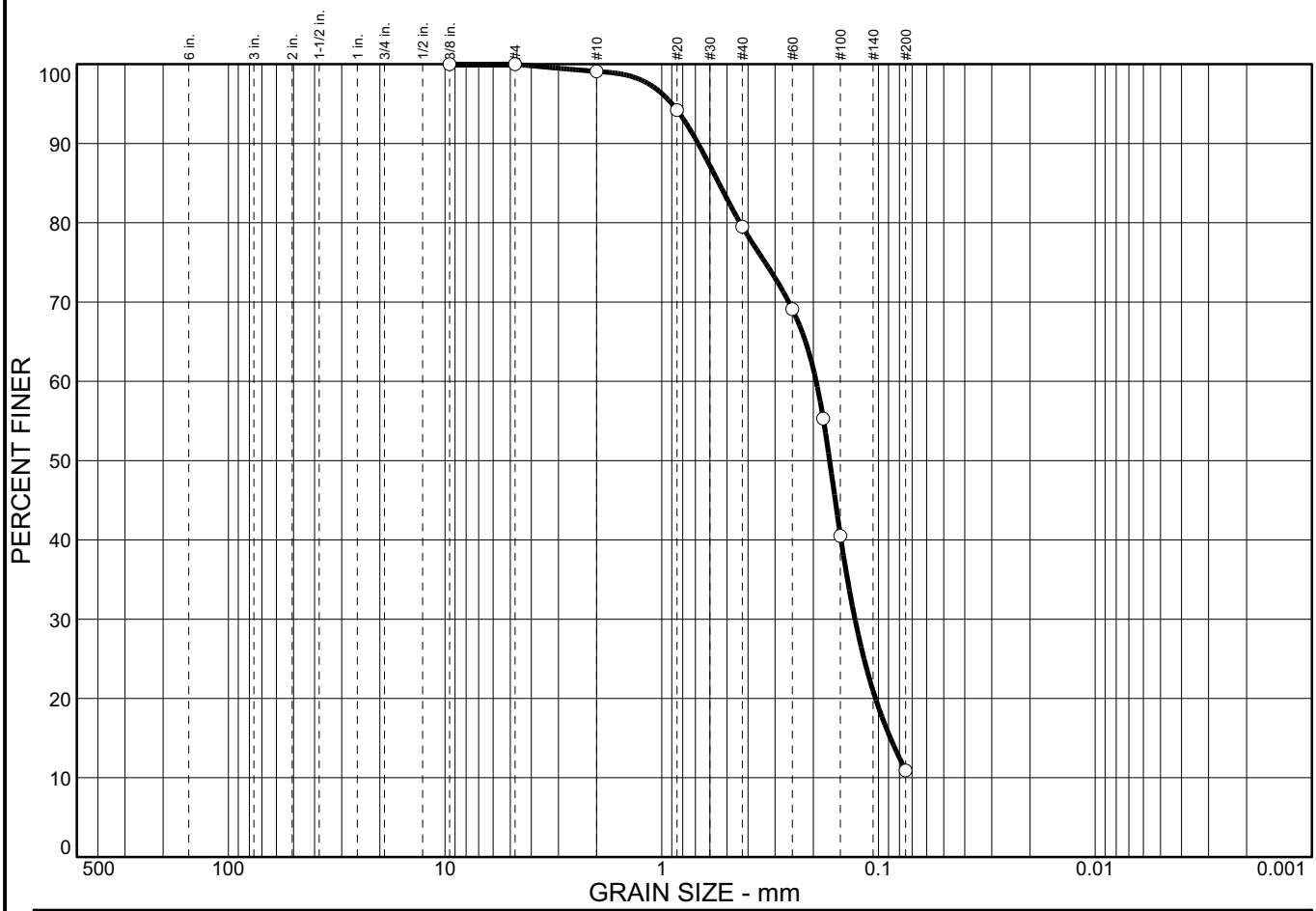
# Particle Size Distribution Report




| % COBBLES | % GRAVEL | % SAND | % SILT | % CLAY |
|---|---|---|---|---|
| 0.0 | 0.0 | 89.1 | 10.9 | |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|---|---|---|---|
| .375 in. | 100.0 | | |
| #4 | 100.0 | | |
| #10 | 99.1 | | |
| #20 | 94.2 | | |
| #40 | 79.5 | | |
| #60 | 69.1 | | |
| #80 | 55.3 | | |
| #100 | 40.5 | | |
| #200 | 10.9 | | |

* (no specification provided)

**Soil Description**

Gray, Poorly Graded SAND with Silt

**Atterberg Limits**

PL= NT LL= NT PI= NP

**Coefficients**

$D_{85}$= 0.545 $D_{60}$= 0.194 $D_{50}$= 0.168
$D_{30}$= 0.128 $D_{15}$= 0.0881 $D_{10}$=
$C_u$= $C_c$=

**Classification**

USCS= SP-SM AASHTO= A-2-4(0)

**Remarks**

Gradation No. 34
Sample Obtained 10/5/10

**Sample No.:** Gradation No. 34 **Source of Sample:** **Date:** 10/5/10
**Location:** CUR-4B **Elev./Depth:** 143.0-145.0

**GET SOLUTIONS, INC.**

**Client:** HDR, Inc.
**Project:** VDOT I-64 to I-264 PSA 3 I-64 D7 and Bridge
Virginia Beach, Virginia
**Project No:** VB10-238G **Figure** G34

# Particle Size Distribution Report

| % COBBLES | % GRAVEL | % SAND | % SILT | % CLAY |
|---|---|---|---|---|
| 0.0 | 0.0 | 68.1 | 31.9 | |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|---|---|---|---|
| .375 in. | 100.0 | | |
| #4 | 100.0 | | |
| #10 | 99.8 | | |
| #20 | 99.6 | | |
| #40 | 99.3 | | |
| #60 | 98.8 | | |
| #80 | 96.7 | | |
| #100 | 91.7 | | |
| #200 | 31.9 | | |

* (no specification provided)

**Soil Description**

Gray, Silty SAND

**Atterberg Limits**

PL= NT LL= NT PI=

**Coefficients**

$D_{85}$= 0.132 $D_{60}$= 0.0980 $D_{50}$= 0.0888
$D_{30}$= $D_{15}$= $D_{10}$=
$C_u$= $C_c$=

**Classification**

USCS= SM AASHTO= A-2-4(0)

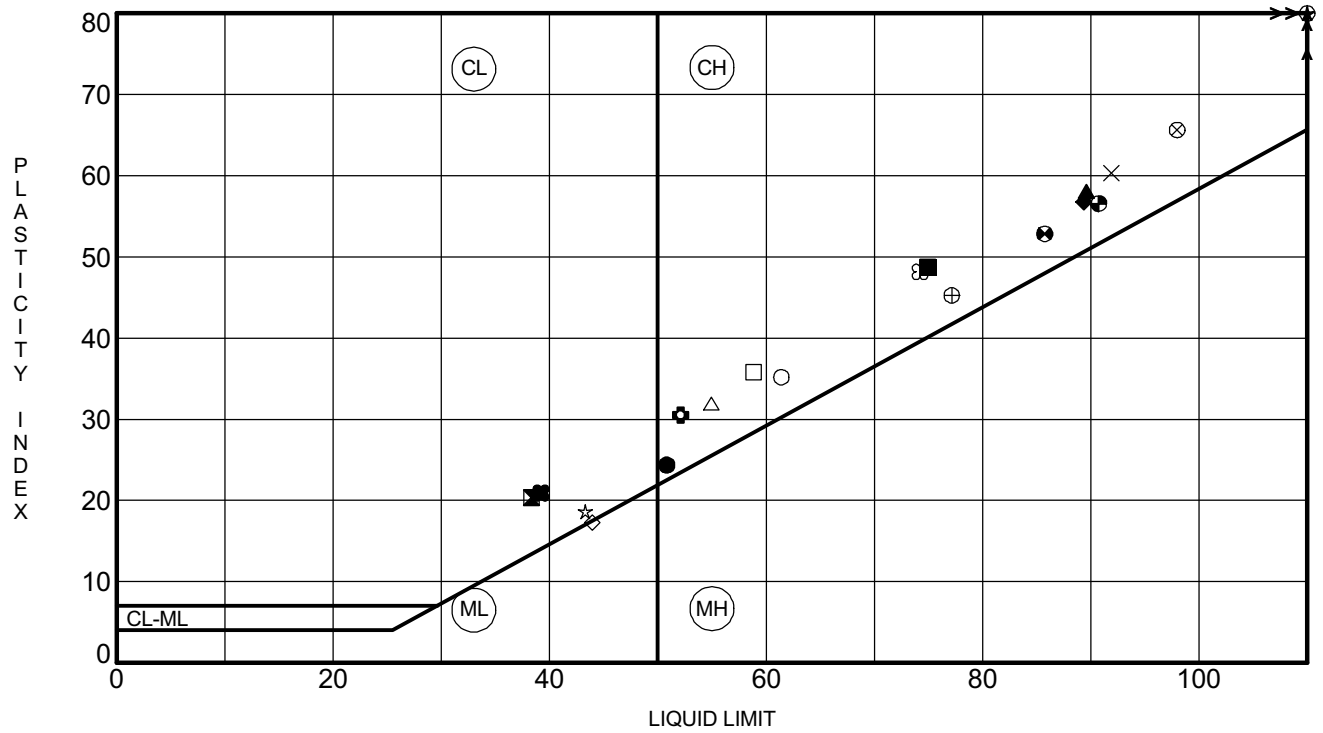
**Remarks**

Gradation No. 35
Sample Obtained 10/5/10

**Sample No.:** Gradation No. 35 **Source of Sample:** **Date:** 10/5/10
**Location:** CUR-4B **Elev./Depth:** 153.0-155.0

**GET SOLUTIONS, INC.**

**Client:** HDR, Inc.
**Project:** VDOT I-64 to I-264 PSA 3 I-64 D7 and Bridge
Virginia Beach, Virginia
**Project No:** VB10-238G **Figure** G35




| | Specimen Identification | | | LL | PL | PI | Fines | MC | Classification |
|---|---|---|---|---|---|---|---|---|---|
| ● | D7-21W | 17229 | 35.0 ft | 51 | 26 | 25 | 79 | 45.0 | FAT CLAY with SAND CH |
| ⊠ | D7CD-16W | 17230 | 28.0 ft | 38 | 18 | 20 | 43 | 31.2 | CLAYEY SAND SC |
| ▲ | D7CD-6W-OS | 17381 | 63.0 ft | 90 | 32 | 58 | 96 | 61.8 | FAT CLAY CH |
| ★ | D7CD-8W | 17380 | 5.0 ft | 208 | 80 | 128 | 65 | 162.6 | SANDY ELASTIC SILT MH |
| ⊙ | D7CD-9W | 17382 | 10.0 ft | 140 | 56 | 84 | 79 | 101.4 | ELASTIC SILT with SAND MH |
| ✿ | D7CD-9W | 17231 | 25.0 ft | 52 | 22 | 30 | 78 | 35.0 | FAT CLAY with SAND CH |
| ○ | KR2-1B | 17232 | 65.0 ft | 61 | 26 | 35 | 89 | 41.0 | FAT CLAY CH |
| △ | KR2-1B | 17244 | 73.0 ft | 55 | 23 | 32 | 85 | 40.2 | FAT CLAY CH |
| ⊗ | KR2-1B | 17247 | 88.0 ft | 98 | 32 | 66 | 97 | 56.9 | FAT CLAY CH |
| ⊕ | KR2-1B | 17250 | 103.0 ft | 77 | 32 | 45 | 89 | 49.7 | FAT CLAY CH |
| □ | KR2-3B | 17233 | 75.0 ft | 59 | 23 | 36 | 71 | 38.3 | FAT CLAY with SAND CH |
| ⊗ | KR2-3B | 17266 | 93.0 ft | 86 | 33 | 53 | 98 | 53.6 | FAT CLAY CH |
| ◕ | KR2-3B | 17270 | 113.0 ft | 91 | 34 | 57 | 96 | 52.9 | FAT CLAY CH |
| ☆ | KR2-3B | 17273 | 128.0 ft | 43 | 25 | 18 | 22 | 29.1 | CLAYEY SAND SC |
| ⊠ | KR2-5B | 17234 | 80.0 ft | 74 | 26 | 48 | 88 | 48.4 | FAT CLAY CH |
| ■ | KR2-5B | 17254 | 88.0 ft | 75 | 26 | 49 | 95 | 46.6 | FAT CLAY CH |
| ◆ | KR2-5B | 17260 | 118.0 ft | 89 | 33 | 56 | 95 | 55.8 | FAT CLAY CH |
| ◇ | KR2-5B | 17262 | 128.0 ft | 44 | 27 | 17 | 22 | 30.2 | SILTY SAND SM |
| × | KR2-6B | 17235 | 90.0 ft | 92 | 32 | 60 | 98 | 57.1 | FAT CLAY CH |
| ⊠ | RC-10 | 17317 | 23.0 ft | 39 | 18 | 21 | 61 | 36.5 | SANDY LEAN CLAY CL |

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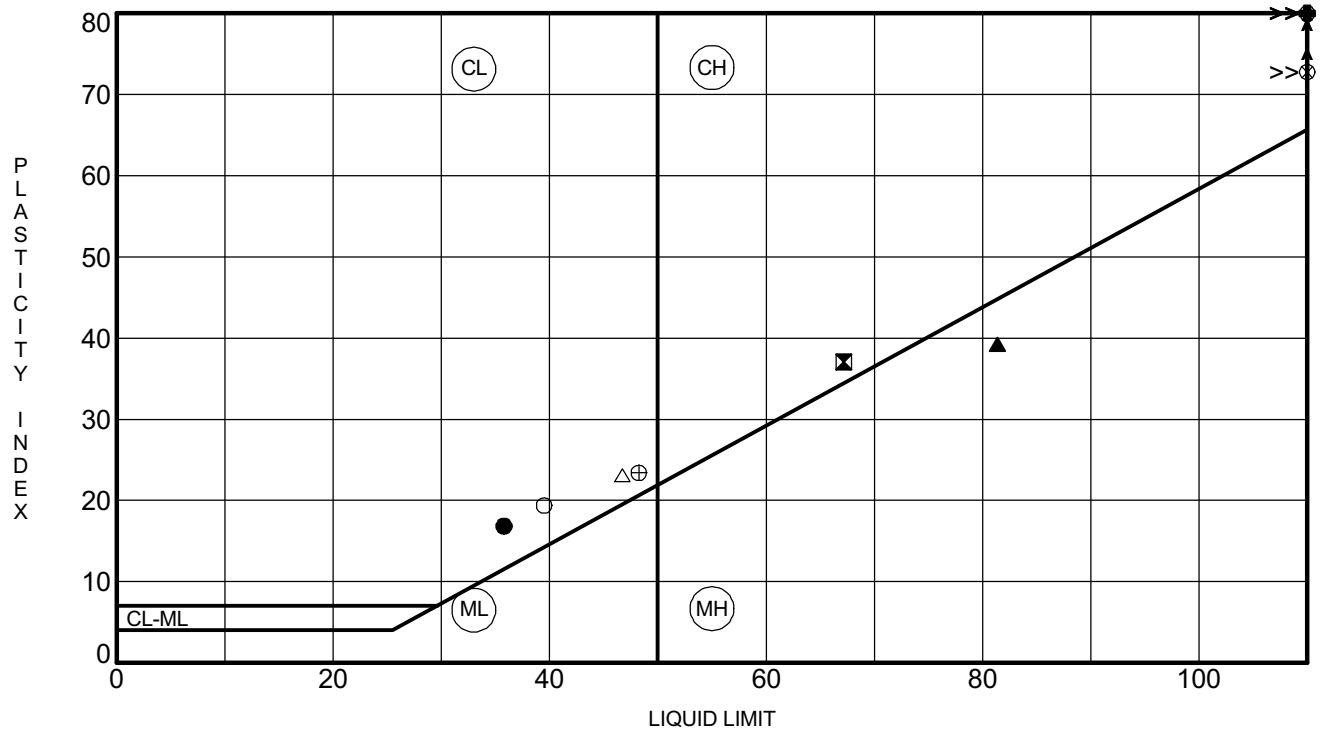
Richmond, Virginia 23228
Telephone: (804) 266-2199
Fax: (804) 261-5569

# ATTERBERG LIMITS RESULTS

Project: I-64/I-264 Interchange - PSA: Ramps and Channel

Location: Virginia Beach, Virginia

Number: 1081-10-2757




| | Specimen Identification | | | LL | PL | PI | Fines | MC | Classification |
|---|---|---|---|---|---|---|---|---|---|
| ● | RC-2 | 17283 | 28.0 ft | 36 | 19 | 17 | 80 | 29.5 | LEAN CLAY with SAND CL |
| ⊠ | RC-3 | 17285 | 6.0 ft | 67 | 30 | 37 | 47 | 46.3 | CLAYEY SAND SC |
| ▲ | RC-3 | 17288 | 23.0 ft | 81 | 42 | 39 | 18 | 115.7 | SILTY SAND SM |
| ★ | RC-5 | 17294 | 6.0 ft | 162 | 59 | 103 | 86 | 112.1 | ELASTIC SILT MH |
| ⊙ | RC-5 | 17296 | 13.0 ft | 157 | 60 | 97 | 98 | 97.3 | ELASTIC SILT MH |
| ✿ | RC-6 | 17299 | 10.0 ft | 183 | 72 | 111 | 61 | 138.4 | SANDY ELASTIC SILT MH |
| ○ | RC-6 | 17301 | 23.0 ft | 39 | 20 | 19 | 53 | 28.1 | SANDY LEAN CLAY CL |
| △ | RC-7 | 17302 | 2.0 ft | 47 | 24 | 23 | 46 | 29.8 | CLAYEY SAND SC |
| ⊗ | RC-8 | 17307 | 6.0 ft | 130 | 58 | 72 | 80 | 124.3 | ELASTIC SILT with SAND MH |
| ⊕ | RC-9 | 17312 | 10.0 ft | 48 | 25 | 23 | 35 | 62.7 | CLAYEY SAND SC |

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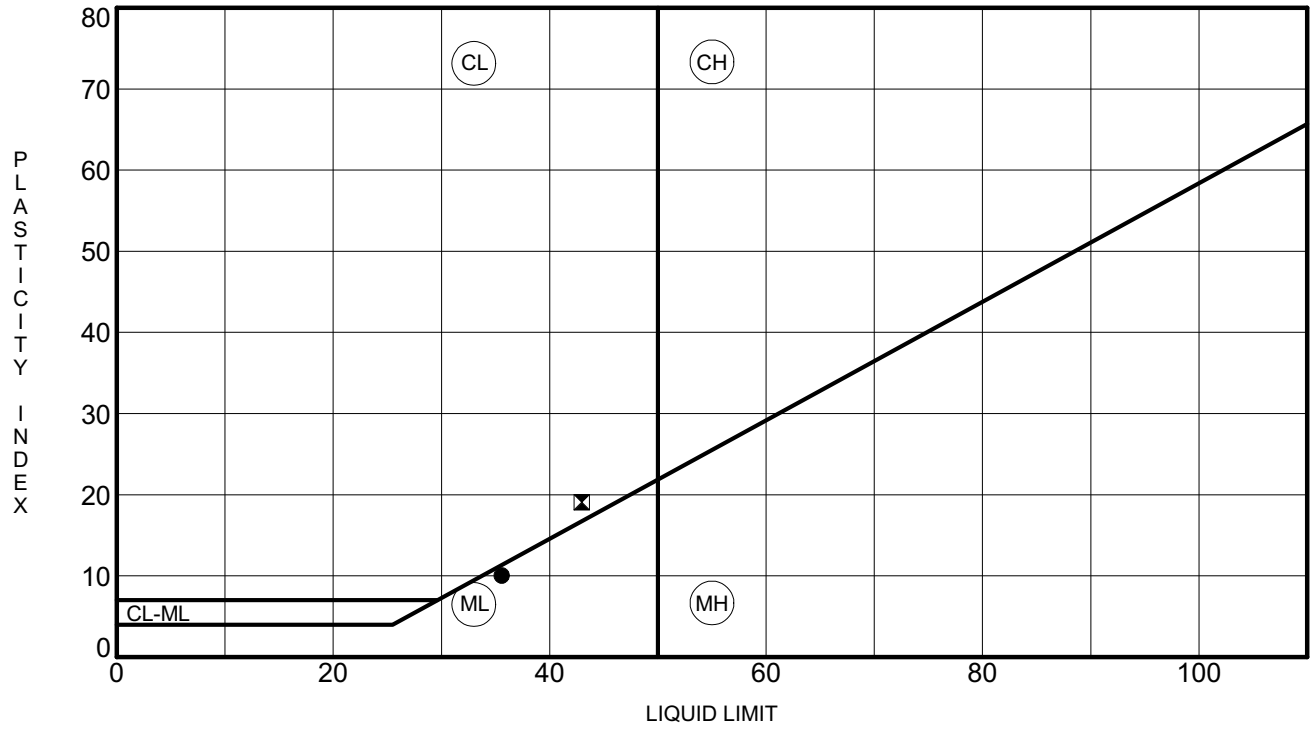
# ATTERBERG LIMITS RESULTS

Project: I-64/I-264 Interchange - PSA: Ramps and Channel

Location: Virginia Beach, Virginia

Number: 1081-10-2757




| | Specimen Identification | | | LL | PL | PI | Fines | MC | Classification |
|---|---|---|---|---|---|---|---|---|---|
| ● | D7CD-25W | 17936 | 30.0 ft | 36 | 26 | 10 | 60 | 44.9 | SANDY SILT ML |
| ⧗ | D7CD-25W | 17937 | 60.0 ft | 43 | 24 | 19 | 96 | 39.5 | LEAN CLAY CL |

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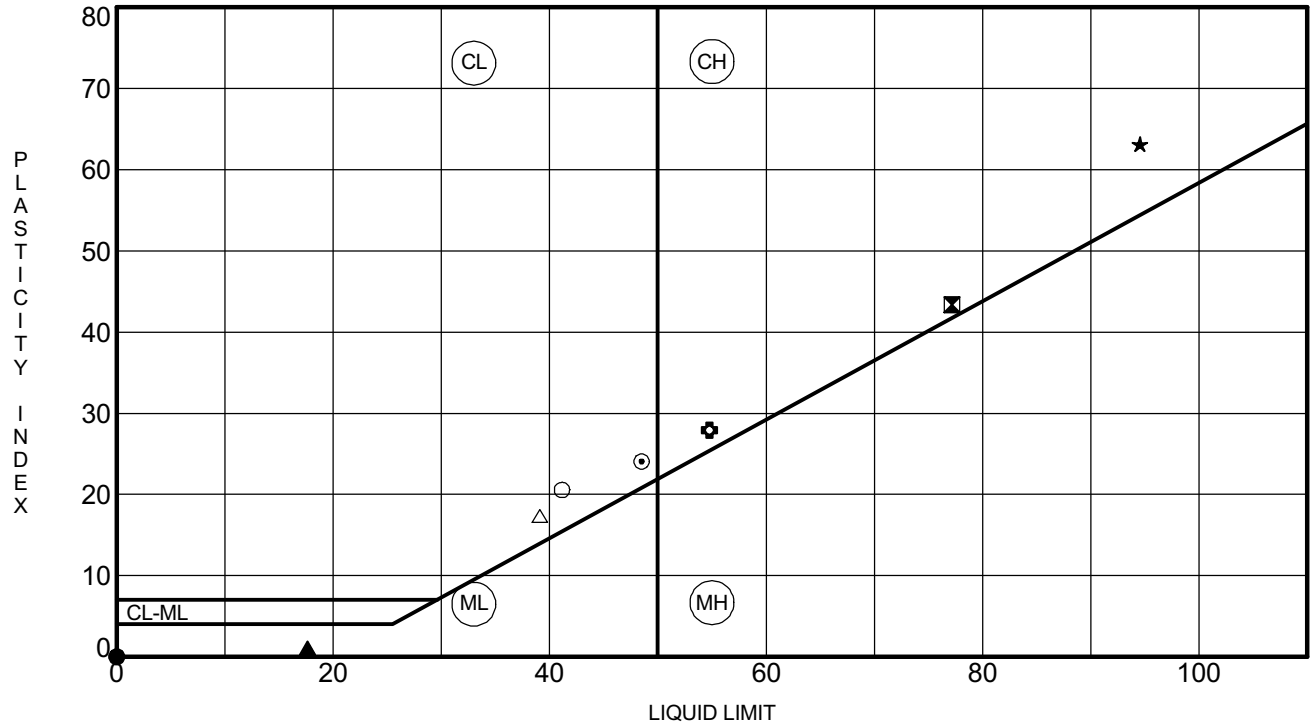
Fax: 804.261.5569

# ATTERBERG LIMITS RESULTS

Project: I-64/I-264 Interchange - PSA Ramps and Channel

Location: Cities of Norfolk and Virginia Beach, Virginia

Number: 1081-10-2757




| | Specimen Identification | | LL | PL | PI | Fines | MC | Classification |
|---|---|---|---|---|---|---|---|---|
| ● | CUR-1B | 17236 25.0 ft | NP | NP | NP | 33 | 30.5 | SILTY SAND SM |
| ⊠ | CUR-1B | 17237 105.0 ft | 77 | 34 | 43 | 93 | 58.4 | FAT CLAY CH |
| ▲ | CUR-4B | 17363 50.0 ft | 18 | 17 | 1 | 31 | 22.6 | SILTY SAND SM |
| ★ | CUR-4B | 17364 95.0 ft | 95 | 31 | 64 | 97 | 60.1 | FAT CLAY CH |

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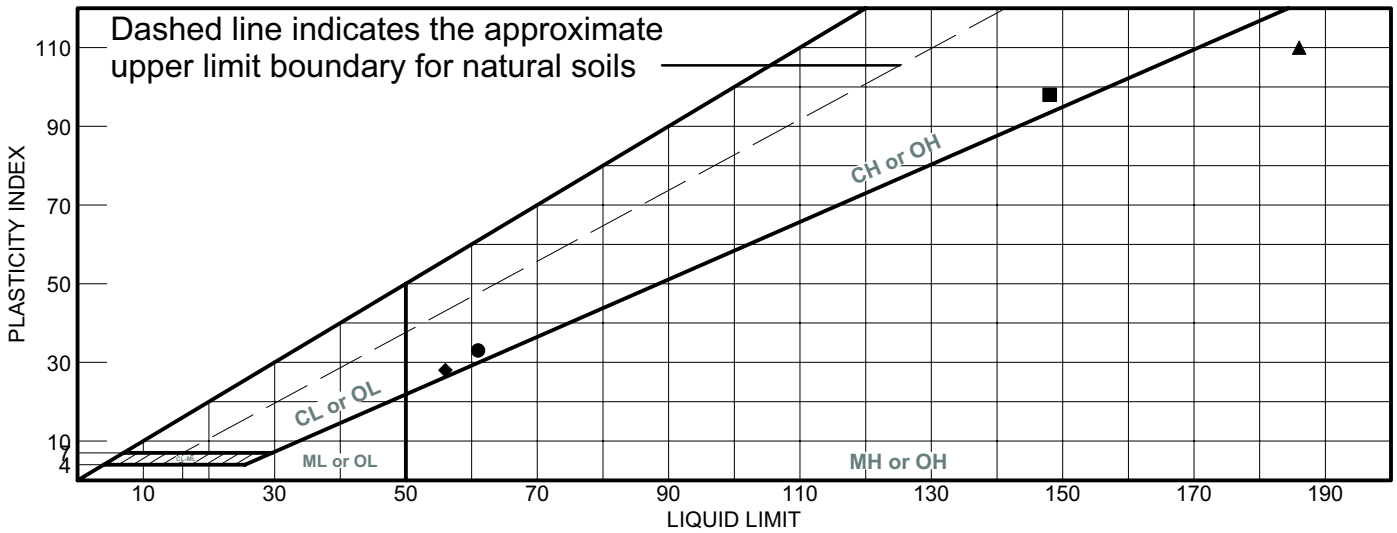
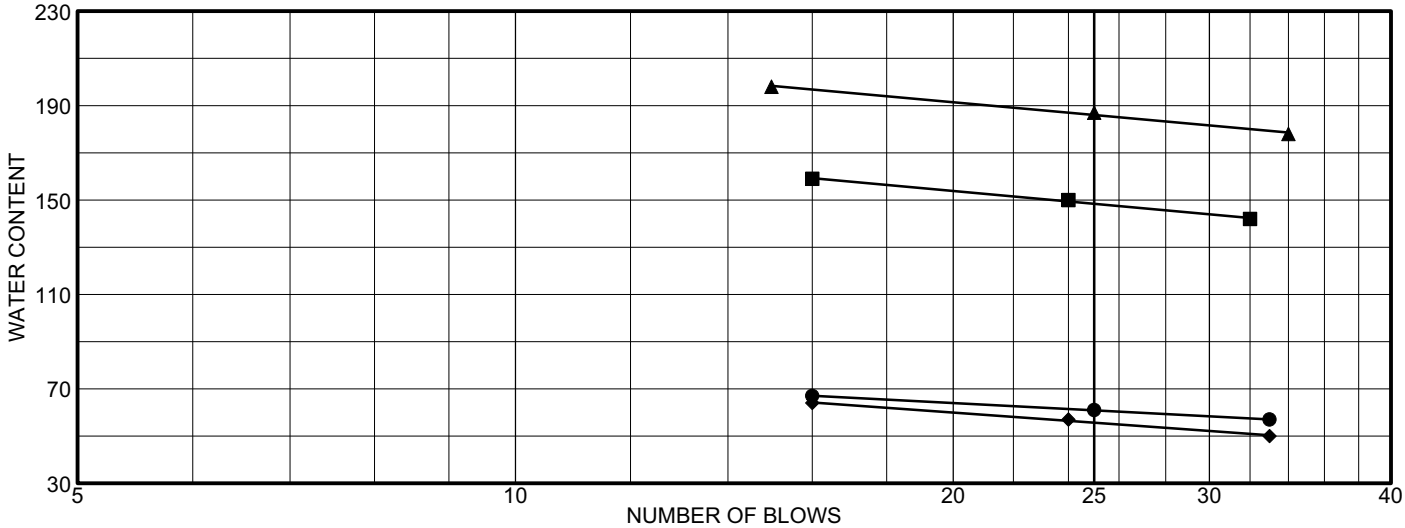
# ATTERBERG LIMITS RESULTS

Project: I-64/I-264 Interchange - PSA: I-64, D7, and Bridge
Location: Virginia Beach, Virginia
Number: 1081-10-2757

# LIQUID AND PLASTIC LIMITS TEST REPORT




| | MATERIAL DESCRIPTION | LL | PL | PI | %<#40 | %<#200 | USCS |
|---|---|---|---|---|---|---|---|
| ● | Brown, Sandy Fat CLAY | 61 | 28 | 33 | 93 | 52 | CH |
| ■ | Brown, Fat CLAY | 148 | 50 | 98 | 96 | 91 | CH |
| ▲ | Brown, Elastic SILT with Sand | 186 | 76 | 110 | 92 | 73 | MH |
| ◆ | Brown, Fat CLAY | 56 | 28 | 28 | 99 | 92 | CH |
| | | | | | | | |

**Project No.** VB10-237G **Client:** HDR, Inc.

**Project:** VDOT I-64 to I-264 PSA 2 Ramps and Channel

VDOT I-64 to I-264 PSA 2 Ramps and Channel

● **Location:** RC-7

■ **Location:** D7CD-8W

▲ **Location:** D7CD-8W

◆ **Location:** D7CD-8W

**Remarks:**

● Gradation No. 1
Sample Obtained 9/23/10

■ Gradation No. 2
Sample Obtained 9/23/10

▲ Gradation No. 3
Sample Obtained 9/23/10

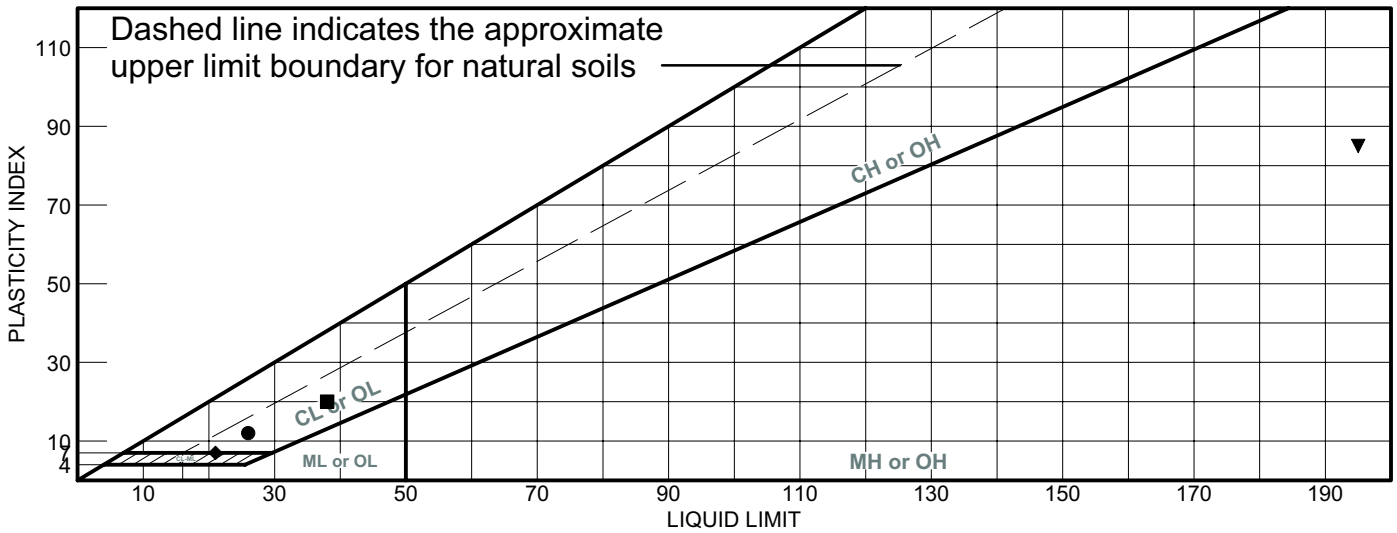
◆ Gradation No. 4
Sample Obtained 9/23/10

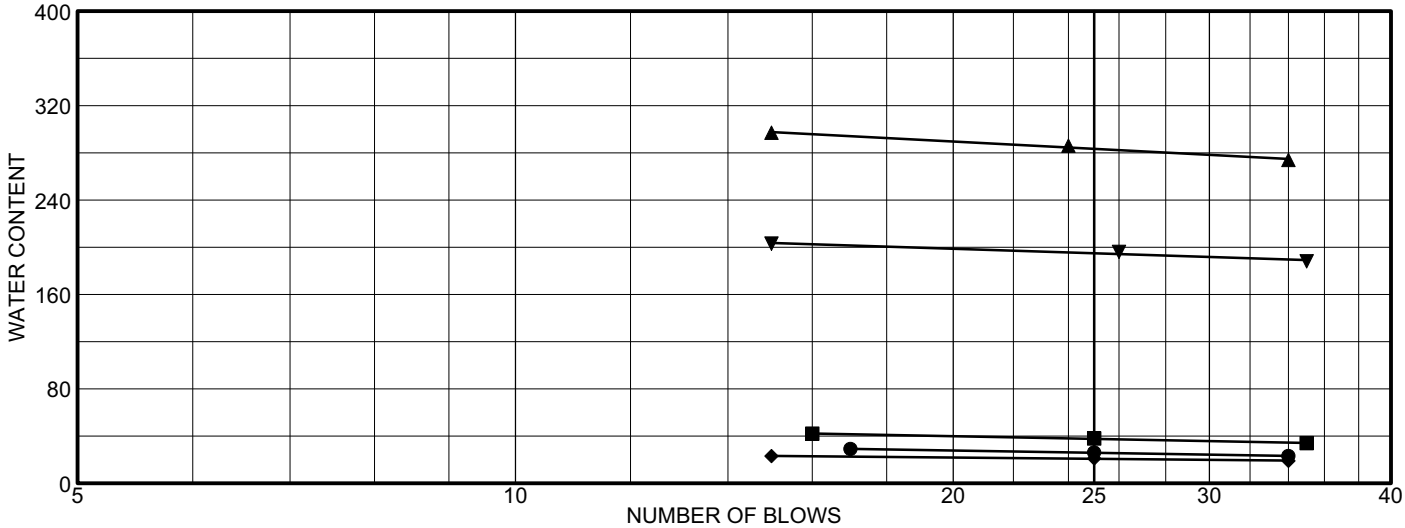
LIQUID AND PLASTIC LIMITS TEST REPORT

**GET SOLUTIONS, INC.**

**Figure** Set 1

# LIQUID AND PLASTIC LIMITS TEST REPORT




| | MATERIAL DESCRIPTION | LL | PL | PI | %<#40 | %<#200 | USCS |
|---|---|---|---|---|---|---|---|
| ● | Brown, Clayey SAND | 26 | 14 | 12 | 94 | 42 | SC |
| ■ | Brown, Sandy Lean CLAY | 38 | 18 | 20 | 99 | 67 | CL |
| ▲ | Brown, Elastic SILT with Sand | 283 | 110 | 173 | 92 | 83 | MH |
| ◆ | Brown, Silty Clayey SAND | 21 | 14 | 7 | 94 | 48 | SC-SM |
| ▼ | Brown, Sandy Elastic SILT | 195 | 110 | 85 | 92 | 69 | MH |

**Project No.** VB10-237G **Client:** HDR, Inc.

**Project:** VDOT I-64 to I-264 PSA 2 Ramps and Channel

VDOT I-64 to I-264 PSA 2 Ramps and Channel

● **Location:** D7CD-18W

■ **Location:** D7CD-18W

▲ **Location:** D7CD-11BC

◆ **Location:** D7CD-11BC

▼ **Location:** D7CD-11BC

**Remarks:**

● Gradation No. 5
Sample Obtained 9/23/10

■ Gradation No. 6
Sample Obtained 9/23/10

▲ Gradation No. 7
Sample Obtained 9/23/10

◆ Gradation No. 8
Sample Obtained 9/23/10

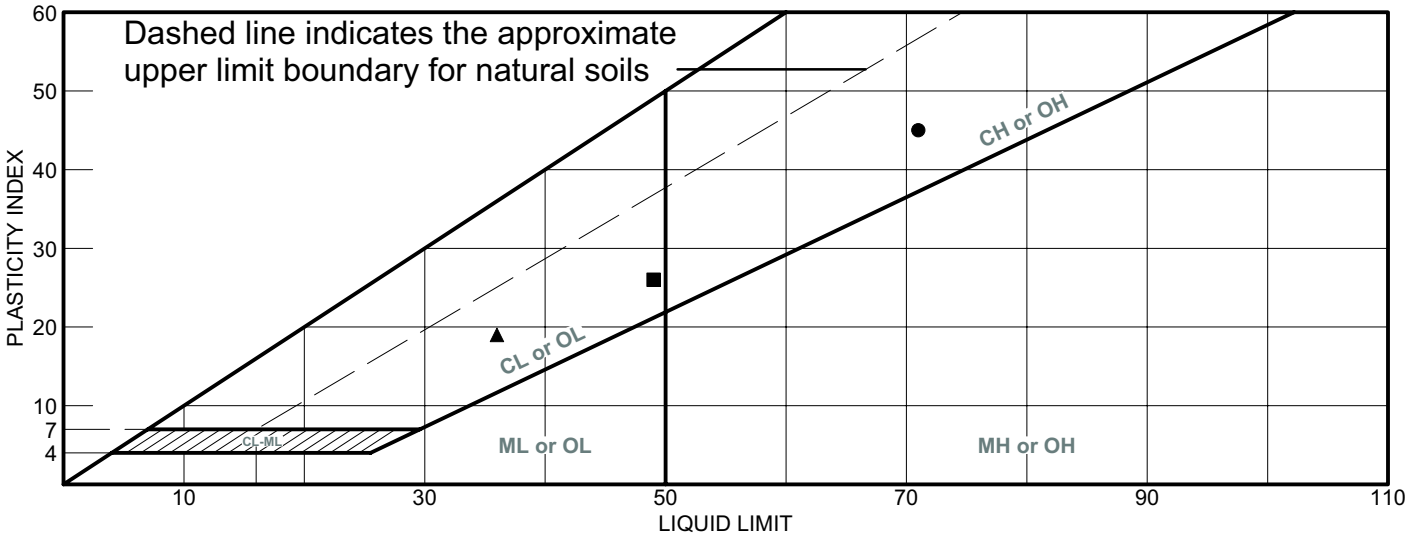
▼ Gradation No. 9
Sample Obtained 9/23/10

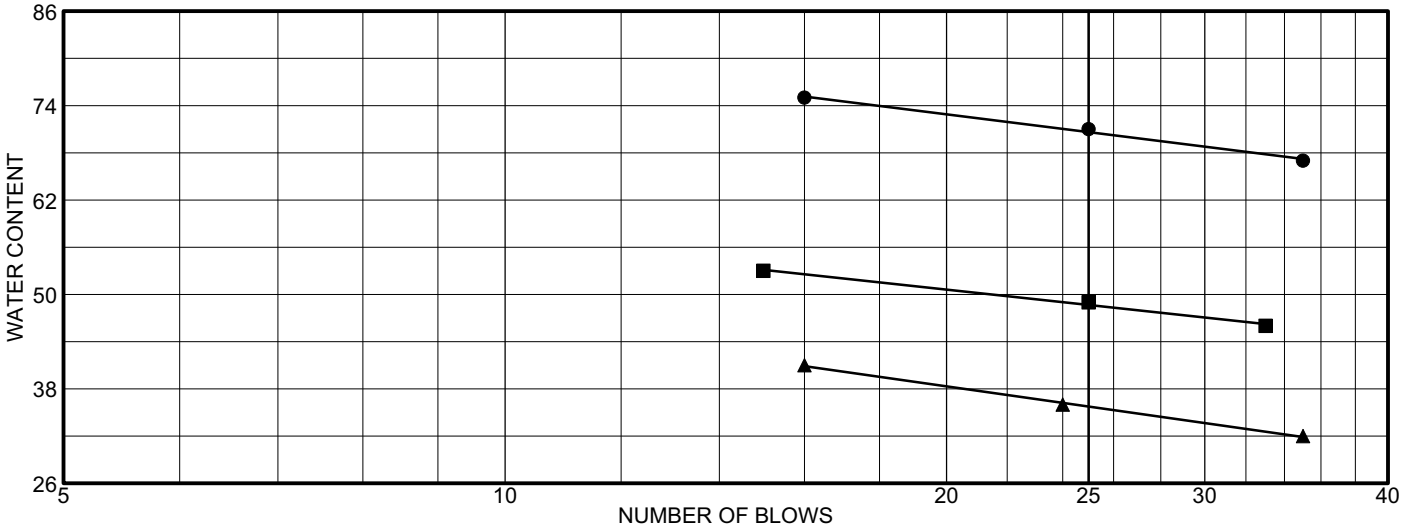
LIQUID AND PLASTIC LIMITS TEST REPORT

**GET SOLUTIONS, INC.**

**Figure** Set 2

# LIQUID AND PLASTIC LIMITS TEST REPORT




| | MATERIAL DESCRIPTION | LL | PL | PI | %<#40 | %<#200 | USCS |
|---|---|---|---|---|---|---|---|
| ● | Gray, Fat CLAY | 71 | 26 | 45 | 99.5 | 94.4 | CH |
| ■ | Gray, Sandy Lean CLAY | 49 | 23 | 26 | 99 | 70 | CL |
| ▲ | Gray, Sandy Lean CLAY | 36 | 17 | 19 | 100 | 82 | CL |
| | | | | | | | |
| | | | | | | | |

**Project No.** VB10-237G **Client:** HDR, Inc.

**Project:** VDOT I-64 to I-264 PSA 2 Ramps and Channel

VDOT I-64 to I-264 PSA 2 Ramps and Channel

● **Location:** D7-22A

■ **Location:** KR2-7B

▲ **Location:** D7-22A

**Remarks:**

● Gradation No. 10
Sample Obtained 10/15/10

■ Gradation No. 18
Sample Obtained 10/20/10

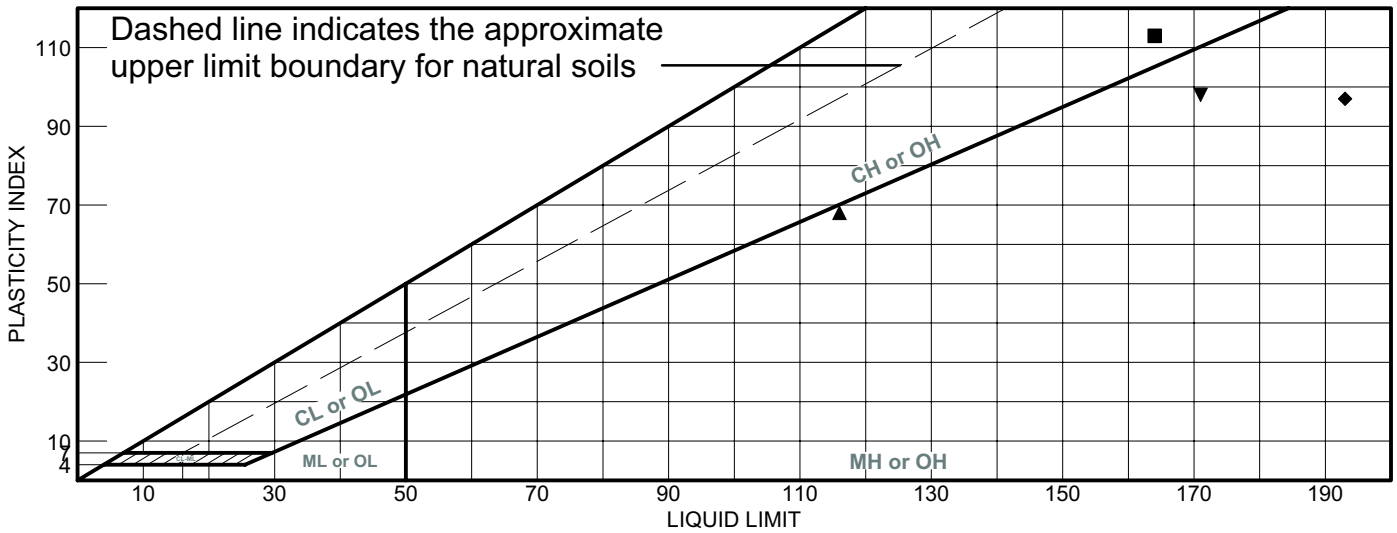
▲ Gradation No. 20
Sample Obtained 10/20/10

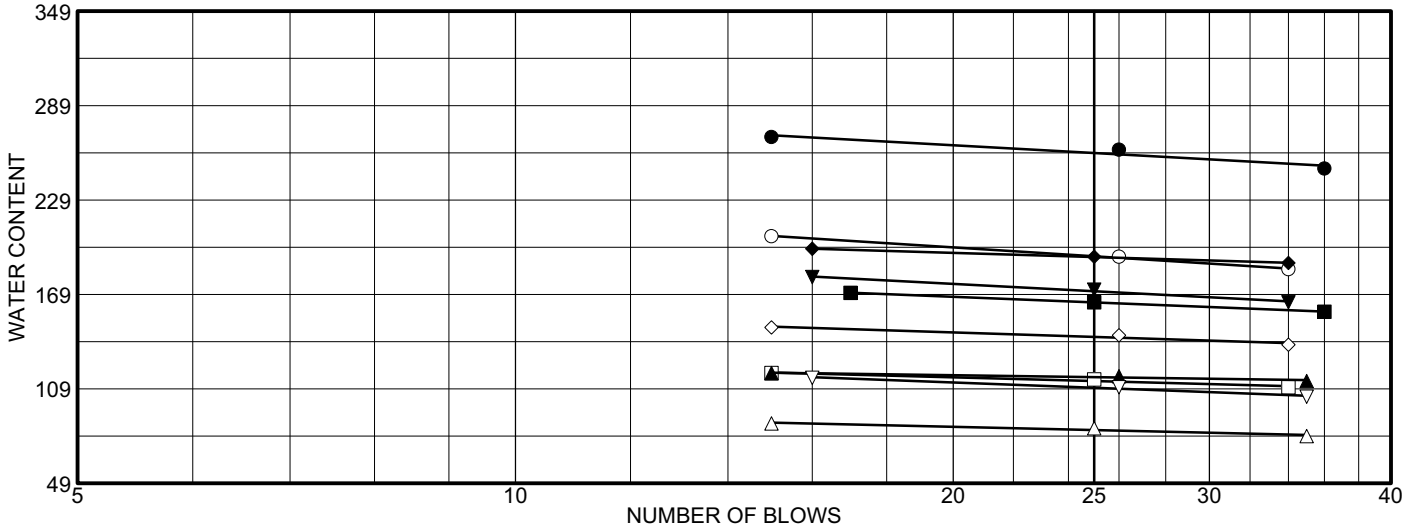
LIQUID AND PLASTIC LIMITS TEST REPORT

**GET SOLUTIONS, INC.**

**Figure** Set 3

# LIQUID AND PLASTIC LIMITS TEST REPORT




| | MATERIAL DESCRIPTION | LL | PL | PI | %<#40 | %<#200 | USCS |
|---|---|---|---|---|---|---|---|
| ● | Brown, Organic SILT with Sand | 259 | 111 | 148 | 94.3 | 73.7 | OH |
| ■ | Brown, Organic CLAY | 164 | 51 | 113 | 98.7 | 95 | OH |
| ▲ | Brown, Organic SILT with Sand | 116 | 48 | 68 | 94.4 | 74 | OH |
| ◆ | Brown, Organic SILT with Sand | 193 | 96 | 97 | 92.8 | 82 | OH |
| ▼ | Brown, Organic SILT | 171 | 73 | 98 | 96.4 | 91 | OH |

**Project No.** VB10-237G **Client:** HDR, Inc.

**Project:** VDOT I-64 to I-264 PSA 2 Ramps and Channel

VDOT I-64 to I-264 PSA 2 Ramps and Channel

● **Location:** D7CD-6W

■ **Location:** D7CD-8W

▲ **Location:** D7CD-9W

◆ **Location:** D7CD-13W

▼ **Location:** D7CD-15W

**Remarks:**

● Gradation No. 21
Sample Obtained 10/20/10

■ Gradation No. 22
Sample Obtained 10/20/10

▲ Gradation No. 23
Sample Obtained 10/20/10

◆ Gradation No. 24
Sample Obtained 10/20/10

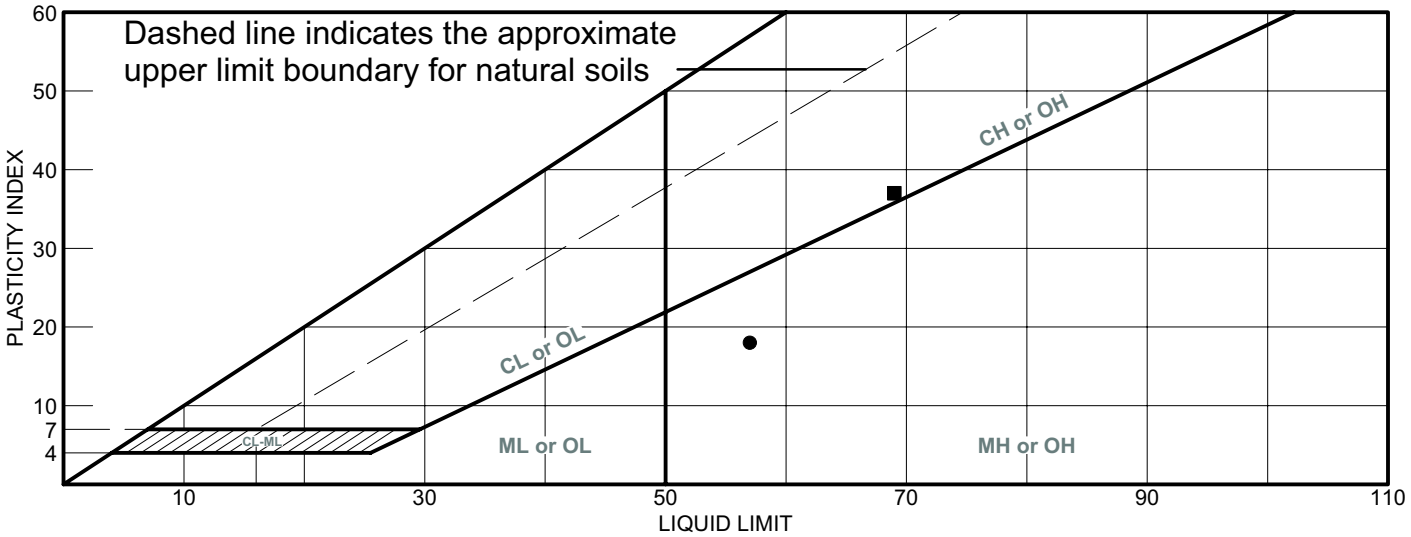
▼ Gradation No. 25
Sample Obtained 10/20/10

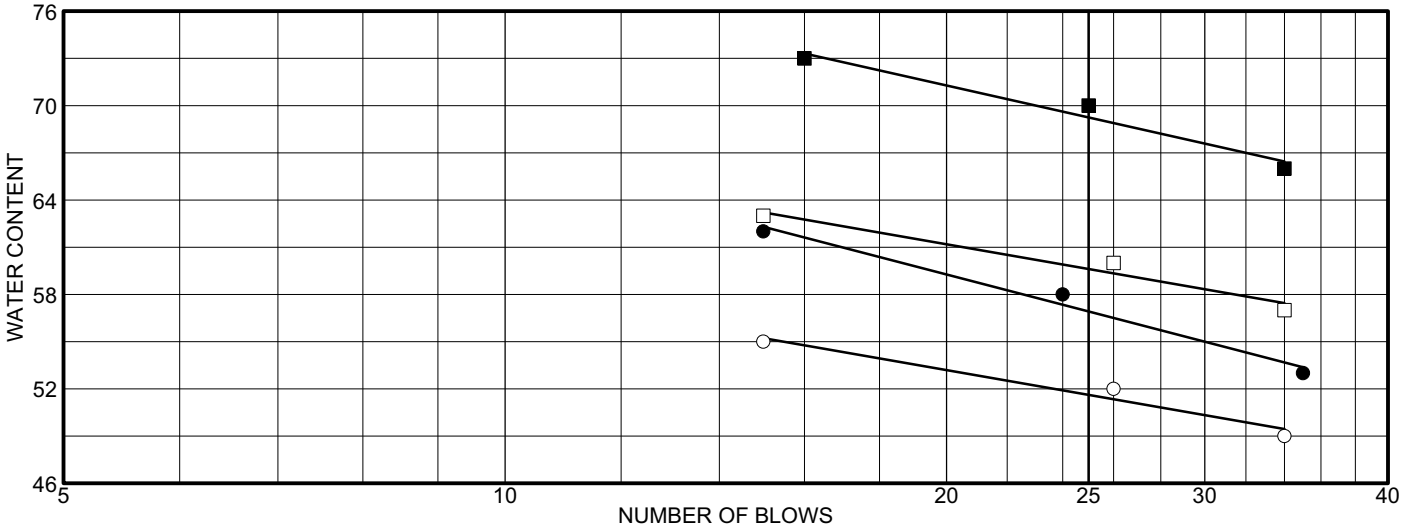
LIQUID AND PLASTIC LIMITS TEST REPORT

**GET SOLUTIONS, INC.**

**Figure** Set 4

# LIQUID AND PLASTIC LIMITS TEST REPORT




| | MATERIAL DESCRIPTION | LL | PL | PI | %<#40 | %<#200 | USCS |
|---|---|---|---|---|---|---|---|
| ● | Brown, Sandy Elastic SILT | 57 | 39 | 18 | 96.9 | 57.2 | MH |
| ■ | Brown, Fat CLAY | 69 | 32 | 37 | 97.1 | 89.3 | CH |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

**Project No.** VB10-237G **Client:** HDR, Inc.

**Project:** VDOT I-64 to I-264 PSA 2 Ramps and Channel

VDOT I-64 to I-264 PSA 2 Ramps and Channel

● **Location:** D7CD-17W

■ **Location:** D7CD-19W

**Remarks:**

● Gradation No. 26
Sample Obtained 10/20/10

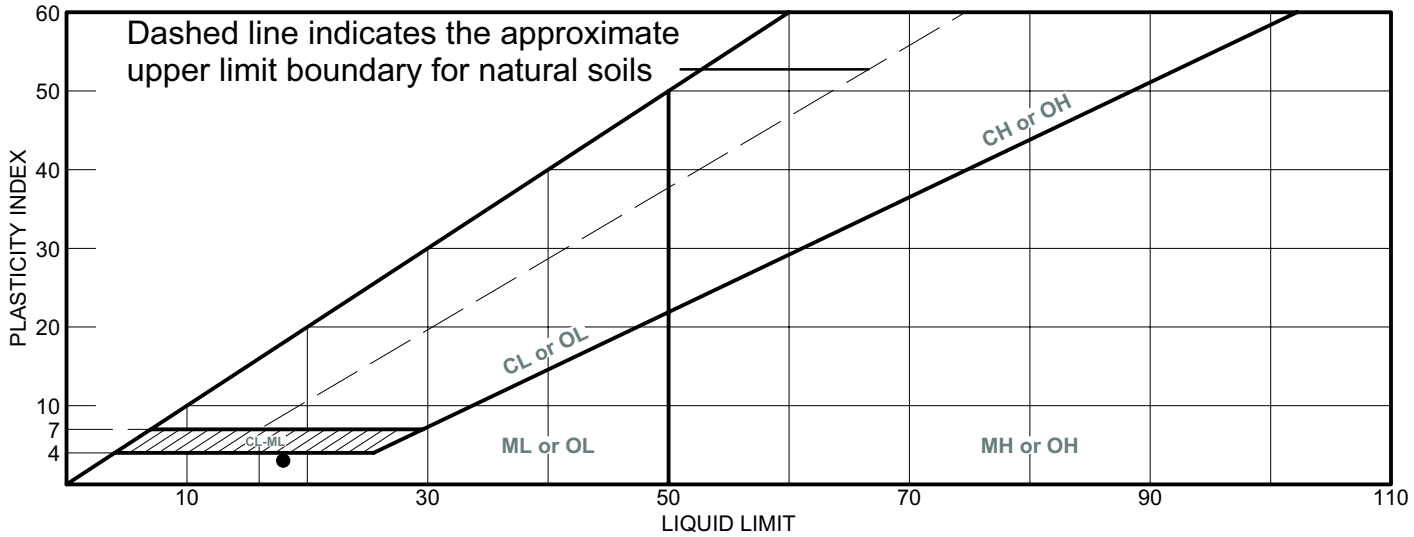
■ Gradation No. 27
Sample Obtained 10/20/10

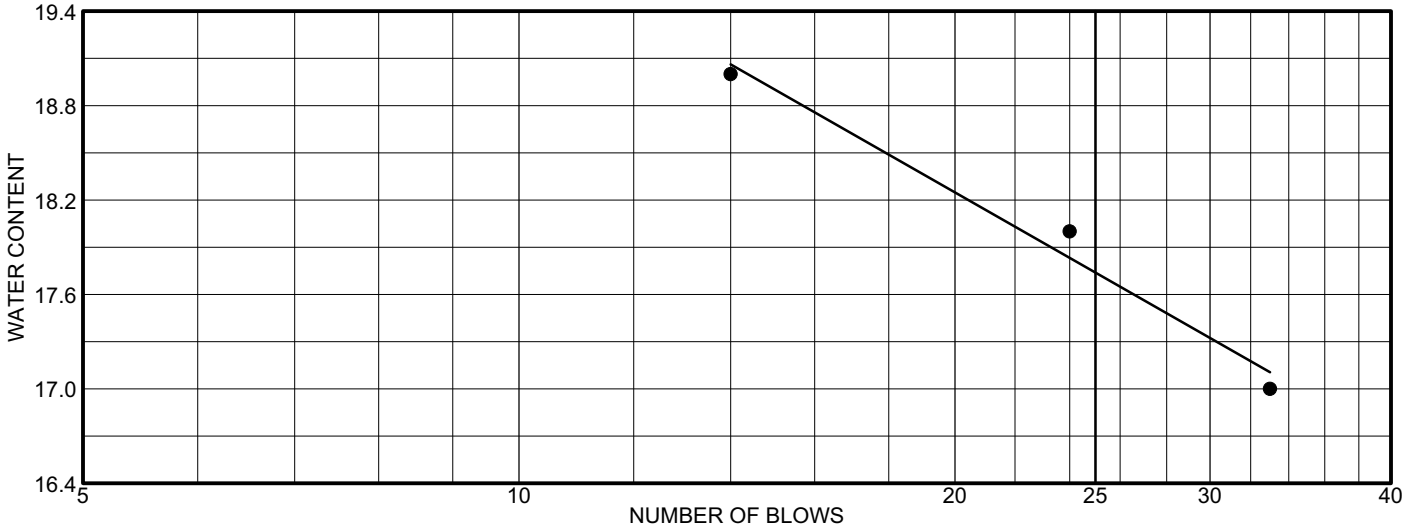
LIQUID AND PLASTIC LIMITS TEST REPORT

**GET SOLUTIONS, INC.**

**Figure** Set 5

# LIQUID AND PLASTIC LIMITS TEST REPORT




| | MATERIAL DESCRIPTION | LL | PL | PI | %<#40 | %<#200 | USCS |
|---|---|---|---|---|---|---|---|
| ● | Gray, Silty SAND | 18 | 15 | 3 | 94 | 36 | SM |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

**Project No.** VB10-237G **Client:** HDR, Inc.

**Project:** VDOT I-64 to I-264 PSA 2 Ramps and Channel

● **Location:** CD-P1

**Remarks:**

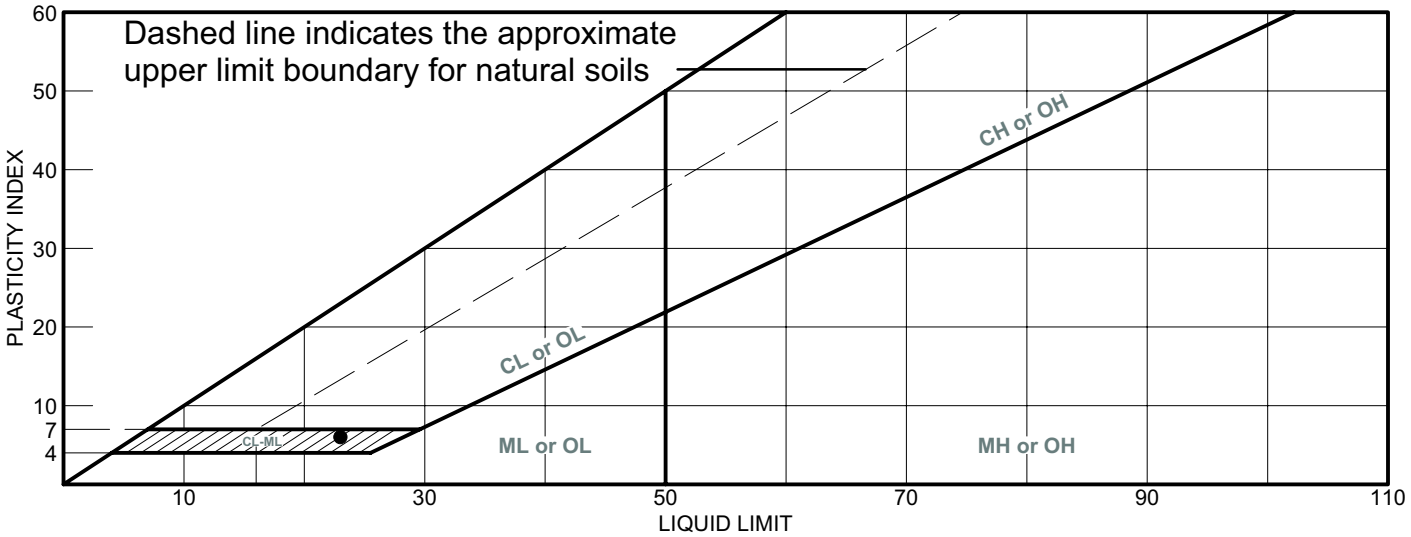
● CBR-CDP1
Sample Obtained 9/20/10

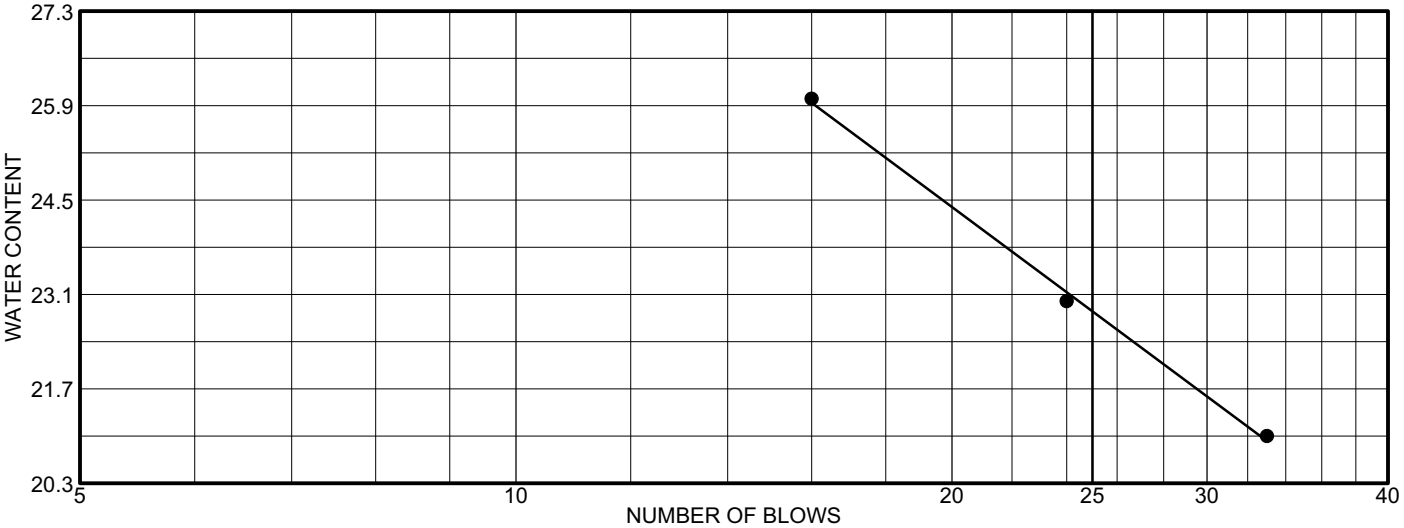
LIQUID AND PLASTIC LIMITS TEST REPORT

**GET SOLUTIONS, INC.**

**Figure** CBR-CDP1

# LIQUID AND PLASTIC LIMITS TEST REPORT




| | MATERIAL DESCRIPTION | LL | PL | PI | %<#40 | %<#200 | USCS |
|---|---|---|---|---|---|---|---|
| ● | Brown, Silty Clayey SAND | 23 | 17 | 6 | 90 | 36 | SC-SM |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

**Project No.** VB10-237G **Client:** HDR, Inc.

**Project:** VDOT I-64 to I-264 PSA 2 Ramps and Channel

● **Location:** I264-CD2

**Remarks:**

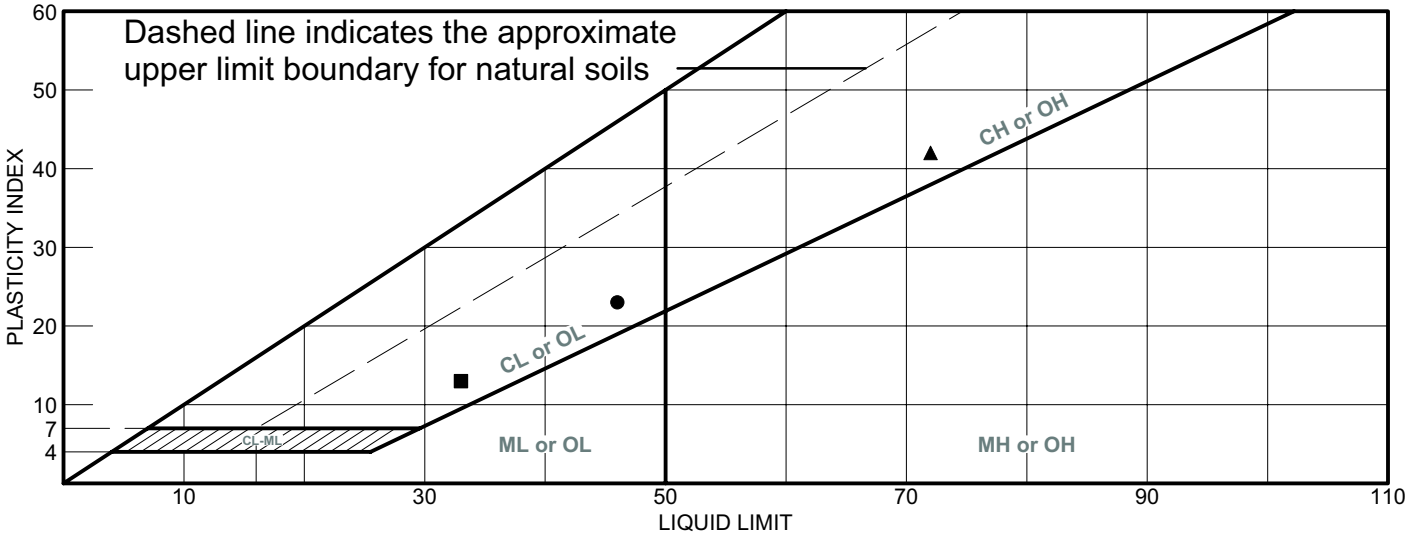
● CBR-I264CD2
Sample Obtained 10/20/10

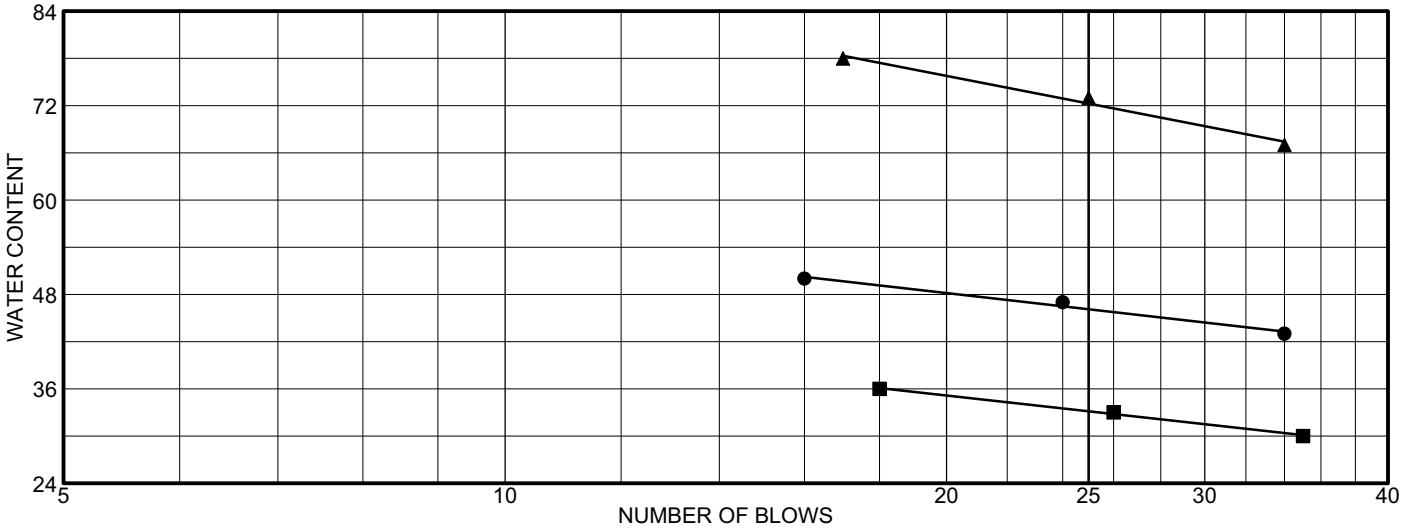
LIQUID AND PLASTIC LIMITS TEST REPORT

**GET SOLUTIONS, INC.**

**Figure** CBR-

# LIQUID AND PLASTIC LIMITS TEST REPORT




| | MATERIAL DESCRIPTION | LL | PL | PI | %<#40 | %<#200 | USCS |
|---|---|---|---|---|---|---|---|
| ● | Gray-Brown, Sandy Lean CLAY | 46 | 23 | 23 | 100 | 60 | CL |
| ■ | Gray-Brown, Clayey Sand | 33 | 20 | 13 | 100 | 48 | SC |
| ▲ | Gray-Brown, Lean CLAY with Sand | 72 | 30 | 42 | 98.8 | 93.3 | CL |
| | | | | | | | |
| | | | | | | | |

**Project No.** VB10-238G **Client:** HDR, Inc.

**Project:** VDOT I-64 to I-264 PSA 3 I-64 D7 and Bridge
Virginia Beach, Virginia

● **Location:** CUR-1B

■ **Location:** CUR-1B

▲ **Location:** CUR-1B

**Remarks:**

● Gradation No. 7
Sample Obtained 10/5/10

■ Gradation No. 8
Sample Obtained 10/5/10

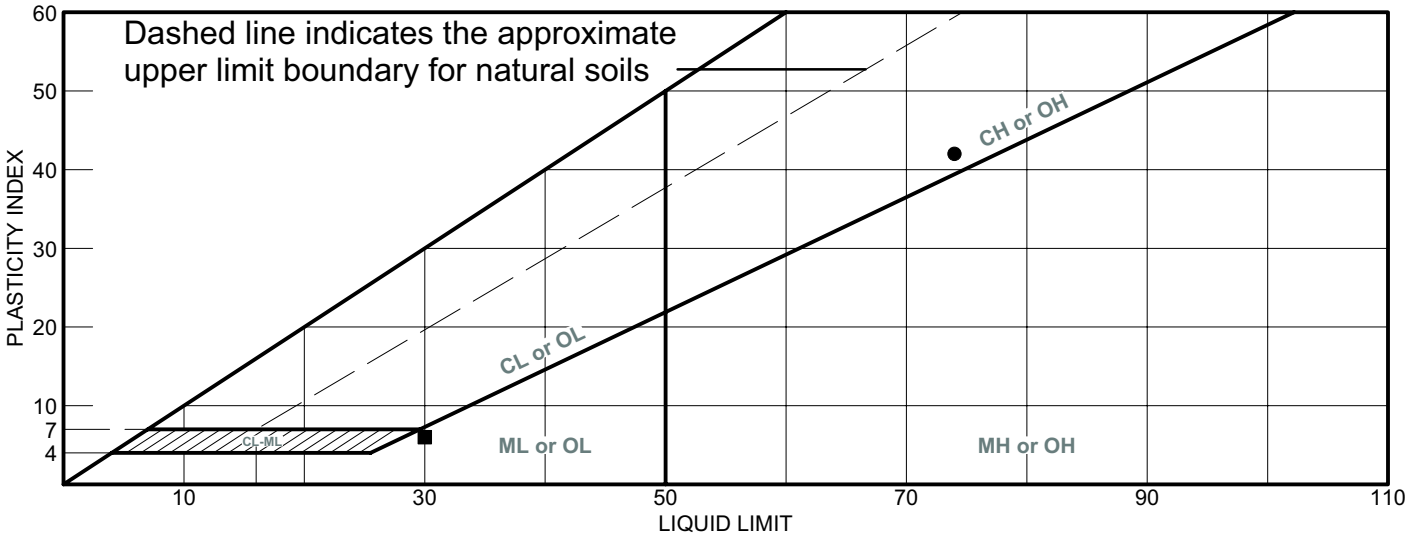
▲ Gradation No. 9
Sample Obtained 10/5/10

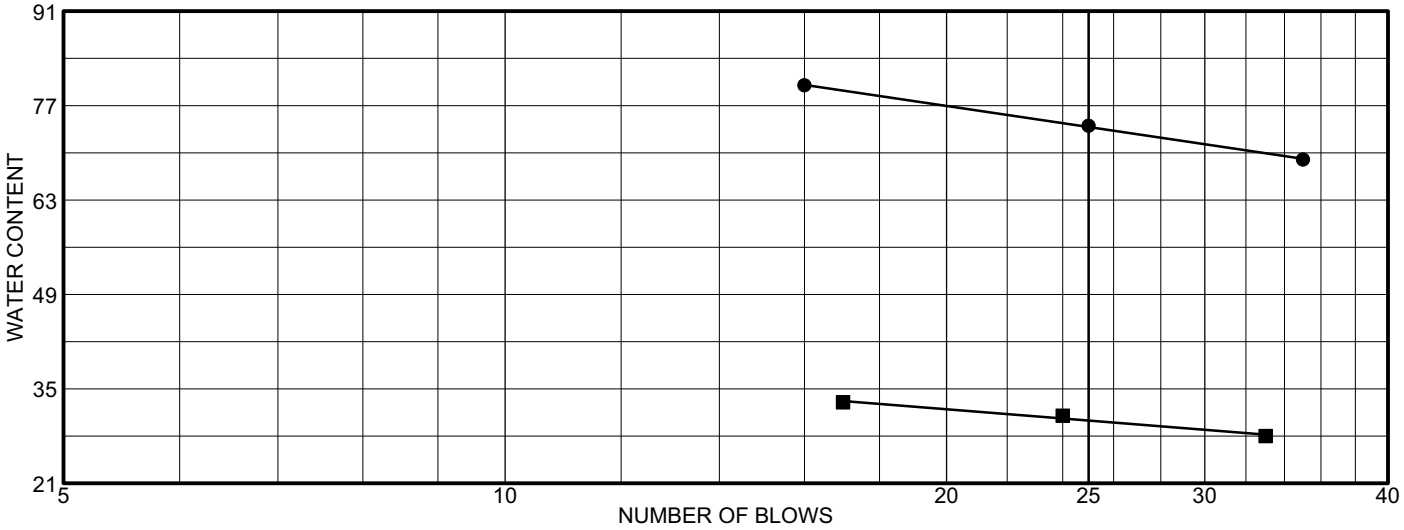
LIQUID AND PLASTIC LIMITS TEST REPORT

**GET SOLUTIONS, INC.**

**Figure** Set 2

# LIQUID AND PLASTIC LIMITS TEST REPORT




| | MATERIAL DESCRIPTION | LL | PL | PI | %<#40 | %<#200 | USCS |
|---|---|---|---|---|---|---|---|
| ● | Gray-Brown, Fat CLAY | 74 | 32 | 42 | 100 | 92 | CH |
| ■ | Gray-Brown, Silty Sand | 30 | 24 | 6 | 99 | 30 | SM |
| | | | | | | | |
| | | | | | | | |

**Project No.** VB10-238G **Client:** HDR, Inc.

**Project:** VDOT I-64 to I-264 PSA 3 I-64 D7 and Bridge
Virginia Beach, Virginia

● **Location:** CUR-1B

■ **Location:** CUR-1B

**Remarks:**

● Gradation No. 12
Sample Obtained 10/5/10

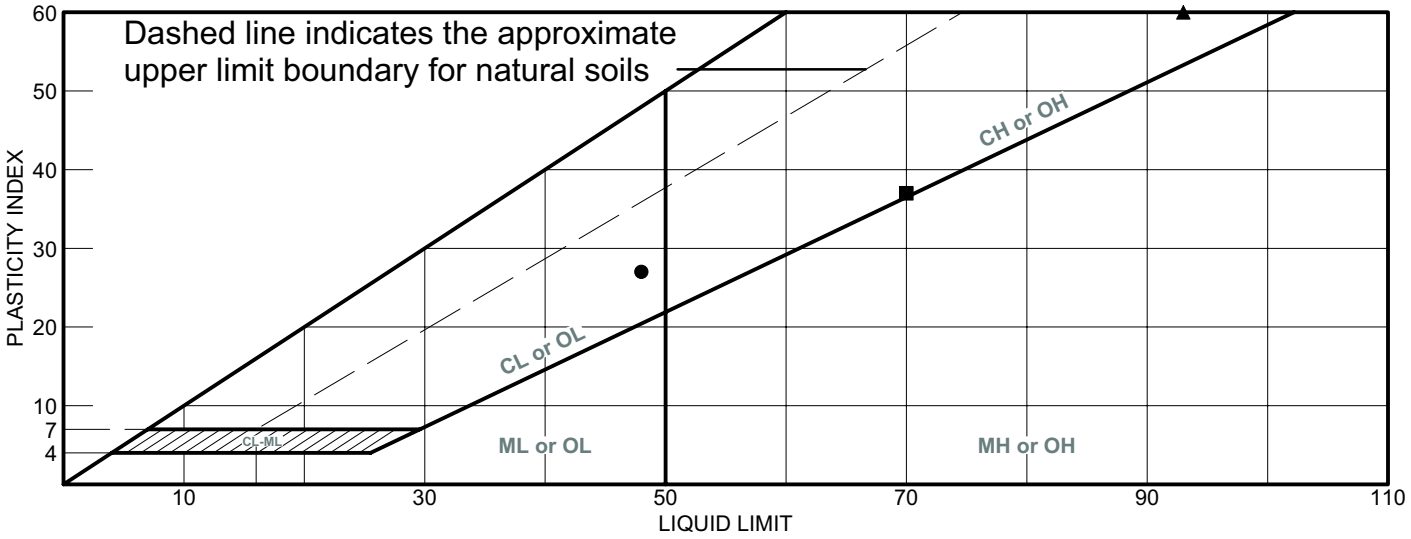
■ Gradation No. 13
Sample Obtained 10/5/10

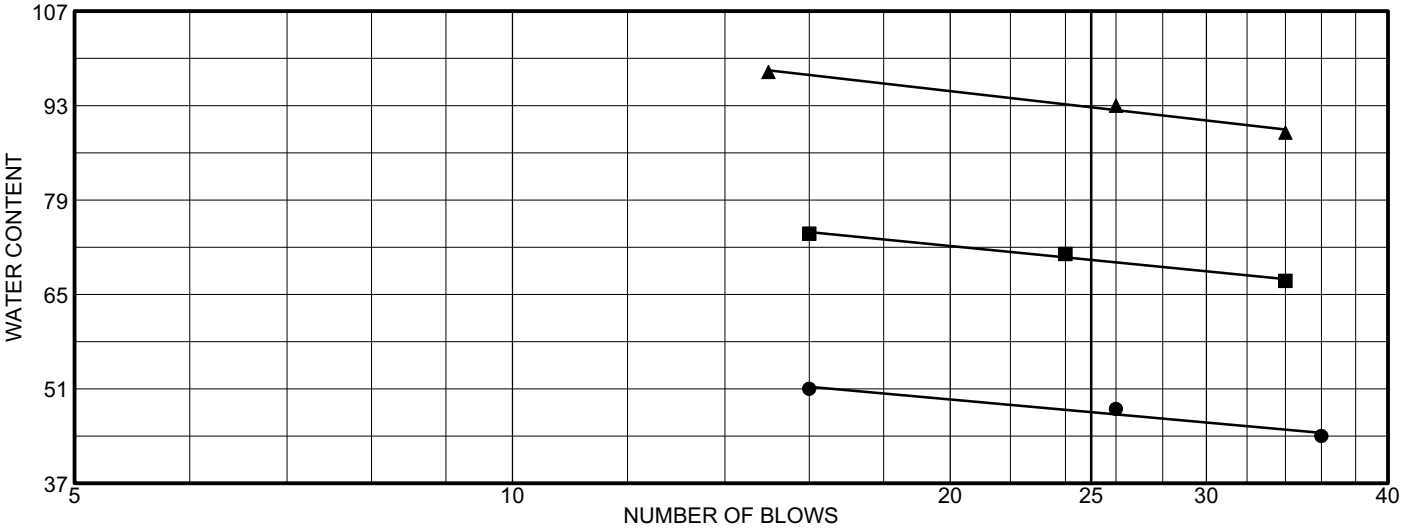
LIQUID AND PLASTIC LIMITS TEST REPORT

**GET SOLUTIONS, INC.**

**Figure** Set 3

# LIQUID AND PLASTIC LIMITS TEST REPORT




| | MATERIAL DESCRIPTION | LL | PL | PI | %<#40 | %<#200 | USCS |
|---|---|---|---|---|---|---|---|
| ● | Gray, Sandy Lean CLAY | 48 | 21 | 27 | 99.4 | 68 | CL |
| ■ | Gray, Fat CLAY | 70 | 33 | 37 | 100 | 89 | CH |
| ▲ | Gray, Fat CLAY | 93 | 33 | 60 | 100 | 98 | CH |
| | | | | | | | |
| | | | | | | | |

**Project No.** VB10-238G **Client:** HDR, Inc.

**Project:** VDOT I-64 to I-264 PSA 3 I-64 D7 and Bridge
Virginia Beach, Virginia

● **Location:** CUR-4B

■ **Location:** CUR-4B

▲ **Location:** CUR-4B

**Remarks:**

● Gradation No. 28
Sample Obtained 10/5/10

■ Gradation No. 21
Sample Obtained 10/5/10

▲ Gradation No. 33
Sample Obtained 10/5/10

LIQUID AND PLASTIC LIMITS TEST REPORT

**GET SOLUTIONS, INC.**

**Figure** Set 5

# MOISTURE, ASH, AND ORGANIC MATTER TEST RESULTS

*Form No: TR-D2974-1*
*Revision No. 0*
*Revision Date: 07/10/08*

# Moisture, Ash, and Organic Matter

S&ME

*ASTM D-2974*

***Quality Assurance***

**S&ME, Inc. Raleigh, 3201 Spring Forest Raod, Raleigh, North Carolina 27616**

| | | | |
|---|---|---|---|
| **Project #:** | **1081-10-2757 Phase 2** | Report Date: | 10/15/10 |
| Project Name: | I-64/I-264 Interchange - VA Beach | Test Date(s): | 10/12 - 10/15/10 |
| Client Name: | | | |
| Client Address: | | | |

| | | | | | |
|---|---|---|---|---|---|
| Boring No. | RC-3 | Sample No. | SS-2 | Sample Date: | NA |
| Location: | Site-Borehole | Offset: | NA | Depth (ft): | 2 - 4 ft. |

Sample Description: Gray Clayey SILT with Organics

***Equipment:*** *Balance: 0.01 g.Readability, 500g. Minimum Capaccity*

*Balance:* *S&ME ID #:* ***1024*** *Cal. Date:* ***11/4/09*** *Due:* ***11/4/10***

## *Method A: Moisture Content Determination*

*Required Oven Temperature: 105 ± 5 °C*

| ***Oven Temperature: 105 °C*** | | *Tare #* | 37 |
|---|---|---|---|
| *t* | Tare Weight *(Dish plus Aluminum Foil Cover)* | *grams* | 112.09 |
| *a* | Mass of ***As-Received*** Specimen + Tare Wt. | *grams* | 204.97 |
| *b* | Mass of Oven Dry Specimen + Tare Wt. | *grams* | 169.51 |
| *w* | Water Weight | *(a-b)* | 35.46 |
| *A* | Mass of As-Received Specimen | *(a-t)* | 92.88 |
| *B* | Mass of Oven Dry Specimen | *(b-t)* | 57.42 |
| ***% Moisture Content as a % of As Received or Total Mass*** | | *(w/A)*100* | **38.2%** |
| ***% Moisture Content as a % of Oven-dried Mass*** | | *(w/B)*100* | **61.8%** |

*Oven* *S&ME ID #:* ***13289*** *Cal. Date:* ***8/17/10*** *Due:* ***8/17/11***

## *Method C (440° C) or D (750° C): Ash Content and Organic Matter Determination*

| ***Muffle Furnace: 440 °C*** | | *Tare #* | 3 |
|---|---|---|---|
| *t* | Tare Weight *(Dish plus Aluminum Foil Cover)* | *grams* | 40.77 |
| *b* | Mass of Oven Dry Specimen + Tare Wt. | *grams* | 98.23 |
| *c* | Ash Weight + Tare Wt. | *grams* | 95.31 |
| *C* | Ash Weight | *c-t* | 54.54 |
| *B* | Mass of Oven Dry Specimen | *(b-t)* | 57.46 |
| *D* | ***% Ash Content*** | *(C/B)*100* | **94.9%** |
| | ***% Organic Matter*** | *100-D* | **5.1%** |

*Muffle Furnace:* *S&ME ID #:* ***00261***

***Notes / Deviations / References:*** ASTM D2974: Moisture, Ash, and Organic Matter of Peat and Other Organic Soils

| | | | |
|---|---|---|---|
| Yogesh Chauhan | 10/12/2010 | | |
| *Technician Name* | *Date* | *Signature* | *Level/Certification* |
| Mal Krajan, ET | | Laboratory Manager | 10/20/10 |
| *Technical Responsibility* | *Signature* | *Position* | *Date* |

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*Form No: TR-D2974-1*
*Revision No. 0*
*Revision Date: 07/10/08*

# Moisture, Ash, and Organic Matter

S&ME

*ASTM D-2974*

***Quality Assurance***

**S&ME, Inc. Raleigh, 3201 Spring Forest Raod, Raleigh, North Carolina 27616**

| | | | |
|---|---|---|---|
| **Project #:** | **1081-10-2757 Phase 2** | Report Date: | 10/15/10 |
| Project Name: | I-64/I-264 Interchange - VA Beach | Test Date(s): | 10/12 - 10/15/10 |
| Client Name: | | | |
| Client Address: | | | |

| | | | | | |
|---|---|---|---|---|---|
| Boring No. | RC-5 | Sample No. | SS-6 | Sample Date: | NA |
| Location: | Site-Borehole | Offset: | NA | Depth (ft): | 10 - 12 ft. |

Sample Description: Gray Clayey SILT with Organics

***Equipment:*** *Balance: 0.01 g.Readability, 500g. Minimum Capaccity*

*Balance:* *S&ME ID #:* ***1024*** *Cal. Date:* ***11/4/09*** *Due:* ***11/4/10***

***Method A: Moisture Content Determination*** *Required Oven Temperature: 105 ± 5 °C*

| ***Oven Temperature: 105 °C*** | | *Tare #* | 33 |
|---|---|---|---|
| *t* | Tare Weight *(Dish plus Aluminum Foil Cover)* | *grams* | 107.62 |
| *a* | Mass of ***As-Received*** Specimen + Tare Wt. | *grams* | 237.89 |
| *b* | Mass of Oven Dry Specimen + Tare Wt. | *grams* | 191.21 |
| *w* | Water Weight | *(a-b)* | 46.68 |
| *A* | Mass of As-Received Specimen | *(a-t)* | 130.27 |
| *B* | Mass of Oven Dry Specimen | *(b-t)* | 83.59 |
| ***% Moisture Content as a % of As Received or Total Mass*** | | *(w/A)*100* | **35.8%** |
| ***% Moisture Content as a % of Oven-dried Mass*** | | *(w/B)*100* | **55.8%** |

*Oven* *S&ME ID #:* ***13289*** *Cal. Date:* ***8/17/10*** *Due:* ***8/17/11***

***Method C (440° C) or D (750° C): Ash Content and Organic Matter Determination***

| ***Muffle Furnace: 440 °C*** | | *Tare #* | 2 |
|---|---|---|---|
| *t* | Tare Weight *(Dish plus Aluminum Foil Cover)* | *grams* | 52.57 |
| *b* | Mass of Oven Dry Specimen + Tare Wt. | *grams* | 133.75 |
| *c* | Ash Weight + Tare Wt. | *grams* | 130.64 |
| *C* | Ash Weight | *c-t* | 78.07 |
| *B* | Mass of Oven Dry Specimen | *(b-t)* | 81.18 |
| *D* | ***% Ash Content*** | *(C/B)*100* | **96.2%** |
| | ***% Organic Matter*** | *100-D* | **3.8%** |

*Muffle Furnace:* *S&ME ID #:* ***00261***

***Notes / Deviations / References:*** ASTM D2974: Moisture, Ash, and Organic Matter of Peat and Other Organic Soils

| | | | |
|---|---|---|---|
| Yogesh Chauhan | 10/12/2010 | | |
| *Technician Name* | *Date* | *Signature* | *Level/Certification* |
| Mal Krajan, ET | | Laboratory Manager | 10/20/10 |
| *Technical Responsibility* | *Signature* | *Position* | *Date* |

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*Form No: TR-D2974-1*
*Revision No. 0*
*Revision Date: 07/10/08*

# Moisture, Ash, and Organic Matter

S&ME

*ASTM D-2974*

***Quality Assurance***

**S&ME, Inc. Raleigh, 3201 Spring Forest Raod, Raleigh, North Carolina 27616**

| | | | |
|---|---|---|---|
| **Project #:** | **1081-10-2757 Phase 2** | Report Date: | 10/15/10 |
| Project Name: | I-64/I-264 Interchange - VA Beach | Test Date(s): | 10/12 - 10/15/10 |
| Client Name: | | | |
| Client Address: | | | |

| | | | | | |
|---|---|---|---|---|---|
| Boring No. | RC-6 | Sample No. | SS-2 | Sample Date: | NA |
| Location: | Site-Borehole | Offset: | NA | Depth (ft): | 2 - 4 ft. |

Sample Description: Gray Silty SAND

***Equipment:*** *Balance: 0.01 g.Readability, 500g. Minimum Capaccity*

*Balance:* *S&ME ID #:* ***1024*** *Cal. Date:* ***11/4/09*** *Due:* ***11/4/10***

## *Method A: Moisture Content Determination*

*Required Oven Temperature: 105 ± 5 °C*

| ***Oven Temperature: 105 °C*** | | *Tare #* | 30 |
|---|---|---|---|
| *t* | Tare Weight *(Dish plus Aluminum Foil Cover)* | *grams* | 110.48 |
| *a* | Mass of ***As-Received*** Specimen + Tare Wt. | *grams* | 207.90 |
| *b* | Mass of Oven Dry Specimen + Tare Wt. | *grams* | 193.79 |
| *w* | Water Weight | *(a-b)* | 14.11 |
| *A* | Mass of As-Received Specimen | *(a-t)* | 97.42 |
| *B* | Mass of Oven Dry Specimen | *(b-t)* | 83.31 |
| ***% Moisture Content as a % of As Received or Total Mass*** | | *(w/A)*100* | **14.5%** |
| ***% Moisture Content as a % of Oven-dried Mass*** | | *(w/B)*100* | **16.9%** |

*Oven* *S&ME ID #:* ***13289*** *Cal. Date:* ***8/17/10*** *Due:* ***8/17/11***

## *Method C (440° C) or D (750° C): Ash Content and Organic Matter Determination*

| ***Muffle Furnace: 440 °C*** | | *Tare #* | 4 |
|---|---|---|---|
| *t* | Tare Weight *(Dish plus Aluminum Foil Cover)* | *grams* | 13.63 |
| *b* | Mass of Oven Dry Specimen + Tare Wt. | *grams* | 96.62 |
| *c* | Ash Weight + Tare Wt. | *grams* | 95.04 |
| *C* | Ash Weight | *c-t* | 81.41 |
| *B* | Mass of Oven Dry Specimen | *(b-t)* | 82.99 |
| *D* | ***% Ash Content*** | *(C/B)*100* | **98.1%** |
| | ***% Organic Matter*** | *100-D* | **1.9%** |

*Muffle Furnace:* *S&ME ID #:* ***00261***

***Notes / Deviations / References:*** ASTM D2974: Moisture, Ash, and Organic Matter of Peat and Other Organic Soils

| | | | |
|---|---|---|---|
| Yogesh Chauhan | 10/12/2010 | | |
| *Technician Name* | *Date* | *Signature* | *Level/Certification* |
| Mal Krajan, ET | | Laboratory Manager | 10/20/10 |
| *Technical Responsibility* | *Signature* | *Position* | *Date* |

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*Form No: TR-D2974-1*
*Revision No. 0*
*Revision Date: 07/10/08*

# Moisture, Ash, and Organic Matter

S&ME

*ASTM D-2974*

***Quality Assurance***

**S&ME, Inc. Raleigh, 3201 Spring Forest Raod, Raleigh, North Carolina 27616**

| | | | |
|---|---|---|---|
| **Project #:** | **1081-10-2757 Phase 2** | Report Date: | 10/15/10 |
| Project Name: | I-64/I-264 Interchange - VA Beach | Test Date(s): | 10/12 - 10/15/10 |
| Client Name: | | | |
| Client Address: | | | |

| | | | | | |
|---|---|---|---|---|---|
| Boring No. | RC-6 | Sample No. | SS-4 | Sample Date: | NA |
| Location: | Site-Borehole | Offset: | NA | Depth (ft): | 6 - 8 ft. |

Sample Description: Gray Clayey SILT with Organics

***Equipment:*** *Balance: 0.01 g.Readability, 500g. Minimum Capaccity*

*Balance:* *S&ME ID #:* ***1024*** *Cal. Date:* ***11/4/09*** *Due:* ***11/4/10***

## *Method A: Moisture Content Determination*

*Required Oven Temperature: 105 ± 5° C*

| | ***Oven Temperature:*** **105 °C** | *Tare #* | 20 |
|---|---|---|---|
| *t* | Tare Weight *(Dish plus Aluminum Foil Cover)* | *grams* | 109.95 |
| *a* | Mass of ***As-Received*** Specimen + Tare Wt. | *grams* | 213.93 |
| *b* | Mass of Oven Dry Specimen + Tare Wt. | *grams* | 176.09 |
| *w* | Water Weight | *(a-b)* | 37.84 |
| *A* | Mass of As-Received Specimen | *(a-t)* | 103.98 |
| *B* | Mass of Oven Dry Specimen | *(b-t)* | 66.14 |
| | ***% Moisture Content as a % of As Received or Total Mass*** | *(w/A)*100* | **36.4%** |
| | ***% Moisture Content as a % of Oven-dried Mass*** | *(w/B)*100* | **57.2%** |

*Oven* *S&ME ID #:* ***13289*** *Cal. Date:* ***8/17/10*** *Due:* ***8/17/11***

## *Method C (440° C) or D (750° C): Ash Content and Organic Matter Determination*

| | ***Muffle Furnace:*** **440 °C** | *Tare #* | 6 |
|---|---|---|---|
| *t* | Tare Weight *(Dish plus Aluminum Foil Cover)* | *grams* | 13.52 |
| *b* | Mass of Oven Dry Specimen + Tare Wt. | *grams* | 72.98 |
| *c* | Ash Weight + Tare Wt. | *grams* | 68.15 |
| *C* | Ash Weight | *c-t* | 54.63 |
| *B* | Mass of Oven Dry Specimen | *(b-t)* | 59.46 |
| *D* | ***% Ash Content*** | *(C/B)*100* | **91.9%** |
| | ***% Organic Matter*** | *100-D* | **8.1%** |

*Muffle Furnace:* *S&ME ID #:* ***00261***

***Notes / Deviations / References:*** ASTM D2974: Moisture, Ash, and Organic Matter of Peat and Other Organic Soils

| | | | |
|---|---|---|---|
| Yogesh Chauhan | 10/12/2010 | | |
| *Technician Name* | *Date* | *Signature* | *Level/Certification* |
| Mal Krajan, ET | | Laboratory Manager | 10/20/10 |
| *Technical Responsibility* | *Signature* | *Position* | *Date* |

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*Revision No. 0*
*Revision Date: 07/10/08*

# Moisture, Ash, and Organic Matter

S&ME

*ASTM D-2974*

***Quality Assurance***

**S&ME, Inc. Raleigh, 3201 Spring Forest Raod, Raleigh, North Carolina 27616**

| | | | |
|---|---|---|---|
| **Project #:** | **1081-10-2757 Phase 2** | Report Date: | 10/15/10 |
| Project Name: | I-64/I-264 Interchange - VA Beach | Test Date(s): | 10/12 - 10/15/10 |
| Client Name: | | | |
| Client Address: | | | |

| | | | | | |
|---|---|---|---|---|---|
| Boring No. | RC-6 | Sample No. | SS-7 | Sample Date: | NA |
| Location: | Site-Borehole | Offset: | NA | Depth (ft): | 13 - 15 ft. |
| Sample Description: | Gray Silty SAND with Organics | | | | |

***Equipment:*** *Balance: 0.01 g.Readability, 500g. Minimum Capaccity*

*Balance:* *S&ME ID #:* ***1024*** *Cal. Date:* ***11/4/09*** *Due:* ***11/4/10***

## *Method A: Moisture Content Determination*

*Required Oven Temperature: 105 ± 5 °C*

| ***Oven Temperature: 105 °C*** | | *Tare #* | 10 |
|---|---|---|---|
| *t* | Tare Weight *(Dish plus Aluminum Foil Cover)* | *grams* | 126.30 |
| *a* | Mass of ***As-Received*** Specimen + Tare Wt. | *grams* | 226.48 |
| *b* | Mass of Oven Dry Specimen + Tare Wt. | *grams* | 198.71 |
| *w* | Water Weight | *(a-b)* | 27.77 |
| *A* | Mass of As-Received Specimen | *(a-t)* | 100.18 |
| *B* | Mass of Oven Dry Specimen | *(b-t)* | 72.41 |
| ***% Moisture Content as a % of As Received or Total Mass*** | | *(w/A)*100* | **27.7%** |
| ***% Moisture Content as a % of Oven-dried Mass*** | | *(w/B)*100* | **38.4%** |

*Oven* *S&ME ID #:* ***13289*** *Cal. Date:* ***8/17/10*** *Due:* ***8/17/11***

## *Method C (440° C) or D (750° C): Ash Content and Organic Matter Determination*

| ***Muffle Furnace: 440 °C*** | | *Tare #* | 9 |
|---|---|---|---|
| *t* | Tare Weight *(Dish plus Aluminum Foil Cover)* | *grams* | 13.67 |
| *b* | Mass of Oven Dry Specimen + Tare Wt. | *grams* | 80.29 |
| *c* | Ash Weight + Tare Wt. | *grams* | 78.62 |
| *C* | Ash Weight | *c-t* | 64.95 |
| *B* | Mass of Oven Dry Specimen | *(b-t)* | 66.62 |
| *D* | ***% Ash Content*** | *(C/B)*100* | **97.5%** |
| | ***% Organic Matter*** | *100-D* | **2.5%** |

*Muffle Furnace:* *S&ME ID #:* ***00261***

***Notes / Deviations / References:*** ASTM D2974: Moisture, Ash, and Organic Matter of Peat and Other Organic Soils

| | | | |
|---|---|---|---|
| Yogesh Chauhan | 10/12/2010 | | |
| *Technician Name* | *Date* | *Signature* | *Level/Certification* |
| Mal Krajan, ET | | Laboratory Manager | 10/20/10 |
| *Technical Responsibility* | *Signature* | *Position* | *Date* |

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*Form No: TR-D2974-1*
*Revision No. 0*
*Revision Date: 07/10/08*

# Moisture, Ash, and Organic Matter

S&ME

*ASTM D-2974*

***Quality Assurance***

**S&ME, Inc. Raleigh, 3201 Spring Forest Raod, Raleigh, North Carolina 27616**

| | | | |
|---|---|---|---|
| **Project #:** | **1081-10-2757 Phase 2** | Report Date: | 10/15/10 |
| Project Name: | I-64/I-264 Interchange - VA Beach | Test Date(s): | 10/12 - 10/15/10 |
| Client Name: | | | |
| Client Address: | | | |

| | | | | | |
|---|---|---|---|---|---|
| Boring No. | RC-7 | Sample No. | SS-7 | Sample Date: | NA |
| Location: | Site-Borehole | Offset: | NA | Depth (ft): | 13 - 15 ft. |

Sample Description: Gray SAND with Silt

***Equipment:*** *Balance: 0.01 g.Readability, 500g. Minimum Capaccity*

*Balance:* *S&ME ID #:* ***1024*** *Cal. Date:* ***11/4/09*** *Due:* ***11/4/10***

## *Method A: Moisture Content Determination*

*Required Oven Temperature: 105 ± 5 °C*

| ***Oven Temperature: 105 °C*** | | *Tare #* | 12 |
|---|---|---|---|
| *t* | Tare Weight *(Dish plus Aluminum Foil Cover)* | *grams* | 94.31 |
| *a* | Mass of ***As-Received*** Specimen + Tare Wt. | *grams* | 232.91 |
| *b* | Mass of Oven Dry Specimen + Tare Wt. | *grams* | 207.80 |
| *w* | Water Weight | *(a-b)* | 25.11 |
| *A* | Mass of As-Received Specimen | *(a-t)* | 138.60 |
| *B* | Mass of Oven Dry Specimen | *(b-t)* | 113.49 |
| ***% Moisture Content as a % of As Received or Total Mass*** | | *(w/A)*100* | **18.1%** |
| ***% Moisture Content as a % of Oven-dried Mass*** | | *(w/B)*100* | **22.1%** |

*Oven* *S&ME ID #:* ***13289*** *Cal. Date:* ***8/17/10*** *Due:* ***8/17/11***

## *Method C (440° C) or D (750° C): Ash Content and Organic Matter Determination*

| ***Muffle Furnace: 440 °C*** | | *Tare #* | 5 |
|---|---|---|---|
| *t* | Tare Weight *(Dish plus Aluminum Foil Cover)* | *grams* | 13.62 |
| *b* | Mass of Oven Dry Specimen + Tare Wt. | *grams* | 109.41 |
| *c* | Ash Weight + Tare Wt. | *grams* | 108.39 |
| *C* | Ash Weight | *c-t* | 94.77 |
| *B* | Mass of Oven Dry Specimen | *(b-t)* | 95.79 |
| *D* | ***% Ash Content*** | *(C/B)*100* | **98.9%** |
| | ***% Organic Matter*** | *100-D* | **1.1%** |

*Muffle Furnace:* *S&ME ID #:* ***00261***

***Notes / Deviations / References:*** ASTM D2974: Moisture, Ash, and Organic Matter of Peat and Other Organic Soils

| | | | |
|---|---|---|---|
| Yogesh Chauhan | 10/12/2010 | | |
| *Technician Name* | *Date* | *Signature* | *Level/Certification* |
| Mal Krajan, ET | | Laboratory Manager | 10/20/10 |
| *Technical Responsibility* | *Signature* | *Position* | *Date* |

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*Form No: TR-D2974-1*
*Revision No. 0*
*Revision Date: 07/10/08*

# Moisture, Ash, and Organic Matter

S&ME

*ASTM D-2974*

***Quality Assurance***

**S&ME, Inc. Raleigh, 3201 Spring Forest Raod, Raleigh, North Carolina 27616**

| | | | |
|---|---|---|---|
| **Project #:** | **1081-10-2757 Phase 2** | Report Date: | 10/15/10 |
| Project Name: | I-64/I-264 Interchange - VA Beach | Test Date(s): | 10/12 - 10/15/10 |
| Client Name: | | | |
| Client Address: | | | |

| | | | | | |
|---|---|---|---|---|---|
| Boring No. | RC-8 | Sample No. | SS-2 | Sample Date: | NA |
| Location: | Site-Borehole | Offset: | NA | Depth (ft): | 2 - 4 ft. |

Sample Description: Gray Clayey SILT with Organics

***Equipment:*** *Balance: 0.01 g.Readability, 500g. Minimum Capaccity*

*Balance:* *S&ME ID #:* ***1024*** *Cal. Date:* ***11/4/09*** *Due:* ***11/4/10***

## *Method A: Moisture Content Determination*

*Required Oven Temperature: 105 ± 5 °C*

| ***Oven Temperature: 105 °C*** | | *Tare #* | 4 |
|---|---|---|---|
| *t* | Tare Weight *(Dish plus Aluminum Foil Cover)* | *grams* | 133.83 |
| *a* | Mass of ***As-Received*** Specimen + Tare Wt. | *grams* | 254.92 |
| *b* | Mass of Oven Dry Specimen + Tare Wt. | *grams* | 204.82 |
| *w* | Water Weight | *(a-b)* | 50.10 |
| *A* | Mass of As-Received Specimen | *(a-t)* | 121.09 |
| *B* | Mass of Oven Dry Specimen | *(b-t)* | 70.99 |
| ***% Moisture Content as a % of As Received or Total Mass*** | | *(w/A)*100* | **41.4%** |
| ***% Moisture Content as a % of Oven-dried Mass*** | | *(w/B)*100* | **70.6%** |

*Oven* *S&ME ID #:* ***13289*** *Cal. Date:* ***8/17/10*** *Due:* ***8/17/11***

## *Method C (440° C) or D (750° C): Ash Content and Organic Matter Determination*

| ***Muffle Furnace: 440 °C*** | | *Tare #* | 1 |
|---|---|---|---|
| *t* | Tare Weight *(Dish plus Aluminum Foil Cover)* | *grams* | 13.56 |
| *b* | Mass of Oven Dry Specimen + Tare Wt. | *grams* | 76.66 |
| *c* | Ash Weight + Tare Wt. | *grams* | 73.14 |
| *C* | Ash Weight | *c-t* | 59.58 |
| *B* | Mass of Oven Dry Specimen | *(b-t)* | 63.10 |
| *D* | ***% Ash Content*** | *(C/B)*100* | **94.4%** |
| | ***% Organic Matter*** | *100-D* | **5.6%** |

*Muffle Furnace:* *S&ME ID #:* ***00261***

***Notes / Deviations / References:*** ASTM D2974: Moisture, Ash, and Organic Matter of Peat and Other Organic Soils

| | | | |
|---|---|---|---|
| Yogesh Chauhan | 10/12/2010 | | |
| *Technician Name* | *Date* | *Signature* | *Level/Certification* |
| Mal Krajan, ET | | Laboratory Manager | 10/20/10 |
| *Technical Responsibility* | *Signature* | *Position* | *Date* |

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*Form No: TR-D2974-1*
*Revision No. 0*
*Revision Date: 07/10/08*

# Moisture, Ash, and Organic Matter

S&ME

*ASTM D-2974* — ***Quality Assurance***

**S&ME, Inc. Raleigh, 3201 Spring Forest Raod, Raleigh, North Carolina 27616**

| | | | |
|---|---|---|---|
| **Project #:** | **1081-10-2757 Phase 2** | Report Date: | 10/15/10 |
| Project Name: | I-64/I-264 Interchange - VA Beach | Test Date(s): | 10/12 - 10/15/10 |
| Client Name: | | | |
| Client Address: | | | |

| | | | | | |
|---|---|---|---|---|---|
| Boring No. | RC-8 | Sample No. | SS-6 | Sample Date: | NA |
| Location: | Site-Borehole | Offset: | NA | Depth (ft): | 10 - 12 ft. |

Sample Description: Gray Clayey SILT with Organics

***Equipment:*** *Balance: 0.01 g.Readability, 500g. Minimum Capaccity*

*Balance:* *S&ME ID #:* ***1024*** *Cal. Date:* ***11/4/09*** *Due:* ***11/4/10***

## *Method A: Moisture Content Determination*

*Required Oven Temperature: 105 ± 5 °C*

| | ***Oven Temperature: 105 °C*** | *Tare #* | 10 |
|---|---|---|---|
| *t* | Tare Weight *(Dish plus Aluminum Foil Cover)* | *grams* | 98.13 |
| *a* | Mass of ***As-Received*** Specimen + Tare Wt. | *grams* | 184.40 |
| *b* | Mass of Oven Dry Specimen + Tare Wt. | *grams* | 132.99 |
| *w* | Water Weight | *(a-b)* | 51.41 |
| *A* | Mass of As-Received Specimen | *(a-t)* | 86.27 |
| *B* | Mass of Oven Dry Specimen | *(b-t)* | 34.86 |
| | ***% Moisture Content as a % of As Received or Total Mass*** | *(w/A)*100* | **59.6%** |
| | ***% Moisture Content as a % of Oven-dried Mass*** | *(w/B)*100* | **147.5%** |

*Oven* *S&ME ID #:* ***13289*** *Cal. Date:* ***8/17/10*** *Due:* ***8/17/11***

## *Method C (440° C) or D (750° C): Ash Content and Organic Matter Determination*

| | ***Muffle Furnace: 440 °C*** | *Tare #* | 7 |
|---|---|---|---|
| *t* | Tare Weight *(Dish plus Aluminum Foil Cover)* | *grams* | 13.66 |
| *b* | Mass of Oven Dry Specimen + Tare Wt. | *grams* | 47.84 |
| *c* | Ash Weight + Tare Wt. | *grams* | 42.79 |
| *C* | Ash Weight | *c-t* | 29.13 |
| *B* | Mass of Oven Dry Specimen | *(b-t)* | 34.18 |
| *D* | ***% Ash Content*** | *(C/B)*100* | **85.2%** |
| | ***% Organic Matter*** | *100-D* | **14.8%** |

*Muffle Furnace:* *S&ME ID #:* ***00261***

***Notes / Deviations / References:*** ASTM D2974: Moisture, Ash, and Organic Matter of Peat and Other Organic Soils

| | | | |
|---|---|---|---|
| Yogesh Chauhan | 10/12/2010 | | |
| *Technician Name* | *Date* | *Signature* | *Level/Certification* |
| Mal Krajan, ET | | Laboratory Manager | 10/20/10 |
| *Technical Responsibility* | *Signature* | *Position* | *Date* |

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*Form No: TR-D2974-1*
*Revision No. 0*
*Revision Date: 07/10/08*

# Moisture, Ash, and Organic Matter

S&ME

*ASTM D-2974*

***Quality Assurance***

**S&ME, Inc. Raleigh, 3201 Spring Forest Raod, Raleigh, North Carolina 27616**

| | | | |
|---|---|---|---|
| **Project #:** | **1081-10-2757 Phase 2** | Report Date: | 10/15/10 |
| Project Name: | I-64/I-264 Interchange - VA Beach | Test Date(s): | 10/12 - 10/15/10 |
| Client Name: | | | |
| Client Address: | | | |

| | | | | | |
|---|---|---|---|---|---|
| Boring No. | RC-9 | Sample No. | SS-2 | Sample Date: | NA |
| Location: | Site-Borehole | Offset: | NA | Depth (ft): | 2 - 4 ft. |
| Sample Description: | Gray Sandy Clayey SILT with Organics | | | | |

***Equipment:*** *Balance: 0.01 g.Readability, 500g. Minimum Capaccity*

*Balance:* *S&ME ID #:* ***1024*** *Cal. Date:* ***11/4/09*** *Due:* ***11/4/10***

***Method A: Moisture Content Determination*** *Required Oven Temperature: 105 ± 5 °C*

| ***Oven Temperature: 105 °C*** | | *Tare #* | 32 |
|---|---|---|---|
| *t* | Tare Weight *(Dish plus Aluminum Foil Cover)* | *grams* | 114.97 |
| *a* | Mass of ***As-Received*** Specimen + Tare Wt. | *grams* | 232.53 |
| *b* | Mass of Oven Dry Specimen + Tare Wt. | *grams* | 196.93 |
| *w* | Water Weight | *(a-b)* | 35.60 |
| *A* | Mass of As-Received Specimen | *(a-t)* | 117.56 |
| *B* | Mass of Oven Dry Specimen | *(b-t)* | 81.96 |
| ***% Moisture Content as a % of As Received or Total Mass*** | | *(w/A)*100* | **30.3%** |
| ***% Moisture Content as a % of Oven-dried Mass*** | | *(w/B)*100* | **43.4%** |

*Oven* *S&ME ID #:* ***13289*** *Cal. Date:* ***8/17/10*** *Due:* ***8/17/11***

***Method C (440° C) or D (750° C): Ash Content and Organic Matter Determination***

| ***Muffle Furnace: 440 °C*** | | *Tare #* | 8 |
|---|---|---|---|
| *t* | Tare Weight *(Dish plus Aluminum Foil Cover)* | *grams* | 13.50 |
| *b* | Mass of Oven Dry Specimen + Tare Wt. | *grams* | 83.87 |
| *c* | Ash Weight + Tare Wt. | *grams* | 81.36 |
| *C* | Ash Weight | *c-t* | 67.86 |
| *B* | Mass of Oven Dry Specimen | *(b-t)* | 70.37 |
| *D* | ***% Ash Content*** | *(C/B)*100* | **96.4%** |
| | ***% Organic Matter*** | *100-D* | **3.6%** |

*Muffle Furnace:* *S&ME ID #:* ***00261***

***Notes / Deviations / References:*** ASTM D2974: Moisture, Ash, and Organic Matter of Peat and Other Organic Soils

| | | | |
|---|---|---|---|
| Yogesh Chauhan | 10/12/2010 | | |
| *Technician Name* | *Date* | *Signature* | *Level/Certification* |
| Mal Krajan, ET | | Laboratory Manager | 10/20/10 |
| *Technical Responsibility* | *Signature* | *Position* | *Date* |

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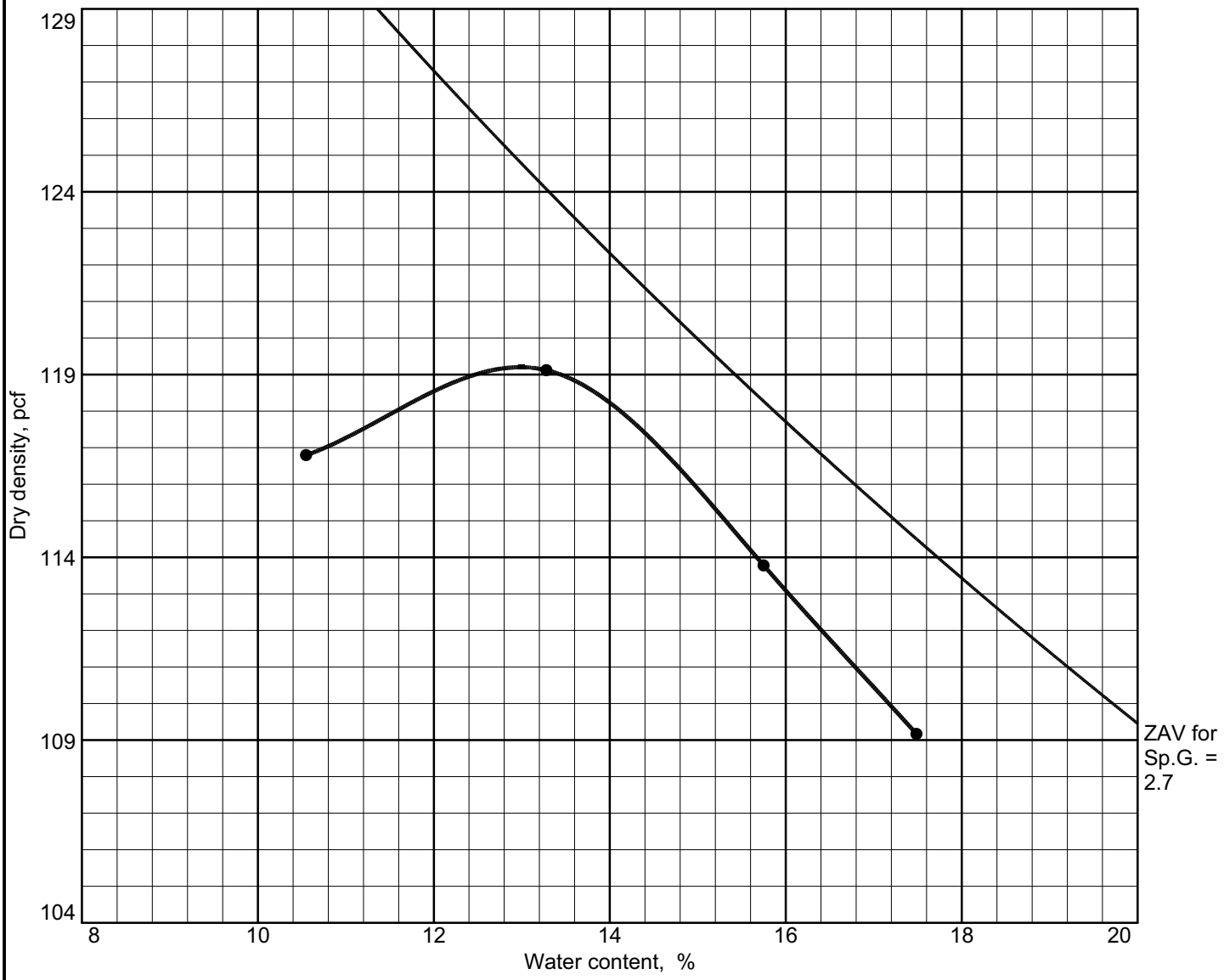
# STANDARD PROCTOR AND CBR TEST RESULTS

# Moisture Density Relationship (Proctor Curve)




Test specification: VTM-1 Standard

| Elev/ Depth | Classification | | Nat. Moist. | Sp.G. | LL | PI | % > No.4 | % < No.200 |
|---|---|---|---|---|---|---|---|---|
| | USCS | AASHTO | | | | | | |
| 1-2 ft. | SM | A-4(0) | 12 | | 18 | 3 | 0.8 | 36 |

| TEST RESULTS | MATERIAL DESCRIPTION |
|---|---|
| Maximum dry density = 119.2 pcf<br>Optimum moisture = 13.0 % | |

**Project No.** VB10-237G **Client:** HDR, Inc.
**Project:** VDOT I-64 to I-264 PSA 2 Ramps and Channel

● **Location:** CD-P1

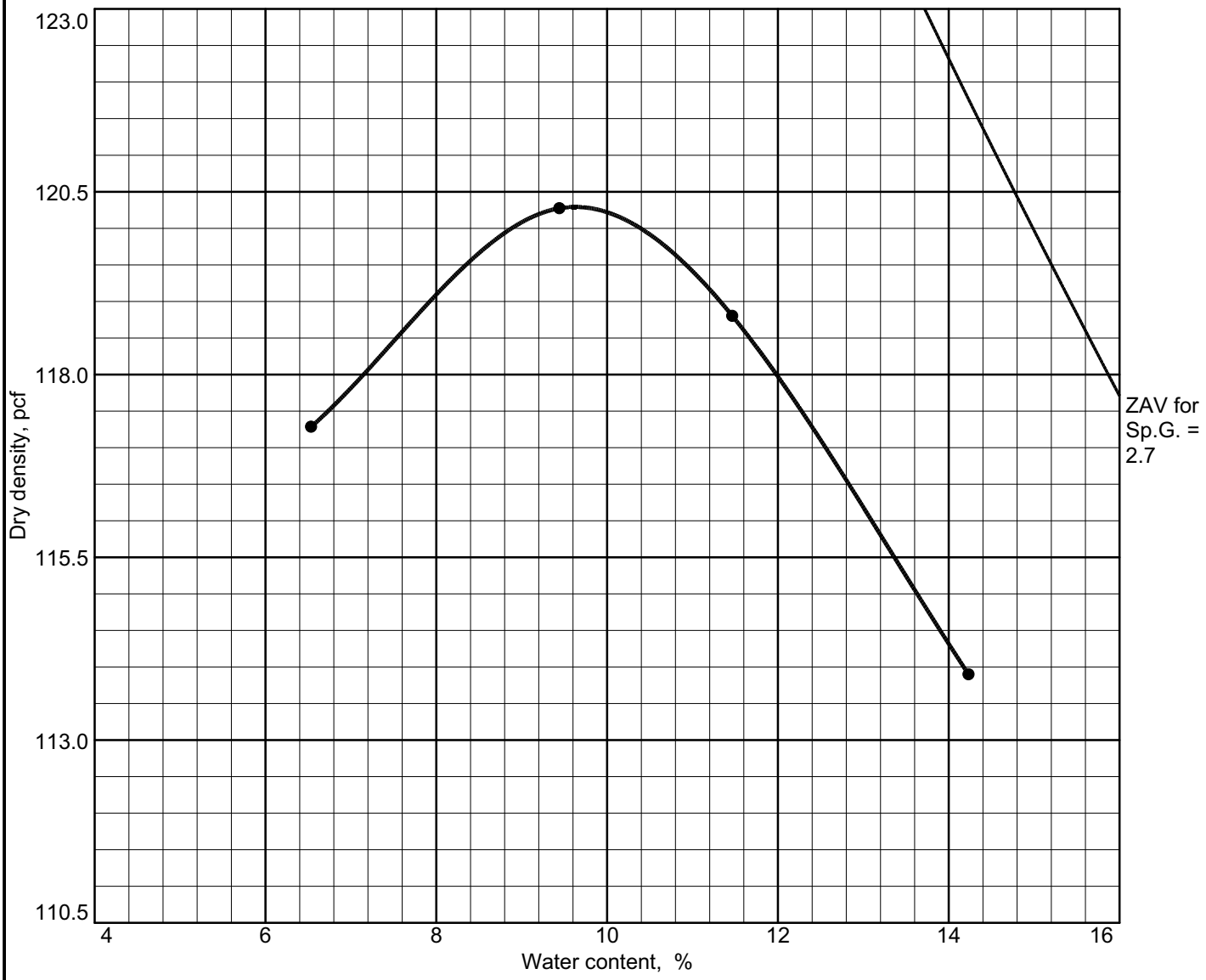
**Remarks:**
CBR-CD-P1
Sample Obtained 9/20/10

Moisture Density Relationship (Proctor Curve)

**GET SOLUTIONS, INC.**

**Figure** CBR-CDP1

# Moisture Density Relationship (Proctor Curve)




Test specification: VTM-1 Standard

| Elev/ Depth | Classification | | Nat. Moist. | Sp.G. | LL | PI | % > No.4 | % < No.200 |
|---|---|---|---|---|---|---|---|---|
| | USCS | AASHTO | | | | | | |
| 2-8 ft. | SM | A-2-4(0) | 7 | | NV | NP | 8.0 | 19 |

| TEST RESULTS | MATERIAL DESCRIPTION |
|---|---|
| Maximum dry density = 120.3 pcf<br>Optimum moisture = 9.6 % | Brown, Silty SAND |

**Project No.** VB10-237G **Client:** HDR, Inc.
**Project:** VDOT I-64 to I-264 PSA 2 Ramps and Channel

● **Location:** D7-13

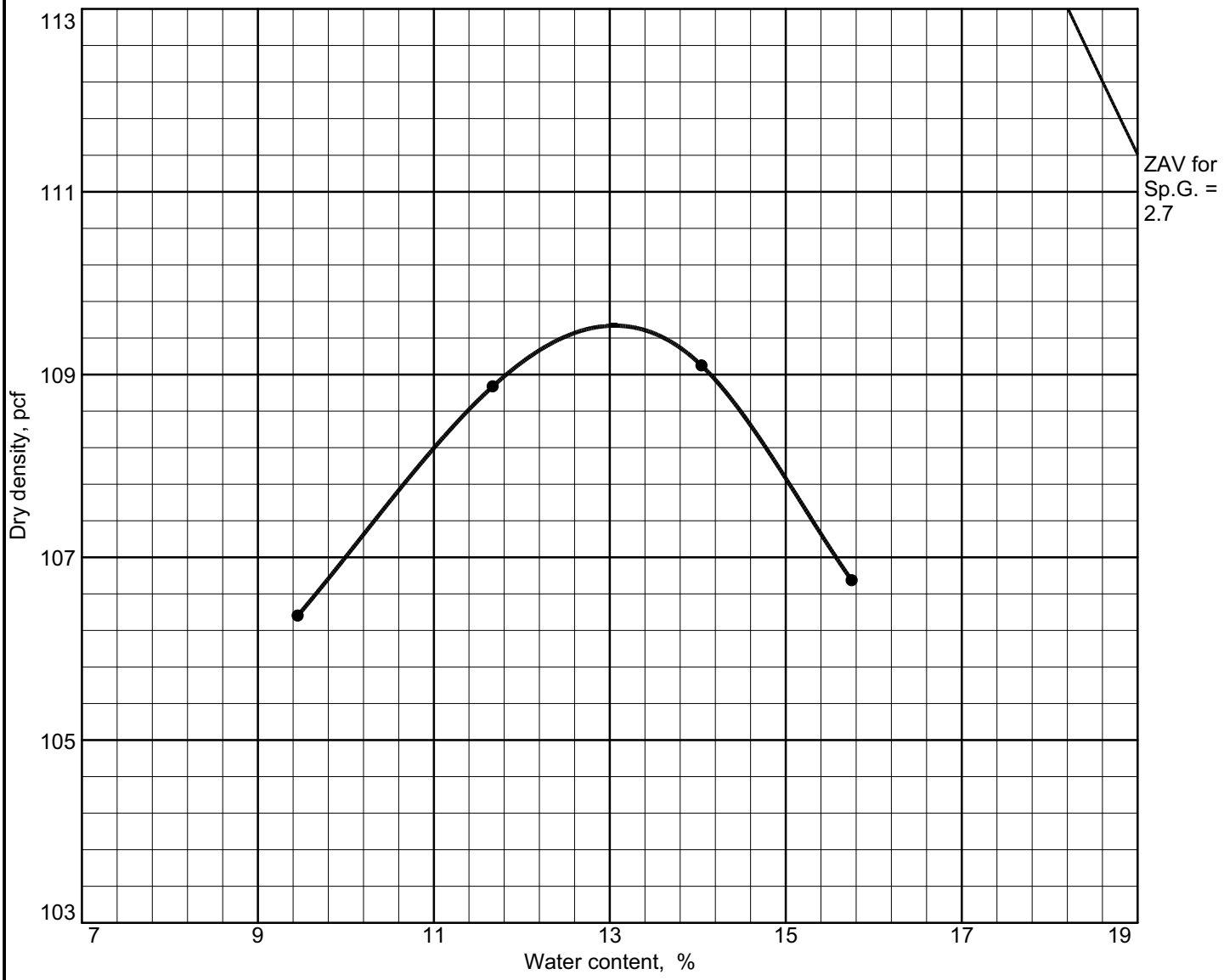
**Remarks:**
CBR-D7-13
Sample Obtained 9/20/10

Moisture Density Relationship (Proctor Curve)

**GET SOLUTIONS, INC.**

**Figure** CBR-D713

# Moisture Density Relationship (Proctor Curve)




Test specification: VTM-1 Standard

| Elev/ Depth | Classification | | Nat. Moist. | Sp.G. | LL | PI | % > No.4 | % < No.200 |
|---|---|---|---|---|---|---|---|---|
| | USCS | AASHTO | | | | | | |
| 2-8 ft. | SP-SM | A-3 | 6 | | NV | NP | 2.7 | 9 |

| TEST RESULTS | MATERIAL DESCRIPTION |
|---|---|
| Maximum dry density = 109.5 pcf<br>Optimum moisture = 13.1 % | Tan, Poorly Graded SAND with Silt |

**Project No.** VB10-237G **Client:** HDR, Inc.

**Project:** VDOT I-64 to I-264 PSA 2 Ramps and Channel

● **Location:** D7-16

**Remarks:**

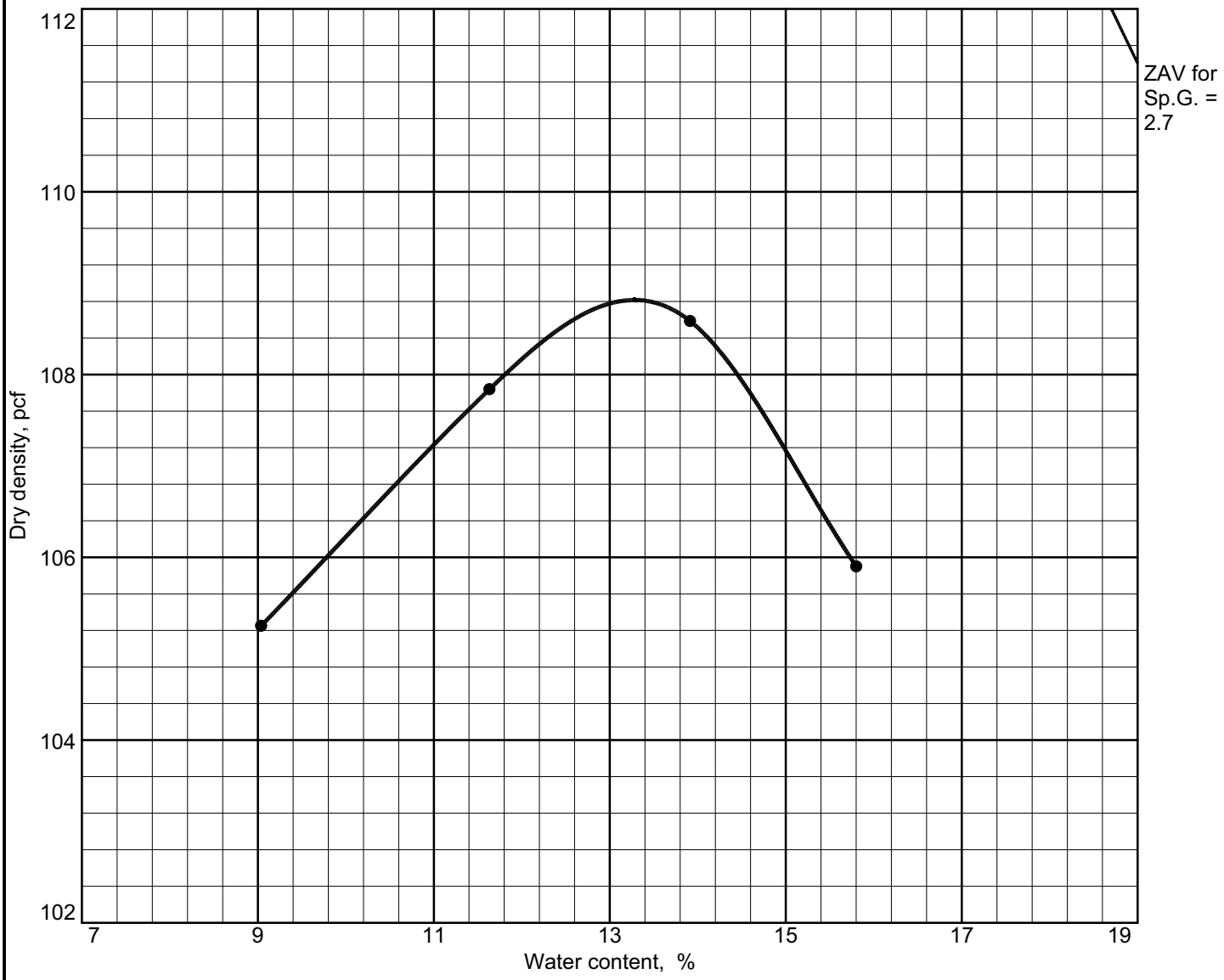
CBR-D7-16
Sample Obtained 9/20/10

Moisture Density Relationship (Proctor Curve)

**GET SOLUTIONS, INC.**

**Figure** CBR-D716

# Moisture Density Relationship (Proctor Curve)




Test specification: VTM-1 Standard

| Elev/ Depth | Classification | | Nat. Moist. | Sp.G. | LL | PI | % > No.4 | % < No.200 |
|---|---|---|---|---|---|---|---|---|
| | USCS | AASHTO | | | | | | |
| 2-4 ft. | SP-SM | | 2 | | NV | NP | 1.0 | 9 |

| TEST RESULTS | MATERIAL DESCRIPTION |
|---|---|
| Maximum dry density = 108.8 pcf<br>Optimum moisture = 13.3 % | Tan, Poorly Graded SAND with Silt |

**Project No.** VB10-237G **Client:** HDR, Inc.

**Project:** VDOT I-64 to I-264 PSA 2 Ramps and Channel

● **Location:** D7-P2

**Remarks:**

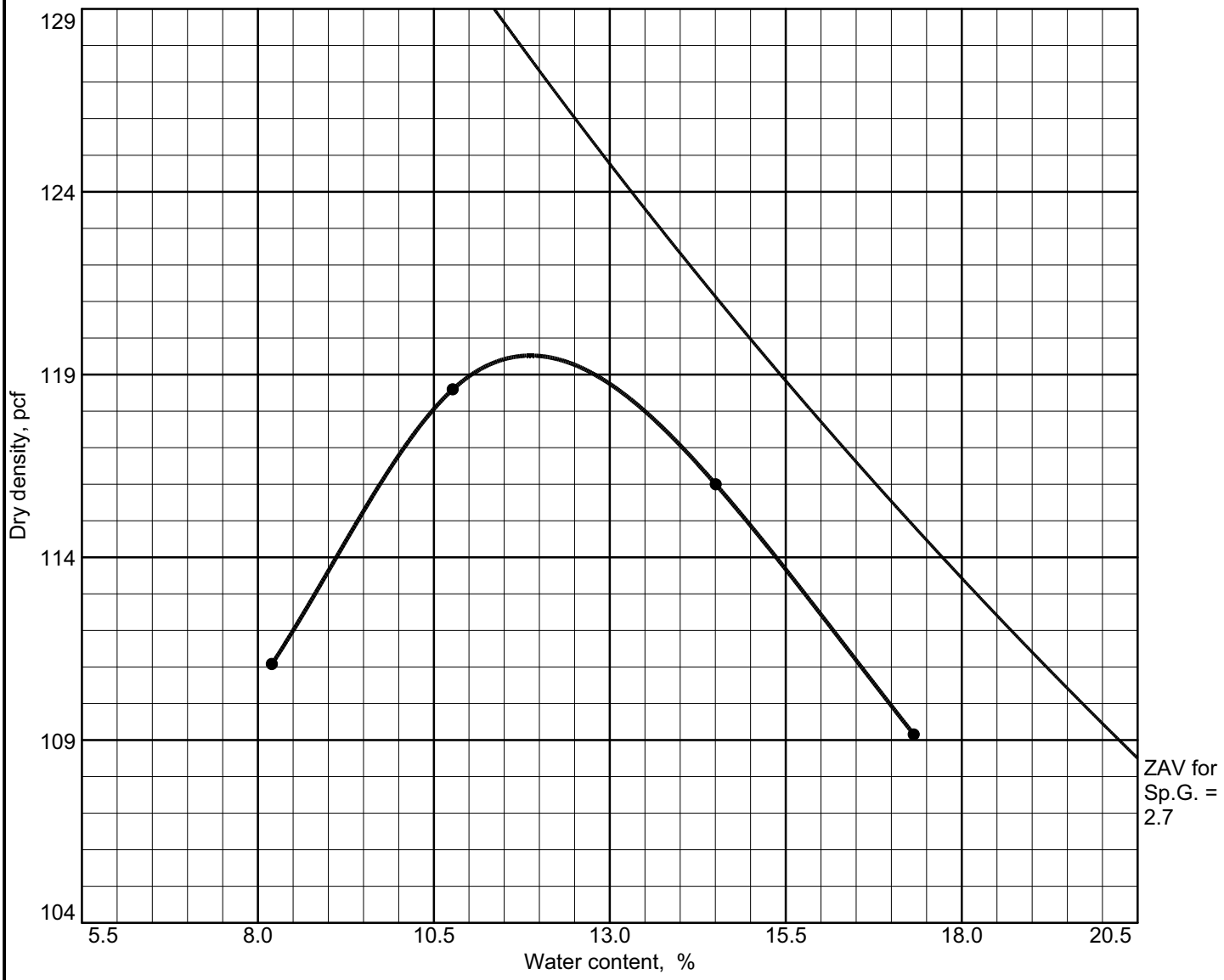
CBR-D7P2
Sample Obtained 10/20/10

Moisture Density Relationship (Proctor Curve)

**GET SOLUTIONS, INC.**

**Figure** CBR-D7P2

# Moisture Density Relationship (Proctor Curve)




Test specification: VTM-1 Standard

| Elev/ Depth | Classification | | Nat. Moist. | Sp.G. | LL | PI | % > No.4 | % < No.200 |
|---|---|---|---|---|---|---|---|---|
| | USCS | AASHTO | | | | | | |
| 2-4 ft. | SC-SM | A-4(0) | 16 | | 23 | 6 | 2.0 | 36 |

| TEST RESULTS | MATERIAL DESCRIPTION |
|---|---|
| Maximum dry density = 119.5 pcf<br>Optimum moisture = 11.9 % | Brown, Silty Clayey SAND |

**Project No.** VB10-237G **Client:** HDR, Inc.
**Project:** VDOT I-64 to I-264 PSA 2 Ramps and Channel

● **Location:** I264-CD2

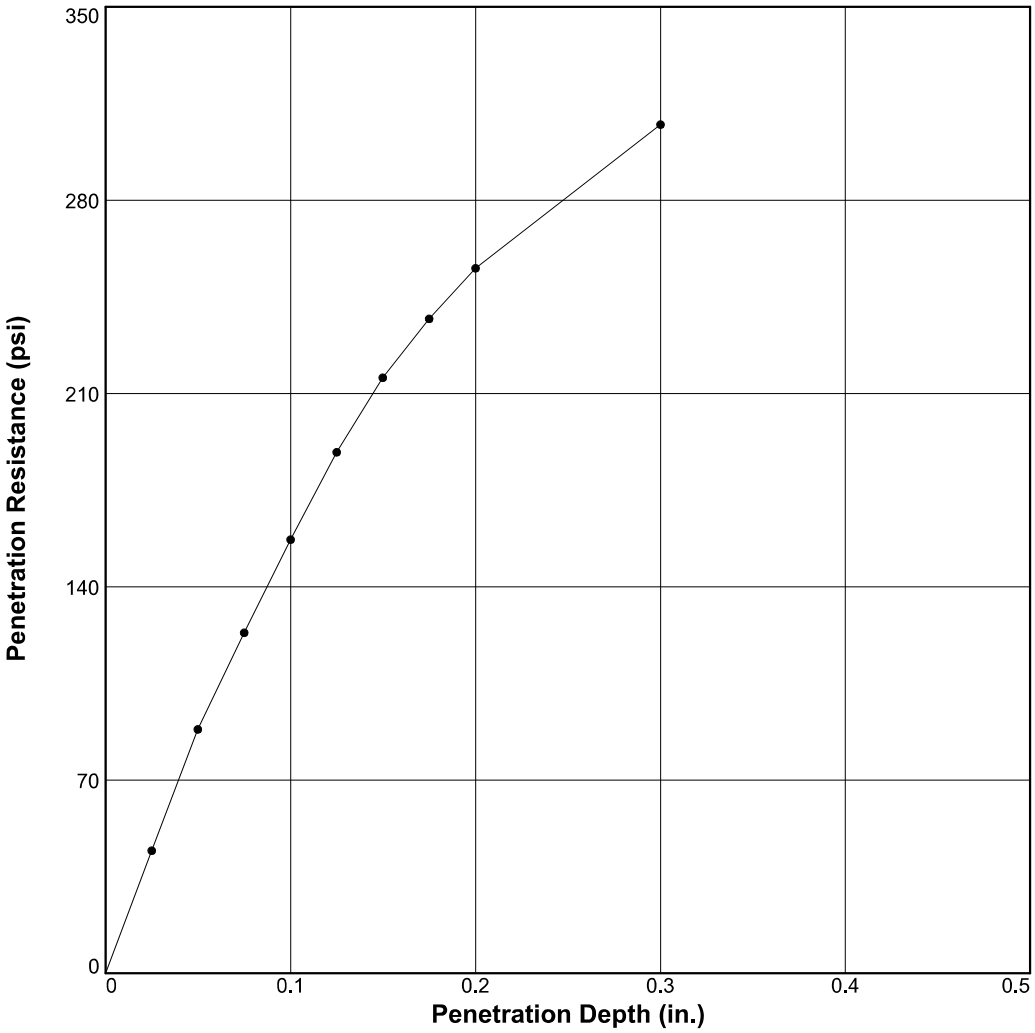
**Remarks:**
CBR-1264CD2
Sample Obtained 10/20/10

Moisture Density Relationship (Proctor Curve)

**GET SOLUTIONS, INC.**

**Figure** CBR-

# BEARING RATIO TEST REPORT
## AASHTO T 193-99




| | 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 ○ | 120.1 | 100.8 | 12.6 | 120.1 | 100.8 | 12.9 | | 17.0 | 0.000 | 10 | 0 |
| 2 △ | | | | | | | | | | | |
| 3 □ | | | | | | | | | | | |

| Material Description | USCS | Max. Dens. (pcf) | Optimum Moisture (%) | LL | PI |
|---|---|---|---|---|---|
| Gray, Silty SAND | SM | 119.2 | 13.0 | 18 | 3 |

**Project No:** VB10-237G

**Project:** VDOT I-64 to I-264 PSA 2 Ramps and Channel

**Location:** CD-P1

**Sample Number:** CBR-CDP-1 **Depth:** 1-2 ft.

**Date:** 9/20/10

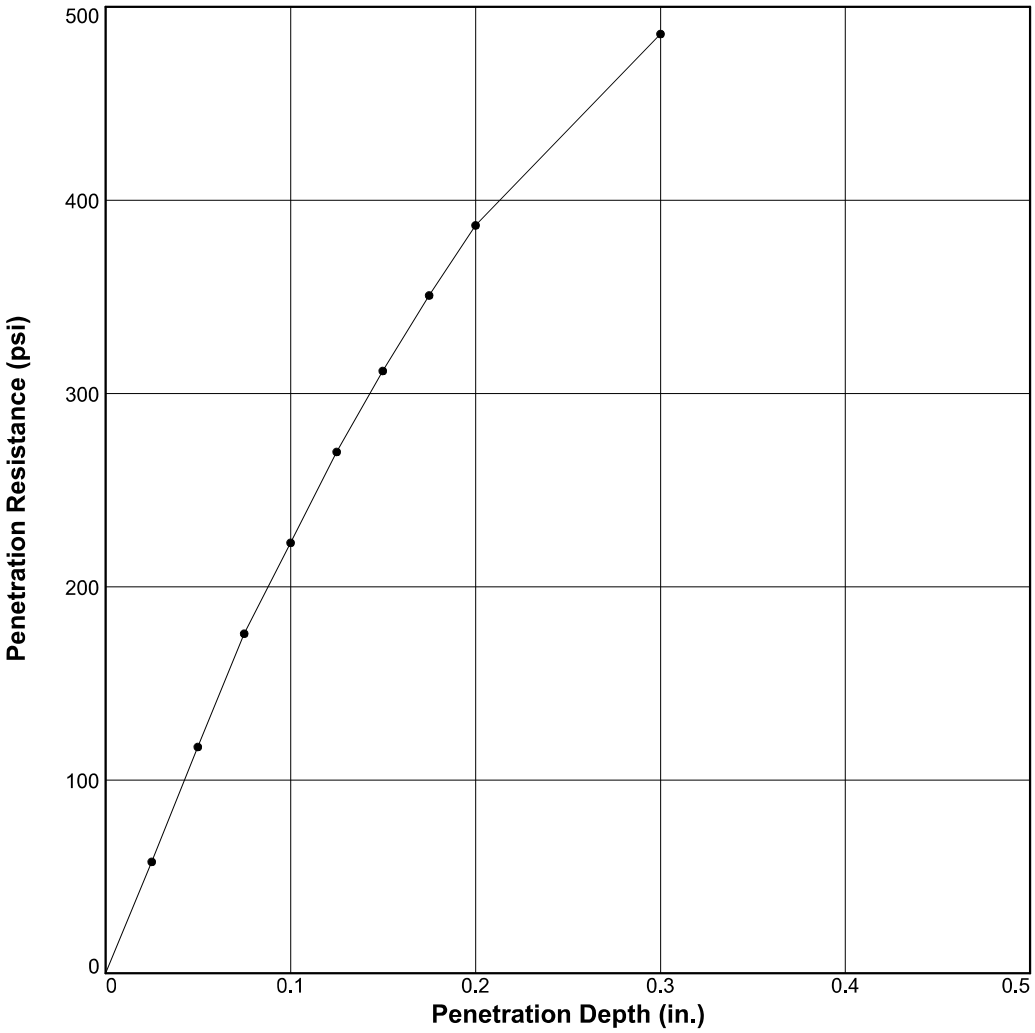
**Test Description/Remarks:**

BEARING RATIO TEST REPORT

GET SOLUTIONS, INC.

**Figure** CBR-CDP1

# BEARING RATIO TEST REPORT
## AASHTO T 193-99




| | 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 ○ | 123.5 | 102.7 | 9.1 | 123.5 | 102.7 | 10.5 | | 25.9 | 0.001 | 10 | 0 |
| 2 △ | | | | | | | | | | | |
| 3 □ | | | | | | | | | | | |

| Material Description | USCS | Max. Dens. (pcf) | Optimum Moisture (%) | LL | PI |
|---|---|---|---|---|---|
| Brown, Silty SAND | SM | 120.3 | 9.6 | NV | NP |

**Project No:** VB10-237G

**Project:** VDOT I-64 to I-264 PSA 2 Ramps and Channel

**Location:** D7-13

**Sample Number:** CBR-D7-13 **Depth:** 2-8 ft.

**Date:** 9/20/10

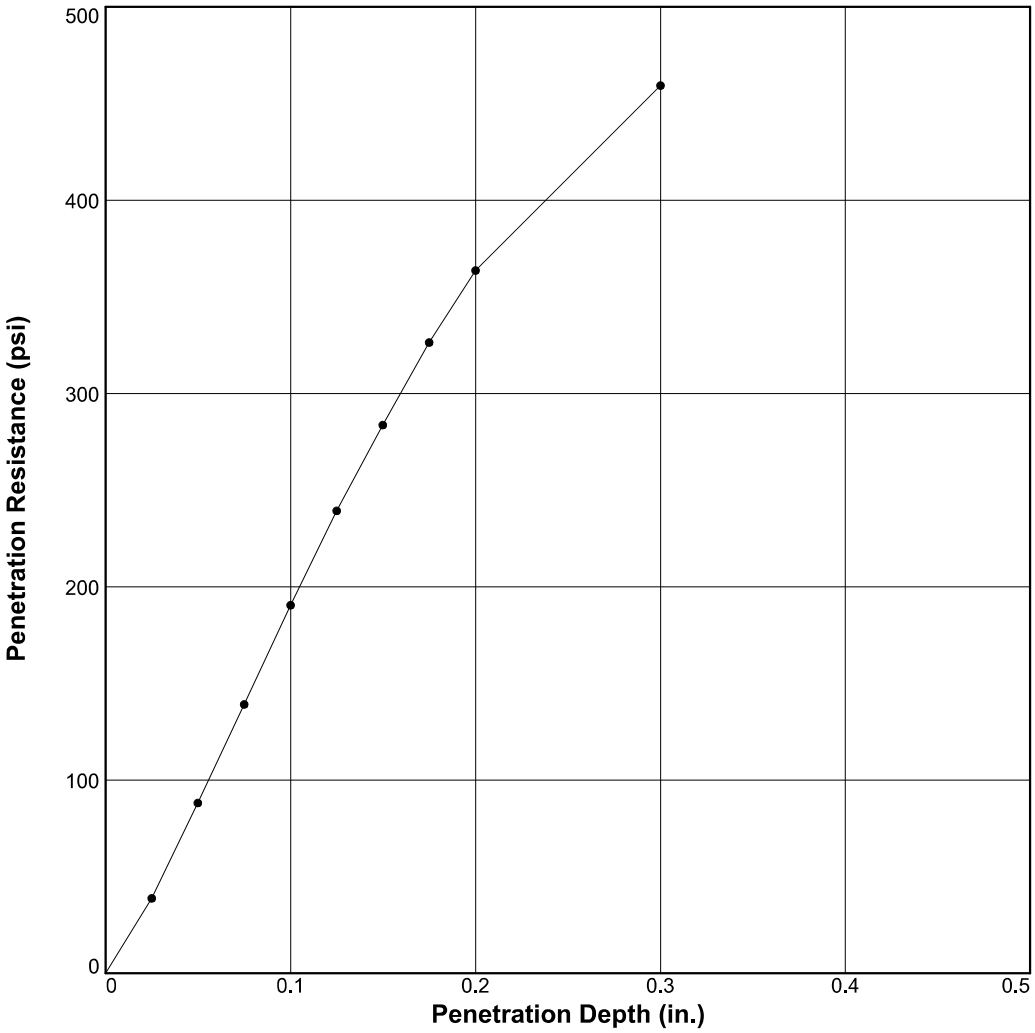
**Test Description/Remarks:**

BEARING RATIO TEST REPORT

GET SOLUTIONS, INC.

**Figure** CBR-D7-13

# BEARING RATIO TEST REPORT
## AASHTO T 193-99




| | 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 ○ | 111.8 | 102.1 | 12.6 | 111.8 | 102.1 | 14.2 | | 24.8 | 0.008 | 10 | 0 |
| 2 △ | | | | | | | | | | | |
| 3 □ | | | | | | | | | | | |

| Material Description | USCS | Max. Dens. (pcf) | Optimum Moisture (%) | LL | PI |
|---|---|---|---|---|---|
| Tan, Poorly Graded SAND with Silt | SP-SM | 109.5 | 13.1 | NV | NP |

**Project No:** VB10-237G

**Project:** VDOT I-64 to I-264 PSA 2 Ramps and Channel

**Location:** D7-16

**Sample Number:** CBR-D7-16 **Depth:** 2-8 ft.

**Date:** 9/20/10

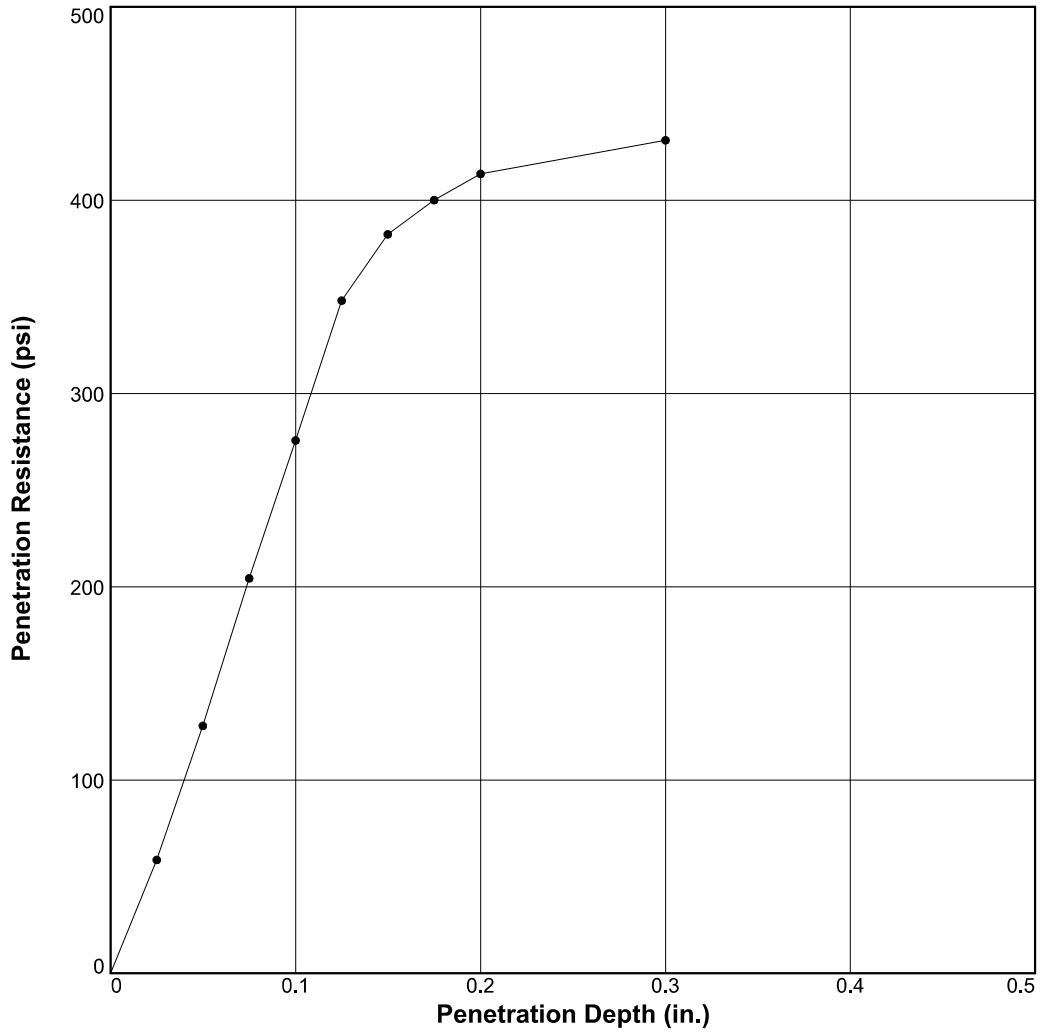
**Test Description/Remarks:**

BEARING RATIO TEST REPORT

GET SOLUTIONS, INC.

**Figure** CBR-D7-16

# BEARING RATIO TEST REPORT
## AASHTO T 193-99




| | 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 ○ | 110.4 | 101.5 | 12.8 | 110.4 | 101.5 | 13.9 | 29.2 | | 0.006 | 10 | 0 |
| 2 △ | | | | | | | | | | | |
| 3 □ | | | | | | | | | | | |

| Material Description | USCS | Max. Dens. (pcf) | Optimum Moisture (%) | LL | PI |
|---|---|---|---|---|---|
| Tan, Poorly Graded SAND with Silt | SP-SM | 108.8 | 13.3 | NV | NP |

**Project No:** VB10-237G

**Project:** VDOT I-64 to I-264 PSA 2 Ramps and Channel

**Location:** D7-P2

**Sample Number:** CBR-D7P2 **Depth:** 2-4 ft.

**Date:** 10/20/10

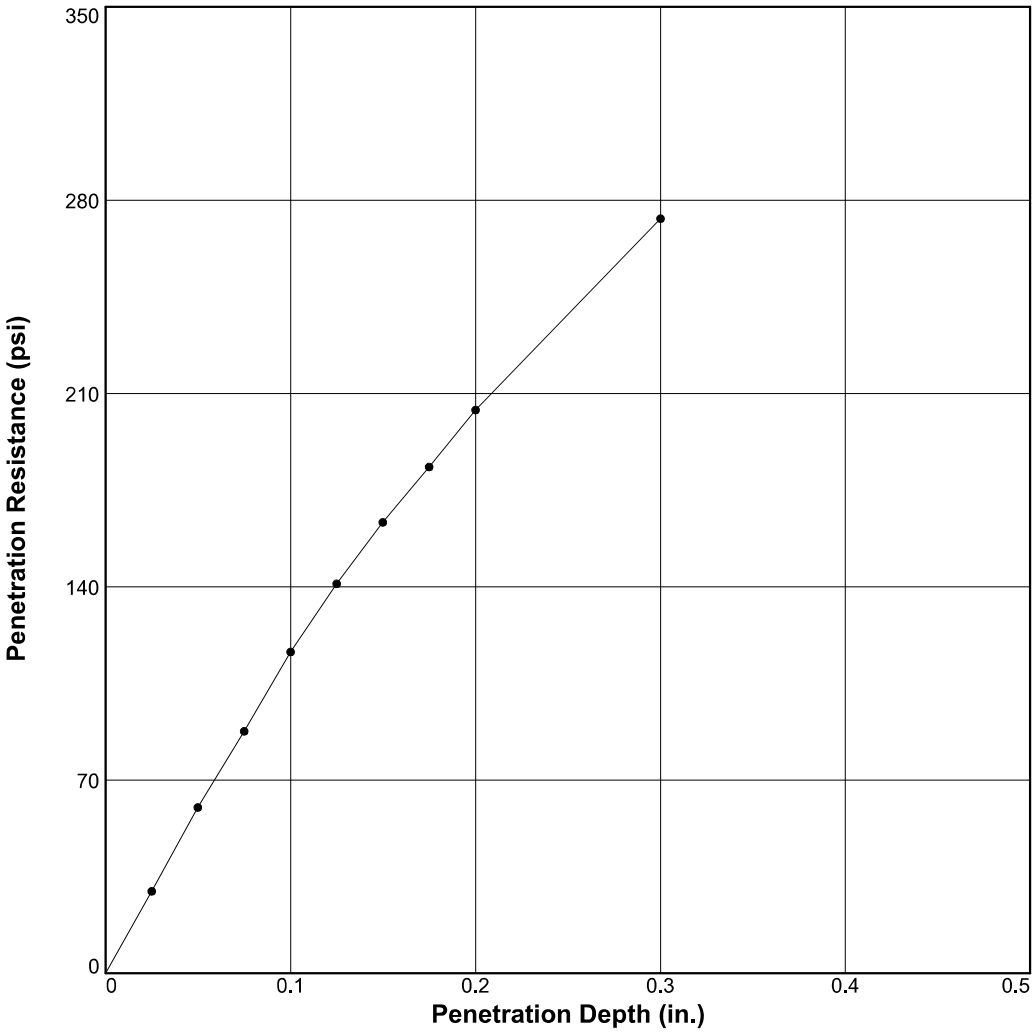
**Test Description/Remarks:**

BEARING RATIO TEST REPORT

GET SOLUTIONS, INC.

**Figure** CBR-D7P2

# BEARING RATIO TEST REPORT
## AASHTO T 193-99




| | 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 ○ | 119.8 | 100.3 | 11.9 | 119.4 | 99.9 | 14.3 | | 13.6 | 0.000 | 10 | 0.4 |
| 2 △ | | | | | | | | | | | |
| 3 □ | | | | | | | | | | | |

| Material Description | USCS | Max. Dens. (pcf) | Optimum Moisture (%) | LL | PI |
|---|---|---|---|---|---|
| Brown, Silty Clayey SAND | SC-SM | 119.5 | 11.9 | 23 | 6 |

**Project No:** VB10-237G

**Project:** VDOT I-64 to I-264 PSA 2 Ramps and Channel

**Location:** I264-CD2

**Sample Number:** CBR-I264CD2 **Depth:** 2-4 ft.

**Date:** 10/20/10

**Test Description/Remarks:**

BEARING RATIO TEST REPORT

GET SOLUTIONS, INC.

**Figure** CBR-I264CD2

# CORROSIVITY TEST RESULTS
# (pH AND RESISTIVITY, SULFIDE AND CHLORIDE)

GET Solutions, Inc.

Geotechnical • Environmental • Testing

# pH & Resistivity Data Sheet

**Project:** VDOT I-64 to I-264 PSA 2 Ramps and Channel

**Job #:**VB10-237G

| Boring | Depth (FT.) | pH | Resistivity |
|---|---|---|---|
| D7CD-11BC | 10-12 | 6.8 | 1620 ohm |
| I264-CD2 | 2-4 | 6.5 | 3800 ohm |
| I264-CD6 | 6-8 | 5.9 | 4100 ohm |
| D7-28 | 6-8 | 5.2 | 18000 ohm |
| D7-P2 | 2-4 | 5.7 | 11000 ohm |

Enviro Compliance Laboratories, Inc.
816 Kiwanis Street
Hampton, Virginia 23661
(757) 244-3424
Fax: (757) 244-3243
www.envirocompliance.com
eclhampton@envirocompliance.com

# Analytical Summary

GET Solutions, Inc.
Attn: Pat
204B Grayson Road
Virginia Beach, Virginia 23462

Date Received: December 07, 2010
Date Sampled : December 07, 2010
Date Issued : December 13, 2010

Lab # 1(A)/Sample ID : SWM4-1 (4')

| Parameter | Result | Units | QL | Date/Time Prepared | Date/Time Analyzed | Method | Analyst |
|---|---|---|---|---|---|---|---|
| Sulfide | BQL | mg/kg | 30.0 | 12-09/0830 | 12-13/1000 | 4500S | GBH |
| Chloride | BQL | mg/kg | 5 | 12-10/1430 | 12-10/1430 | 4500Cl C | PEJ |

Lab # 2(A)/Sample ID : SWM4-2 (6')

| Parameter | Result | Units | QL | Date/Time Prepared | Date/Time Analyzed | Method | Analyst |
|---|---|---|---|---|---|---|---|
| Sulfide | BQL | mg/kg | 30.0 | 12-09/0830 | 12-13/1000 | 4500S | GBH |
| Chloride | 19 | mg/kg | 5 | 12-10/1430 | 12-10/1430 | 4500Cl C | PEJ |

Lab # 3(A)/Sample ID : D7CD-11BC (10')

| Parameter | Result | Units | QL | Date/Time Prepared | Date/Time Analyzed | Method | Analyst |
|---|---|---|---|---|---|---|---|
| Sulfide | BQL | mg/kg | 30.0 | 12-09/0830 | 12-13/1000 | 4500S | GBH |
| Chloride | 688 | mg/kg | 5 | 12-10/1430 | 12-10/1430 | 4500Cl C | PEJ |

Lab # 4(A)/Sample ID : 1264CD-2 (2')

| Parameter | Result | Units | QL | Date/Time Prepared | Date/Time Analyzed | Method | Analyst |
|---|---|---|---|---|---|---|---|
| Sulfide | BQL | mg/kg | 30.0 | 12-09/0830 | 12-13/1000 | 4500S | GBH |
| Chloride | 35 | mg/kg | 5 | 12-10/1430 | 12-10/1430 | 4500Cl C | PEJ |

Lab # 5(A)/Sample ID : 1264CD-6 (6')

| Parameter | Result | Units | QL | Date/Time Prepared | Date/Time Analyzed | Method | Analyst |
|---|---|---|---|---|---|---|---|
| Sulfide | BQL | mg/kg | 30.0 | 12-09/0830 | 12-13/1000 | 4500S | GBH |
| Chloride | 20 | mg/kg | 5 | 12-10/1430 | 12-10/1430 | 4500Cl C | PEJ |

Lab # 6(A)/Sample ID : D7-28 (6')

| Parameter | Result | Units | QL | Date/Time Prepared | Date/Time Analyzed | Method | Analyst |
|---|---|---|---|---|---|---|---|
| Sulfide | BQL | mg/kg | 30.0 | 12-09/0830 | 12-13/1000 | 4500S | GBH |
| Chloride | 34 | mg/kg | 5 | 12-10/1430 | 12-10/1430 | 4500Cl C | PEJ |

BQL = Below Quantitation Limit
All methods are 40 CFR 136 March 12, 2007, Table IB approved.
Reference to Standard Methods is 18th ed.
VELAC ID#: 460130

Enviro Compliance Laboratories, Inc.
816 Kiwanis Street
Hampton, Virginia 23661
(757) 244-3424
Fax: (757) 244-3243
www.envirocompliance.com
eclhampton@envirocompliance.com

# Analytical Summary

GET Solutions, Inc.
Attn: Pat
204B Grayson Road
Virginia Beach, Virginia 23462

Date Received: December 07, 2010
Date Sampled : December 07, 2010
Date Issued : December 13, 2010

Lab # 7(A)/Sample ID : D7-P2 (2')

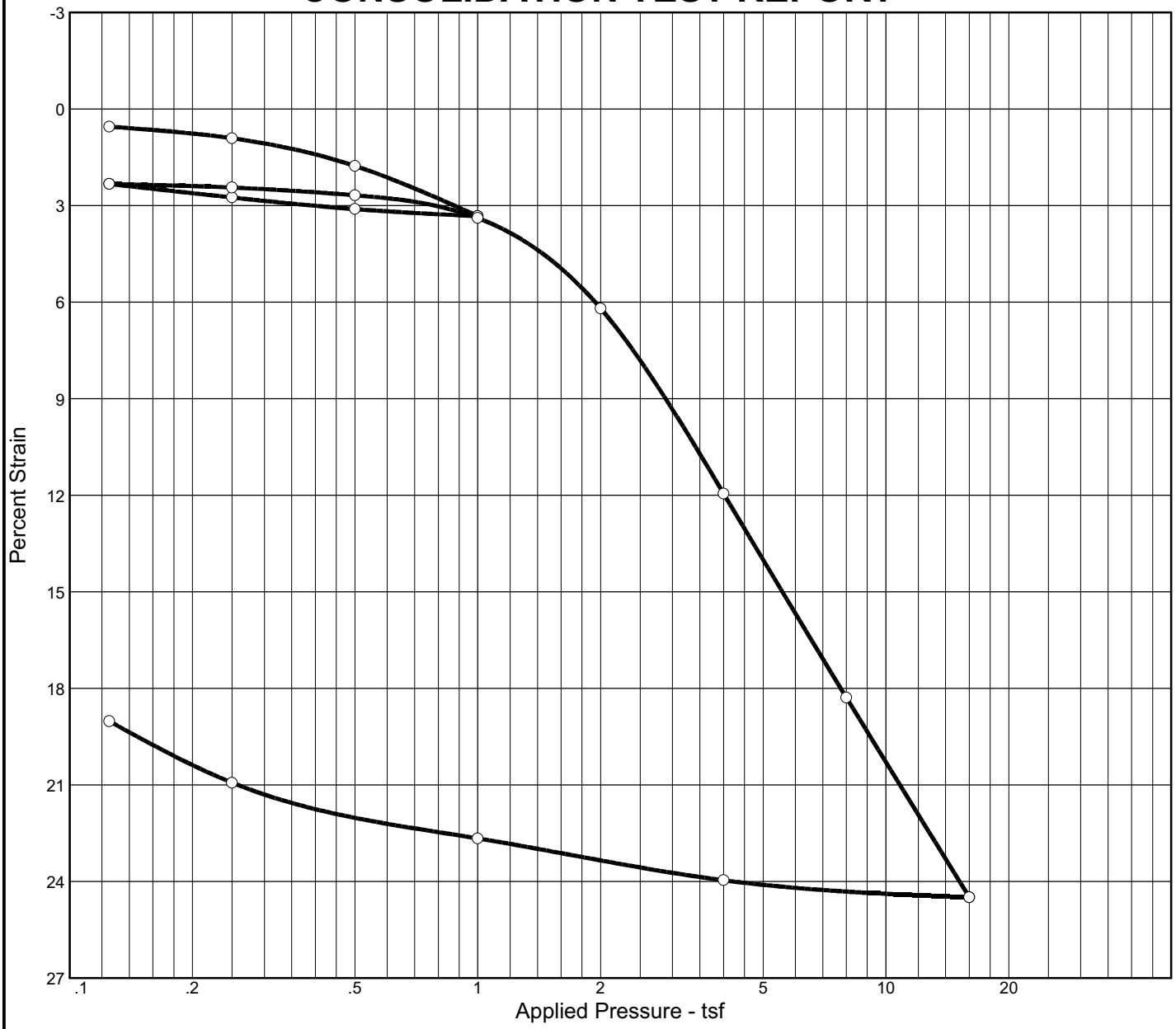
| Parameter | Result | Units | QL | Date/Time Prepared | Date/Time Analyzed | Method | Analyst |
|---|---|---|---|---|---|---|---|
| Sulfide | BQL | mg/kg | 30.0 | 12-09/0830 | 12-13/1000 | 4500S | GBH |
| Chloride | 39 | mg/kg | 5 | 12-10/1430 | 12-10/1430 | 4500Cl C | PEJ |

BQL = Below Quantitation Limit
All methods are 40 CFR 136 March 12, 2007, Table IB approved.
Reference to Standard Methods is 18th ed.
VELAC ID#: 460130

Anamarie E. McKinley
Laboratory Manager

# CONSOLIDATION TEST RESULTS

# CONSOLIDATION TEST REPORT




| MATERIAL DESCRIPTION | USCS | AASHTO |
|---|---|---|
| Gray, Fat CLAY | | |

| LL | PI | Sp. Gr. | Overburden (tsf) | Dry Dens. (pcf) | | Moisture | | Saturation | | Void Ratio | | $P_c$ (tsf) | $C_c$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Init. | Final | Init. | Final | Init. | Final | Init. | Final | | |
| | | 2.58 | 1.20 | 75.7 | | 43.6 % | 25.6 % | 99.7 % | 91.1 % | 1.129 | 0.724 | | |

| Preparation Process: | D2435 Method | $C_r$ | Swell Press. (tsf) | Heave % |
|---|---|---|---|---|
| Condition of Test: | | | | |

**Project No.** VB10-237G **Client:** HDR, Inc.

**Project:** VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia

**Location:** D7-21W

**Remarks:**
D7-21W
Depth=35 ft.

**Checked By:**

**Title:**

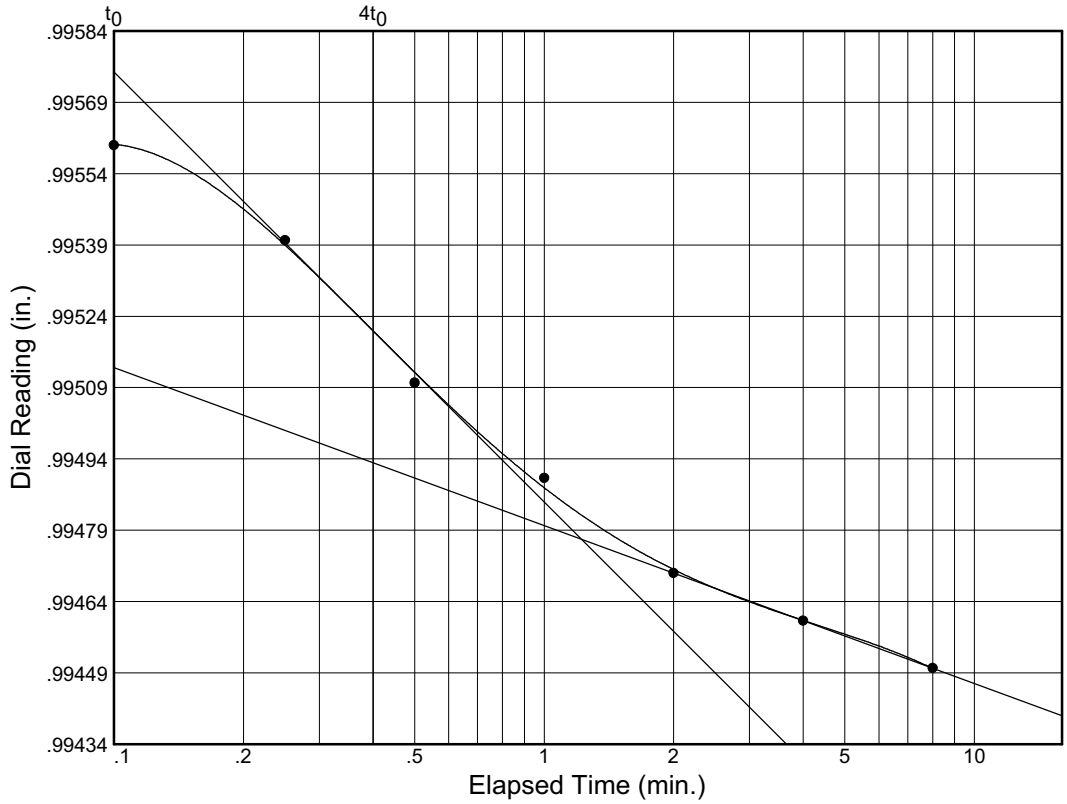
CONSOLIDATION TEST REPORT

**GET SOLUTIONS, INC.**

**Figure** 1

# Dial Reading vs. Time

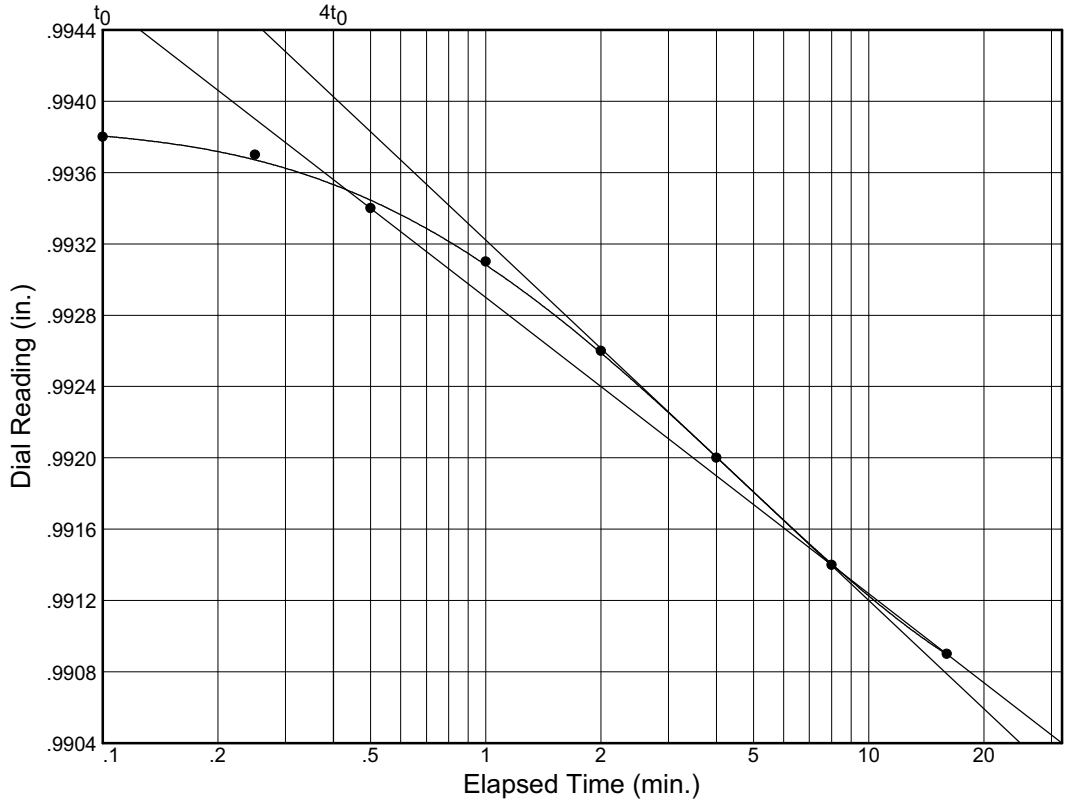
Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7-21W




Load No.= 1
Load= 0.13 tsf
$D_0$ = 0.99599
$D_{50}$ = 0.99538
$D_{100}$ = 0.99477
$T_{50}$ = 0.25 min.

$C_v$ @ $T_{50}$
1.92 ft.$^2$/day

$C_\alpha$ = 0.000




Load No.= 2
Load= 0.25 tsf
$D_0$ = 0.99408
$D_{50}$ = 0.99275
$D_{100}$ = 0.99141
$T_{50}$ = 1.63 min.

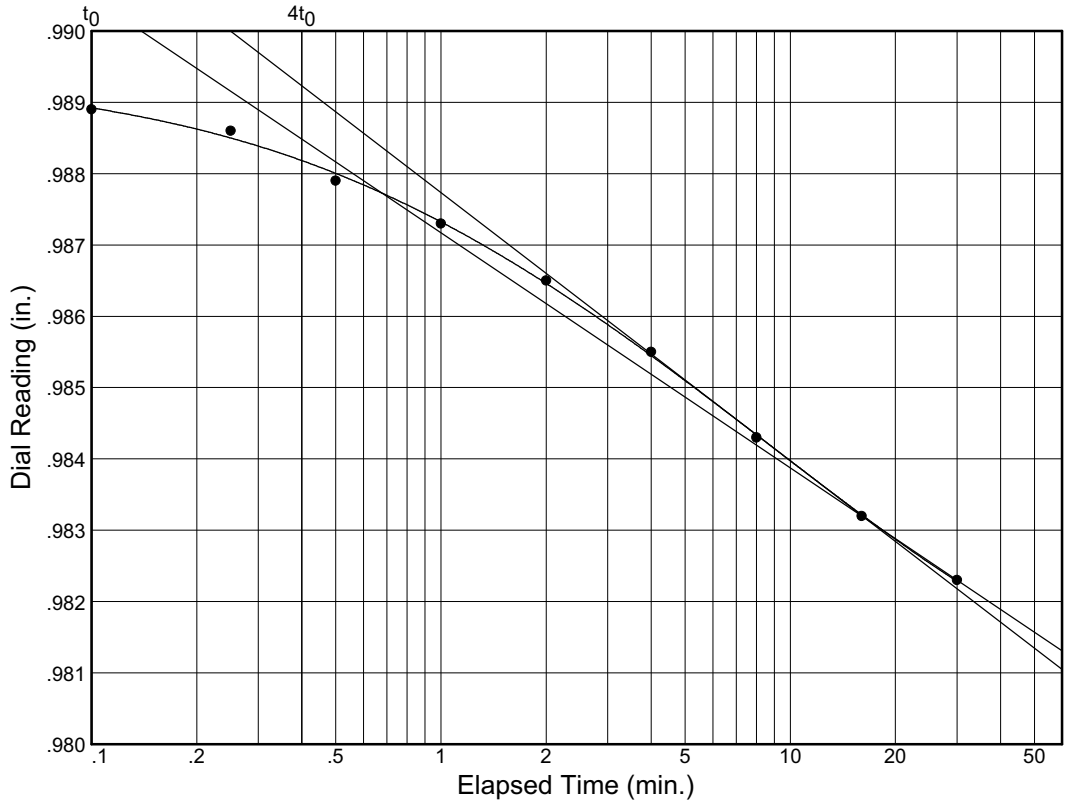
$C_v$ @ $T_{50}$
0.30 ft.$^2$/day

$C_\alpha$ = 0.002

Figure 2

# Dial Reading vs. Time

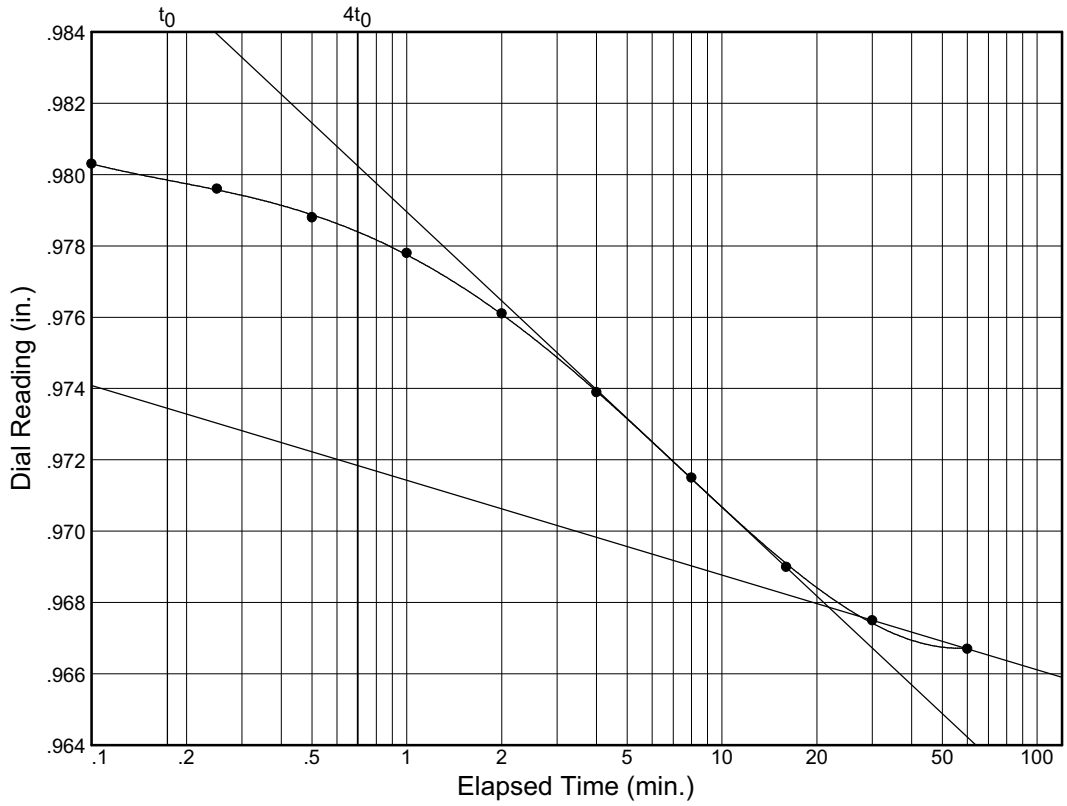
Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7-21W




Load No.= 3
Load= 0.50 tsf
$D_0$ = 0.98966
$D_{50}$ = 0.98641
$D_{100}$ = 0.98315
$T_{50}$ = 2.08 min.

| $C_v$ @ $T_{50}$ |
|---|
| 0.23 ft.$^2$/day |

$C_\alpha$ = 0.003




Load No.= 4
Load= 1.00 tsf
$D_0$ = 0.98129
$D_{50}$ = 0.97458
$D_{100}$ = 0.96787
$T_{50}$ = 3.28 min.

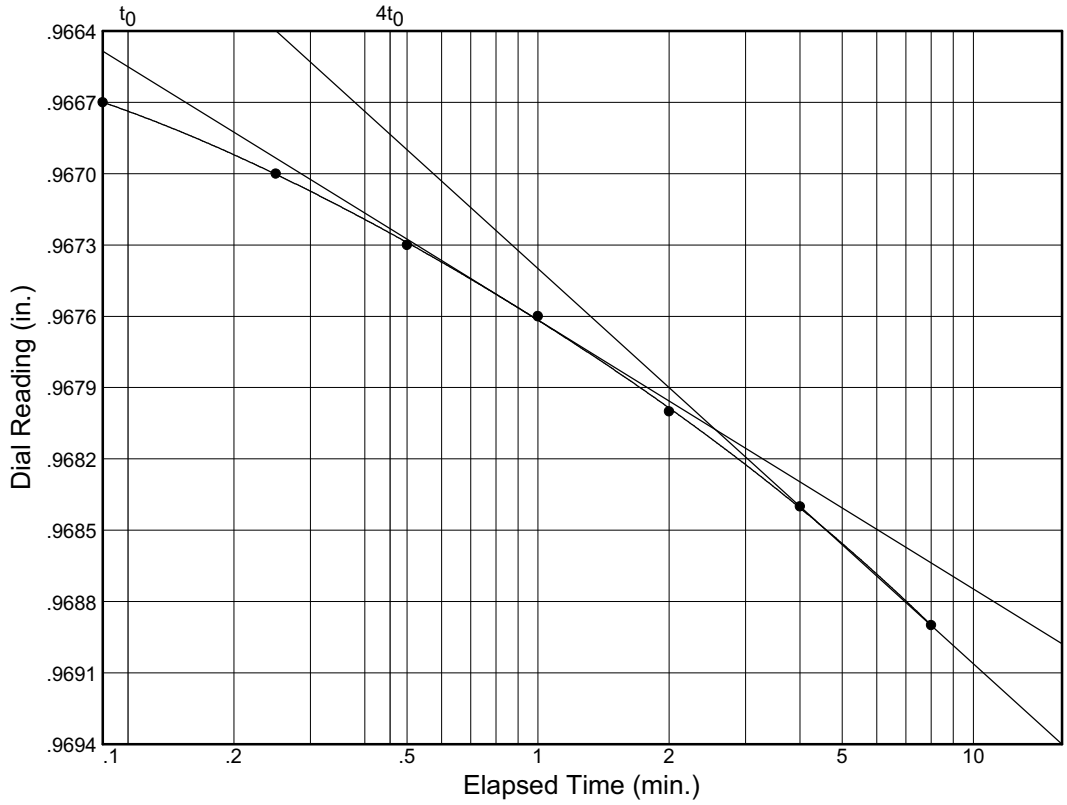
| $C_v$ @ $T_{50}$ |
|---|
| 0.14 ft.$^2$/day |

$C_\alpha$ = 0.003

Figure 3

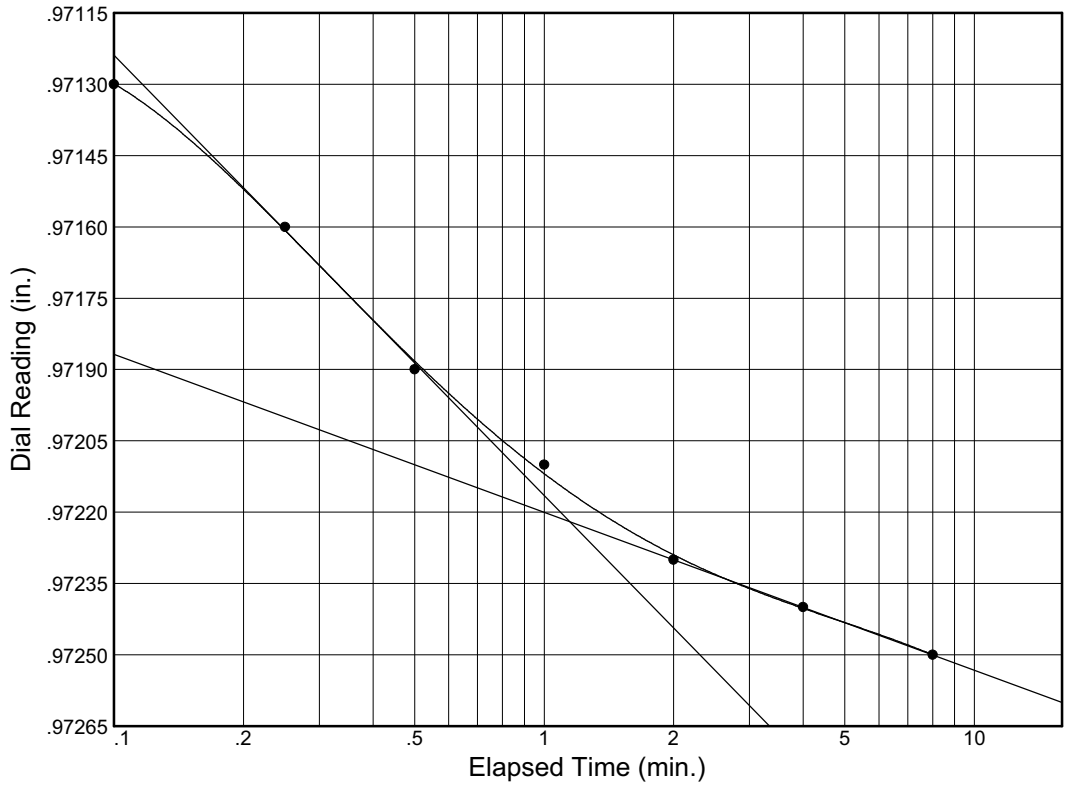
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7-21W




Load No.= 5
Load= 0.50 tsf
$D_0$ = 0.96622
$D_{50}$ = 0.96715
$D_{100}$ = 0.96808
$T_{50}$ = 0.36 min.

$C_v$ @ $T_{50}$
1.27 ft.$^2$/day



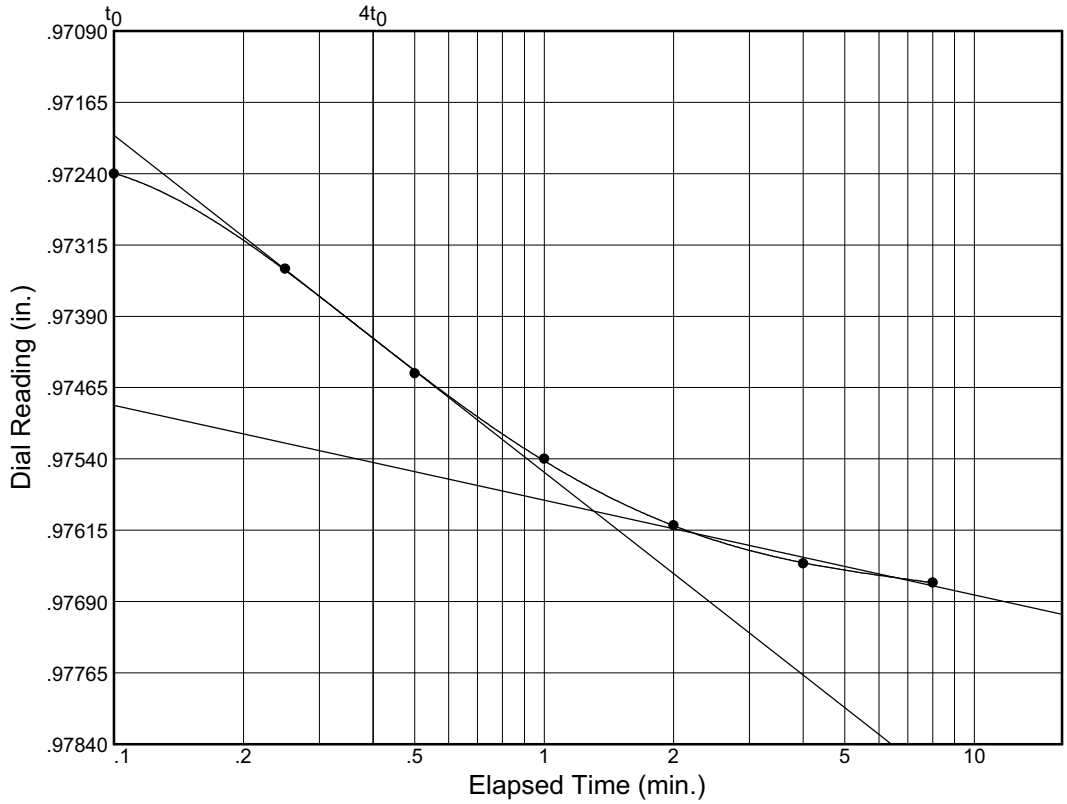

Load No.= 6
Load= 0.25 tsf
$D_0$ = 0.97080
$D_{50}$ = 0.97151
$D_{100}$ = 0.97222
$T_{50}$ = 0.19 min.

$C_v$ @ $T_{50}$
2.39 ft.$^2$/day

Figure 4

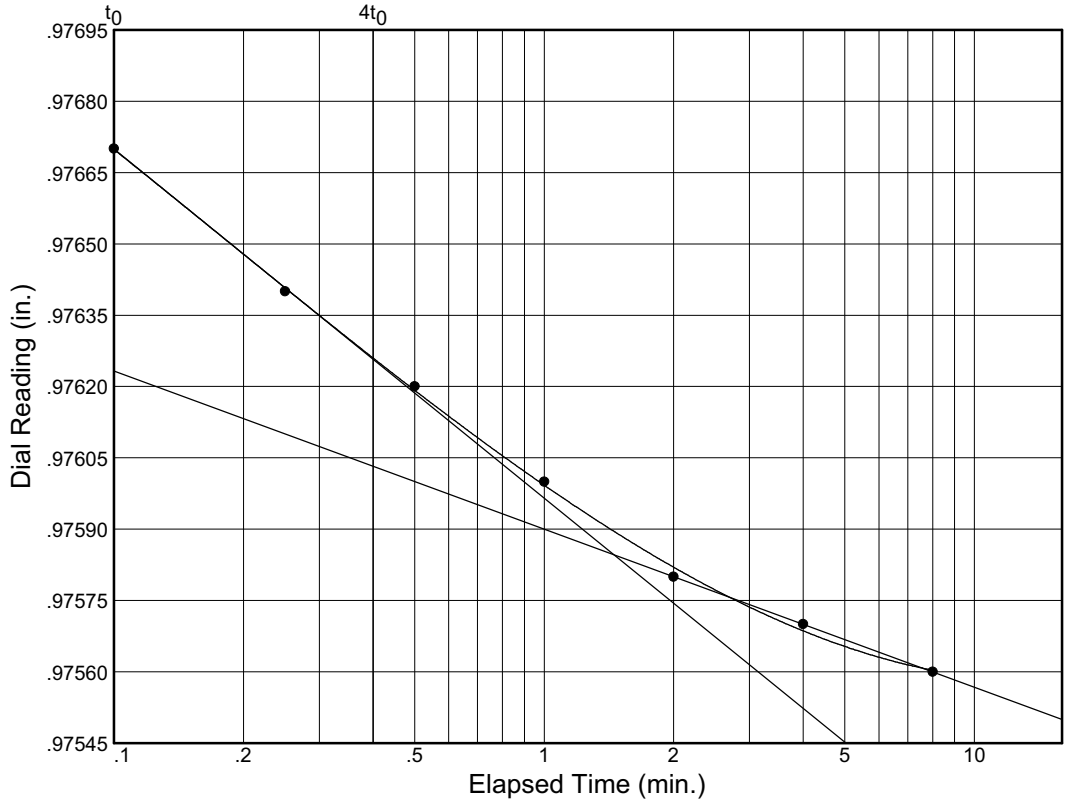
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7-21W




Load No.= 7
Load= 0.13 tsf
$D_0$ = 0.97066
$D_{50}$ = 0.97331
$D_{100}$ = 0.97595
$T_{50}$ = 0.23 min.

$C_v$ @ $T_{50}$
2.02 ft.$^2$/day




Load No.= 8
Load= 0.25 tsf
$D_0$ = 0.97714
$D_{50}$ = 0.97649
$D_{100}$ = 0.97585
$T_{50}$ = 0.19 min.

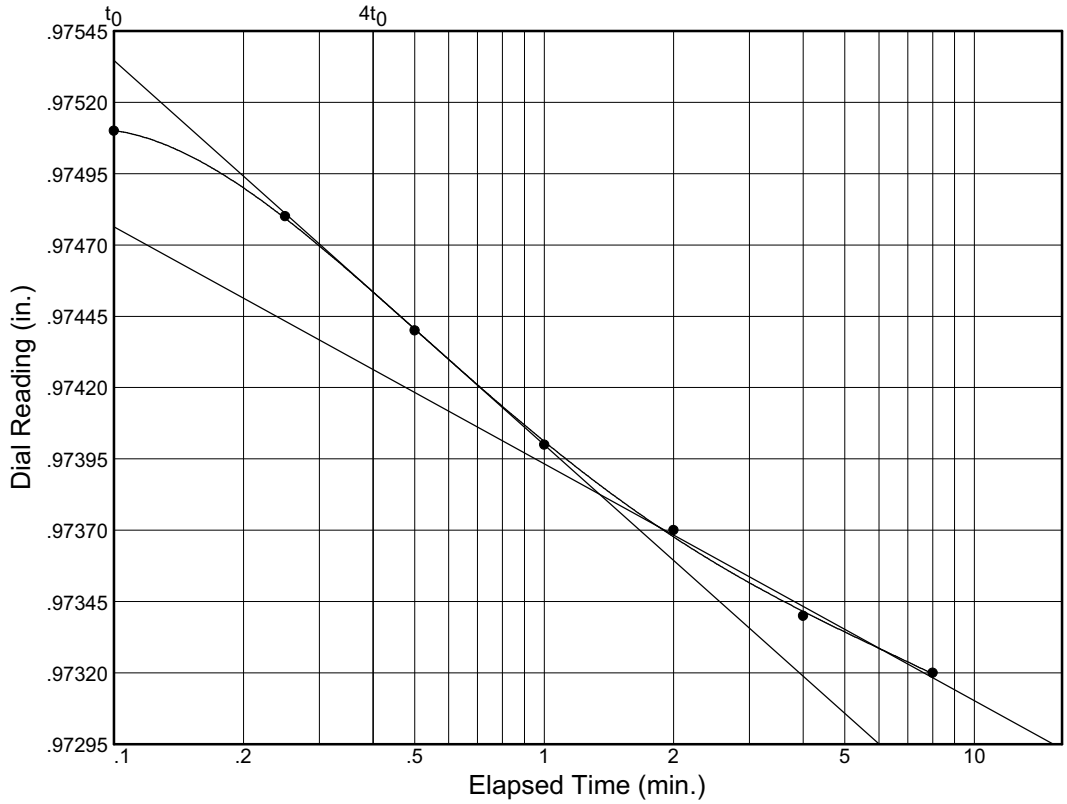
$C_v$ @ $T_{50}$
2.45 ft.$^2$/day

$C_\alpha$ = 0.000

Figure 5

# Dial Reading vs. Time

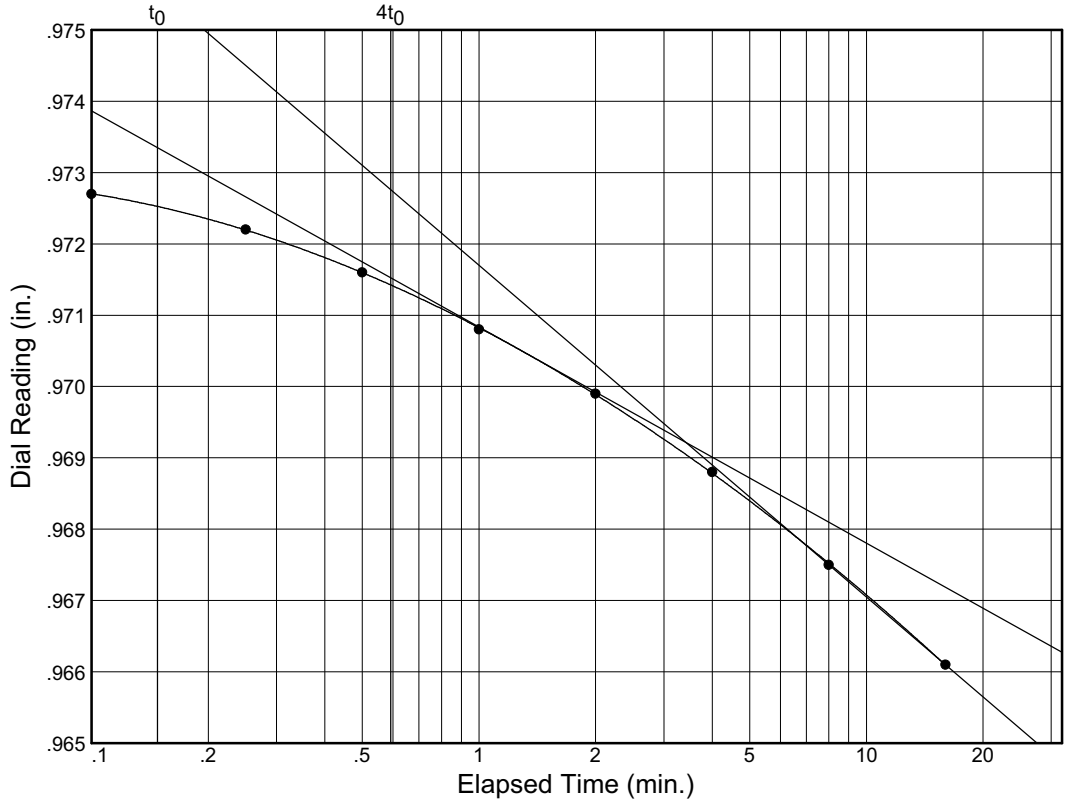
Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7-21W




Load No.= 9
Load= 0.50 tsf
$D_0$ = 0.97567
$D_{50}$ = 0.97475
$D_{100}$ = 0.97383
$T_{50}$ = 0.27 min.

$C_v$ @ $T_{50}$
1.71 ft.$^2$/day

$C_\alpha$ = 0.001




Load No.= 10
Load= 1.00 tsf
$D_0$ = 0.97363
$D_{50}$ = 0.97142
$D_{100}$ = 0.96921
$T_{50}$ = 0.59 min.

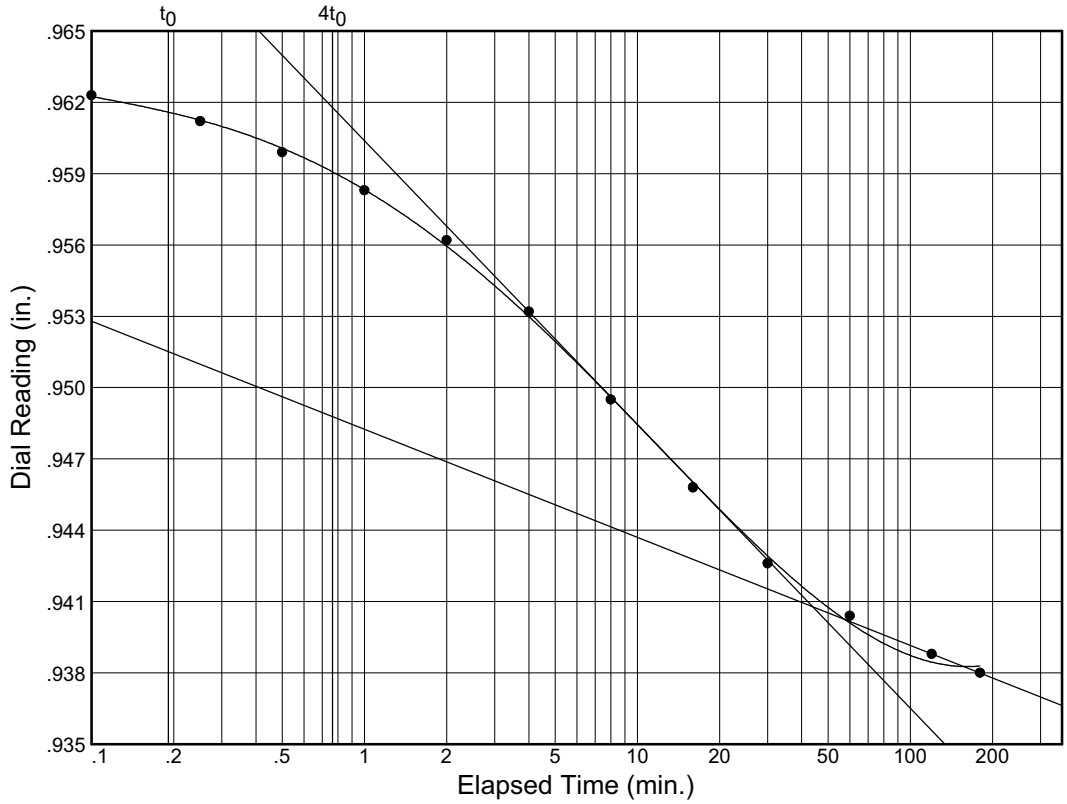
$C_v$ @ $T_{50}$
0.78 ft.$^2$/day

$C_\alpha$ = 0.005

Figure 6

# Dial Reading vs. Time

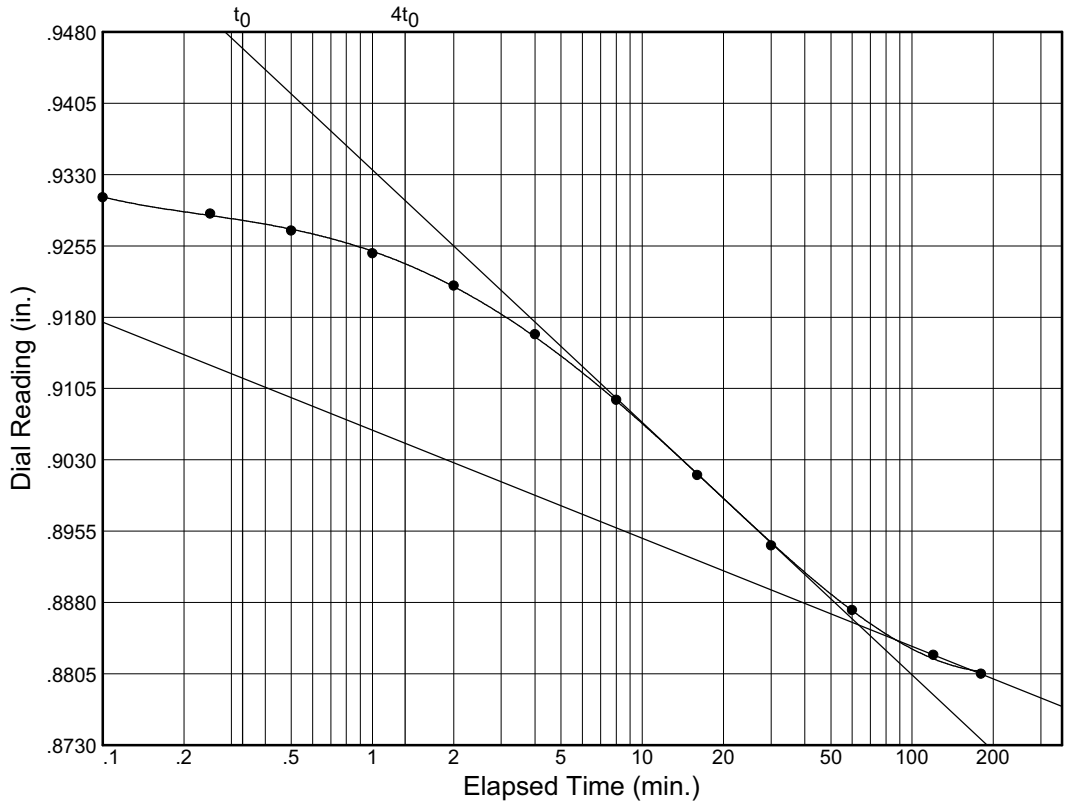
Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7-21W




Load No.= 11
Load= 2.00 tsf
$D_0$ = 0.96410
$D_{50}$ = 0.95244
$D_{100}$ = 0.94078
$T_{50}$ = 4.50 min.

$C_v$ @ $T_{50}$
0.10 ft.$^2$/day

$C_\alpha$ = 0.005




Load No.= 12
Load= 4.00 tsf
$D_0$ = 0.93273
$D_{50}$ = 0.90919
$D_{100}$ = 0.88565
$T_{50}$ = 8.02 min.

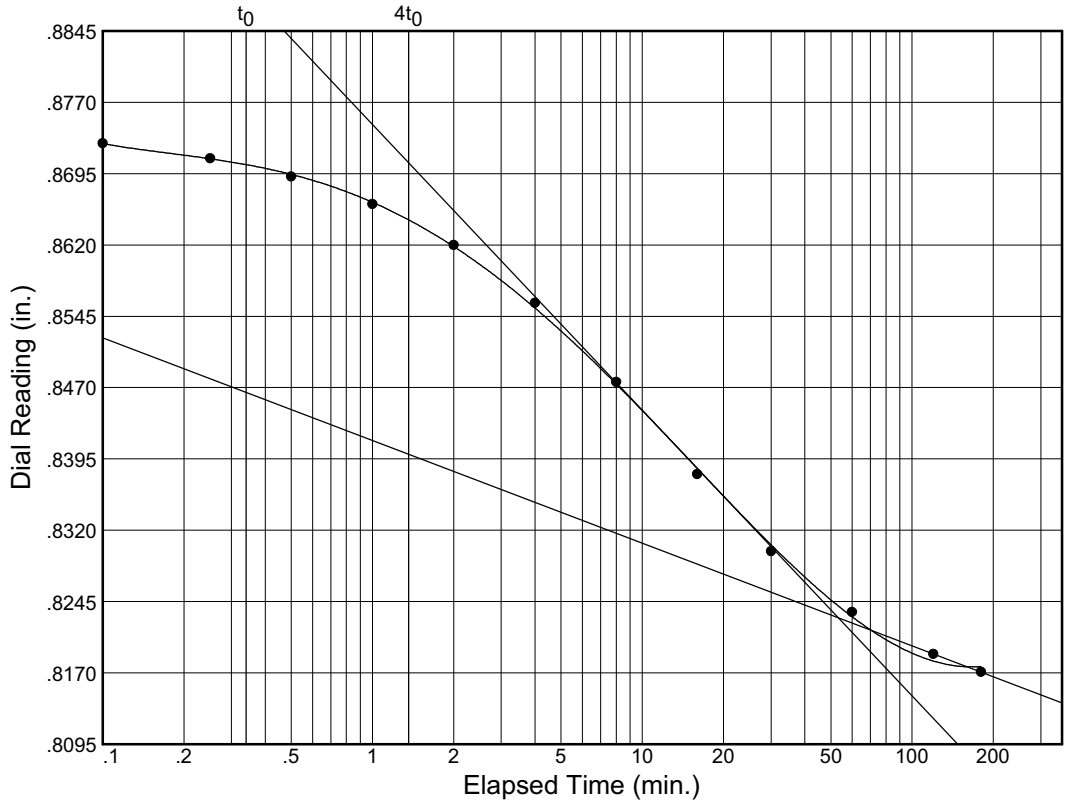
$C_v$ @ $T_{50}$
0.05 ft.$^2$/day

$C_\alpha$ = 0.012

Figure 7

# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7-21W




Load No.= 13

Load= 8.00 tsf

$D_0$ = 0.87625

$D_{50}$ = 0.84953

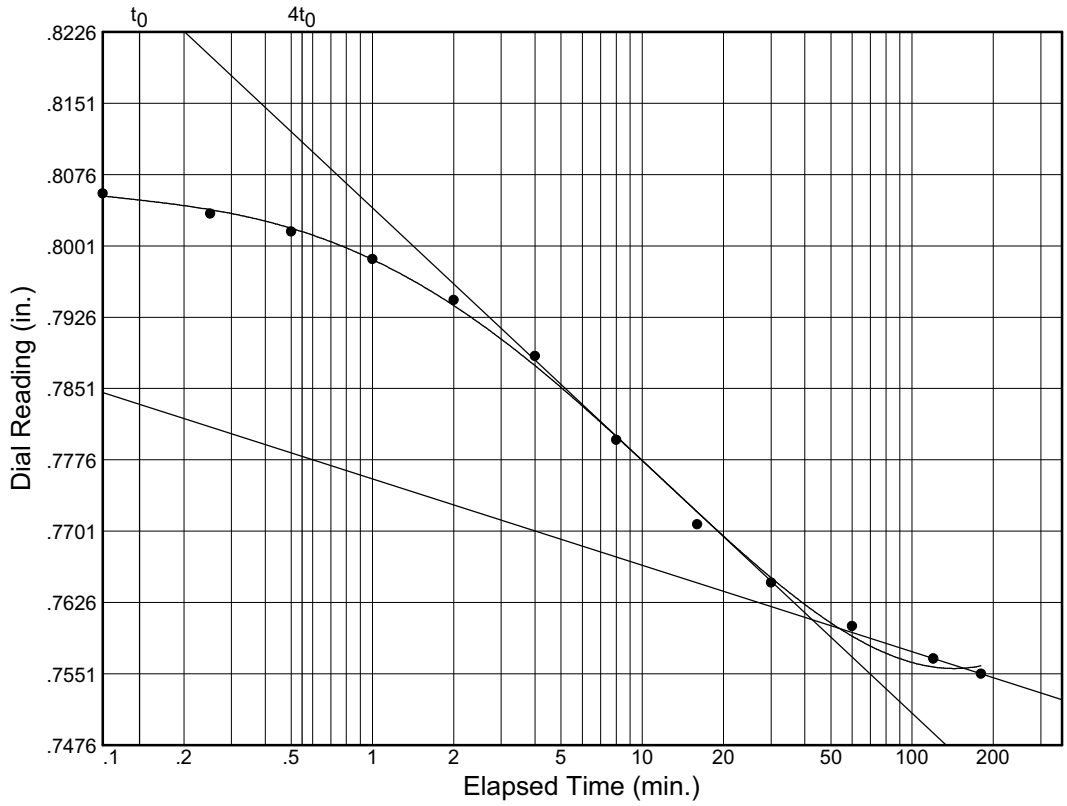
$D_{100}$ = 0.82280

$T_{50}$ = 6.71 min.

$C_v$ @ $T_{50}$

0.05 ft.$^2$/day

$C_\alpha$ = 0.012




Load No.= 14

Load= 16.00 tsf

$D_0$ = 0.80823

$D_{50}$ = 0.78450

$D_{100}$ = 0.76078

$T_{50}$ = 5.34 min.

$C_v$ @ $T_{50}$

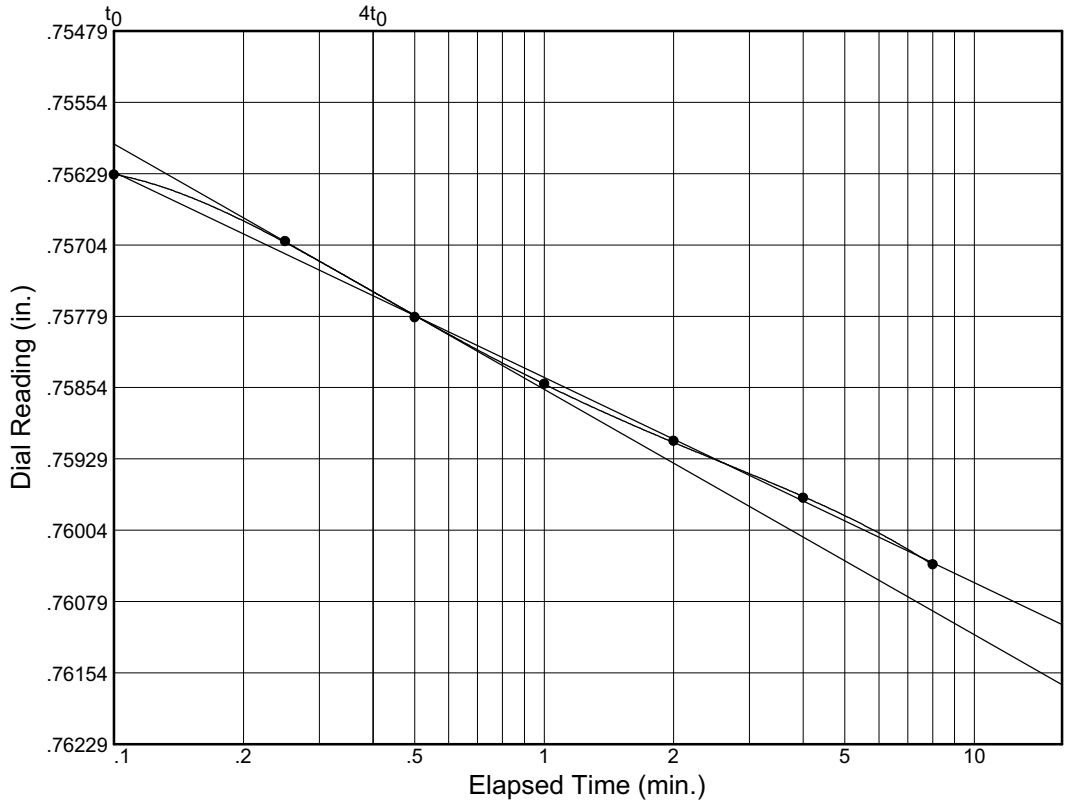
0.06 ft.$^2$/day

$C_\alpha$ = 0.011

Figure 8

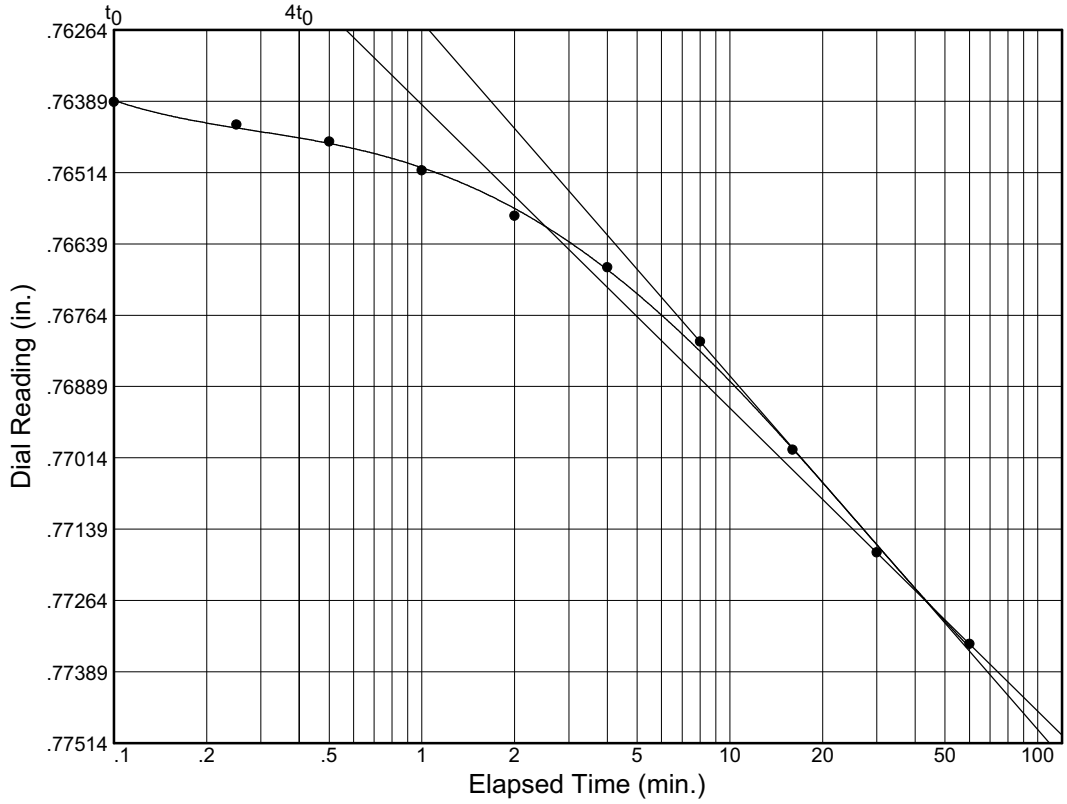
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7-21W




Load No.= 15
Load= 4.00 tsf
$D_0$ = 0.75506
$D_{50}$ = 0.75643
$D_{100}$ = 0.75780
$T_{50}$ = 0.13 min.

$C_v$ @ $T_{50}$
2.18 ft.$^2$/day



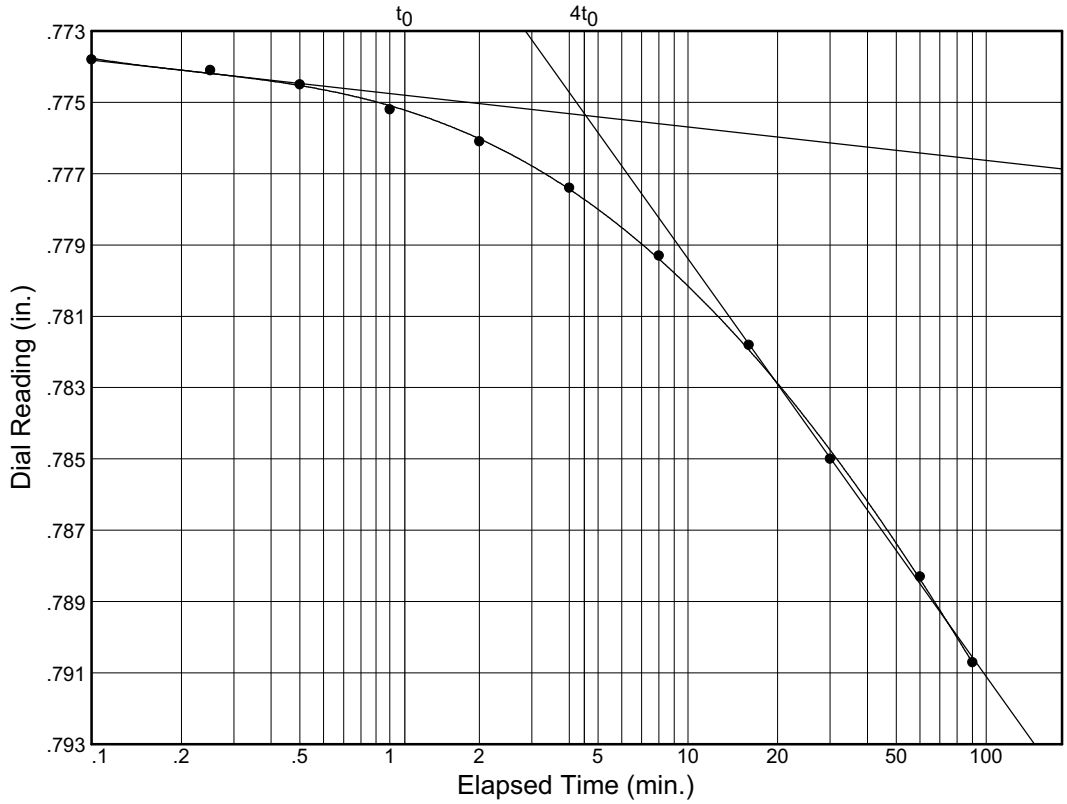

Load No.= 16
Load= 1.00 tsf
$D_0$ = 0.76322
$D_{50}$ = 0.76792
$D_{100}$ = 0.77263
$T_{50}$ = 6.86 min.

$C_v$ @ $T_{50}$
0.04 ft.$^2$/day

Figure 9

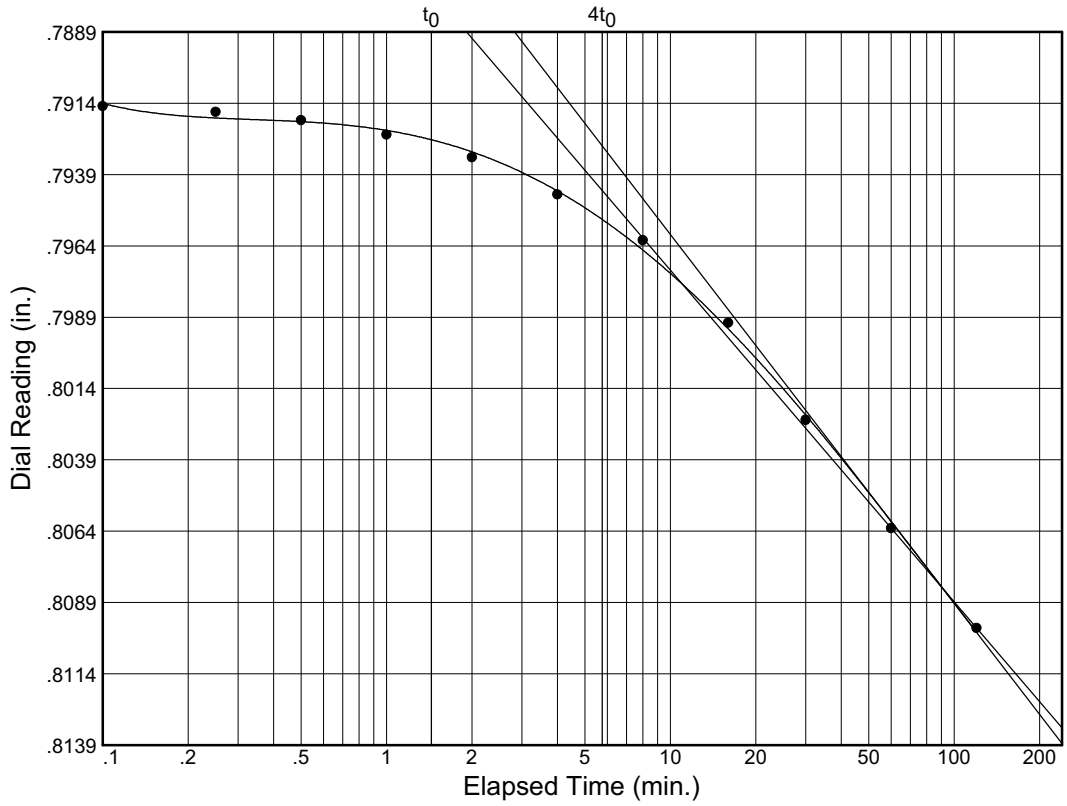
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7-21W




Load No.= 17
Load= 0.25 tsf
$D_0$ = 0.77272
$D_{50}$ = 0.77404
$D_{100}$ = 0.77537
$T_{50}$ = 0.18 min.

| $C_v$ @ $T_{50}$ |
|---|
| 1.72 ft.$^2$/day |



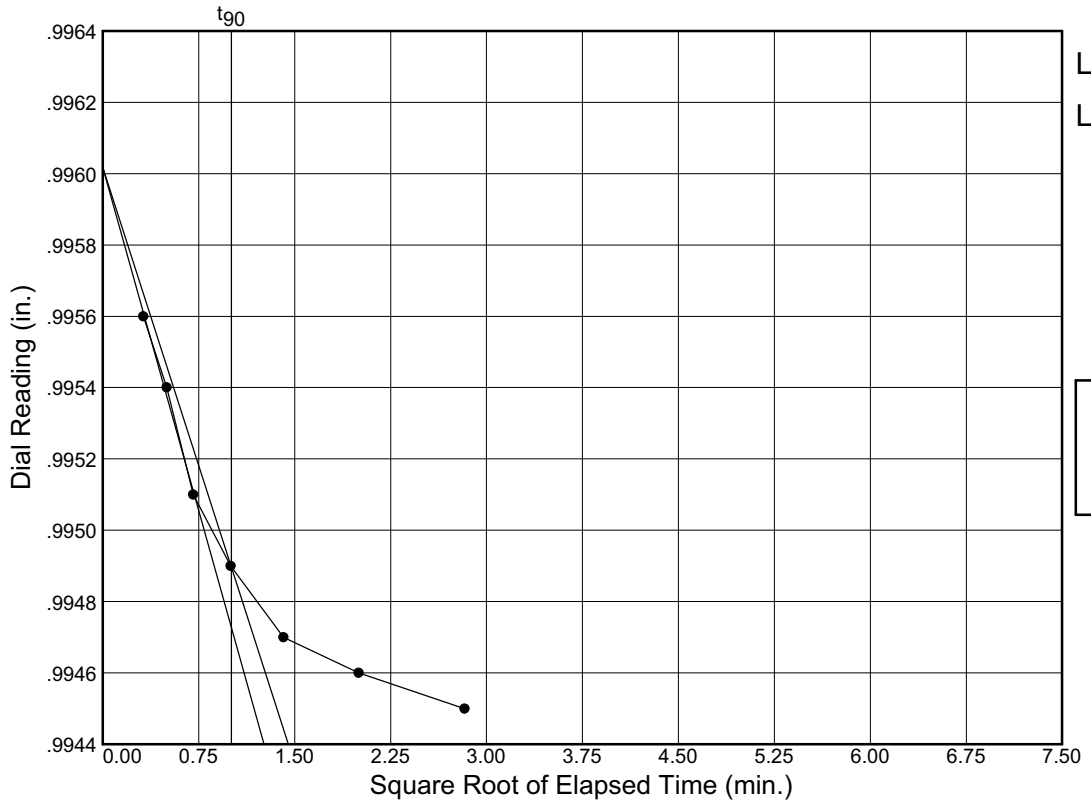

Load No.= 18
Load= 0.13 tsf
$D_0$ = 0.78988
$D_{50}$ = 0.79918
$D_{100}$ = 0.80848
$T_{50}$ = 15.54 min.

| $C_v$ @ $T_{50}$ |
|---|
| 0.02 ft.$^2$/day |

Figure 10

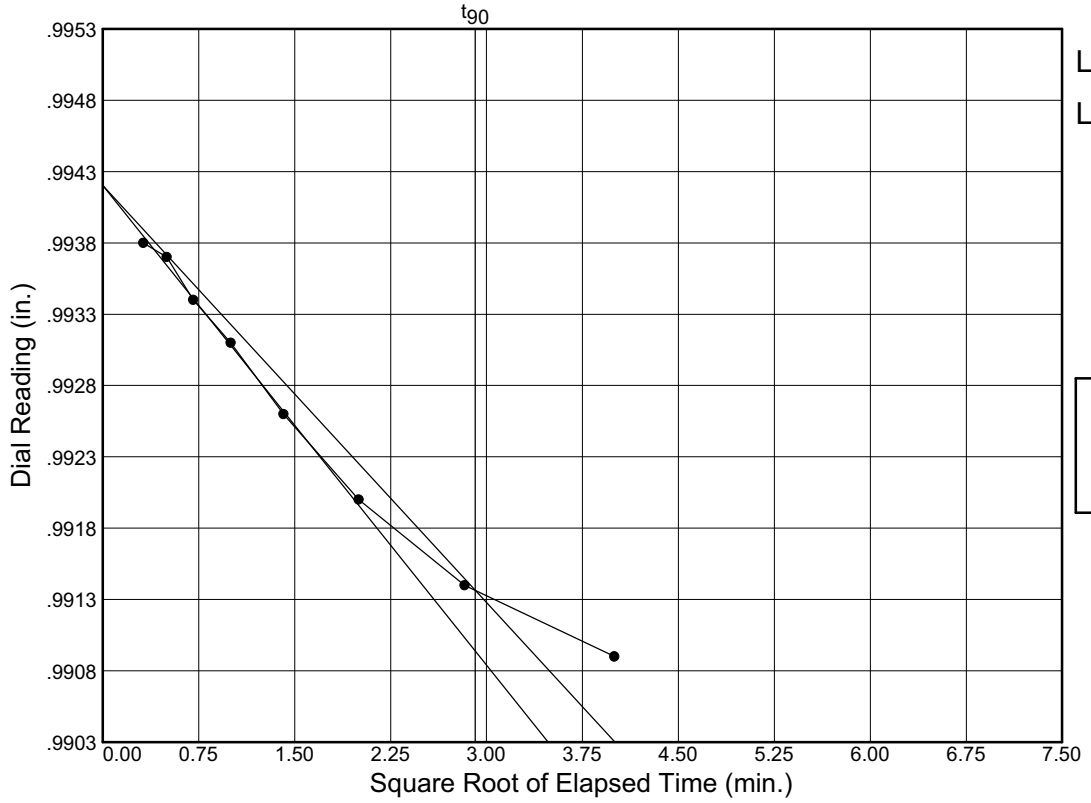
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7-21W




Load No.= 1
Load= 0.13 tsf
$D_0$ = 0.99602
$D_{90}$ = 0.99490
$D_{100}$ = 0.99477
$T_{90}$ = 1.01 min.

