

**Hashamomuck Cove
Southold, New York
Coastal Storm Risk Management
Integrated Feasibility Study/EA**

**Appendix A2
2015 Sediment Sampling
Benthic Community Analysis
& Eel Grass Survey**

Sediment Sampling, Benthic Community Analysis, and
Submerged Aquatic Vegetation Survey
In Support of Feasibility Investigation

Final

Hashamomuck Cove Southold, NY



**US Army Corps
of Engineers**®
New England District

December 2015

**SEDIMENT SAMPLING, BENTHIC COMMUNITY ANALYSIS, AND
EELGRASS SURVEY
IN SUPPORT OF FEASIBILITY INVESTIGATION**

**HASHAMOMUCK COVE
SOUTHOLD, NEW YORK**

December, 2015

Prepared by:

Engineering/Planning Division
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U.S. Army Corps of Engineers
New England District
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SUMMARY

Surveys to document the grain size and benthic communities of the Hashamomuck Cove project area were conducted on September 21, 2015. Additionally, a survey to document the presence or absence of eelgrass (*Zostera marina*) in the subtidal nearshore environments adjacent to the study area was conducted. The grain size data showed that the sediments in the high-, mid-, and low-intertidal areas were predominately a mix of cobble-gravel-sand. The benthic communities in the high-intertidal area were generally azoic or consisted of typical opportunistic annelid species, while the communities in the mid-intertidal areas were dominated by typical opportunistic annelid species. The low-intertidal communities were also dominated by typical opportunistic annelid species, but also contained a varied mix of other typical sandy shore species such as isopod and decapod crustaceans and a few gastropod species. No eelgrass was noted in the eelgrass survey.

1.0 INTRODUCTION

The Hashamomuck Cove study area is in Southold, New York on the north fork of Long Island on Long Island Sound (Figure 1). The study area extends about 1.5 miles west from Soundview Road near the Southold Town Beach. The beach is narrow in width, ranging from about 20 to 100 feet. The study area includes three coves: Southold Town Beach Cove, Hashamomuck Cove, and Pebble Beach Cove separated by slightly protruding headlands (Figure 2). The entire study area has been determined to be susceptible to erosion from coastal storms. The New England District (NAE) of the US Army Corps of Engineers (USACE) is currently conducting a feasibility study to identify coastal erosion protection alternatives that may be implemented to provide protection to the study area.

In September 2015, field studies were conducted to provide baseline information on biological resources (i.e., benthos and eelgrass) of the study area as well as document the existing physical properties (grain size) of the beach sediments in the study area. This report describes the field methods employed, site conditions encountered, and the results of grain size and benthic community analysis of sediment samples along with the interpretation of the eelgrass survey data from the area.

2.0 MATERIALS AND METHODS

Sediment and benthic sampling efforts, as well as an eelgrass survey, were conducted on September 21, 2015 by staff from the Environmental Resource Section of NAE. Work was carried out from shore and from the water using a 12-foot inflatable zodiac. Positioning was achieved using a Trimble GeoXM Differential Global Positioning System (DGPS) with an accuracy of 3 meters or less.

Benthic and Sediment Sampling

Ten transects (Figure 3) were established within the project area to collect samples for benthic community analysis and sediment grain size. General locations of the transects were selected prior to the start of field activities, however specific locations of the transects were established and recorded in the field. Samples were collected on September 21, 2015 at low tide. A sample for benthic community analysis and a sediment sample for grain size analysis were taken at the high-intertidal level, the mid-intertidal level, and the low-intertidal tide level along all transects with the exception of Transect 5. No high-intertidal or mid-intertidal samples were collected on Transect 5 as the area was a bulkhead with large armor stone. A 0.003 m² sized benthic core sampler was used to collect samples at each location.

Each sample for benthic community analysis was sieved with seawater thorough a 0.5 mm sieve and preserved in 10% formaldehyde with 0.1% rose Bengal stain. Samples were kept in formaldehyde solution until they were processed in the New England District's environmental laboratory. At the time of processing the samples were washed on a 0.5 mm sieve to remove the preservative and remaining fine sediment. The material

was then sorted under a low-power dissecting microscope where organisms were removed from the sediments and transferred to jars containing 70% ethanol. Organisms were identified to the lowest taxon possible and enumerated.

Grain size analysis was completed by the NAE environmental laboratory. Samples were prepared according to the guidance in ASTM D421-85 (Re-approved 2002), Dry Preparation of Soil Samples for Particle-Size Analysis and Determination of Soil Constants, and analyzed according to ASTM D422-63 (Re-approved 2002), Standard Test Method for Particle-Size Analysis of Soils using sieve nos. 4, 10, 40, 100, 200. There were no deviations from the established laboratory testing protocols.

Eelgrass survey

Three transects paralleling the shoreline of the study area were established for the eelgrass survey prior to the start of field activities. Transect 1 was located 50' from the shoreline, Transect 2 was located 100' from the shoreline, and Transect 3 was located 200' from the shoreline (Figure 3). Using a 12-foot inflatable zodiac, the transects were traversed at low speeds by a boat operator while visual observations of the bottom were made by a marine ecologist through a viewing bucket. The presence or absence of eelgrass as well as changes in bottom type were noted in a field logbook.

3.0 RESULTS AND DISCUSSION

This section summarizes results obtained from benthic community analysis of sediments, physical testing of sediments, and eelgrass survey from the vicinity of the Hashamomuck Beach feasibility study project area.

3.1 Benthic Community Analysis

Twenty-eight cores for benthic community analysis were processed at the New England District's Environmental Laboratory. Counts of invertebrate organisms by sample station are summarized in Tables 1, 2, and 3. A total of fifteen different taxa were observed in the 28 samples.

High-intertidal Stations

The benthic communities in the high-intertidal area were generally azoic or consisted of typical opportunistic annelid species. Six of the nine stations sampled did not have species present. In the 3 stations where species were present, they were represented by a single polychaetes species, *Capitella capitata*, which is a known opportunistic annelid. Data on the benthos collected at the high-intertidal stations are presented in Table 1.

Mid-intertidal Stations

The benthic communities in the mid-intertidal areas were also dominated by typical opportunistic annelid species (*Capitella capitata* and *Scalibregma inflatum*) commonly found along Long Island Sound beaches. Of note at the mid-intertidal stations are blue

mussels found at station T10-M (i.e., Transect 10 - mid-intertidal). These mussels were juvenile and were attached to large gravel-sized sediments. Data on the benthos collected at the mid-intertidal stations are presented in Table 2.

Low-intertidal Stations

The low-intertidal communities were also dominated by typical opportunistic annelid species (*Capitella capitata* and oligochaetes), but also contained a varied mix of other typical sandy shore species. These species included various crustacean isopods, amphipods, and decapods as well some typical intertidal gastropods species (*Crepidula plana* and *Nassarius trivittatus*). A lone blue mussel was found at station T4-L (i.e., Transect 4 - low-intertidal). Data on the benthos collected at the low-intertidal stations are presented in Table 3.

3.2 Grain Size Analysis

Twenty-eight sediment samples were analyzed for grain size distribution (ASTM D 422-63, reapproved 2002) in the New England District's Environmental Laboratory. The results of the grain size analysis are summarized in Table 4. Complete testing results are provided in the grain size data presented as Appendix A.

The sediments collected from all stations were generally represented by various fractions of gravel and sand. The data show that 10 stations were dominated by gravels, 5 stations were dominated by sands, 12 stations had a similar mix of sands and gravels, and 1 station was dominated by cobble. The presence of cobble at all stations may be under-represented due to the nature of the sediment sampling device used (a 0.003 m² core), however it is noted that cobble was not specifically avoided during sampling.

3.3 Eelgrass Survey

No eelgrass was observed in the vicinity of the survey transects. Additionally, no eelgrass blades were observed within the beach wrack along the entire Hashamomuck Cove study area. The sub-tidal survey area was dominated by sandy expanses interspersed with areas of cobble and large boulders extending beyond the offshore transect. Sparse patches of various macroalgal species typical of a nearshore environment were present on both bottom types.



Figure 1. Location Map

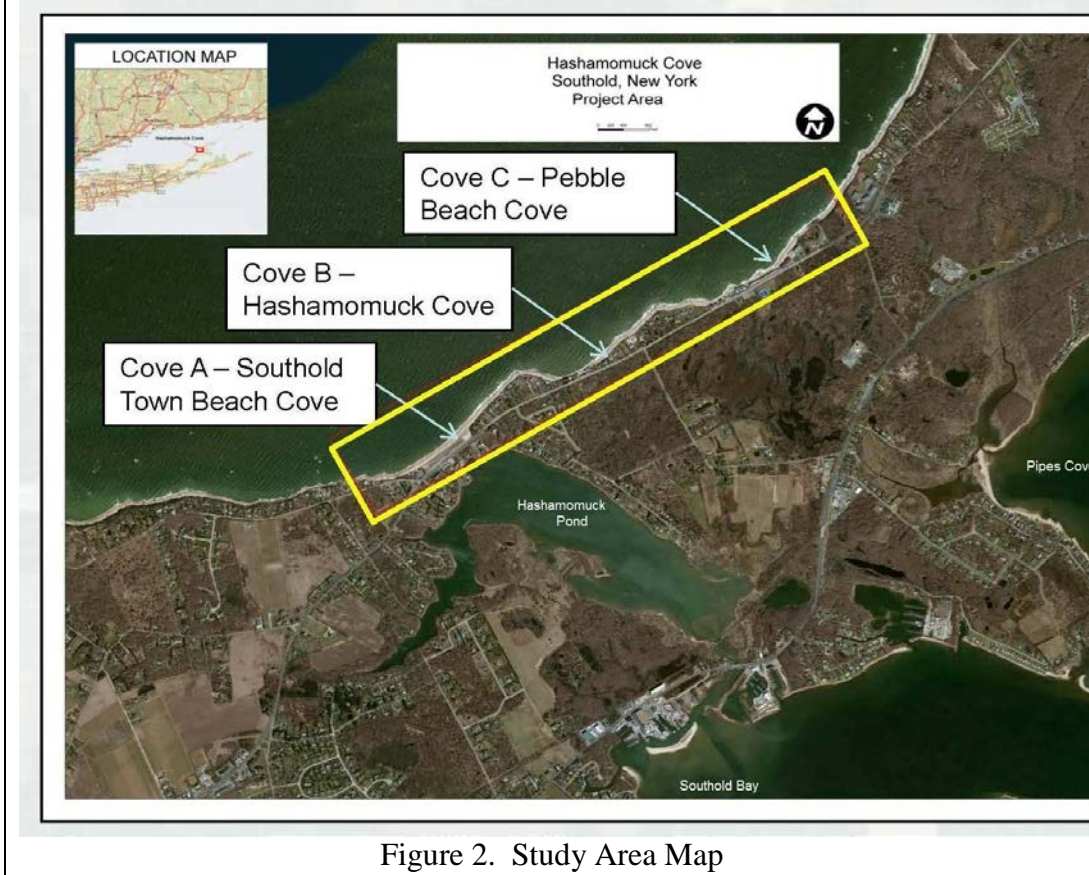



Figure 2. Study Area Map

Figure 3 Sediment Sampling Locations and Eelgrass Survey Transect Locations




LEGEND

- Beach Transect Station
- 50 ft SAV Transect
- 100 ft SAV Transect
- 200 ft SAV Transect

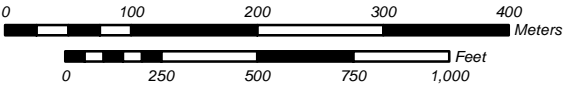


US Army Corps
of Engineers
New England District

HASHAMOMUCK COVE, SOUTHOLD, NY
SEPTEMBER 2015 SURVEY TRANSECTS



W N E S



0 100 200 300 400 Meters
0 250 500 750 1,000 Feet
1:6,000

NAIP 2014 AERIAL IMAGERY

GCS NAD 1983

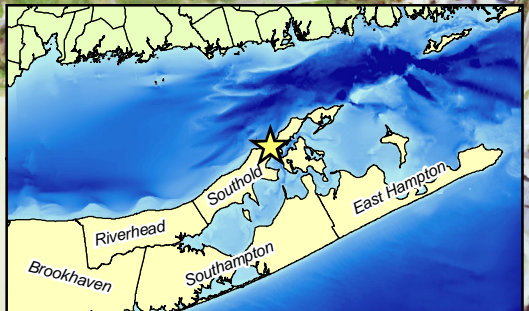


Table 1. Benthic invertebrates collected from the high-intertidal locations at Hashamomuck Beach Study Area on Sept. 21, 2015. No high intertidal sample was collected at Transect 5. Numbers are per 0.003 m²

	HIGH-INTERTIDAL									
TRANSECT NUMBER	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10
ANNELIDA										
POLYCHAETA										
<i>Capitella capitata</i>	3	*	1	*	-	*	2	*	*	*
INDIVIDUALS / SAMPLE	3	0	1	0	-	0	2	0	0	0
SPECIES / SAMPLE	1	0	1	0	-	0	1	0	0	0

Table 2. Benthic invertebrates collected from the mid-intertidal locations at Hashamomuck Beach Study Area on Sept. 21, 2015. No mid-intertidal sample was collected at Transect 5. Numbers are per 0.003 m²

	MID-INTERTIDAL									
TRANSECT NUMBER	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10
ANNELIDA										
POLYCHAETA										
<i>Capitella capitata</i>	111	*	7	*	-	17	4	*	11	*
<i>Scalibregma inflatum</i>	*	3	1	*	-	*	6	*	13	34
OLIGOCHAETA										
Unidentified Oligochaete sp.	10	*	*	*	-	9	*	*	1	*
MOLLUSCA										
BIVALVIA										
<i>Mytilus edulis</i>	*	*	*	*	*	*	*	*	*	2
GASTROPODA										
<i>Nassarius trivittatus</i>	*	*	1	*	-	*	*	*	*	2
INDIVIDUALS / SAMPLE	121	3	9	0	-	26	10	0	25	38
SPECIES / SAMPLE	2	1	3	0	-	2	2	0	3	3

Table 3. Benthic invertebrates collected from the low-intertidal locations at Hashamomuck Beach Study Area on Sept. 21, 2015. Numbers are per 0.003 m²

	LOW-INTERTIDAL									
TRANSECT NUMBER	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10
ANNELIDA										
POLYCHAETA										
<i>Capitella capitata</i>	*	25	67	25	72	91	6	*	*	3
<i>Exogone sp.</i>	*	*	*	*	*	*	1	*	1	*
<i>Leitoscoloplos robustus</i>	*	5	19	*	*	*	*	*	*	*
<i>Scalibregma inflatum</i>	*	3	*	*	*	1	*	*	*	*
<i>Streblospio benedicti</i>	*	*	1	*	*	*	*	*	*	*
OLIGOCHAETA										
Unidentified Oligochaete sp.	*	1	3	*	27	15	10	1	*	17
ARTHROPODA										
CRUSTACEA										
ISOPODA										
<i>Sphaeroma quadridentata</i>	*	*	*	14	*	*	*	*	5	*
AMPHIPODA										
Unidentified Amphithoidae	*	*	*	2	*	*	*	*	*	*
CUMACEA										
Unidentified Cumacean	1	*	*	1	*	*	*	*	*	*
DECAPODA										
<i>Pagurus longicarpus</i>	1	*	*	*	*	*	*	1	*	*
<i>Hemigrapsus sanguineus</i>	*	*	*	4	*	*	*	*	*	*
MOLLUSCA										
BIVALVIA										
<i>Mytilus edulis</i>	*	*	*	1	*	*	*	*	*	*
GASTROPODA										
<i>Mitrella lunata</i>	*	1	*	*	*	*	*	2	*	*
<i>Crepidula plana</i>	*	*	*	*	*	*	*	5	1	*
<i>Nassarius trivittatus</i>	*	*	*	*	*	*	*	*	2	*
INDIVIDUALS / SAMPLE	2	35	90	42	99	107	17	9	9	20
SPECIES / SAMPLE	2	5	4	6	2	3	3	4	4	2

Table 4: Summary of Grain Size Results

Sample ID	%Cobble	%Gravel		%Sand			%Fines
		Coarse	Fine	Coarse	Medium	Fine	
T1-H	0.0	11.0	35.6	13.6	33.3	2.7	3.8
T2-H	0.0	64.5	0.4	0.4	22.9	11.8	0.0
T3-H	0.0	53.2	16.1	0.5	26.3	4.0	0.0
T4-H	0.0	15.1	62.8	6.4	15.3	0.4	0.0
T6-H	0.0	34.8	2.5	1.1	26.6	35.0	0.0
T7-H	0.0	52.1	10.1	0.1	22.8	14.8	0.0
T8-H	0.0	28.6	24.4	4.0	41.2	1.8	0.0
T9-H	0.0	35.2	18.0	0.5	40.3	6.0	0.0
T10-H	0.0	24.3	48.0	6.4	18.0	3.4	0.0
T1-M	0.0	6.2	38.7	24.1	29.8	1.2	0.0
T2-M	0.0	7.0	22.0	32.6	36.2	2.2	0.0
T3-M	0.0	19.7	39.4	19.7	19.8	1.4	0.0
T4-M	0.0	35.9	44.0	9.8	9.8	0.4	0.0
T6-M	0.0	9.2	17.7	8.3	49.3	15.4	0.0
T7-M	0.0	17.0	25.8	14.8	39.8	2.5	0.0
T8-M	0.0	44.8	31.3	8.0	14.5	1.5	0.0
T9-M	0.0	31.3	22.5	9.2	36.1	0.8	0.0
T10-M	0.0	39.8	45.4	10.6	4.1	0.1	0.0
T1-L	0.0	15.5	77.0	6.7	0.9	0.0	0.0
T2-L	0.0	7.1	40.9	24.7	24.5	2.7	0.0
T3-L	0.0	14.0	31.9	34.4	19.3	0.5	0.0
T4-L	78.3	15.6	3.3	1.3	1.4	0.1	0.0
T5-L	0.0	3.5	17.2	13.9	63.3	2.0	0.0
T6-L	0.0	27.3	31.6	9.5	26.5	5.1	0.0
T7-L	0.0	7.5	24.2	12.3	45.1	10.9	0.0
T8-L	0.0	28.4	31.2	13.3	22.5	4.6	0.0
T9-L	59.7	51.7	5.0	1.8	1.2	0.0	0.0
T10-L	0.0	13.0	63.1	5.7	15.3	2.9	0.0

APPENDIX A

GRAIN SIZE DATA



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NAE ENVIRONMENTAL LABORATORY

Project Name: Hashamomuck

Project Location: Southold, NY

Date Collected: 09/21/15

Date Received: 09/23/15

Date Analyzed: 11/30/15

Preparation Method: ASTM D421-85 (reapproved 2002)

Analysis Method: ASTM D 422-63 (reapproved 2002) - Sieve Nos. 4, 10, 40, 100, 200

Lab SOP: Particle Size Analysis of Sediments - Without Hydrometer (October 2011)

Received By: RBL

Analyzed By: LAJ

Checked By: RBL

Discussion: Twenty-eight samples were received by the lab upon completion of field activities. There were no deviations from the established laboratory testing protocols during preparation or analysis.

