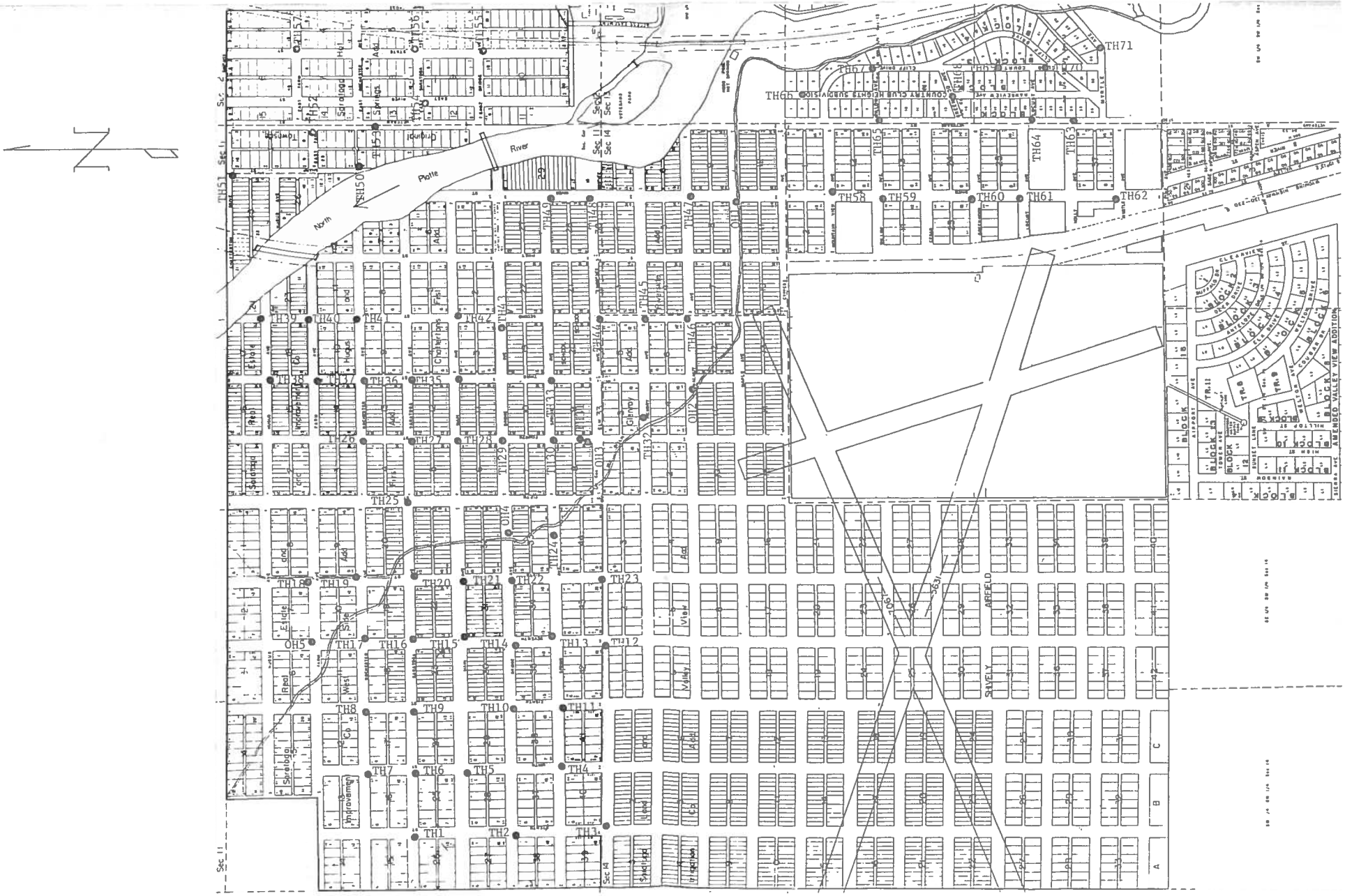
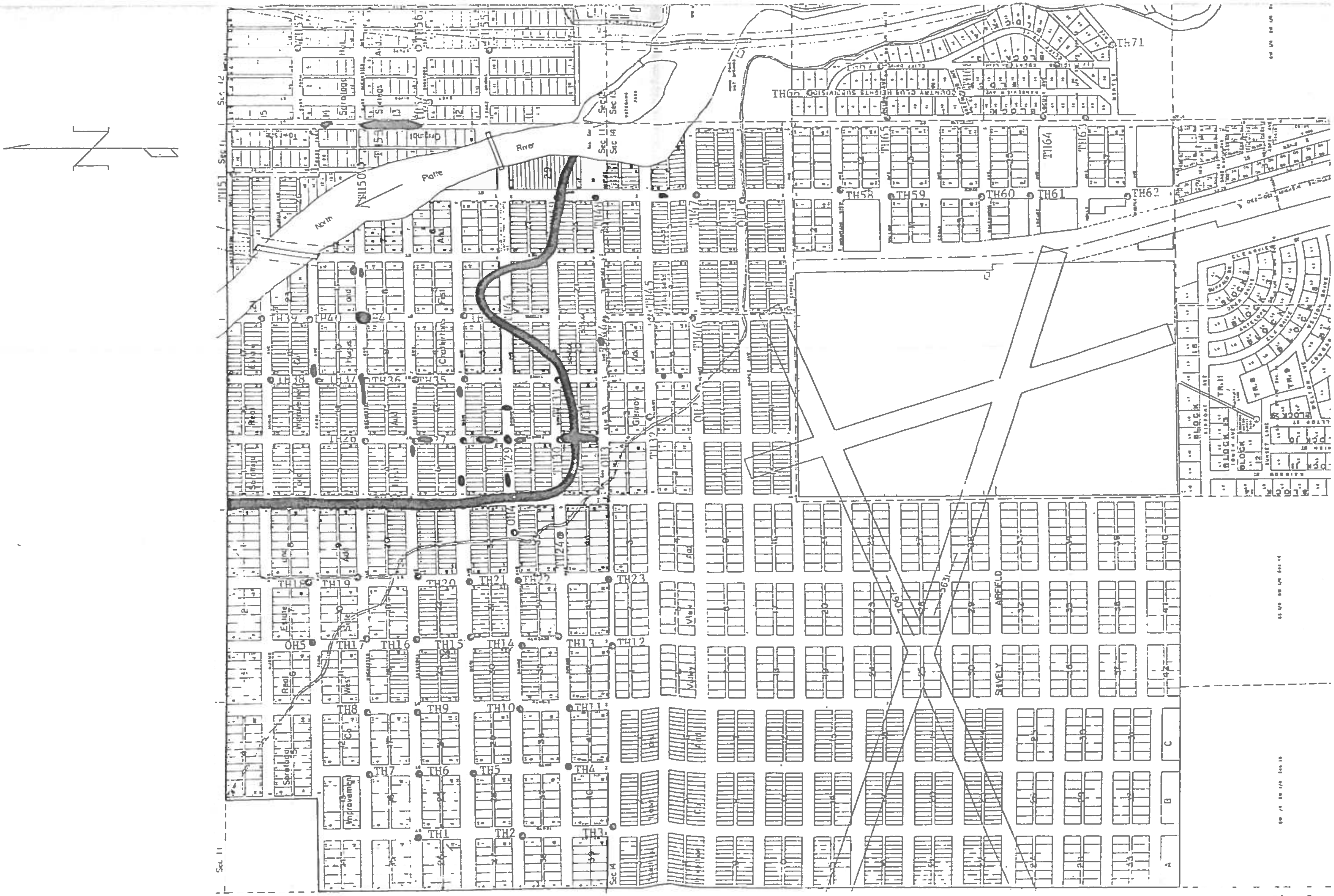


