



Briggs Engineering & Testing

A DIVISION OF PK ASSOCIATES, INC.

June 23, 2004
Project No. 22405

FILE COPY

E.R.M., Inc.
c/o Elissa McNamara
399 Boylston Street, Sixth Floor
Boston, MA 02116

**RE: Estimated Permeability of Soil
For Environmental Resources Management/Raytheon
Wayland, MA**

Dear Ms. McNamara:

Per your request Briggs Engineering & Testing (Briggs) has estimated the permeability rate of the following soil samples delivered to our soils laboratory.

Briggs performed sieve and hydrometer analyses in accordance with ASTM D422. The samples were collected from locations B-417 and B-422. The sample locations and gradation results are detailed on the attached laboratory reports. Based on the result of the sieve and hydrometer analyses and the Hazzen Williams approximation method, Briggs estimated the soil permeability for each sample. The results are tabulated as follows:

<u>Sample Source</u>	<u>Permeability Estimate (cm/sec)</u>
B417, 95-97'	7.7×10^{-5}
B422, 85-87'	1.6×10^{-4}
B422, 107-109'	5.6×10^{-5}

If you have any questions, please do not hesitate to contact us at your convenience.

Very truly yours,
BRIGGS ENGINEERING & TESTING
A Division of PK Associates, Inc.

David W. Geisser
Project Engineer

Paul M. Skorohod
President

DWG:PMS:dg
Enclosure: Lab Report

www.briggsengineering.com

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Briggs Engineering & Testing

A DIVISION OF PK ASSOCIATES, INC.

ERM/Raytheon, Wayland
 Briggs #
 Tested: 6-16-04

1. Sample No.	Description	Source
M-11302	Soil	B417 95-97'

2. Particle Size Analysis { ASTM D 422}

Sieve Size	Results {% Passing by Wt.}	Specs.
100 mm	4"	100
75 mm	3"	100
63 mm	2-1/2"	100
50 mm	2"	100
37.5 mm	1-1/2"	100
25.0 mm	1	100
19.0 mm	3/4"	100
12.5 mm	1/2"	100
9.5 mm	3/8"	100
4.75 mm	#4	100
2.00 mm	#10	100
850 µm	#20	100
425 µm	#40	100
180 µm	#80	99
150 µm	#100	98
75 µm	#200	78.9

HYDROMETER ANALYSIS

0.0304 mm	32
0.0199 mm	22
0.0122 mm	14
0.0088 mm	10
0.0063 mm	8
0.0032 mm	7
0.0013 mm	6

4. No specifications were provided.

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ERM/Raytheon, Wayland
 Briggs #
 Tested: 6-16-04

<u>Sample No.</u>	<u>Description</u>	<u>Source</u>
M-11314	Soil	B422 85-87'

2. Particle Size Analysis { ASTM D 422 }

<u>Sieve Size</u>	<u>Results</u> {% Passing by Wt.}	<u>Specs.</u>
100 mm	4"	100
75 mm	3"	100
63 mm	2-1/2"	100
50 mm	2"	100
37.5 mm	1-1/2"	100
25.0 mm	1"	100
19.0 mm	3/4"	100
12.5 mm	1/2"	100
9.5 mm	3/8"	100
4.75 mm	#4	100
2.00 mm	#10	100
850 µm	#20	100
425 µm	#40	99
180 µm	#80	98
150 µm	#100	96
75 µm	#200	67.0

HYDROMETER ANALYSIS

0.0308 mm	24
0.0207 mm	16
0.0125 mm	10
0.0089 mm	8
0.0065 mm	4
0.0032 mm	3
0.0014 mm	3

4. No specifications were provided.



Briggs Engineering & Testing

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ERM/Raytheon, Wayland

Briggs #

Tested: 6-16-04

1.	<u>Sample No.</u>	<u>Description</u>	<u>Source</u>
	M-11316	Soil	B422 107-109'

2. Particle Size Analysis { ASTM D 422 }

<u>Sieve Size</u>	<u>Results</u>	<u>Specs.</u>
	{% Passing by Wt.}	
100 mm 4"	100	
75 mm 3"	100	
63 mm 2-1/2"	100	
50 mm 2"	100	
37.5 mm 1-1/2"	100	
25.0 mm 1	100	
19.0 mm 3/4"	100	
12.5 mm 1/2"	100	
9.5 mm 3/8"	100	
4.75 mm #4	100	
2.00 mm #10	100	
850 µm #20	100	
425 µm #40	99	
180 µm #80	97	
150 µm #100	94	
75 µm #200	59.2	

HYDROMETER ANALYSIS

0.0305 mm	25
0.0203 mm	19
0.0120 mm	16
0.0088 mm	11
0.0063 mm	9
0.0032 mm	5
0.0014 mm	5

4. No specifications were provided.

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FILE COPY

June 25, 2004
Project No. 22405

E.R.M., Inc.
c/o Elissa McNamara
399 Boylston Street, Sixth Floor
Boston, MA 02116

**RE: Estimated Permeability of Soil
For Environmental Resources Management/Raytheon
Wayland, MA**

Dear Ms. McNamara:

Per your request Briggs Engineering & Testing (Briggs) has estimated the permeability rate of the following soil samples delivered to our soils laboratory.

Briggs performed sieve and hydrometer analyses in accordance with ASTM D422. The samples were collected from various test borings and depths. Briggs previously estimated permeability rates for three samples as documented in our letter dated June 23, 2004. The previous results are tabulated as follows:

<u>Sample Source</u>	<u>Permeability Estimate (cm/sec)</u>
B417, 95-97'	7.7×10^{-5}
B422, 85-87'	1.6×10^{-4}
B422, 107-109'	5.6×10^{-5}

Five more samples were recently tested by Briggs. The gradation results are detailed on the attached laboratory reports. Based on the result of the sieve and hydrometer analyses and the Hazen Williams approximation method, Briggs estimated the soil permeability for each sample. Results for this suite of five samples is tabulated as follows:

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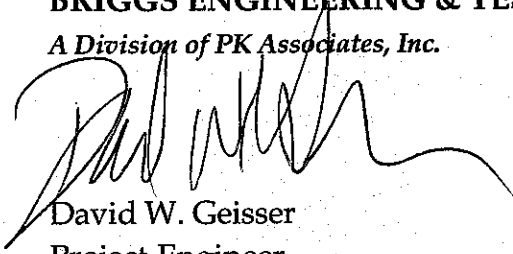
<u>Sample Source</u>	<u>Permeability Estimate (cm/sec)</u>
B419, 20-22'	9.0×10^{-6}
B419, 35-37'	4.9×10^{-5}
B419, 55-57'	4.4×10^{-6}
B422, 9-11'	1.1×10^{-5}
B426, 105-107'	4.4×10^{-6}

If you have any questions, please do not hesitate to contact us at your convenience.

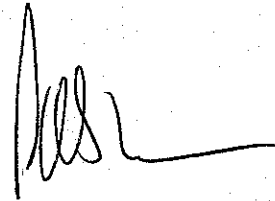
Very truly yours,

BRIGGS ENGINEERING & TESTING

A Division of PK Associates, Inc.



David W. Geisser
Project Engineer



Paul M. Skorohod
President

DWG:PMS:dg

Enclosure: Lab Report



Briggs Engineering & Testing

A DIVISION OF PK ASSOCIATES, INC.

ERM/Raytheon, Wayland

Briggs #

Tested: 6-21-04

1.	<u>Sample No.</u>	<u>Description</u>	<u>Source</u>
	M-11304	Soil	B419 20-22'

2. Particle Size Analysis { ASTM D 422 }

<u>Sieve Size</u>	<u>Results</u> {% Passing by Wt.}	<u>Specs.</u>
100 mm	4"	100
75 mm	3"	100
63 mm	2-1/2"	100
50 mm	2"	100
37.5 mm	1-1/2"	100
25.0 mm	1"	100
19.0 mm	3/4"	100
12.5 mm	1/2"	100
9.5 mm	3/8"	100
4.75 mm	#4	100
2.00 mm	#10	100
850 µm	#20	100
425 µm	#40	99
180 µm	#80	99
150 µm	#100	99
75 µm	#200	97.9

HYDROMETER ANALYSIS

0.0314 mm	70
0.0199 mm	55
0.0120 mm	35
0.0088 mm	26
0.0064 mm	18
0.0033 mm	11
0.0014 mm	3

4. No specifications were provided.

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ERM/Raytheon, Wayland

Briggs #

Tested: 6-21-04

1.	<u>Sample No.</u>	<u>Description</u>	<u>Source</u>
	M-11305	Soil	B419 35-37'

2. Particle Size Analysis { ASTM D 422 }

<u>Sieve Size</u>	<u>Results</u> {% Passing by Wt.}	<u>Specs.</u>
100 mm	4"	100
75 mm	3"	100
63 mm	2-1/2"	100
50 mm	2"	100
37.5 mm	1-1/2"	100
25.0 mm	1"	100
19.0 mm	3/4"	100
12.5 mm	1/2"	100
9.5 mm	3/8"	100
4.75 mm	#4	100
2.00 mm	#10	100
850 µm	#20	100
425 µm	#40	100
180 µm	#80	99
150 µm	#100	99
75 µm	#200	89.9

HYDROMETER ANALYSIS

0.0314 mm	47
0.0212 mm	31
0.0128 mm	20
0.0092 mm	15
0.0067 mm	9
0.0033 mm	5
0.0014 mm	3

4. No specifications were provided.

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ERM/Raytheon, Wayland
 Briggs #
 Tested: 6-21-04

1.	<u>Sample No.</u>	<u>Description</u>	<u>Source</u>
	M-11306	Soil	B419 55-57'

2. Particle Size Analysis { ASTM D 422 }

<u>Sieve Size</u>		<u>Results</u>	<u>Specs.</u>
		{% Passing by Wt.}	
100 mm	4"	100	
75 mm	3"	100	
63 mm	2-1/2"	100	
50 mm	2"	100	
37.5 mm	1-1/2"	100	
25.0 mm	1"	100	
19.0 mm	3/4"	100	
12.5 mm	1/2"	100	
9.5 mm	3/8"	100	
4.75 mm	#4	100	
2.00 mm	#10	100	
850 µm	#20	100	
425 µm	#40	100	
180 µm	#80	100	
150 µm	#100	100	
75 µm	#200	99.7	

HYDROMETER ANALYSIS

0.0314 mm	61
0.0199 mm	55
0.0117 mm	41
0.0087 mm	31
0.0063 mm	23
0.0033 mm	12
0.0014 mm	8

4. No specifications were provided.



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ERM/Raytheon, Wayland

Briggs #

Tested: 6-21-04

1.	<u>Sample No.</u>	<u>Description</u>	<u>Source</u>
	M-11309	Soil	B422 9-11'

2. Particle Size Analysis { ASTM D 422 }

<u>Sieve Size</u>	<u>Results</u> {% Passing by Wt.}	<u>Specs.</u>
100 mm	4"	100
75 mm	3"	100
63 mm	2-1/2"	100
50 mm	2"	100
37.5 mm	1-1/2"	100
25.0 mm	1	100
19.0 mm	3/4"	100
12.5 mm	1/2"	100
9.5 mm	3/8"	100
4.75 mm	#4	100
2.00 mm	#10	99
850 µm	#20	99
425 µm	#40	99
180 µm	#80	98
150 µm	#100	98
75 µm	#200	97.3

HYDROMETER ANALYSIS

0.0314 mm	68
0.0199 mm	61
0.0115 mm	44
0.0086 mm	32
0.0064 mm	21
0.0033 mm	9
0.0014 mm	3

4. No specifications were provided.

www.briggsengineering.com



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ERM/Raytheon, Wayland

Briggs #

Tested: 6-21-04

1. Sample No.	Description	Source
M-11326	Soil	B426
		105-107'

2. Particle Size Analysis { ASTM D 422 }

Sieve Size	Results {% Passing by Wt.}	Specs.
100 mm	4"	100
75 mm	3"	100
63 mm	2-1/2"	100
50 mm	2"	100
37.5 mm	1-1/2"	100
25.0 mm	1"	100
19.0 mm	3/4"	100
12.5 mm	1/2"	100
9.5 mm	3/8"	100
4.75 mm	#4	100
2.00 mm	#10	100
850 µm	#20	100
425 µm	#40	100
180 µm	#80	100
150 µm	#100	100
75 µm	#200	99.4
HYDROMETER ANALYSIS		
0.0314 mm		81
0.0199 mm		70
0.0115 mm		50
0.0084 mm		38
0.0062 mm		26
0.0033 mm		12
0.0014 mm		8

4. No specifications were provided.

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June 29, 2004

Briggs#

Environmental Resources Management
399 Boylston Street, 6th Floor
Boston, MA 02116

Attn.: Ms. Elissa McNamara


**RE: Analysis of Soil Samples obtained from the Raytheon Project in Wayland.
(M-11298, M-11302, M-11304, M-11305, M-11306, M-11308, M-11309,
M-11311 through M-11316, & M-11326)**

Ms. McNamara:

Laboratory analysis of your samples tested at our Rockland Facility has been conducted, please see the enclosed results.

If you have any questions or if I can be of further service to you, please feel free to contact me at your convenience.

Very truly yours,
BRIGGS ENGINEERING & TESTING
A Division of PK Associates, Inc.


Mark Liebert
Laboratory Director
Construction Technology Division

Enclosures: Laboratory Results

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ERM/Raytheon, Wayland
 Briggs #
 Tested: 6-23-04

1. Sample No.	Description	Source
M-11298	Soil	B417 30-32'

2. Particle Size Analysis { ASTM D 422 }

Sieve Size	Results {% Passing by Wt.}	Specs.
100 mm	4"	100
75 mm	3"	100
63 mm	2-1/2"	100
50 mm	2"	100
37.5 mm	1-1/2"	100
25.0 mm	1"	100
19.0 mm	3/4"	100
12.5 mm	1/2"	100
9.5 mm	3/8"	100
4.75 mm	#4	100
2.00 mm	#10	100
850 µm	#20	99
425 µm	#40	99
180 µm	#80	98
150 µm	#100	98
75 µm	#200	97.5

HYDROMETER ANALYSIS

0.0314 mm	77
0.0199 mm	71
0.0115 mm	52
0.0084 mm	38
0.0061 mm	31
0.0032 mm	17
0.0014 mm	8

4. No specifications were provided.

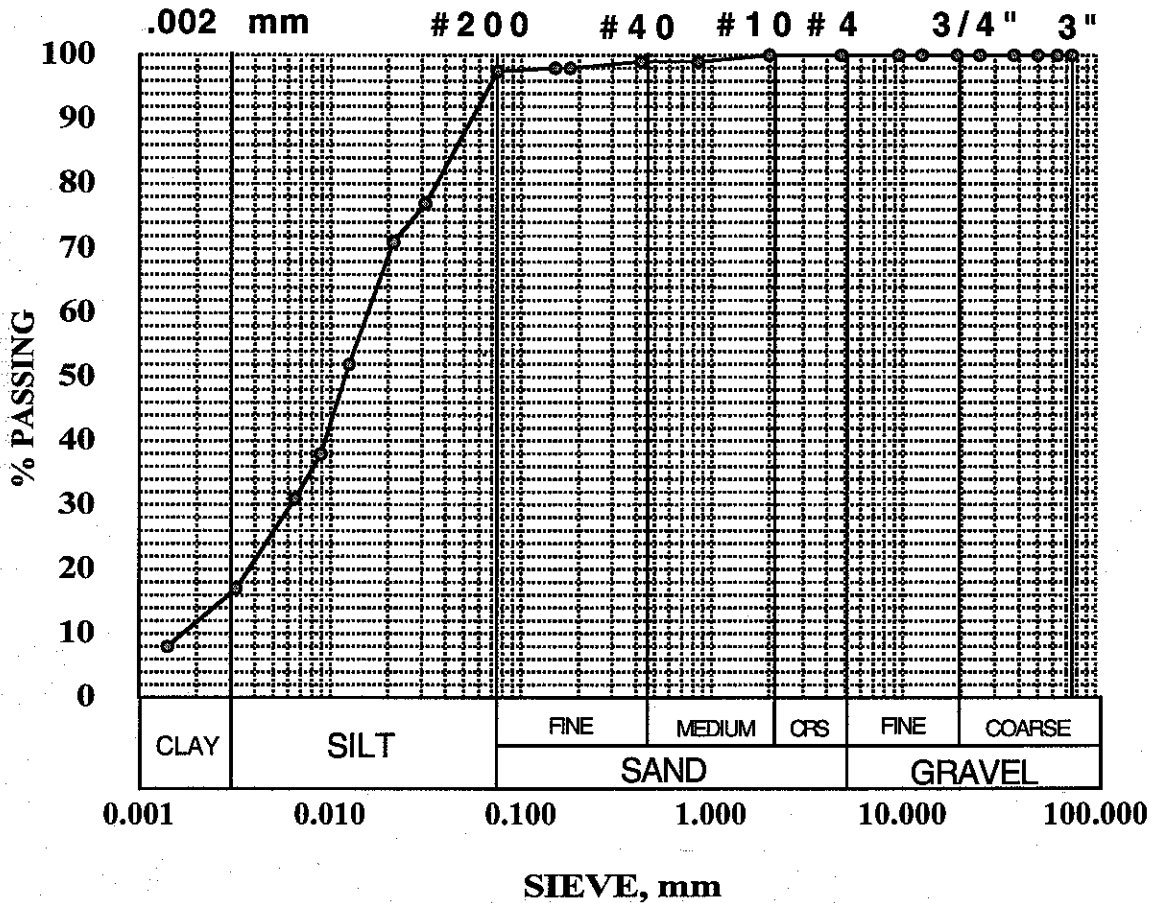


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A Division of PK Associates, Inc.

Project: ERM/Raytheon, Wayland
Sample no. M-11298 **Date:** 6/23/04

PARTICLE SIZE DISTRIBUTION





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 A DIVISION OF PK ASSOCIATES, INC.

ERM/Raytheon, Wayland
 Briggs #
 Tested: 6-16-04

1. <u>Sample No.</u>	<u>Description</u>	<u>Source</u>
M-11302	Soil	B417 95-97'

2. Particle Size Analysis { ASTM D 422 }

<u>Sieve Size</u>	<u>Results</u> {% Passing by Wt.}	<u>Specs.</u>
100 mm	4"	100
75 mm	3"	100
63 mm	2-1/2"	100
50 mm	2"	100
37.5 mm	1-1/2"	100
25.0 mm	1"	100
19.0 mm	3/4"	100
12.5 mm	1/2"	100
9.5 mm	3/8"	100
4.75 mm	#4	100
2.00 mm	#10	100
850 µm	#20	100
425 µm	#40	100
180 µm	#80	99
150 µm	#100	98
75 µm	#200	78.9

HYDROMETER ANALYSIS

0.0304 mm	32
0.0199 mm	22
0.0122 mm	14
0.0088 mm	10
0.0063 mm	8
0.0032 mm	7
0.0013 mm	6

4. No specifications were provided.

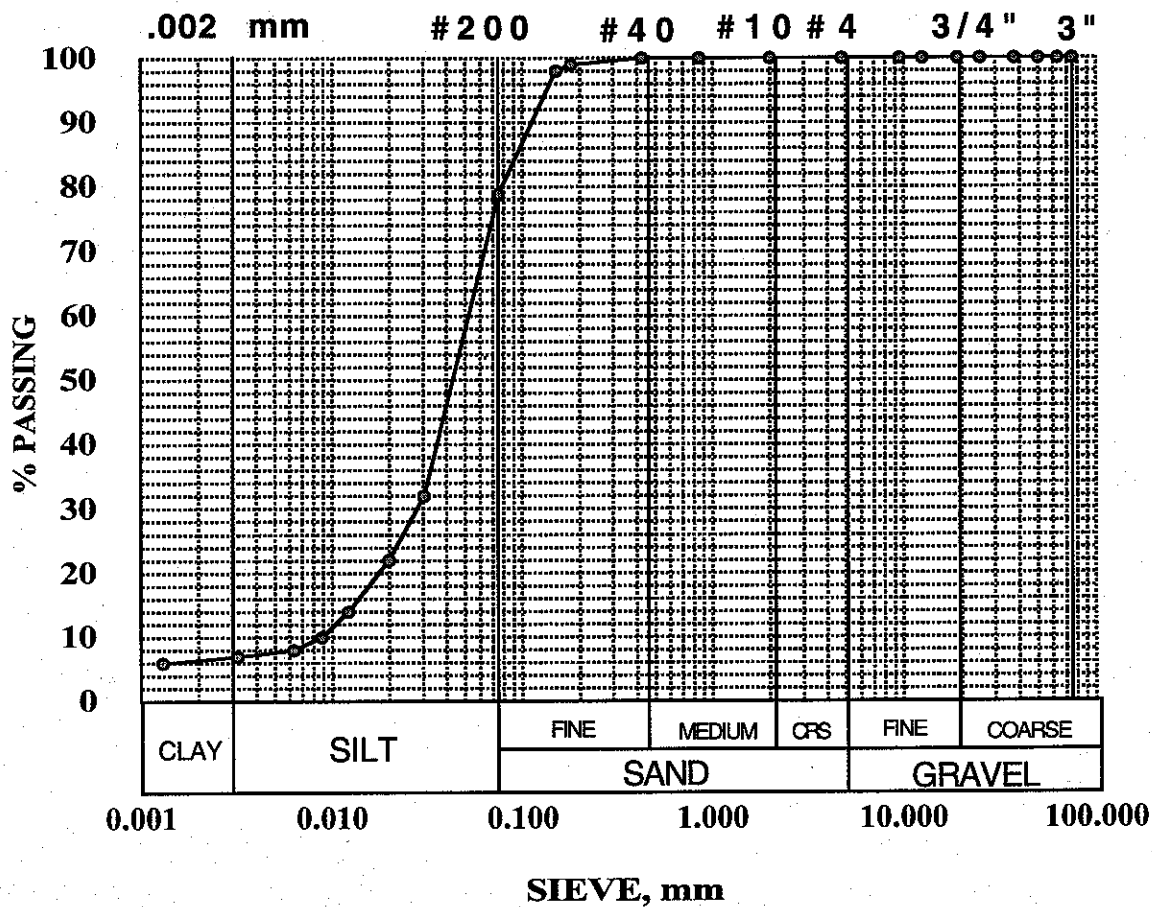


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Project: ERM/Raytheon, Wayland
Sample no. M-11302 **Date:** 6/16/04

PARTICLE SIZE DISTRIBUTION





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A DIVISION OF PK ASSOCIATES, INC.

ERM/Raytheon, Wayland
 Briggs #
 Tested: 6-21-04

1.	<u>Sample No.</u>	<u>Description</u>	<u>Source</u>
	M-11304	Soil	B419 20-22'

2. Particle Size Analysis { ASTM D 422 }

<u>Sieve Size</u>	<u>Results</u> {% Passing by Wt.}	<u>Specs.</u>
100 mm	4"	100
75 mm	3"	100
63 mm	2-1/2"	100
50 mm	2"	100
37.5 mm	1-1/2"	100
25.0 mm	1"	100
19.0 mm	3/4"	100
12.5 mm	1/2"	100
9.5 mm	3/8"	100
4.75 mm	#4	100
2.00 mm	#10	100
850 µm	#20	100
425 µm	#40	99
180 µm	#80	99
150 µm	#100	99
75 µm	#200	97.9

HYDROMETER ANALYSIS

0.0314 mm	70
0.0199 mm	55
0.0120 mm	35
0.0088 mm	26
0.0064 mm	18
0.0033 mm	11
0.0014 mm	3

4. No specifications were provided.

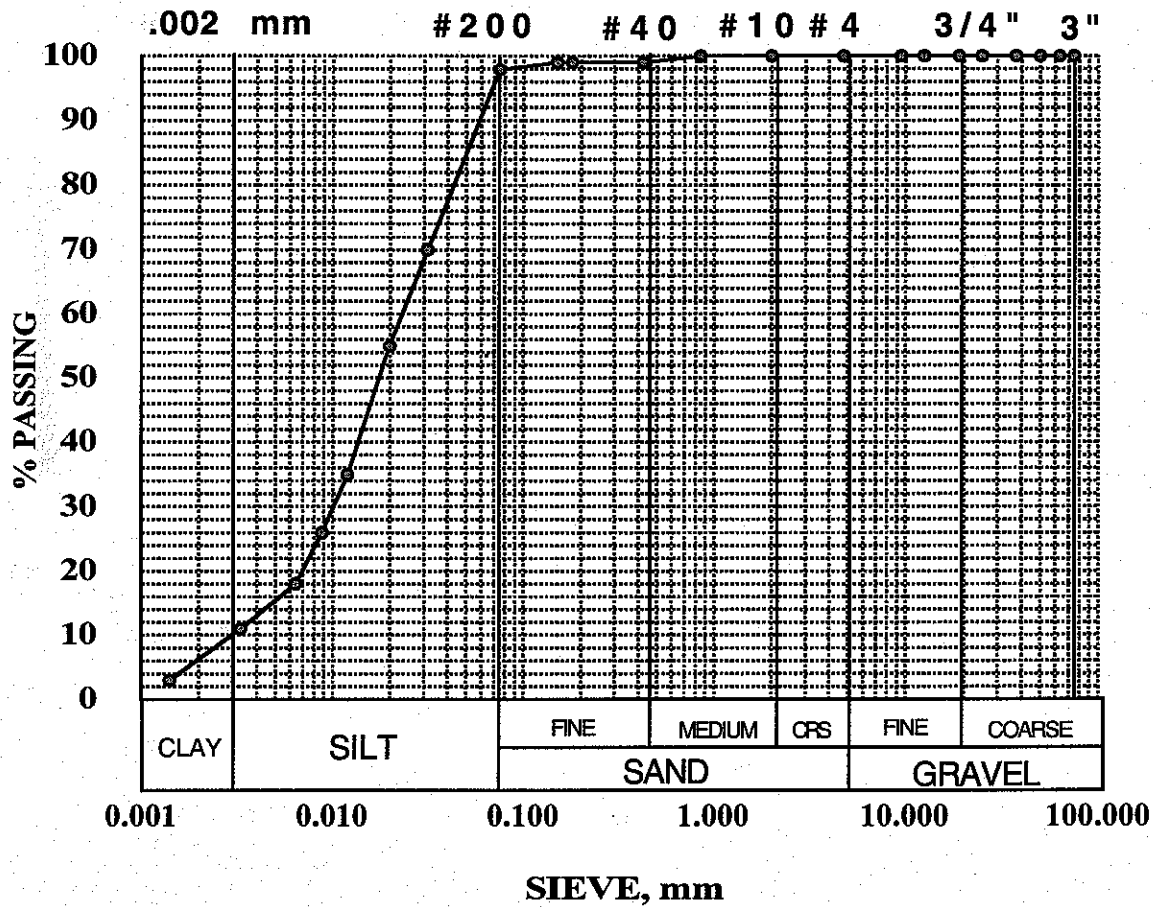


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Project: ERM/Raytheon, Wayland
Sample no. M-11304 **Date:** 6/21/04

PARTICLE SIZE DISTRIBUTION





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ERM/Raytheon, Wayland

Briggs #

Tested: 6-21-04

1.	<u>Sample No.</u> M-11305	<u>Description</u> Soil	<u>Source</u> B419 35-37'
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2. Particle Size Analysis { ASTM D 422 }

<u>Sieve Size</u>		<u>Results</u> {% Passing by Wt.}	<u>Specs.</u>
100 mm	4"	100	
75 mm	3"	100	
63 mm	2-1/2"	100	
50 mm	2"	100	
37.5 mm	1-1/2"	100	
25.0 mm	1"	100	
19.0 mm	3/4"	100	
12.5 mm	1/2"	100	
9.5 mm	3/8"	100	
4.75 mm	#4	100	
2.00 mm	#10	100	
850 µm	#20	100	
425 µm	#40	100	
180 µm	#80	99	
150 µm	#100	99	
75 µm	#200	89.9	

HYDROMETER ANALYSIS

0.0314 mm	47
0.0212 mm	31
0.0128 mm	20
0.0092 mm	15
0.0067 mm	9
0.0033 mm	5
0.0014 mm	3

4. No specifications were provided.



Briggs Engineering & Testing

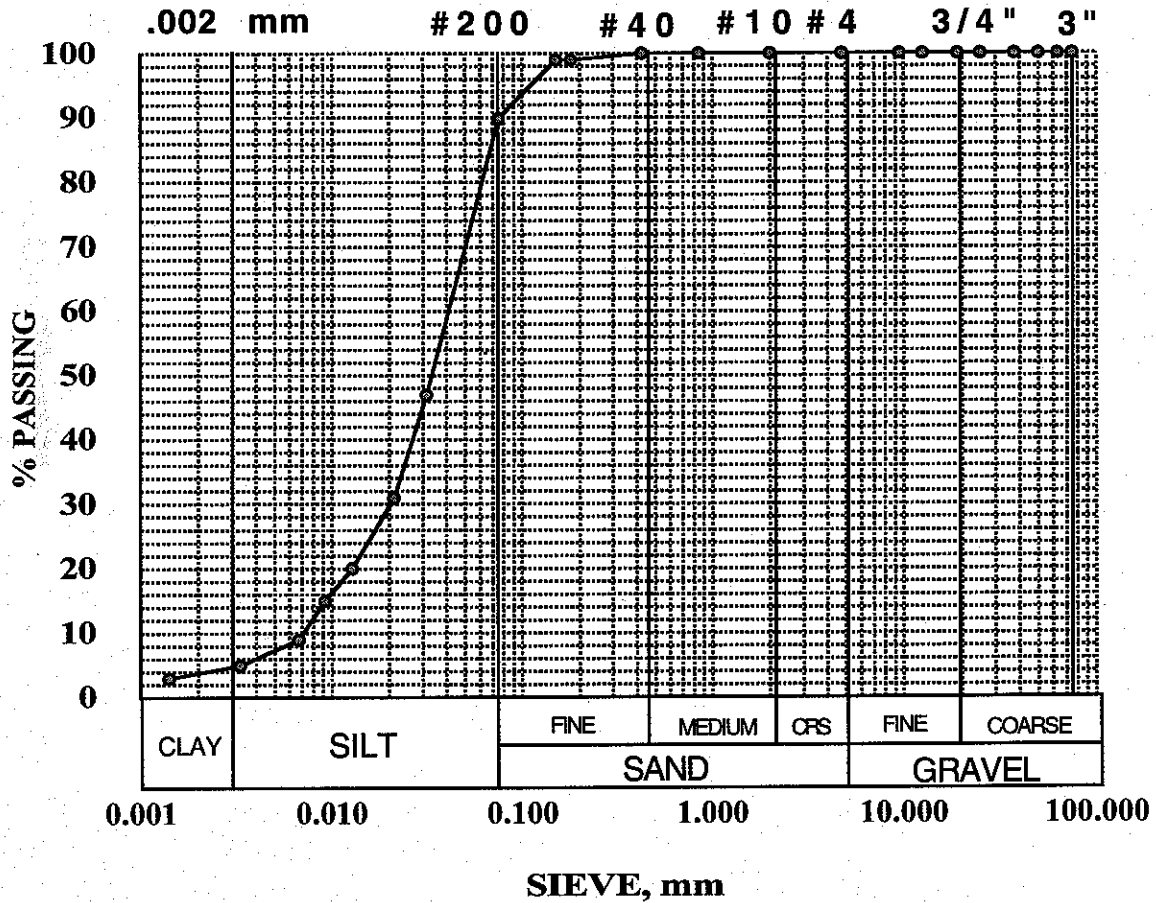
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Project: ERM/Raytheon, Wayland

Sample no. M-11305

Date: 6/21/04

PARTICLE SIZE DISTRIBUTION





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ERM/Raytheon, Wayland
 Briggs #
 Tested: 6-21-04

1.	<u>Sample No.</u>	<u>Description</u>	<u>Source</u>
	M-11306	Soil	B419 55-57'

2. Particle Size Analysis { ASTM D 422 }

<u>Sieve Size</u>	<u>Results</u> {% Passing by Wt.}	<u>Specs.</u>
100 mm	4"	100
75 mm	3"	100
63 mm	2-1/2"	100
50 mm	2"	100
37.5 mm	1-1/2"	100
25.0 mm	1"	100
19.0 mm	3/4"	100
12.5 mm	1/2"	100
9.5 mm	3/8"	100
4.75 mm	#4	100
2.00 mm	#10	100
850 µm	#20	100
425 µm	#40	100
180 µm	#80	100
150 µm	#100	100
75 µm	#200	99.7

HYDROMETER ANALYSIS

0.0314 mm	61
0.0199 mm	55
0.0117 mm	41
0.0087 mm	31
0.0063 mm	23
0.0033 mm	12
0.0014 mm	8

4. No specifications were provided.

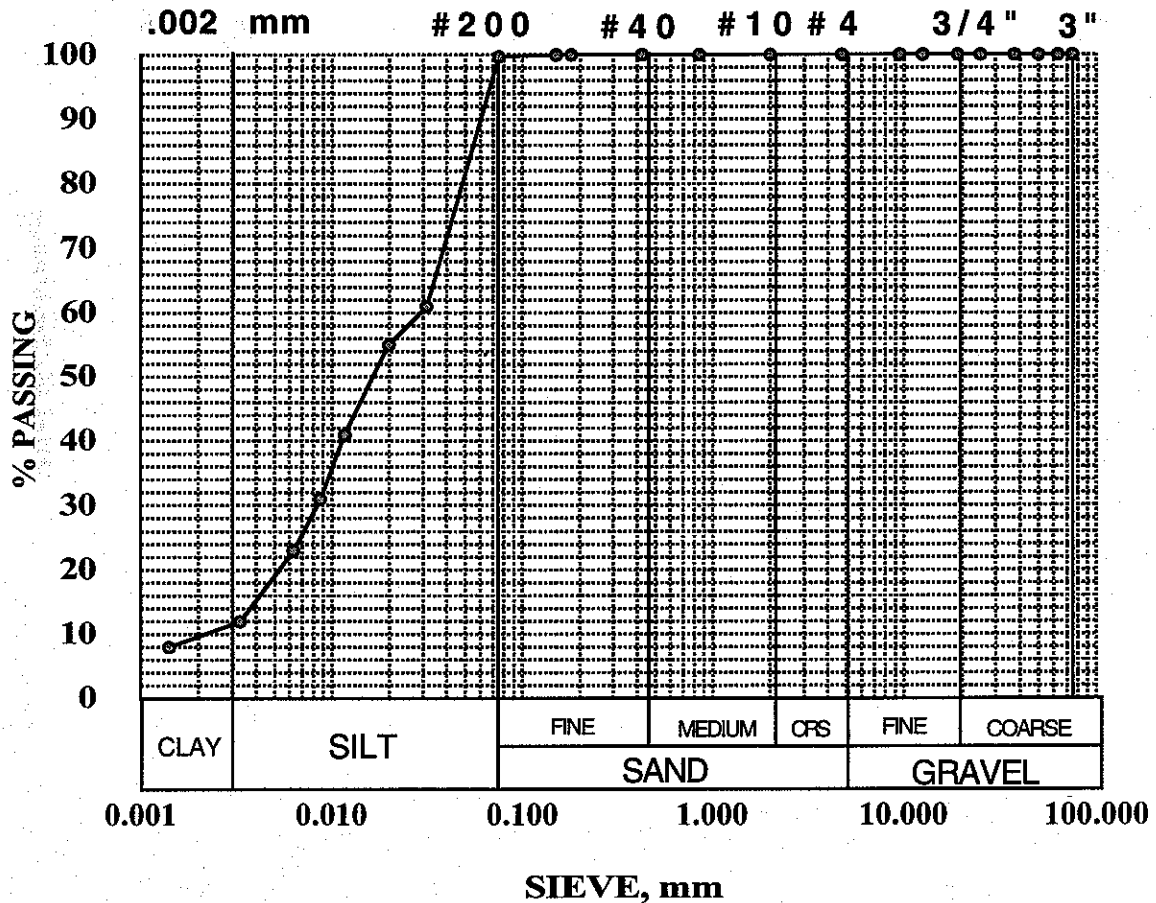


Briggs Engineering & Testing

A Division of PK Associates, Inc.