Summary of Results:

Sample ID	%Cobble	%Gravel		%Sand			%Fines
		Coarse	Fine	Coarse	Medium	Fine	
T1-H	0.0	11.0	35.6	13.6	33.3	2.7	3.8
T2-H	0.0	64.5	0.4	0.4	22.9	11.8	0.0
T3-H	0.0	53.2	16.1	0.5	26.3	4.0	0.0
T4-H	0.0	15.1	62.8	6.4	15.3	0.4	0.0
T6-H	0.0	34.8	2.5	1.1	26.6	35.0	0.0
T7-H	0.0	52.1	10.1	0.1	22.8	14.8	0.0
T8-H	0.0	28.6	24.4	4.0	41.2	1.8	0.0
T9-H	0.0	35.2	18.0	0.5	40.3	6.0	0.0
T10-H	0.0	24.3	48.0	6.4	18.0	3.4	0.0
T1-M	0.0	6.2	38.7	24.1	29.8	1.2	0.0
T2-M	0.0	7.0	22.0	32.6	36.2	2.2	0.0
T3-M	0.0	19.7	39.4	19.7	19.8	1.4	0.0
T4-M	0.0	35.9	44.0	9.8	9.8	0.4	0.0
T6-M	0.0	9.2	17.7	8.3	49.3	15.4	0.0
T7-M	0.0	17.0	25.8	14.8	39.8	2.5	0.0
T8-M	0.0	44.8	31.3	8.0	14.5	1.5	0.0
T9-M	0.0	31.3	22.5	9.2	36.1	0.8	0.0
T10-M	0.0	39.8	45.4	10.6	4.1	0.1	0.0
T1-L	0.0	15.5	77.0	6.7	0.9	0.0	0.0
T2-L	0.0	7.1	40.9	24.7	24.5	2.7	0.0
T3-L	0.0	14.0	31.9	34.4	19.3	0.5	0.0
T4-L	78.3	15.6	3.3	1.3	1.4	0.1	0.0
T5-L	0.0	3.5	17.2	13.9	63.3	2.0	0.0
T6-L	0.0	27.3	31.6	9.5	26.5	5.1	0.0
T7-L	0.0	7.5	24.2	12.3	45.1	10.9	0.0
T8-L	0.0	28.4	31.2	13.3	22.5	4.6	0.0
T9-L	59.7	51.7	5.0	1.8	1.2	0.0	0.0
T10-L	0.0	13.0	63.1	5.7	15.3	2.9	0.0

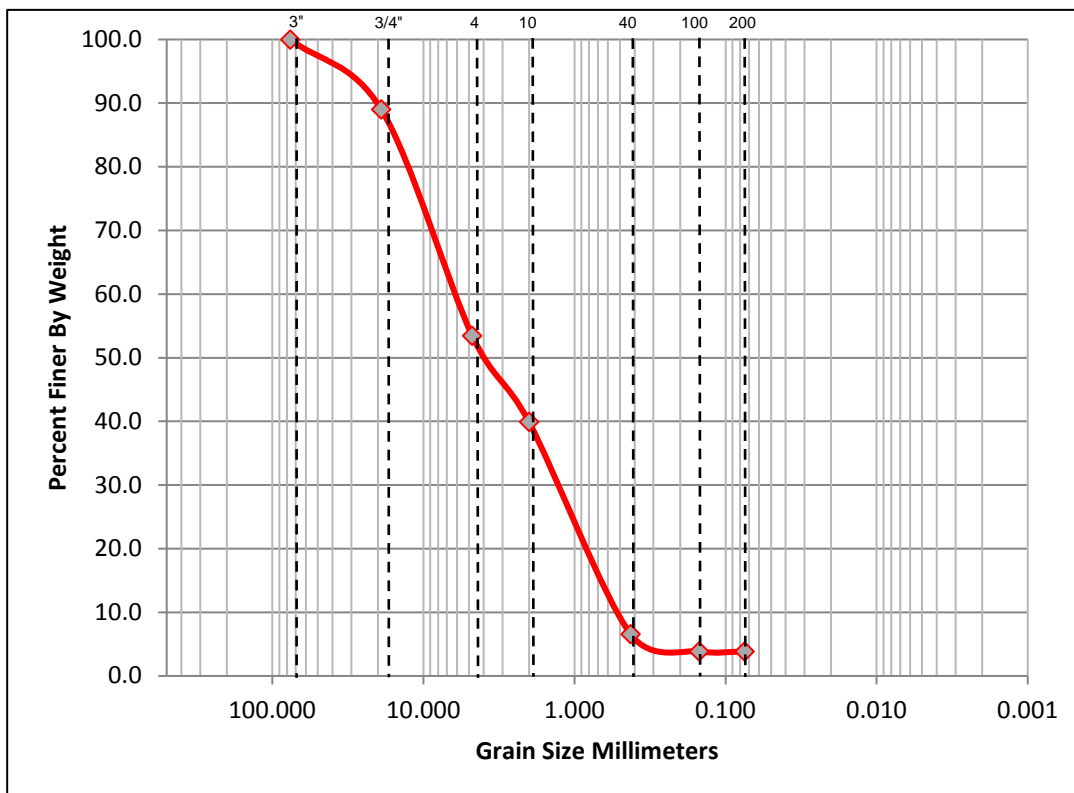


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Project Name: Hashamomuck
Project Location: Southold, NY
Sample ID: T1-H

Date: 11/30/15

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



%Cobble	%Gravel		%Sand			%Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	11.0	35.6	13.6	33.3	2.7	3.8	

D10	D15	D30	D50	D60	D85	Cc	Cu
0.5875	0.8237	1.5323	4.0491	7.3731	17.3929	0.71	12.55

Original Sample Weight (g)			1056.4	Post Wash Weight (g)			-
Sieve	Sieve Size (mm)	Sieve Weight (g)	Shaken Weight (g)	Weight Retained (g)	Percent Retained	Cum. Percent Retained	Percent Finer
3"	76.200	0.0	0.0	0.0	0.0	0.0	100.0
3/4"	19.000	542.8	658.9	116.1	11.0	11.0	89.0
#4	4.750	493.9	869.5	375.6	35.6	46.5	53.5
#10	2.000	470.6	613.8	143.2	13.6	60.1	39.9
#40	0.425	352.9	705.1	352.2	33.3	93.4	6.6
#100	0.150	328.8	357.3	28.5	2.7	96.1	3.9
#200	0.075	316.6	316.9	0.3	0.0	96.2	3.8

Sample Notes:

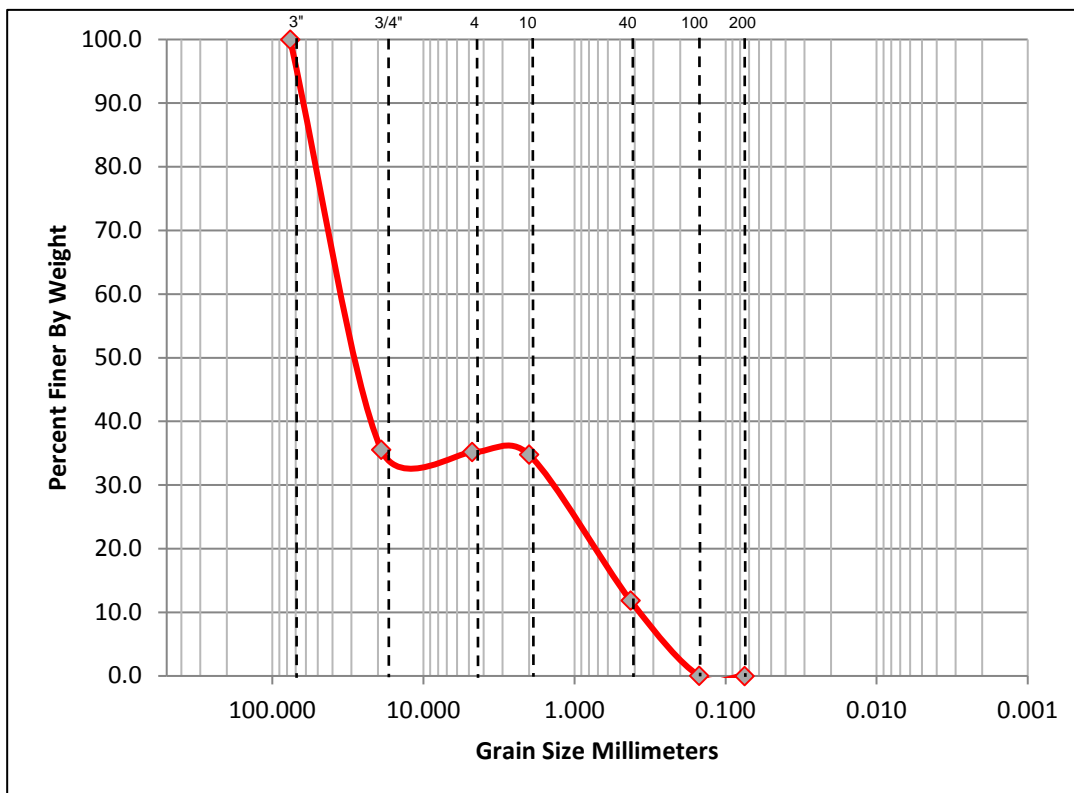


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Project Name: Hashamomuck
Project Location: Southold, NY
Sample ID: T2-H

Date: 11/30/15

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



%Cobble	%Gravel		%Sand			%Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	64.5	0.4	0.4	22.9	11.8	0.0	

D10	D15	D30	D50	D60	D85	Cc	Cu
0.3825	0.6429	1.6726	31.8255	40.7004	62.8876	0.21	106.42

Original Sample Weight (g)			1090.9	Post Wash Weight (g)			*
Sieve	Sieve Size (mm)	Sieve Weight (g)	Shaken Weight (g)	Weight Retained (g)	Percent Retained	Cum. Percent Retained	Percent Finer
3"	76.200	0.0	0.0	0.0	0.0	0.0	100.0
3/4"	19.000	542.9	1246.0	703.1	64.5	64.5	35.5
#4	4.750	489.1	493.3	4.2	0.4	64.8	35.2
#10	2.000	463.4	467.7	4.3	0.4	65.2	34.8
#40	0.425	354.7	605.0	250.3	22.9	88.2	11.8
#100	0.150	325.4	454.1	128.7	11.8	100.0	0.0
#200	0.075	313.5	313.8	0.3	0.0	100.0	0.0

Sample Notes:

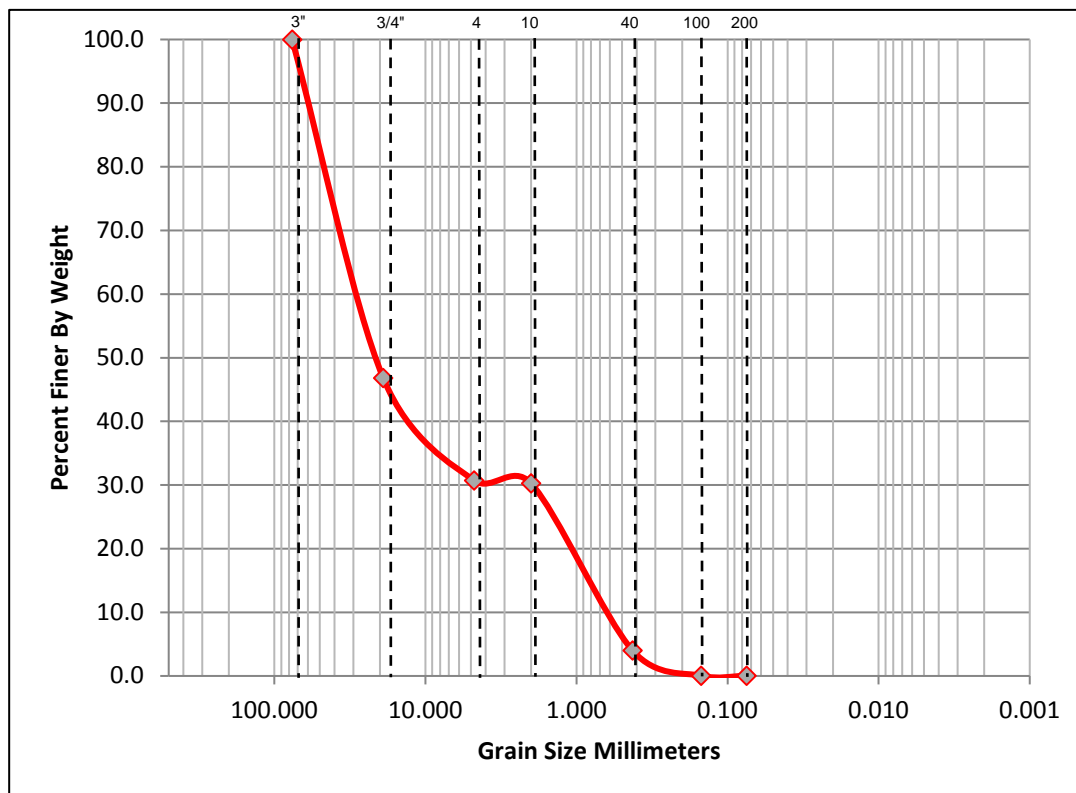


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Project Name: Hashamomuck
Project Location: Southold, NY
Sample ID: T3-H

Date: 11/30/15

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



%Cobble	%Gravel		%Sand			%Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	53.2	16.1	0.5	26.3	4.0	0.0	

D10	D15	D30	D50	D60	D85	Cc	Cu
0.7855	1.0851	1.9839	22.4458	33.1967	60.0738	0.15	42.26

Original Sample Weight (g)			1009.3	Post Wash Weight (g)			
Sieve	Sieve Size (mm)	Sieve Weight (g)	Shaken Weight (g)	Weight Retained (g)	Percent Retained	Cum. Percent Retained	Percent Finer
3"	76.200	0.0	0.0	0.0	0.0	0.0	100.0
3/4"	19.000	542.8	1079.8	537.0	53.2	53.2	46.8
#4	4.750	489.1	651.3	162.2	16.1	69.3	30.7
#10	2.000	463.6	468.2	4.6	0.5	69.7	30.3
#40	0.425	354.6	619.9	265.3	26.3	96.0	4.0
#100	0.150	325.5	365.2	39.7	3.9	100.0	0.0
#200	0.075	313.4	313.6	0.2	0.0	100.0	0.0

Sample Notes:

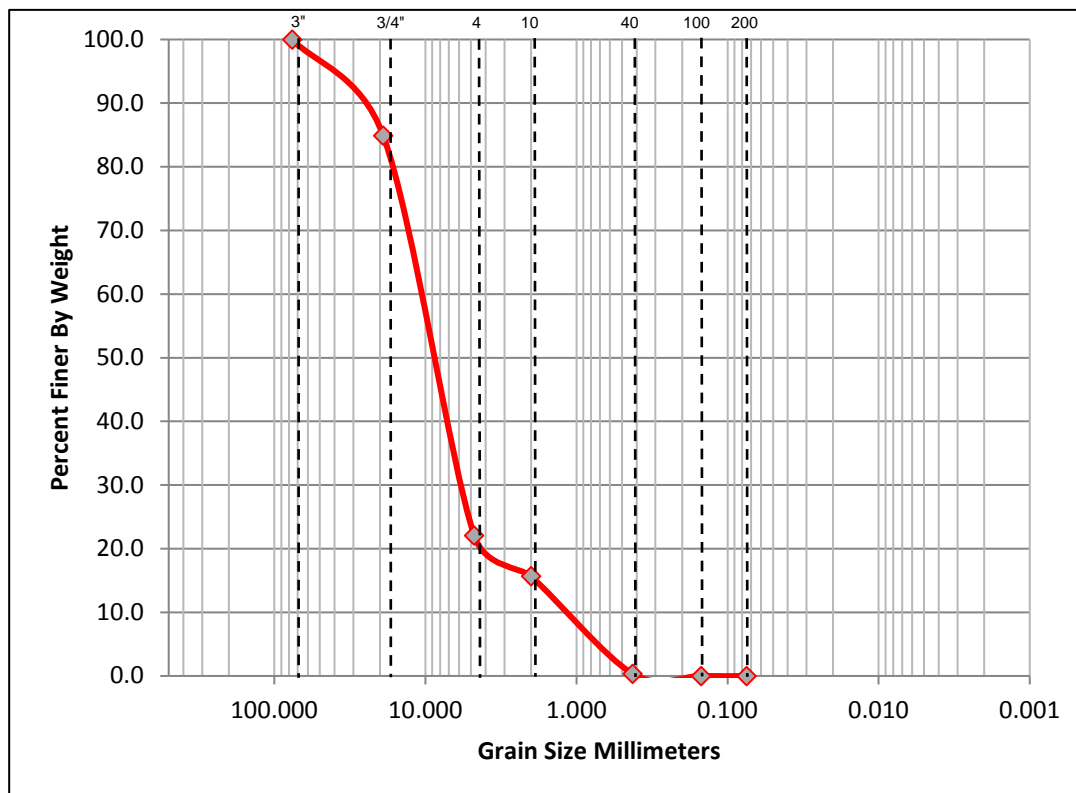


US Army Corps
of Engineers®
New England District

Project Name: Hashamomuck
Project Location: Southold, NY
Sample ID: T4-H

Date: 11/30/15

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



%Cobble	%Gravel		%Sand			%Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	15.1	62.8	6.4	15.3	0.4	0.0	

