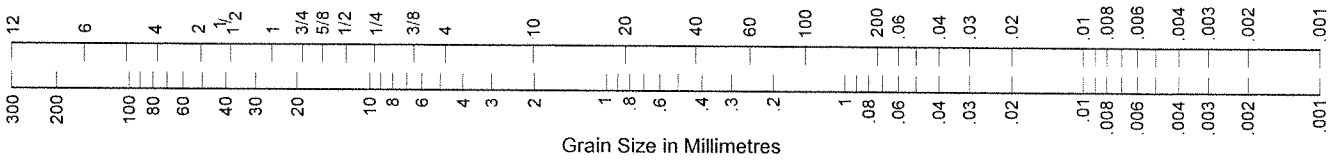
Unified Soil Classification (USC) System
Soil Grain Size

Size of Opening In Inches	Number of Mesh per Inch (US Standard)	Grain Size in Millimetres



COBBLES	GRAVEL	SAND	SILT and CLAY
Coarse-Grained Soils			Fine-Grained Soils

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 requiring 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						

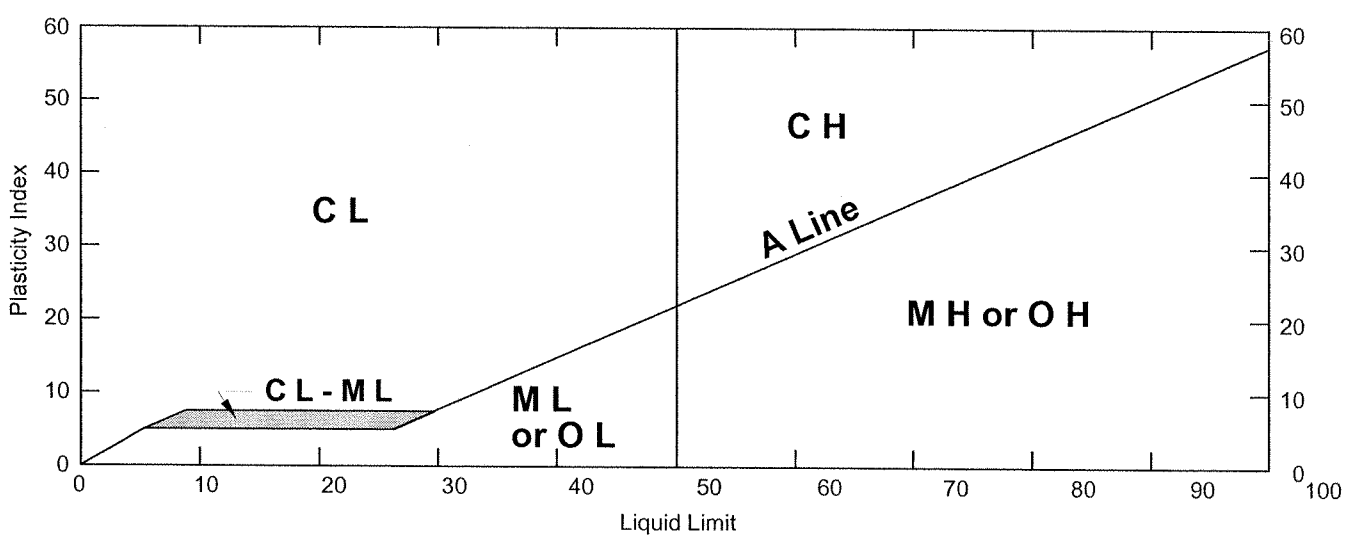


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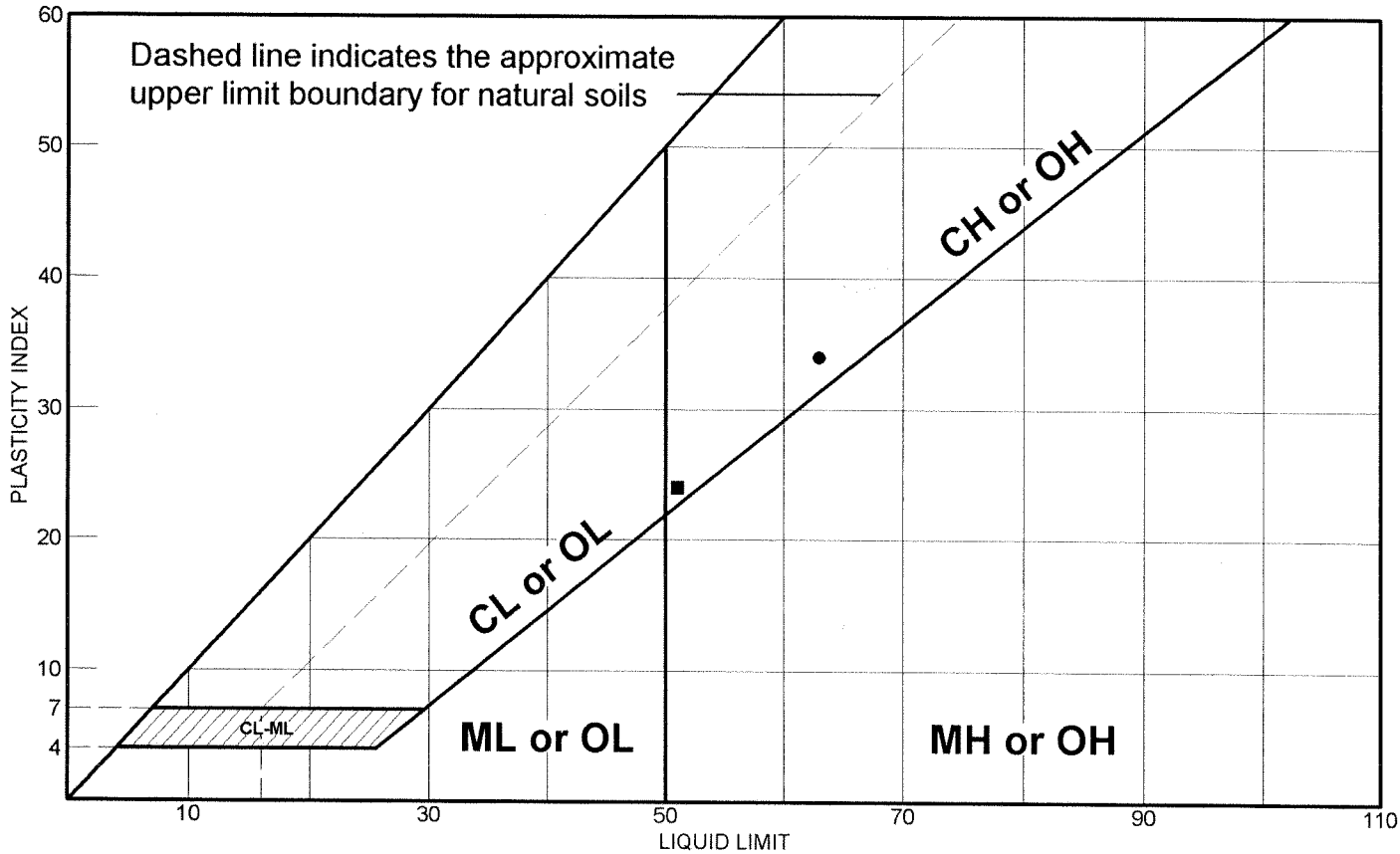
Figure B-1

