

# Geotechnical Data Report

Calais BHF 037-2 (11)  
Vermont Route 14, Bridge 82 Over Kingsbury Branch  
Calais, Vermont  
PIN: s12b146  
June 13, 2014  
Terracon Project No. J1145112

**Prepared for:**  
Vermont Agency of Transportation  
Montpelier, Vermont

**Prepared by:**  
Terracon Consultants, Inc.  
Manchester, New Hampshire

[terracon.com](http://terracon.com)

**Terracon**

Environmental



Facilities



Geotechnical



Materials

June 13, 2014



Vermont Agency of Transportation  
Materials and Research  
One National Life Drive  
Montpelier, Vermont 05633

Attn: Mr. Christopher Benda, PE  
P: [802] 828-6910  
E: chris.benda@state.vt.us

Re: Geotechnical Data Report  
Calais BHF 037-2 (11)  
Vermont Route 14, Bridge 82 Over Kingsbury Branch  
Calais, Vermont  
PIN: s12b146  
June 13, 2014  
Terracon Project No. J1145112

Dear Mr. Benda:

Terracon Consultants, Inc. (Terracon) has completed the geotechnical engineering services for the above referenced project. This study was performed in general accordance with our proposal number PJ1140028 dated February 13, 2014 and proposal Adendum No. 1 dated March 20, 2014. This report presents the findings of the subsurface exploration and laboratory testing for the proposed project.

We appreciate the opportunity to be of service to you on this project. If you have questions concerning this report, or if we may be of further service, please contact us.

Sincerely,  
**Terracon Consultants, Inc.**

A blue ink signature of Anant Panwalkar, written in a cursive style.

Anant Panwalkar  
Senior Project Engineer, P.E.

A blue ink signature of Lawrence J. Dwyer, P.E., written in a cursive style.

Lawrence J. Dwyer, P.E.  
Principal

Enclosures  
cc: 1 – Client (PDF)  
1 – File

Terracon Consultants, Inc. 77 Sundial Ave. Suite 401W Manchester, New Hampshire 03103  
P [603] 647 9700 F [603] 647 4432 terracon.com

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**GEOTECHNICAL DATA REPORT**  
**Calais BHF 037-2 (11)**  
**Vermont Route 14, Bridge 82 Over Kingsbury Branch**  
**CALAIS, VERMONT**  
PIN: s12b146  
Terracon Project No. J1145112  
June 13, 2014

## **1.0 INTRODUCTION**

This geotechnical data report presents the results of our geotechnical exploration performed for the proposed replacement of Bridge No. 82 carrying Vermont Route 14 over Kingsbury Branch in Calais, Vermont.

Our geotechnical engineering scope of services included advancing two test borings, designated B-1 and B-2, as identified on the Geotechnical Services Request Form prepared by Vermont Agency of Transportation (VAOT). The original scope included two borings drilled to a maximum of 100 feet with rock cores taken if refusal was encountered within 50 feet. Terracon finalized the boring depths and sampling intervals in general accordance with the VAOT guidelines "MREI 11-01 Geotechnical Guidelines for the Subsurface Investigation Process" and our discussions with VAOT staff. Subsequently, the scope was modified during drilling to extend the borings and to obtain confirmatory bedrock cores. However, bedrock was not encountered in both the borings. B-1 and B-2 were extended and terminated at depths of 160 and 152 feet, respectively.

Site Location Map is included on Exhibit A-1 in Appendix A. The boring locations are shown on Exhibit A-2: Exploration Location Plan and Interpreted Geologic Cross Section in Appendix A.

## **2.0 PROJECT INFORMATION**

### **2.1 Project Description**

<b>Item</b>	<b>Description</b>
<b>Site layout</b>	See Appendix A, Exhibit A-2: Exploration Location Plan and Interpreted Geologic Cross Section.
<b>Structure</b>	The project consists of replacing the existing 34 feet long and 31 feet wide concrete T-beam Bridge 82 carrying Vermont Route 14 over Kingsbury Branch in Calais, Vermont.
<b>Cut and fill slopes</b>	Minimum cut and fill slopes are anticipated.

Item	Description
<b>Finish Elevation</b>	Bridge and roadway elevations are anticipated to be higher to accommodate the required low beam elevation (EI) of 900.1 feet. We anticipate roadway elevation will be raised 29 inches.

## 2.2 Site Location and Description

Item	Description
<b>Location</b>	The subject bridge is located approximately 0.3 mile north of the intersection of Vermont Route 14 and Balentine Road in Calais, Vermont.
<b>Existing improvements</b>	Existing single span concrete t-beam bridge constructed circa 1919 and re-constructed in 1946.
<b>Current ground cover</b>	Paved roadway.
<b>Existing topography</b>	Roadway is approximately at EI 903.5 feet at the bridge. The streambed is approximately EI 892 feet. Negligible grade difference from one side of the bridge to the other.

## 3.0 SUBSURFACE CONDITIONS

### 3.1 Geology

A preliminary report prepared by VAOT provided a summary of available geological information. Based on the information provided in the preliminary report and the Surficial Geology Map of Vermont, the subsurface soils in the vicinity consist of recent alluvial sands well sorted sand and a gravel deposit over glacial till. Bedrock Geology Map of Vermont 2011 indicates bedrock is part of the Waits River Formation and likely consists of carbonaceous phyllite and limestone.

### 3.2 Typical Profile

Based on the results of the borings, subsurface conditions can be generalized as follows:

Stratum	Approximate Depth to Bottom of Stratum (feet)	Material Description	Consistency/ Density
<b>Fill</b>	4.0 – 5.0	Fine to coarse sand, little silt, trace gravel, brown, moist	N/A
<b>Aluvial Deposit</b>	20 to 21	Poorly graded SAND, with silt, trace gravel.	Loose

## Geotechnical Data Report

Calais BHF 037-2 (11) Bridge No.82 ■ Calais, VT

Jun 13, 2014 ■ Terracon Project No. J1145112



Stratum	Approximate Depth to Bottom of Stratum (feet)	Material Description	Consistency/Density
Well sorted sand and gravel	110.0 to 116.0	Well-graded SAND with silt and gravel, brown, dry to wet.	Medium to dense
Boulders and cobbles*	75.0 to 118.0	Broken weathered rock fragments – boulder and cobbles.	N/A
Glacial Till	152.0 to 160.0**	Mixture of fine to coarse SAND, Silt, Gravel and occasional cobbles, brown, wet.	Dense to very dense

Notes: \* Approximately 30 feet thick pocket of boulder or cobbles encountered in B-1. SPT results indicates very dense strata, however SPT results in this material is unreliable and should not be relied on.

\*\* Glacial till extended to the bottom of the borings and may extend deeper than the maximum exploration depth.

Interpreted subsurface profile along the bridge centerline is presented on Exhibit A-2 in Appendix A. Conditions encountered at each boring location are indicated on the individual boring logs. Stratification boundaries on the exploration logs represent the approximate location of changes in soil types; in situ, the transition between materials may be gradual. Details for each of the explorations can also be found on the logs in Appendix A of this report.

### 3.3 Groundwater

Explorations were observed during drilling for the presence of groundwater. Observed groundwater depths varied from 10.0 feet in B-1 to 5.9 feet in B-2 (El 893.5 feet to El 896.1 feet) at the time of drilling. Groundwater level fluctuations occur due to seasonal variations in the amount of rainfall, runoff, brook elevation, and other factors not evident at the time the explorations were performed. Therefore, groundwater levels during construction or at other times in the life of the structure may be higher or lower than the levels indicated on the boring logs. Groundwater level fluctuations should be considered when developing the design and construction plans for the project.

### 3.4 Laboratory Testing

Laboratory testing was performed on soil samples obtained from the test borings to assist in classification and evaluate engineering properties. Laboratory testing was performed by VAOT staff in the VAOT facility located in Berlin, Vermont. The results of the laboratory tests are presented in Appendix B of this report.

## Geotechnical Data Report

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Jun 13, 2014 ■ Terracon Project No. J1145112



### 4.0 GENERAL COMMENTS

The interpretations presented in this report are based upon the data obtained from the borings performed at the indicated locations and from other information discussed in this report. This report does not reflect variations that may occur between borings, across the site, or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction. If variations appear, we should be immediately notified so that further evaluation and supplemental recommendations can be provided.

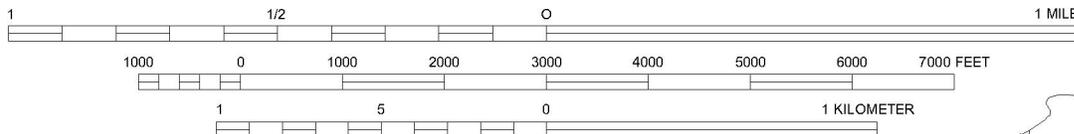
The scope of services for this project does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

This report has been prepared for the exclusive use of our client for specific application to the project discussed and has been prepared in accordance with generally accepted geotechnical engineering practices. No warranties, either express or implied, are intended or made. Site safety, excavation support, and dewatering requirements are the responsibility of others. In the event that changes in the nature, design, or location of the project as outlined in this report are planned, the conclusions and recommendations contained in this report shall not be considered valid unless Terracon reviews the changes and either verifies or modifies the conclusions of this report in writing.

**APPENDIX A**  
**FIELD EXPLORATION**



SCALE: 1:24 000



CONTOUR INTERVAL 6 METERS  
NATIONAL GEODETIC VERTICAL DATUM OF 1929



QUADRANGLE LOCATION  
SOURCE:  
USGS WOODBURY, VT  
1986

Project Mngr:	ASP
Drawn By:	MCR
Checked By:	ASP
Approved By:	LJD

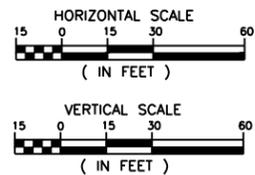
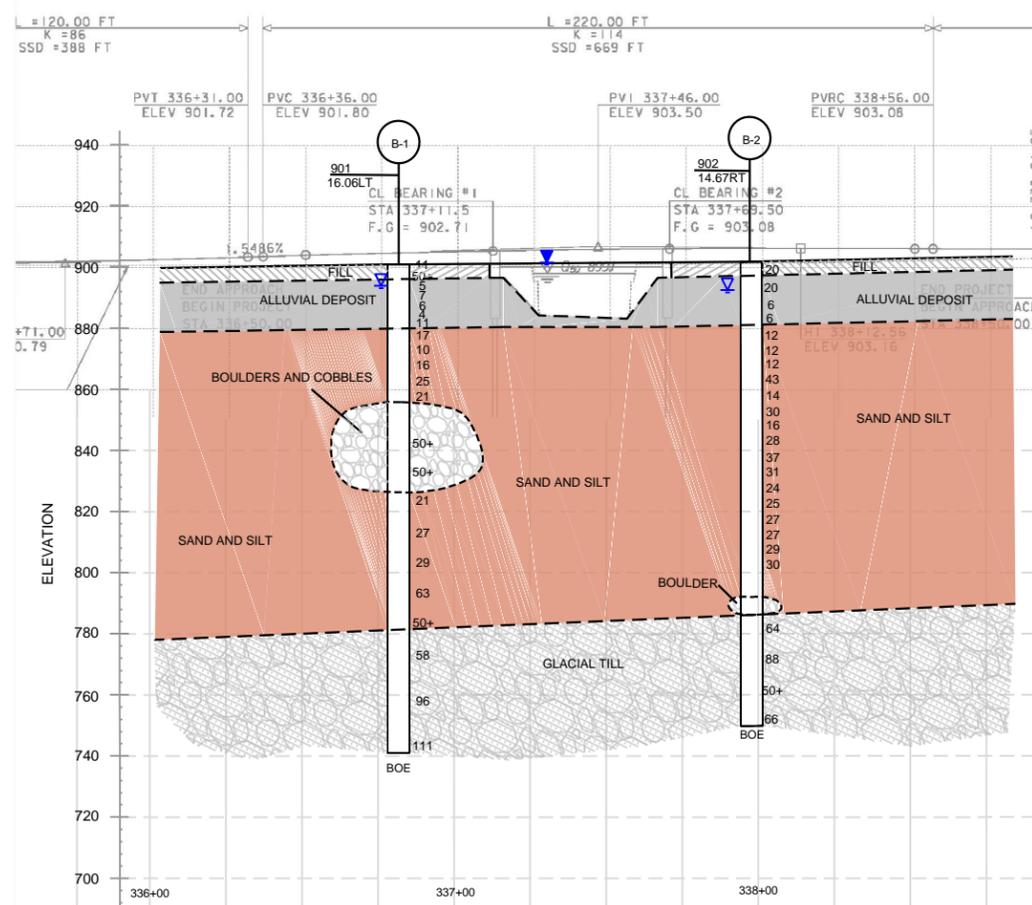
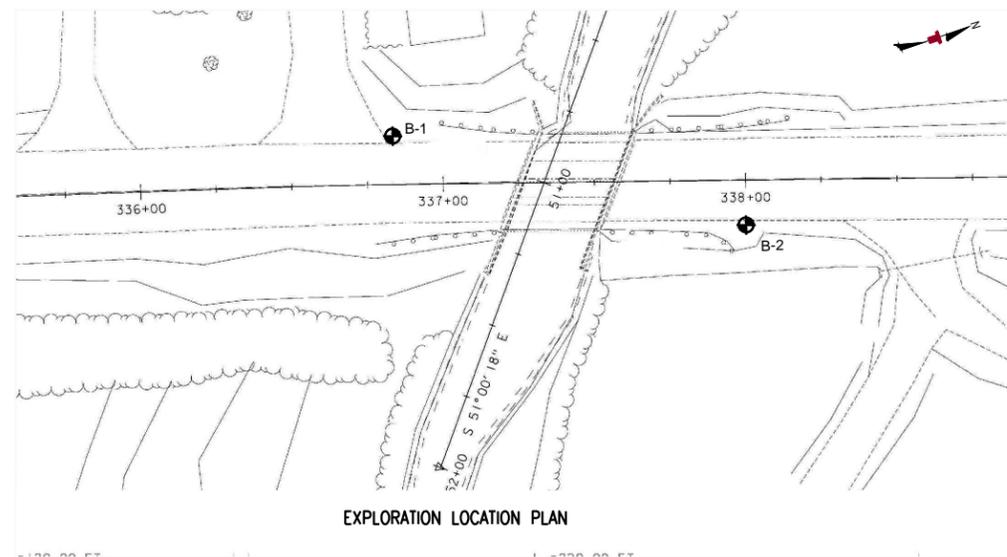
Project No.	J1145111
Scale:	AS SHOWN
File No.	J1145112.dwg
Date:	May 2014

**Terracon**

77 Sundial Ave. Manchester, NH 03103  
PH. (603)647-9700 FAX (603) 647-4432

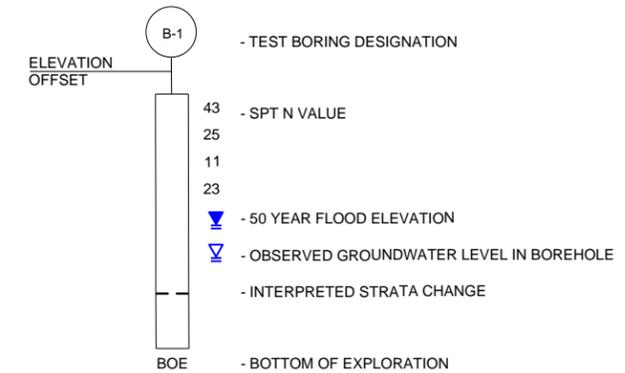
**SITE LOCATION MAP**  
VT Route 14, Bridge 82 Over Kingsbury Branch  
CALAIS, VERMONT  
BHF 037-2(11)

**EXHIBIT**  
**A-1**



BORING CHART

BORING	STATION	OFFSET	NORTHING	EASTING
B-1	336+81.9	16.06LT	687004.28	1661903.75
B-2	338+0.7	14.67RT	687069.54	1662003.95



NOTES:

- EXPLORATION LOCATION PLAN WAS PREPARED FROM A PLAN PROVIDED BY THE VERMONT AGENCY OF TRANSPORTATION.
- TEST BORINGS SHOWN AS B-1 AND B-2 WERE ADVANCED BETWEEN 3/19 AND 4/15, 2014 UNDER THE DIRECTION OF TERRACON WITH EQUIPMENT OWNED AND OPERATED BY DRILEX OF WEST BOYLSTON, MA.
- DATA CONCERNING THE VARIOUS STRATA HAVE BEEN INTERPOLATED AT BORING LOCATIONS ONLY. THE STRATIGRAPHY BETWEEN BORINGS MAY VARY FROM THAT SHOWN.
- THE APPROXIMATE LOCATIONS OF THE TEST BORINGS WERE LOCATED BY MEASURING FROM EXISTING SITE FEATURES. THE LOCATIONS SHOULD BE CONSIDERED ACCURATE TO THE DEGREE IMPLIED BY THE METHOD USED.
- USE OF THIS PLAN IS LIMITED TO THE ILLUSTRATION OF THE APPROXIMATE LOCATION OF THE TEST BORINGS AND OTHER PERTINENT SITE FEATURES. OTHER USE OF THIS PLAN WITHOUT PERMISSION FROM TERRACON IS PROHIBITED.

EXHIBIT A-2

EXPLORATION LOCATION PLAN AND INTERPRETED GEOLOGIC CROSS SECTION

Project Name: VT Route 14, Bridge 82 Over Kingsbury Branch  
 Location: Calais, Vermont  
 Number: BHF 037-2(11)



STATE OF VERMONT  
 AGENCY OF TRANSPORTATION  
 MATERIALS & RESEARCH SECTION  
 SUBSURFACE INFORMATION



77 Sundial Ave. Manchester, NH 03103  
 PH. (603)647-9700 FAX (603) 647-4432

## Field Exploration Description

Two test borings were completed at the site from March 19, 2014 through April 15, 2014. Terracon personnel monitored the advancement of the soil borings within the project site. Soil borings were advanced using an all-terrain vehicle mounted rotary drill rig, owned and operated by Drilllex Environmental of West Boylston, Massachusetts and Crawford Drilling Services of Gardner, MA. B-1 and B-2 were advanced using mud rotary or drive-and-wash drilling methods to depths of 159.5 feet to 152 feet below existing grade, respectively.

The proposed boring locations were laid out in the field by a Terracon representative using a scaled site plan provided by Vermont Agency of Transportation (VAOT) and field ties. Ground surface elevations indicated on the boring logs were estimated based on the grading plan provided by VAOT. The locations and elevations of the borings should be considered accurate only to the degree implied by the means and methods used to define them.

Samples of the soil encountered in the borings were obtained using the split-barrel sampling procedures. In the split-barrel sampling procedure, the number of blows required to advance a standard 2-inch O.D. split-barrel sampler the last 12 inches of the typical total 18-inch penetration by means of a 140-pound hammer with a free fall of 30 inches, is the standard penetration resistance value (SPT-N). This value is used to estimate the in-situ relative density of cohesionless soils and consistency of cohesive soils.

The samples were tagged for identification, sealed to reduce moisture loss, and taken to the VAOT laboratory for further examination, testing, and classification. Information provided on the boring logs attached to this report includes soil descriptions, consistency evaluations, boring depths, sampling intervals, and groundwater conditions. The borings were backfilled with cuttings prior to the drill crew leaving the site.

A field log of each boring was prepared by the Terracon field engineer. These logs included visual classifications of the materials encountered during drilling as well as the field engineer's interpretation of the subsurface conditions between samples. Final boring logs included with this report represent the engineer's interpretation of the field logs and include modifications based on laboratory observation and tests of the samples.



STATE OF VERMONT  
AGENCY OF TRANSPORTATION  
MATERIALS & RESEARCH SECTION  
SUBSURFACE INFORMATION

BORING LOG

VT Route 14, Bridge 82 Over Kingsbury Branch  
Calais, Vermont

BHF 037-2(11)

Boring No.: B-1  
Page No.: 1 of 4  
Pin No.: s12b146  
Checked By: ASP

Boring Crew: Jay/Thiet Ta  
Date Started: 4/15/14 Date Finished: 4/21/14  
VTSPG NAD83: N 687004.28 ft E 1661903.75 ft  
Station: 336+81.40 Offset: 16.06LT  
Ground Elevation: 901.0 ft

Casing: Flushwall Sampler: SPT  
Type: Flushwall I.D.: 4 in 2 in  
Hammer Wt: N.A. 140 lb.  
Hammer Fall: N.A. 30 in.  
Hammer/Rod Type: \_\_\_\_\_  
Rig: CME 75 C<sub>E</sub> = 1.33

Groundwater Observations

Date	Depth (ft)	Notes
04/15/14	7.0	Based on
		sample saturation

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %
		Topsoil (f-m sand)	4-5-6-6 (11)	13.4	20.5	62.6	16.9
		A-2-4, GrSa, Rec. = 1.5 ft, (FILL)	25-50/6" (50+)	19.1	14.1	59.9	26.0
		A-2-4, SiSa, Rec. = 0.67 ft, (FILL)					
		A-3, Sa, Rec. = 0.83 ft	2-2-3-3 (5)	8.5	1.2	90.5	8.3
		A-1-B, Sa, Rec. = 1.0 ft	4-4-3-3 (7)	17.8	14.3	68.3	17.4
10		A-1-B, SiGrSa, Rec. = 0.83 ft	6-2-4-4 (6)	16.3	38.0	40.1	21.9
		A-1-B, GrSa, Rec. = 1.17 ft	8-2-2-4 (4)	13.7	22.3	60.4	17.3
20		A-1-B, SiGrSa, Rec. = 0.67 ft	7-6-5-4 (11)	14.4	38.6	38.6	22.8
		A-1-B, SiSaGr, Rec. = 0.67 ft	14-8-9-5 (17)	12.3	50.4	29.0	20.6
30		A-1-B, Sa, Rec. = 1.33 ft	5-5-5-6 (10)	20.7	8.0	77.5	14.5
		A-1-B, SiSa, Rec. = 1.5 ft	15-8-8-8 (16)	19.1	3.9	75.8	20.3
40		A-1-B, GrSa, Rec. = 1.0 ft	6-10-15-16 (25)	14.8	25.8	58.3	15.9
		A-1-B, SiGrSa, Rec. = 0.83 ft	13-13-8-8 (21)	14.5	36.9	40.9	22.2
		Drill rig grinding at 47 feet					
50		A-1-B, SiGrSa, Rec. = 1.33 ft	13-18-16-12 (34)	13.9	39.5	39.9	20.6

Notes:

1. Stratification lines represent approximate boundary between material types. Transition may be gradual.
2. N Values have not been corrected for hammer energy. C<sub>e</sub> is the hammer energy correction factor. C<sub>e</sub> is an estimated value.
3. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.
4. Ground surface elevations indicated on the boring logs were estimated based on the grading plan provided by VAOT.



2010 COPY J1145112.GPJ VERMONT AOT.GDT 6/11/14



STATE OF VERMONT  
 AGENCY OF TRANSPORTATION  
 MATERIALS & RESEARCH SECTION  
 SUBSURFACE INFORMATION

**BORING LOG**

VT Route 14, Bridge 82 Over Kingsbury Branch  
 Calais, Vermont

BHF 037-2(11)

Boring No.: B-1  
 Page No.: 2 of 4  
 Pin No.: s12b146  
 Checked By: ASP

Boring Crew: Jay/Thiet Ta  
 Date Started: 4/15/14 Date Finished: 4/21/14  
 VTSPG NAD83: N 687004.28 ft E 1661903.75 ft  
 Station: 336+81.40 Offset: 16.06LT  
 Ground Elevation: 901.0 ft

Casing Flushwall Sampler SPT  
 Type: Flushwall SPT  
 I.D.: 4 in 2 in  
 Hammer Wt: N.A. 140 lb.  
 Hammer Fall: N.A. 30 in.  
 Hammer/Rod Type: \_\_\_\_\_  
 Rig: CME 75 C<sub>E</sub> = 1.33

Groundwater Observations		
Date	Depth (ft)	Notes
04/15/14	7.0	Based on
		sample saturation

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %
60		Drill rig grinding at 55 feet	50/1" (50+)				
		Tough grinding, Rec. = 0.0 ft					
		Broke through boulder at 62 feet					
70		Drill rig grinding again at 65 feet	26-50/1" (50+)	15.7			
		Broken weathered rock fragments, Rec. = 0.17 ft					
		Boulders and cobbles- coring, 1min., 1 min., 2 min. for 1.25 feet					
80		Broke through cobble/boulder layer at 75 feet	11-10-11-12 (21)	18.3	6.4	80.1	13.5
		A-1-B, Sa, Rec. = 1.33 ft					
90		A-1-B, Sa, Rec. = 1.5 ft	11-15-12-16 (27)	17.6	11.0	73.9	15.1
		Drill rig grinding at 93 feet					
100		A-1-B, Sa, Rec. = 1.5 ft	20-18-21-26 (29)	18.6	9.1	76.4	14.5

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STATE OF VERMONT  
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BORING LOG

VT Route 14, Bridge 82 Over Kingsbury Branch  
Calais, Vermont

BHF 037-2(11)

Boring No.: B-1

Page No.: 3 of 4

Pin No.: s12b146

Checked By: ASP

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VTSPG NAD83: N 687004.28 ft E 1661903.75 ft  
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Casing Flushwall Sampler SPT  
Type: Flushwall SPT  
I.D.: 4 in 2 in  
Hammer Wt: N.A. 140 lb.  
Hammer Fall: N.A. 30 in.  
Hammer/Rod Type: \_\_\_\_\_  
Rig: CME 75 C<sub>E</sub> = 1.33

Groundwater Observations

Date	Depth (ft)	Notes
04/15/14	7.0	Based on
		sample saturation

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %
110		A-1-B, GrSa, Rec. = 1.5 ft	26-34-39-28 (63)	14.7	22.0	60.0	18.0
120		A-1-b, grinding through gravel, cobble deposit at 118 feet (TILL), SaGr, Rec. = 0.33 ft	87-26/3" (50+)	11.6	54.9	26.5	18.6
130		A-1-B, SiSaGr, Rec. = 1.17 ft, (TILL)	27-32-26-33 (58)	11.6	54.3	25.3	20.4
140							
150		A-1-B, SaGr, Rec. = 1.17 ft, (TILL)	34-43-53-58 (96)	10.5	56.4	25.8	17.8

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Notes:  
1. Stratification lines represent approximate boundary between material types. Transition may be gradual.  
2. N Values have not been corrected for hammer energy. C<sub>e</sub> is the hammer energy correction factor. C<sub>e</sub> is an estimated value.  
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4. Ground surface elevations indicated on the boring logs were estimated based on the grading plan provided by VAOT.