D10	D15	D30	D50	D60	D85	Cc	Cu
1.4181	1.9327	6.5526	11.0888	13.3569	19.4517	0.69	9.42

Original Sample Weight (g)			1084.7	Post Wash Weight (g)			0
Sieve	Sieve Size (mm)	Sieve Weight (g)	Shaken Weight (g)	Weight Retained (g)	Percent Retained	Cum. Percent Retained	Percent Finer
3"	76.200	0.0	0.0	0.0	0.0	0.0	100.0
3/4"	19.000	541.7	705.7	164.0	15.1	15.1	84.9
#4	4.750	493.7	1175.2	681.5	62.8	77.9	22.1
#10	2.000	470.3	539.7	69.4	6.4	84.3	15.7
#40	0.425	353.3	519.3	166.0	15.3	99.6	0.4
#100	0.150	328.7	332.5	3.8	0.4	100.0	0.0
#200	0.075	316.6	316.6	0.0	0.0	100.0	0.0

Sample Notes:

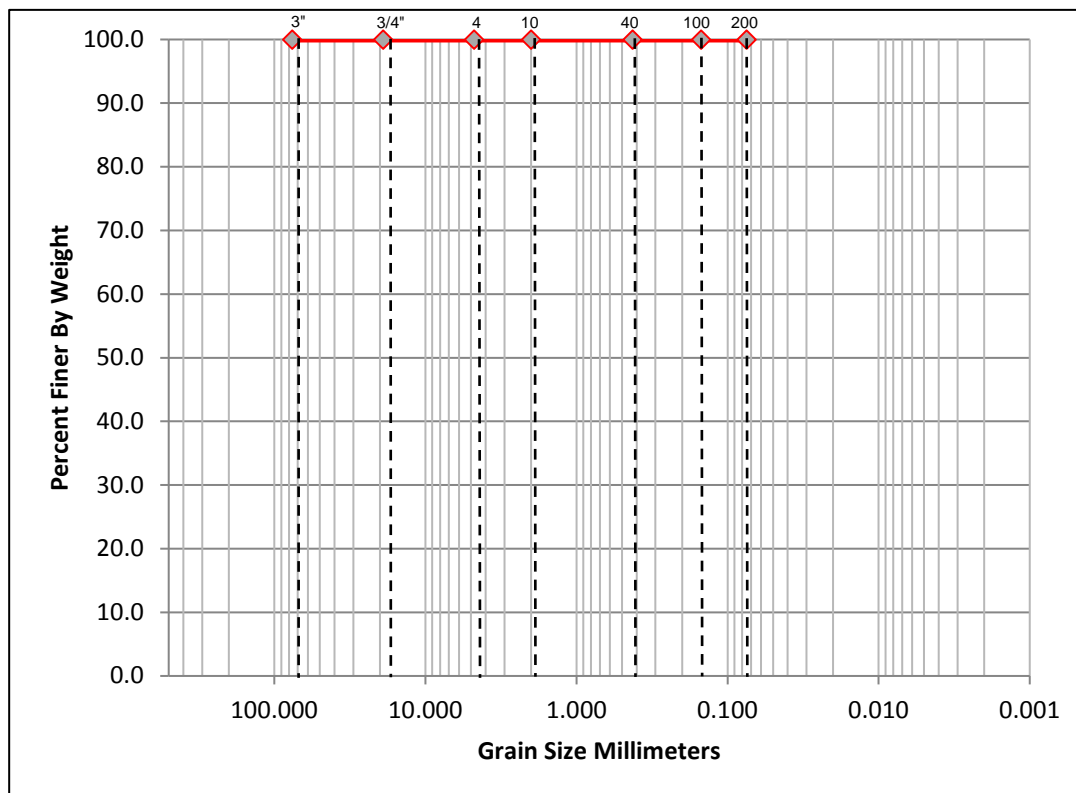


US Army Corps
of Engineers®
New England District

Project Name: Hashamomuck
Project Location: Southold, NY
Sample ID: T5-H

Date: 11/30/15

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



%Cobble	%Gravel		%Sand			%Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.0	0.0	100.0	

D10	D15	D30	D50	D60	D85	Cc	Cu
#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	-	-

Original Sample Weight (g)			Post Wash Weight (g)				0
Sieve	Sieve Size (mm)	Sieve Weight (g)	Shaken Weight (g)	Weight Retained (g)	Percent Retained	Cum. Percent Retained	Percent Finer
3"	76.200			0.0	0.0	0.0	100.0
3/4"	19.000			0.0	0.0	0.0	100.0
#4	4.750			0.0	0.0	0.0	100.0
#10	2.000			0.0	0.0	0.0	100.0
#40	0.425			0.0	0.0	0.0	100.0
#100	0.150			0.0	0.0	0.0	100.0
#200	0.075			0.0	0.0	0.0	100.0

Sample Notes: no station T5-H bulkhead

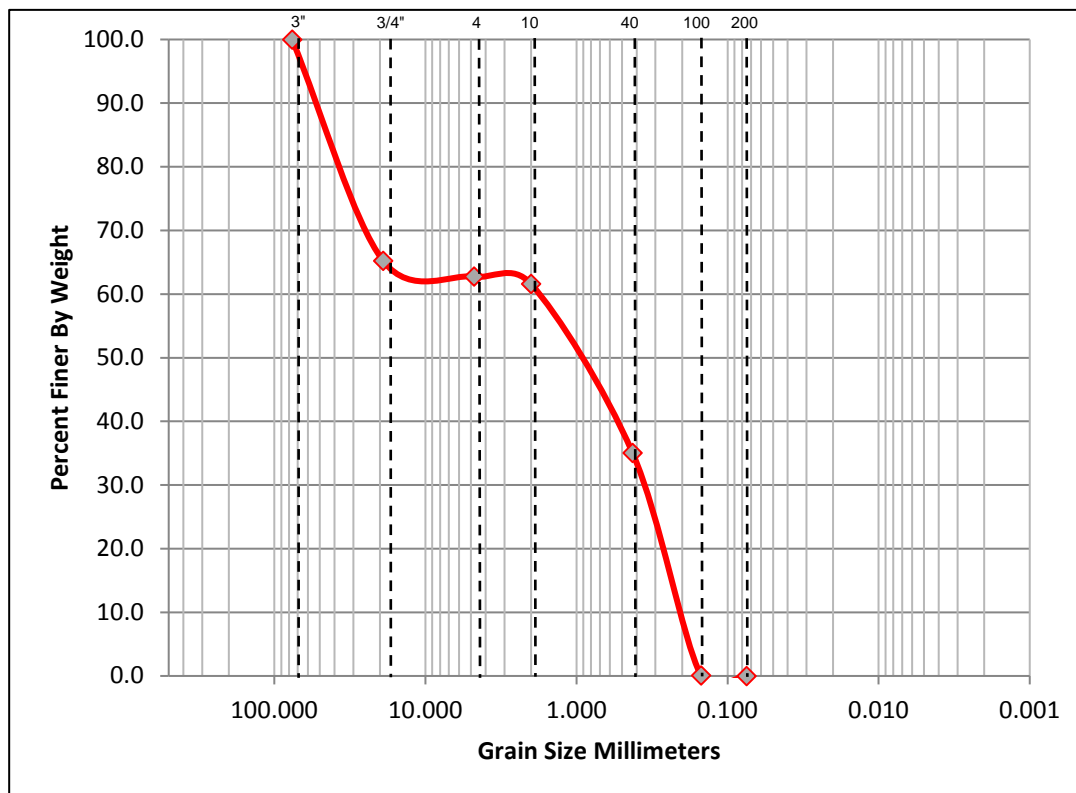


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New England District

Project Name: Hashamomuck
Project Location: Southold, NY
Sample ID: T6-H

Date: 11/30/15

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



%Cobble	%Gravel		%Sand			%Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	34.8	2.5	1.1	26.6	35.0	0.0	

D10	D15	D30	D50	D60	D85	Cc	Cu
0.2282	0.2675	0.3855	1.3128	1.9057	51.5474	1.77	8.35

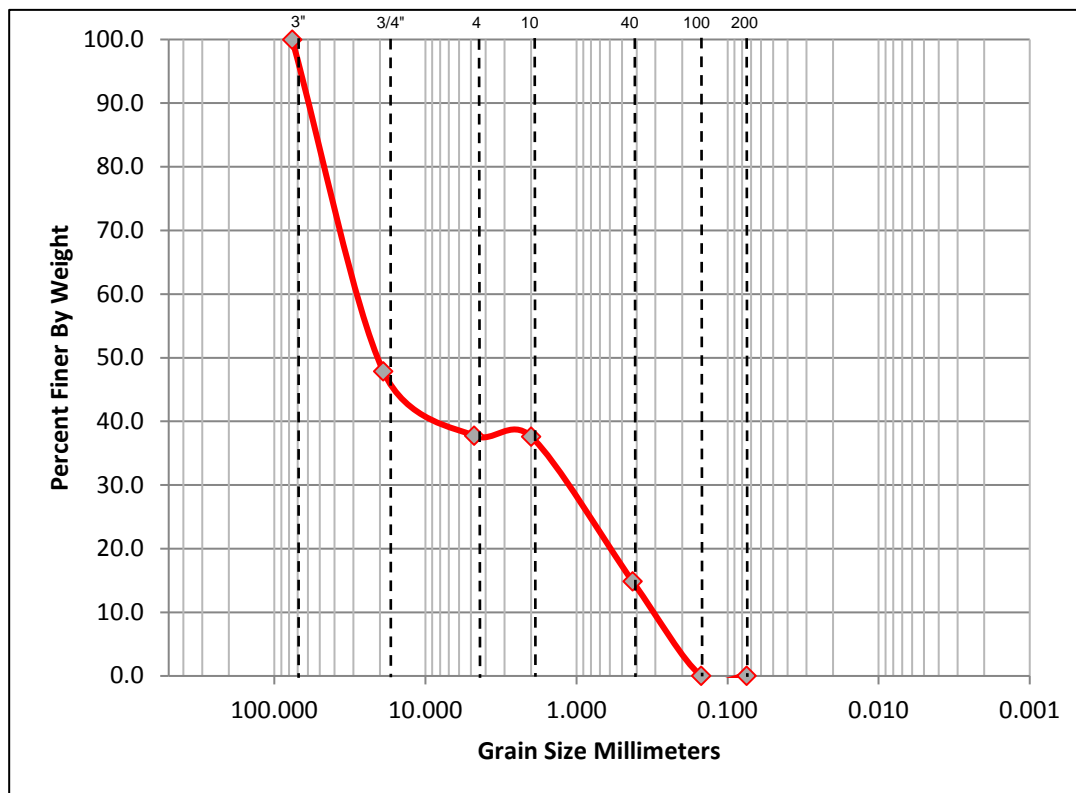
Original Sample Weight (g)			1178.9	Post Wash Weight (g)			0
Sieve	Sieve Size (mm)	Sieve Weight (g)	Shaken Weight (g)	Weight Retained (g)	Percent Retained	Cum. Percent Retained	Percent Finer
3"	76.200	0.0	0.0	0.0	0.0	0.0	100.0
3/4"	19.000	542.7	953.0	410.3	34.8	34.8	65.2
#4	4.750	493.7	522.7	29.0	2.5	37.3	62.7
#10	2.000	470.4	483.9	13.5	1.1	38.4	61.6
#40	0.425	353.3	666.5	313.2	26.6	65.0	35.0
#100	0.150	328.7	740.9	412.2	35.0	99.9	0.1
#200	0.075	316.6	317.3	0.7	0.1	100.0	0.0

Sample Notes:



Date: 11/30/15

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



%Cobble	%Gravel		%Sand			%Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	52.1	10.1	0.1	22.8	14.8	0.0	

D10	D15	D30	D50	D60	D85	Cc	Cu
0.3350	0.4356	1.4729	21.3313	32.3050	59.7394	0.27	96.44

Original Sample Weight (g)			1019.1	Post Wash Weight (g)			0
Sieve	Sieve Size (mm)	Sieve Weight (g)	Shaken Weight (g)	Weight Retained (g)	Percent Retained	Cum. Percent Retained	Percent Finer
3"	76.200	0.0	0.0	0.0	0.0	0.0	100.0
3/4"	19.000	542.8	1074.0	531.2	52.1	52.1	47.9
#4	4.750	493.7	596.9	103.2	10.1	62.3	37.7
#10	2.000	470.3	471.6	1.3	0.1	62.4	37.6
#40	0.425	353.1	585.2	232.1	22.8	85.2	14.8
#100	0.150	328.7	479.6	150.9	14.8	100.0	0.0
#200	0.075	316.5	316.8	0.3	0.0	100.0	0.0

Sample Notes:

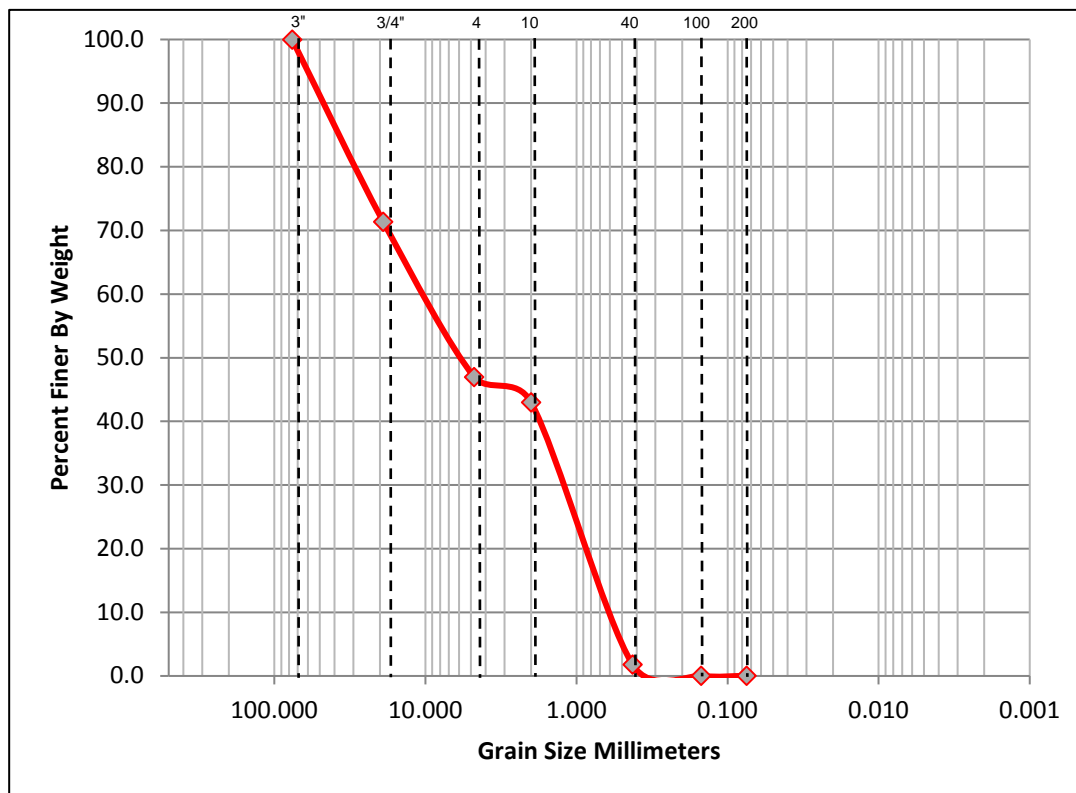


US Army Corps
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New England District

Project Name: Hashamomuck
Project Location: Southold, NY
Sample ID: T8-H

Date: 11/30/15

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



%Cobble	%Gravel		%Sand			%Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	28.6	24.4	4.0	41.2	1.8	0.0	

D10	D15	D30	D50	D60	D85	Cc	Cu
0.7392	0.9302	1.5033	6.5157	12.3593	46.2378	0.33	16.72

Original Sample Weight (g)			1126.9	Post Wash Weight (g)			0
Sieve	Sieve Size (mm)	Sieve Weight (g)	Shaken Weight (g)	Weight Retained (g)	Percent Retained	Cum. Percent Retained	Percent Finer
3"	76.200	0.0	0.0	0.0	0.0	0.0	100.0
3/4"	19.000	542.8	865.5	322.7	28.6	28.6	71.4
#4	4.750	493.7	768.5	274.8	24.4	53.0	47.0
#10	2.000	470.3	515.1	44.8	4.0	57.0	43.0
#40	0.425	353.1	817.7	464.6	41.2	98.2	1.8
#100	0.150	328.7	348.5	19.8	1.8	100.0	0.0
#200	0.075	316.5	316.5	0.0	0.0	100.0	0.0