LOCATION OF EXPLORATORY AND WATER OBSERVATION HOLES
SCALE: 1" = 60'

Fig. 1

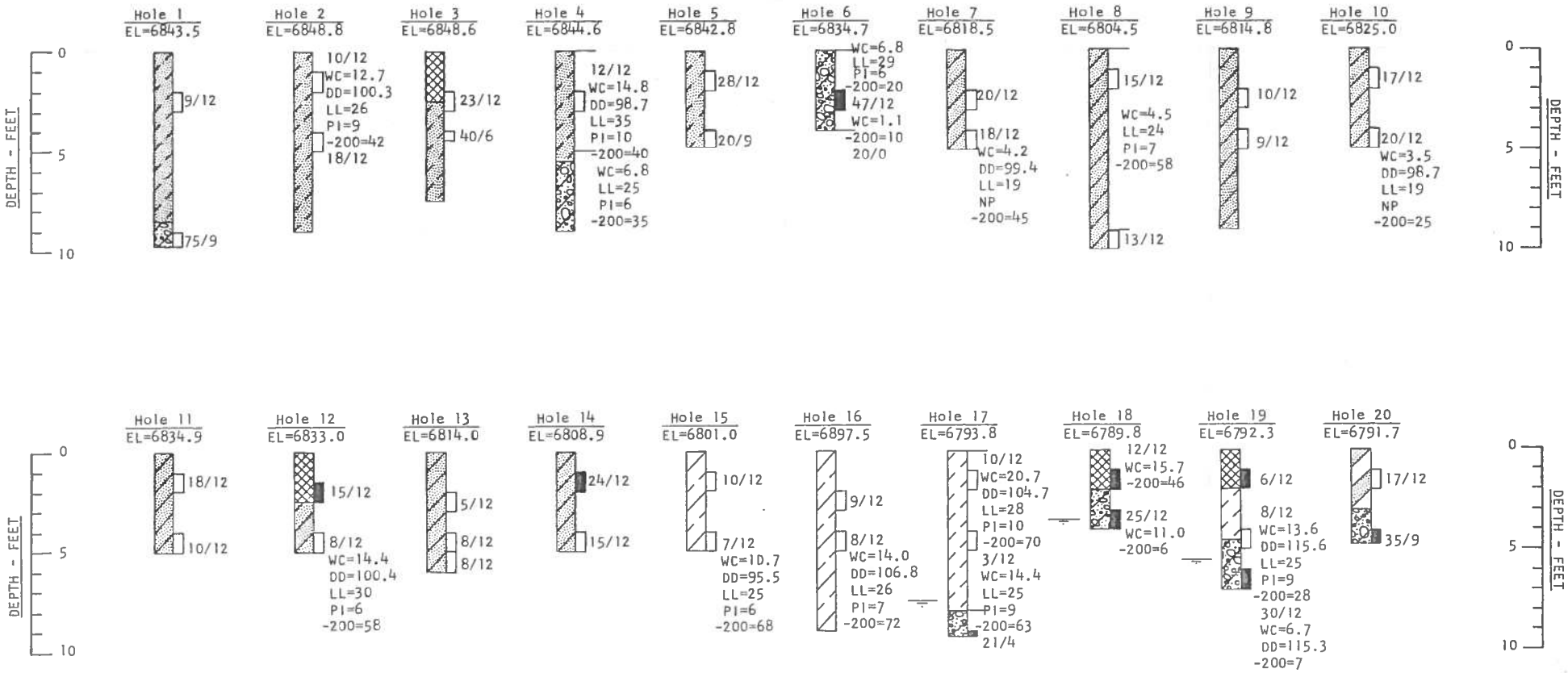
#5615W



LOCATION OF SOFT AREAS AND OLD RIVER CHANNEL

Fig. 2

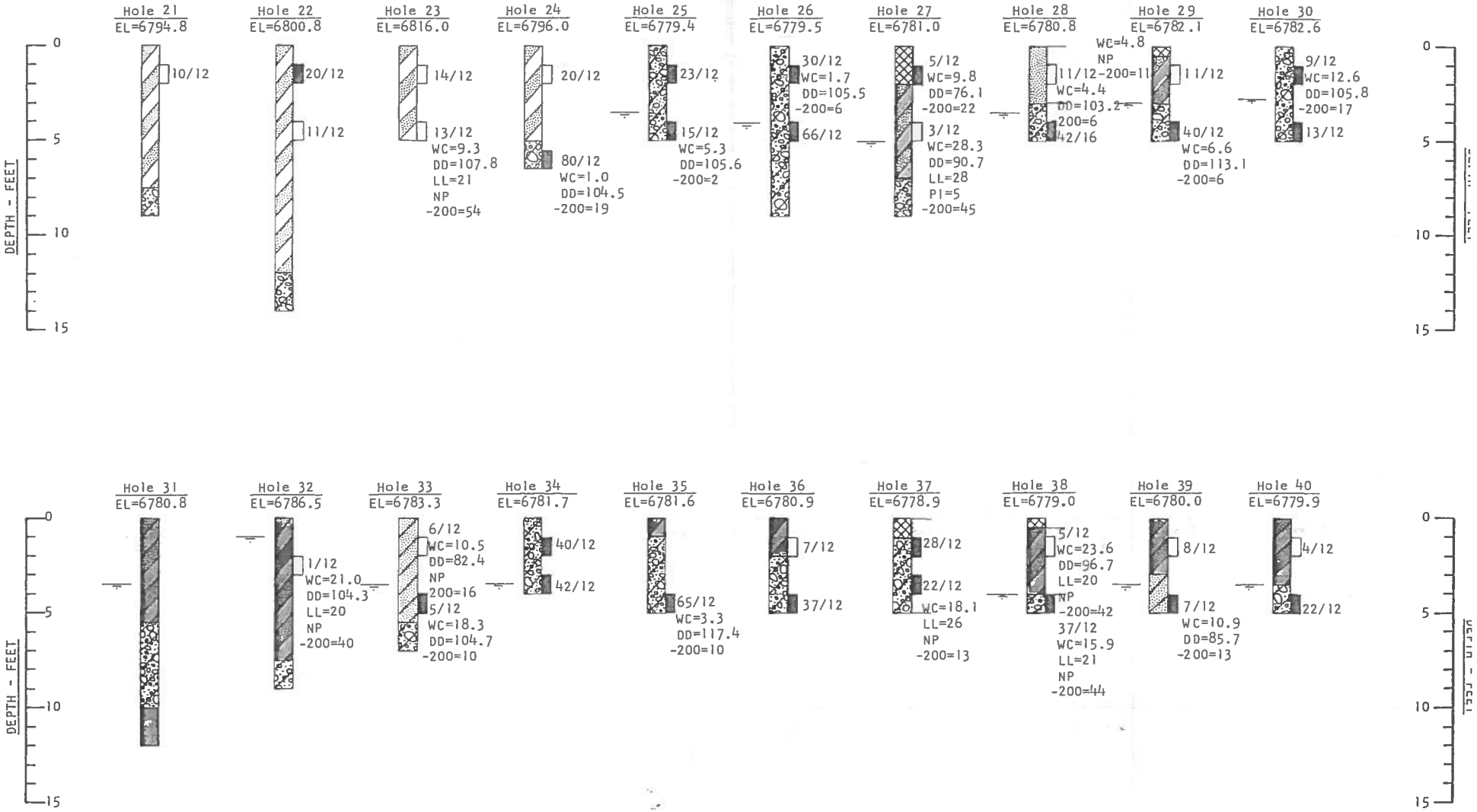
#5615W



LOGS OF EXPLORATORY HOLES

Fig. 3

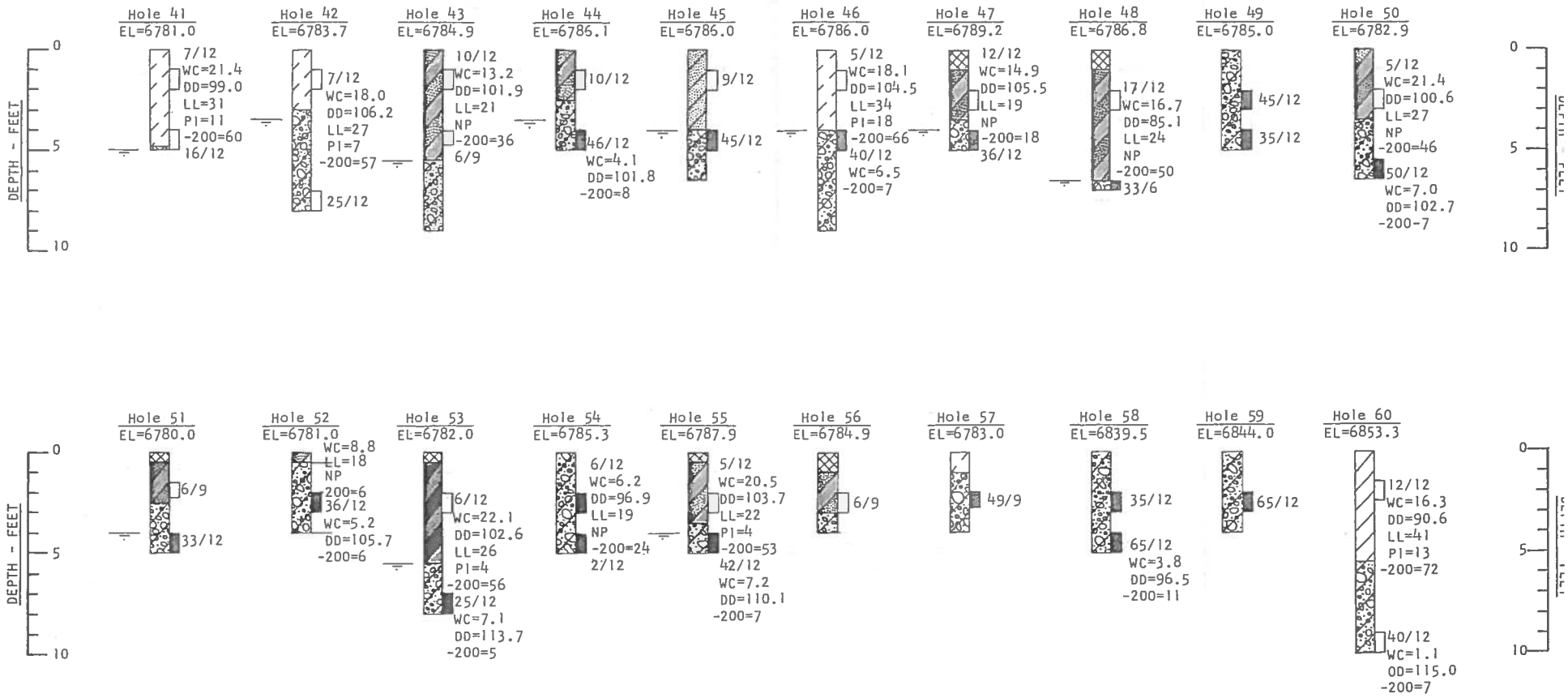
#5615W



#5615W

LOGS OF EXPLORATORY HOLES

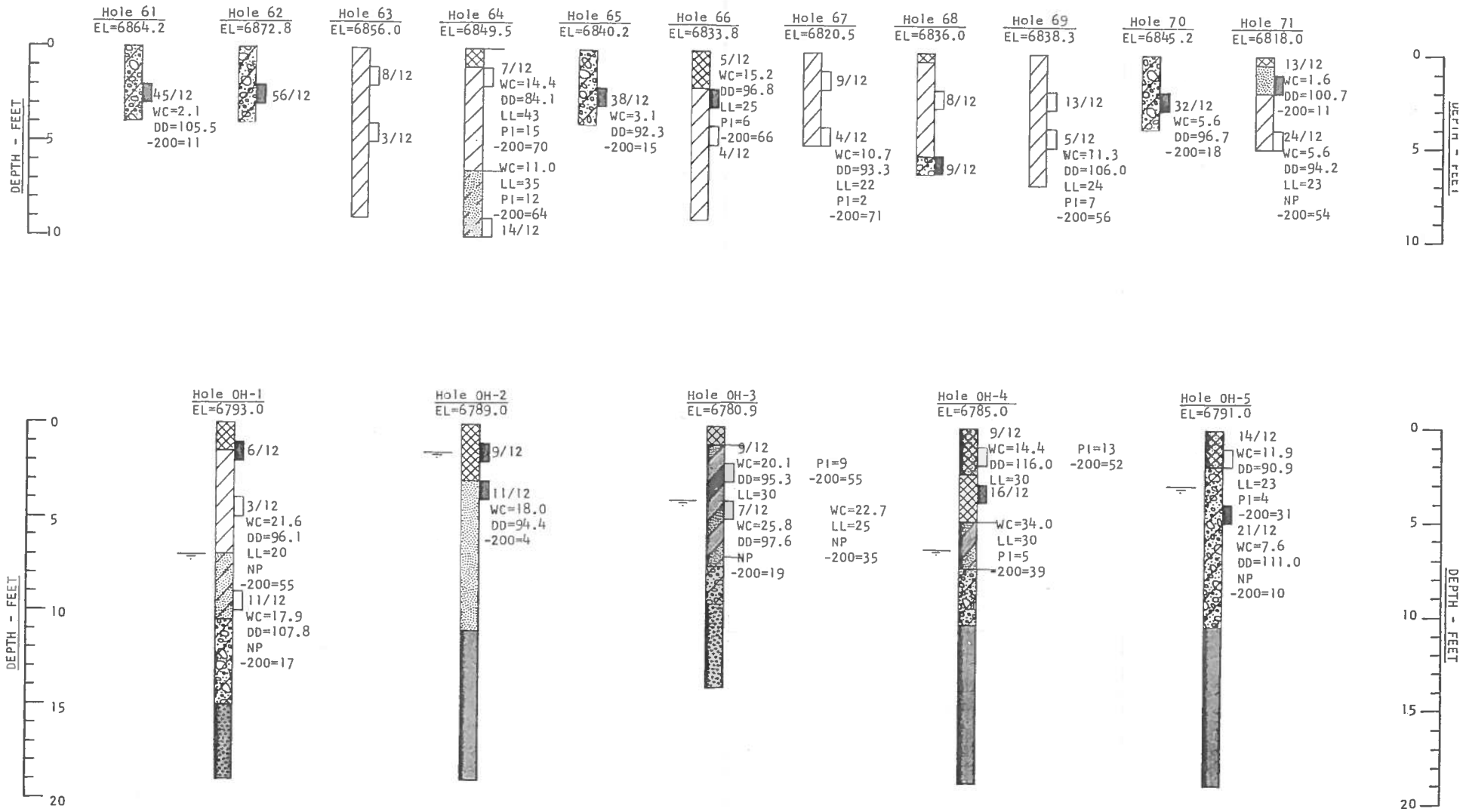
Fig. 4



#5615W

LOGS OF EXPLORATORY HOLES

Fig. 5



#5615W

LOGS OF EXPLORATORY AND WATER OBSERVATION HOLES

Fig. 6

Legend:

Fill, clay, medium stiff to stiff, numerous claystone fragments and gravel, brown, moist.

Fill, sand and gravel, silty to very silty, loose to medium dense, brown, moist to wet.

Clay (CL), sandy to very sandy, soft to stiff, brown, moist to wet.