$C_v$ @ $T_{90}$
2.09 ft.$^2$/day



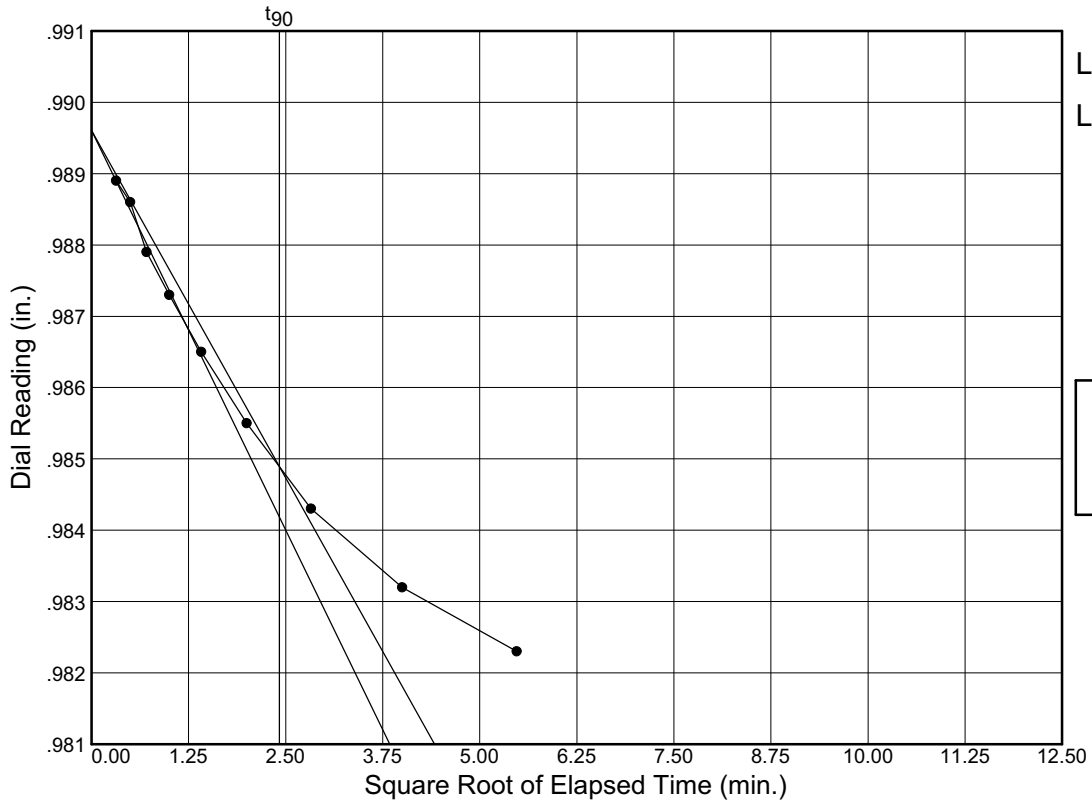

Load No.= 2
Load= 0.25 tsf
$D_0$ = 0.99420
$D_{90}$ = 0.99136
$D_{100}$ = 0.99105
$T_{90}$ = 8.48 min.

$C_v$ @ $T_{90}$
0.25 ft.$^2$/day

Figure 2

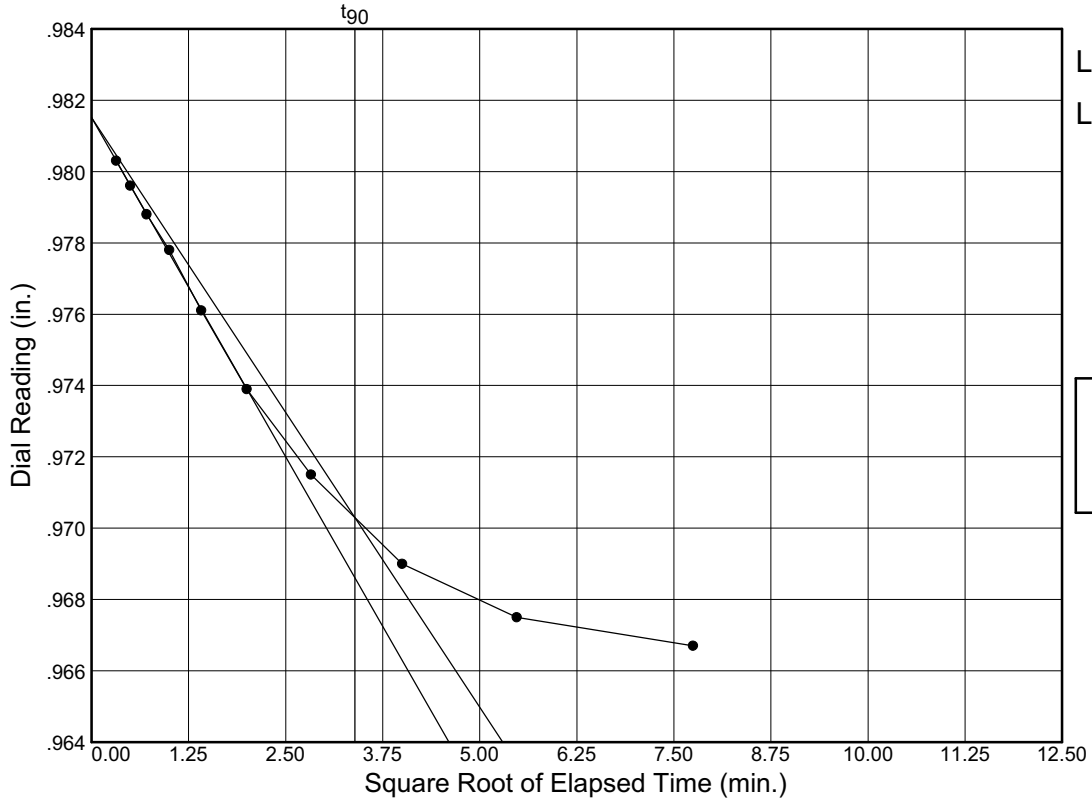
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7-21W




Load No.= 3
Load= 0.50 tsf
$D_0$ = 0.98960
$D_{90}$ = 0.98489
$D_{100}$ = 0.98437
$T_{90}$ = 5.85 min.

$C_v$ @ $T_{90}$
0.35 ft.$^2$/day



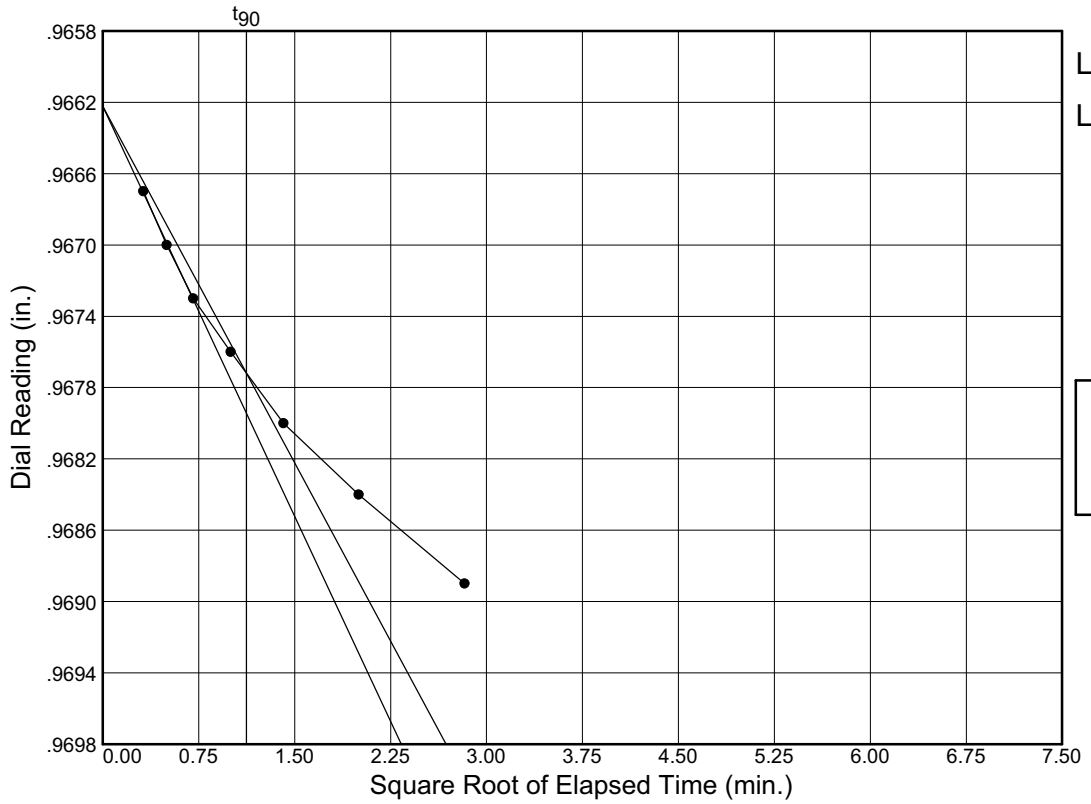

Load No.= 4
Load= 1.00 tsf
$D_0$ = 0.98151
$D_{90}$ = 0.97030
$D_{100}$ = 0.96906
$T_{90}$ = 11.49 min.

$C_v$ @ $T_{90}$
0.18 ft.$^2$/day

Figure 3

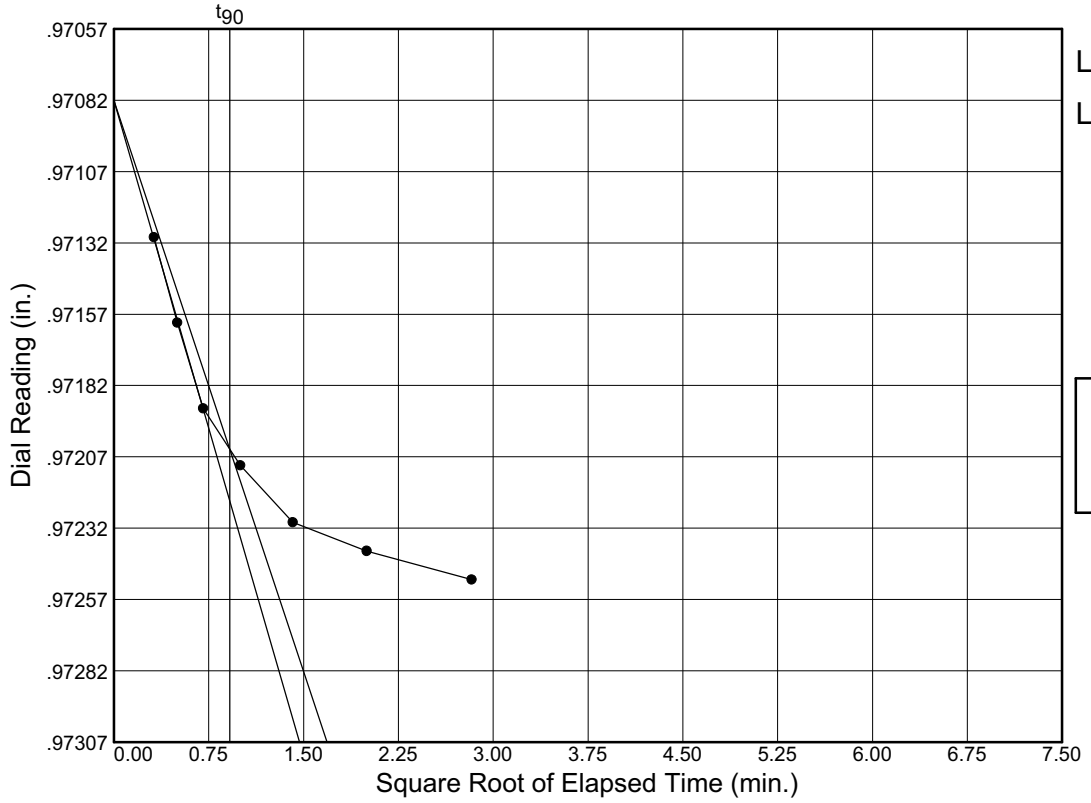
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7-21W




Load No.= 5
Load= 0.50 tsf
$D_0$ = 0.96622
$D_{90}$ = 0.96772
$D_{100}$ = 0.96789
$T_{90}$ = 1.26 min.

$C_v$ @ $T_{90}$
1.57 ft.$^2$/day



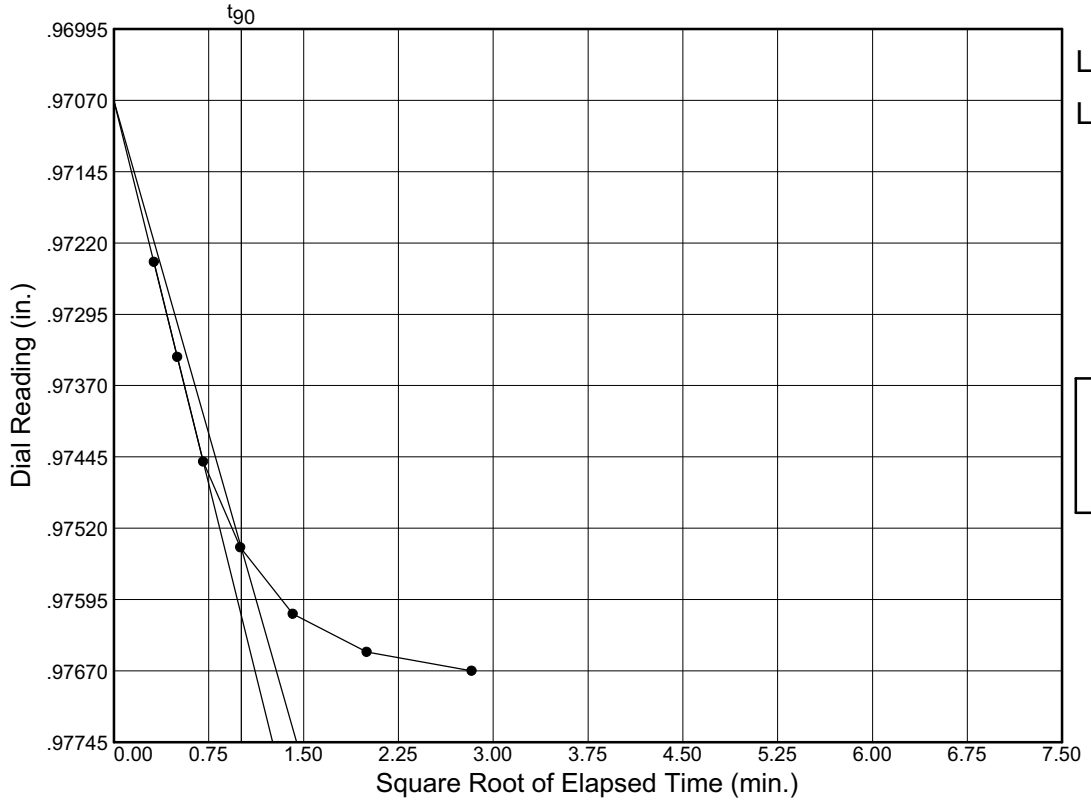

Load No.= 6
Load= 0.25 tsf
$D_0$ = 0.97082
$D_{90}$ = 0.97204
$D_{100}$ = 0.97218
$T_{90}$ = 0.84 min.

$C_v$ @ $T_{90}$
2.39 ft.$^2$/day

Figure 4

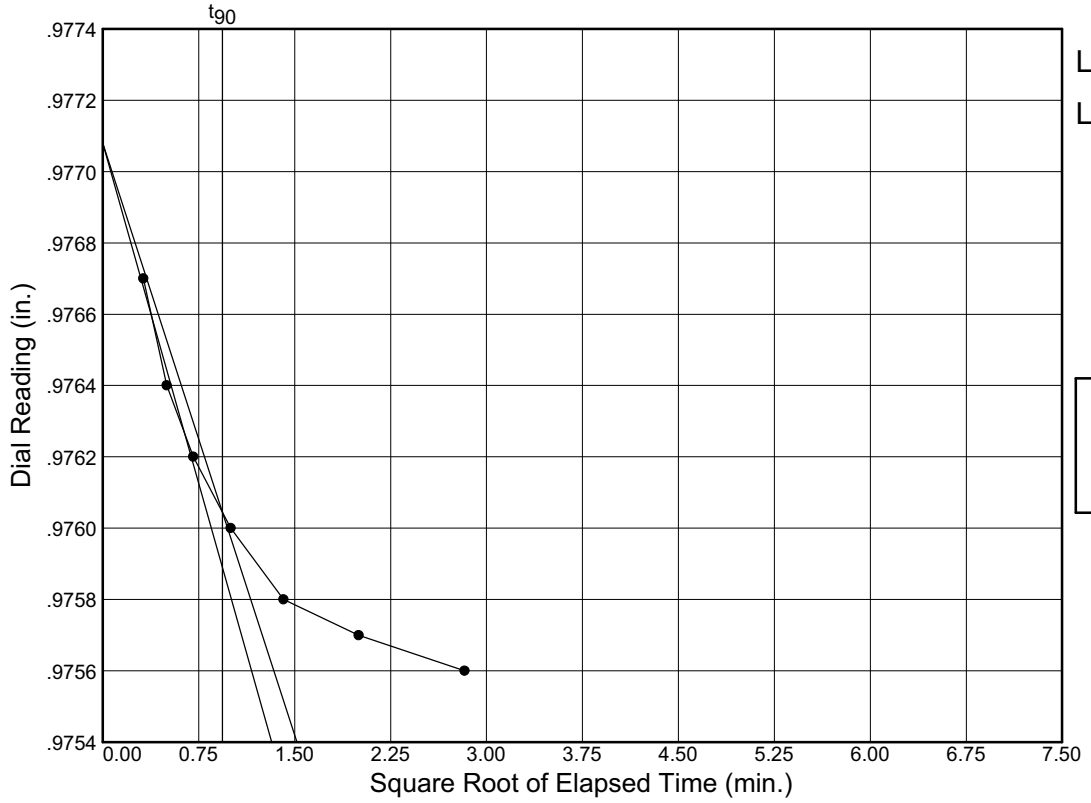
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7-21W




Load No.= 7
Load= 0.13 tsf
$D_0$ = 0.97071
$D_{90}$ = 0.97541
$D_{100}$ = 0.97594
$T_{90}$ = 1.02 min.

$C_v$ @ $T_{90}$
1.98 ft.$^2$/day



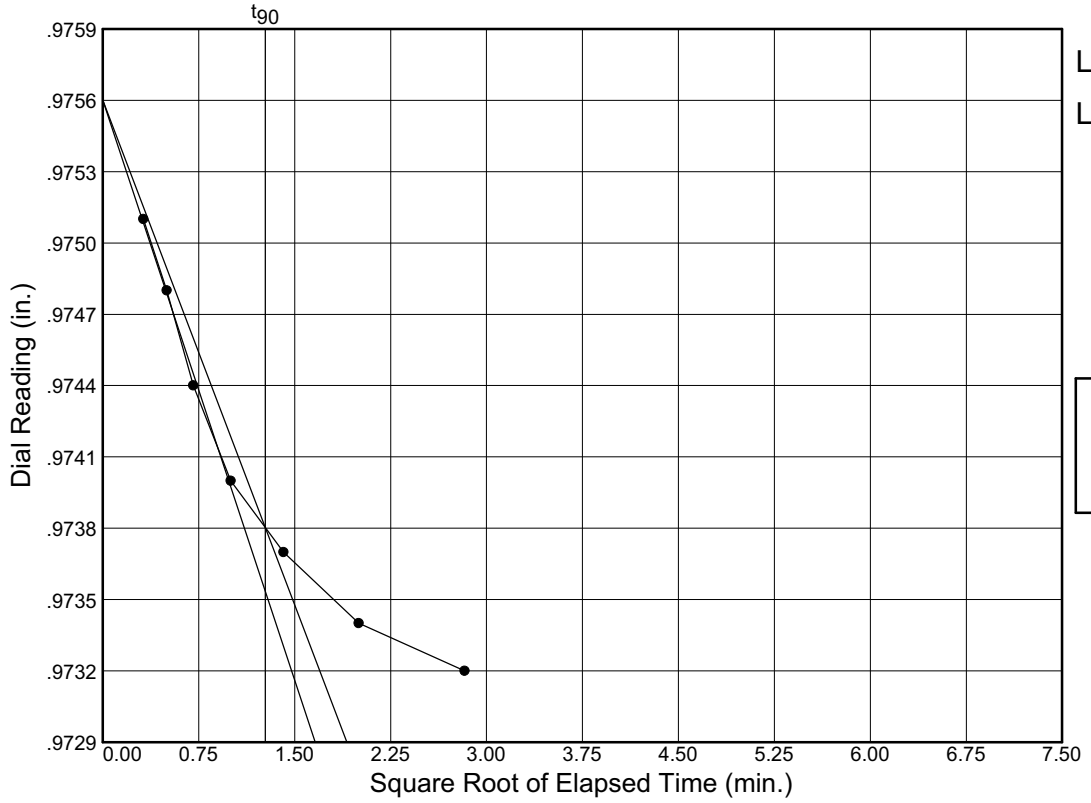

Load No.= 8
Load= 0.25 tsf
$D_0$ = 0.97708
$D_{90}$ = 0.97604
$D_{100}$ = 0.97593
$T_{90}$ = 0.88 min.

$C_v$ @ $T_{90}$
2.31 ft.$^2$/day

Figure 5

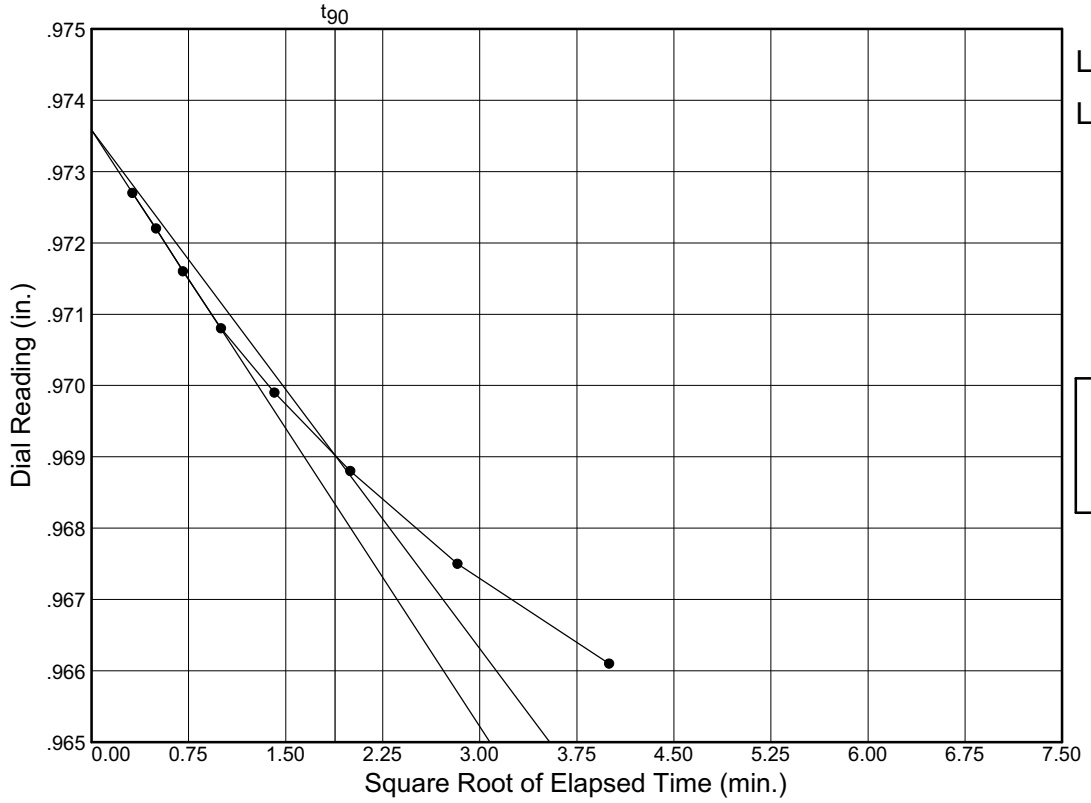
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7-21W




Load No.= 9
Load= 0.50 tsf
$D_0$ = 0.97560
$D_{90}$ = 0.97380
$D_{100}$ = 0.97360
$T_{90}$ = 1.61 min.

$C_v$ @ $T_{90}$
1.25 ft.$^2$/day



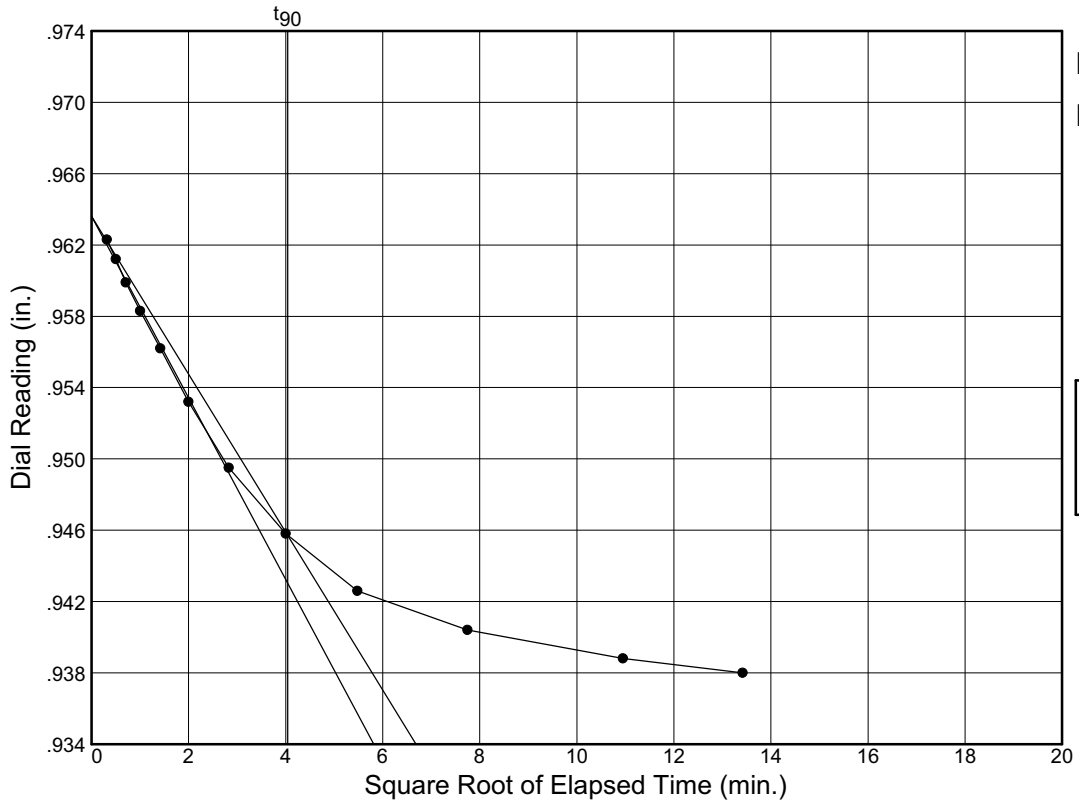

Load No.= 10
Load= 1.00 tsf
$D_0$ = 0.97358
$D_{90}$ = 0.96902
$D_{100}$ = 0.96852
$T_{90}$ = 3.54 min.

$C_v$ @ $T_{90}$
0.56 ft.$^2$/day

Figure 6

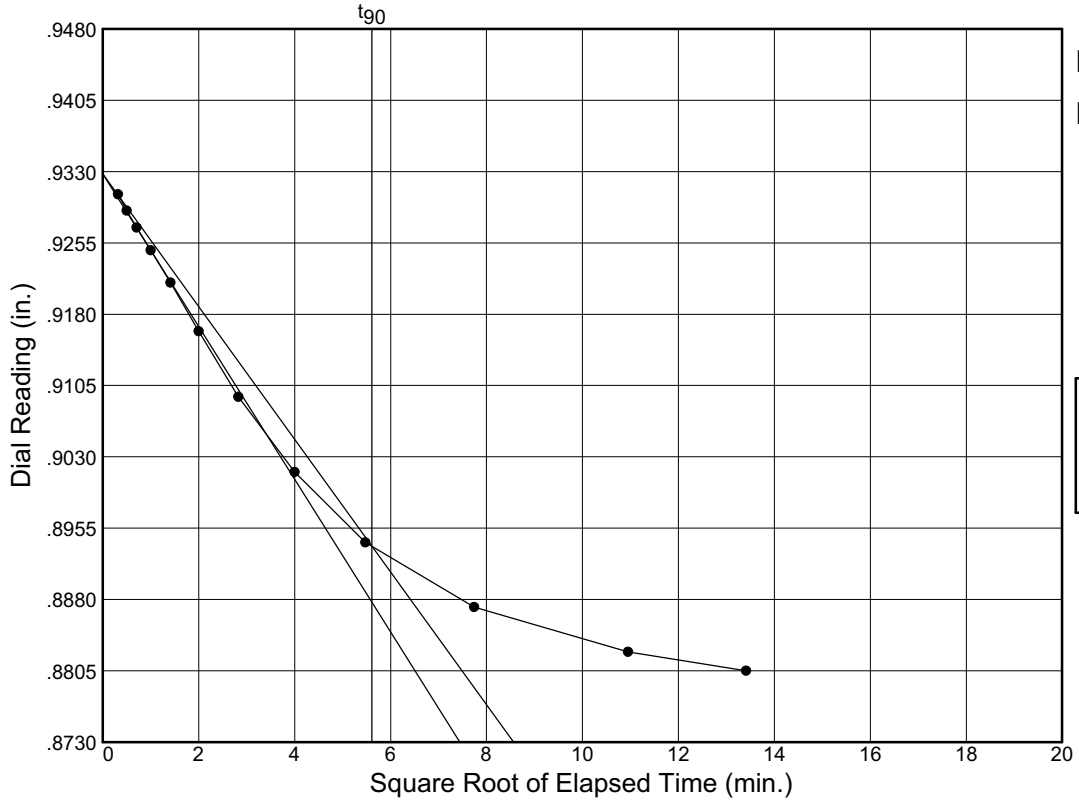
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7-21W




Load No.= 11
Load= 2.00 tsf
$D_0$ = 0.96361
$D_{90}$ = 0.94571
$D_{100}$ = 0.94373
$T_{90}$ = 16.32 min.

| $C_v$ @ $T_{90}$ |
|---|
| 0.12 ft.$^2$/day |



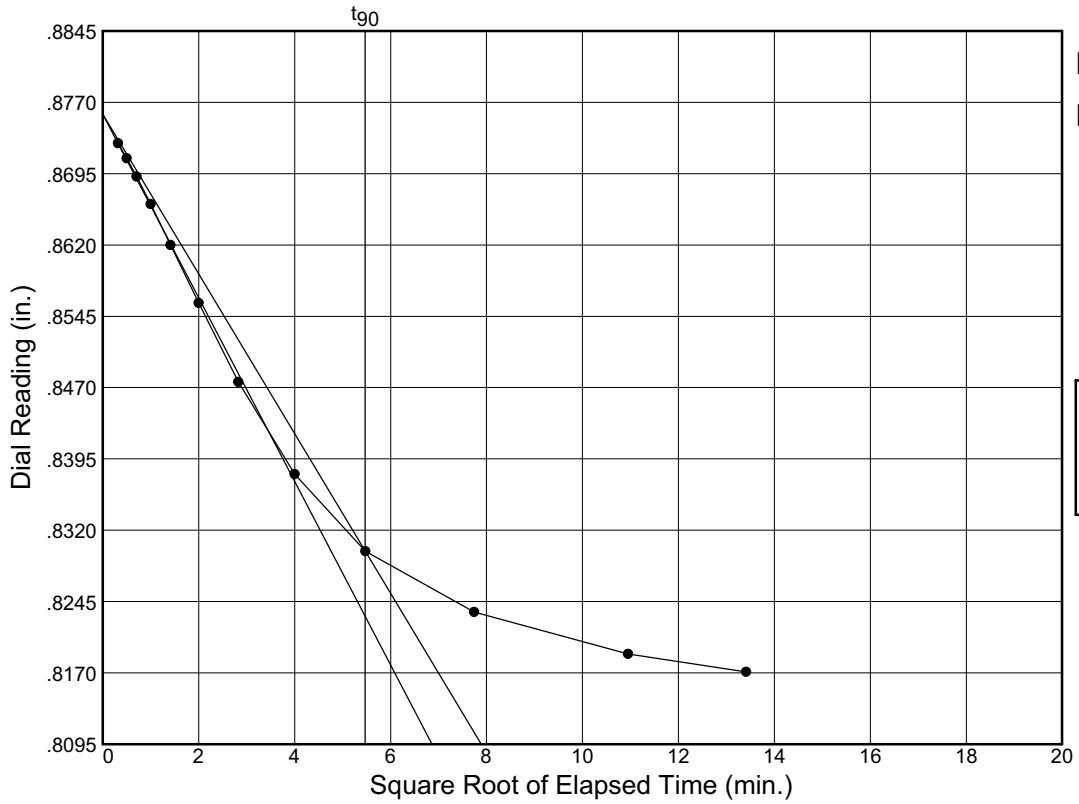

Load No.= 12
Load= 4.00 tsf
$D_0$ = 0.93274
$D_{90}$ = 0.89360
$D_{100}$ = 0.88926
$T_{90}$ = 31.46 min.

| $C_v$ @ $T_{90}$ |
|---|
| 0.06 ft.$^2$/day |

Figure 7

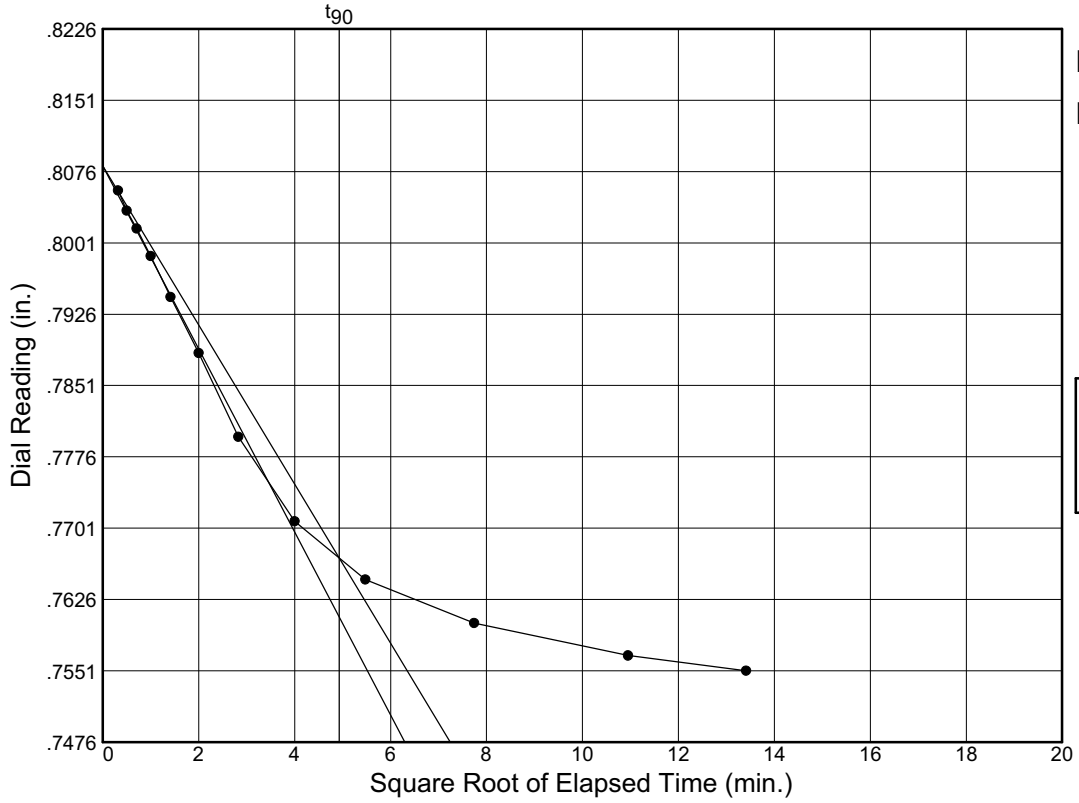
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7-21W




Load No.= 13
Load= 8.00 tsf
$D_0$ = 0.87574
$D_{90}$ = 0.82985
$D_{100}$ = 0.82475
$T_{90}$ = 29.90 min.

$C_v$ @ $T_{90}$
0.05 ft.$^2$/day



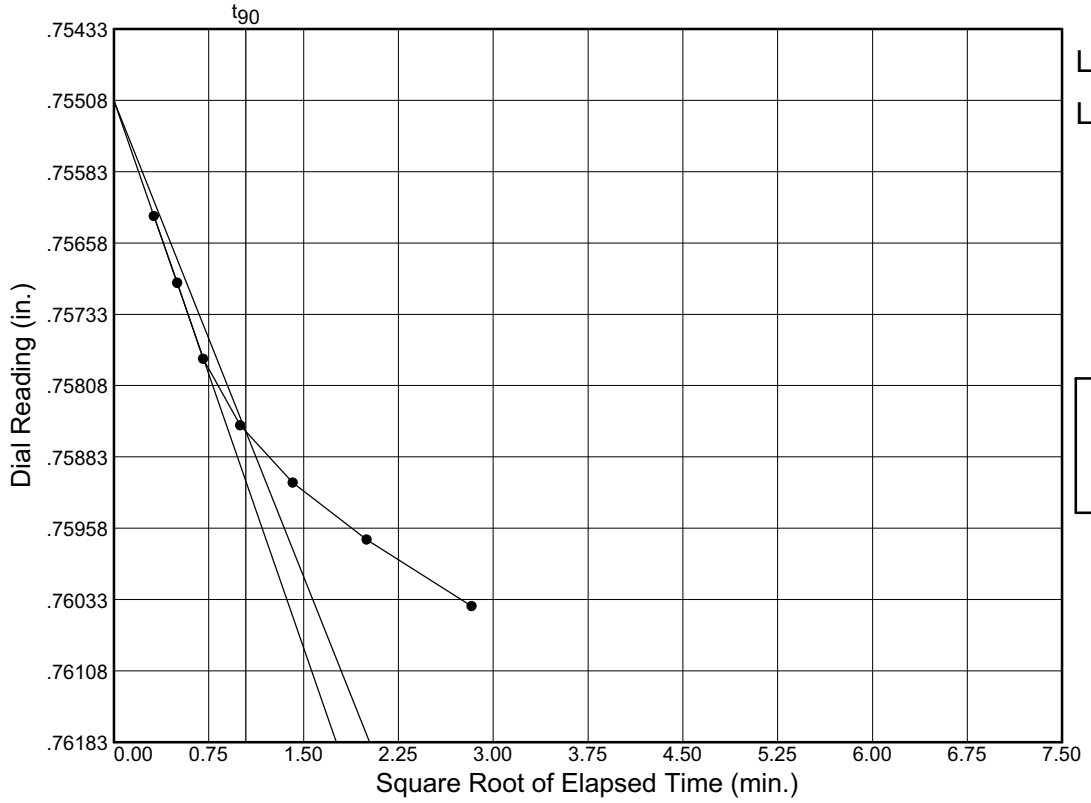

Load No.= 14
Load= 16.00 tsf
$D_0$ = 0.80821
$D_{90}$ = 0.76698
$D_{100}$ = 0.76240
$T_{90}$ = 24.26 min.

$C_v$ @ $T_{90}$
0.05 ft.$^2$/day

Figure 8

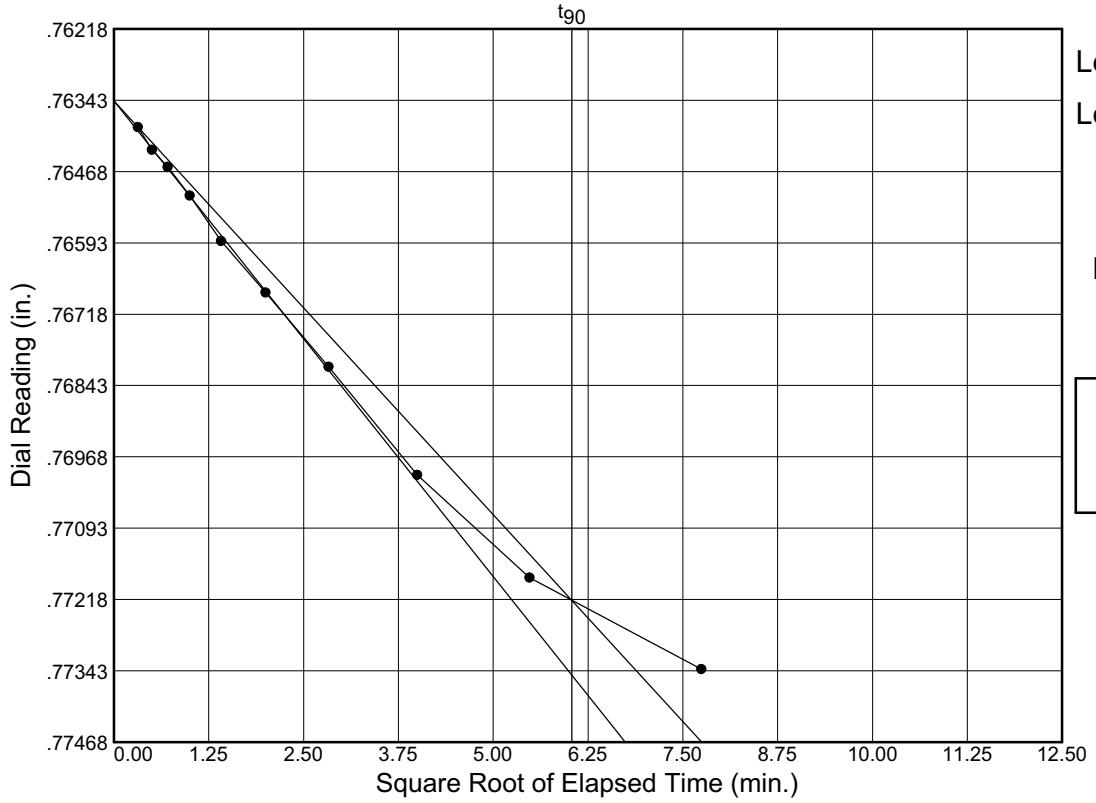
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7-21W




Load No.= 15
Load= 4.00 tsf
$D_0$ = 0.75508
$D_{90}$ = 0.75856
$D_{100}$ = 0.75895
$T_{90}$ = 1.08 min.

$C_v$ @ $T_{90}$
1.12 ft.$^2$/day



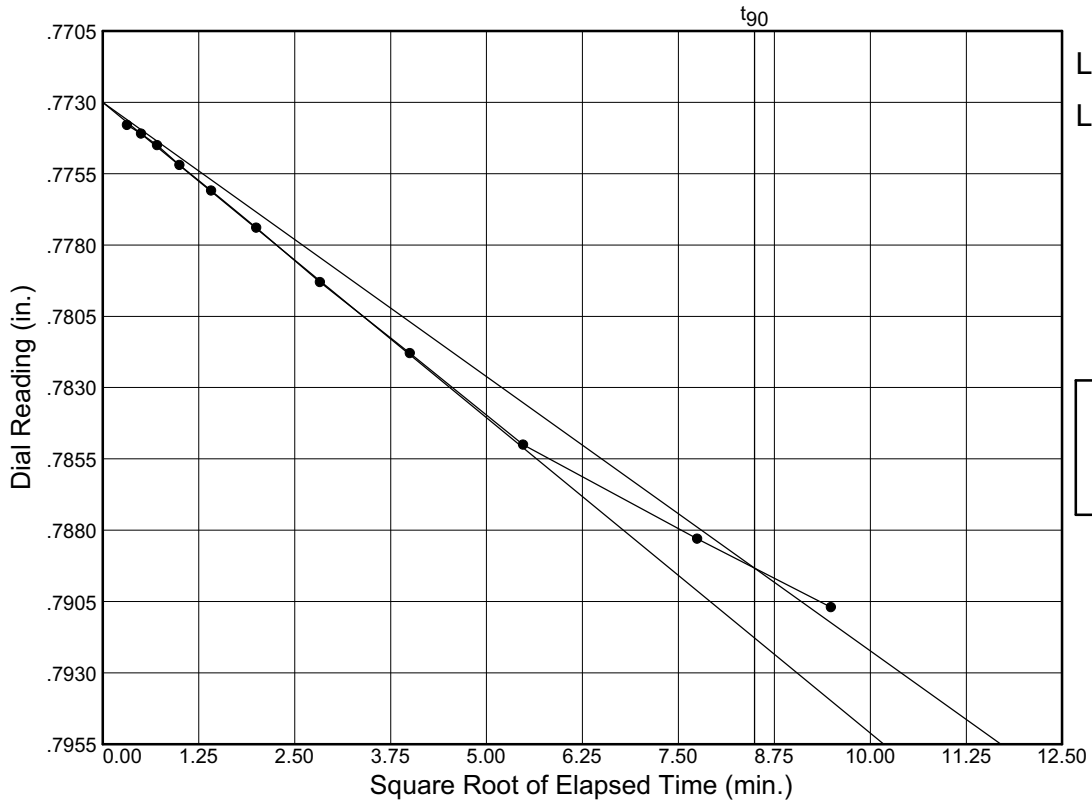

Load No.= 16
Load= 1.00 tsf
$D_0$ = 0.76344
$D_{90}$ = 0.77219
$D_{100}$ = 0.77317
$T_{90}$ = 36.43 min.

$C_v$ @ $T_{90}$
0.03 ft.$^2$/day

Figure 9

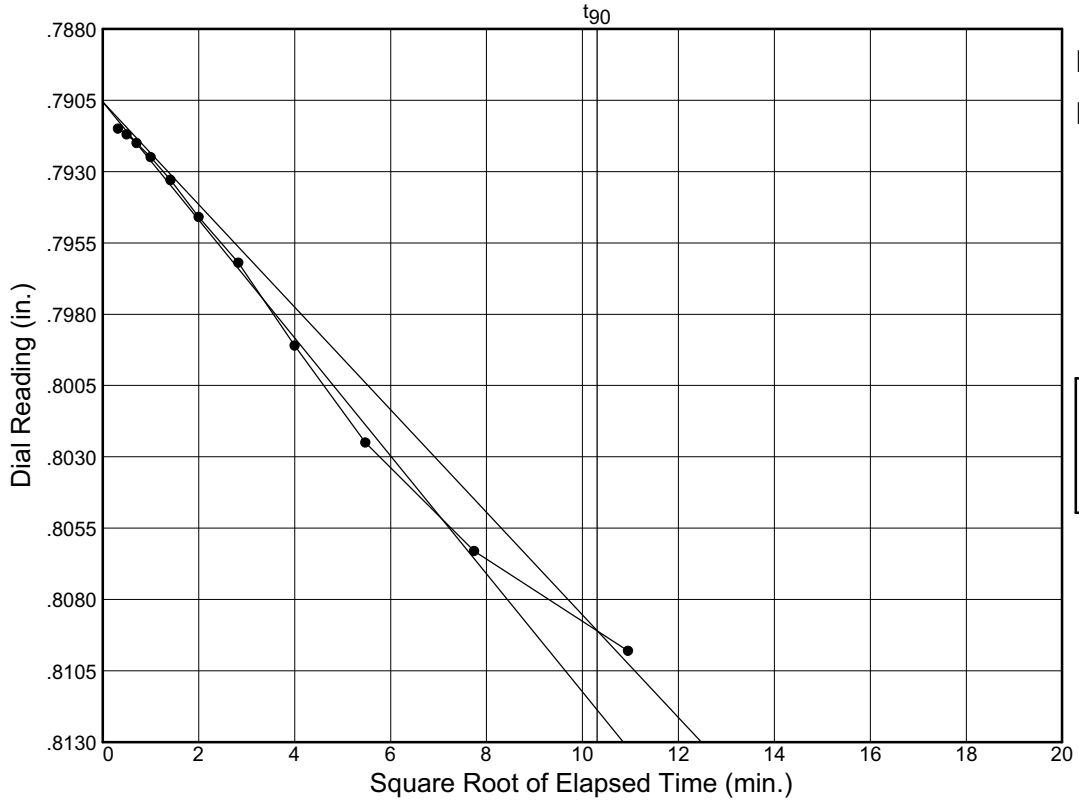
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7-21W




Load No.= 17
Load= 0.25 tsf
$D_0$ = 0.77300
$D_{90}$ = 0.78933
$D_{100}$ = 0.79114
$T_{90}$ = 72.11 min.

$C_v$ @ $T_{90}$
0.02 ft.$^2$/day




Load No.= 18
Load= 0.13 tsf
$D_0$ = 0.79056
$D_{90}$ = 0.80909
$D_{100}$ = 0.81115
$T_{90}$ = 106.23 min.

$C_v$ @ $T_{90}$
0.01 ft.$^2$/day

Figure 10

## CONSOLIDATION TEST DATA

**Client:** HDR, Inc.
**Project:** VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
**Project Number:** VB10-237G

### Sample Data

**Source:**
**Sample No.:** Shelby Tube
**Elev. or Depth:** 35 ft. **Sample Length(in./cm.):** 1 in.
**Location:** D7-21W
**Description:** Gray, Fat CLAY
**Sample Date:** **Liquid Limit:** **Plasticity Index:**
**USCS:** **AASHTO:**
**Preparation Process:**
**Condition of Test:**
**Test Method:** **Final Density:** **Figure No.:** 1
**Testing Remarks:** D7-21W
Depth=35 ft.
**Tested By:** **Test Date:**
**Checked By:** **Title:**

### Test Specimen Data

| TOTAL SAMPLE | BEFORE TEST | AFTER TEST |
|---|---|---|
| **Wet w+t** = 317.28 g. | **Consolidometer #** = 1 | **Wet w+t** = 299.69 g. |
| **Dry w+t** = 274.76 g. | | **Dry w+t** = 274.76 g. |
| **Tare Wt.** = 177.27 g. | **Spec. Gravity** = 2.58 | **Tare Wt.** = 177.27 g. |
| **Height** = 1.00 in. | **Height** = 1.00 in. | |
| **Diameter** = 2.50 in. | **Diameter** = 2.50 in. | |
| **Weight** = 140.01 g. | **Defl. Table** = Reference Set (inches/tsf) | |
| **Moisture** = 43.6 % | **Ht. Solids** = 0.4698 in. | **Moisture** = 25.6 % |
| **Wet Den.** = 108.7 pcf | **Dry Wt.** = 97.49 g. | **Dry Wt.** = 97.49 g.* |
| **Dry Den.** = 75.7 pcf | **Void Ratio** = 1.129 | **Void Ratio** = 0.724 |
| **Ovrbrdn.** = 1.20 tsf | **Saturation** = 99.7 % | |

*** Final dry weight used in calculations**

### End-of-Load Summary

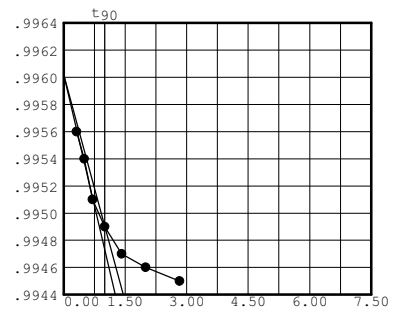
| Pressure (tsf) | Final Dial (in.) | Machine Defl. (in.) | $C_v$ (ft.$^2$/day) | $C_\alpha$ | Void Ratio | % Compression /Swell |
|---|---|---|---|---|---|---|
| start | 1.00000 | | | | 1.129 | |
| 0.13 | 0.99450 | 0.00000 | 2.09 | | 1.117 | 0.6 Comprs. |
| 0.25 | 0.99050 | 0.00040 | 0.25 | | 1.109 | 0.9 Comprs. |
| 0.50 | 0.98150 | 0.00080 | 0.35 | | 1.091 | 1.8 Comprs. |
| 1.00 | 0.96510 | 0.00160 | 0.18 | | 1.058 | 3.3 Comprs. |
| 0.50 | 0.96810 | 0.00080 | 1.57 | | 1.063 | 3.1 Comprs. |
| 0.25 | 0.97210 | 0.00040 | 2.39 | | 1.070 | 2.7 Comprs. |
| 0.13 | 0.97670 | 0.00000 | 1.98 | | 1.079 | 2.3 Comprs. |

| Pressure (tsf) | Final Dial (in.) | Machine Defl. (in.) | $C_v$ (ft.$^2$/day) | $C_\alpha$ | Void Ratio | % Compression /Swell |
|---|---|---|---|---|---|---|
| 0.25 | 0.97520 | 0.00040 | 2.31 | | 1.077 | 2.4 Comprs. |
| 0.50 | 0.97240 | 0.00080 | 1.25 | | 1.072 | 2.7 Comprs. |
| 1.00 | 0.96450 | 0.00160 | 0.56 | | 1.057 | 3.4 Comprs. |
| 2.00 | 0.93560 | 0.00240 | 0.12 | | 0.997 | 6.2 Comprs. |
| 4.00 | 0.88050 | 0.00000 | 0.06 | | 0.874 | 11.9 Comprs. |
| 8.00 | 0.81710 | 0.00000 | 0.05 | | 0.739 | 18.3 Comprs. |
| 16.00 | 0.75510 | 0.00000 | 0.05 | | 0.607 | 24.5 Comprs. |
| 4.00 | 0.76040 | 0.00000 | 1.12 | | 0.619 | 24.0 Comprs. |
| 1.00 | 0.77180 | 0.00160 | 0.03 | | 0.646 | 22.7 Comprs. |
| 0.25 | 0.79030 | 0.00040 | 0.02 | | 0.683 | 20.9 Comprs. |
| 0.13 | 0.80980 | 0.00000 | 0.01 | | 0.724 | 19.0 Comprs. |

**$C_c$ =** 0.44 **$P_c$ =** 1.76 tsf **$C_r$ =** 0.04

**Pressure: 0.13 tsf** **TEST READINGS** **Load No. 1**

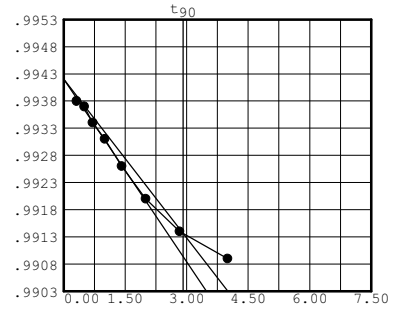
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 1.00000 |
| 2 | 0.10 | 0.99560 |
| 3 | 0.25 | 0.99540 |
| 4 | 0.50 | 0.99510 |
| 5 | 1.00 | 0.99490 |
| 6 | 2.00 | 0.99470 |
| 7 | 4.00 | 0.99460 |
| 8 | 8.00 | 0.99450 |




**Void Ratio =** 1.117 **Compression =** 0.6 %
**$D_0$ =** 0.99602 **$D_{90}$ =** 0.99490 **$D_{100}$ =** 0.99477
**$C_v$ at 1.0 min. =** 2.09 ft.$^2$/day

**Pressure: 0.25 tsf** **TEST READINGS** **Load No. 2**

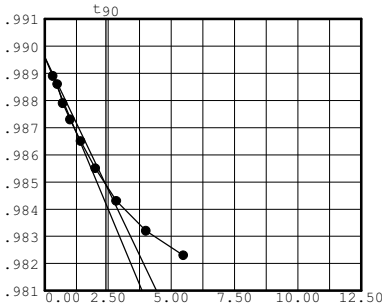
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.99450 |
| 2 | 0.10 | 0.99340 |
| 3 | 0.25 | 0.99330 |
| 4 | 0.50 | 0.99300 |
| 5 | 1.00 | 0.99270 |
| 6 | 2.00 | 0.99220 |
| 7 | 4.00 | 0.99160 |
| 8 | 8.00 | 0.99100 |
| 9 | 16.00 | 0.99050 |




**Void Ratio =** 1.109 **Compression =** 0.9 %
**$D_0$ =** 0.99420 **$D_{90}$ =** 0.99136 **$D_{100}$ =** 0.99105
**$C_v$ at 8.5 min. =** 0.25 ft.$^2$/day

**Pressure: 0.50 tsf** **TEST READINGS** **Load No. 3**

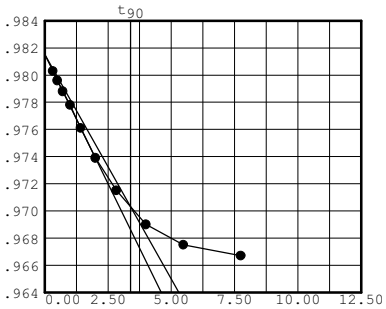
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.99050 |
| 2 | 0.10 | 0.98810 |
| 3 | 0.25 | 0.98780 |
| 4 | 0.50 | 0.98710 |
| 5 | 1.00 | 0.98650 |
| 6 | 2.00 | 0.98570 |
| 7 | 4.00 | 0.98470 |
| 8 | 8.00 | 0.98350 |
| 9 | 16.00 | 0.98240 |
| 10 | 30.00 | 0.98150 |




**Void Ratio =** 1.091 **Compression =** 1.8 %
**$D_0$ =** 0.98960 **$D_{90}$ =** 0.98489 **$D_{100}$ =** 0.98437
**$C_v$ at 5.9 min. =** 0.35 ft.$^2$/day

**Pressure: 1.00 tsf** **TEST READINGS** **Load No. 4**

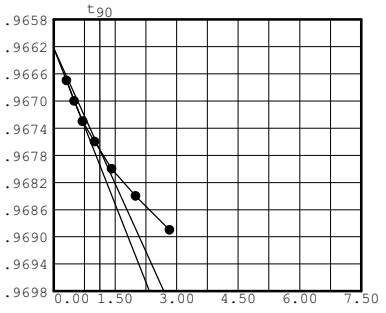
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.98150 | 11 | 60.00 | 0.96510 |
| 2 | 0.10 | 0.97870 | | | |
| 3 | 0.25 | 0.97800 | | | |
| 4 | 0.50 | 0.97720 | | | |
| 5 | 1.00 | 0.97620 | | | |
| 6 | 2.00 | 0.97450 | | | |
| 7 | 4.00 | 0.97230 | | | |
| 8 | 8.00 | 0.96990 | | | |
| 9 | 16.00 | 0.96740 | | | |
| 10 | 30.00 | 0.96590 | | | |




**Void Ratio =** 1.058 **Compression =** 3.3 %
**$D_0$ =** 0.98151 **$D_{90}$ =** 0.97030 **$D_{100}$ =** 0.96906
**$C_v$ at 11.5 min. =** 0.18 ft.$^2$/day

**Pressure: 0.50 tsf** **TEST READINGS** **Load No. 5**

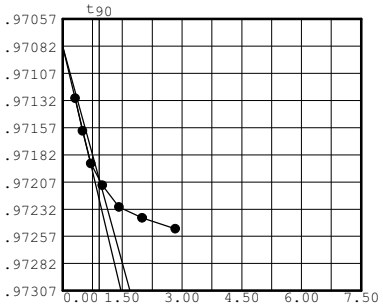
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.96510 |
| 2 | 0.10 | 0.96590 |
| 3 | 0.25 | 0.96620 |
| 4 | 0.50 | 0.96650 |
| 5 | 1.00 | 0.96680 |
| 6 | 2.00 | 0.96720 |
| 7 | 4.00 | 0.96760 |
| 8 | 8.00 | 0.96810 |




**Void Ratio =** 1.063 **Compression =** 3.1 %
**$D_0$ =** 0.96622 **$D_{90}$ =** 0.96772 **$D_{100}$ =** 0.96789
**$C_v$ at 1.3 min. =** 1.57 ft.$^2$/day

**Pressure: 0.25 tsf** **TEST READINGS** **Load No. 6**

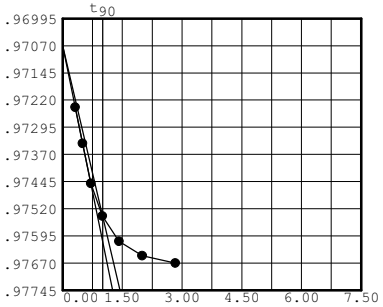
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.97040 |
| 2 | 0.10 | 0.97090 |
| 3 | 0.25 | 0.97120 |
| 4 | 0.50 | 0.97150 |
| 5 | 1.00 | 0.97170 |
| 6 | 2.00 | 0.97190 |
| 7 | 4.00 | 0.97200 |
| 8 | 8.00 | 0.97210 |




**Void Ratio =** 1.070 **Compression =** 2.7 %
**$D_0$ =** 0.97082 **$D_{90}$ =** 0.97204 **$D_{100}$ =** 0.97218
**$C_v$ at 0.8 min. =** 2.39 ft.$^2$/day

**Pressure: 0.13 tsf** **TEST READINGS** **Load No. 7**

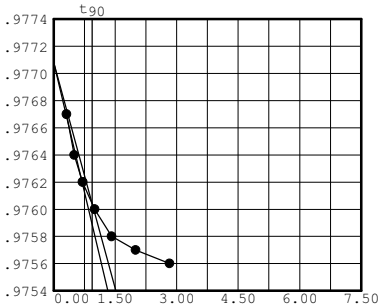
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.97210 |
| 2 | 0.10 | 0.97240 |
| 3 | 0.25 | 0.97340 |
| 4 | 0.50 | 0.97450 |
| 5 | 1.00 | 0.97540 |
| 6 | 2.00 | 0.97610 |
| 7 | 4.00 | 0.97650 |
| 8 | 8.00 | 0.97670 |




**Void Ratio =** 1.079 **Compression =** 2.3 %
**$D_0$ =** 0.97071 **$D_{90}$ =** 0.97541 **$D_{100}$ =** 0.97594
**$C_v$ at 1.0 min. =** 1.98 ft.$^2$/day

**Pressure: 0.25 tsf** **TEST READINGS** **Load No. 8**

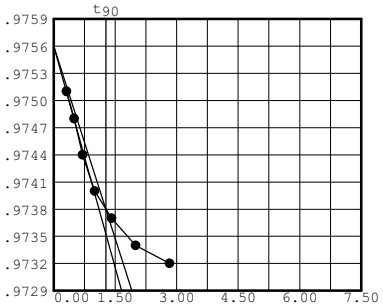
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.97670 |
| 2 | 0.10 | 0.97630 |
| 3 | 0.25 | 0.97600 |
| 4 | 0.50 | 0.97580 |
| 5 | 1.00 | 0.97560 |
| 6 | 2.00 | 0.97540 |
| 7 | 4.00 | 0.97530 |
| 8 | 8.00 | 0.97520 |




**Void Ratio =** 1.077 **Compression =** 2.4 %
**$D_0$ =** 0.97708 **$D_{90}$ =** 0.97604 **$D_{100}$ =** 0.97593
**$C_v$ at 0.9 min. =** 2.31 ft.$^2$/day

**Pressure: 0.50 tsf** **TEST READINGS** **Load No. 9**

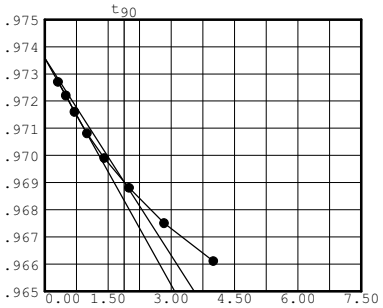
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.97520 |
| 2 | 0.10 | 0.97430 |
| 3 | 0.25 | 0.97400 |
| 4 | 0.50 | 0.97360 |
| 5 | 1.00 | 0.97320 |
| 6 | 2.00 | 0.97290 |
| 7 | 4.00 | 0.97260 |
| 8 | 8.00 | 0.97240 |




**Void Ratio =** 1.072 **Compression =** 2.7 %
**$D_0$ =** 0.97560 **$D_{90}$ =** 0.97380 **$D_{100}$ =** 0.97360
**$C_v$ at 1.6 min. =** 1.25 ft.$^2$/day

**Pressure: 1.00 tsf** **TEST READINGS** **Load No. 10**

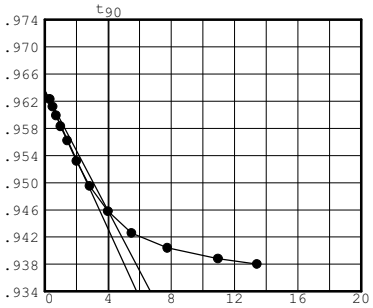
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.97240 |
| 2 | 0.10 | 0.97110 |
| 3 | 0.25 | 0.97060 |
| 4 | 0.50 | 0.97000 |
| 5 | 1.00 | 0.96920 |
| 6 | 2.00 | 0.96830 |
| 7 | 4.00 | 0.96720 |
| 8 | 8.00 | 0.96590 |
| 9 | 16.00 | 0.96450 |




**Void Ratio =** 1.057 **Compression =** 3.4 %
**$D_0$ =** 0.97358 **$D_{90}$ =** 0.96902 **$D_{100}$ =** 0.96852
**$C_v$ at 3.5 min. =** 0.56 ft.$^2$/day

**Pressure: 2.00 tsf** **TEST READINGS** **Load No. 11**

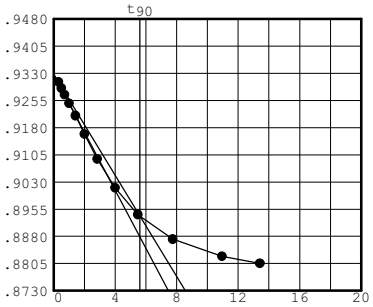
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.96450 | 11 | 60.00 | 0.93800 |
| 2 | 0.10 | 0.95990 | 12 | 120.00 | 0.93640 |
| 3 | 0.25 | 0.95880 | 13 | 180.00 | 0.93560 |
| 4 | 0.50 | 0.95750 | | | |
| 5 | 1.00 | 0.95590 | | | |
| 6 | 2.00 | 0.95380 | | | |
| 7 | 4.00 | 0.95080 | | | |
| 8 | 8.00 | 0.94710 | | | |
| 9 | 16.00 | 0.94340 | | | |
| 10 | 30.00 | 0.94020 | | | |




**Void Ratio =** 0.997 **Compression =** 6.2 %
**$D_0$ =** 0.96361 **$D_{90}$ =** 0.94571 **$D_{100}$ =** 0.94373
**$C_v$ at 16.3 min. =** 0.12 ft.$^2$/day

**Pressure: 4.00 tsf** **TEST READINGS** **Load No. 12**

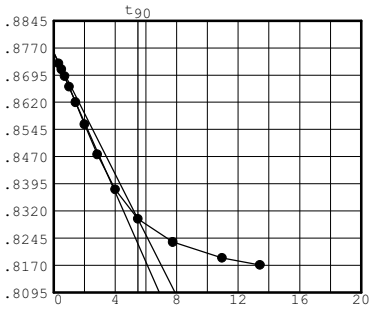
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.93560 | 11 | 60.00 | 0.88720 |
| 2 | 0.10 | 0.93060 | 12 | 120.00 | 0.88250 |
| 3 | 0.25 | 0.92890 | 13 | 180.00 | 0.88050 |
| 4 | 0.50 | 0.92710 | | | |
| 5 | 1.00 | 0.92470 | | | |
| 6 | 2.00 | 0.92130 | | | |
| 7 | 4.00 | 0.91620 | | | |
| 8 | 8.00 | 0.90930 | | | |
| 9 | 16.00 | 0.90140 | | | |
| 10 | 30.00 | 0.89400 | | | |




**Void Ratio =** 0.874 **Compression =** 11.9 %
**$D_0$ =** 0.93274 **$D_{90}$ =** 0.89360 **$D_{100}$ =** 0.88926
**$C_v$ at 31.5 min. =** 0.06 ft.$^2$/day

**Pressure: 8.00 tsf** **TEST READINGS** **Load No. 13**

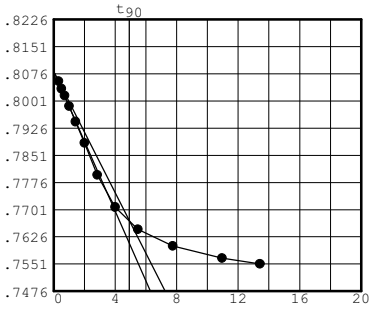
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.88050 | 11 | 60.00 | 0.82340 |
| 2 | 0.10 | 0.87270 | 12 | 120.00 | 0.81900 |
| 3 | 0.25 | 0.87110 | 13 | 180.00 | 0.81710 |
| 4 | 0.50 | 0.86920 | | | |
| 5 | 1.00 | 0.86630 | | | |
| 6 | 2.00 | 0.86200 | | | |
| 7 | 4.00 | 0.85590 | | | |
| 8 | 8.00 | 0.84760 | | | |
| 9 | 16.00 | 0.83790 | | | |
| 10 | 30.00 | 0.82980 | | | |




**Void Ratio =** 0.739 **Compression =** 18.3 %
**$D_0$ =** 0.87574 **$D_{90}$ =** 0.82985 **$D_{100}$ =** 0.82475
**$C_v$ at 29.9 min. =** 0.05 ft.$^2$/day

**Pressure: 16.00 tsf** **TEST READINGS** **Load No. 14**

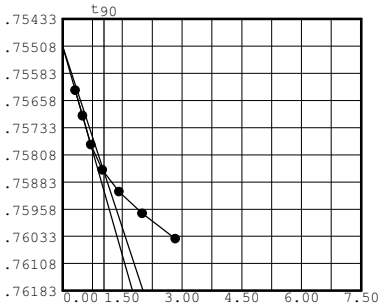
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.81710 | 11 | 60.00 | 0.76010 |
| 2 | 0.10 | 0.80560 | 12 | 120.00 | 0.75670 |
| 3 | 0.25 | 0.80350 | 13 | 180.00 | 0.75510 |
| 4 | 0.50 | 0.80160 | | | |
| 5 | 1.00 | 0.79870 | | | |
| 6 | 2.00 | 0.79440 | | | |
| 7 | 4.00 | 0.78850 | | | |
| 8 | 8.00 | 0.77970 | | | |
| 9 | 16.00 | 0.77080 | | | |
| 10 | 30.00 | 0.76470 | | | |




**Void Ratio =** 0.607 **Compression =** 24.5 %
**$D_0$ =** 0.80821 **$D_{90}$ =** 0.76698 **$D_{100}$ =** 0.76240
**$C_v$ at 24.3 min. =** 0.05 ft.$^2$/day

**Pressure: 4.00 tsf** **TEST READINGS** **Load No. 15**

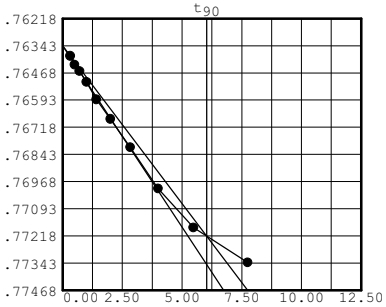
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.75510 |
| 2 | 0.10 | 0.75630 |
| 3 | 0.25 | 0.75700 |
| 4 | 0.50 | 0.75780 |
| 5 | 1.00 | 0.75850 |
| 6 | 2.00 | 0.75910 |
| 7 | 4.00 | 0.75970 |
| 8 | 8.00 | 0.76040 |




**Void Ratio =** 0.619 **Compression =** 24.0 %
**$D_0$ =** 0.75508 **$D_{90}$ =** 0.75856 **$D_{100}$ =** 0.75895
**$C_v$ at 1.1 min. =** 1.12 ft.$^2$/day

**Pressure: 1.00 tsf** **TEST READINGS** **Load No. 16**

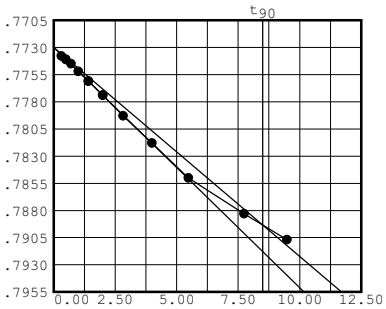
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.76040 | 11 | 60.00 | 0.77180 |
| 2 | 0.10 | 0.76230 | | | |
| 3 | 0.25 | 0.76270 | | | |
| 4 | 0.50 | 0.76300 | | | |
| 5 | 1.00 | 0.76350 | | | |
| 6 | 2.00 | 0.76430 | | | |
| 7 | 4.00 | 0.76520 | | | |
| 8 | 8.00 | 0.76650 | | | |
| 9 | 16.00 | 0.76840 | | | |
| 10 | 30.00 | 0.77020 | | | |




**Void Ratio =** 0.646 **Compression =** 22.7 %
**$D_0$ =** 0.76344 **$D_{90}$ =** 0.77219 **$D_{100}$ =** 0.77317
**$C_v$ at 36.4 min. =** 0.03 ft.$^2$/day

**Pressure: 0.25 tsf** **TEST READINGS** **Load No. 17**

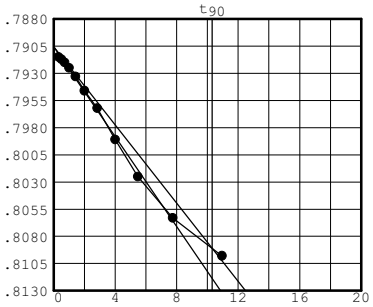
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.77180 | 11 | 60.00 | 0.78790 |
| 2 | 0.10 | 0.77340 | 12 | 90.00 | 0.79030 |
| 3 | 0.25 | 0.77370 | | | |
| 4 | 0.50 | 0.77410 | | | |
| 5 | 1.00 | 0.77480 | | | |
| 6 | 2.00 | 0.77570 | | | |
| 7 | 4.00 | 0.77700 | | | |
| 8 | 8.00 | 0.77890 | | | |
| 9 | 16.00 | 0.78140 | | | |
| 10 | 30.00 | 0.78460 | | | |




**Void Ratio =** 0.683 **Compression =** 20.9 %
**$D_0$ =** 0.77300 **$D_{90}$ =** 0.78933 **$D_{100}$ =** 0.79114
**$C_v$ at 72.1 min. =** 0.02 ft.$^2$/day

**Pressure: 0.13 tsf** **TEST READINGS** **Load No. 18**

| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.79030 | 11 | 60.00 | 0.80630 |
| 2 | 0.10 | 0.79150 | 12 | 120.00 | 0.80980 |
| 3 | 0.25 | 0.79170 | | | |
| 4 | 0.50 | 0.79200 | | | |
| 5 | 1.00 | 0.79250 | | | |
| 6 | 2.00 | 0.79330 | | | |
| 7 | 4.00 | 0.79460 | | | |
| 8 | 8.00 | 0.79620 | | | |
| 9 | 16.00 | 0.79910 | | | |
| 10 | 30.00 | 0.80250 | | | |

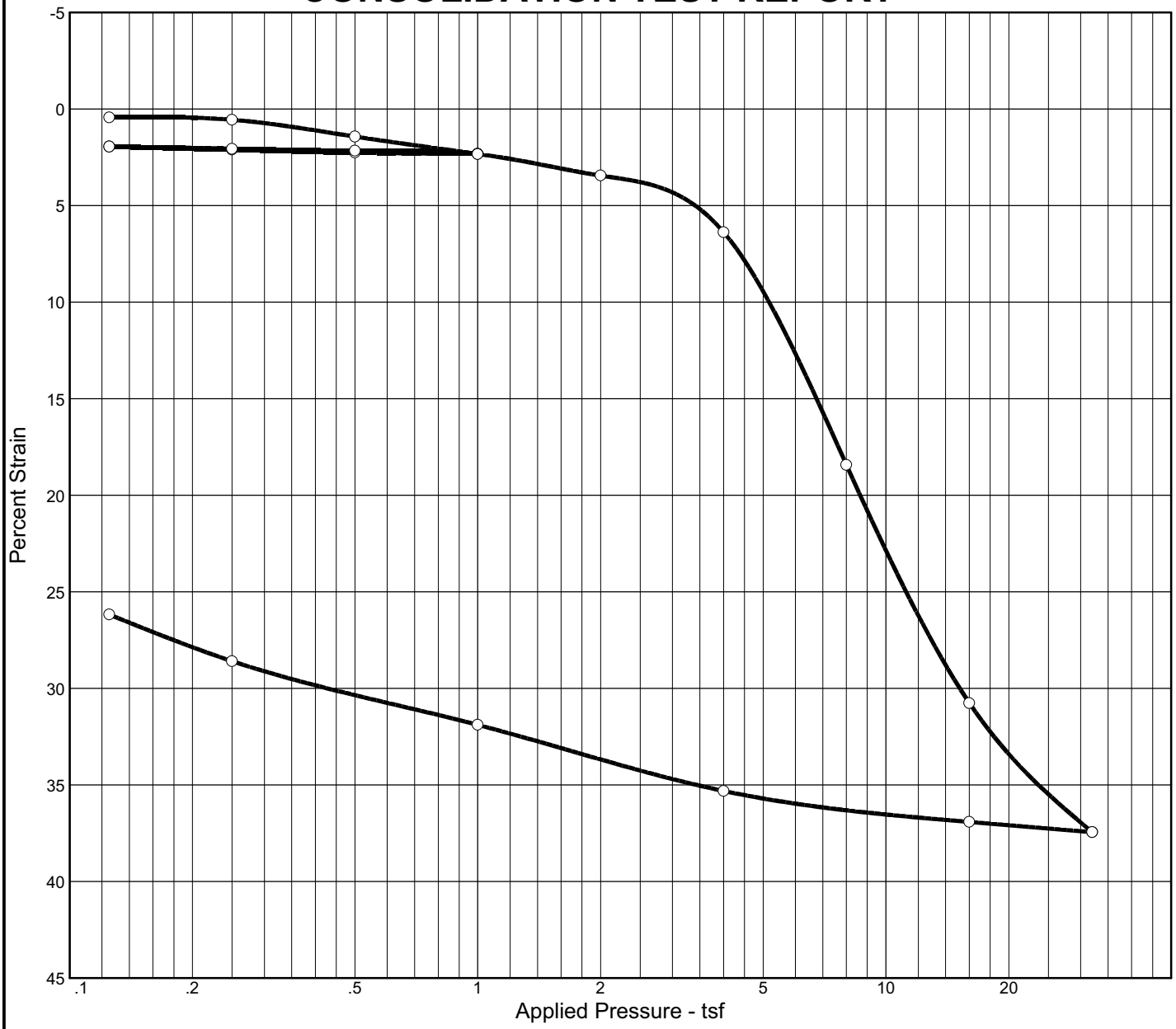



**Void Ratio =** 0.724 **Compression =** 19.0 %

**$D_0$ =** 0.79056 **$D_{90}$ =** 0.80909 **$D_{100}$ =** 0.81115

**$C_v$ at 106.2 min. =** 0.01 ft.$^2$/day

# CONSOLIDATION TEST REPORT




| MATERIAL DESCRIPTION | USCS | AASHTO |
|---|---|---|
| Brown, Fat CLAY | | |

| LL | PI | Sp. Gr. | Overburden (tsf) | Dry Dens. (pcf) | | Moisture | | Saturation | | Void Ratio | | $P_c$ (tsf) | $C_c$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Init. | Final | Init. | Final | Init. | Final | Init. | Final | | |
| | | 2.68 | 1.80 | 61.5 | | 64.2 % | 38.7 % | 100.0 % | 100.0 % | 1.721 | 1.009 | | |

| Preparation Process: | D2435 Method | $C_r$ | Swell Press. (tsf) | Heave % |
|---|---|---|---|---|
| Condition of Test: | | | | |

**Project No.** VB10-237G **Client:** HDR, Inc.

**Project:** VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia

**Location:** D7CD-6W

**Remarks:**
D7CD-6W
Depth=63 ft.

**Checked By:**

**Title:**

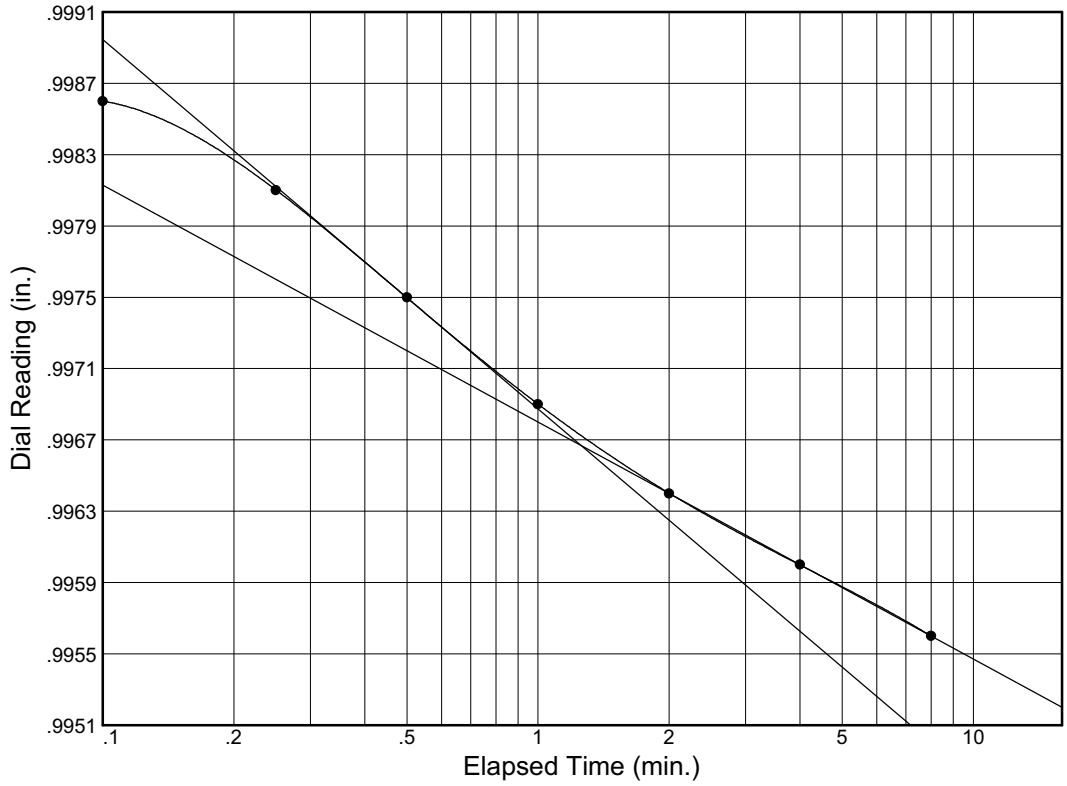
CONSOLIDATION TEST REPORT

**GET SOLUTIONS, INC.**

**Figure** 1

# Dial Reading vs. Time

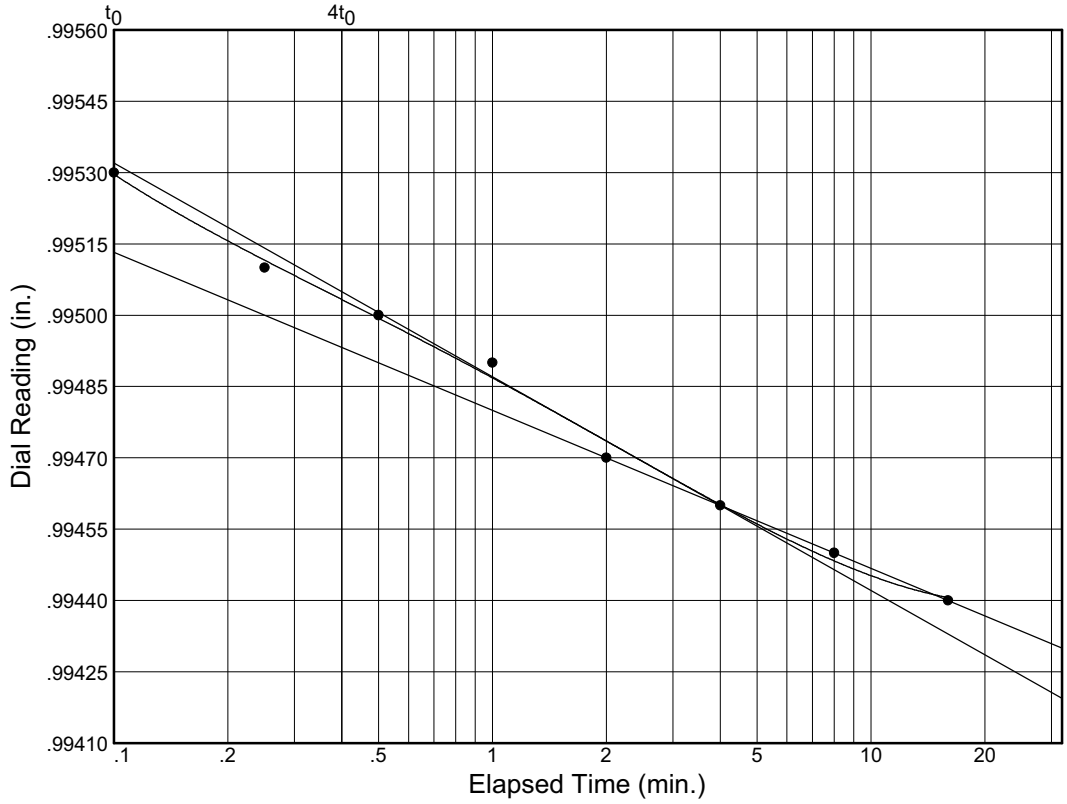
Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-6W




Load No.= 1
Load= 0.13 tsf
$D_0$ = 1.00000
$D_{50}$ = 0.99833
$D_{100}$ = 0.99667
$T_{50}$ = 0.18 min.

$C_v$ @ $T_{50}$
2.69 ft.$^2$/day

$C_\alpha$ = 0.001




Load No.= 2
Load= 0.25 tsf
$D_0$ = 0.99556
$D_{50}$ = 0.99508
$D_{100}$ = 0.99460
$T_{50}$ = 0.31 min.

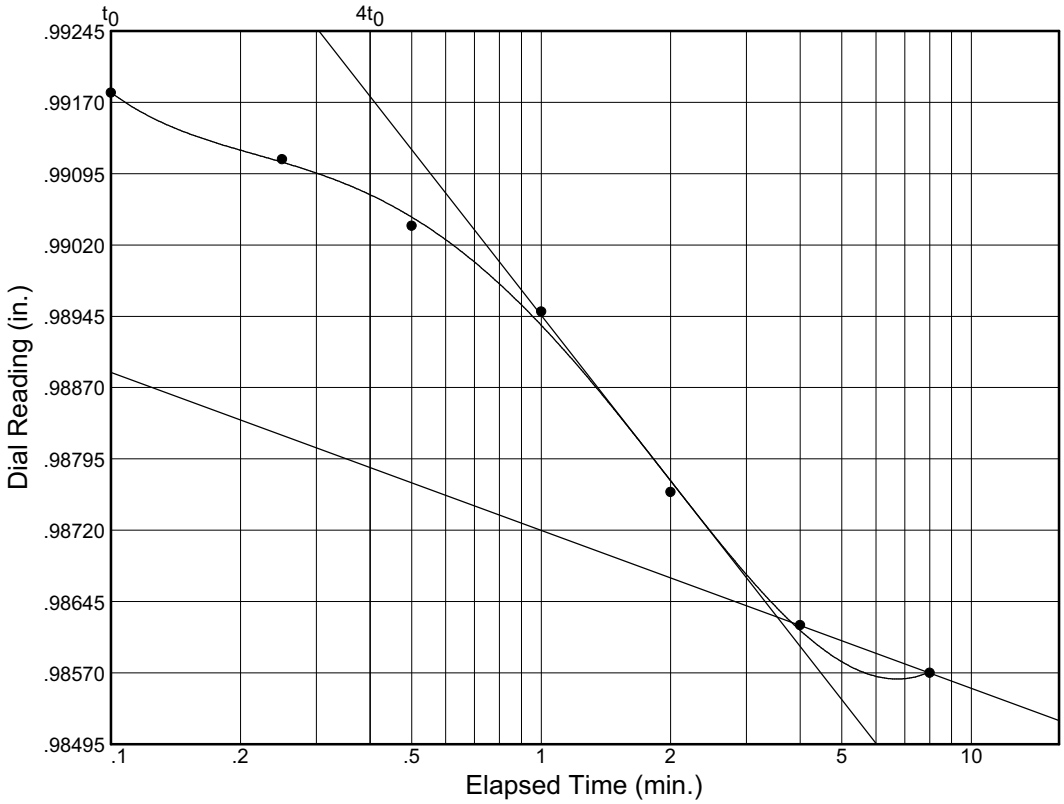
$C_v$ @ $T_{50}$
1.59 ft.$^2$/day

$C_\alpha$ = 0.000

Figure 2

# Dial Reading vs. Time

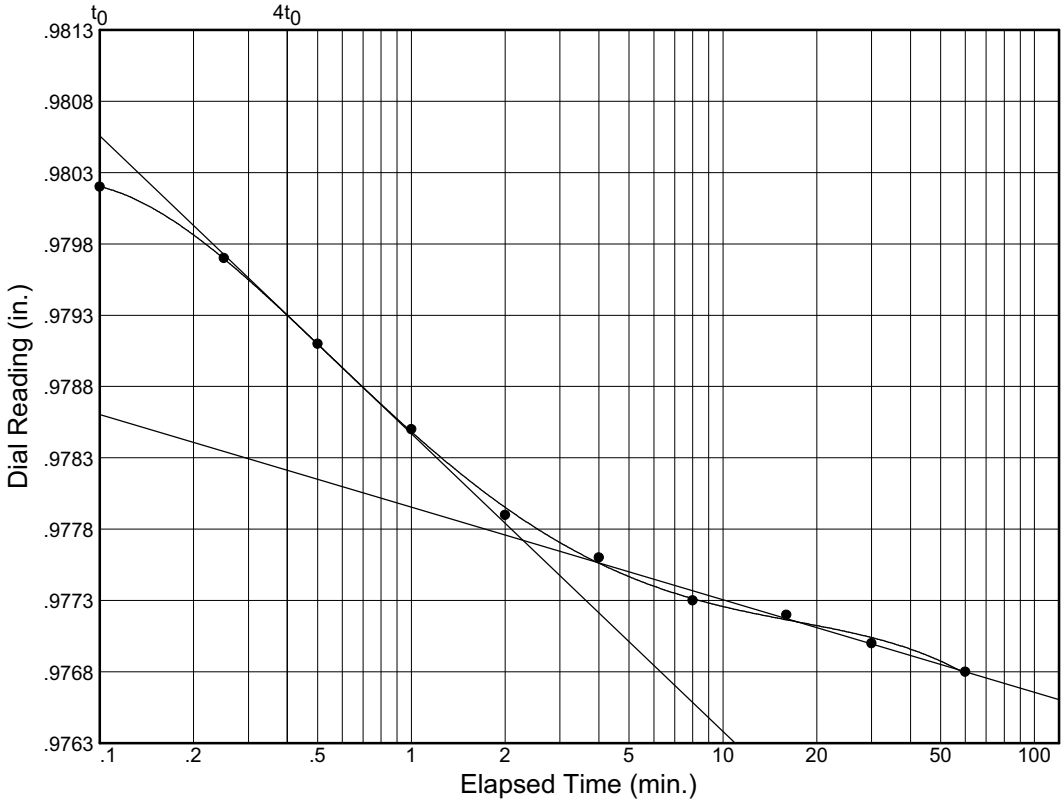
Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-6W




Load No.= 3
Load= 0.50 tsf
$D_0$ = 0.99288
$D_{50}$ = 0.98958
$D_{100}$ = 0.98629
$T_{50}$ = 0.89 min.

| $C_v$ @ $T_{50}$ |
|---|
| 0.54 ft.$^2$/day |

$C_\alpha$ = 0.002




Load No.= 4
Load= 1.00 tsf
$D_0$ = 0.98111
$D_{50}$ = 0.97941
$D_{100}$ = 0.97772
$T_{50}$ = 0.35 min.

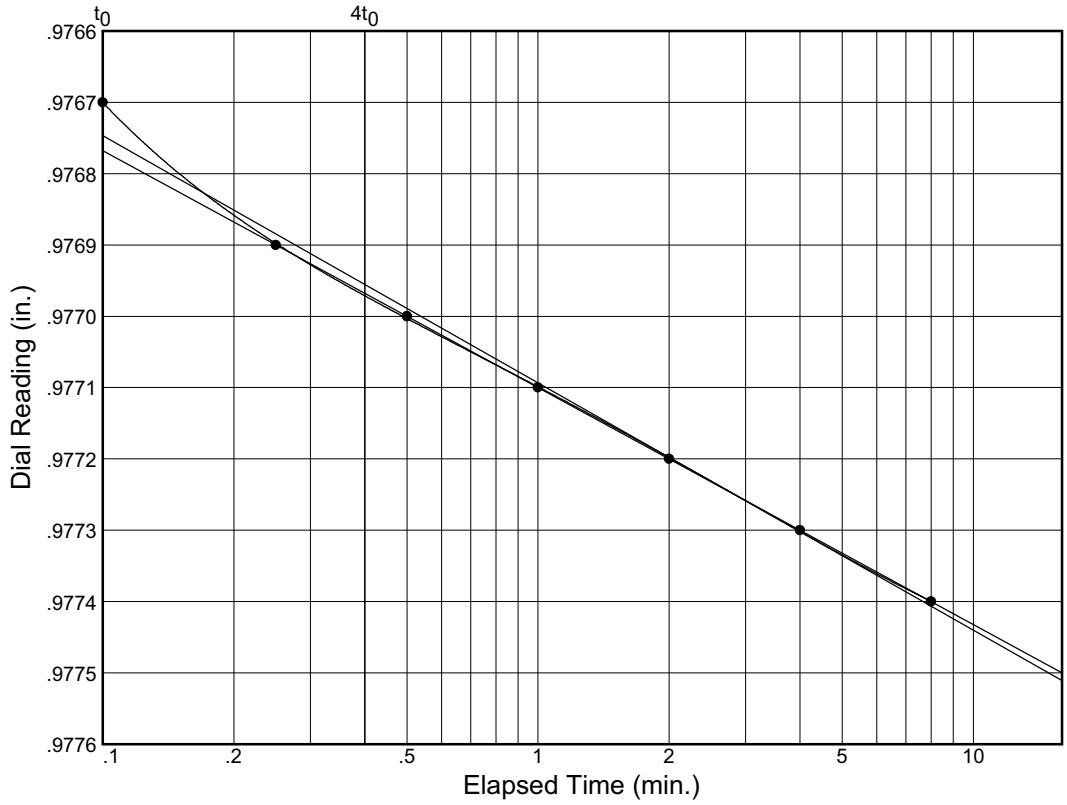
| $C_v$ @ $T_{50}$ |
|---|
| 1.35 ft.$^2$/day |

$C_\alpha$ = 0.001

Figure 3

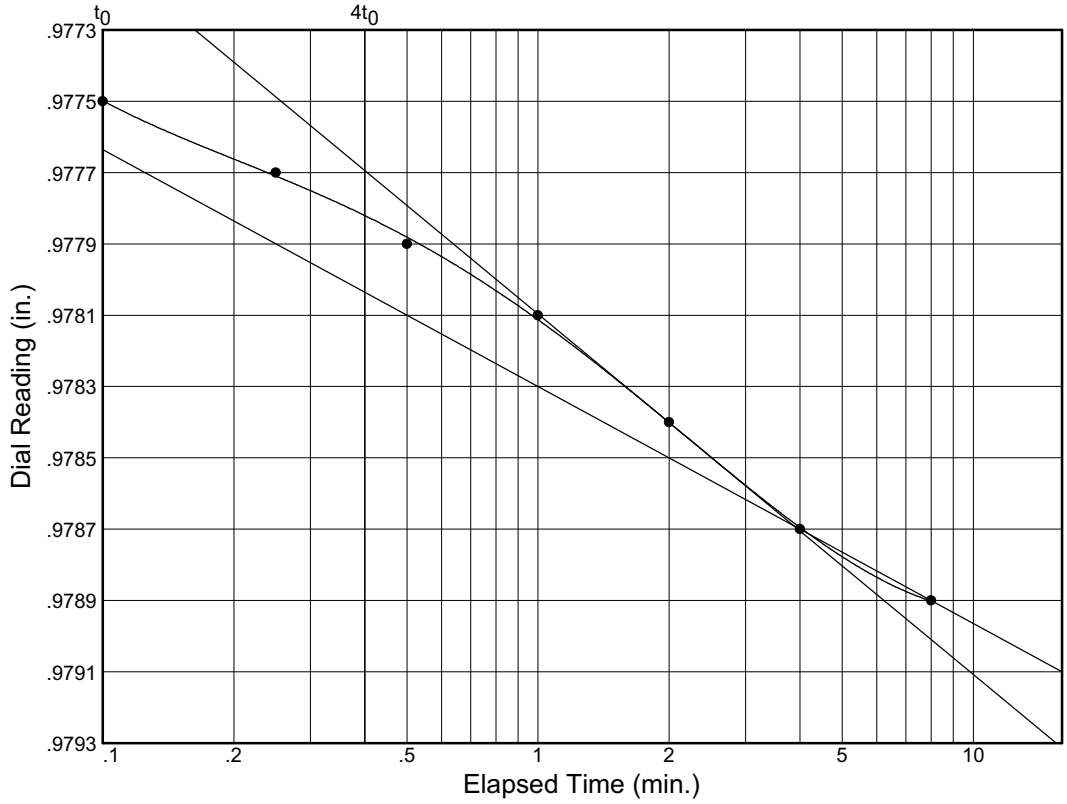
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-6W




Load No.= 5
Load= 0.50 tsf
$D_0$ = 0.97643
$D_{50}$ = 0.97684
$D_{100}$ = 0.97725
$T_{50}$ = 0.18 min.

$C_v$ @ $T_{50}$
2.56 ft.$^2$/day



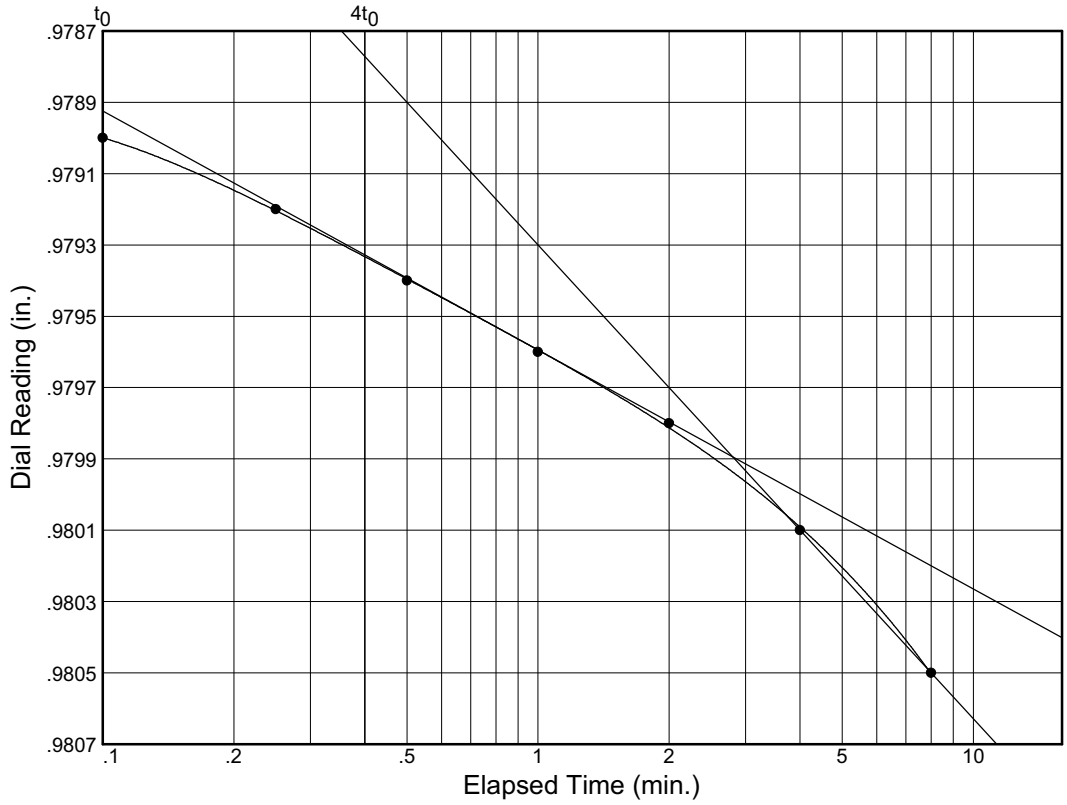

Load No.= 6
Load= 0.25 tsf
$D_0$ = 0.97718
$D_{50}$ = 0.97793
$D_{100}$ = 0.97869
$T_{50}$ = 0.60 min.

$C_v$ @ $T_{50}$
0.79 ft.$^2$/day

Figure 4

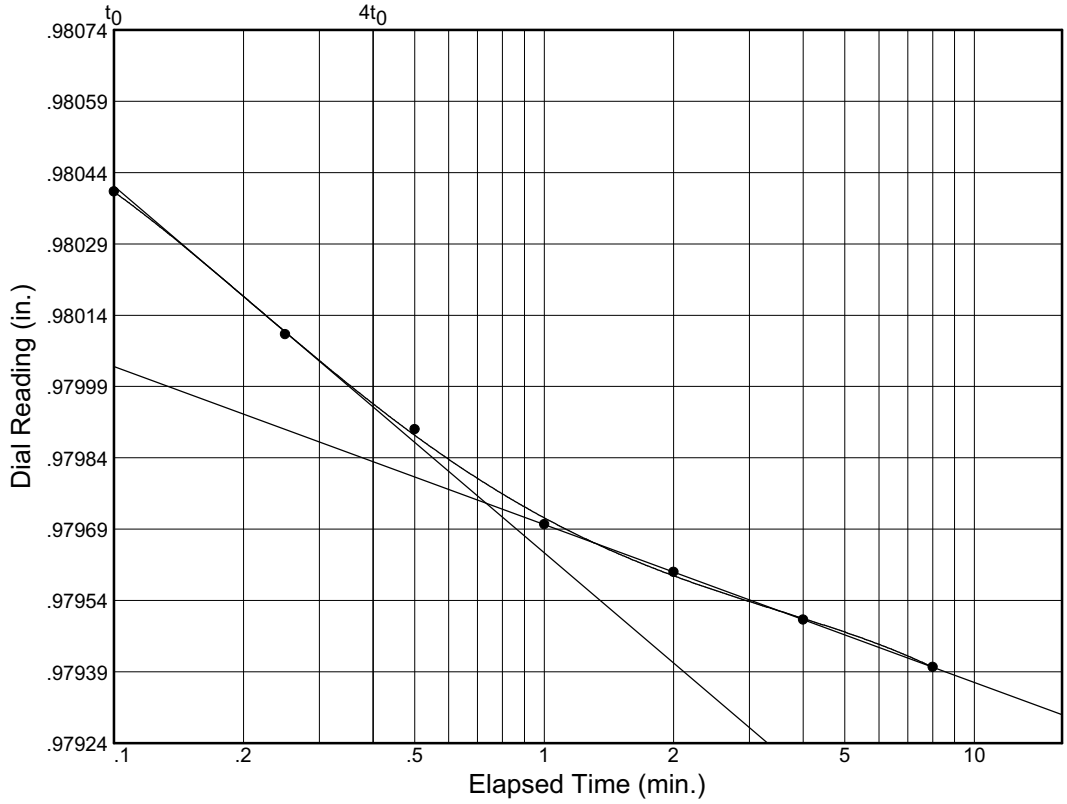
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-6W




Load No.= 7
Load= 0.13 tsf
$D_0$ = 0.97867
$D_{50}$ = 0.97928
$D_{100}$ = 0.97989
$T_{50}$ = 0.33 min.

$C_v$ @ $T_{50}$
1.43 ft.$^2$/day




Load No.= 8
Load= 0.25 tsf
$D_0$ = 0.98084
$D_{50}$ = 0.98029
$D_{100}$ = 0.97974
$T_{50}$ = 0.14 min.

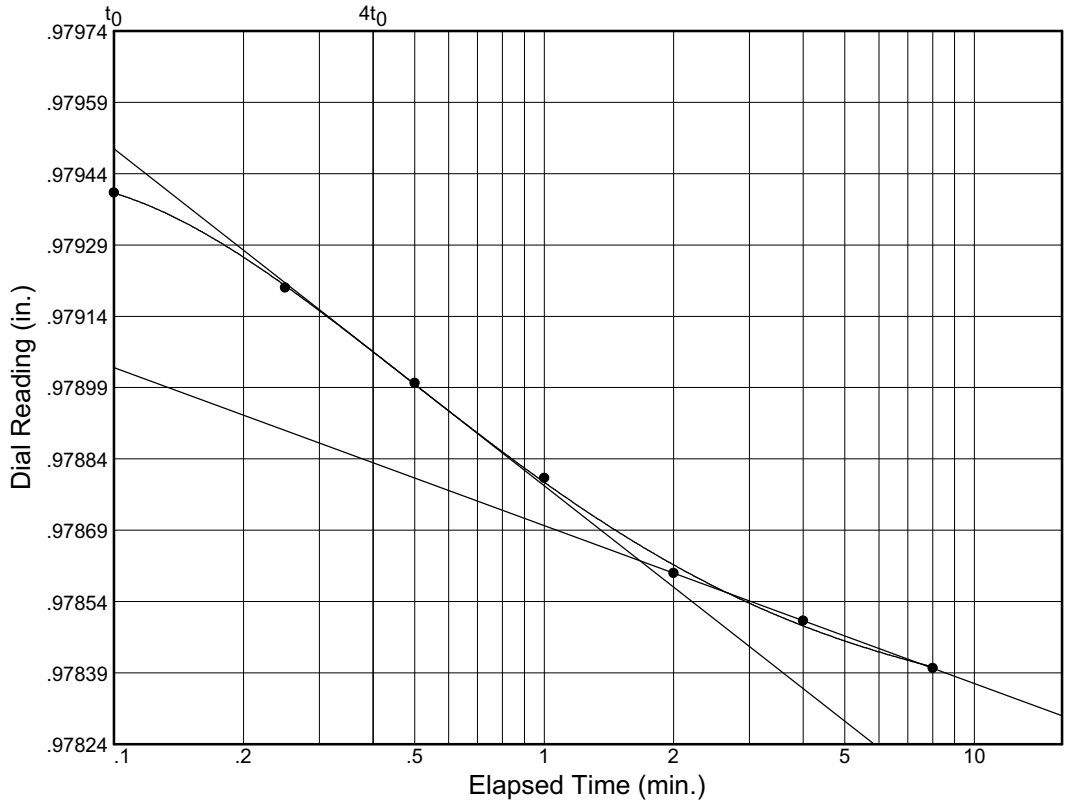
$C_v$ @ $T_{50}$
3.35 ft.$^2$/day

$C_\alpha$ = 0.000

Figure 5

# Dial Reading vs. Time

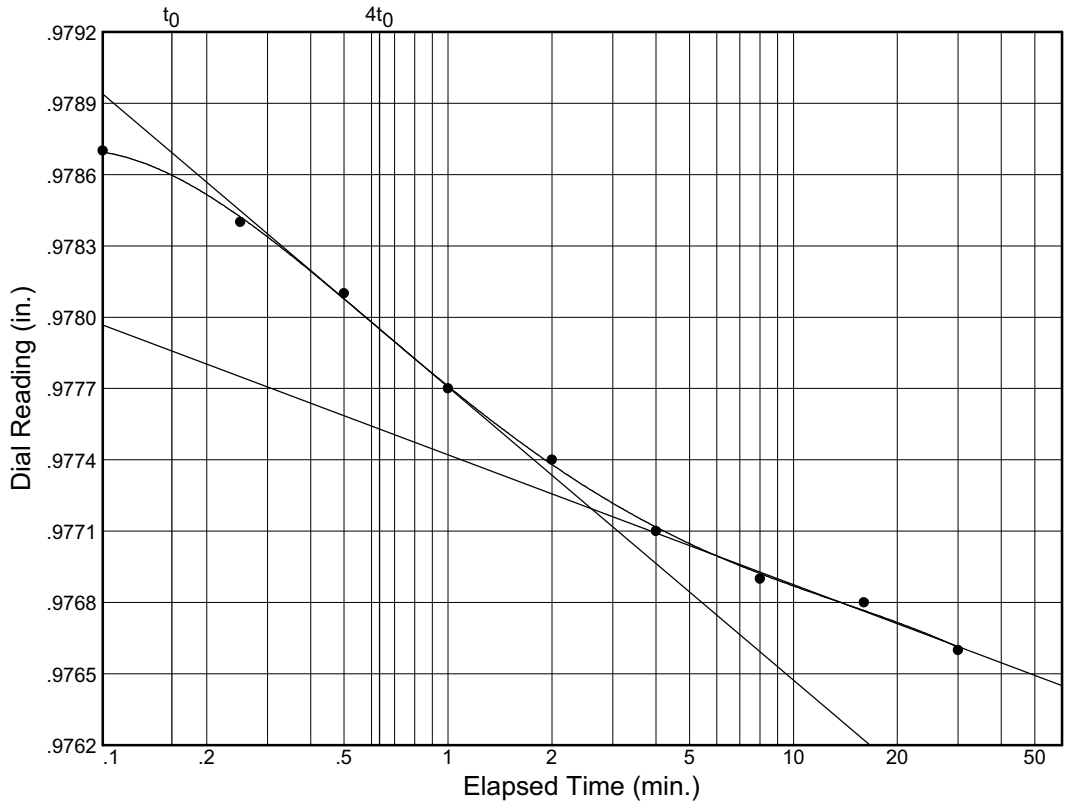
Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-6W




Load No.= 9
Load= 0.50 tsf
$D_0$ = 0.97973
$D_{50}$ = 0.97918
$D_{100}$ = 0.97863
$T_{50}$ = 0.27 min.

| $C_v$ @ $T_{50}$ |
|---|
| 1.73 ft.$^2$/day |

$C_\alpha$ = 0.000




Load No.= 10
Load= 1.00 tsf
$D_0$ = 0.97924
$D_{50}$ = 0.97822
$D_{100}$ = 0.97720
$T_{50}$ = 0.38 min.

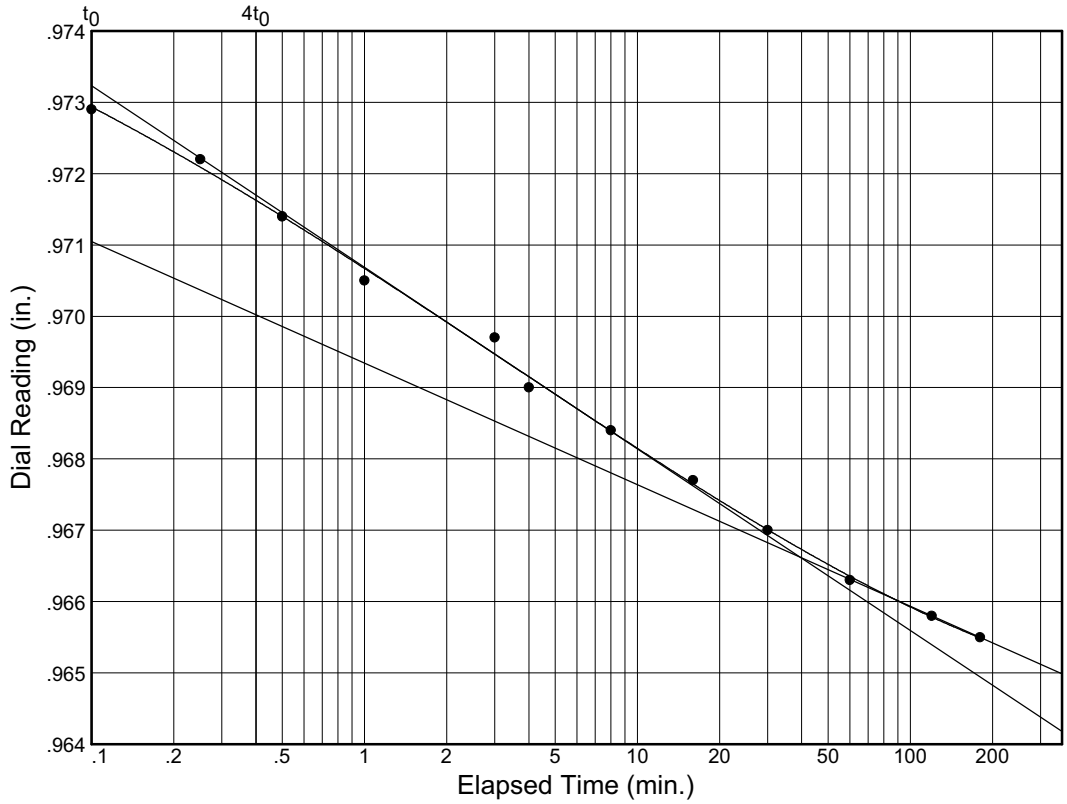
| $C_v$ @ $T_{50}$ |
|---|
| 1.24 ft.$^2$/day |

$C_\alpha$ = 0.001

Figure 6

# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-6W




Load No.= 11

Load= 2.00 tsf

$D_0$ = 0.97425

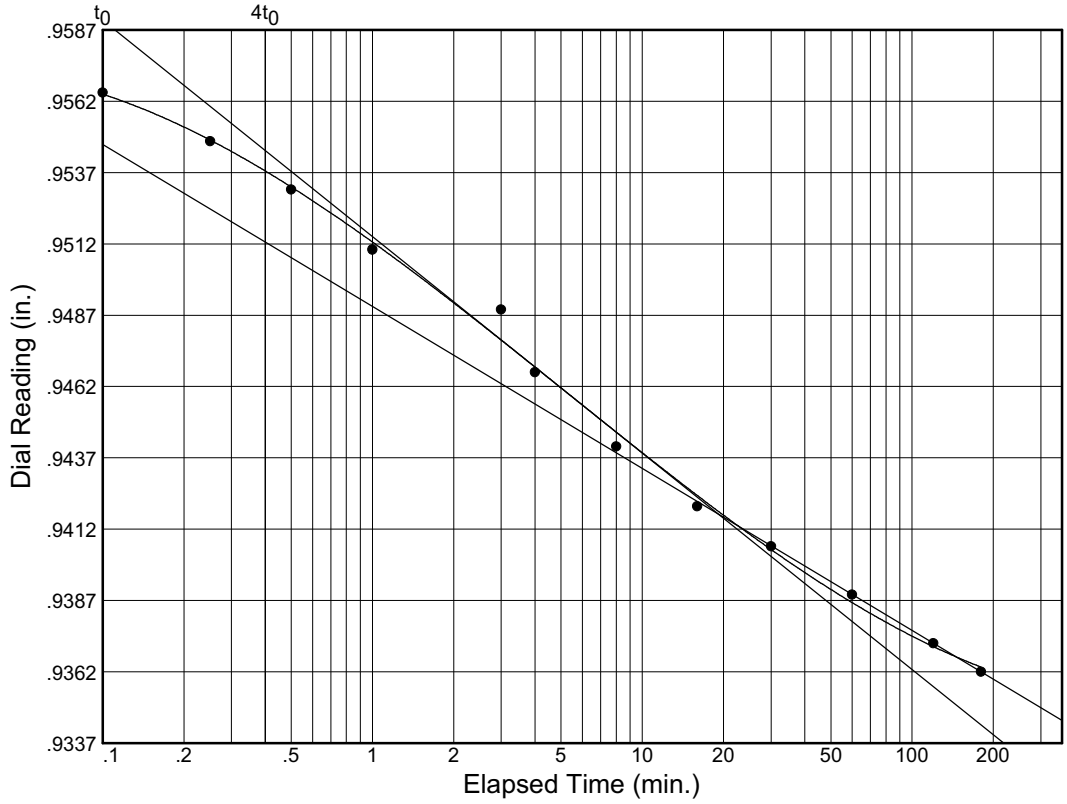
$D_{50}$ = 0.97044

$D_{100}$ = 0.96663

$T_{50}$ = 1.24 min.

| $C_v$ @ $T_{50}$ |
|---|
| 0.37 ft.$^2$/day |

$C_\alpha$ = 0.002




Load No.= 12

Load= 4.00 tsf

$D_0$ = 0.95913

$D_{50}$ = 0.95043

$D_{100}$ = 0.94174

$T_{50}$ = 1.32 min.

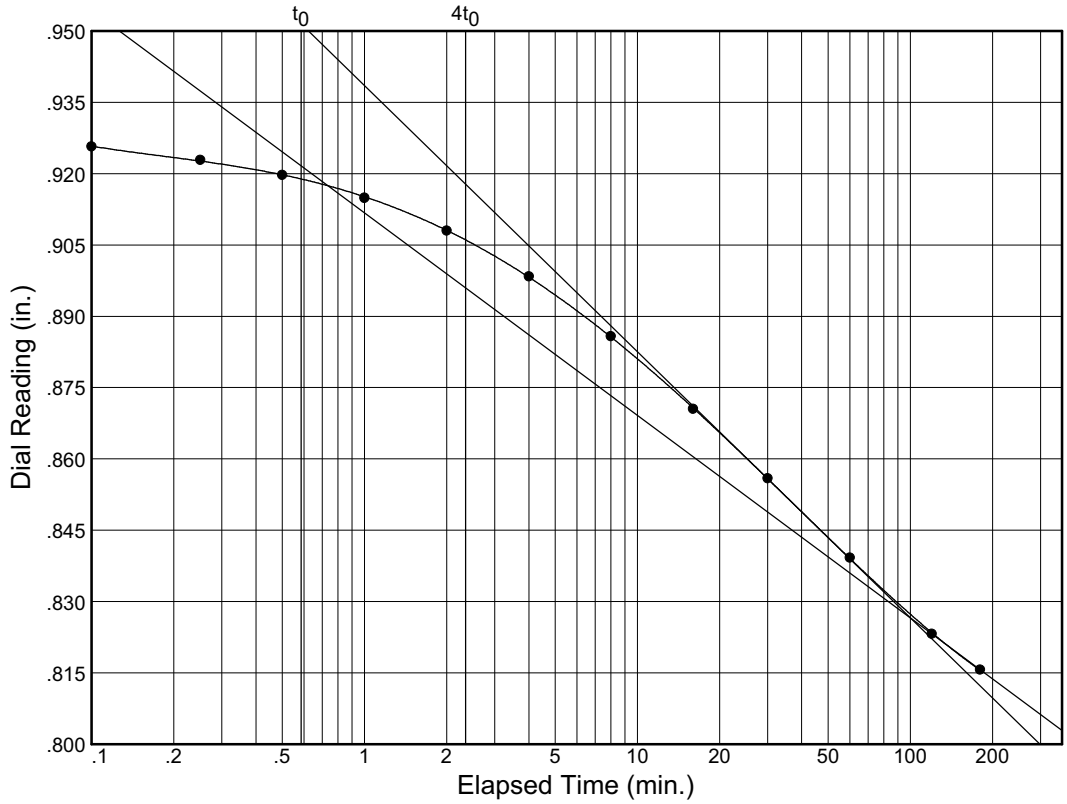
| $C_v$ @ $T_{50}$ |
|---|
| 0.34 ft.$^2$/day |

$C_\alpha$ = 0.006

Figure 7

# Dial Reading vs. Time

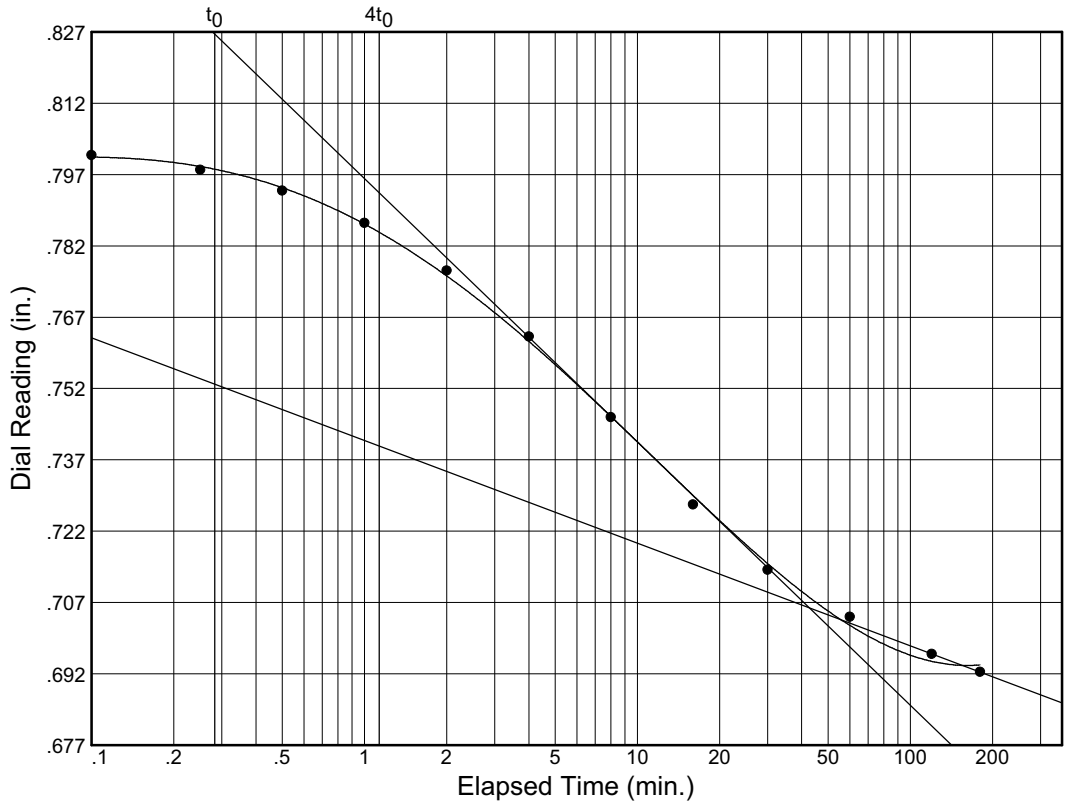
Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-6W




Load No.= 13
Load= 8.00 tsf
$D_0$ = 0.93168
$D_{50}$ = 0.87909
$D_{100}$ = 0.82651
$T_{50}$ = 10.96 min.

| $C_v$ @ $T_{50}$ |
|---|
| 0.03 ft.$^2$/day |

$C_\alpha$ = 0.045




Load No.= 14
Load= 16.00 tsf
$D_0$ = 0.81137
$D_{50}$ = 0.75863
$D_{100}$ = 0.70590
$T_{50}$ = 4.65 min.

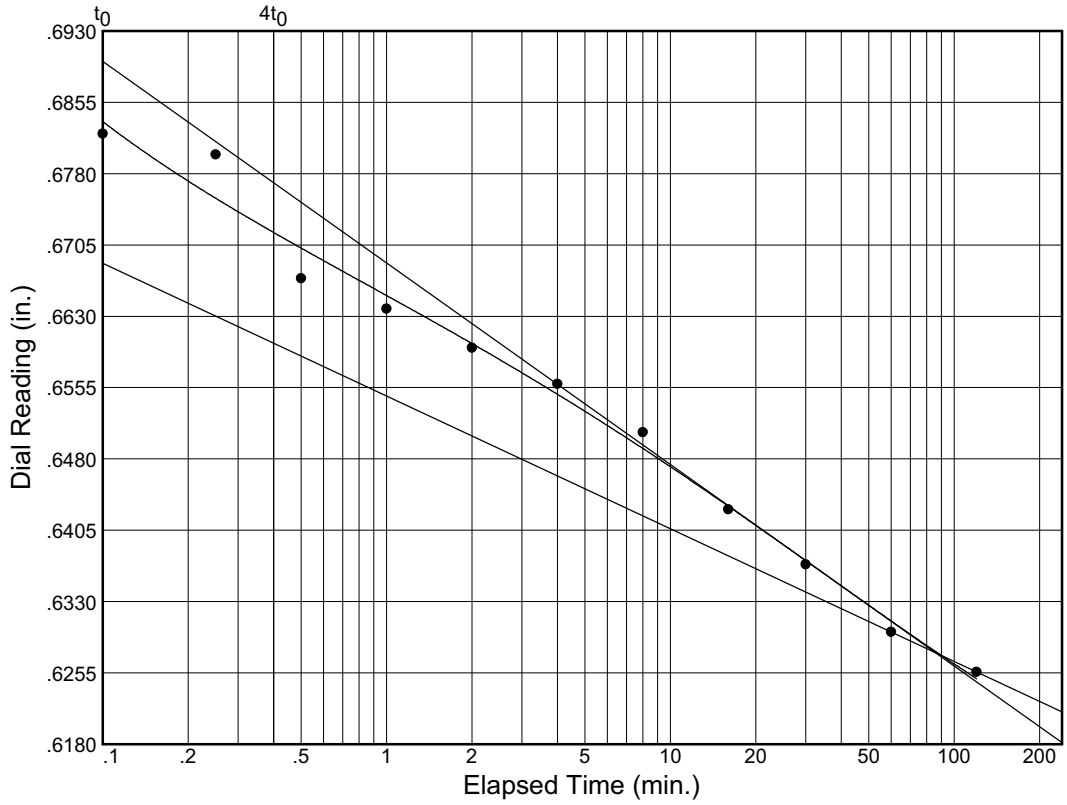
| $C_v$ @ $T_{50}$ |
|---|
| 0.06 ft.$^2$/day |

$C_\alpha$ = 0.026

Figure 8

# Dial Reading vs. Time

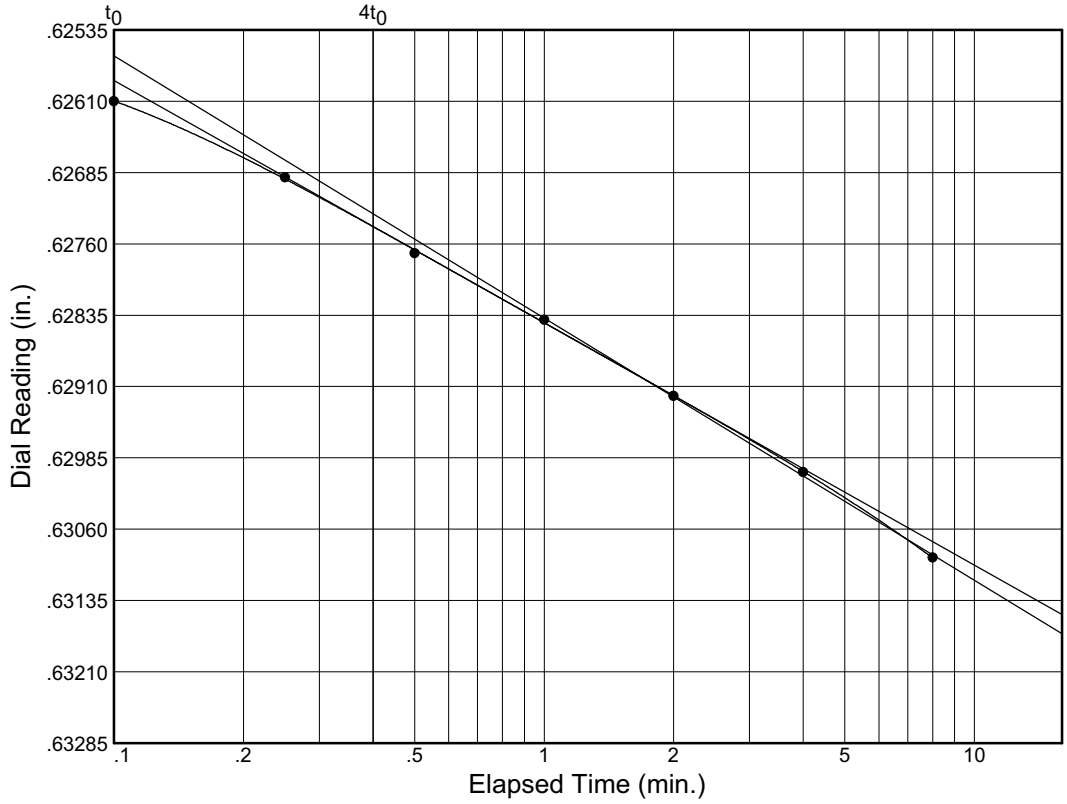
Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-6W




Load No.= 15
Load= 32.00 tsf
$D_0$ = 0.69512
$D_{50}$ = 0.66138
$D_{100}$ = 0.62763
$T_{50}$ = 1.69 min.

$C_v$ @ $T_{50}$
0.13 ft.$^2$/day

$C_\alpha$ = 0.020



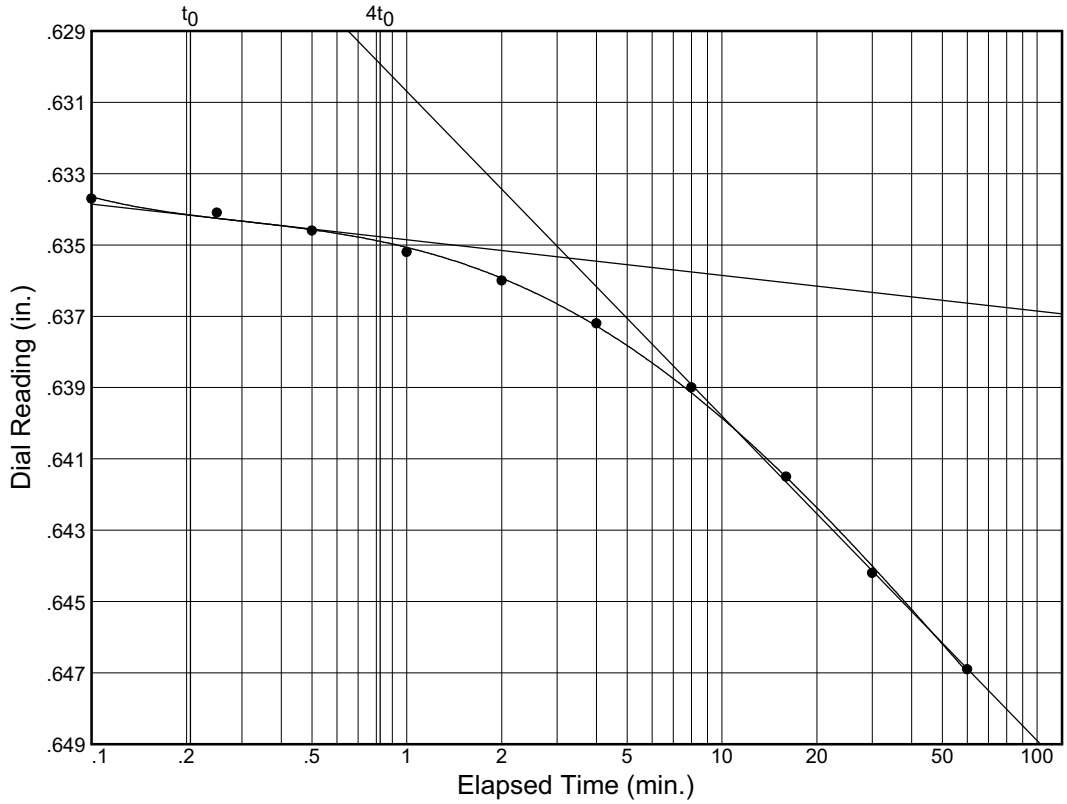

Load No.= 16
Load= 16.00 tsf
$D_0$ = 0.62478
$D_{50}$ = 0.62690
$D_{100}$ = 0.62902
$T_{50}$ = 0.25 min.

$C_v$ @ $T_{50}$
0.79 ft.$^2$/day

Figure 9

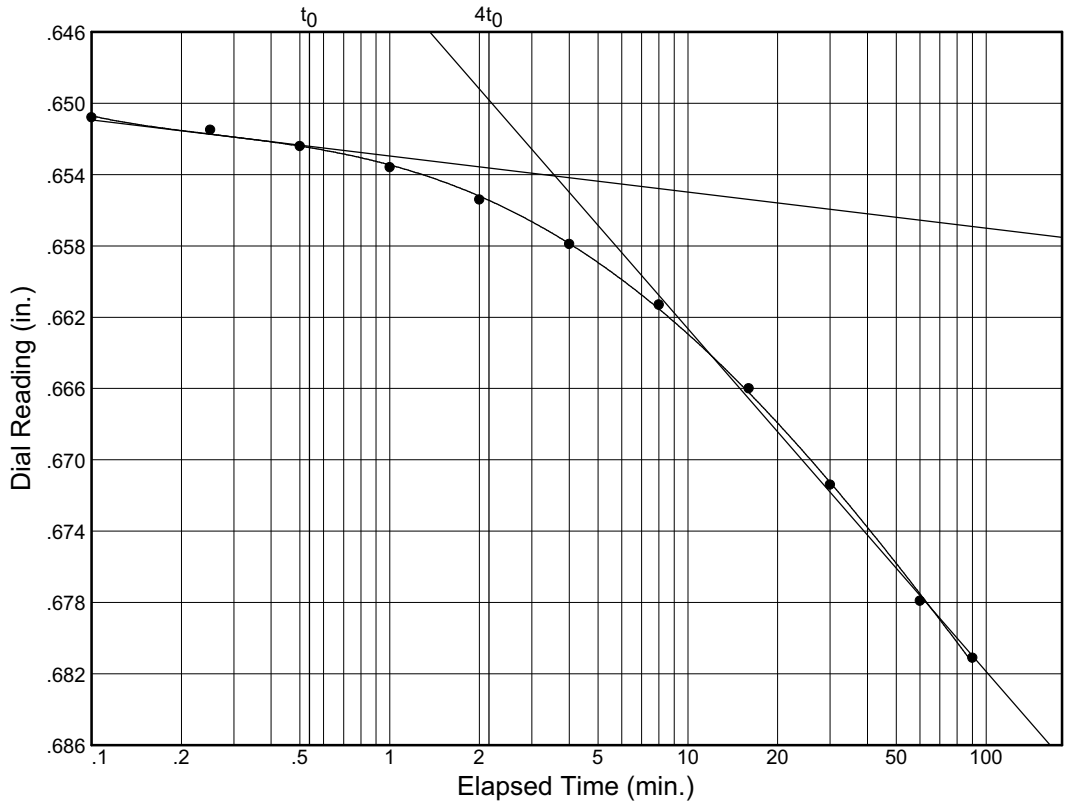
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-6W




Load No.= 17
Load= 4.00 tsf
$D_0$ = 0.63342
$D_{50}$ = 0.63440
$D_{100}$ = 0.63537
$T_{50}$ = 0.35 min.

$C_v$ @ $T_{50}$
0.58 ft.$^2$/day



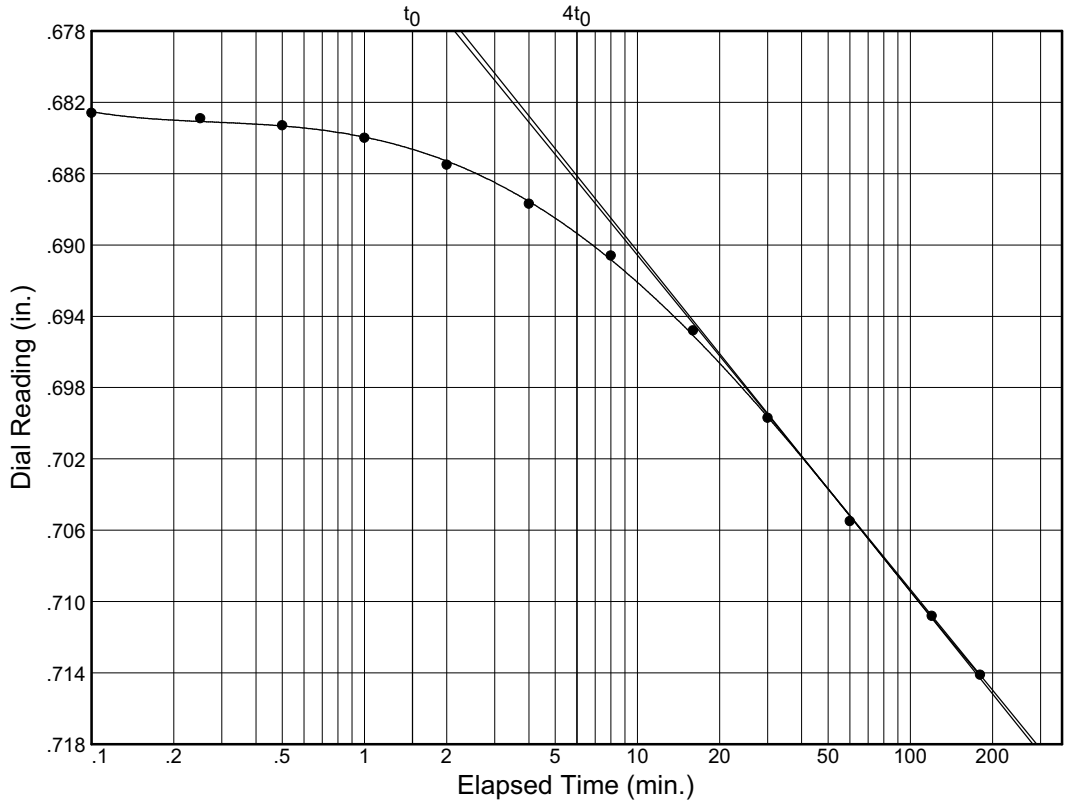

Load No.= 18
Load= 1.00 tsf
$D_0$ = 0.64953
$D_{50}$ = 0.65180
$D_{100}$ = 0.65407
$T_{50}$ = 0.27 min.

$C_v$ @ $T_{50}$
0.80 ft.$^2$/day

Figure 10

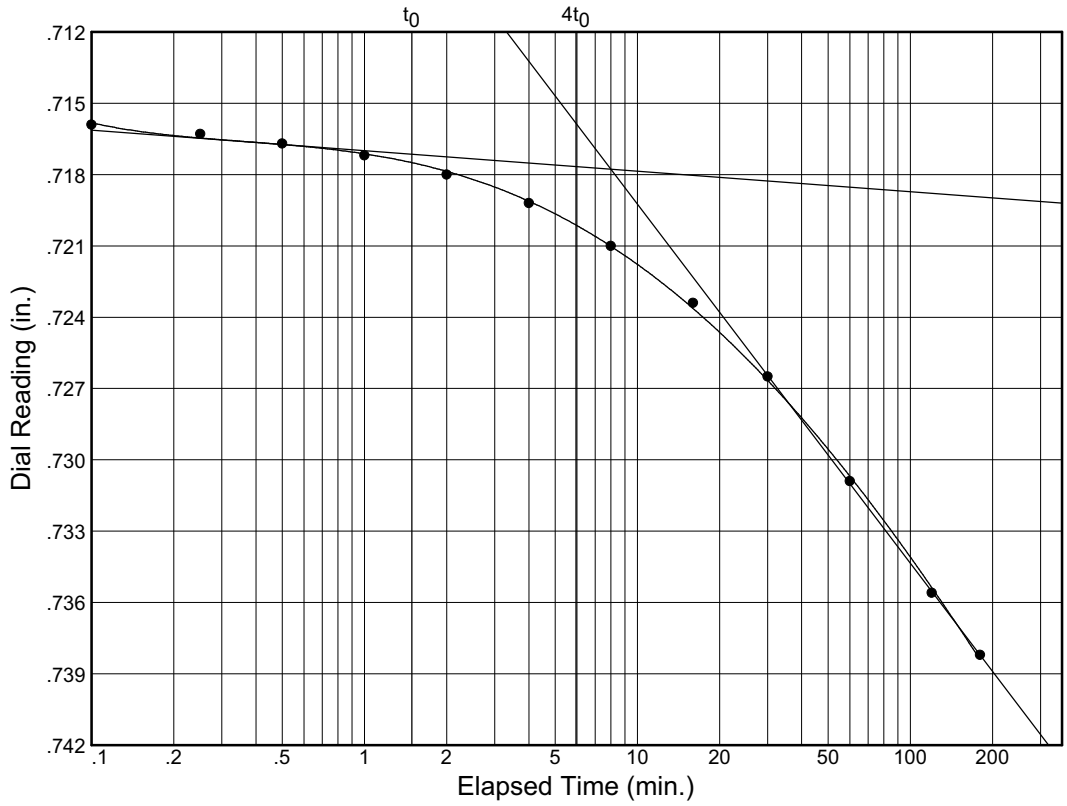
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-6W




Load No.= 19
Load= 0.25 tsf
$D_0$ = 0.67992
$D_{50}$ = 0.69174
$D_{100}$ = 0.70356
$T_{50}$ = 9.41 min.

$C_v$ @ $T_{50}$
0.03 ft.$^2$/day



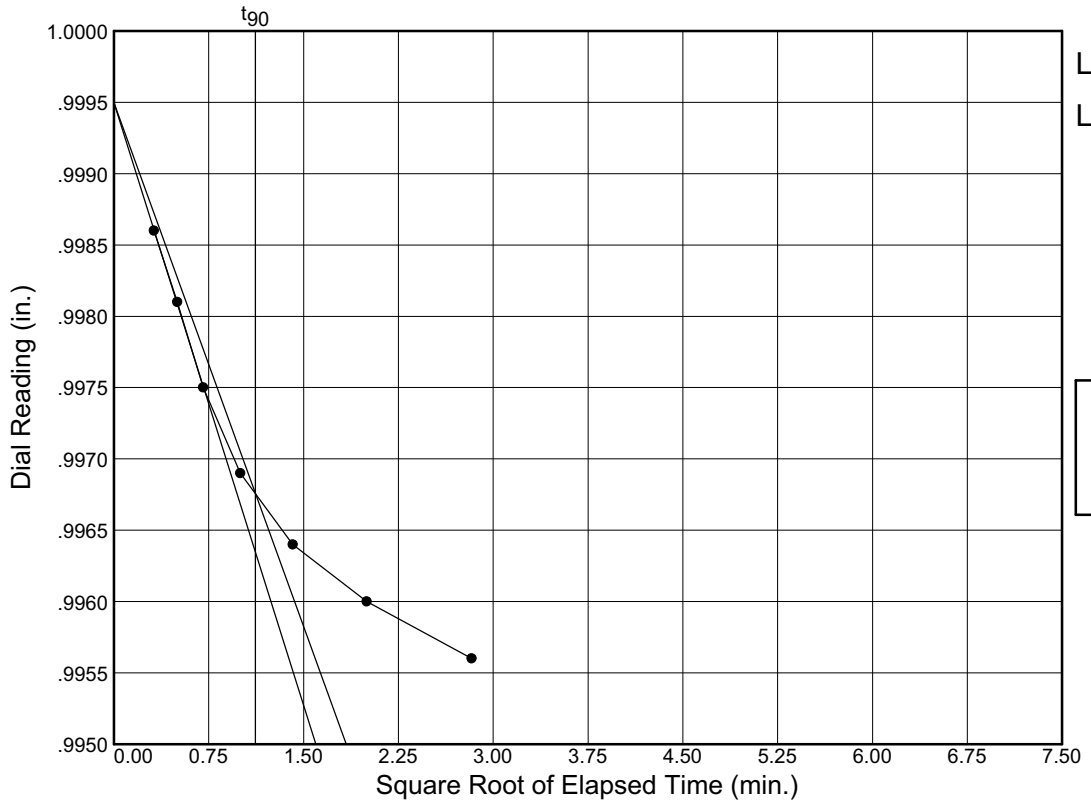

Load No.= 20
Load= 0.13 tsf
$D_0$ = 0.71487
$D_{50}$ = 0.71632
$D_{100}$ = 0.71777
$T_{50}$ = 0.19 min.

$C_v$ @ $T_{50}$
1.40 ft.$^2$/day

Figure 11

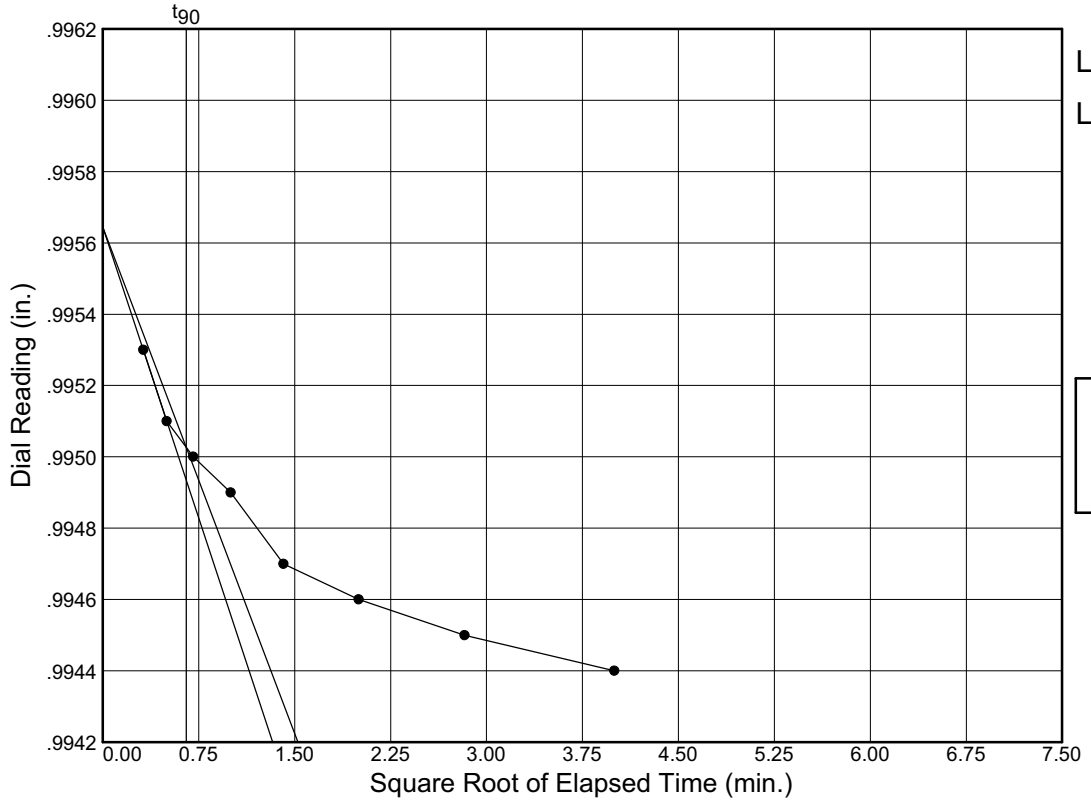
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-6W




Load No.= 1
Load= 0.13 tsf
$D_0$ = 0.99950
$D_{90}$ = 0.99676
$D_{100}$ = 0.99645
$T_{90}$ = 1.25 min.

$C_v$ @ $T_{90}$
1.69 ft.$^2$/day



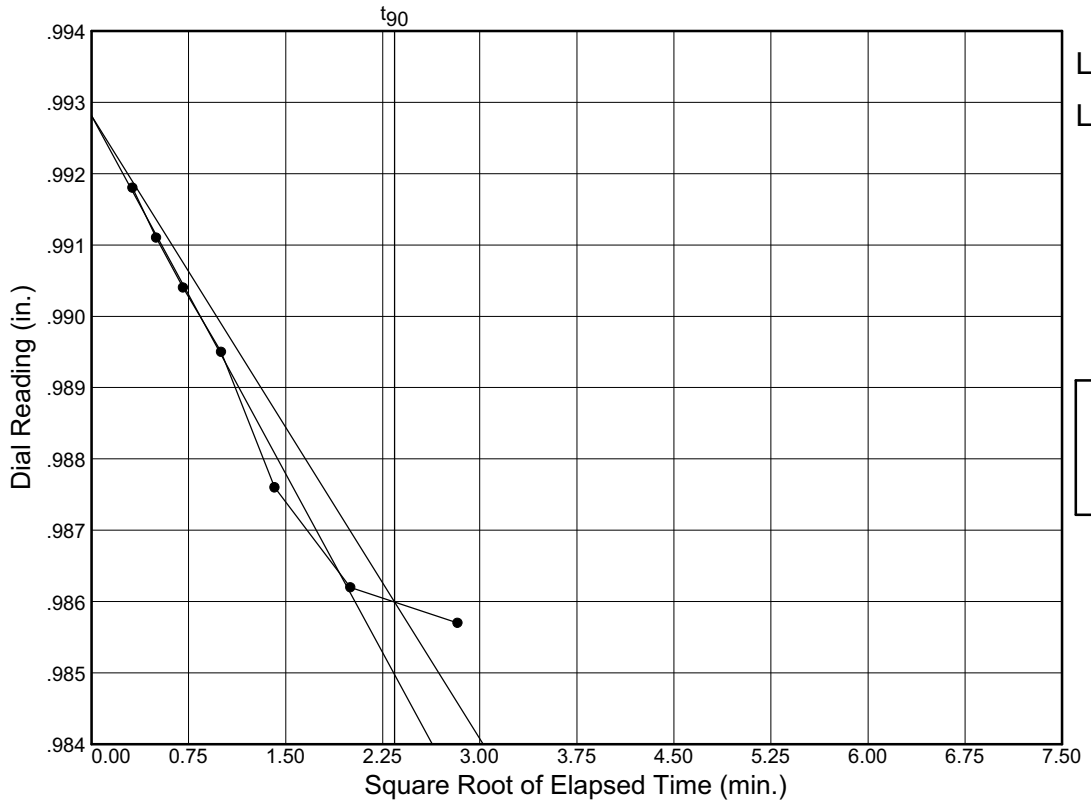

Load No.= 2
Load= 0.25 tsf
$D_0$ = 0.99564
$D_{90}$ = 0.99503
$D_{100}$ = 0.99496
$T_{90}$ = 0.43 min.

$C_v$ @ $T_{90}$
4.92 ft.$^2$/day

Figure 2

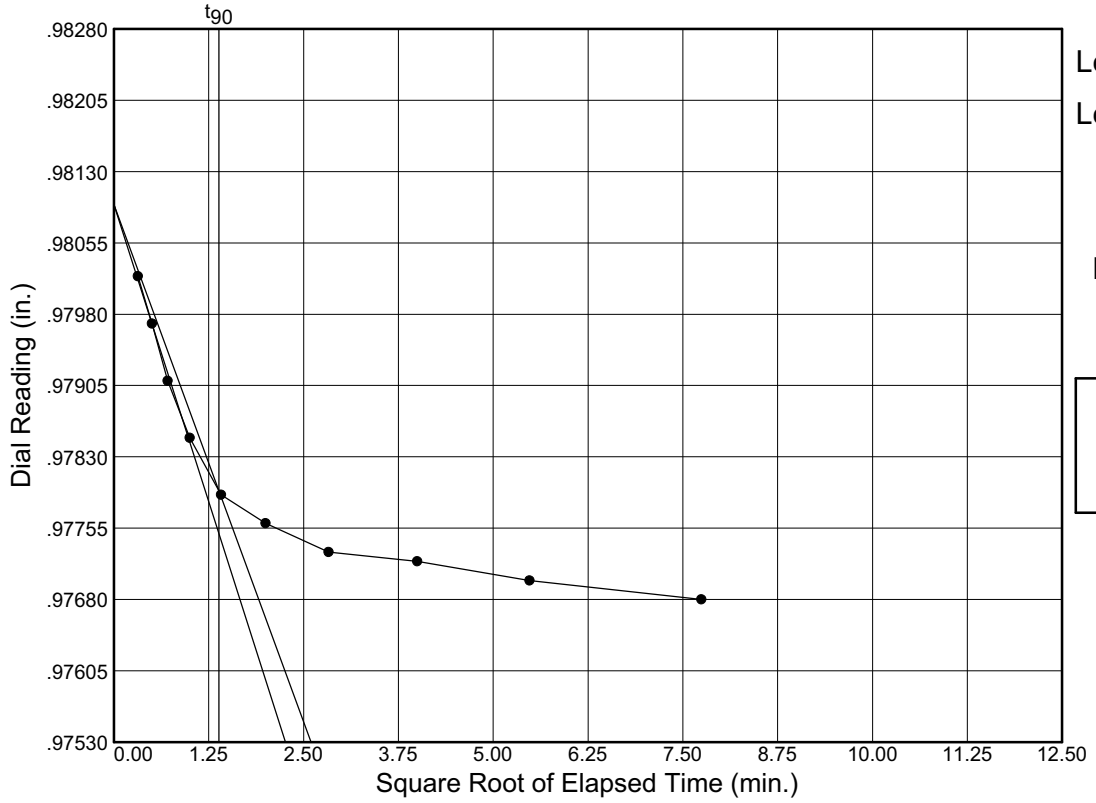
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-6W




Load No.= 3
Load= 0.50 tsf
$D_0$ = 0.99281
$D_{90}$ = 0.98599
$D_{100}$ = 0.98524
$T_{90}$ = 5.49 min.

| $C_v$ @ $T_{90}$ |
|---|
| 0.38 ft.$^2$/day |



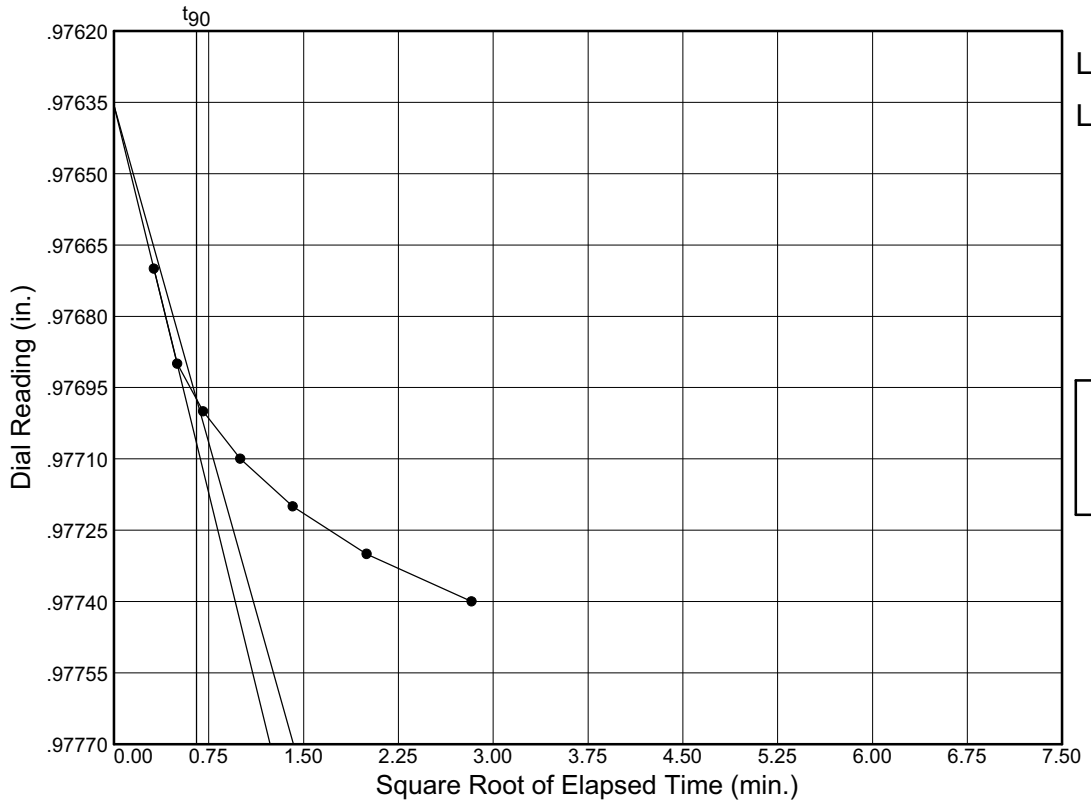

Load No.= 4
Load= 1.00 tsf
$D_0$ = 0.98095
$D_{90}$ = 0.97795
$D_{100}$ = 0.97761
$T_{90}$ = 1.91 min.

| $C_v$ @ $T_{90}$ |
|---|
| 1.07 ft.$^2$/day |

Figure 3

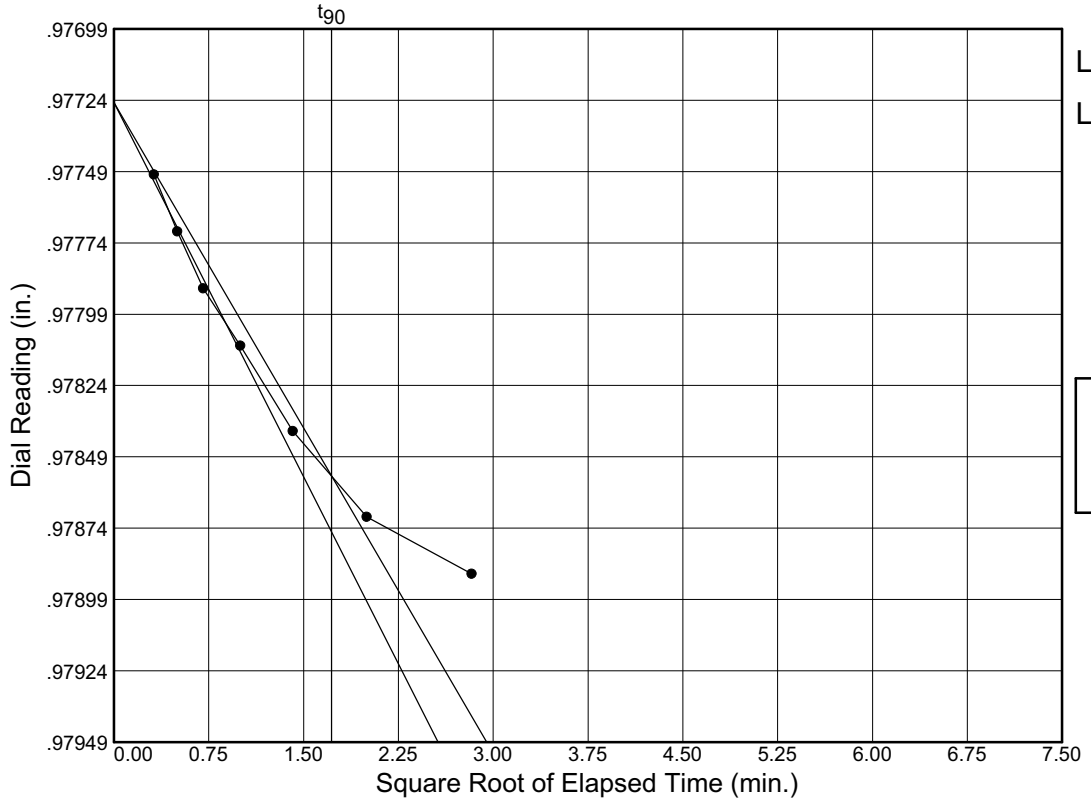
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-6W




Load No.= 5
Load= 0.50 tsf
$D_0$ = 0.97636
$D_{90}$ = 0.97697
$D_{100}$ = 0.97704
$T_{90}$ = 0.43 min.

$C_v$ @ $T_{90}$
4.74 ft.$^2$/day



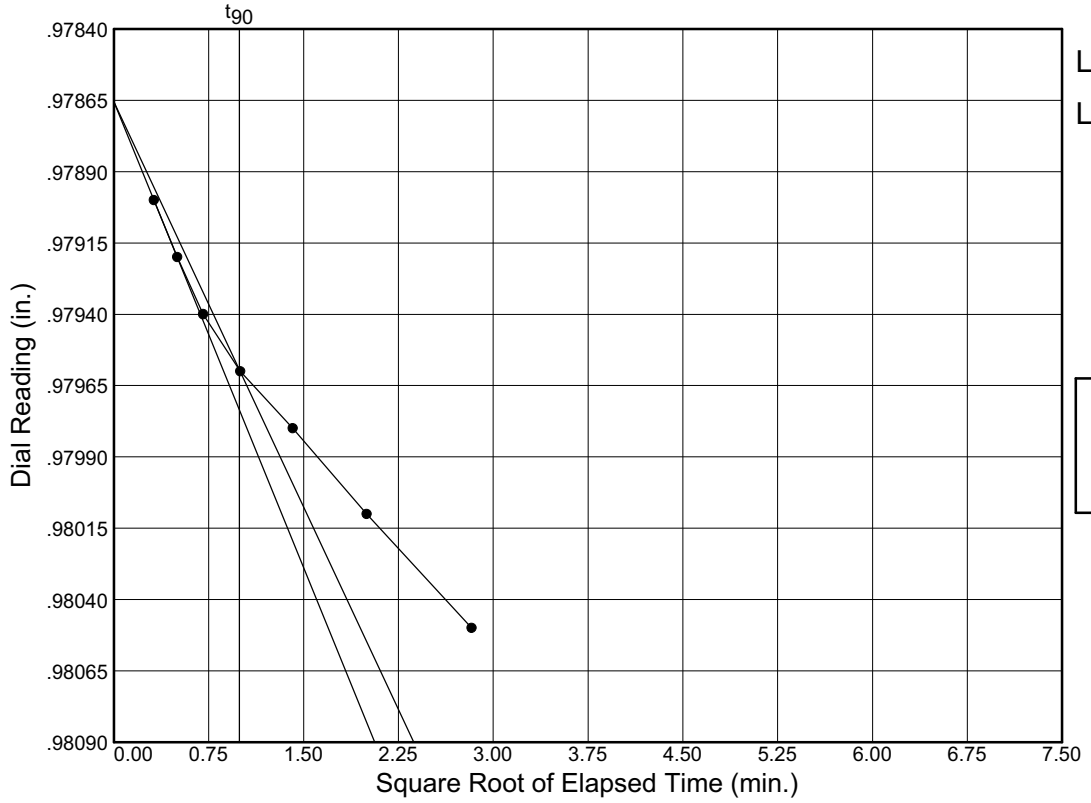

Load No.= 6
Load= 0.25 tsf
$D_0$ = 0.97725
$D_{90}$ = 0.97856
$D_{100}$ = 0.97870
$T_{90}$ = 2.96 min.

$C_v$ @ $T_{90}$
0.69 ft.$^2$/day

Figure 4

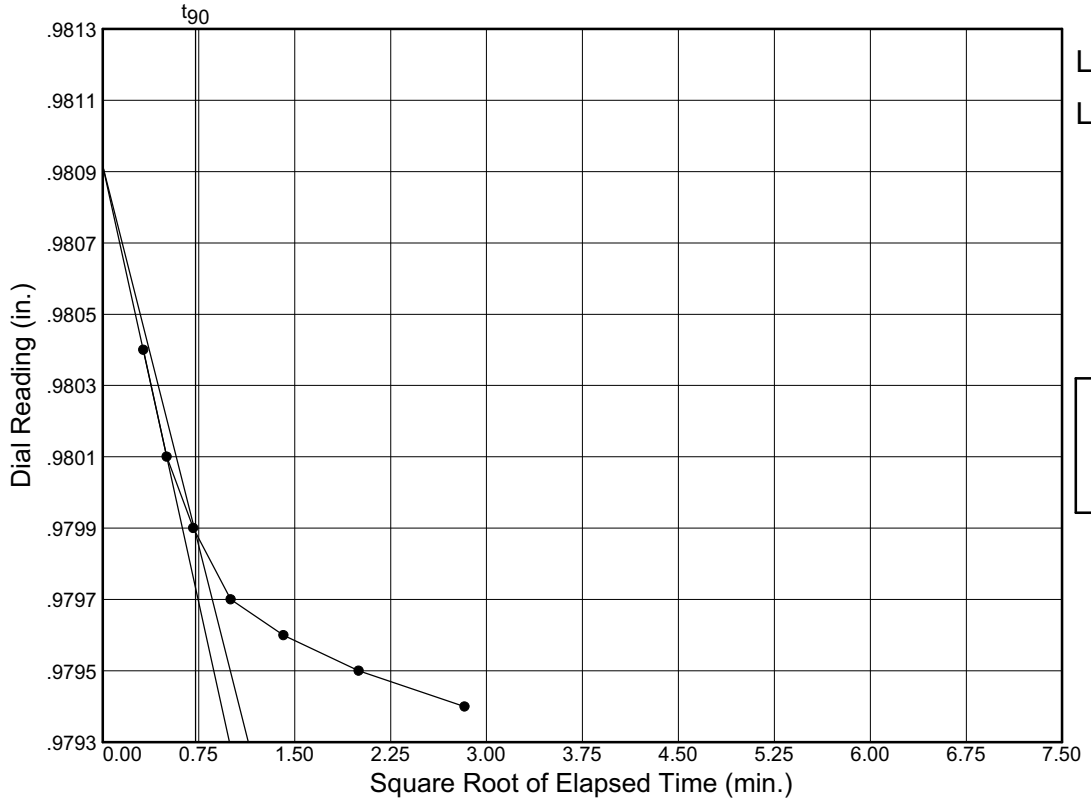
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-6W




Load No.= 7
Load= 0.13 tsf
$D_0$ = 0.97866
$D_{90}$ = 0.97959
$D_{100}$ = 0.97970
$T_{90}$ = 0.98 min.

$C_v$ @ $T_{90}$
2.07 ft.$^2$/day



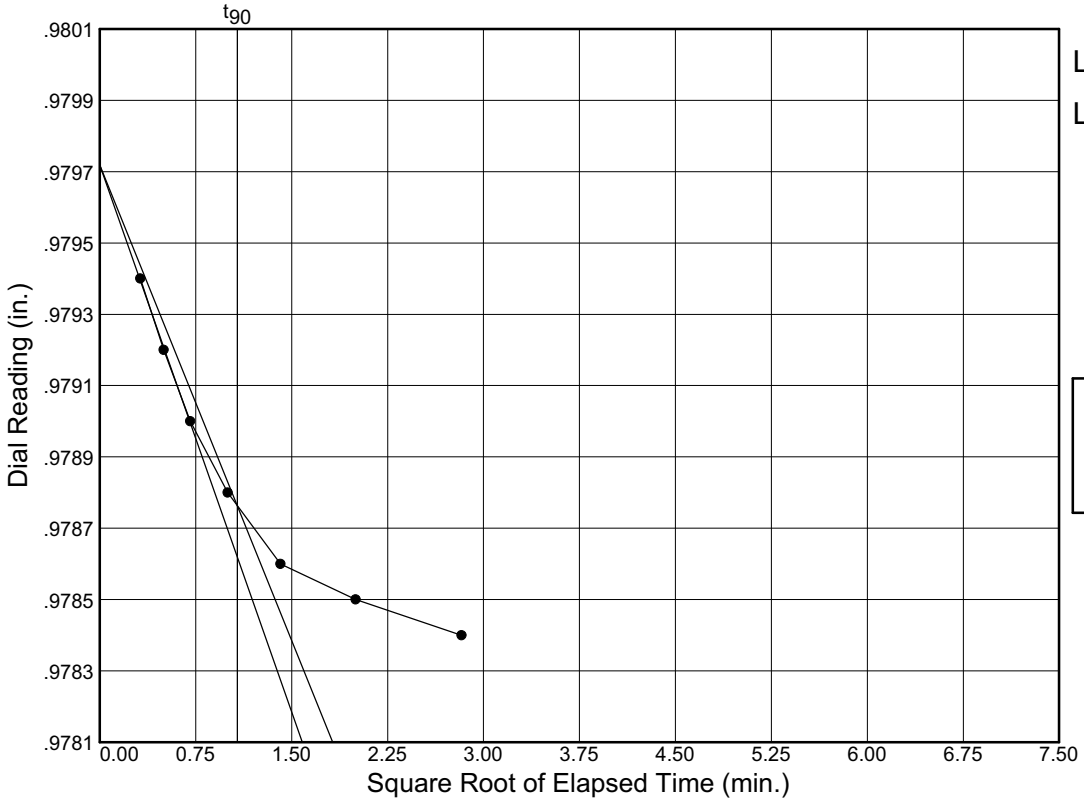

Load No.= 8
Load= 0.25 tsf
$D_0$ = 0.98092
$D_{90}$ = 0.97989
$D_{100}$ = 0.97977
$T_{90}$ = 0.52 min.

$C_v$ @ $T_{90}$
3.88 ft.$^2$/day

Figure 5

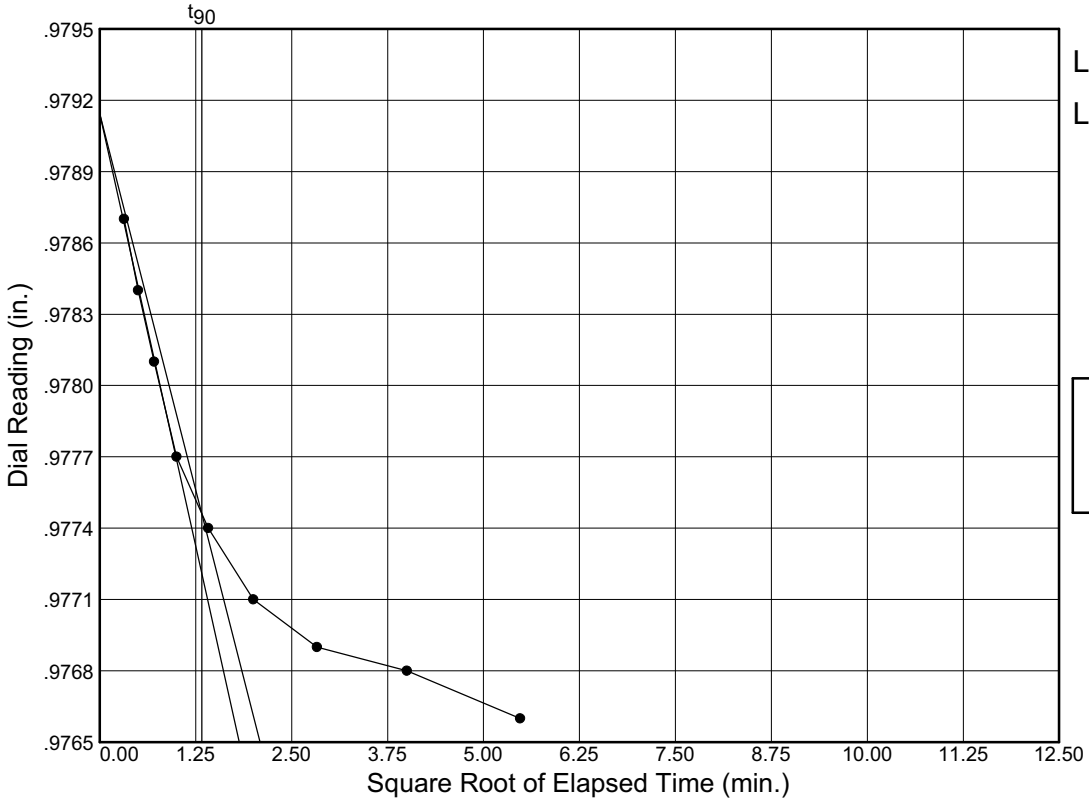
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-6W




Load No.= 9
Load= 0.50 tsf
$D_0$ = 0.97972
$D_{90}$ = 0.97876
$D_{100}$ = 0.97866
$T_{90}$ = 1.15 min.

$C_v$ @ $T_{90}$
1.76 ft.$^2$/day



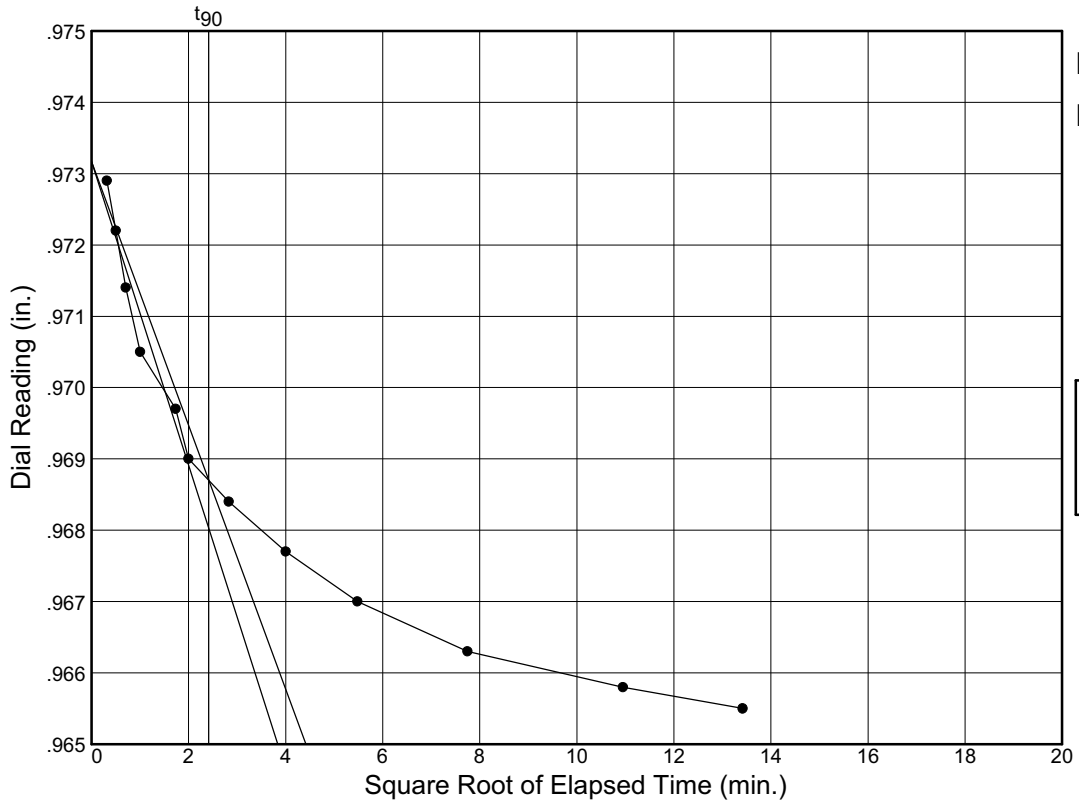

Load No.= 10
Load= 1.00 tsf
$D_0$ = 0.97914
$D_{90}$ = 0.97746
$D_{100}$ = 0.97728
$T_{90}$ = 1.76 min.

$C_v$ @ $T_{90}$
1.15 ft.$^2$/day

Figure 6

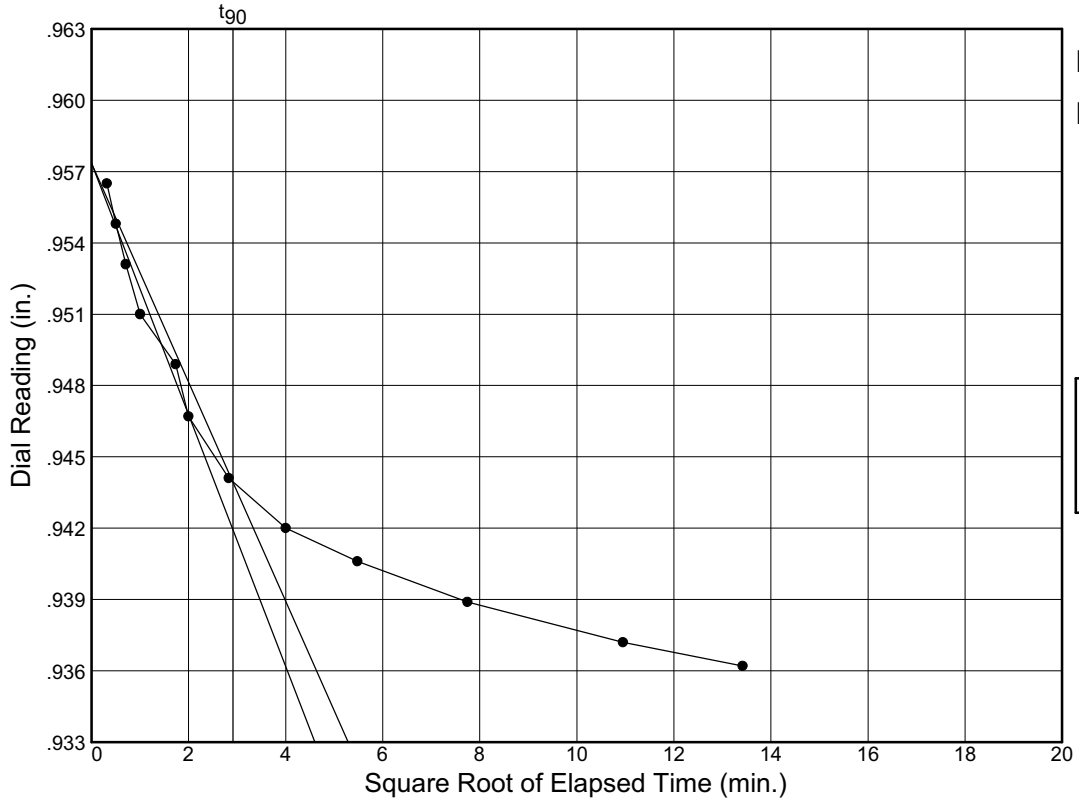
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-6W




Load No.= 11
Load= 2.00 tsf
$D_0$ = 0.97317
$D_{90}$ = 0.96870
$D_{100}$ = 0.96820
$T_{90}$ = 5.83 min.

$C_v$ @ $T_{90}$
0.34 ft.$^2$/day



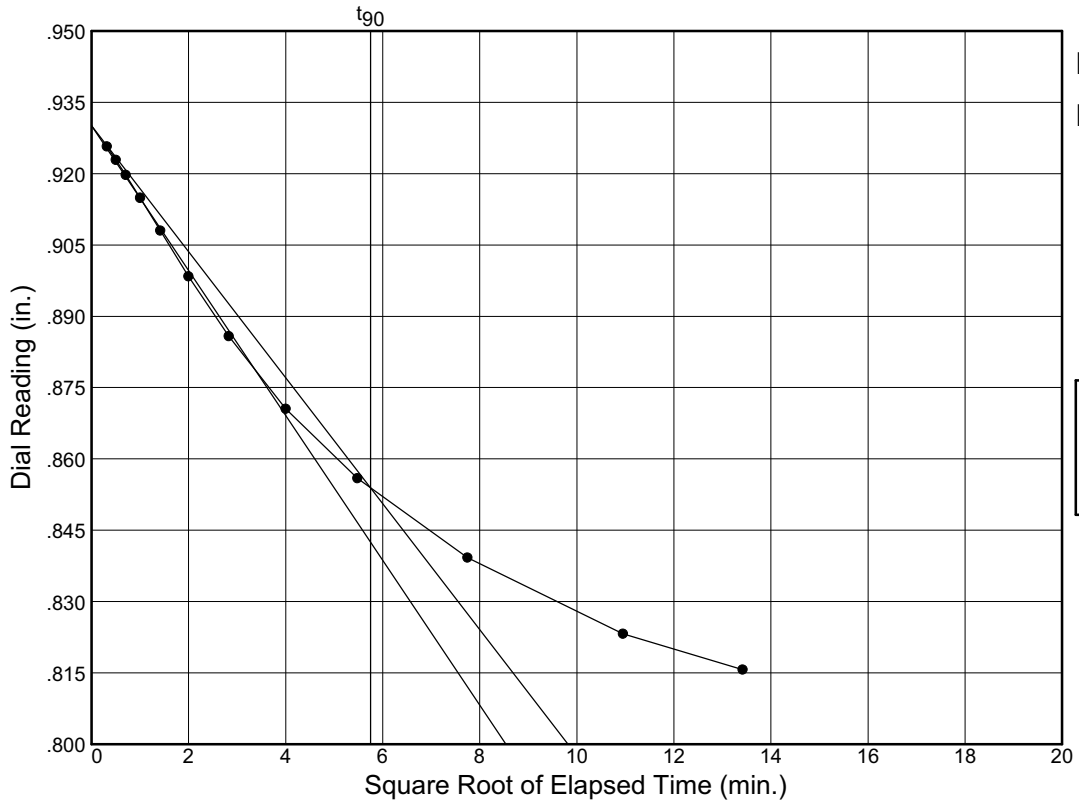

Load No.= 12
Load= 4.00 tsf
$D_0$ = 0.95735
$D_{90}$ = 0.94395
$D_{100}$ = 0.94246
$T_{90}$ = 8.47 min.

$C_v$ @ $T_{90}$
0.23 ft.$^2$/day

Figure 7

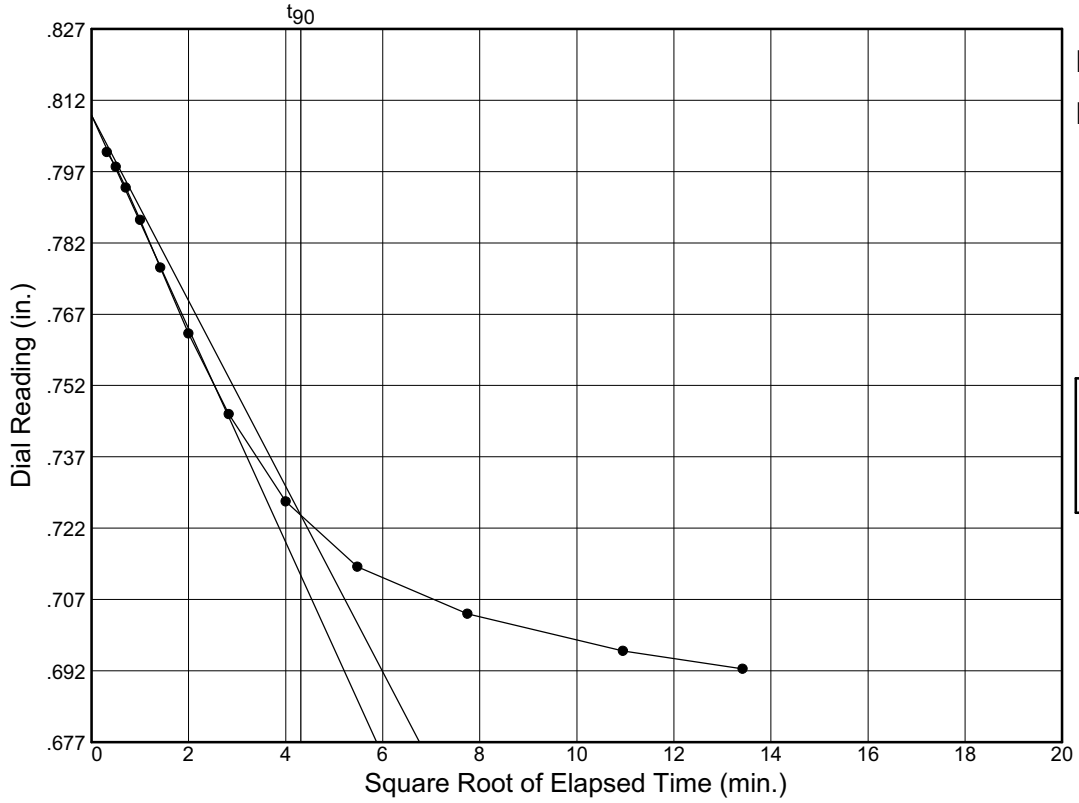
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-6W




Load No.= 13
Load= 8.00 tsf
$D_0$ = 0.93005
$D_{90}$ = 0.85392
$D_{100}$ = 0.84546
$T_{90}$ = 33.02 min.

$C_v$ @ $T_{90}$
0.05 ft.$^2$/day



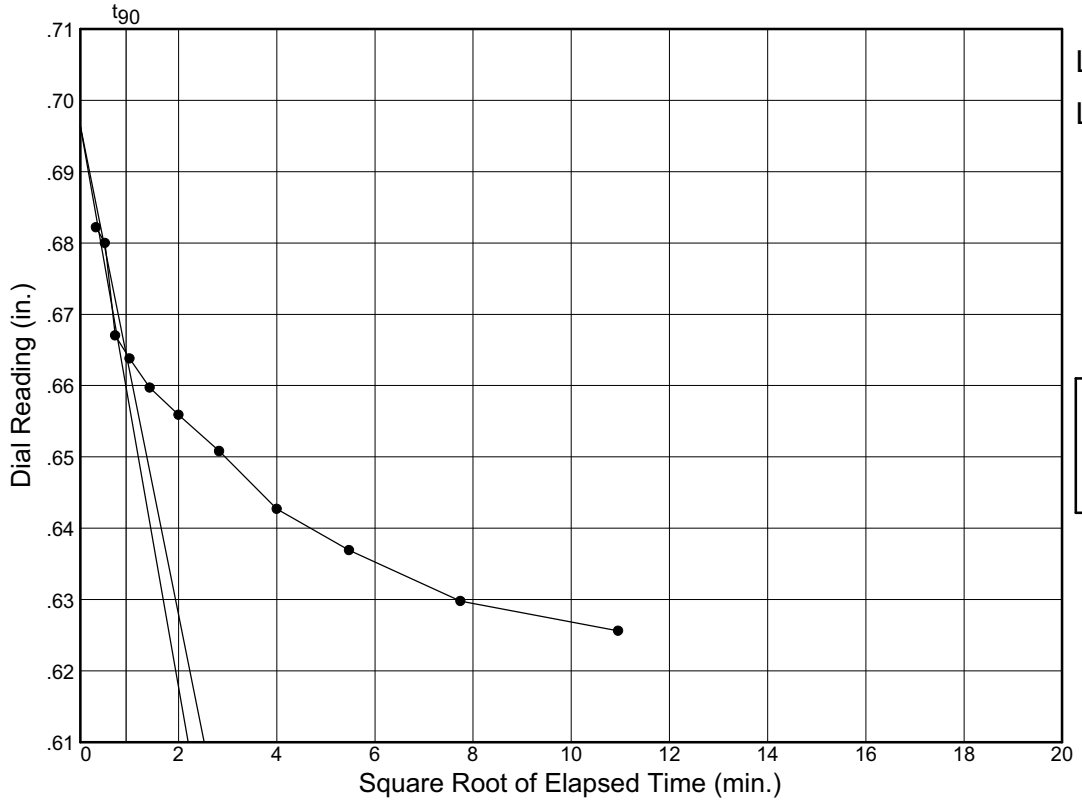

Load No.= 14
Load= 16.00 tsf
$D_0$ = 0.80884
$D_{90}$ = 0.72470
$D_{100}$ = 0.71535
$T_{90}$ = 18.60 min.

$C_v$ @ $T_{90}$
0.06 ft.$^2$/day

Figure 8

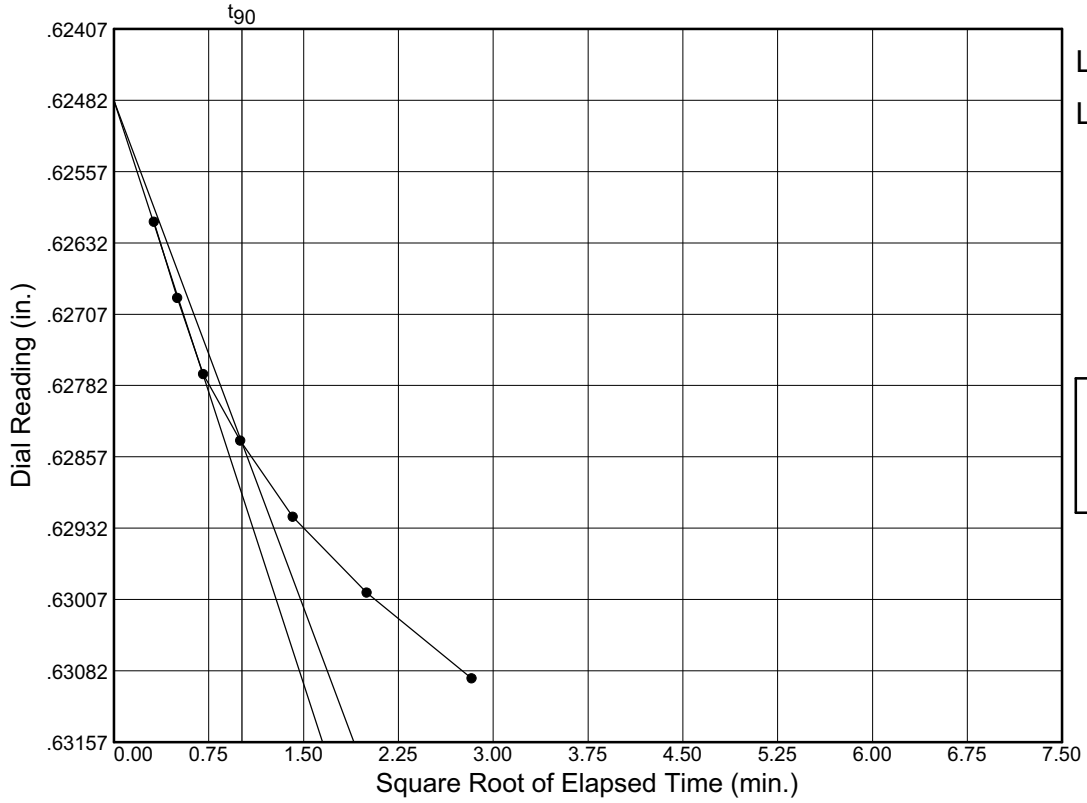
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-6W




Load No.= 15
Load= 32.00 tsf
$D_0$ = 0.69640
$D_{90}$ = 0.66457
$D_{100}$ = 0.66104
$T_{90}$ = 0.86 min.

$C_v$ @ $T_{90}$
1.07 ft.$^2$/day



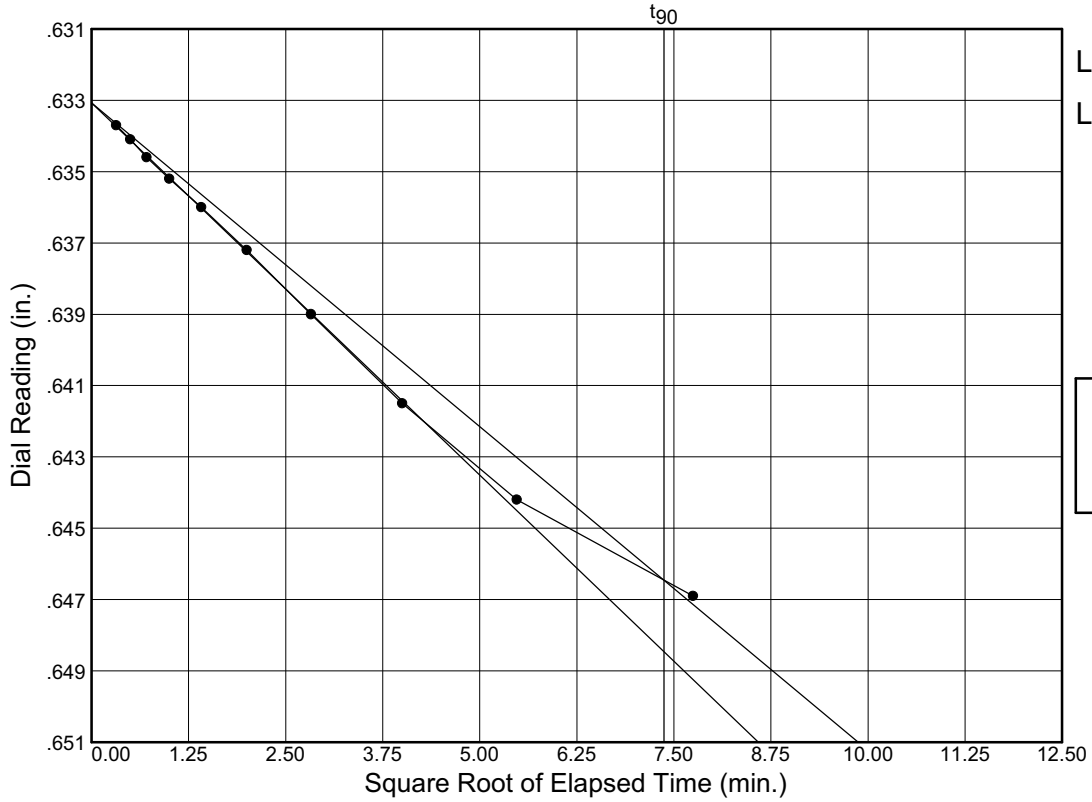

Load No.= 16
Load= 16.00 tsf
$D_0$ = 0.62482
$D_{90}$ = 0.62842
$D_{100}$ = 0.62882
$T_{90}$ = 1.03 min.

$C_v$ @ $T_{90}$
0.82 ft.$^2$/day

Figure 9

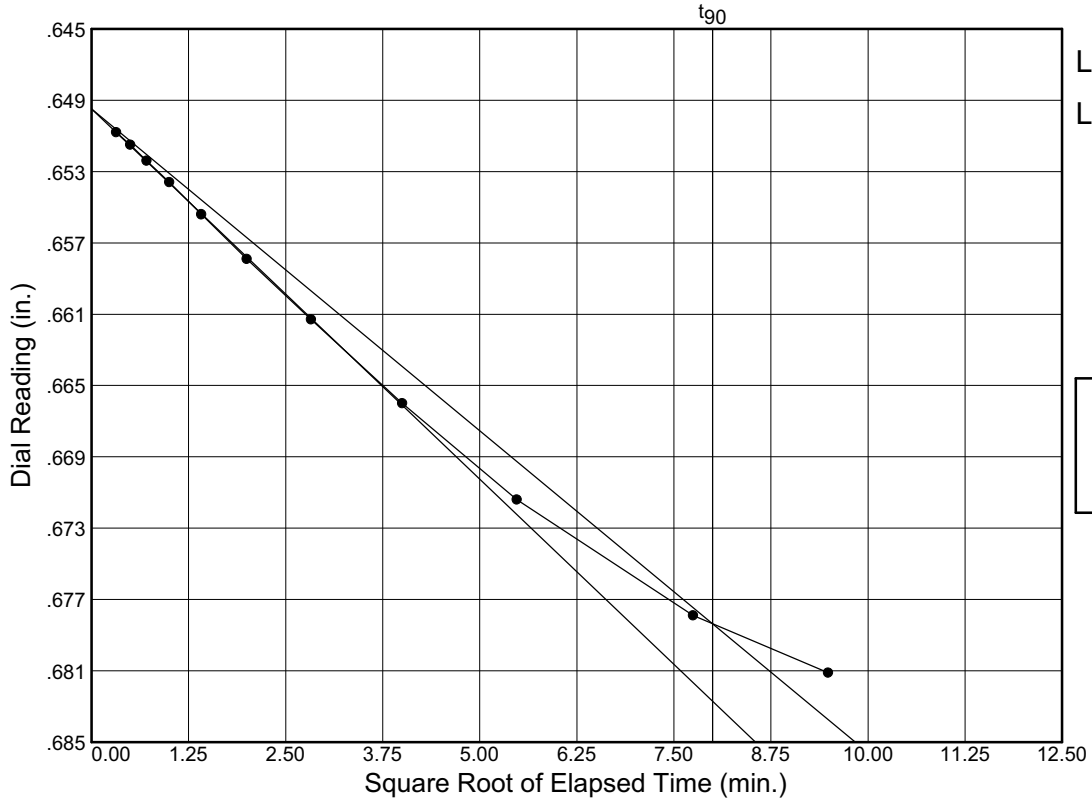
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-6W




Load No.= 17
Load= 4.00 tsf
$D_0$ = 0.63307
$D_{90}$ = 0.64645
$D_{100}$ = 0.64794
$T_{90}$ = 54.34 min.

$C_v$ @ $T_{90}$
0.02 ft.$^2$/day



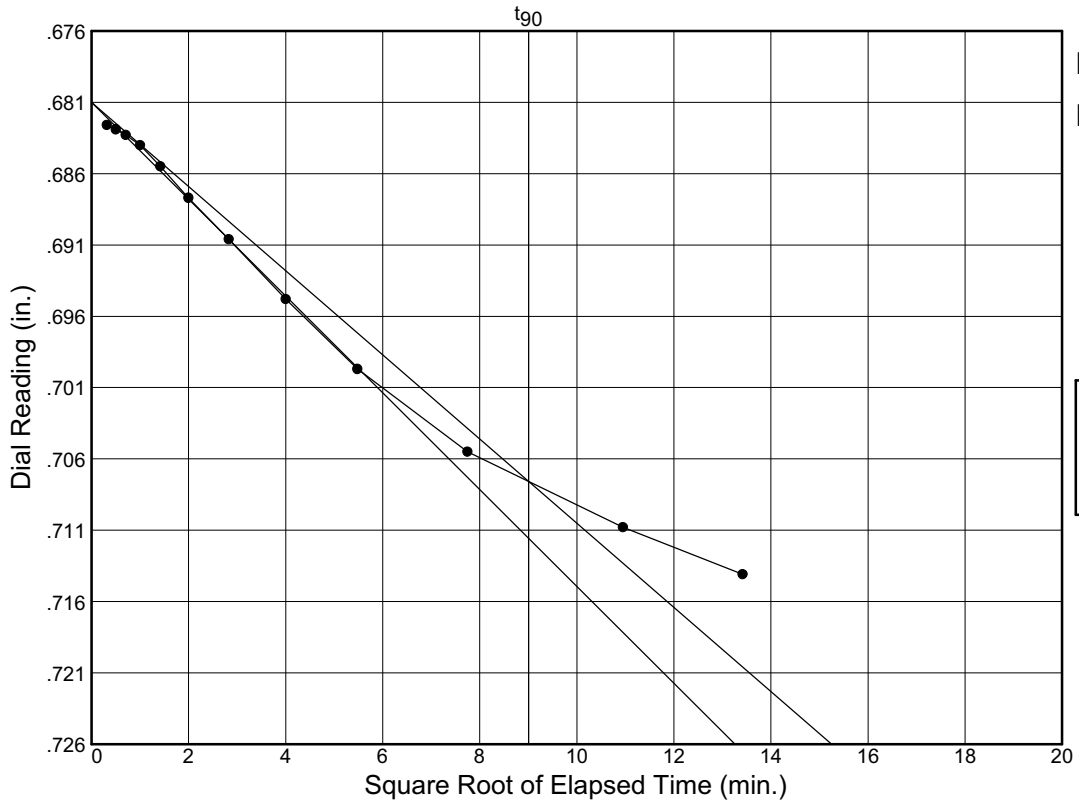

Load No.= 18
Load= 1.00 tsf
$D_0$ = 0.64949
$D_{90}$ = 0.67836
$D_{100}$ = 0.68157
$T_{90}$ = 63.94 min.

$C_v$ @ $T_{90}$
0.01 ft.$^2$/day

Figure 10

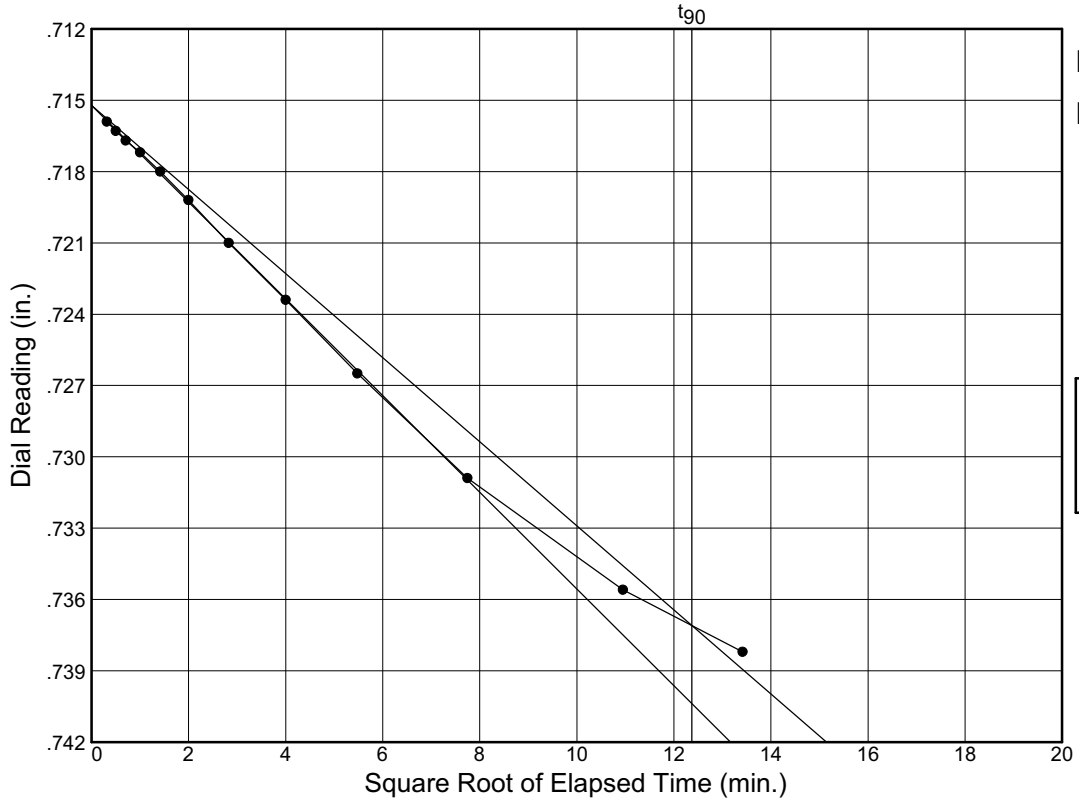
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-6W




Load No.= 19
Load= 0.25 tsf
$D_0$ = 0.68101
$D_{90}$ = 0.70758
$D_{100}$ = 0.71054
$T_{90}$ = 81.12 min.

| $C_v$ @ $T_{90}$ |
|---|
| 0.01 ft.$^2$/day |




Load No.= 20
Load= 0.13 tsf
$D_0$ = 0.71522
$D_{90}$ = 0.73709
$D_{100}$ = 0.73952
$T_{90}$ = 153.00 min.

| $C_v$ @ $T_{90}$ |
|---|
| 0.01 ft.$^2$/day |

Figure 11

## CONSOLIDATION TEST DATA

**Client:** HDR, Inc.
**Project:** VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
**Project Number:** VB10-237G

### Sample Data

**Source:**
**Sample No.:** Shelby Tube
**Elev. or Depth:** 63-65 ft. **Sample Length(in./cm.):** 1 in.
**Location:** D7CD-6W
**Description:** Brown, Fat CLAY
**Sample Date:** **Liquid Limit:** **Plasticity Index:**
**USCS:** **AASHTO:**
**Preparation Process:**
**Condition of Test:**
**Test Method:** **Final Density:** **Figure No.:** 1
**Testing Remarks:** D7CD-6W
Depth=63 ft.
**Tested By:** **Test Date:**
**Checked By:** **Title:**

### Test Specimen Data

| TOTAL SAMPLE | BEFORE TEST | AFTER TEST |
|---|---|---|
| **Wet w+t** = 307.38 g. | **Consolidometer #** = 1 | **Wet w+t** = 287.16 g. |
| **Dry w+t** = 256.51 g. | | **Dry w+t** = 256.51 g. |
| **Tare Wt.** = 177.28 g. | **Spec. Gravity** = 2.68 | **Tare Wt.** = 177.28 g. |
| **Height** = 1.00 in. | **Height** = 1.00 in. | |
| **Diameter** = 2.50 in. | **Diameter** = 2.50 in. | |
| **Weight** = 130.10 g. | **Defl. Table** = Reference Set (inches/tsf) | |
| **Moisture** = 64.2 % | **Ht. Solids** = 0.3675 in. | **Moisture** = 38.7 % |
| **Wet Den.** = 101.0 pcf | **Dry Wt.** = 79.23 g. | **Dry Wt.** = 79.23 g.* |
| **Dry Den.** = 61.5 pcf | **Void Ratio** = 1.721 | **Void Ratio** = 1.009 |
| **Ovrbrdn.** = 1.80 tsf | **Saturation** = 100.0 % | |

*** Final dry weight used in calculations**

### End-of-Load Summary

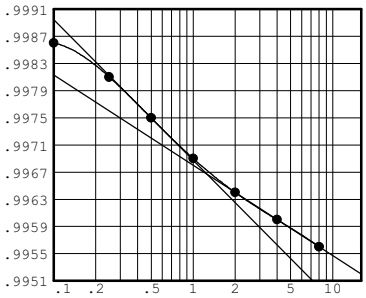
| Pressure (tsf) | Final Dial (in.) | Machine Defl. (in.) | $C_v$ (ft.$^2$/day) | $C_\alpha$ | Void Ratio | % Compression /Swell |
|---|---|---|---|---|---|---|
| start | 1.00000 | | | | 1.721 | |
| 0.13 | 0.99560 | 0.00000 | 2.69 | 0.001 | 1.709 | 0.4 Comprs. |
| 0.25 | 0.99400 | 0.00040 | 1.59 | 0.000 | 1.706 | 0.6 Comprs. |
| 0.50 | 0.98490 | 0.00080 | 0.54 | 0.002 | 1.682 | 1.4 Comprs. |
| 1.00 | 0.97520 | 0.00160 | 1.35 | 0.001 | 1.658 | 2.3 Comprs. |
| 0.50 | 0.97660 | 0.00080 | 2.56 | | 1.659 | 2.3 Comprs. |
| 0.25 | 0.97850 | 0.00040 | 0.79 | | 1.664 | 2.1 Comprs. |
| 0.13 | 0.98050 | 0.00000 | 1.43 | | 1.668 | 2.0 Comprs. |

| Pressure (tsf) | Final Dial (in.) | Machine Defl. (in.) | $C_v$ (ft.$^2$/day) | $C_\alpha$ | Void Ratio | % Compression /Swell |
|---|---|---|---|---|---|---|
| 0.25 | 0.97900 | 0.00040 | 3.35 | 0.000 | 1.665 | 2.1 Comprs. |
| 0.50 | 0.97760 | 0.00080 | 1.73 | 0.000 | 1.662 | 2.2 Comprs. |
| 1.00 | 0.97500 | 0.00160 | 1.24 | 0.001 | 1.657 | 2.3 Comprs. |
| 2.00 | 0.96310 | 0.00240 | 0.37 | 0.002 | 1.627 | 3.5 Comprs. |
| 4.00 | 0.93620 | 0.00000 | 0.34 | 0.006 | 1.547 | 6.4 Comprs. |
| 8.00 | 0.81570 | 0.00000 | 0.03 | 0.045 | 1.219 | 18.4 Comprs. |
| 16.00 | 0.69240 | 0.00000 | 0.06 | 0.026 | 0.884 | 30.8 Comprs. |
| 32.00 | 0.62560 | 0.00000 | 0.13 | 0.020 | 0.702 | 37.4 Comprs. |
| 16.00 | 0.63090 | 0.00000 | 0.79 | | 0.717 | 36.9 Comprs. |
| 4.00 | 0.64690 | 0.00000 | 0.58 | | 0.760 | 35.3 Comprs. |
| 1.00 | 0.67950 | 0.00160 | 0.80 | | 0.853 | 31.9 Comprs. |
| 0.25 | 0.71370 | 0.00040 | 0.03 | | 0.943 | 28.6 Comprs. |
| 0.13 | 0.73820 | 0.00000 | 1.40 | | 1.009 | 26.2 Comprs. |

**$C_c$ =** 1.21 **$P_c$ =** 4.24 tsf **$C_r$ =** 0.06

**Pressure: 0.13 tsf** **TEST READINGS** **Load No. 1**

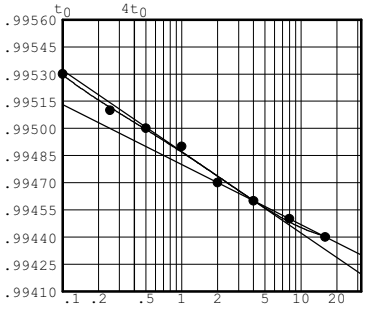
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 1.00000 |
| 2 | 0.10 | 0.99860 |
| 3 | 0.25 | 0.99810 |
| 4 | 0.50 | 0.99750 |
| 5 | 1.00 | 0.99690 |
| 6 | 2.00 | 0.99640 |
| 7 | 4.00 | 0.99600 |
| 8 | 8.00 | 0.99560 |




**Void Ratio =** 1.709 **Compression =** 0.4 %
**$D_0$ =** 1.00000 **$D_{50}$ =** 0.99833 **$D_{100}$ =** 0.99667
**$C_v$ at 0.2 min. =** 2.69 ft.$^2$/day **$C_\alpha$ =** 0.001

**Pressure: 0.25 tsf** **TEST READINGS** **Load No. 2**

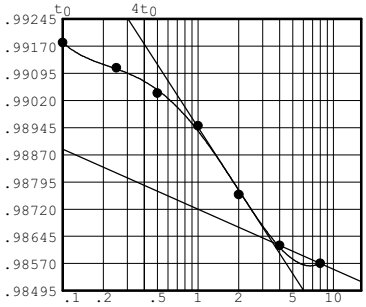
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.99560 |
| 2 | 0.10 | 0.99490 |
| 3 | 0.25 | 0.99470 |
| 4 | 0.50 | 0.99460 |
| 5 | 1.00 | 0.99450 |
| 6 | 2.00 | 0.99430 |
| 7 | 4.00 | 0.99420 |
| 8 | 8.00 | 0.99410 |
| 9 | 16.00 | 0.99400 |




**Void Ratio =** 1.706 **Compression =** 0.6 %
**$D_0$ =** 0.99556 **$D_{50}$ =** 0.99508 **$D_{100}$ =** 0.99460
**$C_v$ at 0.3 min. =** 1.59 ft.$^2$/day **$C_\alpha$ =** 0.000

**Pressure: 0.50 tsf** **TEST READINGS** **Load No. 3**

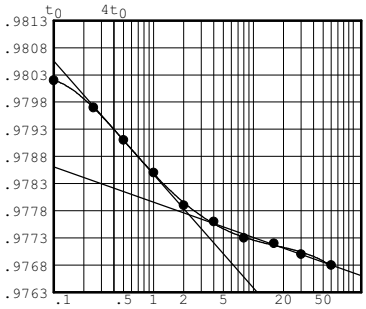
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.99400 |
| 2 | 0.10 | 0.99100 |
| 3 | 0.25 | 0.99030 |
| 4 | 0.50 | 0.98960 |
| 5 | 1.00 | 0.98870 |
| 6 | 2.00 | 0.98680 |
| 7 | 4.00 | 0.98540 |
| 8 | 8.00 | 0.98490 |




**Void Ratio =** 1.682 **Compression =** 1.4 %
**$D_0$ =** 0.99288 **$D_{50}$ =** 0.98958 **$D_{100}$ =** 0.98629
**$C_v$ at 0.9 min. =** 0.54 ft.$^2$/day **$C_\alpha$ =** 0.002

**Pressure: 1.00 tsf** **TEST READINGS** **Load No. 4**

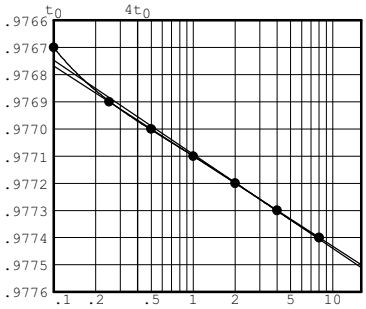
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.98430 | 11 | 60.00 | 0.97520 |
| 2 | 0.10 | 0.97860 | | | |
| 3 | 0.25 | 0.97810 | | | |
| 4 | 0.50 | 0.97750 | | | |
| 5 | 1.00 | 0.97690 | | | |
| 6 | 2.00 | 0.97630 | | | |
| 7 | 4.00 | 0.97600 | | | |
| 8 | 8.00 | 0.97570 | | | |
| 9 | 16.00 | 0.97560 | | | |
| 10 | 30.00 | 0.97540 | | | |




**Void Ratio =** 1.658 **Compression =** 2.3 %
**$D_0$ =** 0.98111 **$D_{50}$ =** 0.97941 **$D_{100}$ =** 0.97772
**$C_v$ at 0.4 min. =** 1.35 ft.$^2$/day **$C_\alpha$ =** 0.001

**Pressure: 0.50 tsf** **TEST READINGS** **Load No. 5**

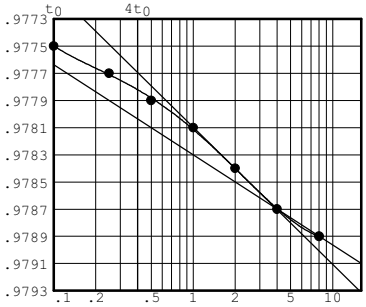
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.97520 |
| 2 | 0.10 | 0.97590 |
| 3 | 0.25 | 0.97610 |
| 4 | 0.50 | 0.97620 |
| 5 | 1.00 | 0.97630 |
| 6 | 2.00 | 0.97640 |
| 7 | 4.00 | 0.97650 |
| 8 | 8.00 | 0.97660 |




**Void Ratio =** 1.659 **Compression =** 2.3 %
**$D_0$ =** 0.97643 **$D_{50}$ =** 0.97684 **$D_{100}$ =** 0.97725
**$C_v$ at 0.2 min. =** 2.56 ft.$^2$/day

**Pressure: 0.25 tsf** **TEST READINGS** **Load No. 6**

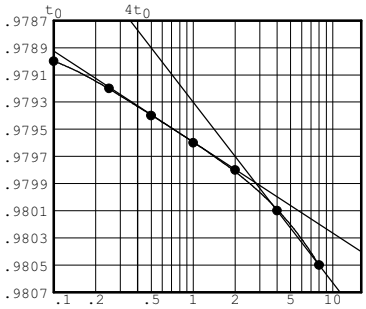
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.97660 |
| 2 | 0.10 | 0.97710 |
| 3 | 0.25 | 0.97730 |
| 4 | 0.50 | 0.97750 |
| 5 | 1.00 | 0.97770 |
| 6 | 2.00 | 0.97800 |
| 7 | 4.00 | 0.97830 |
| 8 | 8.00 | 0.97850 |




**Void Ratio =** 1.664 **Compression =** 2.1 %
**$D_0$ =** 0.97718 **$D_{50}$ =** 0.97793 **$D_{100}$ =** 0.97869
**$C_v$ at 0.6 min. =** 0.79 ft.$^2$/day

**Pressure: 0.13 tsf** **TEST READINGS** **Load No. 7**

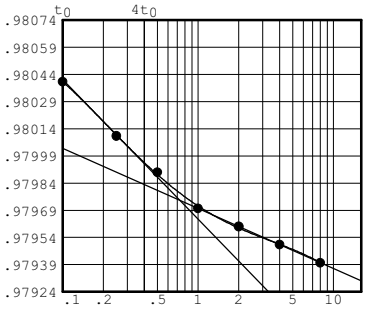
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.97850 |
| 2 | 0.10 | 0.97900 |
| 3 | 0.25 | 0.97920 |
| 4 | 0.50 | 0.97940 |
| 5 | 1.00 | 0.97960 |
| 6 | 2.00 | 0.97980 |
| 7 | 4.00 | 0.98010 |
| 8 | 8.00 | 0.98050 |




**Void Ratio =** 1.668 **Compression =** 2.0 %
**$D_0$ =** 0.97867 **$D_{50}$ =** 0.97928 **$D_{100}$ =** 0.97989
**$C_v$ at 0.3 min. =** 1.43 ft.$^2$/day

**Pressure: 0.25 tsf** **TEST READINGS** **Load No. 8**

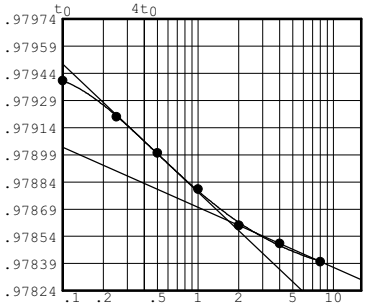
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.98050 |
| 2 | 0.10 | 0.98000 |
| 3 | 0.25 | 0.97970 |
| 4 | 0.50 | 0.97950 |
| 5 | 1.00 | 0.97930 |
| 6 | 2.00 | 0.97920 |
| 7 | 4.00 | 0.97910 |
| 8 | 8.00 | 0.97900 |




**Void Ratio =** 1.665 **Compression =** 2.1 %
**$D_0$ =** 0.98084 **$D_{50}$ =** 0.98029 **$D_{100}$ =** 0.97974
**$C_v$ at 0.1 min. =** 3.35 ft.$^2$/day **$C_\alpha$ =** 0.000

**Pressure: 0.50 tsf** **TEST READINGS** **Load No. 9**

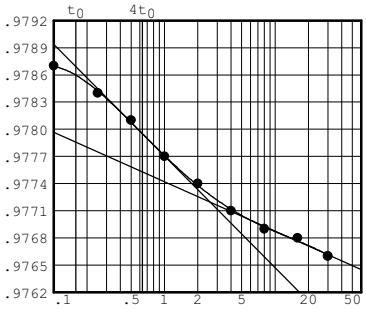
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.97900 |
| 2 | 0.10 | 0.97860 |
| 3 | 0.25 | 0.97840 |
| 4 | 0.50 | 0.97820 |
| 5 | 1.00 | 0.97800 |
| 6 | 2.00 | 0.97780 |
| 7 | 4.00 | 0.97770 |
| 8 | 8.00 | 0.97760 |




**Void Ratio =** 1.662 **Compression =** 2.2 %
**$D_0$ =** 0.97973 **$D_{50}$ =** 0.97918 **$D_{100}$ =** 0.97863
**$C_v$ at 0.3 min. =** 1.73 ft.$^2$/day **$C_\alpha$ =** 0.000

**Pressure: 1.00 tsf** **TEST READINGS** **Load No. 10**

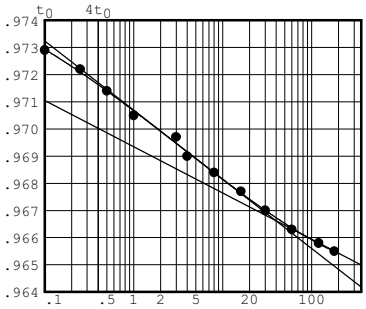
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.97760 |
| 2 | 0.10 | 0.97710 |
| 3 | 0.25 | 0.97680 |
| 4 | 0.50 | 0.97650 |
| 5 | 1.00 | 0.97610 |
| 6 | 2.00 | 0.97580 |
| 7 | 4.00 | 0.97550 |
| 8 | 8.00 | 0.97530 |
| 9 | 16.00 | 0.97520 |
| 10 | 30.00 | 0.97500 |




**Void Ratio =** 1.657 **Compression =** 2.3 %
**$D_0$ =** 0.97924 **$D_{50}$ =** 0.97822 **$D_{100}$ =** 0.97720
**$C_v$ at 0.4 min. =** 1.24 ft.$^2$/day **$C_\alpha$ =** 0.001

**Pressure: 2.00 tsf** **TEST READINGS** **Load No. 11**

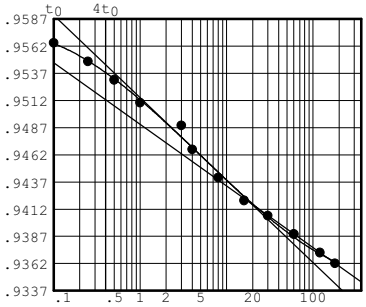
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.97500 | 11 | 60.00 | 0.96390 |
| 2 | 0.10 | 0.97050 | 12 | 120.00 | 0.96340 |
| 3 | 0.25 | 0.96980 | 13 | 180.00 | 0.96310 |
| 4 | 0.50 | 0.96900 | | | |
| 5 | 1.00 | 0.96810 | | | |
| 6 | 3.00 | 0.96730 | | | |
| 7 | 4.00 | 0.96660 | | | |
| 8 | 8.00 | 0.96600 | | | |
| 9 | 16.00 | 0.96530 | | | |
| 10 | 30.00 | 0.96460 | | | |




**Void Ratio =** 1.627 **Compression =** 3.5 %
**$D_0$ =** 0.97425 **$D_{50}$ =** 0.97044 **$D_{100}$ =** 0.96663
**$C_v$ at 1.2 min. =** 0.37 ft.$^2$/day **$C_\alpha$ =** 0.002

**Pressure: 4.00 tsf** **TEST READINGS** **Load No. 12**

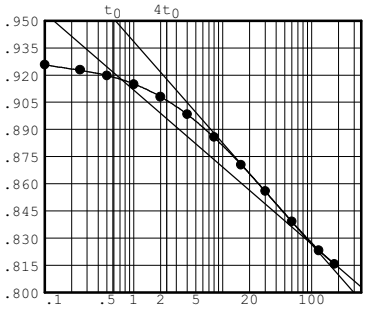
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.96310 | 11 | 60.00 | 0.93890 |
| 2 | 0.10 | 0.95650 | 12 | 120.00 | 0.93720 |
| 3 | 0.25 | 0.95480 | 13 | 180.00 | 0.93620 |
| 4 | 0.50 | 0.95310 | | | |
| 5 | 1.00 | 0.95100 | | | |
| 6 | 3.00 | 0.94890 | | | |
| 7 | 4.00 | 0.94670 | | | |
| 8 | 8.00 | 0.94410 | | | |
| 9 | 16.00 | 0.94200 | | | |
| 10 | 30.00 | 0.94060 | | | |




**Void Ratio =** 1.547 **Compression =** 6.4 %
**$D_0$ =** 0.95913 **$D_{50}$ =** 0.95043 **$D_{100}$ =** 0.94174
**$C_v$ at 1.3 min. =** 0.34 ft.$^2$/day **$C_\alpha$ =** 0.006

**Pressure: 8.00 tsf** **TEST READINGS** **Load No. 13**

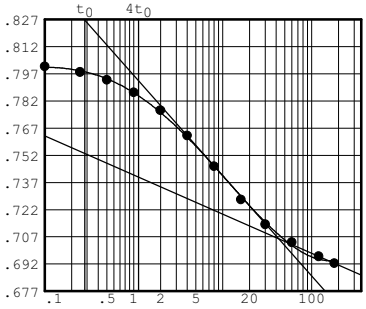
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.93620 | 11 | 60.00 | 0.83920 |
| 2 | 0.10 | 0.92570 | 12 | 120.00 | 0.82320 |
| 3 | 0.25 | 0.92290 | 13 | 180.00 | 0.81570 |
| 4 | 0.50 | 0.91970 | | | |
| 5 | 1.00 | 0.91490 | | | |
| 6 | 2.00 | 0.90800 | | | |
| 7 | 4.00 | 0.89840 | | | |
| 8 | 8.00 | 0.88580 | | | |
| 9 | 16.00 | 0.87050 | | | |
| 10 | 30.00 | 0.85590 | | | |




**Void Ratio =** 1.219 **Compression =** 18.4 %
**$D_0$ =** 0.93168 **$D_{50}$ =** 0.87909 **$D_{100}$ =** 0.82651
**$C_v$ at 11.0 min. =** 0.03 ft.$^2$/day **$C_\alpha$ =** 0.045

**Pressure: 16.00 tsf** **TEST READINGS** **Load No. 14**

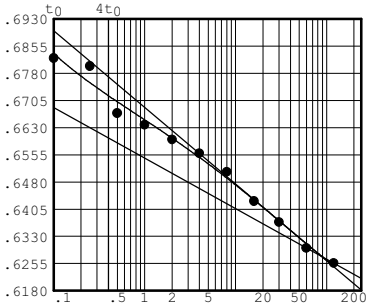
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.81570 | 11 | 60.00 | 0.70400 |
| 2 | 0.10 | 0.80110 | 12 | 120.00 | 0.69620 |
| 3 | 0.25 | 0.79800 | 13 | 180.00 | 0.69240 |
| 4 | 0.50 | 0.79360 | | | |
| 5 | 1.00 | 0.78680 | | | |
| 6 | 2.00 | 0.77680 | | | |
| 7 | 4.00 | 0.76290 | | | |
| 8 | 8.00 | 0.74600 | | | |
| 9 | 16.00 | 0.72760 | | | |
| 10 | 30.00 | 0.71390 | | | |




**Void Ratio =** 0.884 **Compression =** 30.8 %
**$D_0$ =** 0.81137 **$D_{50}$ =** 0.75863 **$D_{100}$ =** 0.70590
**$C_v$ at 4.6 min. =** 0.06 ft.$^2$/day **$C_\alpha$ =** 0.026

**Pressure: 32.00 tsf** **TEST READINGS** **Load No. 15**

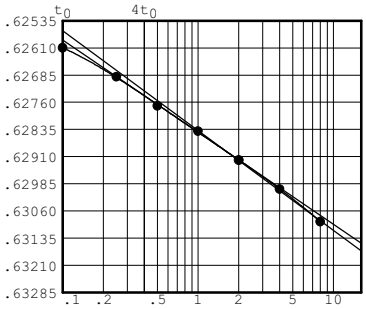
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.69240 | 11 | 60.00 | 0.62980 |
| 2 | 0.10 | 0.68220 | 12 | 120.00 | 0.62560 |
| 3 | 0.25 | 0.68000 | | | |
| 4 | 0.50 | 0.66700 | | | |
| 5 | 1.00 | 0.66380 | | | |
| 6 | 2.00 | 0.65970 | | | |
| 7 | 4.00 | 0.65590 | | | |
| 8 | 8.00 | 0.65080 | | | |
| 9 | 16.00 | 0.64270 | | | |
| 10 | 30.00 | 0.63690 | | | |




**Void Ratio =** 0.702 **Compression =** 37.4 %
**$D_0$ =** 0.69512 **$D_{50}$ =** 0.66138 **$D_{100}$ =** 0.62763
**$C_v$ at 1.7 min. =** 0.13 ft.$^2$/day **$C_\alpha$ =** 0.020

**Pressure: 16.00 tsf** **TEST READINGS** **Load No. 16**

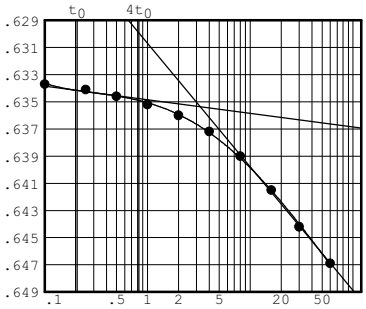
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.62560 |
| 2 | 0.10 | 0.62610 |
| 3 | 0.25 | 0.62690 |
| 4 | 0.50 | 0.62770 |
| 5 | 1.00 | 0.62840 |
| 6 | 2.00 | 0.62920 |
| 7 | 4.00 | 0.63000 |
| 8 | 8.00 | 0.63090 |




**Void Ratio =** 0.717 **Compression =** 36.9 %
**$D_0$ =** 0.62478 **$D_{50}$ =** 0.62690 **$D_{100}$ =** 0.62902
**$C_v$ at 0.2 min. =** 0.79 ft.$^2$/day

**Pressure: 4.00 tsf** **TEST READINGS** **Load No. 17**

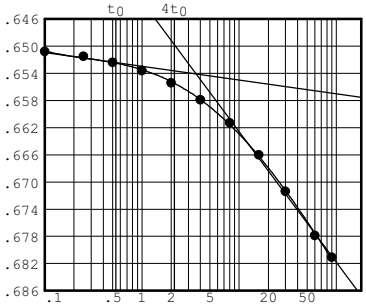
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.63090 | 11 | 60.00 | 0.64690 |
| 2 | 0.10 | 0.63370 | | | |
| 3 | 0.25 | 0.63410 | | | |
| 4 | 0.50 | 0.63460 | | | |
| 5 | 1.00 | 0.63520 | | | |
| 6 | 2.00 | 0.63600 | | | |
| 7 | 4.00 | 0.63720 | | | |
| 8 | 8.00 | 0.63900 | | | |
| 9 | 16.00 | 0.64150 | | | |
| 10 | 30.00 | 0.64420 | | | |




**Void Ratio =** 0.760 **Compression =** 35.3 %
**$D_0$ =** 0.63342 **$D_{50}$ =** 0.63440 **$D_{100}$ =** 0.63537
**$C_v$ at 0.3 min. =** 0.58 ft.$^2$/day

**Pressure: 1.00 tsf** **TEST READINGS** **Load No. 18**

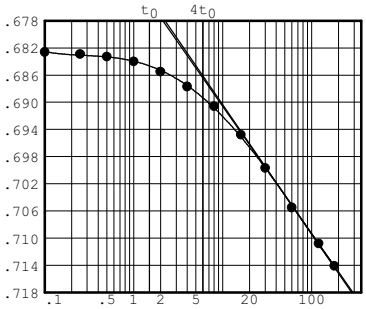
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.64690 | 11 | 60.00 | 0.67630 |
| 2 | 0.10 | 0.64920 | 12 | 90.00 | 0.67950 |
| 3 | 0.25 | 0.64990 | | | |
| 4 | 0.50 | 0.65080 | | | |
| 5 | 1.00 | 0.65200 | | | |
| 6 | 2.00 | 0.65380 | | | |
| 7 | 4.00 | 0.65630 | | | |
| 8 | 8.00 | 0.65970 | | | |
| 9 | 16.00 | 0.66440 | | | |
| 10 | 30.00 | 0.66980 | | | |




**Void Ratio =** 0.853 **Compression =** 31.9 %
**$D_0$ =** 0.64953 **$D_{50}$ =** 0.65180 **$D_{100}$ =** 0.65407
**$C_v$ at 0.3 min. =** 0.80 ft.$^2$/day

**Pressure: 0.25 tsf** **TEST READINGS** **Load No. 19**

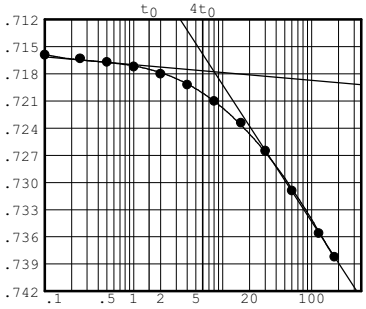
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.67950 | 11 | 60.00 | 0.70510 |
| 2 | 0.10 | 0.68220 | 12 | 120.00 | 0.71040 |
| 3 | 0.25 | 0.68250 | 13 | 180.00 | 0.71370 |
| 4 | 0.50 | 0.68290 | | | |
| 5 | 1.00 | 0.68360 | | | |
| 6 | 2.00 | 0.68510 | | | |
| 7 | 4.00 | 0.68730 | | | |
| 8 | 8.00 | 0.69020 | | | |
| 9 | 16.00 | 0.69440 | | | |
| 10 | 30.00 | 0.69930 | | | |




**Void Ratio =** 0.943 **Compression =** 28.6 %
**$D_0$ =** 0.67992 **$D_{50}$ =** 0.69174 **$D_{100}$ =** 0.70356
**$C_v$ at 9.4 min. =** 0.03 ft.$^2$/day

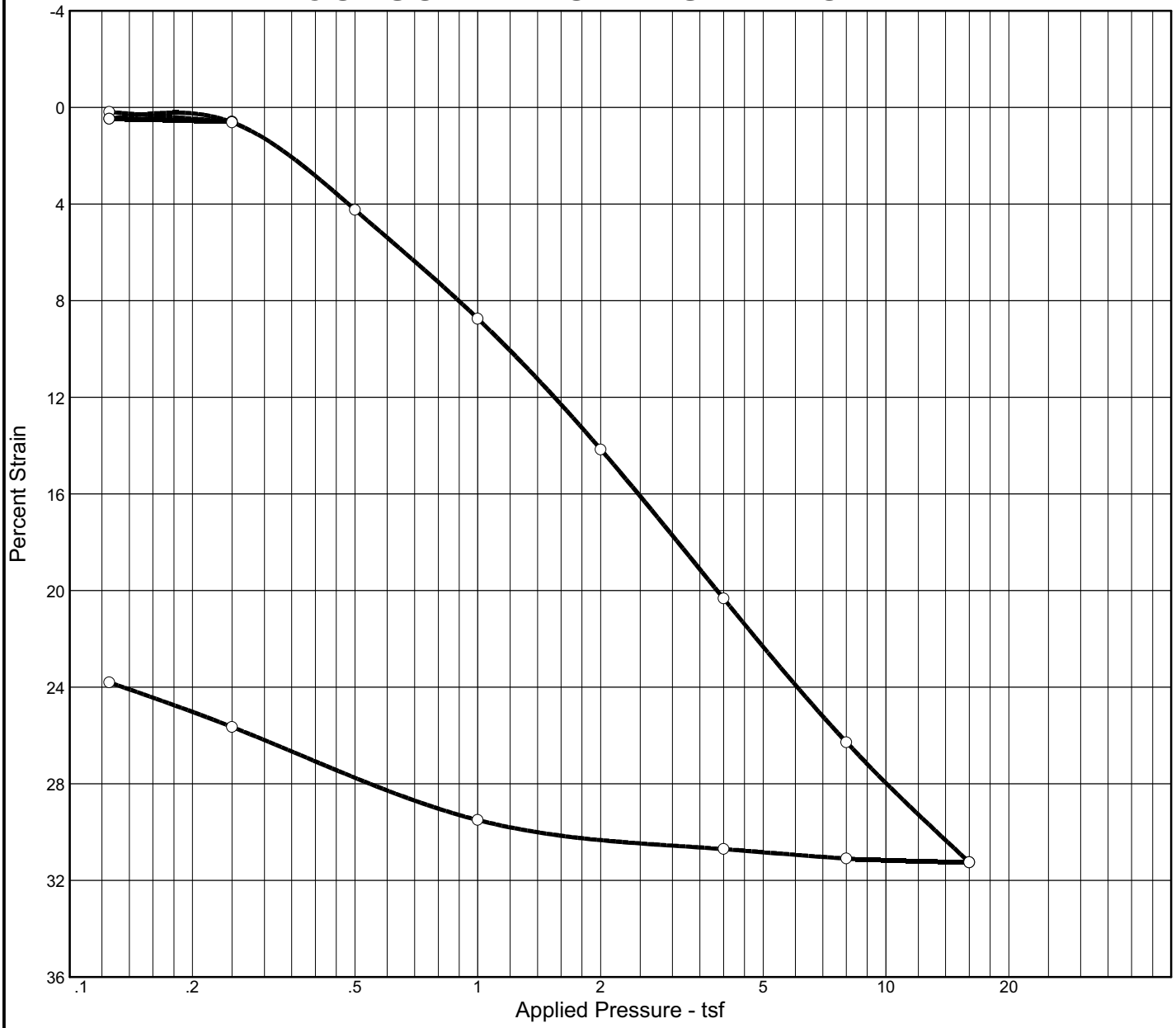
**Pressure: 0.13 tsf** **TEST READINGS** **Load No. 20**

| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.71370 | 11 | 60.00 | 0.73090 |
| 2 | 0.10 | 0.71590 | 12 | 120.00 | 0.73560 |
| 3 | 0.25 | 0.71630 | 13 | 180.00 | 0.73820 |
| 4 | 0.50 | 0.71670 | | | |
| 5 | 1.00 | 0.71720 | | | |
| 6 | 2.00 | 0.71800 | | | |
| 7 | 4.00 | 0.71920 | | | |
| 8 | 8.00 | 0.72100 | | | |
| 9 | 16.00 | 0.72340 | | | |
| 10 | 30.00 | 0.72650 | | | |




**Void Ratio =** 1.009 **Compression =** 26.2 %
**$D_0$ =** 0.71487 **$D_{50}$ =** 0.71632 **$D_{100}$ =** 0.71777
**$C_v$ at 0.2 min. =** 1.40 ft.$^2$/day

# CONSOLIDATION TEST REPORT




| MATERIAL DESCRIPTION | USCS | AASHTO |
|---|---|---|
| Gray-Brown, Fat CLAY | | |

| LL | PI | Sp. Gr. | Overburden (tsf) | Dry Dens. (pcf) | | Moisture | | Saturation | | Void Ratio | | $P_c$ (tsf) | $C_c$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Init. | Final | Init. | Final | Init. | Final | Init. | Final | | |
| | | 2.54 | 0.30 | 60.2 | | 64.2 % | 34.8 % | 100.0 % | 87.8 % | 1.632 | 1.006 | | |

| Preparation Process: | D2435 Method | $C_r$ | Swell Press. (tsf) | Heave % |
|---|---|---|---|---|
| Condition of Test: | | | | |

**Project No.** VB10-237G **Client:** HDR, Inc.

**Project:** VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia

**Location:** D7CD-8W

**Remarks:**
D7CD-8W
Depth=5 ft.

**Checked By:**

**Title:**

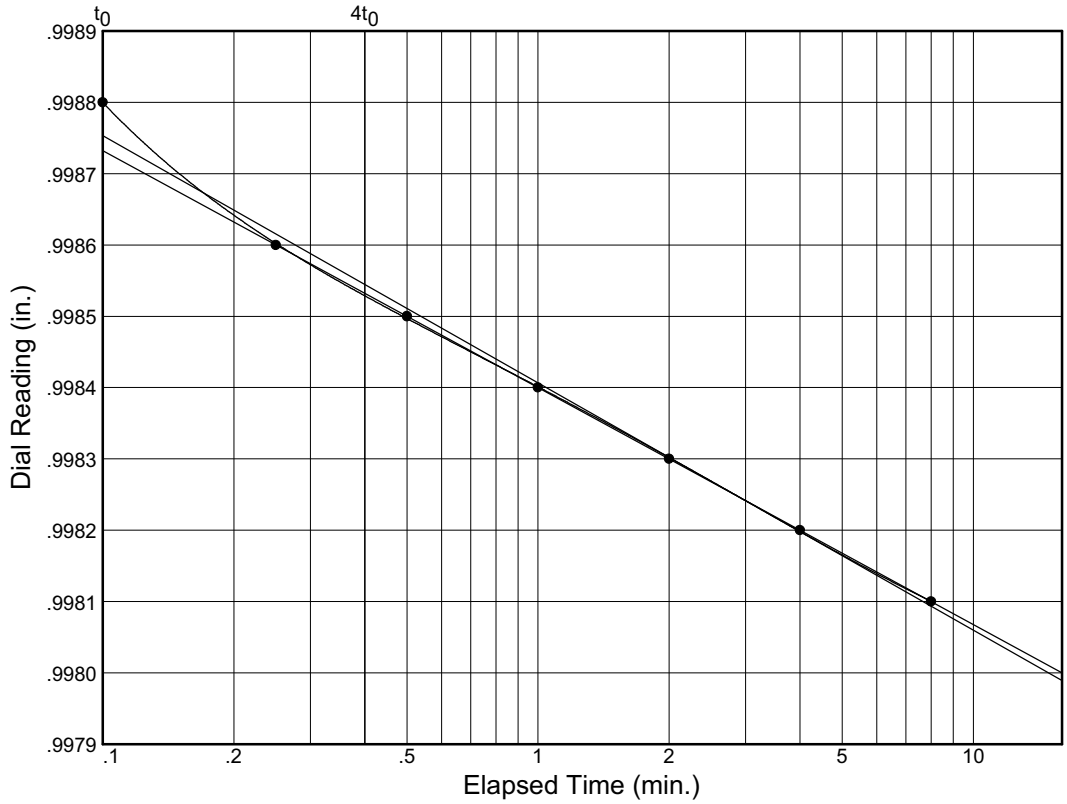
CONSOLIDATION TEST REPORT

**GET SOLUTIONS, INC.**

**Figure** 1

# Dial Reading vs. Time

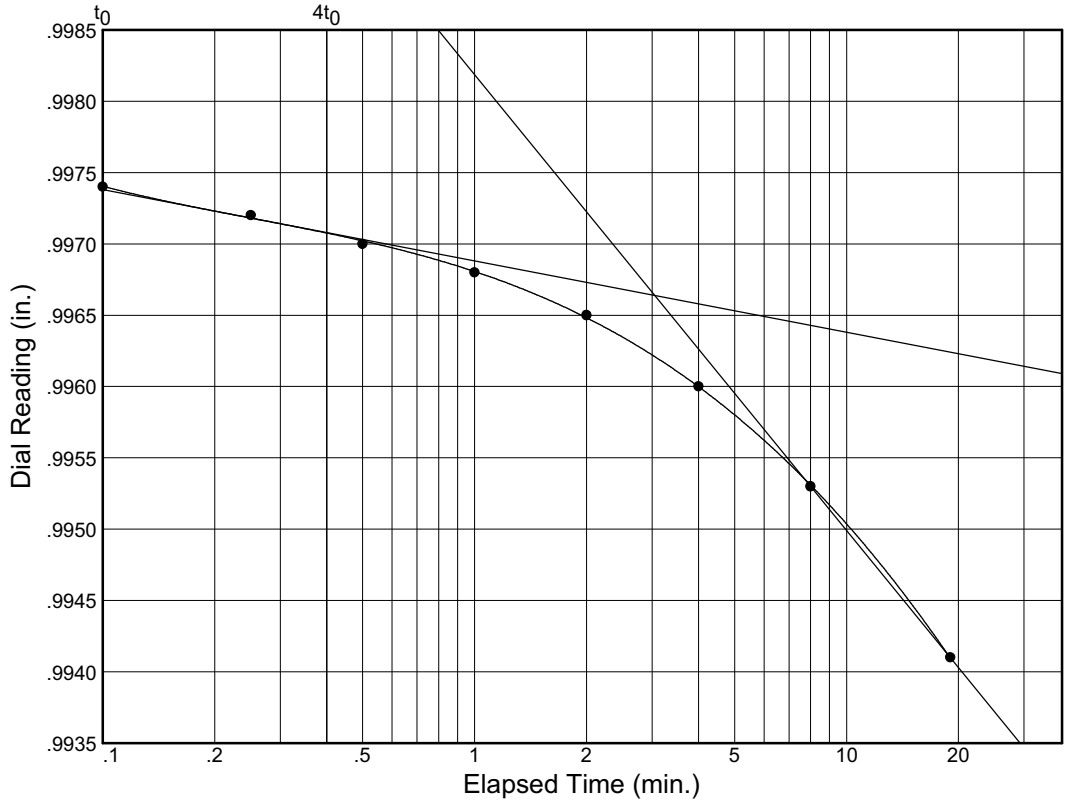
Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-8W




Load No.= 1
Load= 0.13 tsf
$D_0$ = 0.99907
$D_{50}$ = 0.99866
$D_{100}$ = 0.99825
$T_{50}$ = 0.18 min.