Project: ERM/Raytheon, Wayland
Sample no. M-11306 **Date:** 6/21/04

PARTICLE SIZE DISTRIBUTION





Briggs Engineering & Testing
A DIVISION OF PK ASSOCIATES, INC.

ERM/Raytheon, Wayland
Briggs #
Tested: 6-23-04

1.	<u>Sample No.</u> M-11308	<u>Description</u> Soil	<u>Source</u> B419 95-97'
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2. Particle Size Analysis { ASTM D 422 }

<u>Sieve Size</u>		<u>Results</u> {% Passing by Wt.}	<u>Specs.</u>
100 mm	4"	100	
75 mm	3"	100	
63 mm	2-1/2"	100	
50 mm	2"	100	
37.5 mm	1-1/2"	100	
25.0 mm	1"	100	
19.0 mm	3/4"	100	
12.5 mm	1/2"	100	
9.5 mm	3/8"	100	
4.75 mm	#4	100	
2.00 mm	#10	100	
850 µm	#20	99	
425 µm	#40	99	
180 µm	#80	96	
150 µm	#100	92	
75 µm	#200	65.9	

HYDROMETER ANALYSIS

0.0332 mm	34
0.0216 mm	26
0.0129 mm	17
0.0093 mm	12
0.0066 mm	9
0.0033 mm	8
0.0014 mm	5

4. No specifications were provided.

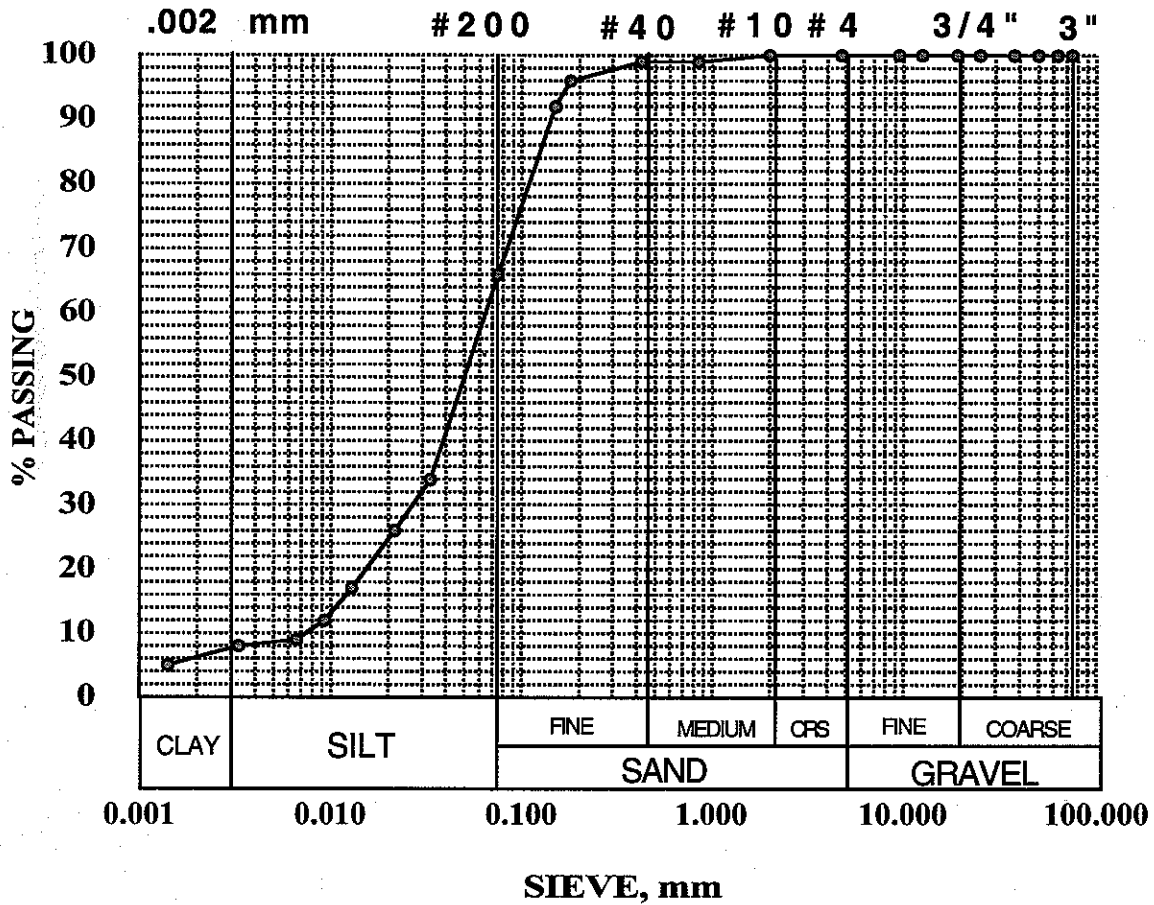


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A Division of PK Associates, Inc.

Project: ERM/Raytheon, Wayland
Sample no. M-11308 **Date:** 6/23/04

PARTICLE SIZE DISTRIBUTION





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ERM/Raytheon, Wayland
 Briggs #
 Tested: 6-21-04

1. Sample No.	Description	Source
M-11309	Soil	B422 9-11'

2. Particle Size Analysis { ASTM D 422 }

Sieve Size	Results {% Passing by Wt.}	Specs.
100 mm	4"	100
75 mm	3"	100
63 mm	2-1/2"	100
50 mm	2"	100
37.5 mm	1-1/2"	100
25.0 mm	1"	100
19.0 mm	3/4"	100
12.5 mm	1/2"	100
9.5 mm	3/8"	100
4.75 mm	#4	100
2.00 mm	#10	99
850 µm	#20	99
425 µm	#40	99
180 µm	#80	98
150 µm	#100	98
75 µm	#200	97.3

HYDROMETER ANALYSIS

0.0314 mm	68
0.0199 mm	61
0.0115 mm	44
0.0086 mm	32
0.0064 mm	21
0.0033 mm	9
0.0014 mm	3

4. No specifications were provided.

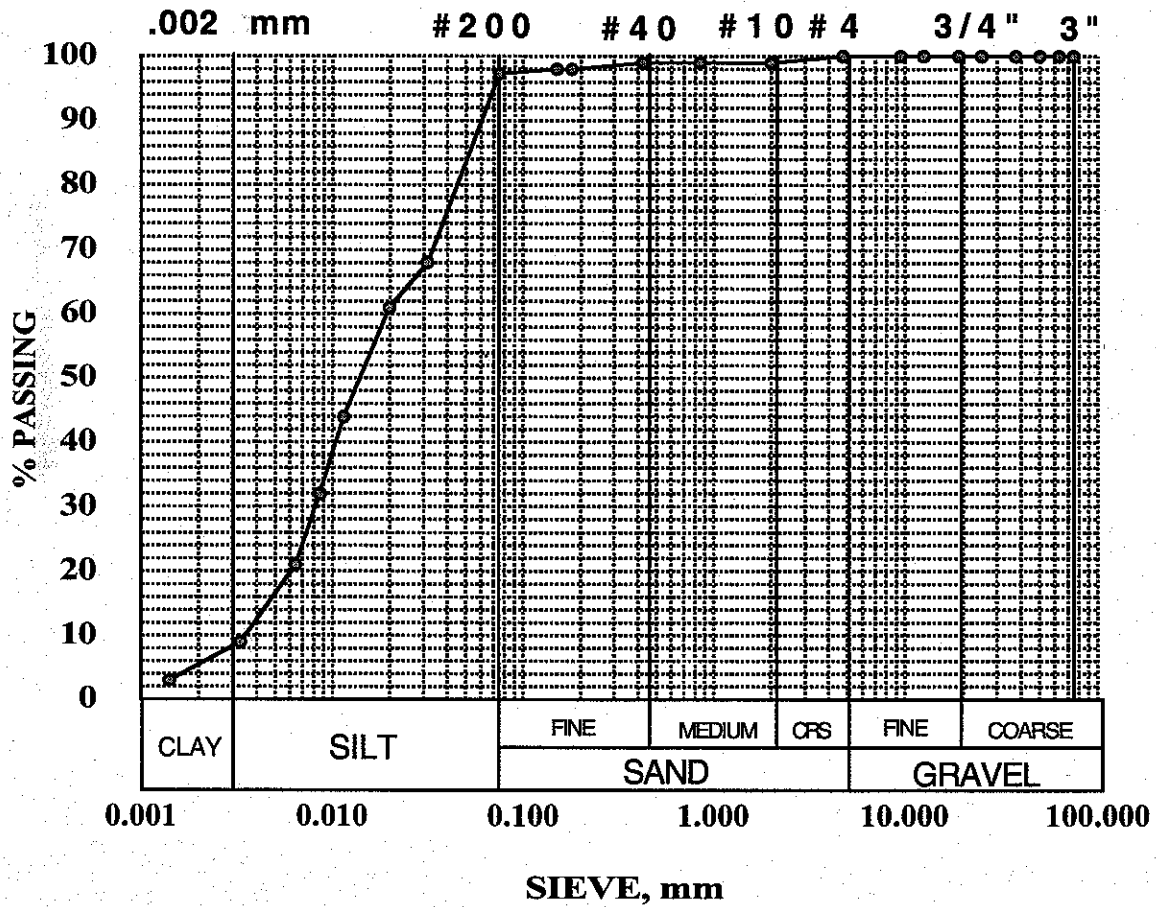


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PARTICLE SIZE DISTRIBUTION





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ERM/Raytheon, Wayland
 Briggs #
 Tested: 6-23-04

1.	<u>Sample No.</u>	<u>Description</u>	<u>Source</u>
	M-11311	Soil	B422 25-27'

2. Particle Size Analysis { ASTM D 422 }

<u>Sieve Size</u>	<u>Results</u> {% Passing by Wt.}	<u>Specs.</u>
100 mm	4"	100
75 mm	3"	100
63 mm	2-1/2"	100
50 mm	2"	100
37.5 mm	1-1/2"	100
25.0 mm	1"	100
19.0 mm	3/4"	100
12.5 mm	1/2"	100
9.5 mm	3/8"	100
4.75 mm	#4	100
2.00 mm	#10	100
850 µm	#20	100
425 µm	#40	100
180 µm	#80	100
150 µm	#100	100
75 µm	#200	87.1
HYDROMETER ANALYSIS		
0.0336 mm		31
0.0222 mm		20
0.0133 mm		11
0.0095 mm		8
0.0066 mm		8
0.0033 mm		5
0.0014 mm		3

4. No specifications were provided.

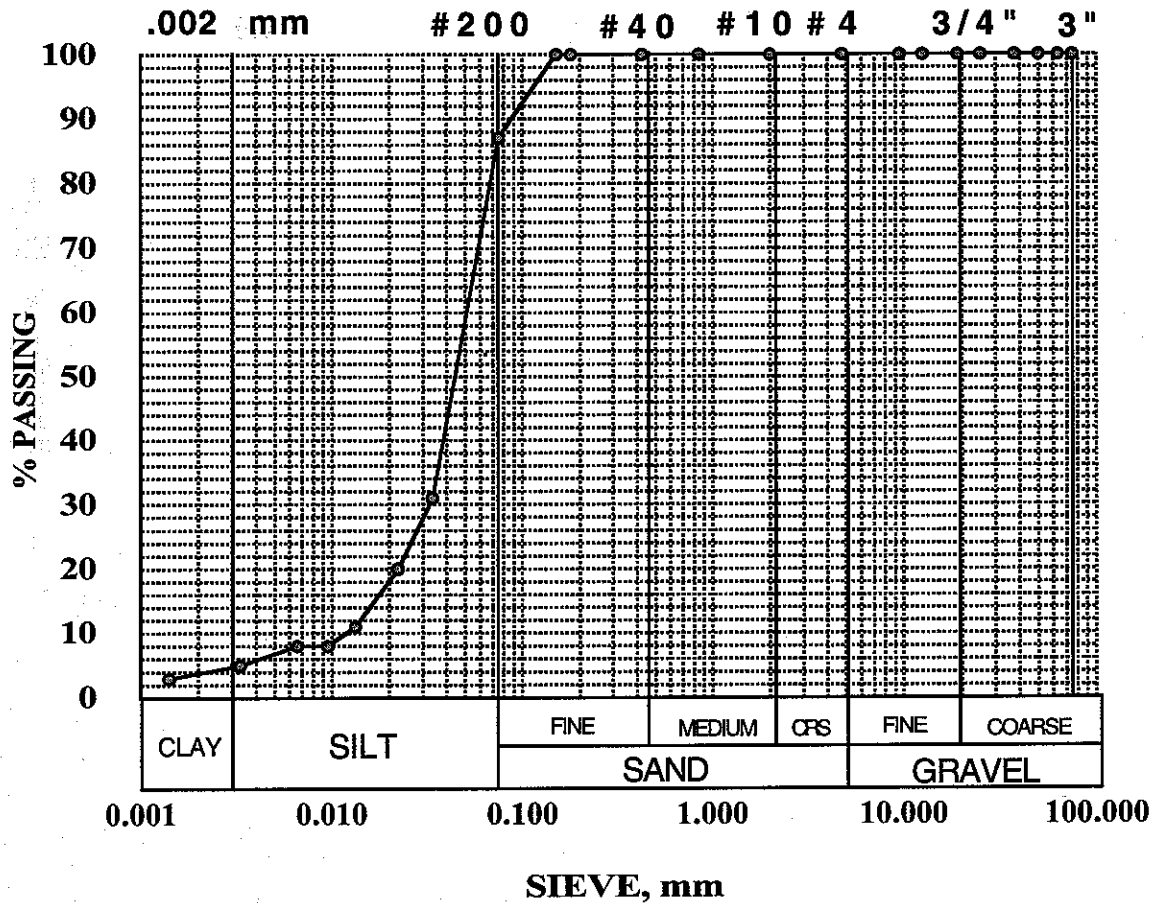


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Sample no. M-11311 **Date:** 6/23/04

PARTICLE SIZE DISTRIBUTION





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ERM/Raytheon, Wayland

Briggs #

Tested: 6-16-04

1. Sample No.	Description	Source
M-11312	Soil	B422 45-47'

2. Particle Size Analysis { ASTM D 422 }

Sieve Size	Results {% Passing by Wt.}	Specs.
100 mm	4"	100
75 mm	3"	100
63 mm	2-1/2"	100
50 mm	2"	100
37.5 mm	1-1/2"	100
25.0 mm	1"	100
19.0 mm	3/4"	100
12.5 mm	1/2"	100
9.5 mm	3/8"	100
4.75 mm	#4	100
2.00 mm	#10	100
850 µm	#20	100
425 µm	#40	100
180 µm	#80	100
150 µm	#100	100
75 µm	#200	99.6

HYDROMETER ANALYSIS

0.0194 mm	48
0.0112 mm	41
0.0079 mm	33
0.0056 mm	27
0.0031 mm	16
0.0013 mm	10

4. No specifications were provided.

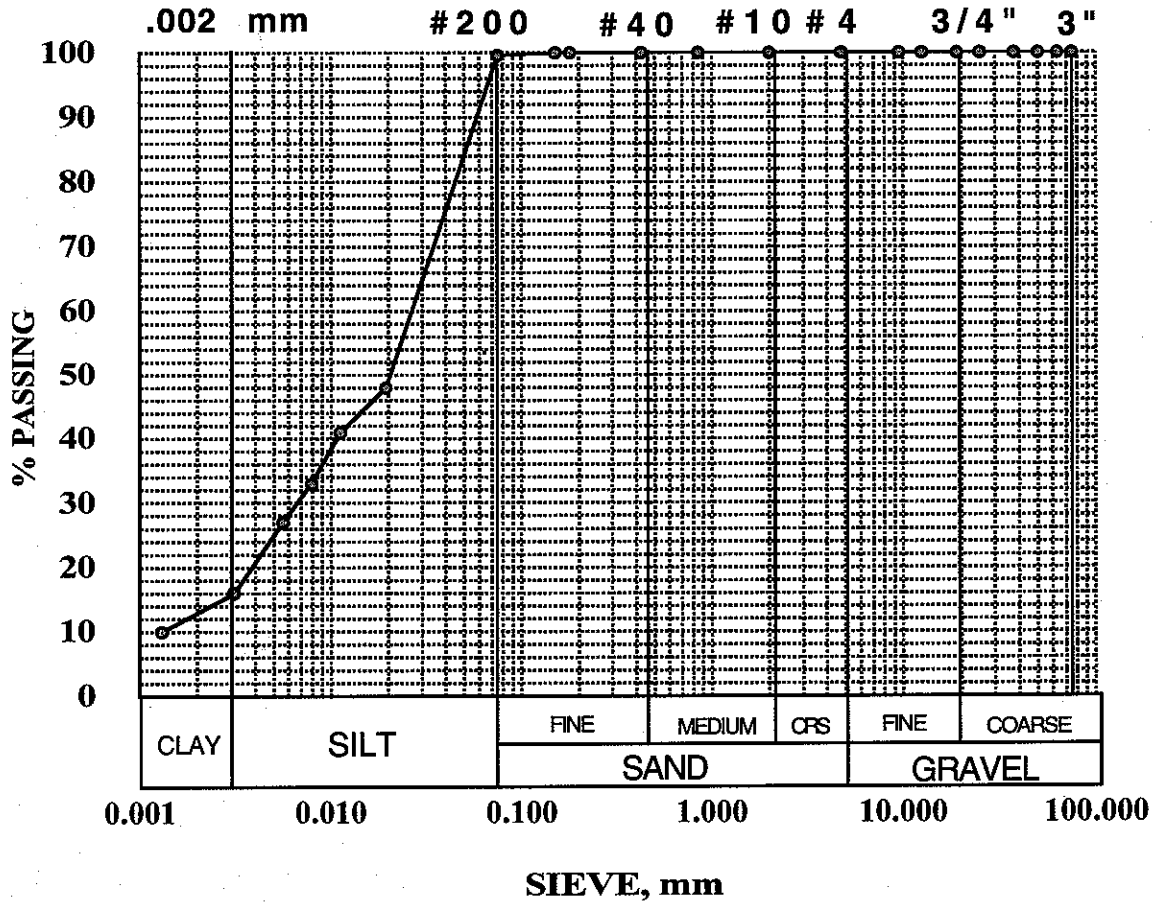


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Sample no. M-11312 **Date:** 6/16/04

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ERM/Raytheon, Wayland
 Briggs #
 Tested: 6-23-04

1. <u>Sample No.</u>	<u>Description</u>	<u>Source</u>
M-11313	Soil	B422 65-67'

2. Particle Size Analysis { ASTM D 422 }

<u>Sieve Size</u>	<u>Results</u> {% Passing by Wt.}	<u>Specs.</u>
100 mm	4"	100
75 mm	3"	100
63 mm	2-1/2"	100
50 mm	2"	100
37.5 mm	1-1/2"	100
25.0 mm	1"	100
19.0 mm	3/4"	100
12.5 mm	1/2"	100
9.5 mm	3/8"	100
4.75 mm	#4	100
2.00 mm	#10	100
850 µm	#20	100
425 µm	#40	100
180 µm	#80	93
150 µm	#100	87
75 µm	#200	33.9

HYDROMETER ANALYSIS

0.0363 mm	11
0.0230 mm	9
0.0134 mm	6
0.0096 mm	3
0.0067 mm	3
0.0033 mm	3
0.0014 mm	2

4. No specifications were provided.

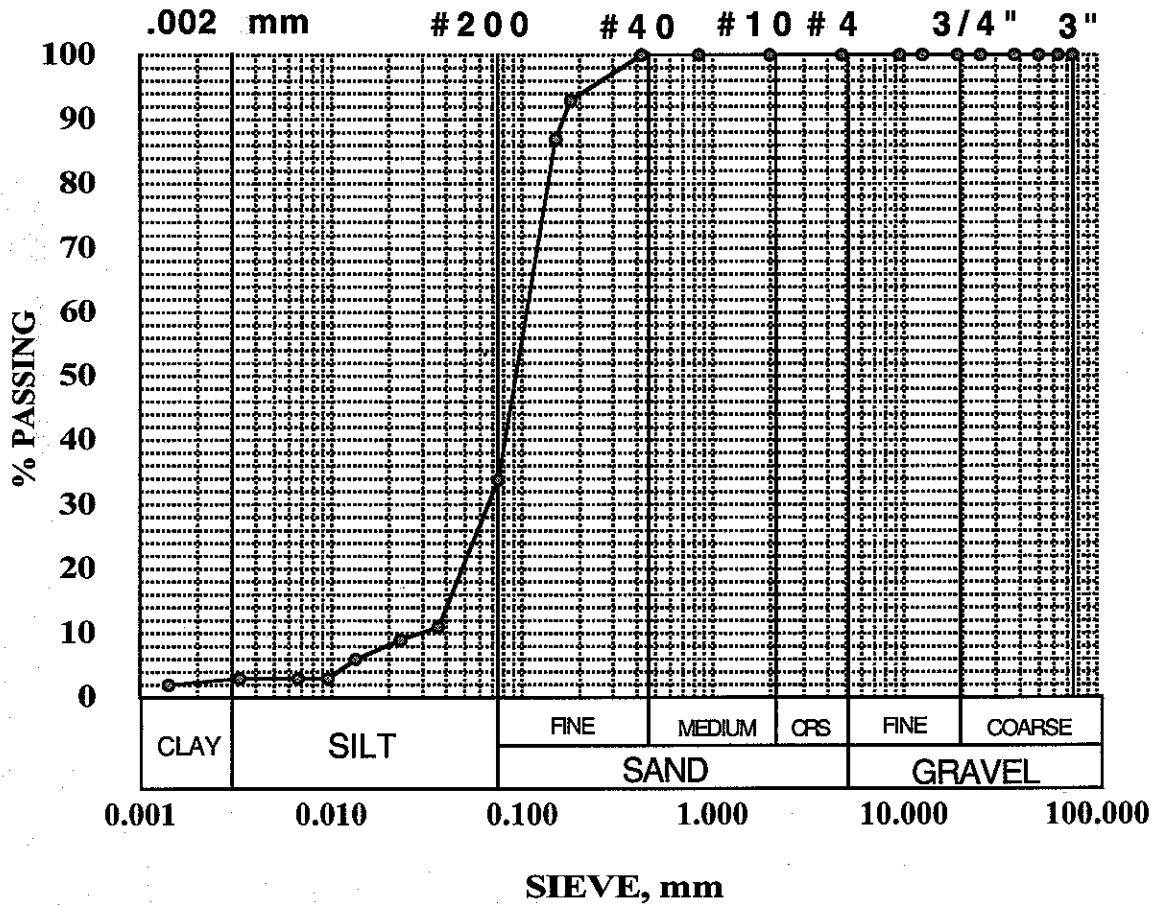


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Sample no. M-11313 **Date:** 6/23/04

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ERM/Raytheon, Wayland
 Briggs #
 Tested: 6-16-04

1. Sample No.	Description	Source
M-11314	Soil	B422 85-87'

2. Particle Size Analysis { ASTM D 422 }

Sieve Size	Results {% Passing by Wt.}	Specs.
100 mm	4"	100
75 mm	3"	100
63 mm	2-1/2"	100
50 mm	2"	100
37.5 mm	1-1/2"	100
25.0 mm	1"	100
19.0 mm	3/4"	100
12.5 mm	1/2"	100
9.5 mm	3/8"	100
4.75 mm	#4	100
2.00 mm	#10	100
850 µm	#20	100
425 µm	#40	99
180 µm	#80	98
150 µm	#100	96
75 µm	#200	67.0
HYDROMETER ANALYSIS		
0.0308 mm		24
0.0207 mm		16
0.0125 mm		10
0.0089 mm		8
0.0065 mm		4
0.0032 mm		3
0.0014 mm		3

4. No specifications were provided.



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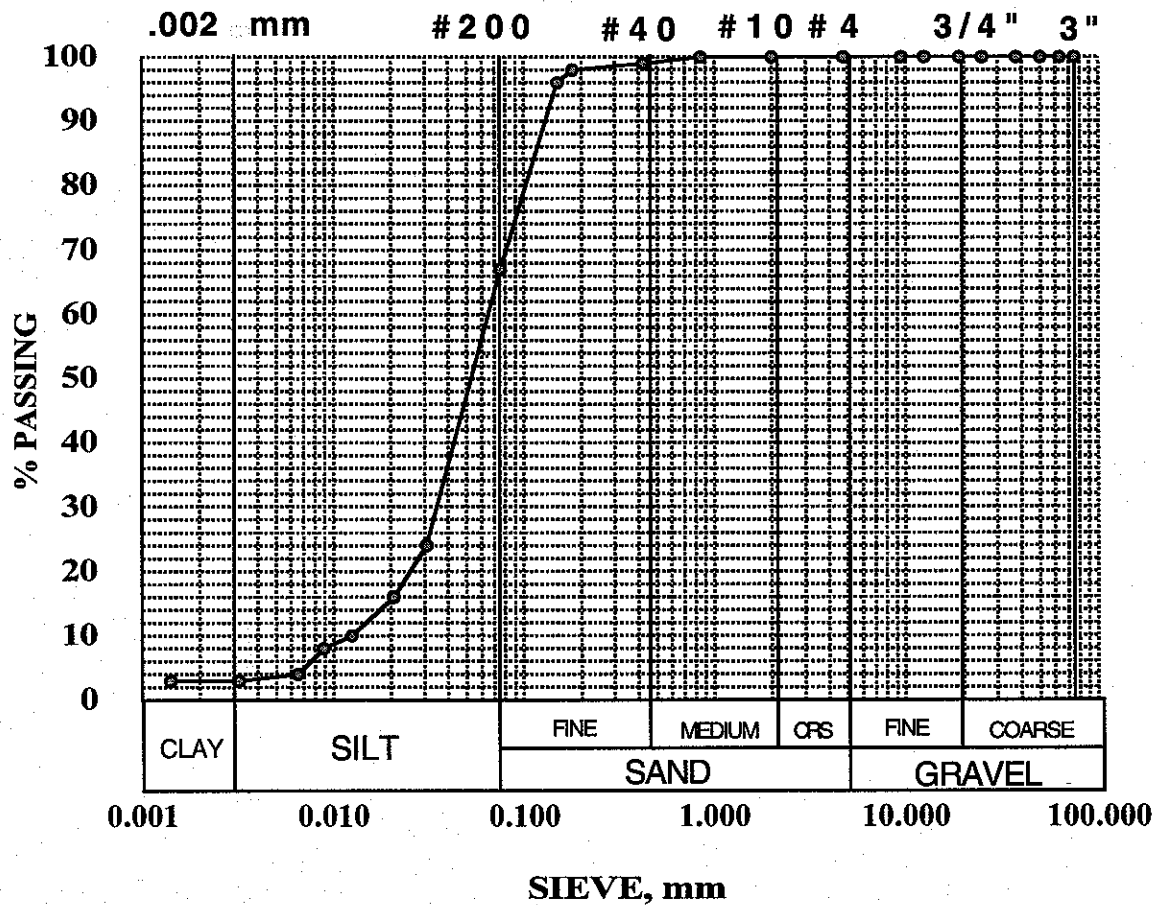
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Project: ERM/Raytheon, Wayland

Sample no. M-11314

Date: 6/16/04

PARTICLE SIZE DISTRIBUTION





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ERM/Raytheon, Wayland

Briggs #

Tested: 6-16-04

1. Sample No.	Description	Source
M-11315	Soil	B422 100-102'

2. Particle Size Analysis { ASTM D 422 }

Sieve Size	Results {% Passing by Wt.}	Specs.
100 mm	4"	100
75 mm	3"	100
63 mm	2-1/2"	100
50 mm	2"	100
37.5 mm	1-1/2"	100
25.0 mm	1"	100
19.0 mm	3/4"	100
12.5 mm	1/2"	100
9.5 mm	3/8"	100
4.75 mm	#4	100
2.00 mm	#10	100
850 µm	#20	99
425 µm	#40	99
180 µm	#80	97
150 µm	#100	95
75 µm	#200	56.7

HYDROMETER ANALYSIS

0.0213 mm	12
0.0125 mm	10
0.0089 mm	8
0.0065 mm	4
0.0032 mm	3
0.0014 mm	3

4. No specifications were provided.

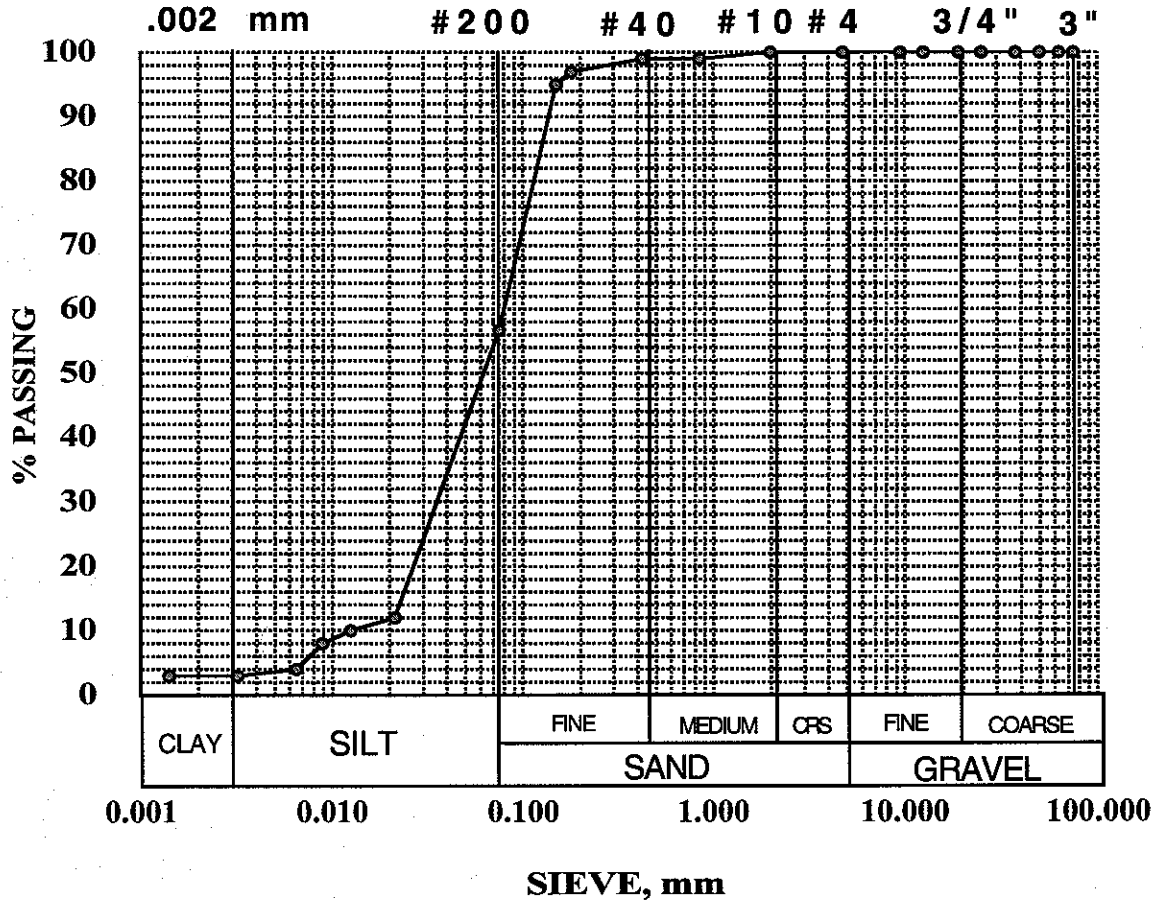


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Project: ERM/Raytheon, Wayland
Sample no. M-11315 **Date:** 6/16/04

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ERM/Raytheon, Wayland
 Briggs #
 Tested: 6-16-04

1.	<u>Sample No.</u>	<u>Description</u>	<u>Source</u>
	M-11316	Soil	B422 107-109'

2. Particle Size Analysis { ASTM D 422 }

<u>Sieve Size</u>	<u>Results</u> {% Passing by Wt.}	<u>Specs.</u>
100 mm	4"	100
75 mm	3"	100
63 mm	2-1/2"	100
50 mm	2"	100
37.5 mm	1-1/2"	100
25.0 mm	1"	100
19.0 mm	3/4"	100
12.5 mm	1/2"	100
9.5 mm	3/8"	100
4.75 mm	#4	100
2.00 mm	#10	100
850 µm	#20	100
425 µm	#40	99
180 µm	#80	97
150 µm	#100	94
75 µm	#200	59.2

HYDROMETER ANALYSIS

0.0305 mm	25
0.0203 mm	19
0.0120 mm	16
0.0088 mm	11
0.0063 mm	9
0.0032 mm	5
0.0014 mm	5

4. No specifications were provided.



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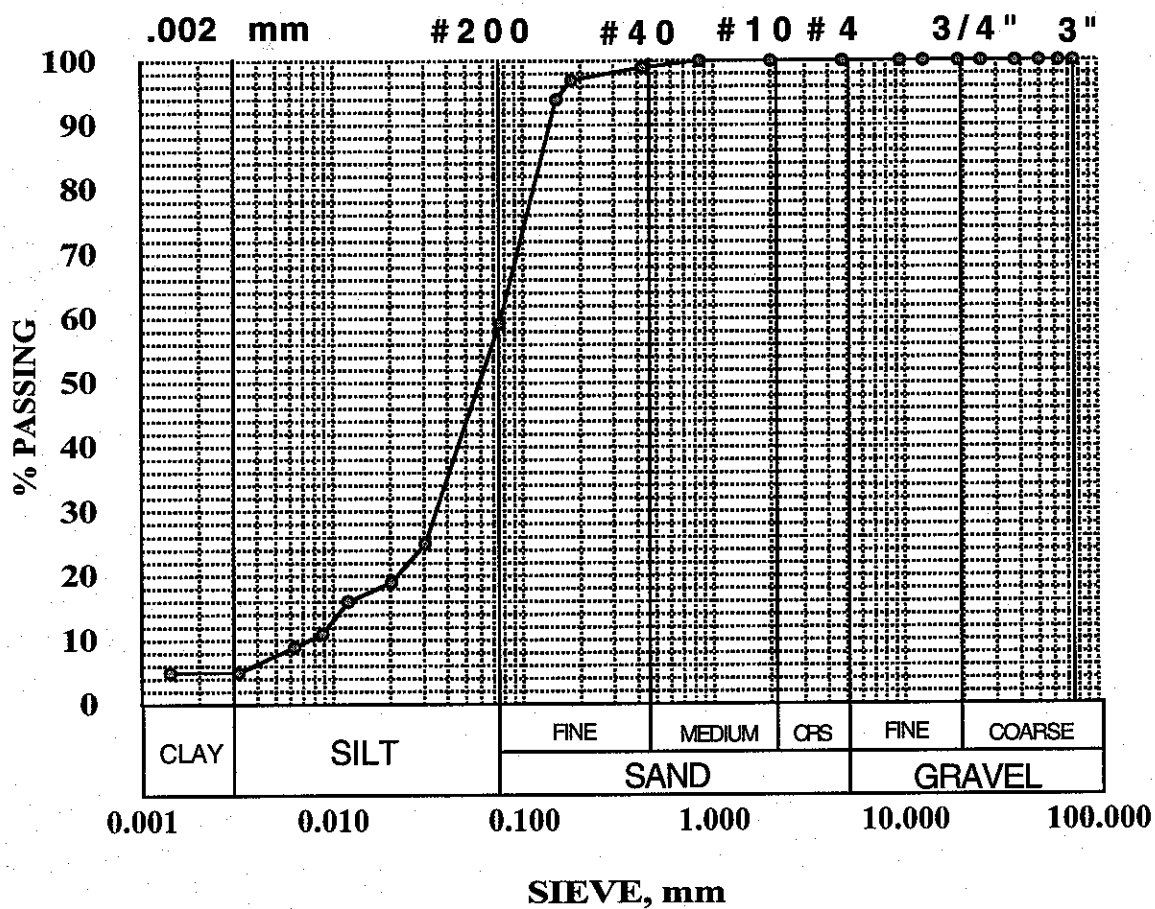
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Project: ERM/Raytheon, Wayland

Sample no. M-11316

Date: 6/16/04

PARTICLE SIZE DISTRIBUTION





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ERM/Raytheon, Wayland

Briggs #

Tested: 6-21-04

1.	<u>Sample No.</u>	<u>Description</u>	<u>Source</u>
	M-11326	Soil	B426 105-107'

2. Particle Size Analysis { ASTM D 422 }

<u>Sieve Size</u>	<u>Results</u> {% Passing by Wt.}	<u>Specs.</u>
100 mm	4"	100
75 mm	3"	100
63 mm	2-1/2"	100
50 mm	2"	100
37.5 mm	1-1/2"	100
25.0 mm	1"	100
19.0 mm	3/4"	100
12.5 mm	1/2"	100
9.5 mm	3/8"	100
4.75 mm	#4	100
2.00 mm	#10	100
850 µm	#20	100
425 µm	#40	100
180 µm	#80	100
150 µm	#100	100
75 µm	#200	99.4

HYDROMETER ANALYSIS

0.0314 mm	81
0.0199 mm	70
0.0115 mm	50
0.0084 mm	38
0.0062 mm	26
0.0033 mm	12
0.0014 mm	8

4. No specifications were provided.

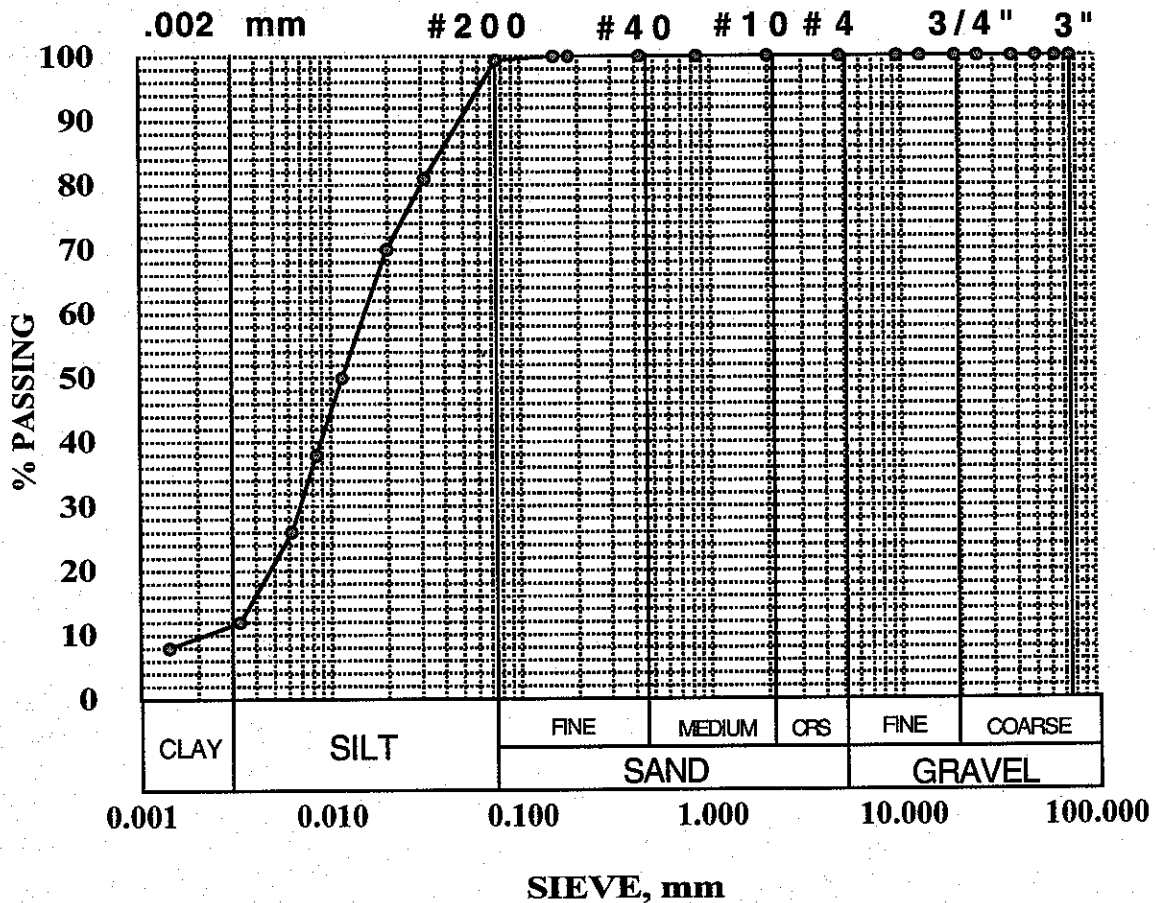


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Project: ERM/Raytheon, Wayland
Sample no. M-11326 **Date:** 6/21/04

PARTICLE SIZE DISTRIBUTION





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FILE COPY

June 30, 2004

Briggs# 22405

Environmental Resources Management
399 Boylston Street, 6th Floor
Boston, MA 02116

Attn.: Ms. Elissa McNamara

**RE: Analysis of Soil Samples obtained from the Raytheon Project in Wayland.
(M-11297, M-11299, M-11300, & M-11310)**

Ms. McNamara:

Laboratory analysis of your samples tested at our Rockland Facility has been conducted, please see the enclosed results.

If you have any questions or if I can be of further service to you, please feel free to contact me at your convenience.

Very truly yours,
BRIGGS ENGINEERING & TESTING
A Division of PK Associates, Inc.

Mark Liebert
Laboratory Director
Construction Technology Division

Enclosures: Laboratory Results

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Cumberland, RI 02864
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Briggs Engineering & Testing
 A DIVISION OF PK ASSOCIATES, INC.

ERM/Raytheon, Wayland
 Briggs # 22405
 Tested: 6-23-04

1. Sample No.	Description	Source
M-11297	Soil	B417 10-12'

2. Particle Size Analysis { ASTM D 422 }

Sieve Size	Results {% Passing by Wt.}	Specs.
100 mm	4"	100
75 mm	3"	100
63 mm	2-1/2"	100
50 mm	2"	100
37.5 mm	1-1/2"	100
25.0 mm	1"	100
19.0 mm	3/4"	97
12.5 mm	1/2"	97
9.5 mm	3/8"	97
4.75 mm	#4	95
2.00 mm	#10	91
850 µm	#20	91
425 µm	#40	90
180 µm	#80	90
150 µm	#100	90
75 µm	#200	88.3

HYDROMETER ANALYSIS

0.0311 mm	38
0.0196 mm	35
0.0113 mm	28
0.0083 mm	22
0.0062 mm	15
0.0032 mm	9
0.0014 mm	3

4. No specifications were provided.

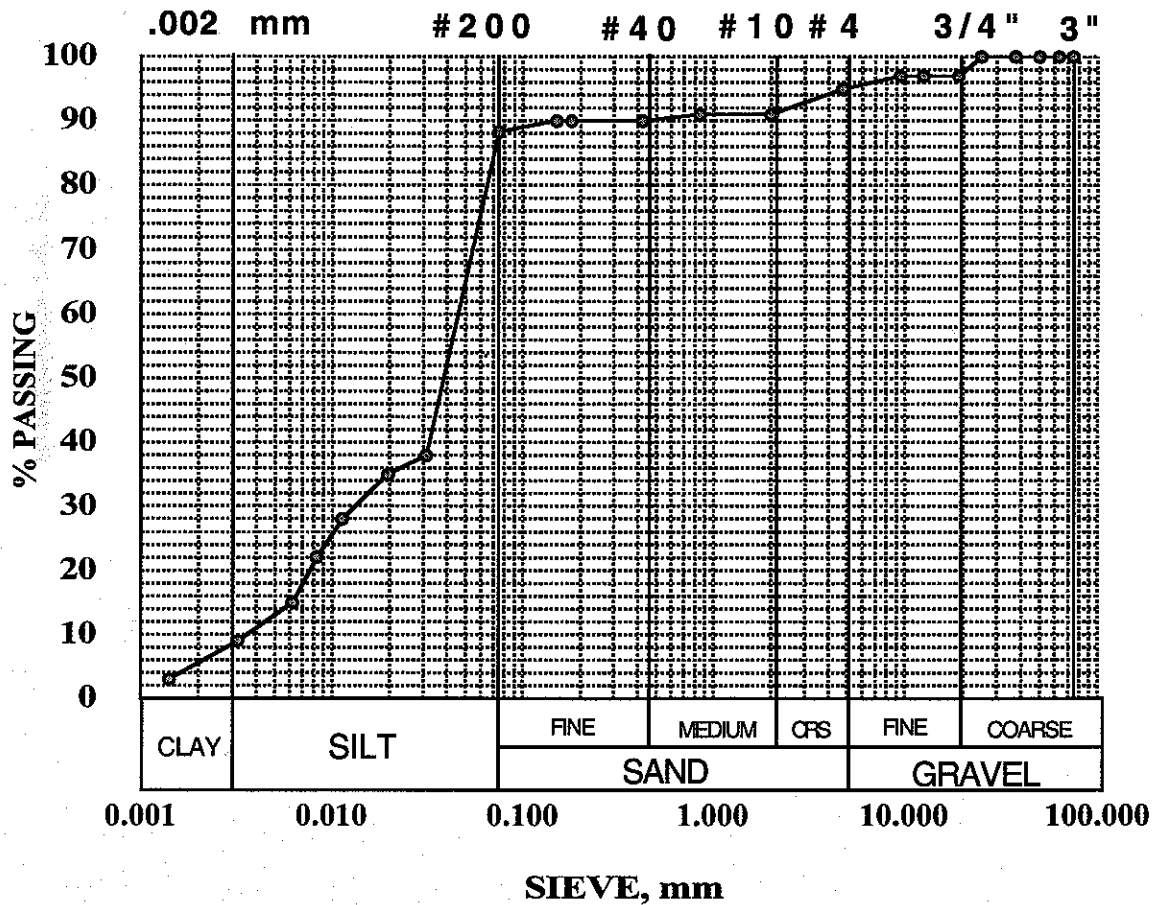


Briggs Engineering & Testing

A Division of PK Associates, Inc.

Project: ERM/Raytheon, Wayland
Sample no. M-11297 **Date:** 6/23/04

PARTICLE SIZE DISTRIBUTION





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ERM/Raytheon, Wayland
 Briggs # 22405
 Tested: 6-23-04

1. <u>Sample No.</u>	<u>Description</u>	<u>Source</u>
M-11299	Soil	B417 40-42'

2. Particle Size Analysis { ASTM D 422 }

<u>Sieve Size</u>	<u>Results</u> {% Passing by Wt.}	<u>Specs.</u>
100 mm	4"	100
75 mm	3"	100
63 mm	2-1/2"	100
50 mm	2"	100
37.5 mm	1-1/2"	100
25.0 mm	1"	100
19.0 mm	3/4"	100
12.5 mm	1/2"	100
9.5 mm	3/8"	100
4.75 mm	#4	100
2.00 mm	#10	100
850 µm	#20	100
425 µm	#40	100
180 µm	#80	99
150 µm	#100	99
75 µm	#200	98.5

HYDROMETER ANALYSIS

0.0196 mm	47
0.0123 mm	26
0.0088 mm	25
0.0064 mm	17
0.0032 mm	11
0.0014 mm	5

4. No specifications were provided.

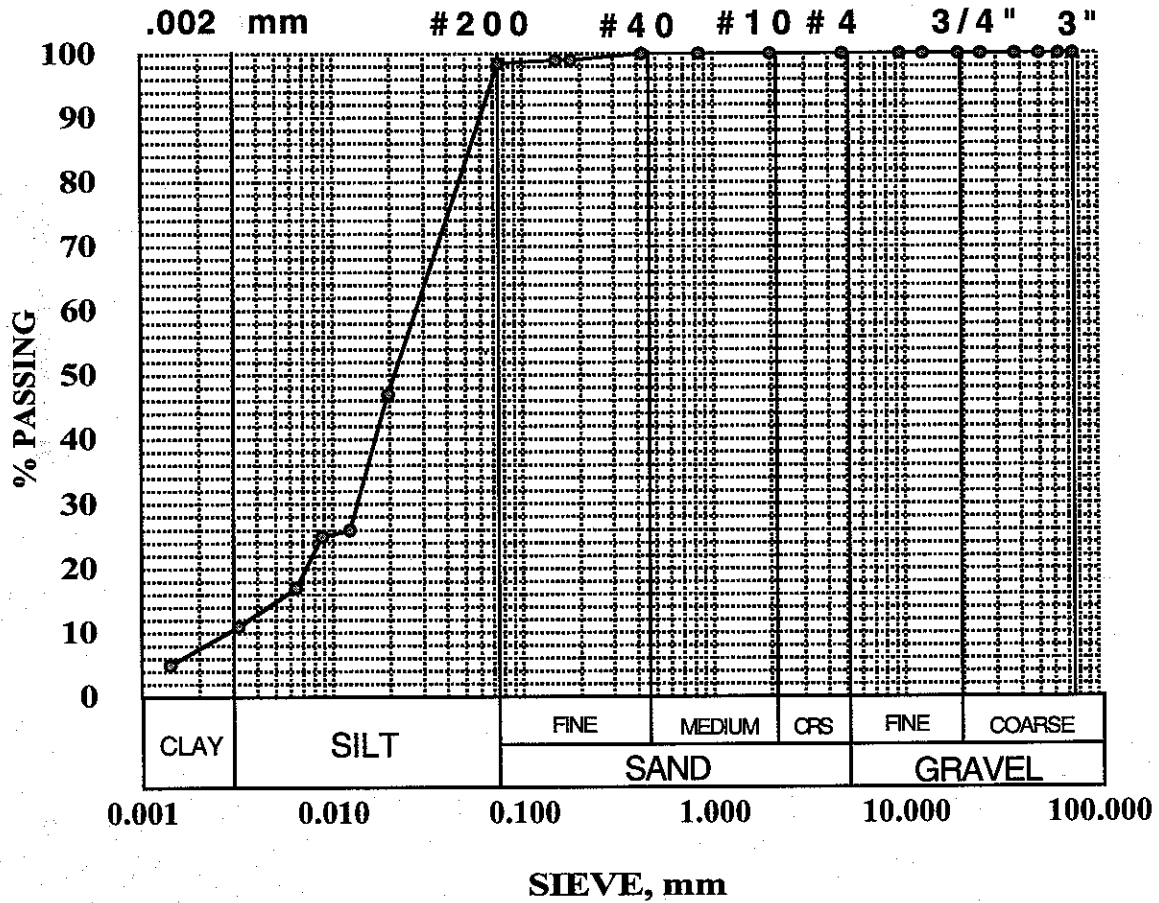


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A Division of PK Associates, Inc.

Project: ERM/Raytheon, Wayland
Sample no. M-11299 **Date:** 6/23/04

PARTICLE SIZE DISTRIBUTION





Briggs Engineering & Testing

A DIVISION OF PK ASSOCIATES, INC.

ERM/Raytheon, Wayland
Briggs # 22405
Tested: 6-23-04

1.	<u>Sample No.</u> M-11300	<u>Description</u> Soil	<u>Source</u> B417 50-52'
----	------------------------------	----------------------------	---------------------------------

2. Particle Size Analysis { ASTM D 422 }

<u>Sieve Size</u>		<u>Results</u> {% Passing by Wt.}	<u>Specs.</u>
100 mm	4"	100	
75 mm	3"	100	
63 mm	2-1/2"	100	
50 mm	2"	100	
37.5 mm	1-1/2"	100	
25.0 mm	1"	100	
19.0 mm	3/4"	100	
12.5 mm	1/2"	100	
9.5 mm	3/8"	100	
4.75 mm	#4	100	
2.00 mm	#10	100	
850 µm	#20	100	
425 µm	#40	100	
180 µm	#80	100	
150 µm	#100	99	
75 µm	#200	88.5	

HYDROMETER ANALYSIS

0.0334 mm	29
0.0223 mm	15
0.0133 mm	6
0.0095 mm	3
0.0067 mm	3
0.0033 mm	3
0.0014 mm	0

4. No specifications were provided.

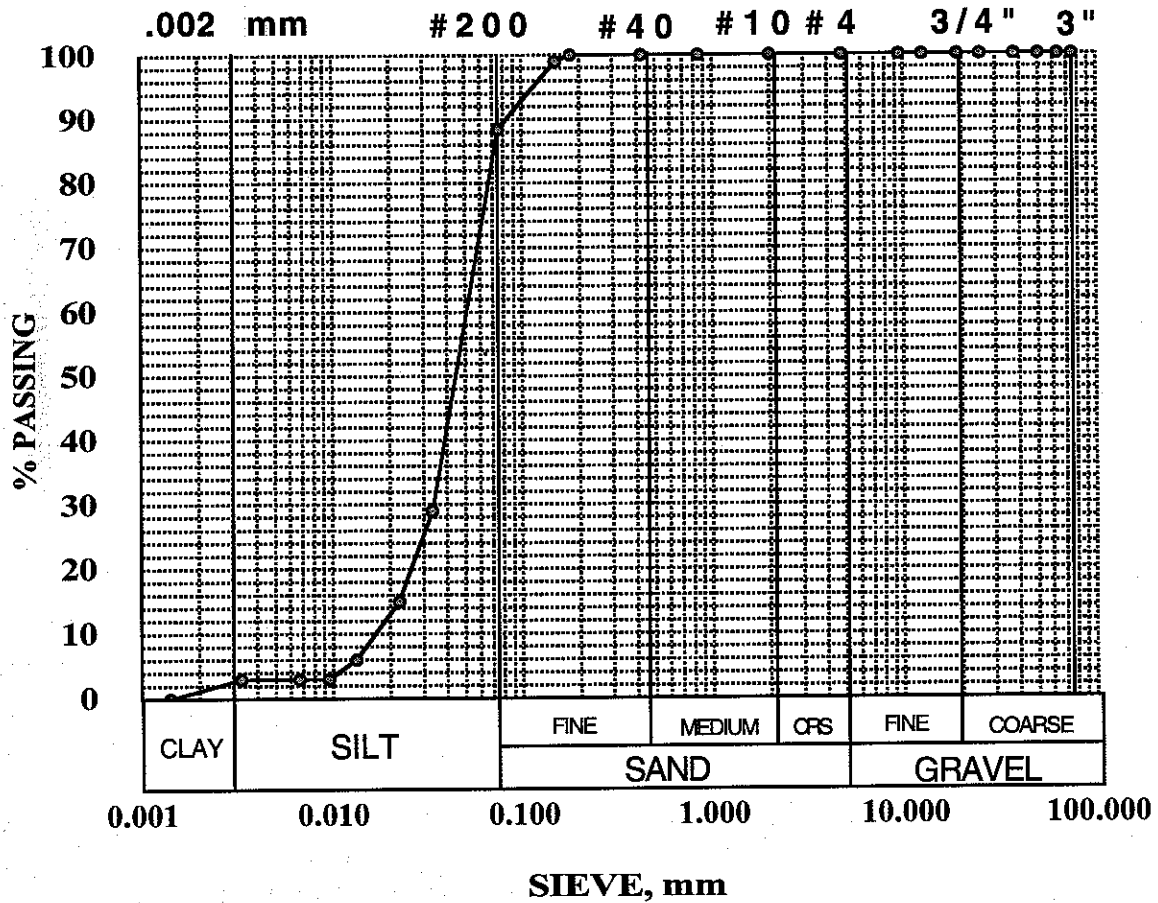


Briggs Engineering & Testing

A Division of PK Associates, Inc.

Project: ERM/Raytheon, Wayland
Sample no. M-11300 **Date:** 6/23/04

PARTICLE SIZE DISTRIBUTION





Briggs Engineering & Testing

A DIVISION OF PK ASSOCIATES, INC.

ERM/Raytheon, Wayland
 Briggs # 22405
 Tested: 6-23-04

1.	<u>Sample No.</u>	<u>Description</u>	<u>Source</u>
	M-11310	Soil	B422 15-17'

2. Particle Size Analysis { ASTM D 422 }

<u>Sieve Size</u>	<u>Results</u> {% Passing by Wt.}	<u>Specs.</u>
100 mm	4"	100
75 mm	3"	100
63 mm	2-1/2"	100
50 mm	2"	100
37.5 mm	1-1/2"	100
25.0 mm	1"	100
19.0 mm	3/4"	100
12.5 mm	1/2"	100
9.5 mm	3/8"	100
4.75 mm	#4	100
2.00 mm	#10	100
850 µm	#20	100
425 µm	#40	100
180 µm	#80	100
150 µm	#100	100
75 µm	#200	99.5

HYDROMETER ANALYSIS

0.0311 mm	61
0.0196 mm	54
0.0117 mm	38
0.0087 mm	26
0.0063 mm	20
0.0032 mm	9
0.0014 mm	5

4. No specifications were provided.



Briggs Engineering & Testing

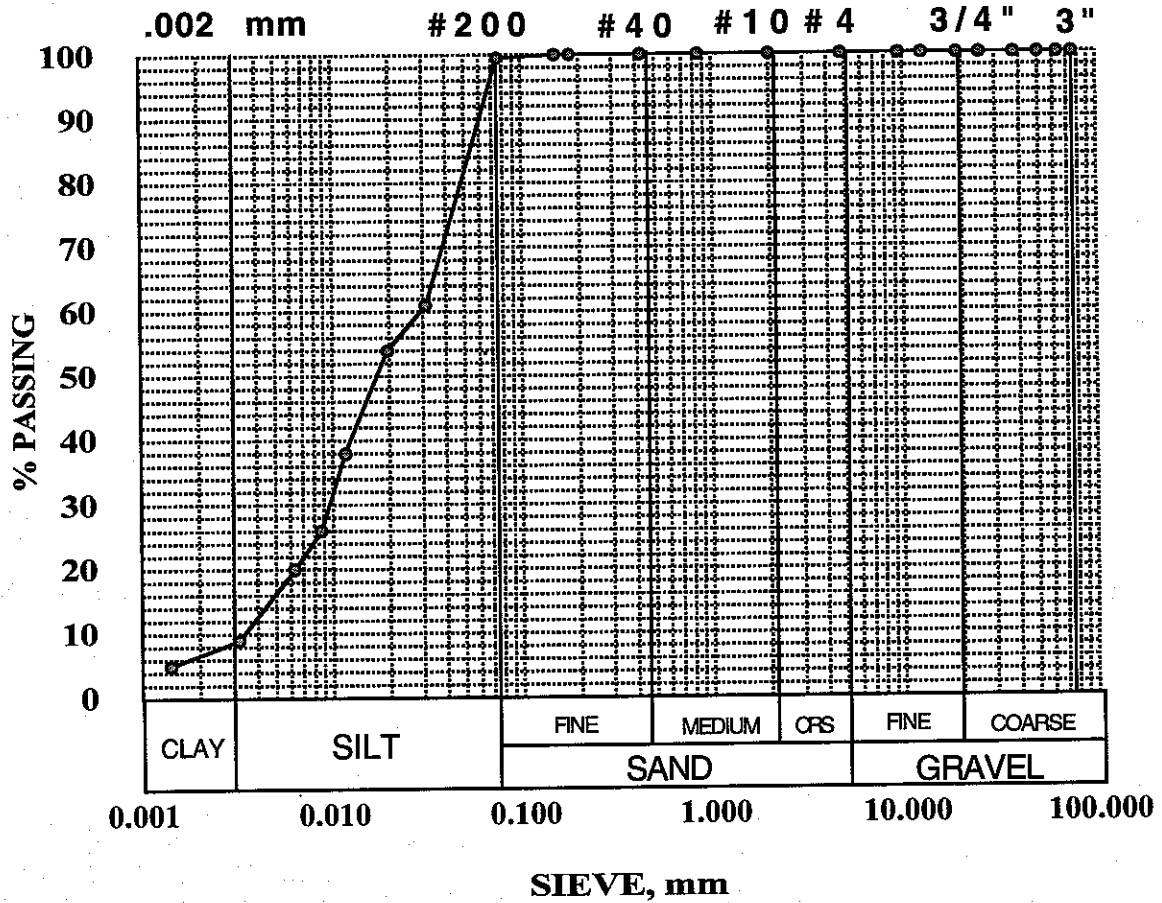
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Project: ERM/Raytheon, Wayland

Sample no. M-11310

Date: 6/23/04

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Briggs Engineering & Testing
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June 30, 2004
Project No. 22405

FILE COPY

E.R.M., Inc.
c/o Elissa McNamara
399 Boylston Street, Sixth Floor
Boston, MA 02116

**RE: Estimated Permeability of Soil
For Environmental Resources Management/Raytheon
Wayland, MA**

Dear Ms. McNamara:

Per your request Briggs Engineering & Testing (Briggs) has estimated the permeability rate of the following soil samples delivered to our soils laboratory.

Briggs performed sieve and hydrometer analyses in accordance with ASTM D422. The samples were collected from various test borings and depths. Briggs previously estimated permeability rates for the following samples as documented in our letter dated June 25, 2004. The previous results are tabulated as follows:

Sample Source	Permeability Estimate (cm/sec)
B417, 95-97'	7.7×10^{-5}
B419, 20-22'	9.0×10^{-6}
B419, 35-37'	4.9×10^{-5}
B419, 55-57'	4.4×10^{-6}
B422, 9-11'	1.1×10^{-5}
B422, 85-87'	1.6×10^{-4}
B422, 107-109'	5.6×10^{-5}
B426, 105-107'	4.4×10^{-6}

www.briggsengineering.com

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Rockland, MA 02370
Phone (781) 871-6040 • Fax (781) 871-7982

100 Pound Road
Cumberland, RI 02864
Phone (401) 658-2990 • Fax (401) 658-2977

Six more samples were recently tested by Briggs. The gradation results are detailed on the attached laboratory reports. Based on the result of the sieve and hydrometer analyses and the Haazen Williams approximation method, Briggs estimated the soil permeability for each sample. Results for this suite of samples is tabulated as follows:

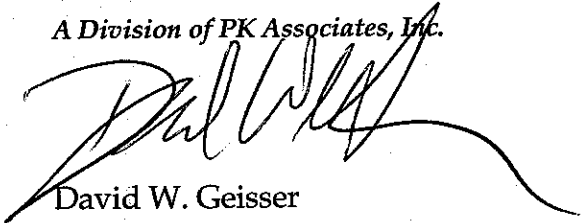
<u>Sample Source</u>	<u>Permeability Estimate (cm/sec)</u>
B417, 30-32'	2.8×10^{-6}
B419, 95-97'	5.2×10^{-5}
B422, 25-27'	1.4×10^{-4}
B422, 45-47'	1.6×10^{-6}
B422, 65-67'	8.4×10^{-4}
B422, 100-102'	1.6×10^{-4}

If you have any questions, please do not hesitate to contact us at your convenience.

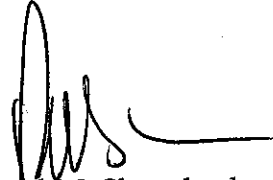
Very truly yours,

BRIGGS ENGINEERING & TESTING

A Division of PK Associates, Inc.



David W. Geisser
Project Engineer



Paul M. Skorohod
President

DWG:PMS:dg

Enclosure: Lab Report



Briggs Engineering & Testing
 A DIVISION OF PK ASSOCIATES, INC.

ERM/Raytheon, Wayland
 Briggs #
 Tested: 6-23-04

1. Sample No.	Description	Source
M-11298	Soil	B417 30-32'

2. Particle Size Analysis { ASTM D 422 }

Sieve Size	Results {% Passing by Wt.}	Specs.
100 mm	4"	100
75 mm	3"	100
63 mm	2-1/2"	100
50 mm	2"	100
37.5 mm	1-1/2"	100
25.0 mm	1	100
19.0 mm	3/4"	100
12.5 mm	1/2"	100
9.5 mm	3/8"	100
4.75 mm	#4	100
2.00 mm	#10	100
850 µm	#20	99
425 µm	#40	99
180 µm	#80	98
150 µm	#100	98
75 µm	#200	97.5
HYDROMETER ANALYSIS		
0.0314 mm		77
0.0199 mm		71
0.0115 mm		52
0.0084 mm		38
0.0061 mm		31
0.0032 mm		17
0.0014 mm		8

4. No specifications were provided.



Briggs Engineering & Testing

A DIVISION OF PK ASSOCIATES, INC.

ERM/Raytheon, Wayland

Briggs #

Tested: 6-23-04

1. Sample No.	Description	Source
M-11308	Soil	B419 95-97'

2. Particle Size Analysis { ASTM D 422 }

Sieve Size	Results {% Passing by Wt.}	Specs.
100 mm	4"	100
75 mm	3"	100
63 mm	2-1/2"	100
50 mm	2"	100
37.5 mm	1-1/2"	100
25.0 mm	1"	100
19.0 mm	3/4"	100
12.5 mm	1/2"	100
9.5 mm	3/8"	100
4.75 mm	#4	100
2.00 mm	#10	100
850 µm	#20	99
425 µm	#40	99
180 µm	#80	96
150 µm	#100	92
75 µm	#200	65.9

HYDROMETER ANALYSIS

0.0332 mm	34
0.0216 mm	26
0.0129 mm	17
0.0093 mm	12
0.0066 mm	9
0.0033 mm	8
0.0014 mm	5

4. No specifications were provided.

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ERM/Raytheon, Wayland

Briggs #

Tested: 6-23-04

1.	<u>Sample No.</u>	<u>Description</u>	<u>Source</u>
	M-11311	Soil	B422 25-27'

2. Particle Size Analysis { ASTM D 422 }

<u>Sieve Size</u>	<u>Results</u> {% Passing by Wt.}	<u>Specs.</u>
100 mm 4"	100	
75 mm 3"	100	
63 mm 2-1/2"	100	
50 mm 2"	100	
37.5 mm 1-1/2"	100	
25.0 mm 1"	100	
19.0 mm 3/4"	100	
12.5 mm 1/2"	100	
9.5 mm 3/8"	100	
4.75 mm #4	100	
2.00 mm #10	100	
850 µm #20	100	
425 µm #40	100	
180 µm #80	100	
150 µm #100	100	
75 µm #200	87.1	

HYDROMETER ANALYSIS

0.0336 mm	31
0.0222 mm	20
0.0133 mm	11
0.0095 mm	8
0.0066 mm	8
0.0033 mm	5
0.0014 mm	3

4. No specifications were provided.

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Briggs Engineering & Testing

A DIVISION OF PK ASSOCIATES, INC.

ERM/Raytheon, Wayland
 Briggs #
 Tested: 6-16-04

1. Sample No.	Description	Source
M-11312	Soil	B422 45-47'

2. Particle Size Analysis { ASTM D 422 }

Sieve Size	Results {% Passing by Wt.}	Specs.
100 mm	4"	100
75 mm	3"	100
63 mm	2-1/2"	100
50 mm	2"	100
37.5 mm	1-1/2"	100
25.0 mm	1"	100
19.0 mm	3/4"	100
12.5 mm	1/2"	100
9.5 mm	3/8"	100
4.75 mm	#4	100
2.00 mm	#10	100
850 µm	#20	100
425 µm	#40	100
180 µm	#80	100
150 µm	#100	100
75 µm	#200	99.6

HYDROMETER ANALYSIS

0.0194 mm	48
0.0112 mm	41
0.0079 mm	33
0.0056 mm	27
0.0031 mm	16
0.0013 mm	10

4. No specifications were provided.



Briggs Engineering & Testing
A DIVISION OF PK ASSOCIATES, INC.

ERM/Raytheon, Wayland
 Briggs #
 Tested: 6-23-04

1.	<u>Sample No.</u>	<u>Description</u>	<u>Source</u>
	M-11313	Soil	B422 65-67'

2. Particle Size Analysis { ASTM D 422 }

<u>Sieve Size</u>		<u>Results</u>	<u>Specs.</u>
		{% Passing by Wt.}	
100 mm	4"	100	
75 mm	3"	100	
63 mm	2-1/2"	100	
50 mm	2"	100	
37.5 mm	1-1/2"	100	
25.0 mm	1"	100	
19.0 mm	3/4"	100	
12.5 mm	1/2"	100	
9.5 mm	3/8"	100	
4.75 mm	#4	100	
2.00 mm	#10	100	
850 µm	#20	100	
425 µm	#40	100	
180 µm	#80	93	
150 µm	#100	87	
75 µm	#200	33.9	

HYDROMETER ANALYSIS

0.0363 mm	11
0.0230 mm	9
0.0134 mm	6
0.0096 mm	3
0.0067 mm	3
0.0033 mm	3
0.0014 mm	2

4. No specifications were provided.



Briggs Engineering & Testing
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ERM/Raytheon, Wayland
 Briggs #
 Tested: 6-16-04

1.	Sample No.	Description	Source
	M-11315	Soil	B422 100-102'

2. Particle Size Analysis { ASTM D 422 }

Sieve Size		Results {% Passing by Wt.}	Specs.
100 mm	4"	100	
75 mm	3"	100	
63 mm	2-1/2"	100	
50 mm	2"	100	
37.5 mm	1-1/2"	100	
25.0 mm	1"	100	
19.0 mm	3/4"	100	
12.5 mm	1/2"	100	
9.5 mm	3/8"	100	
4.75 mm	#4	100	
2.00 mm	#10	100	
850 µm	#20	99	
425 µm	#40	99	
180 µm	#80	97	
150 µm	#100	95	
75 µm	#200	56.7	
HYDROMETER ANALYSIS			
0.0213 mm		12	
0.0125 mm		10	
0.0089 mm		8	
0.0065 mm		4	
0.0032 mm		3	
0.0014 mm		3	

4. No specifications were provided.



Briggs Engineering & Testing

A DIVISION OF PK ASSOCIATES, INC.

July 1, 2005

ERM
c/o Jeff Frazier
399 Boylston Street, 6th Floor
Boston, MA 02116

**RE: Estimated Percolation Rate of Soils
From Kaytheon Wayland, MA**

Per your request Briggs Engineering & Testing (Briggs) has estimated the percolation rate of three soil samples from the above referenced property.

Briggs performed a sieve and hydrometer analysis on the above soil samples in accordance with ASTM D422. Refer to the attached laboratory reports for the analyses results.

Sample M-12283 was a composite of eight samples. The material has 95% fines passing the #200 sieve. The hydrometer test further evaluates gradation of fines which is necessary to estimate percolation rate. Based on the result of the sieve/hydrometer analyse and empirical data for percolation rates for various soils with varying permeability in the New England region, Briggs estimates a percolation rate of 200 minutes per inch or slower for sample M-12283. This soil is therefore a very poorly draining soil composite sample.

Sample M-12284 was a composite of four samples. The material has 89% fines passing the #200 sieve. Based on the result of the sieve/hydrometer analyse and empirical data for percolation rates for various soils with varying permeability in the New England region, Briggs estimates a percolation rate of 150 minutes per inch or slower for sample M-12284. This soil is therefore a very poorly draining soil composite sample.

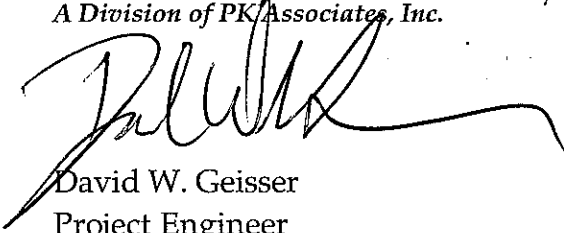
Sample M-12285 was a composite of two samples. The material has 38% fines passing the #200 sieve. Based on the result of the sieve/hydrometer analyse and empirical data for percolation rates for various soils with varying permeability in the New England region, Briggs estimates a percolation rate of approximately 3 to 5 minutes per inch for sample M-12285. This soil is a well draining soil composite sample.

These percolation rate estimates are approximate. Rates must be verified by in-situ percolation tests if used for human septic waste disposal in accordance with Title V. Percolation estimates for discrete samples can be utilized where high groundwater prohibits in-situ percolation testing and is subject to Title V. In that event a Form 59B variance would be required.

If you have any questions, please do not hesitate to contact us at your convenience.

Very truly yours,
BRIGGS ENGINEERING & TESTING

A Division of PK Associates, Inc.



David W. Geisser
Project Engineer

DWG:dg
Enclosure: Lab Reports



Briggs Engineering & Testing
A DIVISION OF PK ASSOCIATES, INC.

ERM
399 Boylston Street, 6th Fl.
Boston, MA 02116
Attn: Mr. Jeff Frazier

Report Date: 6/28/05

Project: **Raytheon/Wayland**
Briggs #:

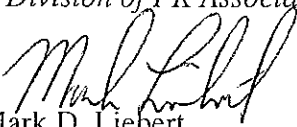
Tested: 6/27/05
Received: 6/3/05

1. Sample No. Description Source of Material
M-12283 Composite of 8 Samples MW-557-16.5-23.5-01

2. Particle Size Analysis {ASTM D422}

Sieve Size		Results	Specifications
Standard	Alternate	{% Passing by Wt.}	
100 mm	4"	100	
90 mm	3-1/2"	100	
75 mm	3"	100	
63 mm	2-1/2"	100	
50 mm	2"	100	
37.5 mm	1-1/2"	100	
25 mm	1"	100	
19 mm	3/4"	100	
12.5 mm	1/2"	100	
9.5 mm	3/8"	100	
4.75 mm	#4	100	
2.00 mm	#10	100	
0.850 mm	#20	99	
0.425 mm	#40	99	
0.180 mm	#80	98	
0.150 mm	#100	97	
0.075 mm	#200	95	
0.0318 mm		56	
0.0201 mm		43	
0.0123 mm		28	
0.0090 mm		19	
0.0066 mm		13	
0.0033 mm		6	
0.0014 mm		4	

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A Division of PK Associates, Inc.


Mark D. Liebert
Director of Testing Services
Construction Technology Division

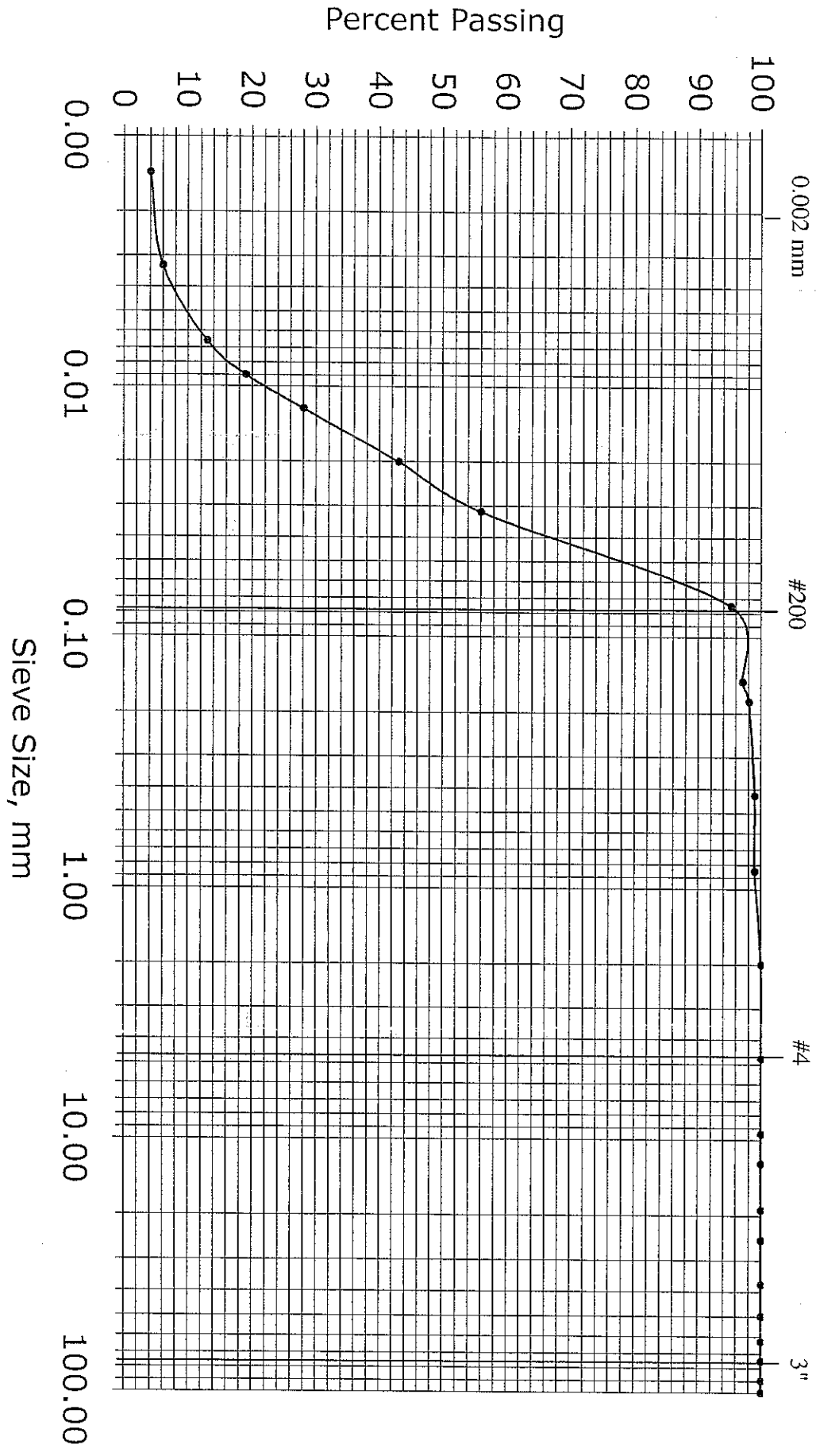
www.briggsengineering.com



Briggs Engineering & Testing
A Division of PK Associates, Inc.

Project:	Raytheon/Wayland
Date Tested:	6/27/05
Lab Ref. No.:	M-12283

Particle Size Analysis





Briggs Engineering & Testing

A DIVISION OF PK ASSOCIATES, INC.

ERM

399 Boylston Street, 6th Fl.

Boston, MA 02116

Attn: Mr. Jeff Frazier

Report Date: 6/28/05

Project: **Raytheon/Wayland**

Briggs #:

Tested: 6/27/05

Received: 6/3/05

1. Sample No. Description Source of Material
M-12284 Composite of 4 Samples MW-557-23.5-25-01
2. Particle Size Analysis {ASTM D422}

Sieve Size		Results	Specifications
Standard	Alternate	{% Passing by Wt.}	
100 mm	4"	100	
90 mm	3-1/2"	100	
75 mm	3"	100	
63 mm	2-1/2"	100	
50 mm	2"	100	
37.5 mm	1-1/2"	100	
25 mm	1"	100	
19 mm	3/4"	100	
12.5 mm	1/2"	100	
9.5 mm	3/8"	100	
4.75 mm	#4	100	
2.00 mm	#10	100	
0.850 mm	#20	99	
0.425 mm	#40	98	
0.180 mm	#80	96	
0.150 mm	#100	95	
0.075 mm	#200	89	
0.0318 mm		48	
0.0202 mm		37	
0.0125 mm		24	
0.0091 mm		18	
0.0066 mm		13	
0.0033 mm		8	
0.0014 mm		5	

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Mark D. Liebert

Director of Testing Services

Construction Technology Division

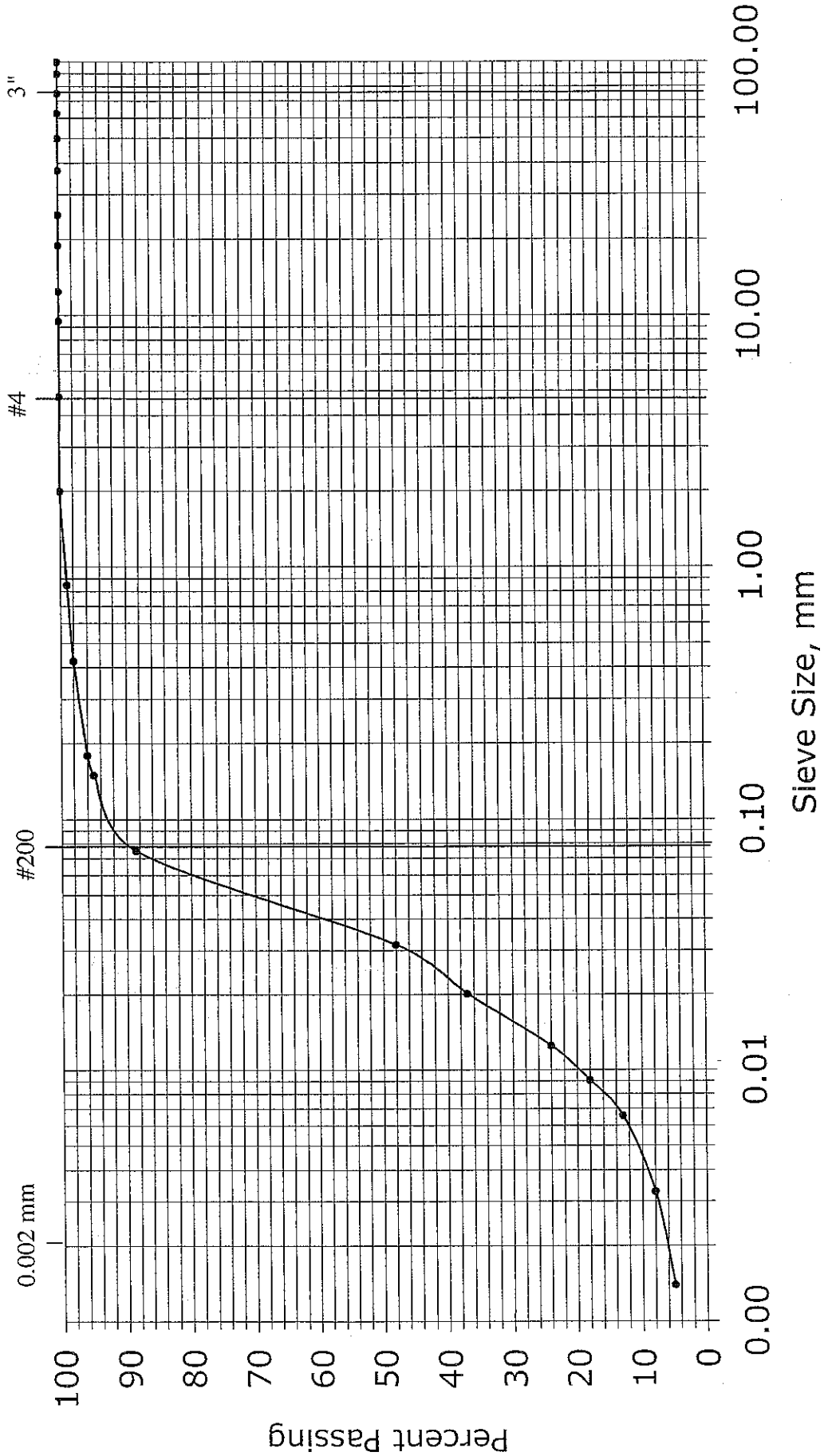
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Project:	Raytheon/Wayland
Date Tested:	6/27/05
Lab Ref. No.:	M-12284

Particle Size Analysis





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ERM
399 Boylston Street, 6th Fl.
Boston, MA 02116
Attn: Mr. Jeff Frazier

Report Date: 6/28/05

Project: **Raytheon/Wayland**
Briggs #:

Tested: 6/27/05
Received: 6/3/05

- | | | | |
|----|------------------------------|--|--|
| 1. | <u>Sample No.</u>
M-12285 | <u>Description</u>
Composite of 2 Samples | <u>Source of Material</u>
MW-557-25-26-01 |
| 2. | Particle Size Analysis | {ASTM D422} | |

Sieve Size		Results	Specifications
Standard	Alternate	{% Passing by Wt.}	
100 mm	4"	100	
90 mm	3-1/2"	100	
75 mm	3"	100	
63 mm	2-1/2"	100	
50 mm	2"	100	
37.5 mm	1-1/2"	100	
25 mm	1"	100	
19 mm	3/4"	100	
12.5 mm	1/2"	100	
9.5 mm	3/8"	100	
4.75 mm	#4	100	
2.00 mm	#10	100	
0.850 mm	#20	100	
0.425 mm	#40	100	
0.180 mm	#80	95	
0.150 mm	#100	87	
0.075 mm	#200	38	
0.0356 mm		9	
0.0231 mm		6	
0.0135 mm		4	
0.0096 mm		3	
0.0068 mm		3	
0.0034 mm		1	
0.0014 mm		1	

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Mark D. Liebert
Director of Testing Services
Construction Technology Division

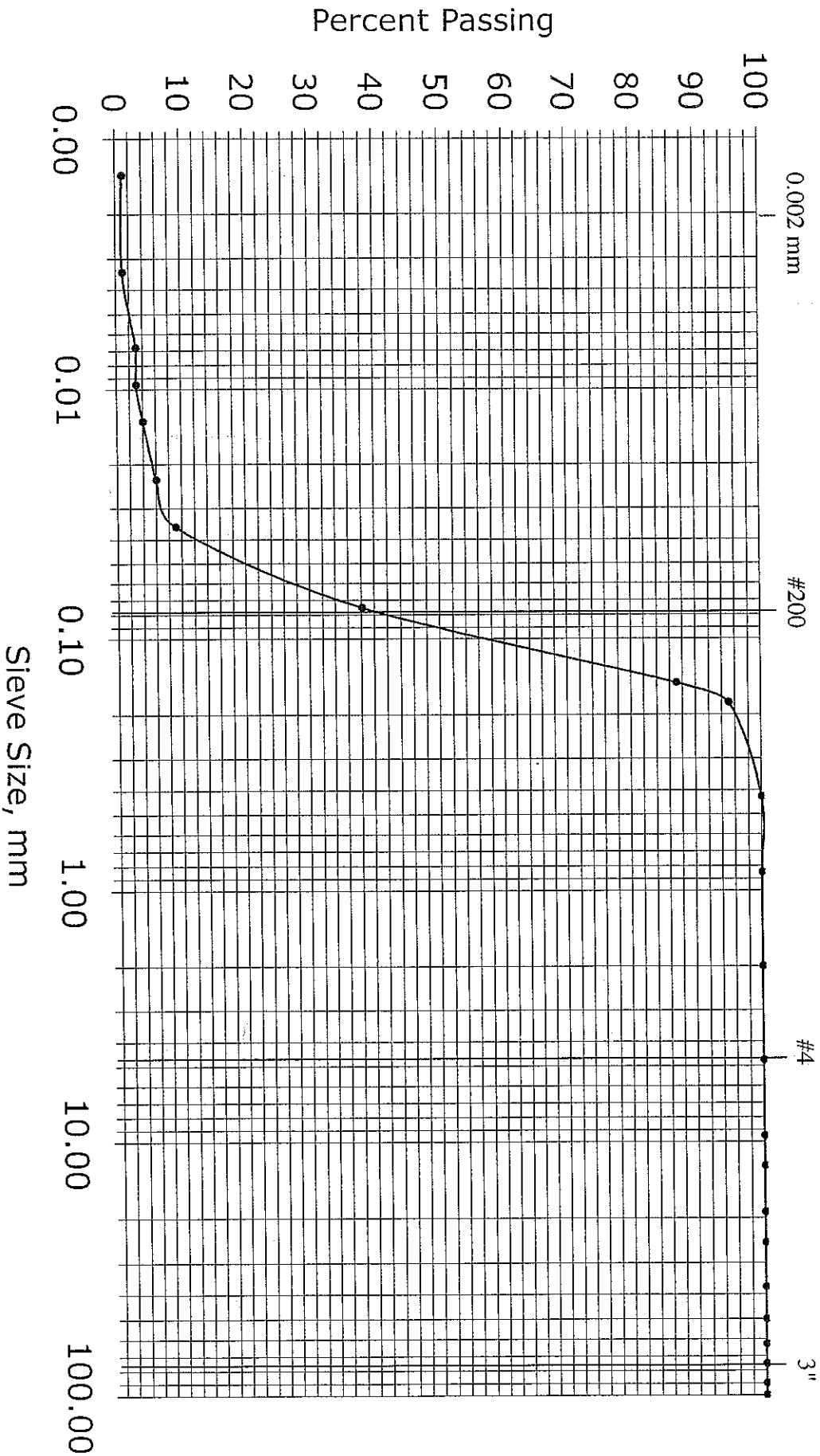
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Project:	Raytheon/Wayland
Date Tested:	6/27/05
Lab Ref. No.:	M-12284

Particle Size Analysis





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ERM
399 Boylston Street, 6th Fl.
Boston, MA 02116
Attn: Mr. Jeff Frazier

Report Date: 6/28/05

Project: **Raytheon/Wayland**
Briggs #:


Tested: 6/27/05
Received: 6/3/05

1.	<u>Sample No.</u> M-12283	<u>Description</u> Composite of 8 Samples	<u>Source of Material</u> MW-557-16.5-23.5-01
----	------------------------------	--	--

2. Particle Size Analysis {ASTM D422}

Sieve Size		Results	Specifications
Standard	Alternate	{% Passing by Wt.}	
100 mm	4"	100	
90 mm	3-1/2"	100	
75 mm	3"	100	
63 mm	2-1/2"	100	
50 mm	2"	100	
37.5 mm	1-1/2"	100	
25 mm	1"	100	
19 mm	3/4"	100	
12.5 mm	1/2"	100	
9.5 mm	3/8"	100	
4.75 mm	#4	100	
2.00 mm	#10	100	
0.850 mm	#20	99	
0.425 mm	#40	99	
0.180 mm	#80	98	
0.150 mm	#100	97	
0.075 mm	#200	95	
0.0318 mm		56	
0.0201 mm		43	
0.0123 mm		28	
0.0090 mm		19	
0.0066 mm		13	
0.0033 mm		6	
0.0014 mm		4	

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Mark D. Liebert
Director of Testing Services
Construction Technology Division

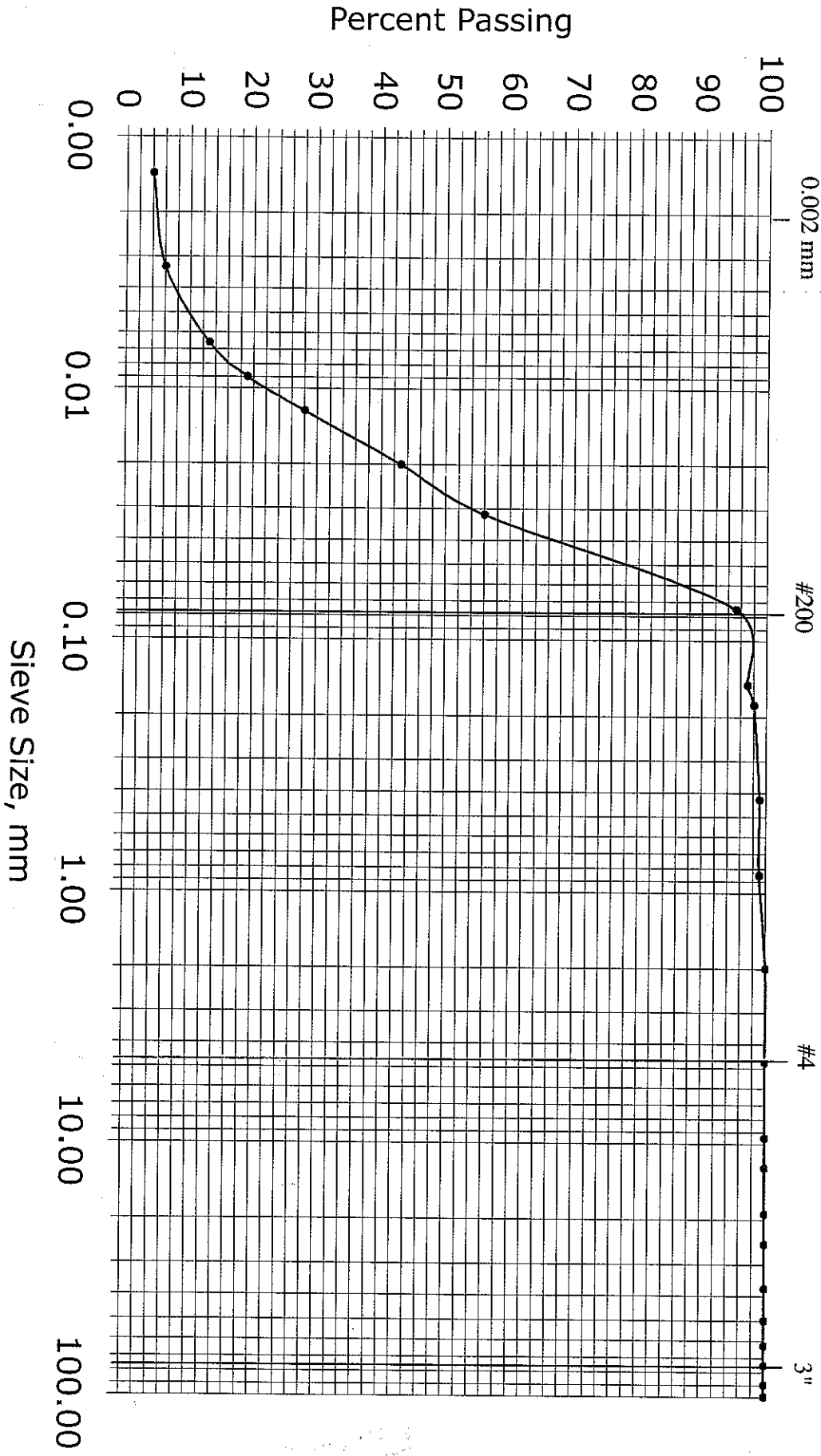
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Project:	Raytheon/Wayland
Date Tested:	6/27/05
Lab Ref. No.:	M-12283

Particle Size Analysis





Briggs Engineering & Testing
A DIVISION OF PK ASSOCIATES, INC.

ERM
399 Boylston Street, 6th Fl.
Boston, MA 02116
Attn: Mr. Jeff Frazier

Report Date: 6/28/05

Project: **Raytheon/Wayland**
Briggs #:

Tested: 6/27/05
Received: 6/3/05

1. Sample No. Description Source of Material
M-12284 Composite of 4 Samples MW-557-23.5-25-01

2. Particle Size Analysis {ASTM D422}

Sieve Size		Results {% Passing by Wt.}	Specifications
Standard	Alternate		
100 mm	4"	100	
90 mm	3-1/2"	100	
75 mm	3"	100	
63 mm	2-1/2"	100	
50 mm	2"	100	
37.5 mm	1-1/2"	100	
25 mm	1"	100	
19 mm	3/4"	100	
12.5 mm	1/2"	100	
9.5 mm	3/8"	100	
4.75 mm	#4	100	
2.00 mm	#10	100	
0.850 mm	#20	99	
0.425 mm	#40	98	
0.180 mm	#80	96	
0.150 mm	#100	95	
0.075 mm	#200	89	
0.0318 mm		48	
0.0202 mm		37	
0.0125 mm		24	
0.0091 mm		18	
0.0066 mm		13	
0.0033 mm		8	
0.0014 mm		5	

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Mark D. Liebert
Director of Testing Services
Construction Technology Division

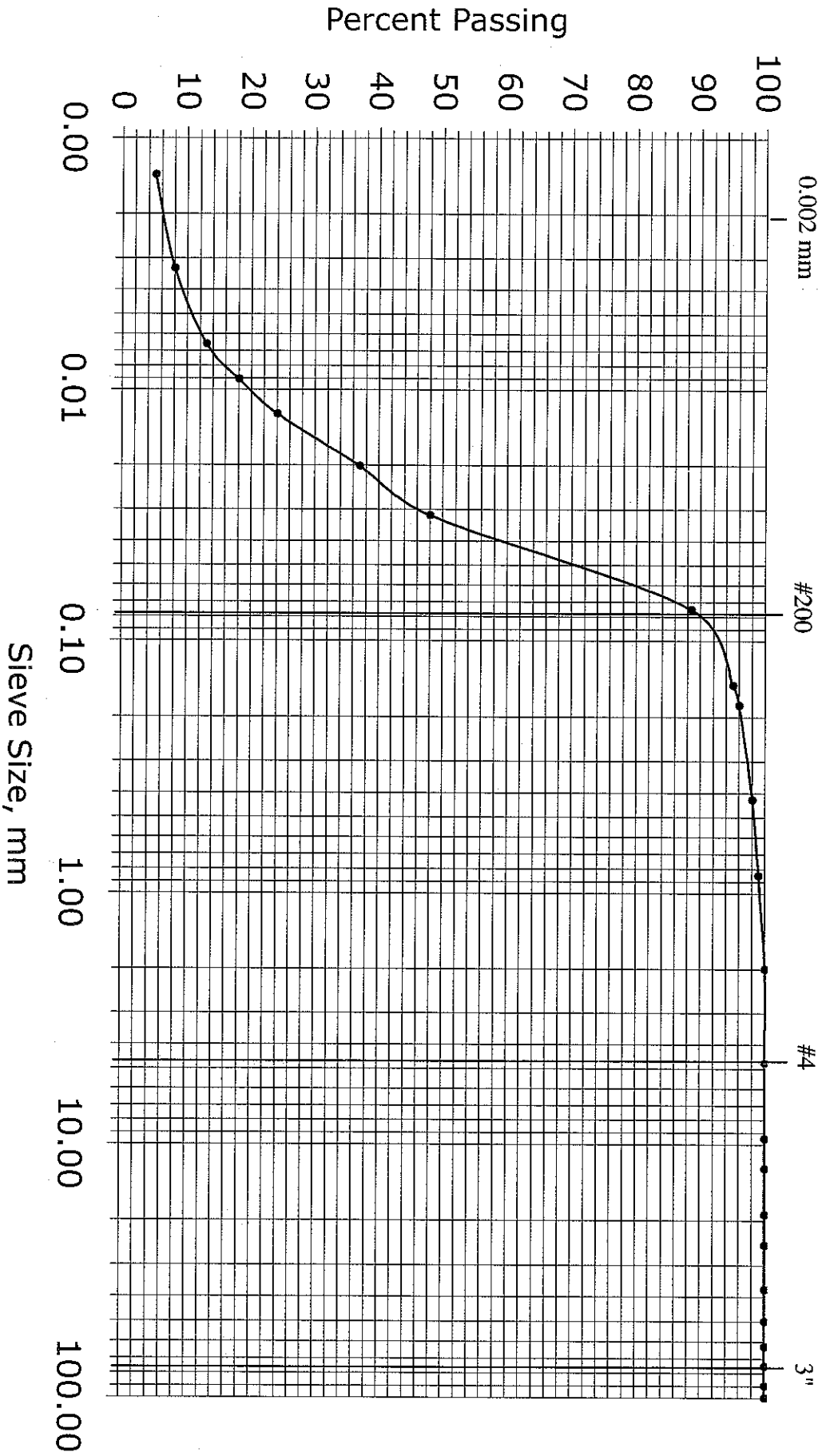
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Briggs Engineering & Testing
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Project:	Raytheon/Wayland
Date Tested:	6/27/05
Lab Ref. No.:	M-12284

Particle Size Analysis





Briggs Engineering & Testing
A DIVISION OF PK ASSOCIATES, INC.

ERM
399 Boylston Street, 6th Fl.
Boston, MA 02116
Attn: Mr. Jeff Frazier

Report Date: 6/28/05

Project: **Raytheon/Wayland**
Briggs #:

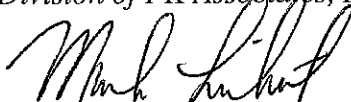
Tested: 6/27/05
Received: 6/3/05

1. Sample No. Description Source of Material
M-12285 Composite of 2 Samples MW-557-25-26-01

2. Particle Size Analysis {ASTM D422}

Sieve Size		Results	Specifications
Standard	Alternate	{% Passing by Wt.}	
100 mm	4"	100	
90 mm	3-1/2"	100	
75 mm	3"	100	
63 mm	2-1/2"	100	
50 mm	2"	100	
37.5 mm	1-1/2"	100	
25 mm	1"	100	
19 mm	3/4"	100	
12.5 mm	1/2"	100	
9.5 mm	3/8"	100	
4.75 mm	#4	100	
2.00 mm	#10	100	
0.850 mm	#20	100	
0.425 mm	#40	100	
0.180 mm	#80	95	
0.150 mm	#100	87	
0.075 mm	#200	38	
0.0356 mm		9	
0.0231 mm		6	
0.0135 mm		4	
0.0096 mm		3	
0.0068 mm		3	
0.0034 mm		1	
0.0014 mm		1	

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Mark D. Liebert
Director of Testing Services
Construction Technology Division

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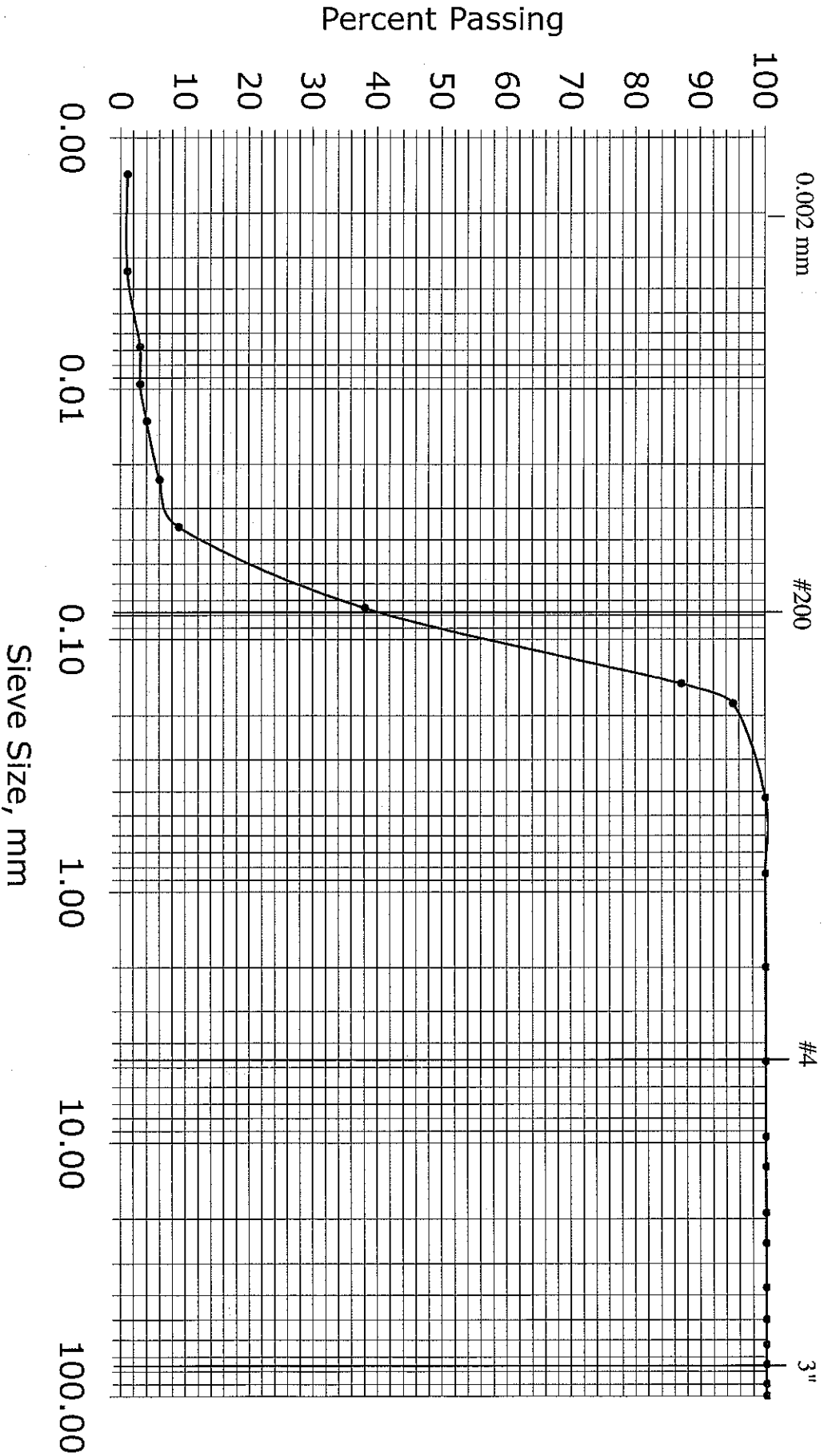
100 Pound Road
Cumberland, RI 02864
Phone (401) 658-2990 • Fax (401) 658-2977



Briggs Engineering & Testing
A Division of PK Associates, Inc.

Project:	Raytheon/Wayland
Date Tested:	6/27/05
Lab Ref. No.:	M-12284

Particle Size Analysis





Briggs Engineering & Testing
A DIVISION OF PK ASSOCIATES, INC.

FILE COPY

July 1, 2004
Project No. 22405

E.R.M., Inc.
c/o Elissa McNamara
399 Boylston Street, Sixth Floor
Boston, MA 02116

**RE: Estimated Permeability of Soil
For Environmental Resources Management/Raytheon
Wayland, MA**

Dear Ms. McNamara:

Per your request Briggs Engineering & Testing (Briggs) has estimated the permeability rate of the following soil samples delivered to our soils laboratory.

Briggs performed sieve and hydrometer analyses in accordance with ASTM D422. The samples were collected from various test borings and depths. Briggs previously estimated permeability rates for the following samples as documented in our letter dated June 30, 2004. The previous results are tabulated as follows:

<u>Sample Source</u>	<u>Permeability Estimate (cm/sec)</u>
B417, 95-97'	7.7×10^{-5}
B419, 20-22'	9.0×10^{-6}
B419, 35-37'	4.9×10^{-5}
B419, 55-57'	4.4×10^{-6}
B422, 9-11'	1.1×10^{-5}
B422, 85-87'	1.6×10^{-4}
B422, 107-109'	5.6×10^{-5}
B426, 105-107'	4.4×10^{-6}
B417, 30-32'	2.8×10^{-6}
B419, 95-97'	5.2×10^{-5}
B422, 25-27'	1.4×10^{-4}
B422, 45-47'	1.6×10^{-6}
B422, 65-67'	8.4×10^{-4}
B422, 100-102'	1.6×10^{-4}

www.briggsengineering.com

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Rockland, MA 02370
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Cumberland, RI 02864
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Four more samples were recently tested by Briggs. The gradation results are detailed on the attached laboratory reports. Based on the result of the sieve and hydrometer analyses and the Haazen Williams approximation method, Briggs estimated the soil permeability for each sample. Results for this suite of samples is tabulated as follows:

<u>Sample Source</u>	<u>Permeability Estimate (cm/sec)</u>
B417, 10-12'	1.3×10^{-5}
B417, 40-42'	7.8×10^{-6}
B417, 50-52'	1.4×10^{-4}
B422, 15-17'	1.1×10^{-5}

If you have any questions, please do not hesitate to contact us at your convenience.

Very truly yours,
BRIGGS ENGINEERING & TESTING
A Division of PK Associates, Inc.



David W. Geisser
Project Engineer



Paul M. Skorohod
President

DWG:PMS:dg
Enclosure: Lab Report



Briggs Engineering & Testing
 A DIVISION OF PK ASSOCIATES, INC.

ERM/Raytheon, Wayland
 Briggs # 22405
 Tested: 6-23-04

1. Sample No.	Description	Source
M-11297	Soil	B417 10-12'

2. Particle Size Analysis { ASTM D 422 }

Sieve Size	Results {% Passing by Wt.}	Specs.
100 mm	4"	100
75 mm	3"	100
63 mm	2-1/2"	100
50 mm	2"	100
37.5 mm	1-1/2"	100
25.0 mm	1"	100
19.0 mm	3/4"	97
12.5 mm	1/2"	97
9.5 mm	3/8"	97
4.75 mm	#4	95
2.00 mm	#10	91
850 µm	#20	91
425 µm	#40	90
180 µm	#80	90
150 µm	#100	90
75 µm	#200	88.3

HYDROMETER ANALYSIS

0.0311 mm	38
0.0196 mm	35
0.0113 mm	28
0.0083 mm	22
0.0062 mm	15
0.0032 mm	9
0.0014 mm	3

4. No specifications were provided.



Briggs Engineering & Testing
 A DIVISION OF PK ASSOCIATES, INC.

ERM/Raytheon, Wayland
 Briggs # 22405
 Tested: 6-23-04

1. Sample No.	Description	Source
M-11299	Soil	B417 40-42'

2. Particle Size Analysis { ASTM D 422 }

Sieve Size	Results {% Passing by Wt.}	Specs.
100 mm	4"	100
75 mm	3"	100
63 mm	2-1/2"	100
50 mm	2"	100
37.5 mm	1-1/2"	100
25.0 mm	1"	100
19.0 mm	3/4"	100
12.5 mm	1/2"	100
9.5 mm	3/8"	100
4.75 mm	#4	100
2.00 mm	#10	100
850 µm	#20	100
425 µm	#40	100
180 µm	#80	99
150 µm	#100	99
75 µm	#200	98.5

HYDROMETER ANALYSIS

0.0196 mm	47
0.0123 mm	26
0.0088 mm	25
0.0064 mm	17
0.0032 mm	11
0.0014 mm	5

4. No specifications were provided.



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ERM/Raytheon, Wayland
 Briggs # 22405
 Tested: 6-23-04

1.	<u>Sample No.</u>	<u>Description</u>	<u>Source</u>
	M-11300	Soil	B417 50-52'

2. Particle Size Analysis { ASTM D 422 }

<u>Sieve Size</u>		<u>Results</u> {% Passing by Wt.}	<u>Specs.</u>
100 mm	4"	100	
75 mm	3"	100	
63 mm	2-1/2"	100	
50 mm	2"	100	
37.5 mm	1-1/2"	100	
25.0 mm	1"	100	
19.0 mm	3/4"	100	
12.5 mm	1/2"	100	
9.5 mm	3/8"	100	
4.75 mm	#4	100	
2.00 mm	#10	100	
850 µm	#20	100	
425 µm	#40	100	
180 µm	#80	100	
150 µm	#100	99	
75 µm	#200	88.5	

HYDROMETER ANALYSIS

0.0334 mm	29
0.0223 mm	15
0.0133 mm	6
0.0095 mm	3
0.0067 mm	3
0.0033 mm	3
0.0014 mm	0

4. No specifications were provided.

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ERM/Raytheon, Wayland
 Briggs # 22405
 Tested: 6-23-04

1. <u>Sample No.</u>	<u>Description</u>	<u>Source</u>
M-11310	Soil	B422 15-17'

2. Particle Size Analysis { ASTM D 422 }

<u>Sieve Size</u>	<u>Results</u> {% Passing by Wt.}	<u>Specs.</u>
100 mm	4"	100
75 mm	3"	100
63 mm	2-1/2"	100
50 mm	2"	100
37.5 mm	1-1/2"	100
25.0 mm	1"	100
19.0 mm	3/4"	100
12.5 mm	1/2"	100
9.5 mm	3/8"	100
4.75 mm	#4	100
2.00 mm	#10	100
850 µm	#20	100
425 µm	#40	100
180 µm	#80	100
150 µm	#100	100
75 µm	#200	99.5

HYDROMETER ANALYSIS

0.0311 mm	61
0.0196 mm	54
0.0117 mm	38
0.0087 mm	26
0.0063 mm	20
0.0032 mm	9
0.0014 mm	5

4. No specifications were provided.



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July 16, 2004

Briggs# 22405

Environmental Resources Management
399 Boylston Street, 6th Floor
Boston, MA 02116

Attn.: Ms. Elissa McNamara

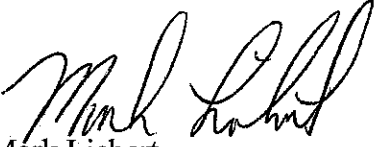
**RE: Analysis of Soil Samples obtained from the Raytheon Project in Wayland.
(M-11289, M-11290, M-11291, M-11292, M-11293, M-11294, M-11295,
M-11296A, M-11296B, M-11317, M-11318, M-11319, M-11320, M-11321,
M-11322, M-11323, M-11326B, & M-11328)**

Ms. McNamara:

Laboratory analysis of your samples tested at our Rockland Facility has been conducted, please see the enclosed results.

If you have any questions or if I can be of further service to you, please feel free to contact me at your convenience.

Very truly yours,
BRIGGS ENGINEERING & TESTING
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Mark Liebert
Laboratory Director
Construction Technology Division

Enclosures: Laboratory Results

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ERM/Raytheon, Wayland
 Briggs # 22405
 Tested: 7-7-04

1.	<u>Sample No.</u>	<u>Description</u>	<u>Source</u>
	M-11289	Soil	B416 10-12'

2. Particle Size Analysis { ASTM D 422 }

<u>Sieve Size</u>	<u>Results</u> {% Passing by Wt.}	<u>Specs.</u>
100 mm	4"	100
75 mm	3"	100
63 mm	2-1/2"	100
50 mm	2"	100
37.5 mm	1-1/2"	100
25.0 mm	1"	100
19.0 mm	3/4"	100
12.5 mm	1/2"	100
9.5 mm	3/8"	100
4.75 mm	#4	100
2.00 mm	#10	97
850 µm	#20	92
425 µm	#40	92
180 µm	#80	92
150 µm	#100	92
75 µm	#200	92.0

HYDROMETER ANALYSIS

0.0307 mm	61
0.0194 mm	51
0.0118 mm	34
0.0087 mm	25
0.0063 mm	17
0.0032 mm	9
0.0014 mm	3

4. No specifications were provided.

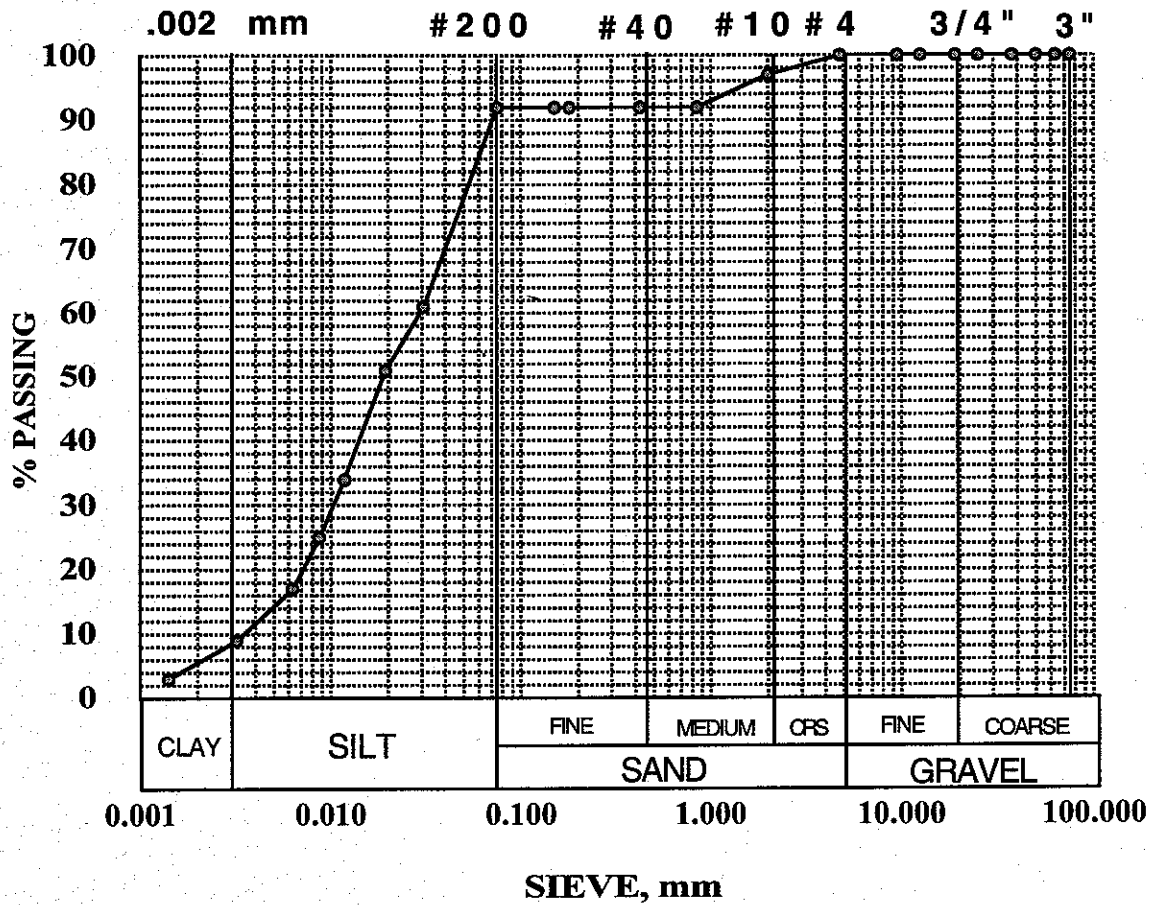


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Sample no. M-11289 **Date:** 7/7/04

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ERM/Raytheon, Wayland
Briggs # 22405
Tested: 7-7-04

1.	<u>Sample No.</u> M-11290	<u>Description</u> Soil	<u>Source</u> B416 15-17'
2.	Particle Size Analysis	{ ASTM D 422 }	

<u>Sieve Size</u>		<u>Results</u> {% Passing by Wt.}	<u>Specs.</u>
100 mm	4"	100	
75 mm	3"	100	
63 mm	2-1/2"	100	
50 mm	2"	100	
37.5 mm	1-1/2"	100	
25.0 mm	1"	100	
19.0 mm	3/4"	100	
12.5 mm	1/2"	100	
9.5 mm	3/8"	100	
4.75 mm	#4	100	
2.00 mm	#10	99	
850 µm	#20	96	
425 µm	#40	96	
180 µm	#80	96	
150 µm	#100	96	
75 µm	#200	91.4	
HYDROMETER ANALYSIS			
0.0307 mm		46	
0.0210 mm		28	
0.0126 mm		17	
0.0092 mm		11	
0.0065 mm		8	
0.0033 mm		3	
0.0014 mm		2	

4. No specifications were provided.

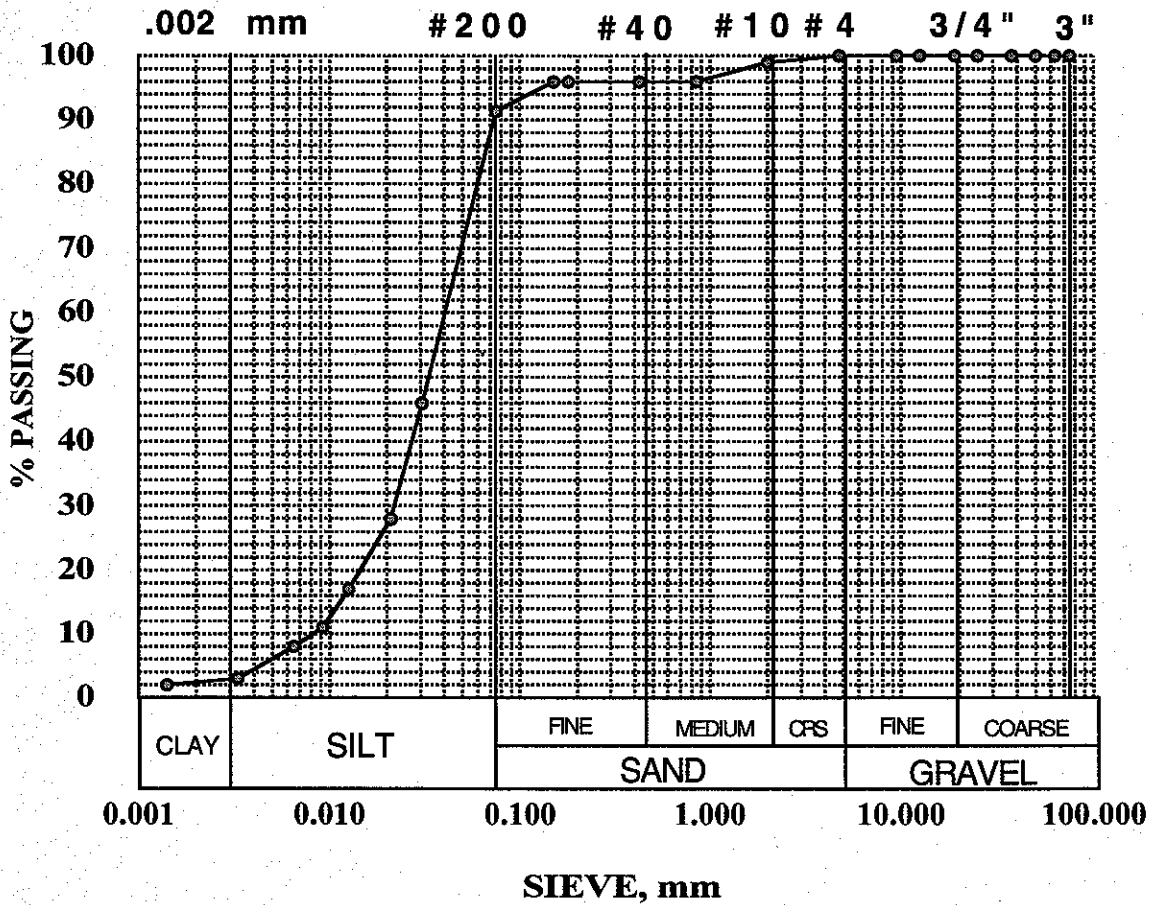


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Sample no. M-11290 **Date:** 7/7/04

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ERM/Raytheon, Wayland
 Briggs # 22405
 Tested: 7-8-04

1. Sample No.	Description	Source
M-11291	Soil	B426 26-28'

2. Particle Size Analysis { ASTM D 422 }

Sieve Size	Results {% Passing by Wt.}	Specs.
100 mm	4"	100
75 mm	3"	100
63 mm	2-1/2"	100
50 mm	2"	100
37.5 mm	1-1/2"	100
25.0 mm	1"	100
19.0 mm	3/4"	100
12.5 mm	1/2"	100
9.5 mm	3/8"	100
4.75 mm	#4	100
2.00 mm	#10	100
850 µm	#20	100
425 µm	#40	100
180 µm	#80	99
150 µm	#100	99
75 µm	#200	99.2

HYDROMETER ANALYSIS

0.0307 mm	49
0.0199 mm	40
0.0122 mm	26
0.0090 mm	15
0.0065 mm	8
0.0033 mm	6
0.0014 mm	0

4. No specifications were provided.



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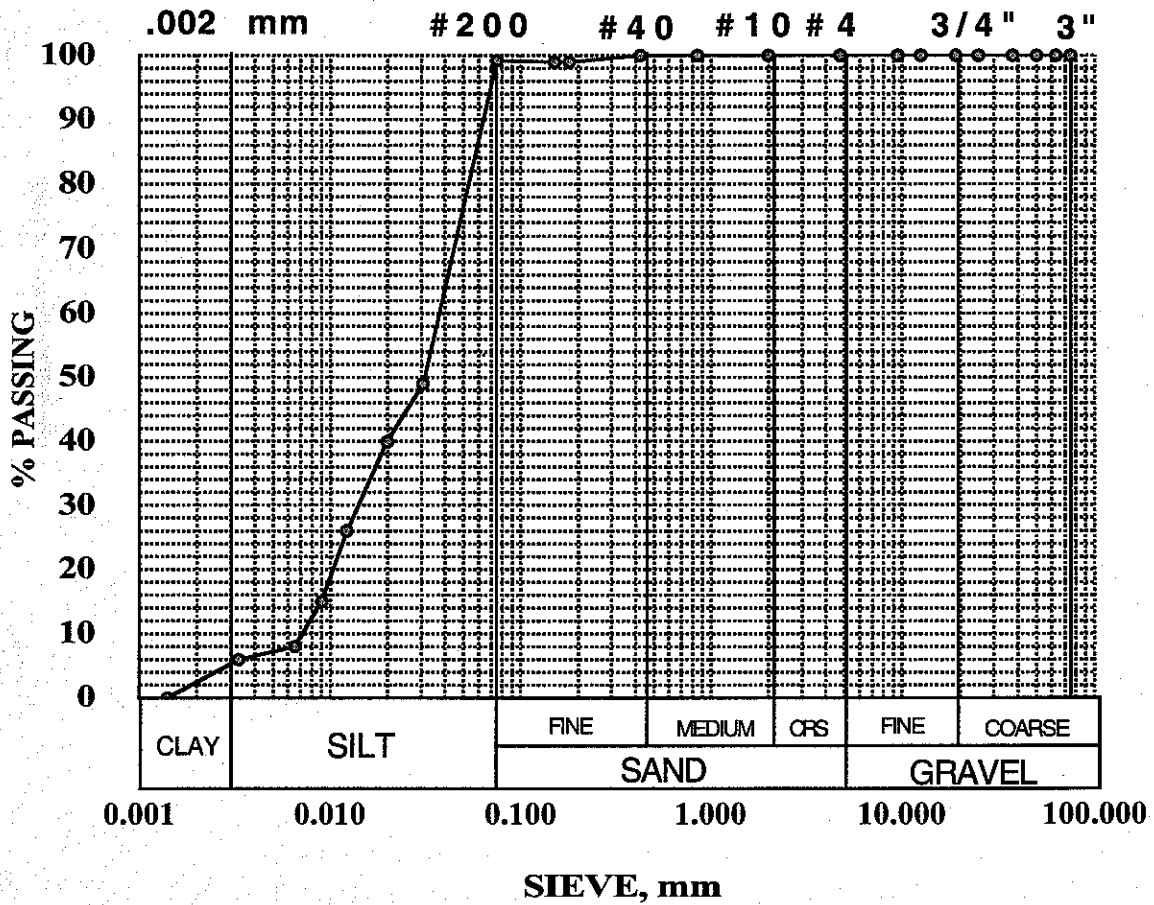
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 Briggs # 22405
 Tested: 7-8-04

1.	<u>Sample No.</u>	<u>Description</u>	<u>Source</u>
	M-11292	Soil	B416 35-37'

2. Particle Size Analysis { ASTM D 422 }

<u>Sieve Size</u>	<u>Results</u> {% Passing by Wt.}	<u>Specs.</u>
100 mm	4"	100
75 mm	3"	100
63 mm	2-1/2"	100
50 mm	2"	100
37.5 mm	1-1/2"	100
25.0 mm	1"	100
19.0 mm	3/4"	100
12.5 mm	1/2"	100
9.5 mm	3/8"	100
4.75 mm	#4	100
2.00 mm	#10	100
850 µm	#20	100
425 µm	#40	100
180 µm	#80	100
150 µm	#100	100
75 µm	#200	99.5

HYDROMETER ANALYSIS

0.0307 mm	50
0.0194 mm	47
0.0116 mm	38
0.0085 mm	29
0.0062 mm	23
0.0032 mm	11
0.0013 mm	9

4. No specifications were provided.

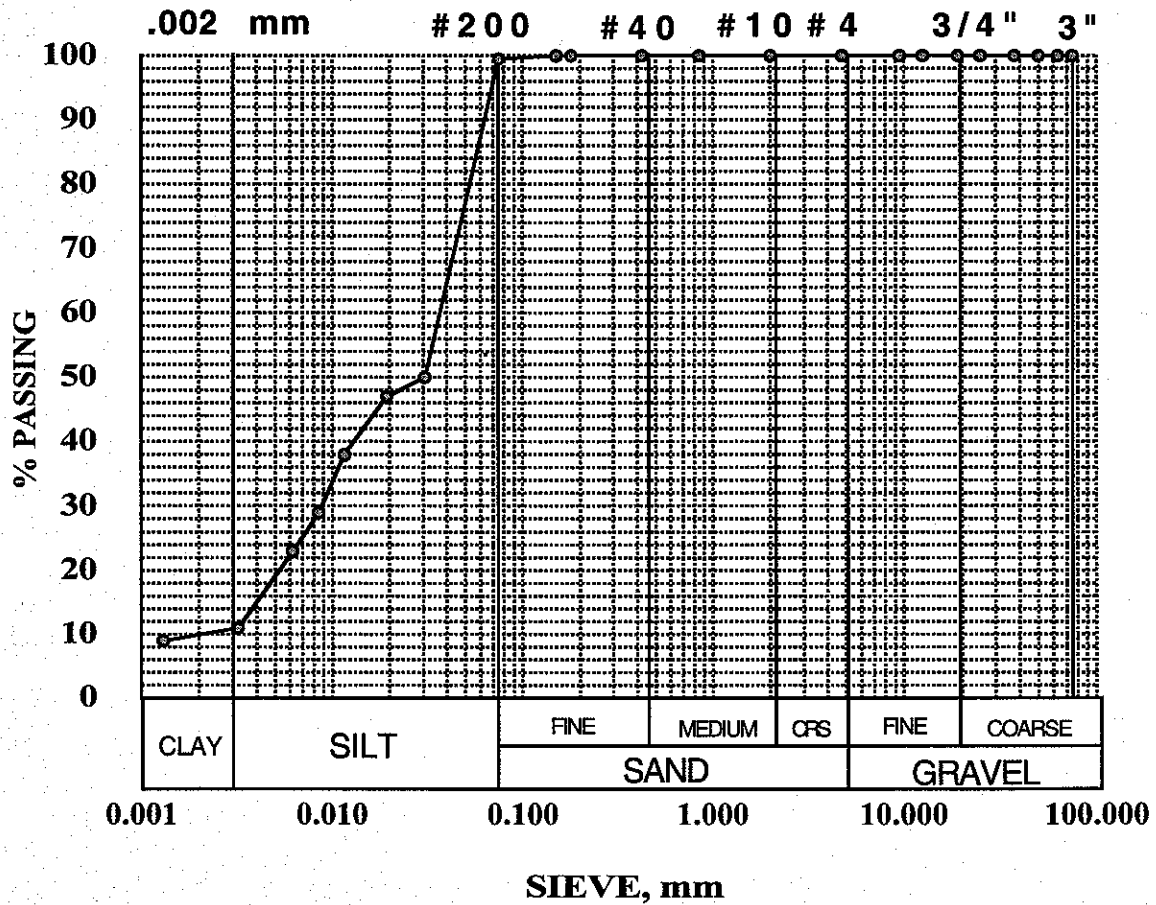


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 Briggs # 22405
 Tested: 7-8-04

1.	<u>Sample No.</u>	<u>Description</u>	<u>Source</u>
	M-11293	Soil	B416 45-47'

2. Particle Size Analysis { ASTM D 422 }

<u>Sieve Size</u>	<u>Results</u> {% Passing by Wt.}	<u>Specs.</u>
100 mm	4"	100
75 mm	3"	100
63 mm	2-1/2"	100
50 mm	2"	100
37.5 mm	1-1/2"	100
25.0 mm	1"	100
19.0 mm	3/4"	100
12.5 mm	1/2"	100
9.5 mm	3/8"	100
4.75 mm	#4	100
2.00 mm	#10	100
850 µm	#20	99
425 µm	#40	99
180 µm	#80	99
150 µm	#100	99
75 µm	#200	98.5

HYDROMETER ANALYSIS

0.0307 mm	83
0.0194 mm	78
0.0112 mm	69
0.0079 mm	57
0.0056 mm	46
0.0030 mm	31
0.0013 mm	15

4. No specifications were provided.

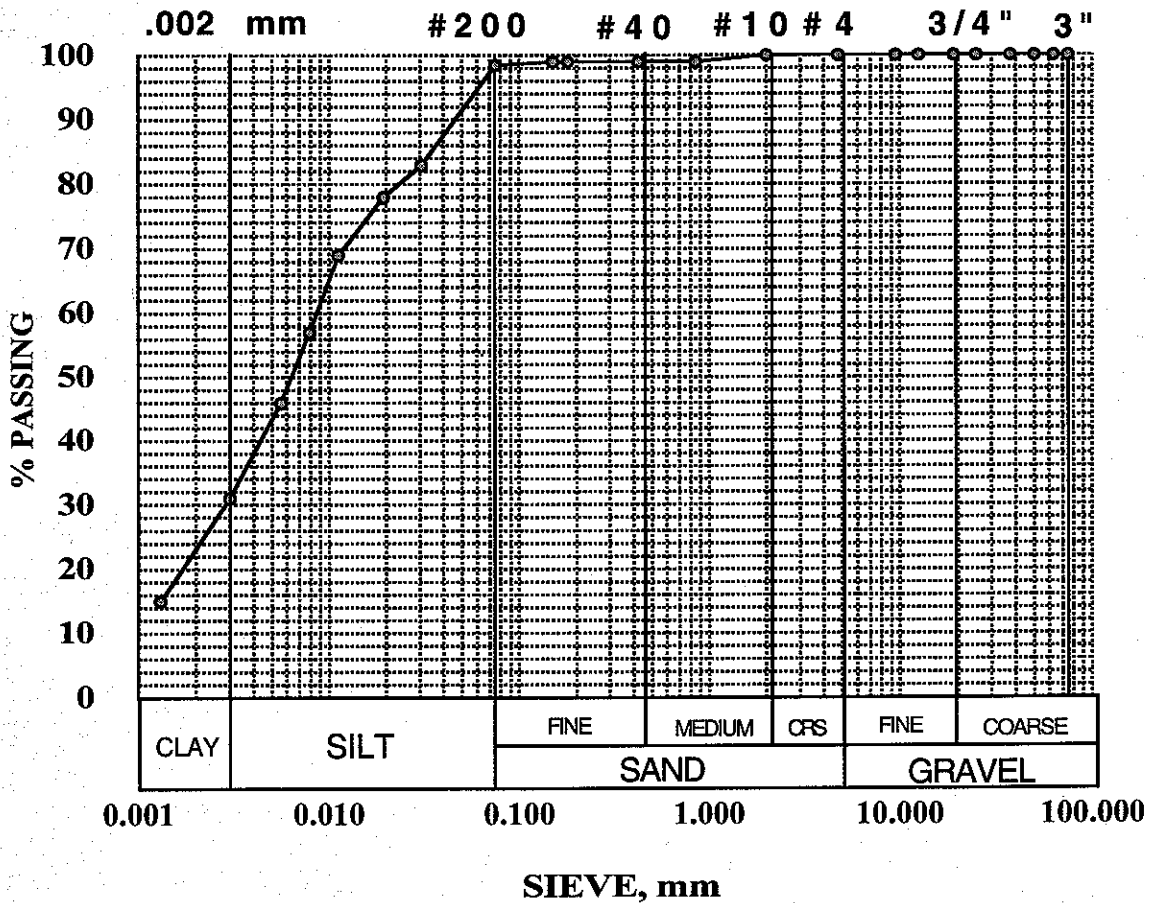


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Sample no.	M-11293	Date: 7/8/04

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ERM/Raytheon, Wayland
 Briggs # 22405
 Tested: 7-7-04

1. Sample No.	Description	Source
M-11294	Soil	B416 60-62'

2. Particle Size Analysis { ASTM D 422 }

Sieve Size	Results {% Passing by Wt.}	Specs.
100 mm	4"	100
75 mm	3"	100
63 mm	2-1/2"	100
50 mm	2"	100
37.5 mm	1-1/2"	100
25.0 mm	1"	100
19.0 mm	3/4"	100
12.5 mm	1/2"	100
9.5 mm	3/8"	100
4.75 mm	#4	100
2.00 mm	#10	99
850 µm	#20	98
425 µm	#40	98
180 µm	#80	97
150 µm	#100	96
75 µm	#200	82.0

HYDROMETER ANALYSIS

0.0315 mm	40
0.0211 mm	26
0.0126 mm	17
0.0092 mm	11
0.0065 mm	9
0.0033 mm	6
0.0014 mm	3

4. No specifications were provided.

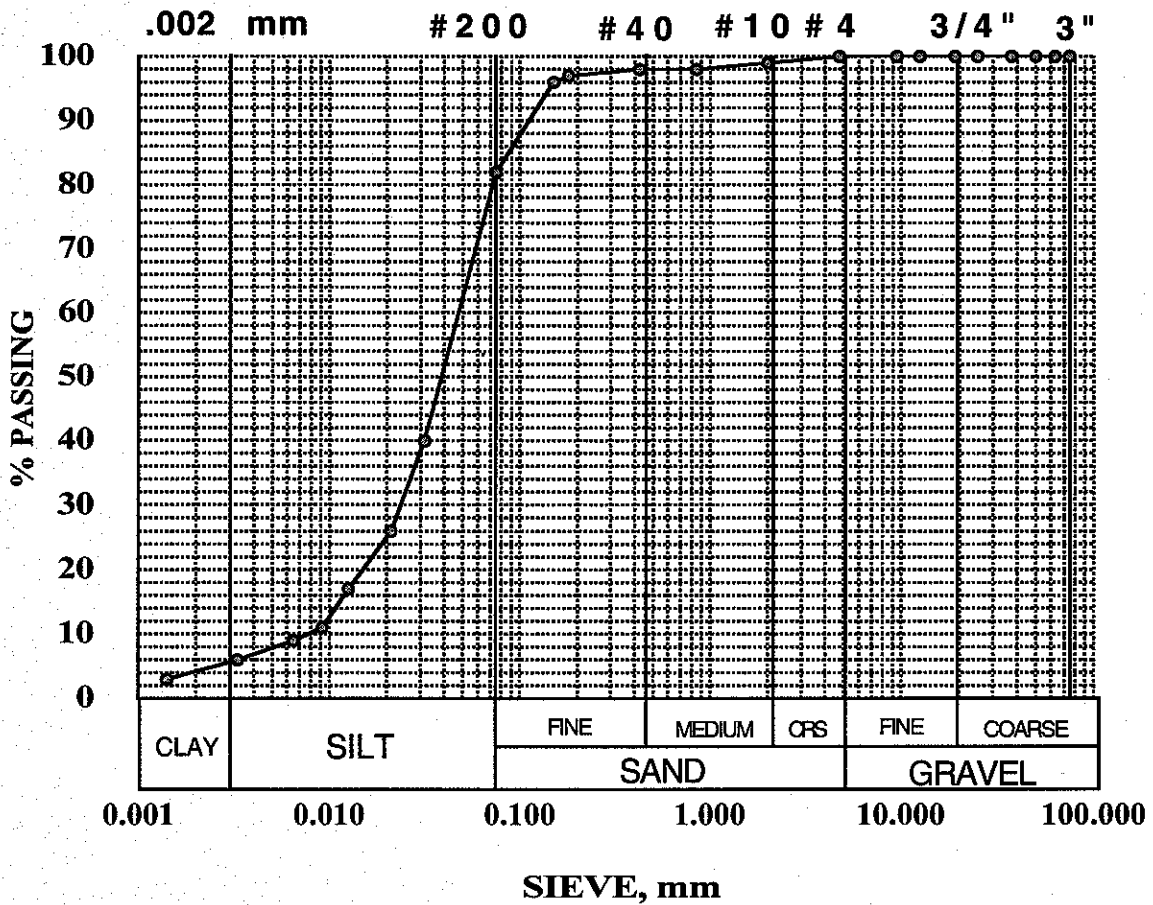


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ERM/Raytheon, Wayland
 Briggs # 22405
 Tested: 7-7-04

1. Sample No.	Description	Source
M-11295	Soil	B416 77-79'

2. Particle Size Analysis { ASTM D 422 }

Sieve Size	Results {% Passing by Wt.}	Specs.
100 mm	4"	100
75 mm	3"	100
63 mm	2-1/2"	100
50 mm	2"	100
37.5 mm	1-1/2"	100
25.0 mm	1"	100
19.0 mm	3/4"	100
12.5 mm	1/2"	100
9.5 mm	3/8"	100
4.75 mm	#4	100
2.00 mm	#10	100
850 µm	#20	99
425 µm	#40	99
180 µm	#80	99
150 µm	#100	99
75 µm	#200	92.5

HYDROMETER ANALYSIS

0.0307 mm	47
0.0209 mm	29
0.0127 mm	15
0.0092 mm	9
0.0066 mm	6
0.0033 mm	6
0.0014 mm	3

4. No specifications were provided.

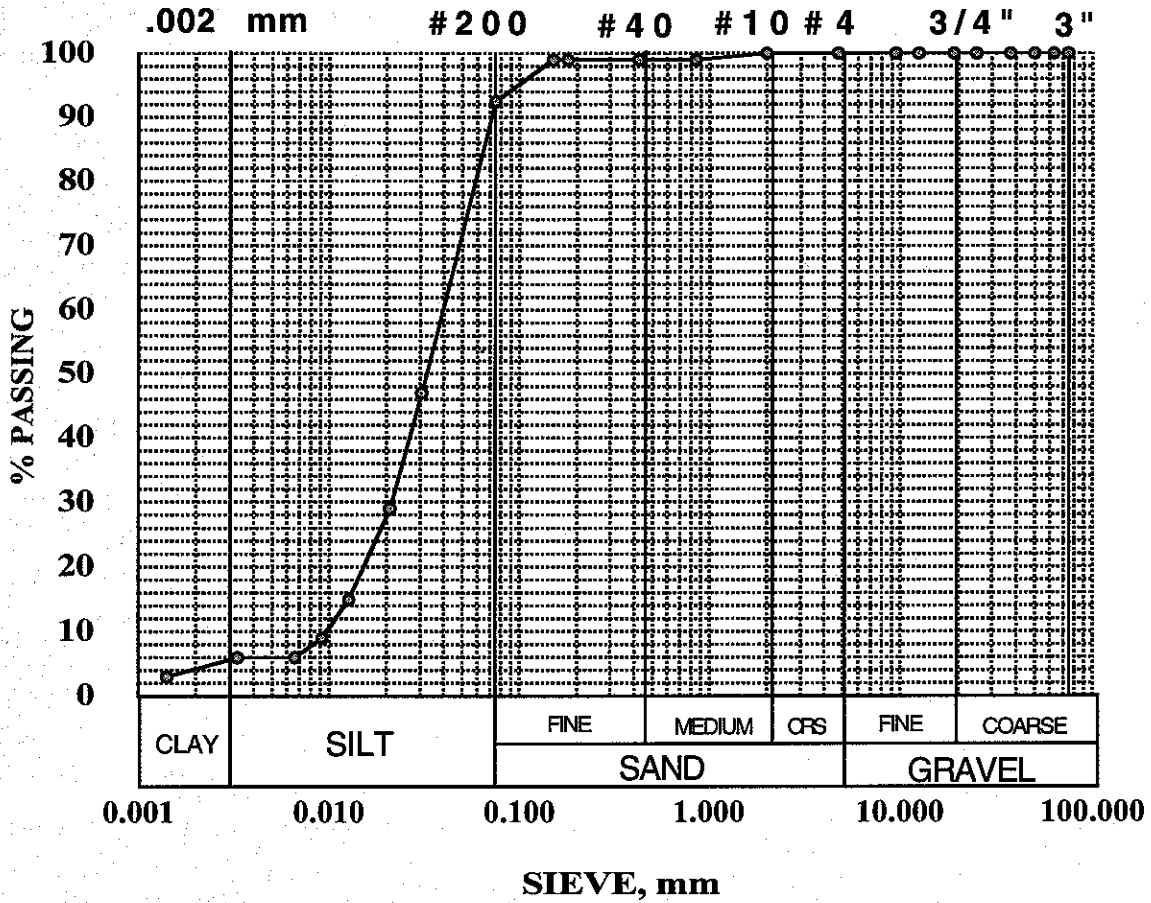


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Project: ERM/Raytheon, Wayland
Sample no. M-11295 **Date:** 7/7/04

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ERM/Raytheon, Wayland
Briggs # 22405
Tested: 7-8-04

1.	<u>Sample No.</u> M-11296A	<u>Description</u> Soil	<u>Source</u> B416 98-99'
----	-------------------------------	----------------------------	---------------------------------

2. Particle Size Analysis { ASTM D 422 }

<u>Sieve Size</u>		<u>Results</u> {% Passing by Wt.}	<u>Specs.</u>
100 mm	4"	100	
75 mm	3"	100	
63 mm	2-1/2"	100	
50 mm	2"	100	
37.5 mm	1-1/2"	100	
25.0 mm	1"	100	
19.0 mm	3/4"	100	
12.5 mm	1/2"	100	
9.5 mm	3/8"	100	
4.75 mm	#4	100	
2.00 mm	#10	99	
850 µm	#20	99	
425 µm	#40	98	
180 µm	#80	98	
150 µm	#100	96	
75 µm	#200	72.0	

HYDROMETER ANALYSIS

0.0342 mm	26
0.0226 mm	15
0.0134 mm	8
0.0096 mm	3
0.0068 mm	2
0.0034 mm	0

4. No specifications were provided.

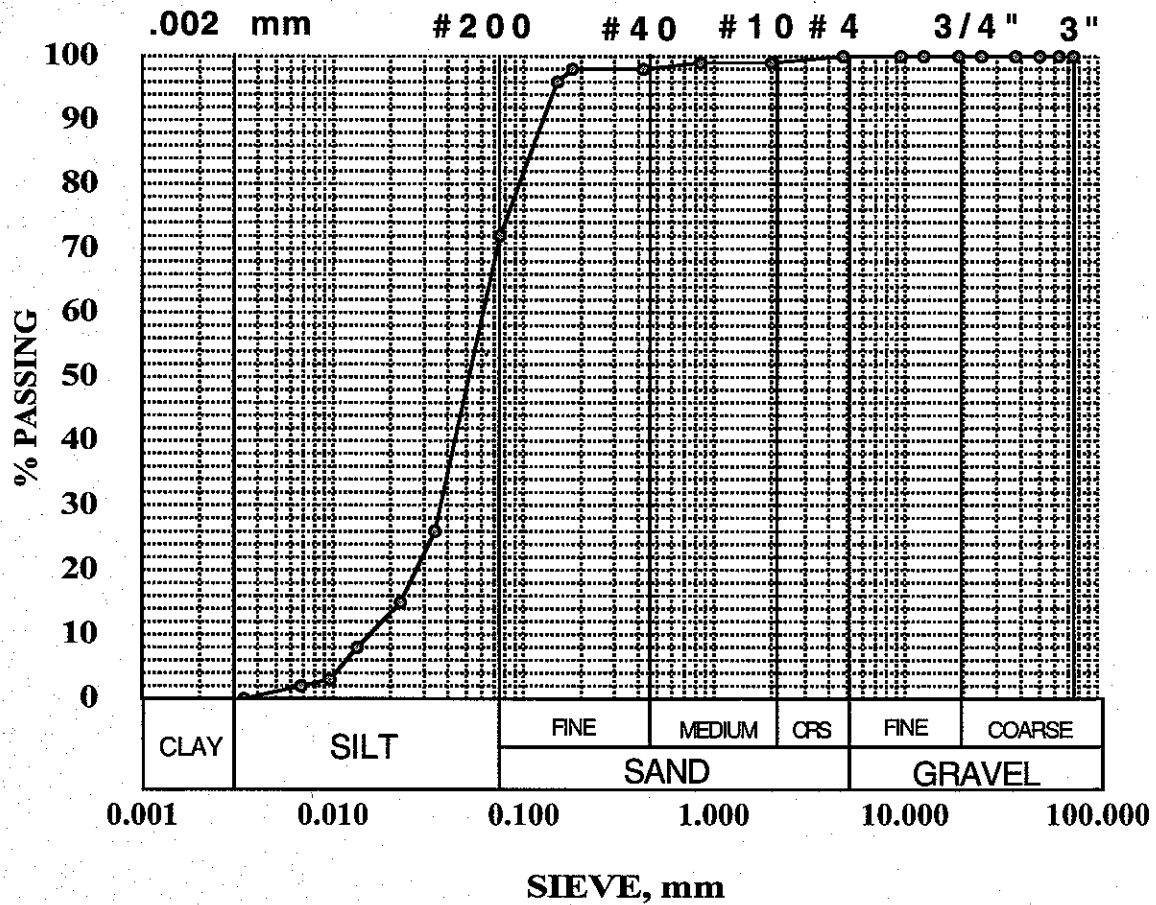


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Sample no. M-11296A **Date:** 7/8/04

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ERM/Raytheon, Wayland

Briggs # 22405

Tested: 7-8-04

1.	<u>Sample No.</u> M-11296B	<u>Description</u> Soil	<u>Source</u> B416 99-100'
----	-------------------------------	----------------------------	----------------------------------

2. Particle Size Analysis { ASTM D 422 }

<u>Sieve Size</u>	<u>Results</u> {% Passing by Wt.}	<u>Specs.</u>
100 mm 4"	100	
75 mm 3"	100	
63 mm 2-1/2"	100	
50 mm 2"	100	
37.5 mm 1-1/2"	100	
25.0 mm 1	83	
19.0 mm 3/4"	76	
12.5 mm 1/2"	62	
9.5 mm 3/8"	57	
4.75 mm #4	48	
2.00 mm #10	39	
850 µm #20	34	
425 µm #40	31	
180 µm #80	28	
150 µm #100	27	
75 µm #200	20.5	

HYDROMETER ANALYSIS

0.0352 mm	9
0.0230 mm	5
0.0135 mm	2
0.0096 mm	1
0.0068 mm	1
0.0034 mm	0

4. No specifications were provided.

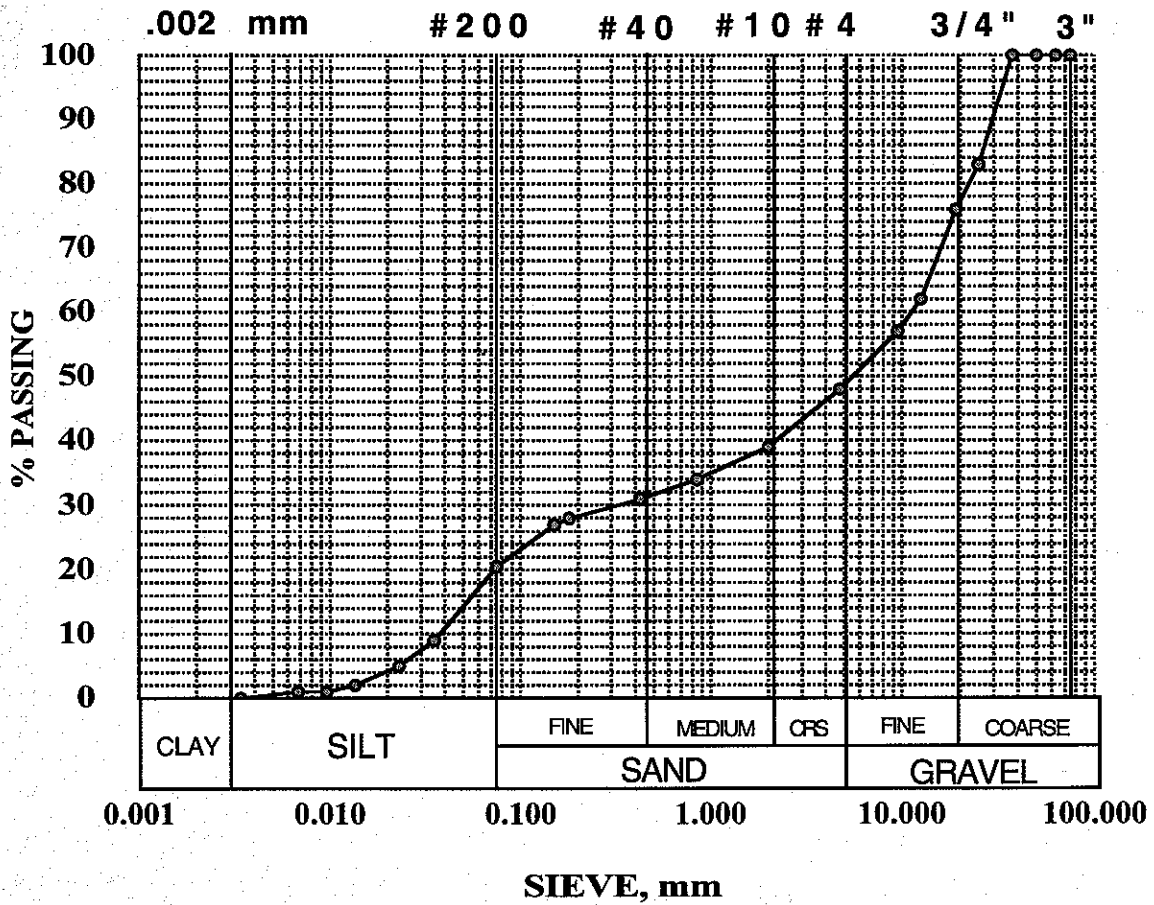


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Project:	ERM/Raytheon, Wayland	
Sample no.	M-11296B	Date: 7/8/04

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ERM/Raytheon, Wayland
 Briggs # 22405
 Tested: 7-7-04

1.	<u>Sample No.</u>	<u>Description</u>	<u>Source</u>
	M-11317	Soil	B426 15-17'

2. Particle Size Analysis { ASTM D 422 }

<u>Sieve Size</u>		<u>Results</u>	<u>Specs.</u>
		{% Passing by Wt.}	
100 mm	4"	100	
75 mm	3"	100	
63 mm	2-1/2"	100	
50 mm	2"	100	
37.5 mm	1-1/2"	100	
25.0 mm	1"	100	
19.0 mm	3/4"	100	
12.5 mm	1/2"	100	
9.5 mm	3/8"	100	
4.75 mm	#4	98	
2.00 mm	#10	98	
850 µm	#20	97	
425 µm	#40	97	
180 µm	#80	97	
150 µm	#100	97	
75 µm	#200	96.8	

HYDROMETER ANALYSIS

0.0314 mm	63
0.0199 mm	55
0.0119 mm	38
0.0088 mm	26
0.0064 mm	18
0.0033 mm	8
0.0014 mm	6

4. No specifications were provided.

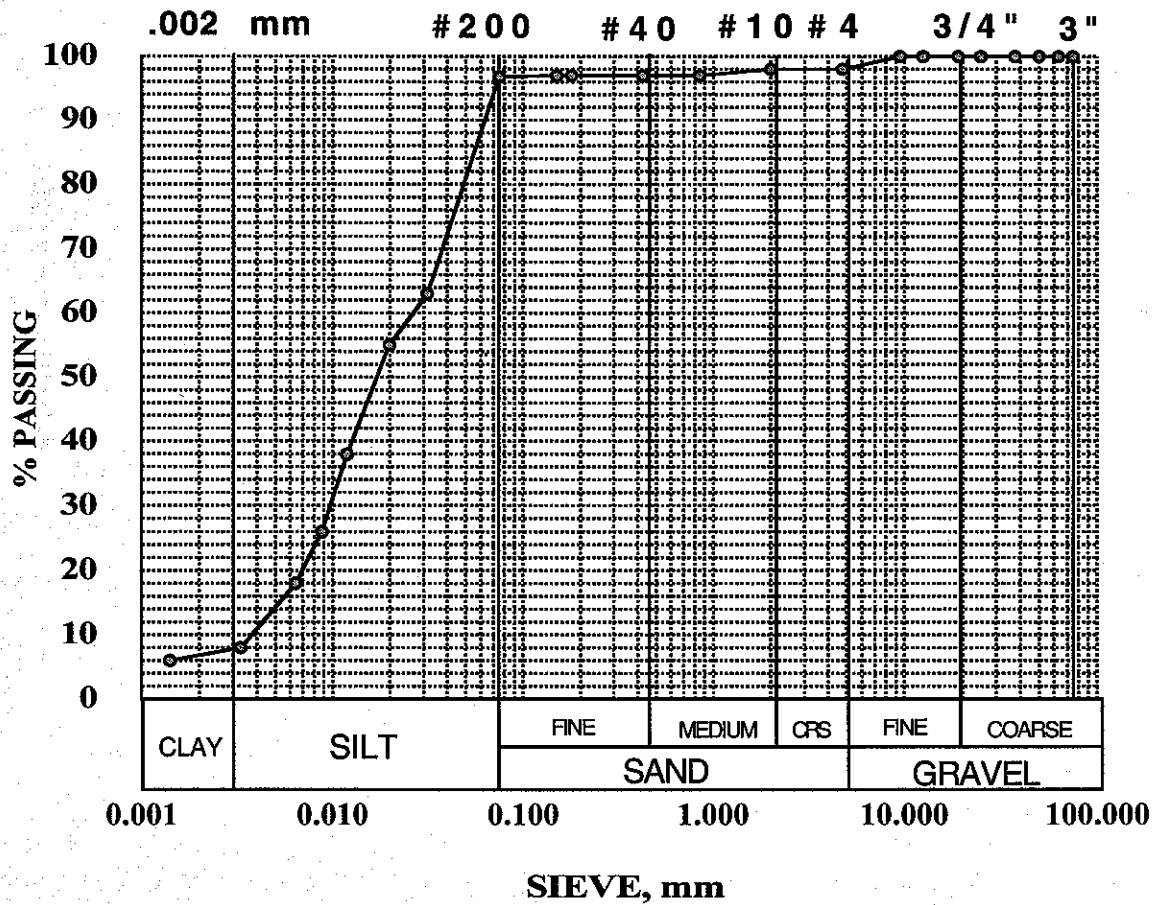


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Project:	ERM/Raytheon, Wayland	
Sample no.	M-11317	Date: 7/7/04

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ERM/Raytheon, Wayland
 Briggs # 22405
 Tested: 7-6-04

1.	<u>Sample No.</u>	<u>Description</u>	<u>Source</u>
	M-11318	Soil	B426 32-34'

2. Particle Size Analysis { ASTM D 422 }

<u>Sieve Size</u>	<u>Results</u> {% Passing by Wt.}	<u>Specs.</u>
100 mm	4"	100
75 mm	3"	100
63 mm	2-1/2"	100
50 mm	2"	100
37.5 mm	1-1/2"	100
25.0 mm	1"	100
19.0 mm	3/4"	100
12.5 mm	1/2"	100
9.5 mm	3/8"	100
4.75 mm	#4	100
2.00 mm	#10	100
850 µm	#20	100
425 µm	#40	100
180 µm	#80	99
150 µm	#100	99
75 µm	#200	98.2

HYDROMETER ANALYSIS

0.0304 mm	62
0.0192 mm	55
0.0115 mm	38
0.0085 mm	26
0.0062 mm	18
0.0032 mm	8
0.0013 mm	6

4. No specifications were provided.

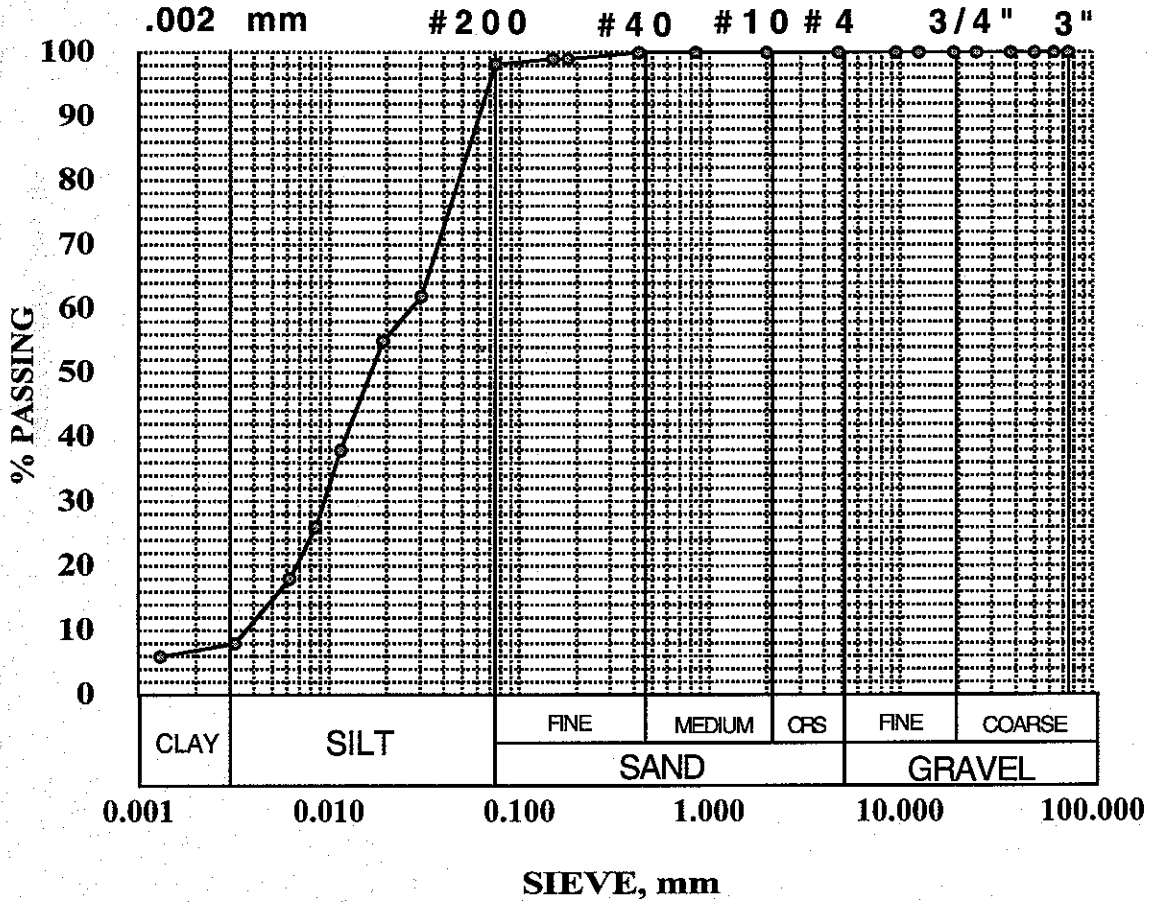


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Project: ERM/Raytheon, Wayland
Sample no. M-11318 **Date:** 7/6/04

PARTICLE SIZE DISTRIBUTION





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A DIVISION OF PK ASSOCIATES, INC.

ERM/Raytheon, Wayland
 Briggs # 22405
 Tested: 7-6-04

1. <u>Sample No.</u>	<u>Description</u>	<u>Source</u>
M-11319	Soil	B426 45-47'

2. Particle Size Analysis { ASTM D 422 }

<u>Sieve Size</u>	<u>Results</u> {% Passing by Wt.}	<u>Specs.</u>
100 mm	4"	100
75 mm	3"	100
63 mm	2-1/2"	100
50 mm	2"	100
37.5 mm	1-1/2"	100
25.0 mm	1"	100
19.0 mm	3/4"	100
12.5 mm	1/2"	100
9.5 mm	3/8"	100
4.75 mm	#4	100
2.00 mm	#10	100
850 µm	#20	100
425 µm	#40	100
180 µm	#80	99
150 µm	#100	99
75 µm	#200	98.6
HYDROMETER ANALYSIS		
0.0304 mm		56
0.0200 mm		37
0.0124 mm		20
0.0090 mm		12
0.0065 mm		6
0.0033 mm		0

4. No specifications were provided.

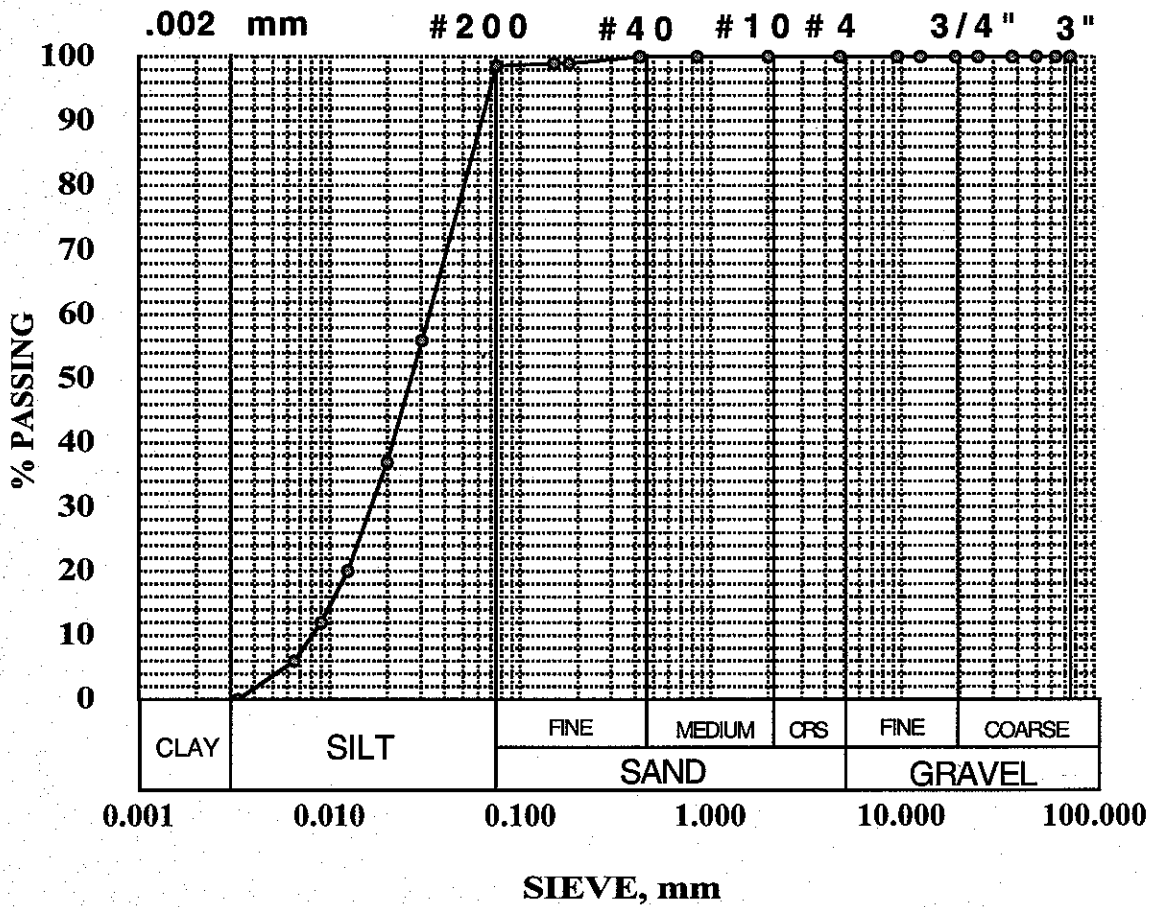


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Project: ERM/Raytheon, Wayland
Sample no. M-11319 **Date:** 7/6/04

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ERM/Raytheon, Wayland
 Briggs # 22405
 Tested: 7-7-04

1. Sample No.	Description	Source
M-11320	Soil	B426 55-57'

2. Particle Size Analysis { ASTM D 422 }

Sieve Size	Results {% Passing by Wt.}	Specs.
100 mm	4"	100
75 mm	3"	100
63 mm	2-1/2"	100
50 mm	2"	100
37.5 mm	1-1/2"	100
25.0 mm	1"	100
19.0 mm	3/4"	100
12.5 mm	1/2"	100
9.5 mm	3/8"	100
4.75 mm	#4	100
2.00 mm	#10	100
850 µm	#20	100
425 µm	#40	100
180 µm	#80	100
150 µm	#100	100
75 µm	#200	95.0

HYDROMETER ANALYSIS

0.0323 mm	40
0.0219 mm	23
0.0133 mm	11
0.0095 mm	8
0.0068 mm	3
0.0034 mm	3
0.0014 mm	3

4. No specifications were provided.

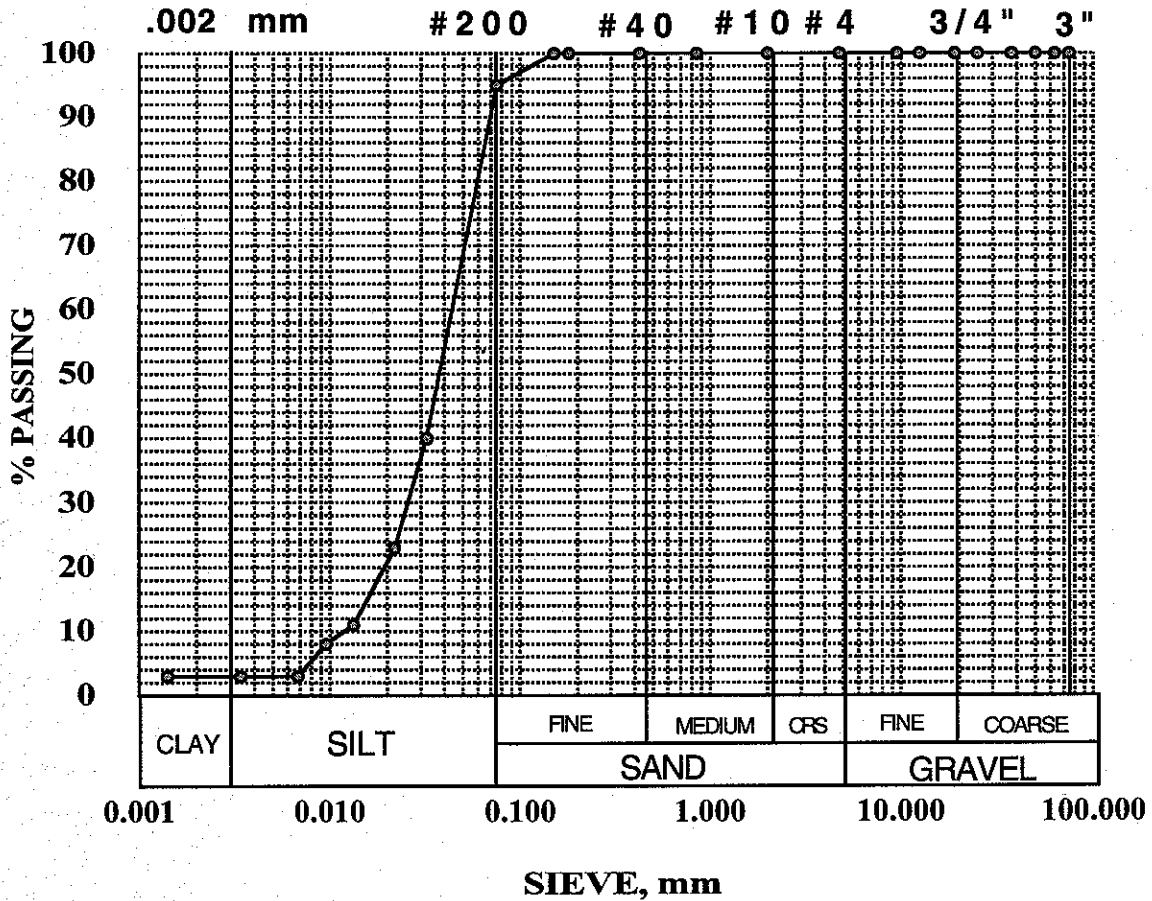


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A Division of PK Associates, Inc.

Project: ERM/Raytheon, Wayland
Sample no. M-11320 **Date:** 7/7/04

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ERM/Raytheon, Wayland
 Briggs # 22405
 Tested: 7-6-04

1.	<u>Sample No.</u>	<u>Description</u>	<u>Source</u>
	M-11321	Soil	B426 70-72'

2. Particle Size Analysis { ASTM D 422 }

<u>Sieve Size</u>	<u>Results</u> {% Passing by Wt.}	<u>Specs.</u>
100 mm	4"	100
75 mm	3"	100
63 mm	2-1/2"	100
50 mm	2"	100
37.5 mm	1-1/2"	100
25.0 mm	1"	100
19.0 mm	3/4"	100
12.5 mm	1/2"	100
9.5 mm	3/8"	100
4.75 mm	#4	100
2.00 mm	#10	100
850 µm	#20	100
425 µm	#40	100
180 µm	#80	100
150 µm	#100	100
75 µm	#200	99.5

HYDROMETER ANALYSIS

0.0304 mm	80
0.0192 mm	72
0.0111 mm	60
0.0078 mm	48
0.0058 mm	37
0.0031 mm	22
0.0013 mm	14

4. No specifications were provided.

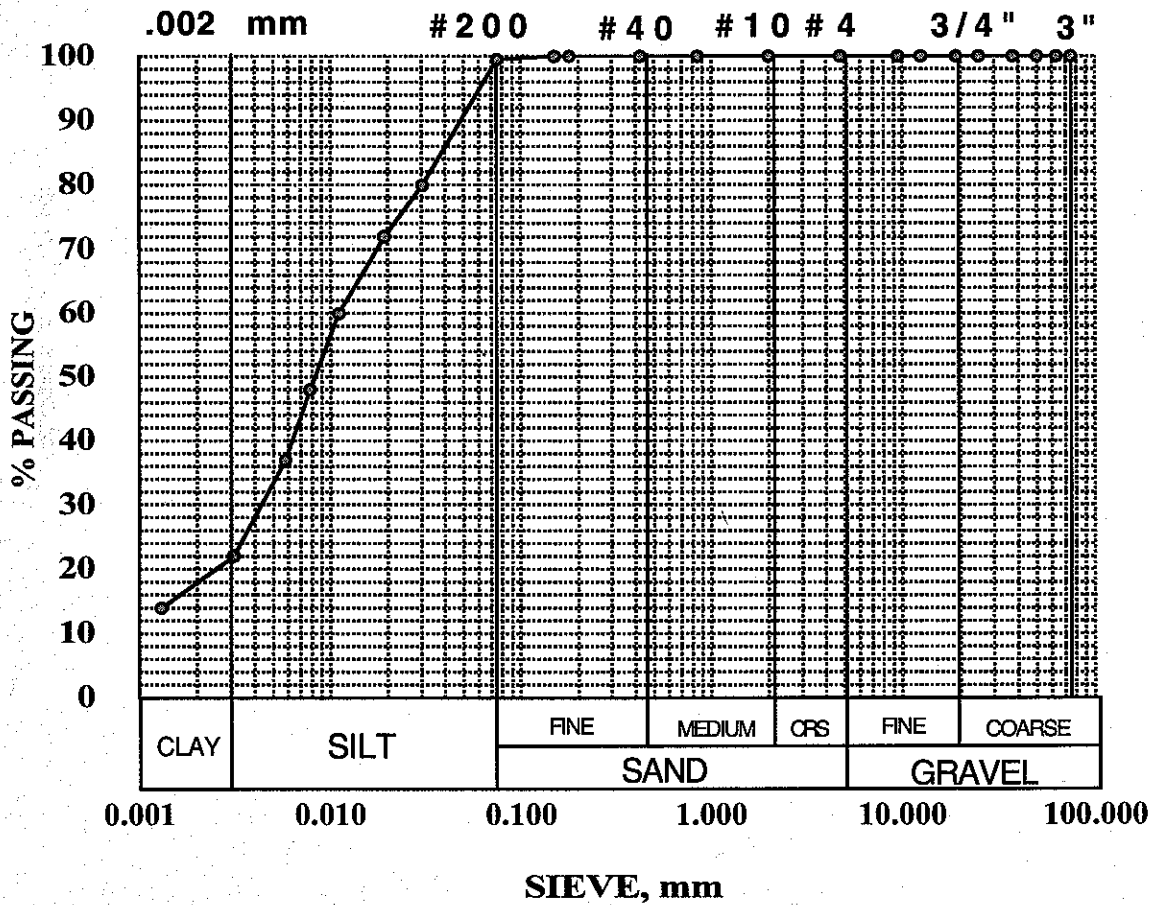


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Project: ERM/Raytheon, Wayland
Sample no. M-11321 **Date:** 7/6/04

PARTICLE SIZE DISTRIBUTION





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ERM/Raytheon, Wayland
 Briggs # 22405
 Tested: 7-6-04

1. <u>Sample No.</u>	<u>Description</u>	<u>Source</u>
M-11322	Soil	B426 85-87'

2. Particle Size Analysis { ASTM D 422 }

<u>Sieve Size</u>	<u>Results</u> {% Passing by Wt.}	<u>Specs.</u>
100 mm	4"	100
75 mm	3"	100
63 mm	2-1/2"	100
50 mm	2"	100
37.5 mm	1-1/2"	100
25.0 mm	1"	100
19.0 mm	3/4"	100
12.5 mm	1/2"	100
9.5 mm	3/8"	100
4.75 mm	#4	100
2.00 mm	#10	100
850 µm	#20	100
425 µm	#40	100
180 µm	#80	100
150 µm	#100	100
75 µm	#200	99.7

HYDROMETER ANALYSIS

0.0304 mm	78
0.0192 mm	66
0.0111 mm	46
0.0082 mm	35
0.0060 mm	26
0.0032 mm	14
0.0013 mm	8

4. No specifications were provided.

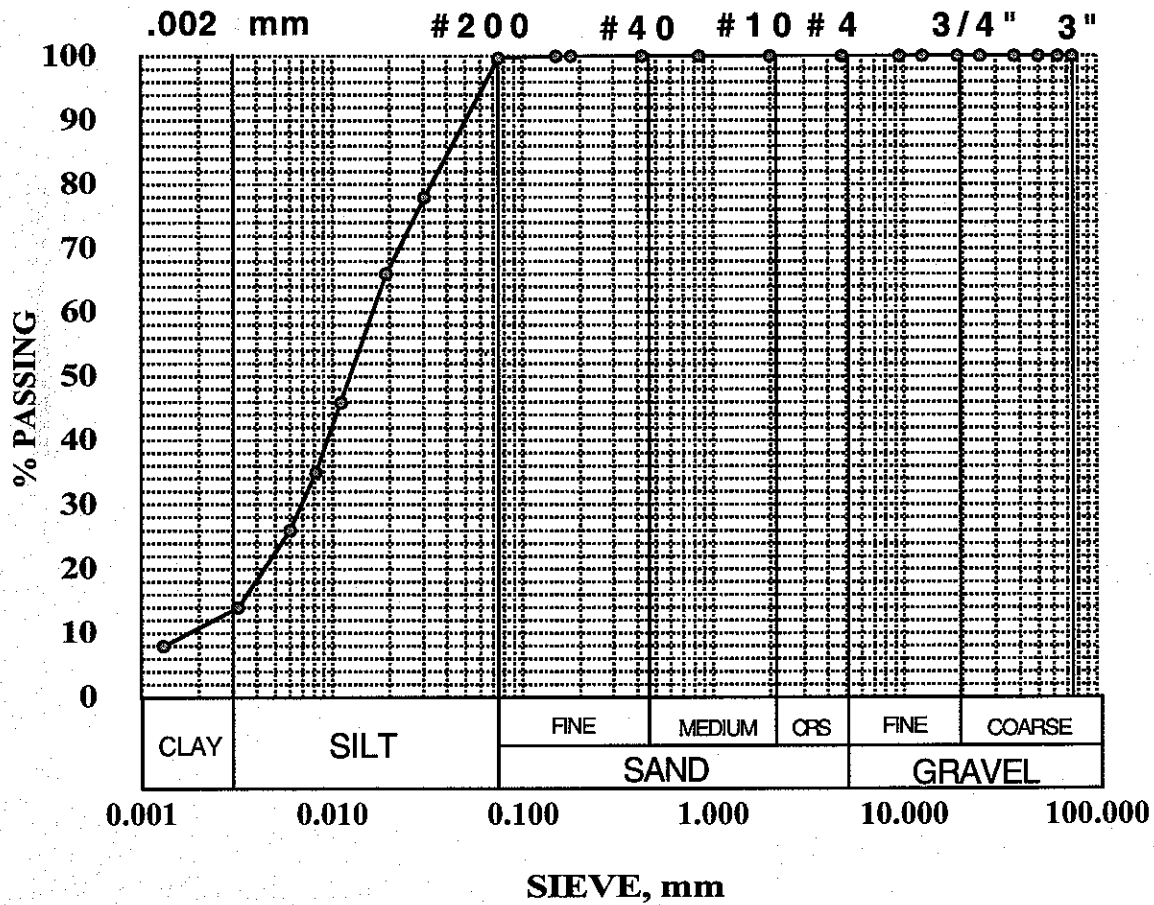


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Project: ERM/Raytheon, Wayland
Sample no. M-11322 **Date:** 7/6/04

PARTICLE SIZE DISTRIBUTION





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ERM/Raytheon, Wayland
 Briggs # 22405
 Tested: 6-29-04

1. Sample No.	Description	Source
M-11323	Soil	B426 90-92'

2. Particle Size Analysis { ASTM D 422 }

Sieve Size		Results	Specs.
		{% Passing by Wt.}	
100 mm	4"	100	
75 mm	3"	100	
63 mm	2-1/2"	100	
50 mm	2"	100	
37.5 mm	1-1/2"	100	
25.0 mm	1"	100	
19.0 mm	3/4"	100	
12.5 mm	1/2"	100	
9.5 mm	3/8"	100	
4.75 mm	#4	100	
2.00 mm	#10	100	
850 µm	#20	100	
425 µm	#40	100	
180 µm	#80	99	
150 µm	#100	98	
75 µm	#200	65.8	

HYDROMETER ANALYSIS

0.0338 mm	23
0.0221 mm	14
0.0130 mm	9
0.0094 mm	3
0.0066 mm	3
0.0034 mm	0

4. No specifications were provided.

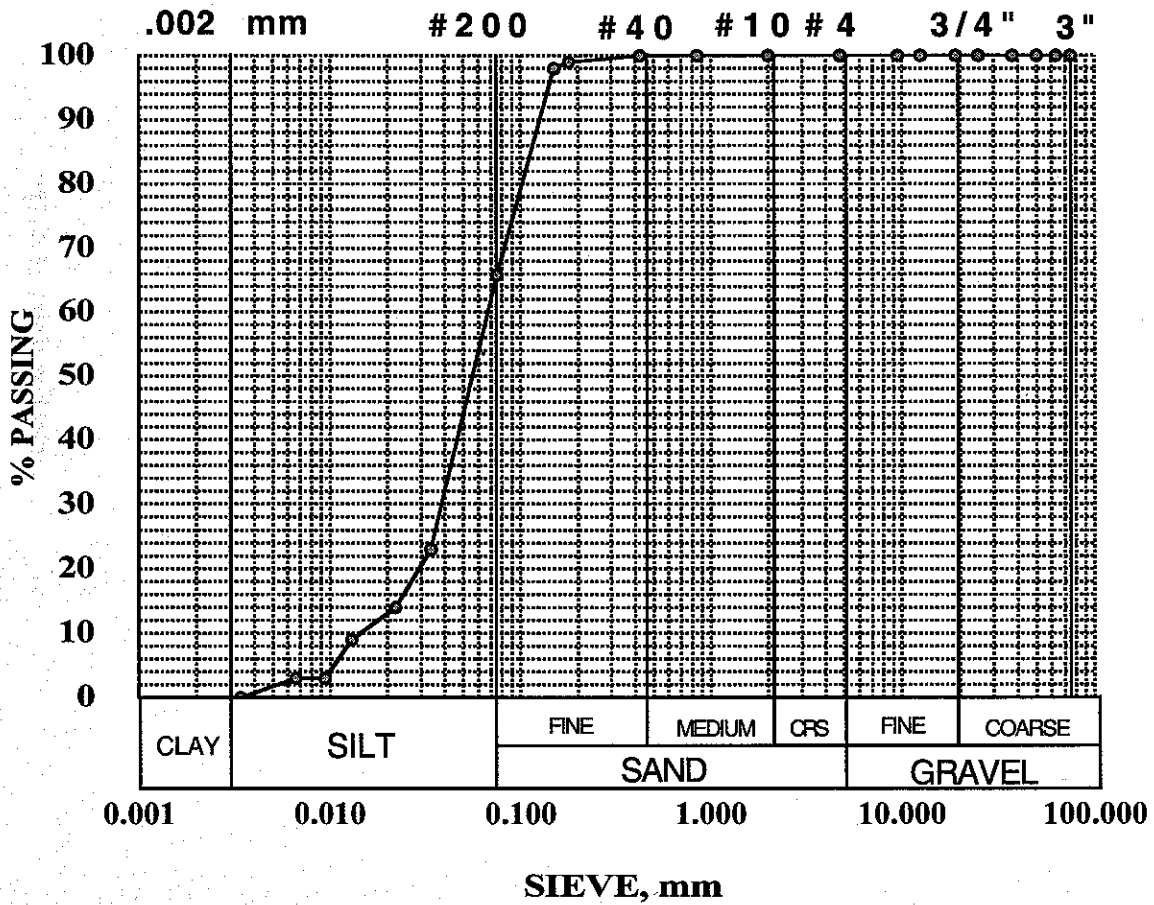


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Project: ERM/Raytheon, Wayland
Sample no. M-11323 **Date:** 6/29/04

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ERM/Raytheon, Wayland
 Briggs # 22405
 Tested: 6-28-04

1.	Sample No.	Description	Source
	M-I1326B	Soil	B419 10-12'

2. Particle Size Analysis { ASTM D 422 }

Sieve Size	Results {% Passing by Wt.}	Specs.
100 mm	4"	100
75 mm	3"	100
63 mm	2-1/2"	100
50 mm	2"	100
37.5 mm	1-1/2"	100
25.0 mm	1"	100
19.0 mm	3/4"	100
12.5 mm	1/2"	100
9.5 mm	3/8"	100
4.75 mm	#4	100
2.00 mm	#10	100
850 µm	#20	100
425 µm	#40	99
180 µm	#80	87
150 µm	#100	83
75 µm	#200	59.0

HYDROMETER ANALYSIS

0.0308 mm	25
0.0207 mm	17
0.0125 mm	11
0.0090 mm	9
0.0065 mm	5
0.0033 mm	3
0.0014 mm	1

4. No specifications were provided.



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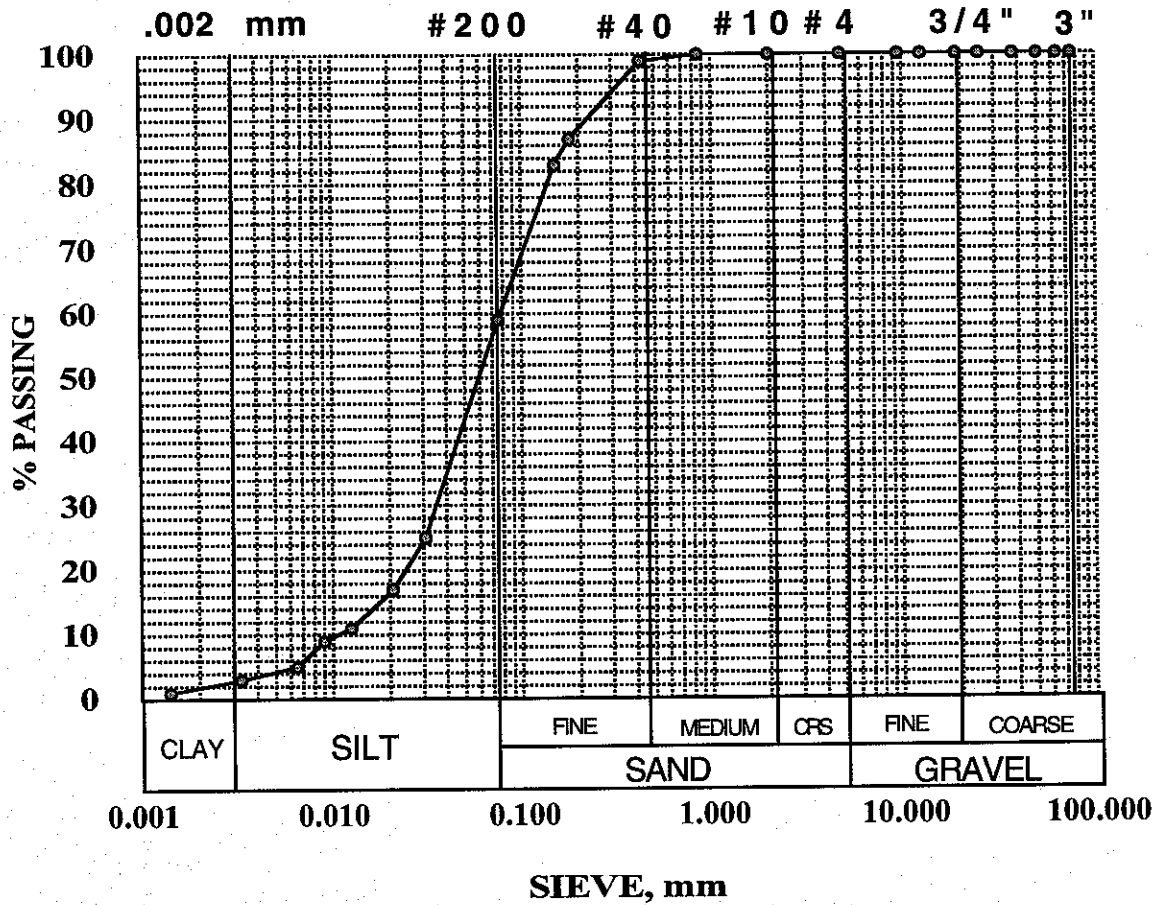
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Project: ERM/Raytheon, Wayland

Sample no. M-11326B

Date: 6/28/04

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ERM/Raytheon, Wayland
 Briggs # 22405
 Tested: 6-28-04

1. Sample No.	Description	Source
M-11328	Soil	B426 115-117'

2. Particle Size Analysis { ASTM D 422 }

Sieve Size		Results {% Passing by Wt.}	Specs.
100 mm	4"	100	
75 mm	3"	100	
63 mm	2-1/2"	100	
50 mm	2"	100	
37.5 mm	1-1/2"	100	
25.0 mm	1"	100	
19.0 mm	3/4"	100	
12.5 mm	1/2"	100	
9.5 mm	3/8"	99	
4.75 mm	#4	96	
2.00 mm	#10	92	
850 µm	#20	88	
425 µm	#40	86	
180 µm	#80	82	
150 µm	#100	80	
75 µm	#200	71.0	

HYDROMETER ANALYSIS

0.0318 mm	37
0.0209 mm	28
0.0126 mm	18
0.0090 mm	15
0.0065 mm	10
0.0033 mm	4
0.0014 mm	1

4. No specifications were provided.

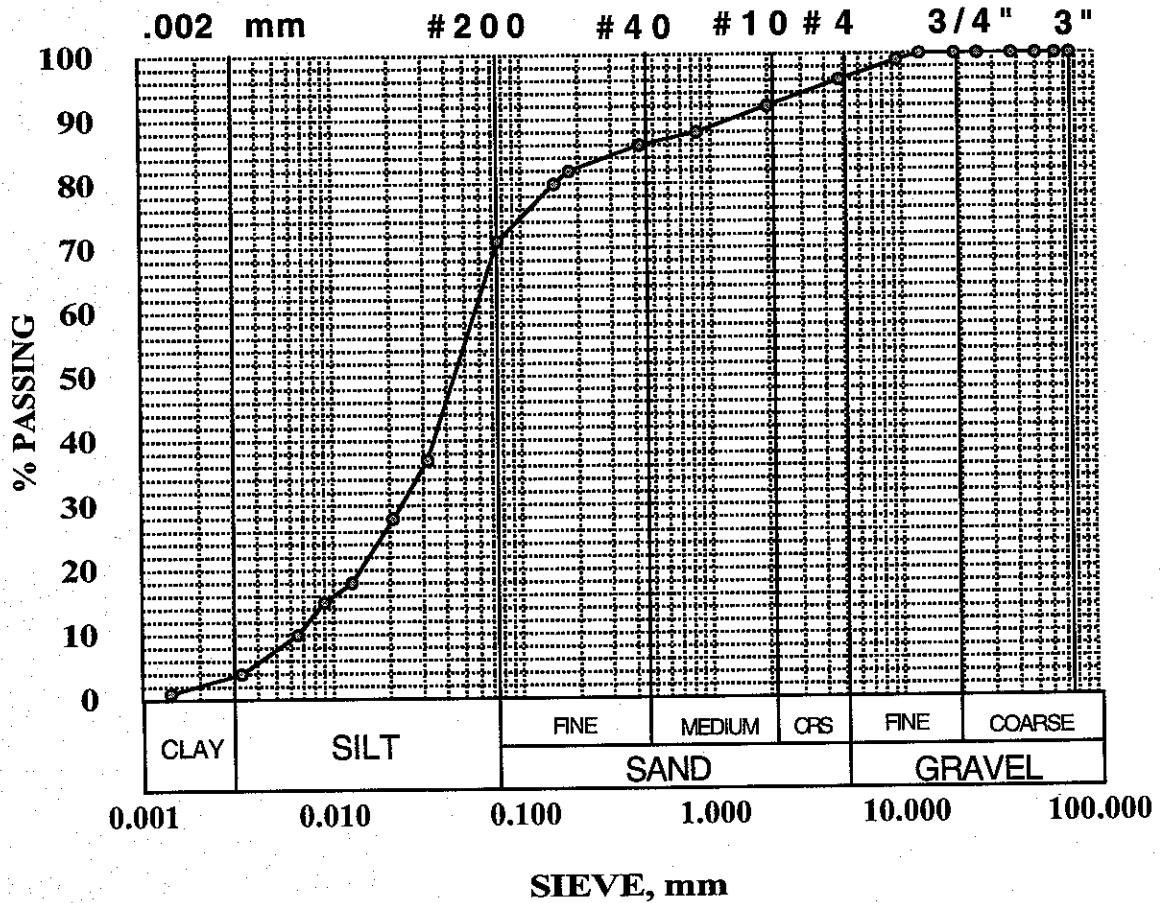


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Project: ERM/Raytheon, Wayland
Sample no. M-11328 **Date:** 6/28/04

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July 9, 2004

Briggs# 22405

Environmental Resources Management
399 Boylston Street, 6th Floor
Boston, MA 02116

Attn.: Ms. Elissa McNamara

**RE: Analysis of Soil Samples obtained from the Raytheon Project in Wayland.
(M-11301, M-11303, M-11325, & M-11327)**

Ms. McNamara:

Laboratory analysis of your samples tested at our Rockland Facility has been conducted, please see the enclosed results.