Silt (ML), sandy to very sandy, soft to very stiff, intergrading into a very sandy clay-silt, scattered small gravel, brown, moist to very moist.

Clay-Silt (CL-ML), sandy to very sandy, medium stiff to stiff, interbedded thin sandy clay or sandy silt layers, brown, moist to very moist.

Sand (SP-SM), clean to slightly silty, medium dense, brown, moist to wet.

Sand (SC), clayey to very clayey, loose to medium dense, occasionally intergrades into a very sandy clay, brown, moist to very moist.

Sand (SM), silty to very silty, loose to medium dense, occasionally intergrades into a very sandy silt, brown, moist to wet.

Sand, silty to Silt, sandy (SM-ML), medium dense, occasional small gravel, brown, moist to very moist.

Sand, silty to Silt, sandy (SM-ML), very loose to medium dense, slightly organic to highly organic, occasionally grading into a sandy clay, dark brown to black, moist to wet.

Sand and Gravel (SM-GM), slightly silty to silty, loose to very dense, occasional areas with numerous cobble, brown, moist to wet.

Sandstone Bedrock, hard to very hard, brown to grey, moist.

Claystone Bedrock, hard to very hard, occasionally thin interbedded siltstone or sandstone layers, grey to brown,

9/12 Undisturbed drive sample. The symbol 9/12 indicates that 9 blows of a 140 lb. hammer falling 30 inches were required to drive the sampler 12 inches.

47/12 Standard drive sample. The symbol 47/12 indicates that 47 blows of a 140 lb. hammer falling 30 inches were required to drive a standard 2-inch O.D. split spoon sampler 12 inches.

Indicates free water level measured at the time of drilling.

Indicates depth interval from which disturbed soil sample was obtained from auger cuttings.