$C_v$ @ $T_{50}$
2.68 ft.$^2$/day

$C_\alpha$ = 0.000




Load No.= 2
Load= 0.25 tsf
$D_0$ = 0.99773
$D_{50}$ = 0.99718
$D_{100}$ = 0.99664
$T_{50}$ = 0.25 min.

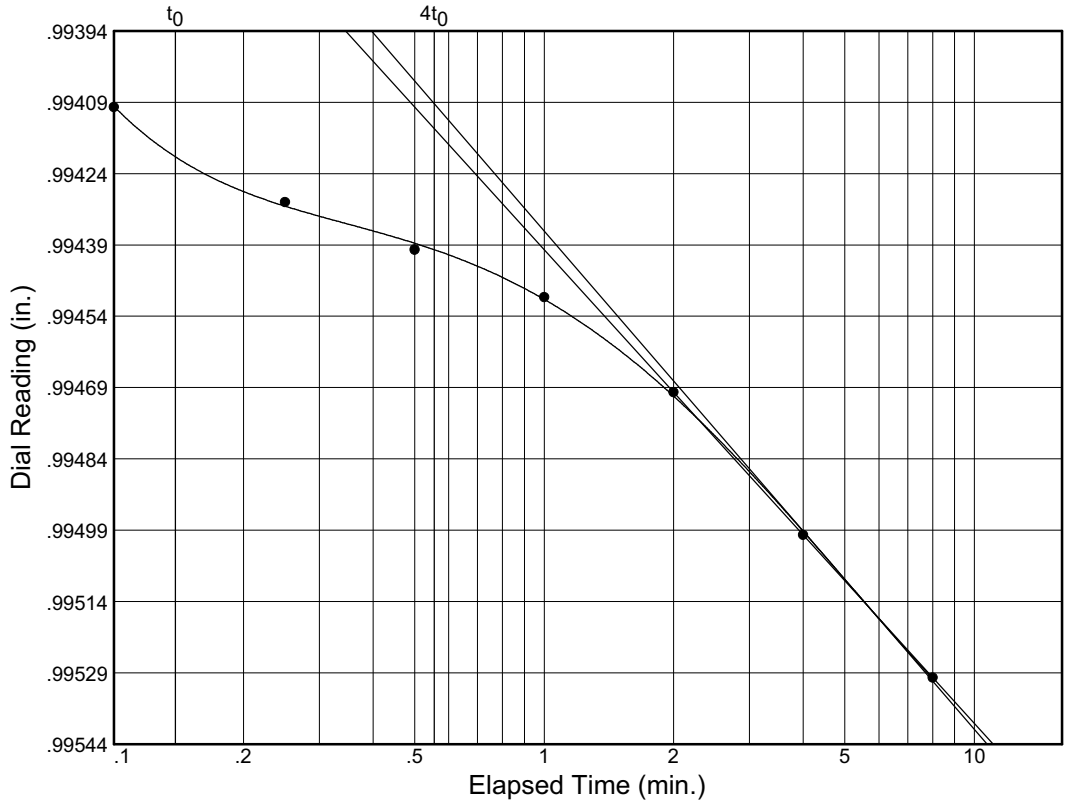
$C_v$ @ $T_{50}$
1.99 ft.$^2$/day

$C_\alpha$ = 0.003

Figure 2

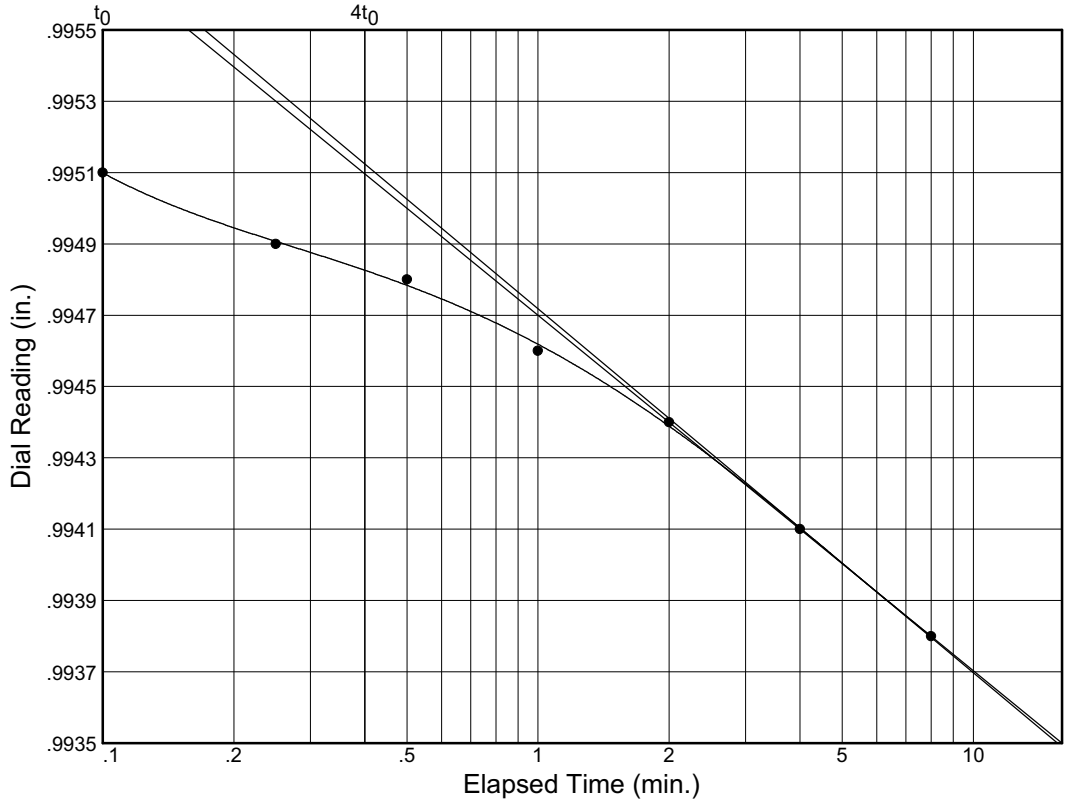
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-8W




Load No.= 3
Load= 0.13 tsf
$D_0$ = 0.99401
$D_{50}$ = 0.99459
$D_{100}$ = 0.99516
$T_{50}$ = 1.37 min.

| $C_v$ @ $T_{50}$ |
|---|
| 0.36 ft.$^2$/day |




Load No.= 4
Load= 0.25 tsf
$D_0$ = 0.99537
$D_{50}$ = 0.99466
$D_{100}$ = 0.99395
$T_{50}$ = 0.85 min.

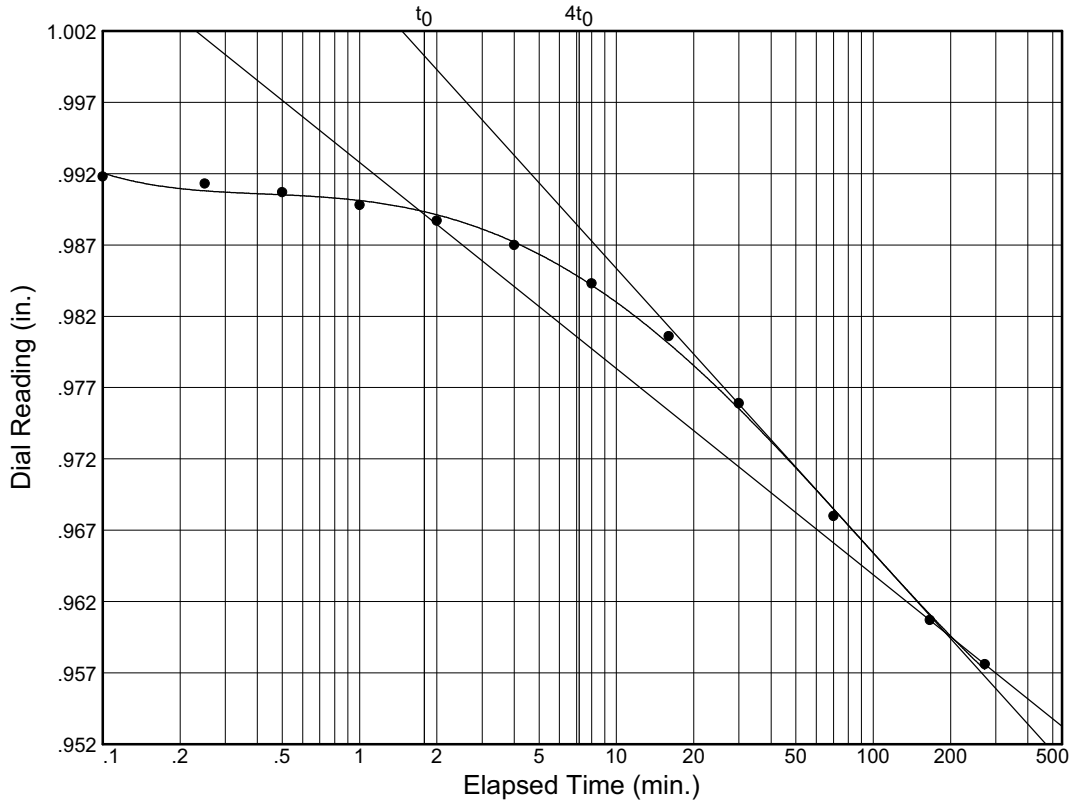
| $C_v$ @ $T_{50}$ |
|---|
| 0.57 ft.$^2$/day |

$C_\alpha$ = 0.001

Figure 3

# Dial Reading vs. Time

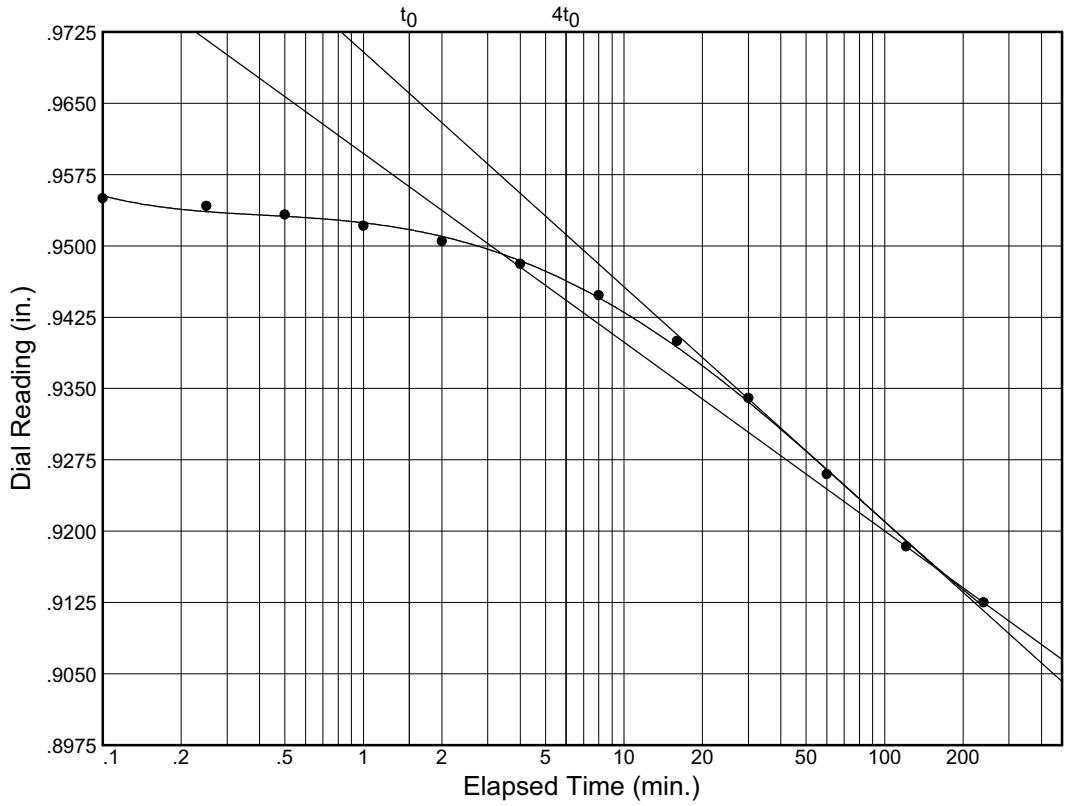
Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-8W




Load No.= 5
Load= 0.50 tsf
$D_0$ = 0.99391
$D_{50}$ = 0.97688
$D_{100}$ = 0.95984
$T_{50}$ = 25.11 min.

| $C_v$ @ $T_{50}$ |
|---|
| 0.02 ft.$^2$/day |

$C_\alpha$ = 0.015




Load No.= 6
Load= 1.00 tsf
$D_0$ = 0.95709
$D_{50}$ = 0.93658
$D_{100}$ = 0.91606
$T_{50}$ = 21.88 min.

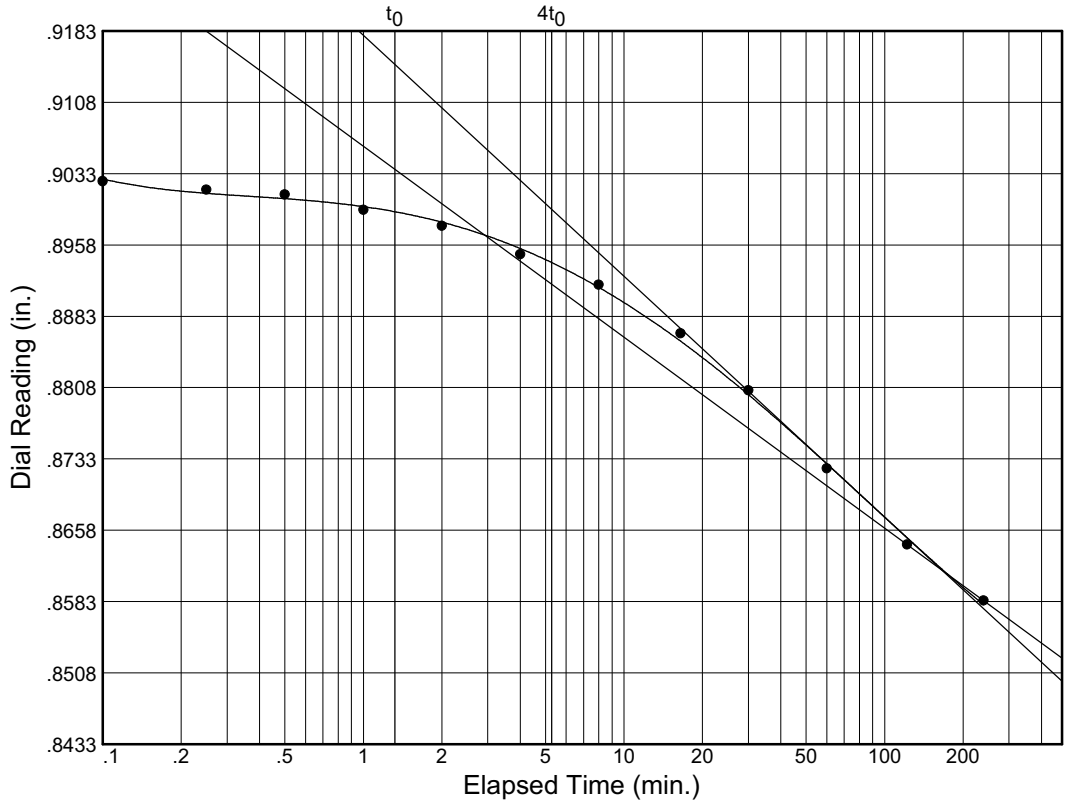
| $C_v$ @ $T_{50}$ |
|---|
| 0.02 ft.$^2$/day |

$C_\alpha$ = 0.021

Figure 4

# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-8W




Load No.= 7

Load= 2.00 tsf

$D_0$ = 0.90464

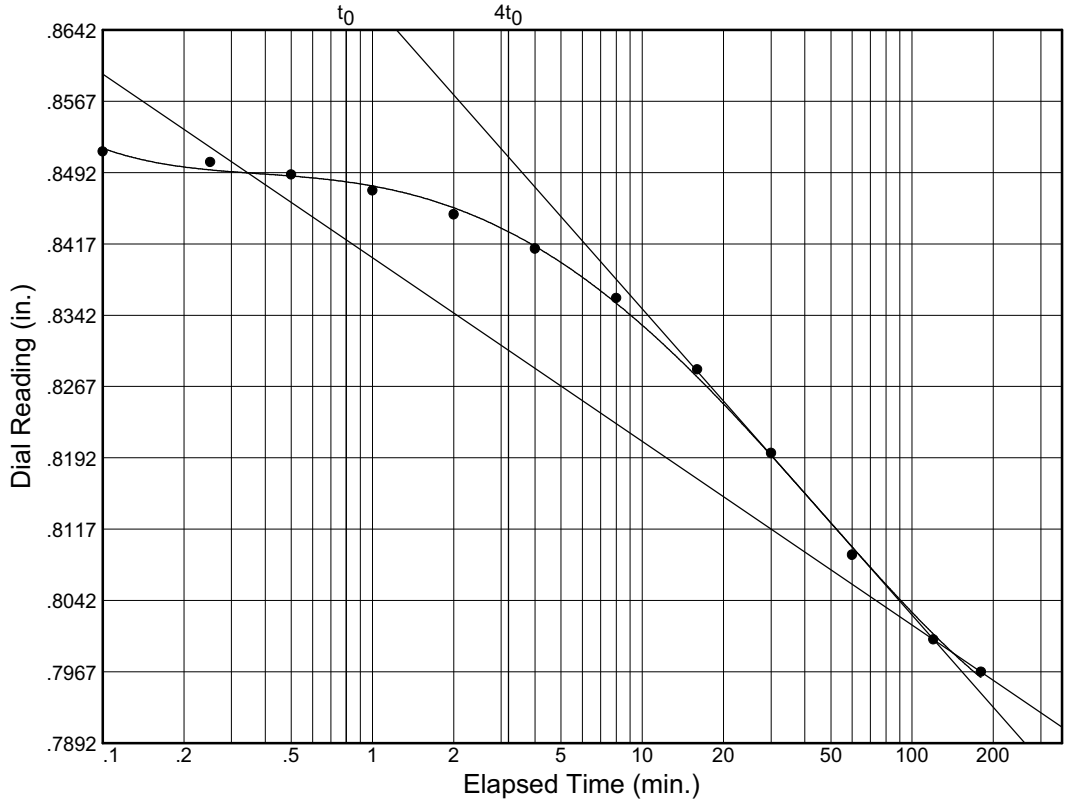
$D_{50}$ = 0.88313

$D_{100}$ = 0.86163

$T_{50}$ = 21.84 min.

| $C_v$ @ $T_{50}$ |
|---|
| 0.02 ft.$^2$/day |

$C_\alpha$ = 0.022




Load No.= 8

Load= 4.00 tsf

$D_0$ = 0.85348

$D_{50}$ = 0.82677

$D_{100}$ = 0.80006

$T_{50}$ = 17.23 min.

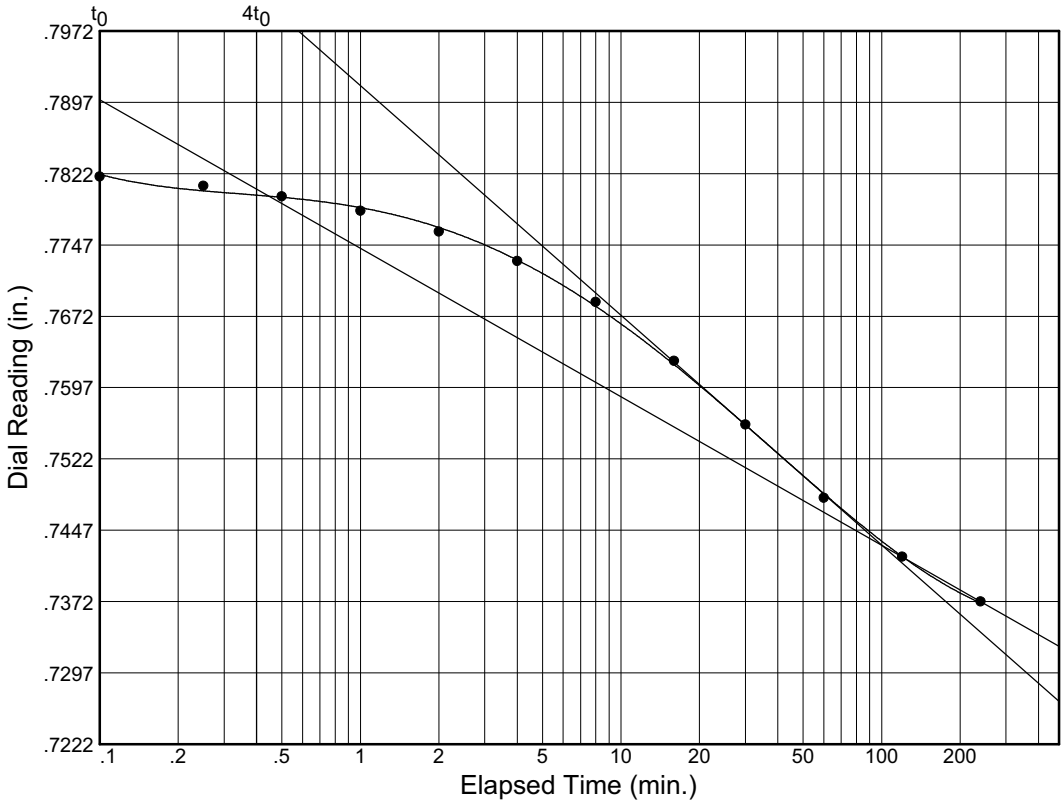
| $C_v$ @ $T_{50}$ |
|---|
| 0.02 ft.$^2$/day |

$C_\alpha$ = 0.022

Figure 5

# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-8W




Load No.= 9

Load= 8.00 tsf

$D_0$ = 0.78430

$D_{50}$ = 0.76369

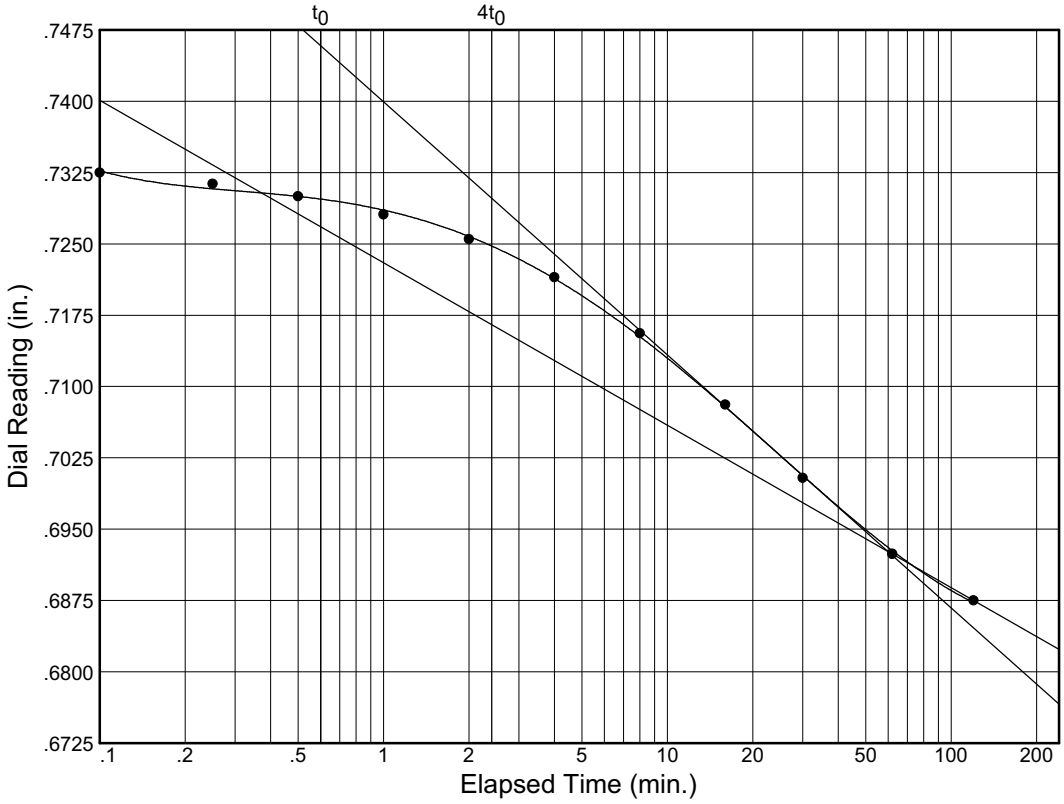
$D_{100}$ = 0.74309

$T_{50}$ = 13.54 min.

$C_v$ @ $T_{50}$

0.02 ft.$^2$/day

$C_\alpha$ = 0.020




Load No.= 10

Load= 16.00 tsf

$D_0$ = 0.73464

$D_{50}$ = 0.71367

$D_{100}$ = 0.69270

$T_{50}$ = 9.35 min.

$C_v$ @ $T_{50}$

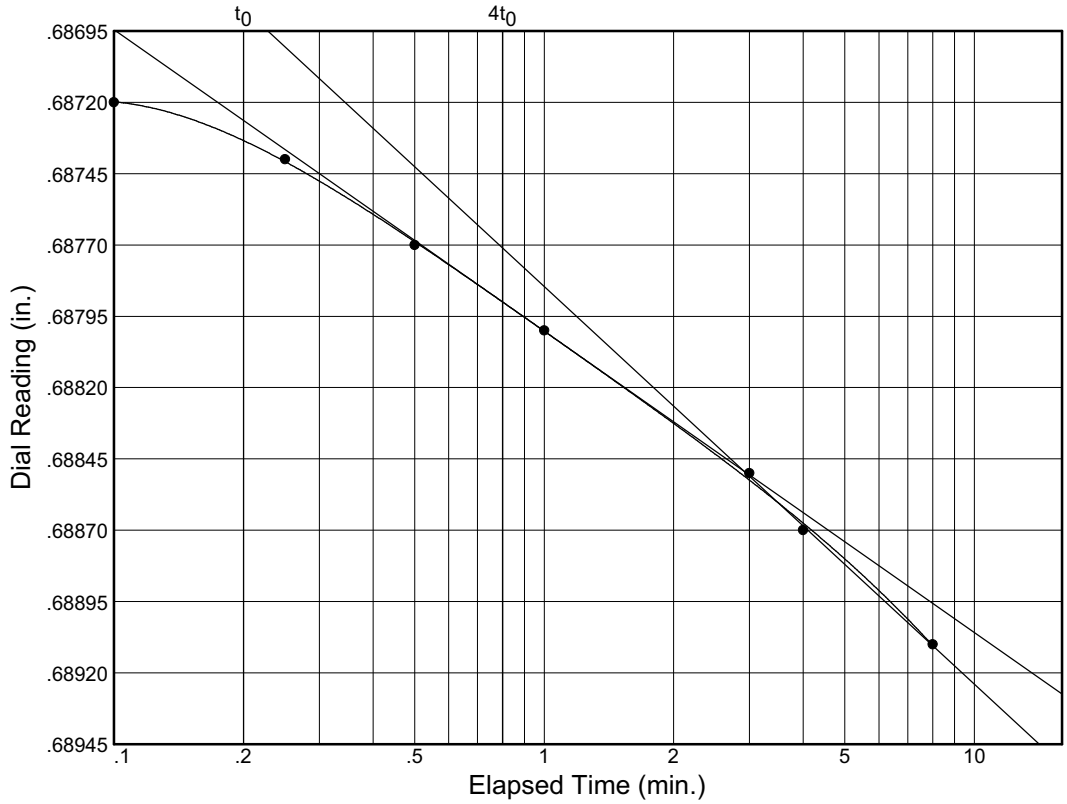
0.03 ft.$^2$/day

$C_\alpha$ = 0.023

Figure 6

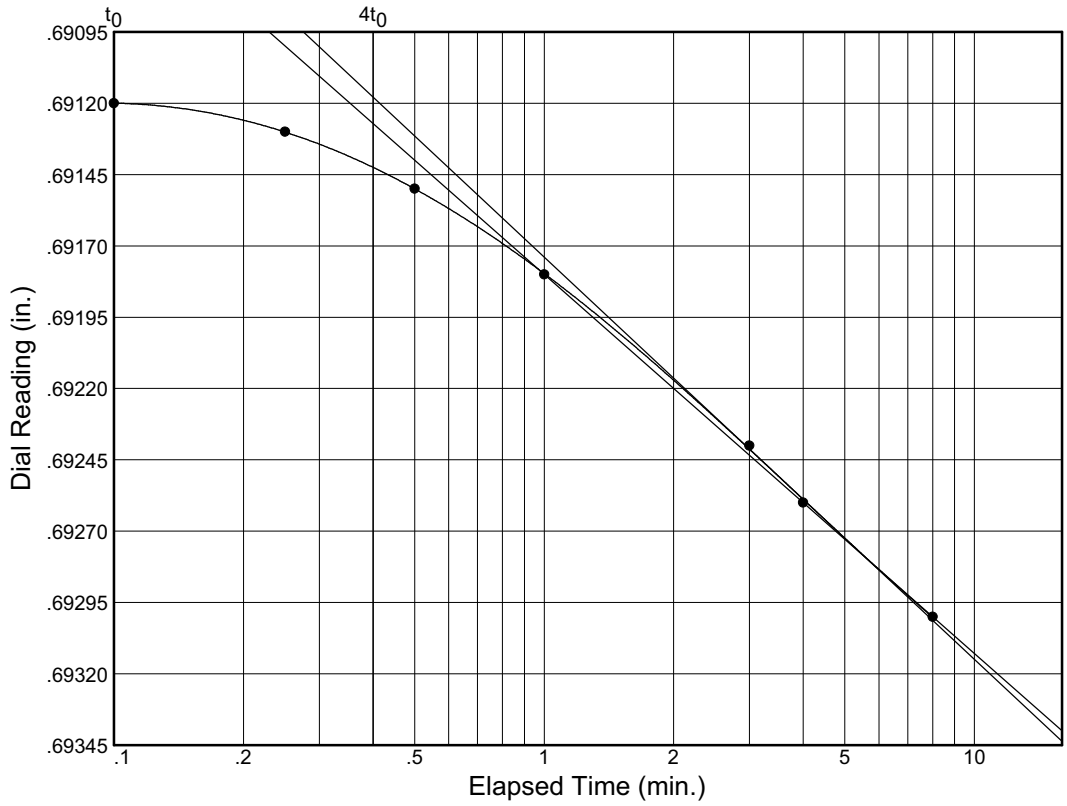
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-8W




Load No.= 11
Load= 8.00 tsf
$D_0$ = 0.68677
$D_{50}$ = 0.68763
$D_{100}$ = 0.68849
$T_{50}$ = 0.44 min.

$C_v$ @ $T_{50}$
0.53 ft.$^2$/day



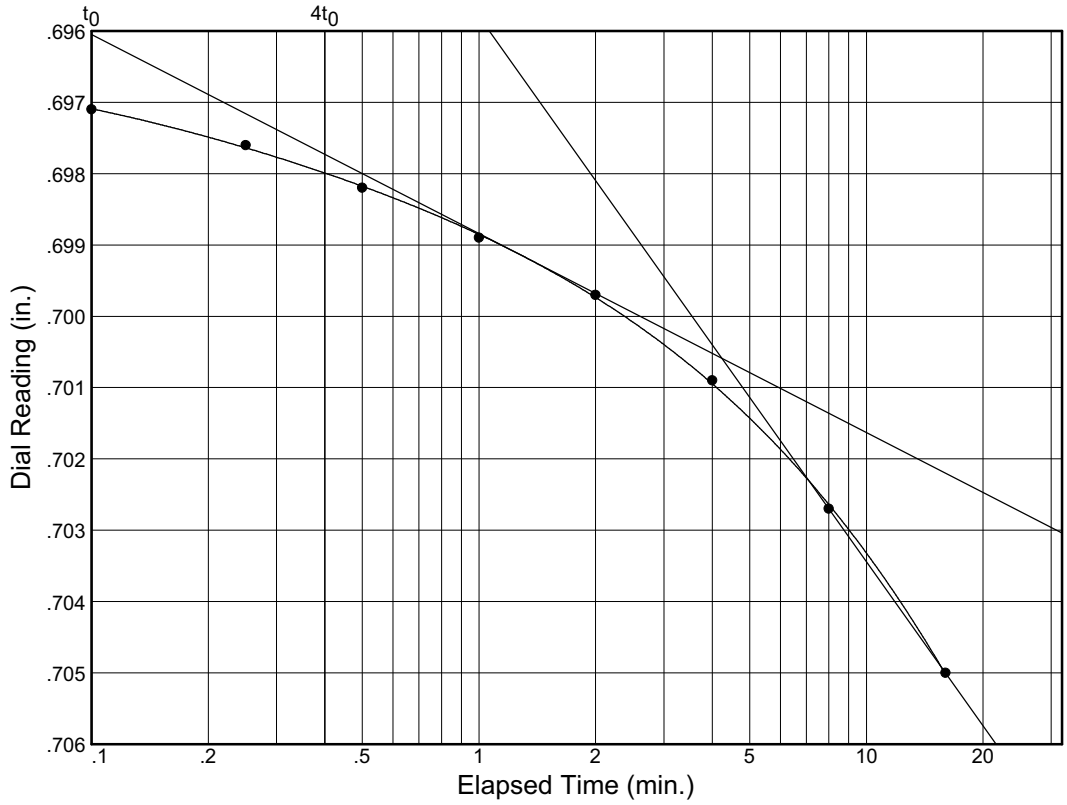

Load No.= 12
Load= 4.00 tsf
$D_0$ = 0.69097
$D_{50}$ = 0.69188
$D_{100}$ = 0.69279
$T_{50}$ = 1.19 min.

$C_v$ @ $T_{50}$
0.20 ft.$^2$/day

Figure 7

# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-8W




Load No.= 13

Load= 1.00 tsf

$D_0$ = 0.69619

$D_{50}$ = 0.69839

$D_{100}$ = 0.70059

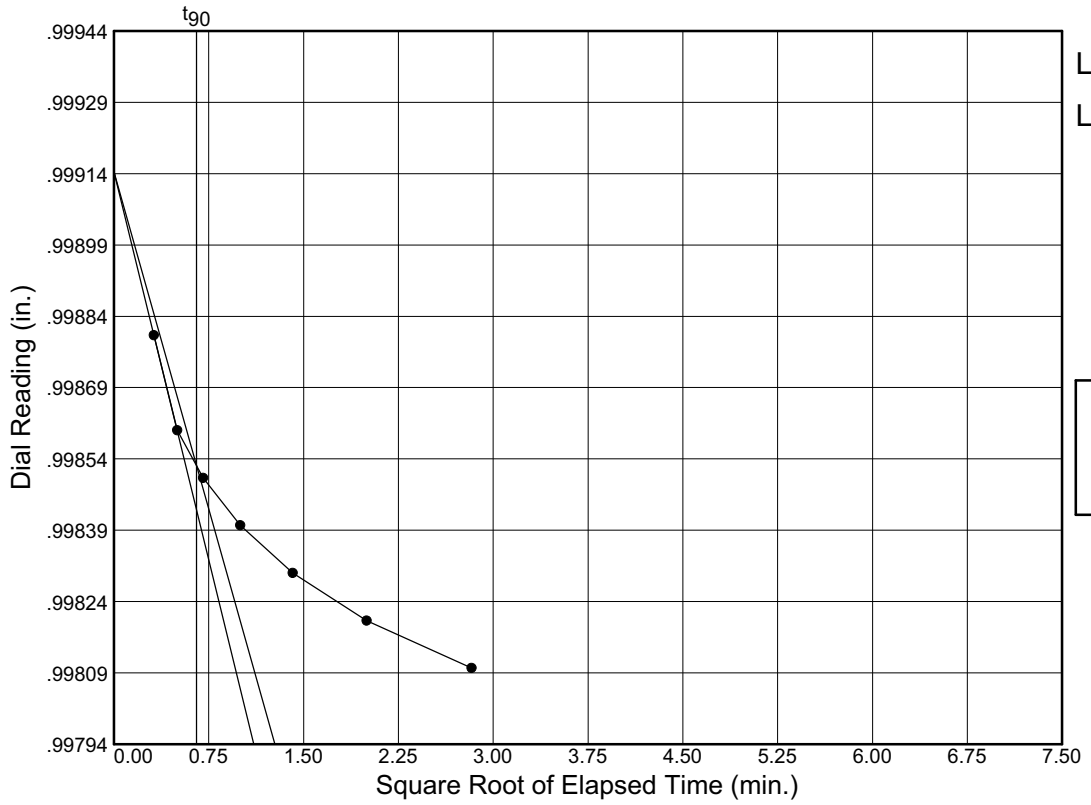
$T_{50}$ = 0.63 min.

| $C_v$ @ $T_{50}$ |
|---|
| 0.38 ft.$^2$/day |

Figure 8

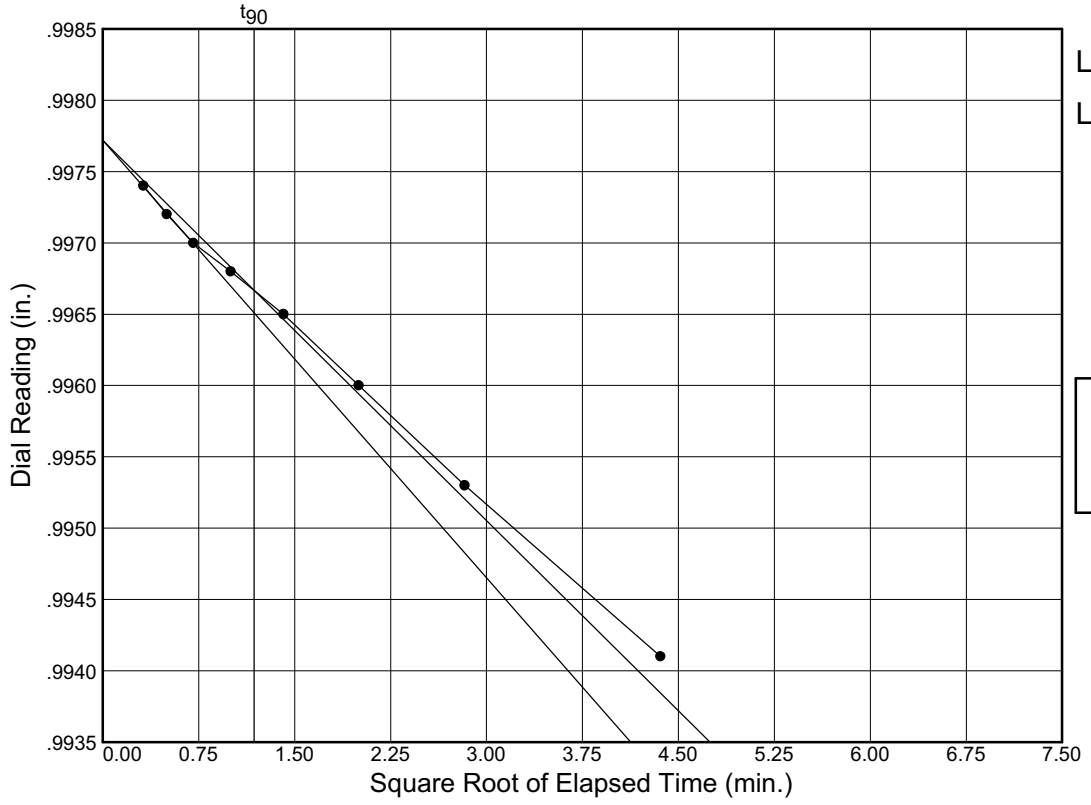
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-8W




Load No.= 1
Load= 0.13 tsf
$D_0$ = 0.99914
$D_{90}$ = 0.99853
$D_{100}$ = 0.99846
$T_{90}$ = 0.43 min.

$C_v$ @ $T_{90}$
4.96 ft.$^2$/day



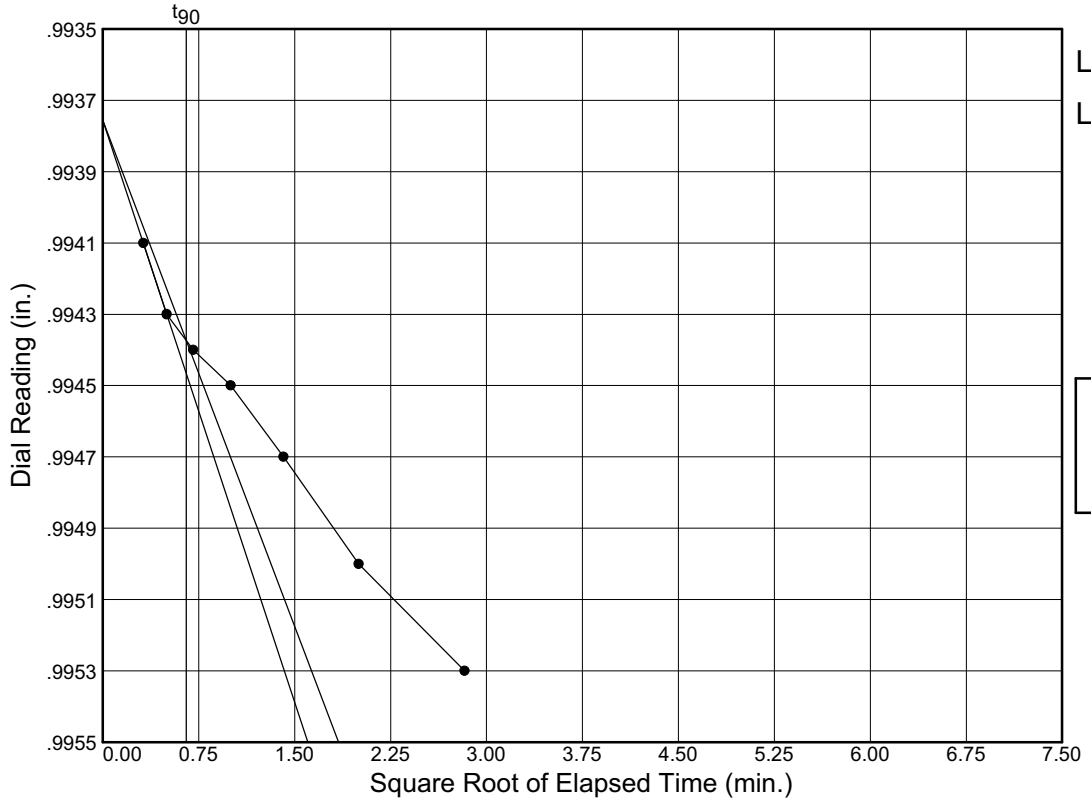

Load No.= 2
Load= 0.25 tsf
$D_0$ = 0.99772
$D_{90}$ = 0.99667
$D_{100}$ = 0.99655
$T_{90}$ = 1.40 min.

$C_v$ @ $T_{90}$
1.50 ft.$^2$/day

Figure 2

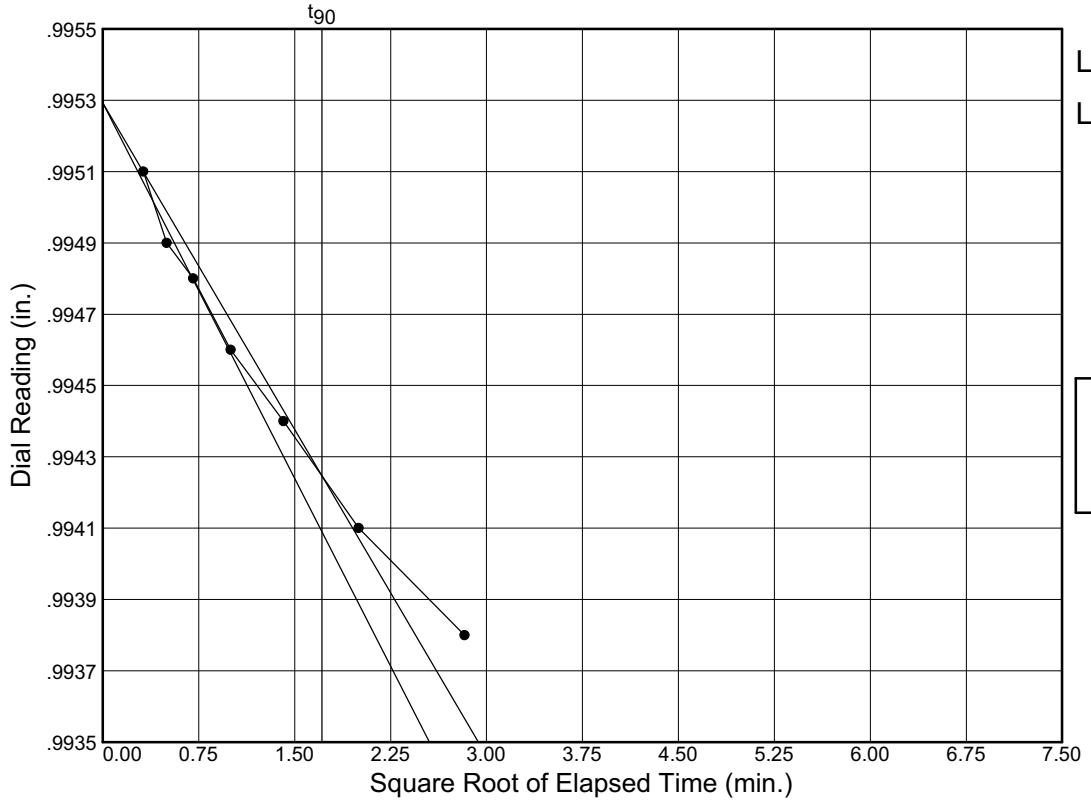
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-8W




Load No.= 3
Load= 0.13 tsf
$D_0$ = 0.99376
$D_{90}$ = 0.99437
$D_{100}$ = 0.99444
$T_{90}$ = 0.43 min.

$C_v$ @ $T_{90}$
4.92 ft.$^2$/day



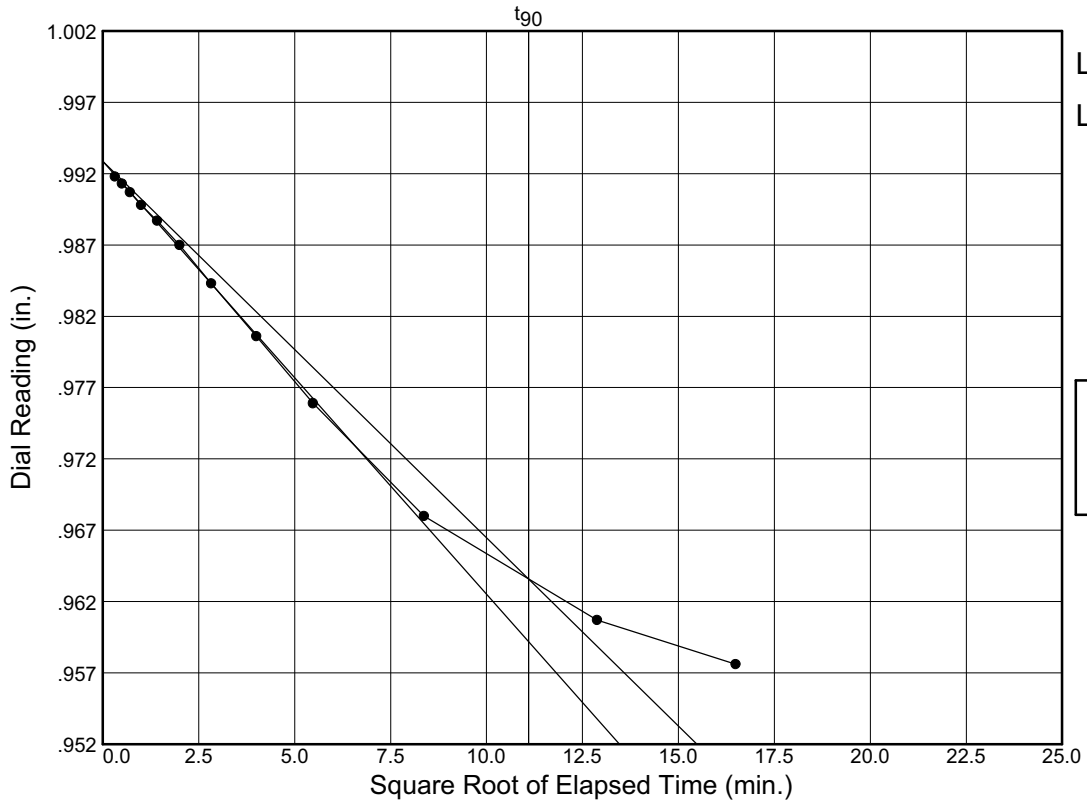

Load No.= 4
Load= 0.25 tsf
$D_0$ = 0.99529
$D_{90}$ = 0.99425
$D_{100}$ = 0.99413
$T_{90}$ = 2.94 min.

$C_v$ @ $T_{90}$
0.71 ft.$^2$/day

Figure 3

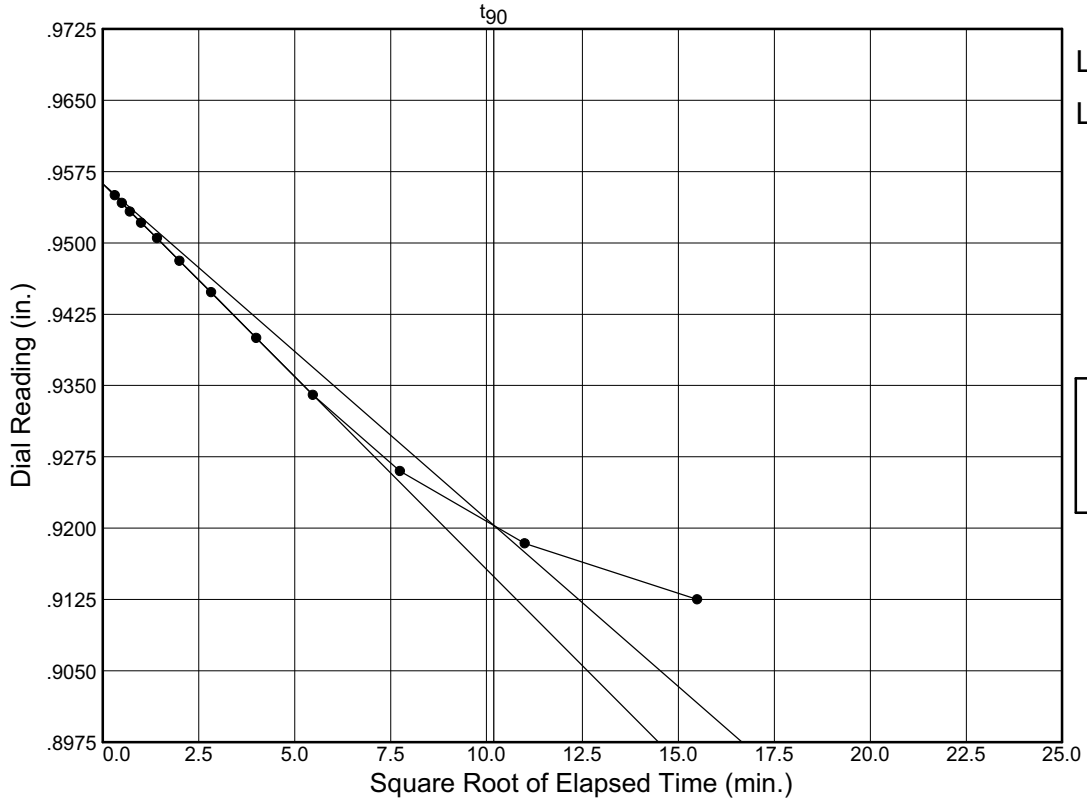
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-8W




Load No.= 5
Load= 0.50 tsf
$D_0$ = 0.99287
$D_{90}$ = 0.96359
$D_{100}$ = 0.96034
$T_{90}$ = 123.08 min.

| $C_v$ @ $T_{90}$ |
|---|
| 0.02 ft.$^2$/day |



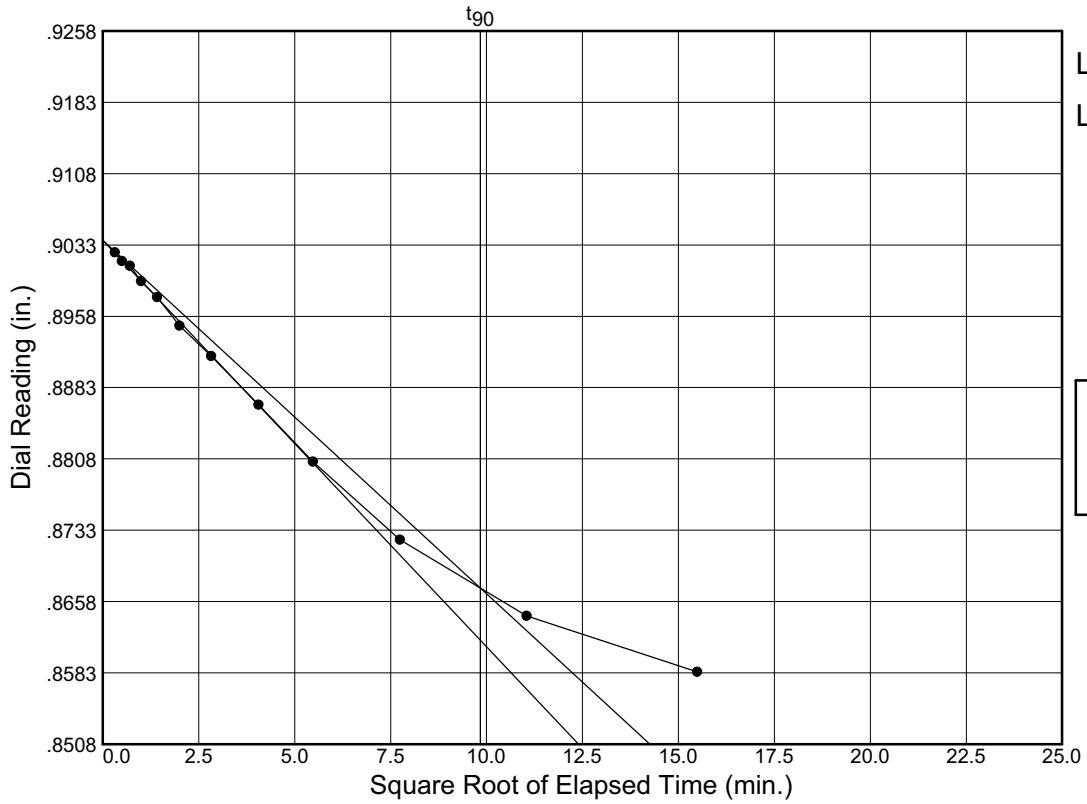

Load No.= 6
Load= 1.00 tsf
$D_0$ = 0.95622
$D_{90}$ = 0.92029
$D_{100}$ = 0.91630
$T_{90}$ = 103.85 min.

| $C_v$ @ $T_{90}$ |
|---|
| 0.02 ft.$^2$/day |

Figure 4

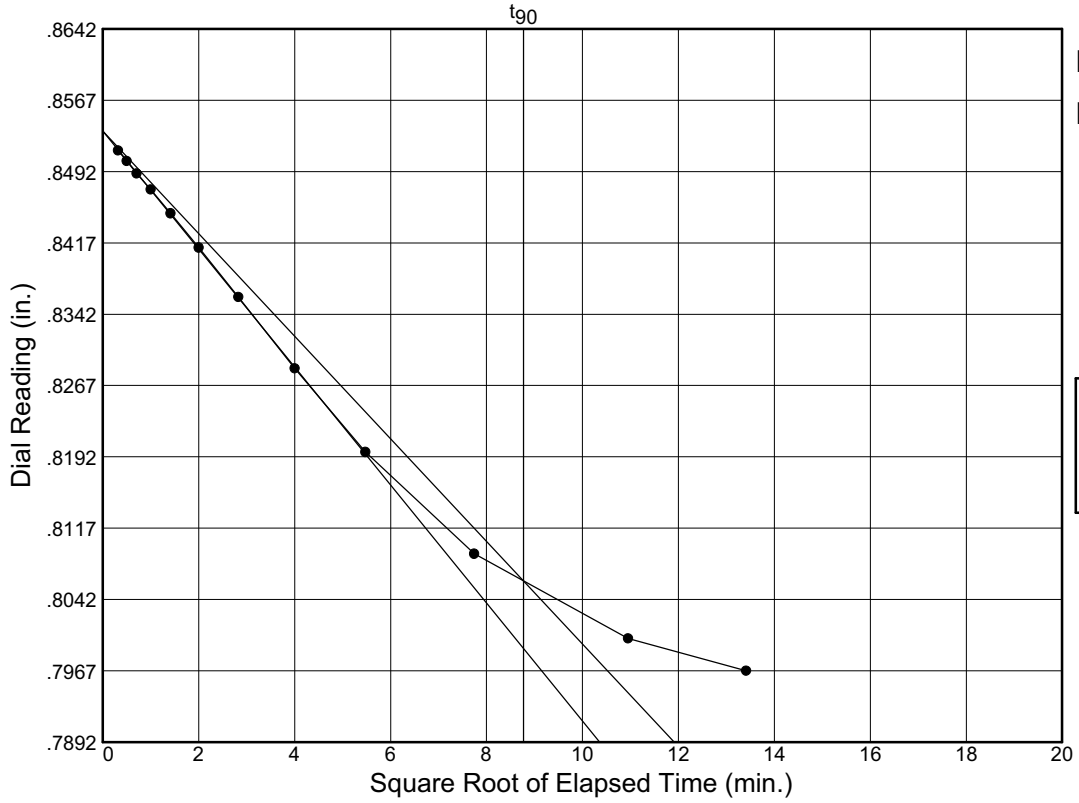
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-8W




Load No.= 7
Load= 2.00 tsf
$D_0$ = 0.90379
$D_{90}$ = 0.86722
$D_{100}$ = 0.86316
$T_{90}$ = 96.85 min.

$C_v$ @ $T_{90}$
0.02 ft.$^2$/day



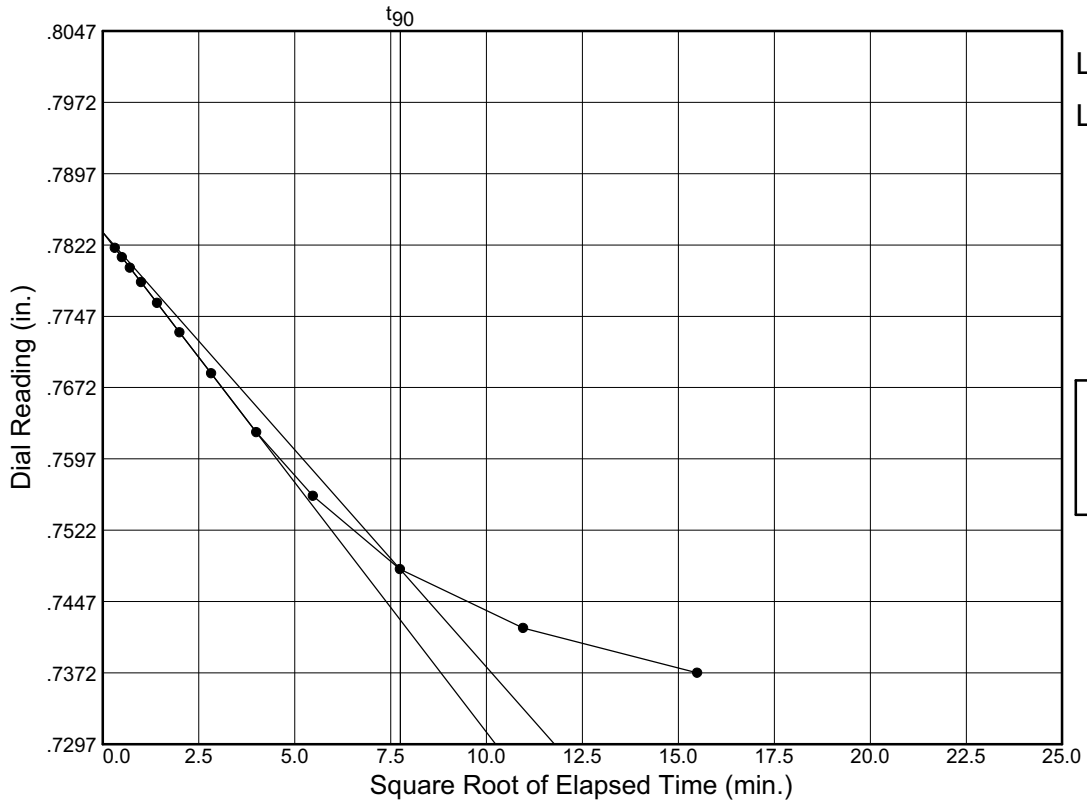

Load No.= 8
Load= 4.00 tsf
$D_0$ = 0.85346
$D_{90}$ = 0.80615
$D_{100}$ = 0.80090
$T_{90}$ = 76.95 min.

$C_v$ @ $T_{90}$
0.02 ft.$^2$/day

Figure 5

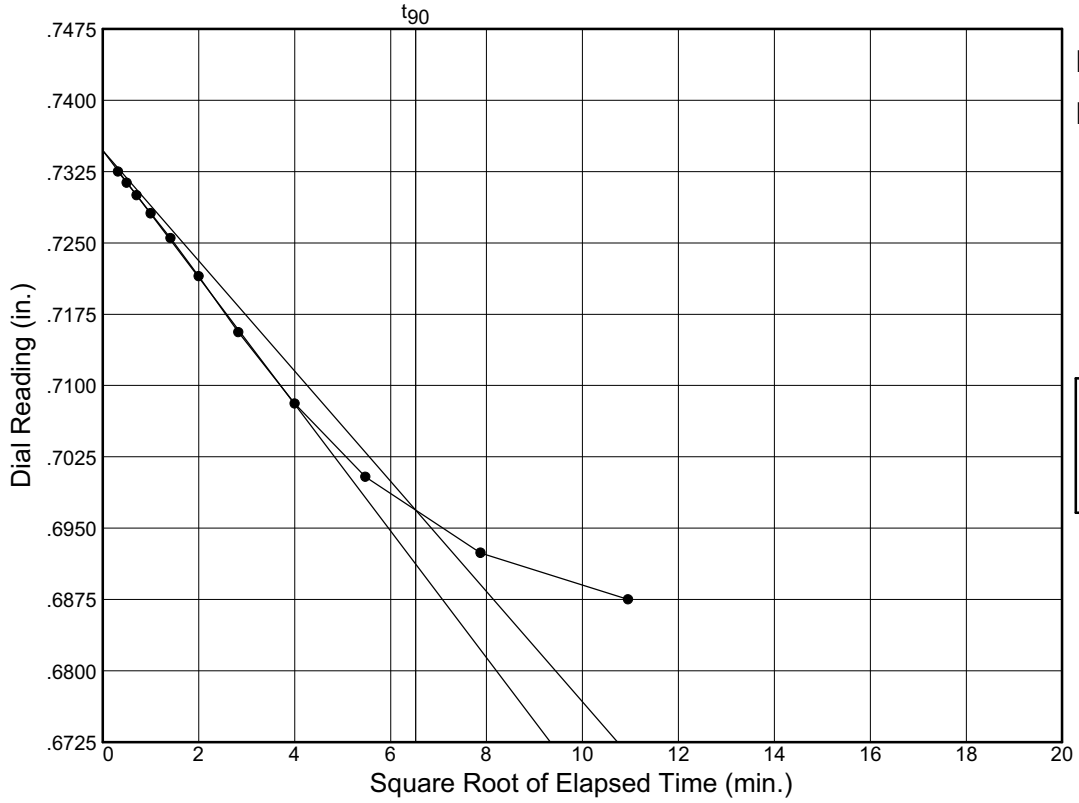
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-8W




Load No.= 9
Load= 8.00 tsf
$D_0$ = 0.78354
$D_{90}$ = 0.74808
$D_{100}$ = 0.74414
$T_{90}$ = 60.15 min.

$C_v$ @ $T_{90}$
0.02 ft.$^2$/day



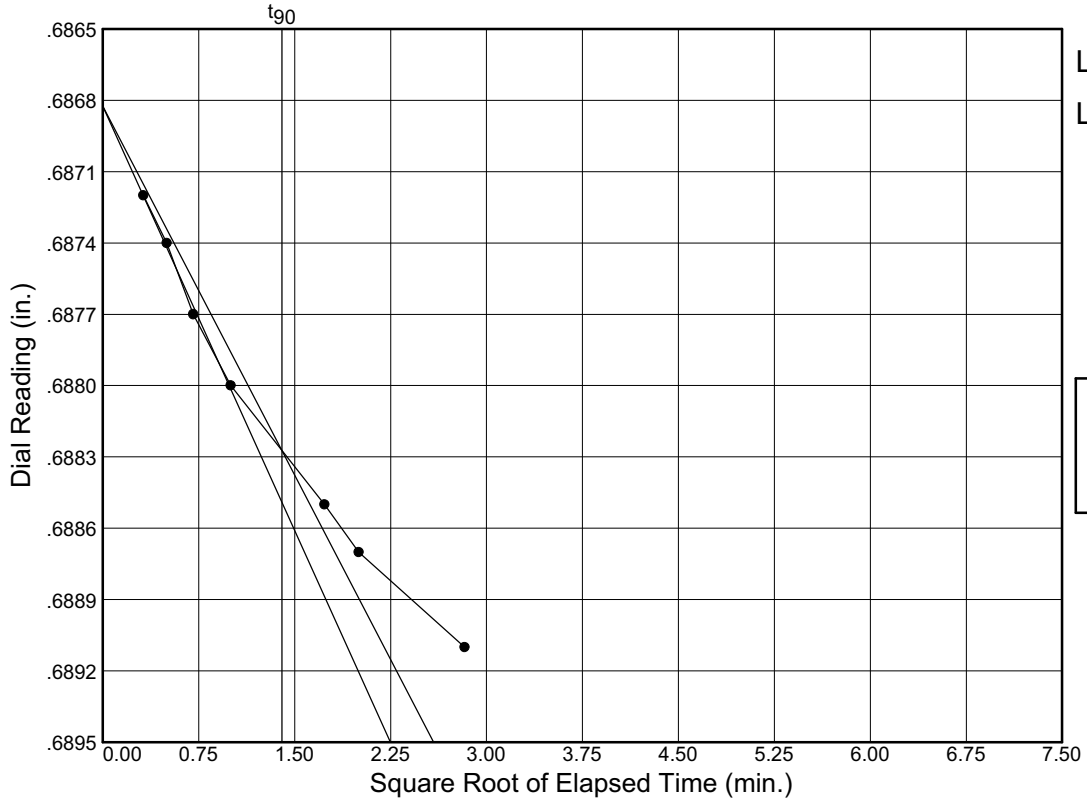

Load No.= 10
Load= 16.00 tsf
$D_0$ = 0.73471
$D_{90}$ = 0.69692
$D_{100}$ = 0.69272
$T_{90}$ = 42.51 min.

$C_v$ @ $T_{90}$
0.03 ft.$^2$/day

Figure 6

# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-8W




Load No.= 11

Load= 8.00 tsf

$D_0$ = 0.68682

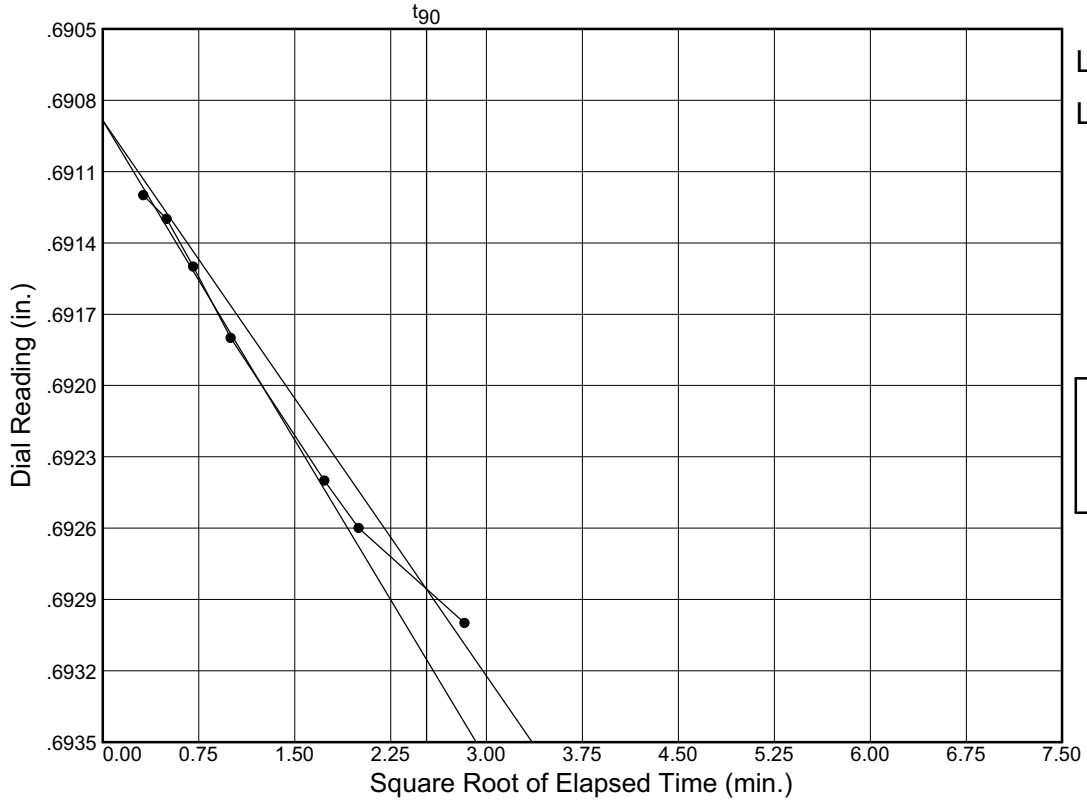
$D_{90}$ = 0.68827

$D_{100}$ = 0.68843

$T_{90}$ = 1.96 min.

$C_v$ @ $T_{90}$

0.51 ft.$^2$/day




Load No.= 12

Load= 4.00 tsf

$D_0$ = 0.69088

$D_{90}$ = 0.69286

$D_{100}$ = 0.69308

$T_{90}$ = 6.40 min.

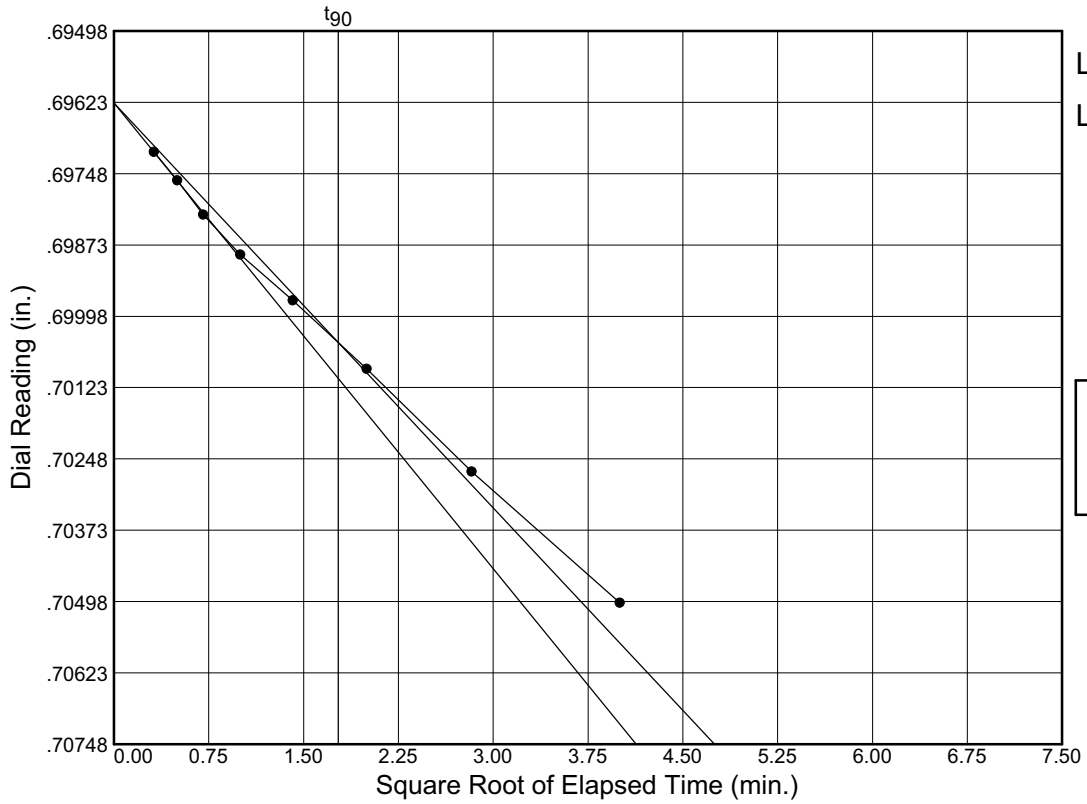
$C_v$ @ $T_{90}$

0.16 ft.$^2$/day

Figure 7

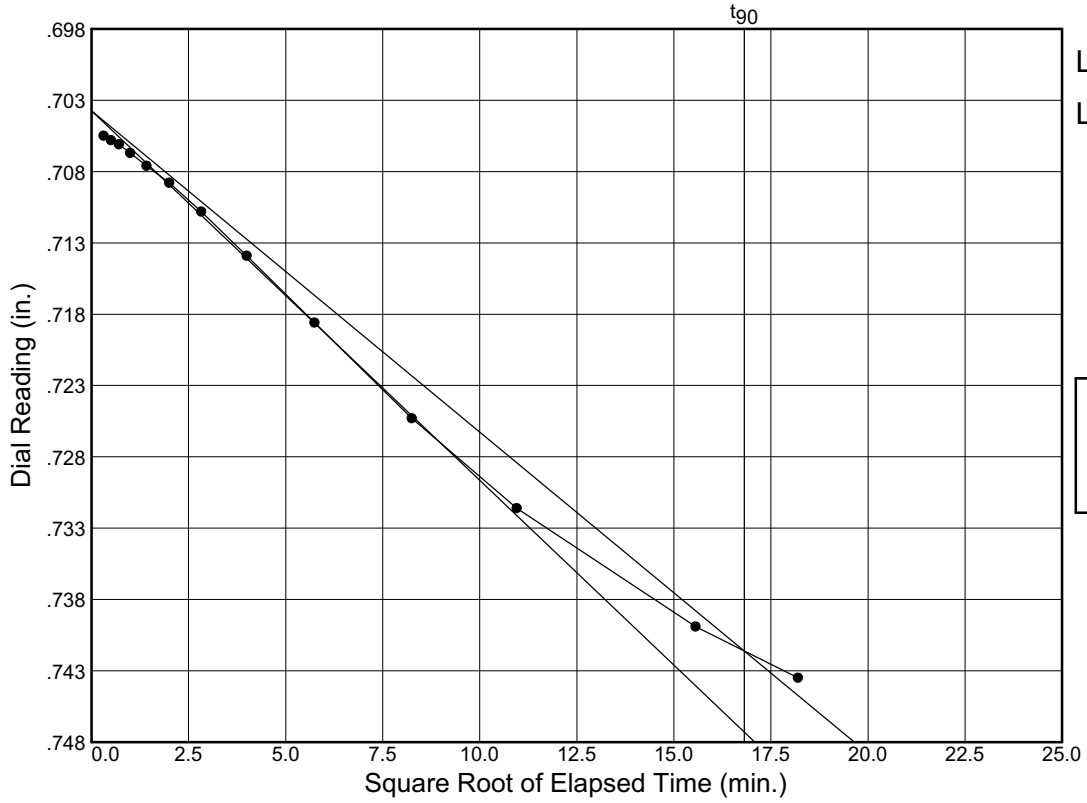
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-8W




Load No.= 13
Load= 1.00 tsf
$D_0$ = 0.69624
$D_{90}$ = 0.70044
$D_{100}$ = 0.70091
$T_{90}$ = 3.15 min.

$C_v$ @ $T_{90}$
0.33 ft.$^2$/day



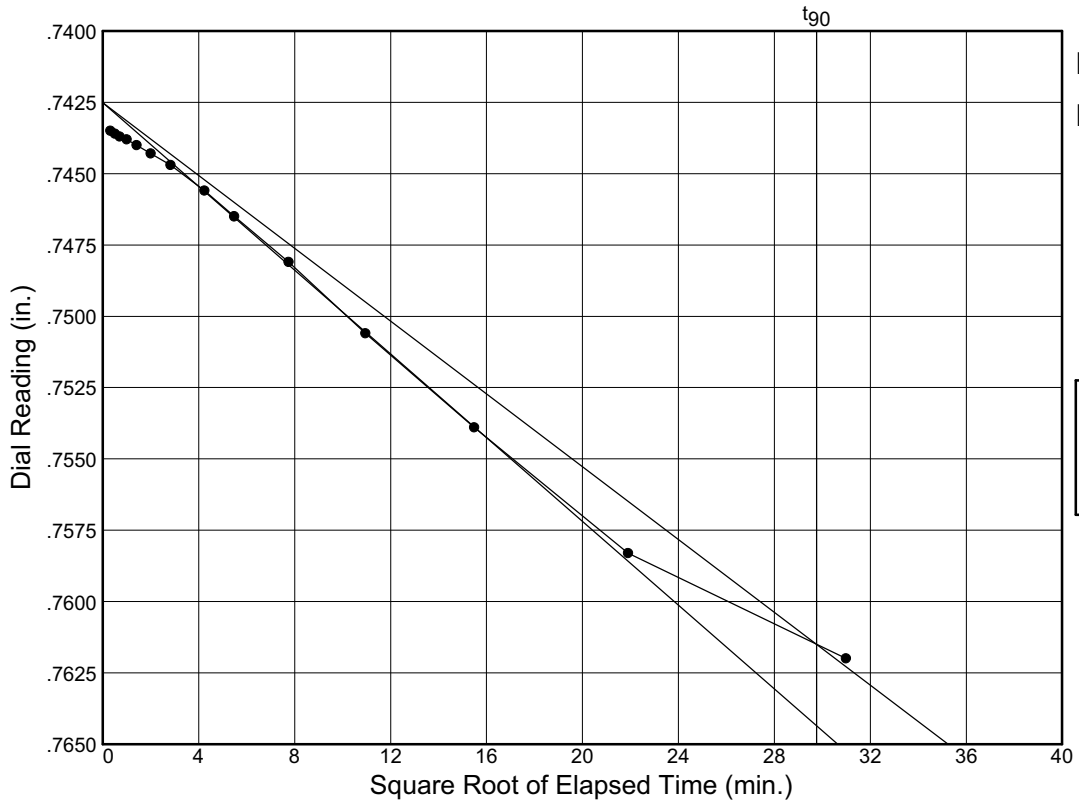

Load No.= 14
Load= 0.25 tsf
$D_0$ = 0.70374
$D_{90}$ = 0.74161
$D_{100}$ = 0.74582
$T_{90}$ = 282.58 min.

$C_v$ @ $T_{90}$
0.00 ft.$^2$/day

Figure 8

# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-8W




Load No.= 15

Load= 0.13 tsf

$D_0$ = 0.74251

$D_{90}$ = 0.76150

$D_{100}$ = 0.76361

$T_{90}$ = 885.98 min.

| $C_v$ @ $T_{90}$ |
|---|
| 0.00 ft.$^2$/day |

Figure 9

## CONSOLIDATION TEST DATA

**Client:** HDR, Inc.
**Project:** VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
**Project Number:** VB10-237G

### Sample Data

**Source:**
**Sample No.:** Shelby Tube
**Elev. or Depth:** 5-7 ft. **Sample Length(in./cm.):** 1 in.
**Location:** D7CD-8W
**Description:** Gray-Brown, Fat CLAY
**Sample Date:** **Liquid Limit:** **Plasticity Index:**
**USCS:** **AASHTO:**
**Preparation Process:**
**Condition of Test:**
**Test Method:** **Final Density:** **Figure No.:** 1
**Testing Remarks:** D7CD-8W
Depth=5 ft.
**Tested By:** **Test Date:**
**Checked By:** **Title:**

### Test Specimen Data

| TOTAL SAMPLE | BEFORE TEST | AFTER TEST |
|---|---|---|
| **Wet w+t** = 272.80 g. | **Consolidometer #** = 1 | **Wet w+t** = 249.92 g. |
| **Dry w+t** = 222.93 g. | | **Dry w+t** = 222.93 g. |
| **Tare Wt.** = 145.30 g. | **Spec. Gravity** = 2.54 | **Tare Wt.** = 145.30 g. |
| **Height** = 1.00 in. | **Height** = 1.00 in. | |
| **Diameter** = 2.50 in. | **Diameter** = 2.50 in. | |
| **Weight** = 127.50 g. | **Defl. Table** = Reference Set (inches/tsf) | |
| **Moisture** = 64.2 % | **Ht. Solids** = 0.3799 in. | **Moisture** = 34.8 % |
| **Wet Den.** = 99.0 pcf | **Dry Wt.** = 77.63 g. | **Dry Wt.** = 77.63 g.* |
| **Dry Den.** = 60.2 pcf | **Void Ratio** = 1.632 | **Void Ratio** = 1.006 |
| **Ovrbrdn.** = 0.30 tsf | **Saturation** = 100.0 % | |

*** Final dry weight used in calculations**

### End-of-Load Summary

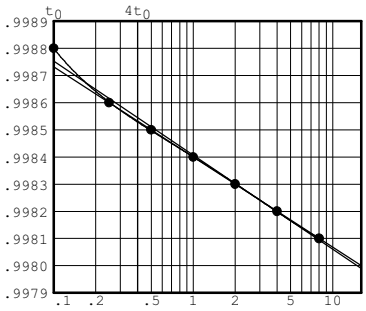
| Pressure (tsf) | Final Dial (in.) | Machine Defl. (in.) | $C_v$ (ft.$^2$/day) | $C_\alpha$ | Void Ratio | % Compression /Swell |
|---|---|---|---|---|---|---|
| start | 1.00000 | | | | 1.632 | |
| 0.13 | 0.99810 | 0.00000 | 2.68 | 0.000 | 1.627 | 0.2 Comprs. |
| 0.25 | 0.99370 | 0.00040 | 1.99 | 0.003 | 1.616 | 0.6 Comprs. |
| 0.13 | 0.99530 | 0.00000 | 0.36 | | 1.620 | 0.5 Comprs. |
| 0.25 | 0.99340 | 0.00040 | 0.57 | 0.001 | 1.616 | 0.6 Comprs. |
| 0.50 | 0.95680 | 0.00080 | 0.02 | 0.015 | 1.520 | 4.2 Comprs. |
| 1.00 | 0.91090 | 0.00160 | 0.02 | 0.021 | 1.402 | 8.7 Comprs. |
| 2.00 | 0.85600 | 0.00240 | 0.02 | 0.022 | 1.259 | 14.2 Comprs. |

| Pressure (tsf) | Final Dial (in.) | Machine Defl. (in.) | $C_v$ (ft.$^2$/day) | $C_\alpha$ | Void Ratio | % Compression /Swell |
|---|---|---|---|---|---|---|
| 4.00 | 0.79670 | 0.00000 | 0.02 | 0.022 | 1.097 | 20.3 Comprs. |
| 8.00 | 0.73720 | 0.00000 | 0.02 | 0.020 | 0.940 | 26.3 Comprs. |
| 16.00 | 0.68750 | 0.00000 | 0.03 | 0.023 | 0.809 | 31.3 Comprs. |
| 8.00 | 0.68910 | 0.00000 | 0.53 | | 0.814 | 31.1 Comprs. |
| 4.00 | 0.69300 | 0.00000 | 0.20 | | 0.824 | 30.7 Comprs. |
| 1.00 | 0.70340 | 0.00160 | 0.38 | | 0.856 | 29.5 Comprs. |
| 0.25 | 0.74310 | 0.00040 | | | 0.957 | 25.6 Comprs. |
| 0.13 | 0.76200 | 0.00000 | | | 1.006 | 23.8 Comprs. |

**$C_c$ =** 0.54 **$P_c$ =** 0.57 tsf **$C_r$ =** 0.06

**Pressure: 0.13 tsf** **TEST READINGS** **Load No. 1**

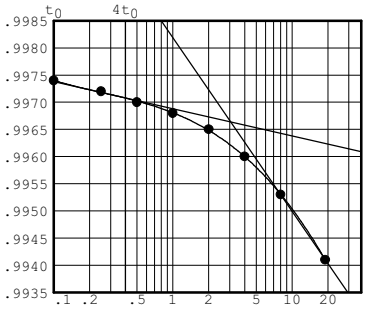
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 1.00000 |
| 2 | 0.10 | 0.99880 |
| 3 | 0.25 | 0.99860 |
| 4 | 0.50 | 0.99850 |
| 5 | 1.00 | 0.99840 |
| 6 | 2.00 | 0.99830 |
| 7 | 4.00 | 0.99820 |
| 8 | 8.00 | 0.99810 |




**Void Ratio =** 1.627 **Compression =** 0.2 %
**$D_0$ =** 0.99907 **$D_{50}$ =** 0.99866 **$D_{100}$ =** 0.99825
**$C_v$ at 0.2 min. =** 2.68 ft.$^2$/day **$C_\alpha$ =** 0.000

**Pressure: 0.25 tsf** **TEST READINGS** **Load No. 2**

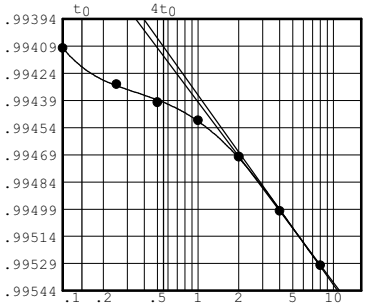
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.99810 |
| 2 | 0.10 | 0.99700 |
| 3 | 0.25 | 0.99680 |
| 4 | 0.50 | 0.99660 |
| 5 | 1.00 | 0.99640 |
| 6 | 2.00 | 0.99610 |
| 7 | 4.00 | 0.99560 |
| 8 | 8.00 | 0.99490 |
| 9 | 19.00 | 0.99370 |




**Void Ratio =** 1.616 **Compression =** 0.6 %
**$D_0$ =** 0.99773 **$D_{50}$ =** 0.99718 **$D_{100}$ =** 0.99664
**$C_v$ at 0.2 min. =** 1.99 ft.$^2$/day **$C_\alpha$ =** 0.003

**Pressure: 0.13 tsf** **TEST READINGS** **Load No. 3**

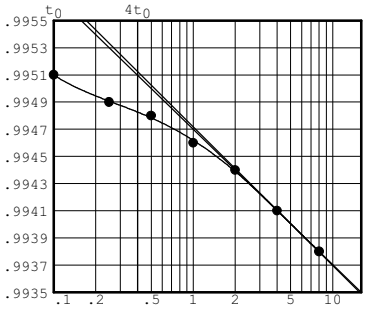
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.99370 |
| 2 | 0.10 | 0.99410 |
| 3 | 0.25 | 0.99430 |
| 4 | 0.50 | 0.99440 |
| 5 | 1.00 | 0.99450 |
| 6 | 2.00 | 0.99470 |
| 7 | 4.00 | 0.99500 |
| 8 | 8.00 | 0.99530 |




**Void Ratio =** 1.620 **Compression =** 0.5 %
**$D_0$ =** 0.99401 **$D_{50}$ =** 0.99459 **$D_{100}$ =** 0.99516
**$C_v$ at 1.4 min. =** 0.36 ft.$^2$/day

**Pressure: 0.25 tsf** **TEST READINGS** **Load No. 4**

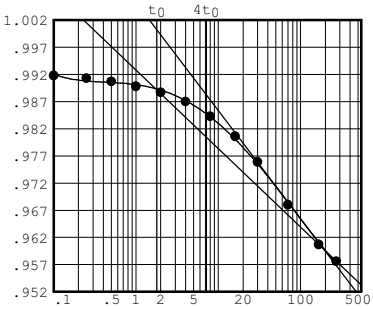
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.99530 |
| 2 | 0.10 | 0.99470 |
| 3 | 0.25 | 0.99450 |
| 4 | 0.50 | 0.99440 |
| 5 | 1.00 | 0.99420 |
| 6 | 2.00 | 0.99400 |
| 7 | 4.00 | 0.99370 |
| 8 | 8.00 | 0.99340 |




**Void Ratio =** 1.616 **Compression =** 0.6 %
**$D_0$ =** 0.99537 **$D_{50}$ =** 0.99466 **$D_{100}$ =** 0.99395
**$C_v$ at 0.9 min. =** 0.57 ft.$^2$/day **$C_\alpha$ =** 0.001

**Pressure: 0.50 tsf** **TEST READINGS** **Load No. 5**

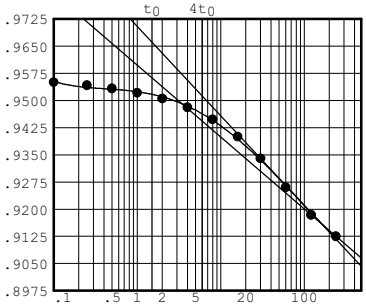
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.99340 | 11 | 70.00 | 0.96720 |
| 2 | 0.10 | 0.99100 | 12 | 166.00 | 0.95990 |
| 3 | 0.25 | 0.99050 | 13 | 272.00 | 0.95680 |
| 4 | 0.50 | 0.98990 | | | |
| 5 | 1.00 | 0.98900 | | | |
| 6 | 2.00 | 0.98790 | | | |
| 7 | 4.00 | 0.98620 | | | |
| 8 | 8.00 | 0.98350 | | | |
| 9 | 16.00 | 0.97980 | | | |
| 10 | 30.00 | 0.97510 | | | |




**Void Ratio =** 1.520 **Compression =** 4.2 %
**$D_0$ =** 0.99391 **$D_{50}$ =** 0.97688 **$D_{100}$ =** 0.95984
**$C_v$ at 25.1 min. =** 0.02 ft.$^2$/day **$C_\alpha$ =** 0.015

**Pressure: 1.00 tsf** **TEST READINGS** **Load No. 6**

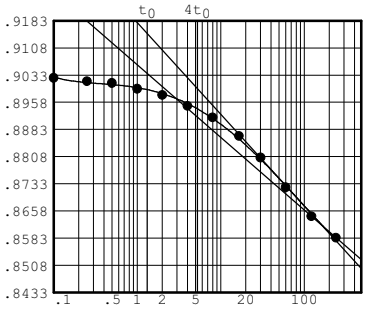
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.95680 | 11 | 60.00 | 0.92440 |
| 2 | 0.10 | 0.95340 | 12 | 121.00 | 0.91680 |
| 3 | 0.25 | 0.95260 | 13 | 240.00 | 0.91090 |
| 4 | 0.50 | 0.95170 | | | |
| 5 | 1.00 | 0.95050 | | | |
| 6 | 2.00 | 0.94890 | | | |
| 7 | 4.00 | 0.94650 | | | |
| 8 | 8.00 | 0.94320 | | | |
| 9 | 16.00 | 0.93840 | | | |
| 10 | 30.00 | 0.93240 | | | |




**Void Ratio =** 1.402 **Compression =** 8.7 %
**$D_0$ =** 0.95709 **$D_{50}$ =** 0.93658 **$D_{100}$ =** 0.91606
**$C_v$ at 21.9 min. =** 0.02 ft.$^2$/day **$C_\alpha$ =** 0.021

**Pressure: 2.00 tsf** **TEST READINGS** **Load No. 7**

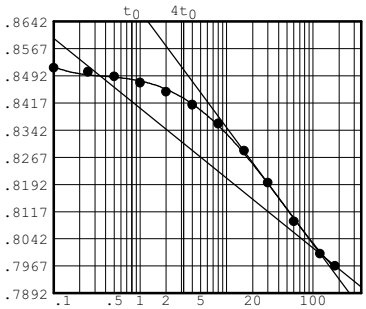
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.90340 | 11 | 60.00 | 0.86990 |
| 2 | 0.10 | 0.90010 | 12 | 122.00 | 0.86190 |
| 3 | 0.25 | 0.89920 | 13 | 240.00 | 0.85600 |
| 4 | 0.50 | 0.89870 | | | |
| 5 | 1.00 | 0.89710 | | | |
| 6 | 2.00 | 0.89540 | | | |
| 7 | 4.00 | 0.89240 | | | |
| 8 | 8.00 | 0.88920 | | | |
| 9 | 16.50 | 0.88410 | | | |
| 10 | 30.00 | 0.87810 | | | |




**Void Ratio =** 1.259 **Compression =** 14.2 %
**$D_0$ =** 0.90464 **$D_{50}$ =** 0.88313 **$D_{100}$ =** 0.86163
**$C_v$ at 21.8 min. =** 0.02 ft.$^2$/day **$C_\alpha$ =** 0.022

**Pressure: 4.00 tsf** **TEST READINGS** **Load No. 8**

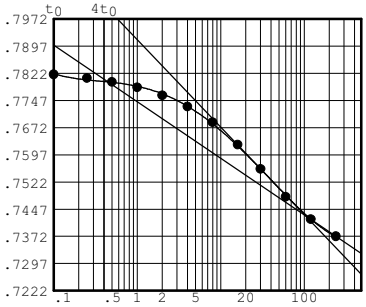
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.85600 | 11 | 60.00 | 0.80900 |
| 2 | 0.10 | 0.85140 | 12 | 120.00 | 0.80010 |
| 3 | 0.25 | 0.85030 | 13 | 180.00 | 0.79670 |
| 4 | 0.50 | 0.84900 | | | |
| 5 | 1.00 | 0.84730 | | | |
| 6 | 2.00 | 0.84480 | | | |
| 7 | 4.00 | 0.84120 | | | |
| 8 | 8.00 | 0.83600 | | | |
| 9 | 16.00 | 0.82850 | | | |
| 10 | 30.00 | 0.81970 | | | |




**Void Ratio =** 1.097 **Compression =** 20.3 %
**$D_0$ =** 0.85348 **$D_{50}$ =** 0.82677 **$D_{100}$ =** 0.80006
**$C_v$ at 17.2 min. =** 0.02 ft.$^2$/day **$C_\alpha$ =** 0.022

**Pressure: 8.00 tsf** **TEST READINGS** **Load No. 9**

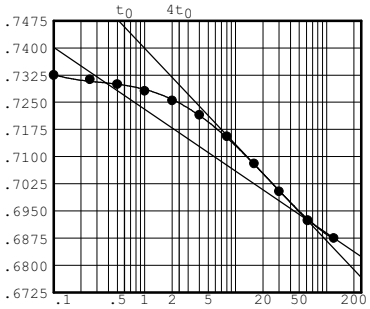
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.79670 | 11 | 60.00 | 0.74810 |
| 2 | 0.10 | 0.78190 | 12 | 120.00 | 0.74190 |
| 3 | 0.25 | 0.78090 | 13 | 240.00 | 0.73720 |
| 4 | 0.50 | 0.77980 | | | |
| 5 | 1.00 | 0.77830 | | | |
| 6 | 2.00 | 0.77610 | | | |
| 7 | 4.00 | 0.77300 | | | |
| 8 | 8.00 | 0.76870 | | | |
| 9 | 16.00 | 0.76250 | | | |
| 10 | 30.00 | 0.75580 | | | |




**Void Ratio =** 0.940 **Compression =** 26.3 %
**$D_0$ =** 0.78430 **$D_{50}$ =** 0.76369 **$D_{100}$ =** 0.74309
**$C_v$ at 13.5 min. =** 0.02 ft.$^2$/day **$C_\alpha$ =** 0.020

**Pressure: 16.00 tsf** **TEST READINGS** **Load No. 10**

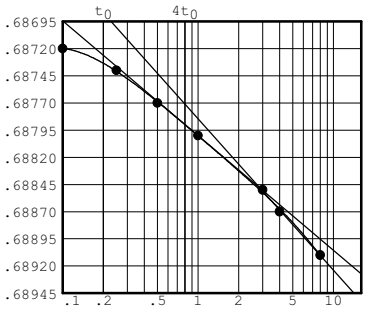
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.73720 | 11 | 62.00 | 0.69240 |
| 2 | 0.10 | 0.73250 | 12 | 120.00 | 0.68750 |
| 3 | 0.25 | 0.73130 | | | |
| 4 | 0.50 | 0.73000 | | | |
| 5 | 1.00 | 0.72810 | | | |
| 6 | 2.00 | 0.72550 | | | |
| 7 | 4.00 | 0.72150 | | | |
| 8 | 8.00 | 0.71560 | | | |
| 9 | 16.00 | 0.70810 | | | |
| 10 | 30.00 | 0.70040 | | | |




**Void Ratio =** 0.809 **Compression =** 31.3 %
**$D_0$ =** 0.73464 **$D_{50}$ =** 0.71367 **$D_{100}$ =** 0.69270
**$C_v$ at 9.4 min. =** 0.03 ft.$^2$/day **$C_\alpha$ =** 0.023

**Pressure: 8.00 tsf** **TEST READINGS** **Load No. 11**

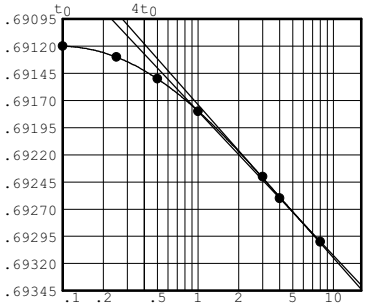
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.68750 |
| 2 | 0.10 | 0.68720 |
| 3 | 0.25 | 0.68740 |
| 4 | 0.50 | 0.68770 |
| 5 | 1.00 | 0.68800 |
| 6 | 3.00 | 0.68850 |
| 7 | 4.00 | 0.68870 |
| 8 | 8.00 | 0.68910 |




**Void Ratio =** 0.814 **Compression =** 31.1 %
**$D_0$ =** 0.68677 **$D_{50}$ =** 0.68763 **$D_{100}$ =** 0.68849
**$C_v$ at 0.4 min. =** 0.53 ft.$^2$/day

**Pressure: 4.00 tsf** **TEST READINGS** **Load No. 12**

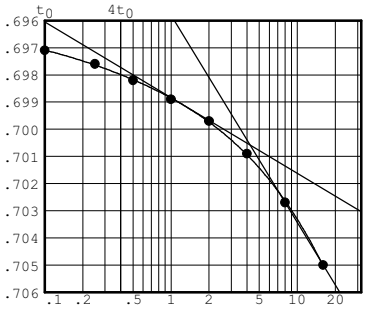
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.68910 |
| 2 | 0.10 | 0.69120 |
| 3 | 0.25 | 0.69130 |
| 4 | 0.50 | 0.69150 |
| 5 | 1.00 | 0.69180 |
| 6 | 3.00 | 0.69240 |
| 7 | 4.00 | 0.69260 |
| 8 | 8.00 | 0.69300 |




**Void Ratio =** 0.824 **Compression =** 30.7 %
**$D_0$ =** 0.69097 **$D_{50}$ =** 0.69188 **$D_{100}$ =** 0.69279
**$C_v$ at 1.2 min. =** 0.20 ft.$^2$/day

**Pressure: 1.00 tsf** **TEST READINGS** **Load No. 13**

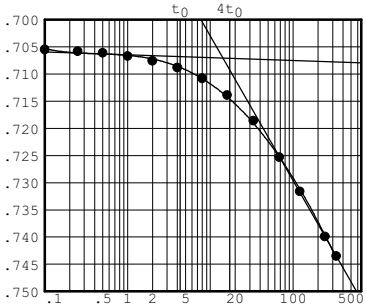
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.69300 |
| 2 | 0.10 | 0.69550 |
| 3 | 0.25 | 0.69600 |
| 4 | 0.50 | 0.69660 |
| 5 | 1.00 | 0.69730 |
| 6 | 2.00 | 0.69810 |
| 7 | 4.00 | 0.69930 |
| 8 | 8.00 | 0.70110 |
| 9 | 16.00 | 0.70340 |




**Void Ratio =** 0.856 **Compression =** 29.5 %
**$D_0$ =** 0.69619 **$D_{50}$ =** 0.69839 **$D_{100}$ =** 0.70059
**$C_v$ at 0.6 min. =** 0.38 ft.$^2$/day

**Pressure: 0.25 tsf** **TEST READINGS** **Load No. 14**

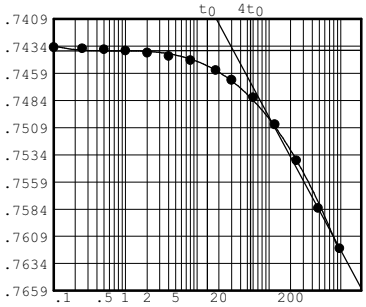
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.70340 | 11 | 68.00 | 0.72490 |
| 2 | 0.10 | 0.70510 | 12 | 120.00 | 0.73120 |
| 3 | 0.25 | 0.70540 | 13 | 242.00 | 0.73950 |
| 4 | 0.50 | 0.70570 | 14 | 331.00 | 0.74310 |
| 5 | 1.00 | 0.70630 | | | |
| 6 | 2.00 | 0.70720 | | | |
| 7 | 4.00 | 0.70840 | | | |
| 8 | 8.00 | 0.71040 | | | |
| 9 | 16.00 | 0.71350 | | | |
| 10 | 33.00 | 0.71820 | | | |




**Void Ratio =** 0.957 **Compression =** 25.6 %

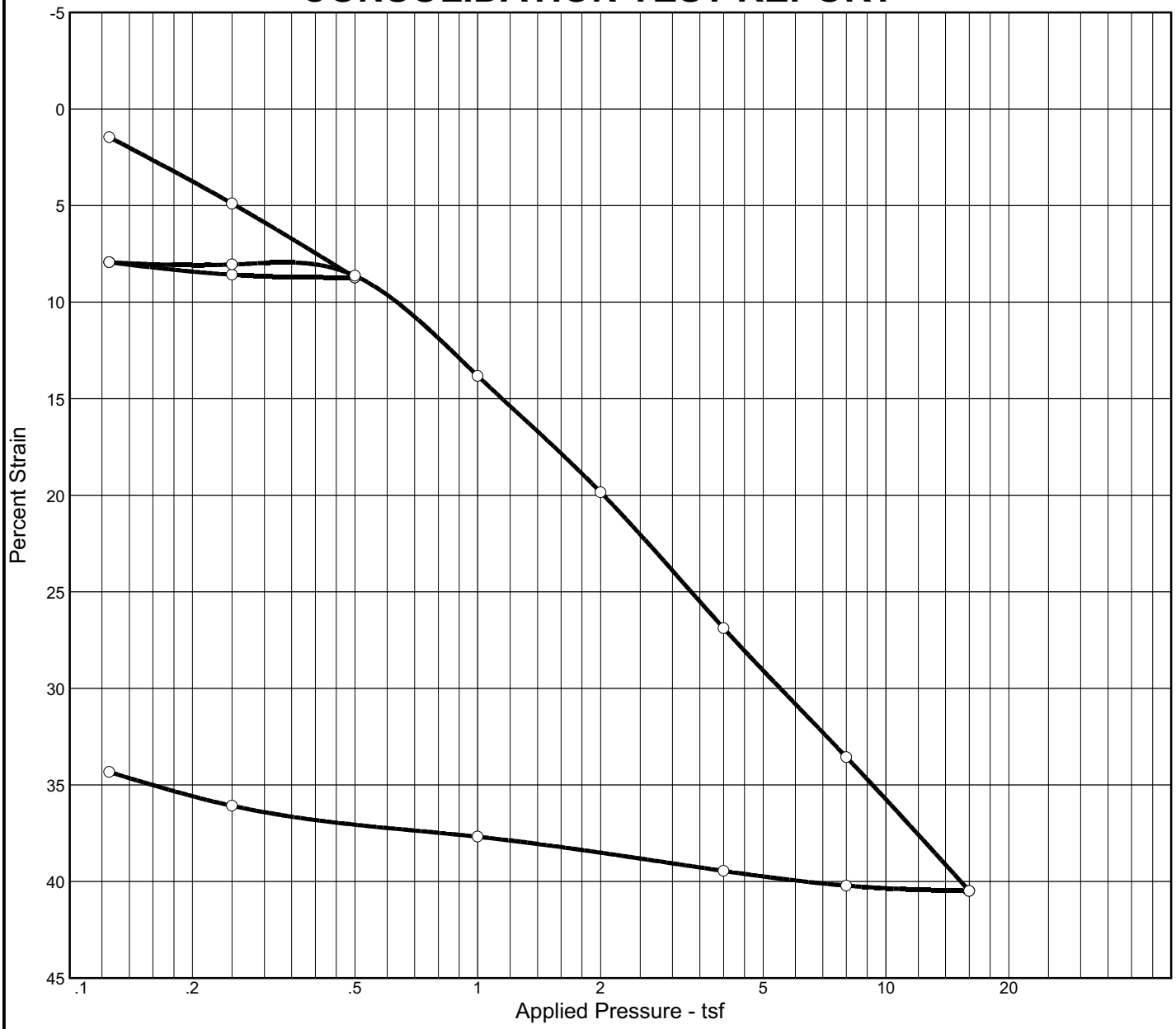
**Pressure: 0.13 tsf** **TEST READINGS** **Load No. 15**

| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.74310 | 11 | 60.00 | 0.74810 |
| 2 | 0.10 | 0.74350 | 12 | 120.00 | 0.75060 |
| 3 | 0.25 | 0.74360 | 13 | 240.00 | 0.75390 |
| 4 | 0.50 | 0.74370 | 14 | 480.00 | 0.75830 |
| 5 | 1.00 | 0.74380 | 15 | 960.00 | 0.76200 |
| 6 | 2.00 | 0.74400 | | | |
| 7 | 4.00 | 0.74430 | | | |
| 8 | 8.00 | 0.74470 | | | |
| 9 | 18.00 | 0.74560 | | | |
| 10 | 30.00 | 0.74650 | | | |




**Void Ratio =** 1.006 **Compression =** 23.8 %

# CONSOLIDATION TEST REPORT




| MATERIAL DESCRIPTION | USCS | AASHTO |
|---|---|---|
| Tan-Brown, Fat CLAY | | |

| LL | PI | Sp. Gr. | Overburden (tsf) | Dry Dens. (pcf) | | Moisture | | Saturation | | Void Ratio | | $P_c$ (tsf) | $C_c$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Init. | Final | Init. | Final | Init. | Final | Init. | Final | | |
| | | 2.52 | 0.50 | 58.0 | | 67.9 % | 38.4 % | 99.9 % | 100.0 % | 1.714 | 0.783 | | |

| Preparation Process: | D2435 Method | $C_r$ | Swell Press. (tsf) | Heave % |
|---|---|---|---|---|
| Condition of Test: | | | | |

**Project No.** VB10-237G **Client:** HDR, Inc.

**Project:** VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia

**Location:** D7CD-9W

**Remarks:**
D7CD-9W
Sample Obtained 10/15/10

**Checked By:**

**Title:**

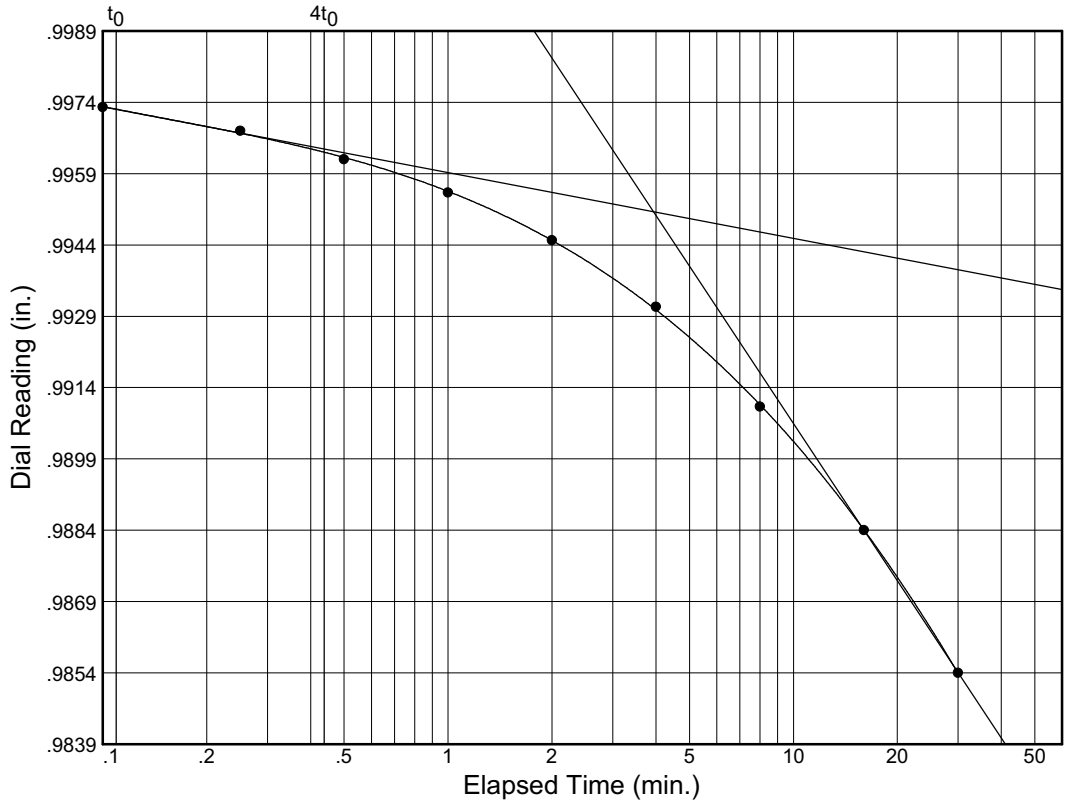
CONSOLIDATION TEST REPORT

**GET SOLUTIONS, INC.**

**Figure**

# Dial Reading vs. Time

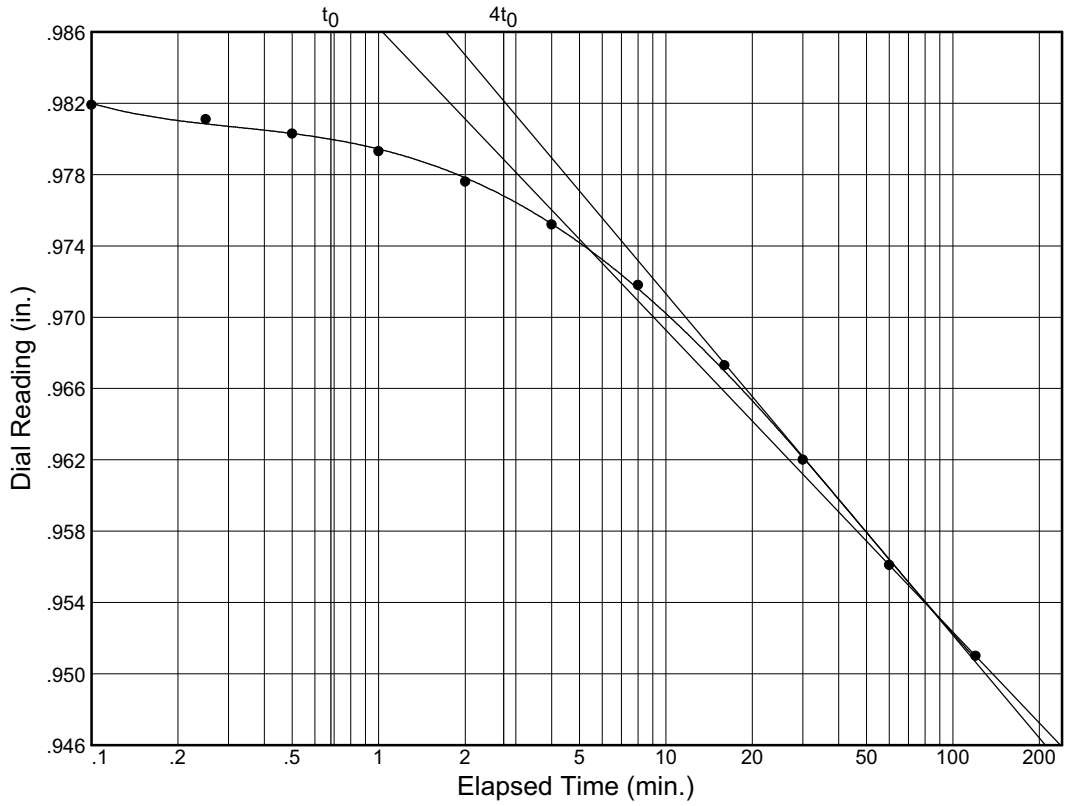
Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-9W




Load No.= 1
Load= 0.13 tsf
$D_0$ = 0.99816
$D_{50}$ = 0.99663
$D_{100}$ = 0.99510
$T_{50}$ = 0.30 min.

$C_v$ @ $T_{50}$
1.62 ft.$^2$/day

$C_\alpha$ = 0.011




Load No.= 2
Load= 0.25 tsf
$D_0$ = 0.98316
$D_{50}$ = 0.96841
$D_{100}$ = 0.95366
$T_{50}$ = 13.09 min.

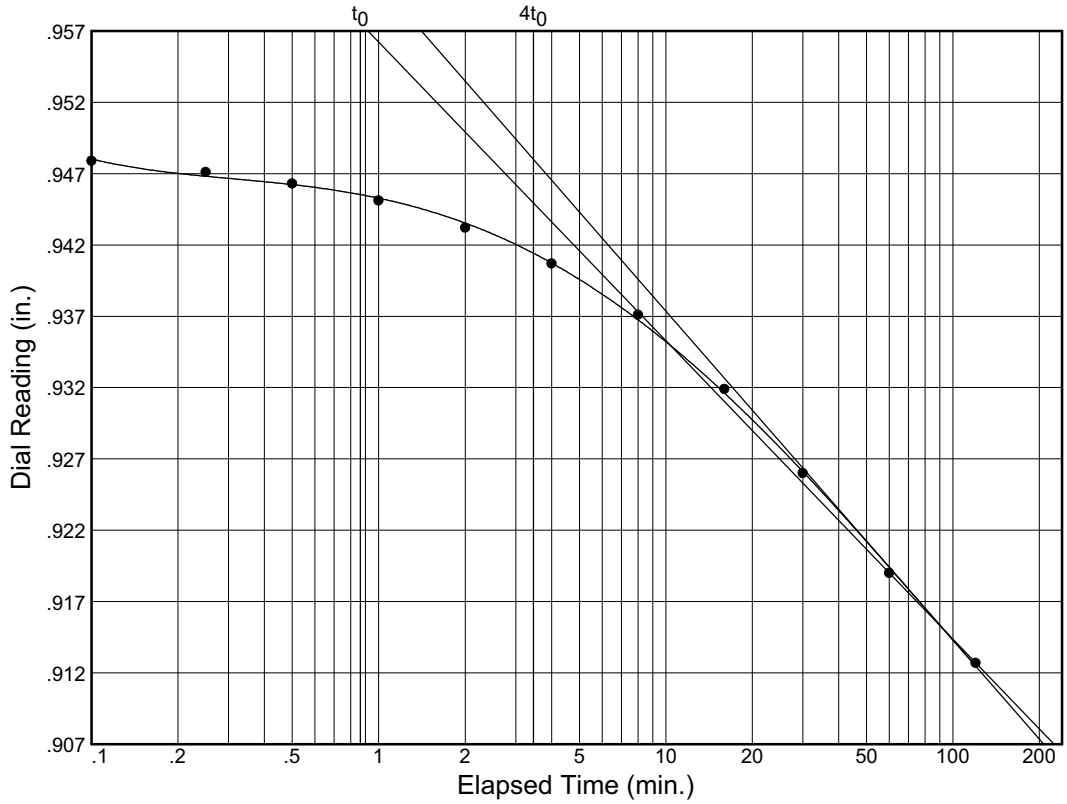
$C_v$ @ $T_{50}$
0.04 ft.$^2$/day

$C_\alpha$ = 0.017

Figure

# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-9W




Load No.= 3

Load= 0.50 tsf

$D_0$ = 0.94964

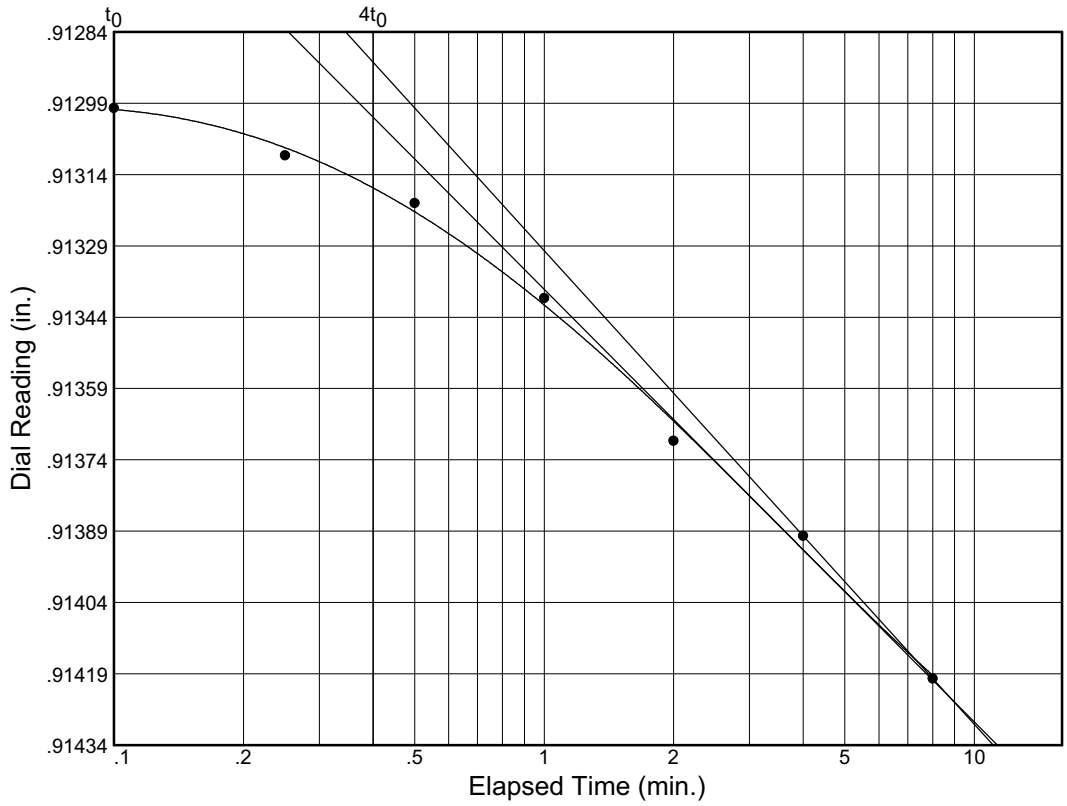
$D_{50}$ = 0.93230

$D_{100}$ = 0.91496

$T_{50}$ = 14.70 min.

| $C_v$ @ $T_{50}$ |
|---|
| 0.03 ft.$^2$/day |

$C_\alpha$ = 0.022




Load No.= 4

Load= 0.25 tsf

$D_0$ = 0.91284

$D_{50}$ = 0.91354

$D_{100}$ = 0.91424

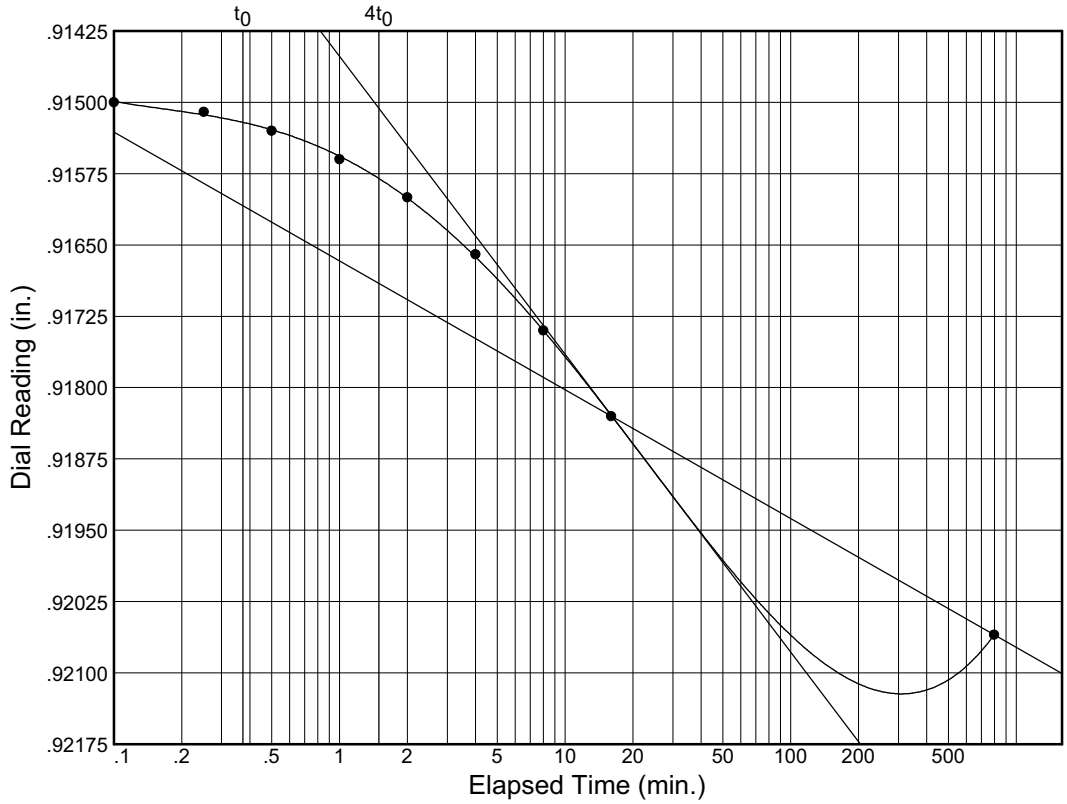
$T_{50}$ = 1.44 min.

| $C_v$ @ $T_{50}$ |
|---|
| 0.29 ft.$^2$/day |

Figure

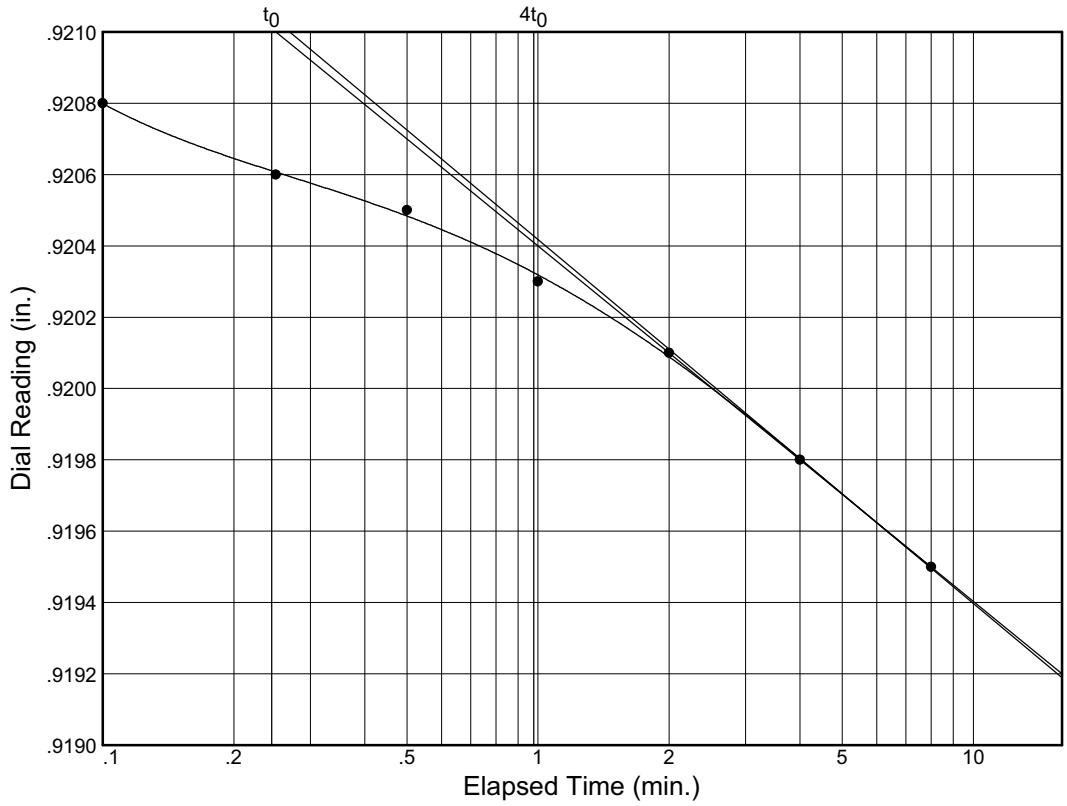
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-9W




Load No.= 5
Load= 0.13 tsf
$D_0$ = 0.91462
$D_{50}$ = 0.91646
$D_{100}$ = 0.91831
$T_{50}$ = 3.40 min.

$C_v$ @ $T_{50}$
0.12 ft.$^2$/day




Load No.= 6
Load= 0.25 tsf
$D_0$ = 0.92090
$D_{50}$ = 0.92027
$D_{100}$ = 0.91965
$T_{50}$ = 1.16 min.

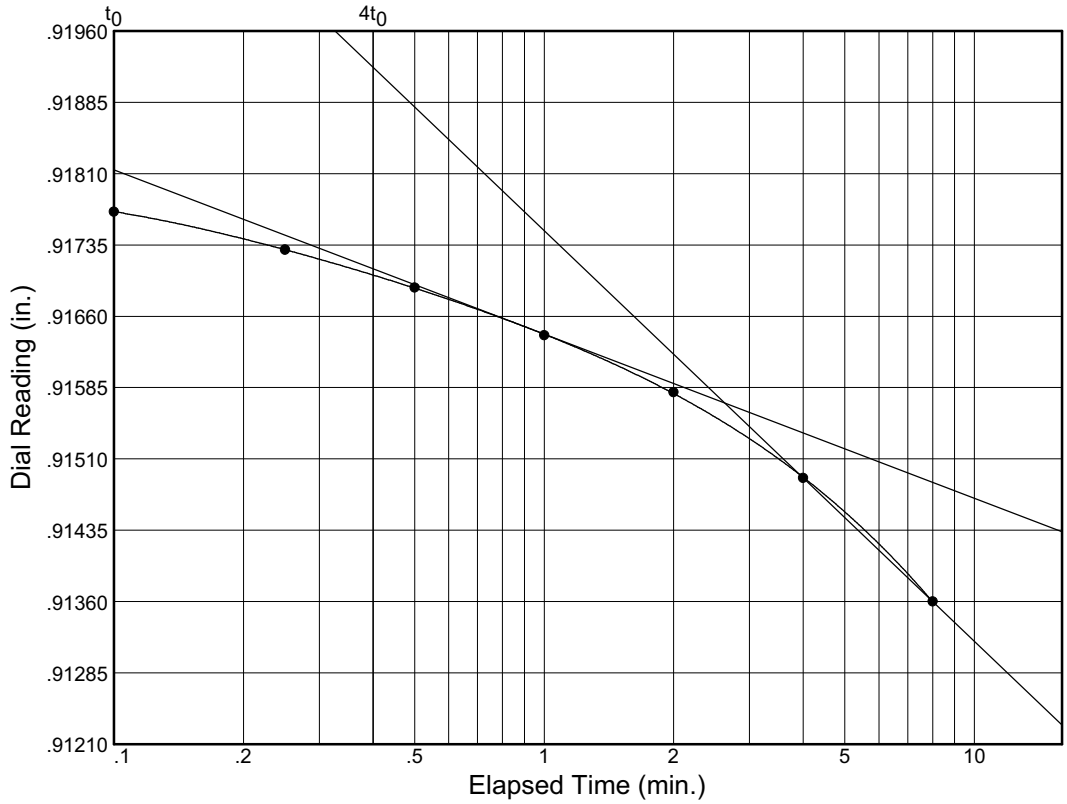
$C_v$ @ $T_{50}$
0.36 ft.$^2$/day

$C_\alpha$ = 0.001

Figure

# Dial Reading vs. Time

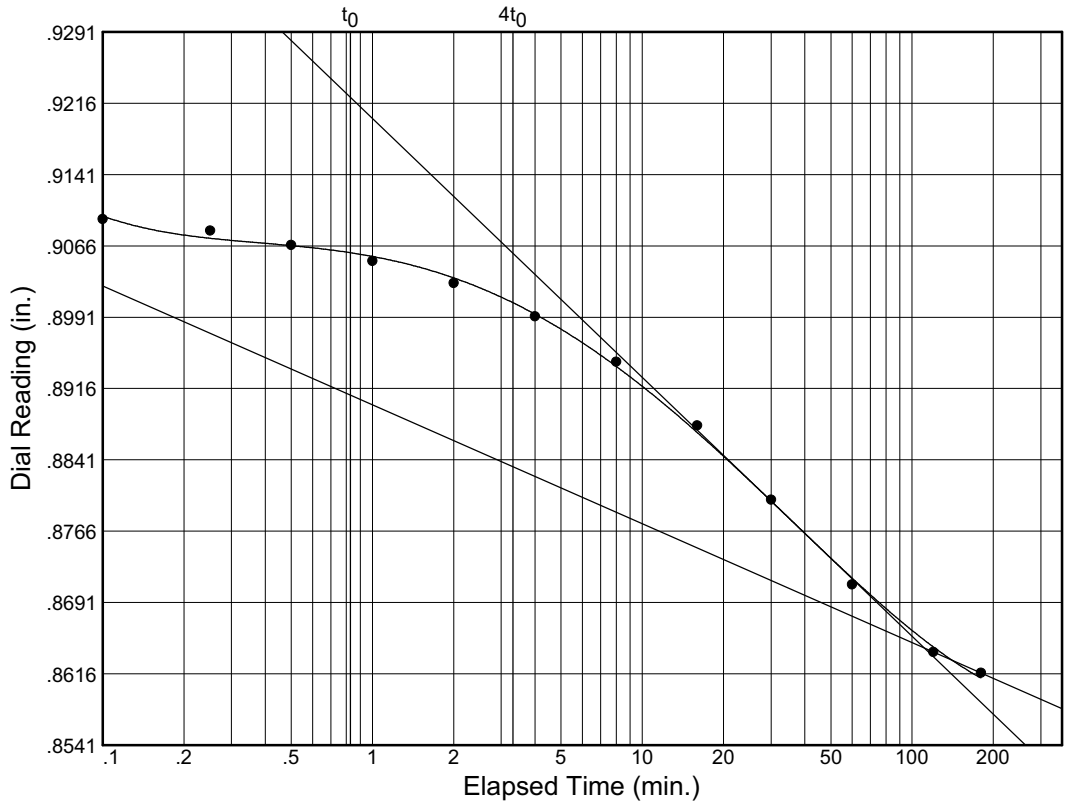
Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-9W




Load No.= 7
Load= 0.50 tsf
$D_0$ = 0.91837
$D_{50}$ = 0.91703
$D_{100}$ = 0.91569
$T_{50}$ = 0.40 min.

$C_v$ @ $T_{50}$
1.02 ft.$^2$/day

$C_\alpha$ = 0.005




Load No.= 8
Load= 1.00 tsf
$D_0$ = 0.91114
$D_{50}$ = 0.88773
$D_{100}$ = 0.86433
$T_{50}$ = 14.90 min.

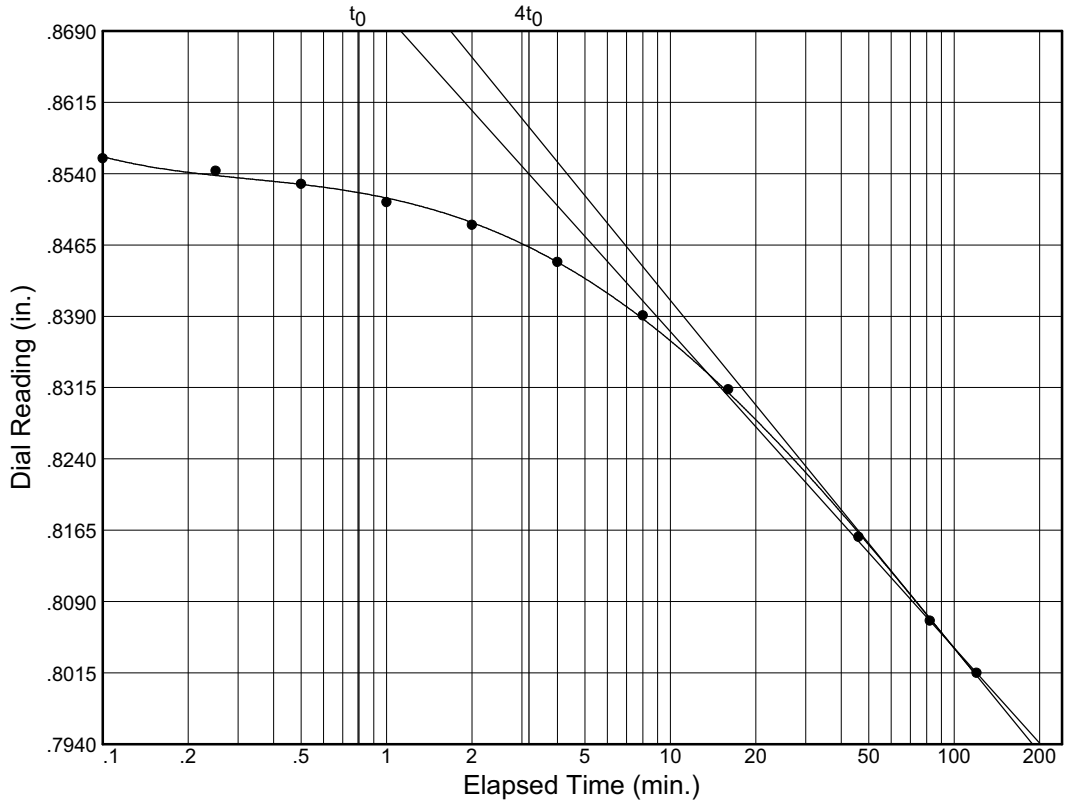
$C_v$ @ $T_{50}$
0.03 ft.$^2$/day

$C_\alpha$ = 0.014

Figure

# Dial Reading vs. Time

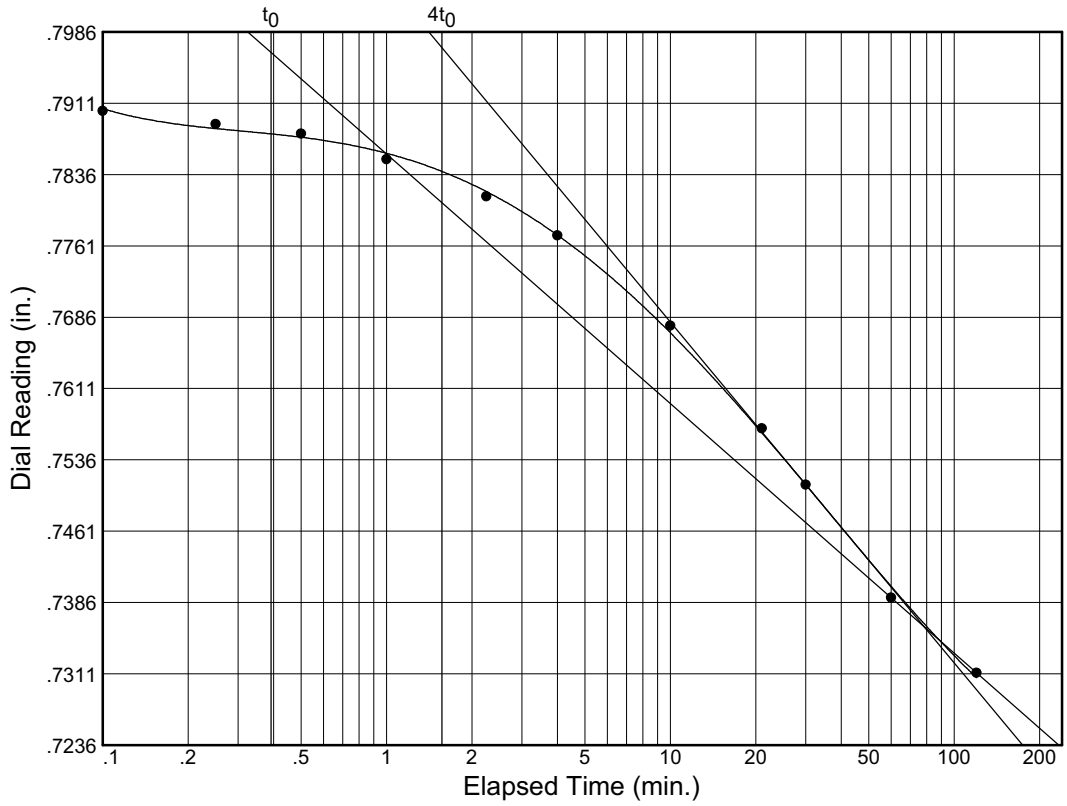
Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-9W




Load No.= 9
Load= 2.00 tsf
$D_0$ = 0.85775
$D_{50}$ = 0.83118
$D_{100}$ = 0.80461
$T_{50}$ = 15.72 min.

$C_v$ @ $T_{50}$
0.02 ft.$^2$/day

$C_\alpha$ = 0.039




Load No.= 10
Load= 4.00 tsf
$D_0$ = 0.79183
$D_{50}$ = 0.76397
$D_{100}$ = 0.73612
$T_{50}$ = 12.49 min.

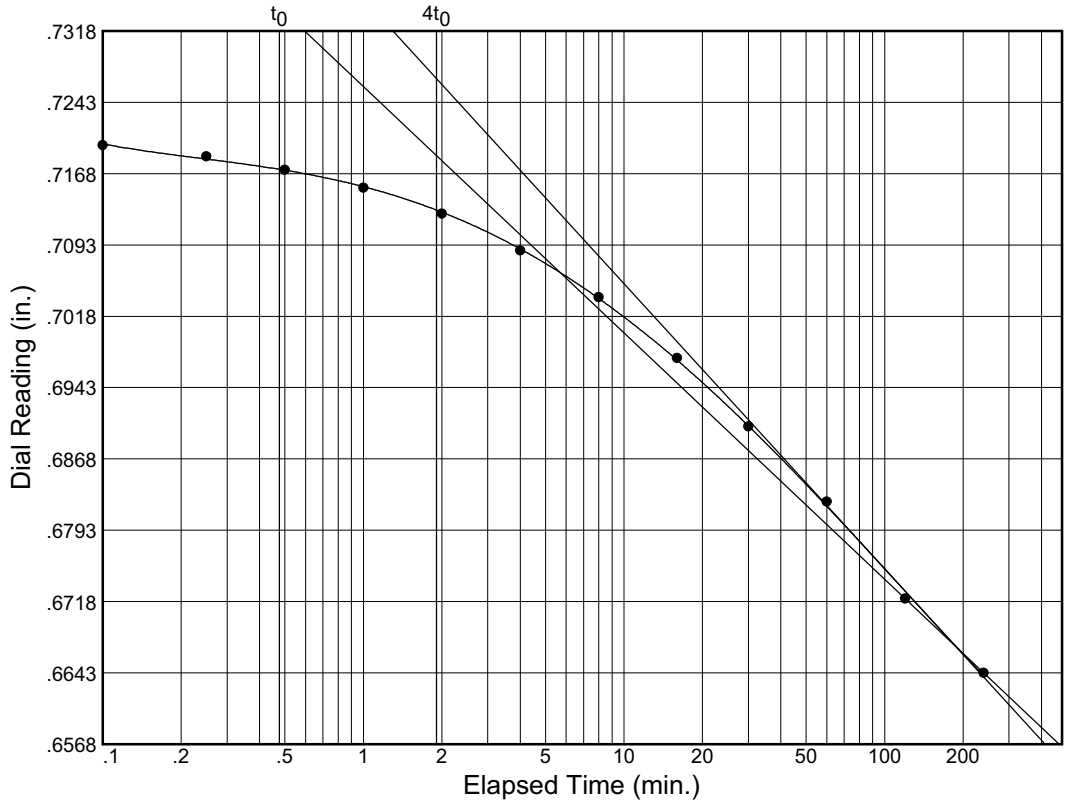
$C_v$ @ $T_{50}$
0.02 ft.$^2$/day

$C_\alpha$ = 0.033

Figure

# Dial Reading vs. Time

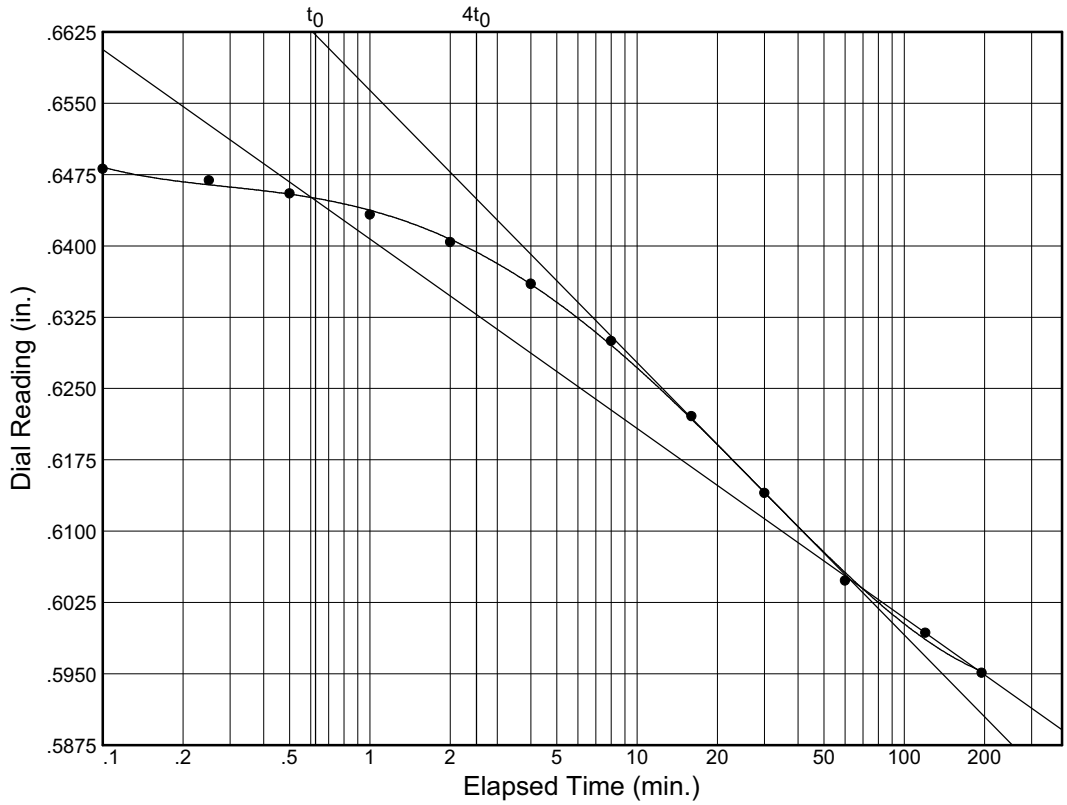
Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-9W




Load No.= 11
Load= 8.00 tsf
$D_0$ = 0.72153
$D_{50}$ = 0.69431
$D_{100}$ = 0.66709
$T_{50}$ = 20.98 min.

| $C_v$ @ $T_{50}$ |
|---|
| 0.01 ft.$^2$/day |

$C_\alpha$ = 0.036




Load No.= 12
Load= 16.00 tsf
$D_0$ = 0.65066
$D_{50}$ = 0.62782
$D_{100}$ = 0.60497
$T_{50}$ = 9.43 min.

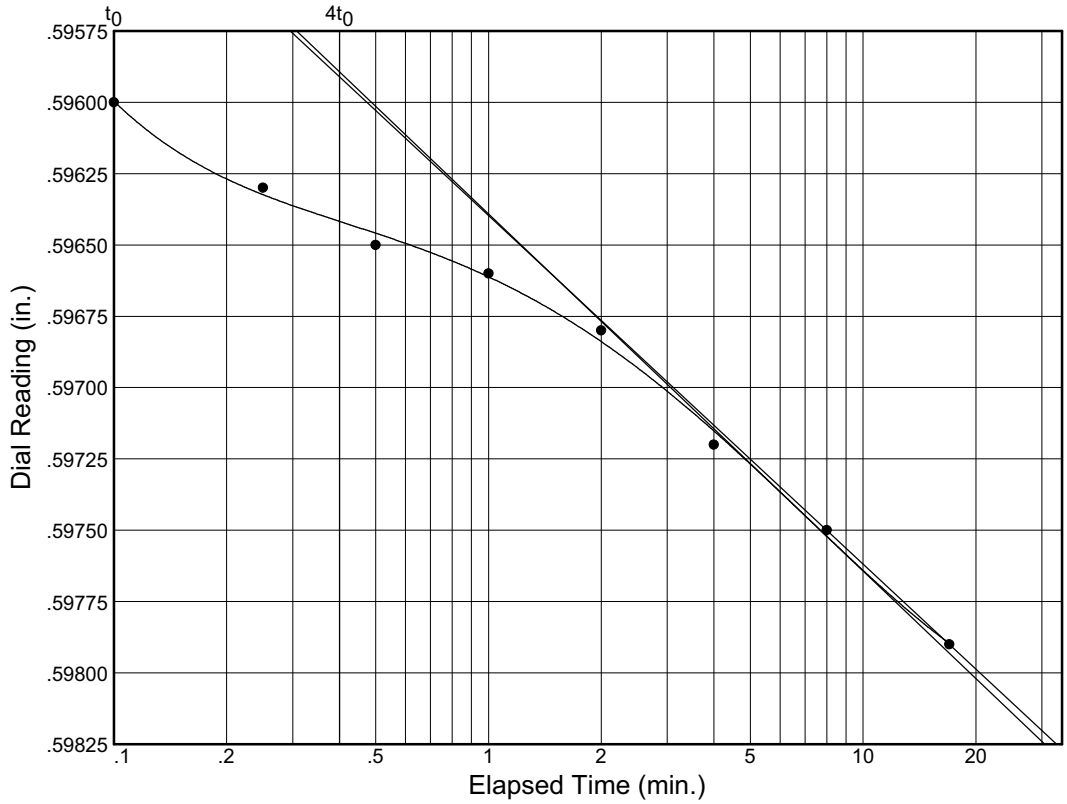
| $C_v$ @ $T_{50}$ |
|---|
| 0.02 ft.$^2$/day |

$C_\alpha$ = 0.030

Figure

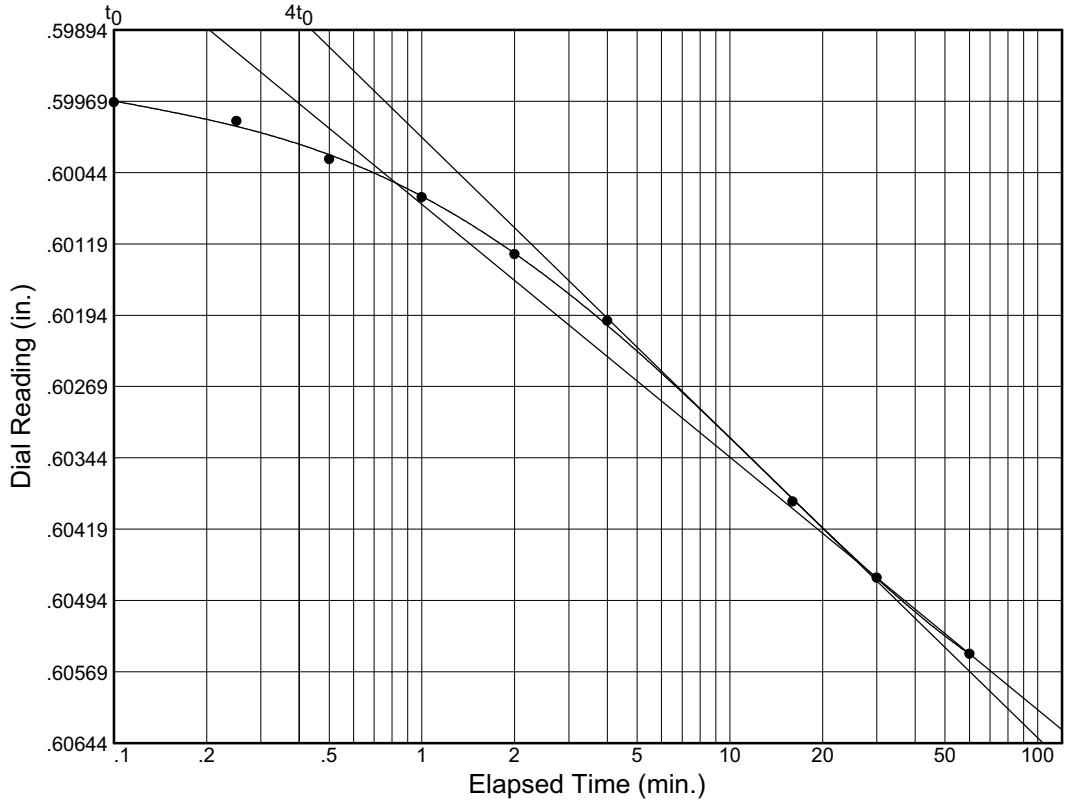
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-9W




Load No.= 13
Load= 8.00 tsf
$D_0$ = 0.59558
$D_{50}$ = 0.59610
$D_{100}$ = 0.59662
$T_{50}$ = 0.12 min.

$C_v$ @ $T_{50}$
1.43 ft.$^2$/day



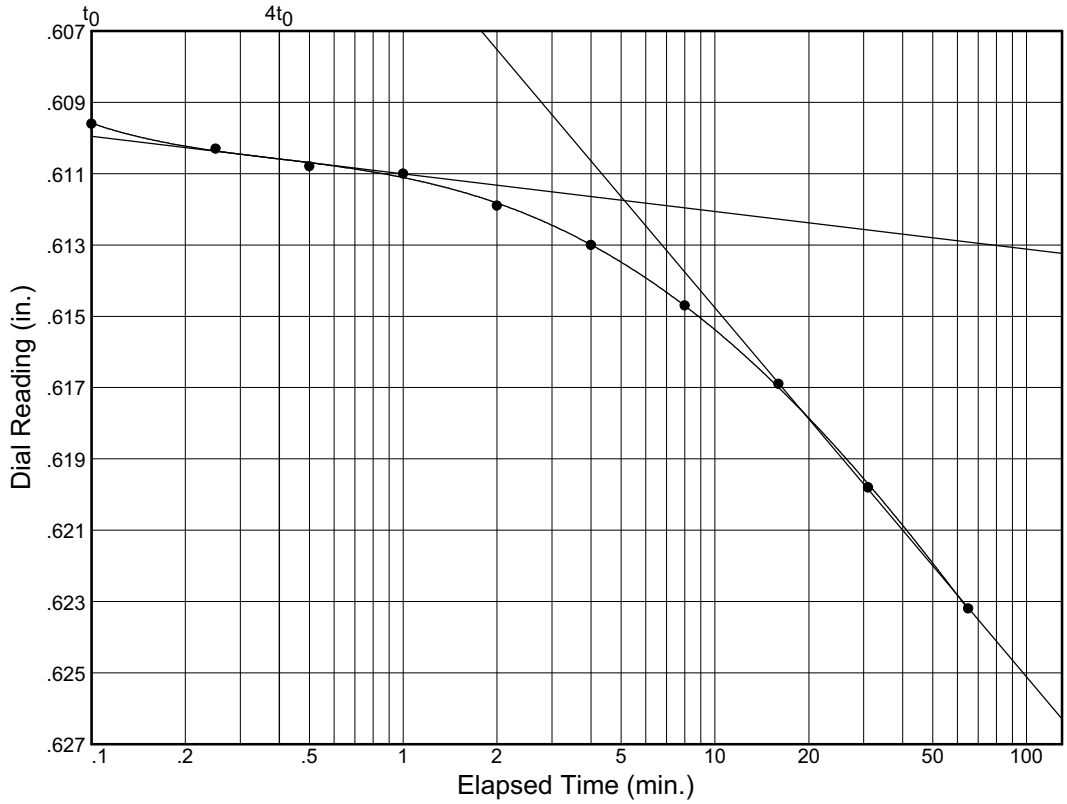

Load No.= 14
Load= 4.00 tsf
$D_0$ = 0.59923
$D_{50}$ = 0.60188
$D_{100}$ = 0.60453
$T_{50}$ = 3.47 min.

$C_v$ @ $T_{50}$
0.05 ft.$^2$/day

Figure

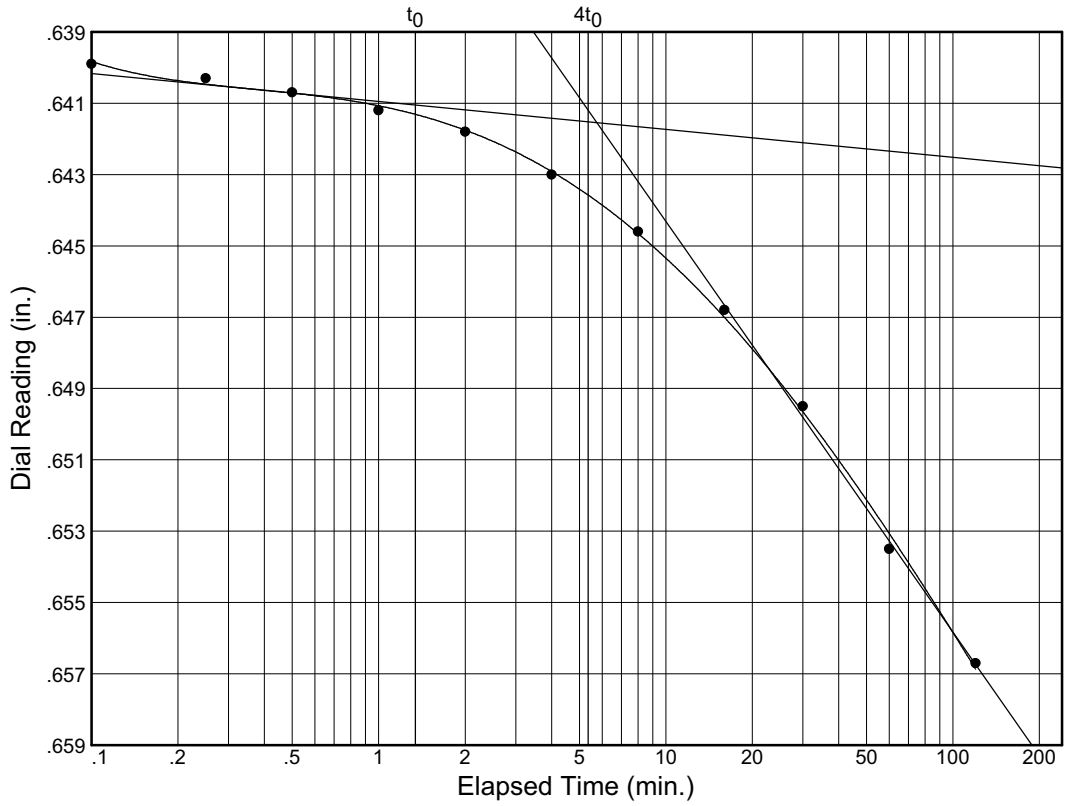
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-9W




Load No.= 15
Load= 1.00 tsf
$D_0$ = 0.60859
$D_{50}$ = 0.61017
$D_{100}$ = 0.61176
$T_{50}$ = 0.18 min.

| $C_v$ @ $T_{50}$ |
|---|
| 1.02 ft.$^2$/day |



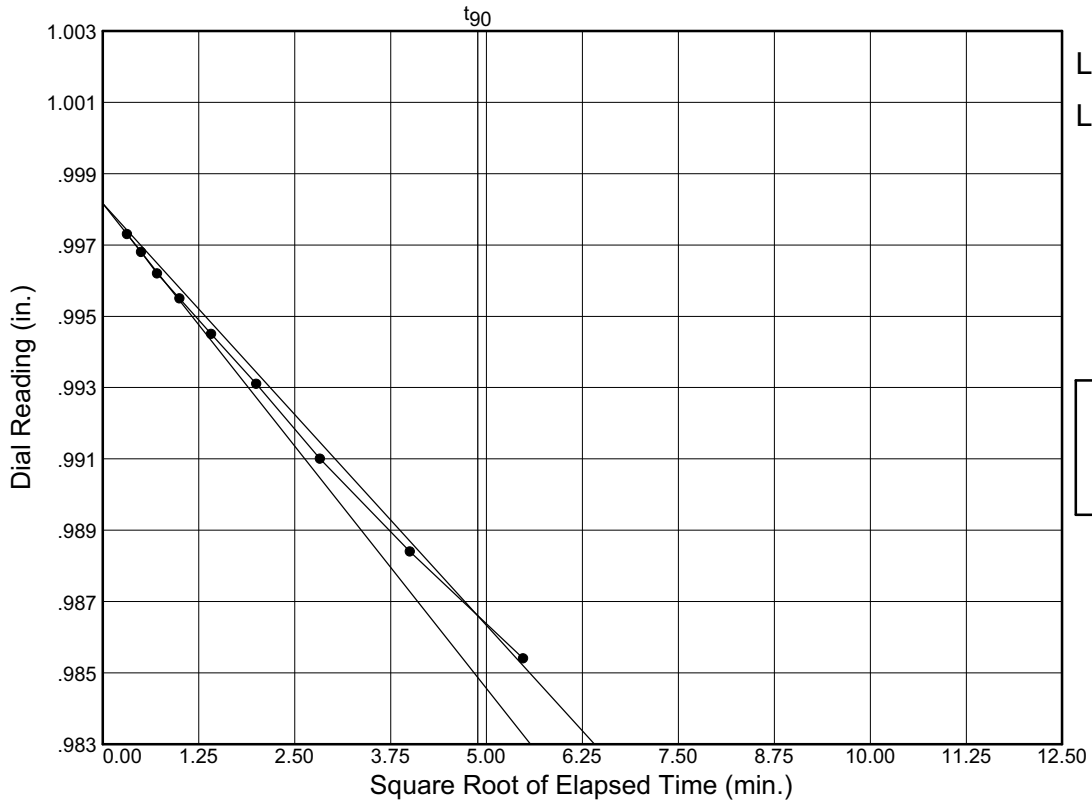

Load No.= 17
Load= 0.13 tsf
$D_0$ = 0.63905
$D_{50}$ = 0.64029
$D_{100}$ = 0.64154
$T_{50}$ = 0.17 min.

| $C_v$ @ $T_{50}$ |
|---|
| 1.18 ft.$^2$/day |

Figure

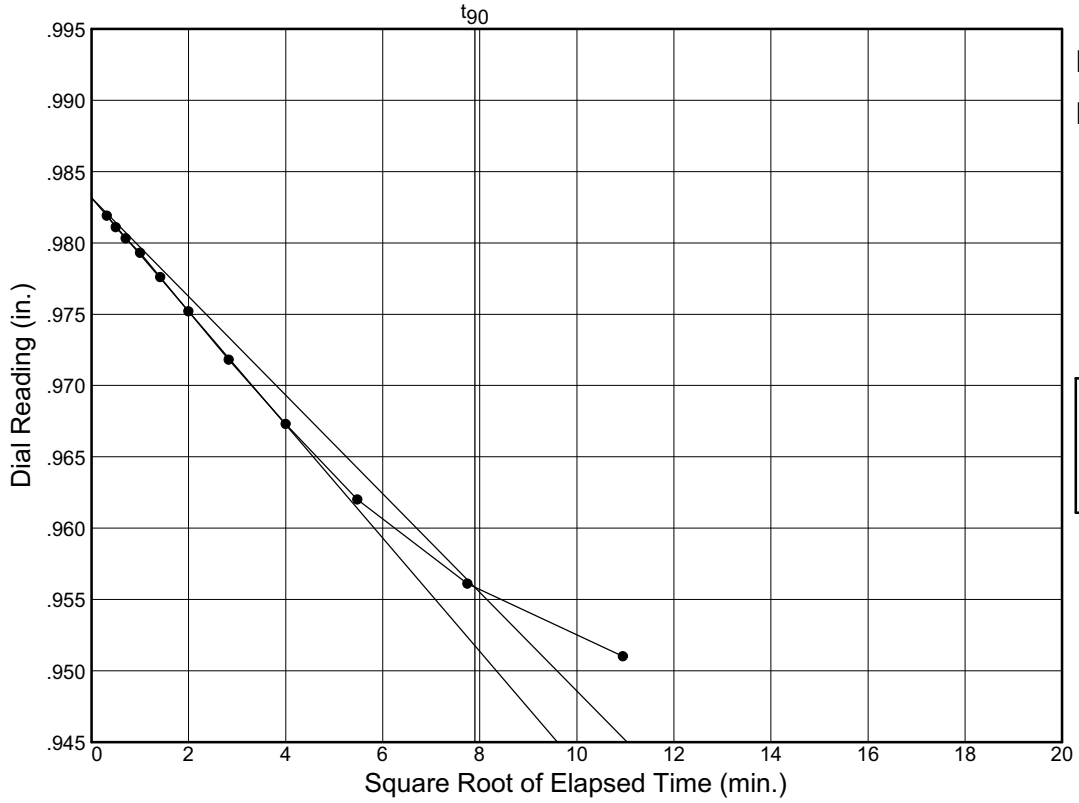
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-9W




Load No.= 1
Load= 0.13 tsf
$D_0$ = 0.99816
$D_{90}$ = 0.98660
$D_{100}$ = 0.98532
$T_{90}$ = 23.87 min.

$C_v$ @ $T_{90}$
0.09 ft.$^2$/day



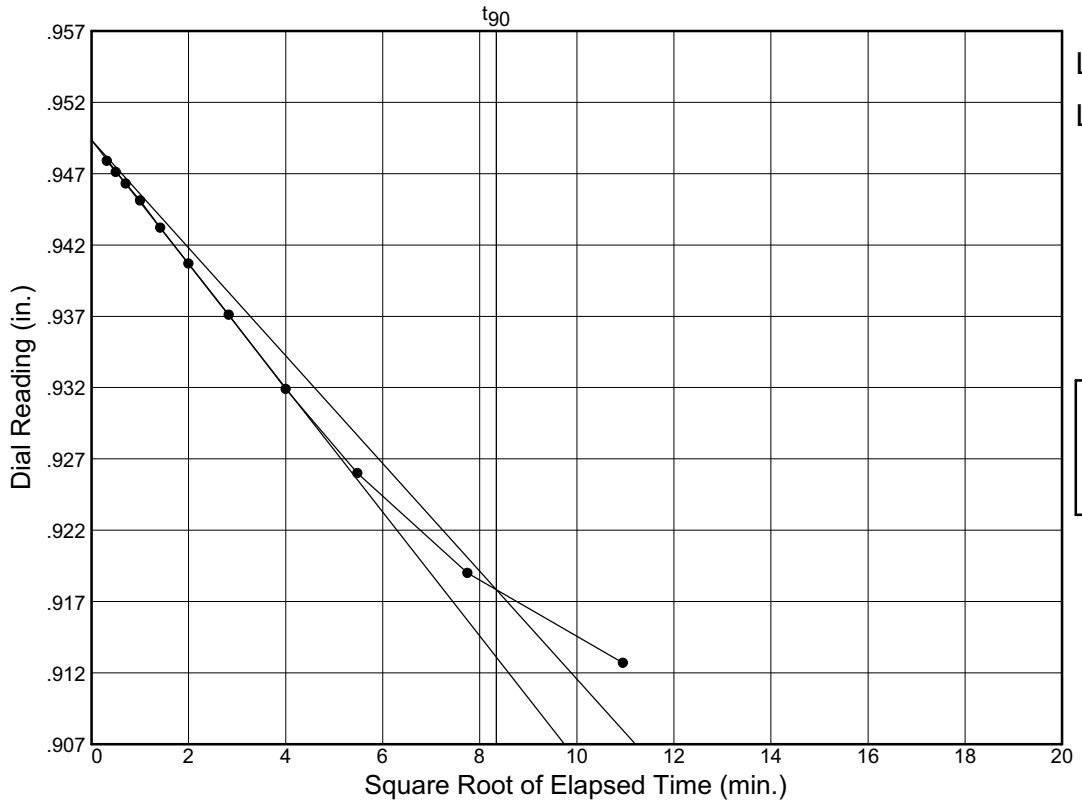

Load No.= 2
Load= 0.25 tsf
$D_0$ = 0.98316
$D_{90}$ = 0.95586
$D_{100}$ = 0.95283
$T_{90}$ = 62.34 min.

$C_v$ @ $T_{90}$
0.03 ft.$^2$/day

Figure

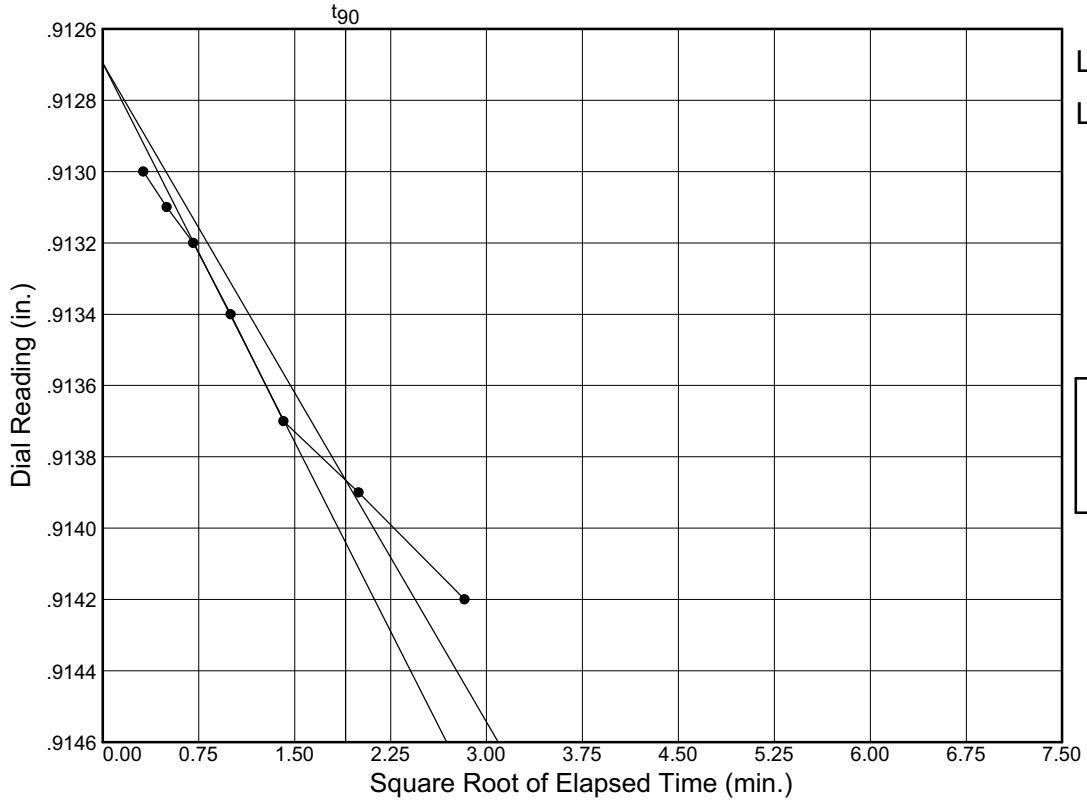
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-9W




Load No.= 3
Load= 0.50 tsf
$D_0$ = 0.94935
$D_{90}$ = 0.91783
$D_{100}$ = 0.91433
$T_{90}$ = 69.59 min.

$C_v$ @ $T_{90}$
0.03 ft.$^2$/day



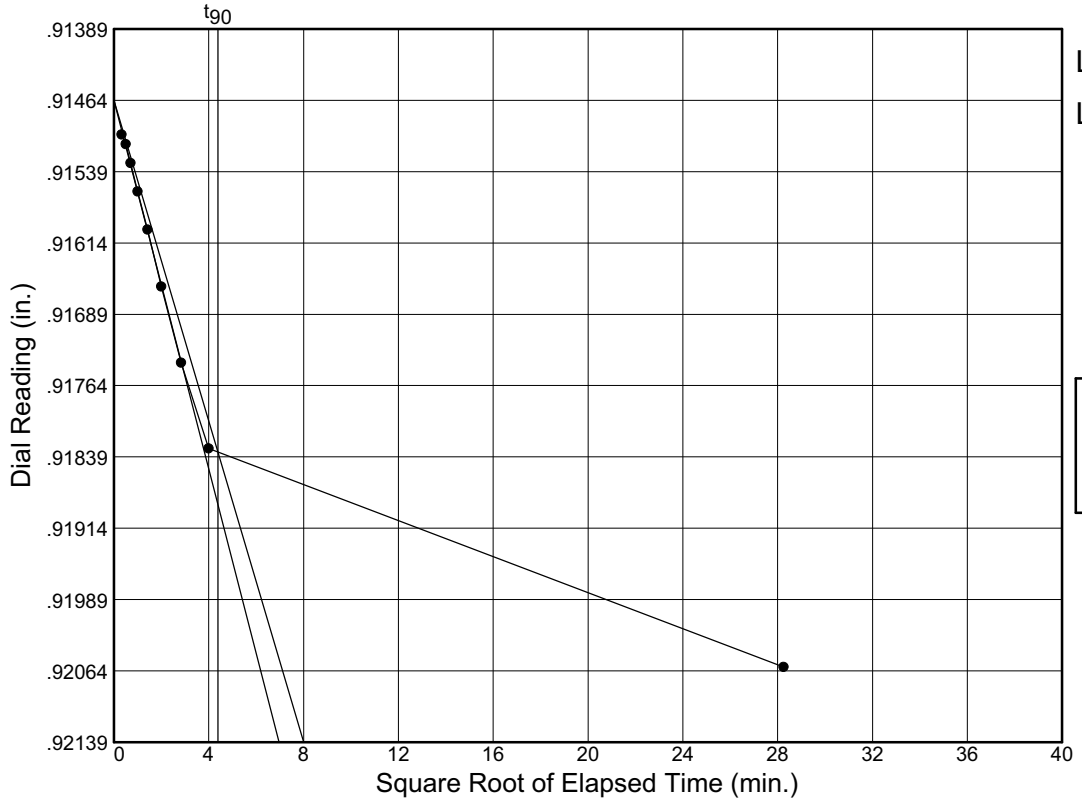

Load No.= 4
Load= 0.25 tsf
$D_0$ = 0.91270
$D_{90}$ = 0.91386
$D_{100}$ = 0.91399
$T_{90}$ = 3.60 min.

$C_v$ @ $T_{90}$
0.49 ft.$^2$/day

Figure

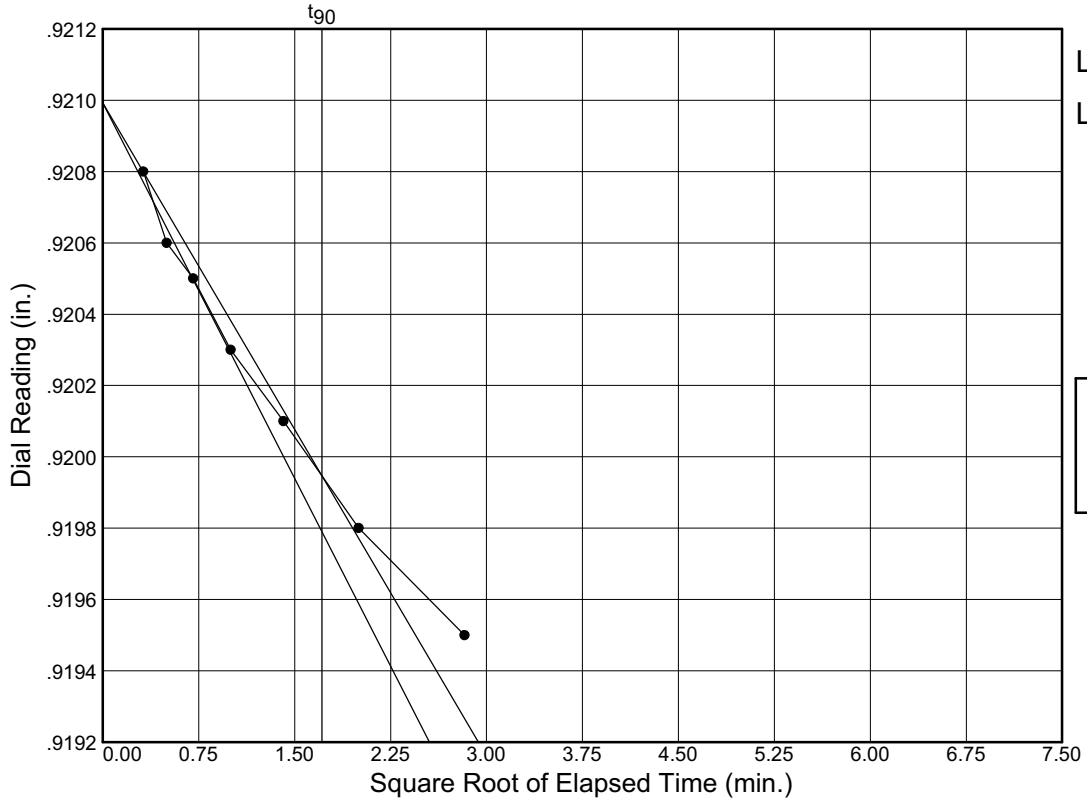
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-9W




Load No.= 5
Load= 0.13 tsf
$D_0$ = 0.91464
$D_{90}$ = 0.91834
$D_{100}$ = 0.91875
$T_{90}$ = 19.22 min.

| $C_v$ @ $T_{90}$ |
|---|
| 0.09 ft.$^2$/day |



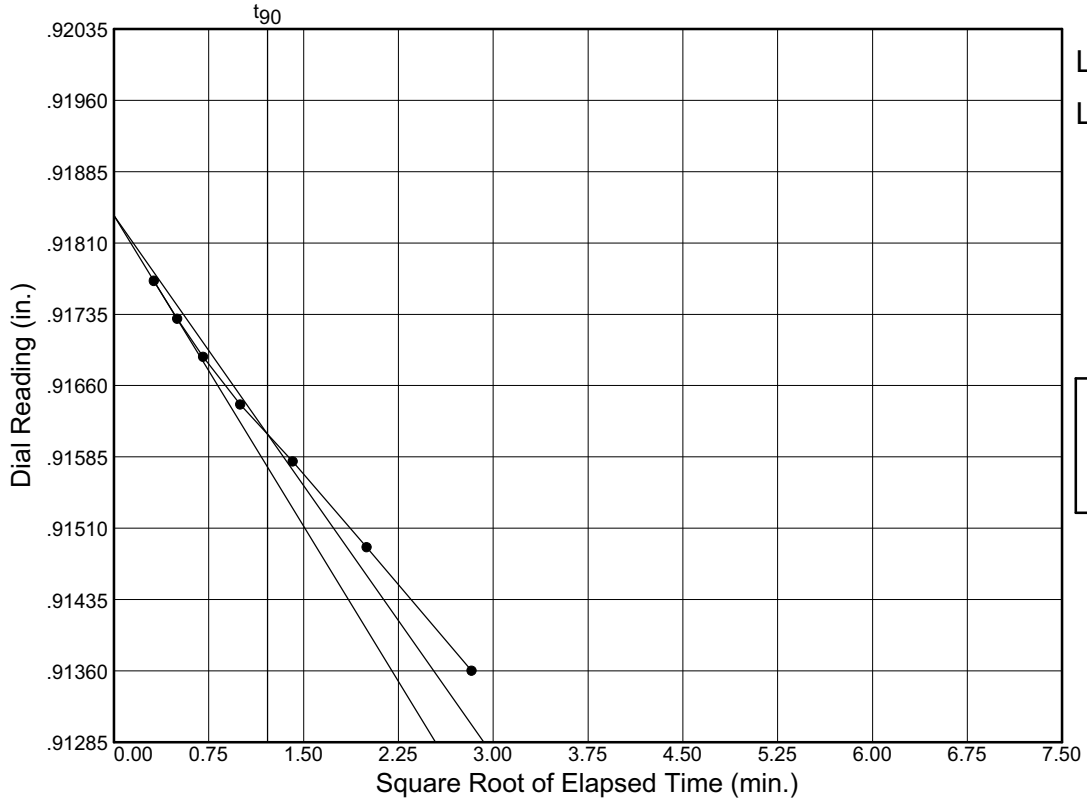

Load No.= 6
Load= 0.25 tsf
$D_0$ = 0.92099
$D_{90}$ = 0.91995
$D_{100}$ = 0.91983
$T_{90}$ = 2.94 min.

| $C_v$ @ $T_{90}$ |
|---|
| 0.61 ft.$^2$/day |

Figure

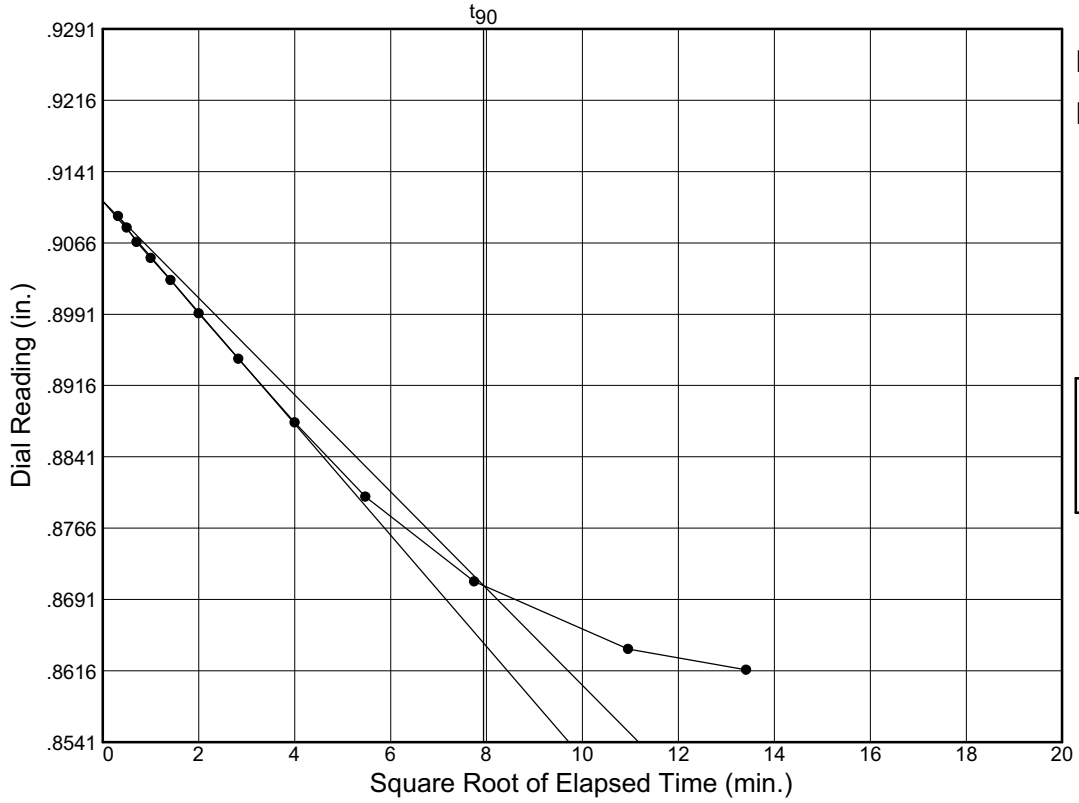
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-9W




Load No.= 7
Load= 0.50 tsf
$D_0$ = 0.91839
$D_{90}$ = 0.91609
$D_{100}$ = 0.91583
$T_{90}$ = 1.48 min.

$C_v$ @ $T_{90}$
1.21 ft.$^2$/day



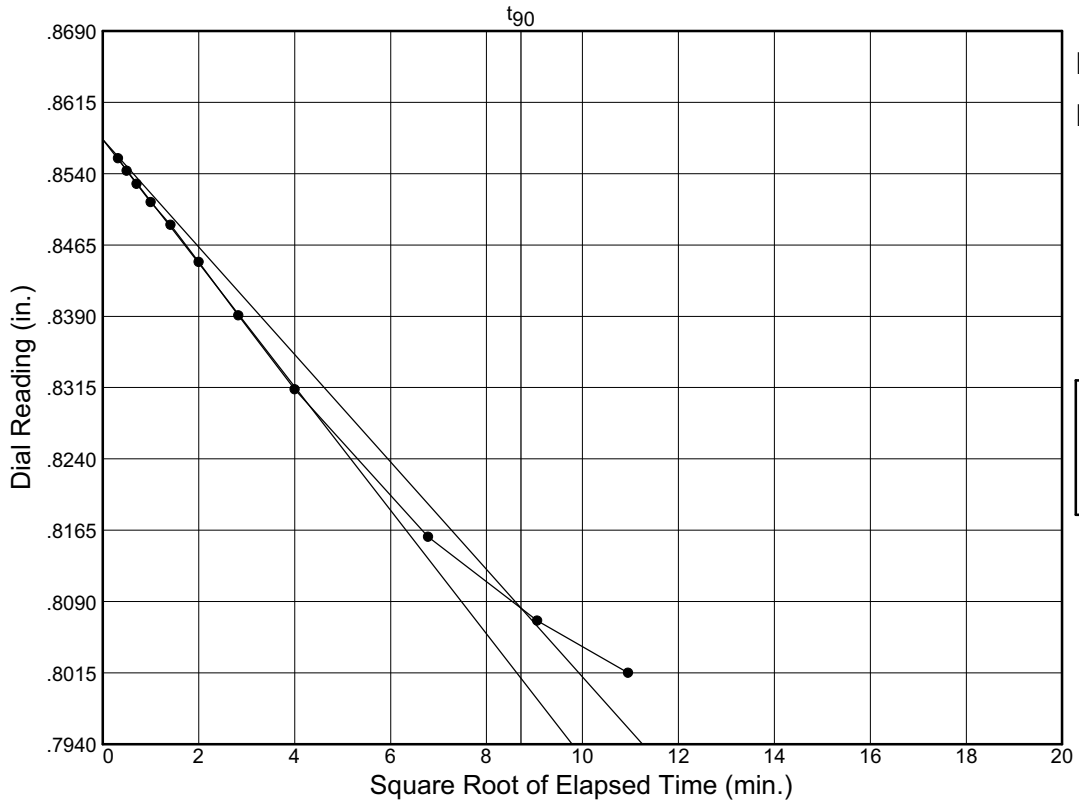

Load No.= 8
Load= 1.00 tsf
$D_0$ = 0.91101
$D_{90}$ = 0.87057
$D_{100}$ = 0.86608
$T_{90}$ = 63.03 min.

$C_v$ @ $T_{90}$
0.03 ft.$^2$/day

Figure

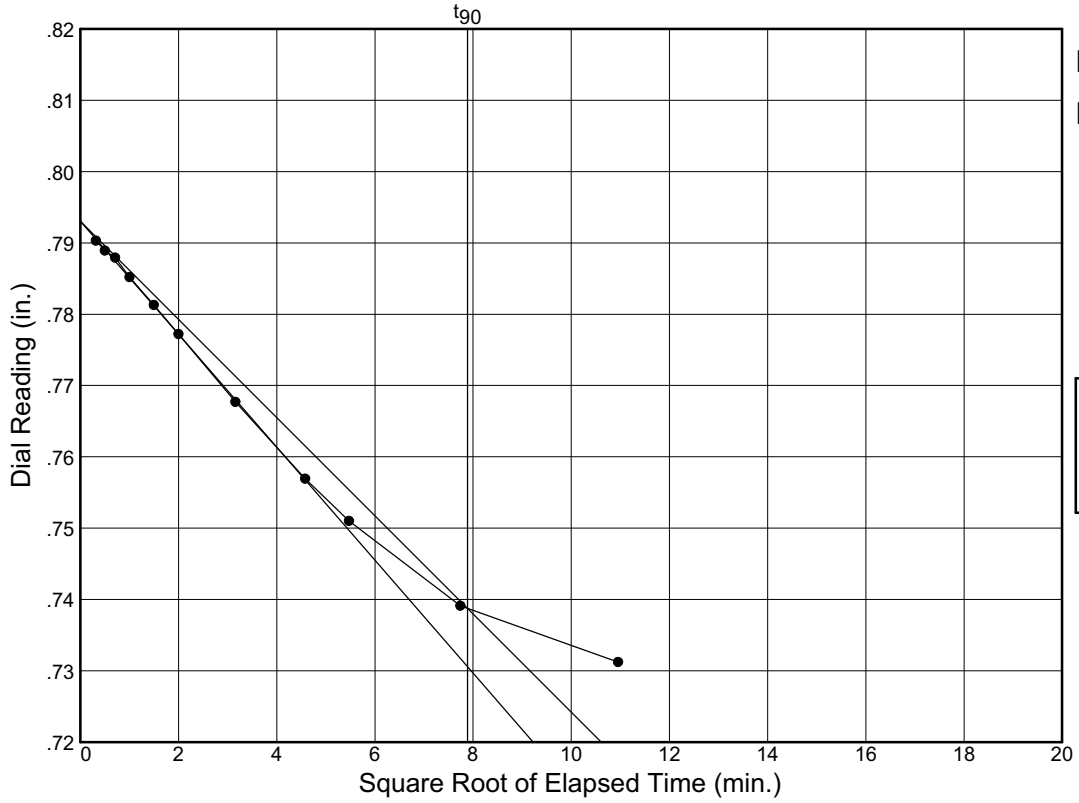
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-9W




Load No.= 9
Load= 2.00 tsf
$D_0$ = 0.85760
$D_{90}$ = 0.80830
$D_{100}$ = 0.80282
$T_{90}$ = 76.05 min.

| $C_v$ @ $T_{90}$ |
|---|
| 0.02 ft.$^2$/day |



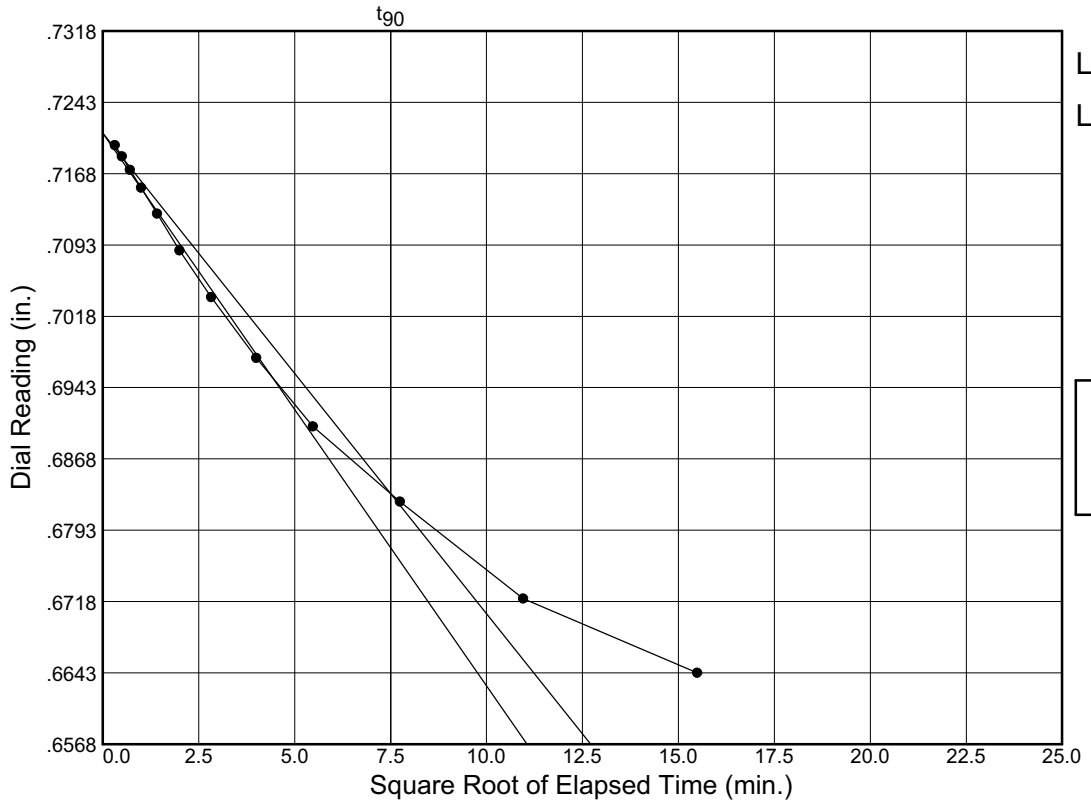

Load No.= 10
Load= 4.00 tsf
$D_0$ = 0.79305
$D_{90}$ = 0.73876
$D_{100}$ = 0.73273
$T_{90}$ = 62.17 min.

| $C_v$ @ $T_{90}$ |
|---|
| 0.02 ft.$^2$/day |

Figure

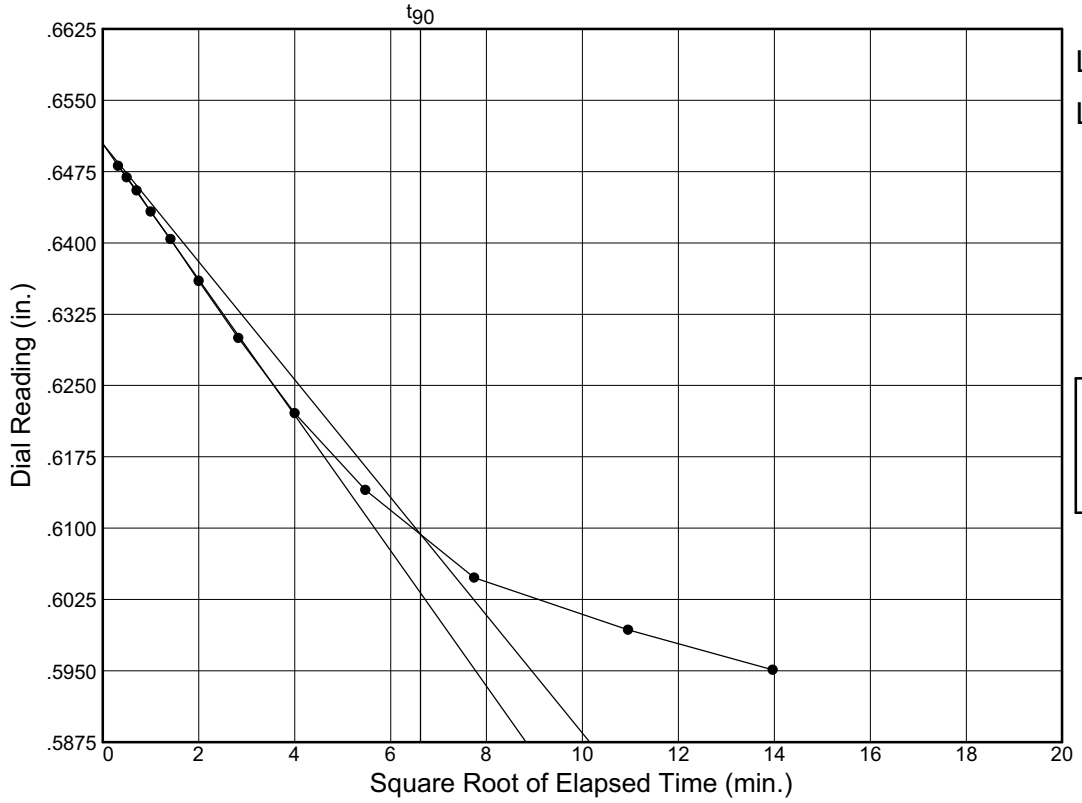
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-9W




Load No.= 11
Load= 8.00 tsf
$D_0$ = 0.72107
$D_{90}$ = 0.68314
$D_{100}$ = 0.67892
$T_{90}$ = 56.34 min.

| $C_v$ @ $T_{90}$ |
|---|
| 0.02 ft.$^2$/day |



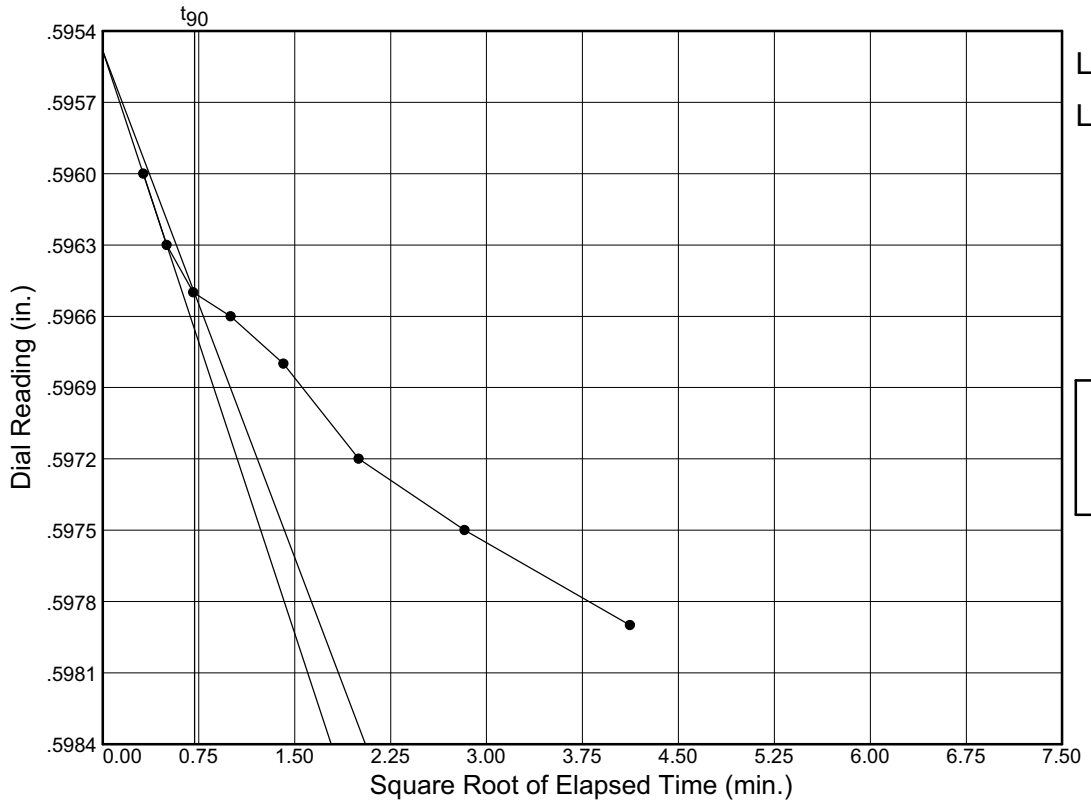

Load No.= 12
Load= 16.00 tsf
$D_0$ = 0.65041
$D_{90}$ = 0.60935
$D_{100}$ = 0.60478
$T_{90}$ = 43.89 min.

| $C_v$ @ $T_{90}$ |
|---|
| 0.02 ft.$^2$/day |

Figure

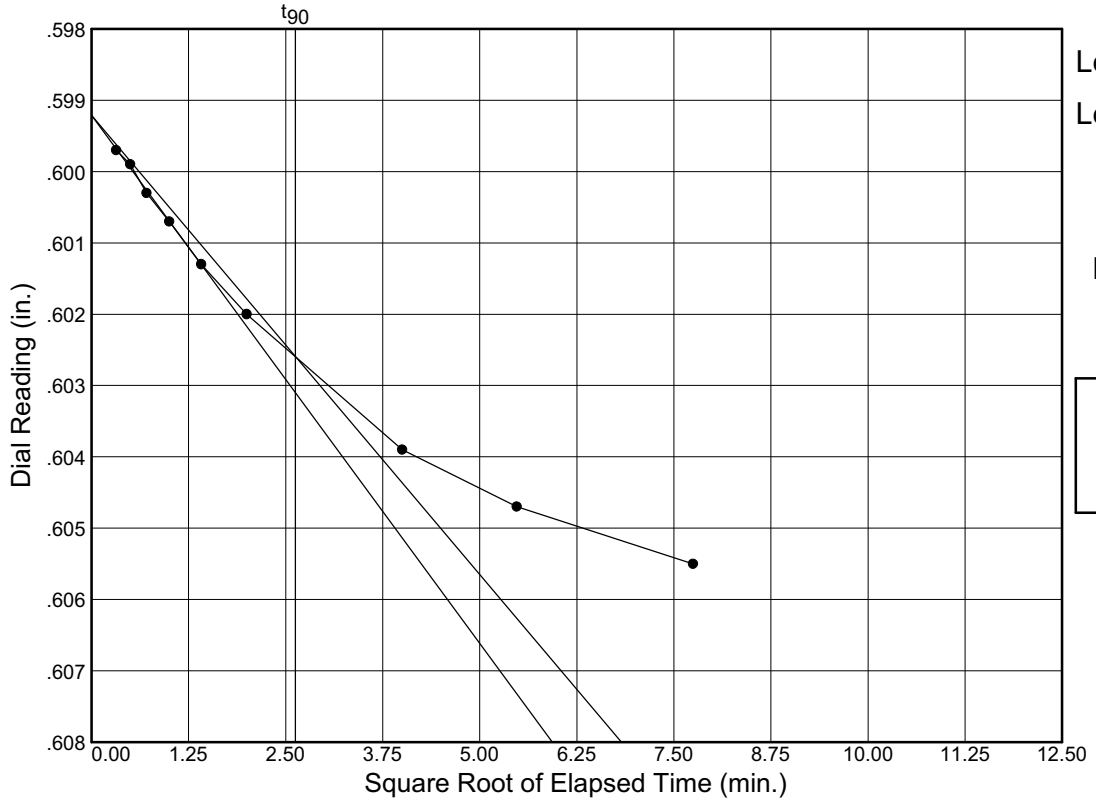
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-9W




Load No.= 13
Load= 8.00 tsf
$D_0$ = 0.59548
$D_{90}$ = 0.59650
$D_{100}$ = 0.59662
$T_{90}$ = 0.52 min.

$C_v$ @ $T_{90}$
1.46 ft.$^2$/day



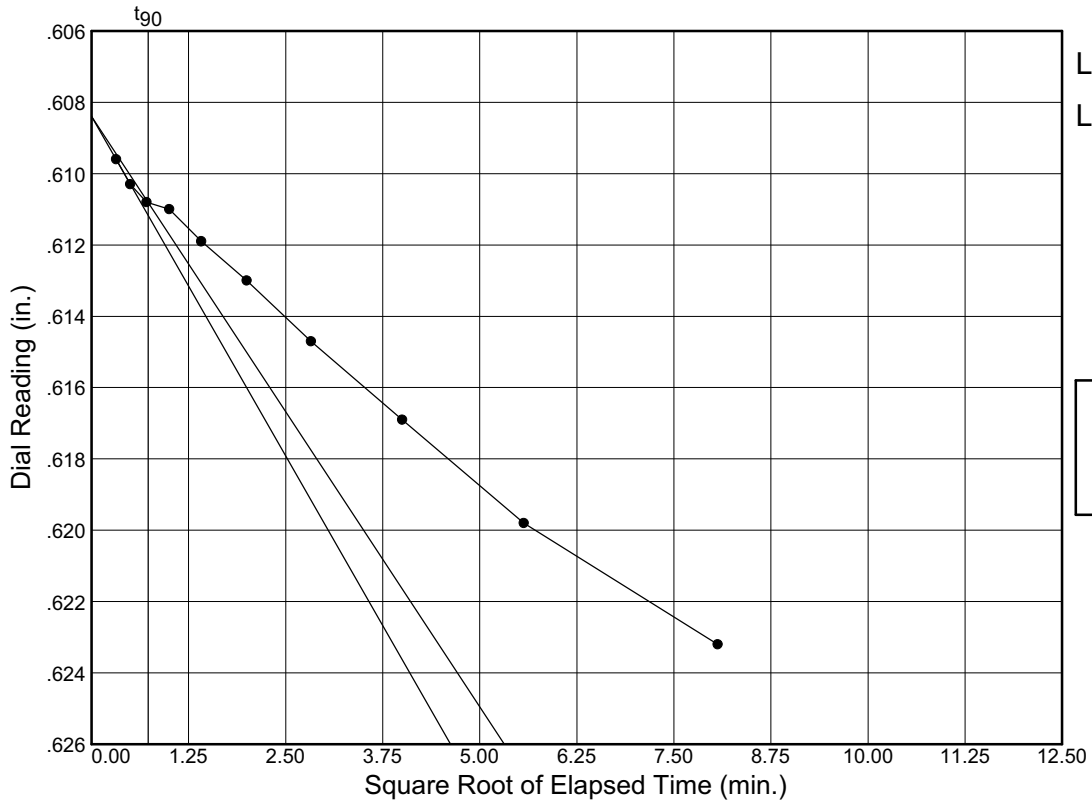

Load No.= 14
Load= 4.00 tsf
$D_0$ = 0.59921
$D_{90}$ = 0.60259
$D_{100}$ = 0.60297
$T_{90}$ = 6.88 min.

$C_v$ @ $T_{90}$
0.11 ft.$^2$/day

Figure

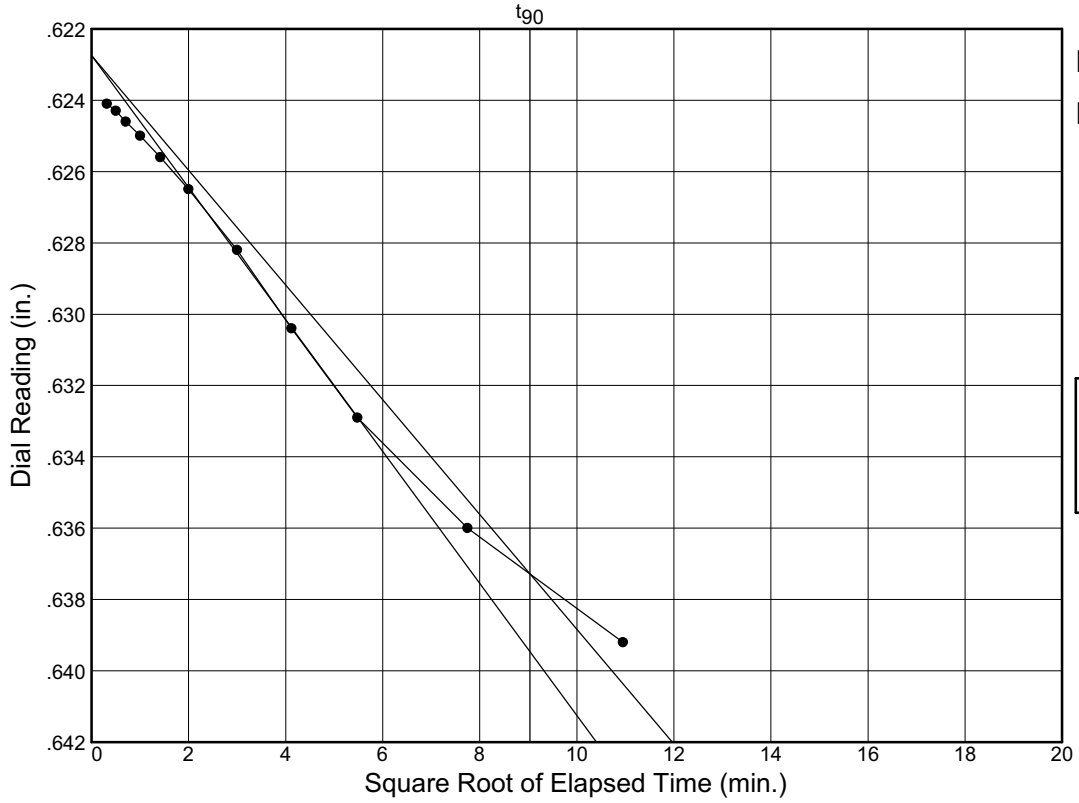
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-9W




Load No.= 15
Load= 1.00 tsf
$D_0$ = 0.60840
$D_{90}$ = 0.61082
$D_{100}$ = 0.61109
$T_{90}$ = 0.53 min.

$C_v$ @ $T_{90}$
1.50 ft.$^2$/day



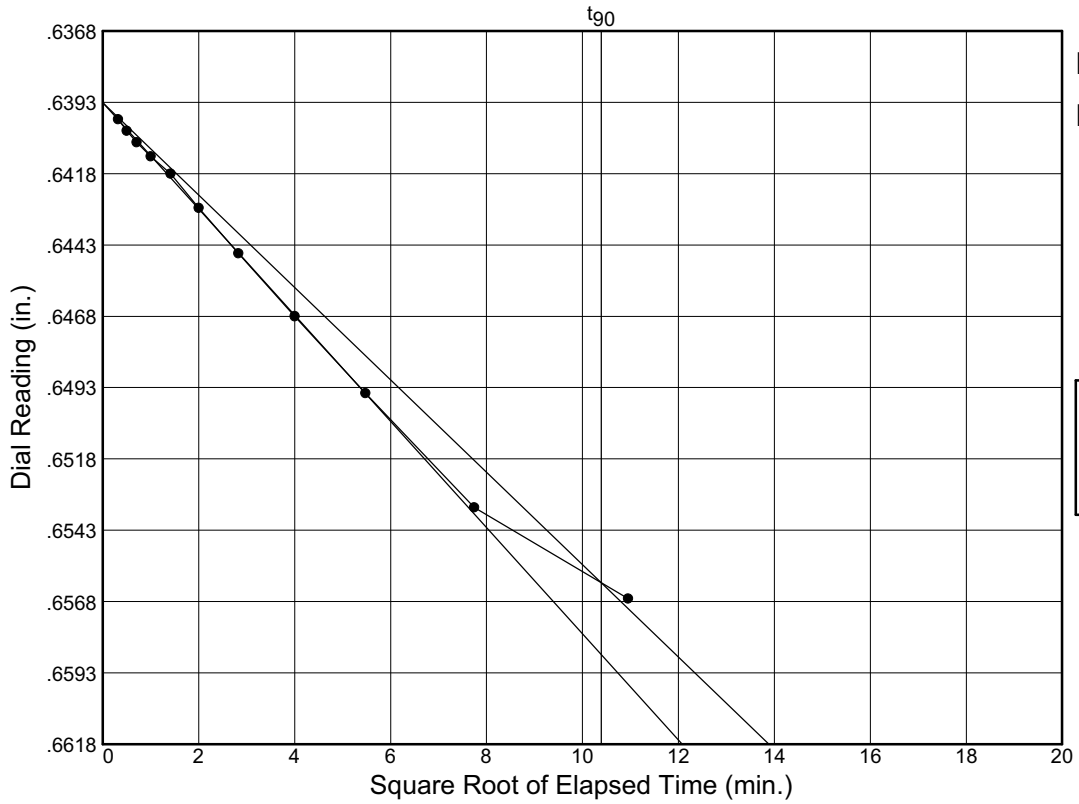

Load No.= 16
Load= 0.25 tsf
$D_0$ = 0.62275
$D_{90}$ = 0.63729
$D_{100}$ = 0.63890
$T_{90}$ = 81.63 min.

