BOWSER-MORNER, INC.

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AASHTO/ISO 17025 Accredited • USACE Validated

LABORATORY REPORT

Report To: Roberts Environmental Services, LLC
Attn: David Jeffers
2112 Carmen Ct.
Goshen, IN 46526

Report Date: March 22, 2013
Job No.: 161262
Report No.: 709941A
No. of Pages: 106

Report On: Laboratory Analysis of Fifty Natural Sand and Gravel Samples
Project: Lane Street, Project No. 11-10378-50

On March 8, 2013, fifty natural sand and gravel samples were submitted for selected laboratory analysis from the above referenced source. Testing was performed as specified by the client and in accordance with the following procedures:

ASTM D 422, "Particle-Size Analysis of Soils".

ASTM D 2216, "Laboratory Determination of Water (Moisture) Content of Soil and Rock".

Results are summarized in the following tables and detailed on the attached data sheets.

Should you have any questions, or if we may be of further service, please contact me at (937) 236-8805, extension 322.

Respectfully submitted,

BOWSER-MORNER, INC.

Karl A. Fletcher, Manager
Construction Materials and
Geotechnical Laboratories

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TABLE I
Summary of Results

Sieve Size	HB-1 1'-3'	HB-1 3'-5'	HB-1 13'-15'	HB-1 15'-17'	HB-1 18'-20'	HB-1 20'-22'	HB-1 28'-30'	HB-1 30'-32'	HB-1 33'-35'	HB-1 40'-42'
1 1/2"								**100.0**		
1"					**100.0**		**100.0**	**94.2**		
3/4"					**96.9**	**100.0**	**93.4**	**91.8**		
1/2"	**100.0**	**100.0**			**91.3**	**93.2**	**87.8**	**86.3**		
3/8"	**99.6**	**99.3**	**100.0**	**100.0**	**84.5**	**89.3**	**81.9**	**81.5**	**100.0**	
No. 4	**98.9**	**97.1**	**99.9**	**99.8**	**73.0**	**78.2**	**69.9**	**69.0**	**97.7**	**100.0**
No. 10	**98.2**	**95.0**	**99.7**	**98.9**	**58.5**	**60.6**	**49.9**	**49.9**	**93.1**	**99.9**
No. 20	**96.9**	**93.4**	**98.8**	**95.6**	**43.9**	**34.0**	**28.1**	**28.6**	**75.1**	**99.8**
No. 40	**81.2**	**80.2**	**77.6**	**70.2**	**25.9**	**12.3**	**12.7**	**11.6**	**38.4**	**95.3**
No. 60	**36.2**	**41.1**	**16.8**	**23.7**	**8.8**	**6.7**	**5.8**	**5.5**	**13.0**	**64.4**
No. 100	**13.7**	**20.2**	**4.2**	**10.2**	**3.2**	**4.5**	**2.5**	**3.3**	**4.7**	**13.8**
No. 200	**9.4**	**15.3**	**1.5**	**6.2**	**1.8**	**3.2**	**1.5**	**1.9**	**2.0**	**2.4**
Gravel, %:	**1.8**	**5.0**	**0.3**	**1.1**	**41.5**	**39.4**	**50.1**	**50.1**	**6.9**	**0.1**
Coarse Sand, %:	**8.6**	**7.6**	**15.5**	**18.1**	**27.4**	**44.4**	**34.1**	**35.0**	**45.3**	**3.2**
Medium Sand, %:	**53.4**	**46.3**	**67.4**	**57.1**	**22.3**	**9.5**	**10.0**	**9.4**	**34.8**	**32.3**
Fine Sand, %:	**26.8**	**25.8**	**15.3**	**17.5**	**7.0**	**3.5**	**4.3**	**3.6**	**11.0**	**62.0**
Fines, %:	**9.4**	**15.3**	**1.5**	**6.2**	**1.8**	**3.2**	**1.5**	**1.9**	**2.0**	**2.4**
As Received Moisture Content, %:	**10.6**	**10.9**	**20.2**	**13.6**	**11.9**	**11.6**	**11.0**	**10.7**	**17.3**	**19.6**

TABLE II
Summary of Results

Sieve Size	HB-2 1'-3'	HB 3'-5'	HB-2 8'-10'	HB-2 12'-14'	HB-2 15'-17'	HB-2 17'-19'	HB-2 23'-25'	HB-2 28'-30'	HB-2 38'-40'	HB-2 46'-48'
1 1/2"						**100.0**	**100.0**	**100.0**		
1"					**100.0**	**94.4**	**95.8**	**91.8**		
3/4"					**97.7**	**94.4**	**84.0**	**88.9**		
1/2"	**100.0**				**94.5**	**82.6**	**80.8**	**84.0**		
3/8"	**99.6**	**100.0**			**91.1**	**75.7**	**78.8**	**73.9**	**100.0**	
No. 4	**99.6**	**99.6**		**100.0**	**81.6**	**60.8**	**69.6**	**53.0**	**99.9**	
No. 10	**99.4**	**98.4**		**99.7**	**66.0**	**45.3**	**58.3**	**35.6**	**99.5**	**100.0**
No. 20	**98.1**	**94.9**	**100.0**	**99.1**	**43.1**	**34.2**	**41.7**	**22.1**	**97.0**	**99.5**
No. 40	**78.4**	**60.3**	**94.8**	**73.5**	**13.7**	**16.7**	**20.8**	**12.3**	**66.8**	**87.2**
No. 60	**40.1**	**26.5**	**31.5**	**23.6**	**4.6**	**7.2**	**7.9**	**4.3**	**18.3**	**49.9**
No. 100	**17.1**	**17.6**	**9.6**	**7.4**	**2.6**	**4.2**	**4.0**	**1.7**	**4.9**	**16.3**
No. 200	**13.0**	**14.0**	**3.2**	**2.3**	**1.5**	**2.7**	**2.3**	**1.1**	**1.9**	**4.4**
Gravel, %:	**0.6**	**1.6**	**0.0**	**0.3**	**34.0**	**54.7**	**41.7**	**64.4**	**0.5**	**0.0**
Coarse Sand, %:	**12.9**	**27.5**	**3.6**	**15.1**	**46.4**	**24.4**	**32.5**	**20.8**	**20.9**	**6.5**
Medium Sand, %:	**46.4**	**44.4**	**64.9**	**61.0**	**15.0**	**13.7**	**17.9**	**10.5**	**60.3**	**43.6**
Fine Sand, %:	**27.1**	**12.5**	**28.3**	**21.3**	**3.1**	**4.5**	**5.6**	**3.2**	**16.4**	**45.5**
Fines, %:	**13.0**	**14.0**	**3.2**	**2.3**	**1.5**	**2.7**	**2.3**	**1.1**	**1.9**	**4.4**
As Received Moisture Content, %:	**8.9**	**9.3**	**19.8**	**18.8**	**11.4**	**8.6**	**10.5**	**8.7**	**18.4**	**18.3**

TABLE III
Summary of Results

Sieve Size	HB-3 1'-3'	HB-3 3'-5'	HB-3 8'-10'	HB-3 17'-19'	HB-3 21'-23'	HB-3 25'-27'	HB-3 33'-35'	HB-3 40'-42'	HB-3 43'-45'	HB-3 48'-50'
1"					100.0	100.0				
3/4"					98.0	95.8	100.0	100.0	100.0	
1/2"				100.0	87.7	87.2	96.0	94.6	98.1	100.0
3/8"	100.0	100.0		99.2	77.8	78.1	92.5	87.9	98.1	99.1
No. 4	99.1	99.9	100.0	97.0	55.0	62.4	75.8	67.3	94.9	96.5
No. 10	98.5	99.7	99.9	94.4	37.0	48.9	58.3	41.5	88.3	93.7
No. 20	97.1	99.3	99.6	89.6	24.3	36.6	40.2	22.3	74.3	89.8
No. 40	81.8	95.8	94.5	54.2	9.8	18.1	15.1	11.3	45.2	68.7
No. 60	41.3	55.0	81.4	13.1	5.1	6.2	7.0	6.8	17.4	25.7
No. 100	22.4	16.4	42.2	3.7	3.6	3.4	4.4	4.6	7.7	4.3
No. 200	17.1	9.6	6.9	2.0	2.6	2.0	2.8	2.7	2.9	1.3
Gravel, %:	1.5	0.3	0.1	5.6	63.0	51.1	41.7	58.5	11.7	6.3
Coarse Sand, %:	8.9	2.8	3.9	28.5	24.3	26.2	38.1	28.1	34.6	16.0
Medium Sand, %:	48.3	41.9	14.6	52.8	7.6	16.5	13.2	6.6	36.3	52.0
Fine Sand, %:	24.2	45.4	74.5	11.1	2.5	4.2	4.2	4.1	14.5	24.4
Fines, %:	17.1	9.6	6.9	2.0	2.6	2.0	2.8	2.7	2.9	1.3
As Received Moisture Content, %:	10.3	8.1	20.3	17.6	8.6	8.6	11.5	9.0	15.4	19.6

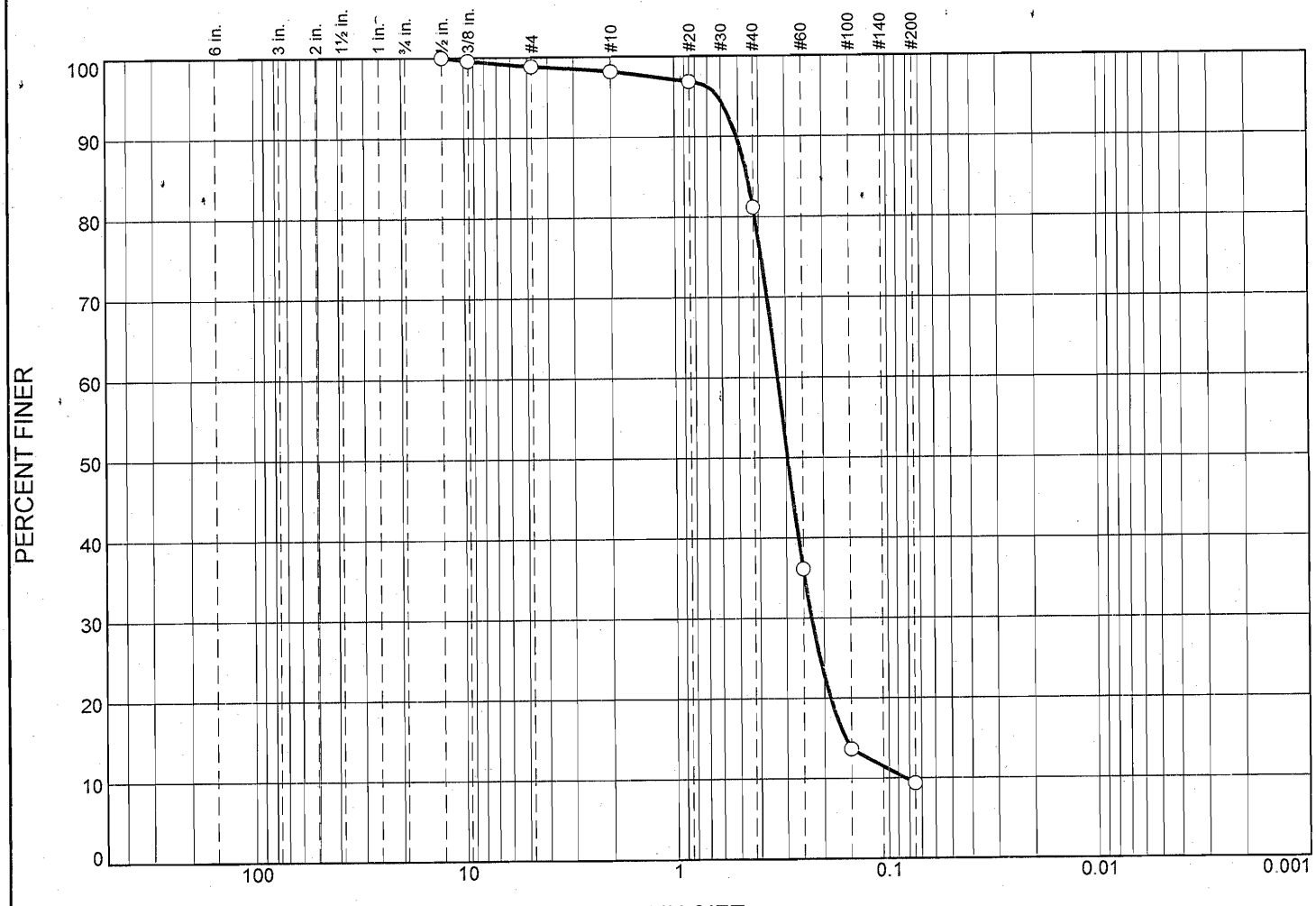
TABLE IV
Summary of Results

Sieve Size	HB-4 1'-3'	HB-4 3'-5'	HB-4 8'-10'	HB-4 12'-14'	HB-4 15'-16.5'	HB-4 18'-20'	HB-4 23'-25'	HB-4 25'-27'	HB-4 33'-35'	HB-4 43'-45'
1 1/2"								100.0		
1"					100.0			82.6	100.0	
3/4"					98.0		100.0	77.2	91.2	
1/2"		100.0			95.3		93.4	69.7	77.6	
3/8"	100.0	99.5	100.0	100.0	88.9	100.0	89.8	67.3	72.1	
No. 4	99.0	98.3	99.9	99.8	67.0	99.6	79.2	55.4	61.8	
No. 10	98.6	97.0	99.7	99.3	37.2	99.1	62.4	43.2	43.5	
No. 20	97.1	94.8	98.8	98.1	21.5	98.7	38.9	30.5	23.3	100.0
No. 40	73.1	68.5	67.4	69.4	12.5	96.0	10.6	18.5	17.2	89.3
No. 60	37.3	35.4	13.9	17.1	6.0	51.9	4.2	7.0	11.6	54.3
No. 100	19.1	21.3	3.2	4.7	3.5	9.1	2.8	4.0	3.4	16.7
No. 200	15.3	17.3	1.8	2.5	2.5	1.3	2.1	2.2	1.4	4.0
Gravel, %:	1.4	3.0	0.3	0.7	62.8	0.9	37.6	56.8	56.5	0.0
Coarse Sand, %:	16.8	19.6	19.4	17.7	22.6	2.3	46.5	21.3	25.2	5.2
Medium Sand, %:	44.5	42.0	66.4	64.5	8.6	44.9	11.7	14.9	6.7	40.5
Fine Sand, %:	22.0	17.9	12.1	14.6	3.5	50.6	2.1	4.8	10.2	50.3
Fines, %:	15.3	17.5	1.8	2.5	2.5	1.3	2.1	2.2	1.4	4.0
As Received Moisture Content, %:	11.8	10.9	20.5	18.5	9.2	20.2	13.3	7.7	10.0	18.6

TABLE V
Summary of Results

Sieve Size	HB-5 1'-3'	HB-5 3'-5'	HB-5 7'-9'	HB-5 13'-15'	HB-5 15'-17'	HB-5 20'-22'	HB-5 25'-27'	HB-5 32'-34'	HB-5 38'-40'	HB-5 43'-45'
1 1/2"					**100.0**			**100.0**		**100.0**
1"					**94.3**		**100.0**	**92.3**		**90.9**
3/4"					**90.1**	**100.0**	**88.1**	**81.6**		**88.0**
1/2"				**100.0**	**85.3**	**98.0**	**73.6**	**78.0**		**78.3**
3/8"	**100.0**	**100.0**		**99.7**	**79.7**	**97.0**	**63.6**	**71.7**		**69.6**
No. 4	**99.6**	**99.5**	**100.0**	**98.6**	**67.8**	**93.4**	**46.3**	**54.0**	**100.0**	**50.5**
No. 10	**99.0**	**98.6**	**99.6**	**95.2**	**51.4**	**87.6**	**32.6**	**31.2**	**99.9**	**31.3**
No. 20	**96.9**	**94.3**	**98.7**	**83.3**	**31.7**	**73.7**	**18.8**	**17.2**	**99.5**	**18.4**
No. 40	**80.3**	**53.2**	**81.9**	**28.2**	**10.6**	**19.0**	**10.9**	**10.0**	**68.4**	**9.9**
No. 60	**38.0**	**17.5**	**35.5**	**8.9**	**4.5**	**5.7**	**5.2**	**6.0**	**10.6**	**5.1**
No. 100	**19.5**	**7.2**	**6.9**	**3.0**	**2.4**	**2.3**	**2.6**	**3.2**	**4.0**	**2.6**
No. 200	**14.8**	**4.9**	**2.8**	**1.5**	**1.4**	**1.1**	**1.5**	**1.8**	**1.4**	**1.4**
Gravel, %:	**1.0**	**1.4**	**0.4**	**4.8**	**48.6**	**12.4**	**67.4**	**68.8**	**0.1**	**68.7**
Coarse Sand, %:	**10.5**	**33.3**	**9.2**	**54.9**	**36.7**	**57.3**	**19.9**	**19.7**	**17.9**	**19.6**
Medium Sand, %:	**50.5**	**47.8**	**54.9**	**31.4**	**10.2**	**24.6**	**7.5**	**5.5**	**71.4**	**6.6**
Fine Sand, %:	**23.2**	**12.6**	**32.7**	**7.4**	**3.1**	**4.6**	**3.7**	**4.2**	**9.2**	**3.7**
Fines, %:	**14.8**	**4.9**	**2.8**	**1.5**	**1.4**	**1.1**	**1.5**	**1.8**	**1.4**	**1.4**
As Received Moisture Content, %:	**8.5**	**12.1**	**20.4**	**18.3**	**9.3**	**16.3**	**5.8**	**5.4**	**19.3**	**8.1**

Particle Size Distribution Report



	% Stones	% +3"	% Gravel			% Sand					% Silt		% Clay
			Coarse	Medium	Fine	V. Crs.	Crs.	Med.	Fine	V. Fine	Crs.	Fine	
○	0.0	0.0	0.0	1.1	0.7	1.1	7.5	53.4	25.1			11.1	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.4529	0.3284	0.2946	0.2284	0.1591	0.0831	1.91	3.95

Material Description	USCS	AASHTO
○ brown sand with silt		

Project No. 161262 **Client:** Roberts Environmental Service

Project: Lane Street

○ **Source of Sample:** HB-1 **Depth:** 1'-3'

Remarks:

○ As Received

Moisture Content: 10.6%

BOWSER-MORNER, INC.

Dayton, Ohio

GRAIN SIZE DISTRIBUTION TEST DATA

3/22/2013

Client: Roberts Environmental Service
Project: Lane Street
Project Number: 161262
Location: HB-1
Depth: 1'-3'
Material Description: brown sand with silt
Testing Remarks: As Received
Moisture Content: 10.6%

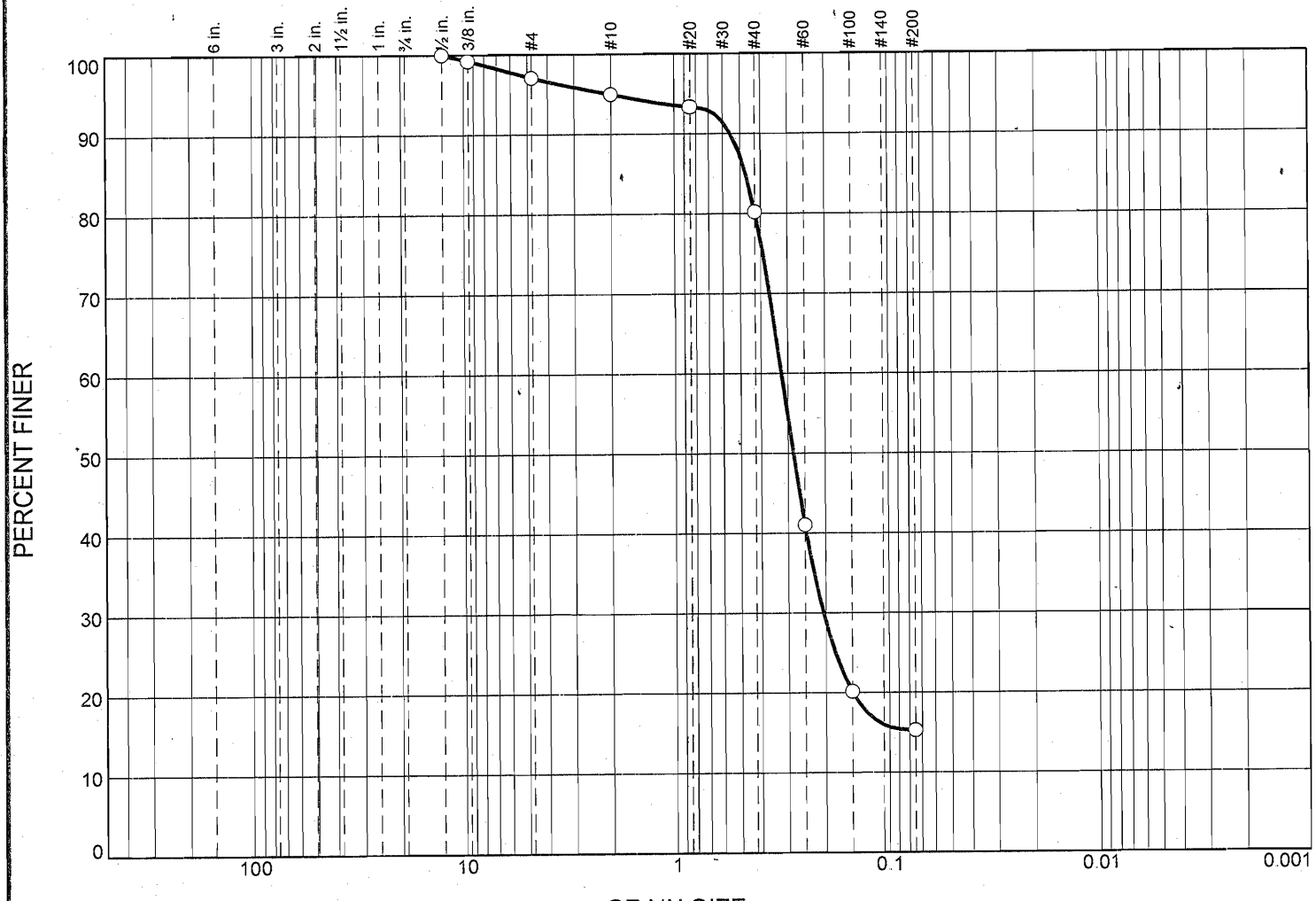
Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
778.40	114.58	0.00	.50	0.00	100.0
			.375	2.51	99.6
			#4	7.37	98.9
			#10	12.02	98.2
			#20	20.66	96.9
			#40	124.72	81.2
			#60	423.77	36.2
			#100	573.05	13.7
			#200	601.70	9.4

Stones	Cobbles	Gravel				Sand						Silt			Clay	Fines
		Coarse	Medium	Fine	Total	V. Crs.	Crs.	Med.	Fine	V. Fine	Total	Crs.	Fine	Total		Total
0.0	0.0	0.0	1.1	0.7	1.8	1.1	7.5	53.4	25.1							

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0831	0.1591	0.1868	0.2284	0.2946	0.3284	0.4174	0.4529	0.5057	0.6168

Fineness Modulus	C_u	C_c
1.46	3.95	1.91

Particle Size Distribution Report



	% Stones	% +3"	% Gravel			% Sand					% Silt		% Clay
			Coarse	Medium	Fine	V. Crs.	Crs.	Med.	Fine	V. Fine	Crs.	Fine	
○	0.0	0.0	0.0	2.9	2.1	1.4	6.2	46.3	25.4			15.7	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.4691	0.3205	0.2827	0.2046				

Material Description	USCS	AASHTO
○ brown sand with silt		

Project No. 161262 **Client:** Roberts Environmental Service

Project: Lane Street

○ **Source of Sample:** HB-1 **Depth:** 3'-5'

Remarks:

○ As Received

Moisture Content: 10.9%

BOWSER-MORNER, INC.

Dayton, Ohio

GRAIN SIZE DISTRIBUTION TEST DATA

3/22/2013

Client: Roberts Environmental Service
Project: Lane Street
Project Number: 161262
Location: HB-1
Depth: 3'-5'
Material Description: brown sand with silt
Testing Remarks: As Received
Moisture Content: 10.9%

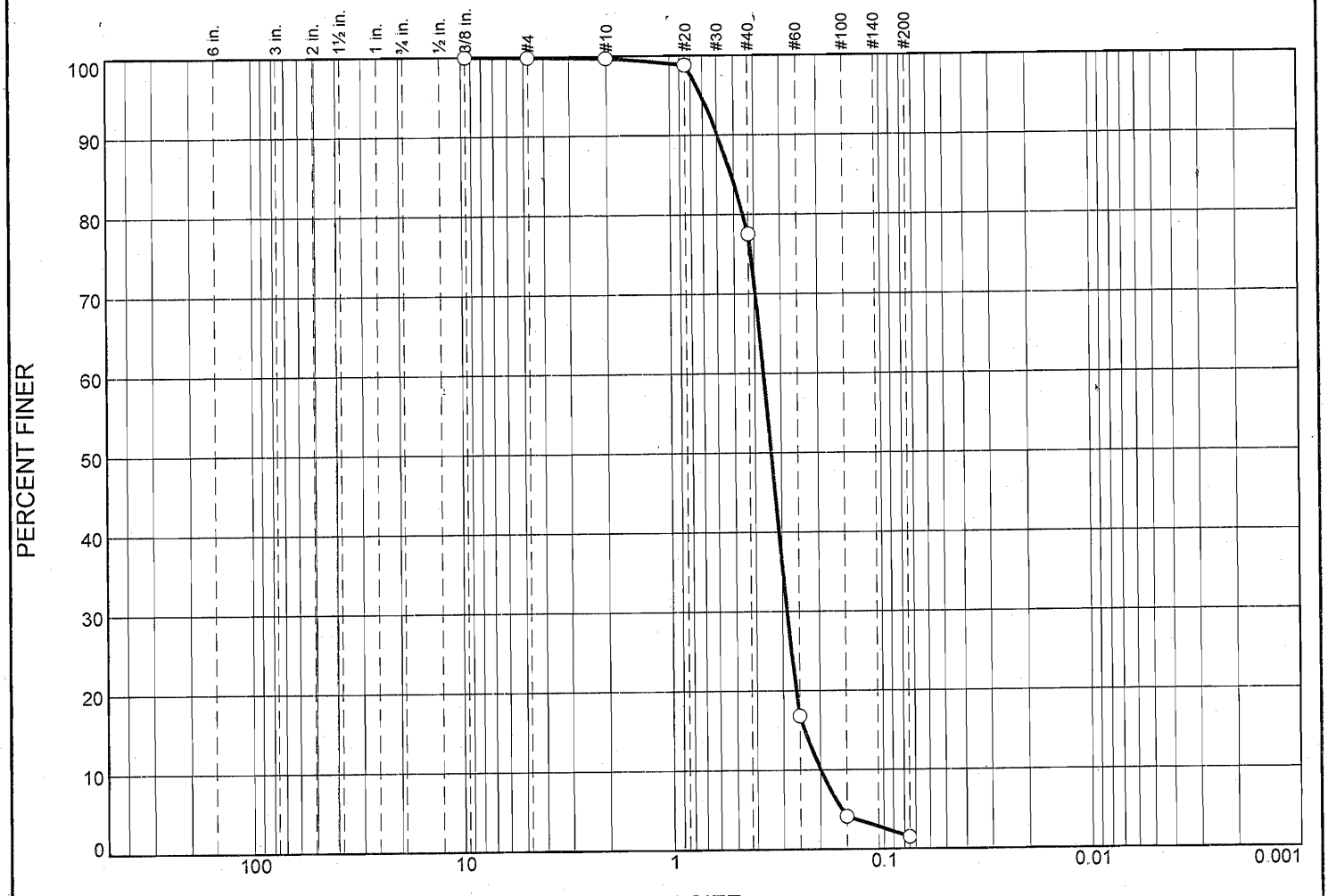
Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
714.20	112.87	0.00	.50	0.00	100.0
			.375	4.44	99.3
			#4	17.46	97.1
			#10	30.06	95.0
			#20	39.73	93.4
			#40	118.91	80.2
			#60	354.41	41.1
			#100	479.90	20.2
			#200	509.36	15.3

Stones	Cobbles	Gravel				Sand						Silt			Clay	Fines
		Coarse	Medium	Fine	Total	V. Crs.	Crs.	Med.	Fine	V. Fine	Total	Crs.	Fine	Total		Total
0.0	0.0	0.0	2.9	2.1	5.0	1.4	6.2	46.3	25.4							

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
		0.1486	0.2046	0.2827	0.3205	0.4233	0.4691	0.5508	1.9990

Fineness Modulus
1.48

Particle Size Distribution Report



	% Stones	% +3"	% Gravel			% Sand					% Silt		% Clay
			Coarse	Medium	Fine	V. Crs.	Crs.	Med.	Fine	V. Fine	Crs.	Fine	
○	0.0	0.0	0.0	0.1	0.2	0.6	14.9	67.4	14.2		2.6		

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.5109	0.3632	0.3357	0.2856	0.2364	0.1987	1.13	1.83

Material Description	USCS	AASHTO
○ light brown sand	SP	

Project No. 161262 **Client:** Roberts Environmental Service

Project: Lane Street

○ **Source of Sample:** HB-1 **Depth:** 13'-15'

Remarks:

○ As Received

Moisture Content: 20.2%

BOWSER-MORNER, INC.

Dayton, Ohio

GRAIN SIZE DISTRIBUTION TEST DATA

3/22/2013

Client: Roberts Environmental Service
Project: Lane Street
Project Number: 161262
Location: HB-1
Depth: 13'-15'
Material Description: light brown sand
USCS Classification: SP
Testing Remarks: As Received
Moisture Content: 20.2%

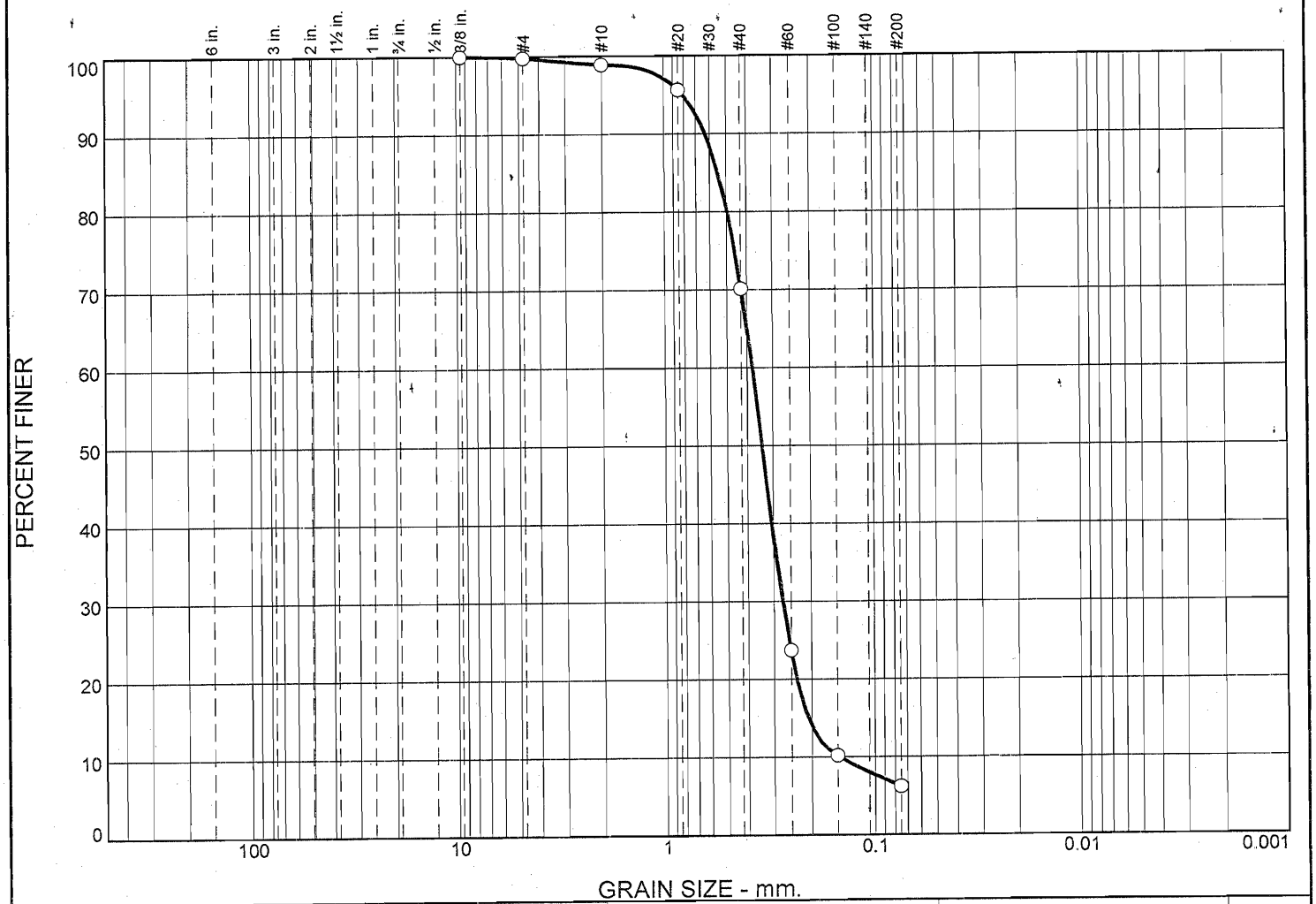
Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
683.60	114.32	0.00	.375	0.00	100.0
			#4	0.55	99.9
			#10	1.47	99.7
			#20	6.64	98.8
			#40	127.74	77.6
			#60	473.46	16.8
			#100	545.63	4.2
			#200	560.59	1.5

Stones	Cobbles	Gravel				Sand						Silt			Clay	Fines
		Coarse	Medium	Fine	Total	V. Crs.	Crs.	Med.	Fine	V. Fine	Total	Crs.	Fine	Total		Total
0.0	0.0	0.0	0.1	0.2	0.3	0.6	14.9	67.4	14.2							

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.1987	0.2364	0.2594	0.2856	0.3357	0.3632	0.4499	0.5109	0.5915	0.7078

Fineness Modulus	C_u	C_c
1.71	1.83	1.13

Particle Size Distribution Report



	% Stones	% +3"	% Gravel			% Sand					% Silt		% Clay
			Coarse	Medium	Fine	V. Crs.	Crs.	Med.	Fine	V. Fine	Crs.	Fine	
○	0.0	0.0	0.0	0.2	0.9	1.7	16.4	57.1	16.0			7.7	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.5457	0.3775	0.3397	0.2727	0.2064	0.1454	1.35	2.60

Material Description	USCS	AASHTO
○ brown sand with silt		

Project No. 161262 **Client:** Roberts Environmental Service

Project: Lane Street

○ **Source of Sample:** HB-1 **Depth:** 15'-17'

Remarks:

○ As Received

Moisture Content: 13.6%

BOWSER-MORNER, INC.

Dayton, Ohio

GRAIN SIZE DISTRIBUTION TEST DATA

3/22/2013

Client: Roberts Environmental Service
Project: Lane Street
Project Number: 161262
Location: HB-1
Depth: 15'-17'
Material Description: brown sand with silt
Testing Remarks: As Received
Moisture Content: 13.6%

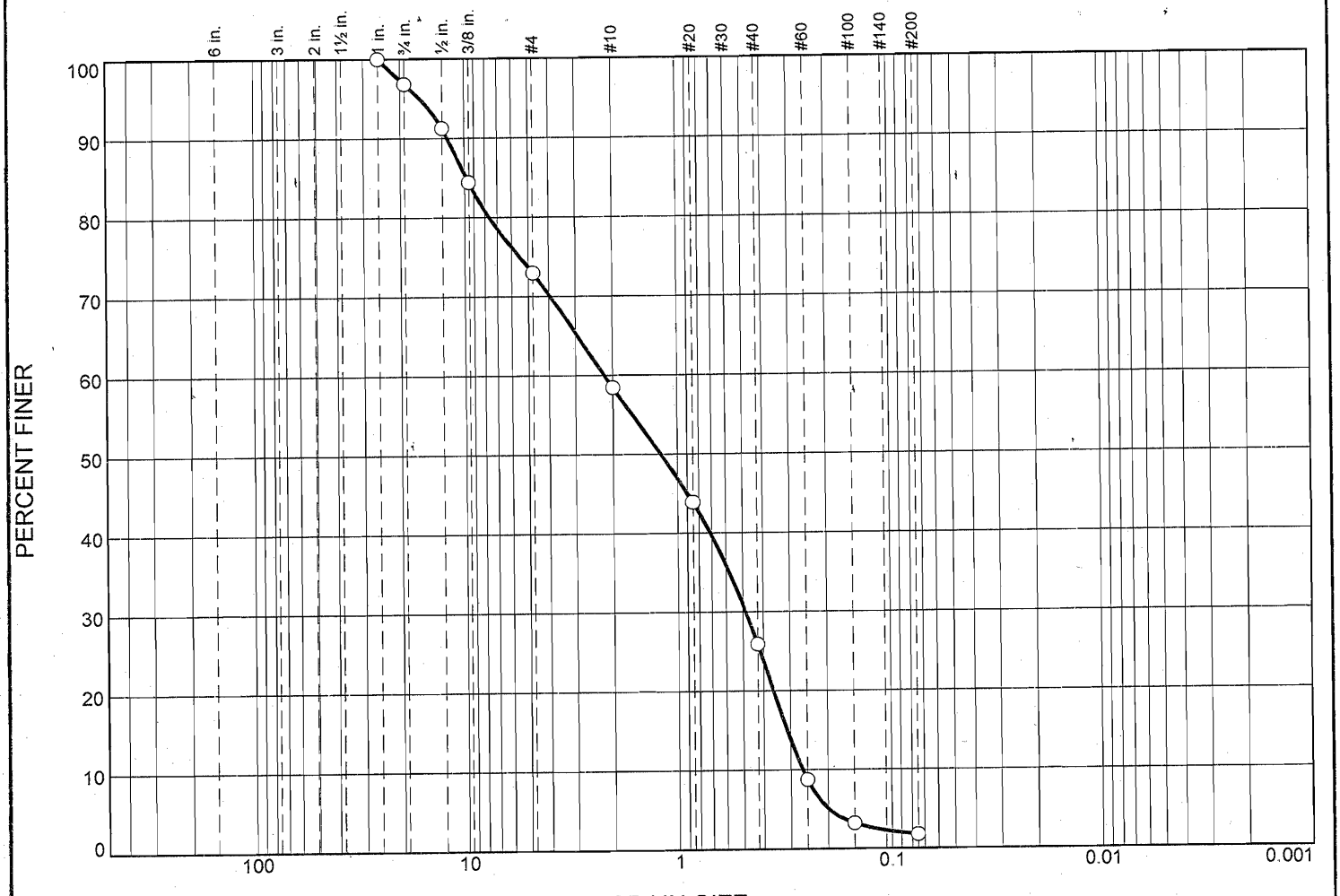
Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
667.30	100.38	0.00	.375	0.00	100.0
			#4	1.22	99.8
			#10	6.08	98.9
			#20	24.69	95.6
			#40	169.16	70.2
			#60	432.40	23.7
			#100	509.00	10.2
			#200	531.72	6.2

Stones	Cobbles	Gravel				Sand						Silt			Clay	Fines
		Coarse	Medium	Fine	Total	V. Crs.	Crs.	Med.	Fine	V. Fine	Total	Crs.	Fine	Total		Total
0.0	0.0	0.0	0.2	0.9	1.1	1.7	16.4	57.1	16.0							

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.1454	0.2064	0.2342	0.2727	0.3397	0.3775	0.4930	0.5457	0.6280	0.8065

Fineness Modulus	C_u	C_c
1.66	2.60	1.35

Particle Size Distribution Report



	% Stones	% +3"	% Gravel			% Sand					% Silt		% Clay
			Coarse	Medium	Fine	V. Crs.	Crs.	Med.	Fine	V. Fine	Crs.	Fine	
○	0.0	0.0	3.1	23.9	14.5	11.5	15.9	22.3	6.6			2.2	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			9.7480	2.1888	1.1879	0.4827	0.3106	0.2630	0.40	8.32

Material Description	USCS	AASHTO
○ brown sand with gravel	SP	

Project No. 161262 **Client:** Roberts Environmental Service

Project: Lane Street

○ **Source of Sample:** HB-1 **Depth:** 18'-20'

Remarks:

○ As Received

Moisture Content: 11.9%

BOWSER-MORNER, INC.

Dayton, Ohio

GRAIN SIZE DISTRIBUTION TEST DATA

3/22/2013

Client: Roberts Environmental Service
Project: Lane Street
Project Number: 161262
Location: HB-1
Depth: 18'-20'
Material Description: brown sand with gravel
USCS Classification: SP
Testing Remarks: As Received
Moisture Content: 11.9%

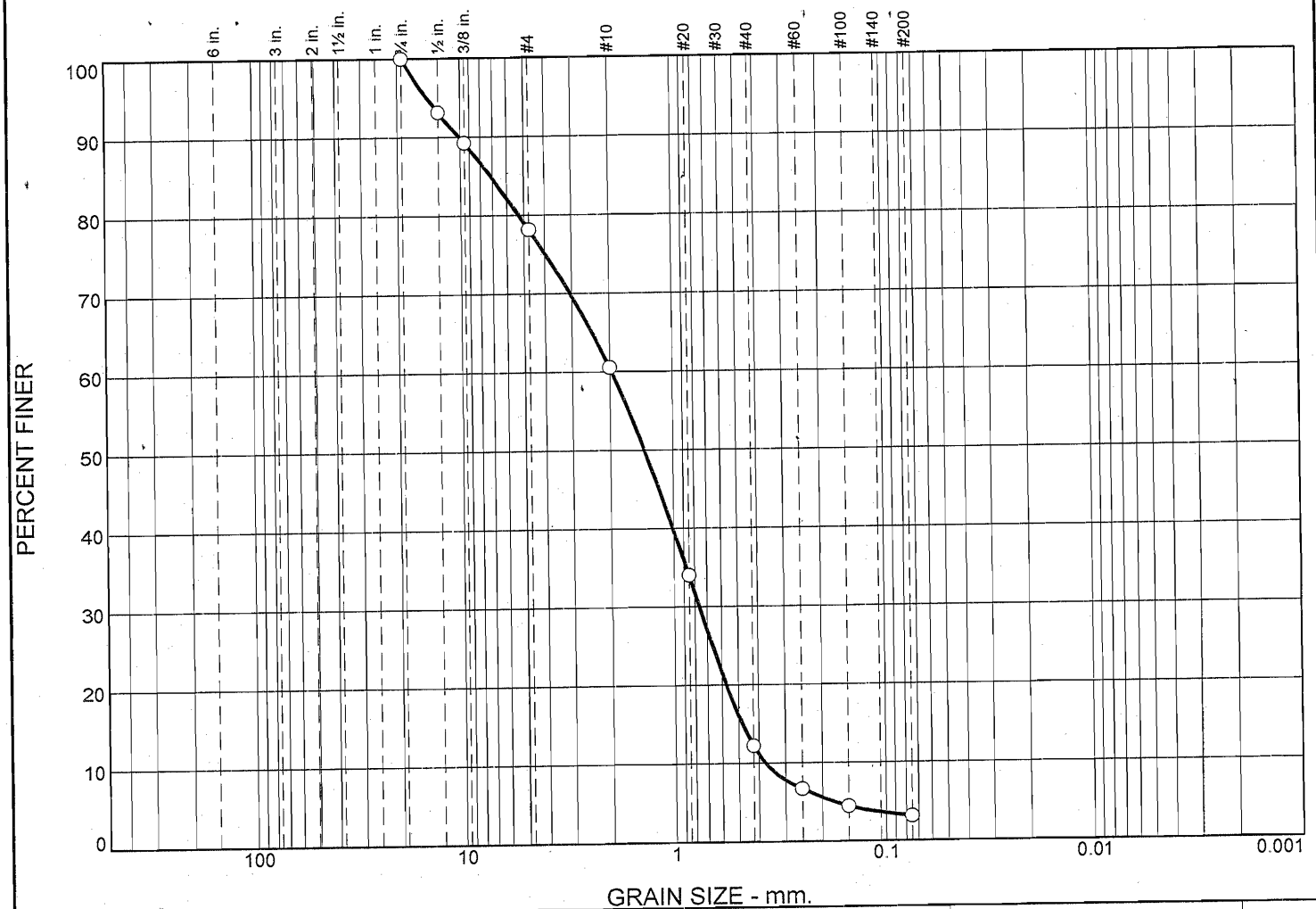
Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
595.10	113.38	0.00	1.0	0.00	100.0
			.75	15.12	96.9
			.50	41.92	91.3
			.375	74.87	84.5
			#4	130.17	73.0
			#10	200.01	58.5
			#20	270.19	43.9
			#40	356.79	25.9
			#60	439.54	8.8
			#100	466.09	3.2
			#200	473.17	1.8

Stones	Cobbles	Gravel				Sand						Silt			Clay	Fines
		Coarse	Medium	Fine	Total	V. Crs.	Crs.	Med.	Fine	V. Fine	Total	Crs.	Fine	Total		Total
0.0	0.0	3.1	23.9	14.5	41.5	11.5	15.9	22.3	6.6							

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.2630	0.3106	0.3587	0.4827	1.1879	2.1888	7.6121	9.7480	11.9660	16.0935

Fineness Modulus	C_u	C_c
3.81	8.32	0.40

Particle Size Distribution Report



	% Stones	% +3"	% Gravel			% Sand					% Silt		% Clay
			Coarse	Medium	Fine	V. Crs.	Crs.	Med.	Fine	V. Fine	Crs.	Fine	
○	0.0	0.0	0.0	21.8	17.6	20.9	23.5	9.5	3.2			3.5	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			7.1309	1.9555	1.3720	0.7595	0.4787	0.3715	0.79	5.26

Material Description	USCS	AASHTO
○ brown sand with gravel	SP	

Project No. 161262 **Client:** Roberts Environmental Service

Project: Lane Street

○ **Source of Sample:** HB-1 **Depth:** 20'-22'

Remarks:

○ As Received

Moisture Content: 11.6%

BOWSER-MORNER, INC.

Dayton, Ohio

GRAIN SIZE DISTRIBUTION TEST DATA

3/22/2013

Client: Roberts Environmental Service
Project: Lane Street
Project Number: 161262
Location: HB-1
Depth: 20'-22'
Material Description: brown sand with gravel
USCS Classification: SP
Testing Remarks: As Received
Moisture Content: 11.6%

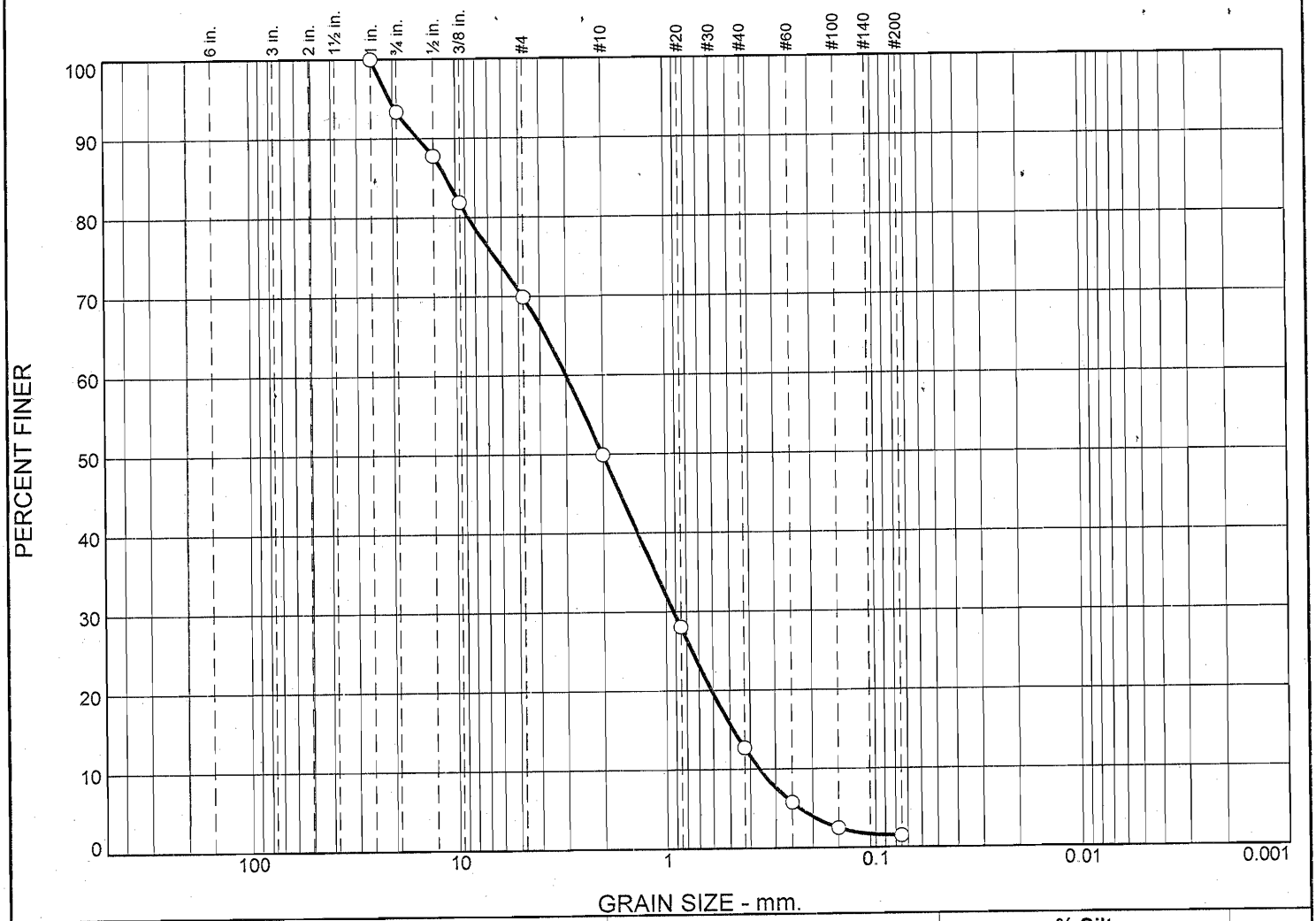
Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
732.80	114.27	0.00			
			.75	0.00	100.0
			.50	42.24	93.2
			.375	66.32	89.3
			#4	134.92	78.2
			#10	243.87	60.6
			#20	407.93	34.0
			#40	542.72	12.3
			#60	576.97	6.7
			#100	590.88	4.5
			#200	598.96	3.2

Stones	Cobbles	Gravel				Sand						Silt			Clay	Fines
		Coarse	Medium	Fine	Total	V. Crs.	Crs.	Med.	Fine	V. Fine	Total	Crs.	Fine	Total		Total
0.0	0.0	0.0	21.8	17.6	39.4	20.9	23.5	9.5	3.2							

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.3715	0.4787	0.5687	0.7595	1.3720	1.9555	5.2736	7.1309	10.0517	14.2889

Fineness Modulus	C_u	C_c
3.89	5.26	0.79

Particle Size Distribution Report



	% Stones	% +3"	% Gravel			% Sand					% Silt		% Clay
			Coarse	Medium	Fine	V. Crs.	Crs.	Med.	Fine	V. Fine	Crs.	Fine	
○	0.0	0.0	6.6	23.5	20.0	17.7	16.4	10.0	4.2			1.6	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			11.0008	2.9896	2.0061	0.9181	0.4808	0.3588	0.79	8.33

Material Description	USCS	AASHTO
○ brown and gray sand with gravel	SP	

Project No. 161262 **Client:** Roberts Environmental Service

Project: Lane Street

○ **Source of Sample:** HB-1 **Depth:** 28'-30'

Remarks:

○ As Received

Moisture Content: 11.0%

BOWSER-MORNER, INC.

Dayton, Ohio

GRAIN SIZE DISTRIBUTION TEST DATA

3/22/2013

Client: Roberts Environmental Service
Project: Lane Street
Project Number: 161262
Location: HB-1
Depth: 28'-30'
Material Description: brown and gray sand with gravel
USCS Classification: SP
Testing Remarks: As Received
Moisture Content: 11.0%

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)
791.40	113.46	0.00

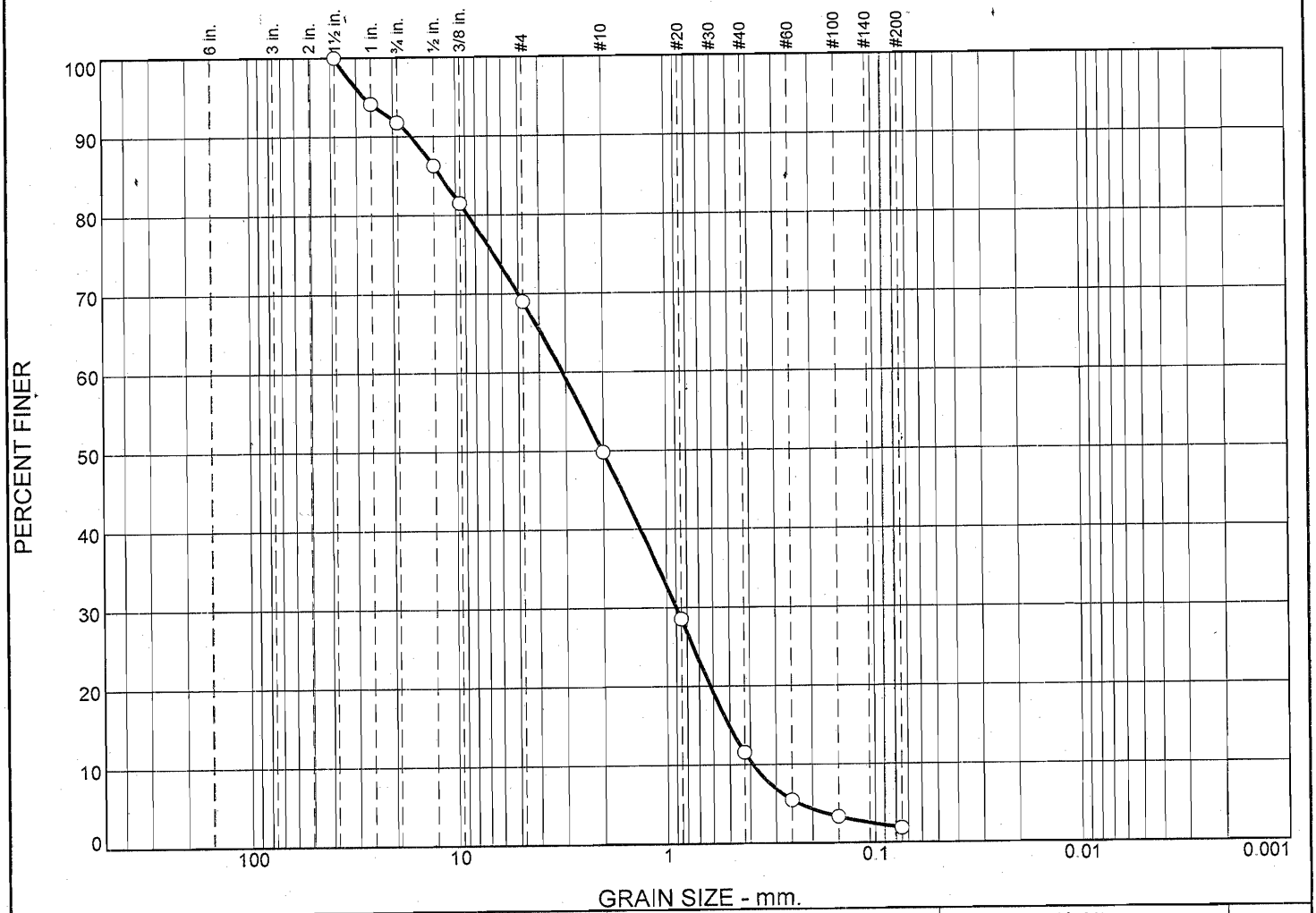
Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
1.0	0.00	100.0
.75	44.86	93.4
.50	82.72	87.8
.375	122.59	81.9
#4	203.77	69.9
#10	339.50	49.9
#20	487.63	28.1
#40	591.82	12.7
#60	638.90	5.8
#100	661.00	2.5
#200	668.00	1.5

Stones	Cobbles	Gravel				Sand						Silt			Clay	Fines
		Coarse	Medium	Fine	Total	V. Crs.	Crs.	Med.	Fine	V. Fine	Total	Crs.	Fine	Total		Total
0.0	0.0	6.6	23.5	20.0	50.1	17.7	16.4	10.0	4.2							

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.3588	0.4808	0.6078	0.9181	2.0061	2.9896	8.6371	11.0008	14.8721	20.6716

Fineness Modulus	C_u	C_c
4.34	8.33	0.79

Particle Size Distribution Report



	% Stones	% +3"	% Gravel			% Sand					% Silt		% Clay
			Coarse	Medium	Fine	V. Crs.	Crs.	Med.	Fine	V. Fine	Crs.	Fine	
○	0.0	0.0	8.2	22.8	19.1	17.0	18.0	9.4	3.1			2.4	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			11.7277	3.1010	2.0112	0.8965	0.5024	0.3863	0.67	8.03

Material Description	USCS	AASHTO
○ gray sand with gravel	SP	

Project No. 161262 **Client:** Roberts Environmental Service

Project: Lane Street

○ **Source of Sample:** HB-1 **Depth:** 30'-32'

Remarks:

○ As Received

Moisture Content: 10.7%

BOWSER-MORNER, INC.

Dayton, Ohio

GRAIN SIZE DISTRIBUTION TEST DATA

3/22/2013

Client: Roberts Environmental Service
Project: Lane Street
Project Number: 161262
Location: HB-1
Depth: 30'-32'
Material Description: gray sand with gravel
USCS Classification: SP
Testing Remarks: As Received
Moisture Content: 10.7%

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)
819.20	119.41	0.00

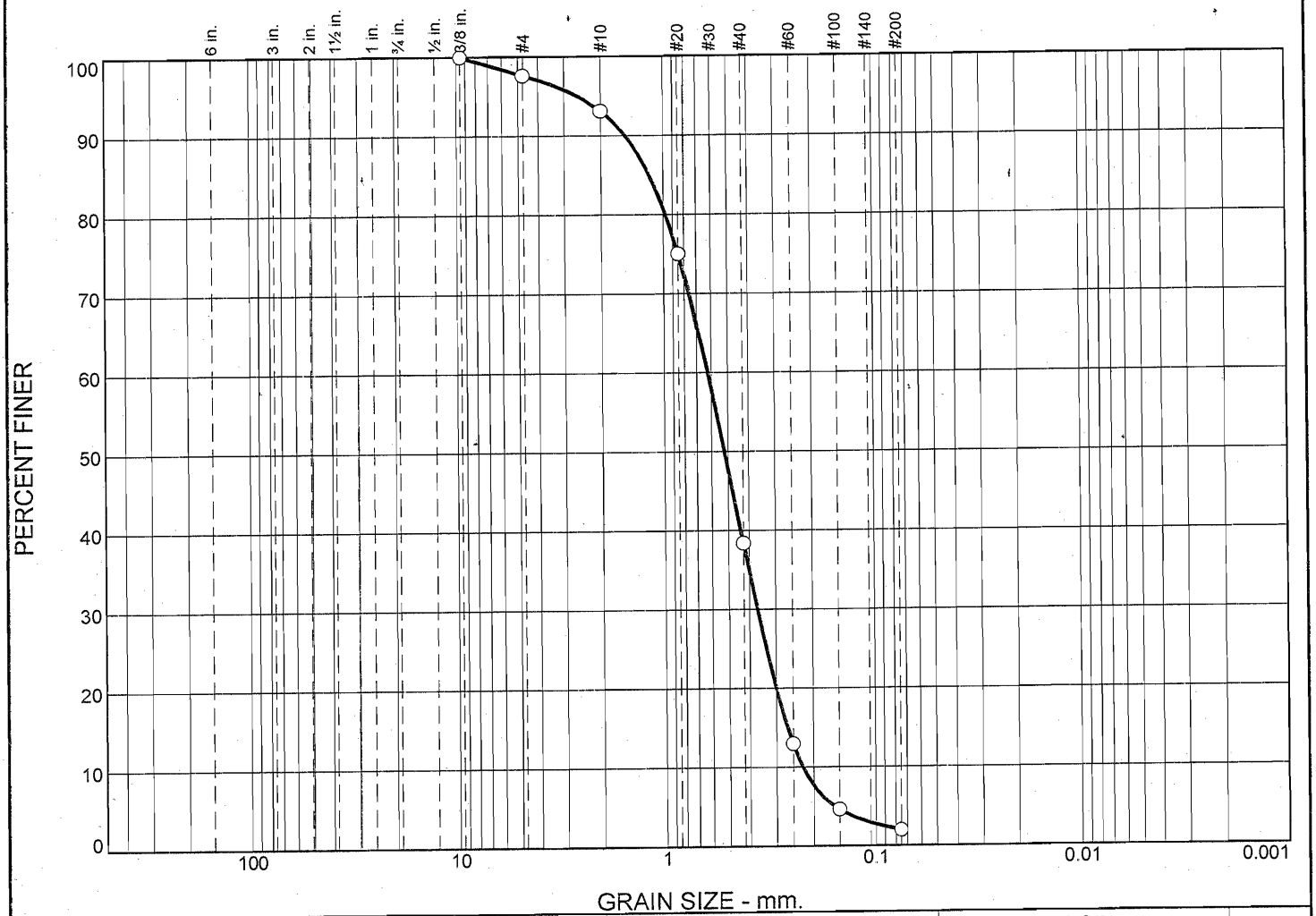
Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
1.5	0.00	100.0
1.0	40.86	94.2
.75	57.40	91.8
.50	95.93	86.3
.375	129.17	81.5
#4	216.67	69.0
#10	350.82	49.9
#20	499.76	28.6
#40	618.70	11.6
#60	661.30	5.5
#100	676.40	3.3
#200	686.80	1.9

Stones	Cobbles	Gravel				Sand						Silt			Clay	Fines
		Coarse	Medium	Fine	Total	V. Crs.	Crs.	Med.	Fine	V. Fine	Total	Crs.	Fine	Total		Total
0.0	0.0	8.2	22.8	19.1	50.1	17.0	18.0	9.4	3.1							

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.3863	0.5024	0.6168	0.8965	2.0112	3.1010	8.6943	11.7277	16.2771	27.3882

Fineness Modulus	C_u	C_c
4.37	8.03	0.67

Particle Size Distribution Report



	% Stones	% +3"	% Gravel			% Sand					% Silt		% Clay
			Coarse	Medium	Fine	V. Crs.	Crs.	Med.	Fine	V. Fine	Crs.	Fine	
○	0.0	0.0	0.0	2.3	4.6	12.3	33.0	34.8	10.3			2.7	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			1.1637	0.6210	0.5196	0.3659	0.2652	0.2244	0.96	2.77

Material Description	USCS	AASHTO
○ gray sand	SP	

Project No. 161262 **Client:** Roberts Environmental Service

Project: Lane Street

○ **Source of Sample:** HB-1 **Depth:** 33'-35'

Remarks:

○ As Received

Moisture Content: 17.3%

BOWSER-MORNER, INC.

Dayton, Ohio

GRAIN SIZE DISTRIBUTION TEST DATA

3/22/2013

Client: Roberts Environmental Service
Project: Lane Street
Project Number: 161262
Location: HB-1
Depth: 33'-35'
Material Description: gray sand
USCS Classification: SP
Testing Remarks: As Received
Moisture Content: 17.3%

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)
605.80	237.36	0.00

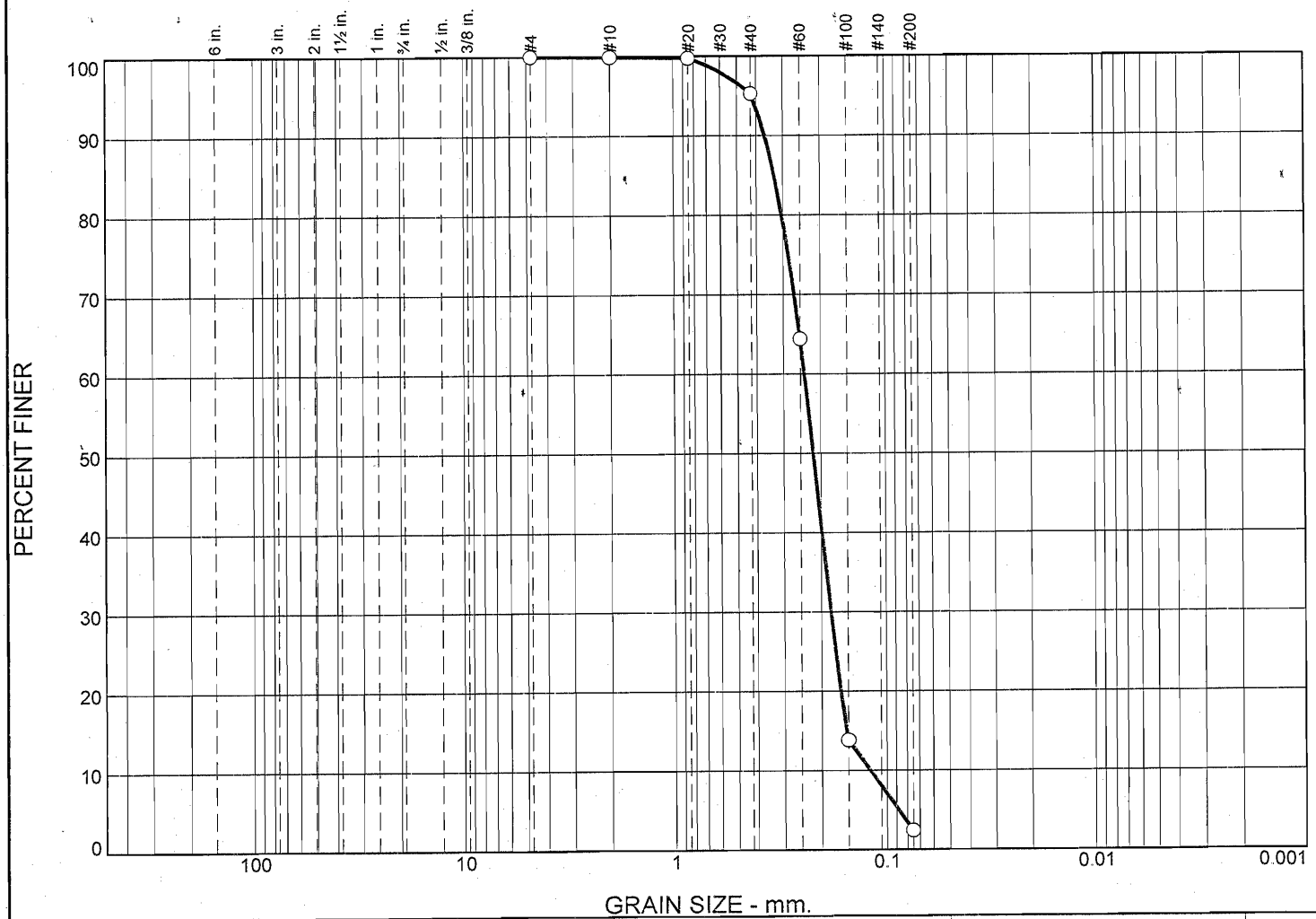
Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
.375	0.00	100.0
#4	8.62	97.7
#10	25.26	93.1
#20	91.85	75.1
#40	226.99	38.4
#60	320.64	13.0
#100	351.27	4.7
#200	361.07	2.0

Stones	Cobbles	Gravel				Sand						Silt			Clay	Fines
		Coarse	Medium	Fine	Total	V. Crs.	Crs.	Med.	Fine	V. Fine	Total	Crs.	Fine	Total		Total
0.0	0.0	0.0	2.3	4.6	6.9	12.3	33.0	34.8	10.3							

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.2244	0.2652	0.2996	0.3659	0.5196	0.6210	0.9738	1.1637	1.5160	2.5654

Fineness Modulus	C_u	C_c
2.40	2.77	0.96

Particle Size Distribution Report



	% Stones	% +3"	% Gravel			% Sand					% Silt		% Clay
			Coarse	Medium	Fine	V. Crs.	Crs.	Med.	Fine	V. Fine	Crs.	Fine	
○	0.0	0.0	0.0	0.0	0.1	0.1	3.1	32.3	57.2		7.2		

☒	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.3304	0.2388	0.2169	0.1799	0.1524	0.1188	1.14	2.01

Material Description	USCS	AASHTO
○ light brown sand	SP	

Project No. 161262 **Client:** Roberts Environmental Service

Project: Lane Street

○ **Source of Sample:** HB-1 **Depth:** 40'-42'

Remarks:

○ As Received

Moisture Content: 19.6%

BOWSER-MORNER, INC.

Dayton, Ohio

GRAIN SIZE DISTRIBUTION TEST DATA

3/22/2013

Client: Roberts Environmental Service
Project: Lane Street
Project Number: 161262
Location: HB-1
Depth: 40'-42'
Material Description: light brown sand
USCS Classification: SP
Testing Remarks: As Received
Moisture Content: 19.6%

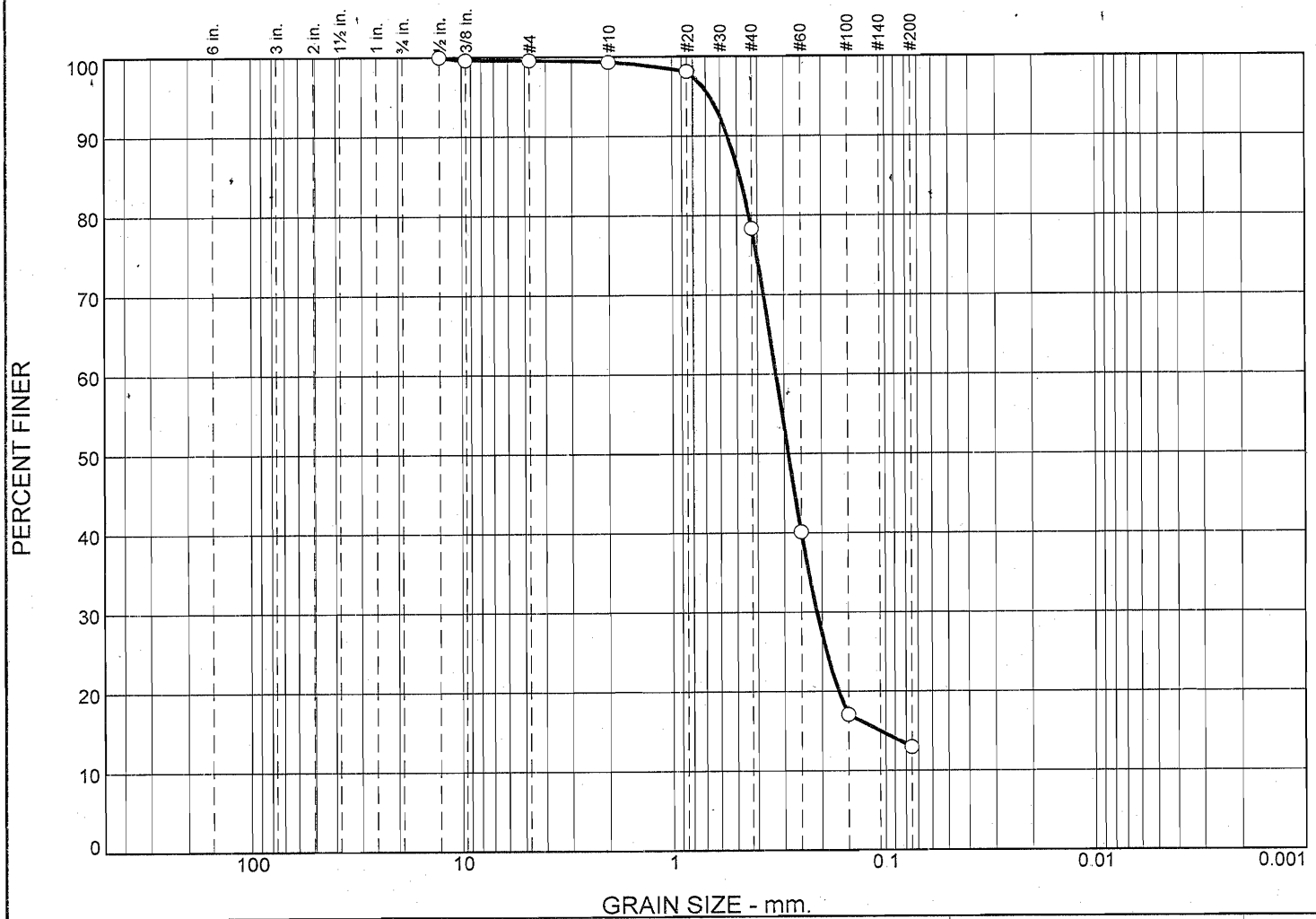
Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
608.40	117.51	0.00	#4	0.00	100.0
			#10	0.37	99.9
			#20	0.96	99.8
			#40	23.04	95.3
			#60	174.55	64.4
			#100	422.94	13.8
			#200	479.00	2.4

Stones	Cobbles	Gravel				Sand						Silt			Clay	Fines
		Coarse	Medium	Fine	Total	V. Crs.	Crs.	Med.	Fine	V. Fine	Total	Crs.	Fine	Total		Total
0.0	0.0	0.0	0.0	0.1	0.1	0.1	3.1	32.3	57.2							

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.1188	0.1524	0.1620	0.1799	0.2169	0.2388	0.3042	0.3304	0.3657	0.4204

Fineness Modulus	C_u	C_c
1.09	2.01	1.14

Particle Size Distribution Report



	% Stones	% +3"	% Gravel			% Sand					% Silt		% Clay
			Coarse	Medium	Fine	V. Crs.	Crs.	Med.	Fine	V. Fine	Crs.	Fine	
○	0.0	0.0	0.0	0.4	0.2	0.9	12.0	46.4	25.4		14.7		

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.4830	0.3269	0.2868	0.2108	0.1053			

Material Description	USCS	AASHTO
○ light brown sand with silt		

Project No. 161262 **Client:** Roberts Environmental Service

Project: Lane Street

○ **Source of Sample:** HB-2 **Depth:** 1'-3'

Remarks:

○ As Received

Moisture Content: 8.9%

BOWSER-MORNER, INC.

Dayton, Ohio

GRAIN SIZE DISTRIBUTION TEST DATA

3/22/2013

Client: Roberts Environmental Service
Project: Lane Street
Project Number: 161262
Location: HB-2
Depth: 1'-3'
Material Description: light brown sand with silt
Testing Remarks: As Received
Moisture Content: 8.9%

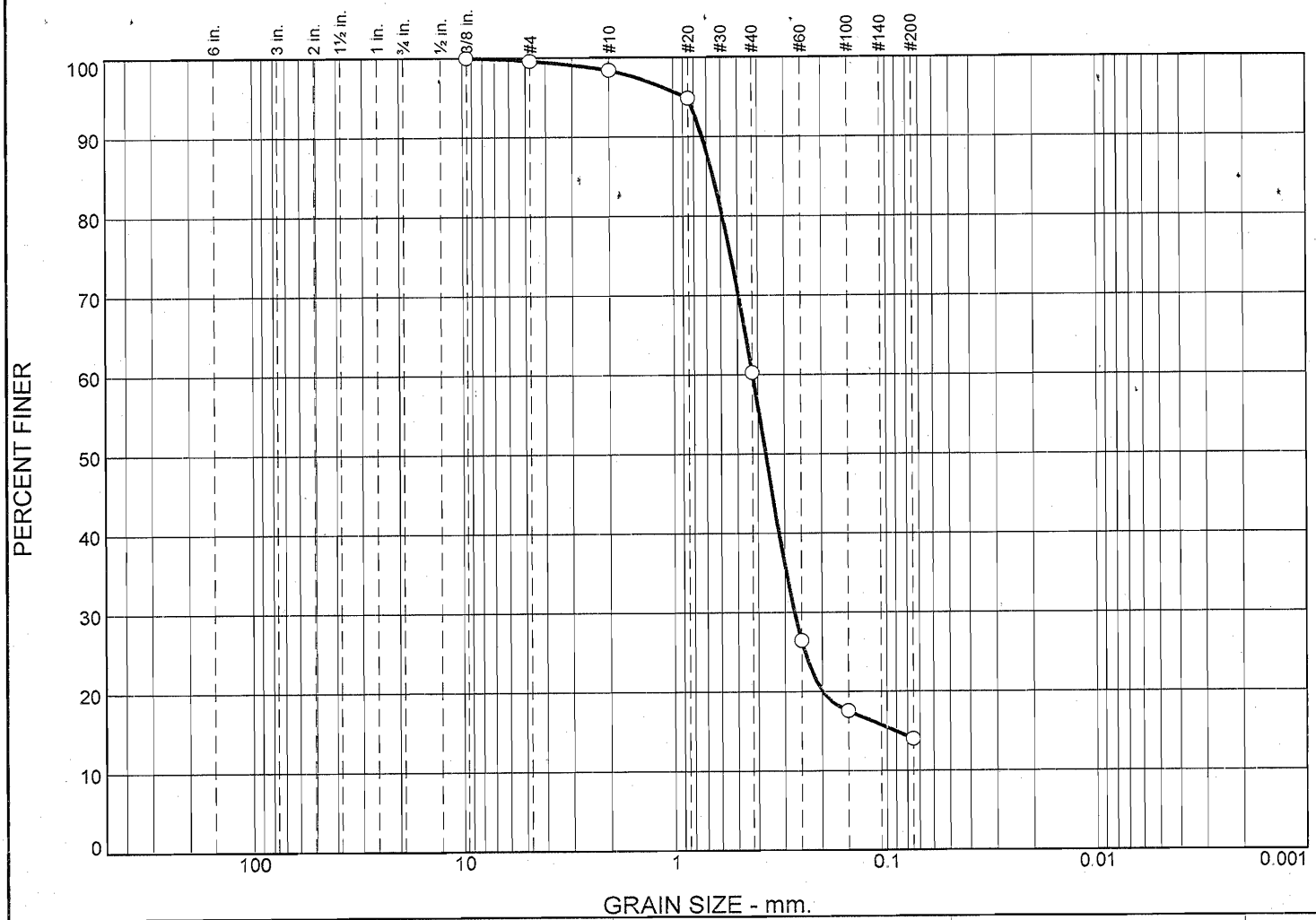
Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
660.80	119.99	0.00	.50	0.00	100.0
			.375	1.94	99.6
			#4	2.13	99.6
			#10	3.39	99.4
			#20	10.03	98.1
			#40	116.94	78.4
			#60	323.68	40.1
			#100	448.36	17.1
			#200	470.57	13.0

Stones	Cobbles	Gravel				Sand						Silt			Clay	Fines
		Coarse	Medium	Fine	Total	V. Crs.	Crs.	Med.	Fine	V. Fine	Total	Crs.	Fine	Total		Total
0.0	0.0	0.0	0.4	0.2	0.6	0.9	12.0	46.4	25.4							

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.1053	0.1662	0.2108	0.2868	0.3269	0.4372	0.4830	0.5495	0.6684

Fineness Modulus
1.39

Particle Size Distribution Report



	% Stones	% +3"	% Gravel			% Sand					% Silt		% Clay
			Coarse	Medium	Fine	V. Crs.	Crs.	Med.	Fine	V. Fine	Crs.	Fine	
○	0.0	0.0	0.0	0.4	1.2	2.7	24.8	44.4	11.0			15.5	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	0.6478	0.4233	0.3677	0.2695	0.0906			

Material Description	USCS	AASHTO
○ orange sand with silt		

Project No. 161262 **Client:** Roberts Environmental Service

Project: Lane Street

○ **Source of Sample:** HB-2 **Depth:** 3'-5'

Remarks:

○ As Received

Moisture Content: 9.3%

BOWSER-MORNER, INC.

Dayton, Ohio

GRAIN SIZE DISTRIBUTION TEST DATA

3/22/2013

Client: Roberts Environmental Service
Project: Lane Street
Project Number: 161262
Location: HB-2
Depth: 3'-5'
Material Description: orange sand with silt
Plastic Limit: NP
Testing Remarks: As Received
Moisture Content: 9.3%

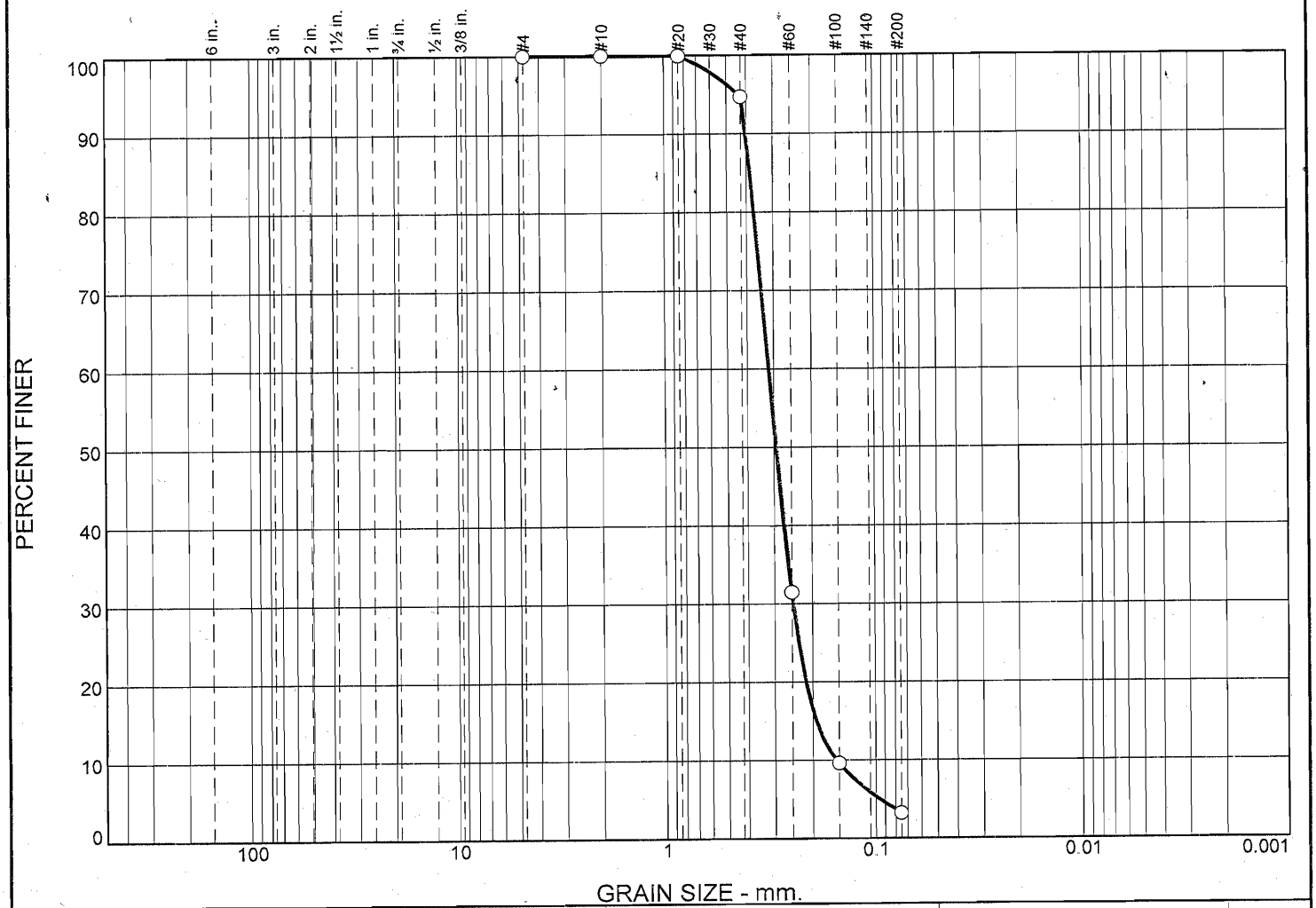
Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
532.32	119.63	0.00	.375	0.00	100.0
			#4	1.62	99.6
			#10	6.43	98.4
			#20	21.13	94.9
			#40	163.92	60.3
			#60	303.45	26.5
			#100	340.11	17.6
			#200	354.77	14.0

Stones	Cobbles	Gravel				Sand						Silt			Clay	Fines
		Coarse	Medium	Fine	Total	V. Crs.	Crs.	Med.	Fine	V. Fine	Total	Crs.	Fine	Total		Total
0.0	0.0	0.0	0.4	1.2	1.6	2.7	24.8	44.4	11.0							

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.0906	0.1978	0.2695	0.3677	0.4233	0.5857	0.6478	0.7294	0.8687

Fineness Modulus
1.70

Particle Size Distribution Report



	% Stones	% +3"	% Gravel			% Sand					% Silt		% Clay
			Coarse	Medium	Fine	V. Crs.	Crs.	Med.	Fine	V. Fine	Crs.	Fine	
○	0.0	0.0	0.0	0.0	0.0	0.0	3.6	64.9	26.1		5.4		

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	0.3849	0.3163	0.2933	0.2461	0.1923	0.1539	1.24	2.05

Material Description	USCS	AASHTO
○ light brown sand	SP	

Project No. 161262 **Client:** Roberts Environmental Service

Project: Lane Street

○ **Source of Sample:** HB-2 **Depth:** 8'-10'

Remarks:

○ As Received

Moisture Content: 19.8%

BOWSER-MORNER, INC.

Dayton, Ohio

GRAIN SIZE DISTRIBUTION TEST DATA

3/22/2013

Client: Roberts Environmental Service
Project: Lane Street
Project Number: 161262
Location: HB-2
Depth: 8'-10'
Material Description: light brown sand
Plastic Limit: NP
USCS Classification: SP
Testing Remarks: As Received
Moisture Content: 19.8%

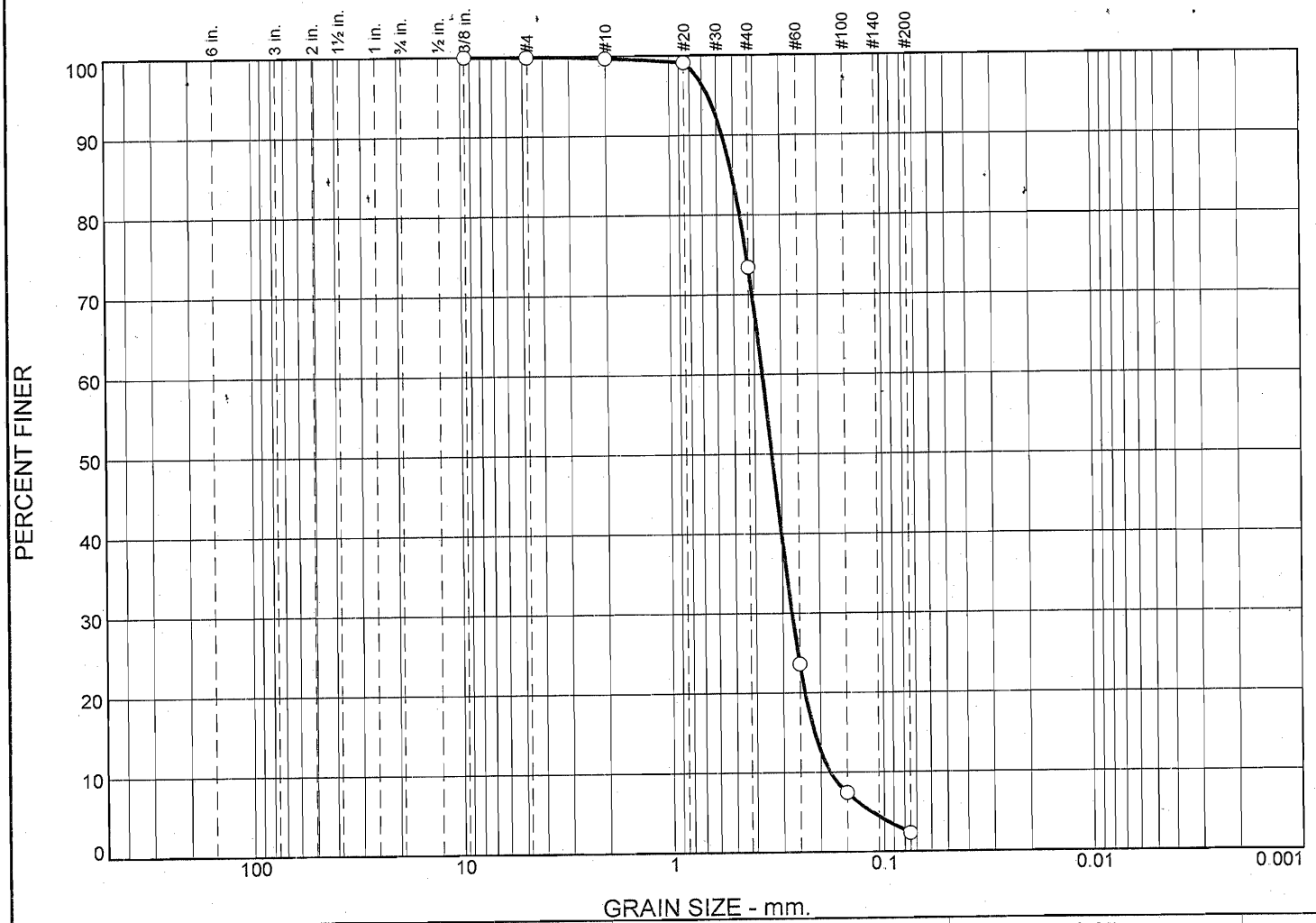
Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
603.50	121.39	0.00	#4	0.00	100.0
			#10	0.03	100.0
			#20	0.07	100.0
			#40	25.29	94.8
			#60	330.37	31.5
			#100	435.61	9.6
			#200	466.47	3.2

Stones	Cobbles	Gravel				Sand						Silt			Clay	Fines
		Coarse	Medium	Fine	Total	V. Crs.	Crs.	Med.	Fine	V. Fine	Total	Crs.	Fine	Total		Total
0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.6	64.9	26.1							

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.1539	0.1923	0.2147	0.2461	0.2933	0.3163	0.3688	0.3849	0.4035	0.4348

Fineness Modulus	C_u	C_c
1.39	2.05	1.24

Particle Size Distribution Report



	% Stones	% +3"	% Gravel			% Sand					% Silt		% Clay
			Coarse	Medium	Fine	V. Crs.	Crs.	Med.	Fine	V. Fine	Crs.	Fine	
○	0.0	0.0	0.0	0.0	0.3	0.4	14.7	61.0	19.5			4.1	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	0.5038	0.3674	0.3331	0.2711	0.2136	0.1800	1.11	2.04

Material Description	USCS	AASHTO
○ brown sand	SP	

Project No. 161262 **Client:** Roberts Environmental Service

Project: Lane Street

○ **Source of Sample:** HB-2 **Depth:** 12'-14'

Remarks:

○ As Received

Moisture Content: 18.8%

BOWSER-MORNER, INC.

Dayton, Ohio

GRAIN SIZE DISTRIBUTION TEST DATA

3/22/2013

Client: Roberts Environmental Service
Project: Lane Street
Project Number: 161262
Location: HB-2
Depth: 12'-14'
Material Description: brown sand
Plastic Limit: NP
USCS Classification: SP
Testing Remarks: As Received
Moisture Content: 18.8%

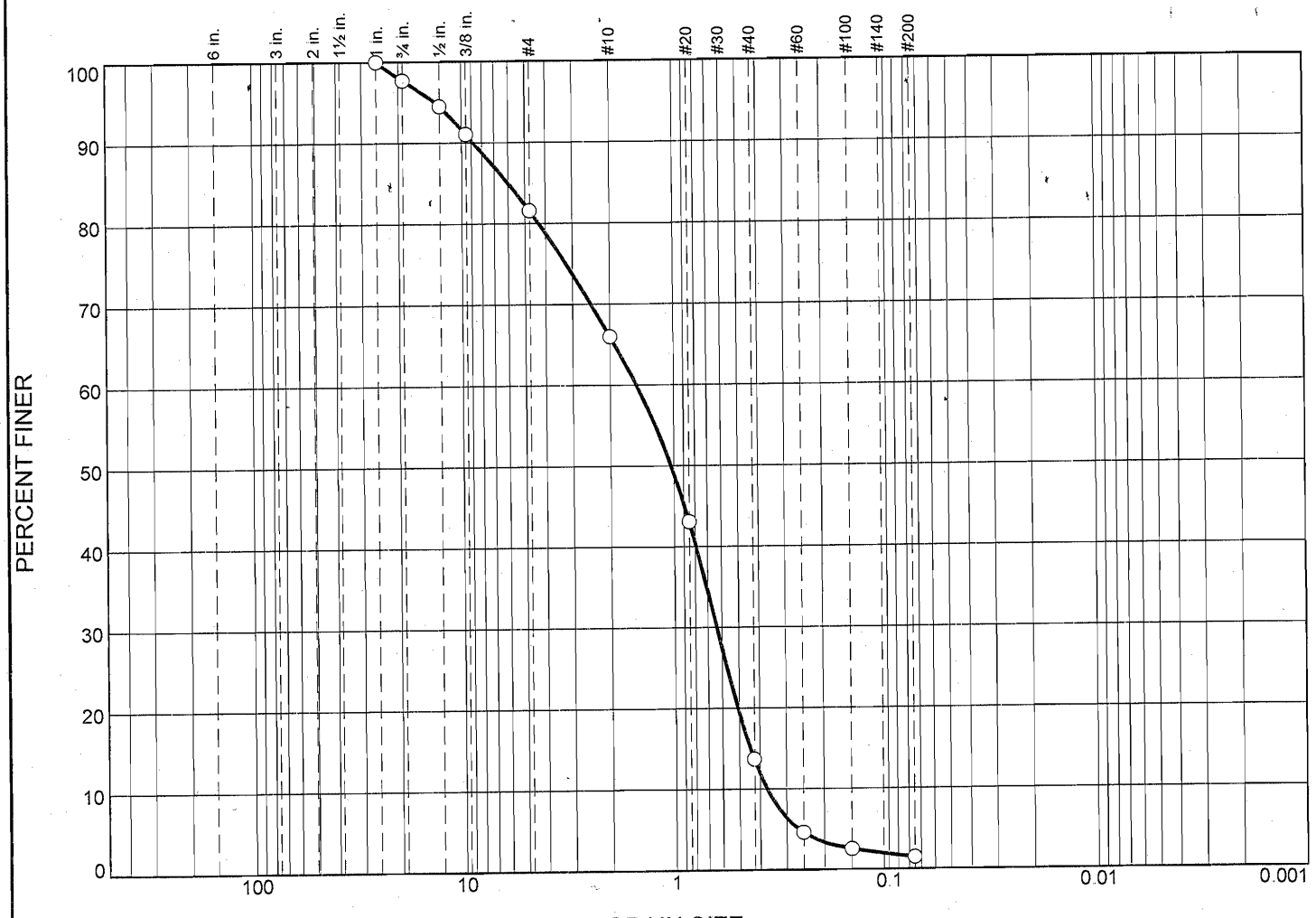
Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
631.90	120.41	0.00	.375	0.00	100.0
			#4	0.25	100.0
			#10	1.37	99.7
			#20	4.36	99.1
			#40	135.78	73.5
			#60	390.67	23.6
			#100	473.44	7.4
			#200	499.68	2.3

Stones	Cobbles	Gravel				Sand						Silt			Clay	Fines
		Coarse	Medium	Fine	Total	V. Crs.	Crs.	Med.	Fine	V. Fine	Total	Crs.	Fine	Total		Total
0.0	0.0	0.0	0.0	0.3	0.3	0.4	14.7	61.0	19.5							

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.1800	0.2136	0.2364	0.2711	0.3331	0.3674	0.4641	0.5038	0.5596	0.6526

Fineness Modulus	C_u	C_c
1.61	2.04	1.11

Particle Size Distribution Report



	% Stones	% +3"	% Gravel			% Sand					% Silt		% Clay
			Coarse	Medium	Fine	V. Crs.	Crs.	Med.	Fine	V. Fine	Crs.	Fine	
○	0.0	0.0	2.3	16.1	15.6	17.0	29.4	15.0	2.7		1.9		

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	5.9960	1.4969	1.0299	0.6327	0.4422	0.3699	0.72	4.05

Material Description	USCS	AASHTO
○ brown sand with gravel	SP	

Project No. 161262 **Client:** Roberts Environmental Service

Project: Lane Street

○ **Source of Sample:** HB-2 **Depth:** 15'-17'

Remarks:

○ As Received

Moisture Content: 11.4%

BOWSER-MORNER, INC.

Dayton, Ohio

GRAIN SIZE DISTRIBUTION TEST DATA

3/22/2013

Client: Roberts Environmental Service
Project: Lane Street
Project Number: 161262
Location: HB-2
Depth: 15'-17'
Material Description: brown sand with gravel
Plastic Limit: NP
USCS Classification: SP
Testing Remarks: As Received
Moisture Content: 11.4%

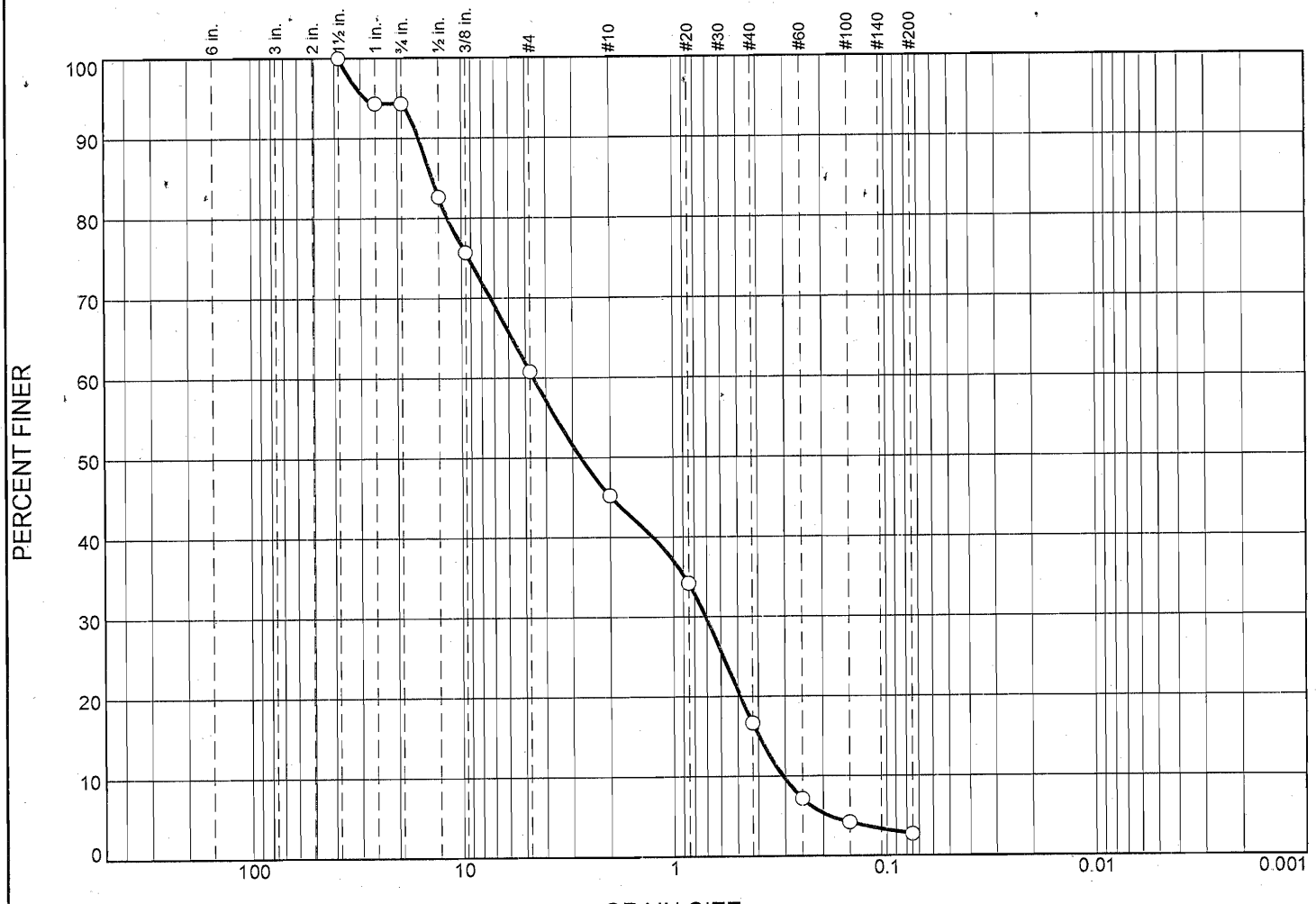
Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
678.30	99.40	0.00	1.0	0.00	100.0
			.75	13.29	97.7
			0.5	31.68	94.5
			0.375	51.73	91.1
			#4	106.42	81.6
			#10	196.76	66.0
			#20	329.44	43.1
			#40	499.56	13.7
			#60	552.11	4.6
			#100	564.13	2.6
			#200	570.29	1.5

Stones	Cobbles	Gravel				Sand						Silt			Clay	Fines
		Coarse	Medium	Fine	Total	V. Crs.	Crs.	Med.	Fine	V. Fine	Total	Crs.	Fine	Total		Total
0.0	0.0	2.3	16.1	15.6	34.0	17.0	29.4	15.0	2.7							

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.3699	0.4422	0.5048	0.6327	1.0299	1.4969	4.2876	5.9960	8.7687	13.3357

Fineness Modulus	C_u	C_c
3.70	4.05	0.72

Particle Size Distribution Report



	% Stones	% +3"	% Gravel			% Sand					% Silt		% Clay
			Coarse	Medium	Fine	V. Crs.	Crs.	Med.	Fine	V. Fine	Crs.	Fine	
○	0.0	0.0	5.6	33.6	15.5	8.2	16.2	13.7	4.0		3.2		

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	13.6505	4.5695	2.7354	0.7055	0.3953	0.3063	0.36	14.92

Material Description	USCS	AASHTO
○ brown sand with gravel	SP	

Project No. 161262 **Client:** Roberts Environmental Service

Project: Lane Street

○ **Source of Sample:** HB-2 **Depth:** 17'-19'

Remarks:

○ As Received

Moisture Content: 8.6%

BOWSER-MORNER, INC.

Dayton, Ohio

GRAIN SIZE DISTRIBUTION TEST DATA

3/22/2013

Client: Roberts Environmental Service
Project: Lane Street
Project Number: 161262
Location: HB-2
Depth: 17'-19'
Material Description: brown sand with gravel
Plastic Limit: NP
USCS Classification: SP
Testing Remarks: As Received
Moisture Content: 8.6%

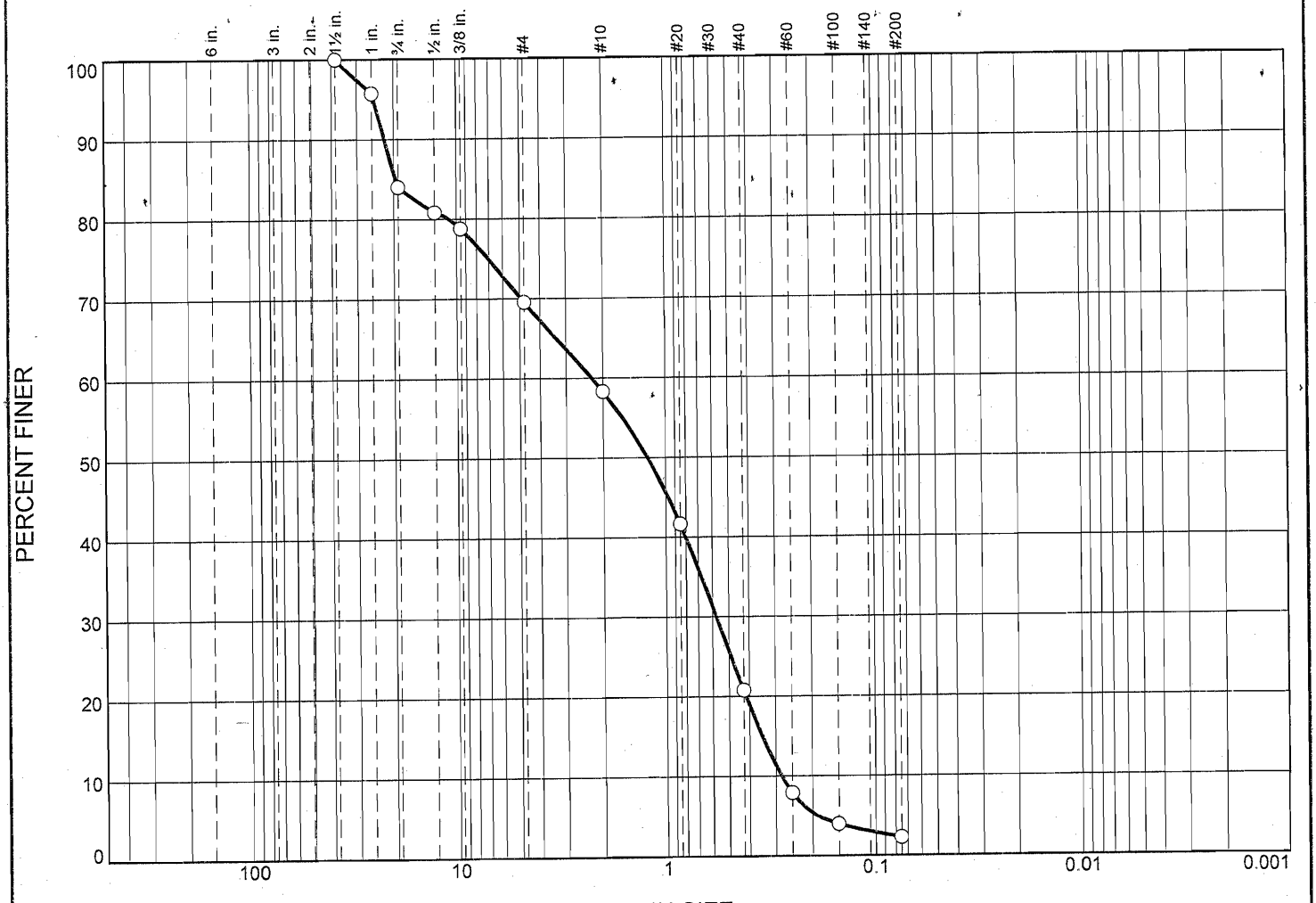
Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
683.50	121.03	0.00	1.50	0.00	100.0
			1.0	31.75	94.4
			.75	31.75	94.4
			.50	97.61	82.6
			.375	136.54	75.7
			#4	220.39	60.8
			#10	307.94	45.3
			#20	369.93	34.2
			#40	468.57	16.7
			#60	521.96	7.2
			#100	538.85	4.2
			#200	547.11	2.7

Stones	Cobbles	Gravel				Sand						Silt			Clay	Fines
		Coarse	Medium	Fine	Total	V. Crs.	Crs.	Med.	Fine	V. Fine	Total	Crs.	Fine	Total		Total
0.0	0.0	5.6	33.6	15.5	54.7	8.2	16.2	13.7	4.0							

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.3063	0.3953	0.4841	0.7055	2.7354	4.5695	11.5408	13.6505	15.8060	28.3485

Fineness Modulus	C_u	C_c
4.43	14.92	0.36

Particle Size Distribution Report



	% Stones	% +3"	% Gravel			% Sand					% Silt		% Clay
			Coarse	Medium	Fine	V. Crs.	Crs.	Med.	Fine	V. Fine	Crs.	Fine	
○	0.0	0.0	16.0	14.4	11.3	12.6	19.9	17.9	5.0			2.9	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	19.6127	2.2518	1.2188	0.5723	0.3470	0.2807	0.52	8.02

Material Description	USCS	AASHTO
○ brown and gray sand with gravel	SP	

Project No. 161262 **Client:** Roberts Environmental Service

Project: Lane Street

○ **Source of Sample:** HB-2 **Depth:** 23'-25'

Remarks:

○ As Received

Moisture Content: 10.5%

BOWSER-MORNER, INC.

Dayton, Ohio

GRAIN SIZE DISTRIBUTION TEST DATA

3/22/2013

Client: Roberts Environmental Service
Project: Lane Street
Project Number: 161262
Location: HB-2
Depth: 23'-25'
Material Description: brown and gray sand with gravel
Plastic Limit: NP
USCS Classification: SP
Testing Remarks: As Received
Moisture Content: 10.5%

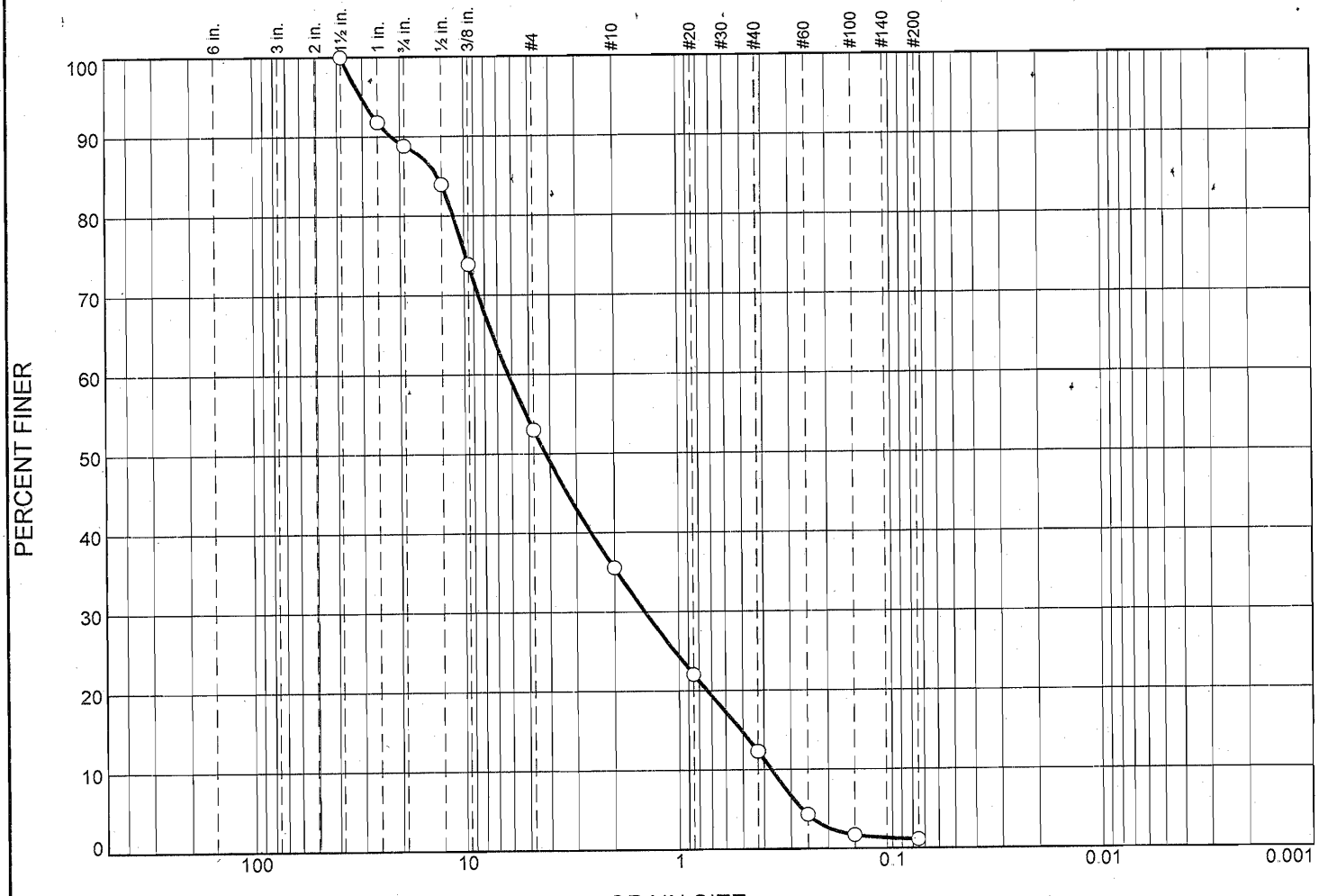
Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
729.50	119.53	0.00	1.5	0.00	100.0
			1.0	25.88	95.8
			.75	97.38	84.0
			.50	116.95	80.8
			.375	129.33	78.8
			#4	185.54	69.6
			#10	254.07	58.3
			#20	355.78	41.7
			#40	483.22	20.8
			#60	561.62	7.9
			#100	585.62	4.0
			#200	596.11	2.3

Stones	Cobbles	Gravel				Sand						Silt			Clay	Fines
		Coarse	Medium	Fine	Total	V. Crs.	Crs.	Med.	Fine	V. Fine	Total	Crs.	Fine	Total		Total
0.0	0.0	16.0	14.4	11.3	41.7	12.6	19.9	17.9	5.0							

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.2807	0.3470	0.4141	0.5723	1.2188	2.2518	10.8030	19.6127	22.1013	24.8610

Fineness Modulus	C_u	C_c
4.11	8.02	0.52

Particle Size Distribution Report



	% Stones	% +3"	% Gravel			% Sand					% Silt		% Clay
			Coarse	Medium	Fine	V. Crs.	Crs.	Med.	Fine	V. Fine	Crs.	Fine	
○	0.0	0.0	11.1	35.9	17.4	11.2	9.6	10.5	3.0			1.3	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	13.2617	6.2111	4.1711	1.4356	0.5071	0.3689	0.90	16.83

Material Description	USCS	AASHTO
○ brown and gray sand with gravel	SP	

Project No. 161262 **Client:** Roberts Environmental Service

Project: Lane Street

○ **Source of Sample:** HB-2 **Depth:** 28'-30'

Remarks:

○ As Received

Moisture Content: 8.7%

BOWSER-MORNER, INC.

Dayton, Ohio

GRAIN SIZE DISTRIBUTION TEST DATA

3/22/2013

Client: Roberts Environmental Service
Project: Lane Street
Project Number: 161262
Location: HB-2
Depth: 28'-30'
Material Description: brown and gray sand with gravel
Plastic Limit: NP
USCS Classification: SP
Testing Remarks: As Received
Moisture Content: 8.7%

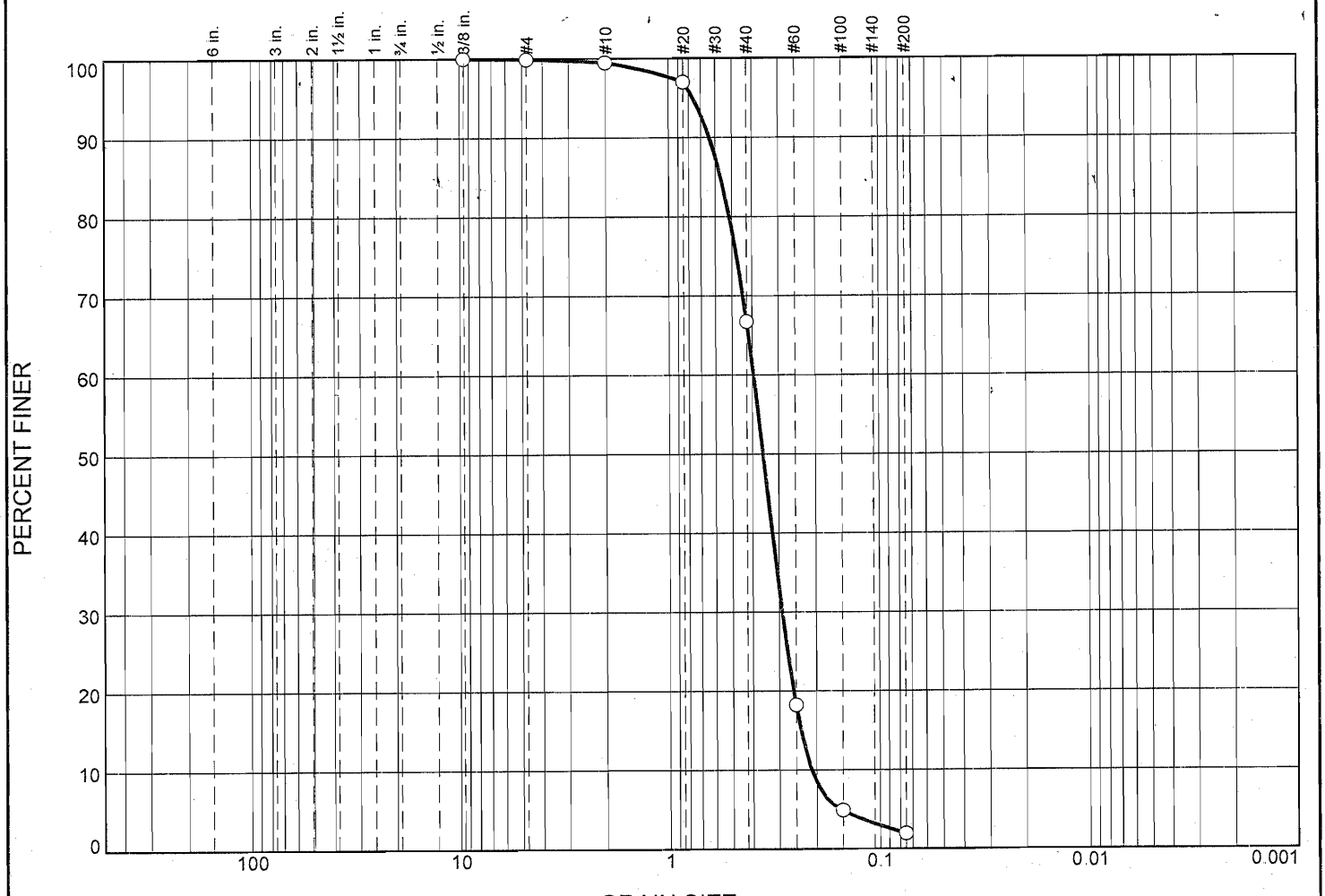
Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
829.30	96.83	0.00	1.5	0.00	100.0
			1.0	59.98	91.8
			.75	81.58	88.9
			.50	117.32	84.0
			.375	191.08	73.9
			#4	343.99	53.0
			#10	471.85	35.6
			#20	570.70	22.1
			#40	642.20	12.3
			#60	700.90	4.3
			#100	720.00	1.7
			#200	724.20	1.1

Stones	Cobbles	Gravel				Sand						Silt			Clay	Fines
		Coarse	Medium	Fine	Total	V. Crs.	Crs.	Med.	Fine	V. Fine	Total	Crs.	Fine	Total		Total
0.0	0.0	11.1	35.9	17.4	64.4	11.2	9.6	10.5	3.0							

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.3689	0.5071	0.7298	1.4356	4.1711	6.2111	11.1896	13.2617	21.8907	30.3664

Fineness Modulus	C_u	C_c
4.93	16.83	0.90

Particle Size Distribution Report



	% Stones	% +3"	% Gravel			% Sand					% Silt		% Clay
			Coarse	Medium	Fine	V. Crs.	Crs.	Med.	Fine	V. Fine	Crs.	Fine	
○	0.0	0.0	0.0	0.1	0.4	1.8	19.1	60.3	15.3			3.0	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	0.5628	0.3940	0.3557	0.2900	0.2366	0.2103	1.01	1.87

Material Description	USCS	AASHTO
○ light brown sand	SP	

Project No. 161262 **Client:** Roberts Environmental Service

Project: Lane Street

○ **Source of Sample:** HB-2 **Depth:** 38'-40'

Remarks:

○ As Received

Moisture Content: 18.4%

BOWSER-MORNER, INC.

Dayton, Ohio

GRAIN SIZE DISTRIBUTION TEST DATA

3/22/2013

Client: Roberts Environmental Service
Project: Lane Street
Project Number: 161262
Location: HB-2
Depth: 38'-40'
Material Description: light brown sand
Plastic Limit: NP
USCS Classification: SP
Testing Remarks: As Received
Moisture Content: 18.4%

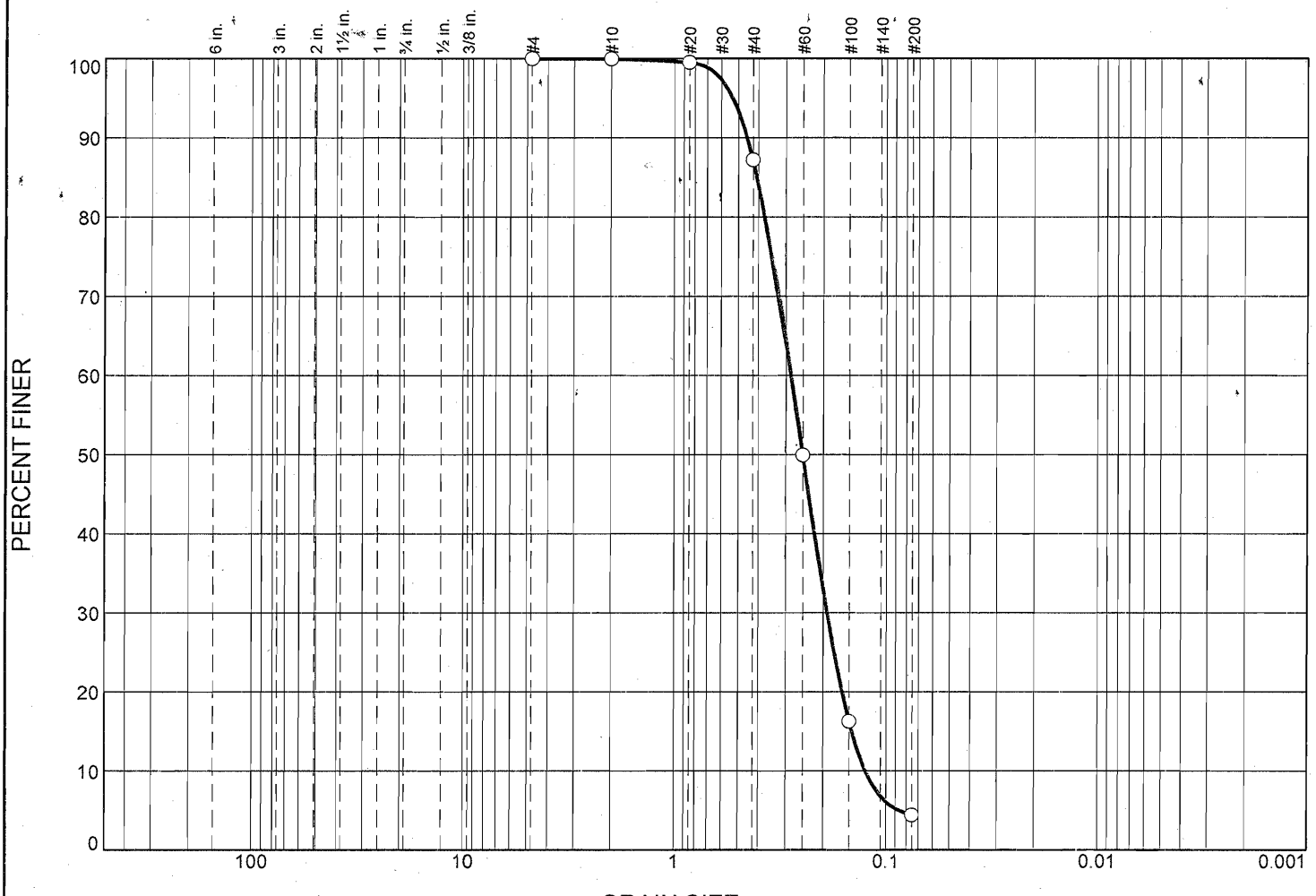
Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
547.90	119.12	0.00	.375	0.00	100.0
			#4	0.34	99.9
			#10	2.12	99.5
			#20	12.73	97.0
			#40	142.51	66.8
			#60	350.49	18.3
			#100	407.80	4.9
			#200	420.43	1.9

Stones	Cobbles	Gravel				Sand						Silt			Clay	Fines
		Coarse	Medium	Fine	Total	V. Crs.	Crs.	Med.	Fine	V. Fine	Total	Crs.	Fine	Total		Total
0.0	0.0	0.0	0.1	0.4	0.5	1.8	19.1	60.3	15.3							

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.2103	0.2366	0.2565	0.2900	0.3557	0.3940	0.5121	0.5628	0.6354	0.7599

Fineness Modulus	C_u	C_c
1.76	1.87	1.01

Particle Size Distribution Report



	% Stones	% +3"	% Gravel			% Sand					% Silt		% Clay
			Coarse	Medium	Fine	V. Crs.	Crs.	Med.	Fine	V. Fine	Crs.	Fine	
○	0.0	0.0	0.0	0.0	0.0	0.4	6.1	43.6	43.8		6.1		

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	0.4069	0.2838	0.2502	0.1910	0.1455	0.1250	1.03	2.27

Material Description	USCS	AASHTO
○ gray sand	SP	

Project No. 161262 **Client:** Roberts Environmental Service

Project: Lane Street

○ **Source of Sample:** HB-2 **Depth:** 46'-48'

Remarks:

○ As Received

Moisture Content: 18.3%

BOWSER-MORNER, INC.

Dayton, Ohio

GRAIN SIZE DISTRIBUTION TEST DATA

3/22/2013

Client: Roberts Environmental Service
Project: Lane Street
Project Number: 161262
Location: HB-2
Depth: 46'-48'
Material Description: gray sand
Plastic Limit: NP
USCS Classification: SP
Testing Remarks: As Received
Moisture Content: 18.3%

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)
562.10	119.77	0.00

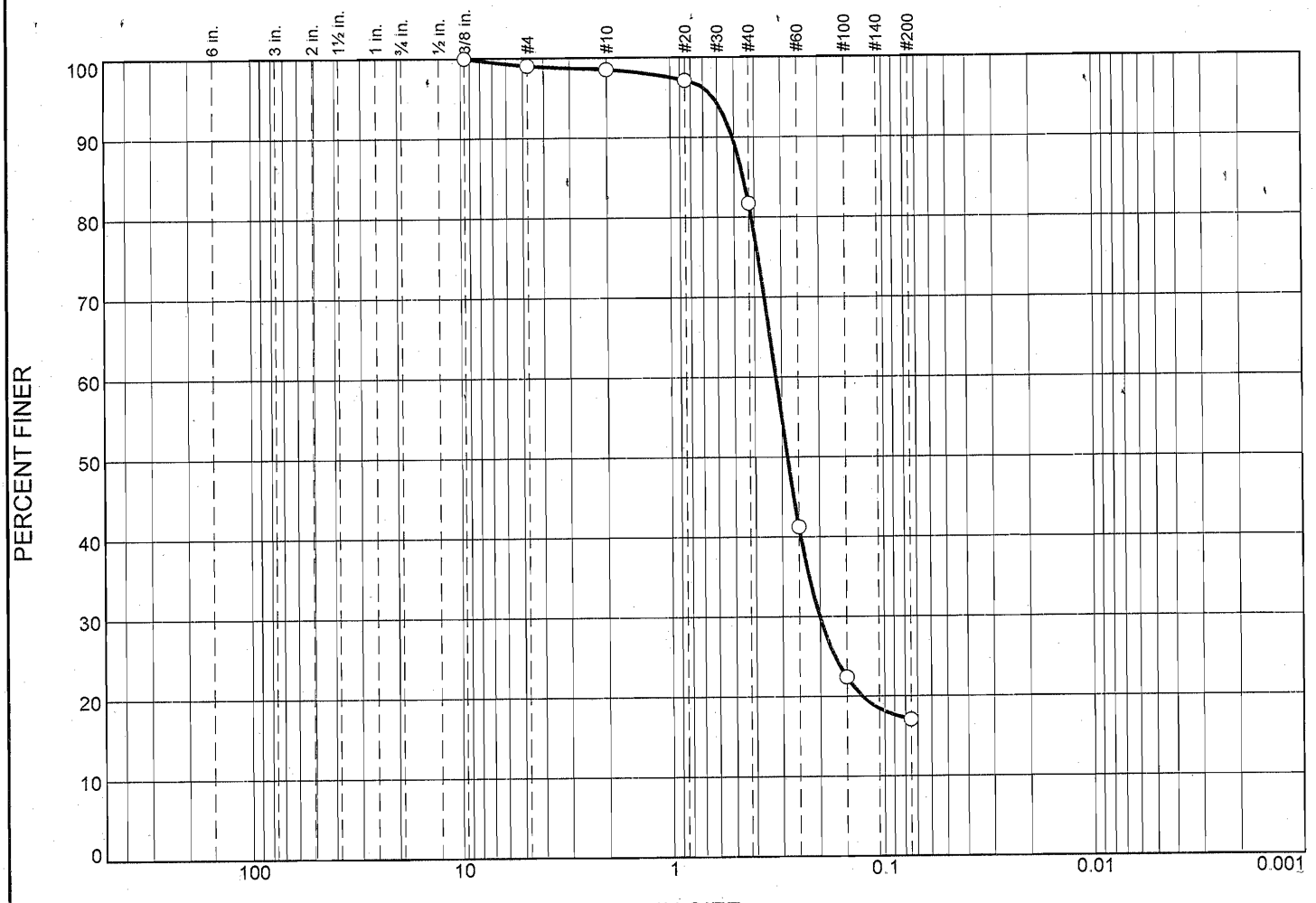
Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
#4	0.00	100.0
#10	0.17	100.0
#20	2.10	99.5
#40	56.48	87.2
#60	221.40	49.9
#100	370.26	16.3
#200	422.81	4.4

Stones	Cobbles	Gravel				Sand						Silt			Clay	Fines
		Coarse	Medium	Fine	Total	V. Crs.	Crs.	Med.	Fine	V. Fine	Total	Crs.	Fine	Total		Total
0.0	0.0	0.0	0.0	0.0	0.0	0.4	6.1	43.6	43.8							

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.1250	0.1455	0.1619	0.1910	0.2502	0.2838	0.3737	0.4069	0.4522	0.5283

Fineness Modulus	C_u	C_c
1.22	2.27	1.03

Particle Size Distribution Report



	% Stones	% +3"	% Gravel			% Sand					% Silt		% Clay
			Coarse	Medium	Fine	V. Crs.	Crs.	Med.	Fine	V. Fine	Crs.	Fine	
○	0.0	0.0	0.0	0.9	0.6	1.0	7.9	48.3	23.2			18.1	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.4505	0.3188	0.2820	0.2002				

Material Description	USCS	AASHTO
○ brown sand with silt		

Project No. 161262 **Client:** Roberts Environmental Service

Project: Lane Street

○ **Source of Sample:** HB-3 **Depth:** 1'-3'

Remarks:

○ As Received

Moisture Content: 10.3%

BOWSER-MORNER, INC.

Dayton, Ohio

GRAIN SIZE DISTRIBUTION TEST DATA

3/22/2013

Client: Roberts Environmental Service
Project: Lane Street
Project Number: 161262
Location: HB-3
Depth: 1'-3'
Material Description: brown sand with silt
Testing Remarks: As Received
Moisture Content: 10.3%

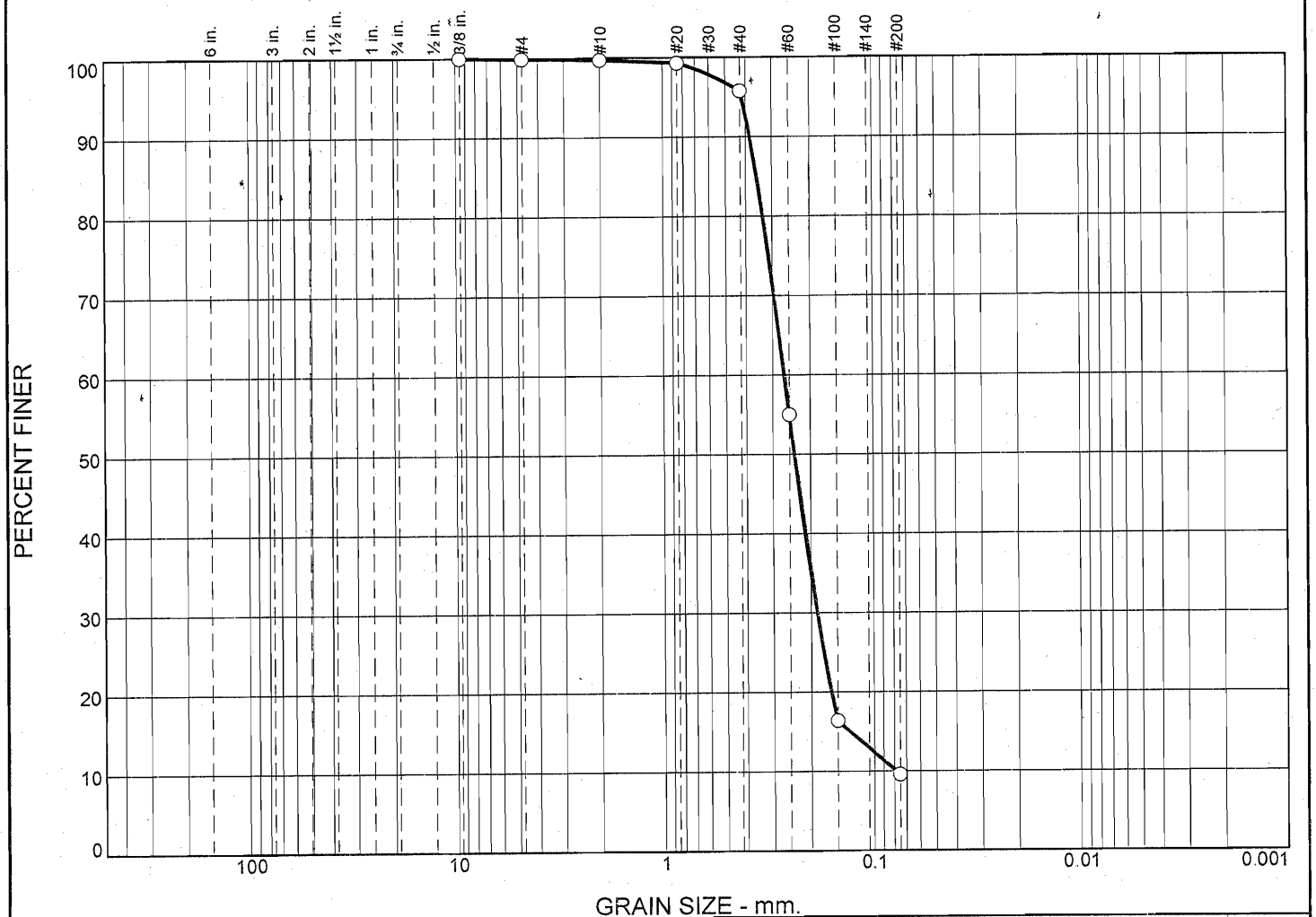
Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
629.50	119.99	0.00	.375	0.00	100.0
			#4	4.84	99.1
			#10	7.43	98.5
			#20	14.57	97.1
			#40	92.95	81.8
			#60	299.23	41.3
			#100	395.27	22.4
			#200	422.44	17.1

Stones	Cobbles	Gravel				Sand						Silt			Clay	Fines
		Coarse	Medium	Fine	Total	V. Crs.	Crs.	Med.	Fine	V. Fine	Total	Crs.	Fine	Total		Total
0.0	0.0	0.0	0.9	0.6	1.5	1.0	7.9	48.3	23.2							

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
		0.1263	0.2002	0.2820	0.3188	0.4132	0.4505	0.5062	0.6224

Fineness Modulus
1.33

Particle Size Distribution Report



	% Stones	% +3"	% Gravel			% Sand					% Silt		% Clay
			Coarse	Medium	Fine	V. Crs.	Crs.	Med.	Fine	V. Fine	Crs.	Fine	
○	0.0	0.0	0.0	0.1	0.2	0.3	2.5	41.9	42.6			12.4	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.3546	0.2640	0.2365	0.1865	0.1301	0.0781	1.69	3.38

Material Description	USCS	AASHTO
○ orange sand with silt		

Project No. 161262 **Client:** Roberts Environmental Service

Project: Lane Street

○ **Source of Sample:** HB-3 **Depth:** 3'-5'

Remarks:

○ As Received

Moisture Content: 8.1%

BOWSER-MORNER, INC.

Dayton, Ohio

GRAIN SIZE DISTRIBUTION TEST DATA

3/22/2013

Client: Roberts Environmental Service
Project: Lane Street
Project Number: 161262
Location: HB-3
Depth: 3'-5'
Material Description: orange sand with silt
Testing Remarks: As Received
Moisture Content: 8.1%

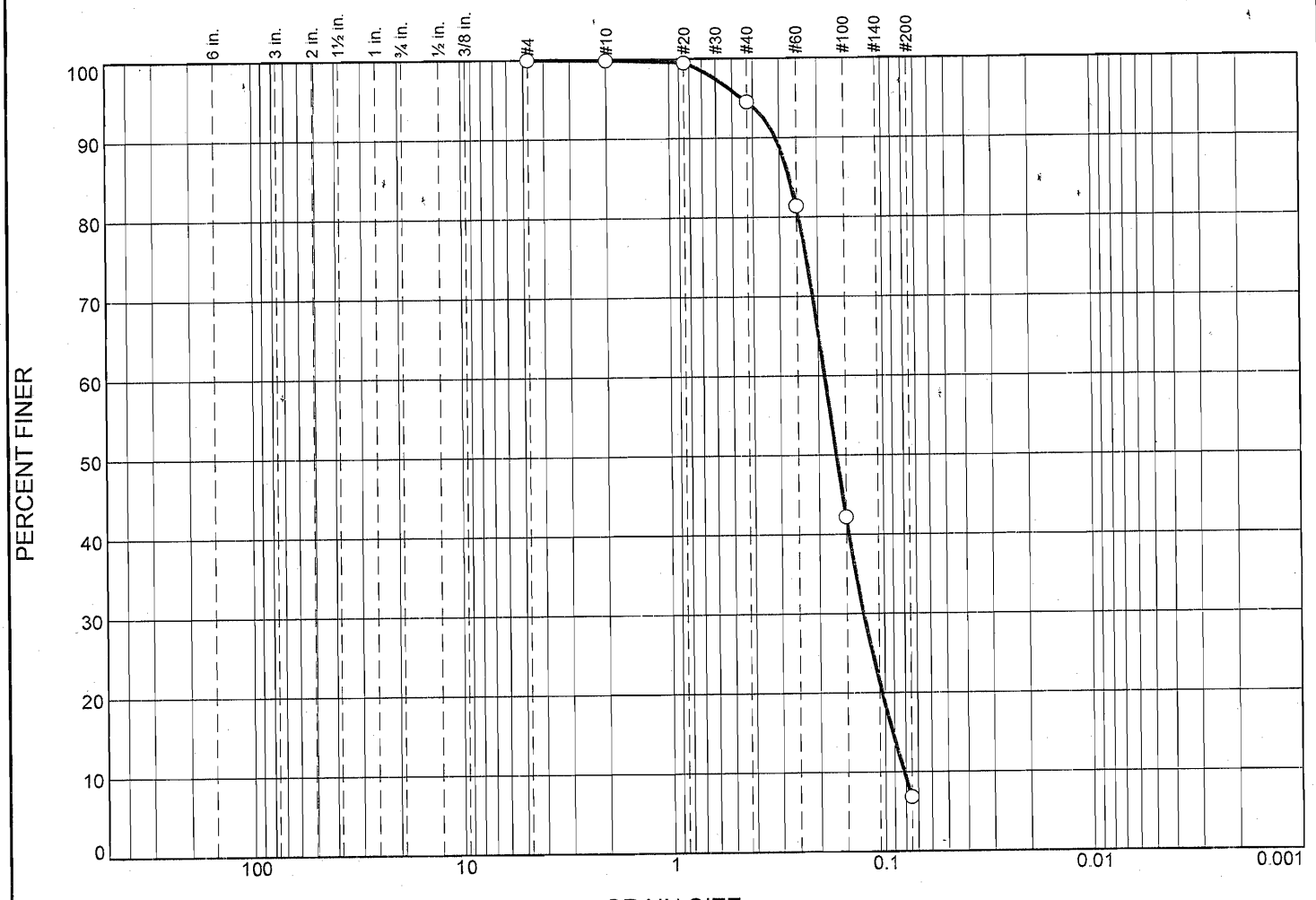
Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
642.50	237.72	0.00	.375	0.00	100.0
			#4	0.44	99.9
			#10	1.05	99.7
			#20	2.68	99.3
			#40	17.08	95.8
			#60	182.03	55.0
			#100	338.41	16.4
			#200	365.92	9.6

Stones	Cobbles	Gravel				Sand						Silt			Clay	Fines
		Coarse	Medium	Fine	Total	V. Crs.	Crs.	Med.	Fine	V. Fine	Total	Crs.	Fine	Total		Total
0.0	0.0	0.0	0.1	0.2	0.3	0.3	2.5	41.9	42.6							

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0781	0.1301	0.1607	0.1865	0.2365	0.2640	0.3320	0.3546	0.3818	0.4179

Fineness Modulus	C_u	C_c
1.15	3.38	1.69

Particle Size Distribution Report



	% Stones	% +3"	% Gravel			% Sand					% Silt		% Clay
			Coarse	Medium	Fine	V. Crs.	Crs.	Med.	Fine	V. Fine	Crs.	Fine	
○	0.0	0.0	0.0	0.0	0.1	0.3	3.6	14.6	62.7		18.7		

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.2687	0.1868	0.1657	0.1246	0.0918	0.0812	1.02	2.30

Material Description	USCS	AASHTO
○ brown sand with silt		

Project No. 161262 **Client:** Roberts Environmental Service

Project: Lane Street

○ **Source of Sample:** HB-3 **Depth:** 8'-10'

Remarks:

○ As Received

Moisture Content: 20.3%

BOWSER-MORNER, INC.

Dayton, Ohio

GRAIN SIZE DISTRIBUTION TEST DATA

3/22/2013

Client: Roberts Environmental Service
Project: Lane Street
Project Number: 161262
Location: HB-3
Depth: 8'-10'
Material Description: brown sand with silt
Testing Remarks: As Received
Moisture Content: 20.3%

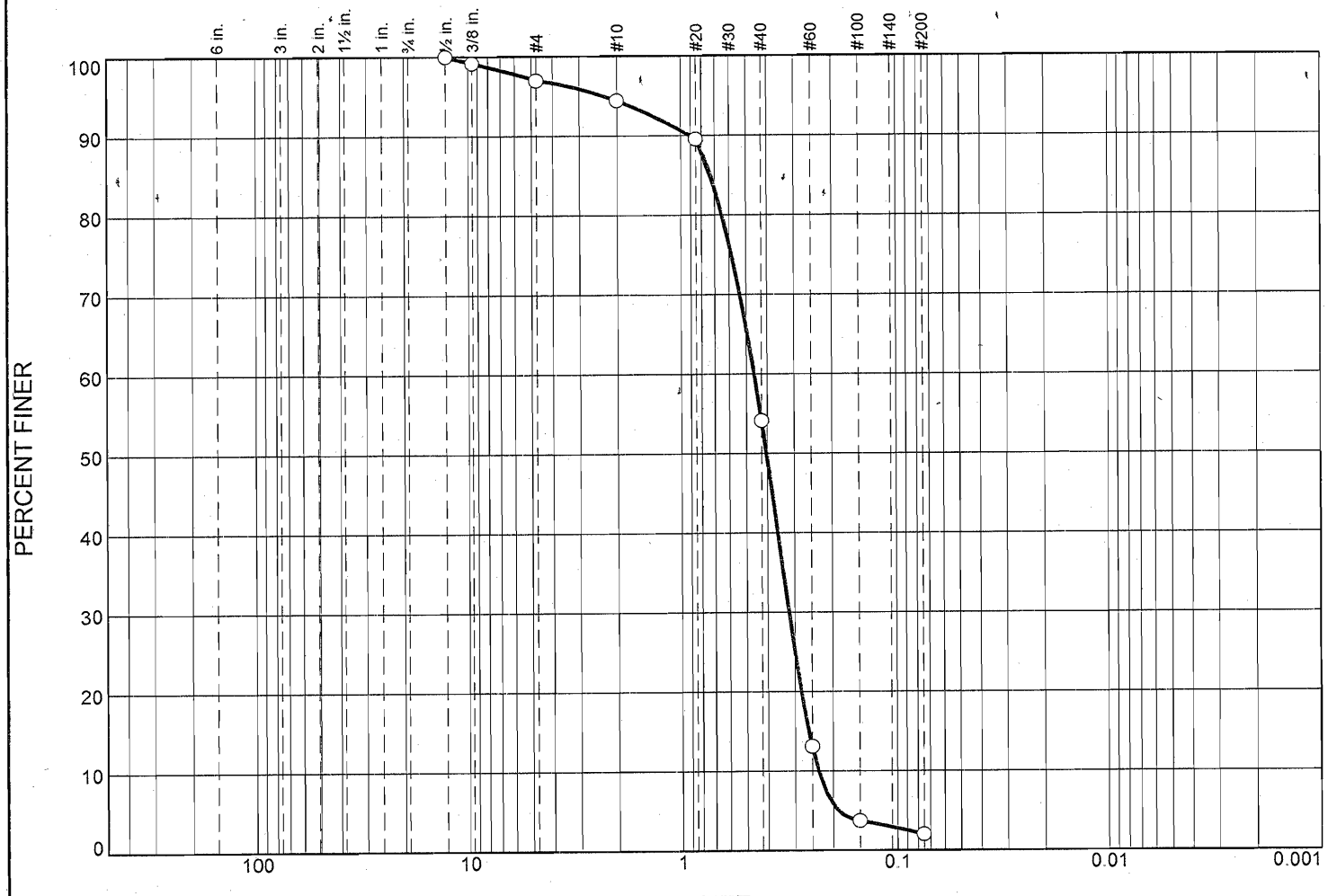
Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
650.80	230.13	0.00	#4	0.00	100.0
			#10	0.44	99.9
			#20	1.89	99.6
			#40	22.94	94.5
			#60	78.18	81.4
			#100	243.14	42.2
			#200	391.80	6.9

Stones	Cobbles	Gravel				Sand						Silt			Clay	Fines
		Coarse	Medium	Fine	Total	V. Crs.	Crs.	Med.	Fine	V. Fine	Total	Crs.	Fine	Total		Total
0.0	0.0	0.0	0.0	0.1	0.1	0.3	3.6	14.6	62.7							

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0812	0.0918	0.1028	0.1246	0.1657	0.1868	0.2440	0.2687	0.3112	0.4468

Fineness Modulus	C_u	C_c
0.72	2.30	1.02

Particle Size Distribution Report



	% Stones	% +3"	% Gravel			% Sand					% Silt		% Clay
			Coarse	Medium	Fine	V. Crs.	Crs.	Med.	Fine	V. Fine	Crs.	Fine	
○	0.0	0.0	0.0	3.0	2.6	3.7	24.8	52.8	10.3			2.8	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	0.7299	0.4590	0.4038	0.3191	0.2588	0.2330	0.95	1.97

Material Description	USCS	AASHTO
○ brown sand	SP	

Project No. 161262 **Client:** Roberts Environmental Service

Project: Lane Street

○ **Source of Sample:** HB-3 **Depth:** 17'-19'

Remarks:

○ As Received

Moisture Content: 17.6%

BOWSER-MORNER, INC.

Dayton, Ohio

GRAIN SIZE DISTRIBUTION TEST DATA

3/22/2013

Client: Roberts Environmental Service
Project: Lane Street
Project Number: 161262
Location: HB-3
Depth: 17'-19'
Material Description: brown sand
Plastic Limit: NP
USCS Classification: SP
Testing Remarks: As Received
Moisture Content: 17.6%

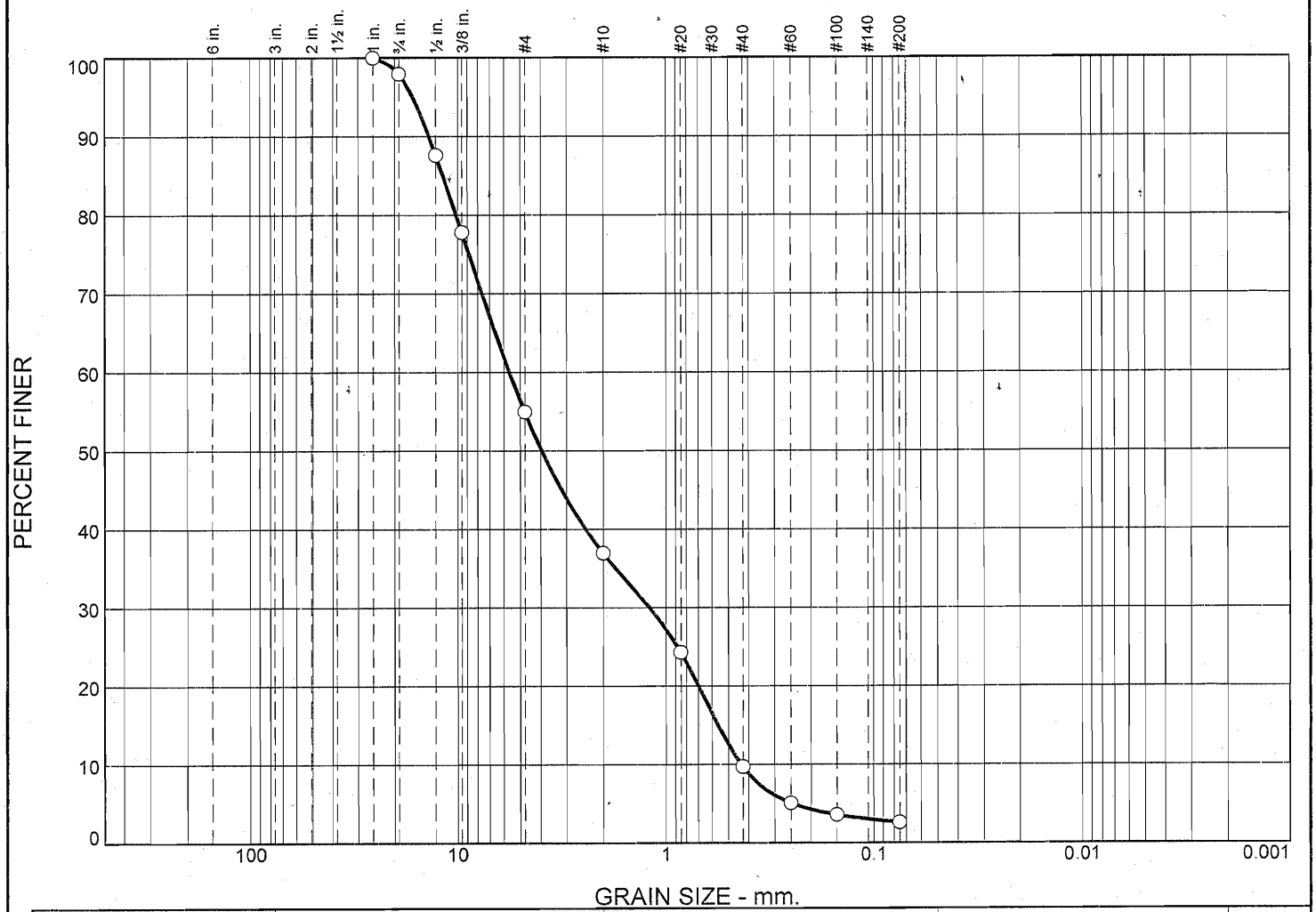
Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
708.30	232.71	0.00	.50	0.00	100.0
			.375	3.89	99.2
			#4	14.23	97.0
			#10	26.44	94.4
			#20	49.58	89.6
			#40	218.05	54.2
			#60	413.14	13.1
			#100	457.78	3.7
			#200	465.91	2.0

Stones	Cobbles	Gravel				Sand						Silt			Clay	Fines
		Coarse	Medium	Fine	Total	V. Crs.	Crs.	Med.	Fine	V. Fine	Total	Crs.	Fine	Total		Total
0.0	0.0	0.0	3.0	2.6	5.6	3.7	24.8	52.8	10.3							

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.2330	0.2588	0.2800	0.3191	0.4038	0.4590	0.6451	0.7299	0.9037	2.2909

Fineness Modulus	C_u	C_c
2.12	1.97	0.95

Particle Size Distribution Report



	% Stones	% +3"	% Gravel			% Sand					% Silt		% Clay
			Coarse	Medium	Fine	V. Crs.	Crs.	Med.	Fine	V. Fine	Crs.	Fine	
○	0.0	0.0	2.0	43.0	18.0	9.7	14.6	7.6	2.2		2.9		

☒	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	11.7272	5.6233	3.9330	1.1952	0.5575	0.4316	0.59	13.03

Material Description	USCS	AASHTO
○ brown sand with gravel	SP	

Project No. 161262 **Client:** Roberts Environmental Service

Project: Lane Street

○ **Source of Sample:** HB-3 **Depth:** 21'-23'

Remarks:

○ As Received

Moisture Content: 8.6%

BOWSER-MORNER, INC.

Dayton, Ohio

GRAIN SIZE DISTRIBUTION TEST DATA

3/22/2013

Client: Roberts Environmental Service
Project: Lane Street
Project Number: 161262
Location: HB-3
Depth: 21'-23'
Material Description: brown sand with gravel
Plastic Limit: NP
USCS Classification: SP
Testing Remarks: As Received
Moisture Content: 8.6%

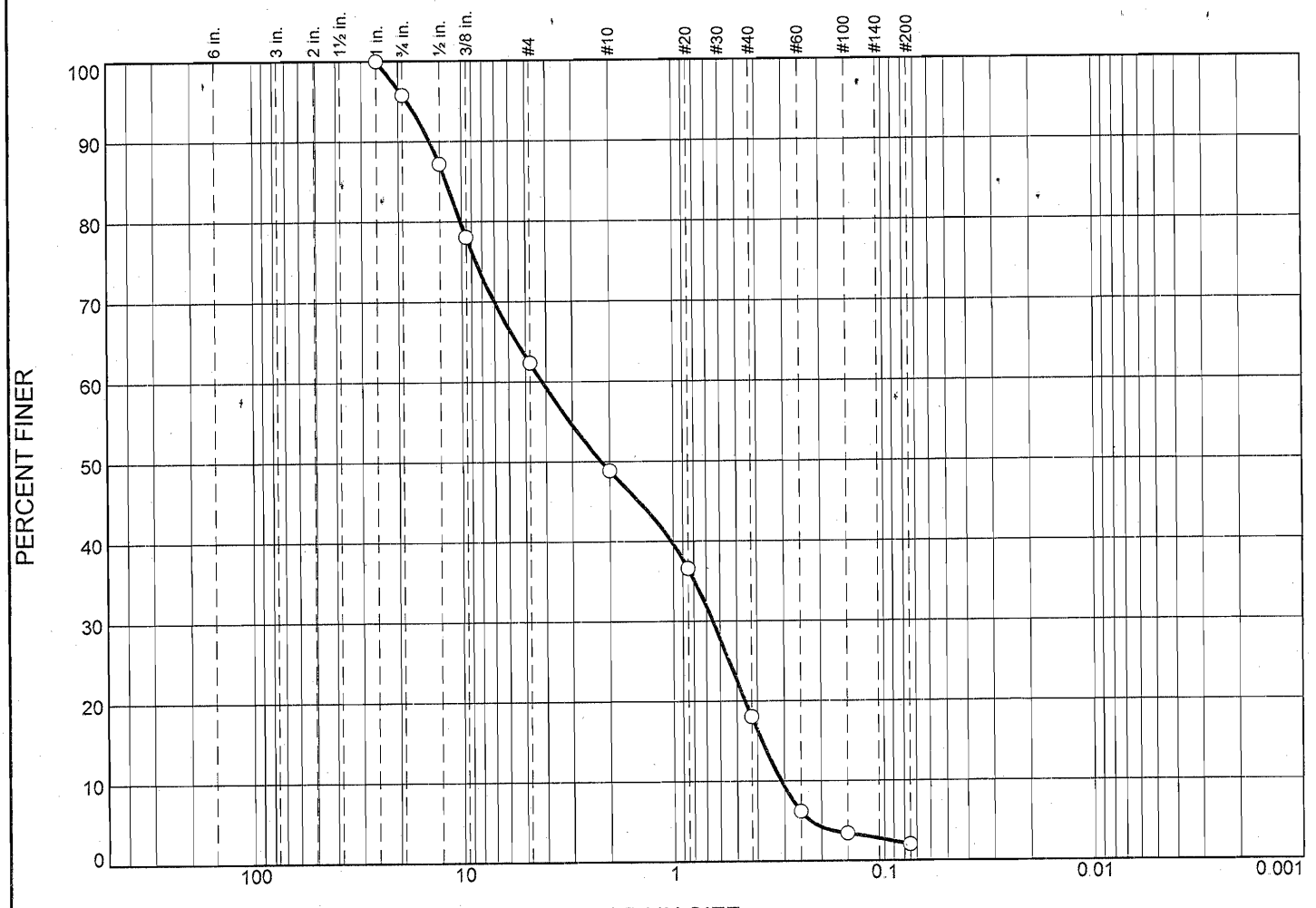
Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
895.70	227.19	0.00	1.0	0.00	100.0
			.75	13.46	98.0
			.50	82.56	87.7
			.375	148.35	77.8
			#4	300.99	55.0
			#10	421.20	37.0
			#20	505.83	24.3
			#40	603.30	9.8
			#60	634.50	5.1
			#100	644.60	3.6
			#200	651.10	2.6

Stones	Cobbles	Gravel				Sand						Silt			Clay	Fines
		Coarse	Medium	Fine	Total	V. Crs.	Crs.	Med.	Fine	V. Fine	Total	Crs.	Fine	Total		Total
0.0	0.0	2.0	43.0	18.0	63.0	9.7	14.6	7.6	2.2							

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.4316	0.5575	0.6949	1.1952	3.9330	5.6233	10.1411	11.7272	13.6680	16.3389

Fineness Modulus	C_u	C_c
4.74	13.03	0.59

Particle Size Distribution Report



	% Stones	% +3"	% Gravel			% Sand					% Silt		% Clay
			Coarse	Medium	Fine	V. Crs.	Crs.	Med.	Fine	V. Fine	Crs.	Fine	
○	0.0	0.0	4.2	33.4	13.5	9.2	17.0	16.5	3.6			2.6	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	11.8102	4.1545	2.1822	0.6480	0.3799	0.3095	0.33	13.42

Material Description	USCS	AASHTO
○ gray sand with gravel	SP	

Project No. 161262 **Client:** Roberts Environmental Service

Project: Lane Street

○ **Source of Sample:** HB-3 **Depth:** 25'-27'

Remarks:

○ As Received

Moisture Content: 8.6%

BOWSER-MORNER, INC.

Dayton, Ohio

GRAIN SIZE DISTRIBUTION TEST DATA

3/22/2013

Client: Roberts Environmental Service
Project: Lane Street
Project Number: 161262
Location: HB-3
Depth: 25'-27'
Material Description: gray sand with gravel
Plastic Limit: NP
USCS Classification: SP
Testing Remarks: As Received
Moisture Content: 8.6%

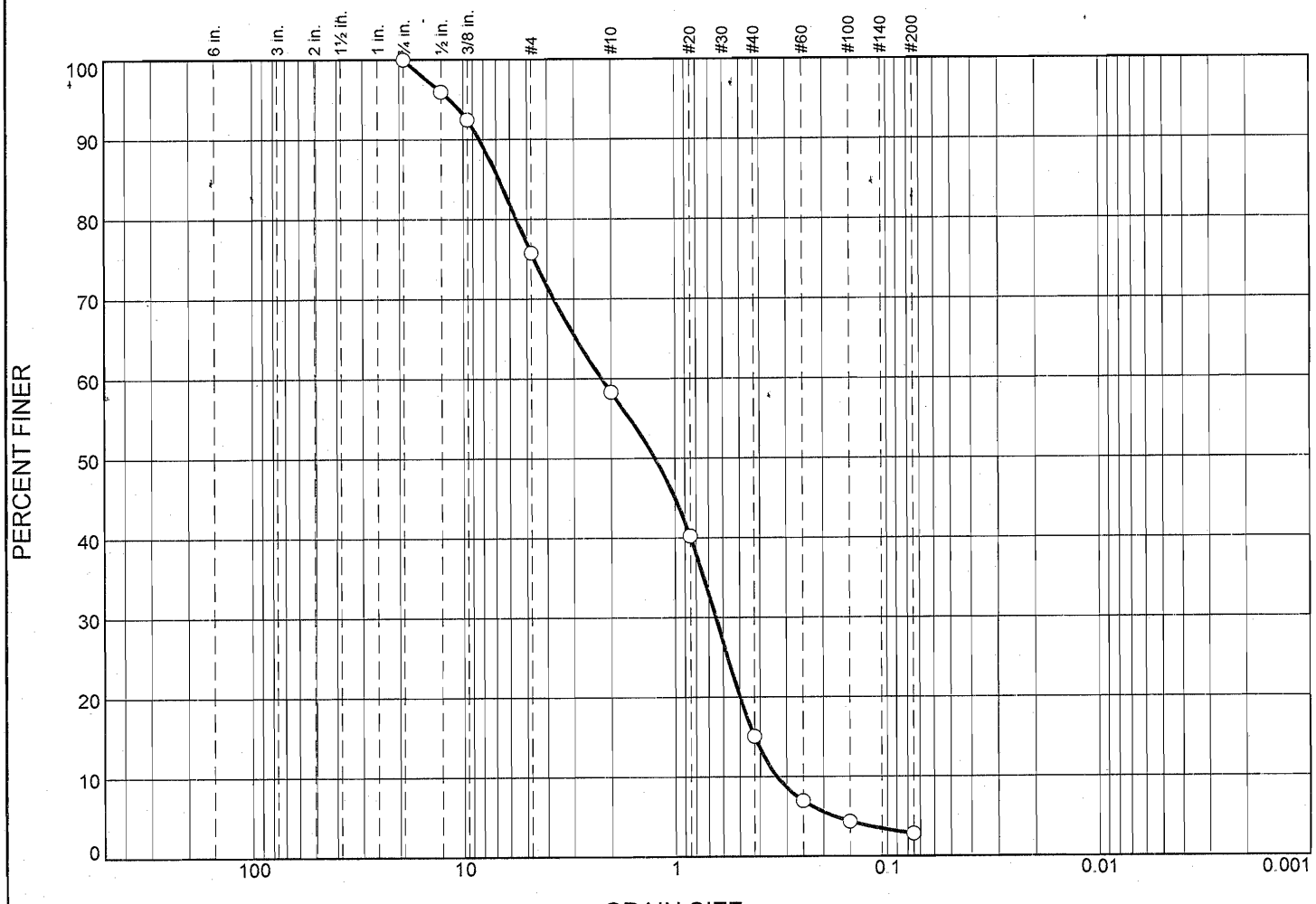
Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
770.30	232.51	0.00	1.0	0.00	100.0
			.75	22.55	95.8
			.50	68.87	87.2
			.375	117.91	78.1
			#4	202.44	62.4
			#10	275.00	48.9
			#20	340.88	36.6
			#40	440.58	18.1
			#60	504.41	6.2
			#100	519.28	3.4
			#200	526.98	2.0

Stones	Cobbles	Gravel				Sand						Silt			Clay	Fines
		Coarse	Medium	Fine	Total	V. Crs.	Crs.	Med.	Fine	V. Fine	Total	Crs.	Fine	Total		Total
0.0	0.0	4.2	33.4	13.5	51.1	9.2	17.0	16.5	3.6							

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.3095	0.3799	0.4549	0.6480	2.1822	4.1545	10.1228	11.8102	14.1290	18.1353

Fineness Modulus	C_u	C_c
4.30	13.42	0.33

Particle Size Distribution Report



	% Stones	% +3"	% Gravel			% Sand					% Silt		% Clay
			Coarse	Medium	Fine	V. Crs.	Crs.	Med.	Fine	V. Fine	Crs.	Fine	
○	0.0	0.0	0.0	24.2	17.5	13.2	24.9	13.2	3.7			3.3	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	6.7454	2.2080	1.2352	0.6458	0.4236	0.3319	0.57	6.65

Material Description	USCS	AASHTO
○ brown sand with gravel	SP	

Project No. 161262 **Client:** Roberts Environmental Service

Project: Lane Street

○ **Source of Sample:** HB-3 **Depth:** 33'-35'

Remarks:

○ As Received

Moisture Content: 11.5%

BOWSER-MORNER, INC.

Dayton, Ohio

GRAIN SIZE DISTRIBUTION TEST DATA

3/22/2013

Client: Roberts Environmental Service
Project: Lane Street
Project Number: 161262
Location: HB-3
Depth: 33'-35'
Material Description: brown sand with gravel
Plastic Limit: NP
USCS Classification: SP
Testing Remarks: As Received
Moisture Content: 11.5%

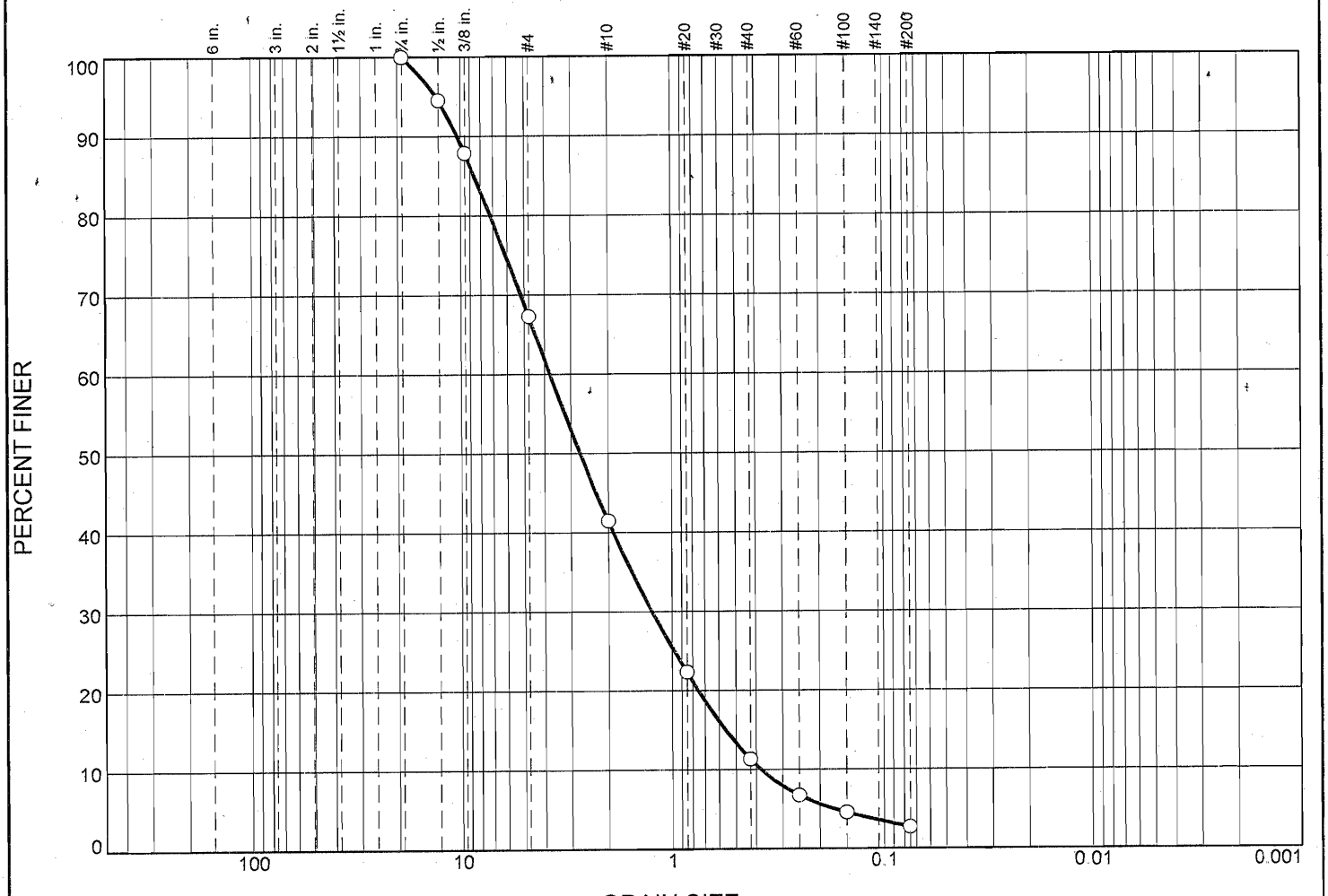
Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
819.10	230.84	0.00	0.75	0.00	100.0
			.50	23.59	96.0
			.375	44.26	92.5
			#4	142.34	75.8
			#10	245.03	58.3
			#20	351.53	40.2
			#40	499.49	15.1
			#60	547.17	7.0
			#100	562.54	4.4
			#200	571.60	2.8

Stones	Cobbles	Gravel				Sand						Silt			Clay	Fines
		Coarse	Medium	Fine	Total	V. Crs.	Crs.	Med.	Fine	V. Fine	Total	Crs.	Fine	Total		Total
0.0	0.0	0.0	24.2	17.5	41.7	13.2	24.9	13.2	3.7							

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.3319	0.4236	0.4969	0.6458	1.2352	2.2080	5.5782	6.7454	8.3425	11.5455

Fineness Modulus	C_u	C_c
3.81	6.65	0.57

Particle Size Distribution Report



	% Stones	% +3"	% Gravel			% Sand					% Silt		% Clay
			Coarse	Medium	Fine	V. Crs.	Crs.	Med.	Fine	V. Fine	Crs.	Fine	
○	0.0	0.0	0.0	32.7	25.8	16.0	12.1	6.6	3.4			3.4	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	8.5571	3.7581	2.7061	1.2402	0.5559	0.3767	1.09	9.98

Material Description	USCS	AASHTO
○ brown sand with gravel	SW	

Project No. 161262 **Client:** Roberts Environmental Service

Project: Lane Street

○ **Source of Sample:** HB-3 **Depth:** 40'-42'

Remarks:

○ As Received

Moisture Content: 9.0%

BOWSER-MORNER, INC.

Dayton, Ohio

GRAIN SIZE DISTRIBUTION TEST DATA

3/22/2013

Client: Roberts Environmental Service
Project: Lane Street
Project Number: 161262
Location: HB-3
Depth: 40'-42'
Material Description: brown sand with gravel
Plastic Limit: NP
USCS Classification: SW
Testing Remarks: As Received
Moisture Content: 9.0%

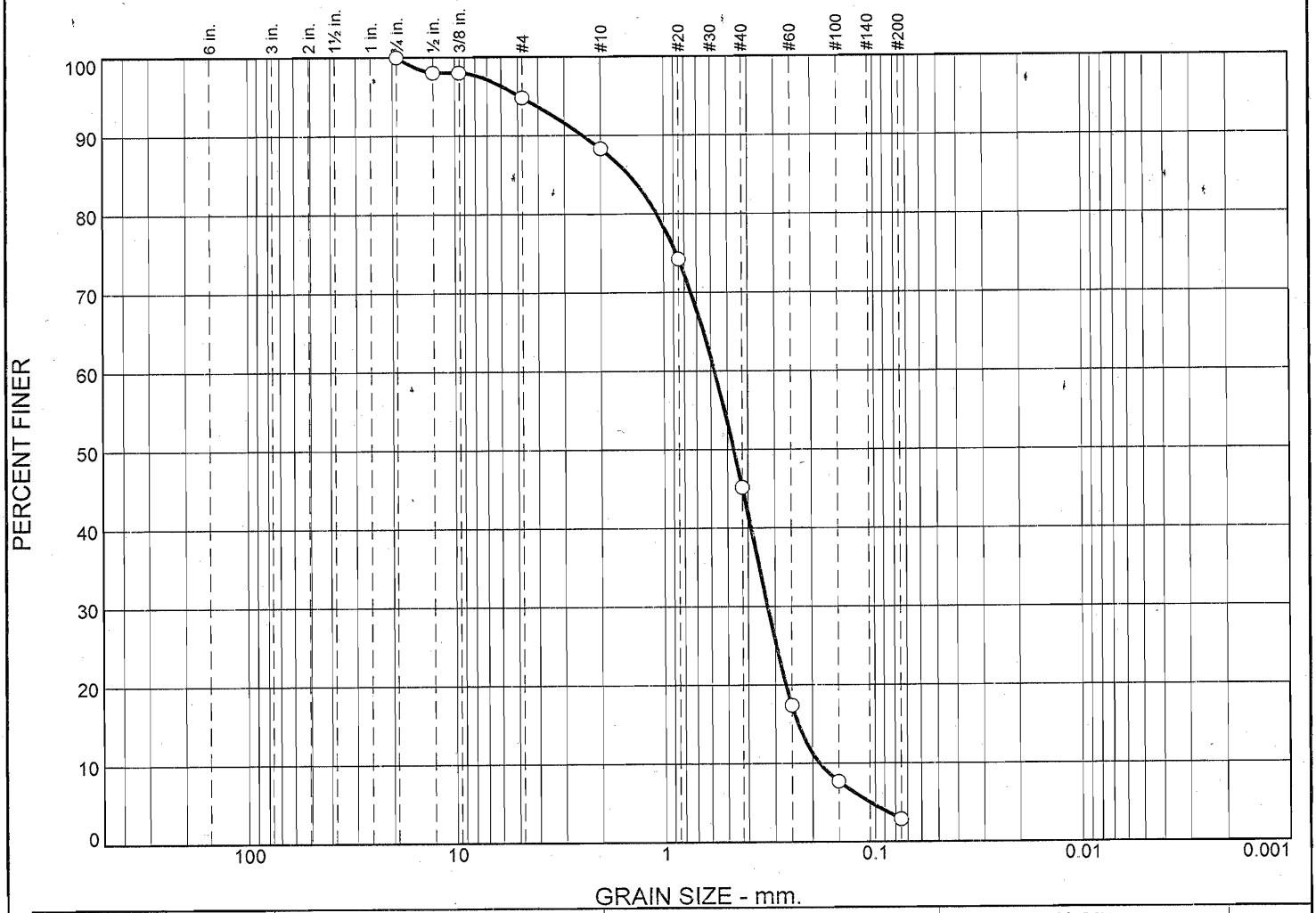
Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
740.10	229.99	0.00	.75	0.00	100.0
			.50	27.73	94.6
			.375	61.74	87.9
			#4	166.65	67.3
			#10	298.50	41.5
			#20	396.11	22.3
			#40	452.30	11.3
			#60	475.61	6.8
			#100	486.78	4.6
			#200	496.31	2.7

Stones	Cobbles	Gravel				Sand						Silt			Clay	Fines
		Coarse	Medium	Fine	Total	V. Crs.	Crs.	Med.	Fine	V. Fine	Total	Crs.	Fine	Total		Total
0.0	0.0	0.0	32.7	25.8	58.5	16.0	12.1	6.6	3.4							

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.3767	0.5559	0.7488	1.2402	2.7061	3.7581	7.1842	8.5571	10.3372	13.0065

Fineness Modulus	C_u	C_c
4.41	9.98	1.09

Particle Size Distribution Report



	% Stones	% +3"	% Gravel			% Sand					% Silt		% Clay
			Coarse	Medium	Fine	V. Crs.	Crs.	Med.	Fine	V. Fine	Crs.	Fine	
○	0.0	0.0	0.0	5.1	6.6	9.9	24.7	36.3	12.7			4.7	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			1.4651	0.5732	0.4650	0.3252	0.2328	0.1847	1.00	3.10

Material Description	USCS	AASHTO
○ light brown sand	SP	

Project No. 161262 **Client:** Roberts Environmental Service

Project: Lane Street

○ **Source of Sample:** HB-3 **Depth:** 43'-45'

Remarks:

○ As Received

Moisture Content: 15.4%

BOWSER-MORNER, INC.

Dayton, Ohio

GRAIN SIZE DISTRIBUTION TEST DATA

3/22/2013

Client: Roberts Environmental Service
Project: Lane Street
Project Number: 161262
Location: HB-3
Depth: 43'-45'
Material Description: light brown sand
USCS Classification: SP
Testing Remarks: As Received
Moisture Content: 15.4%

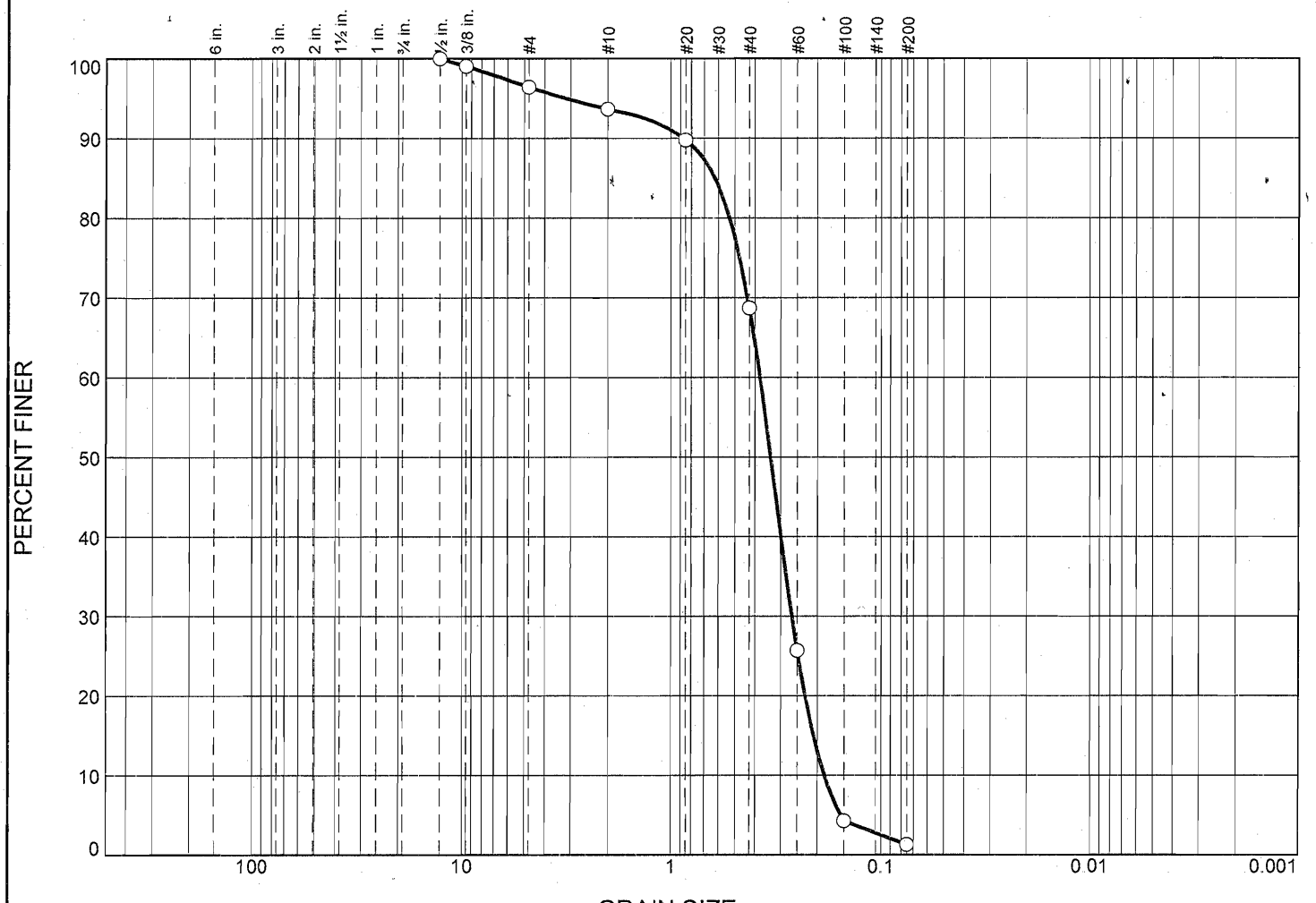
Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
533.40	117.48	0.00	.75	0.00	100.0
			.50	8.08	98.1
			.375	8.08	98.1
			#4	21.37	94.9
			#10	48.56	88.3
			#20	106.98	74.3
			#40	227.94	45.2
			#60	343.51	17.4
			#100	383.83	7.7
			#200	403.94	2.9

Stones	Cobbles	Gravel				Sand						Silt			Clay	Fines
		Coarse	Medium	Fine	Total	V. Crs.	Crs.	Med.	Fine	V. Fine	Total	Crs.	Fine	Total		Total
0.0	0.0	0.0	5.1	6.6	11.7	9.9	24.7	36.3	12.7							

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.1847	0.2328	0.2665	0.3252	0.4650	0.5732	1.0766	1.4651	2.4253	4.8492

Fineness Modulus	C_u	C_c
2.40	3.10	1.00

Particle Size Distribution Report



	% Stones	% +3"	% Gravel			% Sand					% Silt		% Clay
			Coarse	Medium	Fine	V. Crs.	Crs.	Med.	Fine	V. Fine	Crs.	Fine	
○	0.0	0.0	0.0	3.5	2.8	2.6	13.4	52.0	23.2		2.5		

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.6193	0.3778	0.3356	0.2649	0.2084	0.1850	1.00	2.04

Material Description	USCS	AASHTO
○ brown sand	SP	

Project No. 161262 **Client:** Roberts Environmental Service

Project: Lane Street

○ **Source of Sample:** HB-3 **Depth:** 48'-50'

Remarks:

○ As Received

Moisture Content: 19.6%

BOWSER-MORNER, INC.

Dayton, Ohio

GRAIN SIZE DISTRIBUTION TEST DATA

3/22/2013

Client: Roberts Environmental Service
Project: Lane Street
Project Number: 161262
Location: HB-3
Depth: 48'-50'
Material Description: brown sand
USCS Classification: SP
Testing Remarks: As Received
Moisture Content: 19.6%

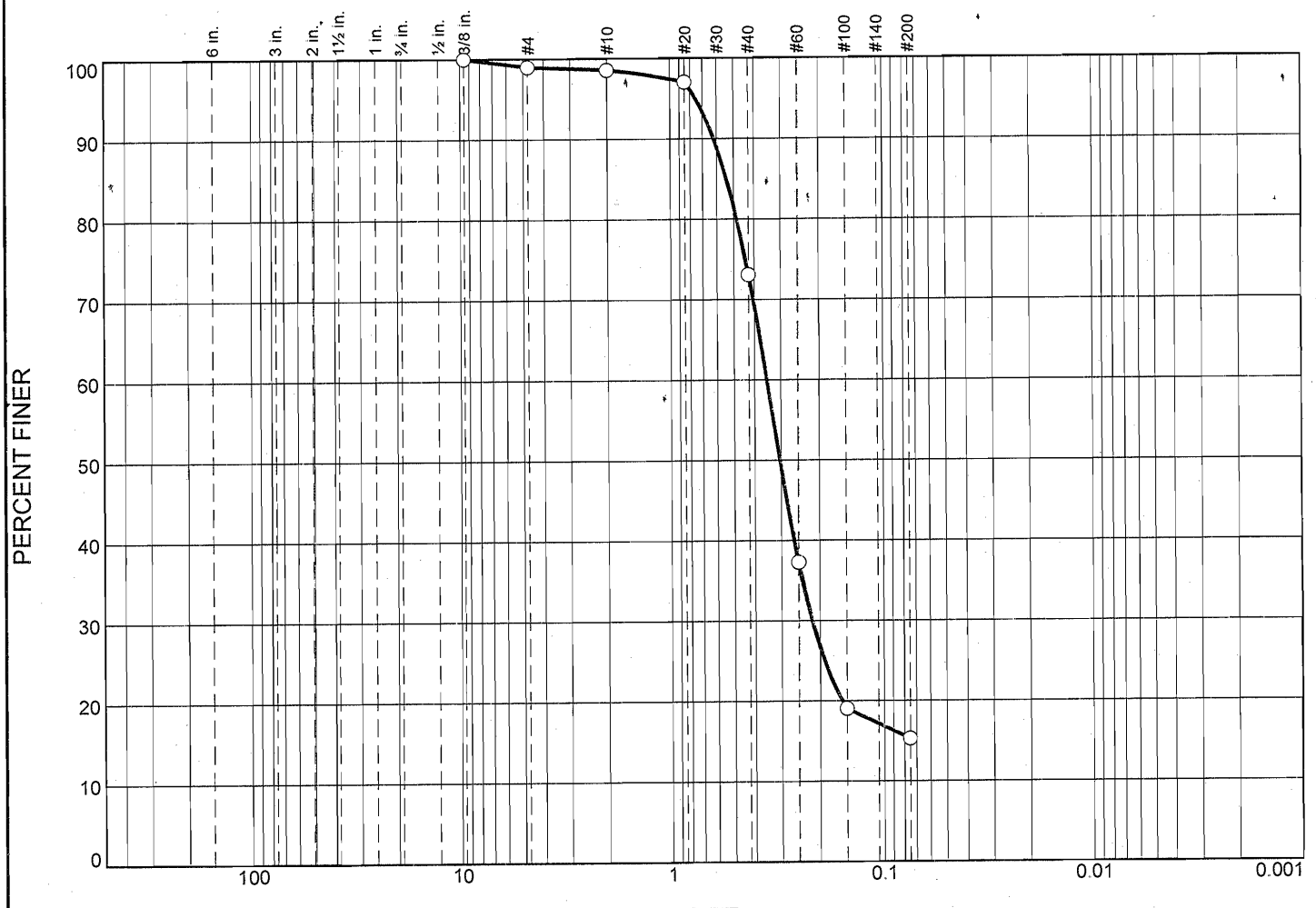
Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
608.60	121.34	0.00	.50	0.00	100.0
			.375	4.60	99.1
			#4	17.28	96.5
			#10	30.74	93.7
			#20	49.72	89.8
			#40	152.37	68.7
			#60	361.92	25.7
			#100	466.35	4.3
			#200	481.00	1.3

Stones	Cobbles	Gravel				Sand						Silt			Clay	Fines
		Coarse	Medium	Fine	Total	V. Crs.	Crs.	Med.	Fine	V. Fine	Total	Crs.	Fine	Total		Total
0.0	0.0	0.0	3.5	2.8	6.3	2.6	13.4	52.0	23.2							

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.1850	0.2084	0.2288	0.2649	0.3356	0.3778	0.5276	0.6193	0.8694	3.1322

Fineness Modulus	C_u	C_c
1.90	2.04	1.00

Particle Size Distribution Report



	% Stones	% +3"	% Gravel			% Sand					% Silt		% Clay
			Coarse	Medium	Fine	V. Crs.	Crs.	Med.	Fine	V. Fine	Crs.	Fine	
○	0.0	0.0	0.0	1.0	0.4	1.1	15.7	44.5	20.4			16.9	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	NV	NP	0.5374	0.3495	0.3039	0.2164				

Material Description	USCS	AASHTO
○ dark brown sand with silt	SM	A-2-4(0)

Project No. 161262 **Client:** Roberts Environmental Service

Project: Lane Street

○ **Source of Sample:** HB-4 **Depth:** 1'-3'

Remarks:

○ As Received

Moisture Content: 11.8%

BOWSER-MORNER, INC.

Dayton, Ohio

GRAIN SIZE DISTRIBUTION TEST DATA

3/22/2013

Client: Roberts Environmental Service
Project: Lane Street
Project Number: 161262
Location: HB-4
Depth: 1'-3'
Material Description: dark brown sand with silt
Liquid Limit: NV
Plastic Limit: NP
USCS Classification: SM
AASHTO Classification: A-2-4(0)
Testing Remarks: As Received
Moisture Content: 11.8%

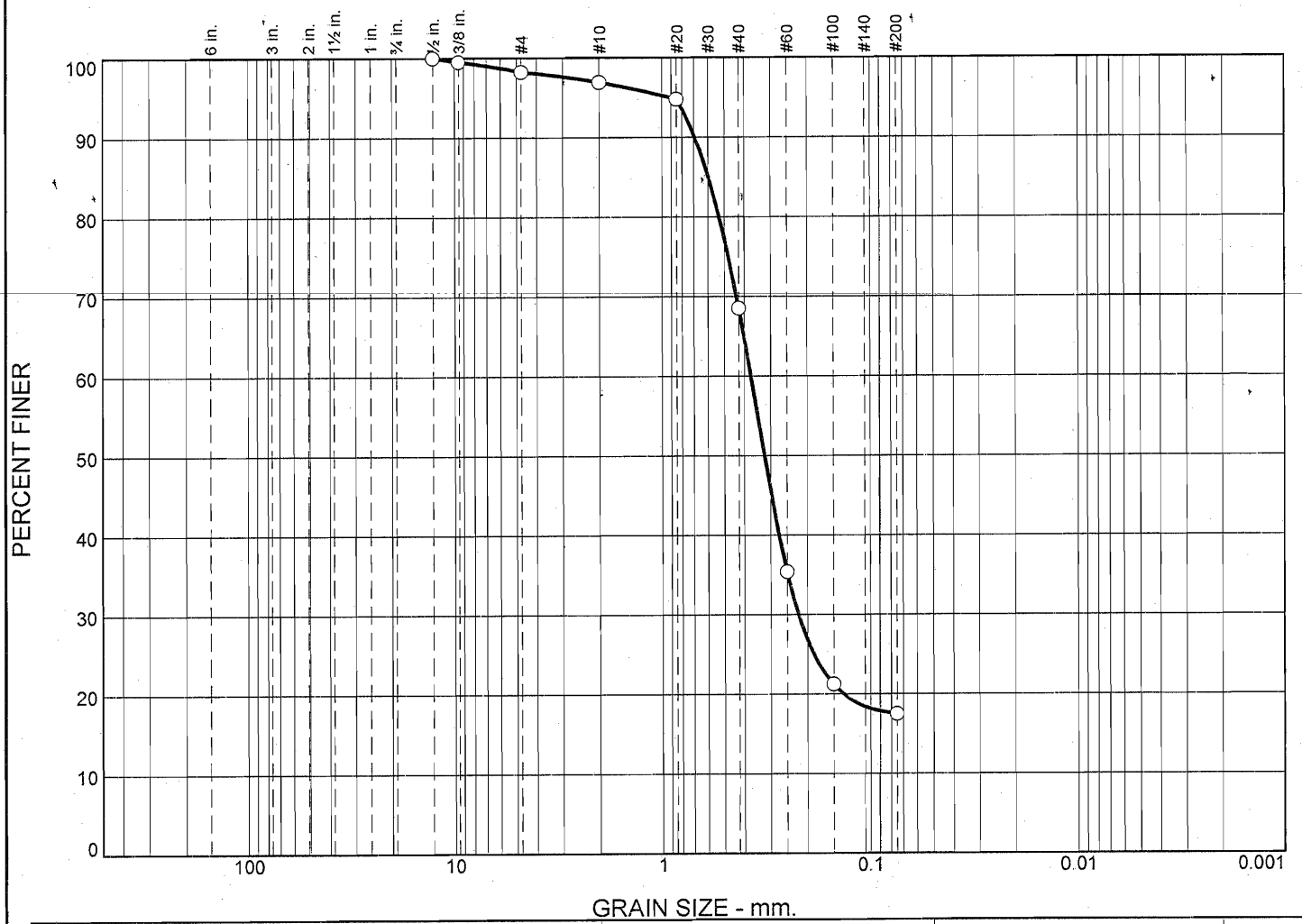
Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
529.60	119.96	0.00	.375	0.00	100.0
			#4	4.11	99.0
			#10	5.69	98.6
			#20	12.00	97.1
			#40	110.14	73.1
			#60	256.88	37.3
			#100	331.59	19.1
			#200	346.94	15.3

Stones	Cobbles	Gravel				Sand						Silt			Clay	Fines
		Coarse	Medium	Fine	Total	V. Crs.	Crs.	Med.	Fine	V. Fine	Total	Crs.	Fine	Total		Total
0.0	0.0	0.0	1.0	0.4	1.4	1.1	15.7	44.5	20.4							

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
		0.1576	0.2164	0.3039	0.3495	0.4815	0.5374	0.6167	0.7504

Fineness Modulus
1.47

Particle Size Distribution Report



	% Stones	% +3"	% Gravel			% Sand					% Silt		% Clay
			Coarse	Medium	Fine	V. Crs.	Crs.	Med.	Fine	V. Fine	Crs.	Fine	
○	0.0	0.0	0.0	1.7	1.3	1.7	17.9	42.0	17.2		18.2		

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	NV	NP	0.5945	0.3717	0.3199	0.2202				

Material Description	USCS	AASHTO
○ orange sand with silt	SM	A-2-4(0)

Project No. 161262 **Client:** Roberts Environmental Service

Project: Lane Street

○ **Source of Sample:** HB-4 **Depth:** 3'-5'

Remarks:

○ As Received

Moisture Content: 10.9%

BOWSER-MORNER, INC.

Dayton, Ohio

GRAIN SIZE DISTRIBUTION TEST DATA

3/22/2013

Client: Roberts Environmental Service
Project: Lane Street
Project Number: 161262
Location: HB-4
Depth: 3'-5'
Material Description: orange sand with silt
Liquid Limit: NV
Plastic Limit: NP
USCS Classification: SM
AASHTO Classification: A-2-4(0)
Testing Remarks: As Received
Moisture Content: 10.9%

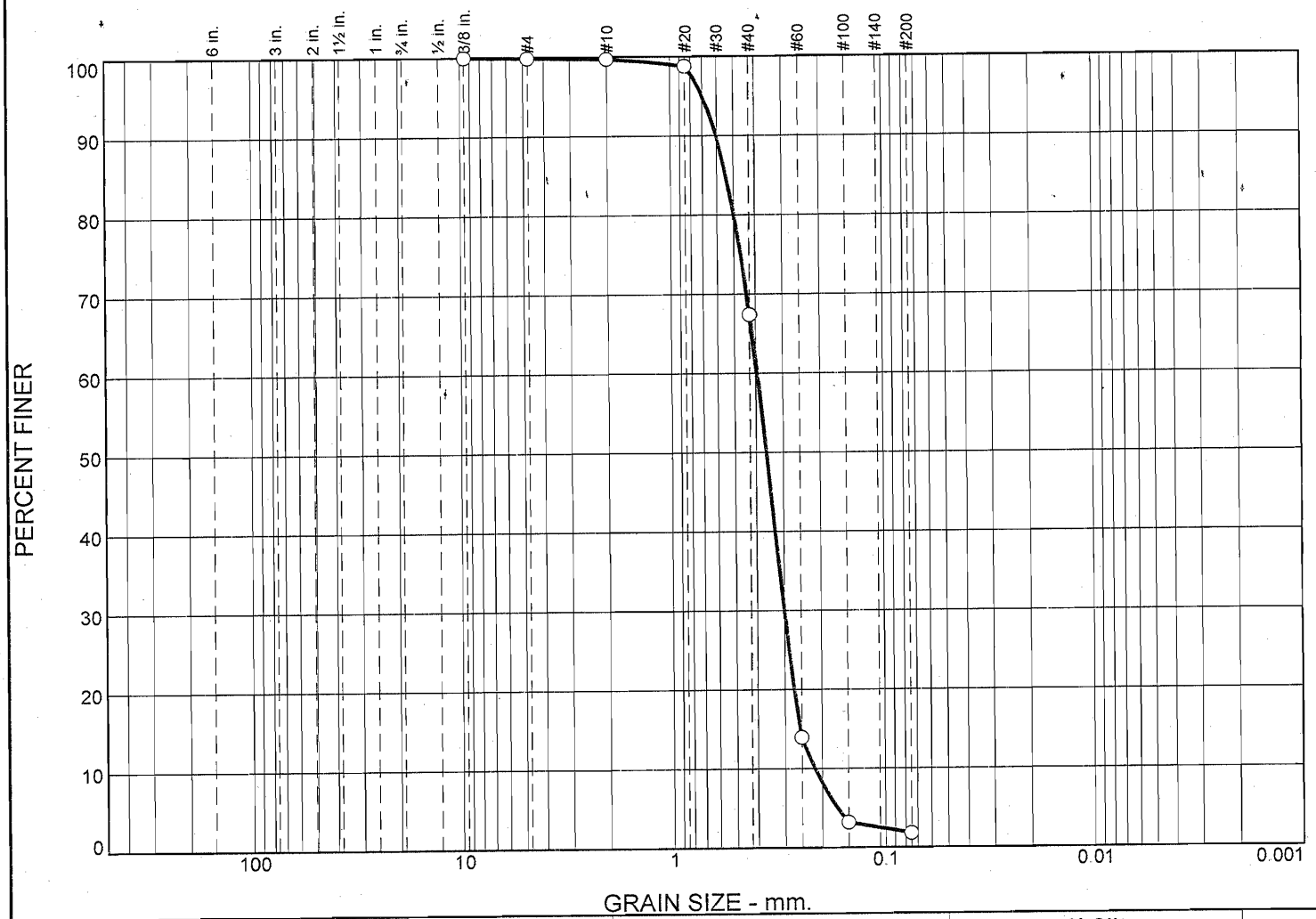
Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
588.60	114.30	0.00	.50	0.00	100.0
			.375	2.16	99.5
			#4	8.30	98.3
			#10	14.44	97.0
			#20	24.67	94.8
			#40	149.23	68.5
			#60	306.40	35.4
			#100	373.39	21.3
			#200	391.26	17.5

Stones	Cobbles	Gravel				Sand						Silt			Clay	Fines
		Coarse	Medium	Fine	Total	V. Crs.	Crs.	Med.	Fine	V. Fine	Total	Crs.	Fine	Total		Total
0.0	0.0	0.0	1.7	1.3	3.0	1.7	17.9	42.0	17.2							

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
		0.1337	0.2202	0.3199	0.3717	0.5278	0.5945	0.6897	0.9092

Fineness Modulus
1.57

Particle Size Distribution Report



	% Stones	% +3"	% Gravel			% Sand					% Silt		% Clay
			Coarse	Medium	Fine	V. Crs.	Crs.	Med.	Fine	V. Fine	Crs.	Fine	
○	0.0	0.0	0.0	0.1	0.2	0.7	18.7	66.4	11.5		2.4		

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	0.5408	0.3943	0.3596	0.2999	0.2538	0.2157	1.06	1.83

Material Description	USCS	AASHTO
○ brown sand	SP	

Project No. 161262 **Client:** Roberts Environmental Service

Project: Lane Street

○ **Source of Sample:** HB-4 **Depth:** 8'-10'

Remarks:

○ As Received

Moisture Content: 20.5%

BOWSER-MORNER, INC.

Dayton, Ohio

GRAIN SIZE DISTRIBUTION TEST DATA

3/22/2013

Client: Roberts Environmental Service
Project: Lane Street
Project Number: 161262
Location: HB-4
Depth: 8'-10'
Material Description: brown sand
Plastic Limit: NP
USCS Classification: SP
Testing Remarks: As Received
Moisture Content: 20.5%

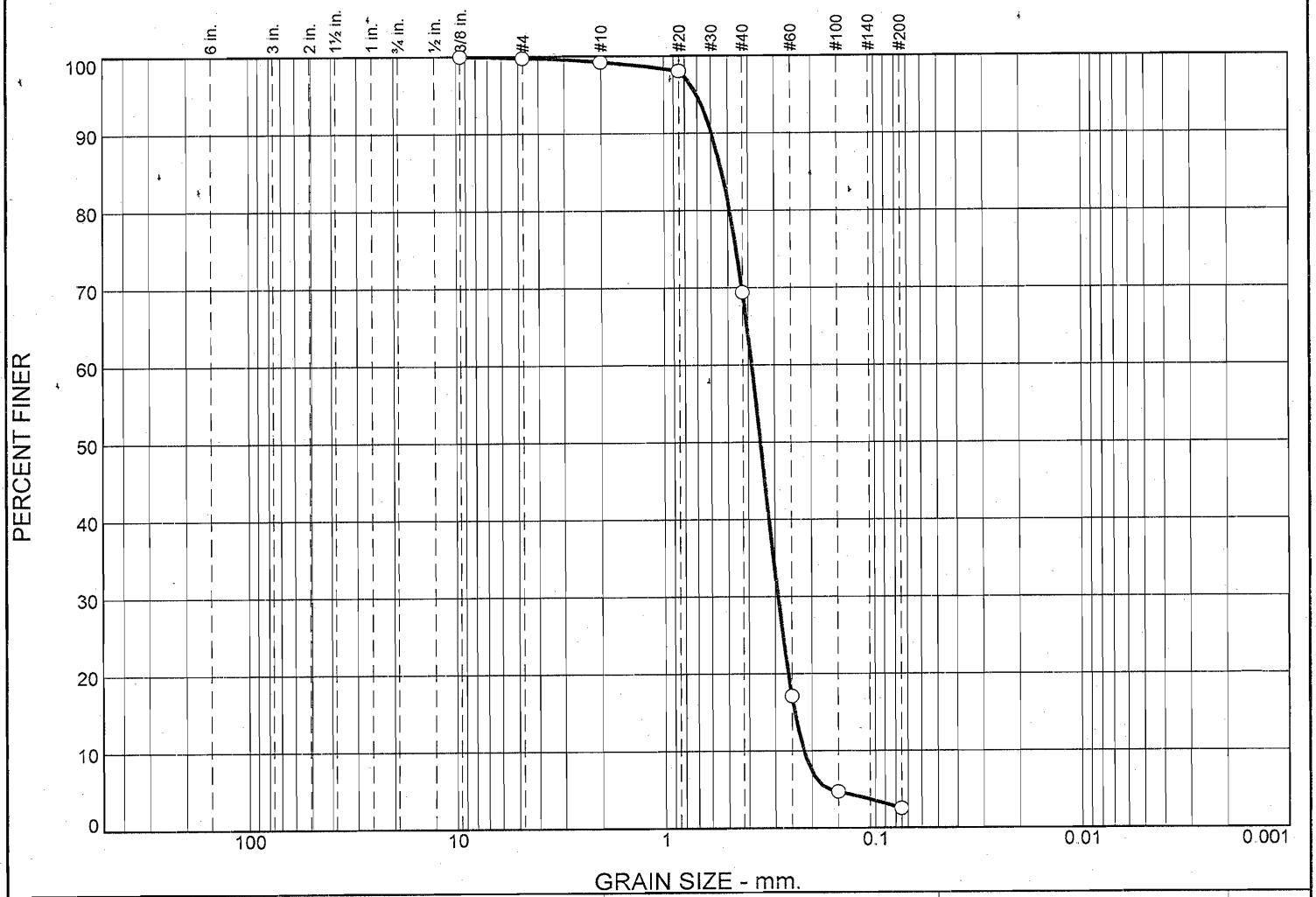
Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
929.50	113.32	0.00	.375	0.00	100.0
			#4	0.81	99.9
			#10	2.10	99.7
			#20	9.79	98.8
			#40	265.86	67.4
			#60	702.37	13.9
			#100	790.01	3.2
			#200	801.38	1.8

Stones	Cobbles	Gravel				Sand						Silt			Clay	Fines
		Coarse	Medium	Fine	Total	V. Crs.	Crs.	Med.	Fine	V. Fine	Total	Crs.	Fine	Total		Total
0.0	0.0	0.0	0.1	0.2	0.3	0.7	18.7	66.4	11.5							

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.2157	0.2538	0.2703	0.2999	0.3596	0.3943	0.4979	0.5408	0.6004	0.6968

Fineness Modulus	C_u	C_c
1.78	1.83	1.06

Particle Size Distribution Report



	% Stones	% +3"	% Gravel			% Sand					% Silt		% Clay
			Coarse	Medium	Fine	V. Crs.	Crs.	Med.	Fine	V. Fine	Crs.	Fine	
○	0.0	0.0	0.0	0.2	0.5	0.9	16.8	64.5	13.6		3.5		

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	0.5311	0.3855	0.3510	0.2908	0.2420	0.2184	1.00	1.77

Material Description	USCS	AASHTO
○ brown sand	SP	

Project No. 161262 **Client:** Roberts Environmental Service

Project: Lane Street

○ **Source of Sample:** HB-4 **Depth:** 12'-14'

Remarks:

○ As Received

Moisture Content: 18.5%

BOWSER-MORNER, INC.

Dayton, Ohio

GRAIN SIZE DISTRIBUTION TEST DATA

3/22/2013

Client: Roberts Environmental Service
Project: Lane Street
Project Number: 161262
Location: HB-4
Depth: 12'-14'
Material Description: brown sand
Plastic Limit: NP
USCS Classification: SP
Testing Remarks: As Received
Moisture Content: 18.5%

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)
551.50	99.69	0.00

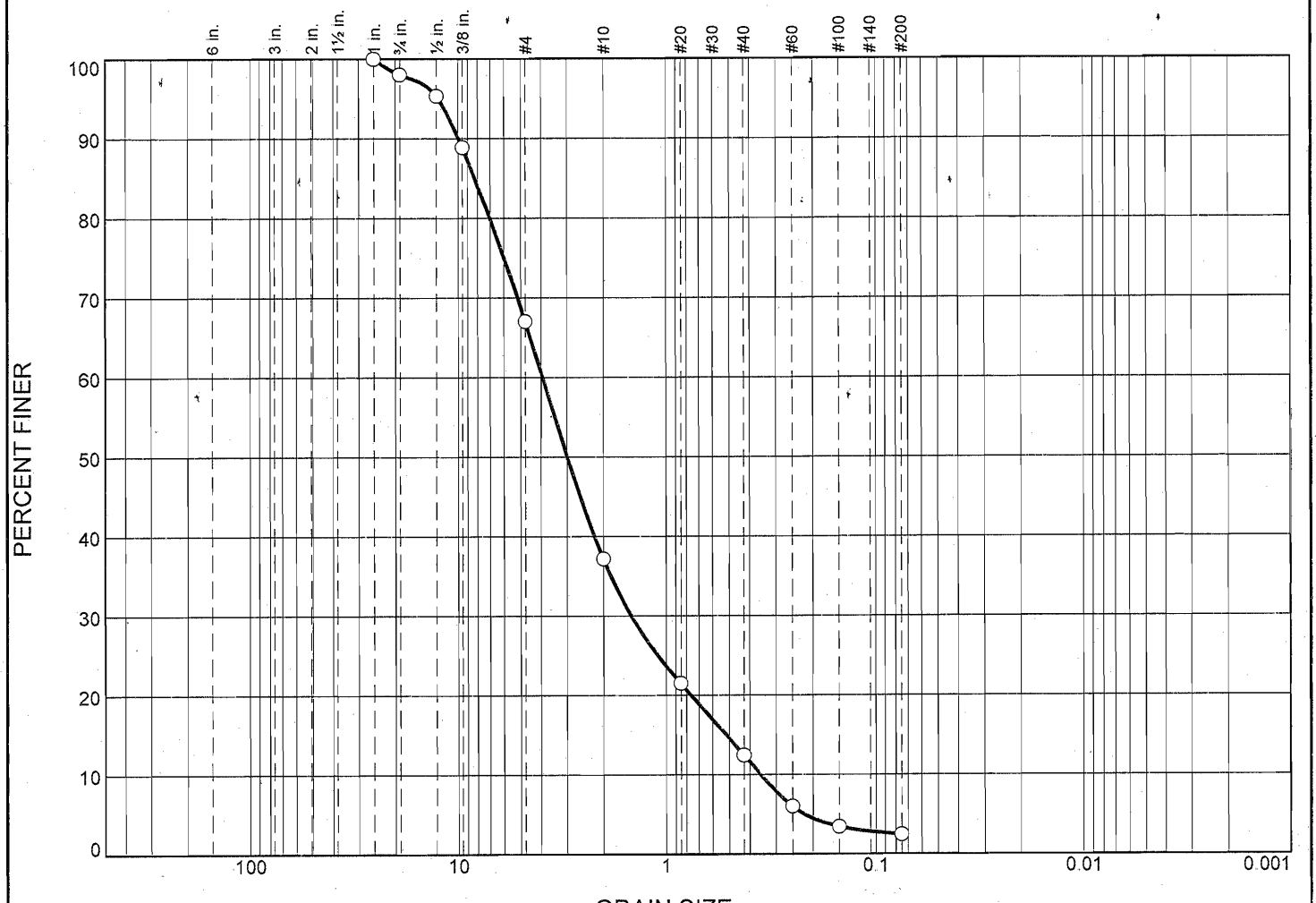
Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
.375	0.00	100.0
#4	0.88	99.8
#10	3.33	99.3
#20	8.61	98.1
#40	138.10	69.4
#60	374.53	17.1
#100	430.55	4.7
#200	440.33	2.5

Stones	Cobbles	Gravel				Sand						Silt			Clay	Fines
		Coarse	Medium	Fine	Total	V. Crs.	Crs.	Med.	Fine	V. Fine	Total	Crs.	Fine	Total		Total
0.0	0.0	0.0	0.2	0.5	0.7	0.9	16.8	64.5	13.6							

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.2184	0.2420	0.2600	0.2908	0.3510	0.3855	0.4878	0.5311	0.5930	0.7006

Fineness Modulus	C_u	C_c
1.74	1.77	1.00

Particle Size Distribution Report



	% Stones	% +3"	% Gravel			% Sand					% Silt		% Clay
			Coarse	Medium	Fine	V. Crs.	Crs.	Med.	Fine	V. Fine	Crs.	Fine	
○	0.0	0.0	2.0	31.0	29.8	13.5	9.1	8.6	3.3		2.7		

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	8.2761	3.9148	2.9783	1.4658	0.5147	0.3536	1.55	11.07

Material Description	USCS	AASHTO
○ brown sand with gravel	SW	

Project No. 161262 **Client:** Roberts Environmental Service

Project: Lane Street

○ **Source of Sample:** HB-4 **Depth:** 15'-16.5'

Remarks:

○ As Received

Moisture Content: 9.2%

BOWSER-MORNER, INC.

Dayton, Ohio

GRAIN SIZE DISTRIBUTION TEST DATA

3/22/2013

Client: Roberts Environmental Service
Project: Lane Street
Project Number: 161262
Location: HB-4
Depth: 15'-16.5'
Material Description: brown sand with gravel
Plastic Limit: NP
USCS Classification: SW
Testing Remarks: As Received
Moisture Content: 9.2%

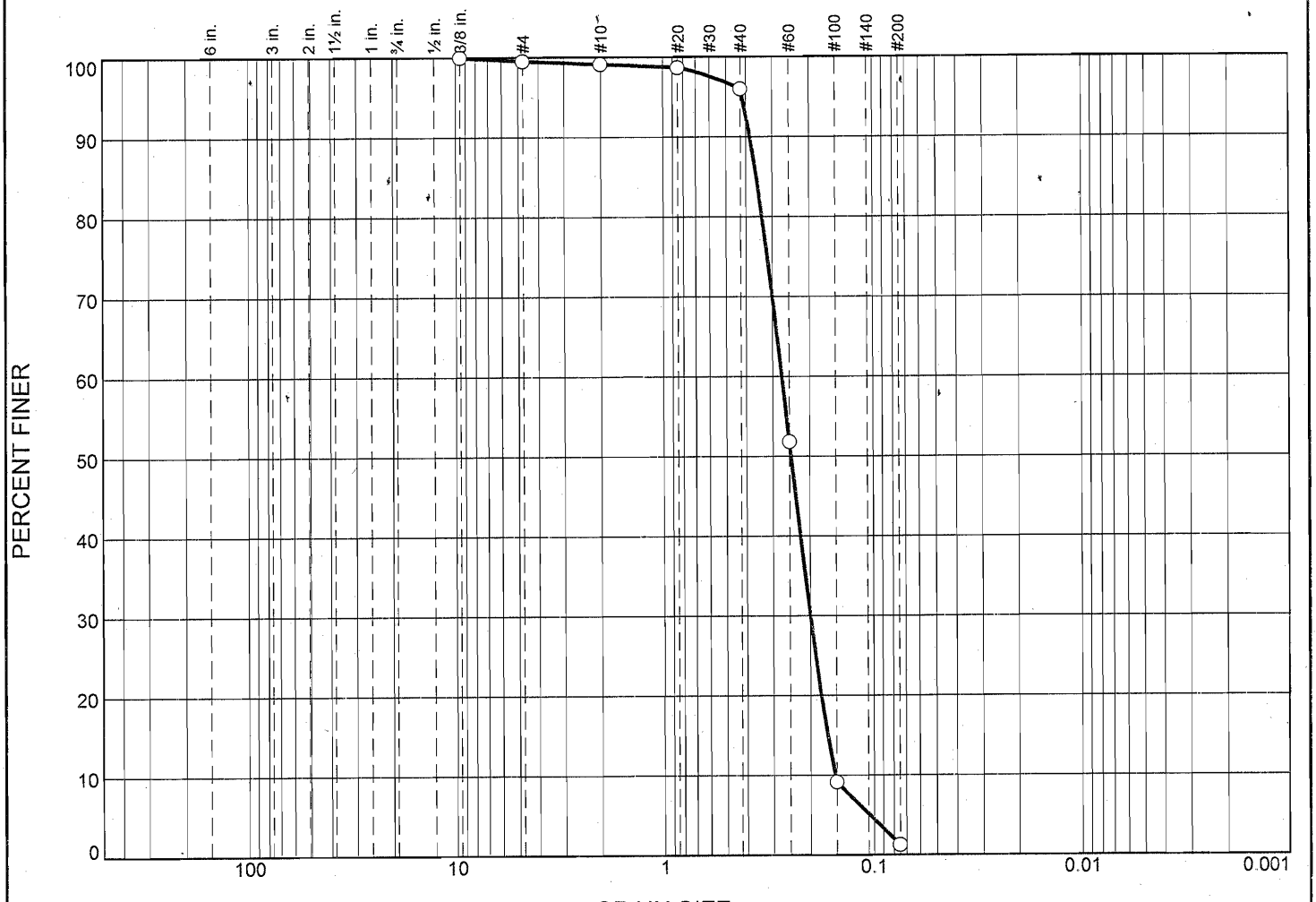
Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
797.30	95.78	0.00	1.0	0.00	100.0
			.75	13.76	98.0
			.50	32.64	95.3
			.375	77.66	88.9
			#4	231.20	67.0
			#10	440.55	37.2
			#20	550.65	21.5
			#40	614.00	12.5
			#60	659.30	6.0
			#100	677.30	3.5
			#200	684.20	2.5

Stones	Cobbles	Gravel				Sand						Silt			Clay	Fines
		Coarse	Medium	Fine	Total	V. Crs.	Crs.	Med.	Fine	V. Fine	Total	Crs.	Fine	Total		Total
0.0	0.0	2.0	31.0	29.8	62.8	13.5	9.1	8.6	3.3							

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.3536	0.5147	0.7580	1.4658	2.9783	3.9148	7.0040	8.2761	9.9146	12.4204

Fineness Modulus	C_u	C_c
4.49	11.07	1.55

Particle Size Distribution Report



	% Stones	% +3"	% Gravel			% Sand					% Silt		% Clay
			Coarse	Medium	Fine	V. Crs.	Crs.	Med.	Fine	V. Fine	Crs.	Fine	
○	0.0	0.0	0.0	0.4	0.5	0.3	2.0	44.9	47.4			4.5	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	0.3569	0.2711	0.2454	0.1993	0.1652	0.1524	0.96	1.78

Material Description	USCS	AASHTO
○ light brown sand	SP	

Project No. 161262 **Client:** Roberts Environmental Service

Project: Lane Street

○ **Source of Sample:** HB-4 **Depth:** 18'-20'

Remarks:

○ As Received

Moisture Content: 20.2%

BOWSER-MORNER, INC.

Dayton, Ohio

GRAIN SIZE DISTRIBUTION TEST DATA

3/22/2013

Client: Roberts Environmental Service
Project: Lane Street
Project Number: 161262
Location: HB-4
Depth: 18'-20'
Material Description: light brown sand
Plastic Limit: NP
USCS Classification: SP
Testing Remarks: As Received
Moisture Content: 20.2%

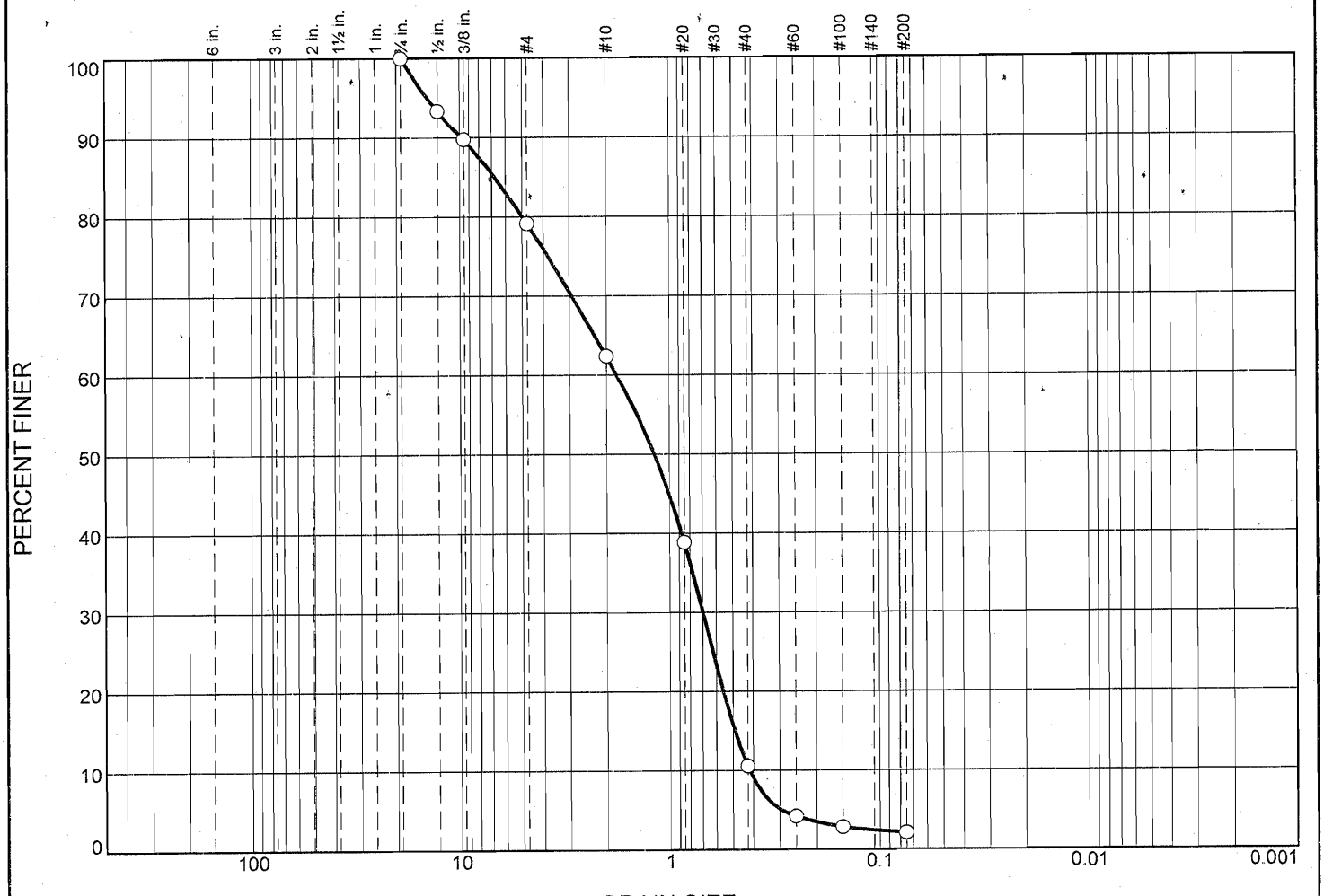
Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
704.30	95.65	0.00	.375	0.00	100.0
			#4	2.72	99.6
			#10	5.25	99.1
			#20	7.79	98.7
			#40	24.17	96.0
			#60	292.93	51.9
			#100	552.97	9.1
			#200	600.92	1.3

Stones	Cobbles	Gravel				Sand						Silt			Clay	Fines
		Coarse	Medium	Fine	Total	V. Crs.	Crs.	Med.	Fine	V. Fine	Total	Crs.	Fine	Total		Total
0.0	0.0	0.0	0.4	0.5	0.9	0.3	2.0	44.9	47.4							

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.1524	0.1652	0.1769	0.1993	0.2454	0.2711	0.3356	0.3569	0.3825	0.4162

Fineness Modulus	C_u	C_c
1.26	1.78	0.96

Particle Size Distribution Report



	% Stones	% +3"	% Gravel			% Sand					% Silt		% Clay
			Coarse	Medium	Fine	V. Crs.	Crs.	Med.	Fine	V. Fine	Crs.	Fine	
○	0.0	0.0	0.0	20.8	16.8	17.5	29.0	11.7	1.9			2.3	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	6.7569	1.7823	1.1794	0.6927	0.4878	0.4155	0.65	4.29

Material Description	USCS	AASHTO
○ brown sand with gravel	SP	

Project No. 161262 **Client:** Roberts Environmental Service

Project: Lane Street

○ **Source of Sample:** HB-4 **Depth:** 23'-25'

Remarks:

○ As Received

Moisture Content: 13.3%

BOWSER-MORNER, INC.

Dayton, Ohio

GRAIN SIZE DISTRIBUTION TEST DATA

3/22/2013

Client: Roberts Environmental Service
Project: Lane Street
Project Number: 161262
Location: HB-4
Depth: 23'-25'
Material Description: brown sand with gravel
Plastic Limit: NP
USCS Classification: SP
Testing Remarks: As Received
Moisture Content: 13.3%

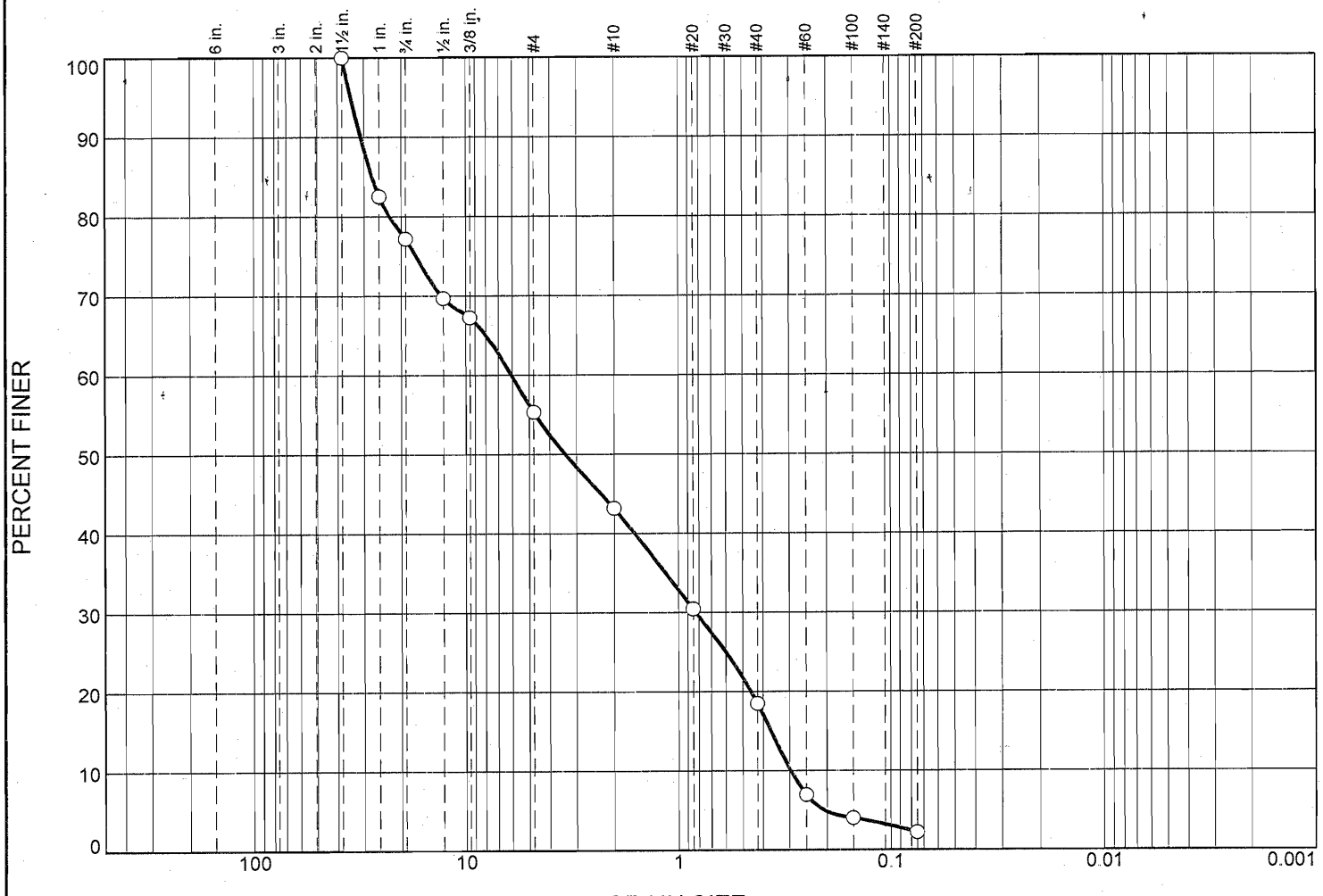
Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
776.90	112.08	0.00	.75	0.00	100.0
			.50	44.21	93.4
			.375	67.85	89.8
			#4	138.57	79.2
			#10	249.90	62.4
			#20	406.34	38.9
			#40	594.44	10.6
			#60	636.80	4.2
			#100	645.90	2.8
			#200	650.90	2.1

Stones	Cobbles	Gravel				Sand						Silt			Clay	Fines
		Coarse	Medium	Fine	Total	V. Crs.	Crs.	Med.	Fine	V. Fine	Total	Crs.	Fine	Total		Total
0.0	0.0	0.0	20.8	16.8	37.6	17.5	29.0	11.7	1.9							

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.4155	0.4878	0.5535	0.6927	1.1794	1.7823	4.9846	6.7569	9.6856	14.2031

Fineness Modulus	C_u	C_c
3.84	4.29	0.65

Particle Size Distribution Report



	% Stones	% +3"	% Gravel			% Sand					% Silt		% Clay
			Coarse	Medium	Fine	V. Crs.	Crs.	Med.	Fine	V. Fine	Crs.	Fine	
○	0.0	0.0	22.8	21.8	12.2	10.3	11.0	14.9	3.9		3.1		

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	27.4331	6.0443	3.3758	0.8240	0.3660	0.2952	0.38	20.48

Material Description	USCS	AASHTO
○ brown sand with gravel	SP	

Project No. 161262 **Client:** Roberts Environmental Service

Project: Lane Street

○ **Source of Sample:** HB-4 **Depth:** 25'-27'

Remarks:

○ As Received

Moisture Content: 7.7%

BOWSER-MORNER, INC.

Dayton, Ohio

GRAIN SIZE DISTRIBUTION TEST DATA

3/22/2013

Client: Roberts Environmental Service
Project: Lane Street
Project Number: 161262
Location: HB-4
Depth: 25'-27'
Material Description: brown sand with gravel
Plastic Limit: NP
USCS Classification: SP
Testing Remarks: As Received
Moisture Content: 7.7%

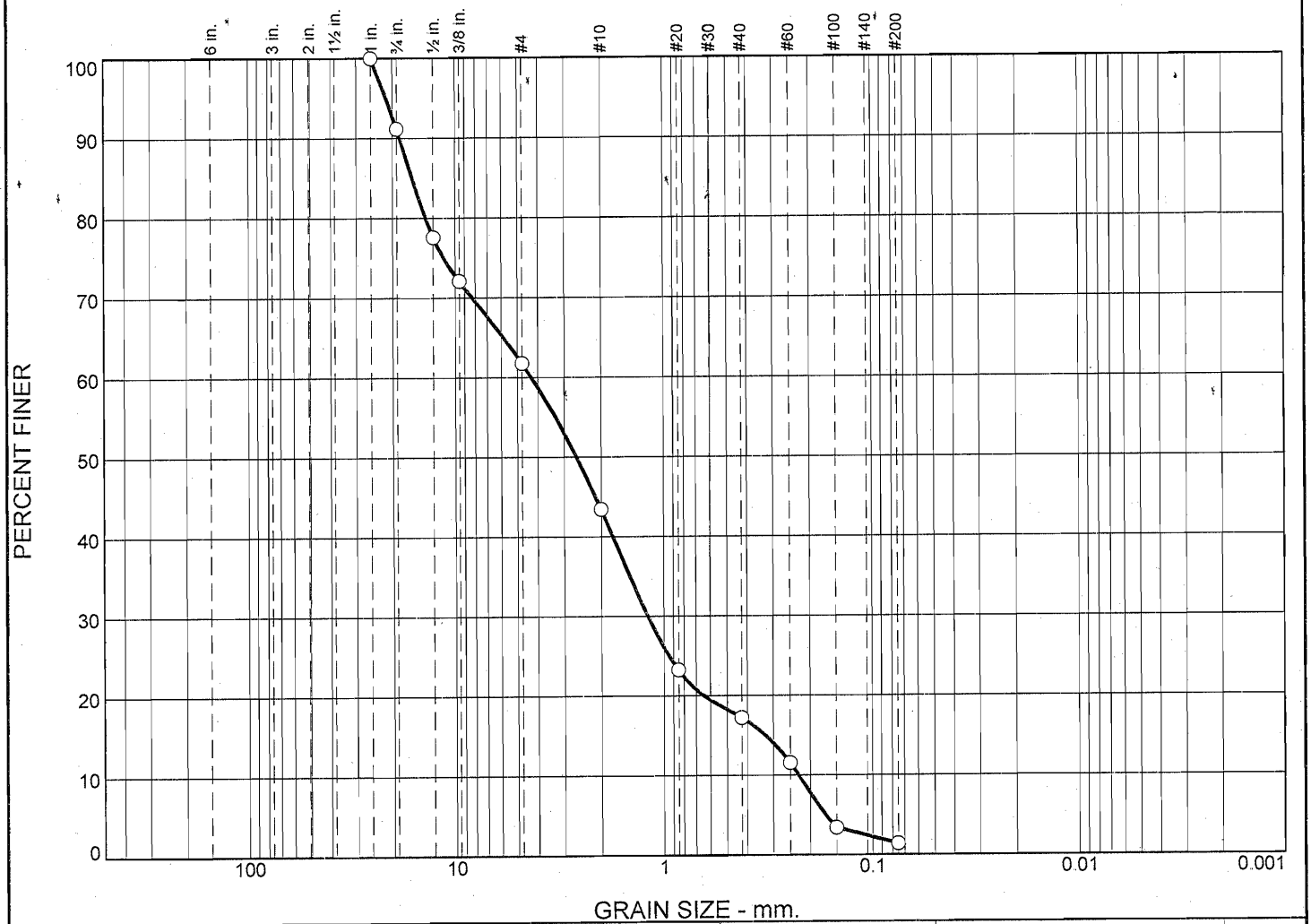
Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
625.40	96.88	0.00	1.5	0.00	100.0
			1.0	92.17	82.6
			.75	120.44	77.2
			.50	159.98	69.7
			.375	172.88	67.3
			#4	235.98	55.4
			#10	300.20	43.2
			#20	367.49	30.5
			#40	430.67	18.5
			#60	491.64	7.0
			#100	507.22	4.0
			#200	516.76	2.2

Stones	Cobbles	Gravel				Sand						Silt			Clay	Fines
		Coarse	Medium	Fine	Total	V. Crs.	Crs.	Med.	Fine	V. Fine	Total	Crs.	Fine	Total		Total
0.0	0.0	22.8	21.8	12.2	56.8	10.3	11.0	14.9	3.9							

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.2952	0.3660	0.4553	0.8240	3.3758	6.0443	22.6272	27.4331	31.0357	34.4931

Fineness Modulus	C_u	C_c
4.80	20.48	0.38

Particle Size Distribution Report



	% Stones	% +3"	% Gravel			% Sand					% Silt		% Clay
			Coarse	Medium	Fine	V. Crs.	Crs.	Med.	Fine	V. Fine	Crs.	Fine	
○	0.0	0.0	8.8	29.4	18.3	17.3	7.9	6.7	9.4		2.2		

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	16.0018	4.2814	2.6179	1.1885	0.3272	0.2270	1.45	18.86

Material Description	USCS	AASHTO
○ gray sand with gravel	SW	

Project No. 161262 **Client:** Roberts Environmental Service

Project: Lane Street

○ **Source of Sample:** HB-4 **Depth:** 33'-35'

Remarks:

○ As Received

Moisture Content: 10.0%

BOWSER-MORNER, INC.

Dayton, Ohio

GRAIN SIZE DISTRIBUTION TEST DATA

3/22/2013

Client: Roberts Environmental Service
Project: Lane Street
Project Number: 161262
Location: HB-4
Depth: 33'-35'
Material Description: gray sand with gravel
Plastic Limit: NP
USCS Classification: SW
Testing Remarks: As Received
Moisture Content: 10.0%

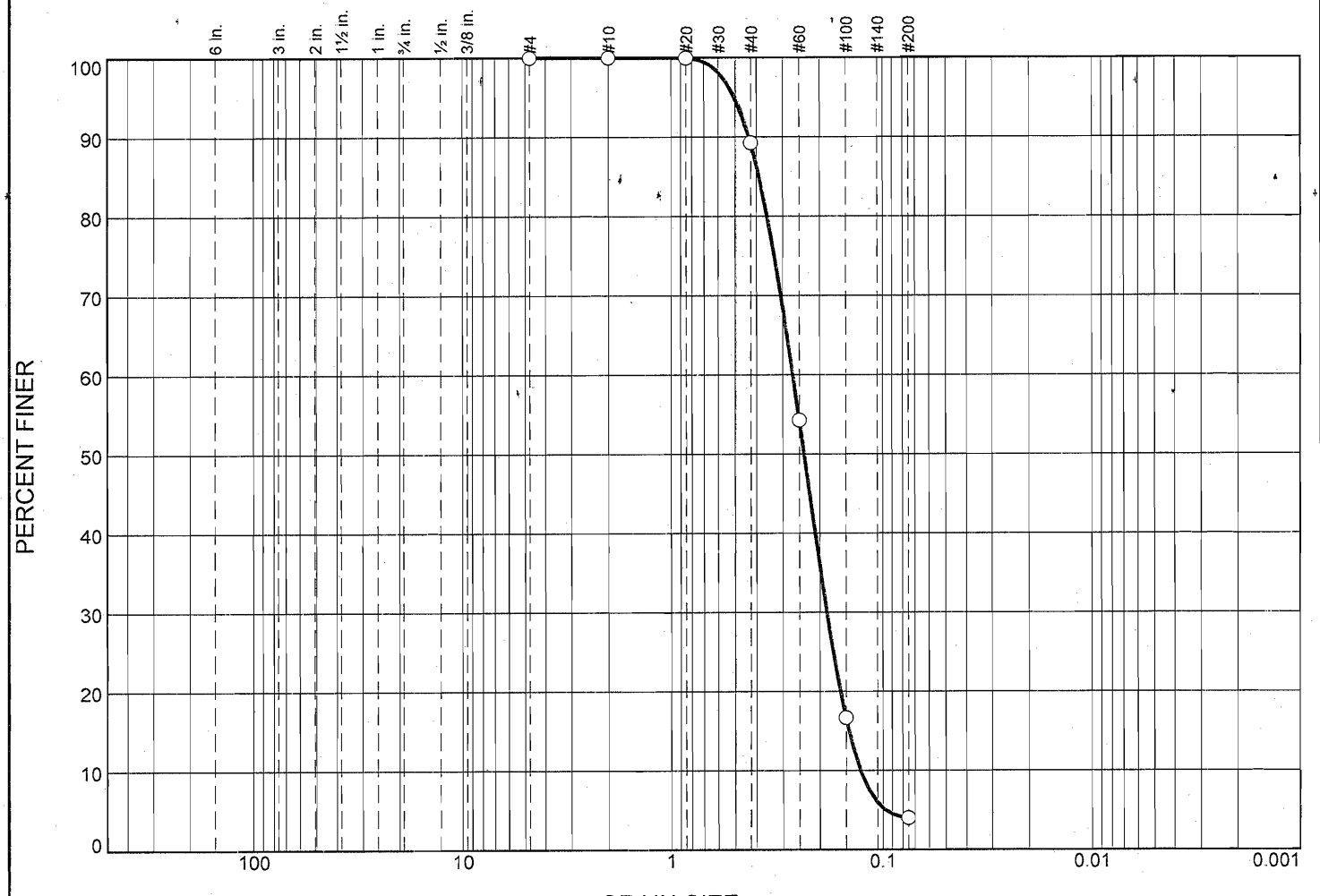
Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
630.80	96.73	0.00	1.0	0.00	100.0
			.75	47.14	91.2
			.50	119.67	77.6
			.375	148.95	72.1
			#4	204.10	61.8
			#10	301.90	43.5
			#20	409.84	23.3
			#40	442.02	17.2
			#60	472.26	11.6
			#100	515.81	3.4
			#200	526.55	1.4

Stones	Cobbles	Gravel				Sand						Silt			Clay	Fines
		Coarse	Medium	Fine	Total	V. Crs.	Crs.	Med.	Fine	V. Fine	Total	Crs.	Fine	Total		Total
0.0	0.0	8.8	29.4	18.3	56.5	17.3	7.9	6.7	9.4							

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.2270	0.3272	0.6387	1.1885	2.6179	4.2814	13.8068	16.0018	18.4101	21.4580

Fineness Modulus	C_u	C_c
4.61	18.86	1.45

Particle Size Distribution Report



	% Stones	% +3"	% Gravel			% Sand					% Silt		% Clay
			Coarse	Medium	Fine	V. Crs.	Crs.	Med.	Fine	V. Fine	Crs.	Fine	
○	0.0	0.0	0.0	0.0	0.0	0.0	5.2	40.5	49.0		5.3		

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.3886	0.2685	0.2372	0.1847	0.1450	0.1273	1.00	2.11

Material Description	USCS	AASHTO
○ light brown and gray sand	SP	

Project No. 161262 **Client:** Roberts Environmental Service

Project: Lane Street

○ **Source of Sample:** HB-4 **Depth:** 43'-45'

Remarks:

○ As Received

Moisture Content: 18.6%

BOWSER-MORNER, INC.

Dayton, Ohio

GRAIN SIZE DISTRIBUTION TEST DATA

3/22/2013

Client: Roberts Environmental Service
Project: Lane Street
Project Number: 161262
Location: HB-4
Depth: 43'-45'
Material Description: light brown and gray sand
USCS Classification: SP
Testing Remarks: As Received
Moisture Content: 18.6%

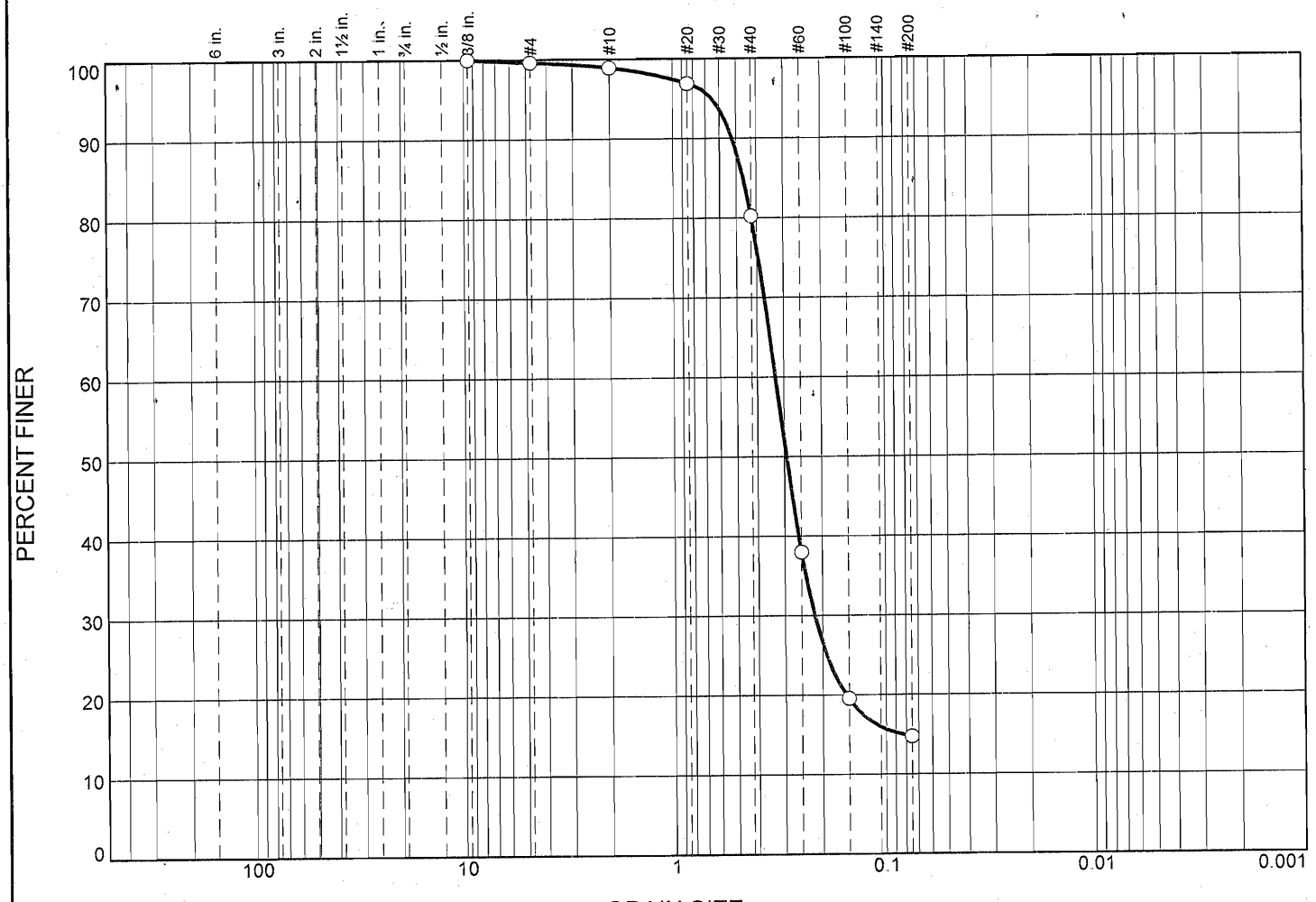
Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
772.20	112.50	0.00	#4	0.00	100.0
			#10	0.04	100.0
			#20	0.11	100.0
			#40	70.72	89.3
			#60	301.48	54.3
			#100	549.73	16.7
			#200	633.13	4.0

Stones	Cobbles	Gravel				Sand						Silt			Clay	Fines
		Coarse	Medium	Fine	Total	V. Crs.	Crs.	Med.	Fine	V. Fine	Total	Crs.	Fine	Total		Total
0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.2	40.5	49.0							

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.1273	0.1450	0.1593	0.1847	0.2372	0.2685	0.3559	0.3886	0.4324	0.5035

Fineness Modulus	C_u	C_c
1.17	2.11	1.00

Particle Size Distribution Report



	% Stones	% +3"	% Gravel			% Sand					% Silt		% Clay
			Coarse	Medium	Fine	V. Crs.	Crs.	Med.	Fine	V. Fine	Crs.	Fine	
○	0.0	0.0	0.0	0.4	0.6	1.5	9.0	50.5	22.3			15.7	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.4618	0.3285	0.2925	0.2167	0.0823			

Material Description	USCS	AASHTO
○ dark brown sand with silt		

Project No. 161262 **Client:** Roberts Environmental Service

Project: Lane Street

○ **Source of Sample:** HB-5 **Depth:** 1'-3'

Remarks:

○ As Received

Moisture Content: 8.5%

BOWSER-MORNER, INC.

Dayton, Ohio

GRAIN SIZE DISTRIBUTION TEST DATA

3/22/2013

Client: Roberts Environmental Service
Project: Lane Street
Project Number: 161262
Location: HB-5
Depth: 1'-3'
Material Description: dark brown sand with silt
Testing Remarks: As Received
Moisture Content: 8.5%

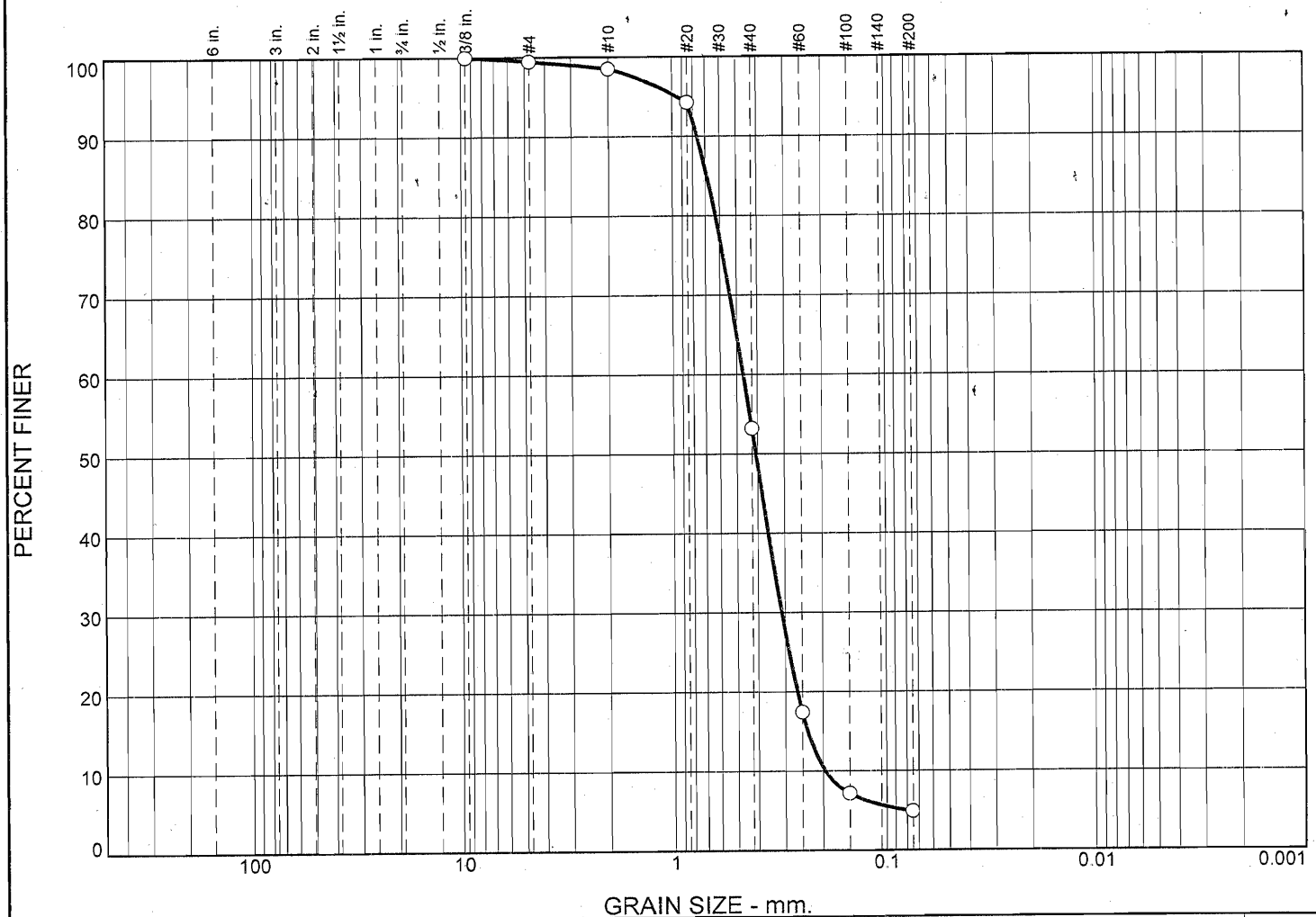
Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
645.70	231.67	0.00	.375	0.00	100.0
			#4	1.47	99.6
			#10	4.33	99.0
			#20	12.72	96.9
			#40	81.69	80.3
			#60	256.69	38.0
			#100	333.10	19.5
			#200	352.87	14.8

Stones	Cobbles	Gravel				Sand						Silt			Clay	Fines
		Coarse	Medium	Fine	Total	V. Crs.	Crs.	Med.	Fine	V. Fine	Total	Crs.	Fine	Total		Total
0.0	0.0	0.0	0.4	0.6	1.0	1.5	9.0	50.5	22.3							

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.0823	0.1542	0.2167	0.2925	0.3285	0.4232	0.4618	0.5202	0.6470

Fineness Modulus
1.38

Particle Size Distribution Report



	% Stones	% +3"	% Gravel			% Sand					% Silt		% Clay
			Coarse	Medium	Fine	V. Crs.	Crs.	Med.	Fine	V. Fine	Crs.	Fine	
○	0.0	0.0	0.0	0.5	0.9	3.2	30.1	47.8	12.0		5.5		

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	0.6844	0.4651	0.4074	0.3110	0.2353	0.1950	1.07	2.38

Material Description	USCS	AASHTO
○ orange sand	SP	

Project No. 161262 **Client:** Roberts Environmental Service

Project: Lane Street

○ **Source of Sample:** HB-5 **Depth:** 3'-5'

Remarks:

○ As Received

Moisture Content: 12.1%

BOWSER-MORNER, INC.

Dayton, Ohio

GRAIN SIZE DISTRIBUTION TEST DATA

3/22/2013

Client: Roberts Environmental Service
Project: Lane Street
Project Number: 161262
Location: HB-5
Depth: 3'-5'
Material Description: orange sand
Plastic Limit: NP
USCS Classification: SP
Testing Remarks: As Received
Moisture Content: 12.1%

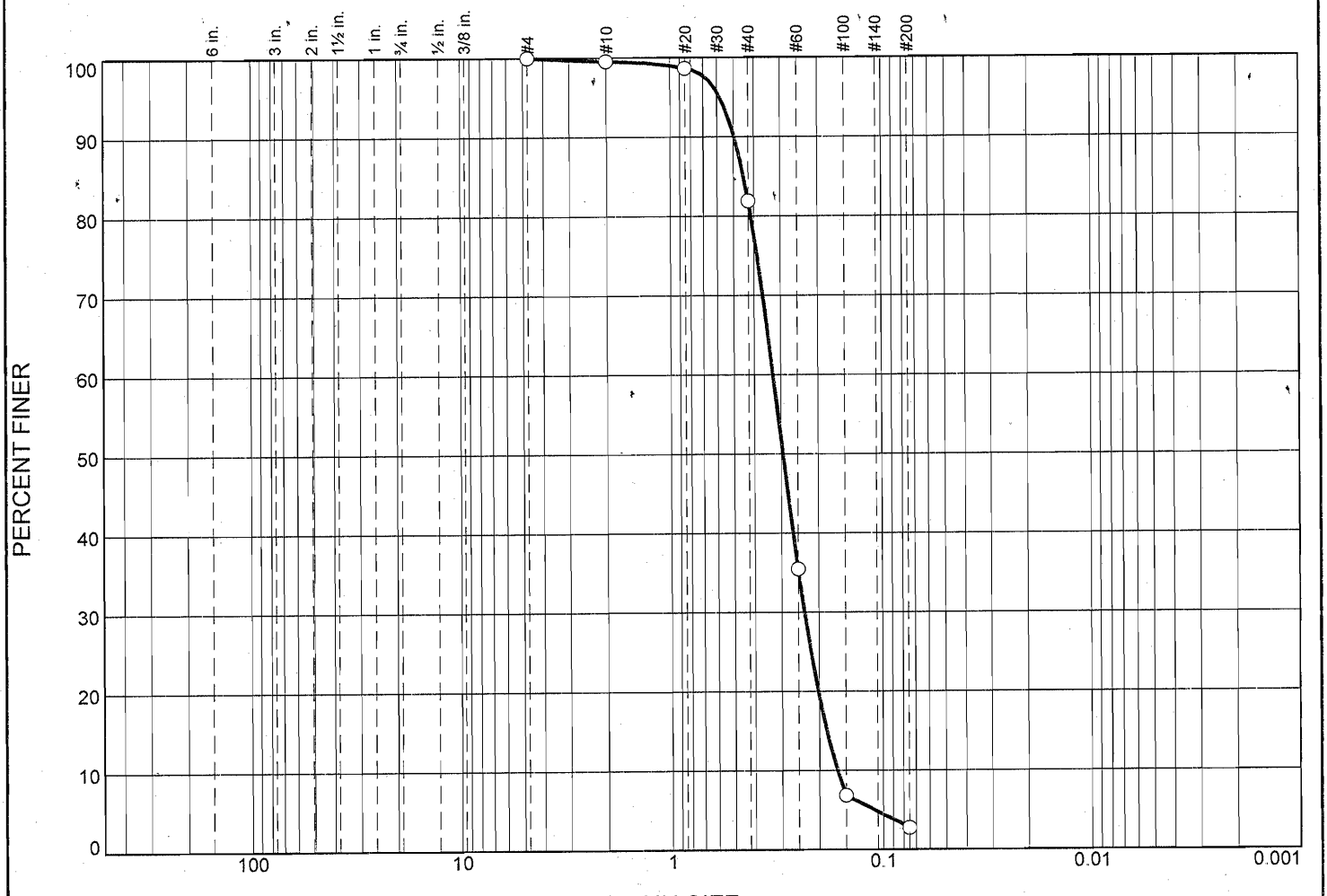
Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
807.10	235.52	0.00	.375	0.00	100.0
			#4	2.91	99.5
			#10	8.23	98.6
			#20	32.61	94.3
			#40	267.32	53.2
			#60	471.75	17.5
			#100	530.41	7.2
			#200	543.35	4.9

Stones	Cobbles	Gravel				Sand						Silt			Clay	Fines
		Coarse	Medium	Fine	Total	V. Crs.	Crs.	Med.	Fine	V. Fine	Total	Crs.	Fine	Total		Total
0.0	0.0	0.0	0.5	0.9	1.4	3.2	30.1	47.8	12.0							

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.1950	0.2353	0.2635	0.3110	0.4074	0.4651	0.6258	0.6844	0.7593	0.9445

Fineness Modulus	C_u	C_c
1.93	2.38	1.07

Particle Size Distribution Report



	% Stones	% +3"	% Gravel			% Sand					% Silt		% Clay
			Coarse	Medium	Fine	V. Crs.	Crs.	Med.	Fine	V. Fine	Crs.	Fine	
○	0.0	0.0	0.0	0.0	0.4	0.6	8.6	54.9	31.0			4.5	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.4468	0.3264	0.2936	0.2334	0.1840	0.1644	1.01	1.98

Material Description	USCS	AASHTO
○ light brown sand	SP	

Project No. 161262 **Client:** Roberts Environmental Service

Project: Lane Street

○ **Source of Sample:** HB-5 **Depth:** 7'-9'

Remarks:

○ As Received

Moisture Content: 20.4%

BOWSER-MORNER, INC.

Dayton, Ohio

GRAIN SIZE DISTRIBUTION TEST DATA

3/22/2013

Client: Roberts Environmental Service
Project: Lane Street
Project Number: 161262
Location: HB-5
Depth: 7'-9'
Material Description: light brown sand
USCS Classification: SP
Testing Remarks: As Received
Moisture Content: 20.4%

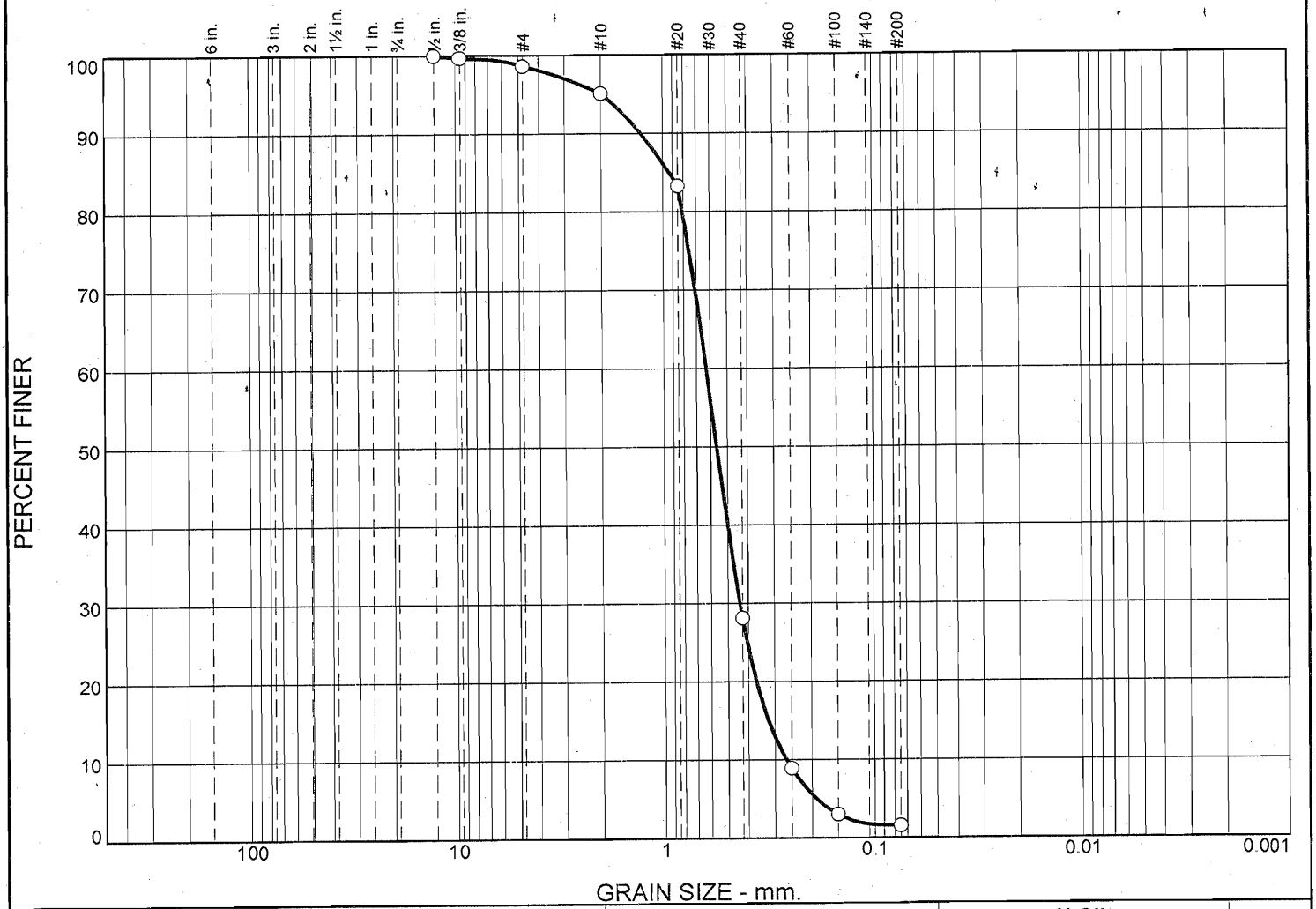
Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
551.69	236.72	0.00	#4	0.00	100.0
			#10	1.36	99.6
			#20	4.20	98.7
			#40	56.95	81.9
			#60	203.18	35.5
			#100	293.31	6.9
			#200	306.24	2.8

Stones	Cobbles	Gravel				Sand						Silt			Clay	Fines
		Coarse	Medium	Fine	Total	V. Crs.	Crs.	Med.	Fine	V. Fine	Total	Crs.	Fine	Total		Total
0.0	0.0	0.0	0.0	0.4	0.4	0.6	8.6	54.9	31.0							

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.1644	0.1840	0.2014	0.2334	0.2936	0.3264	0.4132	0.4468	0.4945	0.5789

Fineness Modulus	C_u	C_c
1.46	1.98	1.01

Particle Size Distribution Report



	% Stones	% +3"	% Gravel			% Sand					% Silt		% Clay
			Coarse	Medium	Fine	V. Crs.	Crs.	Med.	Fine	V. Fine	Crs.	Fine	
○	0.0	0.0	0.0	1.4	3.4	9.0	45.9	31.4	7.2			1.7	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	0.9321	0.6264	0.5595	0.4369	0.3216	0.2642	1.15	2.37

Material Description	USCS	AASHTO
○ light brown sand	SP	

Project No. 161262 **Client:** Roberts Environmental Service

Project: Lane Street

○ **Source of Sample:** HB-5 **Depth:** 13'-15'

Remarks:

○ As Received

Moisture Content: 18.3%

BOWSER-MORNER, INC.

Dayton, Ohio

GRAIN SIZE DISTRIBUTION TEST DATA

3/22/2013

Client: Roberts Environmental Service
Project: Lane Street
Project Number: 161262
Location: HB-5
Depth: 13'-15'
Material Description: light brown sand
Plastic Limit: NP
USCS Classification: SP
Testing Remarks: As Received
Moisture Content: 18.3%

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)
770.60	227.78	0.00

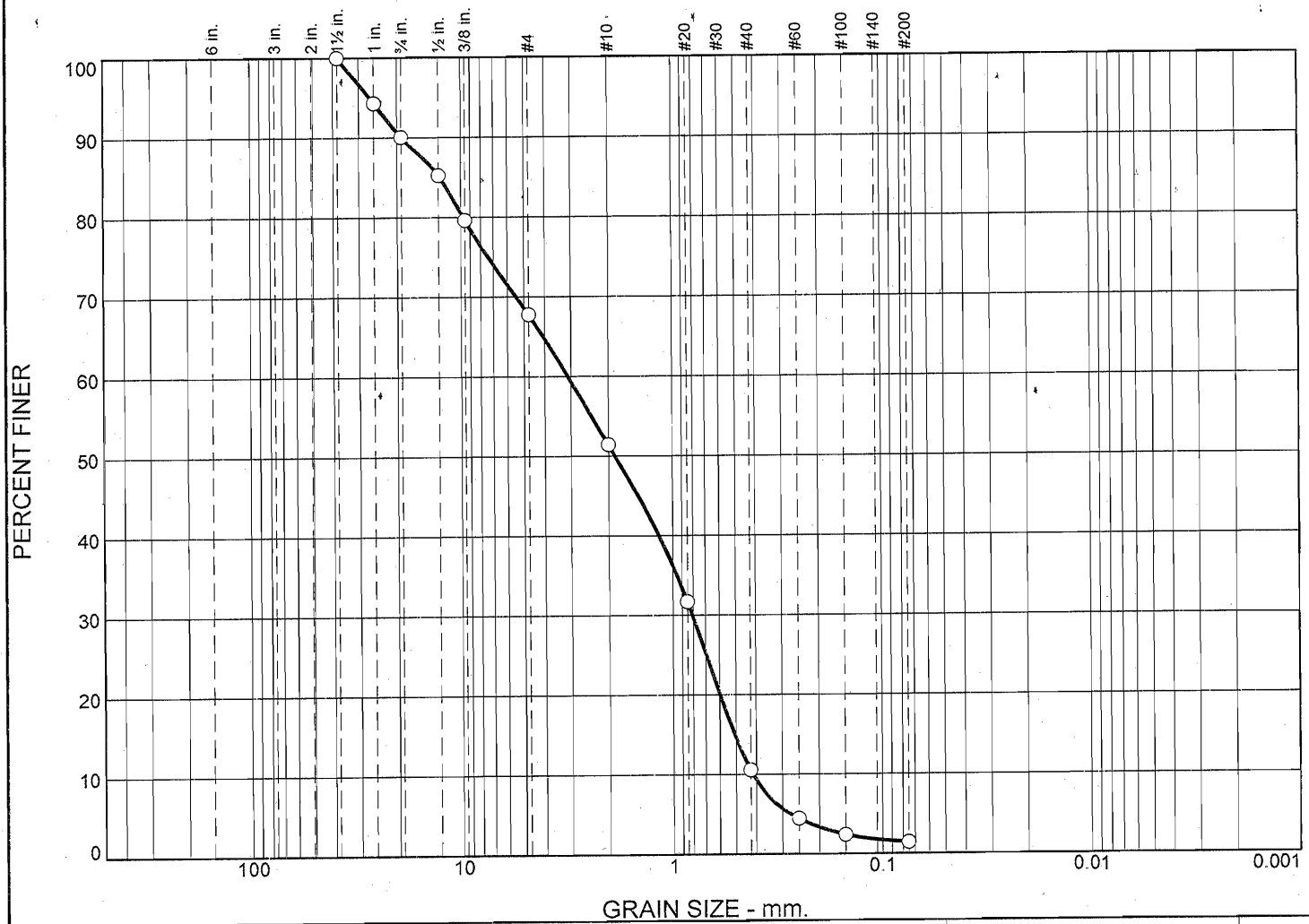
Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
.50	0.00	100.0
.375	1.54	99.7
#4	7.39	98.6
#10	26.30	95.2
#20	90.52	83.3
#40	389.99	28.2
#60	494.24	8.9
#100	526.54	3.0
#200	534.43	1.5

Stones	Cobbles	Gravel				Sand						Silt			Clay	Fines
		Coarse	Medium	Fine	Total	V. Crs.	Crs.	Med.	Fine	V. Fine	Total	Crs.	Fine	Total		Total
0.0	0.0	0.0	1.4	3.4	4.8	9.0	45.9	31.4	7.2							

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.2642	0.3216	0.3661	0.4369	0.5595	0.6264	0.8057	0.9321	1.2777	1.9661

Fineness Modulus	C_u	C_c
2.45	2.37	1.15

Particle Size Distribution Report



	% Stones	% +3"	% Gravel			% Sand					% Silt		% Clay
			Coarse	Medium	Fine	V. Crs.	Crs.	Med.	Fine	V. Fine	Crs.	Fine	
○	0.0	0.0	9.9	22.3	16.4	15.1	21.6	10.2	2.8		1.7		

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	12.4714	3.0970	1.8580	0.8042	0.5055	0.4131	0.51	7.50

Material Description	USCS	AASHTO
○ dark brown sand with gravel	SP	

Project No. 161262 **Client:** Roberts Environmental Service

Project: Lane Street

○ **Source of Sample:** HB-5 **Depth:** 15'-17'

Remarks:

○ As Received

Moisture Content: 9.3%

BOWSER-MORNER, INC.

Dayton, Ohio

GRAIN SIZE DISTRIBUTION TEST DATA

3/22/2013

Client: Roberts Environmental Service
Project: Lane Street
Project Number: 161262
Location: HB-5
Depth: 15'-17'
Material Description: dark brown sand with gravel
Plastic Limit: NP
USCS Classification: SP
Testing Remarks: As Received
Moisture Content: 9.3%

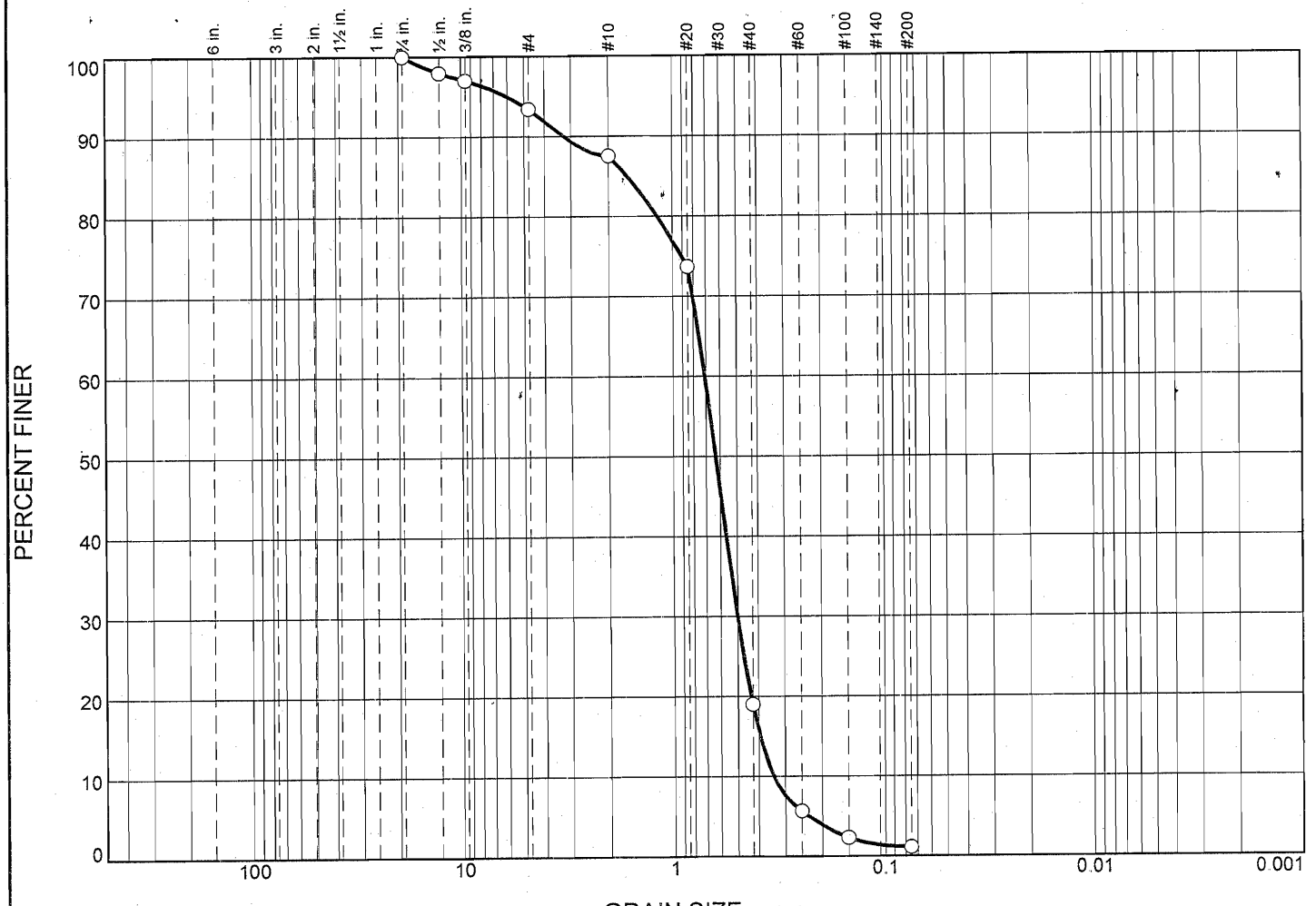
Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
772.40	228.30	0.00	1.5	0.00	100.0
			1.0	30.83	94.3
			.75	54.06	90.1
			.50	79.99	85.3
			.375	110.72	79.7
			#4	175.36	67.8
			#10	264.19	51.4
			#20	371.51	31.7
			#40	486.48	10.6
			#60	519.87	4.5
			#100	531.06	2.4
			#200	536.30	1.4

Stones	Cobbles	Gravel				Sand						Silt			Clay	Fines
		Coarse	Medium	Fine	Total	V. Crs.	Crs.	Med.	Fine	V. Fine	Total	Crs.	Fine	Total		Total
0.0	0.0	9.9	22.3	16.4	48.6	15.1	21.6	10.2	2.8							

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.4131	0.5055	0.5941	0.8042	1.8580	3.0970	9.6900	12.4714	18.9519	26.5470

Fineness Modulus	C_u	C_c
4.39	7.50	0.51

Particle Size Distribution Report



	% Stones	% +3"	% Gravel			% Sand					% Silt		% Clay
			Coarse	Medium	Fine	V. Crs.	Crs.	Med.	Fine	V. Fine	Crs.	Fine	
○	0.0	0.0	0.0	6.6	5.8	10.6	46.7	24.6	4.4			1.3	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	1.6294	0.7050	0.6281	0.4981	0.3926	0.3389	1.04	2.08

Material Description	USCS	AASHTO
○ light brown sand	SP	

Project No. 161262 **Client:** Roberts Environmental Service

Project: Lane Street

○ **Source of Sample:** HB-5 **Depth:** 20'-22'

Remarks:

○ As Received

Moisture Content: 16.3%

BOWSER-MORNER, INC.

Dayton, Ohio

GRAIN SIZE DISTRIBUTION TEST DATA

3/22/2013

Client: Roberts Environmental Service
Project: Lane Street
Project Number: 161262
Location: HB-5
Depth: 20'-22'
Material Description: light brown sand
Plastic Limit: NP
USCS Classification: SP
Testing Remarks: As Received
Moisture Content: 16.3%

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)
997.60	120.11	0.00

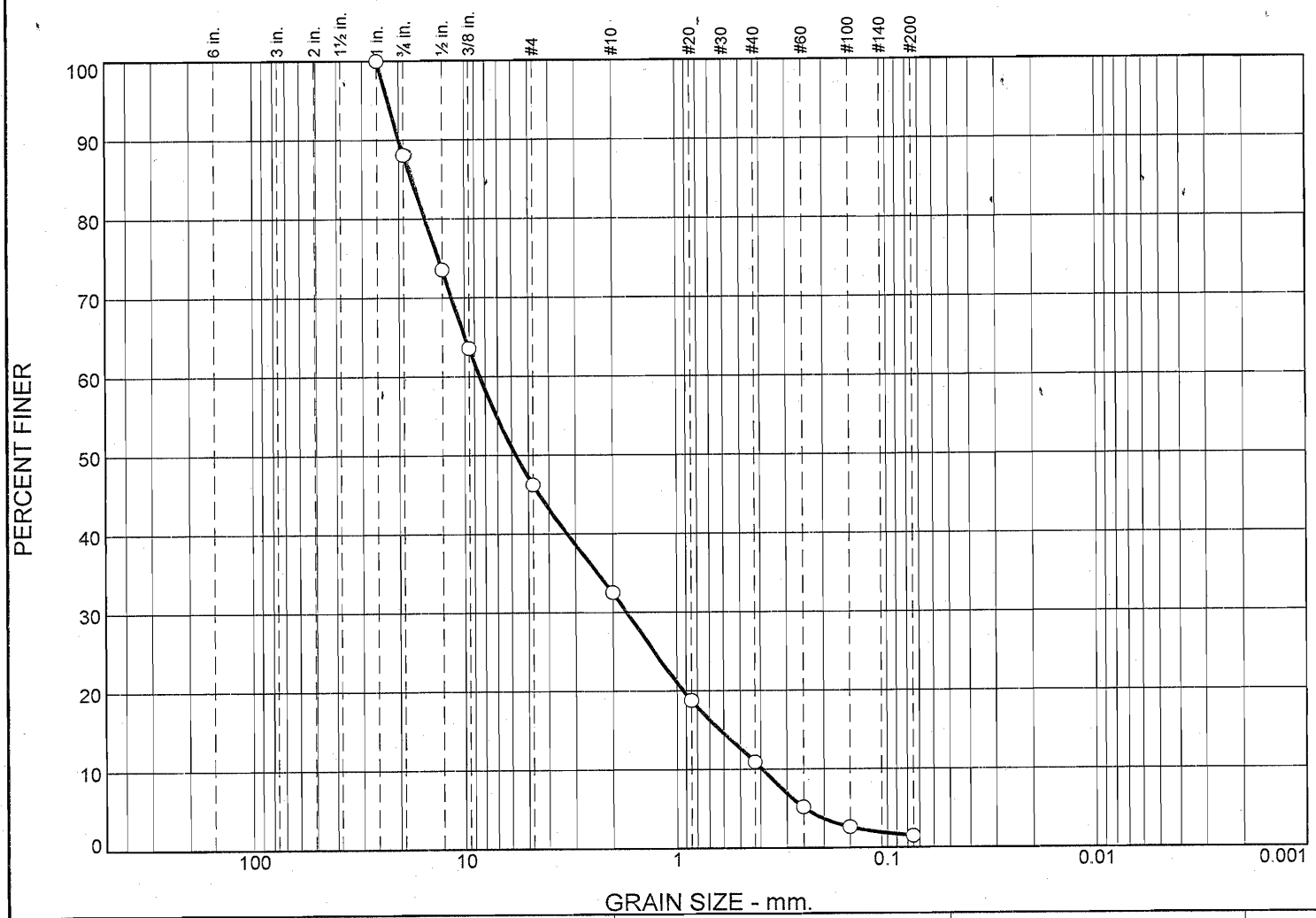
Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
.75	0.00	100.0
.50	17.63	98.0
.375	26.13	97.0
#4	57.81	93.4
#10	108.93	87.6
#20	230.54	73.7
#40	710.70	19.0
#60	827.80	5.7
#100	857.20	2.3
#200	867.80	1.1

Stones	Cobbles	Gravel				Sand						Silt			Clay	Fines
		Coarse	Medium	Fine	Total	V. Crs.	Crs.	Med.	Fine	V. Fine	Total	Crs.	Fine	Total		Total
0.0	0.0	0.0	6.6	5.8	12.4	10.6	46.7	24.6	4.4							

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.3389	0.3926	0.4322	0.4981	0.6281	0.7050	1.1805	1.6294	3.2133	5.9998

Fineness Modulus	C_u	C_c
2.86	2.08	1.04

Particle Size Distribution Report



	% Stones	% +3"	% Gravel			% Sand					% Silt		% Clay
			Coarse	Medium	Fine	V. Crs.	Crs.	Med.	Fine	V. Fine	Crs.	Fine	
○	0.0	0.0	11.9	41.8	13.7	11.5	8.4	7.5	3.4		1.8		

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	17.5382	8.4742	5.7147	1.7108	0.6189	0.3914	0.88	21.65

Material Description	USCS	AASHTO
○ brown gravel with sand	GP	

Project No. 161262 **Client:** Roberts Environmental Service

Project: Lane Street

○ **Source of Sample:** HB-5 **Depth:** 25'-27'

Remarks:

○ As Received

Moisture Content: 5.8%

BOWSER-MORNER, INC.

Dayton, Ohio

GRAIN SIZE DISTRIBUTION TEST DATA

3/22/2013

Client: Roberts Environmental Service
Project: Lane Street
Project Number: 161262
Location: HB-5
Depth: 25'-27'
Material Description: brown gravel with sand
Plastic Limit: NP
USCS Classification: GP
Testing Remarks: As Received
Moisture Content: 5.8%

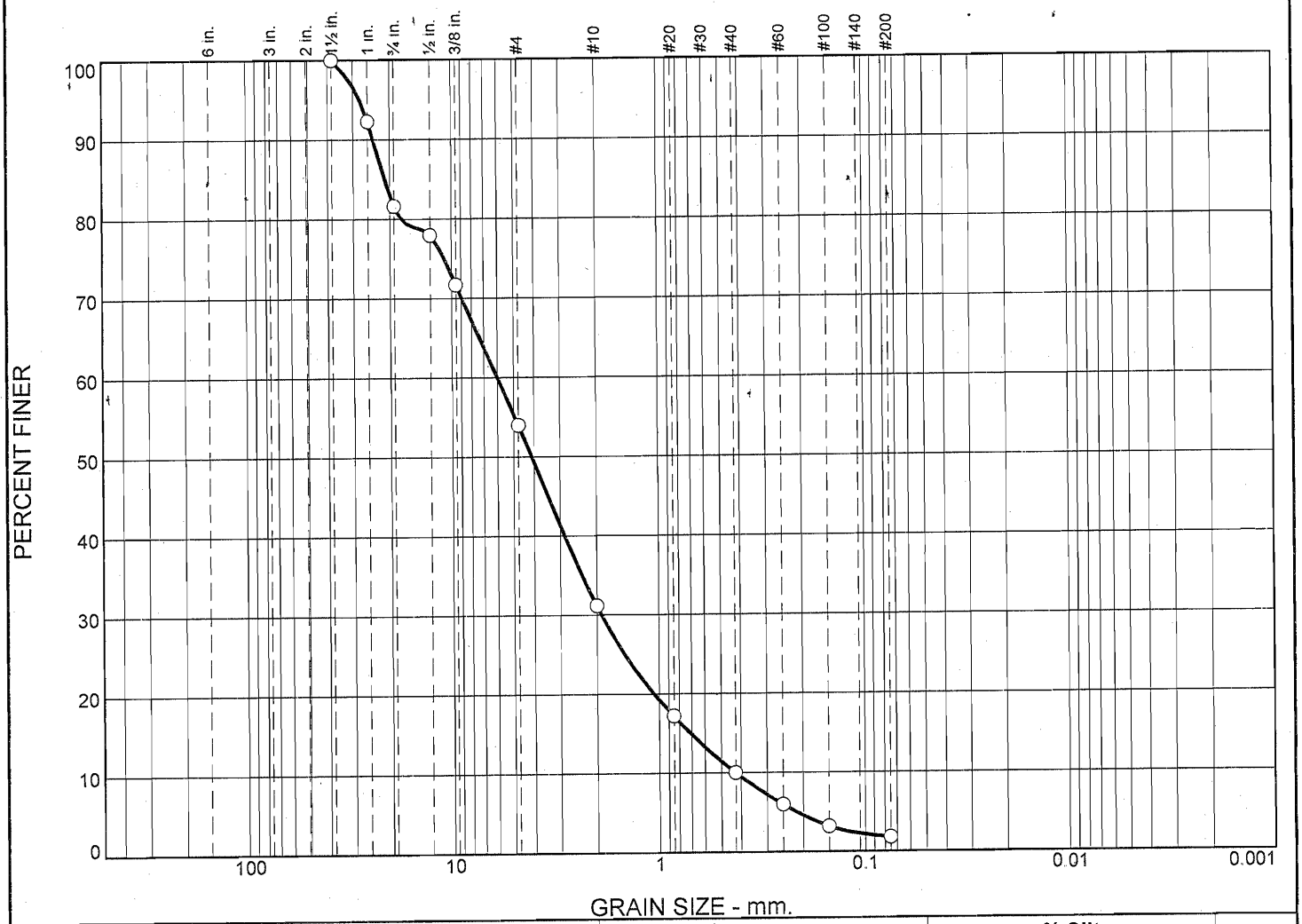
Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
841.50	124.61	0.00	1.0	0.00	100.0
			.75	85.06	88.1
			.50	189.51	73.6
			.375	260.79	63.6
			#4	385.18	46.3
			#10	483.53	32.6
			#20	582.17	18.8
			#40	638.40	10.9
			#60	679.80	5.2
			#100	698.00	2.6
			#200	706.20	1.5

Stones	Cobbles	Gravel				Sand						Silt			Clay	Fines
		Coarse	Medium	Fine	Total	V. Crs.	Crs.	Med.	Fine	V. Fine	Total	Crs.	Fine	Total		Total
0.0	0.0	11.9	41.8	13.7	67.4	11.5	8.4	7.5	3.4							

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.3914	0.6189	0.9266	1.7108	5.7147	8.4742	15.2654	17.5382	19.9732	22.5643

Fineness Modulus	C_u	C_c
5.19	21.65	0.88

Particle Size Distribution Report



	% Stones	% +3"	% Gravel			% Sand					% Silt		% Clay
			Coarse	Medium	Fine	V. Crs.	Crs.	Med.	Fine	V. Fine	Crs.	Fine	
○	0.0	0.0	18.4	27.6	22.8	11.9	7.8	5.5	3.8		2.2		

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	21.1013	5.9937	4.0976	1.8924	0.7029	0.4241	1.41	14.13

Material Description	USCS	AASHTO
○ gray sand with gravel	SW	

Project No. 161262 **Client:** Roberts Environmental Service

Project: Lane Street

○ **Source of Sample:** HB-5 **Depth:** 32'-34'

Remarks:

○ As Received

Moisture Content: 5.4%

BOWSER-MORNER, INC.

Dayton, Ohio

GRAIN SIZE DISTRIBUTION TEST DATA

3/22/2013

Client: Roberts Environmental Service
Project: Lane Street
Project Number: 161262
Location: HB-5
Depth: 32'-34'
Material Description: gray sand with gravel
Plastic Limit: NP
USCS Classification: SW
Testing Remarks: As Received
Moisture Content: 5.4%

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)
963.20	227.16	0.00

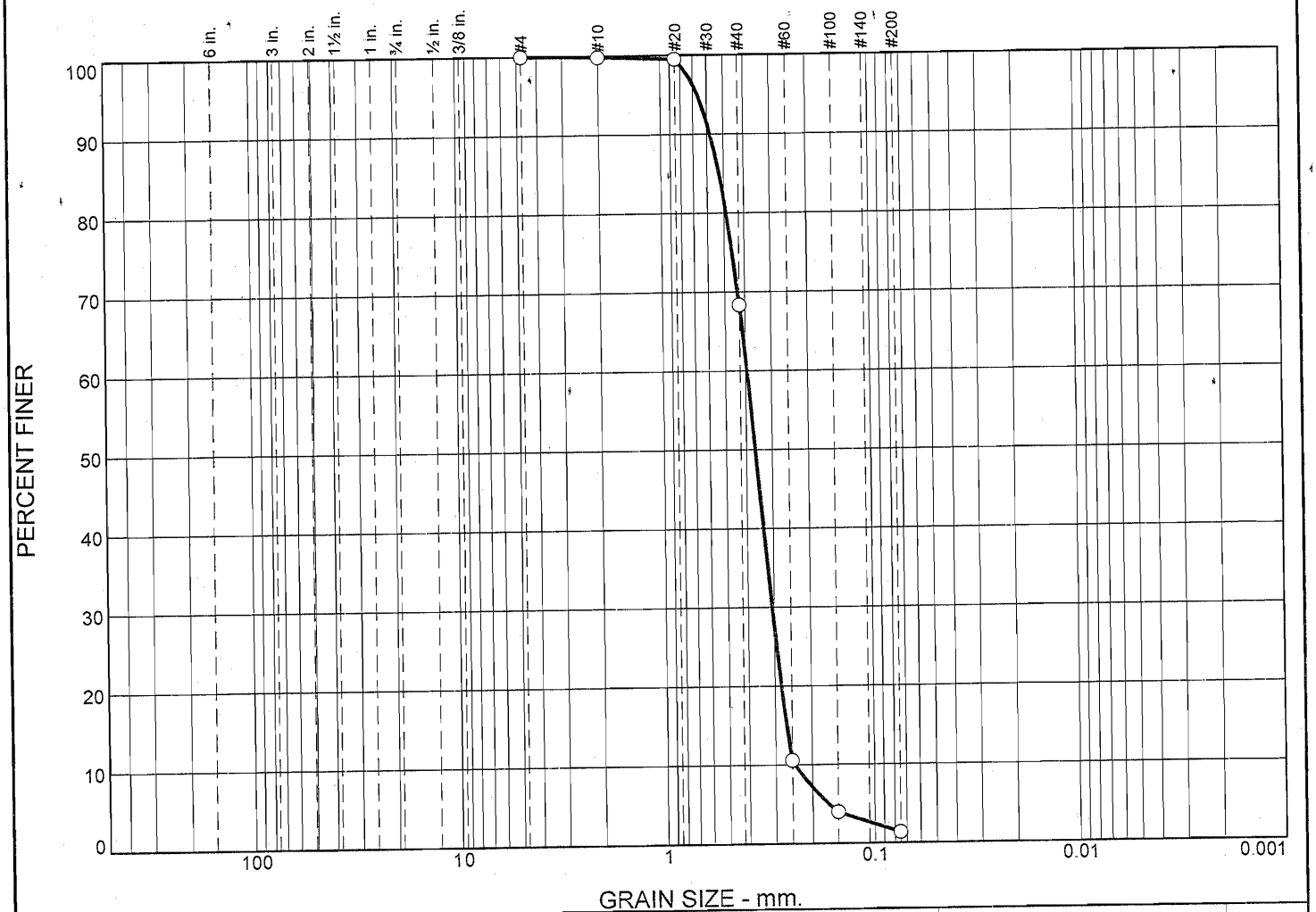
Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
1.5	0.00	100.0
1.0	56.66	92.3
.75	135.18	81.6
.50	162.14	78.0
.375	208.11	71.7
#4	338.58	54.0
#10	506.35	31.2
#20	609.30	17.2
#40	662.30	10.0
#60	692.00	6.0
#100	712.50	3.2
#200	722.80	1.8

Stones	Cobbles	Gravel				Sand						Silt			Clay	Fines
		Coarse	Medium	Fine	Total	V. Crs.	Crs.	Med.	Fine	V. Fine	Total	Crs.	Fine	Total		Total
0.0	0.0	18.4	27.6	22.8	68.8	11.9	7.8	5.5	3.8							

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.4241	0.7029	1.0546	1.8924	4.0976	5.9937	17.4679	21.1013	23.8849	27.8156

Fineness Modulus	C_u	C_c
5.12	14.13	1.41

Particle Size Distribution Report



	% Stones	% +3"	% Gravel			% Sand					% Silt		% Clay
			Coarse	Medium	Fine	V. Crs.	Crs.	Med.	Fine	V. Fine	Crs.	Fine	
○	0.0	0.0	0.0	0.0	0.1	0.3	17.6	71.4	8.2			2.4	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	0.5242	0.3933	0.3615	0.3066	0.2648	0.2415	0.99	1.63

Material Description	USCS	AASHTO
○ brown sand	SP	

Project No. 161262 **Client:** Roberts Environmental Service

Project: Lane Street

○ **Source of Sample:** HB-5 **Depth:** 38'-40'

Remarks:

○ As Received

Moisture Content: 19.3%

BOWSER-MORNER, INC.

Dayton, Ohio

GRAIN SIZE DISTRIBUTION TEST DATA

3/22/2013

Client: Roberts Environmental Service
Project: Lane Street
Project Number: 161262
Location: HB-5
Depth: 38'-40'
Material Description: brown sand
Plastic Limit: NP
USCS Classification: SP
Testing Remarks: As Received
Moisture Content: 19.3%

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)
867.20	229.96	0.00

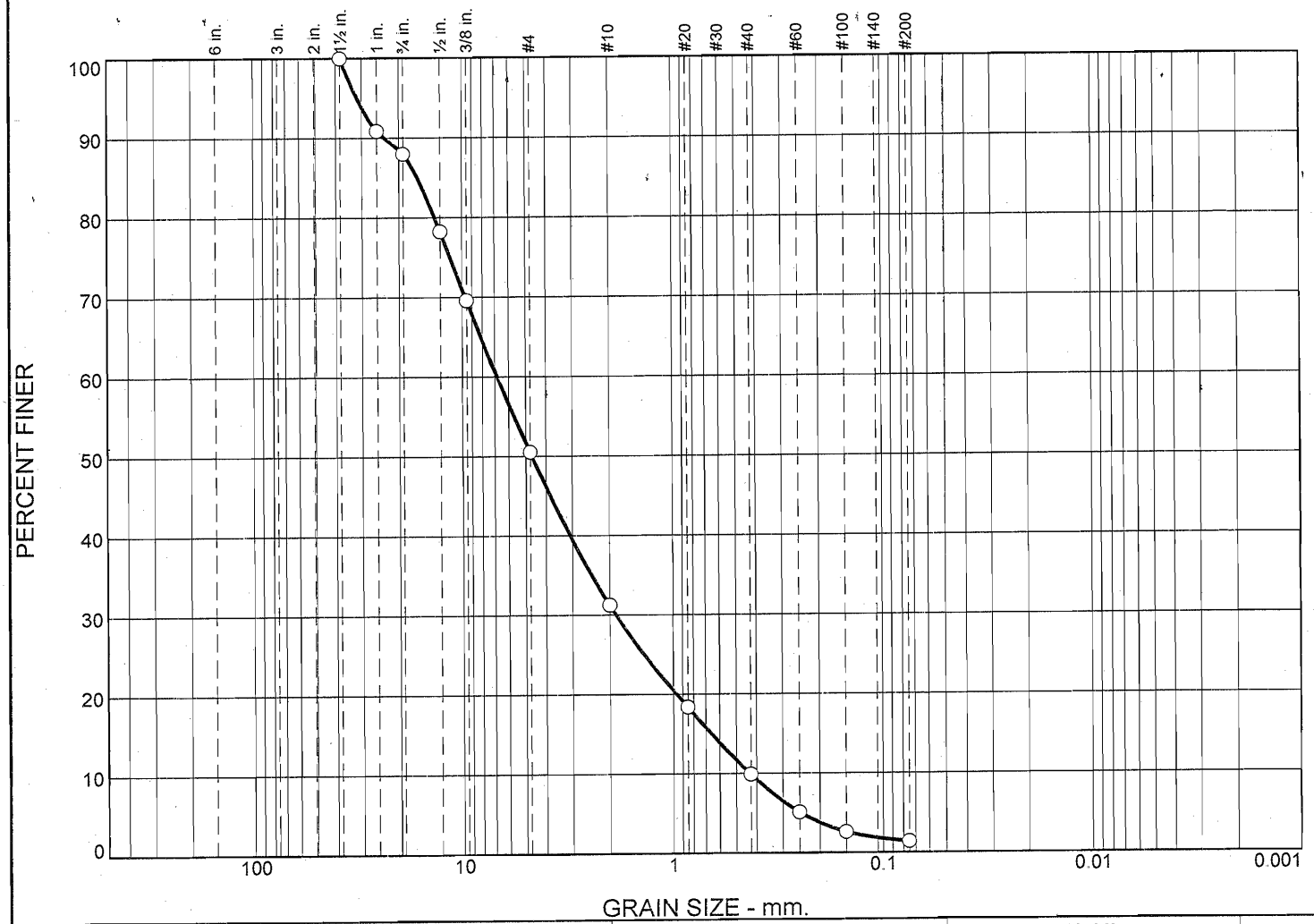
Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
#4	0.00	100.0
#10	0.85	99.9
#20	3.05	99.5
#40	201.53	68.4
#60	569.87	10.6
#100	611.88	4.0
#200	628.57	1.4

Stones	Cobbles	Gravel				Sand						Silt			Clay	Fines
		Coarse	Medium	Fine	Total	V. Crs.	Crs.	Med.	Fine	V. Fine	Total	Crs.	Fine	Total		Total
0.0	0.0	0.0	0.0	0.1	0.1	0.3	17.6	71.4	8.2							

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.2415	0.2648	0.2795	0.3066	0.3615	0.3933	0.4862	0.5242	0.5767	0.6614

Fineness Modulus	C_u	C_c
1.77	1.63	0.99

Particle Size Distribution Report



	% Stones	% +3"	% Gravel			% Sand					% Silt		% Clay
			Coarse	Medium	Fine	V. Crs.	Crs.	Med.	Fine	V. Fine	Crs.	Fine	
○	0.0	0.0	12.0	37.5	19.2	10.7	8.9	6.6	3.4			1.7	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			16.2496	6.8028	4.6517	1.8627	0.6535	0.4288	1.19	15.86

Material Description	USCS	AASHTO
○ gray gravel with sand	GW	

Project No. 161262 **Client:** Roberts Environmental Service

Project: Lane Street

○ **Source of Sample:** HB-5 **Depth:** 43'-45'

Remarks:

○ As Received

Moisture Content: 8.1%

BOWSER-MORNER, INC.

Dayton, Ohio

GRAIN SIZE DISTRIBUTION TEST DATA

3/22/2013

Client: Roberts Environmental Service
Project: Lane Street
Project Number: 161262
Location: HB-5
Depth: 43'-45'
Material Description: gray gravel with sand
USCS Classification: GW
Testing Remarks: As Received
Moisture Content: 8.1%

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)
1264.40	230.84	0.00

Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
1.5	0.00	100.0
1.0	94.19	90.9
.75	124.08	88.0
.50	224.72	78.3
.375	314.15	69.6
#4	511.31	50.5
#10	710.30	31.3
#20	843.30	18.4
#40	931.20	9.9
#60	980.50	5.1
#100	1006.50	2.6
#200	1019.10	1.4

Stones	Cobbles	Gravel				Sand						Silt			Clay	Fines
		Coarse	Medium	Fine	Total	V. Crs.	Crs.	Med.	Fine	V. Fine	Total	Crs.	Fine	Total		Total
0.0	0.0	12.0	37.5	19.2	68.7	10.7	8.9	6.6	3.4							

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.4288	0.6535	0.9583	1.8627	4.6517	6.8028	13.4721	16.2496	23.4167	31.4556

Fineness Modulus	C_u	C_c
5.11	15.86	1.19