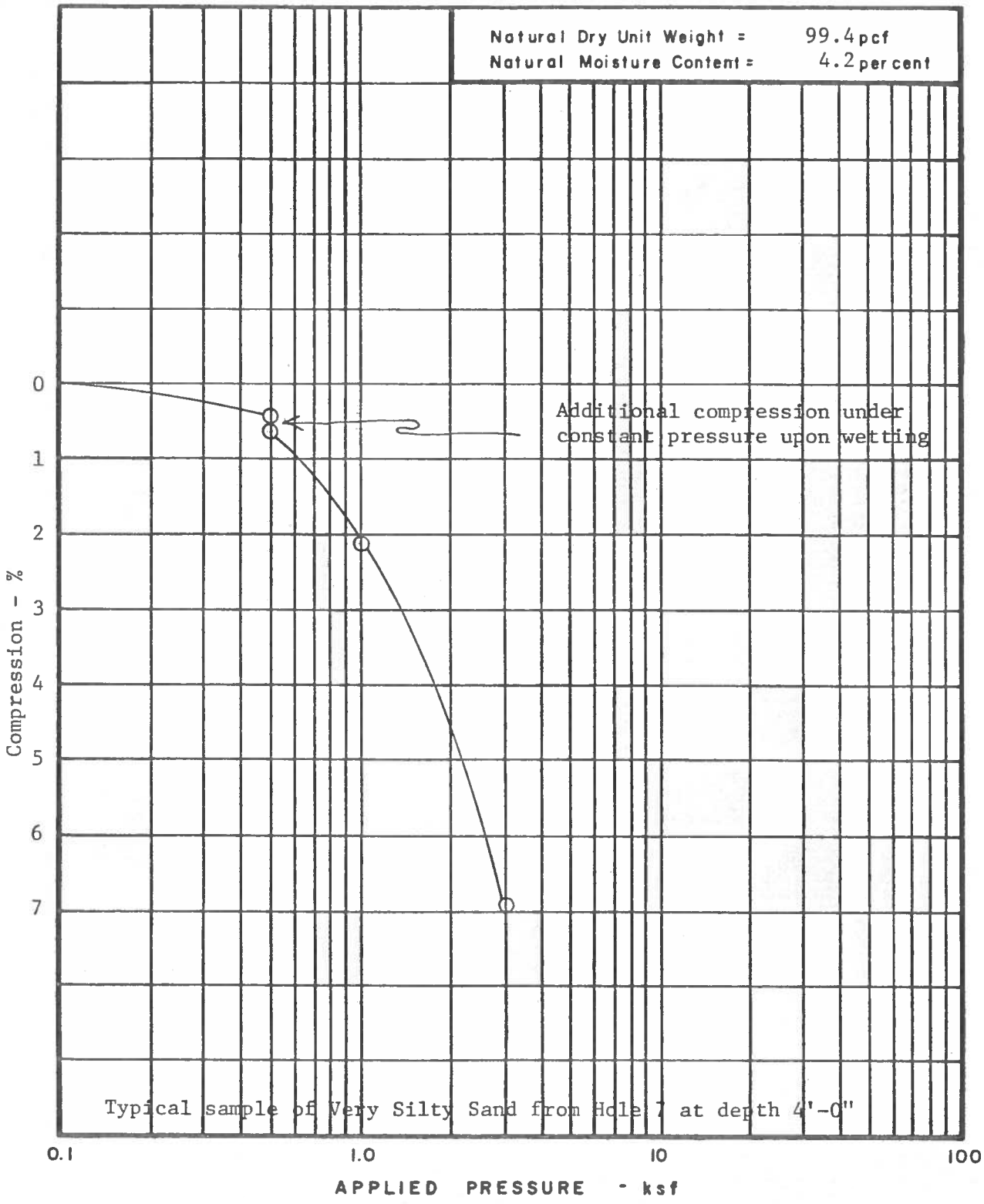
Notes

(1) Test holes were drilled July 18, 19, and 20, 1978 using a 4-inch diameter continuous flight power auger.

(2) Elevations of test holes were established by personnel from Robert Jack Smith and Associates, Inc.

(3) WC = Water Content (%)
DD = Dry Density (pcf)
LL = Liquid Limit (%)
PI = Plasticity Index (%)
NP = Non-plastic
-200 = Passing No. 200 Sieve (%)
WSS = Water Soluble Sulfate Content (%)

(4) Slotted PVC pipe was installed in Water Observation Holes 1 through 5 to allow monitoring the water table.