$C_v$ @ $T_{90}$
0.01 ft.$^2$/day

Figure

# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-9W




Load No.= 17

Load= 0.13 tsf

$D_0$ = 0.63932

$D_{90}$ = 0.65614

$D_{100}$ = 0.65801

$T_{90}$ = 108.01 min.

| $C_v$ @ $T_{90}$ |
|---|
| 0.01 ft.$^2$/day |

Figure

## CONSOLIDATION TEST DATA

**Client:** HDR, Inc.
**Project:** VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
**Project Number:** VB10-237G

### Sample Data

**Source:**
**Sample No.:** Shelby Tube
**Elev. or Depth:** 10-12 ft. **Sample Length(in./cm.):** 1 in.
**Location:** D7CD-9W
**Description:** Tan-Brown, Fat CLAY
**Sample Date:** **Liquid Limit:** **Plasticity Index:**
**USCS:** **AASHTO:**
**Preparation Process:**
**Condition of Test:**
**Test Method:** **Final Density:** **Figure No.:**
**Testing Remarks:** D7CD-9W
Sample Obtained 10/15/10
**Tested By:** **Test Date:**
**Checked By:** **Title:**

### Test Specimen Data

| TOTAL SAMPLE | BEFORE TEST | AFTER TEST |
|---|---|---|
| **Wet w+t** = 270.74 g. | **Consolidometer #** = 1 | **Wet w+t** = 248.71 g. |
| **Dry w+t** = 220.00 g. | | **Dry w+t** = 220.00 g. |
| **Tare Wt.** = 145.32 g. | **Spec. Gravity** = 2.52 | **Tare Wt.** = 145.32 g. |
| **Height** = 1.00 in. | **Height** = 1.00 in. | |
| **Diameter** = 2.50 in. | **Diameter** = 2.50 in. | |
| **Weight** = 125.42 g. | **Defl. Table** = Reference Set (inches/tsf) | |
| **Moisture** = 67.9 % | **Ht. Solids** = 0.3684 in. | **Moisture** = 38.4 % |
| **Wet Den.** = 97.3 pcf | **Dry Wt.** = 74.68 g. | **Dry Wt.** = 74.68 g.* |
| **Dry Den.** = 58.0 pcf | **Void Ratio** = 1.714 | **Void Ratio** = 0.783 |
| **Ovrbrdn.** = 0.50 tsf | **Saturation** = 99.9 % | |

*** Final dry weight used in calculations**

### End-of-Load Summary

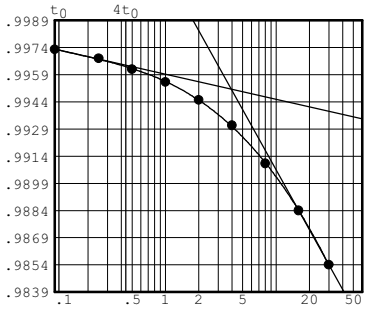
| Pressure (tsf) | Final Dial (in.) | Machine Defl. (in.) | $C_v$ (ft.$^2$/day) | $C_\alpha$ | Void Ratio | % Compression /Swell |
|---|---|---|---|---|---|---|
| start | 1.00000 | | | | 1.714 | |
| 0.13 | 0.98540 | 0.00000 | 1.62 | 0.011 | 1.675 | 1.5 Comprs. |
| 0.25 | 0.95060 | 0.00040 | 0.04 | 0.017 | 1.581 | 4.9 Comprs. |
| 0.50 | 0.91190 | 0.00080 | 0.03 | 0.022 | 1.477 | 8.7 Comprs. |
| 0.25 | 0.91380 | 0.00040 | 0.29 | | 1.481 | 8.6 Comprs. |
| 0.13 | 0.92060 | 0.00000 | 0.12 | | 1.499 | 7.9 Comprs. |
| 0.25 | 0.91910 | 0.00040 | 0.36 | 0.001 | 1.496 | 8.1 Comprs. |
| 0.50 | 0.91280 | 0.00080 | 1.02 | 0.005 | 1.480 | 8.6 Comprs. |

| Pressure (tsf) | Final Dial (in.) | Machine Defl. (in.) | $C_v$ (ft.$^2$/day) | $C_\alpha$ | Void Ratio | % Compression /Swell |
|---|---|---|---|---|---|---|
| 1.00 | 0.86010 | 0.00160 | 0.03 | 0.014 | 1.339 | 13.8 Comprs. |
| 2.00 | 0.79910 | 0.00240 | 0.02 | 0.039 | 1.176 | 19.9 Comprs. |
| 4.00 | 0.73120 | 0.00000 | 0.02 | 0.033 | 0.985 | 26.9 Comprs. |
| 8.00 | 0.66430 | 0.00000 | 0.01 | 0.036 | 0.803 | 33.6 Comprs. |
| 16.00 | 0.59510 | 0.00000 | 0.02 | 0.030 | 0.615 | 40.5 Comprs. |
| 8.00 | 0.59790 | 0.00000 | 1.43 | | 0.623 | 40.2 Comprs. |
| 4.00 | 0.60550 | 0.00000 | 0.05 | | 0.644 | 39.5 Comprs. |
| 1.00 | 0.62160 | 0.00160 | 1.02 | | 0.692 | 37.7 Comprs. |
| 0.25 | 0.63880 | 0.00040 | | | 0.735 | 36.1 Comprs. |
| 0.13 | 0.65670 | 0.00000 | 1.18 | | 0.783 | 34.3 Comprs. |

**$C_c$ =** 0.63 **$P_c$ =** 0.80 tsf **$C_r$ =** 0.06

**Pressure: 0.13 tsf** **TEST READINGS** **Load No. 1**

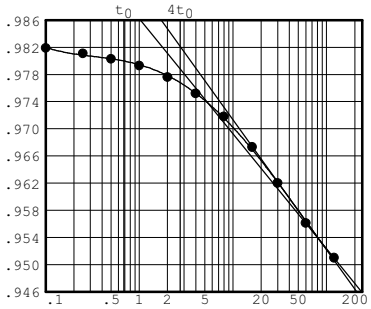
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 1.00000 |
| 2 | 0.10 | 0.99730 |
| 3 | 0.25 | 0.99680 |
| 4 | 0.50 | 0.99620 |
| 5 | 1.00 | 0.99550 |
| 6 | 2.00 | 0.99450 |
| 7 | 4.00 | 0.99310 |
| 8 | 8.00 | 0.99100 |
| 9 | 16.00 | 0.98840 |
| 10 | 30.00 | 0.98540 |




**Void Ratio =** 1.675 **Compression =** 1.5 %
**$D_0$ =** 0.99816 **$D_{50}$ =** 0.99663 **$D_{100}$ =** 0.99510
**$C_v$ at 0.3 min. =** 1.62 ft.$^2$/day **$C_\alpha$ =** 0.011

**Pressure: 0.25 tsf** **TEST READINGS** **Load No. 2**

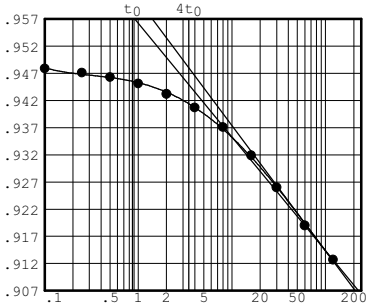
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.98540 | 11 | 60.00 | 0.95570 |
| 2 | 0.10 | 0.98150 | 12 | 120.00 | 0.95060 |
| 3 | 0.25 | 0.98070 | | | |
| 4 | 0.50 | 0.97990 | | | |
| 5 | 1.00 | 0.97890 | | | |
| 6 | 2.00 | 0.97720 | | | |
| 7 | 4.00 | 0.97480 | | | |
| 8 | 8.00 | 0.97140 | | | |
| 9 | 16.00 | 0.96690 | | | |
| 10 | 30.00 | 0.96160 | | | |




**Void Ratio =** 1.581 **Compression =** 4.9 %
**$D_0$ =** 0.98316 **$D_{50}$ =** 0.96841 **$D_{100}$ =** 0.95366
**$C_v$ at 13.1 min. =** 0.04 ft.$^2$/day **$C_\alpha$ =** 0.017

**Pressure: 0.50 tsf** **TEST READINGS** **Load No. 3**

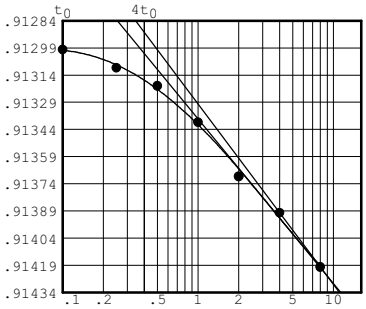
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.95060 | 11 | 60.00 | 0.91820 |
| 2 | 0.10 | 0.94710 | 12 | 120.00 | 0.91190 |
| 3 | 0.25 | 0.94630 | | | |
| 4 | 0.50 | 0.94550 | | | |
| 5 | 1.00 | 0.94430 | | | |
| 6 | 2.00 | 0.94240 | | | |
| 7 | 4.00 | 0.93990 | | | |
| 8 | 8.00 | 0.93630 | | | |
| 9 | 16.00 | 0.93110 | | | |
| 10 | 30.00 | 0.92520 | | | |




**Void Ratio =** 1.477 **Compression =** 8.7 %
$D_0$ **=** 0.94964 $D_{50}$ **=** 0.93230 $D_{100}$ **=** 0.91496
$C_v$ **at 14.7 min. =** 0.03 ft.$^2$/day $C_\alpha$ **=** 0.022

**Pressure: 0.25 tsf** **TEST READINGS** **Load No. 4**

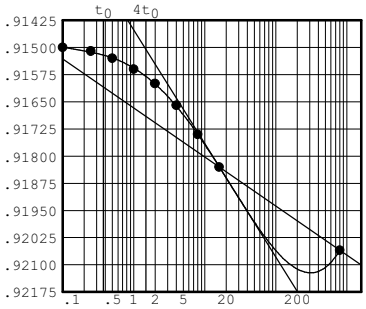
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.91190 |
| 2 | 0.10 | 0.91260 |
| 3 | 0.25 | 0.91270 |
| 4 | 0.50 | 0.91280 |
| 5 | 1.00 | 0.91300 |
| 6 | 2.00 | 0.91330 |
| 7 | 4.00 | 0.91350 |
| 8 | 8.00 | 0.91380 |




**Void Ratio =** 1.481 **Compression =** 8.6 %
$D_0$ **=** 0.91284 $D_{50}$ **=** 0.91354 $D_{100}$ **=** 0.91424
$C_v$ **at 1.4 min. =** 0.29 ft.$^2$/day

**Pressure: 0.13 tsf** **TEST READINGS** **Load No. 5**

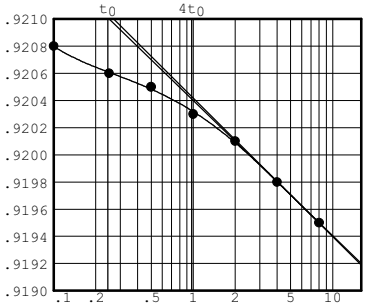
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.91380 |
| 2 | 0.10 | 0.91500 |
| 3 | 0.25 | 0.91510 |
| 4 | 0.50 | 0.91530 |
| 5 | 1.00 | 0.91560 |
| 6 | 2.00 | 0.91600 |
| 7 | 4.00 | 0.91660 |
| 8 | 8.00 | 0.91740 |
| 9 | 16.00 | 0.91830 |
| 10 | 798.00 | 0.92060 |




**Void Ratio =** 1.499 **Compression =** 7.9 %
$D_0$ **=** 0.91462 $D_{50}$ **=** 0.91646 $D_{100}$ **=** 0.91831
$C_v$ **at 3.4 min. =** 0.12 ft.$^2$/day

**Pressure: 0.25 tsf** **TEST READINGS** **Load No. 6**

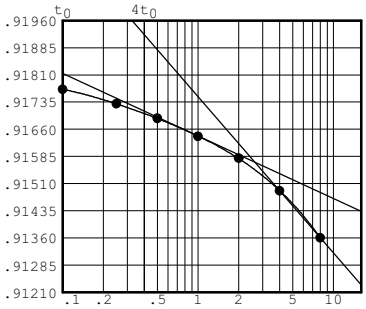
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.92060 |
| 2 | 0.10 | 0.92040 |
| 3 | 0.25 | 0.92020 |
| 4 | 0.50 | 0.92010 |
| 5 | 1.00 | 0.91990 |
| 6 | 2.00 | 0.91970 |
| 7 | 4.00 | 0.91940 |
| 8 | 8.00 | 0.91910 |




**Void Ratio =** 1.496 **Compression =** 8.1 %
**$D_0$ =** 0.92090 **$D_{50}$ =** 0.92027 **$D_{100}$ =** 0.91965
**$C_v$ at 1.2 min. =** 0.36 ft.$^2$/day **$C_\alpha$ =** 0.001

**Pressure: 0.50 tsf** **TEST READINGS** **Load No. 7**

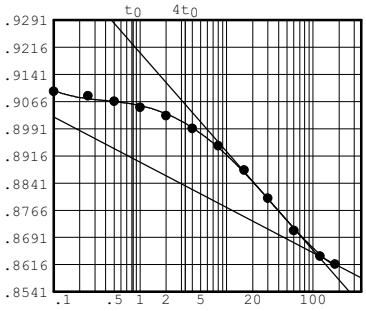
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.91910 |
| 2 | 0.10 | 0.91690 |
| 3 | 0.25 | 0.91650 |
| 4 | 0.50 | 0.91610 |
| 5 | 1.00 | 0.91560 |
| 6 | 2.00 | 0.91500 |
| 7 | 4.00 | 0.91410 |
| 8 | 8.00 | 0.91280 |




**Void Ratio =** 1.480 **Compression =** 8.6 %
**$D_0$ =** 0.91837 **$D_{50}$ =** 0.91703 **$D_{100}$ =** 0.91569
**$C_v$ at 0.4 min. =** 1.02 ft.$^2$/day **$C_\alpha$ =** 0.005

**Pressure: 1.00 tsf** **TEST READINGS** **Load No. 8**

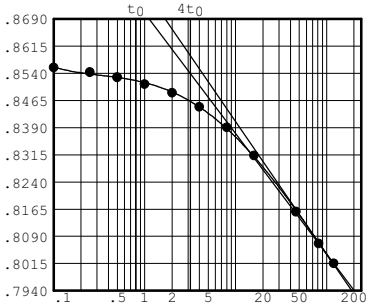
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.91280 | 11 | 60.00 | 0.86940 |
| 2 | 0.10 | 0.90780 | 12 | 120.00 | 0.86230 |
| 3 | 0.25 | 0.90660 | 13 | 180.00 | 0.86010 |
| 4 | 0.50 | 0.90510 | | | |
| 5 | 1.00 | 0.90340 | | | |
| 6 | 2.00 | 0.90110 | | | |
| 7 | 4.00 | 0.89760 | | | |
| 8 | 8.00 | 0.89280 | | | |
| 9 | 16.00 | 0.88610 | | | |
| 10 | 30.00 | 0.87830 | | | |




**Void Ratio =** 1.339 **Compression =** 13.8 %
**$D_0$ =** 0.91114 **$D_{50}$ =** 0.88773 **$D_{100}$ =** 0.86433
**$C_v$ at 14.9 min. =** 0.03 ft.$^2$/day **$C_\alpha$ =** 0.014

**Pressure: 2.00 tsf** **TEST READINGS** **Load No. 9**

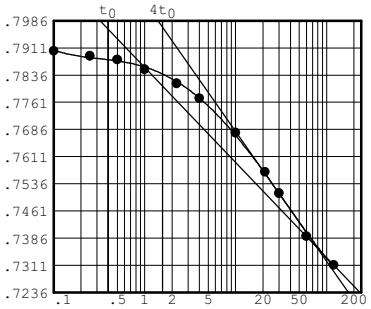
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.85880 | 11 | 82.00 | 0.80460 |
| 2 | 0.10 | 0.85320 | 12 | 120.00 | 0.79910 |
| 3 | 0.25 | 0.85190 | | | |
| 4 | 0.50 | 0.85050 | | | |
| 5 | 1.00 | 0.84860 | | | |
| 6 | 2.00 | 0.84620 | | | |
| 7 | 4.00 | 0.84230 | | | |
| 8 | 8.00 | 0.83670 | | | |
| 9 | 16.00 | 0.82890 | | | |
| 10 | 46.00 | 0.81340 | | | |




**Void Ratio =** 1.176 **Compression =** 19.9 %
**$D_0$ =** 0.85775 **$D_{50}$ =** 0.83118 **$D_{100}$ =** 0.80461
**$C_v$ at 15.7 min. =** 0.02 ft.$^2$/day **$C_\alpha$ =** 0.039

**Pressure: 4.00 tsf** **TEST READINGS** **Load No. 10**

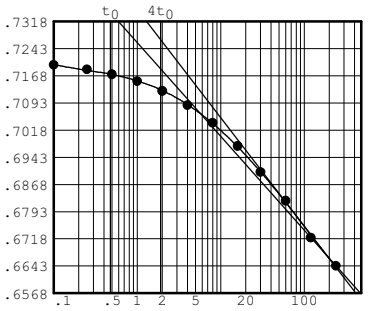
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.79910 | 11 | 60.00 | 0.73910 |
| 2 | 0.10 | 0.79030 | 12 | 120.00 | 0.73120 |
| 3 | 0.25 | 0.78890 | | | |
| 4 | 0.50 | 0.78790 | | | |
| 5 | 1.00 | 0.78520 | | | |
| 6 | 2.25 | 0.78130 | | | |
| 7 | 4.00 | 0.77720 | | | |
| 8 | 10.00 | 0.76770 | | | |
| 9 | 21.00 | 0.75690 | | | |
| 10 | 30.00 | 0.75100 | | | |




**Void Ratio =** 0.985 **Compression =** 26.9 %
**$D_0$ =** 0.79183 **$D_{50}$ =** 0.76397 **$D_{100}$ =** 0.73612
**$C_v$ at 12.5 min. =** 0.02 ft.$^2$/day **$C_\alpha$ =** 0.033

**Pressure: 8.00 tsf** **TEST READINGS** **Load No. 11**

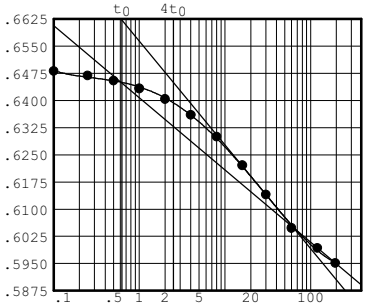
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.72920 | 11 | 60.00 | 0.68230 |
| 2 | 0.10 | 0.71980 | 12 | 120.00 | 0.67210 |
| 3 | 0.25 | 0.71860 | 13 | 240.00 | 0.66430 |
| 4 | 0.50 | 0.71720 | | | |
| 5 | 1.00 | 0.71530 | | | |
| 6 | 2.00 | 0.71260 | | | |
| 7 | 4.00 | 0.70870 | | | |
| 8 | 8.00 | 0.70380 | | | |
| 9 | 16.00 | 0.69740 | | | |
| 10 | 30.00 | 0.69020 | | | |




**Void Ratio =** 0.803 **Compression =** 33.6 %
**$D_0$ =** 0.72153 **$D_{50}$ =** 0.69431 **$D_{100}$ =** 0.66709
**$C_v$ at 21.0 min. =** 0.01 ft.$^2$/day **$C_\alpha$ =** 0.036

**Pressure: 16.00 tsf** **TEST READINGS** **Load No. 12**

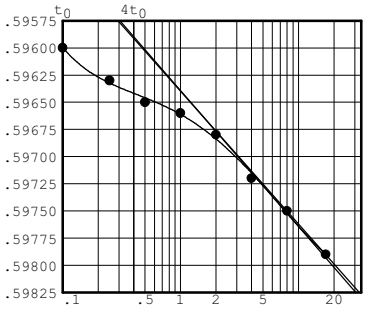
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.65410 | 11 | 60.00 | 0.60480 |
| 2 | 0.10 | 0.64810 | 12 | 120.00 | 0.59930 |
| 3 | 0.25 | 0.64690 | 13 | 195.00 | 0.59510 |
| 4 | 0.50 | 0.64550 | | | |
| 5 | 1.00 | 0.64330 | | | |
| 6 | 2.00 | 0.64040 | | | |
| 7 | 4.00 | 0.63600 | | | |
| 8 | 8.00 | 0.63000 | | | |
| 9 | 16.00 | 0.62210 | | | |
| 10 | 30.00 | 0.61400 | | | |




**Void Ratio =** 0.615 **Compression =** 40.5 %
**$D_0$ =** 0.65066 **$D_{50}$ =** 0.62782 **$D_{100}$ =** 0.60497
**$C_v$ at 9.4 min. =** 0.02 ft.$^2$/day **$C_\alpha$ =** 0.030

**Pressure: 8.00 tsf** **TEST READINGS** **Load No. 13**

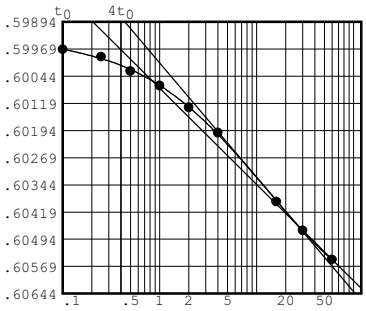
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.59510 |
| 2 | 0.10 | 0.59600 |
| 3 | 0.25 | 0.59630 |
| 4 | 0.50 | 0.59650 |
| 5 | 1.00 | 0.59660 |
| 6 | 2.00 | 0.59680 |
| 7 | 4.00 | 0.59720 |
| 8 | 8.00 | 0.59750 |
| 9 | 17.00 | 0.59790 |




**Void Ratio =** 0.623 **Compression =** 40.2 %
**$D_0$ =** 0.59558 **$D_{50}$ =** 0.59610 **$D_{100}$ =** 0.59662
**$C_v$ at 0.1 min. =** 1.43 ft.$^2$/day

**Pressure: 4.00 tsf** **TEST READINGS** **Load No. 14**

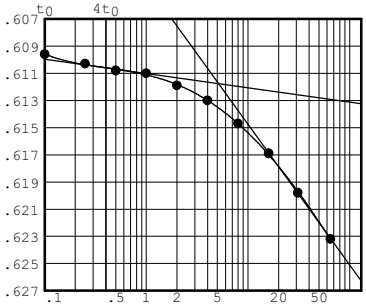
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.59790 |
| 2 | 0.10 | 0.59970 |
| 3 | 0.25 | 0.59990 |
| 4 | 0.50 | 0.60030 |
| 5 | 1.00 | 0.60070 |
| 6 | 2.00 | 0.60130 |
| 7 | 4.00 | 0.60200 |
| 8 | 16.00 | 0.60390 |
| 9 | 30.00 | 0.60470 |
| 10 | 60.00 | 0.60550 |




**Void Ratio =** 0.644 **Compression =** 39.5 %
**$D_0$ =** 0.59923 **$D_{50}$ =** 0.60188 **$D_{100}$ =** 0.60453
**$C_v$ at 3.5 min. =** 0.05 ft.$^2$/day

**Pressure: 1.00 tsf** **TEST READINGS** **Load No. 15**

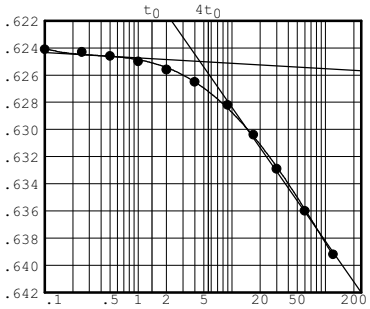
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.60550 | 11 | 65.00 | 0.62160 |
| 2 | 0.10 | 0.60800 | | | |
| 3 | 0.25 | 0.60870 | | | |
| 4 | 0.50 | 0.60920 | | | |
| 5 | 1.00 | 0.60940 | | | |
| 6 | 2.00 | 0.61030 | | | |
| 7 | 4.00 | 0.61140 | | | |
| 8 | 8.00 | 0.61310 | | | |
| 9 | 16.00 | 0.61530 | | | |
| 10 | 31.00 | 0.61820 | | | |




**Void Ratio =** 0.692 **Compression =** 37.7 %
**$D_0$ =** 0.60859 **$D_{50}$ =** 0.61017 **$D_{100}$ =** 0.61176
**$C_v$ at 0.2 min. =** 1.02 ft.$^2$/day

**Pressure: 0.25 tsf** **TEST READINGS** **Load No. 16**

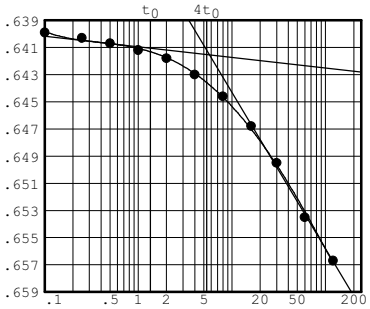
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.62160 | 11 | 60.00 | 0.63560 |
| 2 | 0.10 | 0.62370 | 12 | 120.00 | 0.63880 |
| 3 | 0.25 | 0.62390 | | | |
| 4 | 0.50 | 0.62420 | | | |
| 5 | 1.00 | 0.62460 | | | |
| 6 | 2.00 | 0.62520 | | | |
| 7 | 4.00 | 0.62610 | | | |
| 8 | 9.00 | 0.62780 | | | |
| 9 | 17.00 | 0.63000 | | | |
| 10 | 30.00 | 0.63250 | | | |




**Void Ratio =** 0.735 **Compression =** 36.1 %

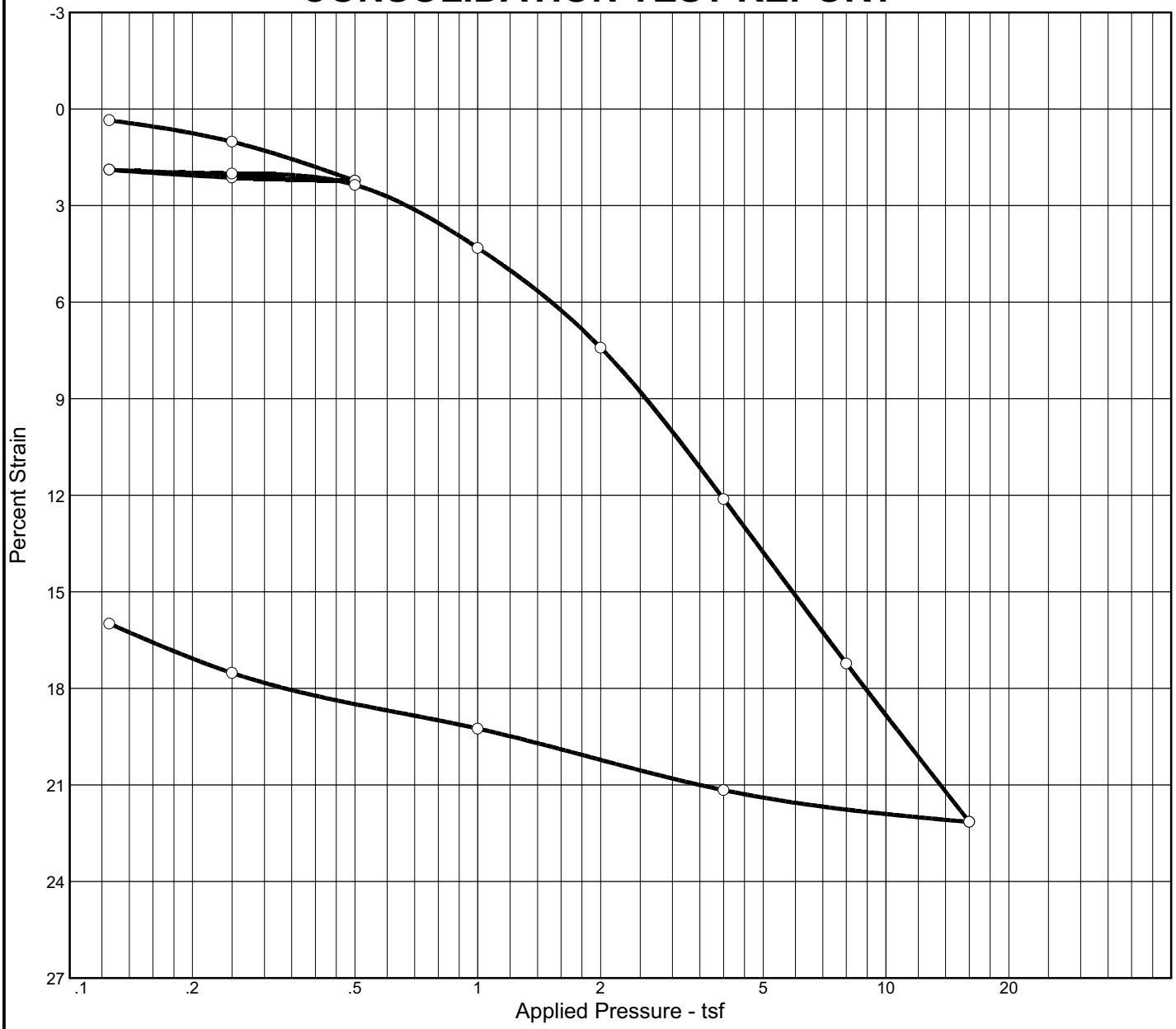
**Pressure: 0.13 tsf** **TEST READINGS** **Load No. 17**

| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.63880 | 11 | 60.00 | 0.65350 |
| 2 | 0.10 | 0.63990 | 12 | 120.00 | 0.65670 |
| 3 | 0.25 | 0.64030 | | | |
| 4 | 0.50 | 0.64070 | | | |
| 5 | 1.00 | 0.64120 | | | |
| 6 | 2.00 | 0.64180 | | | |
| 7 | 4.00 | 0.64300 | | | |
| 8 | 8.00 | 0.64460 | | | |
| 9 | 16.00 | 0.64680 | | | |
| 10 | 30.00 | 0.64950 | | | |




**Void Ratio =** 0.783 **Compression =** 34.3 %
**$D_0$ =** 0.63905 **$D_{50}$ =** 0.64029 **$D_{100}$ =** 0.64154
**$C_v$ at 0.2 min. =** 1.18 ft.$^2$/day

# CONSOLIDATION TEST REPORT




| MATERIAL DESCRIPTION | USCS | AASHTO |
|---|---|---|
| Gray, Fat CLAY | | |

| LL | PI | Sp. Gr. | Overburden (tsf) | Dry Dens. (pcf) | | Moisture | | Saturation | | Void Ratio | | $P_c$ (tsf) | $C_c$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Init. | Final | Init. | Final | Init. | Final | Init. | Final | | |
| | | 2.63 | 0.90 | 86.3 | | 34.2 % | 25.4 % | 99.8 % | 100.0 % | 0.902 | 0.598 | | |

| Preparation Process: | D2435 Method | $C_r$ | Swell Press. (tsf) | Heave % |
|---|---|---|---|---|
| Condition of Test: | | | | |

**Project No.** VB10-237G **Client:** HDR, Inc.

**Project:** VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia

**Location:** D7CD-9W

**Remarks:**
D7CD-9W
Depth=25 ft.

**Checked By:**

**Title:**

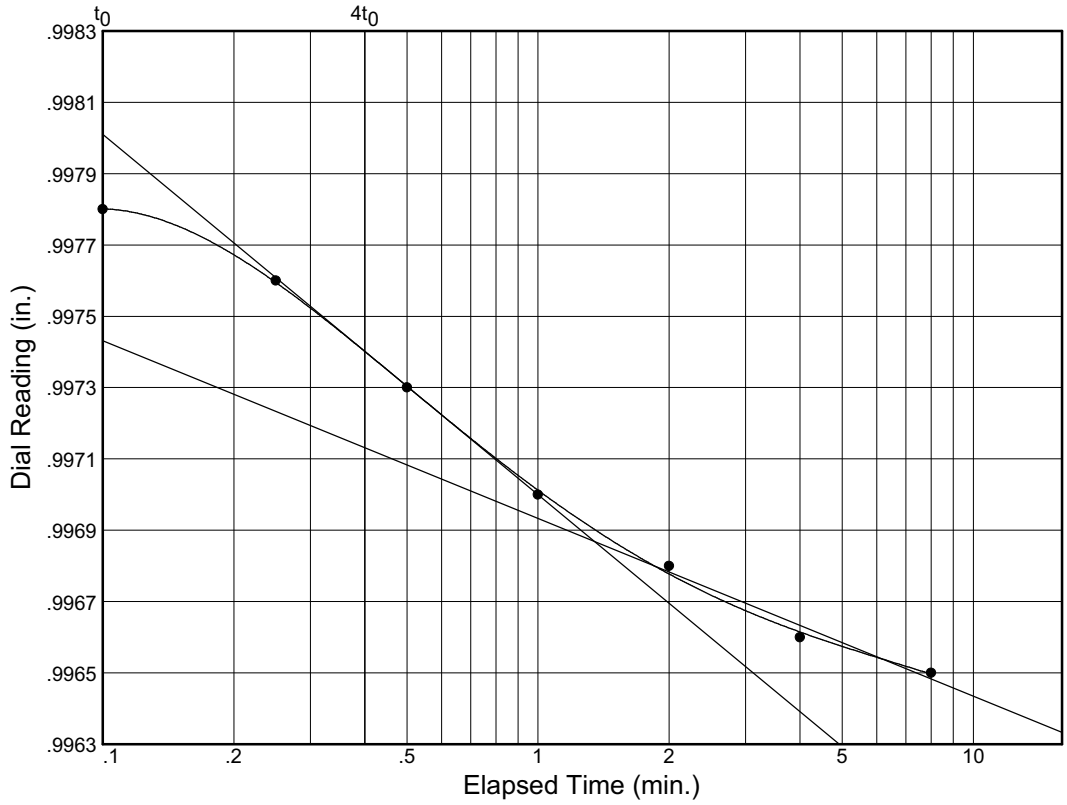
CONSOLIDATION TEST REPORT

**GET SOLUTIONS, INC.**

**Figure** 1

# Dial Reading vs. Time

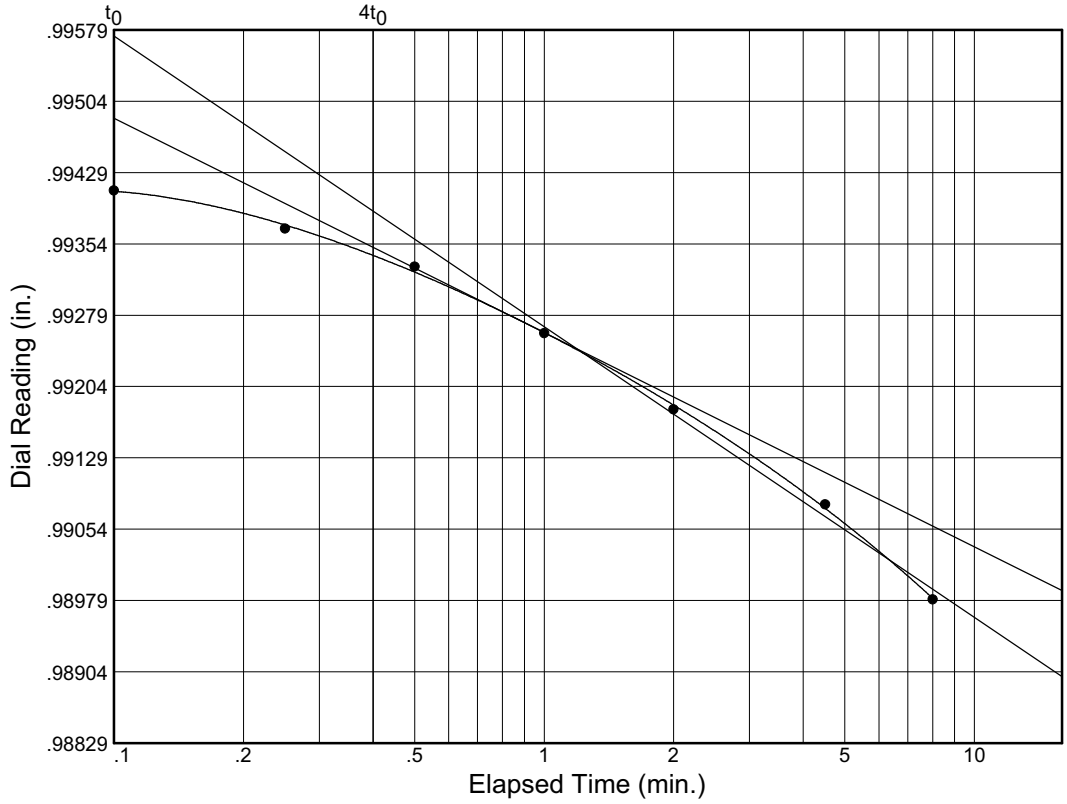
Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-9W




Load No.= 1
Load= 0.13 tsf
$D_0$ = 0.99820
$D_{50}$ = 0.99753
$D_{100}$ = 0.99687
$T_{50}$ = 0.29 min.

$C_v$ @ $T_{50}$
1.69 ft.$^2$/day

$C_\alpha$ = 0.000




Load No.= 2
Load= 0.25 tsf
$D_0$ = 0.99477
$D_{50}$ = 0.99360
$D_{100}$ = 0.99244
$T_{50}$ = 0.31 min.

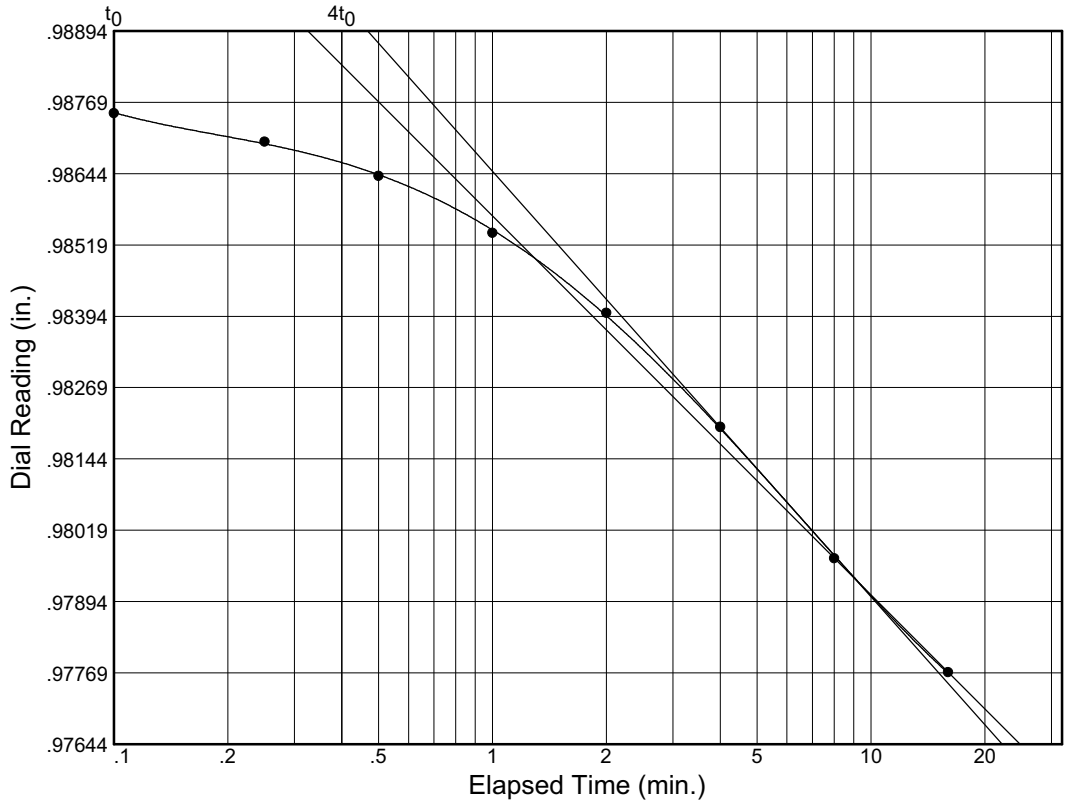
$C_v$ @ $T_{50}$
1.57 ft.$^2$/day

$C_\alpha$ = 0.003

Figure 2

# Dial Reading vs. Time

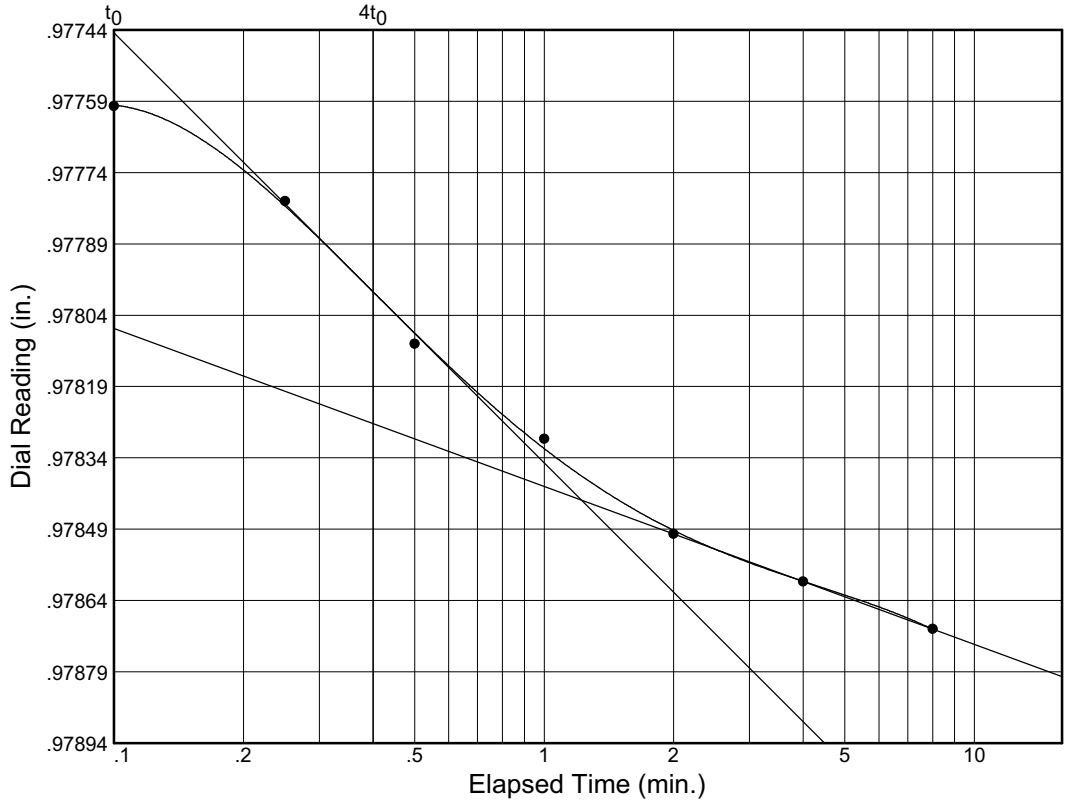
Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-9W




Load No.= 3
Load= 0.50 tsf
$D_0$ = 0.98839
$D_{50}$ = 0.98385
$D_{100}$ = 0.97931
$T_{50}$ = 2.08 min.

| $C_v$ @ $T_{50}$ |
|---|
| 0.23 ft.$^2$/day |

$C_\alpha$ = 0.007



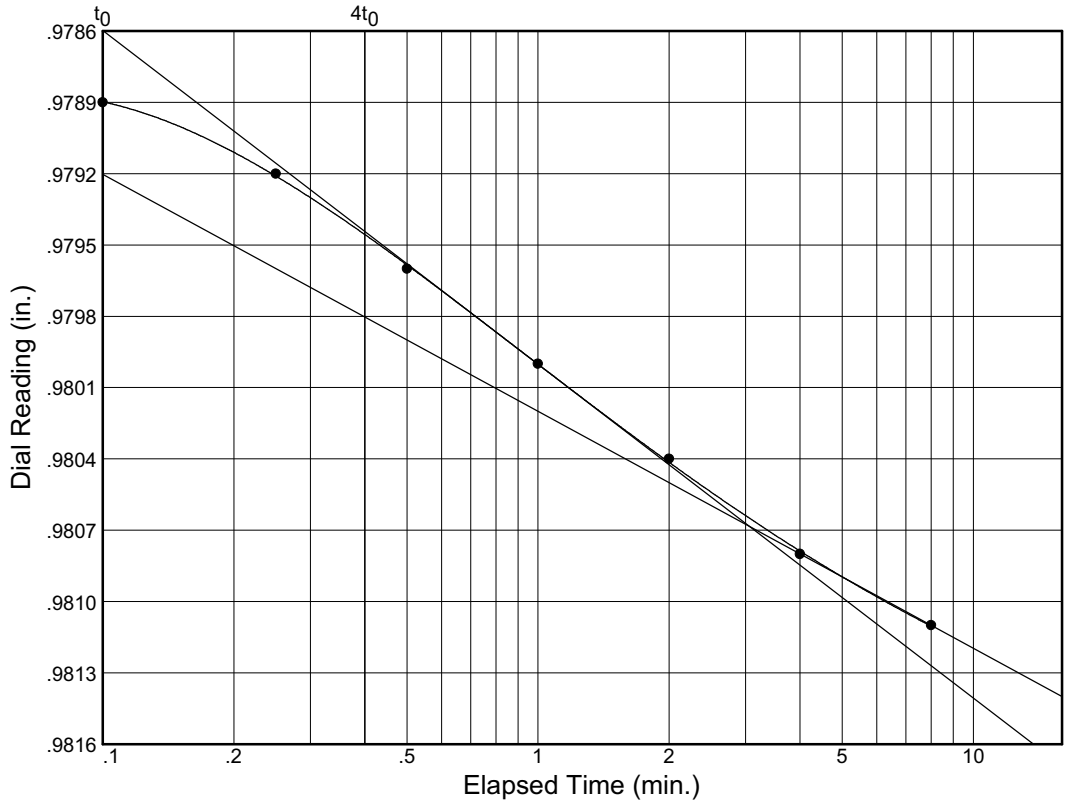

Load No.= 4
Load= 0.25 tsf
$D_0$ = 0.97721
$D_{50}$ = 0.97782
$D_{100}$ = 0.97843
$T_{50}$ = 0.25 min.

| $C_v$ @ $T_{50}$ |
|---|
| 1.85 ft.$^2$/day |

Figure 3

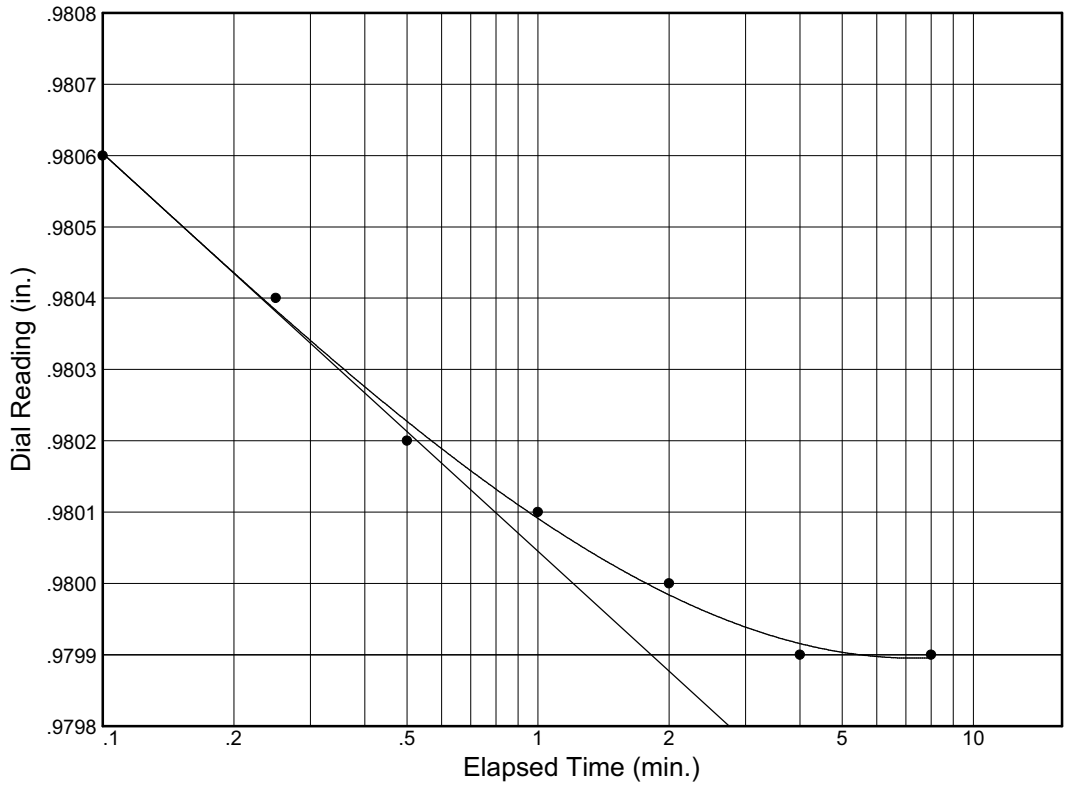
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-9W




Load No.= 5
Load= 0.13 tsf
$D_0$ = 0.97834
$D_{50}$ = 0.97951
$D_{100}$ = 0.98068
$T_{50}$ = 0.44 min.

$C_v$ @ $T_{50}$
1.07 ft.$^2$/day




Load No.= 6
Load= 0.25 tsf
$D_0$ = 0.98110
$D_{50}$ = 0.98050
$D_{100}$ = 0.97990
$T_{50}$ = 0.15 min.

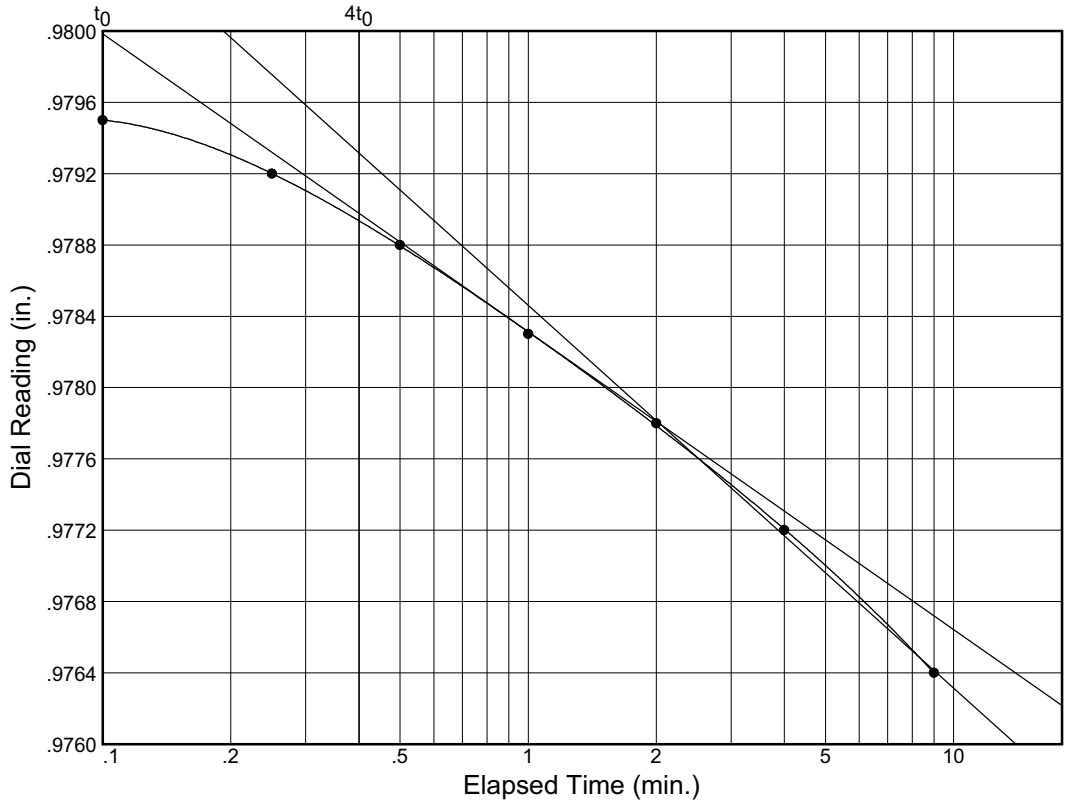
$C_v$ @ $T_{50}$
3.09 ft.$^2$/day

$C_\alpha$ = 0.000

Figure 4

# Dial Reading vs. Time

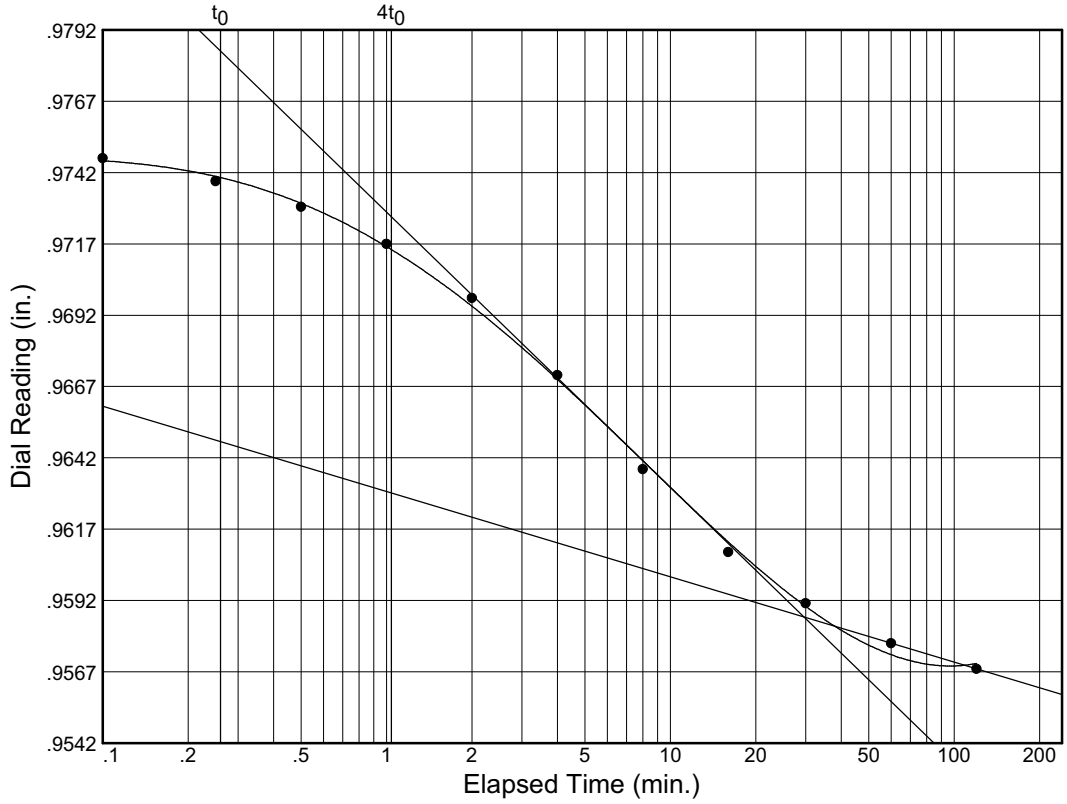
Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-9W




Load No.= 7
Load= 0.50 tsf
$D_0$ = 0.98006
$D_{50}$ = 0.97893
$D_{100}$ = 0.97779
$T_{50}$ = 0.41 min.

$C_v$ @ $T_{50}$
1.16 ft.$^2$/day

$C_\alpha$ = 0.002




Load No.= 8
Load= 1.00 tsf
$D_0$ = 0.97655
$D_{50}$ = 0.96758
$D_{100}$ = 0.95862
$T_{50}$ = 3.40 min.

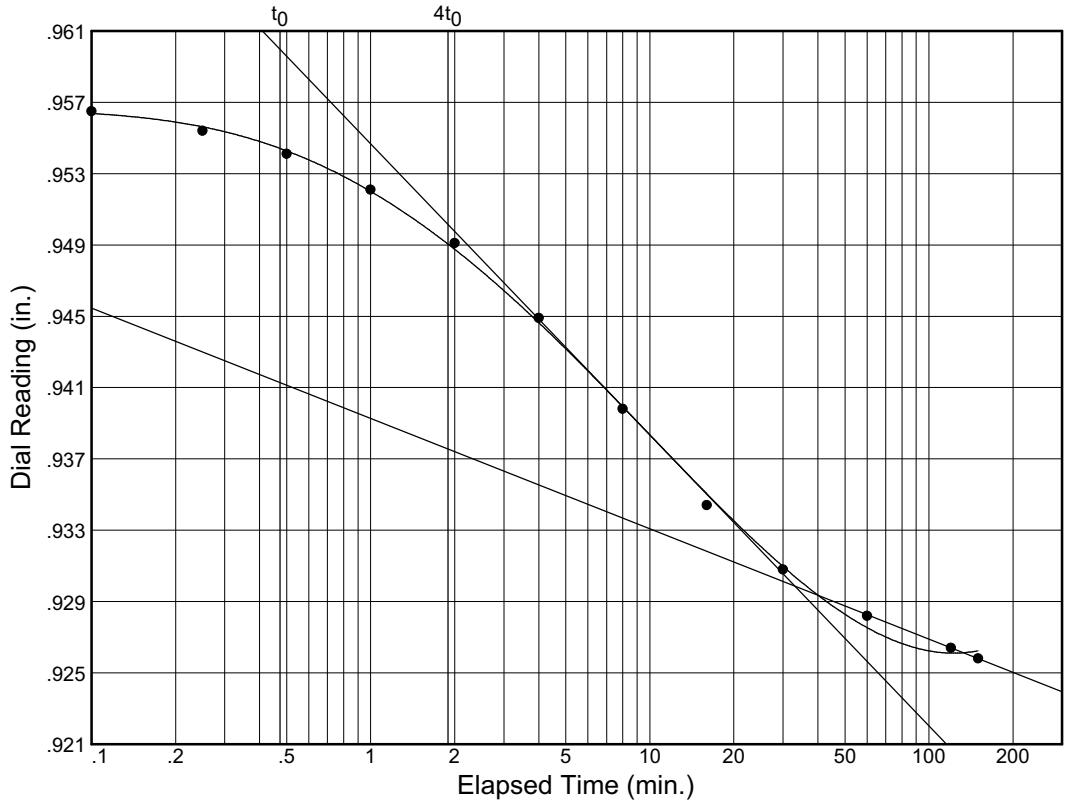
$C_v$ @ $T_{50}$
0.14 ft.$^2$/day

$C_\alpha$ = 0.003

Figure 5

# Dial Reading vs. Time

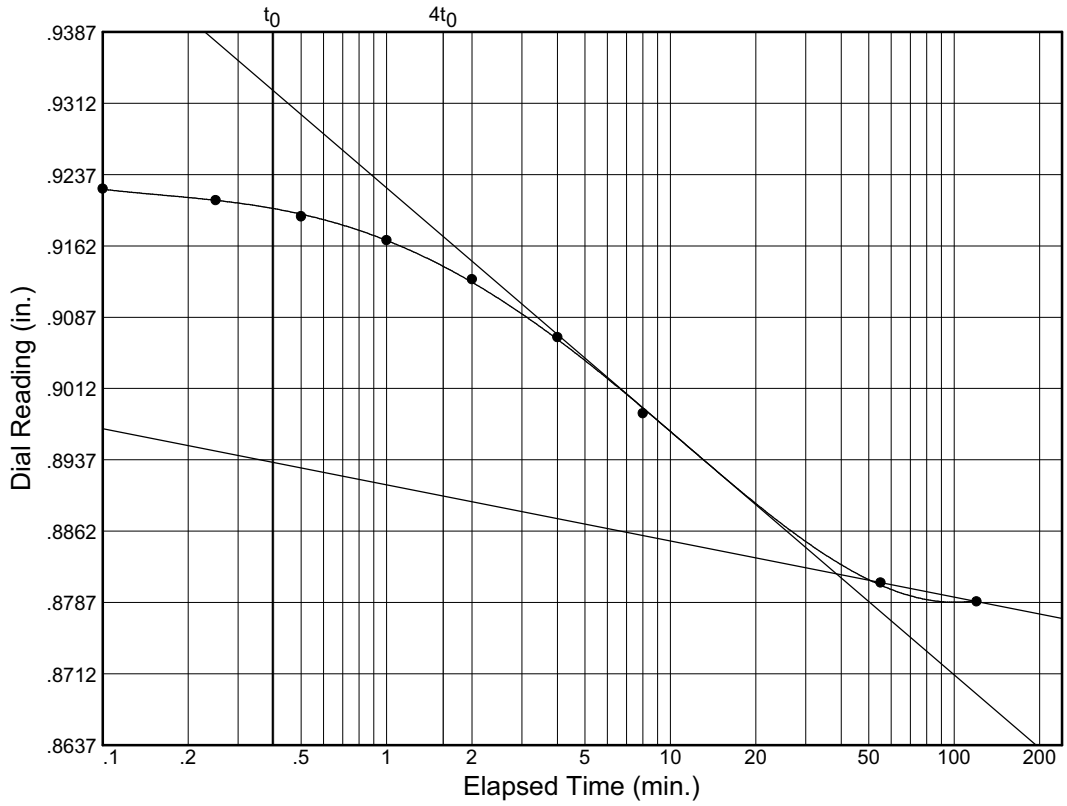
Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-9W




Load No.= 9
Load= 2.00 tsf
$D_0$ = 0.95978
$D_{50}$ = 0.94482
$D_{100}$ = 0.92986
$T_{50}$ = 3.89 min.

| $C_v$ @ $T_{50}$ |
|---|
| 0.11 ft.$^2$/day |

$C_\alpha$ = 0.006




Load No.= 10
Load= 4.00 tsf
$D_0$ = 0.92624
$D_{50}$ = 0.90398
$D_{100}$ = 0.88172
$T_{50}$ = 5.08 min.

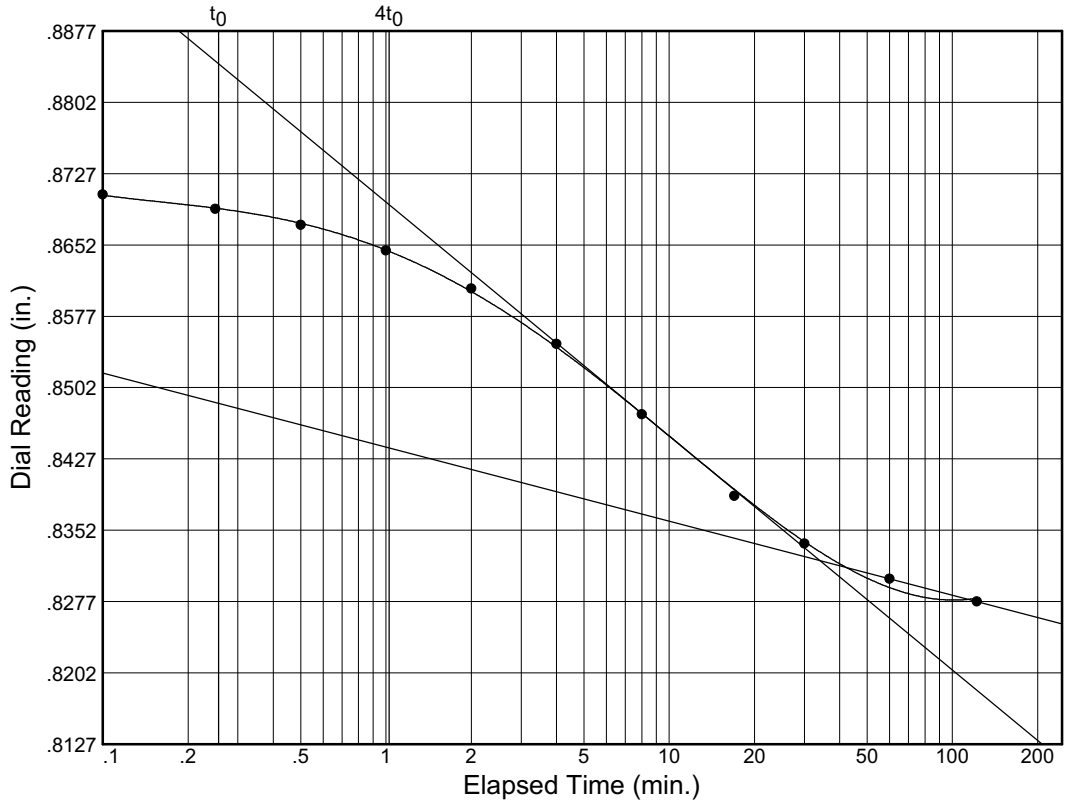
| $C_v$ @ $T_{50}$ |
|---|
| 0.08 ft.$^2$/day |

$C_\alpha$ = 0.006

Figure 6

# Dial Reading vs. Time

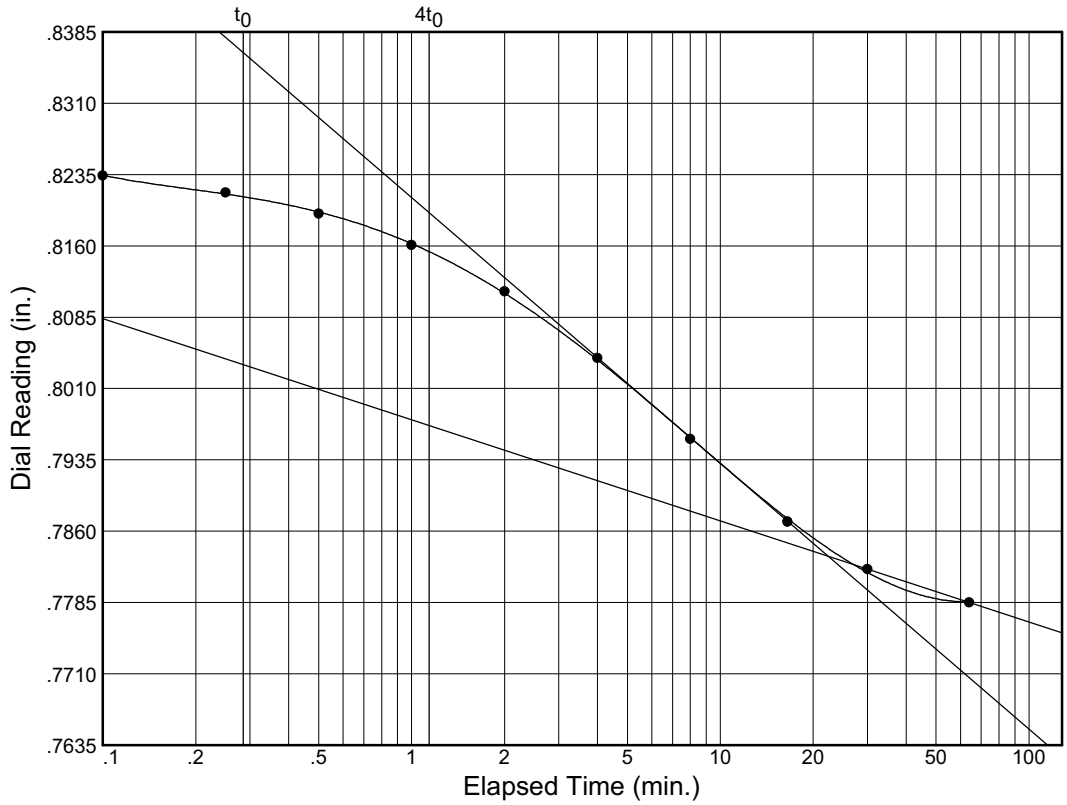
Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-9W




Load No.= 11
Load= 8.00 tsf
$D_0$ = 0.87352
$D_{50}$ = 0.85277
$D_{100}$ = 0.83201
$T_{50}$ = 4.77 min.

$C_v$ @ $T_{50}$
0.08 ft.$^2$/day

$C_\alpha$ = 0.009




Load No.= 12
Load= 16.00 tsf
$D_0$ = 0.82693
$D_{50}$ = 0.80514
$D_{100}$ = 0.78335
$T_{50}$ = 3.61 min.

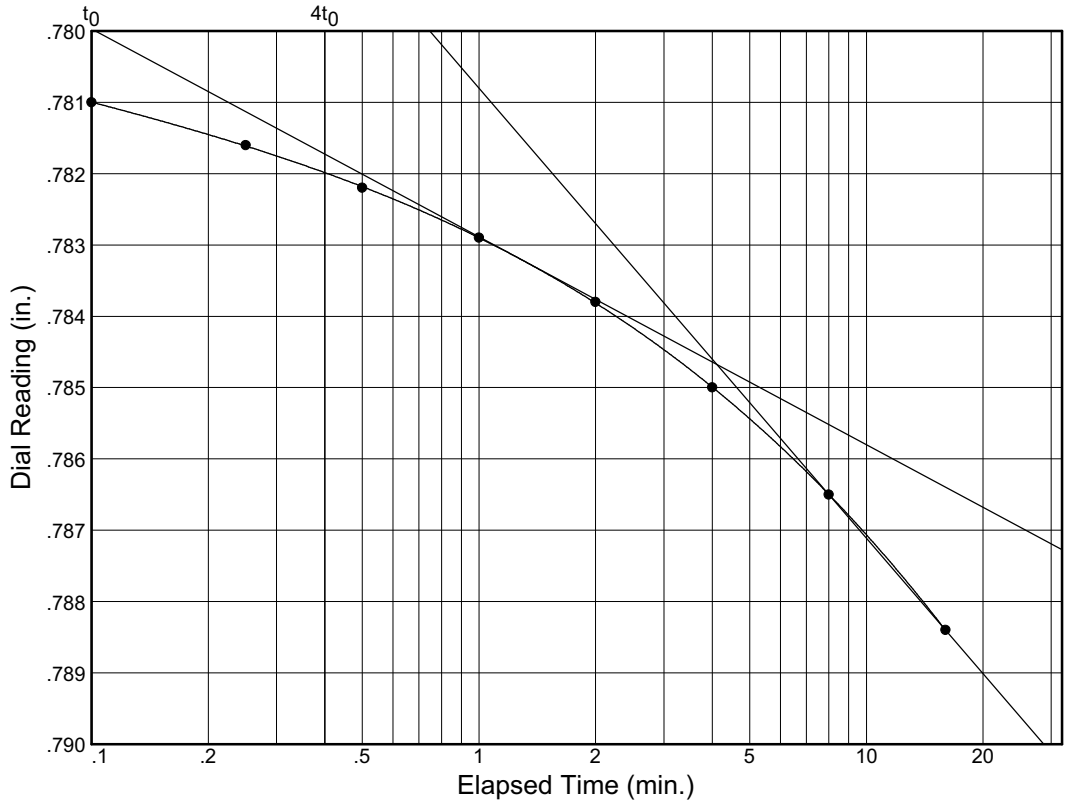
$C_v$ @ $T_{50}$
0.09 ft.$^2$/day

$C_\alpha$ = 0.013

Figure 7

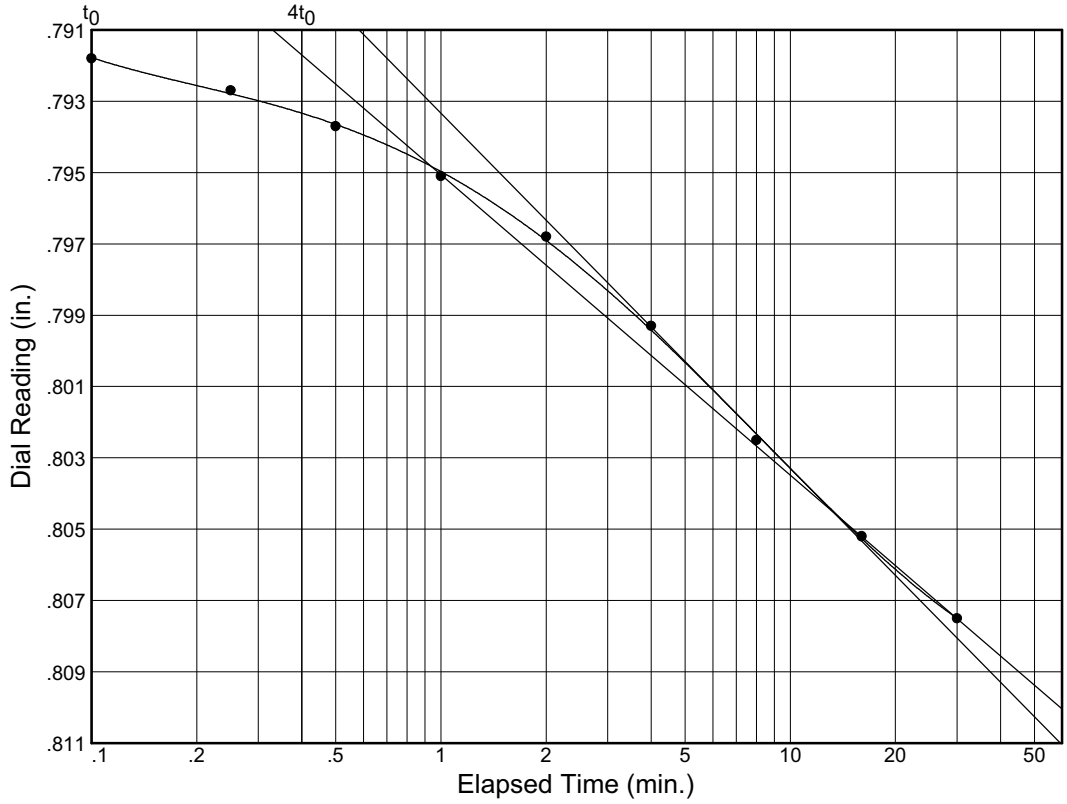
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-9W




Load No.= 13
Load= 4.00 tsf
$D_0$ = 0.78001
$D_{50}$ = 0.78234
$D_{100}$ = 0.78468
$T_{50}$ = 0.59 min.

$C_v$ @ $T_{50}$
0.51 ft.$^2$/day



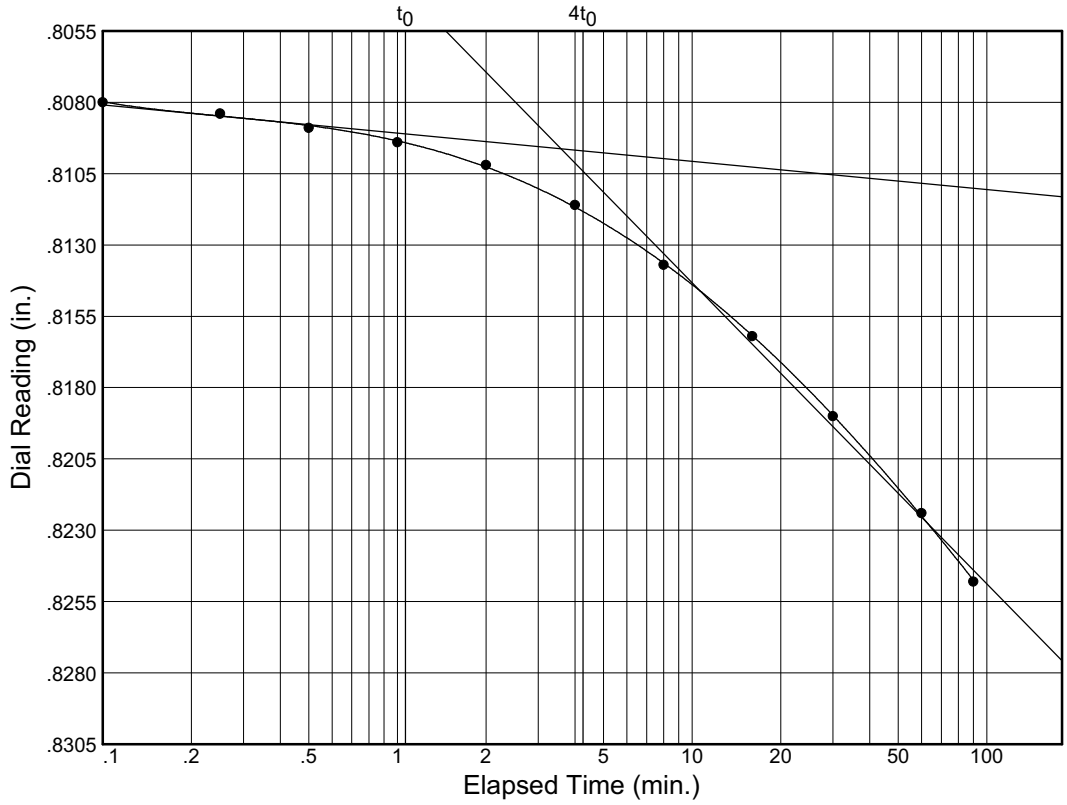

Load No.= 14
Load= 1.00 tsf
$D_0$ = 0.79022
$D_{50}$ = 0.79736
$D_{100}$ = 0.80449
$T_{50}$ = 2.29 min.

$C_v$ @ $T_{50}$
0.14 ft.$^2$/day

Figure 8

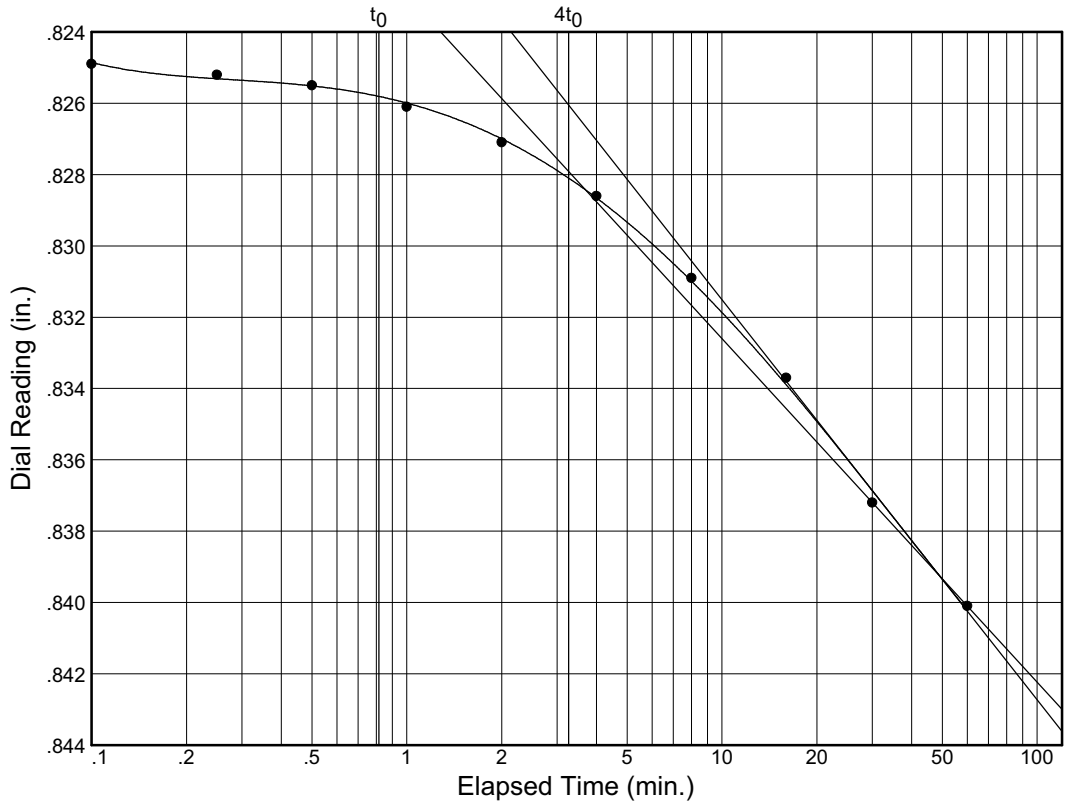
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-9W




Load No.= 15
Load= 0.25 tsf
$D_0$ = 0.80701
$D_{50}$ = 0.80832
$D_{100}$ = 0.80962
$T_{50}$ = 0.17 min.

$C_v$ @ $T_{50}$
1.88 ft.$^2$/day



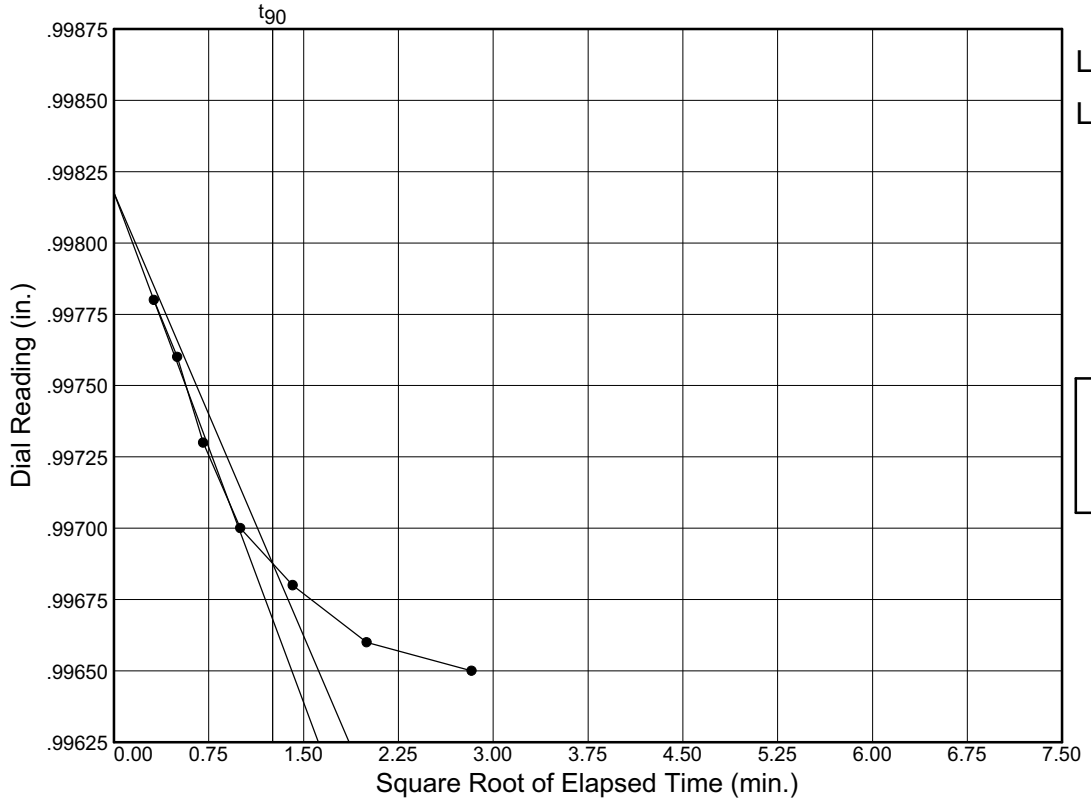

Load No.= 16
Load= 0.13 tsf
$D_0$ = 0.82352
$D_{50}$ = 0.83138
$D_{100}$ = 0.83924
$T_{50}$ = 8.84 min.

$C_v$ @ $T_{50}$
0.04 ft.$^2$/day

Figure 9

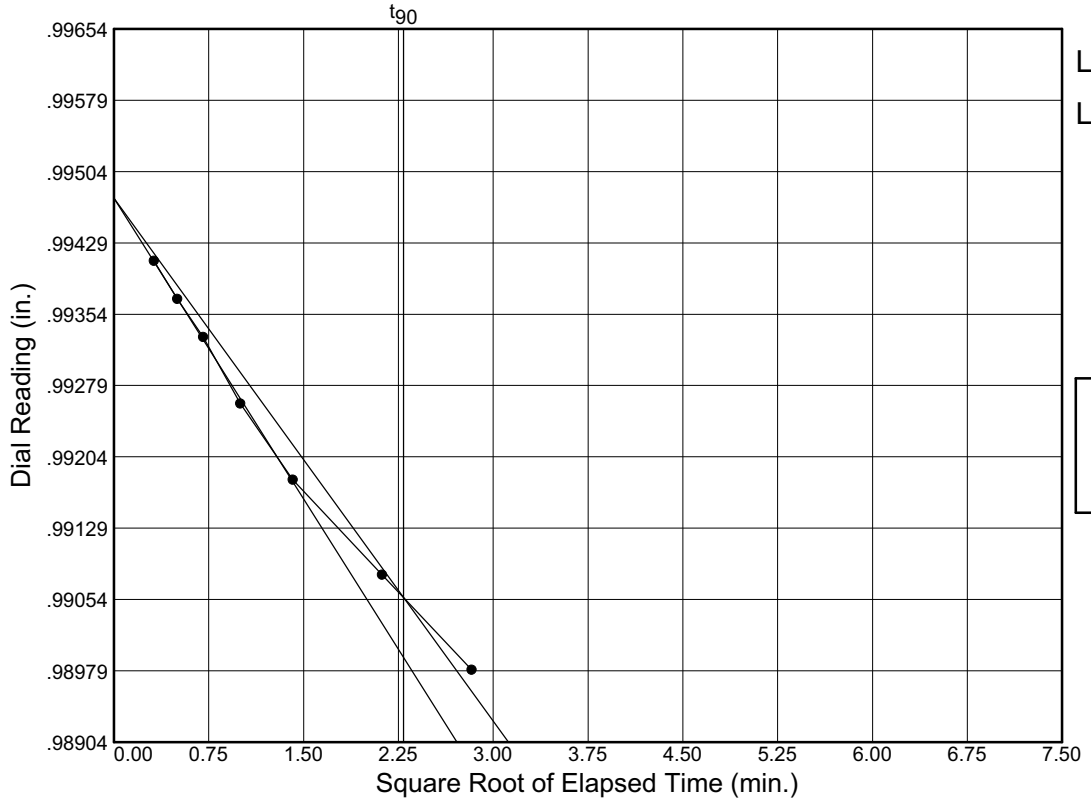
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-9W




Load No.= 1
Load= 0.13 tsf
$D_0$ = 0.99818
$D_{90}$ = 0.99688
$D_{100}$ = 0.99673
$T_{90}$ = 1.58 min.

$C_v$ @ $T_{90}$
1.34 ft.$^2$/day



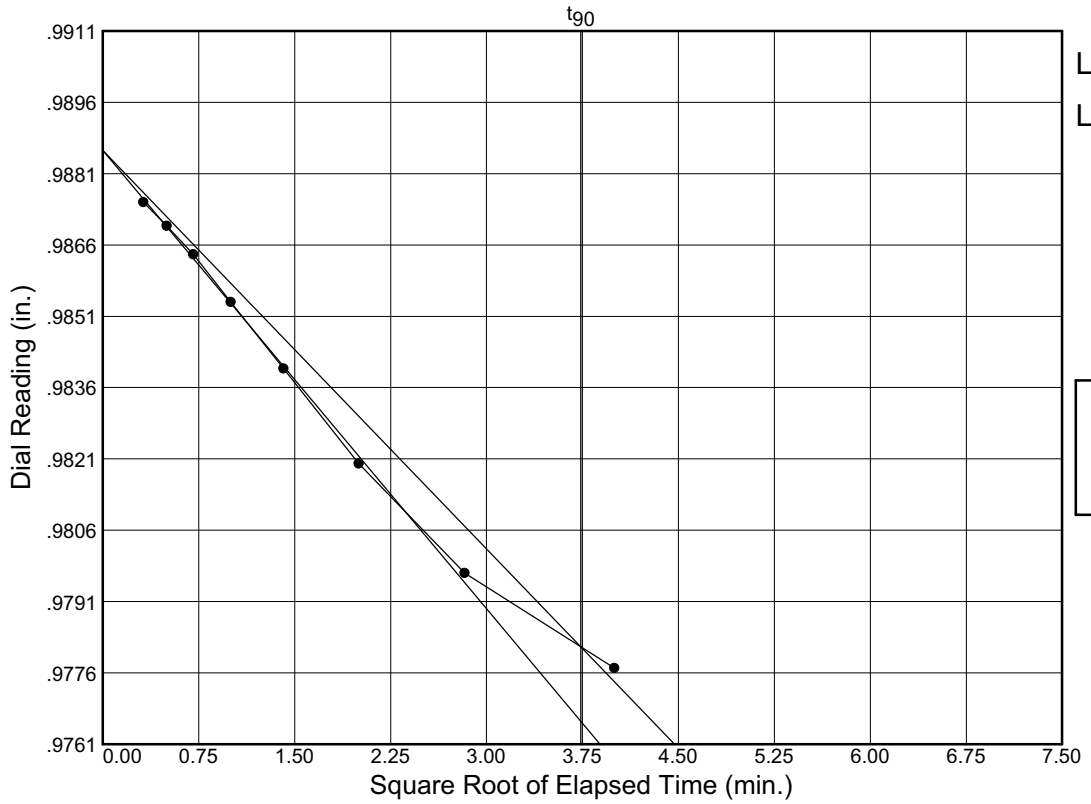

Load No.= 2
Load= 0.25 tsf
$D_0$ = 0.99476
$D_{90}$ = 0.99056
$D_{100}$ = 0.99009
$T_{90}$ = 5.25 min.

$C_v$ @ $T_{90}$
0.40 ft.$^2$/day

Figure 2

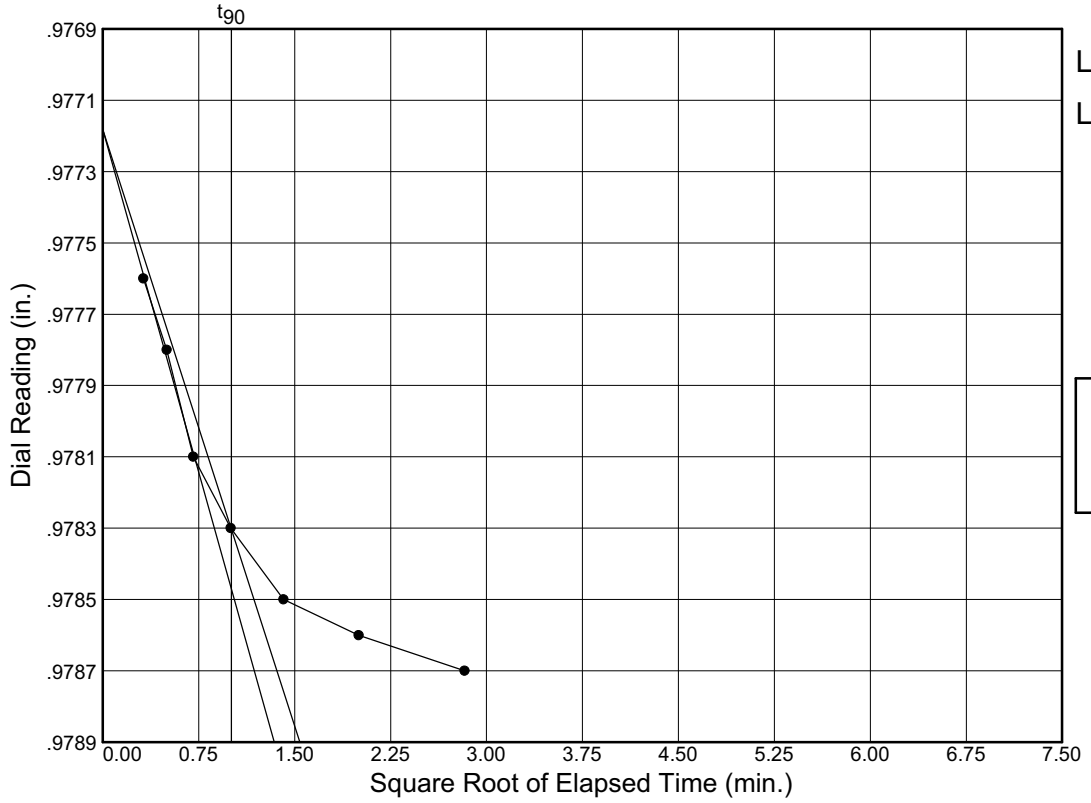
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-9W




Load No.= 3
Load= 0.50 tsf
$D_0$ = 0.98859
$D_{90}$ = 0.97815
$D_{100}$ = 0.97699
$T_{90}$ = 13.96 min.

$C_v$ @ $T_{90}$
0.15 ft.$^2$/day



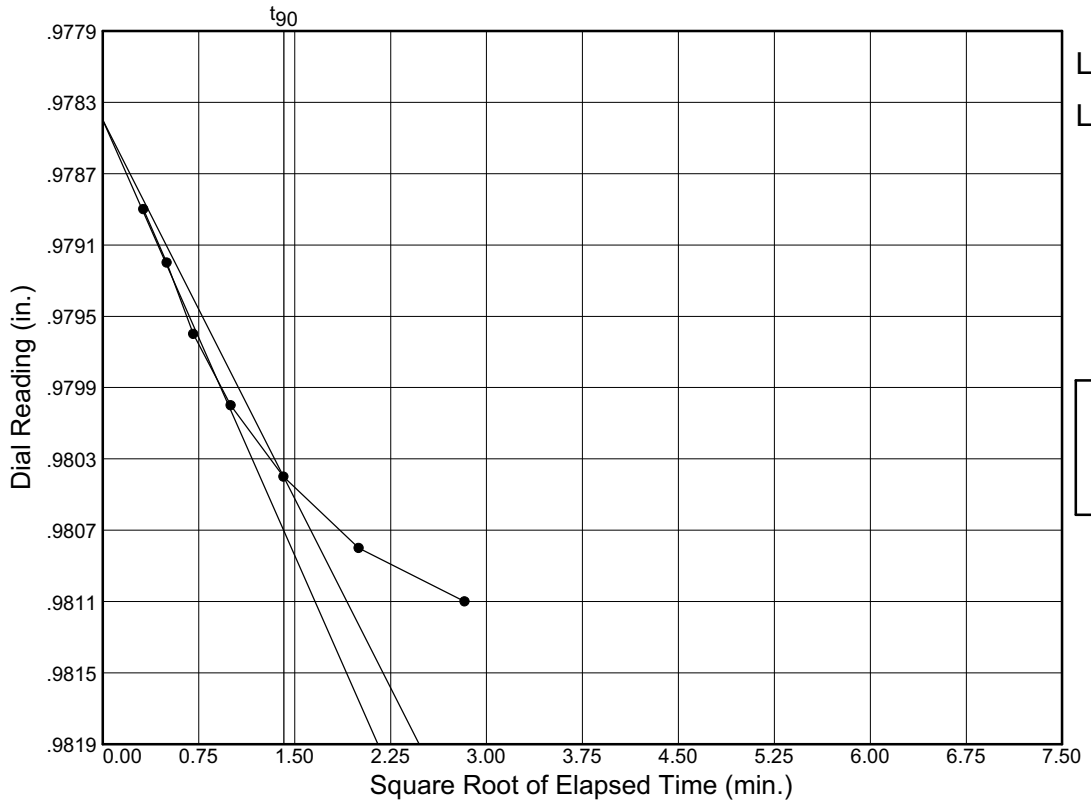

Load No.= 4
Load= 0.25 tsf
$D_0$ = 0.97718
$D_{90}$ = 0.97830
$D_{100}$ = 0.97843
$T_{90}$ = 1.01 min.

$C_v$ @ $T_{90}$
2.01 ft.$^2$/day

Figure 3

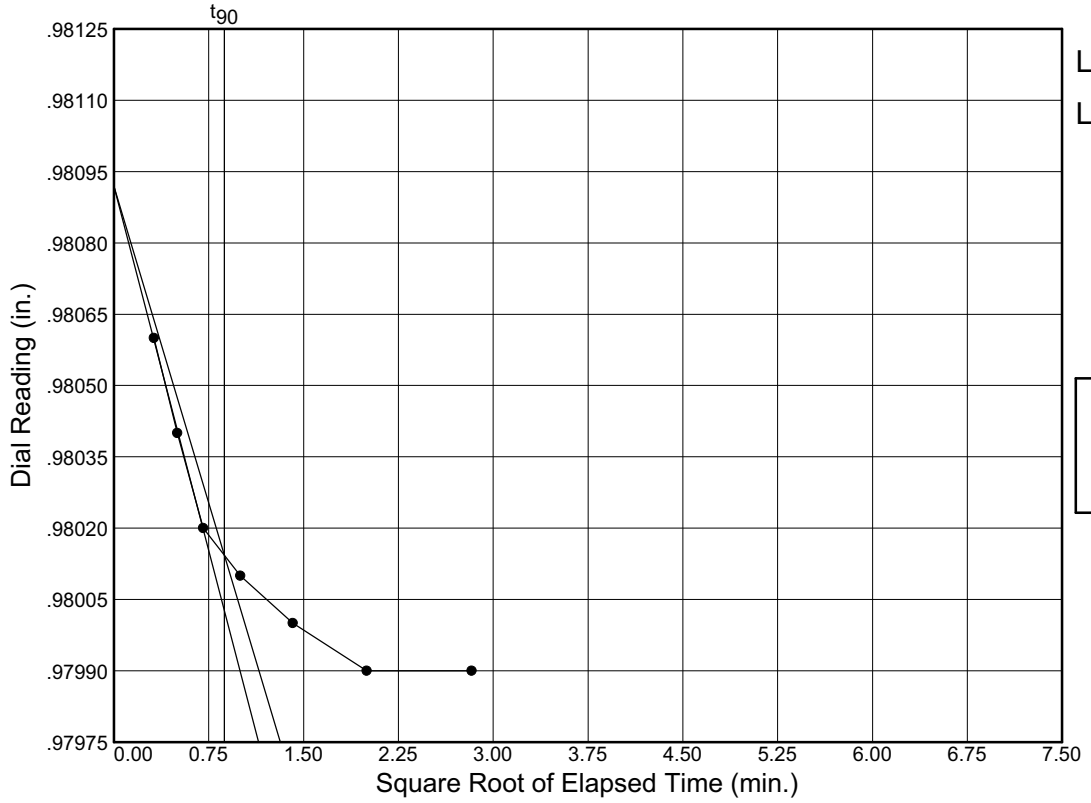
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-9W




Load No.= 5
Load= 0.13 tsf
$D_0$ = 0.97840
$D_{90}$ = 0.98040
$D_{100}$ = 0.98062
$T_{90}$ = 2.00 min.

$C_v$ @ $T_{90}$
1.02 ft.$^2$/day



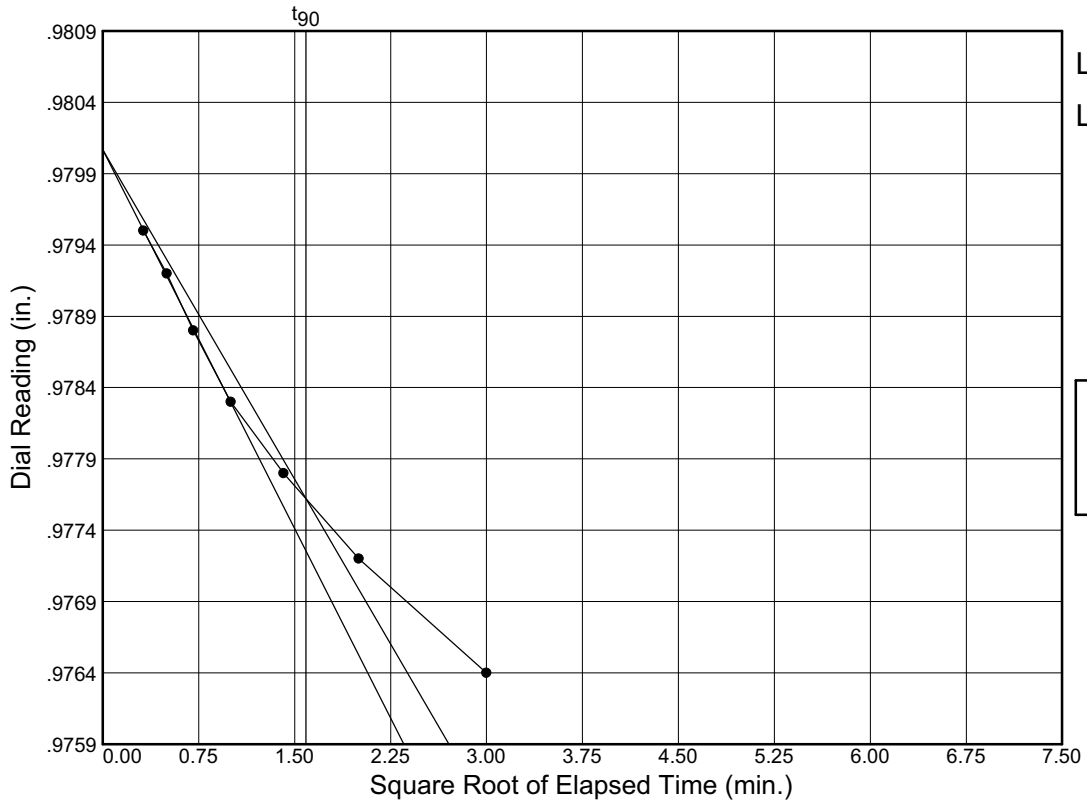

Load No.= 6
Load= 0.25 tsf
$D_0$ = 0.98092
$D_{90}$ = 0.98014
$D_{100}$ = 0.98006
$T_{90}$ = 0.76 min.

$C_v$ @ $T_{90}$
2.68 ft.$^2$/day

Figure 4

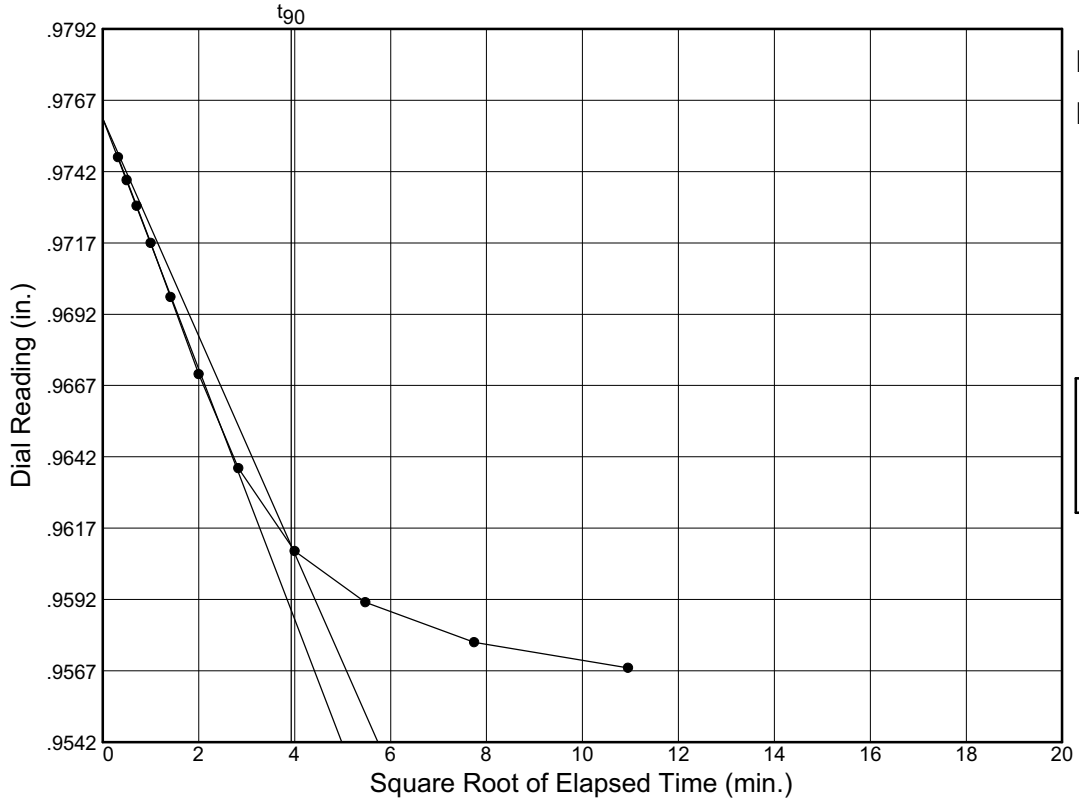
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-9W




Load No.= 7
Load= 0.50 tsf
$D_0$ = 0.98007
$D_{90}$ = 0.97762
$D_{100}$ = 0.97735
$T_{90}$ = 2.52 min.

$C_v$ @ $T_{90}$
0.80 ft.$^2$/day



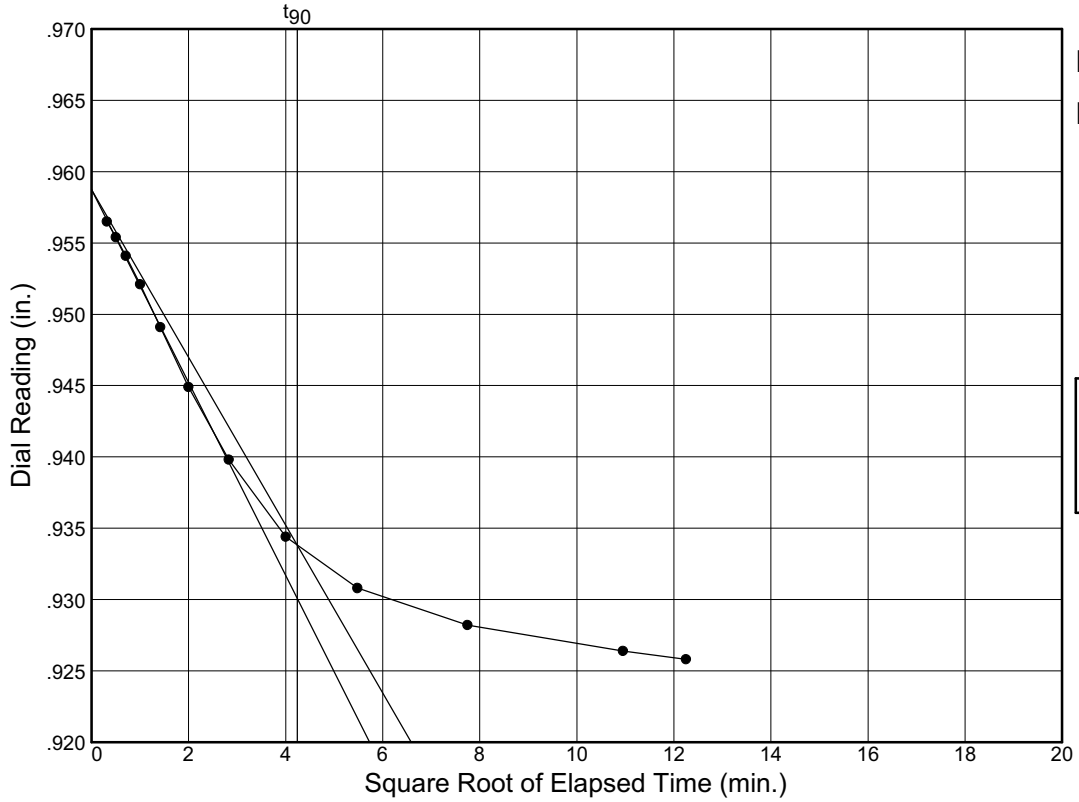

Load No.= 8
Load= 1.00 tsf
$D_0$ = 0.97606
$D_{90}$ = 0.96107
$D_{100}$ = 0.95940
$T_{90}$ = 15.46 min.

$C_v$ @ $T_{90}$
0.13 ft.$^2$/day

Figure 5

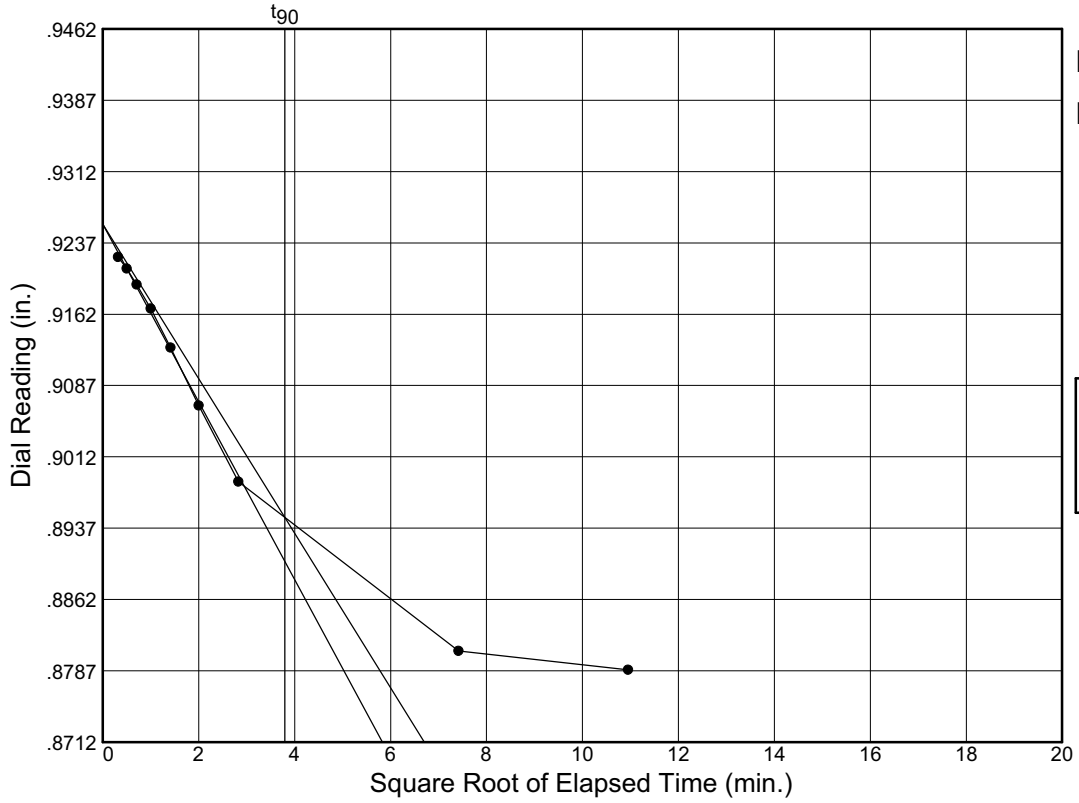
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-9W




Load No.= 9
Load= 2.00 tsf
$D_0$ = 0.95874
$D_{90}$ = 0.93382
$D_{100}$ = 0.93105
$T_{90}$ = 17.96 min.

$C_v$ @ $T_{90}$
0.10 ft.$^2$/day



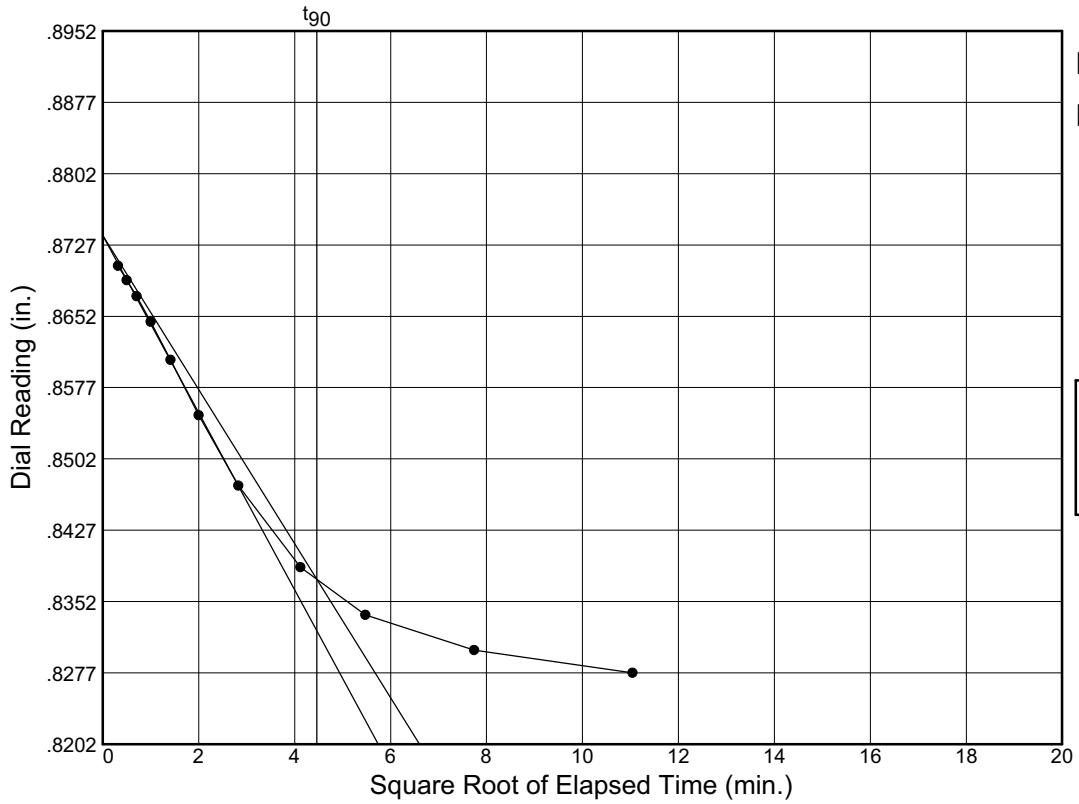

Load No.= 10
Load= 4.00 tsf
$D_0$ = 0.92568
$D_{90}$ = 0.89485
$D_{100}$ = 0.89143
$T_{90}$ = 14.40 min.

$C_v$ @ $T_{90}$
0.12 ft.$^2$/day

Figure 6

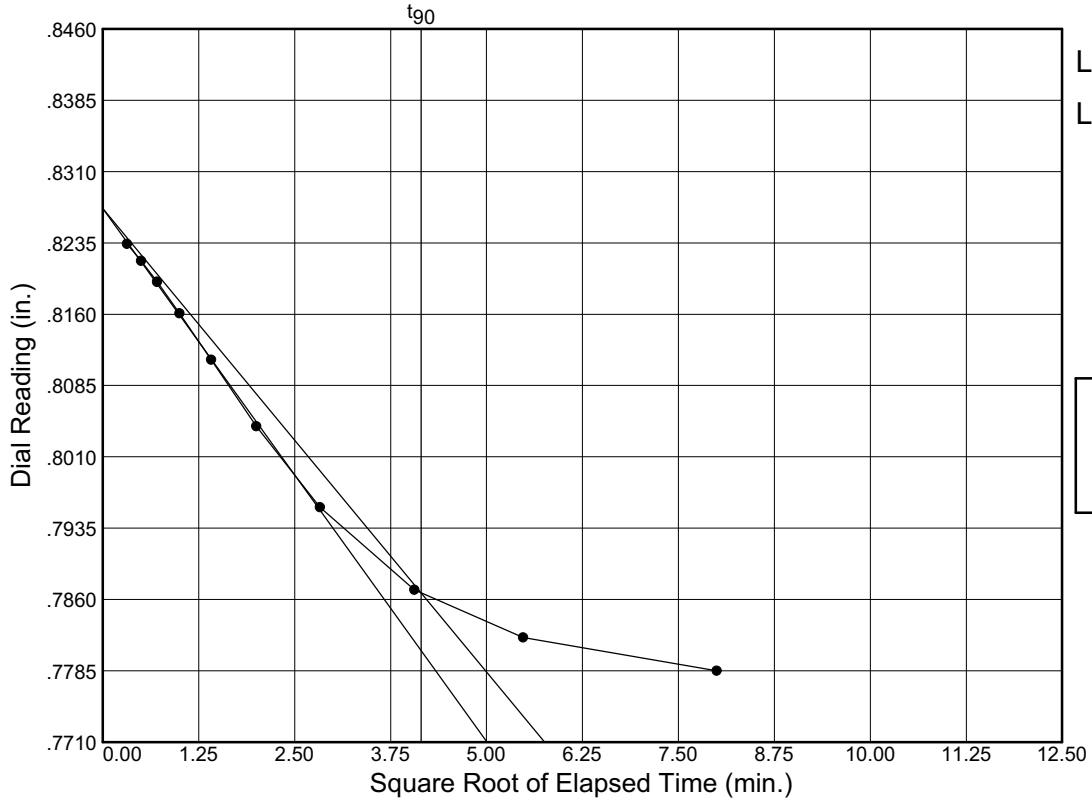
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-9W




Load No.= 11
Load= 8.00 tsf
$D_0$ = 0.87369
$D_{90}$ = 0.83755
$D_{100}$ = 0.83353
$T_{90}$ = 19.91 min.

| $C_v$ @ $T_{90}$ |
|---|
| 0.08 ft.$^2$/day |



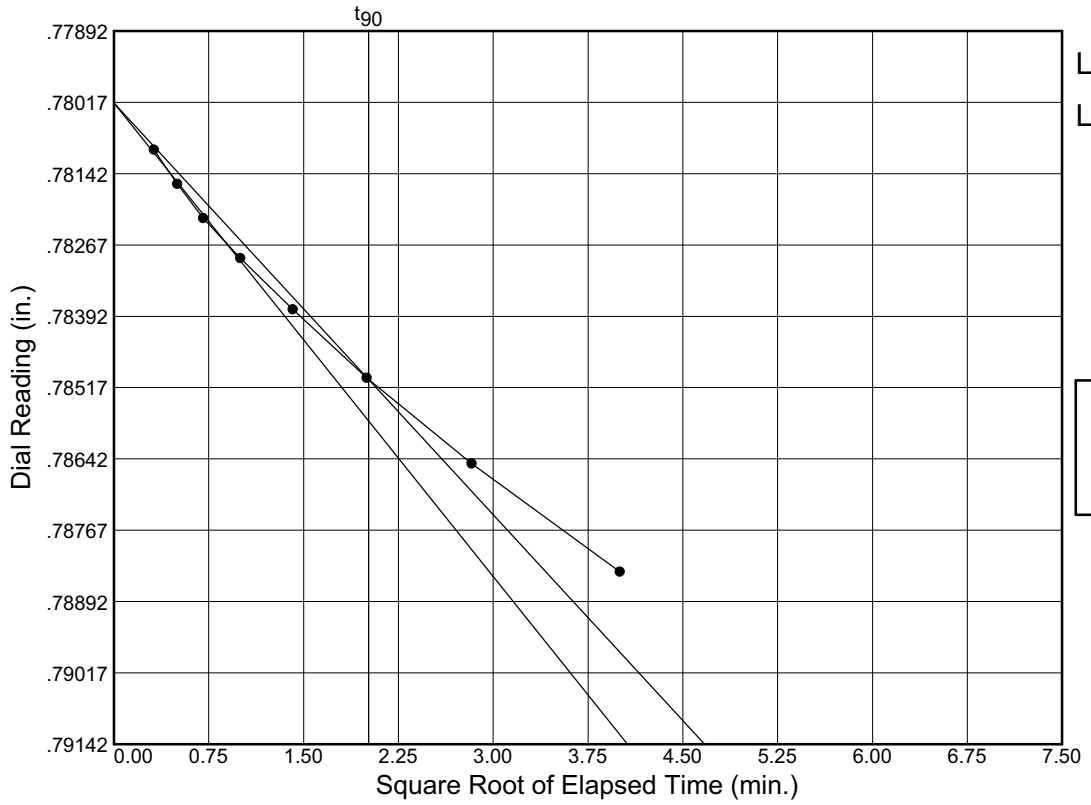

Load No.= 12
Load= 16.00 tsf
$D_0$ = 0.82712
$D_{90}$ = 0.78670
$D_{100}$ = 0.78221
$T_{90}$ = 17.20 min.

| $C_v$ @ $T_{90}$ |
|---|
| 0.08 ft.$^2$/day |

Figure 7

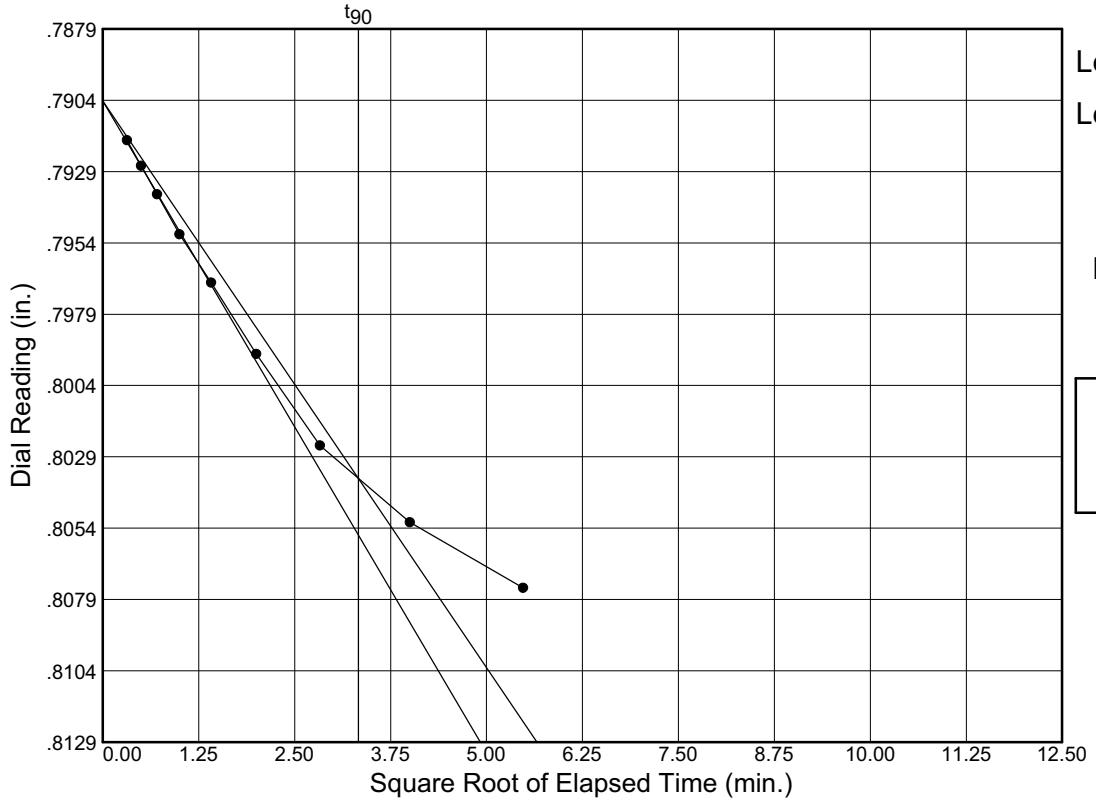
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-9W




Load No.= 13
Load= 4.00 tsf
$D_0$ = 0.78018
$D_{90}$ = 0.78503
$D_{100}$ = 0.78556
$T_{90}$ = 4.06 min.

$C_v$ @ $T_{90}$
0.32 ft.$^2$/day



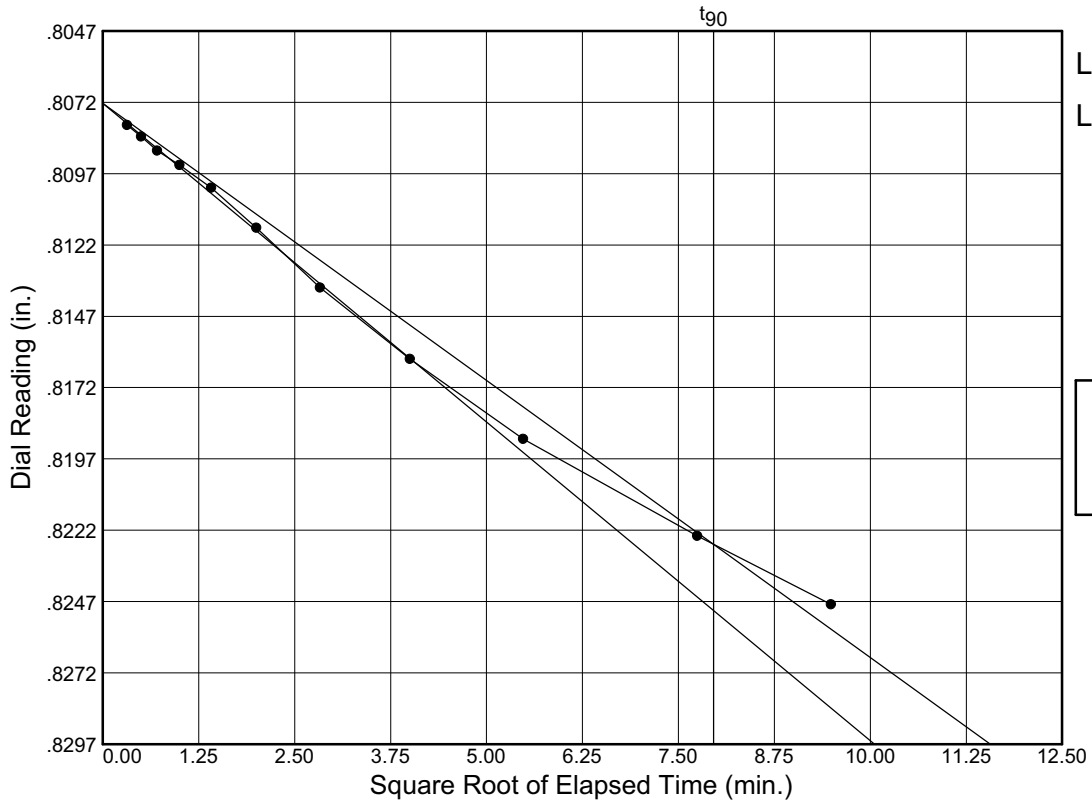

Load No.= 14
Load= 1.00 tsf
$D_0$ = 0.79042
$D_{90}$ = 0.80366
$D_{100}$ = 0.80513
$T_{90}$ = 11.10 min.

$C_v$ @ $T_{90}$
0.12 ft.$^2$/day

Figure 8

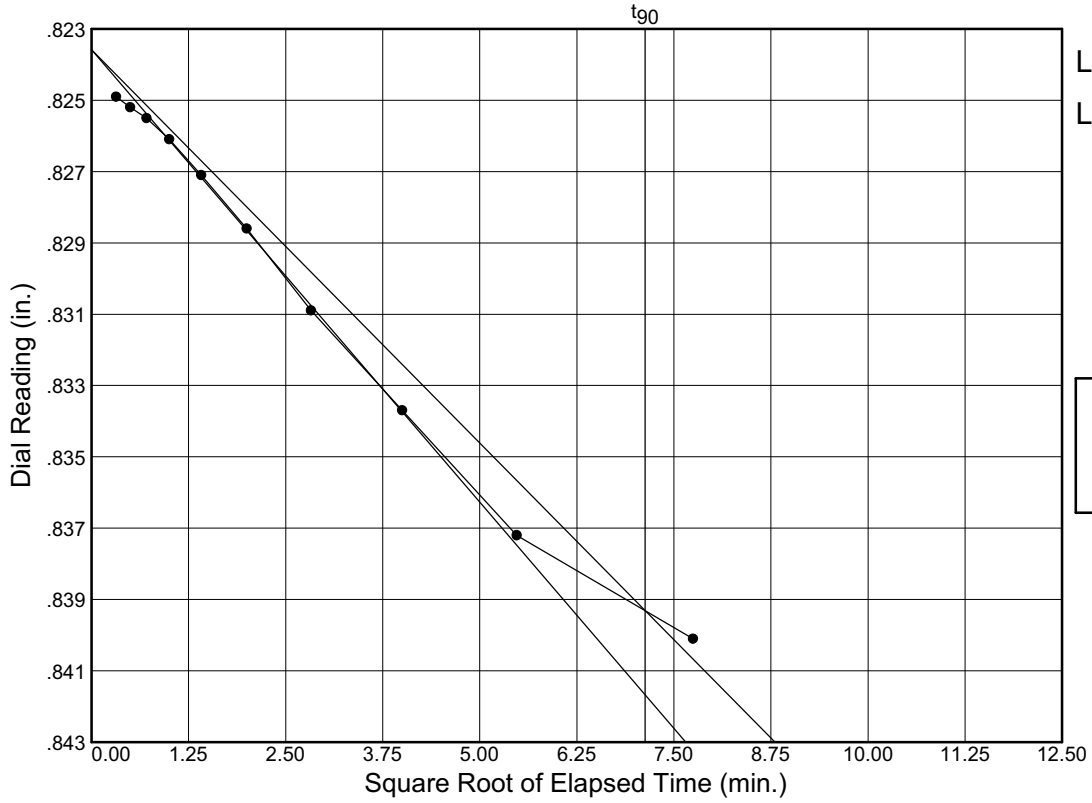
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: D7CD-9W




Load No.= 15
Load= 0.25 tsf
$D_0$ = 0.80723
$D_{90}$ = 0.82269
$D_{100}$ = 0.82441
$T_{90}$ = 63.32 min.

$C_v$ @ $T_{90}$
0.02 ft.$^2$/day




Load No.= 16
Load= 0.13 tsf
$D_0$ = 0.82358
$D_{90}$ = 0.83931
$D_{100}$ = 0.84106
$T_{90}$ = 50.81 min.

$C_v$ @ $T_{90}$
0.03 ft.$^2$/day

Figure 9

## CONSOLIDATION TEST DATA

**Client:** HDR, Inc.
**Project:** VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
**Project Number:** VB10-237G

### Sample Data

**Source:**
**Sample No.:** Shelby Tube
**Elev. or Depth:** 25 ft. **Sample Length(in./cm.):** 1 in.
**Location:** D7CD-9W
**Description:** Gray, Fat CLAY
**Sample Date:** **Liquid Limit:** **Plasticity Index:**
**USCS:** **AASHTO:**
**Preparation Process:**
**Condition of Test:**
**Test Method:** **Final Density:** **Figure No.:** 1
**Testing Remarks:** D7CD-9W
Depth=25 ft.
**Tested By:** **Test Date:**
**Checked By:** **Title:**

### Test Specimen Data

| TOTAL SAMPLE | BEFORE TEST | AFTER TEST |
|---|---|---|
| **Wet w+t** = 294.62 g. | **Consolidometer #** = 1 | **Wet w+t** = 284.80 g. |
| **Dry w+t** = 256.54 g. | | **Dry w+t** = 256.54 g. |
| **Tare Wt.** = 145.30 g. | **Spec. Gravity** = 2.63 | **Tare Wt.** = 145.30 g. |
| **Height** = 1.00 in. | **Height** = 1.00 in. | |
| **Diameter** = 2.50 in. | **Diameter** = 2.50 in. | |
| **Weight** = 149.32 g. | **Defl. Table** = Reference Set (inches/tsf) | |
| **Moisture** = 34.2 % | **Ht. Solids** = 0.5258 in. | **Moisture** = 25.4 % |
| **Wet Den.** = 115.9 pcf | **Dry Wt.** = 111.24 g. | **Dry Wt.** = 111.24 g.* |
| **Dry Den.** = 86.3 pcf | **Void Ratio** = 0.902 | **Void Ratio** = 0.598 |
| **Ovrbrdn.** = 0.90 tsf | **Saturation** = 99.8 % | |

*** Final dry weight used in calculations**

### End-of-Load Summary

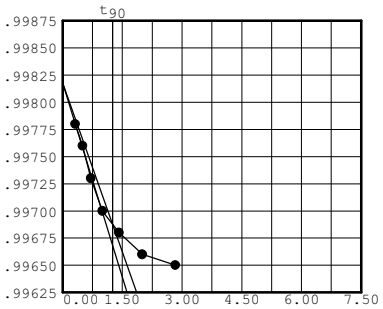
| Pressure (tsf) | Final Dial (in.) | Machine Defl. (in.) | $C_v$ (ft.$^2$/day) | $C_\alpha$ | Void Ratio | % Compression /Swell |
|---|---|---|---|---|---|---|
| start | 1.00000 | | | | 0.902 | |
| 0.13 | 0.99650 | 0.00000 | 1.34 | | 0.895 | 0.3 Comprs. |
| 0.25 | 0.98940 | 0.00040 | 0.40 | | 0.882 | 1.0 Comprs. |
| 0.50 | 0.97690 | 0.00080 | 0.15 | | 0.859 | 2.2 Comprs. |
| 0.25 | 0.97830 | 0.00040 | 2.01 | | 0.861 | 2.1 Comprs. |
| 0.13 | 0.98110 | 0.00000 | 1.02 | | 0.866 | 1.9 Comprs. |
| 0.25 | 0.97950 | 0.00040 | 2.68 | | 0.864 | 2.0 Comprs. |
| 0.50 | 0.97560 | 0.00080 | 0.80 | | 0.857 | 2.4 Comprs. |

| Pressure (tsf) | Final Dial (in.) | Machine Defl. (in.) | $C_v$ (ft.$^2$/day) | $C_\alpha$ | Void Ratio | % Compression /Swell |
|---|---|---|---|---|---|---|
| 1.00 | 0.95520 | 0.00160 | 0.13 | | 0.820 | 4.3 Comprs. |
| 2.00 | 0.92340 | 0.00240 | 0.10 | | 0.761 | 7.4 Comprs. |
| 4.00 | 0.87880 | 0.00000 | 0.12 | | 0.671 | 12.1 Comprs. |
| 8.00 | 0.82770 | 0.00000 | 0.08 | | 0.574 | 17.2 Comprs. |
| 16.00 | 0.77850 | 0.00000 | 0.08 | | 0.481 | 22.1 Comprs. |
| 4.00 | 0.78840 | 0.00000 | 0.32 | | 0.499 | 21.2 Comprs. |
| 1.00 | 0.80590 | 0.00160 | 0.12 | | 0.536 | 19.3 Comprs. |
| 0.25 | 0.82440 | 0.00040 | 0.02 | | 0.569 | 17.5 Comprs. |
| 0.13 | 0.84010 | 0.00000 | 0.03 | | 0.598 | 16.0 Comprs. |

**$C_c$ =** 0.33 **$P_c$ =** 1.81 tsf **$C_r$ =** 0.04

**Pressure: 0.13 tsf** **TEST READINGS** **Load No. 1**

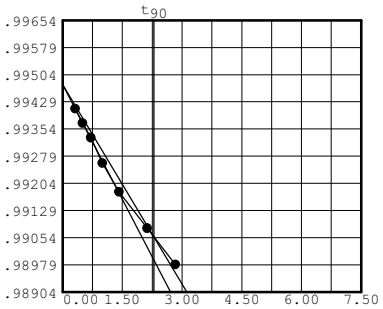
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 1.00000 |
| 2 | 0.10 | 0.99780 |
| 3 | 0.25 | 0.99760 |
| 4 | 0.50 | 0.99730 |
| 5 | 1.00 | 0.99700 |
| 6 | 2.00 | 0.99680 |
| 7 | 4.00 | 0.99660 |
| 8 | 8.00 | 0.99650 |




**Void Ratio =** 0.895 **Compression =** 0.3 %
**$D_0$ =** 0.99818 **$D_{90}$ =** 0.99688 **$D_{100}$ =** 0.99673
**$C_v$ at 1.6 min. =** 1.34 ft.$^2$/day

**Pressure: 0.25 tsf** **TEST READINGS** **Load No. 2**

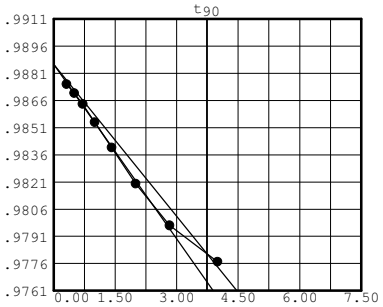
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.99650 |
| 2 | 0.10 | 0.99370 |
| 3 | 0.25 | 0.99330 |
| 4 | 0.50 | 0.99290 |
| 5 | 1.00 | 0.99220 |
| 6 | 2.00 | 0.99140 |
| 7 | 4.50 | 0.99040 |
| 8 | 8.00 | 0.98940 |




**Void Ratio =** 0.882 **Compression =** 1.0 %
**$D_0$ =** 0.99476 **$D_{90}$ =** 0.99056 **$D_{100}$ =** 0.99009
**$C_v$ at 5.2 min. =** 0.40 ft.$^2$/day

**Pressure: 0.50 tsf** **TEST READINGS** **Load No. 3**

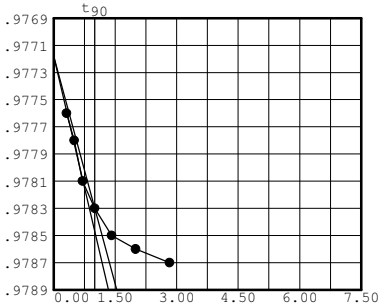
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.98940 |
| 2 | 0.10 | 0.98670 |
| 3 | 0.25 | 0.98620 |
| 4 | 0.50 | 0.98560 |
| 5 | 1.00 | 0.98460 |
| 6 | 2.00 | 0.98320 |
| 7 | 4.00 | 0.98120 |
| 8 | 8.00 | 0.97890 |
| 9 | 16.00 | 0.97690 |




**Void Ratio =** 0.859 **Compression =** 2.2 %
**$D_0$ =** 0.98859 **$D_{90}$ =** 0.97815 **$D_{100}$ =** 0.97699
**$C_v$ at 14.0 min. =** 0.15 ft.$^2$/day

**Pressure: 0.25 tsf** **TEST READINGS** **Load No. 4**

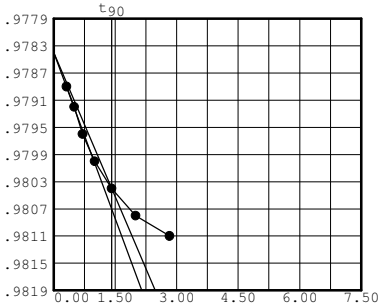
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.97690 |
| 2 | 0.10 | 0.97720 |
| 3 | 0.25 | 0.97740 |
| 4 | 0.50 | 0.97770 |
| 5 | 1.00 | 0.97790 |
| 6 | 2.00 | 0.97810 |
| 7 | 4.00 | 0.97820 |
| 8 | 8.00 | 0.97830 |




**Void Ratio =** 0.861 **Compression =** 2.1 %
**$D_0$ =** 0.97718 **$D_{90}$ =** 0.97830 **$D_{100}$ =** 0.97843
**$C_v$ at 1.0 min. =** 2.01 ft.$^2$/day

**Pressure: 0.13 tsf** **TEST READINGS** **Load No. 5**

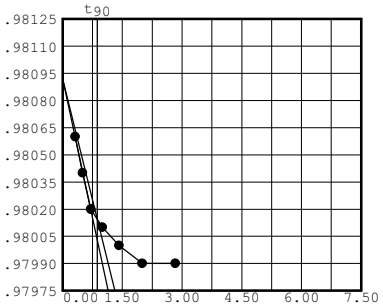
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.97830 |
| 2 | 0.10 | 0.97890 |
| 3 | 0.25 | 0.97920 |
| 4 | 0.50 | 0.97960 |
| 5 | 1.00 | 0.98000 |
| 6 | 2.00 | 0.98040 |
| 7 | 4.00 | 0.98080 |
| 8 | 8.00 | 0.98110 |




**Void Ratio =** 0.866 **Compression =** 1.9 %
**$D_0$ =** 0.97840 **$D_{90}$ =** 0.98040 **$D_{100}$ =** 0.98062
**$C_v$ at 2.0 min. =** 1.02 ft.$^2$/day

**Pressure: 0.25 tsf** **TEST READINGS** **Load No. 6**

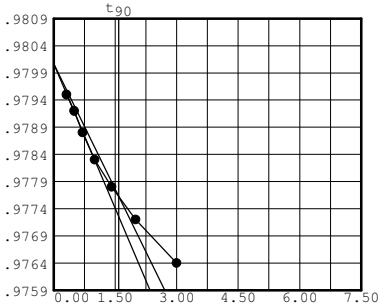
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.98110 |
| 2 | 0.10 | 0.98020 |
| 3 | 0.25 | 0.98000 |
| 4 | 0.50 | 0.97980 |
| 5 | 1.00 | 0.97970 |
| 6 | 2.00 | 0.97960 |
| 7 | 4.00 | 0.97950 |
| 8 | 8.00 | 0.97950 |




**Void Ratio =** 0.864 **Compression =** 2.0 %
**$D_0$ =** 0.98092 **$D_{90}$ =** 0.98014 **$D_{100}$ =** 0.98006
**$C_v$ at 0.8 min. =** 2.68 ft.$^2$/day

**Pressure: 0.50 tsf** **TEST READINGS** **Load No. 7**

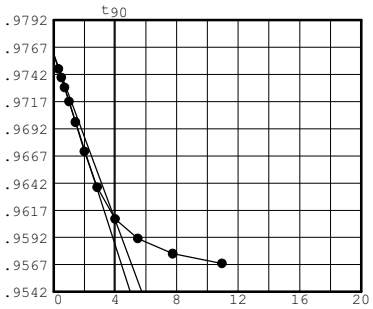
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.97950 |
| 2 | 0.10 | 0.97870 |
| 3 | 0.25 | 0.97840 |
| 4 | 0.50 | 0.97800 |
| 5 | 1.00 | 0.97750 |
| 6 | 2.00 | 0.97700 |
| 7 | 4.00 | 0.97640 |
| 8 | 9.00 | 0.97560 |




**Void Ratio =** 0.857 **Compression =** 2.4 %
**$D_0$ =** 0.98007 **$D_{90}$ =** 0.97762 **$D_{100}$ =** 0.97735
**$C_v$ at 2.5 min. =** 0.80 ft.$^2$/day

**Pressure: 1.00 tsf** **TEST READINGS** **Load No. 8**

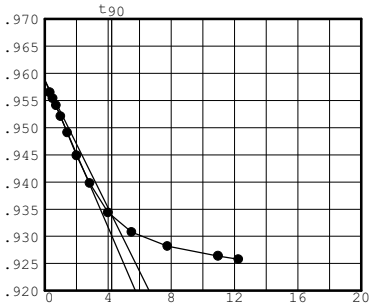
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.97560 | 11 | 60.00 | 0.95610 |
| 2 | 0.10 | 0.97310 | 12 | 120.00 | 0.95520 |
| 3 | 0.25 | 0.97230 | | | |
| 4 | 0.50 | 0.97140 | | | |
| 5 | 1.00 | 0.97010 | | | |
| 6 | 2.00 | 0.96820 | | | |
| 7 | 4.00 | 0.96550 | | | |
| 8 | 8.00 | 0.96220 | | | |
| 9 | 16.00 | 0.95930 | | | |
| 10 | 30.00 | 0.95750 | | | |




**Void Ratio =** 0.820 **Compression =** 4.3 %
**$D_0$ =** 0.97606 **$D_{90}$ =** 0.96107 **$D_{100}$ =** 0.95940
**$C_v$ at 15.5 min. =** 0.13 ft.$^2$/day

**Pressure: 2.00 tsf** **TEST READINGS** **Load No. 9**

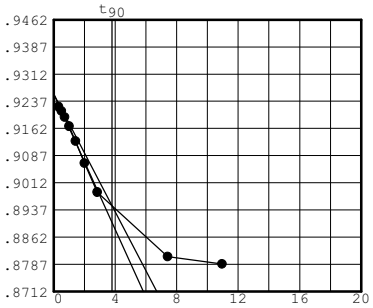
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.95520 | 11 | 60.00 | 0.92580 |
| 2 | 0.10 | 0.95410 | 12 | 120.00 | 0.92400 |
| 3 | 0.25 | 0.95300 | 13 | 150.00 | 0.92340 |
| 4 | 0.50 | 0.95170 | | | |
| 5 | 1.00 | 0.94970 | | | |
| 6 | 2.00 | 0.94670 | | | |
| 7 | 4.00 | 0.94250 | | | |
| 8 | 8.00 | 0.93740 | | | |
| 9 | 16.00 | 0.93200 | | | |
| 10 | 30.00 | 0.92840 | | | |




**Void Ratio =** 0.761 **Compression =** 7.4 %
**$D_0$ =** 0.95874 **$D_{90}$ =** 0.93382 **$D_{100}$ =** 0.93105
**$C_v$ at 18.0 min. =** 0.10 ft.$^2$/day

**Pressure: 4.00 tsf** **TEST READINGS** **Load No. 10**

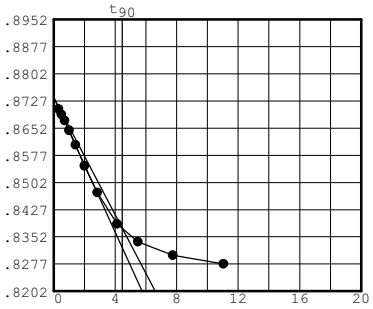
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.92340 |
| 2 | 0.10 | 0.92220 |
| 3 | 0.25 | 0.92100 |
| 4 | 0.50 | 0.91930 |
| 5 | 1.00 | 0.91680 |
| 6 | 2.00 | 0.91270 |
| 7 | 4.00 | 0.90660 |
| 8 | 8.00 | 0.89860 |
| 9 | 55.00 | 0.88080 |
| 10 | 120.00 | 0.87880 |




**Void Ratio =** 0.671 **Compression =** 12.1 %
**$D_0$ =** 0.92568 **$D_{90}$ =** 0.89485 **$D_{100}$ =** 0.89143
**$C_v$ at 14.4 min. =** 0.12 ft.$^2$/day

**Pressure: 8.00 tsf** **TEST READINGS** **Load No. 11**

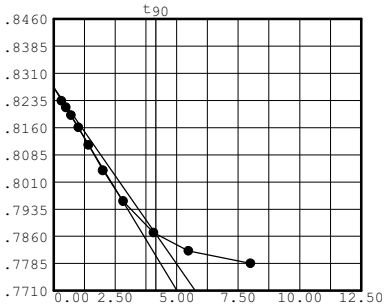
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.87680 | 11 | 60.00 | 0.83010 |
| 2 | 0.10 | 0.87050 | 12 | 122.00 | 0.82770 |
| 3 | 0.25 | 0.86900 | | | |
| 4 | 0.50 | 0.86730 | | | |
| 5 | 1.00 | 0.86460 | | | |
| 6 | 2.00 | 0.86060 | | | |
| 7 | 4.00 | 0.85480 | | | |
| 8 | 8.00 | 0.84740 | | | |
| 9 | 17.00 | 0.83880 | | | |
| 10 | 30.00 | 0.83380 | | | |




**Void Ratio =** 0.574 **Compression =** 17.2 %
**$D_0$ =** 0.87369 **$D_{90}$ =** 0.83755 **$D_{100}$ =** 0.83353
**$C_v$ at 19.9 min. =** 0.08 ft.$^2$/day

**Pressure: 16.00 tsf** **TEST READINGS** **Load No. 12**

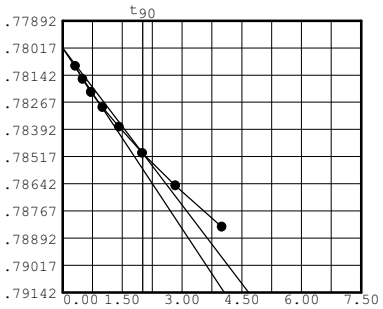
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.82770 | 11 | 64.00 | 0.77850 |
| 2 | 0.10 | 0.82340 | | | |
| 3 | 0.25 | 0.82160 | | | |
| 4 | 0.50 | 0.81940 | | | |
| 5 | 1.00 | 0.81610 | | | |
| 6 | 2.00 | 0.81120 | | | |
| 7 | 4.00 | 0.80420 | | | |
| 8 | 8.00 | 0.79570 | | | |
| 9 | 16.50 | 0.78700 | | | |
| 10 | 30.00 | 0.78200 | | | |




**Void Ratio =** 0.481 **Compression =** 22.1 %
**$D_0$ =** 0.82712 **$D_{90}$ =** 0.78670 **$D_{100}$ =** 0.78221
**$C_v$ at 17.2 min. =** 0.08 ft.$^2$/day

**Pressure: 4.00 tsf** **TEST READINGS** **Load No. 13**

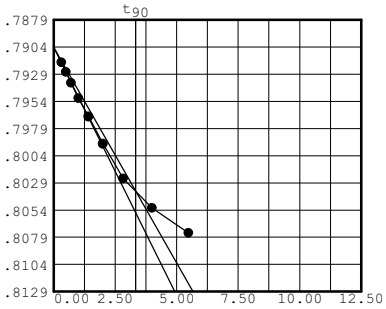
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.77850 |
| 2 | 0.10 | 0.78100 |
| 3 | 0.25 | 0.78160 |
| 4 | 0.50 | 0.78220 |
| 5 | 1.00 | 0.78290 |
| 6 | 2.00 | 0.78380 |
| 7 | 4.00 | 0.78500 |
| 8 | 8.00 | 0.78650 |
| 9 | 16.00 | 0.78840 |




**Void Ratio =** 0.499 **Compression =** 21.2 %
**$D_0$ =** 0.78018 **$D_{90}$ =** 0.78503 **$D_{100}$ =** 0.78556
**$C_v$ at 4.1 min. =** 0.32 ft.$^2$/day

**Pressure: 1.00 tsf** **TEST READINGS** **Load No. 14**

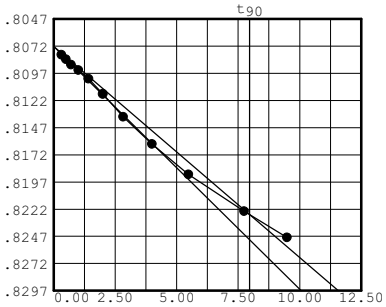
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.78840 |
| 2 | 0.10 | 0.79020 |
| 3 | 0.25 | 0.79110 |
| 4 | 0.50 | 0.79210 |
| 5 | 1.00 | 0.79350 |
| 6 | 2.00 | 0.79520 |
| 7 | 4.00 | 0.79770 |
| 8 | 8.00 | 0.80090 |
| 9 | 16.00 | 0.80360 |
| 10 | 30.00 | 0.80590 |




**Void Ratio =** 0.536 **Compression =** 19.3 %
**$D_0$ =** 0.79042 **$D_{90}$ =** 0.80366 **$D_{100}$ =** 0.80513
**$C_v$ at 11.1 min. =** 0.12 ft.$^2$/day

**Pressure: 0.25 tsf** **TEST READINGS** **Load No. 15**

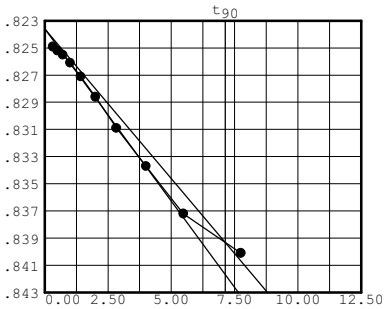
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.80590 | 11 | 60.00 | 0.82200 |
| 2 | 0.10 | 0.80760 | 12 | 90.00 | 0.82440 |
| 3 | 0.25 | 0.80800 | | | |
| 4 | 0.50 | 0.80850 | | | |
| 5 | 1.00 | 0.80900 | | | |
| 6 | 2.00 | 0.80980 | | | |
| 7 | 4.00 | 0.81120 | | | |
| 8 | 8.00 | 0.81330 | | | |
| 9 | 16.00 | 0.81580 | | | |
| 10 | 30.00 | 0.81860 | | | |




**Void Ratio =** 0.569 **Compression =** 17.5 %
**$D_0$ =** 0.80723 **$D_{90}$ =** 0.82269 **$D_{100}$ =** 0.82441
**$C_v$ at 63.3 min. =** 0.02 ft.$^2$/day

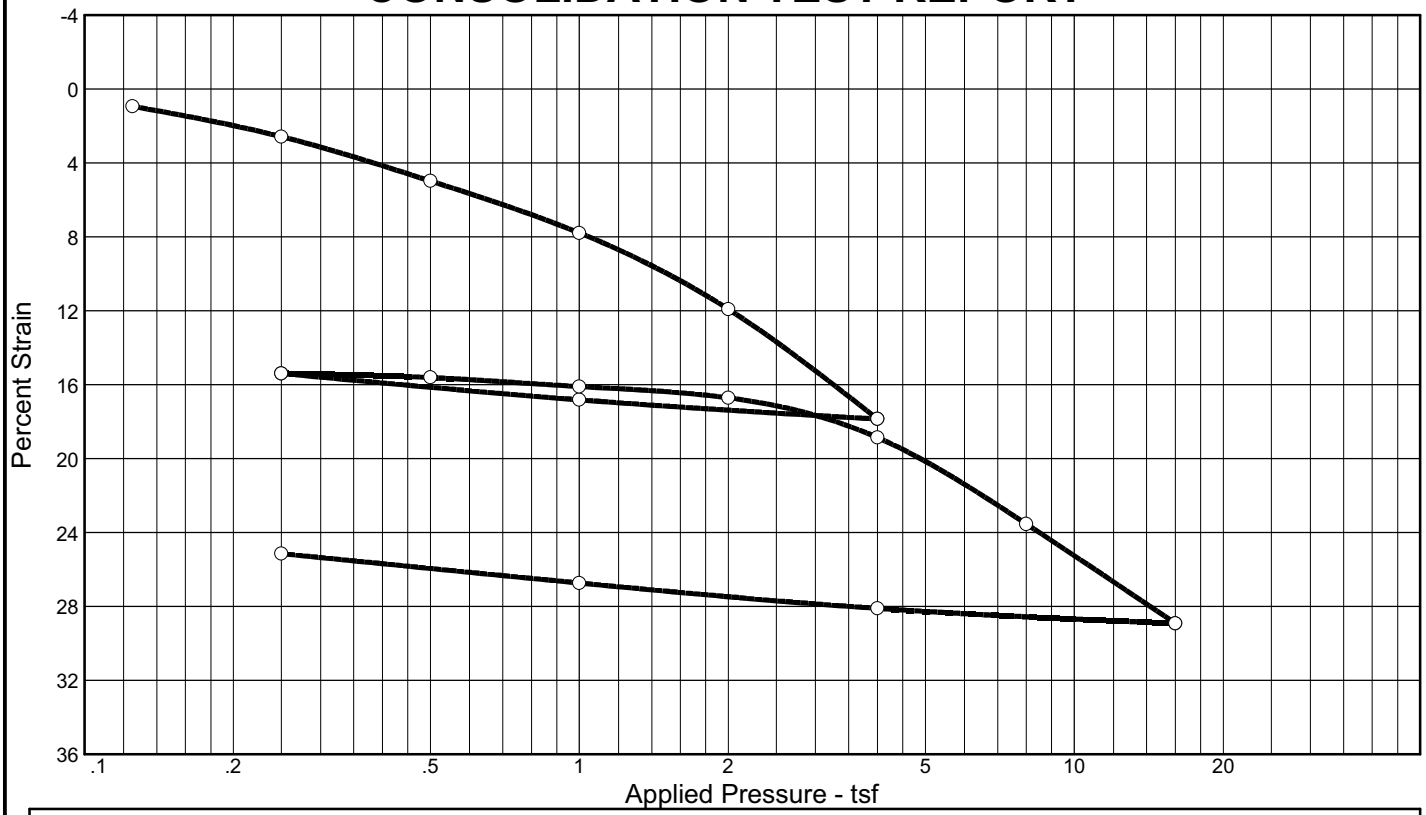
**Pressure: 0.13 tsf** **TEST READINGS** **Load No. 16**

| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.82410 | 11 | 60.00 | 0.84010 |
| 2 | 0.10 | 0.82490 | | | |
| 3 | 0.25 | 0.82520 | | | |
| 4 | 0.50 | 0.82550 | | | |
| 5 | 1.00 | 0.82610 | | | |
| 6 | 2.00 | 0.82710 | | | |
| 7 | 4.00 | 0.82860 | | | |
| 8 | 8.00 | 0.83090 | | | |
| 9 | 16.00 | 0.83370 | | | |
| 10 | 30.00 | 0.83720 | | | |




**Void Ratio =** 0.598 **Compression =** 16.0 %
**$D_0$ =** 0.82358 **$D_{90}$ =** 0.83931 **$D_{100}$ =** 0.84106
**$C_v$ at 50.8 min. =** 0.03 ft.$^2$/day

# CONSOLIDATION TEST REPORT




Coefficients of Consolidation and Secondary Consolidation

| No. | Load (tsf) | $C_v$ (ft.$^2$/day) | $C_\alpha$ | No. | Load (tsf) | $C_v$ (ft.$^2$/day) | $C_\alpha$ | No. | Load (tsf) | $C_v$ (ft.$^2$/day) | $C_\alpha$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.13 | 0.21 | 0.000 | 15 | 4.00 | 0.97 | | | | | |
| 2 | 0.25 | 0.72 | 0.002 | 17 | 0.25 | 0.20 | | | | | |
| 3 | 0.50 | 4.36 | 0.002 | | | | | | | | |
| 7 | 1.00 | 0.97 | 0.000 | | | | | | | | |
| 8 | 0.25 | 0.88 | | | | | | | | | |
| 10 | 1.00 | 2.52 | 0.000 | | | | | | | | |
| 11 | 2.00 | 2.42 | 0.000 | | | | | | | | |
| 12 | 4.00 | 1.88 | 0.004 | | | | | | | | |
| 13 | 8.00 | 0.43 | 0.007 | | | | | | | | |
| 14 | 16.00 | 0.80 | 0.008 | | | | | | | | |

| MATERIAL DESCRIPTION | USCS | AASHTO |
|---|---|---|
| Gray, Sandy Lean CLAY | CL | A-7-6(8) |

| LL | PI | Sp. Gr. | Overburden (tsf) | Dry Dens. (pcf) | | Moisture | | Saturation | | Void Ratio | | $P_c$ (tsf) | $C_c$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Init. | Final | Init. | Final | Init. | Final | Init. | Final | | |
| 46 | 21 | 2.749 | 1.10 | 93.6 | | 37.8 % | 30.6 % | 113.9 % | 100.0 % | 0.913 | 0.432 | | |

| Preparation Process: | D2435 Method | $C_r$ | Swell Press. (tsf) | Swell % |
|---|---|---|---|---|
| Condition of Test: | | | | |

**Project No.** VB11-232G **Client:** HDR, Inc.

**Project:** I64/I264 Improvements - PSA Ramps & Channel

**Location:** D7CD-25W

**Remarks:**

Sample Obtained
Boring# D7CD-25W

**Checked By:**

**Title:**

CONSOLIDATION TEST REPORT

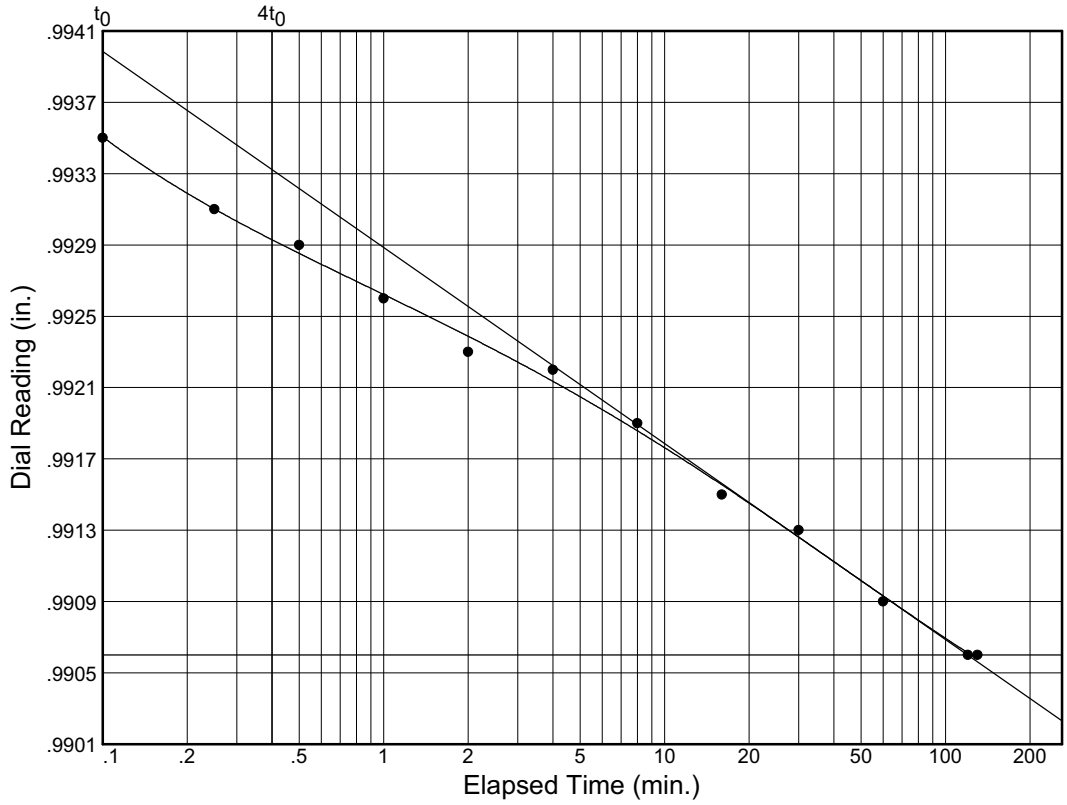
**GET SOLUTIONS, INC.**

**Figure**

# Dial Reading vs. Time

Project No.: VB11-232G
Project: I64/I264 Improvements - PSA Ramps & Channel

Location: D7CD-25W




Load No.= 1

Load= 0.13 tsf

$D_0$ = 0.99408

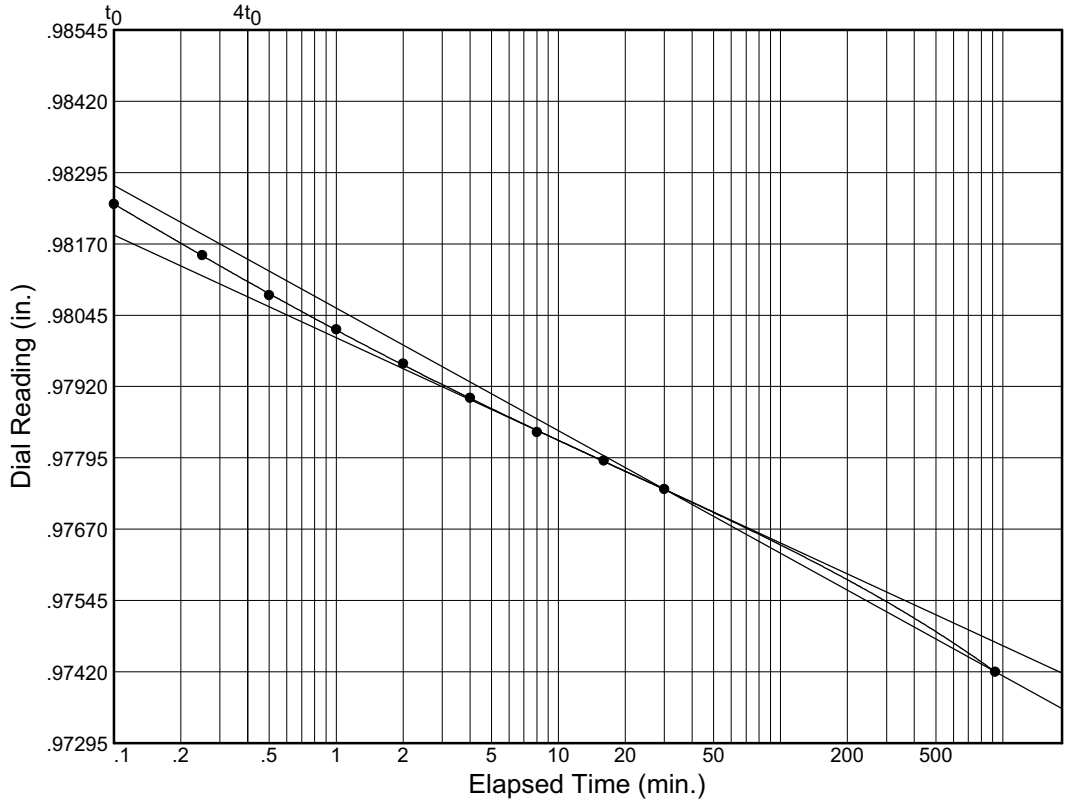
$D_{50}$ = 0.99234

$D_{100}$ = 0.99060

$T_{50}$ = 2.28 min.

| $C_v$ @ $T_{50}$ |
|---|
| 0.21 ft.$^2$/day |

$C_\alpha$ = 0.000




Load No.= 2

Load= 0.25 tsf

$D_0$ = 0.98376

$D_{50}$ = 0.98057

$D_{100}$ = 0.97738

$T_{50}$ = 0.66 min.

| $C_v$ @ $T_{50}$ |
|---|
| 0.72 ft.$^2$/day |

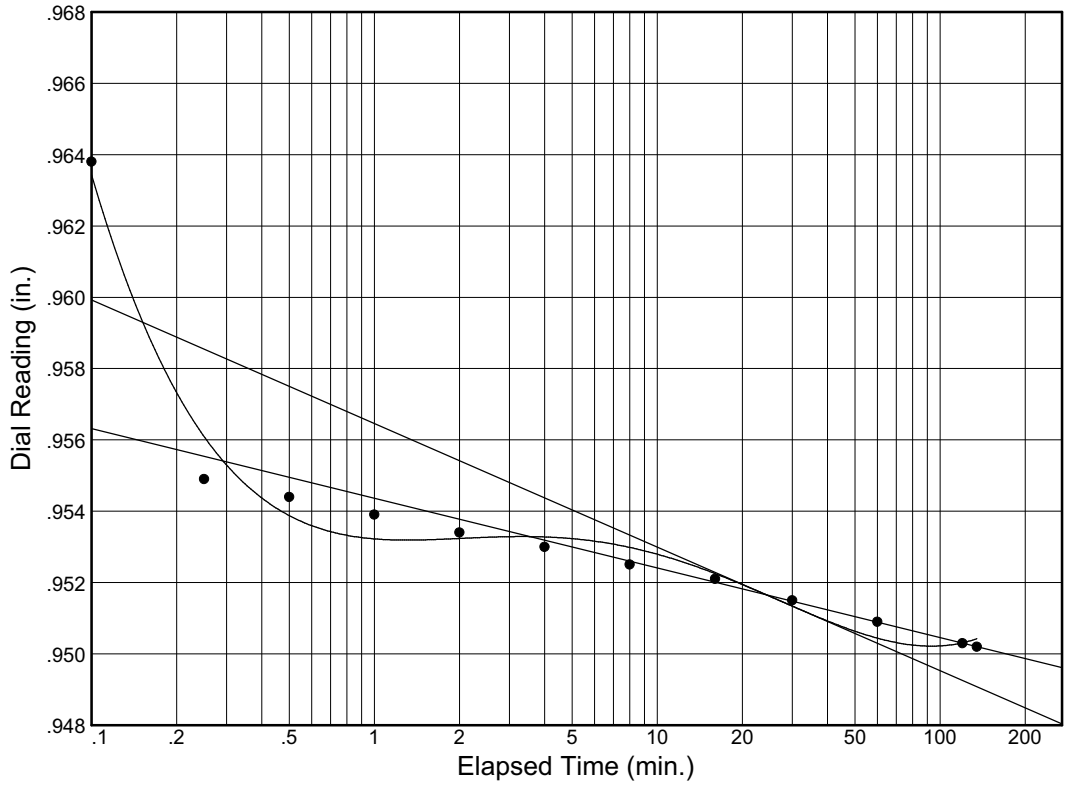
$C_\alpha$ = 0.002

Figure

# Dial Reading vs. Time

Project No.: VB11-232G
Project: I64/I264 Improvements - PSA Ramps & Channel

Location: D7CD-25W




Load No.= 3

Load= 0.50 tsf

$D_0$ = 0.97420

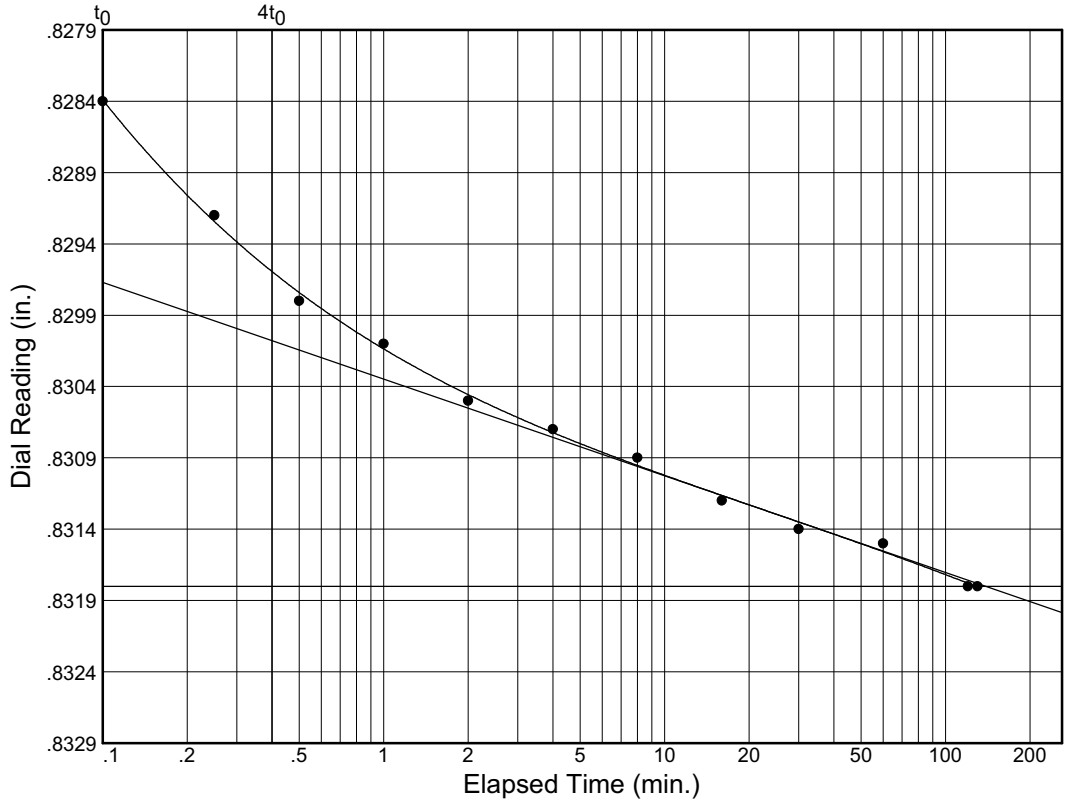
$D_{50}$ = 0.96293

$D_{100}$ = 0.95165

$T_{50}$ = 0.10 min.

| $C_v$ @ $T_{50}$ |
|---|
| 4.36 ft.$^2$/day |

$C_\alpha$ = 0.002




Load No.= 7

Load= 1.00 tsf

$D_0$ = 0.82719

$D_{50}$ = 0.82949

$D_{100}$ = 0.83180

$T_{50}$ = 0.35 min.

| $C_v$ @ $T_{50}$ |
|---|
| 0.97 ft.$^2$/day |

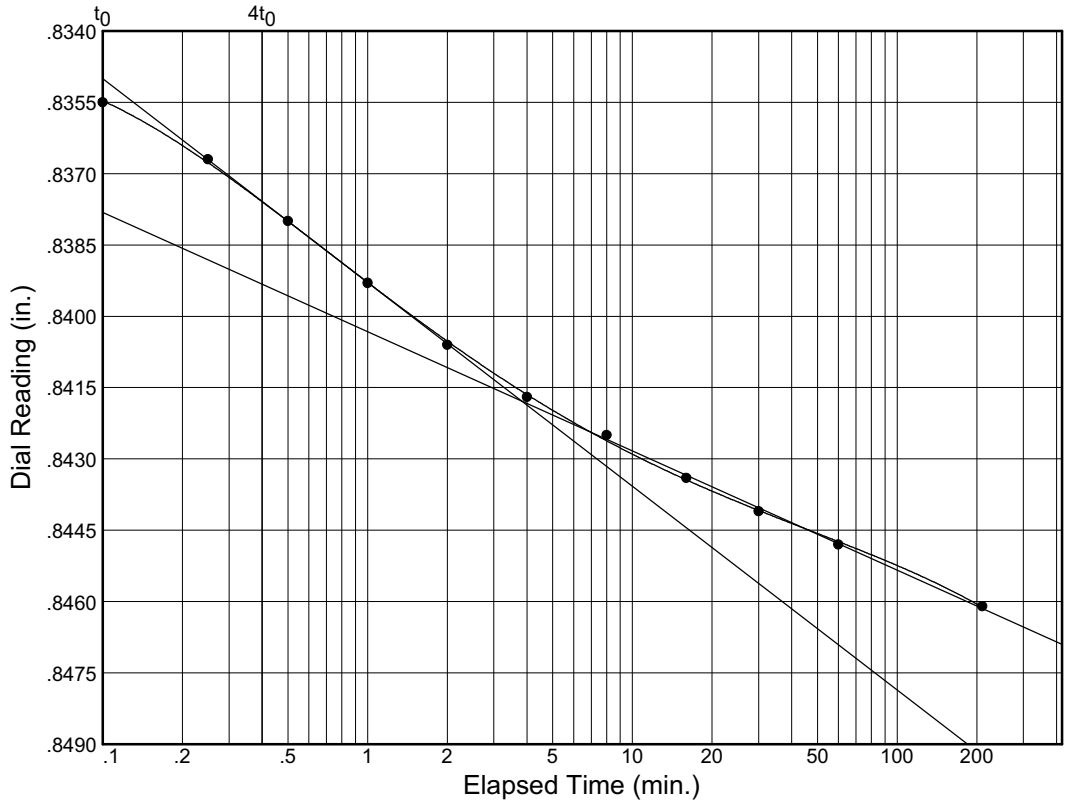
$C_\alpha$ = 0.000

Figure

# Dial Reading vs. Time

Project No.: VB11-232G
Project: I64/I264 Improvements - PSA Ramps & Channel

Location: D7CD-25W




Load No.= 8

Load= 0.25 tsf

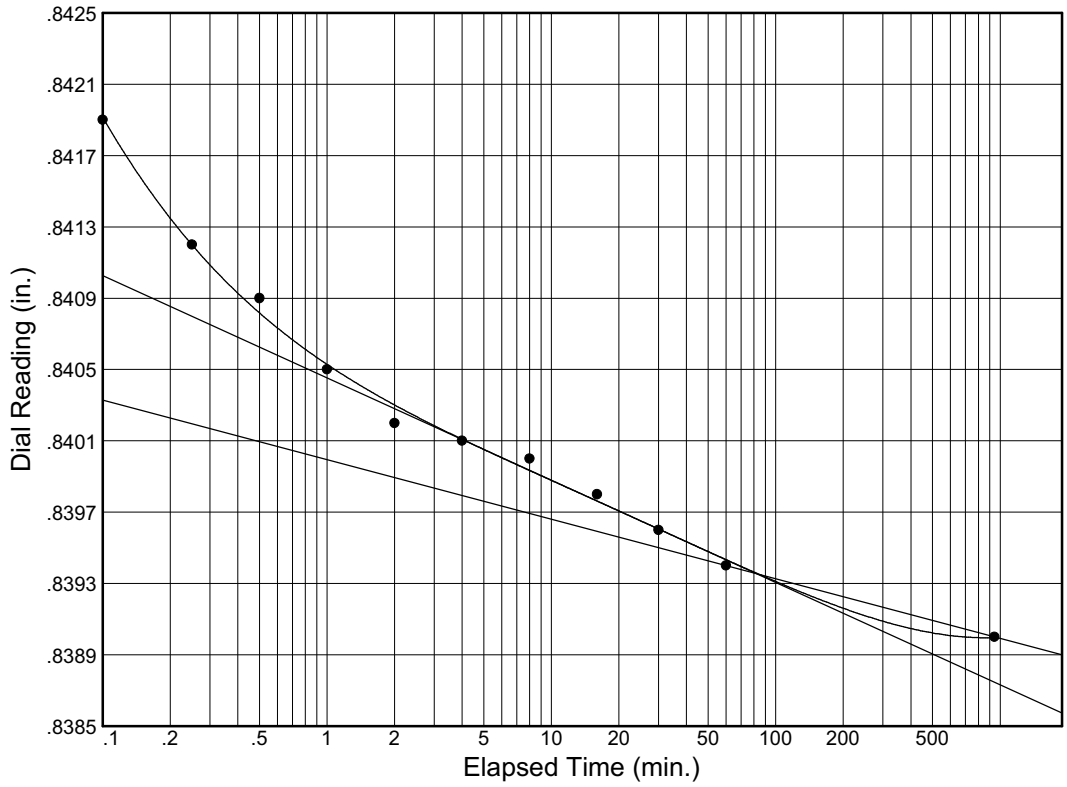
$D_0$ = 0.83335

$D_{50}$ = 0.83757

$D_{100}$ = 0.84179

$T_{50}$ = 0.40 min.

| $C_v$ @ $T_{50}$ |
|---|
| 0.88 ft.$^2$/day |




Load No.= 10

Load= 1.00 tsf

$D_0$ = 0.84390

$D_{50}$ = 0.84163

$D_{100}$ = 0.83935

$T_{50}$ = 0.14 min.

| $C_v$ @ $T_{50}$ |
|---|
| 2.52 ft.$^2$/day |

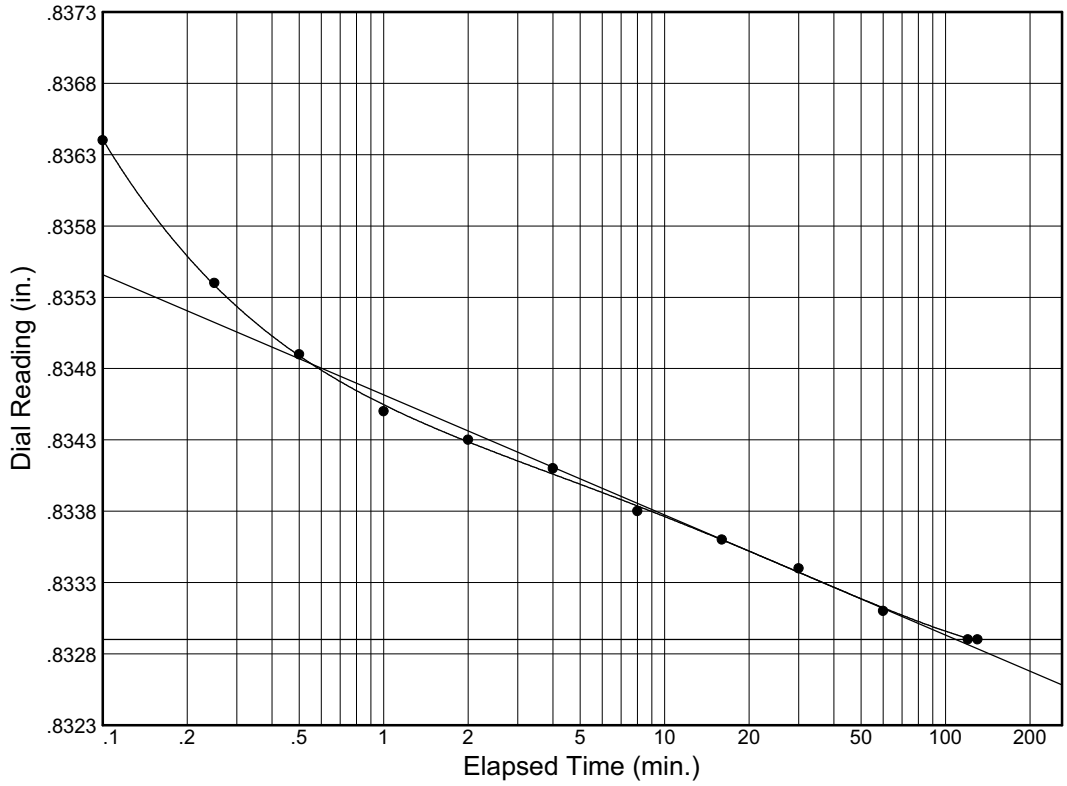
$C_\alpha$ = 0.000

Figure

# Dial Reading vs. Time

Project No.: VB11-232G
Project: I64/I264 Improvements - PSA Ramps & Channel

Location: D7CD-25W




Load No.= 11

Load= 2.00 tsf

$D_0$ = 0.83900

$D_{50}$ = 0.83595

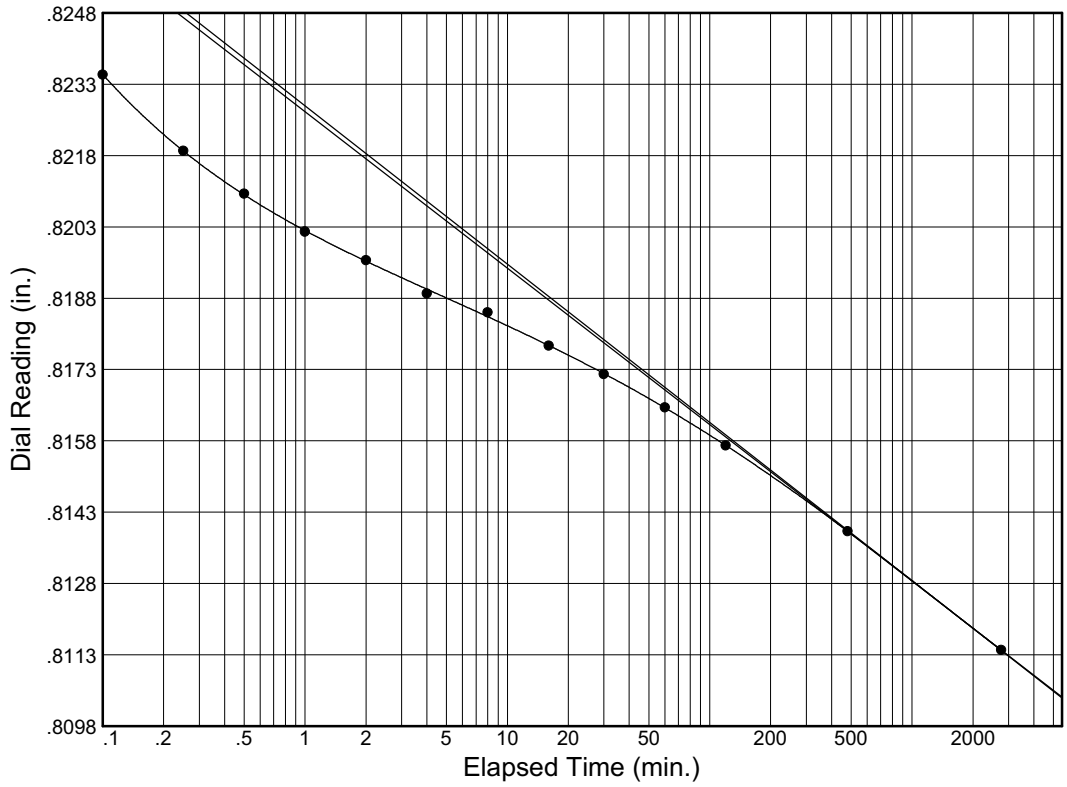
$D_{100}$ = 0.83290

$T_{50}$ = 0.14 min.

$C_v$ @ $T_{50}$

2.42 ft.$^2$/day

$C_\alpha$ = 0.000




Load No.= 12

Load= 4.00 tsf

$D_0$ = 0.83290

$D_{50}$ = 0.82245

$D_{100}$ = 0.81199

$T_{50}$ = 0.18 min.

$C_v$ @ $T_{50}$

1.88 ft.$^2$/day

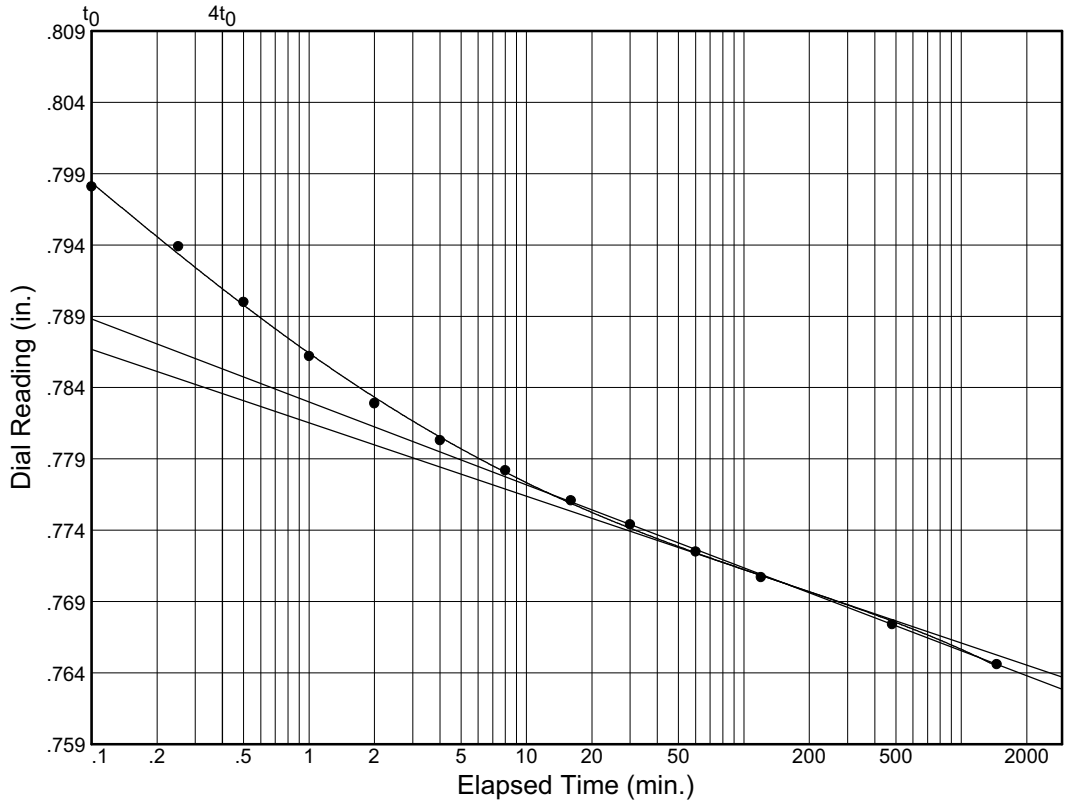
$C_\alpha$ = 0.004

Figure

# Dial Reading vs. Time

Project No.: VB11-232G
Project: I64/I264 Improvements - PSA Ramps & Channel

Location: D7CD-25W




Load No.= 13

Load= 8.00 tsf

$D_0$ = 0.80582

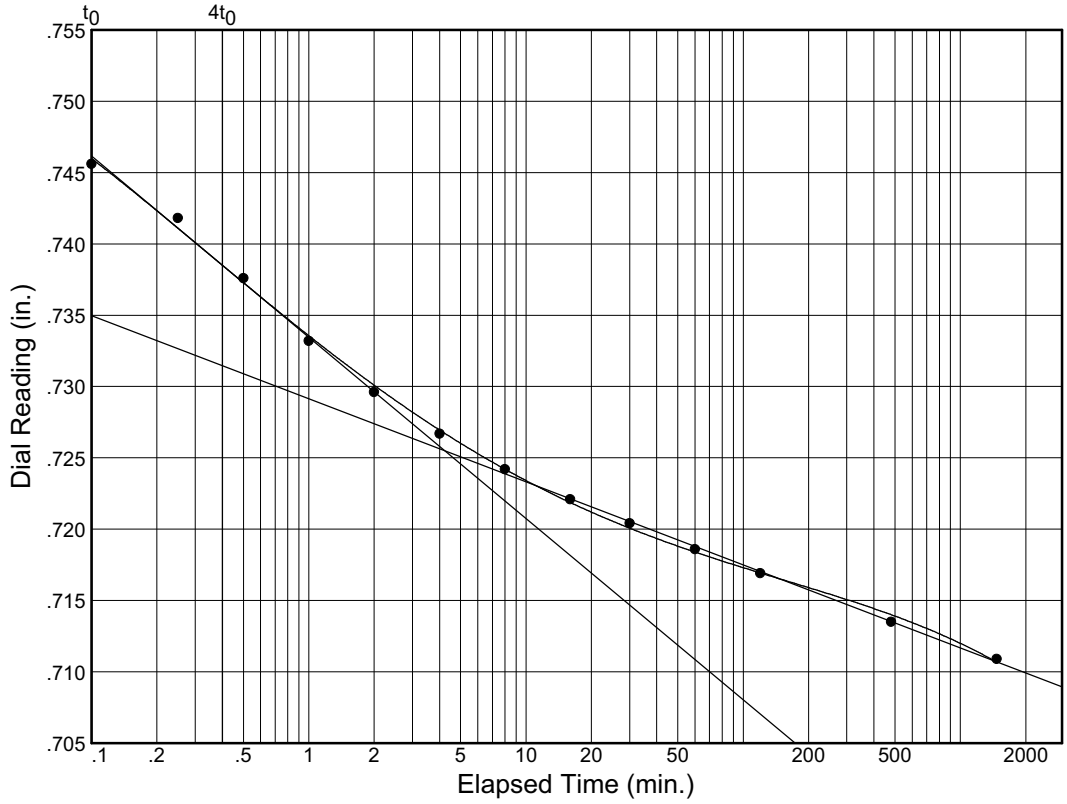
$D_{50}$ = 0.78805

$D_{100}$ = 0.77028

$T_{50}$ = 0.71 min.

| $C_v$ @ $T_{50}$ |
|---|
| 0.43 ft.$^2$/day |

$C_\alpha$ = 0.007




Load No.= 14

Load= 16.00 tsf

$D_0$ = 0.75346

$D_{50}$ = 0.73948

$D_{100}$ = 0.72550

$T_{50}$ = 0.34 min.

| $C_v$ @ $T_{50}$ |
|---|
| 0.80 ft.$^2$/day |

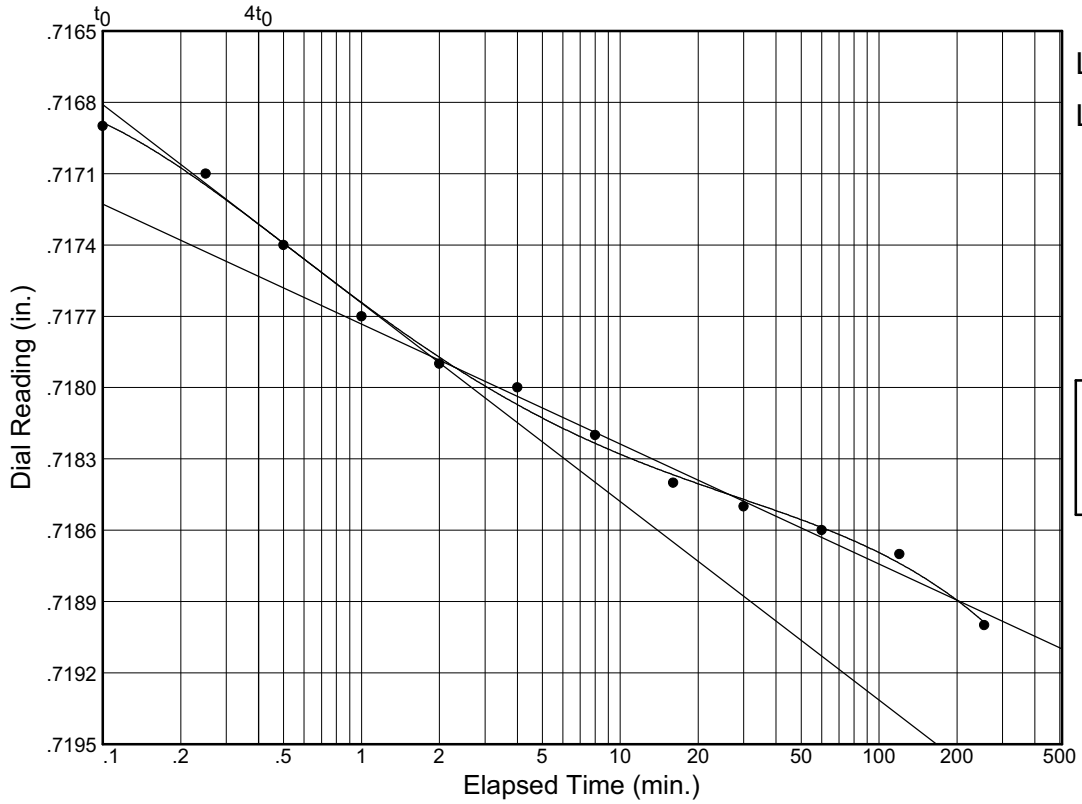
$C_\alpha$ = 0.008

Figure

# Dial Reading vs. Time

Project No.: VB11-232G
Project: I64/I264 Improvements - PSA Ramps & Channel

Location: D7CD-25W




Load No.= 15

Load= 4.00 tsf

$D_0$ = 0.71646

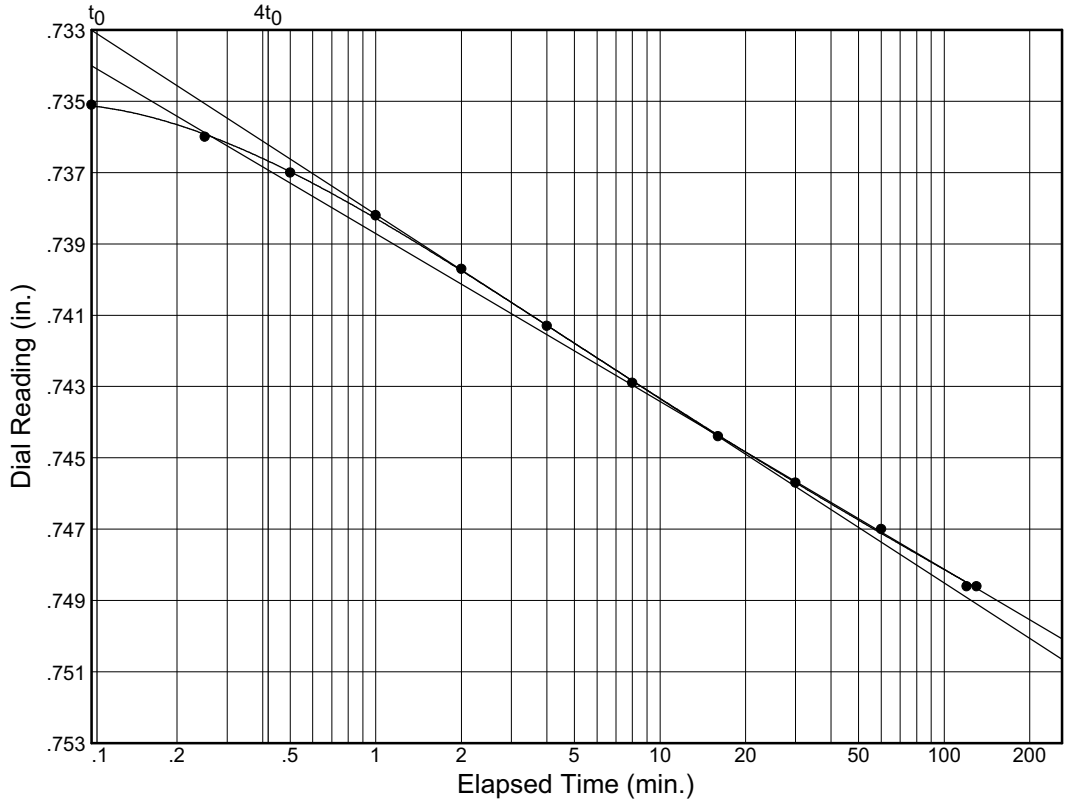
$D_{50}$ = 0.71716

$D_{100}$ = 0.71787

$T_{50}$ = 0.26 min.

$C_v$ @ $T_{50}$

0.97 ft.$^2$/day




Load No.= 17

Load= 0.25 tsf

$D_0$ = 0.73362

$D_{50}$ = 0.73892

$D_{100}$ = 0.74421

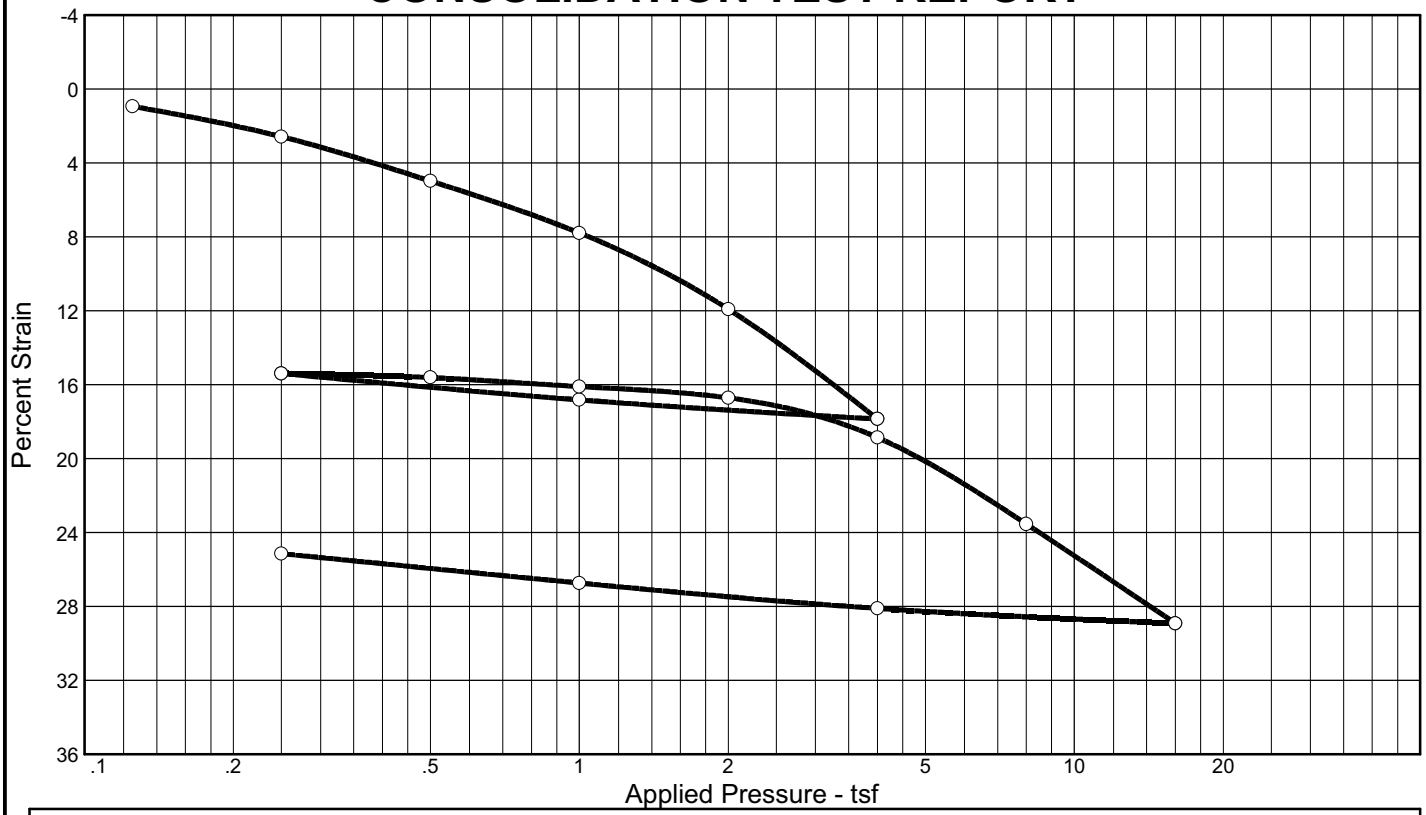
$T_{50}$ = 1.36 min.

$C_v$ @ $T_{50}$

0.20 ft.$^2$/day

Figure

# CONSOLIDATION TEST REPORT




Coefficients of Consolidation and Secondary Consolidation

| No. | Load (tsf) | $C_v$ (ft.$^2$/day) | $C_\alpha$ | No. | Load (tsf) | $C_v$ (ft.$^2$/day) | $C_\alpha$ | No. | Load (tsf) | $C_v$ (ft.$^2$/day) | $C_\alpha$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.13 | 1.18 | | 11 | 2.00 | 2.10 | | | | | |
| 2 | 0.25 | 1.40 | | 12 | 4.00 | 1.12 | | | | | |
| 3 | 0.50 | 5.84 | | 13 | 8.00 | 0.52 | | | | | |
| 4 | 1.00 | 1.28 | | 14 | 16.00 | 0.45 | | | | | |
| 5 | 2.00 | 1.19 | | 15 | 4.00 | 0.69 | | | | | |
| 6 | 4.00 | 1.09 | | 16 | 1.00 | 0.40 | | | | | |
| 7 | 1.00 | 2.03 | | 17 | 0.25 | 0.18 | | | | | |
| 8 | 0.25 | 0.54 | | | | | | | | | |
| 9 | 0.50 | 1.50 | | | | | | | | | |
| 10 | 1.00 | 1.10 | | | | | | | | | |

| MATERIAL DESCRIPTION | USCS | AASHTO |
|---|---|---|
| Gray, Sandy Lean CLAY | CL | A-7-6(8) |

| LL | PI | Sp. Gr. | Overburden (tsf) | Dry Dens. (pcf) | | Moisture | | Saturation | | Void Ratio | | $P_c$ (tsf) | $C_c$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Init. | Final | Init. | Final | Init. | Final | Init. | Final | | |
| 46 | 21 | 2.749 | 1.10 | 93.6 | | 37.8 % | 30.6 % | 113.9 % | 100.0 % | 0.913 | 0.432 | | |

| Preparation Process: | D2435 Method | $C_r$ | Swell Press. (tsf) | Swell % |
|---|---|---|---|---|
| Condition of Test: | | | | |

**Project No.** VB11-232G **Client:** HDR, Inc.

**Project:** I64/I264 Improvements - PSA Ramps & Channel

**Location:** D7CD-25W

**Remarks:**

Sample Obtained
Boring# D7CD-25W

**Checked By:**

**Title:**

CONSOLIDATION TEST REPORT

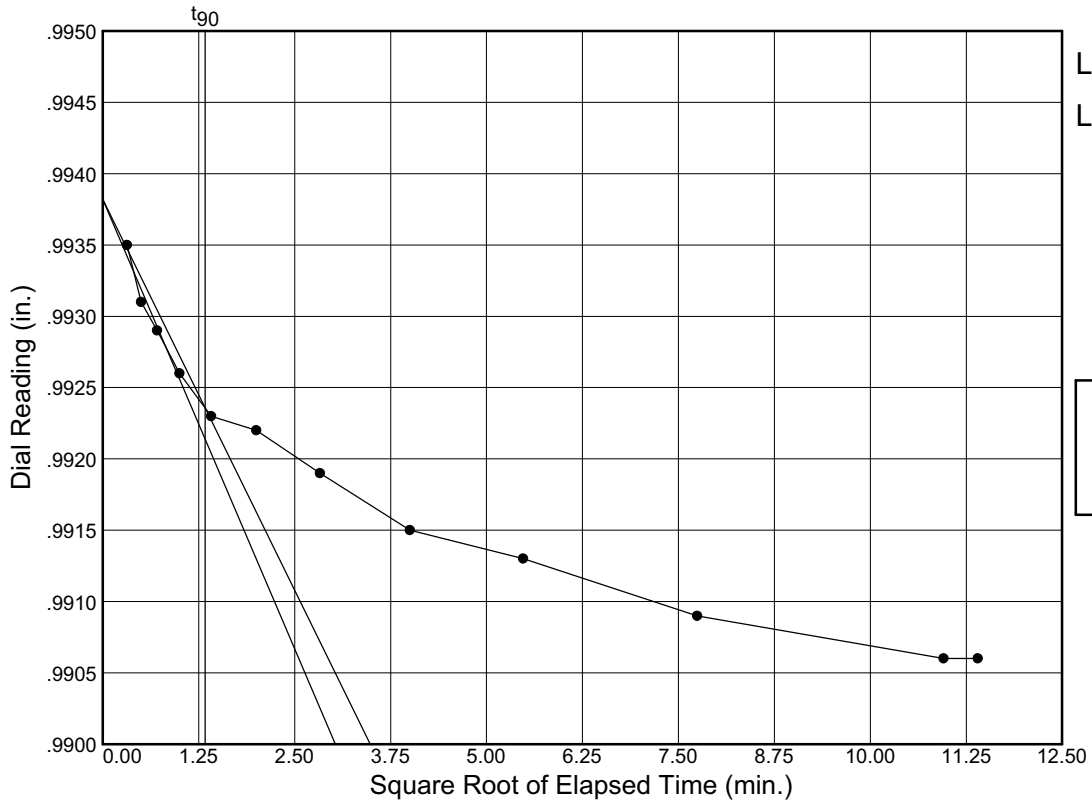
**GET SOLUTIONS, INC.**

**Figure**

# Dial Reading vs. Time

Project No.: VB11-232G
Project: I64/I264 Improvements - PSA Ramps & Channel

Location: D7CD-25W




Load No.= 1

Load= 0.13 tsf

$D_0$ = 0.99382

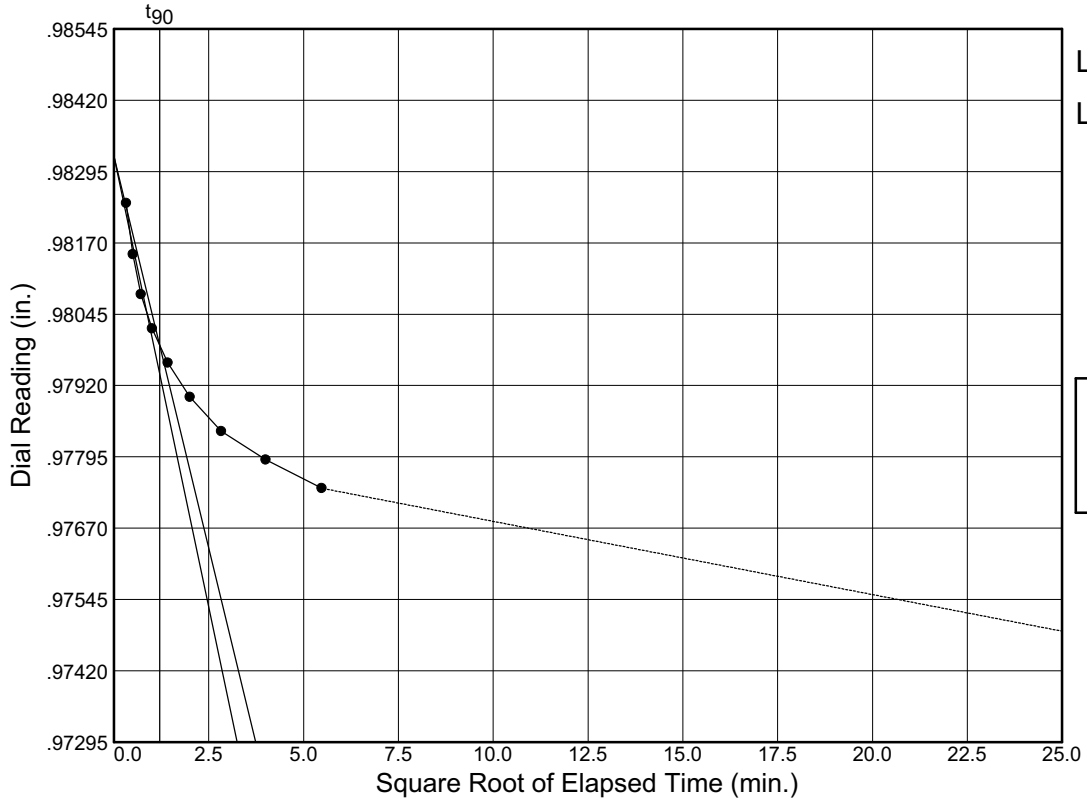
$D_{90}$ = 0.99236

$D_{100}$ = 0.99220

$T_{90}$ = 1.78 min.

$C_v$ @ $T_{90}$

1.18 ft.$^2$/day




Load No.= 2

Load= 0.25 tsf

$D_0$ = 0.98322

$D_{90}$ = 0.97990

$D_{100}$ = 0.97953

$T_{90}$ = 1.46 min.

$C_v$ @ $T_{90}$

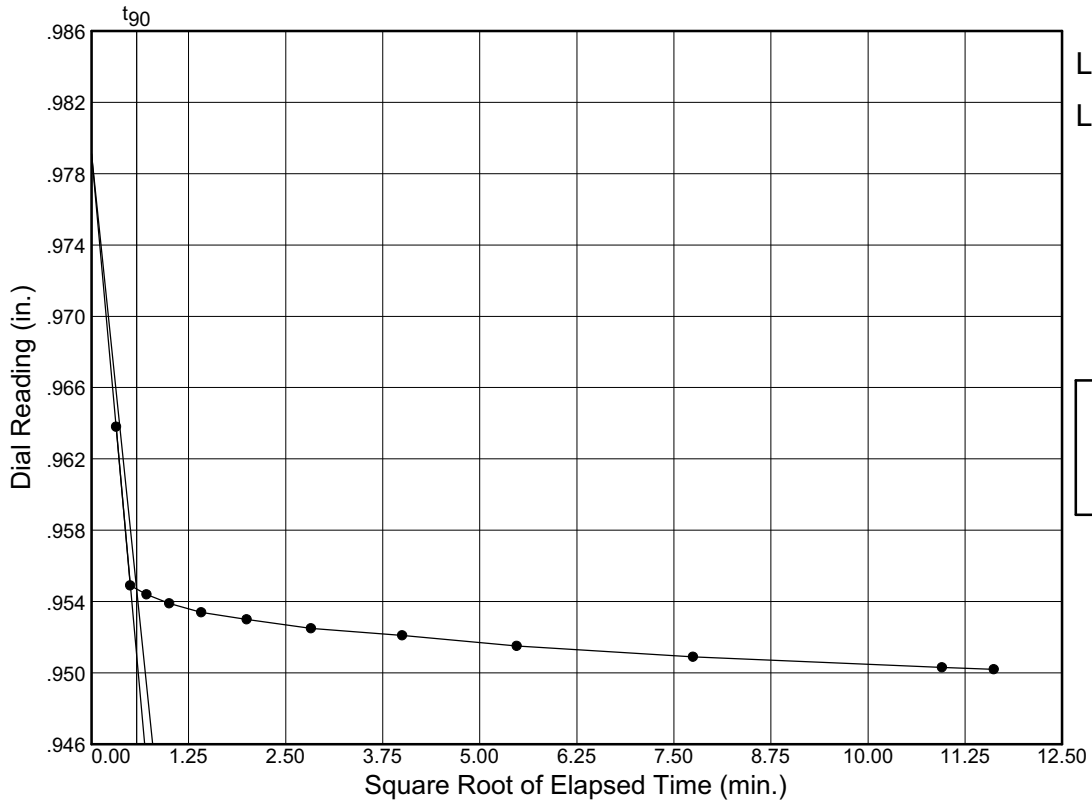
1.40 ft.$^2$/day

Figure

# Dial Reading vs. Time

Project No.: VB11-232G
Project: I64/I264 Improvements - PSA Ramps & Channel

Location: D7CD-25W




Load No.= 3

Load= 0.50 tsf

$D_0$ = 0.97911

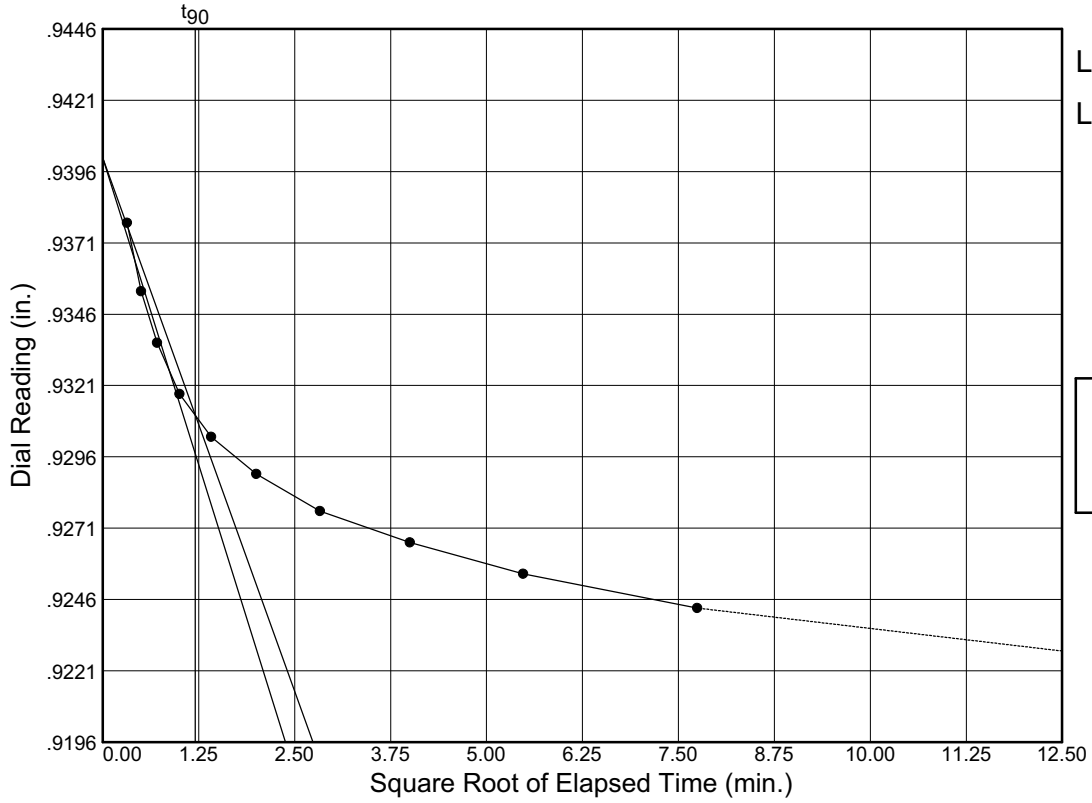
$D_{90}$ = 0.95471

$D_{100}$ = 0.95200

$T_{90}$ = 0.34 min.

$C_v$ @ $T_{90}$

5.84 ft.$^2$/day




Load No.= 4

Load= 1.00 tsf

$D_0$ = 0.94008

$D_{90}$ = 0.93105

$D_{100}$ = 0.93005

$T_{90}$ = 1.46 min.

$C_v$ @ $T_{90}$

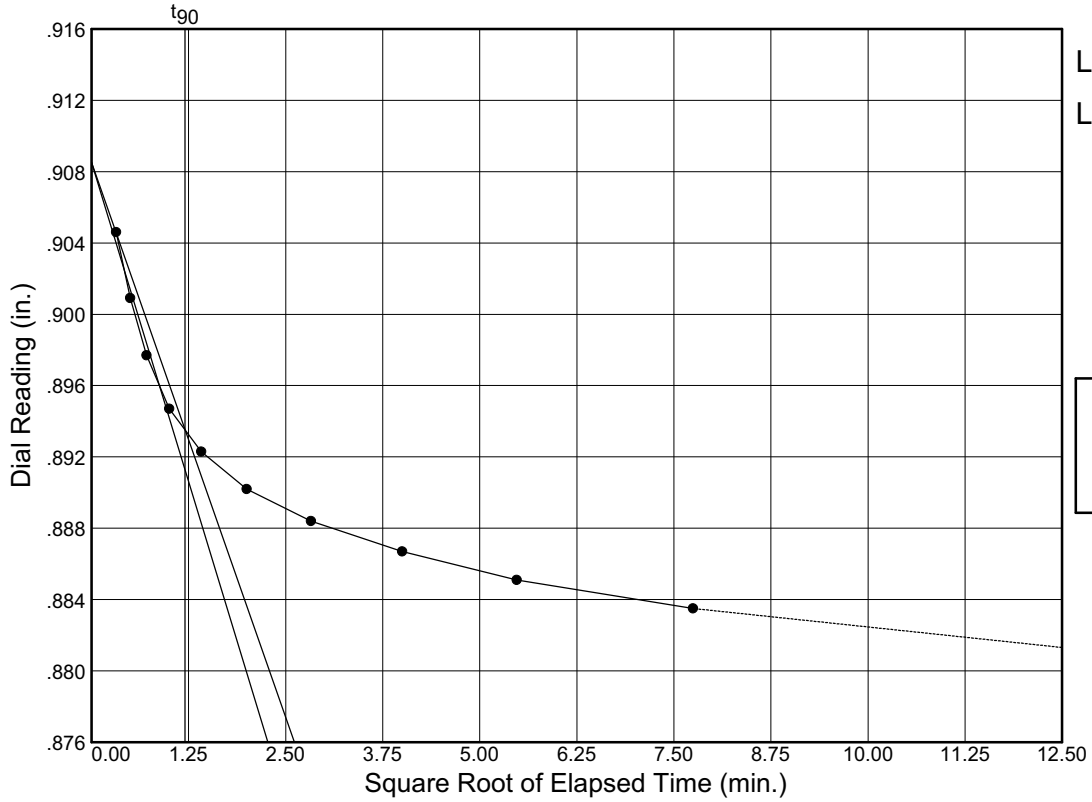
1.28 ft.$^2$/day

Figure

# Dial Reading vs. Time

Project No.: VB11-232G
Project: I64/I264 Improvements - PSA Ramps & Channel

Location: D7CD-25W




Load No.= 5

Load= 2.00 tsf

$D_0$ = 0.90851

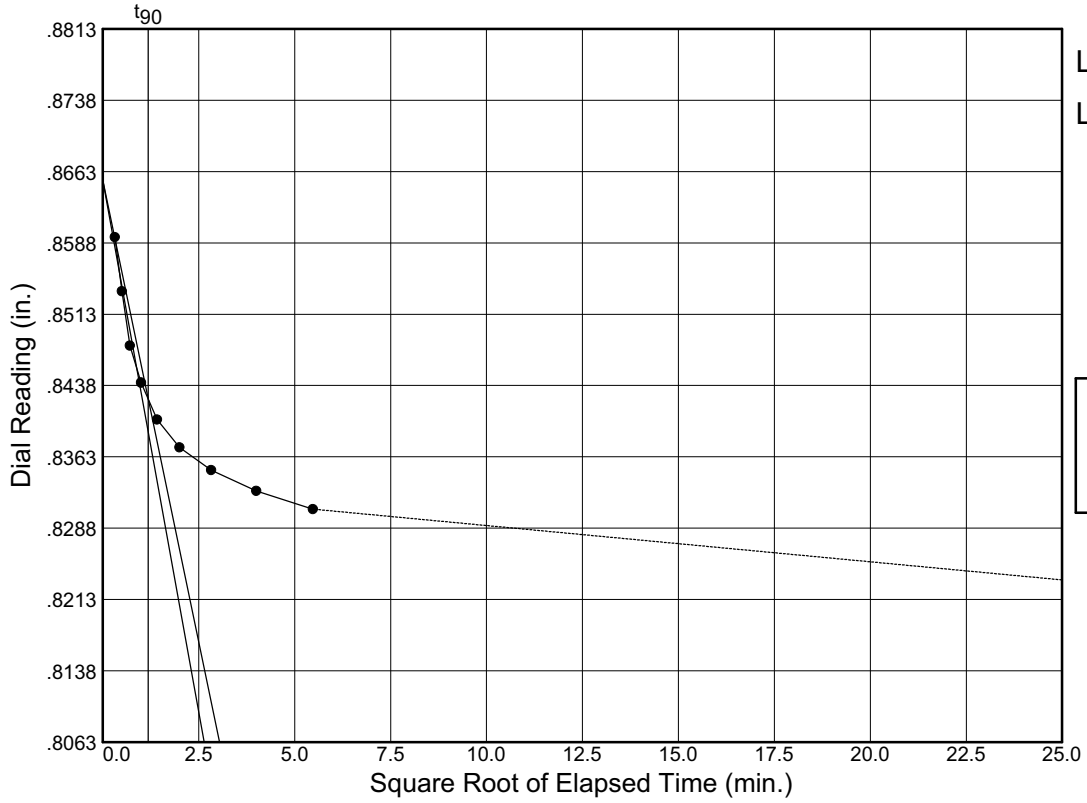
$D_{90}$ = 0.89352

$D_{100}$ = 0.89185

$T_{90}$ = 1.45 min.

$C_v$ @ $T_{90}$

1.19 ft.$^2$/day




Load No.= 6

Load= 4.00 tsf

$D_0$ = 0.86540

$D_{90}$ = 0.84235

$D_{100}$ = 0.83979

$T_{90}$ = 1.41 min.

$C_v$ @ $T_{90}$

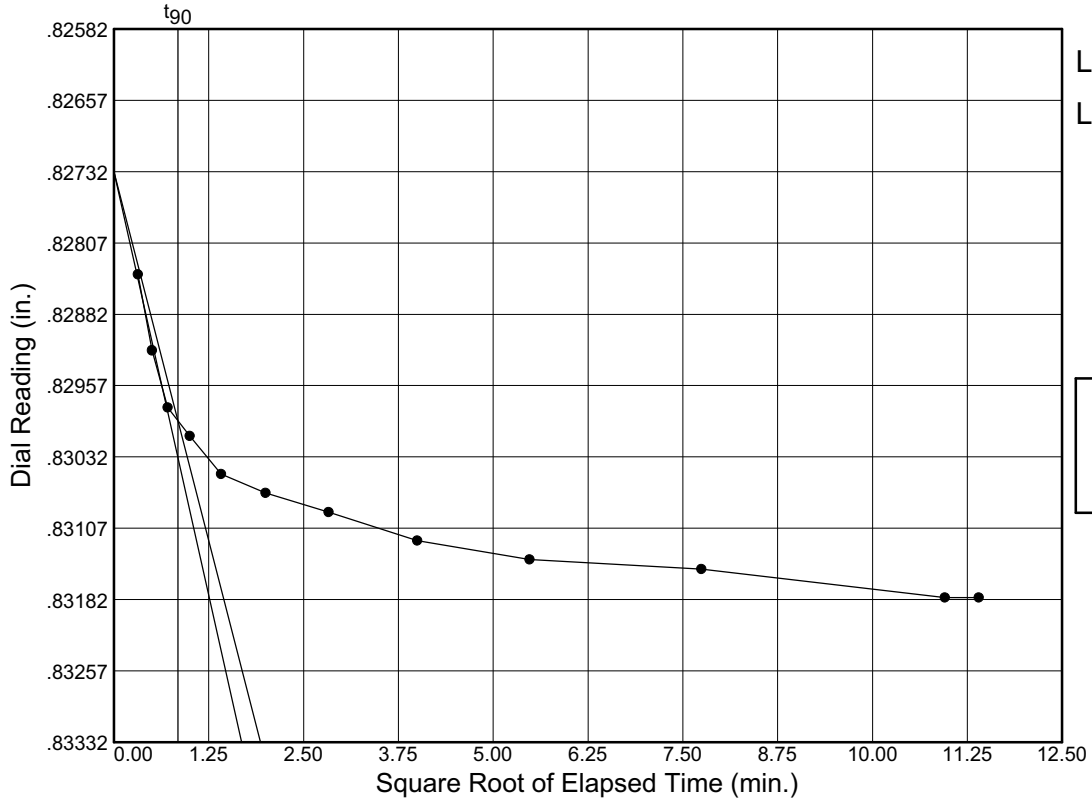
1.09 ft.$^2$/day

Figure

# Dial Reading vs. Time

Project No.: VB11-232G
Project: I64/I264 Improvements - PSA Ramps & Channel

Location: D7CD-25W




Load No.= 7

Load= 1.00 tsf

$D_0$ = 0.82732

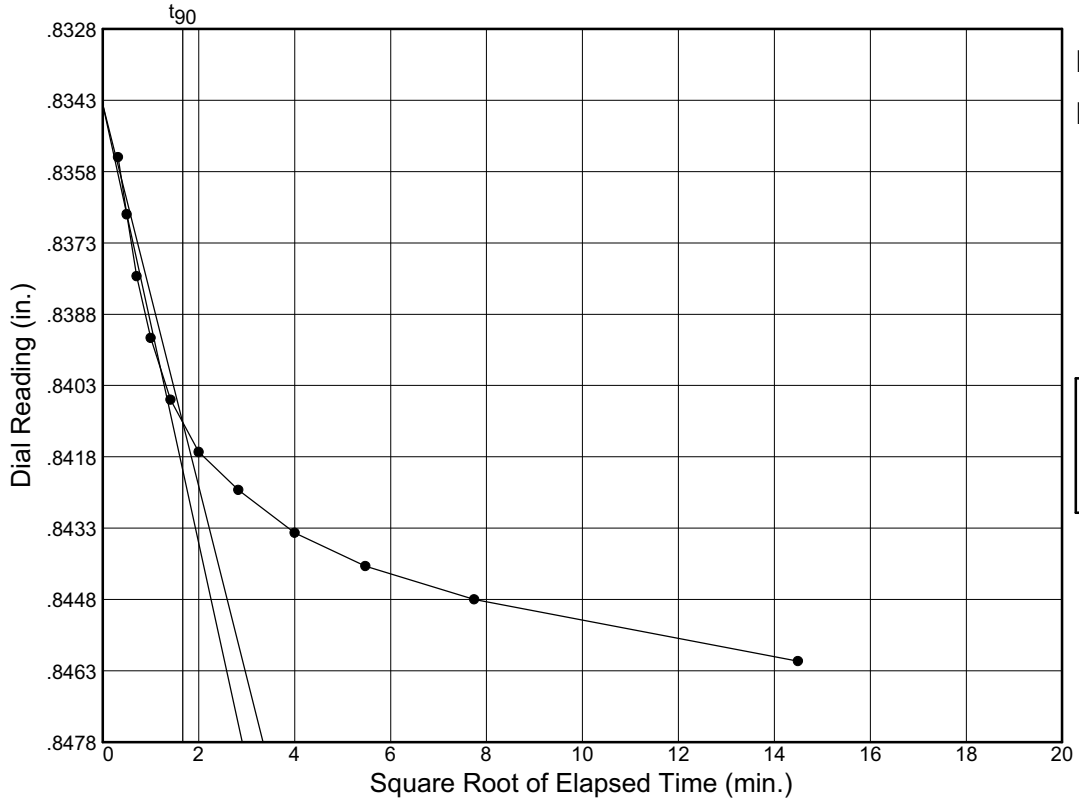
$D_{90}$ = 0.82994

$D_{100}$ = 0.83023

$T_{90}$ = 0.71 min.

$C_v$ @ $T_{90}$

2.03 ft.$^2$/day




Load No.= 8

Load= 0.25 tsf

$D_0$ = 0.83439

$D_{90}$ = 0.84107

$D_{100}$ = 0.84182

$T_{90}$ = 2.78 min.

$C_v$ @ $T_{90}$

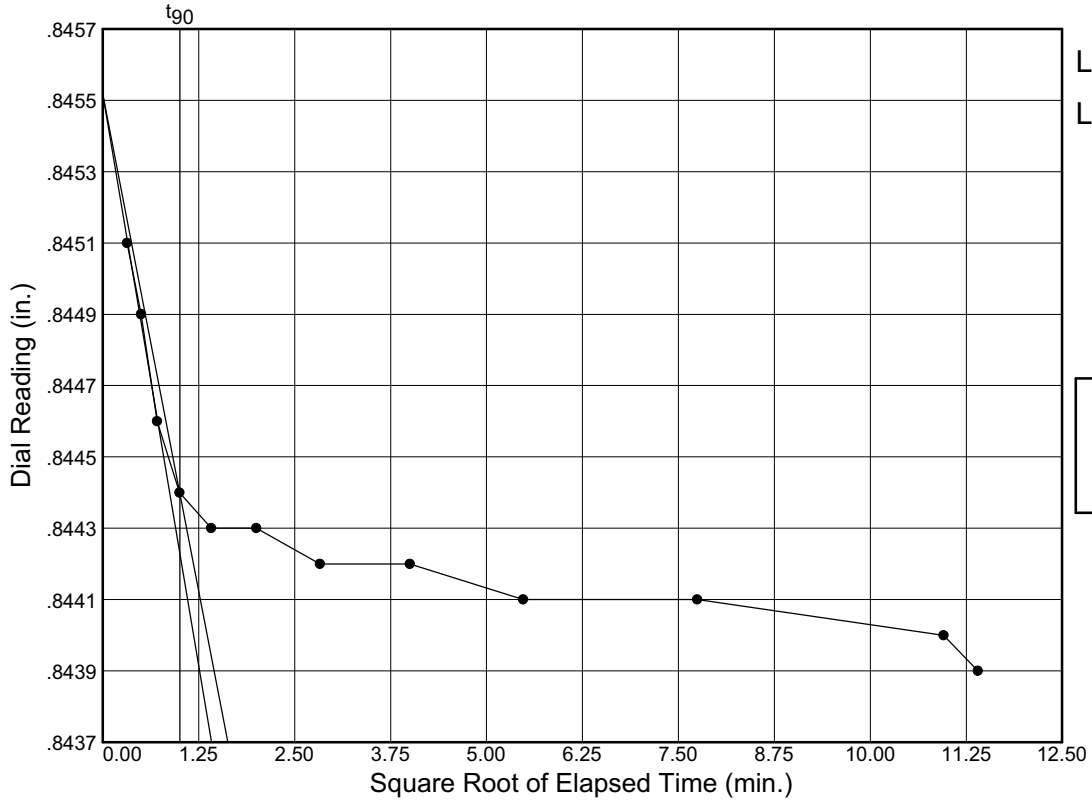
0.54 ft.$^2$/day

Figure

# Dial Reading vs. Time

Project No.: VB11-232G
Project: I64/I264 Improvements - PSA Ramps & Channel

Location: D7CD-25W




Load No.= 9

Load= 0.50 tsf

$D_0$ = 0.84552

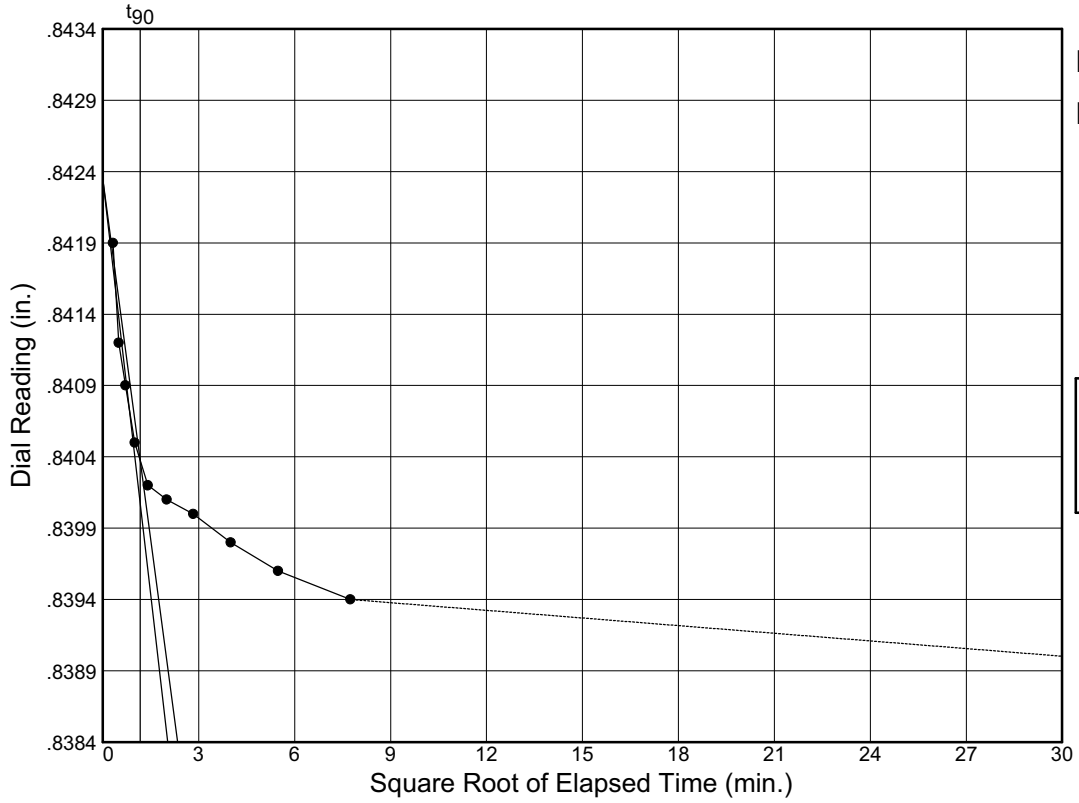
$D_{90}$ = 0.84440

$D_{100}$ = 0.84427

$T_{90}$ = 1.01 min.

$C_v$ @ $T_{90}$

1.50 ft.$^2$/day




Load No.= 10

Load= 1.00 tsf

$D_0$ = 0.84235

$D_{90}$ = 0.84038

$D_{100}$ = 0.84016

$T_{90}$ = 1.36 min.

$C_v$ @ $T_{90}$

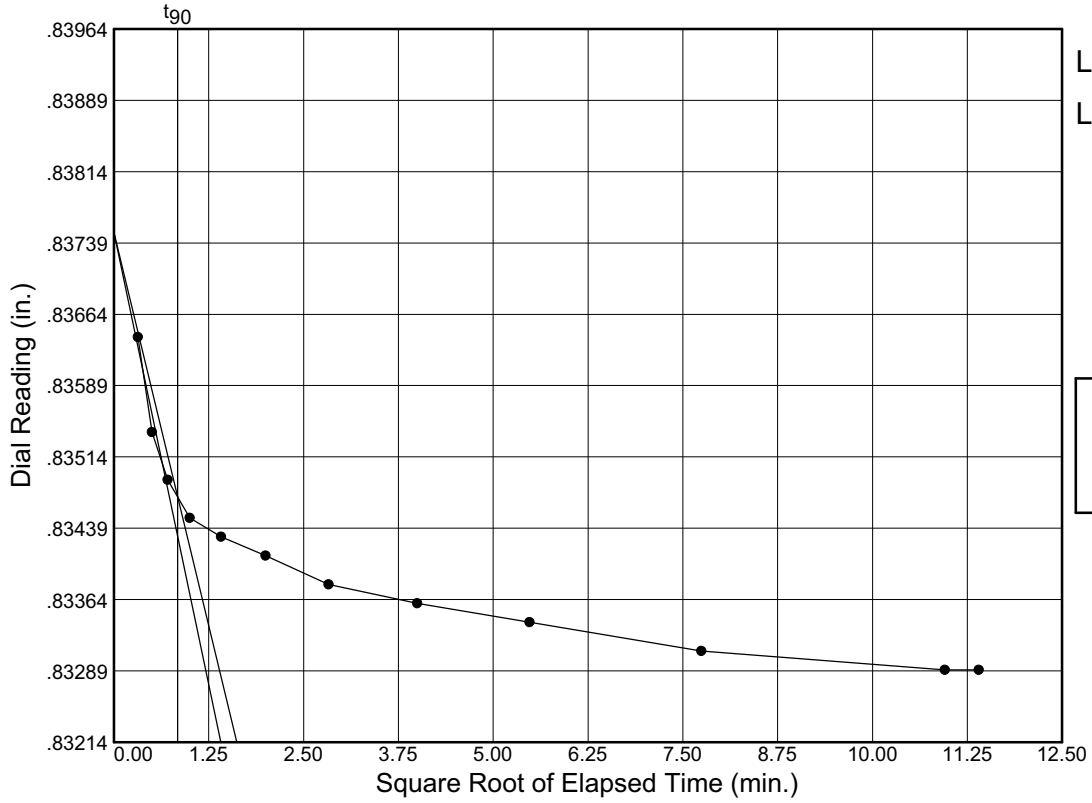
1.10 ft.$^2$/day

Figure

# Dial Reading vs. Time

Project No.: VB11-232G
Project: I64/I264 Improvements - PSA Ramps & Channel

Location: D7CD-25W




Load No.= 11

Load= 2.00 tsf

$D_0$ = 0.83750

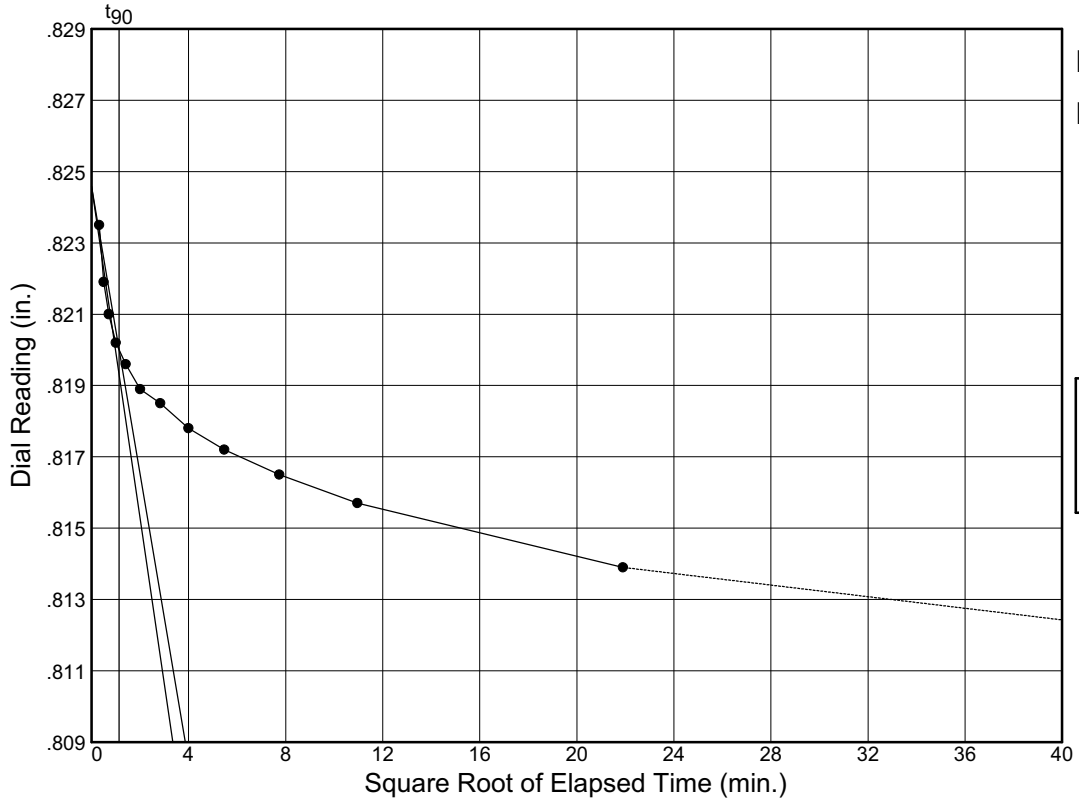
$D_{90}$ = 0.83472

$D_{100}$ = 0.83441

$T_{90}$ = 0.71 min.

$C_v$ @ $T_{90}$

2.10 ft.$^2$/day




Load No.= 12

Load= 4.00 tsf

$D_0$ = 0.82458

$D_{90}$ = 0.82001

$D_{100}$ = 0.81950

$T_{90}$ = 1.28 min.