Sample Notes:

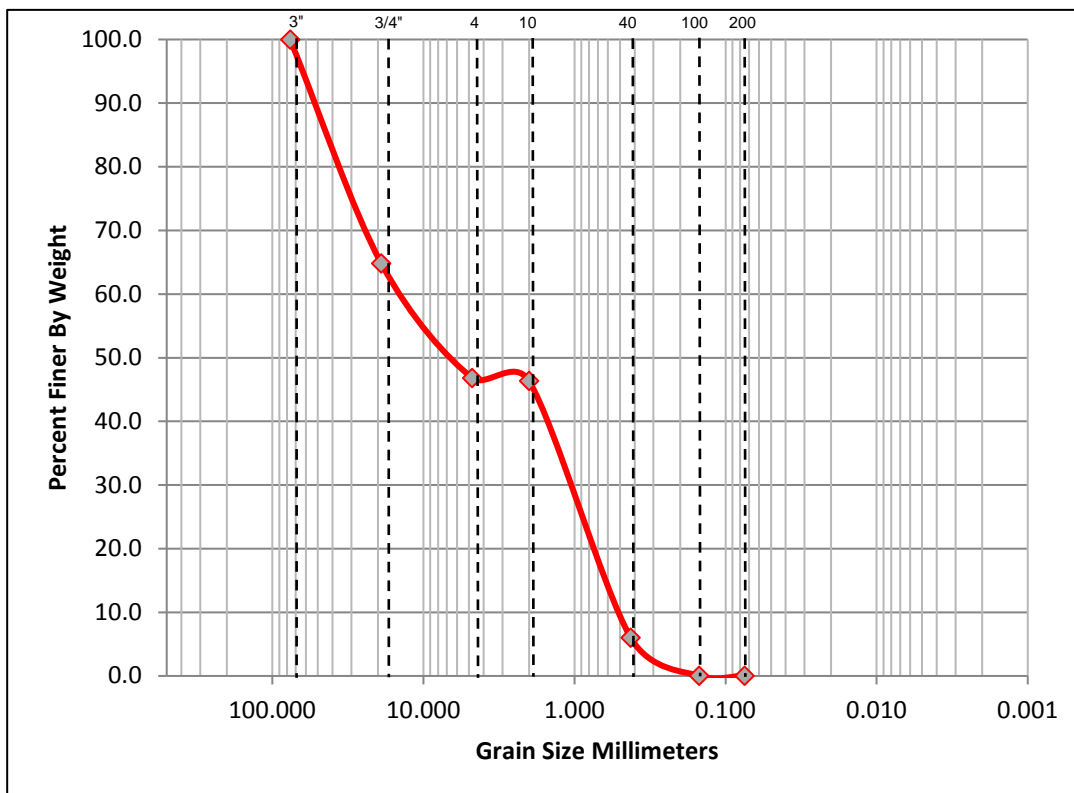


US Army Corps
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New England District

Project Name: Hashamomuck
Project Location: Southold, NY
Sample ID: T9-H

Date: 11/30/15

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



%Cobble	%Gravel		%Sand			%Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	35.2	18.0	0.5	40.3	6.0	0.0	

D10	D15	D30	D50	D60	D85	Cc	Cu
0.5800	0.7754	1.3614	7.2667	15.1818	51.8084	0.31	26.17

Original Sample Weight (g)			1070.9	Post Wash Weight (g)			0
Sieve	Sieve Size (mm)	Sieve Weight (g)	Shaken Weight (g)	Weight Retained (g)	Percent Retained	Cum. Percent Retained	Percent Finer
3"	76.200	0.0	0.0	0.0	0.0	0.0	100.0
3/4"	19.000	542.8	919.5	376.7	35.2	35.2	64.8
#4	4.750	493.7	686.5	192.8	18.0	53.2	46.8
#10	2.000	470.3	475.4	5.1	0.5	53.7	46.3
#40	0.425	353.1	784.8	431.7	40.3	94.0	6.0
#100	0.150	328.7	392.8	64.1	6.0	100.0	0.0
#200	0.075	316.5	316.7	0.2	0.0	100.0	0.0

Sample Notes:

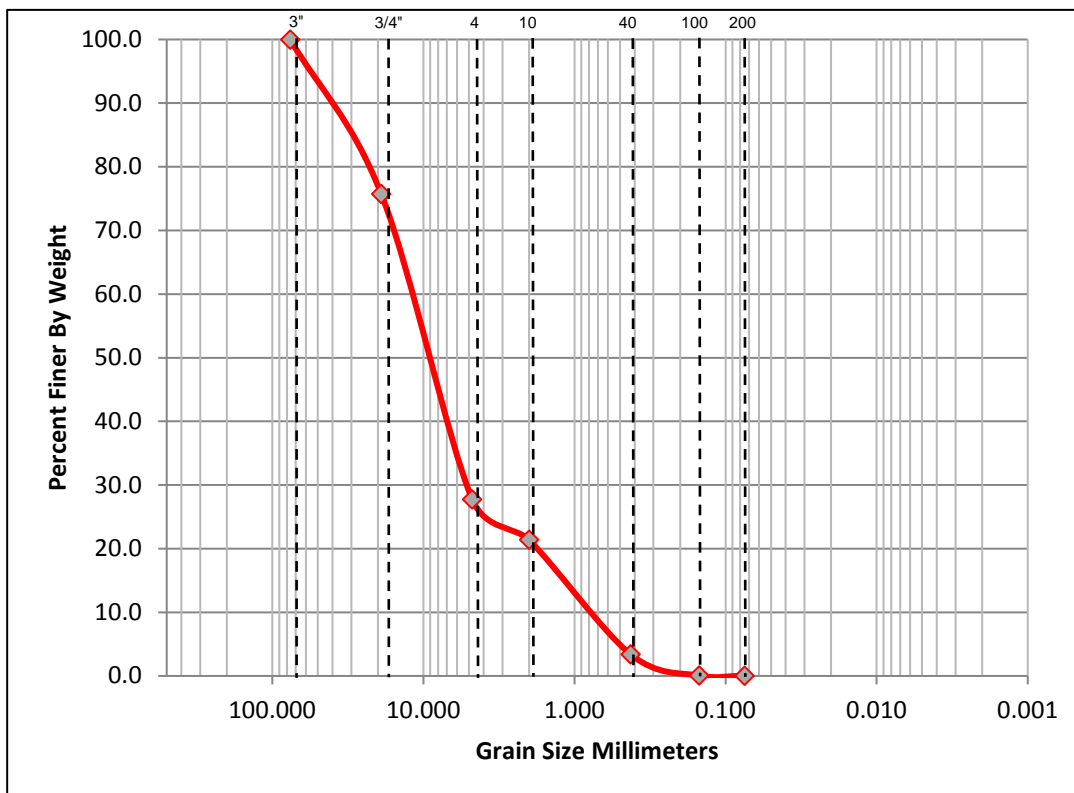


US Army Corps
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New England District

Project Name: Hashamomuck
Project Location: Southold, NY
Sample ID: T10-H

Date: 11/30/15

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



%Cobble	%Gravel		%Sand			%Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	24.3	48.0	6.4	18.0	3.4	0.0	

D10	D15	D30	D50	D60	D85	Cc	Cu
1.0033	1.4411	5.4192	11.3583	14.3278	40.8426	0.75	14.28

Original Sample Weight (g)			1172.4	Post Wash Weight (g)			0
Sieve	Sieve Size (mm)	Sieve Weight (g)	Shaken Weight (g)	Weight Retained (g)	Percent Retained	Cum. Percent Retained	Percent Finer
3"	76.200	0.0	0.0	0.0	0.0	0.0	100.0
3/4"	19.000	542.9	827.4	284.5	24.3	24.3	75.7
#4	4.750	493.6	1056.2	562.6	48.0	72.3	27.7
#10	2.000	470.3	544.9	74.6	6.4	78.6	21.4
#40	0.425	353.7	564.6	210.9	18.0	96.6	3.4
#100	0.150	328.6	367.7	39.1	3.3	99.9	0.1
#200	0.075	316.6	316.9	0.3	0.0	100.0	0.0

Sample Notes:

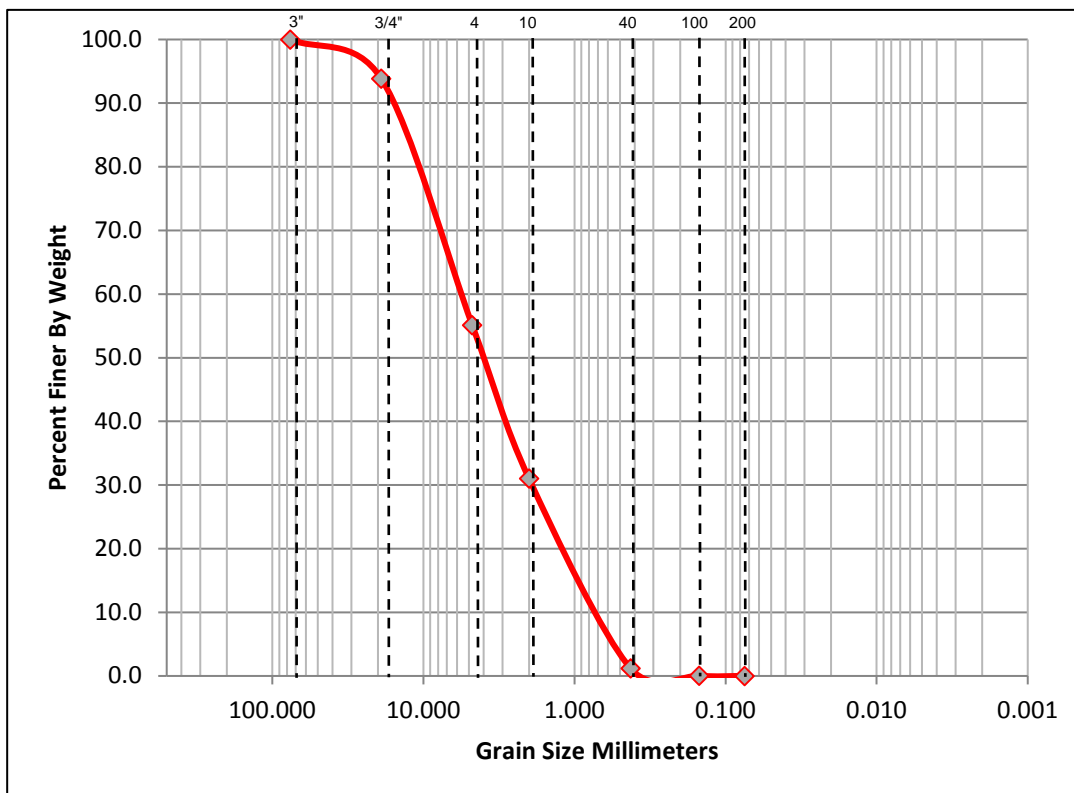


US Army Corps
of Engineers®
New England District

Project Name: Hashamomuck
Project Location: Southold, NY
Sample ID: T1-M

Date: 11/30/15

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



%Cobble	%Gravel		%Sand			%Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	6.2	38.7	24.1	29.8	1.2	0.0	

D10	D15	D30	D50	D60	D85	Cc	Cu
0.8908	1.1549	1.9473	4.1665	6.5466	15.7464	0.67	7.35

Original Sample Weight (g)			1167.5	Post Wash Weight (g)			0
Sieve	Sieve Size (mm)	Sieve Weight (g)	Shaken Weight (g)	Weight Retained (g)	Percent Retained	Cum. Percent Retained	Percent Finer
3"	76.200	0.0	0.0	0.0	0.0	0.0	100.0
3/4"	19.000	542.9	614.8	71.9	6.2	6.2	93.8
#4	4.750	489.0	941.1	452.1	38.7	44.9	55.1
#10	2.000	463.4	745.0	281.6	24.1	69.0	31.0
#40	0.425	354.8	702.9	348.1	29.8	98.8	1.2
#100	0.150	325.5	338.9	13.4	1.1	100.0	0.0
#200	0.075	313.5	313.9	0.4	0.0	100.0	0.0

Sample Notes:

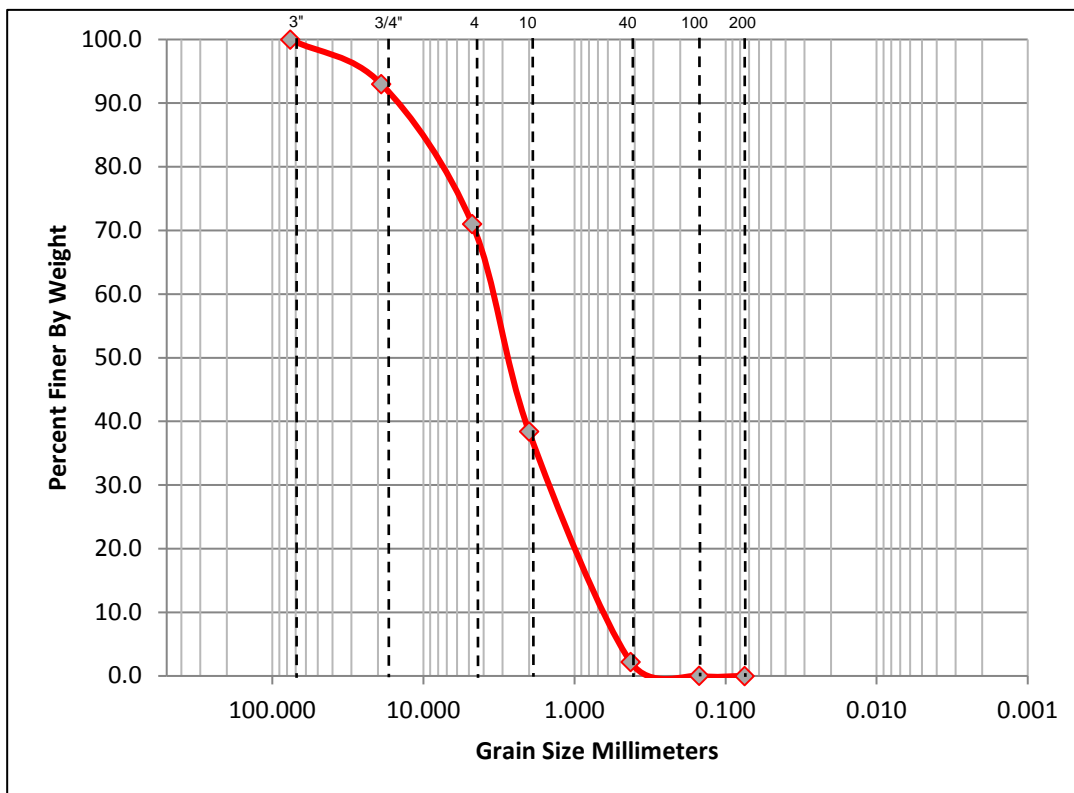


US Army Corps
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New England District

Project Name: Hashamomuck
Project Location: Southold, NY
Sample ID: T2-M

Date: 11/30/15

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



%Cobble	%Gravel		%Sand			%Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	7.0	22.0	32.6	36.2	2.2	0.0	

D10	D15	D30	D50	D60	D85	Cc	Cu
0.7641	0.9817	1.6343	2.9778	3.8212	13.8130	1.12	5.00

Original Sample Weight (g)			1052.2	Post Wash Weight (g)			0
Sieve	Sieve Size (mm)	Sieve Weight (g)	Shaken Weight (g)	Weight Retained (g)	Percent Retained	Cum. Percent Retained	Percent Finer
3"	76.200	0.0	0.0	0.0	0.0	0.0	100.0
3/4"	19.000	542.7	616.3	73.6	7.0	7.0	93.0
#4	4.750	493.7	725.1	231.4	22.0	29.0	71.0
#10	2.000	470.3	813.4	343.1	32.6	61.6	38.4
#40	0.425	353.4	734.3	380.9	36.2	97.8	2.2
#100	0.150	328.8	351.7	22.9	2.2	100.0	0.0
#200	0.075	316.7	317.0	0.3	0.0	100.0	0.0

Sample Notes:

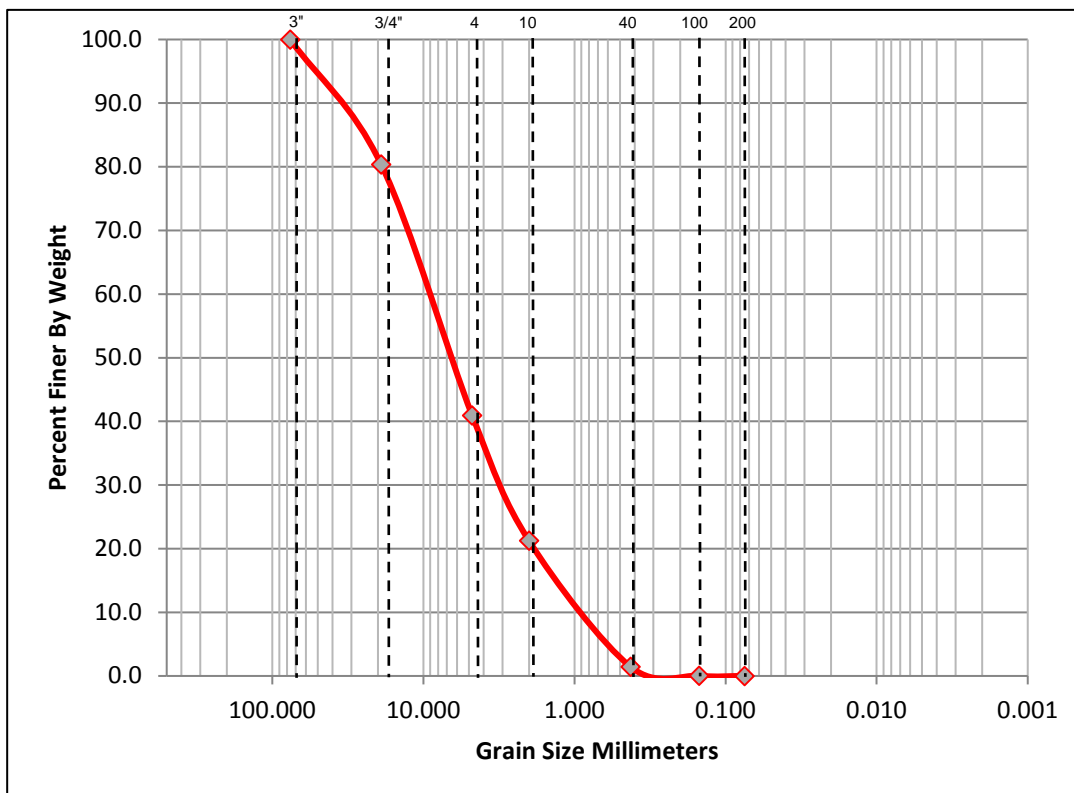


US Army Corps
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New England District

Project Name: Hashamomuck
Project Location: Southold, NY
Sample ID: T3-M

Date: 11/30/15

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



%Cobble	%Gravel		%Sand			%Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	19.7	39.4	19.7	19.8	1.4	0.0	

D10	D15	D30	D50	D60	D85	Cc	Cu
1.1060	1.5037	3.2251	8.0371	11.6511	32.5699	0.50	10.53

Original Sample Weight (g)			1105.5	Post Wash Weight (g)			0
Sieve	Sieve Size (mm)	Sieve Weight (g)	Shaken Weight (g)	Weight Retained (g)	Percent Retained	Cum. Percent Retained	Percent Finer
3"	76.200	0.0	0.0	0.0	0.0	0.0	100.0
3/4"	19.000	542.9	760.3	217.4	19.7	19.7	80.3
#4	4.750	493.8	929.7	435.9	39.4	59.1	40.9
#10	2.000	470.6	688.0	217.4	19.7	78.8	21.2
#40	0.425	353.2	572.1	218.9	19.8	98.6	1.4
#100	0.150	328.7	344.3	15.6	1.4	100.0	0.0
#200	0.075	316.6	316.9	0.3	0.0	100.0	0.0

Sample Notes:

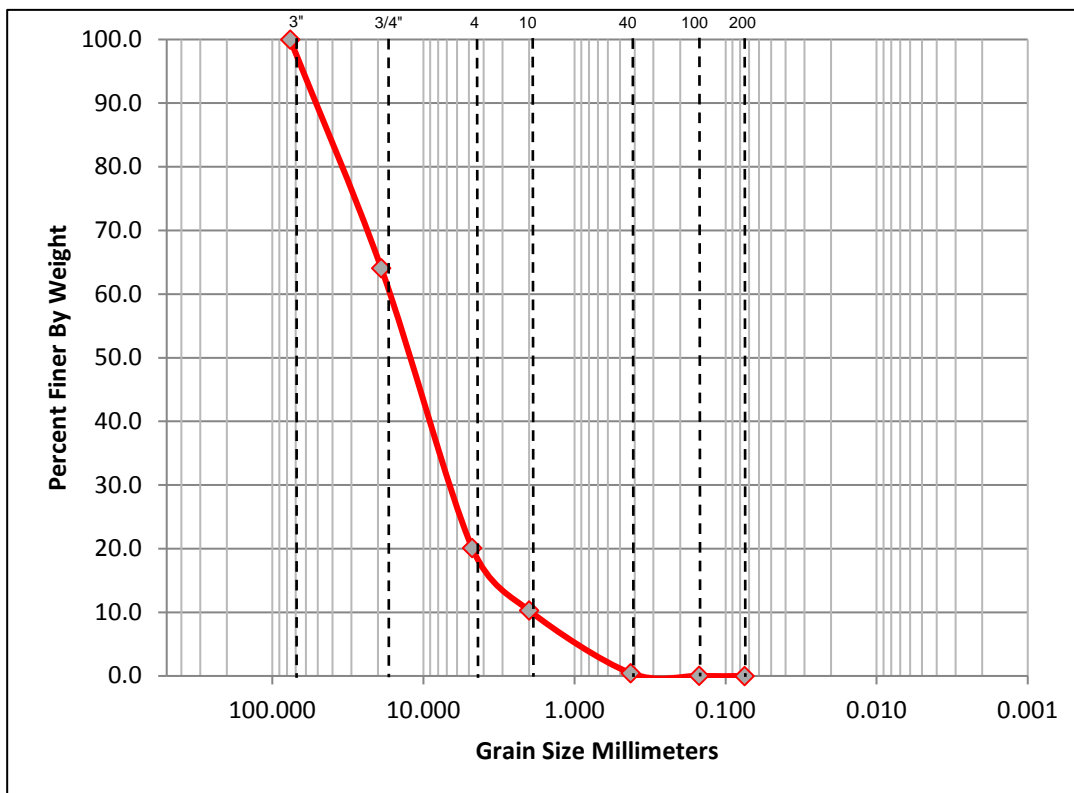


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New England District

Project Name: Hashamomuck
Project Location: Southold, NY
Sample ID: T4-M

Date: 11/30/15

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



%Cobble	%Gravel		%Sand			%Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	35.9	44.0	9.8	9.8	0.4	0.0	

D10	D15	D30	D50	D60	D85	Cc	Cu
1.9524	3.3196	7.9591	14.4406	17.6813	52.3208	0.46	9.06

Original Sample Weight (g)			1045.9	Post Wash Weight (g)			0
Sieve	Sieve Size (mm)	Sieve Weight (g)	Shaken Weight (g)	Weight Retained (g)	Percent Retained	Cum. Percent Retained	Percent Finer
3"	76.200	0.0	0.0	0.0	0.0	0.0	100.0
3/4"	19.000	542.8	918.6	375.8	35.9	35.9	64.1
#4	4.750	489.2	949.1	459.9	44.0	79.9	20.1
#10	2.000	464.2	566.7	102.5	9.8	89.7	10.3
#40	0.425	354.5	457.5	103.0	9.8	99.6	0.4
#100	0.150	325.5	330.1	4.6	0.4	100.0	0.0
#200	0.075	313.6	313.7	0.1	0.0	100.0	0.0

Sample Notes:

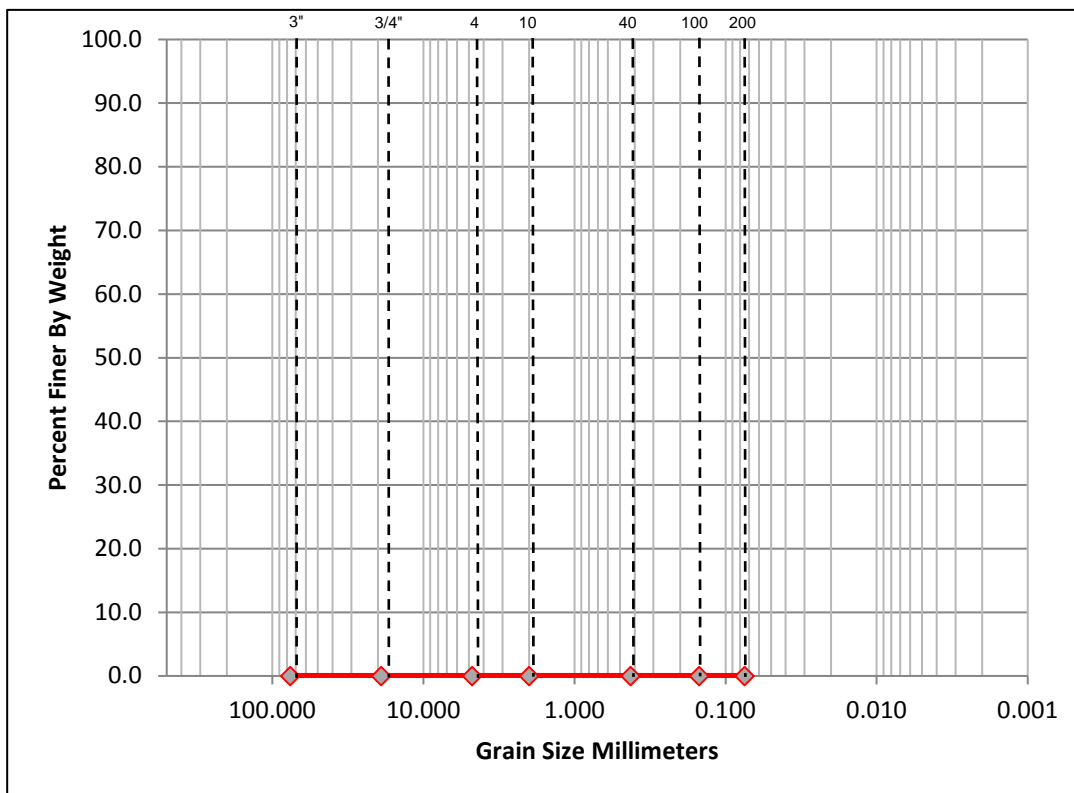


US Army Corps
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New England District

Project Name: Hashamomuck
Project Location: Southold, NY
Sample ID: T5-M

Date: 11/30/15

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



%Cobble	%Gravel		%Sand			%Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.0	0.0	0.0	

D10	D15	D30	D50	D60	D85	Cc	Cu
#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	-	-

Original Sample Weight (g)			0.0	Post Wash Weight (g)			0
Sieve	Sieve Size (mm)	Sieve Weight (g)	Shaken Weight (g)	Weight Retained (g)	Percent Retained	Cum. Percent Retained	Percent Finer
3"	76.200			0.0	0.0	0.0	0.0
3/4"	19.000			0.0	0.0	0.0	0.0
#4	4.750			0.0	0.0	0.0	0.0
#10	2.000			0.0	0.0	0.0	0.0
#40	0.425			0.0	0.0	0.0	0.0
#100	0.150			0.0	0.0	0.0	0.0
#200	0.075			0.0	0.0	0.0	0.0

Sample Notes: NO SAMPLE - ARMORSTONE

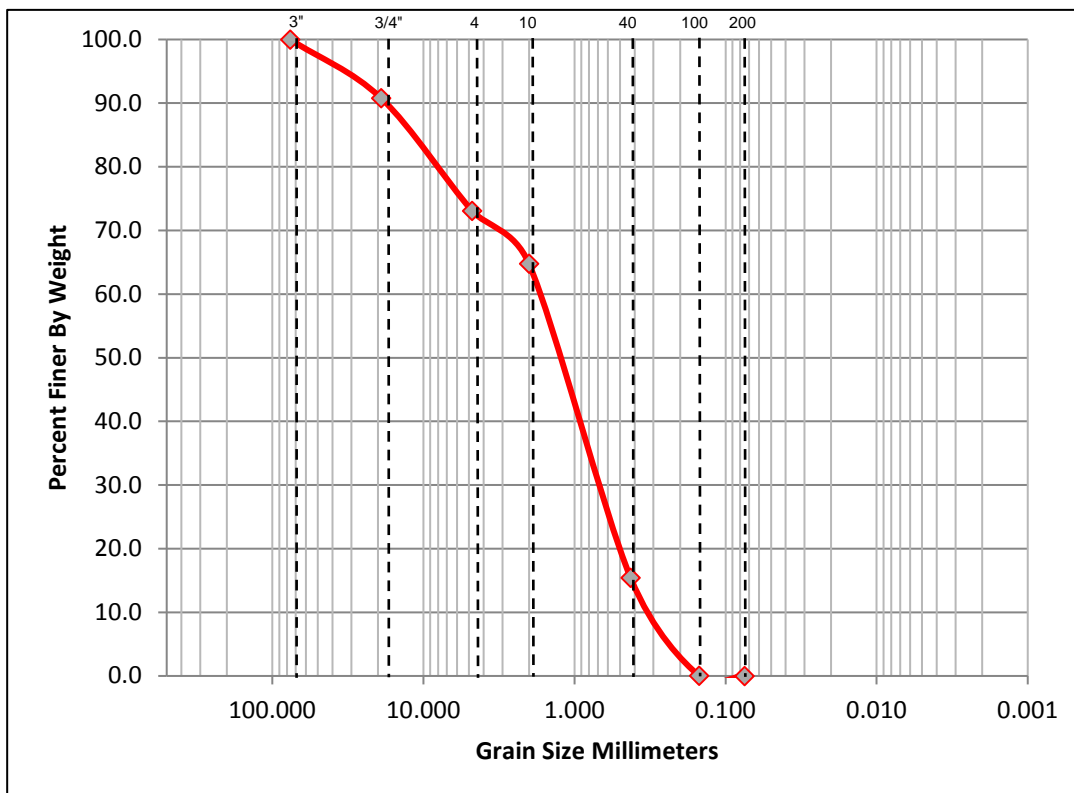


US Army Corps
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New England District

Project Name: Hashamomuck
Project Location: Southold, NY
Sample ID: T6-M

Date: 11/30/15

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



%Cobble	%Gravel		%Sand			%Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	9.2	17.7	8.3	49.3	15.4	0.0	

D10	D15	D30	D50	D60	D85	Cc	Cu
0.3282	0.4176	0.8907	1.5291	1.8484	14.3570	2.94	5.63

Original Sample Weight (g)			1046.5	Post Wash Weight (g)			0
Sieve	Sieve Size (mm)	Sieve Weight (g)	Shaken Weight (g)	Weight Retained (g)	Percent Retained	Cum. Percent Retained	Percent Finer
3"	76.200	0.0	0.0	0.0	0.0	0.0	100.0
3/4"	19.000	542.8	639.4	96.6	9.2	9.2	90.8
#4	4.750	489.0	674.3	185.3	17.7	26.9	73.1
#10	2.000	463.5	550.5	87.0	8.3	35.3	64.7
#40	0.425	354.6	870.9	516.3	49.3	84.6	15.4
#100	0.150	325.5	486.4	160.9	15.4	100.0	0.0
#200	0.075	313.5	313.9	0.4	0.0	100.0	0.0

Sample Notes:

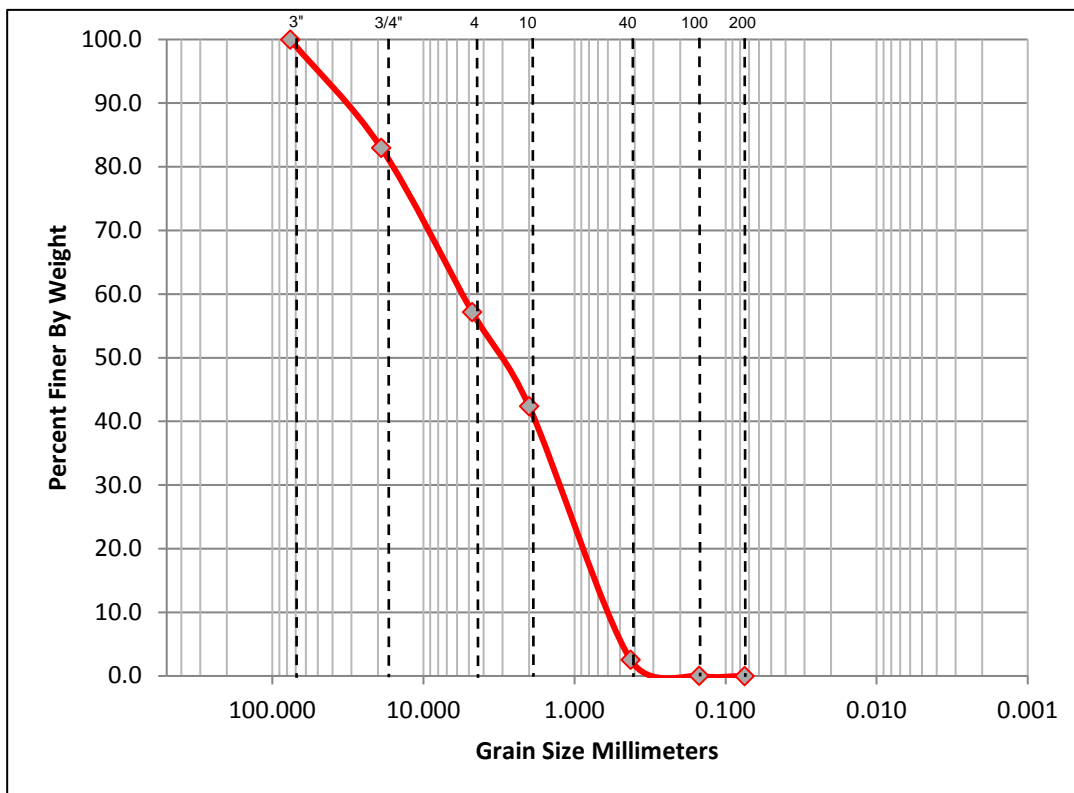


US Army Corps
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New England District

Project Name: Hashamomuck
Project Location: Southold, NY
Sample ID: T7-M

Date: 11/30/15

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



%Cobble	%Gravel		%Sand			%Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	17.0	25.8	14.8	39.8	2.5	0.0	