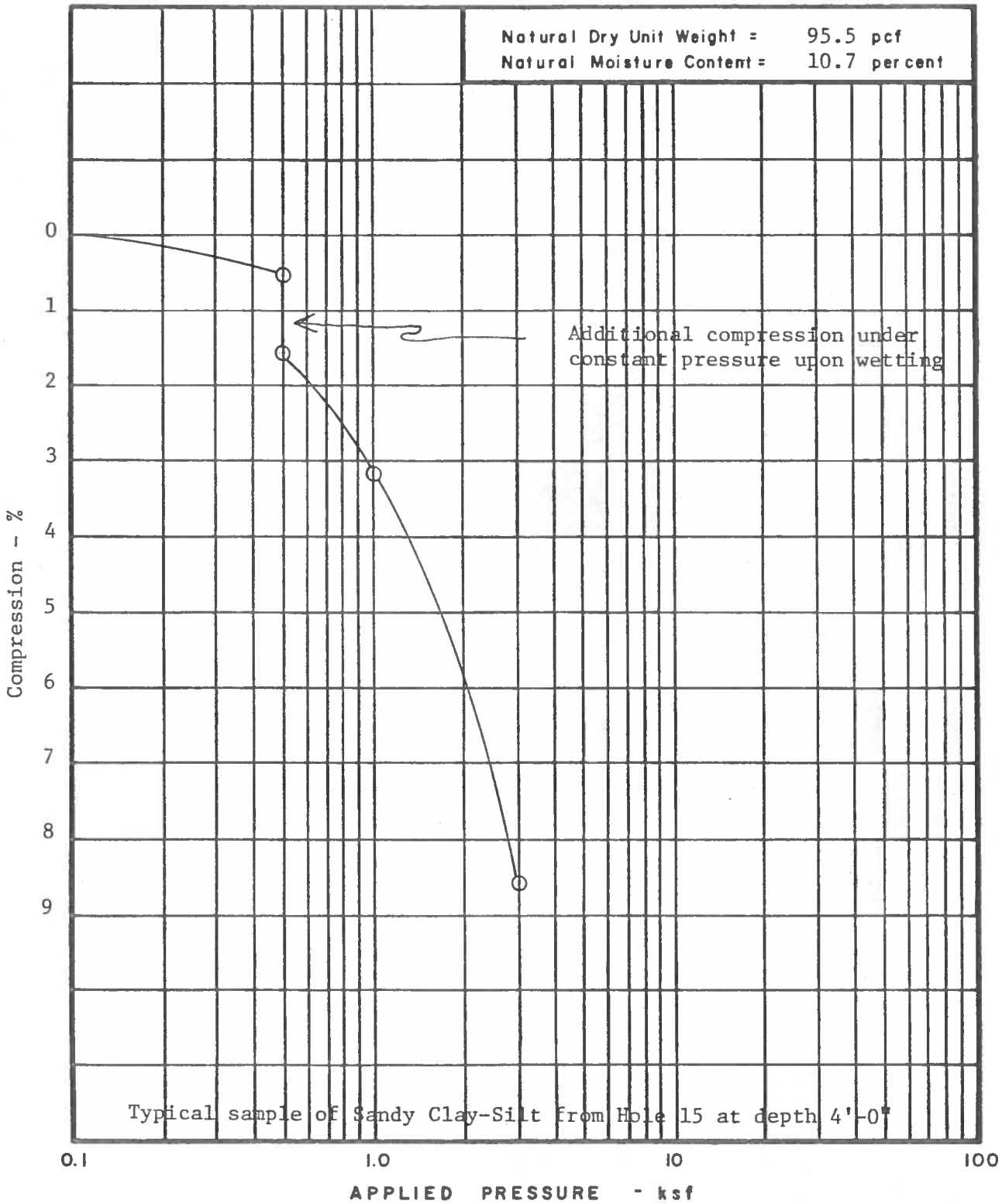
Swell - Consolidation Test Results

#5615W

Fig. 8

CA-1A

CHEN AND ASSOCIATES

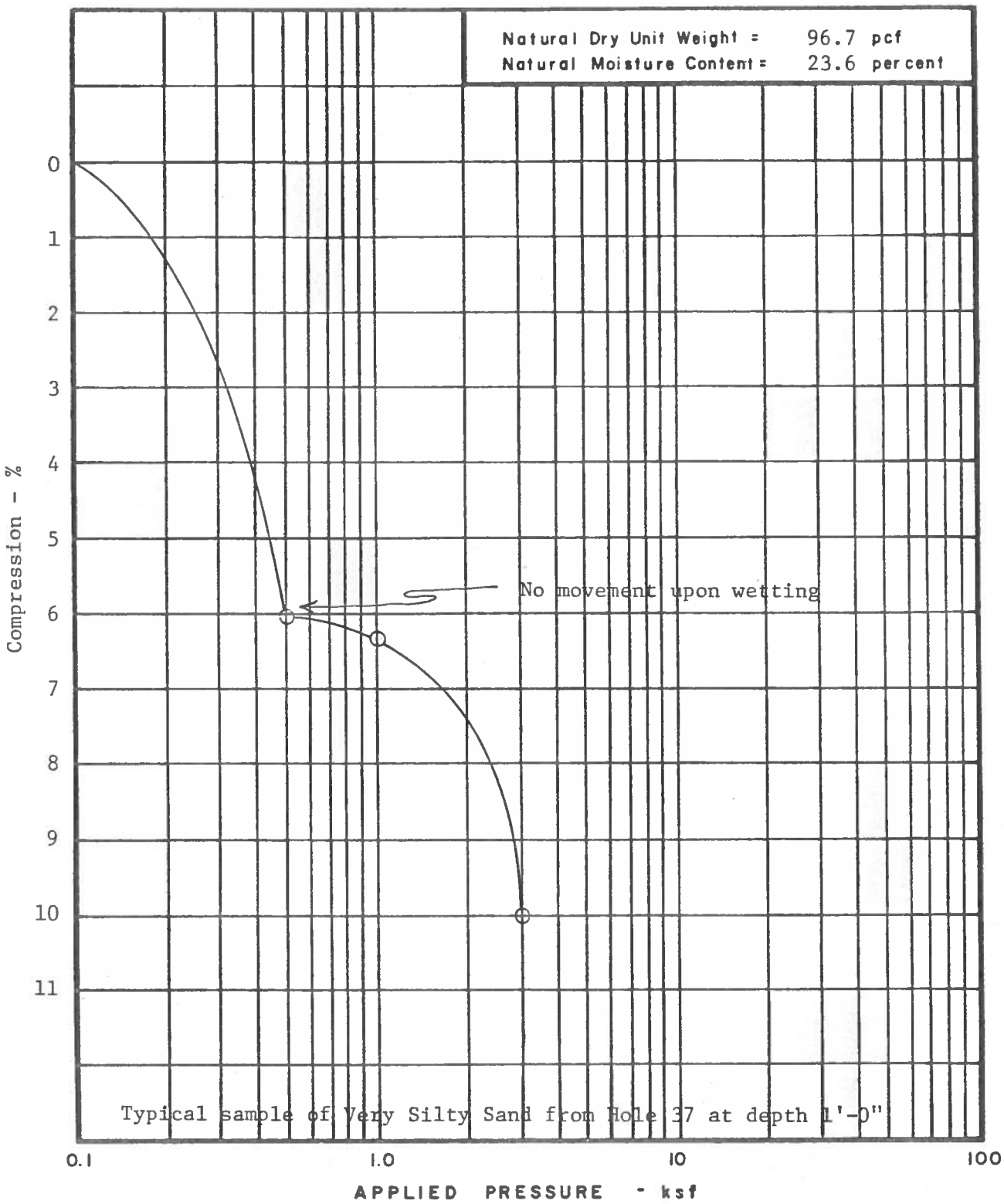


#5615W

Swell - Consolidation Test Results