$C_v$ @ $T_{90}$

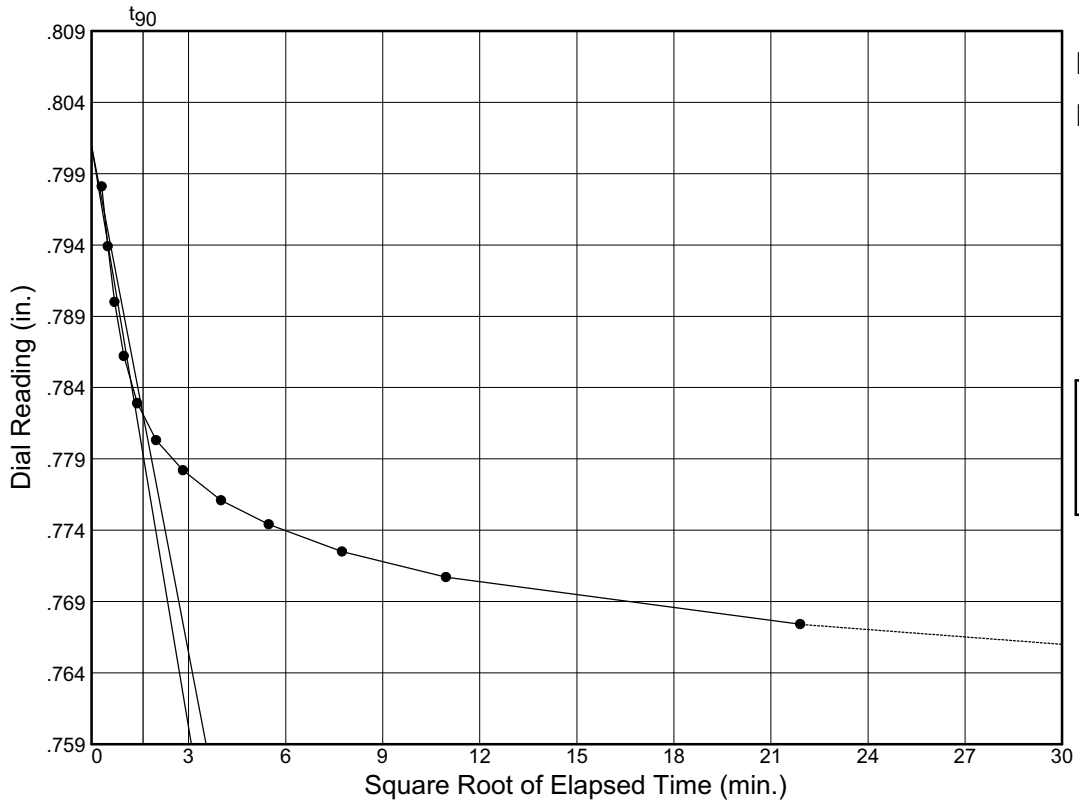
1.12 ft.$^2$/day

Figure

# Dial Reading vs. Time

Project No.: VB11-232G
Project: I64/I264 Improvements - PSA Ramps & Channel

Location: D7CD-25W




Load No.= 13

Load= 8.00 tsf

$D_0$ = 0.80094

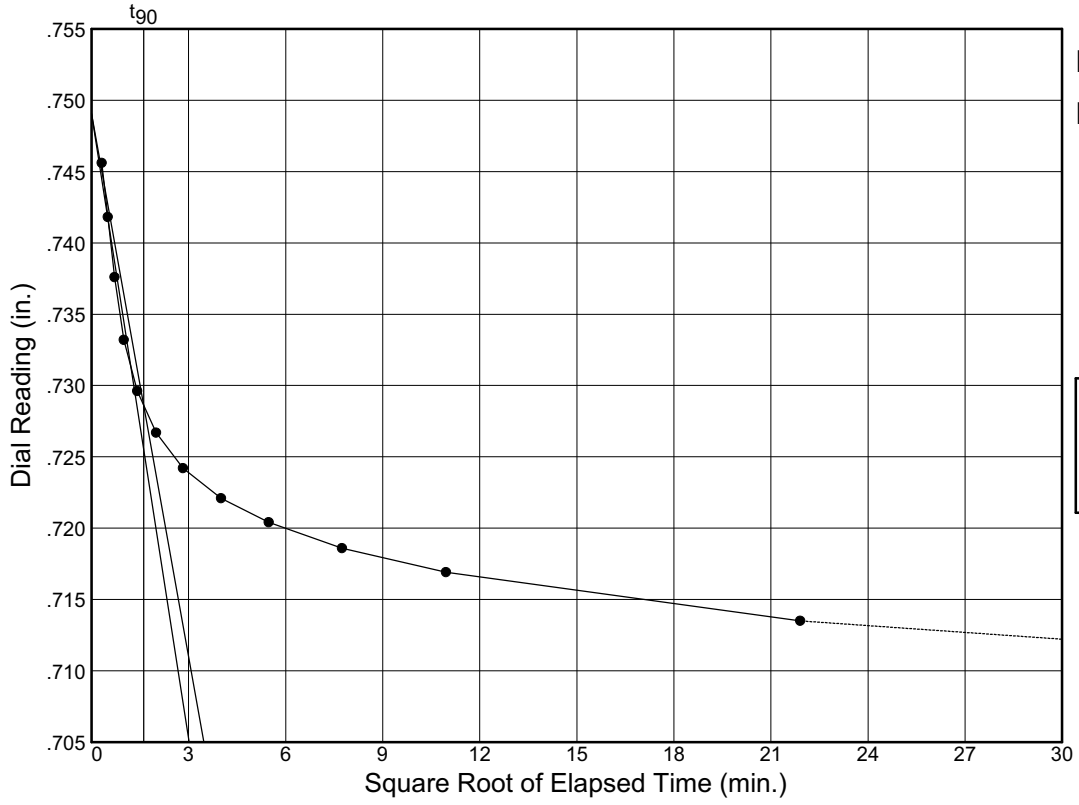
$D_{90}$ = 0.78212

$D_{100}$ = 0.78003

$T_{90}$ = 2.53 min.

$C_v$ @ $T_{90}$

0.52 ft.$^2$/day




Load No.= 14

Load= 16.00 tsf

$D_0$ = 0.74905

$D_{90}$ = 0.72863

$D_{100}$ = 0.72637

$T_{90}$ = 2.59 min.

$C_v$ @ $T_{90}$

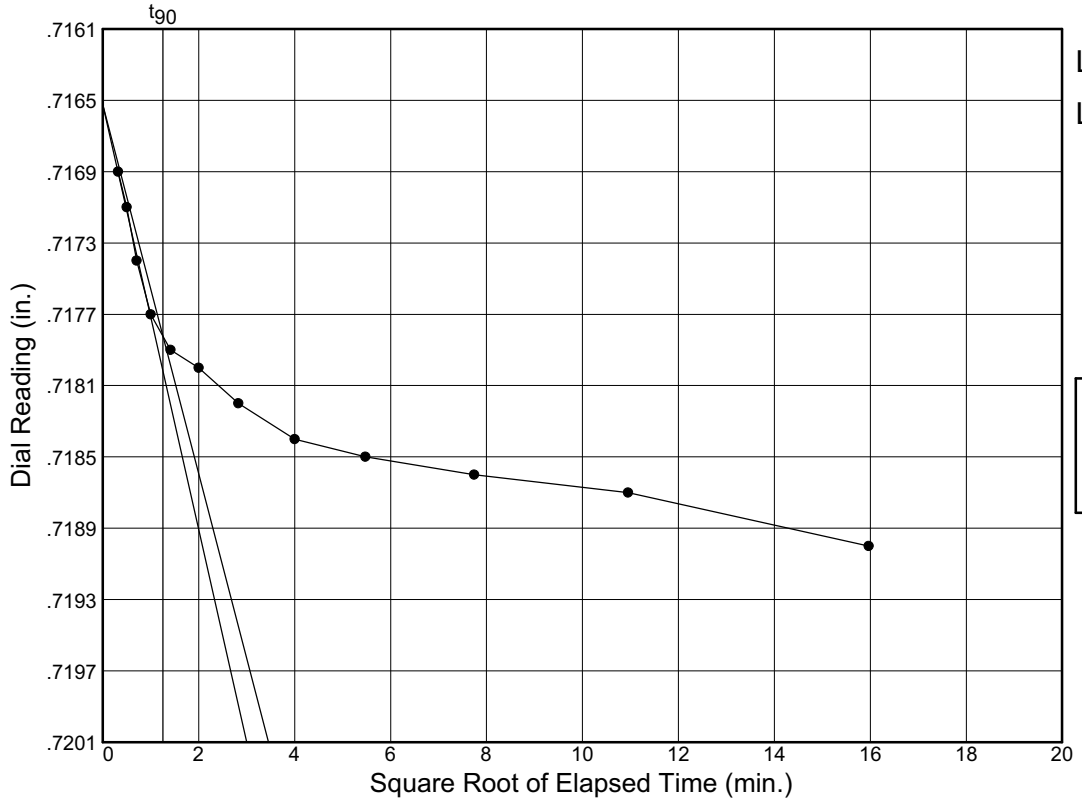
0.45 ft.$^2$/day

Figure

# Dial Reading vs. Time

Project No.: VB11-232G
Project: I64/I264 Improvements - PSA Ramps & Channel

Location: D7CD-25W




Load No.= 15

Load= 4.00 tsf

$D_0$ = 0.71652

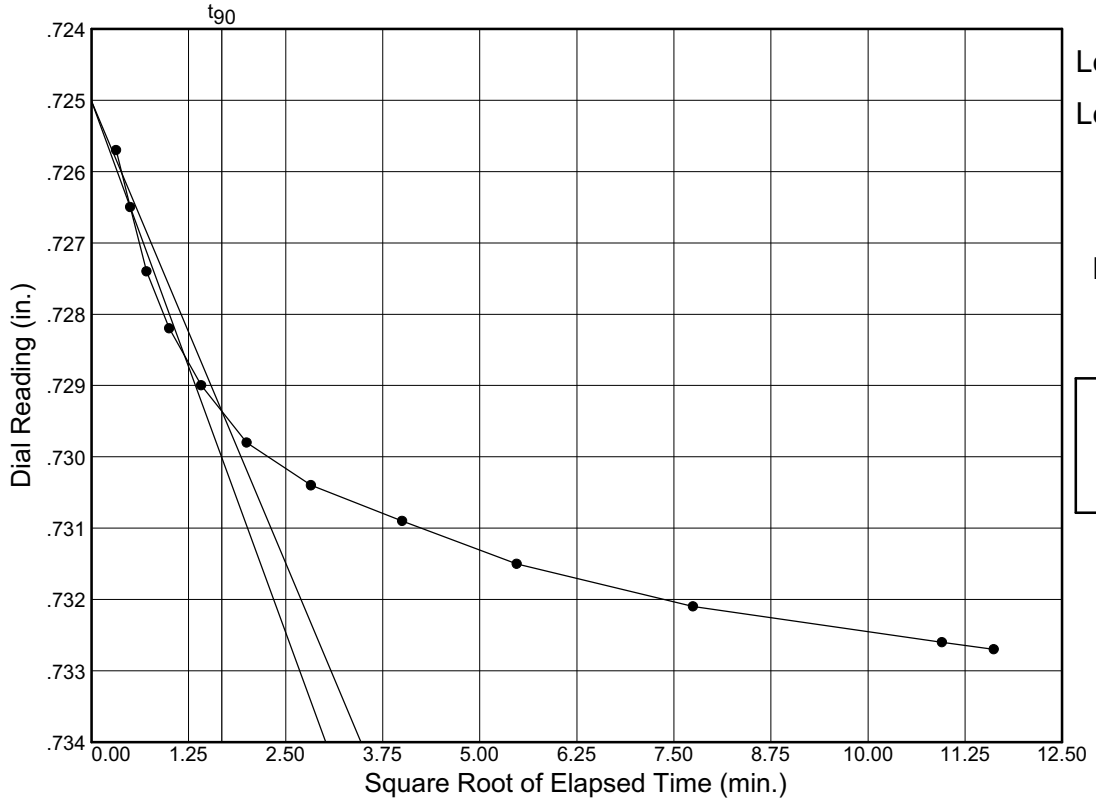
$D_{90}$ = 0.71782

$D_{100}$ = 0.71797

$T_{90}$ = 1.58 min.

$C_v$ @ $T_{90}$

0.69 ft.$^2$/day




Load No.= 16

Load= 1.00 tsf

$D_0$ = 0.72501

$D_{90}$ = 0.72936

$D_{100}$ = 0.72984

$T_{90}$ = 2.81 min.

$C_v$ @ $T_{90}$

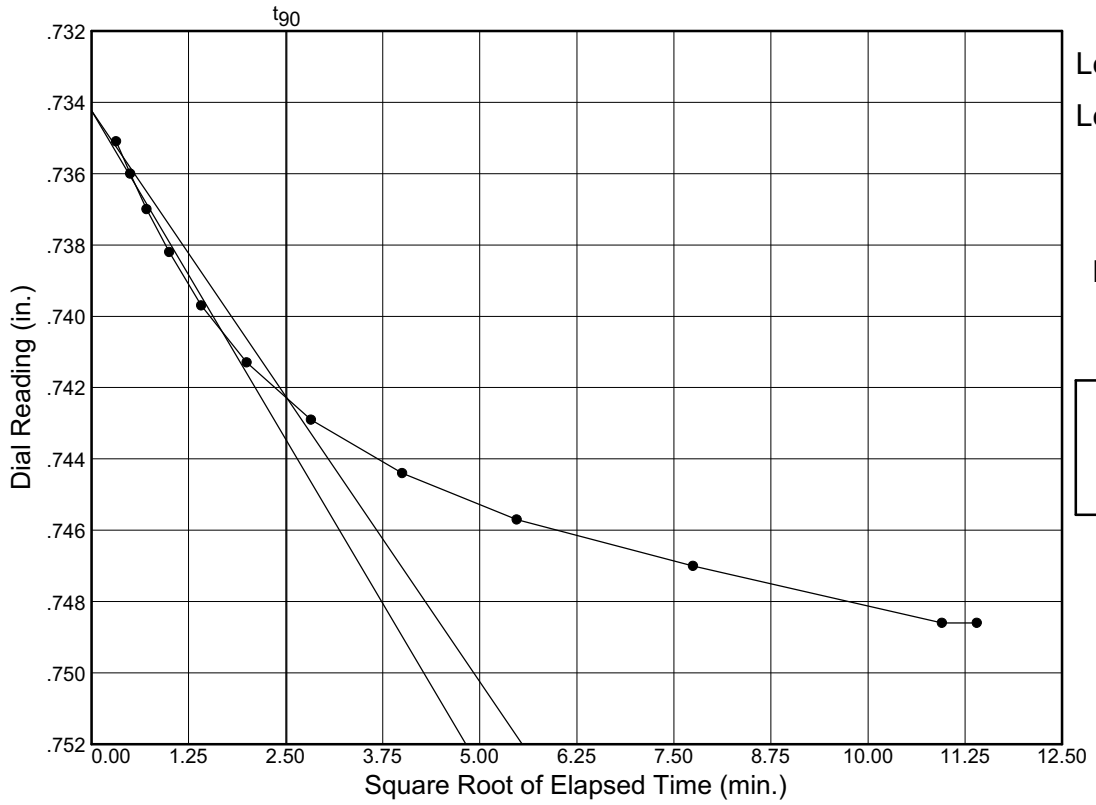
0.40 ft.$^2$/day

Figure

# Dial Reading vs. Time

Project No.: VB11-232G
Project: I64/I264 Improvements - PSA Ramps & Channel

Location: D7CD-25W




Load No.= 17

Load= 0.25 tsf

$D_0$ = 0.73424

$D_{90}$ = 0.74230

$D_{100}$ = 0.74319

$T_{90}$ = 6.33 min.

| $C_v$ @ $T_{90}$ |
|---|
| 0.18 ft.$^2$/day |

Figure

## CONSOLIDATION TEST DATA

**Client:** HDR, Inc.
**Project:** I64/I264 Improvements - PSA Ramps & Channel
**Project Number:** VB11-232G

### Sample Data

**Source:**
**Sample No.:** Consolidation No. 1
**Elev. or Depth:** 30-32 ft. **Sample Length(in./cm.):**
**Location:** D7CD-25W
**Description:** Gray, Sandy Lean CLAY
**Sample Date:** **Liquid Limit:** 46 **Plasticity Index:** 21
**USCS:** CL **AASHTO:** A-7-6(8)
**Preparation Process:**
**Condition of Test:**
**Test Method:** **Final Density:** **Figure No.:**
**Testing Remarks:** Sample Obtained
Boring# D7CD-25W
Depth = 30-32 ft.
% Passing #200 Sieve = 51
**Tested By:** **Test Date:**
**Checked By:** **Title:**

### Test Specimen Data

| TOTAL SAMPLE | BEFORE TEST | AFTER TEST |
|---|---|---|
| **Wet w+t** = 226.21 g. | **Consolidometer #** = 2 | **Wet w+t** = 296.18 g. |
| **Dry w+t** = 201.63 g. | | **Dry w+t** = 260.85 g. |
| **Tare Wt.** = 136.68 g. | **Spec. Gravity** = 2.749 | **Tare Wt.** = 145.26 g. |
| **Height** = 1.00 in. | **Height** = 1.00 in. | |
| **Diameter** = 2.50 in. | **Diameter** = 2.50 in. | |
| **Weight** = 166.23 g. | **Defl. Table** = Reference Set (inches/tsf) | |
| **Moisture** = 37.8 % | **Ht. Solids** = 0.5227 in. | **Moisture** = 30.6 % |
| **Wet Den.** = 129.0 pcf | **Dry Wt.** = 120.59 g. | **Dry Wt.** = 115.59 g.* |
| **Dry Den.** = 93.6 pcf | **Void Ratio** = 0.913 | **Void Ratio** = 0.432 |
| **Ovrbrdn.** = 1.10 tsf | **Saturation** = 113.9 % | |

*** Final dry weight used in calculations**

### End-of-Load Summary

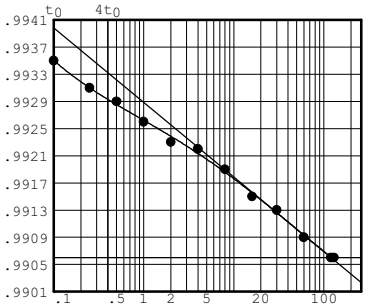
| Pressure (tsf) | Final Dial (in.) | Machine Defl. (in.) | $C_v$ (ft.$^2$/day) | $C_\alpha$ | Void Ratio | % Compression /Swell |
|---|---|---|---|---|---|---|
| start | 1.00000 | | | | 0.913 | |
| 0.13 | 0.99060 | 0.00000 | 0.21 | 0.000 | 0.895 | 0.9 Comprs. |
| 0.25 | 0.97380 | 0.00040 | 0.72 | 0.002 | 0.864 | 2.6 Comprs. |
| 0.50 | 0.94940 | 0.00080 | 4.36 | 0.002 | 0.818 | 5.0 Comprs. |
| 1.00 | 0.92050 | 0.00160 | | 0.004 | 0.764 | 7.8 Comprs. |
| 2.00 | 0.87840 | 0.00240 | | 0.006 | 0.685 | 11.9 Comprs. |
| 4.00 | 0.82140 | 0.00000 | | 0.008 | 0.571 | 17.9 Comprs. |

| Pressure (tsf) | Final Dial (in.) | Machine Defl. (in.) | $C_v$ (ft.$^2$/day) | $C_\alpha$ | Void Ratio | % Compression /Swell |
|---|---|---|---|---|---|---|
| 1.00 | 0.83020 | 0.00160 | 0.97 | 0.000 | 0.591 | 16.8 Comprs. |
| 0.25 | 0.84570 | 0.00040 | 0.88 | | 0.619 | 15.4 Comprs. |
| 0.50 | 0.84310 | 0.00080 | | 0.000 | 0.614 | 15.6 Comprs. |
| 1.00 | 0.83740 | 0.00160 | 2.52 | 0.000 | 0.605 | 16.1 Comprs. |
| 2.00 | 0.82990 | 0.00300 | 2.42 | 0.000 | 0.593 | 16.7 Comprs. |
| 4.00 | 0.81140 | 0.00000 | 1.88 | 0.004 | 0.552 | 18.9 Comprs. |
| 8.00 | 0.76460 | 0.00000 | 0.43 | 0.007 | 0.463 | 23.5 Comprs. |
| 16.00 | 0.71090 | 0.00000 | 0.80 | 0.008 | 0.360 | 28.9 Comprs. |
| 4.00 | 0.71900 | 0.00000 | 0.97 | | 0.375 | 28.1 Comprs. |
| 1.00 | 0.73110 | 0.00160 | | | 0.402 | 26.7 Comprs. |
| 0.25 | 0.74820 | 0.00040 | 0.20 | | 0.432 | 25.1 Comprs. |

**$C_c$ =** 0.34 **$P_c$ =** 1.62 tsf **$C_r$ =** 0.05

**Pressure: 0.13 tsf** **TEST READINGS** **Load No. 1**

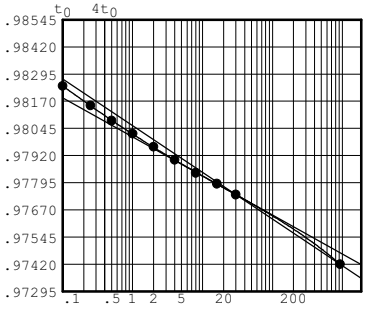
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 1.00000 | 11 | 60.00 | 0.99090 |
| 2 | 0.10 | 0.99350 | 12 | 120.00 | 0.99060 |
| 3 | 0.25 | 0.99310 | 13 | 130.00 | 0.99060 |
| 4 | 0.50 | 0.99290 | | | |
| 5 | 1.00 | 0.99260 | | | |
| 6 | 2.00 | 0.99230 | | | |
| 7 | 4.00 | 0.99220 | | | |
| 8 | 8.00 | 0.99190 | | | |
| 9 | 16.00 | 0.99150 | | | |
| 10 | 30.00 | 0.99130 | | | |




**Void Ratio =** 0.895 **Compression =** 0.9 %
**$D_0$ =** 0.99408 **$D_{50}$ =** 0.99234 **$D_{100}$ =** 0.99060
**$C_v$ at 2.3 min. =** 0.21 ft.$^2$/day **$C_\alpha$ =** 0.000

**Pressure: 0.25 tsf** **TEST READINGS** **Load No. 2**

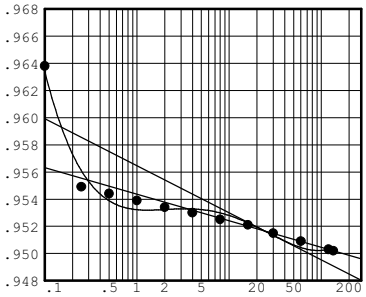
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.99060 | 11 | 925.00 | 0.97380 |
| 2 | 0.10 | 0.98200 | | | |
| 3 | 0.25 | 0.98110 | | | |
| 4 | 0.50 | 0.98040 | | | |
| 5 | 1.00 | 0.97980 | | | |
| 6 | 2.00 | 0.97920 | | | |
| 7 | 4.00 | 0.97860 | | | |
| 8 | 8.00 | 0.97800 | | | |
| 9 | 16.00 | 0.97750 | | | |
| 10 | 30.00 | 0.97700 | | | |




**Void Ratio =** 0.864 **Compression =** 2.6 %
**$D_0$ =** 0.98376 **$D_{50}$ =** 0.98057 **$D_{100}$ =** 0.97738
**$C_v$ at 0.7 min. =** 0.72 ft.$^2$/day **$C_\alpha$ =** 0.002

**Pressure: 0.50 tsf** **TEST READINGS** **Load No. 3**

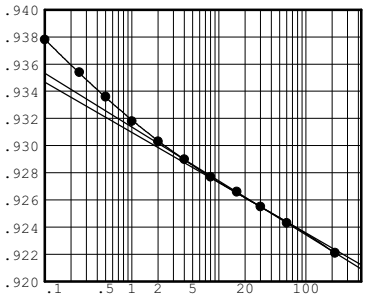
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.97380 | 11 | 60.00 | 0.95010 |
| 2 | 0.10 | 0.96300 | 12 | 120.00 | 0.94950 |
| 3 | 0.25 | 0.95410 | 13 | 135.00 | 0.94940 |
| 4 | 0.50 | 0.95360 | | | |
| 5 | 1.00 | 0.95310 | | | |
| 6 | 2.00 | 0.95260 | | | |
| 7 | 4.00 | 0.95220 | | | |
| 8 | 8.00 | 0.95170 | | | |
| 9 | 16.00 | 0.95130 | | | |
| 10 | 30.00 | 0.95070 | | | |




**Void Ratio =** 0.818 **Compression =** 5.0 %
**$D_0$ =** 0.97420 **$D_{50}$ =** 0.96293 **$D_{100}$ =** 0.95165
**$C_v$ at 0.1 min. =** 4.36 ft.$^2$/day **$C_\alpha$ =** 0.002

**Pressure: 1.00 tsf** **TEST READINGS** **Load No. 4**

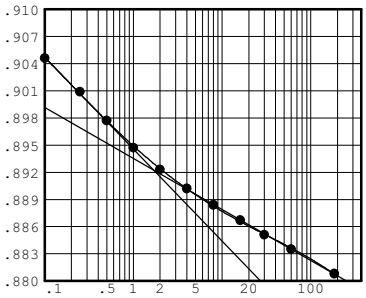
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.94940 | 11 | 60.00 | 0.92270 |
| 2 | 0.10 | 0.93620 | 12 | 215.00 | 0.92050 |
| 3 | 0.25 | 0.93380 | | | |
| 4 | 0.50 | 0.93200 | | | |
| 5 | 1.00 | 0.93020 | | | |
| 6 | 2.00 | 0.92870 | | | |
| 7 | 4.00 | 0.92740 | | | |
| 8 | 8.00 | 0.92610 | | | |
| 9 | 16.00 | 0.92500 | | | |
| 10 | 30.00 | 0.92390 | | | |




**Void Ratio =** 0.764 **Compression =** 7.8 %

**Pressure: 2.00 tsf** **TEST READINGS** **Load No. 5**

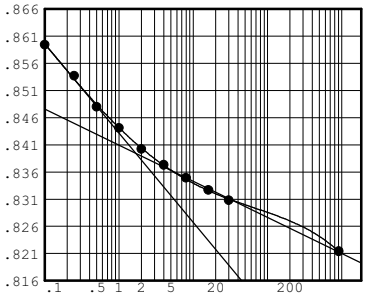
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.92050 | 11 | 60.00 | 0.88110 |
| 2 | 0.10 | 0.90220 | 12 | 185.00 | 0.87840 |
| 3 | 0.25 | 0.89850 | | | |
| 4 | 0.50 | 0.89530 | | | |
| 5 | 1.00 | 0.89230 | | | |
| 6 | 2.00 | 0.88990 | | | |
| 7 | 4.00 | 0.88780 | | | |
| 8 | 8.00 | 0.88600 | | | |
| 9 | 16.00 | 0.88430 | | | |
| 10 | 30.00 | 0.88270 | | | |




**Void Ratio =** 0.685 **Compression =** 11.9 %

**Pressure: 4.00 tsf** **TEST READINGS** **Load No. 6**

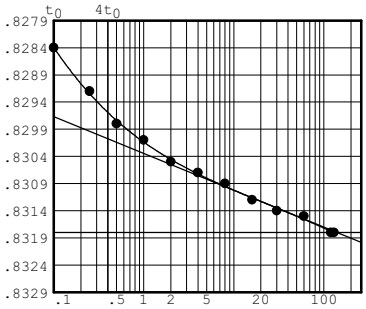
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.87840 | 11 | 910.00 | 0.82140 |
| 2 | 0.10 | 0.85940 | | | |
| 3 | 0.25 | 0.85370 | | | |
| 4 | 0.50 | 0.84800 | | | |
| 5 | 1.00 | 0.84410 | | | |
| 6 | 2.00 | 0.84020 | | | |
| 7 | 4.00 | 0.83730 | | | |
| 8 | 8.00 | 0.83490 | | | |
| 9 | 16.00 | 0.83270 | | | |
| 10 | 30.00 | 0.83080 | | | |




**Void Ratio =** 0.571 **Compression =** 17.9 %

**Pressure: 1.00 tsf** **TEST READINGS** **Load No. 7**

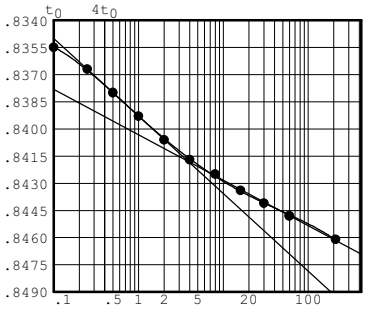
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.82140 | 11 | 60.00 | 0.82990 |
| 2 | 0.10 | 0.82680 | 12 | 120.00 | 0.83020 |
| 3 | 0.25 | 0.82760 | 13 | 130.00 | 0.83020 |
| 4 | 0.50 | 0.82820 | | | |
| 5 | 1.00 | 0.82850 | | | |
| 6 | 2.00 | 0.82890 | | | |
| 7 | 4.00 | 0.82910 | | | |
| 8 | 8.00 | 0.82930 | | | |
| 9 | 16.00 | 0.82960 | | | |
| 10 | 30.00 | 0.82980 | | | |




**Void Ratio =** 0.591 **Compression =** 16.8 %
**$D_0$ =** 0.82719 **$D_{50}$ =** 0.82949 **$D_{100}$ =** 0.83180
**$C_v$ at 0.3 min. =** 0.97 ft.$^2$/day **$C_\alpha$ =** 0.000

**Pressure: 0.25 tsf** **TEST READINGS** **Load No. 8**

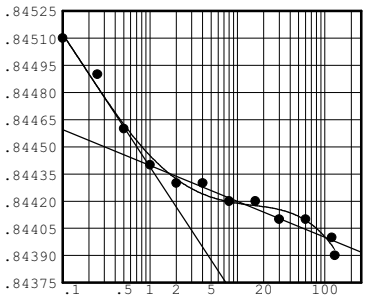
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.83020 | 11 | 60.00 | 0.84440 |
| 2 | 0.10 | 0.83510 | 12 | 210.00 | 0.84570 |
| 3 | 0.25 | 0.83630 | | | |
| 4 | 0.50 | 0.83760 | | | |
| 5 | 1.00 | 0.83890 | | | |
| 6 | 2.00 | 0.84020 | | | |
| 7 | 4.00 | 0.84130 | | | |
| 8 | 8.00 | 0.84210 | | | |
| 9 | 16.00 | 0.84300 | | | |
| 10 | 30.00 | 0.84370 | | | |




**Void Ratio =** 0.619 **Compression =** 15.4 %
**$D_0$ =** 0.83335 **$D_{50}$ =** 0.83757 **$D_{100}$ =** 0.84179
**$C_v$ at 0.4 min. =** 0.88 ft.$^2$/day

**Pressure: 0.50 tsf** **TEST READINGS** **Load No. 9**

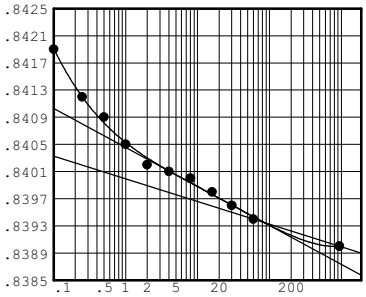
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.84570 | 11 | 60.00 | 0.84330 |
| 2 | 0.10 | 0.84430 | 12 | 120.00 | 0.84320 |
| 3 | 0.25 | 0.84410 | 13 | 130.00 | 0.84310 |
| 4 | 0.50 | 0.84380 | | | |
| 5 | 1.00 | 0.84360 | | | |
| 6 | 2.00 | 0.84350 | | | |
| 7 | 4.00 | 0.84350 | | | |
| 8 | 8.00 | 0.84340 | | | |
| 9 | 16.00 | 0.84340 | | | |
| 10 | 30.00 | 0.84330 | | | |




**Void Ratio =** 0.614 **Compression =** 15.6 %

**Pressure: 1.00 tsf** **TEST READINGS** **Load No. 10**

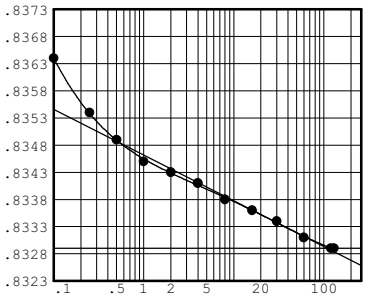
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.84310 | 11 | 60.00 | 0.83780 |
| 2 | 0.10 | 0.84030 | 12 | 945.00 | 0.83740 |
| 3 | 0.25 | 0.83960 | | | |
| 4 | 0.50 | 0.83930 | | | |
| 5 | 1.00 | 0.83890 | | | |
| 6 | 2.00 | 0.83860 | | | |
| 7 | 4.00 | 0.83850 | | | |
| 8 | 8.00 | 0.83840 | | | |
| 9 | 16.00 | 0.83820 | | | |
| 10 | 30.00 | 0.83800 | | | |




**Void Ratio =** 0.605 **Compression =** 16.1 %
**$D_0$ =** 0.84390 **$D_{50}$ =** 0.84163 **$D_{100}$ =** 0.83935
**$C_v$ at 0.1 min. =** 2.52 ft.$^2$/day **$C_\alpha$ =** 0.000

**Pressure: 2.00 tsf** **TEST READINGS** **Load No. 11**

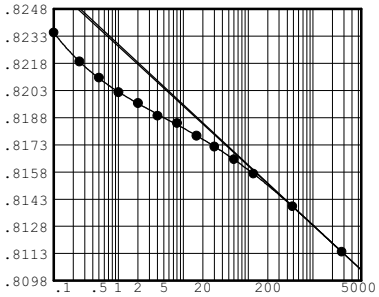
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.83740 | 11 | 60.00 | 0.83010 |
| 2 | 0.10 | 0.83340 | 12 | 120.00 | 0.82990 |
| 3 | 0.25 | 0.83240 | 13 | 130.00 | 0.82990 |
| 4 | 0.50 | 0.83190 | | | |
| 5 | 1.00 | 0.83150 | | | |
| 6 | 2.00 | 0.83130 | | | |
| 7 | 4.00 | 0.83110 | | | |
| 8 | 8.00 | 0.83080 | | | |
| 9 | 16.00 | 0.83060 | | | |
| 10 | 30.00 | 0.83040 | | | |




**Void Ratio =** 0.593 **Compression =** 16.7 %
**$D_0$ =** 0.83900 **$D_{50}$ =** 0.83595 **$D_{100}$ =** 0.83290
**$C_v$ at 0.1 min. =** 2.42 ft.$^2$/day **$C_\alpha$ =** 0.000

**Pressure: 4.00 tsf** **TEST READINGS** **Load No. 12**

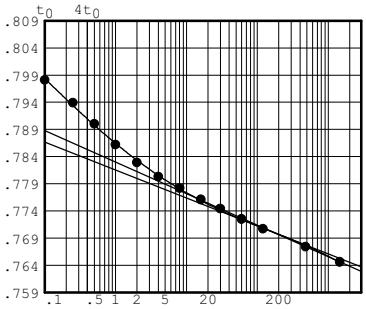
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.82990 | 11 | 60.00 | 0.81650 |
| 2 | 0.10 | 0.82350 | 12 | 120.00 | 0.81570 |
| 3 | 0.25 | 0.82190 | 13 | 480.00 | 0.81390 |
| 4 | 0.50 | 0.82100 | 14 | 2760.00 | 0.81140 |
| 5 | 1.00 | 0.82020 | | | |
| 6 | 2.00 | 0.81960 | | | |
| 7 | 4.00 | 0.81890 | | | |
| 8 | 8.00 | 0.81850 | | | |
| 9 | 16.00 | 0.81780 | | | |
| 10 | 30.00 | 0.81720 | | | |




**Void Ratio =** 0.552 **Compression =** 18.9 %
**$D_0$ =** 0.83290 **$D_{50}$ =** 0.82245 **$D_{100}$ =** 0.81199
**$C_v$ at 0.2 min. =** 1.88 ft.$^2$/day **$C_\alpha$ =** 0.004

**Pressure: 8.00 tsf** **TEST READINGS** **Load No. 13**

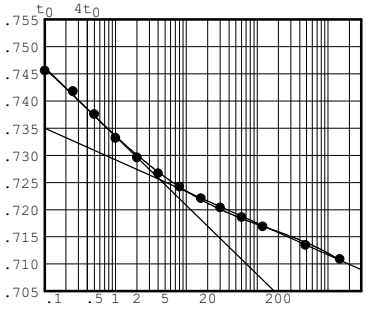
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.81140 | 11 | 60.00 | 0.77250 |
| 2 | 0.10 | 0.79810 | 12 | 120.00 | 0.77070 |
| 3 | 0.25 | 0.79390 | 13 | 480.00 | 0.76740 |
| 4 | 0.50 | 0.79000 | 14 | 1455.00 | 0.76460 |
| 5 | 1.00 | 0.78620 | | | |
| 6 | 2.00 | 0.78290 | | | |
| 7 | 4.00 | 0.78030 | | | |
| 8 | 8.00 | 0.77820 | | | |
| 9 | 16.00 | 0.77610 | | | |
| 10 | 30.00 | 0.77440 | | | |




**Void Ratio =** 0.463 **Compression =** 23.5 %
**$D_0$ =** 0.80582 **$D_{50}$ =** 0.78805 **$D_{100}$ =** 0.77028
**$C_v$ at 0.7 min. =** 0.43 ft.$^2$/day **$C_\alpha$ =** 0.007

**Pressure: 16.00 tsf** **TEST READINGS** **Load No. 14**

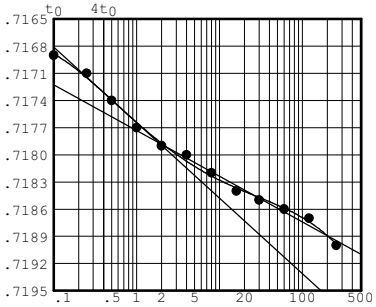
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.76460 | 11 | 60.00 | 0.71860 |
| 2 | 0.10 | 0.74560 | 12 | 120.00 | 0.71690 |
| 3 | 0.25 | 0.74180 | 13 | 480.00 | 0.71350 |
| 4 | 0.50 | 0.73760 | 14 | 1470.00 | 0.71090 |
| 5 | 1.00 | 0.73320 | | | |
| 6 | 2.00 | 0.72960 | | | |
| 7 | 4.00 | 0.72670 | | | |
| 8 | 8.00 | 0.72420 | | | |
| 9 | 16.00 | 0.72210 | | | |
| 10 | 30.00 | 0.72040 | | | |




**Void Ratio =** 0.360 **Compression =** 28.9 %
**$D_0$ =** 0.75346 **$D_{50}$ =** 0.73948 **$D_{100}$ =** 0.72550
**$C_v$ at 0.3 min. =** 0.80 ft.$^2$/day **$C_\alpha$ =** 0.008

**Pressure: 4.00 tsf** **TEST READINGS** **Load No. 15**

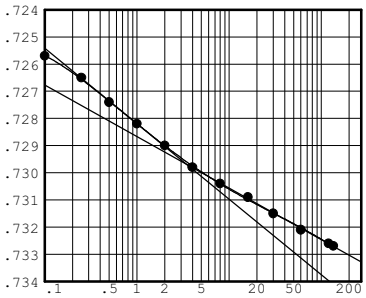
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.71090 | 11 | 60.00 | 0.71860 |
| 2 | 0.10 | 0.71690 | 12 | 120.00 | 0.71870 |
| 3 | 0.25 | 0.71710 | 13 | 255.00 | 0.71900 |
| 4 | 0.50 | 0.71740 | | | |
| 5 | 1.00 | 0.71770 | | | |
| 6 | 2.00 | 0.71790 | | | |
| 7 | 4.00 | 0.71800 | | | |
| 8 | 8.00 | 0.71820 | | | |
| 9 | 16.00 | 0.71840 | | | |
| 10 | 30.00 | 0.71850 | | | |




**Void Ratio =** 0.375 **Compression =** 28.1 %
**$D_0$ =** 0.71646 **$D_{50}$ =** 0.71716 **$D_{100}$ =** 0.71787
**$C_v$ at 0.3 min. =** 0.97 ft.$^2$/day

**Pressure: 1.00 tsf** **TEST READINGS** **Load No. 16**

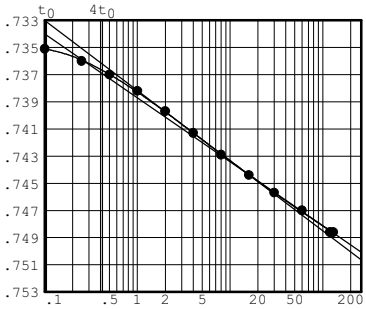
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.71900 | 11 | 60.00 | 0.73050 |
| 2 | 0.10 | 0.72410 | 12 | 120.00 | 0.73100 |
| 3 | 0.25 | 0.72490 | 13 | 135.00 | 0.73110 |
| 4 | 0.50 | 0.72580 | | | |
| 5 | 1.00 | 0.72660 | | | |
| 6 | 2.00 | 0.72740 | | | |
| 7 | 4.00 | 0.72820 | | | |
| 8 | 8.00 | 0.72880 | | | |
| 9 | 16.00 | 0.72930 | | | |
| 10 | 30.00 | 0.72990 | | | |




**Void Ratio =** 0.402 **Compression =** 26.7 %

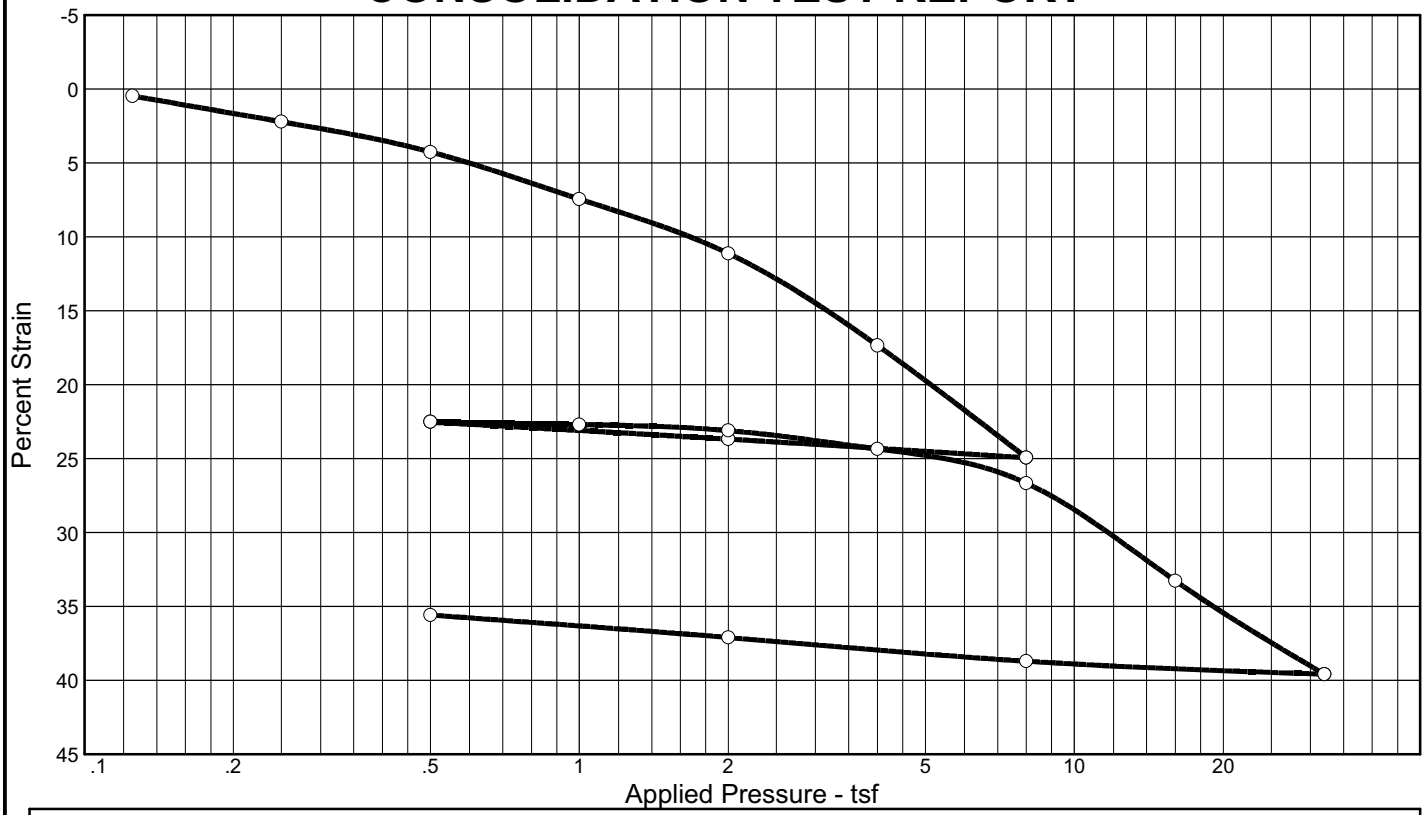
**Pressure: 0.25 tsf** **TEST READINGS** **Load No. 17**

| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.73110 | 11 | 60.00 | 0.74660 |
| 2 | 0.10 | 0.73470 | 12 | 120.00 | 0.74820 |
| 3 | 0.25 | 0.73560 | 13 | 130.00 | 0.74820 |
| 4 | 0.50 | 0.73660 | | | |
| 5 | 1.00 | 0.73780 | | | |
| 6 | 2.00 | 0.73930 | | | |
| 7 | 4.00 | 0.74090 | | | |
| 8 | 8.00 | 0.74250 | | | |
| 9 | 16.00 | 0.74400 | | | |
| 10 | 30.00 | 0.74530 | | | |




**Void Ratio =** 0.432 **Compression =** 25.1 %
**$D_0$ =** 0.73362 **$D_{50}$ =** 0.73892 **$D_{100}$ =** 0.74421
**$C_v$ at 1.4 min. =** 0.20 ft.$^2$/day

# CONSOLIDATION TEST REPORT




Coefficients of Consolidation and Secondary Consolidation

| No. | Load (tsf) | $C_v$ (ft.$^2$/day) | $C_\alpha$ | No. | Load (tsf) | $C_v$ (ft.$^2$/day) | $C_\alpha$ | No. | Load (tsf) | $C_v$ (ft.$^2$/day) | $C_\alpha$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.13 | 0.24 | 0.001 | 16 | 8.00 | 0.21 | | | | | |
| 3 | 0.50 | 0.27 | 0.000 | 17 | 2.00 | 0.57 | | | | | |
| 5 | 2.00 | 0.39 | 0.005 | 18 | 0.50 | 0.13 | | | | | |
| 6 | 4.00 | 0.83 | 0.008 | | | | | | | | |
| 8 | 2.00 | 1.01 | | | | | | | | | |
| 9 | 0.50 | 0.84 | | | | | | | | | |
| 10 | 1.00 | 0.85 | 0.000 | | | | | | | | |
| 12 | 4.00 | 0.70 | 0.001 | | | | | | | | |
| 13 | 8.00 | 0.52 | 0.006 | | | | | | | | |
| 15 | 32.00 | 1.13 | 0.008 | | | | | | | | |

| MATERIAL DESCRIPTION | USCS | AASHTO |
|---|---|---|
| Gray, Lean CLAY | CL | A-7-6(28 |

| LL | PI | Sp. Gr. | Overburden (tsf) | Dry Dens. (pcf) | | Moisture | | Saturation | | Void Ratio | | $P_c$ (tsf) | $C_c$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Init. | Final | Init. | Final | Init. | Final | Init. | Final | | |
| 49 | 26 | 2.79 | 2.10 | 93.5 | | 42.7 % | 28.4 % | 123.9 % | 100.0 % | 0.962 | 0.264 | | |

| Preparation Process: | D2435 Method | $C_r$ | Swell Press. (tsf) | Swell % |
|---|---|---|---|---|
| Condition of Test: | | | | |

**Project No.** VB11-232G **Client:** HDR, Inc.

**Project:** I64/I264 Improvements - PSA Ramps & Channel

**Location:** D7CD-25W

**Remarks:**

Sample Obtained
Boring# D7CD-25W

**Checked By:**

**Title:**

CONSOLIDATION TEST REPORT

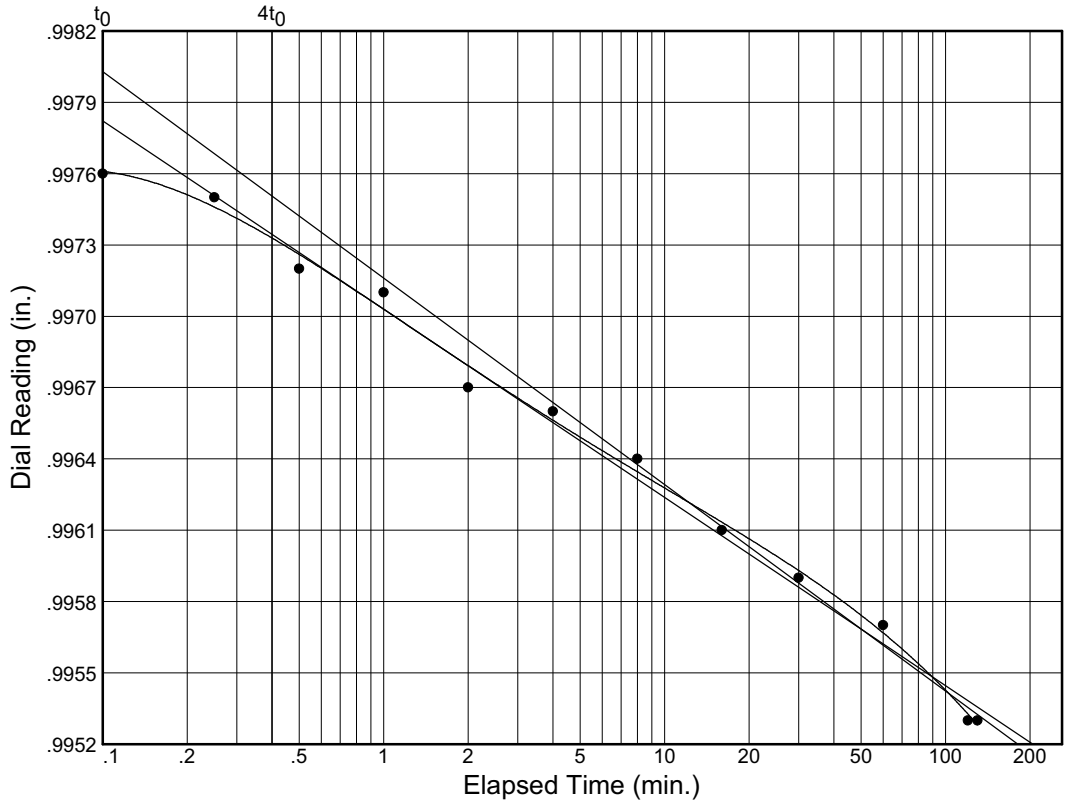
**GET SOLUTIONS, INC.**

**Figure**

# Dial Reading vs. Time

Project No.: VB11-232G
Project: I64/I264 Improvements - PSA Ramps & Channel

Location: D7CD-25W




Load No.= 1

Load= 0.13 tsf

$D_0$ = 0.99789

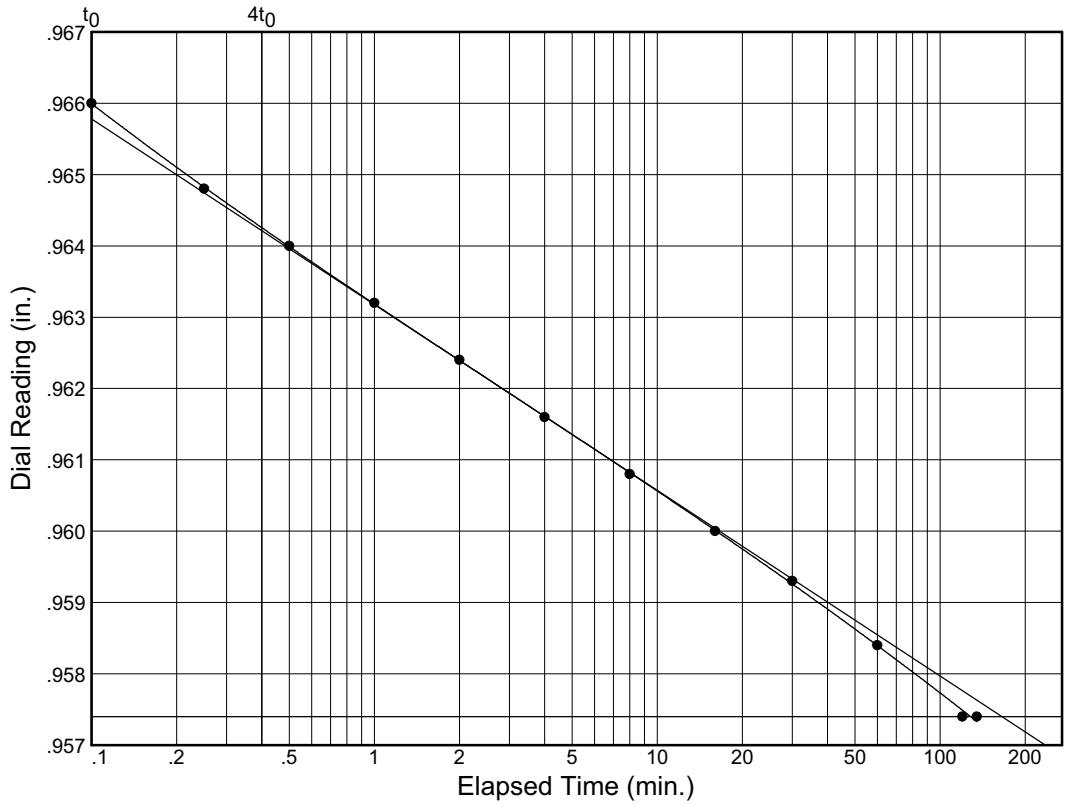
$D_{50}$ = 0.99679

$D_{100}$ = 0.99568

$T_{50}$ = 2.04 min.

| $C_v$ @ $T_{50}$ |
|---|
| 0.24 ft.$^2$/day |

$C_\alpha$ = 0.001




Load No.= 3

Load= 0.50 tsf

$D_0$ = 0.96773

$D_{50}$ = 0.96257

$D_{100}$ = 0.95740

$T_{50}$ = 1.72 min.

| $C_v$ @ $T_{50}$ |
|---|
| 0.27 ft.$^2$/day |

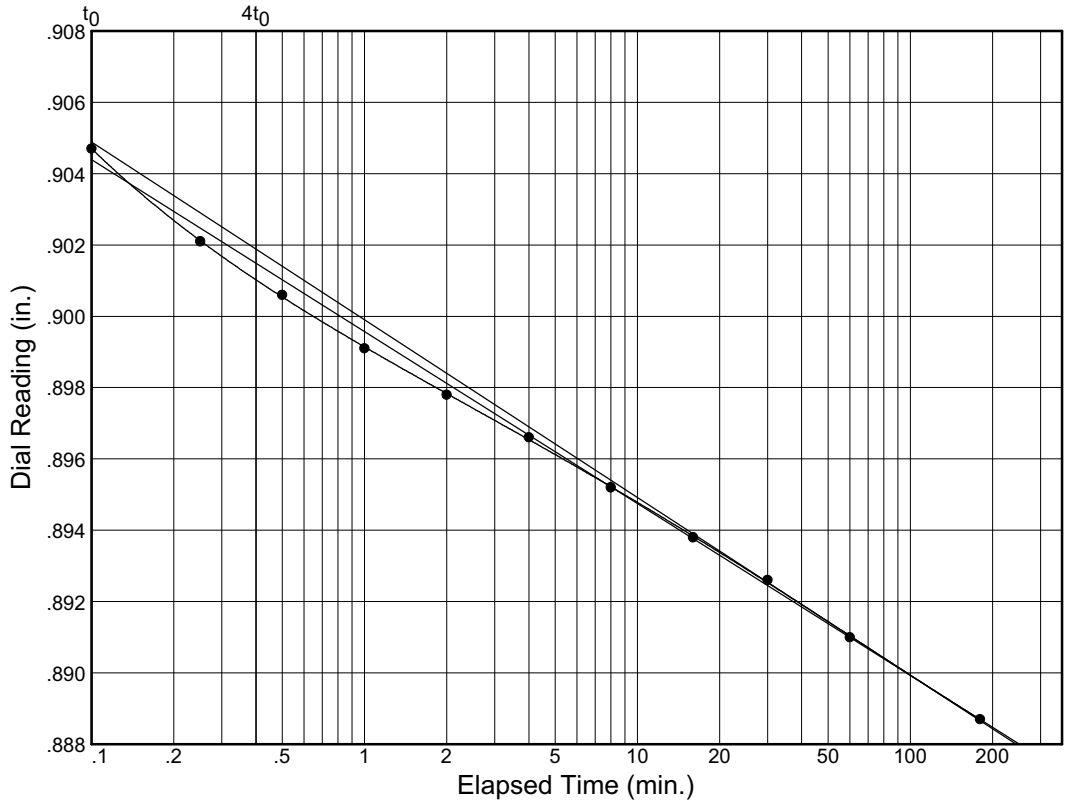
$C_\alpha$ = 0.000

Figure

# Dial Reading vs. Time

Project No.: VB11-232G
Project: I64/I264 Improvements - PSA Ramps & Channel

Location: D7CD-25W




Load No.= 5

Load= 2.00 tsf

$D_0$ = 0.90837

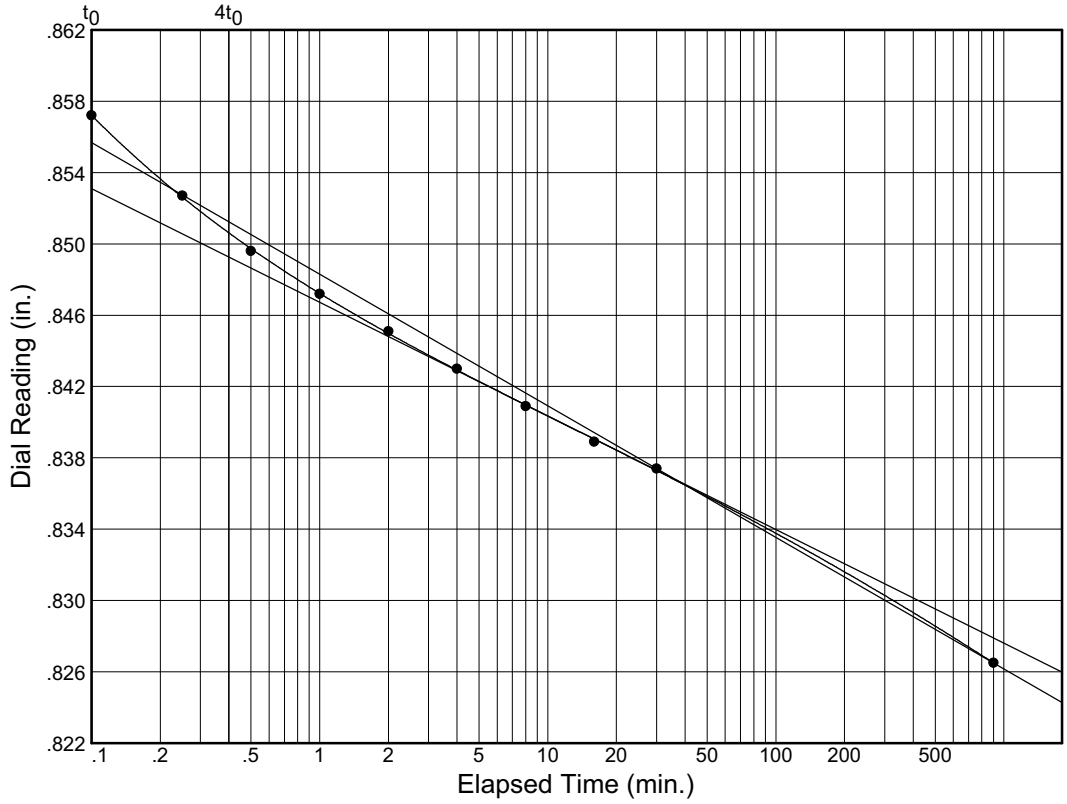
$D_{50}$ = 0.89905

$D_{100}$ = 0.88973

$T_{50}$ = 1.05 min.

| $C_v$ @ $T_{50}$ |
|---|
| 0.39 ft.$^2$/day |

$C_\alpha$ = 0.005




Load No.= 6

Load= 4.00 tsf

$D_0$ = 0.86379

$D_{50}$ = 0.85026

$D_{100}$ = 0.83672

$T_{50}$ = 0.44 min.

| $C_v$ @ $T_{50}$ |
|---|
| 0.83 ft.$^2$/day |

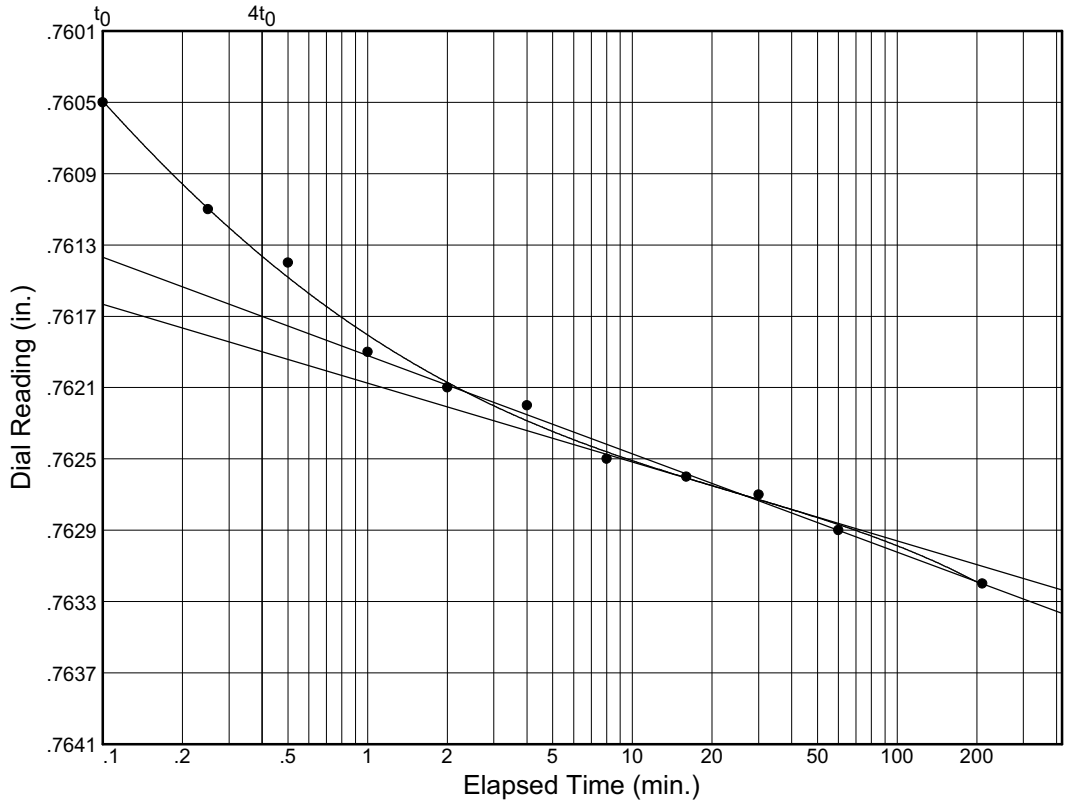
$C_\alpha$ = 0.008

Figure

# Dial Reading vs. Time

Project No.: VB11-232G
Project: I64/I264 Improvements - PSA Ramps & Channel

Location: D7CD-25W




Load No.= 8

Load= 2.00 tsf

$D_0$ = 0.75962

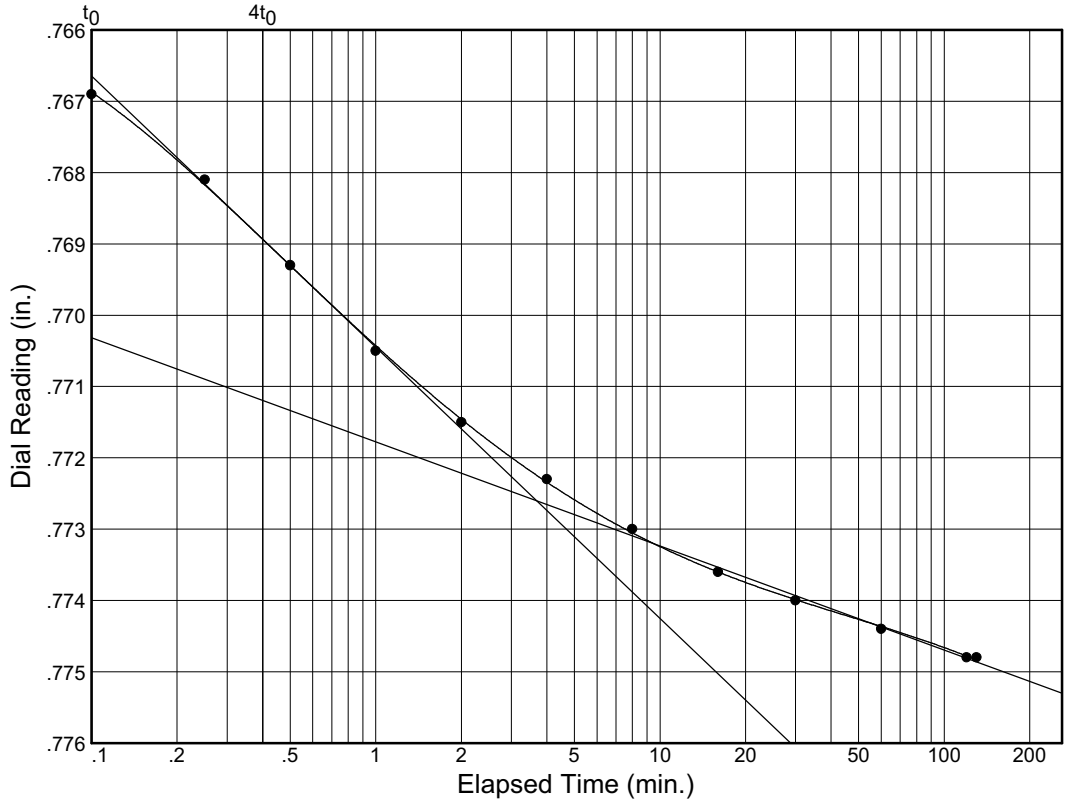
$D_{50}$ = 0.76116

$D_{100}$ = 0.76270

$T_{50}$ = 0.28 min.

$C_v$ @ $T_{50}$

1.01 ft.$^2$/day




Load No.= 9

Load= 0.50 tsf

$D_0$ = 0.76481

$D_{50}$ = 0.76871

$D_{100}$ = 0.77260

$T_{50}$ = 0.35 min.

$C_v$ @ $T_{50}$

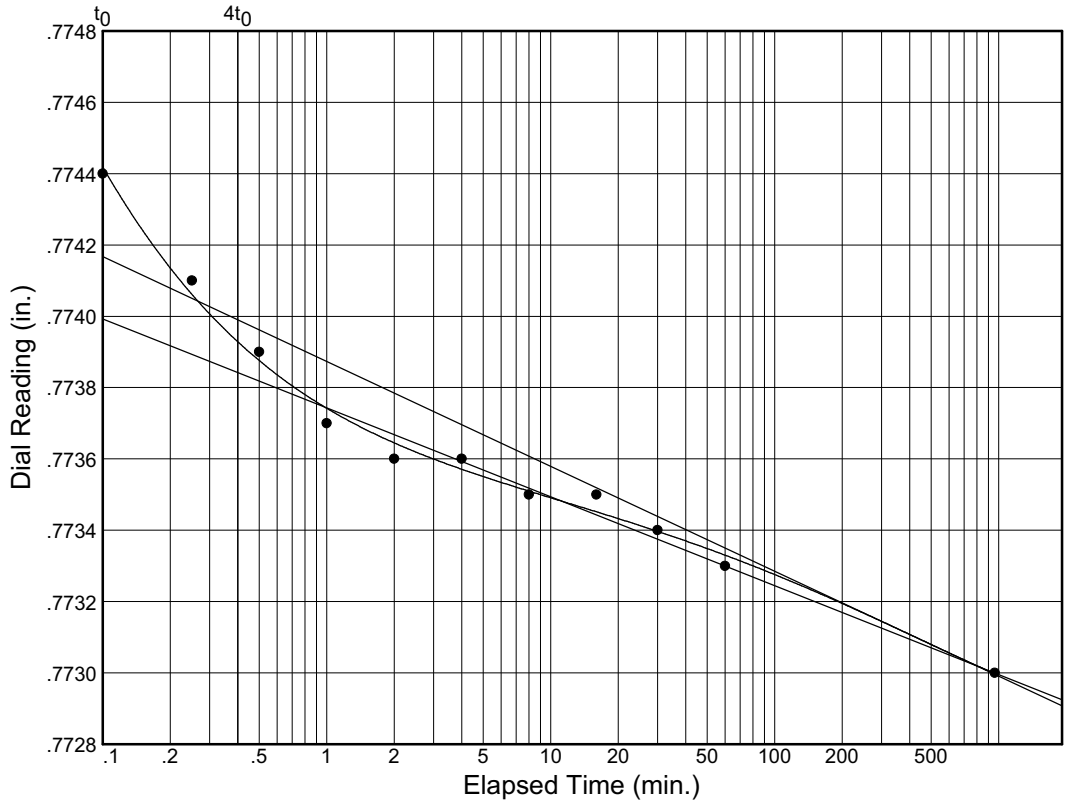
0.84 ft.$^2$/day

Figure

# Dial Reading vs. Time

Project No.: VB11-232G
Project: I64/I264 Improvements - PSA Ramps & Channel

Location: D7CD-25W




Load No.= 10

Load= 1.00 tsf

$D_0$ = 0.77491

$D_{50}$ = 0.77396

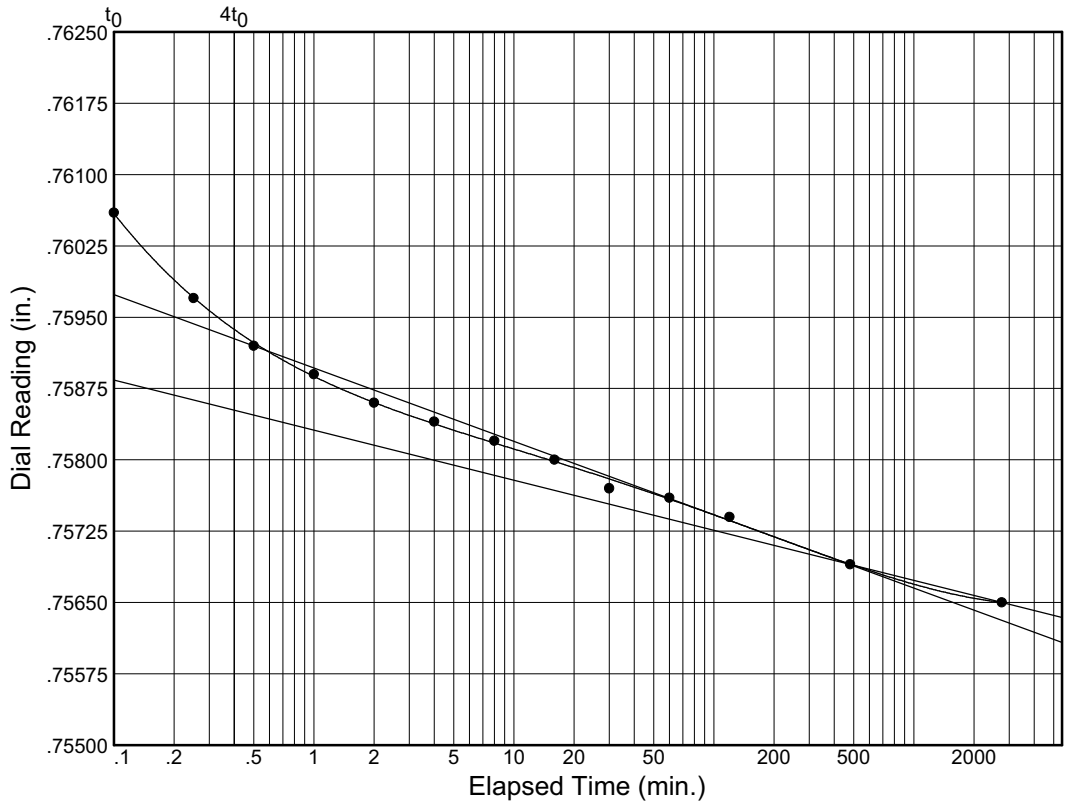
$D_{100}$ = 0.77302

$T_{50}$ = 0.35 min.

$C_v$ @ $T_{50}$

0.85 ft.$^2$/day

$C_\alpha$ = 0.000




Load No.= 12

Load= 4.00 tsf

$D_0$ = 0.76181

$D_{50}$ = 0.75936

$D_{100}$ = 0.75691

$T_{50}$ = 0.41 min.

$C_v$ @ $T_{50}$

0.70 ft.$^2$/day

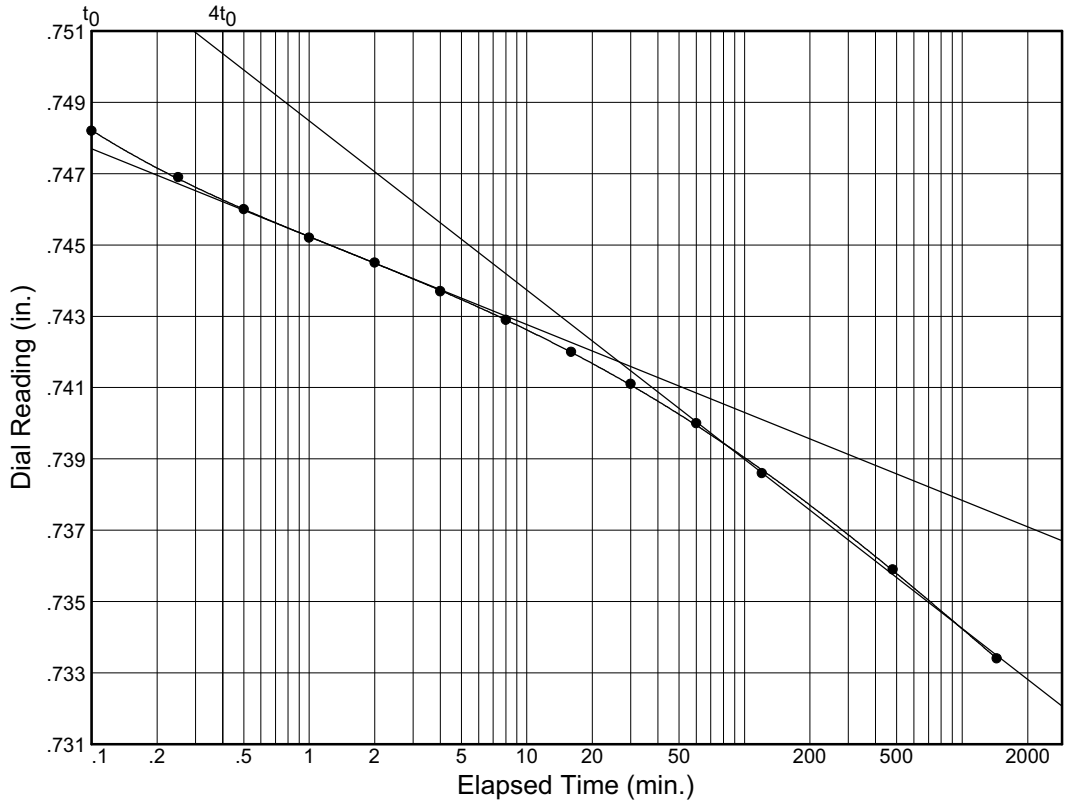
$C_\alpha$ = 0.001

Figure

# Dial Reading vs. Time

Project No.: VB11-232G
Project: I64/I264 Improvements - PSA Ramps & Channel

Location: D7CD-25W




Load No.= 13

Load= 8.00 tsf

$D_0$ = 0.75017

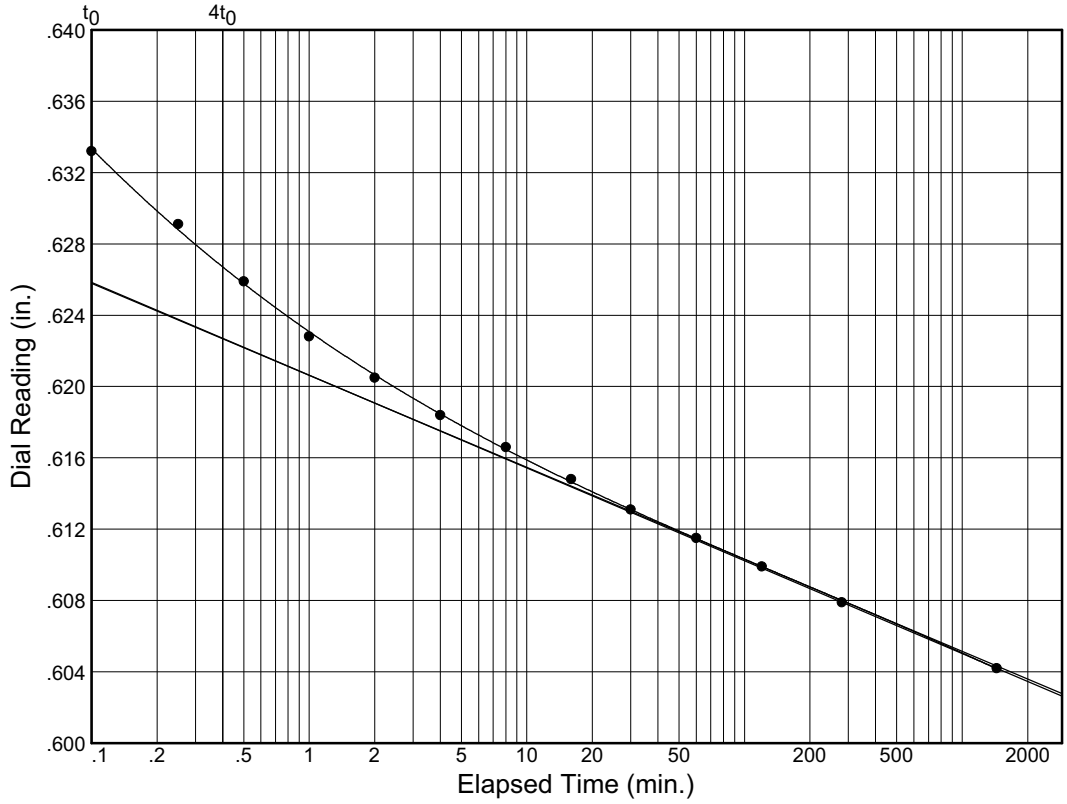
$D_{50}$ = 0.74595

$D_{100}$ = 0.74173

$T_{50}$ = 0.52 min.

| $C_v$ @ $T_{50}$ |
|---|
| 0.52 ft.$^2$/day |

$C_\alpha$ = 0.006




Load No.= 15

Load= 32.00 tsf

$D_0$ = 0.63998

$D_{50}$ = 0.63045

$D_{100}$ = 0.62092

$T_{50}$ = 0.18 min.

| $C_v$ @ $T_{50}$ |
|---|
| 1.13 ft.$^2$/day |

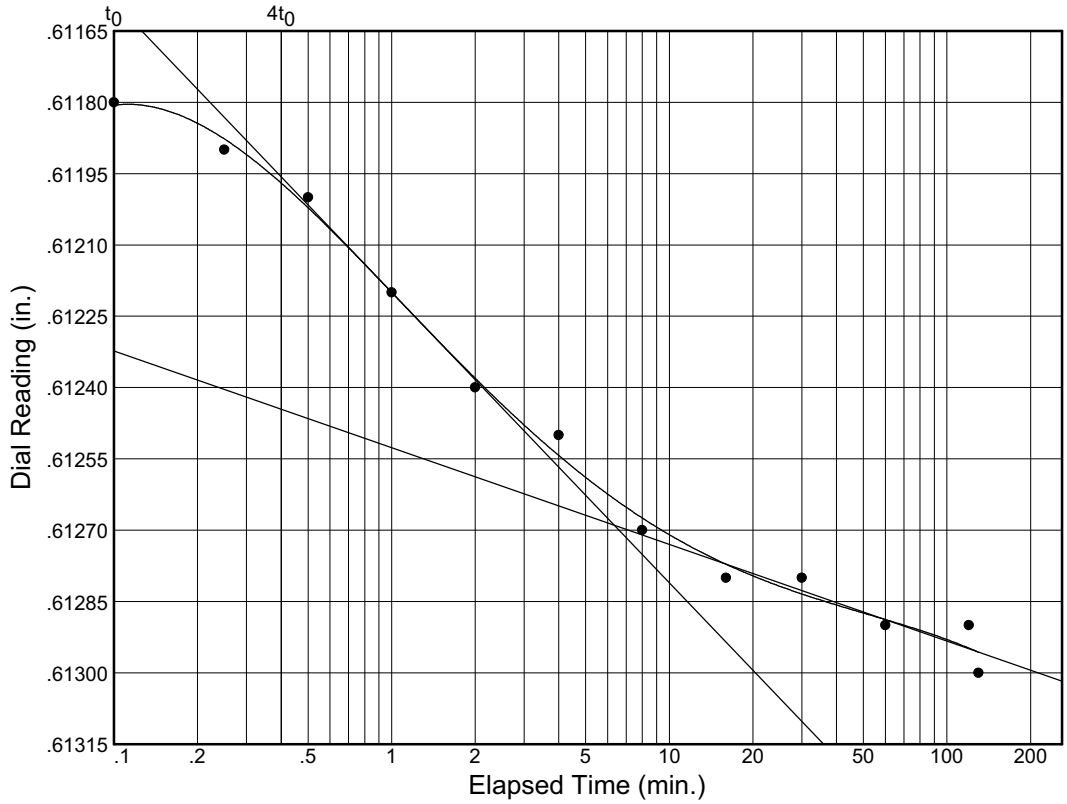
$C_\alpha$ = 0.008

Figure

# Dial Reading vs. Time

Project No.: VB11-232G
Project: I64/I264 Improvements - PSA Ramps & Channel

Location: D7CD-25W




Load No.= 16

Load= 8.00 tsf

$D_0$ = 0.61164

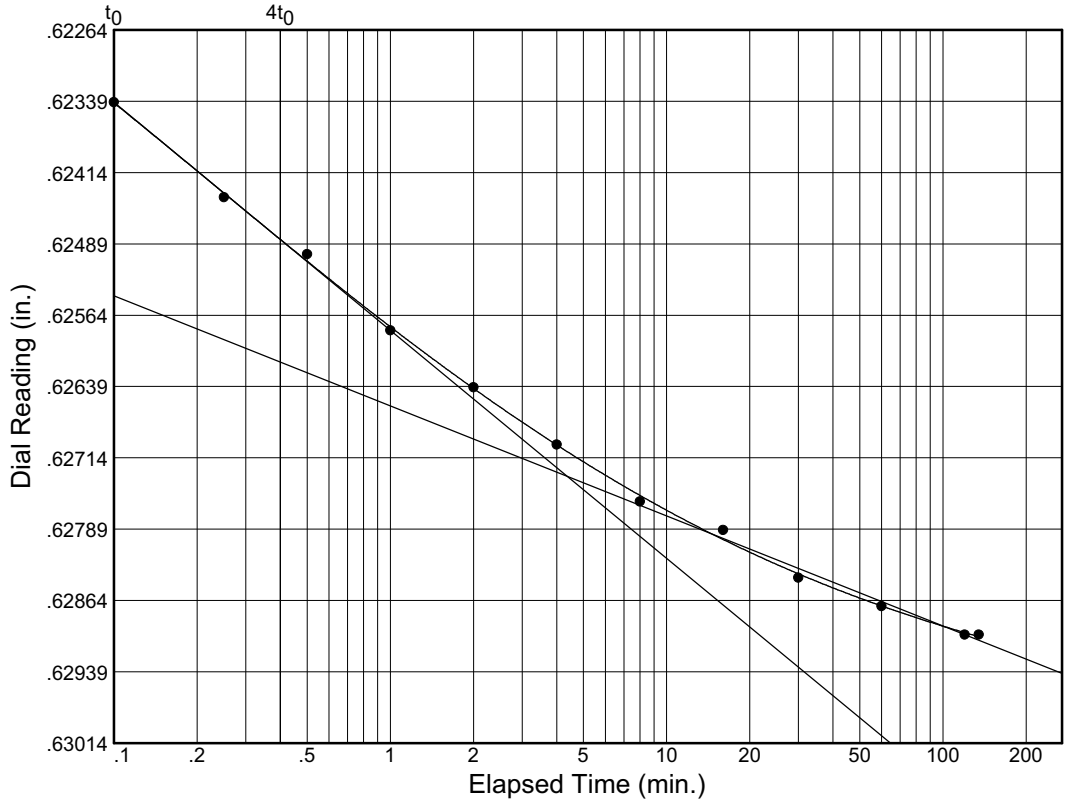
$D_{50}$ = 0.61217

$D_{100}$ = 0.61269

$T_{50}$ = 0.88 min.

$C_v$ @ $T_{50}$

0.21 ft.$^2$/day




Load No.= 17

Load= 2.00 tsf

$D_0$ = 0.62197

$D_{50}$ = 0.62465

$D_{100}$ = 0.62733

$T_{50}$ = 0.33 min.

$C_v$ @ $T_{50}$

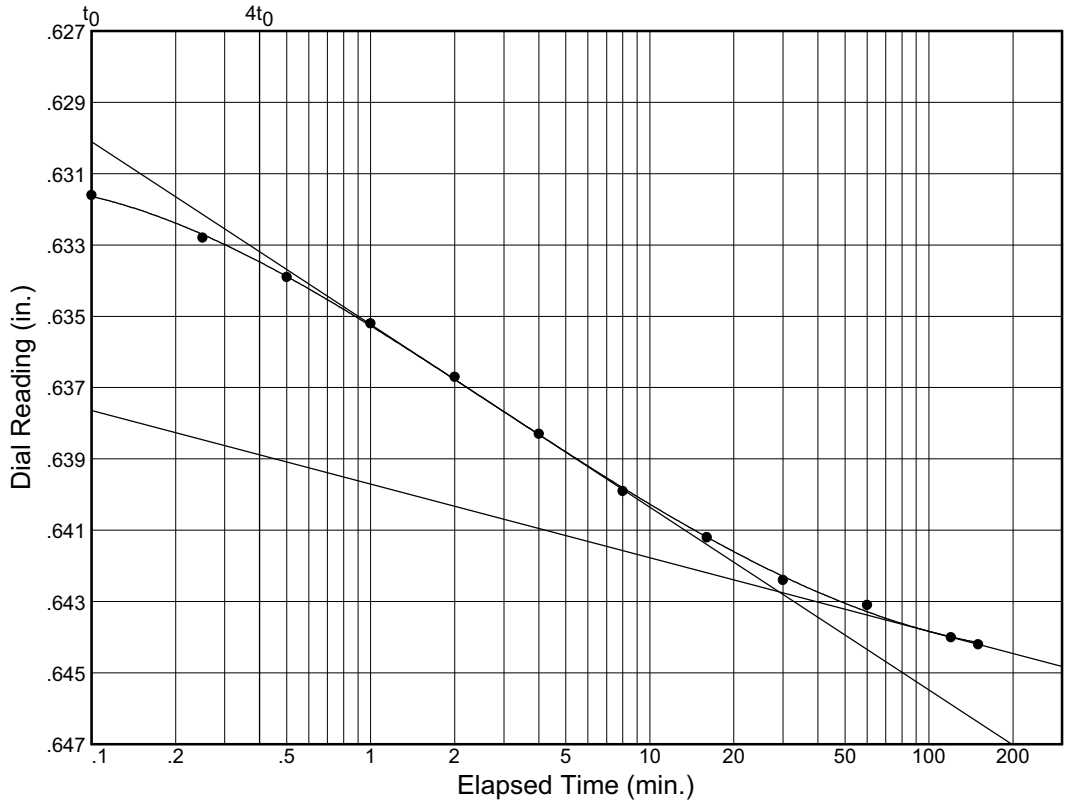
0.57 ft.$^2$/day

Figure

# Dial Reading vs. Time

Project No.: VB11-232G
Project: I64/I264 Improvements - PSA Ramps & Channel

Location: D7CD-25W




Load No.= 18

Load= 0.50 tsf

$D_0$ = 0.62980

$D_{50}$ = 0.63626

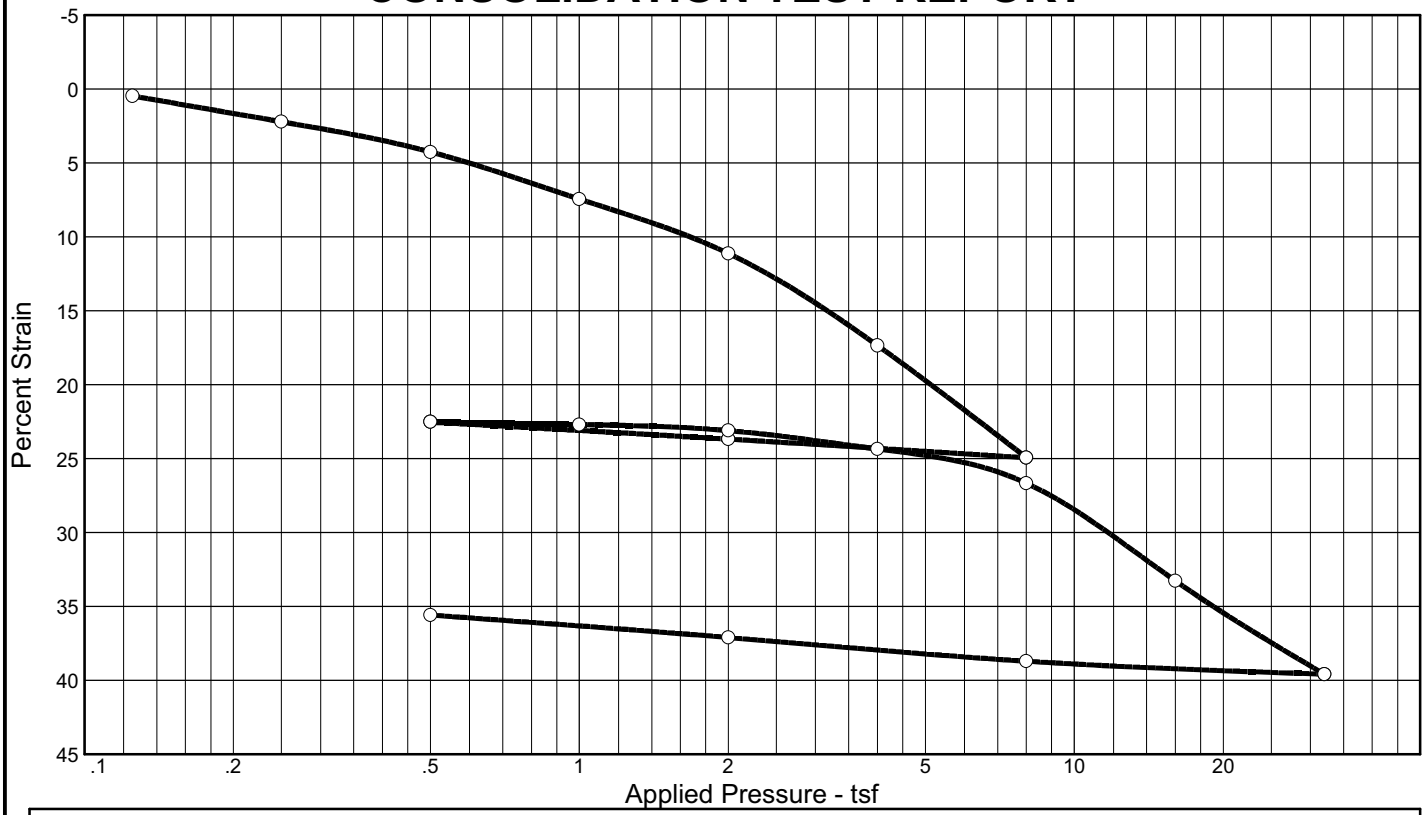
$D_{100}$ = 0.64273

$T_{50}$ = 1.59 min.

| $C_v$ @ $T_{50}$ |
|---|
| 0.13 ft.$^2$/day |

Figure

# CONSOLIDATION TEST REPORT




Coefficients of Consolidation and Secondary Consolidation

| No. | Load (tsf) | $C_v$ (ft.$^2$/day) | $C_\alpha$ | No. | Load (tsf) | $C_v$ (ft.$^2$/day) | $C_\alpha$ | No. | Load (tsf) | $C_v$ (ft.$^2$/day) | $C_\alpha$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.13 | 0.72 | | 11 | 2.00 | 0.95 | | | | | |
| 2 | 0.25 | 1.43 | | 12 | 4.00 | 1.79 | | | | | |
| 3 | 0.50 | 1.32 | | 13 | 8.00 | 0.25 | | | | | |
| 4 | 1.00 | 1.42 | | 14 | 16.00 | 0.43 | | | | | |
| 5 | 2.00 | 1.27 | | 15 | 32.00 | 0.36 | | | | | |
| 6 | 4.00 | 1.19 | | 16 | 8.00 | 0.27 | | | | | |
| 7 | 8.00 | 0.99 | | 17 | 2.00 | 0.54 | | | | | |
| 8 | 2.00 | 0.89 | | 18 | 0.50 | 0.15 | | | | | |
| 9 | 0.50 | 0.80 | | | | | | | | | |
| 10 | 1.00 | 0.98 | | | | | | | | | |

| MATERIAL DESCRIPTION | USCS | AASHTO |
|---|---|---|
| Gray, Lean CLAY | CL | A-7-6(28 |

| LL | PI | Sp. Gr. | Overburden (tsf) | Dry Dens. (pcf) | | Moisture | | Saturation | | Void Ratio | | $P_c$ (tsf) | $C_c$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Init. | Final | Init. | Final | Init. | Final | Init. | Final | | |
| 49 | 26 | 2.79 | 2.10 | 93.5 | | 42.7 % | 28.4 % | 123.9 % | 100.0 % | 0.962 | 0.264 | | |

| Preparation Process: | D2435 Method | $C_r$ | Swell Press. (tsf) | Swell % |
|---|---|---|---|---|
| Condition of Test: | | | | |

**Project No.** VB11-232G **Client:** HDR, Inc.

**Project:** I64/I264 Improvements - PSA Ramps & Channel

**Location:** D7CD-25W

**Remarks:**

Sample Obtained
Boring# D7CD-25W

**Checked By:**

**Title:**

CONSOLIDATION TEST REPORT

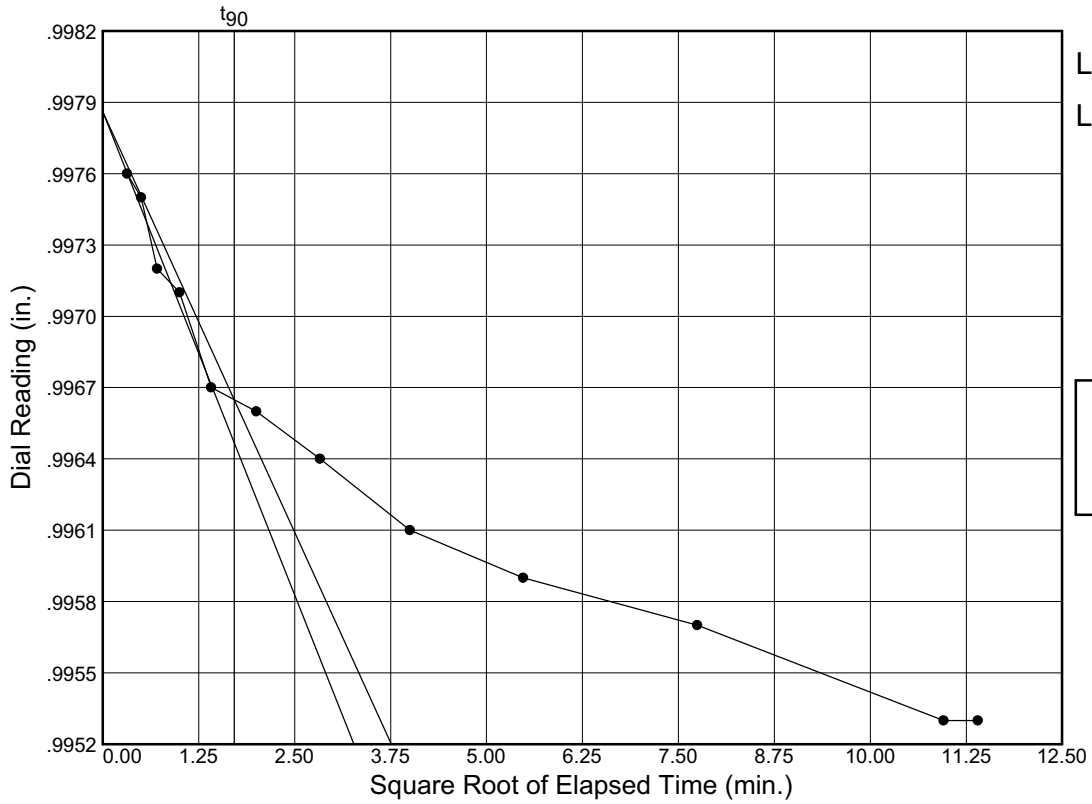
**GET SOLUTIONS, INC.**

**Figure**

# Dial Reading vs. Time

Project No.: VB11-232G
Project: I64/I264 Improvements - PSA Ramps & Channel

Location: D7CD-25W




Load No.= 1

Load= 0.13 tsf

$D_0$ = 0.99786

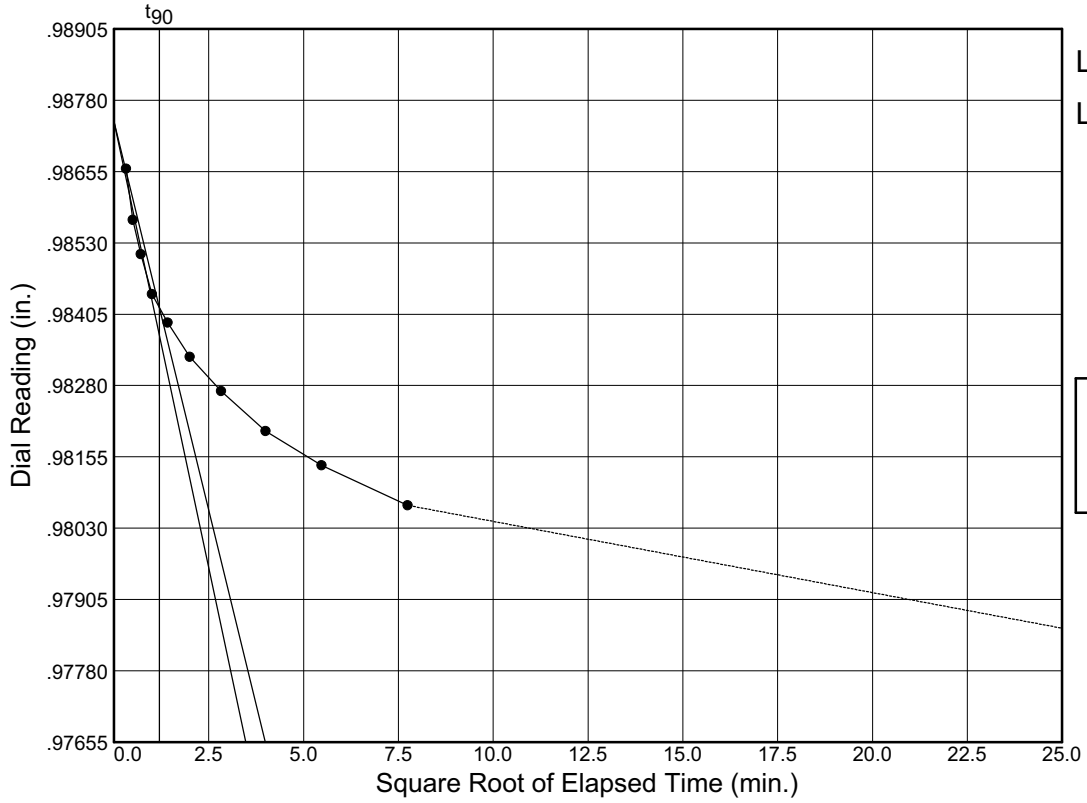
$D_{90}$ = 0.99665

$D_{100}$ = 0.99651

$T_{90}$ = 2.93 min.

$C_v$ @ $T_{90}$

0.72 ft.$^2$/day




Load No.= 2

Load= 0.25 tsf

$D_0$ = 0.98743

$D_{90}$ = 0.98416

$D_{100}$ = 0.98380

$T_{90}$ = 1.44 min.

$C_v$ @ $T_{90}$

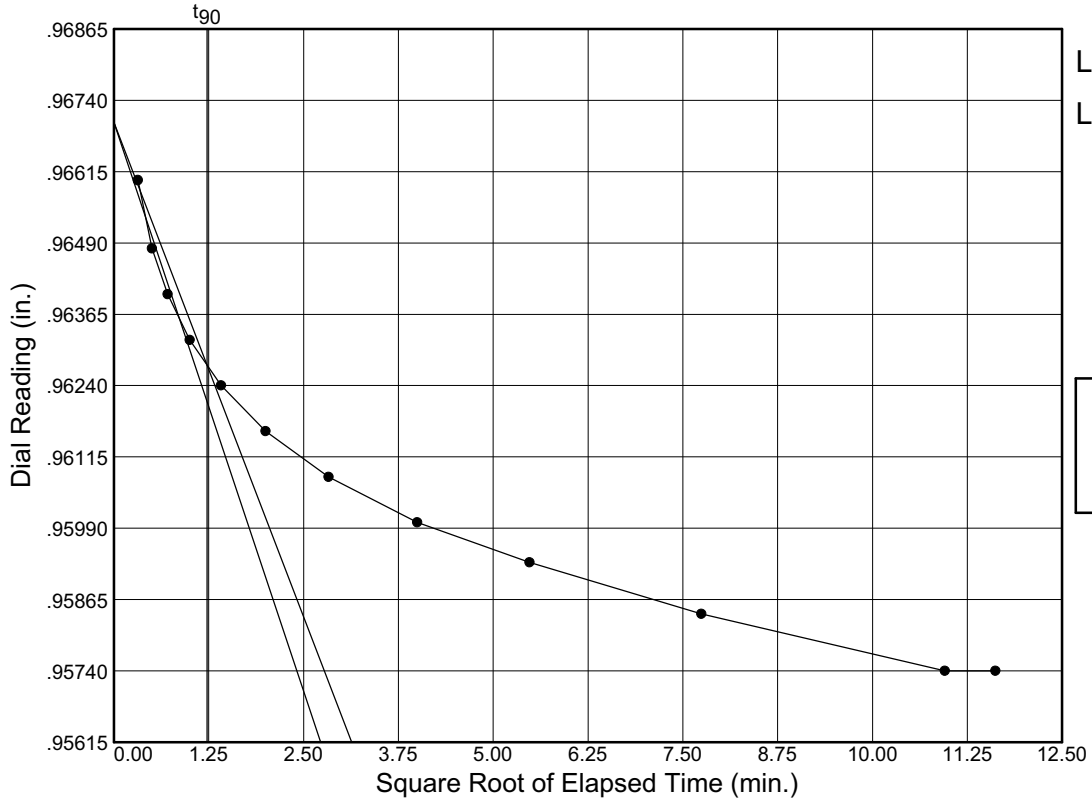
1.43 ft.$^2$/day

Figure

# Dial Reading vs. Time

Project No.: VB11-232G
Project: I64/I264 Improvements - PSA Ramps & Channel

Location: D7CD-25W




Load No.= 3

Load= 0.50 tsf

$D_0$ = 0.96701

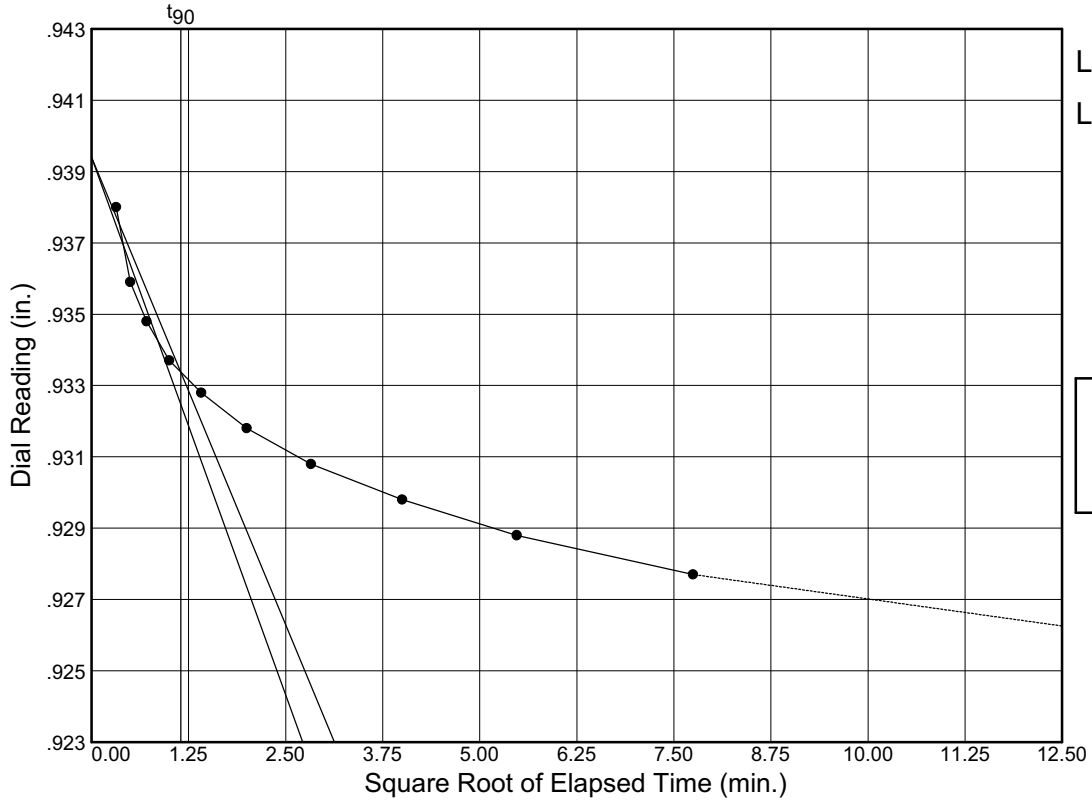
$D_{90}$ = 0.96276

$D_{100}$ = 0.96229

$T_{90}$ = 1.51 min.

$C_v$ @ $T_{90}$

1.32 ft.$^2$/day




Load No.= 4

Load= 1.00 tsf

$D_0$ = 0.93940

$D_{90}$ = 0.93337

$D_{100}$ = 0.93270

$T_{90}$ = 1.32 min.

$C_v$ @ $T_{90}$

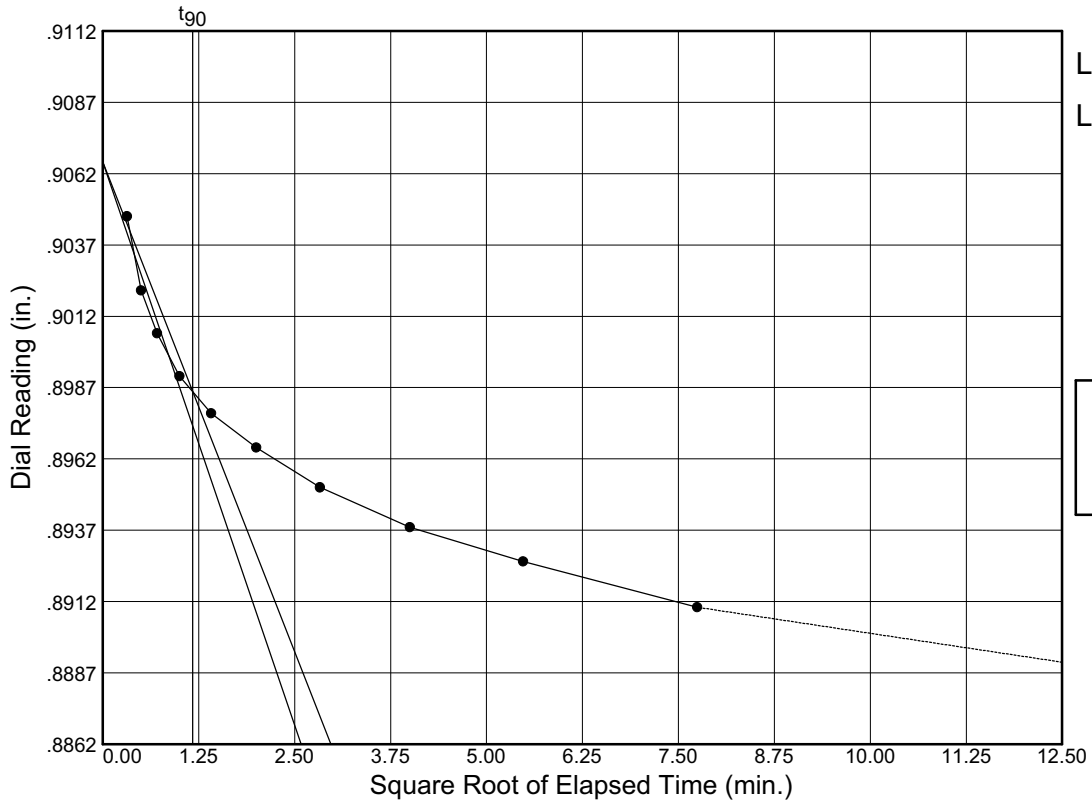
1.42 ft.$^2$/day

Figure

# Dial Reading vs. Time

Project No.: VB11-232G
Project: I64/I264 Improvements - PSA Ramps & Channel

Location: D7CD-25W




Load No.= 5

Load= 2.00 tsf

$D_0$ = 0.90661

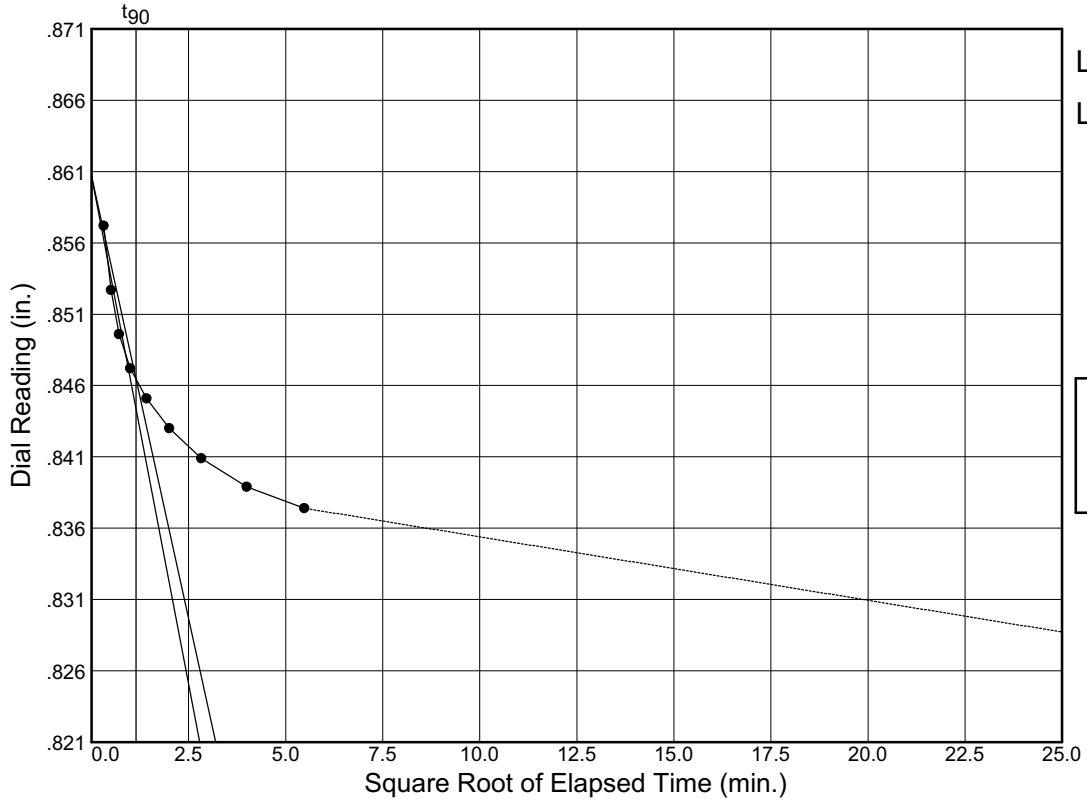
$D_{90}$ = 0.89856

$D_{100}$ = 0.89767

$T_{90}$ = 1.37 min.

$C_v$ @ $T_{90}$

1.27 ft.$^2$/day




Load No.= 6

Load= 4.00 tsf

$D_0$ = 0.86067

$D_{90}$ = 0.84646

$D_{100}$ = 0.84488

$T_{90}$ = 1.31 min.

$C_v$ @ $T_{90}$

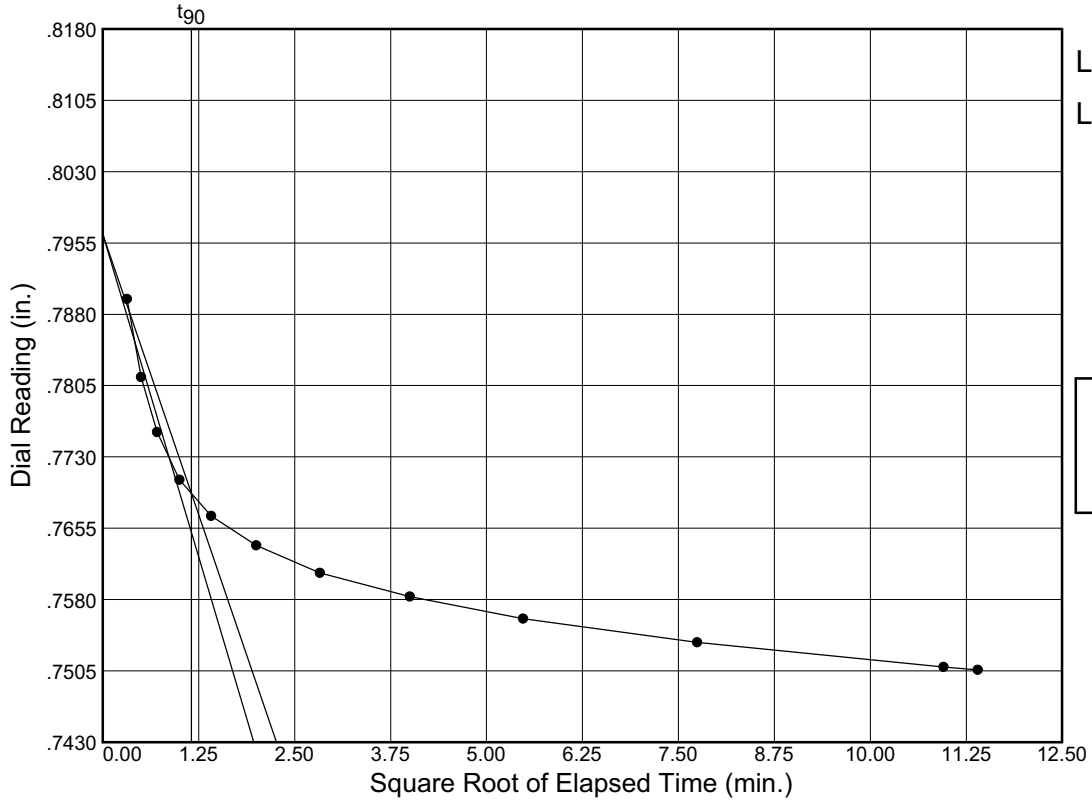
1.19 ft.$^2$/day

Figure

# Dial Reading vs. Time

Project No.: VB11-232G
Project: I64/I264 Improvements - PSA Ramps & Channel

Location: D7CD-25W




Load No.= 7

Load= 8.00 tsf

$D_0$ = 0.79642

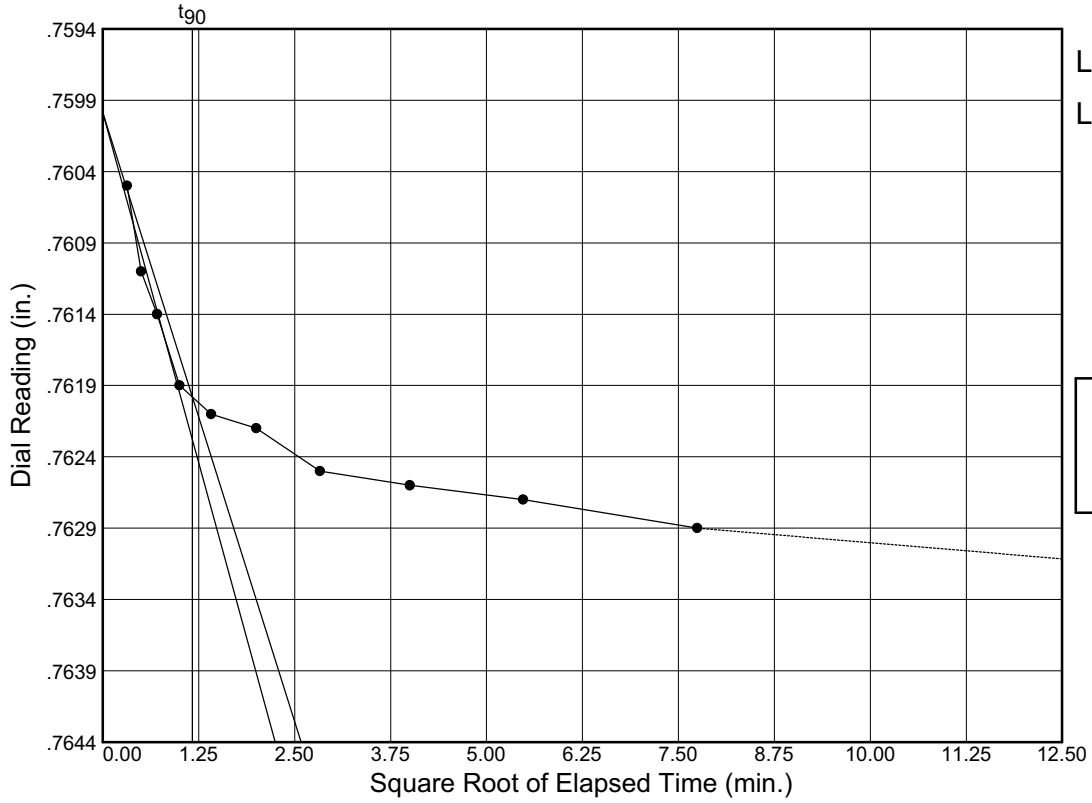
$D_{90}$ = 0.76919

$D_{100}$ = 0.76616

$T_{90}$ = 1.33 min.

$C_v$ @ $T_{90}$

0.99 ft.$^2$/day




Load No.= 8

Load= 2.00 tsf

$D_0$ = 0.75999

$D_{90}$ = 0.76198

$D_{100}$ = 0.76220

$T_{90}$ = 1.37 min.

$C_v$ @ $T_{90}$

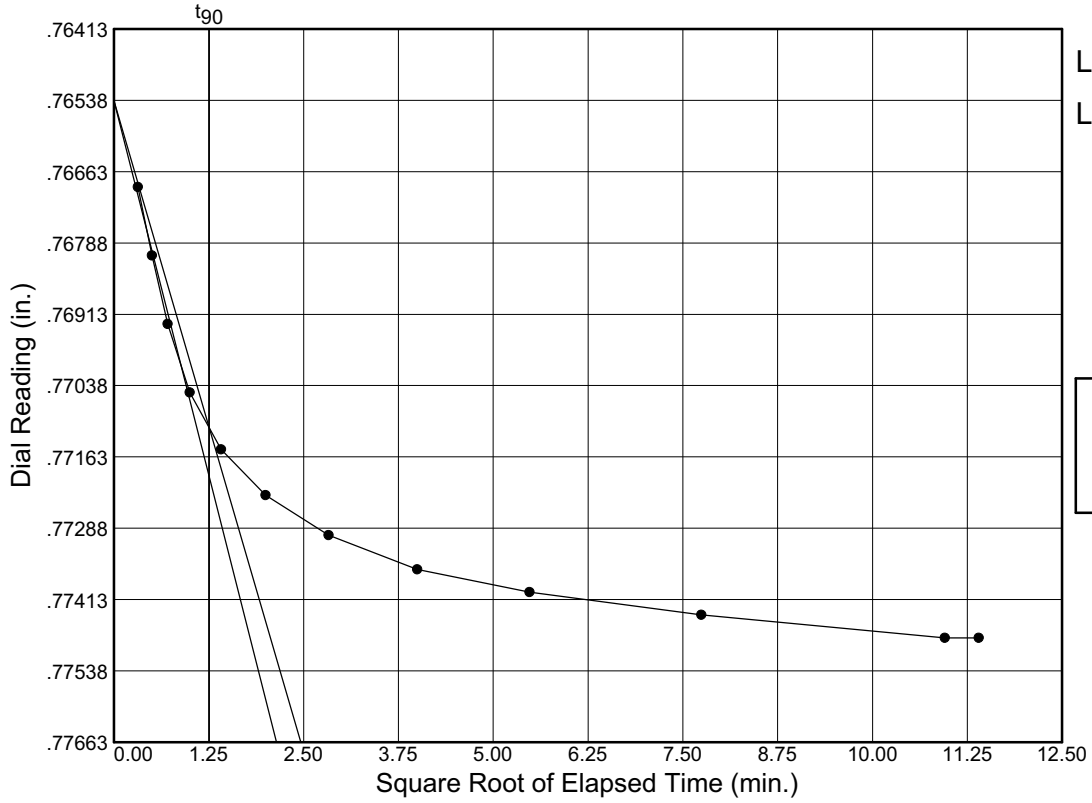
0.89 ft.$^2$/day

Figure

# Dial Reading vs. Time

Project No.: VB11-232G
Project: I64/I264 Improvements - PSA Ramps & Channel

Location: D7CD-25W




Load No.= 9

Load= 0.50 tsf

$D_0$ = 0.76539

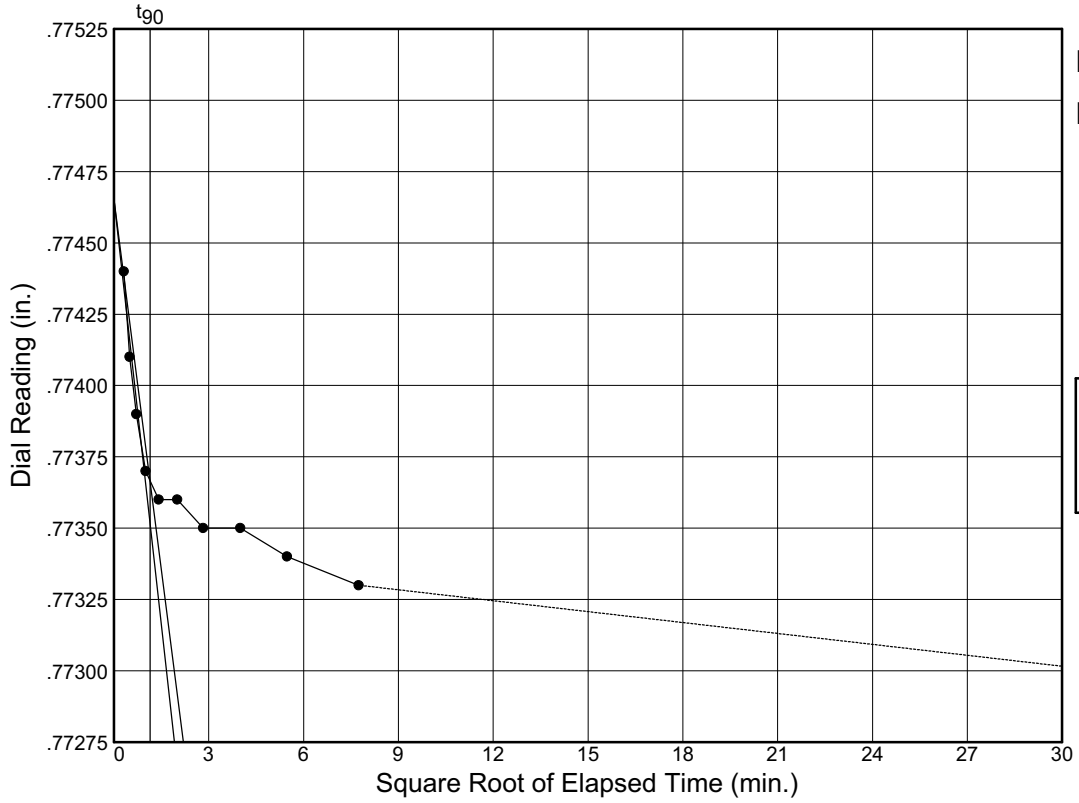
$D_{90}$ = 0.77111

$D_{100}$ = 0.77175

$T_{90}$ = 1.57 min.

$C_v$ @ $T_{90}$

0.80 ft.$^2$/day




Load No.= 10

Load= 1.00 tsf

$D_0$ = 0.77465

$D_{90}$ = 0.77367

$D_{100}$ = 0.77356

$T_{90}$ = 1.30 min.

$C_v$ @ $T_{90}$

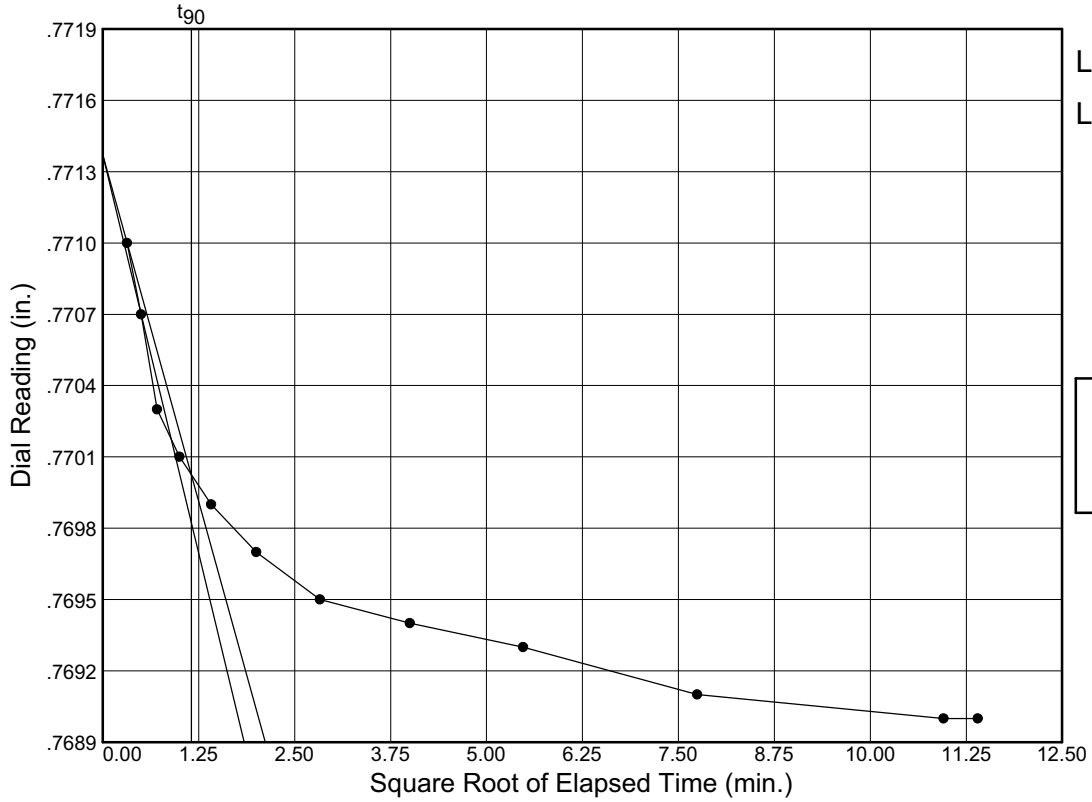
0.98 ft.$^2$/day

Figure

# Dial Reading vs. Time

Project No.: VB11-232G
Project: I64/I264 Improvements - PSA Ramps & Channel

Location: D7CD-25W




Load No.= 11

Load= 2.00 tsf

$D_0$ = 0.77137

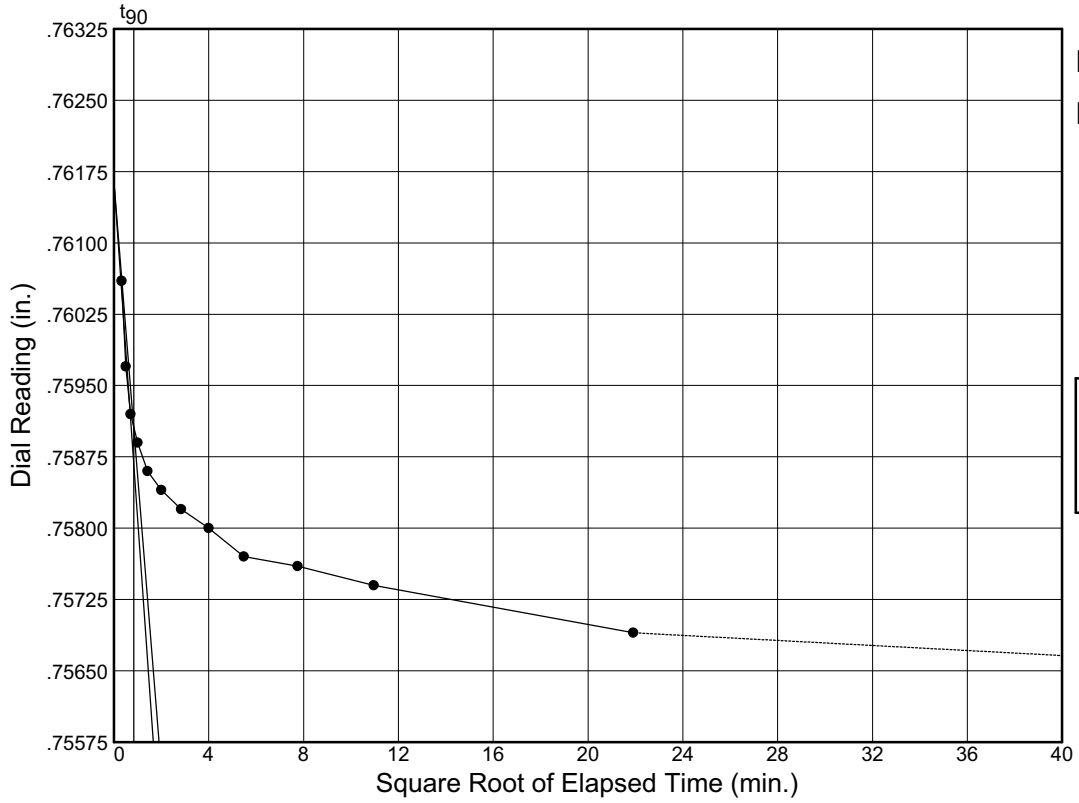
$D_{90}$ = 0.77003

$D_{100}$ = 0.76988

$T_{90}$ = 1.33 min.

$C_v$ @ $T_{90}$

0.95 ft.$^2$/day




Load No.= 12

Load= 4.00 tsf

$D_0$ = 0.76164

$D_{90}$ = 0.75907

$D_{100}$ = 0.75879

$T_{90}$ = 0.69 min.

$C_v$ @ $T_{90}$

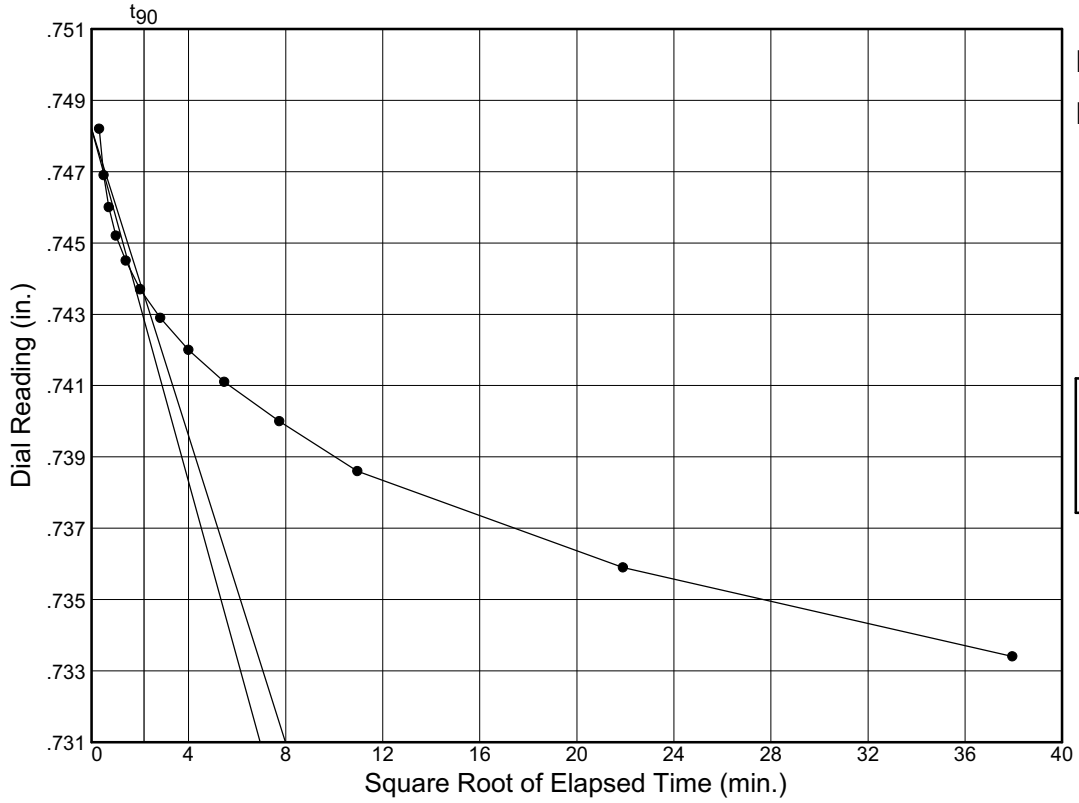
1.79 ft.$^2$/day

Figure

# Dial Reading vs. Time

Project No.: VB11-232G
Project: I64/I264 Improvements - PSA Ramps & Channel

Location: D7CD-25W




Load No.= 13

Load= 8.00 tsf

$D_0$ = 0.74820

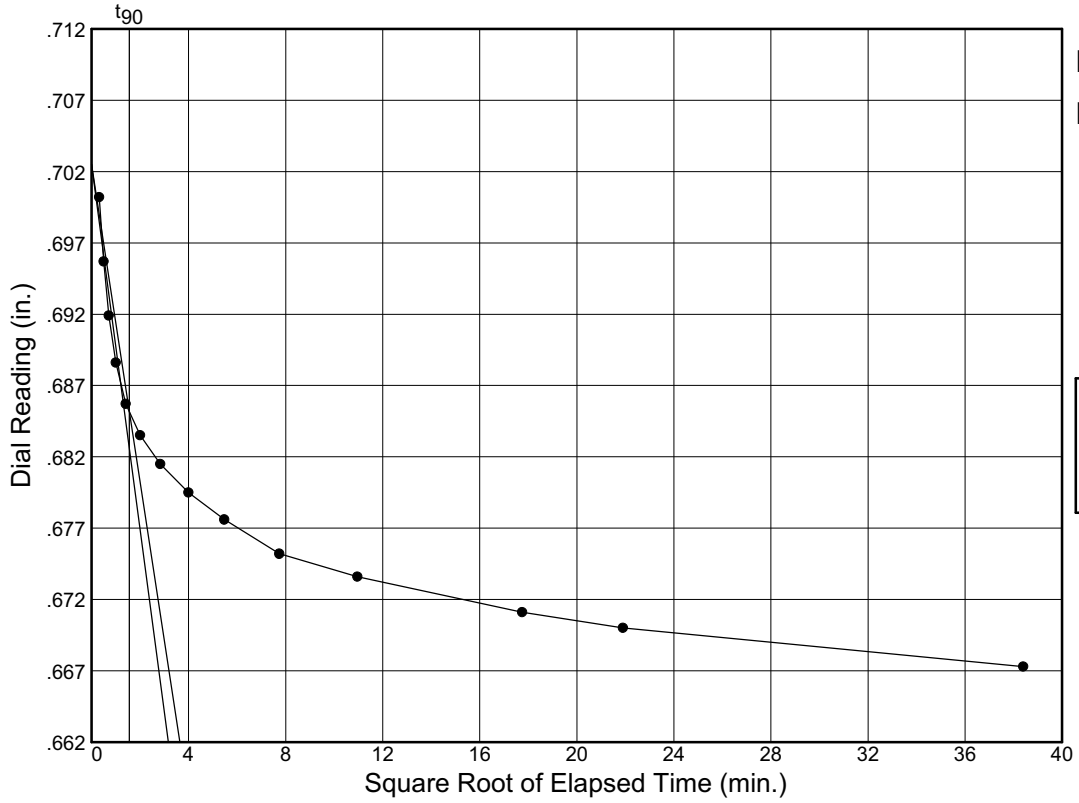
$D_{90}$ = 0.74354

$D_{100}$ = 0.74303

$T_{90}$ = 4.68 min.

$C_v$ @ $T_{90}$

0.25 ft.$^2$/day




Load No.= 14

Load= 16.00 tsf

$D_0$ = 0.70250

$D_{90}$ = 0.68516

$D_{100}$ = 0.68323

$T_{90}$ = 2.43 min.

$C_v$ @ $T_{90}$

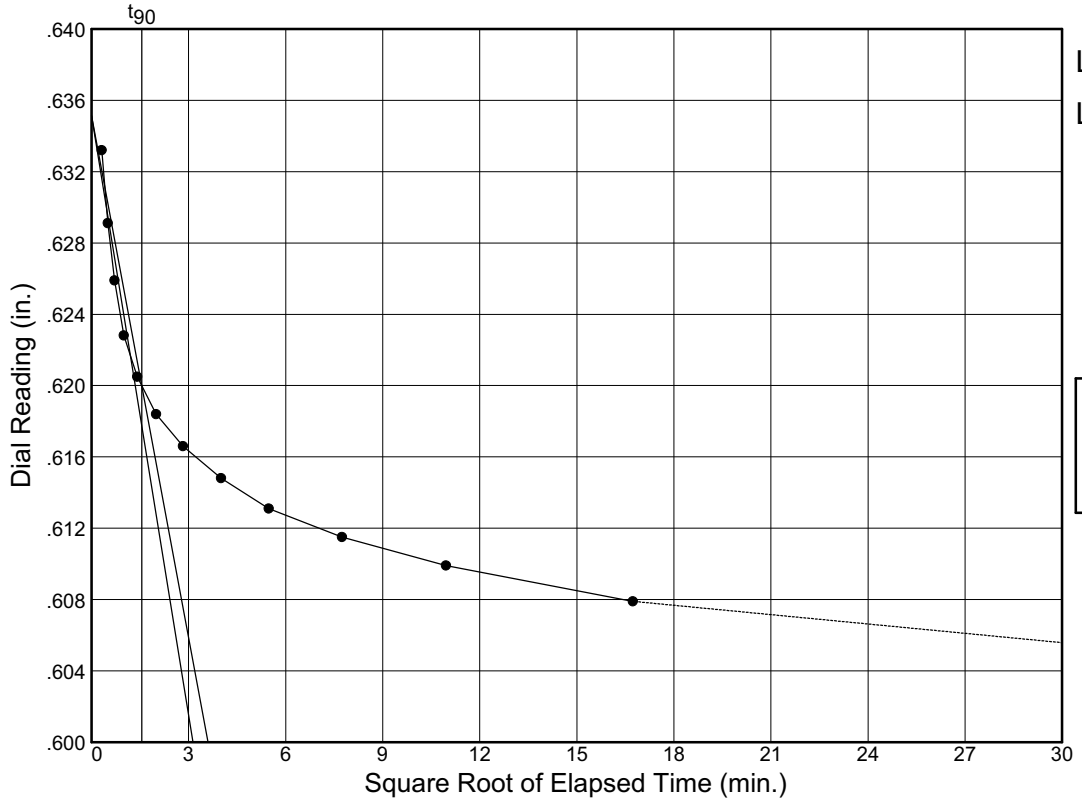
0.43 ft.$^2$/day

Figure

# Dial Reading vs. Time

Project No.: VB11-232G
Project: I64/I264 Improvements - PSA Ramps & Channel

Location: D7CD-25W




Load No.= 15

Load= 32.00 tsf

$D_0$ = 0.63513

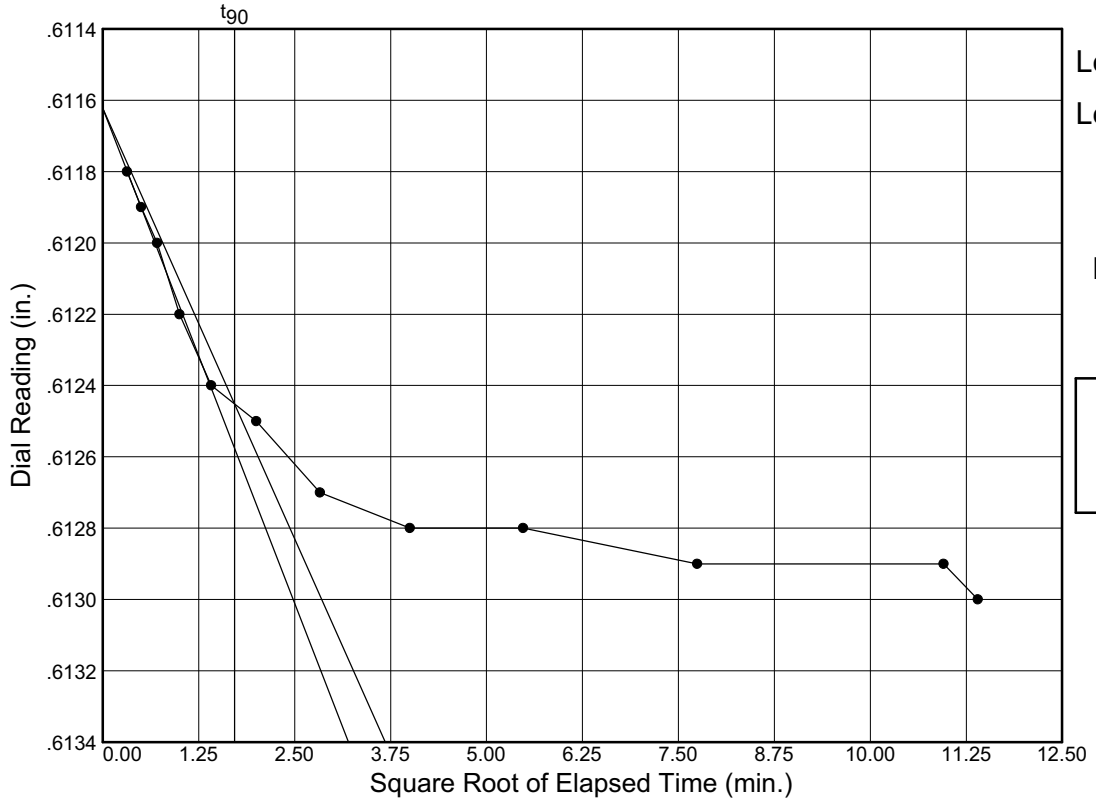
$D_{90}$ = 0.62001

$D_{100}$ = 0.61833

$T_{90}$ = 2.40 min.

$C_v$ @ $T_{90}$

0.36 ft.$^2$/day




Load No.= 16

Load= 8.00 tsf

$D_0$ = 0.61162

$D_{90}$ = 0.61245

$D_{100}$ = 0.61254

$T_{90}$ = 2.95 min.

$C_v$ @ $T_{90}$

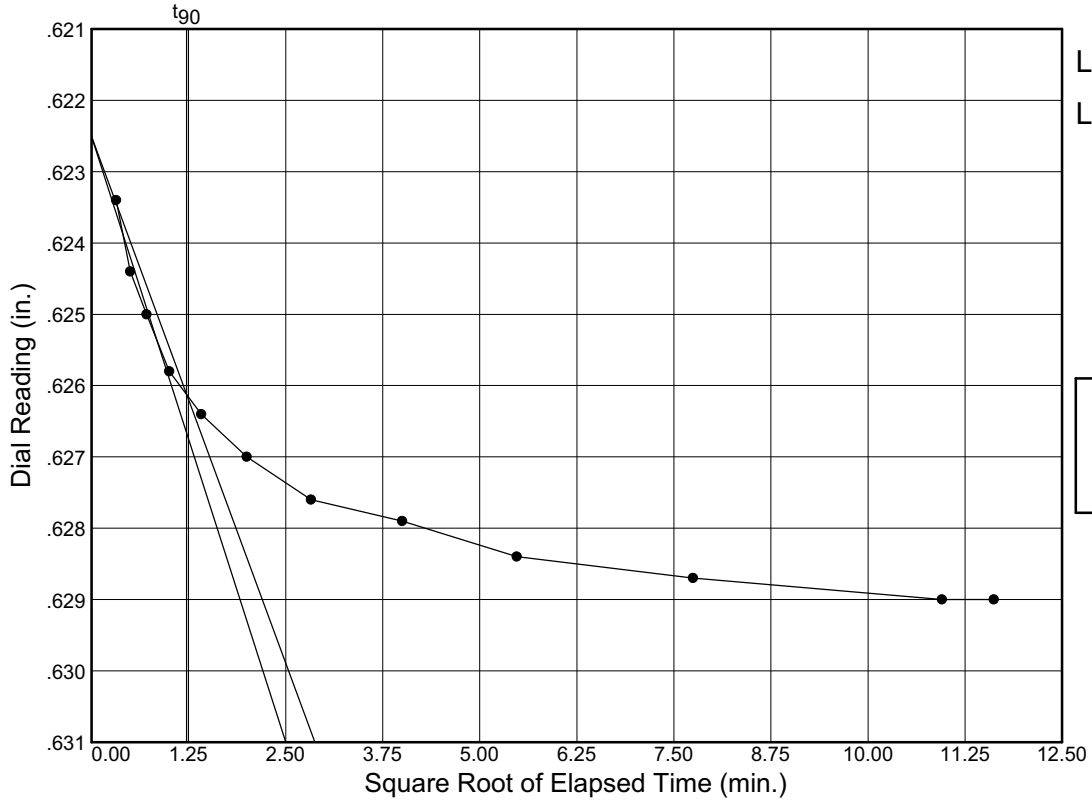
0.27 ft.$^2$/day

Figure

# Dial Reading vs. Time

Project No.: VB11-232G
Project: I64/I264 Improvements - PSA Ramps & Channel

Location: D7CD-25W




Load No.= 17

Load= 2.00 tsf

$D_0$ = 0.62251

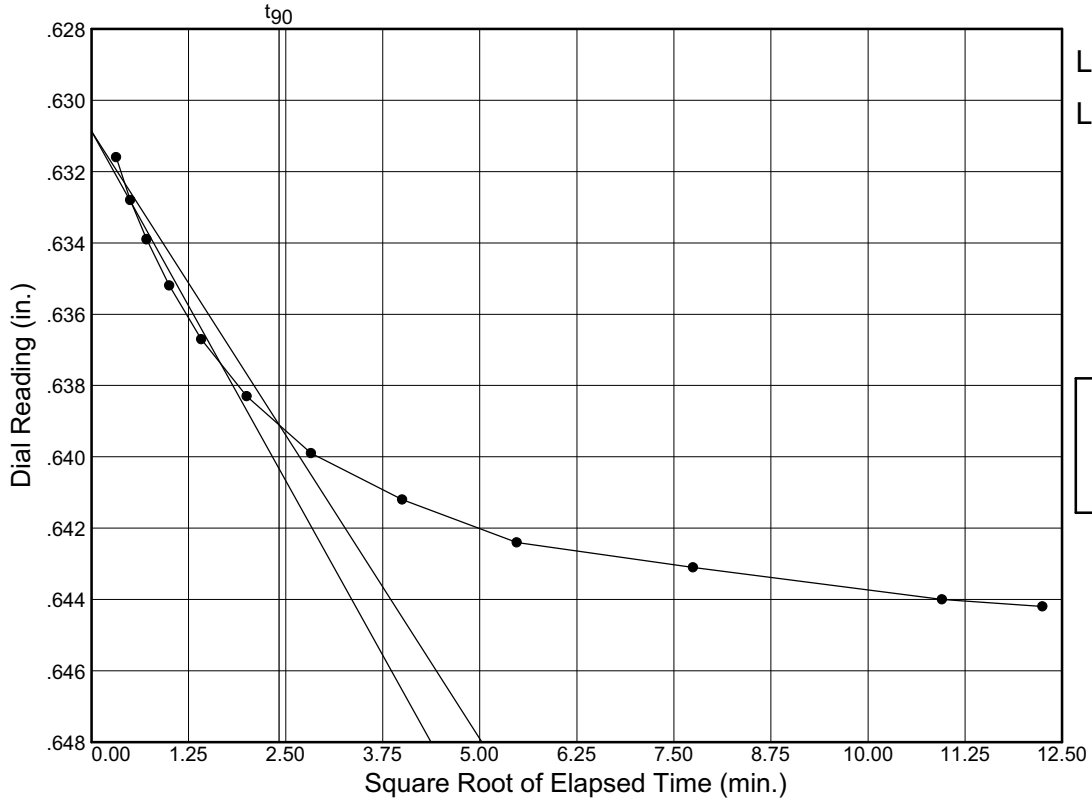
$D_{90}$ = 0.62613

$D_{100}$ = 0.62653

$T_{90}$ = 1.50 min.

$C_v$ @ $T_{90}$

0.54 ft.$^2$/day




Load No.= 18

Load= 0.50 tsf

$D_0$ = 0.63087

$D_{90}$ = 0.63910

$D_{100}$ = 0.64002

$T_{90}$ = 5.83 min.

$C_v$ @ $T_{90}$

0.15 ft.$^2$/day

Figure

## CONSOLIDATION TEST DATA

**Client:** HDR, Inc.
**Project:** I64/I264 Improvements - PSA Ramps & Channel
**Project Number:** VB11-232G

### Sample Data

**Source:**
**Sample No.:** Consolidation No. 2
**Elev. or Depth:** 60-62 ft. **Sample Length(in./cm.):**
**Location:** D7CD-25W
**Description:** Gray, Lean CLAY
**Sample Date:** **Liquid Limit:** 49 **Plasticity Index:** 26
**USCS:** CL **AASHTO:** A-7-6(28
**Preparation Process:**
**Condition of Test:**
**Test Method:** **Final Density:** **Figure No.:**
**Testing Remarks:** Sample Obtained
Boring# D7CD-25W
Depth = 60-62 ft.
% Passing #200 Sieve = 95
**Tested By:** **Test Date:**
**Checked By:** **Title:**

### Test Specimen Data

| TOTAL SAMPLE | BEFORE TEST | AFTER TEST |
|---|---|---|
| **Wet w+t** = 213.62 g. | **Consolidometer #** = 1 | **Wet w+t** = 293.95 g. |
| **Dry w+t** = 189.25 g. | | **Dry w+t** = 261.44 g. |
| **Tare Wt.** = 132.16 g. | **Spec. Gravity** = 2.79 | **Tare Wt.** = 147.03 g. |
| **Height** = 1.00 in. | **Height** = 1.00 in. | |
| **Diameter** = 2.50 in. | **Diameter** = 2.50 in. | |
| **Weight** = 171.83 g. | **Defl. Table** = Reference Set (inches/tsf) | |
| **Moisture** = 42.7 % | **Ht. Solids** = 0.5098 in. | **Moisture** = 28.4 % |
| **Wet Den.** = 133.4 pcf | **Dry Wt.** = 120.42 g. | **Dry Wt.** = 114.41 g.* |
| **Dry Den.** = 93.5 pcf | **Void Ratio** = 0.962 | **Void Ratio** = 0.264 |
| **Ovrbrdn.** = 2.10 tsf | **Saturation** = 123.9 % | |

*** Final dry weight used in calculations**

### End-of-Load Summary

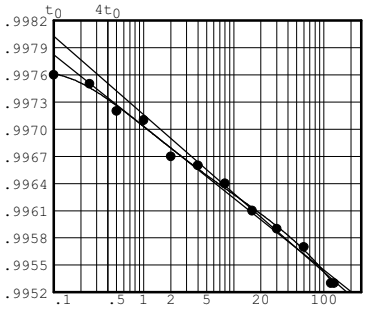
| Pressure (tsf) | Final Dial (in.) | Machine Defl. (in.) | $C_v$ (ft.$^2$/day) | $C_\alpha$ | Void Ratio | % Compression /Swell |
|---|---|---|---|---|---|---|
| start | 1.00000 | | | | 0.962 | |
| 0.13 | 0.99530 | 0.00000 | 0.24 | 0.001 | 0.952 | 0.5 Comprs. |
| 0.25 | 0.97740 | 0.00040 | | 0.002 | 0.918 | 2.2 Comprs. |
| 0.50 | 0.95660 | 0.00080 | 0.27 | 0.000 | 0.878 | 4.3 Comprs. |
| 1.00 | 0.92390 | 0.00160 | | 0.004 | 0.815 | 7.5 Comprs. |
| 2.00 | 0.88630 | 0.00240 | 0.39 | 0.005 | 0.743 | 11.1 Comprs. |
| 4.00 | 0.82650 | 0.00000 | 0.83 | 0.008 | 0.621 | 17.4 Comprs. |

| Pressure (tsf) | Final Dial (in.) | Machine Defl. (in.) | $C_v$ (ft.$^2$/day) | $C_\alpha$ | Void Ratio | % Compression /Swell |
|---|---|---|---|---|---|---|
| 8.00 | 0.75060 | 0.00000 | | 0.010 | 0.472 | 24.9 Comprs. |
| 2.00 | 0.76020 | 0.00300 | 1.01 | | 0.497 | 23.7 Comprs. |
| 0.50 | 0.77400 | 0.00080 | 0.84 | | 0.520 | 22.5 Comprs. |
| 1.00 | 0.77140 | 0.00160 | 0.85 | 0.000 | 0.516 | 22.7 Comprs. |
| 2.00 | 0.76600 | 0.00300 | | 0.001 | 0.508 | 23.1 Comprs. |
| 4.00 | 0.75650 | 0.00000 | 0.70 | 0.001 | 0.484 | 24.4 Comprs. |
| 8.00 | 0.73340 | 0.00000 | 0.52 | 0.006 | 0.439 | 26.7 Comprs. |
| 16.00 | 0.66730 | 0.00000 | | 0.008 | 0.309 | 33.3 Comprs. |
| 32.00 | 0.60420 | 0.00000 | 1.13 | 0.008 | 0.185 | 39.6 Comprs. |
| 8.00 | 0.61300 | 0.00000 | 0.21 | | 0.202 | 38.7 Comprs. |
| 2.00 | 0.62600 | 0.00300 | 0.57 | | 0.234 | 37.1 Comprs. |
| 0.50 | 0.64340 | 0.00080 | 0.13 | | 0.264 | 35.6 Comprs. |

**$C_c$ =** 0.41 **$P_c$ =** 1.02 tsf **$C_r$ =** 0.05

**Pressure: 0.13 tsf** **TEST READINGS** **Load No. 1**

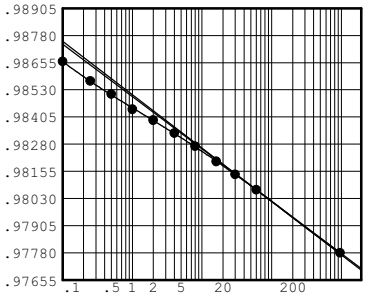
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 1.00000 | 11 | 60.00 | 0.99570 |
| 2 | 0.10 | 0.99760 | 12 | 120.00 | 0.99530 |
| 3 | 0.25 | 0.99750 | 13 | 130.00 | 0.99530 |
| 4 | 0.50 | 0.99720 | | | |
| 5 | 1.00 | 0.99710 | | | |
| 6 | 2.00 | 0.99670 | | | |
| 7 | 4.00 | 0.99660 | | | |
| 8 | 8.00 | 0.99640 | | | |
| 9 | 16.00 | 0.99610 | | | |
| 10 | 30.00 | 0.99590 | | | |




**Void Ratio =** 0.952 **Compression =** 0.5 %
**$D_0$ =** 0.99789 **$D_{50}$ =** 0.99679 **$D_{100}$ =** 0.99568
**$C_v$ at 2.0 min. =** 0.24 ft.$^2$/day **$C_\alpha$ =** 0.001

**Pressure: 0.25 tsf** **TEST READINGS** **Load No. 2**

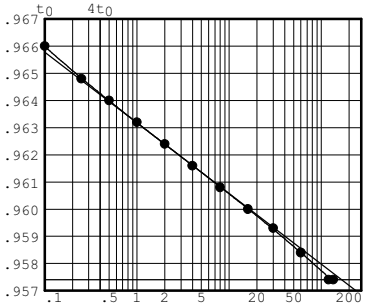
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.99530 | 11 | 60.00 | 0.98030 |
| 2 | 0.10 | 0.98620 | 12 | 960.00 | 0.97740 |
| 3 | 0.25 | 0.98530 | | | |
| 4 | 0.50 | 0.98470 | | | |
| 5 | 1.00 | 0.98400 | | | |
| 6 | 2.00 | 0.98350 | | | |
| 7 | 4.00 | 0.98290 | | | |
| 8 | 8.00 | 0.98230 | | | |
| 9 | 16.00 | 0.98160 | | | |
| 10 | 30.00 | 0.98100 | | | |




**Void Ratio =** 0.918 **Compression =** 2.2 %

**Pressure: 0.50 tsf** **TEST READINGS** **Load No. 3**

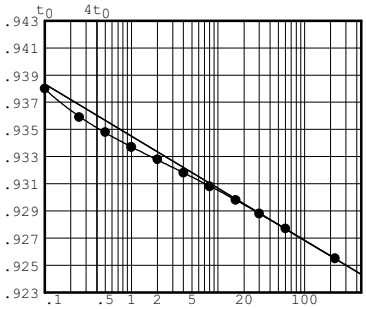
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.97740 | 11 | 60.00 | 0.95760 |
| 2 | 0.10 | 0.96520 | 12 | 120.00 | 0.95660 |
| 3 | 0.25 | 0.96400 | 13 | 135.00 | 0.95660 |
| 4 | 0.50 | 0.96320 | | | |
| 5 | 1.00 | 0.96240 | | | |
| 6 | 2.00 | 0.96160 | | | |
| 7 | 4.00 | 0.96080 | | | |
| 8 | 8.00 | 0.96000 | | | |
| 9 | 16.00 | 0.95920 | | | |
| 10 | 30.00 | 0.95850 | | | |




**Void Ratio =** 0.878 **Compression =** 4.3 %
**$D_0$ =** 0.96773 **$D_{50}$ =** 0.96257 **$D_{100}$ =** 0.95740
**$C_v$ at 1.7 min. =** 0.27 ft.$^2$/day **$C_\alpha$ =** 0.000

**Pressure: 1.00 tsf** **TEST READINGS** **Load No. 4**

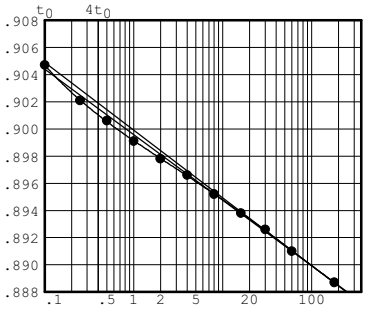
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.95660 | 11 | 60.00 | 0.92610 |
| 2 | 0.10 | 0.93640 | 12 | 225.00 | 0.92390 |
| 3 | 0.25 | 0.93430 | | | |
| 4 | 0.50 | 0.93320 | | | |
| 5 | 1.00 | 0.93210 | | | |
| 6 | 2.00 | 0.93120 | | | |
| 7 | 4.00 | 0.93020 | | | |
| 8 | 8.00 | 0.92920 | | | |
| 9 | 16.00 | 0.92820 | | | |
| 10 | 30.00 | 0.92720 | | | |




**Void Ratio =** 0.815 **Compression =** 7.5 %

**Pressure: 2.00 tsf** **TEST READINGS** **Load No. 5**

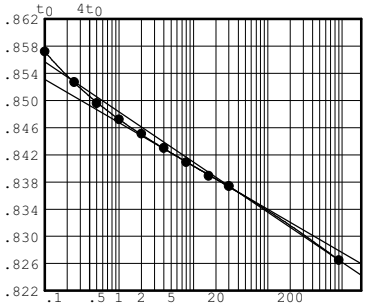
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.92390 | 11 | 60.00 | 0.88860 |
| 2 | 0.10 | 0.90230 | 12 | 180.00 | 0.88630 |
| 3 | 0.25 | 0.89970 | | | |
| 4 | 0.50 | 0.89820 | | | |
| 5 | 1.00 | 0.89670 | | | |
| 6 | 2.00 | 0.89540 | | | |
| 7 | 4.00 | 0.89420 | | | |
| 8 | 8.00 | 0.89280 | | | |
| 9 | 16.00 | 0.89140 | | | |
| 10 | 30.00 | 0.89020 | | | |




**Void Ratio =** 0.743 **Compression =** 11.1 %
**$D_0$ =** 0.90837 **$D_{50}$ =** 0.89905 **$D_{100}$ =** 0.88973
**$C_v$ at 1.0 min. =** 0.39 ft.$^2$/day **$C_\alpha$ =** 0.005

**Pressure: 4.00 tsf** **TEST READINGS** **Load No. 6**

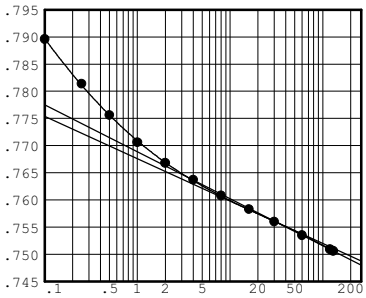
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.88630 | 11 | 900.00 | 0.82650 |
| 2 | 0.10 | 0.85720 | | | |
| 3 | 0.25 | 0.85270 | | | |
| 4 | 0.50 | 0.84960 | | | |
| 5 | 1.00 | 0.84720 | | | |
| 6 | 2.00 | 0.84510 | | | |
| 7 | 4.00 | 0.84300 | | | |
| 8 | 8.00 | 0.84090 | | | |
| 9 | 16.00 | 0.83890 | | | |
| 10 | 30.00 | 0.83740 | | | |




**Void Ratio =** 0.621 **Compression =** 17.4 %
**$D_0$ =** 0.86379 **$D_{50}$ =** 0.85026 **$D_{100}$ =** 0.83672
**$C_v$ at 0.4 min. =** 0.83 ft.$^2$/day **$C_\alpha$ =** 0.008

**Pressure: 8.00 tsf** **TEST READINGS** **Load No. 7**

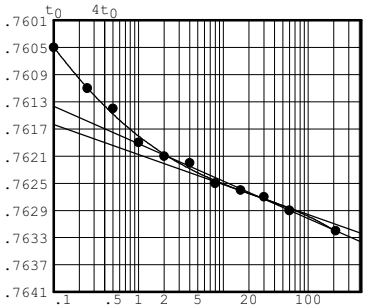
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.82650 | 11 | 60.00 | 0.75350 |
| 2 | 0.10 | 0.78960 | 12 | 120.00 | 0.75090 |
| 3 | 0.25 | 0.78140 | 13 | 130.00 | 0.75060 |
| 4 | 0.50 | 0.77560 | | | |
| 5 | 1.00 | 0.77060 | | | |
| 6 | 2.00 | 0.76680 | | | |
| 7 | 4.00 | 0.76370 | | | |
| 8 | 8.00 | 0.76080 | | | |
| 9 | 16.00 | 0.75830 | | | |
| 10 | 30.00 | 0.75600 | | | |




**Void Ratio =** 0.472 **Compression =** 24.9 %

**Pressure: 2.00 tsf** **TEST READINGS** **Load No. 8**

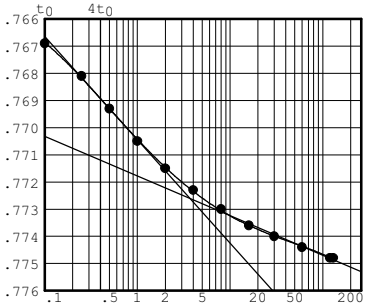
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.75060 | 11 | 60.00 | 0.75990 |
| 2 | 0.10 | 0.75750 | 12 | 210.00 | 0.76020 |
| 3 | 0.25 | 0.75810 | | | |
| 4 | 0.50 | 0.75840 | | | |
| 5 | 1.00 | 0.75890 | | | |
| 6 | 2.00 | 0.75910 | | | |
| 7 | 4.00 | 0.75920 | | | |
| 8 | 8.00 | 0.75950 | | | |
| 9 | 16.00 | 0.75960 | | | |
| 10 | 30.00 | 0.75970 | | | |




**Void Ratio =** 0.497 **Compression =** 23.7 %
**$D_0$ =** 0.75962 **$D_{50}$ =** 0.76116 **$D_{100}$ =** 0.76270
**$C_v$ at 0.3 min. =** 1.01 ft.$^2$/day

**Pressure: 0.50 tsf** **TEST READINGS** **Load No. 9**

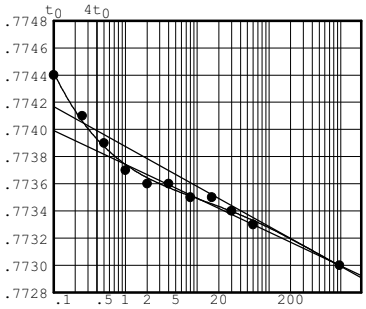
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.76020 | 11 | 60.00 | 0.77360 |
| 2 | 0.10 | 0.76610 | 12 | 120.00 | 0.77400 |
| 3 | 0.25 | 0.76730 | 13 | 130.00 | 0.77400 |
| 4 | 0.50 | 0.76850 | | | |
| 5 | 1.00 | 0.76970 | | | |
| 6 | 2.00 | 0.77070 | | | |
| 7 | 4.00 | 0.77150 | | | |
| 8 | 8.00 | 0.77220 | | | |
| 9 | 16.00 | 0.77280 | | | |
| 10 | 30.00 | 0.77320 | | | |




**Void Ratio =** 0.520 **Compression =** 22.5 %
**$D_0$ =** 0.76481 **$D_{50}$ =** 0.76871 **$D_{100}$ =** 0.77260
**$C_v$ at 0.3 min. =** 0.84 ft.$^2$/day

**Pressure: 1.00 tsf** **TEST READINGS** **Load No. 10**

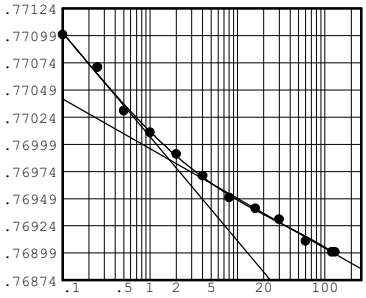
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.77400 | 11 | 60.00 | 0.77170 |
| 2 | 0.10 | 0.77280 | 12 | 960.00 | 0.77140 |
| 3 | 0.25 | 0.77250 | | | |
| 4 | 0.50 | 0.77230 | | | |
| 5 | 1.00 | 0.77210 | | | |
| 6 | 2.00 | 0.77200 | | | |
| 7 | 4.00 | 0.77200 | | | |
| 8 | 8.00 | 0.77190 | | | |
| 9 | 16.00 | 0.77190 | | | |
| 10 | 30.00 | 0.77180 | | | |




**Void Ratio =** 0.516 **Compression =** 22.7 %
**$D_0$ =** 0.77491 **$D_{50}$ =** 0.77396 **$D_{100}$ =** 0.77302
**$C_v$ at 0.3 min. =** 0.85 ft.$^2$/day **$C_\alpha$ =** 0.000

**Pressure: 2.00 tsf** **TEST READINGS** **Load No. 11**

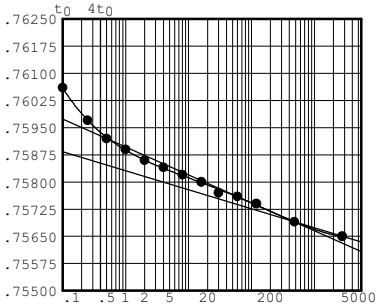
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.77140 | 11 | 60.00 | 0.76610 |
| 2 | 0.10 | 0.76800 | 12 | 120.00 | 0.76600 |
| 3 | 0.25 | 0.76770 | 13 | 130.00 | 0.76600 |
| 4 | 0.50 | 0.76730 | | | |
| 5 | 1.00 | 0.76710 | | | |
| 6 | 2.00 | 0.76690 | | | |
| 7 | 4.00 | 0.76670 | | | |
| 8 | 8.00 | 0.76650 | | | |
| 9 | 16.00 | 0.76640 | | | |
| 10 | 30.00 | 0.76630 | | | |




**Void Ratio =** 0.508 **Compression =** 23.1 %

**Pressure: 4.00 tsf** **TEST READINGS** **Load No. 12**

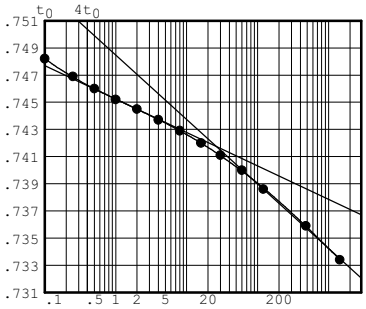
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.76600 | 11 | 60.00 | 0.75760 |
| 2 | 0.10 | 0.76060 | 12 | 120.00 | 0.75740 |
| 3 | 0.25 | 0.75970 | 13 | 480.00 | 0.75690 |
| 4 | 0.50 | 0.75920 | 14 | 2760.00 | 0.75650 |
| 5 | 1.00 | 0.75890 | | | |
| 6 | 2.00 | 0.75860 | | | |
| 7 | 4.00 | 0.75840 | | | |
| 8 | 8.00 | 0.75820 | | | |
| 9 | 16.00 | 0.75800 | | | |
| 10 | 30.00 | 0.75770 | | | |




**Void Ratio =** 0.484 **Compression =** 24.4 %
**$D_0$ =** 0.76181 **$D_{50}$ =** 0.75936 **$D_{100}$ =** 0.75691
**$C_v$ at 0.4 min. =** 0.70 ft.$^2$/day **$C_\alpha$ =** 0.001

**Pressure: 8.00 tsf** **TEST READINGS** **Load No. 13**

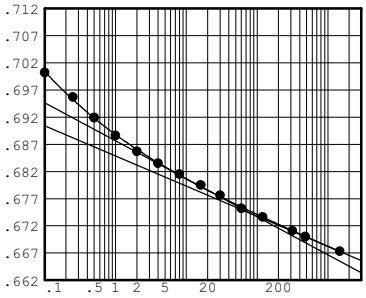
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.75650 | 11 | 60.00 | 0.74000 |
| 2 | 0.10 | 0.74820 | 12 | 120.00 | 0.73860 |
| 3 | 0.25 | 0.74690 | 13 | 480.00 | 0.73590 |
| 4 | 0.50 | 0.74600 | 14 | 1440.00 | 0.73340 |
| 5 | 1.00 | 0.74520 | | | |
| 6 | 2.00 | 0.74450 | | | |
| 7 | 4.00 | 0.74370 | | | |
| 8 | 8.00 | 0.74290 | | | |
| 9 | 16.00 | 0.74200 | | | |
| 10 | 30.00 | 0.74110 | | | |




**Void Ratio =** 0.439 **Compression =** 26.7 %
**$D_0$ =** 0.75017 **$D_{50}$ =** 0.74595 **$D_{100}$ =** 0.74173
**$C_v$ at 0.5 min. =** 0.52 ft.$^2$/day **$C_\alpha$ =** 0.006

**Pressure: 16.00 tsf** **TEST READINGS** **Load No. 14**

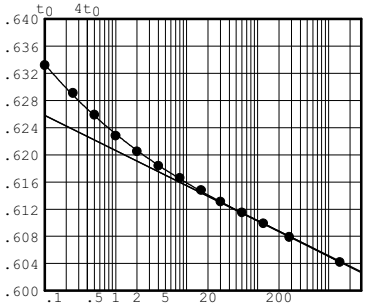
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.73340 | 11 | 60.00 | 0.67520 |
| 2 | 0.10 | 0.70020 | 12 | 120.00 | 0.67360 |
| 3 | 0.25 | 0.69570 | 13 | 315.00 | 0.67110 |
| 4 | 0.50 | 0.69190 | 14 | 480.00 | 0.67000 |
| 5 | 1.00 | 0.68860 | 15 | 1475.00 | 0.66730 |
| 6 | 2.00 | 0.68570 | | | |
| 7 | 4.00 | 0.68350 | | | |
| 8 | 8.00 | 0.68150 | | | |
| 9 | 16.00 | 0.67950 | | | |
| 10 | 30.00 | 0.67760 | | | |




**Void Ratio =** 0.309 **Compression =** 33.3 %

**Pressure: 32.00 tsf** **TEST READINGS** **Load No. 15**

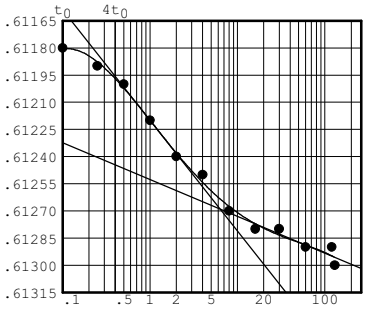
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.66730 | 11 | 60.00 | 0.61150 |
| 2 | 0.10 | 0.63320 | 12 | 120.00 | 0.60990 |
| 3 | 0.25 | 0.62910 | 13 | 280.00 | 0.60790 |
| 4 | 0.50 | 0.62590 | 14 | 1440.00 | 0.60420 |
| 5 | 1.00 | 0.62280 | | | |
| 6 | 2.00 | 0.62050 | | | |
| 7 | 4.00 | 0.61840 | | | |
| 8 | 8.00 | 0.61660 | | | |
| 9 | 16.00 | 0.61480 | | | |
| 10 | 30.00 | 0.61310 | | | |




**Void Ratio =** 0.185 **Compression =** 39.6 %
**$D_0$ =** 0.63998 **$D_{50}$ =** 0.63045 **$D_{100}$ =** 0.62092
**$C_v$ at 0.2 min. =** 1.13 ft.$^2$/day **$C_\alpha$ =** 0.008

**Pressure: 8.00 tsf** **TEST READINGS** **Load No. 16**

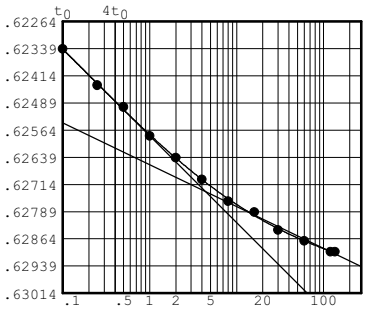
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.60420 | 11 | 60.00 | 0.61290 |
| 2 | 0.10 | 0.61180 | 12 | 120.00 | 0.61290 |
| 3 | 0.25 | 0.61190 | 13 | 130.00 | 0.61300 |
| 4 | 0.50 | 0.61200 | | | |
| 5 | 1.00 | 0.61220 | | | |
| 6 | 2.00 | 0.61240 | | | |
| 7 | 4.00 | 0.61250 | | | |
| 8 | 8.00 | 0.61270 | | | |
| 9 | 16.00 | 0.61280 | | | |
| 10 | 30.00 | 0.61280 | | | |




**Void Ratio =** 0.202 **Compression =** 38.7 %
**$D_0$ =** 0.61164 **$D_{50}$ =** 0.61217 **$D_{100}$ =** 0.61269
**$C_v$ at 0.9 min. =** 0.21 ft.$^2$/day

**Pressure: 2.00 tsf** **TEST READINGS** **Load No. 17**

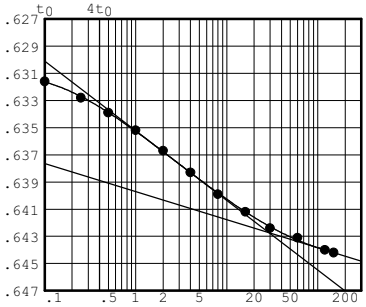
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.61300 | 11 | 60.00 | 0.62570 |
| 2 | 0.10 | 0.62040 | 12 | 120.00 | 0.62600 |
| 3 | 0.25 | 0.62140 | 13 | 135.00 | 0.62600 |
| 4 | 0.50 | 0.62200 | | | |
| 5 | 1.00 | 0.62280 | | | |
| 6 | 2.00 | 0.62340 | | | |
| 7 | 4.00 | 0.62400 | | | |
| 8 | 8.00 | 0.62460 | | | |
| 9 | 16.00 | 0.62490 | | | |
| 10 | 30.00 | 0.62540 | | | |




**Void Ratio =** 0.234 **Compression =** 37.1 %
**$D_0$ =** 0.62197 **$D_{50}$ =** 0.62465 **$D_{100}$ =** 0.62733
**$C_v$ at 0.3 min. =** 0.57 ft.$^2$/day

**Pressure: 0.50 tsf** **TEST READINGS** **Load No. 18**

| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.62600 | 11 | 60.00 | 0.64230 |
| 2 | 0.10 | 0.63080 | 12 | 120.00 | 0.64320 |
| 3 | 0.25 | 0.63200 | 13 | 150.00 | 0.64340 |
| 4 | 0.50 | 0.63310 | | | |
| 5 | 1.00 | 0.63440 | | | |
| 6 | 2.00 | 0.63590 | | | |
| 7 | 4.00 | 0.63750 | | | |
| 8 | 8.00 | 0.63910 | | | |
| 9 | 16.00 | 0.64040 | | | |
| 10 | 30.00 | 0.64160 | | | |

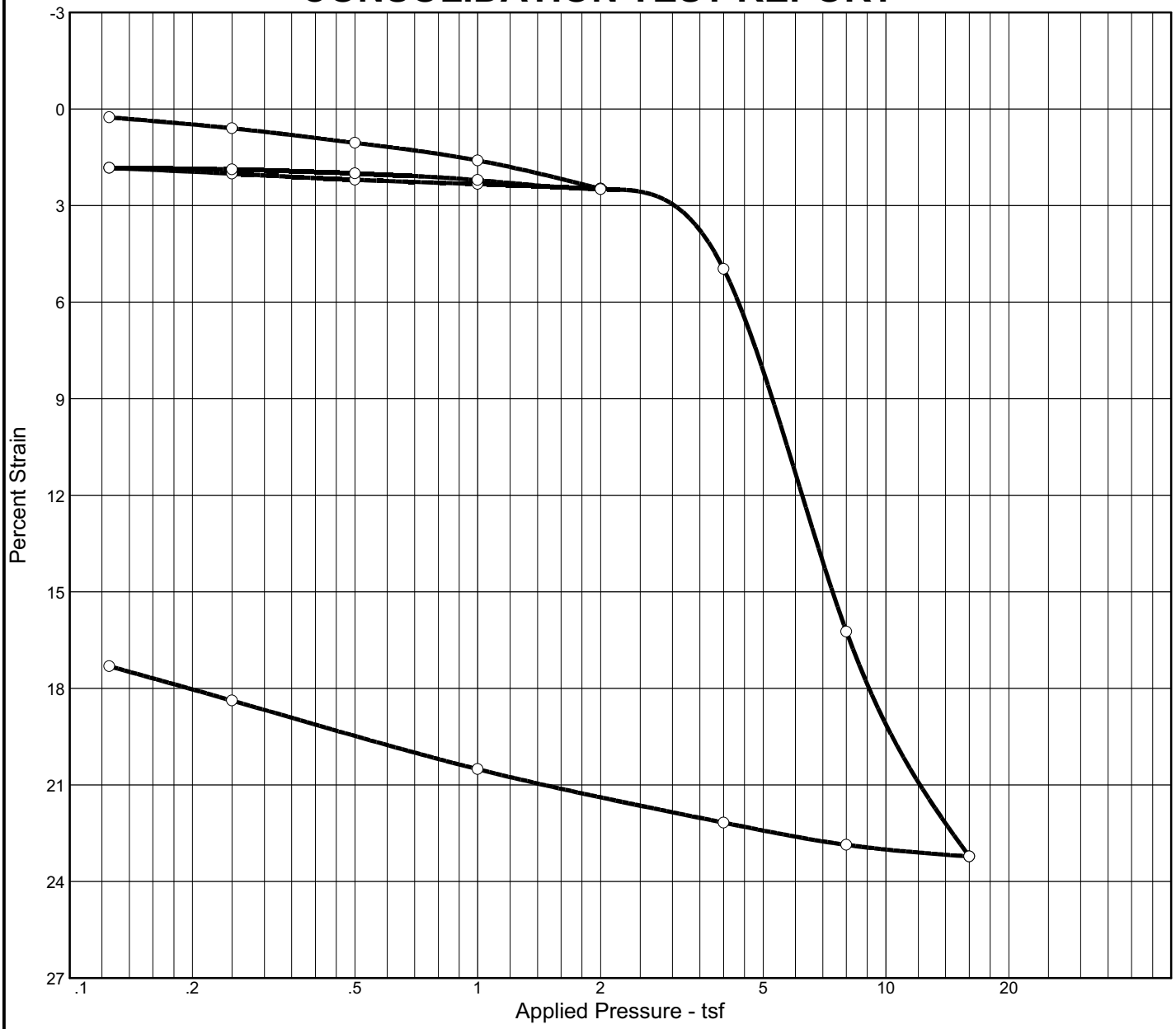



**Void Ratio =** 0.264 **Compression =** 35.6 %

**$D_0$ =** 0.62980 **$D_{50}$ =** 0.63626 **$D_{100}$ =** 0.64273

**$C_v$ at 1.6 min. =** 0.13 ft.$^2$/day

# CONSOLIDATION TEST REPORT




| MATERIAL DESCRIPTION | USCS | AASHTO |
|---|---|---|
| Gray, Fat CLAY | | |

| LL | PI | Sp. Gr. | Overburden (tsf) | Dry Dens. (pcf) | | Moisture | | Saturation | | Void Ratio | | $P_c$ (tsf) | $C_c$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Init. | Final | Init. | Final | Init. | Final | Init. | Final | | |
| | | 2.62 | 2.00 | 75.3 | | 44.7 % | 33.2 % | 99.9 % | 100.0 % | 1.172 | 0.796 | | |

| Preparation Process: | D2435 Method | $C_r$ | Swell Press. (tsf) | Heave % |
|---|---|---|---|---|
| Condition of Test: | | | | |

**Project No.** VB10-237G **Client:** HDR, Inc.

**Project:** VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia

**Location:** KR2-1B

**Remarks:**
KR2-1B
Depth=65 ft.

**Checked By:**

**Title:**

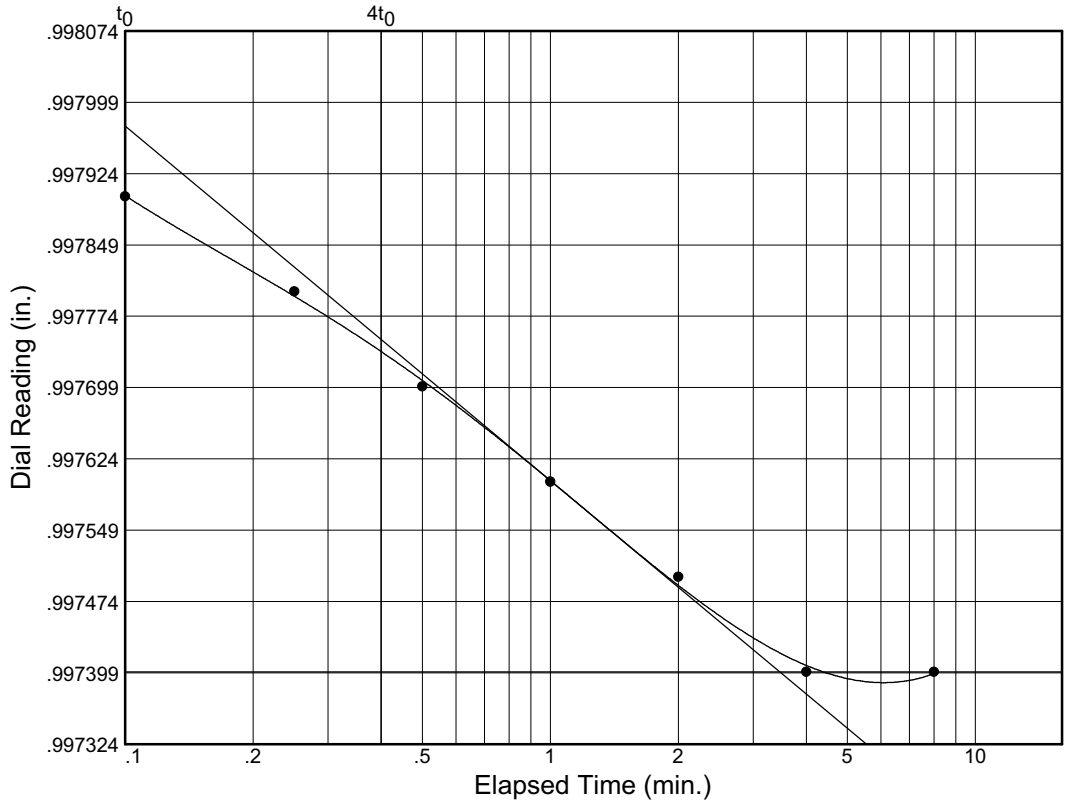
CONSOLIDATION TEST REPORT

**GET SOLUTIONS, INC.**

**Figure** 1

# Dial Reading vs. Time

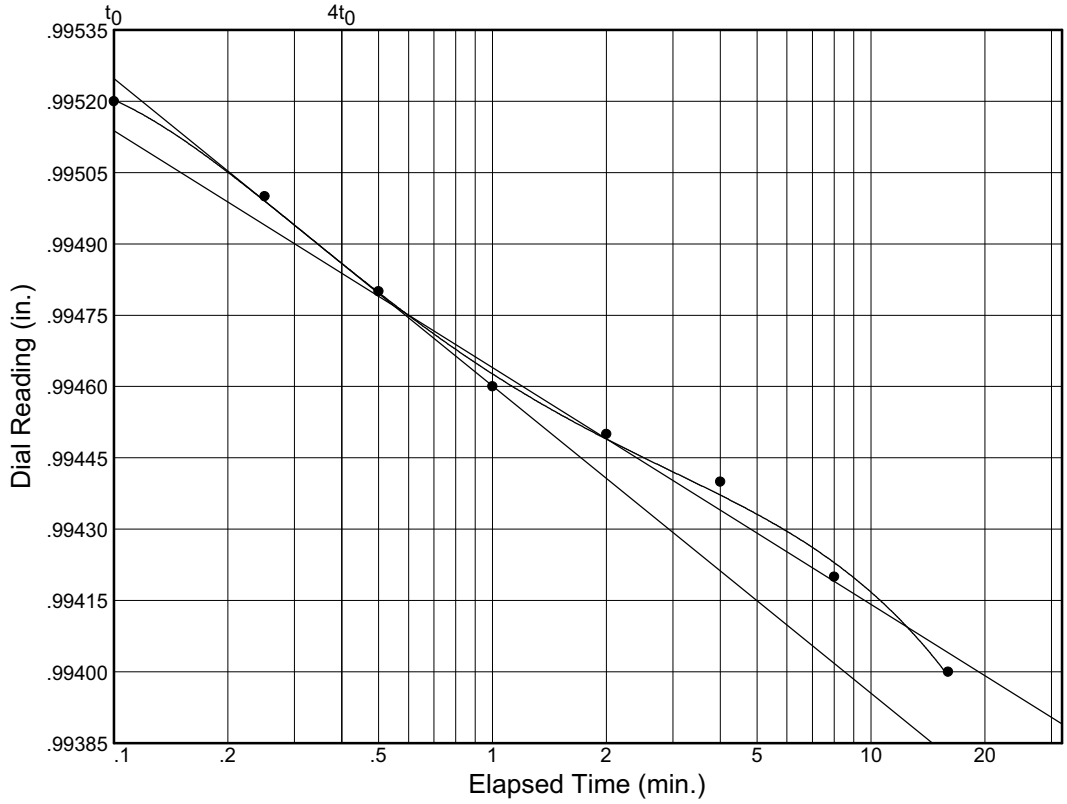
Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: KR2-1B




Load No.= 1
Load= 0.13 tsf
$D_0$ = 0.99806
$D_{50}$ = 0.99773
$D_{100}$ = 0.99740
$T_{50}$ = 0.41 min.

$C_v$ @ $T_{50}$
1.19 ft.$^2$/day

$C_\alpha$ = 0.000




Load No.= 2
Load= 0.25 tsf
$D_0$ = 0.99555
$D_{50}$ = 0.99516
$D_{100}$ = 0.99477
$T_{50}$ = 0.13 min.

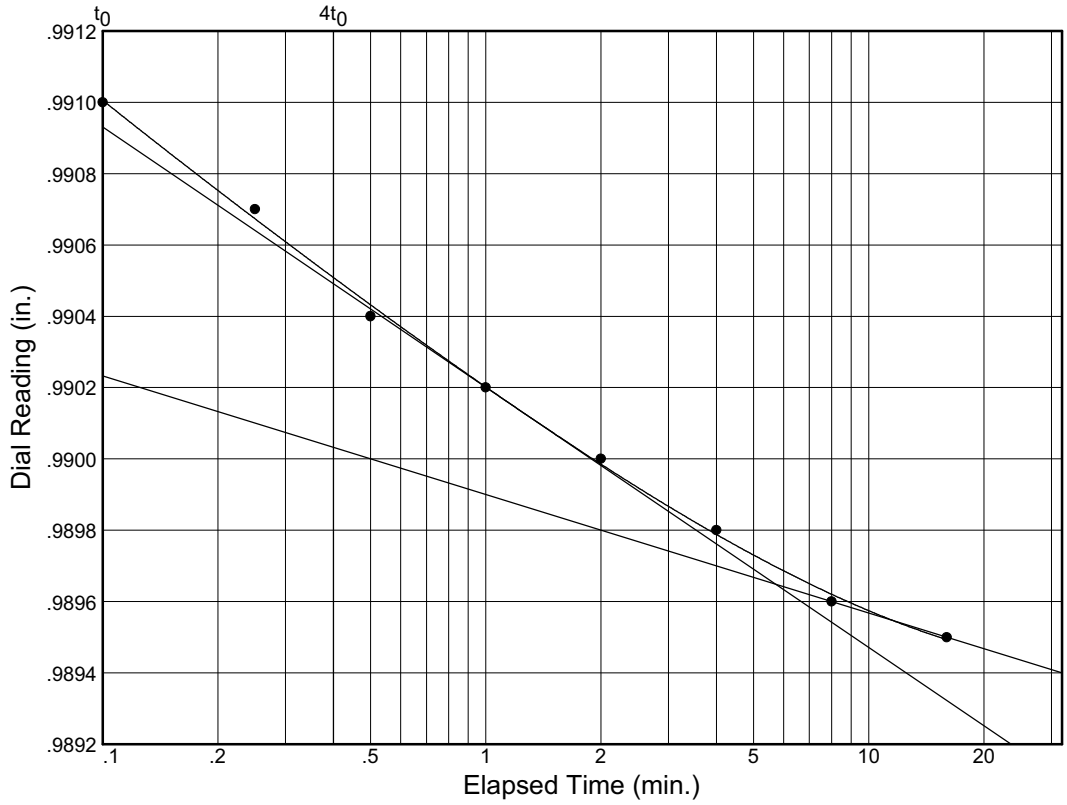
$C_v$ @ $T_{50}$
3.83 ft.$^2$/day

$C_\alpha$ = 0.000

Figure 2

# Dial Reading vs. Time

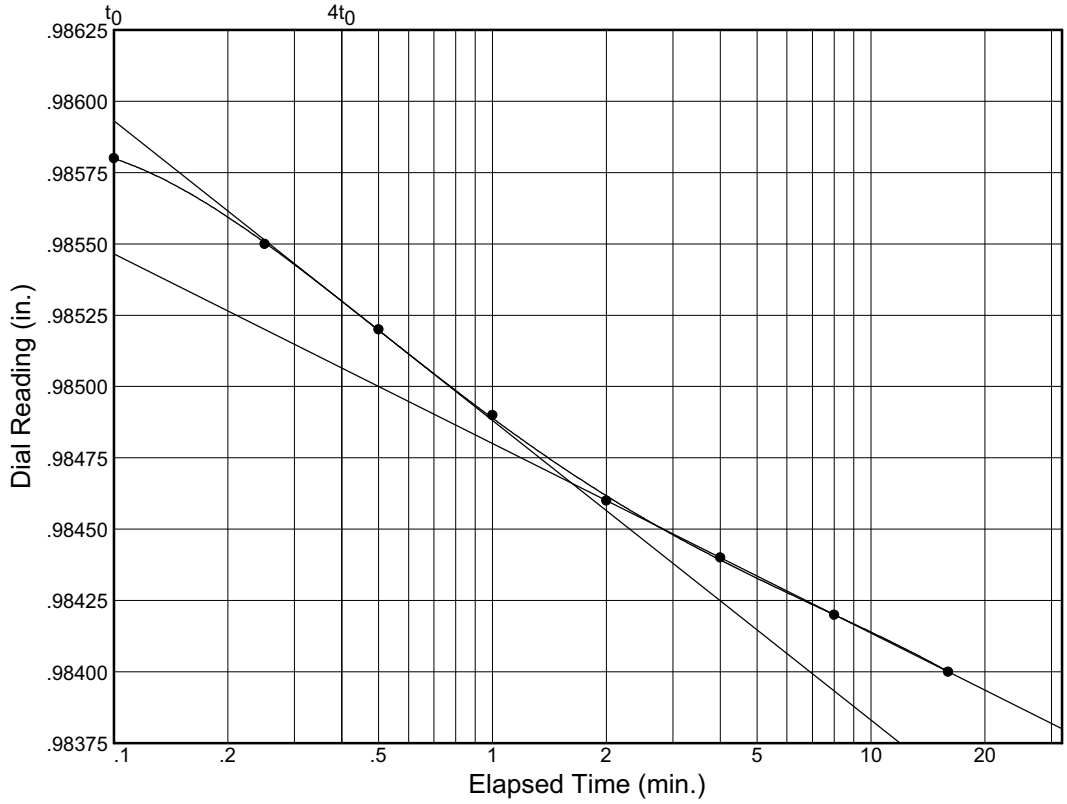
Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: KR2-1B




Load No.= 3
Load= 0.50 tsf
$D_0$ = 0.99150
$D_{50}$ = 0.99058
$D_{100}$ = 0.98965
$T_{50}$ = 0.33 min.

$C_v$ @ $T_{50}$
1.47 ft.$^2$/day

$C_\alpha$ = 0.000




Load No.= 4
Load= 1.00 tsf
$D_0$ = 0.98630
$D_{50}$ = 0.98548
$D_{100}$ = 0.98466
$T_{50}$ = 0.27 min.

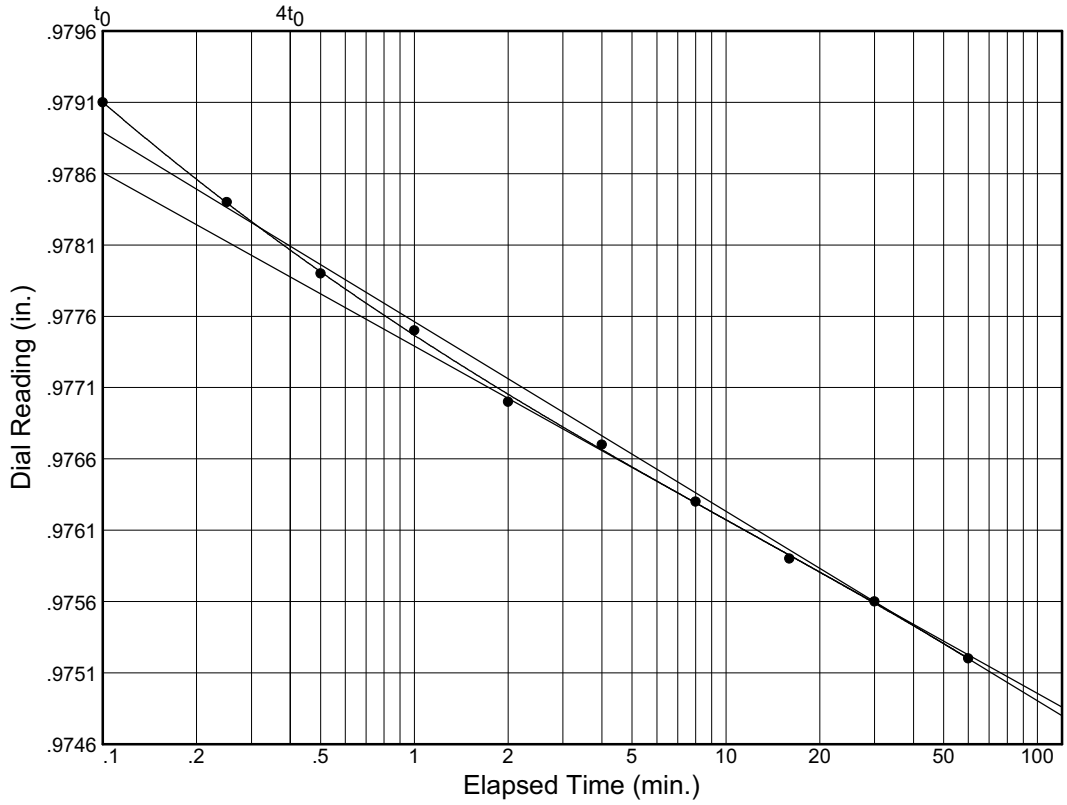
$C_v$ @ $T_{50}$
1.81 ft.$^2$/day

$C_\alpha$ = 0.001

Figure 3

# Dial Reading vs. Time

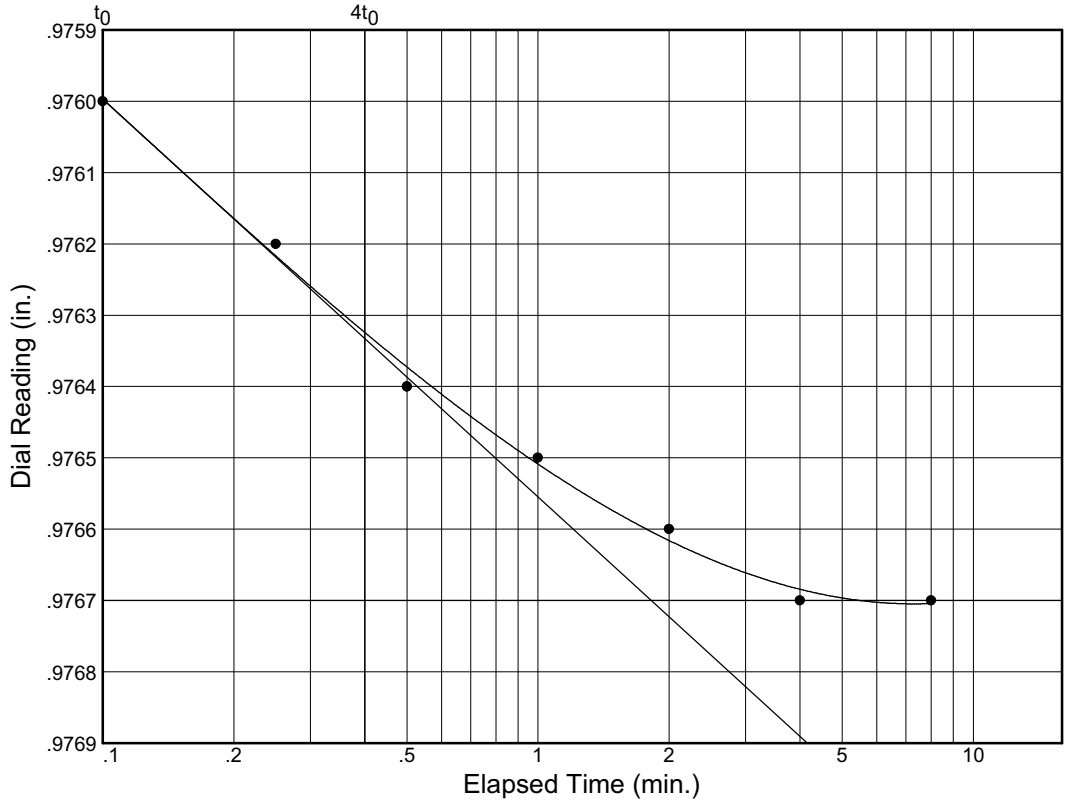
Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: KR2-1B




Load No.= 5
Load= 2.00 tsf
$D_0$ = 0.98014
$D_{50}$ = 0.97783
$D_{100}$ = 0.97551
$T_{50}$ = 0.57 min.

| $C_v$ @ $T_{50}$ |
|---|
| 0.83 ft.$^2$/day |

$C_\alpha$ = 0.001




Load No.= 6
Load= 1.00 tsf
$D_0$ = 0.97567
$D_{50}$ = 0.97619
$D_{100}$ = 0.97670
$T_{50}$ = 0.22 min.

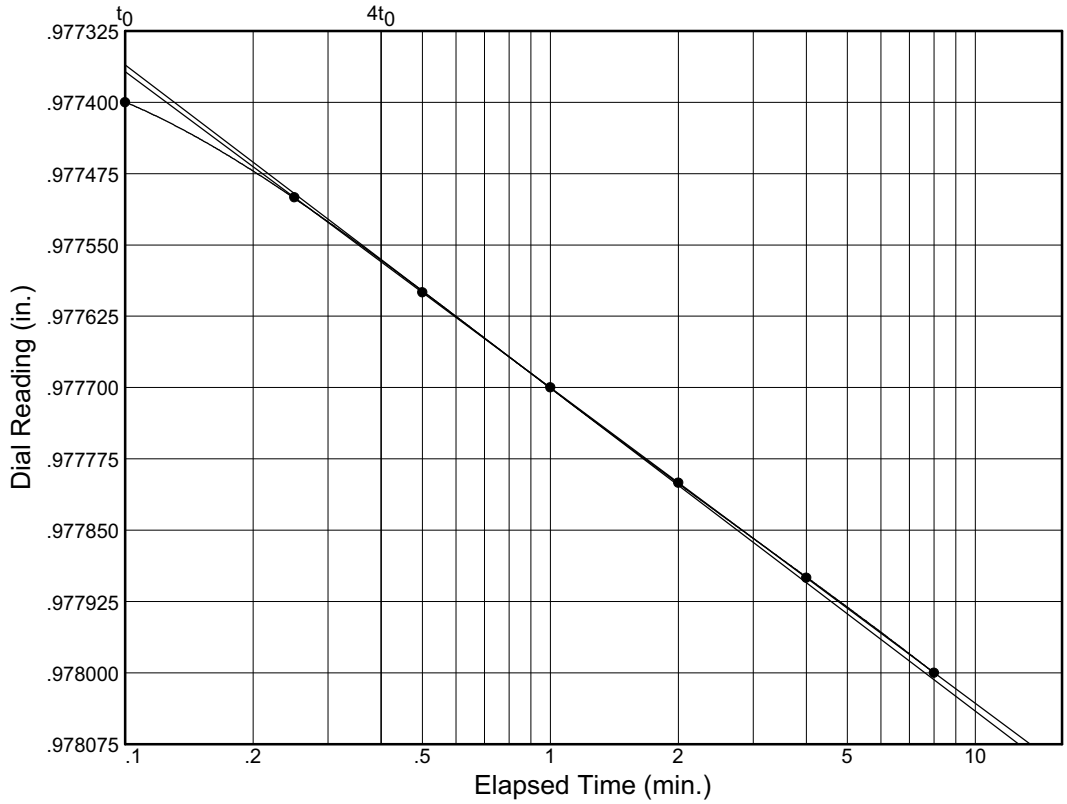
| $C_v$ @ $T_{50}$ |
|---|
| 2.15 ft.$^2$/day |

$C_\alpha$ = 0.000

Figure 4

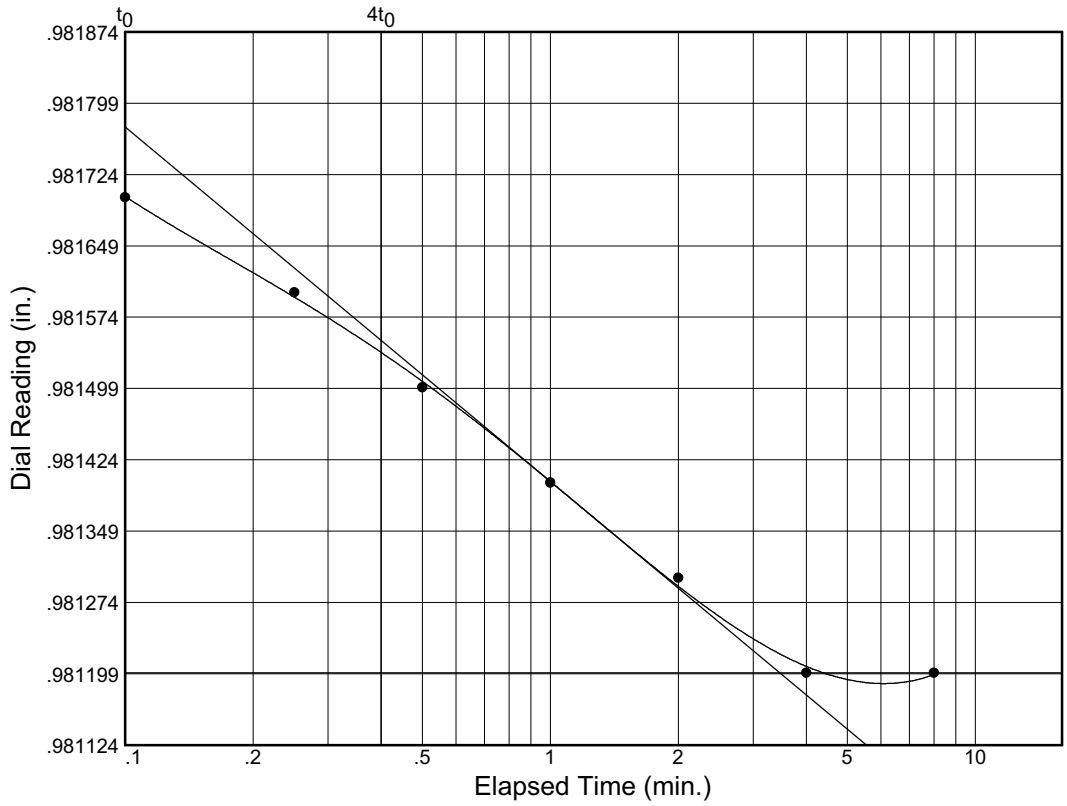
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: KR2-1B




Load No.= 7
Load= 0.50 tsf
$D_0$ = 0.97723
$D_{50}$ = 0.97746
$D_{100}$ = 0.97768
$T_{50}$ = 0.17 min.

$C_v$ @ $T_{50}$
2.71 ft.$^2$/day




Load No.= 10
Load= 0.25 tsf
$D_0$ = 0.98186
$D_{50}$ = 0.98153
$D_{100}$ = 0.98120
$T_{50}$ = 0.41 min.

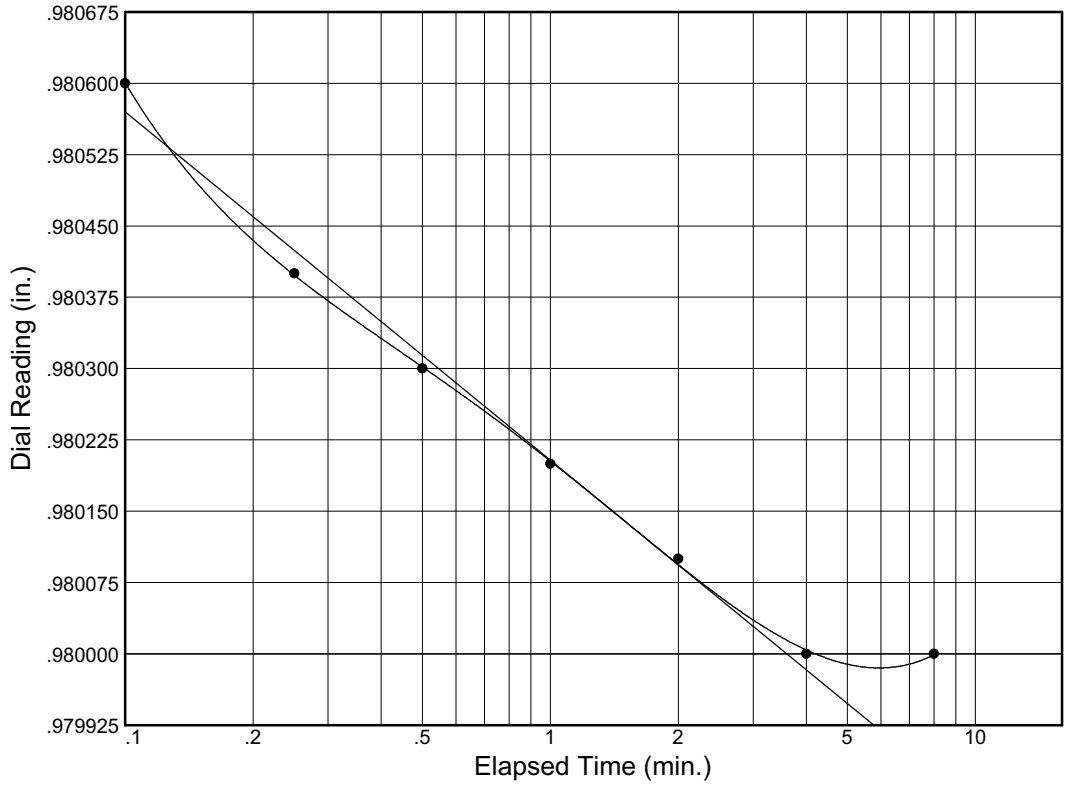
$C_v$ @ $T_{50}$
1.15 ft.$^2$/day

$C_\alpha$ = 0.000

Figure 5

# Dial Reading vs. Time

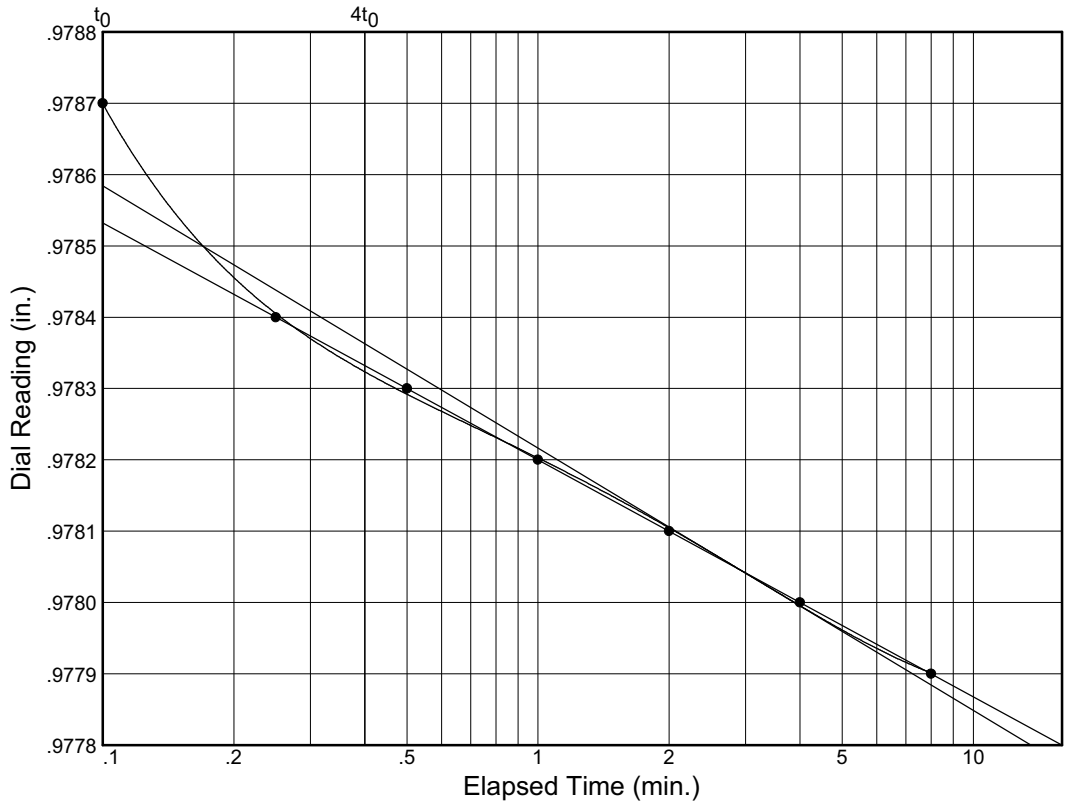
Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: KR2-1B




Load No.= 11
Load= 0.50 tsf
$D_0$ = 0.98120
$D_{50}$ = 0.98060
$D_{100}$ = 0.98000
$T_{50}$ = 0.10 min.

$C_v$ @ $T_{50}$
4.73 ft.$^2$/day

$C_\alpha$ = 0.000




Load No.= 12
Load= 1.00 tsf
$D_0$ = 0.97907
$D_{50}$ = 0.97856
$D_{100}$ = 0.97804
$T_{50}$ = 0.14 min.

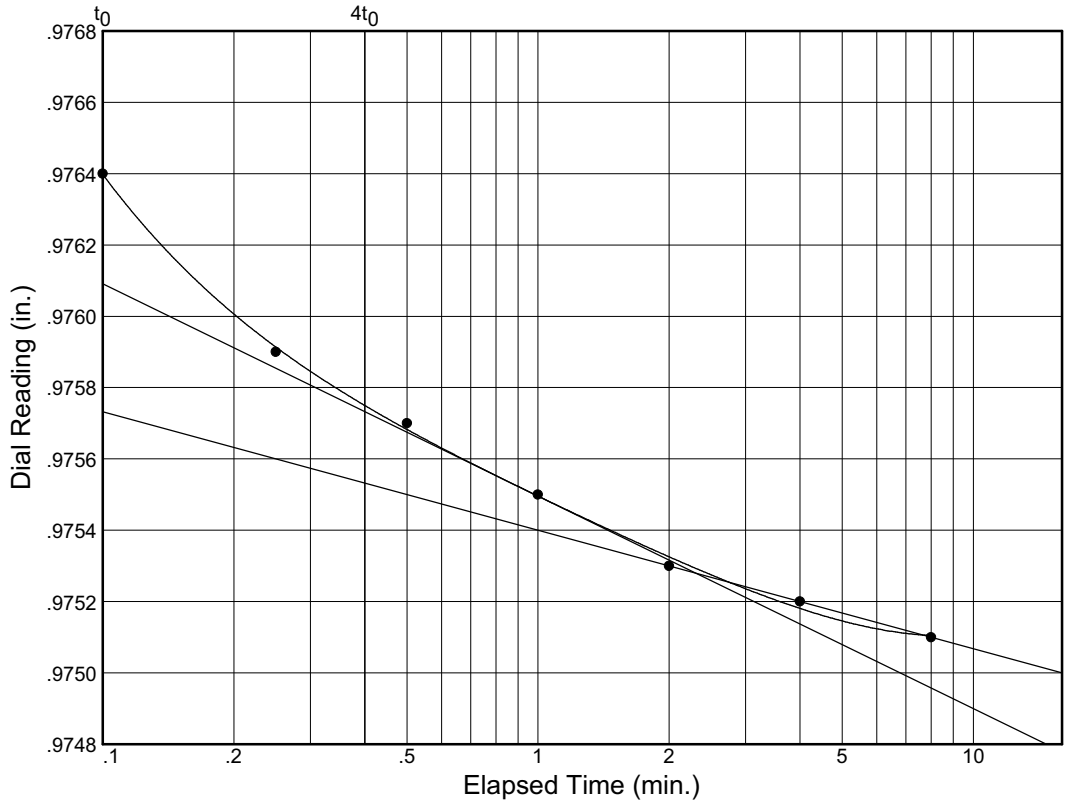
$C_v$ @ $T_{50}$
3.36 ft.$^2$/day

$C_\alpha$ = 0.000

Figure 6

# Dial Reading vs. Time

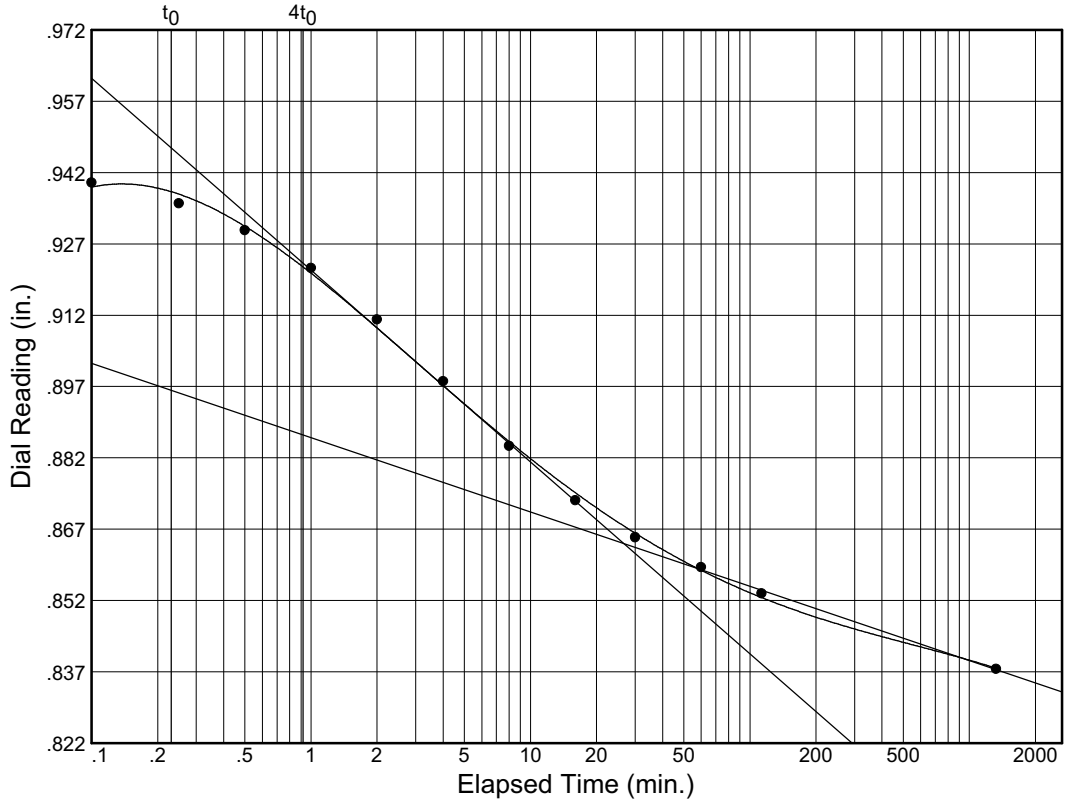
Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: KR2-1B




Load No.= 13
Load= 2.00 tsf
$D_0$ = 0.97705
$D_{50}$ = 0.97616
$D_{100}$ = 0.97528
$T_{50}$ = 0.15 min.

| $C_v$ @ $T_{50}$ |
|---|
| 3.22 ft.$^2$/day |

$C_\alpha$ = 0.000




Load No.= 15
Load= 8.00 tsf
$D_0$ = 0.95384
$D_{50}$ = 0.90892
$D_{100}$ = 0.86399
$T_{50}$ = 2.04 min.

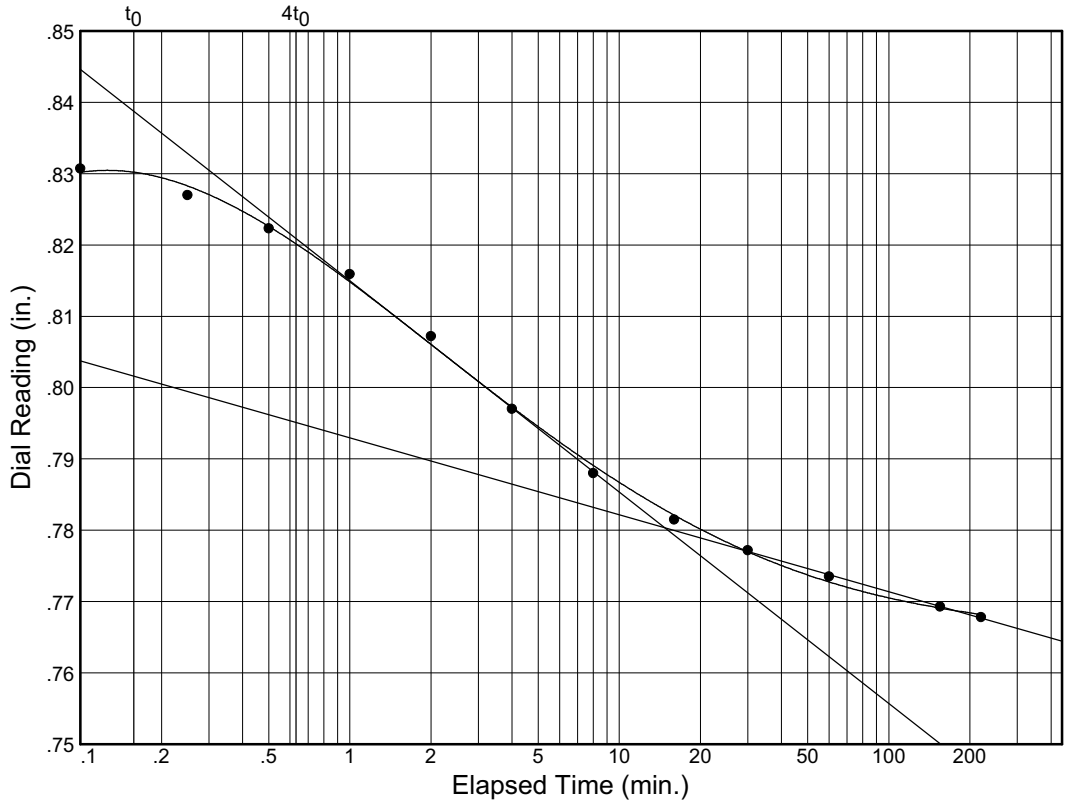
| $C_v$ @ $T_{50}$ |
|---|
| 0.19 ft.$^2$/day |

$C_\alpha$ = 0.016

Figure 7

# Dial Reading vs. Time

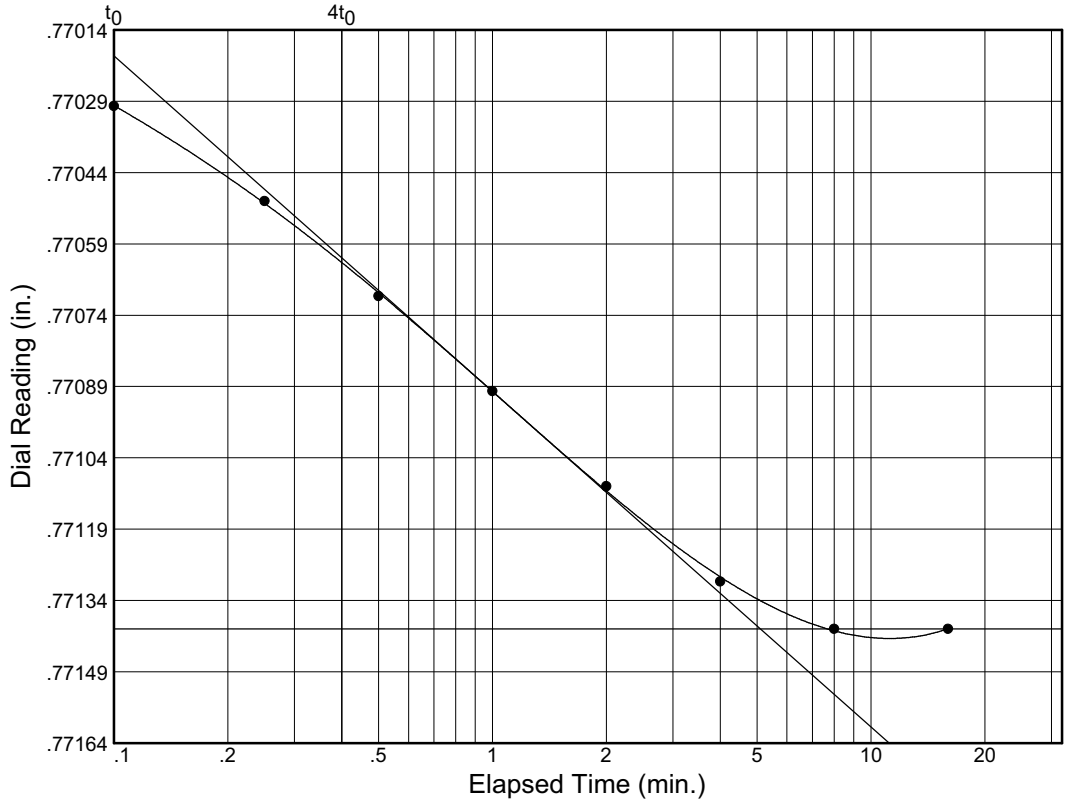
Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: KR2-1B




Load No.= 16
Load= 16.00 tsf
$D_0$ = 0.84025
$D_{50}$ = 0.81030
$D_{100}$ = 0.78034
$T_{50}$ = 1.44 min.

$C_v$ @ $T_{50}$
0.22 ft.$^2$/day

$C_\alpha$ = 0.013




Load No.= 17
Load= 8.00 tsf
$D_0$ = 0.76997
$D_{50}$ = 0.77068
$D_{100}$ = 0.77140
$T_{50}$ = 0.49 min.

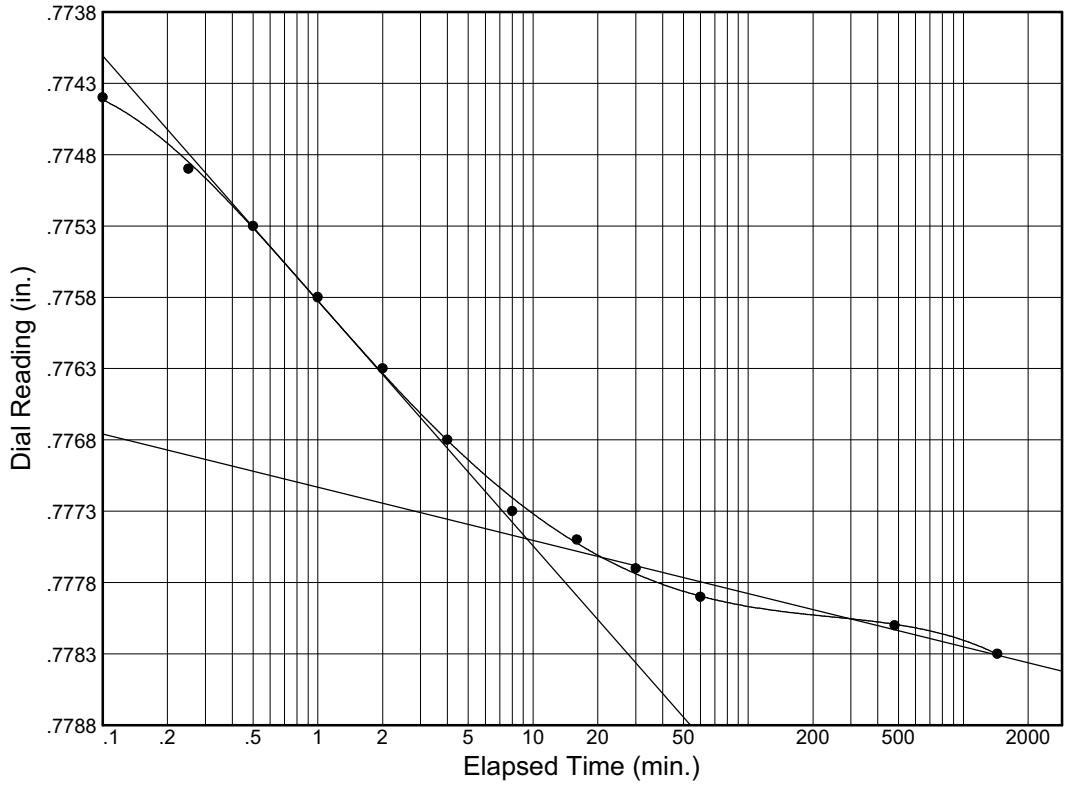
$C_v$ @ $T_{50}$
0.60 ft.$^2$/day

$C_\alpha$ = 0.000

Figure 8

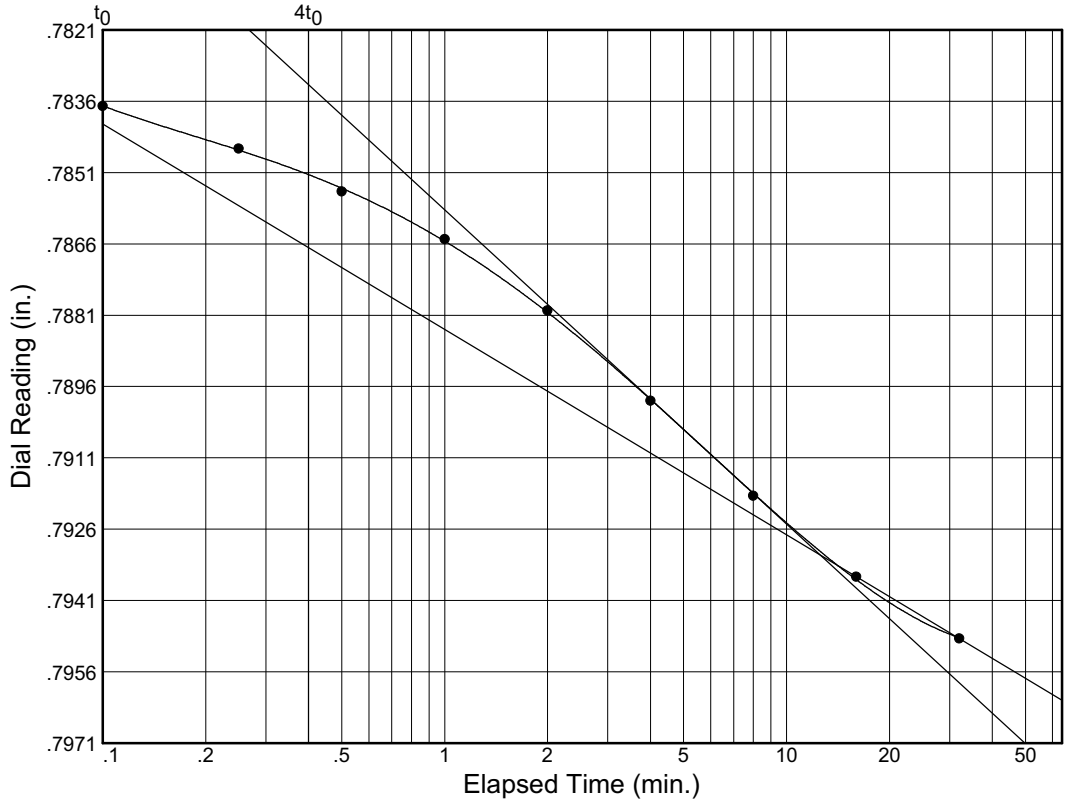
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: KR2-1B




Load No.= 18
Load= 4.00 tsf
$D_0$ = 0.77140
$D_{50}$ = 0.77445
$D_{100}$ = 0.77749
$T_{50}$ = 0.13 min.