Grain Size (B-1).cdr

LIQUID AND PLASTIC LIMITS TEST REPORT



Location + Description	LL	PL	PI	-200	USCS
● Source: HC-1 Sample No.: S-11 Fat CLAY	63	29	34		CH
■ Source: HC-1 Sample No.: S-15 Fat CLAY	51	27	24		CH

Remarks:

●

■

Project: Washington Mutual Office Building Development - Tasks 1 & 2

Client: Pine Street Group LLC

Location: Seattle, WA

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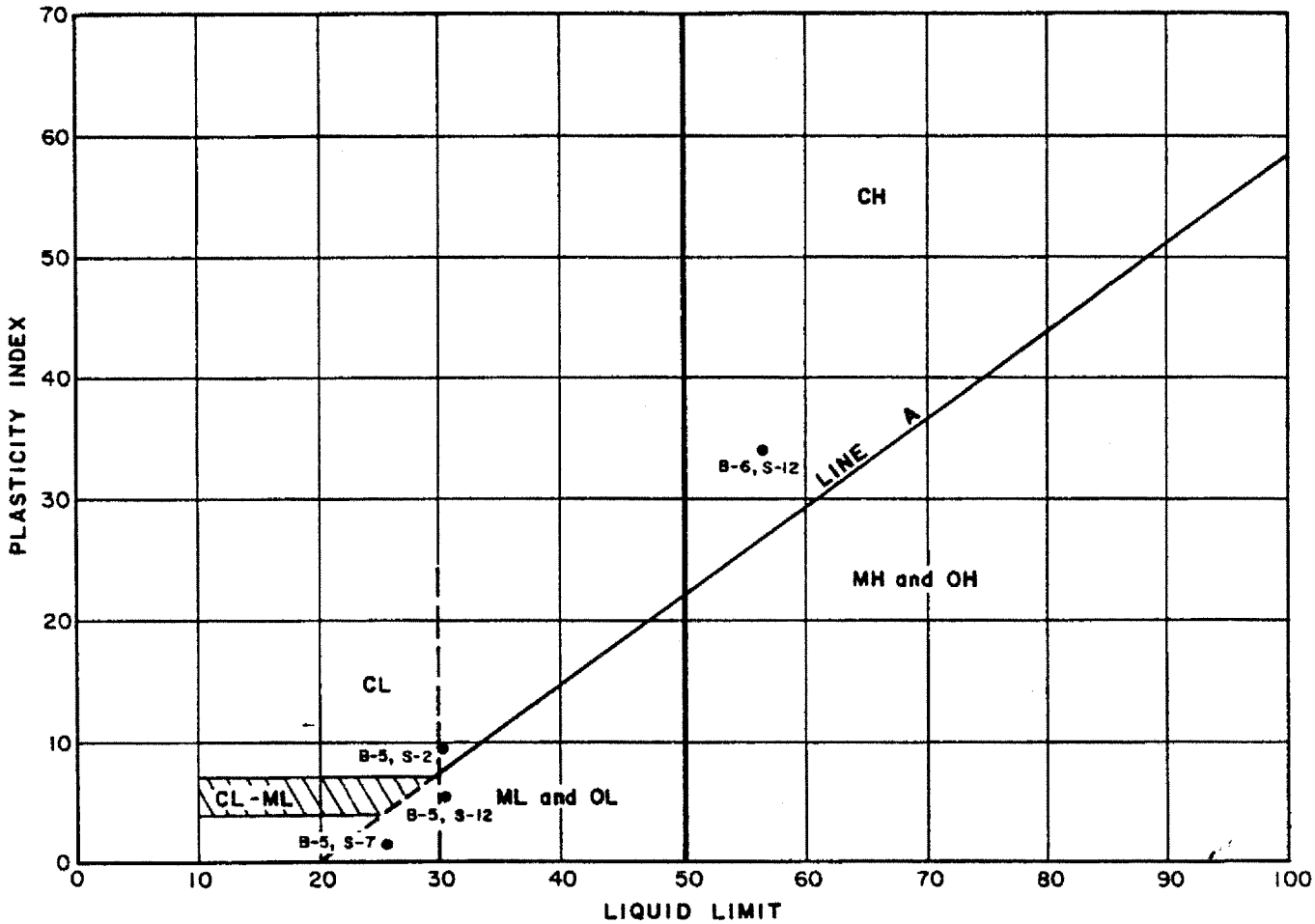
Figure No. B-2

Plasticity Chart



Boring	Sample	Depth	W.C.	L.L.	P.L.	P.I.	Classification	U.S.C.
B-5	S-2	12.0		30	21	9	SILTY CLAY.	CL
B-5	S-7	31.4-31.7	23	26	24	2	SILT.	ML
B-5	S-12	51.1-51.4	26	31	25	5	CLAYEY SILT.	ML
B-6	S-12	56.6-56.8	34	57	24	33	SILTY CLAY.	CH