D10	D15	D30	D50	D60	D85	Cc	Cu
0.7199	0.9176	1.5106	3.4168	6.3124	25.8560	0.66	8.77

Original Sample Weight (g)			1090.2	Post Wash Weight (g)			0
Sieve	Sieve Size (mm)	Sieve Weight (g)	Shaken Weight (g)	Weight Retained (g)	Percent Retained	Cum. Percent Retained	Percent Finer
3"	76.200	0.0	0.0	0.0	0.0	0.0	100.0
3/4"	19.000	542.9	728.7	185.8	17.0	17.0	83.0
#4	4.750	489.1	770.2	281.1	25.8	42.8	57.2
#10	2.000	463.4	624.7	161.3	14.8	57.6	42.4
#40	0.425	354.7	789.0	434.3	39.8	97.5	2.5
#100	0.150	325.4	353.0	27.6	2.5	100.0	0.0
#200	0.075	313.5	313.6	0.1	0.0	100.0	0.0

Sample Notes:

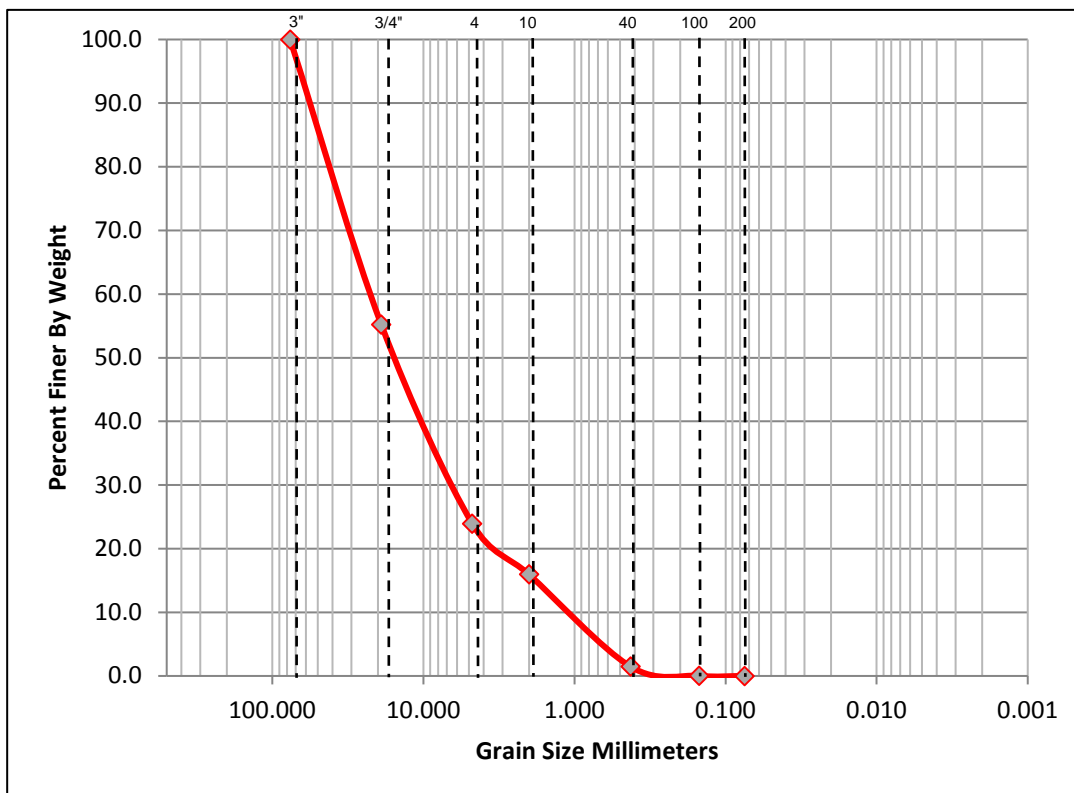


US Army Corps
of Engineers®
New England District

Project Name: Hashamomuck
Project Location: Southold, NY
Sample ID: T8-M

Date: 11/30/15

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



%Cobble	%Gravel		%Sand			%Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	44.8	31.3	8.0	14.5	1.5	0.0	

D10	D15	D30	D50	D60	D85	Cc	Cu
1.3530	1.8968	7.5116	16.6235	25.1101	57.0413	0.44	18.56

Original Sample Weight (g)			1015.1	Post Wash Weight (g)			
Sieve	Sieve Size (mm)	Sieve Weight (g)	Shaken Weight (g)	Weight Retained (g)	Percent Retained	Cum. Percent Retained	Percent Finer
3"	76.200	0	0.0	0.0	0.0	0.0	100.0
3/4"	19.000	542.9	997.5	454.6	44.8	44.8	55.2
#4	4.750	488.9	806.4	317.5	31.3	76.1	23.9
#10	2.000	463.4	544.5	81.1	8.0	84.1	15.9
#40	0.425	354.8	501.8	147.0	14.5	98.5	1.5
#100	0.150	325.5	340.2	14.7	1.4	100.0	0.0
#200	0.075	313.5	313.7	0.2	0.0	100.0	0.0

Sample Notes:

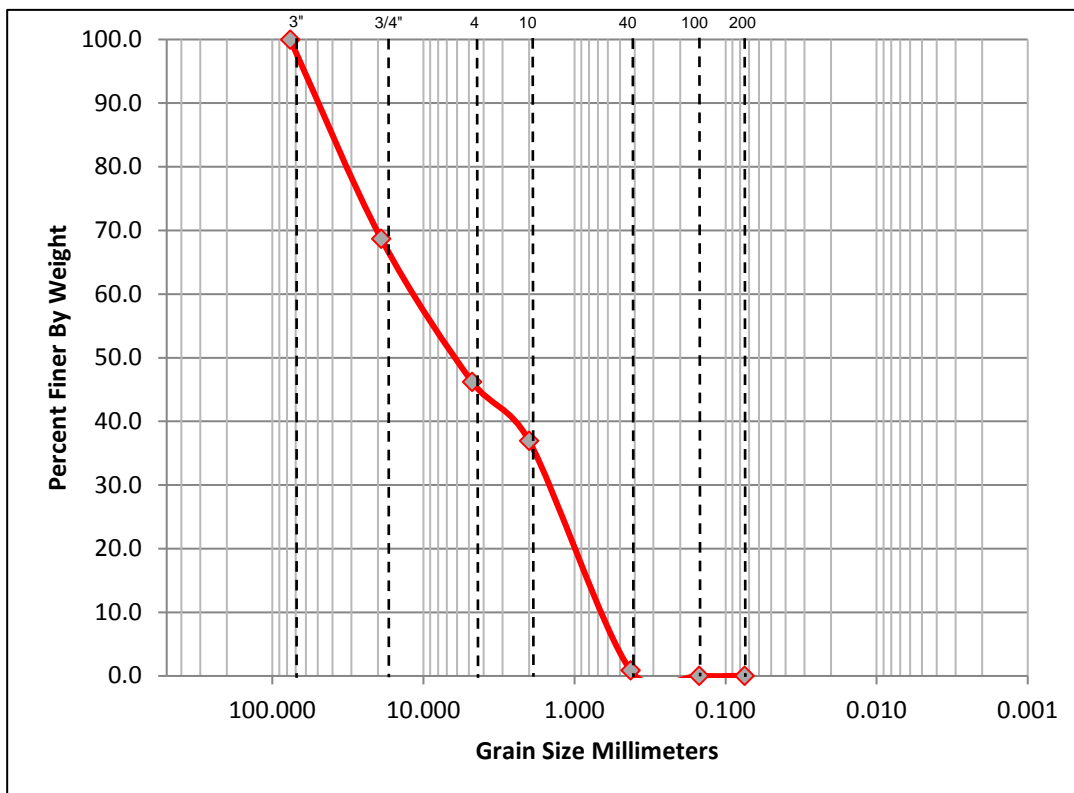


US Army Corps
of Engineers®
New England District

Project Name: Hashamomuck
Project Location: Southold, NY
Sample ID: T9-M

Date: 11/30/15

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



%Cobble	%Gravel		%Sand			%Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	31.3	22.5	9.2	36.1	0.8	0.0	

D10	D15	D30	D50	D60	D85	Cc	Cu
0.8237	1.0418	1.6963	7.1682	13.4989	48.7969	0.31	16.39

Original Sample Weight (g)			1171.5	Post Wash Weight (g)			
Sieve	Sieve Size (mm)	Sieve Weight (g)	Shaken Weight (g)	Weight Retained (g)	Percent Retained	Cum. Percent Retained	Percent Finer
3"	76.200	0.0	0.0	0.0	0.0	0.0	100.0
3/4"	19.000	542.9	909.7	366.8	31.3	31.3	68.7
#4	4.750	493.8	757.5	263.7	22.5	53.8	46.2
#10	2.000	470.5	578.5	108.0	9.2	63.0	37.0
#40	0.425	353.5	776.4	422.9	36.1	99.1	0.9
#100	0.150	328.7	338.4	9.7	0.8	100.0	0.0
#200	0.075	316.6	316.8	0.2	0.0	100.0	0.0

Sample Notes:

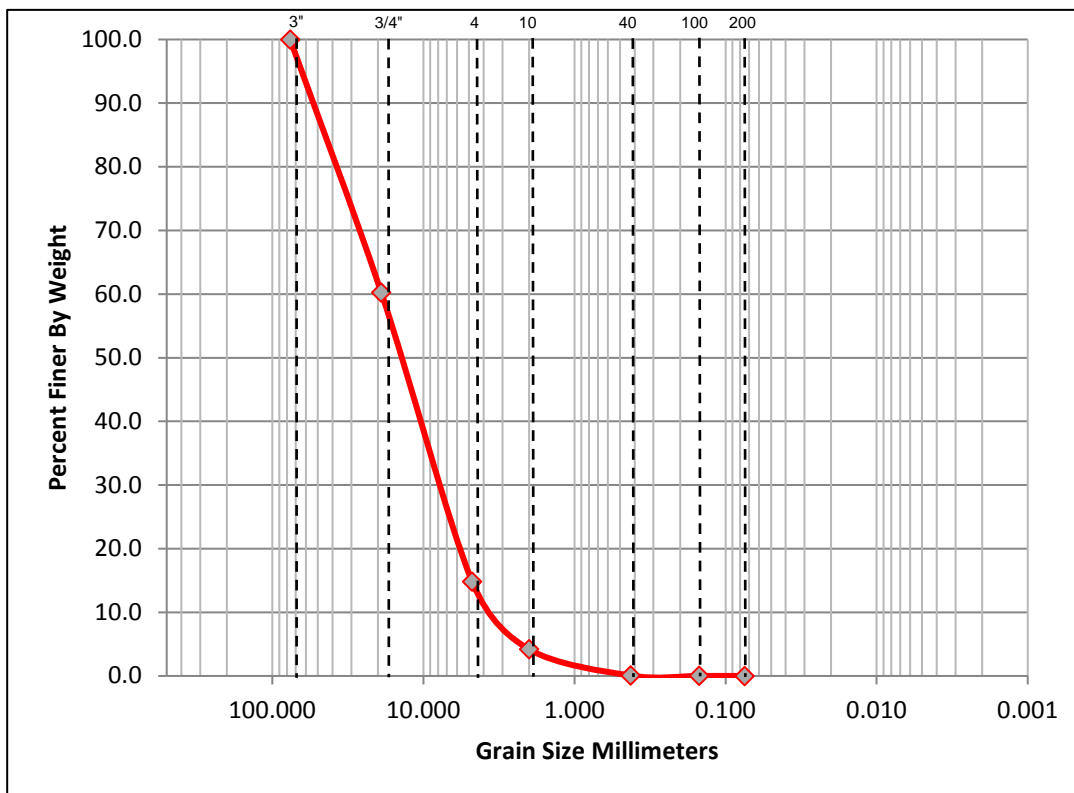


US Army Corps
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New England District

Project Name: Hashamomuck
Project Location: Southold, NY
Sample ID: T10-M

Date: 11/30/15

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



%Cobble	%Gravel		%Sand			%Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	39.8	45.4	10.6	4.1	0.1	0.0	

D10	D15	D30	D50	D60	D85	Cc	Cu
3.5052	4.8140	9.5175	15.7889	18.9246	54.6202	0.29	5.40

Original Sample Weight (g)			1030.7	Post Wash Weight (g)			0
Sieve	Sieve Size (mm)	Sieve Weight (g)	Shaken Weight (g)	Weight Retained (g)	Percent Retained	Cum. Percent Retained	Percent Finer
3"	76.200	0.0	0.0	0.0	0.0	0.0	100.0
3/4"	19.000	542.9	952.7	409.8	39.8	39.8	60.2
#4	4.750	489.0	957.4	468.4	45.4	85.2	14.8
#10	2.000	463.5	572.7	109.2	10.6	95.8	4.2
#40	0.425	354.8	397.5	42.7	4.1	99.9	0.1
#100	0.150	325.6	326.1	0.5	0.0	100.0	0.0
#200	0.075	313.6	313.7	0.1	0.0	100.0	0.0

Sample Notes:

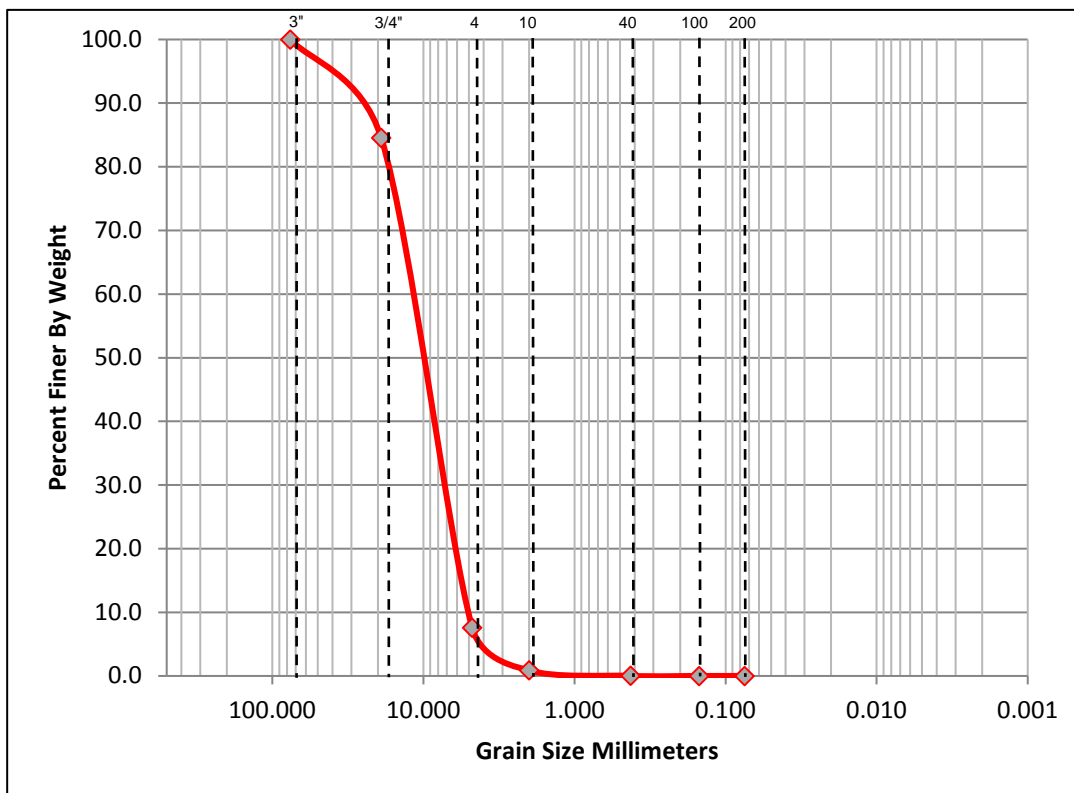


US Army Corps
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New England District

Project Name: Hashamomuck
Project Location: Southold, NY
Sample ID: T1-L

Date: 11/30/15

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



%Cobble	%Gravel		%Sand			%Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	15.5	77.0	6.7	0.9	0.0	0.0	

D10	D15	D30	D50	D60	D85	Cc	Cu
5.2023	6.1282	8.9058	12.6092	14.4609	20.8003	0.24	2.78

Original Sample Weight (g)			1099.6	Post Wash Weight (g)			
Sieve	Sieve Size (mm)	Sieve Weight (g)	Shaken Weight (g)	Weight Retained (g)	Percent Retained	Cum. Percent Retained	Percent Finer
3"	76.200	0.0	0.0	0.0	0.0	0.0	100.0
3/4"	19.000	542.9	713.2	170.3	15.5	15.5	84.5
#4	4.750	489.0	1335.2	846.2	77.0	92.4	7.6
#10	2.000	463.5	536.9	73.4	6.7	99.1	0.9
#40	0.425	354.7	364.2	9.5	0.9	100.0	0.0
#100	0.150	325.4	325.6	0.2	0.0	100.0	0.0
#200	0.075	313.5	313.5	0.0	0.0	100.0	0.0

Sample Notes:

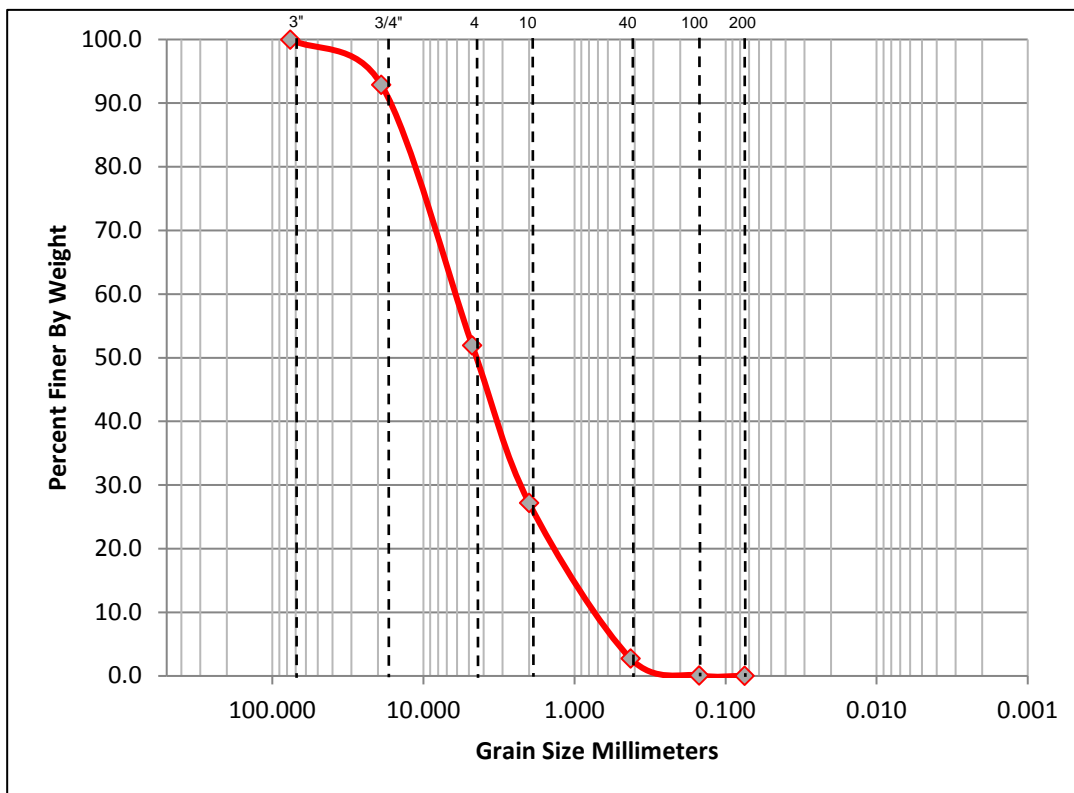


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New England District

Project Name: Hashamomuck
Project Location: Southold, NY
Sample ID: T2-L

Date: 11/30/15

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



%Cobble	%Gravel		%Sand			%Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	7.1	40.9	24.7	24.5	2.7	0.0	

D10	D15	D30	D50	D60	D85	Cc	Cu
0.8928	1.2146	2.3109	4.5336	7.5524	16.2530	0.69	8.46

Original Sample Weight (g)			1127.1	Post Wash Weight (g)			
Sieve	Sieve Size (mm)	Sieve Weight (g)	Shaken Weight (g)	Weight Retained (g)	Percent Retained	Cum. Percent Retained	Percent Finer
3"	76.200	0.0	0.0	0.0	0.0	0.0	100.0
3/4"	19.000	542.8	622.9	80.1	7.1	7.1	92.9
#4	4.750	493.8	955.3	461.5	40.9	48.1	51.9
#10	2.000	470.3	749.2	278.9	24.7	72.8	27.2
#40	0.425	353.3	629.1	275.8	24.5	97.3	2.7
#100	0.150	328.6	358.3	29.7	2.6	99.9	0.1
#200	0.075	316.6	317.6	1.0	0.1	100.0	0.0

Sample Notes:

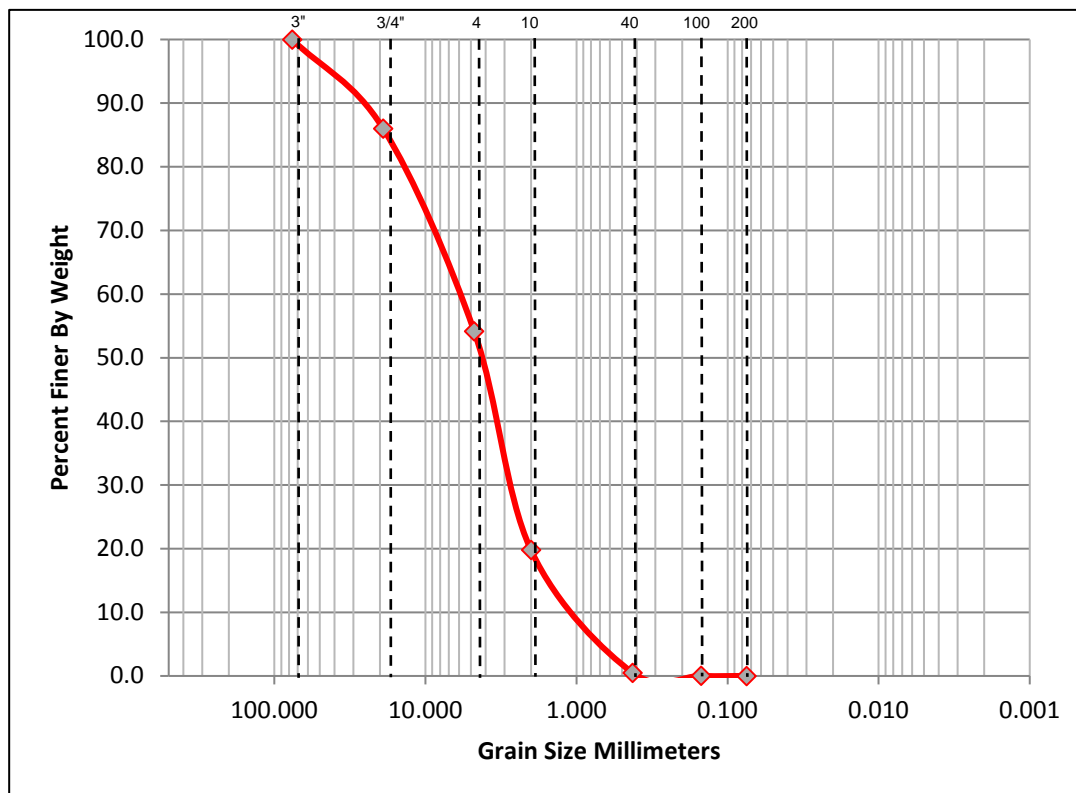


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New England District

Project Name: Hashamomuck
Project Location: Southold, NY
Sample ID: T3-L

Date: 11/30/15

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



%Cobble	%Gravel		%Sand			%Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	14.0	31.9	34.4	19.3	0.5	0.0	

D10	D15	D30	D50	D60	D85	Cc	Cu
1.2013	1.6099	2.8186	4.4196	7.3768	18.5590	0.64	6.14

Original Sample Weight (g)			1078.2	Post Wash Weight (g)			
Sieve	Sieve Size (mm)	Sieve Weight (g)	Shaken Weight (g)	Weight Retained (g)	Percent Retained	Cum. Percent Retained	Percent Finer
3"	76.200	0.0	0.0	0.0	0.0	0.0	100.0
3/4"	19.000	542.8	693.9	151.1	14.0	14.0	86.0
#4	4.750	489.0	832.5	343.5	31.9	45.9	54.1
#10	2.000	463.5	833.9	370.4	34.4	80.2	19.8
#40	0.425	354.7	562.5	207.8	19.3	99.5	0.5
#100	0.150	325.5	330.8	5.3	0.5	100.0	0.0
#200	0.075	313.5	313.6	0.1	0.0	100.0	0.0

Sample Notes:

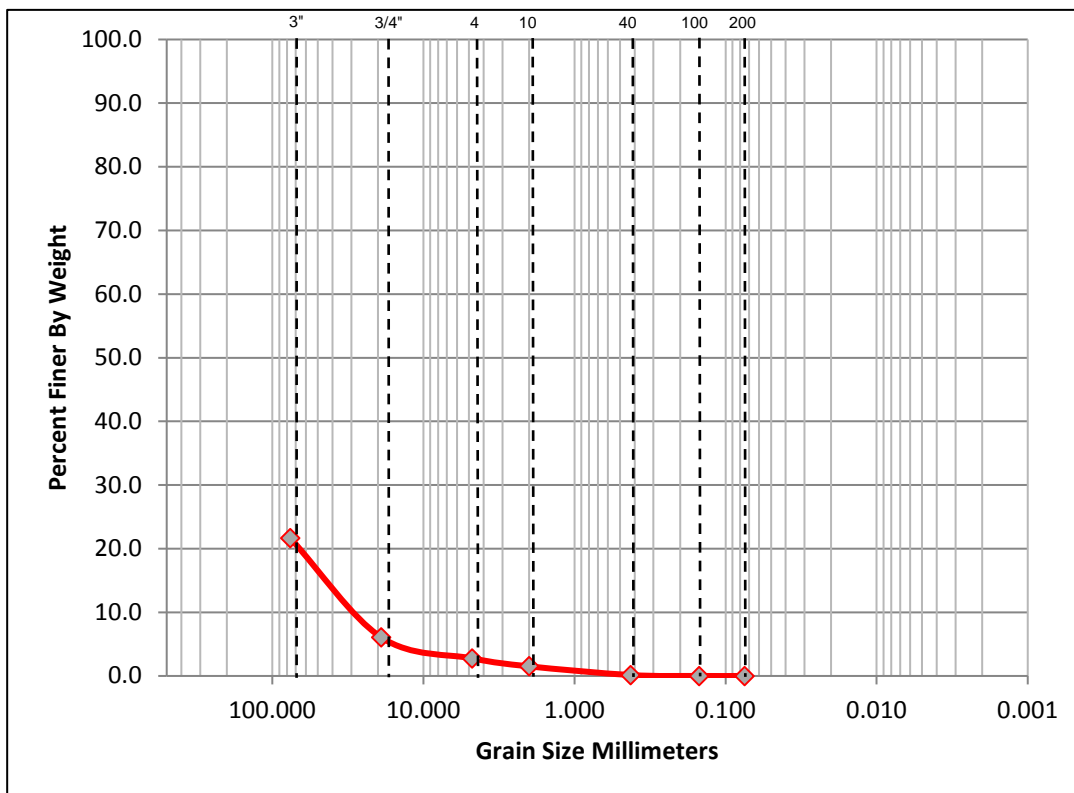


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New England District

Project Name: Hashamomuck
Project Location: Southold, NY
Sample ID: T4-L

Date: 11/30/15

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



%Cobble	%Gravel		%Sand			%Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
78.3	15.6	3.3	1.3	1.4	0.1	0.0	

D10	D15	D30	D50	D60	D85	Cc	Cu
33.4199	51.7400	-	-	-	-	-	-

Original Sample Weight (g)			2277.2	Post Wash Weight (g)			
Sieve	Sieve Size (mm)	Sieve Weight (g)	Shaken Weight (g)	Weight Retained (g)	Percent Retained	Cum. Percent Retained	Percent Finer
3"	76.200	506.9	2290.5	1783.6	78.3	78.3	21.7
3/4"	19.000	542.9	898.4	355.5	15.6	93.9	6.1
#4	4.750	493.6	568.7	75.1	3.3	97.2	2.8
#10	2.000	470.3	498.9	28.6	1.3	98.5	1.5
#40	0.425	353.7	384.8	31.1	1.4	99.9	0.1
#100	0.150	328.6	331.9	3.3	0.1	100.0	0.0
#200	0.075	316.6	316.6	0.0	0.0	100.0	0.0

Sample Notes:

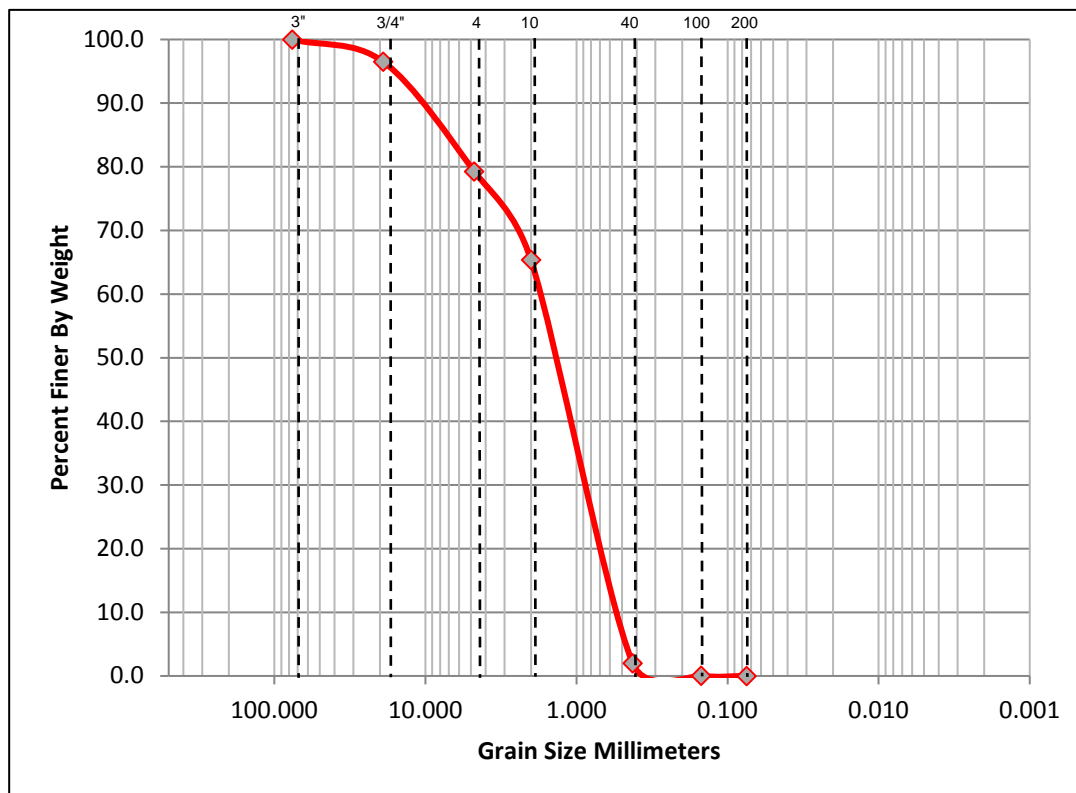


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New England District

Project Name: Hashamomuck
Project Location: Southold, NY
Sample ID: T5-L

Date: 11/30/15

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



%Cobble	%Gravel		%Sand			%Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	3.5	17.2	13.9	63.3	2.0	0.0	

D10	D15	D30	D50	D60	D85	Cc	Cu
0.6236	0.7479	1.1209	1.6183	1.8670	9.4881	1.93	2.99

Original Sample Weight (g)			1043.0	Post Wash Weight (g)			
Sieve	Sieve Size (mm)	Sieve Weight (g)	Shaken Weight (g)	Weight Retained (g)	Percent Retained	Cum. Percent Retained	Percent Finer
3"	76.200	0.0	0.0	0.0	0.0	0.0	100.0
3/4"	19.000	542.9	579.4	36.5	3.5	3.5	96.5
#4	4.750	493.7	673.4	179.7	17.2	20.7	79.3
#10	2.000	470.3	615.5	145.2	13.9	34.7	65.3
#40	0.425	353.3	1013.9	660.6	63.3	98.0	2.0
#100	0.150	328.7	349.4	20.7	2.0	100.0	0.0
#200	0.075	316.6	316.9	0.3	0.0	100.0	0.0

Sample Notes:

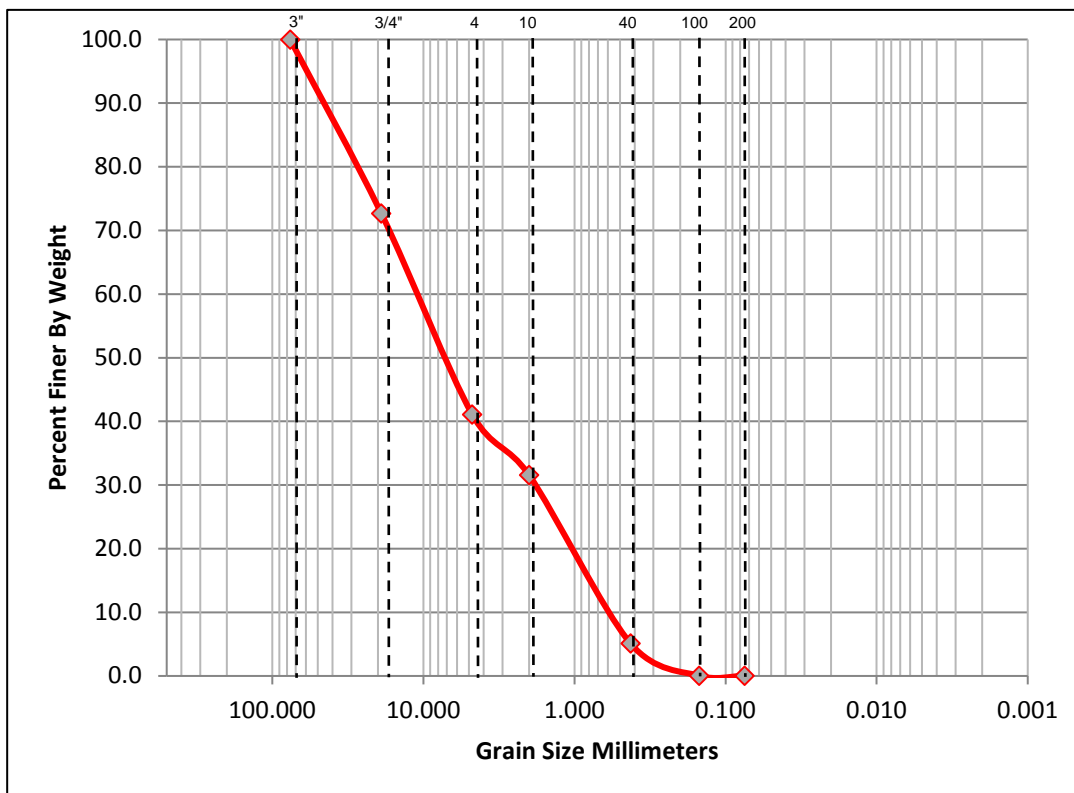


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New England District

Project Name: Hashamomuck
Project Location: Southold, NY
Sample ID: T6-L

Date: 11/30/15

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



%Cobble	%Gravel		%Sand			%Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	27.3	31.6	9.5	26.5	5.1	0.0	