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**BORING LOG**

VT Route 14, Bridge 82 Over Kingsbury Branch  
 Calais, Vermont

BHF 037-2(11)

Boring No.: B-1

Page No.: 4 of 4

Pin No.: s12b146

Checked By: ASP

Boring Crew: Jay/Thiet Ta  
 Date Started: 4/15/14 Date Finished: 4/21/14  
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Casing Flushwall Sampler SPT  
 Type: Flushwall SPT  
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 Hammer Fall: N.A. 30 in.  
 Hammer/Rod Type: \_\_\_\_\_  
 Rig: CME 75 C<sub>F</sub> = 1.33

Groundwater Observations		
Date	Depth (ft)	Notes
04/15/14	7.0	Based on
		sample saturation

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %
160		A-2-4, Sa, Rec. = 1.5 ft, (TILL)	40-51-60 (111)	21.7	0.9	81.5	17.6
Hole stopped @ 160.0 ft							

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Notes:  
 1. Stratification lines represent approximate boundary between material types. Transition may be gradual.  
 2. N Values have not been corrected for hammer energy. C<sub>F</sub> is the hammer energy correction factor. C<sub>E</sub> is an estimated value.  
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BORING LOG

VT Route 14, Bridge 82 Over Kingsbury Branch  
Calais, Vermont

BHF 037-2(11)

Boring No.: B-2  
Page No.: 1 of 3  
Pin No.: s12b146  
Checked By: ASP

Boring Crew: Jay/Thiet Ta/JF  
Date Started: 3/19/14 Date Finished: 4/15/14  
VTSPG NAD83: N 687069.54 ft E 1662003.95 ft  
Station: 33+80.70 Offset: 14.67RT  
Ground Elevation: 902.0 ft

Casing Flushwall Sampler SPT  
Type: Flushwall SPT  
I.D.: 4 in 2 in  
Hammer Wt: N.A. 140 lb.  
Hammer Fall: N.A. 30 in.  
Hammer/Rod Type: \_\_\_\_\_  
Rig: CME 75 C<sub>E</sub> = 1.33

Groundwater Observations

Date	Depth (ft)	Notes
03/14/14	5.9	

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %
		A-2-4, SiSa, Rec. = 0.7 ft, (FILL)	5-17-3-4 (20)	15.8	10.0	65.2	24.8
10		(pebbles), Rec. = 0.0 ft	15-12-8-15 (20)				
		Subrounded pebbles, stream deposits, Rec. = 0.0 ft	3-3-3-2 (6)				
20		A-2-4, Sa, Rec. = 0.5 ft	5-3-3-4 (6)	18.5	8.1	80.4	11.5
		Rec. = 0.7 ft, 25.0 ft - 27.0 ft	6-6-6-6 (12)				
30		A-2-4, SiSa, Rec. = 0.92 ft	6-6-6-5 (12)	16.1	9.5	68.8	21.7
		A-3, Sa, Rec. = 0.83 ft	8-6-6-8 (12)	18.1	3.0	87.7	9.3
40		A-1-B, GrSa, Rec. = 0.83 ft	19-23-20-18 (43)	13.3	27.1	63.6	9.3
		A-2-4, GrSa, Rec. = 0.5 ft	7-6-8-12 (14)	14.4	23.2	63.7	13.1
50		A-1-A, Gr, Rec. = 0.0 ft	5-13-17-24 (30)				

Notes:

1. Stratification lines represent approximate boundary between material types. Transition may be gradual.
2. N Values have not been corrected for hammer energy. C<sub>e</sub> is the hammer energy correction factor. C<sub>e</sub> is an estimated value.
3. Water level readings have been made at times and under conditions stated.
4. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.
5. Ground surface elevations indicated on the boring logs were estimated based on the grading plan provided by VAOT.



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STATE OF VERMONT  
AGENCY OF TRANSPORTATION  
MATERIALS & RESEARCH SECTION  
SUBSURFACE INFORMATION

BORING LOG

VT Route 14, Bridge 82 Over Kingsbury Branch  
Calais, Vermont

BHF 037-2(11)

Boring No.: B-2  
Page No.: 2 of 3  
Pin No.: s12b146  
Checked By: ASP

Boring Crew: Jay/Thiet Ta/JF  
Date Started: 3/19/14 Date Finished: 4/15/14  
VTSPG NAD83: N 687069.54 ft E 1662003.95 ft  
Station: 33+80.70 Offset: 14.67RT  
Ground Elevation: 902.0 ft

Casing Flushwall Sampler SPT  
Type: Flushwall SPT  
I.D.: 4 in 2 in  
Hammer Wt: N.A. 140 lb.  
Hammer Fall: N.A. 30 in.  
Hammer/Rod Type: \_\_\_\_\_  
Rig: CME 75 C<sub>E</sub> = 1.33

Groundwater Observations

Date	Depth (ft)	Notes
03/14/14	5.9	

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %
60		A-2-4, Sa, Rec. = 1.33 ft	7-8-8-12 (16)	22.9	0.6	82.2	17.2
		A-4, SaSi, Rec. = 1.5 ft	9-12-16-22 (28)	23.6	0.3	47.4	52.3
		A-2-4, SiGrSa, Rec. = 1.17 ft	10-19-18-25 (37)	16.4	28.0	49.6	22.4
70		A-1-B, SiSaGr, Rec. = 1.0 ft	13-16-15-23 (31)	11.1	47.4	31.7	20.9
		A-1-B, GrSa, Rec. = 0.67 ft	11-12-12-14 (24)	14.6	23.7	59.3	17.0
80		A-3, Sa, Rec. = 1.17 ft	8-13-12-16 (25)	20.9	2.8	88.1	9.1
		A-3, Sa, Rec. = 1.33 ft	8-11-16-19 (27)	21.0	2.9	87.7	9.4
90		A-1-A, SaGr, Rec. = 0.67 ft	17-14-13-18 (27)	9.5	59.9	26.6	13.5
		A-1-B, Sa, Rec. = 1.33 ft	11-15-14-17 (29)	17.2	3.2	82.4	14.4
100		A-1-B, Sa	12-15-15-15 (30)	16.4	3.2	84.2	12.6

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Notes: 1. Stratification lines represent approximate boundary between material types. Transition may be gradual.  
2. N Values have not been corrected for hammer energy. C<sub>e</sub> is the hammer energy correction factor. C<sub>e</sub> is an estimated value.  
3. Water level readings have been made at times and under conditions stated.  
Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.  
4. Ground surface elevations indicated on the boring logs were estimated based on the grading plan provided by VAOT.





STATE OF VERMONT  
AGENCY OF TRANSPORTATION  
MATERIALS & RESEARCH SECTION  
SUBSURFACE INFORMATION

BORING LOG

VT Route 14, Bridge 82 Over Kingsbury Branch  
Calais, Vermont

BHF 037-2(11)

Boring No.: B-2  
Page No.: 3 of 3  
Pin No.: s12b146  
Checked By: ASP

Boring Crew: Jay/Thiet Ta/JF  
Date Started: 3/19/14 Date Finished: 4/15/14  
VTSPG NAD83: N 687069.54 ft E 1662003.95 ft  
Station: 33+80.70 Offset: 14.67RT  
Ground Elevation: 902.0 ft

Casing Flushwall Sampler SPT  
Type: Flushwall SPT  
I.D.: 4 in 2 in  
Hammer Wt: N.A. 140 lb.  
Hammer Fall: N.A. 30 in.  
Hammer/Rod Type: \_\_\_\_\_  
Rig: CME 75 C<sub>F</sub> = 1.33

Groundwater Observations

Date	Depth (ft)	Notes
03/14/14	5.9	

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %
110		Boulder (drill rig grinding) at 110 feet  TILL at 116 feet					
120		A-1-A, Gr, Rec. = 1.0 ft, (TILL)	30-32-32-35 (64)	8.9	65.8	18.9	15.3
130		A-1-B, SaGr, Rec. = 1.33 ft, (TILL)	52-48-40-27 (88)	12.6	60.5	26.3	13.2
140		(roller bit grinding), Rec. = 0.0 ft  Slow roller bit through gravel/cobbles	50/1" (50+)				
150		A-2-4, Sa, (TILL)	25-31-35-58 (66)	21.2	0.4	83.6	16.0
Hole stopped @ 152.0 ft							

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Notes:  
1. Stratification lines represent approximate boundary between material types. Transition may be gradual.  
2. N Values have not been corrected for hammer energy. C<sub>F</sub> is the hammer energy correction factor. C<sub>E</sub> is an estimated value.  
3. Water level readings have been made at times and under conditions stated.  
4. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.  
5. Ground surface elevations indicated on the boring logs were estimated based on the grading plan provided by VAOT.



# **APPENDIX B**

## **LABORATORY TEST RESULTS**

Vermont Agency of Transportation  
Materials and Research Section  
1 National Life Drive  
Montpelier, VT 05633-5001

Distribution list  
TERRACON  
T. ELIASSEN  
J. TOUCHETTE

Report on Soil Sample

Lab number: E140640      Corrected copy: N/A      Report Date: 4/30/2014 7:29:17 A  
Project: CALAIS      Number: BHF 037-2(11)      Site: VT-14 BR-82  
Date sampled: 4/15/2014    Received: 4/18/2014    Tested: 4/18/2014    Tested by: J. TOUCHETTE  
Station:      Offset:      Hole: B-1      Depth: 0 FT to: 2 FT  
Field description: Sa, Gr & Si  
Submitted by: TERRACON      Address:  
Sample type: SPLIT BARREL      Quantity:  
Sample source/Outside agency name:  
Location used:      Examined for: MC, GS  
Comment:

Test Results

Sieve Analysis	
T-88	% Passing
Total Sample	
75 mm (3.0"):	
37.5 mm (1.5"):	
19 mm (3/4"):	95.6%
9.5 mm (3/8"):	91.9%
4.75 mm (#4):	86.3%
2.00 mm (#10):	79.5%
850 µm (#20):	72.1%
425 µm (#40):	60.6%
250 µm (#60):	45.2%
150 µm (#100):	29.4%
75 µm (#200):	16.9%

Hydrometer Analysis	
Particles smaller	% total sample
0.05 mm:	
0.02 mm:	
0.005 mm:	
0.002 mm:	
0.001 mm:	

Limits	
T-265 Moisture content:	13.4%
T-89 Liquid Limit:	
T-90 Plastic Limit:	
T-90 Plasticity Index:	NP
Moisture Density	
Test method:	T-180      Method:
Maximum density:	pcf
Optimum moisture:	
T-100 Specific Gravity:	
Gr:	20.5%    D2487: SM
Sa:	62.6%    M145: A-2-4    Gravelly Sand
Si:	16.9%

Comments:

Reviewed by: T. Eliassen, P.G., Transportation Geologist *TE*

Vermont Agency of Transportation  
Materials and Research Section  
1 National Life Drive  
Montpelier, VT 05633-5001

Distribution list

Report on Soil Sample

Lab number: E140640

Corrected copy: N/A

Report Date: 4/30/2014 7:29:23 A

Project: CALAIS

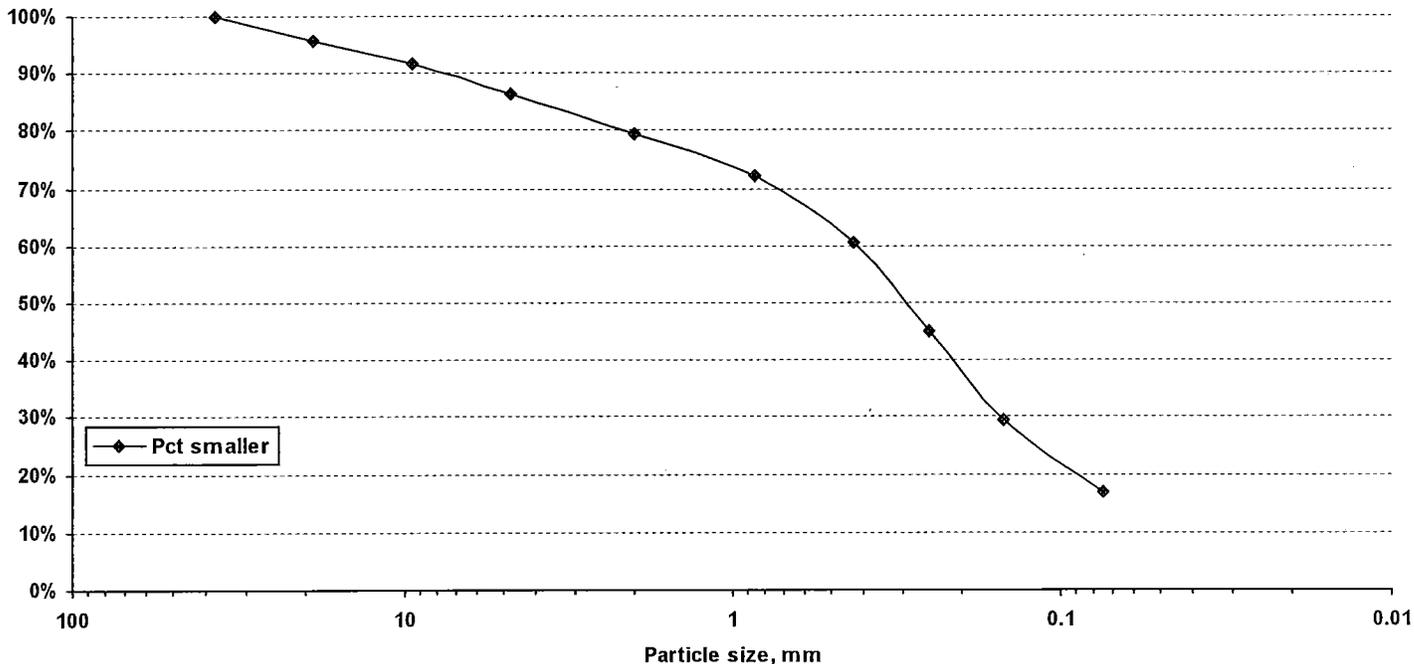
Number: BHF 037-2(11)

Site: VT-14 BR-82

Hole: B-1

Depth: 0 FT - 2 FT

T-88 Particle size analysis



Vermont Agency of Transportation  
Materials and Research Section  
1 National Life Drive  
Montpelier, VT 05633-5001

Distribution list  
TERRACON  
T. ELIASSEN  
J. TOUCHETTE

Report on Soil Sample

Lab number: E140641      Corrected copy: N/A      Report Date: 4/30/2014 7:31:25 A  
Project: CALAIS      Number: BHF 037-2(11)      Site: VT-14 BR-82  
Date sampled: 4/15/2014    Received: 4/18/2014    Tested: 4/18/2014    Tested by: J. TOUCHETTE  
Station:      Offset:      Hole: B-1      Depth: 2 FT to: 3 FT  
Field description: NONE  
Submitted by: TERRACON      Address:  
Sample type: SPLIT BARREL      Quantity:  
Sample source/Outside agency name:  
Location used:      Examined for: MC, GS  
Comment:

Test Results

Sieve Analysis		Limits	
T-88	% Passing		
Total Sample		T-265 Moisture content:	19.1%
75 mm (3.0"):		T-89 Liquid Limit:	
37.5 mm (1.5"):		T-90 Plastic Limit:	
19 mm (3/4"):	97.8%	T-90 Plasticity Index:	NP
9.5 mm (3/8"):	95.5%	Moisture Density	
4.75 mm (#4):	92.1%	Test method:	T-180      Method:
2.00 mm (#10):	85.9%	Maximum density:	pcf
850 µm (#20):	76.7%	Optimum moisture:	
425 µm (#40):	58.5%	T-100 Specific Gravity:	
250 µm (#60):	43.0%	Gr: 14.1%	D2487: SM
150 µm (#100):	37.2%	Sa: 59.9%	M145: A-2-4      Silty Sand
75 µm (#200):	26.0%	Si: 26.0%	
Hydrometer Analysis			
Particles smaller	% total sample		
0.05 mm:			
0.02 mm:			
0.005 mm:			
0.002 mm:			
0.001 mm:			

Comments:

Reviewed by: T. Eliassen, P.G., Transportation Geologist *TE*

Vermont Agency of Transportation  
Materials and Research Section  
1 National Life Drive  
Montpelier, VT 05633-5001

Distribution list

Report on Soil Sample

Lab number: E140641

Corrected copy: N/A

Report Date: 4/30/2014 7:31:29 A

Project: CALAIS

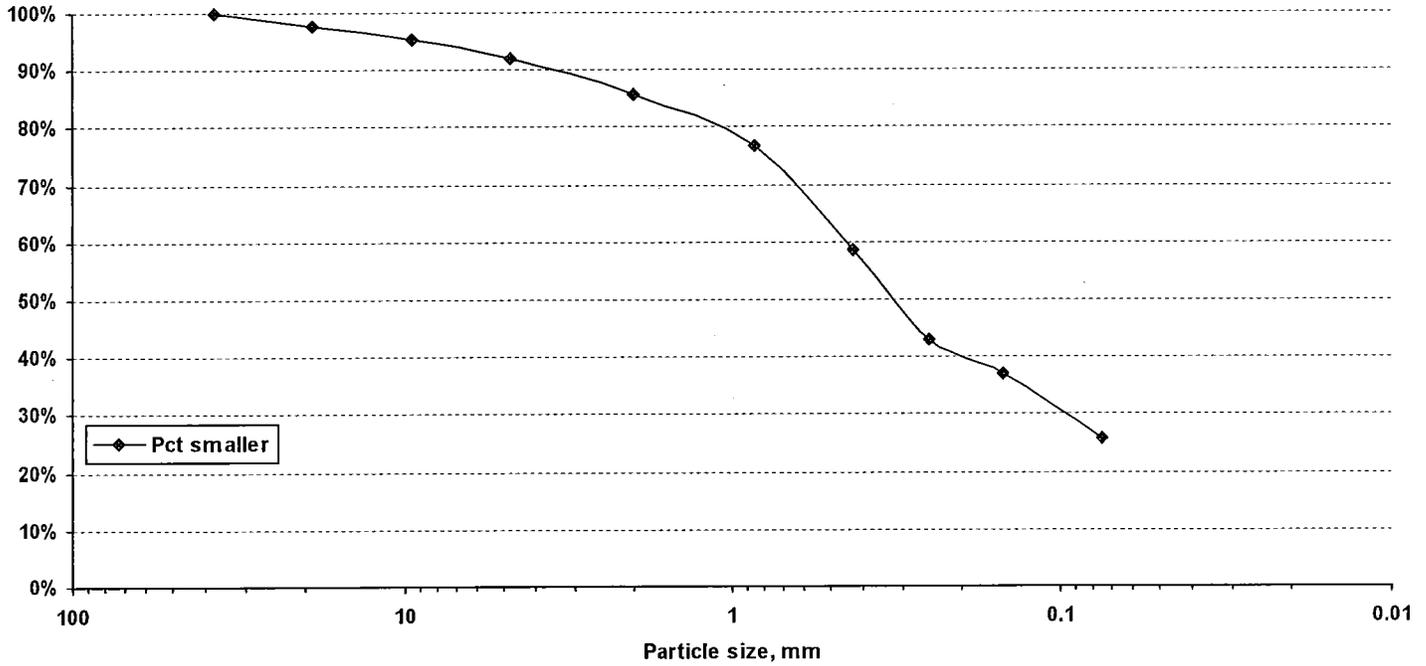
Number: BHF 037-2(11)

Site: VT-14 BR-82

Hole: B-1

Depth: 2 FT - 3 FT

T-88 Particle size analysis



Vermont Agency of Transportation  
Materials and Research Section  
1 National Life Drive  
Montpelier, VT 05633-5001

Distribution list  
TERRACON  
T. ELIASSEN  
J. TOUCHETTE

Report on Soil Sample

Lab number: E140642      Corrected copy: N/A      Report Date: 4/30/2014 7:33:07 A  
Project: CALAIS      Number: BHF 037-2(11)      Site: VT-14 BR-82  
Date sampled: 4/15/2014    Received: 4/18/2014    Tested: 4/18/2014    Tested by: J. TOUCHETTE  
Station:      Offset:      Hole: B-1      Depth: 5 FT to: 7 FT  
Field description: SAND  
Submitted by: TERRACON      Address:  
Sample type: SPLIT BARREL      Quantity:  
Sample source/Outside agency name:  
Location used:      Examined for: MC, GS  
Comment:

Test Results

Sieve Analysis	
T-88	% Passing
Total Sample	
75 mm (3.0"):	
37.5 mm (1.5"):	
19 mm (3/4"):	
9.5 mm (3/8"):	
4.75 mm (#4):	99.5%
2.00 mm (#10):	98.8%
850 µm (#20):	93.3%
425 µm (#40):	56.2%
250 µm (#60):	19.9%
150 µm (#100):	12.2%
75 µm (#200):	8.3%

Hydrometer Analysis	
Particles smaller	% total sample
0.05 mm:	
0.02 mm:	
0.005 mm:	
0.002 mm:	
0.001 mm:	

Limits	
T-265 Moisture content:	8.5%
T-89 Liquid Limit:	
T-90 Plastic Limit:	
T-90 Plasticity Index:	NP
Moisture Density	
Test method:	T-180      Method:
Maximum density:	pcf
Optimum moisture:	
T-100 Specific Gravity:	
Gr: 1.2%	D2487: SP-SM
Sa: 90.6%	M145: A-3      Sand
Si: 8.3%	

Comments:

Reviewed by: T. Eliassen, P.G., Transportation Geologist



Vermont Agency of Transportation  
Materials and Research Section  
1 National Life Drive  
Montpelier, VT 05633-5001

Distribution list

Report on Soil Sample

Lab number: E140642

Corrected copy: N/A

Report Date: 4/30/2014 7:33:13 A

Project: CALAIS

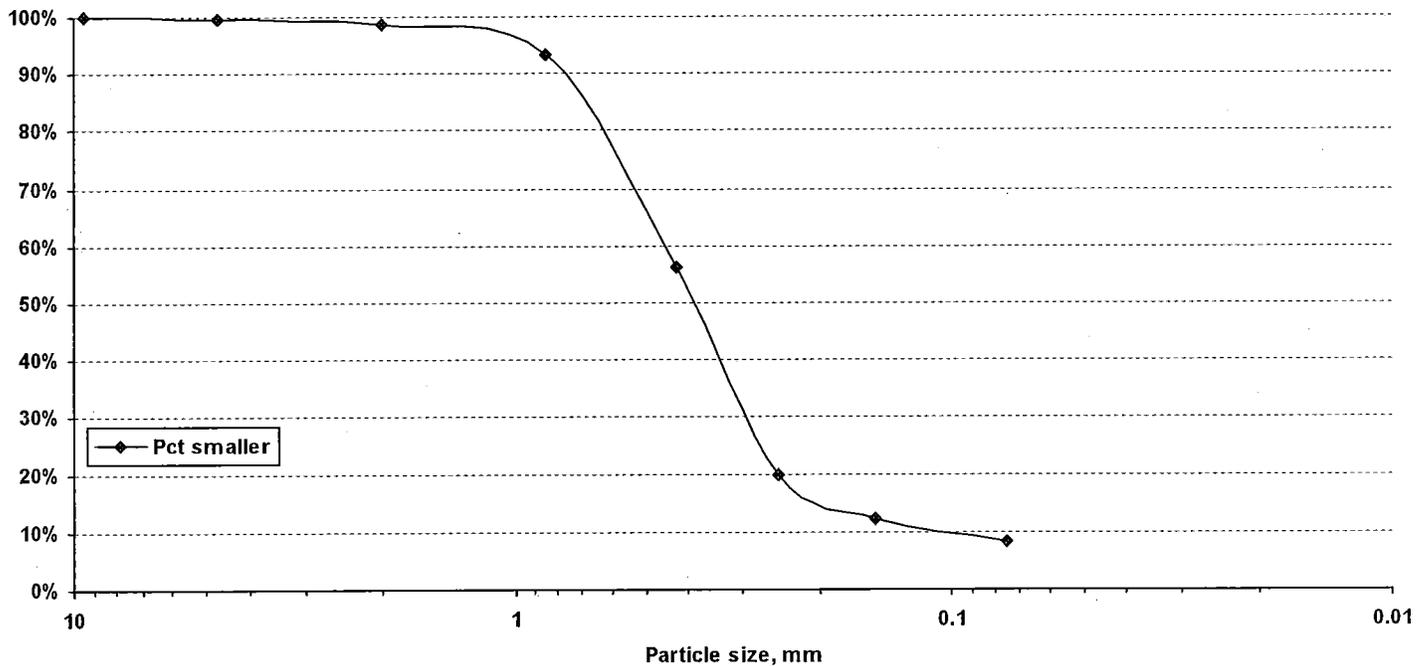
Number: BHF 037-2(11)

Site: VT-14 BR-82

Hole: B-1

Depth: 5 FT - 7 FT

T-88 Particle size analysis



Vermont Agency of Transportation  
Materials and Research Section  
1 National Life Drive  
Montpelier, VT 05633-5001

Distribution list  
TERRACON  
T. ELIASSEN  
J. TOUCHETTE

Report on Soil Sample

Lab number: E140643      Corrected copy: N/A      Report Date: 4/30/2014 7:35:01 A  
Project: CALAIS      Number: BHF 037-2(11)      Site: VT-14 BR-82  
Date sampled: 4/15/2014    Received: 4/18/2014    Tested: 4/18/2014    Tested by: J. TOUCHETTE  
Station:      Offset:      Hole: B-1      Depth: 7 FT to: 9 FT  
Field description: SAND  
Submitted by: TERRACON      Address:  
Sample type: SPLIT BARREL      Quantity:  
Sample source/Outside agency name:  
Location used:      Examined for: MC, GS  
Comment:

Test Results

T-88	Sieve Analysis
	% Passing
	Total Sample
75 mm (3.0"):	
37.5 mm (1.5"):	
19 mm (3/4"):	
9.5 mm (3/8"):	98.8%
4.75 mm (#4):	95.4%
2.00 mm (#10):	85.7%
850 µm (#20):	57.2%
425 µm (#40):	34.6%
250 µm (#60):	27.1%
150 µm (#100):	23.1%
75 µm (#200):	17.4%

Hydrometer Analysis	
Particles smaller	% total sample
0.05 mm:	
0.02 mm:	
0.005 mm:	
0.002 mm:	
0.001 mm:	

Limits	
T-265 Moisture content:	17.8%
T-89 Liquid Limit:	
T-90 Plastic Limit:	
T-90 Plasticity Index:	NP
Moisture Density	
Test method:	T-180      Method:
Maximum density:	pcf
Optimum moisture:	
T-100 Specific Gravity:	
Gr:	14.3%    D2487: SM
Sa:	68.3%    M145: A-1-b    Sand
Si:	17.4%

Comments:

Reviewed by: T. Eliassen, P.G., Transportation Geologist *TE*

Vermont Agency of Transportation  
Materials and Research Section  
1 National Life Drive  
Montpelier, VT 05633-5001

Distribution list

Report on Soil Sample

Lab number: E140643

Corrected copy: N/A

Report Date: 4/30/2014 7:35:04 A

Project: CALAIS

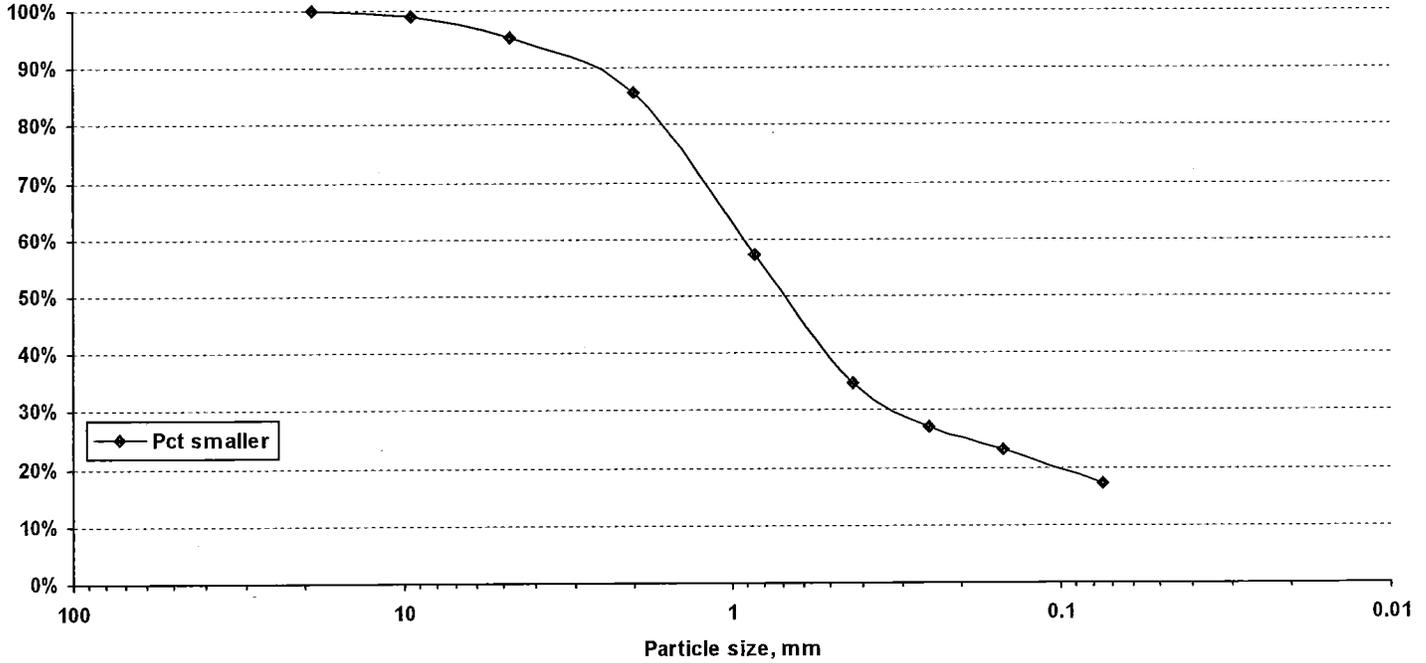
Number: BHF 037-2(11)

Site: VT-14 BR-82

Hole: B-1

Depth: 7 FT - 9 FT

T-88 Particle size analysis



Vermont Agency of Transportation  
Materials and Research Section  
1 National Life Drive  
Montpelier, VT 05633-5001

Distribution list  
TERRACON  
T. ELIASSEN  
J. TOUCHETTE

Report on Soil Sample

Lab number: E140644      Corrected copy: N/A      Report Date: 4/30/2014 7:37:42 A  
Project: CALAIS      Number: BHF 037-2(11)      Site: VT-14 BR-82  
Date sampled: 4/15/2014    Received: 4/18/2014    Tested: 4/18/2014    Tested by: J. TOUCHETTE  
Station:      Offset:      Hole: B-1      Depth: 10 FT to: 12 FT  
Field description: Si Sa w/Gr  
Submitted by: TERRACON      Address:  
Sample type: SPLIT BARREL      Quantity:  
Sample source/Outside agency name:  
Location used:      Examined for: MC, GS  
Comment:

Test Results

Sieve Analysis	
T-88	% Passing
Total Sample	
75 mm (3.0"):	
37.5 mm (1.5"):	
19 mm (3/4"):	
9.5 mm (3/8"):	89.8%
4.75 mm (#4):	76.8%
2.00 mm (#10):	62.0%
850 µm (#20):	48.7%
425 µm (#40):	39.1%
250 µm (#60):	33.7%
150 µm (#100):	29.8%
75 µm (#200):	21.9%

Hydrometer Analysis	
Particles smaller	% total sample
0.05 mm:	
0.02 mm:	
0.005 mm:	
0.002 mm:	
0.001 mm:	

Limits  
T-265 Moisture content: 16.3%  
T-89 Liquid Limit:  
T-90 Plastic Limit:  
T-90 Plasticity Index: NP  
Moisture Density  
Test method: T-180      Method:  
Maximum density:      pcf  
Optimum moisture:  
T-100 Specific Gravity:  
Gr: 38.0%    D2487: SM  
Sa: 40.1%    M145: A-1-b    Silty Gravelly Sand  
Si: 21.9%

Comments:

Reviewed by: T. Eliassen, P.G., Transportation Geologist *TE*

Vermont Agency of Transportation  
Materials and Research Section  
1 National Life Drive  
Montpelier, VT 05633-5001

Distribution list

Report on Soil Sample

Lab number: E140644

Corrected copy: N/A

Report Date: 4/30/2014 7:37:45 A

Project: CALAIS

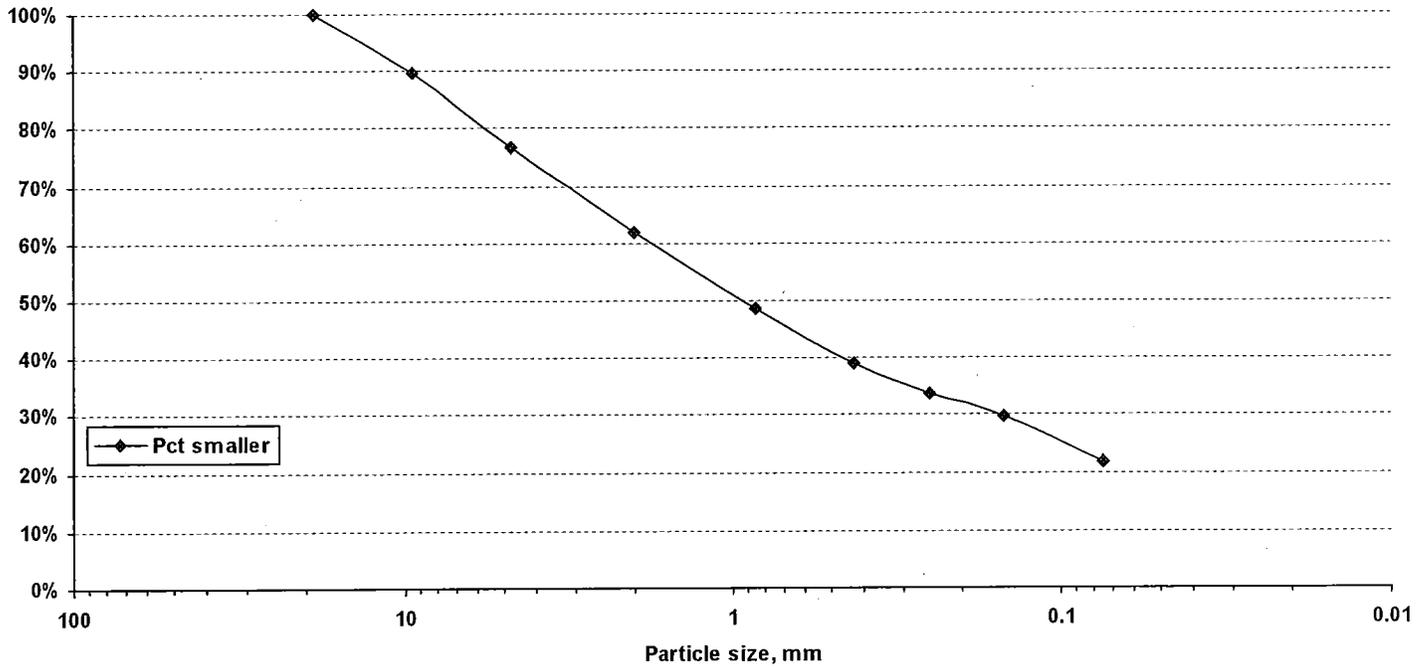
Number: BHF 037-2(11)

Site: VT-14 BR-82

Hole: B-1

Depth: 10 FT - 12 FT

T-88 Particle size analysis



Vermont Agency of Transportation  
Materials and Research Section  
1 National Life Drive  
Montpelier, VT 05633-5001

Distribution list  
TERRACON  
T. ELIASSEN  
J. TOUCHETTE

Report on Soil Sample

Lab number: E140645      Corrected copy: N/A      Report Date: 4/30/2014 7:39:59 A  
Project: CALAIS      Number: BHF 037-2(11)      Site: VT-14 BR-82  
Date sampled: 4/15/2014    Received: 4/18/2014    Tested: 4/18/2014    Tested by: J. TOUCHETTE  
Station:      Offset:      Hole: B-1      Depth: 15 FT to: 17 FT  
Field description: Si Sa w/Gr  
Submitted by: TERRACON      Address:  
Sample type: SPLIT BARREL      Quantity:  
Sample source/Outside agency name:  
Location used:      Examined for: MC, GS  
Comment:

Test Results

Sieve Analysis	
T-88	% Passing
Total Sample	
75 mm (3.0"):	
37.5 mm (1.5"):	
19 mm (3/4"):	97.9%
9.5 mm (3/8"):	94.5%
4.75 mm (#4):	87.6%
2.00 mm (#10):	77.7%
850 µm (#20):	58.8%
425 µm (#40):	38.4%
250 µm (#60):	27.9%
150 µm (#100):	23.2%
75 µm (#200):	17.3%

Hydrometer Analysis	
Particles smaller	% total sample
0.05 mm:	
0.02 mm:	
0.005 mm:	
0.002 mm:	
0.001 mm:	

Limits	
T-265 Moisture content:	13.7%
T-89 Liquid Limit:	
T-90 Plastic Limit:	
T-90 Plasticity Index:	NP
Moisture Density	
Test method:	T-180      Method:
Maximum density:	pcf
Optimum moisture:	
T-100 Specific Gravity:	
Gr: 22.3%	D2487: SM
Sa: 60.4%	M145: A-1-b      Gravelly Sand
Si: 17.3%	

Comments: LAB NOTE: DAMAGED SAMPLE BAG (SMALL HOLE)

Reviewed by: T. Eliassen, P.G., Transportation Geologist *TE*

Vermont Agency of Transportation  
Materials and Research Section  
1 National Life Drive  
Montpelier, VT 05633-5001

Distribution list

Report on Soil Sample

Lab number: E140645

Corrected copy: N/A

Report Date: 4/30/2014 7:40:02 A

Project: CALAIS

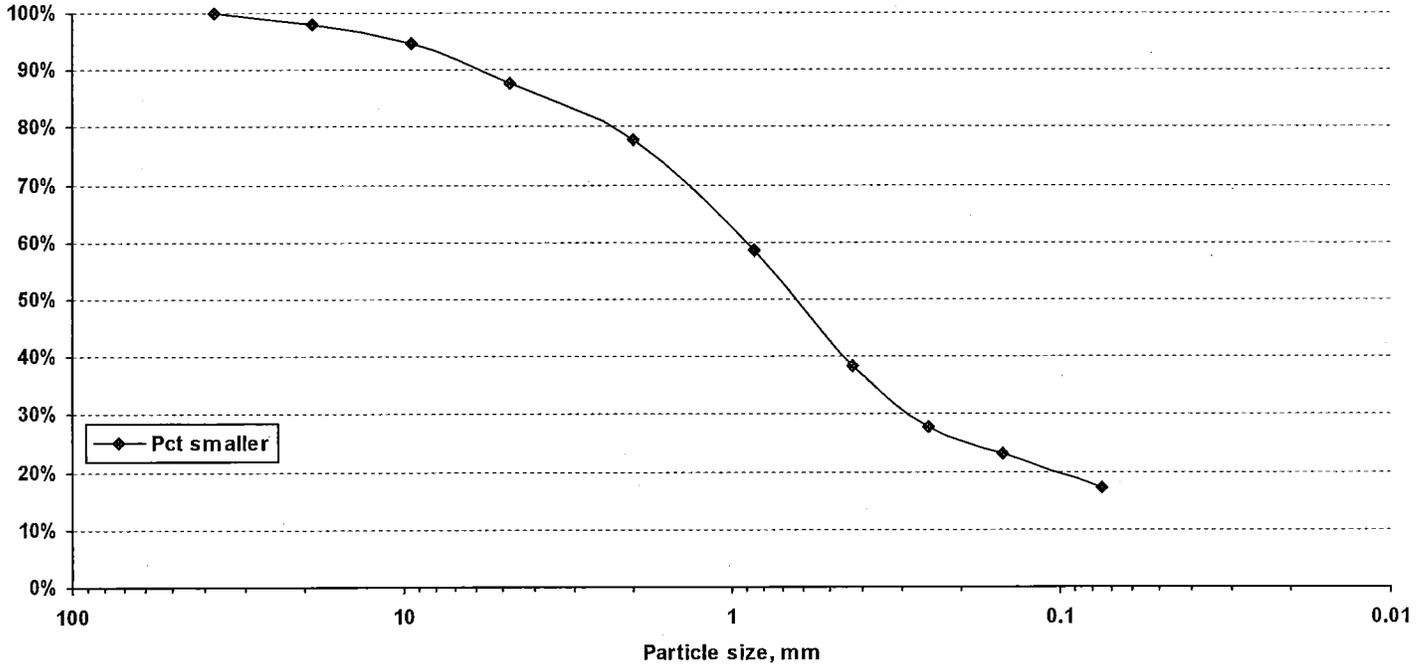
Number: BHF 037-2(11)

Site: VT-14 BR-82

Hole: B-1

Depth: 15 FT - 17 FT

T-88 Particle size analysis



Vermont Agency of Transportation  
Materials and Research Section  
1 National Life Drive  
Montpelier, VT 05633-5001

Distribution list  
TERRACON  
T. ELIASSEN  
J. TOUCHETTE

Report on Soil Sample

Lab number: E140646      Corrected copy: N/A      Report Date: 4/30/2014 7:41:42 A  
Project: CALAIS      Number: BHF 037-2(11)      Site: VT-14 BR-82  
Date sampled: 4/16/2014    Received: 4/18/2014    Tested: 4/18/2014    Tested by: J. TOUCHETTE  
Station:      Offset:      Hole: B-1      Depth: 20 FT to: 22 FT  
Field description: Si Sa w/Gr  
Submitted by: TERRACON      Address:  
Sample type: SPLIT BARREL      Quantity:  
Sample source/Outside agency name:  
Location used:      Examined for: MC, GS  
Comment:

Test Results

Sieve Analysis	
T-88	% Passing
Total Sample	
75 mm (3.0"):	
37.5 mm (1.5"):	
19 mm (3/4"):	91.5%
9.5 mm (3/8"):	84.5%
4.75 mm (#4):	71.1%
2.00 mm (#10):	61.4%
850 µm (#20):	49.6%
425 µm (#40):	39.7%
250 µm (#60):	33.6%
150 µm (#100):	29.5%
75 µm (#200):	22.8%

Hydrometer Analysis	
Particles smaller	% total sample
0.05 mm:	
0.02 mm:	
0.005 mm:	
0.002 mm:	
0.001 mm:	

Limits	
T-265 Moisture content:	14.4%
T-89 Liquid Limit:	
T-90 Plastic Limit:	
T-90 Plasticity Index:	NP
Moisture Density	
Test method:	T-180      Method:
Maximum density:	pcf
Optimum moisture:	
T-100 Specific Gravity:	
Gr: 38.6%	D2487: SM
Sa: 38.6%	M145: A-1-b      Silty Gravelly Sand
Si: 22.8%	

Comments:

Reviewed by: T. Eliassen, P.G., Transportation Geologist *TE*

Vermont Agency of Transportation  
Materials and Research Section  
1 National Life Drive  
Montpelier, VT 05633-5001

Distribution list

Report on Soil Sample

Lab number: E140646

Corrected copy: N/A

Report Date: 4/30/2014 7:41:47 A

Project: CALAIS

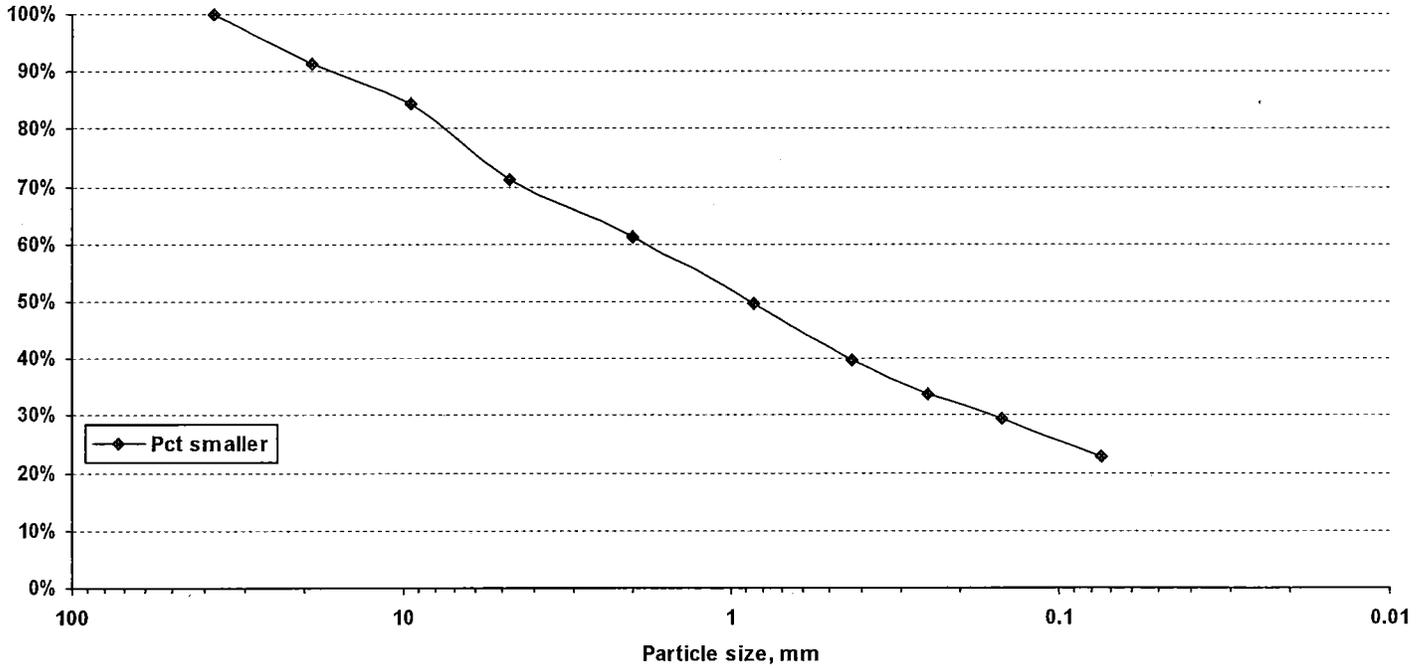
Number: BHF 037-2(11)

Site: VT-14 BR-82

Hole: B-1

Depth: 20 FT - 22 FT

T-88 Particle size analysis



Vermont Agency of Transportation  
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Distribution list  
TERRACON  
T. ELIASSEN  
J. TOUCHETTE

Report on Soil Sample

Lab number: E140647      Corrected copy: N/A      Report Date: 4/30/2014 7:43:32 A  
Project: CALAIS      Number: BHF 037-2(11)      Site: VT-14 BR-82  
Date sampled: 4/16/2014    Received: 4/18/2014    Tested: 4/18/2014    Tested by: J. TOUCHETTE  
Station:      Offset:      Hole: B-1      Depth: 24 FT to: 26 FT  
Field description: Si Sa w/Gr  
Submitted by: TERRACON      Address:  
Sample type: SPLIT BARREL      Quantity:  
Sample source/Outside agency name:  
Location used:      Examined for: MC, GS  
Comment:

Test Results

Sieve Analysis	
T-88	% Passing
Total Sample	
75 mm (3.0"):	
37.5 mm (1.5"):	
19 mm (3/4"):	77.1%
9.5 mm (3/8"):	65.9%
4.75 mm (#4):	57.9%
2.00 mm (#10):	49.6%
850 µm (#20):	43.3%
425 µm (#40):	36.7%
250 µm (#60):	31.9%
150 µm (#100):	28.3%
75 µm (#200):	20.6%

Hydrometer Analysis	
Particles smaller	% total sample
0.05 mm:	
0.02 mm:	
0.005 mm:	
0.002 mm:	
0.001 mm:	

Limits	
T-265 Moisture content:	12.3%
T-89 Liquid Limit:	
T-90 Plastic Limit:	
T-90 Plasticity Index:	NP
Moisture Density	
Test method:	T-180      Method:
Maximum density:	pcf
Optimum moisture:	
T-100 Specific Gravity:	
Gr: 50.4%	D2487: GM
Sa: 29.0%	M145: A-1-b      Silty Sandy Gravel
Si: 20.6%	

Comments:

Reviewed by: T. Eliassen, P.G., Transportation Geologist *TE*

Vermont Agency of Transportation  
Materials and Research Section  
1 National Life Drive  
Montpelier, VT 05633-5001

Distribution list

Report on Soil Sample

Lab number: E140647

Corrected copy: N/A

Report Date: 4/30/2014 7:43:37 A

Project: CALAIS

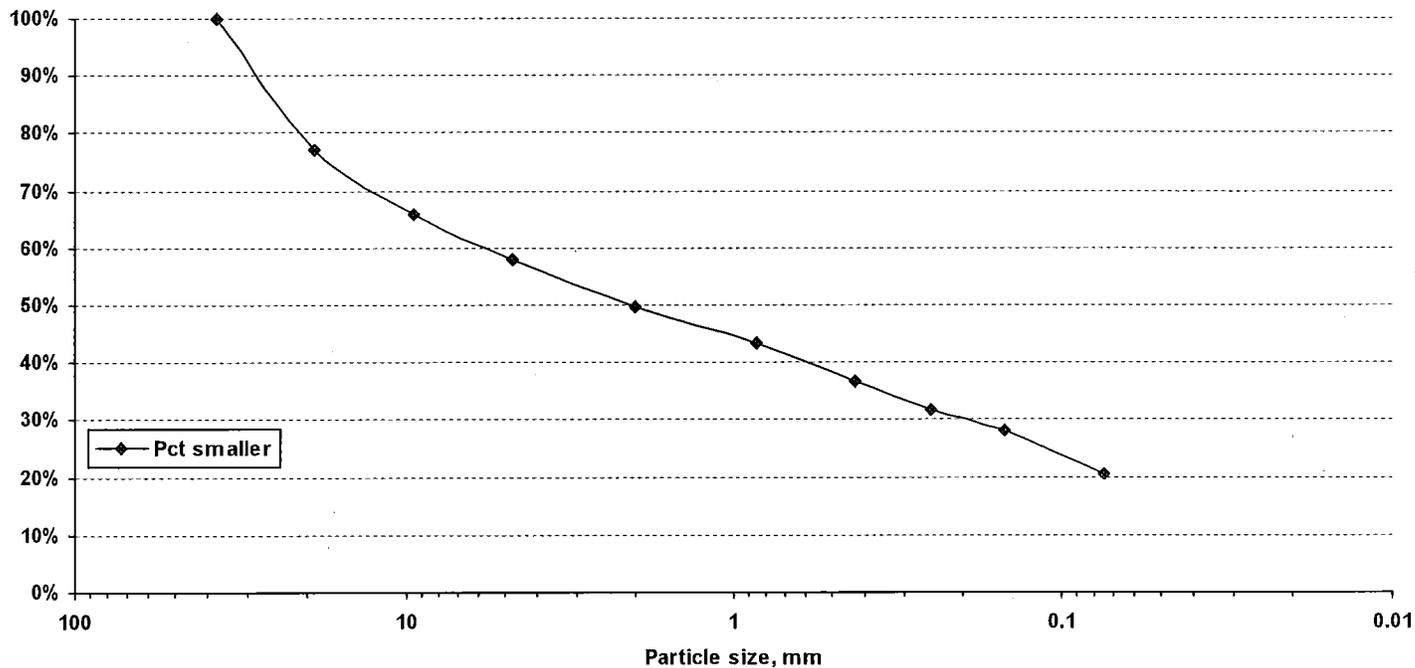
Number: BHF 037-2(11)

Site: VT-14 BR-82

Hole: B-1

Depth: 24 FT - 26 FT

T-88 Particle size analysis



Vermont Agency of Transportation  
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Distribution list  
TERRACON  
T. ELIASSEN  
J. TOUCHETTE

Report on Soil Sample

Lab number: E140648      Corrected copy: N/A      Report Date: 4/30/2014 7:45:16 A  
Project: CALAIS      Number: BHF 037-2(11)      Site: VT-14 BR-82  
Date sampled: 4/16/2014      Received: 4/18/2014      Tested: 4/18/2014      Tested by: J. TOUCHETTE  
Station:      Offset:      Hole: B-1      Depth: 29 FT to: 31 FT  
Field description: SAND  
Submitted by: TERRACON      Address:  
Sample type: SPLIT BARREL      Quantity:  
Sample source/Outside agency name:  
Location used:      Examined for: MC, GS  
Comment:

Test Results

Sieve Analysis	
T-88	% Passing
Total Sample	
75 mm (3.0"):	
37.5 mm (1.5"):	
19 mm (3/4"):	
9.5 mm (3/8"):	99.8%
4.75 mm (#4):	98.7%
2.00 mm (#10):	92.0%
850 µm (#20):	58.5%
425 µm (#40):	33.7%
250 µm (#60):	24.2%
150 µm (#100):	19.7%
75 µm (#200):	14.5%

Hydrometer Analysis	
Particles smaller	% total sample
0.05 mm:	
0.02 mm:	
0.005 mm:	
0.002 mm:	
0.001 mm:	

Limits	
T-265 Moisture content:	20.7%
T-89 Liquid Limit:	
T-90 Plastic Limit:	
T-90 Plasticity Index:	NP
Moisture Density	
Test method:	T-180      Method:
Maximum density:	pcf
Optimum moisture:	
T-100 Specific Gravity:	
Gr:	8.0%      D2487: SM
Sa:	77.5%      M145: A-1-b      Sand
Si:	14.5%

Comments:

Reviewed by: T. Eliassen, P.G., Transportation Geologist *TE*

Vermont Agency of Transportation  
Materials and Research Section  
1 National Life Drive  
Montpelier, VT 05633-5001

Distribution list

Report on Soil Sample

Lab number: E140648

Corrected copy: N/A

Report Date: 4/30/2014 7:45:19 A

Project: CALAIS

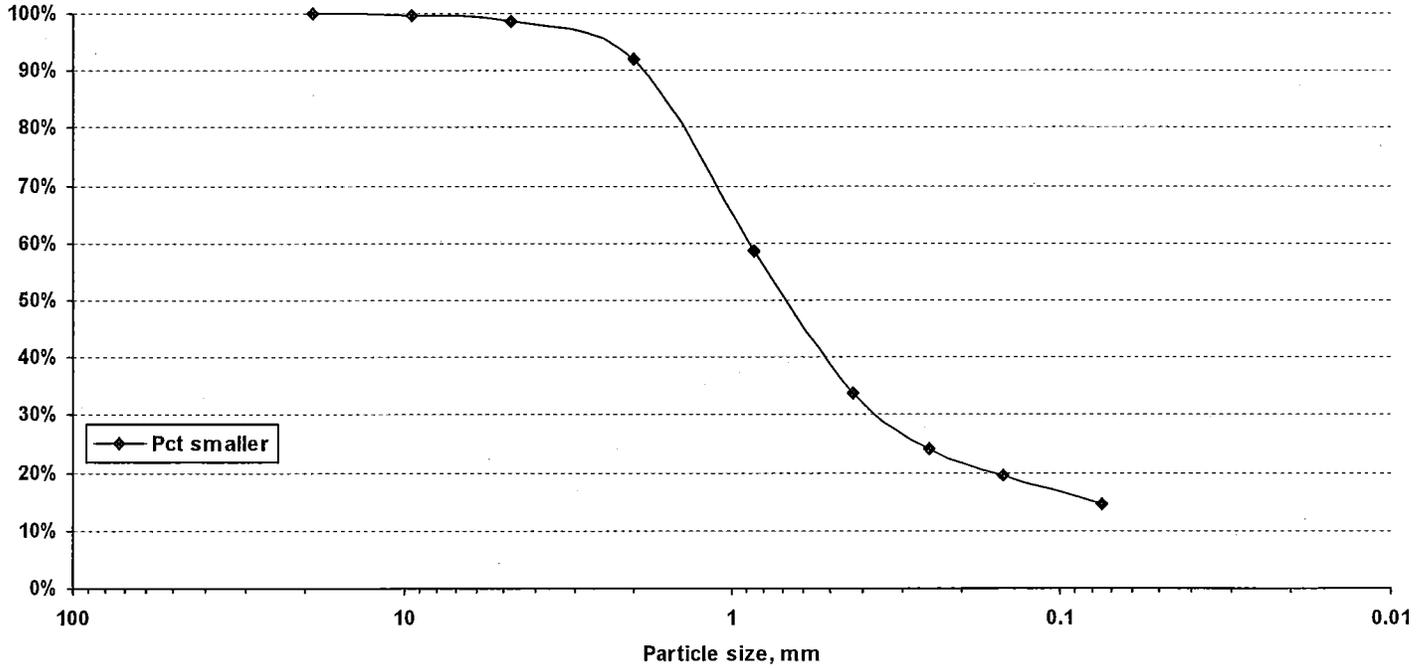
Number: BHF 037-2(11)

Site: VT-14 BR-82

Hole: B-1

Depth: 29 FT - 31 FT

T-88 Particle size analysis



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Distribution list  
TERRACON  
T. ELIASSEN  
J. TOUCHETTE

Report on Soil Sample

Lab number: E140649      Corrected copy: N/A      Report Date: 4/30/2014 7:47:19 A  
Project: CALAIS      Number: BHF 037-2(11)      Site: VT-14 BR-82  
Date sampled: 4/16/2014    Received: 4/18/2014    Tested: 4/18/2014    Tested by: J. TOUCHETTE  
Station:      Offset:      Hole: B-1      Depth: 34 FT to: 36 FT  
Field description: SAND  
Submitted by: TERRACON      Address:  
Sample type: SPLIT BARREL      Quantity:  
Sample source/Outside agency name:  
Location used:      Examined for: MC, GS  
Comment:

Test Results

**Sieve Analysis**  
T-88      % Passing  
Total Sample  
75 mm (3.0"):        
37.5 mm (1.5"):        
19 mm (3/4"):        
9.5 mm (3/8"):        
4.75 mm (#4):      99.8%  
2.00 mm (#10):      96.1%  
850 µm (#20):      66.1%  
425 µm (#40):      40.3%  
250 µm (#60):      31.2%  
150 µm (#100):      26.2%  
75 µm (#200):      20.3%

**Hydrometer Analysis**  
Particles smaller % total sample  
0.05 mm:  
0.02 mm:  
0.005 mm:  
0.002 mm:  
0.001 mm:

**Limits**  
T-265 Moisture content: 19.1%  
T-89 Liquid Limit:  
T-90 Plastic Limit:  
T-90 Plasticity Index: NP  
**Moisture Density**  
Test method: T-180      Method:  
Maximum density:      pcf  
Optimum moisture:  
T-100 Specific Gravity:  
Gr: 3.9%    D2487: SM  
Sa: 75.8%    M145: A-1-b    Silty Sand  
Si: 20.3%

Comments:

Reviewed by: T. Eliassen, P.G., Transportation Geologist *TE*

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Materials and Research Section  
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Distribution list

Report on Soil Sample

Lab number: E140649

Corrected copy: N/A

Report Date: 4/30/2014 7:47:23 A

Project: CALAIS

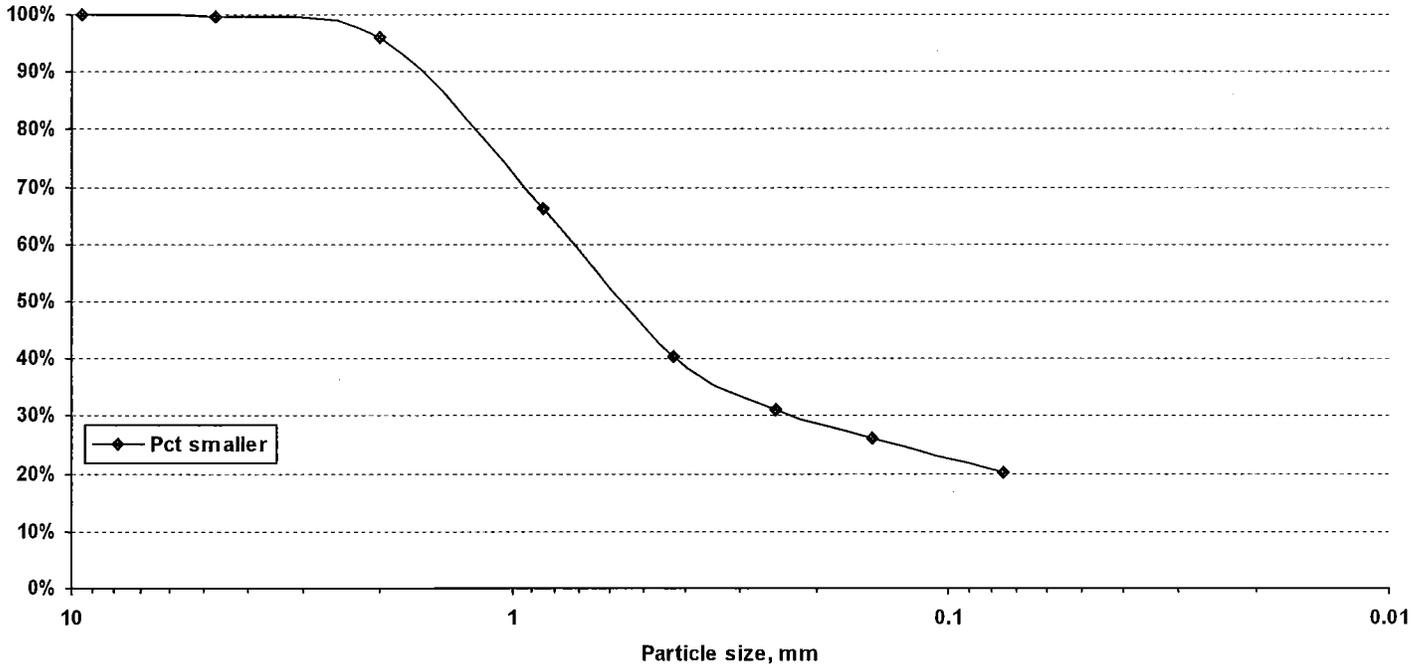
Number: BHF 037-2(11)

Site: VT-14 BR-82

Hole: B-1

Depth: 34 FT - 36 FT

T-88 Particle size analysis



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Distribution list  
TERRACON  
T. ELIASSEN  
J. TOUCHETTE

Report on Soil Sample

Lab number: E140650      Corrected copy: N/A      Report Date: 4/30/2014 7:49:12 A  
Project: CALAIS      Number: BHF 037-2(11)      Site: VT-14 BR-82  
Date sampled: 4/16/2014    Received: 4/18/2014    Tested: 4/18/2014    Tested by: J. TOUCHETTE  
Station:      Offset:      Hole: B-1      Depth: 39 FT to: 41 FT  
Field description: Sa w/Gr  
Submitted by: TERRACON      Address:  
Sample type: SPLIT BARREL      Quantity:  
Sample source/Outside agency name:  
Location used:      Examined for: MC, GS  
Comment:

Test Results

T-88	Sieve Analysis
	% Passing
	Total Sample
75 mm (3.0"):	
37.5 mm (1.5"):	
19 mm (3/4"):	97.3%
9.5 mm (3/8"):	93.0%
4.75 mm (#4):	85.4%
2.00 mm (#10):	74.2%
850 µm (#20):	61.9%
425 µm (#40):	42.4%
250 µm (#60):	28.9%
150 µm (#100):	21.7%
75 µm (#200):	15.9%

Hydrometer Analysis	
Particles smaller	% total sample
0.05 mm:	
0.02 mm:	
0.005 mm:	
0.002 mm:	
0.001 mm:	

Limits	
T-265 Moisture content:	14.8%
T-89 Liquid Limit:	
T-90 Plastic Limit:	
T-90 Plasticity Index:	NP
Moisture Density	
Test method:	T-180      Method:
Maximum density:	pcf
Optimum moisture:	
T-100 Specific Gravity:	
Gr: 25.8%	D2487: SM
Sa: 58.3%	M145: A-1-b      Gravelly Sand
Si: 15.9%	

Comments:

Reviewed by: T. Eliassen, P.G., Transportation Geologist 

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Distribution list

Report on Soil Sample

Lab number: E140650

Corrected copy: N/A

Report Date: 4/30/2014 7:49:16 A

Project: CALAIS

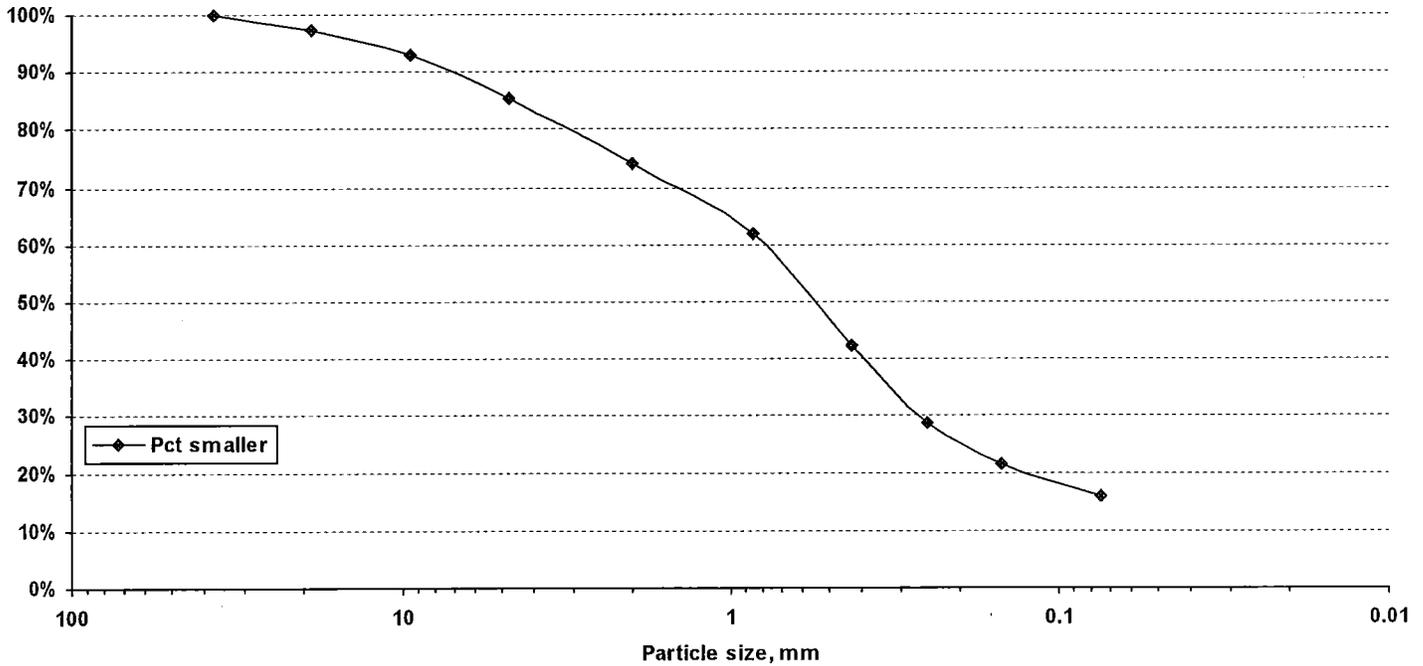
Number: BHF 037-2(11)

Site: VT-14 BR-82

Hole: B-1

Depth: 39 FT - 41 FT

T-88 Particle size analysis



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Distribution list  
TERRACON  
T. ELIASSEN  
J. TOUCHETTE

Report on Soil Sample

Lab number: E140651      Corrected copy: N/A      Report Date: 4/30/2014 7:51:34 A  
Project: CALAIS      Number: BHF 037-2(11)      Site: VT-14 BR-82  
Date sampled: 4/16/2014    Received: 4/18/2014    Tested: 4/18/2014    Tested by: J. TOUCHETTE  
Station:      Offset:      Hole: B-1      Depth: 44 FT to: 46 FT  
Field description: Sa w/Gr  
Submitted by: TERRACON      Address:  
Sample type: SPLIT BARREL      Quantity:  
Sample source/Outside agency name:  
Location used:      Examined for: MC, GS  
Comment:

Test Results

T-88	Sieve Analysis
	% Passing
	Total Sample
75 mm (3.0"):	
37.5 mm (1.5"):	
19 mm (3/4"):	95.1%
9.5 mm (3/8"):	86.2%
4.75 mm (#4):	74.0%
2.00 mm (#10):	63.1%
850 µm (#20):	49.4%
425 µm (#40):	36.3%
250 µm (#60):	31.0%
150 µm (#100):	27.8%
75 µm (#200):	22.2%

Hydrometer Analysis	
Particles smaller	% total sample
0.05 mm:	
0.02 mm:	
0.005 mm:	
0.002 mm:	
0.001 mm:	

Limits	
T-265 Moisture content:	14.5%
T-89 Liquid Limit:	
T-90 Plastic Limit:	
T-90 Plasticity Index:	NP
Moisture Density	
Test method:	T-180      Method:
Maximum density:	pcf
Optimum moisture:	
T-100 Specific Gravity:	
Gr: 36.9%	D2487: SM
Sa: 40.9%	M145: A-1-b      Silty Gravelly Sand
Si: 22.2%	

Comments:

Reviewed by: T. Eliassen, P.G., Transportation Geologist *TE*

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Materials and Research Section  
1 National Life Drive  
Montpelier, VT 05633-5001

Distribution list

Report on Soil Sample

Lab number: E140651

Corrected copy: N/A

Report Date: 4/30/2014 7:51:38 A

Project: CALAIS

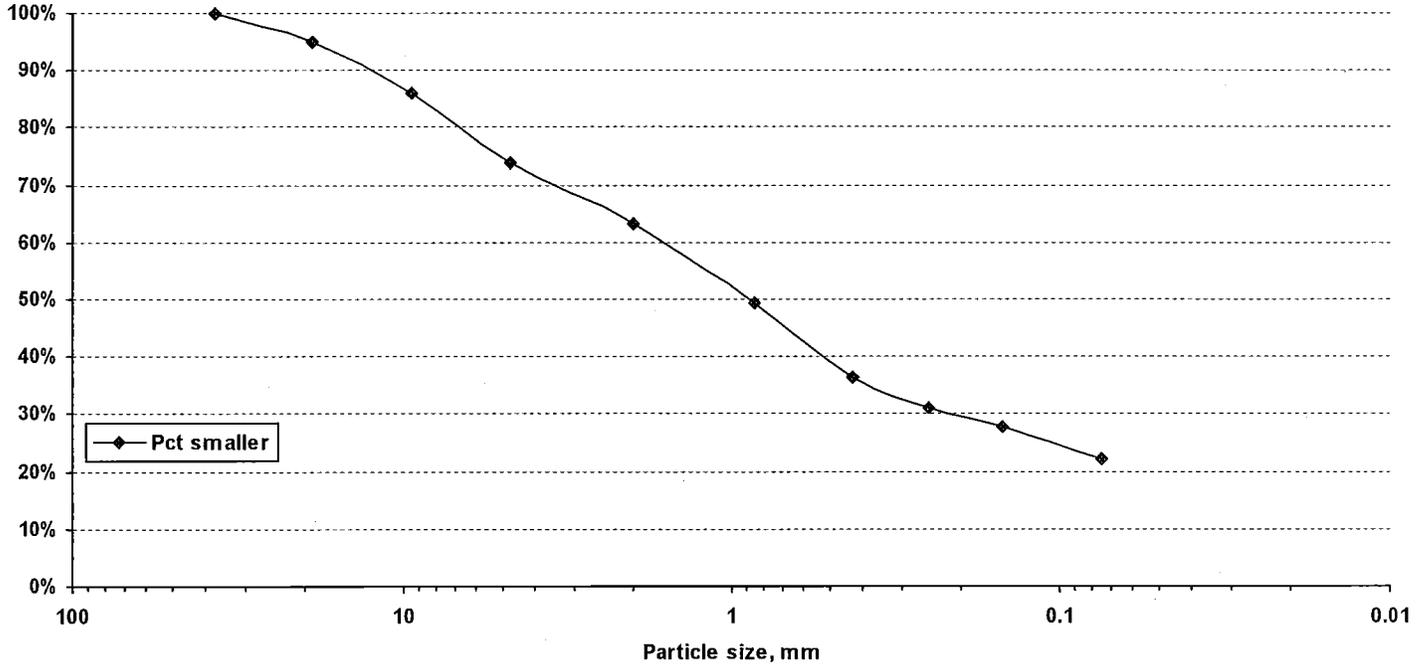
Number: BHF 037-2(11)

Site: VT-14 BR-82

Hole: B-1

Depth: 44 FT - 46 FT

T-88 Particle size analysis



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Distribution list  
TERRACON  
T. ELIASSEN  
J. TOUCHETTE

Report on Soil Sample

Lab number: E140652      Corrected copy: N/A      Report Date: 4/30/2014 7:53:48 A  
Project: CALAIS      Number: BHF 037-2(11)      Site: VT-14 BR-82  
Date sampled: 4/16/2014    Received: 4/18/2014    Tested: 4/18/2014    Tested by: J. TOUCHETTE  
Station:      Offset:      Hole: B-1      Depth: 49 FT to: 51 FT  
Field description: Si Sa w/Gr  
Submitted by: TERRACON      Address:  
Sample type: SPLIT BARREL      Quantity:  
Sample source/Outside agency name:  
Location used:      Examined for: MC, GS  
Comment:

Test Results

Sieve Analysis	
T-88	% Passing
Total Sample	
75 mm (3.0"):	
37.5 mm (1.5"):	
19 mm (3/4"):	91.8%
9.5 mm (3/8"):	78.2%
4.75 mm (#4):	68.2%
2.00 mm (#10):	60.5%
850 µm (#20):	51.2%
425 µm (#40):	38.8%
250 µm (#60):	30.8%
150 µm (#100):	26.4%
75 µm (#200):	20.6%

Hydrometer Analysis	
Particles smaller	% total sample
0.05 mm:	
0.02 mm:	
0.005 mm:	
0.002 mm:	
0.001 mm:	

Limits	
T-265 Moisture content:	13.9%
T-89 Liquid Limit:	
T-90 Plastic Limit:	
T-90 Plasticity Index:	NP
Moisture Density	
Test method:	T-180      Method:
Maximum density:	pcf
Optimum moisture:	
T-100 Specific Gravity:	
Gr: 39.5%	D2487: SM
Sa: 39.9%	M145: A-1-b      Silty Gravelly Sand
Si: 20.6%	

Comments: LAB NOTE: BROKEN ROCK WAS WITHIN SAMPLE.

Reviewed by: T. Eliassen, P.G., Transportation Geologist *TE*

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Distribution list

Report on Soil Sample

Lab number: E140652

Corrected copy: N/A

Report Date: 4/30/2014 7:53:53 A

Project: CALAIS

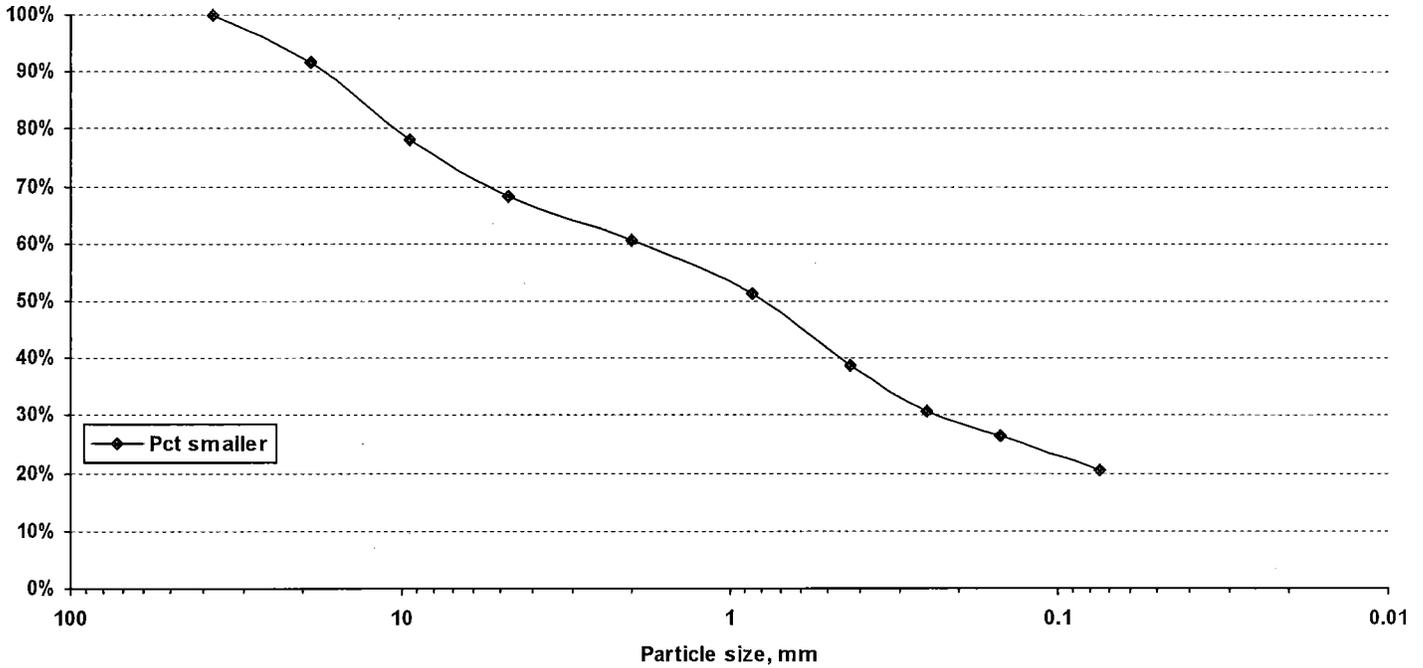
Number: BHF 037-2(11)

Site: VT-14 BR-82

Hole: B-1

Depth: 49 FT - 51 FT

T-88 Particle size analysis



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Distribution list  
TERRACON  
T. ELIASSEN  
J. TOUCHETTE

Report on Soil Sample

Lab number: E140654      Corrected copy: N/A      Report Date: 4/30/2014 7:56:36 A  
Project: CALAIS      Number: BHF 037-2(11)      Site: VT-14 BR-82  
Date sampled: 4/16/2014    Received: 4/18/2014    Tested: 4/18/2014    Tested by: J. TOUCHETTE  
Station:      Offset:      Hole: B-1      Depth: 69 FT to: 69.5 FT  
Field description: Sa w/Gr  
Submitted by: TERRACON      Address:  
Sample type: SPLIT BARREL      Quantity:  
Sample source/Outside agency name:  
Location used:      Examined for: MC, GS  
Comment:

Test Results

Sieve Analysis		Limits	
T-88	% Passing Total Sample		
75 mm (3.0"):		T-265 Moisture content:	15.7%
37.5 mm (1.5"):		T-89 Liquid Limit:	
19 mm (3/4"):		T-90 Plastic Limit:	
9.5 mm (3/8"):		T-90 Plasticity Index:	NP
4.75 mm (#4):		Moisture Density	
2.00 mm (#10):		Test method: T-180	Method:
850 µm (#20):		Maximum density:	pcf
425 µm (#40):		Optimum moisture:	
250 µm (#60):		T-100 Specific Gravity:	
150 µm (#100):		Gr: D2487:	N/A
75 µm (#200):		Sa: M145:	N/A
		Si:	
Hydrometer Analysis			
Particles smaller	% total sample		
0.05 mm:			
0.02 mm:			
0.005 mm:			
0.002 mm:			
0.001 mm:			

Comments: VISUAL DESCRIPTION: BROKEN ROCK WITH GRAVEL & SAND  
INSUFFICIENT SAMPLE FOR TESTING.

Reviewed by: T. Eliassen, P.G., Transportation Geologist TZ

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Materials and Research Section  
1 National Life Drive  
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Distribution list  
TERRACON  
T. ELIASSEN  
J. TOUCHETTE

Report on Soil Sample

Lab number: E140655      Corrected copy: N/A      Report Date: 4/30/2014 8:04:52 A  
Project: CALAIS      Number: BHF 037-2(11)      Site: VT-14 BR-82  
Date sampled: 4/17/2014    Received: 4/18/2014    Tested: 4/18/2014    Tested by: J. TOUCHETTE  
Station:      Offset:      Hole: B-1      Depth: 69.5 FT to: 72 FT  
Field description: BOULDERS  
Submitted by: TERRACON      Address:  
Sample type: CORE      Quantity:  
Sample source/Outside agency name:  
Location used:      Examined for: MC, GS  
Comment:

Test Results

Sieve Analysis		Limits	
T-88	% Passing Total Sample		
75 mm (3.0"):		T-265 Moisture content:	
37.5 mm (1.5"):		T-89 Liquid Limit:	
19 mm (3/4"):		T-90 Plastic Limit:	
9.5 mm (3/8"):		T-90 Plasticity Index:	NP
4.75 mm (#4):		Moisture Density	
2.00 mm (#10):		Test method: T-180	Method:
850 µm (#20):		Maximum density:	pcf
425 µm (#40):		Optimum moisture:	
250 µm (#60):		T-100 Specific Gravity:	
150 µm (#100):		Gr: D2487: N/A	
75 µm (#200):		Sa: M145: N/A	
		Si:	
Hydrometer Analysis			
Particles smaller	% total sample		
0.05 mm:			
0.02 mm:			
0.005 mm:			
0.002 mm:			
0.001 mm:			

Comments: VISUAL DESCRIPTION: BOULDERS & COBBLES

Reviewed by: T. Eliassen, P.G., Transportation Geologist

Vermont Agency of Transportation  
Materials and Research Section  
1 National Life Drive  
Montpelier, VT 05633-5001

Distribution list  
TERRACON  
T. ELIASSEN  
J. TOUCHETTE

Report on Soil Sample

Lab number: E140656      Corrected copy: N/A      Report Date: 4/30/2014 8:07:17 A  
Project: CALAIS      Number: BHF 037-2(11)      Site: VT-14 BR-82  
Date sampled: 4/17/2014    Received: 4/18/2014    Tested: 4/18/2014    Tested by: J. TOUCHETTE  
Station:      Offset:      Hole: B-1      Depth: 78 FT to: 80 FT  
Field description: Sa trace Gr  
Submitted by: TERRACON      Address:  
Sample type: SPLIT BARREL      Quantity:  
Sample source/Outside agency name:  
Location used:      Examined for: MC, GS  
Comment:

Test Results

Sieve Analysis	
T-88	% Passing
Total Sample	
75 mm (3.0"):	
37.5 mm (1.5"):	
19 mm (3/4"):	
9.5 mm (3/8"):	98.7%
4.75 mm (#4):	97.5%
2.00 mm (#10):	93.6%
850 µm (#20):	65.4%
425 µm (#40):	33.2%
250 µm (#60):	23.1%
150 µm (#100):	18.6%
75 µm (#200):	13.5%

Hydrometer Analysis	
Particles smaller	% total sample
0.05 mm:	
0.02 mm:	
0.005 mm:	
0.002 mm:	
0.001 mm:	

Limits	
T-265 Moisture content:	18.3%
T-89 Liquid Limit:	
T-90 Plastic Limit:	
T-90 Plasticity Index:	NP
Moisture Density	
Test method:	T-180      Method:
Maximum density:	pcf
Optimum moisture:	
T-100 Specific Gravity:	
Gr:	6.4%    D2487: SM
Sa:	80.1%    M145: A-1-b    Sand
Si:	13.5%

Comments:

Reviewed by: T. Eliassen, P.G., Transportation Geologist 

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Montpelier, VT 05633-5001

Distribution list

Report on Soil Sample

Lab number: E140656

Corrected copy: N/A

Report Date: 4/30/2014 8:07:24 A

Project: CALAIS

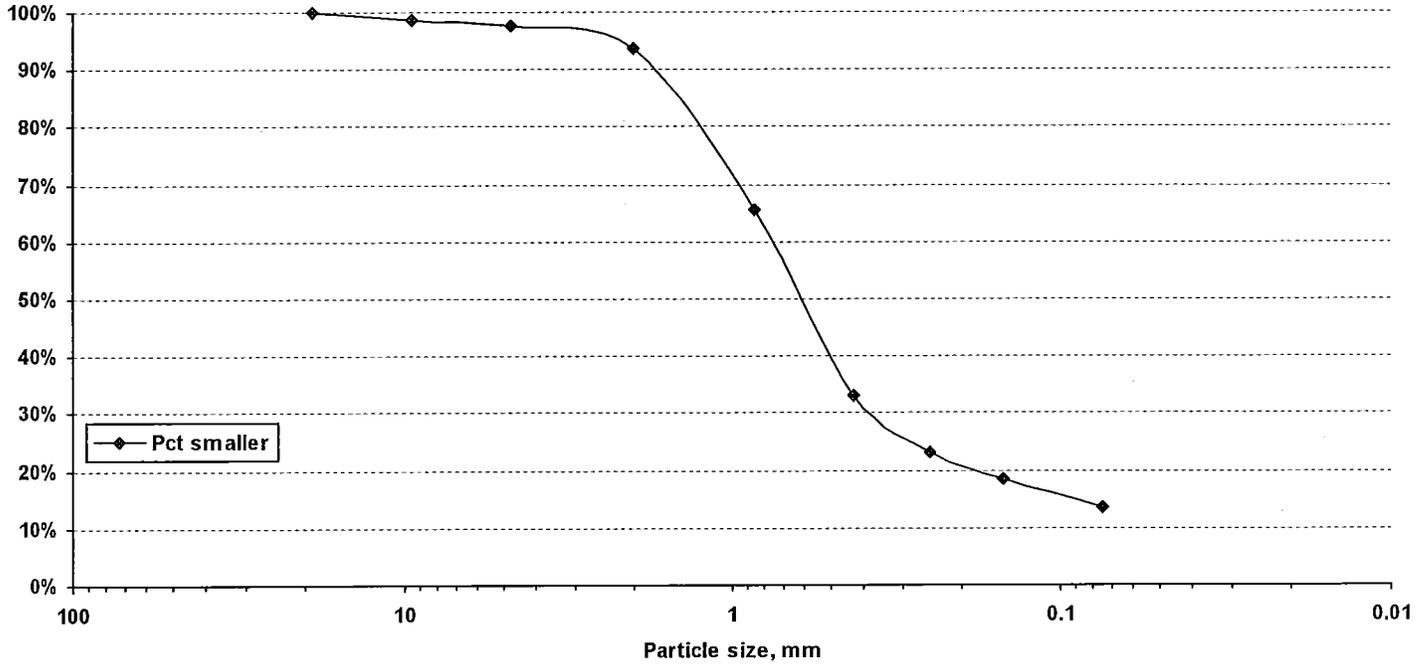
Number: BHF 037-2(11)

Site: VT-14 BR-82

Hole: B-1

Depth: 78 FT - 80 FT

T-88 Particle size analysis



Vermont Agency of Transportation  
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Distribution list  
TERRACON  
T. ELIASSEN  
J. TOUCHETTE

Report on Soil Sample

Lab number: E140657      Corrected copy: N/A      Report Date: 4/30/2014 8:09:12 A  
Project: CALAIS      Number: BHF 037-2(11)      Site: VT-14 BR-82  
Date sampled: 4/17/2014    Received: 4/18/2014    Tested: 4/18/2014    Tested by: J. TOUCHETTE  
Station:      Offset:      Hole: B-1      Depth: 88 FT to: 90 FT  
Field description: Sa w/Gr  
Submitted by: TERRACON      Address:  
Sample type: SPLIT BARREL      Quantity:  
Sample source/Outside agency name:  
Location used:      Examined for: MC, GS  
Comment:

Test Results

Sieve Analysis	
T-88	% Passing
Total Sample	
75 mm (3.0"):	
37.5 mm (1.5"):	
19 mm (3/4"):	
9.5 mm (3/8"):	98.8%
4.75 mm (#4):	96.1%
2.00 mm (#10):	89.0%
850 µm (#20):	66.4%
425 µm (#40):	40.3%
250 µm (#60):	26.1%
150 µm (#100):	20.4%
75 µm (#200):	15.1%

Hydrometer Analysis	
Particles smaller	% total sample
0.05 mm:	
0.02 mm:	
0.005 mm:	
0.002 mm:	
0.001 mm:	

Limits	
T-265 Moisture content:	17.6%
T-89 Liquid Limit:	
T-90 Plastic Limit:	
T-90 Plasticity Index:	NP
Moisture Density	
Test method:	T-180      Method:
Maximum density:	pcf
Optimum moisture:	
T-100 Specific Gravity:	
Gr: 11.0%	D2487: SM
Sa: 74.0%	M145: A-1-b      Sand
Si: 15.1%	

Comments:

Reviewed by: T. Eliassen, P.G., Transportation Geologist *TE*

Vermont Agency of Transportation  
Materials and Research Section  
1 National Life Drive  
Montpelier, VT 05633-5001

Distribution list

Report on Soil Sample

Lab number: E140657

Corrected copy: N/A

Report Date: 4/30/2014 8:09:16 A

Project: CALAIS

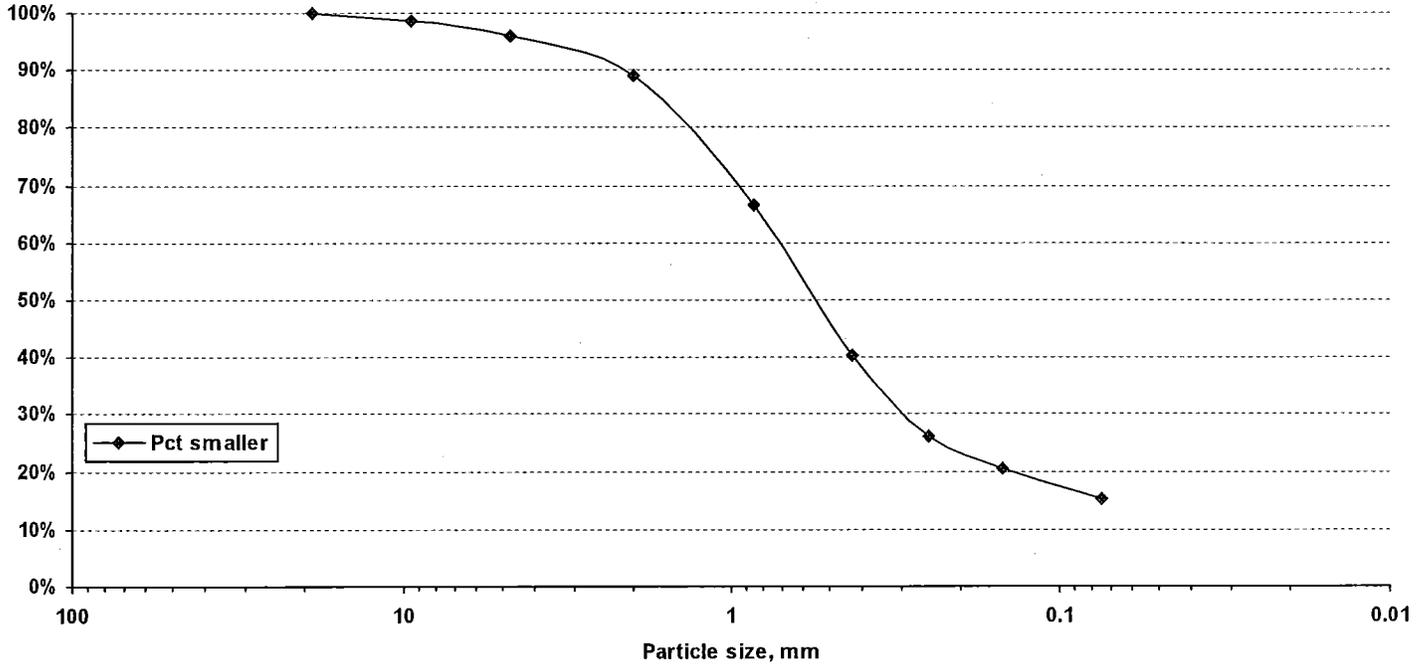
Number: BHF 037-2(11)

Site: VT-14 BR-82

Hole: B-1

Depth: 88 FT - 90 FT

T-88 Particle size analysis



Vermont Agency of Transportation  
Materials and Research Section  
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Montpelier, VT 05633-5001

Distribution list  
TERRACON  
T. ELIASSEN  
J. TOUCHETTE

Report on Soil Sample

Lab number: E140658      Corrected copy: N/A      Report Date: 4/30/2014 8:11:01 A  
Project: CALAIS      Number: BHF 037-2(11)      Site: VT-14 BR-82  
Date sampled: 4/17/2014 Received: 4/18/2014 Tested: 4/18/2014 Tested by: J. TOUCHETTE  
Station:      Offset:      Hole: B-1      Depth: 98 FT to: 100 FT  
Field description: Sa w/Gr  
Submitted by: TERRACON      Address:  
Sample type: SPLIT BARREL      Quantity:  
Sample source/Outside agency name:  
Location used:      Examined for: MC, GS  
Comment:

Test Results

T-88	Sieve Analysis
	% Passing
	Total Sample
75 mm (3.0"):	
37.5 mm (1.5"):	
19 mm (3/4"):	
9.5 mm (3/8"):	96.8%
4.75 mm (#4):	95.1%
2.00 mm (#10):	90.9%
850 µm (#20):	76.0%
425 µm (#40):	44.5%
250 µm (#60):	24.6%
150 µm (#100):	19.3%
75 µm (#200):	14.5%

Hydrometer Analysis	
Particles smaller	% total sample
0.05 mm:	
0.02 mm:	
0.005 mm:	
0.002 mm:	
0.001 mm:	

Limits	
T-265 Moisture content:	18.6%
T-89 Liquid Limit:	
T-90 Plastic Limit:	
T-90 Plasticity Index:	NP
Moisture Density	
Test method:	T-180      Method:
Maximum density:	pcf
Optimum moisture:	
T-100 Specific Gravity:	
Gr:	9.1%      D2487: SM
Sa:	76.3%      M145: A-1-b      Sand
Si:	14.5%

Comments:

Reviewed by: T. Eliassen, P.G., Transportation Geologist *TE*

Vermont Agency of Transportation  
Materials and Research Section  
1 National Life Drive  
Montpelier, VT 05633-5001

Distribution list

Report on Soil Sample

Lab number: E140658

Corrected copy: N/A

Report Date: 4/30/2014 8:11:05 A

Project: CALAIS

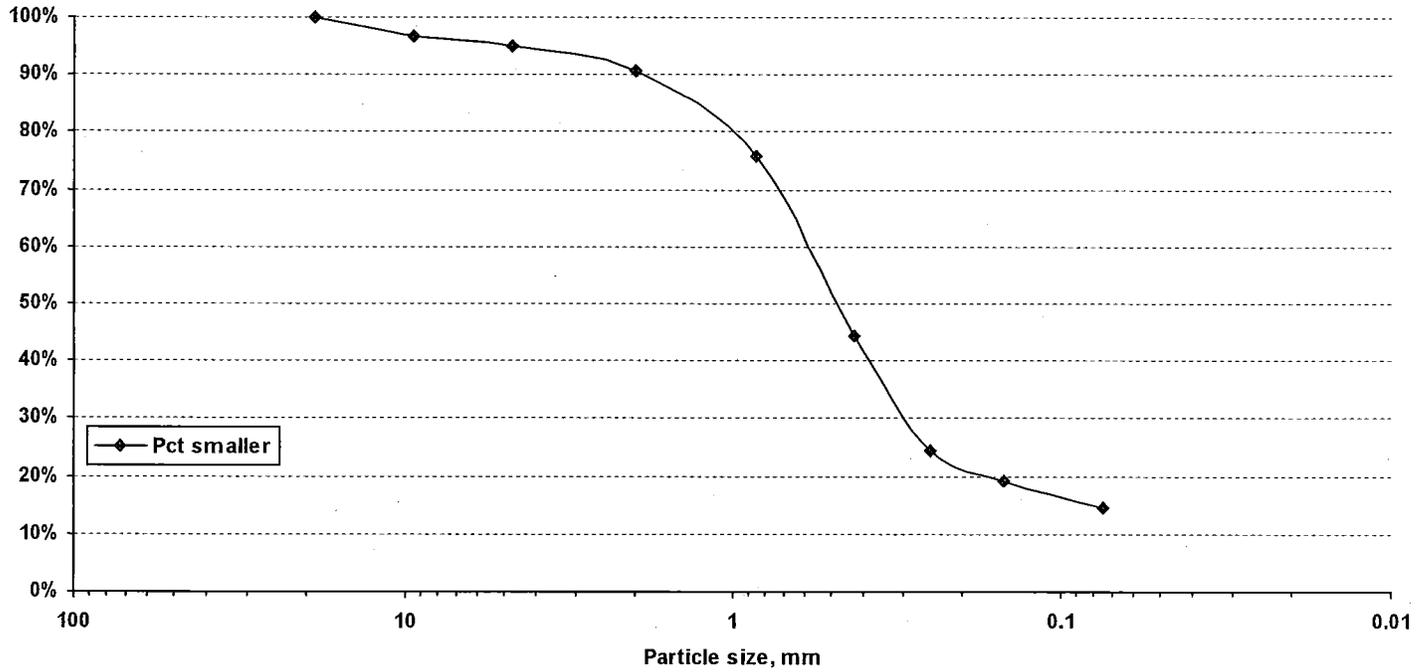
Number: BHF 037-2(11)

Site: VT-14 BR-82

Hole: B-1

Depth: 98 FT - 100 FT

T-88 Particle size analysis



Vermont Agency of Transportation  
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Distribution list  
TERRACON  
T. ELIASSEN  
J. TOUCHETTE

Report on Soil Sample

Lab number: E140659      Corrected copy: N/A      Report Date: 4/30/2014 8:12:52 A  
Project: CALAIS      Number: BHF 037-2(11)      Site: VT-14 BR-82  
Date sampled: 4/17/2014    Received: 4/18/2014    Tested: 4/18/2014    Tested by: J. TOUCHETTE  
Station:      Offset:      Hole: B-1      Depth: 108 FT to: 110 FT  
Field description: Sa w/Gr  
Submitted by: TERRACON      Address:  
Sample type: SPLIT BARREL      Quantity:  
Sample source/Outside agency name:  
Location used:      Examined for: MC, GS  
Comment:

Test Results

T-88	Sieve Analysis
	% Passing
	Total Sample
75 mm (3.0"):	
37.5 mm (1.5"):	
19 mm (3/4"):	98.8%
9.5 mm (3/8"):	96.3%
4.75 mm (#4):	90.6%
2.00 mm (#10):	78.0%
850 µm (#20):	53.0%
425 µm (#40):	36.1%
250 µm (#60):	28.3%
150 µm (#100):	23.7%
75 µm (#200):	18.0%

Hydrometer Analysis	
Particles smaller	% total sample
0.05 mm:	
0.02 mm:	
0.005 mm:	
0.002 mm:	
0.001 mm:	

Limits	
T-265 Moisture content:	14.7%
T-89 Liquid Limit:	
T-90 Plastic Limit:	
T-90 Plasticity Index:	NP
Moisture Density	
Test method:	T-180      Method:
Maximum density:	pcf
Optimum moisture:	
T-100 Specific Gravity:	
Gr: 22.0%	D2487: SM
Sa: 60.0%	M145: A-1-b      Gravelly Sand
Si: 18.0%	

Comments:

Reviewed by: T. Eliassen, P.G., Transportation Geologist *TE*

Vermont Agency of Transportation  
Materials and Research Section  
1 National Life Drive  
Montpelier, VT 05633-5001

Distribution list

Report on Soil Sample

Lab number: E140659

Corrected copy: N/A

Report Date: 4/30/2014 8:12:56 A

Project: CALAIS

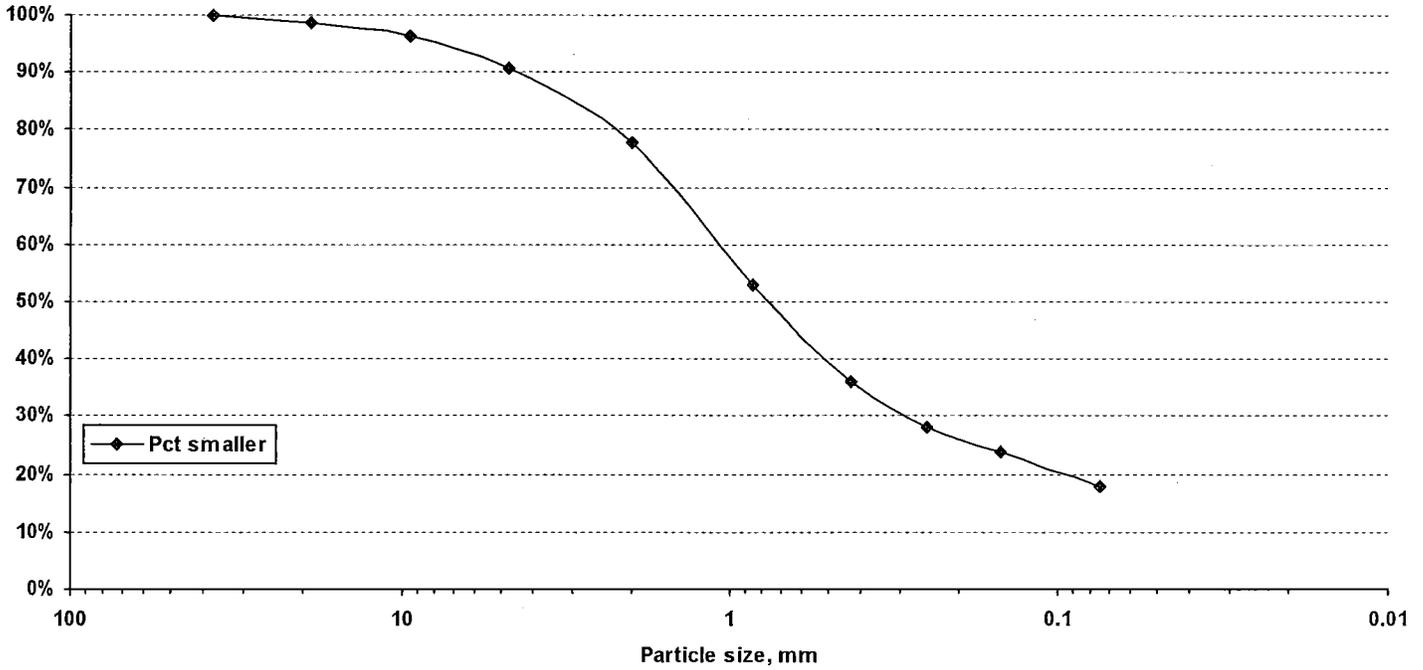
Number: BHF 037-2(11)

Site: VT-14 BR-82

Hole: B-1

Depth: 108 FT - 110 FT

T-88 Particle size analysis



Vermont Agency of Transportation  
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Distribution list  
TERRACON  
T. ELIASSEN  
J. TOUCHETTE

Report on Soil Sample

Lab number: E140660      Corrected copy: N/A      Report Date: 4/30/2014 8:16:13 A  
Project: CALAIS      Number: BHF 037-2(11)      Site: VT-14 BR-82  
Date sampled: 4/18/2014      Received: 4/18/2014      Tested: 4/18/2014      Tested by: J. TOUCHETTE  
Station:      Offset:      Hole: B-1      Depth: 118 FT to: 118.8 FT  
Field description: NONE  
Submitted by: TERRACON      Address:  
Sample type: SPLIT BARREL      Quantity:  
Sample source/Outside agency name:  
Location used:      Examined for: MC, GS  
Comment:

Test Results

T-88	Sieve Analysis
	% Passing
	Total Sample
75 mm (3.0"):	
37.5 mm (1.5"):	
19 mm (3/4"):	93.3%
9.5 mm (3/8"):	77.1%
4.75 mm (#4):	57.9%
2.00 mm (#10):	45.1%
850 µm (#20):	35.4%
425 µm (#40):	30.1%
250 µm (#60):	26.3%
150 µm (#100):	23.4%
75 µm (#200):	18.6%

Hydrometer Analysis	
Particles smaller	% total sample
0.05 mm:	
0.02 mm:	
0.005 mm:	
0.002 mm:	
0.001 mm:	

Limits	
T-265 Moisture content:	11.6%
T-89 Liquid Limit:	
T-90 Plastic Limit:	
T-90 Plasticity Index:	NP
Moisture Density	
Test method:	T-180      Method:
Maximum density:	pcf
Optimum moisture:	
T-100 Specific Gravity:	
Gr:	54.9%      D2487: GM
Sa:	26.5%      M145: A-1-b      Sandy Gravel
Si:	18.6%

Comments: LAB NOTE: LOTS OF BROKEN ROCK WAS WITHIN SAMPLE.

Reviewed by: T. Eliassen, P.G., Transportation Geologist 

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Distribution list

Report on Soil Sample

Lab number: E140660

Corrected copy: N/A

Report Date: 4/30/2014 8:16:16 A

Project: CALAIS

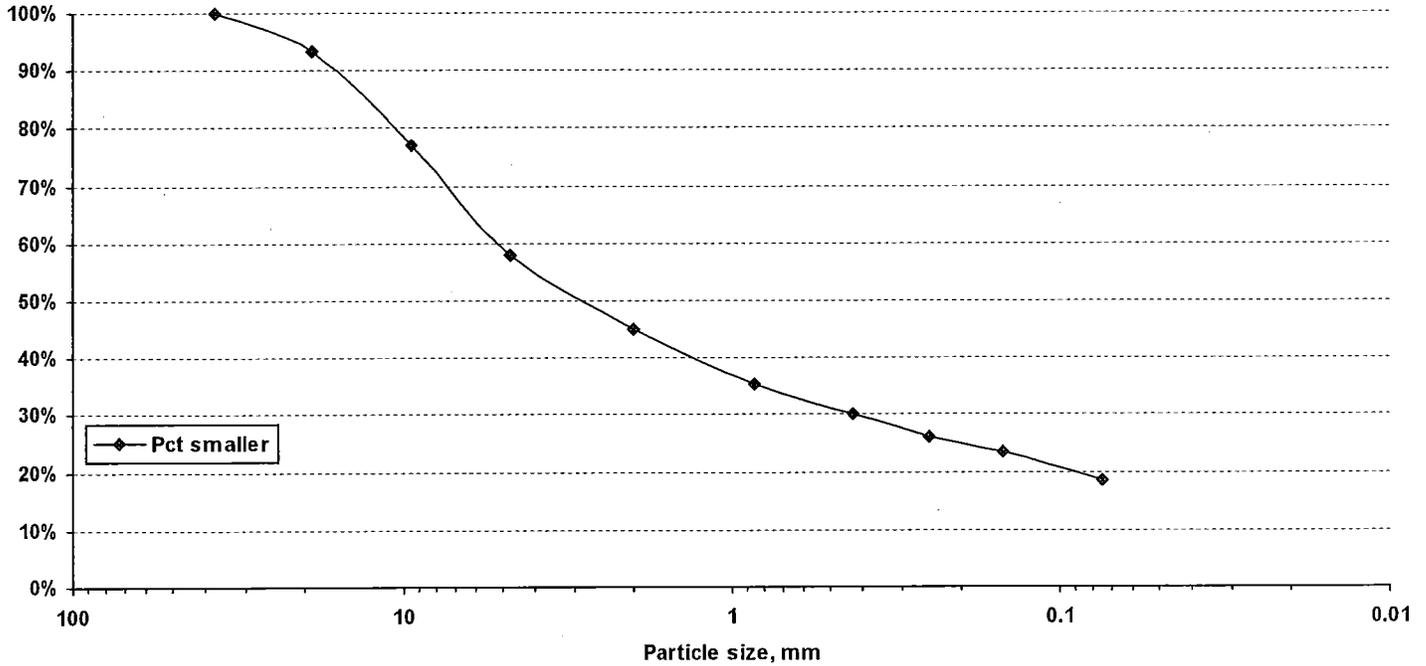
Number: BHF 037-2(11)

Site: VT-14 BR-82

Hole: B-1

Depth: 118 FT - 118.8 FT

T-88 Particle size analysis



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Distribution list  
TERRACON  
T. ELIASSEN  
J. TOUCHETTE

Report on Soil Sample

Lab number: E140661      Corrected copy: N/A      Report Date: 4/30/2014 8:18:16 A  
Project: CALAIS      Number: BHF 037-2(11)      Site: VT-14 BR-82  
Date sampled: 4/18/2014    Received: 4/18/2014    Tested: 4/18/2014    Tested by: J. TOUCHETTE  
Station:      Offset:      Hole: B-1      Depth: 128 FT to: 130 FT  
Field description: Si Sa w/Gr  
Submitted by: TERRACON      Address:  
Sample type: SPLIT BARREL      Quantity:  
Sample source/Outside agency name:  
Location used:      Examined for: MC, GS  
Comment:

Test Results

Sieve Analysis	
T-88	% Passing
Total Sample	
75 mm (3.0"):	
37.5 mm (1.5"):	
19 mm (3/4"):	
9.5 mm (3/8"):	81.6%
4.75 mm (#4):	57.9%
2.00 mm (#10):	45.7%
850 µm (#20):	37.6%
425 µm (#40):	31.9%
250 µm (#60):	28.1%
150 µm (#100):	25.2%
75 µm (#200):	20.4%

Hydrometer Analysis	
Particles smaller	% total sample
0.05 mm:	
0.02 mm:	
0.005 mm:	
0.002 mm:	
0.001 mm:	

Limits	
T-265 Moisture content:	11.6%
T-89 Liquid Limit:	
T-90 Plastic Limit:	
T-90 Plasticity Index:	NP
Moisture Density	
Test method:	T-180      Method:
Maximum density:	pcf
Optimum moisture:	
T-100 Specific Gravity:	
Gr: 54.3%	D2487: GM
Sa: 25.4%	M145: A-1-b      Silty Sandy Gravel
Si: 20.4%	

Comments:

Reviewed by: T. Eliassen, P.G., Transportation Geologist *FE*

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Distribution list

Report on Soil Sample

Lab number: E140661

Corrected copy: N/A

Report Date: 4/30/2014 8:18:20 A

Project: CALAIS

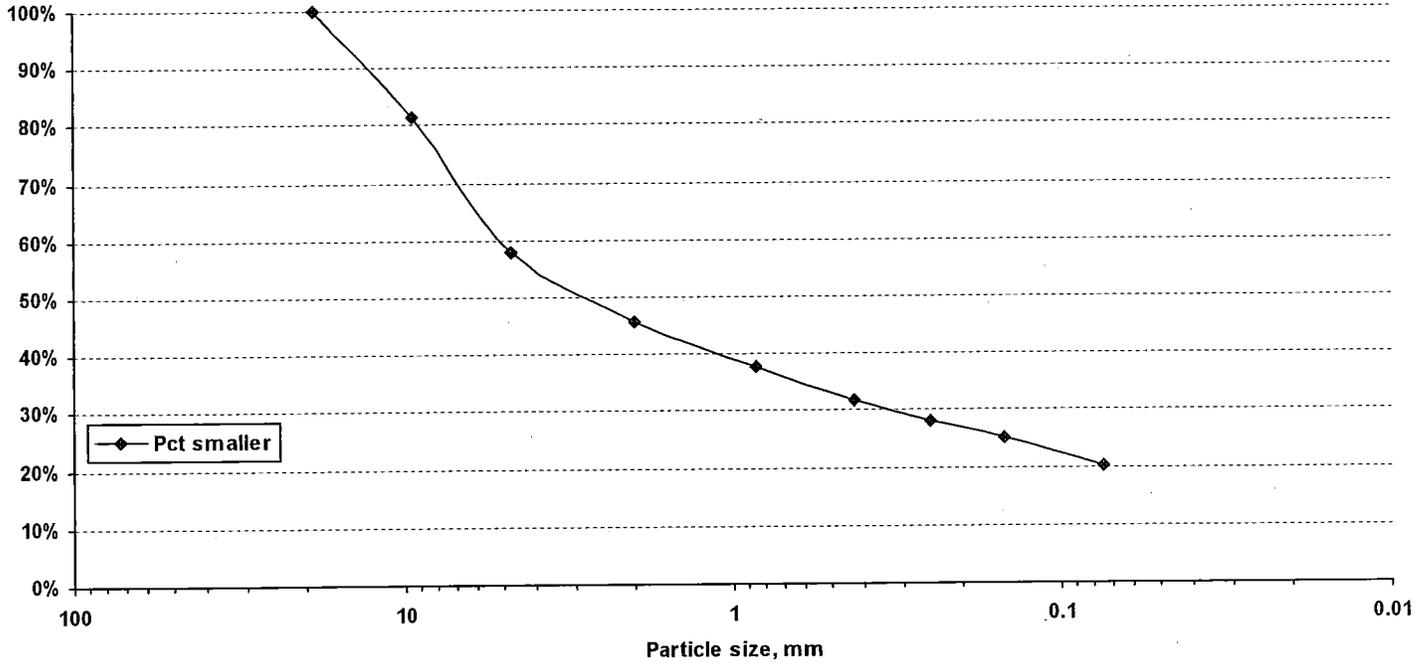
Number: BHF 037-2(11)

Site: VT-14 BR-82

Hole: B-1

Depth: 128 FT - 130 FT

T-88 Particle size analysis



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Distribution list  
TERRACON  
T. ELIASSEN  
J. TOUCHETTE

Report on Soil Sample

Lab number: E140662      Corrected copy: N/A      Report Date: 4/30/2014 8:20:30 A  
Project: CALAIS      Number: BHF 037-2(11)      Site: VT-14 BR-82  
Date sampled: 4/18/2014    Received: 4/18/2014    Tested: 4/18/2014    Tested by: J. TOUCHETTE  
Station:      Offset:      Hole: B-1      Depth: 143 FT to: 145 FT  
Field description: Si Sa w/Gr (TILL)  
Submitted by: TERRACON      Address:  
Sample type: SPLIT BARREL      Quantity:  
Sample source/Outside agency name:  
Location used:      Examined for: MC, GS  
Comment:

Test Results

Sieve Analysis	
T-88	% Passing
Total Sample	
75 mm (3.0"):	
37.5 mm (1.5"):	
19 mm (3/4"):	88.2%
9.5 mm (3/8"):	76.1%
4.75 mm (#4):	55.7%
2.00 mm (#10):	43.6%
850 µm (#20):	34.1%
425 µm (#40):	28.2%
250 µm (#60):	24.6%
150 µm (#100):	22.1%
75 µm (#200):	17.8%

Hydrometer Analysis	
Particles smaller	% total sample
0.05 mm:	
0.02 mm:	
0.005 mm:	
0.002 mm:	
0.001 mm:	

Limits	
T-265 Moisture content:	10.5%
T-89 Liquid Limit:	
T-90 Plastic Limit:	
T-90 Plasticity Index:	NP
Moisture Density	
Test method:	T-180      Method:
Maximum density:	pcf
Optimum moisture:	
T-100 Specific Gravity:	
Gr: 56.4%	D2487: GM
Sa: 25.8%	M145: A-1-b      Sandy Gravel
Si: 17.8%	

Comments: LAB NOTE: BROKEN ROCK WAS WITHIN SAMPLE.

Reviewed by: T. Eliassen, P.G., Transportation Geologist 

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1 National Life Drive  
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Distribution list

Report on Soil Sample

Lab number: E140662

Corrected copy: N/A

Report Date: 4/30/2014 8:20:34 A

Project: CALAIS

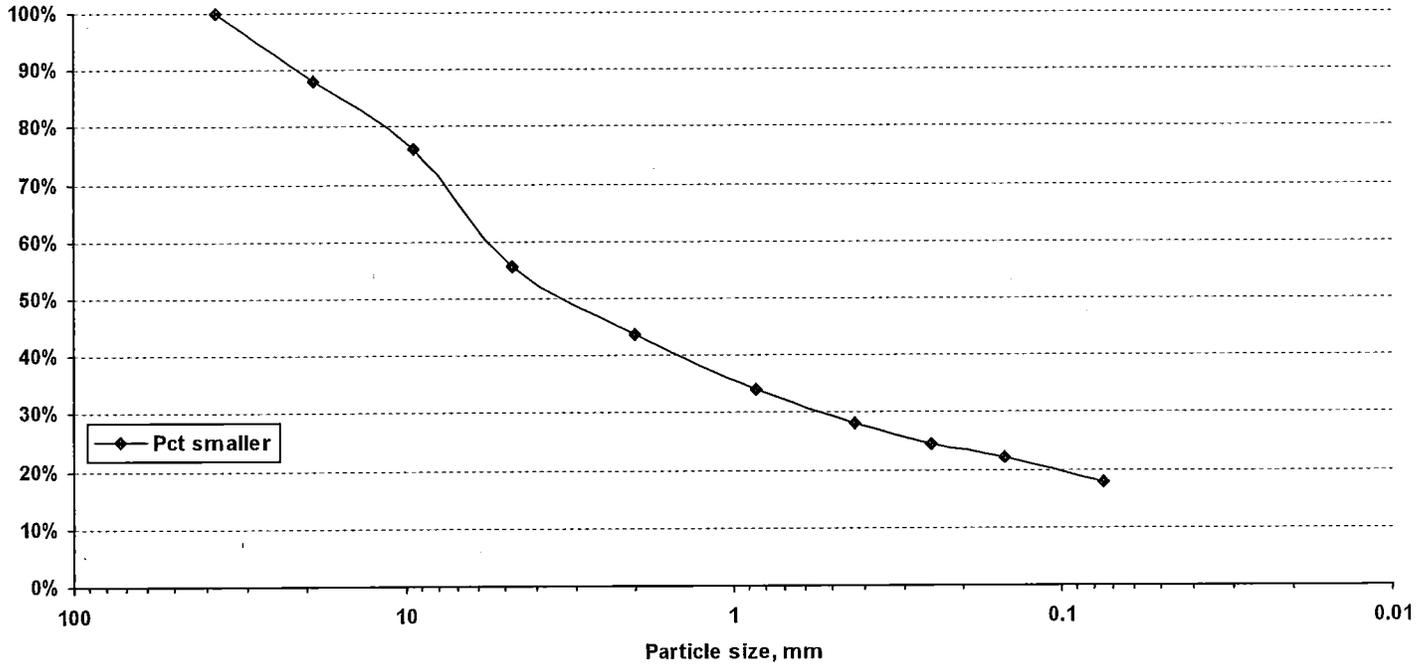
Number: BHF 037-2(11)

Site: VT-14 BR-82

Hole: B-1

Depth: 143 FT - 145 FT

T-88 Particle size analysis



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Distribution list  
TERRACON  
T. ELIASSEN  
J. TOUCHETTE

Report on Soil Sample

Lab number: E140663      Corrected copy: N/A      Report Date: 4/30/2014 8:22:00 A  
Project: CALAIS      Number: BHF 037-2(11)      Site: VT-14 BR-82  
Date sampled: 4/18/2014    Received: 4/18/2014    Tested: 4/18/2014    Tested by: J. TOUCHETTE  
Station:      Offset:      Hole: B-1      Depth: 158 FT to: 159.5 FT  
Field description: SAND  
Submitted by: TERRACON      Address:  
Sample type: SPLIT BARREL      Quantity:  
Sample source/Outside agency name:  
Location used:      Examined for: MC, GS  
Comment:

Test Results

Sieve Analysis	
T-88	% Passing
Total Sample	
75 mm (3.0"):	
37.5 mm (1.5"):	
19 mm (3/4"):	
9.5 mm (3/8"):	
4.75 mm (#4):	100.0%
2.00 mm (#10):	99.1%
850 µm (#20):	98.4%
425 µm (#40):	96.1%
250 µm (#60):	67.8%
150 µm (#100):	31.8%
75 µm (#200):	17.6%

Hydrometer Analysis	
Particles smaller	% total sample
0.05 mm:	
0.02 mm:	
0.005 mm:	
0.002 mm:	
0.001 mm:	

Limits	
T-265 Moisture content:	21.7%
T-89 Liquid Limit:	
T-90 Plastic Limit:	
T-90 Plasticity Index:	NP
Moisture Density	
Test method:	T-180      Method:
Maximum density:	pcf
Optimum moisture:	
T-100 Specific Gravity:	
Gr:	0.9%    D2487: SM
Sa:	81.5%    M145: A-2-4    Sand
Si:	17.6%

Comments:

Reviewed by: T. Eliassen, P.G., Transportation Geologist 

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Materials and Research Section  
1 National Life Drive  
Montpelier, VT 05633-5001

Distribution list

Report on Soil Sample

Lab number: E140663

Corrected copy: N/A

Report Date: 4/30/2014 8:22:06 A

Project: CALAIS

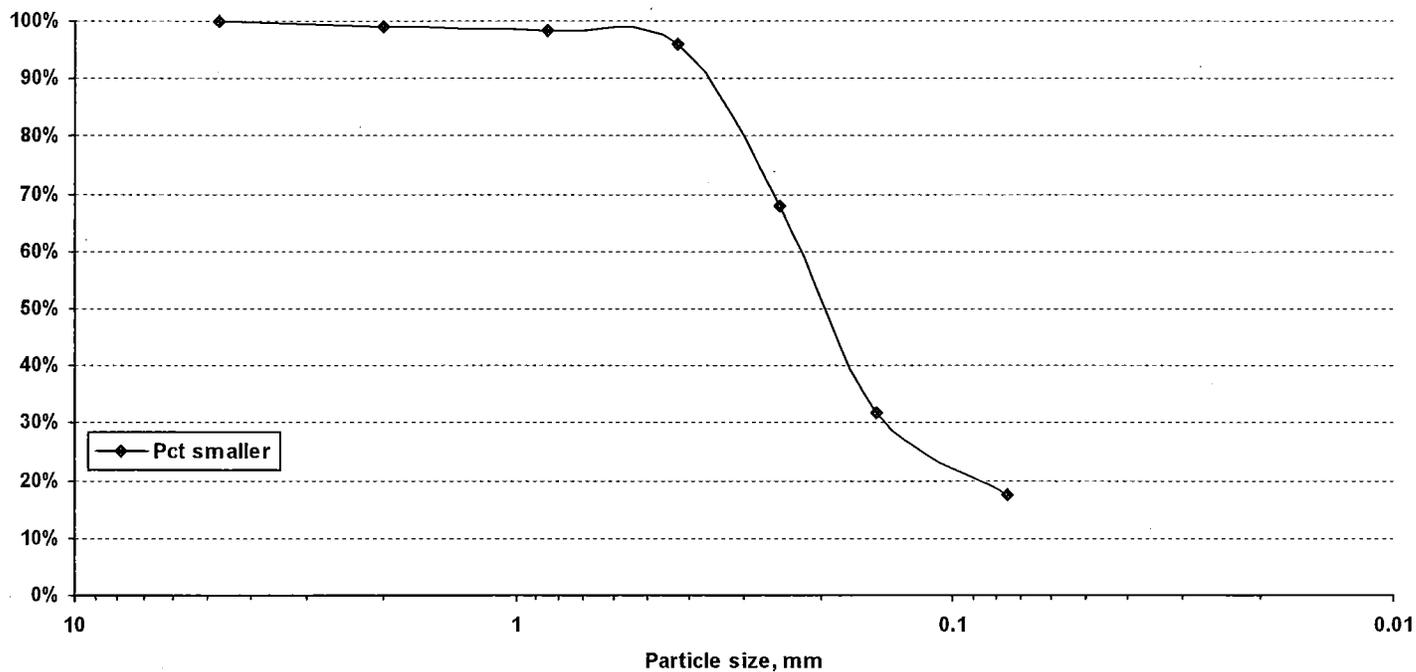
Number: BHF 037-2(11)

Site: VT-14 BR-82

Hole: B-1

Depth: 158 FT - 159.5 FT

T-88 Particle size analysis



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Distribution list  
TERRACON  
T. ELIASSEN  
J. TOUCHETTE

Report on Soil Sample

Lab number: E140665      Corrected copy: N/A      Report Date: 4/30/2014 8:40:20 A  
Project: CALAIS      Number: BHF 037-2(11)      Site: VT-14 BR-82  
Date sampled: 4/14/2014    Received: 4/18/2014    Tested: 4/28/2014    Tested by: J. TOUCHETTE  
Station:      Offset:      Hole: B-2      Depth: 44 FT to: 46 FT  
Field description: Sa & Gr  
Submitted by: TERRACON      Address:  
Sample type: SPLIT BARREL      Quantity:  
Sample source/Outside agency name:  
Location used:      Examined for: MC, GS  
Comment:

Test Results

Sieve Analysis	
T-88	% Passing
	Total Sample
75 mm (3.0"):	
37.5 mm (1.5"):	
19 mm (3/4"):	92.8%
9.5 mm (3/8"):	89.3%
4.75 mm (#4):	80.9%
2.00 mm (#10):	76.8%
850 µm (#20):	74.0%
425 µm (#40):	59.3%
250 µm (#60):	30.1%
150 µm (#100):	17.8%
75 µm (#200):	13.1%

Hydrometer Analysis	
Particles smaller	% total sample
0.05 mm:	
0.02 mm:	
0.005 mm:	
0.002 mm:	
0.001 mm:	

Limits	
T-265 Moisture content:	14.4%
T-89 Liquid Limit:	
T-90 Plastic Limit:	
T-90 Plasticity Index:	NP
Moisture Density	
Test method:	T-180      Method:
Maximum density:	pcf
Optimum moisture:	
T-100 Specific Gravity:	
Gr:	23.2%    D2487: SM
Sa:	63.8%    M145: A-2-4    Gravelly Sand
Si:	13.1%

Comments:

Reviewed by: T. Eliassen, P.G., Transportation Geologist 

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1 National Life Drive  
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Distribution list

Report on Soil Sample

Lab number: E140665

Corrected copy: N/A

Report Date: 4/30/2014 8:40:25 A

Project: CALAIS

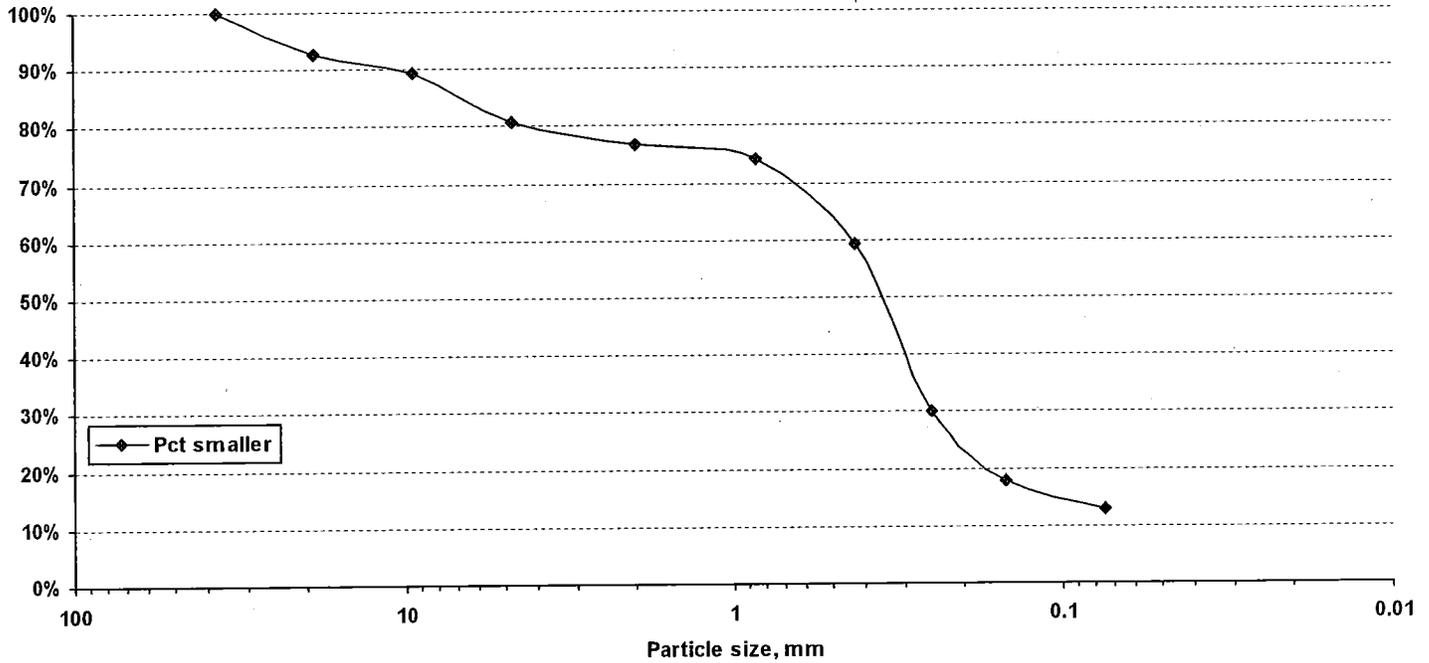
Number: BHF 037-2(11)

Site: VT-14 BR-82

Hole: B-2

Depth: 44 FT - 46 FT

T-88 Particle size analysis



Vermont Agency of Transportation  
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Distribution list  
TERRACON  
T. ELIASSEN  
J. TOUCHETTE

Report on Soil Sample

Lab number: E140666      Corrected copy: N/A      Report Date: 4/30/2014 8:42:13 A  
Project: CALAIS      Number: BHF 037-2(11)      Site: VT-14 BR-82  
Date sampled: 4/14/2014    Received: 4/18/2014    Tested: 4/28/2014    Tested by: J. TOUCHETTE  
Station:      Offset:      Hole: B-2      Depth: 49 FT to: 51 FT  
Field description: WASH SAND  
Submitted by: TERRACON      Address:  
Sample type: SPLIT BARREL      Quantity:  
Sample source/Outside agency name:  
Location used:      Examined for: MC, GS  
Comment:

Test Results

Sieve Analysis	
T-88	% Passing
Total Sample	
75 mm (3.0"):	
37.5 mm (1.5"):	
19 mm (3/4"):	
9.5 mm (3/8"):	87.9%
4.75 mm (#4):	28.7%
2.00 mm (#10):	7.1%
850 µm (#20):	4.3%
425 µm (#40):	3.2%
250 µm (#60):	2.5%
150 µm (#100):	2.0%
75 µm (#200):	1.6%

Hydrometer Analysis	
Particles smaller	% total sample
0.05 mm:	
0.02 mm:	
0.005 mm:	
0.002 mm:	
0.001 mm:	

Limits	
T-265 Moisture content:	14.1%
T-89 Liquid Limit:	
T-90 Plastic Limit:	
T-90 Plasticity Index:	NP
Moisture Density	
Test method:	T-180      Method:
Maximum density:	pcf
Optimum moisture:	
T-100 Specific Gravity:	
Gr: 92.9%	D2487: GP
Sa: 5.5%	M145: A-1-a      Gravel
Si: 1.6%	

Comments:

Reviewed by: T. Eliassen, P.G., Transportation Geologist *TE*

Vermont Agency of Transportation  
Materials and Research Section  
1 National Life Drive  
Montpelier, VT 05633-5001

Distribution list

Report on Soil Sample

Lab number: E140666

Corrected copy: N/A

Report Date: 4/30/2014 8:42:18 A

Project: CALAIS

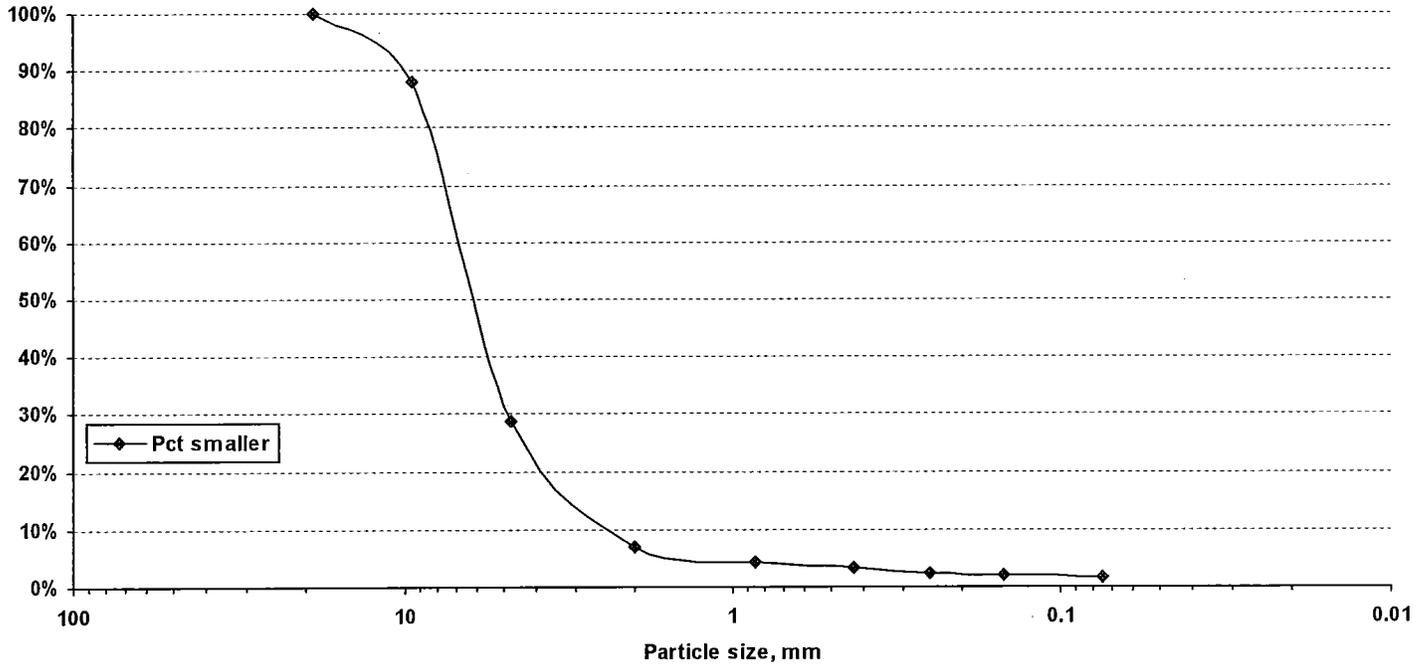
Number: BHF 037-2(11)

Site: VT-14 BR-82

Hole: B-2

Depth: 49 FT - 51 FT

T-88 Particle size analysis



Vermont Agency of Transportation  
Materials and Research Section  
1 National Life Drive  
Montpelier, VT 05633-5001

Distribution list  
TERRACON  
T. ELIASSEN  
J. TOUCHETTE

Report on Soil Sample

Lab number: E140667      Corrected copy: N/A      Report Date: 4/30/2014 8:43:54 A  
Project: CALAIS      Number: BHF 037-2(11)      Site: VT-14 BR-82  
Date sampled: 4/14/2014    Received: 4/18/2014    Tested: 4/28/2014    Tested by: J. TOUCHETTE  
Station:      Offset:      Hole: B-2      Depth: 54 FT to: 56 FT  
Field description: Si Sa  
Submitted by: TERRACON      Address:  
Sample type: SPLIT BARREL      Quantity:  
Sample source/Outside agency name:  
Location used:      Examined for: MC, GS  
Comment:

Test Results

Sieve Analysis	
T-88	% Passing
Total Sample	
75 mm (3.0"):	
37.5 mm (1.5"):	
19 mm (3/4"):	
9.5 mm (3/8"):	
4.75 mm (#4):	100.0%
2.00 mm (#10):	99.4%
850 µm (#20):	95.3%
425 µm (#40):	83.7%
250 µm (#60):	65.6%
150 µm (#100):	40.8%
75 µm (#200):	17.2%

Hydrometer Analysis	
Particles smaller	% total sample
0.05 mm:	
0.02 mm:	
0.005 mm:	
0.002 mm:	
0.001 mm:	

Limits	
T-265 Moisture content:	22.9%
T-89 Liquid Limit:	
T-90 Plastic Limit:	
T-90 Plasticity Index:	NP
Moisture Density	
Test method:	T-180      Method:
Maximum density:	pcf
Optimum moisture:	
T-100 Specific Gravity:	
Gr:	0.6%    D2487: SM
Sa:	82.2%    M145: A-2-4    Sand
Si:	17.2%

Comments:

Reviewed by: T. Eliassen, P.G., Transportation Geologist 

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Distribution list

Report on Soil Sample

Lab number: E140667

Corrected copy: N/A

Report Date: 4/30/2014 8:43:57 A

Project: CALAIS

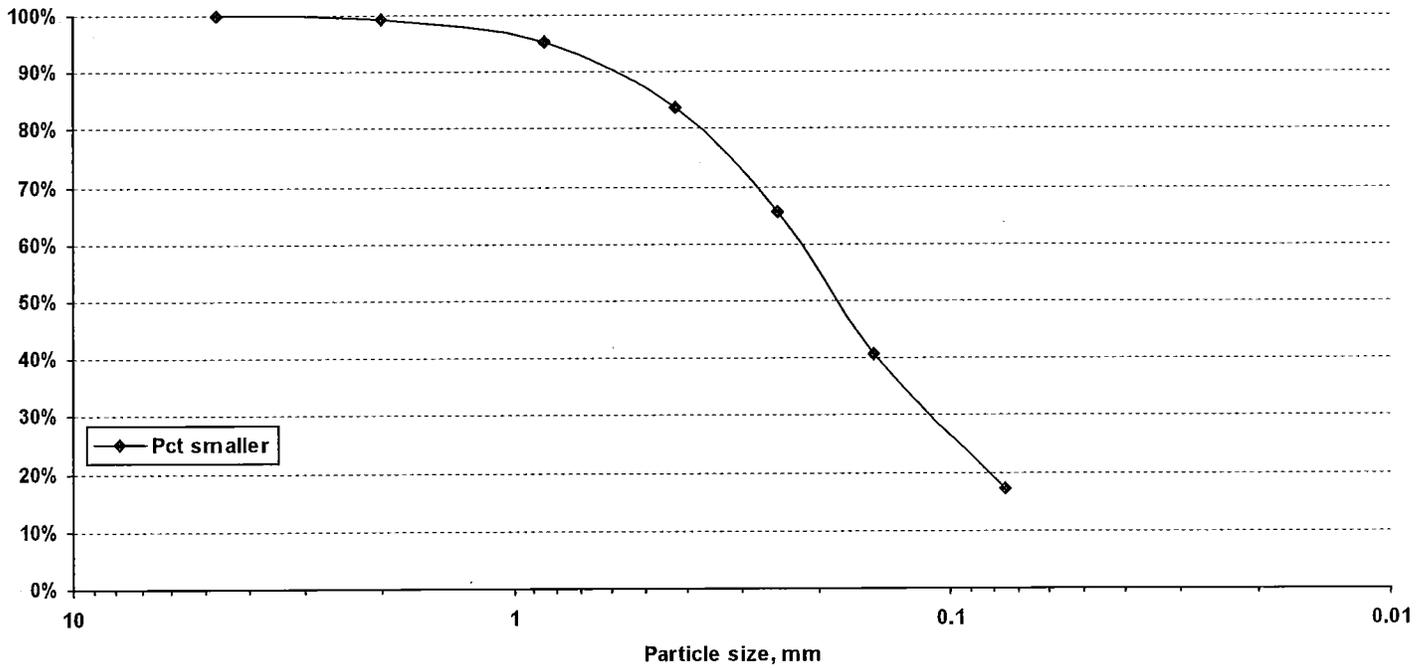
Number: BHF 037-2(11)

Site: VT-14 BR-82

Hole: B-2

Depth: 54 FT - 56 FT

T-88 Particle size analysis



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Distribution list  
TERRACON  
T. ELIASSEN  
J. TOUCHETTE

Report on Soil Sample

Lab number: E140668      Corrected copy: N/A      Report Date: 4/30/2014 8:45:40 A  
Project: CALAIS      Number: BHF 037-2(11)      Site: VT-14 BR-82  
Date sampled: 4/14/2014    Received: 4/18/2014    Tested: 4/28/2014    Tested by: J. TOUCHETTE  
Station:      Offset:      Hole: B-2      Depth: 59 FT to: 61 FT  
Field description: Si Sa w/Gr  
Submitted by: TERRACON      Address:  
Sample type: SPLIT BARREL      Quantity:  
Sample source/Outside agency name:  
Location used:      Examined for: MC, GS  
Comment:

Test Results

Sieve Analysis	
T-88	% Passing
Total Sample	
75 mm (3.0"):	
37.5 mm (1.5"):	
19 mm (3/4"):	
9.5 mm (3/8"):	
4.75 mm (#4):	100.0%
2.00 mm (#10):	99.7%
850 µm (#20):	99.3%
425 µm (#40):	97.2%
250 µm (#60):	91.1%
150 µm (#100):	80.0%
75 µm (#200):	52.3%

Hydrometer Analysis	
Particles smaller	% total sample
0.05 mm:	
0.02 mm:	
0.005 mm:	
0.002 mm:	
0.001 mm:	

Limits	
T-265 Moisture content:	23.6%
T-89 Liquid Limit:	
T-90 Plastic Limit:	
T-90 Plasticity Index:	NP
Moisture Density	
Test method:	T-180      Method:
Maximum density:	pcf
Optimum moisture:	
T-100 Specific Gravity:	
Gr: 0.3%	D2487: ML
Sa: 47.4%	M145: A-4      Sandy Silt
Si: 52.3%	

Comments:

Reviewed by: T. Eliassen, P.G., Transportation Geologist *TE*

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Materials and Research Section  
1 National Life Drive  
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Distribution list

Report on Soil Sample

Lab number: E140668

Corrected copy: N/A

Report Date: 4/30/2014 8:45:44 A

Project: CALAIS

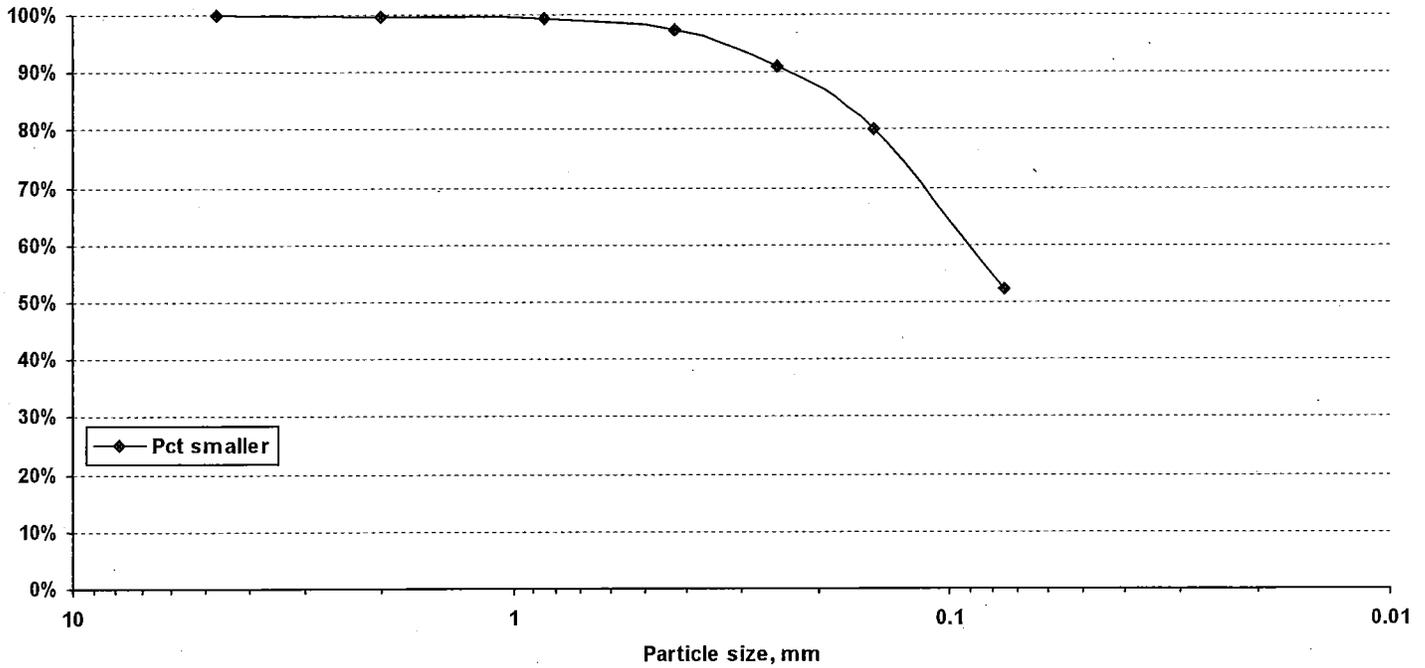
Number: BHF 037-2(11)

Site: VT-14 BR-82

Hole: B-2

Depth: 59 FT - 61 FT

T-88 Particle size analysis



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Distribution list  
TERRACON  
T. ELIASSEN  
J. TOUCHETTE

Report on Soil Sample

Lab number: E140669      Corrected copy: N/A      Report Date: 4/30/2014 8:47:23 A  
Project: CALAIS      Number: BHF 037-2(11)      Site: VT-14 BR-82  
Date sampled: 4/14/2014    Received: 4/18/2014    Tested: 4/28/2014    Tested by: J. TOUCHETTE  
Station:      Offset:      Hole: B-2      Depth: 64 FT to: 66 FT  
Field description: NONE  
Submitted by: TERRACON      Address:  
Sample type: SPLIT BARREL      Quantity:  
Sample source/Outside agency name:  
Location used:      Examined for: MC, GS  
Comment:

Test Results

Sieve Analysis	
T-88	% Passing
Total Sample	
75 mm (3.0"):	
37.5 mm (1.5"):	
19 mm (3/4"):	
9.5 mm (3/8"):	89.9%
4.75 mm (#4):	78.1%
2.00 mm (#10):	72.0%
850 µm (#20):	64.8%
425 µm (#40):	60.0%
250 µm (#60):	55.0%
150 µm (#100):	41.0%
75 µm (#200):	22.4%

Hydrometer Analysis	
Particles smaller	% total sample
0.05 mm:	
0.02 mm:	
0.005 mm:	
0.002 mm:	
0.001 mm:	

Limits	
T-265 Moisture content:	16.4%
T-89 Liquid Limit:	
T-90 Plastic Limit:	
T-90 Plasticity Index:	NP
Moisture Density	
Test method:	T-180      Method:
Maximum density:	pcf
Optimum moisture:	
T-100 Specific Gravity:	
Gr:	28.0%    D2487: SM
Sa:	49.6%    M145: A-2-4    Silty Gravelly Sand
Si:	22.4%

Comments: LAB NOTE: BROKEN ROCK WAS WITHIN SAMPLE.

Reviewed by: T. Eliassen, P.G., Transportation Geologist *TE*

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Distribution list

Report on Soil Sample

Lab number: E140669

Corrected copy: N/A

Report Date: 4/30/2014 8:47:26 A

Project: CALAIS

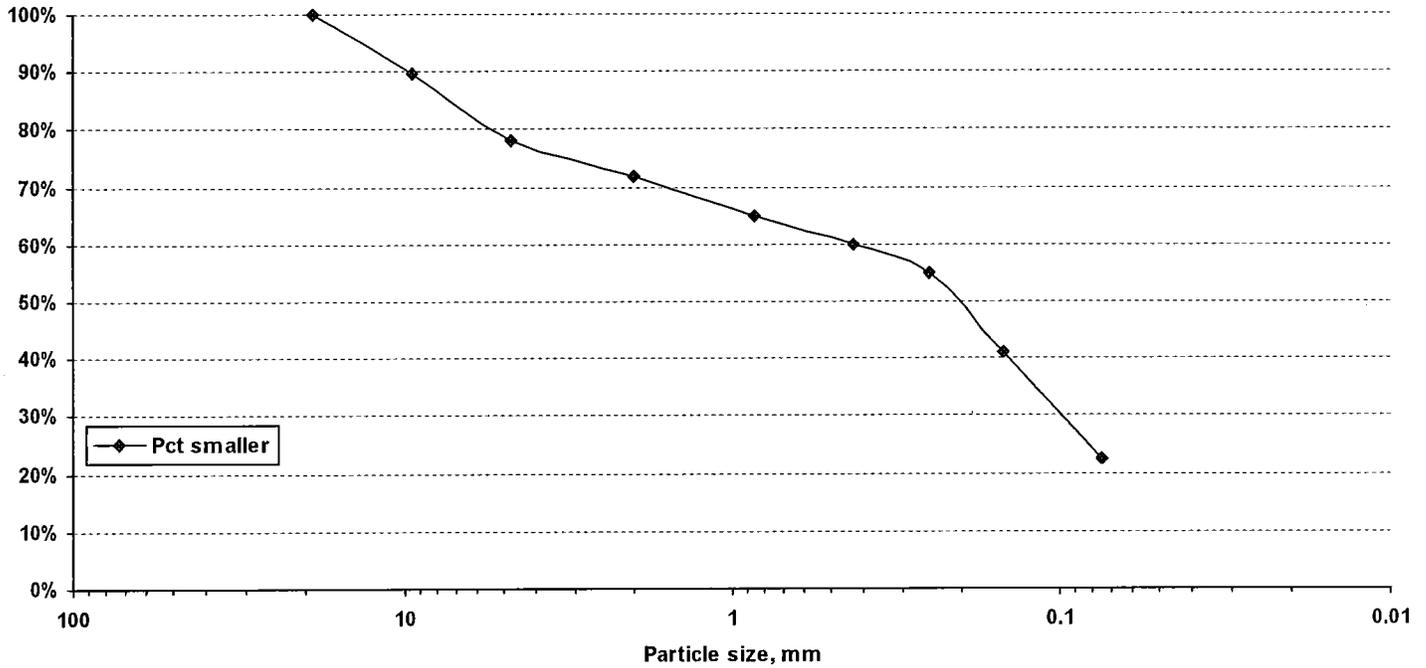
Number: BHF 037-2(11)

Site: VT-14 BR-82

Hole: B-2

Depth: 64 FT - 66 FT

T-88 Particle size analysis



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Distribution list  
TERRACON  
T. ELIASSEN  
J. TOUCHETTE

Report on Soil Sample

Lab number: E140670      Corrected copy: N/A      Report Date: 4/30/2014 8:49:42 A  
Project: CALAIS      Number: BHF 037-2(11)      Site: VT-14 BR-82  
Date sampled: 4/14/2014    Received: 4/18/2014    Tested: 4/28/2014    Tested by: J. TOUCHETTE  
Station:      Offset:      Hole: B-2      Depth: 69 FT to: 71 FT  
Field description: Sa Gr w/Si  
Submitted by: TERRACON      Address:  
Sample type: SPLIT BARREL      Quantity:  
Sample source/Outside agency name:  
Location used:      Examined for: MC, GS  
Comment:

Test Results

T-88	Sieve Analysis
	% Passing
	Total Sample
75 mm (3.0"):	
37.5 mm (1.5"):	
19 mm (3/4"):	89.6%
9.5 mm (3/8"):	81.5%
4.75 mm (#4):	67.0%
2.00 mm (#10):	52.6%
850 µm (#20):	39.7%
425 µm (#40):	33.9%
250 µm (#60):	30.8%
150 µm (#100):	27.7%
75 µm (#200):	20.9%

Limits  
T-265 Moisture content: 11.1%  
T-89 Liquid Limit:  
T-90 Plastic Limit:  
T-90 Plasticity Index: NP

Moisture Density  
Test method: T-180      Method:  
Maximum density:      pcf  
Optimum moisture:  
T-100 Specific Gravity:

Gr: 47.4%    D2487: SM  
Sa: 31.7%    M145: A-1-b    Silty Sandy Gravel  
Si: 20.9%

Hydrometer Analysis	
Particles smaller	% total sample
0.05 mm:	
0.02 mm:	
0.005 mm:	
0.002 mm:	
0.001 mm:	

Comments:

Reviewed by: T. Eliassen, P.G., Transportation Geologist *TE*

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Distribution list

Report on Soil Sample

Lab number: E140670

Corrected copy: N/A

Report Date: 4/30/2014 8:49:46 A

Project: CALAIS

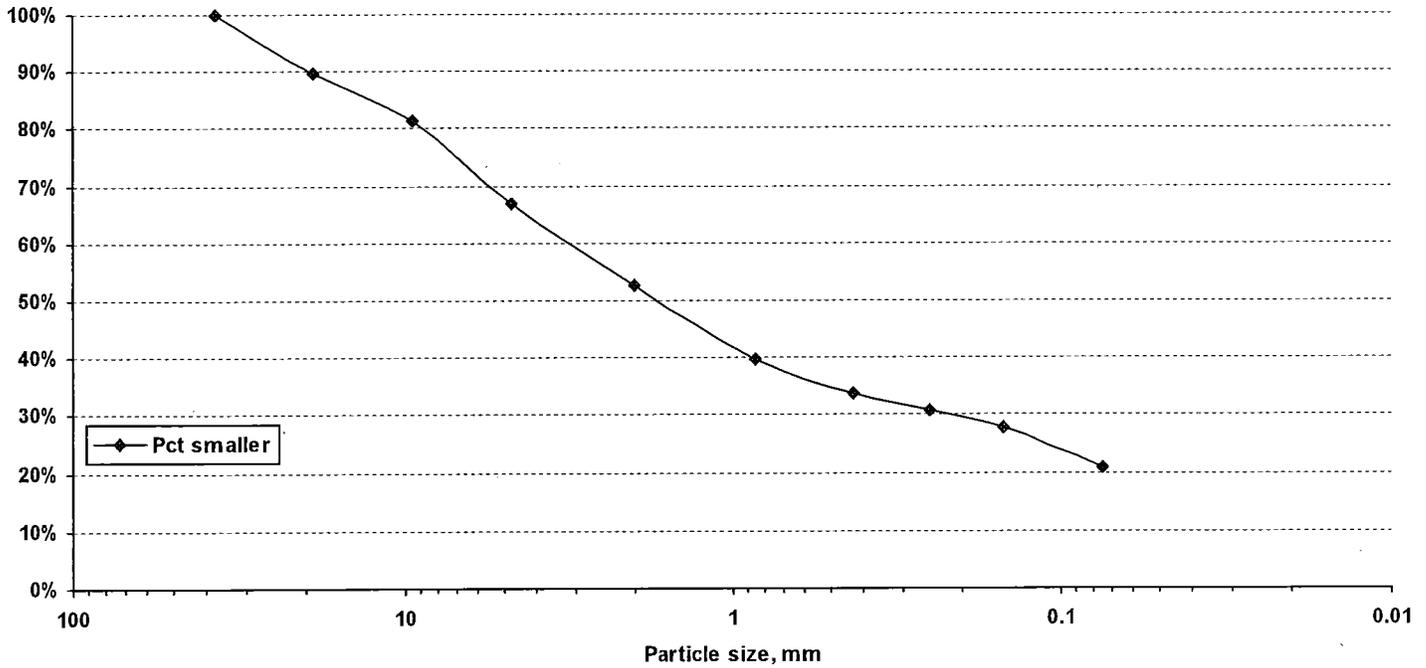
Number: BHF 037-2(11)

Site: VT-14 BR-82

Hole: B-2

Depth: 69 FT - 71 FT

T-88 Particle size analysis



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Distribution list  
TERRACON  
T. ELIASSEN  
J. TOUCHETTE

Report on Soil Sample

Lab number: E140671      Corrected copy: N/A      Report Date: 4/30/2014 8:51:25 A  
Project: CALAIS      Number: BHF 037-2(11)      Site: VT-14 BR-82  
Date sampled: 4/14/2014    Received: 4/18/2014    Tested: 4/28/2014    Tested by: J. TOUCHETTE  
Station:      Offset:      Hole: B-2      Depth: 74 FT to: 76 FT  
Field description: Gr Sa  
Submitted by: TERRACON      Address:  
Sample type: SPLIT BARREL      Quantity:  
Sample source/Outside agency name:  
Location used:      Examined for: MC, GS  
Comment:

Test Results

Sieve Analysis	
T-88	% Passing
Total Sample	
75 mm (3.0"):	
37.5 mm (1.5"):	
19 mm (3/4"):	
9.5 mm (3/8"):	96.4%
4.75 mm (#4):	89.0%
2.00 mm (#10):	76.3%
850 µm (#20):	48.1%
425 µm (#40):	31.2%
250 µm (#60):	25.2%
150 µm (#100):	21.9%
75 µm (#200):	17.0%

Hydrometer Analysis	
Particles smaller	% total sample
0.05 mm:	
0.02 mm:	
0.005 mm:	
0.002 mm:	
0.001 mm:	

Limits	
T-265 Moisture content:	14.6%
T-89 Liquid Limit:	
T-90 Plastic Limit:	
T-90 Plasticity Index:	NP
Moisture Density	
Test method:	T-180      Method:
Maximum density:	pcf
Optimum moisture:	
T-100 Specific Gravity:	
Gr: 23.7%	D2487: SM
Sa: 59.3%	M145: A-1-b      Gravelly Sand
Si: 17.0%	

Comments:

Reviewed by: T. Eliassen, P.G., Transportation Geologist *TE*

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Distribution list

Report on Soil Sample

Lab number: E140671

Corrected copy: N/A

Report Date: 4/30/2014 8:51:29 A

Project: CALAIS

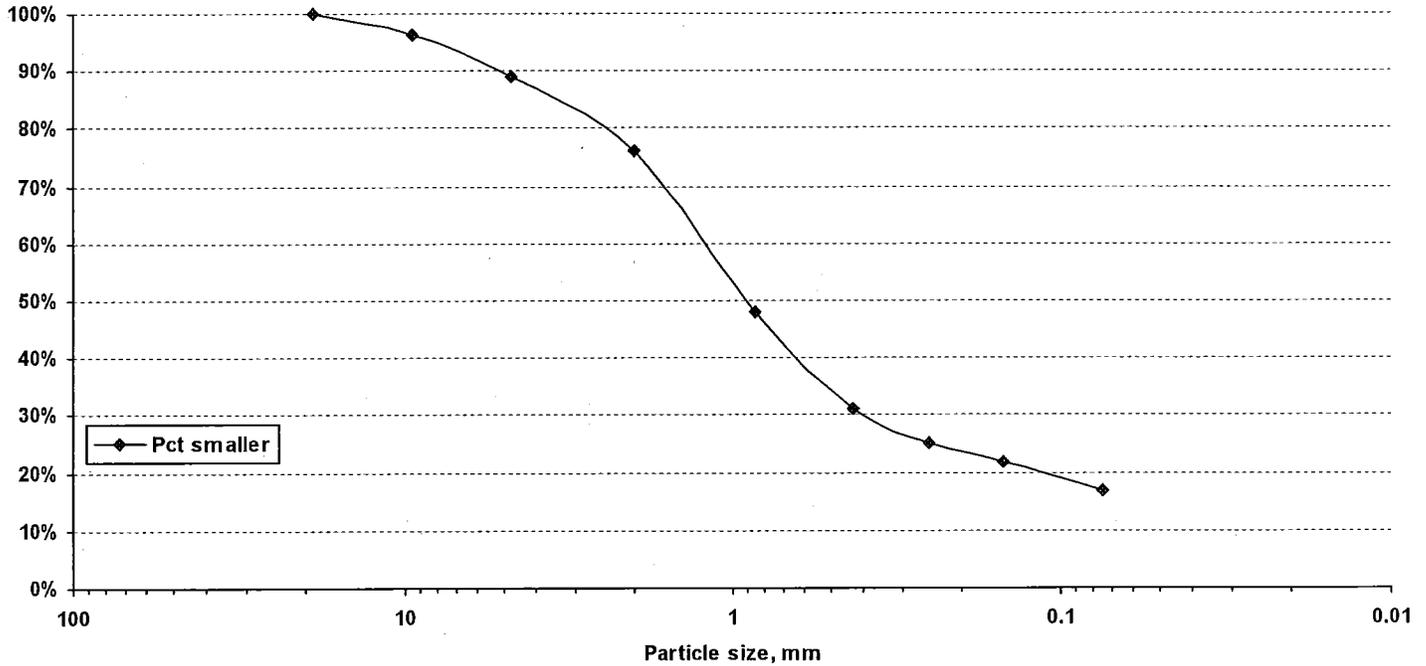
Number: BHF 037-2(11)

Site: VT-14 BR-82

Hole: B-2

Depth: 74 FT - 76 FT

T-88 Particle size analysis



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Distribution list  
TERRACON  
T. ELIASSEN  
J. TOUCHETTE

Report on Soil Sample

Lab number: E140672      Corrected copy: N/A      Report Date: 4/30/2014 8:53:21 A  
Project: CALAIS      Number: BHF 037-2(11)      Site: VT-14 BR-82  
Date sampled: 4/14/2014    Received: 4/18/2014    Tested: 4/28/2014    Tested by: J. TOUCHETTE  
Station:      Offset:      Hole: B-2      Depth: 79 FT to: 81 FT  
Field description: SAND  
Submitted by: TERRACON      Address:  
Sample type: SPLIT BARREL      Quantity:  
Sample source/Outside agency name:  
Location used:      Examined for: MC, GS  
Comment:

Test Results

Sieve Analysis	
T-88	% Passing
Total Sample	
75 mm (3.0"):	
37.5 mm (1.5"):	
19 mm (3/4"):	
9.5 mm (3/8"):	
4.75 mm (#4):	97.6%
2.00 mm (#10):	97.2%
850 µm (#20):	96.6%
425 µm (#40):	75.1%
250 µm (#60):	26.5%
150 µm (#100):	14.4%
75 µm (#200):	9.1%

Hydrometer Analysis	
Particles smaller	% total sample
0.05 mm:	
0.02 mm:	
0.005 mm:	
0.002 mm:	
0.001 mm:	

Limits	
T-265 Moisture content:	20.9%
T-89 Liquid Limit:	
T-90 Plastic Limit:	
T-90 Plasticity Index:	NP
Moisture Density	
Test method:	T-180      Method:
Maximum density:	pcf
Optimum moisture:	
T-100 Specific Gravity:	
Gr: 2.8%	D2487: SP-SM
Sa: 88.0%	M145: A-3      Sand
Si: 9.1%	

Comments:

Reviewed by: T. Eliassen, P.G., Transportation Geologist *TE*

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Distribution list

Report on Soil Sample

Lab number: E140672

Corrected copy: N/A

Report Date: 4/30/2014 8:53:28 A

Project: CALAIS

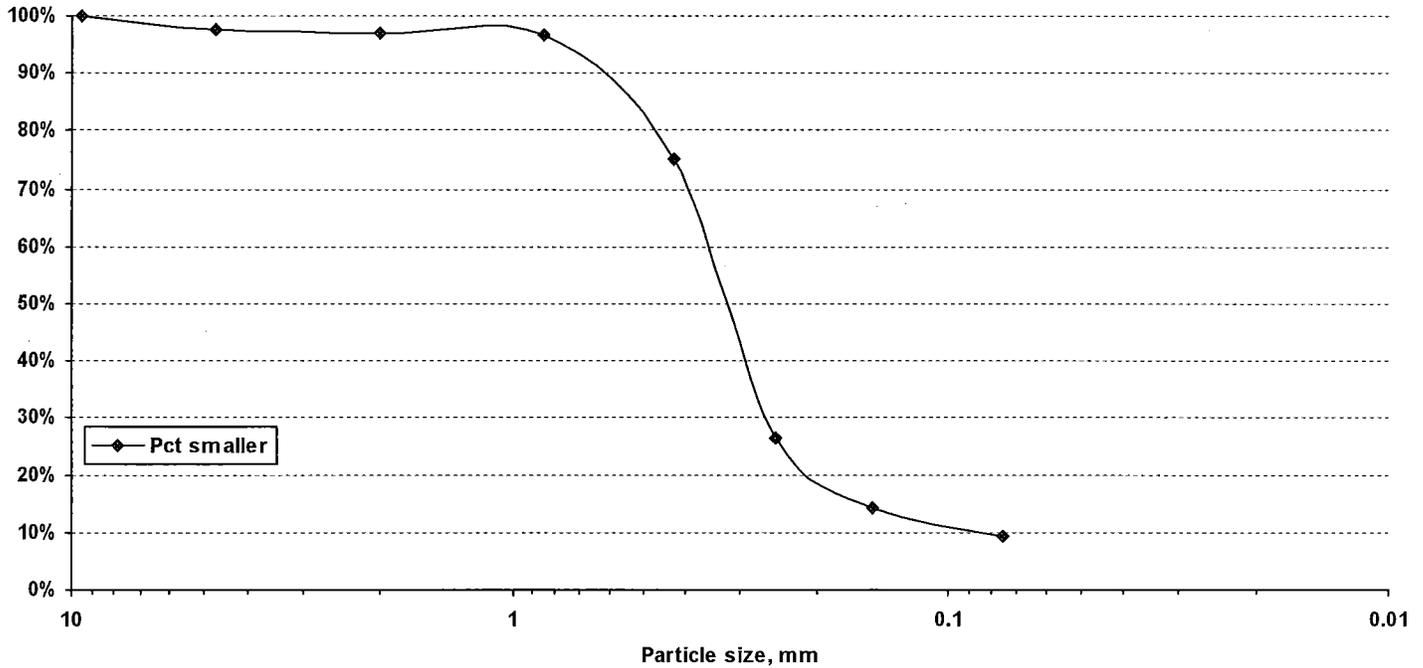
Number: BHF 037-2(11)

Site: VT-14 BR-82

Hole: B-2

Depth: 79 FT - 81 FT

T-88 Particle size analysis



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Distribution list  
TERRACON  
T. ELIASSEN  
J. TOUCHETTE

Report on Soil Sample

Lab number: E140673      Corrected copy: N/A      Report Date: 4/30/2014 8:55:50 A  
Project: CALAIS      Number: BHF 037-2(11)      Site: VT-14 BR-82  
Date sampled: 4/14/2014    Received: 4/18/2014    Tested: 4/28/2014    Tested by: J. TOUCHETTE  
Station:      Offset:      Hole: B-2      Depth: 84 FT to: 86 FT  
Field description: NONE  
Submitted by: TERRACON      Address:  
Sample type: SPLIT BARREL      Quantity:  
Sample source/Outside agency name:  
Location used:      Examined for: MC, GS  
Comment:

Test Results

Sieve Analysis	
T-88	% Passing
Total Sample	
75 mm (3.0"):	
37.5 mm (1.5"):	
19 mm (3/4"):	
9.5 mm (3/8"):	99.7%
4.75 mm (#4):	97.3%
2.00 mm (#10):	97.1%
850 µm (#20):	95.6%
425 µm (#40):	86.5%
250 µm (#60):	46.5%
150 µm (#100):	18.5%
75 µm (#200):	9.4%

Hydrometer Analysis	
Particles smaller	% total sample
0.05 mm:	
0.02 mm:	
0.005 mm:	
0.002 mm:	
0.001 mm:	

Limits	
T-265 Moisture content:	21.0%
T-89 Liquid Limit:	
T-90 Plastic Limit:	
T-90 Plasticity Index:	NP
Moisture Density	
Test method:	T-180      Method:
Maximum density:	pcf
Optimum moisture:	
T-100 Specific Gravity:	
Gr: 2.9%	D2487: SP-SM
Sa: 87.6%	M145: A-3      Sand
Si: 9.4%	

Comments:

Reviewed by: T. Eliassen, P.G., Transportation Geologist *TE*

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Distribution list

Report on Soil Sample

Lab number: E140673

Corrected copy: N/A

Report Date: 4/30/2014 8:55:54 A

Project: CALAIS

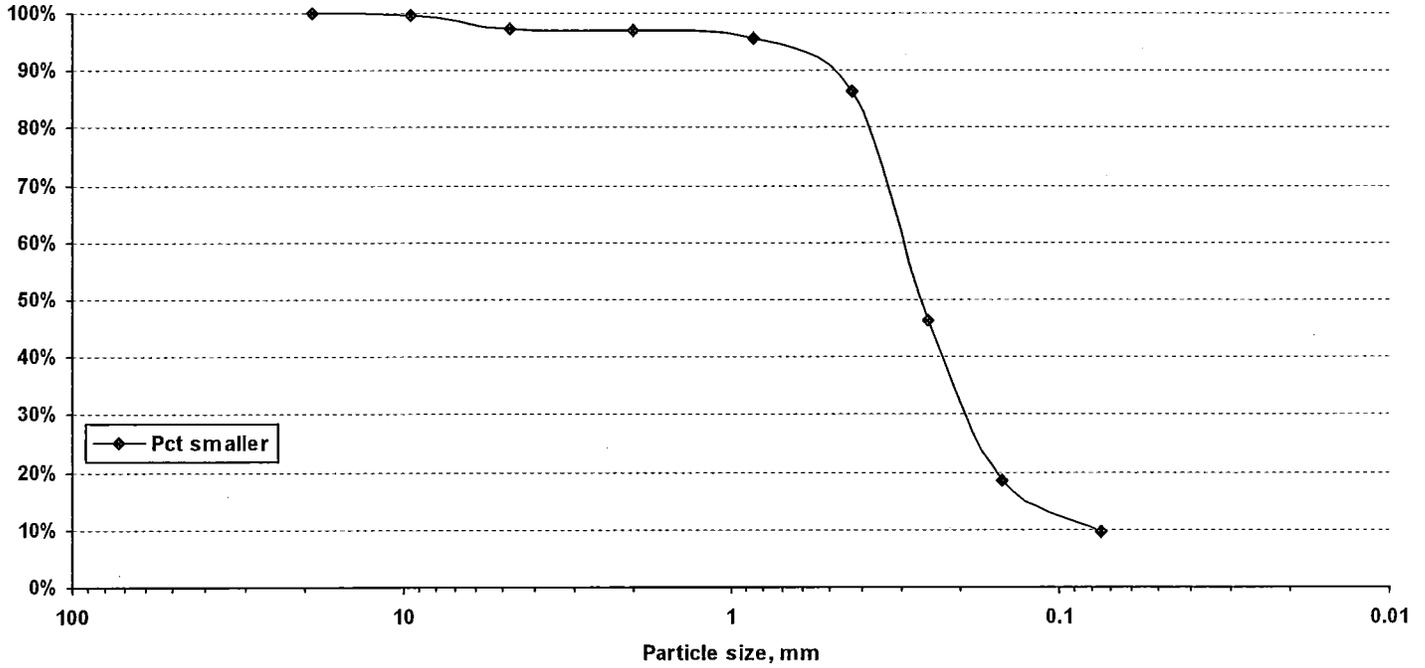
Number: BHF 037-2(11)

Site: VT-14 BR-82

Hole: B-2

Depth: 84 FT - 86 FT

T-88 Particle size analysis



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Distribution list  
TERRACON  
T. ELIASSEN  
J. TOUCHETTE

Report on Soil Sample

Lab number: E140674      Corrected copy: N/A      Report Date: 4/30/2014 8:57:39 A  
Project: CALAIS      Number: BHF 037-2(11)      Site: VT-14 BR-82  
Date sampled: 4/14/2014    Received: 4/18/2014    Tested: 4/28/2014    Tested by: J. TOUCHETTE  
Station:      Offset:      Hole: B-2      Depth: 89 FT to: 91 FT  
Field description: Sa & Gr  
Submitted by: TERRACON      Address:  
Sample type: SPLIT BARREL      Quantity:  
Sample source/Outside agency name:  
Location used:      Examined for: MC, GS  
Comment:

Test Results

Sieve Analysis	
T-88	% Passing
Total Sample	
75 mm (3.0"):	
37.5 mm (1.5"):	
19 mm (3/4"):	82.2%
9.5 mm (3/8"):	64.5%
4.75 mm (#4):	50.8%
2.00 mm (#10):	40.1%
850 µm (#20):	32.8%
425 µm (#40):	26.9%
250 µm (#60):	21.0%
150 µm (#100):	17.5%
75 µm (#200):	13.5%

Hydrometer Analysis	
Particles smaller	% total sample
0.05 mm:	
0.02 mm:	
0.005 mm:	
0.002 mm:	
0.001 mm:	

Limits	
T-265 Moisture content:	9.5%
T-89 Liquid Limit:	
T-90 Plastic Limit:	
T-90 Plasticity Index:	NP
Moisture Density	
Test method:	T-180      Method:
Maximum density:	pcf
Optimum moisture:	
T-100 Specific Gravity:	
Gr: 59.9%	D2487: GM
Sa: 26.6%	M145: A-1-a      Sandy Gravel
Si: 13.5%	

Comments:

Reviewed by: T. Eliassen, P.G., Transportation Geologist *TE*

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Distribution list

Report on Soil Sample

Lab number: E140674

Corrected copy: N/A

Report Date: 4/30/2014 8:57:43 A

Project: CALAIS

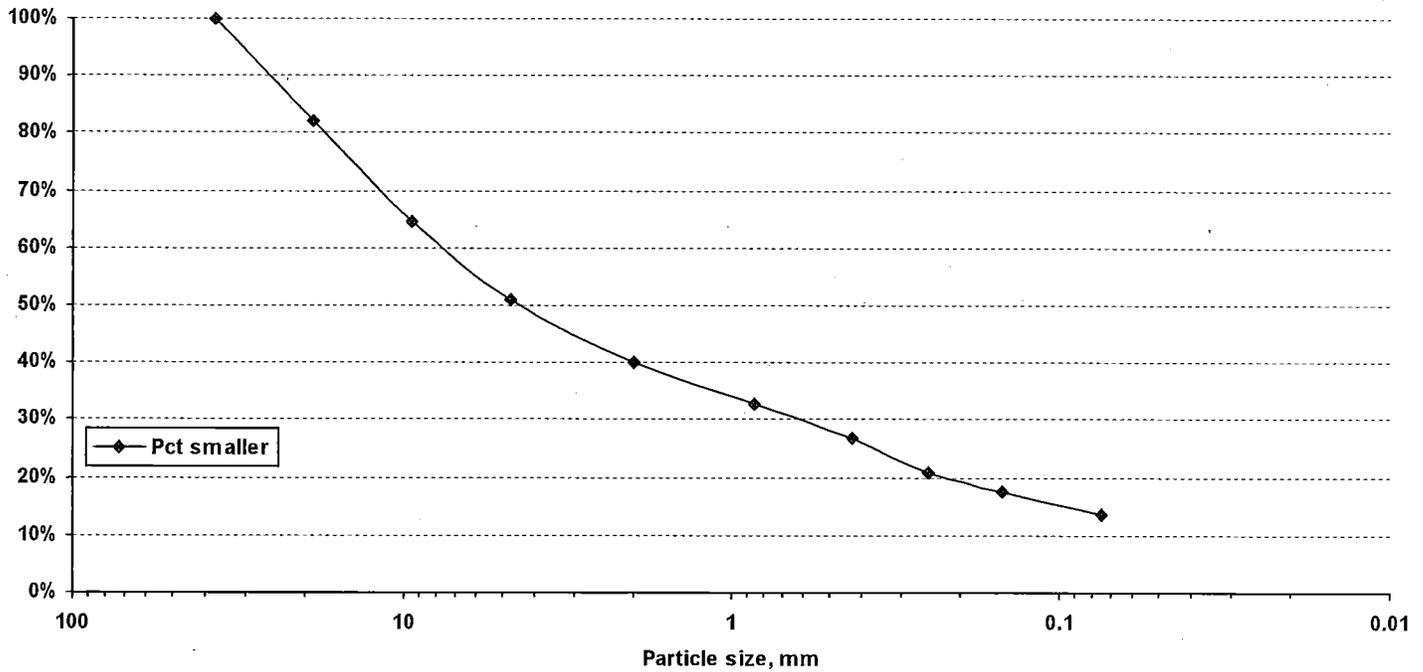
Number: BHF 037-2(11)

Site: VT-14 BR-82

Hole: B-2

Depth: 89 FT - 91 FT

T-88 Particle size analysis



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Distribution list  
TERRACON  
T. ELIASSEN  
J. TOUCHETTE

Report on Soil Sample

Lab number: E140675      Corrected copy: N/A      Report Date: 4/30/2014 8:59:20 A  
Project: CALAIS      Number: BHF 037-2(11)      Site: VT-14 BR-82  
Date sampled: 4/14/2014    Received: 4/18/2014    Tested: 4/28/2014    Tested by: J. TOUCHETTE  
Station:      Offset:      Hole: B-2      Depth: 94 FT to: 96 FT  
Field description: NONE  
Submitted by: TERRACON      Address:  
Sample type: SPLIT BARREL      Quantity:  
Sample source/Outside agency name:  
Location used:      Examined for: MC, GS  
Comment:

Test Results

T-88	Sieve Analysis
	% Passing
	Total Sample
75 mm (3.0"):	
37.5 mm (1.5"):	
19 mm (3/4"):	
9.5 mm (3/8"):	
4.75 mm (#4):	98.6%
2.00 mm (#10):	96.8%
850 µm (#20):	70.2%
425 µm (#40):	42.6%
250 µm (#60):	25.6%
150 µm (#100):	19.6%
75 µm (#200):	14.4%

Hydrometer Analysis	
Particles smaller	% total sample
0.05 mm:	
0.02 mm:	
0.005 mm:	
0.002 mm:	
0.001 mm:	

Limits	
T-265 Moisture content:	17.2%
T-89 Liquid Limit:	
T-90 Plastic Limit:	
T-90 Plasticity Index:	NP
Moisture Density	
Test method:	T-180      Method:
Maximum density:	pcf
Optimum moisture:	
T-100 Specific Gravity:	
Gr: 3.2%	D2487: SM
Sa: 82.3%	M145: A-1-b      Sand
Si: 14.4%	

Comments:

Reviewed by: T. Eliassen, P.G., Transportation Geologist *TE*

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Distribution list

Report on Soil Sample

Lab number: E140675

Corrected copy: N/A

Report Date: 4/30/2014 8:59:26 A

Project: CALAIS

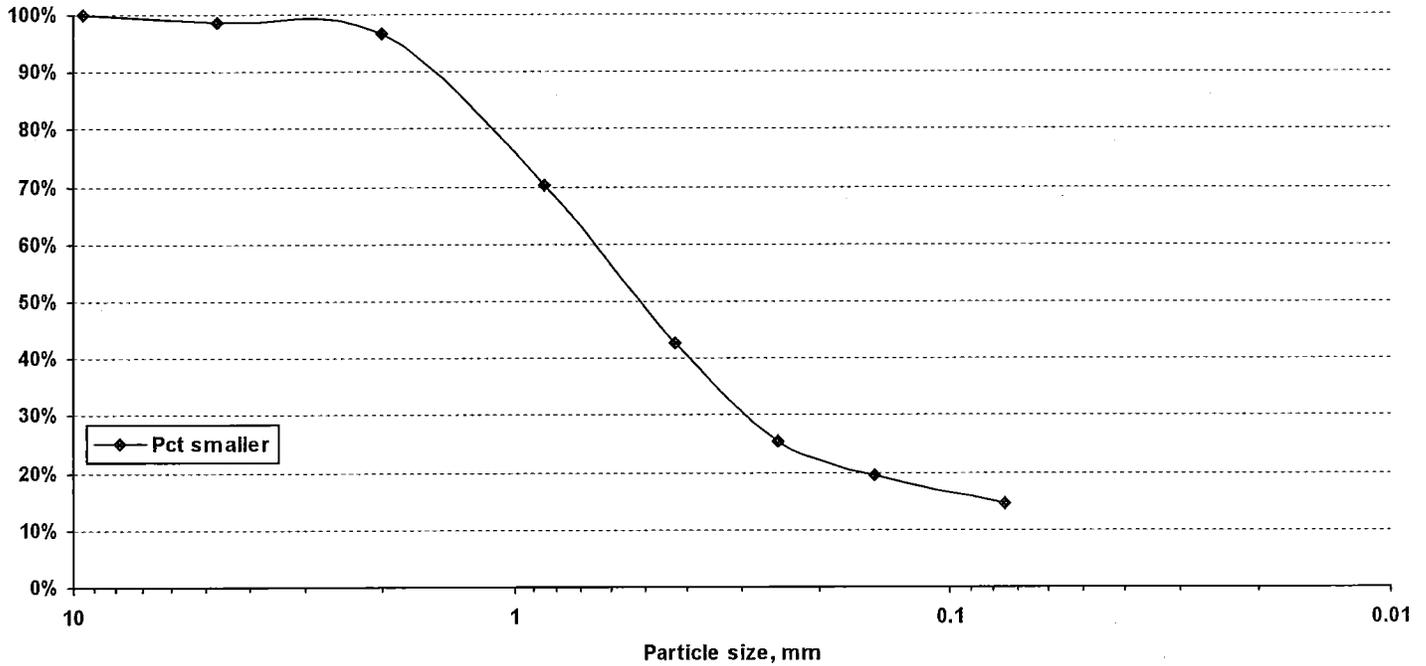
Number: BHF 037-2(11)

Site: VT-14 BR-82

Hole: B-2

Depth: 94 FT - 96 FT

T-88 Particle size analysis



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Distribution list  
TERRACON  
T. ELIASSEN  
J. TOUCHETTE

Report on Soil Sample

Lab number: E140676      Corrected copy: N/A      Report Date: 4/30/2014 9:01:02 A  
Project: CALAIS      Number: BHF 037-2(11)      Site: VT-14 BR-82  
Date sampled: 4/14/2014    Received: 4/18/2014    Tested: 4/28/2014    Tested by: J. TOUCHETTE  
Station:      Offset:      Hole: B-2      Depth: 99 FT to: 101 FT  
Field description: NONE  
Submitted by: TERRACON      Address:  
Sample type: SPLIT BARREL      Quantity:  
Sample source/Outside agency name:  
Location used:      Examined for: MC, GS  
Comment:

Test Results

T-88	Sieve Analysis
	% Passing
	Total Sample
75 mm (3.0"):	
37.5 mm (1.5"):	
19 mm (3/4"):	
9.5 mm (3/8"):	
4.75 mm (#4):	99.1%
2.00 mm (#10):	96.8%
850 µm (#20):	78.6%
425 µm (#40):	47.1%
250 µm (#60):	31.0%
150 µm (#100):	20.7%
75 µm (#200):	12.6%

Hydrometer Analysis	
Particles smaller	% total sample
0.05 mm:	
0.02 mm:	
0.005 mm:	
0.002 mm:	
0.001 mm:	

Limits	
T-265 Moisture content:	16.4%
T-89 Liquid Limit:	
T-90 Plastic Limit:	
T-90 Plasticity Index:	NP
Moisture Density	
Test method:	T-180      Method:
Maximum density:	pcf
Optimum moisture:	
T-100 Specific Gravity:	
Gr:	3.2%    D2487: SM
Sa:	84.2%    M145: A-1-b    Sand
Si:	12.6%

Comments:

Reviewed by: T. Eliassen, P.G., Transportation Geologist *TE*

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Materials and Research Section  
1 National Life Drive  
Montpelier, VT 05633-5001

Distribution list

Report on Soil Sample

Lab number: E140676

Corrected copy: N/A

Report Date: 4/30/2014 9:01:07 A

Project: CALAIS

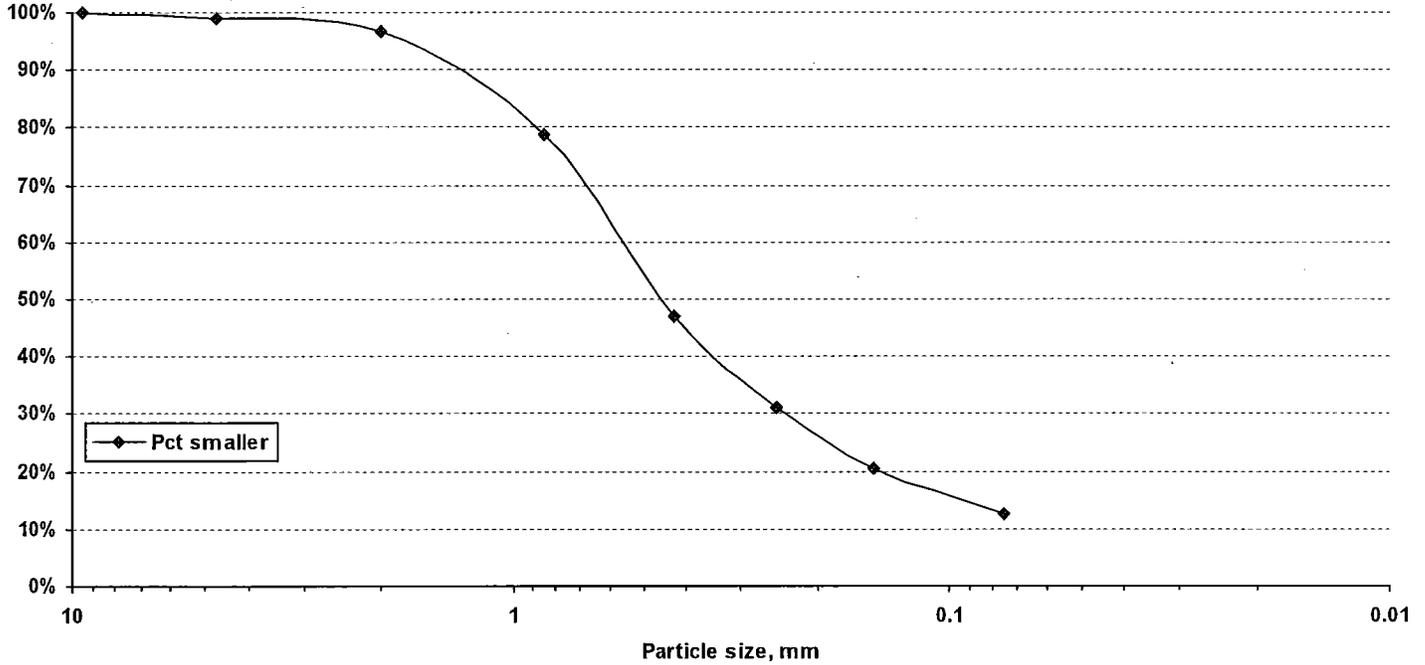
Number: BHF 037-2(11)

Site: VT-14 BR-82

Hole: B-2

Depth: 99 FT - 101 FT

T-88 Particle size analysis



Vermont Agency of Transportation  
Materials and Research Section  
1 National Life Drive  
Montpelier, VT 05633-5001

Distribution list  
TERRACON  
T. ELIASSEN  
J. TOUCHETTE

Report on Soil Sample

Lab number: E140677      Corrected copy: N/A      Report Date: 4/30/2014 9:02:48 A  
Project: CALAIS      Number: BHF 037-2(11)      Site: VT-14 BR-82  
Date sampled: 4/15/2014    Received: 4/18/2014    Tested: 4/28/2014    Tested by: J. TOUCHETTE  
Station:      Offset:      Hole: B-2      Depth: 120 FT to: 122 FT  
Field description: Gr Sa  
Submitted by: TERRACON      Address:  
Sample type: SPLIT BARREL      Quantity:  
Sample source/Outside agency name:  
Location used:      Examined for: MC, GS  
Comment:

Test Results

T-88	Sieve Analysis
	% Passing
	Total Sample
75 mm (3.0"):	
37.5 mm (1.5"):	
19 mm (3/4"):	84.5%
9.5 mm (3/8"):	66.5%
4.75 mm (#4):	45.0%
2.00 mm (#10):	34.2%
850 µm (#20):	27.5%
425 µm (#40):	22.7%
250 µm (#60):	19.9%
150 µm (#100):	18.1%
75 µm (#200):	15.3%

Hydrometer Analysis	
Particles smaller	% total sample
0.05 mm:	
0.02 mm:	
0.005 mm:	
0.002 mm:	
0.001 mm:	

Limits	
T-265 Moisture content:	8.9%
T-89 Liquid Limit:	
T-90 Plastic Limit:	
T-90 Plasticity Index:	NP
Moisture Density	
Test method:	T-180      Method:
Maximum density:	pcf
Optimum moisture:	
T-100 Specific Gravity:	
Gr: 65.8%	D2487: GM
Sa: 18.9%	M145: A-1-a      Gravel
Si: 15.3%	

Comments:

Reviewed by: T. Eliassen, P.G., Transportation Geologist *TE*

Vermont Agency of Transportation  
Materials and Research Section  
1 National Life Drive  
Montpelier, VT 05633-5001

Distribution list

Report on Soil Sample

Lab number: E140677

Corrected copy: N/A

Report Date: 4/30/2014 9:02:52 A

Project: CALAIS

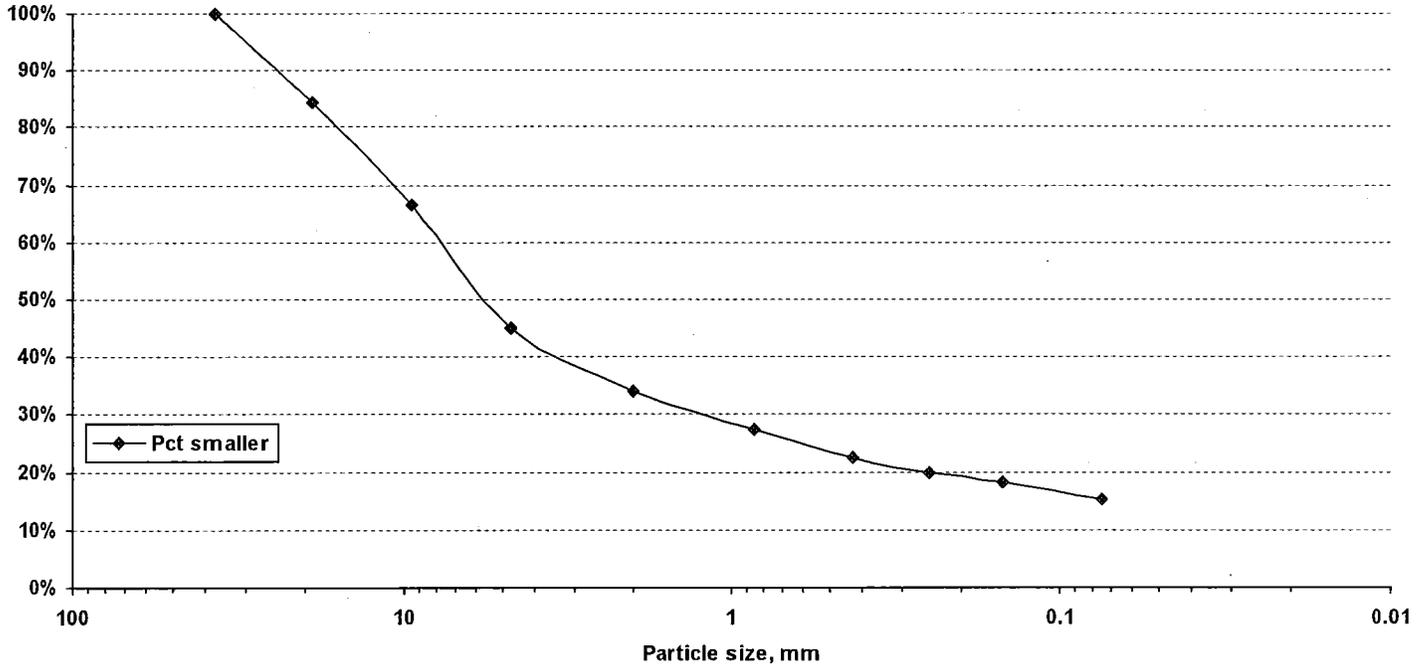
Number: BHF 037-2(11)

Site: VT-14 BR-82

Hole: B-2

Depth: 120 FT - 122 FT

T-88 Particle size analysis



Vermont Agency of Transportation  
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Montpelier, VT 05633-5001

Distribution list  
TERRACON  
T. ELIASSEN  
J. TOUCHETTE

Report on Soil Sample

Lab number: E140678      Corrected copy: N/A      Report Date: 4/30/2014 9:04:38 A  
Project: CALAIS      Number: BHF 037-2(11)      Site: VT-14 BR-82  
Date sampled: 4/15/2014    Received: 4/18/2014    Tested: 4/28/2014    Tested by: J. TOUCHETTE  
Station:      Offset:      Hole: B-2      Depth: 130 FT to: 132 FT  
Field description: Gr Sa w/Si  
Submitted by: TERRACON      Address:  
Sample type: SPLIT BARREL      Quantity:  
Sample source/Outside agency name:  
Location used:      Examined for: MC, GS  
Comment:

Test Results

	Sieve Analysis
T-88	% Passing
	Total Sample
75 mm (3.0"):	
37.5 mm (1.5"):	
19 mm (3/4"):	85.6%
9.5 mm (3/8"):	66.3%
4.75 mm (#4):	47.0%
2.00 mm (#10):	39.5%
850 µm (#20):	35.1%
425 µm (#40):	32.3%
250 µm (#60):	27.1%
150 µm (#100):	20.0%
75 µm (#200):	13.2%

Hydrometer Analysis	
Particles smaller	% total sample
0.05 mm:	
0.02 mm:	
0.005 mm:	
0.002 mm:	
0.001 mm:	

Limits	
T-265 Moisture content:	12.6%
T-89 Liquid Limit:	
T-90 Plastic Limit:	
T-90 Plasticity Index:	NP
Moisture Density	
Test method:	T-180      Method:
Maximum density:	pcf
Optimum moisture:	
T-100 Specific Gravity:	
Gr:	60.5%    D2487: GM
Sa:	26.3%    M145: A-1-b    Sandy Gravel
Si:	13.2%

Comments:

Reviewed by: T. Eliassen, P.G., Transportation Geologist *TE*

Vermont Agency of Transportation  
Materials and Research Section  
1 National Life Drive  
Montpelier, VT 05633-5001

Distribution list

Report on Soil Sample

Lab number: E140678

Corrected copy: N/A

Report Date: 4/30/2014 9:04:41 A

Project: CALAIS

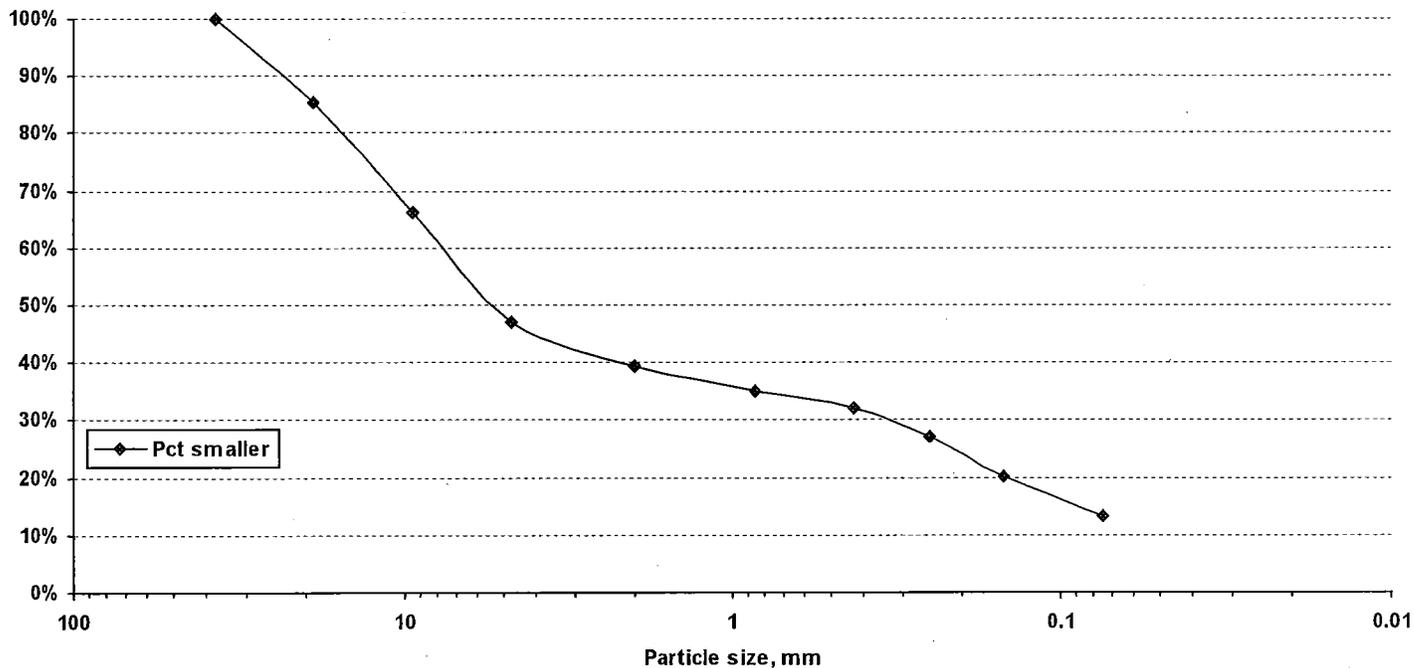
Number: BHF 037-2(11)

Site: VT-14 BR-82

Hole: B-2

Depth: 130 FT - 132 FT

T-88 Particle size analysis



Vermont Agency of Transportation  
Materials and Research Section  
1 National Life Drive  
Montpelier, VT 05633-5001

Distribution list  
TERRACON  
T. ELIASSEN  
J. TOUCHETTE

Report on Soil Sample

Lab number: E140679      Corrected copy: N/A      Report Date: 4/30/2014 9:06:10 A  
Project: CALAIS      Number: BHF 037-2(11)      Site: VT-14 BR-82  
Date sampled: 4/15/2014    Received: 4/18/2014    Tested: 4/28/2014    Tested by: J. TOUCHETTE  
Station:      Offset:      Hole: B-2      Depth: 150 FT to: 152 FT  
Field description: SAND  
Submitted by: TERRACON      Address:  
Sample type: SPLIT BARREL      Quantity:  
Sample source/Outside agency name:  
Location used:      Examined for: MC, GS  
Comment:

Test Results

Sieve Analysis		Limits	
T-88	% Passing		
Total Sample		T-265 Moisture content:	21.2%
75 mm (3.0"):		T-89 Liquid Limit:	
37.5 mm (1.5"):		T-90 Plastic Limit:	
19 mm (3/4"):		T-90 Plasticity Index:	NP
9.5 mm (3/8"):		Moisture Density	
4.75 mm (#4):	99.7%	Test method:	T-180      Method:
2.00 mm (#10):	99.6%	Maximum density:	pcf
850 µm (#20):	98.9%	Optimum moisture:	
425 µm (#40):	91.0%	T-100 Specific Gravity:	
250 µm (#60):	55.7%	Gr: 0.4%	D2487: SM
150 µm (#100):	30.0%	Sa: 83.6%	M145: A-2-4      Sand
75 µm (#200):	16.0%	Si: 16.0%	
Hydrometer Analysis			
Particles smaller	% total sample		
0.05 mm:			
0.02 mm:			
0.005 mm:			
0.002 mm:			
0.001 mm:			

Comments:

Reviewed by: T. Eliassen, P.G., Transportation Geologist *TE*

Report on Soil Sample

Lab number: E140679

Corrected copy: N/A

Report Date: 4/30/2014 9:06:13 A

Project: CALAIS

Number: BHF 037-2(11)

Site: VT-14 BR-82

Hole: B-2

Depth: 150 FT - 152 FT

T-88 Particle size analysis