$C_v$ @ $T_{50}$
2.19 ft.$^2$/day



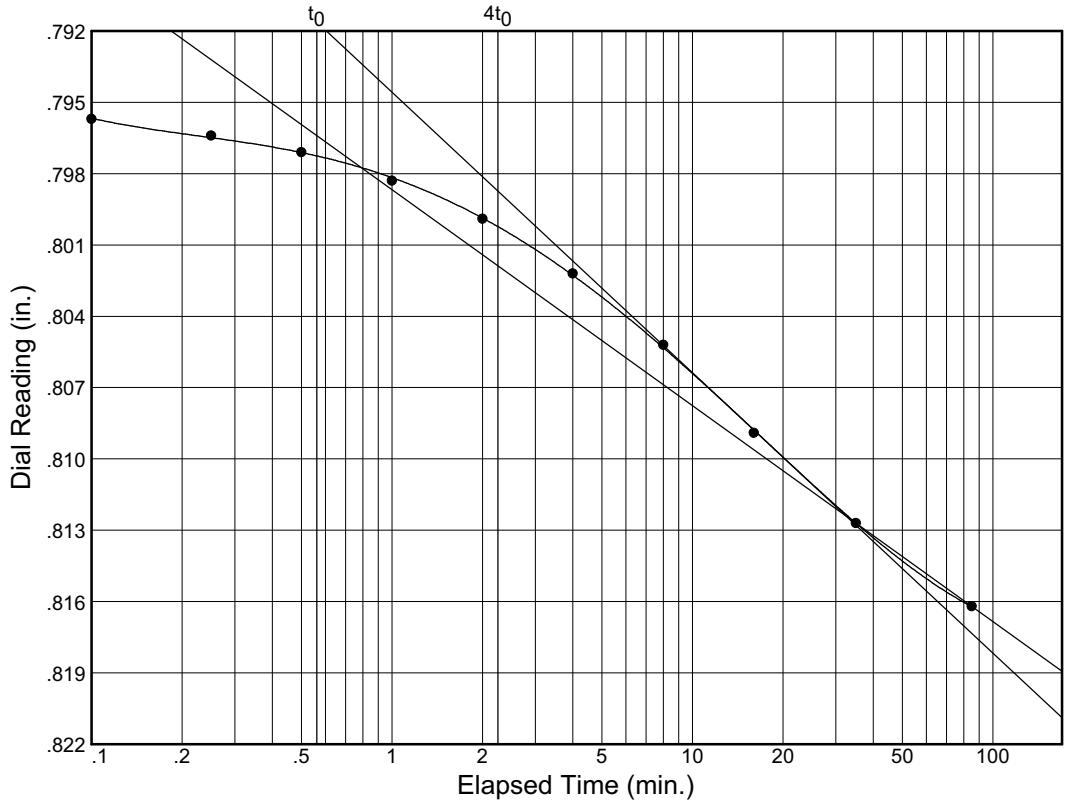

Load No.= 19
Load= 1.00 tsf
$D_0$ = 0.78225
$D_{50}$ = 0.78770
$D_{100}$ = 0.79315
$T_{50}$ = 1.73 min.

$C_v$ @ $T_{50}$
0.18 ft.$^2$/day

Figure 9

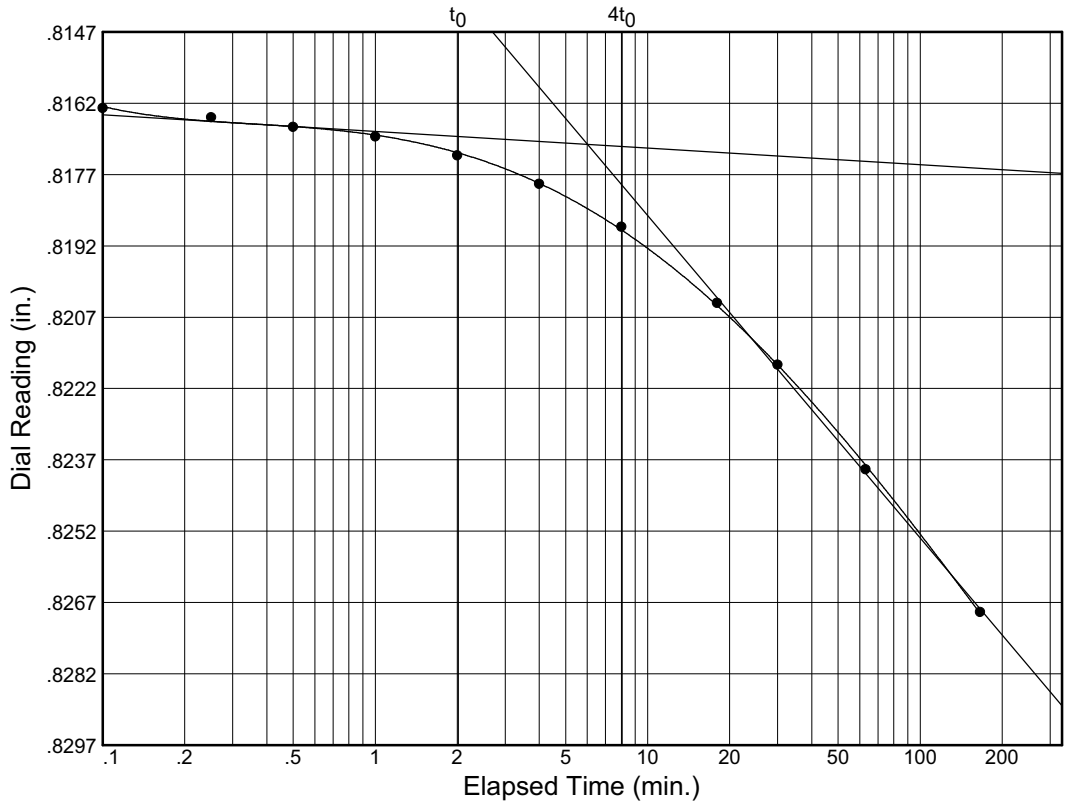
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: KR2-1B




Load No.= 20
Load= 0.25 tsf
$D_0$ = 0.79429
$D_{50}$ = 0.80335
$D_{100}$ = 0.81240
$T_{50}$ = 5.18 min.

$C_v$ @ $T_{50}$
0.06 ft.$^2$/day



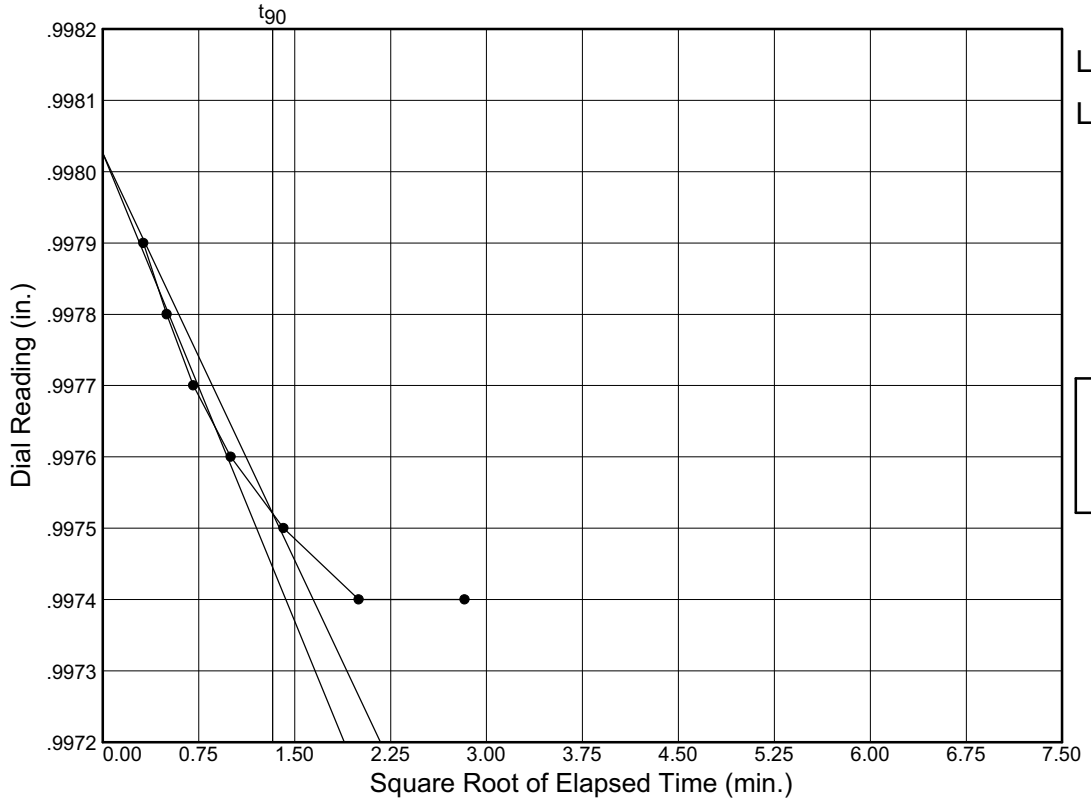

Load No.= 21
Load= 0.13 tsf
$D_0$ = 0.81561
$D_{50}$ = 0.81634
$D_{100}$ = 0.81707
$T_{50}$ = 0.11 min.

$C_v$ @ $T_{50}$
2.91 ft.$^2$/day

Figure 10

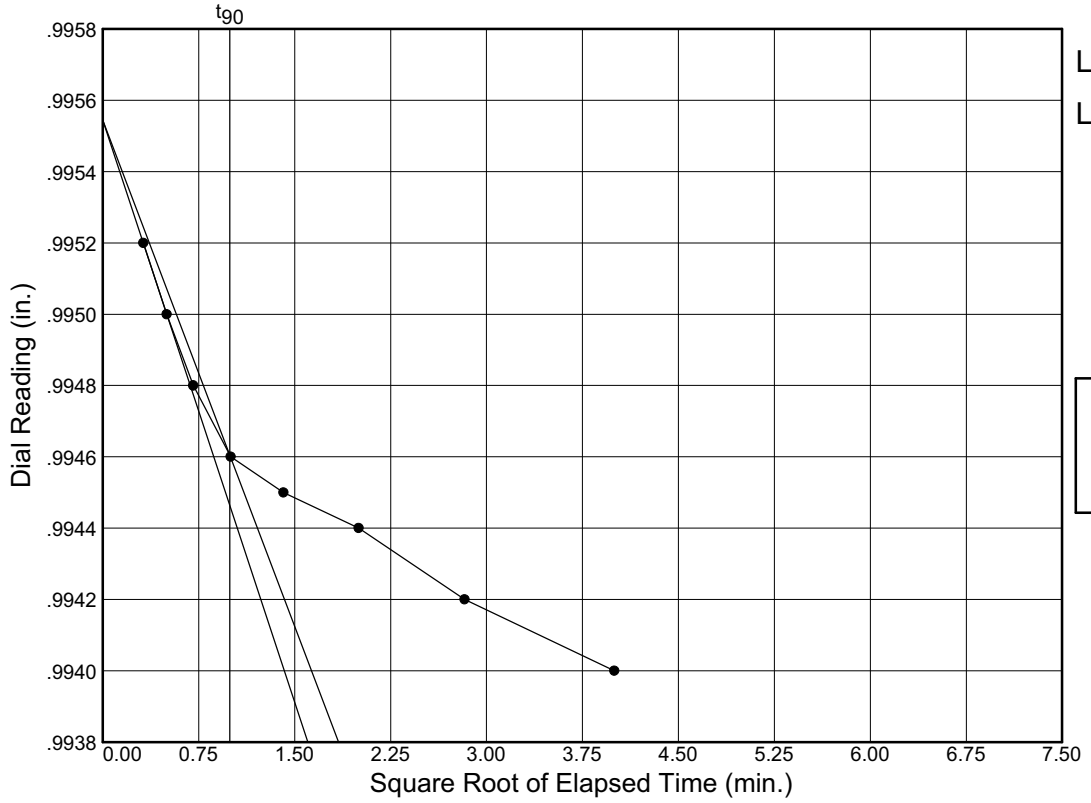
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: KR2-1B




Load No.= 1
Load= 0.13 tsf
$D_0$ = 0.99803
$D_{90}$ = 0.99752
$D_{100}$ = 0.99746
$T_{90}$ = 1.76 min.

$C_v$ @ $T_{90}$
1.20 ft.$^2$/day



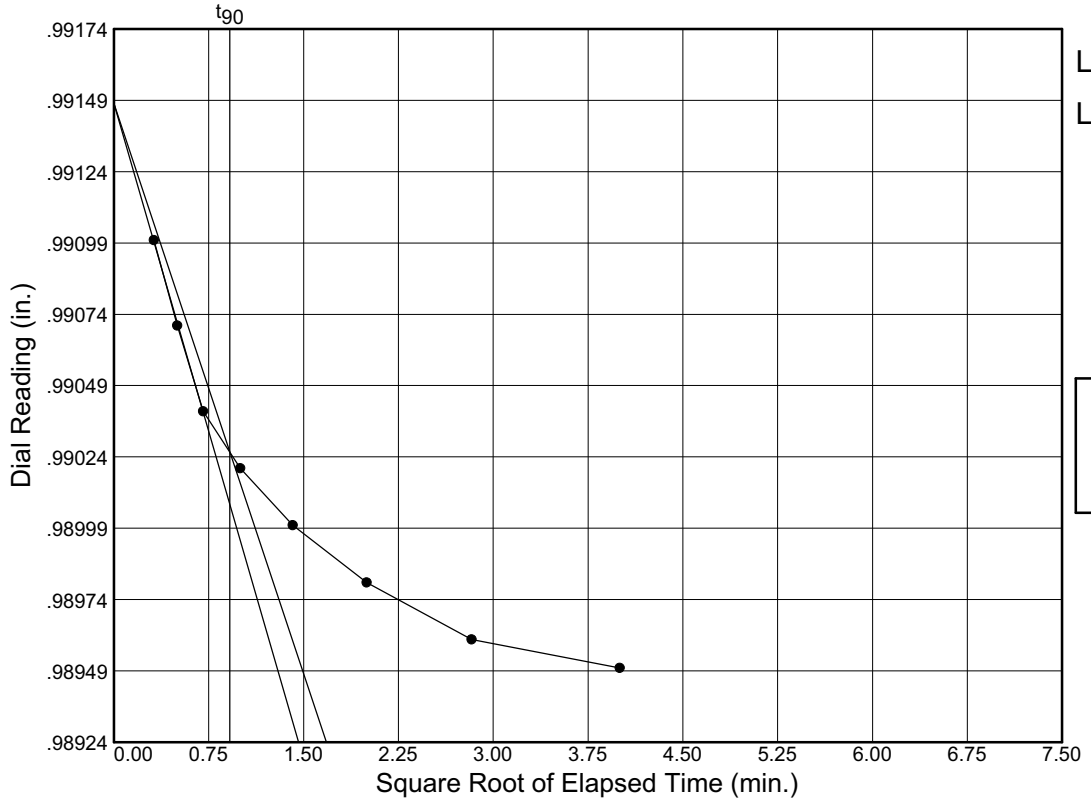

Load No.= 2
Load= 0.25 tsf
$D_0$ = 0.99554
$D_{90}$ = 0.99461
$D_{100}$ = 0.99450
$T_{90}$ = 0.98 min.

$C_v$ @ $T_{90}$
2.14 ft.$^2$/day

Figure 2

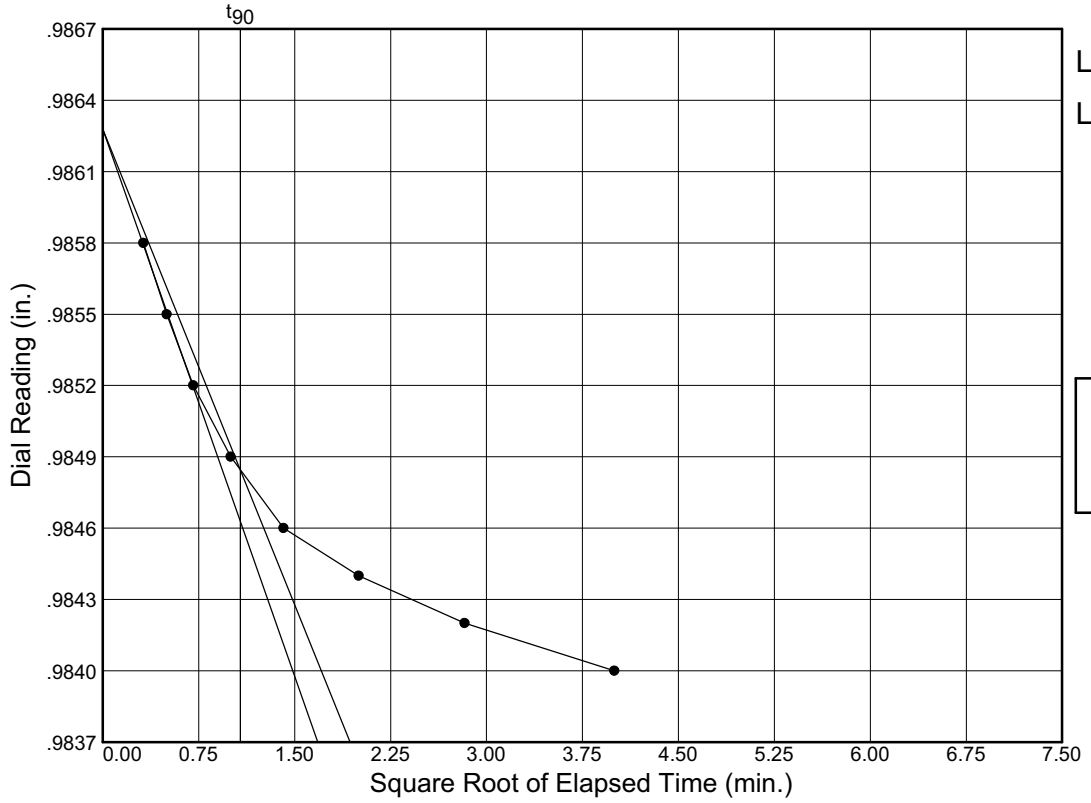
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: KR2-1B




Load No.= 3
Load= 0.50 tsf
$D_0$ = 0.99148
$D_{90}$ = 0.99026
$D_{100}$ = 0.99012
$T_{90}$ = 0.84 min.

$C_v$ @ $T_{90}$
2.49 ft.$^2$/day



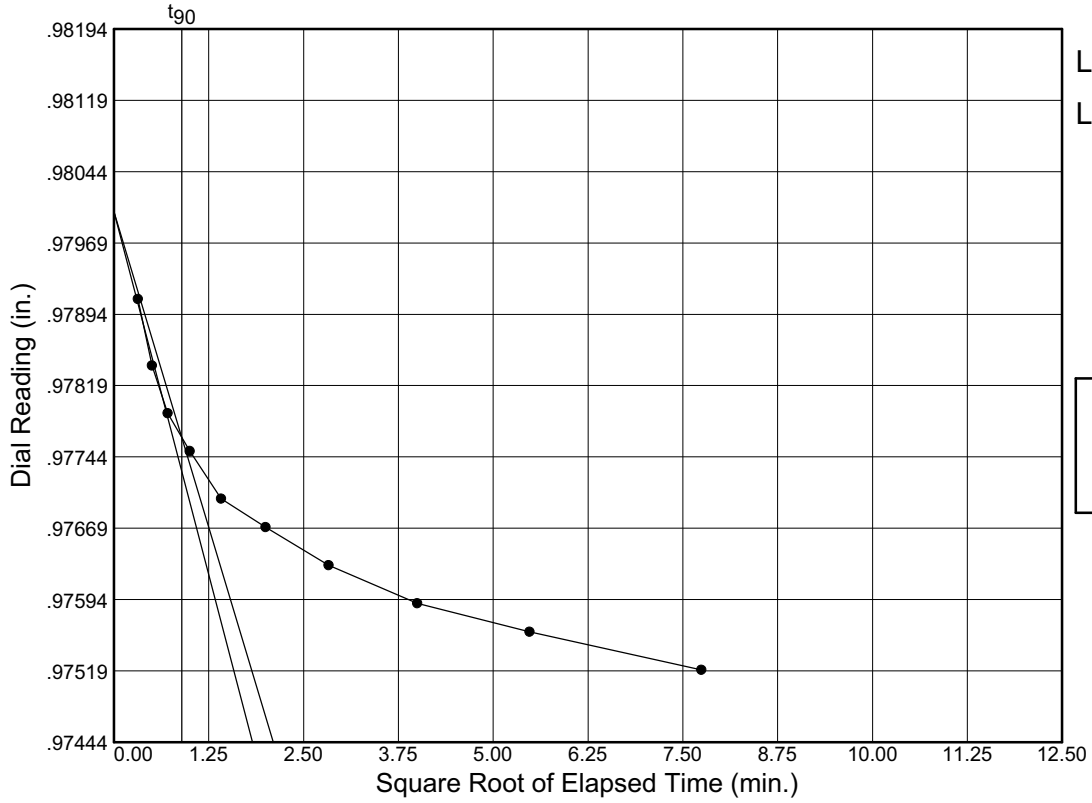

Load No.= 4
Load= 1.00 tsf
$D_0$ = 0.98628
$D_{90}$ = 0.98485
$D_{100}$ = 0.98469
$T_{90}$ = 1.15 min.

$C_v$ @ $T_{90}$
1.79 ft.$^2$/day

Figure 3

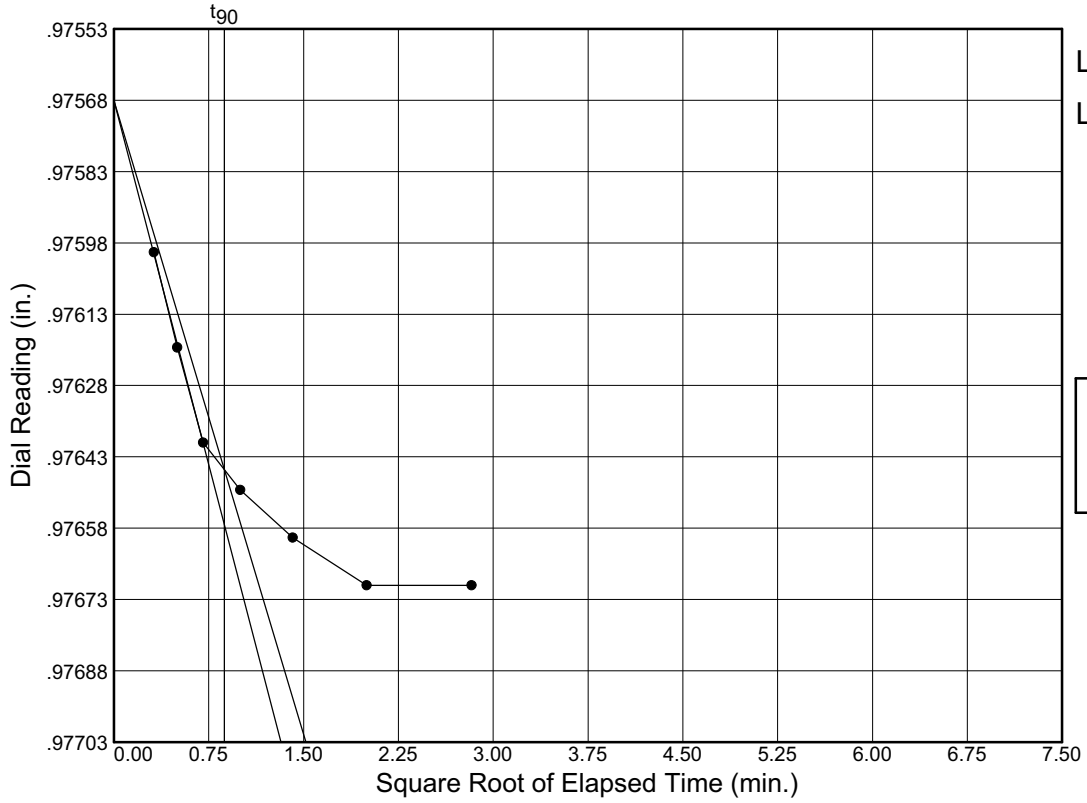
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: KR2-1B




Load No.= 5
Load= 2.00 tsf
$D_0$ = 0.98002
$D_{90}$ = 0.97765
$D_{100}$ = 0.97738
$T_{90}$ = 0.80 min.

$C_v$ @ $T_{90}$
2.55 ft.$^2$/day



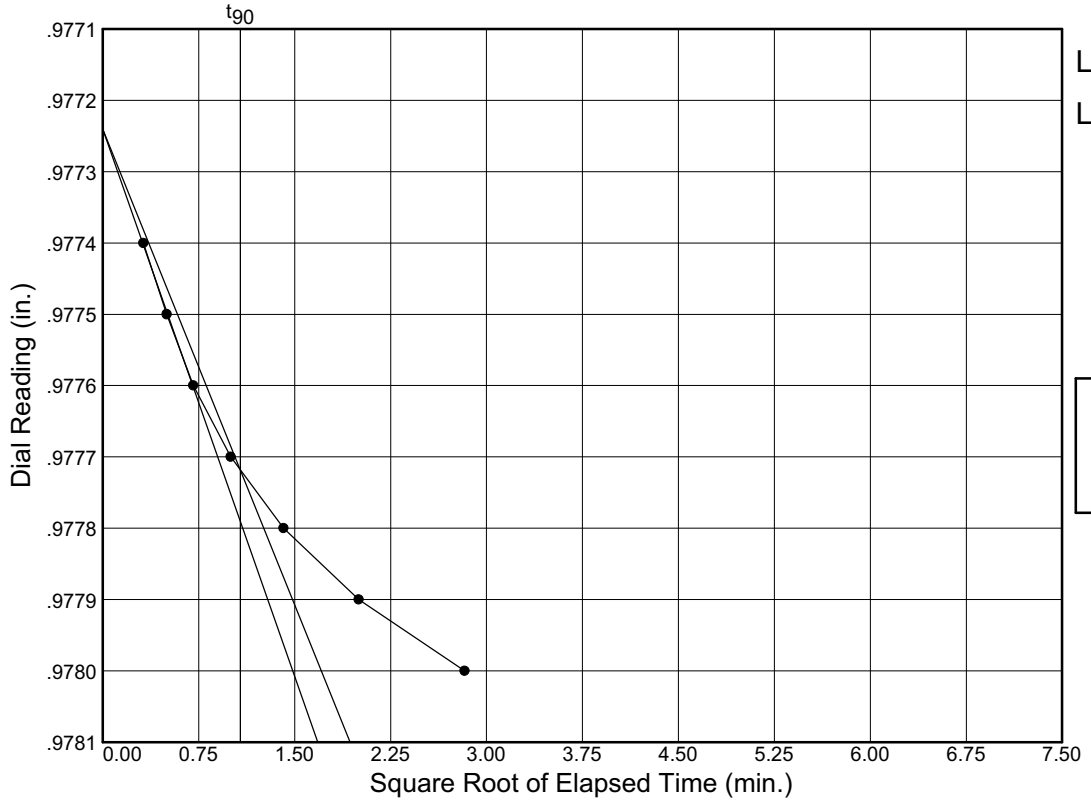

Load No.= 6
Load= 1.00 tsf
$D_0$ = 0.97568
$D_{90}$ = 0.97646
$D_{100}$ = 0.97654
$T_{90}$ = 0.76 min.

$C_v$ @ $T_{90}$
2.65 ft.$^2$/day

Figure 4

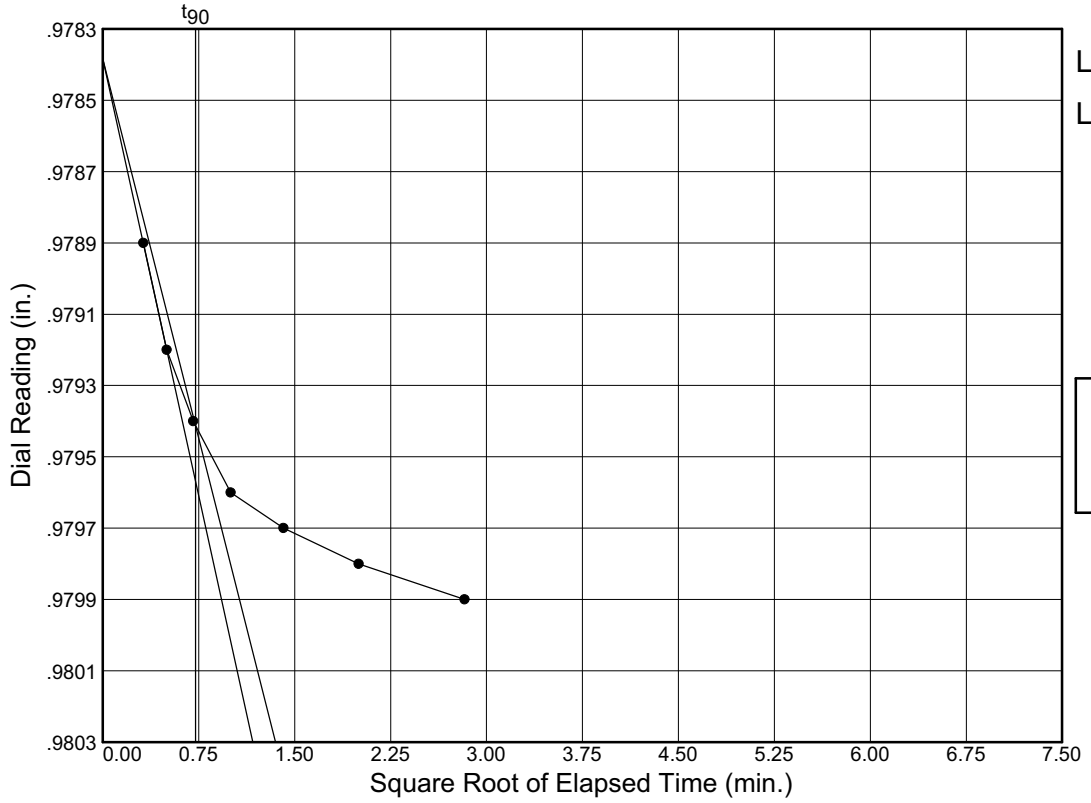
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: KR2-1B




Load No.= 7
Load= 0.50 tsf
$D_0$ = 0.97724
$D_{90}$ = 0.97772
$D_{100}$ = 0.97777
$T_{90}$ = 1.15 min.

$C_v$ @ $T_{90}$
1.75 ft.$^2$/day



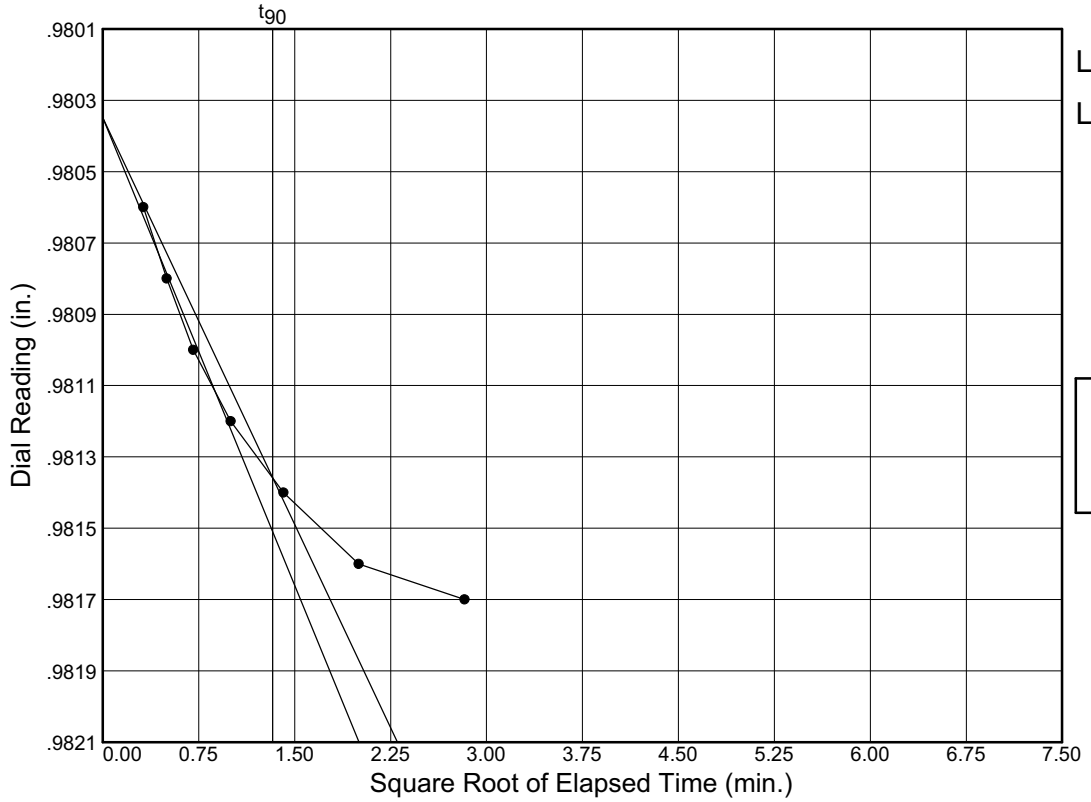

Load No.= 8
Load= 0.25 tsf
$D_0$ = 0.97838
$D_{90}$ = 0.97941
$D_{100}$ = 0.97953
$T_{90}$ = 0.52 min.

$C_v$ @ $T_{90}$
3.88 ft.$^2$/day

Figure 5

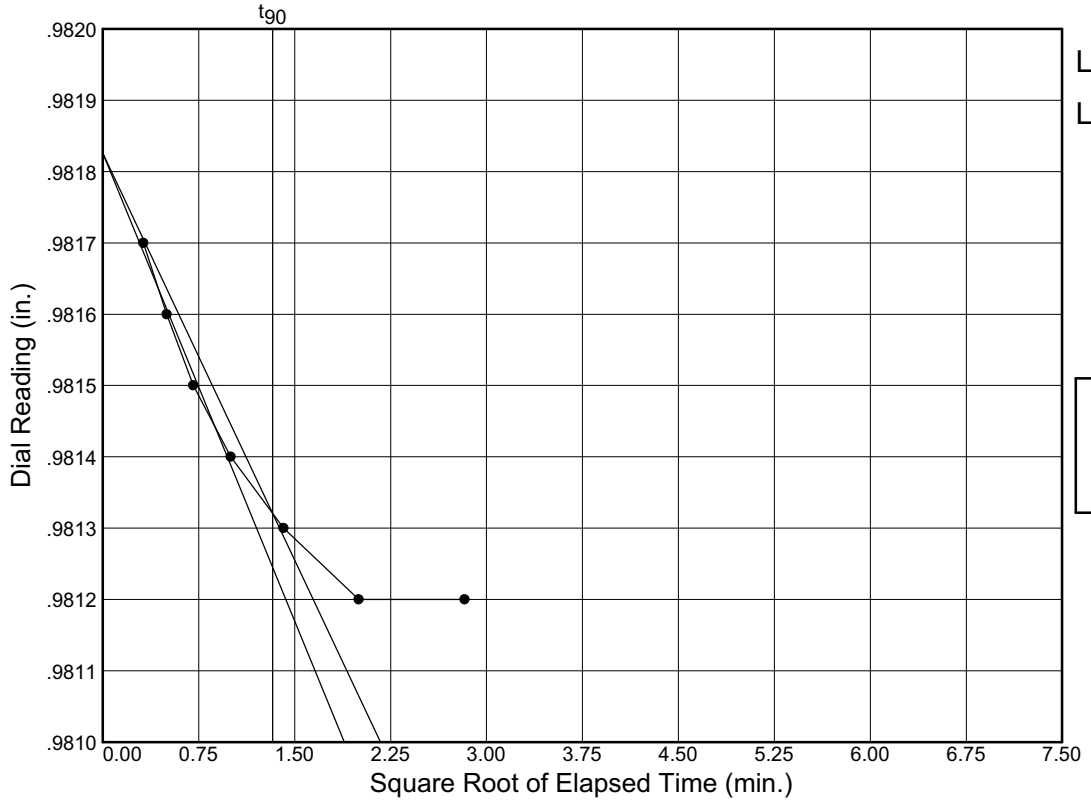
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: KR2-1B




Load No.= 9
Load= 0.13 tsf
$D_0$ = 0.98035
$D_{90}$ = 0.98136
$D_{100}$ = 0.98147
$T_{90}$ = 1.76 min.

| $C_v$ @ $T_{90}$ |
|---|
| 1.16 ft.$^2$/day |



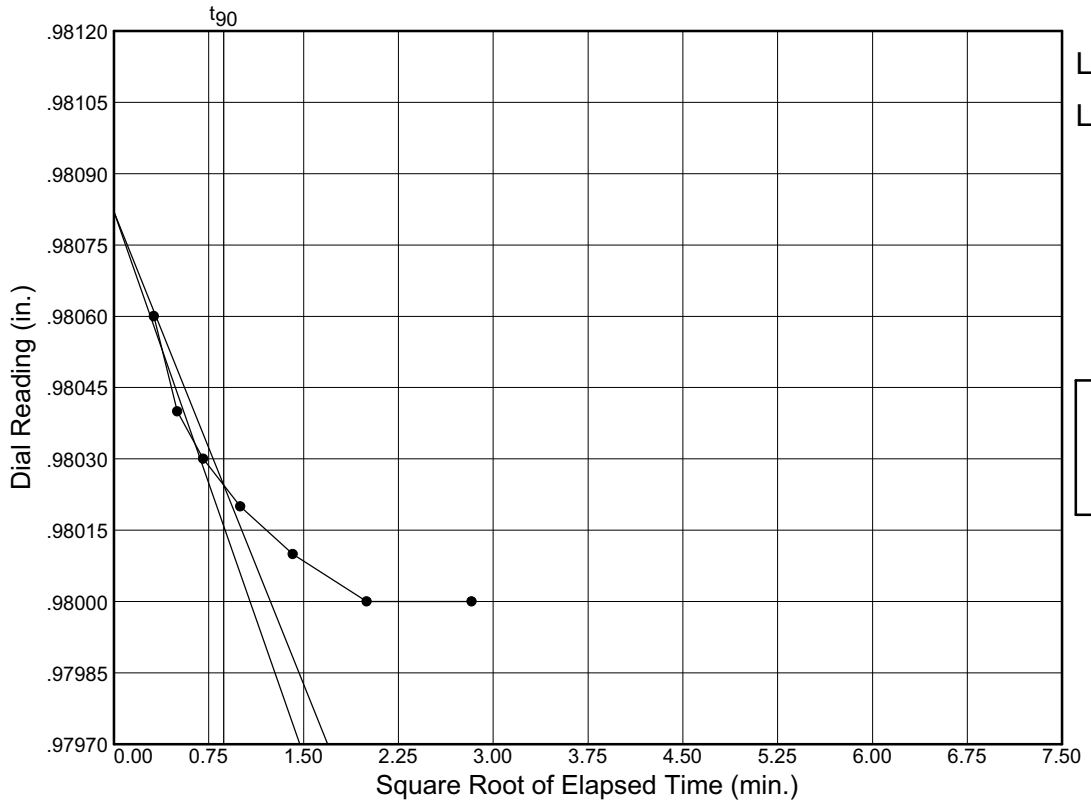

Load No.= 10
Load= 0.25 tsf
$D_0$ = 0.98183
$D_{90}$ = 0.98132
$D_{100}$ = 0.98126
$T_{90}$ = 1.76 min.

| $C_v$ @ $T_{90}$ |
|---|
| 1.16 ft.$^2$/day |

Figure 6

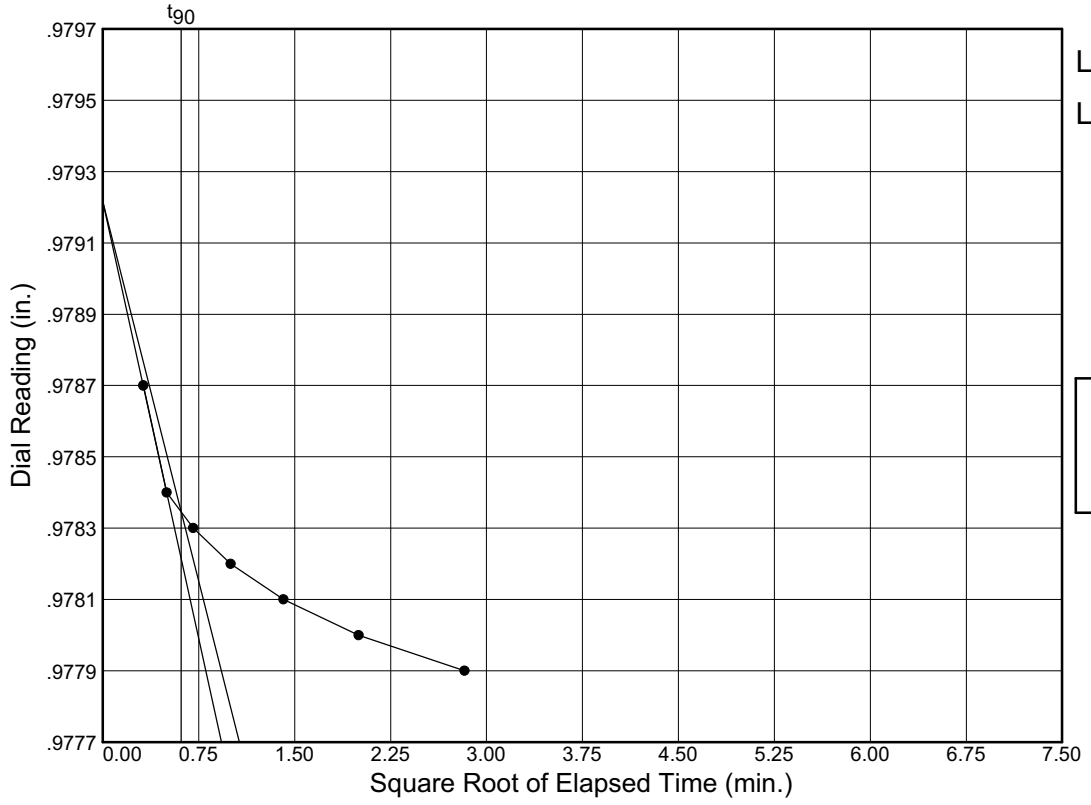
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: KR2-1B




Load No.= 11
Load= 0.50 tsf
$D_0$ = 0.98082
$D_{90}$ = 0.98024
$D_{100}$ = 0.98018
$T_{90}$ = 0.75 min.

$C_v$ @ $T_{90}$
2.70 ft.$^2$/day



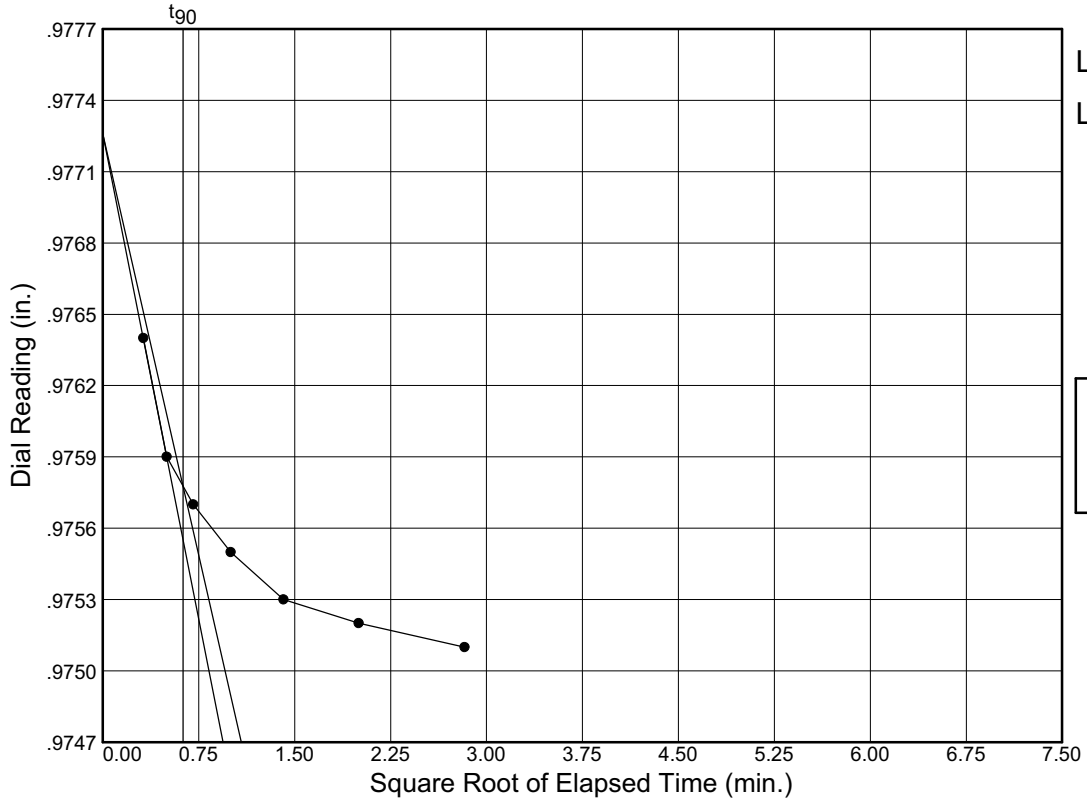

Load No.= 12
Load= 1.00 tsf
$D_0$ = 0.97922
$D_{90}$ = 0.97835
$D_{100}$ = 0.97825
$T_{90}$ = 0.38 min.

$C_v$ @ $T_{90}$
5.40 ft.$^2$/day

Figure 7

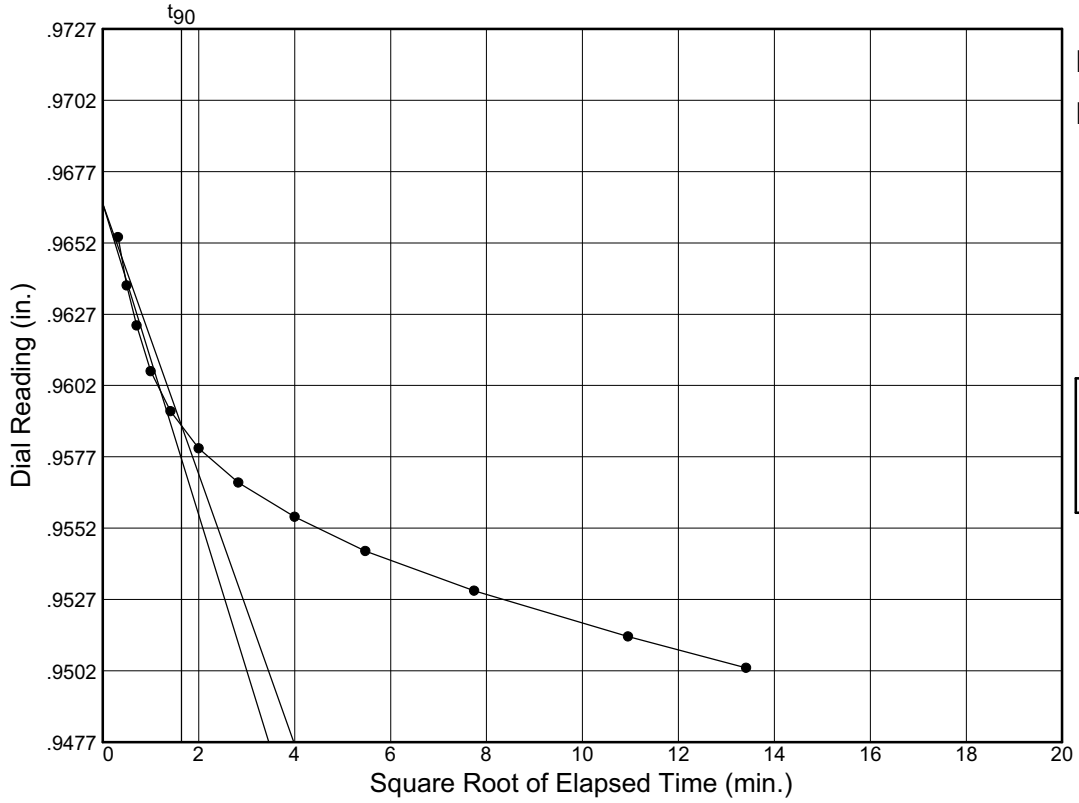
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: KR2-1B




Load No.= 13
Load= 2.00 tsf
$D_0$ = 0.97726
$D_{90}$ = 0.97578
$D_{100}$ = 0.97561
$T_{90}$ = 0.39 min.

$C_v$ @ $T_{90}$
5.15 ft.$^2$/day



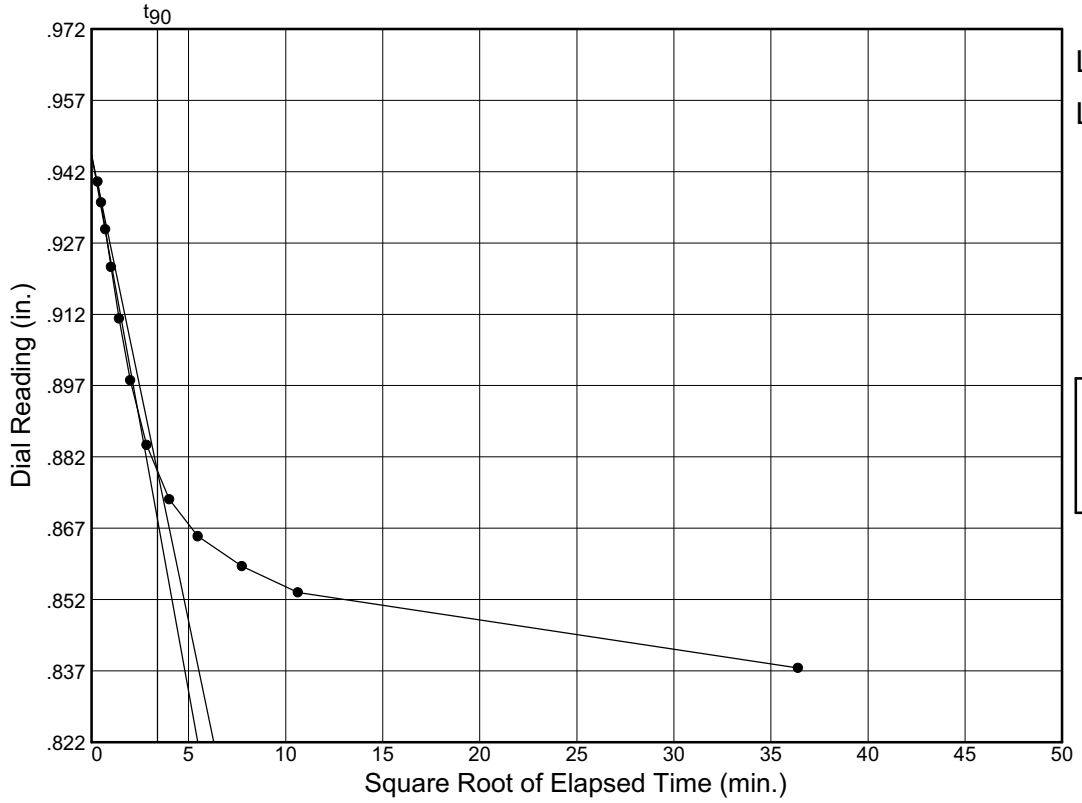

Load No.= 14
Load= 4.00 tsf
$D_0$ = 0.96657
$D_{90}$ = 0.95880
$D_{100}$ = 0.95793
$T_{90}$ = 2.69 min.

$C_v$ @ $T_{90}$
0.73 ft.$^2$/day

Figure 8

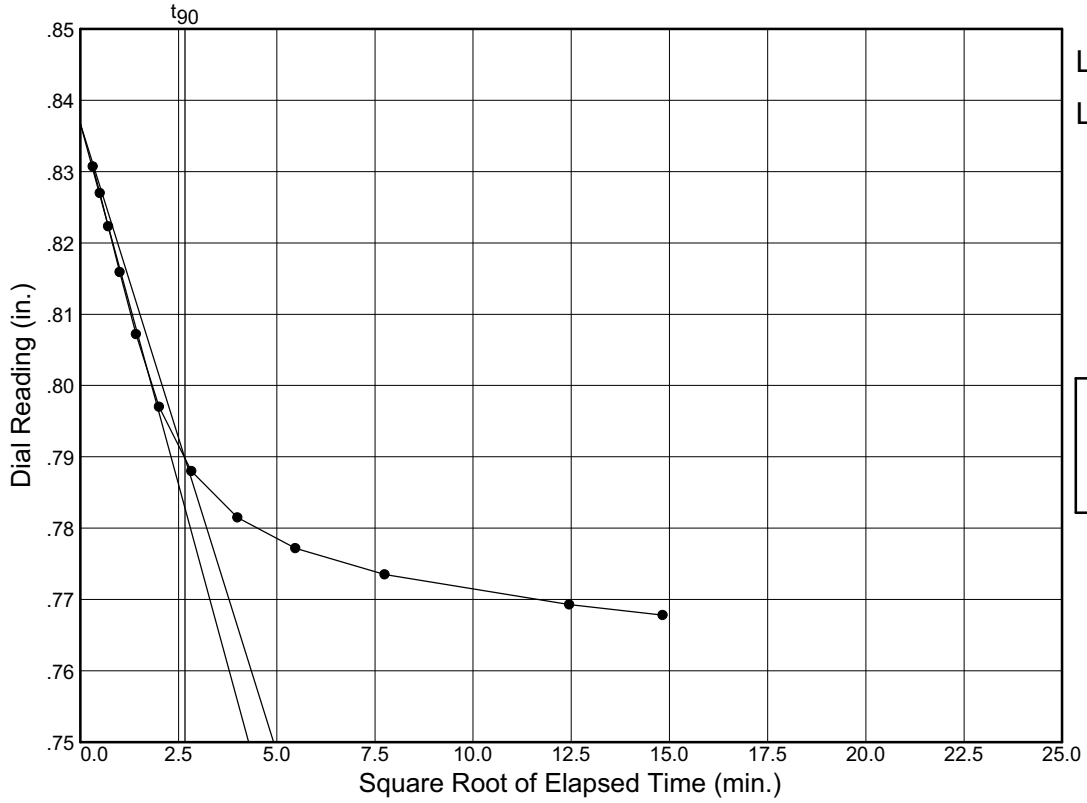
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: KR2-1B




Load No.= 15
Load= 8.00 tsf
$D_0$ = 0.94553
$D_{90}$ = 0.87905
$D_{100}$ = 0.87167
$T_{90}$ = 11.48 min.

| $C_v$ @ $T_{90}$ |
|---|
| 0.15 ft.$^2$/day |



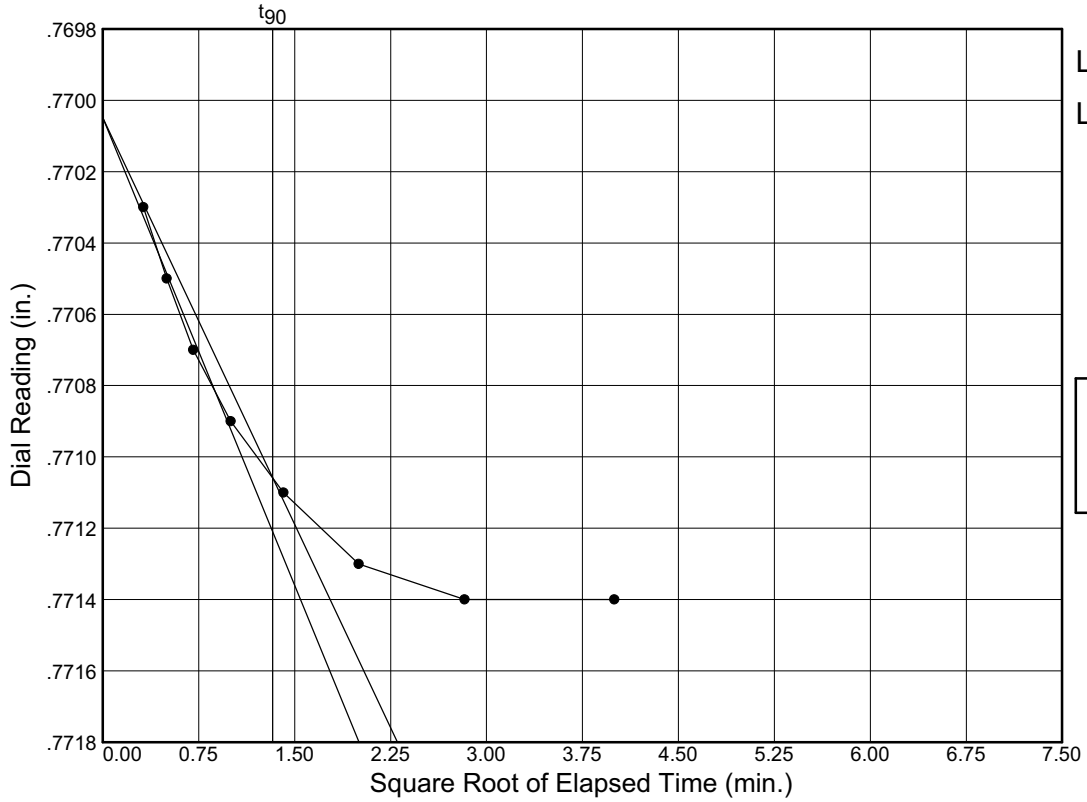

Load No.= 16
Load= 16.00 tsf
$D_0$ = 0.83673
$D_{90}$ = 0.78977
$D_{100}$ = 0.78455
$T_{90}$ = 7.11 min.

| $C_v$ @ $T_{90}$ |
|---|
| 0.19 ft.$^2$/day |

Figure 9

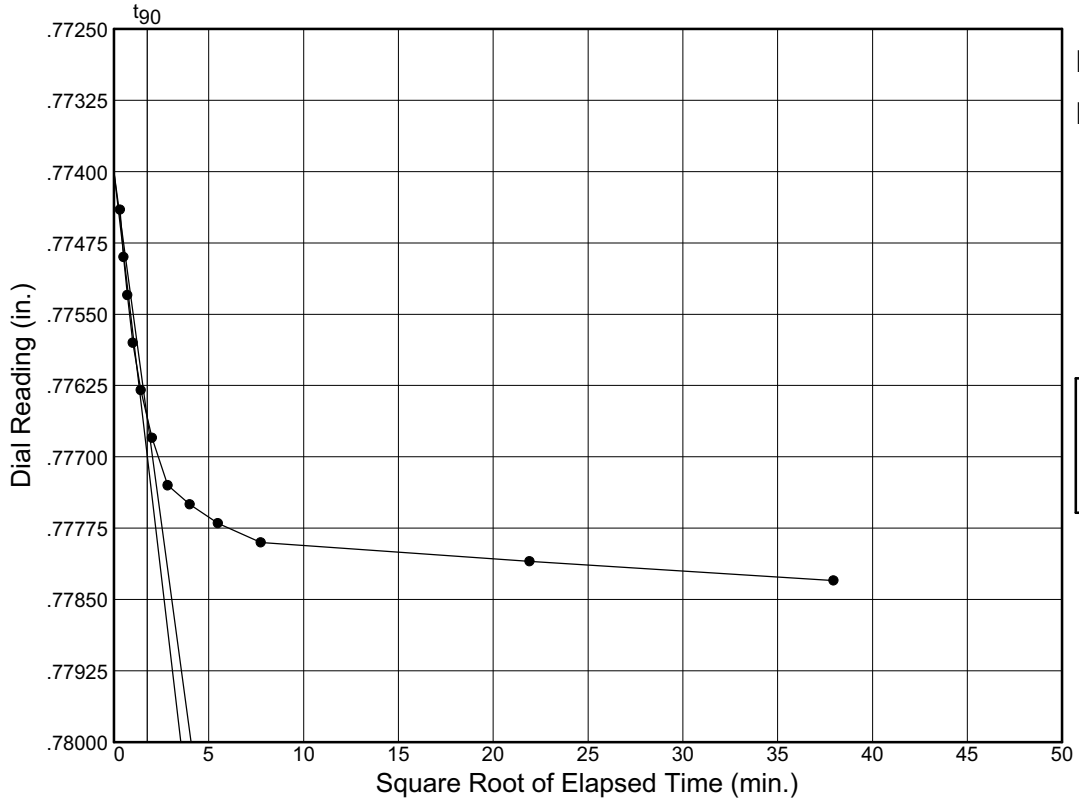
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: KR2-1B




Load No.= 17
Load= 8.00 tsf
$D_0$ = 0.77005
$D_{90}$ = 0.77106
$D_{100}$ = 0.77117
$T_{90}$ = 1.76 min.

$C_v$ @ $T_{90}$
0.71 ft.$^2$/day



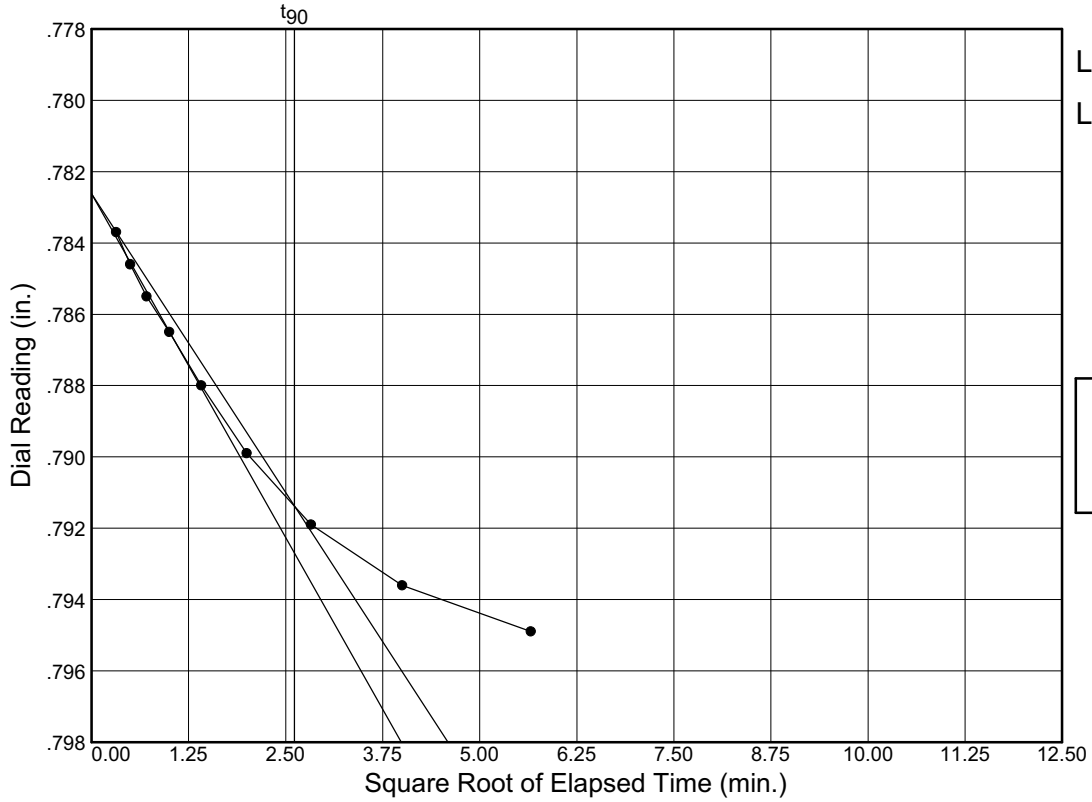

Load No.= 18
Load= 4.00 tsf
$D_0$ = 0.77400
$D_{90}$ = 0.77659
$D_{100}$ = 0.77687
$T_{90}$ = 3.06 min.

$C_v$ @ $T_{90}$
0.42 ft.$^2$/day

Figure 10

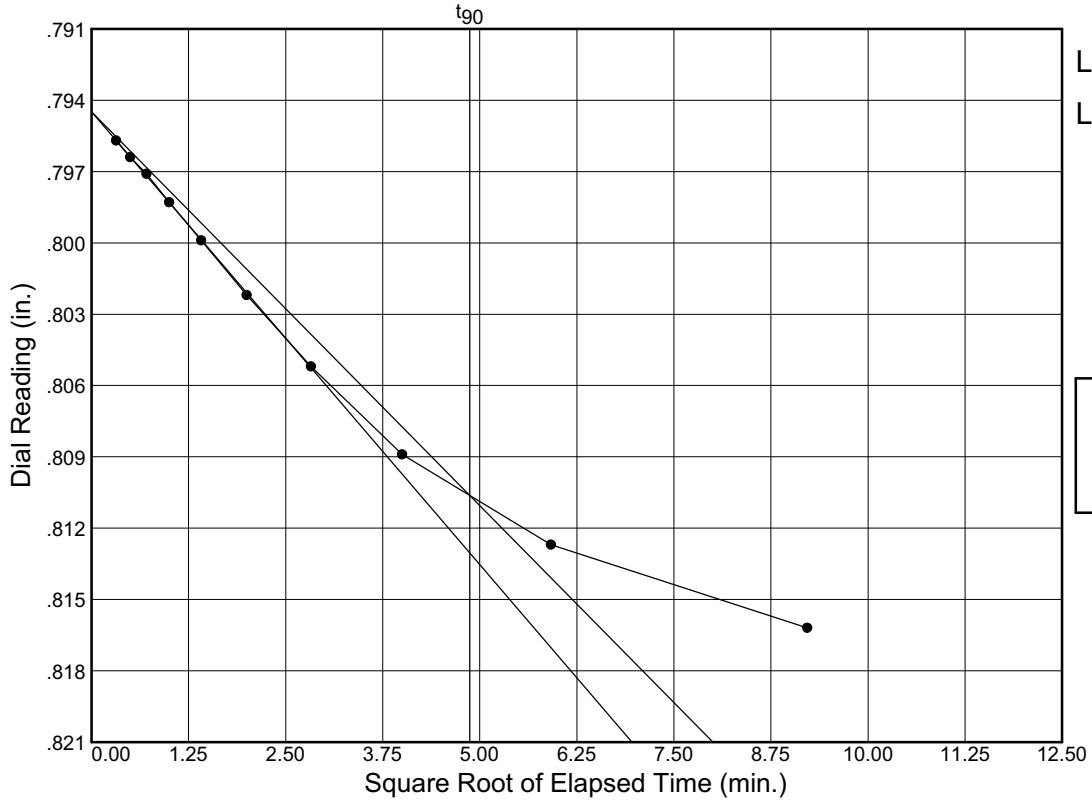
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: KR2-1B




Load No.= 19
Load= 1.00 tsf
$D_0$ = 0.78263
$D_{90}$ = 0.79138
$D_{100}$ = 0.79235
$T_{90}$ = 6.83 min.

$C_v$ @ $T_{90}$
0.19 ft.$^2$/day



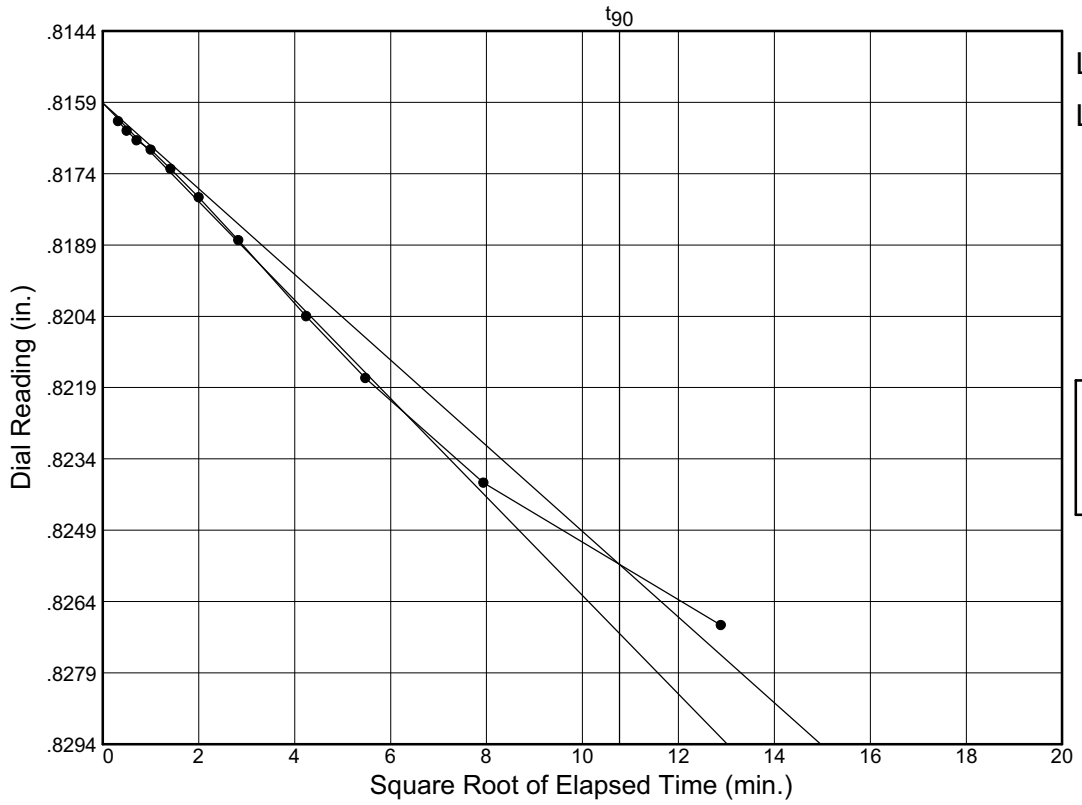

Load No.= 20
Load= 0.25 tsf
$D_0$ = 0.79448
$D_{90}$ = 0.81063
$D_{100}$ = 0.81242
$T_{90}$ = 23.74 min.

$C_v$ @ $T_{90}$
0.06 ft.$^2$/day

Figure 11

# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: KR2-1B




Load No.= 21

Load= 0.13 tsf

$D_0$ = 0.81592

$D_{90}$ = 0.82562

$D_{100}$ = 0.82670

$T_{90}$ = 116.11 min.

| $C_v$ @ $T_{90}$ |
|---|
| 0.01 ft.$^2$/day |

Figure 12

## CONSOLIDATION TEST DATA

**Client:** HDR, Inc.
**Project:** VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
**Project Number:** VB10-237G

### Sample Data

**Source:**
**Sample No.:** Shelby Tube
**Elev. or Depth:** 65 ft. **Sample Length(in./cm.):** 1 in.
**Location:** KR2-1B
**Description:** Gray, Fat CLAY
**Sample Date:** **Liquid Limit:** **Plasticity Index:**
**USCS:** **AASHTO:**
**Preparation Process:**
**Condition of Test:**
**Test Method:** **Final Density:** **Figure No.:** 1
**Testing Remarks:** KR2-1B
Depth=65 ft.
**Tested By:** **Test Date:**
**Checked By:** **Title:**

### Test Specimen Data

| TOTAL SAMPLE | BEFORE TEST | AFTER TEST |
|---|---|---|
| **Wet w+t** = 285.71 g. | **Consolidometer #** = 1 | **Wet w+t** = 274.61 g. |
| **Dry w+t** = 242.36 g. | | **Dry w+t** = 242.36 g. |
| **Tare Wt.** = 145.31 g. | **Spec. Gravity** = 2.62 | **Tare Wt.** = 145.31 g. |
| **Height** = 1.00 in. | **Height** = 1.00 in. | |
| **Diameter** = 2.50 in. | **Diameter** = 2.50 in. | |
| **Weight** = 140.40 g. | **Defl. Table** = Reference Set (inches/tsf) | |
| **Moisture** = 44.7 % | **Ht. Solids** = 0.4605 in. | **Moisture** = 33.2 % |
| **Wet Den.** = 109.0 pcf | **Dry Wt.** = 97.05 g. | **Dry Wt.** = 97.05 g.* |
| **Dry Den.** = 75.3 pcf | **Void Ratio** = 1.172 | **Void Ratio** = 0.796 |
| **Ovrbrdn.** = 2.00 tsf | **Saturation** = 99.9 % | |

*** Final dry weight used in calculations**

### End-of-Load Summary

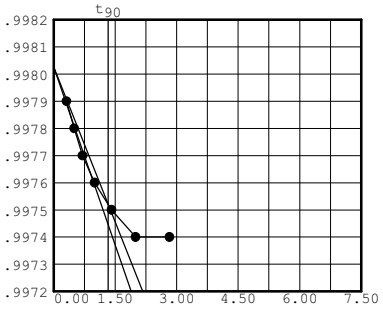
| Pressure (tsf) | Final Dial (in.) | Machine Defl. (in.) | $C_v$ (ft.$^2$/day) | $C_\alpha$ | Void Ratio | % Compression /Swell |
|---|---|---|---|---|---|---|
| start | 1.00000 | | | | 1.172 | |
| 0.13 | 0.99740 | 0.00000 | 1.20 | | 1.166 | 0.3 Comprs. |
| 0.25 | 0.99360 | 0.00040 | 3.83 | 0.000 | 1.159 | 0.6 Comprs. |
| 0.50 | 0.98870 | 0.00080 | 1.47 | 0.000 | 1.149 | 1.1 Comprs. |
| 1.00 | 0.98240 | 0.00160 | 1.81 | 0.001 | 1.137 | 1.6 Comprs. |
| 2.00 | 0.97280 | 0.00240 | 0.83 | 0.001 | 1.118 | 2.5 Comprs. |
| 1.00 | 0.97510 | 0.00160 | 2.15 | 0.000 | 1.121 | 2.3 Comprs. |
| 0.50 | 0.97720 | 0.00080 | 2.71 | | 1.124 | 2.2 Comprs. |

| Pressure (tsf) | Final Dial (in.) | Machine Defl. (in.) | $C_v$ (ft.$^2$/day) | $C_\alpha$ | Void Ratio | % Compression /Swell |
|---|---|---|---|---|---|---|
| 0.25 | 0.97950 | 0.00040 | | | 1.128 | 2.0 Comprs. |
| 0.13 | 0.98170 | 0.00000 | | | 1.132 | 1.8 Comprs. |
| 0.25 | 0.98080 | 0.00040 | 1.15 | 0.000 | 1.131 | 1.9 Comprs. |
| 0.50 | 0.97920 | 0.00080 | 4.73 | 0.000 | 1.128 | 2.0 Comprs. |
| 1.00 | 0.97630 | 0.00160 | 3.36 | 0.000 | 1.124 | 2.2 Comprs. |
| 2.00 | 0.97210 | 0.00300 | 3.22 | 0.000 | 1.118 | 2.5 Comprs. |
| 4.00 | 0.95030 | 0.00000 | | 0.005 | 1.064 | 5.0 Comprs. |
| 8.00 | 0.83760 | 0.00000 | 0.19 | 0.016 | 0.819 | 16.2 Comprs. |
| 16.00 | 0.76780 | 0.00000 | 0.22 | 0.013 | 0.667 | 23.2 Comprs. |
| 8.00 | 0.77140 | 0.00000 | 0.60 | 0.000 | 0.675 | 22.9 Comprs. |
| 4.00 | 0.77830 | 0.00000 | 2.19 | | 0.690 | 22.2 Comprs. |
| 1.00 | 0.79330 | 0.00160 | 0.18 | | 0.726 | 20.5 Comprs. |
| 0.25 | 0.81580 | 0.00040 | 0.06 | | 0.772 | 18.4 Comprs. |
| 0.13 | 0.82690 | 0.00000 | 2.91 | | 0.796 | 17.3 Comprs. |

**$C_c$ =** 0.84 **$P_c$ =** 3.82 tsf **$C_r$ =** 0.03

**Pressure: 0.13 tsf** **TEST READINGS** **Load No. 1**

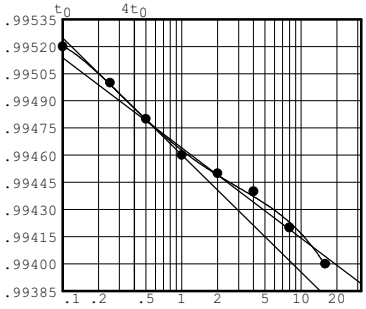
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 1.00000 |
| 2 | 0.10 | 0.99790 |
| 3 | 0.25 | 0.99780 |
| 4 | 0.50 | 0.99770 |
| 5 | 1.00 | 0.99760 |
| 6 | 2.00 | 0.99750 |
| 7 | 4.00 | 0.99740 |
| 8 | 8.00 | 0.99740 |




**Void Ratio =** 1.166 **Compression =** 0.3 %
**$D_0$ =** 0.99803 **$D_{90}$ =** 0.99752 **$D_{100}$ =** 0.99746
**$C_v$ at 1.8 min. =** 1.20 ft.$^2$/day

**Pressure: 0.25 tsf** **TEST READINGS** **Load No. 2**

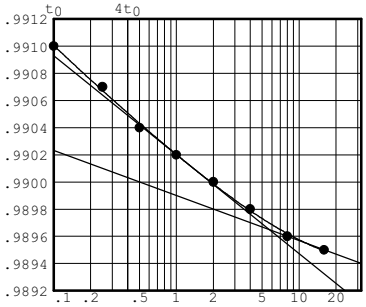
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.99740 |
| 2 | 0.10 | 0.99480 |
| 3 | 0.25 | 0.99460 |
| 4 | 0.50 | 0.99440 |
| 5 | 1.00 | 0.99420 |
| 6 | 2.00 | 0.99410 |
| 7 | 4.00 | 0.99400 |
| 8 | 8.00 | 0.99380 |
| 9 | 16.00 | 0.99360 |




**Void Ratio =** 1.159 **Compression =** 0.6 %
**$D_0$ =** 0.99555 **$D_{50}$ =** 0.99516 **$D_{100}$ =** 0.99477
**$C_v$ at 0.1 min. =** 3.83 ft.$^2$/day **$C_\alpha$ =** 0.000

**Pressure: 0.50 tsf** **TEST READINGS** **Load No. 3**

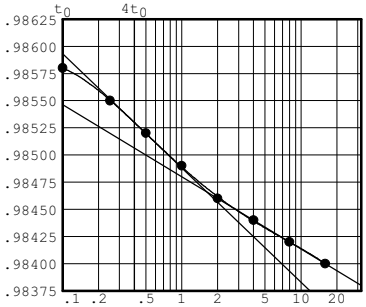
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.99360 |
| 2 | 0.10 | 0.99020 |
| 3 | 0.25 | 0.98990 |
| 4 | 0.50 | 0.98960 |
| 5 | 1.00 | 0.98940 |
| 6 | 2.00 | 0.98920 |
| 7 | 4.00 | 0.98900 |
| 8 | 8.00 | 0.98880 |
| 9 | 16.00 | 0.98870 |




**Void Ratio =** 1.149 **Compression =** 1.1 %
**$D_0$ =** 0.99150 **$D_{50}$ =** 0.99058 **$D_{100}$ =** 0.98965
**$C_v$ at 0.3 min. =** 1.47 ft.$^2$/day **$C_\alpha$ =** 0.000

**Pressure: 1.00 tsf** **TEST READINGS** **Load No. 4**

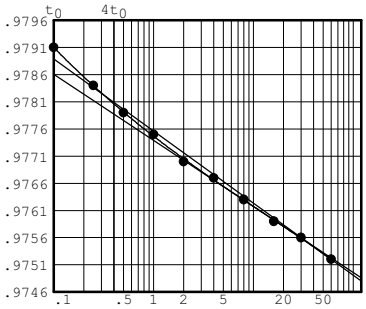
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.98880 |
| 2 | 0.10 | 0.98420 |
| 3 | 0.25 | 0.98390 |
| 4 | 0.50 | 0.98360 |
| 5 | 1.00 | 0.98330 |
| 6 | 2.00 | 0.98300 |
| 7 | 4.00 | 0.98280 |
| 8 | 8.00 | 0.98260 |
| 9 | 16.00 | 0.98240 |




**Void Ratio =** 1.137 **Compression =** 1.6 %
**$D_0$ =** 0.98630 **$D_{50}$ =** 0.98548 **$D_{100}$ =** 0.98466
**$C_v$ at 0.3 min. =** 1.81 ft.$^2$/day **$C_\alpha$ =** 0.001

**Pressure: 2.00 tsf** **TEST READINGS** **Load No. 5**

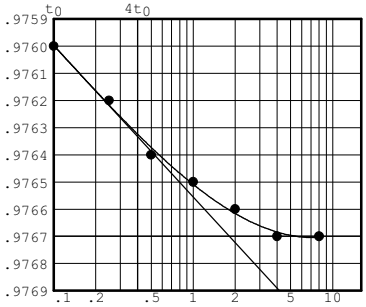
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.98240 | 11 | 60.00 | 0.97280 |
| 2 | 0.10 | 0.97670 | | | |
| 3 | 0.25 | 0.97600 | | | |
| 4 | 0.50 | 0.97550 | | | |
| 5 | 1.00 | 0.97510 | | | |
| 6 | 2.00 | 0.97460 | | | |
| 7 | 4.00 | 0.97430 | | | |
| 8 | 8.00 | 0.97390 | | | |
| 9 | 16.00 | 0.97350 | | | |
| 10 | 30.00 | 0.97320 | | | |




**Void Ratio =** 1.118 **Compression =** 2.5 %
**$D_0$ =** 0.98014 **$D_{50}$ =** 0.97783 **$D_{100}$ =** 0.97551
**$C_v$ at 0.6 min. =** 0.83 ft.$^2$/day **$C_\alpha$ =** 0.001

**Pressure: 1.00 tsf** **TEST READINGS** **Load No. 6**

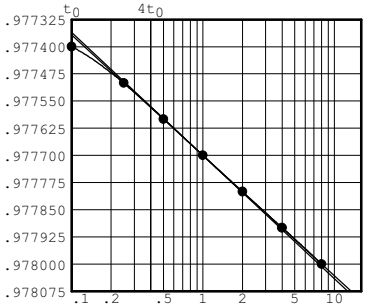
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.97280 |
| 2 | 0.10 | 0.97440 |
| 3 | 0.25 | 0.97460 |
| 4 | 0.50 | 0.97480 |
| 5 | 1.00 | 0.97490 |
| 6 | 2.00 | 0.97500 |
| 7 | 4.00 | 0.97510 |
| 8 | 8.00 | 0.97510 |




**Void Ratio =** 1.121 **Compression =** 2.3 %
**$D_0$ =** 0.97567 **$D_{50}$ =** 0.97619 **$D_{100}$ =** 0.97670
**$C_v$ at 0.2 min. =** 2.15 ft.$^2$/day **$C_\alpha$ =** 0.000

**Pressure: 0.50 tsf** **TEST READINGS** **Load No. 7**

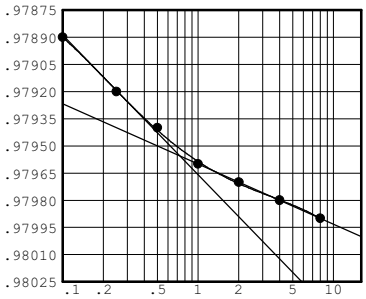
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.97510 |
| 2 | 0.10 | 0.97660 |
| 3 | 0.25 | 0.97670 |
| 4 | 0.50 | 0.97680 |
| 5 | 1.00 | 0.97690 |
| 6 | 2.00 | 0.97700 |
| 7 | 4.00 | 0.97710 |
| 8 | 8.00 | 0.97720 |




**Void Ratio =** 1.124 **Compression =** 2.2 %
**$D_0$ =** 0.97723 **$D_{50}$ =** 0.97746 **$D_{100}$ =** 0.97768
**$C_v$ at 0.2 min. =** 2.71 ft.$^2$/day

**Pressure: 0.25 tsf** **TEST READINGS** **Load No. 8**

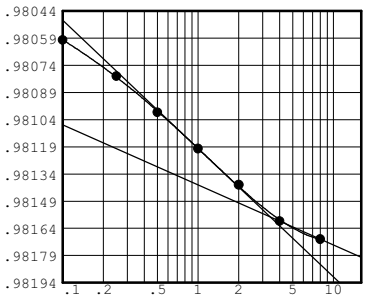
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.97720 |
| 2 | 0.10 | 0.97850 |
| 3 | 0.25 | 0.97880 |
| 4 | 0.50 | 0.97900 |
| 5 | 1.00 | 0.97920 |
| 6 | 2.00 | 0.97930 |
| 7 | 4.00 | 0.97940 |
| 8 | 8.00 | 0.97950 |




**Void Ratio =** 1.128 **Compression =** 2.0 %

**Pressure: 0.13 tsf** **TEST READINGS** **Load No. 9**

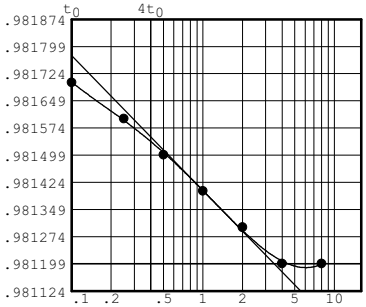
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.97960 |
| 2 | 0.10 | 0.98060 |
| 3 | 0.25 | 0.98080 |
| 4 | 0.50 | 0.98100 |
| 5 | 1.00 | 0.98120 |
| 6 | 2.00 | 0.98140 |
| 7 | 4.00 | 0.98160 |
| 8 | 8.00 | 0.98170 |




**Void Ratio =** 1.132 **Compression =** 1.8 %

**Pressure: 0.25 tsf** **TEST READINGS** **Load No. 10**

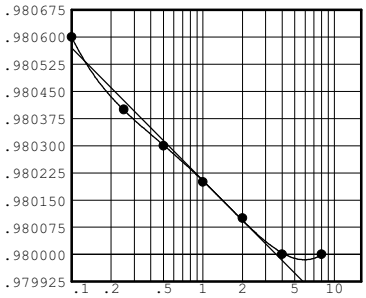
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.98170 |
| 2 | 0.10 | 0.98130 |
| 3 | 0.25 | 0.98120 |
| 4 | 0.50 | 0.98110 |
| 5 | 1.00 | 0.98100 |
| 6 | 2.00 | 0.98090 |
| 7 | 4.00 | 0.98080 |
| 8 | 8.00 | 0.98080 |




**Void Ratio =** 1.131 **Compression =** 1.9 %
**$D_0$ =** 0.98186 **$D_{50}$ =** 0.98153 **$D_{100}$ =** 0.98120
**$C_v$ at 0.4 min. =** 1.15 ft.$^2$/day **$C_\alpha$ =** 0.000

**Pressure: 0.50 tsf** **TEST READINGS** **Load No. 11**

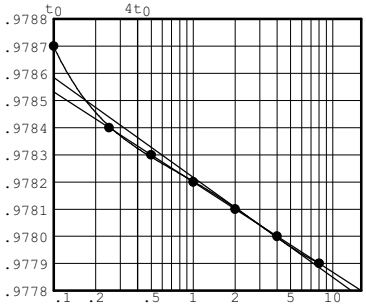
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.98080 |
| 2 | 0.10 | 0.97980 |
| 3 | 0.25 | 0.97960 |
| 4 | 0.50 | 0.97950 |
| 5 | 1.00 | 0.97940 |
| 6 | 2.00 | 0.97930 |
| 7 | 4.00 | 0.97920 |
| 8 | 8.00 | 0.97920 |




**Void Ratio =** 1.128 **Compression =** 2.0 %
**$D_0$ =** 0.98120 **$D_{50}$ =** 0.98060 **$D_{100}$ =** 0.98000
**$C_v$ at 0.1 min. =** 4.73 ft.$^2$/day **$C_\alpha$ =** 0.000

**Pressure: 1.00 tsf** **TEST READINGS** **Load No. 12**

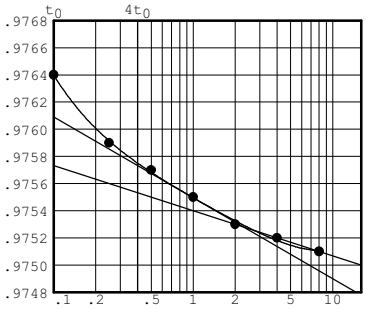
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.97920 |
| 2 | 0.10 | 0.97710 |
| 3 | 0.25 | 0.97680 |
| 4 | 0.50 | 0.97670 |
| 5 | 1.00 | 0.97660 |
| 6 | 2.00 | 0.97650 |
| 7 | 4.00 | 0.97640 |
| 8 | 8.00 | 0.97630 |




**Void Ratio =** 1.124 **Compression =** 2.2 %
**$D_0$ =** 0.97907 **$D_{50}$ =** 0.97856 **$D_{100}$ =** 0.97804
**$C_v$ at 0.1 min. =** 3.36 ft.$^2$/day **$C_\alpha$ =** 0.000

**Pressure: 2.00 tsf** **TEST READINGS** **Load No. 13**

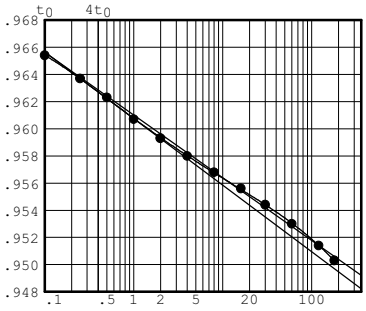
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.97630 |
| 2 | 0.10 | 0.97340 |
| 3 | 0.25 | 0.97290 |
| 4 | 0.50 | 0.97270 |
| 5 | 1.00 | 0.97250 |
| 6 | 2.00 | 0.97230 |
| 7 | 4.00 | 0.97220 |
| 8 | 8.00 | 0.97210 |




**Void Ratio =** 1.118 **Compression =** 2.5 %
**$D_0$ =** 0.97705 **$D_{50}$ =** 0.97616 **$D_{100}$ =** 0.97528
**$C_v$ at 0.1 min. =** 3.22 ft.$^2$/day **$C_\alpha$ =** 0.000

**Pressure: 4.00 tsf** **TEST READINGS** **Load No. 14**

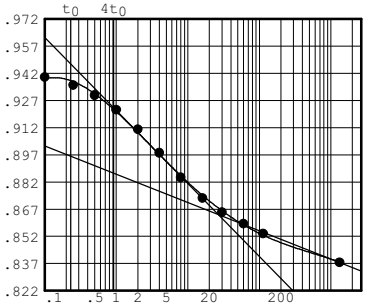
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.97210 | 11 | 60.00 | 0.95300 |
| 2 | 0.10 | 0.96540 | 12 | 120.00 | 0.95140 |
| 3 | 0.25 | 0.96370 | 13 | 180.00 | 0.95030 |
| 4 | 0.50 | 0.96230 | | | |
| 5 | 1.00 | 0.96070 | | | |
| 6 | 2.00 | 0.95930 | | | |
| 7 | 4.00 | 0.95800 | | | |
| 8 | 8.00 | 0.95680 | | | |
| 9 | 16.00 | 0.95560 | | | |
| 10 | 30.00 | 0.95440 | | | |




**Void Ratio =** 1.064 **Compression =** 5.0 %

**Pressure: 8.00 tsf** **TEST READINGS** **Load No. 15**

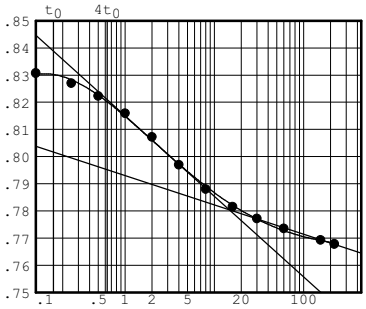
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.95030 | 11 | 60.00 | 0.85900 |
| 2 | 0.10 | 0.93990 | 12 | 113.00 | 0.85350 |
| 3 | 0.25 | 0.93550 | 13 | 1324.00 | 0.83760 |
| 4 | 0.50 | 0.92990 | | | |
| 5 | 1.00 | 0.92190 | | | |
| 6 | 2.00 | 0.91110 | | | |
| 7 | 4.00 | 0.89810 | | | |
| 8 | 8.00 | 0.88450 | | | |
| 9 | 16.00 | 0.87310 | | | |
| 10 | 30.00 | 0.86530 | | | |




**Void Ratio =** 0.819 **Compression =** 16.2 %
**$D_0$ =** 0.95384 **$D_{50}$ =** 0.90892 **$D_{100}$ =** 0.86399
**$C_v$ at 2.0 min. =** 0.19 ft.$^2$/day **$C_\alpha$ =** 0.016

**Pressure: 16.00 tsf** **TEST READINGS** **Load No. 16**

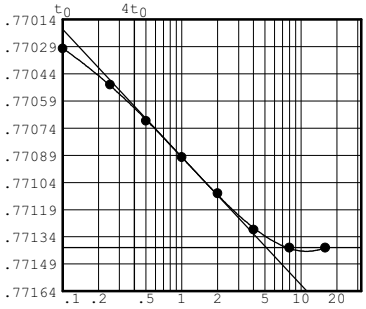
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.83760 | 11 | 60.00 | 0.77350 |
| 2 | 0.10 | 0.83070 | 12 | 155.00 | 0.76930 |
| 3 | 0.25 | 0.82700 | 13 | 220.00 | 0.76780 |
| 4 | 0.50 | 0.82230 | | | |
| 5 | 1.00 | 0.81590 | | | |
| 6 | 2.00 | 0.80720 | | | |
| 7 | 4.00 | 0.79700 | | | |
| 8 | 8.00 | 0.78800 | | | |
| 9 | 16.00 | 0.78150 | | | |
| 10 | 30.00 | 0.77720 | | | |




**Void Ratio =** 0.667 **Compression =** 23.2 %
**$D_0$ =** 0.84025 **$D_{50}$ =** 0.81030 **$D_{100}$ =** 0.78034
**$C_v$ at 1.4 min. =** 0.22 ft.$^2$/day **$C_\alpha$ =** 0.013

**Pressure: 8.00 tsf** **TEST READINGS** **Load No. 17**

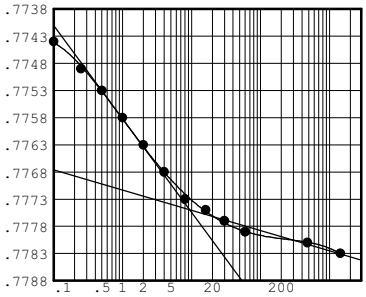
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.76780 |
| 2 | 0.10 | 0.77030 |
| 3 | 0.25 | 0.77050 |
| 4 | 0.50 | 0.77070 |
| 5 | 1.00 | 0.77090 |
| 6 | 2.00 | 0.77110 |
| 7 | 4.00 | 0.77130 |
| 8 | 8.00 | 0.77140 |
| 9 | 16.00 | 0.77140 |




**Void Ratio =** 0.675 **Compression =** 22.9 %
**$D_0$ =** 0.76997 **$D_{50}$ =** 0.77068 **$D_{100}$ =** 0.77140
**$C_v$ at 0.5 min. =** 0.60 ft.$^2$/day **$C_\alpha$ =** 0.000

**Pressure: 4.00 tsf** **TEST READINGS** **Load No. 18**

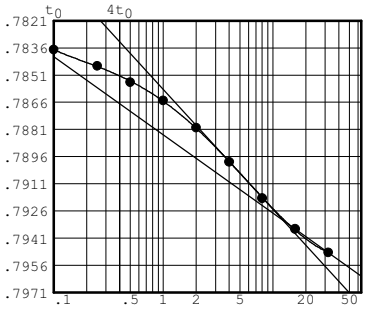
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.77140 | 11 | 60.00 | 0.77790 |
| 2 | 0.10 | 0.77440 | 12 | 480.00 | 0.77810 |
| 3 | 0.25 | 0.77490 | 13 | 1440.00 | 0.77830 |
| 4 | 0.50 | 0.77530 | | | |
| 5 | 1.00 | 0.77580 | | | |
| 6 | 2.00 | 0.77630 | | | |
| 7 | 4.00 | 0.77680 | | | |
| 8 | 8.00 | 0.77730 | | | |
| 9 | 16.00 | 0.77750 | | | |
| 10 | 30.00 | 0.77770 | | | |




**Void Ratio =** 0.690 **Compression =** 22.2 %
**$D_0$ =** 0.77140 **$D_{50}$ =** 0.77445 **$D_{100}$ =** 0.77749
**$C_v$ at 0.1 min. =** 2.19 ft.$^2$/day

**Pressure: 1.00 tsf** **TEST READINGS** **Load No. 19**

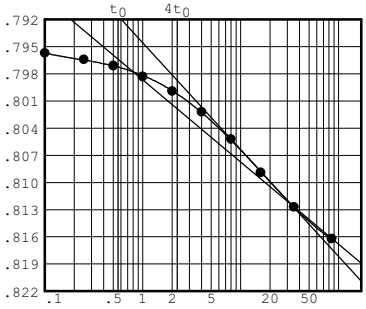
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.77830 |
| 2 | 0.10 | 0.78210 |
| 3 | 0.25 | 0.78300 |
| 4 | 0.50 | 0.78390 |
| 5 | 1.00 | 0.78490 |
| 6 | 2.00 | 0.78640 |
| 7 | 4.00 | 0.78830 |
| 8 | 8.00 | 0.79030 |
| 9 | 16.00 | 0.79200 |
| 10 | 32.00 | 0.79330 |




**Void Ratio =** 0.726 **Compression =** 20.5 %
**$D_0$ =** 0.78225 **$D_{50}$ =** 0.78770 **$D_{100}$ =** 0.79315
**$C_v$ at 1.7 min. =** 0.18 ft.$^2$/day

**Pressure: 0.25 tsf** **TEST READINGS** **Load No. 20**

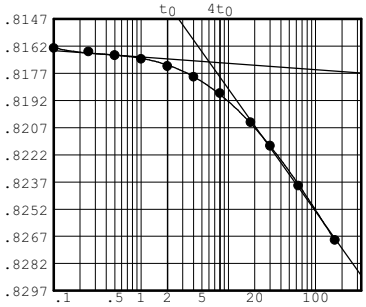
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.79330 | 11 | 85.00 | 0.81580 |
| 2 | 0.10 | 0.79530 | | | |
| 3 | 0.25 | 0.79600 | | | |
| 4 | 0.50 | 0.79670 | | | |
| 5 | 1.00 | 0.79790 | | | |
| 6 | 2.00 | 0.79950 | | | |
| 7 | 4.00 | 0.80180 | | | |
| 8 | 8.00 | 0.80480 | | | |
| 9 | 16.00 | 0.80850 | | | |
| 10 | 35.00 | 0.81230 | | | |




**Void Ratio =** 0.772 **Compression =** 18.4 %
**$D_0$ =** 0.79429 **$D_{50}$ =** 0.80335 **$D_{100}$ =** 0.81240
**$C_v$ at 5.2 min. =** 0.06 ft.$^2$/day

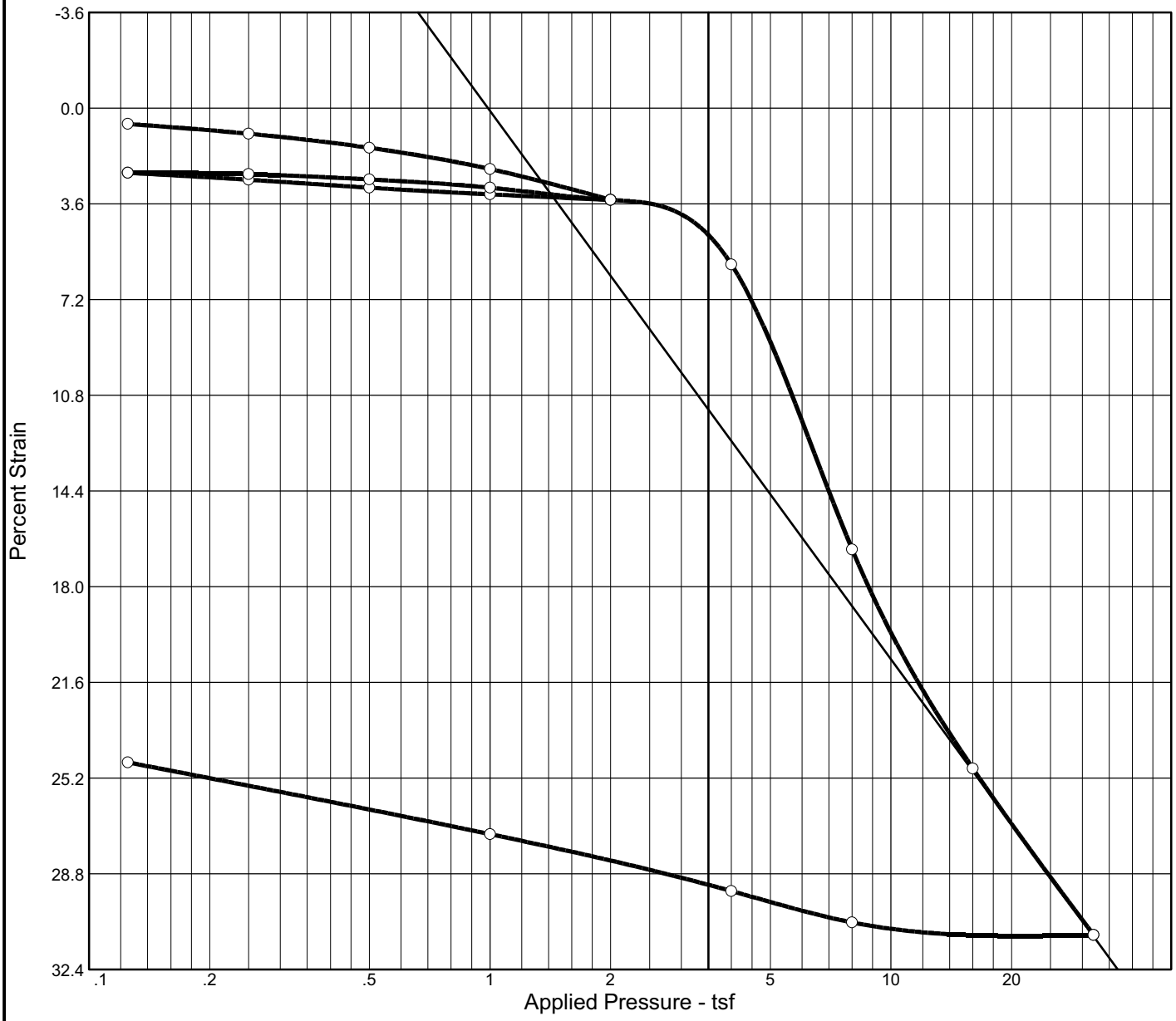
**Pressure: 0.13 tsf** **TEST READINGS** **Load No. 21**

| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.81580 | 11 | 63.00 | 0.82390 |
| 2 | 0.10 | 0.81630 | 12 | 166.00 | 0.82690 |
| 3 | 0.25 | 0.81650 | | | |
| 4 | 0.50 | 0.81670 | | | |
| 5 | 1.00 | 0.81690 | | | |
| 6 | 2.00 | 0.81730 | | | |
| 7 | 4.00 | 0.81790 | | | |
| 8 | 8.00 | 0.81880 | | | |
| 9 | 18.00 | 0.82040 | | | |
| 10 | 30.00 | 0.82170 | | | |




**Void Ratio =** 0.796 **Compression =** 17.3 %
$D_0$ **=** 0.81561 $D_{50}$ **=** 0.81634 $D_{100}$ **=** 0.81707
$C_v$ **at 0.1 min. =** 2.91 ft.$^2$/day

# CONSOLIDATION TEST REPORT




| MATERIAL DESCRIPTION | USCS | AASHTO |
|---|---|---|
| Gray, Fat CLAY | | |

| LL | PI | Sp. Gr. | Overburden (tsf) | Dry Dens. (pcf) | | Moisture | | Saturation | | Void Ratio | | $P_c$ (tsf) | $C_c$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Init. | Final | Init. | Final | Init. | Final | Init. | Final | | |
| | | 2.58 | 2.50 | 73.7 | | 46.1 % | 27.3 % | 100.0 % | 100.0 % | 1.188 | 0.649 | | |

| Preparation Process: | D2435 Method | $C_r$ | Swell Press. (tsf) | Swell % |
|---|---|---|---|---|
| Condition of Test: | | | | |

**Project No.** VB10-237G **Client:** HDR, Inc.

**Project:** VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia

**Location:** KR2-5B - re-entered

**Remarks:**
KR2-5B
Depth = 80 ft.

**Checked By:**

**Title:**

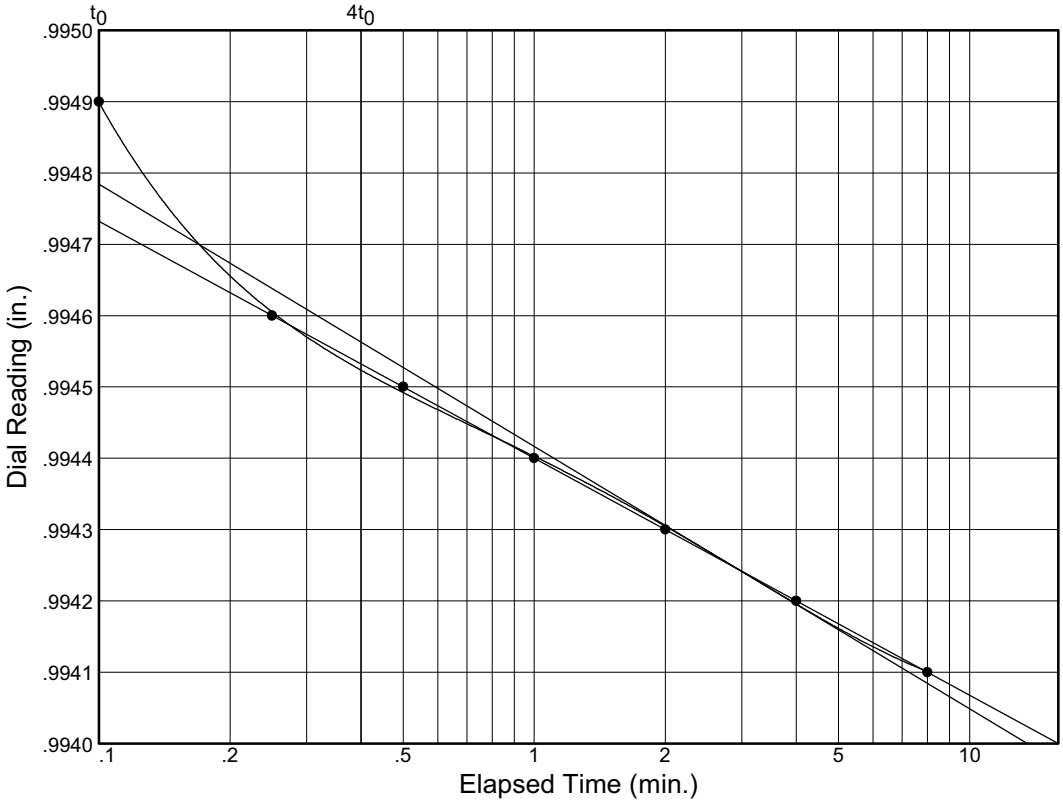
CONSOLIDATION TEST REPORT

**GET SOLUTIONS, INC.**

**Figure**

# Dial Reading vs. Time

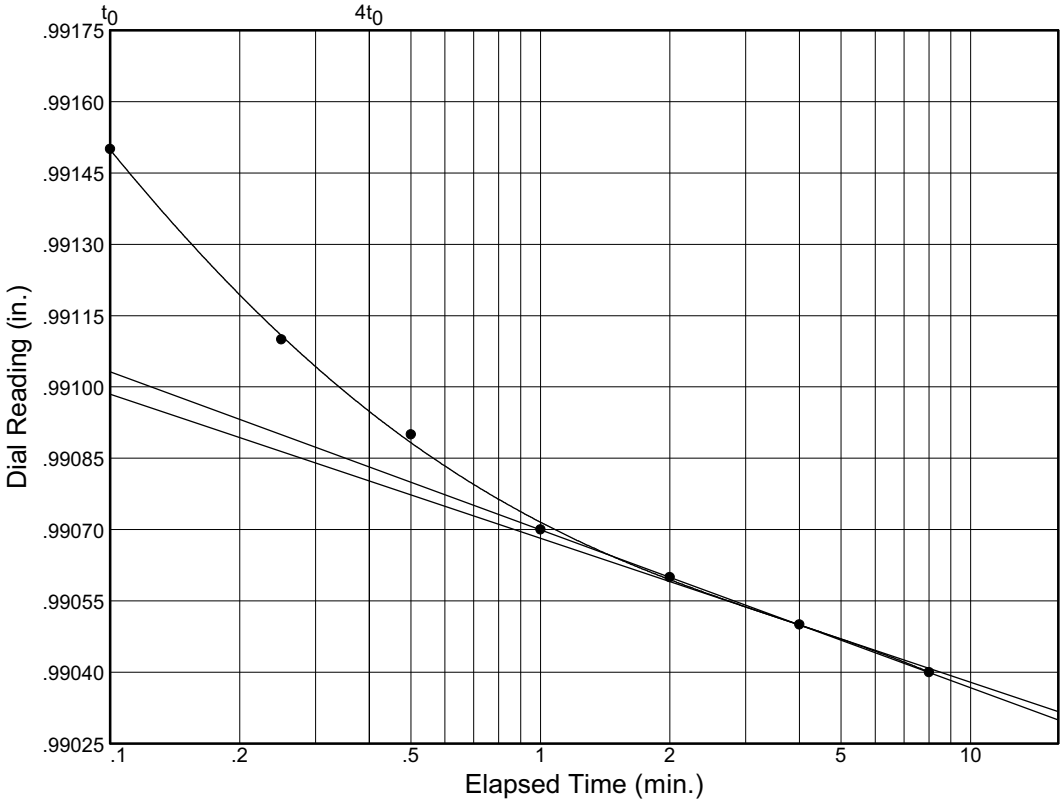
Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: KR2-5B - re-entered




Load No.= 1
Load= 0.13 tsf
$D_0$ = 0.99527
$D_{50}$ = 0.99476
$D_{100}$ = 0.99425
$T_{50}$ = 0.14 min.

$C_v$ @ $T_{50}$
3.48 ft.$^2$/day

$C_\alpha$ = 0.000




Load No.= 2
Load= 0.25 tsf
$D_0$ = 0.99205
$D_{50}$ = 0.99127
$D_{100}$ = 0.99049
$T_{50}$ = 0.17 min.

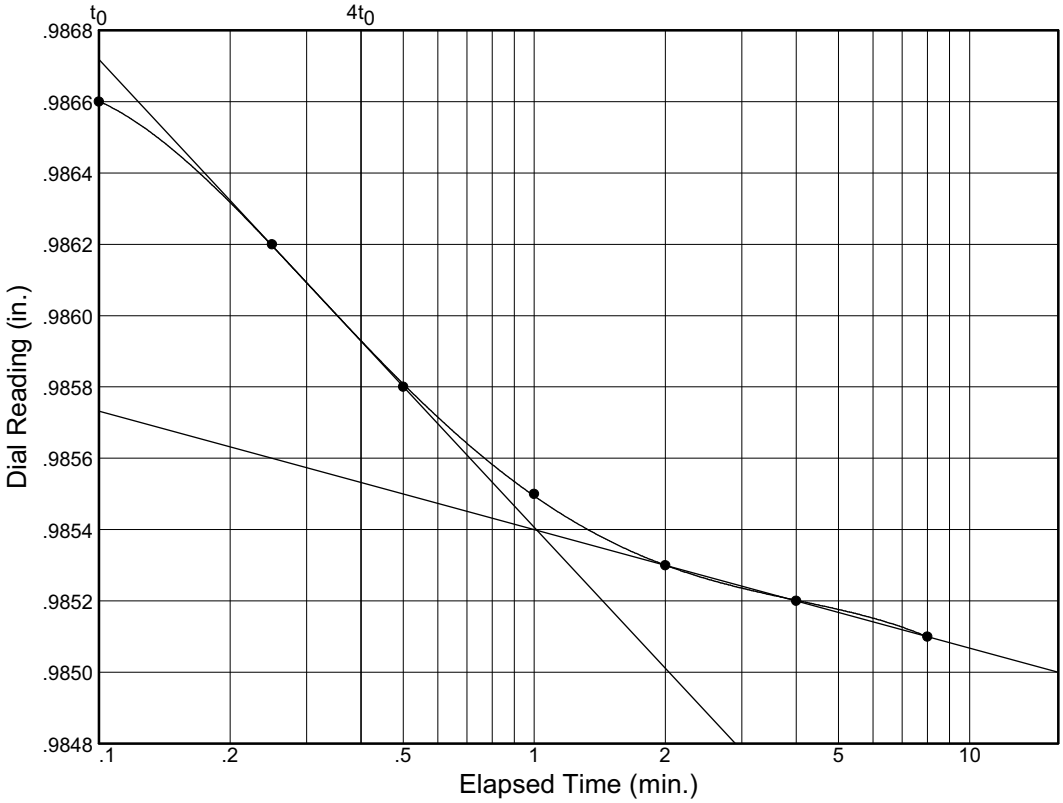
$C_v$ @ $T_{50}$
2.93 ft.$^2$/day

$C_\alpha$ = 0.000

Figure

# Dial Reading vs. Time

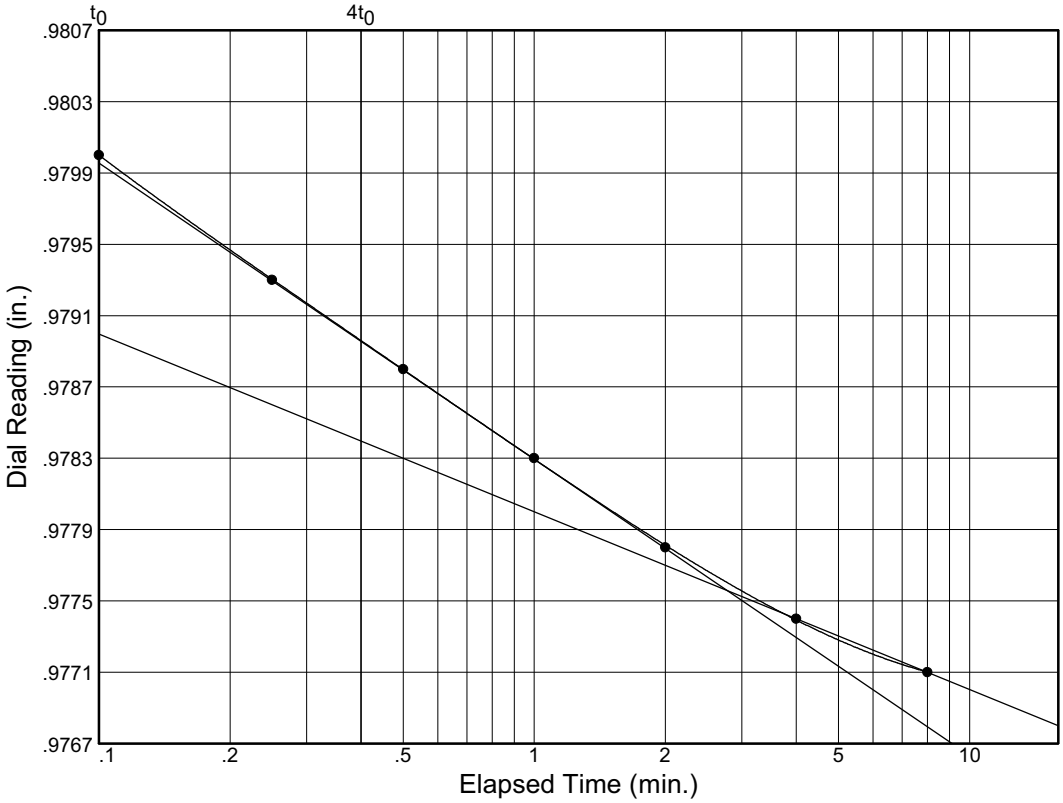
Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: KR2-5B - re-entered




Load No.= 3
Load= 0.50 tsf
$D_0$ = 0.98727
$D_{50}$ = 0.98633
$D_{100}$ = 0.98540
$T_{50}$ = 0.19 min.

$C_v$ @ $T_{50}$
2.48 ft.$^2$/day

$C_\alpha$ = 0.000




Load No.= 4
Load= 1.00 tsf
$D_0$ = 0.98104
$D_{50}$ = 0.97930
$D_{100}$ = 0.97756
$T_{50}$ = 0.25 min.

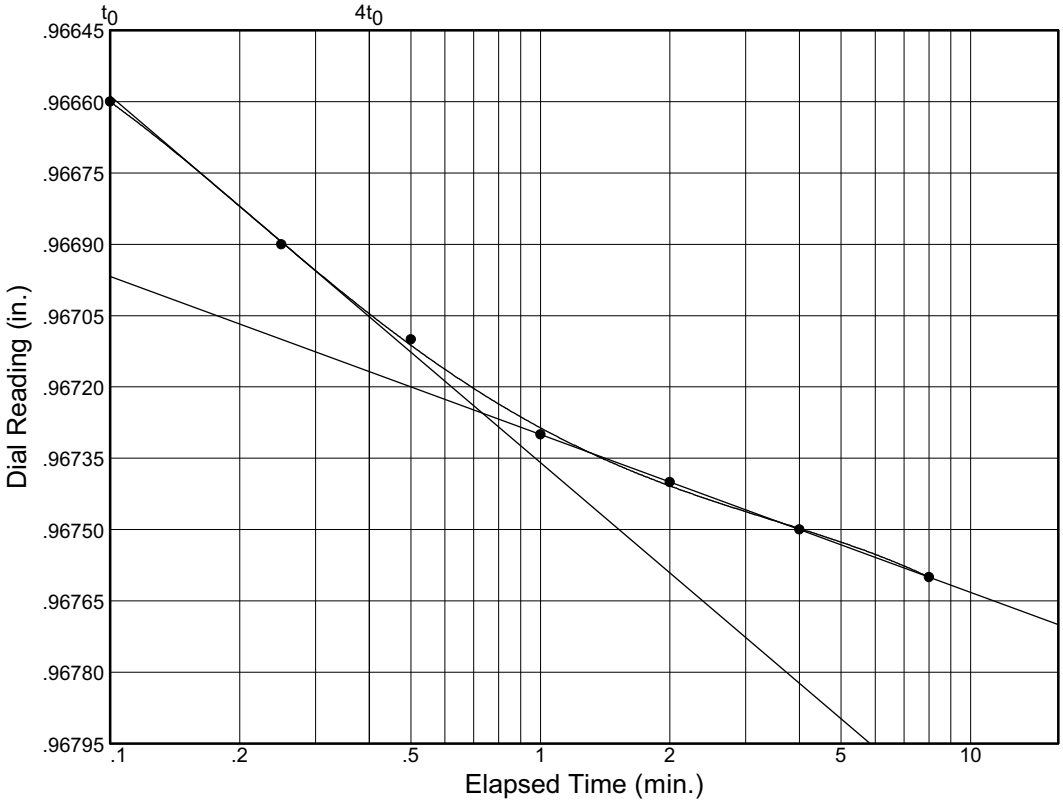
$C_v$ @ $T_{50}$
1.88 ft.$^2$/day

$C_\alpha$ = 0.001

Figure

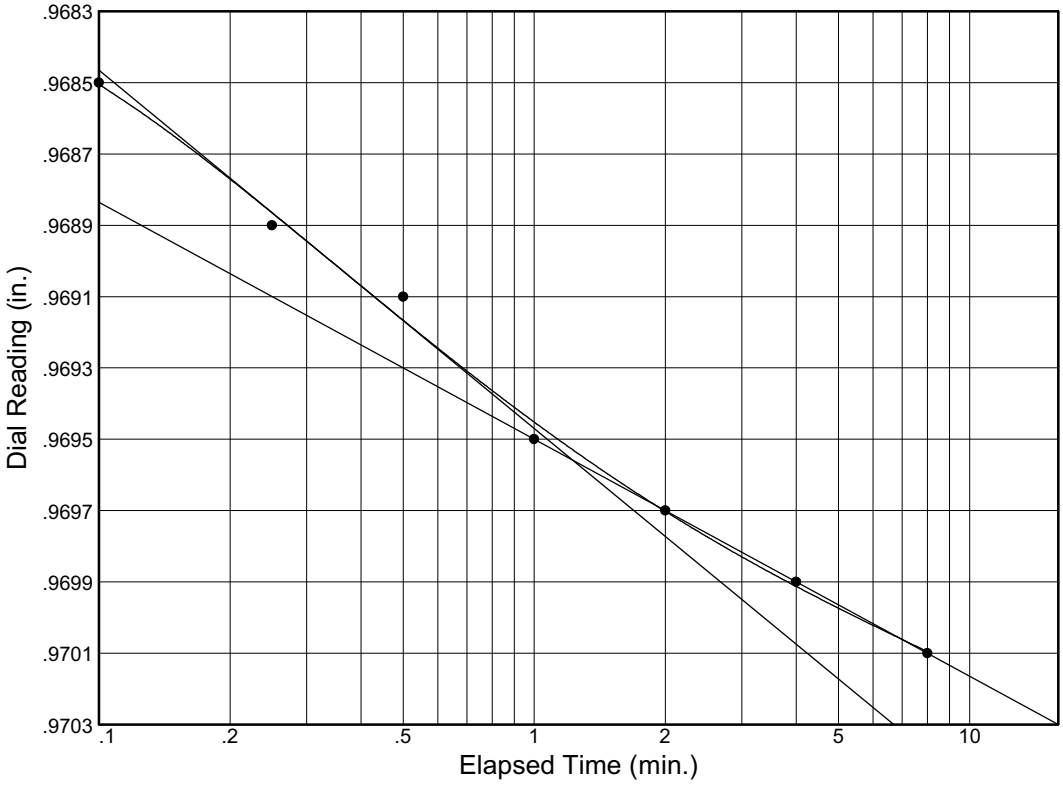
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: KR2-5B - re-entered




Load No.= 6
Load= 1.00 tsf
$D_0$ = 0.96616
$D_{50}$ = 0.96671
$D_{100}$ = 0.96726
$T_{50}$ = 0.14 min.

$C_v$ @ $T_{50}$
3.26 ft.$^2$/day



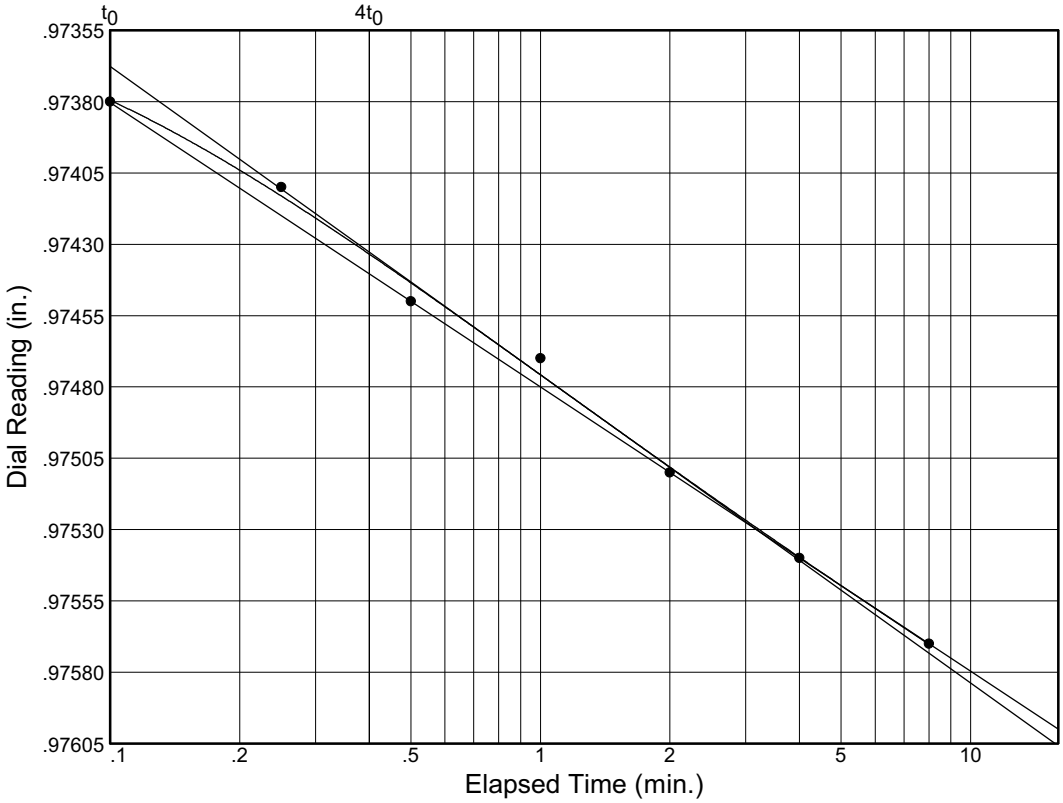

Load No.= 7
Load= 0.50 tsf
$D_0$ = 0.96760
$D_{50}$ = 0.96858
$D_{100}$ = 0.96956
$T_{50}$ = 0.12 min.

$C_v$ @ $T_{50}$
3.74 ft.$^2$/day

Figure

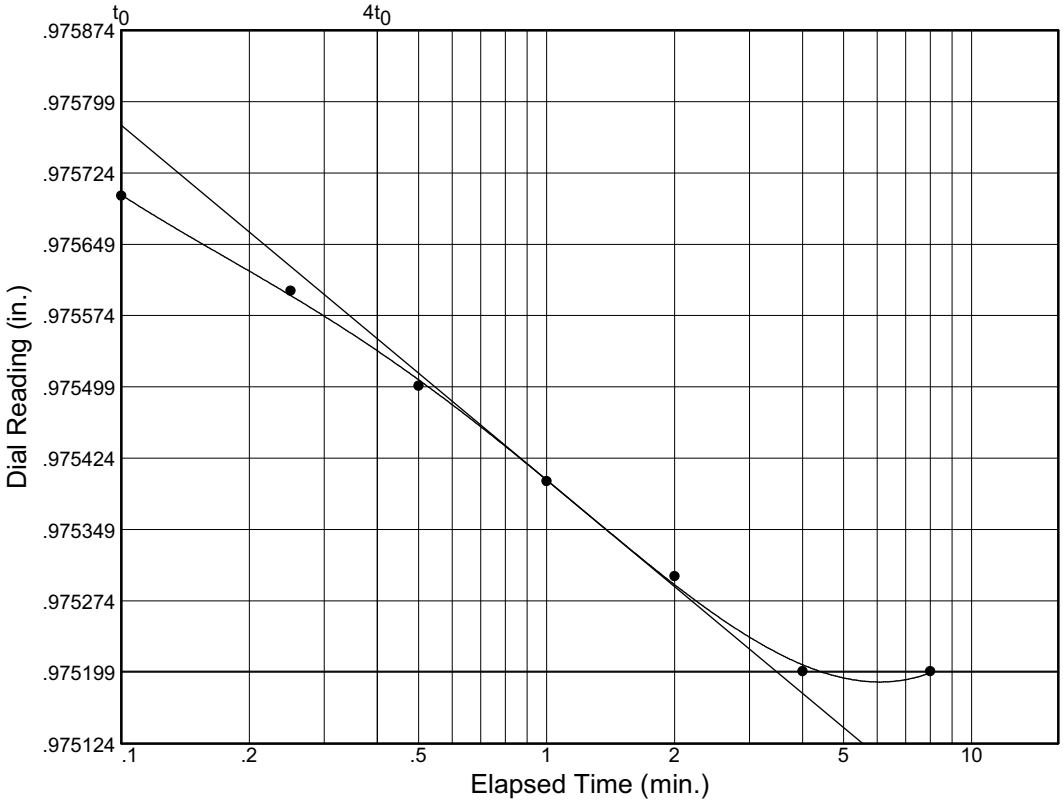
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: KR2-5B - re-entered




Load No.= 9
Load= 0.13 tsf
$D_0$ = 0.97326
$D_{50}$ = 0.97428
$D_{100}$ = 0.97531
$T_{50}$ = 0.36 min.

| $C_v$ @ $T_{50}$ |
|---|
| 1.32 ft.$^2$/day |




Load No.= 10
Load= 0.25 tsf
$D_0$ = 0.97586
$D_{50}$ = 0.97553
$D_{100}$ = 0.97520
$T_{50}$ = 0.41 min.

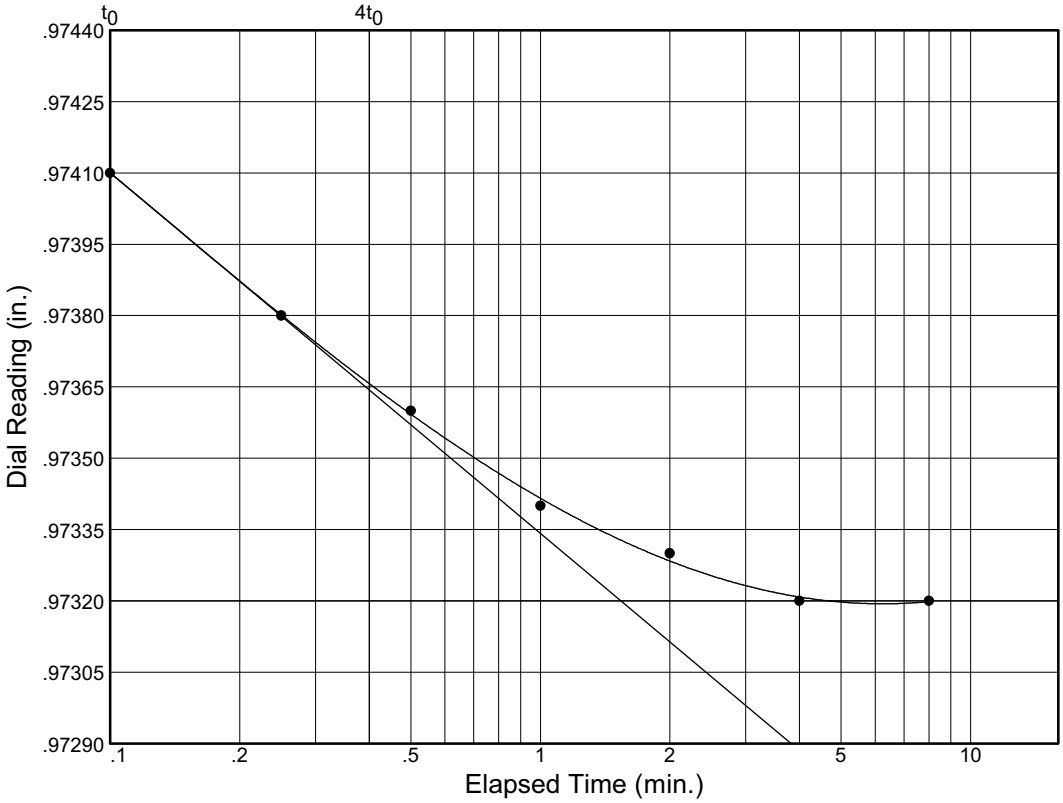
| $C_v$ @ $T_{50}$ |
|---|
| 1.13 ft.$^2$/day |

$C_\alpha$ = 0.000

Figure

# Dial Reading vs. Time

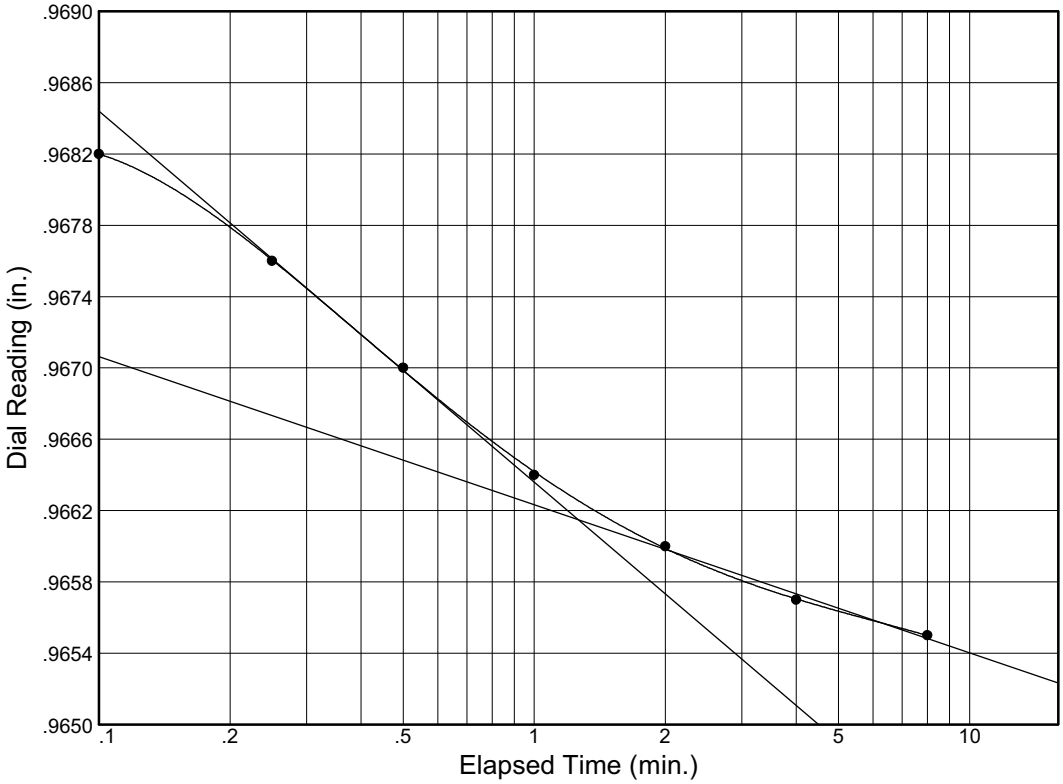
Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: KR2-5B - re-entered




Load No.= 11
Load= 0.50 tsf
$D_0$ = 0.97454
$D_{50}$ = 0.97387
$D_{100}$ = 0.97320
$T_{50}$ = 0.20 min.

$C_v$ @ $T_{50}$
2.33 ft.$^2$/day

$C_\alpha$ = 0.000




Load No.= 13
Load= 2.00 tsf
$D_0$ = 0.97010
$D_{50}$ = 0.96812
$D_{100}$ = 0.96615
$T_{50}$ = 0.12 min.

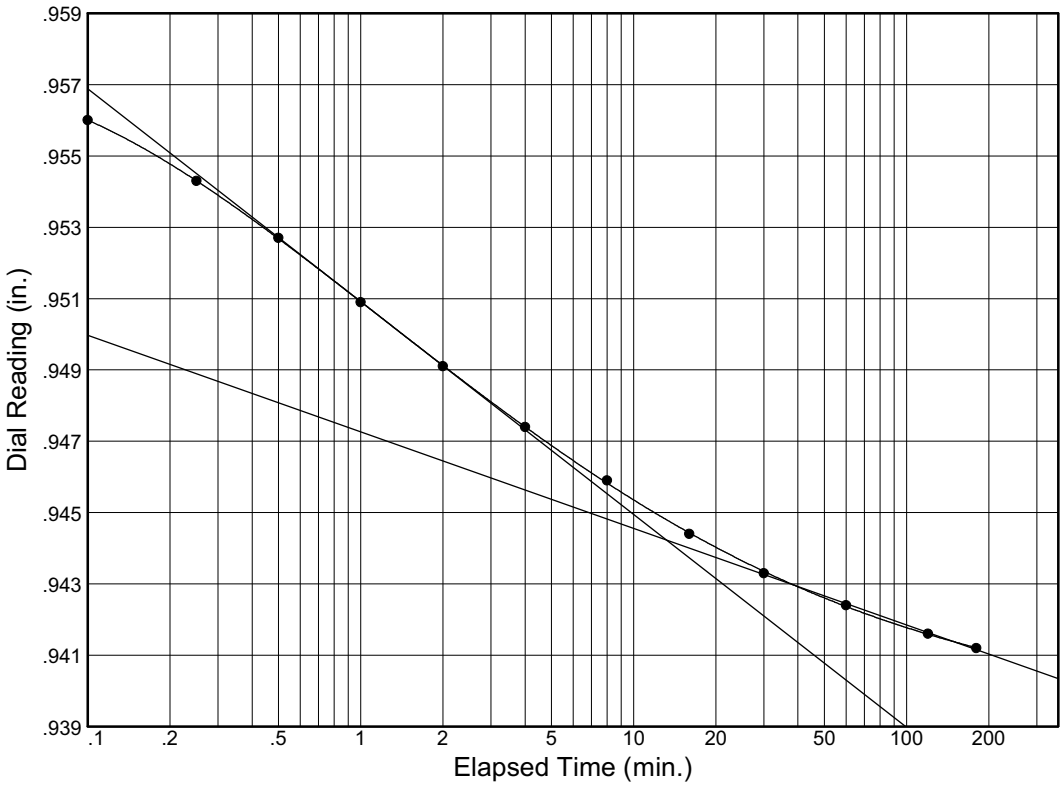
$C_v$ @ $T_{50}$
3.85 ft.$^2$/day

$C_\alpha$ = 0.001

Figure

# Dial Reading vs. Time

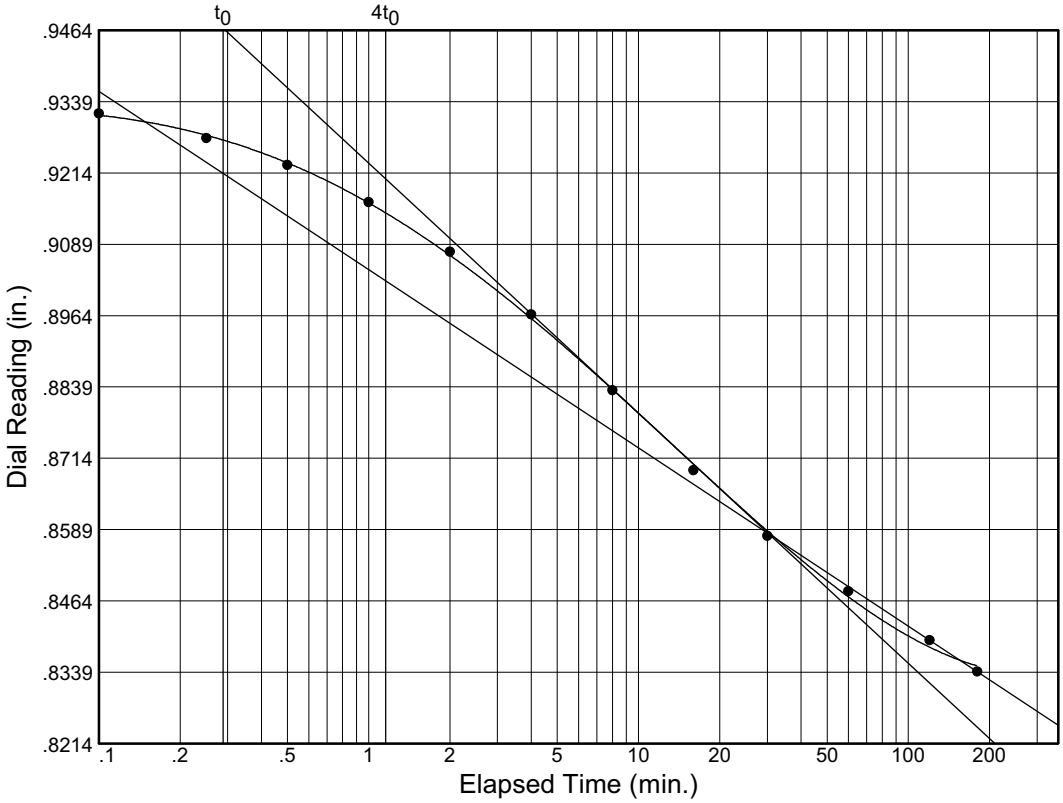
Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: KR2-5B - re-entered




Load No.= 14
Load= 4.00 tsf
$D_0$ = 0.96550
$D_{50}$ = 0.95486
$D_{100}$ = 0.94423
$T_{50}$ = 0.19 min.

$C_v$ @ $T_{50}$
2.34 ft.$^2$/day

$C_\alpha$ = 0.003




Load No.= 15
Load= 8.00 tsf
$D_0$ = 0.93995
$D_{50}$ = 0.89902
$D_{100}$ = 0.85809
$T_{50}$ = 3.33 min.

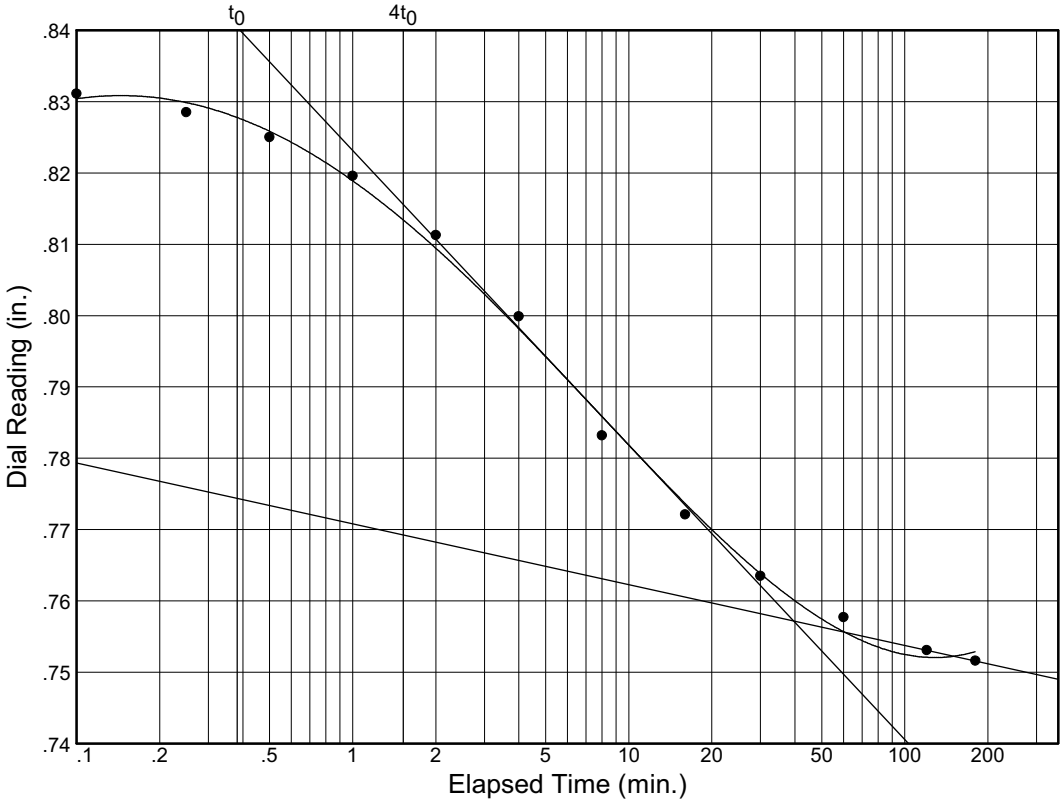
$C_v$ @ $T_{50}$
0.12 ft.$^2$/day

$C_\alpha$ = 0.033

Figure

# Dial Reading vs. Time

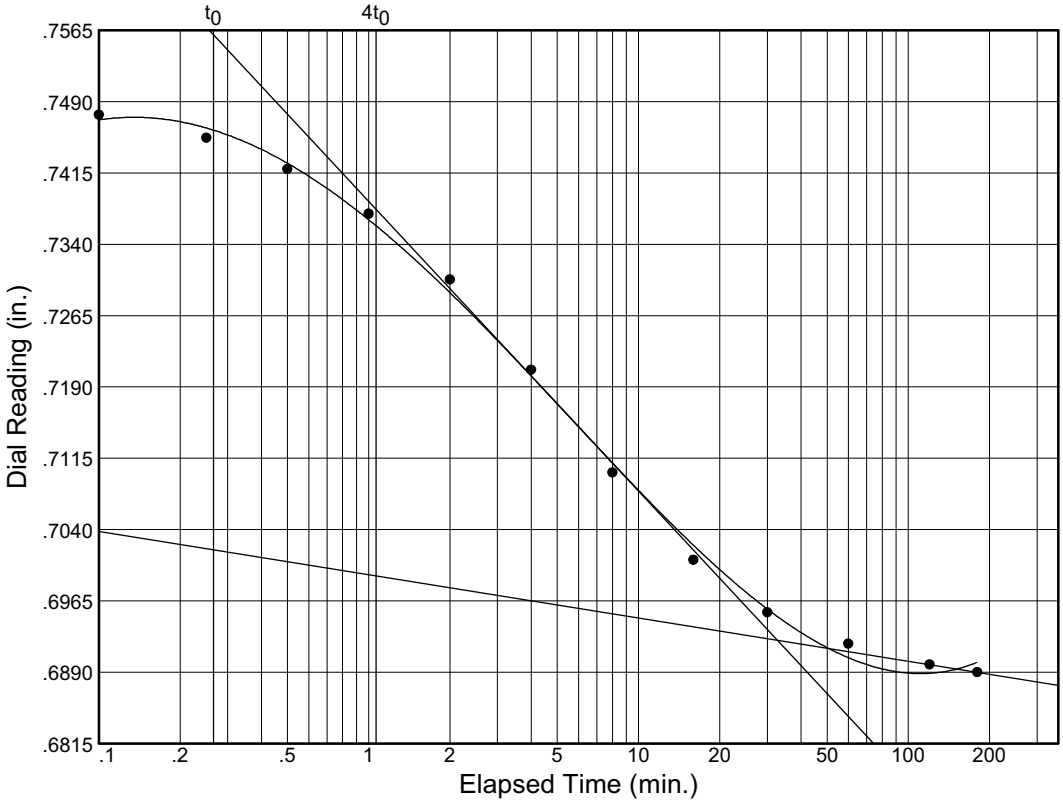
Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: KR2-5B - re-entered




Load No.= 16
Load= 16.00 tsf
$D_0$ = 0.84215
$D_{50}$ = 0.79968
$D_{100}$ = 0.75721
$T_{50}$ = 3.66 min.

$C_v$ @ $T_{50}$
0.08 ft.$^2$/day

$C_\alpha$ = 0.010




Load No.= 17
Load= 32.00 tsf
$D_0$ = 0.75605
$D_{50}$ = 0.72421
$D_{100}$ = 0.69236
$T_{50}$ = 2.92 min.

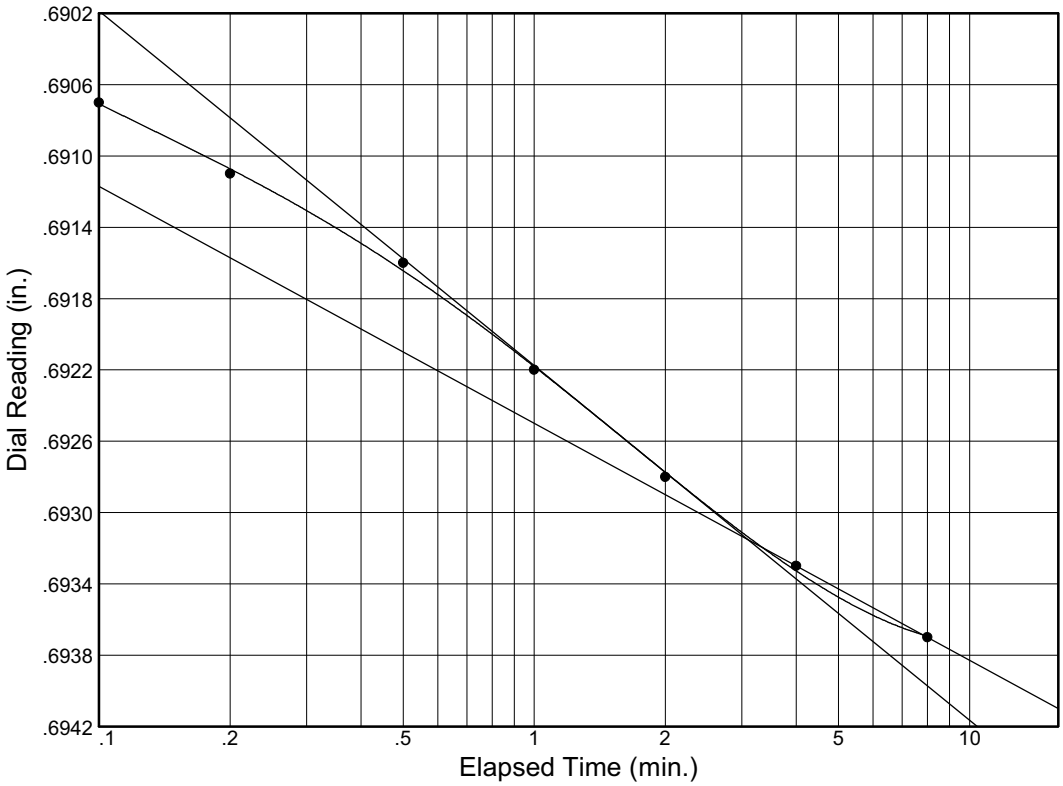
$C_v$ @ $T_{50}$
0.09 ft.$^2$/day

$C_\alpha$ = 0.006

Figure

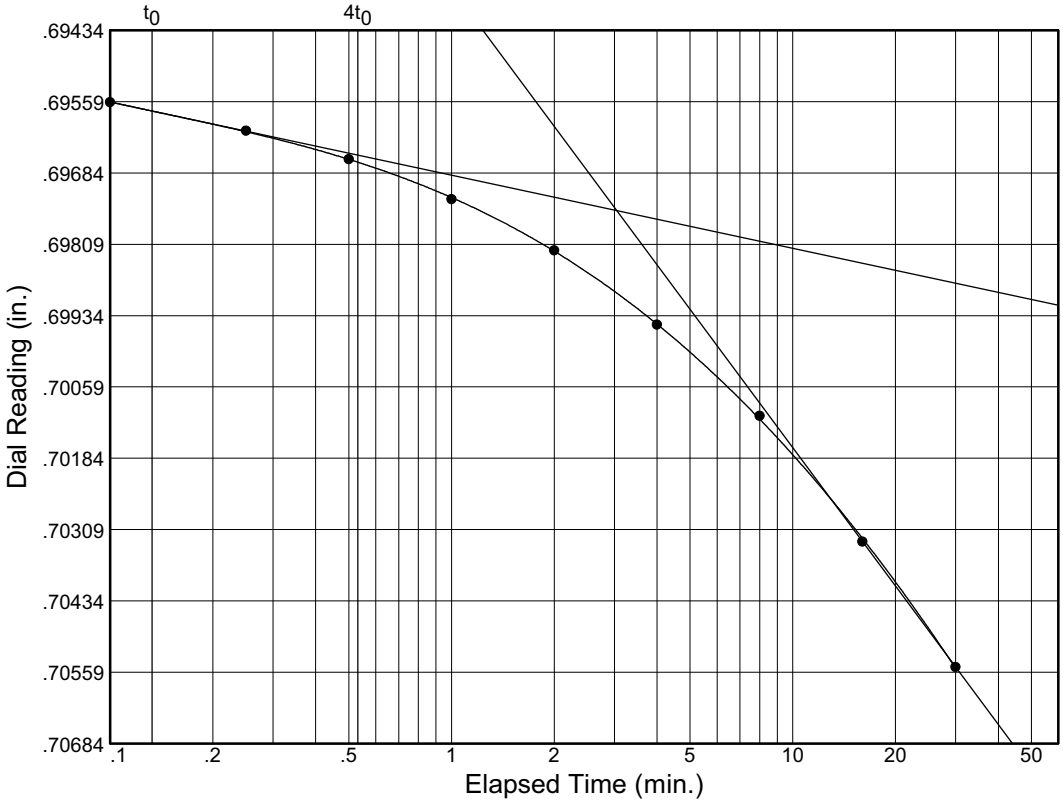
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: KR2-5B - re-entered




Load No.= 18
Load= 8.00 tsf
$D_0$ = 0.68900
$D_{50}$ = 0.69108
$D_{100}$ = 0.69315
$T_{50}$ = 0.20 min.

$C_v$ @ $T_{50}$
1.17 ft.$^2$/day



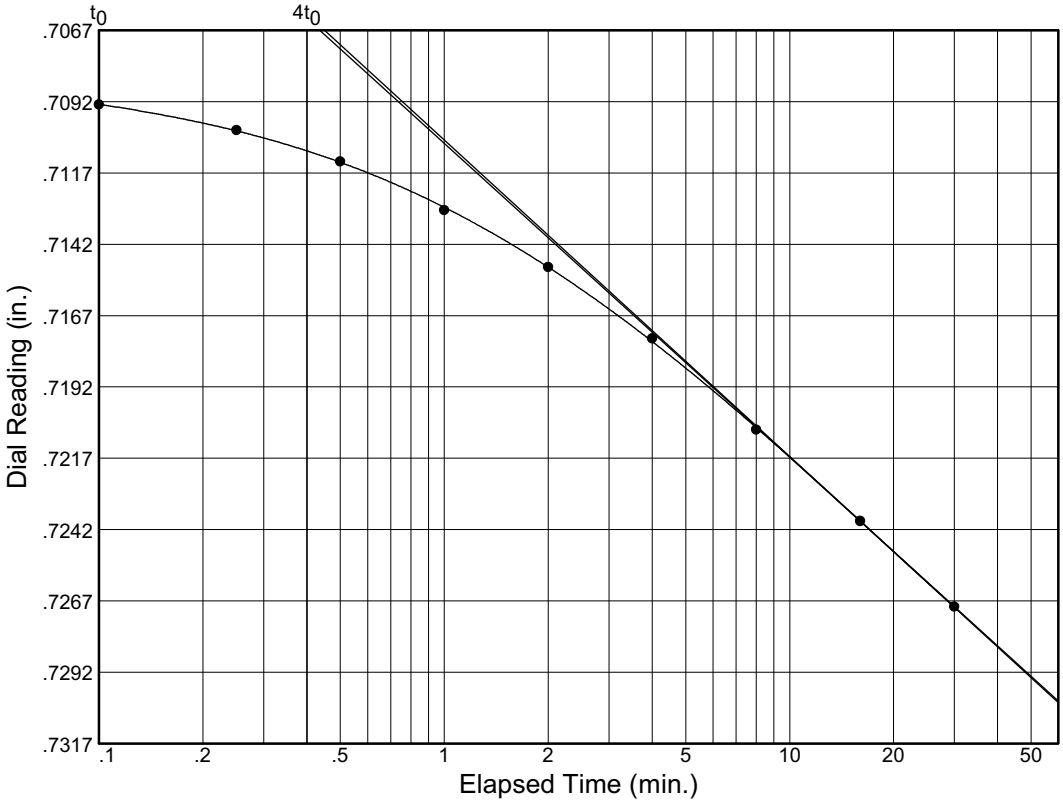

Load No.= 19
Load= 4.00 tsf
$D_0$ = 0.69486
$D_{50}$ = 0.69618
$D_{100}$ = 0.69750
$T_{50}$ = 0.28 min.

$C_v$ @ $T_{50}$
0.87 ft.$^2$/day

Figure

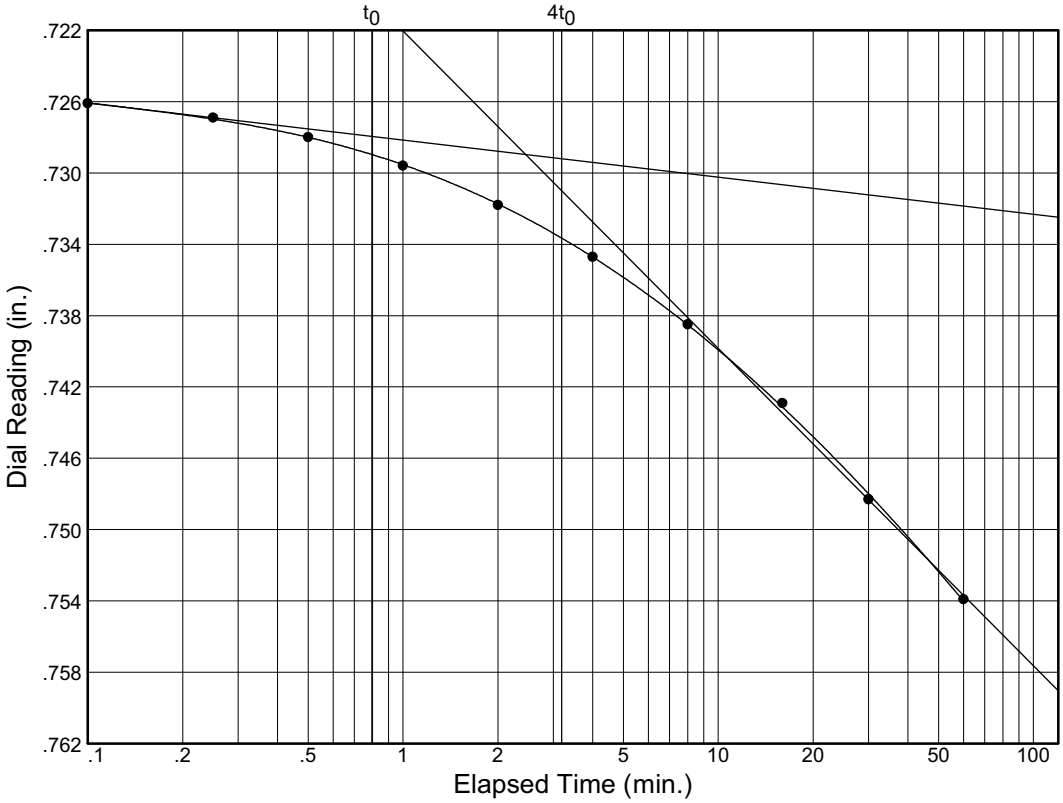
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: KR2-5B - re-entered




Load No.= 20
Load= 1.00 tsf
$D_0$ = 0.70766
$D_{50}$ = 0.71581
$D_{100}$ = 0.72396
$T_{50}$ = 2.51 min.

$C_v$ @ $T_{50}$
0.10 ft.$^2$/day



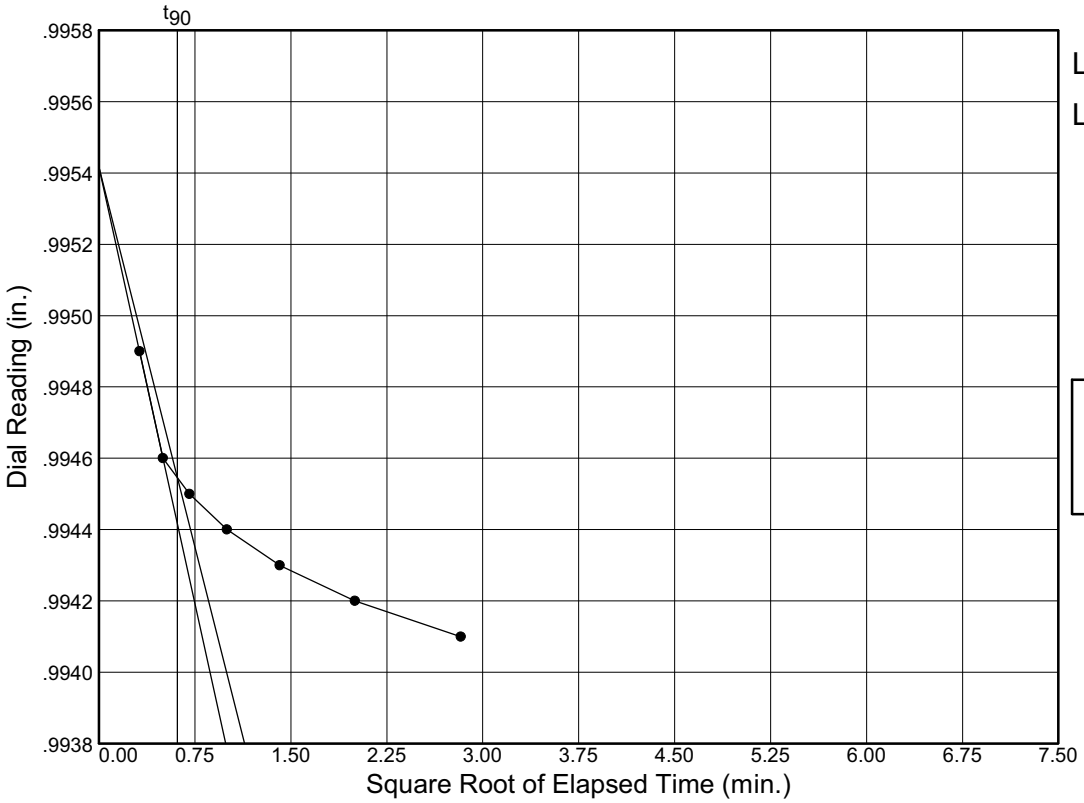

Load No.= 21
Load= 0.13 tsf
$D_0$ = 0.72428
$D_{50}$ = 0.72662
$D_{100}$ = 0.72896
$T_{50}$ = 0.18 min.

$C_v$ @ $T_{50}$
1.50 ft.$^2$/day

Figure

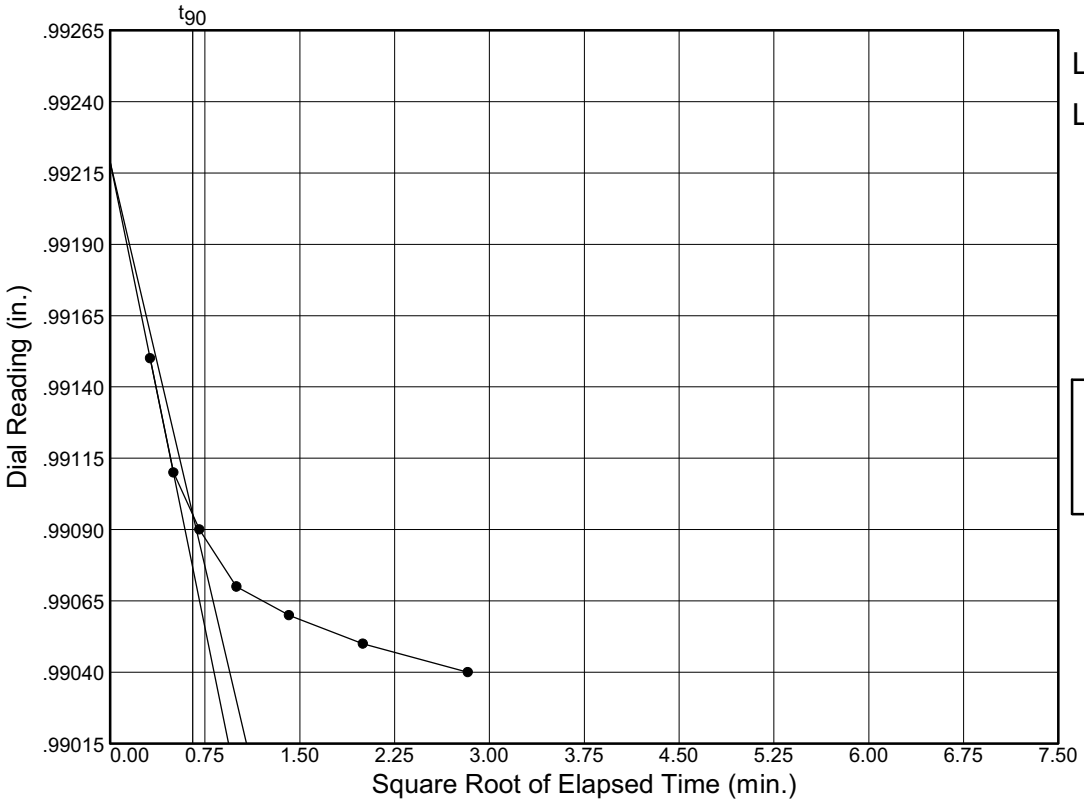
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: KR2-5B - re-entered




Load No.= 1
Load= 0.13 tsf
$D_0$ = 0.99542
$D_{90}$ = 0.99455
$D_{100}$ = 0.99445
$T_{90}$ = 0.38 min.

$C_v$ @ $T_{90}$
5.60 ft.$^2$/day



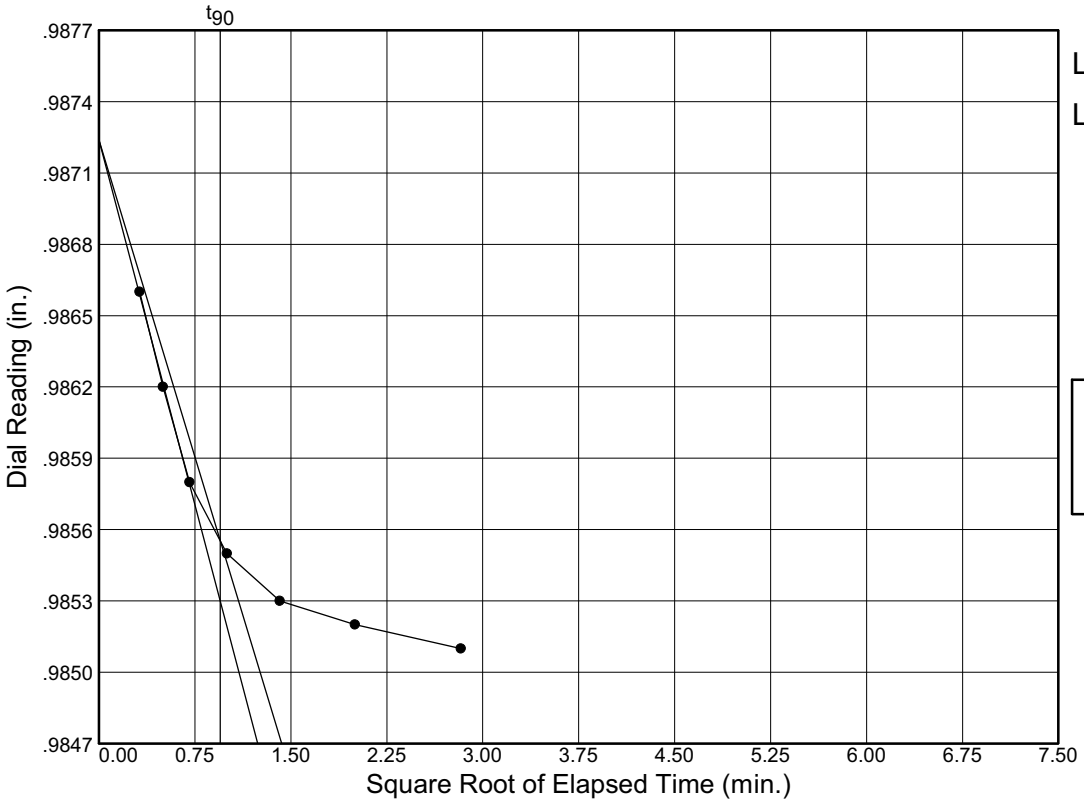

Load No.= 2
Load= 0.25 tsf
$D_0$ = 0.99219
$D_{90}$ = 0.99095
$D_{100}$ = 0.99081
$T_{90}$ = 0.43 min.

$C_v$ @ $T_{90}$
4.89 ft.$^2$/day

Figure

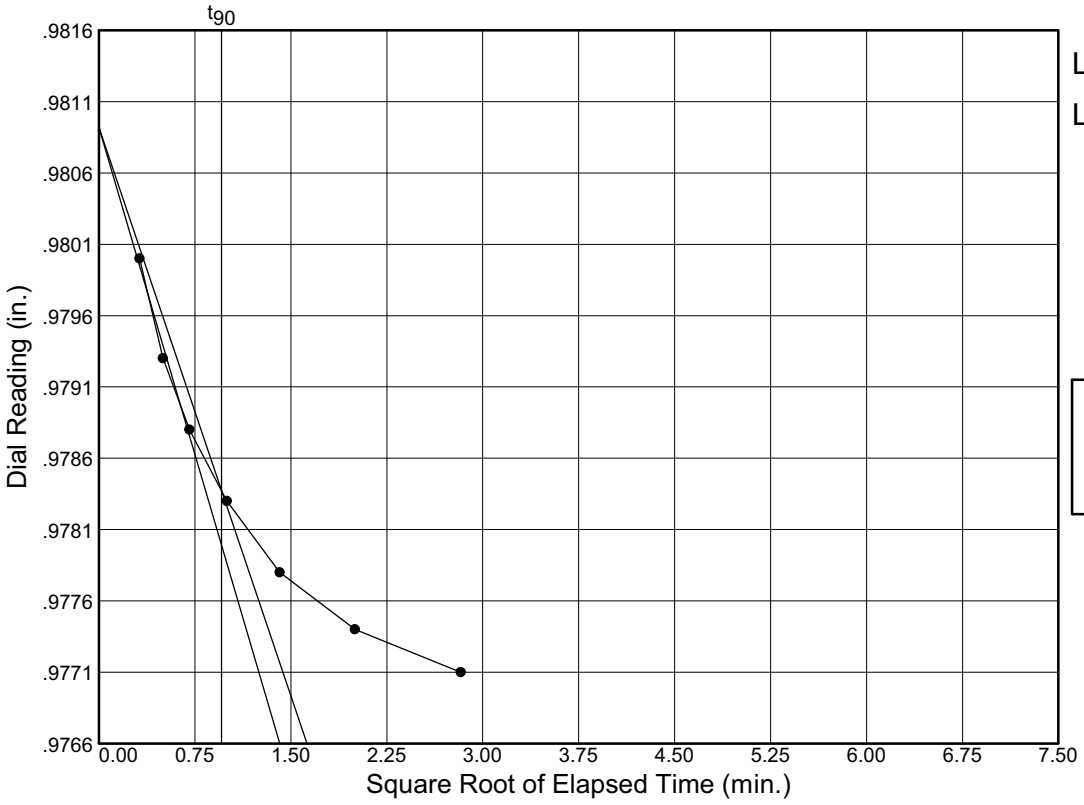
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: KR2-5B - re-entered




Load No.= 3
Load= 0.50 tsf
$D_0$ = 0.98724
$D_{90}$ = 0.98555
$D_{100}$ = 0.98537
$T_{90}$ = 0.90 min.

$C_v$ @ $T_{90}$
2.30 ft.$^2$/day



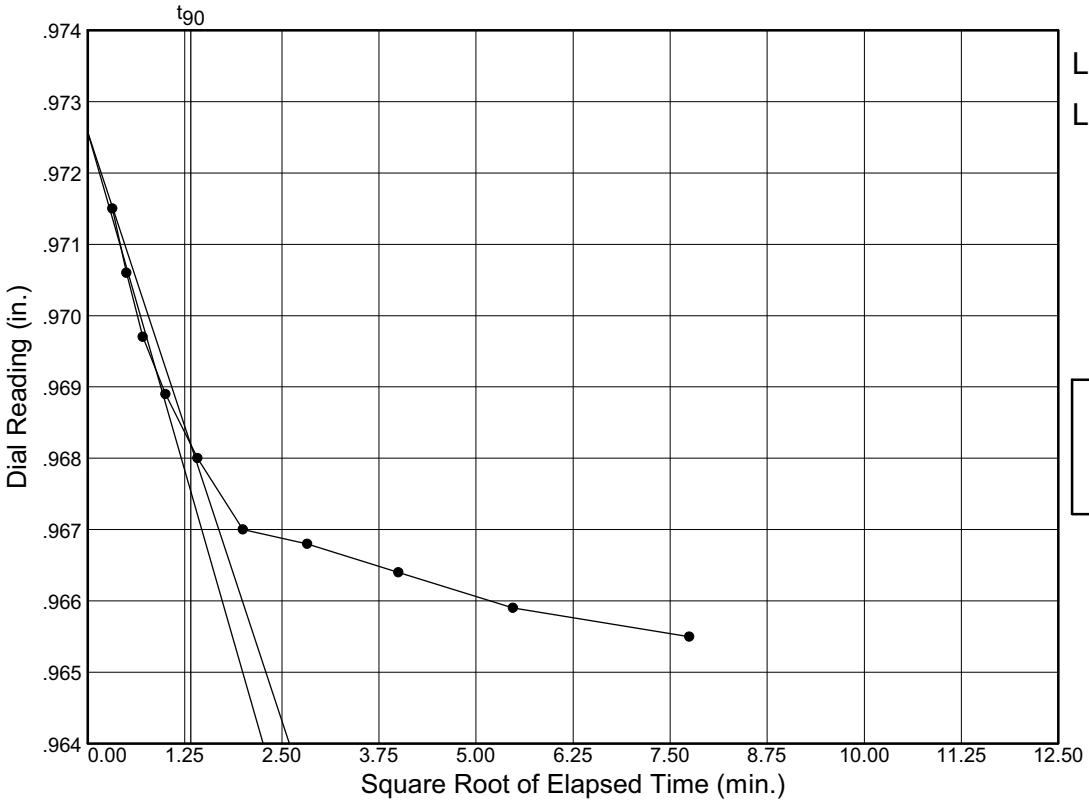

Load No.= 4
Load= 1.00 tsf
$D_0$ = 0.98092
$D_{90}$ = 0.97837
$D_{100}$ = 0.97809
$T_{90}$ = 0.92 min.

$C_v$ @ $T_{90}$
2.22 ft.$^2$/day

Figure

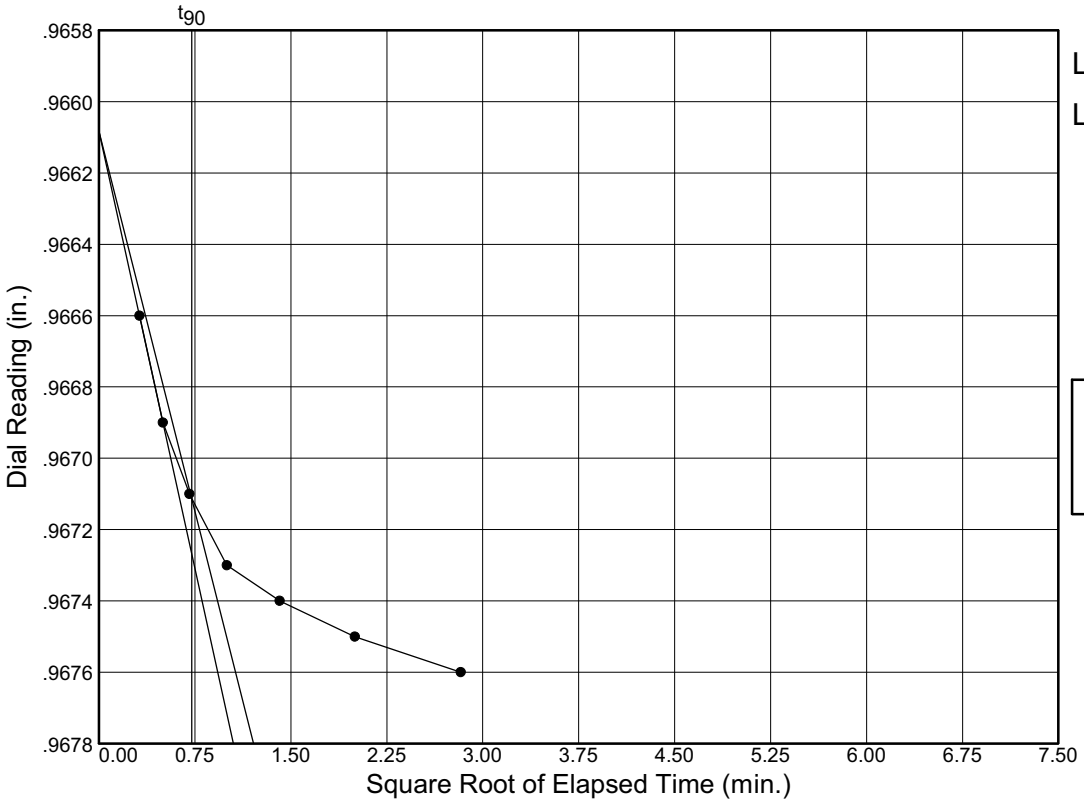
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: KR2-5B - re-entered




Load No.= 5
Load= 2.00 tsf
$D_0$ = 0.97257
$D_{90}$ = 0.96819
$D_{100}$ = 0.96770
$T_{90}$ = 1.76 min.

$C_v$ @ $T_{90}$
1.13 ft.$^2$/day



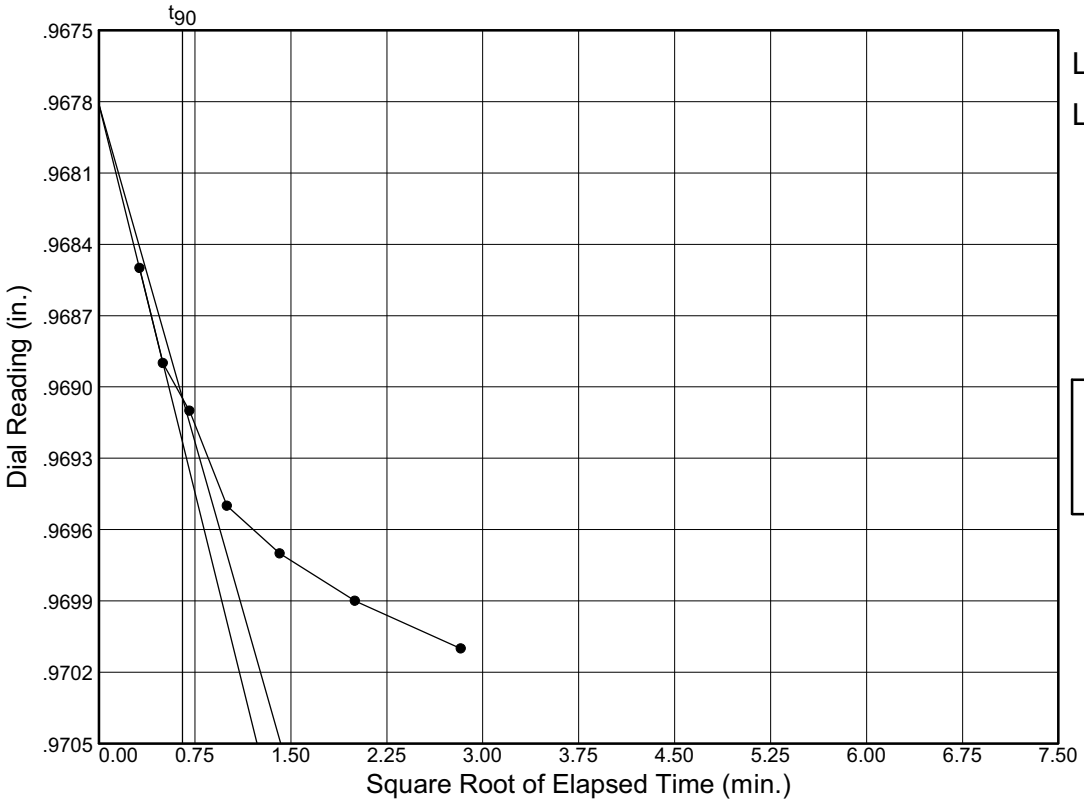

Load No.= 6
Load= 1.00 tsf
$D_0$ = 0.96608
$D_{90}$ = 0.96711
$D_{100}$ = 0.96723
$T_{90}$ = 0.52 min.

$C_v$ @ $T_{90}$
3.78 ft.$^2$/day

Figure

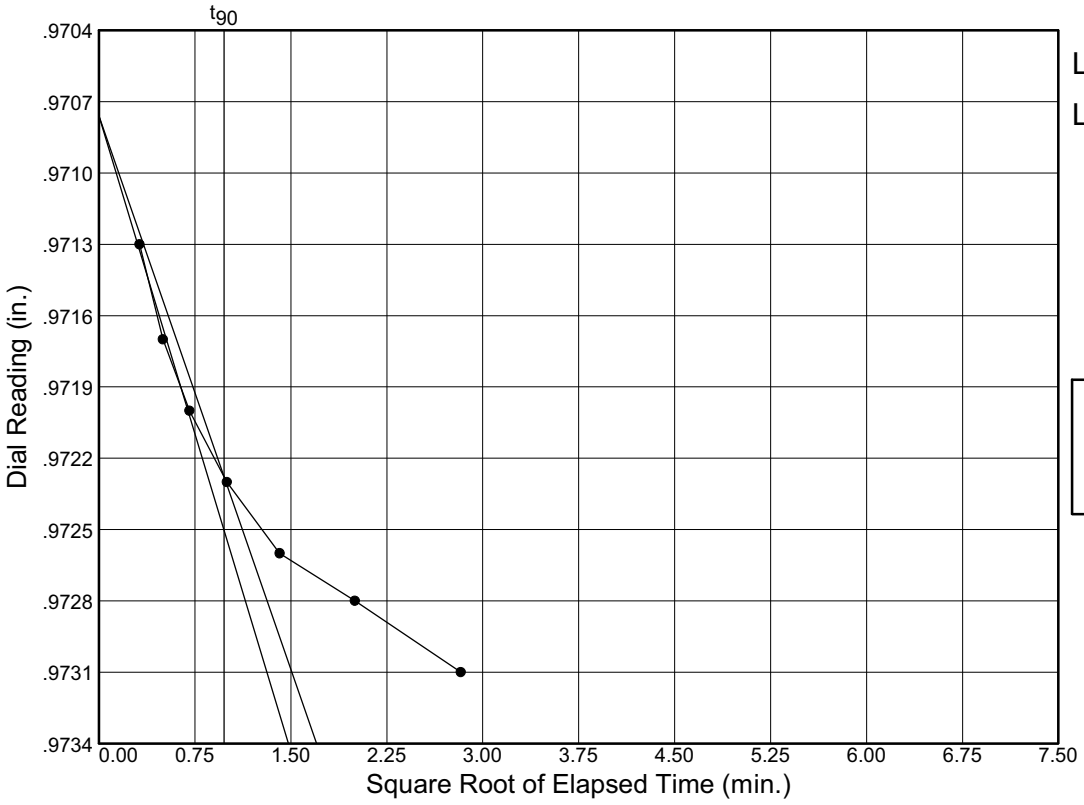
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: KR2-5B - re-entered




Load No.= 7
Load= 0.50 tsf
$D_0$ = 0.96781
$D_{90}$ = 0.96905
$D_{100}$ = 0.96919
$T_{90}$ = 0.43 min.

$C_v$ @ $T_{90}$
4.67 ft.$^2$/day



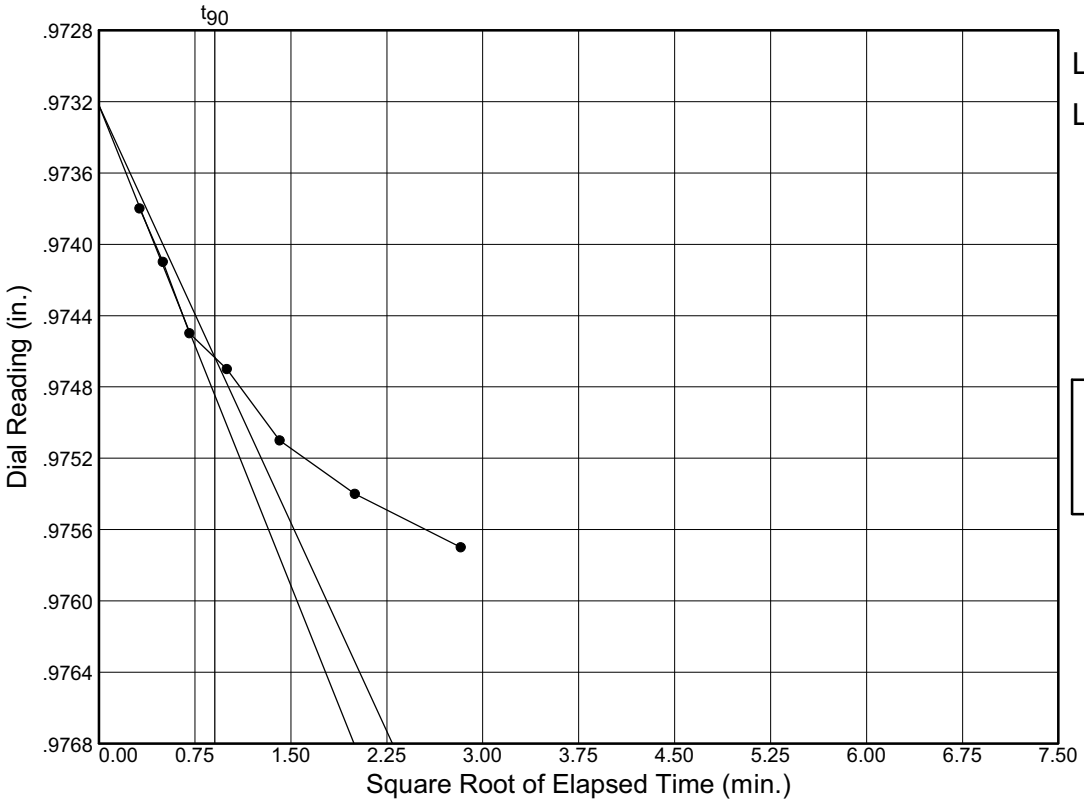

Load No.= 8
Load= 0.25 tsf
$D_0$ = 0.97076
$D_{90}$ = 0.97228
$D_{100}$ = 0.97245
$T_{90}$ = 0.96 min.

$C_v$ @ $T_{90}$
2.10 ft.$^2$/day

Figure

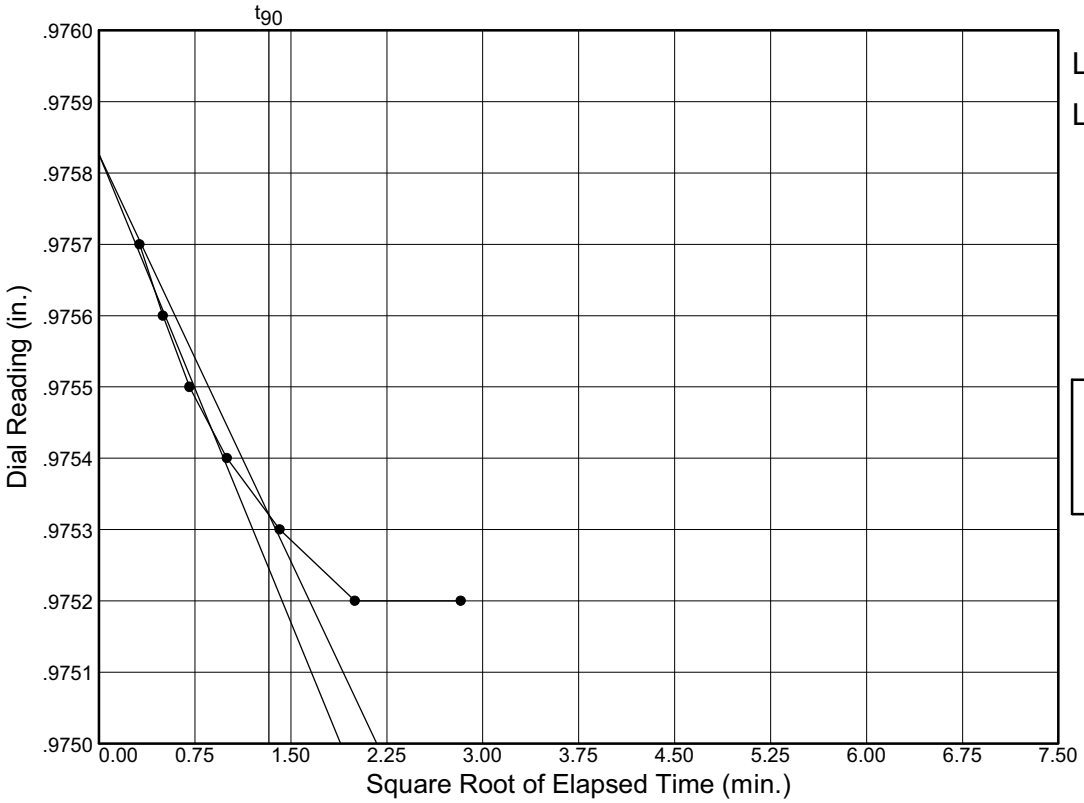
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: KR2-5B - re-entered




Load No.= 9
Load= 0.13 tsf
$D_0$ = 0.97322
$D_{90}$ = 0.97464
$D_{100}$ = 0.97479
$T_{90}$ = 0.82 min.

$C_v$ @ $T_{90}$
2.45 ft.$^2$/day



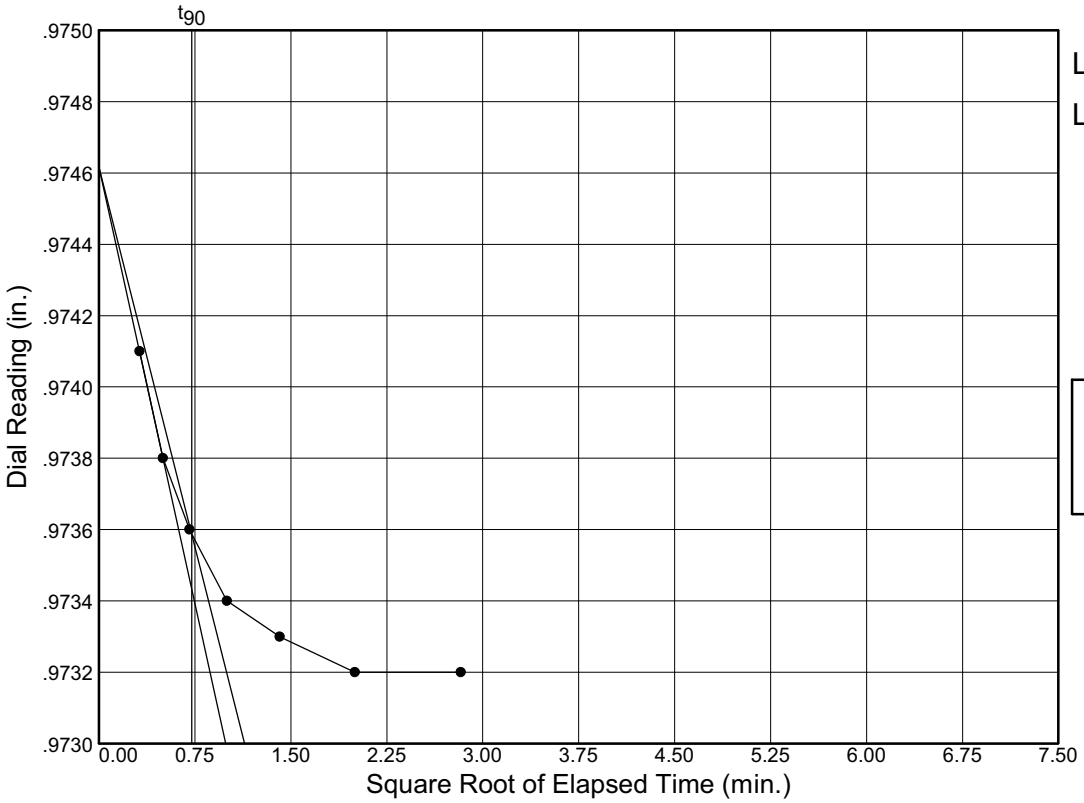

Load No.= 10
Load= 0.25 tsf
$D_0$ = 0.97583
$D_{90}$ = 0.97532
$D_{100}$ = 0.97526
$T_{90}$ = 1.76 min.

$C_v$ @ $T_{90}$
1.14 ft.$^2$/day

Figure

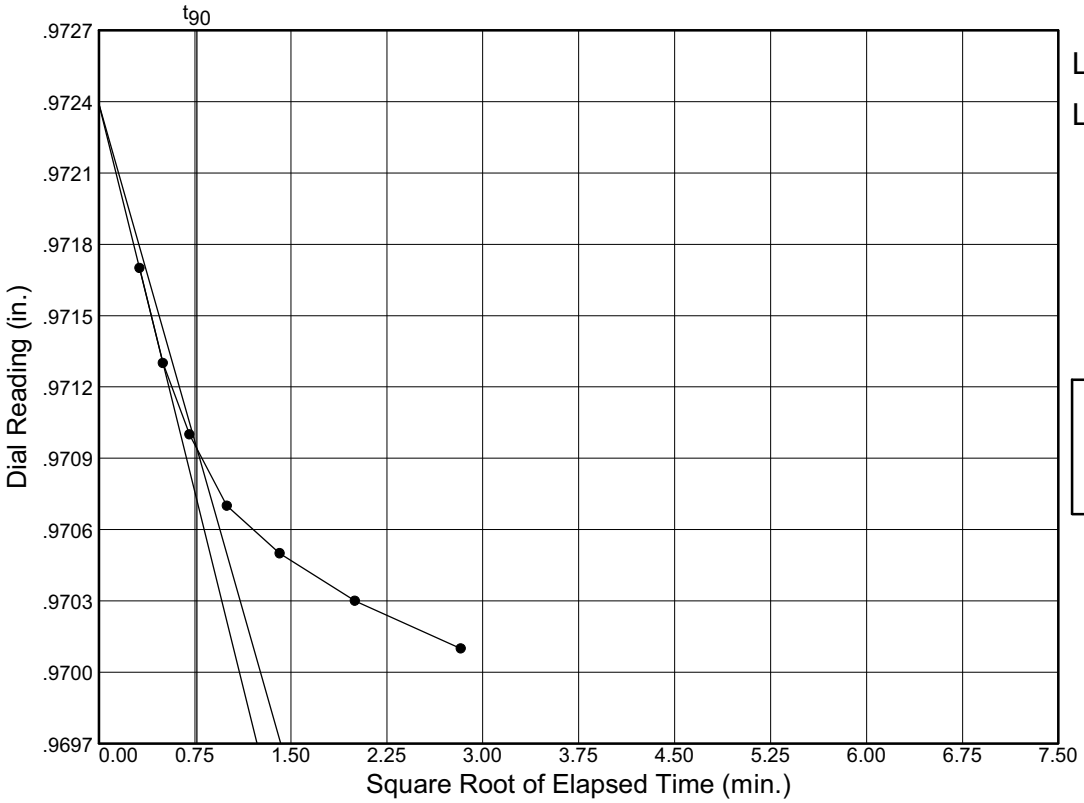
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: KR2-5B - re-entered




Load No.= 11
Load= 0.50 tsf
$D_0$ = 0.97462
$D_{90}$ = 0.97359
$D_{100}$ = 0.97347
$T_{90}$ = 0.52 min.

$C_v$ @ $T_{90}$
3.84 ft.$^2$/day



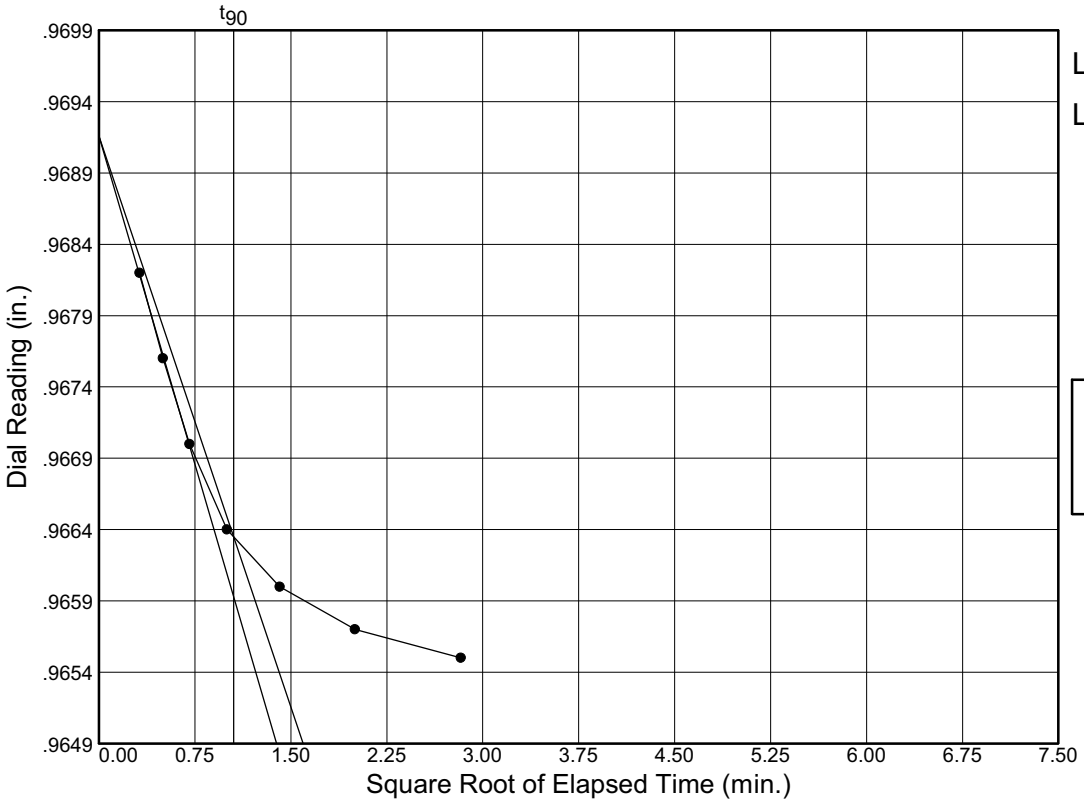

Load No.= 12
Load= 1.00 tsf
$D_0$ = 0.97239
$D_{90}$ = 0.97094
$D_{100}$ = 0.97078
$T_{90}$ = 0.58 min.

$C_v$ @ $T_{90}$
3.42 ft.$^2$/day

Figure

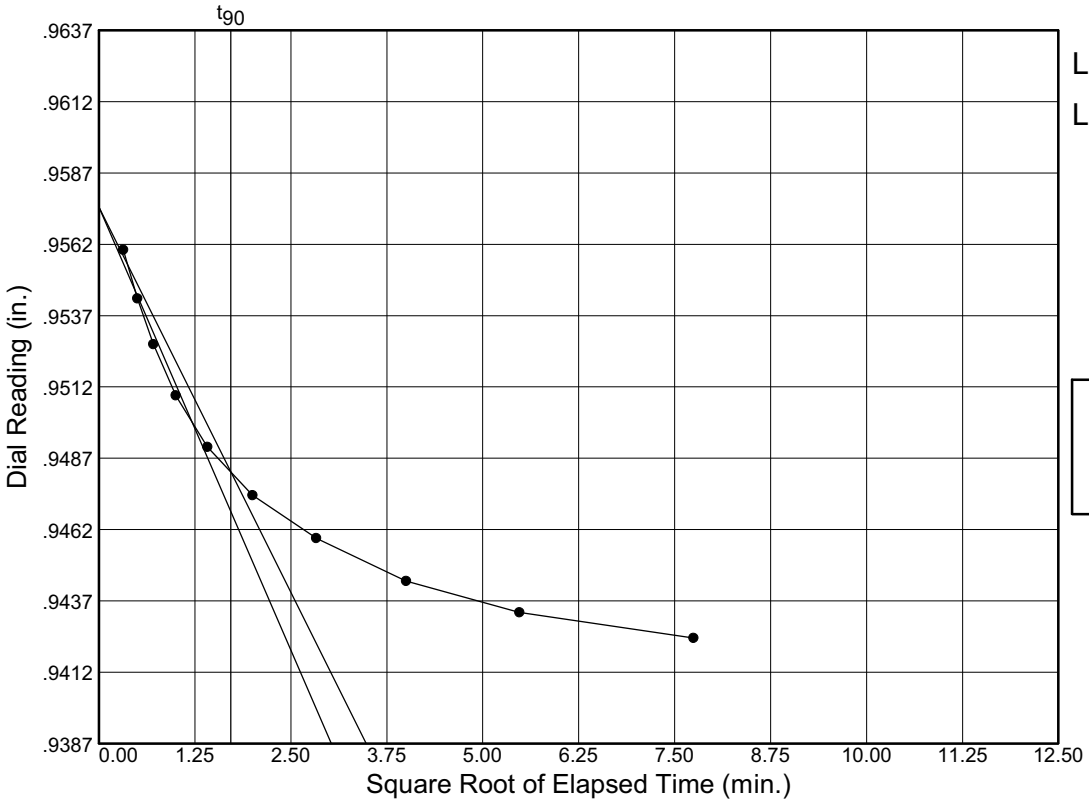
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: KR2-5B - re-entered




Load No.= 13
Load= 2.00 tsf
$D_0$ = 0.96916
$D_{90}$ = 0.96635
$D_{100}$ = 0.96604
$T_{90}$ = 1.11 min.

$C_v$ @ $T_{90}$
1.79 ft.$^2$/day



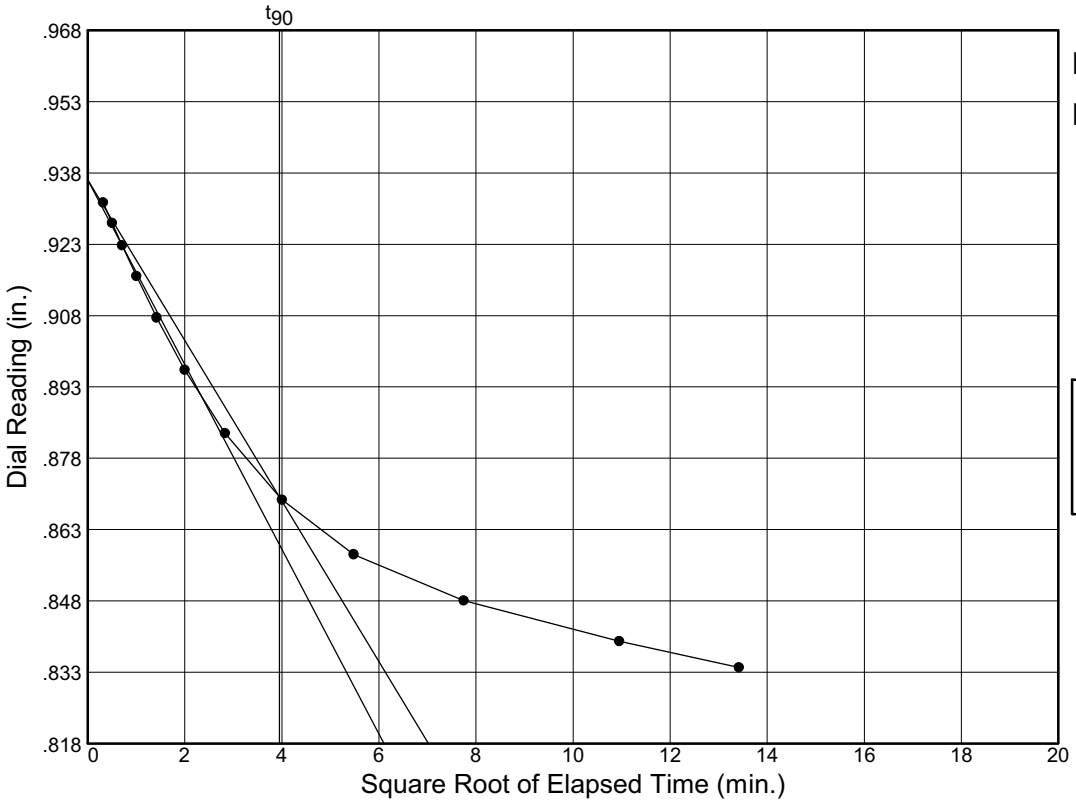

Load No.= 14
Load= 4.00 tsf
$D_0$ = 0.95749
$D_{90}$ = 0.94823
$D_{100}$ = 0.94720
$T_{90}$ = 2.94 min.

$C_v$ @ $T_{90}$
0.65 ft.$^2$/day

Figure

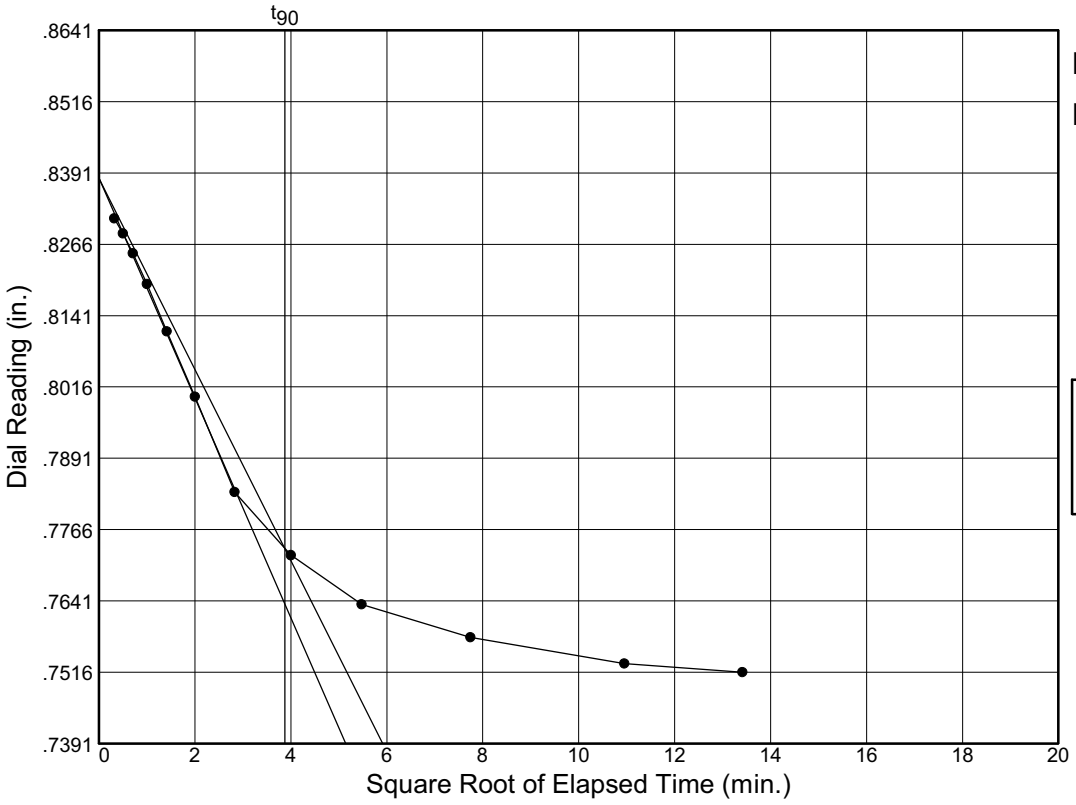
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: KR2-5B - re-entered




Load No.= 15
Load= 8.00 tsf
$D_0$ = 0.93659
$D_{90}$ = 0.86993
$D_{100}$ = 0.86252
$T_{90}$ = 15.58 min.

$C_v$ @ $T_{90}$
0.11 ft.$^2$/day



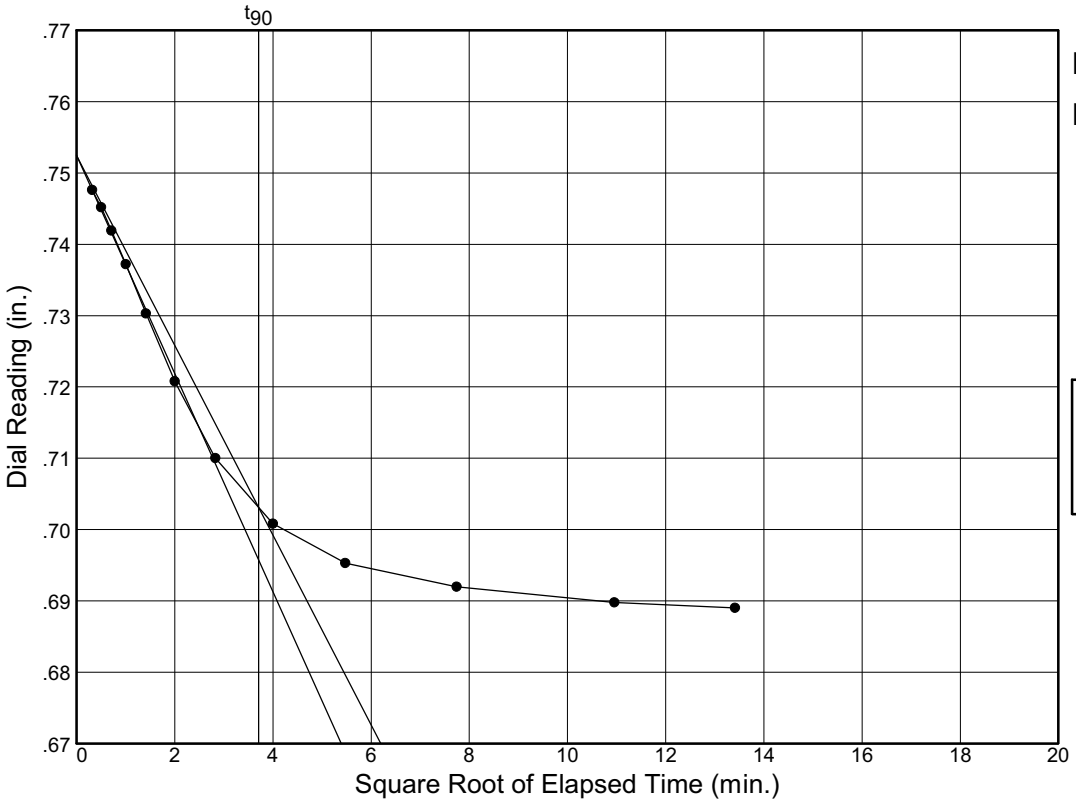

Load No.= 16
Load= 16.00 tsf
$D_0$ = 0.83821
$D_{90}$ = 0.77326
$D_{100}$ = 0.76604
$T_{90}$ = 15.04 min.

$C_v$ @ $T_{90}$
0.09 ft.$^2$/day

Figure

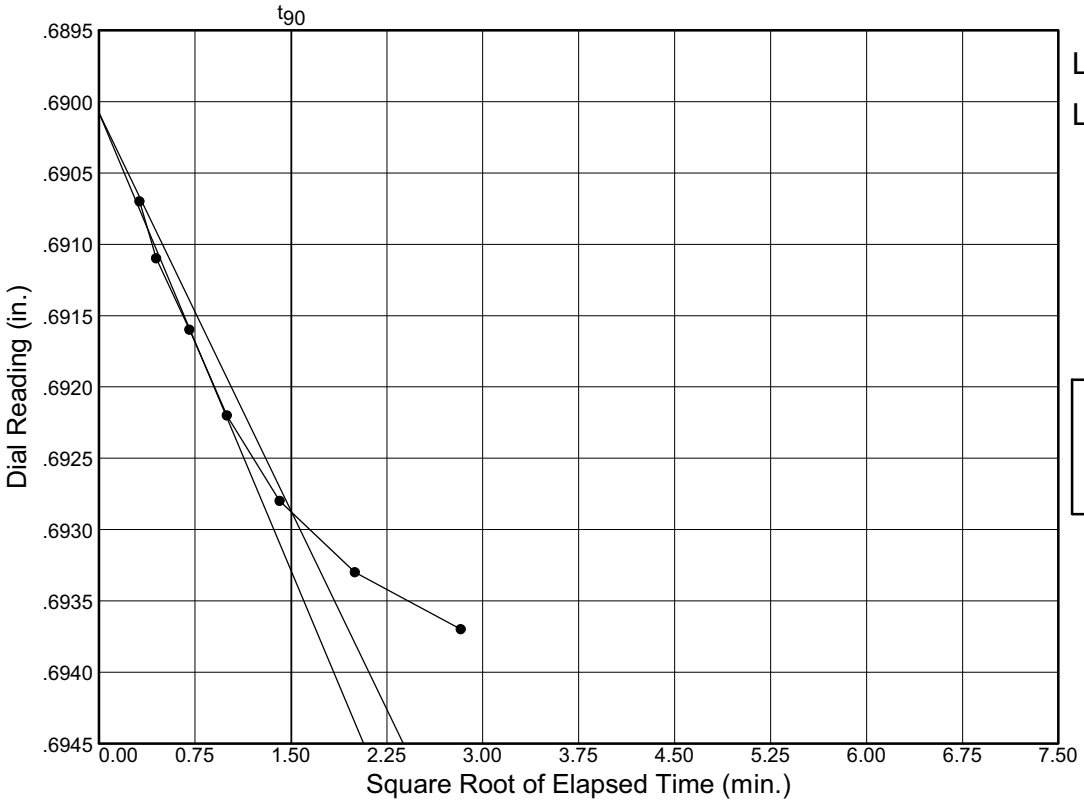
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: KR2-5B - re-entered




Load No.= 17
Load= 32.00 tsf
$D_0$ = 0.75245
$D_{90}$ = 0.70307
$D_{100}$ = 0.69759
$T_{90}$ = 13.77 min.

$C_v$ @ $T_{90}$
0.08 ft.$^2$/day



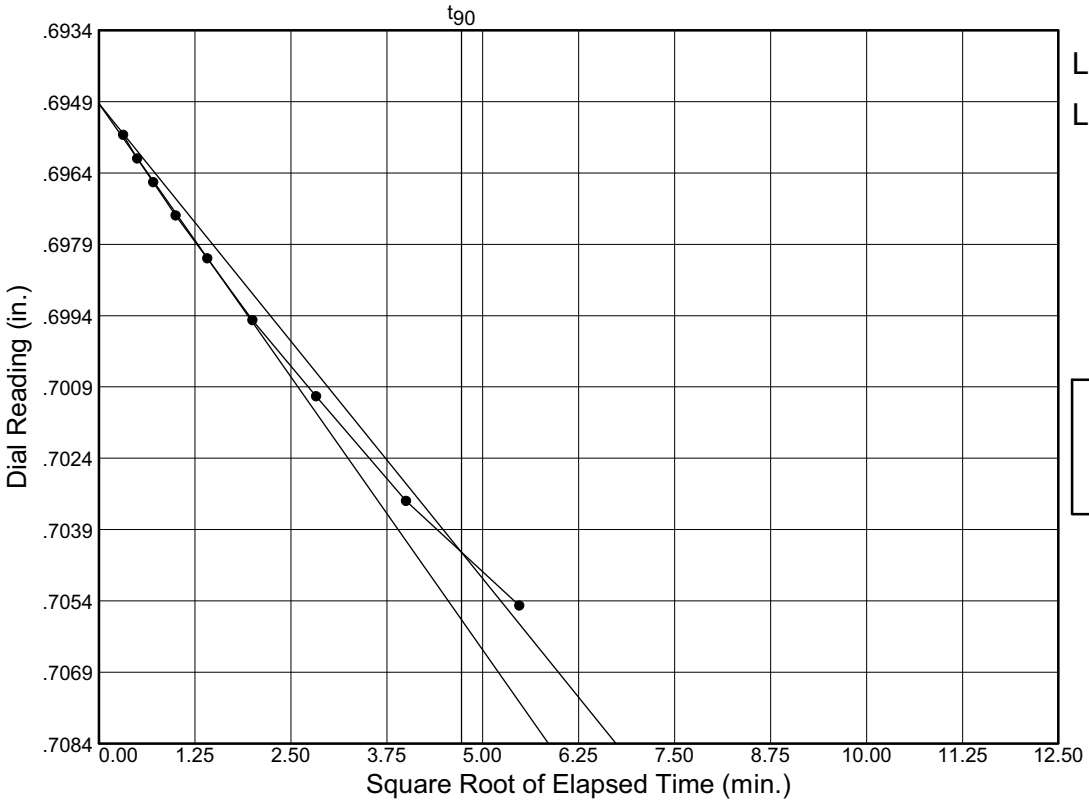

Load No.= 18
Load= 8.00 tsf
$D_0$ = 0.69008
$D_{90}$ = 0.69288
$D_{100}$ = 0.69319
$T_{90}$ = 2.27 min.

$C_v$ @ $T_{90}$
0.45 ft.$^2$/day

Figure

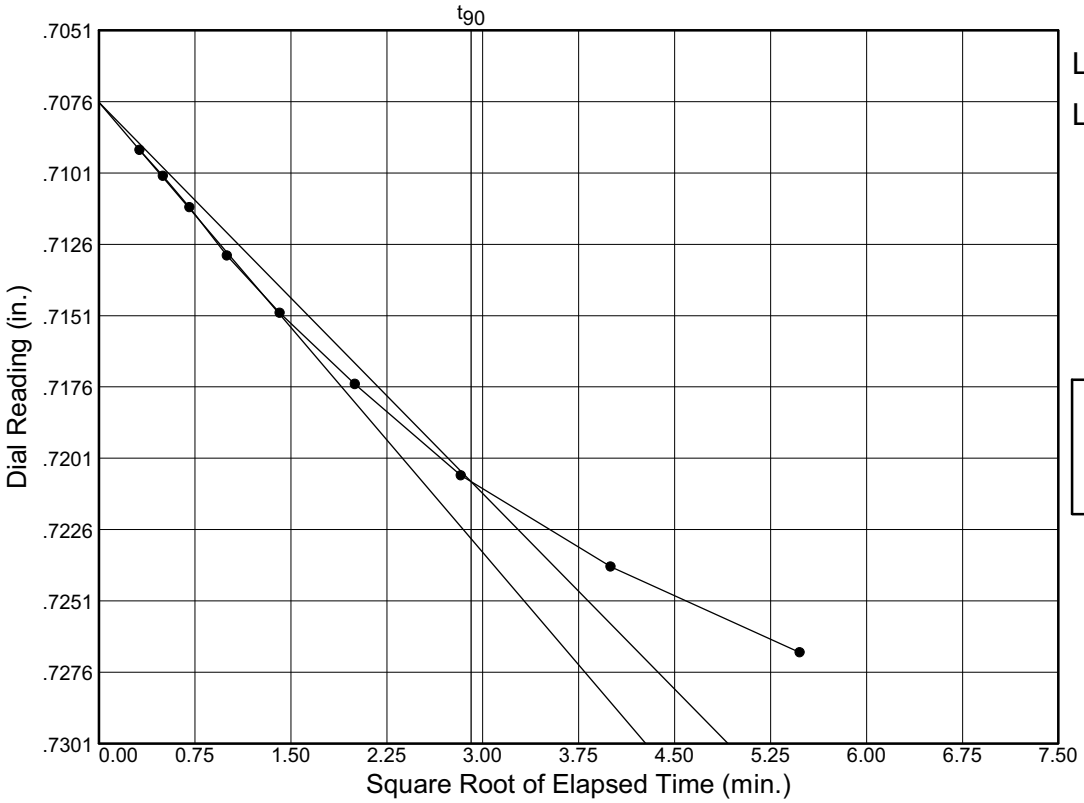
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: KR2-5B - re-entered




Load No.= 19
Load= 4.00 tsf
$D_0$ = 0.69494
$D_{90}$ = 0.70437
$D_{100}$ = 0.70542
$T_{90}$ = 22.29 min.

$C_v$ @ $T_{90}$
0.05 ft.$^2$/day



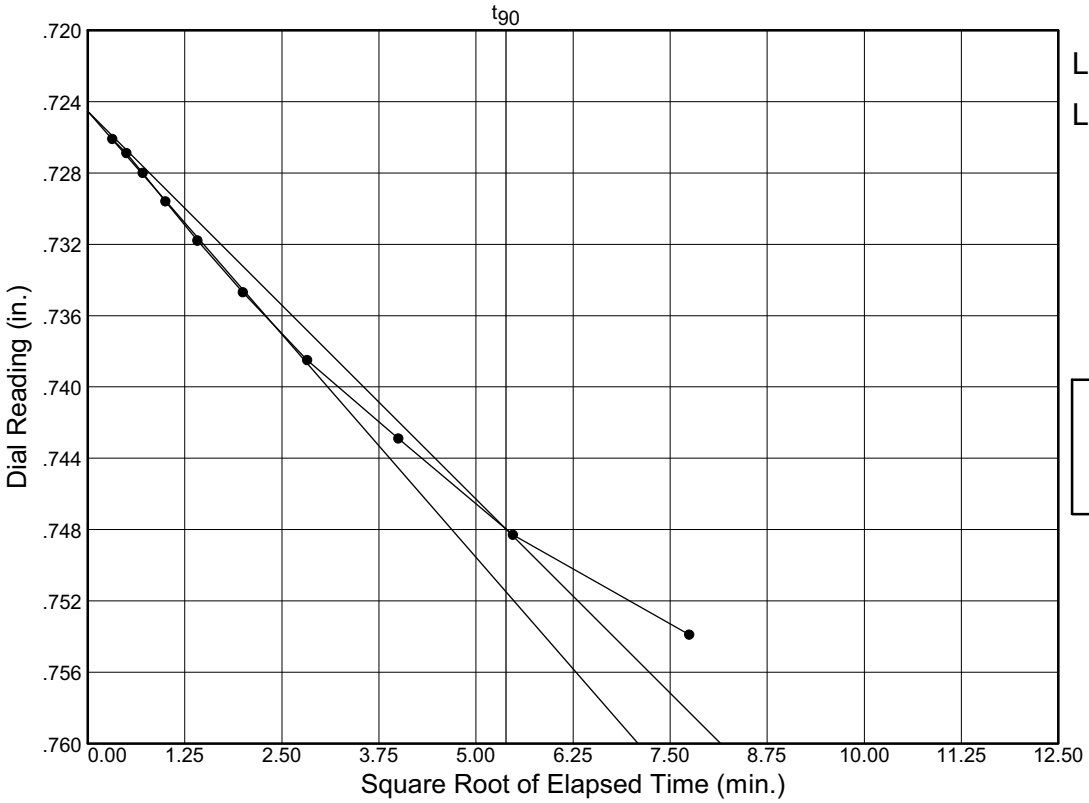

Load No.= 20
Load= 1.00 tsf
$D_0$ = 0.70762
$D_{90}$ = 0.72092
$D_{100}$ = 0.72240
$T_{90}$ = 8.46 min.

$C_v$ @ $T_{90}$
0.13 ft.$^2$/day

Figure

# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: KR2-5B - re-entered




Load No.= 21

Load= 0.13 tsf

$D_0$ = 0.72453

$D_{90}$ = 0.74797

$D_{100}$ = 0.75057

$T_{90}$ = 29.02 min.

| $C_v$ @ $T_{90}$ |
|---|
| 0.04 ft.$^2$/day |

Figure

## CONSOLIDATION TEST DATA

**Client:** HDR, Inc.
**Project:** VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
**Project Number:** VB10-237G

### Sample Data

**Source:**
**Sample No.:** Shelby Tube
**Elev. or Depth:** 80 ft. **Sample Length(in./cm.):** 1 in.
**Location:** KR2-5B - re-entered
**Description:** Gray, Fat CLAY
**Sample Date:** **Liquid Limit:** **Plasticity Index:**
**USCS:** **AASHTO:**
**Preparation Process:**
**Condition of Test:**
**Test Method:** **Final Density:** **Figure No.:**
**Testing Remarks:** KR2-5B
Depth = 80 ft.
**Tested By:** **Test Date:**
**Checked By:** **Title:**

### Test Specimen Data

| TOTAL SAMPLE | BEFORE TEST | AFTER TEST |
|---|---|---|
| **Wet w+t** = 283.85 g. | **Consolidometer #** = 1 | **Wet w+t** = 266.01 g. |
| **Dry w+t** = 240.16 g. | | **Dry w+t** = 240.16 g. |
| **Tare Wt.** = 145.30 g. | **Spec. Gravity** = 2.58 | **Tare Wt.** = 145.30 g. |
| **Height** = 1.00 in. | **Height** = 1.00 in. | |
| **Diameter** = 2.50 in. | **Diameter** = 2.50 in. | |
| **Weight** = 138.65 g. | **Defl. Table** = Reference Set (inches/tsf) | |
| **Moisture** = 46.1 % | **Ht. Solids** = 0.4571 in. | **Moisture** = 27.3 % |
| **Wet Den.** = 107.6 pcf | **Dry Wt.** = 94.93 g. | **Dry Wt.** = 94.86 g.* |
| **Dry Den.** = 73.7 pcf | **Void Ratio** = 1.188 | **Void Ratio** = 0.649 |
| **Ovrbrdn.** = 2.50 tsf | **Saturation** = 100.0 % | |

*** Final dry weight used in calculations**

### End-of-Load Summary

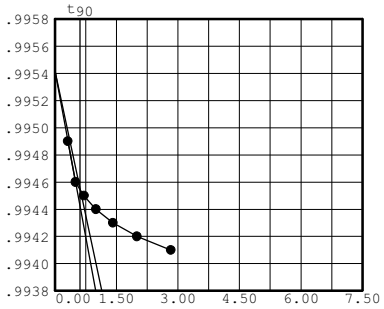
| Pressure (tsf) | Final Dial (in.) | Machine Defl. (in.) | $C_v$ (ft.$^2$/day) | $C_\alpha$ | Void Ratio | % Compression /Swell |
|---|---|---|---|---|---|---|
| start | 1.00000 | | | | 1.188 | |
| 0.13 | 0.99410 | 0.00000 | 5.60 | | 1.175 | 0.6 Comprs. |
| 0.25 | 0.99000 | 0.00040 | 4.89 | | 1.167 | 1.0 Comprs. |
| 0.50 | 0.98430 | 0.00080 | 2.30 | | 1.155 | 1.5 Comprs. |
| 1.00 | 0.97550 | 0.00160 | 2.22 | | 1.138 | 2.3 Comprs. |
| 2.00 | 0.96310 | 0.00240 | 1.13 | | 1.112 | 3.5 Comprs. |
| 1.00 | 0.96600 | 0.00160 | 3.78 | | 1.117 | 3.2 Comprs. |
| 0.50 | 0.96930 | 0.00080 | 4.67 | | 1.122 | 3.0 Comprs. |

| Pressure (tsf) | Final Dial (in.) | Machine Defl. (in.) | $C_v$ (ft.$^2$/day) | $C_\alpha$ | Void Ratio | % Compression /Swell |
|---|---|---|---|---|---|---|
| 0.25 | 0.97270 | 0.00040 | 2.10 | | 1.129 | 2.7 Comprs. |
| 0.13 | 0.97570 | 0.00000 | 2.45 | | 1.135 | 2.4 Comprs. |
| 0.25 | 0.97480 | 0.00040 | 1.14 | | 1.134 | 2.5 Comprs. |
| 0.50 | 0.97240 | 0.00080 | 3.84 | | 1.129 | 2.7 Comprs. |
| 1.00 | 0.96850 | 0.00160 | 3.42 | | 1.122 | 3.0 Comprs. |
| 2.00 | 0.96250 | 0.00300 | 1.79 | | 1.112 | 3.5 Comprs. |
| 4.00 | 0.94120 | 0.00000 | 0.65 | | 1.059 | 5.9 Comprs. |
| 8.00 | 0.83400 | 0.00000 | 0.11 | | 0.825 | 16.6 Comprs. |
| 16.00 | 0.75160 | 0.00000 | 0.09 | | 0.644 | 24.8 Comprs. |
| 32.00 | 0.68900 | 0.00000 | 0.08 | | 0.507 | 31.1 Comprs. |
| 8.00 | 0.69370 | 0.00000 | 0.45 | | 0.518 | 30.6 Comprs. |
| 4.00 | 0.70550 | 0.00000 | 0.05 | | 0.543 | 29.5 Comprs. |
| 1.00 | 0.72530 | 0.00160 | 0.13 | | 0.590 | 27.3 Comprs. |
| 0.13 | 0.75390 | 0.00000 | 0.04 | | 0.649 | 24.6 Comprs. |

**$C_c$ =** 0.45 **$P_c$ =** 1.11 tsf **$C_r$ =** 0.03

**Pressure: 0.13 tsf** **TEST READINGS** **Load No. 1**

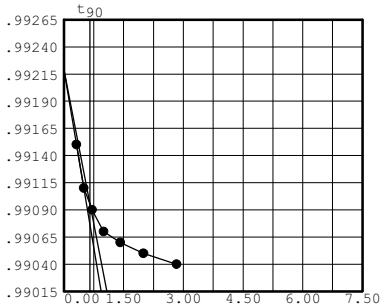
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 1.00000 |
| 2 | 0.10 | 0.99490 |
| 3 | 0.25 | 0.99460 |
| 4 | 0.50 | 0.99450 |
| 5 | 1.00 | 0.99440 |
| 6 | 2.00 | 0.99430 |
| 7 | 4.00 | 0.99420 |
| 8 | 8.00 | 0.99410 |




**Void Ratio =** 1.175 **Compression =** 0.6 %
**$D_0$ =** 0.99542 **$D_{90}$ =** 0.99455 **$D_{100}$ =** 0.99445
**$C_v$ at 0.4 min. =** 5.60 ft.$^2$/day

**Pressure: 0.25 tsf** **TEST READINGS** **Load No. 2**

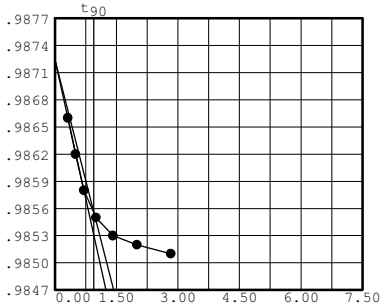
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.99410 |
| 2 | 0.10 | 0.99110 |
| 3 | 0.25 | 0.99070 |
| 4 | 0.50 | 0.99050 |
| 5 | 1.00 | 0.99030 |
| 6 | 2.00 | 0.99020 |
| 7 | 4.00 | 0.99010 |
| 8 | 8.00 | 0.99000 |




**Void Ratio =** 1.167 **Compression =** 1.0 %
**$D_0$ =** 0.99219 **$D_{90}$ =** 0.99095 **$D_{100}$ =** 0.99081
**$C_v$ at 0.4 min. =** 4.89 ft.$^2$/day

**Pressure: 0.50 tsf** **TEST READINGS** **Load No. 3**

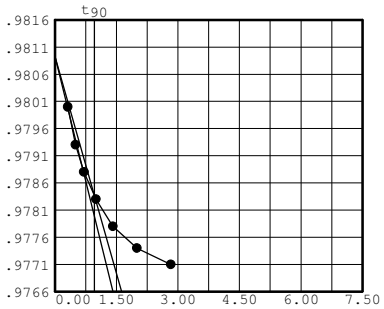
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.99000 |
| 2 | 0.10 | 0.98580 |
| 3 | 0.25 | 0.98540 |
| 4 | 0.50 | 0.98500 |
| 5 | 1.00 | 0.98470 |
| 6 | 2.00 | 0.98450 |
| 7 | 4.00 | 0.98440 |
| 8 | 8.00 | 0.98430 |




**Void Ratio =** 1.155 **Compression =** 1.5 %
**$D_0$ =** 0.98724 **$D_{90}$ =** 0.98555 **$D_{100}$ =** 0.98537
**$C_v$ at 0.9 min. =** 2.30 ft.$^2$/day

**Pressure: 1.00 tsf** **TEST READINGS** **Load No. 4**

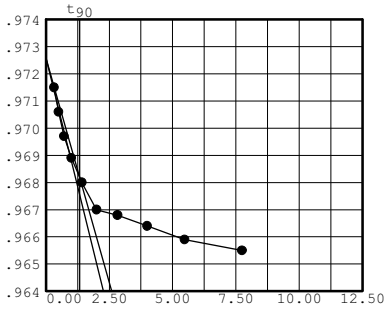
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.98430 |
| 2 | 0.10 | 0.97840 |
| 3 | 0.25 | 0.97770 |
| 4 | 0.50 | 0.97720 |
| 5 | 1.00 | 0.97670 |
| 6 | 2.00 | 0.97620 |
| 7 | 4.00 | 0.97580 |
| 8 | 8.00 | 0.97550 |




**Void Ratio =** 1.138 **Compression =** 2.3 %
**$D_0$ =** 0.98092 **$D_{90}$ =** 0.97837 **$D_{100}$ =** 0.97809
**$C_v$ at 0.9 min. =** 2.22 ft.$^2$/day

**Pressure: 2.00 tsf** **TEST READINGS** **Load No. 5**

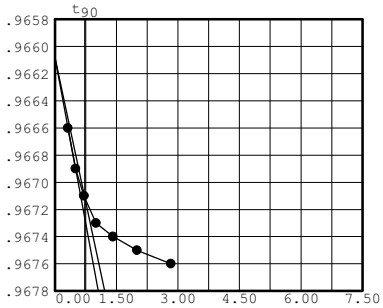
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.97550 | 11 | 60.00 | 0.96310 |
| 2 | 0.10 | 0.96910 | | | |
| 3 | 0.25 | 0.96820 | | | |
| 4 | 0.50 | 0.96730 | | | |
| 5 | 1.00 | 0.96650 | | | |
| 6 | 2.00 | 0.96560 | | | |
| 7 | 4.00 | 0.96460 | | | |
| 8 | 8.00 | 0.96440 | | | |
| 9 | 16.00 | 0.96400 | | | |
| 10 | 30.00 | 0.96350 | | | |




**Void Ratio =** 1.112 **Compression =** 3.5 %
**$D_0$ =** 0.97257 **$D_{90}$ =** 0.96819 **$D_{100}$ =** 0.96770
**$C_v$ at 1.8 min. =** 1.13 ft.$^2$/day

**Pressure: 1.00 tsf** **TEST READINGS** **Load No. 6**

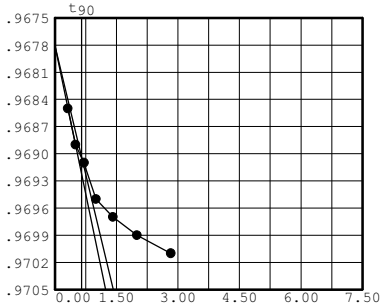
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.96310 |
| 2 | 0.10 | 0.96500 |
| 3 | 0.25 | 0.96530 |
| 4 | 0.50 | 0.96550 |
| 5 | 1.00 | 0.96570 |
| 6 | 2.00 | 0.96580 |
| 7 | 4.00 | 0.96590 |
| 8 | 8.00 | 0.96600 |




**Void Ratio =** 1.117 **Compression =** 3.2 %
**$D_0$ =** 0.96608 **$D_{90}$ =** 0.96711 **$D_{100}$ =** 0.96723
**$C_v$ at 0.5 min. =** 3.78 ft.$^2$/day

**Pressure: 0.50 tsf** **TEST READINGS** **Load No. 7**

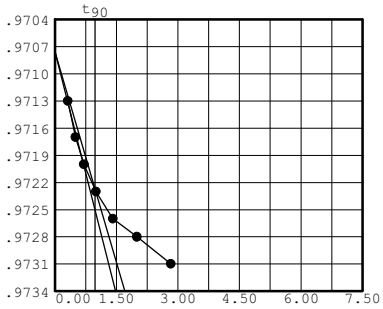
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.96600 |
| 2 | 0.10 | 0.96770 |
| 3 | 0.25 | 0.96810 |
| 4 | 0.50 | 0.96830 |
| 5 | 1.00 | 0.96870 |
| 6 | 2.00 | 0.96890 |
| 7 | 4.00 | 0.96910 |
| 8 | 8.00 | 0.96930 |




**Void Ratio =** 1.122 **Compression =** 3.0 %
**$D_0$ =** 0.96781 **$D_{90}$ =** 0.96905 **$D_{100}$ =** 0.96919
**$C_v$ at 0.4 min. =** 4.67 ft.$^2$/day

**Pressure: 0.25 tsf** **TEST READINGS** **Load No. 8**

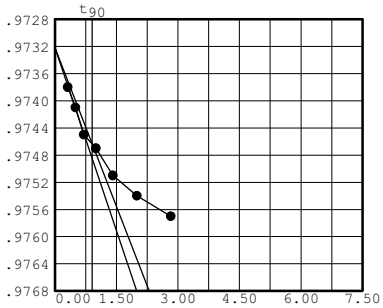
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.96930 |
| 2 | 0.10 | 0.97090 |
| 3 | 0.25 | 0.97130 |
| 4 | 0.50 | 0.97160 |
| 5 | 1.00 | 0.97190 |
| 6 | 2.00 | 0.97220 |
| 7 | 4.00 | 0.97240 |
| 8 | 8.00 | 0.97270 |




**Void Ratio =** 1.129 **Compression =** 2.7 %
**$D_0$ =** 0.97076 **$D_{90}$ =** 0.97228 **$D_{100}$ =** 0.97245
**$C_v$ at 1.0 min. =** 2.10 ft.$^2$/day

**Pressure: 0.13 tsf** **TEST READINGS** **Load No. 9**

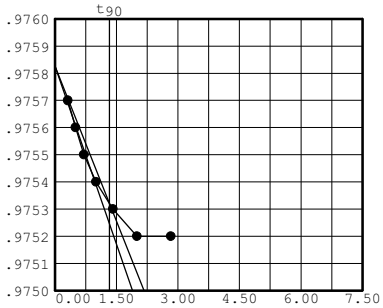
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.97270 |
| 2 | 0.10 | 0.97380 |
| 3 | 0.25 | 0.97410 |
| 4 | 0.50 | 0.97450 |
| 5 | 1.00 | 0.97470 |
| 6 | 2.00 | 0.97510 |
| 7 | 4.00 | 0.97540 |
| 8 | 8.00 | 0.97570 |




**Void Ratio =** 1.135 **Compression =** 2.4 %
**$D_0$ =** 0.97322 **$D_{90}$ =** 0.97464 **$D_{100}$ =** 0.97479
**$C_v$ at 0.8 min. =** 2.45 ft.$^2$/day

**Pressure: 0.25 tsf** **TEST READINGS** **Load No. 10**

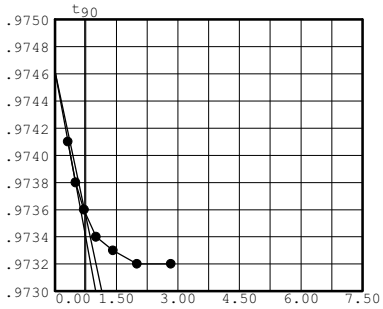
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.97570 |
| 2 | 0.10 | 0.97530 |
| 3 | 0.25 | 0.97520 |
| 4 | 0.50 | 0.97510 |
| 5 | 1.00 | 0.97500 |
| 6 | 2.00 | 0.97490 |
| 7 | 4.00 | 0.97480 |
| 8 | 8.00 | 0.97480 |




**Void Ratio =** 1.134 **Compression =** 2.5 %
**$D_0$ =** 0.97583 **$D_{90}$ =** 0.97532 **$D_{100}$ =** 0.97526
**$C_v$ at 1.8 min. =** 1.14 ft.$^2$/day

**Pressure: 0.50 tsf** **TEST READINGS** **Load No. 11**

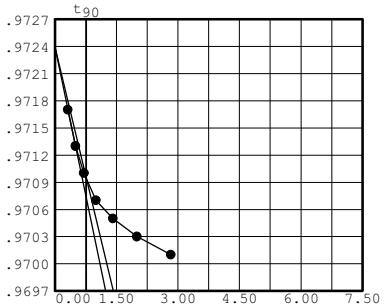
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.97480 |
| 2 | 0.10 | 0.97330 |
| 3 | 0.25 | 0.97300 |
| 4 | 0.50 | 0.97280 |
| 5 | 1.00 | 0.97260 |
| 6 | 2.00 | 0.97250 |
| 7 | 4.00 | 0.97240 |
| 8 | 8.00 | 0.97240 |




**Void Ratio =** 1.129 **Compression =** 2.7 %
**$D_0$ =** 0.97462 **$D_{90}$ =** 0.97359 **$D_{100}$ =** 0.97347
**$C_v$ at 0.5 min. =** 3.84 ft.$^2$/day

**Pressure: 1.00 tsf** **TEST READINGS** **Load No. 12**

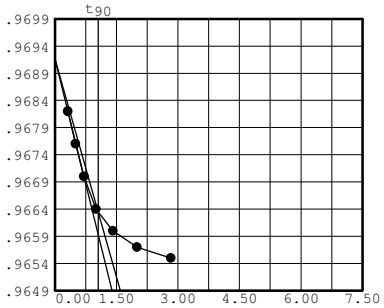
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.97240 |
| 2 | 0.10 | 0.97010 |
| 3 | 0.25 | 0.96970 |
| 4 | 0.50 | 0.96940 |
| 5 | 1.00 | 0.96910 |
| 6 | 2.00 | 0.96890 |
| 7 | 4.00 | 0.96870 |
| 8 | 8.00 | 0.96850 |




**Void Ratio =** 1.122 **Compression =** 3.0 %
**$D_0$ =** 0.97239 **$D_{90}$ =** 0.97094 **$D_{100}$ =** 0.97078
**$C_v$ at 0.6 min. =** 3.42 ft.$^2$/day

**Pressure: 2.00 tsf** **TEST READINGS** **Load No. 13**

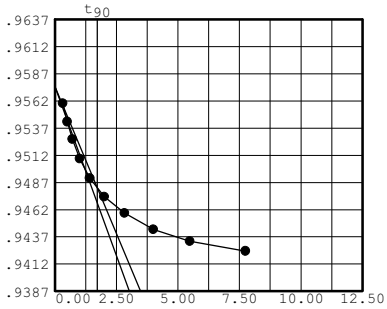
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.96850 |
| 2 | 0.10 | 0.96520 |
| 3 | 0.25 | 0.96460 |
| 4 | 0.50 | 0.96400 |
| 5 | 1.00 | 0.96340 |
| 6 | 2.00 | 0.96300 |
| 7 | 4.00 | 0.96270 |
| 8 | 8.00 | 0.96250 |




**Void Ratio =** 1.112 **Compression =** 3.5 %
**$D_0$ =** 0.96916 **$D_{90}$ =** 0.96635 **$D_{100}$ =** 0.96604
**$C_v$ at 1.1 min. =** 1.79 ft.$^2$/day

**Pressure: 4.00 tsf** **TEST READINGS** **Load No. 14**

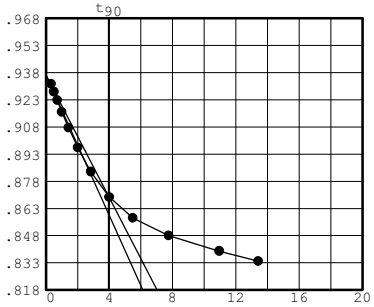
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.96250 | 11 | 60.00 | 0.94240 |
| 2 | 0.10 | 0.95600 | 12 | 120.00 | 0.94160 |
| 3 | 0.25 | 0.95430 | 13 | 180.00 | 0.94120 |
| 4 | 0.50 | 0.95270 | | | |
| 5 | 1.00 | 0.95090 | | | |
| 6 | 2.00 | 0.94910 | | | |
| 7 | 4.00 | 0.94740 | | | |
| 8 | 8.00 | 0.94590 | | | |
| 9 | 16.00 | 0.94440 | | | |
| 10 | 30.00 | 0.94330 | | | |




**Void Ratio =** 1.059 **Compression =** 5.9 %
**$D_0$ =** 0.95749 **$D_{90}$ =** 0.94823 **$D_{100}$ =** 0.94720
**$C_v$ at 2.9 min. =** 0.65 ft.$^2$/day

**Pressure: 8.00 tsf** **TEST READINGS** **Load No. 15**

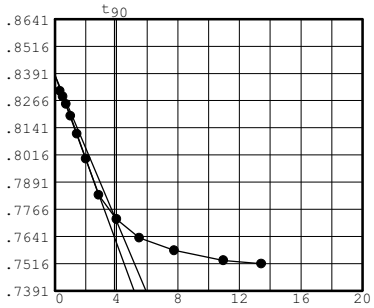
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.94120 | 11 | 60.00 | 0.84810 |
| 2 | 0.10 | 0.93180 | 12 | 120.00 | 0.83950 |
| 3 | 0.25 | 0.92750 | 13 | 180.00 | 0.83400 |
| 4 | 0.50 | 0.92280 | | | |
| 5 | 1.00 | 0.91630 | | | |
| 6 | 2.00 | 0.90760 | | | |
| 7 | 4.00 | 0.89660 | | | |
| 8 | 8.00 | 0.88330 | | | |
| 9 | 16.00 | 0.86930 | | | |
| 10 | 30.00 | 0.85780 | | | |




**Void Ratio =** 0.825 **Compression =** 16.6 %
**$D_0$ =** 0.93659 **$D_{90}$ =** 0.86993 **$D_{100}$ =** 0.86252
**$C_v$ at 15.6 min. =** 0.11 ft.$^2$/day

**Pressure: 16.00 tsf** **TEST READINGS** **Load No. 16**

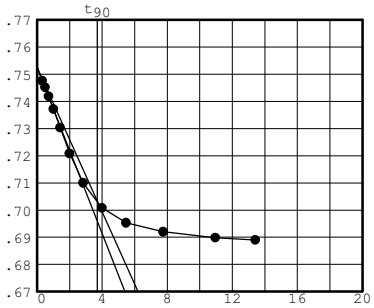
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.83400 | 11 | 60.00 | 0.75770 |
| 2 | 0.10 | 0.83110 | 12 | 120.00 | 0.75310 |
| 3 | 0.25 | 0.82850 | 13 | 180.00 | 0.75160 |
| 4 | 0.50 | 0.82500 | | | |
| 5 | 1.00 | 0.81960 | | | |
| 6 | 2.00 | 0.81130 | | | |
| 7 | 4.00 | 0.79990 | | | |
| 8 | 8.00 | 0.78320 | | | |
| 9 | 16.00 | 0.77210 | | | |
| 10 | 30.00 | 0.76350 | | | |




**Void Ratio =** 0.644 **Compression =** 24.8 %
**$D_0$ =** 0.83821 **$D_{90}$ =** 0.77326 **$D_{100}$ =** 0.76604
**$C_v$ at 15.0 min. =** 0.09 ft.$^2$/day

**Pressure: 32.00 tsf** **TEST READINGS** **Load No. 17**

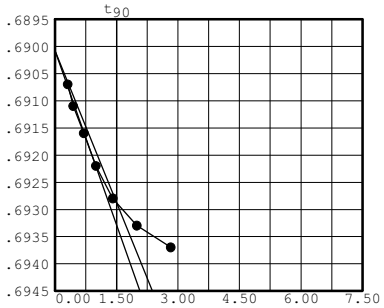
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.75160 | 11 | 60.00 | 0.69200 |
| 2 | 0.10 | 0.74760 | 12 | 120.00 | 0.68980 |
| 3 | 0.25 | 0.74520 | 13 | 180.00 | 0.68900 |
| 4 | 0.50 | 0.74190 | | | |
| 5 | 1.00 | 0.73720 | | | |
| 6 | 2.00 | 0.73030 | | | |
| 7 | 4.00 | 0.72080 | | | |
| 8 | 8.00 | 0.71000 | | | |
| 9 | 16.00 | 0.70080 | | | |
| 10 | 30.00 | 0.69530 | | | |




**Void Ratio =** 0.507 **Compression =** 31.1 %
**$D_0$ =** 0.75245 **$D_{90}$ =** 0.70307 **$D_{100}$ =** 0.69759
**$C_v$ at 13.8 min. =** 0.08 ft.$^2$/day

**Pressure: 8.00 tsf** **TEST READINGS** **Load No. 18**

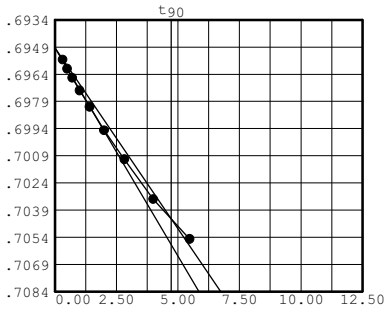
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.68900 |
| 2 | 0.10 | 0.69070 |
| 3 | 0.20 | 0.69110 |
| 4 | 0.50 | 0.69160 |
| 5 | 1.00 | 0.69220 |
| 6 | 2.00 | 0.69280 |
| 7 | 4.00 | 0.69330 |
| 8 | 8.00 | 0.69370 |




**Void Ratio =** 0.518 **Compression =** 30.6 %
**$D_0$ =** 0.69008 **$D_{90}$ =** 0.69288 **$D_{100}$ =** 0.69319
**$C_v$ at 2.3 min. =** 0.45 ft.$^2$/day

**Pressure: 4.00 tsf** **TEST READINGS** **Load No. 19**

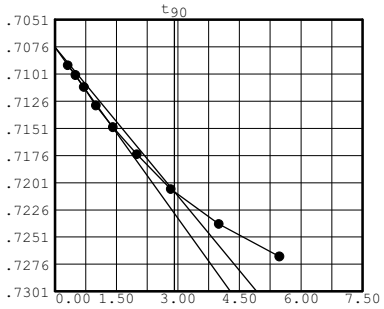
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.69370 |
| 2 | 0.10 | 0.69560 |
| 3 | 0.25 | 0.69610 |
| 4 | 0.50 | 0.69660 |
| 5 | 1.00 | 0.69730 |
| 6 | 2.00 | 0.69820 |
| 7 | 4.00 | 0.69950 |
| 8 | 8.00 | 0.70110 |
| 9 | 16.00 | 0.70330 |
| 10 | 30.00 | 0.70550 |




**Void Ratio =** 0.543 **Compression =** 29.5 %
**$D_0$ =** 0.69494 **$D_{90}$ =** 0.70437 **$D_{100}$ =** 0.70542
**$C_v$ at 22.3 min. =** 0.05 ft.$^2$/day

**Pressure: 1.00 tsf** **TEST READINGS** **Load No. 20**

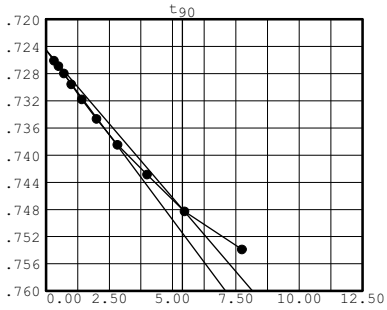
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.70550 |
| 2 | 0.10 | 0.70770 |
| 3 | 0.25 | 0.70860 |
| 4 | 0.50 | 0.70970 |
| 5 | 1.00 | 0.71140 |
| 6 | 2.00 | 0.71340 |
| 7 | 4.00 | 0.71590 |
| 8 | 8.00 | 0.71910 |
| 9 | 16.00 | 0.72230 |
| 10 | 30.00 | 0.72530 |




**Void Ratio =** 0.590 **Compression =** 27.3 %
**$D_0$ =** 0.70762 **$D_{90}$ =** 0.72092 **$D_{100}$ =** 0.72240
**$C_v$ at 8.5 min. =** 0.13 ft.$^2$/day

**Pressure: 0.13 tsf** **TEST READINGS** **Load No. 21**

| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.72530 | 11 | 60.00 | 0.75390 |
| 2 | 0.10 | 0.72610 | | | |
| 3 | 0.25 | 0.72690 | | | |
| 4 | 0.50 | 0.72800 | | | |
| 5 | 1.00 | 0.72960 | | | |
| 6 | 2.00 | 0.73180 | | | |
| 7 | 4.00 | 0.73470 | | | |
| 8 | 8.00 | 0.73850 | | | |
| 9 | 16.00 | 0.74290 | | | |
| 10 | 30.00 | 0.74830 | | | |

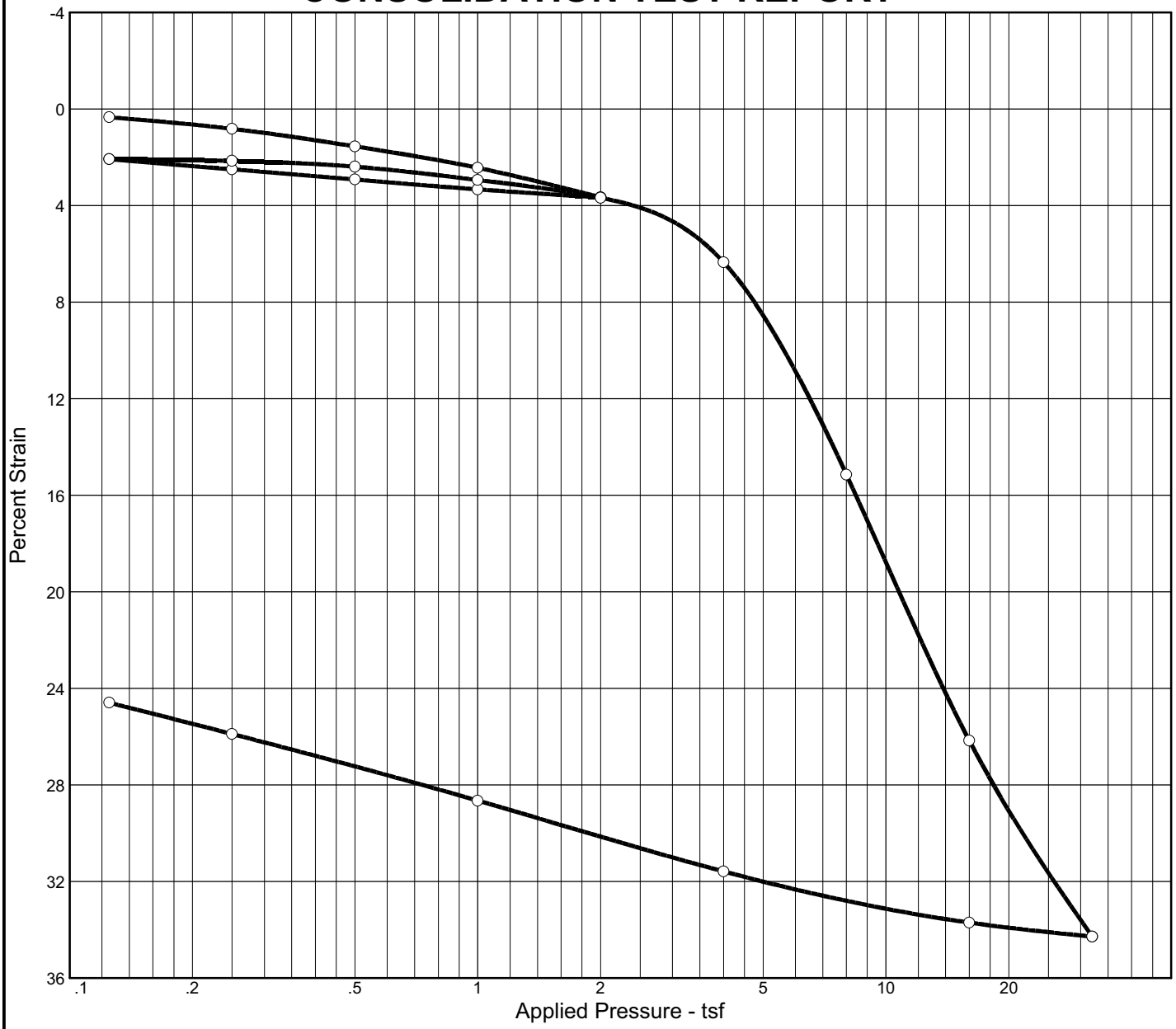



**Void Ratio =** 0.649 **Compression =** 24.6 %

**$D_0$ =** 0.72453 **$D_{90}$ =** 0.74797 **$D_{100}$ =** 0.75057

**$C_v$ at 29.0 min. =** 0.04 ft.$^2$/day

# CONSOLIDATION TEST REPORT




| MATERIAL DESCRIPTION | USCS | AASHTO |
|---|---|---|
| Gray, Fat CLAY | | |

| LL | PI | Sp. Gr. | Overburden (tsf) | Dry Dens. (pcf) | | Moisture | | Saturation | | Void Ratio | | $P_c$ (tsf) | $C_c$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Init. | Final | Init. | Final | Init. | Final | Init. | Final | | |
| | | 2.59 | 2.75 | 66.8 | | 54.7 % | 27.3 % | 99.7 % | 85.8 % | 1.419 | 0.825 | | |

| Preparation Process: | D2435 Method | $C_r$ | Swell Press. (tsf) | Heave % |
|---|---|---|---|---|
| Condition of Test: | | | | |

**Project No.** VB10-237G **Client:** HDR, Inc.

**Project:** VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia

**Location:** KR2-6B

**Remarks:**
KR2-6B
Depth=90 ft.

**Checked By:**

**Title:**

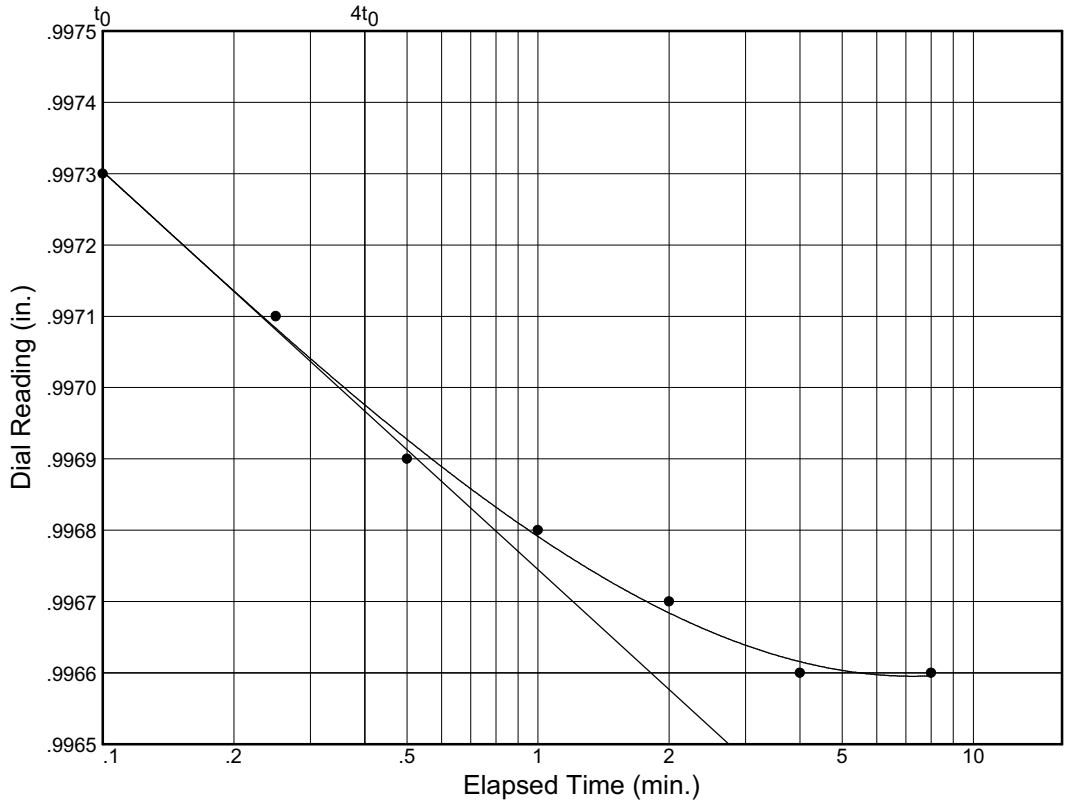
CONSOLIDATION TEST REPORT

**GET SOLUTIONS, INC.**

**Figure** 1

# Dial Reading vs. Time

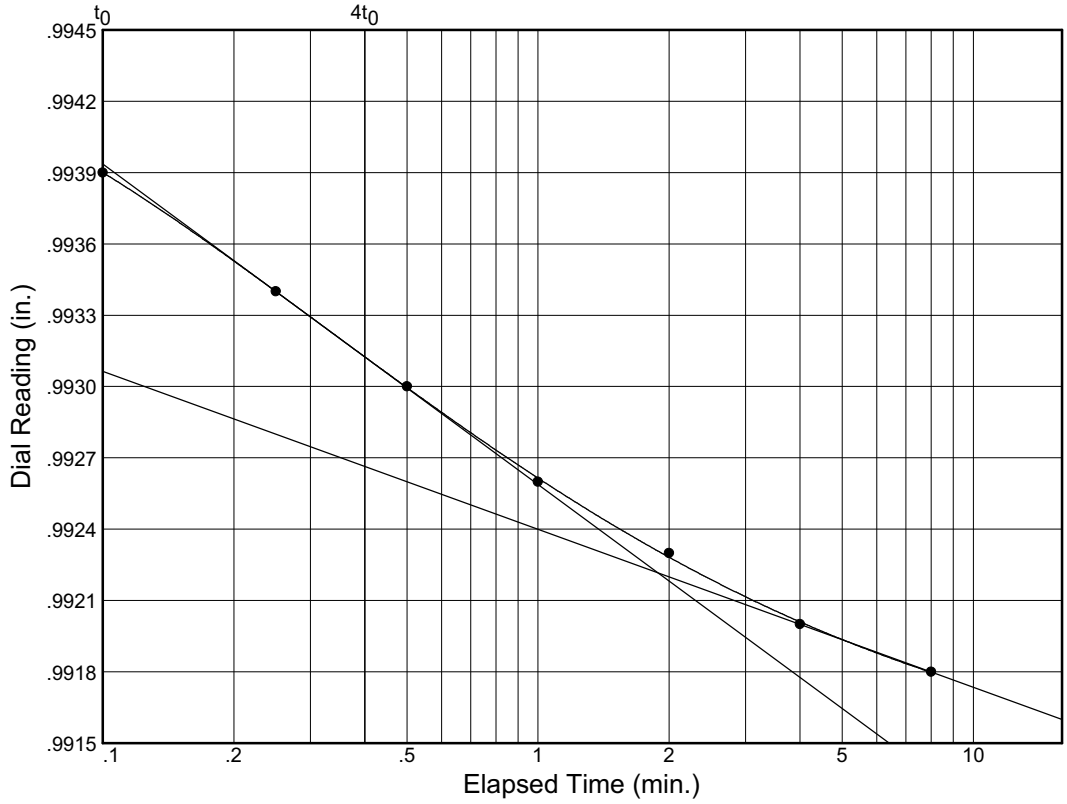
Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: KR2-6B




Load No.= 1
Load= 0.13 tsf
$D_0$ = 0.99763
$D_{50}$ = 0.99712
$D_{100}$ = 0.99660
$T_{50}$ = 0.22 min.

$C_v$ @ $T_{50}$
2.25 ft.$^2$/day

$C_\alpha$ = 0.000




Load No.= 2
Load= 0.25 tsf
$D_0$ = 0.99468
$D_{50}$ = 0.99345
$D_{100}$ = 0.99222
$T_{50}$ = 0.23 min.

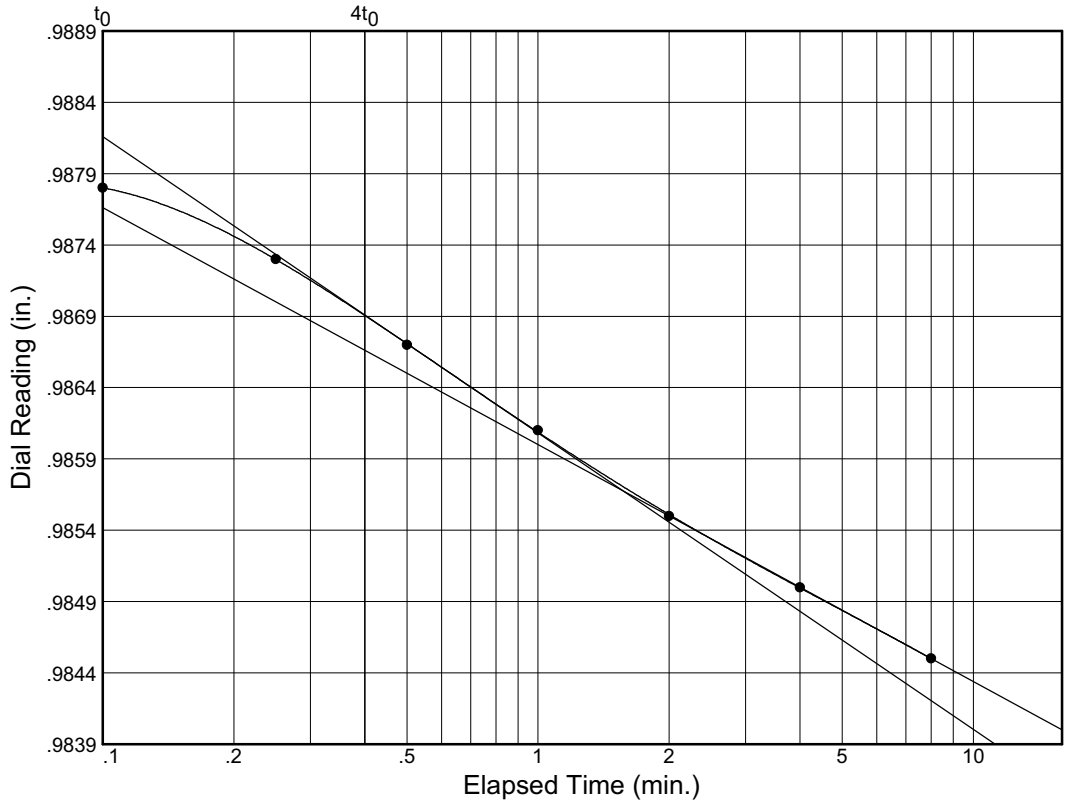
$C_v$ @ $T_{50}$
2.11 ft.$^2$/day

$C_\alpha$ = 0.001

Figure 2

# Dial Reading vs. Time

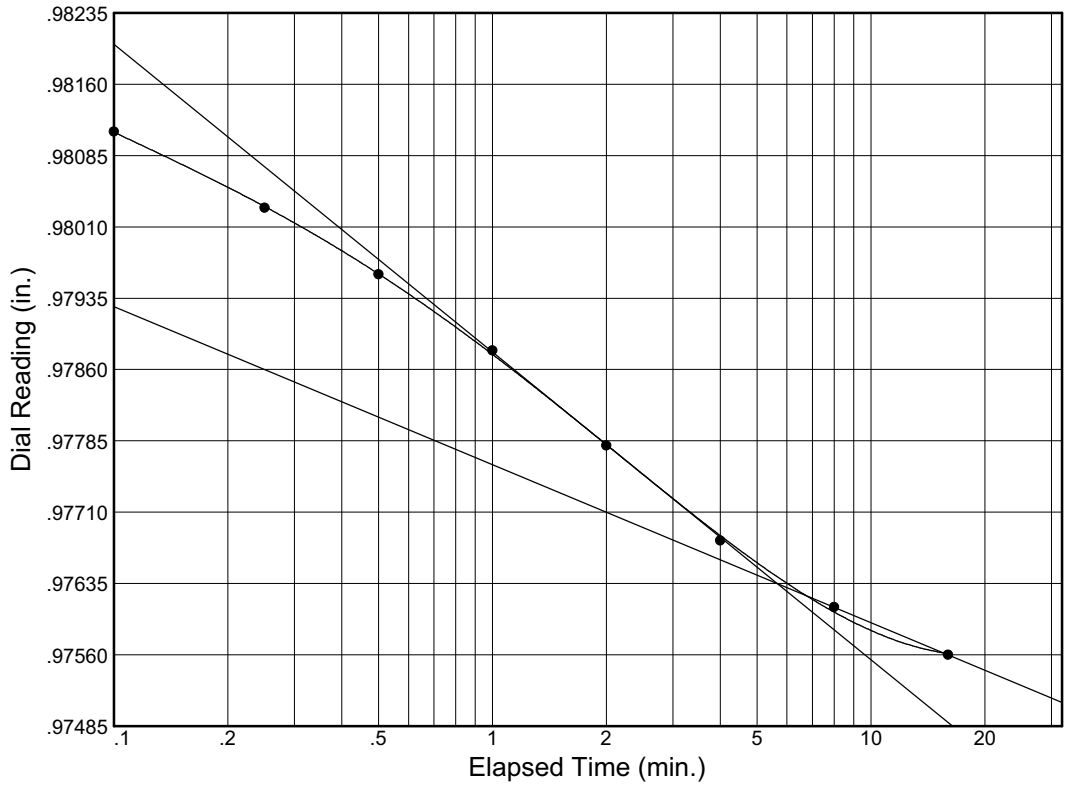
Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: KR2-6B




Load No.= 3
Load= 0.50 tsf
$D_0$ = 0.98869
$D_{50}$ = 0.98718
$D_{100}$ = 0.98567
$T_{50}$ = 0.29 min.

$C_v$ @ $T_{50}$
1.66 ft.$^2$/day

$C_\alpha$ = 0.002




Load No.= 4
Load= 1.00 tsf
$D_0$ = 0.98450
$D_{50}$ = 0.98043
$D_{100}$ = 0.97635
$T_{50}$ = 0.22 min.

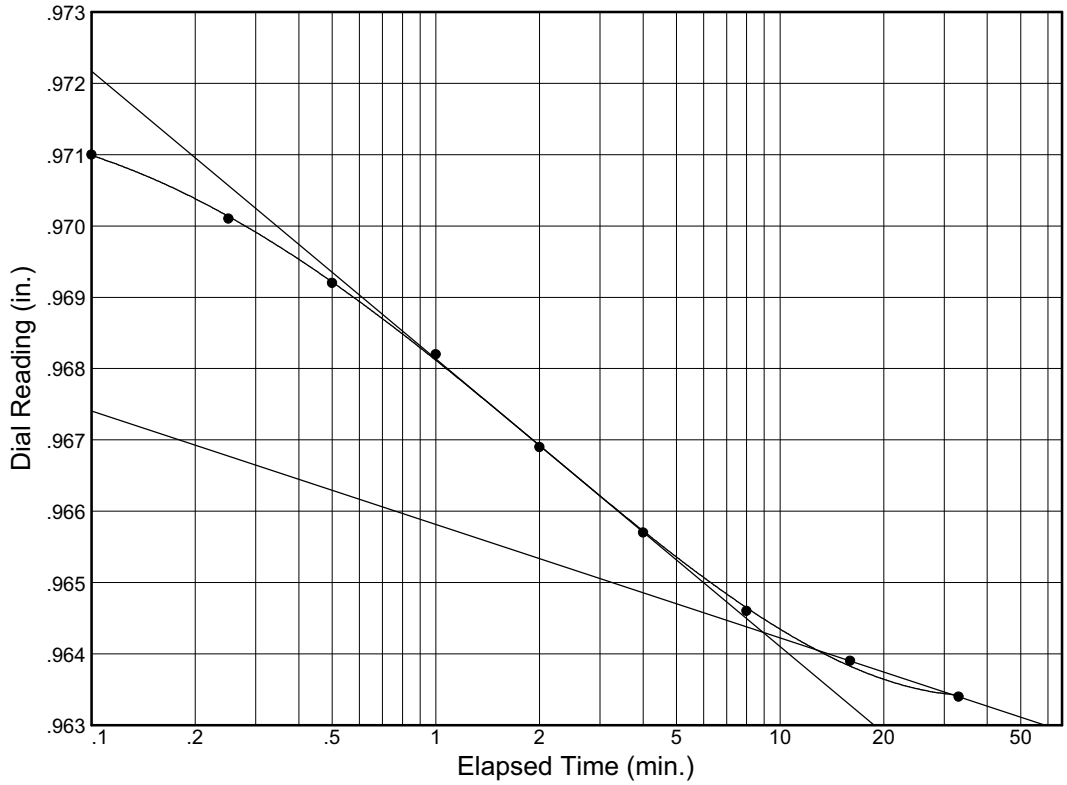
$C_v$ @ $T_{50}$
2.14 ft.$^2$/day

$C_\alpha$ = 0.002

Figure 3

# Dial Reading vs. Time

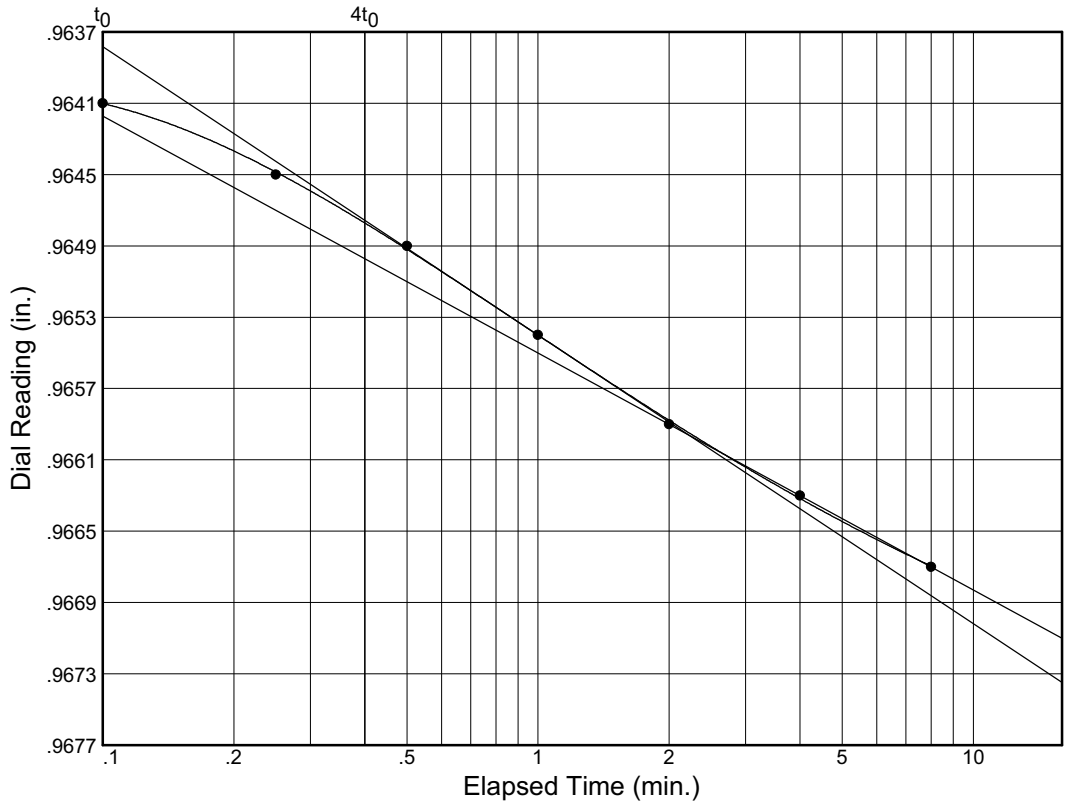
Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: KR2-6B




Load No.= 5
Load= 2.00 tsf
$D_0$ = 0.97690
$D_{50}$ = 0.97060
$D_{100}$ = 0.96430
$T_{50}$ = 0.16 min.

$C_v$ @ $T_{50}$
2.89 ft.$^2$/day

$C_\alpha$ = 0.002



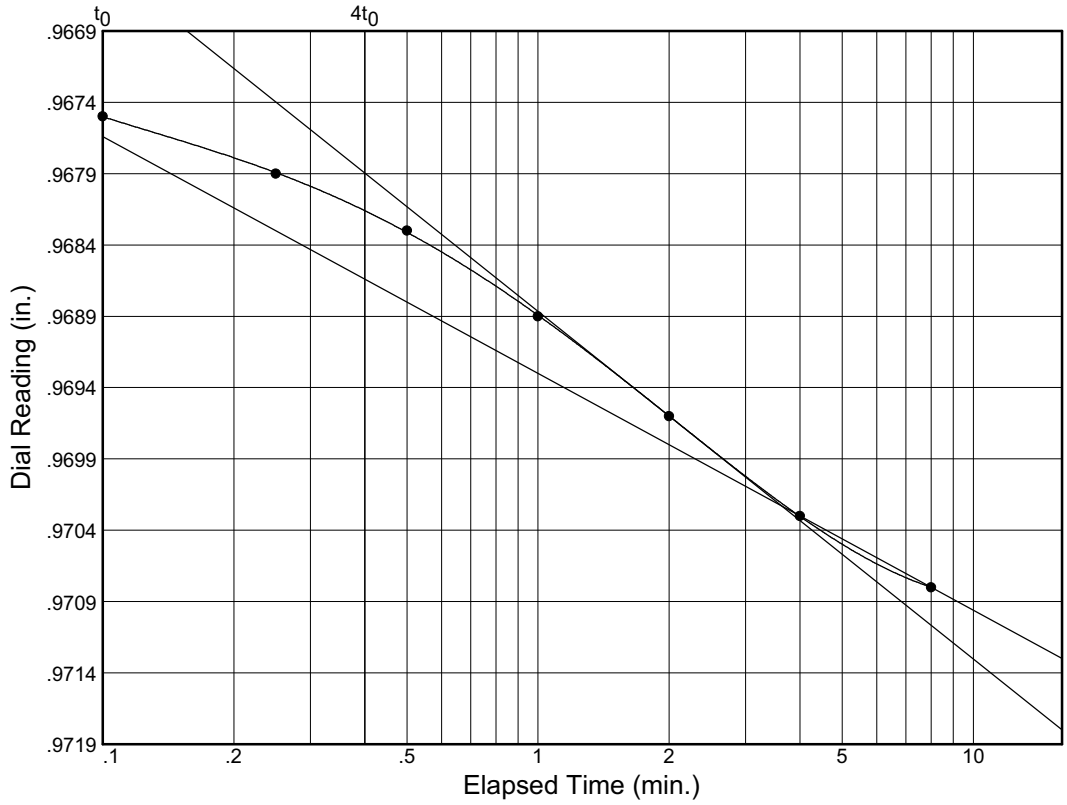

Load No.= 6
Load= 1.00 tsf
$D_0$ = 0.96343
$D_{50}$ = 0.96470
$D_{100}$ = 0.96596
$T_{50}$ = 0.35 min.

$C_v$ @ $T_{50}$
1.29 ft.$^2$/day

Figure 4

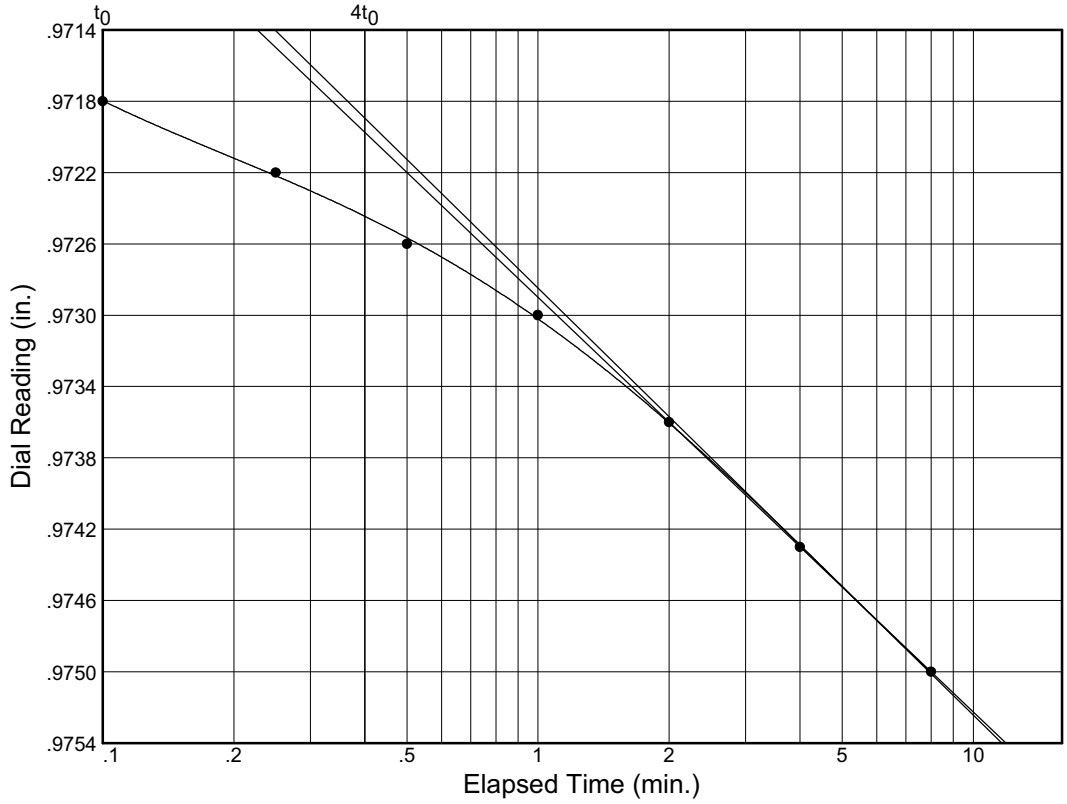
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: KR2-6B




Load No.= 7
Load= 0.50 tsf
$D_0$ = 0.96684
$D_{50}$ = 0.96854
$D_{100}$ = 0.97023
$T_{50}$ = 0.67 min.

$C_v$ @ $T_{50}$
0.69 ft.$^2$/day



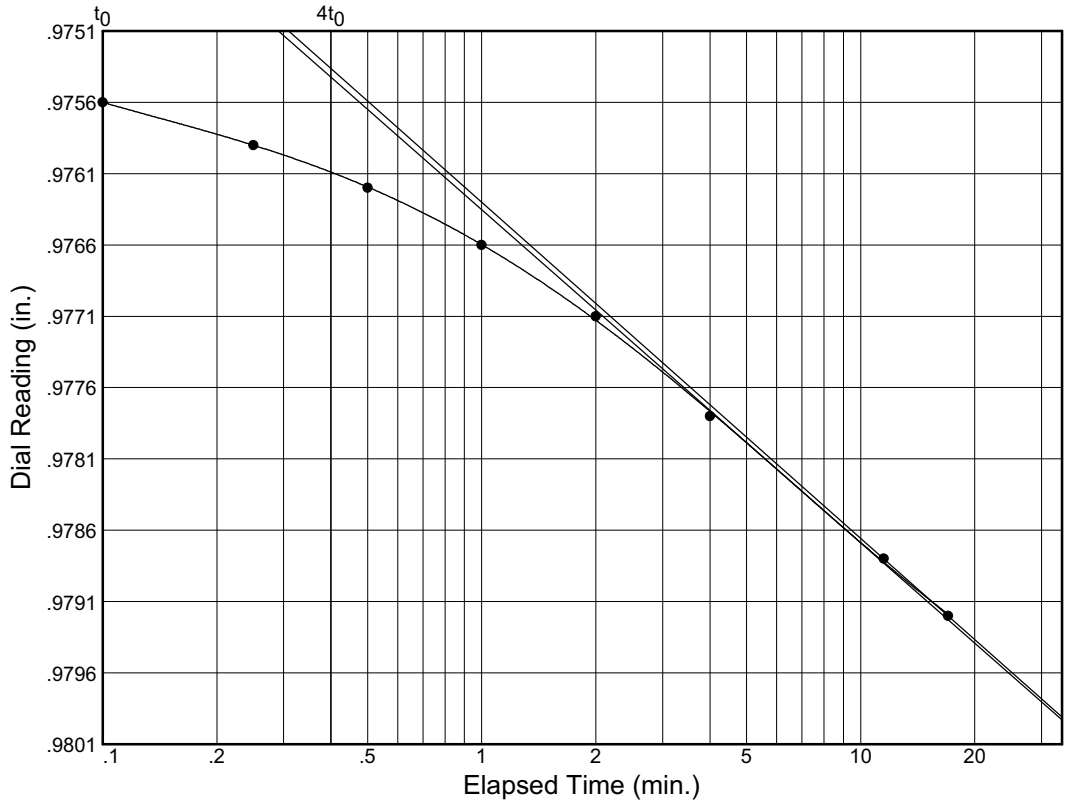

Load No.= 8
Load= 0.25 tsf
$D_0$ = 0.97115
$D_{50}$ = 0.97290
$D_{100}$ = 0.97465
$T_{50}$ = 0.85 min.

$C_v$ @ $T_{50}$
0.55 ft.$^2$/day

Figure 5

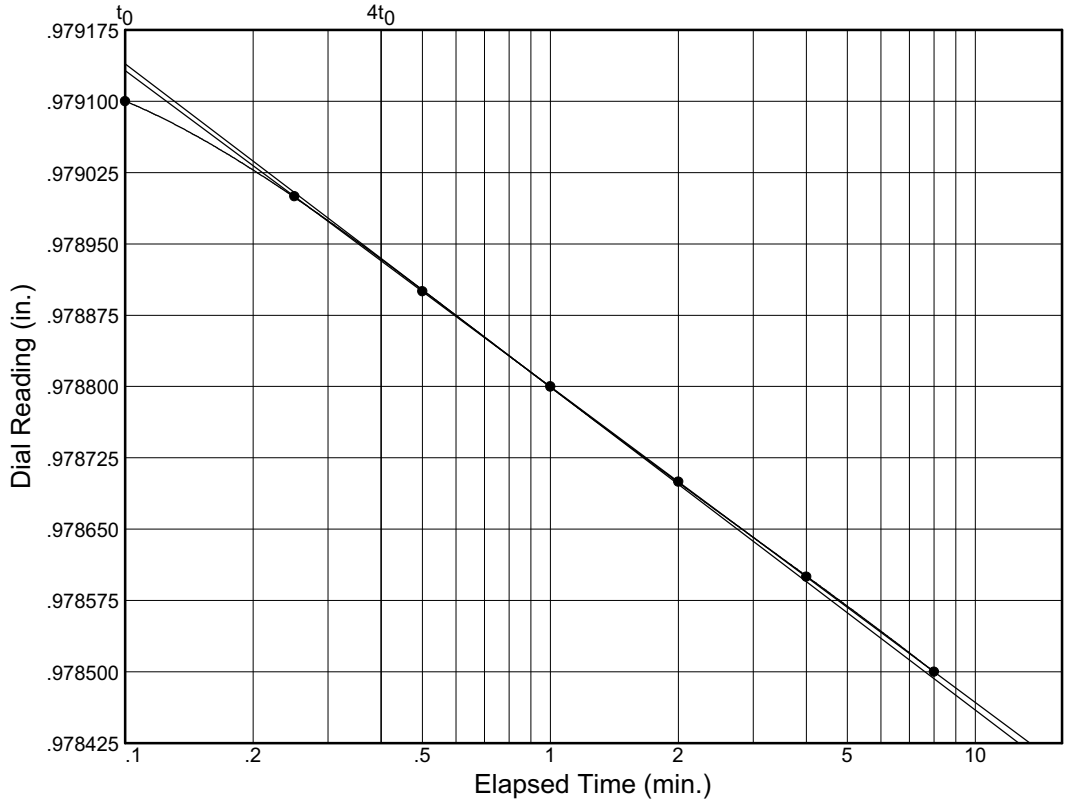
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: KR2-6B




Load No.= 9
Load= 0.13 tsf
$D_0$ = 0.97511
$D_{50}$ = 0.97873
$D_{100}$ = 0.98234
$T_{50}$ = 10.40 min.

| $C_v$ @ $T_{50}$ |
|---|
| 0.05 ft.$^2$/day |




Load No.= 10
Load= 0.25 tsf
$D_0$ = 0.97927
$D_{50}$ = 0.97904
$D_{100}$ = 0.97882
$T_{50}$ = 0.17 min.

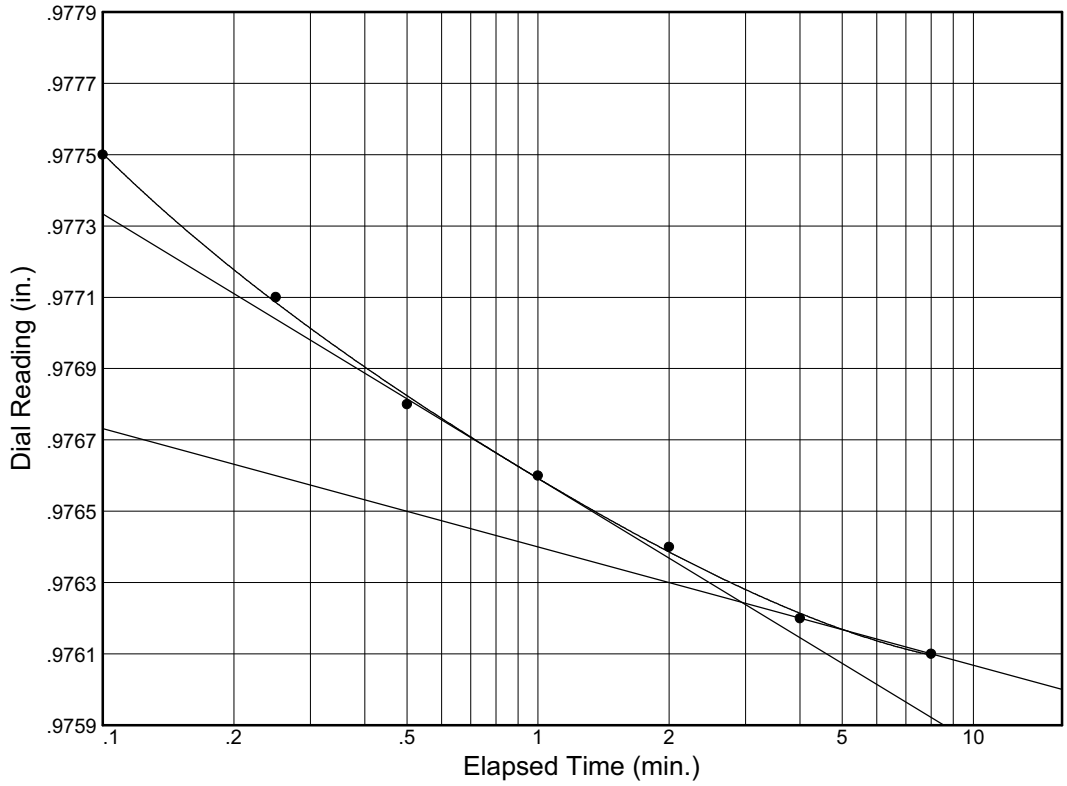
| $C_v$ @ $T_{50}$ |
|---|
| 2.72 ft.$^2$/day |

$C_\alpha$ = 0.000

Figure 6

# Dial Reading vs. Time

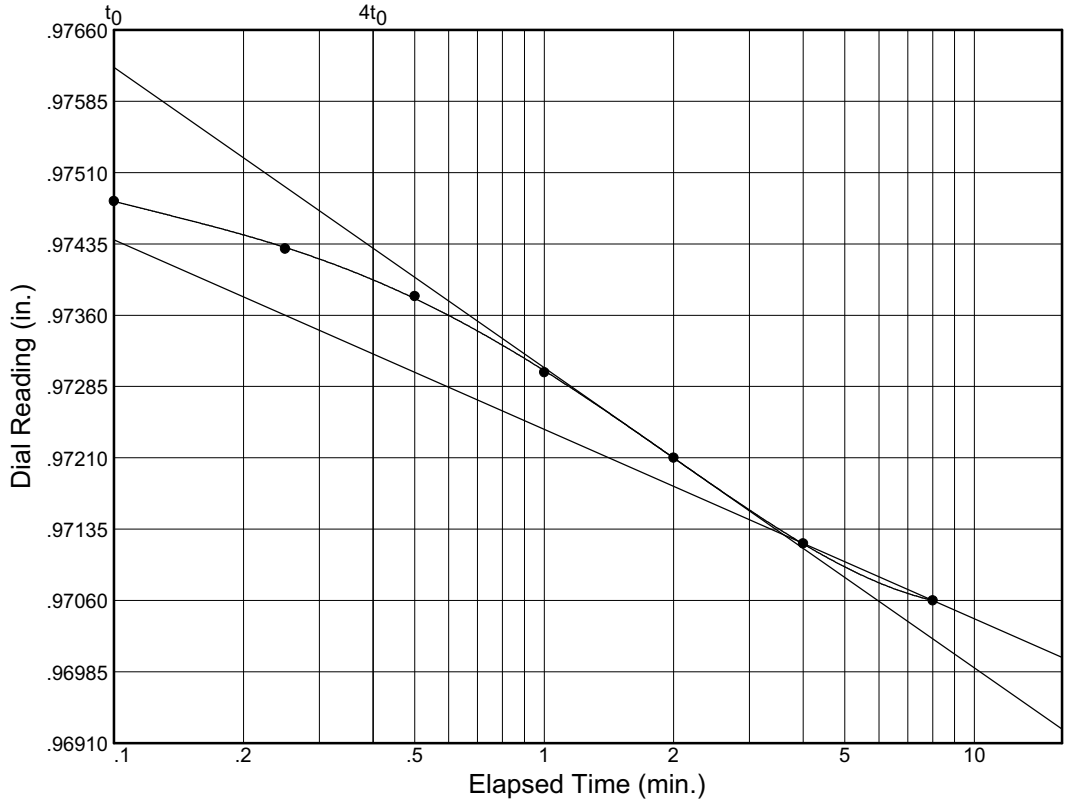
Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: KR2-6B




Load No.= 11
Load= 0.50 tsf
$D_0$ = 0.97850
$D_{50}$ = 0.97737
$D_{100}$ = 0.97624
$T_{50}$ = 0.13 min.

$C_v$ @ $T_{50}$
3.62 ft.$^2$/day

$C_\alpha$ = 0.000




Load No.= 12
Load= 1.00 tsf
$D_0$ = 0.97562
$D_{50}$ = 0.97346
$D_{100}$ = 0.97129
$T_{50}$ = 0.69 min.

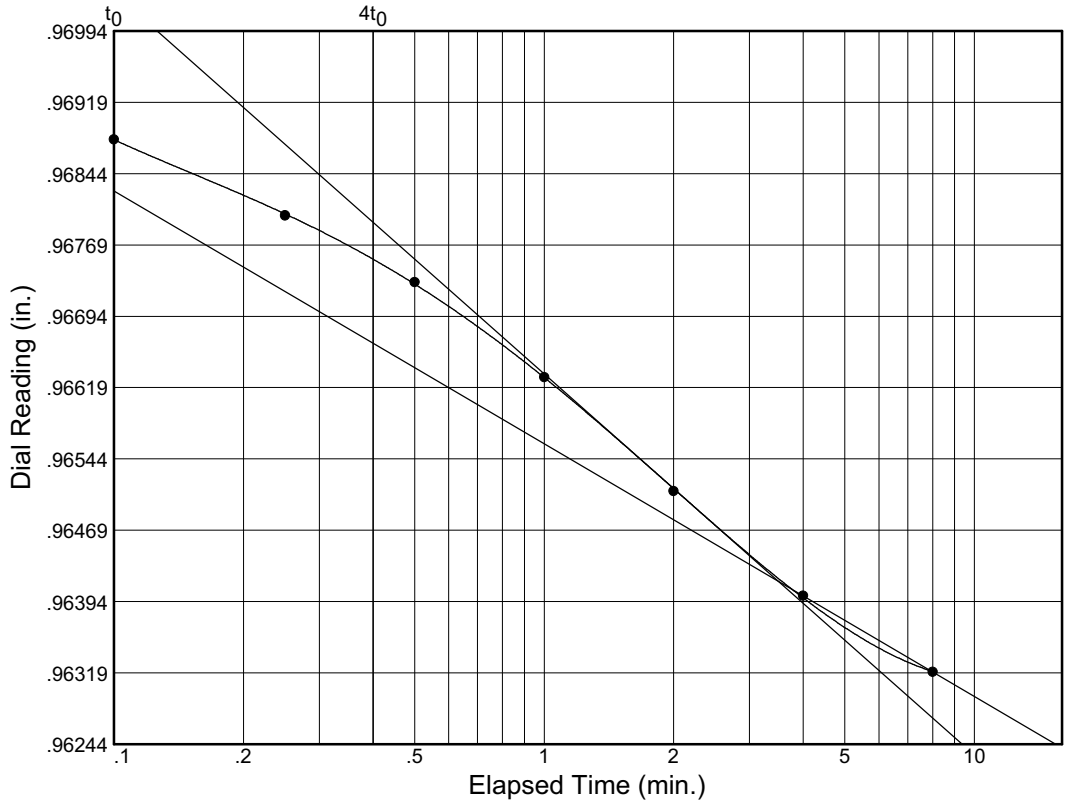
$C_v$ @ $T_{50}$
0.68 ft.$^2$/day

$C_\alpha$ = 0.002

Figure 7

# Dial Reading vs. Time

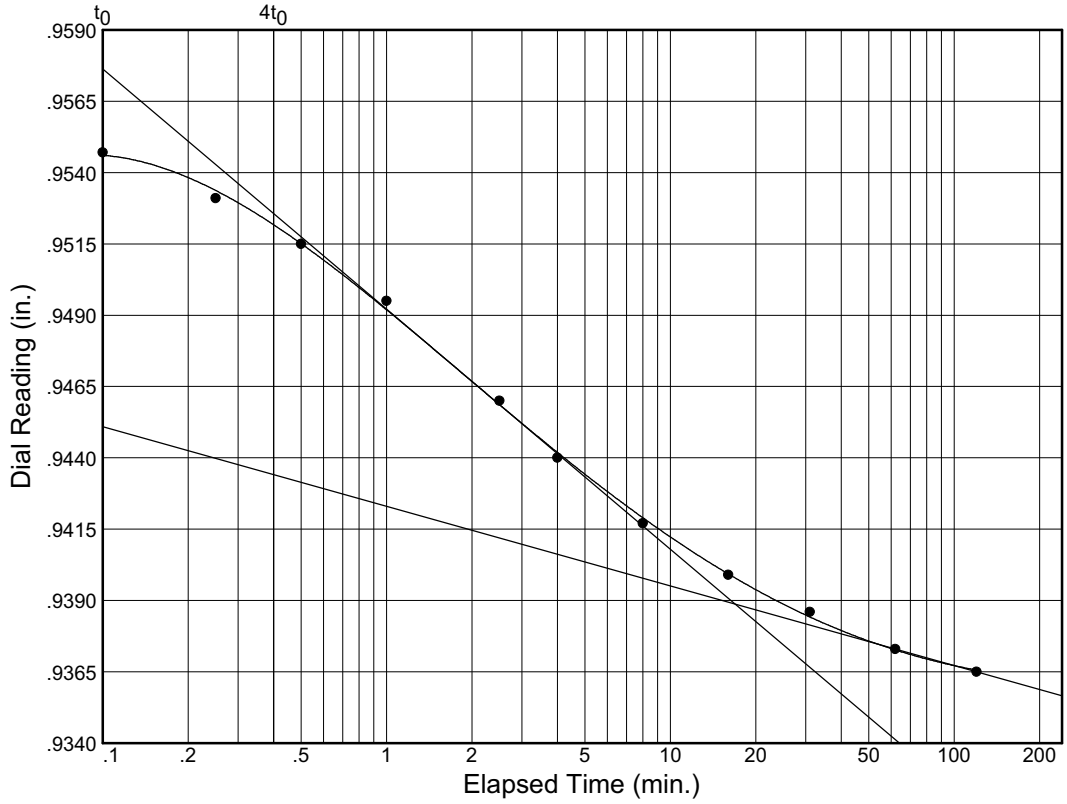
Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: KR2-6B




Load No.= 13
Load= 2.00 tsf
$D_0$ = 0.97005
$D_{50}$ = 0.96710
$D_{100}$ = 0.96415
$T_{50}$ = 0.57 min.

$C_v$ @ $T_{50}$
0.80 ft.$^2$/day

$C_\alpha$ = 0.003




Load No.= 14
Load= 4.00 tsf
$D_0$ = 0.95704
$D_{50}$ = 0.94796
$D_{100}$ = 0.93887
$T_{50}$ = 1.41 min.

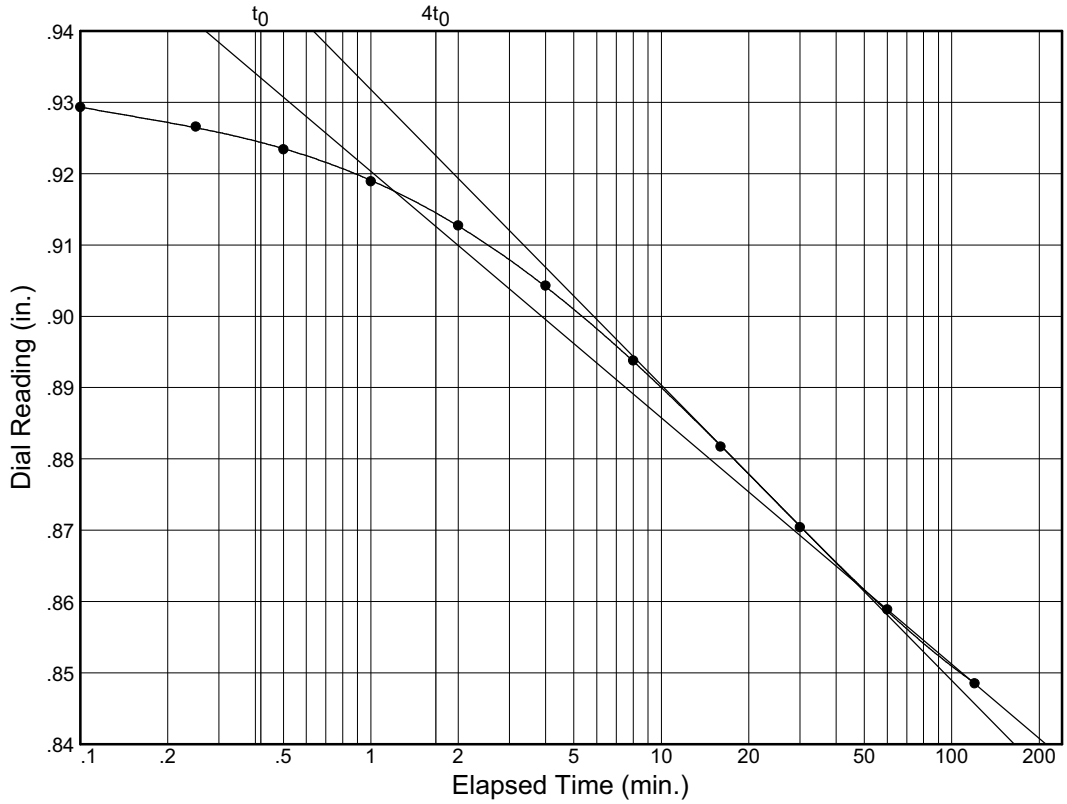
$C_v$ @ $T_{50}$
0.32 ft.$^2$/day

$C_\alpha$ = 0.003

Figure 8

# Dial Reading vs. Time

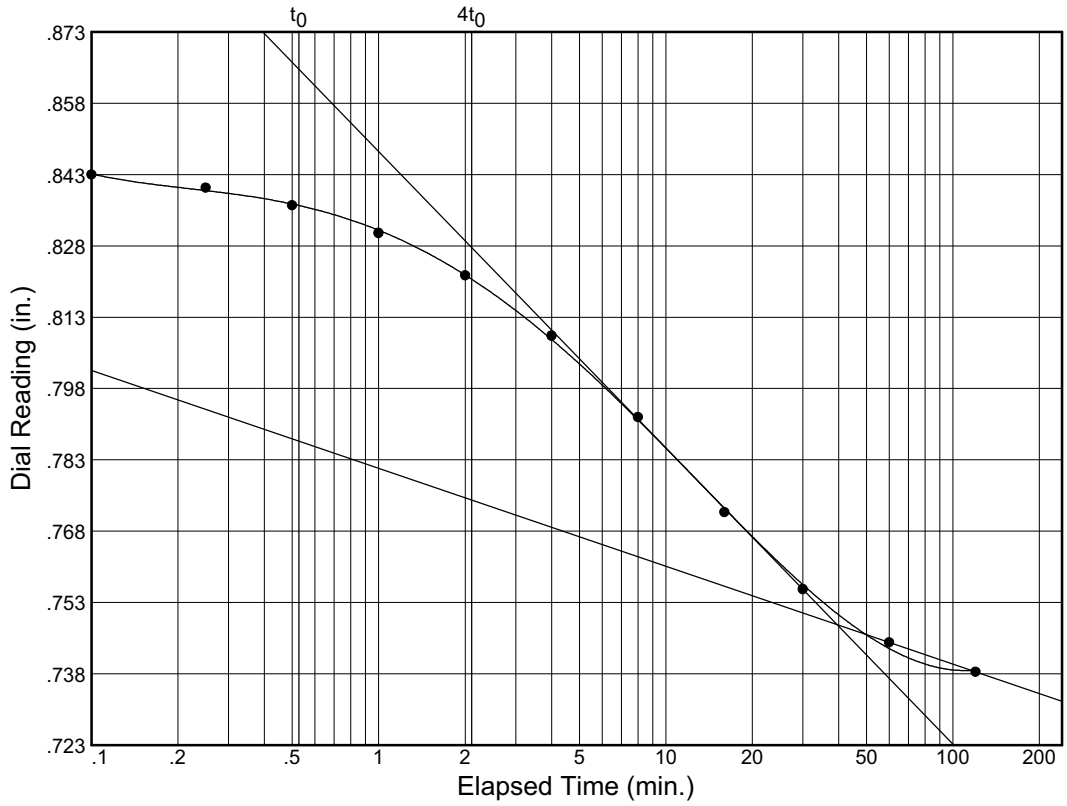
Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: KR2-6B




Load No.= 15
Load= 8.00 tsf
$D_0$ = 0.93425
$D_{50}$ = 0.89855
$D_{100}$ = 0.86285
$T_{50}$ = 5.88 min.

| $C_v$ @ $T_{50}$ |
|---|
| 0.07 ft.$^2$/day |

$C_\alpha$ = 0.037




Load No.= 16
Load= 16.00 tsf
$D_0$ = 0.85200
$D_{50}$ = 0.80017
$D_{100}$ = 0.74834
$T_{50}$ = 5.66 min.

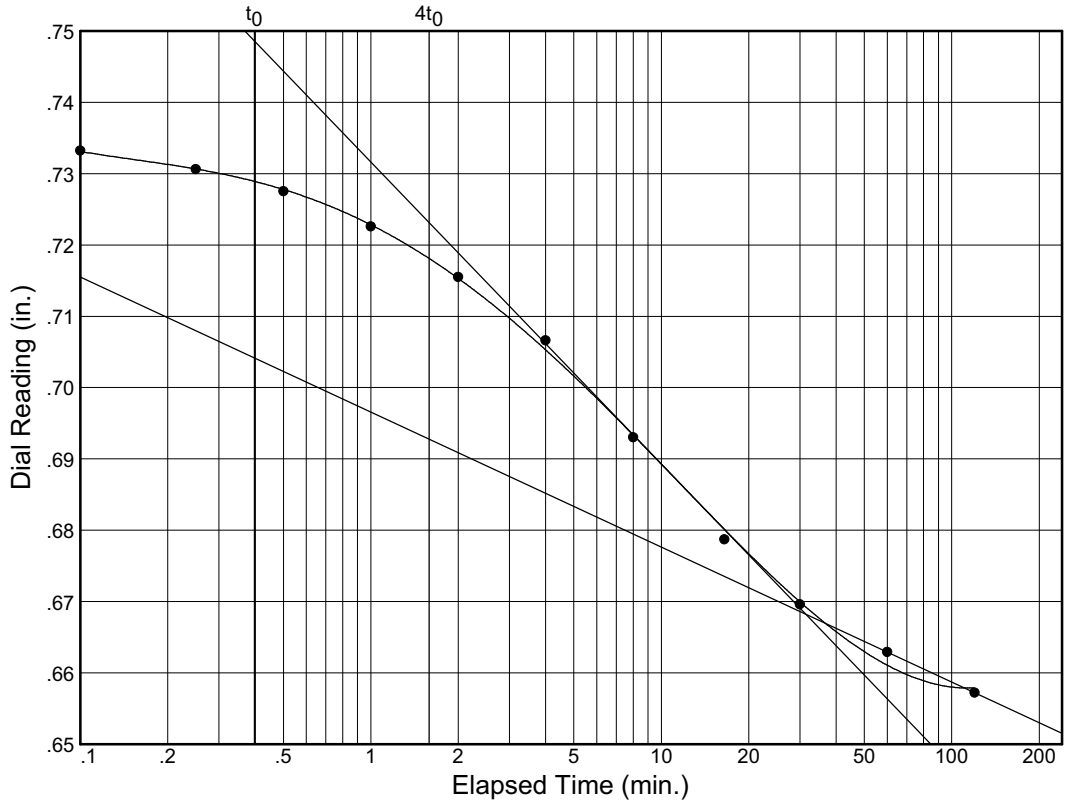
| $C_v$ @ $T_{50}$ |
|---|
| 0.05 ft.$^2$/day |

$C_\alpha$ = 0.024

Figure 9

# Dial Reading vs. Time

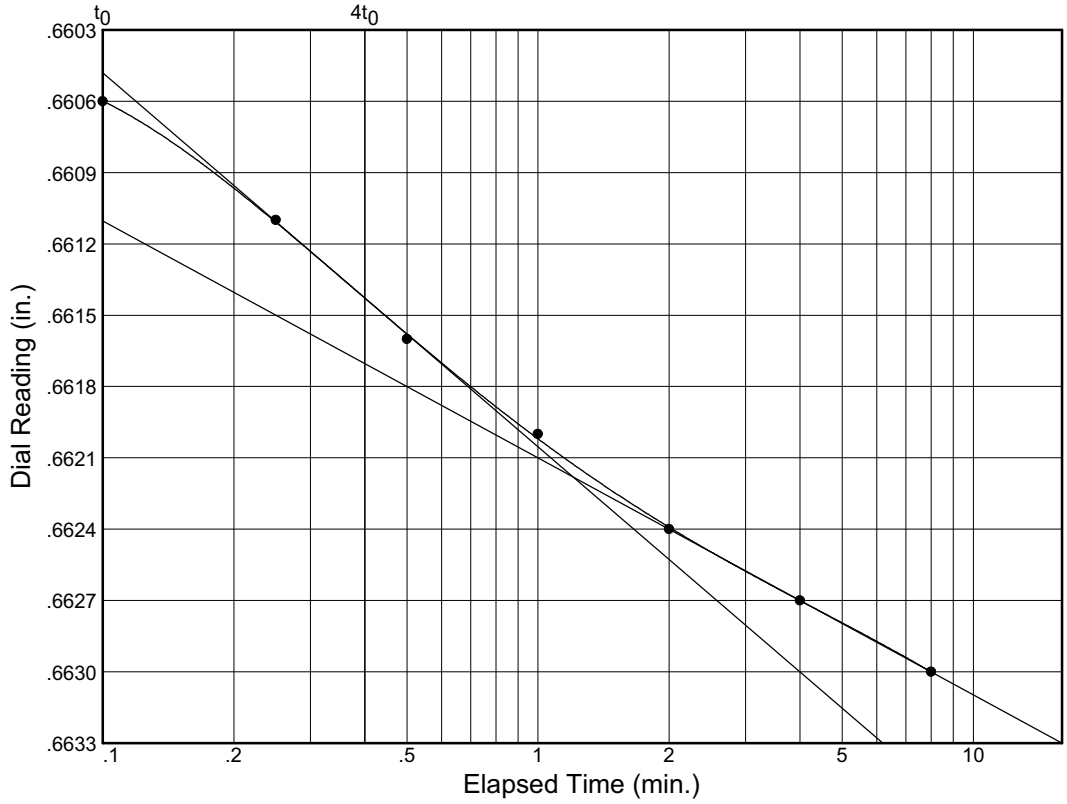
Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: KR2-6B




Load No.= 17
Load= 32.00 tsf
$D_0$ = 0.73974
$D_{50}$ = 0.70397
$D_{100}$ = 0.66820
$T_{50}$ = 4.34 min.

| $C_v$ @ $T_{50}$ |
|---|
| 0.06 ft.$^2$/day |

$C_\alpha$ = 0.026



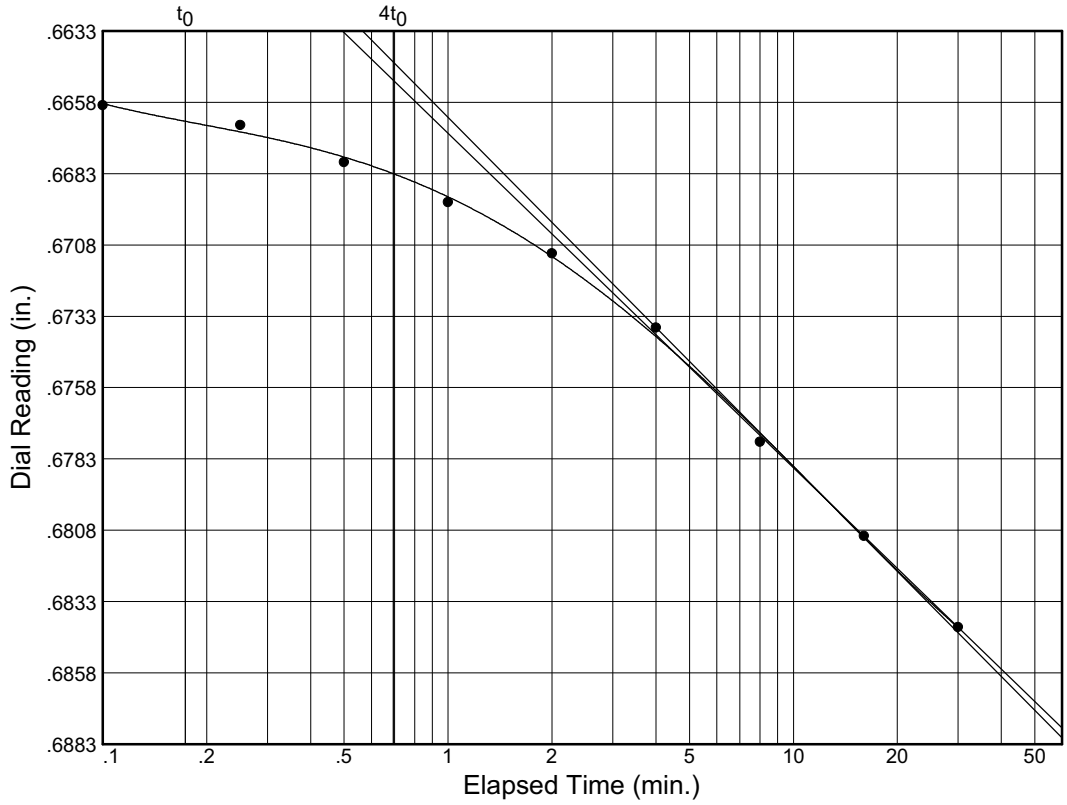

Load No.= 18
Load= 16.00 tsf
$D_0$ = 0.65977
$D_{50}$ = 0.66097
$D_{100}$ = 0.66218
$T_{50}$ = 0.20 min.

| $C_v$ @ $T_{50}$ |
|---|
| 1.06 ft.$^2$/day |

Figure 10

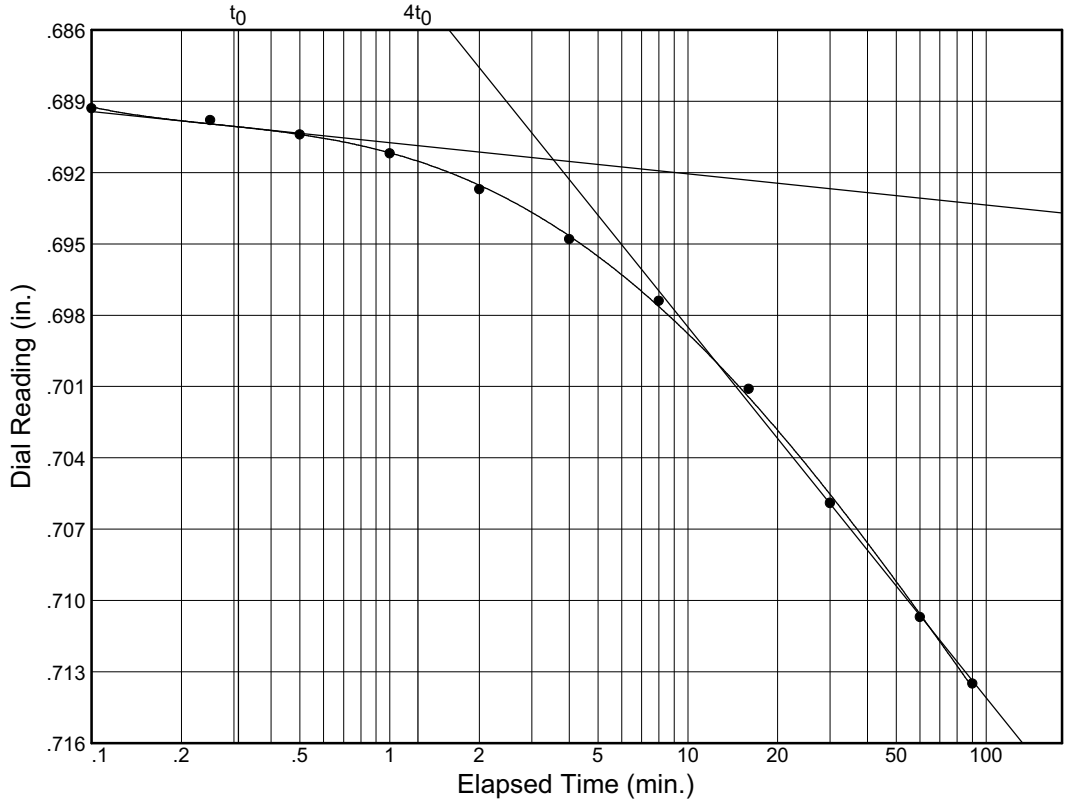
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: KR2-6B




Load No.= 19
Load= 4.00 tsf
$D_0$ = 0.66463
$D_{50}$ = 0.67217
$D_{100}$ = 0.67970
$T_{50}$ = 2.59 min.

| $C_v$ @ $T_{50}$ |
|---|
| 0.09 ft.$^2$/day |



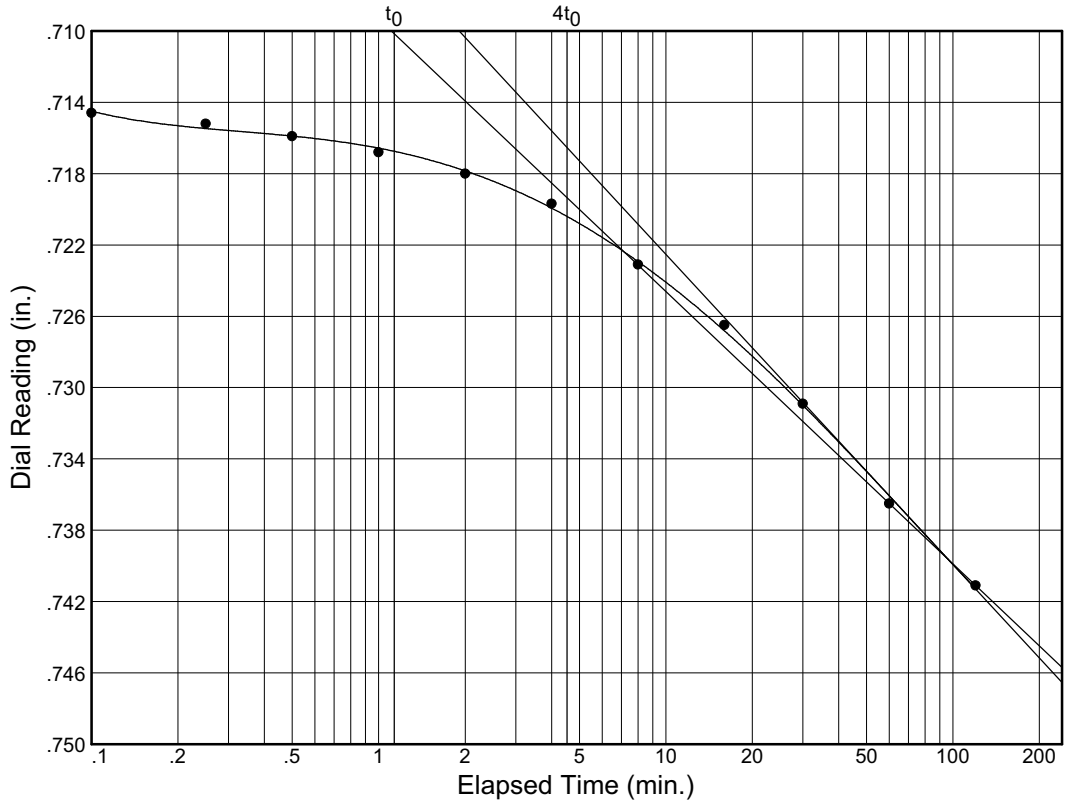

Load No.= 20
Load= 1.00 tsf
$D_0$ = 0.68863
$D_{50}$ = 0.69004
$D_{100}$ = 0.69146
$T_{50}$ = 0.29 min.

| $C_v$ @ $T_{50}$ |
|---|
| 0.82 ft.$^2$/day |

Figure 11

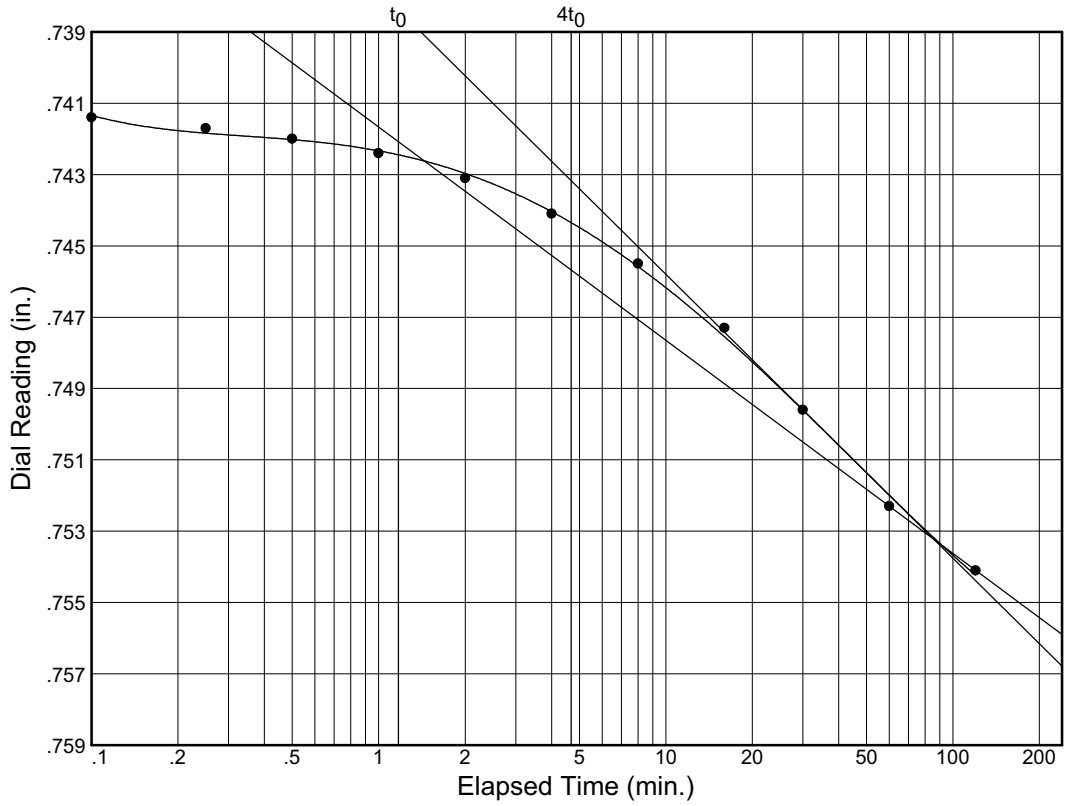
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: KR2-6B




Load No.= 21
Load= 0.25 tsf
$D_0$ = 0.71310
$D_{50}$ = 0.72636
$D_{100}$ = 0.73961
$T_{50}$ = 14.84 min.

| $C_v$ @ $T_{50}$ |
|---|
| 0.02 ft.$^2$/day |



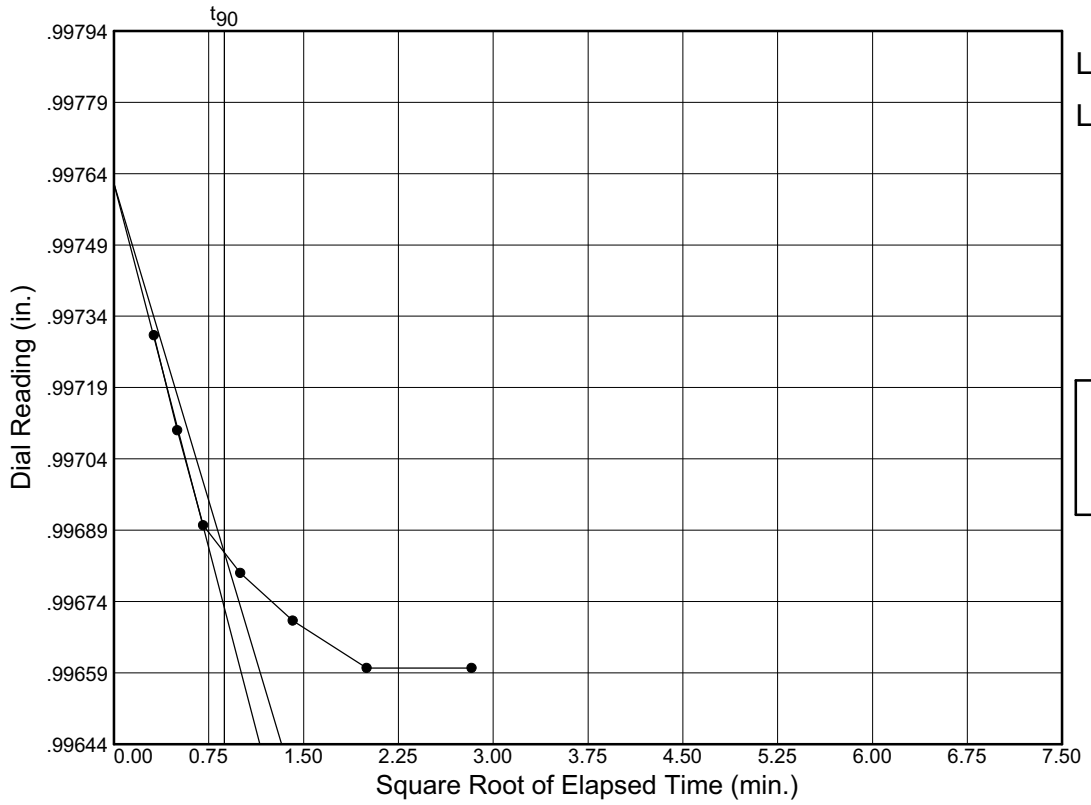

Load No.= 22
Load= 0.13 tsf
$D_0$ = 0.74054
$D_{50}$ = 0.74688
$D_{100}$ = 0.75323
$T_{50}$ = 12.85 min.

| $C_v$ @ $T_{50}$ |
|---|
| 0.02 ft.$^2$/day |

Figure 12

# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: KR2-6B




Load No.= 1

Load= 0.13 tsf

$D_0$ = 0.99762

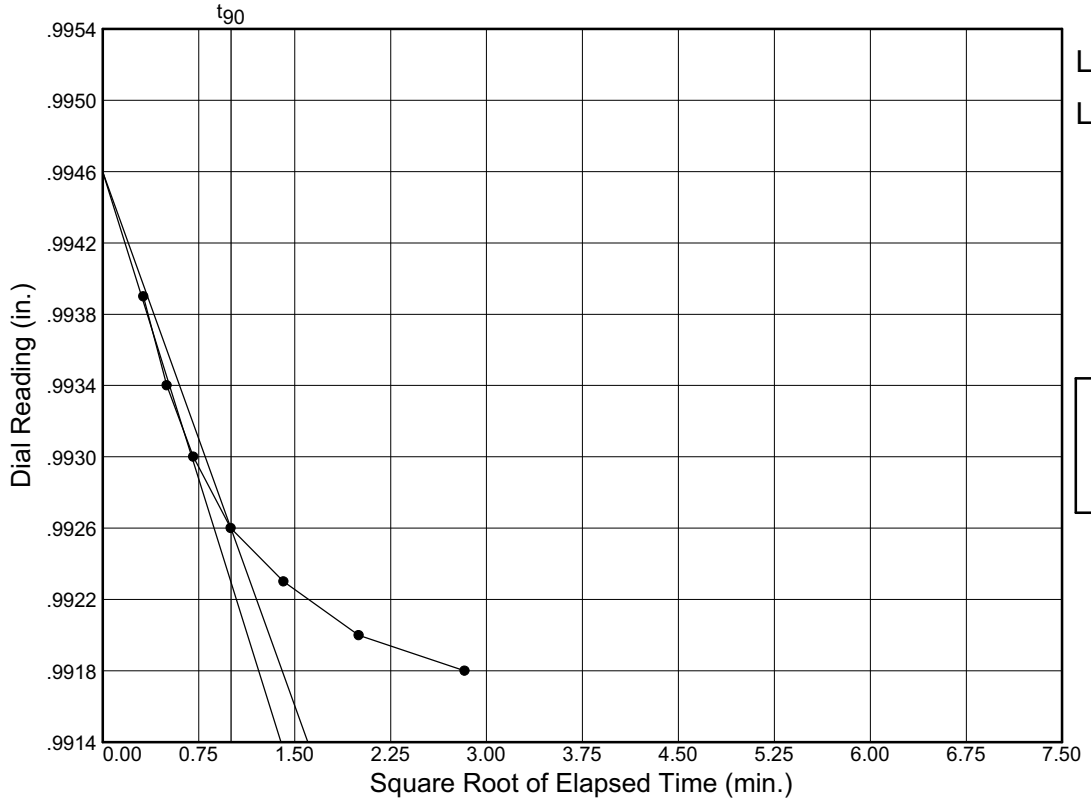
$D_{90}$ = 0.99684

$D_{100}$ = 0.99676

$T_{90}$ = 0.76 min.

$C_v$ @ $T_{90}$

2.78 ft.$^2$/day




Load No.= 2

Load= 0.25 tsf

$D_0$ = 0.99460

$D_{90}$ = 0.99260

$D_{100}$ = 0.99238

$T_{90}$ = 1.00 min.

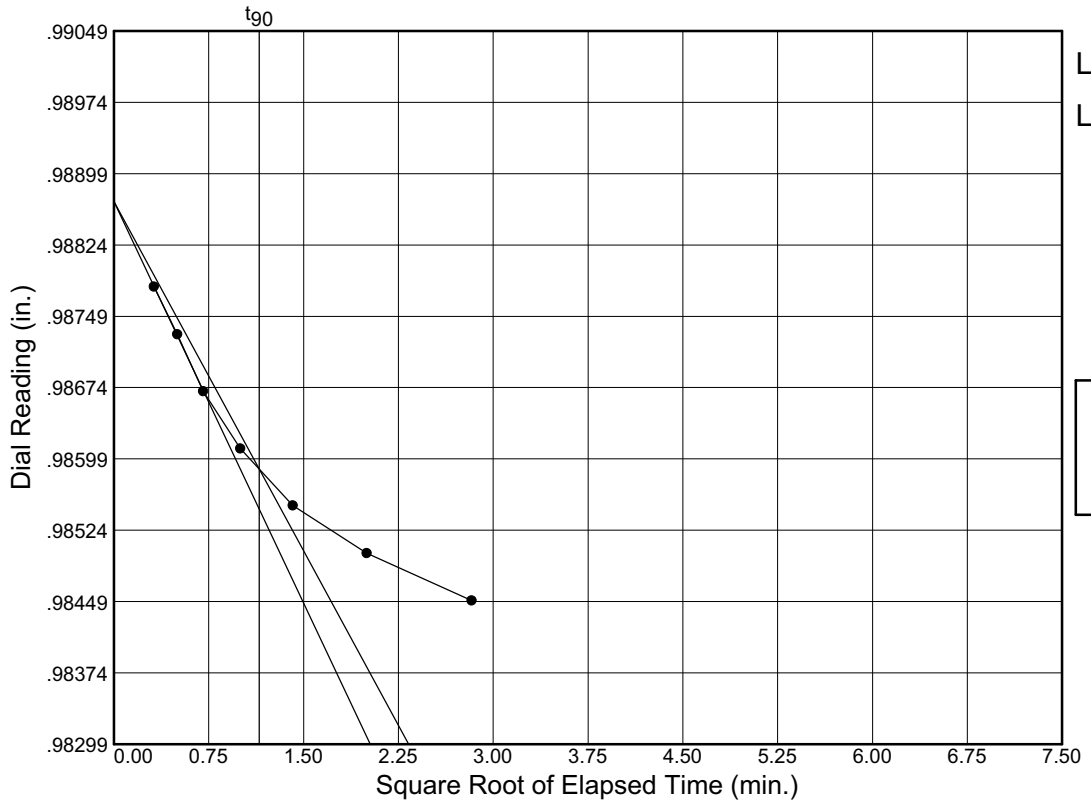
$C_v$ @ $T_{90}$

2.09 ft.$^2$/day

Figure 2

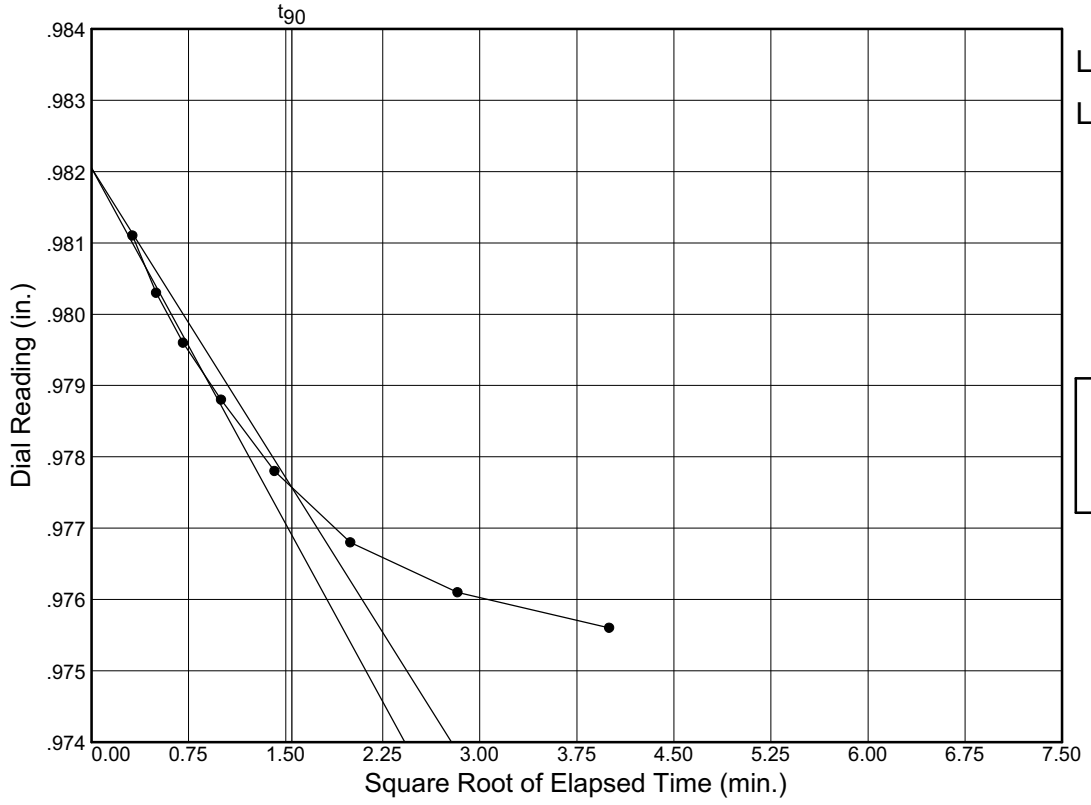
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: KR2-6B




Load No.= 3
Load= 0.50 tsf
$D_0$ = 0.98870
$D_{90}$ = 0.98589
$D_{100}$ = 0.98557
$T_{90}$ = 1.32 min.

$C_v$ @ $T_{90}$
1.57 ft.$^2$/day



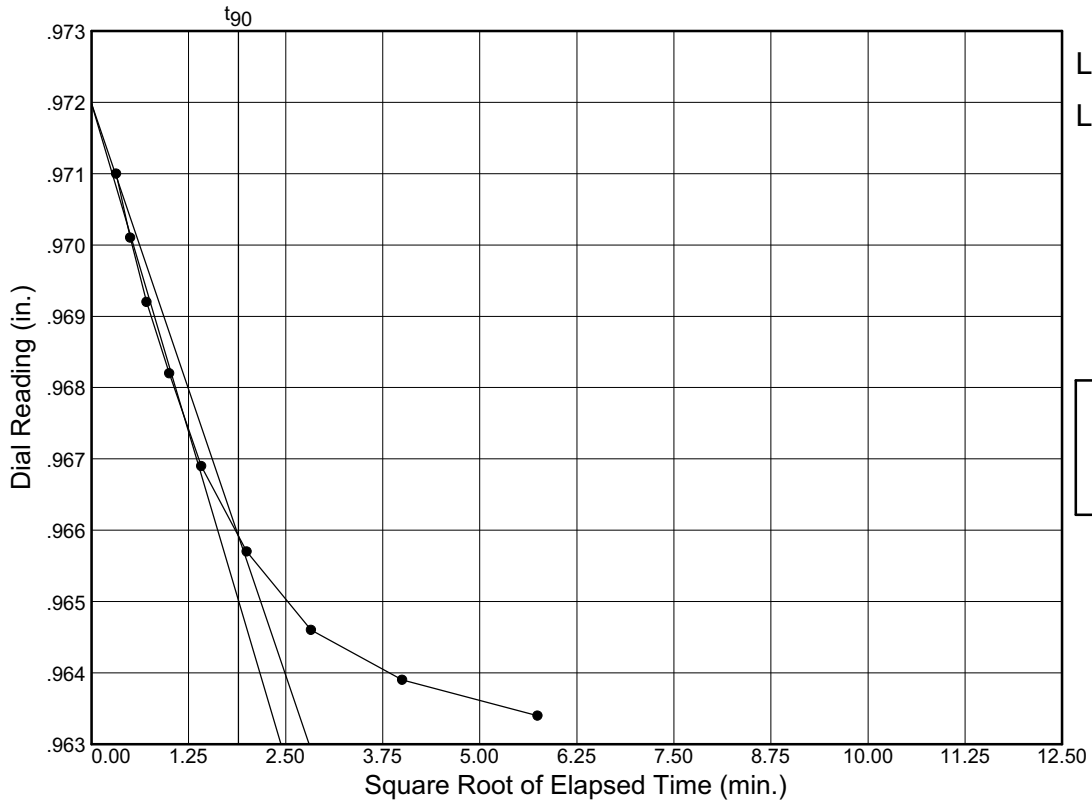

Load No.= 4
Load= 1.00 tsf
$D_0$ = 0.98205
$D_{90}$ = 0.97757
$D_{100}$ = 0.97708
$T_{90}$ = 2.39 min.

$C_v$ @ $T_{90}$
0.85 ft.$^2$/day

Figure 3

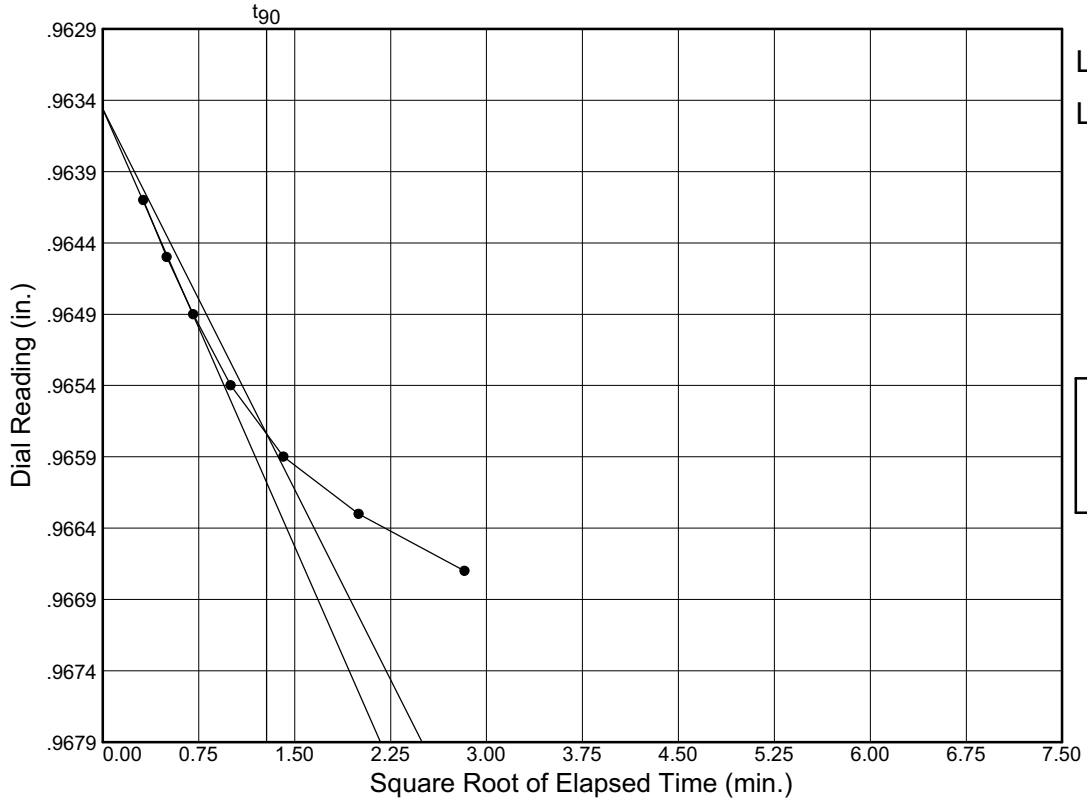
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: KR2-6B




Load No.= 5
Load= 2.00 tsf
$D_0$ = 0.97198
$D_{90}$ = 0.96593
$D_{100}$ = 0.96525
$T_{90}$ = 3.57 min.

$C_v$ @ $T_{90}$
0.56 ft.$^2$/day



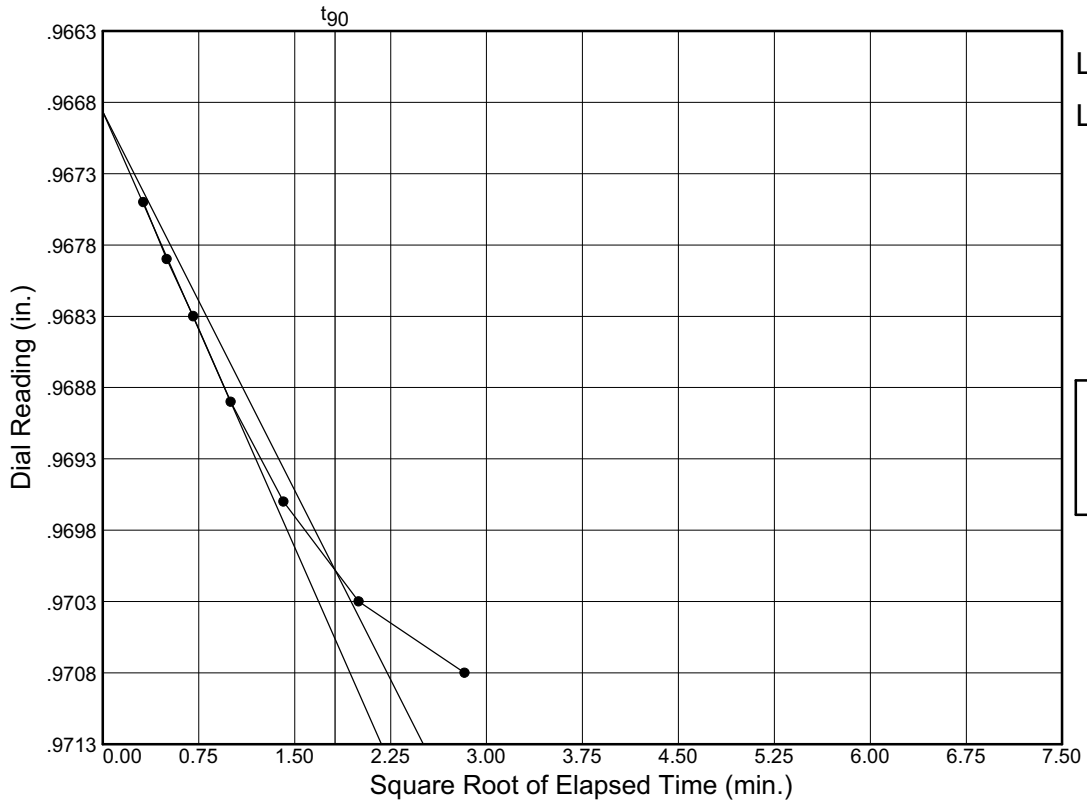

Load No.= 6
Load= 1.00 tsf
$D_0$ = 0.96346
$D_{90}$ = 0.96574
$D_{100}$ = 0.96599
$T_{90}$ = 1.64 min.

$C_v$ @ $T_{90}$
1.20 ft.$^2$/day

Figure 4

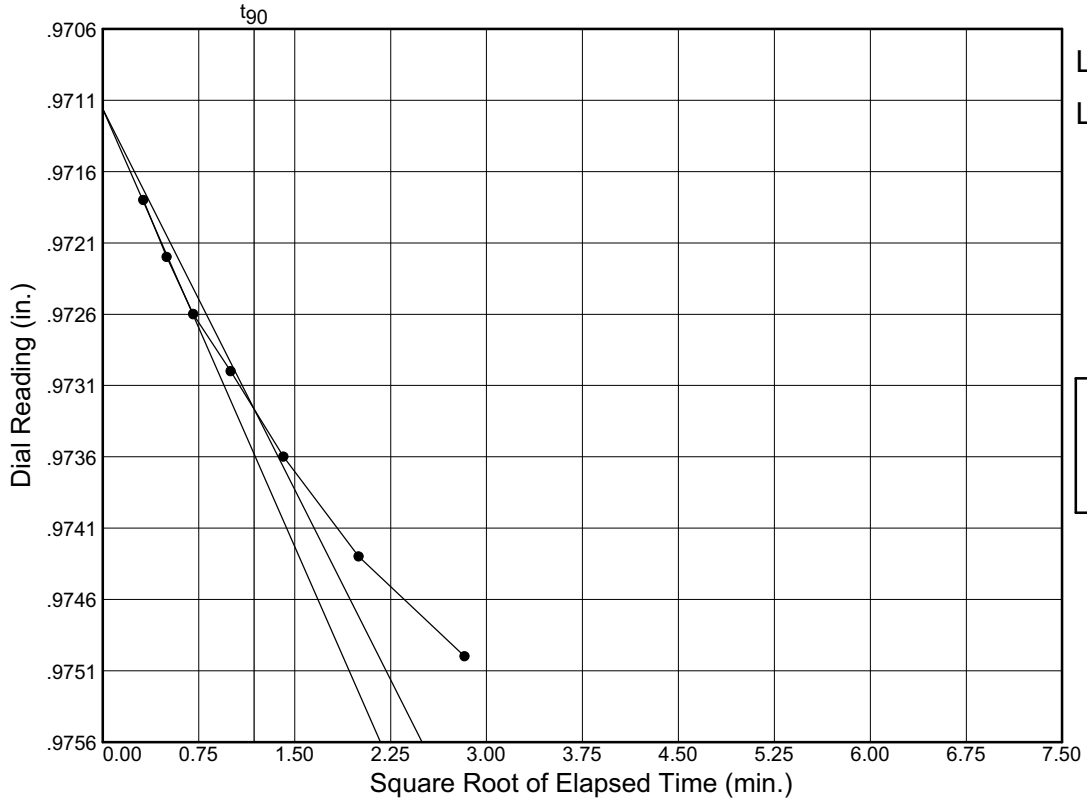
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: KR2-6B




Load No.= 7
Load= 0.50 tsf
$D_0$ = 0.96687
$D_{90}$ = 0.97008
$D_{100}$ = 0.97044
$T_{90}$ = 3.30 min.

$C_v$ @ $T_{90}$
0.60 ft.$^2$/day



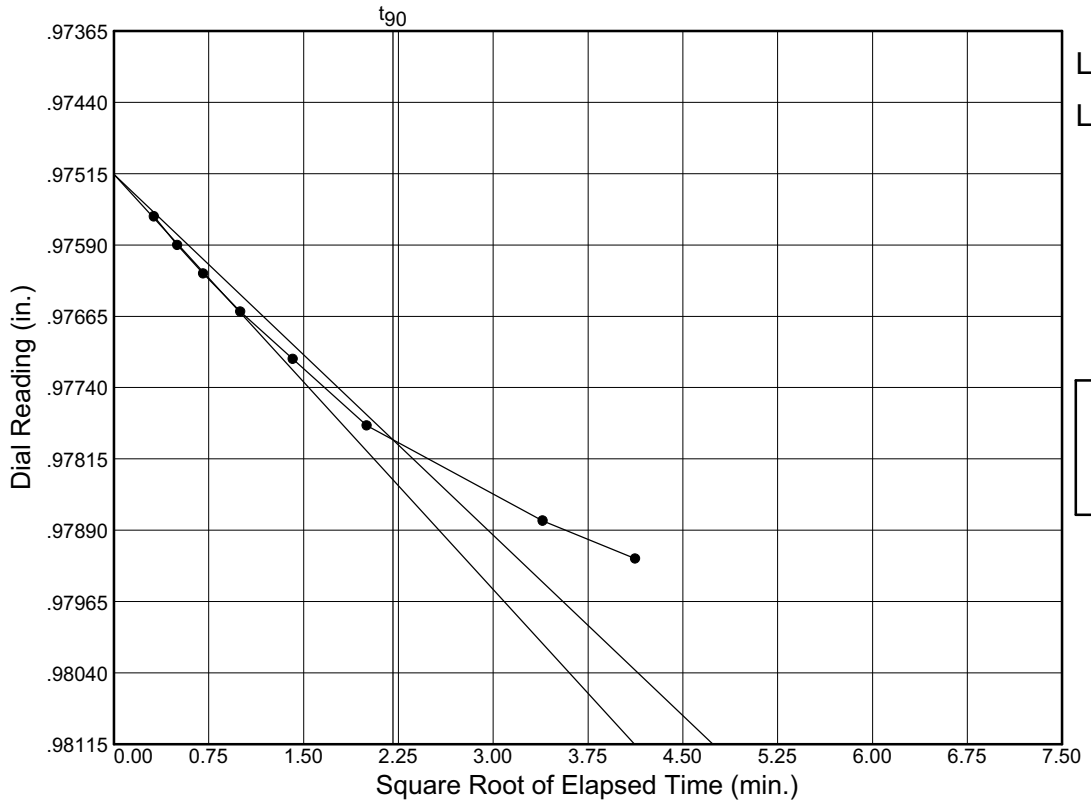

Load No.= 8
Load= 0.25 tsf
$D_0$ = 0.97116
$D_{90}$ = 0.97327
$D_{100}$ = 0.97350
$T_{90}$ = 1.40 min.

$C_v$ @ $T_{90}$
1.43 ft.$^2$/day

Figure 5

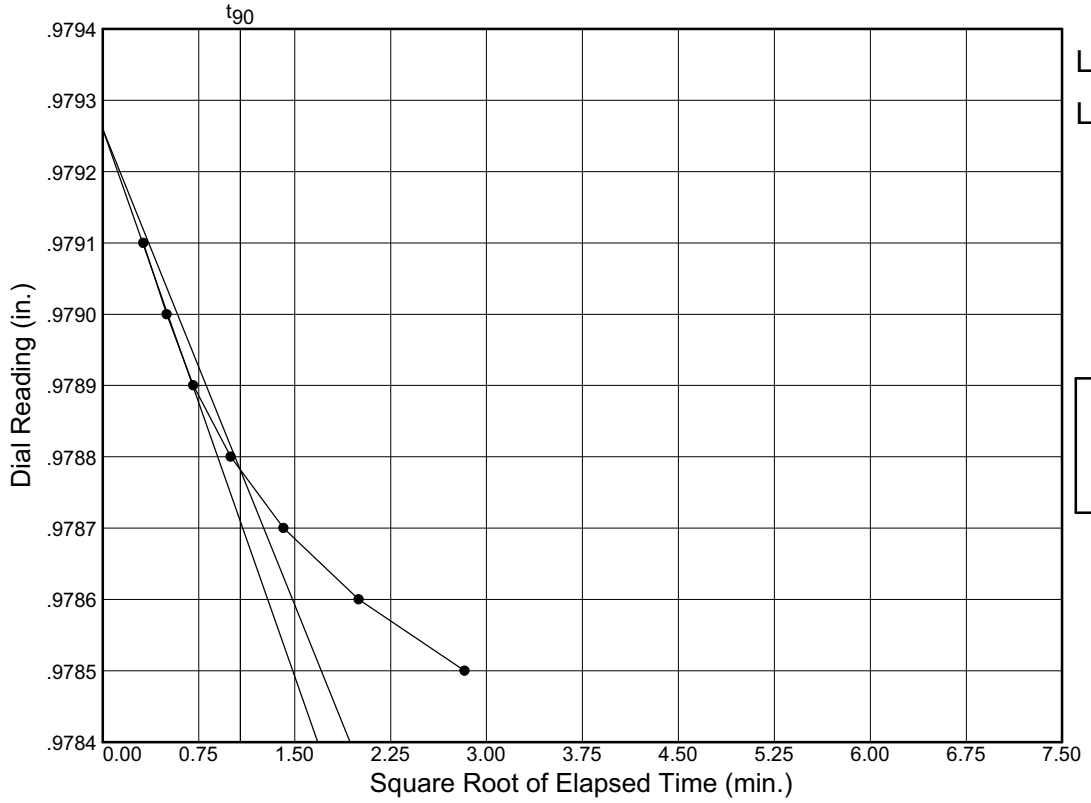
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: KR2-6B




Load No.= 9
Load= 0.13 tsf
$D_0$ = 0.97516
$D_{90}$ = 0.97795
$D_{100}$ = 0.97826
$T_{90}$ = 4.87 min.

$C_v$ @ $T_{90}$
0.42 ft.$^2$/day



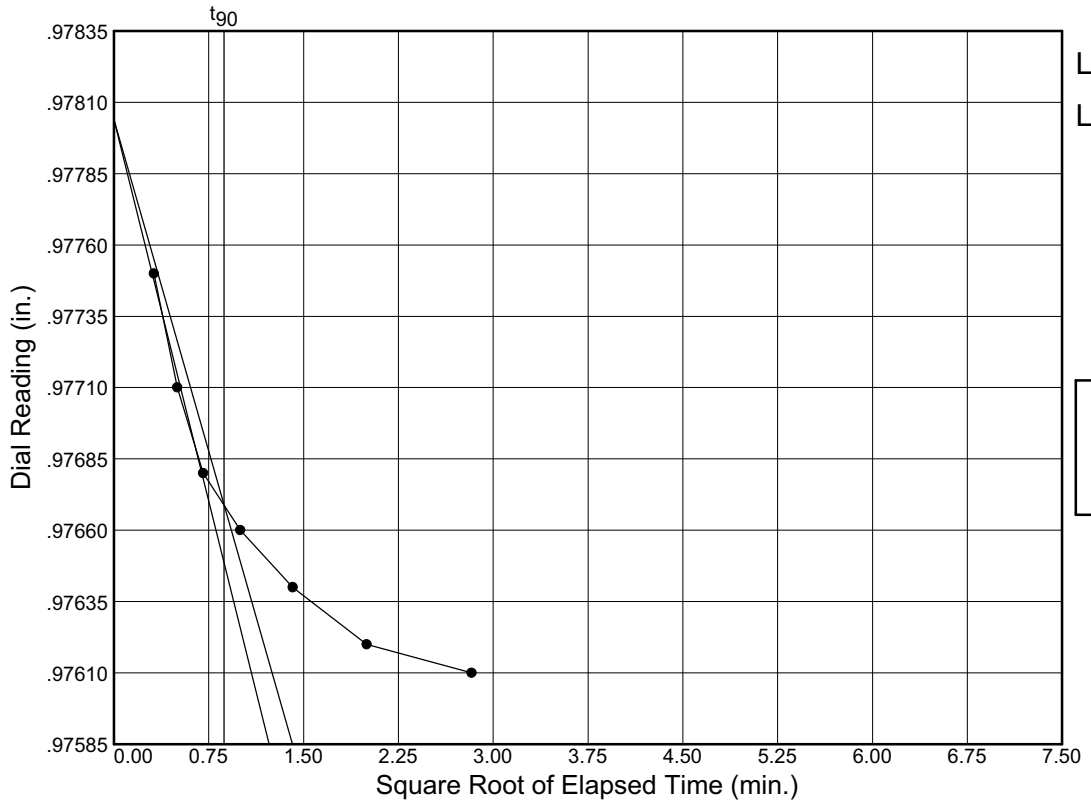

Load No.= 10
Load= 0.25 tsf
$D_0$ = 0.97926
$D_{90}$ = 0.97878
$D_{100}$ = 0.97873
$T_{90}$ = 1.15 min.

$C_v$ @ $T_{90}$
1.76 ft.$^2$/day

Figure 6

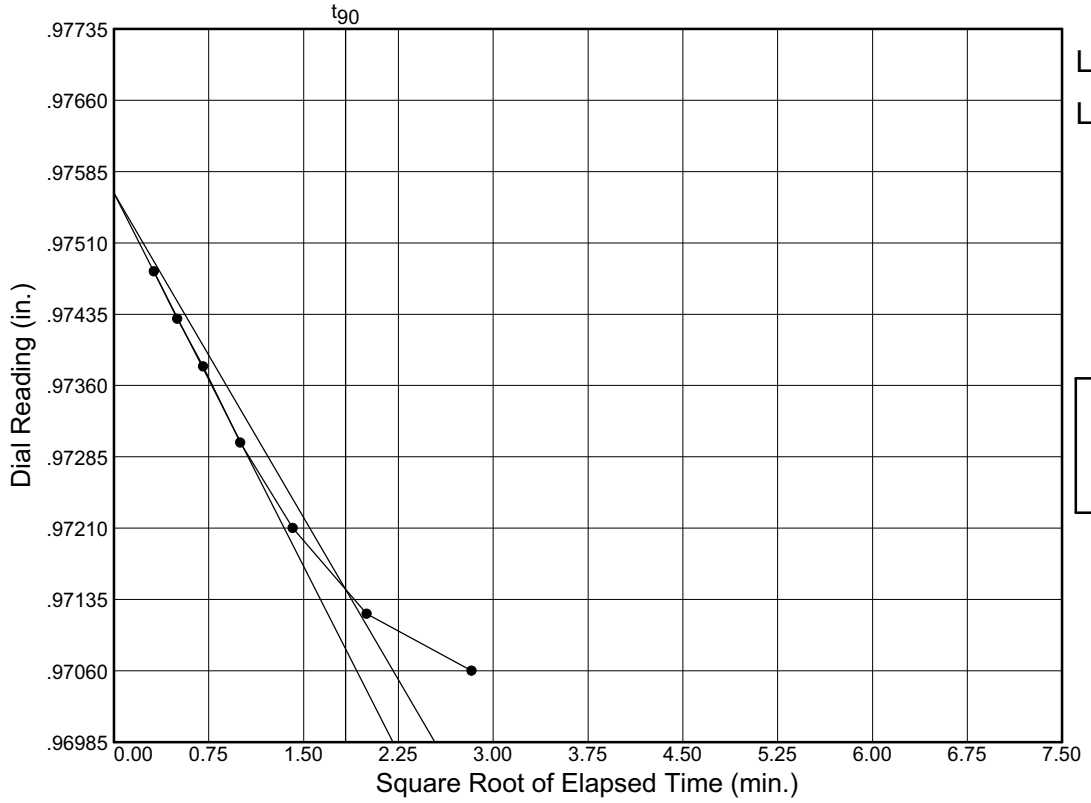
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: KR2-6B




Load No.= 11
Load= 0.50 tsf
$D_0$ = 0.97804
$D_{90}$ = 0.97669
$D_{100}$ = 0.97654
$T_{90}$ = 0.76 min.

$C_v$ @ $T_{90}$
2.67 ft.$^2$/day



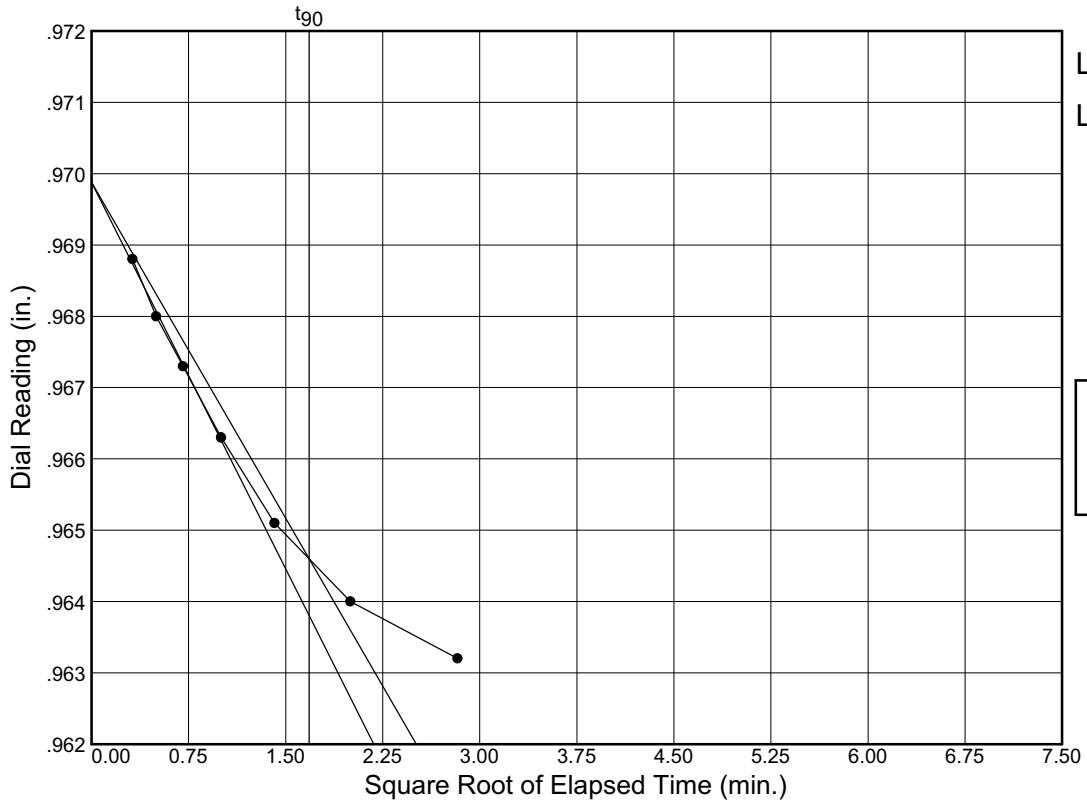

Load No.= 12
Load= 1.00 tsf
$D_0$ = 0.97562
$D_{90}$ = 0.97146
$D_{100}$ = 0.97100
$T_{90}$ = 3.36 min.

$C_v$ @ $T_{90}$
0.60 ft.$^2$/day

Figure 7

# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: KR2-6B




Load No.= 13

Load= 2.00 tsf

$D_0$ = 0.96988

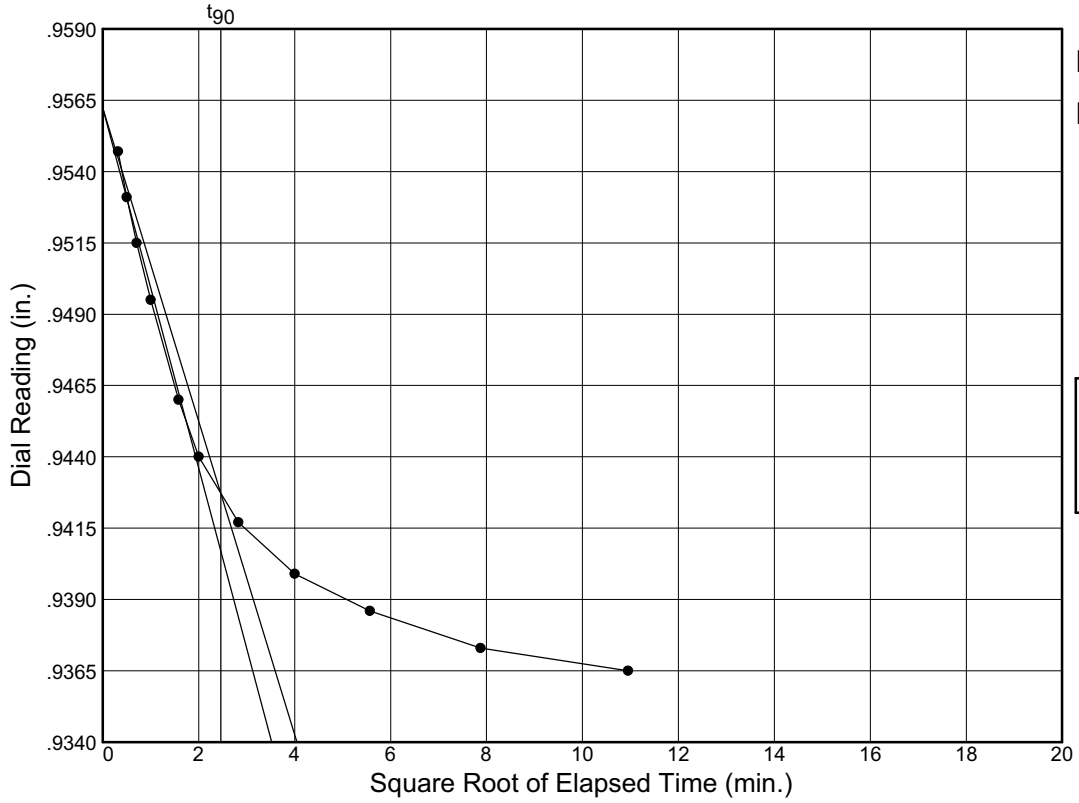
$D_{90}$ = 0.96460

$D_{100}$ = 0.96401

$T_{90}$ = 2.82 min.

$C_v$ @ $T_{90}$

0.70 ft.$^2$/day




Load No.= 14

Load= 4.00 tsf

$D_0$ = 0.95622

$D_{90}$ = 0.94273

$D_{100}$ = 0.94123

$T_{90}$ = 6.04 min.

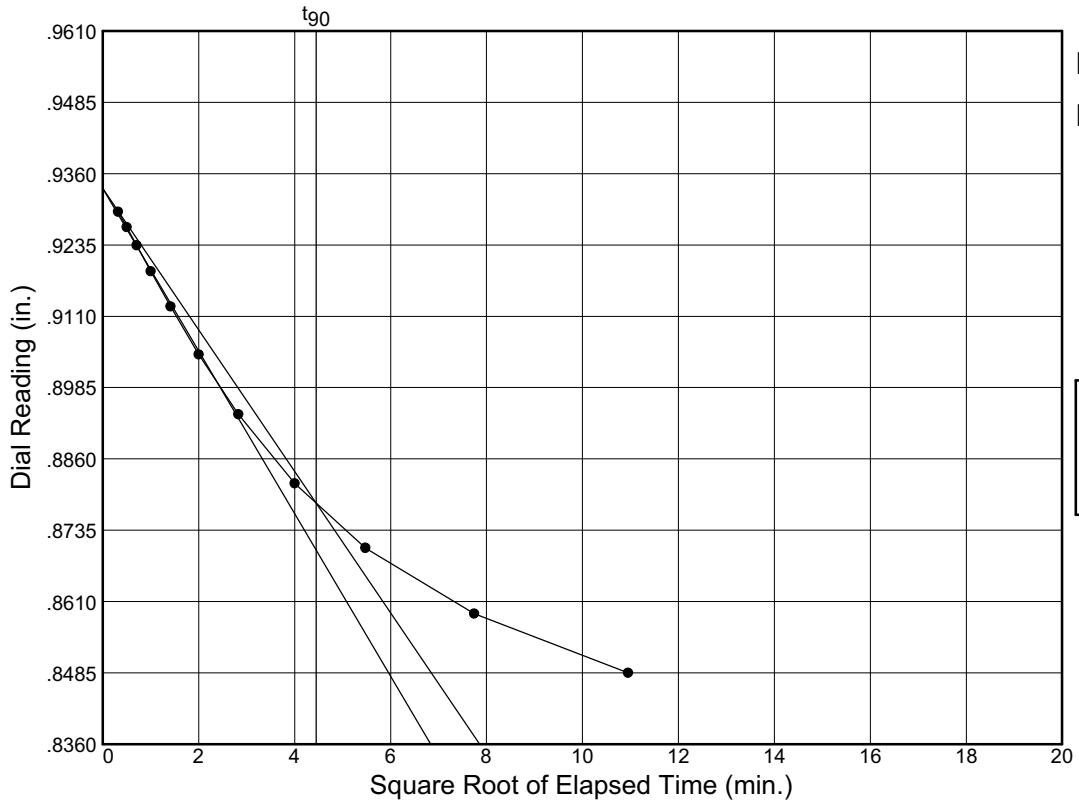
$C_v$ @ $T_{90}$

0.32 ft.$^2$/day

Figure 8

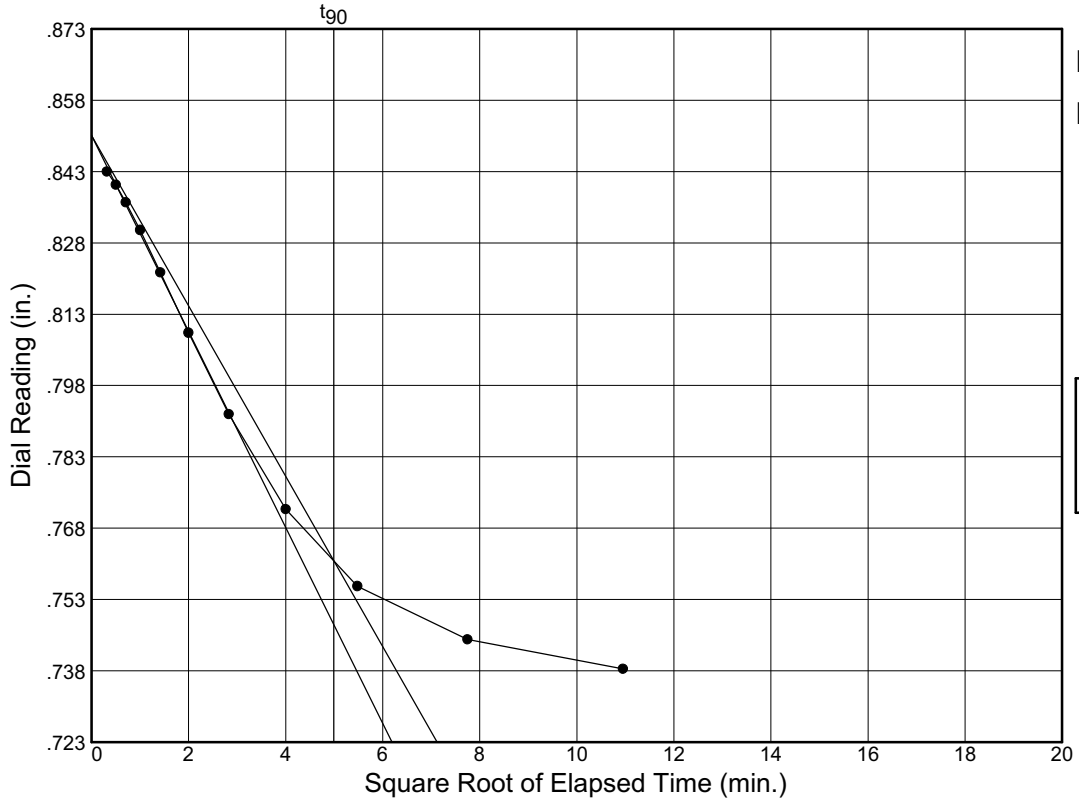
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: KR2-6B




Load No.= 15
Load= 8.00 tsf
$D_0$ = 0.93342
$D_{90}$ = 0.87826
$D_{100}$ = 0.87213
$T_{90}$ = 19.81 min.

$C_v$ @ $T_{90}$
0.09 ft.$^2$/day



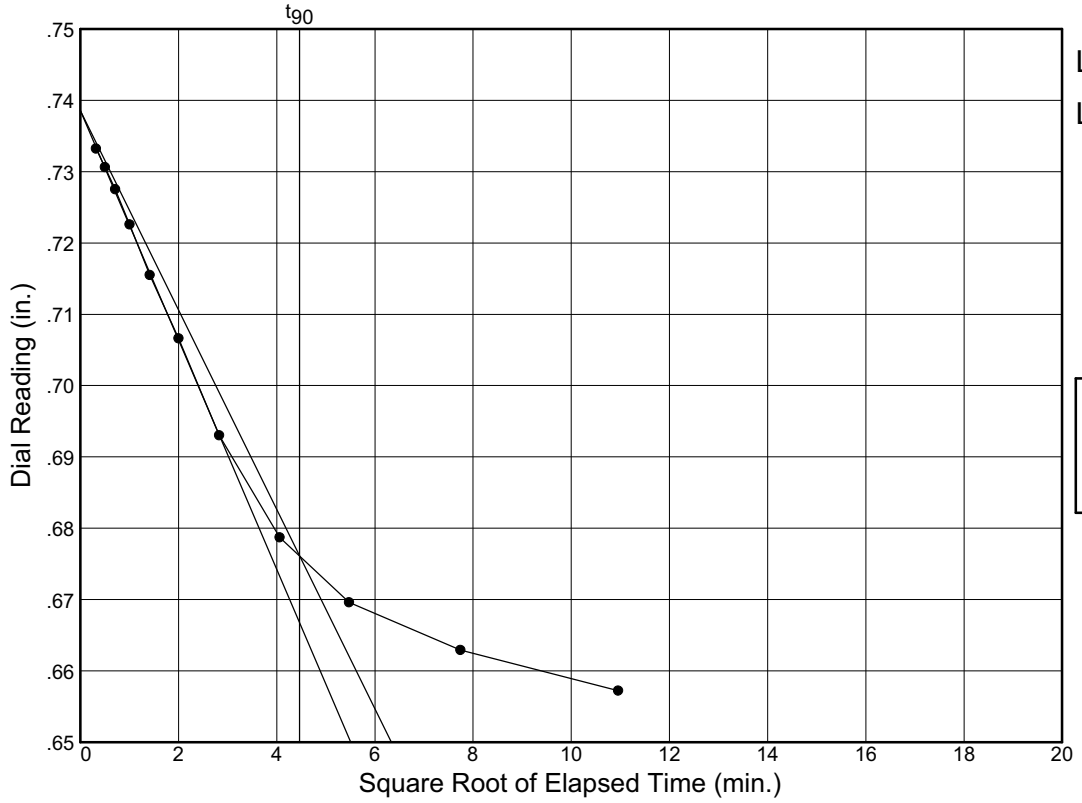

Load No.= 16
Load= 16.00 tsf
$D_0$ = 0.85056
$D_{90}$ = 0.76114
$D_{100}$ = 0.75120
$T_{90}$ = 24.90 min.

$C_v$ @ $T_{90}$
0.05 ft.$^2$/day

Figure 9

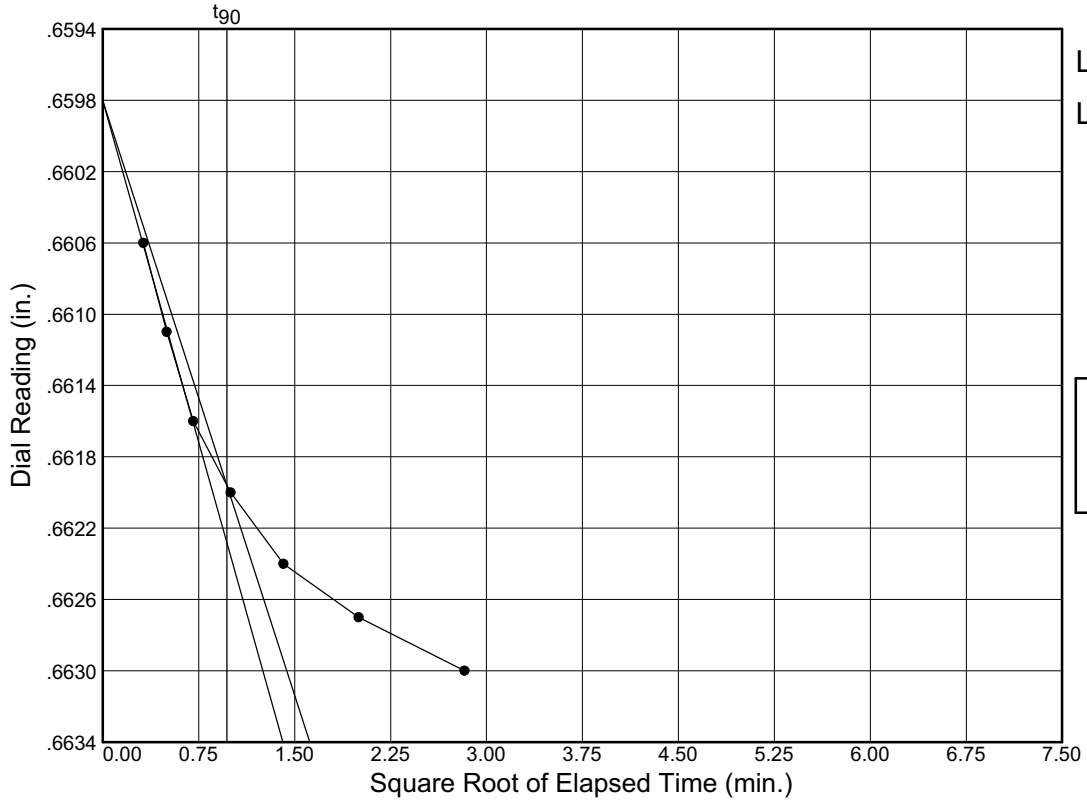
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: KR2-6B




Load No.= 17
Load= 32.00 tsf
$D_0$ = 0.73857
$D_{90}$ = 0.67610
$D_{100}$ = 0.66916
$T_{90}$ = 19.95 min.

$C_v$ @ $T_{90}$
0.05 ft.$^2$/day



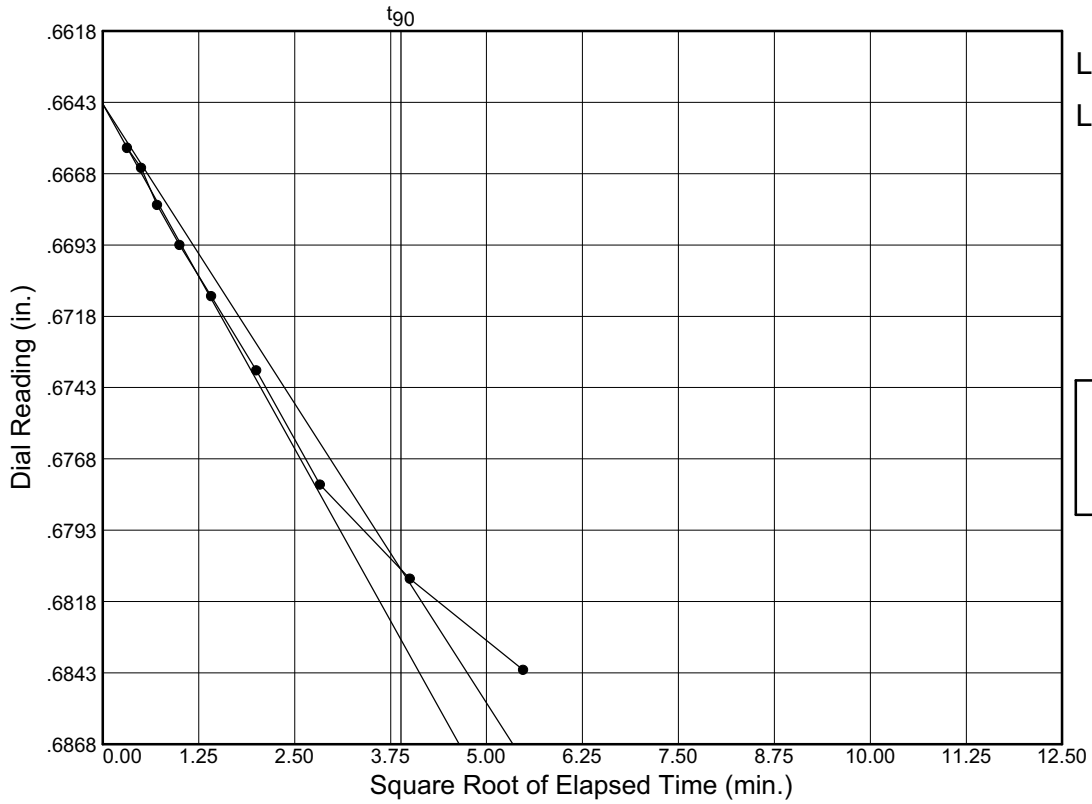

Load No.= 18
Load= 16.00 tsf
$D_0$ = 0.65980
$D_{90}$ = 0.66196
$D_{100}$ = 0.66220
$T_{90}$ = 0.94 min.

$C_v$ @ $T_{90}$
0.98 ft.$^2$/day

Figure 10

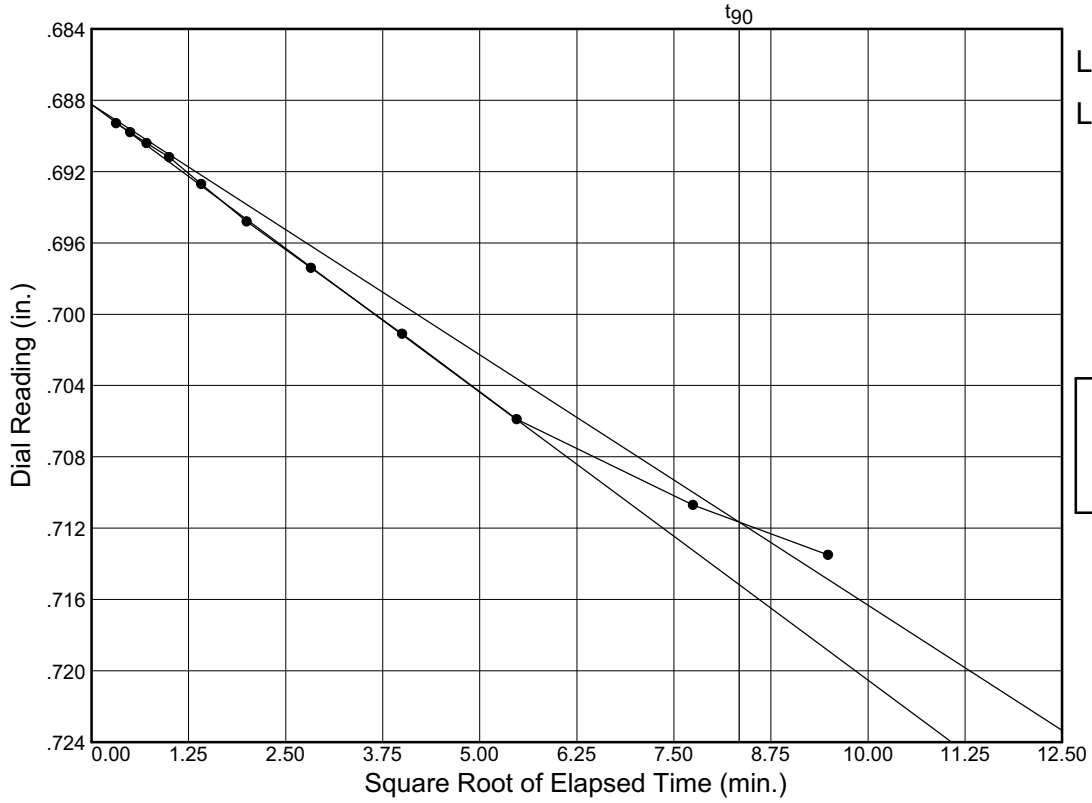
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: KR2-6B




Load No.= 19
Load= 4.00 tsf
$D_0$ = 0.66436
$D_{90}$ = 0.68068
$D_{100}$ = 0.68249
$T_{90}$ = 15.09 min.

$C_v$ @ $T_{90}$
0.06 ft.$^2$/day



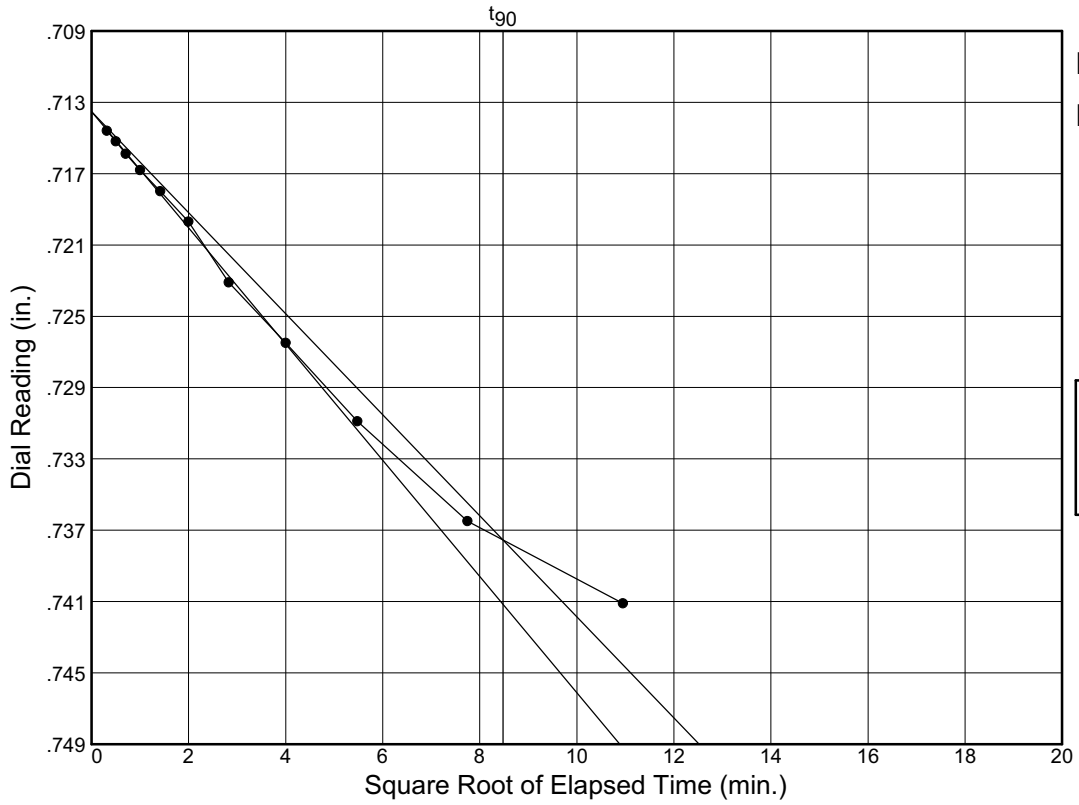

Load No.= 20
Load= 1.00 tsf
$D_0$ = 0.68824
$D_{90}$ = 0.71166
$D_{100}$ = 0.71426
$T_{90}$ = 69.56 min.

$C_v$ @ $T_{90}$
0.01 ft.$^2$/day

Figure 11

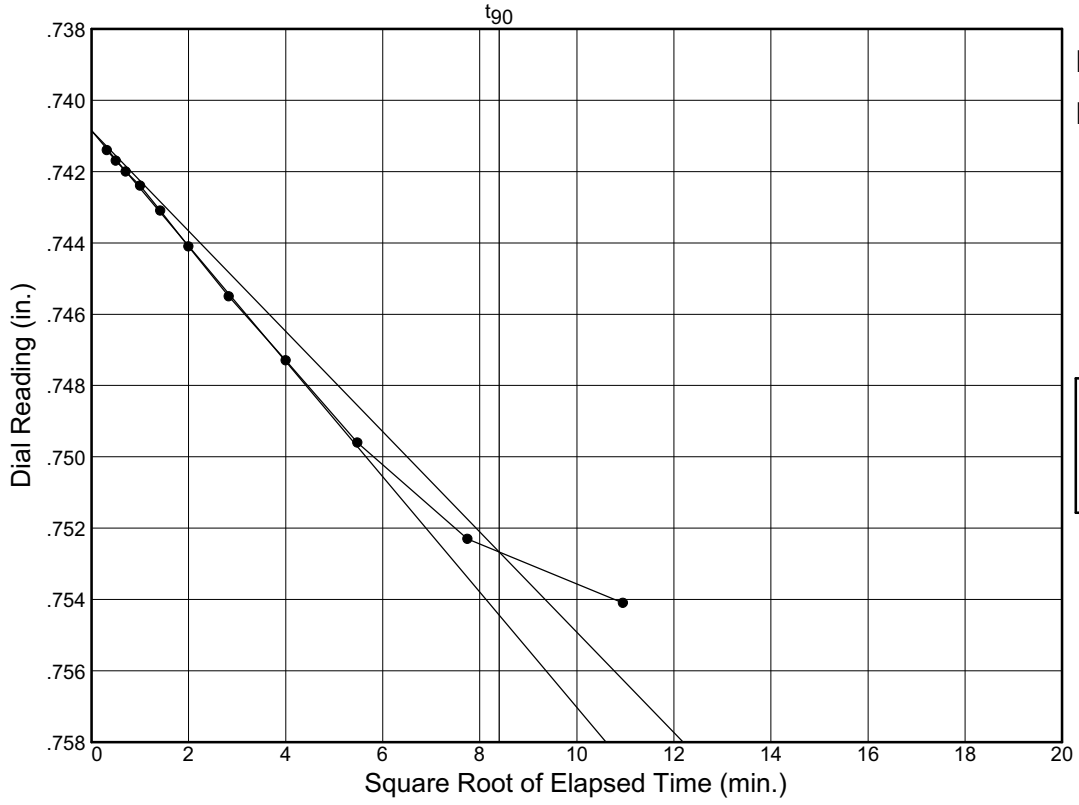
# Dial Reading vs. Time

Project No.: VB10-237G
Project: VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
Location: KR2-6B




Load No.= 21
Load= 0.25 tsf
$D_0$ = 0.71352
$D_{90}$ = 0.73755
$D_{100}$ = 0.74022
$T_{90}$ = 71.86 min.

$C_v$ @ $T_{90}$
0.02 ft.$^2$/day




Load No.= 22
Load= 0.13 tsf
$D_0$ = 0.74086
$D_{90}$ = 0.75266
$D_{100}$ = 0.75398
$T_{90}$ = 70.50 min.

$C_v$ @ $T_{90}$
0.02 ft.$^2$/day

Figure 12

## CONSOLIDATION TEST DATA

**Client:** HDR, Inc.
**Project:** VDOT I-64 to I-264 PSA 2 Ramps and Channel
Virginia Beach, Virginia
**Project Number:** VB10-237G

### Sample Data

**Source:**
**Sample No.:** Shelby Tube
**Elev. or Depth:** 90 ft. **Sample Length(in./cm.):** 1 in.
**Location:** KR2-6B
**Description:** Gray, Fat CLAY
**Sample Date:** **Liquid Limit:** **Plasticity Index:**
**USCS:** **AASHTO:**
**Preparation Process:**
**Condition of Test:**
**Test Method:** **Final Density:** **Figure No.:** 1
**Testing Remarks:** KR2-6B
Depth=90 ft.
**Tested By:** **Test Date:**
**Checked By:** **Title:**

### Test Specimen Data

| TOTAL SAMPLE | BEFORE TEST | AFTER TEST |
|---|---|---|
| **Wet w+t** = 278.49 g. | **Consolidometer #** = 1 | **Wet w+t** = 254.96 g. |
| **Dry w+t** = 231.43 g. | | **Dry w+t** = 231.43 g. |
| **Tare Wt.** = 145.32 g. | **Spec. Gravity** = 2.59 | **Tare Wt.** = 145.32 g. |
| **Height** = 1.00 in. | **Height** = 1.00 in. | |
| **Diameter** = 2.50 in. | **Diameter** = 2.50 in. | |
| **Weight** = 133.17 g. | **Defl. Table** = Reference Set (inches/tsf) | |
| **Moisture** = 54.7 % | **Ht. Solids** = 0.4133 in. | **Moisture** = 27.3 % |
| **Wet Den.** = 103.4 pcf | **Dry Wt.** = 86.11 g. | **Dry Wt.** = 86.11 g.* |
| **Dry Den.** = 66.8 pcf | **Void Ratio** = 1.419 | **Void Ratio** = 0.825 |
| **Ovrbrdn.** = 2.75 tsf | **Saturation** = 99.7 % | |

*** Final dry weight used in calculations**

### End-of-Load Summary

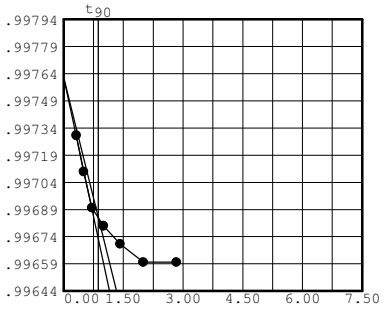
| Pressure (tsf) | Final Dial (in.) | Machine Defl. (in.) | $C_v$ (ft.$^2$/day) | $C_\alpha$ | Void Ratio | % Compression /Swell |
|---|---|---|---|---|---|---|
| start | 1.00000 | | | | 1.419 | |
| 0.13 | 0.99660 | 0.00000 | 2.78 | | 1.411 | 0.3 Comprs. |
| 0.25 | 0.99140 | 0.00040 | 2.09 | | 1.400 | 0.8 Comprs. |
| 0.50 | 0.98370 | 0.00080 | 1.57 | | 1.382 | 1.6 Comprs. |
| 1.00 | 0.97400 | 0.00160 | 0.85 | | 1.360 | 2.4 Comprs. |
| 2.00 | 0.96100 | 0.00240 | 0.56 | | 1.331 | 3.7 Comprs. |
| 1.00 | 0.96510 | 0.00160 | 1.20 | | 1.339 | 3.3 Comprs. |
| 0.50 | 0.97000 | 0.00080 | 0.60 | | 1.349 | 2.9 Comprs. |

| Pressure (tsf) | Final Dial (in.) | Machine Defl. (in.) | $C_v$ (ft.$^2$/day) | $C_\alpha$ | Void Ratio | % Compression /Swell |
|---|---|---|---|---|---|---|
| 0.25 | 0.97460 | 0.00040 | 1.43 | | 1.359 | 2.5 Comprs. |
| 0.13 | 0.97920 | 0.00000 | 0.42 | | 1.369 | 2.1 Comprs. |
| 0.25 | 0.97810 | 0.00040 | 1.76 | | 1.367 | 2.1 Comprs. |
| 0.50 | 0.97530 | 0.00080 | 2.67 | | 1.362 | 2.4 Comprs. |
| 1.00 | 0.96900 | 0.00160 | 0.60 | | 1.348 | 2.9 Comprs. |
| 2.00 | 0.96020 | 0.00300 | 0.70 | | 1.330 | 3.7 Comprs. |
| 4.00 | 0.93650 | 0.00000 | 0.32 | | 1.266 | 6.3 Comprs. |
| 8.00 | 0.84850 | 0.00000 | 0.09 | | 1.053 | 15.1 Comprs. |
| 16.00 | 0.73840 | 0.00000 | 0.05 | | 0.787 | 26.2 Comprs. |
| 32.00 | 0.65720 | 0.00000 | 0.05 | | 0.590 | 34.3 Comprs. |
| 16.00 | 0.66300 | 0.00000 | 0.98 | | 0.604 | 33.7 Comprs. |
| 4.00 | 0.68420 | 0.00000 | 0.06 | | 0.655 | 31.6 Comprs. |
| 1.00 | 0.71190 | 0.00160 | 0.01 | | 0.726 | 28.6 Comprs. |
| 0.25 | 0.74070 | 0.00040 | 0.02 | | 0.793 | 25.9 Comprs. |
| 0.13 | 0.75410 | 0.00000 | 0.02 | | 0.825 | 24.6 Comprs. |

**$C_c$ =** 0.91 **$P_c$ =** 4.52 tsf **$C_r$ =** 0.06

**Pressure: 0.13 tsf** **TEST READINGS** **Load No. 1**

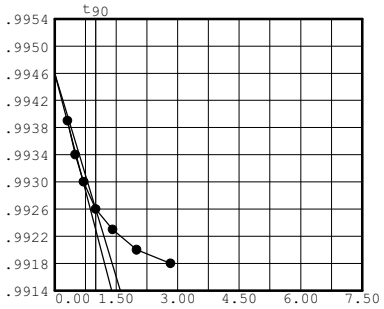
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 1.00000 |
| 2 | 0.10 | 0.99730 |
| 3 | 0.25 | 0.99710 |
| 4 | 0.50 | 0.99690 |
| 5 | 1.00 | 0.99680 |
| 6 | 2.00 | 0.99670 |
| 7 | 4.00 | 0.99660 |
| 8 | 8.00 | 0.99660 |




**Void Ratio =** 1.411 **Compression =** 0.3 %
**$D_0$ =** 0.99762 **$D_{90}$ =** 0.99684 **$D_{100}$ =** 0.99676
**$C_v$ at 0.8 min. =** 2.78 ft.$^2$/day

**Pressure: 0.25 tsf** **TEST READINGS** **Load No. 2**

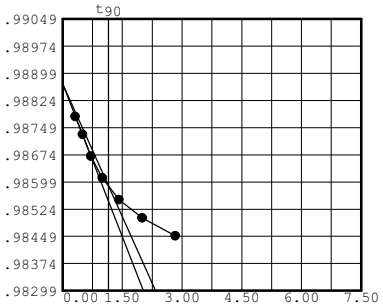
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.99660 |
| 2 | 0.10 | 0.99350 |
| 3 | 0.25 | 0.99300 |
| 4 | 0.50 | 0.99260 |
| 5 | 1.00 | 0.99220 |
| 6 | 2.00 | 0.99190 |
| 7 | 4.00 | 0.99160 |
| 8 | 8.00 | 0.99140 |




**Void Ratio =** 1.400 **Compression =** 0.8 %
**$D_0$ =** 0.99460 **$D_{90}$ =** 0.99260 **$D_{100}$ =** 0.99238
**$C_v$ at 1.0 min. =** 2.09 ft.$^2$/day

**Pressure: 0.50 tsf** **TEST READINGS** **Load No. 3**

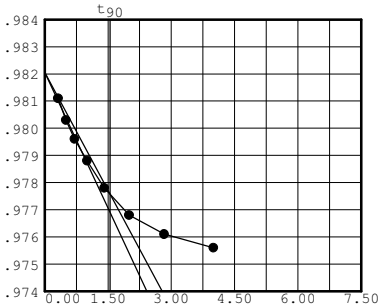
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.99140 |
| 2 | 0.10 | 0.98700 |
| 3 | 0.25 | 0.98650 |
| 4 | 0.50 | 0.98590 |
| 5 | 1.00 | 0.98530 |
| 6 | 2.00 | 0.98470 |
| 7 | 4.00 | 0.98420 |
| 8 | 8.00 | 0.98370 |




**Void Ratio =** 1.382 **Compression =** 1.6 %
**$D_0$ =** 0.98870 **$D_{90}$ =** 0.98589 **$D_{100}$ =** 0.98557
**$C_v$ at 1.3 min. =** 1.57 ft.$^2$/day

**Pressure: 1.00 tsf** **TEST READINGS** **Load No. 4**

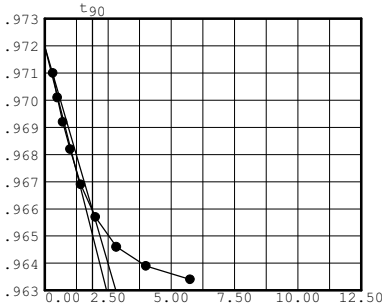
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.98370 |
| 2 | 0.10 | 0.97950 |
| 3 | 0.25 | 0.97870 |
| 4 | 0.50 | 0.97800 |
| 5 | 1.00 | 0.97720 |
| 6 | 2.00 | 0.97620 |
| 7 | 4.00 | 0.97520 |
| 8 | 8.00 | 0.97450 |
| 9 | 16.00 | 0.97400 |




**Void Ratio =** 1.360 **Compression =** 2.4 %
**$D_0$ =** 0.98205 **$D_{90}$ =** 0.97757 **$D_{100}$ =** 0.97708
**$C_v$ at 2.4 min. =** 0.85 ft.$^2$/day

**Pressure: 2.00 tsf** **TEST READINGS** **Load No. 5**

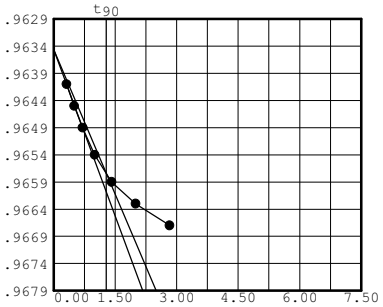
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.97450 |
| 2 | 0.10 | 0.96860 |
| 3 | 0.25 | 0.96770 |
| 4 | 0.50 | 0.96680 |
| 5 | 1.00 | 0.96580 |
| 6 | 2.00 | 0.96450 |
| 7 | 4.00 | 0.96330 |
| 8 | 8.00 | 0.96220 |
| 9 | 16.00 | 0.96150 |
| 10 | 33.00 | 0.96100 |




**Void Ratio =** 1.331 **Compression =** 3.7 %
**$D_0$ =** 0.97198 **$D_{90}$ =** 0.96593 **$D_{100}$ =** 0.96525
**$C_v$ at 3.6 min. =** 0.56 ft.$^2$/day

**Pressure: 1.00 tsf** **TEST READINGS** **Load No. 6**

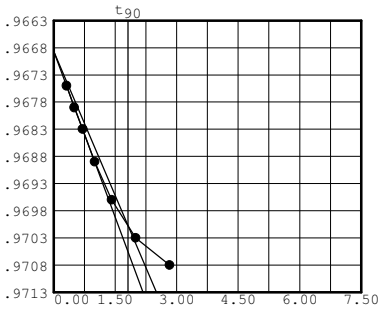
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.96100 |
| 2 | 0.10 | 0.96250 |
| 3 | 0.25 | 0.96290 |
| 4 | 0.50 | 0.96330 |
| 5 | 1.00 | 0.96380 |
| 6 | 2.00 | 0.96430 |
| 7 | 4.00 | 0.96470 |
| 8 | 8.00 | 0.96510 |




**Void Ratio =** 1.339 **Compression =** 3.3 %
**$D_0$ =** 0.96346 **$D_{90}$ =** 0.96574 **$D_{100}$ =** 0.96599
**$C_v$ at 1.6 min. =** 1.20 ft.$^2$/day

**Pressure: 0.50 tsf** **TEST READINGS** **Load No. 7**

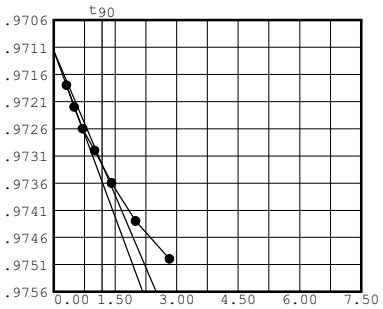
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.96510 |
| 2 | 0.10 | 0.96670 |
| 3 | 0.25 | 0.96710 |
| 4 | 0.50 | 0.96750 |
| 5 | 1.00 | 0.96810 |
| 6 | 2.00 | 0.96880 |
| 7 | 4.00 | 0.96950 |
| 8 | 8.00 | 0.97000 |




**Void Ratio =** 1.349 **Compression =** 2.9 %
**$D_0$ =** 0.96687 **$D_{90}$ =** 0.97008 **$D_{100}$ =** 0.97044
**$C_v$ at 3.3 min. =** 0.60 ft.$^2$/day

**Pressure: 0.25 tsf** **TEST READINGS** **Load No. 8**

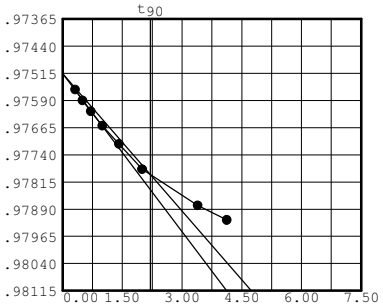
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.97000 |
| 2 | 0.10 | 0.97140 |
| 3 | 0.25 | 0.97180 |
| 4 | 0.50 | 0.97220 |
| 5 | 1.00 | 0.97260 |
| 6 | 2.00 | 0.97320 |
| 7 | 4.00 | 0.97390 |
| 8 | 8.00 | 0.97460 |




**Void Ratio =** 1.359 **Compression =** 2.5 %
**$D_0$ =** 0.97116 **$D_{90}$ =** 0.97327 **$D_{100}$ =** 0.97350
**$C_v$ at 1.4 min. =** 1.43 ft.$^2$/day

**Pressure: 0.13 tsf** **TEST READINGS** **Load No. 9**

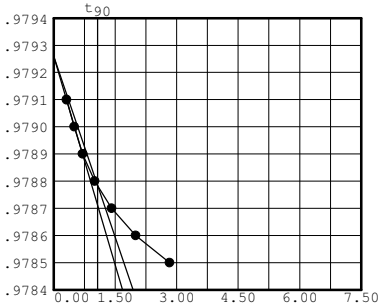
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.97460 |
| 2 | 0.10 | 0.97560 |
| 3 | 0.25 | 0.97590 |
| 4 | 0.50 | 0.97620 |
| 5 | 1.00 | 0.97660 |
| 6 | 2.00 | 0.97710 |
| 7 | 4.00 | 0.97780 |
| 8 | 11.50 | 0.97880 |
| 9 | 17.00 | 0.97920 |




**Void Ratio =** 1.369 **Compression =** 2.1 %
**$D_0$ =** 0.97516 **$D_{90}$ =** 0.97795 **$D_{100}$ =** 0.97826
**$C_v$ at 4.9 min. =** 0.42 ft.$^2$/day

**Pressure: 0.25 tsf** **TEST READINGS** **Load No. 10**

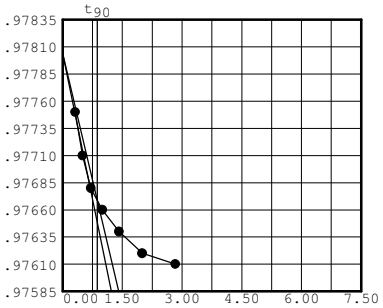
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.97920 |
| 2 | 0.10 | 0.97870 |
| 3 | 0.25 | 0.97860 |
| 4 | 0.50 | 0.97850 |
| 5 | 1.00 | 0.97840 |
| 6 | 2.00 | 0.97830 |
| 7 | 4.00 | 0.97820 |
| 8 | 8.00 | 0.97810 |




**Void Ratio =** 1.367 **Compression =** 2.1 %
**$D_0$ =** 0.97926 **$D_{90}$ =** 0.97878 **$D_{100}$ =** 0.97873
**$C_v$ at 1.2 min. =** 1.76 ft.$^2$/day

**Pressure: 0.50 tsf** **TEST READINGS** **Load No. 11**

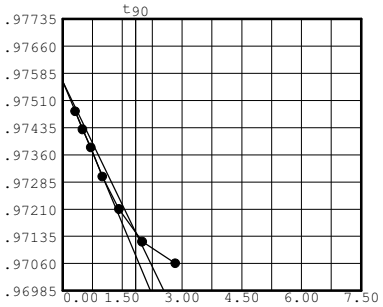
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.97810 |
| 2 | 0.10 | 0.97670 |
| 3 | 0.25 | 0.97630 |
| 4 | 0.50 | 0.97600 |
| 5 | 1.00 | 0.97580 |
| 6 | 2.00 | 0.97560 |
| 7 | 4.00 | 0.97540 |
| 8 | 8.00 | 0.97530 |




**Void Ratio =** 1.362 **Compression =** 2.4 %
**$D_0$ =** 0.97804 **$D_{90}$ =** 0.97669 **$D_{100}$ =** 0.97654
**$C_v$ at 0.8 min. =** 2.67 ft.$^2$/day

**Pressure: 1.00 tsf** **TEST READINGS** **Load No. 12**

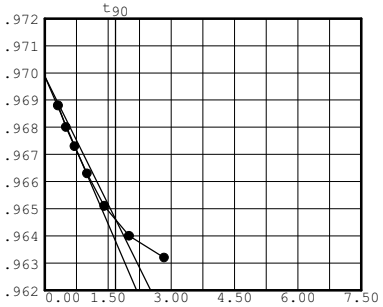
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.97530 |
| 2 | 0.10 | 0.97320 |
| 3 | 0.25 | 0.97270 |
| 4 | 0.50 | 0.97220 |
| 5 | 1.00 | 0.97140 |
| 6 | 2.00 | 0.97050 |
| 7 | 4.00 | 0.96960 |
| 8 | 8.00 | 0.96900 |




**Void Ratio =** 1.348 **Compression =** 2.9 %
**$D_0$ =** 0.97562 **$D_{90}$ =** 0.97146 **$D_{100}$ =** 0.97100
**$C_v$ at 3.4 min. =** 0.60 ft.$^2$/day

**Pressure: 2.00 tsf** **TEST READINGS** **Load No. 13**

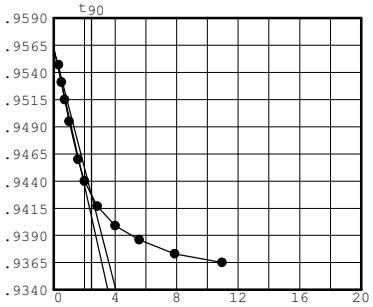
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.96900 |
| 2 | 0.10 | 0.96580 |
| 3 | 0.25 | 0.96500 |
| 4 | 0.50 | 0.96430 |
| 5 | 1.00 | 0.96330 |
| 6 | 2.00 | 0.96210 |
| 7 | 4.00 | 0.96100 |
| 8 | 8.00 | 0.96020 |




**Void Ratio =** 1.330 **Compression =** 3.7 %
**$D_0$ =** 0.96988 **$D_{90}$ =** 0.96460 **$D_{100}$ =** 0.96401
**$C_v$ at 2.8 min. =** 0.70 ft.$^2$/day

**Pressure: 4.00 tsf** **TEST READINGS** **Load No. 14**

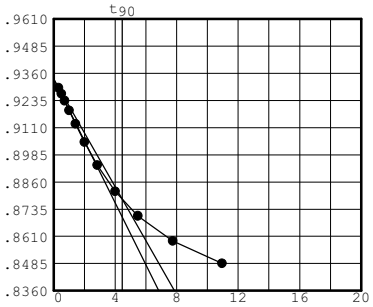
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.96020 | 11 | 62.00 | 0.93730 |
| 2 | 0.10 | 0.95470 | 12 | 120.00 | 0.93650 |
| 3 | 0.25 | 0.95310 | | | |
| 4 | 0.50 | 0.95150 | | | |
| 5 | 1.00 | 0.94950 | | | |
| 6 | 2.50 | 0.94600 | | | |
| 7 | 4.00 | 0.94400 | | | |
| 8 | 8.00 | 0.94170 | | | |
| 9 | 16.00 | 0.93990 | | | |
| 10 | 31.00 | 0.93860 | | | |




**Void Ratio =** 1.266 **Compression =** 6.3 %
**$D_0$ =** 0.95622 **$D_{90}$ =** 0.94273 **$D_{100}$ =** 0.94123
**$C_v$ at 6.0 min. =** 0.32 ft.$^2$/day

**Pressure: 8.00 tsf** **TEST READINGS** **Load No. 15**

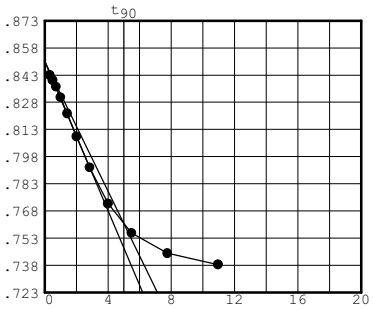
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.93650 | 11 | 60.00 | 0.85890 |
| 2 | 0.10 | 0.92930 | 12 | 120.00 | 0.84850 |
| 3 | 0.25 | 0.92660 | | | |
| 4 | 0.50 | 0.92340 | | | |
| 5 | 1.00 | 0.91890 | | | |
| 6 | 2.00 | 0.91270 | | | |
| 7 | 4.00 | 0.90430 | | | |
| 8 | 8.00 | 0.89380 | | | |
| 9 | 16.00 | 0.88170 | | | |
| 10 | 30.00 | 0.87040 | | | |




**Void Ratio =** 1.053 **Compression =** 15.1 %
**$D_0$ =** 0.93342 **$D_{90}$ =** 0.87826 **$D_{100}$ =** 0.87213
**$C_v$ at 19.8 min. =** 0.09 ft.$^2$/day

**Pressure: 16.00 tsf** **TEST READINGS** **Load No. 16**

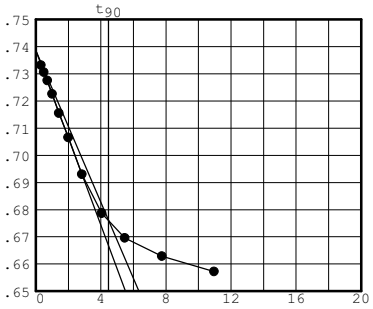
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.84850 | 11 | 60.00 | 0.74460 |
| 2 | 0.10 | 0.84300 | 12 | 120.00 | 0.73840 |
| 3 | 0.25 | 0.84020 | | | |
| 4 | 0.50 | 0.83650 | | | |
| 5 | 1.00 | 0.83070 | | | |
| 6 | 2.00 | 0.82180 | | | |
| 7 | 4.00 | 0.80910 | | | |
| 8 | 8.00 | 0.79200 | | | |
| 9 | 16.00 | 0.77200 | | | |
| 10 | 30.00 | 0.75580 | | | |




**Void Ratio =** 0.787 **Compression =** 26.2 %
**$D_0$ =** 0.85056 **$D_{90}$ =** 0.76114 **$D_{100}$ =** 0.75120
**$C_v$ at 24.9 min. =** 0.05 ft.$^2$/day

**Pressure: 32.00 tsf** **TEST READINGS** **Load No. 17**

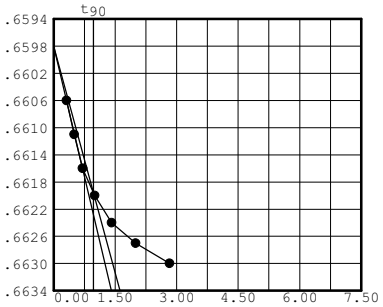
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.73840 | 11 | 60.00 | 0.66290 |
| 2 | 0.10 | 0.73320 | 12 | 120.00 | 0.65720 |
| 3 | 0.25 | 0.73060 | | | |
| 4 | 0.50 | 0.72750 | | | |
| 5 | 1.00 | 0.72260 | | | |
| 6 | 2.00 | 0.71550 | | | |
| 7 | 4.00 | 0.70660 | | | |
| 8 | 8.00 | 0.69300 | | | |
| 9 | 16.50 | 0.67870 | | | |
| 10 | 30.00 | 0.66960 | | | |




**Void Ratio =** 0.590 **Compression =** 34.3 %
**$D_0$ =** 0.73857 **$D_{90}$ =** 0.67610 **$D_{100}$ =** 0.66916
**$C_v$ at 19.9 min. =** 0.05 ft.$^2$/day

**Pressure: 16.00 tsf** **TEST READINGS** **Load No. 18**

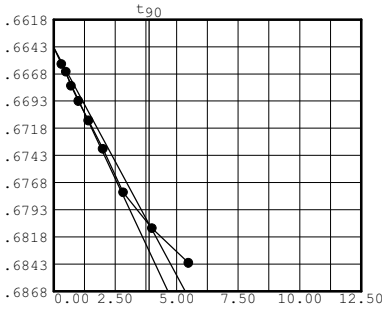
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.65720 |
| 2 | 0.10 | 0.66060 |
| 3 | 0.25 | 0.66110 |
| 4 | 0.50 | 0.66160 |
| 5 | 1.00 | 0.66200 |
| 6 | 2.00 | 0.66240 |
| 7 | 4.00 | 0.66270 |
| 8 | 8.00 | 0.66300 |




**Void Ratio =** 0.604 **Compression =** 33.7 %
**$D_0$ =** 0.65980 **$D_{90}$ =** 0.66196 **$D_{100}$ =** 0.66220
**$C_v$ at 0.9 min. =** 0.98 ft.$^2$/day

**Pressure: 4.00 tsf** **TEST READINGS** **Load No. 19**

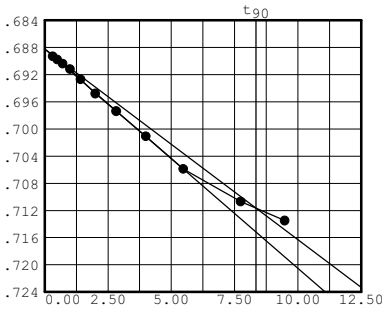
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.66300 |
| 2 | 0.10 | 0.66590 |
| 3 | 0.25 | 0.66660 |
| 4 | 0.50 | 0.66790 |
| 5 | 1.00 | 0.66930 |
| 6 | 2.00 | 0.67110 |
| 7 | 4.00 | 0.67370 |
| 8 | 8.00 | 0.67770 |
| 9 | 16.00 | 0.68100 |
| 10 | 30.00 | 0.68420 |




**Void Ratio =** 0.655 **Compression =** 31.6 %
**$D_0$ =** 0.66436 **$D_{90}$ =** 0.68068 **$D_{100}$ =** 0.68249
**$C_v$ at 15.1 min. =** 0.06 ft.$^2$/day

**Pressure: 1.00 tsf** **TEST READINGS** **Load No. 20**

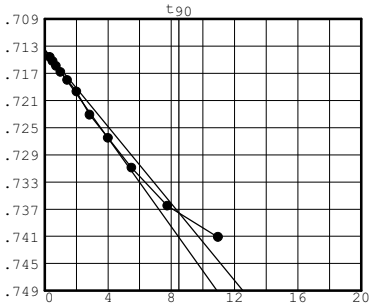
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.68420 | 11 | 60.00 | 0.70910 |
| 2 | 0.10 | 0.68770 | 12 | 90.00 | 0.71190 |
| 3 | 0.25 | 0.68820 | | | |
| 4 | 0.50 | 0.68880 | | | |
| 5 | 1.00 | 0.68960 | | | |
| 6 | 2.00 | 0.69110 | | | |
| 7 | 4.00 | 0.69320 | | | |
| 8 | 8.00 | 0.69580 | | | |
| 9 | 16.00 | 0.69950 | | | |
| 10 | 30.00 | 0.70430 | | | |




**Void Ratio =** 0.726 **Compression =** 28.6 %
**$D_0$ =** 0.68824 **$D_{90}$ =** 0.71166 **$D_{100}$ =** 0.71426
**$C_v$ at 69.6 min. =** 0.01 ft.$^2$/day

**Pressure: 0.25 tsf** **TEST READINGS** **Load No. 21**

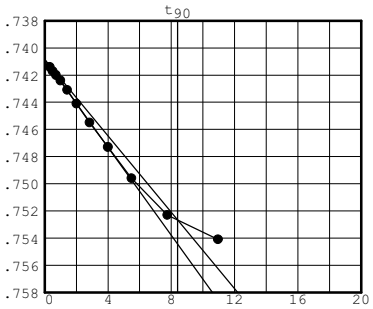
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.71190 | 11 | 60.00 | 0.73610 |
| 2 | 0.10 | 0.71420 | 12 | 120.00 | 0.74070 |
| 3 | 0.25 | 0.71480 | | | |
| 4 | 0.50 | 0.71550 | | | |
| 5 | 1.00 | 0.71640 | | | |
| 6 | 2.00 | 0.71760 | | | |
| 7 | 4.00 | 0.71930 | | | |
| 8 | 8.00 | 0.72270 | | | |
| 9 | 16.00 | 0.72610 | | | |
| 10 | 30.00 | 0.73050 | | | |




**Void Ratio =** 0.793 **Compression =** 25.9 %
**$D_0$ =** 0.71352 **$D_{90}$ =** 0.73755 **$D_{100}$ =** 0.74022
**$C_v$ at 71.9 min. =** 0.02 ft.$^2$/day

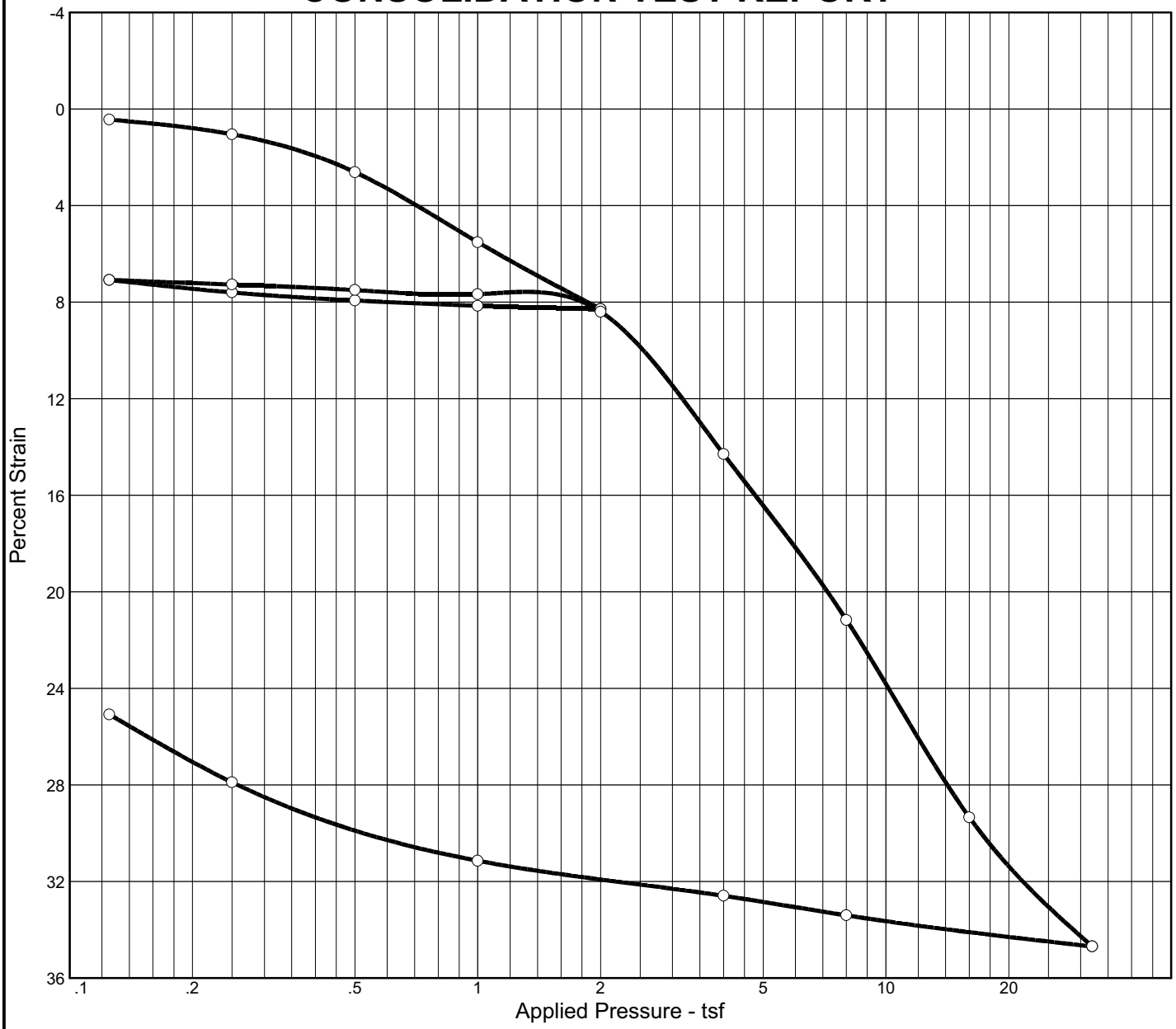
**Pressure: 0.13 tsf** **TEST READINGS** **Load No. 22**

| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.74070 | 11 | 60.00 | 0.75230 |
| 2 | 0.10 | 0.74140 | 12 | 120.00 | 0.75410 |
| 3 | 0.25 | 0.74170 | | | |
| 4 | 0.50 | 0.74200 | | | |
| 5 | 1.00 | 0.74240 | | | |
| 6 | 2.00 | 0.74310 | | | |
| 7 | 4.00 | 0.74410 | | | |
| 8 | 8.00 | 0.74550 | | | |
| 9 | 16.00 | 0.74730 | | | |
| 10 | 30.00 | 0.74960 | | | |




**Void Ratio =** 0.825 **Compression =** 24.6 %
**$D_0$ =** 0.74086 **$D_{90}$ =** 0.75266 **$D_{100}$ =** 0.75398
**$C_v$ at 70.5 min. =** 0.02 ft.$^2$/day

# CONSOLIDATION TEST REPORT




| MATERIAL DESCRIPTION | USCS | AASHTO |
|---|---|---|
| Gray, Fat CLAY | | |

| LL | PI | Sp. Gr. | Overburden (tsf) | Dry Dens. (pcf) | | Moisture | | Saturation | | Void Ratio | | $P_c$ (tsf) | $C_c$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Init. | Final | Init. | Final | Init. | Final | Init. | Final | | |
| | | 2.71 | 2.70 | 62.1 | | 56.1 % | 34.7 % | 100.0 % | 100.0 % | 1.521 | 0.889 | | |

| Preparation Process: | D2435 Method | $C_r$ | Swell Press. (tsf) | Heave % |
|---|---|---|---|---|
| Condition of Test: | | | | |

**Project No.** VB10-238G **Client:** HDR, Inc.

**Project:** VDOT I-64 to I-264 PSA 3 I-64 D7 and Bridge
Virginia Beach, Virginia

**Location:** CUR-4B

**Remarks:**
CUR-4B
Sample Obtained 10/15/10

**Checked By:**

**Title:**

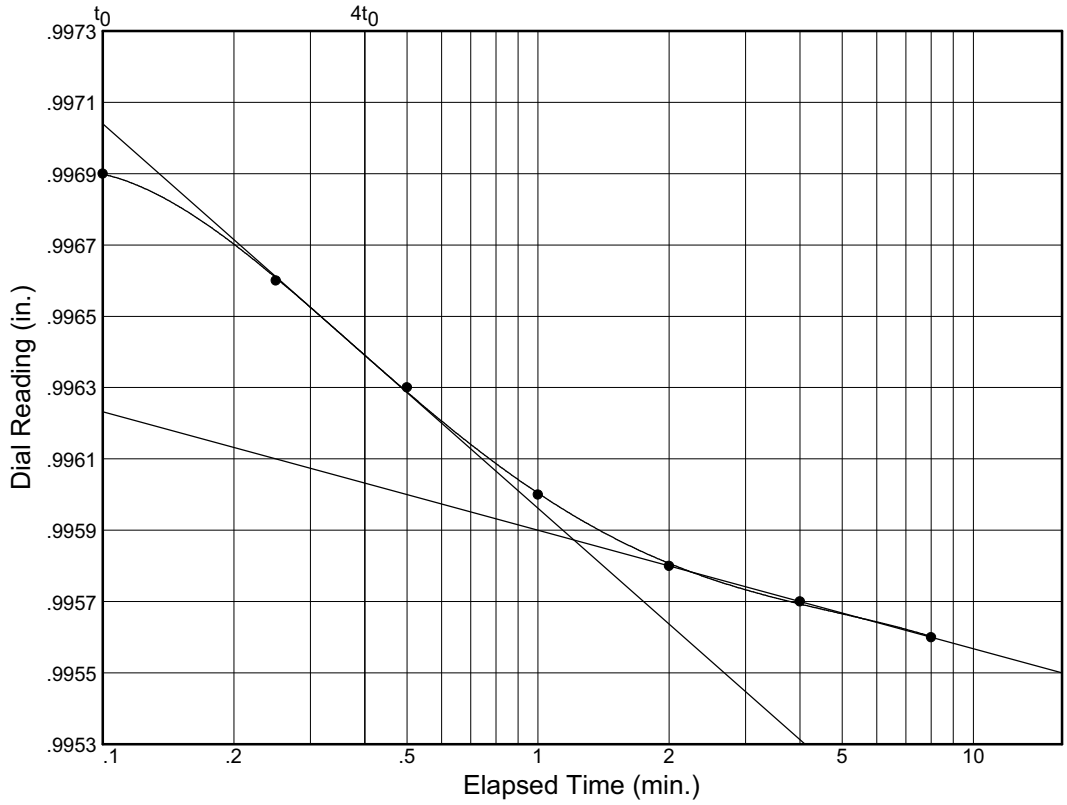
CONSOLIDATION TEST REPORT

**GET SOLUTIONS, INC.**

**Figure**

# Dial Reading vs. Time

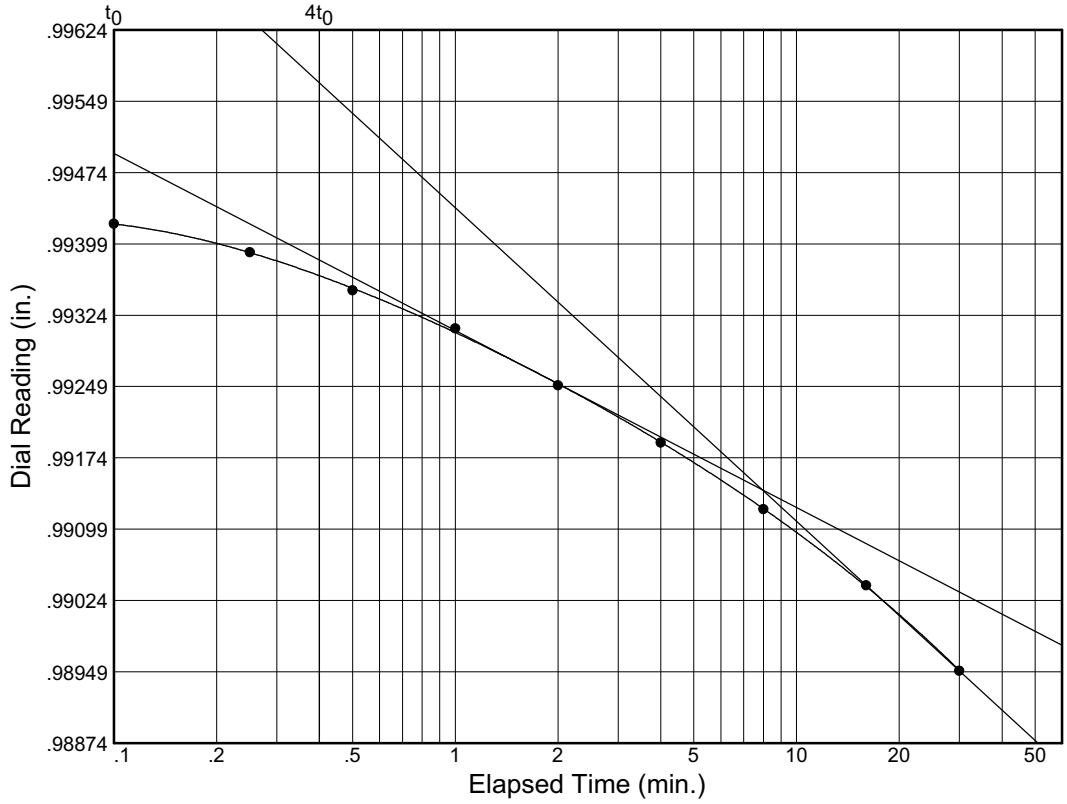
Project No.: VB10-238G
Project: VDOT I-64 to I-264 PSA 3 I-64 D7 and Bridge
Virginia Beach, Virginia
Location: CUR-4B




Load No.= 1
Load= 0.13 tsf
$D_0$ = 0.99741
$D_{50}$ = 0.99664
$D_{100}$ = 0.99587
$T_{50}$ = 0.23 min.

$C_v$ @ $T_{50}$
2.11 ft.$^2$/day

$C_\alpha$ = 0.000




Load No.= 2
Load= 0.25 tsf
$D_0$ = 0.99474
$D_{50}$ = 0.99308
$D_{100}$ = 0.99141
$T_{50}$ = 0.98 min.

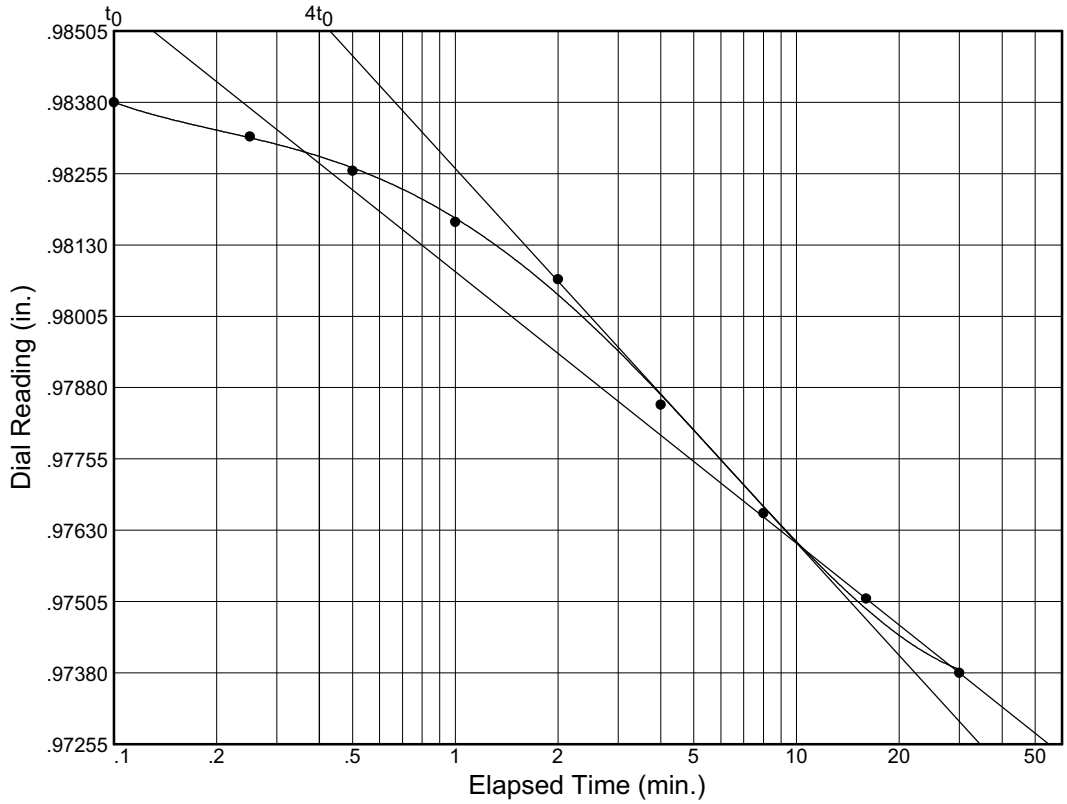
$C_v$ @ $T_{50}$
0.50 ft.$^2$/day

$C_\alpha$ = 0.003

Figure

# Dial Reading vs. Time

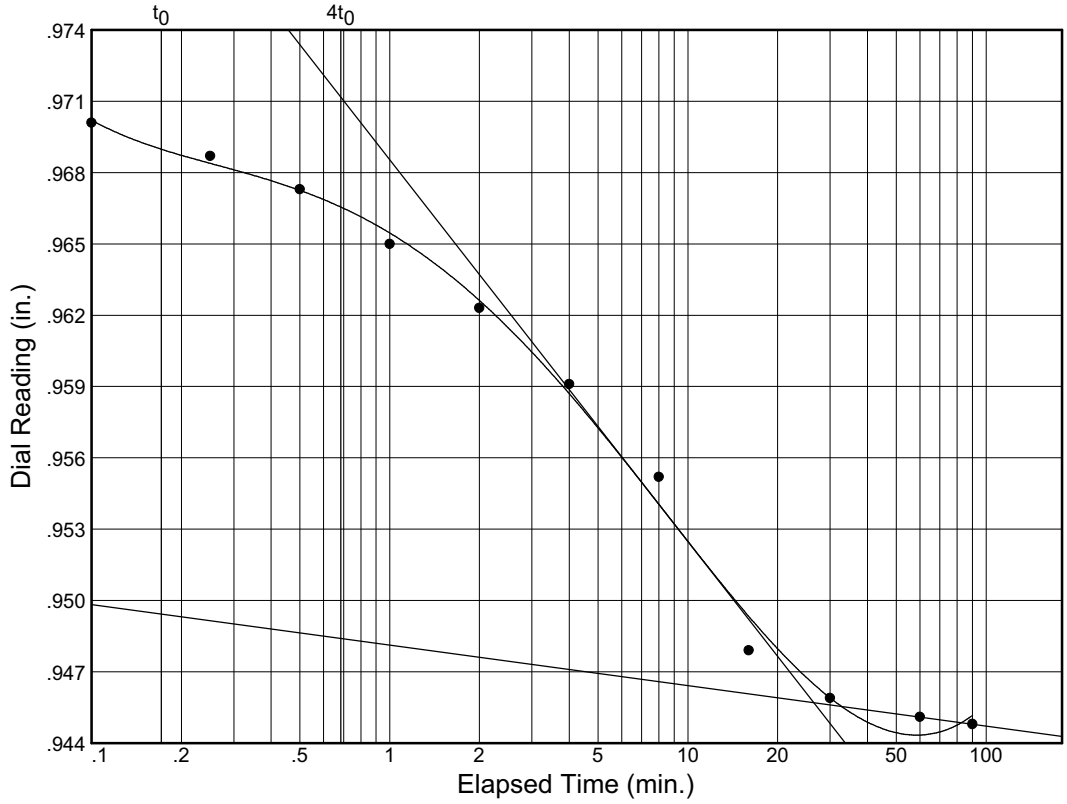
Project No.: VB10-238G
Project: VDOT I-64 to I-264 PSA 3 I-64 D7 and Bridge
Virginia Beach, Virginia
Location: CUR-4B




Load No.= 3
Load= 0.50 tsf
$D_0$ = 0.98475
$D_{50}$ = 0.98040
$D_{100}$ = 0.97605
$T_{50}$ = 2.03 min.

| $C_v$ @ $T_{50}$ |
|---|
| 0.23 ft.$^2$/day |

$C_\alpha$ = 0.005




Load No.= 4
Load= 1.00 tsf
$D_0$ = 0.97141
$D_{50}$ = 0.95856
$D_{100}$ = 0.94571
$T_{50}$ = 4.09 min.

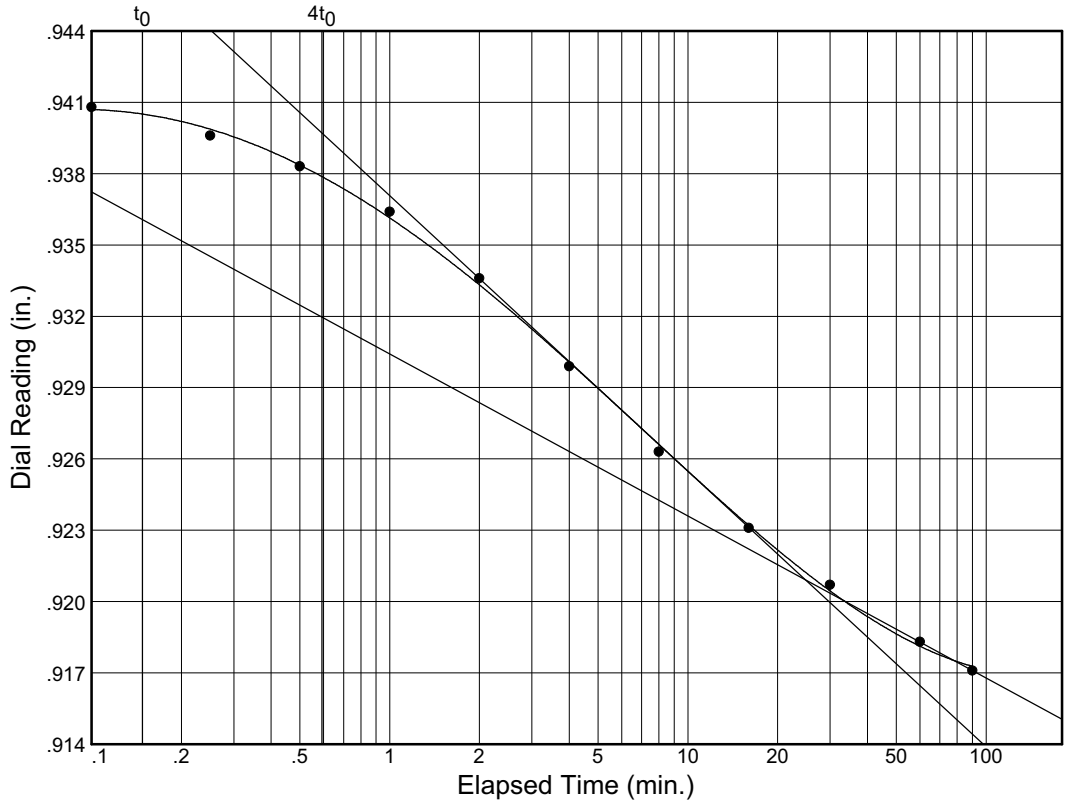
| $C_v$ @ $T_{50}$ |
|---|
| 0.11 ft.$^2$/day |

$C_\alpha$ = 0.002

Figure

# Dial Reading vs. Time

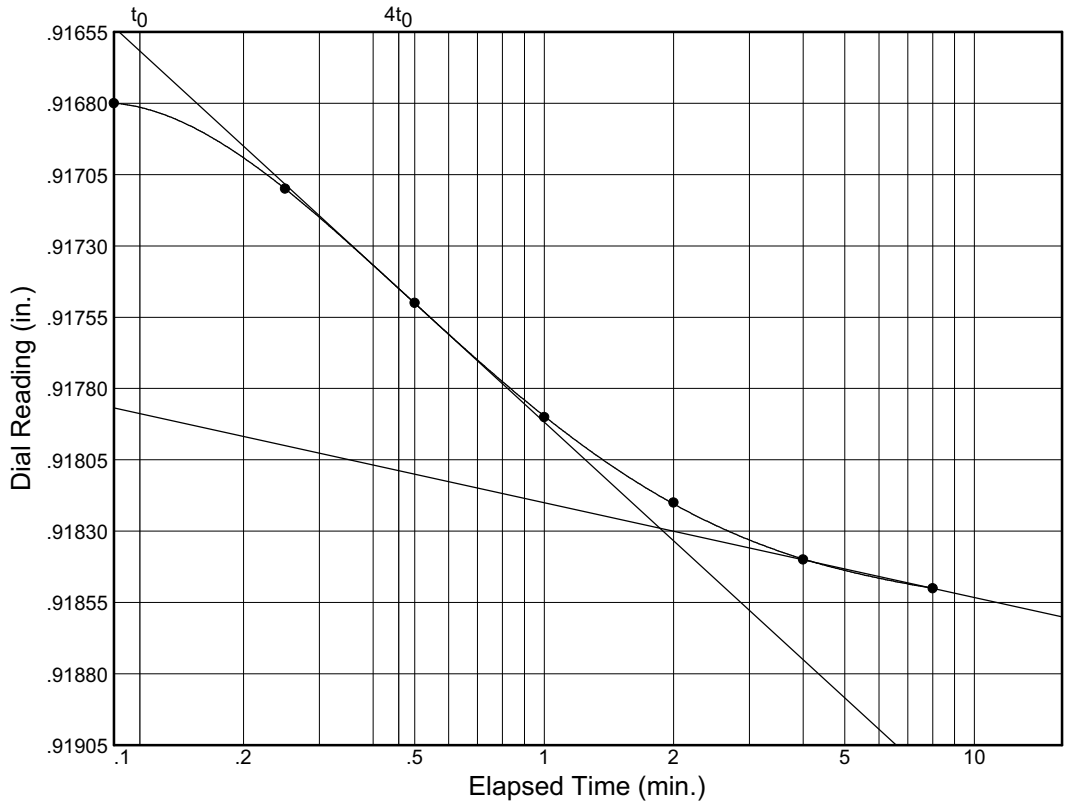
Project No.: VB10-238G
Project: VDOT I-64 to I-264 PSA 3 I-64 D7 and Bridge
Virginia Beach, Virginia
Location: CUR-4B




Load No.= 5
Load= 2.00 tsf
$D_0$ = 0.94314
$D_{50}$ = 0.93203
$D_{100}$ = 0.92092
$T_{50}$ = 2.66 min.

| $C_v$ @ $T_{50}$ |
|---|
| 0.16 ft.$^2$/day |

$C_\alpha$ = 0.007



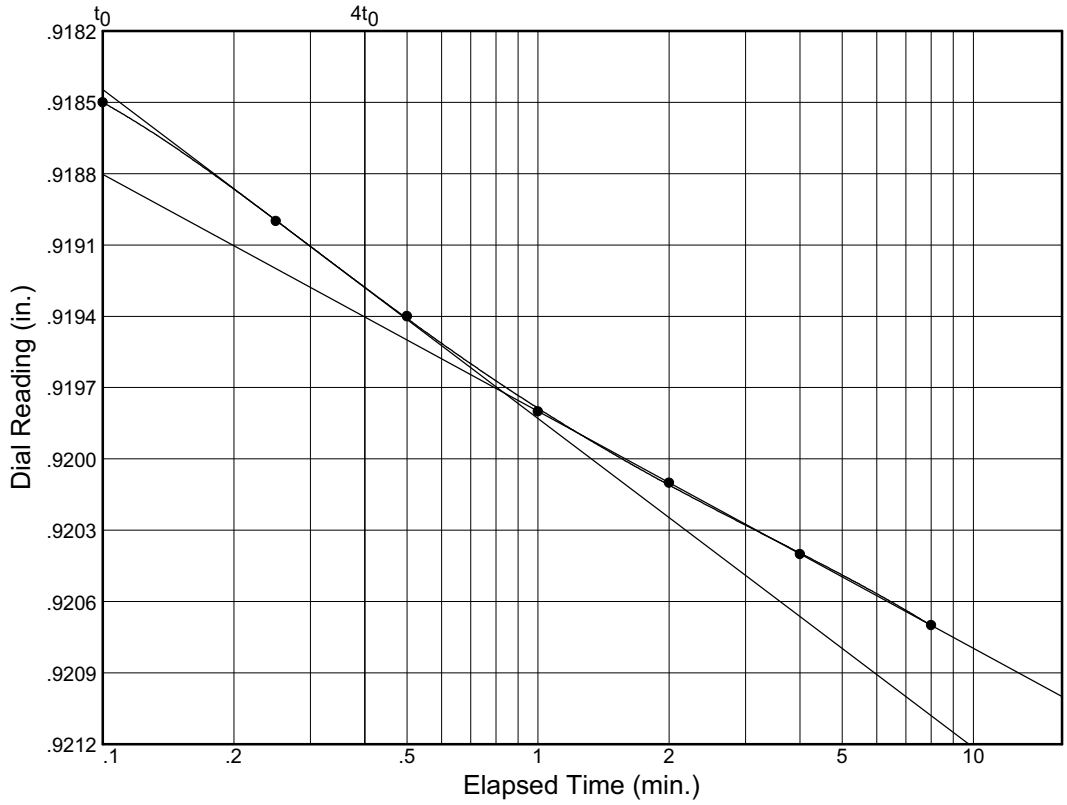

Load No.= 6
Load= 1.00 tsf
$D_0$ = 0.91618
$D_{50}$ = 0.91723
$D_{100}$ = 0.91829
$T_{50}$ = 0.32 min.

| $C_v$ @ $T_{50}$ |
|---|
| 1.30 ft.$^2$/day |

Figure

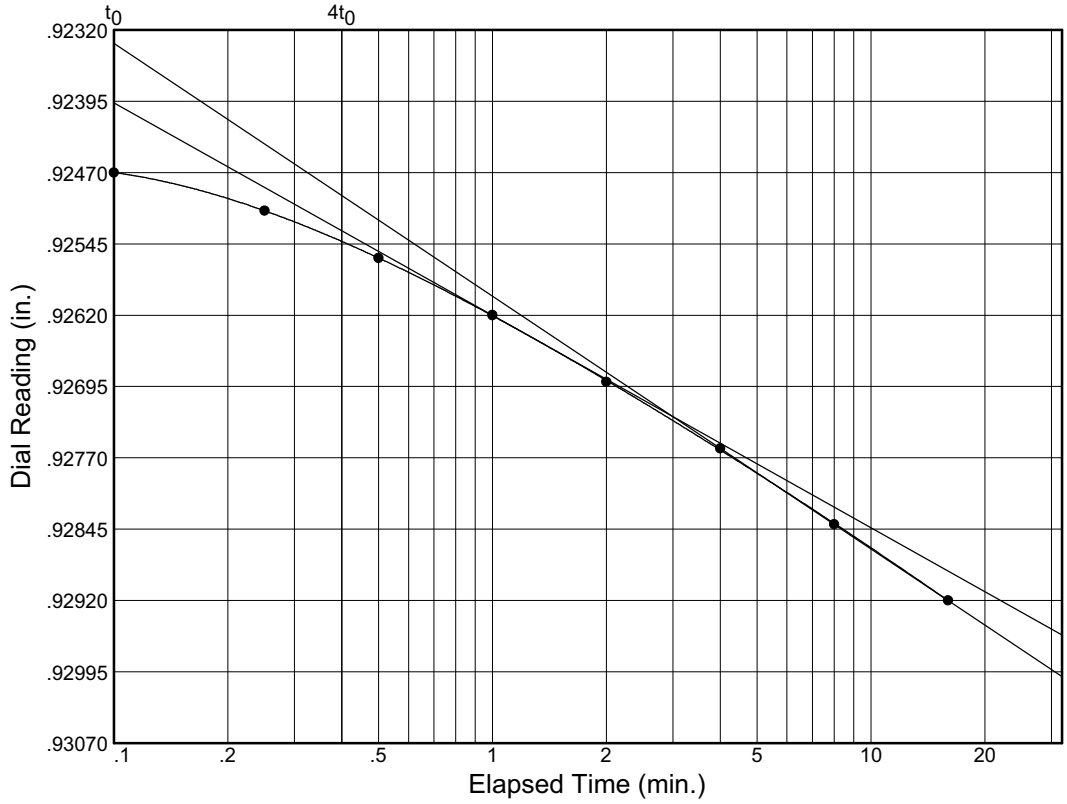
# Dial Reading vs. Time

Project No.: VB10-238G
Project: VDOT I-64 to I-264 PSA 3 I-64 D7 and Bridge
Virginia Beach, Virginia
Location: CUR-4B




Load No.= 7
Load= 0.50 tsf
$D_0$ = 0.91772
$D_{50}$ = 0.91872
$D_{100}$ = 0.91972
$T_{50}$ = 0.16 min.

$C_v$ @ $T_{50}$
2.67 ft.$^2$/day



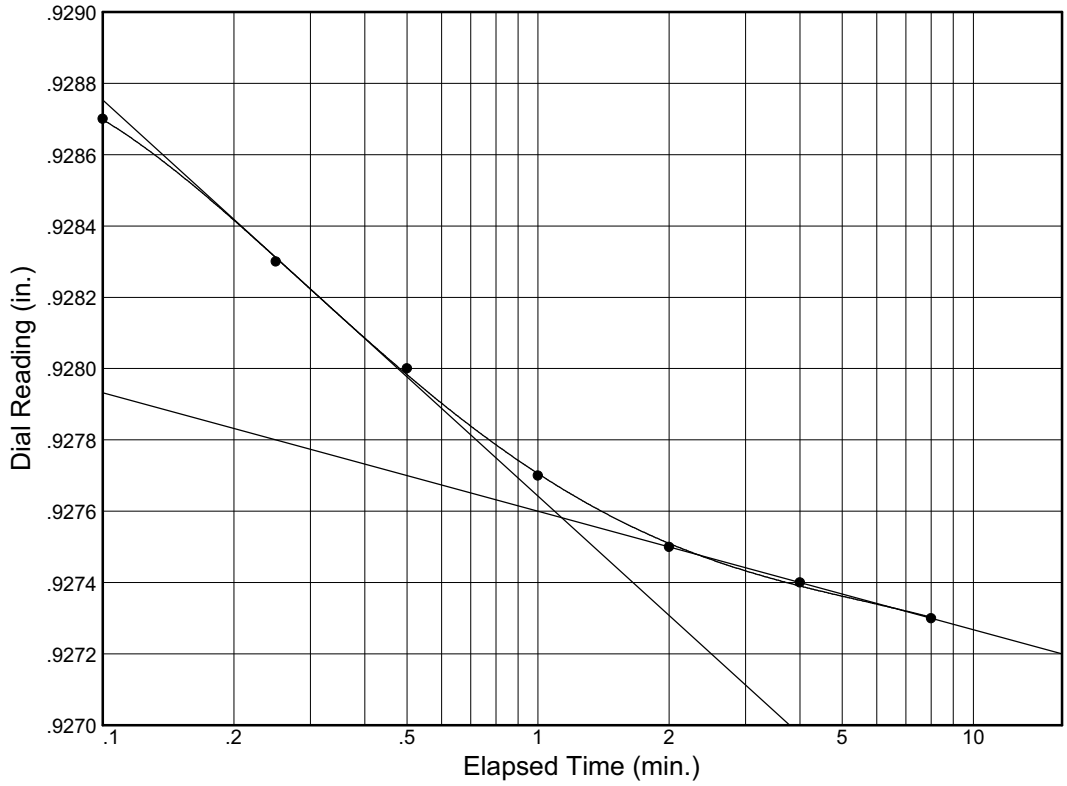

Load No.= 9
Load= 0.13 tsf
$D_0$ = 0.92398
$D_{50}$ = 0.92562
$D_{100}$ = 0.92726
$T_{50}$ = 0.51 min.

$C_v$ @ $T_{50}$
0.83 ft.$^2$/day

Figure

# Dial Reading vs. Time

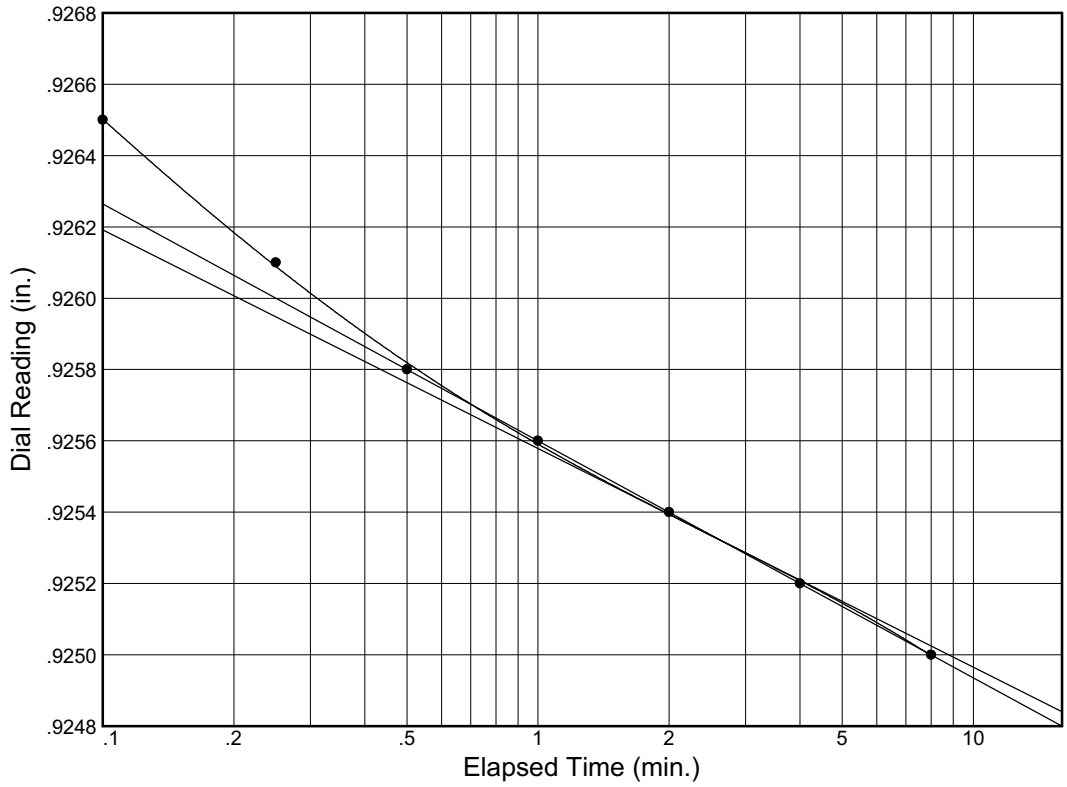
Project No.: VB10-238G
Project: VDOT I-64 to I-264 PSA 3 I-64 D7 and Bridge
Virginia Beach, Virginia
Location: CUR-4B




Load No.= 10
Load= 0.25 tsf
$D_0$ = 0.92920
$D_{50}$ = 0.92839
$D_{100}$ = 0.92758
$T_{50}$ = 0.21 min.

$C_v$ @ $T_{50}$
2.01 ft.$^2$/day

$C_\alpha$ = 0.000




Load No.= 11
Load= 0.50 tsf
$D_0$ = 0.92730
$D_{50}$ = 0.92631
$D_{100}$ = 0.92532
$T_{50}$ = 0.15 min.

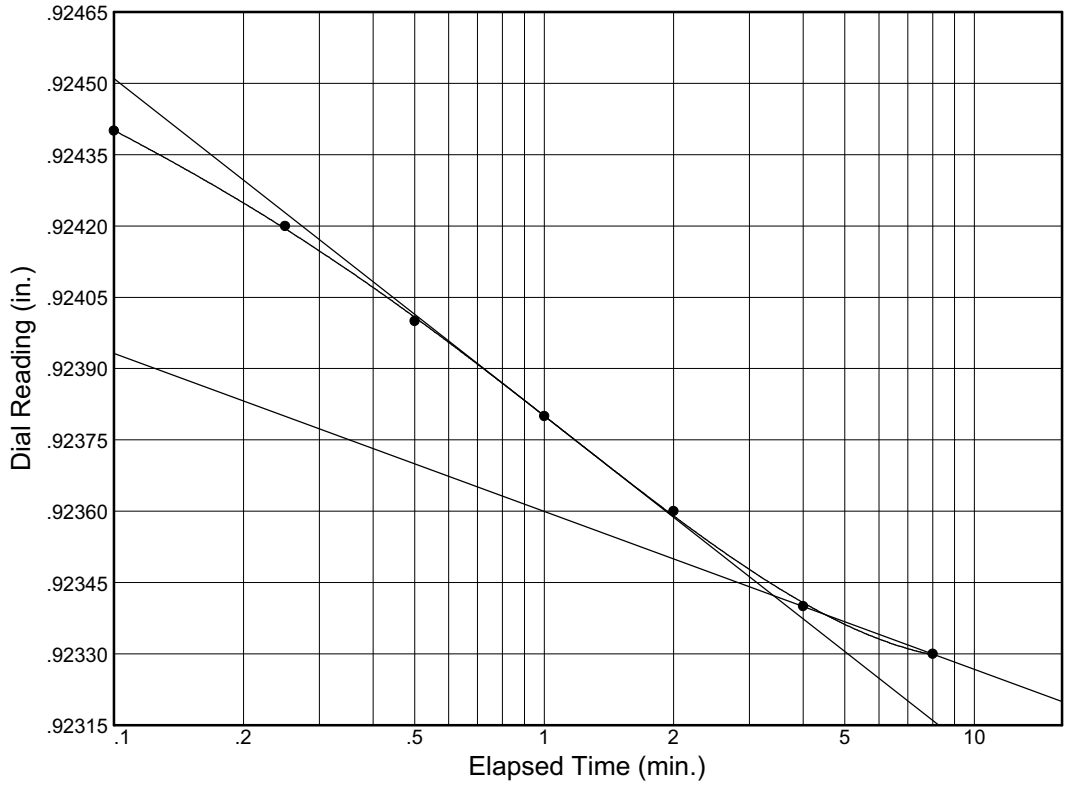
$C_v$ @ $T_{50}$
2.80 ft.$^2$/day

$C_\alpha$ = 0.001

Figure

# Dial Reading vs. Time

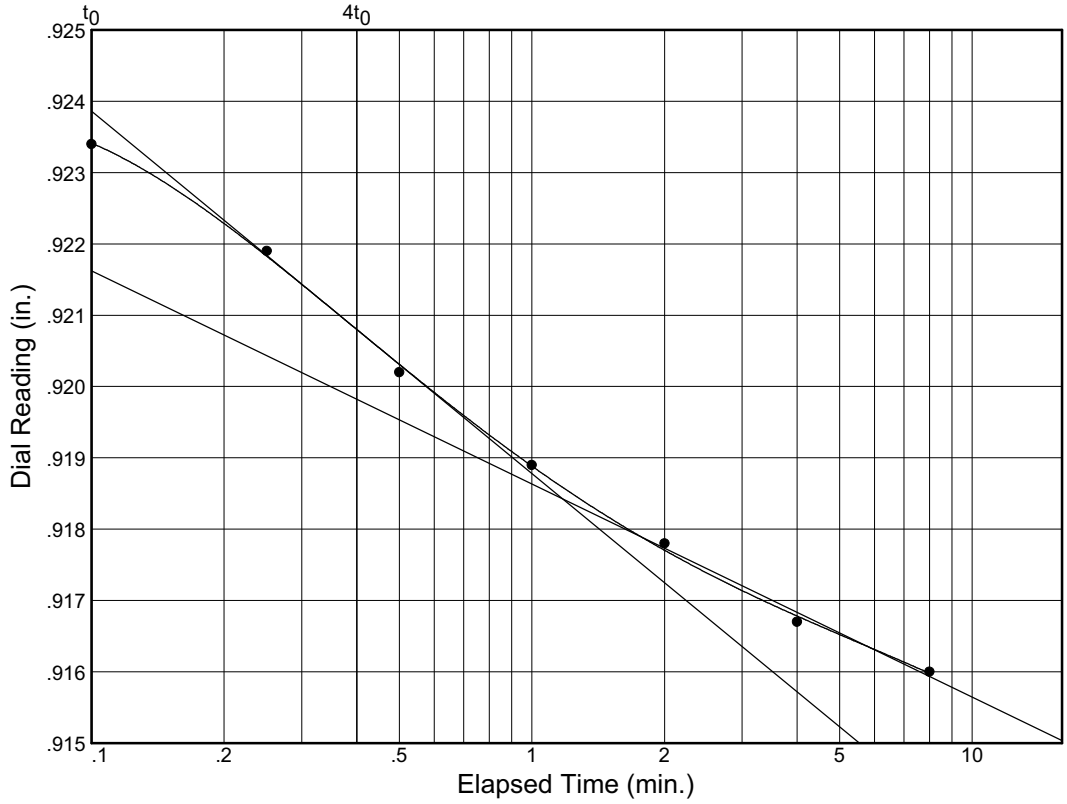
Project No.: VB10-238G
Project: VDOT I-64 to I-264 PSA 3 I-64 D7 and Bridge
Virginia Beach, Virginia
Location: CUR-4B




Load No.= 12
Load= 1.00 tsf
$D_0$ = 0.92500
$D_{50}$ = 0.92421
$D_{100}$ = 0.92342
$T_{50}$ = 0.23 min.

$C_v$ @ $T_{50}$
1.80 ft.$^2$/day

$C_\alpha$ = 0.000




Load No.= 13
Load= 2.00 tsf
$D_0$ = 0.92602
$D_{50}$ = 0.92222
$D_{100}$ = 0.91842
$T_{50}$ = 0.21 min.

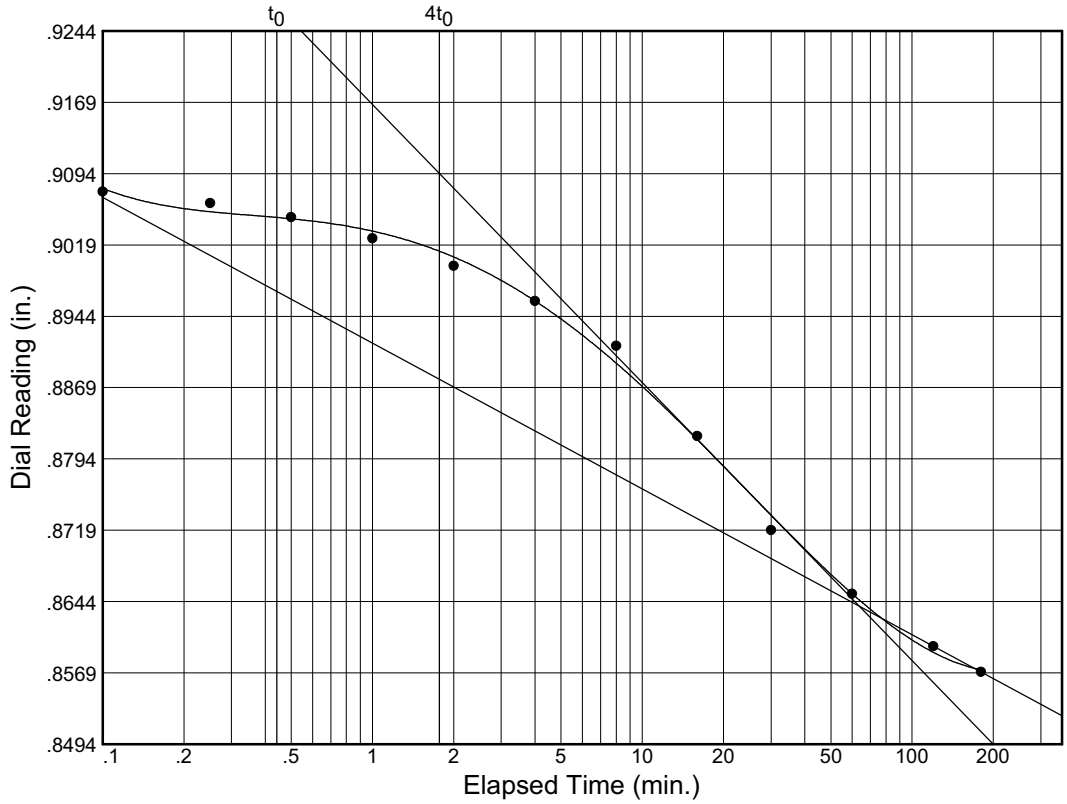
$C_v$ @ $T_{50}$
2.02 ft.$^2$/day

$C_\alpha$ = 0.003

Figure

# Dial Reading vs. Time

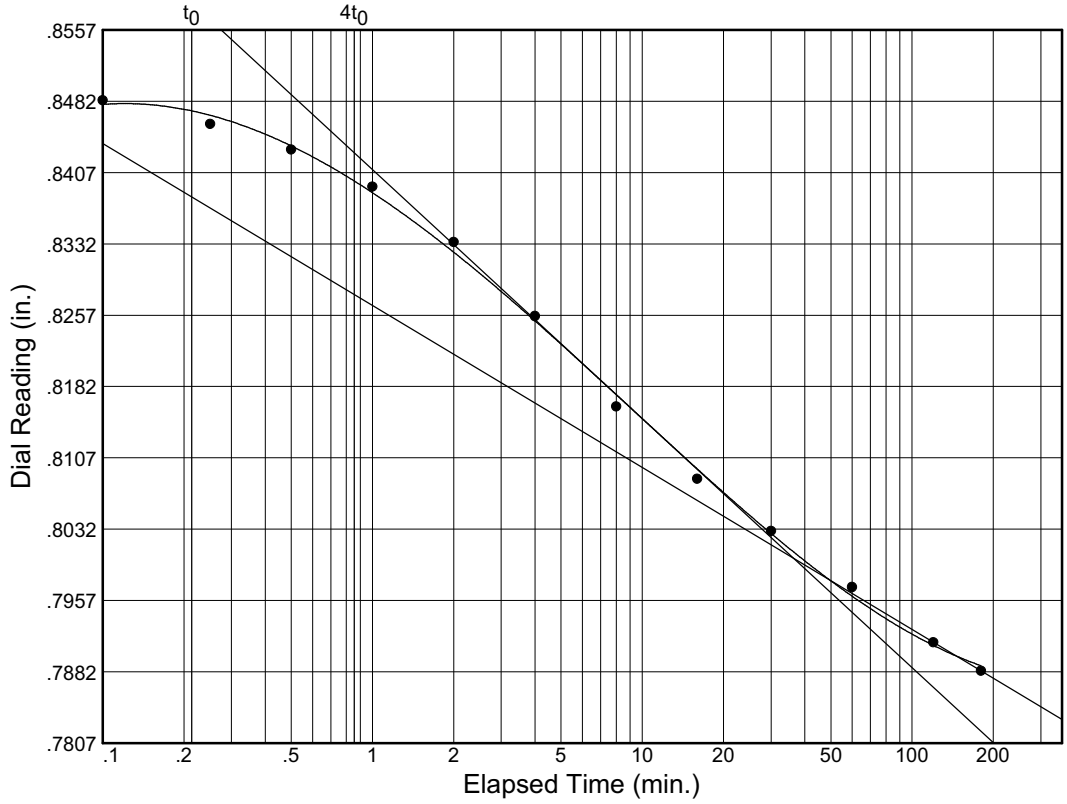
Project No.: VB10-238G
Project: VDOT I-64 to I-264 PSA 3 I-64 D7 and Bridge
Virginia Beach, Virginia
Location: CUR-4B




Load No.= 14
Load= 4.00 tsf
$D_0$ = 0.90833
$D_{50}$ = 0.88612
$D_{100}$ = 0.86390
$T_{50}$ = 10.82 min.

$C_v$ @ $T_{50}$
0.04 ft.$^2$/day

$C_\alpha$ = 0.017




Load No.= 15
Load= 8.00 tsf
$D_0$ = 0.85455
$D_{50}$ = 0.82733
$D_{100}$ = 0.80011
$T_{50}$ = 3.25 min.

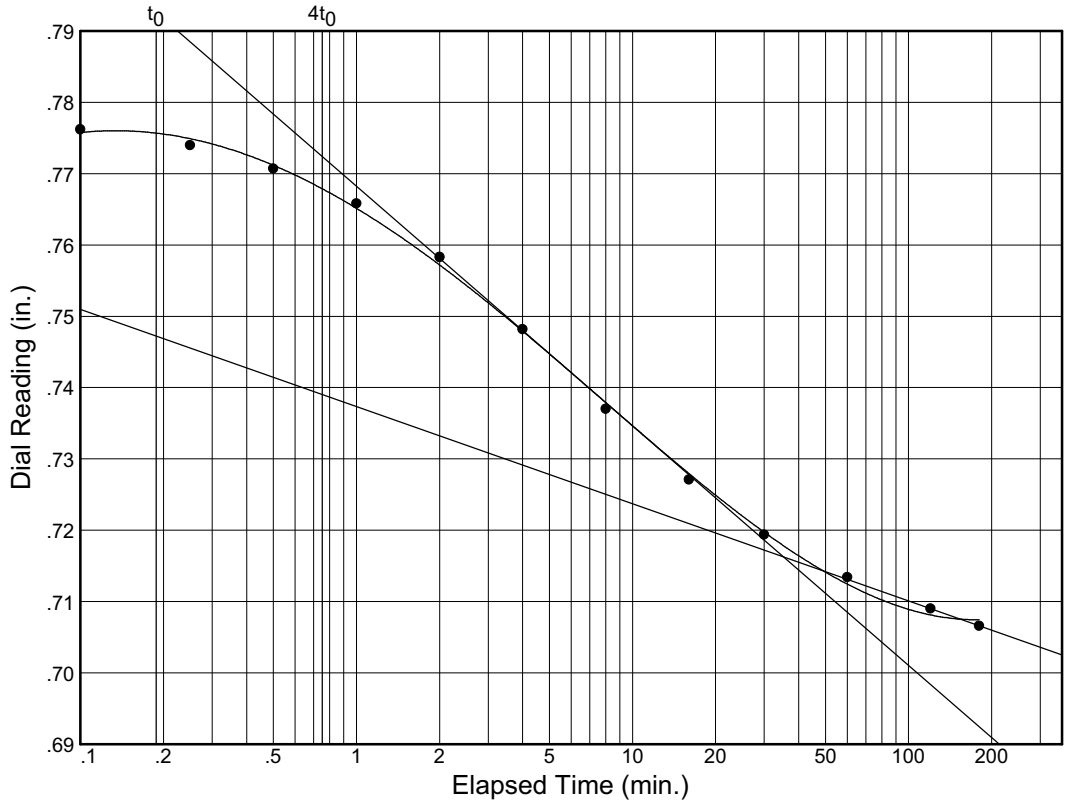
$C_v$ @ $T_{50}$
0.10 ft.$^2$/day

$C_\alpha$ = 0.020

Figure

# Dial Reading vs. Time

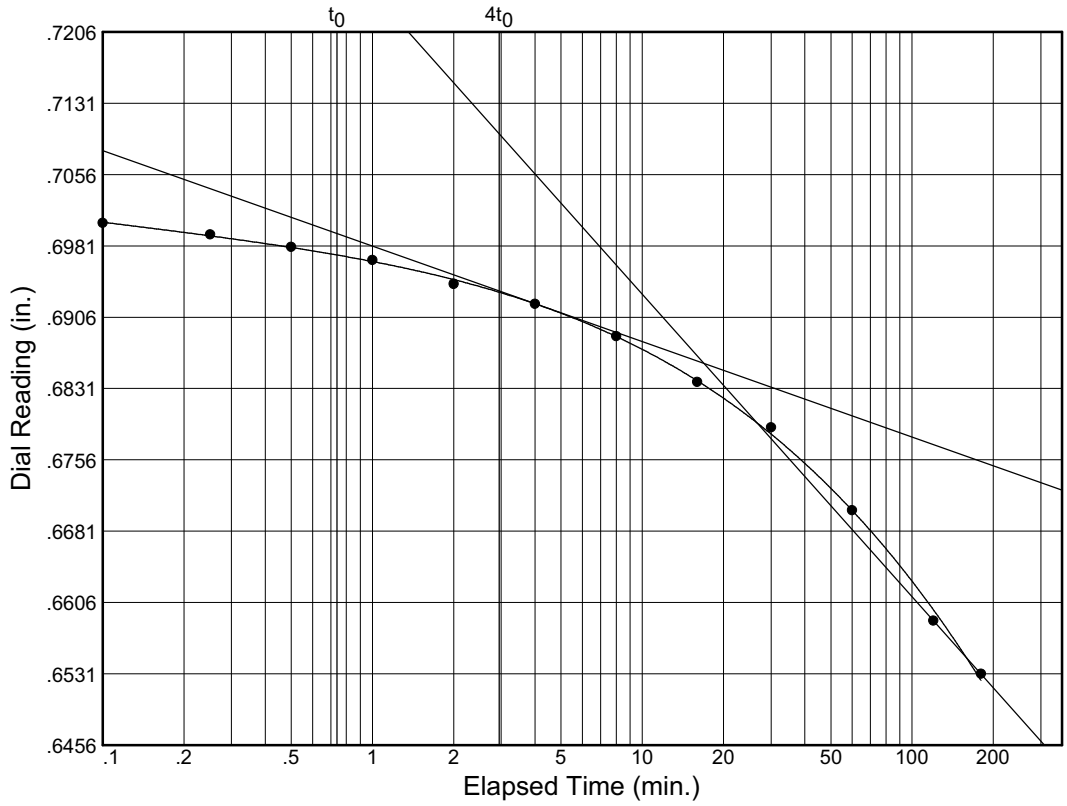
Project No.: VB10-238G
Project: VDOT I-64 to I-264 PSA 3 I-64 D7 and Bridge
Virginia Beach, Virginia
Location: CUR-4B




Load No.= 16
Load= 16.00 tsf
$D_0$ = 0.78348
$D_{50}$ = 0.74987
$D_{100}$ = 0.71625
$T_{50}$ = 3.48 min.

| $C_v$ @ $T_{50}$ |
|---|
| 0.08 ft.$^2$/day |

$C_\alpha$ = 0.017




Load No.= 17
Load= 32.00 tsf
$D_0$ = 0.70106
$D_{50}$ = 0.69339
$D_{100}$ = 0.68572
$T_{50}$ = 2.82 min.

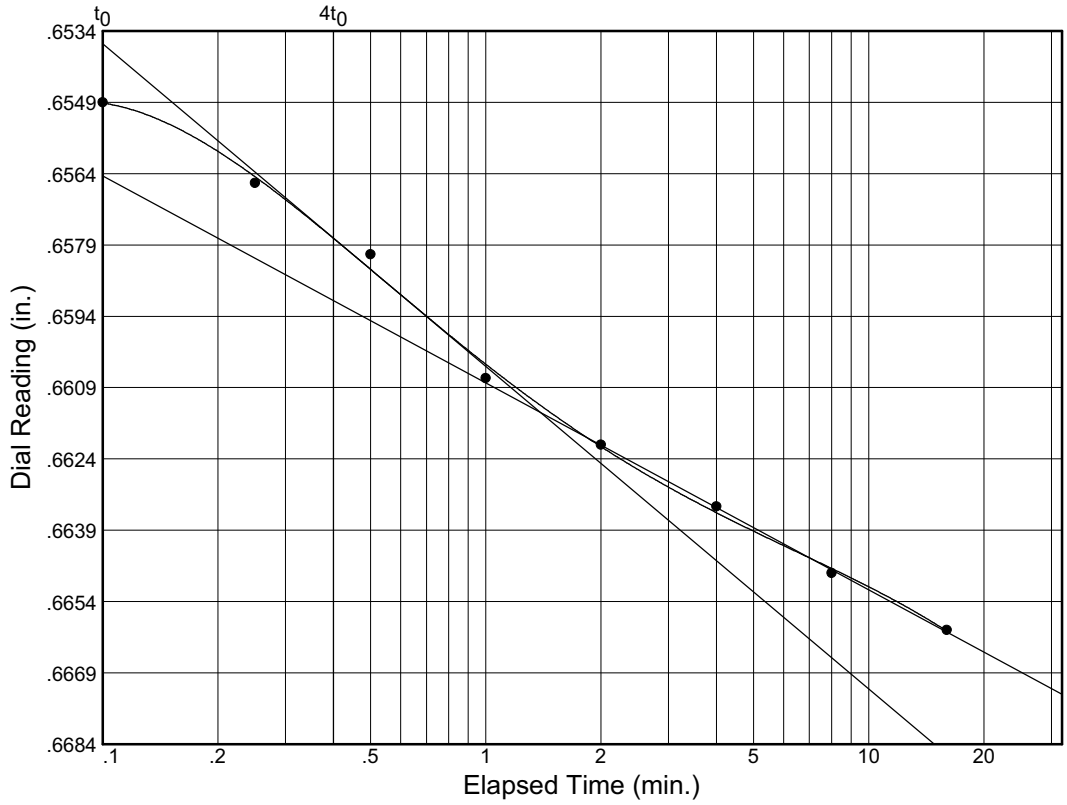
| $C_v$ @ $T_{50}$ |
|---|
| 0.08 ft.$^2$/day |

$C_\alpha$ = 0.045

Figure

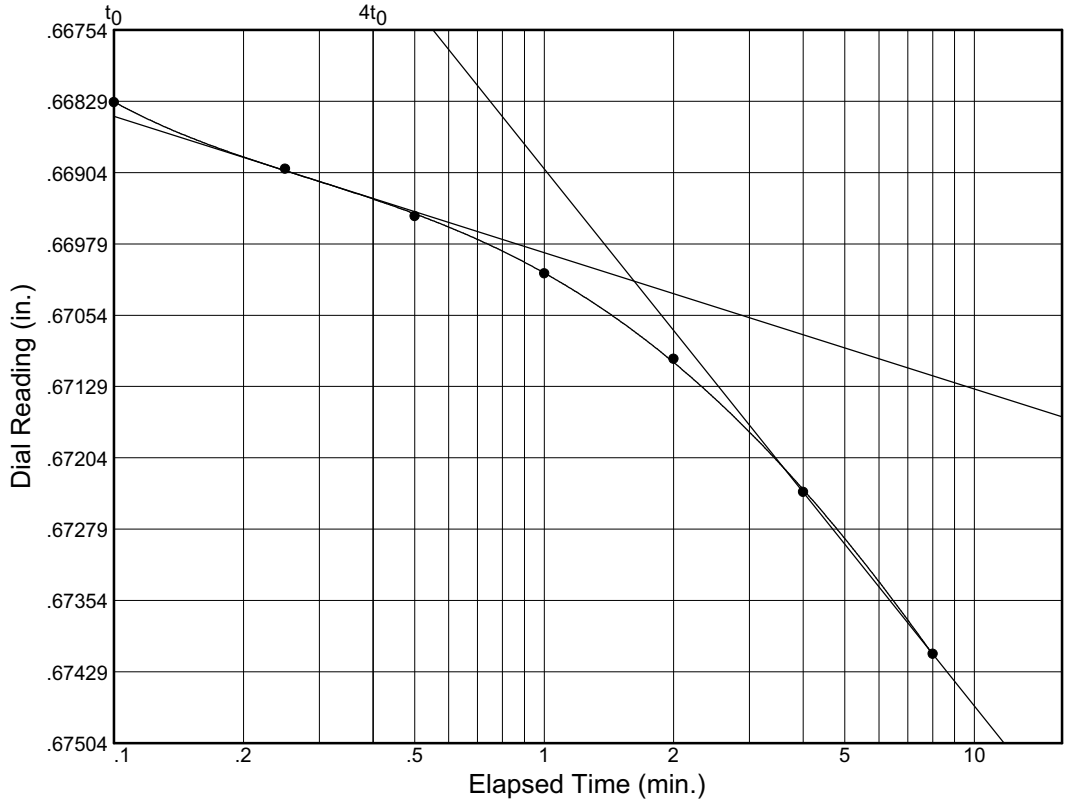
# Dial Reading vs. Time

Project No.: VB10-238G
Project: VDOT I-64 to I-264 PSA 3 I-64 D7 and Bridge
Virginia Beach, Virginia
Location: CUR-4B




Load No.= 18
Load= 8.00 tsf
$D_0$ = 0.65207
$D_{50}$ = 0.65675
$D_{100}$ = 0.66142
$T_{50}$ = 0.28 min.

$C_v$ @ $T_{50}$
0.77 ft.$^2$/day



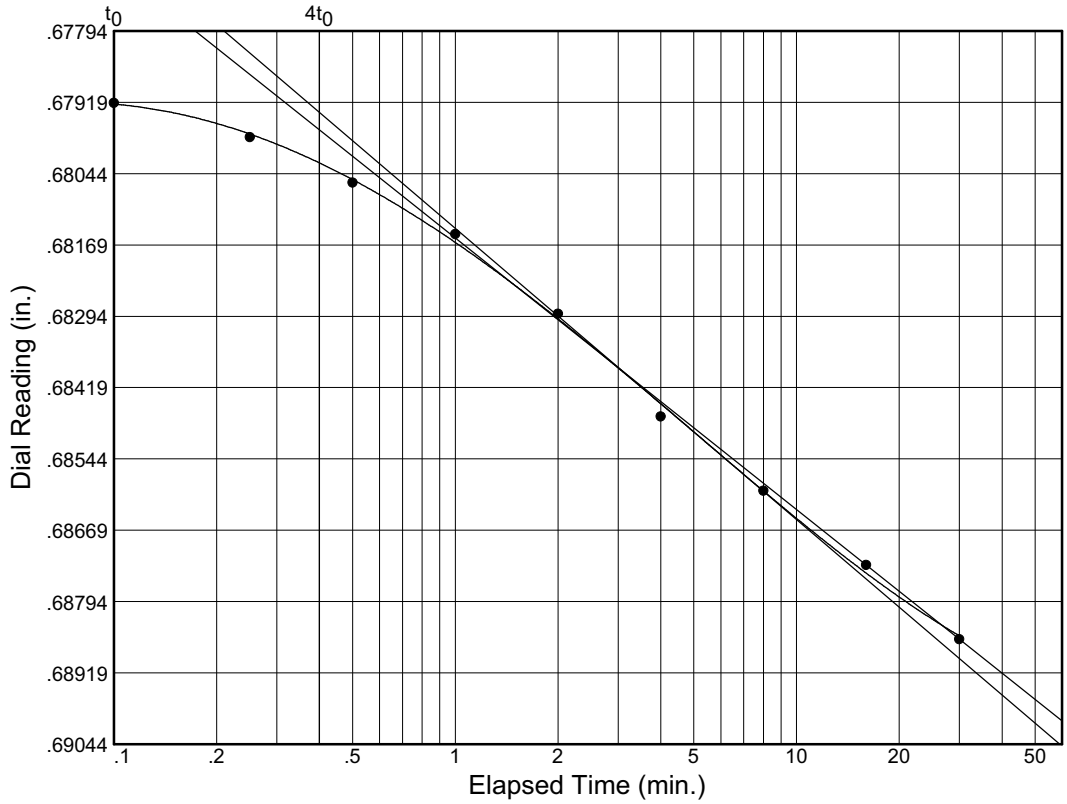

Load No.= 19
Load= 4.00 tsf
$D_0$ = 0.66727
$D_{50}$ = 0.66873
$D_{100}$ = 0.67018
$T_{50}$ = 0.16 min.

$C_v$ @ $T_{50}$
1.36 ft.$^2$/day

Figure

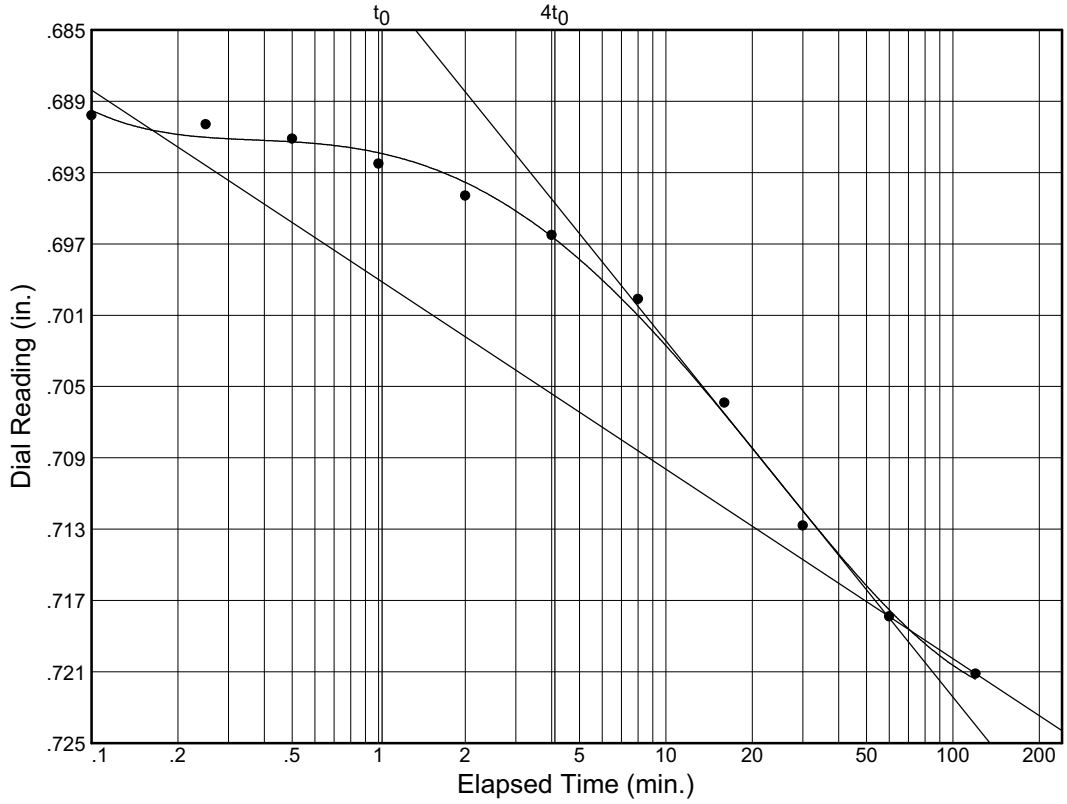
# Dial Reading vs. Time

Project No.: VB10-238G
Project: VDOT I-64 to I-264 PSA 3 I-64 D7 and Bridge
Virginia Beach, Virginia
Location: CUR-4B




Load No.= 20
Load= 1.00 tsf
$D_0$ = 0.67819
$D_{50}$ = 0.68104
$D_{100}$ = 0.68390
$T_{50}$ = 0.70 min.

$C_v$ @ $T_{50}$
0.33 ft.$^2$/day



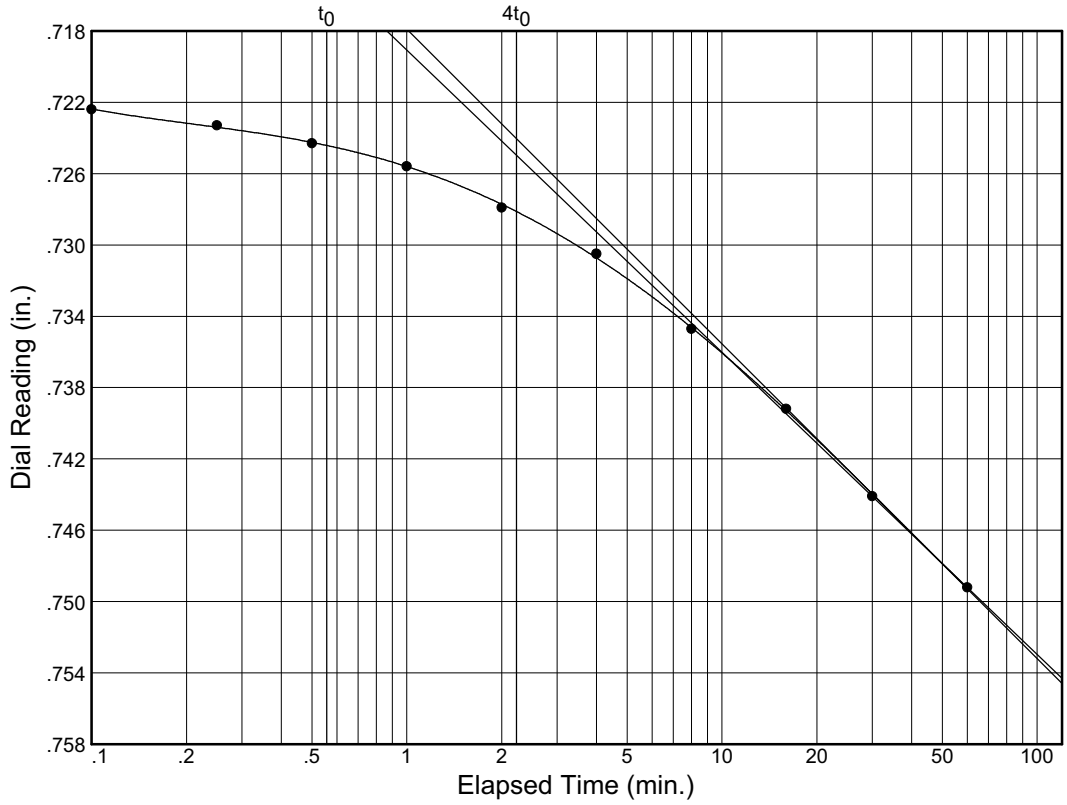

Load No.= 21
Load= 0.25 tsf
$D_0$ = 0.68714
$D_{50}$ = 0.70247
$D_{100}$ = 0.71779
$T_{50}$ = 9.70 min.

$C_v$ @ $T_{50}$
0.03 ft.$^2$/day

Figure

# Dial Reading vs. Time

Project No.: VB10-238G
Project: VDOT I-64 to I-264 PSA 3 I-64 D7 and Bridge
Virginia Beach, Virginia
Location: CUR-4B




Load No.= 22

Load= 0.13 tsf

$D_0$ = 0.72071

$D_{50}$ = 0.73409

$D_{100}$ = 0.74746

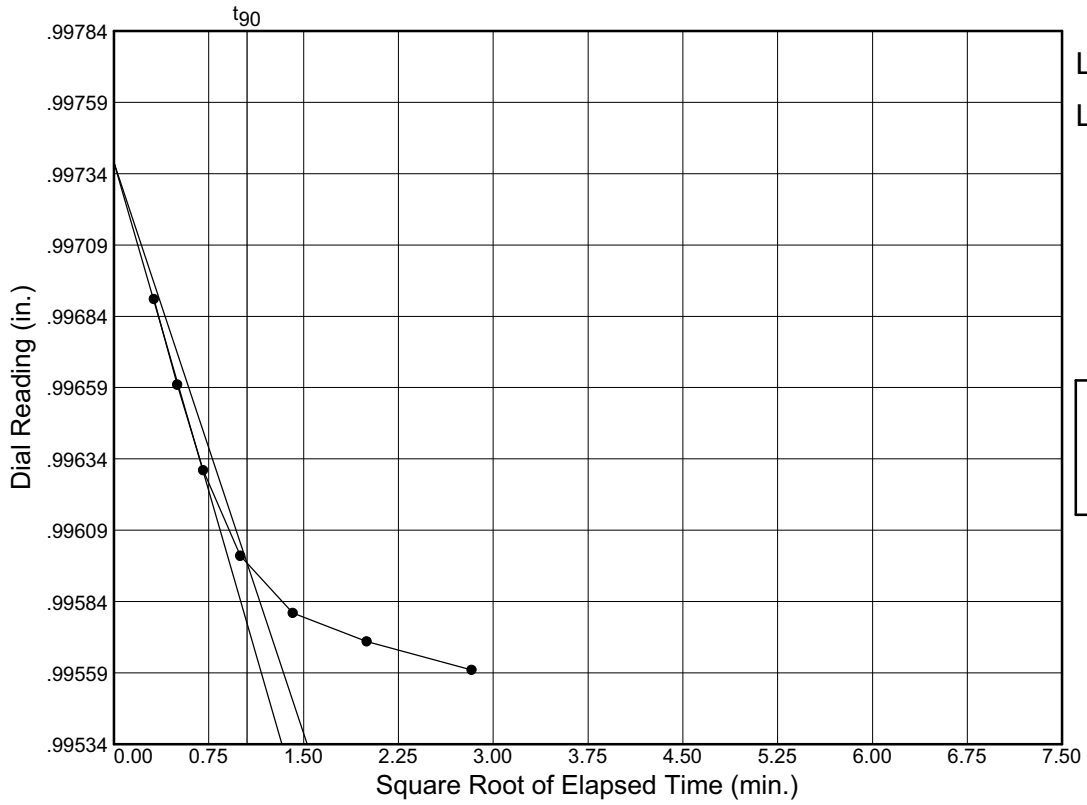
$T_{50}$ = 7.32 min.

| $C_v$ @ $T_{50}$ |
|---|
| 0.04 ft.$^2$/day |

Figure

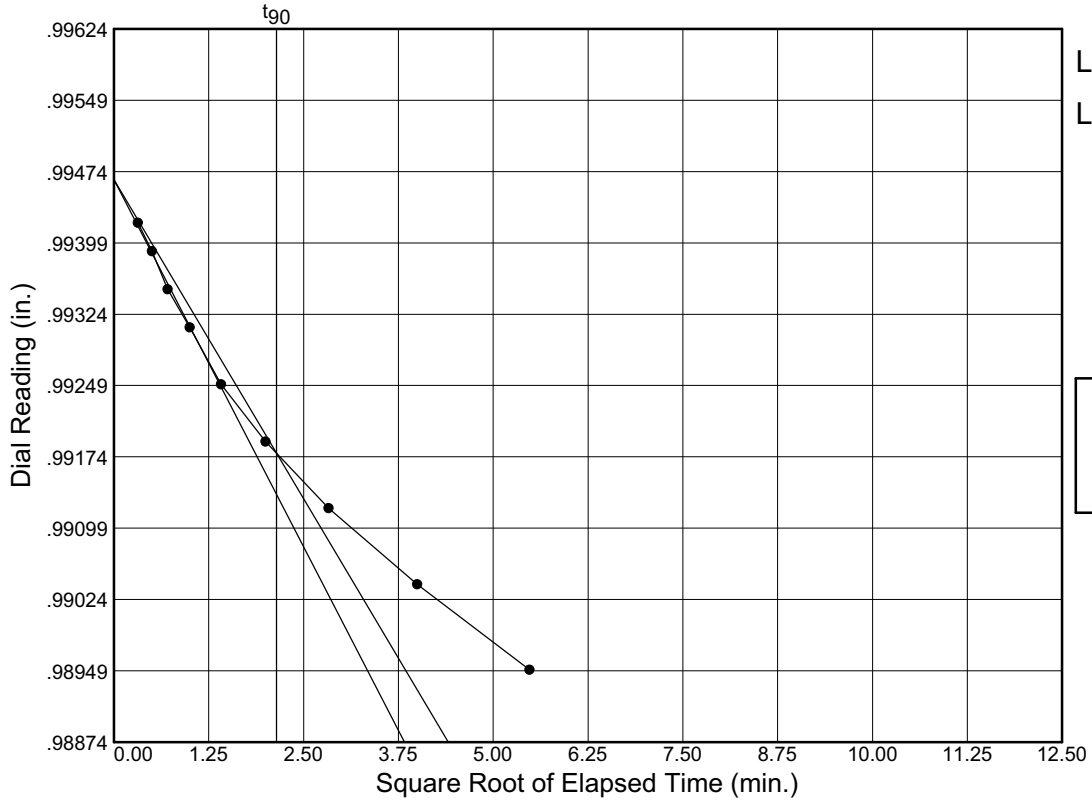
# Dial Reading vs. Time

Project No.: VB10-238G
Project: VDOT I-64 to I-264 PSA 3 I-64 D7 and Bridge
Virginia Beach, Virginia
Location: CUR-4B




Load No.= 1
Load= 0.13 tsf
$D_0$ = 0.99738
$D_{90}$ = 0.99597
$D_{100}$ = 0.99582
$T_{90}$ = 1.11 min.

$C_v$ @ $T_{90}$
1.90 ft.$^2$/day



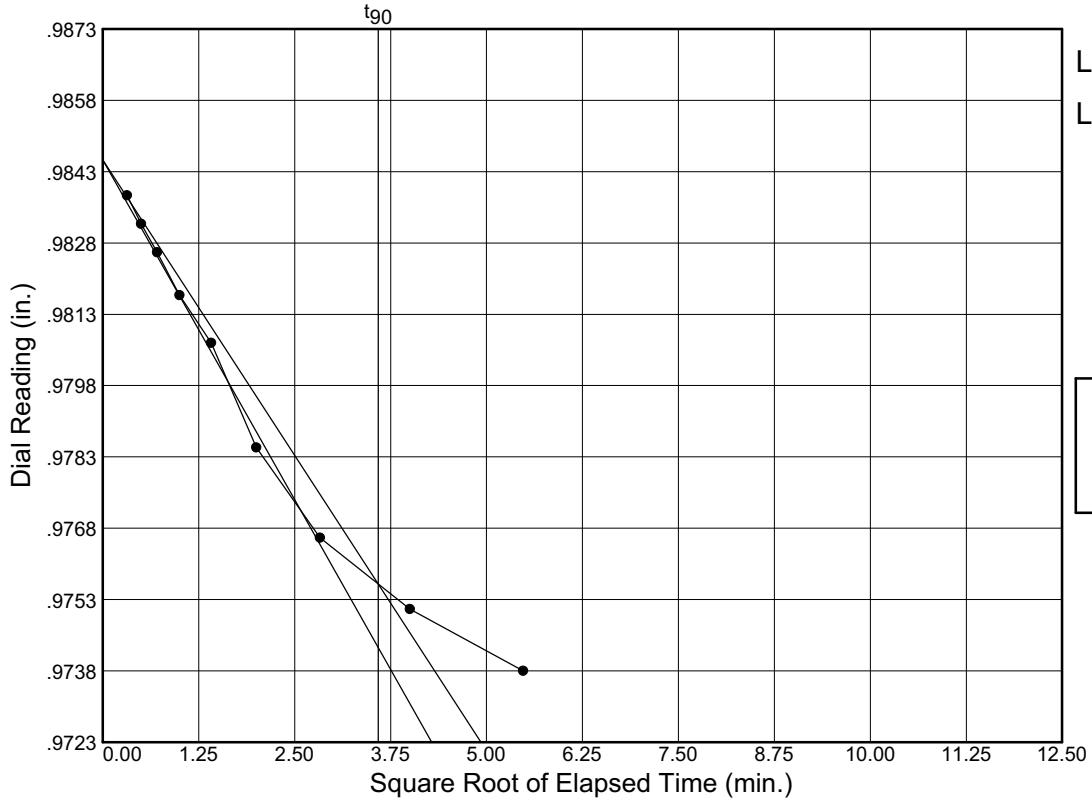

Load No.= 2
Load= 0.25 tsf
$D_0$ = 0.99466
$D_{90}$ = 0.99178
$D_{100}$ = 0.99146
$T_{90}$ = 4.59 min.

$C_v$ @ $T_{90}$
0.46 ft.$^2$/day

Figure

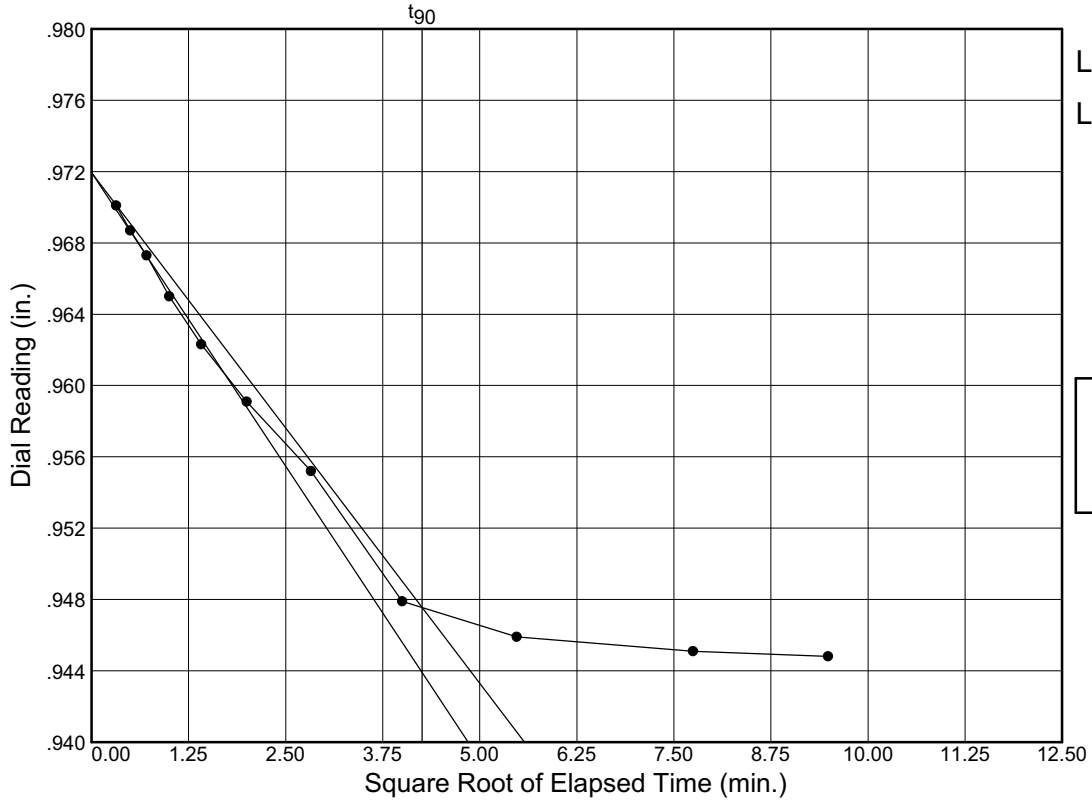
# Dial Reading vs. Time

Project No.: VB10-238G
Project: VDOT I-64 to I-264 PSA 3 I-64 D7 and Bridge
Virginia Beach, Virginia
Location: CUR-4B




Load No.= 3
Load= 0.50 tsf
$D_0$ = 0.98455
$D_{90}$ = 0.97563
$D_{100}$ = 0.97463
$T_{90}$ = 12.88 min.

$C_v$ @ $T_{90}$
0.16 ft.$^2$/day



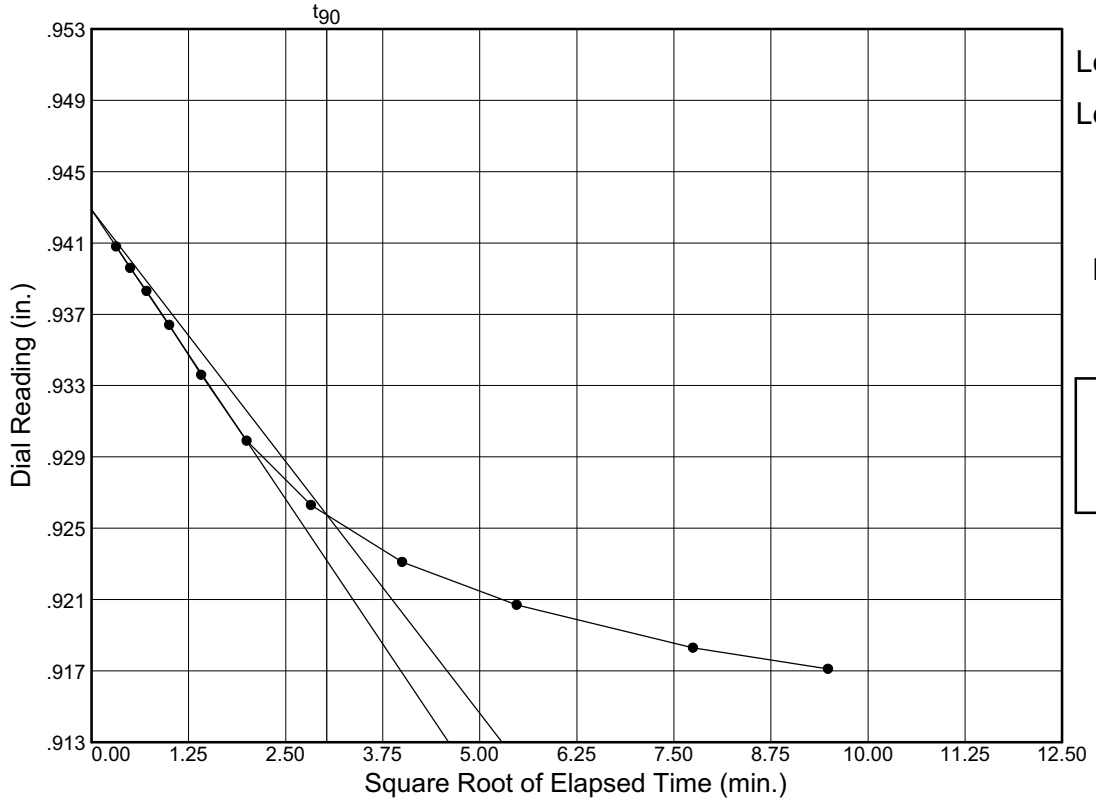

Load No.= 4
Load= 1.00 tsf
$D_0$ = 0.97193
$D_{90}$ = 0.94755
$D_{100}$ = 0.94484
$T_{90}$ = 18.12 min.

$C_v$ @ $T_{90}$
0.11 ft.$^2$/day

Figure

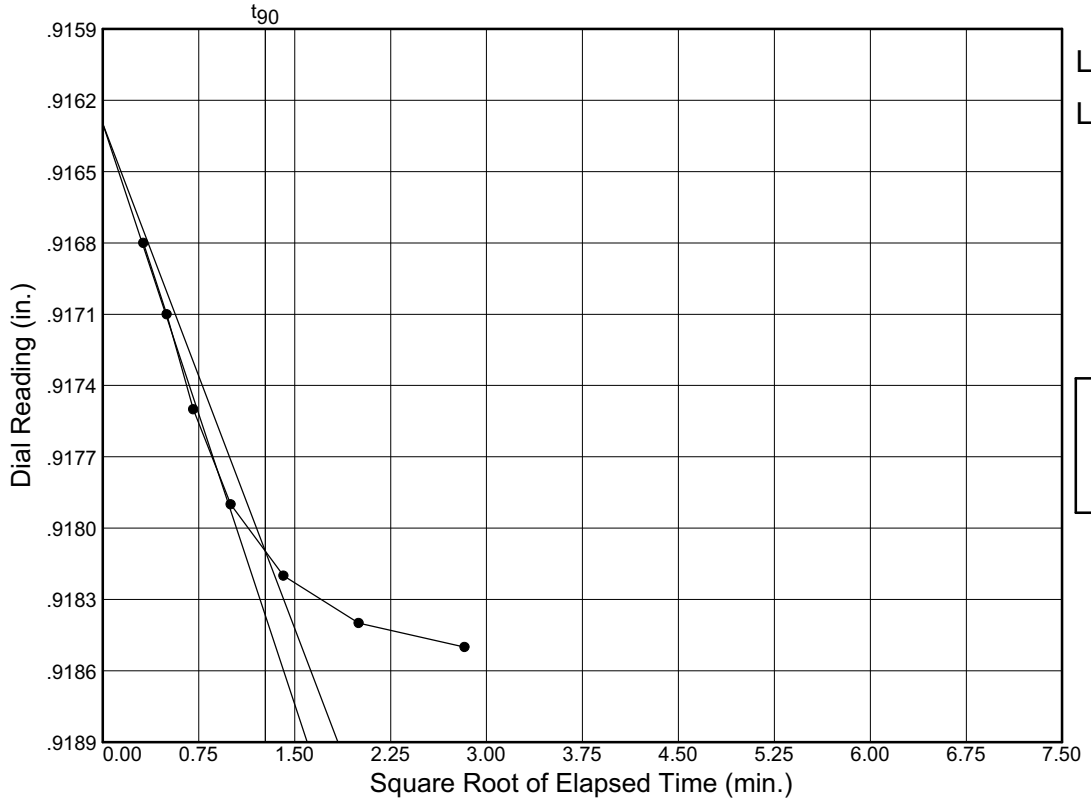
# Dial Reading vs. Time

Project No.: VB10-238G
Project: VDOT I-64 to I-264 PSA 3 I-64 D7 and Bridge
Virginia Beach, Virginia
Location: CUR-4B




Load No.= 5
Load= 2.00 tsf
$D_0$ = 0.94286
$D_{90}$ = 0.92575
$D_{100}$ = 0.92385
$T_{90}$ = 9.18 min.

$C_v$ @ $T_{90}$
0.20 ft.$^2$/day



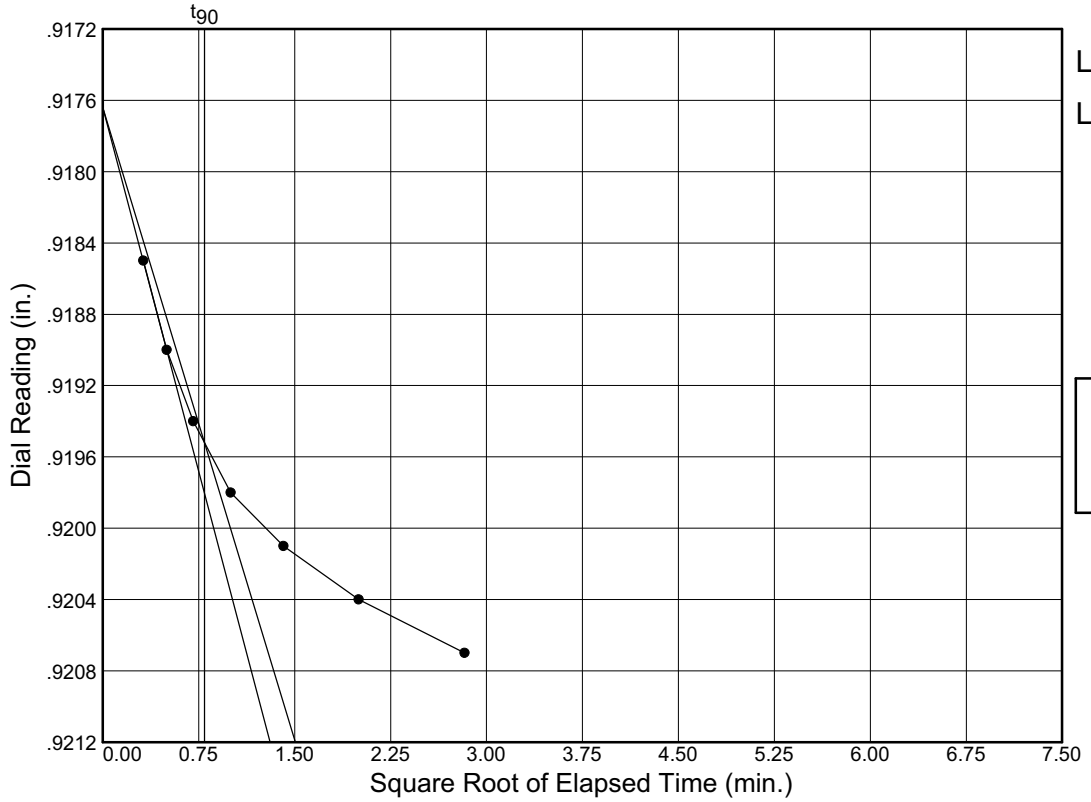

Load No.= 6
Load= 1.00 tsf
$D_0$ = 0.91630
$D_{90}$ = 0.91810
$D_{100}$ = 0.91830
$T_{90}$ = 1.61 min.

$C_v$ @ $T_{90}$
1.11 ft.$^2$/day

Figure

# Dial Reading vs. Time

Project No.: VB10-238G
Project: VDOT I-64 to I-264 PSA 3 I-64 D7 and Bridge
Virginia Beach, Virginia
Location: CUR-4B




Load No.= 7

Load= 0.50 tsf

$D_0$ = 0.91764

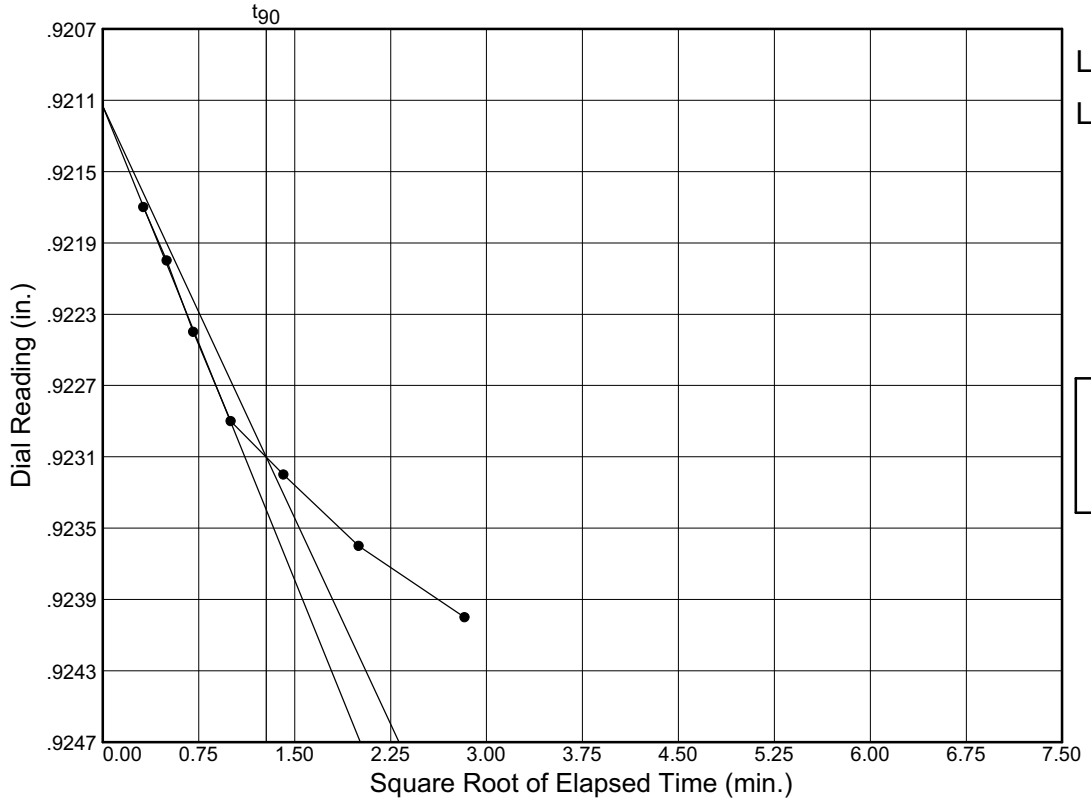
$D_{90}$ = 0.91952

$D_{100}$ = 0.91973

$T_{90}$ = 0.63 min.

$C_v$ @ $T_{90}$

2.84 ft.$^2$/day




Load No.= 8

Load= 0.25 tsf

$D_0$ = 0.92113

$D_{90}$ = 0.92310

$D_{100}$ = 0.92332

$T_{90}$ = 1.64 min.

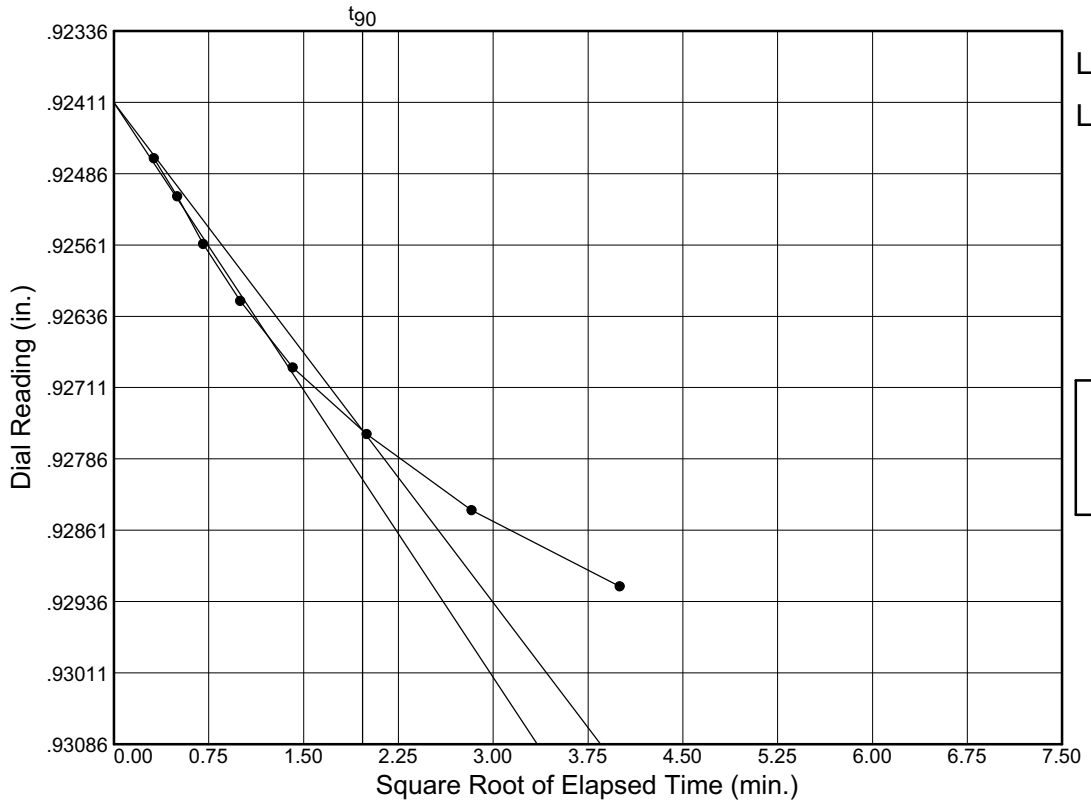
$C_v$ @ $T_{90}$

1.10 ft.$^2$/day

Figure

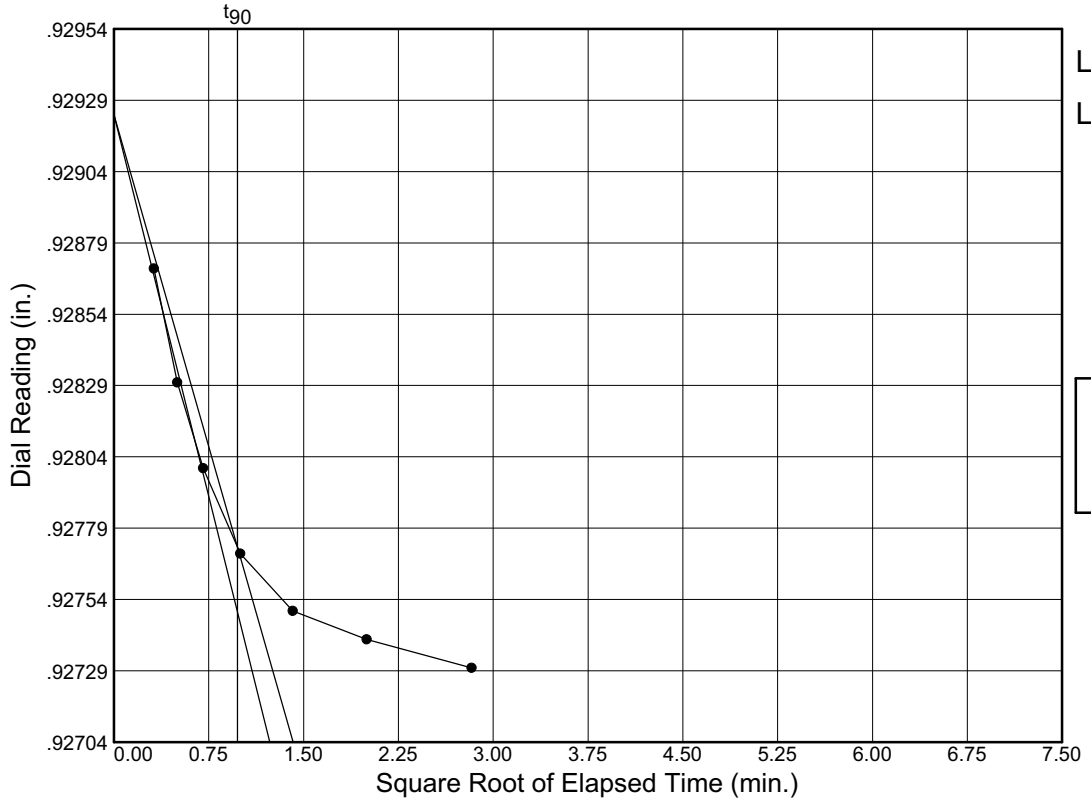
# Dial Reading vs. Time

Project No.: VB10-238G
Project: VDOT I-64 to I-264 PSA 3 I-64 D7 and Bridge
Virginia Beach, Virginia
Location: CUR-4B




Load No.= 9
Load= 0.13 tsf
$D_0$ = 0.92411
$D_{90}$ = 0.92756
$D_{100}$ = 0.92794
$T_{90}$ = 3.87 min.

$C_v$ @ $T_{90}$
0.47 ft.$^2$/day



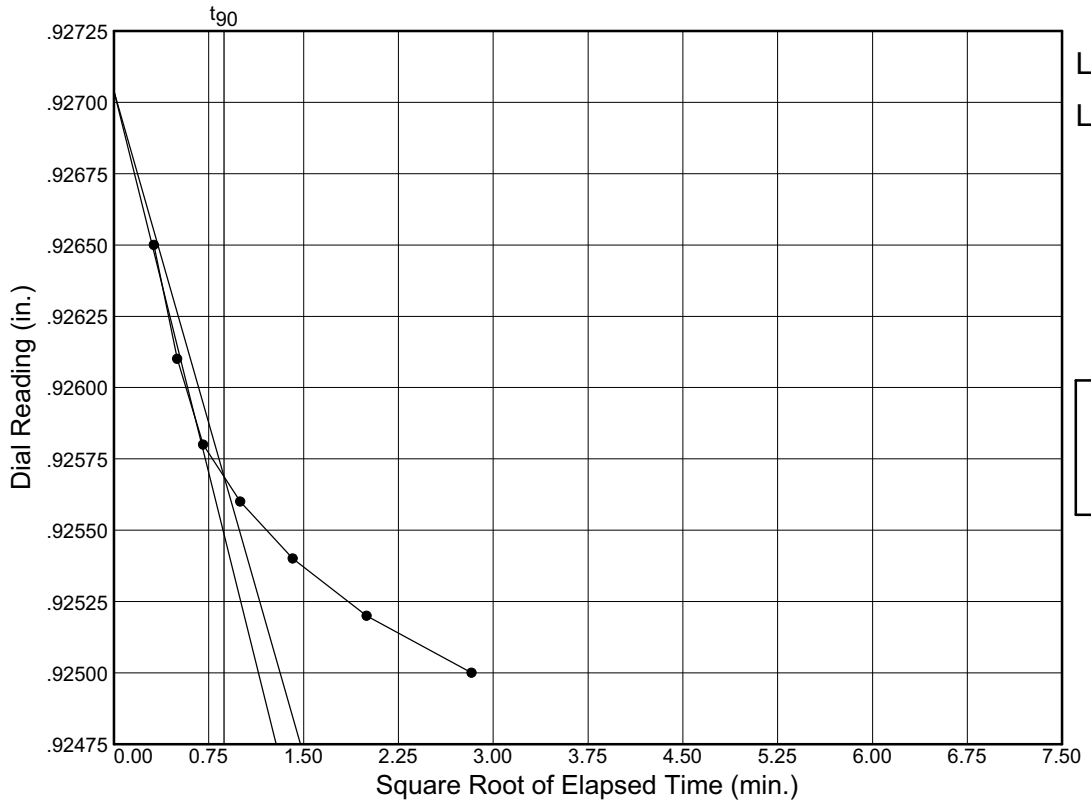

Load No.= 10
Load= 0.25 tsf
$D_0$ = 0.92924
$D_{90}$ = 0.92772
$D_{100}$ = 0.92755
$T_{90}$ = 0.96 min.

$C_v$ @ $T_{90}$
1.91 ft.$^2$/day

Figure

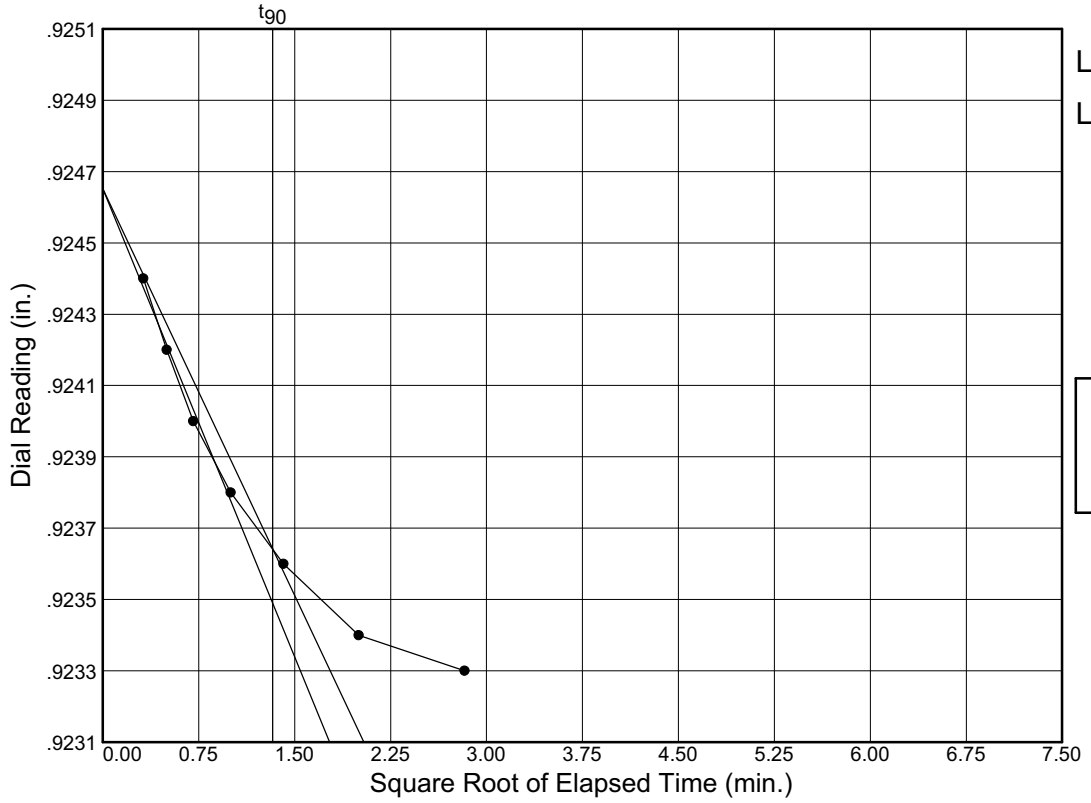
# Dial Reading vs. Time

Project No.: VB10-238G
Project: VDOT I-64 to I-264 PSA 3 I-64 D7 and Bridge
Virginia Beach, Virginia
Location: CUR-4B




Load No.= 11
Load= 0.50 tsf
$D_0$ = 0.92704
$D_{90}$ = 0.92569
$D_{100}$ = 0.92554
$T_{90}$ = 0.76 min.

$C_v$ @ $T_{90}$
2.40 ft.$^2$/day



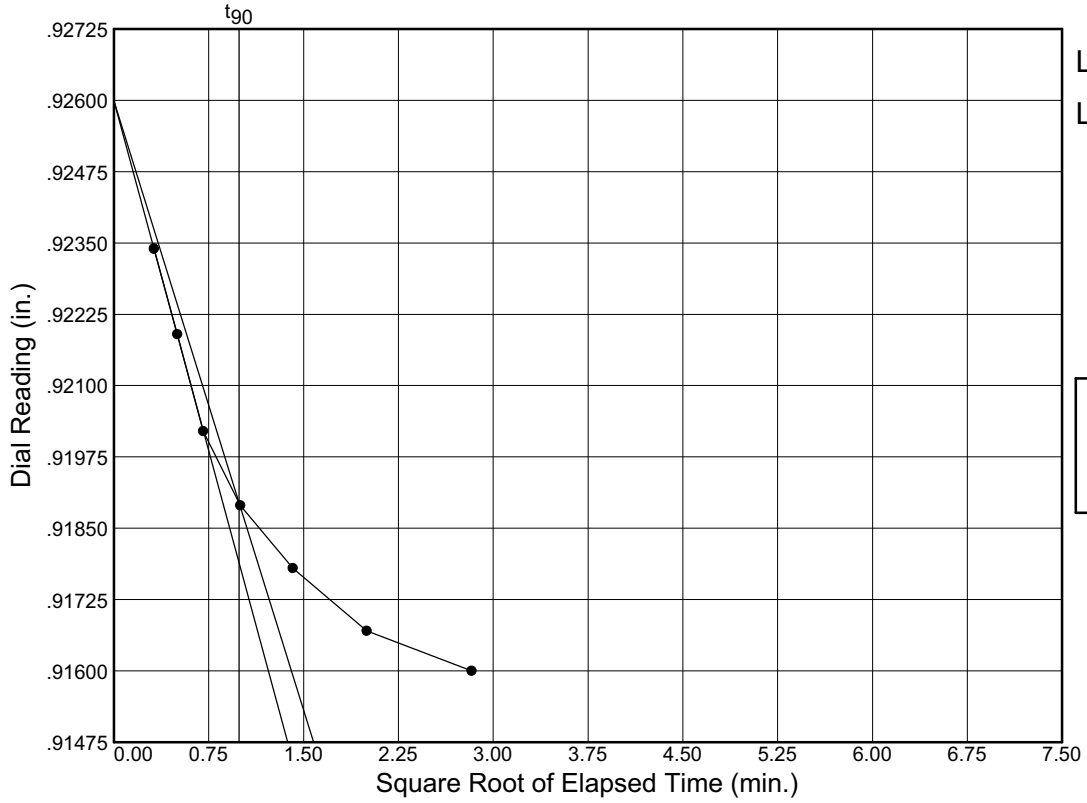

Load No.= 12
Load= 1.00 tsf
$D_0$ = 0.92465
$D_{90}$ = 0.92364
$D_{100}$ = 0.92353
$T_{90}$ = 1.76 min.

$C_v$ @ $T_{90}$
1.03 ft.$^2$/day

Figure

# Dial Reading vs. Time

Project No.: VB10-238G
Project: VDOT I-64 to I-264 PSA 3 I-64 D7 and Bridge
Virginia Beach, Virginia
Location: CUR-4B




Load No.= 13

Load= 2.00 tsf

$D_0$ = 0.92599

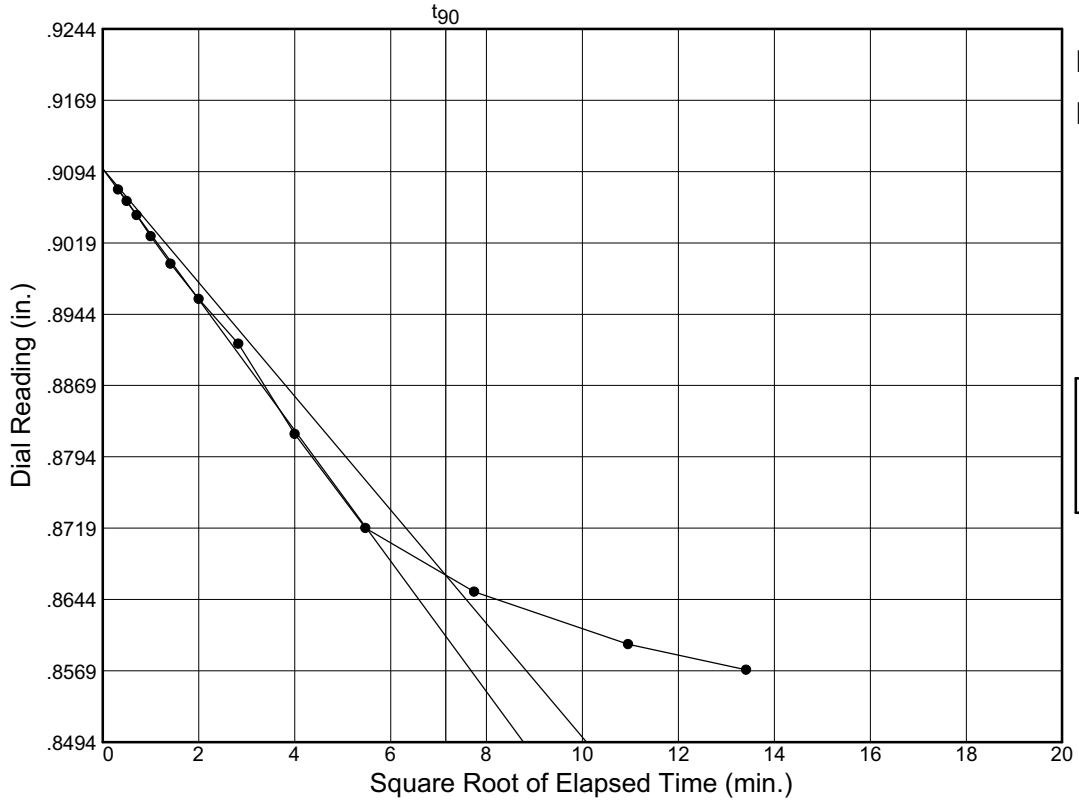
$D_{90}$ = 0.91895

$D_{100}$ = 0.91816

$T_{90}$ = 0.98 min.

$C_v$ @ $T_{90}$

1.83 ft.$^2$/day




Load No.= 14

Load= 4.00 tsf

$D_0$ = 0.90970

$D_{90}$ = 0.86696

$D_{100}$ = 0.86221

$T_{90}$ = 51.10 min.

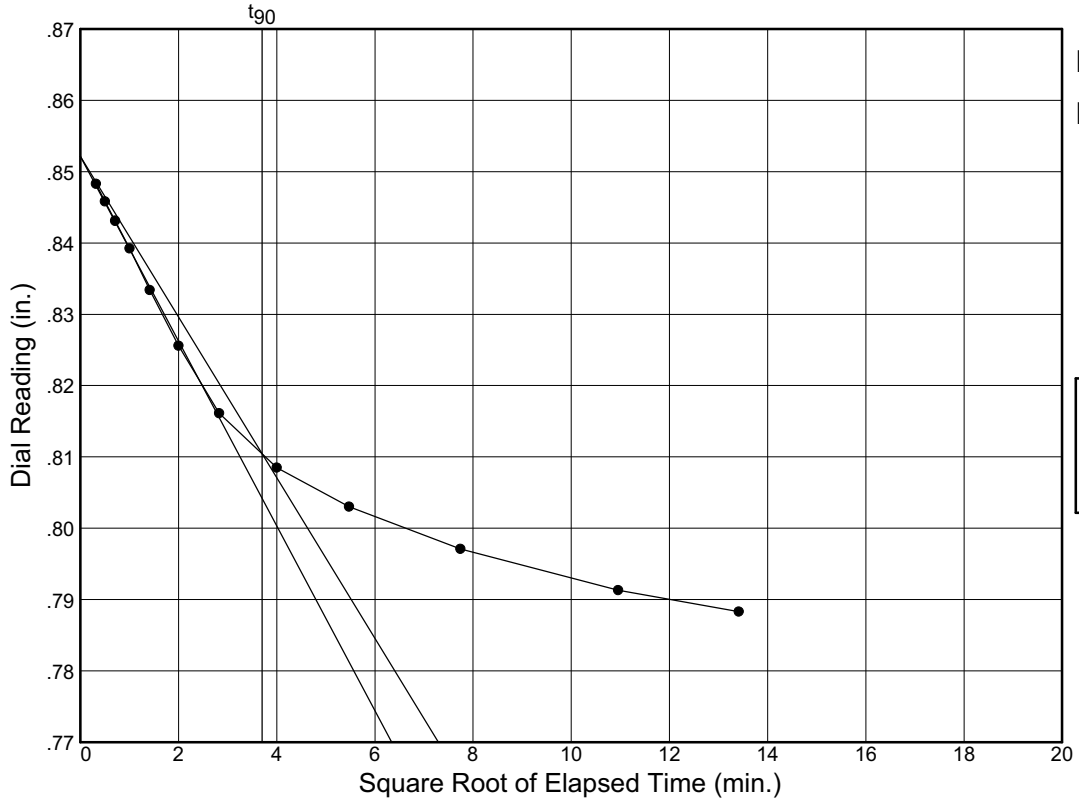
$C_v$ @ $T_{90}$

0.03 ft.$^2$/day

Figure

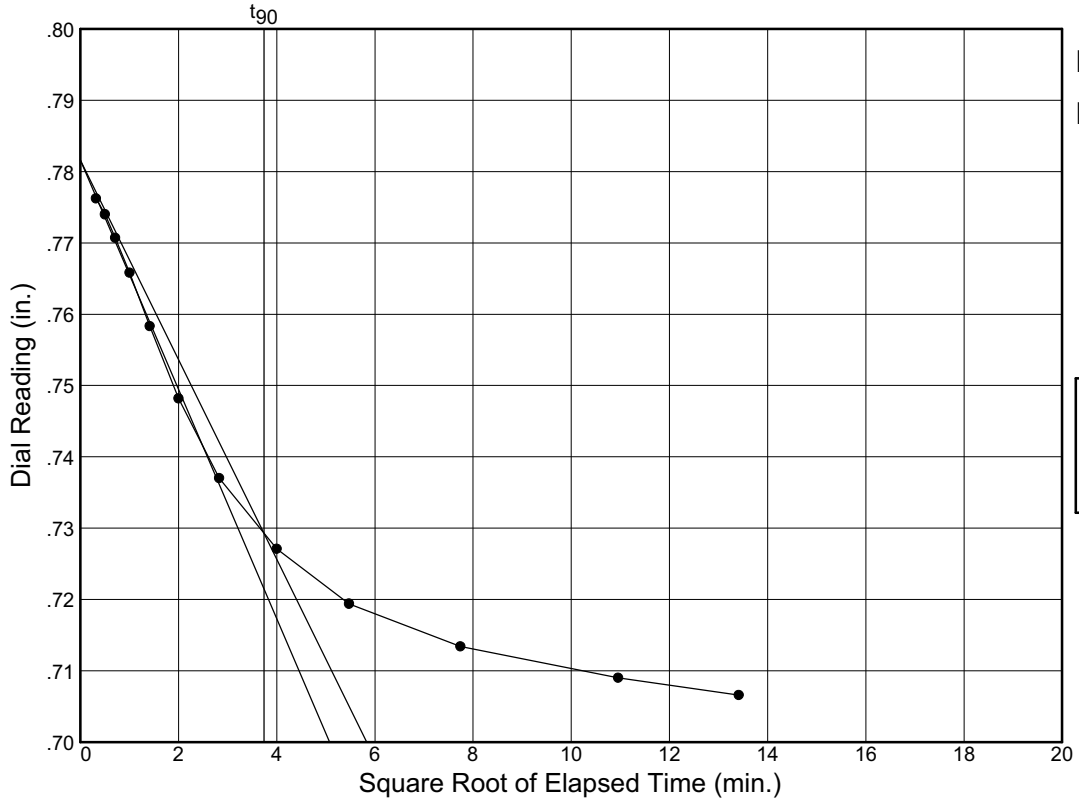
# Dial Reading vs. Time

Project No.: VB10-238G
Project: VDOT I-64 to I-264 PSA 3 I-64 D7 and Bridge
Virginia Beach, Virginia
Location: CUR-4B




Load No.= 15
Load= 8.00 tsf
$D_0$ = 0.85215
$D_{90}$ = 0.81041
$D_{100}$ = 0.80578
$T_{90}$ = 13.73 min.

$C_v$ @ $T_{90}$
0.10 ft.$^2$/day



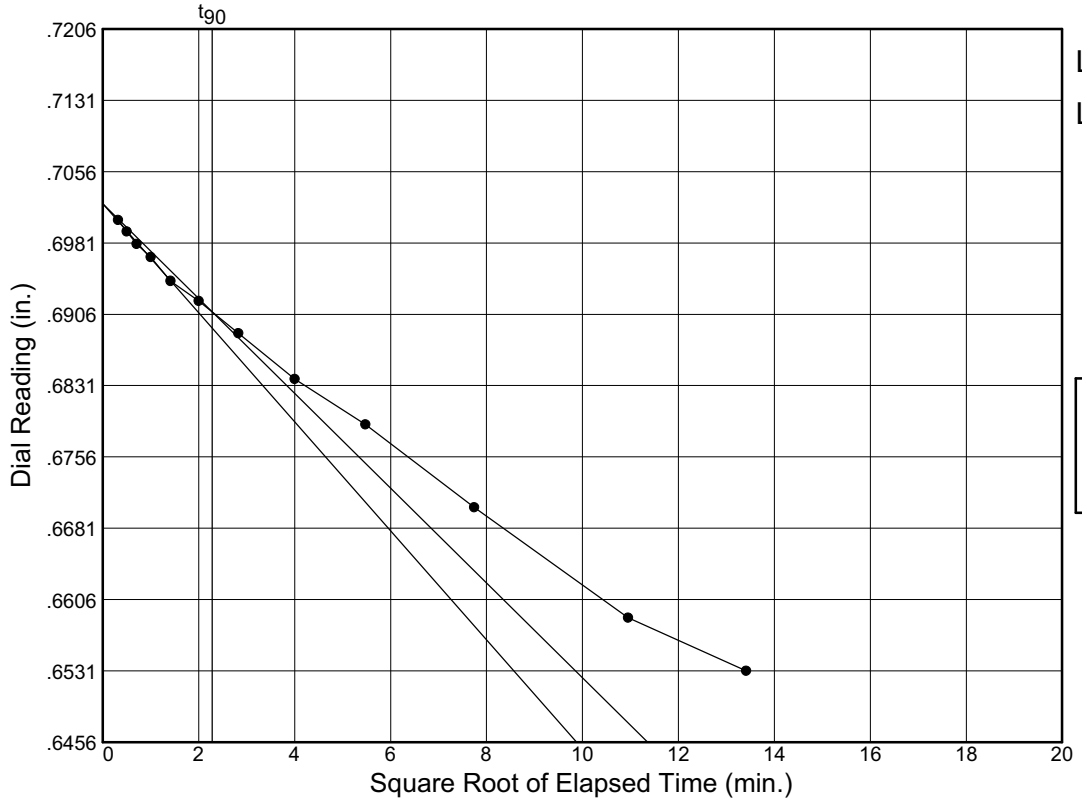

Load No.= 16
Load= 16.00 tsf
$D_0$ = 0.78159
$D_{90}$ = 0.72929
$D_{100}$ = 0.72348
$T_{90}$ = 13.99 min.

$C_v$ @ $T_{90}$
0.08 ft.$^2$/day

Figure

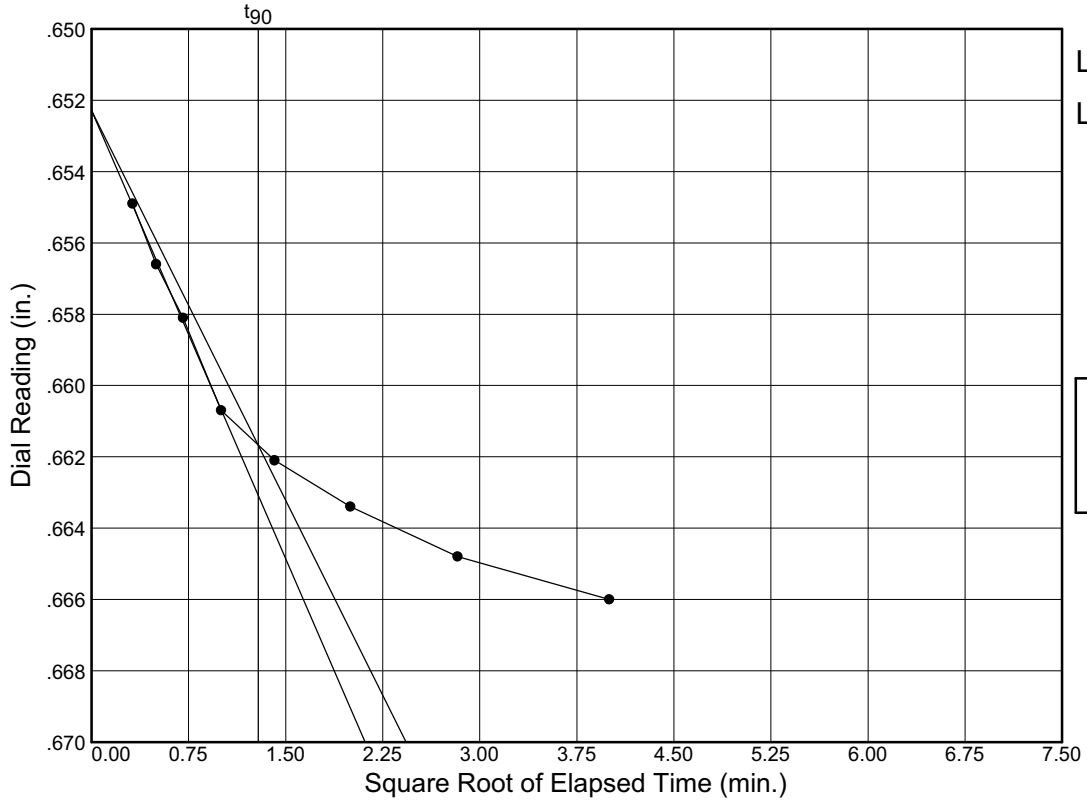
# Dial Reading vs. Time

Project No.: VB10-238G
Project: VDOT I-64 to I-264 PSA 3 I-64 D7 and Bridge
Virginia Beach, Virginia
Location: CUR-4B




Load No.= 17
Load= 32.00 tsf
$D_0$ = 0.70221
$D_{90}$ = 0.69085
$D_{100}$ = 0.68959
$T_{90}$ = 5.20 min.

$C_v$ @ $T_{90}$
0.19 ft.$^2$/day



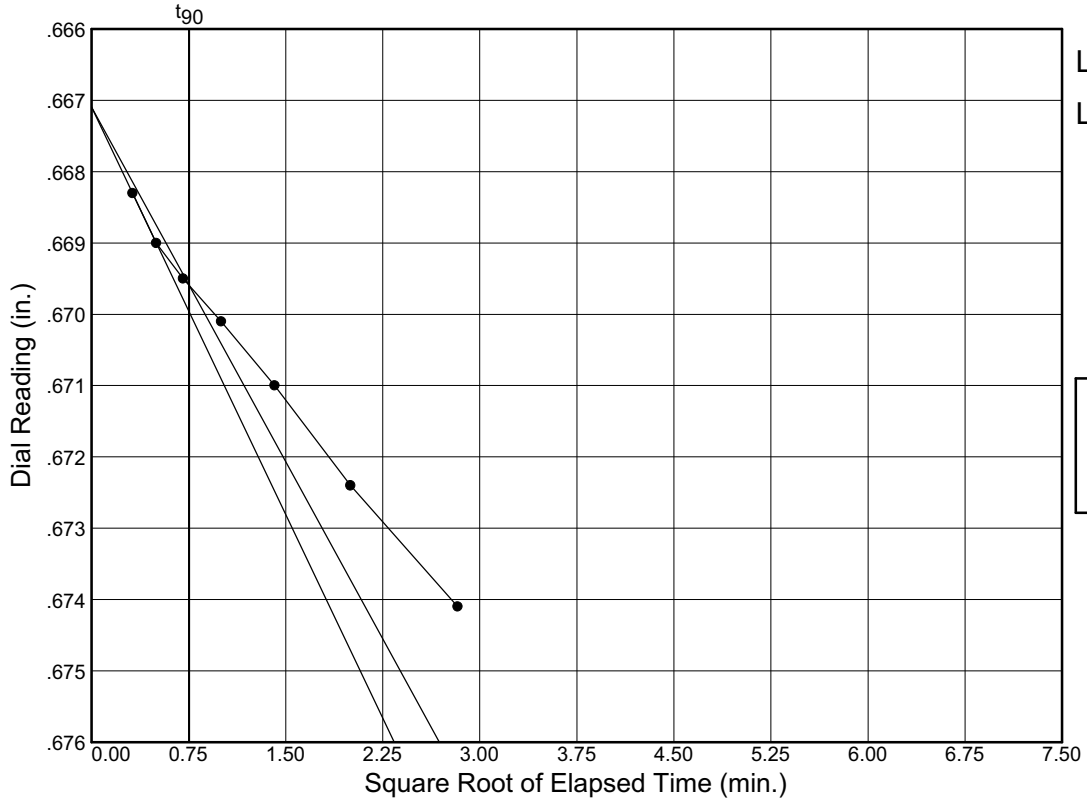

Load No.= 18
Load= 8.00 tsf
$D_0$ = 0.65229
$D_{90}$ = 0.66167
$D_{100}$ = 0.66272
$T_{90}$ = 1.66 min.

$C_v$ @ $T_{90}$
0.56 ft.$^2$/day

Figure

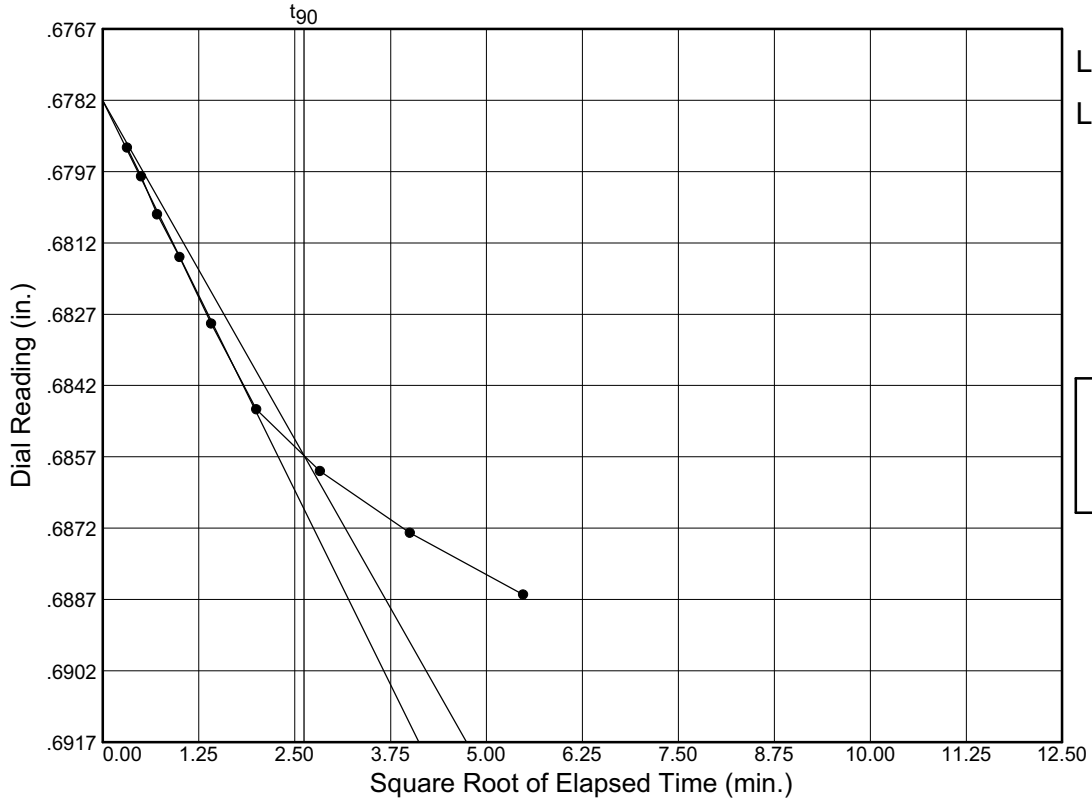
# Dial Reading vs. Time

Project No.: VB10-238G
Project: VDOT I-64 to I-264 PSA 3 I-64 D7 and Bridge
Virginia Beach, Virginia
Location: CUR-4B




Load No.= 19
Load= 4.00 tsf
$D_0$ = 0.66710
$D_{90}$ = 0.66960
$D_{100}$ = 0.66988
$T_{90}$ = 0.57 min.

$C_v$ @ $T_{90}$
1.66 ft.$^2$/day



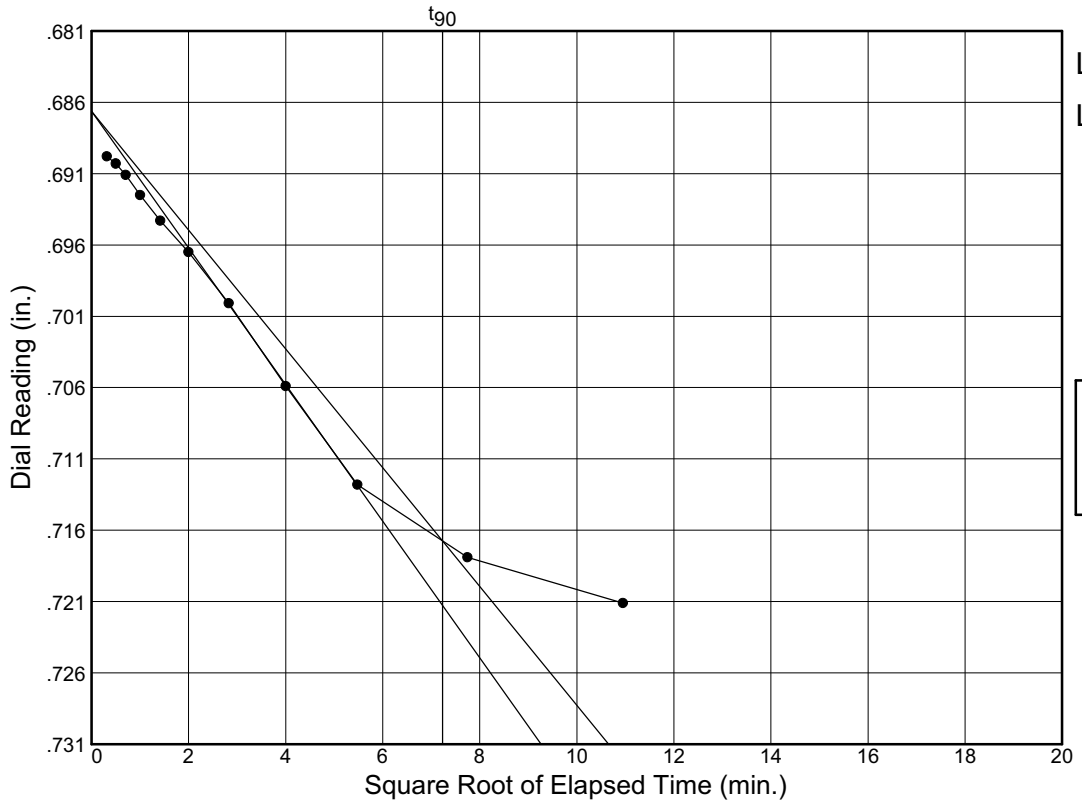

Load No.= 20
Load= 1.00 tsf
$D_0$ = 0.67821
$D_{90}$ = 0.68568
$D_{100}$ = 0.68651
$T_{90}$ = 6.88 min.

$C_v$ @ $T_{90}$
0.14 ft.$^2$/day

Figure

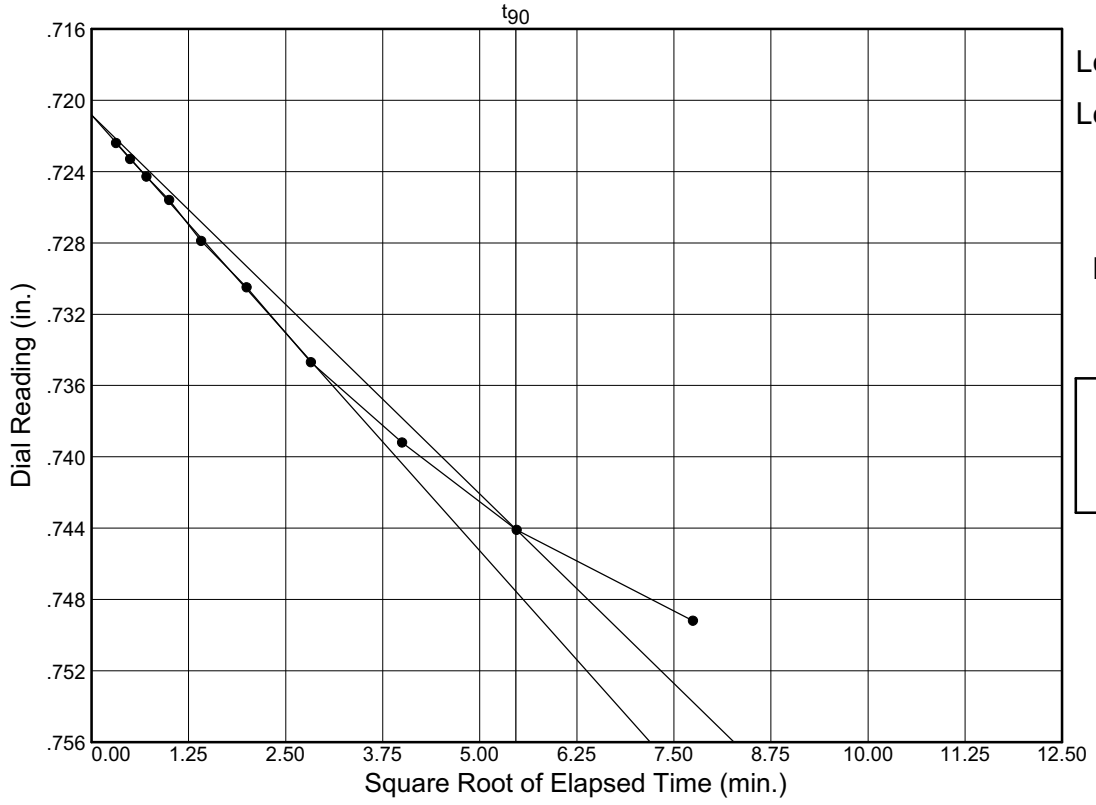
# Dial Reading vs. Time

Project No.: VB10-238G
Project: VDOT I-64 to I-264 PSA 3 I-64 D7 and Bridge
Virginia Beach, Virginia
Location: CUR-4B




Load No.= 21
Load= 0.25 tsf
$D_0$ = 0.68662
$D_{90}$ = 0.71675
$D_{100}$ = 0.72010
$T_{90}$ = 52.34 min.

$C_v$ @ $T_{90}$
0.02 ft.$^2$/day




Load No.= 22
Load= 0.13 tsf
$D_0$ = 0.72084
$D_{90}$ = 0.74405
$D_{100}$ = 0.74663
$T_{90}$ = 29.83 min.

$C_v$ @ $T_{90}$
0.04 ft.$^2$/day

Figure

## CONSOLIDATION TEST DATA

**Client:** HDR, Inc.
**Project:** VDOT I-64 to I-264 PSA 3 I-64 D7 and Bridge
Virginia Beach, Virginia
**Project Number:** VB10-238G

### Sample Data

**Source:**
**Sample No.:** Shelby Tube
**Elev. or Depth:** 95-97 ft. **Sample Length(in./cm.):** 1 in.
**Location:** CUR-4B
**Description:** Gray, Fat CLAY
**Sample Date:** **Liquid Limit:** **Plasticity Index:**
**USCS:** **AASHTO:**
**Preparation Process:**
**Condition of Test:**
**Test Method:** **Final Density:** **Figure No.:** 1
**Testing Remarks:** CUR-4B
Sample Obtained 10/15/10
**Tested By:** **Test Date:**
**Checked By:** **Title:**

### Test Specimen Data

| TOTAL SAMPLE | BEFORE TEST | AFTER TEST |
|---|---|---|
| **Wet w+t** = 309.47 g. | **Consolidometer #** = 1 | **Wet w+t** = 290.95 g. |
| **Dry w+t** = 260.95 g. | | **Dry w+t** = 260.95 g. |
| **Tare Wt.** = 174.48 g. | **Spec. Gravity** = 2.71 | **Tare Wt.** = 174.48 g. |
| **Height** = 1.00 in. | **Height** = 1.00 in. | |
| **Diameter** = 2.50 in. | **Diameter** = 2.50 in. | |
| **Weight** = 124.99 g. | **Defl. Table** = Reference Set (inches/tsf) | |
| **Moisture** = 56.1 % | **Ht. Solids** = 0.3967 in. | **Moisture** = 34.7 % |
| **Wet Den.** = 97.0 pcf | **Dry Wt.** = 80.06 g. | **Dry Wt.** = 86.47 g.* |
| **Dry Den.** = 62.1 pcf | **Void Ratio** = 1.521 | **Void Ratio** = 0.889 |
| **Ovrbrdn.** = 2.70 tsf | **Saturation** = 100.0 % | |

*** Final dry weight used in calculations**

### End-of-Load Summary

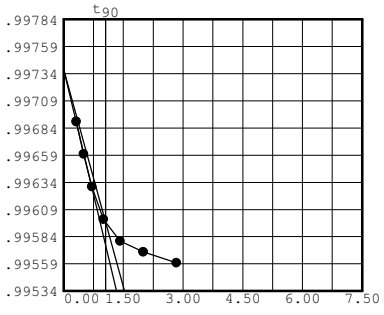
| Pressure (tsf) | Final Dial (in.) | Machine Defl. (in.) | $C_v$ (ft.$^2$/day) | $C_\alpha$ | Void Ratio | % Compression /Swell |
|---|---|---|---|---|---|---|
| start | 1.00000 | | | | 1.521 | |
| 0.13 | 0.99560 | 0.00000 | 1.90 | | 1.510 | 0.4 Comprs. |
| 0.25 | 0.98910 | 0.00040 | 0.46 | | 1.495 | 1.1 Comprs. |
| 0.50 | 0.97300 | 0.00080 | 0.16 | | 1.455 | 2.6 Comprs. |
| 1.00 | 0.94320 | 0.00160 | 0.11 | | 1.382 | 5.5 Comprs. |
| 2.00 | 0.91470 | 0.00240 | 0.20 | | 1.312 | 8.3 Comprs. |
| 1.00 | 0.91690 | 0.00160 | 1.11 | | 1.316 | 8.1 Comprs. |
| 0.50 | 0.91990 | 0.00080 | 2.84 | | 1.321 | 7.9 Comprs. |

| Pressure (tsf) | Final Dial (in.) | Machine Defl. (in.) | $C_v$ (ft.$^2$/day) | $C_\alpha$ | Void Ratio | % Compression /Swell |
|---|---|---|---|---|---|---|
| 0.25 | 0.92360 | 0.00040 | 1.10 | | 1.329 | 7.6 Comprs. |
| 0.13 | 0.92920 | 0.00000 | 0.47 | | 1.343 | 7.1 Comprs. |
| 0.25 | 0.92690 | 0.00040 | 1.91 | | 1.338 | 7.3 Comprs. |
| 0.50 | 0.92420 | 0.00080 | 2.40 | | 1.332 | 7.5 Comprs. |
| 1.00 | 0.92170 | 0.00160 | 1.03 | | 1.328 | 7.7 Comprs. |
| 2.00 | 0.91300 | 0.00300 | 1.83 | | 1.309 | 8.4 Comprs. |
| 4.00 | 0.85700 | 0.00000 | 0.03 | | 1.161 | 14.3 Comprs. |
| 8.00 | 0.78830 | 0.00000 | 0.10 | | 0.987 | 21.2 Comprs. |
| 16.00 | 0.70660 | 0.00000 | 0.08 | | 0.781 | 29.3 Comprs. |
| 32.00 | 0.65310 | 0.00000 | 0.19 | | 0.646 | 34.7 Comprs. |
| 8.00 | 0.66600 | 0.00000 | 0.56 | | 0.679 | 33.4 Comprs. |
| 4.00 | 0.67410 | 0.00000 | 1.66 | | 0.699 | 32.6 Comprs. |
| 1.00 | 0.68700 | 0.00160 | 0.14 | | 0.736 | 31.1 Comprs. |
| 0.25 | 0.72070 | 0.00040 | 0.02 | | 0.818 | 27.9 Comprs. |
| 0.13 | 0.74920 | 0.00000 | 0.04 | | 0.889 | 25.1 Comprs. |

**$C_c$ =** 0.70 **$P_c$ =** 3.31 tsf **$C_r$ =** 0.06

**Pressure: 0.13 tsf** **TEST READINGS** **Load No. 1**

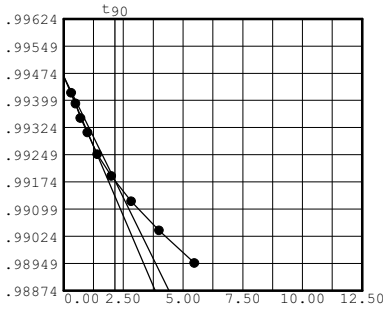
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 1.00000 |
| 2 | 0.10 | 0.99690 |
| 3 | 0.25 | 0.99660 |
| 4 | 0.50 | 0.99630 |
| 5 | 1.00 | 0.99600 |
| 6 | 2.00 | 0.99580 |
| 7 | 4.00 | 0.99570 |
| 8 | 8.00 | 0.99560 |




**Void Ratio =** 1.510 **Compression =** 0.4 %
**$D_0$ =** 0.99738 **$D_{90}$ =** 0.99597 **$D_{100}$ =** 0.99582
**$C_v$ at 1.1 min. =** 1.90 ft.$^2$/day

**Pressure: 0.25 tsf** **TEST READINGS** **Load No. 2**

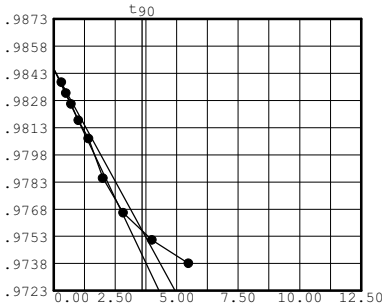
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.99560 |
| 2 | 0.10 | 0.99380 |
| 3 | 0.25 | 0.99350 |
| 4 | 0.50 | 0.99310 |
| 5 | 1.00 | 0.99270 |
| 6 | 2.00 | 0.99210 |
| 7 | 4.00 | 0.99150 |
| 8 | 8.00 | 0.99080 |
| 9 | 16.00 | 0.99000 |
| 10 | 30.00 | 0.98910 |




**Void Ratio =** 1.495 **Compression =** 1.1 %
**$D_0$ =** 0.99466 **$D_{90}$ =** 0.99178 **$D_{100}$ =** 0.99146
**$C_v$ at 4.6 min. =** 0.46 ft.$^2$/day

**Pressure: 0.50 tsf** **TEST READINGS** **Load No. 3**

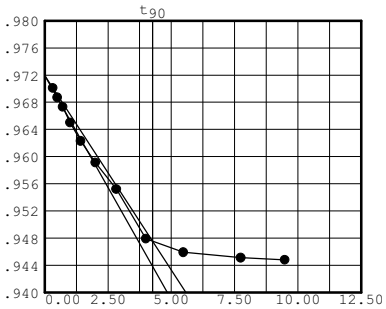
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.98910 |
| 2 | 0.10 | 0.98300 |
| 3 | 0.25 | 0.98240 |
| 4 | 0.50 | 0.98180 |
| 5 | 1.00 | 0.98090 |
| 6 | 2.00 | 0.97990 |
| 7 | 4.00 | 0.97770 |
| 8 | 8.00 | 0.97580 |
| 9 | 16.00 | 0.97430 |
| 10 | 30.00 | 0.97300 |




**Void Ratio =** 1.455 **Compression =** 2.6 %
$D_0$ **=** 0.98455 $D_{90}$ **=** 0.97563 $D_{100}$ **=** 0.97463
$C_v$ **at 12.9 min. =** 0.16 ft.$^2$/day

**Pressure: 1.00 tsf** **TEST READINGS** **Load No. 4**

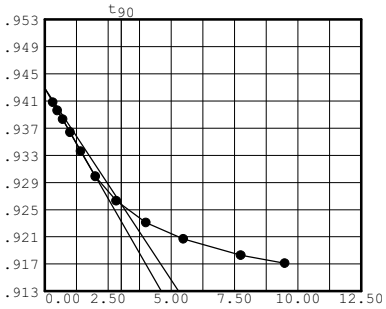
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.97300 | 11 | 60.00 | 0.94350 |
| 2 | 0.10 | 0.96850 | 12 | 90.00 | 0.94320 |
| 3 | 0.25 | 0.96710 | | | |
| 4 | 0.50 | 0.96570 | | | |
| 5 | 1.00 | 0.96340 | | | |
| 6 | 2.00 | 0.96070 | | | |
| 7 | 4.00 | 0.95750 | | | |
| 8 | 8.00 | 0.95360 | | | |
| 9 | 16.00 | 0.94630 | | | |
| 10 | 30.00 | 0.94430 | | | |




**Void Ratio =** 1.382 **Compression =** 5.5 %
$D_0$ **=** 0.97193 $D_{90}$ **=** 0.94755 $D_{100}$ **=** 0.94484
$C_v$ **at 18.1 min. =** 0.11 ft.$^2$/day

**Pressure: 2.00 tsf** **TEST READINGS** **Load No. 5**

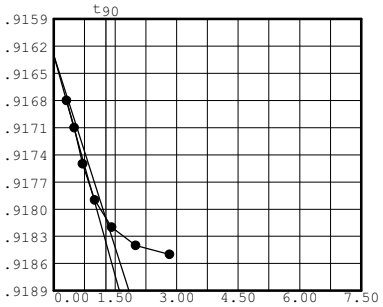
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.94320 | 11 | 60.00 | 0.91590 |
| 2 | 0.10 | 0.93840 | 12 | 90.00 | 0.91470 |
| 3 | 0.25 | 0.93720 | | | |
| 4 | 0.50 | 0.93590 | | | |
| 5 | 1.00 | 0.93400 | | | |
| 6 | 2.00 | 0.93120 | | | |
| 7 | 4.00 | 0.92750 | | | |
| 8 | 8.00 | 0.92390 | | | |
| 9 | 16.00 | 0.92070 | | | |
| 10 | 30.00 | 0.91830 | | | |




**Void Ratio =** 1.312 **Compression =** 8.3 %
$D_0$ **=** 0.94286 $D_{90}$ **=** 0.92575 $D_{100}$ **=** 0.92385
$C_v$ **at 9.2 min. =** 0.20 ft.$^2$/day

**Pressure: 1.00 tsf** **TEST READINGS** **Load No. 6**

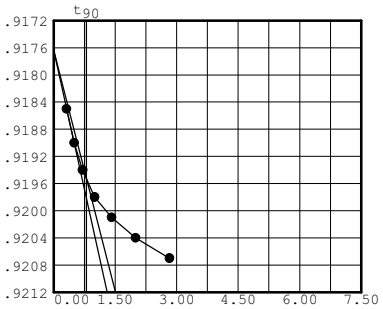
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.91470 |
| 2 | 0.10 | 0.91520 |
| 3 | 0.25 | 0.91550 |
| 4 | 0.50 | 0.91590 |
| 5 | 1.00 | 0.91630 |
| 6 | 2.00 | 0.91660 |
| 7 | 4.00 | 0.91680 |
| 8 | 8.00 | 0.91690 |




**Void Ratio =** 1.316 **Compression =** 8.1 %
**$D_0$ =** 0.91630 **$D_{90}$ =** 0.91810 **$D_{100}$ =** 0.91830
**$C_v$ at 1.6 min. =** 1.11 ft.$^2$/day

**Pressure: 0.50 tsf** **TEST READINGS** **Load No. 7**

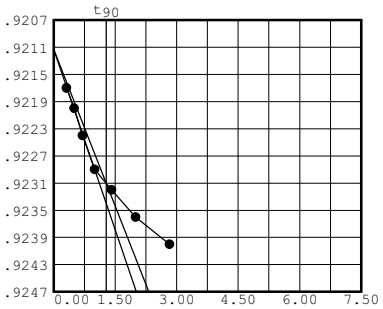
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.91690 |
| 2 | 0.10 | 0.91770 |
| 3 | 0.25 | 0.91820 |
| 4 | 0.50 | 0.91860 |
| 5 | 1.00 | 0.91900 |
| 6 | 2.00 | 0.91930 |
| 7 | 4.00 | 0.91960 |
| 8 | 8.00 | 0.91990 |




**Void Ratio =** 1.321 **Compression =** 7.9 %
**$D_0$ =** 0.91764 **$D_{90}$ =** 0.91952 **$D_{100}$ =** 0.91973
**$C_v$ at 0.6 min. =** 2.84 ft.$^2$/day

**Pressure: 0.25 tsf** **TEST READINGS** **Load No. 8**

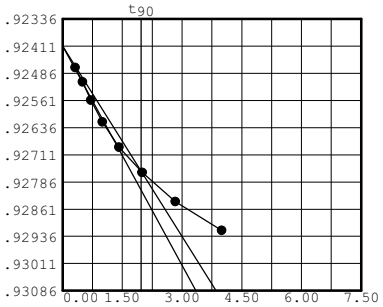
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.91990 |
| 2 | 0.10 | 0.92130 |
| 3 | 0.25 | 0.92160 |
| 4 | 0.50 | 0.92200 |
| 5 | 1.00 | 0.92250 |
| 6 | 2.00 | 0.92280 |
| 7 | 4.00 | 0.92320 |
| 8 | 8.00 | 0.92360 |




**Void Ratio =** 1.329 **Compression =** 7.6 %
**$D_0$ =** 0.92113 **$D_{90}$ =** 0.92310 **$D_{100}$ =** 0.92332
**$C_v$ at 1.6 min. =** 1.10 ft.$^2$/day

**Pressure: 0.13 tsf** **TEST READINGS** **Load No. 9**

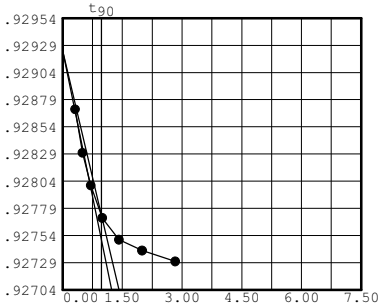
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.92360 |
| 2 | 0.10 | 0.92470 |
| 3 | 0.25 | 0.92510 |
| 4 | 0.50 | 0.92560 |
| 5 | 1.00 | 0.92620 |
| 6 | 2.00 | 0.92690 |
| 7 | 4.00 | 0.92760 |
| 8 | 8.00 | 0.92840 |
| 9 | 16.00 | 0.92920 |




**Void Ratio =** 1.343 **Compression =** 7.1 %
**$D_0$ =** 0.92411 **$D_{90}$ =** 0.92756 **$D_{100}$ =** 0.92794
**$C_v$ at 3.9 min. =** 0.47 ft.$^2$/day

**Pressure: 0.25 tsf** **TEST READINGS** **Load No. 10**

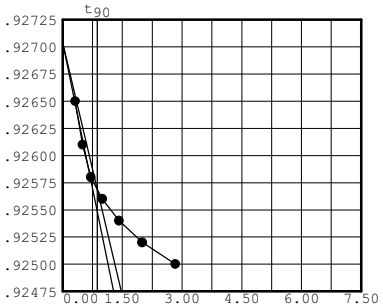
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.92920 |
| 2 | 0.10 | 0.92830 |
| 3 | 0.25 | 0.92790 |
| 4 | 0.50 | 0.92760 |
| 5 | 1.00 | 0.92730 |
| 6 | 2.00 | 0.92710 |
| 7 | 4.00 | 0.92700 |
| 8 | 8.00 | 0.92690 |




**Void Ratio =** 1.338 **Compression =** 7.3 %
**$D_0$ =** 0.92924 **$D_{90}$ =** 0.92772 **$D_{100}$ =** 0.92755
**$C_v$ at 1.0 min. =** 1.91 ft.$^2$/day

**Pressure: 0.50 tsf** **TEST READINGS** **Load No. 11**

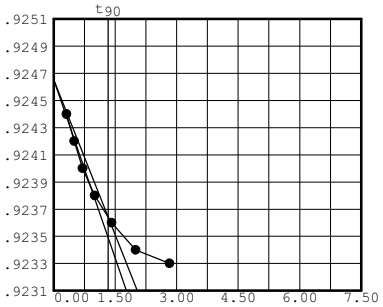
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.92690 |
| 2 | 0.10 | 0.92570 |
| 3 | 0.25 | 0.92530 |
| 4 | 0.50 | 0.92500 |
| 5 | 1.00 | 0.92480 |
| 6 | 2.00 | 0.92460 |
| 7 | 4.00 | 0.92440 |
| 8 | 8.00 | 0.92420 |




**Void Ratio =** 1.332 **Compression =** 7.5 %
**$D_0$ =** 0.92704 **$D_{90}$ =** 0.92569 **$D_{100}$ =** 0.92554
**$C_v$ at 0.8 min. =** 2.40 ft.$^2$/day

**Pressure: 1.00 tsf** **TEST READINGS** **Load No. 12**

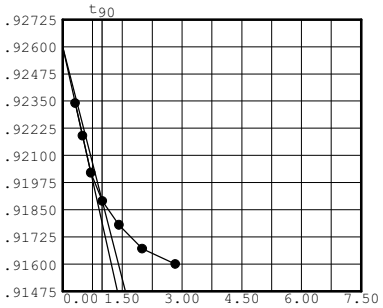
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.92420 |
| 2 | 0.10 | 0.92280 |
| 3 | 0.25 | 0.92260 |
| 4 | 0.50 | 0.92240 |
| 5 | 1.00 | 0.92220 |
| 6 | 2.00 | 0.92200 |
| 7 | 4.00 | 0.92180 |
| 8 | 8.00 | 0.92170 |




**Void Ratio =** 1.328 **Compression =** 7.7 %
**$D_0$ =** 0.92465 **$D_{90}$ =** 0.92364 **$D_{100}$ =** 0.92353
**$C_v$ at 1.8 min. =** 1.03 ft.$^2$/day

**Pressure: 2.00 tsf** **TEST READINGS** **Load No. 13**

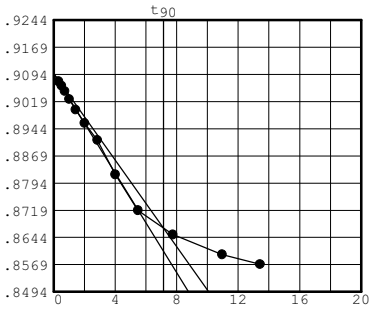
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.92170 |
| 2 | 0.10 | 0.92040 |
| 3 | 0.25 | 0.91890 |
| 4 | 0.50 | 0.91720 |
| 5 | 1.00 | 0.91590 |
| 6 | 2.00 | 0.91480 |
| 7 | 4.00 | 0.91370 |
| 8 | 8.00 | 0.91300 |




**Void Ratio =** 1.309 **Compression =** 8.4 %
**$D_0$ =** 0.92599 **$D_{90}$ =** 0.91895 **$D_{100}$ =** 0.91816
**$C_v$ at 1.0 min. =** 1.83 ft.$^2$/day

**Pressure: 4.00 tsf** **TEST READINGS** **Load No. 14**

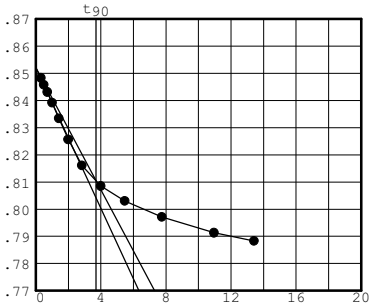
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.91300 | 11 | 60.00 | 0.86520 |
| 2 | 0.10 | 0.90750 | 12 | 120.00 | 0.85970 |
| 3 | 0.25 | 0.90630 | 13 | 180.00 | 0.85700 |
| 4 | 0.50 | 0.90480 | | | |
| 5 | 1.00 | 0.90260 | | | |
| 6 | 2.00 | 0.89970 | | | |
| 7 | 4.00 | 0.89600 | | | |
| 8 | 8.00 | 0.89130 | | | |
| 9 | 16.00 | 0.88180 | | | |
| 10 | 30.00 | 0.87190 | | | |




**Void Ratio =** 1.161 **Compression =** 14.3 %
**$D_0$ =** 0.90970 **$D_{90}$ =** 0.86696 **$D_{100}$ =** 0.86221
**$C_v$ at 51.1 min. =** 0.03 ft.$^2$/day

**Pressure: 8.00 tsf** **TEST READINGS** **Load No. 15**

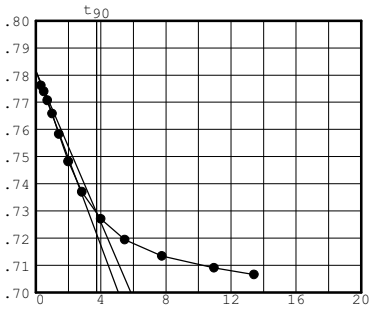
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.85700 | 11 | 60.00 | 0.79710 |
| 2 | 0.10 | 0.84830 | 12 | 120.00 | 0.79130 |
| 3 | 0.25 | 0.84580 | 13 | 180.00 | 0.78830 |
| 4 | 0.50 | 0.84310 | | | |
| 5 | 1.00 | 0.83920 | | | |
| 6 | 2.00 | 0.83340 | | | |
| 7 | 4.00 | 0.82560 | | | |
| 8 | 8.00 | 0.81610 | | | |
| 9 | 16.00 | 0.80850 | | | |
| 10 | 30.00 | 0.80300 | | | |




**Void Ratio =** 0.987 **Compression =** 21.2 %
**$D_0$ =** 0.85215 **$D_{90}$ =** 0.81041 **$D_{100}$ =** 0.80578
**$C_v$ at 13.7 min. =** 0.10 ft.$^2$/day

**Pressure: 16.00 tsf** **TEST READINGS** **Load No. 16**

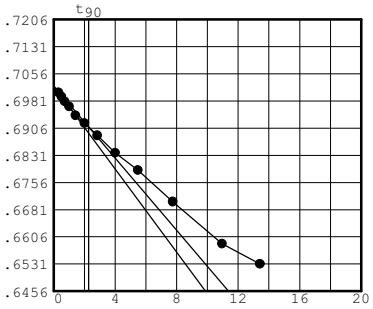
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.78830 | 11 | 60.00 | 0.71340 |
| 2 | 0.10 | 0.77620 | 12 | 120.00 | 0.70900 |
| 3 | 0.25 | 0.77400 | 13 | 180.00 | 0.70660 |
| 4 | 0.50 | 0.77070 | | | |
| 5 | 1.00 | 0.76580 | | | |
| 6 | 2.00 | 0.75830 | | | |
| 7 | 4.00 | 0.74820 | | | |
| 8 | 8.00 | 0.73700 | | | |
| 9 | 16.00 | 0.72710 | | | |
| 10 | 30.00 | 0.71940 | | | |




**Void Ratio =** 0.781 **Compression =** 29.3 %
**$D_0$ =** 0.78159 **$D_{90}$ =** 0.72929 **$D_{100}$ =** 0.72348
**$C_v$ at 14.0 min. =** 0.08 ft.$^2$/day

**Pressure: 32.00 tsf** **TEST READINGS** **Load No. 17**

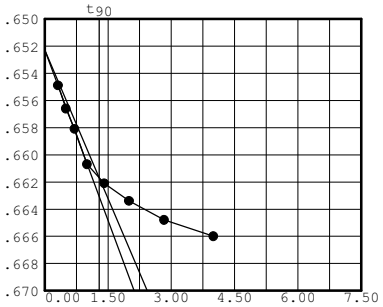
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.70660 | 11 | 60.00 | 0.67030 |
| 2 | 0.10 | 0.70050 | 12 | 120.00 | 0.65870 |
| 3 | 0.25 | 0.69930 | 13 | 180.00 | 0.65310 |
| 4 | 0.50 | 0.69800 | | | |
| 5 | 1.00 | 0.69660 | | | |
| 6 | 2.00 | 0.69410 | | | |
| 7 | 4.00 | 0.69200 | | | |
| 8 | 8.00 | 0.68860 | | | |
| 9 | 16.00 | 0.68380 | | | |
| 10 | 30.00 | 0.67900 | | | |




**Void Ratio =** 0.646 **Compression =** 34.7 %
**$D_0$ =** 0.70221 **$D_{90}$ =** 0.69085 **$D_{100}$ =** 0.68959
**$C_v$ at 5.2 min. =** 0.19 ft.$^2$/day

**Pressure: 8.00 tsf** **TEST READINGS** **Load No. 18**

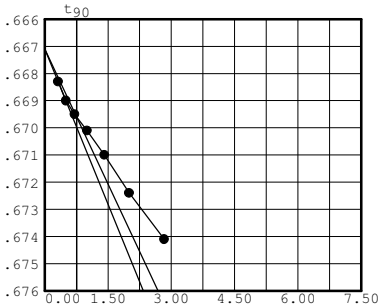
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.65310 |
| 2 | 0.10 | 0.65490 |
| 3 | 0.25 | 0.65660 |
| 4 | 0.50 | 0.65810 |
| 5 | 1.00 | 0.66070 |
| 6 | 2.00 | 0.66210 |
| 7 | 4.00 | 0.66340 |
| 8 | 8.00 | 0.66480 |
| 9 | 16.00 | 0.66600 |




**Void Ratio =** 0.679 **Compression =** 33.4 %
**$D_0$ =** 0.65229 **$D_{90}$ =** 0.66167 **$D_{100}$ =** 0.66272
**$C_v$ at 1.7 min. =** 0.56 ft.$^2$/day

**Pressure: 4.00 tsf** **TEST READINGS** **Load No. 19**

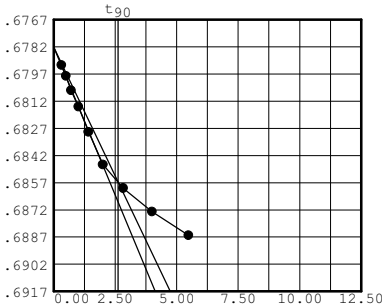
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.66600 |
| 2 | 0.10 | 0.66830 |
| 3 | 0.25 | 0.66900 |
| 4 | 0.50 | 0.66950 |
| 5 | 1.00 | 0.67010 |
| 6 | 2.00 | 0.67100 |
| 7 | 4.00 | 0.67240 |
| 8 | 8.00 | 0.67410 |




**Void Ratio =** 0.699 **Compression =** 32.6 %
**$D_0$ =** 0.66710 **$D_{90}$ =** 0.66960 **$D_{100}$ =** 0.66988
**$C_v$ at 0.6 min. =** 1.66 ft.$^2$/day

**Pressure: 1.00 tsf** **TEST READINGS** **Load No. 20**

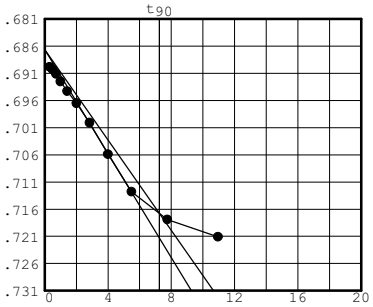
| No. | Elapsed Time | Dial Reading |
|---|---|---|
| 1 | 0.00 | 0.67410 |
| 2 | 0.10 | 0.67760 |
| 3 | 0.25 | 0.67820 |
| 4 | 0.50 | 0.67900 |
| 5 | 1.00 | 0.67990 |
| 6 | 2.00 | 0.68130 |
| 7 | 4.00 | 0.68310 |
| 8 | 8.00 | 0.68440 |
| 9 | 16.00 | 0.68570 |
| 10 | 30.00 | 0.68700 |




**Void Ratio =** 0.736 **Compression =** 31.1 %
**$D_0$ =** 0.67821 **$D_{90}$ =** 0.68568 **$D_{100}$ =** 0.68651
**$C_v$ at 6.9 min. =** 0.14 ft.$^2$/day

**Pressure: 0.25 tsf** **TEST READINGS** **Load No. 21**

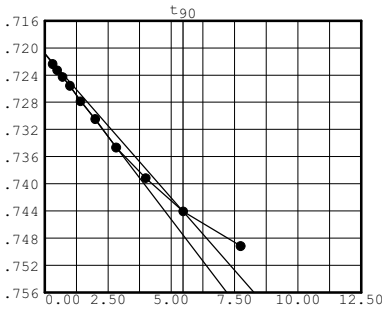
| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.68700 | 11 | 60.00 | 0.71750 |
| 2 | 0.10 | 0.68940 | 12 | 120.00 | 0.72070 |
| 3 | 0.25 | 0.68990 | | | |
| 4 | 0.50 | 0.69070 | | | |
| 5 | 1.00 | 0.69210 | | | |
| 6 | 2.00 | 0.69390 | | | |
| 7 | 4.00 | 0.69610 | | | |
| 8 | 8.00 | 0.69970 | | | |
| 9 | 16.00 | 0.70550 | | | |
| 10 | 30.00 | 0.71240 | | | |




**Void Ratio =** 0.818 **Compression =** 27.9 %
**$D_0$ =** 0.68662 **$D_{90}$ =** 0.71675 **$D_{100}$ =** 0.72010
**$C_v$ at 52.3 min. =** 0.02 ft.$^2$/day

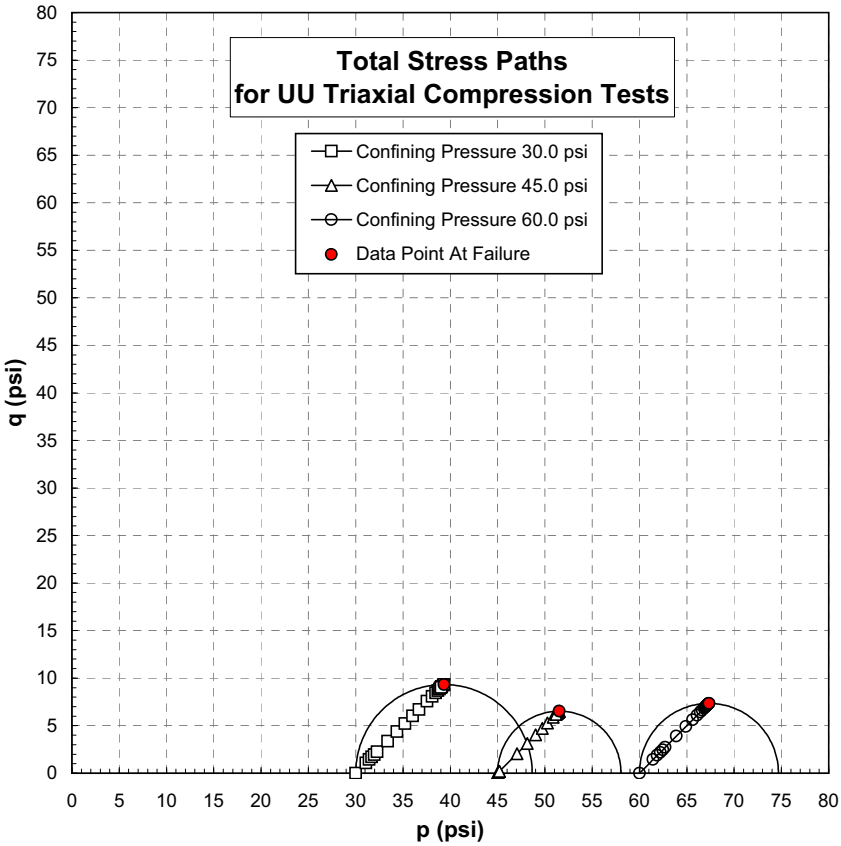
**Pressure: 0.13 tsf** **TEST READINGS** **Load No. 22**

| No. | Elapsed Time | Dial Reading | No. | Elapsed Time | Dial Reading |
|---|---|---|---|---|---|
| 1 | 0.00 | 0.72070 | 11 | 60.00 | 0.74920 |
| 2 | 0.10 | 0.72240 | | | |
| 3 | 0.25 | 0.72330 | | | |
| 4 | 0.50 | 0.72430 | | | |
| 5 | 1.00 | 0.72560 | | | |
| 6 | 2.00 | 0.72790 | | | |
| 7 | 4.00 | 0.73050 | | | |
| 8 | 8.00 | 0.73470 | | | |
| 9 | 16.00 | 0.73920 | | | |
| 10 | 30.00 | 0.74410 | | | |




**Void Ratio =** 0.889 **Compression =** 25.1 %
**$D_0$ =** 0.72084 **$D_{90}$ =** 0.74405 **$D_{100}$ =** 0.74663
**$C_v$ at 29.8 min. =** 0.04 ft.$^2$/day

# UU TRIAXIAL TEST RESULTS




**SAMPLE ID**

| | |
|---|---|
| Sample No.: | 17229 |
| Exploration No.: | D7-21W |
| Sample Depth: | 35 to 37 feet |
| USCS Description: | Gray, fat CLAY with sand (CH) |

**SAMPLE INFORMATION**

| Sample Number | A | B | C |
|---|---|---|---|
| Wet Weight, g | 144.4 | 140.6 | 139.3 |
| Dry Weight, g | 109.7 | 100.8 | 101.2 |
| Water Content, % | 31.6 | 39.4 | 37.7 |
| Wet Density, pcf | 122.6 | 114.3 | 115.2 |
| Dry Density, pcf | 93.1 | 82.0 | 83.6 |
| Saturation, % | 100.0 | 100.0 | 100.0 |
| Void Ratio | 0.85 | 1.06 | 1.02 |
| Diameter, in | 1.378 | 1.388 | 1.390 |
| Height, in | 3.010 | 3.097 | 3.036 |
| Area, $in^2$ | 1.491 | 1.513 | 1.518 |

* Water content data obtained using entire sample

**CLASSIFICATION**

| Sieve Size | %-Passing | Atterberg Limits & Gs | |
|---|---|---|---|
| 3/8-in (9.5-mm) | | Liquid Limit, % | 51 |
| No. 4 (4.75-mm) | | Plastic Limit, % | 26 |
| No. 10 (2.0-mm) | 100.0 | Plasticity Index, % | 25 |
| No. 40 (0.425-mm) | 99.4 | Group Symbol | CH |
| No. 100 (0.150-mm) | 97.9 | | |
| No. 200 (0.075-mm) | 79.2 | Estimated Gs | 2.70 |

Notes:

**TEST SUMMARY**

| Sample Number | A | B | C |
|---|---|---|---|
| Strain Rate, %/min | 1.00 | 1.00 | 1.00 |
| Confining Pressure, psi | 30.0 | 45.0 | 60.0 |
| Failure Criteria | $\sigma_{DMAX}$ | $\sigma_{DMAX}$ | $\sigma_{DMAX}$ |
| $\sigma_D$ At Failure, psi* | 18.7 | 13.0 | 14.7 |
| Axial Strain at Failure, % | 13.9 | 8.0 | 6.0 |
| $\sigma_{1F}$, psi | 48.7 | 58.0 | 74.7 |
| $\sigma_{3F}$, psi | 30.0 | 45.0 | 60.0 |

* Membrane correction subtracted from deviator stress for Samples A-C

**REMARKS**

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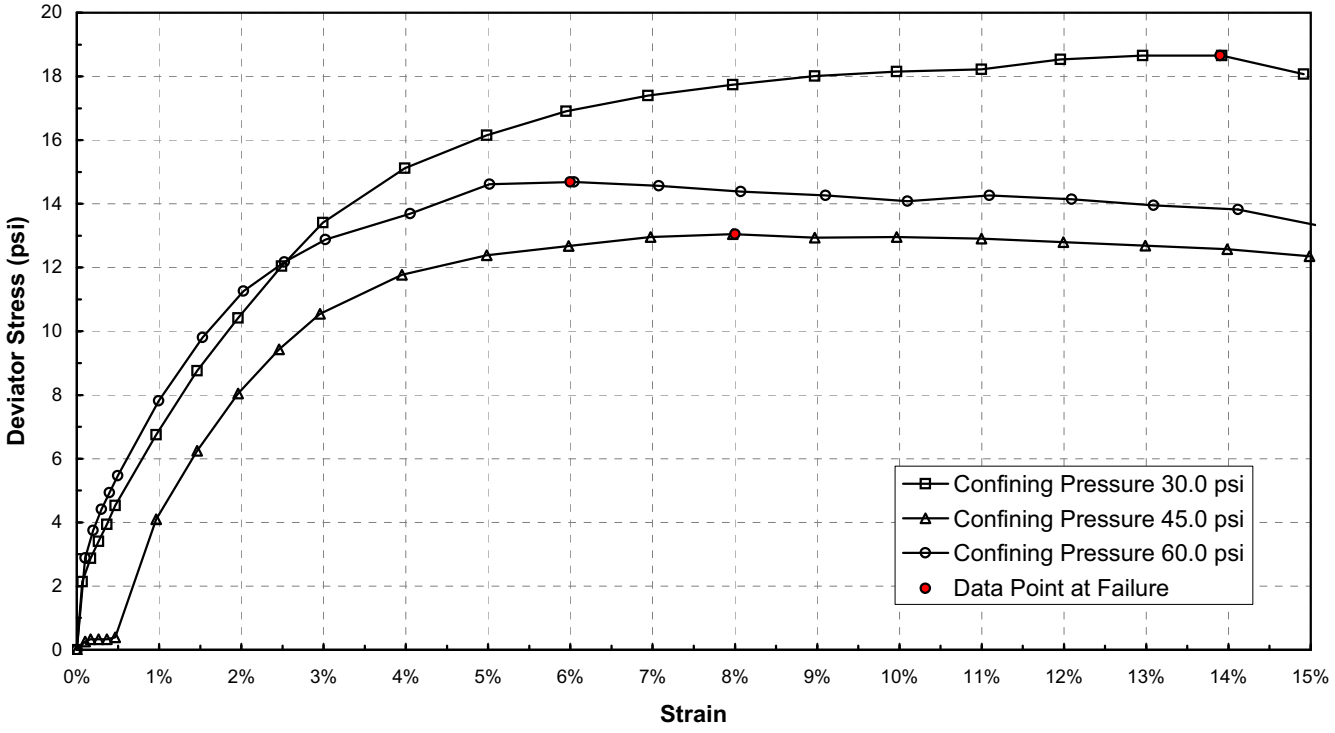
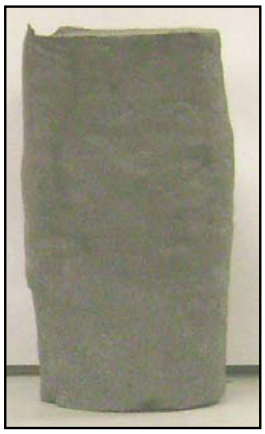
**UNCONSOLIDATED UNDRAINED (UU) TRIAXIAL TEST**

| | |
|---|---|
| Project: | I-64/I-264 Interchange: PSA - Ramps and Channels |
| Client: | HDR Engineering, Inc. |
| Location: | Virginia Beach, Virginia |
| Project No.: | 1081-10-2757 |

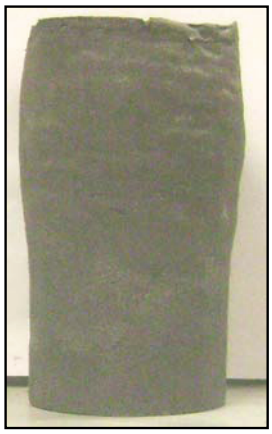
Sample No.: 17229
Exploration No.: D7-21W
Sample I.D. / Depth: 35 to 37 feet




**SPECIMEN PHOTOGRAPHS (AFTER SHEARING)**


A

B


C

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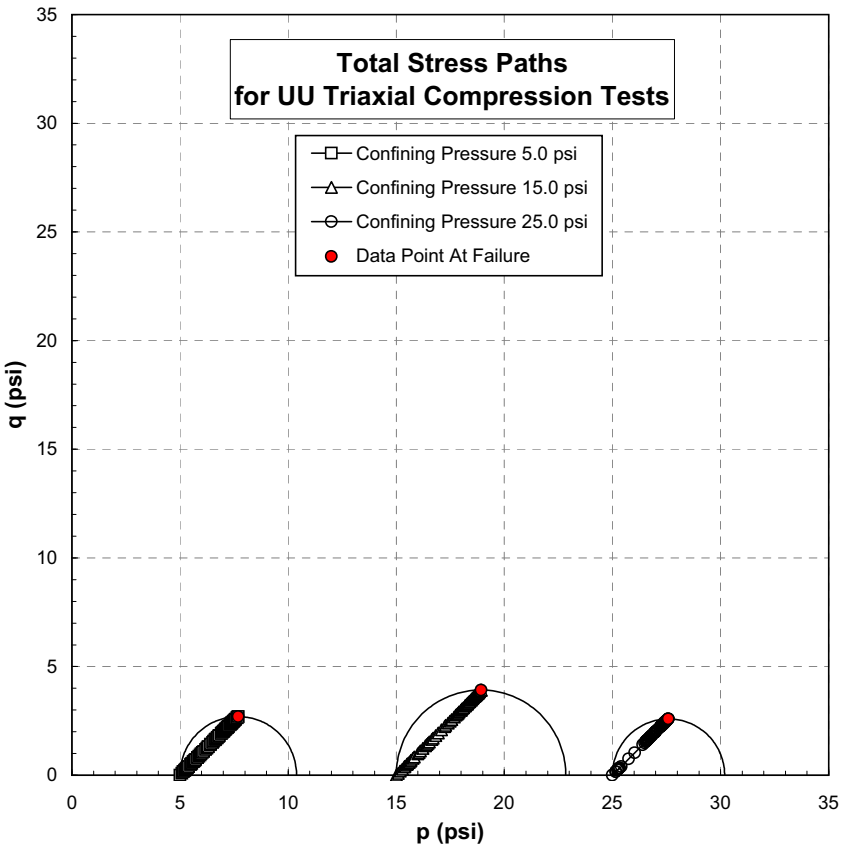
**UNCONSOLIDATED UNDRAINED (UU) TRIAXIAL TEST**

Project: I-64/I-264 Interchange: PSA - Ramps and Channels
Client: HDR Engineering, Inc.
Location: Virginia Beach, Virginia
Project No.: 1081-10-2757




**SAMPLE ID**

| | |
|---|---|
| Sample No.: | 17380 |
| Exploration No.: | D7CD-8W |
| Sample Depth: | 5 to 7 feet |
| USCS Description: | Black, sandy elastic SILT (MH) |

**SAMPLE INFORMATION**

| Sample Number | A | B | C |
|---|---|---|---|
| Wet Weight, g | 99.9 | 104.7 | 98.8 |
| Dry Weight, g | 41.2 | 42.0 | 39.0 |
| Water Content, % | 142.5 | 149.0 | 153.1 |
| Wet Density, pcf | 73.9 | 77.7 | 78.9 |
| Dry Density, pcf | 30.5 | 31.2 | 31.1 |
| Saturation, % | 85.0 | 91.4 | 93.8 |
| Void Ratio | 4.53 | 4.40 | 4.41 |
| Diameter, in | 1.421 | 1.437 | 1.412 |
| Height, in | 3.244 | 3.167 | 3.048 |
| Area, $in^2$ | 1.587 | 1.622 | 1.566 |

* Water content data obtained using entire sample

**CLASSIFICATION**

| Sieve Size | %-Passing | Atterberg Limits & Gs | |
|---|---|---|---|
| 3/8-in (9.5-mm) | 100.0 | Liquid Limit, % | 208 |
| No. 4 (4.75-mm) | 98.6 | Plastic Limit, % | 80 |
| No. 10 (2.0-mm) | 87.6 | Plasticity Index, % | 128 |
| No. 40 (0.425-mm) | 76.0 | Group Symbol | MH |
| No. 100 (0.150-mm) | 67.7 | | |
| No. 200 (0.075-mm) | 64.6 | Estimated Gs | 2.70 |

Notes:

**TEST SUMMARY**

| Sample Number | A | B | C |
|---|---|---|---|
| Strain Rate, %/min | 0.50 | 0.50 | 0.50 |
| Confining Pressure, psi | 5.0 | 15.0 | 25.0 |
| Failure Criteria | $\sigma_{DMAX}$ | $\sigma_{DMAX}$ | $\sigma_{DMAX}$ |
| $\sigma_D$ At Failure, psi* | 5.4 | 7.8 | 5.2 |
| Axial Strain at Failure, % | 14.9 | 15.0 | 14.8 |
| $\sigma_{1F}$, psi | 10.4 | 22.8 | 30.2 |
| $\sigma_{3F}$, psi | 5.0 | 15.0 | 25.0 |

* Membrane correction subtracted from deviator stress for Samples A-C

**REMARKS**

Samples contain organic material.

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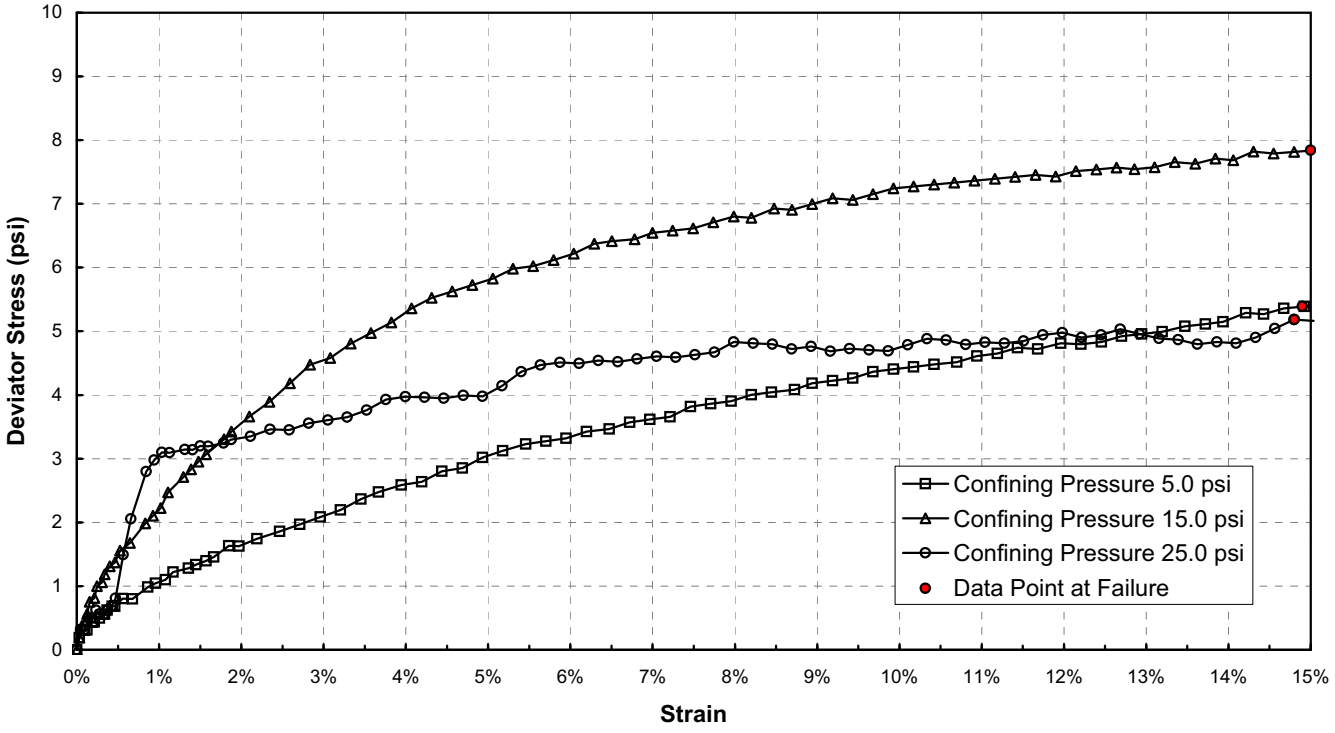
**UNCONSOLIDATED UNDRAINED (UU) TRIAXIAL TEST**

| | |
|---|---|
| Project: | I-64/I-264 Interchange: PSA - Ramps and Channels |
| Client: | HDR Engineering, Inc. |
| Location: | Virginia Beach, Virginia |
| Project No.: | 1081-10-2757 |

Sample No.: 17380
Exploration No.: D7CD-8W
Sample I.D. / Depth: 5 to 7 feet




**SPECIMEN PHOTOGRAPHS (AFTER SHEARING)**

A

B

C

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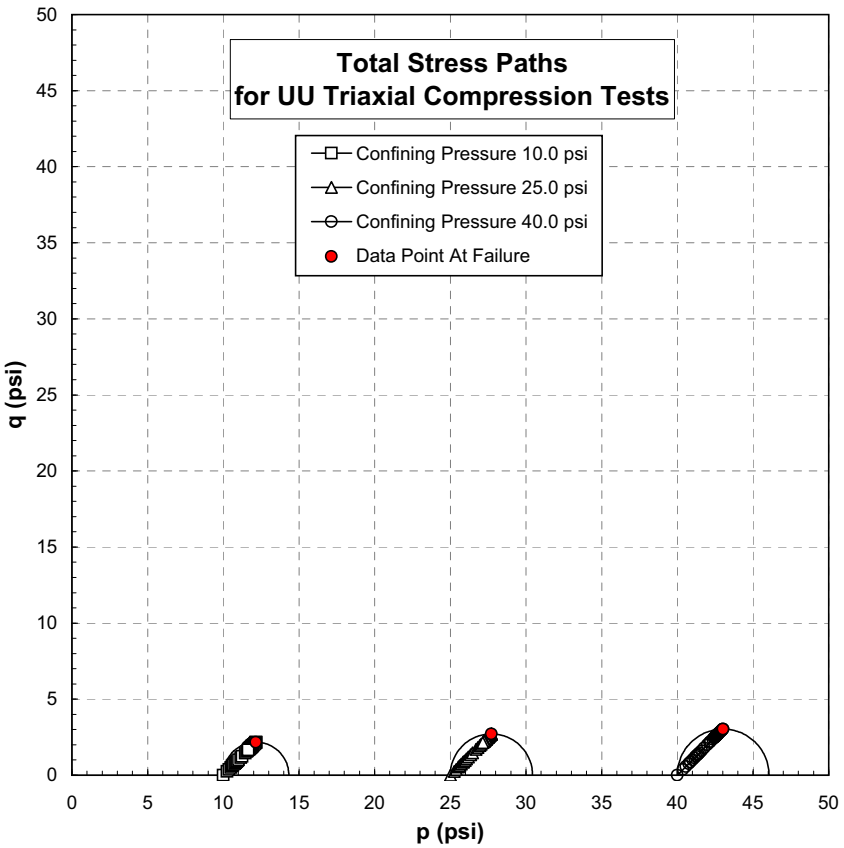
**UNCONSOLIDATED UNDRAINED (UU) TRIAXIAL TEST**

Project: I-64/I-264 Interchange: PSA - Ramps and Channels
Client: HDR Engineering, Inc.
Location: Virginia Beach, Virginia
Project No.: 1081-10-2757




**SAMPLE ID**

| | |
|---|---|
| Sample No.: | 17382 |
| Exploration No.: | D7CD-9W |
| Sample Depth: | 10 to 12 feet |
| USCS Description: | Black, elastic SILT with sand (MH) |

**SAMPLE INFORMATION**

| Sample Number | A | B | C |
|---|---|---|---|
| Wet Weight, g | 109.4 | 110.3 | 106.3 |
| Dry Weight, g | 53.1 | 53.1 | 49.0 |
| Water Content, % | 106.2 | 107.7 | 117.0 |
| Wet Density, pcf | 87.3 | 88.5 | 85.9 |
| Dry Density, pcf | 42.3 | 42.6 | 39.6 |
| Saturation, % | 96.3 | 98.5 | 97.1 |
| Void Ratio | 2.98 | 2.95 | 3.25 |
| Diameter, in | 1.410 | 1.402 | 1.401 |
| Height, in | 3.056 | 3.076 | 3.055 |
| Area, $in^2$ | 1.562 | 1.543 | 1.542 |

* Water content data obtained using entire sample

**CLASSIFICATION**

| Sieve Size | %-Passing | Atterberg Limits & Gs | |
|---|---|---|---|
| 3/8-in (9.5-mm) | | Liquid Limit, % | 140 |
| No. 4 (4.75-mm) | 100.0 | Plastic Limit, % | 56 |
| No. 10 (2.0-mm) | 99.7 | Plasticity Index, % | 84 |
| No. 40 (0.425-mm) | 97.8 | Group Symbol | MH |
| No. 100 (0.150-mm) | 83.4 | | |
| No. 200 (0.075-mm) | 79.2 | Estimated Gs | 2.70 |

Notes:

**TEST SUMMARY**

| Sample Number | A | B | C |
|---|---|---|---|
| Strain Rate, %/min | 1.00 | 1.00 | 1.00 |
| Confining Pressure, psi | 10.0 | 25.0 | 40.0 |
| Failure Criteria | $\sigma_{DMAX}$ | $\sigma_{DMAX}$ | $\sigma_{DMAX}$ |
| $\sigma_D$ At Failure, psi* | 4.3 | 5.4 | 6.1 |
| Axial Strain at Failure, % | 6.0 | 6.5 | 5.5 |
| $\sigma_{1F}$, psi | 14.3 | 30.4 | 46.1 |
| $\sigma_{3F}$, psi | 10.0 | 25.0 | 40.0 |

* Membrane correction subtracted from deviator stress for Samples A-C

**REMARKS**

Samples contain organic material.

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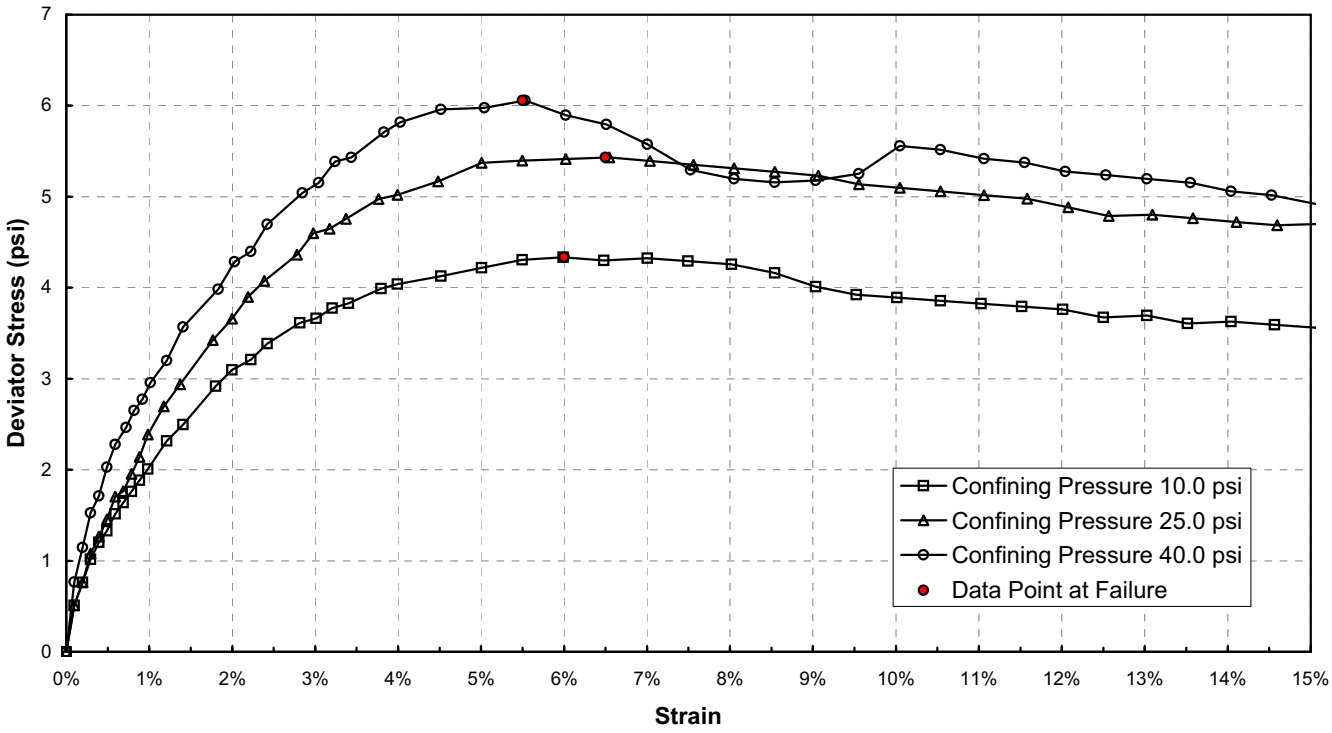
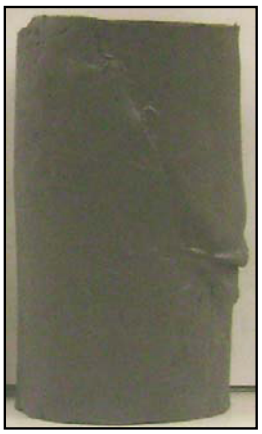
**UNCONSOLIDATED UNDRAINED (UU) TRIAXIAL TEST**

| | |
|---|---|
| Project: | I-64/I-264 Interchange: PSA - Ramps and Channels |
| Client: | HDR Engineering, Inc. |
| Location: | Virginia Beach, Virginia |
| Project No.: | 1081-10-2757 |

Sample No.: 17382
Exploration No.: D7CD-9W
Sample I.D. / Depth: 10 to 12 feet




**SPECIMEN PHOTOGRAPHS (AFTER SHEARING)**


A

B

C

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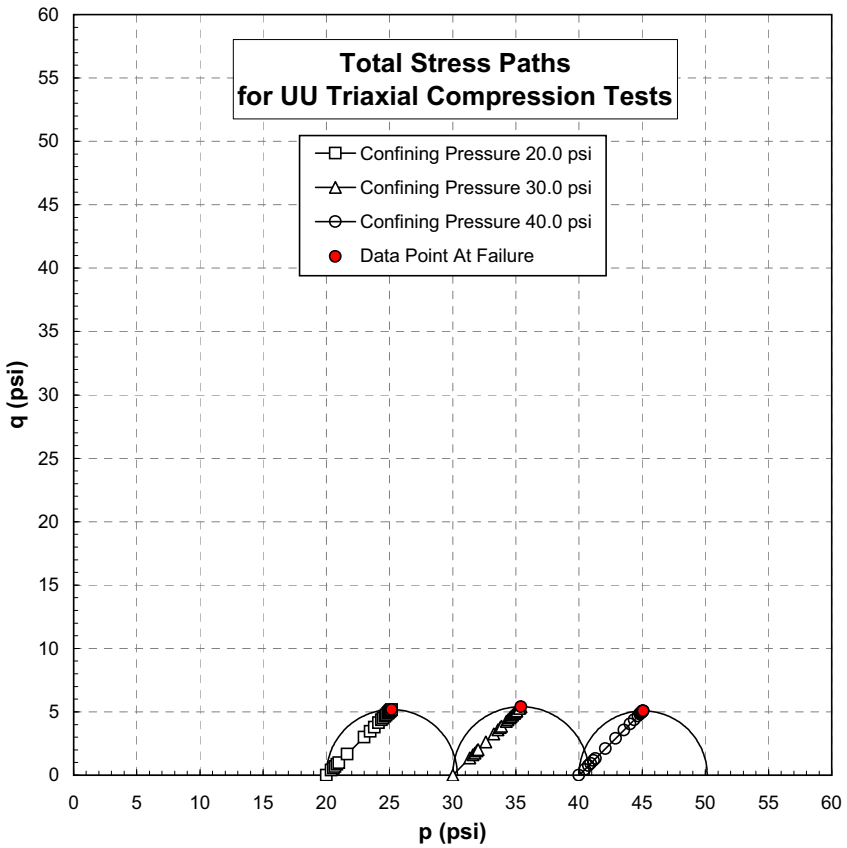
**UNCONSOLIDATED UNDRAINED (UU) TRIAXIAL TEST**

Project: I-64/I-264 Interchange: PSA - Ramps and Channels
Client: HDR Engineering, Inc.
Location: Virginia Beach, Virginia
Project No.: 1081-10-2757




**SAMPLE ID**

| | |
|---|---|
| Sample No.: | 17231 |
| Exploration No.: | D7CD-9W |
| Sample Depth: | 25 to 27 feet |
| USCS Description: | Blue-gray, fat CLAY with sand (CH) |

**SAMPLE INFORMATION**

| Sample Number | A | B | C |
|---|---|---|---|
| Wet Weight, g | 146.8 | 142.2 | 143.4 |
| Dry Weight, g | 112.6 | 106.4 | 106.1 |
| Water Content, % | 30.3 | 33.7 | 35.2 |
| Wet Density, pcf | 122.7 | 119.7 | 118.1 |
| Dry Density, pcf | 94.2 | 89.5 | 87.4 |
| Saturation, % | 100.0 | 100.0 | 100.0 |
| Void Ratio | 0.82 | 0.91 | 0.95 |
| Diameter, in | 1.386 | 1.386 | 1.393 |
| Height, in | 3.022 | 3.004 | 3.035 |
| Area, $in^2$ | 1.508 | 1.508 | 1.524 |

* Water content data obtained using entire sample

**CLASSIFICATION**

| Sieve Size | %-Passing |
|---|---|
| 3/8-in (9.5-mm) | |
| No. 4 (4.75-mm) | 100.0 |
| No. 10 (2.0-mm) | 99.9 |
| No. 40 (0.425-mm) | 99.2 |
| No. 100 (0.150-mm) | 96.3 |
| No. 200 (0.075-mm) | 78.4 |

| Atterberg Limits & Gs | |
|---|---|
| Liquid Limit, % | 52 |
| Plastic Limit, % | 22 |
| Plasticity Index, % | 30 |
| Group Symbol | CH |
| Estimated Gs | 2.70 |

Notes:

**TEST SUMMARY**

| Sample Number | A | B | C |
|---|---|---|---|
| Strain Rate, %/min | 1.00 | 1.00 | 1.00 |
| Confining Pressure, psi | 20.0 | 30.0 | 40.0 |
| Failure Criteria | $\sigma_{DMAX}$ | $\sigma_{DMAX}$ | $\sigma_{DMAX}$ |
| $\sigma_D$ At Failure, psi* | 10.4 | 10.8 | 10.1 |
| Axial Strain at Failure, % | 15.0 | 13.8 | 14.1 |
| $\sigma_{1F}$, psi | 30.4 | 40.8 | 50.1 |
| $\sigma_{3F}$, psi | 20.0 | 30.0 | 40.0 |

* Membrane correction subtracted from deviator stress for Samples A-C

**REMARKS**

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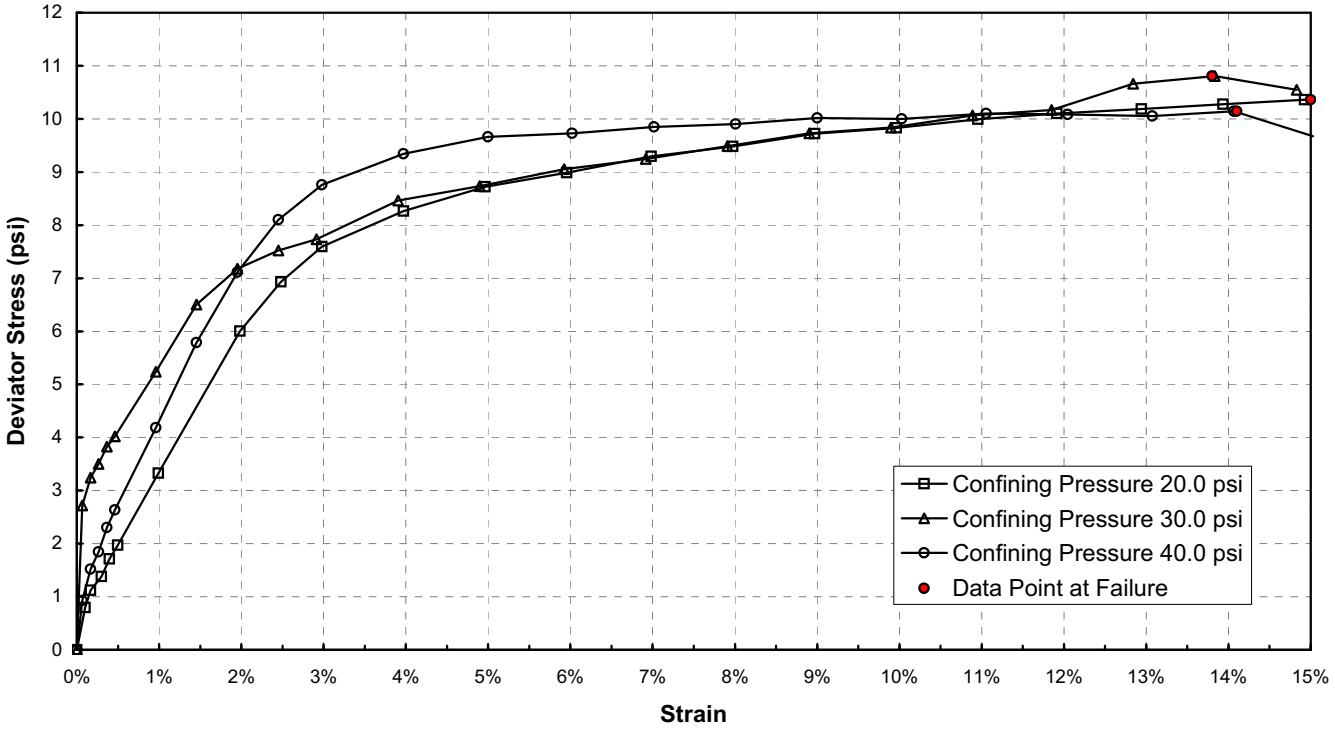
**UNCONSOLIDATED UNDRAINED (UU) TRIAXIAL TEST**

| | |
|---|---|
| Project: | I-64/I-264 Interchange: PSA - Ramps and Channels |
| Client: | HDR Engineering, Inc. |
| Location: | Virginia Beach, Virginia |
| Project No.: | 1081-10-2757 |

Sample No.: 17231
Exploration No.: D7CD-9W
Sample I.D. / Depth: 25 to 27 feet




**SPECIMEN PHOTOGRAPHS (AFTER SHEARING)**

A

B

C

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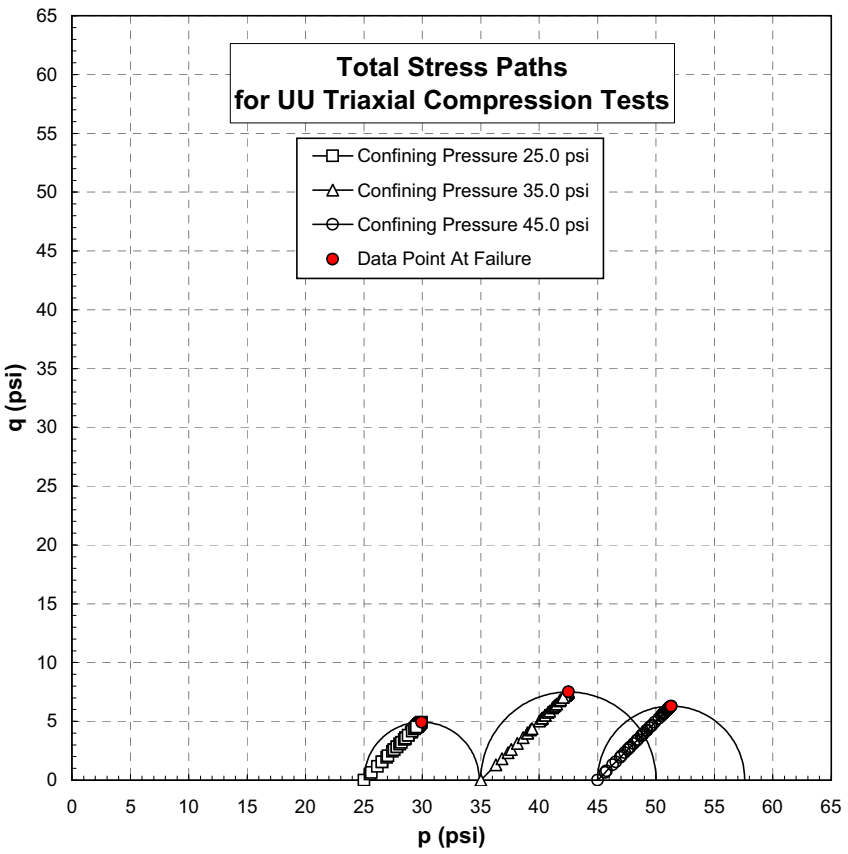
**UNCONSOLIDATED UNDRAINED (UU) TRIAXIAL TEST**

Project: I-64/I-264 Interchange: PSA - Ramps and Channels
Client: HDR Engineering, Inc.
Location: Virginia Beach, Virginia
Project No.: 1081-10-2757




**SAMPLE ID**

| | |
|---|---|
| Sample No.: | 17936 |
| Exploration No.: | D7CD-25W |
| Sample Depth: | 30 to 32 feet |
| USCS Description: | Gray, sandy SILT (ML) |

**SAMPLE INFORMATION**

| Sample Number | A | B | C |
|---|---|---|---|
| Wet Weight, g | 142.5 | 134.1 | 140.1 |
| Dry Weight, g | 102.8 | 96.7 | 101.6 |
| Water Content, % | 38.6 | 38.7 | 37.9 |
| Wet Density, pcf | 112.7 | 113.2 | 113.6 |
| Dry Density, pcf | 81.3 | 81.6 | 82.4 |
| Saturation, % | 98.9 | 99.8 | 99.8 |
| Void Ratio | 1.03 | 1.03 | 1.01 |
| Diameter, in | 1.408 | 1.395 | 1.398 |
| Height, in | 3.096 | 2.954 | 3.060 |
| Area, $in^2$ | 1.556 | 1.528 | 1.535 |

* Water content data obtained using entire sample

**CLASSIFICATION**

| Sieve Size | %-Passing |
|---|---|
| No. 4 (4.75-mm) | 100.0 |
| No. 10 (2.0-mm) | 99.9 |
| No. 40 (0.425-mm) | 98.2 |
| No. 100 (0.150-mm) | 94.0 |
| No. 200 (0.075-mm) | 59.8 |

| Atterberg Limits & Gs | |
|---|---|
| Liquid Limit, % | 36 |
| Plastic Limit, % | 26 |
| Plasticity Index, % | 10 |
| Plasticity Group | ML |
| Estimated Gs | 2.65 |

Notes:

**TEST SUMMARY**

| Sample Number | A | B | C |
|---|---|---|---|
| Strain Rate, %/min | 0.50 | 0.50 | 0.50 |
| Confining Pressure, psi | 25.0 | 35.0 | 45.0 |
| Failure Criteria | $\sigma_{DMAX}$ | $\sigma_{DMAX}$ | $\sigma_{DMAX}$ |
| $\sigma_D$ At Failure, psi* | 9.9 | 15.0 | 12.6 |
| Axial Strain at Failure, % | 8.5 | 5.2 | 10.9 |
| $\sigma_{1F}$, psi | 34.9 | 50.0 | 57.6 |
| $\sigma_{3F}$, psi | 25.0 | 35.0 | 45.0 |

* Membrane correction subtracted from deviator stress for Samples A-C

**REMARKS**

$\sigma_{DMAX}$ = Maximum deviator stress.

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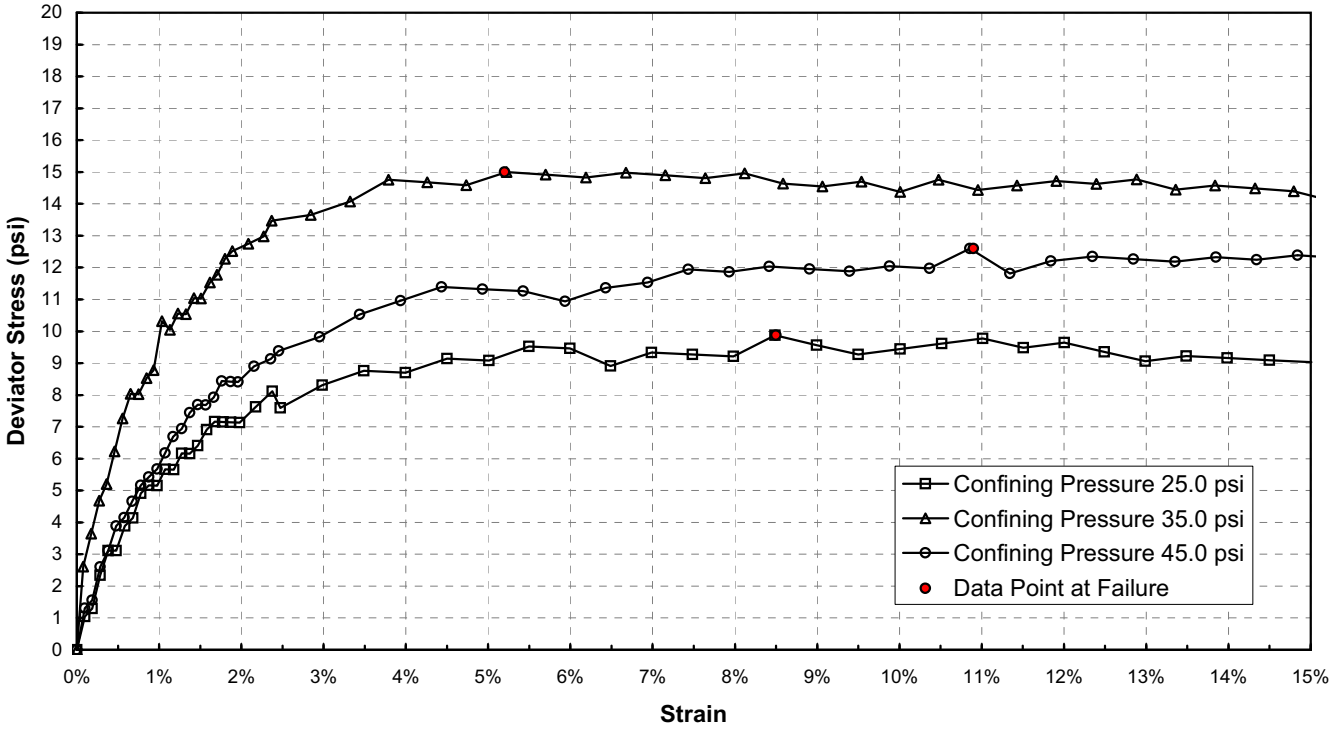
**UNCONSOLIDATED UNDRAINED (UU) TRIAXIAL TEST**

| | |
|---|---|
| Project: | I-64/I-264 Interchange: PSA - Ramps and Channels |
| Client: | HDR Engineering, Inc. |
| Location: | Virginia Beach, Virginia |
| Project No.: | 1081-10-2757 |

Laboratory No.: 17936
Exploration No.: D7CD-25W
Sample Depth: 30 to 32 feet




**SPECIMEN PHOTOGRAPHS (AFTER SHEARING)**

A

B

C

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Tel: 804.266.2199
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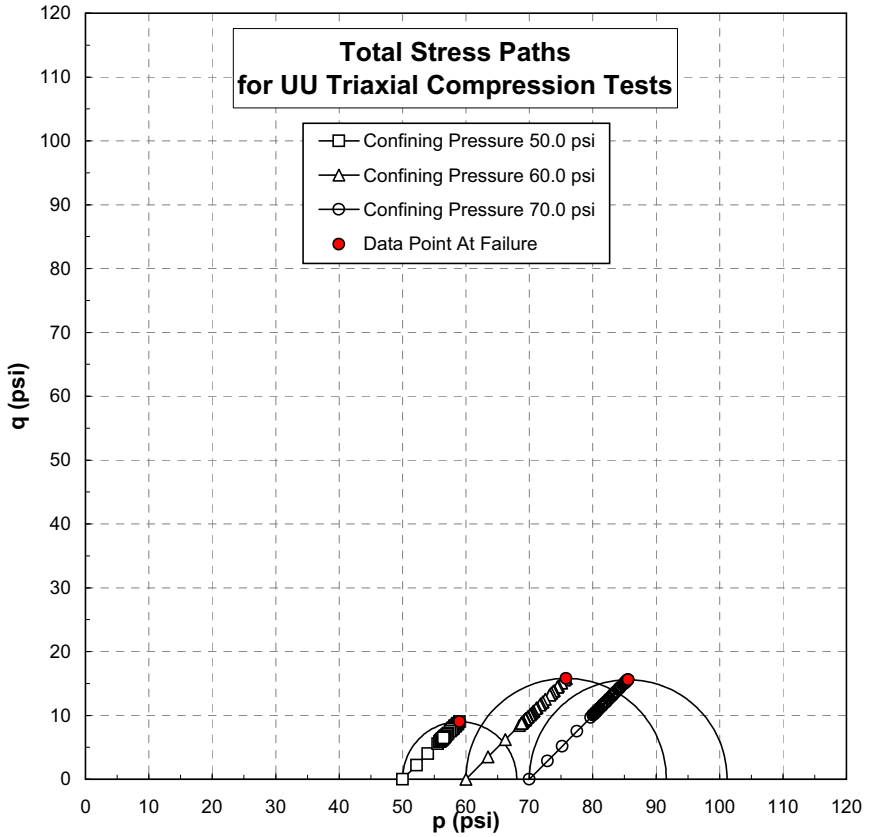
**UNCONSOLIDATED UNDRAINED (UU) TRIAXIAL TEST**

Project: I-64/I-264 Interchange: PSA - Ramps and Channels
Client: HDR Engineering, Inc.
Location: Virginia Beach, Virginia
Project No.: 1081-10-2757




**SAMPLE ID**

| | |
|---|---|
| Sample No.: | 17937 |
| Exploration No.: | D7CD-25W |
| Sample Depth: | 60 to 62 feet |
| USCS Description: | Gray, LEAN CLAY (CL) |

**SAMPLE INFORMATION**

| Sample Number | A | B | C |
|---|---|---|---|
| Wet Weight, g | 127.1 | 134.9 | 134.9 |
| Dry Weight, g | 89.6 | 93.9 | 92.1 |
| Water Content, % | 41.9 | 43.7 | 46.4 |
| Wet Density, pcf | 110.1 | 110.6 | 109.5 |
| Dry Density, pcf | 77.6 | 77.0 | 74.8 |
| Saturation, % | 96.6 | 99.4 | 100.0 |
| Void Ratio | 1.17 | 1.19 | 1.25 |
| Diameter, in | 1.412 | 1.403 | 1.397 |
| Height, in | 2.809 | 3.006 | 3.062 |
| Area, $in^2$ | 1.565 | 1.545 | 1.532 |

* Water content data obtained using entire sample

**CLASSIFICATION**

| Sieve Size | %-Passing |
|---|---|
| No. 10 (2.0-mm) | 100.0 |
| No. 40 (0.425-mm) | 99.4 |
| No. 100 (0.150-mm) | 98.9 |
| No. 200 (0.075-mm) | 95.9 |

| Atterberg Limits & Gs | |
|---|---|
| Liquid Limit, % | 43 |
| Plastic Limit, % | 24 |
| Plasticity Index, % | 19 |
| Plasticity Group | CL |
| Estimated Gs | 2.70 |

Notes:

**TEST SUMMARY**

| Sample Number | A | B | C |
|---|---|---|---|
| Strain Rate, %/min | 1.00 | 1.00 | 1.00 |
| Confining Pressure, psi | 50.0 | 60.0 | 70.0 |
| Failure Criteria | $\sigma_{DMAX}$ | $\sigma_{DMAX}$ | $\sigma_{DMAX}$ |
| $\sigma_D$ At Failure, psi* | 18.0 | 31.6 | 31.2 |
| Axial Strain at Failure, % | 0.9 | 1.0 | 1.5 |
| $\sigma_{1F}$, psi | 68.0 | 91.6 | 101.2 |
| $\sigma_{3F}$, psi | 50.0 | 60.0 | 70.0 |

* Membrane correction subtracted from deviator stress for Samples A-C

**REMARKS**

$\sigma_{DMAX}$ = Maximum deviator stress.

Specimen B contains trace amounts of shells.

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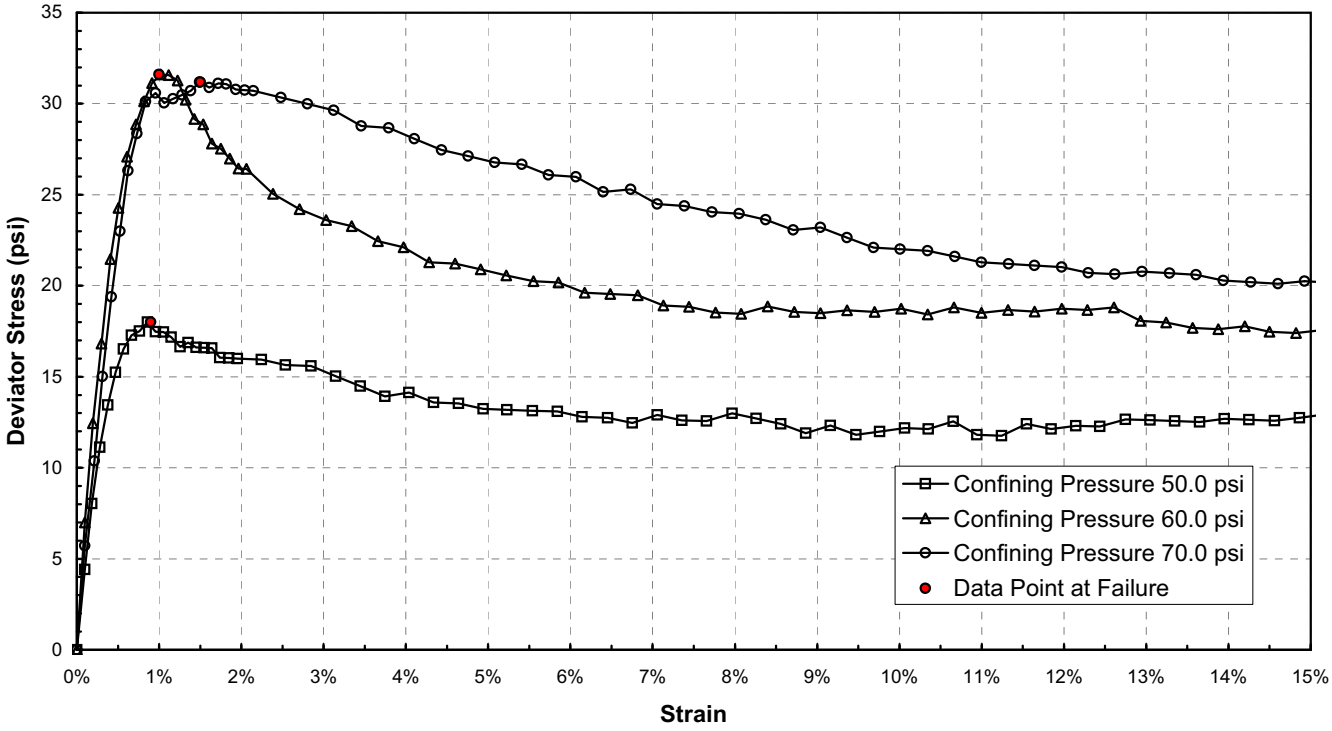
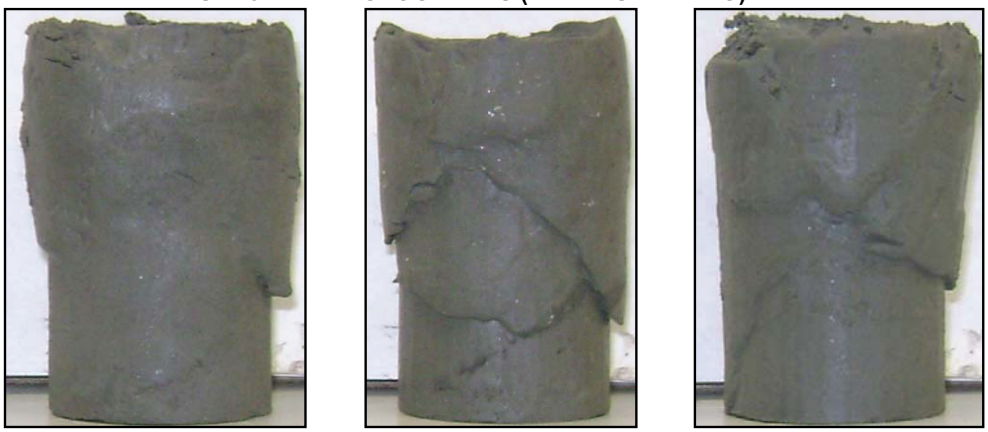
**UNCONSOLIDATED UNDRAINED (UU) TRIAXIAL TEST**

| | |
|---|---|
| Project: | I-64/I-264 Interchange: PSA - Ramps and Channels |
| Client: | HDR Engineering, Inc. |
| Location: | Virginia Beach, Virginia |
| Project No.: | 1081-10-2757 |

Laboratory No.: 17937
Exploration No.: D7CD-25W
Sample Depth: 60 to 62 feet




**SPECIMEN PHOTOGRAPHS (AFTER SHEARING)**

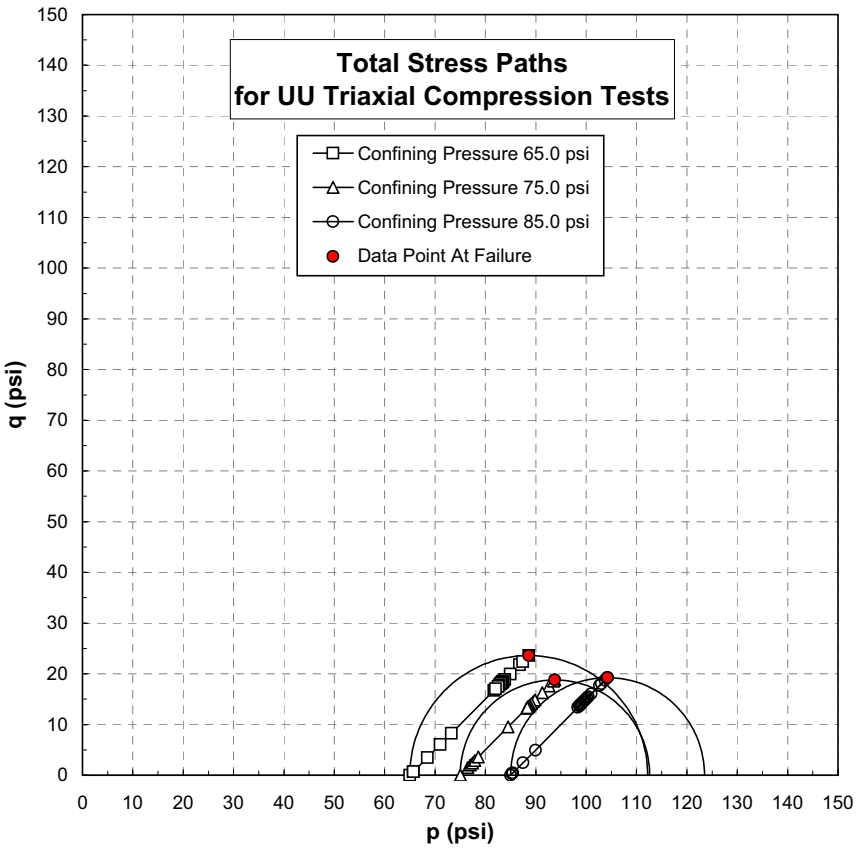


A B C

**UNCONSOLIDATED UNDRAINED (UU) TRIAXIAL TEST**


S&ME
8211 Hermitage Road
Richmond, Virginia 23228
Tel: 804.266.2199
Fax: 804.261.5569


Project: I-64/I-264 Interchange: PSA - Ramps and Channels
Client: HDR Engineering, Inc.
Location: Virginia Beach, Virginia
Project No.: 1081-10-2757




**SAMPLE ID**

| | |
|---|---|
| Sample No.: | 17234 |
| Exploration No.: | KR2-5B |
| Sample Depth: | 80 to 82 feet |
| USCS Description: | Gray, fat CLAY (CH) |

**SAMPLE INFORMATION**

| Sample Number | A | B | C |
|---|---|---|---|
| Wet Weight, g | 138.3 | 134.5 | 133.5 |
| Dry Weight, g | 96.0 | 91.1 | 93.0 |
| Water Content, % | 44.1 | 47.7 | 43.6 |
| Wet Density, pcf | 110.0 | 107.5 | 109.7 |
| Dry Density, pcf | 76.4 | 72.8 | 76.4 |
| Saturation, % | 98.6 | 98.0 | 97.6 |
| Void Ratio | 1.21 | 1.31 | 1.21 |
| Diameter, in | 1.400 | 1.403 | 1.403 |
| Height, in | 3.111 | 3.086 | 3.002 |
| Area, $in^2$ | 1.540 | 1.545 | 1.545 |

* Water content data obtained using entire sample

**CLASSIFICATION**

| Sieve Size | %-Passing | Atterberg Limits & Gs | |
|---|---|---|---|
| 3/8-in (9.5-mm) | 100.0 | Liquid Limit, % | 74 |
| No. 4 (4.75-mm) | 99.9 | Plastic Limit, % | 26 |
| No. 10 (2.0-mm) | 99.6 | Plasticity Index, % | 48 |
| No. 40 (0.425-mm) | 98.6 | Group Symbol | CH |
| No. 100 (0.150-mm) | 97.7 | | |
| No. 200 (0.075-mm) | 87.9 | Estimated Gs | 2.70 |

Notes:

**TEST SUMMARY**

| Sample Number | A | B | C |
|---|---|---|---|
| Strain Rate, %/min | 1.00 | 1.00 | 1.00 |
| Confining Pressure, psi | 65.0 | 75.0 | 85.0 |
| Failure Criteria | $\sigma_{DMAX}$ | $\sigma_{DMAX}$ | $\sigma_{DMAX}$ |
| $\sigma_D$ At Failure, psi* | 47.2 | 37.6 | 38.5 |
| Axial Strain at Failure, % | 2.0 | 2.4 | 1.9 |
| $\sigma_{1F}$, psi | 112.2 | 112.6 | 123.5 |
| $\sigma_{3F}$, psi | 65.0 | 75.0 | 85.0 |

* Membrane correction subtracted from deviator stress for Samples A-C

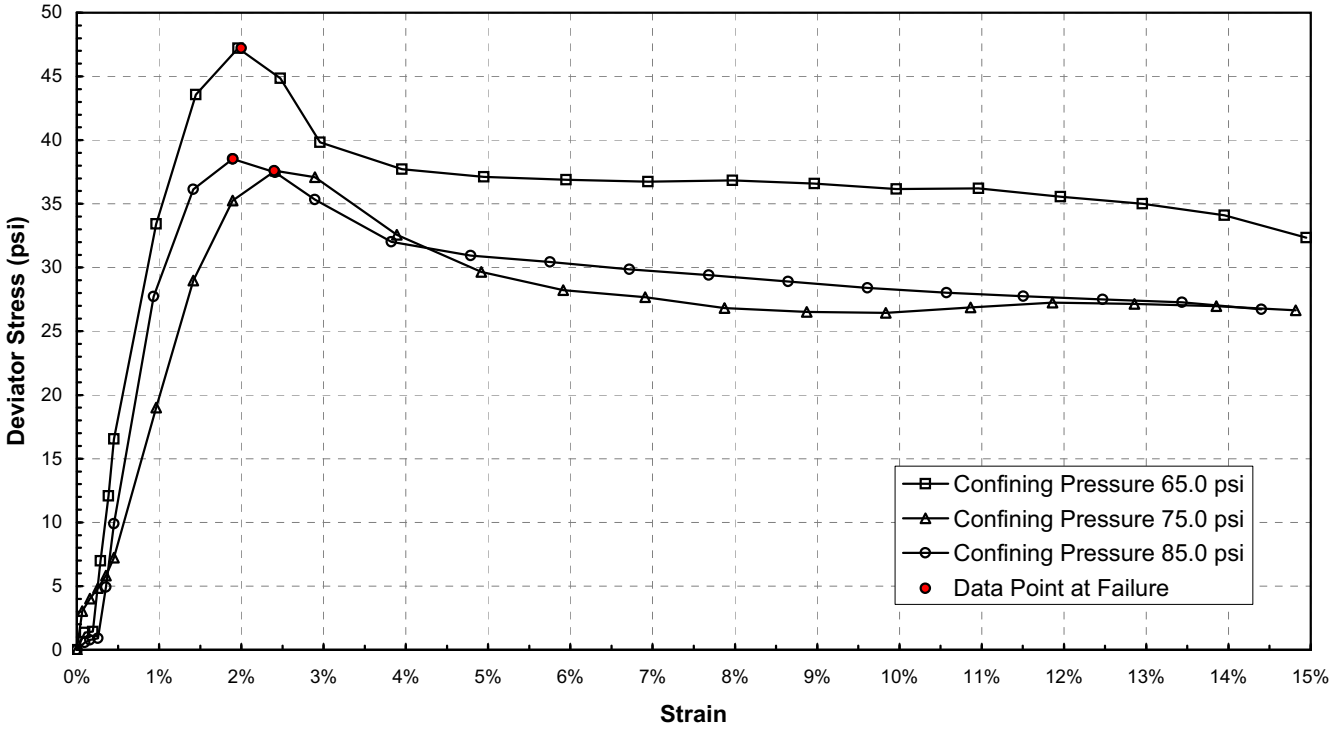
**REMARKS**

S&ME
8211 Hermitage Road
Richmond, Virginia 23228
Tel: 804.266.2199
Fax: 804.261.5569

**UNCONSOLIDATED UNDRAINED (UU) TRIAXIAL TEST**

| | |
|---|---|
| Project: | I-64/I-264 Interchange: PSA - Ramps and Channels |
| Client: | HDR Engineering, Inc. |
| Location: | Virginia Beach, Virginia |
| Project No.: | 1081-10-2757 |

Sample No.: 17234
Exploration No.: KR2-5B
Sample I.D. / Depth: 80 to 82 feet




**SPECIMEN PHOTOGRAPHS (AFTER SHEARING)**

A

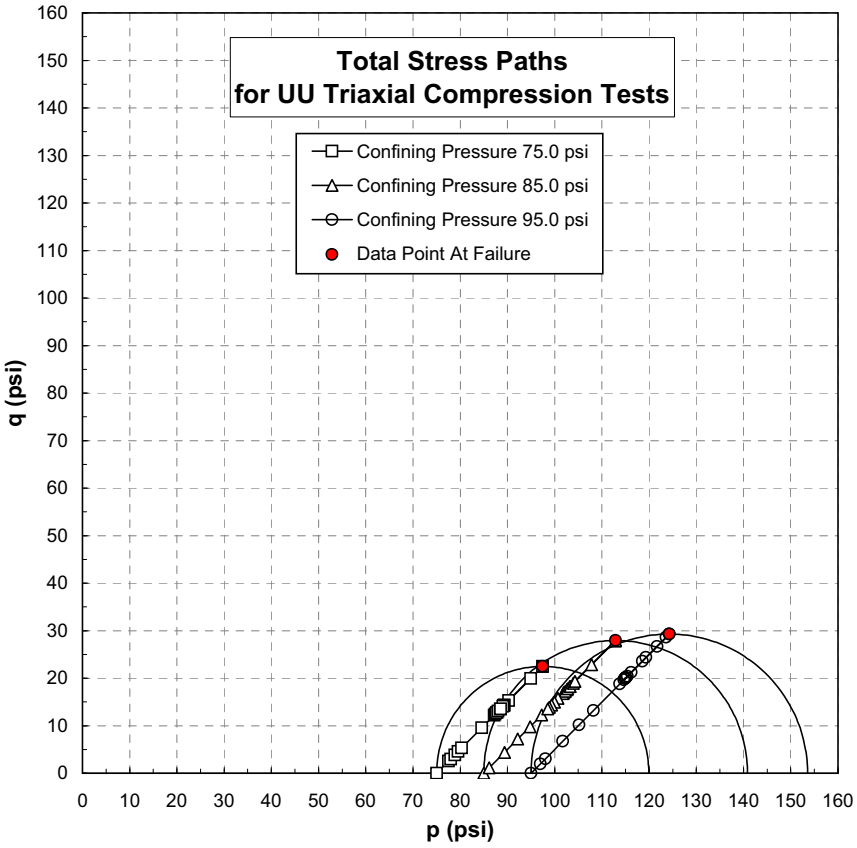
B

C

S&ME
8211 Hermitage Road
Richmond, Virginia 23228
Tel: 804.266.2199
Fax: 804.261.5569

**UNCONSOLIDATED UNDRAINED (UU) TRIAXIAL TEST**

Project: I-64/I-264 Interchange: PSA - Ramps and Channels
Client: HDR Engineering, Inc.
Location: Virginia Beach, Virginia
Project No.: 1081-10-2757




**SAMPLE ID**

| | |
|---|---|
| Sample No.: | 17235 |
| Exploration No.: | KR2-6B |
| Sample Depth: | 90 to 92 feet |
| USCS Description: | Gray, fat CLAY (CH) |

**SAMPLE INFORMATION**

| Sample Number | A | B | C |
|---|---|---|---|
| Wet Weight, g | 128.7 | 128.0 | 126.8 |
| Dry Weight, g | 82.4 | 82.9 | 83.1 |
| Water Content, % | 56.1 | 54.5 | 52.6 |
| Wet Density, pcf | 104.3 | 105.5 | 105.3 |
| Dry Density, pcf | 66.8 | 68.3 | 69.0 |
| Saturation, % | 99.6 | 100.0 | 98.4 |
| Void Ratio | 1.52 | 1.47 | 1.44 |
| Diameter, in | 1.406 | 1.399 | 1.400 |
| Height, in | 3.025 | 3.008 | 2.983 |
| Area, $in^2$ | 1.553 | 1.537 | 1.539 |

* Water content data obtained using entire sample

**CLASSIFICATION**

| Sieve Size | %-Passing | Atterberg Limits & Gs | |
|---|---|---|---|
| 3/8-in (9.5-mm) | | Liquid Limit, % | 92 |
| No. 4 (4.75-mm) | 100.0 | Plastic Limit, % | 32 |
| No. 10 (2.0-mm) | 99.9 | Plasticity Index, % | 60 |
| No. 40 (0.425-mm) | 99.6 | Group Symbol | CH |
| No. 100 (0.150-mm) | 99.4 | | |
| No. 200 (0.075-mm) | 98.4 | Estimated Gs | 2.70 |

Notes:

**TEST SUMMARY**

| Sample Number | A | B | C |
|---|---|---|---|
| Strain Rate, %/min | 1.00 | 1.00 | 1.00 |
| Confining Pressure, psi | 75.0 | 85.0 | 95.0 |
| Failure Criteria | $\sigma_{DMAX}$ | $\sigma_{DMAX}$ | $\sigma_{DMAX}$ |
| $\sigma_D$ At Failure, psi* | 44.9 | 55.8 | 58.6 |
| Axial Strain at Failure, % | 3.0 | 2.0 | 1.4 |
| $\sigma_{1F}$, psi | 119.9 | 140.8 | 153.6 |
| $\sigma_{3F}$, psi | 75.0 | 85.0 | 95.0 |

* Membrane correction subtracted from deviator stress for Samples A-C

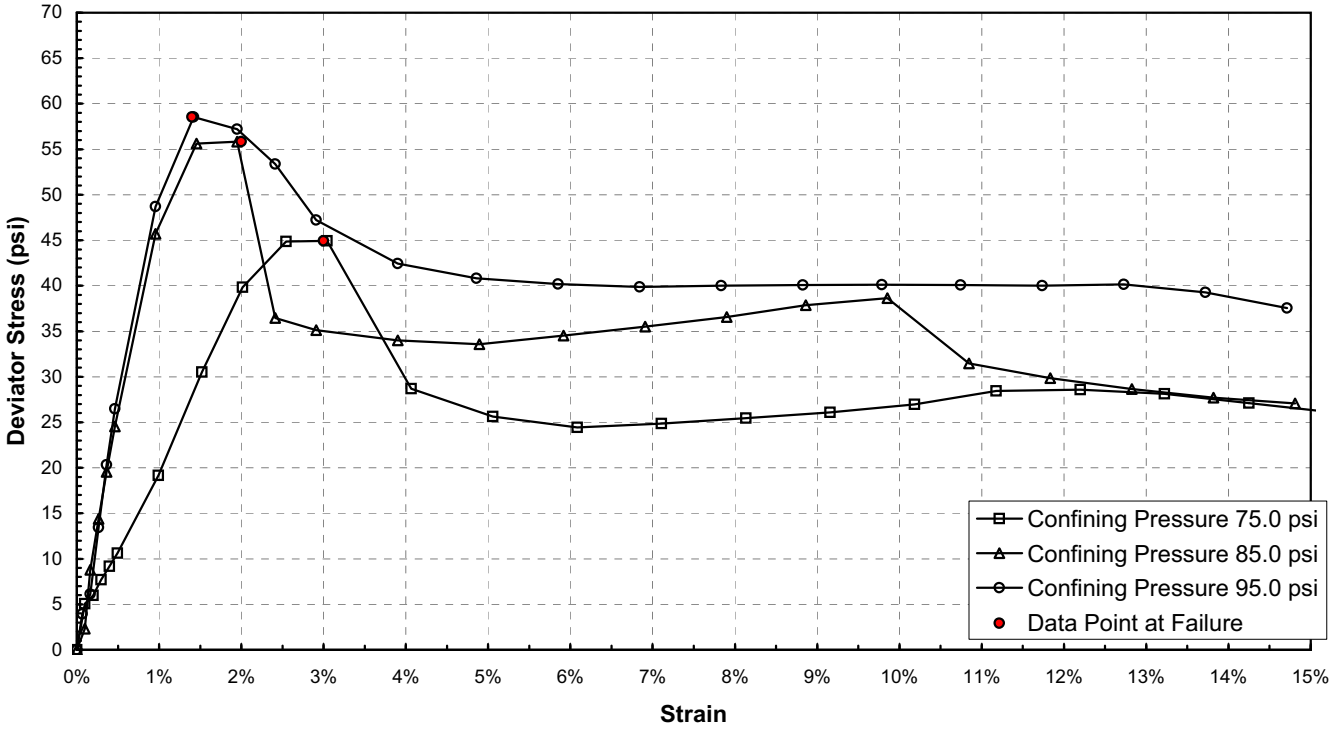
**REMARKS**

S&ME
8211 Hermitage Road
Richmond, Virginia 23228
Tel: 804.266.2199
Fax: 804.261.5569

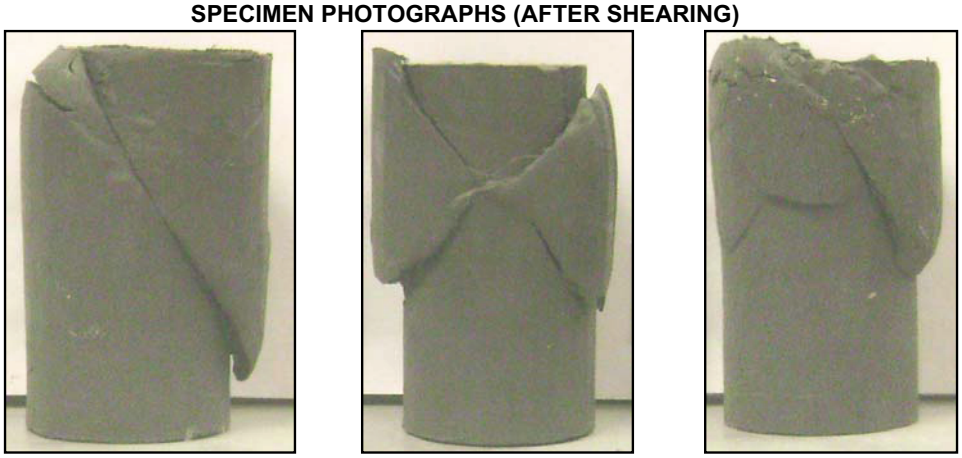
**UNCONSOLIDATED UNDRAINED (UU) TRIAXIAL TEST**

| | |
|---|---|
| Project: | I-64/I-264 Interchange: PSA - Ramps and Channels |
| Client: | HDR Engineering, Inc. |
| Location: | Virginia Beach, Virginia |
| Project No.: | 1081-10-2757 |

Sample No.: 17235
Exploration No.: KR2-6B
Sample I.D. / Depth: 90 to 92 feet




**SPECIMEN PHOTOGRAPHS (AFTER SHEARING)**



A B C

**UNCONSOLIDATED UNDRAINED (UU) TRIAXIAL TEST**


S&ME
8211 Hermitage Road
Richmond, Virginia 23228
Tel: 804.266.2199
Fax: 804.261.5569


Project: I-64/I-264 Interchange: PSA - Ramps and Channels
Client: HDR Engineering, Inc.
Location: Virginia Beach, Virginia
Project No.: 1081-10-2757

# SHELBY TUBE EXTRACTION LOGS

Project: I-64/I-264 Interchange Phase: RAMPS AND CHANNEL

Location: Virginia Beach, Virginia

Job No.: 1081-10-2757

Client: HDR, Inc.

Inspector: MATTHEW THORNTON

Date: 9/27/2010

Boring: D7-21W

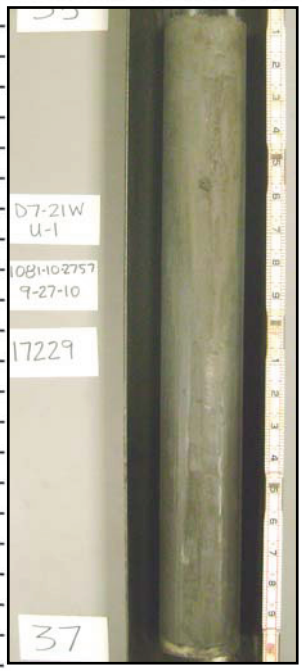
Lab No.: 17229

Tube No.: U-1

Depth (ft.): 35 TO 37

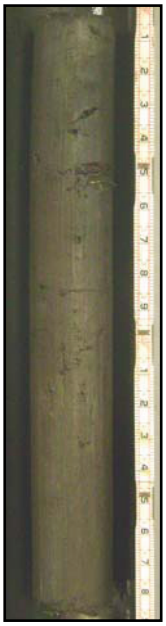
Rec. (ft.): 2.0

Date Collected: 9-19-2010

| Length (ft.) | Depth (ft.) | DESCRIPTION | REMARKS | PICTURE |
|---|---|---|---|---|
| 0 | 35 | Gray, fat CLAY w/sand, moist (CH) | CONTAINS TRACE OF ORGANICS THROUGHOUT |  |
| 0.5 | 35.5 | | UUA | |
| 1.0 | 36 | SAME AS ABOVE (CH) | UUB | |
| 1.5 | 36.5 | | UUC | |
| | | | CONSOL | |
| 2.0 | 37 | SAME AS ABOVE (CH) | MC, CLASS | |
| | | END OF SAMPLE | | |

S&ME

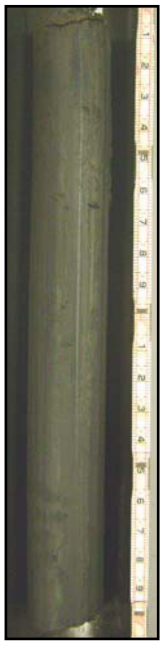
| | | | |
|---|---|---|---|
| Project: | I-64/I-264 Interchange Phase: RAMPS AND CHANNELS | Location: | Virginia Beach, Virginia |
| Job No.: | 1081-10-2757 | Client: | HDR, Inc. |
| Inspector: | Matthew L. Thornton | Date: | November 3, 2010 |
| Boring: | D7CD-8W | Lab No.: | 17380 |
| Tube No.: | ST-1 | Depth (ft.): | 5 to 7 |
| Rec. (ft.): | 1.9 | Date Collected: | 10-14-2010 |

| Length (ft.) | Depth (ft.) | DESCRIPTION | REMARKS | PICTURE |
|---|---|---|---|---|
| 0 | 5 | Black, elastic SILT and sand, little organics, moist (MH) | cracks |  |
| 0.5 | 5.5 | | crack | |
| | | | UUA | |
| 1.0 | 6 | | UUB | |
| 1.5 | 6.5 | SAME AS ABOVE (MH) | UUC | |
| | | | MC, CLASS | |
| 2.0 | 7.0 | END OF SAMPLE | | |

Photograph A depicts the presence of organic material encountered during specimen trimming for triaxial testing.

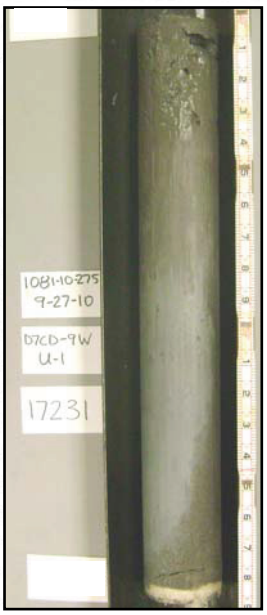
S&ME

Project: I-64/I-264 Interchange Phase: RAMPS AND CHANNELS
Location: Virginia Beach, Virginia
Job No.: 1081-10-2757
Client: HDR, Inc.
Inspector: Matthew L. Thornton
Date: November 3, 2010
Boring: D7CD-9W
Lab No.: 17 382
Tube No.: ST-1
Depth (ft.): 10 to 12
Rec. (ft.): 2.0
Date Collected: 10-14-2010

| Length (ft.) | Depth (ft.) | DESCRIPTION | REMARKS | PICTURE |
|---|---|---|---|---|
| 0 | 10 | Black, elastic SILT, some sand, trace organics, moist (MH) | |  |
| 0.5 | 10.5 | | | |
| 1.0 | 11 | | UUA | |
| | | | UUB | |
| 1.5 | 11.5 | SAME AS ABOVE (MH) | UUC | |
| | | | MC, CLASS | |
| 2.0 | 12 | END OF SAMPLE | | |

S:\GT\GT2701 to 2800\GT2757 - I-64_I-264 Interchange\PSA - Ramps and Channel\Lab\Tubes\[Tube Extraction Logs.xls]D7CD-9W 10 ft

Project: I-64/I-264 Interchange Phase: RAMPS AND CHANNEL
Location: Virginia Beach, Virginia
Job No.: 1081-10-2757
Client: HDR, Inc.
Inspector: MATTHEW THORNTON
Date: 9-27-2010
Boring: D7CD-9W
Lab No.: 17231
Tube No.: U-1
Depth (ft.): 25 TO 27
Rec. (ft.): 1.8
Date Collected: 9-20-10

| Length (ft.) | Depth (ft.) | DESCRIPTION | REMARKS | PICTURE |
|---|---|---|---|---|
| 0 | 25 | Dark gray, sandy fat CLAY, contains organics, wet (CH) | Possibly disturbed, voids |   |
| 0.5 | 25.5 | Blue-gray, fat CLAY, with sand, moist (CH) | mottled w/ gray to 28.8' uuA | |
| 1.0 | 26 | | uuB | |
| | | | uuC | |
| 1.5 | 26.5 | SAME AS ABOVE (CH) | CONSOL 3MC, CLASS | |
| 2.0 | 27 | END OF SAMPLE | | |

S:\GT\GT2701 to 2800\GT2757 - I-64_I-264 Interchange\PSA - Ramps and Channel\Lab\Tubes\[Tube Extraction Logs.xls]D7CD-9W 25 ft

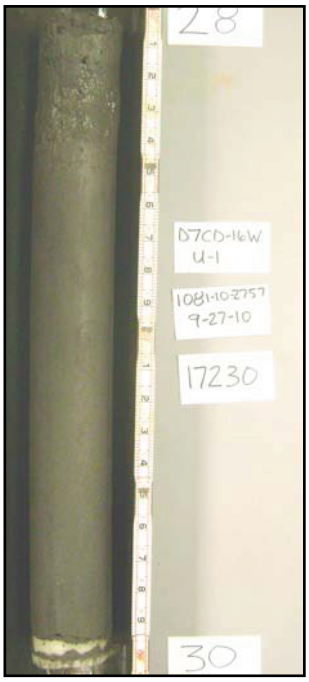
S&ME

Project: I-64/I-264 Interchange Phase: RAMPS AND CHANNELS
Location: Virginia Beach, Virginia
Job No.: 1081-10-2757
Client: HDR, Inc.
Inspector: Matthew L. Thornton
Date: November 3, 2010
Boring: D7CD-11BC
Lab No.: 17362
Tube No.: ST-1
Depth (ft.): 13 to 15
Rec. (ft.): 1.9
Date Collected: 10-12-2010

| Length (ft.) | Depth (ft.) | DESCRIPTION | REMARKS | PICTURE |
|---|---|---|---|---|
| 0 | 13 | Gray, sandy Fat CLAY, moist (CH) | MC, CLASS → cancelled by HDR 11-3-10 | |
| 0.5 | 13.5 | Light gray, fine to medium SAND, trace of clay, trace of organics, moist (SP-SC) | | |
| 1.0 | 14 | | | |
| 1.5 | 14.5 | SAME AS ABOVE (SP-SC) | | |
| 2.0 | 15 | END OF SAMPLE | | |

S&ME

Project: I-64/I-264 Interchange Phase: RAMPS AND CHANNEL
Location: Virginia Beach, Virginia
Job No.: 1081-10-2757
Client: HDR, Inc.
Inspector: MATTHEW THORNTON
Date: 9-27-10
Boring: D7CD-16W
Lab No.: 17230
Tube No.: U-1
Depth (ft.): 28-30
Rec. (ft.): 2.0
Date Collected: 9-24-10

| Length (ft.) | Depth (ft.) | DESCRIPTION | REMARKS | PICTURE |
|---|---|---|---|---|
| 0 | 28 | Dark gray, sandy Fat CLAY, contains organics, moist (CH) | possibly disturbed; oversaturated |  |
| 0.5 | 28.5 | Dark gray, clayey SAND, moist (SC) | | |
| 1.0 | 29 | SAME AS ABOVE (SC) | | |
| 1.5 | 29.5 | | | |
| 2.0 | 30 | SAME AS ABOVE (SC) | MC, CLASS | |
| | | END OF SAMPLE | | |

S&ME

Project: I-64/I-264 Interchange Phase: RAMPS AND CHANNELS Location: Virginia Beach, Virginia

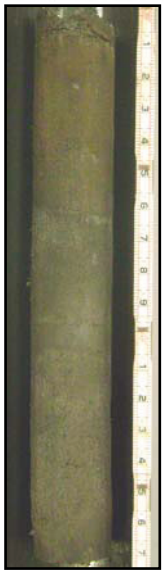
Job No.: 1081-10-2757 Client: HDR, Inc.

Inspector: Matthew L. Thornton Date: November 3, 2010

Boring: D7CD-18W Lab No.: 17361

Tube No.: ST-1 Depth (ft.): 5 to 7

Rec. (ft.): 1.7 Date Collected: 10-12-10

| Length (ft.) | Depth (ft.) | DESCRIPTION | REMARKS | PICTURE |
|---|---|---|---|---|
| 0 | 5 | Light gray, fine to medium SAND, trace of clay, trace of organics, moist (SP-SC) | |  |
| | | | Gray sandy CLAY seam | |
| 0.5 | 5.5 | | Gray sandy CLAY seam | |
| | | | Gray sandy CLAY seam | |
| 1.0 | 6 | | | |
| | | SAME AS ABOVE (SP-SC) | | |
| 1.5 | 6.5 | | MC, CLASS cancelled by HDR 11-3-10 | |
| | | | Gray sandy CLAY seam | |
| | | END OF SAMPLE | | |
| 2.0 | 7 | | | |

S:\GT\GT2701 to 2800\GT2757 - I-64_I-264 Interchange\PSA - Ramps and Channel\Lab\Tubes\[Tube Extraction Logs.xls]D7CD-18W 5 ft

Form No. 1081-TR-TEL
Revision No. : 0
Revision Date: 6/17/2011

# Tube Extraction Log

S&ME

**S&ME, Inc. - Richmond 8211 Hermitage Road Richmond, VA 23228**

| | | | |
|---|---|---|---|
| Project No.: | 1081-10-2757 | Report Date: | 8/1/2011 |
| Project Name: | I-64 / I-264 Interchange PSA Ramps and Channel | Extrusion Date: | 7/19/2011 |
| Client Name: | HDR Engineering, Inc. | | |
| Client Address: | Glen Allen, Virginia | | |

| | | | | | |
|---|---|---|---|---|---|
| Boring #: | D7CD-25W | Depth: | 30 to 32 feet | Sample Date: | 6/27/2011 |
| Station: | ----- | Tube #: | ----- | Lab Sample #: | 17936 |
| Offset: | ----- | Recovery: | 1.9 feet | Inspector: | MLT |

| Length (feet) | Depth (feet) | DESCRIPTION | REMARKS |
|---|---|---|---|
| 0 | 30 | **Gray, fine to medium silty SAND, moist (SM)** | **crack** |
| 0.5 | 30.5 | **Gray, sandy SILT, moist (ML)** | **UU Point A** |
| 1.0 | 31.0 | **SAME AS ABOVE (ML)** | **UU Point B** |
| | | | **UU Point C** |
| 1.5 | 31.5 | | **moisture, classification** |
| | | **SAME AS ABOVE (ML)** | **consol** |
| 2.0 | 32.0 | **END OF SAMPLE** | |

**PICTURE**

***References / Comments / Deviations:***

| Technical Responsibility | Signature | Position | Date |
|---|---|---|---|

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Form No. 1081-TR-TEL
Revision No. : 0
Revision Date: 6/17/2011

# Tube Extraction Log

S&ME

**S&ME, Inc. - Richmond 8211 Hermitage Road Richmond, VA 23228**

| | | | |
|---|---|---|---|
| Project No.: | 1081-10-2757 | Report Date: | 8/1/2011 |
| Project Name: | I-64 / I-264 Interchange PSA Ramps and Channel | Extrusion Date: | 7/19/2011 |
| Client Name: | HDR Engineering, Inc. | | |
| Client Address: | Glen Allen, Virginia | | |

| | | | | | |
|---|---|---|---|---|---|
| Boring #: | D7CD-25W | Depth: | 60 to 62 feet | Sample Date: | 6/27/2011 |
| Station: | ----- | Tube #: | ----- | Lab Sample #: | 17937 |
| Offset: | ----- | Recovery: | 2 feet | Inspector: | MLT |

| Length (feet) | Depth (feet) | DESCRIPTION | REMARKS |
|---|---|---|---|
| 0 | 60 | **Blue-gray, LEAN CLAY, trace sand, moist (CL)** | **Frequent sand partings throughout** |
| 0.5 | 60.5 | | |
| | | | **UU Point A** |
| 1.0 | 61.0 | **SAME AS ABOVE (CL)** | **crack** |
| | | | **UU Point B** |
| | | | **trace shells within Point B** |
| | | | **UU Point C** |
| 1.5 | 61.5 | | |
| | | | **moisture, classification** |
| | | **SAME AS ABOVE (CL)** | |
| | | | **consol** |
| 2.0 | 62.0 | **END OF SAMPLE** | |

**PICTURE**

***References / Comments / Deviations:***

| Technical Responsibility | Signature | Position | Date |
|---|---|---|---|

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S&ME

Project: I-64/I-264 Interchange Phase: RAMPS AND CHANNEL Location: Virginia Beach, Virginia

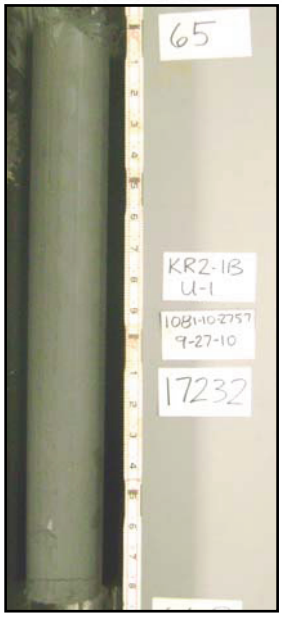
Job No.: 1081-10-2757 Client: HDR, Inc.

Inspector: MATTHEW THORNTON Date: 9-27-2010

Boring: KR2-1B Lab No.: 17232

Tube No.: U-1 Depth (ft.): 65 to 67

Rec. (ft.): 1.9 Date Collected: 9-14-2010

| Length (ft.) | Depth (ft.) | DESCRIPTION | REMARKS | PICTURE |
|---|---|---|---|---|
| 0 | 65 | Gray, fat CLAY, trace of sand, contains trace of shells, contains frequent sand partings, moist (CH) | |   |
| 0.5 | 65.5 | | crack | |
| 1.0 | 66 | SAME AS ABOVE (CH) | | |
| 1.5 | 66.5 | | CONSOL | |
| | | SAME AS ABOVE (CH) | crack MC, CLASS | |
| 2.0 | 67 | END OF SAMPLE | | |

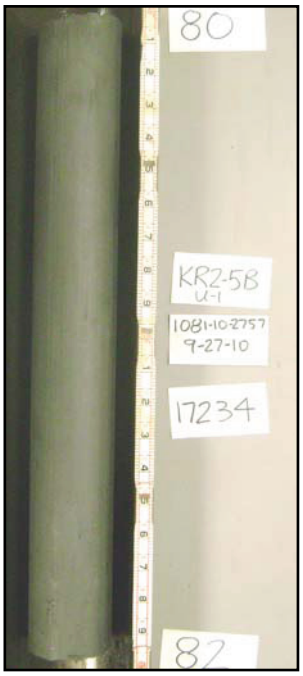
S&ME

Project: I-64/I-264 Interchange Phase: RAMPS AND CHANNEL
Location: Virginia Beach, Virginia
Job No.: 1081-10-2757
Client: HDR, Inc.
Inspector: MATTHEW THORNTON
Date: 9-27-10
Boring: KR2-3B
Lab No.: 17233
Tube No.: U-1
Depth (ft.): 75 to 77
Rec. (ft.): 2.3
Date Collected: 9-16-2010

| Length (ft.) | Depth (ft.) | DESCRIPTION | REMARKS | PICTURE |
|---|---|---|---|---|
| 0 | 75 | Blue-gray, Fat CLAY, w/sand, contains shells, moist (CH) | | |
| 0.5 | 75.5 | | | |
| 1.0 | 76 | SAME AS ABOVE (CH) | | |
| 1.5 | 76.5 | | | |
| 2.0 | 77 | SAME AS ABOVE (CH) | 3 MC, CLASS | |
| | | END OF SAMPLE | | |

S&ME

Project: I-64/I-264 Interchange Phase: RAMPS AND CHANNEL
Location: Virginia Beach, Virginia
Job No.: 1081-10-2757
Client: HDR, Inc.
Inspector: MATTHEW THORNTON
Date: 9-27-10
Boring: KR2-5B
Lab No.: 17234
Tube No.: U-1
Depth (ft.): 80 to 82
Rec. (ft.): 1.95
Date Collected: 9-16-2010

| Length (ft.) | Depth (ft.) | DESCRIPTION | REMARKS | PICTURE |
|---|---|---|---|---|
| 0 | 80 | Gray, Fat CLAY, trace of sand, contains shells, moist (CH) | |   |
| 0.5 | 80.5 | | UUA | |
| 1.0 | 81 | SAME AS ABOVE (CH) | UUB | |
| 1.5 | 81.5 | | UUC | |
| | | | CONSOL | |
| 2.0 | 82 | SAME AS ABOVE (CH) | 3 MC, CLASS | |
| | | END OF SAMPLE | | |

S&ME

Project: I-64/I-264 Interchange Phase: RAMPS AND CHANNEL

Location: Virginia Beach, Virginia

Job No.: 1081-10-2757

Client: HDR, Inc.

Inspector: MATTHEW THORNTON

Date: 9-27-10

Boring: KR2-6B

Lab No.: 17235

Tube No.: U-1

Depth (ft.): 90 to 92

Rec. (ft.): 1.9

Date Collected: 9-15-2010

| Length (ft.) | Depth (ft.) | DESCRIPTION | REMARKS |
|---|---|---|---|
| 0 | 90 | Gray, fat CLAY, trace of sand, contains shells, moist (CH) | |
| 0.5 | 90.5 | | crack, sand parting; UUA |
| 1.0 | 91 | SAME AS ABOVE (CH) | crack, sand parting; UUB |
| 1.5 | 91.5 | | UUC |
| | | SAME AS ABOVE (CH) | CONSOL; mc, class |
| 2.0 | 92 | END OF SAMPLE | BRITTLE BEHAVIOR OBSERVED |

PICTURE

S:\GT\GT2701 to 2800\GT2757 - I-64_I-264 Interchange\PSA - Ramps and Channel\Lab\Tubes\[Tube Extraction Logs.xls]KR2-6B 90 ft

Project: I-64/I-264 Interchange Phase: I-64, D7, AND BRIDGE Location: Virginia Beach, Virginia

Job No.: 1081-10-2757 Client: HDR, Inc.

Inspector: MATTHEW THORNTON Date: 9-28-2010

Boring: CUR-1B Lab No.: 17236

Tube No.: U-1 Depth (ft.): 25-27

Rec. (ft.): 1.8 Date Collected: 9-23-2010

| Length (ft.) | Depth (ft.) | DESCRIPTION | REMARKS | PICTURE |
|---|---|---|---|---|
| 0 | 25 | Gray, sandy Fat CLAY, contains shells, moist (CH) | wet | |
| 0.5 | 25.5 | | | |
| 1.0 | 26 | Gray, fine to medium silty SAND, moist (SM) | UU A<br>MC, CLASS | |
| 1.5 | 26.5 | Gray, fine to medium SAND, with silt, moist (SM) | UU B<br>UU C | |
| 2.0 | 27 | END OF SAMPLE | | |

S:\GT\GT2701 to 2800\GT2757 - I-64_I-264 Interchange\PSA - I-64 D7 and Bridge\Lab\Tubes\[Tube Extraction Logs.xls]CUR-1B 25 ft

S&ME

Project: I-64/I-264 Interchange Phase: I-64, D7, AND BRIDGE

Location: Virginia Beach, Virginia

Job No.: 1081-10-2757

Client: HDR, Inc.

Inspector: MATTHEW THORNTON

Date: 9-28-2010

Boring: CUR-1B

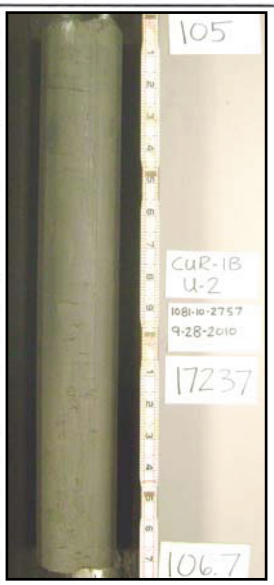
Lab No.: 17237

Tube No.: U-2

Depth (ft.): 105 to 107

Rec. (ft.): 1.7

Date Collected: 9-23-2010

| Length (ft.) | Depth (ft.) | DESCRIPTION | REMARKS | PICTURE |
|---|---|---|---|---|
| 0 | 105 | Gray, fat CLAY, trace of sand, moist (CH) | FREQUENT SAND PARTINGS CAUSING PERPENDICULAR CRACKS THROUGHOUT SAMPLE |   |
| 0.5 | 105.5 | | | |
| 1.0 | 106 | SAME AS ABOVE (CH) | | |
| 1.5 | 106.5 | SAME AS ABOVE (CH) | 3 MC, CLASS | |
| | | END OF SAMPLE | | |
| 2.0 | 107 | | | |

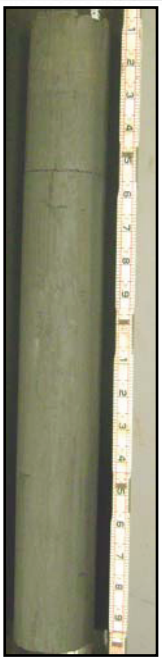
S&ME

| | | | |
|---|---|---|---|
| Project: | I-64/I-264 Interchange Phase: I64, D7, AND BRIDGE | Location: | Virginia Beach, Virginia |
| Job No.: | 1081-10-2757 | Client: | HDR, Inc. |
| Inspector: | Matthew L. Thornton | Date: | November 3, 2010 |
| Boring: | CUR-4B | Lab No.: | 173363 |
| Tube No.: | ST-1 | Depth (ft.): | 50 to 52 |
| Rec. (ft.): | 1.7 | Date Collected: | 10-6-2010 |

| Length (ft.) | Depth (ft.) | DESCRIPTION | REMARKS | PICTURE |
|---|---|---|---|---|
| 0 | 50 | Light gray, Fine to medium SAND, with clay, wet (SC) | Gray sandy CLAY | |
| 0.5 | 50.5 | Gray, fine to coarse, SAND, some silt, moist (SM) | crack mm | |
| 1.0 | 51 | | | |
| 1.5 | 51.5 | SAME AS ABOVE (SM) | MC, CLASS | |
| | | END OF SAMPLE | | |
| 2.0 | 52 | | | |

S&ME

| | | | |
|---|---|---|---|
| Project: | I-64/I-264 Interchange Phase: I64, D7, AND BRIDGE | Location: | Virginia Beach, Virginia |
| Job No.: | 1081-10-2757 | Client: | HDR, Inc. |
| Inspector: | Matthew L. Thornton | Date: | November 3, 2010 |
| Boring: | CUR-4B | Lab No.: | 17364 |
| Tube No.: | ST-2 | Depth (ft.): | 95 to 97 |
| Rec. (ft.): | 2.0 | Date Collected: | 10-6-2010 |

| Length (ft.) | Depth (ft.) | DESCRIPTION | REMARKS | PICTURE |
|---|---|---|---|---|
| 0 | 95 | Blue-gray, Fat CLAY, trace of sand, contains frequent sand partings, contains trace of shells, moist (CH) | cracks |  |
| 0.5 | 95.5 | | crack (sand parting) | |
| 1.0 | 96 | | crack | |
| | | | crack | |
| 1.5 | 96.5 | SAME AS ABOVE (CH) | crack | |
| | | | MC, CLASS | |
| 2.0 | 97 | END OF SAMPLE | | |