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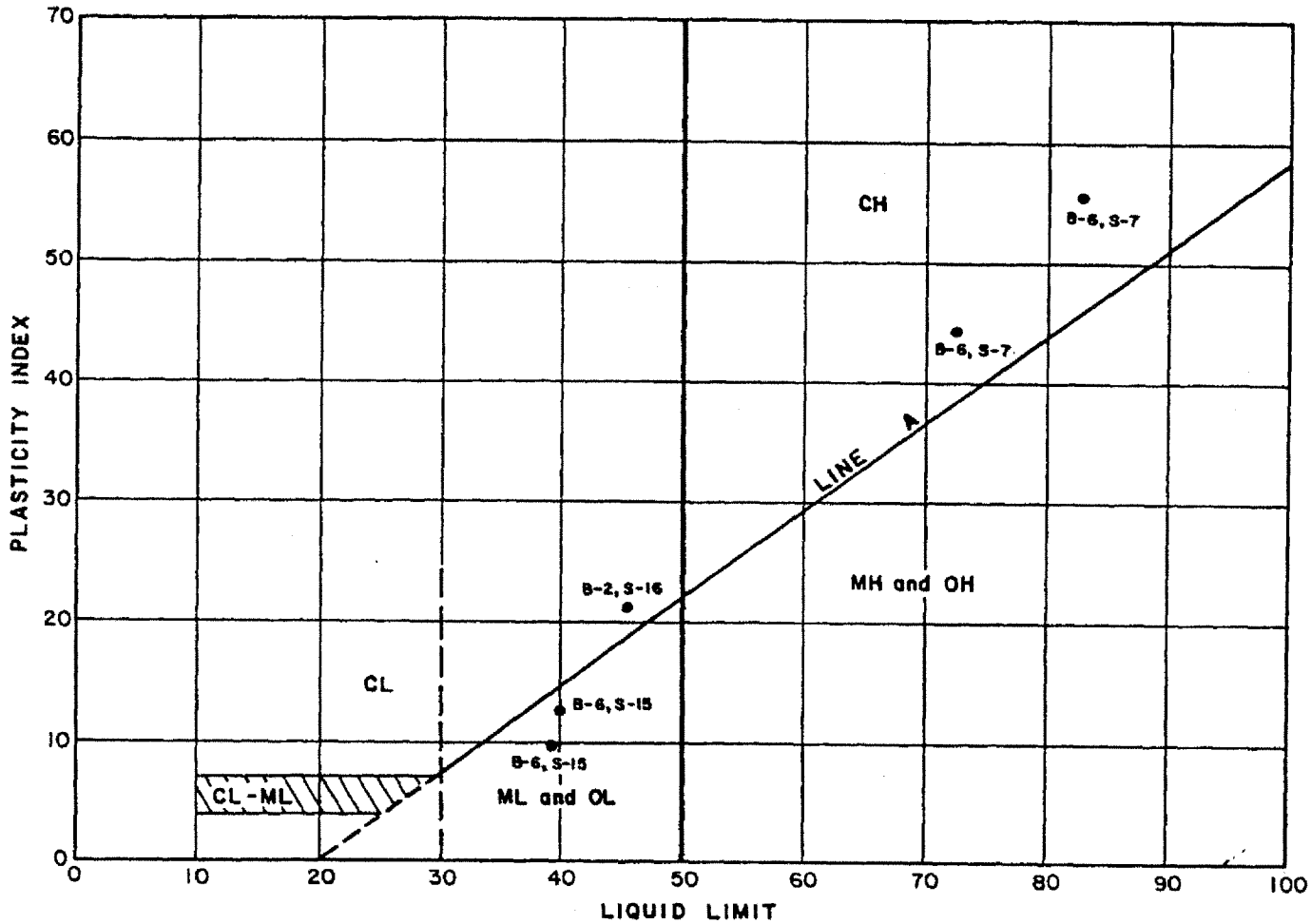
Figure B-3

Plasticity Chart



Boring	Sample	Depth	W.C.	L.L.	P.L.	P.I.	Classification	U.S.C.
B-6	S-15	66.0-66.7	31	40	27	13	CLAYEY SILT.	ML
B-6	S-7	37.0-38.0	34	83	28	55	CLAY.	CH
B-6	S-15	66.0-67.0	31	39	29	10	SILT.	ML
B-6	S-16	77.5-78.0		46	25	21	VERY SILTY CLAY	CL

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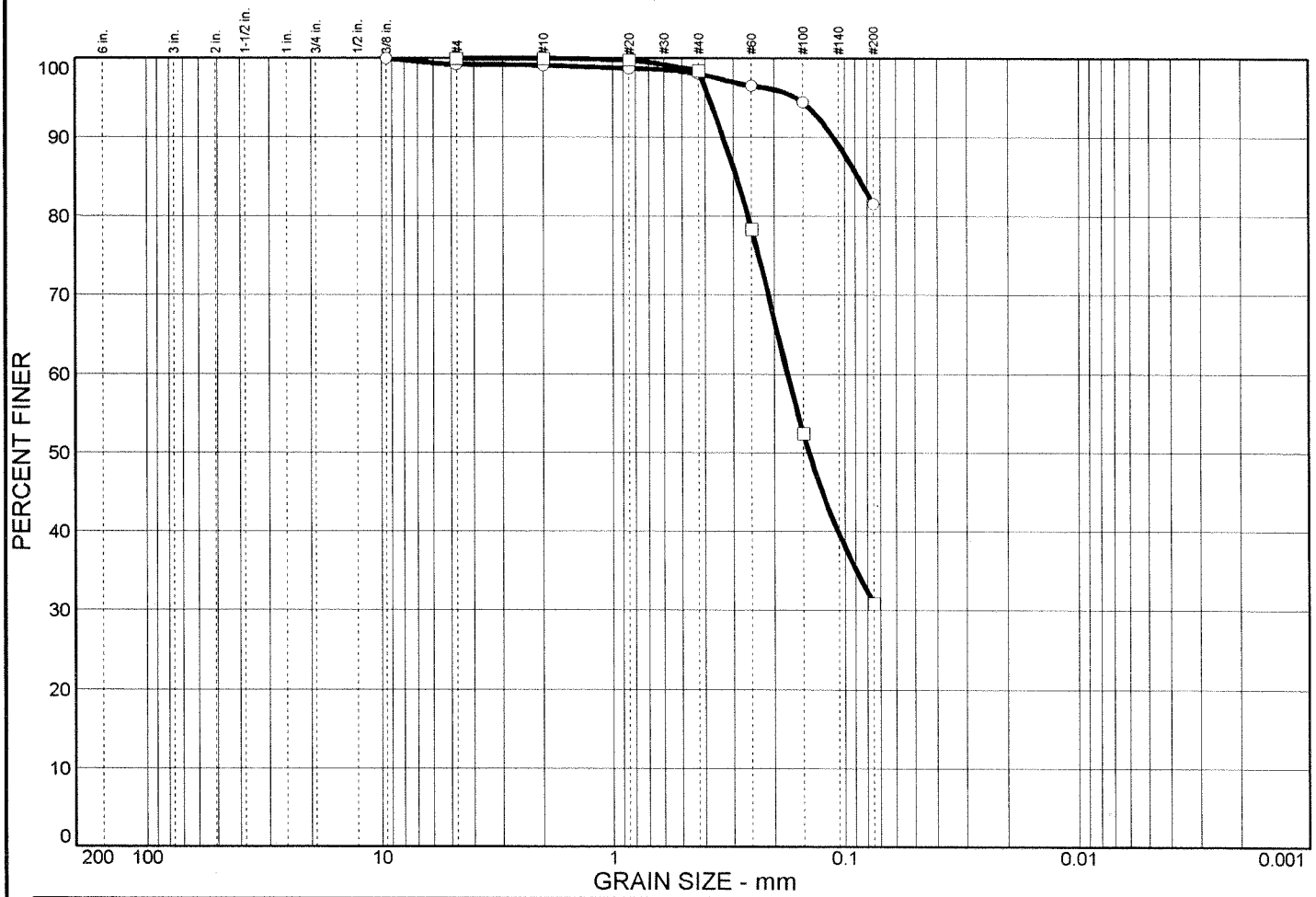
Figure B-4

Particle Size Distribution Report



	% COBBLES	% GRAVEL		% SAND			% FINES	
		CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.8	0.1	1.1	16.5	81.5	
□	0.0	0.0	0.0	0.0	1.6	67.6	30.8	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.0875							
□			0.292	0.175	0.142					

MATERIAL DESCRIPTION	USCS	NAT. MOIST.
○ Sandy SILT	ML	20%
□ Very silty, fine SAND	SM	16%

Remarks:

○

□

Project: Washington Mutual Office Building Development - Tasks 1 & 2

Client: Pine Street Group LLC

○ **Source:** HC-1 **Sample No.:** S-1

□ **Source:** HC-1 **Sample No.:** S-3

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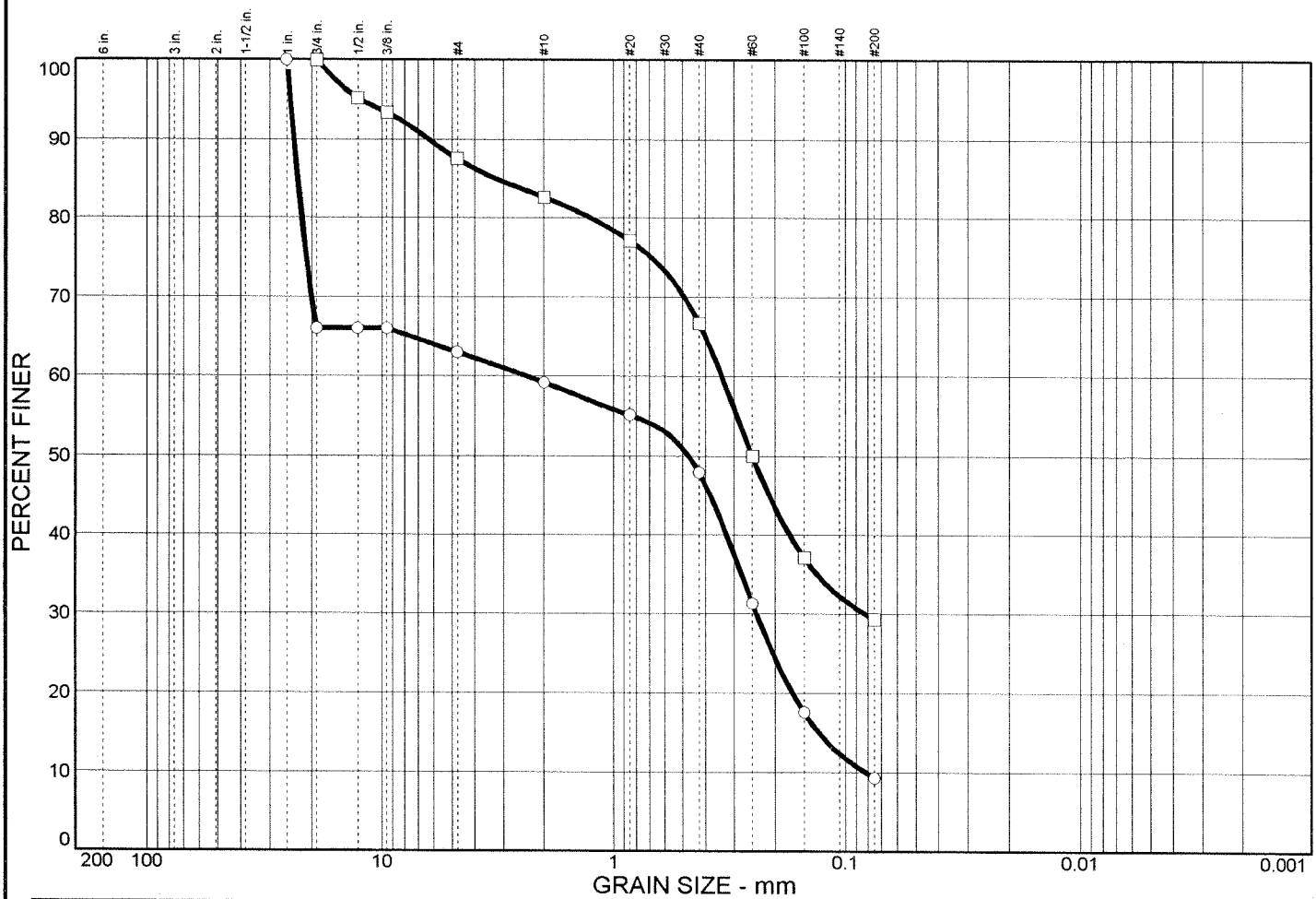
Figure No. B-5

Particle Size Distribution Report



	% COBBLES	% GRAVEL		% SAND			% FINES	
		CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
○	0.0	34.0	3.0	3.8	11.3	38.6	9.3	
□	0.0	0.0	12.5	4.9	15.9	37.4	29.3	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			22.8	2.38	0.471	0.240	0.130	0.0819	0.30	29.04
□			3.25	0.339	0.250	0.0820				

MATERIAL DESCRIPTION	USCS	NAT. MOIST.
○ Slightly silty, very gravelly, medium to fine SAND	SP-SM	13%
□ Gravelly, silty, medium to fine SAND	SM	11%

Remarks:

○ Small sample size

□

Project: Washington Mutual Office Building Development - Tasks 1 & 2

Client: Pine Street Group LLC

○ **Source:** HC-1 **Sample No.:** S-7

□ **Source:** HC-1 **Sample No.:** S-18

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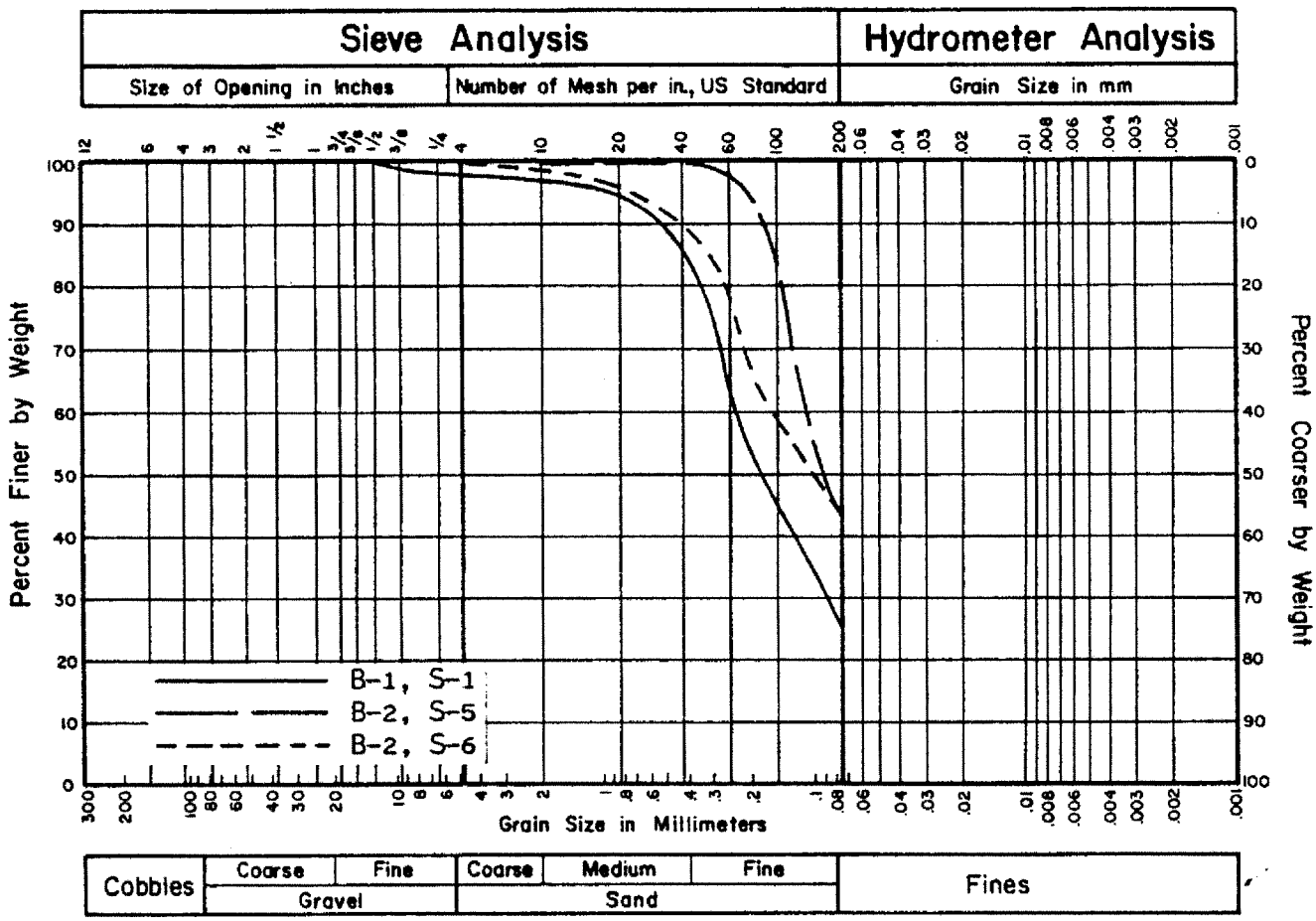
Figure No. B-6

Grain Size Classification



Sample	Depth-ft	U.S.C.	Classification	Nat. W.C. %	Atterberg Limits LL	PL	PI
B-1 S-1	5.0- 5.6	SM	VERY SILTY FINE SAND.	14.6			
B-2 S-5	22.5- 24.0	SM	VERY SILTY FINE SAND.	8.4			
B-2 S-6	27.5- 28.0	SM	VERY SILTY FINE SAND.	18.4			

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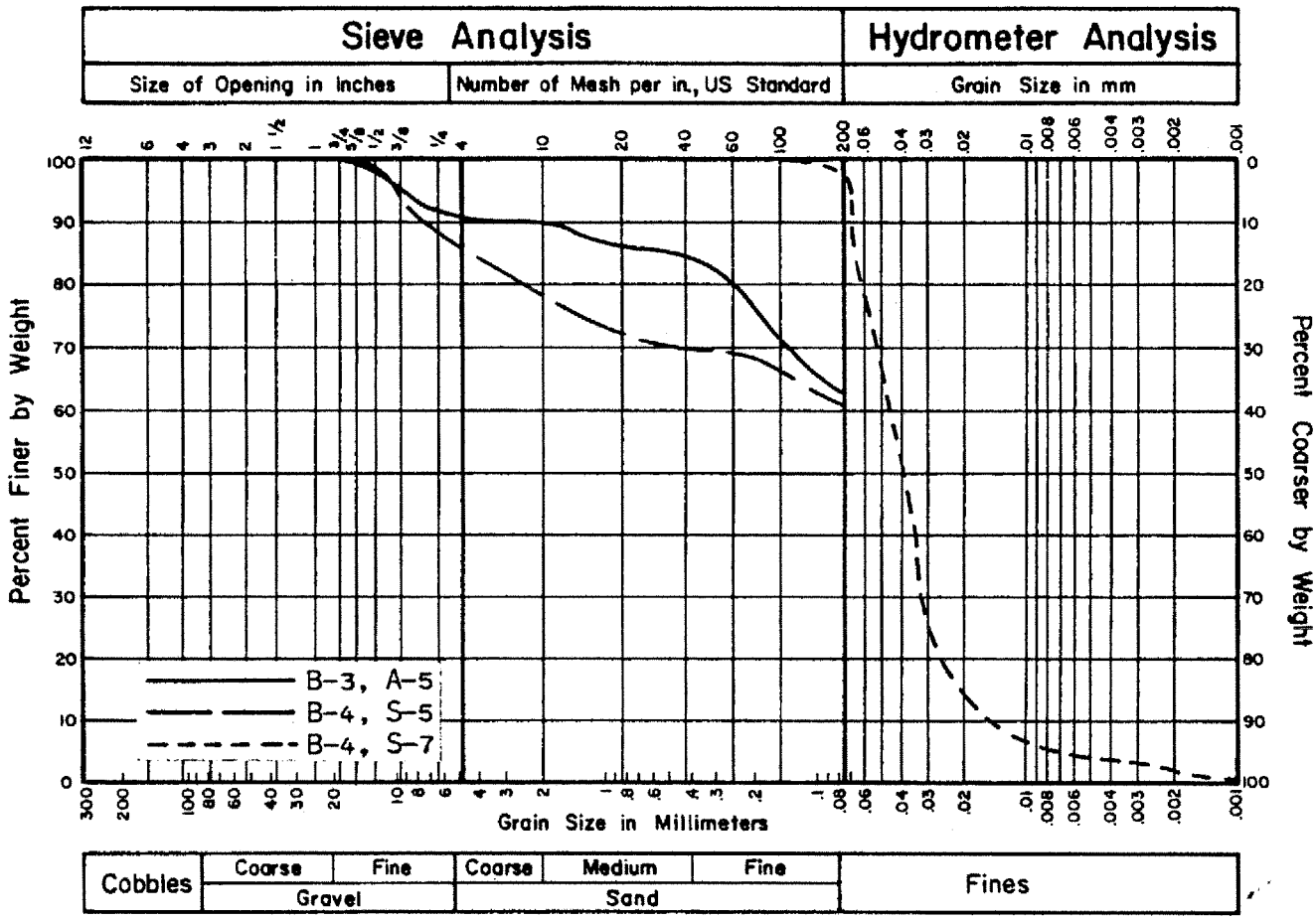
Figure B-7

Grain Size Classification



Sample	Depth-ft	U.S.C.	Classification	Nat. W.C. %	Atterberg Limits LL	PL	PI
B-3 S-5	22.0-24.5	ML	SLIGHTLY GRAVELLY, FINE, VERY SANDY SILT.	14.0			
B-4 S-5	22.5-23.5	ML	GRAVELLY, VERY SANDY SILT.	14.1			
B-4 S-7	33.0-34.0	ML	SILT.	25.6			

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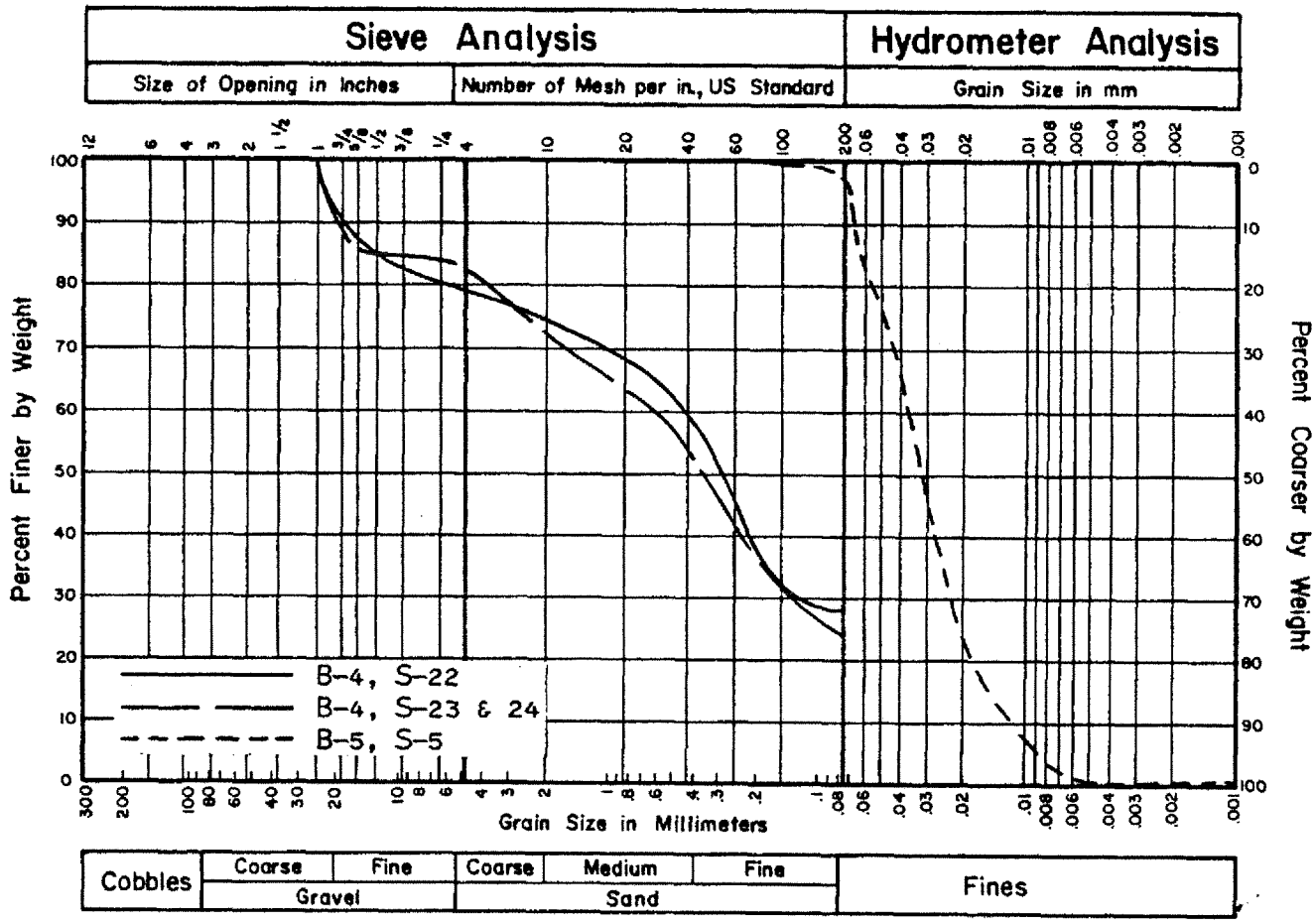
Figure B-8

Grain Size Classification



Sample	Depth-ft	U.S.C.	Classification	Nat. W.C. %	Atterberg Limits LL	PL	PI
B-4 S-22	93.0-93.5	SM	GRAVELLY, VERY SILTY, MEDIUM TO FINE SAND.	9.1			
B-4 S-23 & 24 (COMBINED)	98.0-98.3	SM	GRAVELLY, VERY SILTY, MEDIUM TO FINE SAND.	12.3			
B-5 S-5	21.0-22.5	ML	SILT.	22.4			

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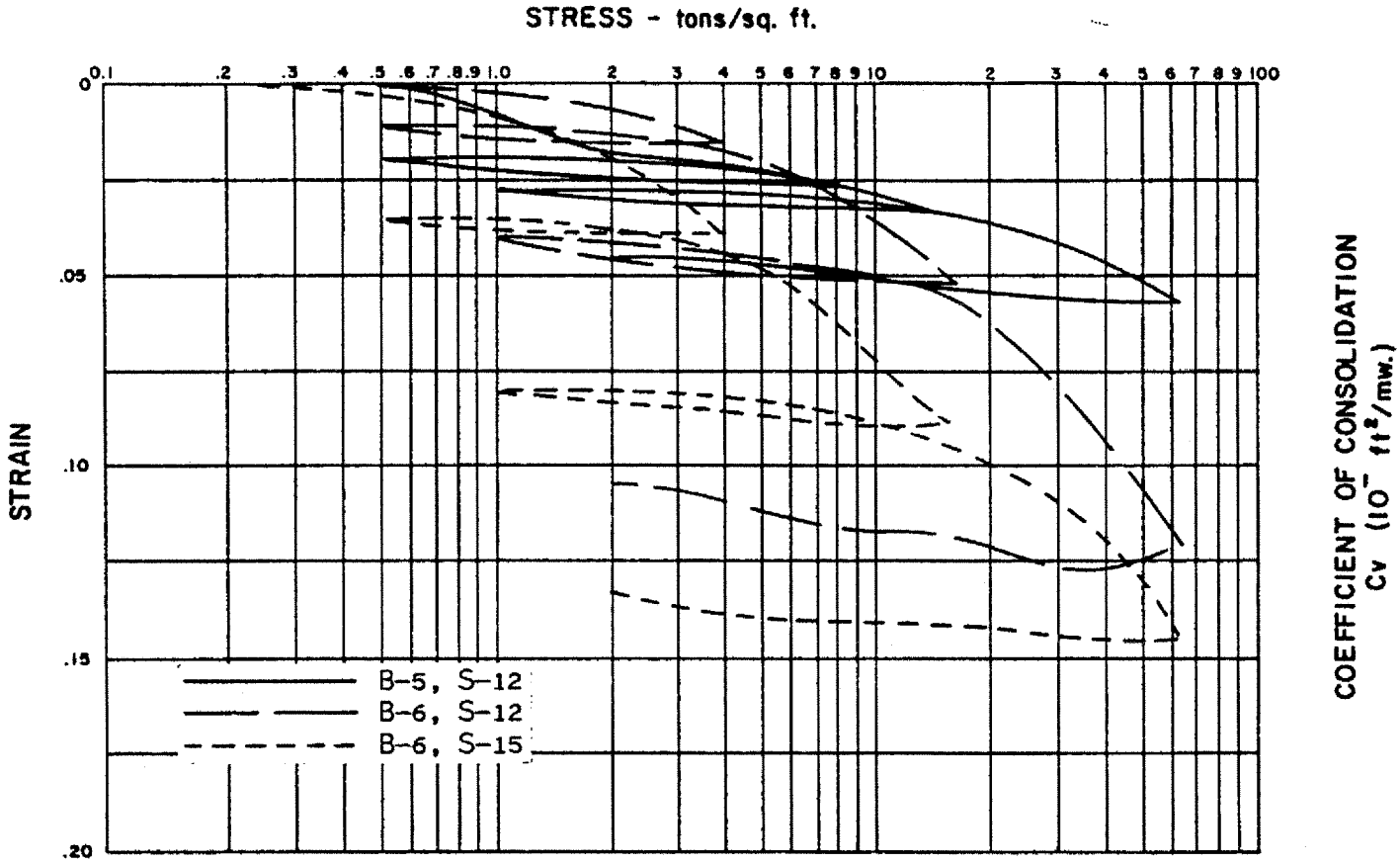
Figure B-9

Consolidation Test Results



SAMPLE	DEPTH feet	% WATER CONTENT Before	After	ATTERBERG LIMITS LL	PL	PI	CLASSIFICATION	WET UNIT WEIGHT
B-5 S-12	51.0-52.0	26	26	31	25	6	CLAYEY SILT.	
B-6 S-12	56.6-56.8	34	34	57	24	33	SILTY CLAY.	114 PCF
B-6 S-15	66.0-67.0	31		39	29	10	SILT.	

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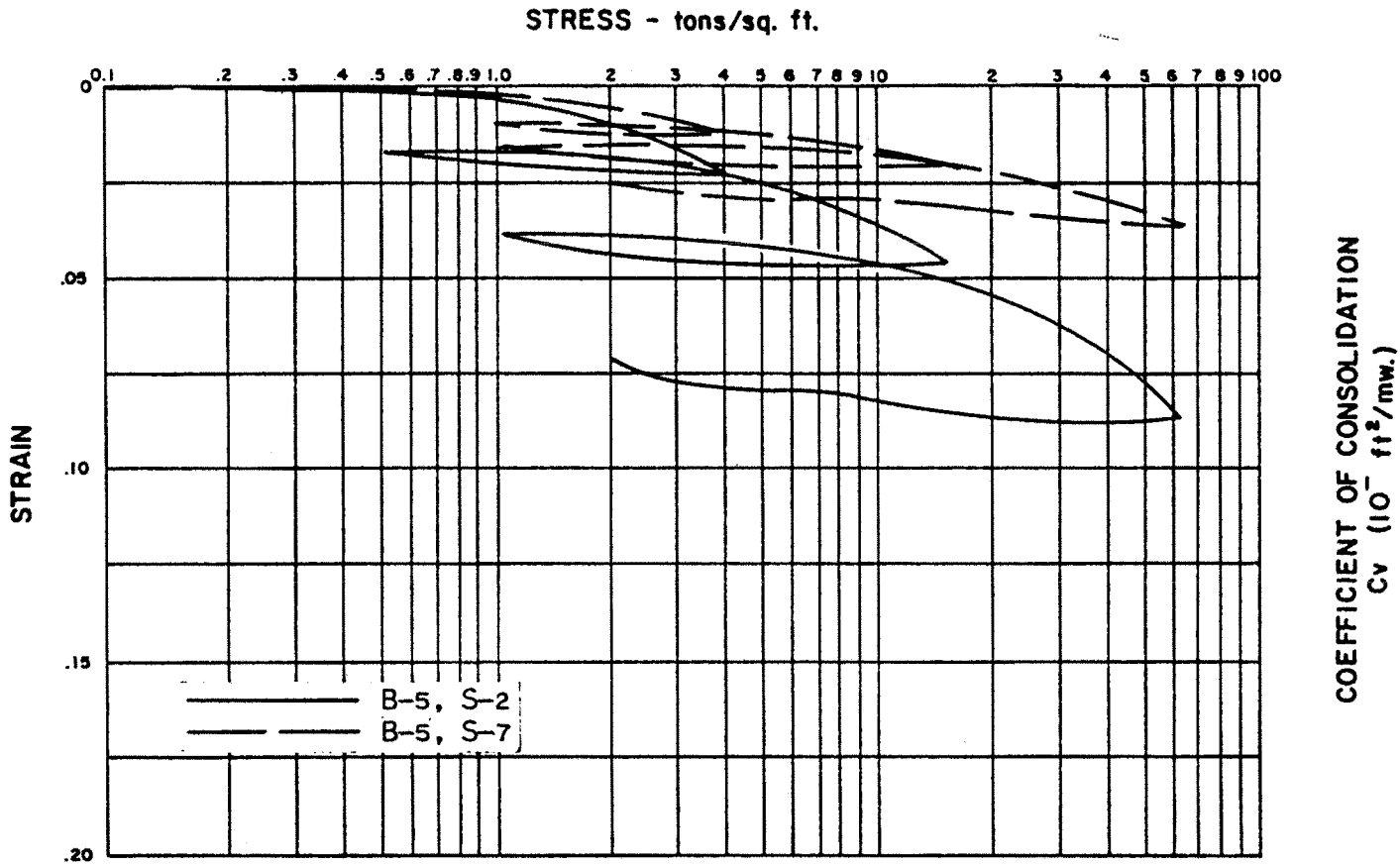
Figure B-10

Consolidation Test Results



SAMPLE	DEPTH feet	% WATER CONTENT Before	After	ATTERBERG LIMITS LL	PL	PI	CLASSIFICATION	WET UNIT WEIGHT
B-5 S-2	12.2-12.5	25.3	25.6	30	21	9	SILTY CLAY.	121.3
B-5 S-7	31.0-32.0	23.2	23.1	26	24	1		

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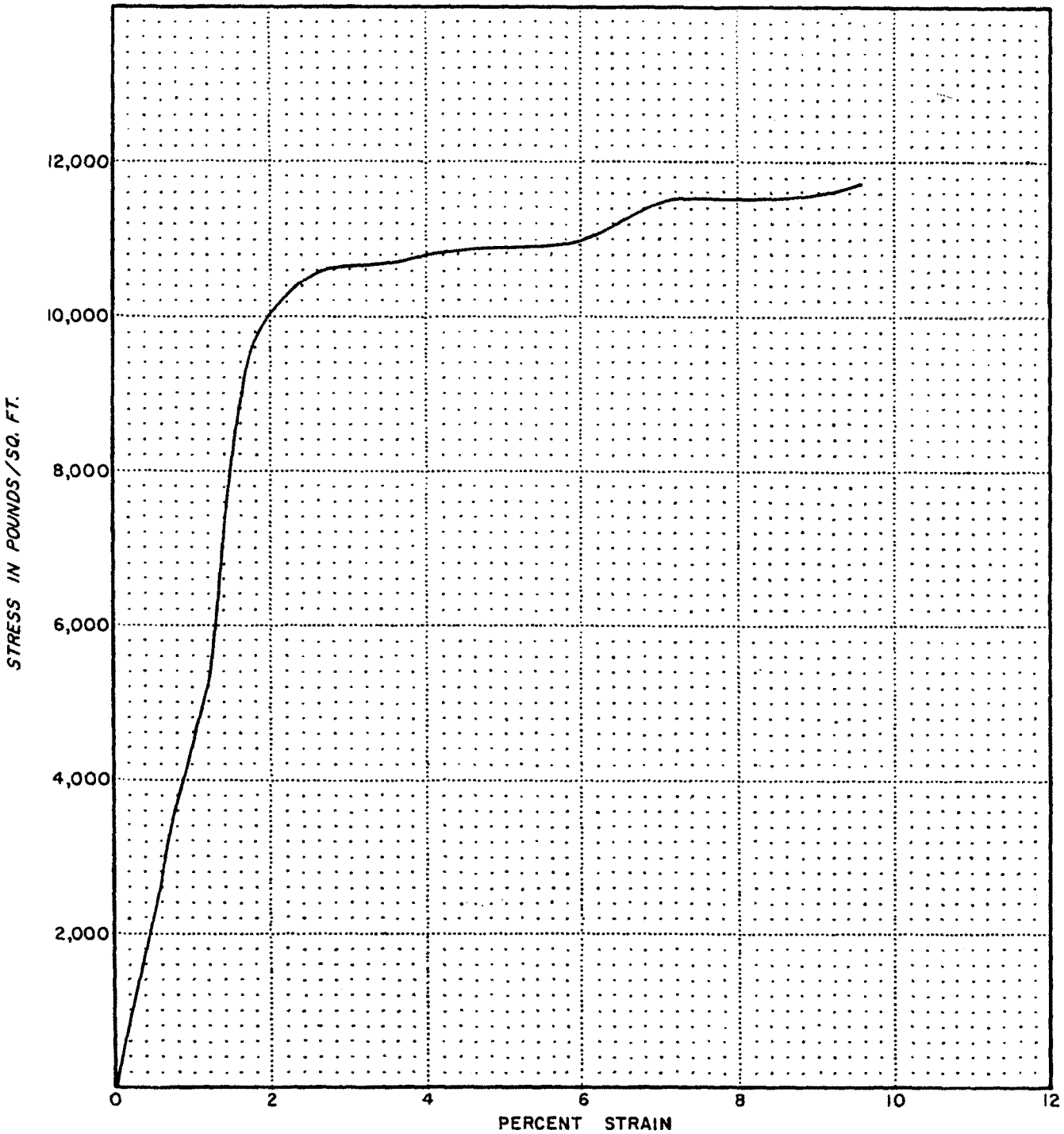
Figure B-11

Unconsolidated Undrained Test



SAMPLE CLASSIFICATION

TEST NO.	2
BORING NO.	B-6
SAMPLE NO.	S-12
DEPTH	56.0-57.0
HEIGHT, INCHES	5.433
DIAMETER, INCHES	2.863
WET WEIGHT	1146.2
WET UNIT WEIGHT, PCF.	85.5
W.C. %, BEFORE TEST	32.5

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Figure B-12