D10	D15	D30	D50	D60	D85	Cc	Cu
0.7169	1.0142	1.9062	8.7681	13.2797	44.7951	0.40	18.52

Original Sample Weight (g)			1064.4	Post Wash Weight (g)			
Sieve	Sieve Size (mm)	Sieve Weight (g)	Shaken Weight (g)	Weight Retained (g)	Percent Retained	Cum. Percent Retained	Percent Finer
3"	76.200	0.0	0.0	0.0	0.0	0.0	100.0
3/4"	19.000	542.8	833.6	290.8	27.3	27.3	72.7
#4	4.750	493.9	830.1	336.2	31.6	58.9	41.1
#10	2.000	470.5	571.8	101.3	9.5	68.4	31.6
#40	0.425	353.3	635.2	281.9	26.5	94.9	5.1
#100	0.150	328.8	382.5	53.7	5.0	100.0	0.0
#200	0.075	316.6	316.9	0.3	0.0	100.0	0.0

Sample Notes:

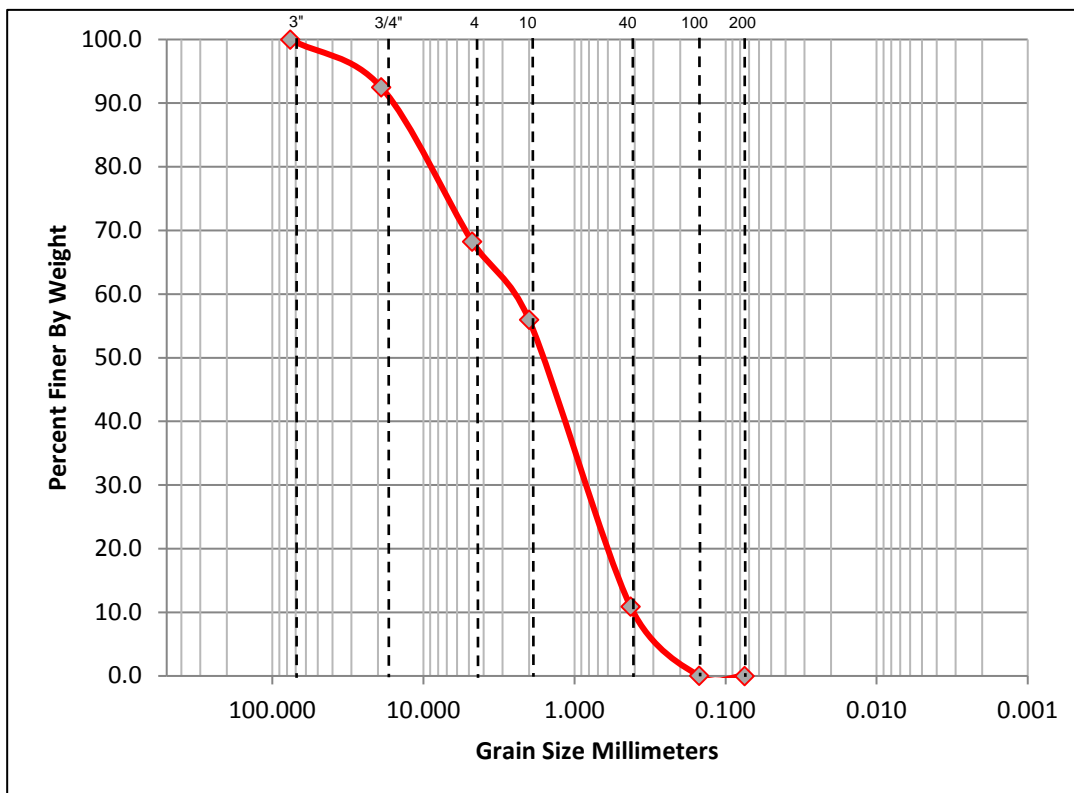


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New England District

Project Name: Hashamomuck
Project Location: Southold, NY
Sample ID: T7-L

Date: 11/30/15

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



%Cobble	%Gravel		%Sand			%Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	7.5	24.2	12.3	45.1	10.9	0.0	

D10	D15	D30	D50	D60	D85	Cc	Cu
0.4030	0.5693	1.0932	1.7917	2.9043	14.6048	1.87	7.21

Original Sample Weight (g)			1073.9	Post Wash Weight (g)			
Sieve	Sieve Size (mm)	Sieve Weight (g)	Shaken Weight (g)	Weight Retained (g)	Percent Retained	Cum. Percent Retained	Percent Finer
3"	76.200	0.0	0.0	0.0	0.0	0.0	100.0
3/4"	19.000	542.9	623.7	80.8	7.5	7.5	92.5
#4	4.750	489.0	749.3	260.3	24.2	31.8	68.2
#10	2.000	463.4	595.2	131.8	12.3	44.0	56.0
#40	0.425	354.6	838.9	484.3	45.1	89.1	10.9
#100	0.150	325.4	441.6	116.2	10.8	100.0	0.0
#200	0.075	313.5	314.0	0.5	0.0	100.0	0.0

Sample Notes:

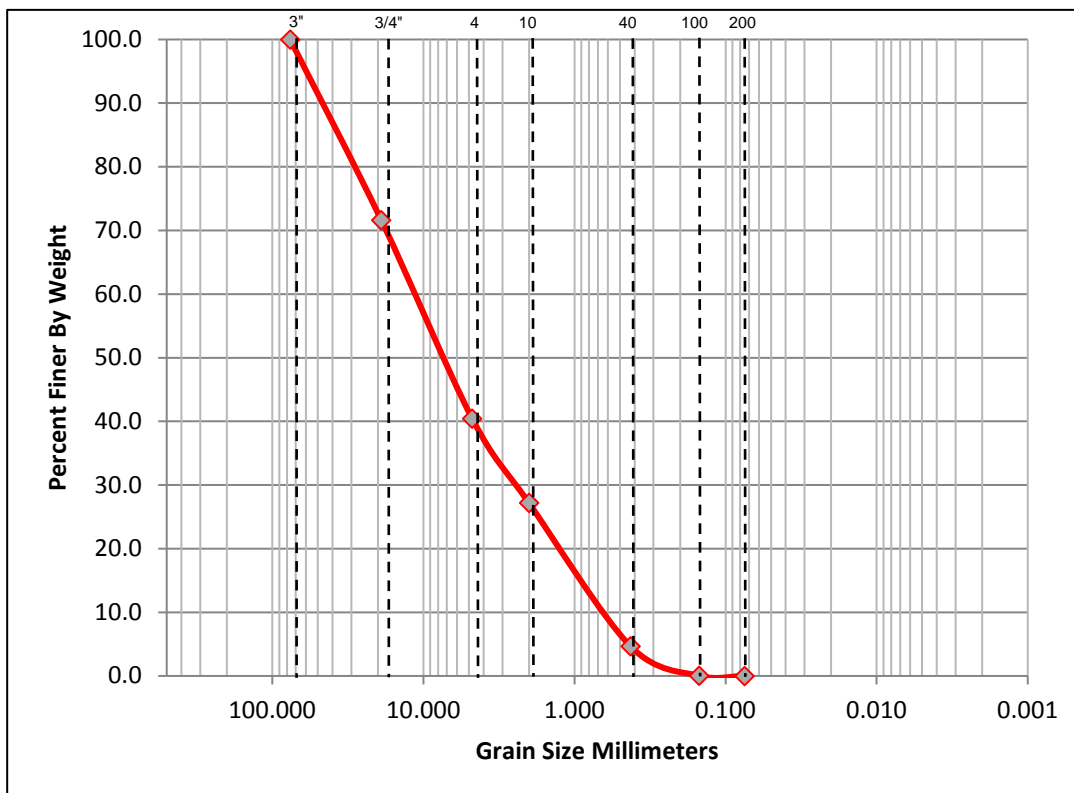


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New England District

Project Name: Hashamomuck
Project Location: Southold, NY
Sample ID: T8-L

Date: 11/30/15

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



%Cobble	%Gravel		%Sand			%Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	28.4	31.2	13.3	22.5	4.6	0.0	

D10	D15	D30	D50	D60	D85	Cc	Cu
0.7995	1.1491	2.5873	9.1222	13.6903	45.9639	0.47	17.12

Original Sample Weight (g)			1100.2	Post Wash Weight (g)			
Sieve	Sieve Size (mm)	Sieve Weight (g)	Shaken Weight (g)	Weight Retained (g)	Percent Retained	Cum. Percent Retained	Percent Finer
3"	76.200	0.0	0.0	0.0	0.0	0.0	100.0
3/4"	19.000	542.7	854.9	312.2	28.4	28.4	71.6
#4	4.750	493.7	836.9	343.2	31.2	59.6	40.4
#10	2.000	470.2	616.1	145.9	13.3	72.8	27.2
#40	0.425	353.3	601.1	247.8	22.5	95.4	4.6
#100	0.150	328.8	379.6	50.8	4.6	100.0	0.0
#200	0.075	316.6	316.9	0.3	0.0	100.0	0.0

Sample Notes:

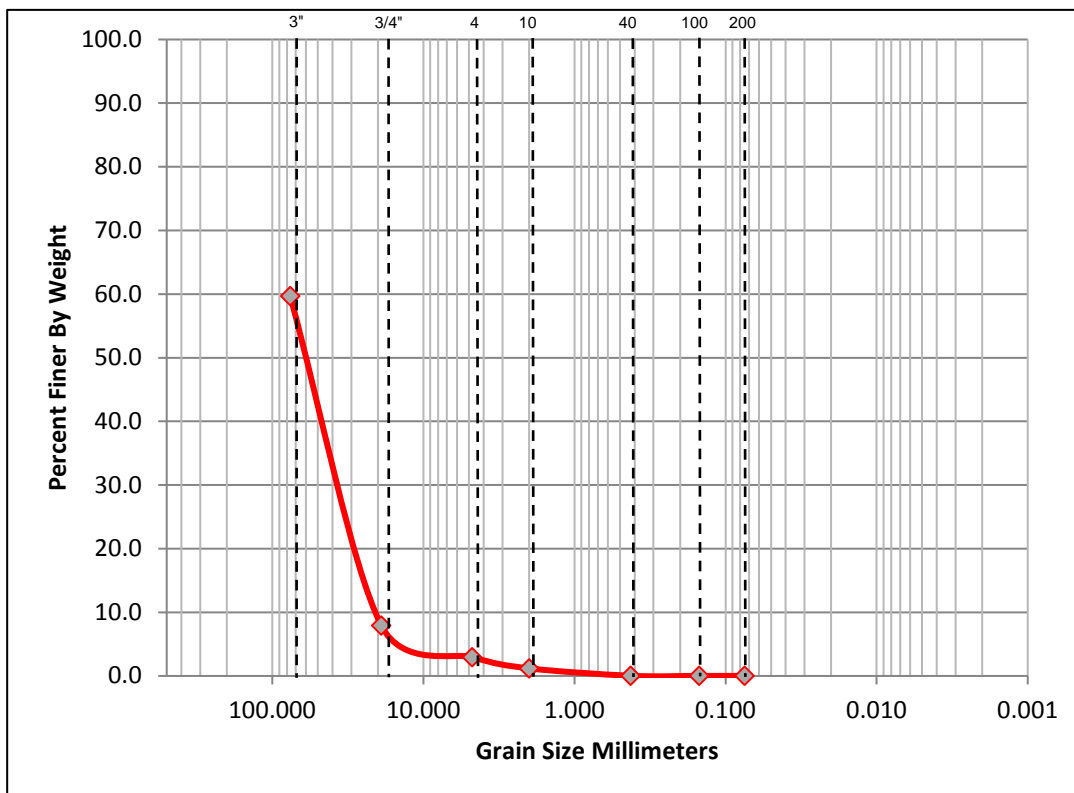


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New England District

Project Name: Hashamomuck
Project Location: Southold, NY
Sample ID: T9-L

Date: 11/30/15

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



%Cobble	%Gravel		%Sand			%Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
59.7	51.7	5.0	1.8	1.2	0.0	0.0	

D10	D15	D30	D50	D60	D85	Cc	Cu
21.2760	26.8042	43.3886	65.5013	-	-	-	-

Original Sample Weight (g)			2158.3	Post Wash Weight (g)			
Sieve	Sieve Size (mm)	Sieve Weight (g)	Shaken Weight (g)	Weight Retained (g)	Percent Retained	Cum. Percent Retained	Percent Finer
3"	76.200	506.7	1377.0	870.3	40.3	40.3	59.7
3/4"	19.000	542.8	1659.4	1116.6	51.7	92.1	7.9
#4	4.750	488.9	596.4	107.5	5.0	97.0	3.0
#10	2.000	463.3	501.4	38.1	1.8	98.8	1.2
#40	0.425	354.5	379.6	25.1	1.2	100.0	0.0
#100	0.150	325.3	325.8	0.5	0.0	100.0	0.0
#200	0.075	313.4	313.5	0.1	0.0	100.0	0.0

Sample Notes:

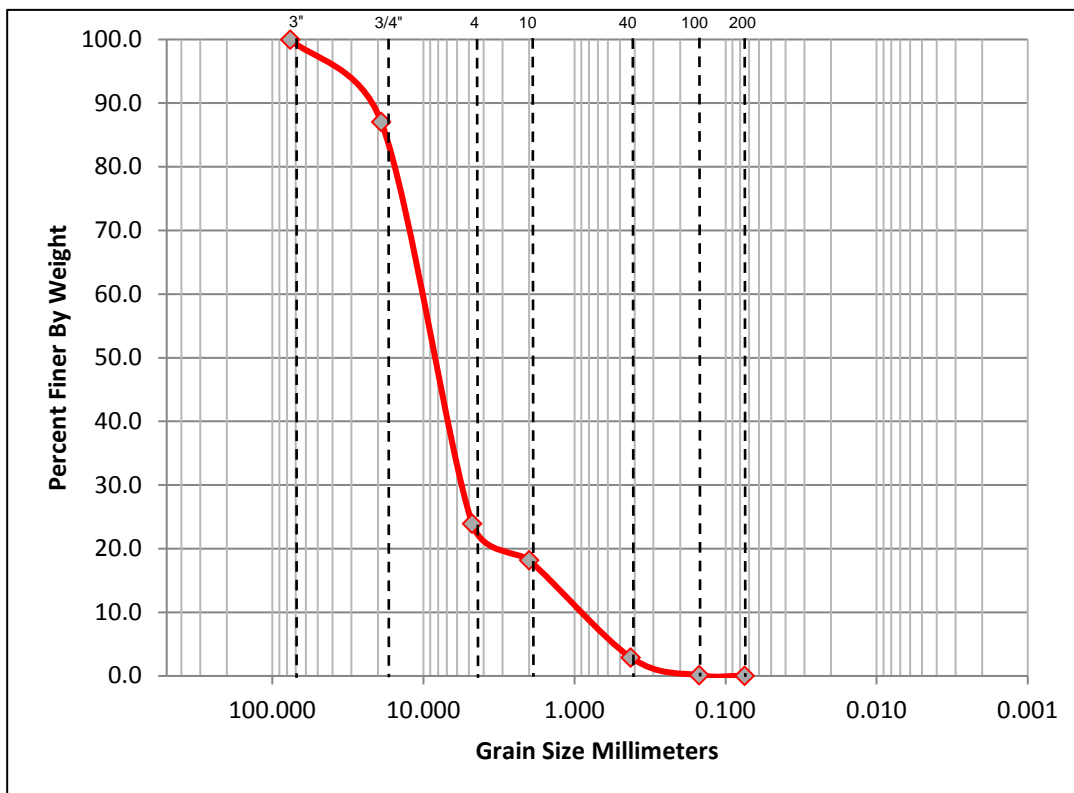


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New England District

Project Name: Hashamomuck
Project Location: Southold, NY
Sample ID: T10-L

Date: 11/30/15

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



%Cobble	%Gravel		%Sand			%Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	13.0	63.1	5.7	15.3	2.9	0.0	

D10	D15	D30	D50	D60	D85	Cc	Cu
1.1559	1.6713	6.1215	10.6375	12.8955	18.5404	0.82	11.16

Original Sample Weight (g)			1068.3	Post Wash Weight (g)			
Sieve	Sieve Size (mm)	Sieve Weight (g)	Shaken Weight (g)	Weight Retained (g)	Percent Retained	Cum. Percent Retained	Percent Finer
3"	76.200	0.0	0.0	0.0	0.0	0.0	100.0
3/4"	19.000	542.7	681.2	138.5	13.0	13.0	87.0
#4	4.750	493.7	1167.9	674.2	63.1	76.1	23.9
#10	2.000	470.4	531.7	61.3	5.7	81.8	18.2
#40	0.425	353.3	516.5	163.2	15.3	97.1	2.9
#100	0.150	328.7	358.6	29.9	2.8	99.9	0.1
#200	0.075	316.6	317.5	0.9	0.1	100.0	0.0

Sample Notes: