APPENDIX D
PHYSICAL TESTING

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Representative surface, and subsurface sediment samples were obtained from the WW Area during the Remedial Investigation field sampling activities for physical testing at Hart Crowser. Physical testing was performed for this study to assess the basic index properties of the site sediments. In addition, selected natural recovery sediment samples were obtained for radionuclide profiling to derive net sedimentation rates in the WW Area. The following tests were performed on selected sediment samples:

- Grain size analysis;
- Water content determinations;
- Specific gravity;
- Atterberg limits analysis;
- Sediment Wet Density; and
- Age Dating by Lead-210 and Cesium-137 profiling.

Grain Size Analysis

Sample grain size distributions were analyzed at Hart Crowser Physical Testing Laboratory in general accordance with PSEP protocols. Dry sieve analysis was used to determine the particle size distribution greater than the U.S. No. 230 mesh sieve. The size distribution for particles smaller than the No. 230 mesh sieve were determined by the pipet method. Percent fines (sum of clay and silt fraction) are defined as that fraction less than 74 µm. Only sediments containing a fine fraction greater than 4 percent were run through the pipet analysis.

The results of the grain size analyses are presented as (reverse) cumulative curves plotting percent finer by weight versus grain size. The results of 148 grain size tests (64 surface, 42 subsurface, 15 diver core, 6 field duplicates, 3 reference, 2 SPM from sediment traps, and 16 lab QC) are plotted on Figures D-2 through D-150. Figure D-1 is a key to the grain size curve plots and describes the USC Soil Classification. Sediment grain size data results by major size category (gravel, sand, silt, and clay) are summarized in Table D-1.

Water Content Determinations

Water contents were routinely determined for samples subjected to other physical and chemical testing and as part of the grain size analysis. As soon as possible following sample arrival in the Hart Crowser laboratory, water contents were determined for surface and subsurface sediment samples in general accordance with ASTM D 2216. Water contents were not determined for

samples where large gravel contents would result in values considered unrepresentative.

Atterberg Limits Analysis

Atterberg limits were analyzed at Hart Crowser Physical Testing Laboratory for ten fine-grained cohesive samples in general accordance with ASTM D 4318-84. Selected samples included: HC-SC-71, HC-DC-87-S2, HC-VC-72-S1, HC-VC-73-S2, HC-VC-72-S4, HC-VC-74-S3, HC-VC-75-S1, HC-VC-79-S4, HC-VC-81-S2, and HC-VC-83-S1. The results of the Atterberg limits analyses and the plasticity characteristics are summarized on a Liquid and Plastic Limits Test Report as shown on Figures D-151 and D-152. This relates the plasticity index (liquid limit minus the plastic limit) to the liquid limit. As a result of this test, a sample may be classified as a non-elastic silt, an elastic silt, or a clay.

Specific Gravity

A specific gravity test was conducted on one sample, HC-VC-80-S1, representing a typical granular material from the upper 2-foot interval of the Whatcom Waterway. The purpose of this test is to determine settling characteristics of sediment during dredging. The sample was analyzed in general accordance with ASTM D854 on sediment that pass the 4.75 µm (No. 4) sieve by means of a pycnometer. The test used volumetric flask with 500 ml capacity. The specific gravity test result is presented on Figure D-153.

Sediment Wet Density Determination

Profiles of sediment wet density were calculated for the natural recovery cores. These profiles are presented on Figure D-154 and described in Section 3.7. Sediment wet density was calculated using an empirical formula derived by Battelle (1995) for sediment compositions typical of Puget Sound. Results of the calculated sediment wet density based on Battelle model (Battelle, 1995) are presented in Table D-2. This formula relates the percent dry weight of sediments to the sediment wet density by the following equation:

$$\text{Wet density} = 0.1737(5.0245 + e^{0.0238 \times \%\text{dry weight}})$$

Because sediment wet density is affected by porosity loss resulting from compression and sediment dewatering that occurs during calculations of sediment wet density must allow for the re-addition of this lost pore space volume and water to obtain accurate results. As a result, sediment wet density calculations for the Bellingham Bay natural recovery cores were corrected for compression. This correction incorporated the volumetric addition of water that was lost when the core was advanced and incidentally dewatered.

To establish an accurate calculation of sediment wet density using the Battelle equation, a volumetric correction of the laboratory determined percent solids value is necessary. This correction is described below.

Method for Volumetric Total Solids Correction

By definition the water content (w)

= % moisture/% total solids
= Weight water (W_w)/Weight solids (W_s).

To allow for an addition of water, a volumetric water content is defined by the following relations:

Volume water (V_w) = W_w/γ_w and Volume solids (V_s) = W_s/γ_s.

The volumetric water content (W_{vol}) is derived using the following relationships:

$$W_{vol} = V_w/V_s$$
$$= (W_w/\gamma_w)/(W_s/\gamma_s)$$
$$= (W_w/W_s)\ (\gamma_s/\gamma_w).$$

This term is simplified to:

$$W_{vol} = w\ (\gamma_s/\gamma_w).$$

Since $W_{vol} = V_w/V_s$ and $V_w + V_s$ = Total Volume = 1, it can be derived that:

$$V_s = 1/(1+W_{vol}) \text{ and } V_w = 1- V_s.$$

The volumetric proportion of water (ΔV_w) is added to the original volume of water, based on the field-determined ratio of drive length to recovery length (expansion factor), to calculate the compaction corrected volume of water (V_{cc}) using the following relationship:

$$V_{cc} = V_w + \Delta V_w.$$

This calculated volume of water (V_{cc}) is used to calculate a new W_{vol} by:

$$W_{vol} = V_{cc}/V_s = W_{volnew}.$$

The new water content (w_{new}) is determined using the newly calculated W_{vol} value using:

$$W_{volnew} = (w_{new})(\gamma_s/\gamma_w).$$

The compaction corrected water content (w_{new}) is used to determine the new percent total solids using the following relationship:

$$\%\text{total solids}_{new} = 1/ (1+w_{new}).100.$$

The compaction corrected percent total solids is then used in the Battelle equation to determine the compaction corrected wet density:

$$\text{Wet density}_{\text{compaction corrected}} = 0.1737(5.0245 + e^{0.0238 \times \%\text{dry weight}}).$$

Data Quality Review

The data quality review for physical testing focuses primarily on grain size determinations of sediment samples obtained in the Whatcom and I&J Street Waterways during the Remedial Investigation sampling activities. The following criteria were evaluated in the validation process for the results of grain size:

- Laboratory Duplicate Relative Percent Difference (RPD) and Triplicate Relative Standard Deviation (RSD); and
- Field Duplicates Relative Percent Differences (RPD).

The samples were analyzed for grain size in accordance with PSEP Protocols. The grain size results for the sediment samples were presented as percent by weight. A total of eight triplicate samples (HC-SS-01, HC-SS-22, HC-SS-45, HC-SC-73, HC-VC-70-S2, HC-VC-74-S3, HC-VC-82-S2, and HC-ST-100) were run for grain size quality assurance analysis. The percent relative standard deviation (RSD) for these samples ranged from 0 to 22 percent, excluding "gravel" results because of its non-representativeness. The relative percent difference (RPD) for these samples ranged from 0 to 37 percent, excluding results for gravel.

Homogenized field duplicates of HC-SS-25, HC-SS-30, HC-SS-41, HC-SC-79, HC-VC-80-S2, HC-VC-81-S1, HC-DC-87-S1 designated as HC-SS-202, HC-SS-203, HC-SS-204, HC-SC-205, HC-VC-206, HC-VC-207, HC-DC-208, respectively, were analyzed to assess the variability of site sediment conditions and field homogenization of sediments. The RPDs for these field duplicates ranged from 0 to 22 percent.

The data are acceptable for use as reported.

Age Dating Techniques

The age of a sediment layer can be estimated by several methods. For the purposes of this study Lead-210, Cesium-137, and chemical concentration profiling were used. Lead-210 (Pb-210) is the application of radiometric methods to sedimentary geochronology, and Cesium-137 (Cs-137) uses historical events such as the time-dependence of the input of an anthropogenic pollutant with no significant natural background concentration. Chemical profiling of a tracer constituent, in this case mercury, consists of correlating peak accumulations in sediment to known historical periods when pollutant loads were discharged to the bay. The purpose of these age dating methods is to calculate rates of net sedimentation which will be used to assess the potential for natural recovery or sediment recontamination (see Sections 7 and 8). The three age dating methods applied to the WW Area natural recovery cores are discussed below.

Lead-210

Lead-210 has a known half-life of 22.26 years and is a common isotope used for dating estuarine sediments. This dating method is based on the known rate of Pb-210 radioactive decay and measurement of the change in Pb-210 activity with depth within the sediment column.

Net sedimentation rate estimates computed from Pb-210 activity are based on a model of constant sediment accumulation and other assumptions including:

- A two-layer, steady-state sediment system;
- Mixing occurs only in an upper surface layer of constant thickness;
- No mixing occurs in the deeper subsurface layers;
- Lead-210 does not migrate after deposition; and
- Lead-210 rapidly deposits to the bottom from the water column.

The thickness of the surface mixed layer is interpreted from a plot of the natural logarithm (Ln) of the excess Pb-210 activity in dpm/g of dry sediment versus sediment depth in cm. Natural recovery core Pb-210 profiles are shown on Figure 7-1. The depth above which Pb-210 activity is relatively uniform, and below which the Pb-210 activity indicates steady-state decay behavior (constant decrease with depth) identifies the depth of the mixed layer (Battelle, 1995). Because of the uncertainties associated with sediment coring and sampling

(compaction, sectioning, etc.) and potential Pb-210 counting errors, the mixing depth in most cores was not clearly interpretable, but was estimated to be 23.8 cm in core HC-NR-100, 11.7 cm in core HC-NR-101, and 10.8 in core HC-NR-102. A bioturbation depth of 10 to 20 cm is in general agreement with studies conducted in other Puget Sound embayments.

Excess lead-210 was determined by subtracting supported Pb-210 from total Pb-210 measurements. "Supported" Pb-210 is produced in the sediments by radioactive decay of parent elements, and excess Pb-210 is delivered to the sediment column by deposition of new material. Since the supported Pb-210 was not clearly discernible in all of the natural recovery cores, the supported Pb-210 activity was estimated to be 0.75 for all of the natural recovery cores. This estimate represents the median value of the range of supported Pb-210 values (0.5 to 1 dpm/g) determined by Battelle (1995) for Puget Sound Sediments. Only data from below the surface mixed layer were used to calculate the sedimentation rate. A summary of the Pb-210 regression analysis, and parameters supporting the Pb-210 based age dating determinations are presented in Table D-3. Regression analysis of the Pb-210 data is also presented on Figure D-155.

Cesium-137

Cesium-137 profiles provide another means of determining the age of a sediment layer. Cesium-137 has entered the oceans since the early 1950s as the result of nuclear weapons testing. Peaks in the Cs-137 profiles reflect the major global atmospheric inputs of Cs-137 to the ocean surface which were subsequently incorporated in sediments since the beginning of Cs-137 production. The maximum atmospheric input is known to have occurred in approximately 1962 (Battelle, 1995). Subsequently, the subsurface maximum of Cs-137 in sediments is correlated with 1962. Profiles of Cs-137 for the natural recovery cores are shown on Figure 7-2.

Another time marker is the point where Cs-137 begins to increase sharply from a background or non-detectable concentration to measurable concentrations, because Cs-137 is anthropogenic in origin and the date of original production is well established. The depth at which Cs-137 appears in the sediment column is correlated with the onset of nuclear weapons testing in 1951. Data supporting Cs-137 age dating calculations for the natural recovery cores is presented in Table D-4.

Mercury

Chemical profiles that display historical accumulation patterns with a stratigraphic/time correlation can also provide estimates of net sedimentation

rate. This method assumes that data exists on the time period and historical loading rates of the chemical of interest, and that a single source of the tracer constituent is largely responsible for its presence in the sediment.

In the case of this study, mercury is documented as having been discharged into the Whatcom Waterway at maximum historical levels between 1965 and 1970 (Bothner, 1980); subsequent to 1970, mercury discharges were significantly reduced by the implementation of source controls at the Georgia Pacific plant. For the purposes of the age dating calculations, peak mercury discharge to Bellingham Bay is assumed to have occurred in 1970. Data supporting the dating of natural recovery cores using mercury profiling is presented in Table D-5.

References for Appendix D

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Table D-1 - Summary of Grain Size Results

Sample ID		Gravel	Sand	Silt	Clay
Surface Samples (0 - 10 cm)					
HC-SS-01		0	5	79	16
HC-SS-01B	GS DUP	0	4	78	18
HC-SS-01C	GS DUP	0	3	81	16
HC-SS-02		0	7	78	15
HC-SS-03		0	7	64	29
HC-SS-04		0	7	76	17
HC-SS-05		0	3	80	17
HC-SS-06		0	4	58	38
HC-SS-07		0	3	55	42
HC-SS-08		0	8	60	32
HC-SS-09		0	2	81	17
HC-SS-10		0	2	80	18
HC-SS-11		0	2	78	20
HC-SS-12		0	14	54	32
HC-SS-13		0	4	75	21
HC-SS-14		0	3	71	26
HC-SS-15		0	4	79	17
HC-SS-16		0	2	73	25
HC-SS-17		0	3	76	21
HC-SS-18		0	6	59	35
HC-SS-19		0	4	70	26
HC-SS-20		1	6	69	24
HC-SS-21		0	11	60	29
HC-SS-22		0	7	60	33
HC-SS-22B	GS DUP	0	6	61	33
HC-SS-22C	GS DUP	0	6	63	31
HC-SS-23		0	16	69	15
HC-SS-24		0	18	55	27
HC-SS-25		0	15	56	29
HC-SS-202	Dup of HC-SS-25	0	14	59	27
HC-SS-26		0	60	20	20
HC-SS-27		0	83	10	7
HC-SS-28		0	5	65	30
HC-SS-29		0	18	59	23
HC-SS-30		0	3	71	26
HC-SS-203	Dup of HC-SS-30	0	8	65	27
HC-SS-31		0	6	61	33
HC-SS-32		2	71	17	10
HC-SS-33		9	70	17	4
HC-SS-34		11	66	17	6
HC-SS-35		0	10	64	26
HC-SS-36		0	53	31	16
HC-SS-37		0	32	52	16

Table D-1 - Summary of Grain Size Results

Sample ID		Gravel	Sand	Silt	Clay
Surface Samples (0 - 10 cm)					
HC-SS-38		0	66	26	8
HC-SS-39		18	61	19	2
HC-SS-40		0	48	33	19
HC-SS-41		1	93	4	2
HC-SS-204	Dup of HC-SS-41	0	94	3	3
HC-SS-42		0	19	47	34
HC-SS-43		0	83	13	4
HC-SS-44		0	5	69	26
HC-SS-45		0	10	66	24
HC-SS-45B	GS DUP	0	10	65	25
HC-SS-45C	GS DUP	0	11	66	23
HC-SS-46		35	23	27	15
HC-SS-47		5	49	37	9
HC-SS-48		6	88	5	1
HC-SC-70		1	9	55	35
HC-SC-71		0	8	47	45
HC-SC-72		0	15	57	28
HC-SC-73		0	10	66	24
HC-SC-73B	GS DUP	0	10	65	25
HC-SC-73C	GS DUP	0	11	66	23
HC-SC-74		0	24	59	17
HC-SC-75		0	21	61	18
HC-SC-76		0	14	69	17
HC-SC-77		0	6	54	40
HC-SC-78		0	10	71	19
HC-SC-79		2	14	47	37
HC-SC-205	Dup of HC-SC-79	0	14	69	17
HC-SC-80		0	11	62	27
HC-SC-81		0	28	64	8
HC-SC-82		0	14	66	20
HC-SC-83		0	8	59	33
HC-SC-84		0	9	51	40
HC-SC-85		0	13	71	16
Subsurface Core Samples					
HC-VC-70-S1		0	6	51	43
HC-VC-70-S2		0	3	45	52
HC-VC-70-S2B	GS DUP	0	3	46	51
HC-VC-70-S2C	GS DUP	0	2	46	52
HC-VC-71-S1		0	17	64	19
HC-VC-71-S2		0	15	47	38
HC-VC-71-S3		2	81	14	3
HC-VC-71-S4		0	70	23	7
HC-VC-71-S7		0	59	35	6

Table D-1 - Summary of Grain Size Results

Sample ID		Gravel	Sand	Silt	Clay
Subsurface Core Samples					
HC-VC-72-S1		0	11	65	24
HC-VC-72-S2		0	53	32	15
HC-VC-72-S3		0	86	10	4
HC-VC-72-S4		0	1	50	49
HC-VC-72-S7		0	2	39	59
HC-VC-73-S1		0	15	69	16
HC-VC-73-S2		0	11	46	43
HC-VC-74-S1		1	36	38	25
HC-VC-74-S3		0	7	47	46
HC-VC-74-S3B	GS DUP	0	7	49	44
HC-VC-74-S3C	GS DUP	0	7	47	46
HC-VC-75-S1		3	18	22	57
HC-VC-75-S2		3	91	4	2
HC-VC-76-S1		1	33	47	19
HC-VC-76-S2		1	43	38	18
HC-VC-77-S1		1	21	51	27
HC-VC-77-S2		2	26	41	31
HC-VC-77-S3		0	62	24	14
HC-VC-77-S4		0	22	45	33
HC-VC-78-S1		1	12	60	27
HC-VC-78-S2		0	76	15	9
HC-VC-79-S1		5	17	52	26
HC-VC-79-S2		0	23	37	40
HC-VC-79-S3		3	30	37	30
HC-VC-79-S4		0	21	47	32
HC-VC-80-S1		0	23	53	24
HC-VC-80-S2		0	31	44	25
HC-VC-206	Dup of HC-VC-80-S2	0	35	44	21
HC-VC-81-S1		0	35	52	13
HC-VC-207	Dup of HC-VC-81-S1	0	36	54	10
HC-VC-81-S2		0	28	49	23
HC-VC-82-S1		0	20	52	28
HC-VC-82-S2		0	19	50	31
HC-VC-82-S2B	GS DUP	0	18	51	31
HC-VC-82-S2C	GS DUP	0	19	49	32
HC-VC-83-S1		0	4	60	36
HC-VC-83-S2		0	4	51	45
HC-VC-84-S1		1	18	46	35
HC-VC-84-S2		0	13	48	39
HC-VC-85-S1		0	10	65	25
HC-VC-85-S2		0	69	22	9
Diver Core Samples					
HC-DC-86-S1		5	53	36	6
HC-DC-86-S2		4	51	40	5

Table D-1 - Summary of Grain Size Results

Sample ID		Gravel	Sand	Silt	Clay
Diver Core Samples					
HC-DC-87-S1		3	47	36	14
HC-DC-208	Dup of HC-DC-87-S1	4	47	31	18
HC-DC-87-S2		0	12	55	33
HC-DC-88-S1		10	70	13	7
HC-DC-88-S2		12	39	30	19
HC-DC-89-S1		21	59	13	7
HC-DC-89-S2		10	43	32	15
HC-DC-90-S1		2	24	49	25
HC-DC-90-S2		0	29	45	26
HC-DC-91-S1		13	68	13	6
HC-DC-91-S2		3	65	11	21
HC-DC-92-S1		19	74	6	1
HC-DC-92-S2		16	75	5	4
HC-DC-93-S1		25	64	9	2
Reference Samples					
CR-02		0	14	78	8
CR-22		0	85	12	3
CR-24		0	30	62	8
Sediment Trap Samples					
HC-ST-100 (A)		0	1	53	46
HC-ST-100 (B)	GS DUP	0	2	51	47
HC-ST-100 (C)	GS DUP	0	2	50	48
HC-ST-101		0	3	53	44

Table D-2 - Sediment Moisture, Percent Solids, and Wet Density

Natural Recovery Sediment Core Interval Number	Compaction Corrected Average Depth in cm	Percent Moisture	Corrected Percent Total Solids[1]	Calculated Wet Density[2]
HC-NR-100-S1	1.25	63	30.97	1.236
HC-NR-100-S2	3.75	58	35.38	1.277
HC-NR-100-S3	6.25	57	36.27	1.285
HC-NR-100-S4	8.75	55	38.05	1.303
HC-NR-100-S5	11.25	54	38.95	1.312
HC-NR-100-S6	13.75	54	38.95	1.312
HC-NR-100-S7	16.25	53	39.84	1.322
HC-NR-100-S8	18.75	53	39.84	1.322
HC-NR-100-S9	21.25	53	39.84	1.322
HC-NR-100-S10	23.75	52	40.74	1.331
HC-NR-100-S13	31.25	55	38.05	1.303
HC-NR-100-S16/17	40	53	39.84	1.322
HC-NR-100-S19	46.25	53	39.84	1.322
HC-NR-100-S22	53.75	54	38.95	1.312
HC-NR-100-S25	61.25	54	38.95	1.312
HC-NR-100-S33	81.25	53	39.84	1.322
HC-NR-100-S40	98.75	57	36.27	1.285
HC-NR-100-S45	111.25	51	41.65	1.341
HC-NR-101-S1	1.3	63	30.00	1.228
HC-NR-101-S2	3.9	59	33.43	1.258
HC-NR-101-S3	6.5	56	36.04	1.283
HC-NR-101-S4	9.1	58	34.30	1.266
HC-NR-101-S5	11.7	58	34.30	1.266
HC-NR-101-S6	14.3	56	36.04	1.283
HC-NR-101-S7	16.9	54	37.79	1.300
HC-NR-101-S8	19.5	53	38.67	1.309
HC-NR-101-S9	22.1	55	36.91	1.292
HC-NR-101-S10	24.7	55	36.91	1.292
HC-NR-101-S13	32.5	53	38.67	1.309
HC-NR-101-S16/17	41.6	60	32.57	1.250
HC-NR-101-S19	48.1	57	35.17	1.274
HC-NR-101-S22	55.9	57	35.17	1.274
HC-NR-101-S25	63.7	54	37.79	1.300
HC-NR-101-S30	76.7	54	37.79	1.300
HC-NR-101-S33	84.5	52	39.55	1.319
HC-NR-101-S38	97.5	51	40.43	1.328
HC-NR-101-S40	102.7	54	37.79	1.300
HC-NR-101-S45	115.7	51	40.43	1.328

Table D-2 - Sediment Moisture, Percent Solids, and Wet Density

Natural Recovery Sediment Core Interval Number	Compaction Corrected Average Depth in cm	Percent Moisture	Corrected Percent Total Solids[1]	Calculated Wet Density[2]
HC-NR-102-S1	1.2	57	37.68	1.299
HC-NR-102-S2	3.6	53	41.36	1.338
HC-NR-102-S3	6	51	43.20	1.359
HC-NR-102-S4	8.4	54	40.43	1.328
HC-NR-102-S5	10.8	55	39.52	1.318
HC-NR-102-S6	13.2	54	40.43	1.328
HC-NR-102-S7	15.6	54	40.43	1.328
HC-NR-102-S8	18	51	43.20	1.359
HC-NR-102-S9	20.4	52	42.28	1.348
HC-NR-102-S10	22.8	52	42.28	1.348
HC-NR-102-S13	30	51	43.20	1.359
HC-NR-102-S16/17	38.4	51	43.20	1.359
HC-NR-102-S19	44.4	49	45.06	1.381
HC-NR-102-S22	51.6	51	43.20	1.359
HC-NR-102-S25	58.8	52	42.28	1.348
HC-NR-102-S33	78	51	43.20	1.359
HC-NR-102-S40	94.8	46	47.85	1.416
HC-NR-102-S45	106.8	47	46.92	1.404

Notes:
1. Calculated using method described in Appendix D.
2. Calculated using formula derived by Battelle (Battelle, 1995).

Wetdensity.xls

Table D-3 - Excess Lead-210 Regression Analysis and Estimated Sedimentation Rates

Natural Recovery Core Number	Water Depth in Feet	Supported Lead-210 in dpm/g	Depth of Mixing Zone in cm	Number of Samples Used	Maximum Sample Depth in cm	Regression R^2 Value	Sedimentation Rate in cm/yr
HC-NR-100	-21.90	0.75	-23.75	9	-111.25	0.91	1.40
HC-NR-101	-16.30	0.75	-11.70	11	-102.70	0.49	1.06
HC-NR-102	-26.00	0.75	-10.80	13	-106.80	0.93	2.07

NRPB.xls

Table D-4 - Cesium-137 Sedimentation Rate Determination Summary

Natural Recovery Core Number	Depth of Cs-137 Onset	Depth of Cs-137 Peak	Sedimentation Rate Based on 1951 Cs Onset in cm/yr	Sedimentation Rate Based on 1962 Cs Peak in cm/yr	Average Sedimentation Rate in cm/yr
HC-NR-100	76.25	48.75	1.69	1.43	1.56
HC-NR-101	89.7	48.1	1.99	1.41	1.70
HC-NR-102	68.4	51.6	1.52	1.52	1.52

NRCs.xls

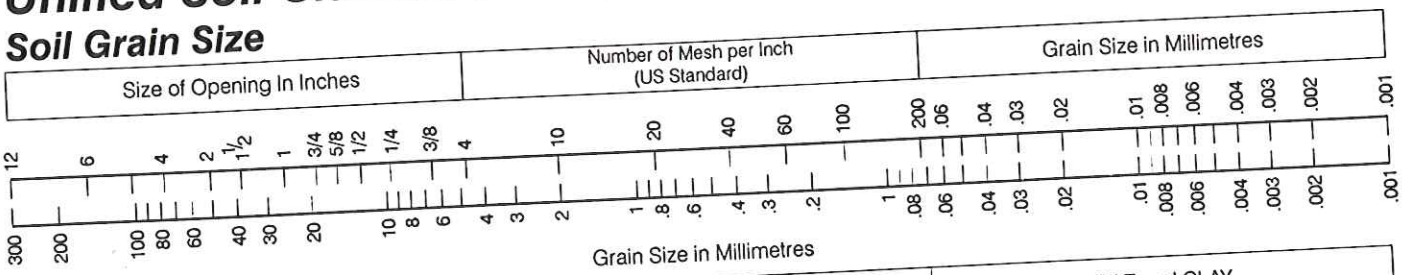
Table D-5 - Mercury Sedimentation Rate Determination Summary

Natural Recovery Core Number	Maximum Depth of Mercury Concentration in cm	Sedimentation Rate Based on Mercury Peak in cm/yr
HC-NR-100	40	1.54
HC-NR-101	41.8	1.61
HC-NR-102	51.6	1.98

NRHg.xls

Unified Soil Classification (USC) System

Soil Grain Size



Coarse-Grained Soils

G W	G P	G M	G C	S W	S P	S M	S C
Clean GRAVEL <5% fines	*	GRAVEL with >12% fines		Clean SAND <5% fines	*	SAND with >12% fines	
GRAVEL >50% coarse fraction larger than No. 4				SAND >50% coarse fraction smaller than No. 4			
Coarse-Grained Soils >50% larger than No. 200 sieve							

G W and S W $\left(\frac{D_{60}}{D_{10}}\right) > 4$ for G W, > 6 for S W & $1 \leq \left(\frac{(D_{30})^2}{D_{10} \times D_{60}}\right) \leq 3$

G P and S P Clean GRAVEL or SAND not meeting requirements for G W and S W

G M and S M Atterberg limits below A line with PI <4

G C and S C Atterberg limits above A Line with PI >7

* Coarse-grained soils with percentage of fines between 5 and 12 are considered borderline cases required use of dual symbols

D_{10}, D_{30}, and D_{60} are the particles diameter of which 10, 30, and 60 percent, respectively, of the soil weight are finer.

Fine-Grained Soils

M L	C L	O L	M H	C H	O H	Pt
SILT	CLAY	Organic	SILT	CLAY	Organic	Highly Organic Soils
Soils with Liquid Limit <50%			Soils with Liquid Limit >50%			
Fine-Grained Soils >50% smaller than No. 200 sieve						

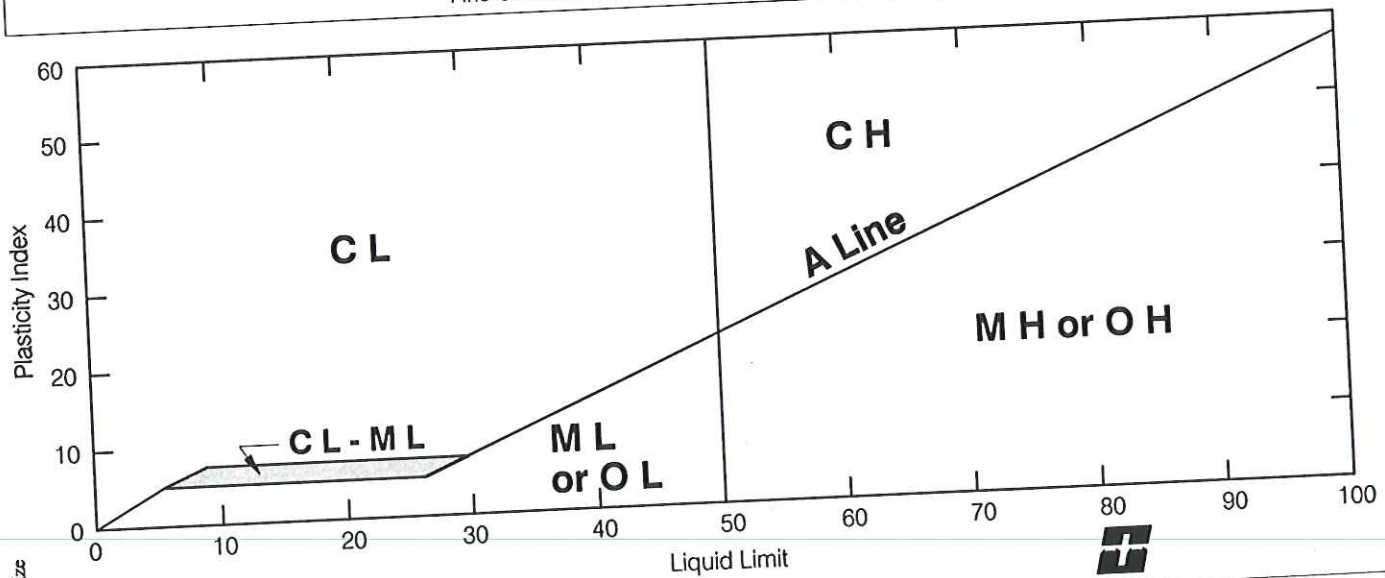


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Figure D-1

Corel\forms\gr_size

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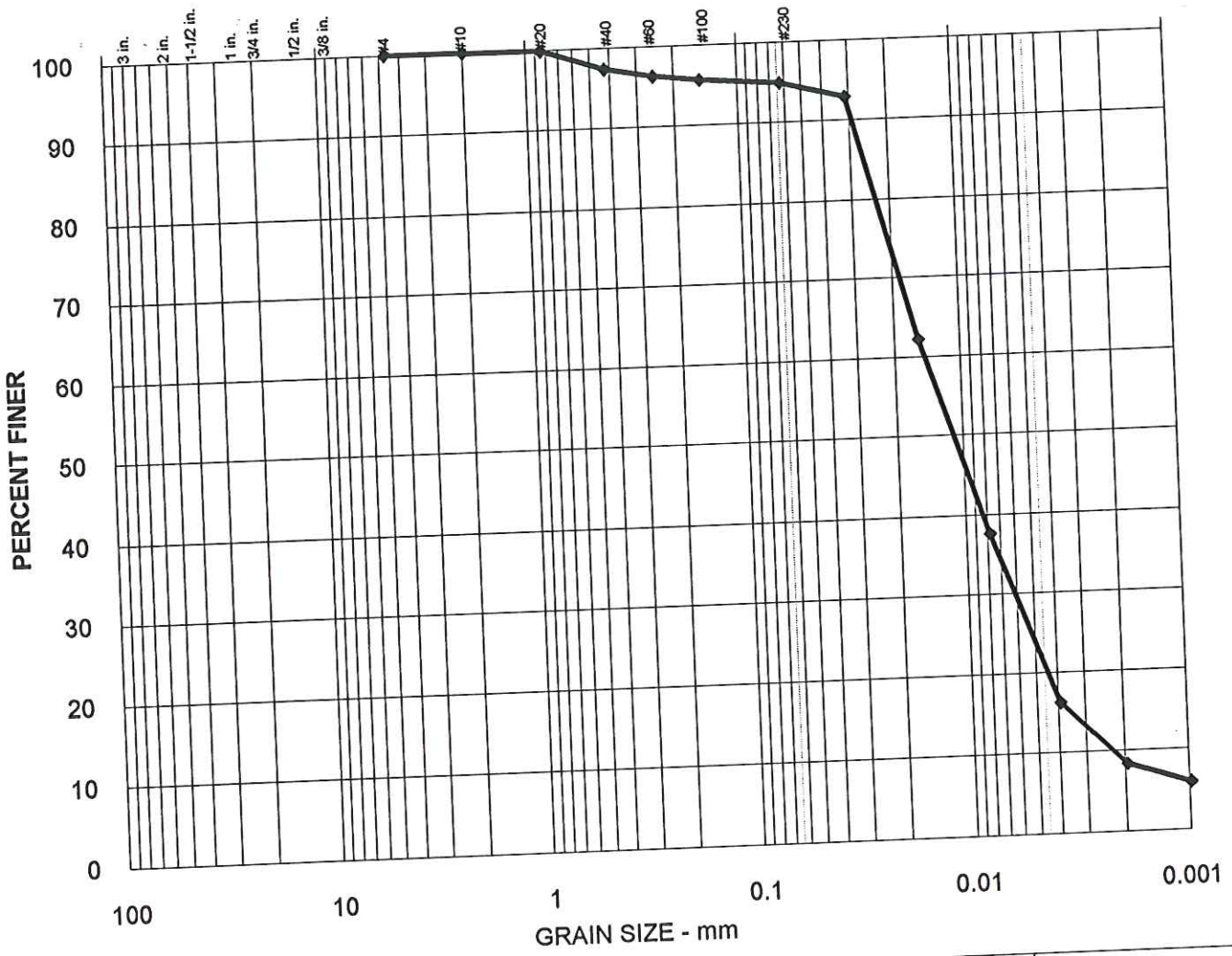

% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	5%	79%	16%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SS-01(A)	0 to 10 cm		*

MATERIAL DESCRIPTION
Clayey SILT

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

J-4478-05
Figure D ?

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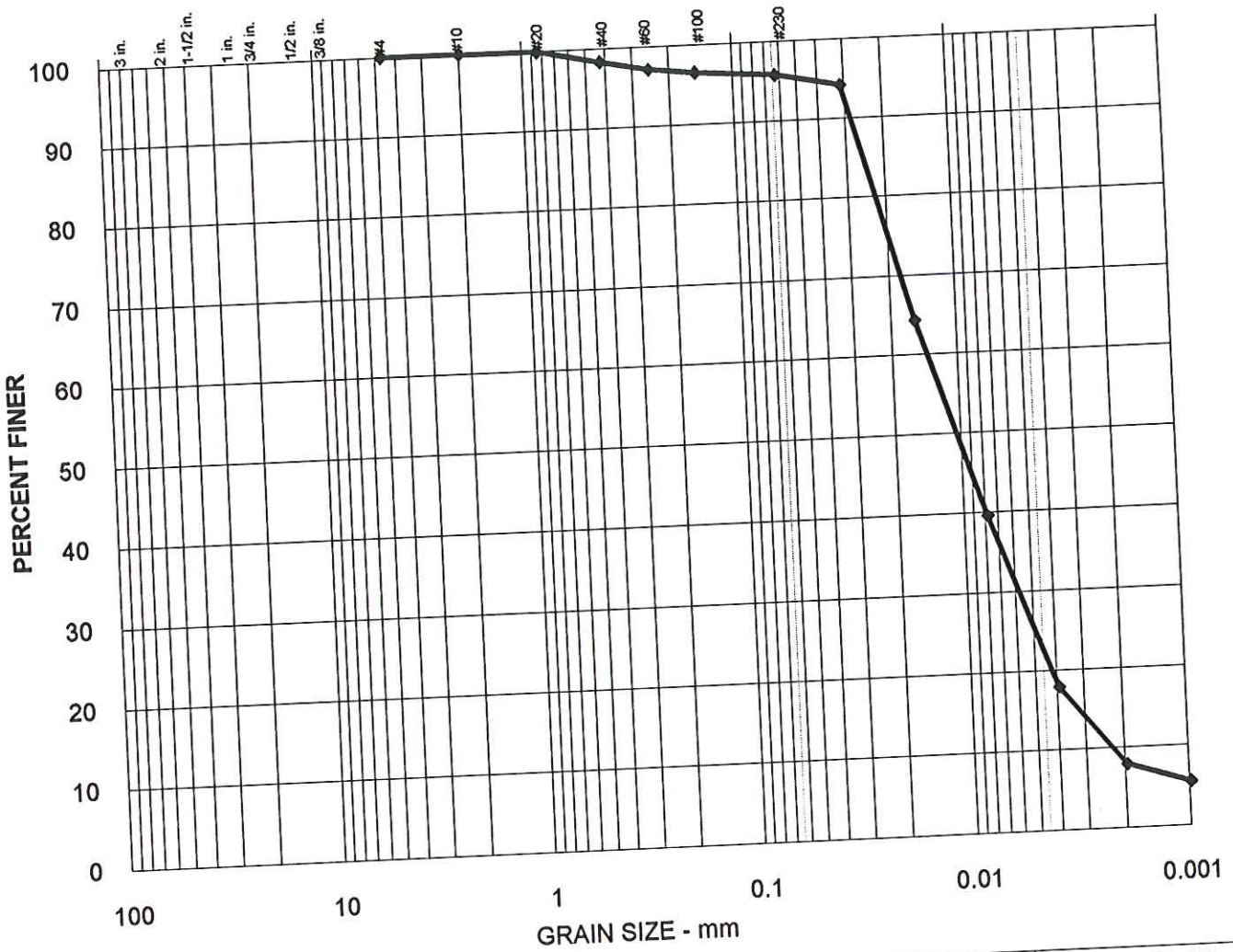
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	4%	78%	18%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SS-01(B) Duplicate	0 to 10 cm		*

MATERIAL DESCRIPTION
Clayey SILT

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

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Figure D-3

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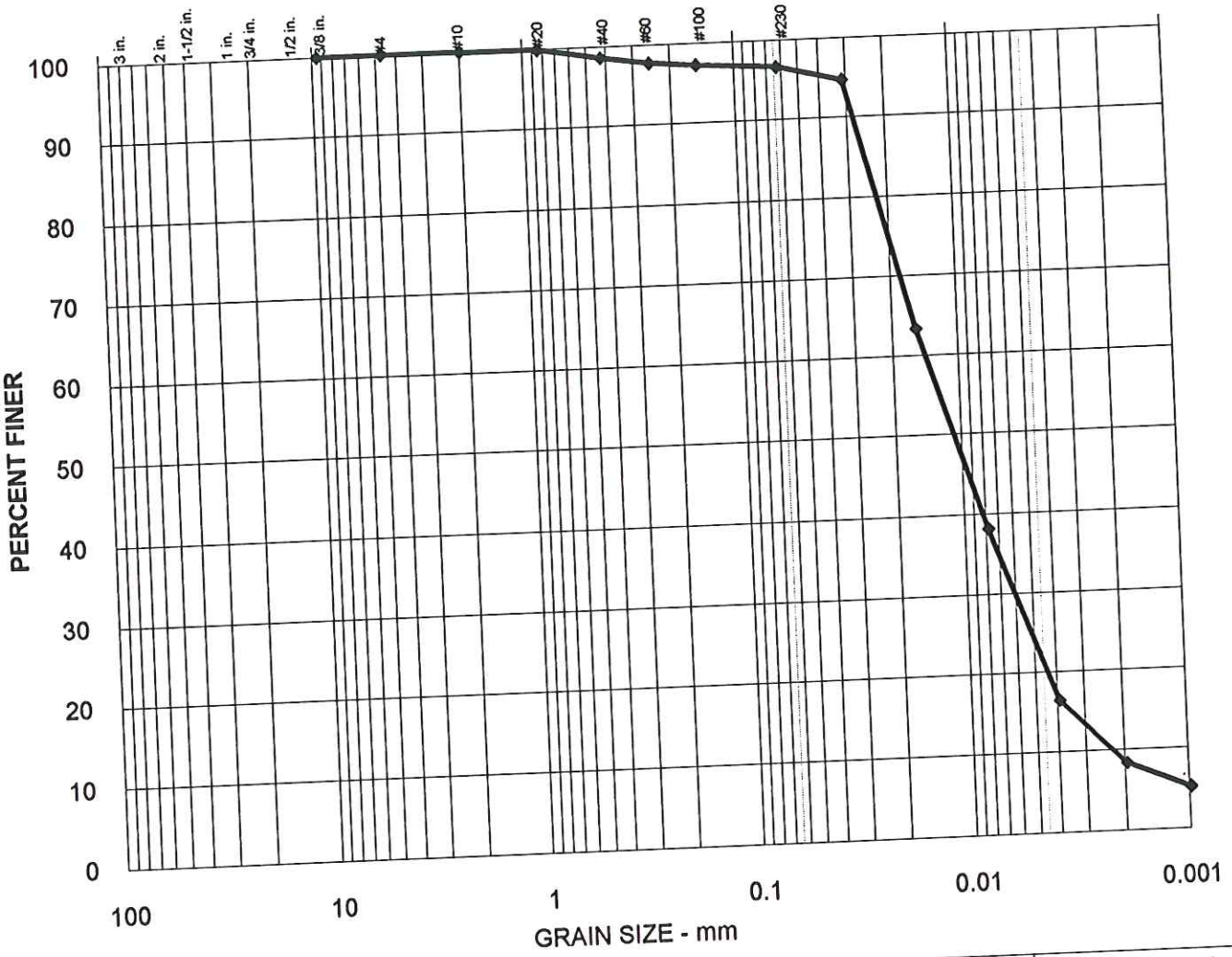
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	3%	81%	16%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SS-01(C) Triplicate	0 to 10 cm		*

	MATERIAL DESCRIPTION	
	Clayey SILT	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

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Figure D-4

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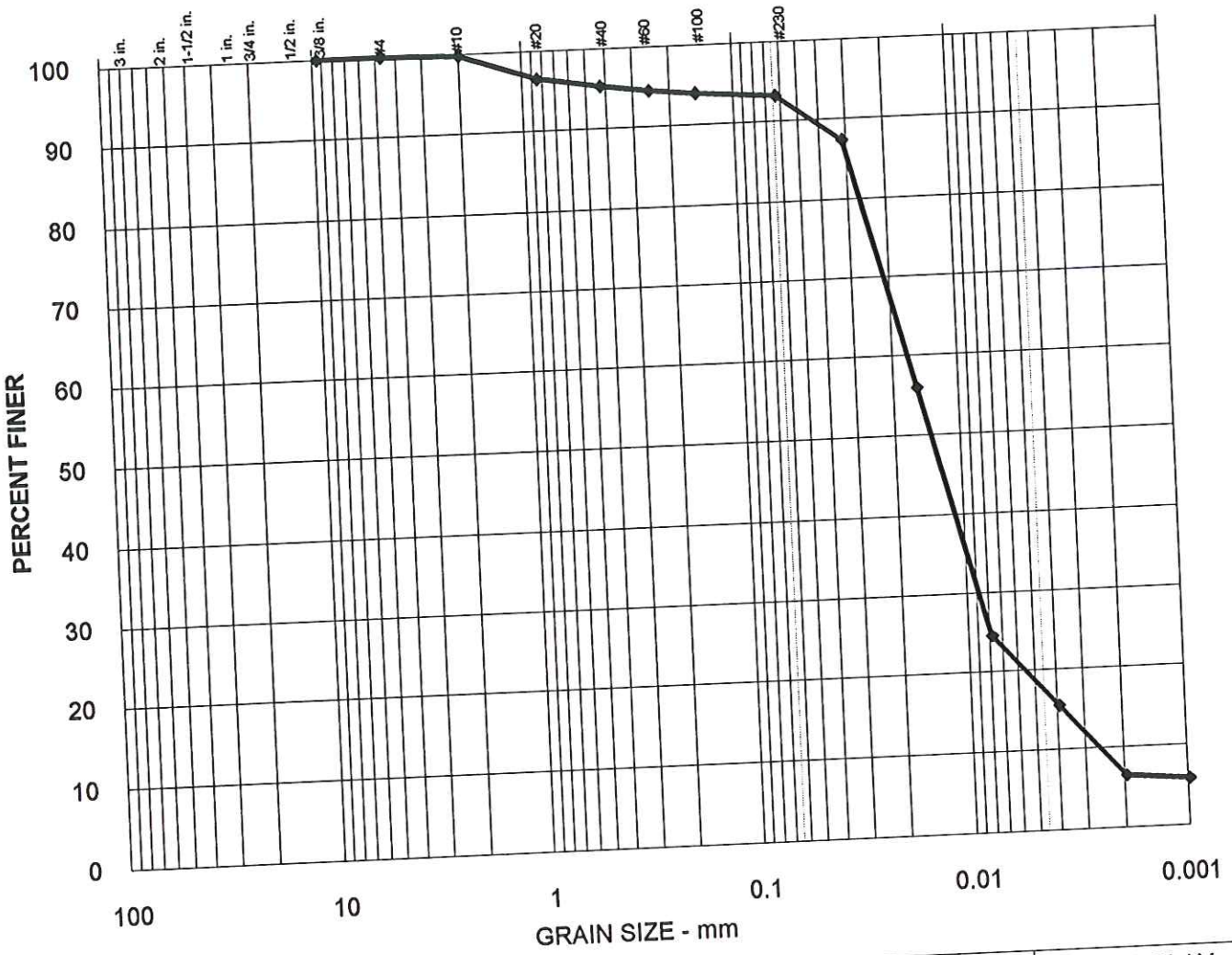
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	7%	78%	15%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SS-02	0 to 10 cm		*

	MATERIAL DESCRIPTION	
	Slightly sandy, clayey SILT	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

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Figure D-5

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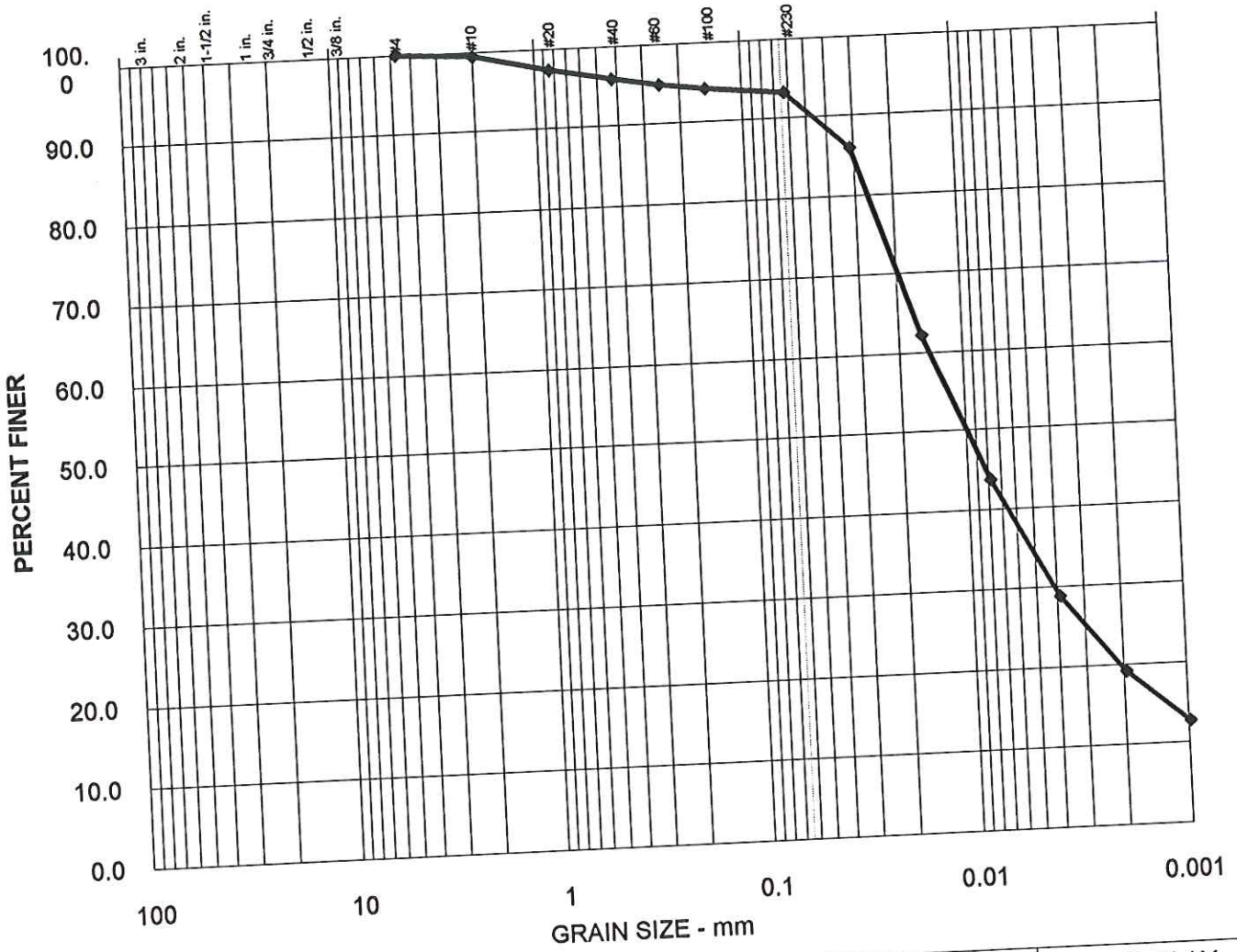
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	7%	64%	29%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SS-03	0 to 10 cm		*

MATERIAL DESCRIPTION
Slightly sandy, clayey SILT

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

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Figure D-6

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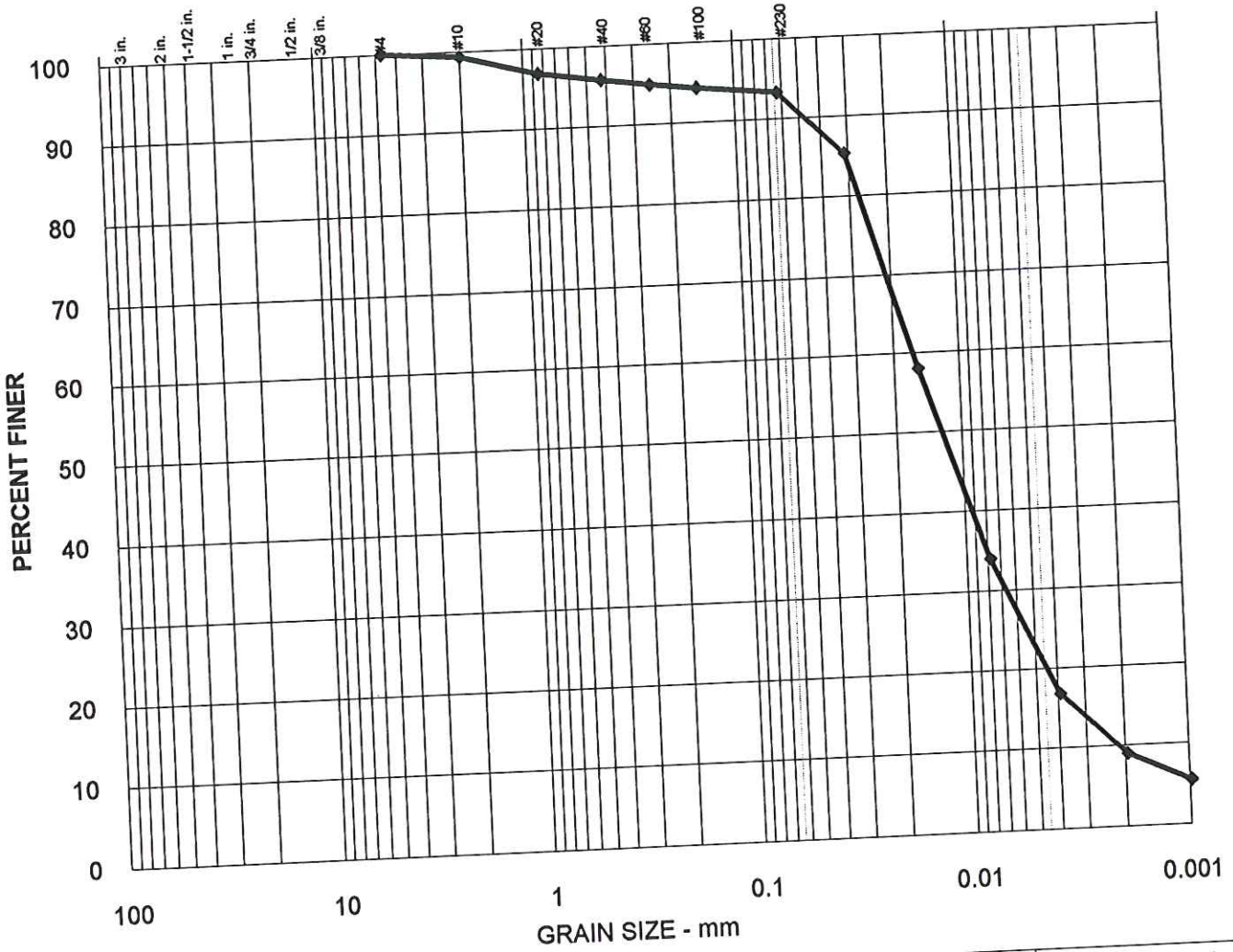
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	7%	76%	17%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SS-04	0 to 10 cm		*

MATERIAL DESCRIPTION
Slightly sandy, clayey SILT

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

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Figure D-7

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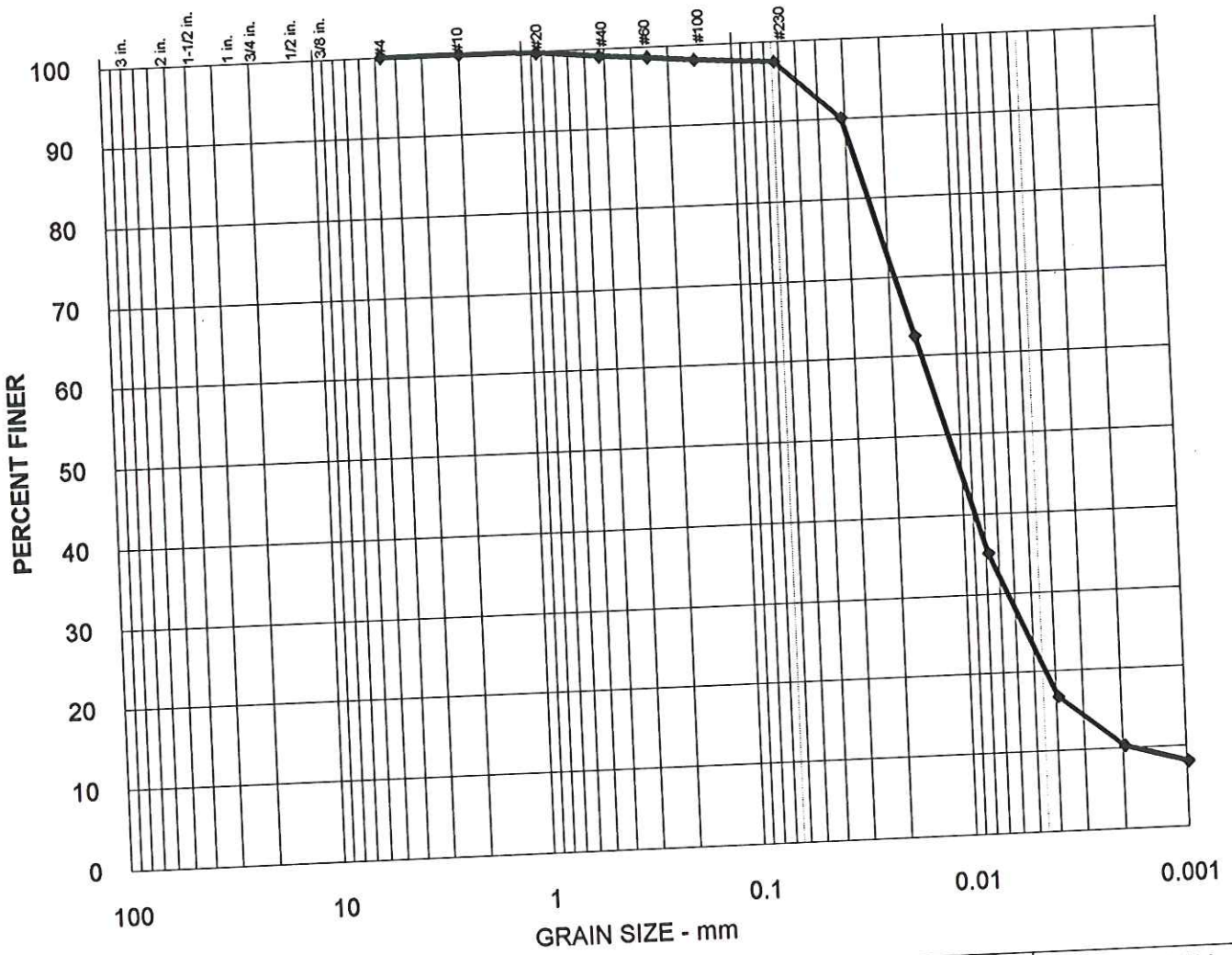
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	3%	80%	17%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SS-05	0 to 10 cm		*

	MATERIAL DESCRIPTION	
	Clayey SILT	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

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Figure D-8

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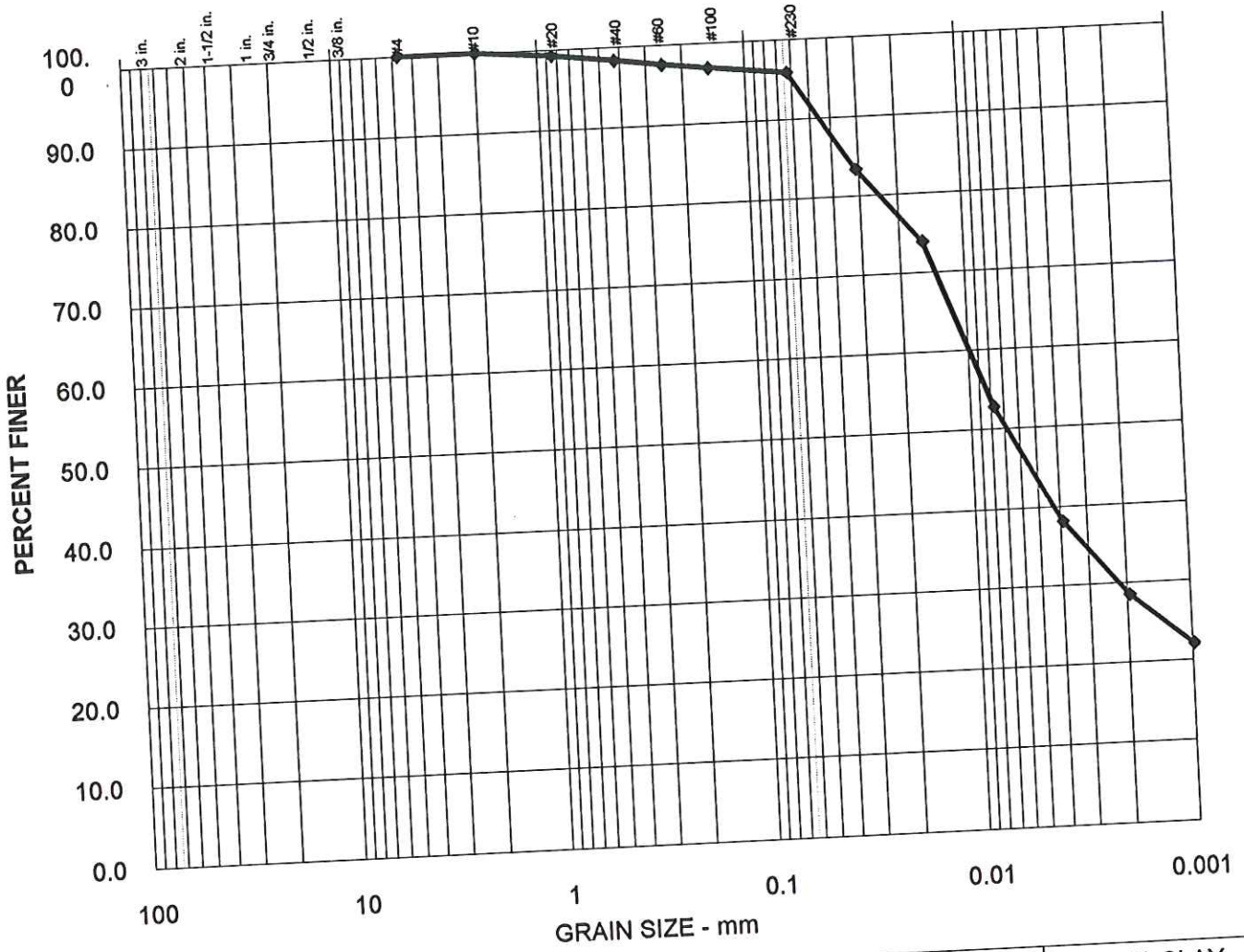
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	4%	58%	38%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SS-06	0 to 10 cm		*

	MATERIAL DESCRIPTION	
	Very clayey SILT	

Remarks:

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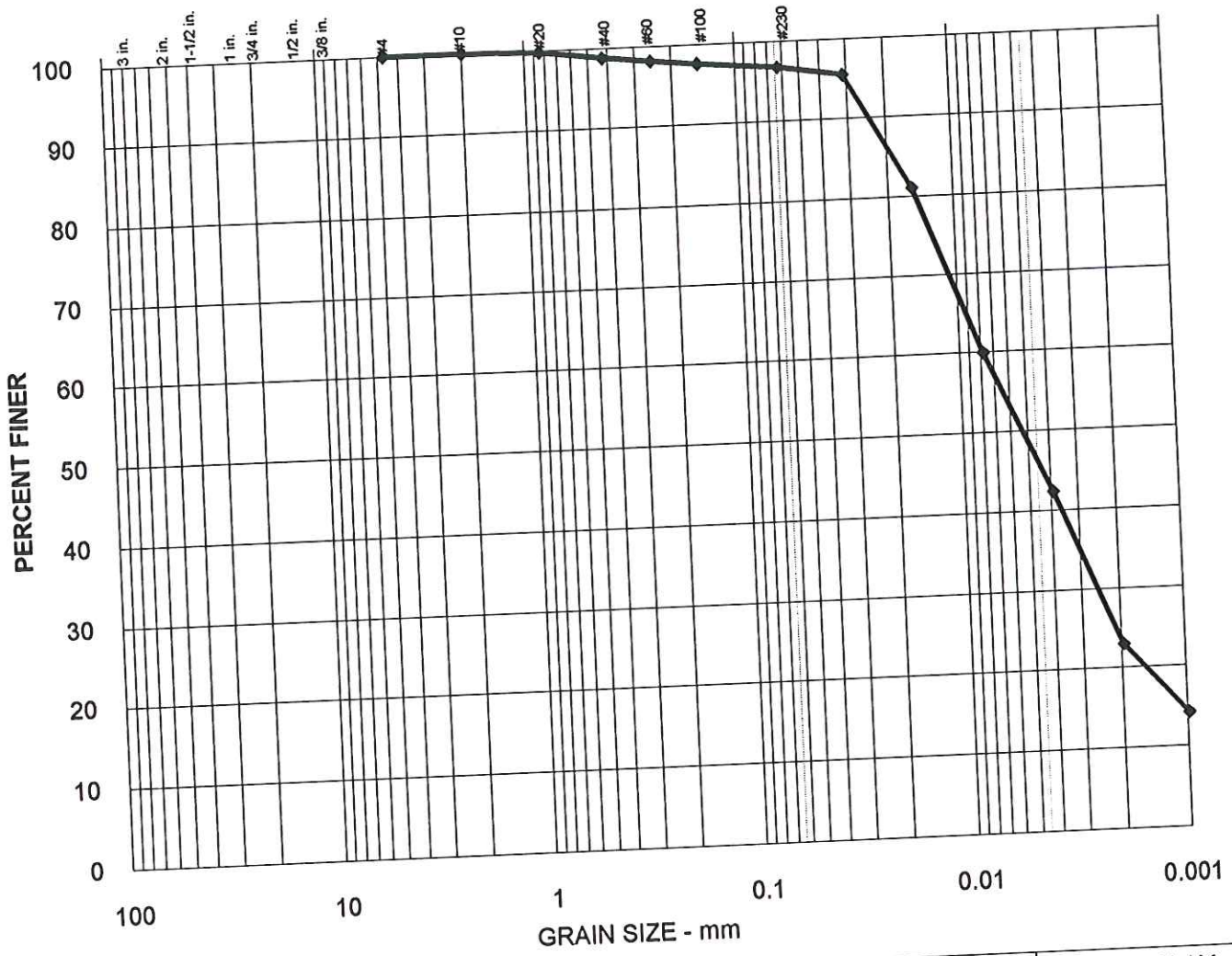
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	3%	55%	42%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SS-07	0 to 10 cm		*

MATERIAL DESCRIPTION
Very clayey SILT

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

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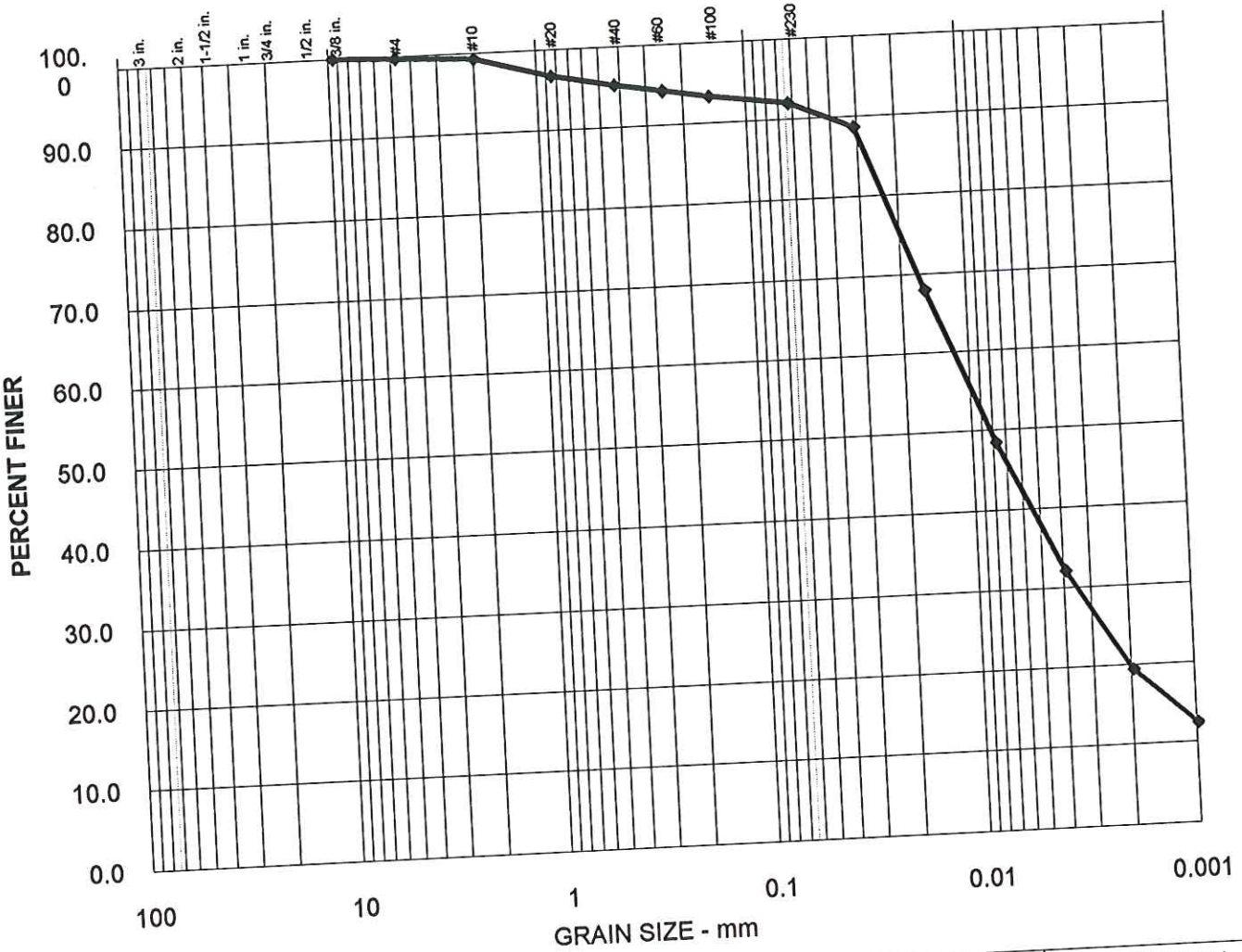
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	8%	60%	32%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SS-08	0 to 10 cm		*

	MATERIAL DESCRIPTION	
	Slightly sandy, very clayey SILT	

Remarks:

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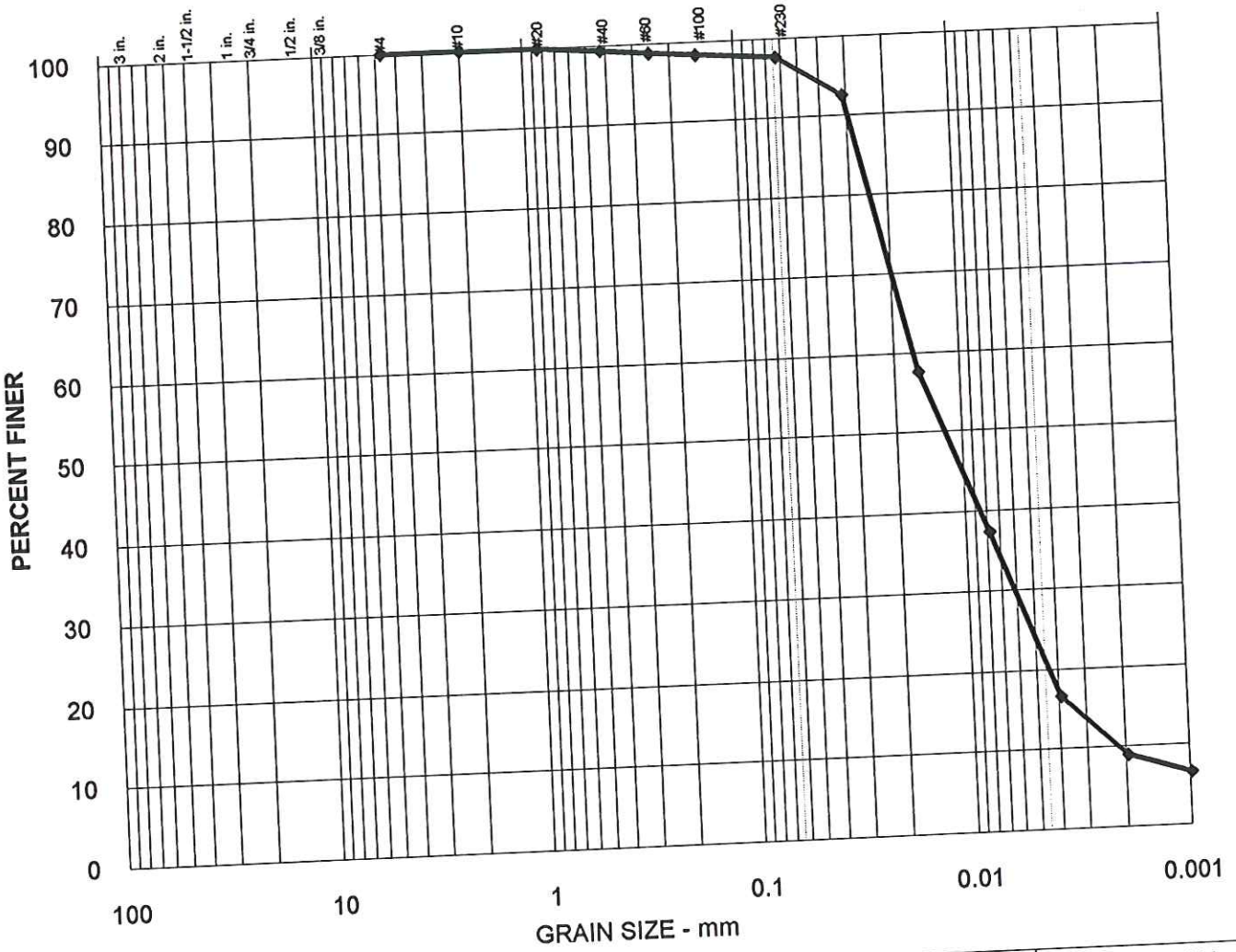
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	2%	81%	17%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SS-09	0 to 10 cm		*

	MATERIAL DESCRIPTION	
	Clayey SILT	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

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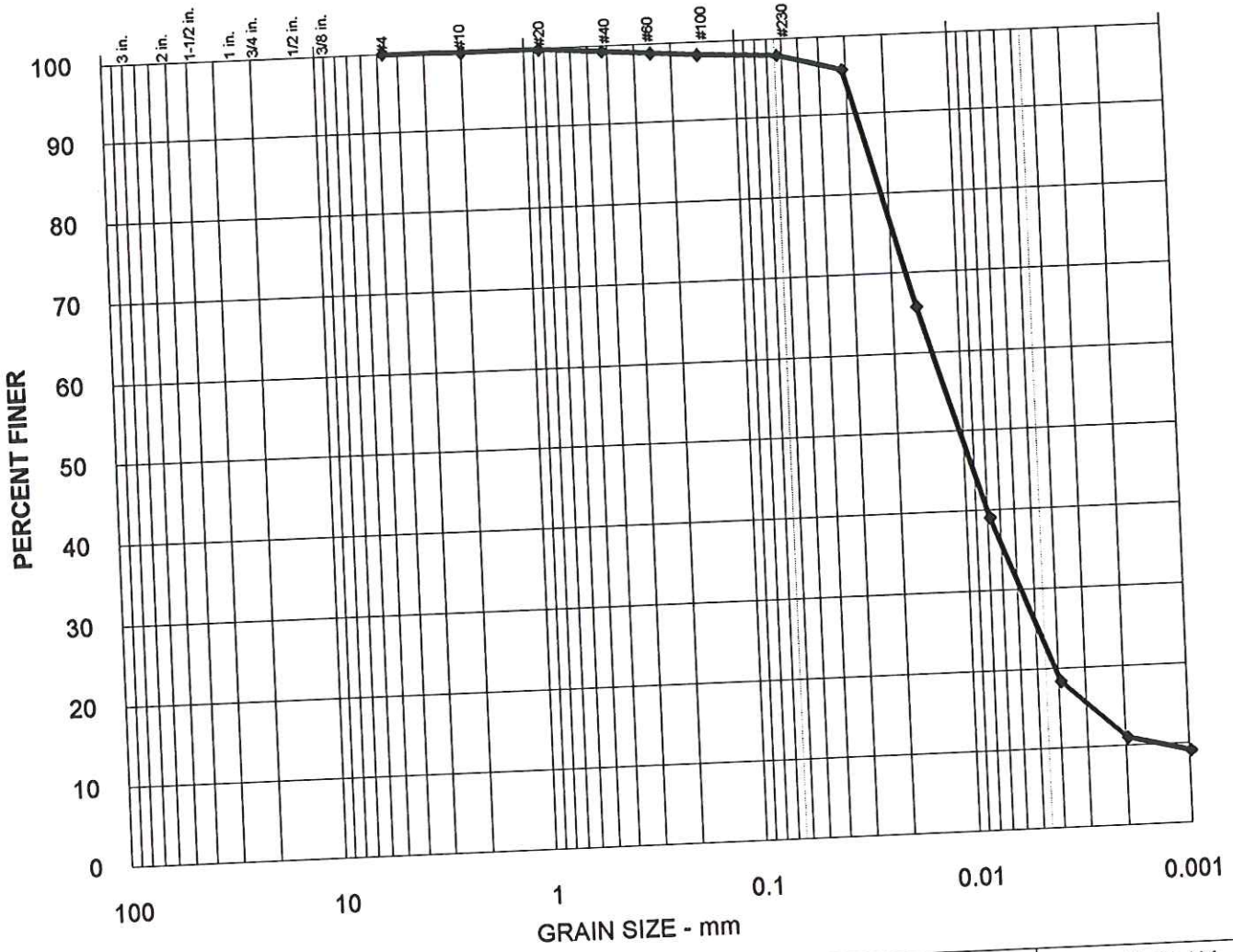

% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	2%	80%	18%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SS-10	0 to 10 cm		*

MATERIAL DESCRIPTION
Clayey SILT

Remarks:

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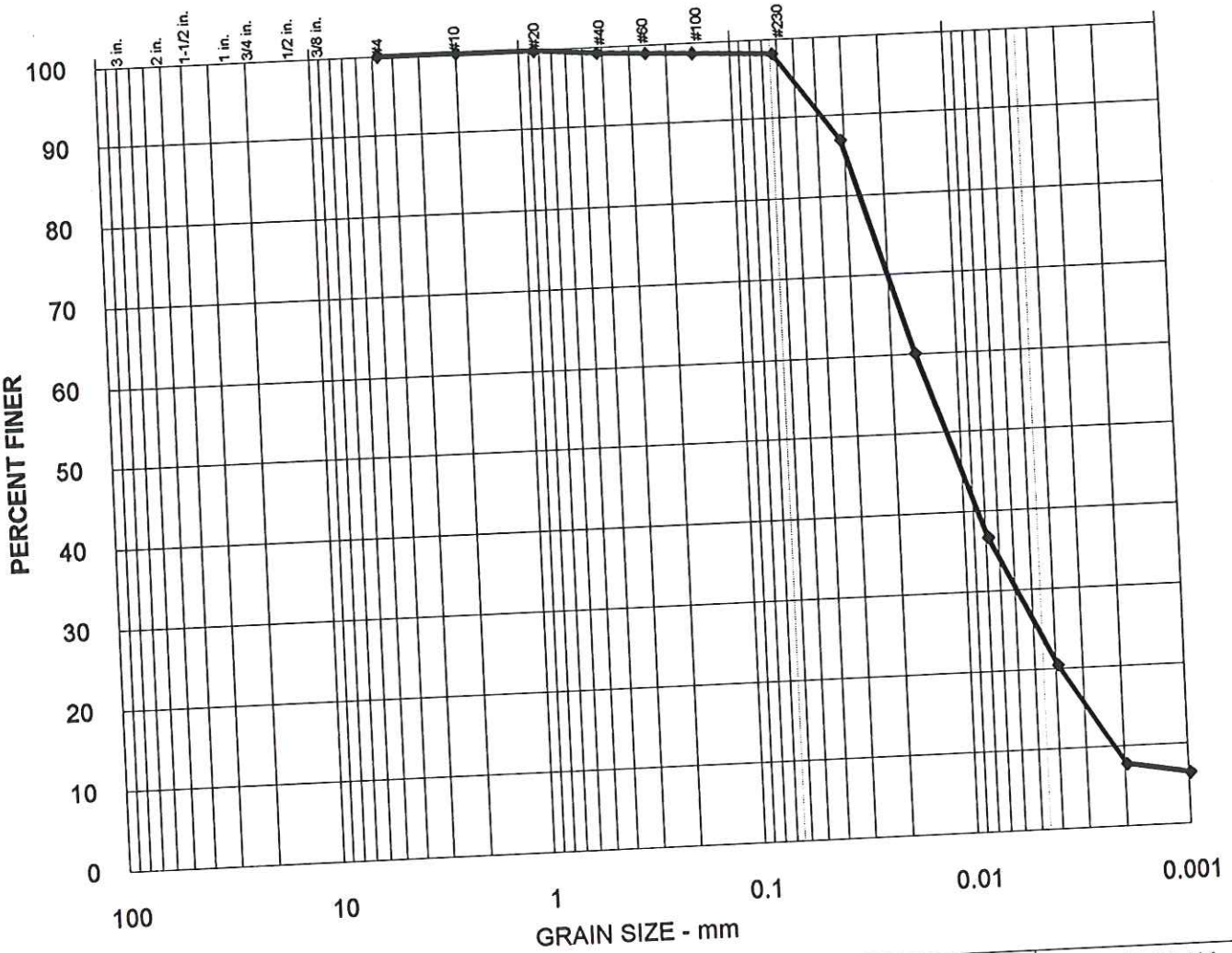
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	2%	78%	20%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SS-11	0 to 10 cm		*

MATERIAL DESCRIPTION
Clayey SILT

Remarks:

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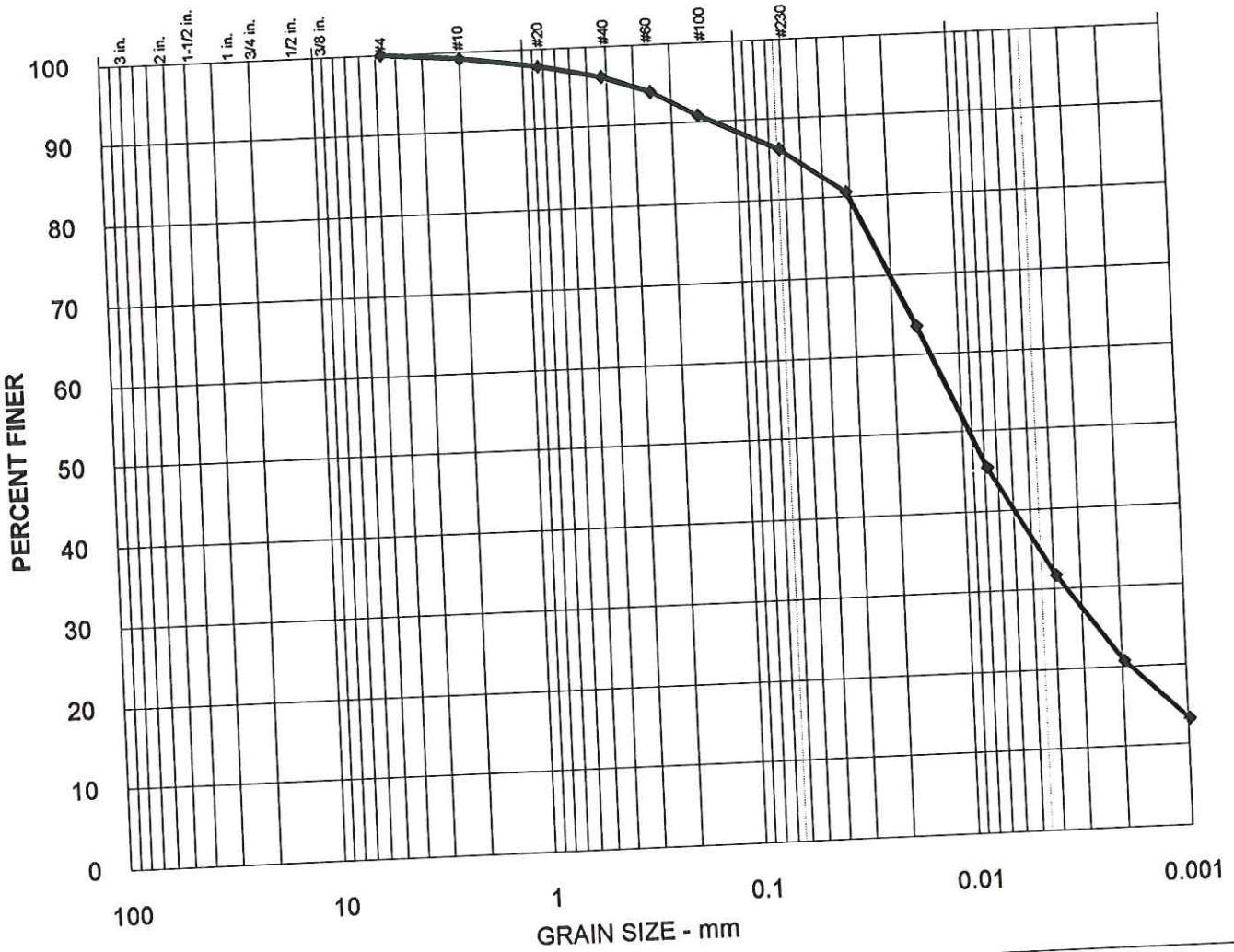

% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	14%	54%	32%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SS-12	0 to 10 cm		*

	MATERIAL DESCRIPTION	
	Sandy, very clayey SILT	

Remarks:

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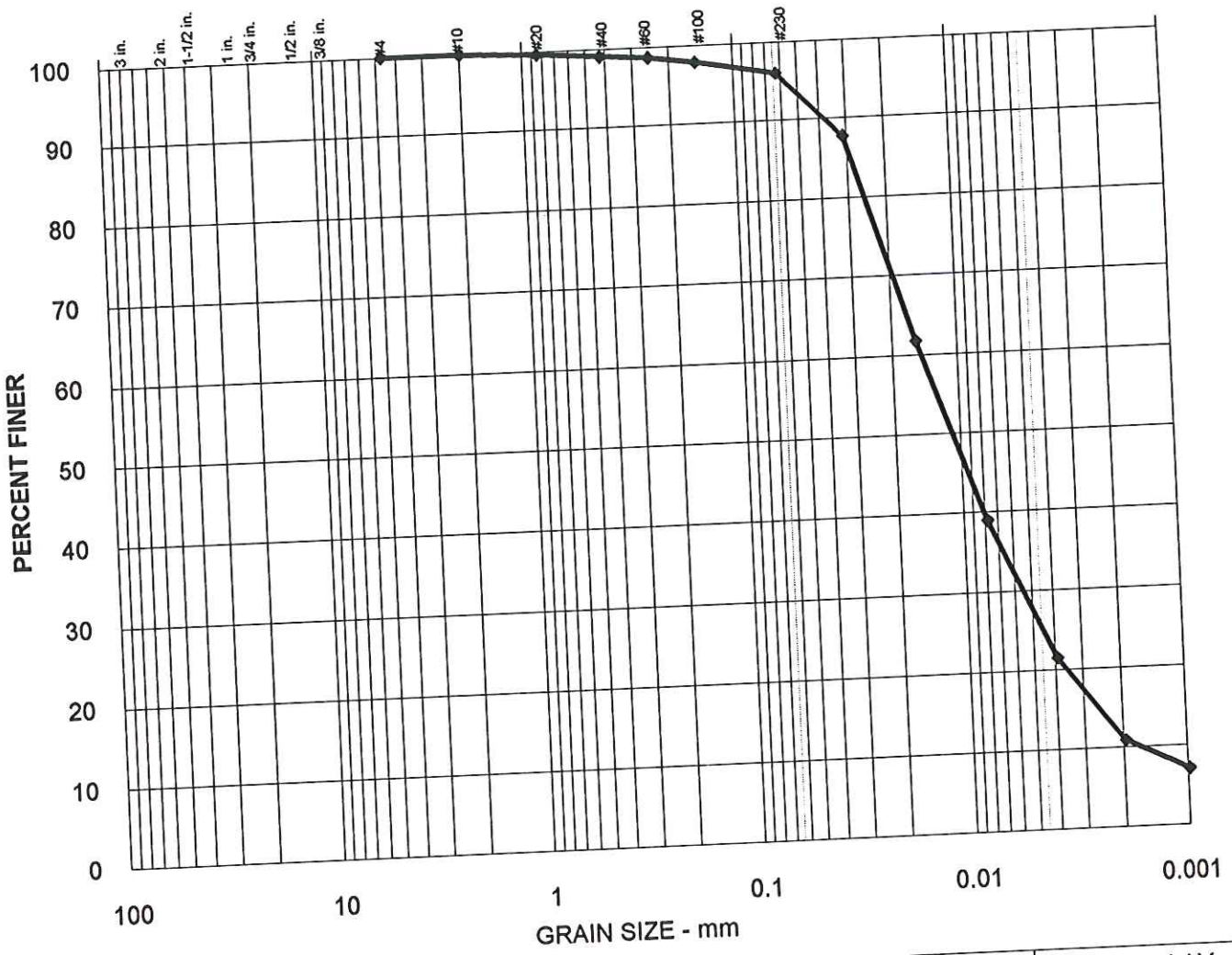

% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	4%	75%	21%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SS-13	0 to 10 cm		*

	MATERIAL DESCRIPTION	
	Clayey SILT	

Remarks:

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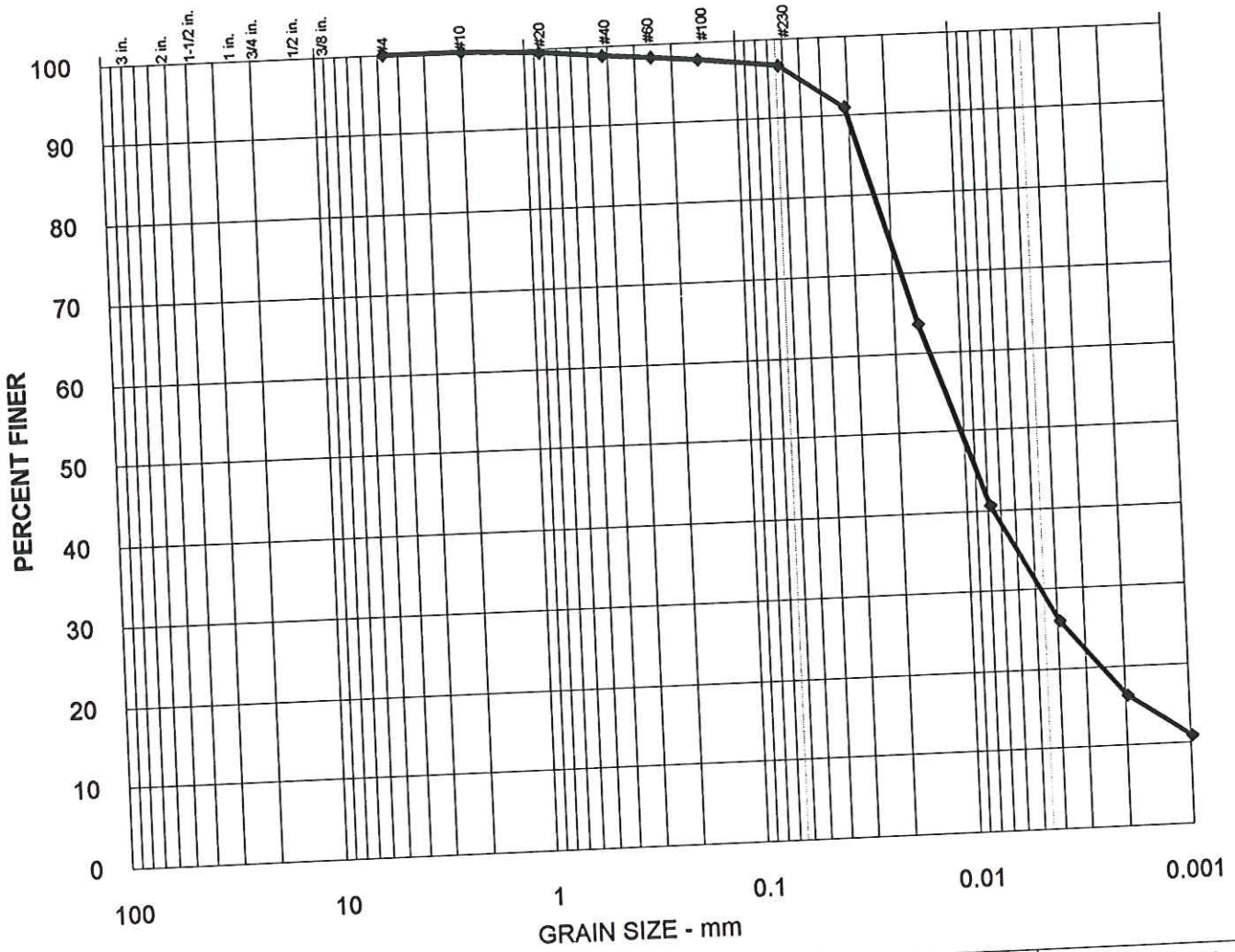
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	3%	71%	26%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SS-14	0 to 10 cm		*

MATERIAL DESCRIPTION
Clayey SILT

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

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Figure D- 17

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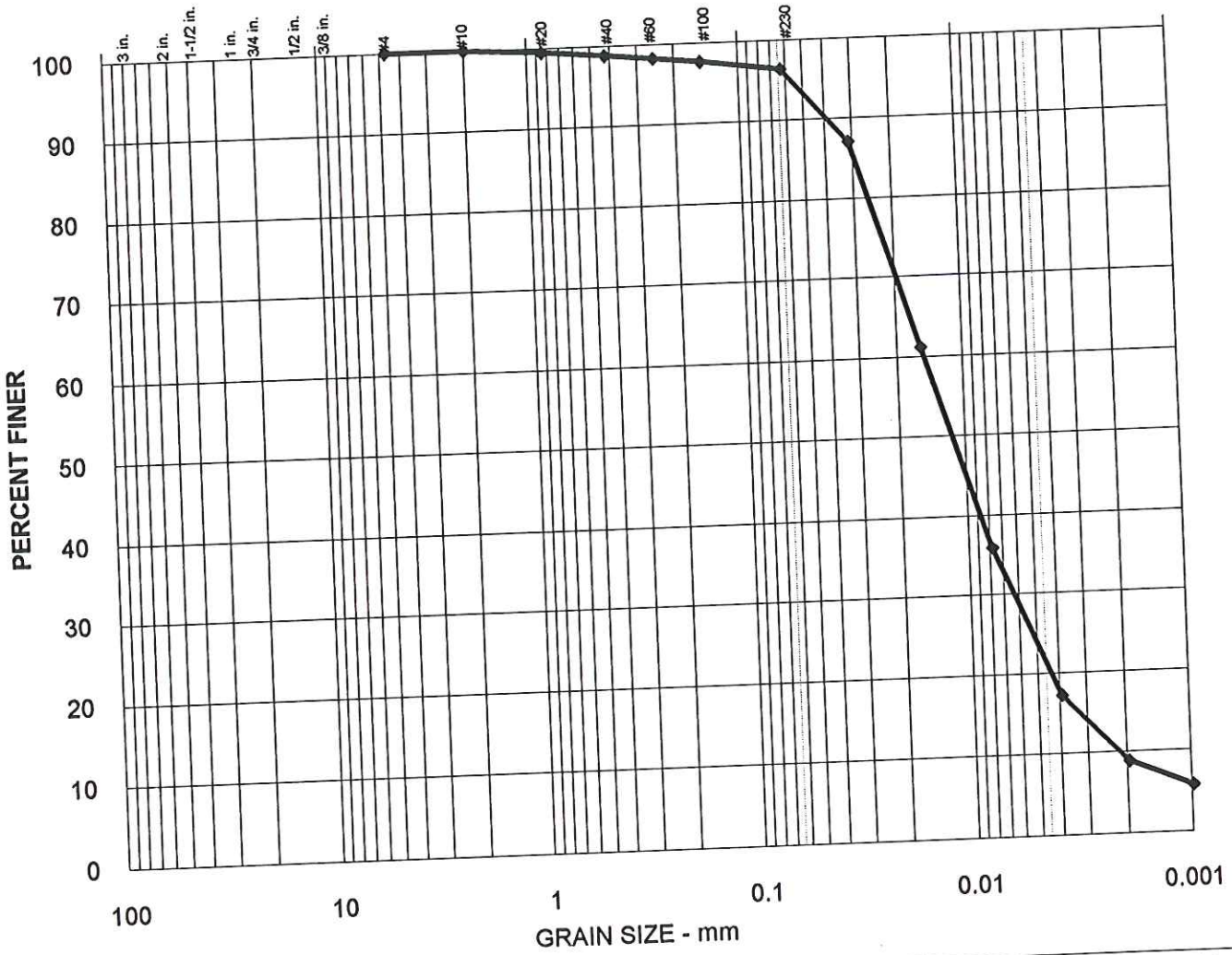
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	4%	79%	17%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SS-15	0 to 10 cm		*

MATERIAL DESCRIPTION
Clayey SILT

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

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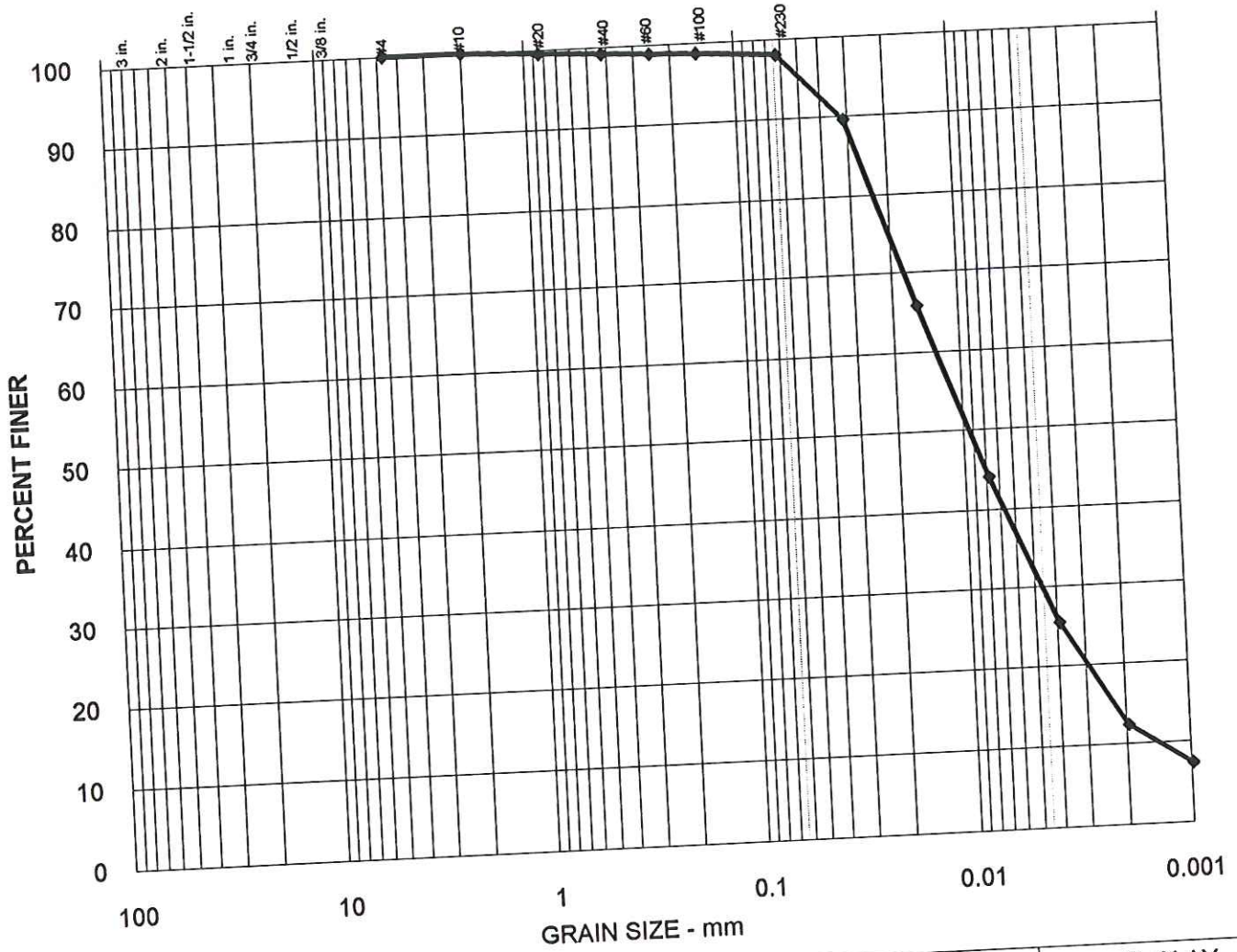
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	2%	73%	25%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SS-16	0 to 10 cm		*

	MATERIAL DESCRIPTION	
	Clayey SILT	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

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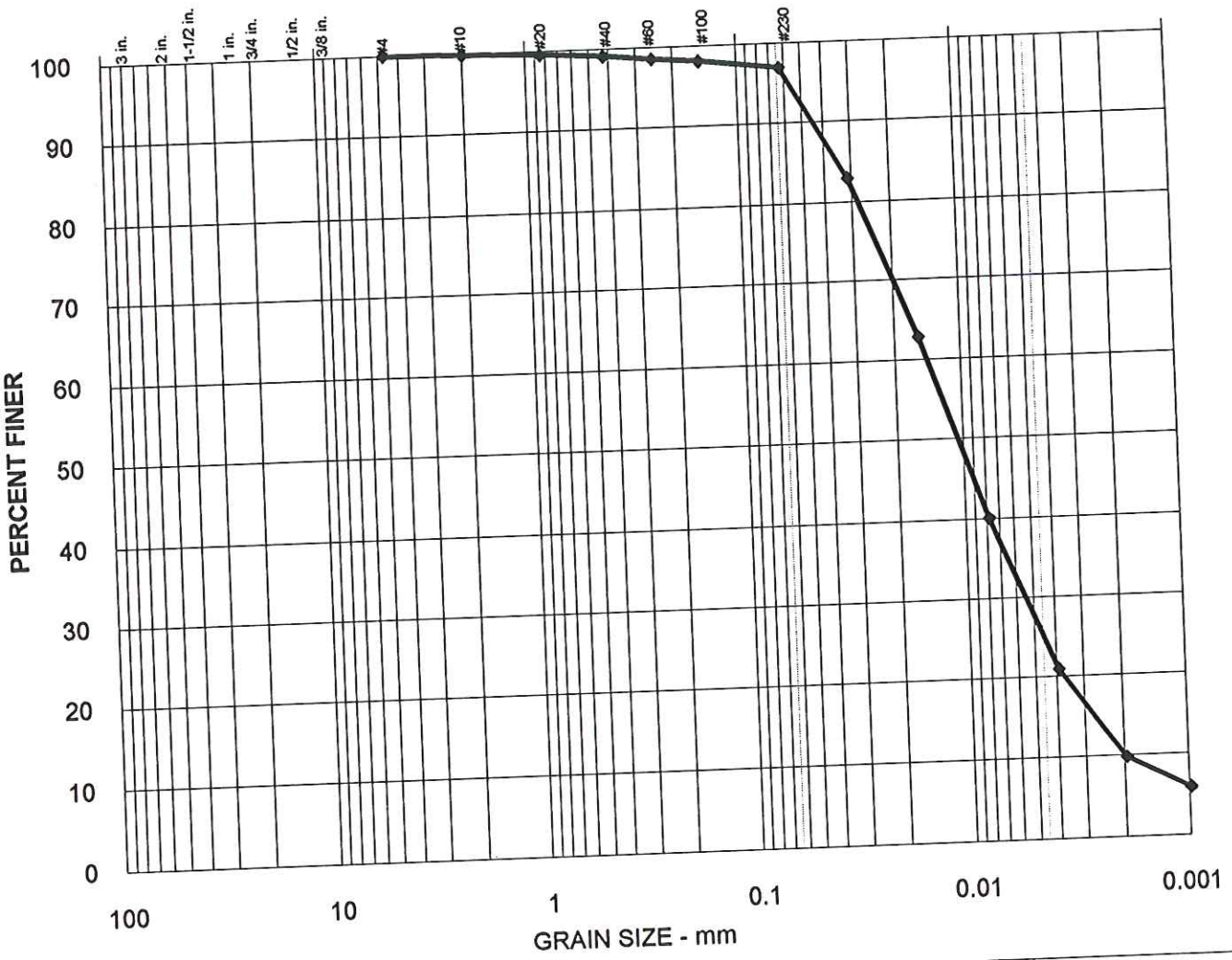
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	3%	76%	21%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SS-17	0 to 10 cm		*

MATERIAL DESCRIPTION
Clayey SILT

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

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Figure D- 20

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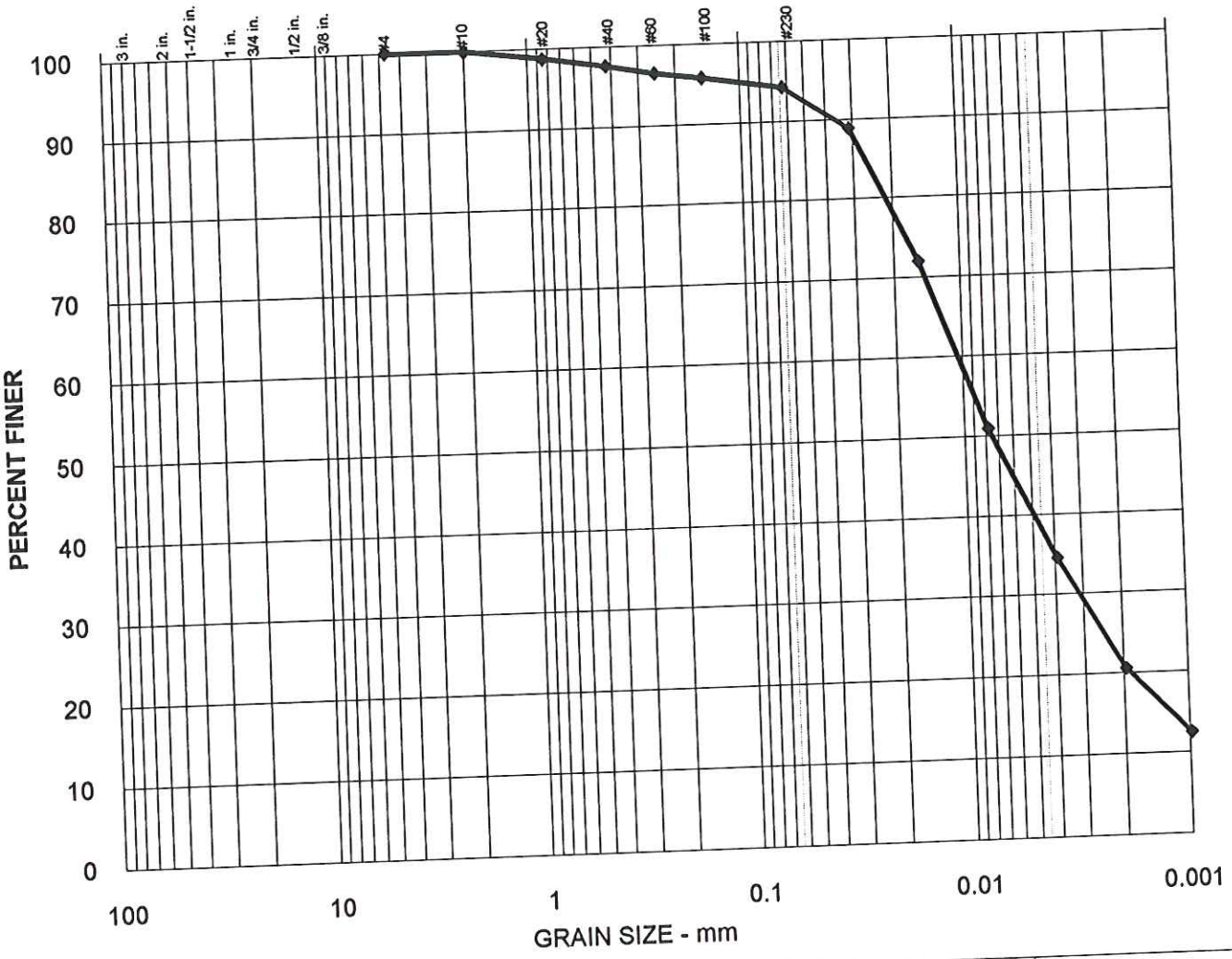
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	6%	59%	35%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SS-18	0 to 10 cm		*

	MATERIAL DESCRIPTION	
	Slightly sandy, very clayey SILT	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

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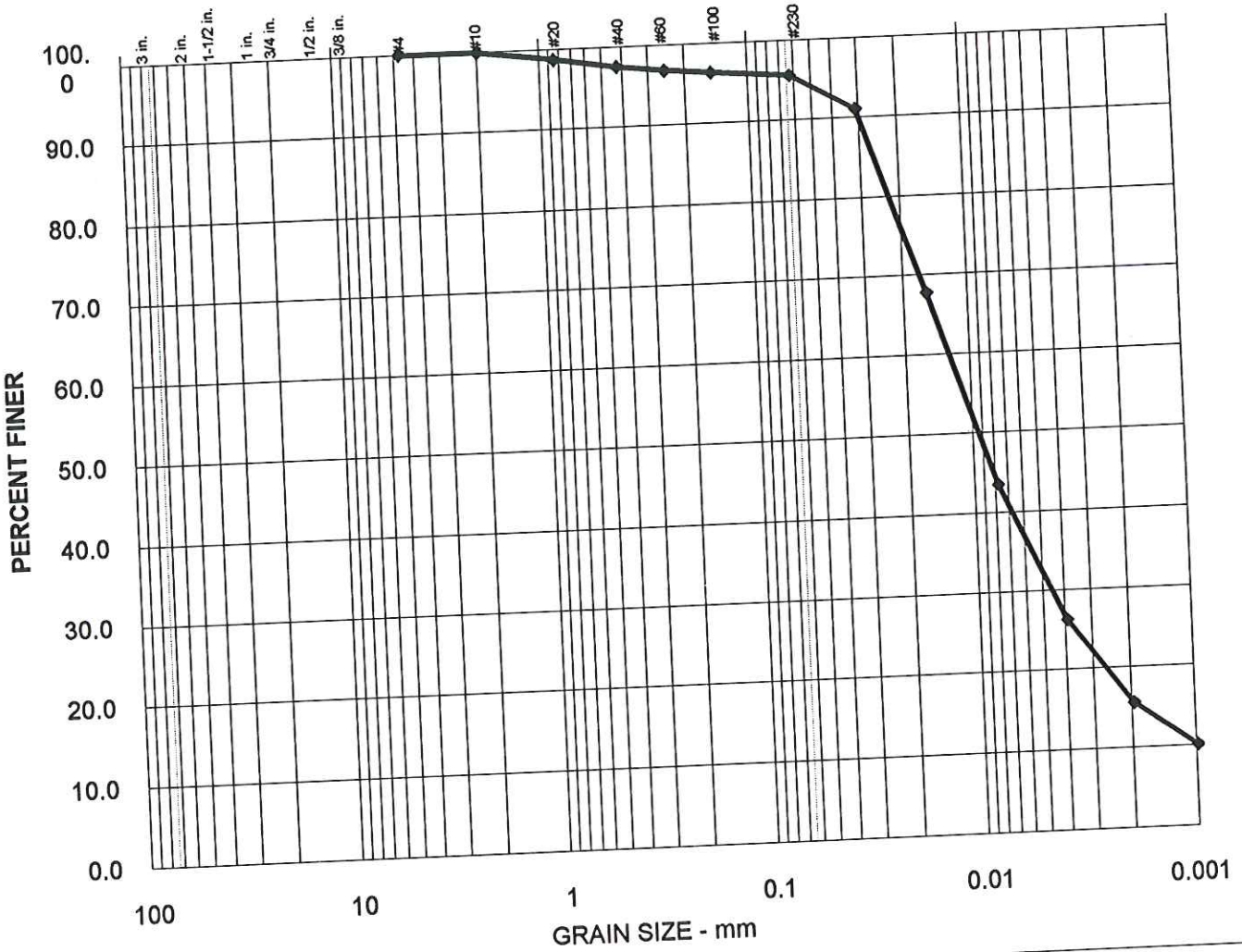
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	4%	70%	26%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SS-19	0 to 10 cm		*

	MATERIAL DESCRIPTION	
	Clayey SILT	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

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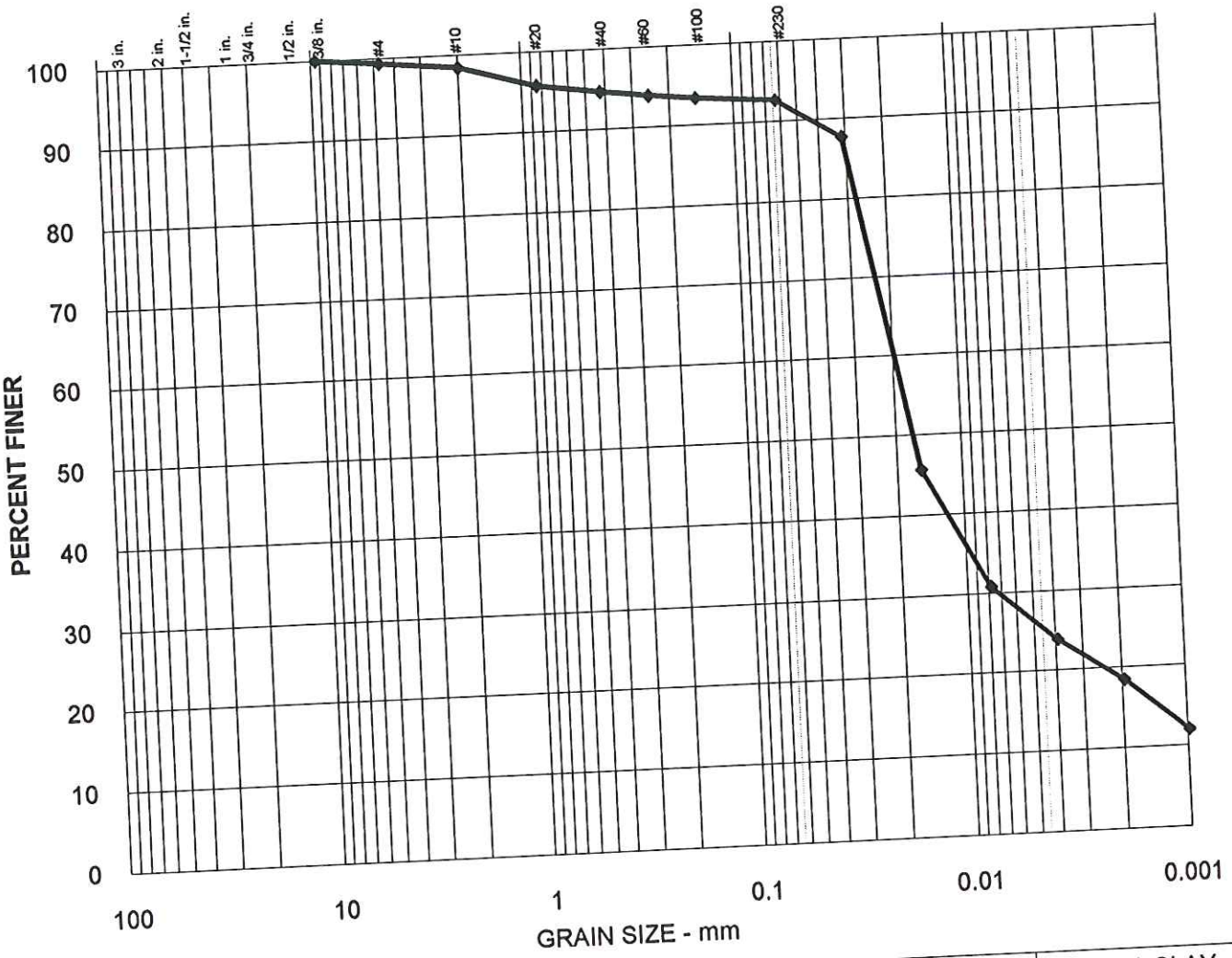
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	1%	6%	69%	24%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SS-20	0 to 10 cm		*

	MATERIAL DESCRIPTION	
	Slightly sandy, clayey SILT	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

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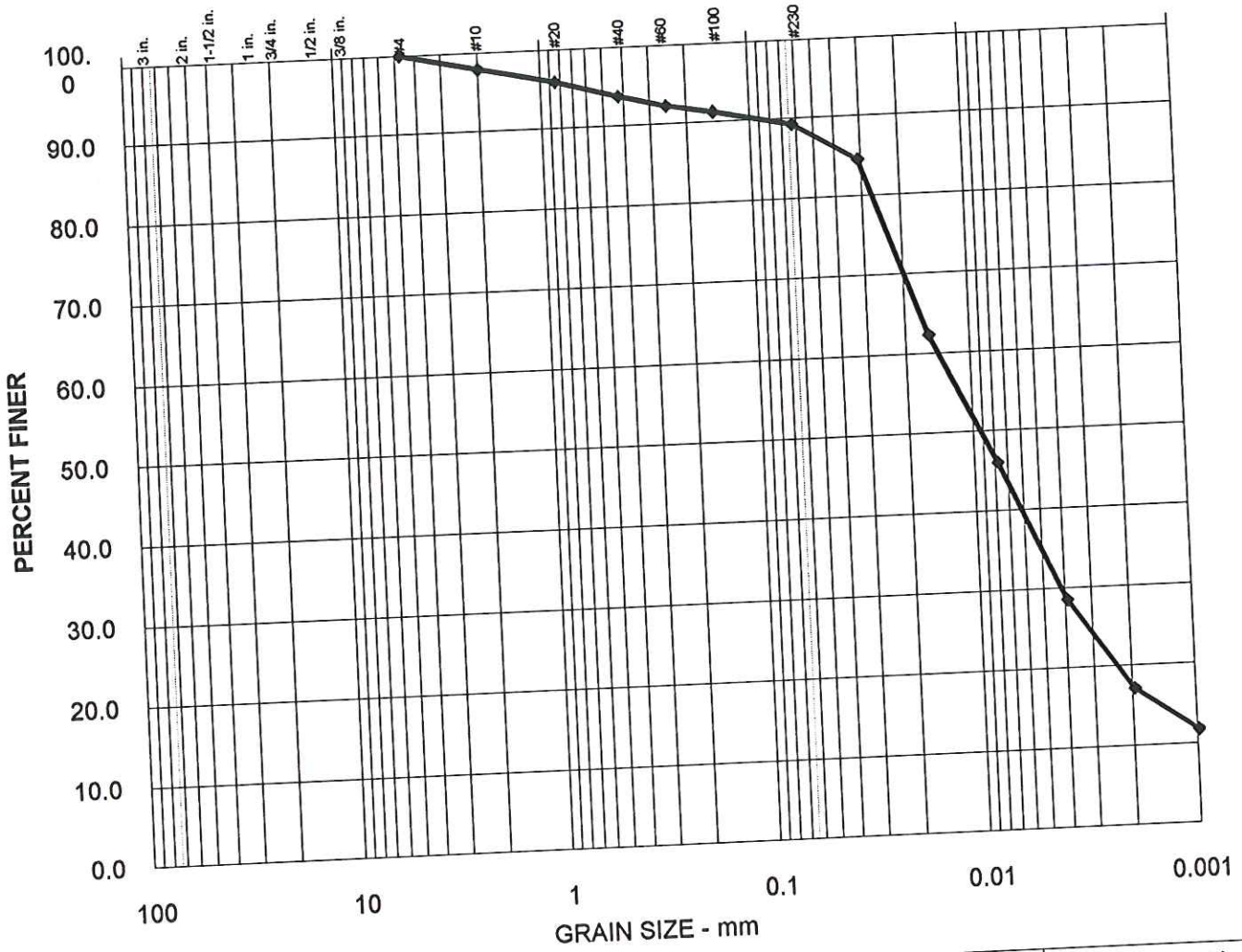
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	11%	60%	29%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SS-21	0 to 10 cm		*

	MATERIAL DESCRIPTION	
	Slightly sandy, clayey SILT	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

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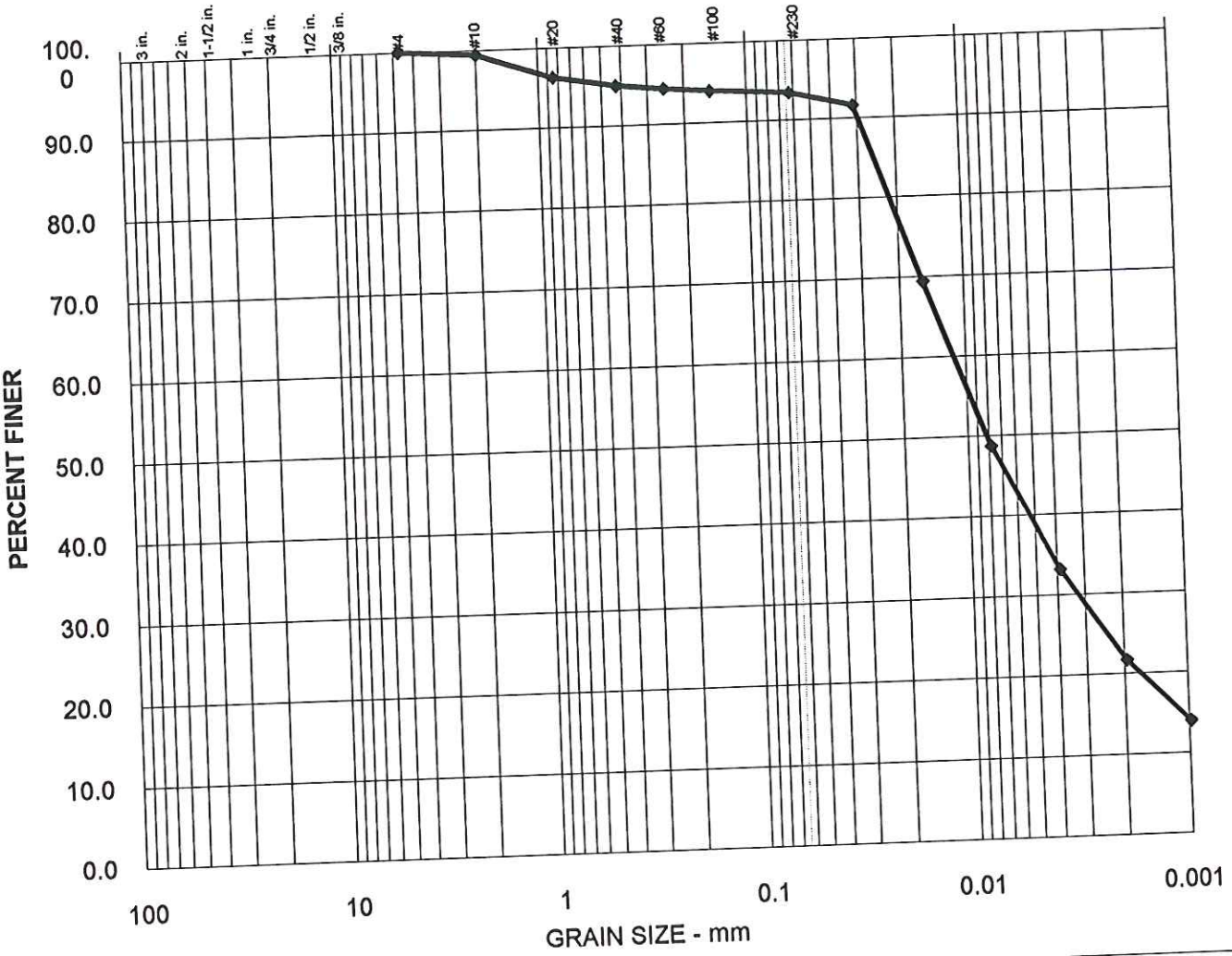
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	7%	60%	33%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SS-22(A)	0 to 10 cm		*

	MATERIAL DESCRIPTION	
	Slightly sandy, very clayey SILT	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

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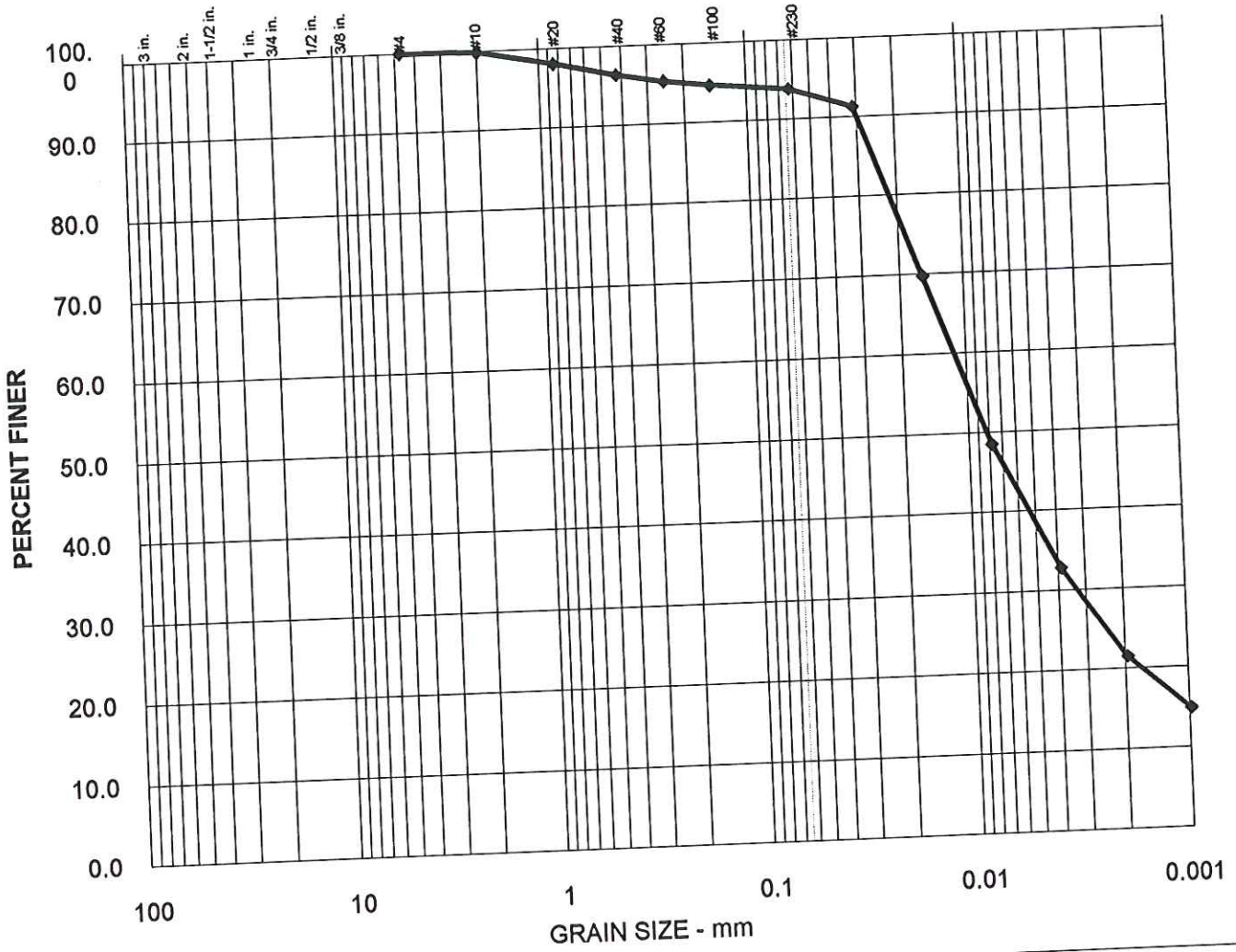
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	6%	61%	33%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SS-22(B) Duplicate	0 to 10 cm		*

	MATERIAL DESCRIPTION	
	Slightly sandy, very clayey SILT	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

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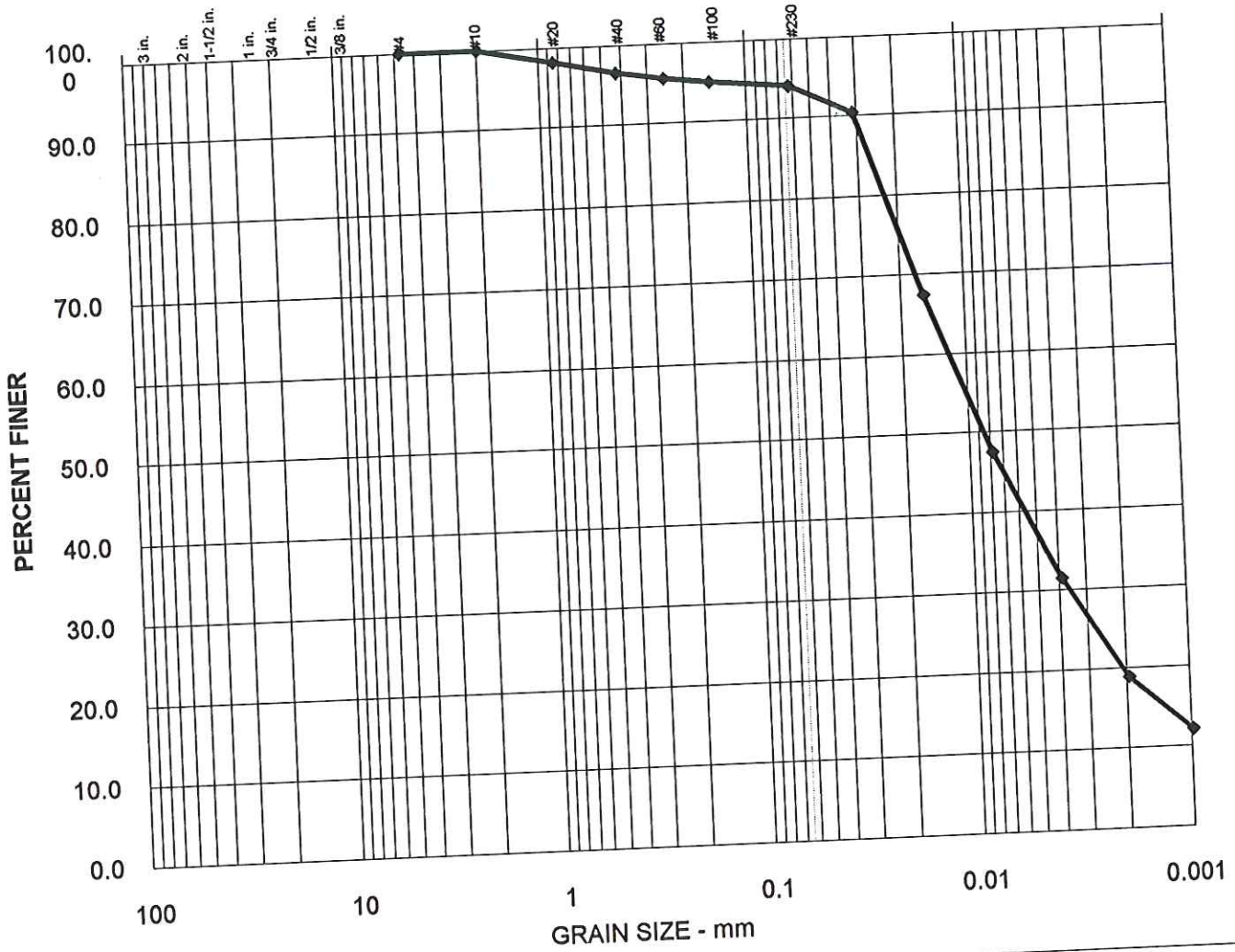
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	6%	63%	31%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SS-22(C) Triplicate	0 to 10 cm		*

	MATERIAL DESCRIPTION	
	Slightly sandy, very clayey SILT	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

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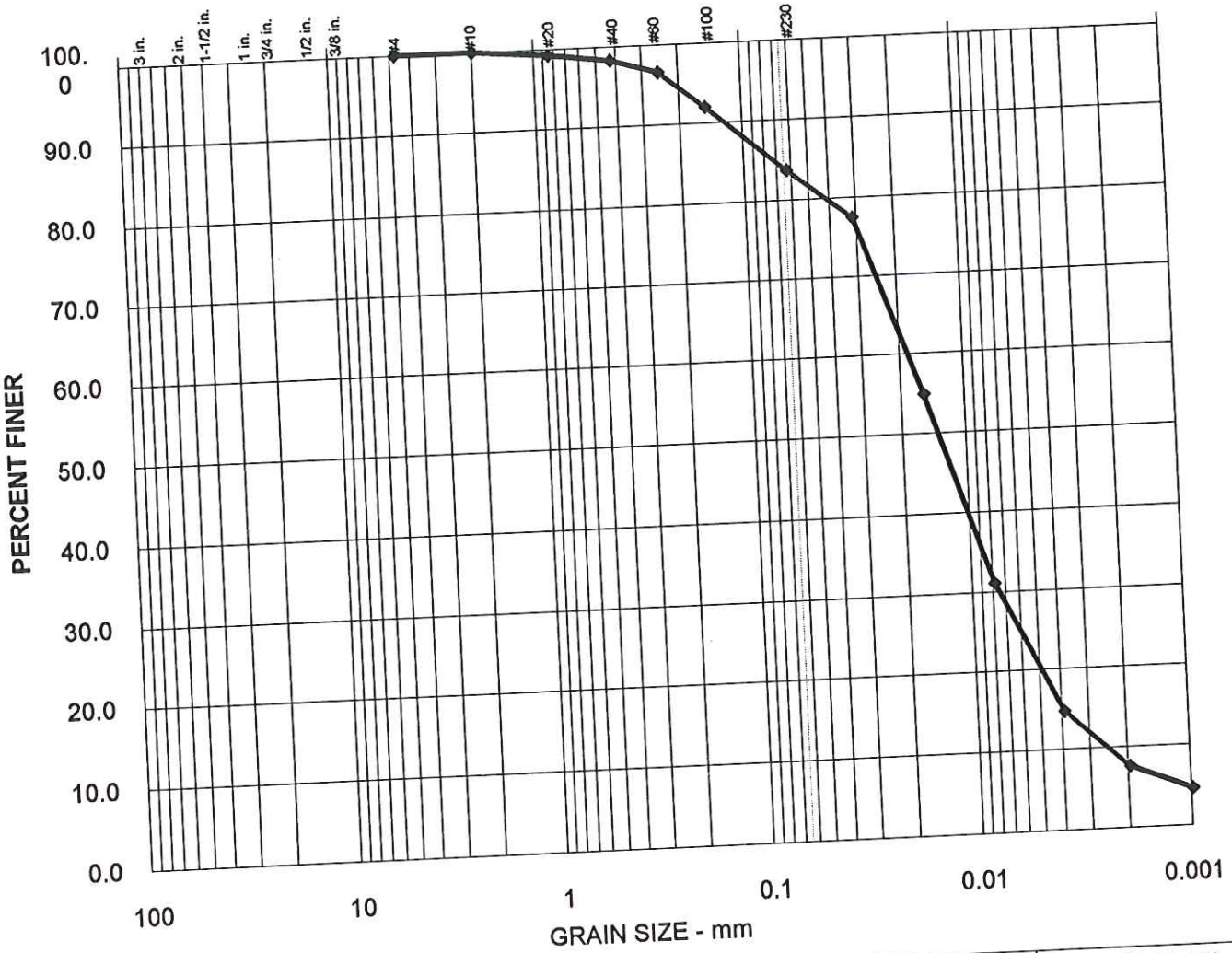
Figure D- 27

10/2/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	16%	69%	15%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SS-23	0 to 10 cm		*

MATERIAL DESCRIPTION
Clayey , sandy SILT

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

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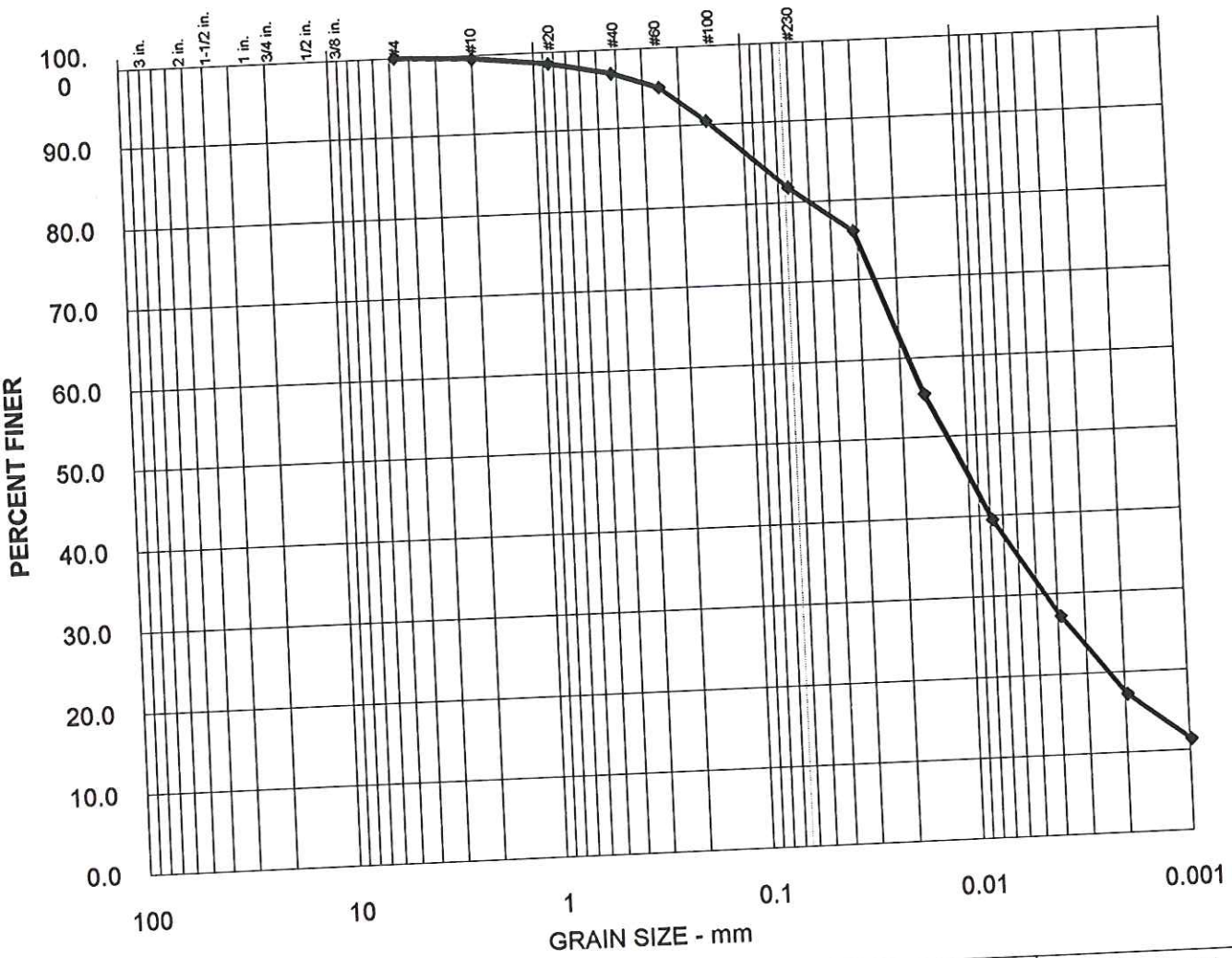
9/27/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	18%	55%	27%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SS-24	0 to 10 cm		*

MATERIAL DESCRIPTION
Sandy, clayey SILT

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

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HARTCROWSER

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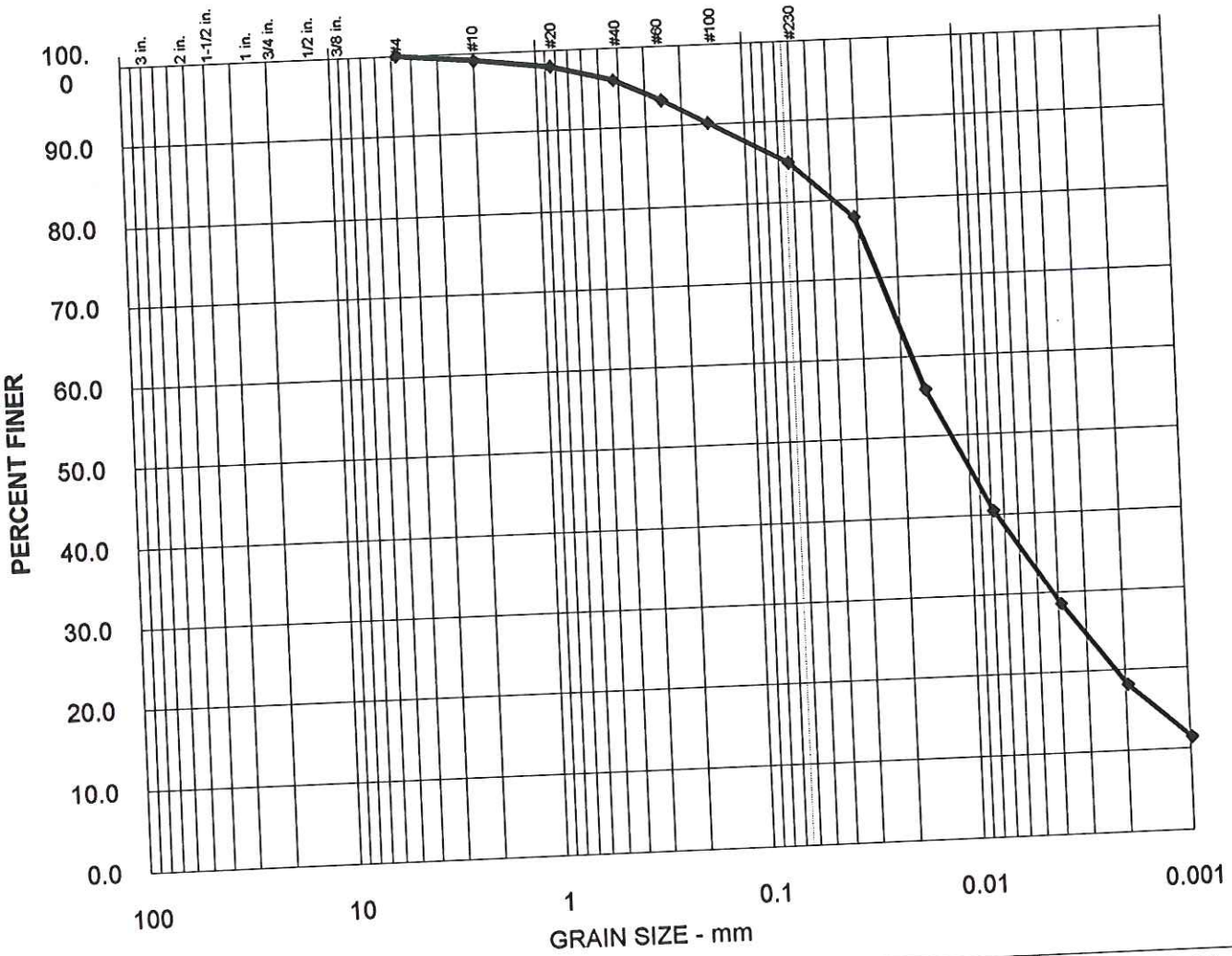
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	15%	56%	29%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SS-25	0 to 10 cm		*

	MATERIAL DESCRIPTION	
	Sandy, clayey SILT	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

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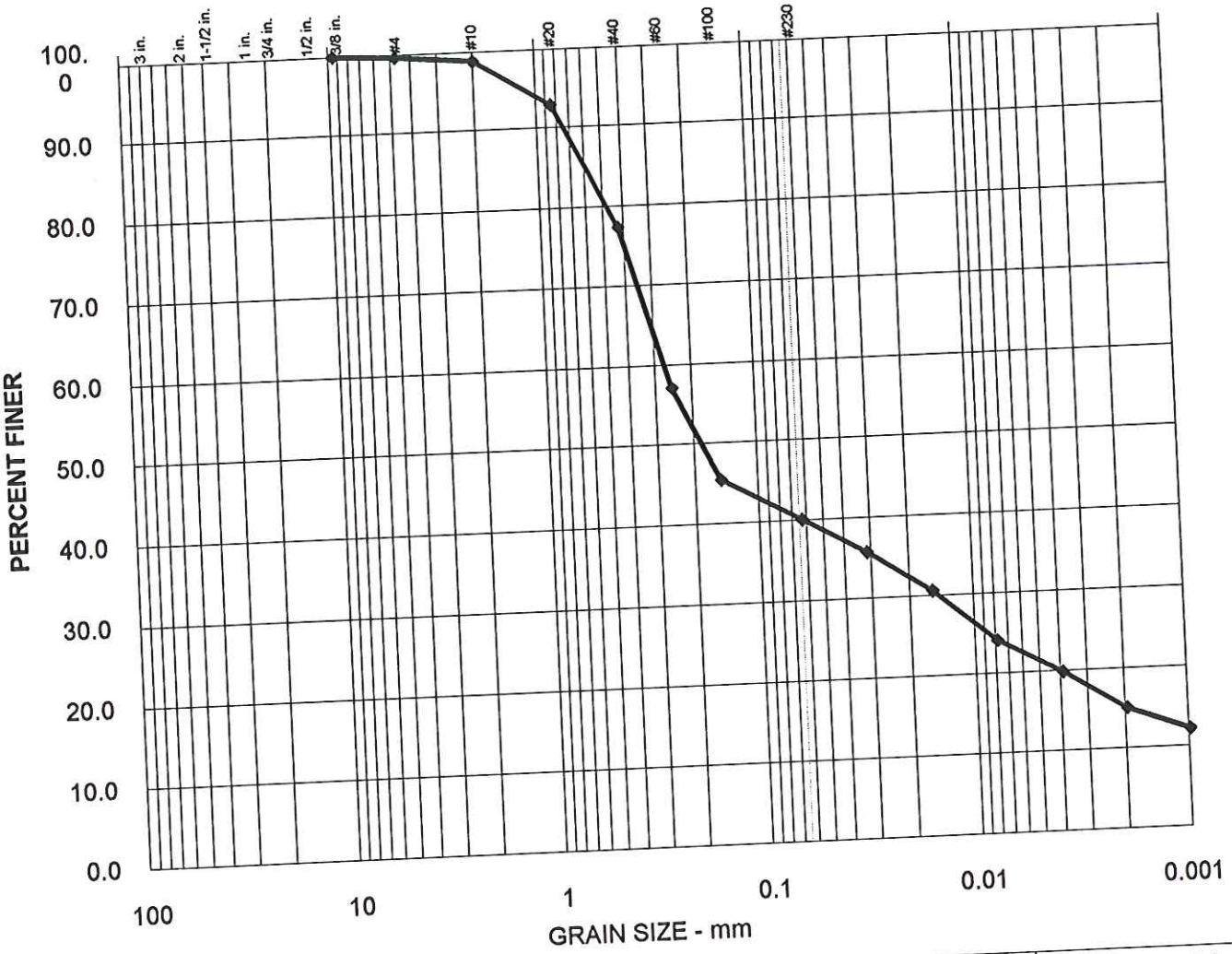
10/2/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	60%	20%	20%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SS-26	0 to 10 cm		*

	MATERIAL DESCRIPTION	
	Clayey, silty SAND	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

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HARTCROWSER

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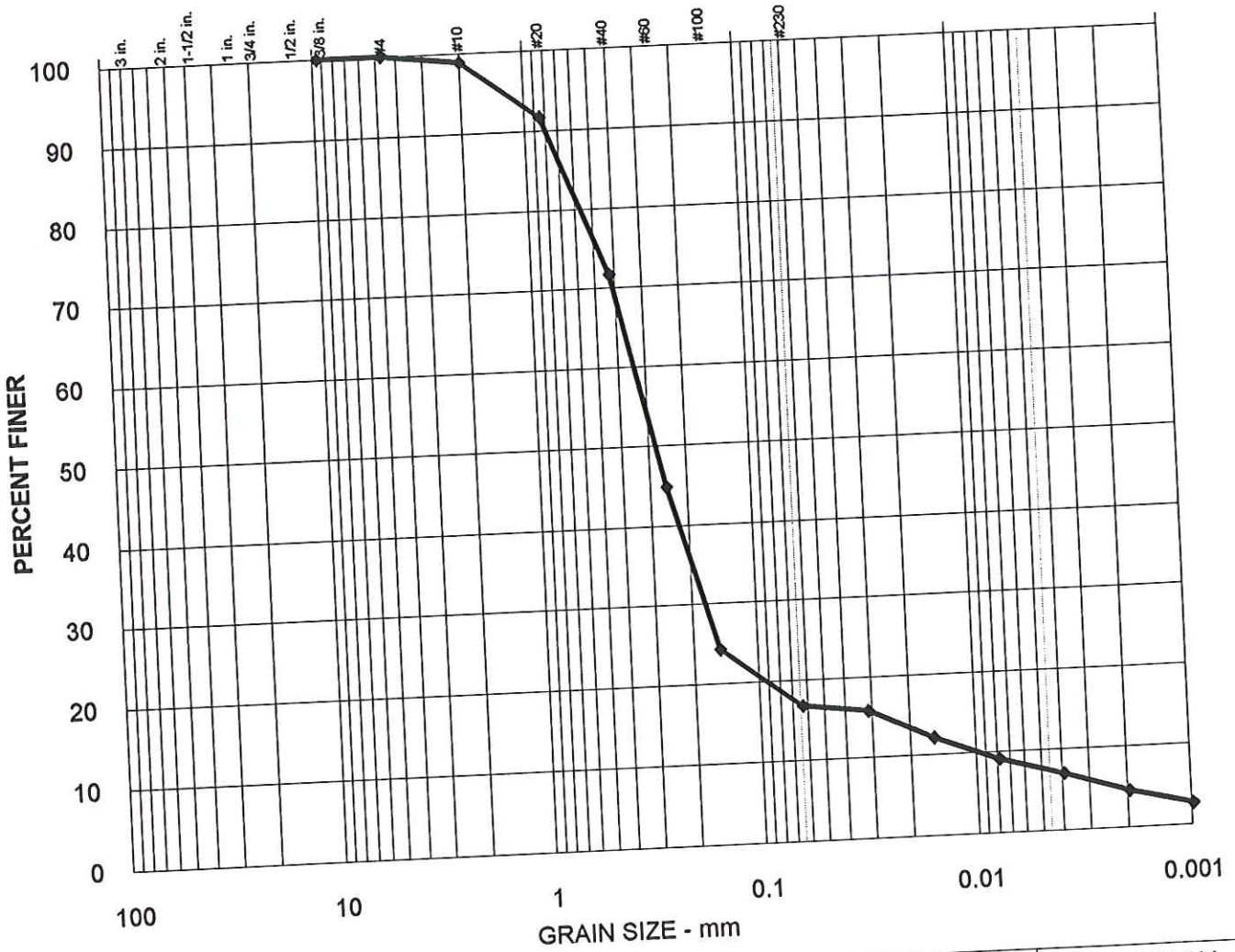
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	83%	10%	7%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SS-27	0 to 10 cm		*

	MATERIAL DESCRIPTION	
	Slightly clayey, slightly silty SAND	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

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HARTCROWSER

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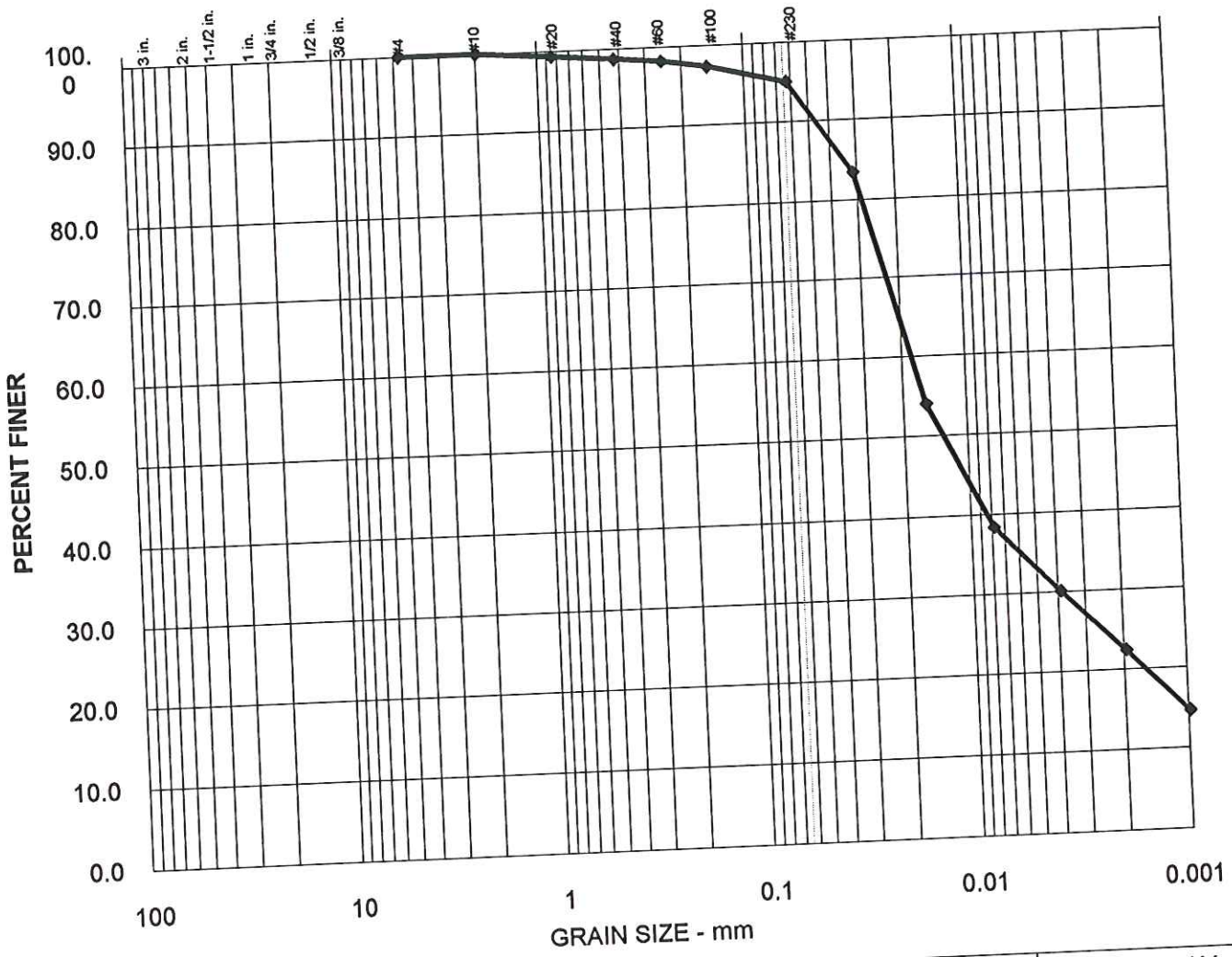
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	5%	65%	30%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SS-28	0 to 10 cm		*

MATERIAL DESCRIPTION
Clayey SILT

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

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HARTCROWSER

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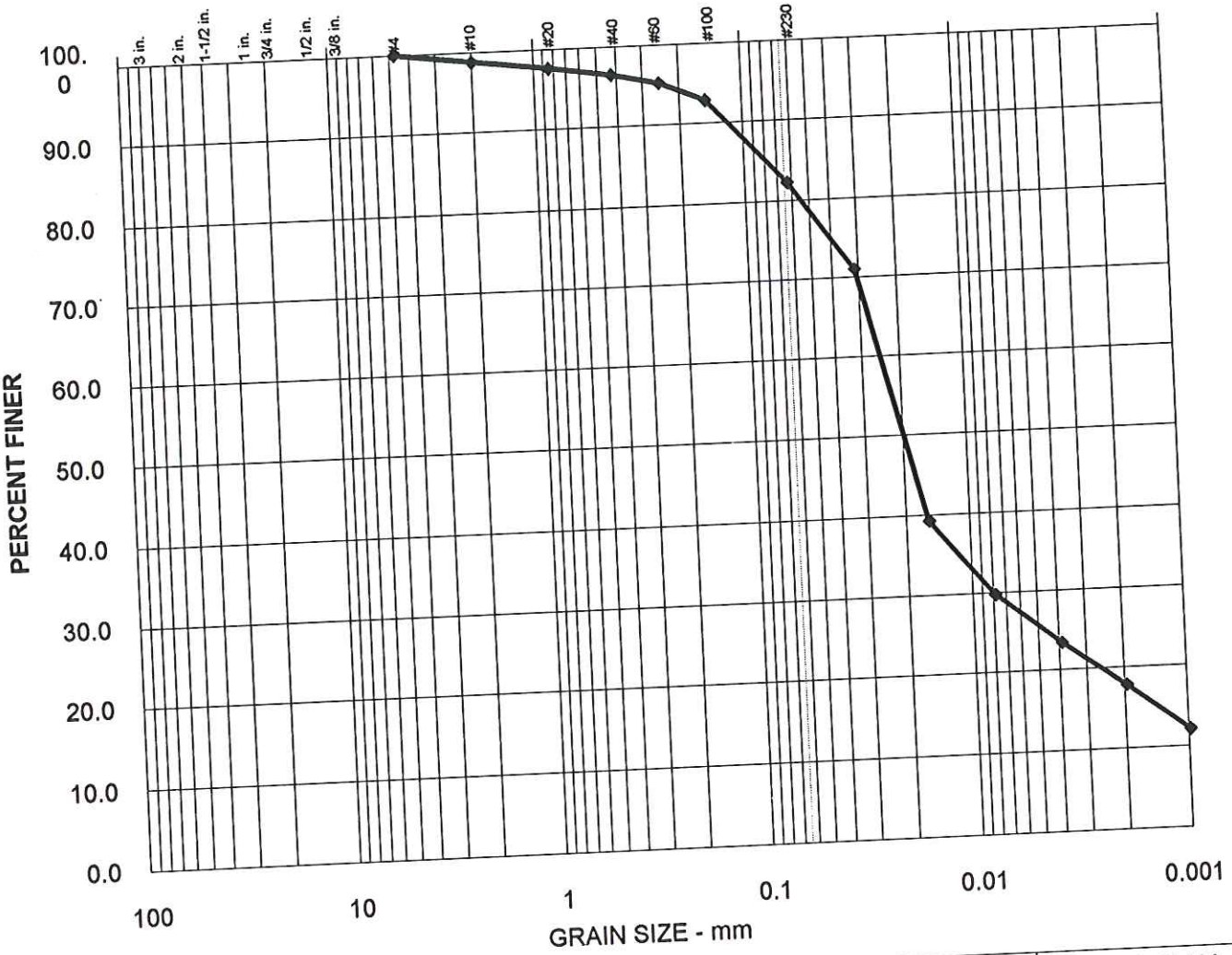
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	18%	59%	23%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SS-29	0 to 10 cm		*

	MATERIAL DESCRIPTION	
	Sandy, clayey SILT	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

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HARTCROWSER

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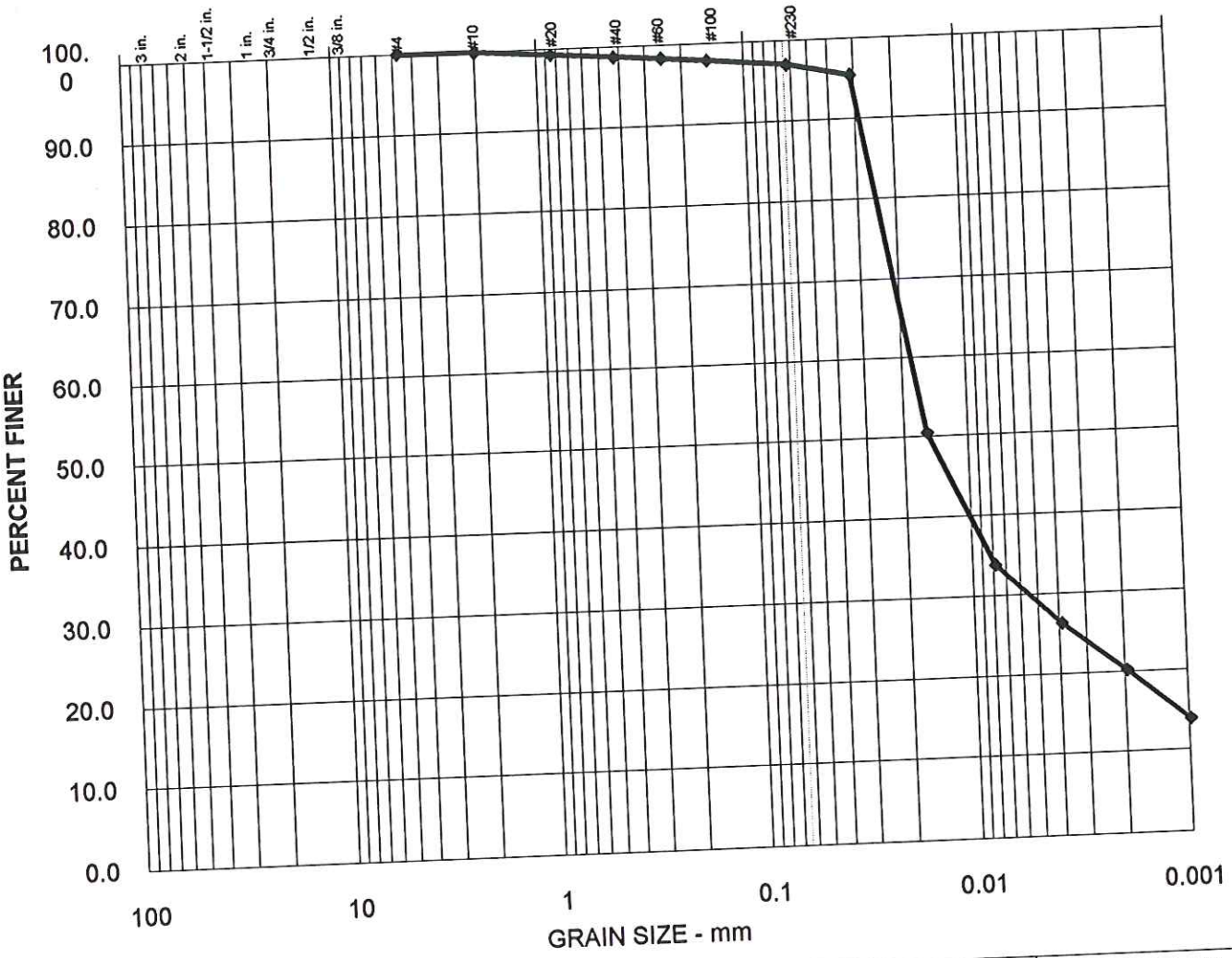
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	3%	71%	26%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SS-30	0 to 10 cm		*

MATERIAL DESCRIPTION
Clayey SILT

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

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HARTCROWSER

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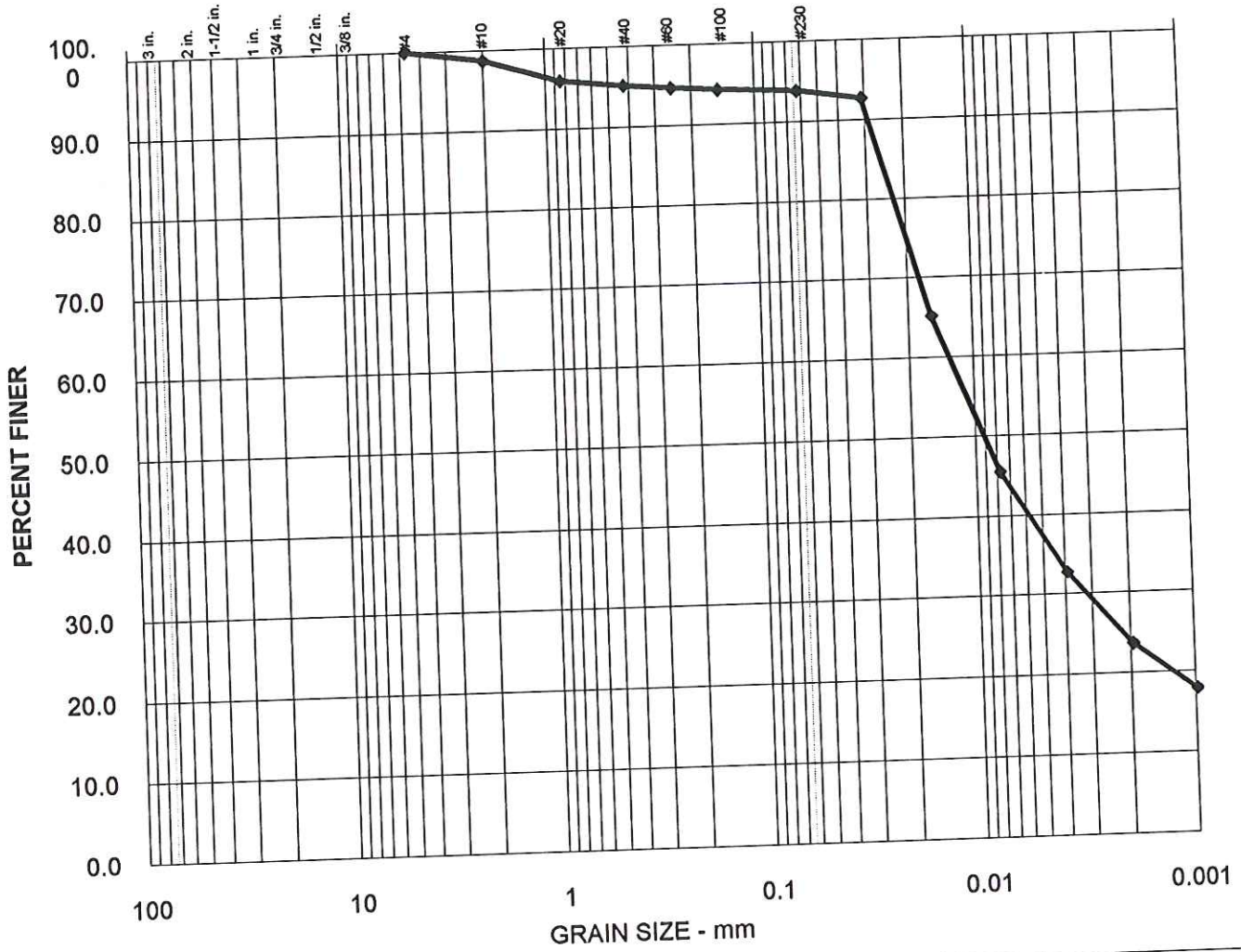
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	6%	61%	33%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SS-31	0 to 10 cm		*

	MATERIAL DESCRIPTION	
	Slightly sandy, very clayey SILT	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

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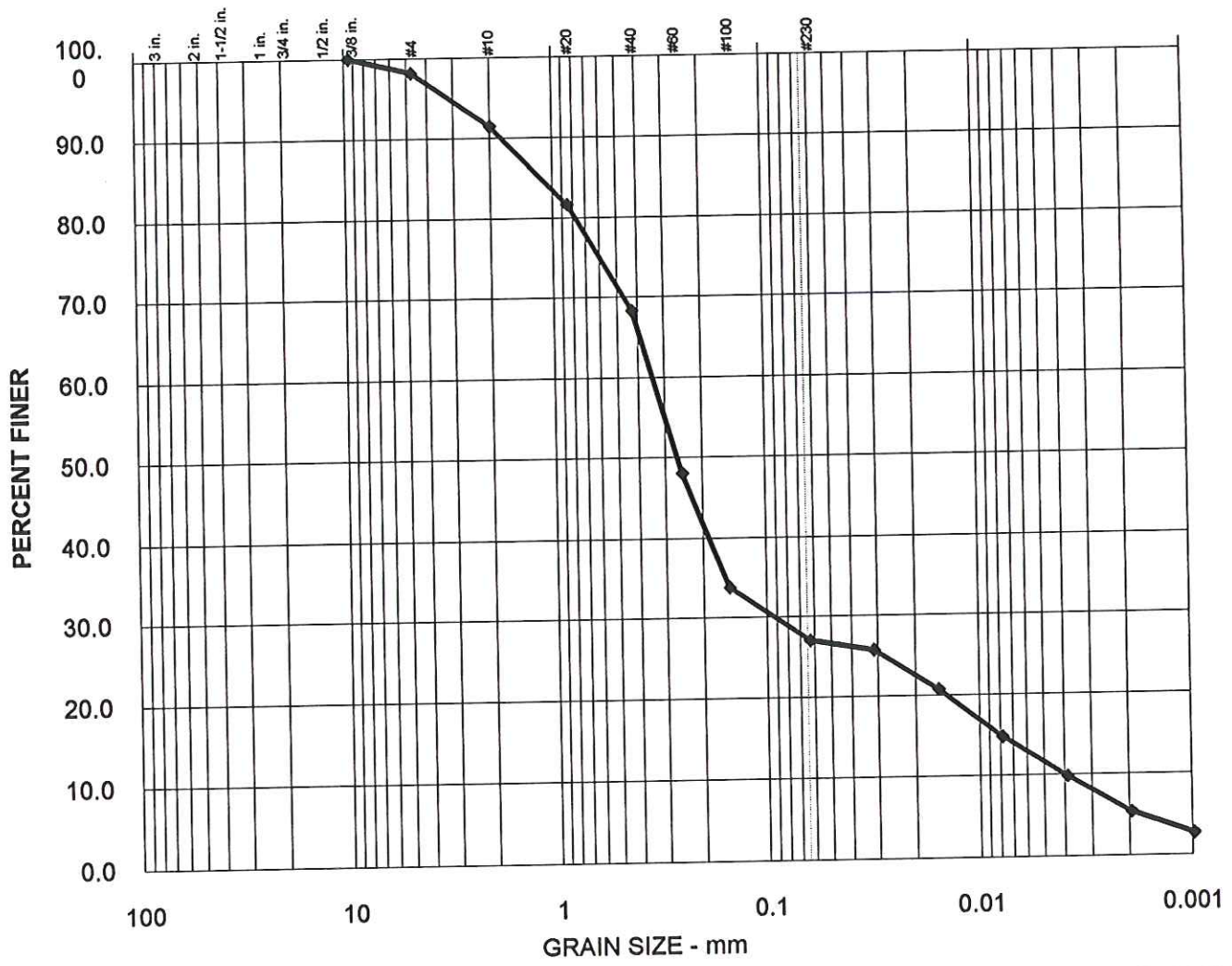
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	2%	71%	17%	10%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SS-32	0 to 10 cm		*

	MATERIAL DESCRIPTION	
	Slightly clayey, silty SAND	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

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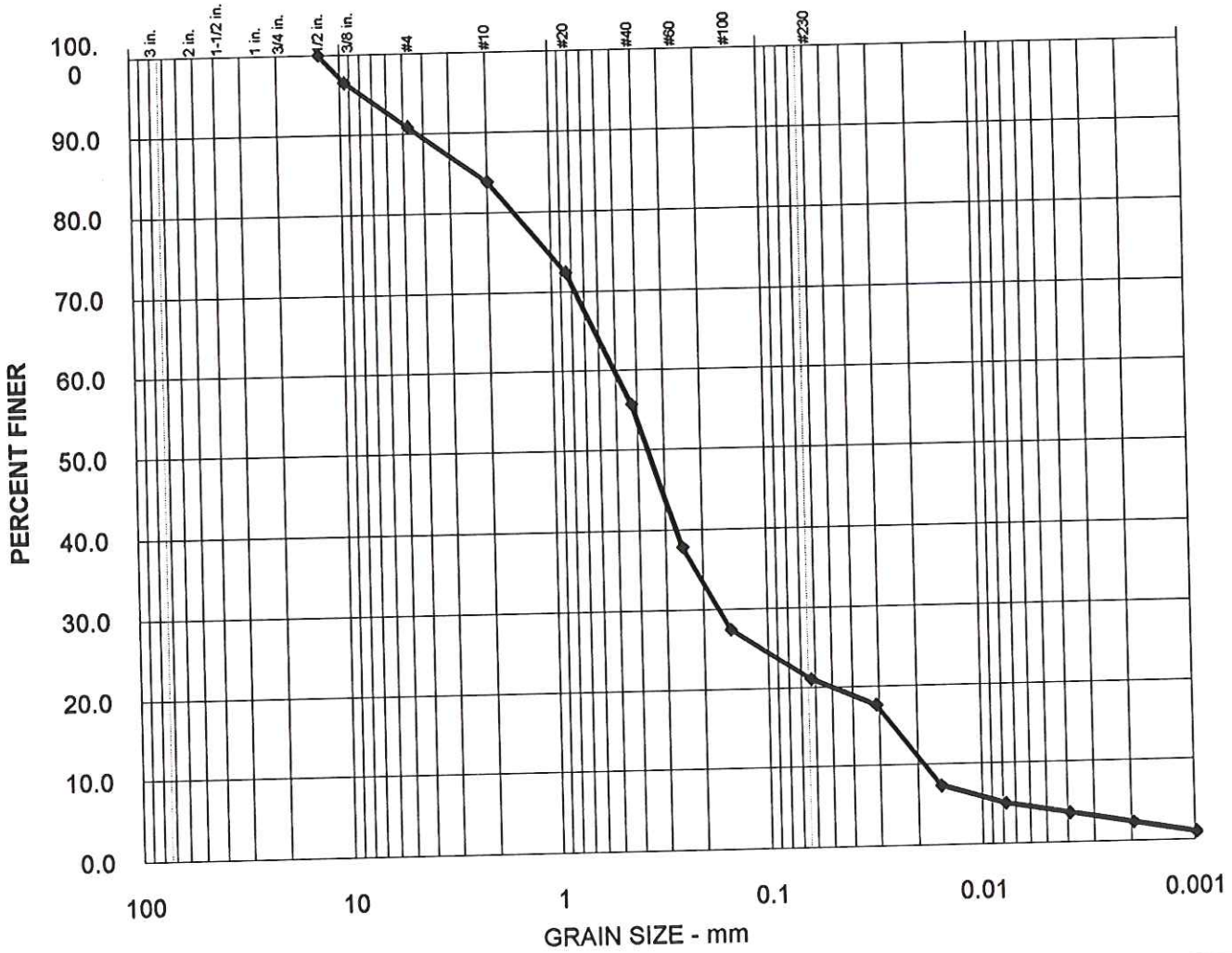
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	9%	70%	17%	4%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SS-33	0 to 10 cm		*

	MATERIAL DESCRIPTION	
	Slightly gravelly, silty SAND	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

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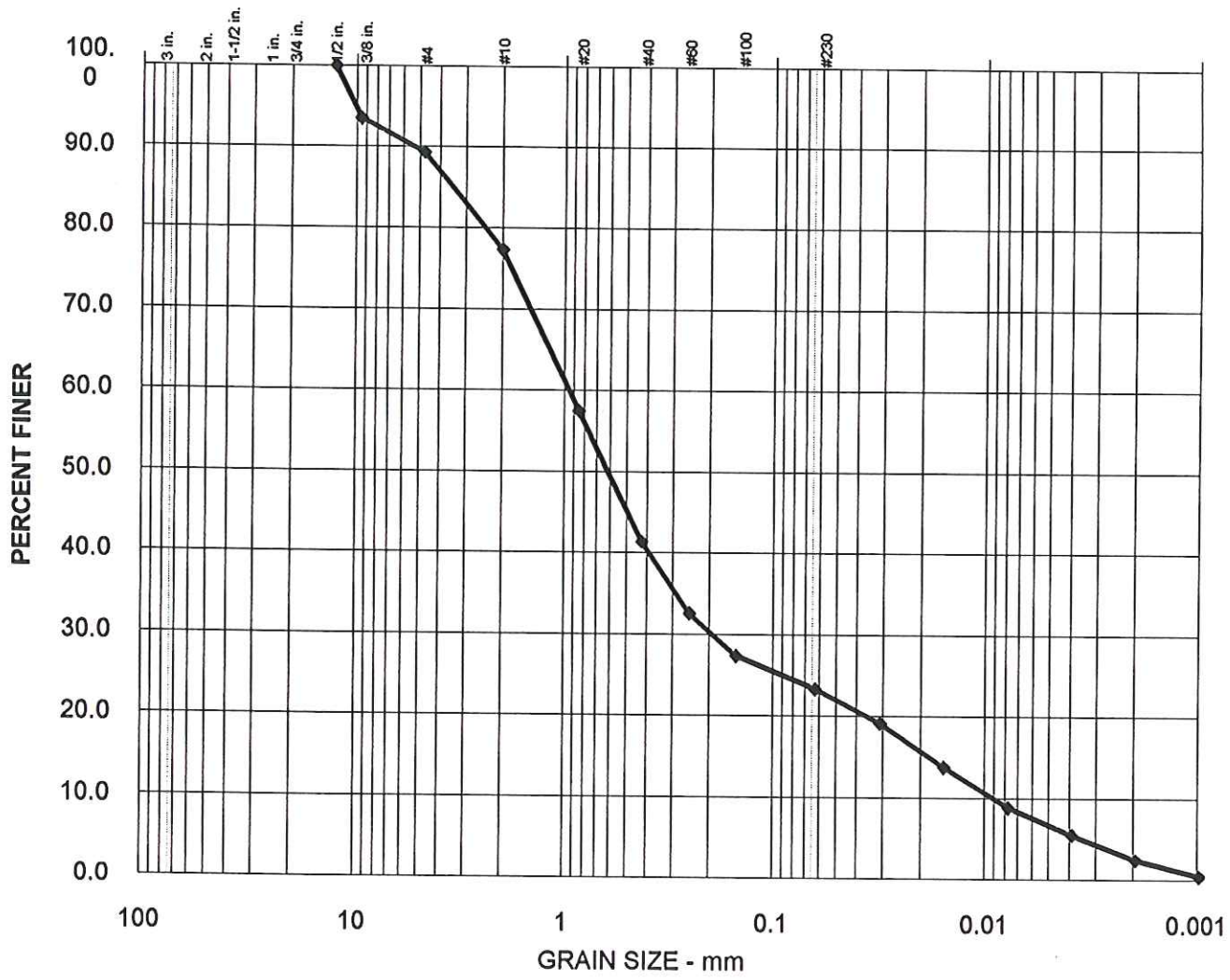
HARTCROWSER

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	11%	66%	17%	6%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SS-34	0 to 10 cm		*

	MATERIAL DESCRIPTION	
	Slightly clayey, slightly gravelly, silty SAND	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

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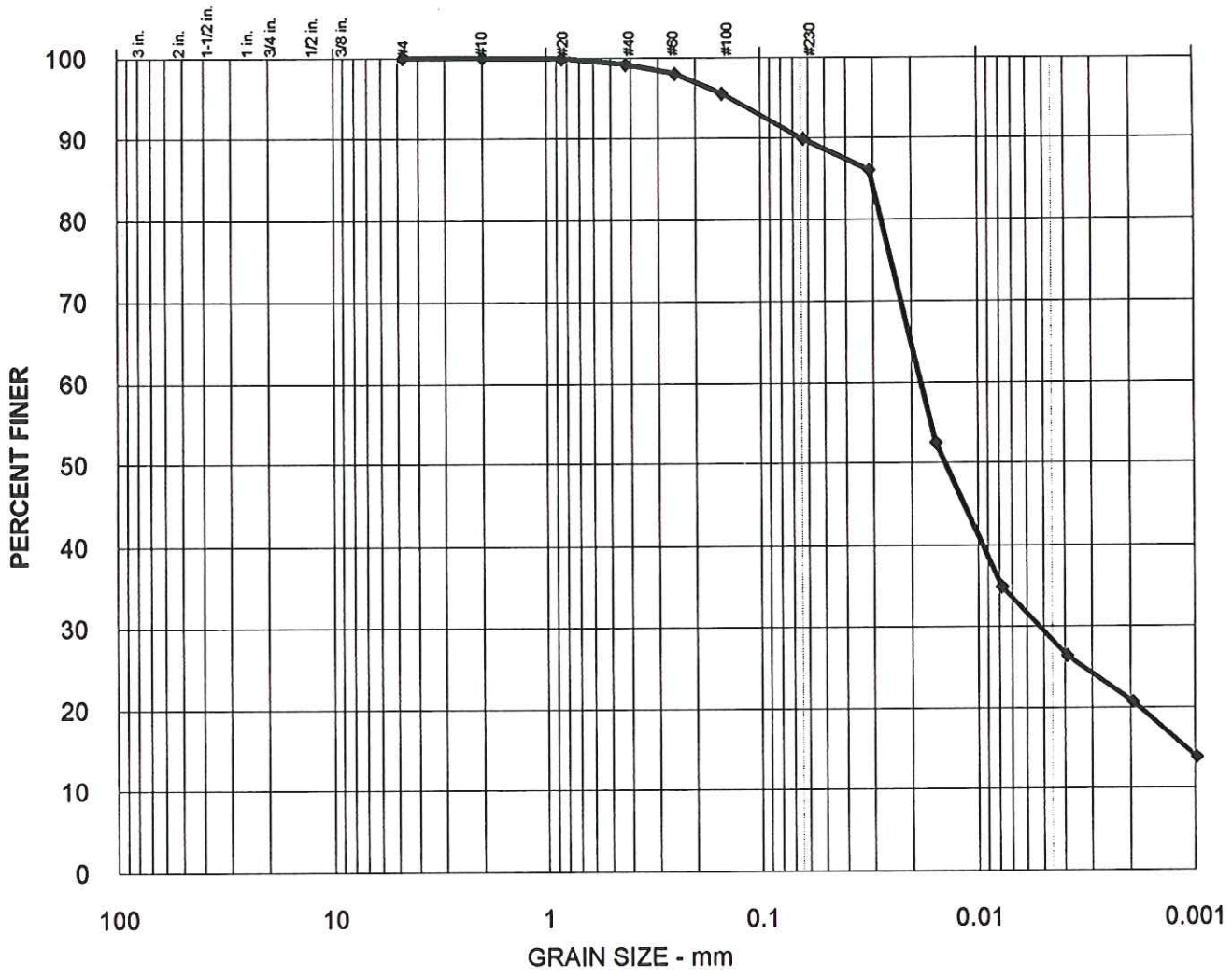
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	10%	64%	26%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SS-35	0 to 10 cm		*

	MATERIAL DESCRIPTION	
	Slightly sandy, clayey SILT	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

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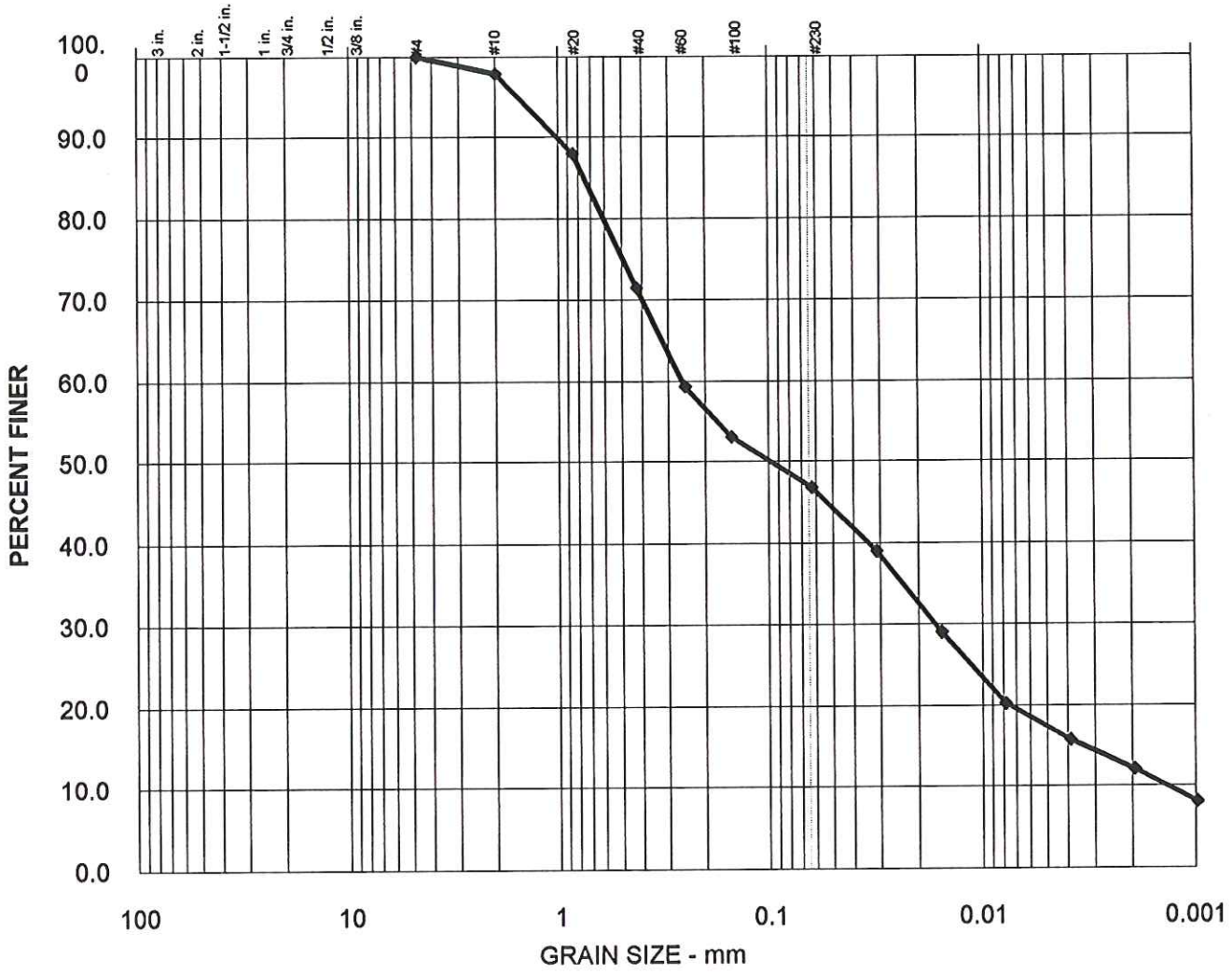
9/11/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	53%	31%	16%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SS-36	0 to 10 cm		*

	MATERIAL DESCRIPTION	
	Clayey, very silty SAND	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

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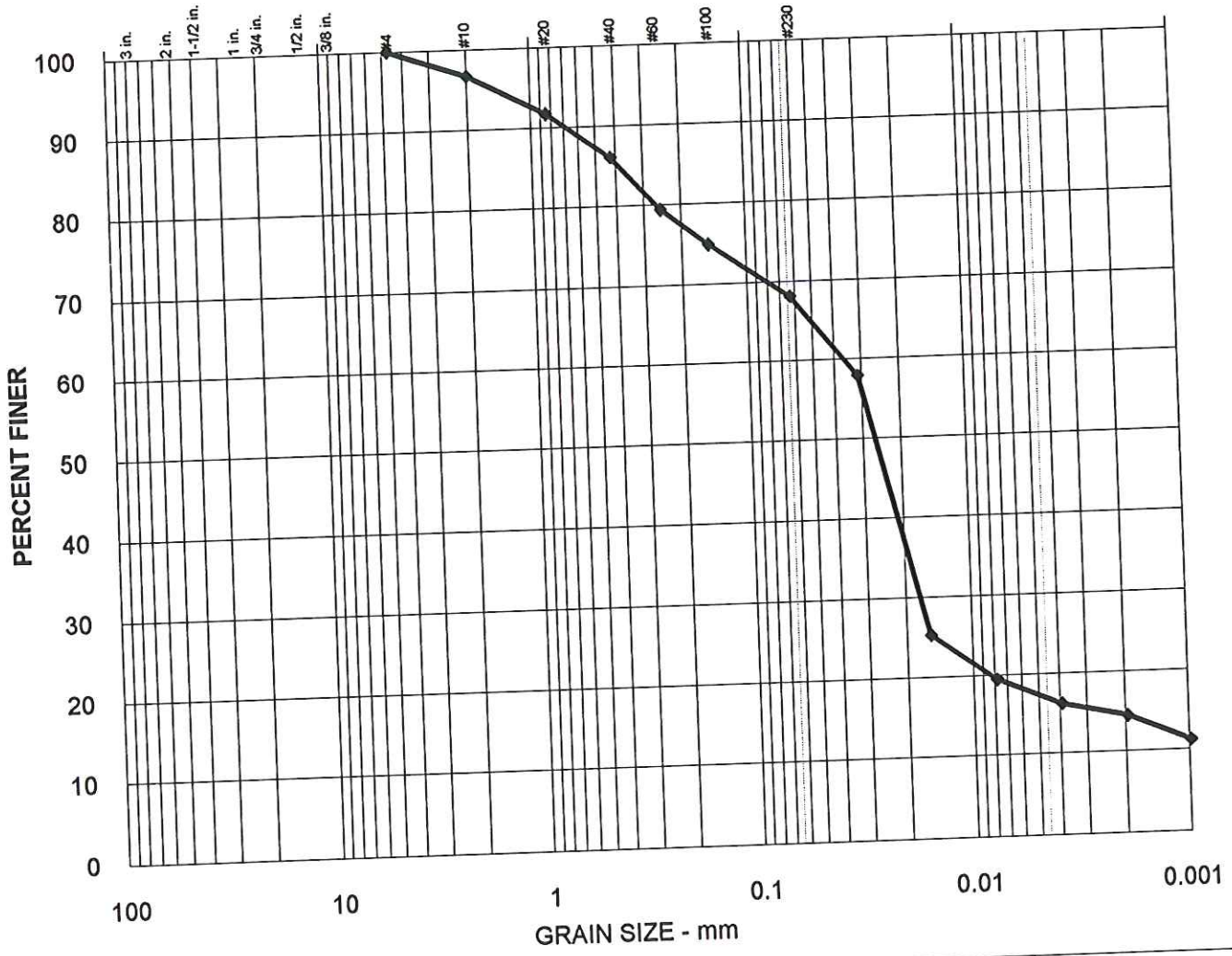
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	32%	52%	16%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SS-37	0 to 10 cm		*

MATERIAL DESCRIPTION
Clayey, very sandy SILT

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

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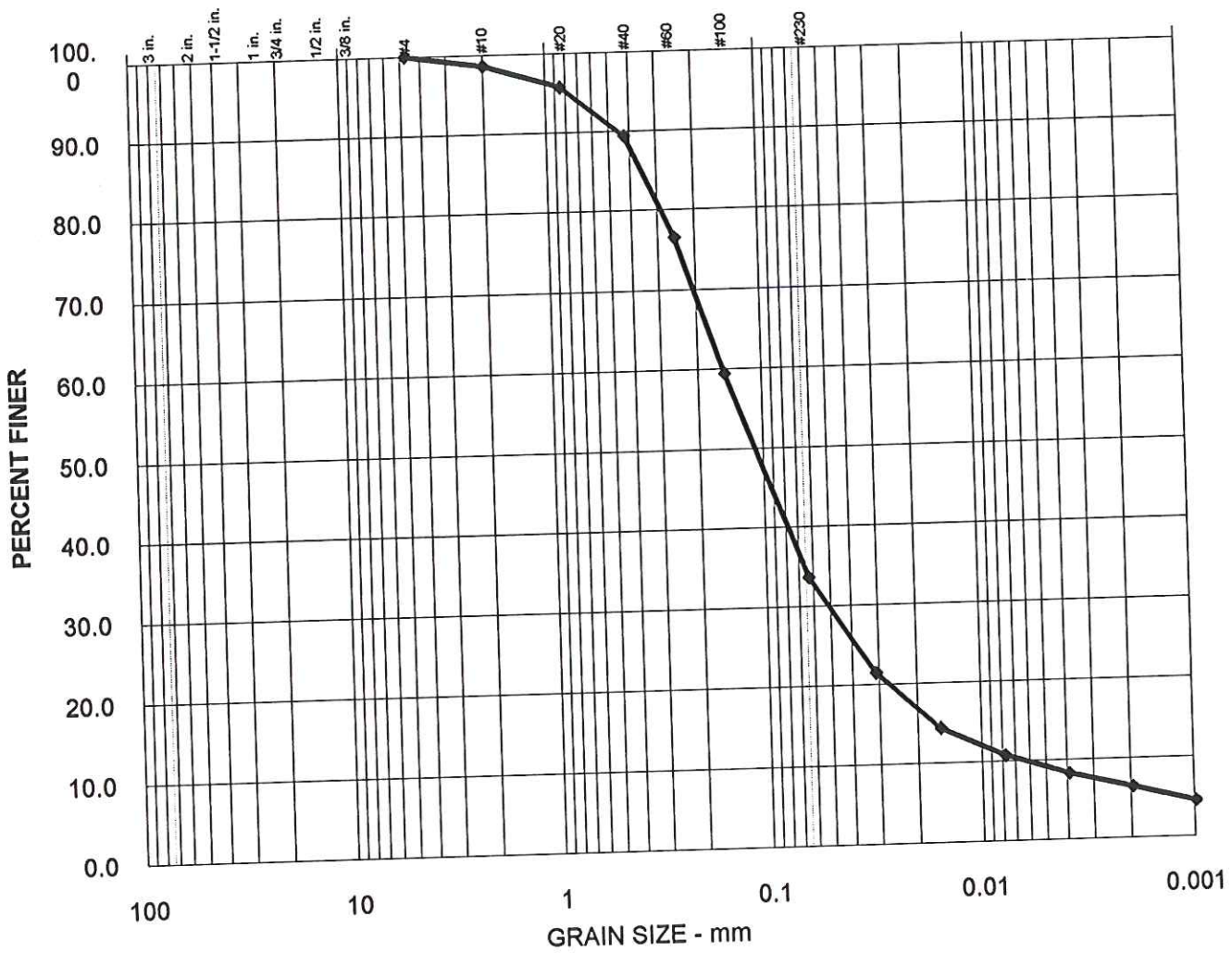
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	66%	26%	8%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SS-38	0 to 10 cm		*

	MATERIAL DESCRIPTION	
	Slightly clayey, silty SAND	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

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HARTCROWSER

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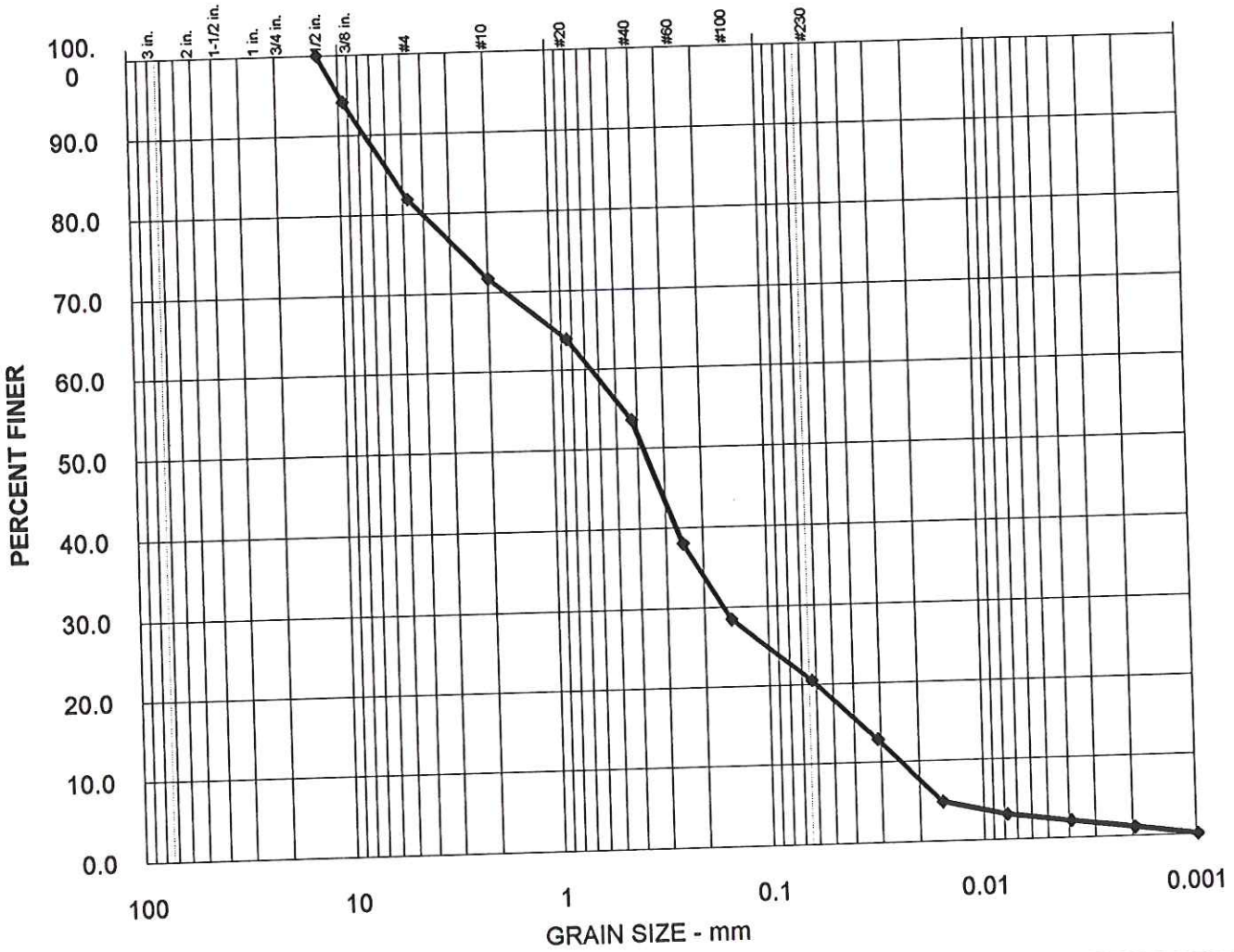
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	18%	61%	19%	2%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SS-39	0 to 10 cm		*

	MATERIAL DESCRIPTION	
	Gravelly, silty SAND	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

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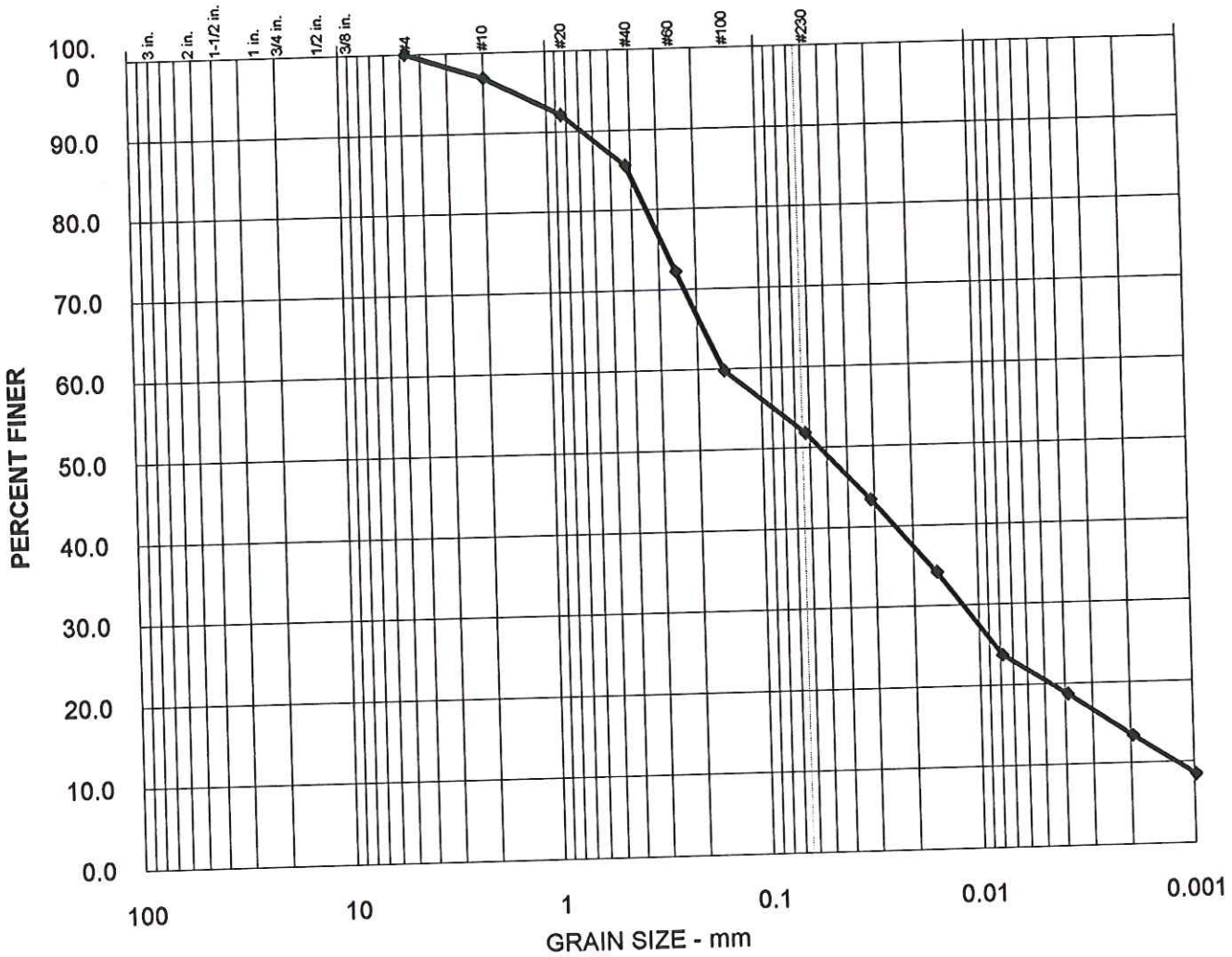
10/14/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	48%	33%	19%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SS-40	0 to 10 cm		*

	MATERIAL DESCRIPTION	
	Clayey, very silty SAND	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

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HARTCROWSER

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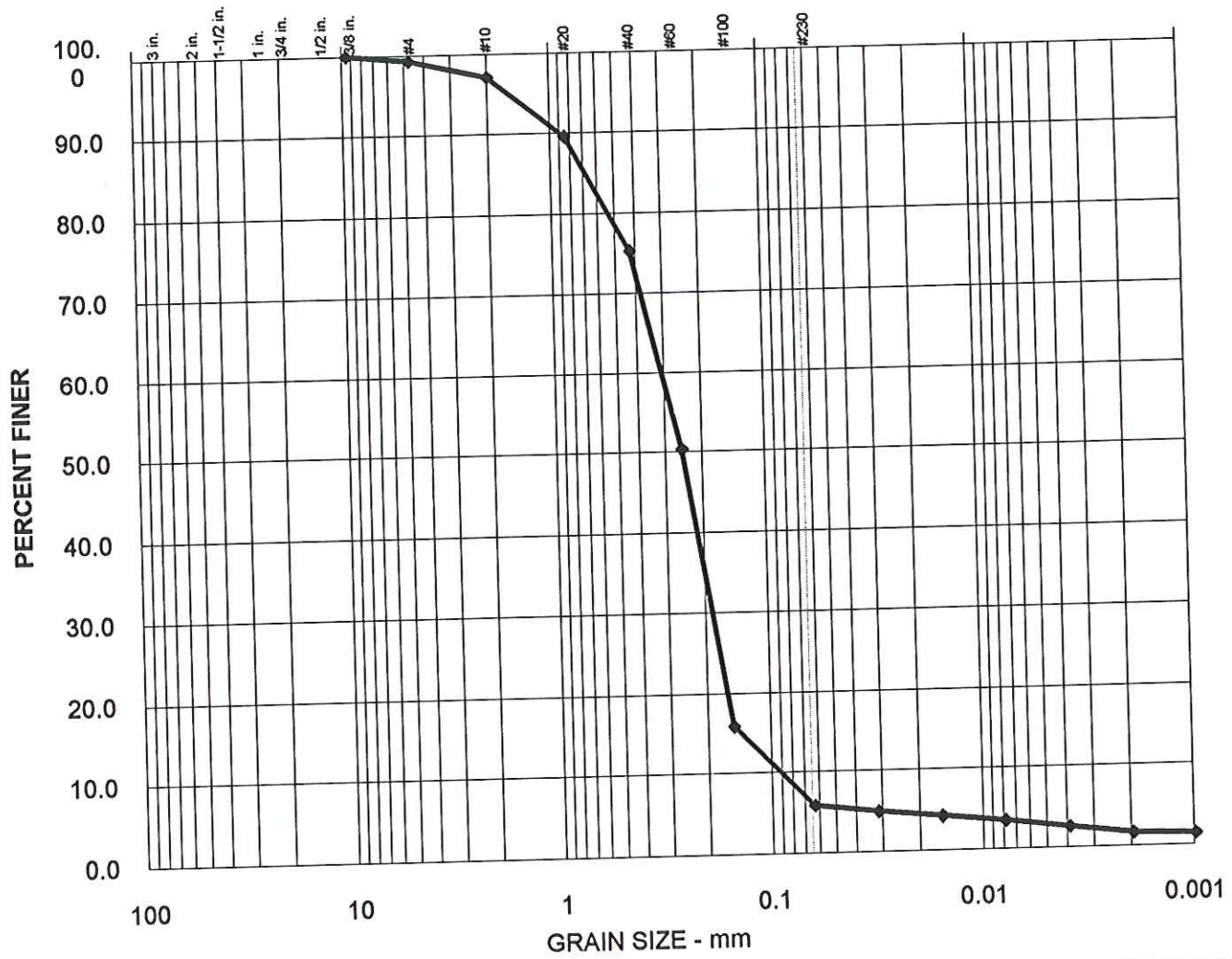
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	1%	93%	4%	2%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SS-41	0 to 10 cm		*

	MATERIAL DESCRIPTION	
	SAND	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

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HARTCROWSER

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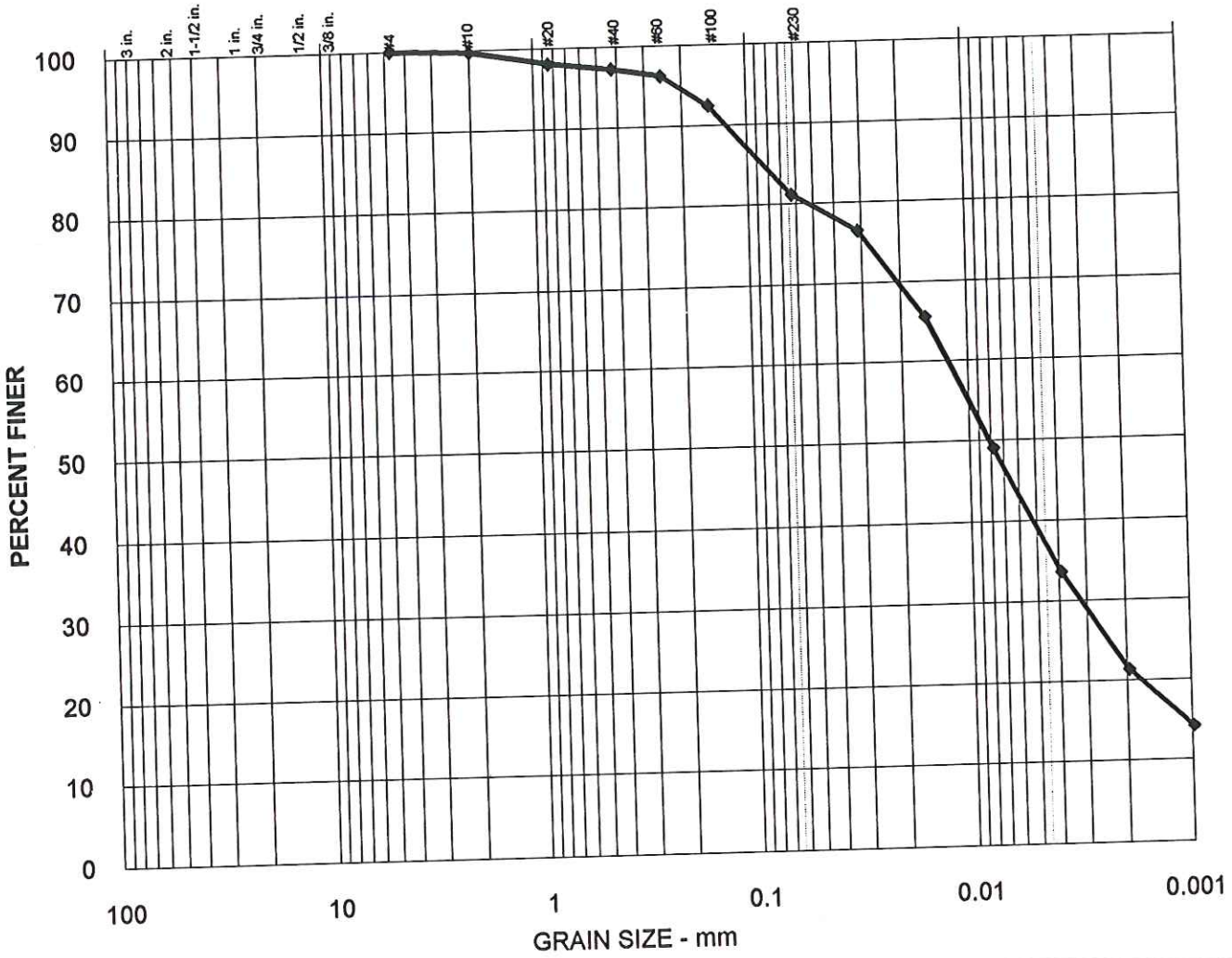
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	19%	47%	34%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SS-42	0 to 10 cm		*

MATERIAL DESCRIPTION
Sandy, very clayey SILT

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

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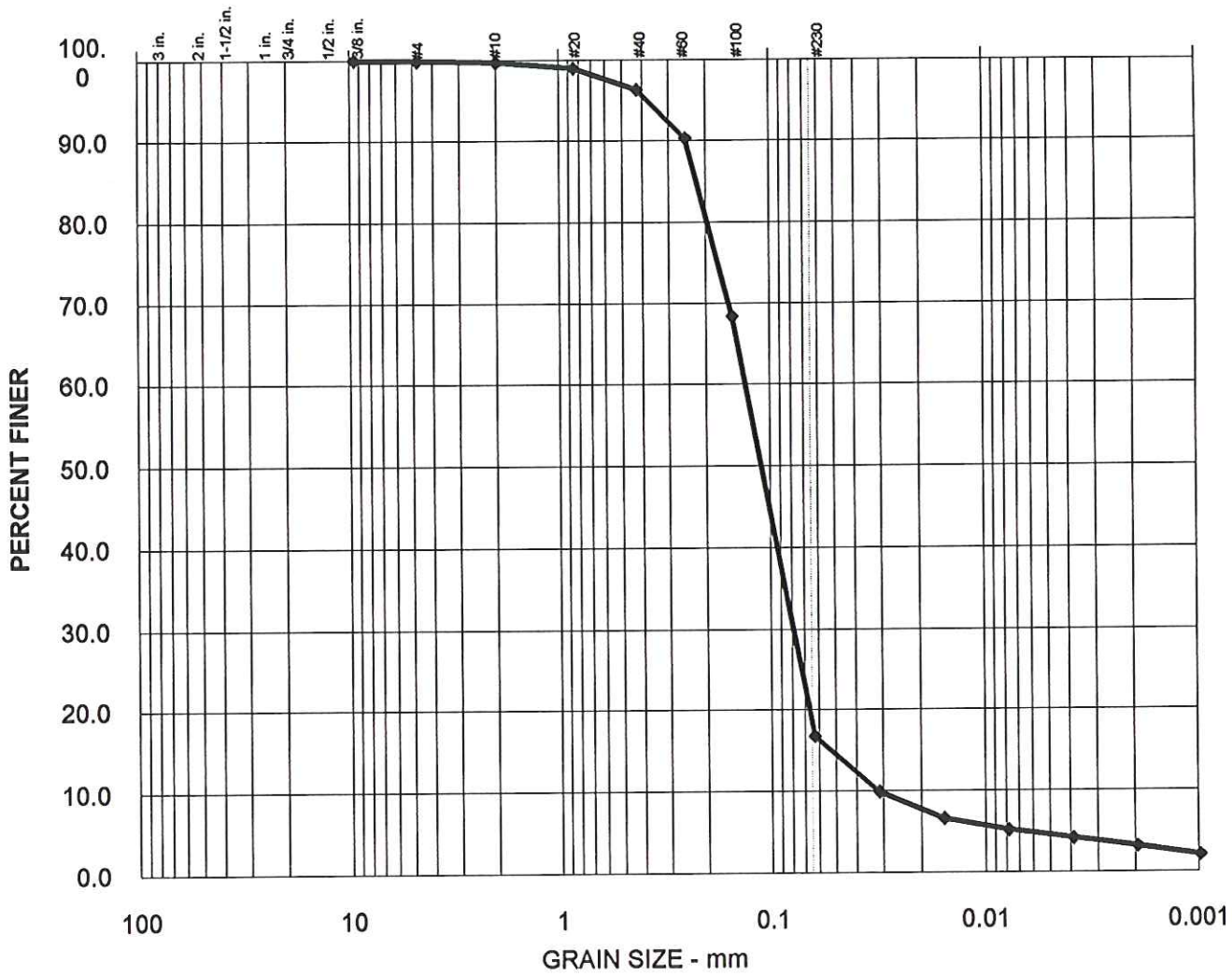
HARTCROWSER

9/19/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	83%	13%	4%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SS-43	0 to 10 cm		*

	MATERIAL DESCRIPTION	
	Silty SAND	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

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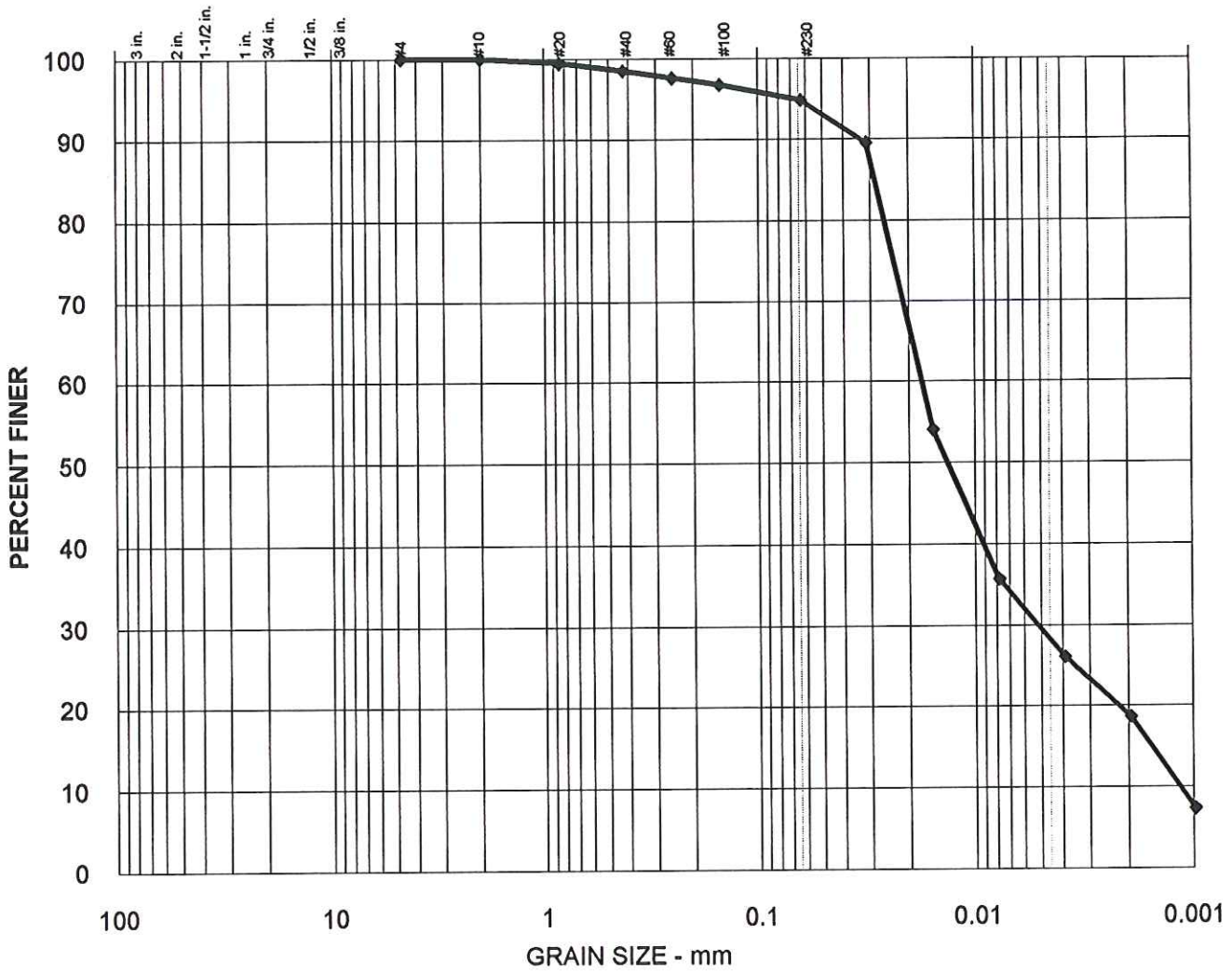
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	5%	69%	26%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SS-44	0 to 10 cm		*

	MATERIAL DESCRIPTION	
	Clayey SILT	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

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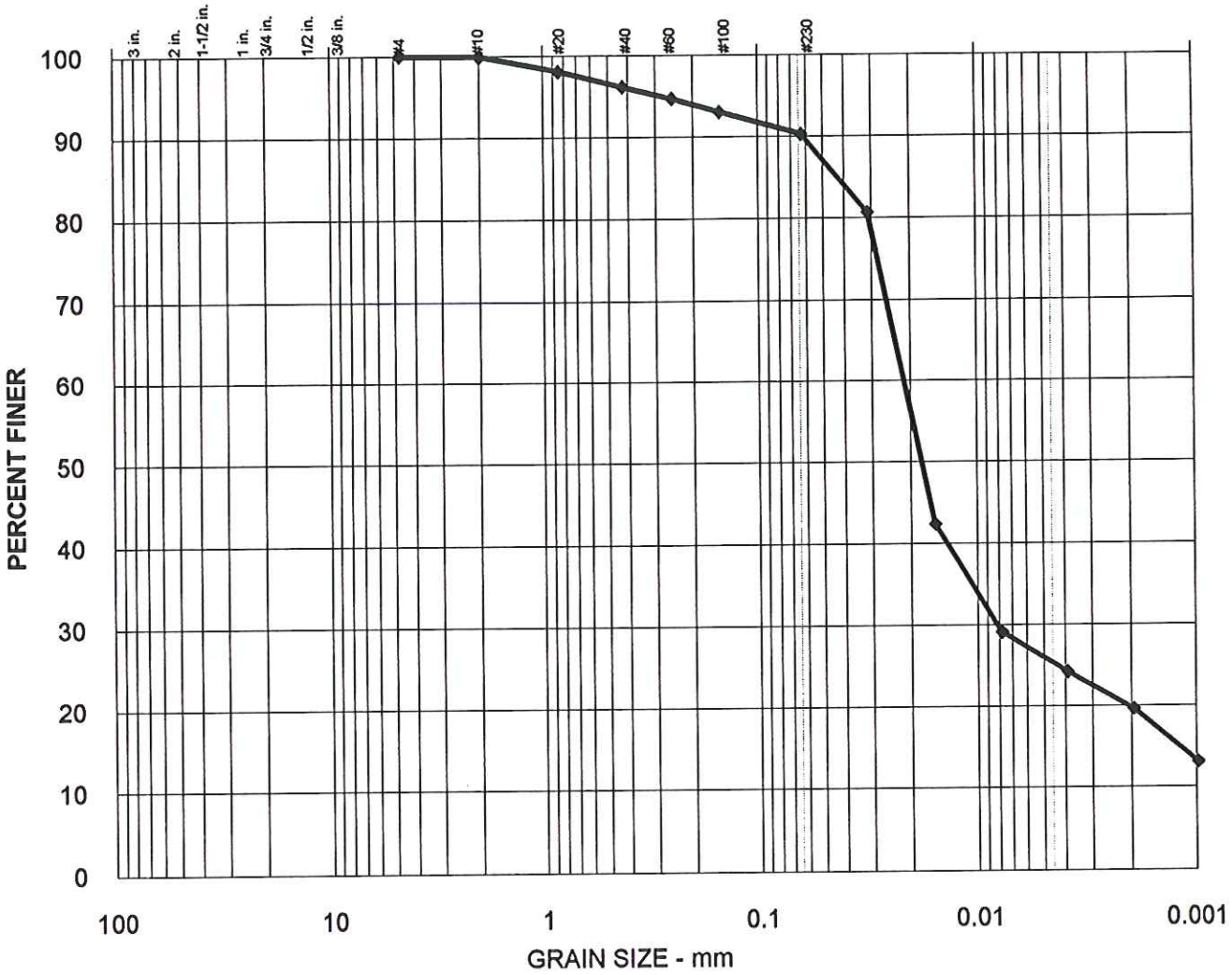
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	10%	66%	24%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SS-45 (A)	0 to 10 cm		*

	MATERIAL DESCRIPTION	
	Slightly sandy, clayey SILT	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

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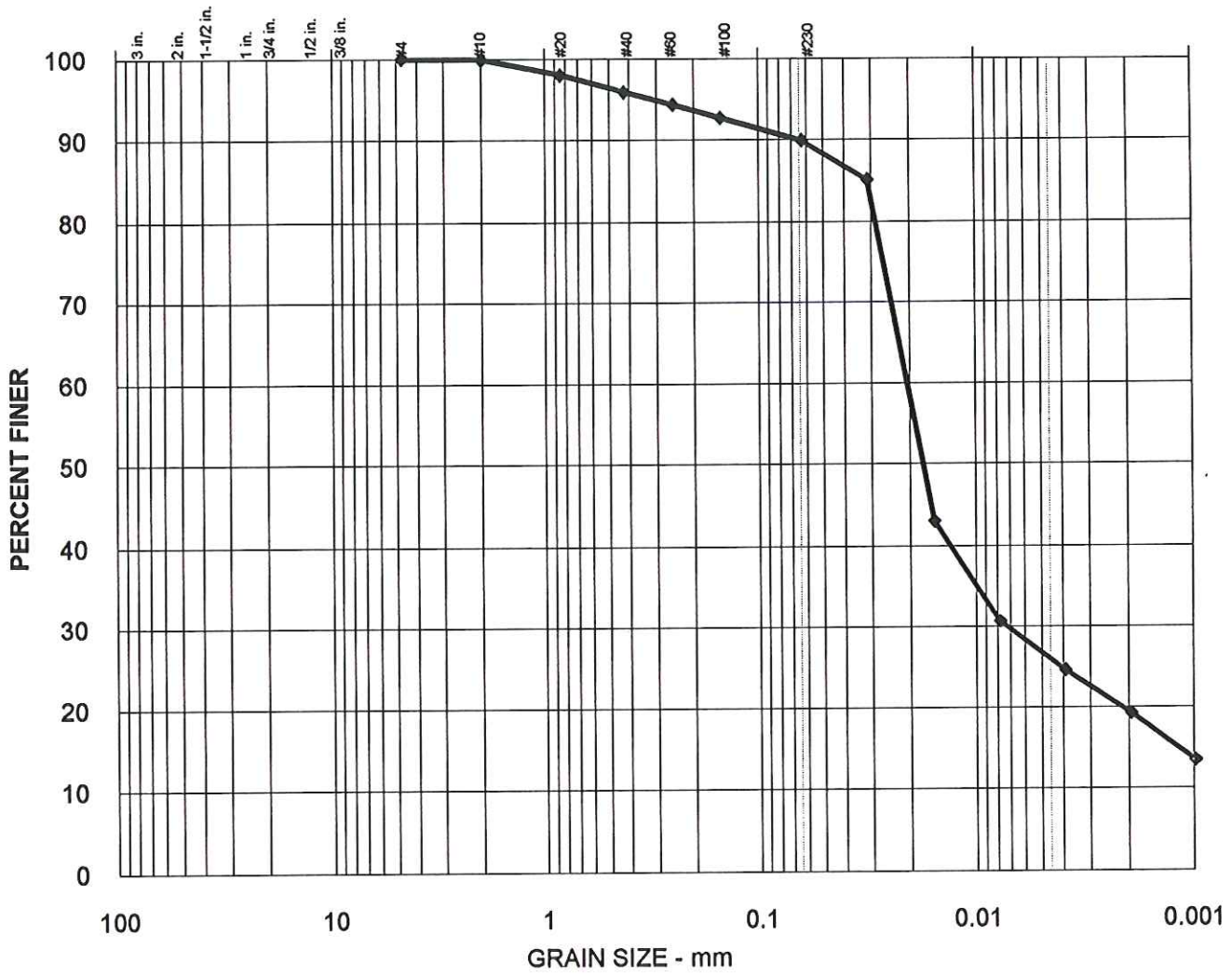
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	10%	65%	25%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SS-45 (B) Duplicate	0 to 10 cm		*

	MATERIAL DESCRIPTION	
	Slightly sandy, clayey SILT	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

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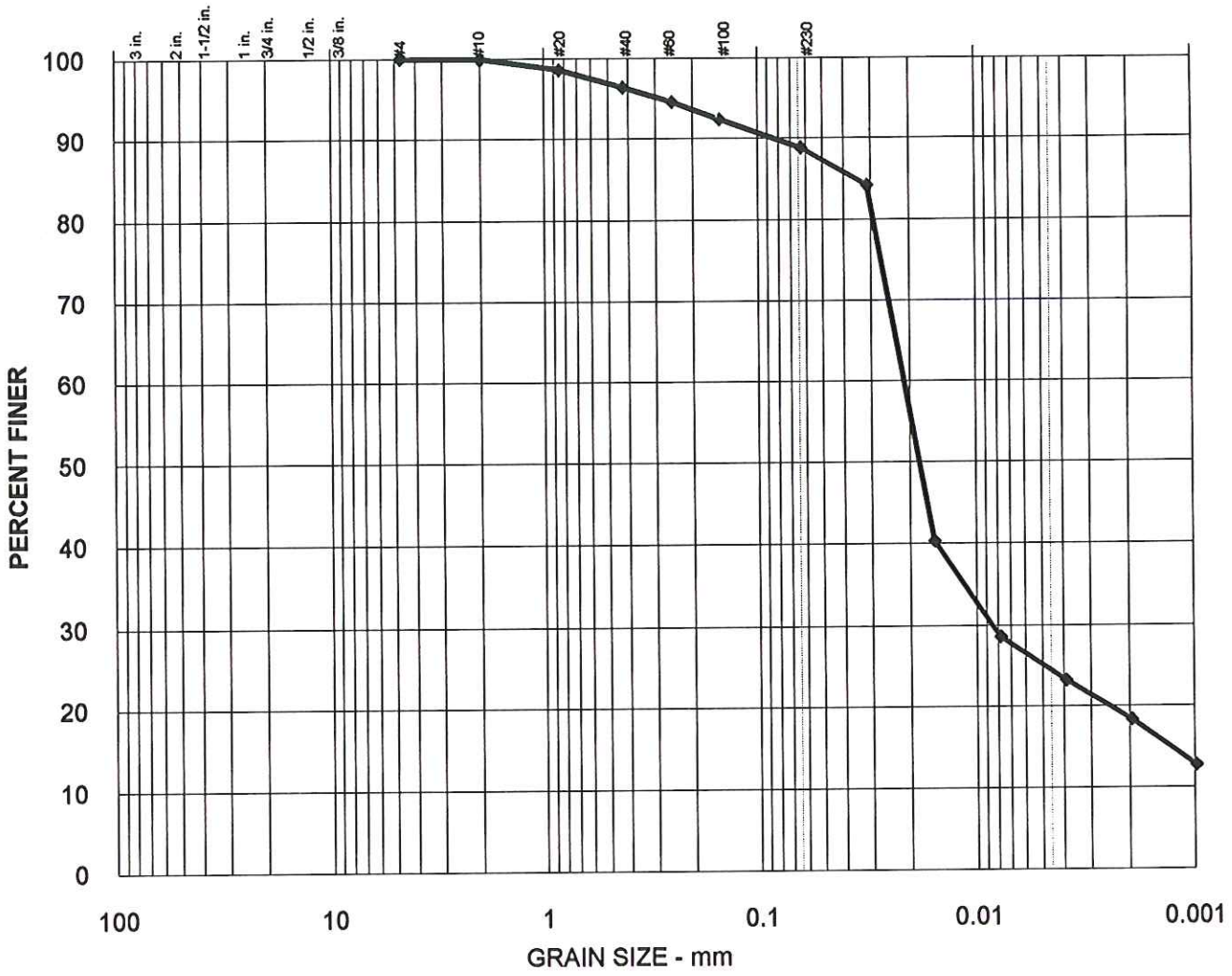
12/12/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	11%	66%	23%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SS-45 (C) Triplicate	0 to 10 cm		*

	MATERIAL DESCRIPTION	
	Slightly sandy, clayey SILT	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

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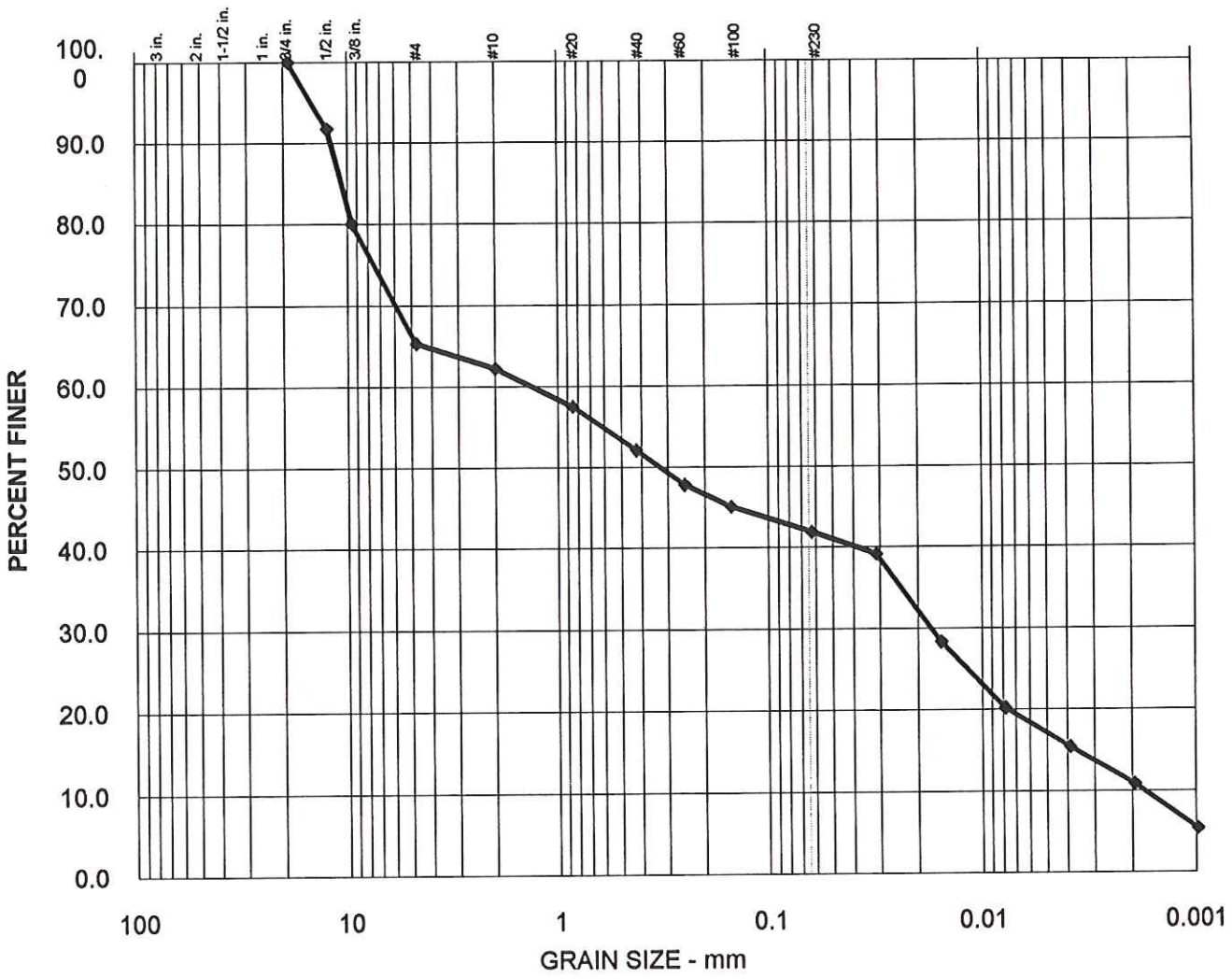
12/12/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	35%	23%	27%	15%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SS-46	0 to 10 cm		*

	MATERIAL DESCRIPTION	
	Clayey, sandy, silty GRAVEL	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

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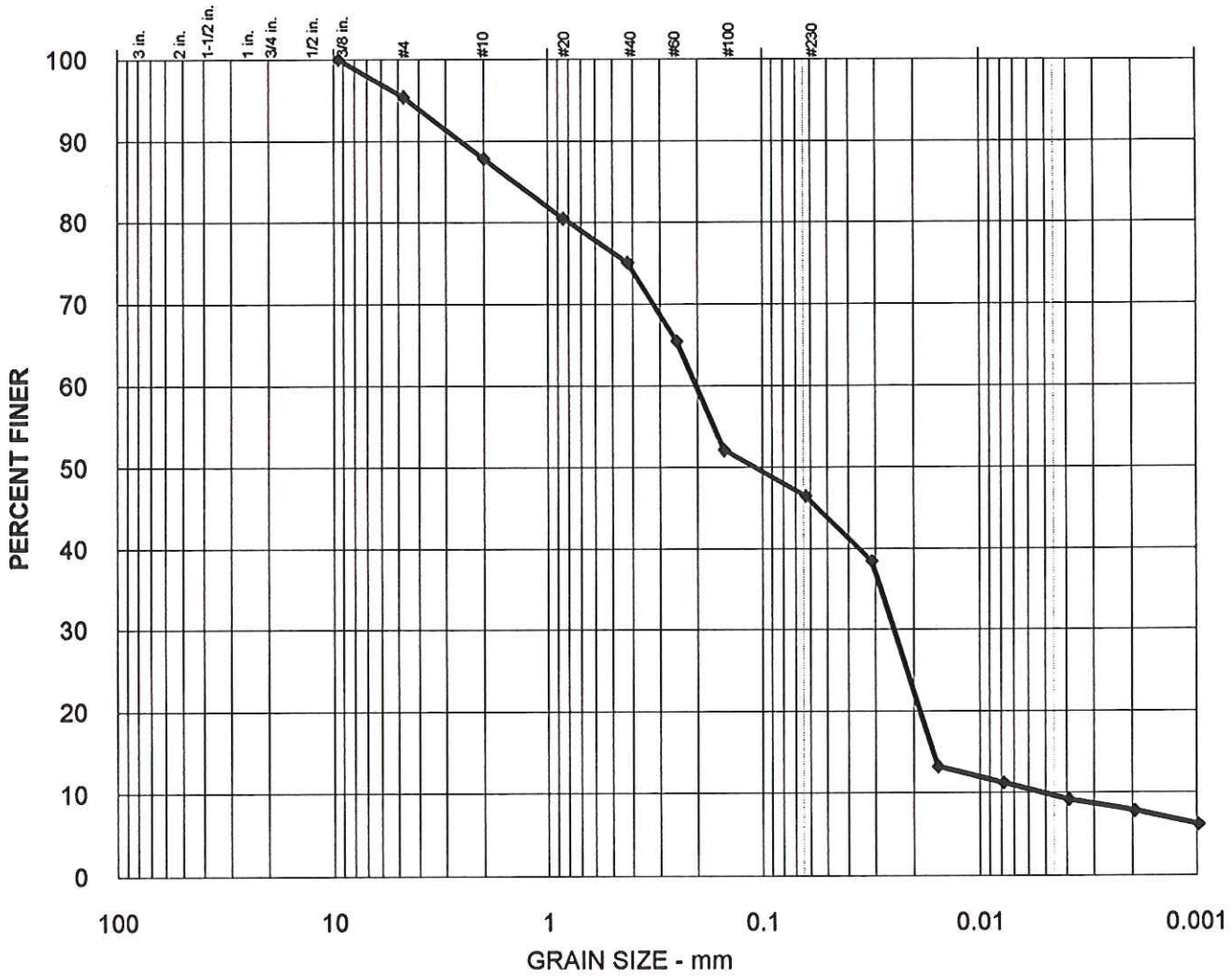
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	5%	49%	37%	9%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SS-47	0 to 10 cm		*

	MATERIAL DESCRIPTION	
	Slightly clayey, very silty SAND	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

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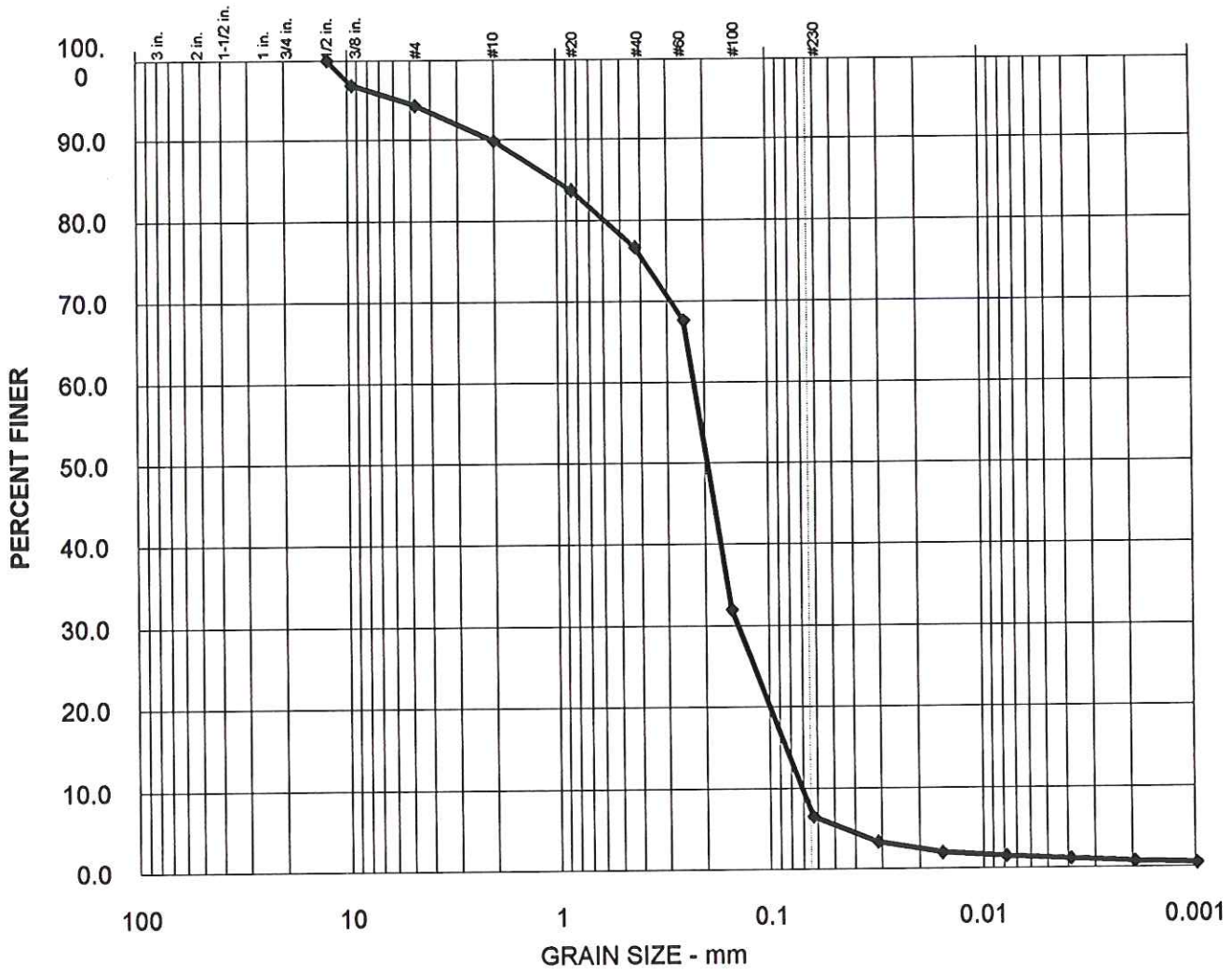
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	6%	88%	5%	1%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SS-48	0 to 10 cm		*

	MATERIAL DESCRIPTION	
	Slightly gravelly SAND	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

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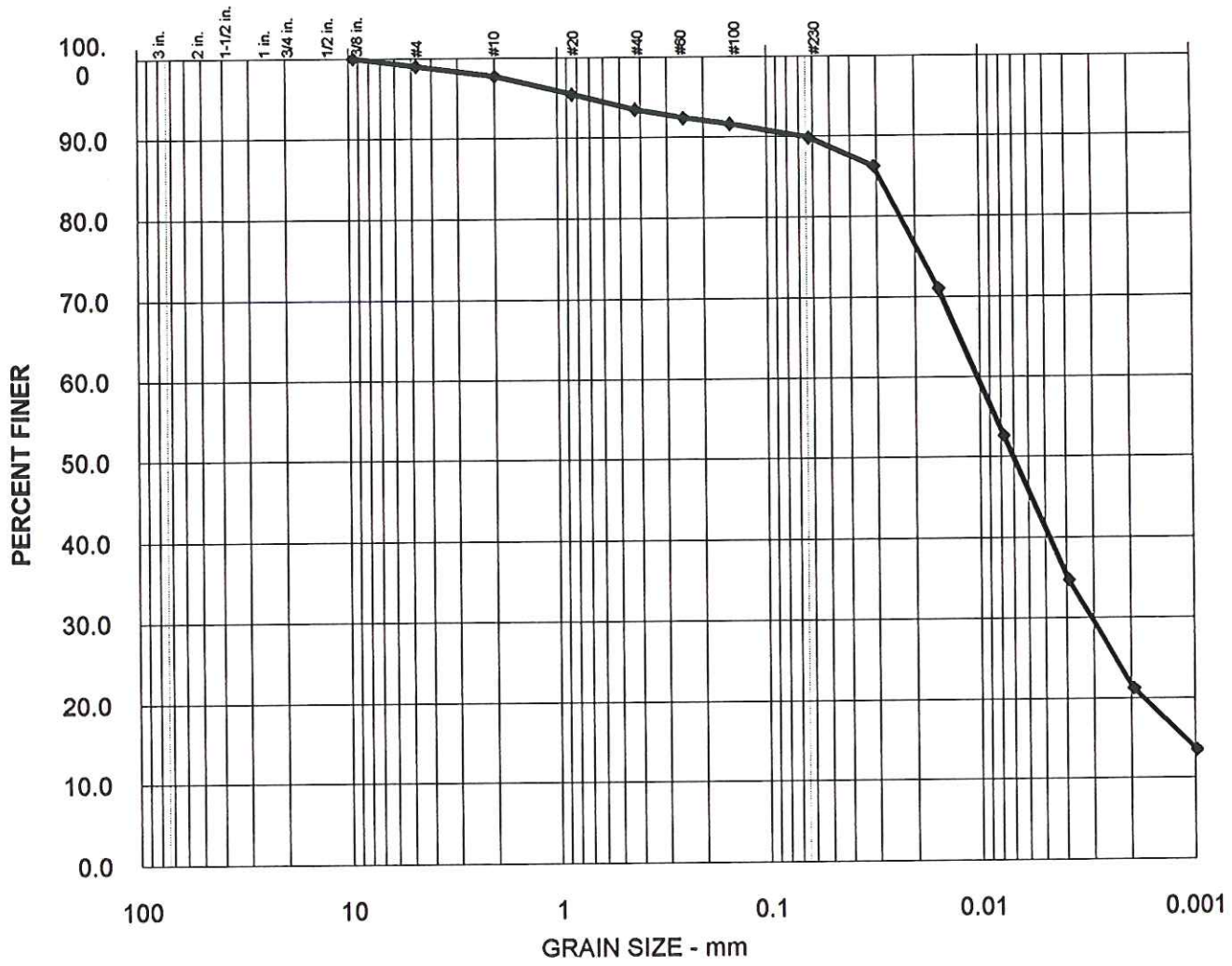
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	1%	9%	55%	35%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SC-70	0 to 10 cm		*

	MATERIAL DESCRIPTION	
	Slightly sandy, very clayey SILT	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

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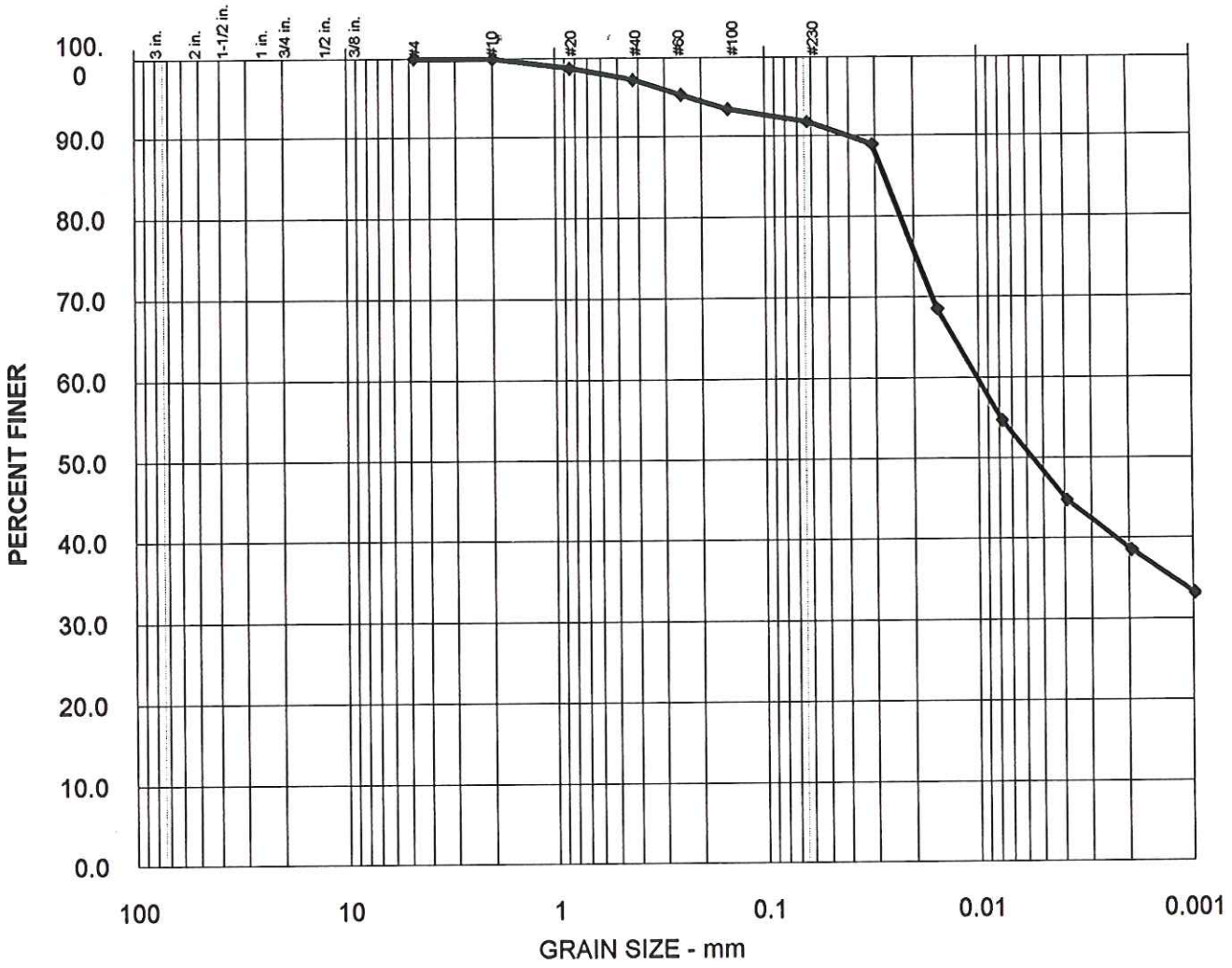
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	8%	47%	45%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SC-71	0 to 10 cm		*

	MATERIAL DESCRIPTION	
	Slightly sandy, very clayey SILT	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

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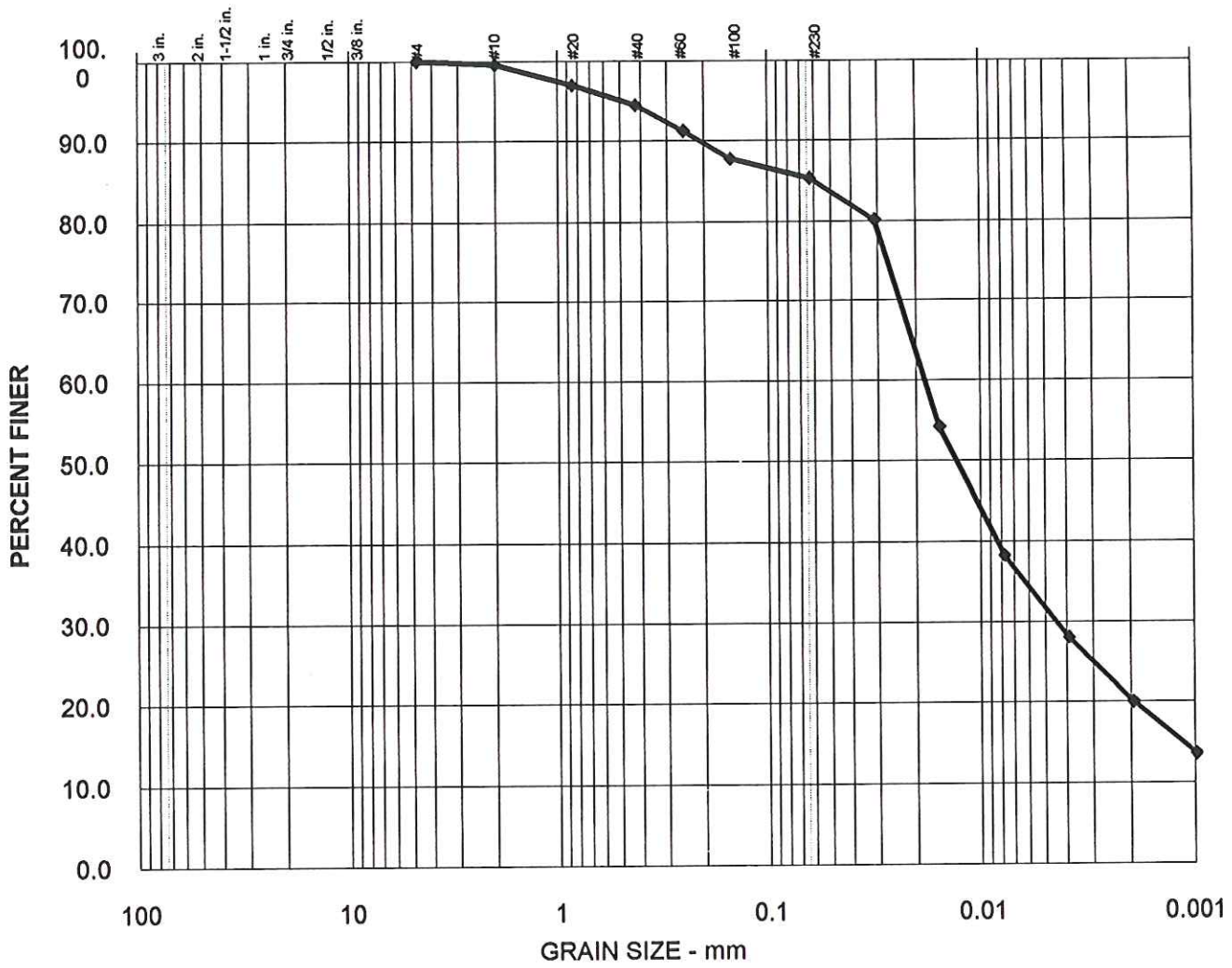
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	15%	57%	28%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SC-72	0 to 10 cm		*

	MATERIAL DESCRIPTION	
	Sandy, clayey SILT	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

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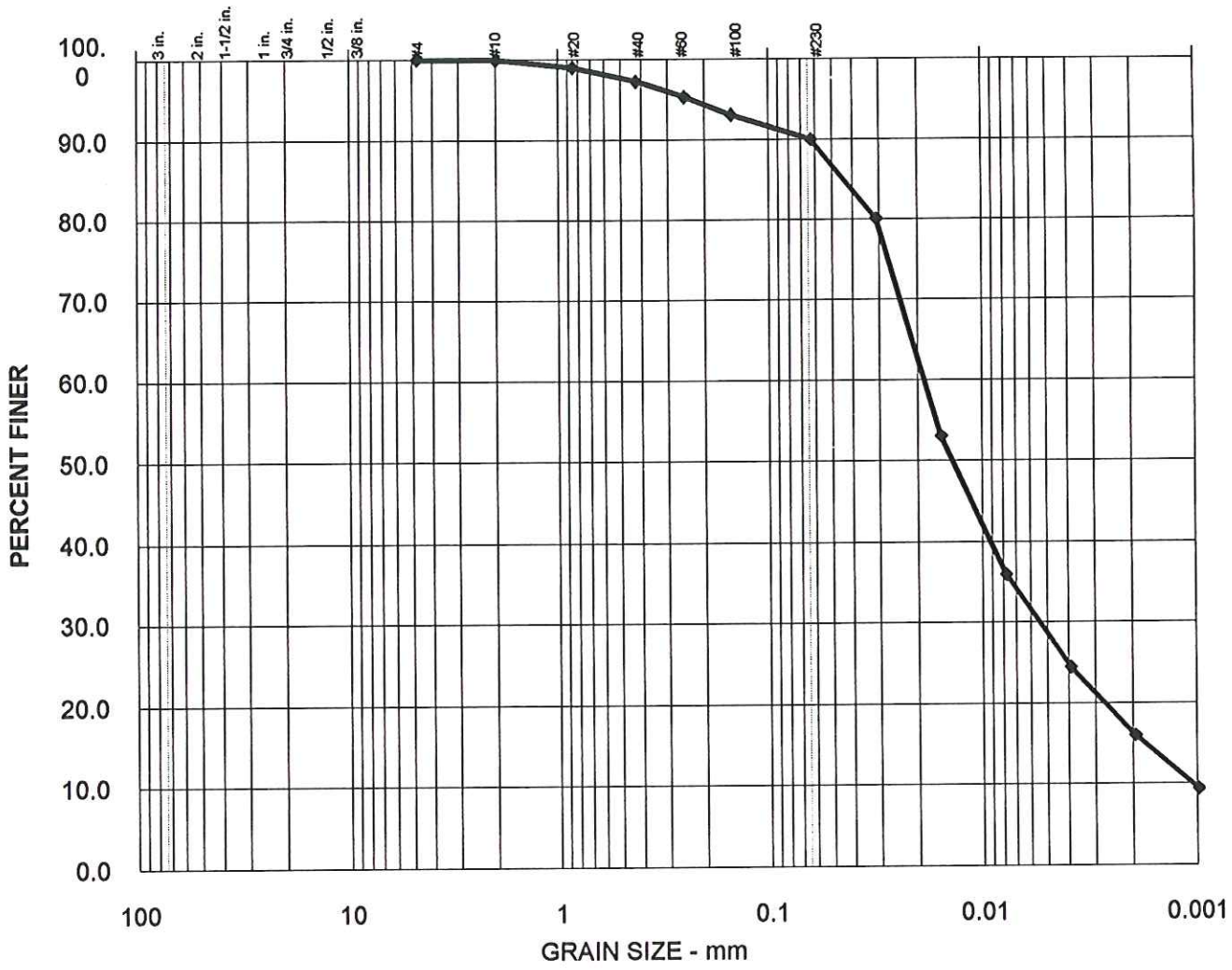
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	10%	66%	24%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SC-73(A)	0 to 10 cm		*

	MATERIAL DESCRIPTION	
	Slightly sandy, clayey SILT	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

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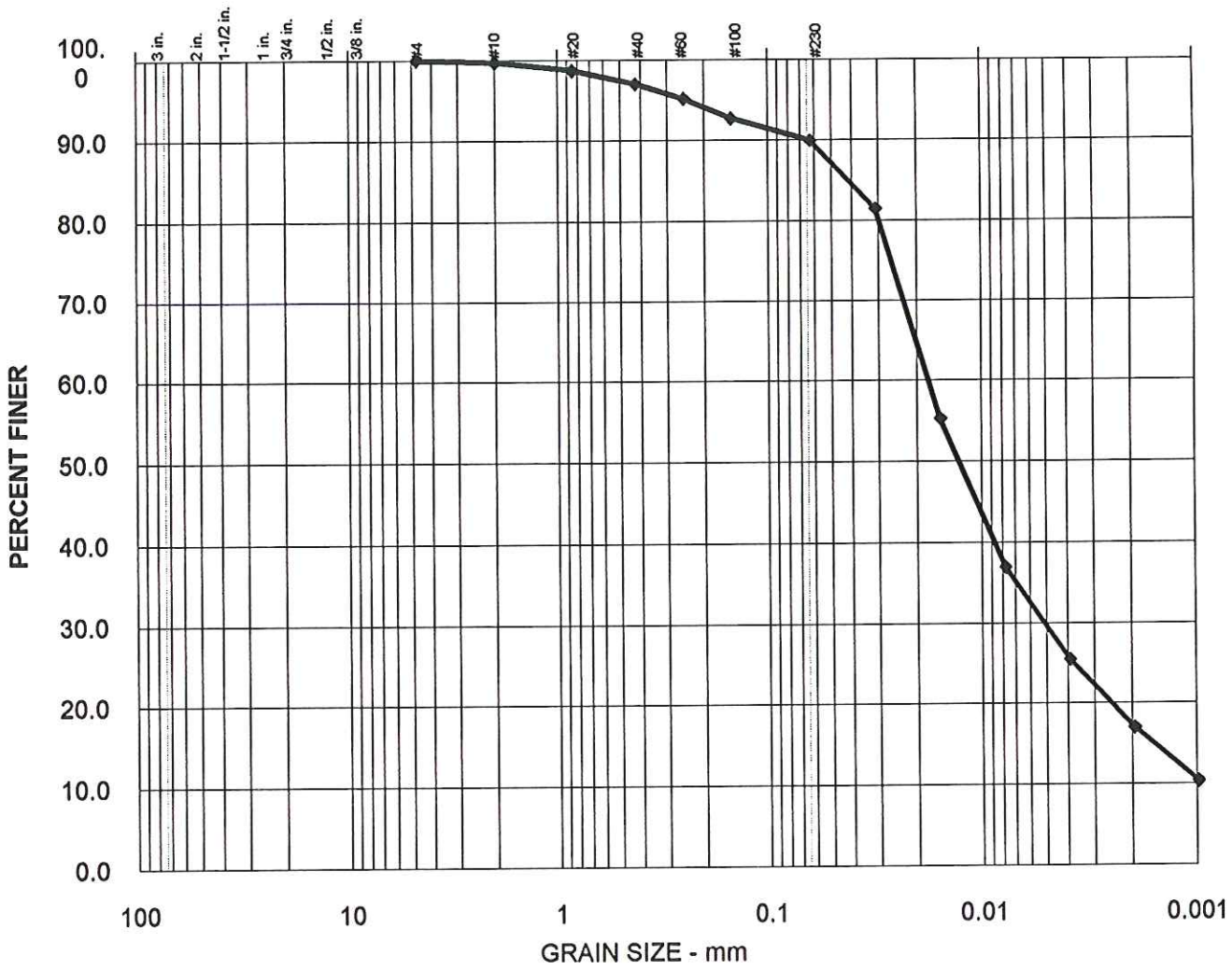
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	10%	65%	25%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SC-73(B) Duplicate	0 to 10 cm		*

	MATERIAL DESCRIPTION	
	Slightly sandy, clayey SILT	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

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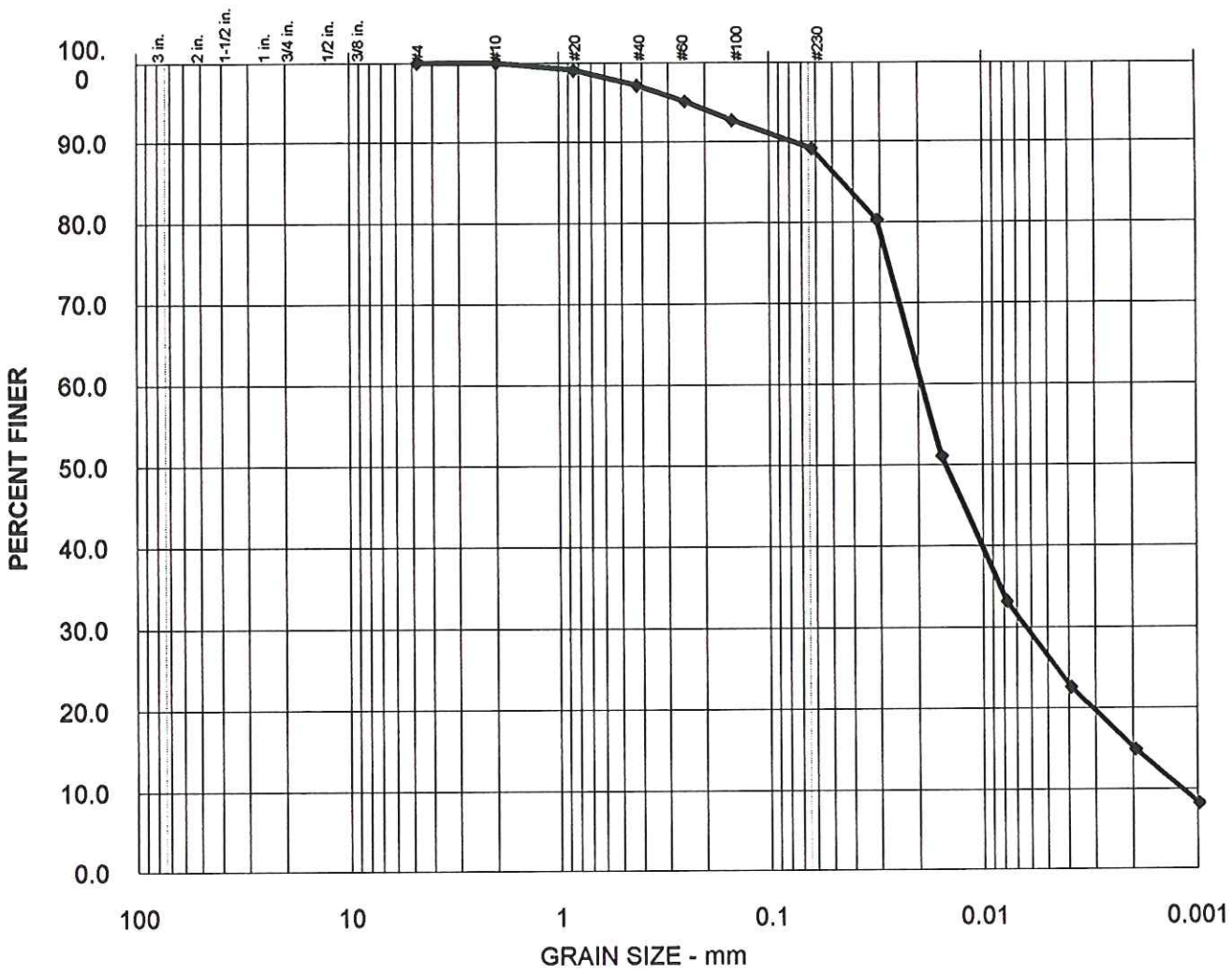
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	11%	66%	23%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SC-73(C) Triplicate	0 to 10 cm		*

	MATERIAL DESCRIPTION	
	Slightly sandy, clayey SILT	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

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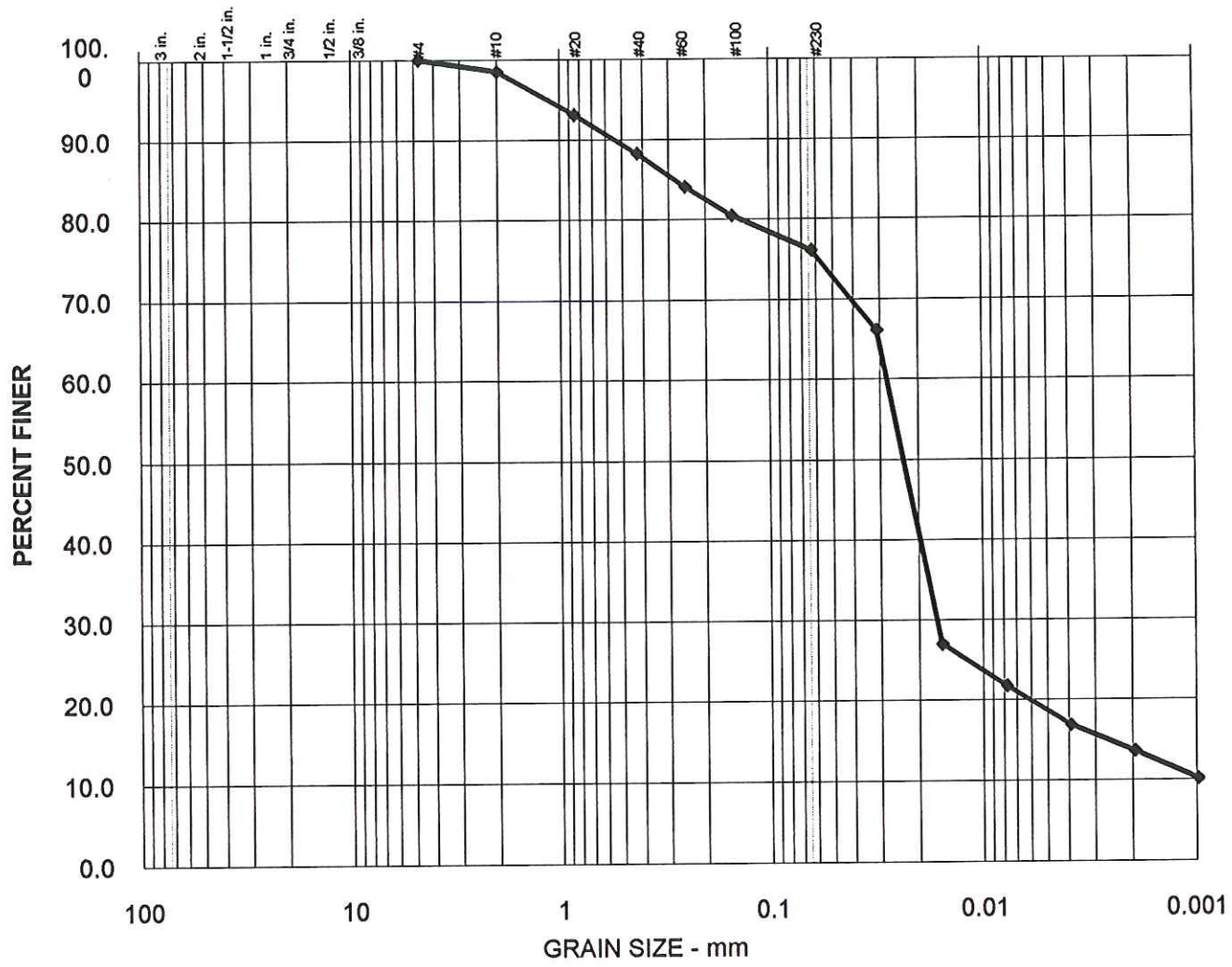
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	24%	59%	17%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SC-74	0 to 10 cm		*

	MATERIAL DESCRIPTION	
	Clayey, sandy SILT	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

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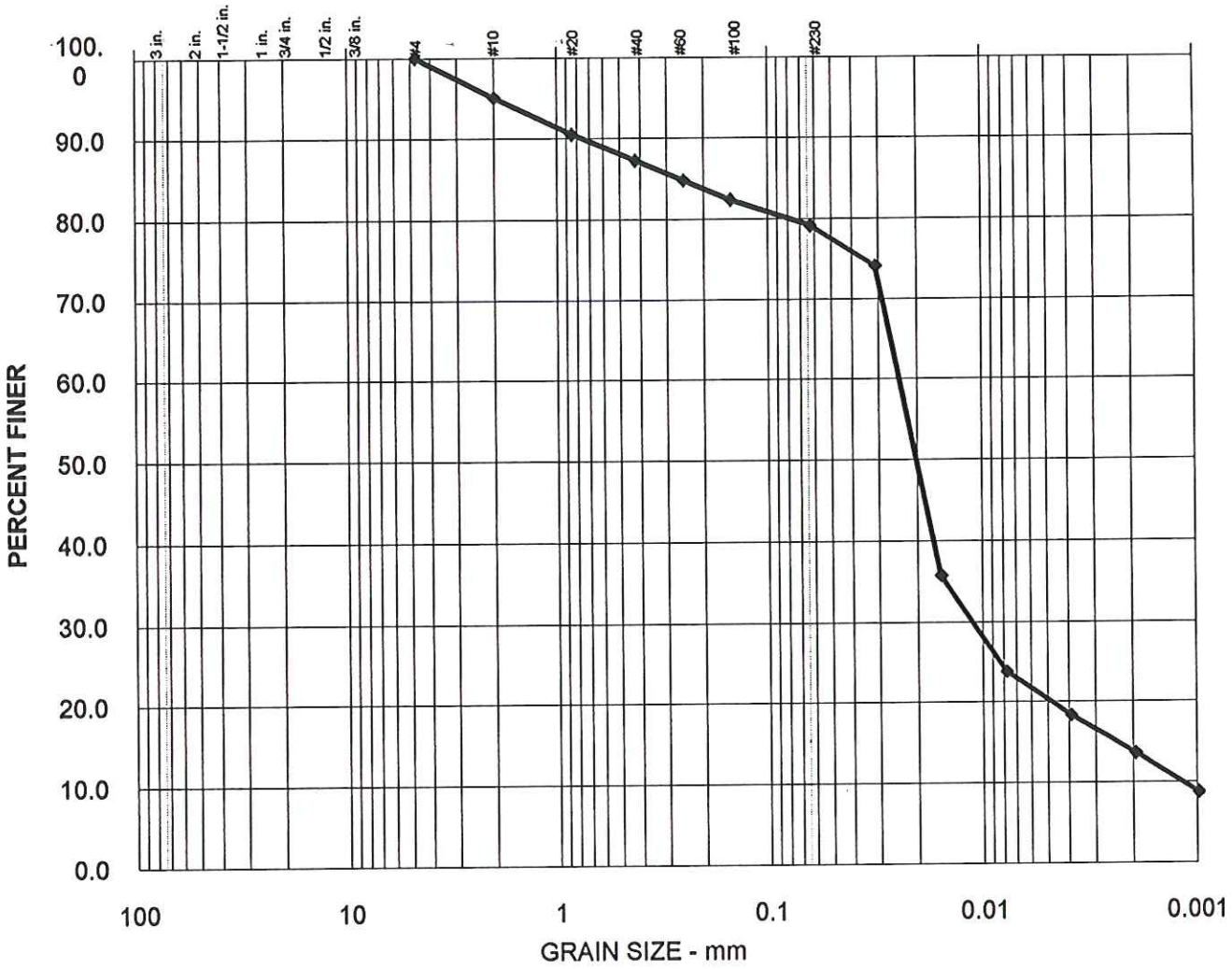
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	21%	61%	18%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SC-75	0 to 10 cm		*

	MATERIAL DESCRIPTION	
	Clayey, sandy SILT	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

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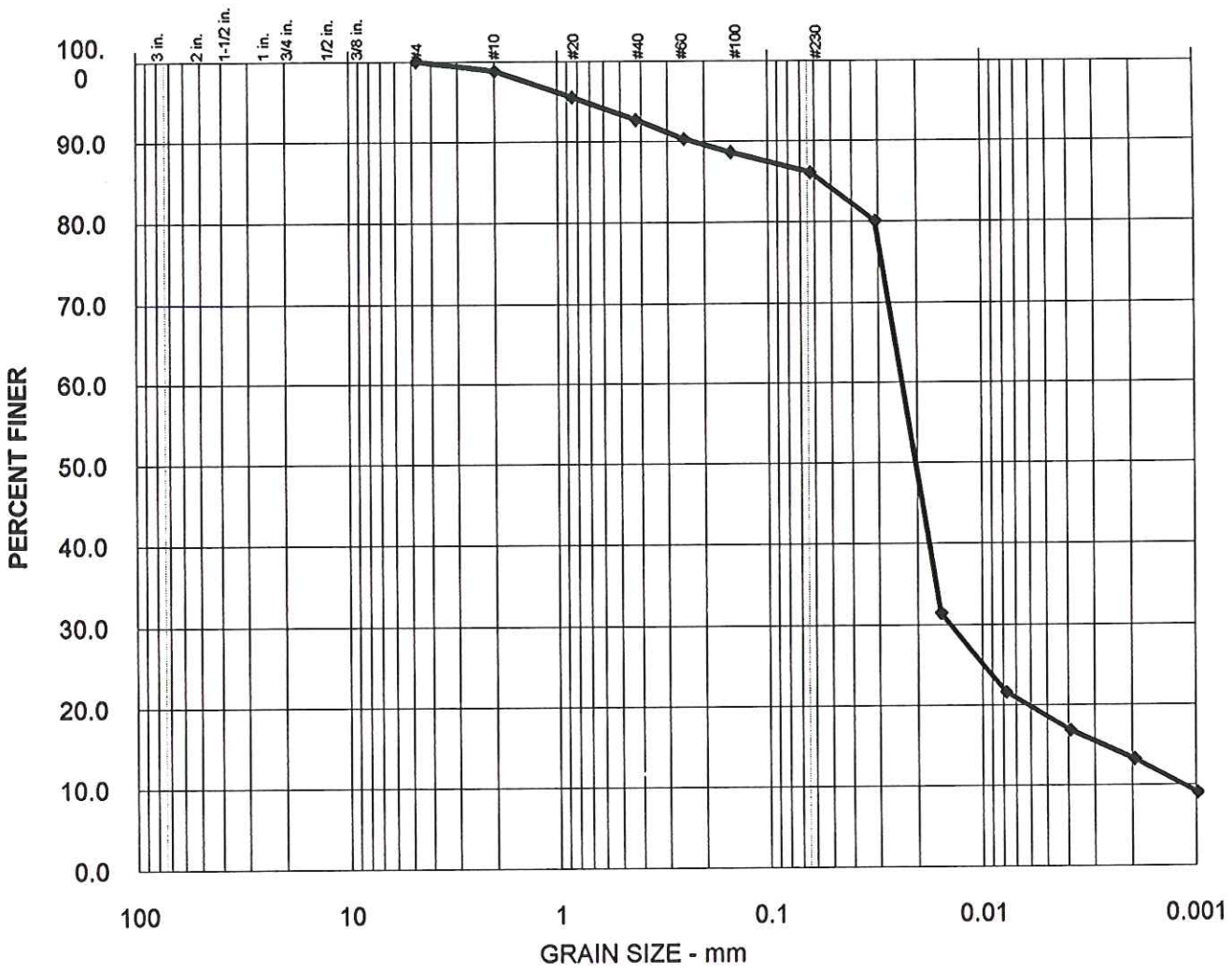
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	14%	69%	17%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SC-76	0 to 10 cm		*

	MATERIAL DESCRIPTION	
	Sandy, clayey SILT	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

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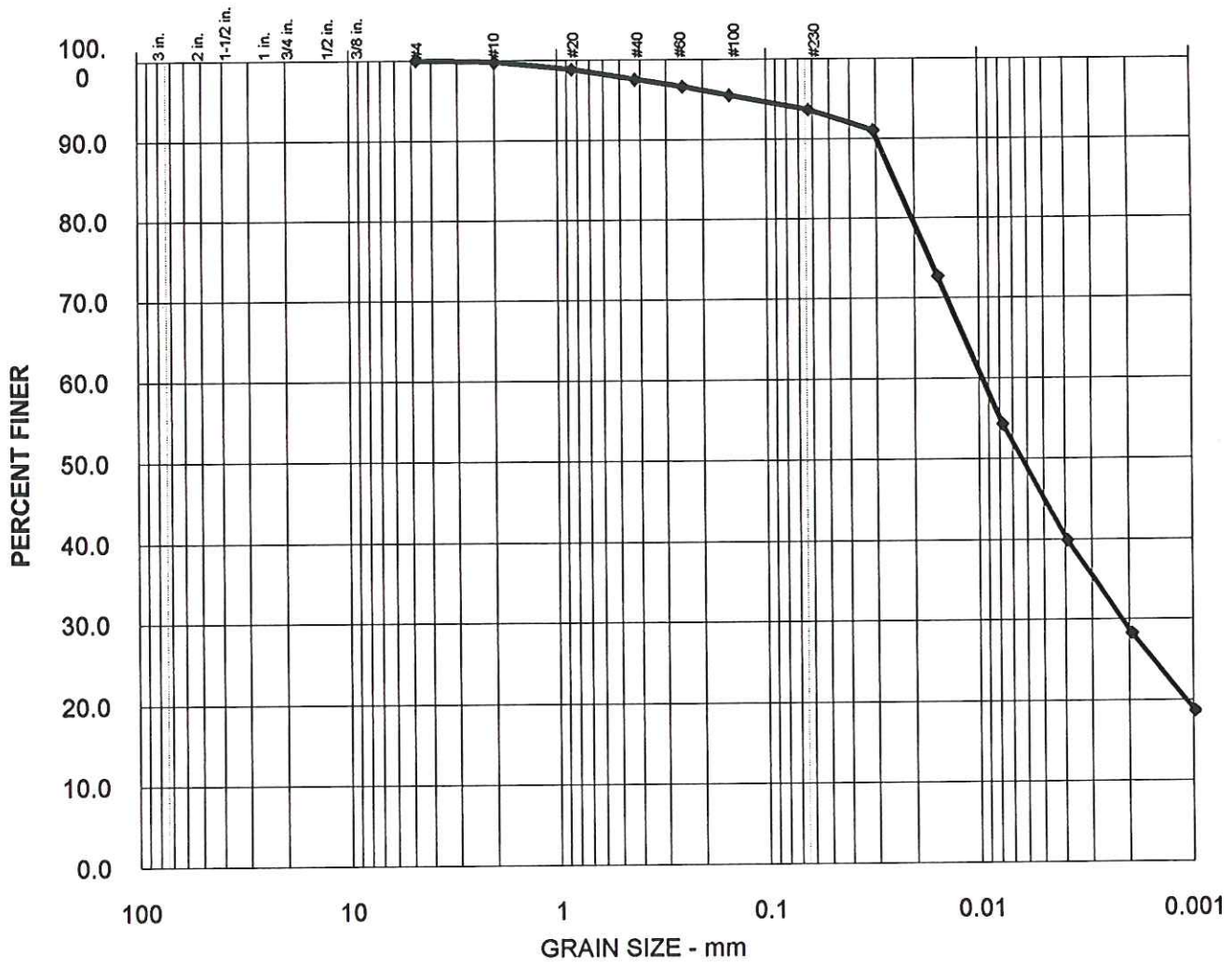
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	6%	54%	40%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SC-77	0 to 10 cm		*

	MATERIAL DESCRIPTION	
	Slightly sandy, very clayey SILT	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

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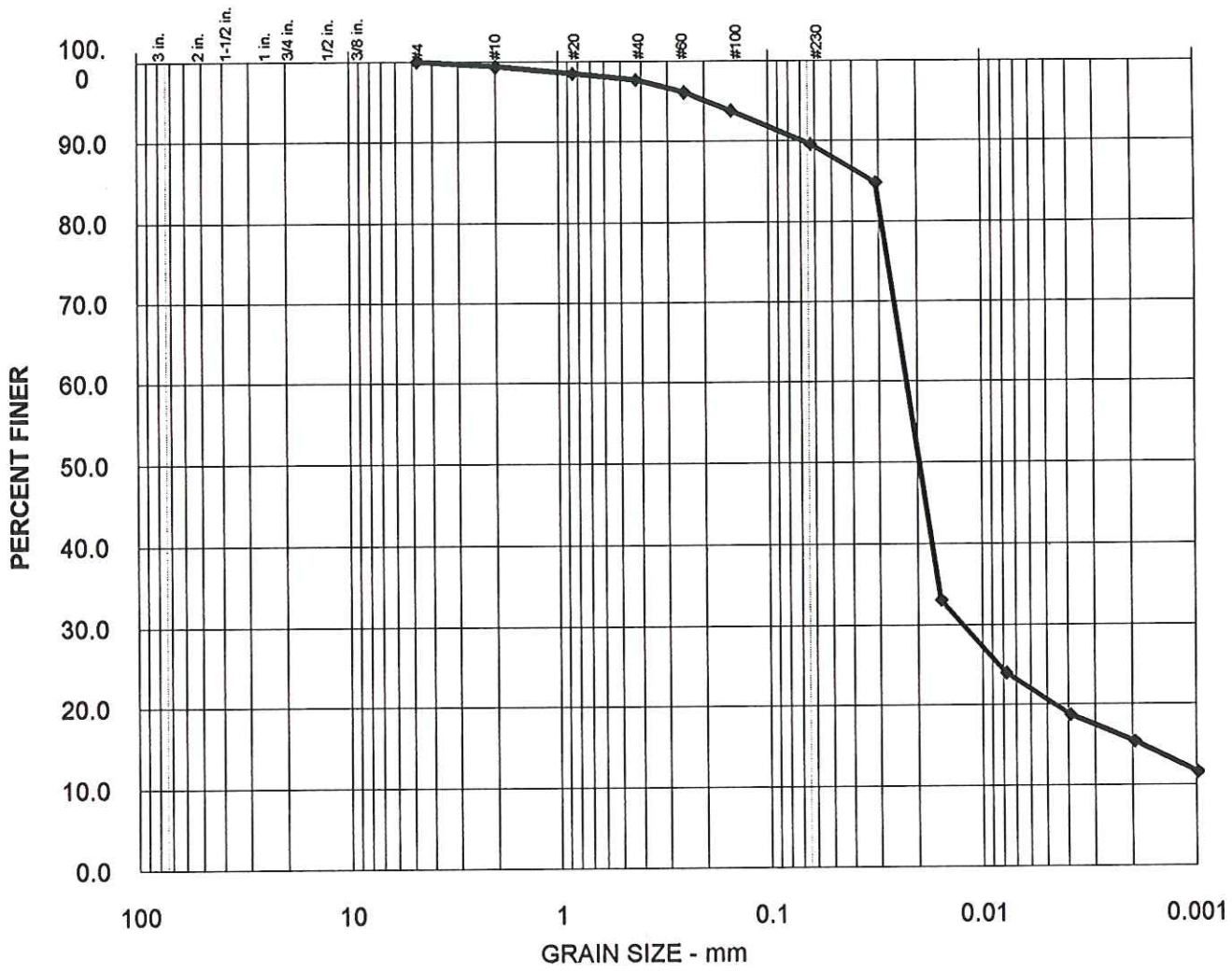
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	10%	71%	19%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SC-78	0 to 10 cm		*

	MATERIAL DESCRIPTION	
	Slightly sandy, clayey SILT	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

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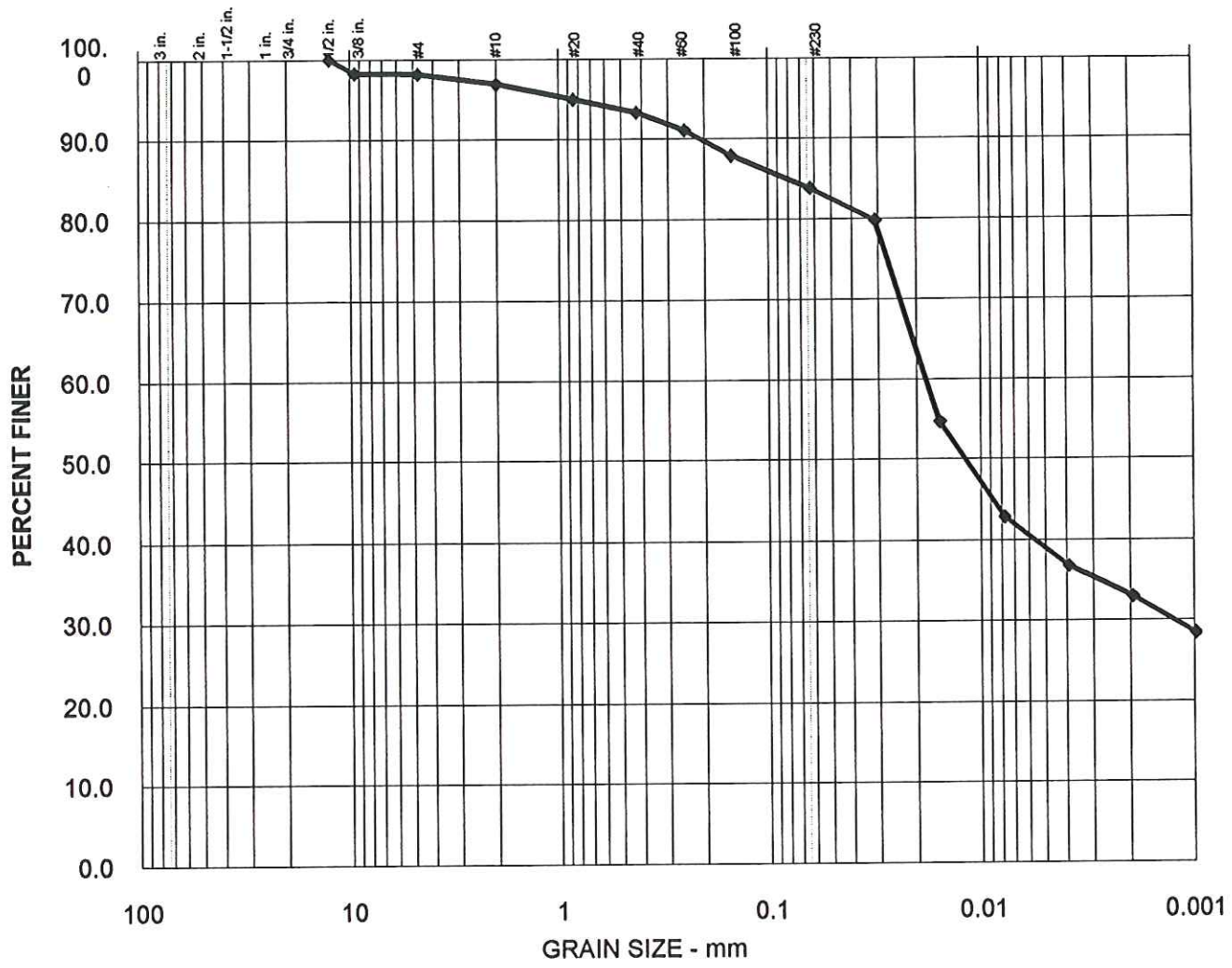
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	2%	14%	47%	37%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SC-79	0 to 10 cm		*

	MATERIAL DESCRIPTION	
	Sandy, very clayey SILT	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

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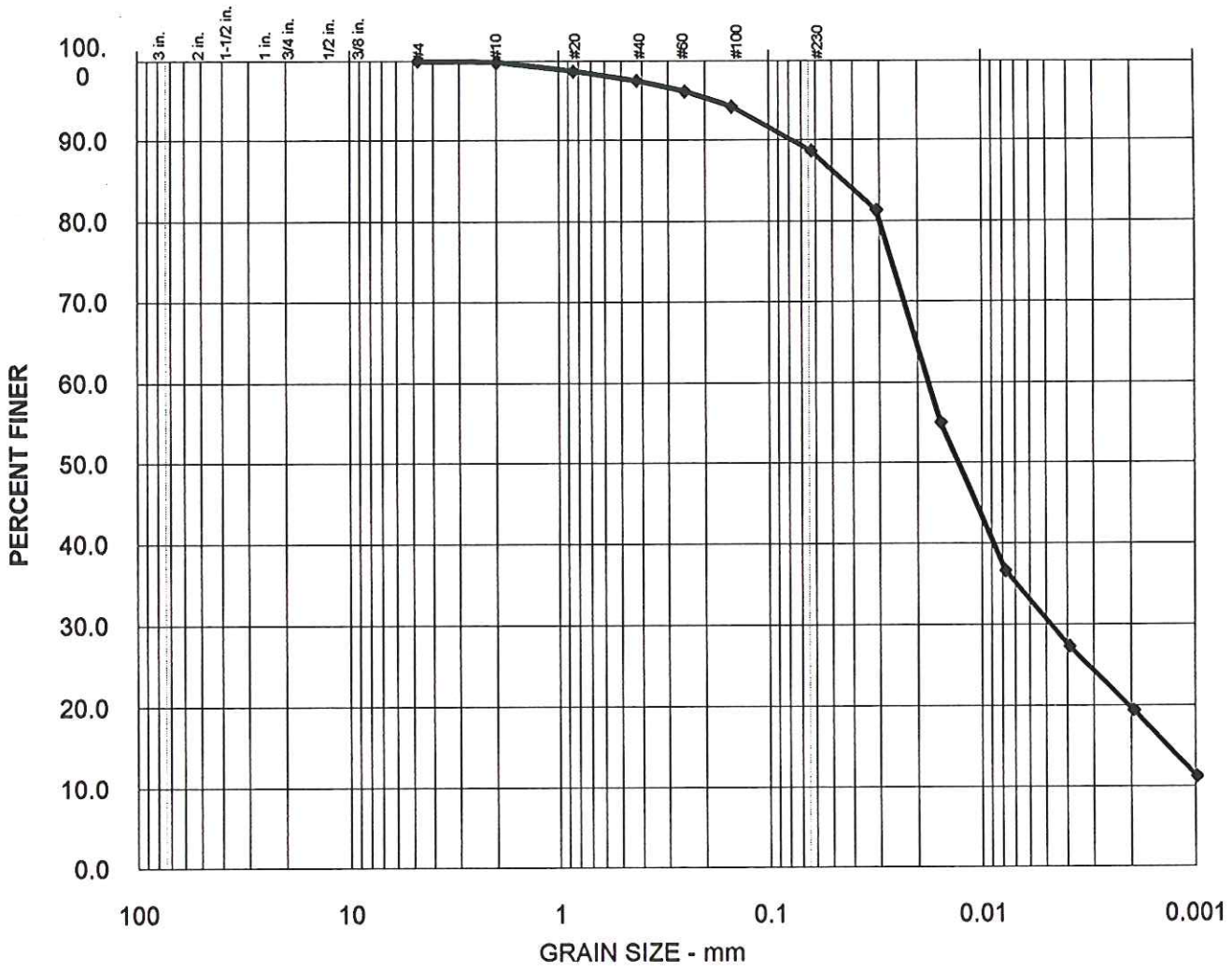
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	11%	62%	27%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SC-80	0 to 10 cm		*

	MATERIAL DESCRIPTION	
	Slightly sandy, clayey SILT	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

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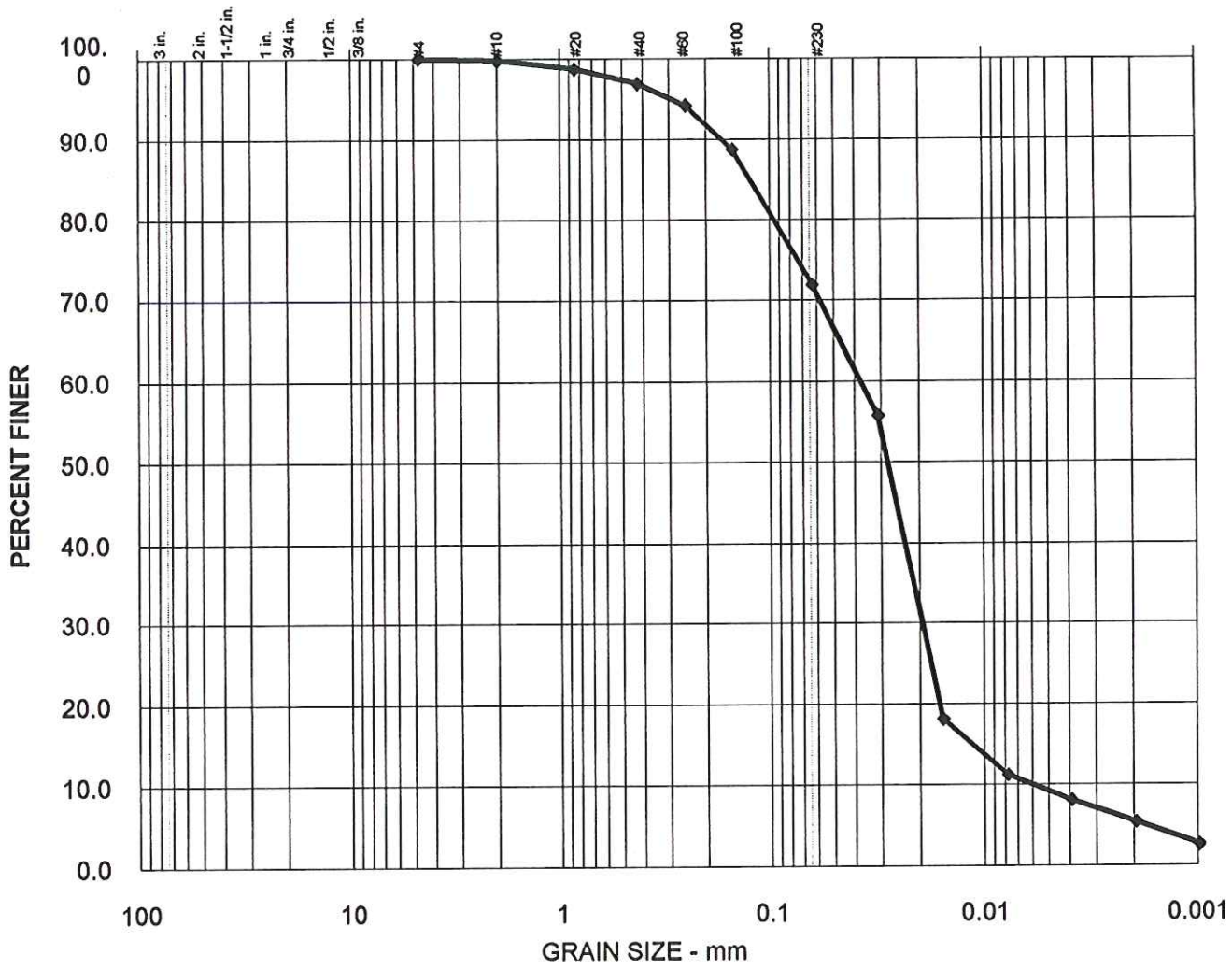
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	28%	64%	8%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SC-81	0 to 10 cm		*

	MATERIAL DESCRIPTION	
	Slightly clayey, sandy SILT	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

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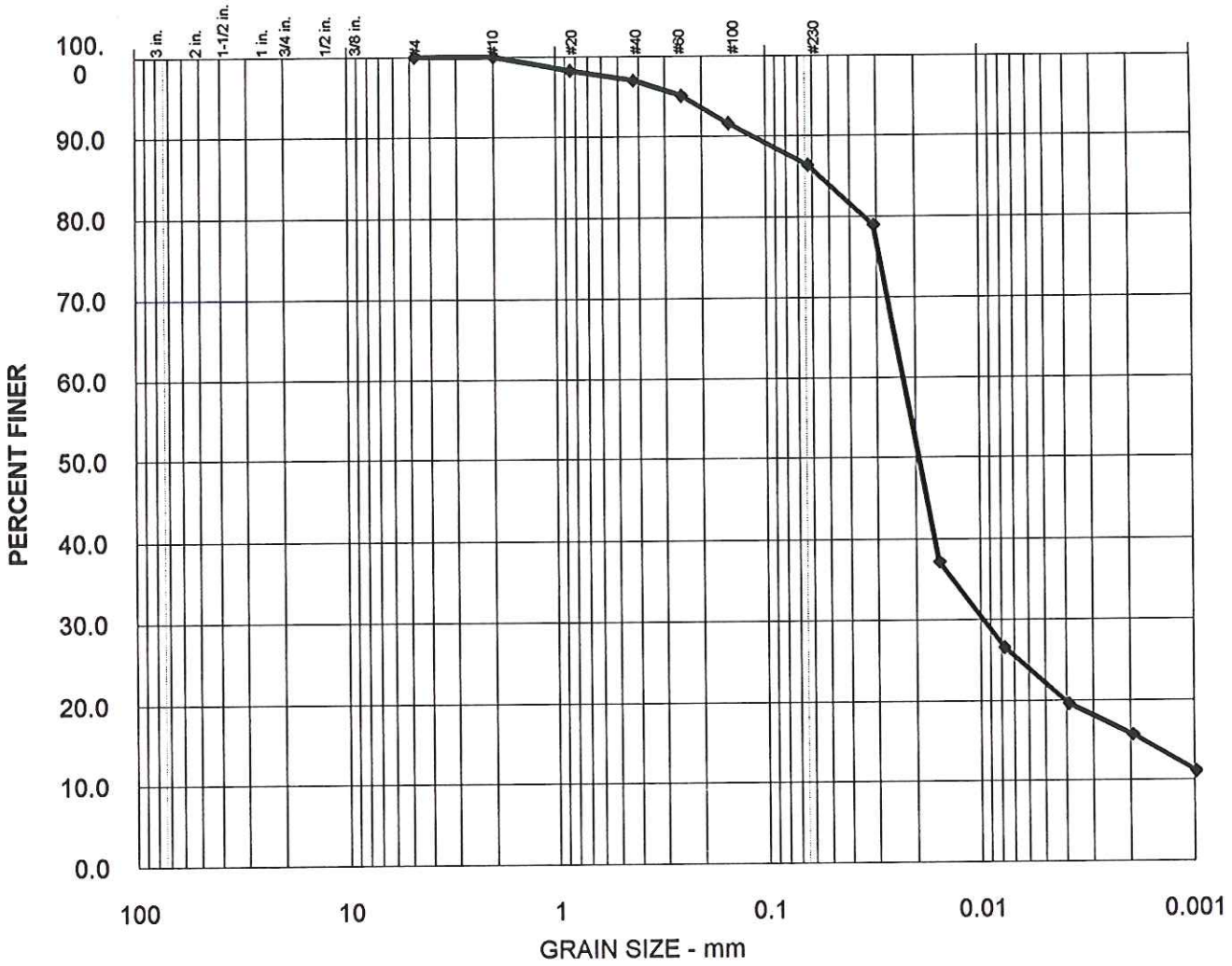
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	14%	66%	20%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SC-82	0 to 10 cm		*

	MATERIAL DESCRIPTION	
	Sandy, clayey SILT	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

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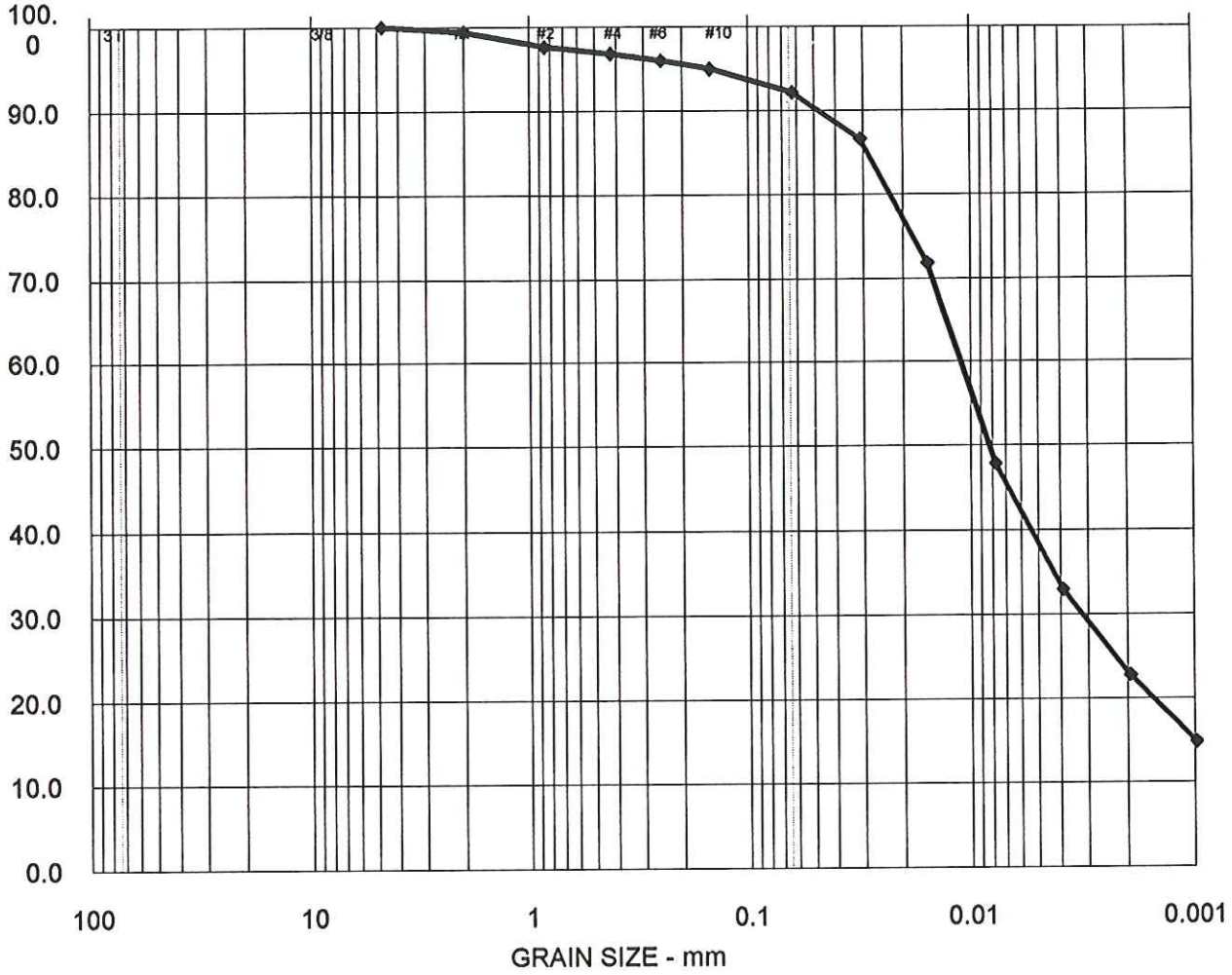
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	8%	59%	33%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SC-83	0 to 10 cm		*

	MATERIAL DESCRIPTION	
	Slightly sandy, very clayey SILT	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

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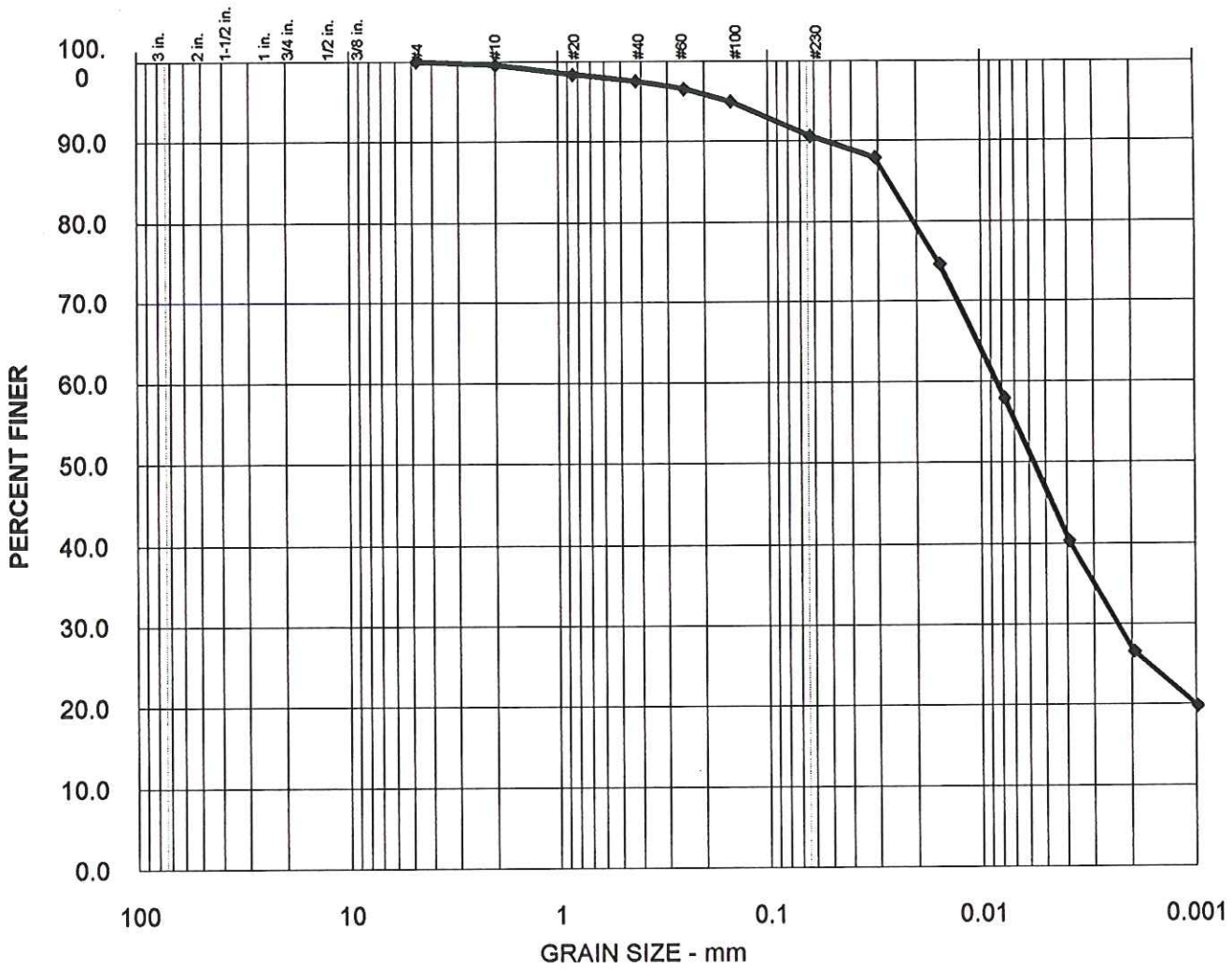
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	9%	51%	40%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SC-84	0 to 10 cm		*

	MATERIAL DESCRIPTION	
	Slightly sandy, very clayey SILT	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

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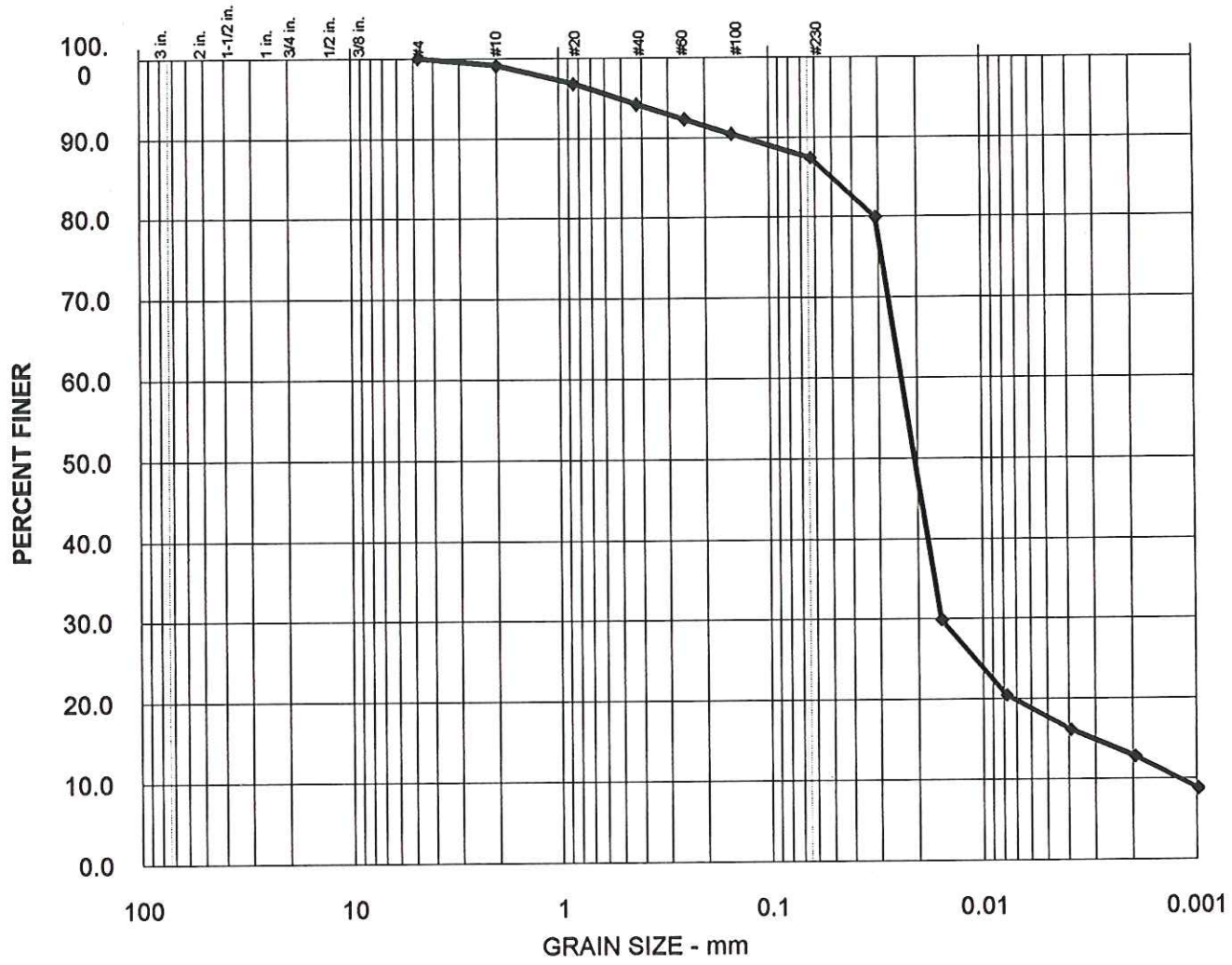
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	13%	71%	16%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SC-85	0 to 10 cm		*

	MATERIAL DESCRIPTION	
	Sandy, clayey SILT	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

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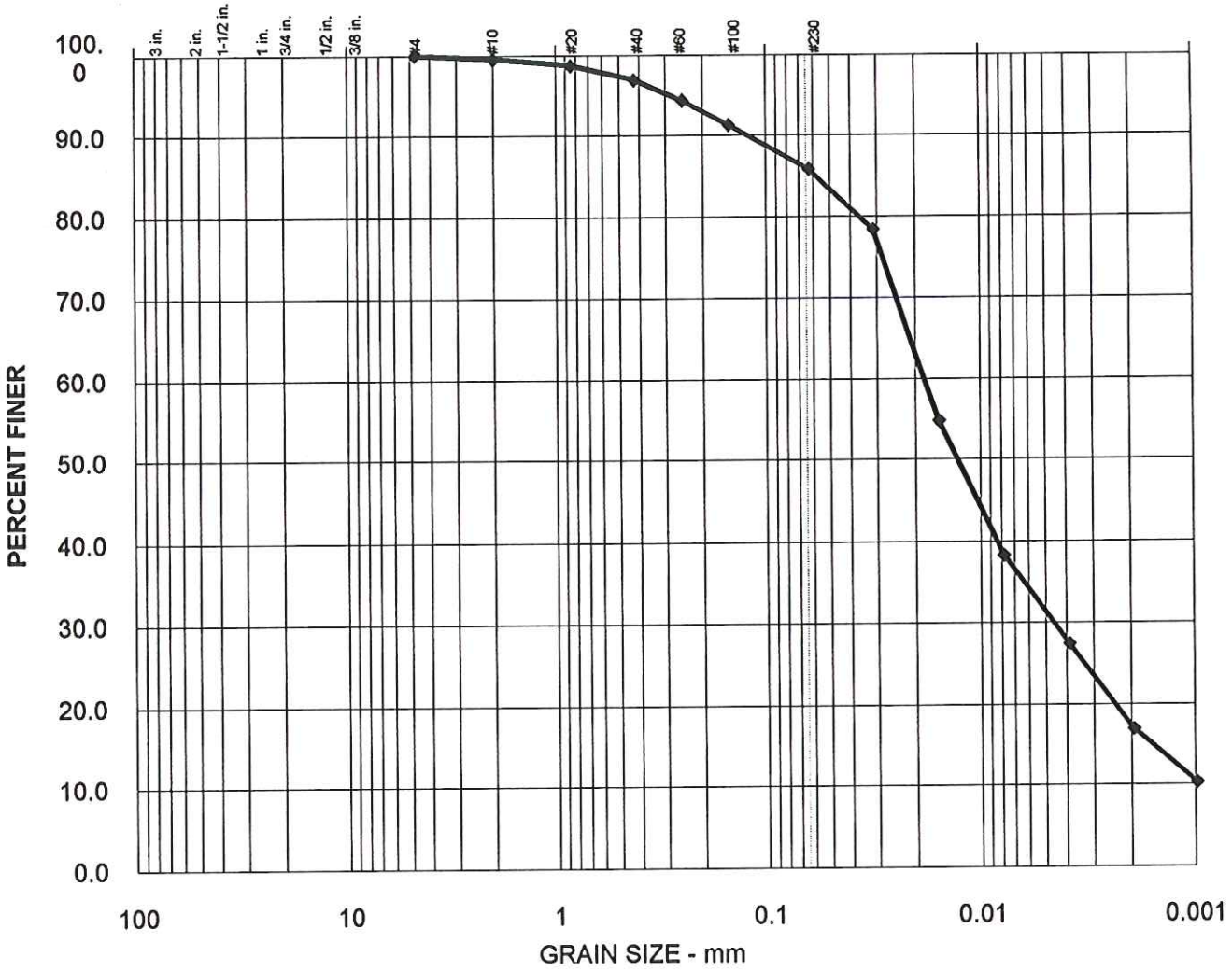
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	14%	59%	27%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SS-202	0 to 10 cm		*

	MATERIAL DESCRIPTION	
	Sandy, clayey SILT	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

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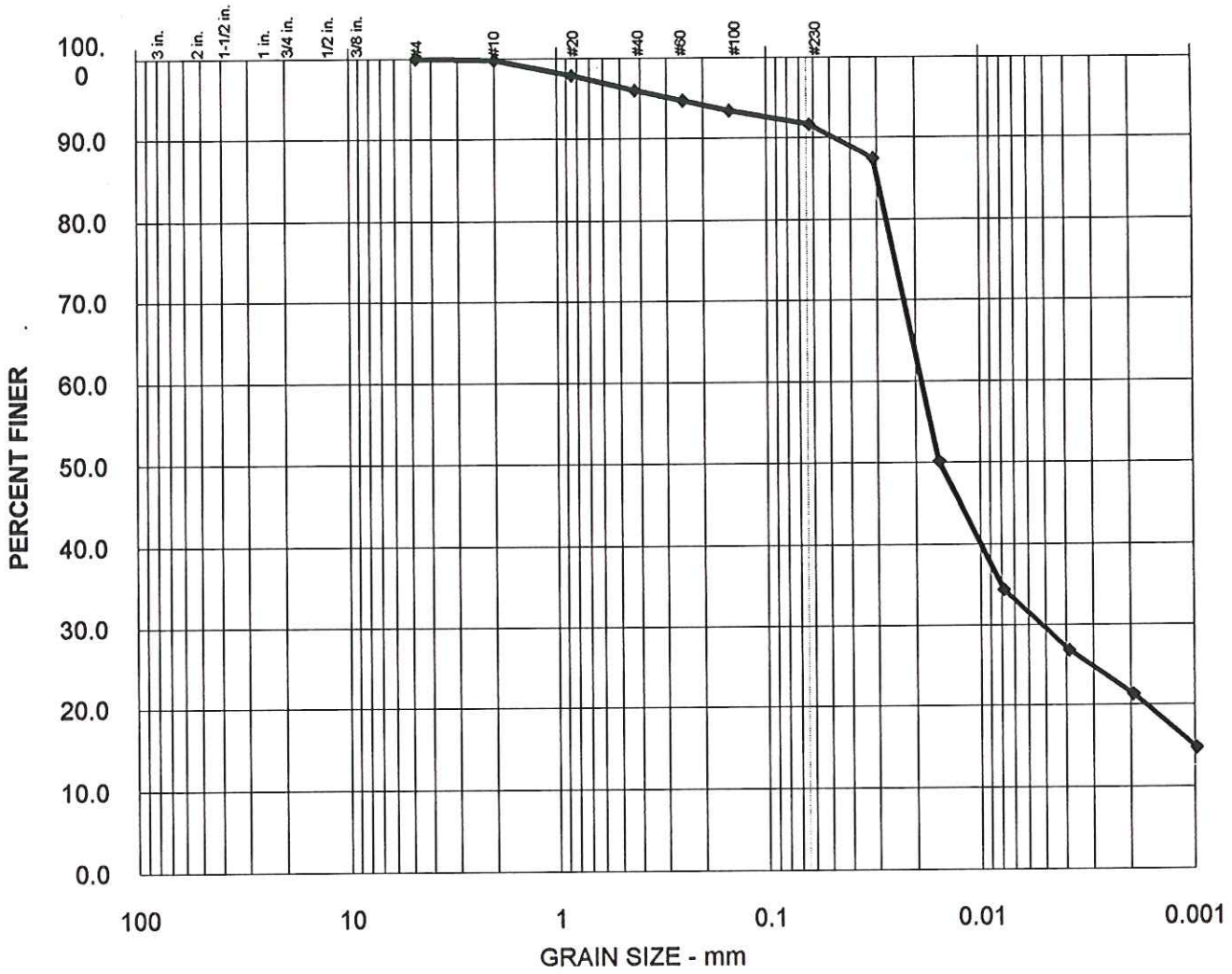
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	8%	65%	27%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SS-203	0 to 10 cm		*

	MATERIAL DESCRIPTION	
	Slightly sandy, clayey SILT	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

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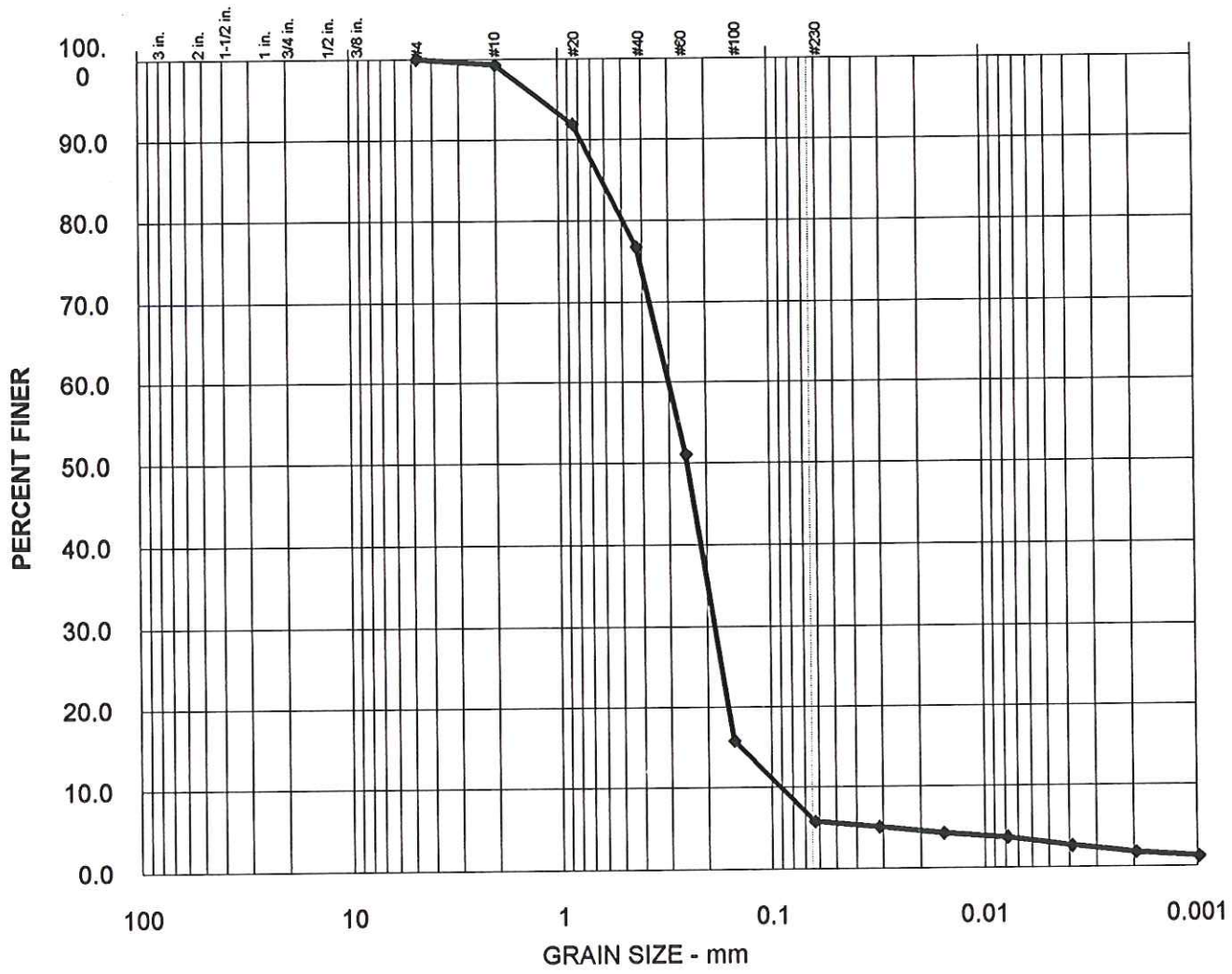
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	94%	3%	3%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SS-204	0 to 10 cm		*

	MATERIAL DESCRIPTION	
	SAND	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

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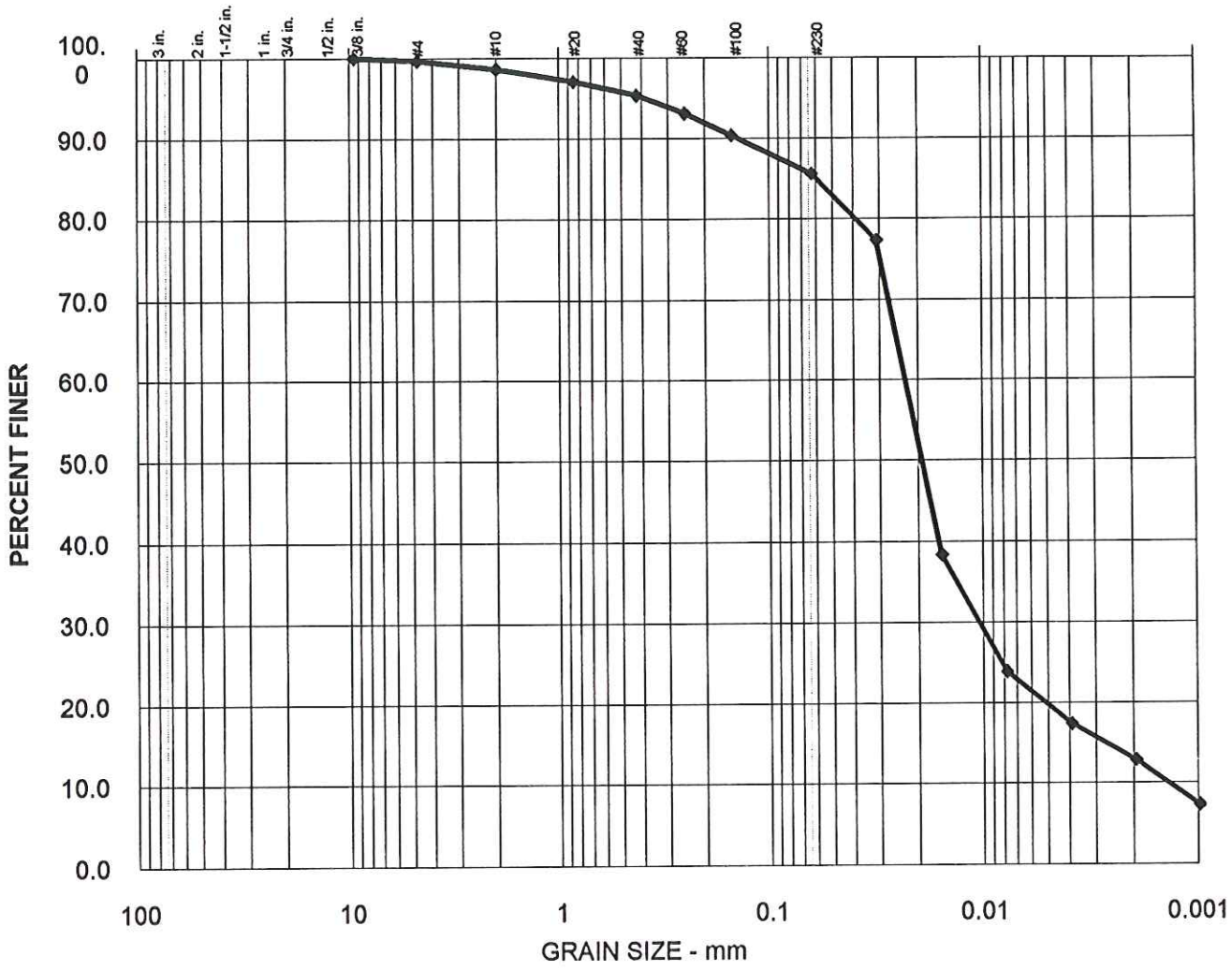
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	14%	69%	17%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-SC-205	0 to 10 cm		*

	MATERIAL DESCRIPTION	
	Sandy, clayey SILT	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

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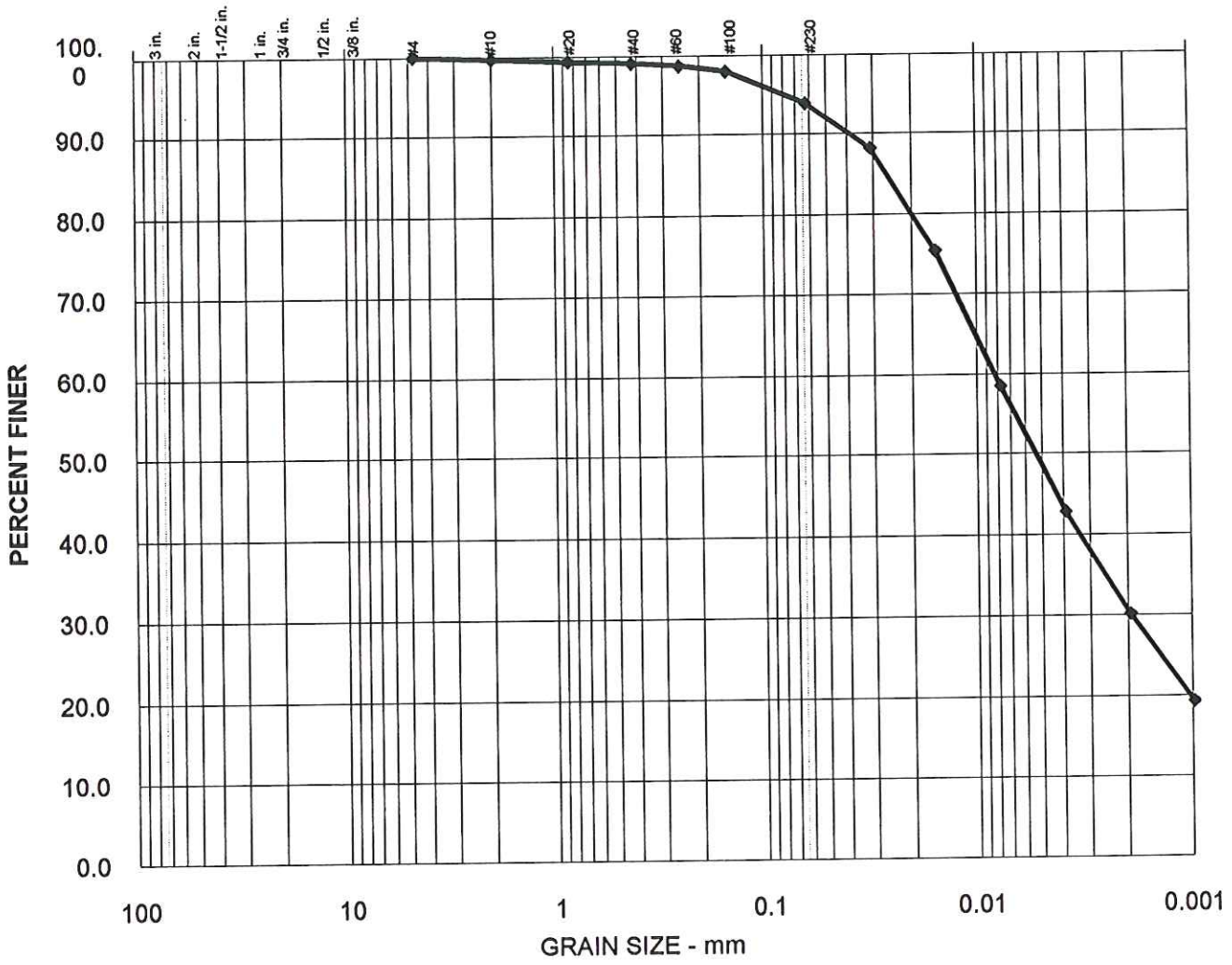
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	6%	51%	43%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-VC-70-S1	0 to 1.5 feet		*

	MATERIAL DESCRIPTION	
	Slightly sandy, very clayey SILT	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

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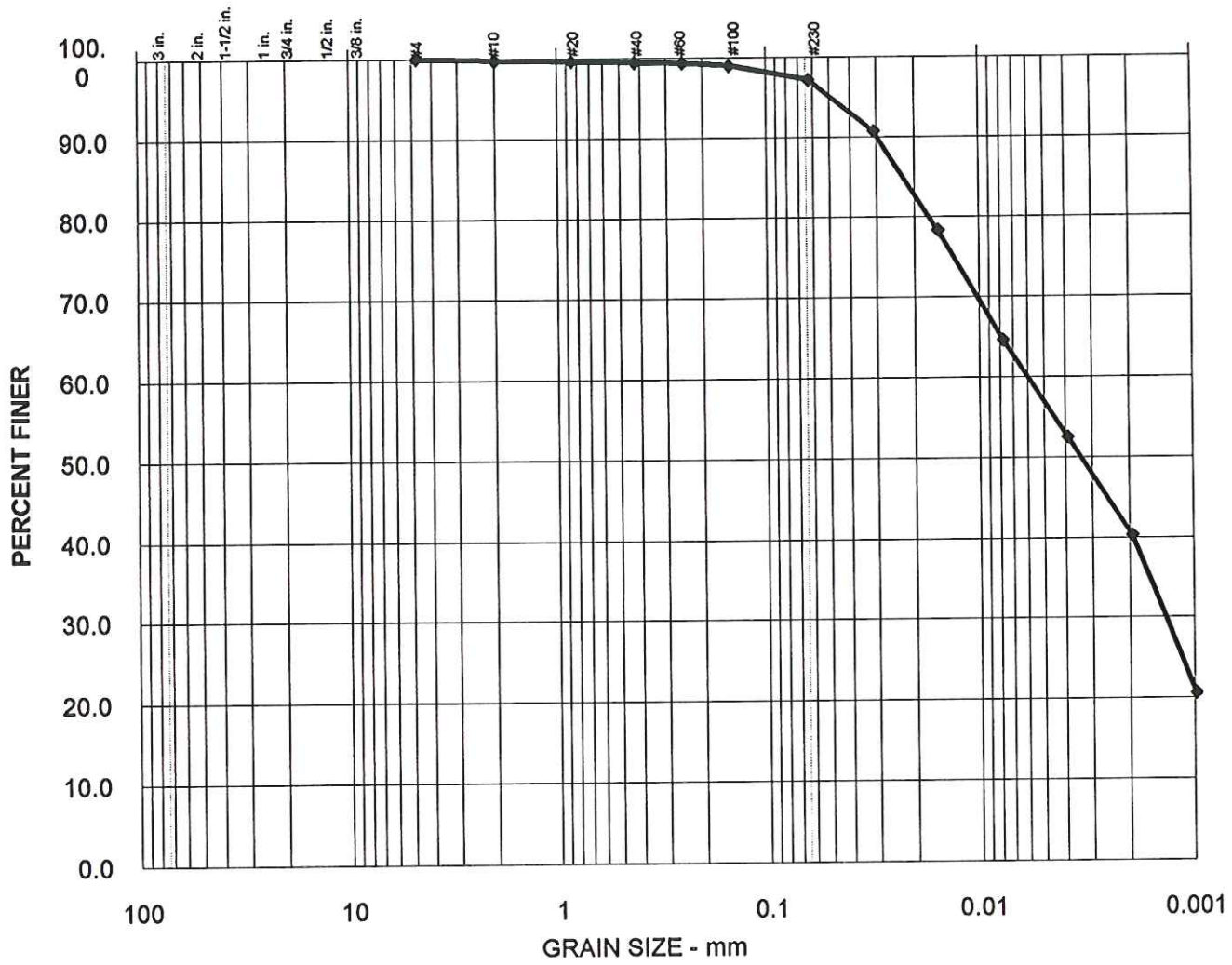
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	3%	45%	52%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-VC-70-S2(A)	3.7 to 5.8 feet		*

	MATERIAL DESCRIPTION	
	Very silty CLAY	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

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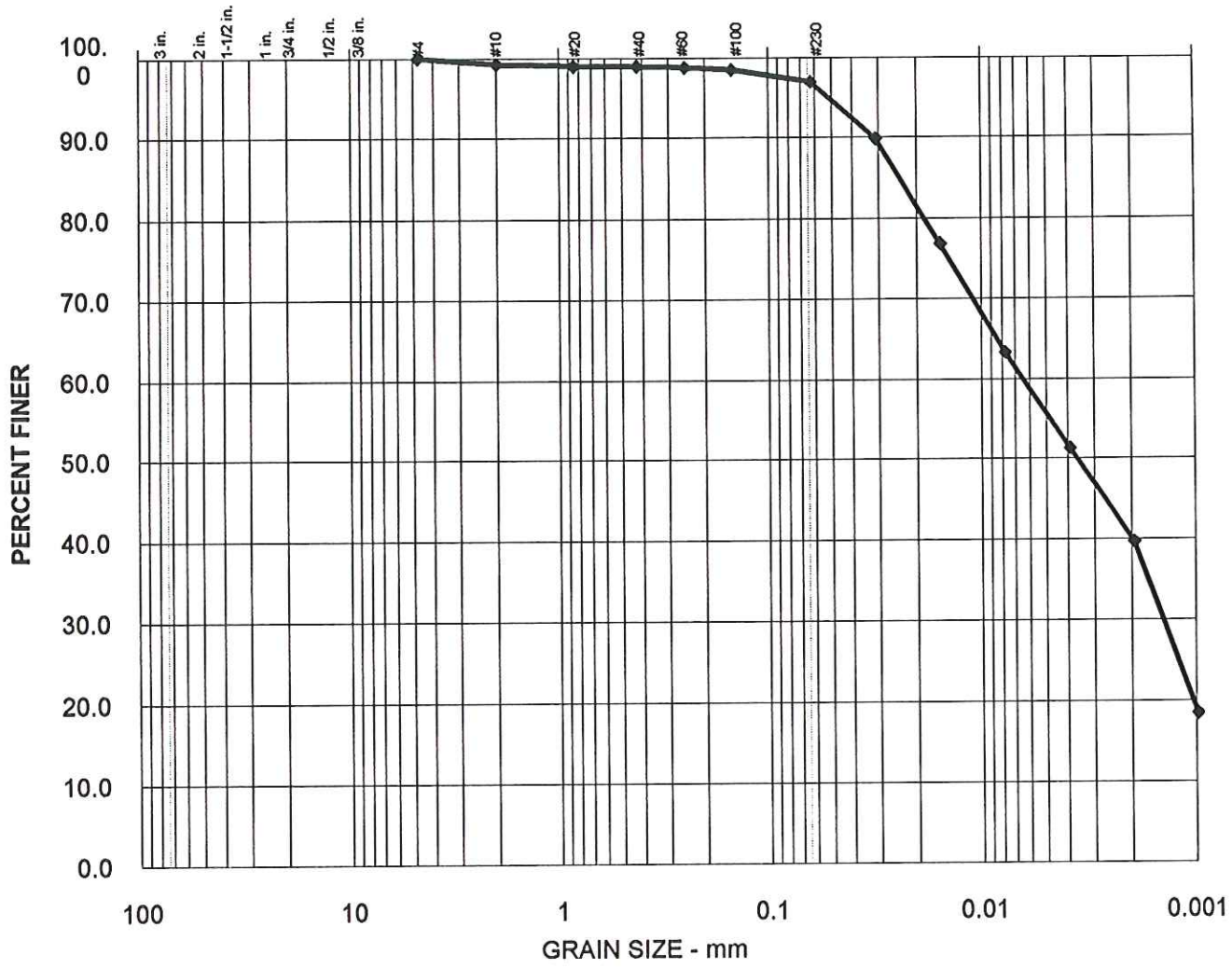
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	3%	46%	51%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-VC-70-S2(B) Duplicate	3.7 to 5.8 feet		*

	MATERIAL DESCRIPTION	
	Very silty CLAY	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

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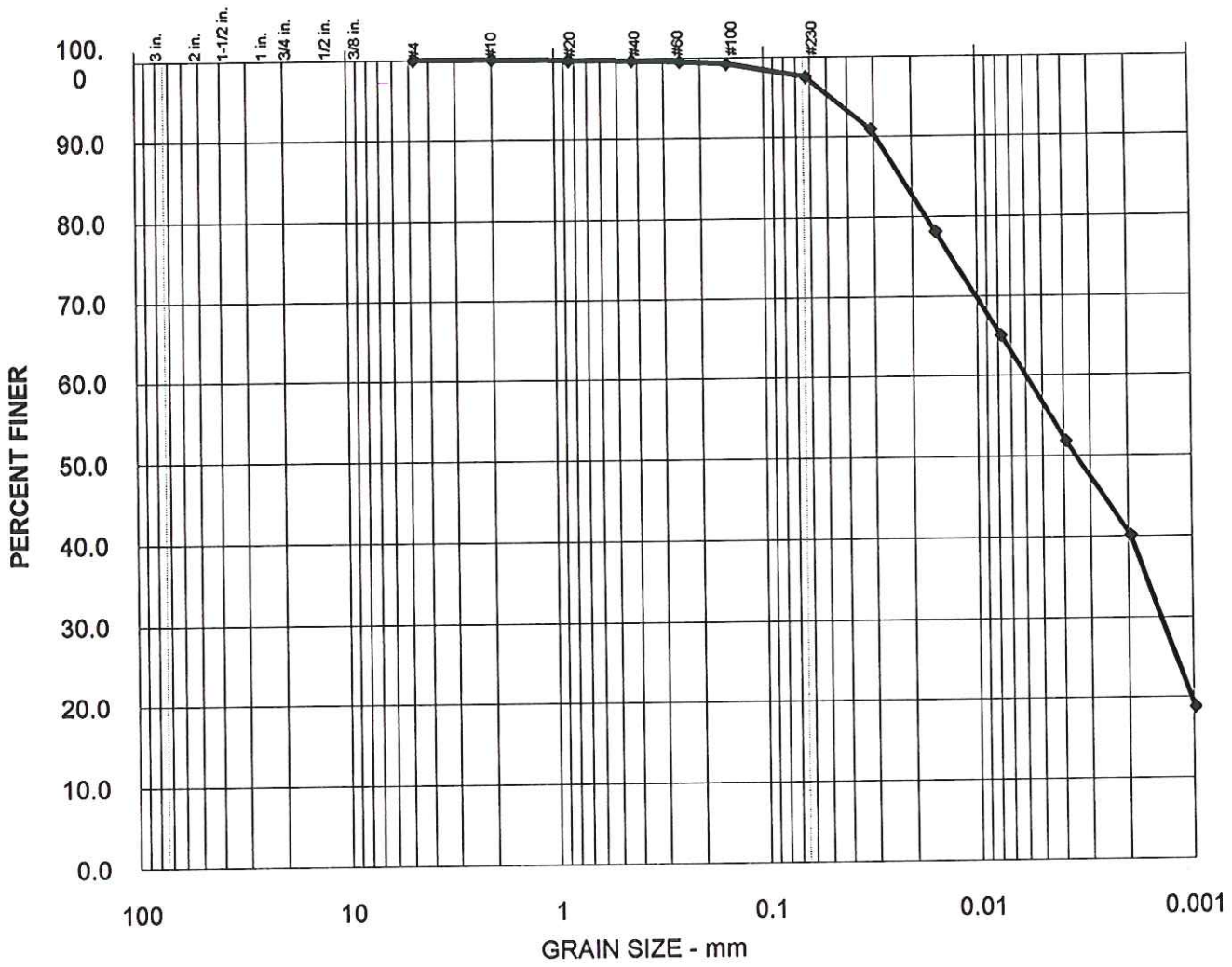
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	2%	46%	52%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-VC-70-S2(C) Triplicate	3.7 to 5.8 feet		*

	MATERIAL DESCRIPTION	
	Very silty CLAY	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

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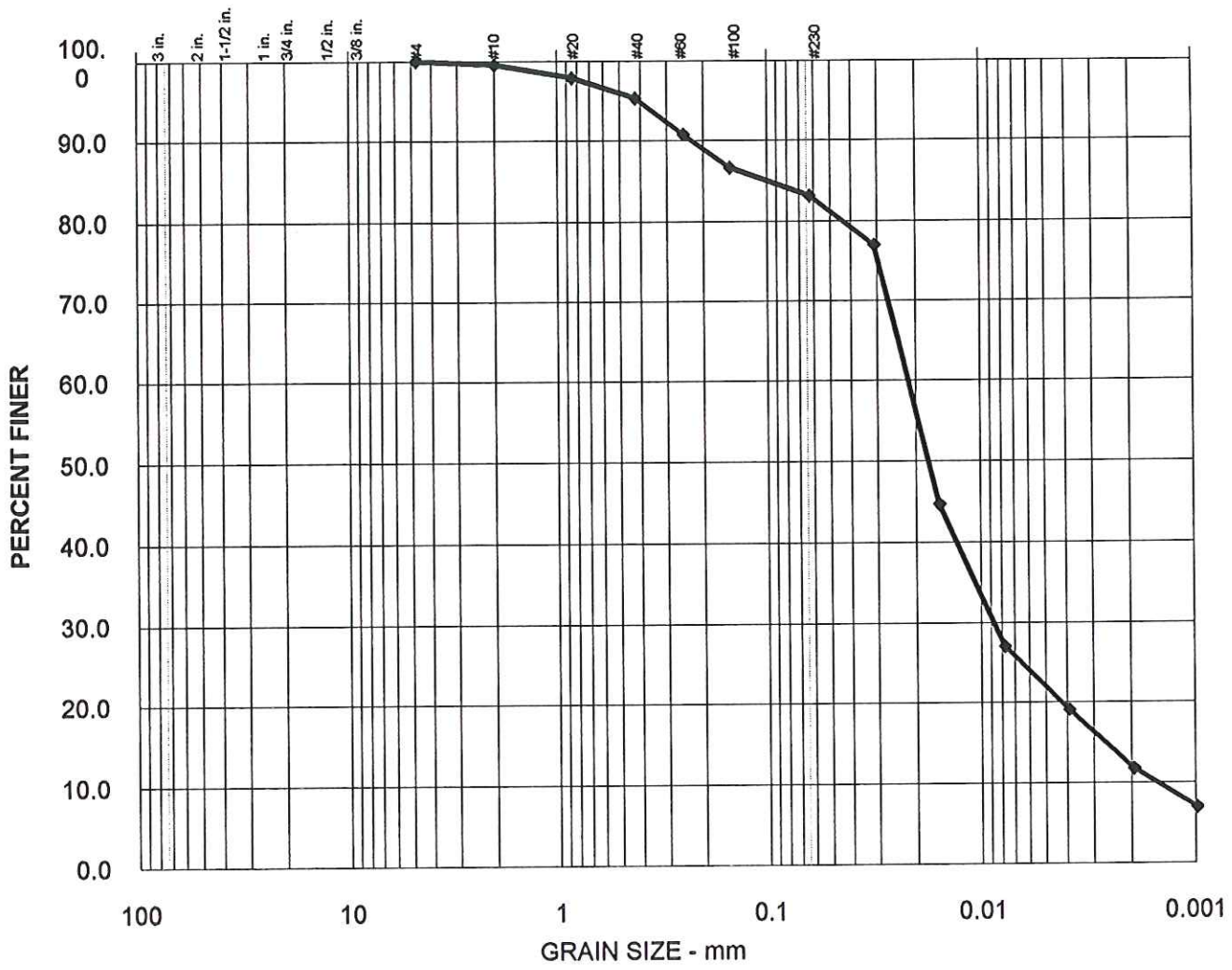
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	17%	64%	19%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-VC-71-S1	0 to 1.5 feet		*

	MATERIAL DESCRIPTION	
	Sandy, clayey SILT	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

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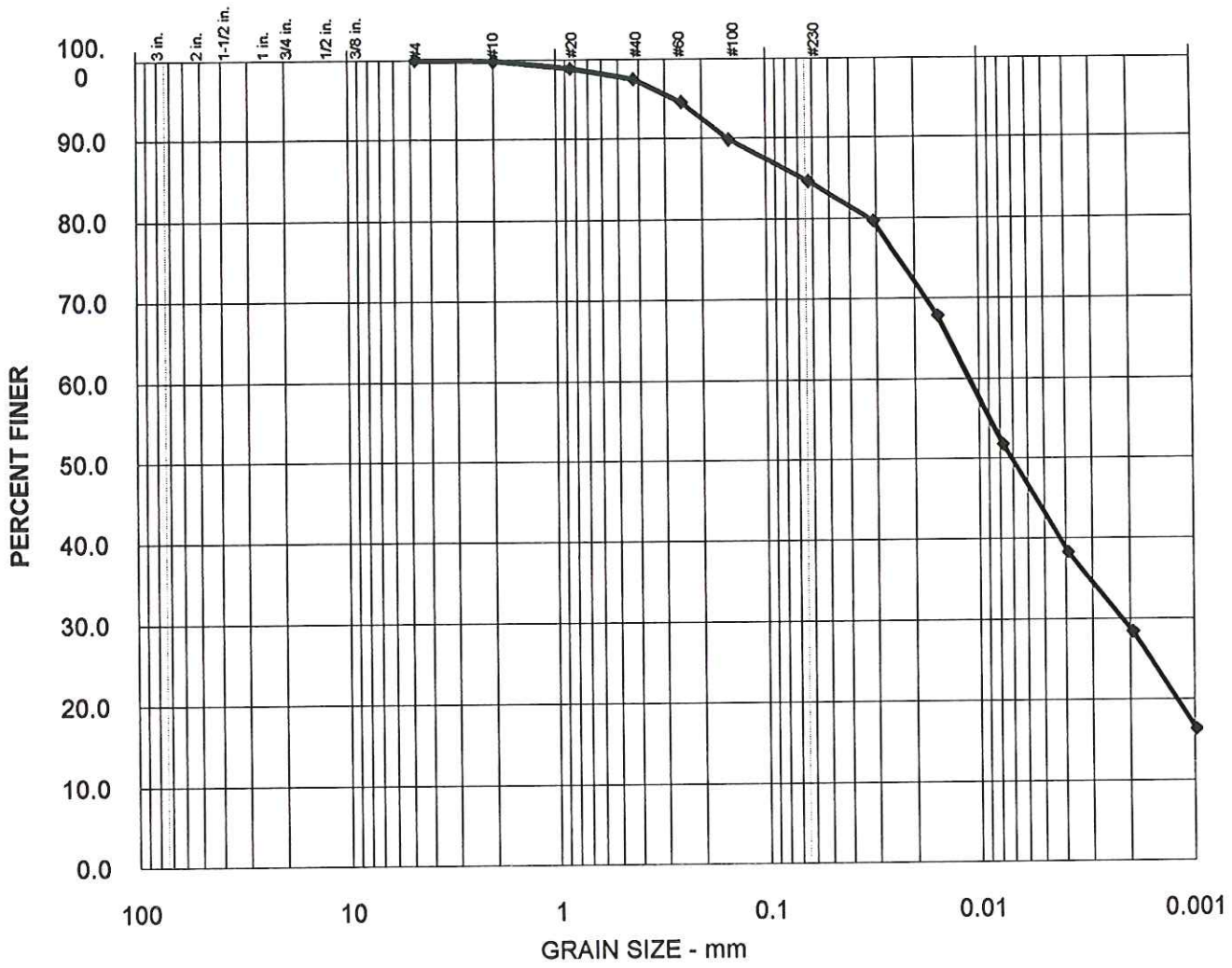
10/14/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	15%	47%	38%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-VC-71-S2	1.5 to 4.4 feet		*

	MATERIAL DESCRIPTION	
	Sandy, very clayey SILT	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

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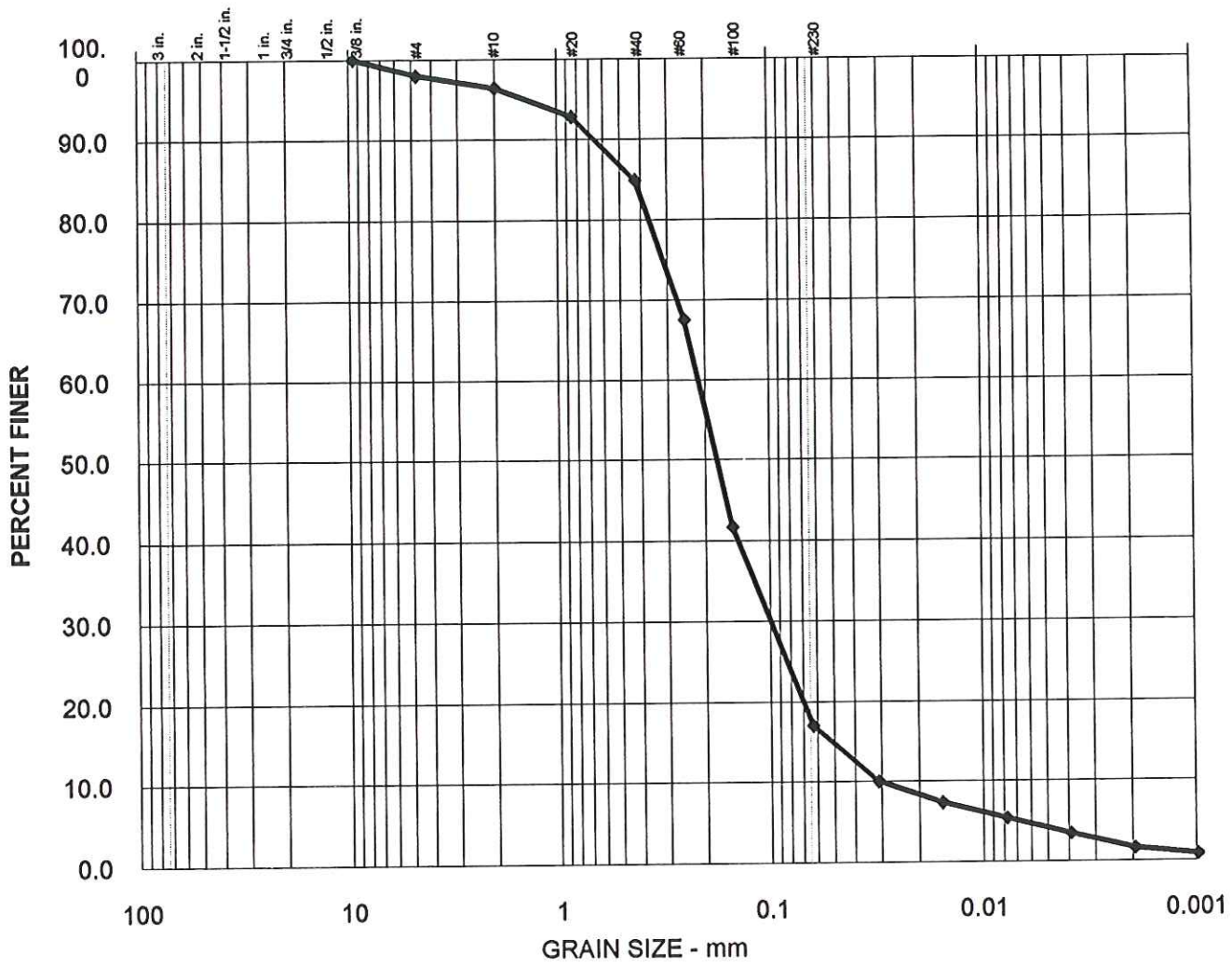
10/15/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	2%	81%	14%	3%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-VC-71-S3	6.0 to 7.6 feet		*

	MATERIAL DESCRIPTION	
	Silty SAND	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

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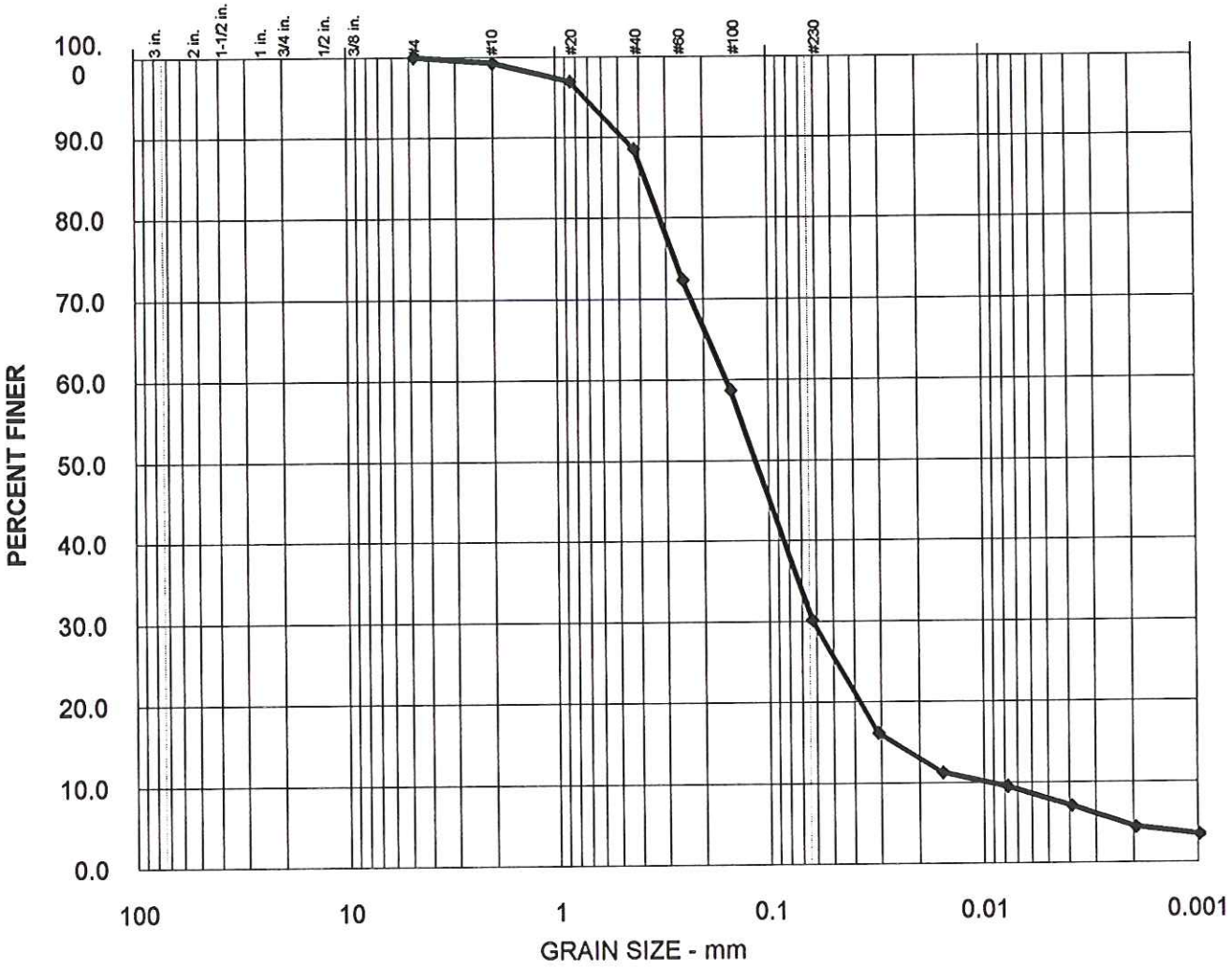
Figure D- 84

10/14/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	70%	23%	7%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-VC-71-S4	9.8 to 11.4 feet		*

	MATERIAL DESCRIPTION	
	Slightly clayey, silty SAND	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

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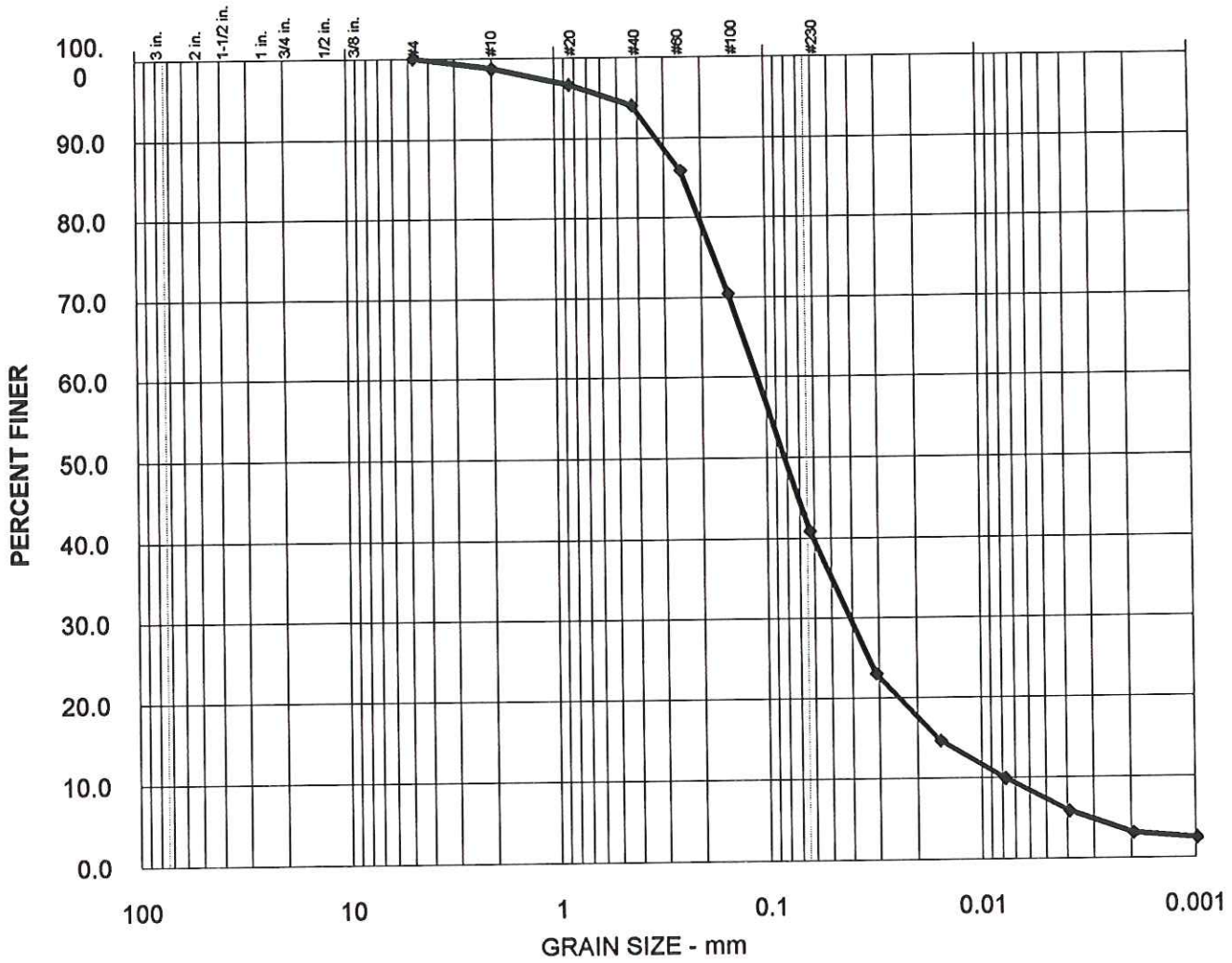
10/14/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	59%	35%	6%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-VC-71-S7	13.1 to 14.9 feet		*

	MATERIAL DESCRIPTION	
	Slightly clayey, very silty SAND	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

J-4478-05
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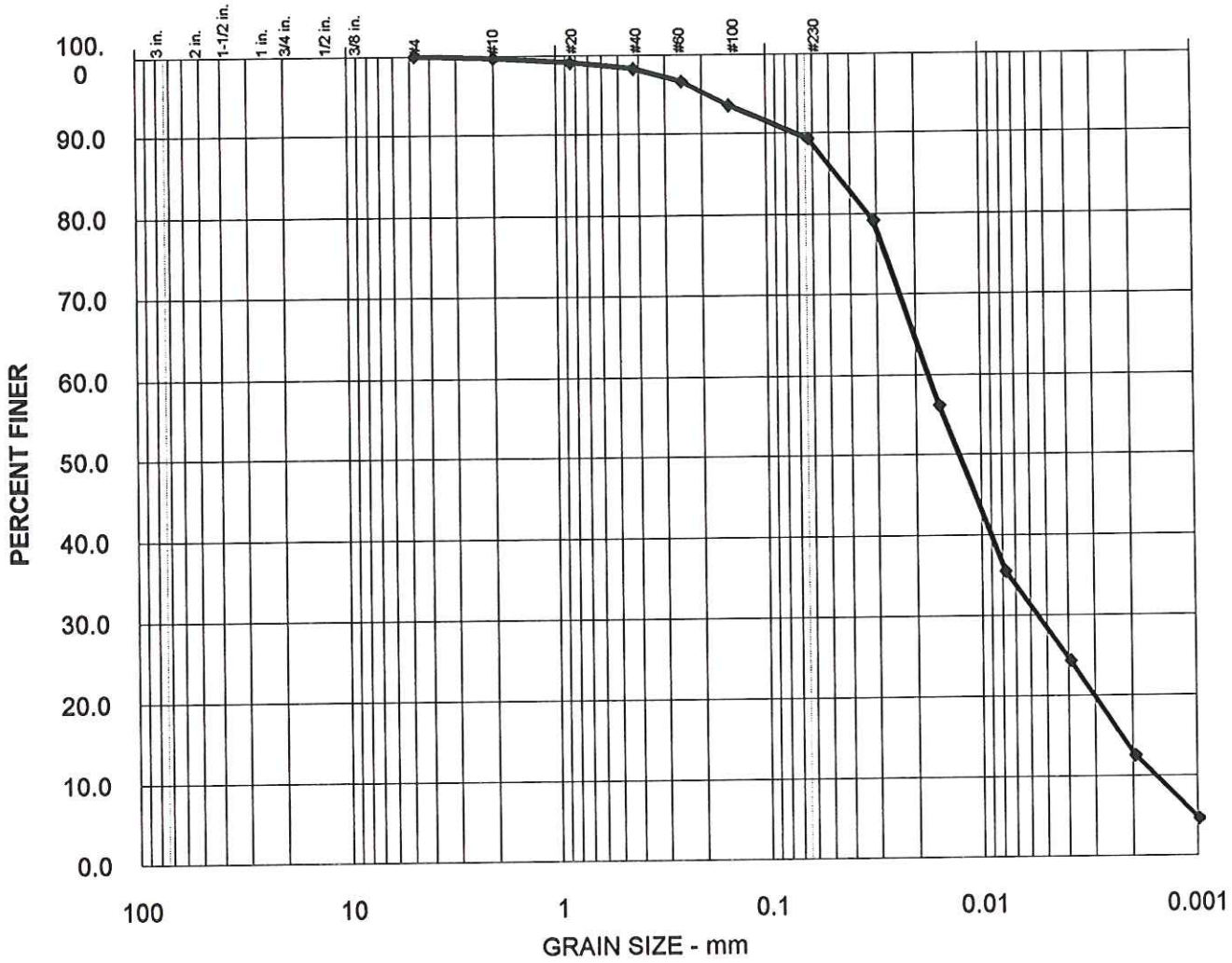
12/12/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	11%	65%	24%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-VC-72-S1	0 to 3.2 feet		*

	MATERIAL DESCRIPTION	
	Slightly sandy, clayey SILT	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

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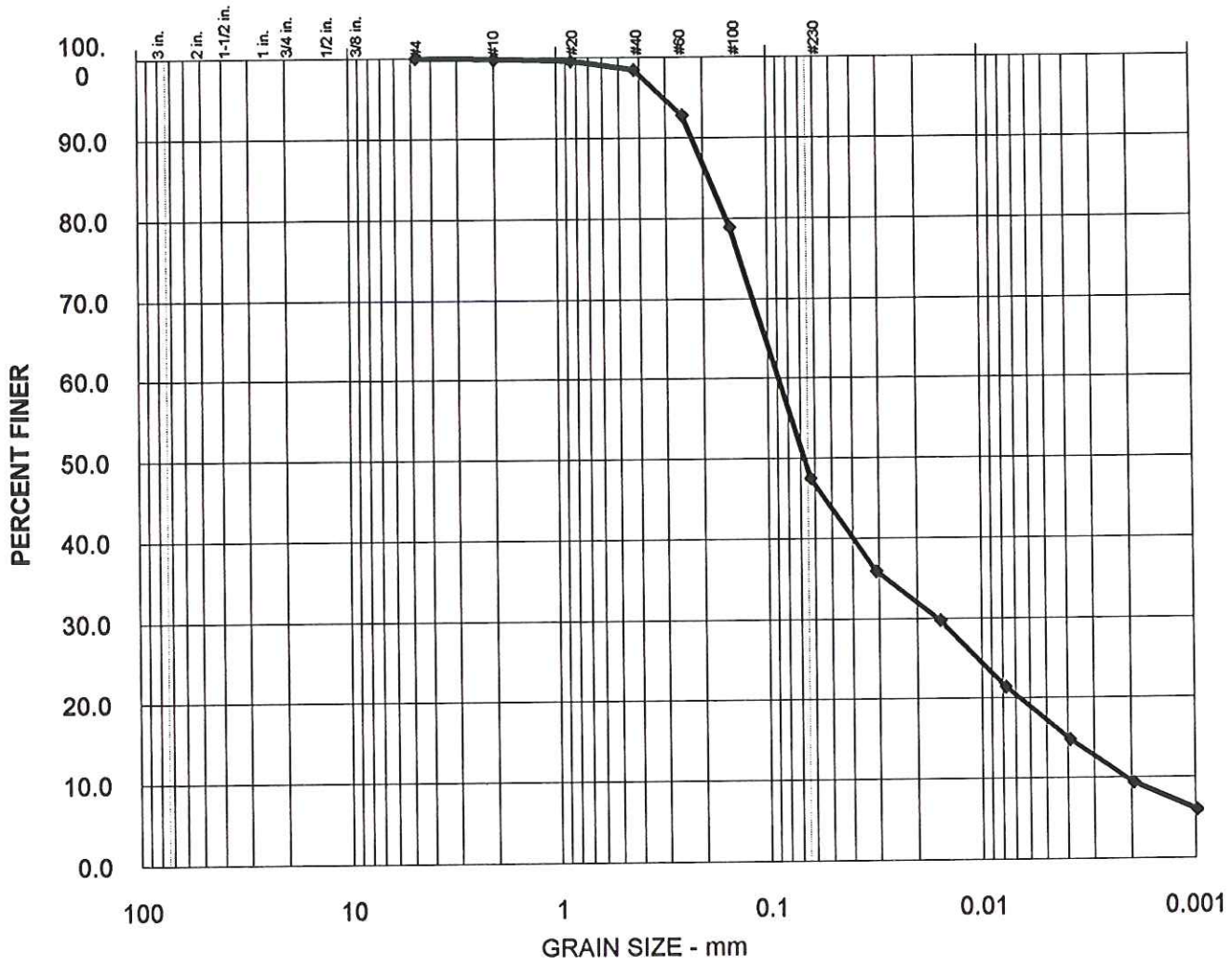
10/17/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	53%	32%	15%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-VC-72-S2	3.2 to 4.0 feet		*

	MATERIAL DESCRIPTION	
	Clayey, very silty SAND	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

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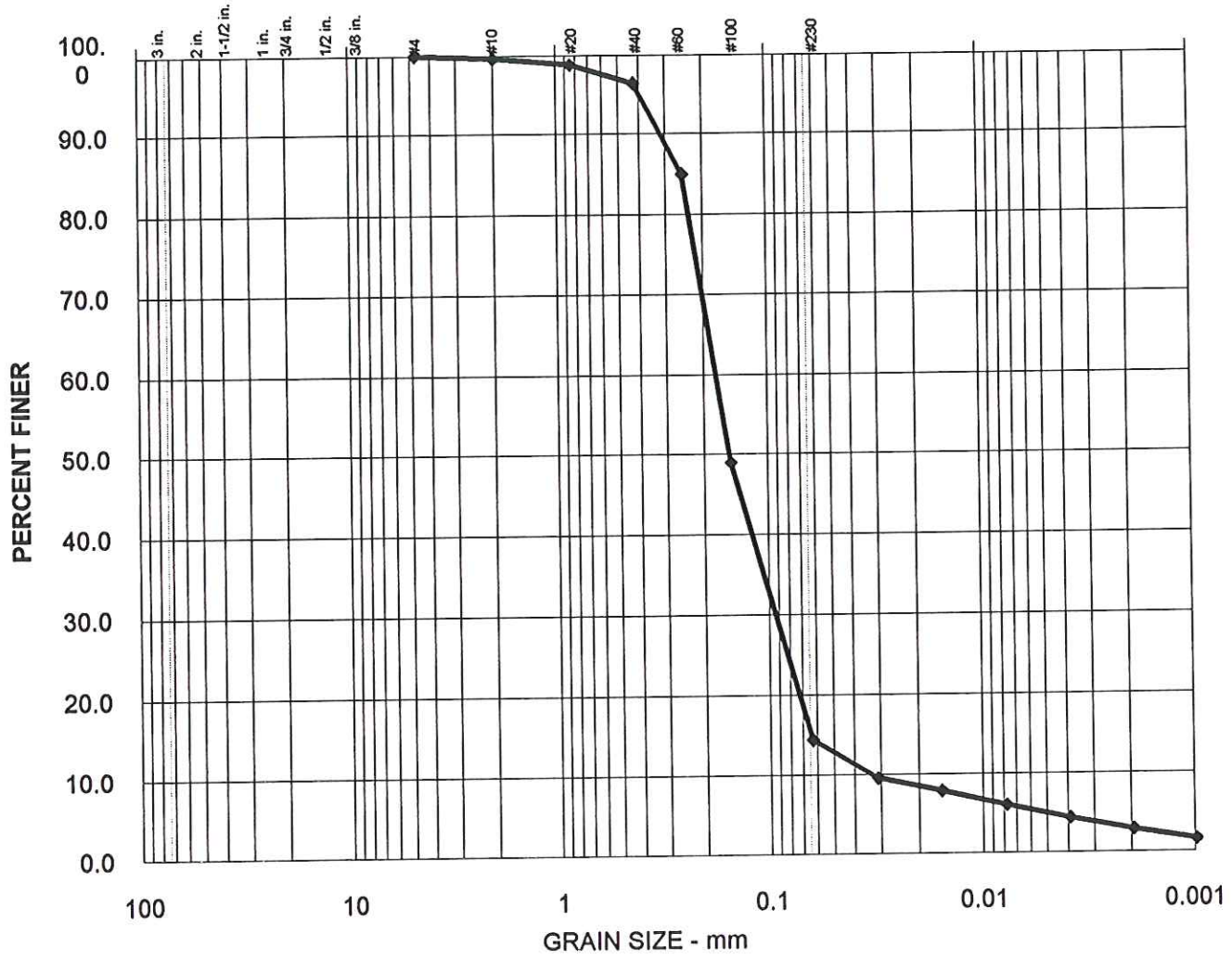
10/17/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	86%	10%	4%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-VC-72-S3	4.0 to 7.0 feet		*

	MATERIAL DESCRIPTION	
	Slightly silty SAND	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

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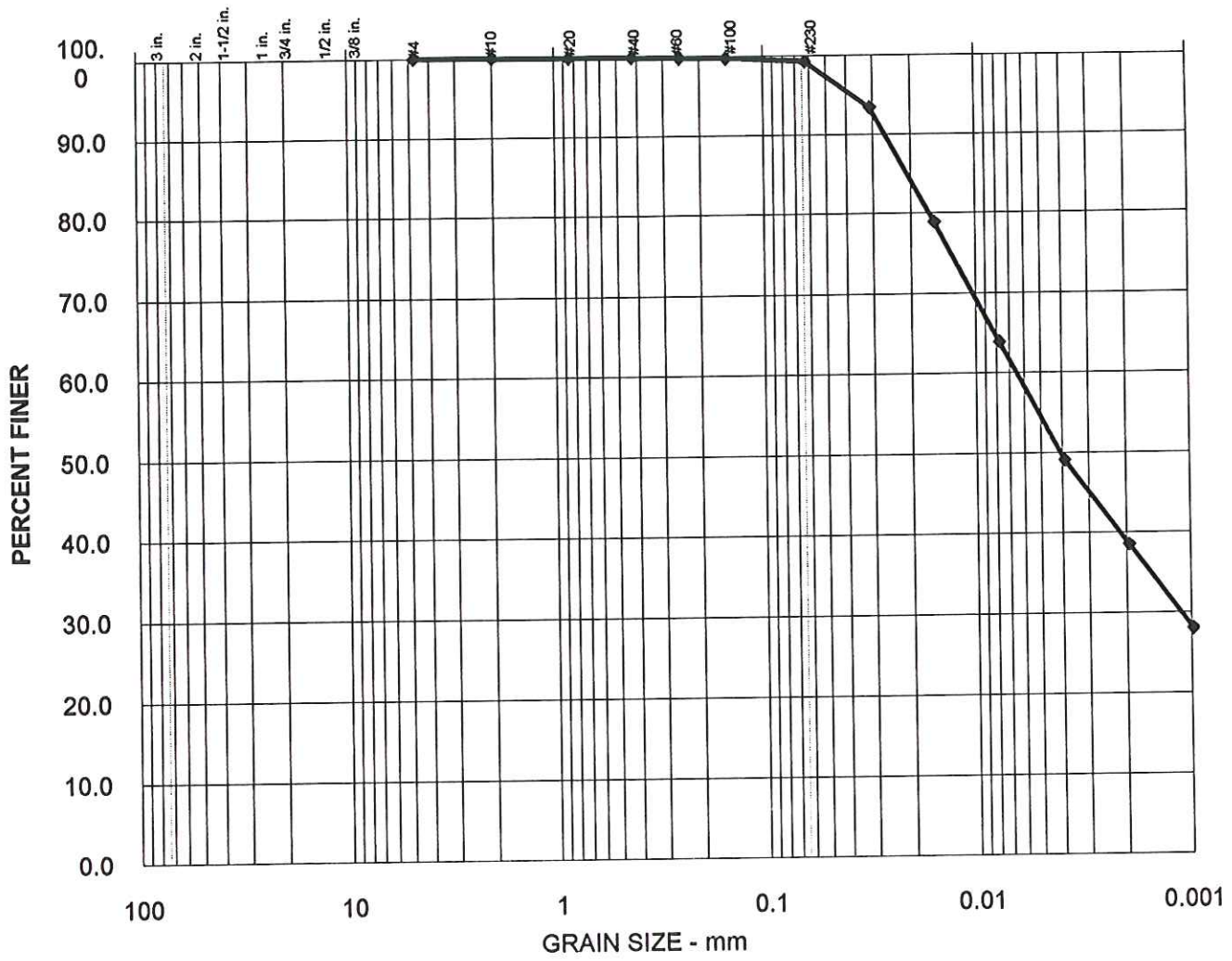
10/17/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	1%	50%	49%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-VC-72-S4	8.4 to 10.0 feet		*

	MATERIAL DESCRIPTION	
	Very clayey SILT	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

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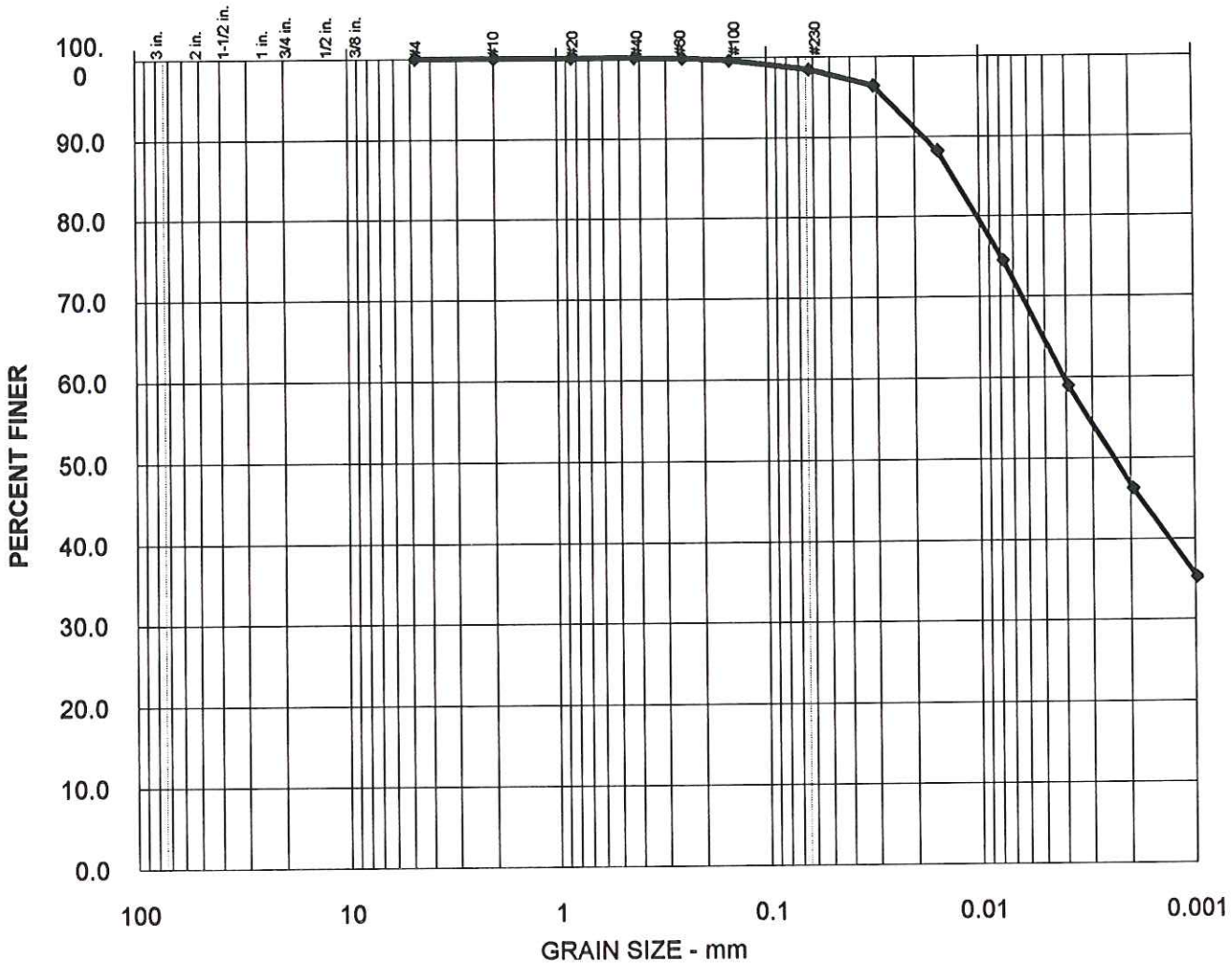
10/17/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	2%	39%	59%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-VC-72-S7	12.0 to 13.1 feet		*

	MATERIAL DESCRIPTION	
	Very silty CLAY	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

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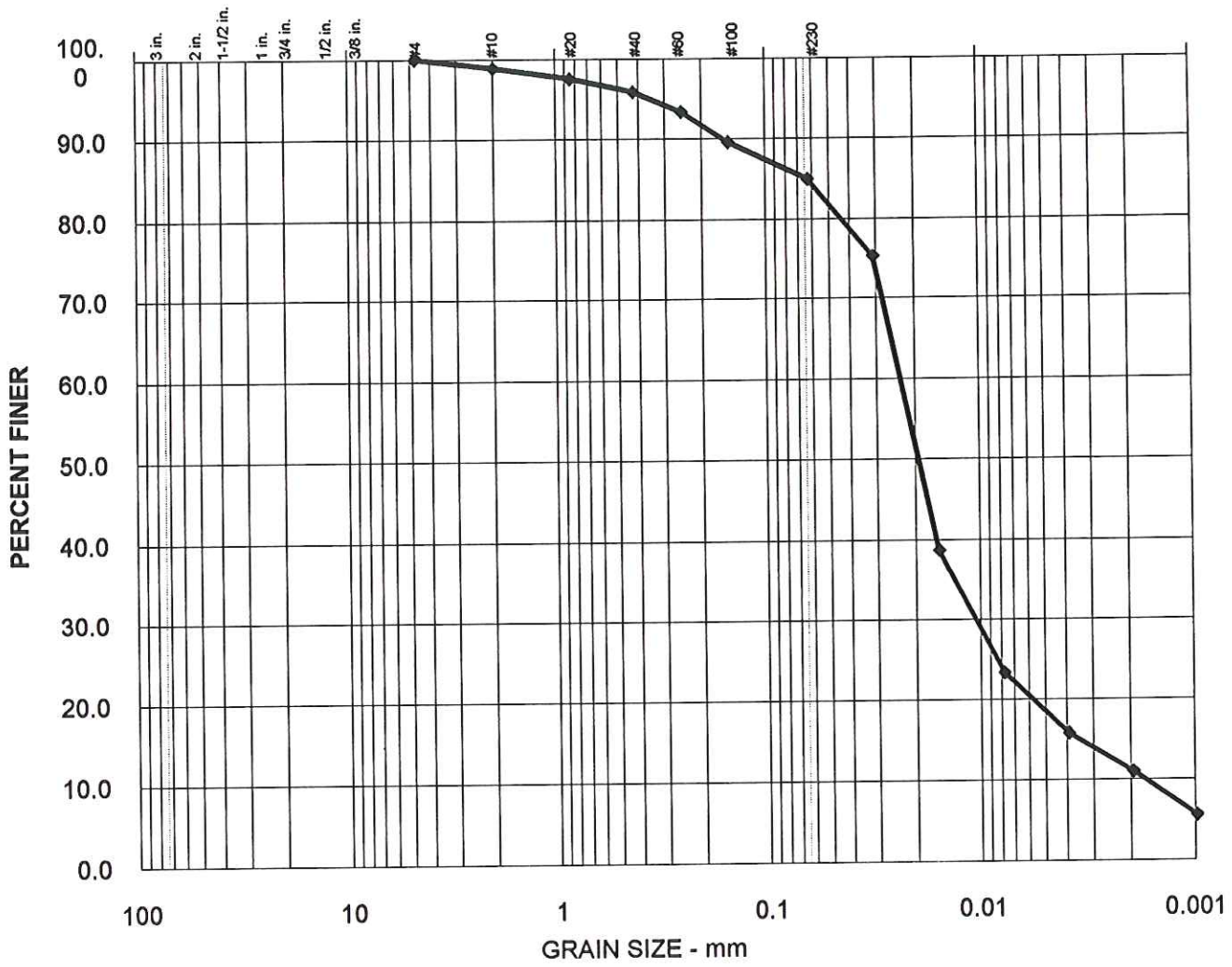
12/12/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	15%	69%	16%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-VC-73-S1	0 to 2.0 feet		*

	MATERIAL DESCRIPTION	
	Sandy, clayey SILT	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

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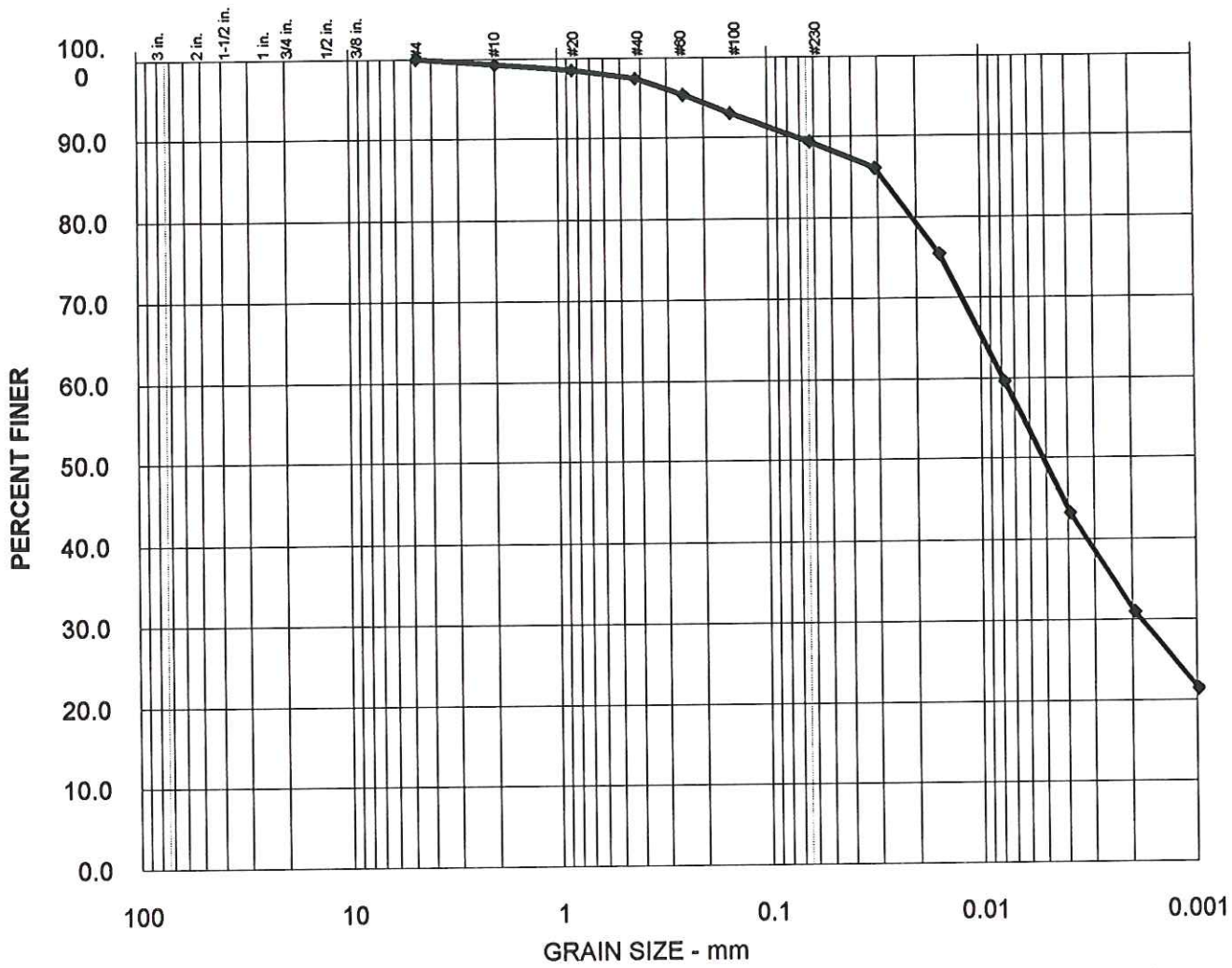
10/25/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	11%	46%	43%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-VC-73-S2	2.4 to 4.7 feet		*

	MATERIAL DESCRIPTION	
	Slightly sandy, very clayey SILT	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

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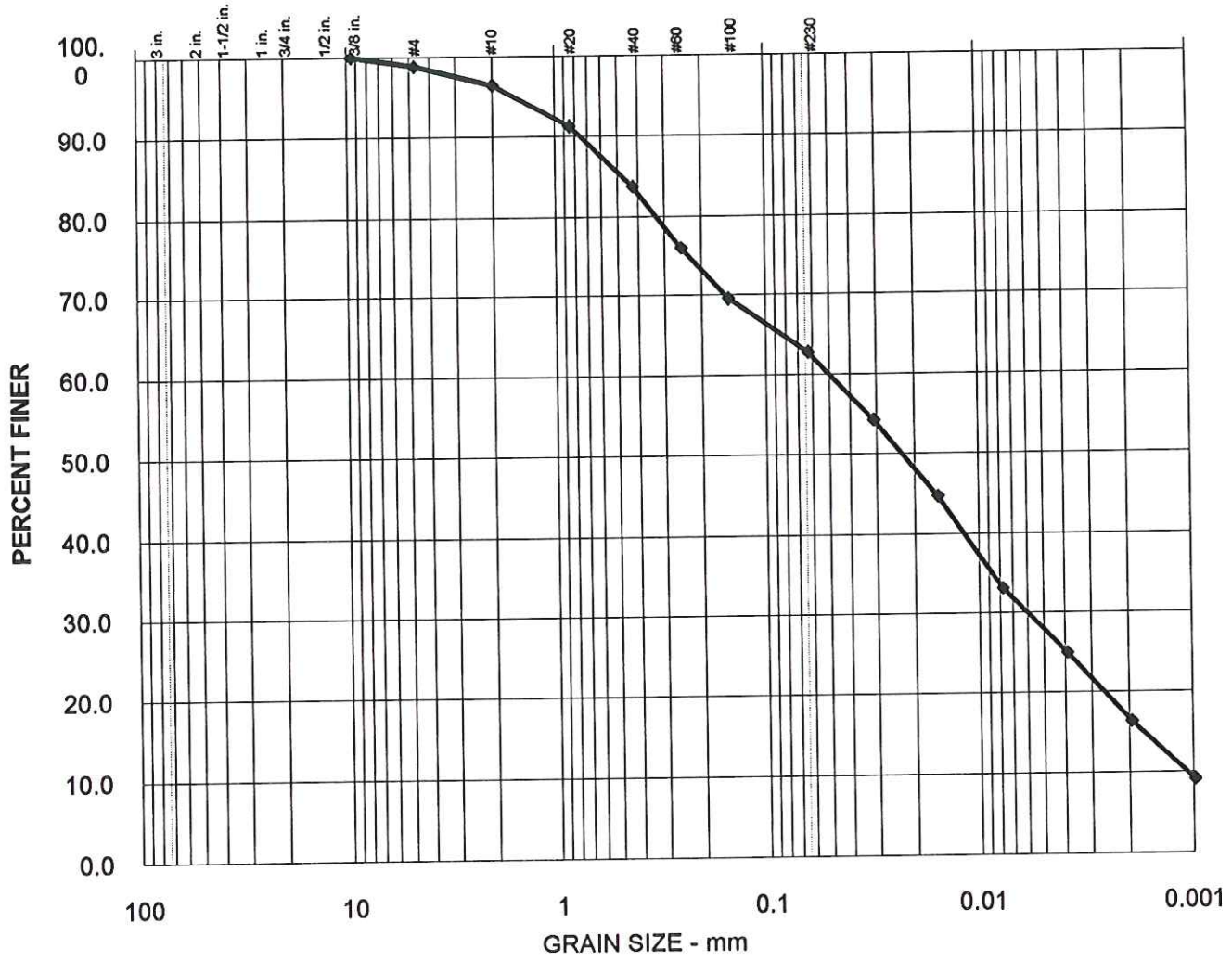
11/19/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	1%	36%	38%	25%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-VC-74-S1	0 to 2.4 feet		*

	MATERIAL DESCRIPTION	
	Clayey, very sandy SILT	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

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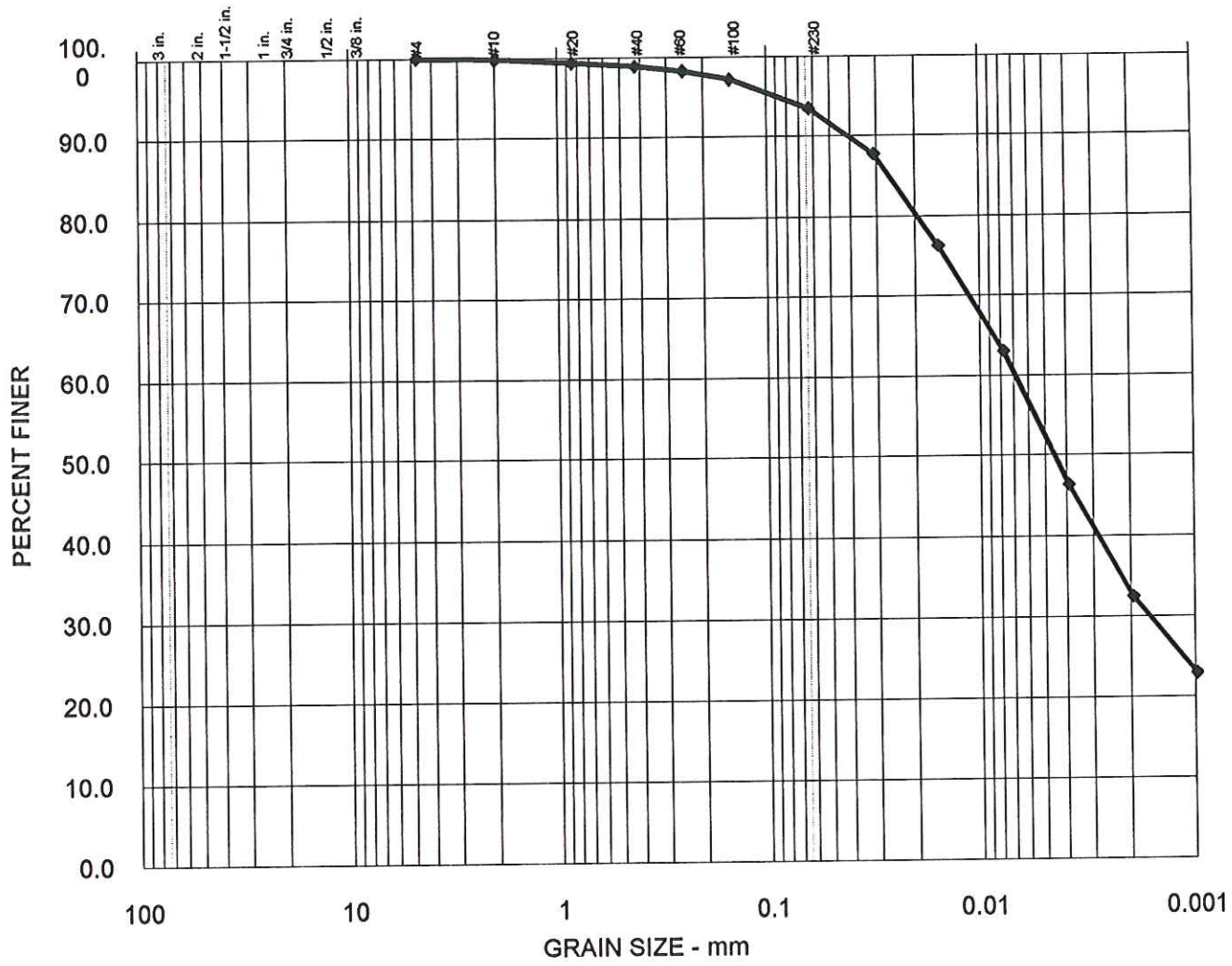
10/25/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	7%	47%	46%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-VC-74-S3(A)	4.5 to 6.9 feet		*

	MATERIAL DESCRIPTION	
	Slightly sandy, very clayey SILT	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

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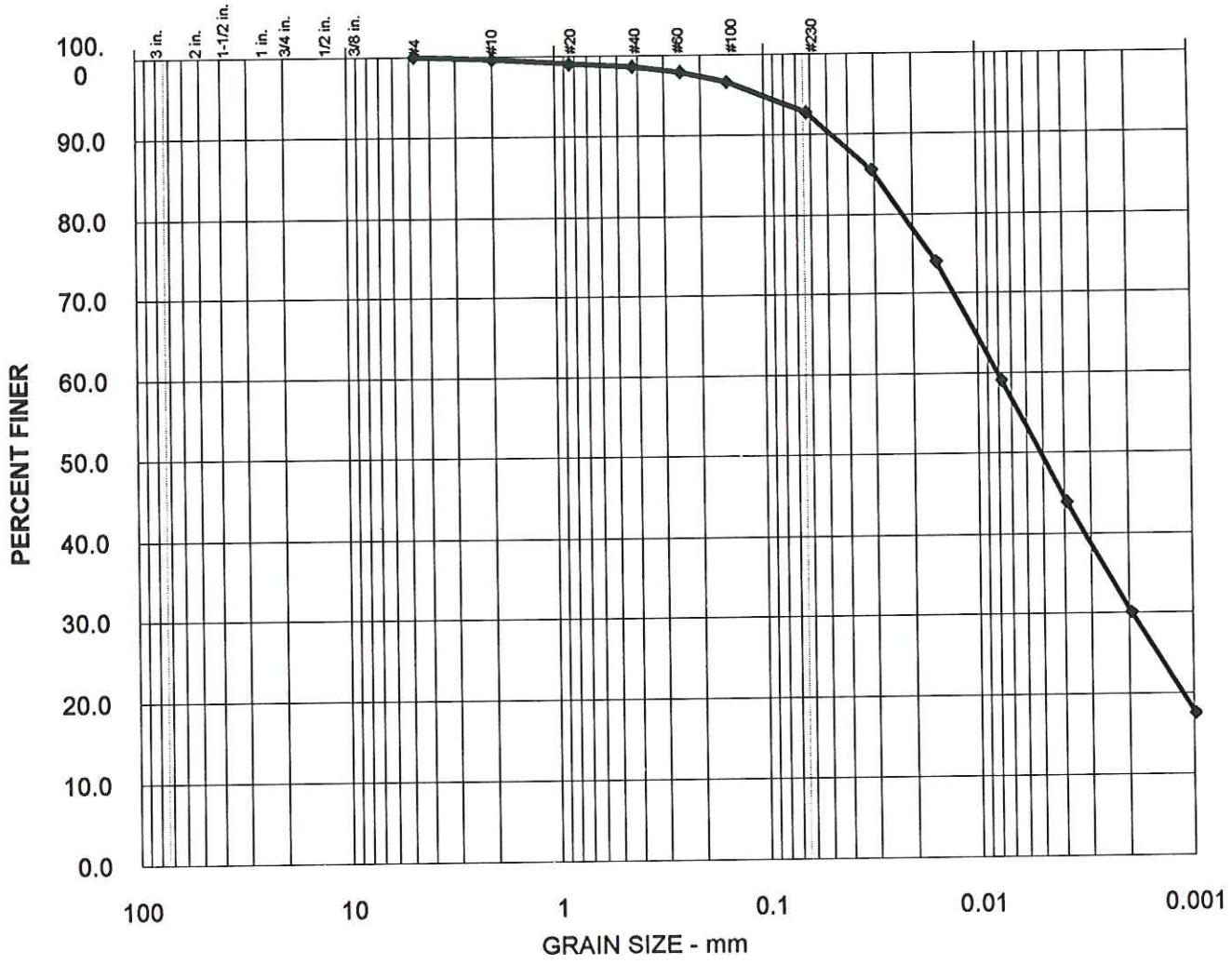
10/25/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	7%	49%	44%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-VC-74-S3(B) Duplicate	4.5 to 6.9 feet		*

	MATERIAL DESCRIPTION	
	Slightly sandy, very clayey SILT	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

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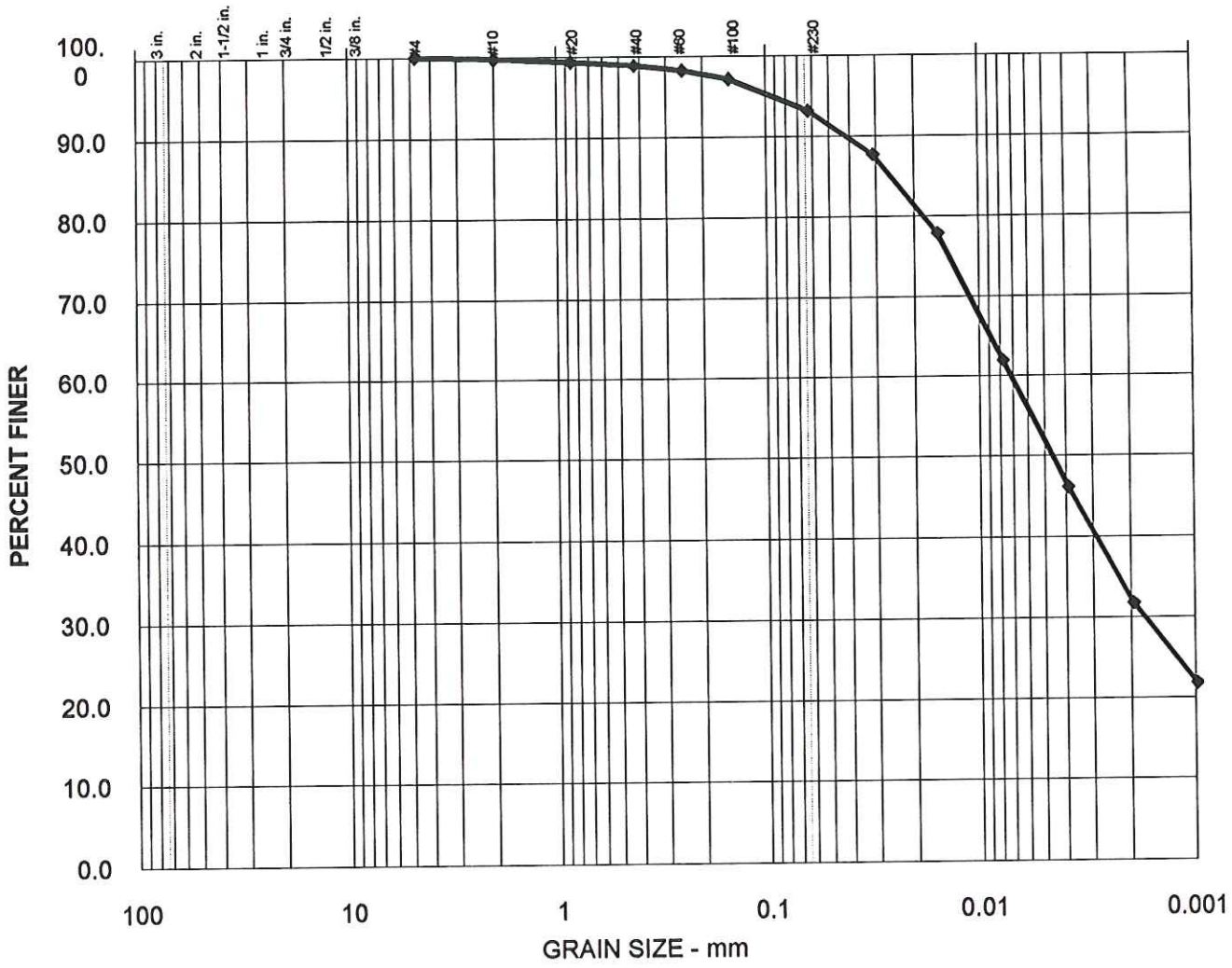
Figure D- 96

10/25/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	7%	47%	46%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-VC-74-S3(C) Triplicate	4.5 to 6.9 feet		*

	MATERIAL DESCRIPTION	
	Slightly sandy, very clayey SILT	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

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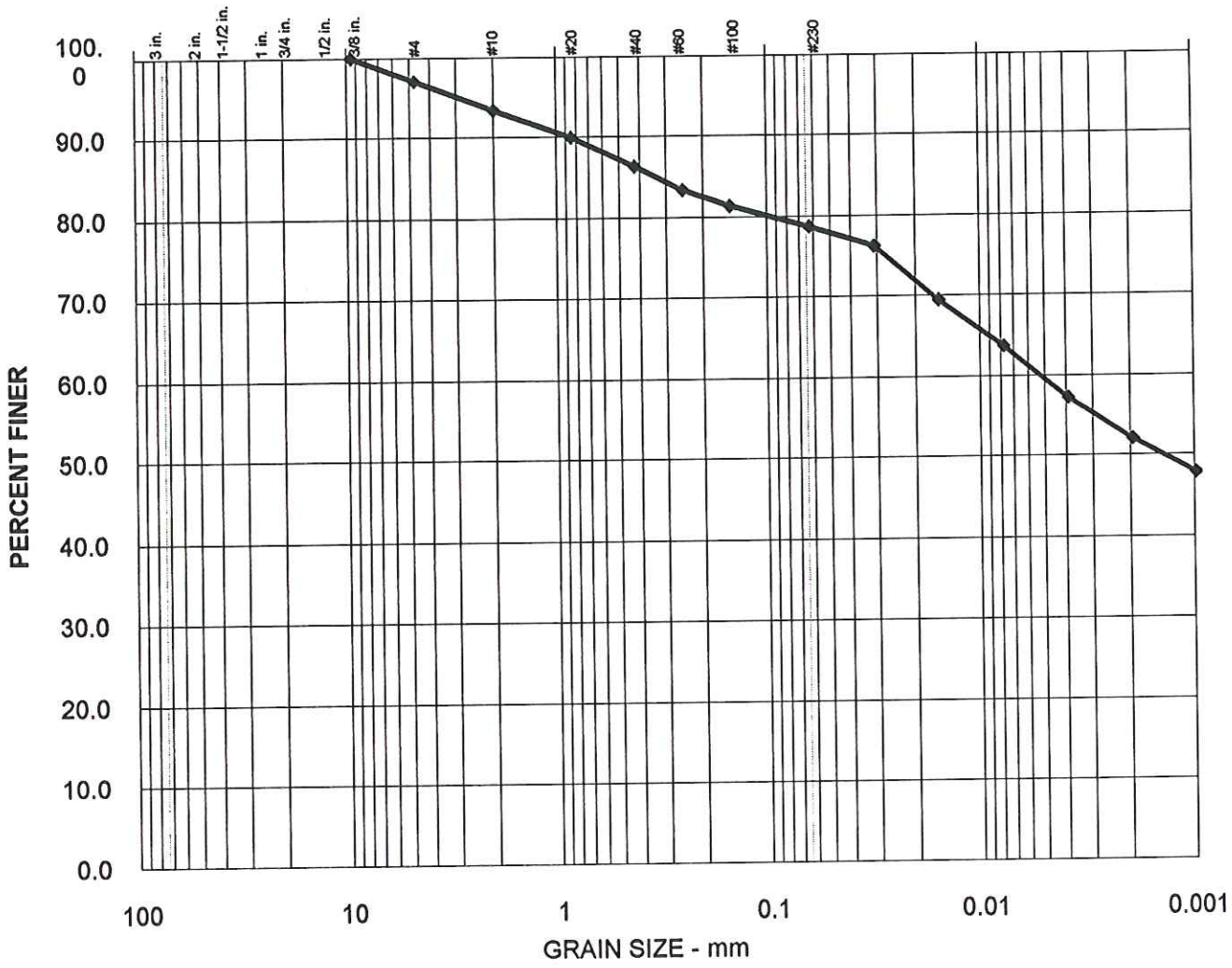
10/25/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	3%	18%	22%	57%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-VC-75-S1	0 to 3.3 feet		*

	MATERIAL DESCRIPTION	
	Sandy, silty CLAY	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

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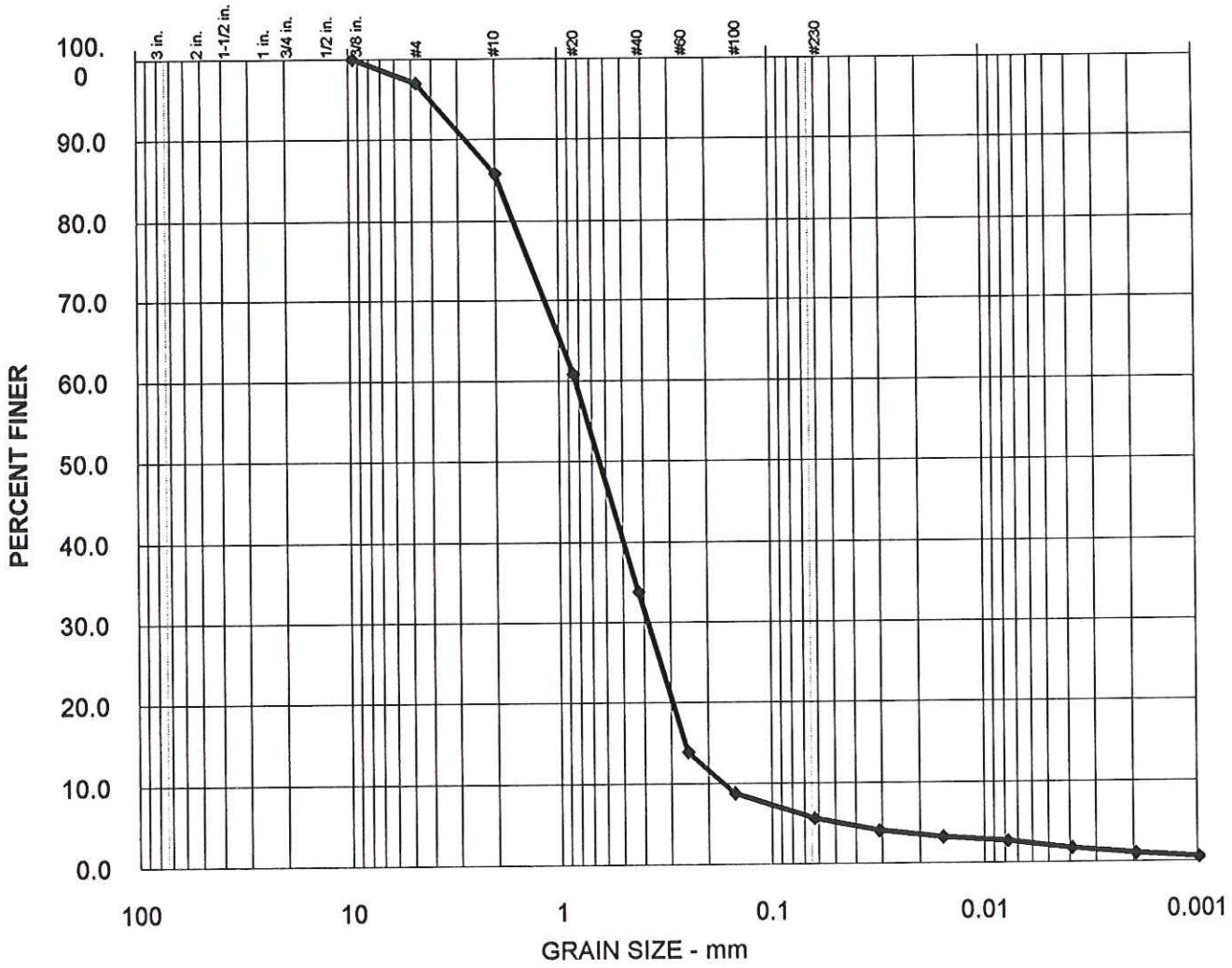
10/21/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	3%	91%	4%	2%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-VC-75-S2	3.6 to 5.8 feet		*

	MATERIAL DESCRIPTION	
	SAND	

Remarks:

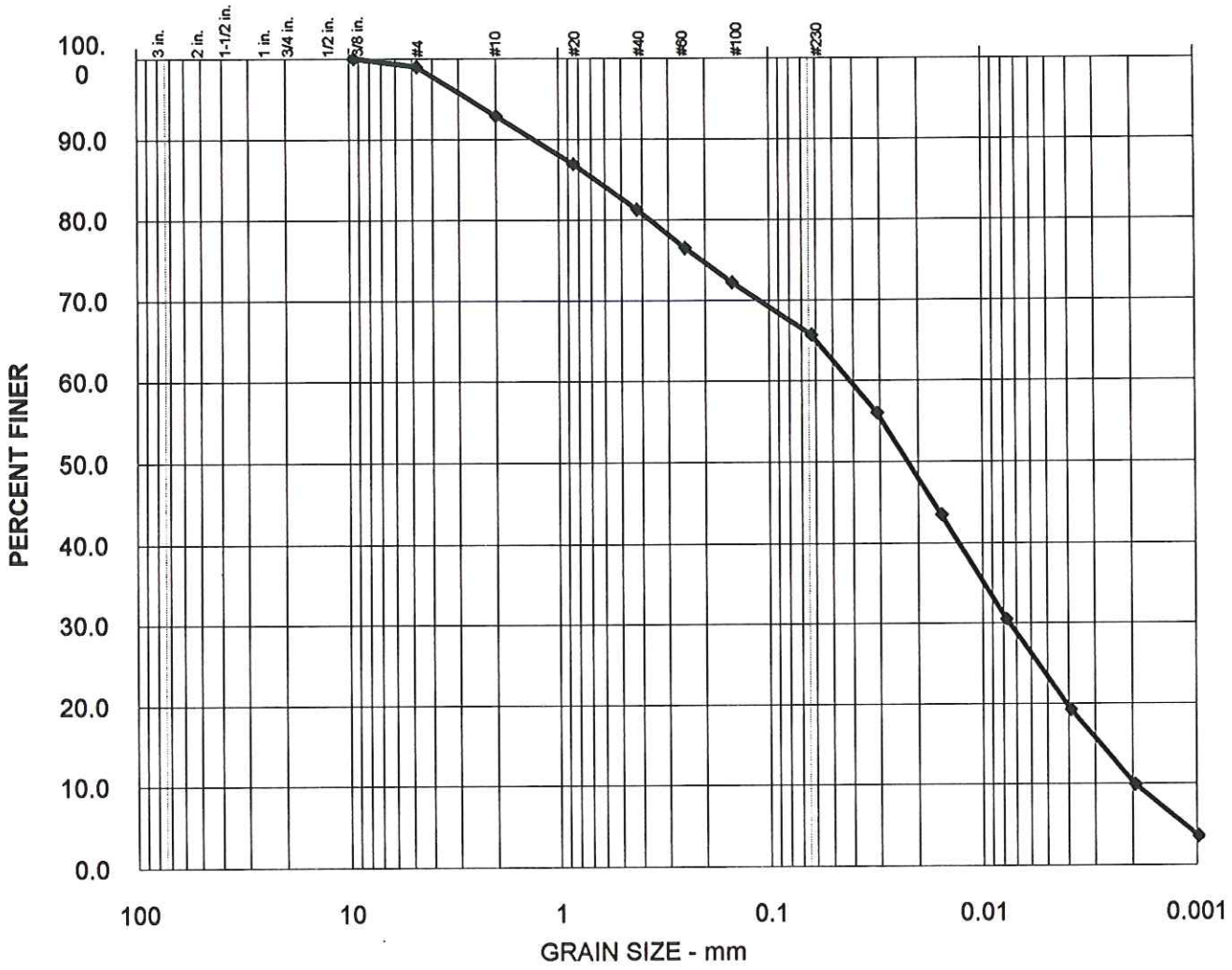
Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

J-4478-05
Figure D- 99

10/21/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	1%	33%	47%	19%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-VC-76-S1	0 to 2.9 feet		*

	MATERIAL DESCRIPTION	
	Clayey, very sandy SILT	

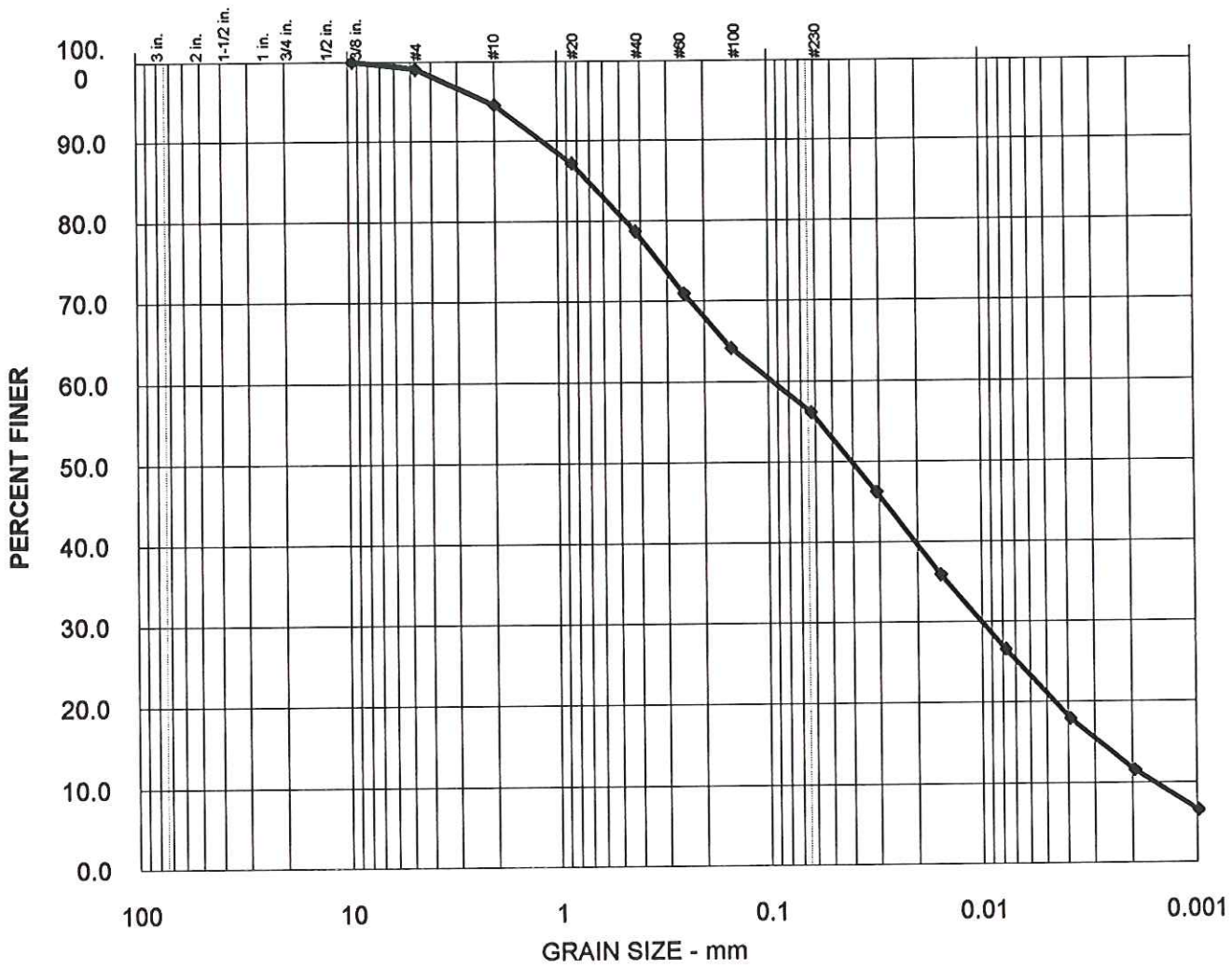
Remarks:

Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

J-4478-05
Figure D-100

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	1%	43%	38%	18%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-VC-76-S2	2.9 to 4.4 feet		*

	MATERIAL DESCRIPTION	
	Clayey, very silty SAND	

Remarks:

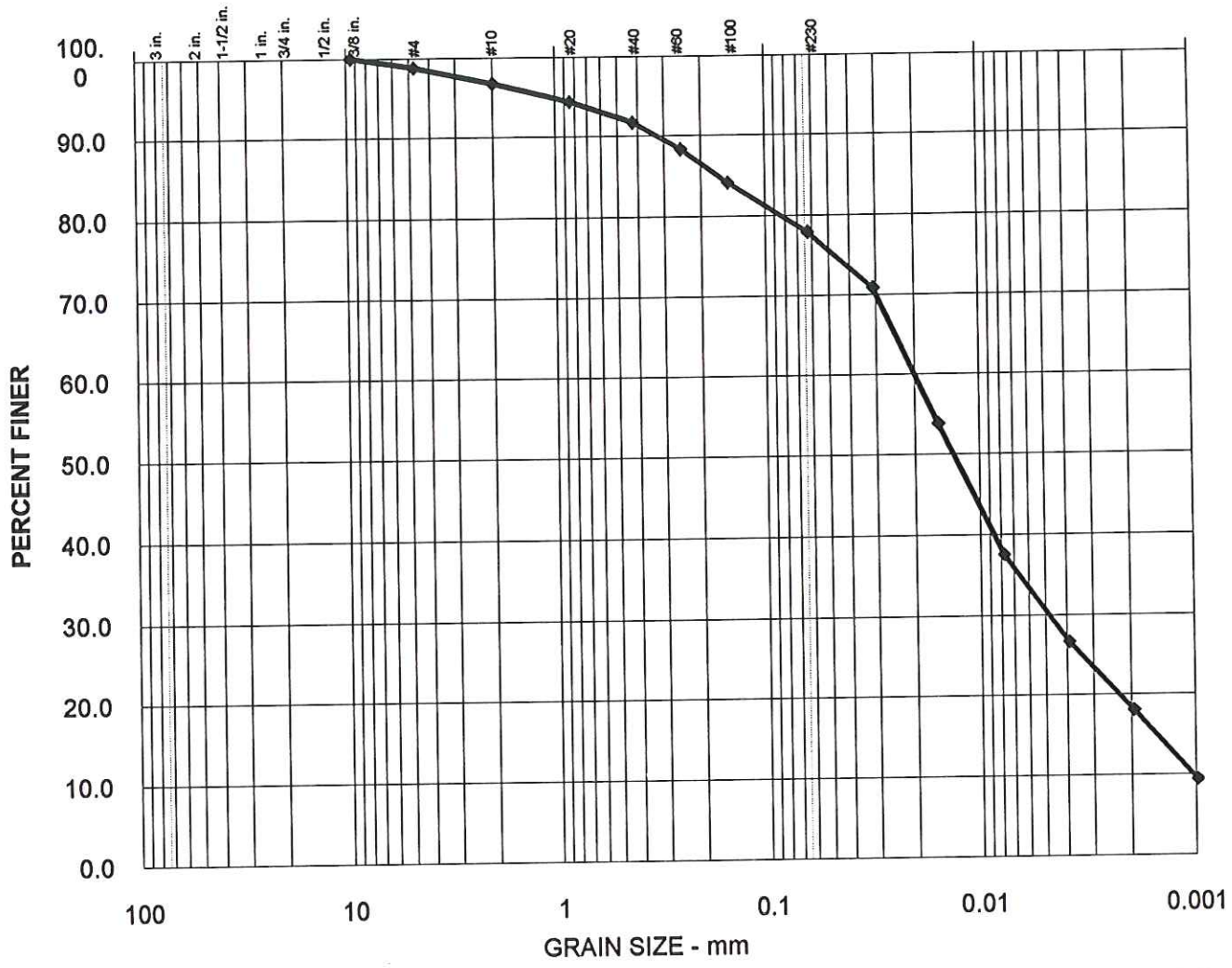
Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

J-4478-05
Figure D-101

12/12/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	1%	21%	51%	27%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-VC-77-S1	0 to 2.1 feet		*

	MATERIAL DESCRIPTION	
	Sandy, clayey SILT	

Remarks:

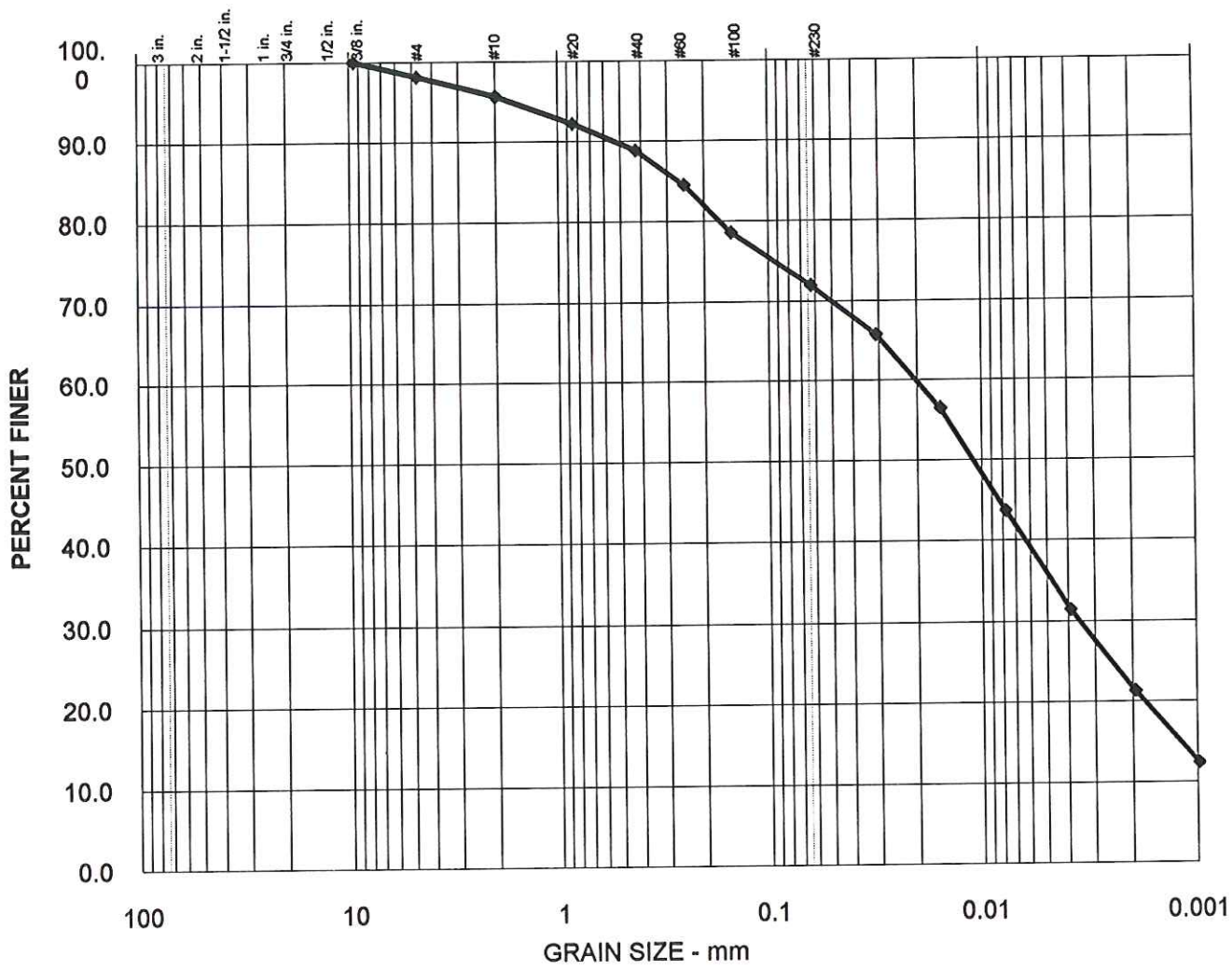
Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

J-4478-05
Figure D-102

11/5/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	2%	26%	41%	31%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-VC-77-S2	2.1 to 3.9 feet		*

	MATERIAL DESCRIPTION	
	Sandy, very clayey SILT	

Remarks:

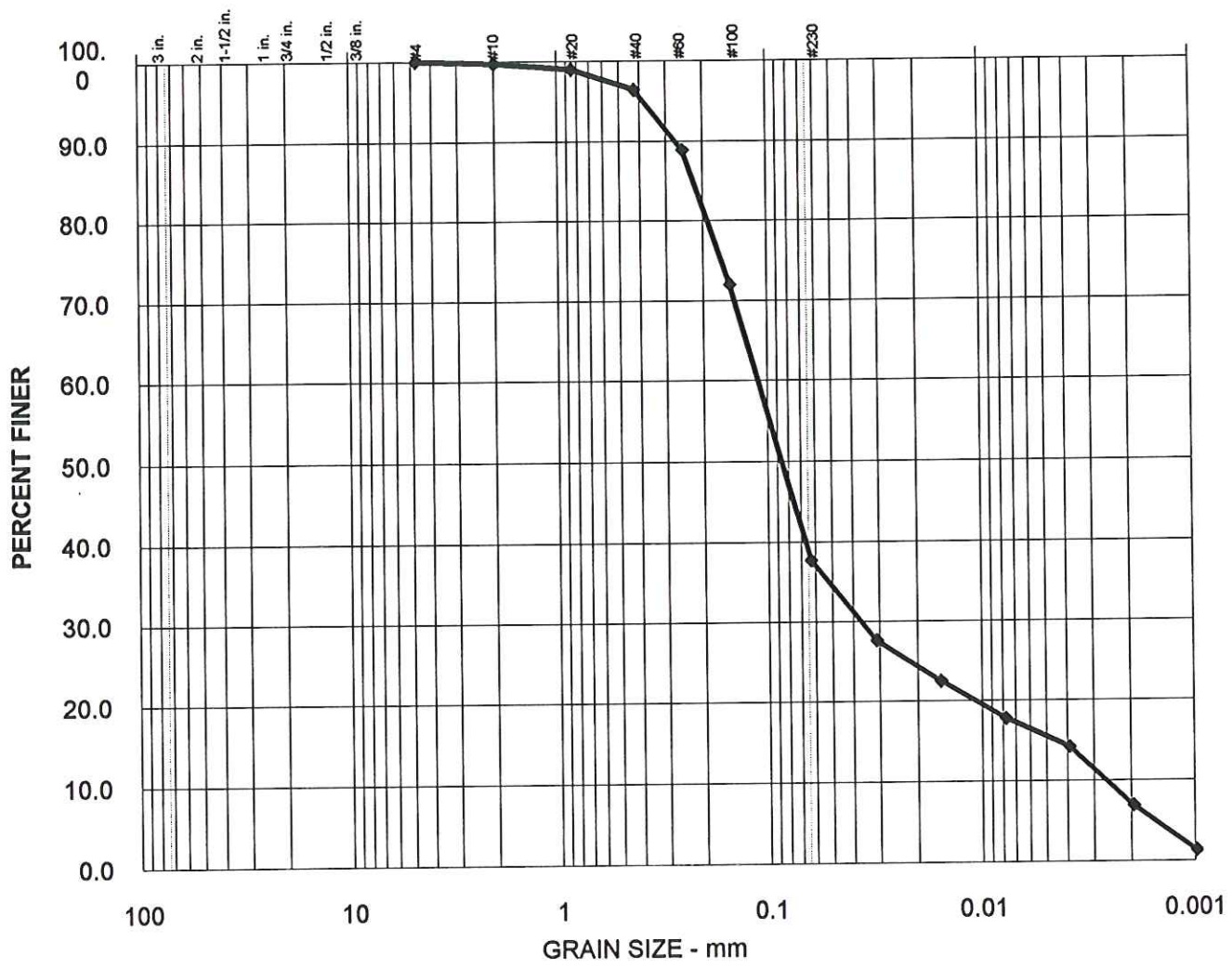
Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

J-4478-05
Figure D-103

11/5/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	62%	24%	14%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-VC-77-S3	3.9 to 5.4 feet		*

	MATERIAL DESCRIPTION	
	Clayey, silty SAND	

Remarks:

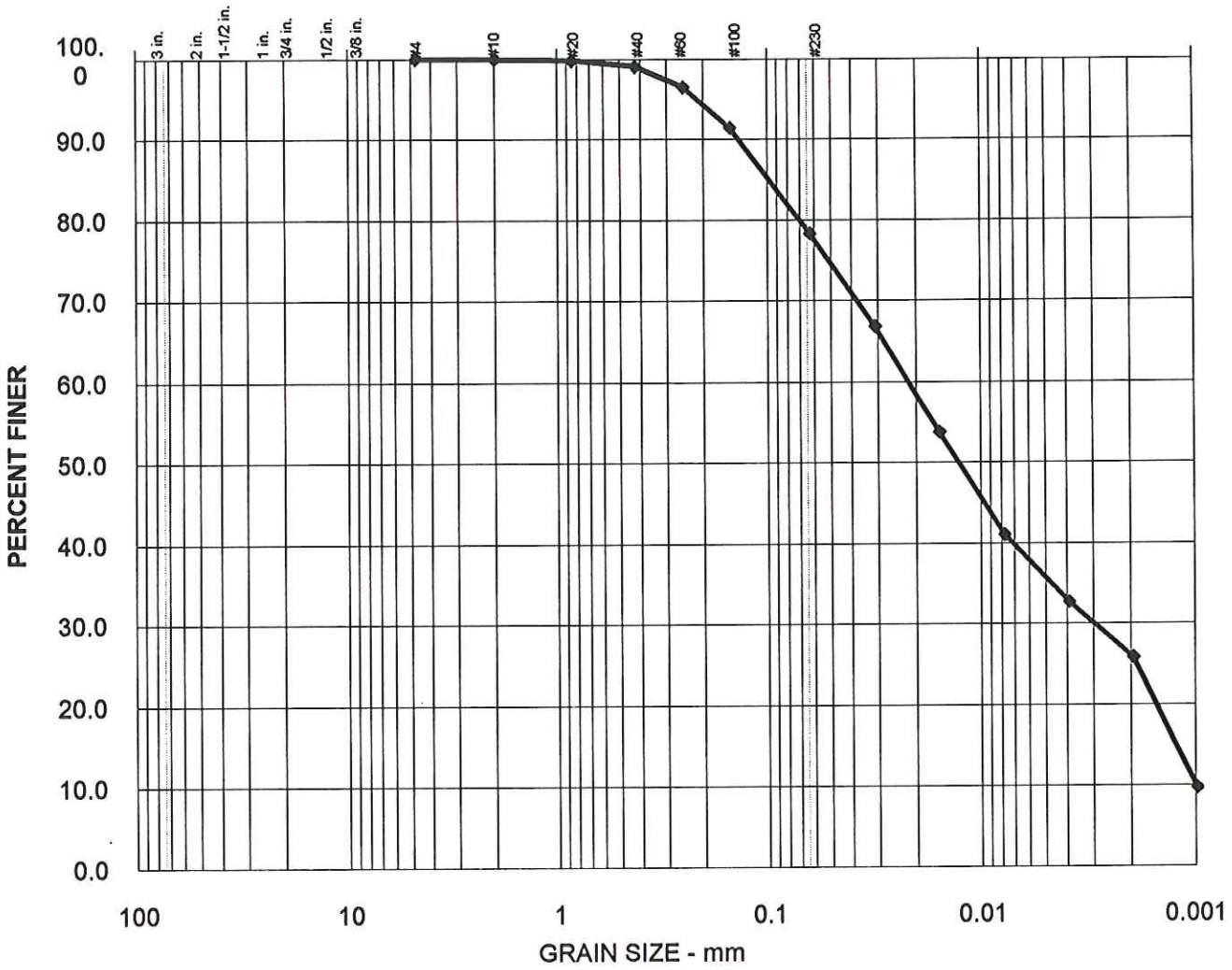
Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

J-4478-05
Figure D-104

11/5/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	22%	45%	33%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-VC-77-S4	5.4 to 8.6 feet		*

	MATERIAL DESCRIPTION	
	Sandy, very clayey SILT	

Remarks:

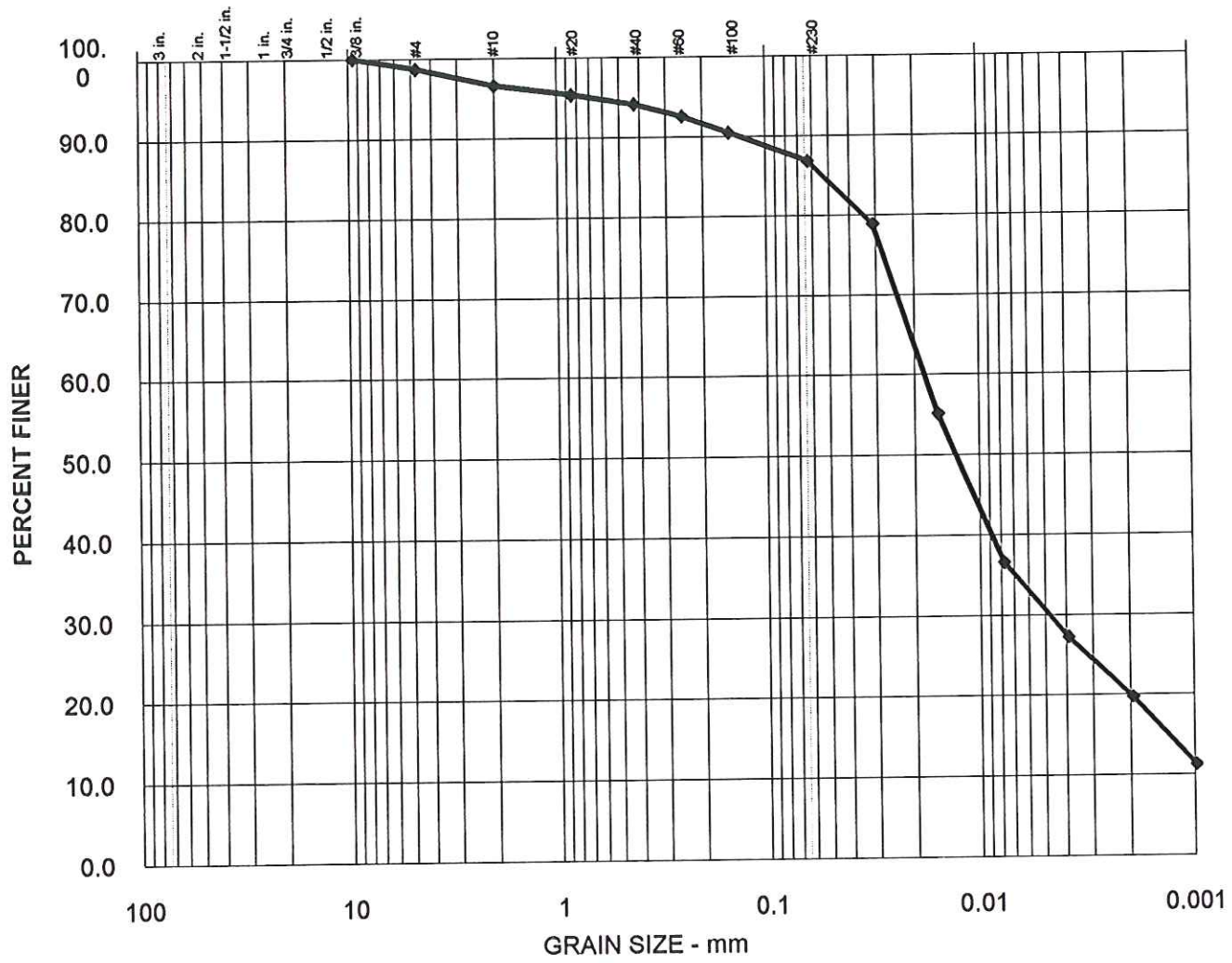
Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

J-4478-05
Figure D-105

11/5/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	1%	12%	60%	27%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-VC-78-S1	0 to 2.38 feet		*

	MATERIAL DESCRIPTION	
	Slightly sandy, clayey SILT	

Remarks:

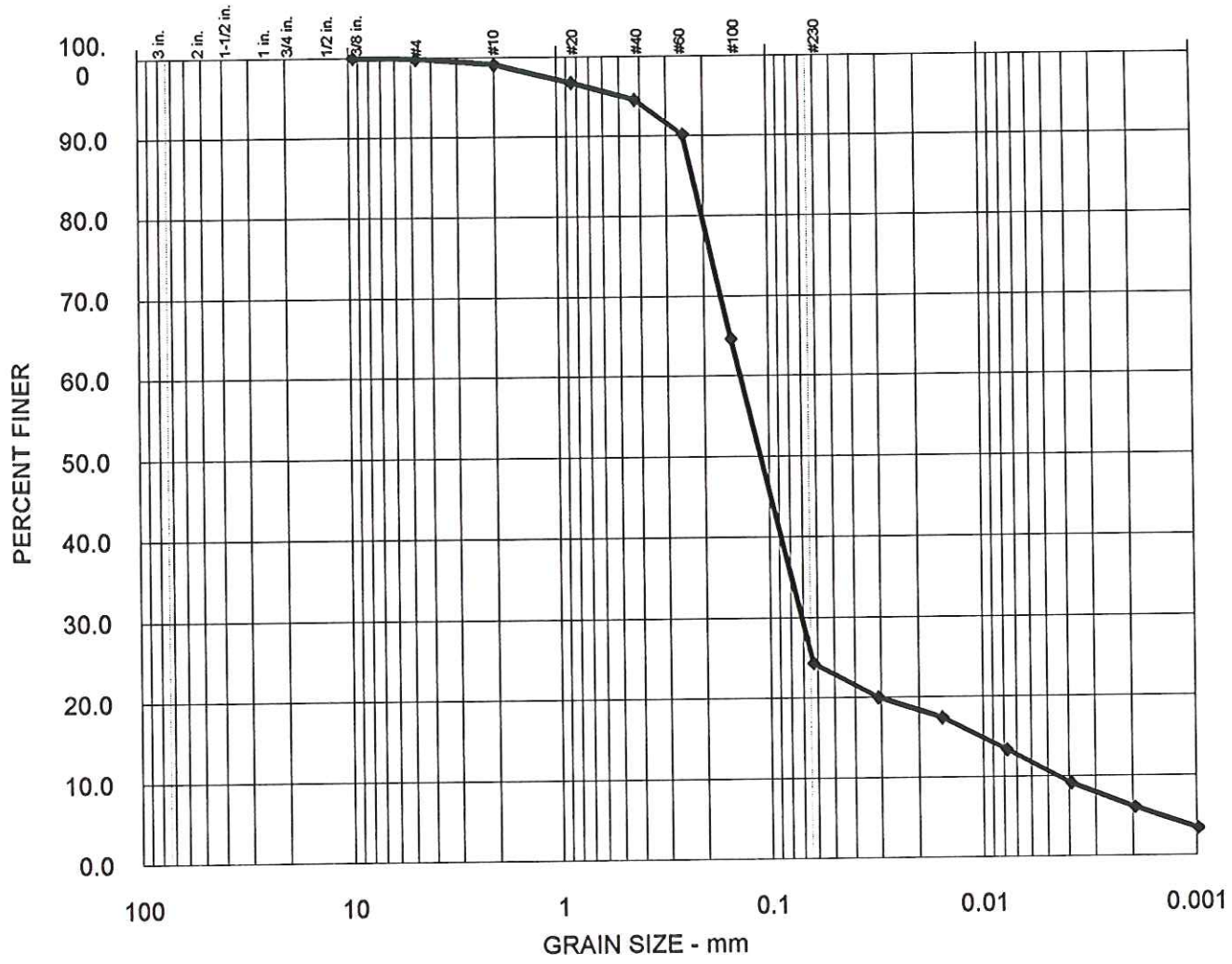
Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

J-4478-05
Figure D-106

10/24/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	76%	15%	9%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-VC-78-S2	2.6 to 3.9 feet		*

	MATERIAL DESCRIPTION	
	Slightly clayey, silty SAND	

Remarks:

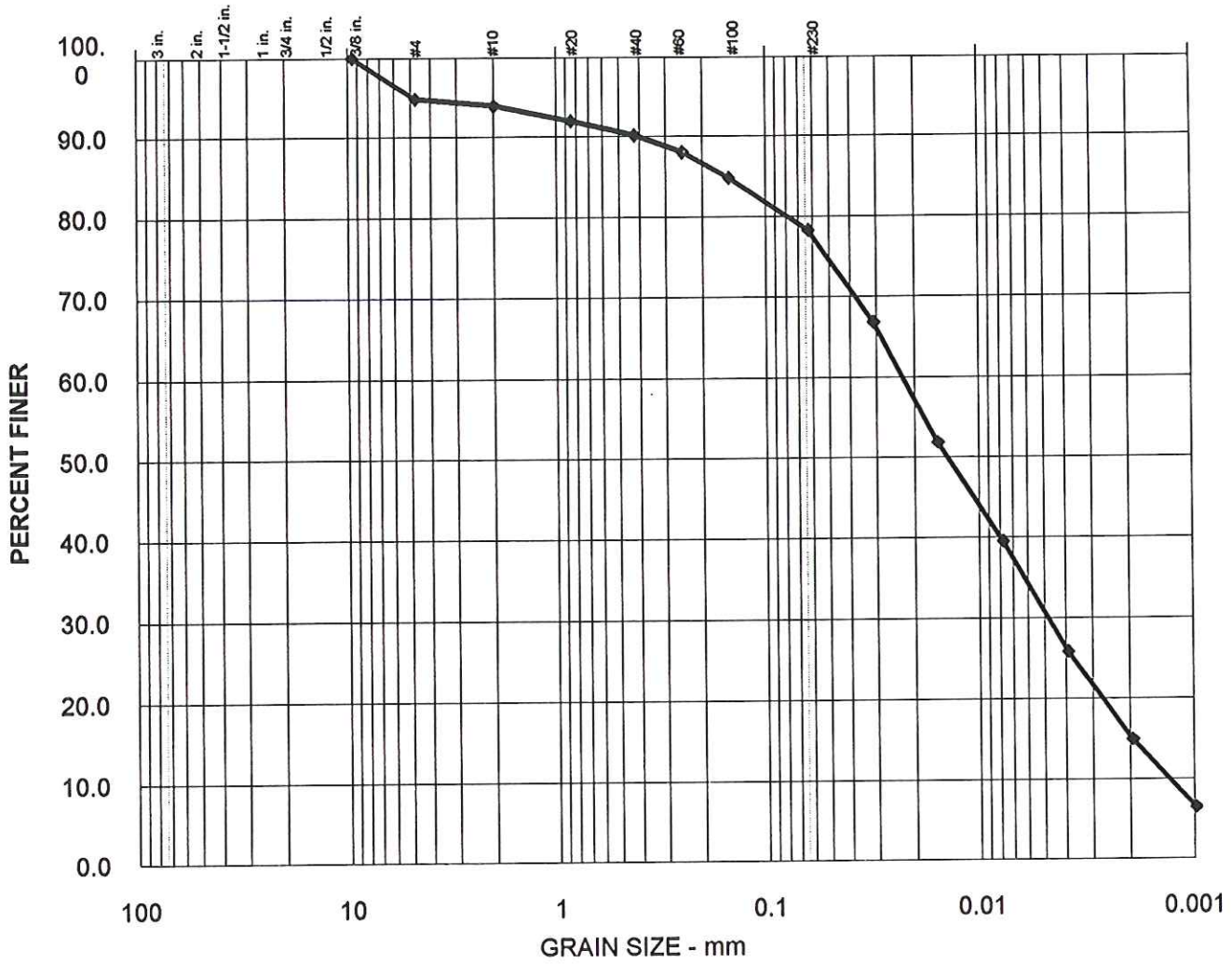
Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

J-4478-05
Figure D-107

10/25/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	5%	17%	52%	26%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-VC-79-S1	0 to 2.0 feet		*

	MATERIAL DESCRIPTION	
	Sandy, clayey SILT	

Remarks:

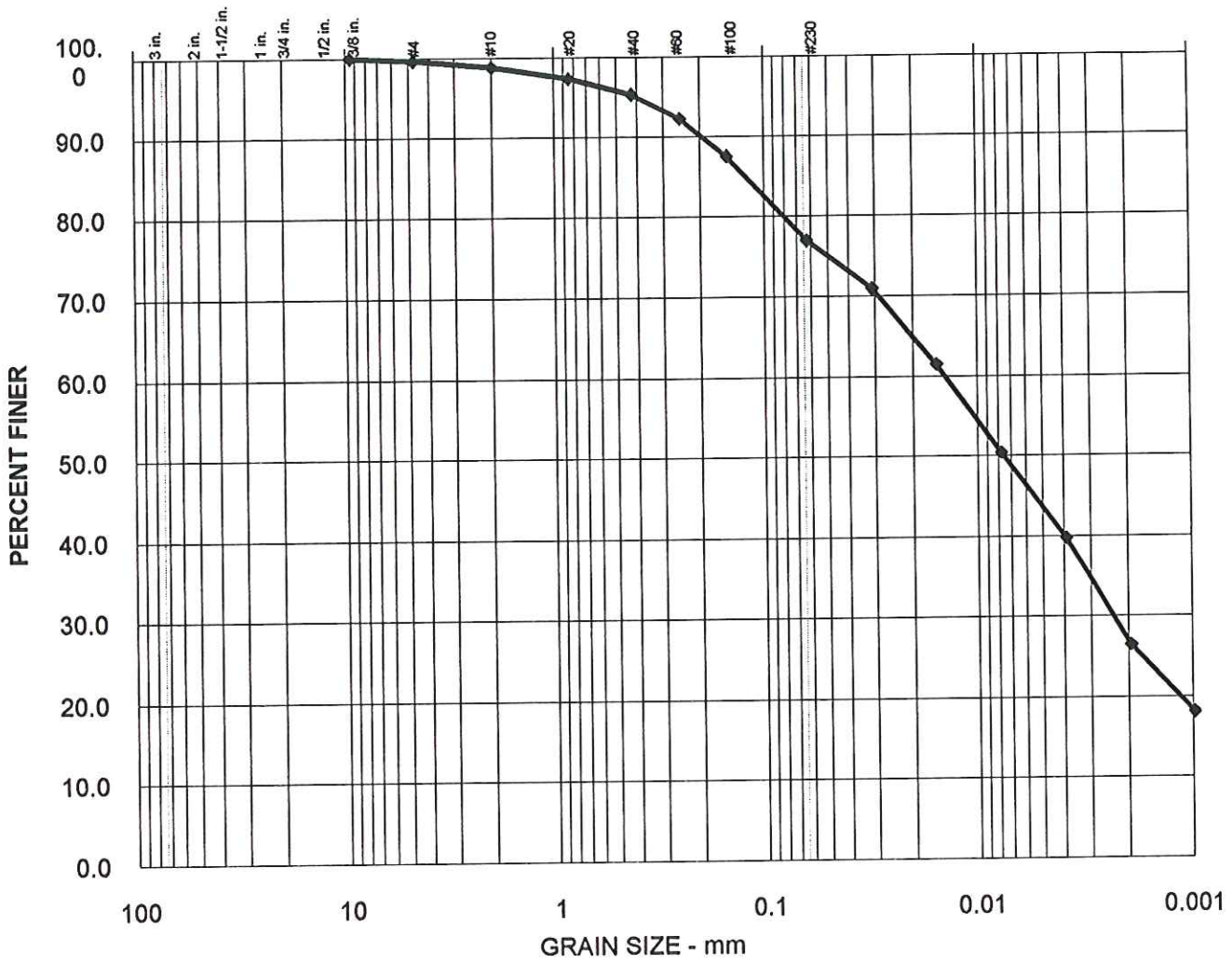
Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

J-4478-05
Figure D-108

10/21/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	23%	37%	40%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-VC-79-S2	2.0 to 4.0 feet		*

	MATERIAL DESCRIPTION	
	Sandy, very silty CLAY	

Remarks:

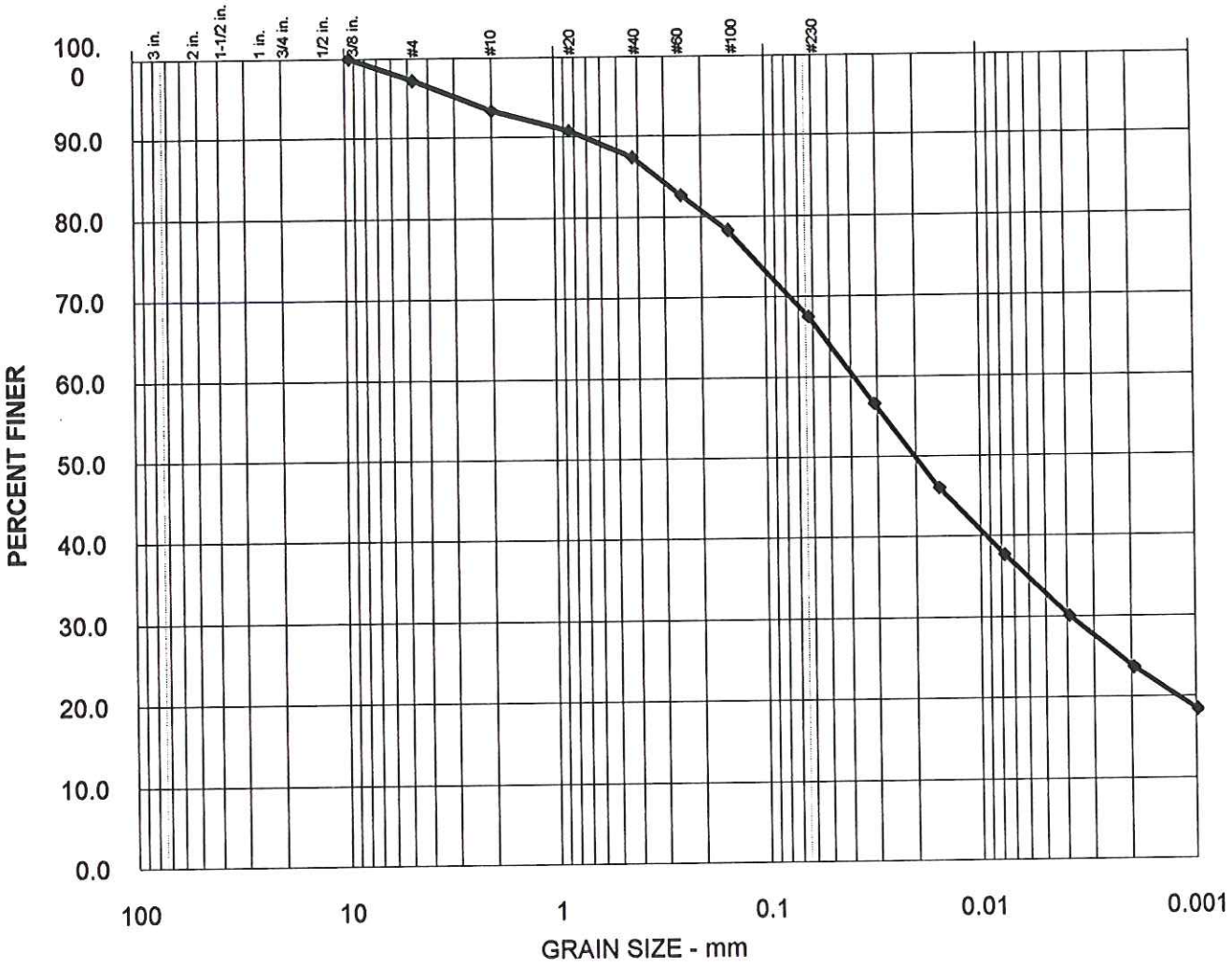
Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

J-4478-05
Figure D-109

10/22/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	3%	30%	37%	30%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-VC-79-S3	3.8 to 4.9 feet		*

	MATERIAL DESCRIPTION	
	Sandy, clayey SILT	

Remarks:

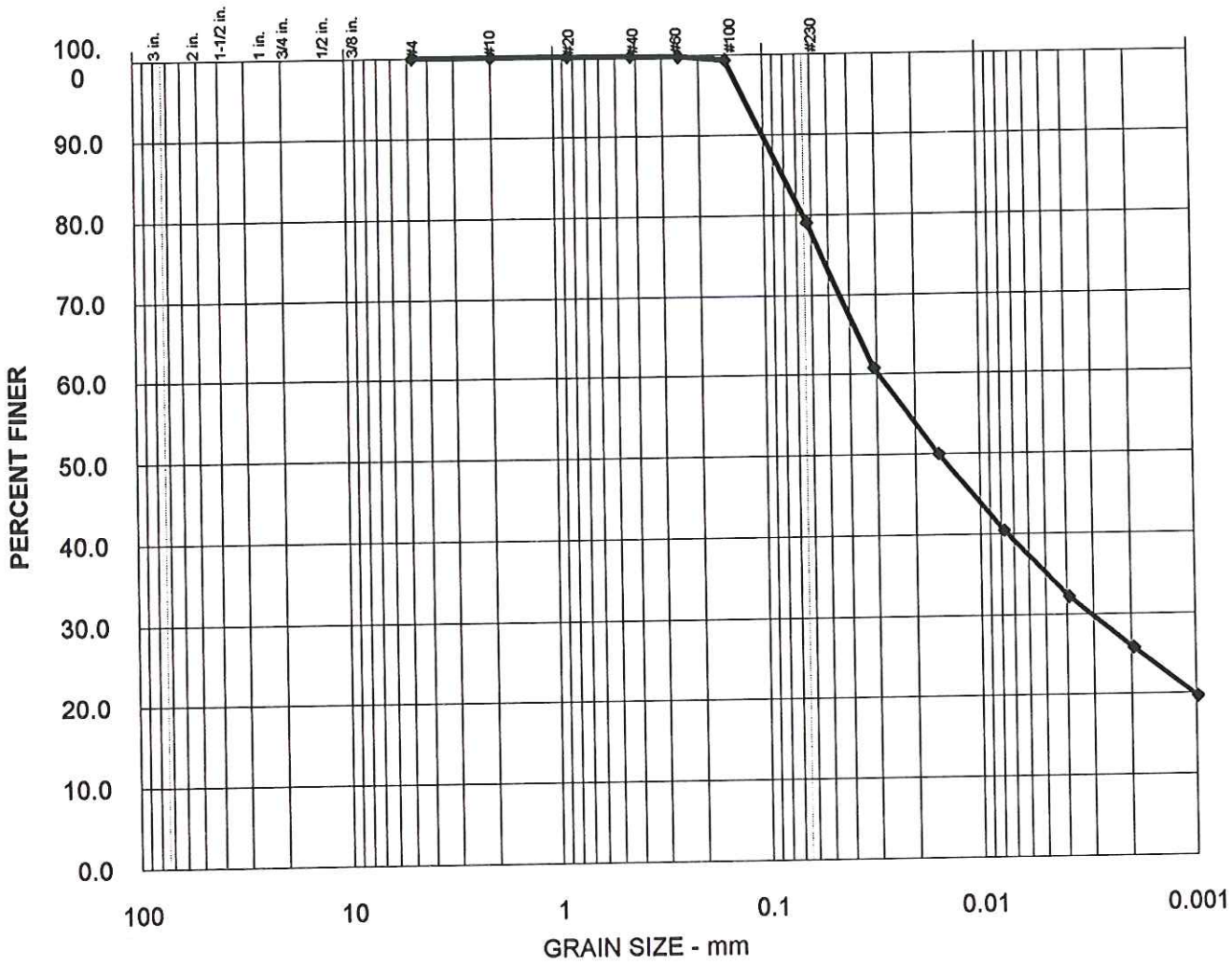
Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

J-4478-05
Figure D-110

10/21/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	21%	47%	32%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-VC-79-S4	4.9 to 7.0 feet		*

	MATERIAL DESCRIPTION	
	Sandy, very clayey SILT	

Remarks:

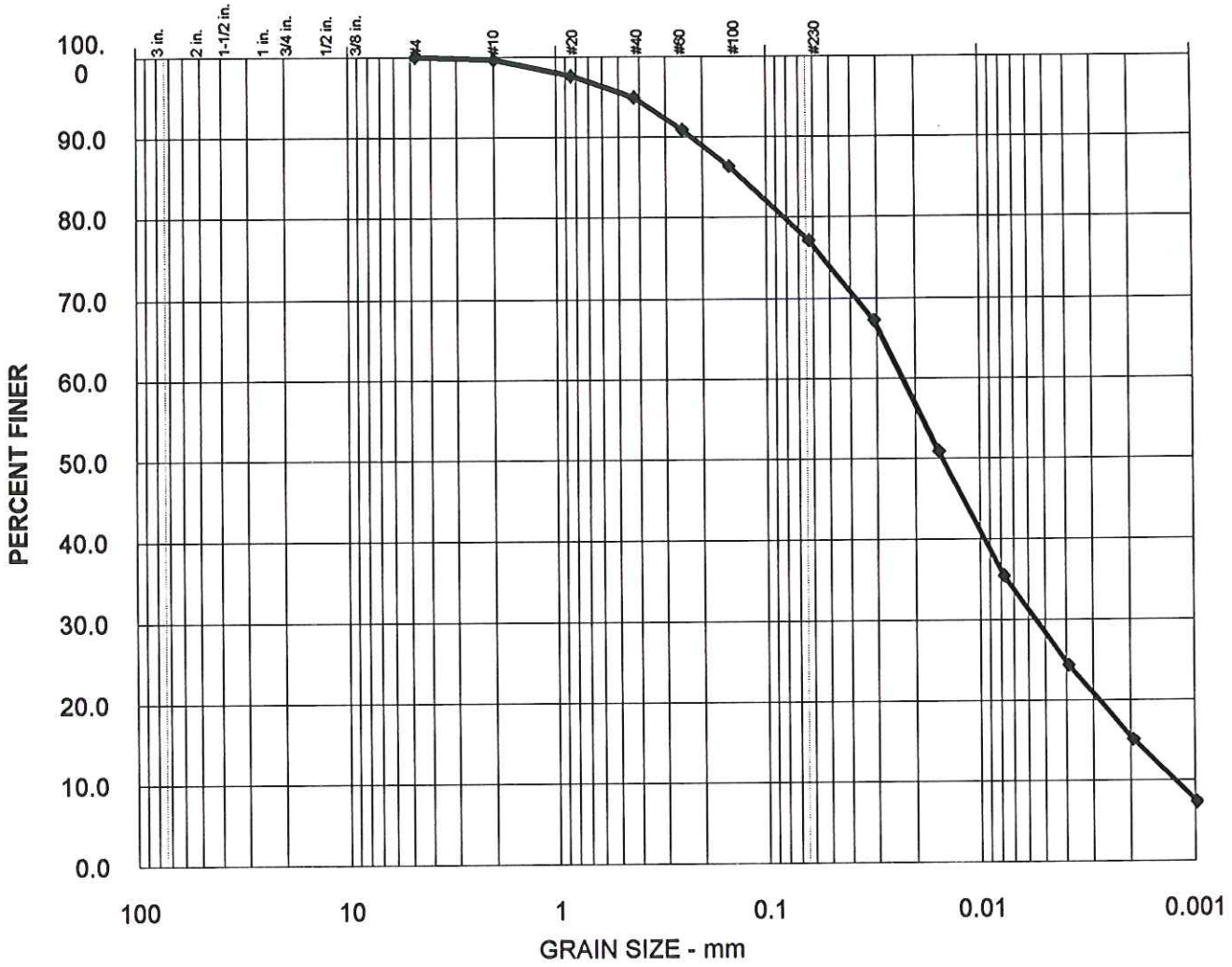
Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

J-4478-05
Figure D-111

10/21/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	23%	53%	24%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-VC-80-S1	0 to 1.5 feet		*

	MATERIAL DESCRIPTION	
	Sandy, clayey SILT	

Remarks:

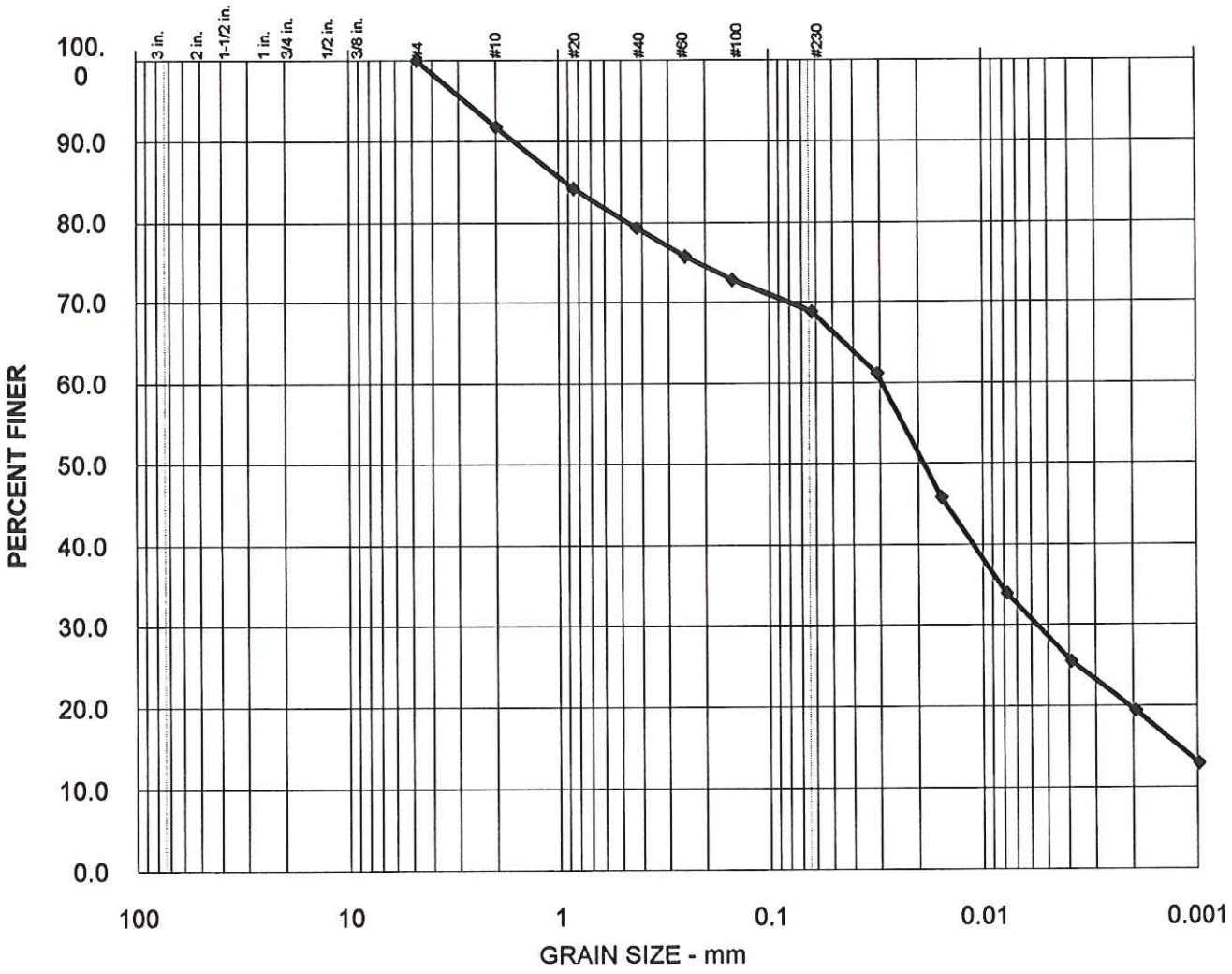
Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

J-4478-05
Figure D-112

12/12/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	31%	44%	25%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-VC-80-S2	1.8 to 4.8 feet		*

	MATERIAL DESCRIPTION	
	Clayey, very sandy SILT	

Remarks:

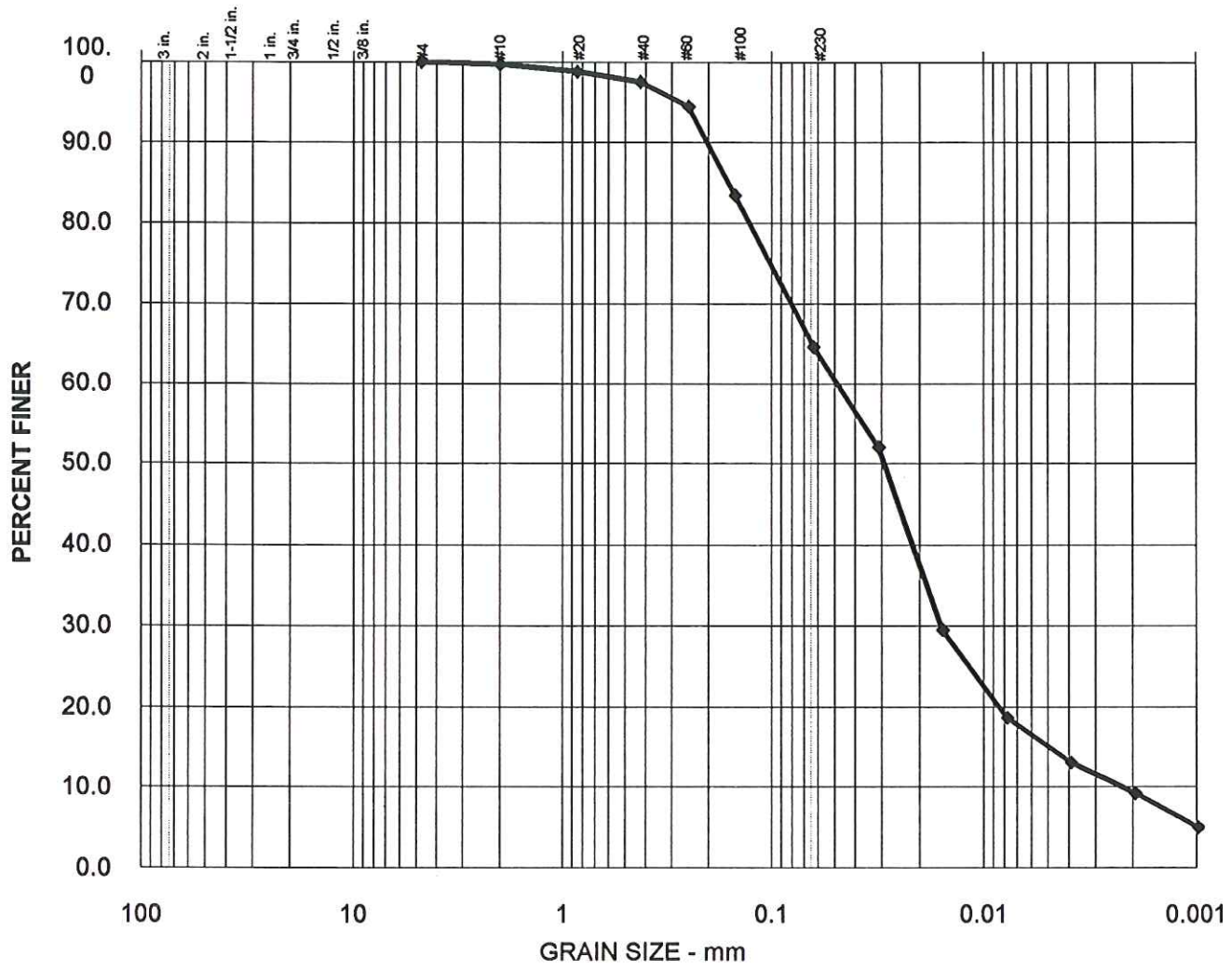
Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

J-4478-05
Figure D-113

11/5/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	35%	52%	13%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-VC-81-S1	0 to 1.6 feet		*

	MATERIAL DESCRIPTION	
	Clayey, very sandy SILT	

Remarks:

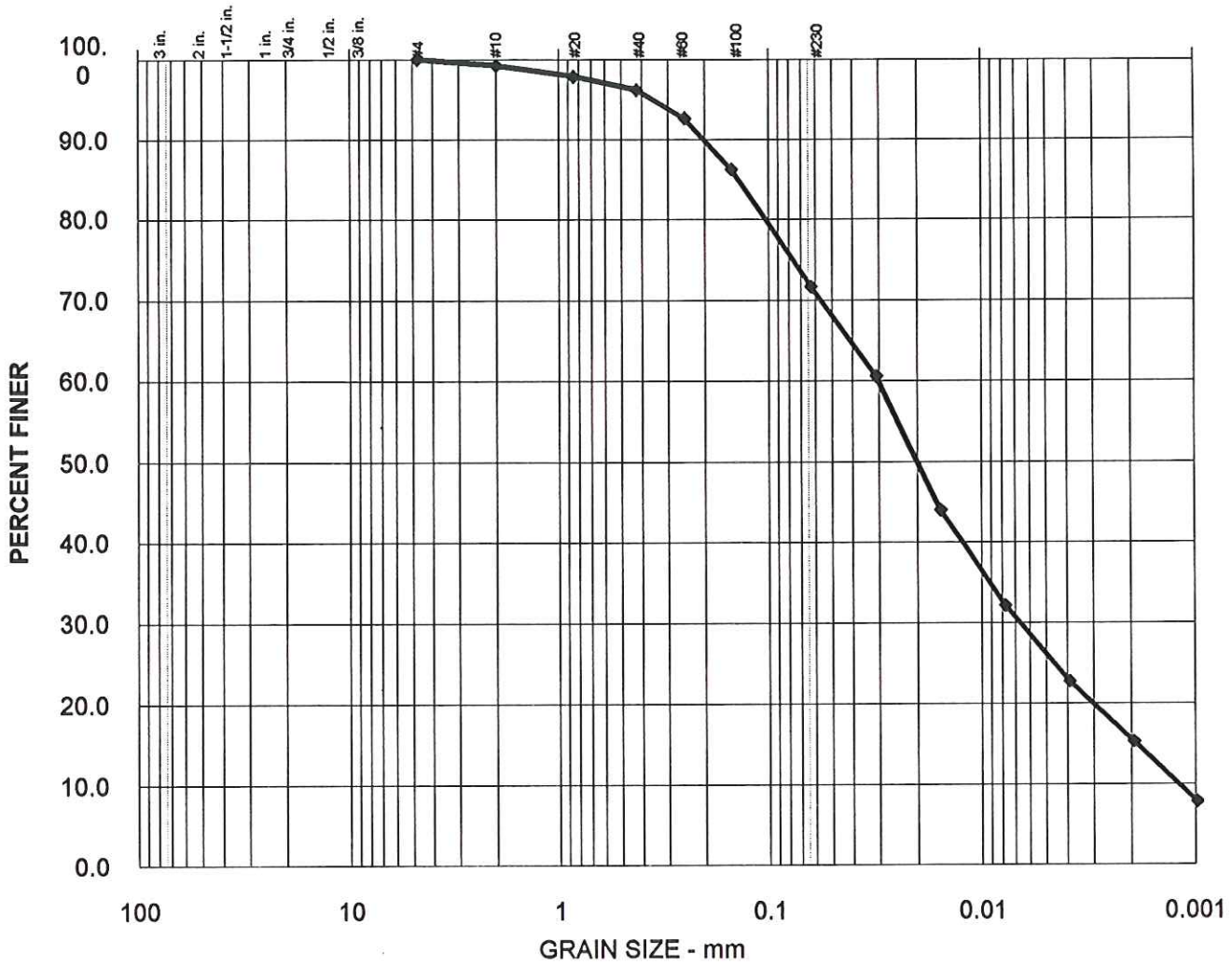
Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

J-4478-05
Figure D-114

11/19/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	28%	49%	23%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-VC-81-S2	1.6 to 3.2 feet		*

	MATERIAL DESCRIPTION	
	Clayey, sandy SILT	

Remarks:

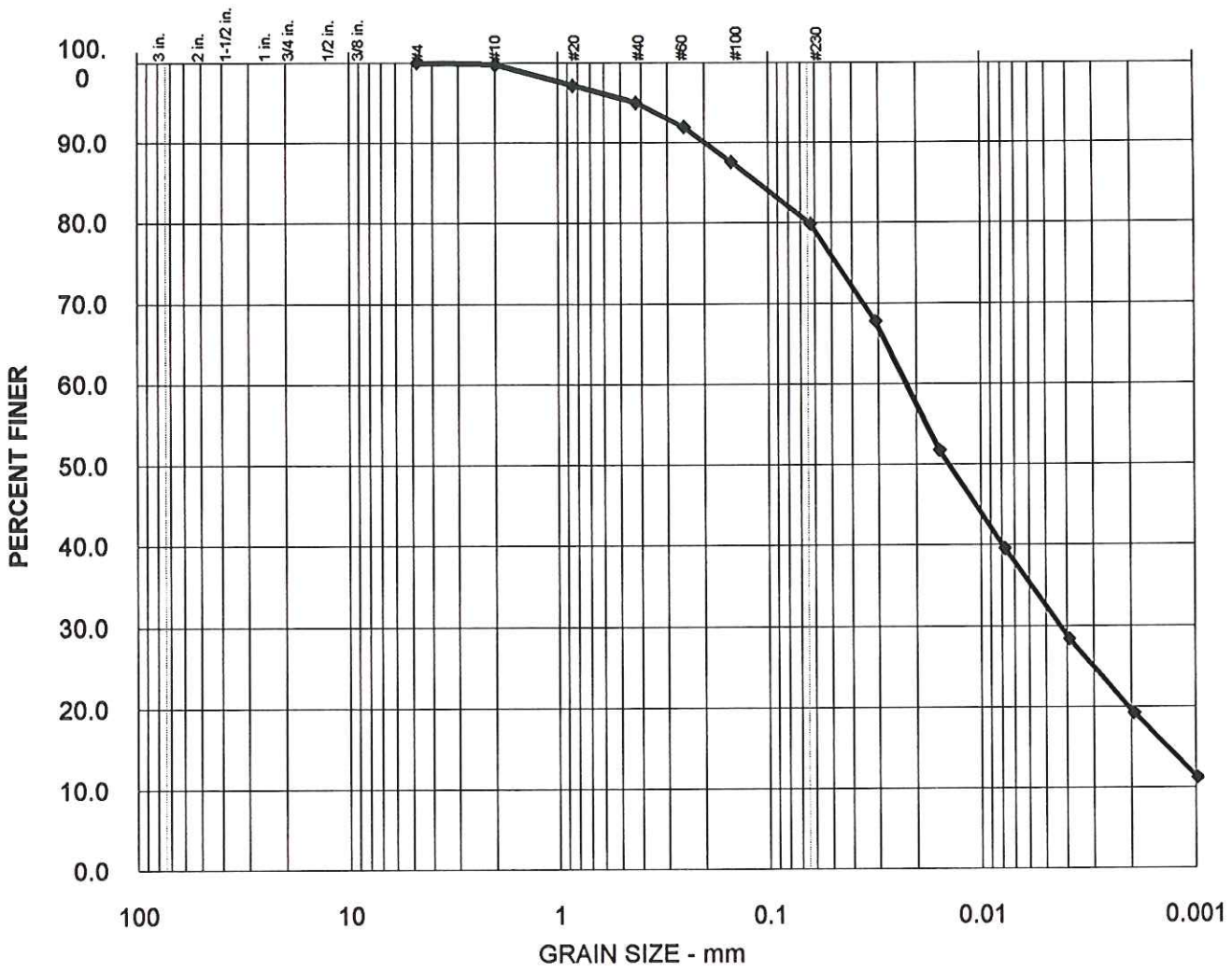
Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

J-4478-05
Figure D-115

10/25/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	20%	52%	28%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-VC-82-S1	0 to 2.3 feet		*

	MATERIAL DESCRIPTION	
	Sandy, clayey SILT	

Remarks:

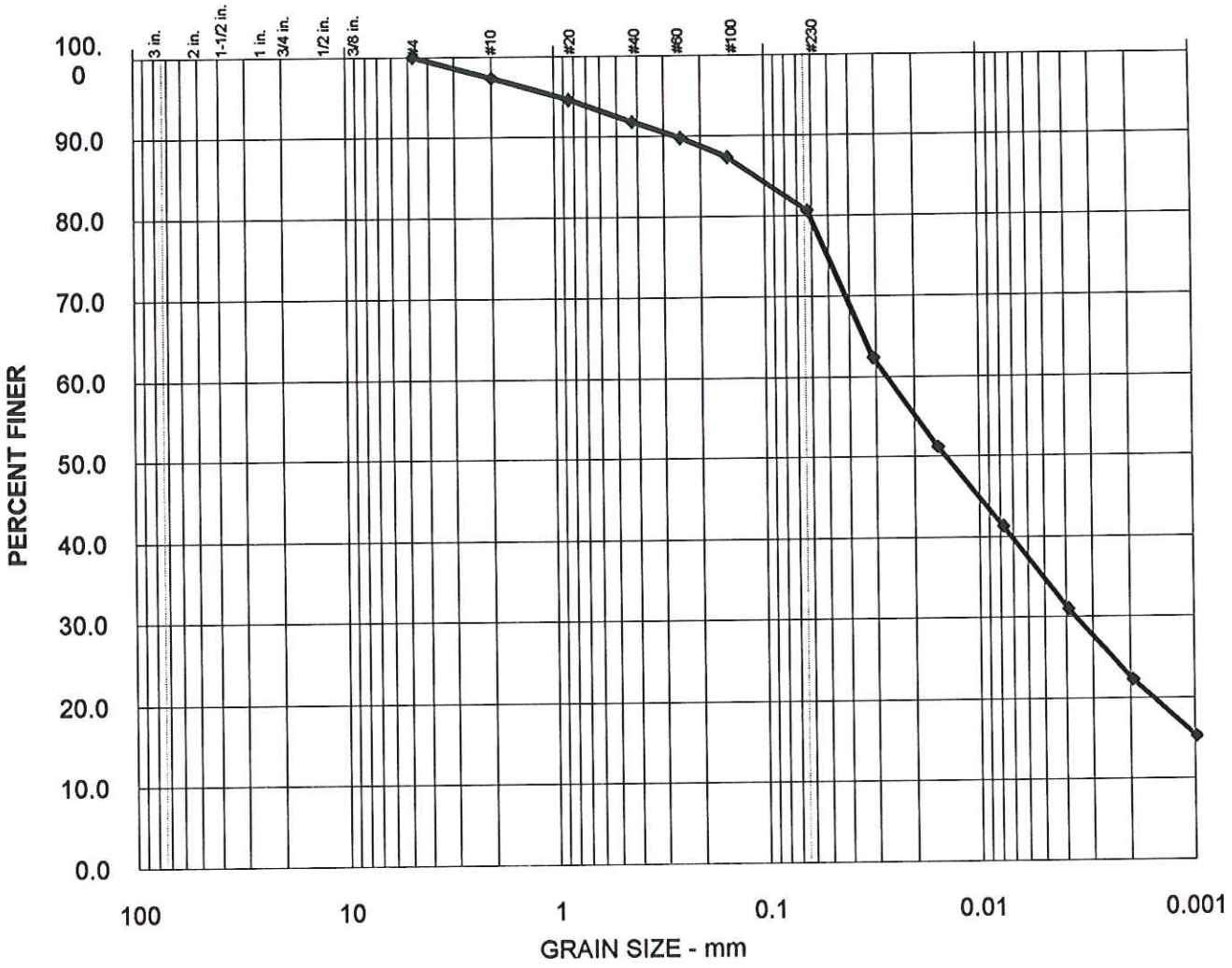
Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

J-4478-05
Figure D-116

11/12/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	19%	50%	31%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-VC-82-S2(A)	2.5 to 5.0 feet		*

	MATERIAL DESCRIPTION	
	Sandy, very clayey SILT	

Remarks:

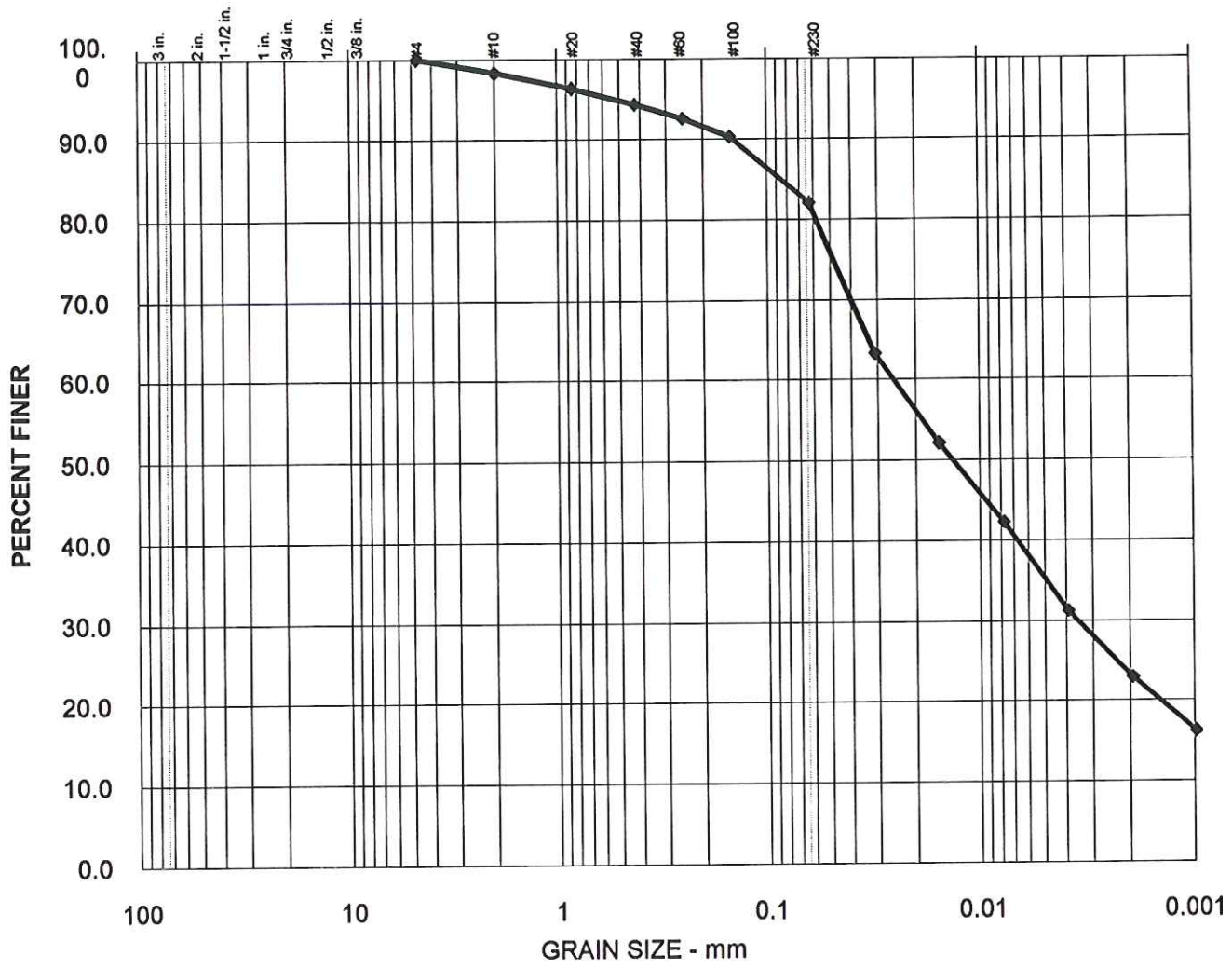
Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

J-4478-05
Figure D-117

11/12/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	18%	51%	31%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-VC-82-S2(B) Duplicate	2.5 to 5.0 feet		*

	MATERIAL DESCRIPTION	
	Sandy, very clayey SILT	

Remarks:

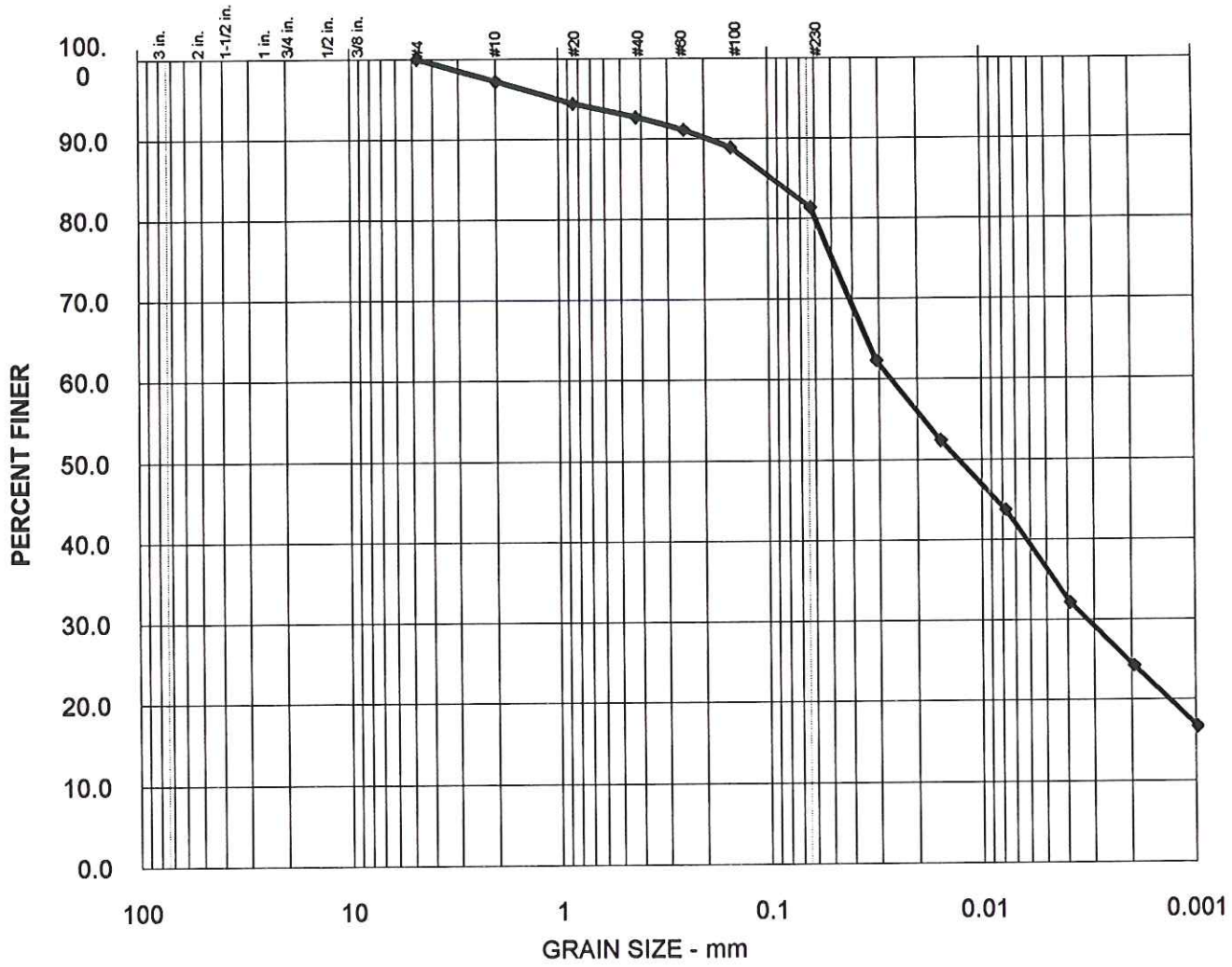
Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

J-4478-05
Figure D-118

11/12/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	19%	49%	32%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-VC-82-S2(C) Triplicate	2.5 to 5.0 feet		*

	MATERIAL DESCRIPTION	
	Sandy, very clayey SILT	

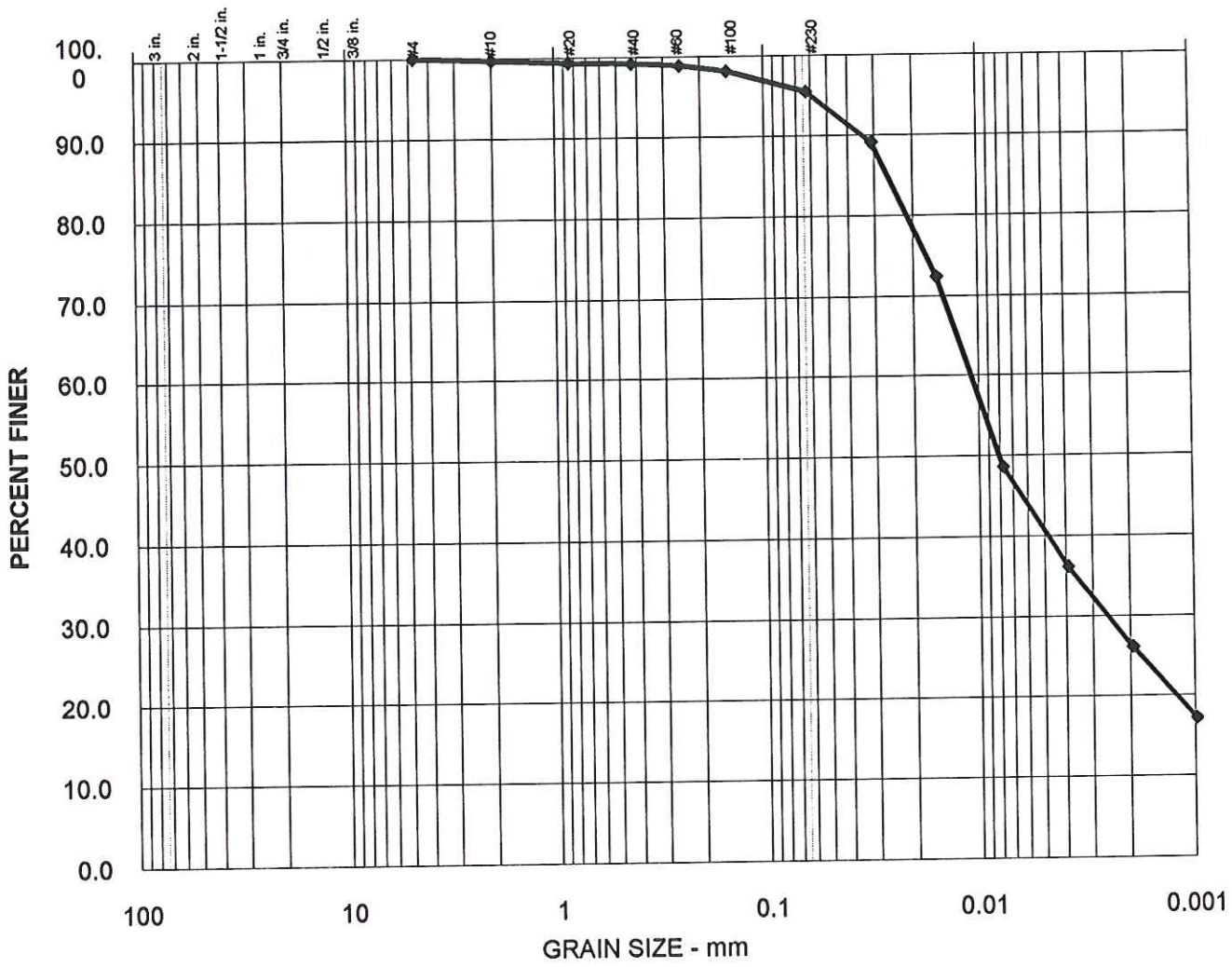
Remarks:

Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

J-4478-05
Figure D-119

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	4%	60%	36%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-VC-83-S1	0 to 2.4 feet		*

	MATERIAL DESCRIPTION	
	Very clayey SILT	

Remarks:

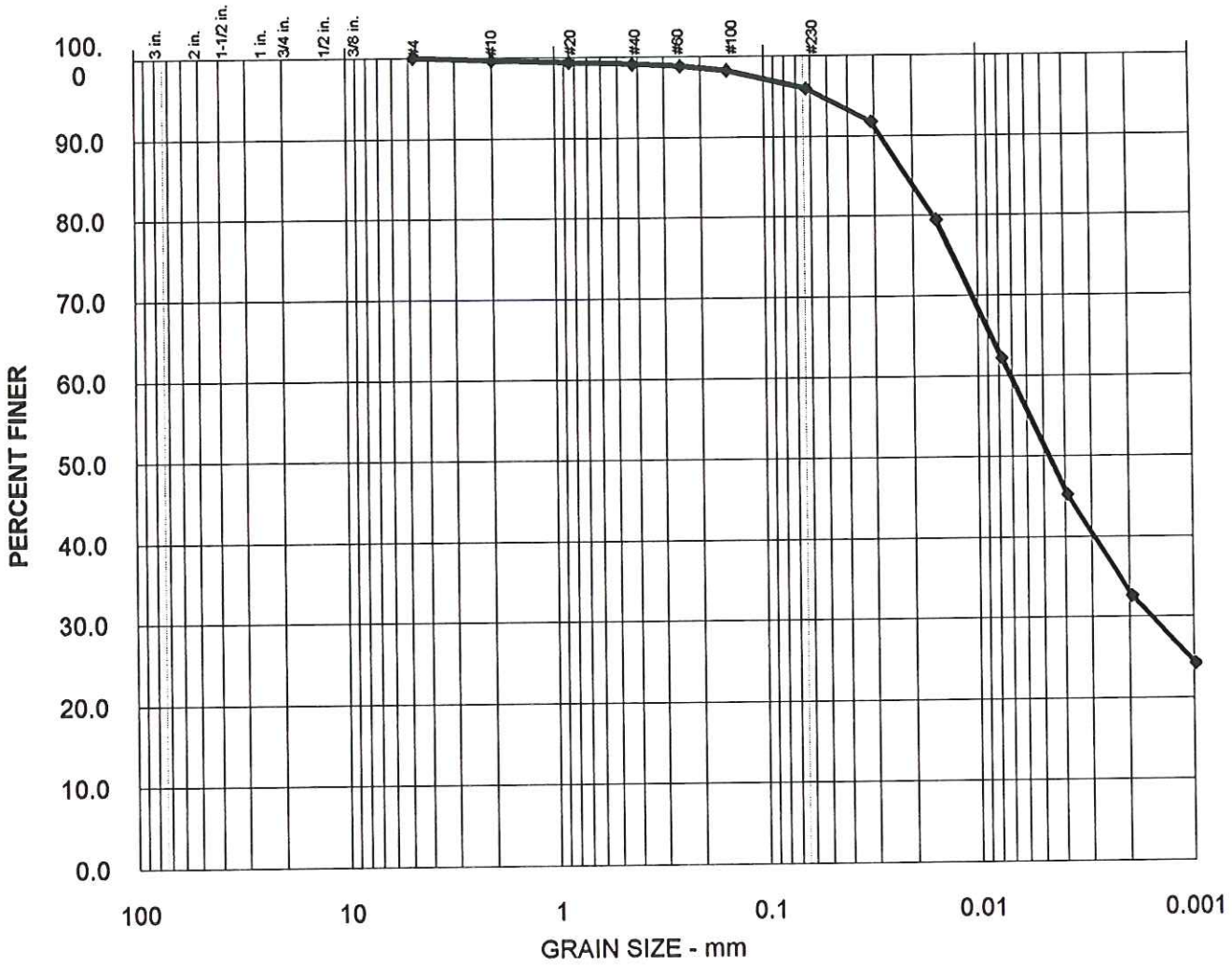
Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

J-4478-05
Figure D-120

10/17/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	4%	51%	45%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-VC-83-S2	5.5 to 7.3 feet		*

	MATERIAL DESCRIPTION	
	Very clayey SILT	

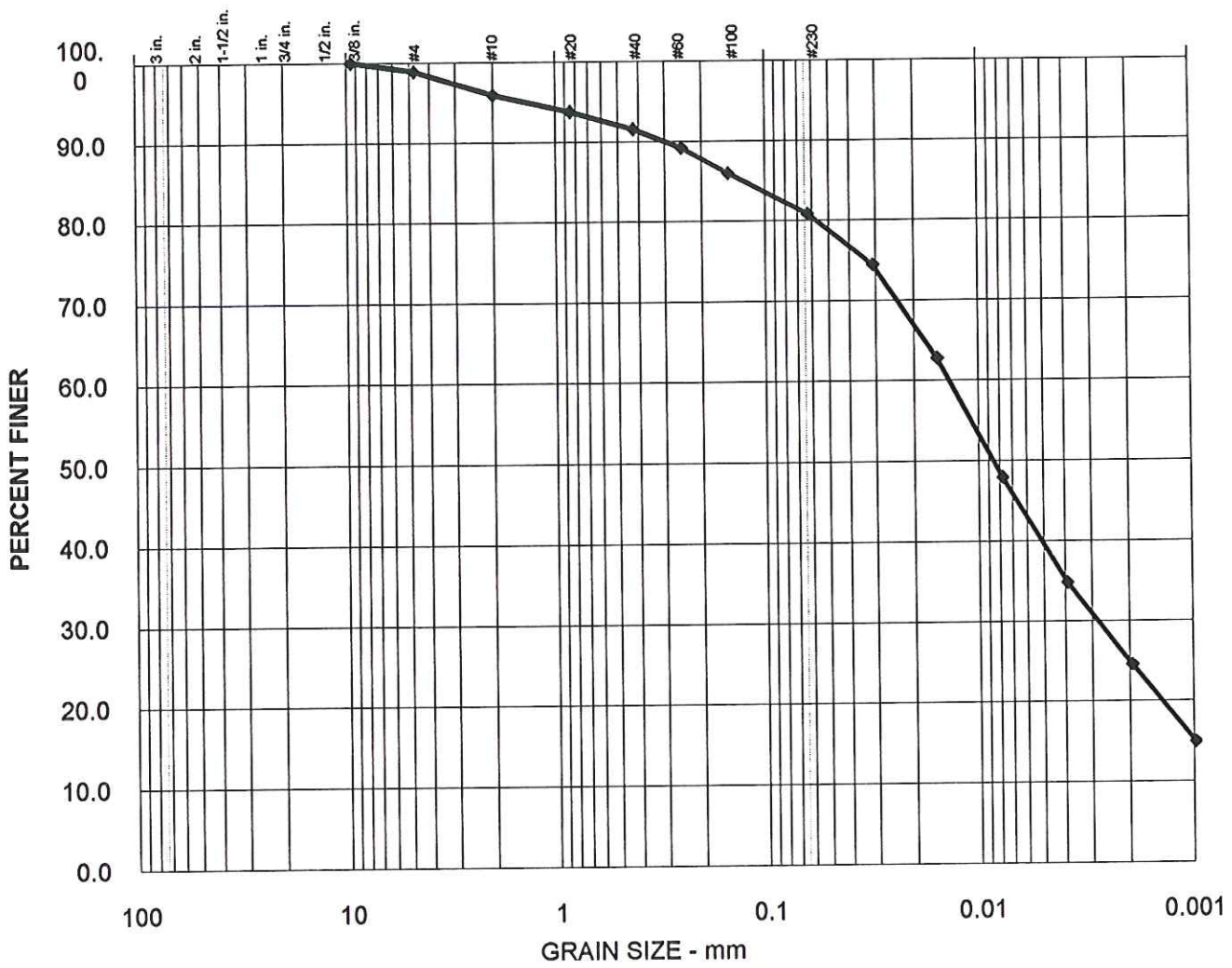
Remarks:

Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

J-4478-05
Figure D-121

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	1%	18%	46%	35%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-VC-84-S1	0 to 1.32 feet		*

	MATERIAL DESCRIPTION	
	Sandy, very clayey SILT	

Remarks:

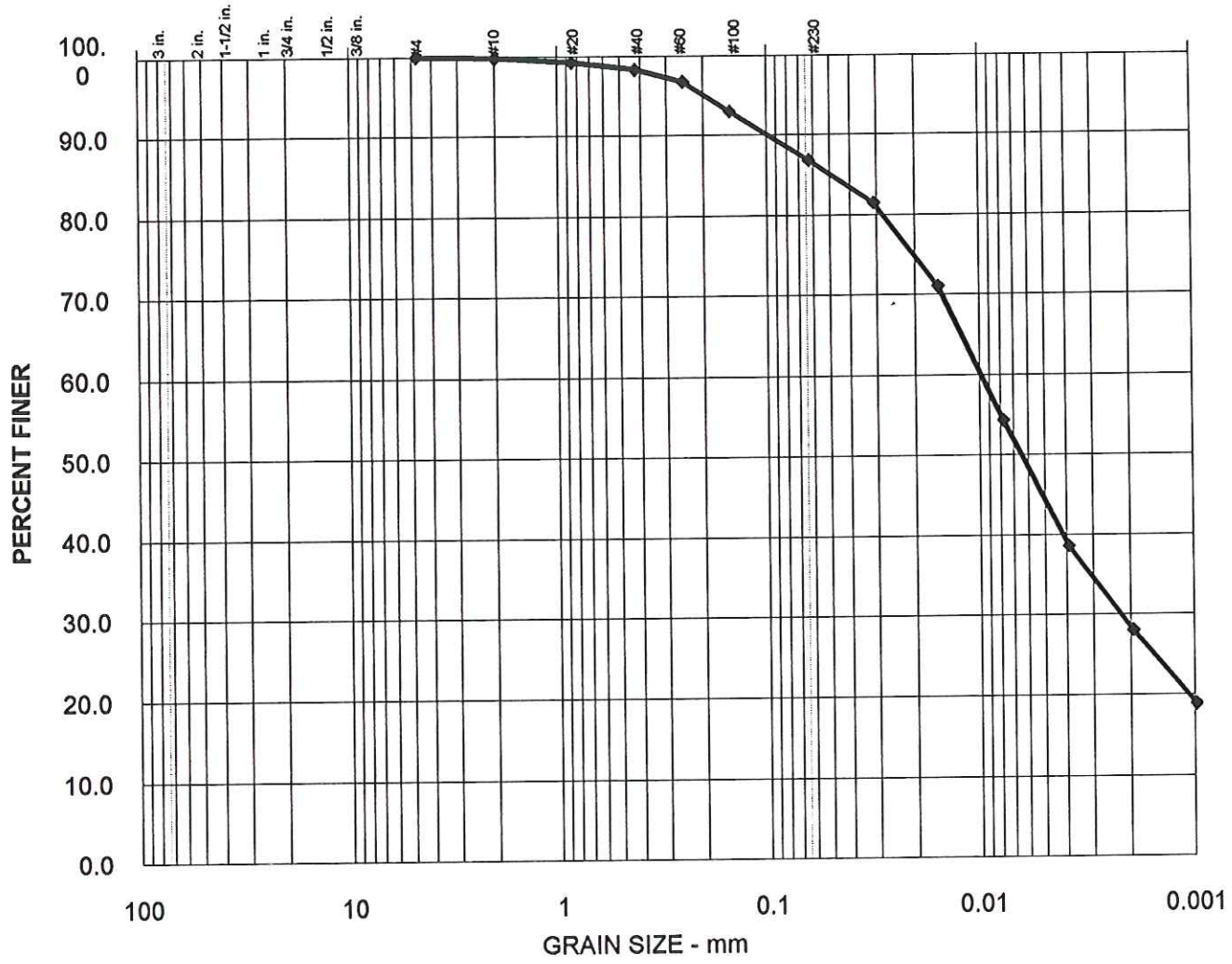
Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

J-4478-05
Figure D-122

10/22/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	13%	48%	39%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-VC-84-S2	1.8 to 4.4 feet		*

	MATERIAL DESCRIPTION	
	Sandy, very clayey SILT	

Remarks:

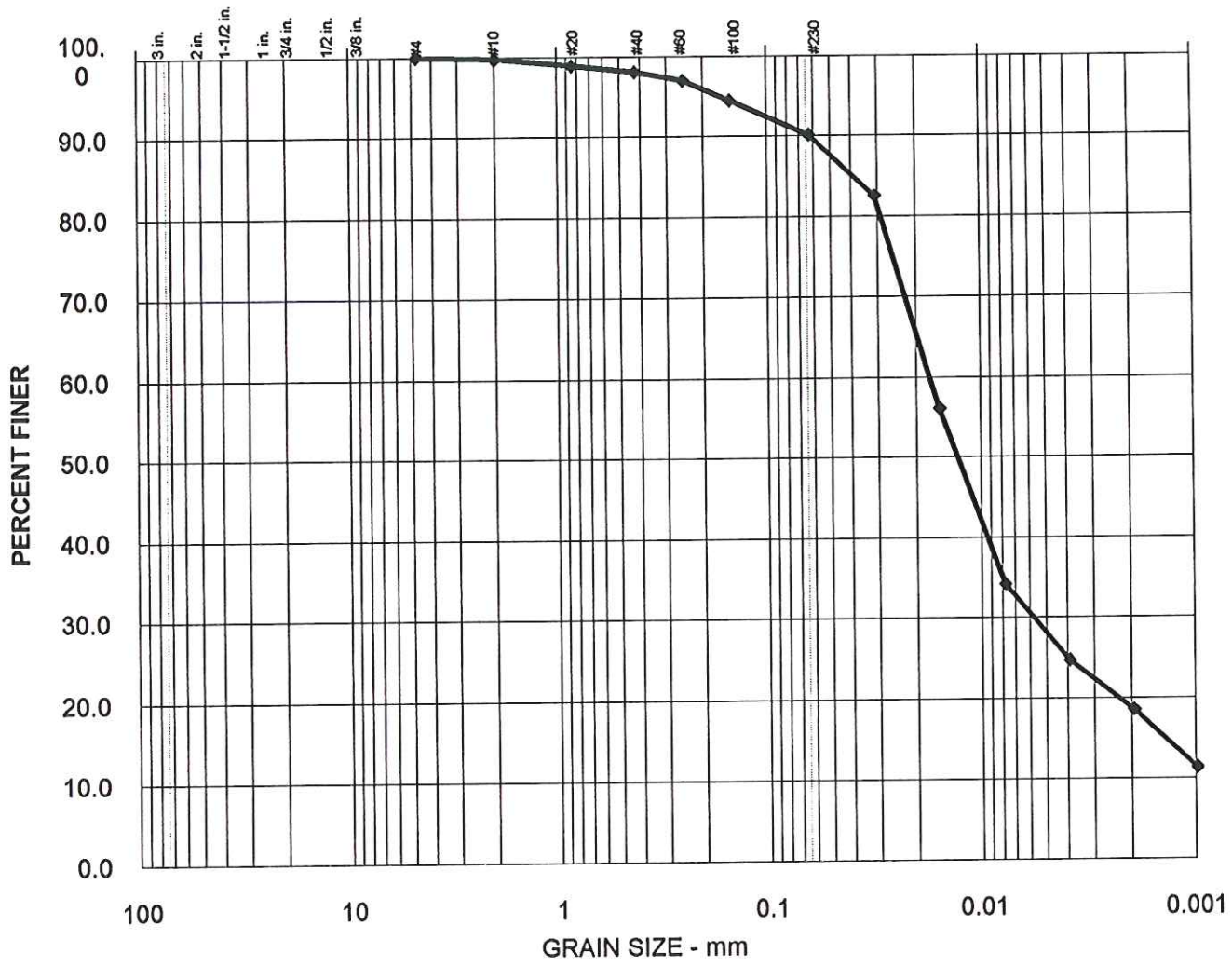
Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

J-4478-05
Figure D-123

10/22/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	10%	65%	25%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-VC-85-S1	0 to 3.1 feet		*

	MATERIAL DESCRIPTION	
	Slightly sandy, clayey SILT	

Remarks:

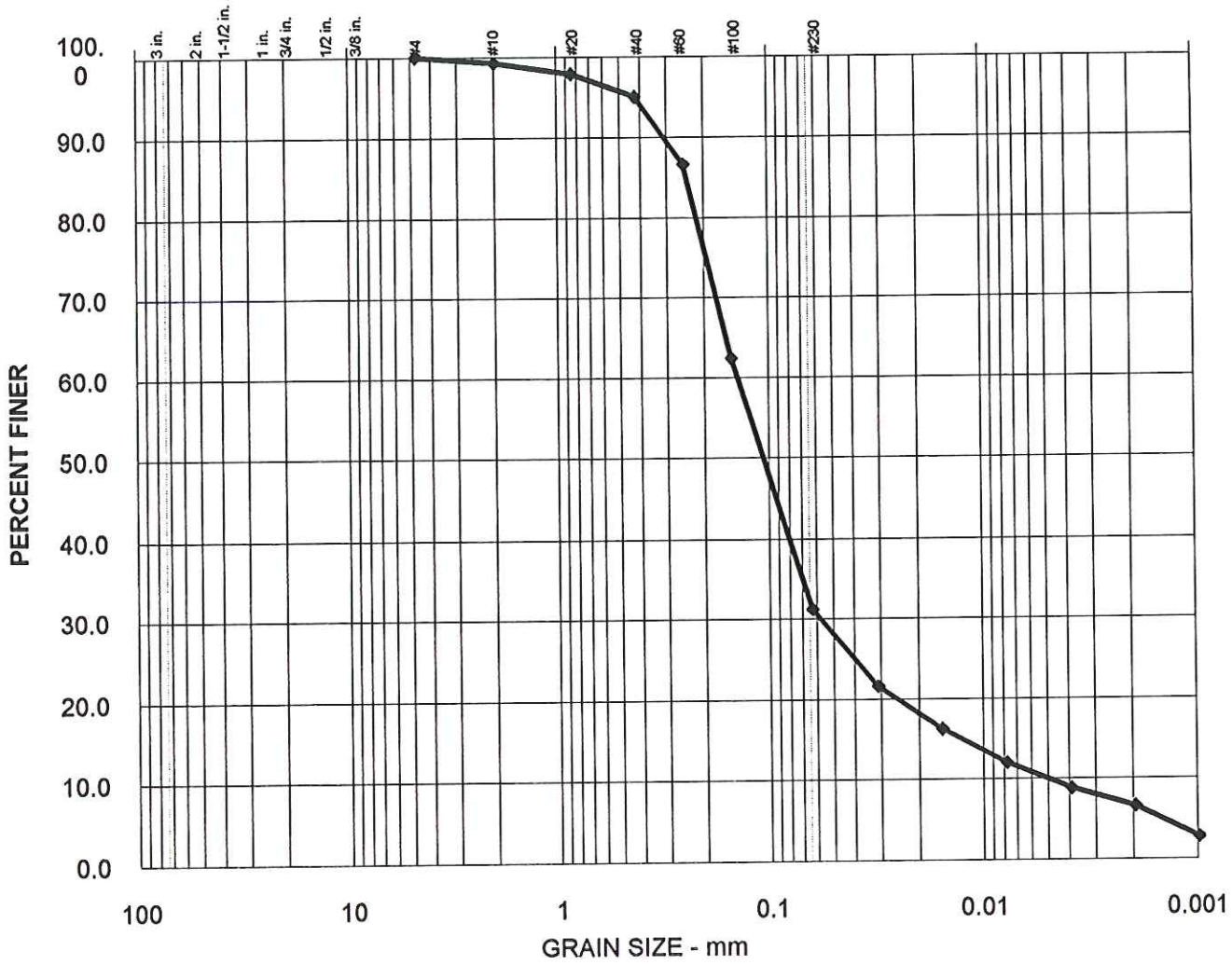
Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

J-4478-05
Figure D-124

10/22/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	69%	22%	9%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-VC-85-S2	3.3 to 5.6 feet		*

	MATERIAL DESCRIPTION	
	Slightly clayey, silty SAND	

Remarks:

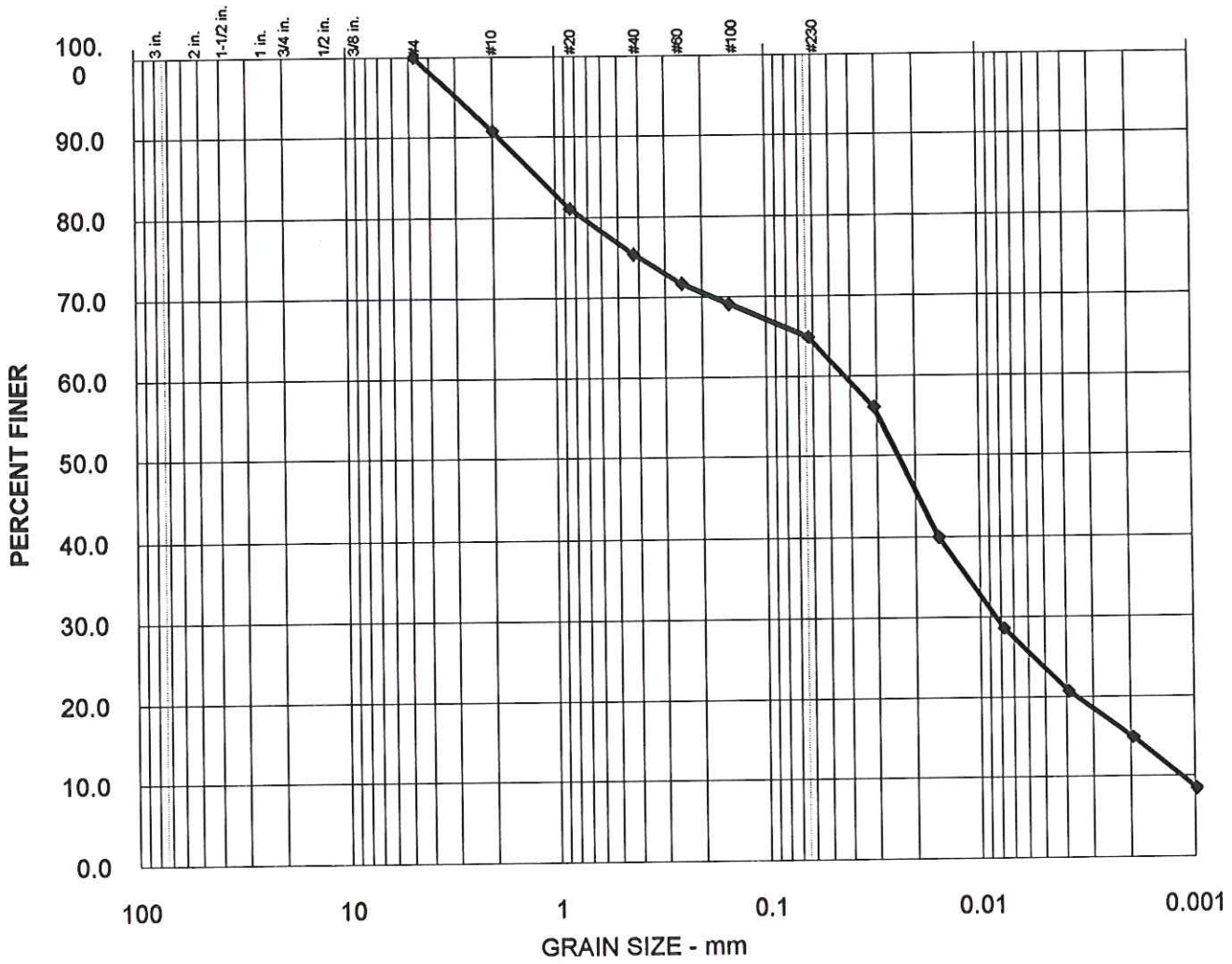
Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

J-4478-05
Figure D--125

10/22/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	35%	44%	21%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-VC-206	1.9 to 5.3 feet		*

	MATERIAL DESCRIPTION	
	Clayey, very sandy SILT	

Remarks:

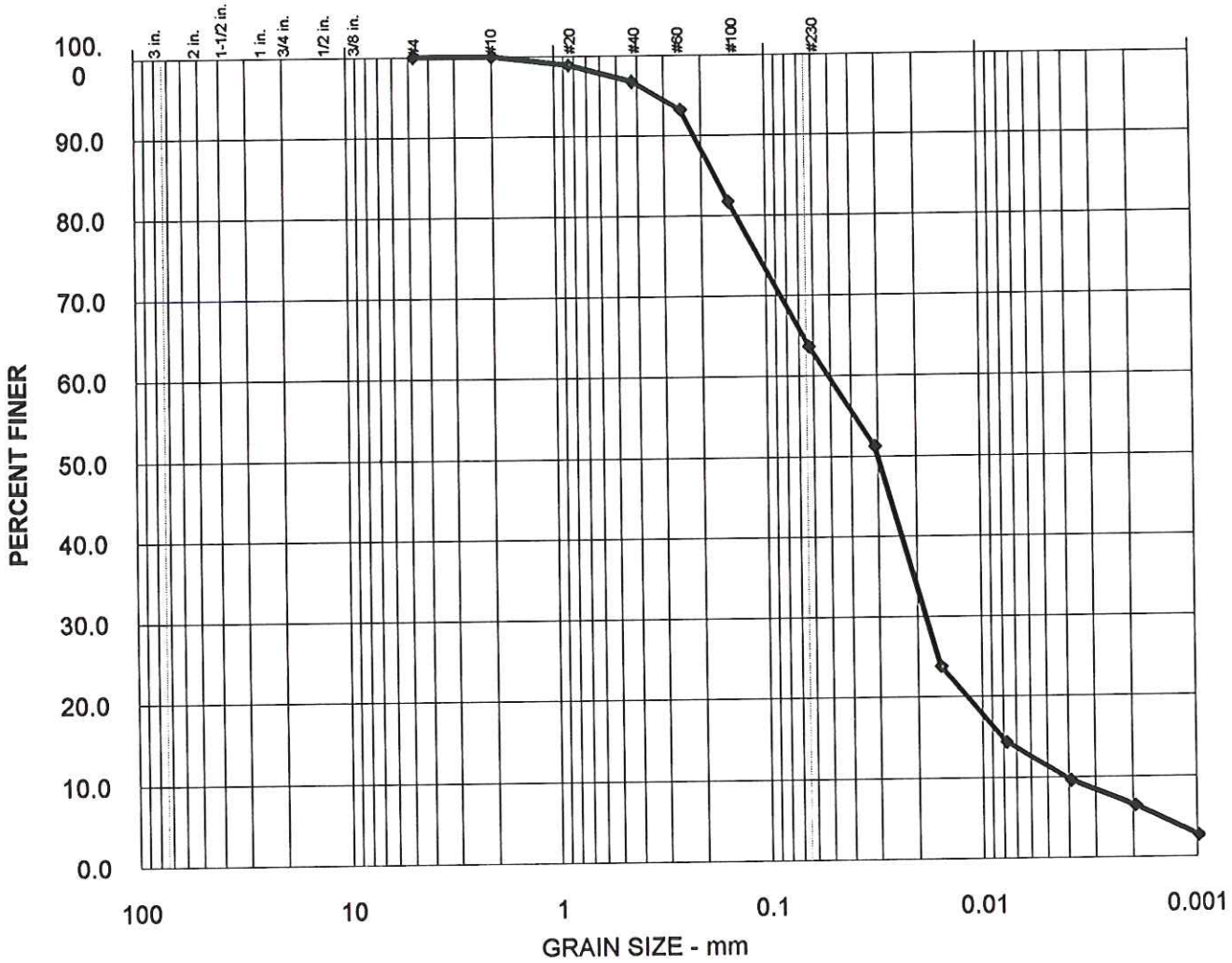
Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

J-4478-05
Figure D-126

11/5/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	36%	54%	10%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-VC-207	0 to 1.6 feet		*

	MATERIAL DESCRIPTION	
	Slightly clayey, very sandy SILT	

Remarks:

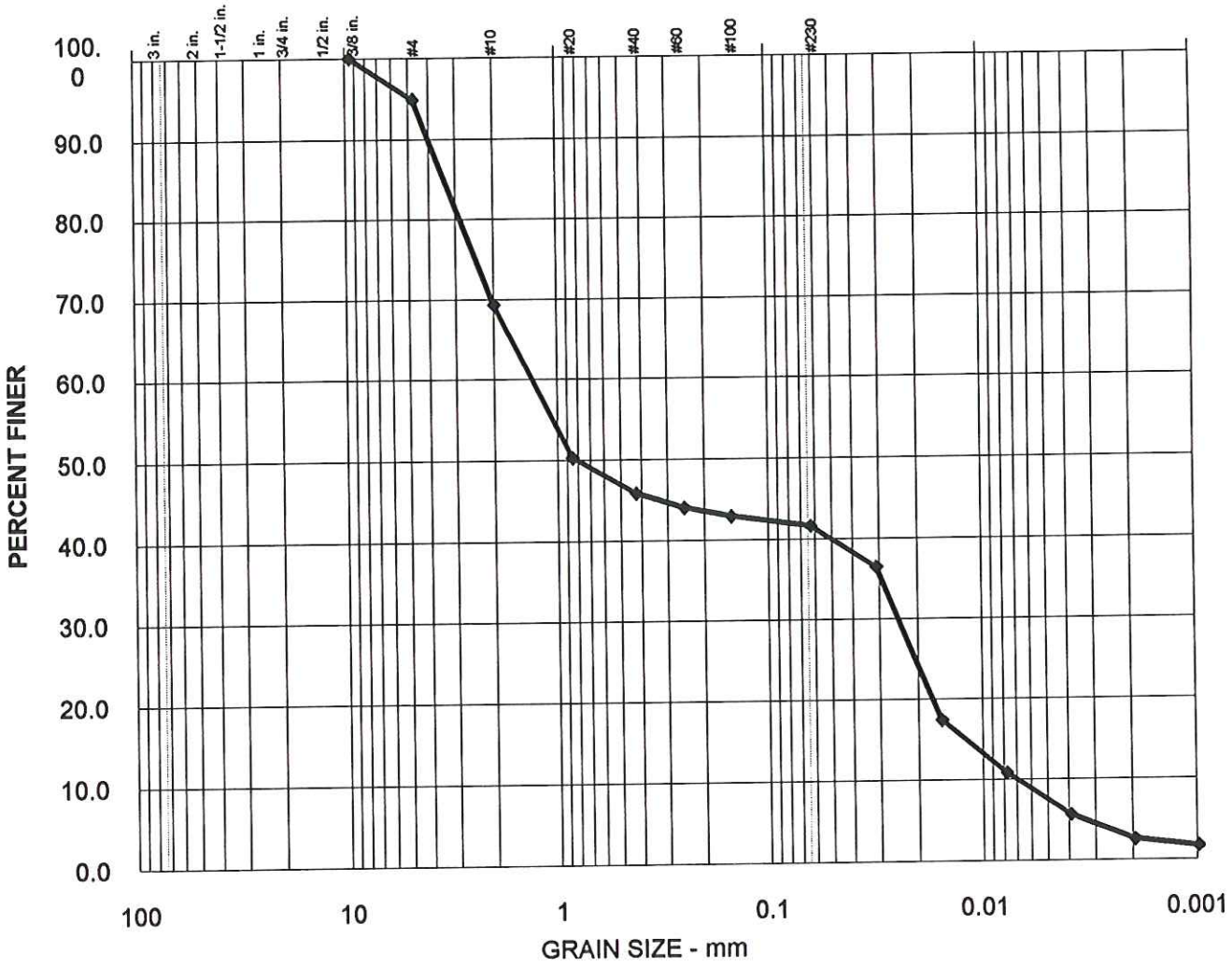
Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

J-4478-05
Figure D-127

11/5/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	5%	53%	36%	6%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-DC-86-S1	0 to 1.9 feet		*

	MATERIAL DESCRIPTION	
	Slightly clayey, very silty SAND	

Remarks:

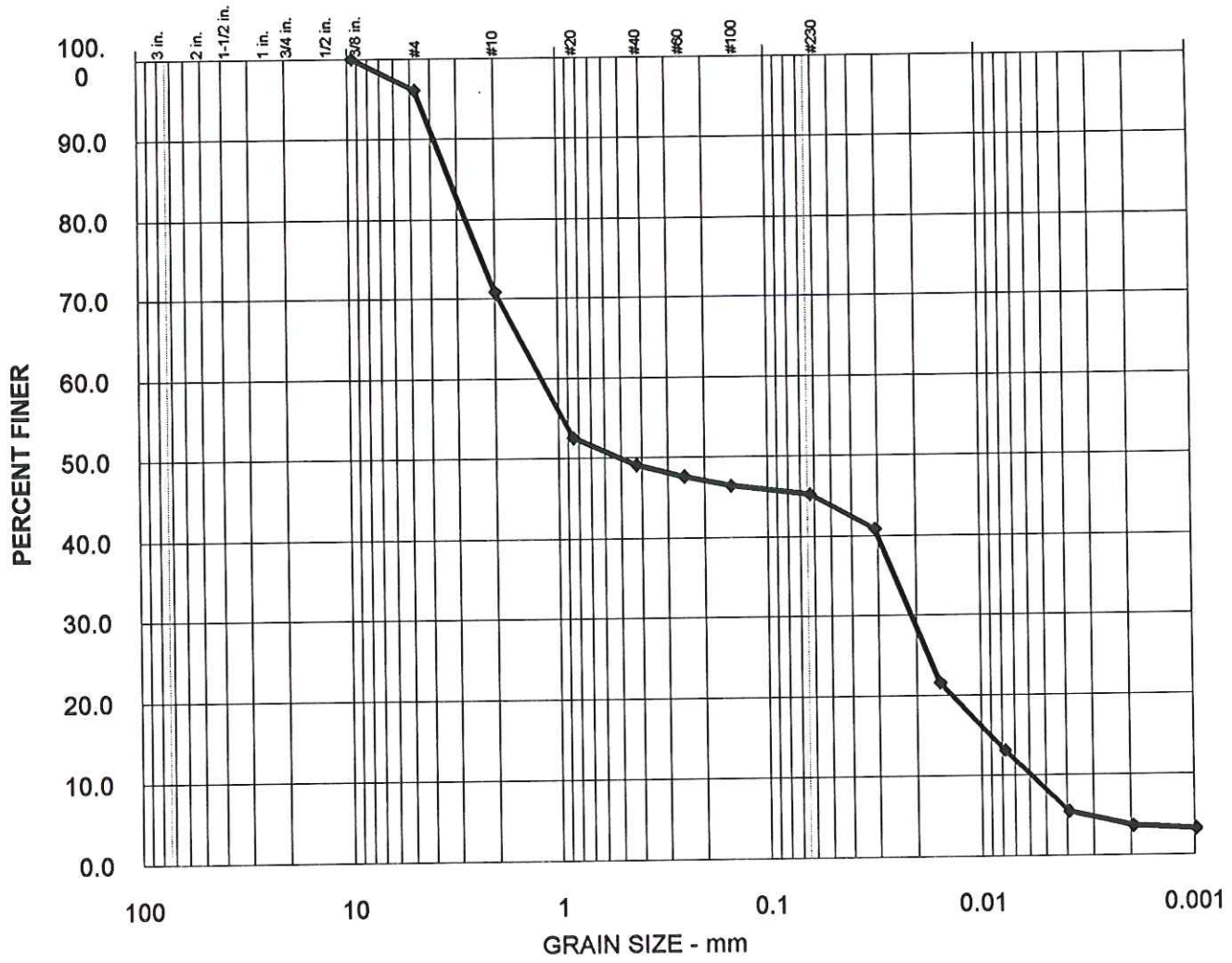
Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

J-4478-05
Figure D-128

12/12/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	4%	51%	40%	5%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-DC-86-S2	1.9 to 3.8 feet		*

	MATERIAL DESCRIPTION	
	Very silty SAND	

Remarks:

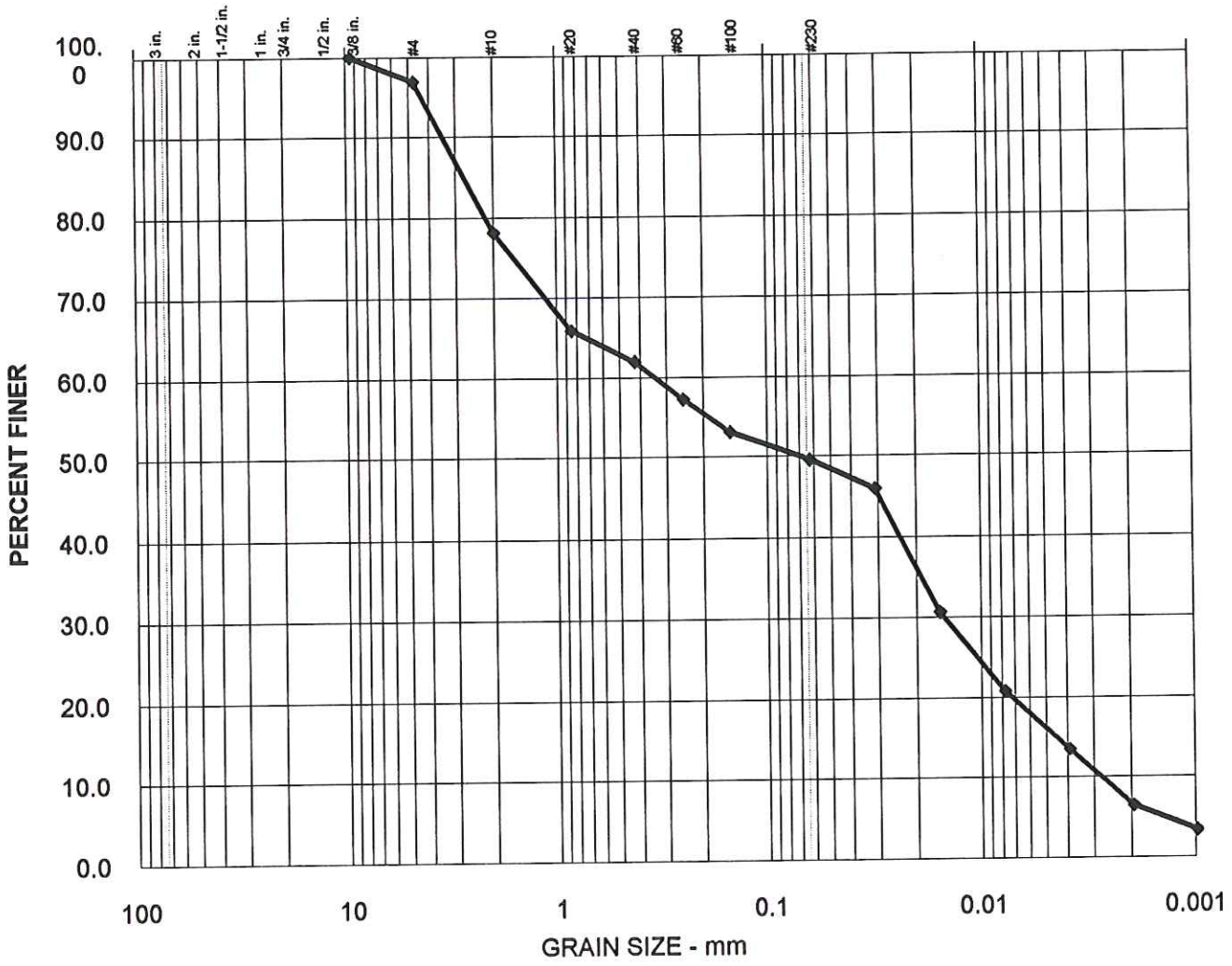
Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

J-4478-05
Figure D-129

11/15/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	3%	47%	36%	14%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-DC-87-S1	0 to 2.3 feet		*

	MATERIAL DESCRIPTION	
	Clayey, very silty SAND	

Remarks:

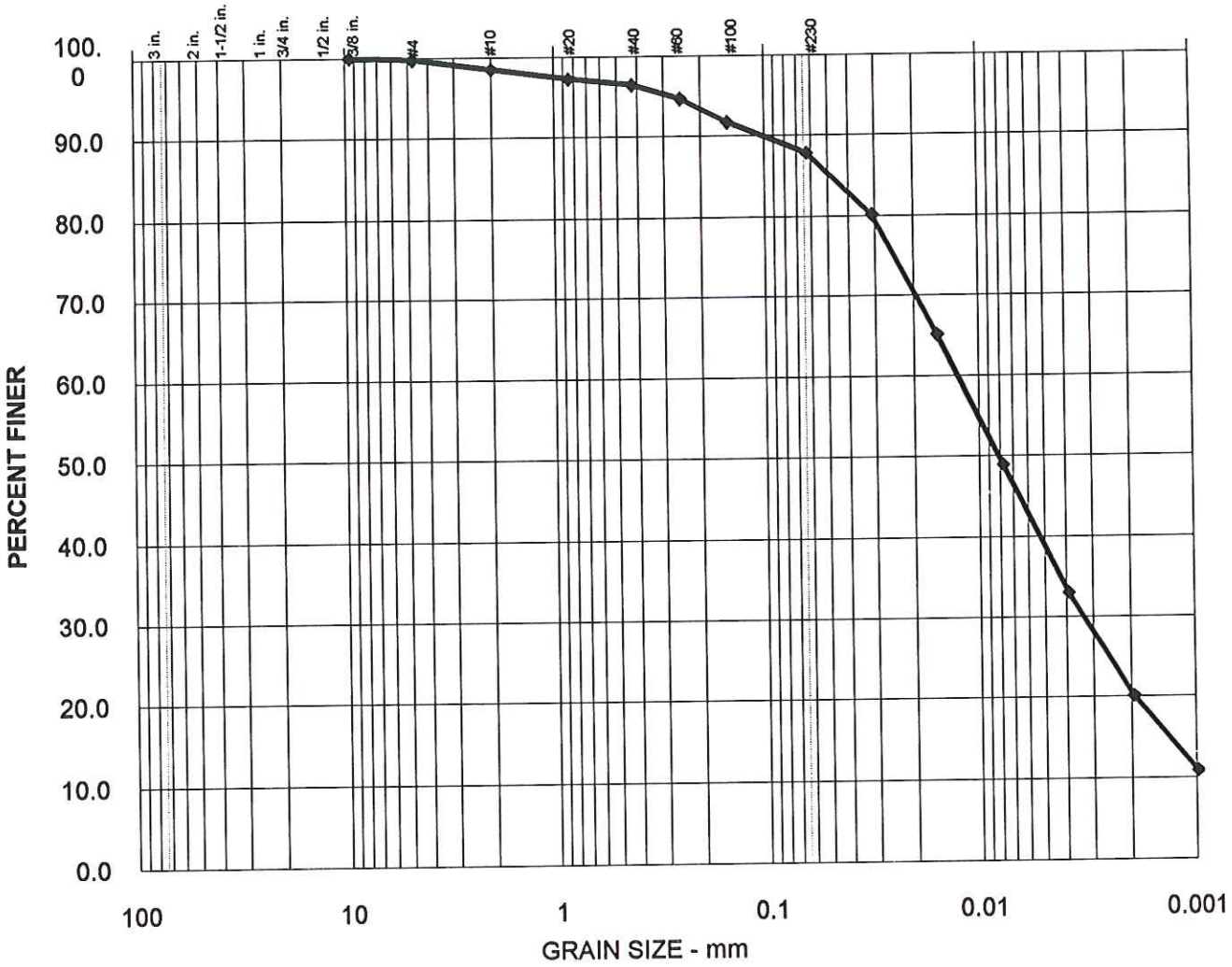
Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

J-4478-05
Figure D-130

11/19/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	12%	55%	33%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-DC-87-S2	2.3 to 3.8 feet		*

	MATERIAL DESCRIPTION	
	Slightly sandy, very clayey SILT	

Remarks:

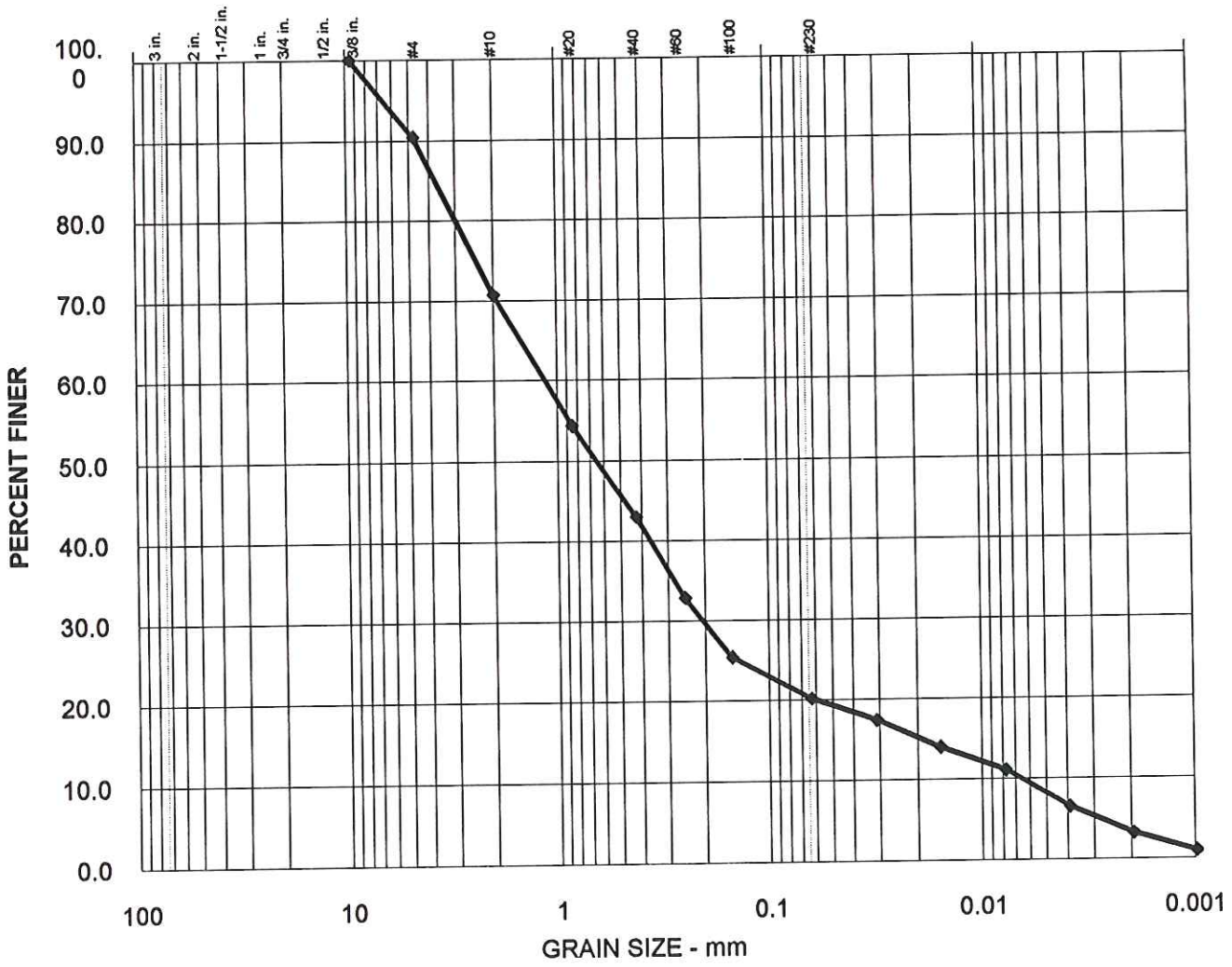
Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

J-4478-05
Figure D-131

11/15/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	10%	70%	13%	7%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-DC-88-S1	0 to 1.6 feet		*

	MATERIAL DESCRIPTION	
	Slightly clayey, slightly gravelly, silty SAND	

Remarks:

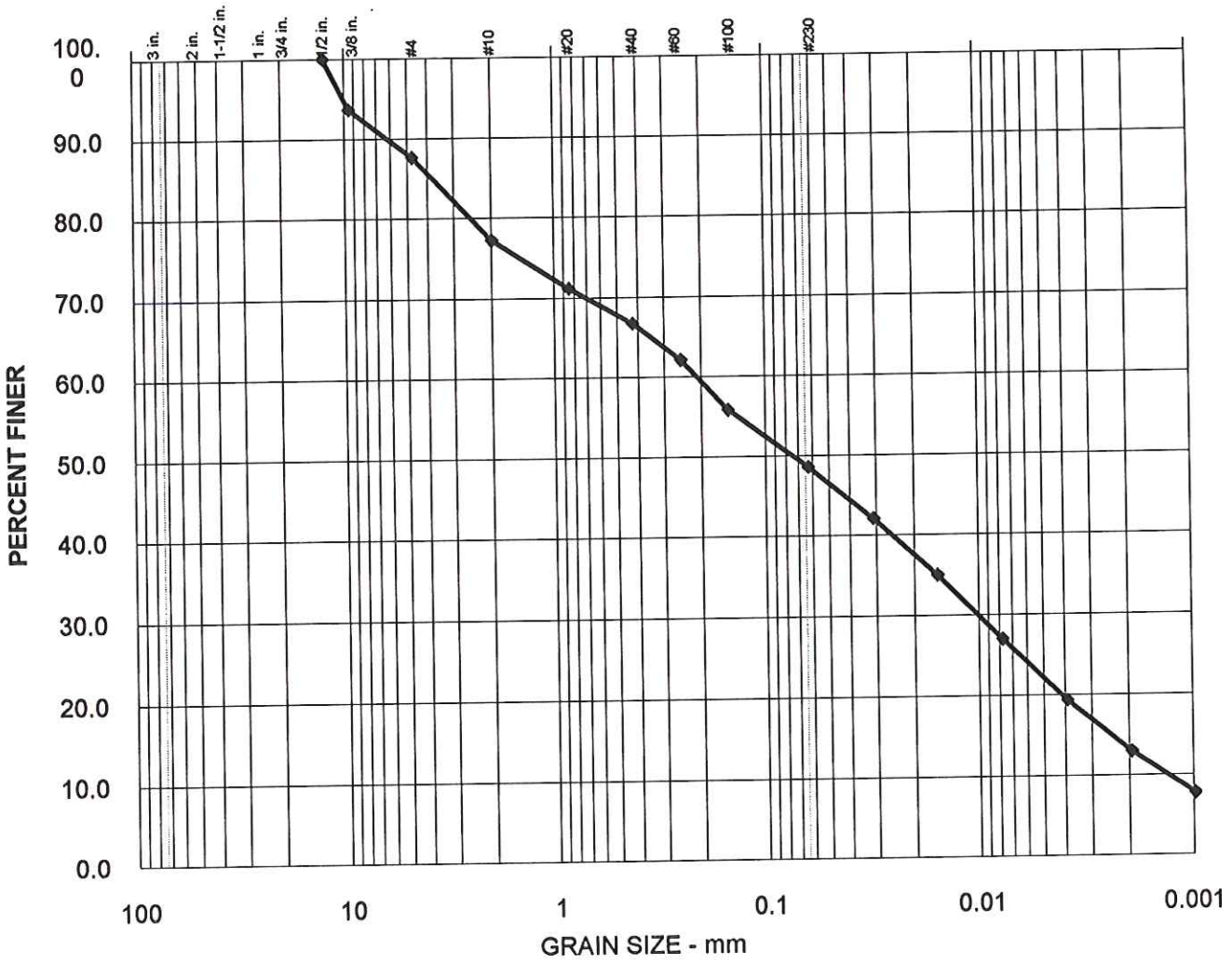
Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

J-4478-05
Figure D-132

11/15/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	12%	39%	30%	19%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-DC-88-S2	1.6 to 3.8 feet		*

	MATERIAL DESCRIPTION	
	Slightly gravelly, clayey, silty SAND	

Remarks:

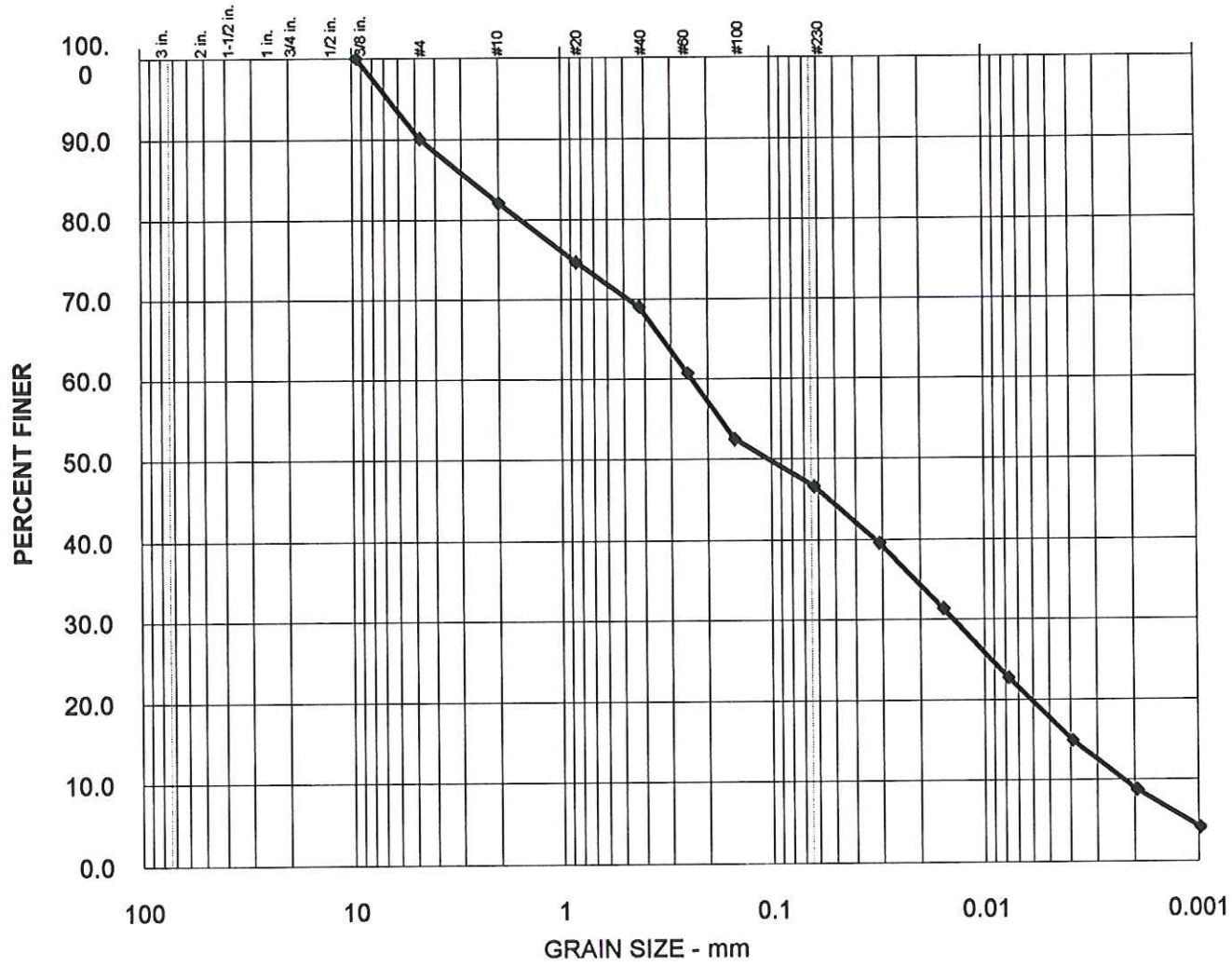
Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

J-4478-05
Figure D-133

11/19/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	10%	43%	32%	15%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-DC-89-S2	1.6 to 3.8 feet		*

	MATERIAL DESCRIPTION	
	Slightly gravelly, clayey, very silty SAND	

Remarks:

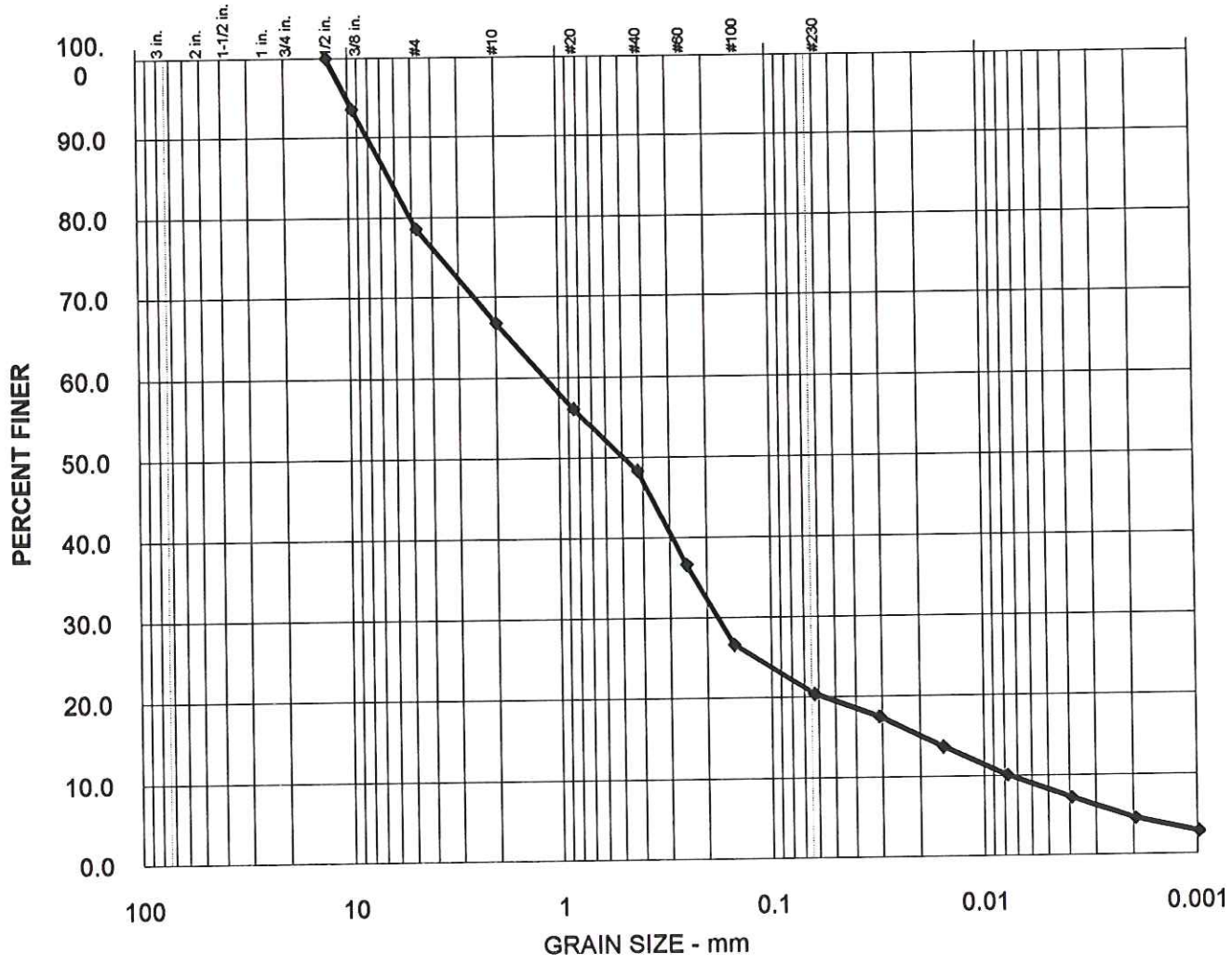
Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

J-4478-05
Figure D-134

11/15/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	21%	59%	13%	7%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-DC-89-S1	0 to 1.6 feet		*

	MATERIAL DESCRIPTION	
	Slightly clayey, silty, gravelly SAND	

Remarks:

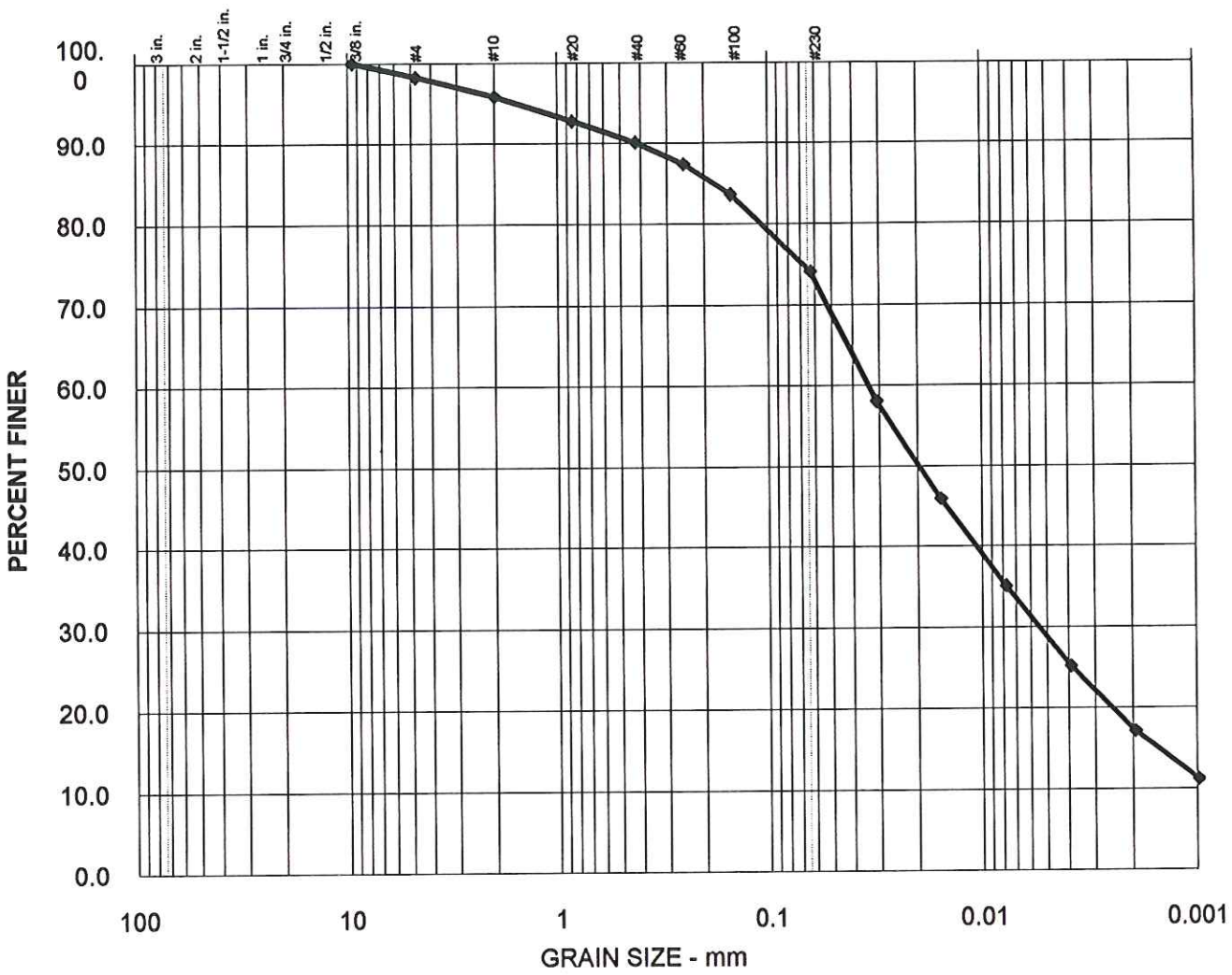
Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

J-4478-05
Figure D-135

11/15/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	2%	24%	49%	25%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-DC-90-S1	0 to 1.6 feet		*

	MATERIAL DESCRIPTION	
	Sandy, clayey SILT	

Remarks:

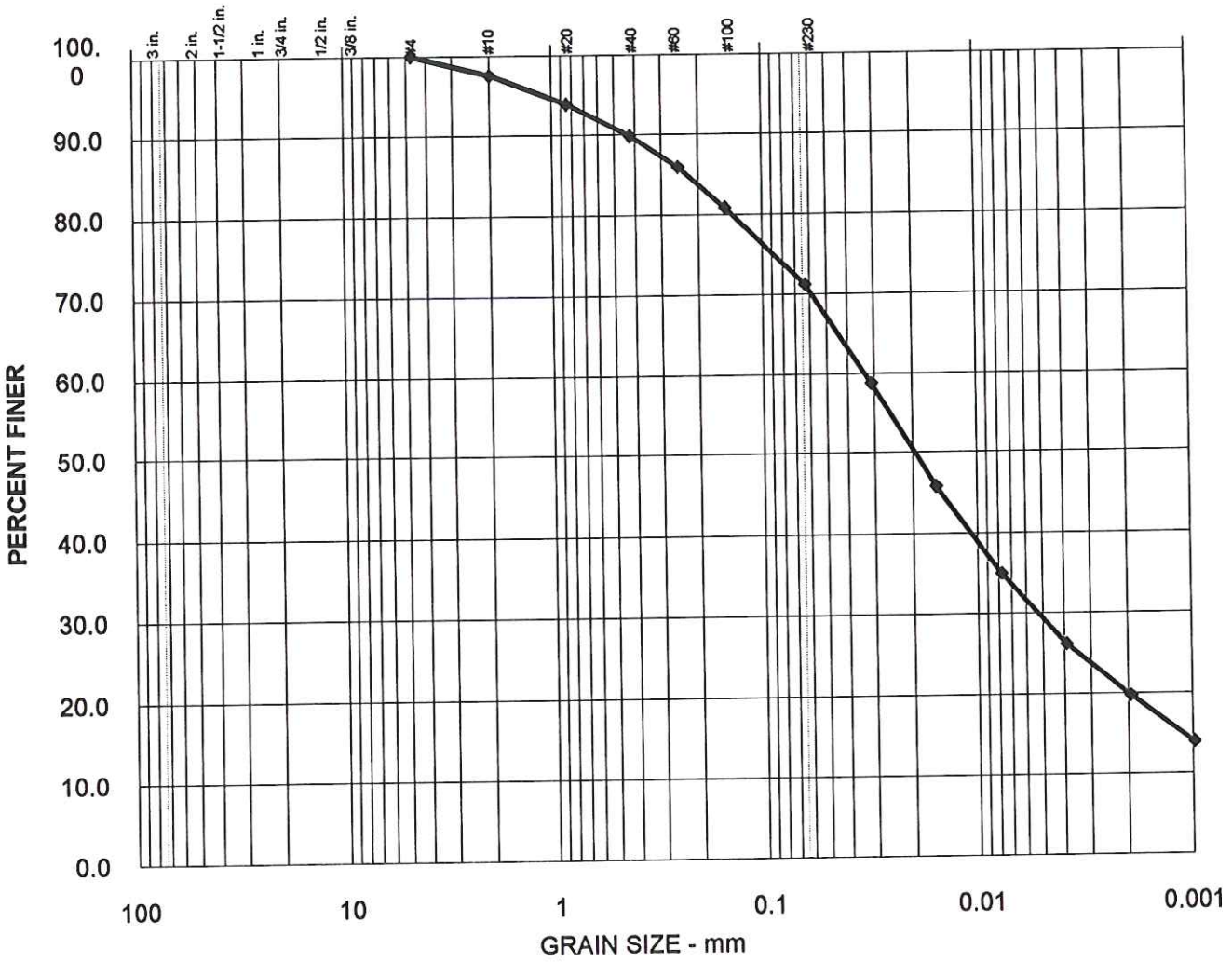
Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

J-4478-05
Figure D-136

11/13/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	29%	45%	26%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-DC-90-S2	1.6 to 3.8 feet		*

	MATERIAL DESCRIPTION	
	Clayey, sandy SILT	

Remarks:

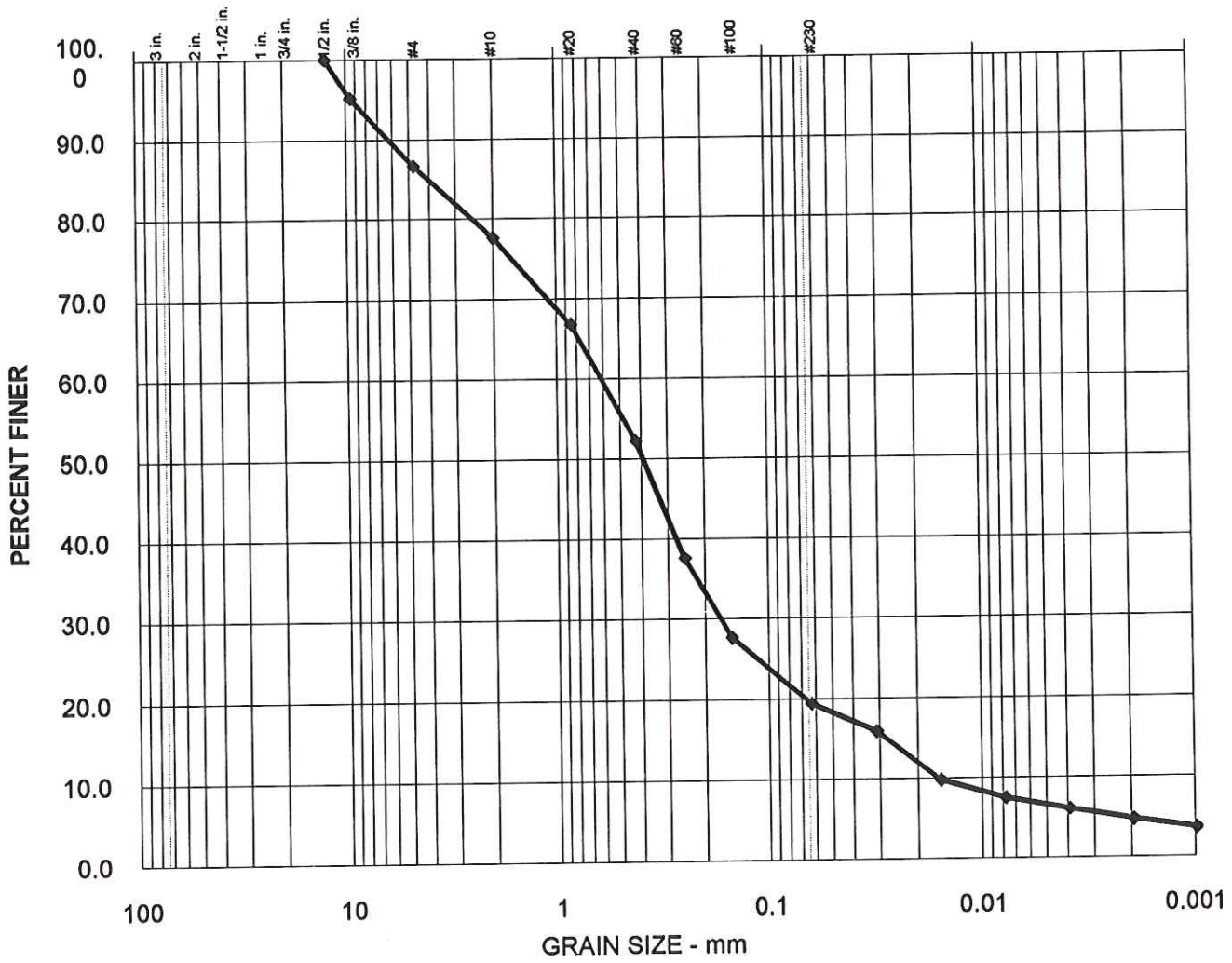
Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

J-4478-05
Figure D-137

11/19/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	13%	68%	13%	6%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-DC-91-S1	0 to 1.6 feet		*

	MATERIAL DESCRIPTION	
	Slightly clayey, gravelly, silty SAND	

Remarks:

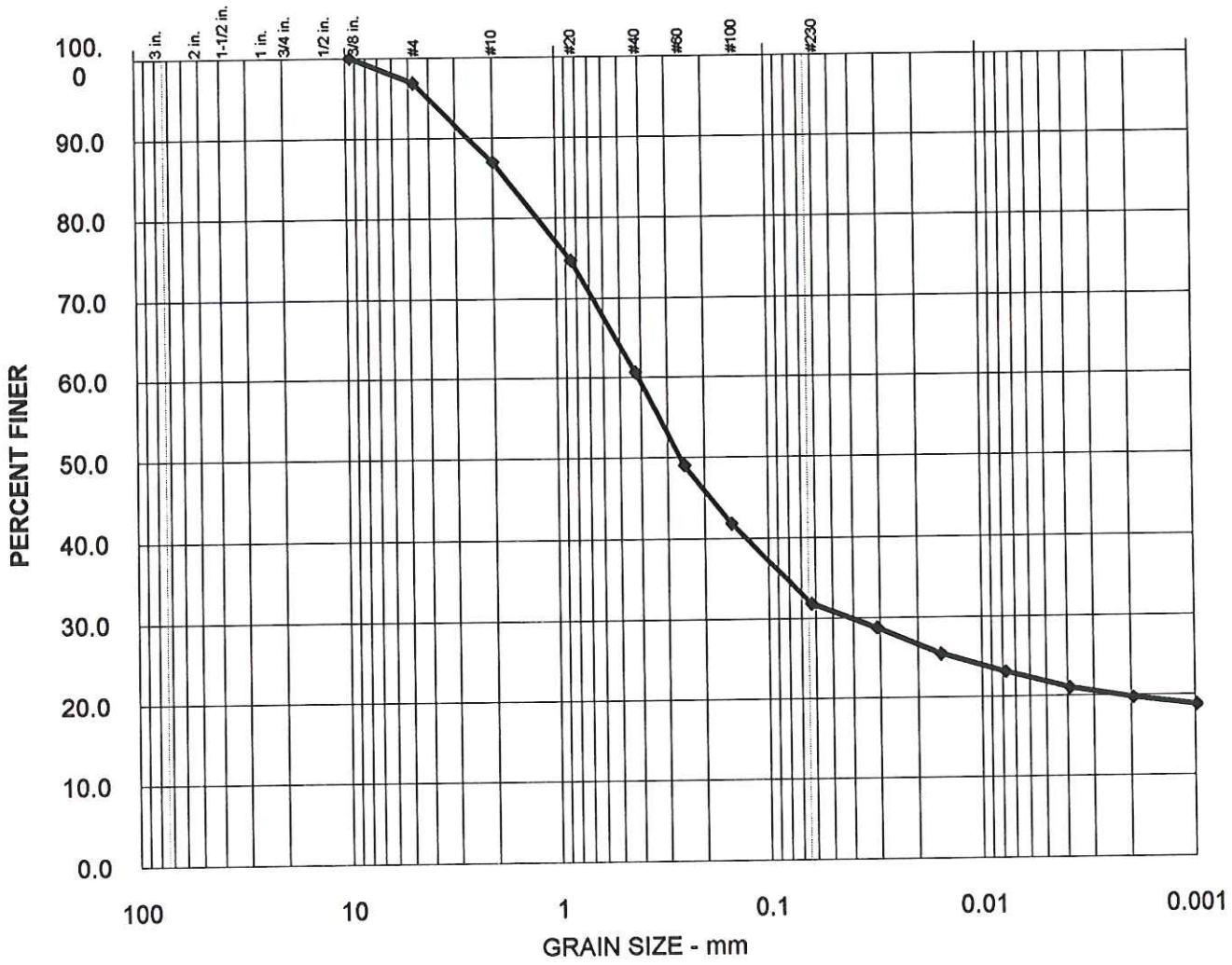
Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

J-4478-05
Figure D-138

11/13/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	3%	65%	11%	21%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-DC-91-S2	1.6 to 3.0 feet		*

	MATERIAL DESCRIPTION	
	Slightly silty, clayey SAND	

Remarks:

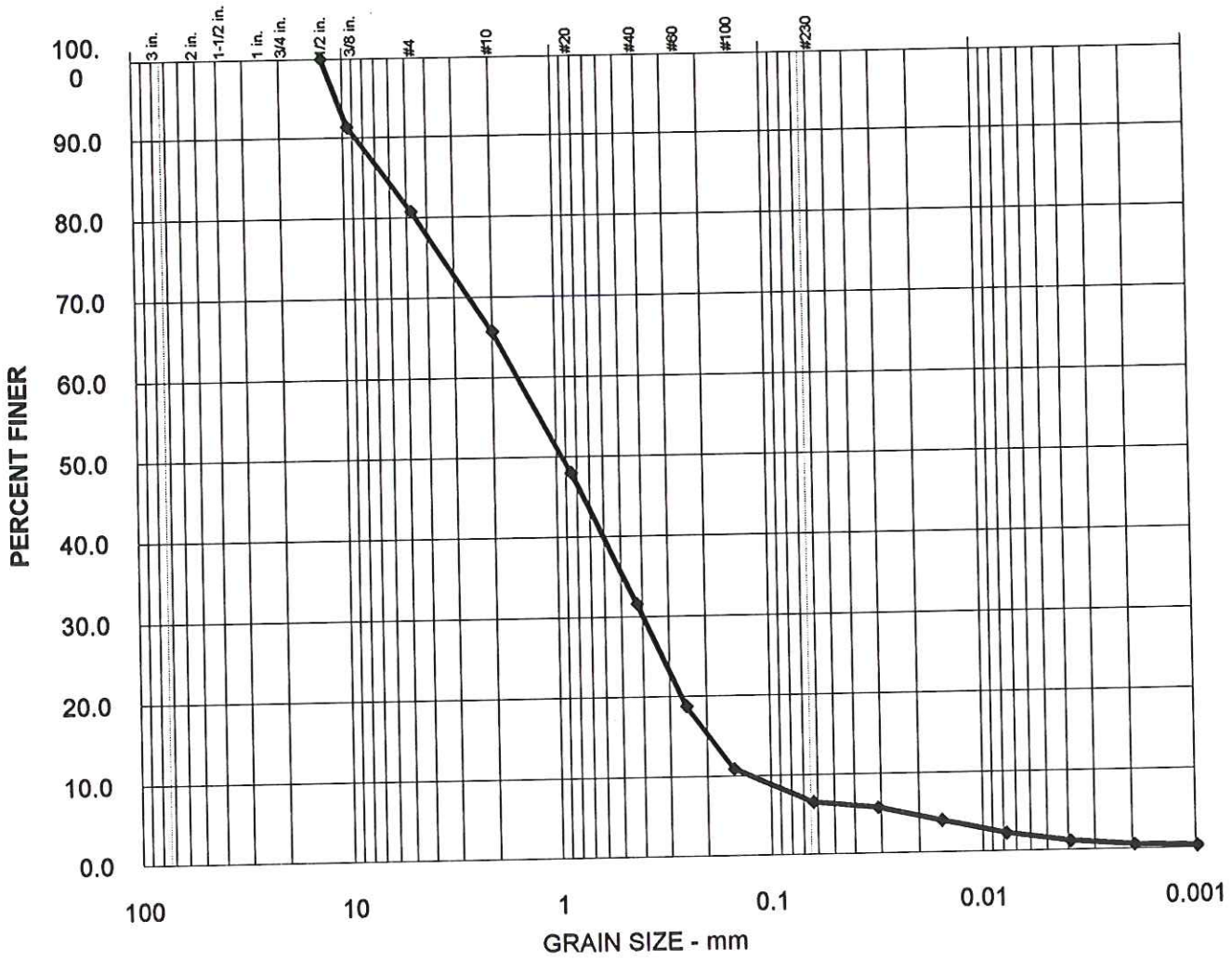
Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

J-4478-05
Figure D-139

11/13/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	19%	74%	6%	1%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-DC-92-S1	0 to 1.4 feet		*

	MATERIAL DESCRIPTION	
	Slightly silty, gravelly SAND	

Remarks:

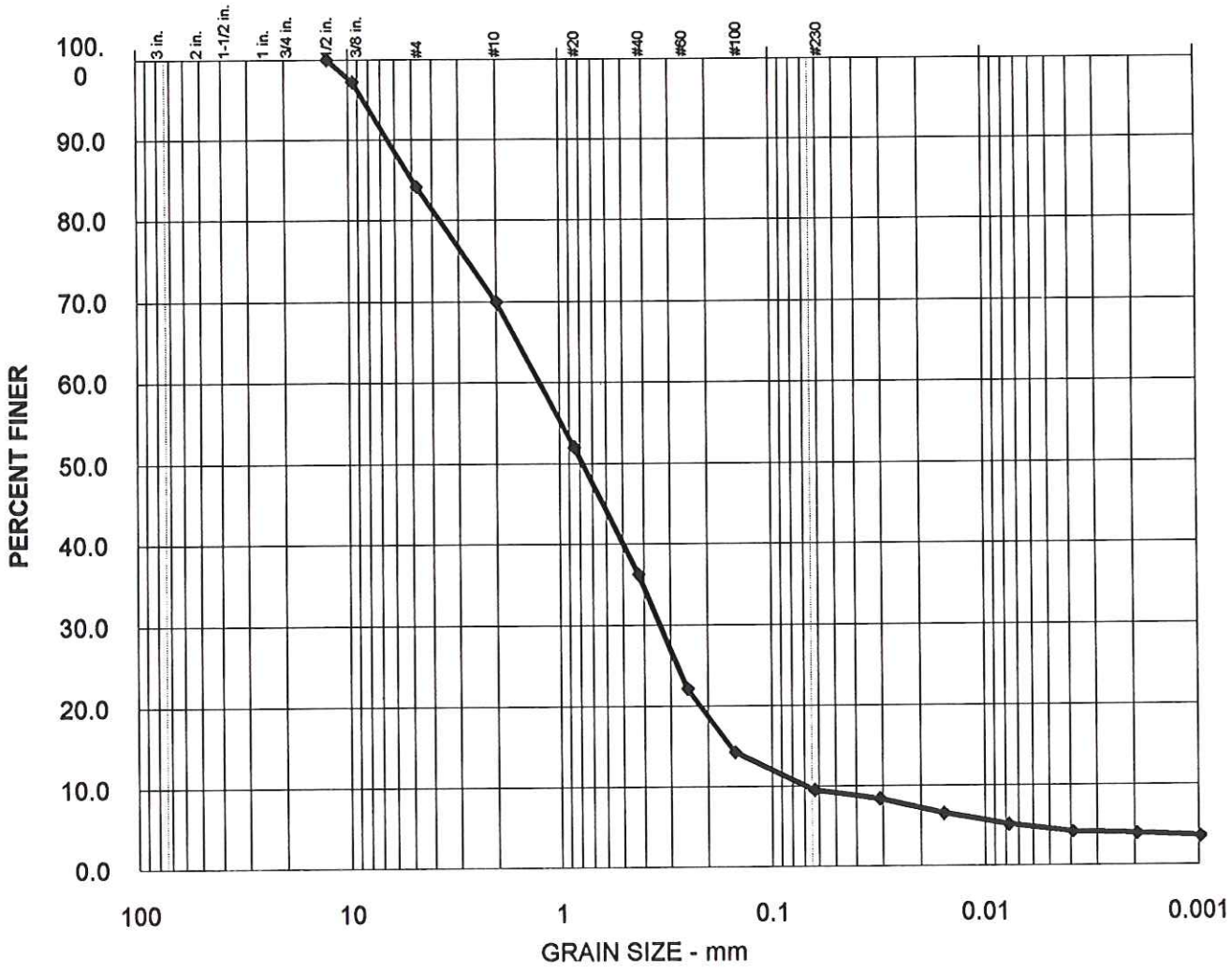
Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

J-4478-05
Figure D-140

11/13/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	16%	75%	5%	4%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-DC-92-S2	1.4 to 2.8 feet		*

	MATERIAL DESCRIPTION	
	Gravelly SAND	

Remarks:

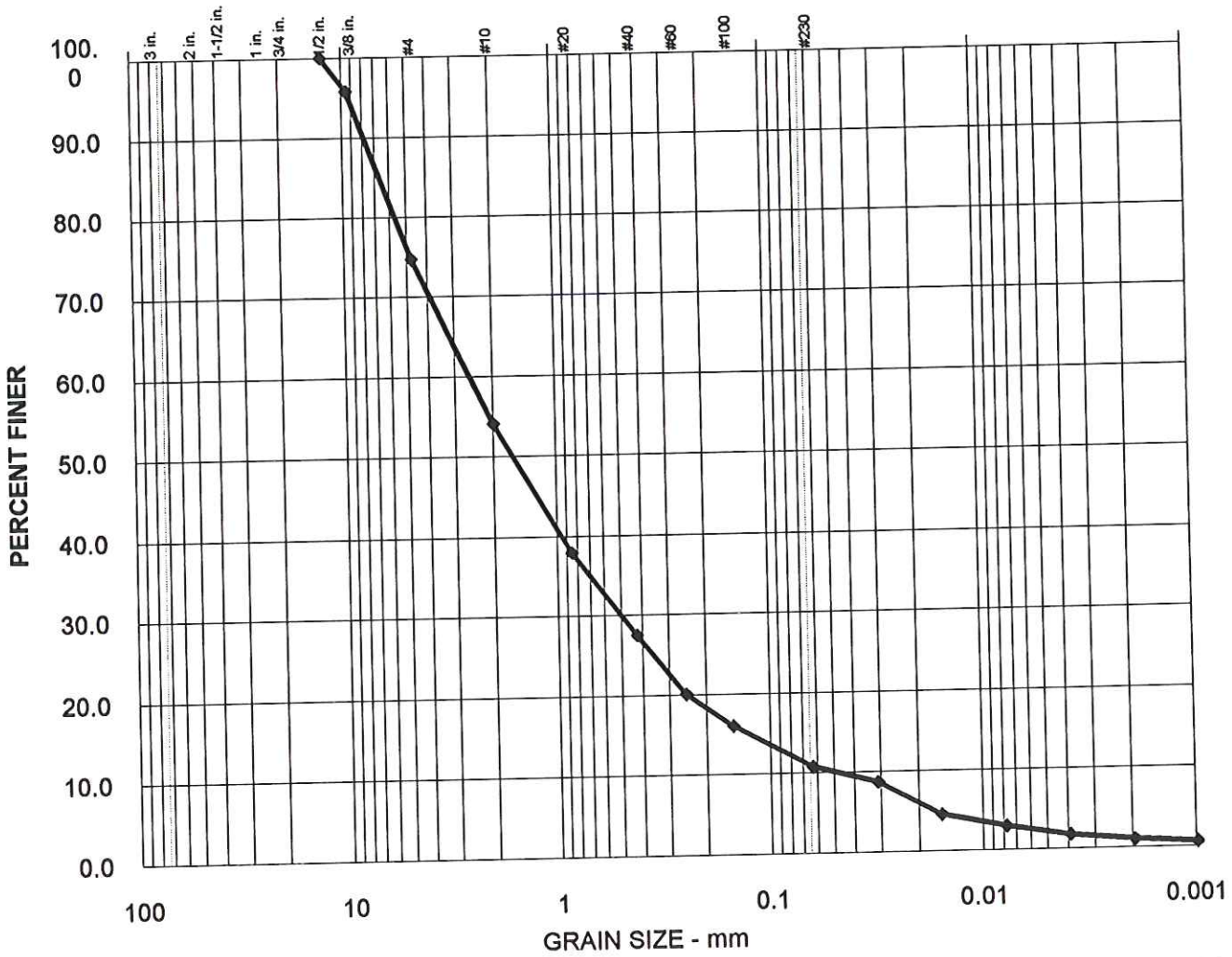
Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

J-4478-05
Figure D-141

11/13/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	25%	64%	9%	2%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-DC-93-S1	0 to 2.0 feet		*

	MATERIAL DESCRIPTION	
	Slightly silty, gravelly SAND	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

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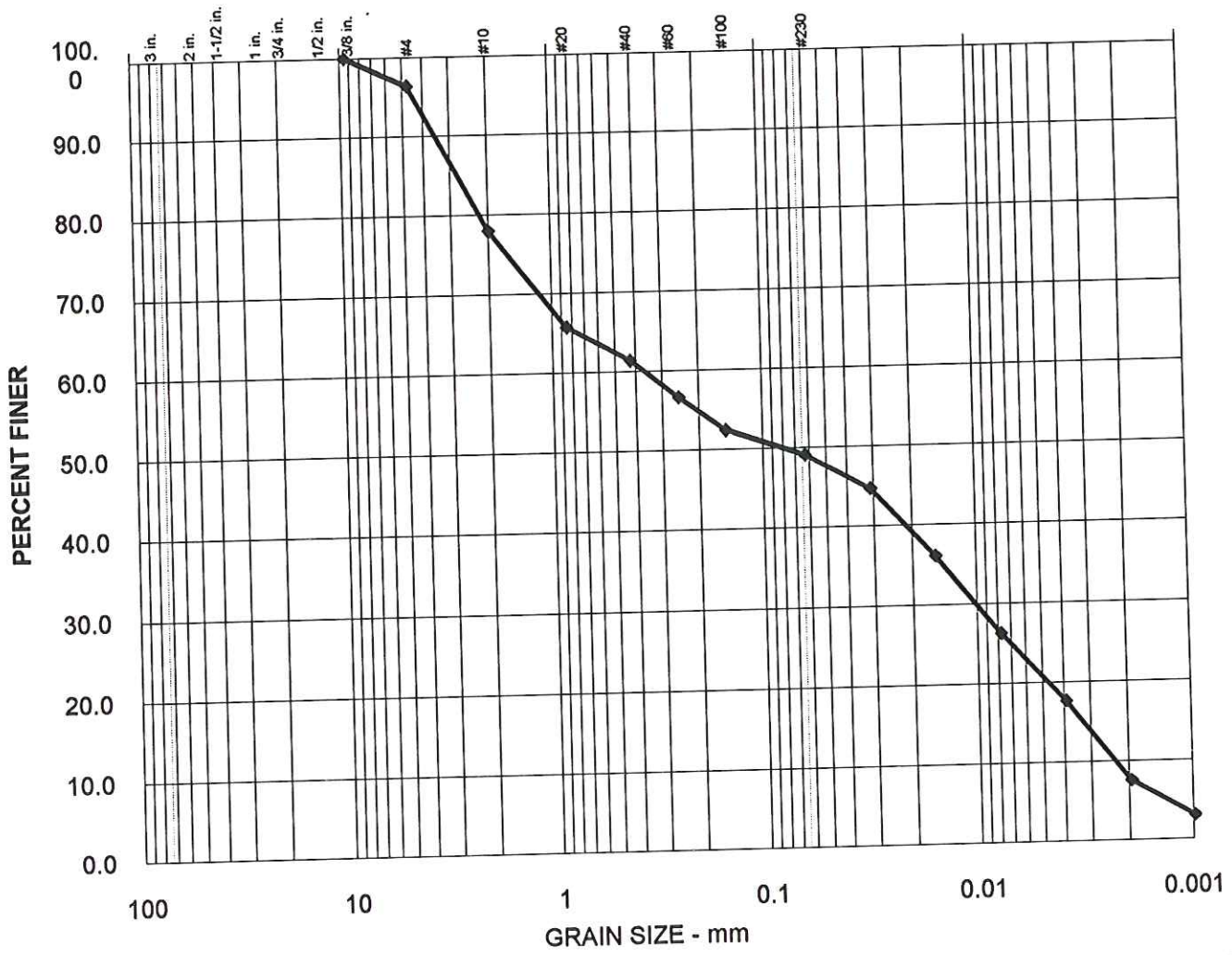
Figure D-142

11/13/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	4%	47%	31%	18%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-DC-208	0 to 2.1 feet		*

MATERIAL DESCRIPTION
Clayey, very silty SAND

Remarks:

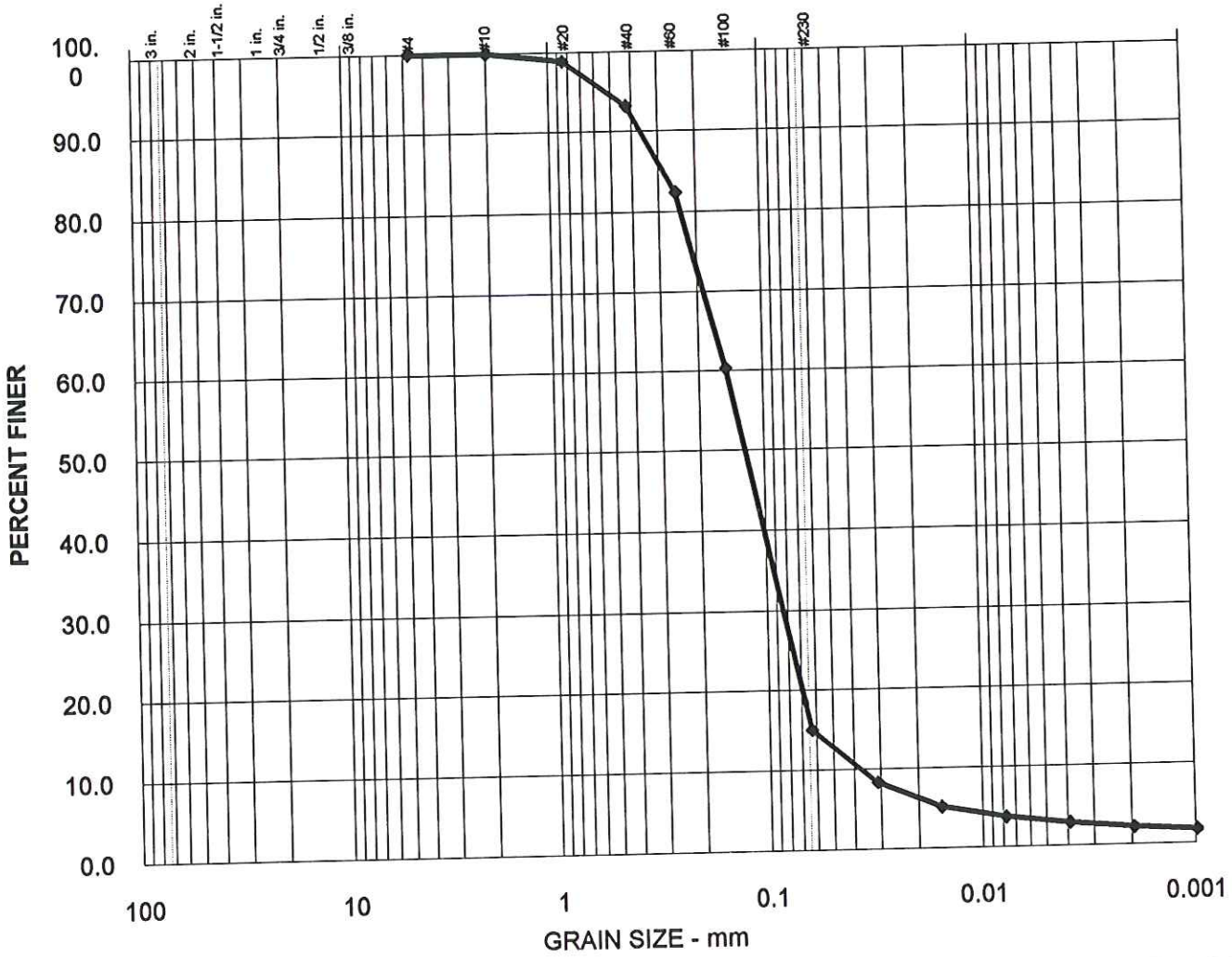
Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

J-4478-05
Figure D-143

11/15/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	85%	12%	3%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	CR-22-2	0 to 10 cm		*

	MATERIAL DESCRIPTION	
	Slightly silty SAND	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

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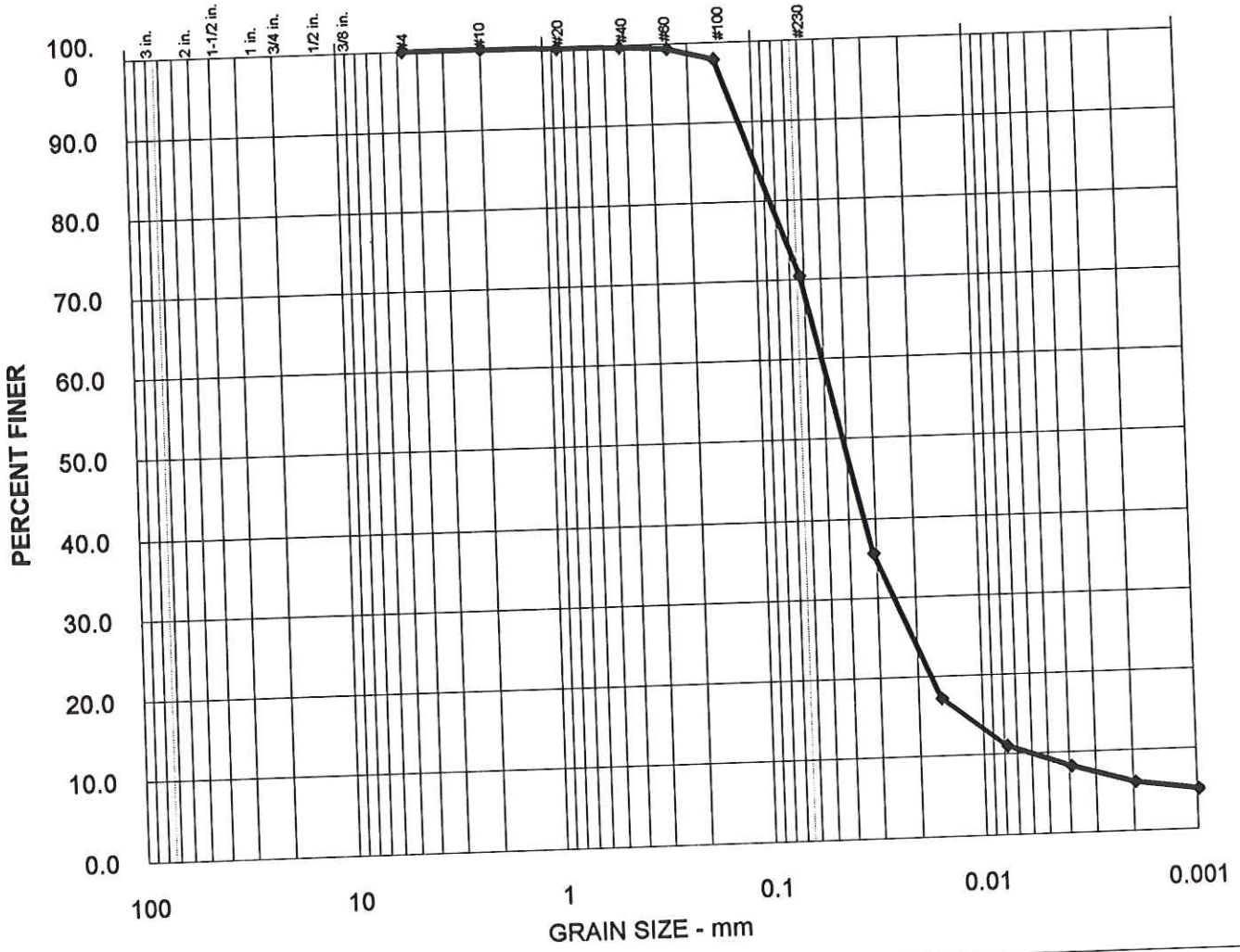
Figure D-144

11/30/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	30%	62%	8%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	CR-24-1	0 to 10 cm		*

	MATERIAL DESCRIPTION	
	Slightly clayey, sandy SILT	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

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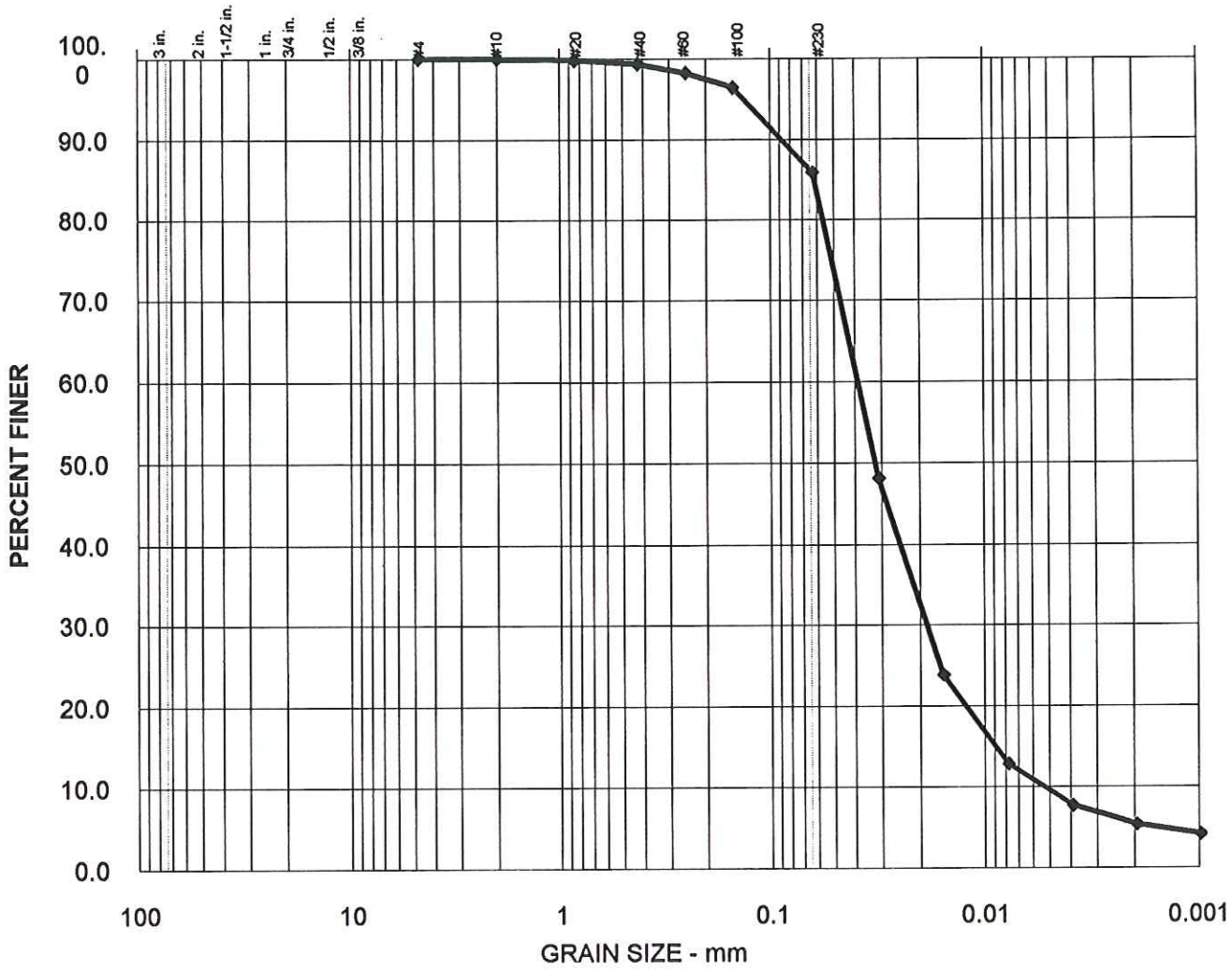
HARTCROWSER

11/30/96

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	14%	78%	8%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	CR-02-3	0 to 10 cm		*

	MATERIAL DESCRIPTION	
	Slightly clayey, sandy SILT	

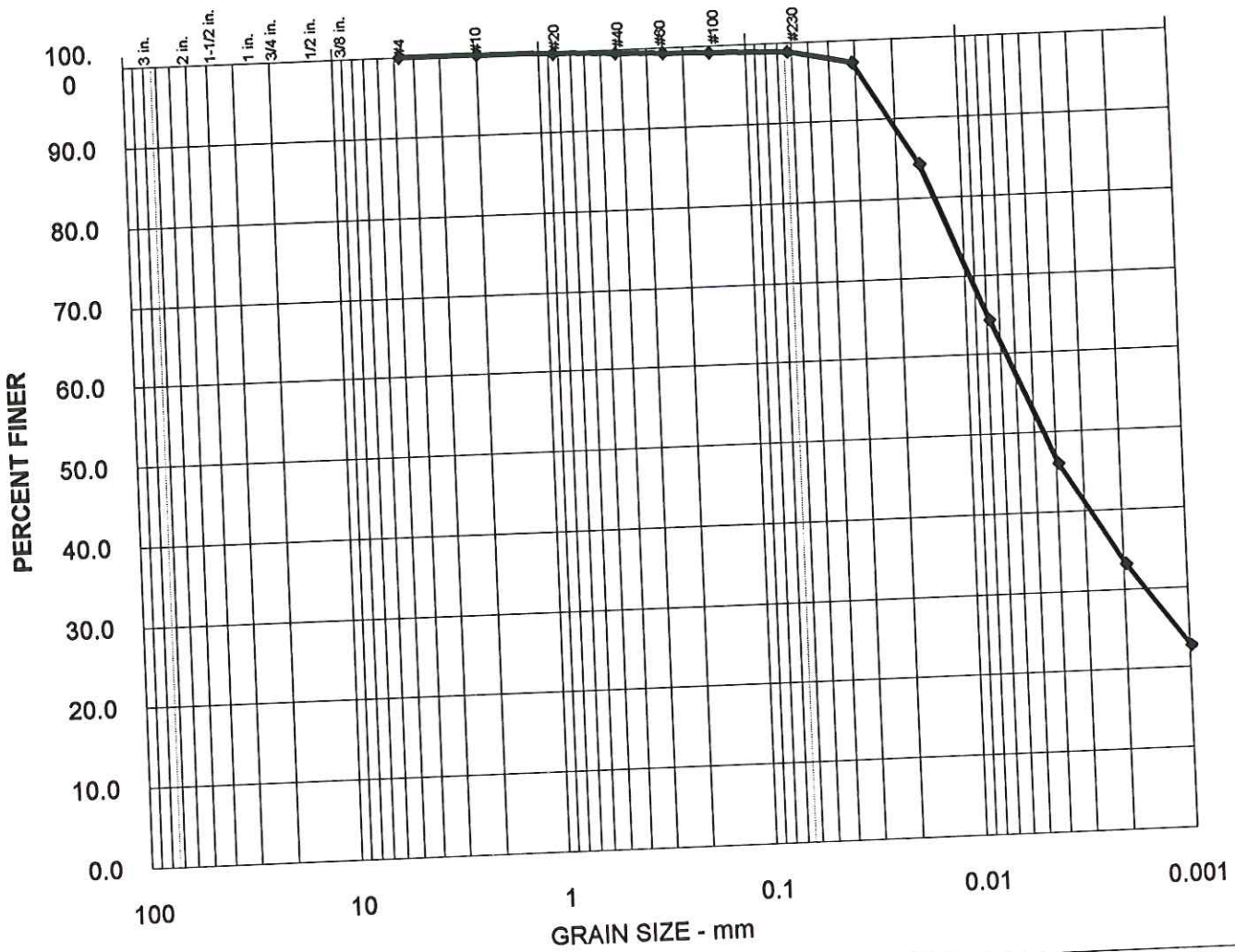
Remarks:

Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

J-4478-05
Figure D-146

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	1%	53%	46%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-ST-100 (A)	*		*

MATERIAL DESCRIPTION
Very clayey SILT

Remarks:

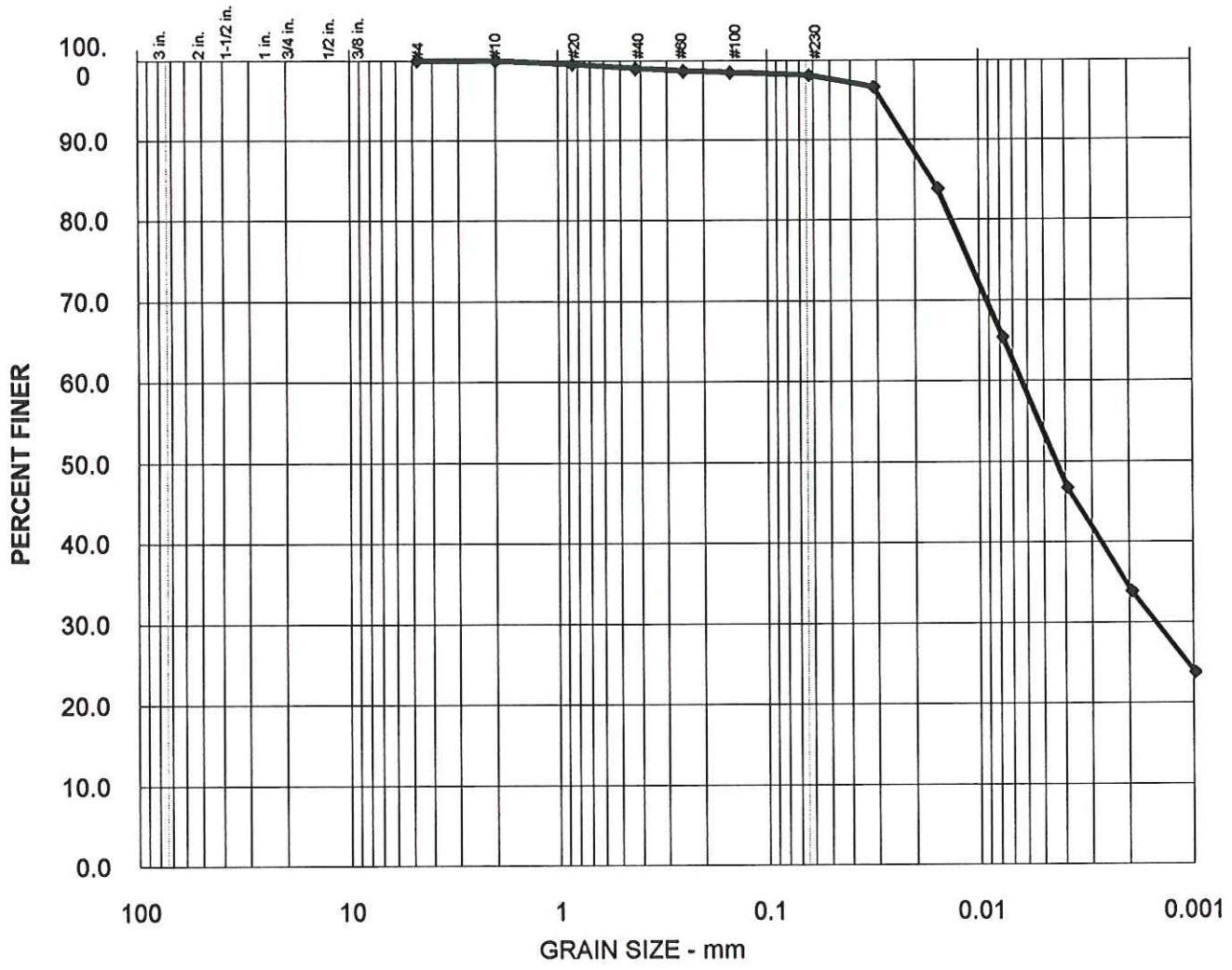
Project: Whatcom Waterway, Bellingham, Washington

J-4478-05
Figure D-147

HARTCROWSER

2/13/97

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	2%	51%	47%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-ST-100 (B) Duplica	*		*

	MATERIAL DESCRIPTION	
	Very clayey SILT	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

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Figure D--148

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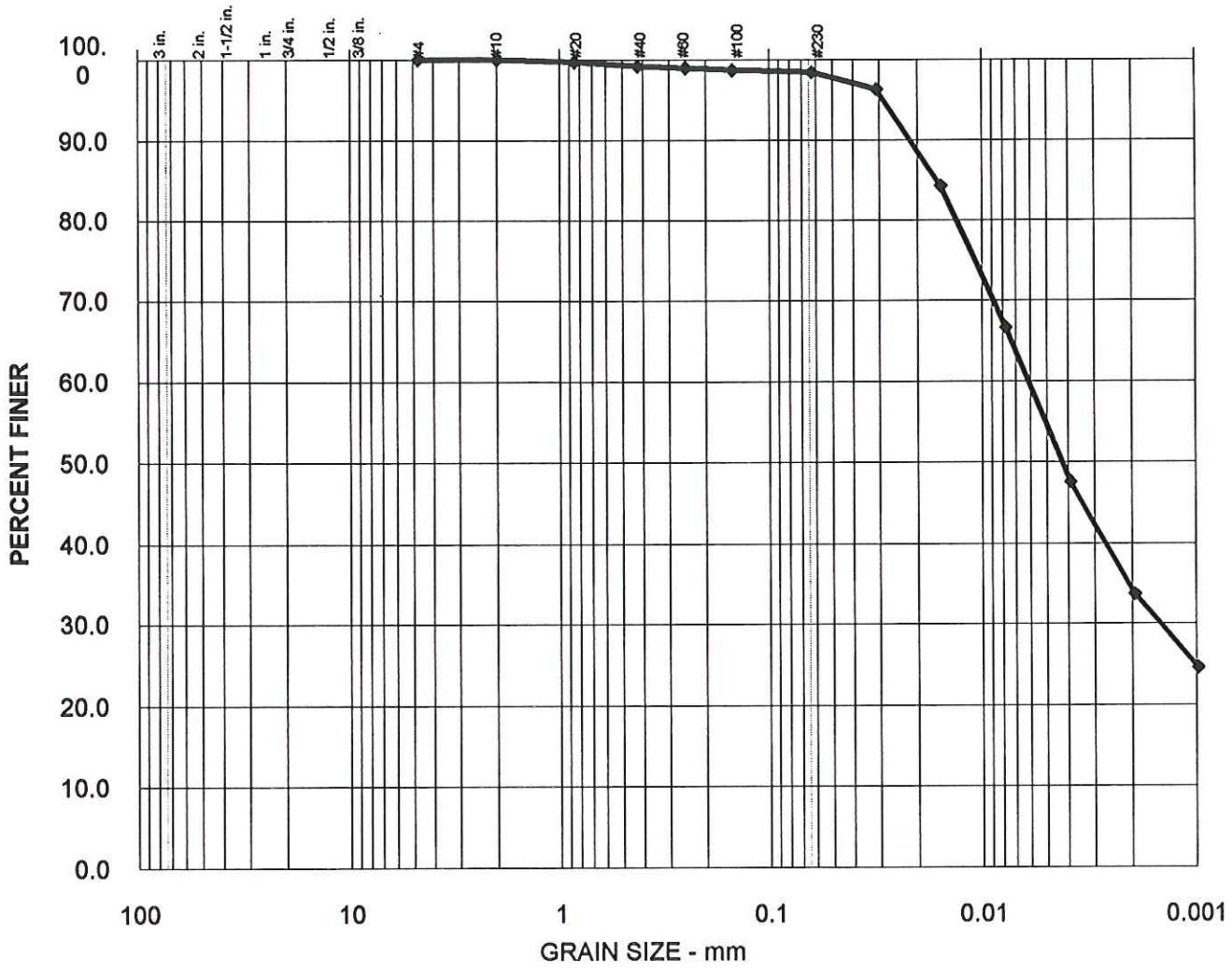
SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	2%	50%	48%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-ST-100 (C) Triplica	*		*

	MATERIAL DESCRIPTION	
	Very clayey SILT	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

HARTCROWSER

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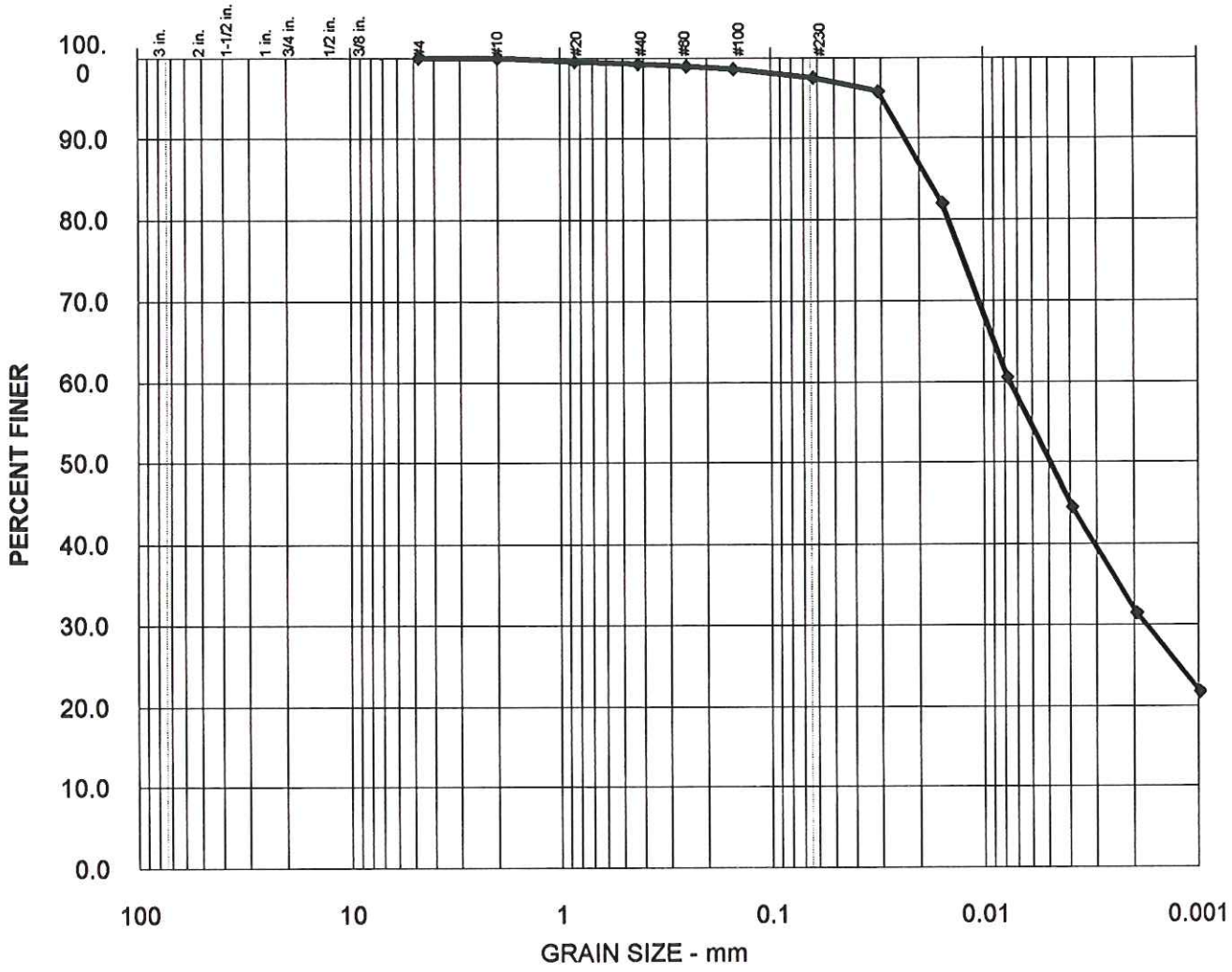
Figure D-149

2/14/97

SIEVE & PIPET ANALYSES TEST REPORT



% +75mm	% GRAVEL	% SAND	% SILT	% CLAY
	0%	3%	53%	44%

Exploration Number:	Sample Number:	Sample Depth	Sample Matrix:	Natural Moisture:
*	HC-ST-101	*		*

	MATERIAL DESCRIPTION	
	Very clayey SILT	

Remarks:

Project: Whatcom Waterway, Bellingham, Washington

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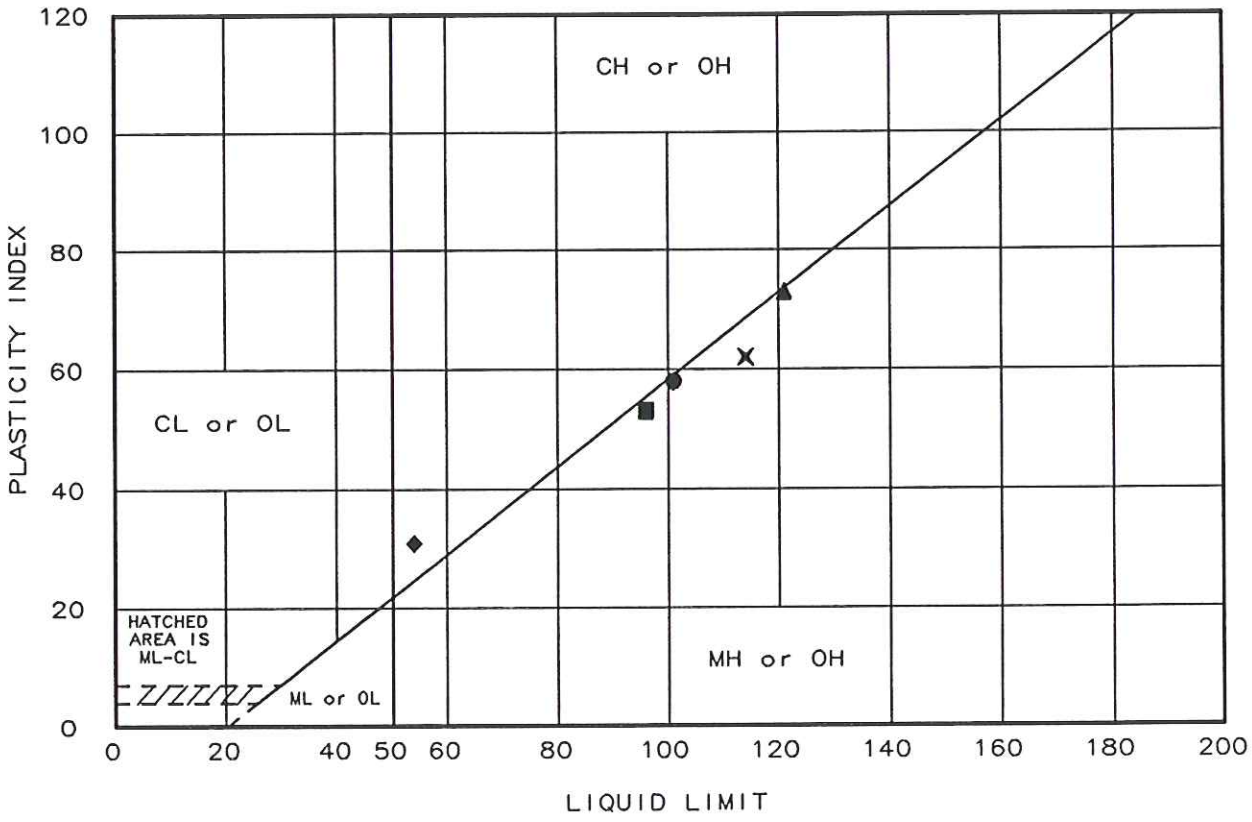
Figure D-150

2/14/97

LIQUID AND PLASTIC LIMITS TEST REPORT



	Location + Description	LL	PL	PI	-200	ASTM D 2487-90
●	HC-DC-87-S2 Depth 2.3 to 3.8 feet	101	43	58		
▲	HC-SC-71 Depth 0 to 10 cm	121	48	73		
■	HC-VC-72-S1 Depth 0 to 3.2 feet	96	43	53		
◆	HC-VC-72-S4 Depth 8.4 to 10.0 feet	54	23	31		
×	HC-VC-73-S2 Depth 2.4 to 4.7 feet	114	52	62		

Remarks:

Project: Whatcom Waterway

Client: Georgia Pacific

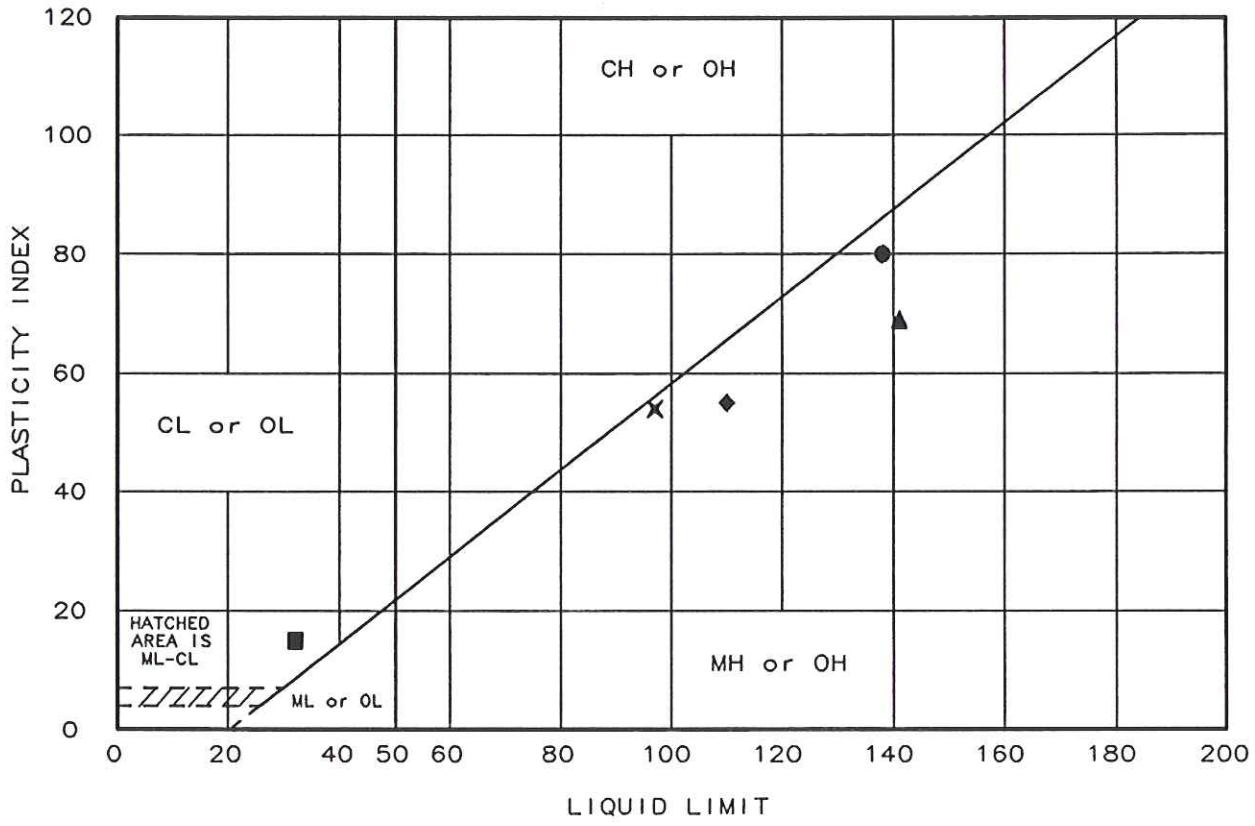
Location: Bellingham, Washington

HARTCROWSER

J-4478-05 4/30/97

Figure D-151

LIQUID AND PLASTIC LIMITS TEST REPORT



	Location + Description	LL	PL	PI	-200	ASTM D 2487-90
●	HC-VC-74-S3 Depth 4.5 to 6.9 feet	138	58	80		
▲	HC-VC-75-S1 Depth 0 to 3.3 feet	141	72	69		
■	HC-VC-79-S4 Depth 4.9 to 7.0 feet	32	17	15		
◆	HC-VC-81-S2 Depth 1.6 to 3.2 feet	110	55	55		
×	HC-VC-83-S1 Depth 0 to 2.4 feet	97	43	54		

Remarks:

Project: Whatcom Waterway

Client: Georgia Pacific

Location: Bellingham, Washington

HARTCROWSER

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Figure D-152

Specific Gravity Test

JOB NO. 4478-05 DATE 2/5/97

Sample:- HC-VC-80-S2

$\frac{Tx}{20C}, Gs = \frac{Wo}{Wo + Wa - Wb} \times K$

FLASK NO.	B-1					
BORING						
DEPTH/SAMPLE	HC-VC-80-S2					
MATERIAL						
Tx	21					
CONTAINER NO.						
Wo + TARE						
TARE						
Wo	35.04					
Wa	655.64					
Wo + Wa	690.68					
Wb	674.79					
Wo + Wa - Wb	15.89					
K	0.9998					
Gs, $\frac{Tx}{20C}$	2.20					

Tx = Temperature of contents of Volumetric Flask when W_b was determined, in C°

Wo = Weight of sample of oven-dry soil in grams

Wa = Weight of Volumetric Flask filled with water at T_x

Wb = Weight of Volumetric Flask filled with water and soil at T_x

K = Correction factor for density of water at T_x

Tested by _____

Computed by _____

Checked by _____

HARTCROWSER

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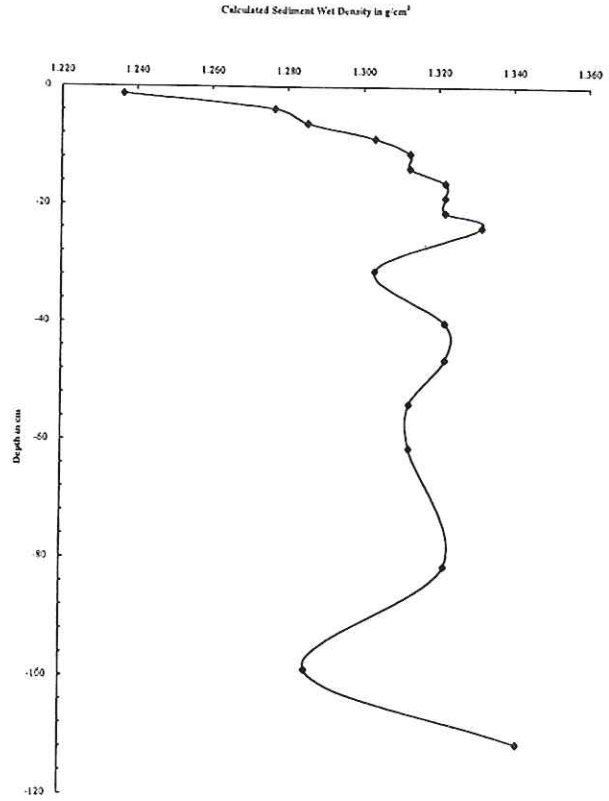
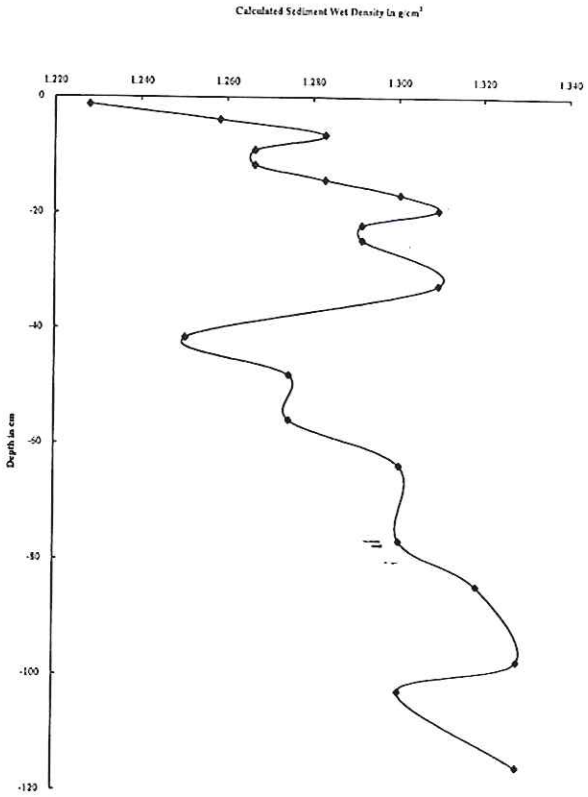
Figure D-153

Natural Recovery Core
Calculated Sediment Wet Density

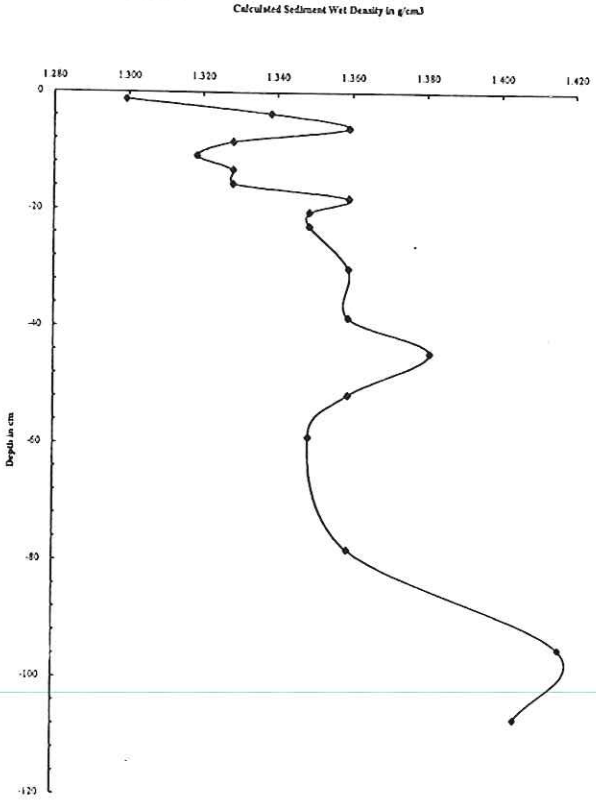
HC-NR-100



HC-NR-101



HC-NR-102



HARTCROWSER
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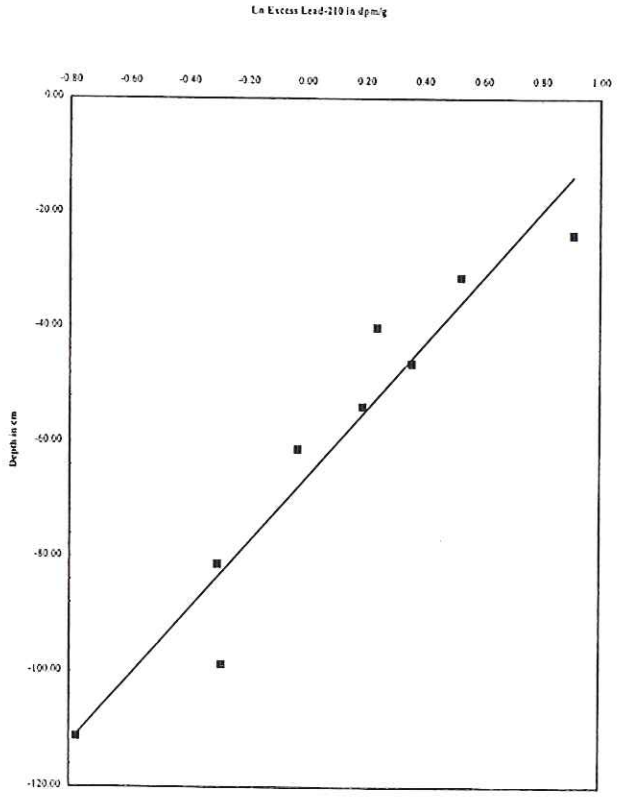
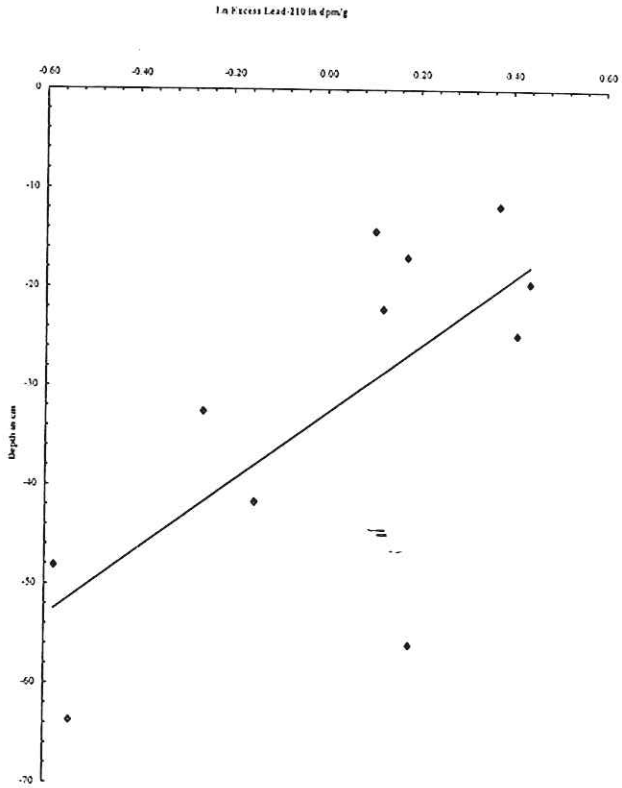
Figure D-154

Natural Recovery Core
Lead-210 Regression Analysis

HC-NR-100



HC-NR-101



HC-NR-102

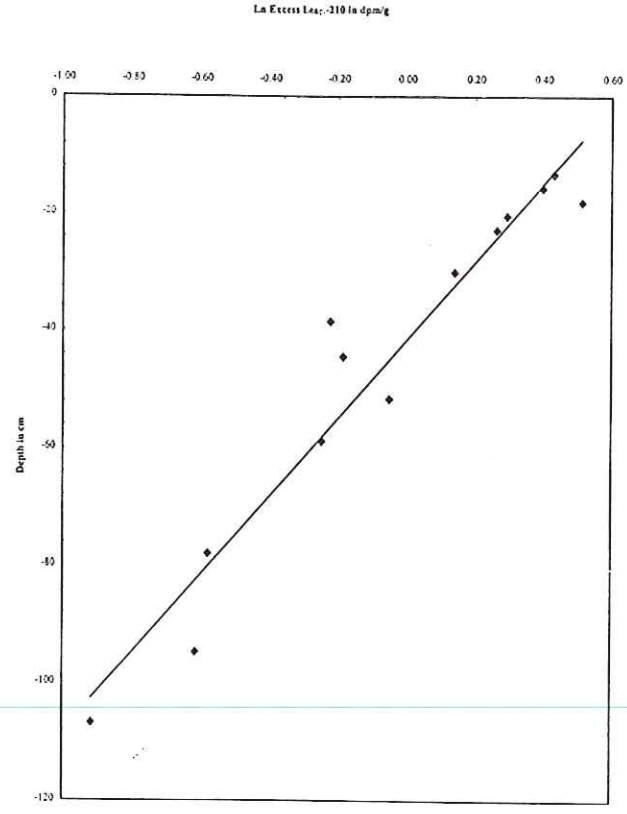


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Figure D-155