If you have any questions or if I can be of further service to you, please feel free to contact me at your convenience.

Very truly yours,
BRIGGS ENGINEERING & TESTING
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Mark Liebert
Laboratory Director
Construction Technology Division

Enclosures: Laboratory Results

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ERM/Raytheon, Wayland
 Briggs # 22405
 Tested: 6-28-04

1. Sample No.	Description	Source
M-11301	Soil	B417 70-72'

2. Particle Size Analysis { ASTM D 422 }

Sieve Size	Results {% Passing by Wt.}	Specs.
100 mm	4"	100
75 mm	3"	100
63 mm	2-1/2"	100
50 mm	2"	100
37.5 mm	1-1/2"	100
25.0 mm	1"	100
19.0 mm	3/4"	100
12.5 mm	1/2"	100
9.5 mm	3/8"	100
4.75 mm	#4	100
2.00 mm	#10	100
850 µm	#20	100
425 µm	#40	99
180 µm	#80	99
150 µm	#100	99
75 µm	#200	99.0

HYDROMETER ANALYSIS

0.0314 mm	72
0.0199 mm	63
0.0115 mm	46
0.0085 mm	35
0.0062 mm	26
0.0033 mm	15
0.0014 mm	9

4. No specifications were provided.

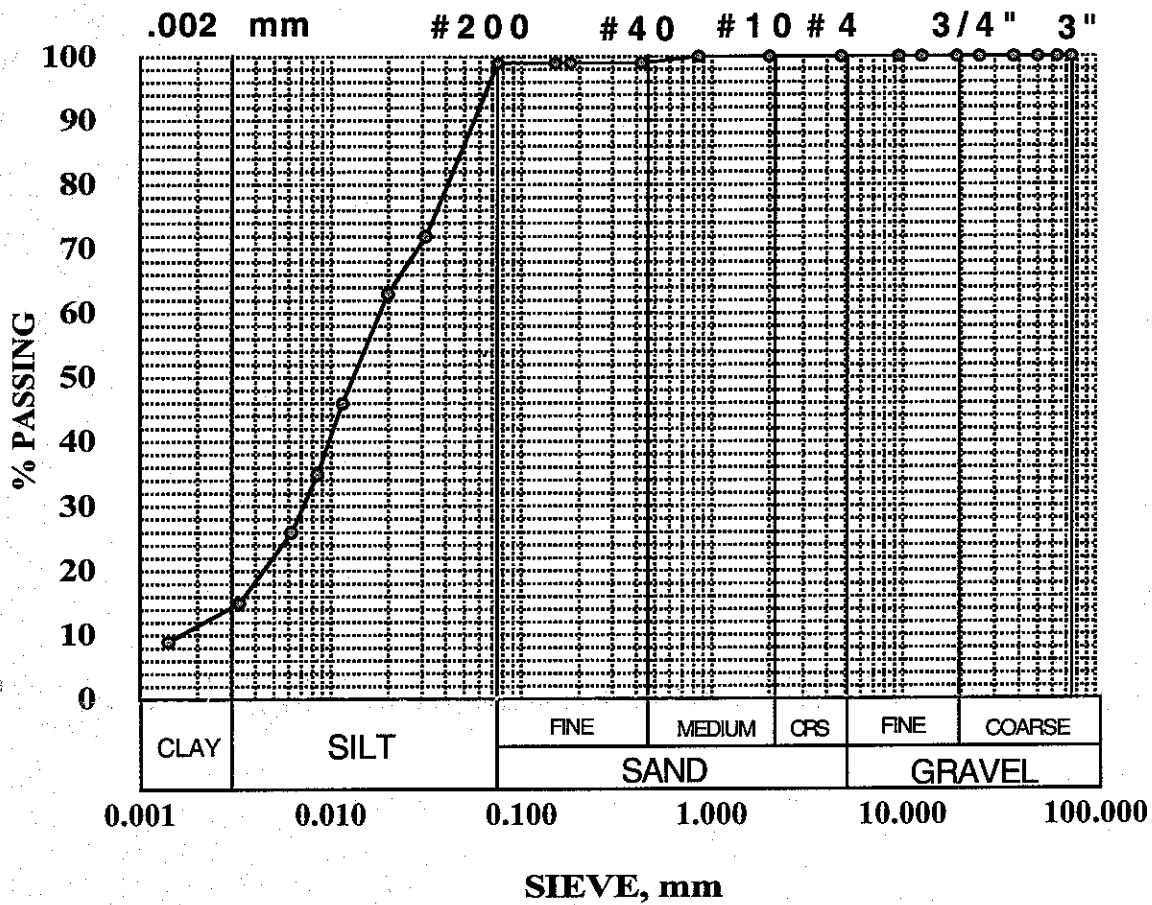


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Project: ERM/Raytheon, Wayland
Sample no. M-11301 **Date:** 6/28/04

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ERM/Raytheon, Wayland
 Briggs # 22405
 Tested: 6-28-04

1. Sample No.	Description	Source
M-11303	Soil	B417 105-107'

2. Particle Size Analysis { ASTM D 422 }

Sieve Size		Results	Specs.
		{% Passing by Wt.}	
100 mm	4"	100	
75 mm	3"	100	
63 mm	2-1/2"	100	
50 mm	2"	100	
37.5 mm	1-1/2"	100	
25.0 mm	1"	100	
19.0 mm	3/4"	89	
12.5 mm	1/2"	83	
9.5 mm	3/8"	83	
4.75 mm	#4	79	
2.00 mm	#10	71	
850 µm	#20	58	
425 µm	#40	44	
180 µm	#80	25	
150 µm	#100	22	
75 µm	#200	15.0	

HYDROMETER ANALYSIS

0.0352 mm	11
0.0226 mm	9
0.0133 mm	6
0.0095 mm	4
0.0068 mm	2
0.0034 mm	0
0.0014 mm	0

4. No specifications were provided.

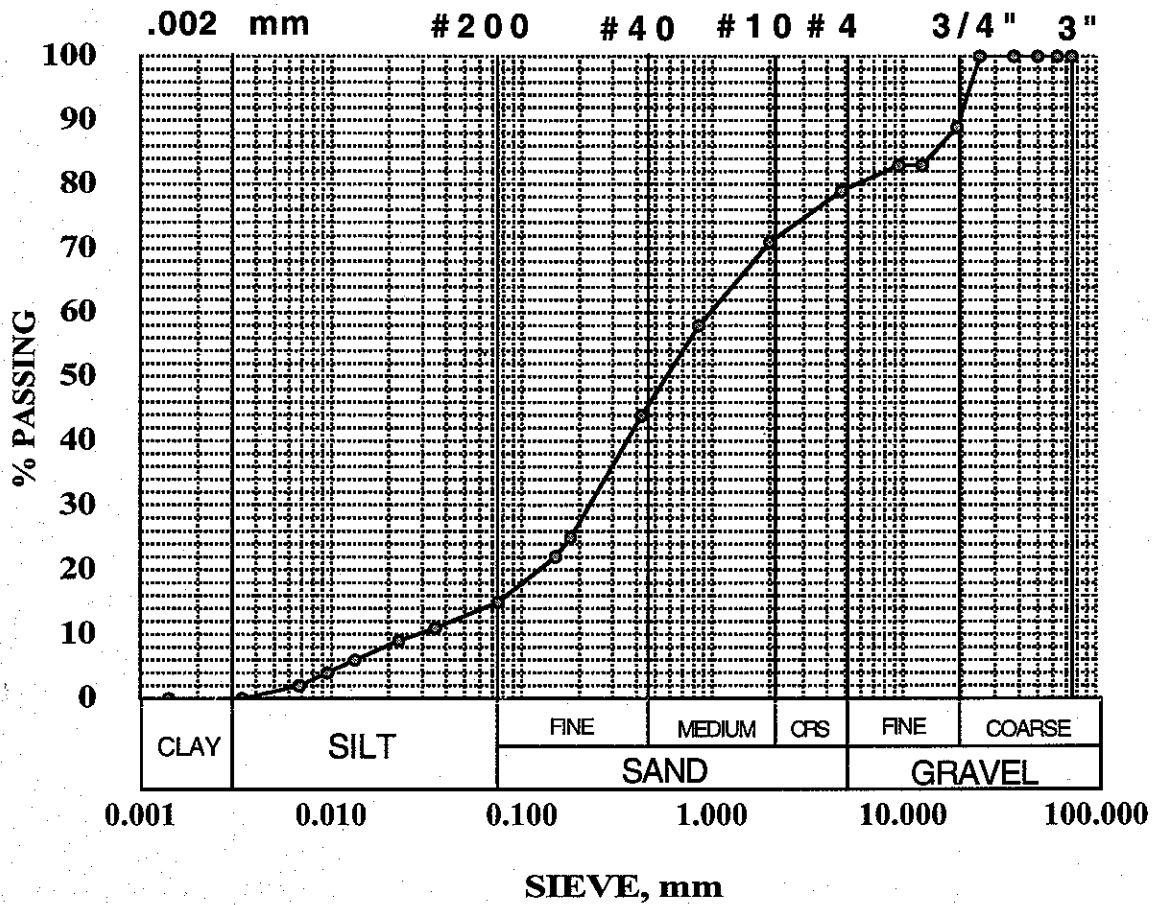


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Project:	ERM/Raytheon, Wayland	
Sample no.	M-11303	Date: 6/28/04

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ERM/Raytheon, Wayland
 Briggs # 22405
 Tested: 6-28-04

1.	<u>Sample No.</u>	<u>Description</u>	<u>Source</u>
	M-11325	Soil	B426 100-102'

2. Particle Size Analysis { ASTM D 422 }

<u>Sieve Size</u>	<u>Results</u> {% Passing by Wt.}	<u>Specs.</u>
100 mm	4"	100
75 mm	3"	100
63 mm	2-1/2"	100
50 mm	2"	100
37.5 mm	1-1/2"	100
25.0 mm	1"	100
19.0 mm	3/4"	100
12.5 mm	1/2"	100
9.5 mm	3/8"	100
4.75 mm	#4	100
2.00 mm	#10	100
850 µm	#20	100
425 µm	#40	99
180 µm	#80	64
150 µm	#100	52
75 µm	#200	24.2

HYDROMETER ANALYSIS

0.0358 mm	8
0.0230 mm	6
0.0133 mm	5
0.0096 mm	3
0.0068 mm	2
0.0034 mm	0
0.0014 mm	0

4. No specifications were provided.

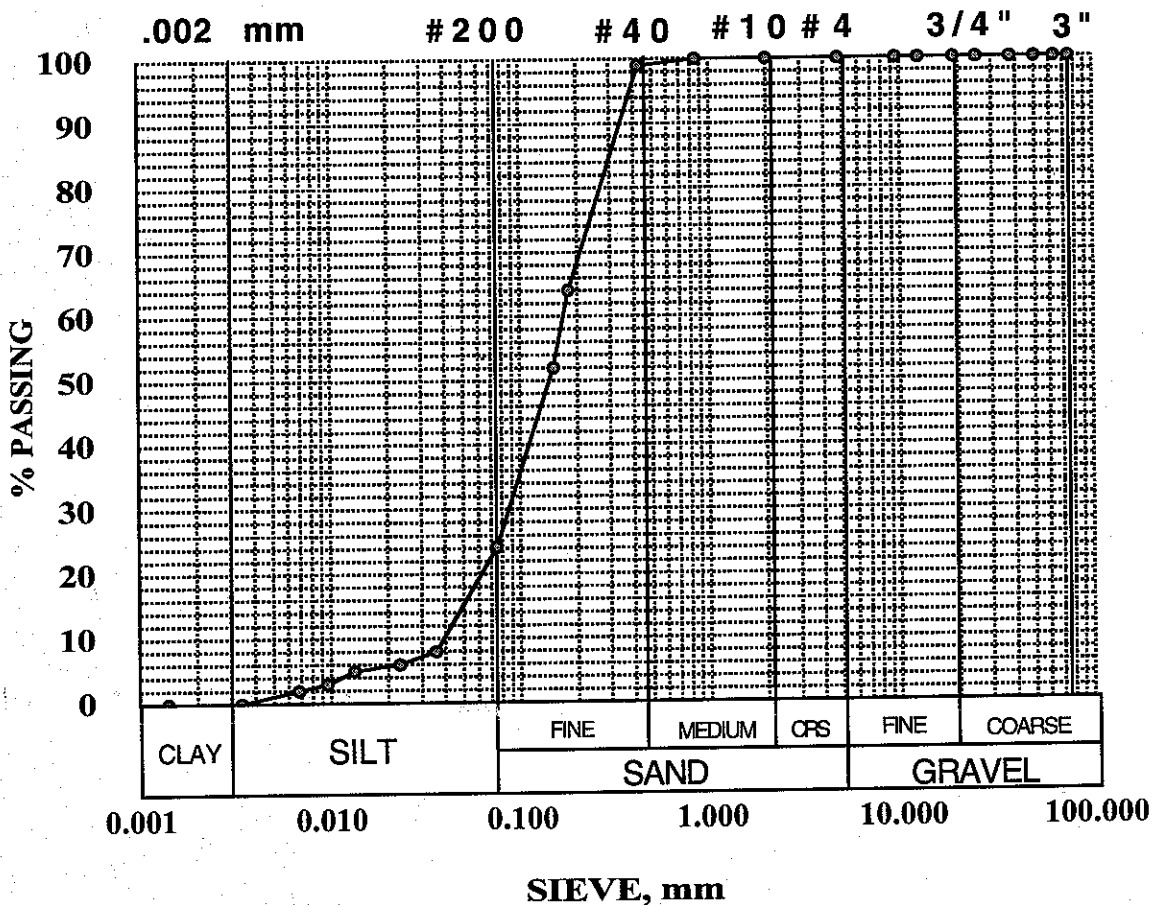


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Project: ERM/Raytheon, Wayland
Sample no. M-11325 **Date:** 6/28/04

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ERM/Raytheon, Wayland
 Briggs # 22405
 Tested: 6-28-04

1.	<u>Sample No.</u>	<u>Description</u>	<u>Source</u>
	M-11327	Soil	B426 110-112'

2. Particle Size Analysis { ASTM D 422 }

<u>Sieve Size</u>	<u>Results</u> {% Passing by Wt.}	<u>Specs.</u>
100 mm	4"	100
75 mm	3"	100
63 mm	2-1/2"	100
50 mm	2"	100
37.5 mm	1-1/2"	100
25.0 mm	1"	100
19.0 mm	3/4"	100
12.5 mm	1/2"	100
9.5 mm	3/8"	100
4.75 mm	#4	100
2.00 mm	#10	99
850 µm	#20	99
425 µm	#40	99
180 µm	#80	97
150 µm	#100	96
75 µm	#200	70.1

HYDROMETER ANALYSIS

0.0338 mm	29
0.0222 mm	20
0.0131 mm	14
0.0094 mm	11
0.0068 mm	5
0.0034 mm	3
0.0014 mm	0

4. No specifications were provided.



Briggs Engineering & Testing

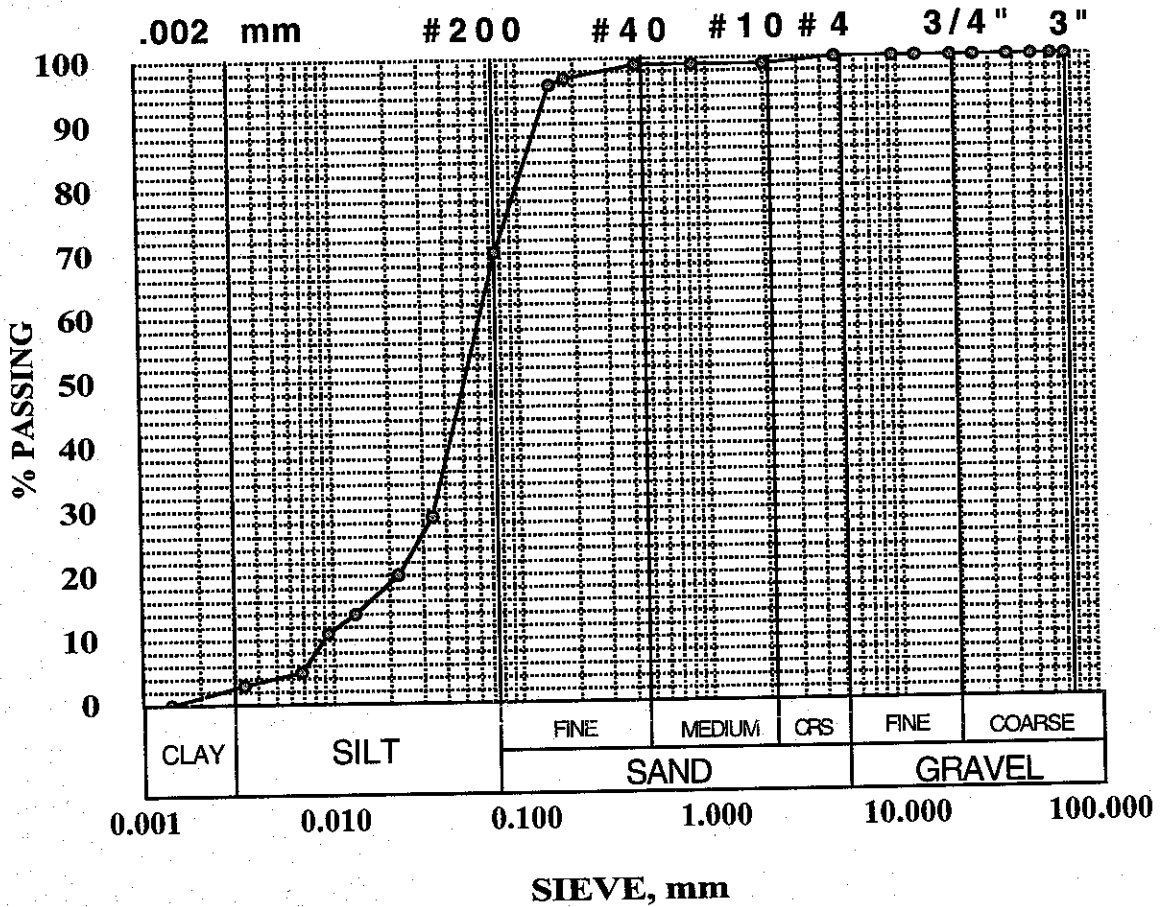
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Project: ERM/Raytheon, Wayland

Sample no. M-11327

Date: 6/28/04

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July 26, 2004

Briggs# 22405

Environmental Resources Management
399 Boylston Street, 6th Floor
Boston, MA 02116

Attn.: Ms. Elissa McNamara

**RE: Analysis of Soil Samples obtained from the Raytheon Project in Wayland.
(M-11307 & M-11324)**

Ms. McNamara:

Laboratory analysis of your samples tested at our Rockland Facility has been conducted, please see the enclosed results.

If you have any questions or if I can be of further service to you, please feel free to contact me at your convenience.

Very truly yours,
BRIGGS ENGINEERING & TESTING
A Division of PK Associates, Inc.

Mark Liebert
Laboratory Director
Construction Technology Division

Enclosures: Laboratory Results

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Briggs Engineering & Testing

A DIVISION OF PK ASSOCIATES, INC.

ERM/Raytheon, Wayland
 Briggs # 22405
 Tested: 7-20-04

1. Sample No.	Description	Source
M-11307	Soil	B419 75-77'

2. Particle Size Analysis { ASTM D 422 }

Sieve Size	Results {% Passing by Wt.}	Specs.
100 mm	4"	100
75 mm	3"	100
63 mm	2-1/2"	100
50 mm	2"	100
37.5 mm	1-1/2"	100
25.0 mm	1"	100
19.0 mm	3/4"	100
12.5 mm	1/2"	100
9.5 mm	3/8"	100
4.75 mm	#4	100
2.00 mm	#10	100
850 µm	#20	100
425 µm	#40	100
180 µm	#80	99
150 µm	#100	99
75 µm	#200	85.9

HYDROMETER ANALYSIS

0.0305 mm	44
0.0213 mm	21
0.0128 mm	11
0.0092 mm	6
0.0065 mm	6
0.0032 mm	2
0.0013 mm	2

4. No specifications were provided.

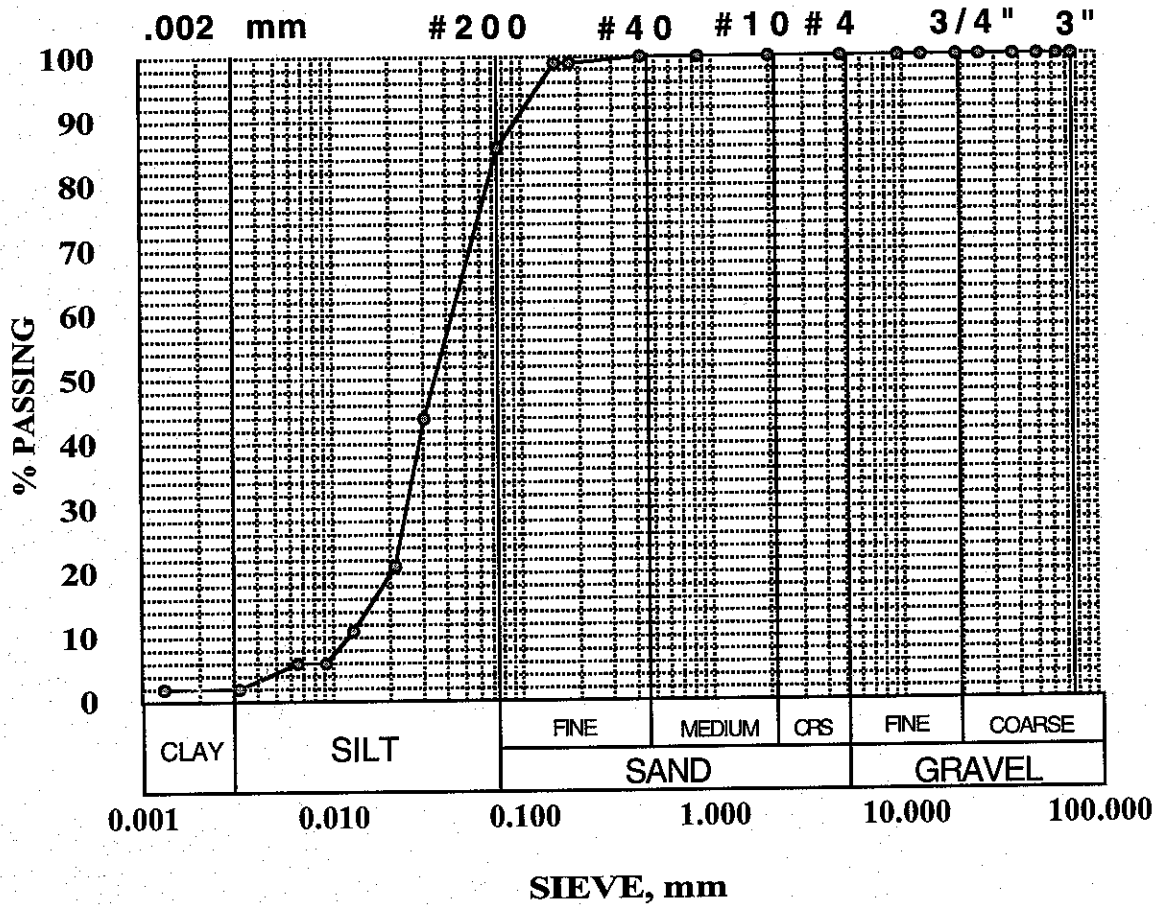


Briggs Engineering & Testing

A Division of PK Associates, Inc.

Project: ERM/Raytheon, Wayland
Sample no. M-11307 **Date:** 7/20/04

PARTICLE SIZE DISTRIBUTION





Briggs Engineering & Testing

A DIVISION OF PK ASSOCIATES, INC.

ERM/Raytheon, Wayland
 Briggs # 22405
 Tested: 7-20-04

1.	<u>Sample No.</u>	<u>Description</u>	<u>Source</u>
	M-11324	Soil	B426 95-97'

2. Particle Size Analysis { ASTM D 422 }

<u>Sieve Size</u>		<u>Results</u>	<u>Specs.</u>
		{% Passing by Wt.}	
100 mm	4"	100	
75 mm	3"	100	
63 mm	2-1/2"	100	
50 mm	2"	100	
37.5 mm	1-1/2"	100	
25.0 mm	1"	100	
19.0 mm	3/4"	100	
12.5 mm	1/2"	100	
9.5 mm	3/8"	100	
4.75 mm	#4	100	
2.00 mm	#10	100	
850 µm	#20	99	
425 µm	#40	99	
180 µm	#80	82	
150 µm	#100	67	
75 µm	#200	18.7	

HYDROMETER ANALYSIS

0.0346 mm	8
0.0220 mm	7
0.0129 mm	4
0.0092 mm	3
0.0065 mm	3
0.0032 mm	1
0.0013 mm	0

4. No specifications were provided.

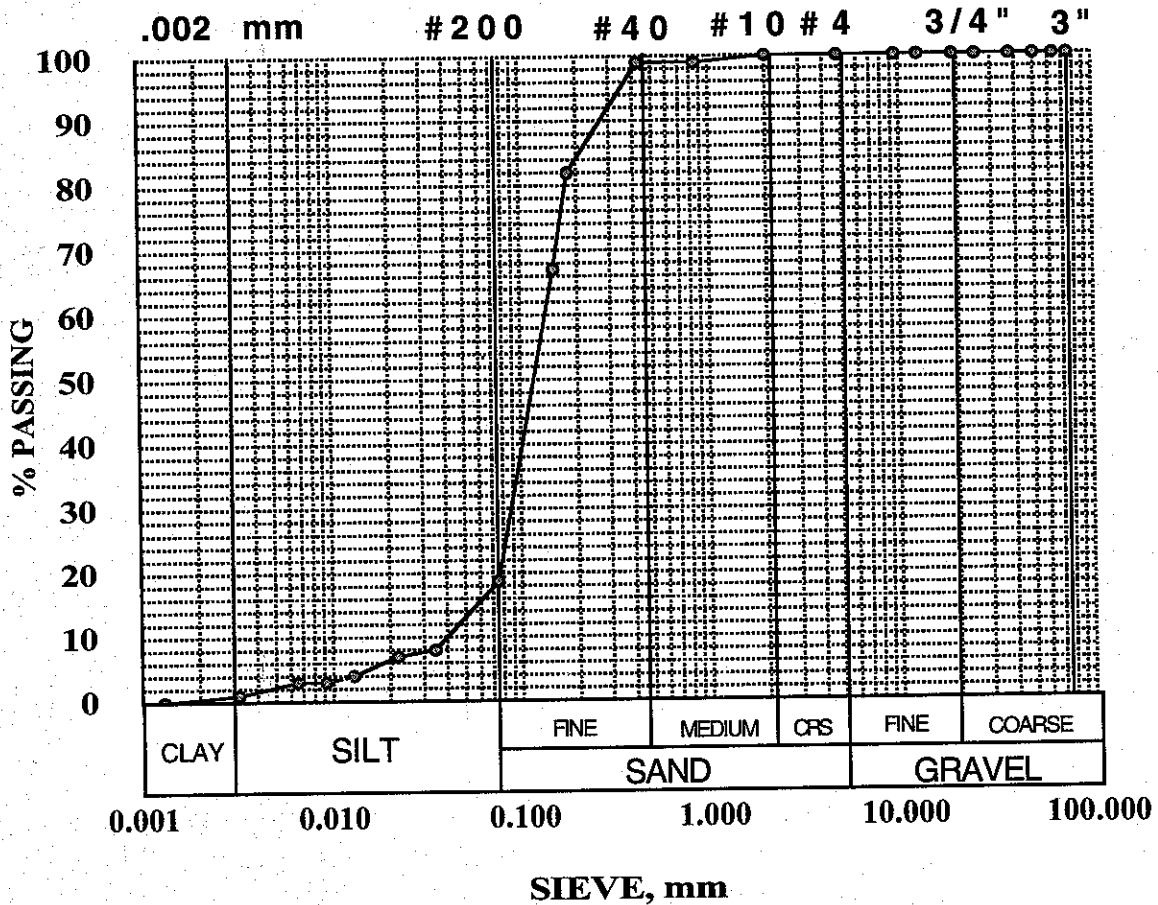


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Project: ERM/Raytheon, Wayland
Sample no. M-11324 **Date:** 7/20/04

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Briggs Engineering & Testing
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June 23, 2004
Project No. 22405

FILE COPY

E.R.M., Inc.
c/o Elissa McNamara
399 Boylston Street, Sixth Floor
Boston, MA 02116

**RE: Estimated Permeability of Soil
For Environmental Resources Management/Raytheon
Wayland, MA**

Dear Ms. McNamara:

Per your request Briggs Engineering & Testing (Briggs) has estimated the permeability rate of the following soil samples delivered to our soils laboratory.

Briggs performed sieve and hydrometer analyses in accordance with ASTM D422. The samples were collected from locations B-417 and B-422. The sample locations and gradation results are detailed on the attached laboratory reports. Based on the result of the sieve and hydrometer analyses and the Hazen Williams approximation method, Briggs estimated the soil permeability for each sample. The results are tabulated as follows:

<u>Sample Source</u>	<u>Permeability Estimate (cm/sec)</u>
B417, 95-97'	7.7×10^{-5}
B422, 85-87'	1.6×10^{-4}
B422, 107-109'	5.6×10^{-5}

If you have any questions, please do not hesitate to contact us at your convenience.

Very truly yours,
BRIGGS ENGINEERING & TESTING
A Division of PK Associates, Inc.

David W. Geisser
Project Engineer

Paul M. Skorohod
President

DWG:PMS:dg
Enclosure: Lab Report

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