Fig. 9

CA-1A

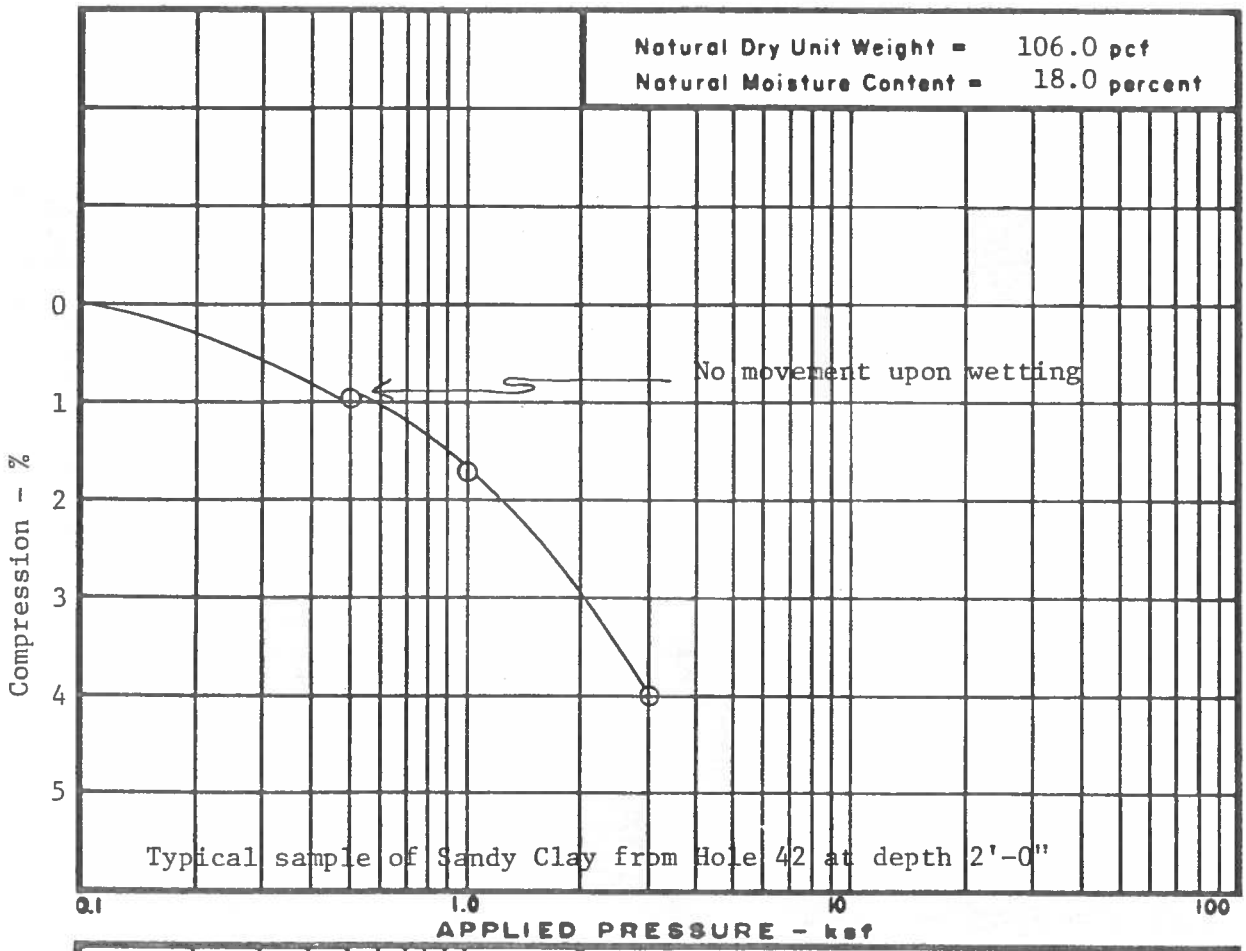


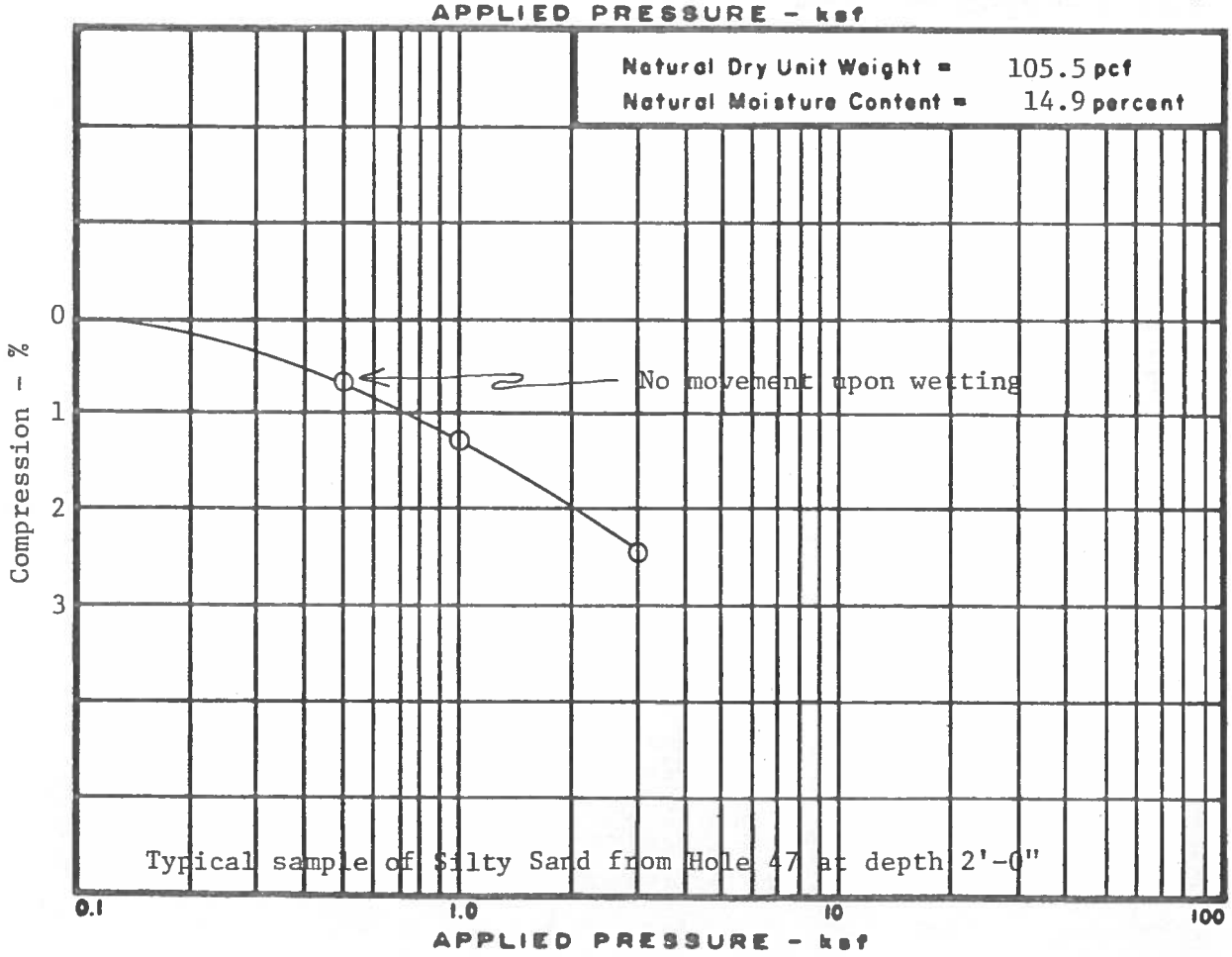
Swell - Consolidation Test Results

#5615W

Fig. 10

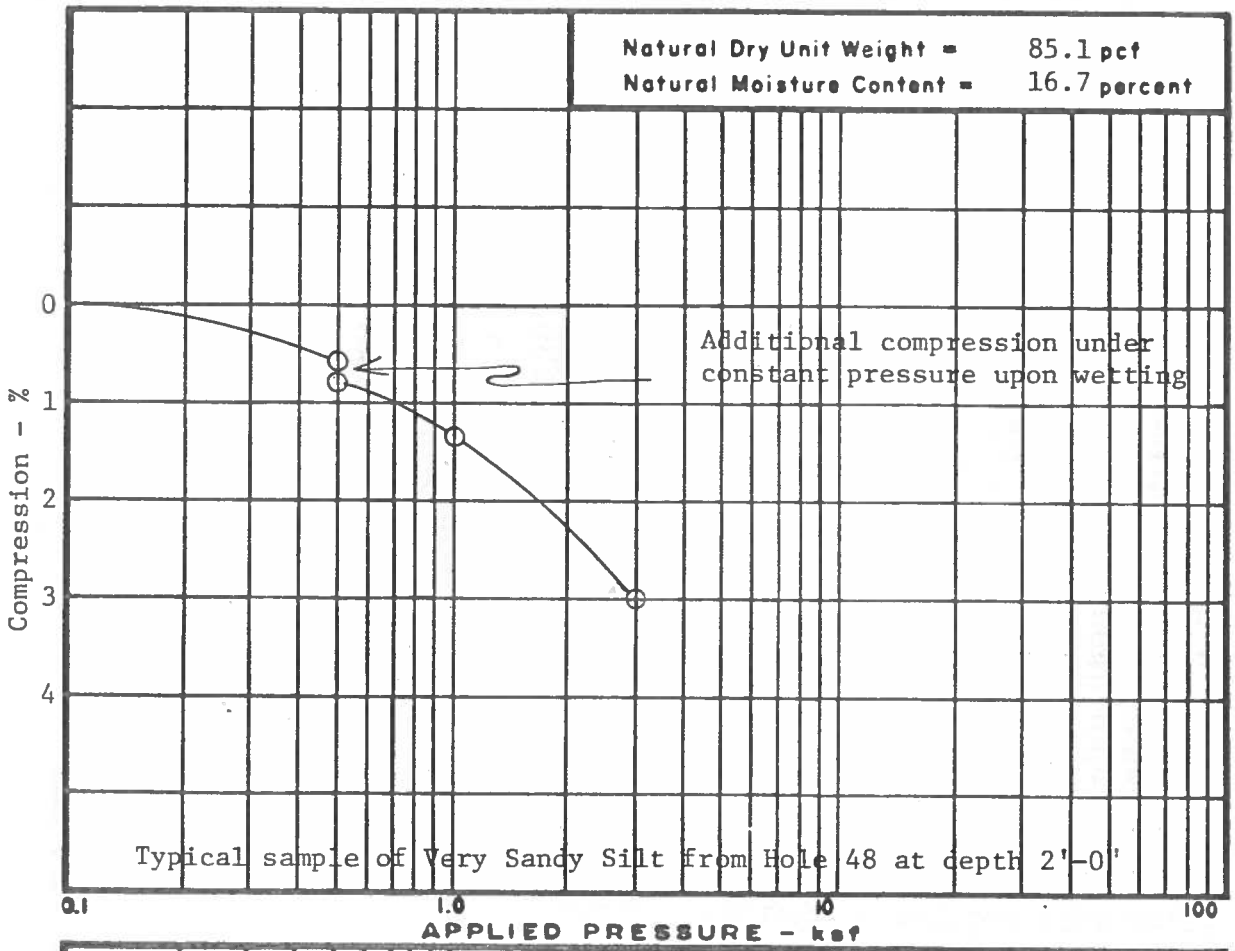
CA-1A

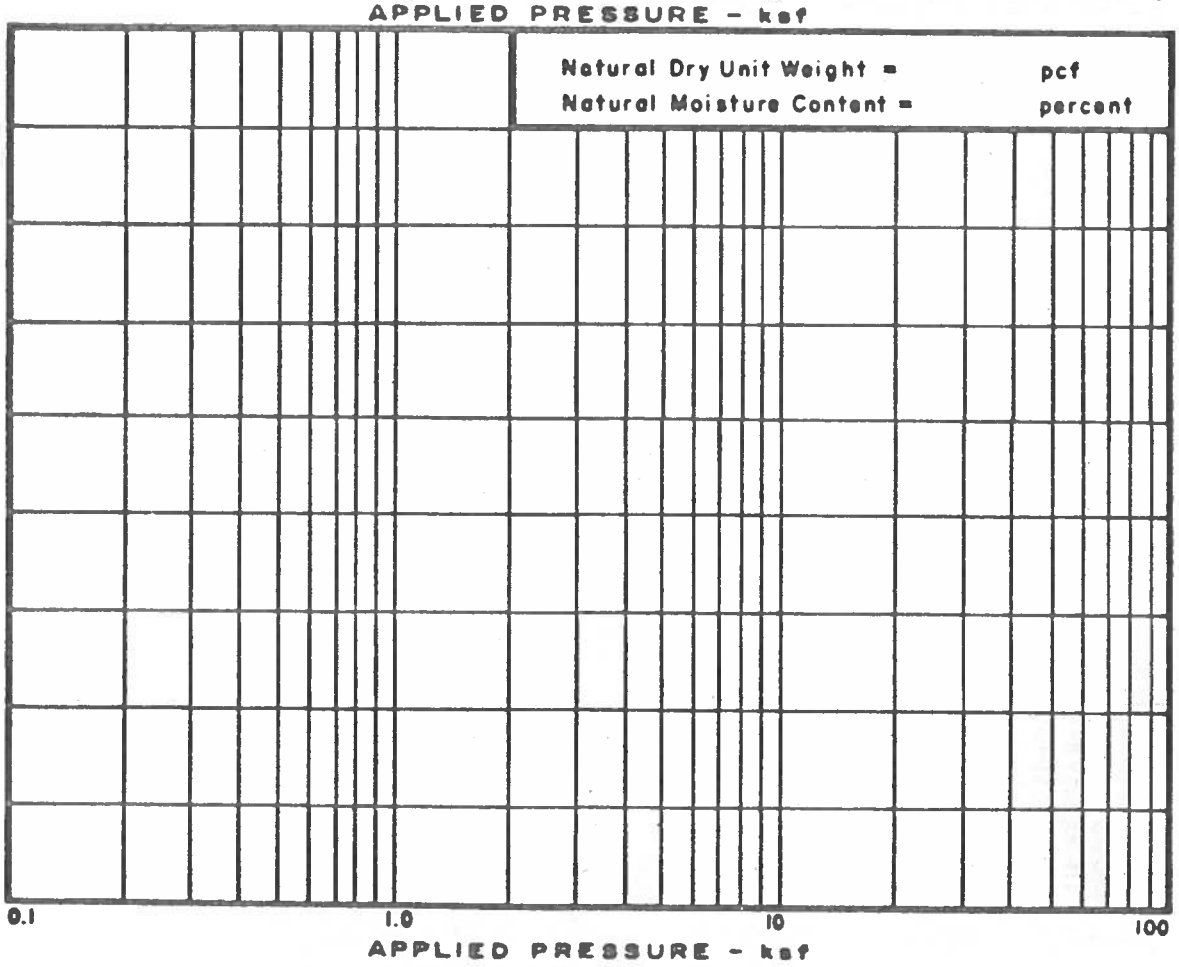




Swell-Consolidation Test Results

CHEN AND ASSOCIATES





Swell-Consolidation Test Results

#5615W

Fig. 12 CA-1

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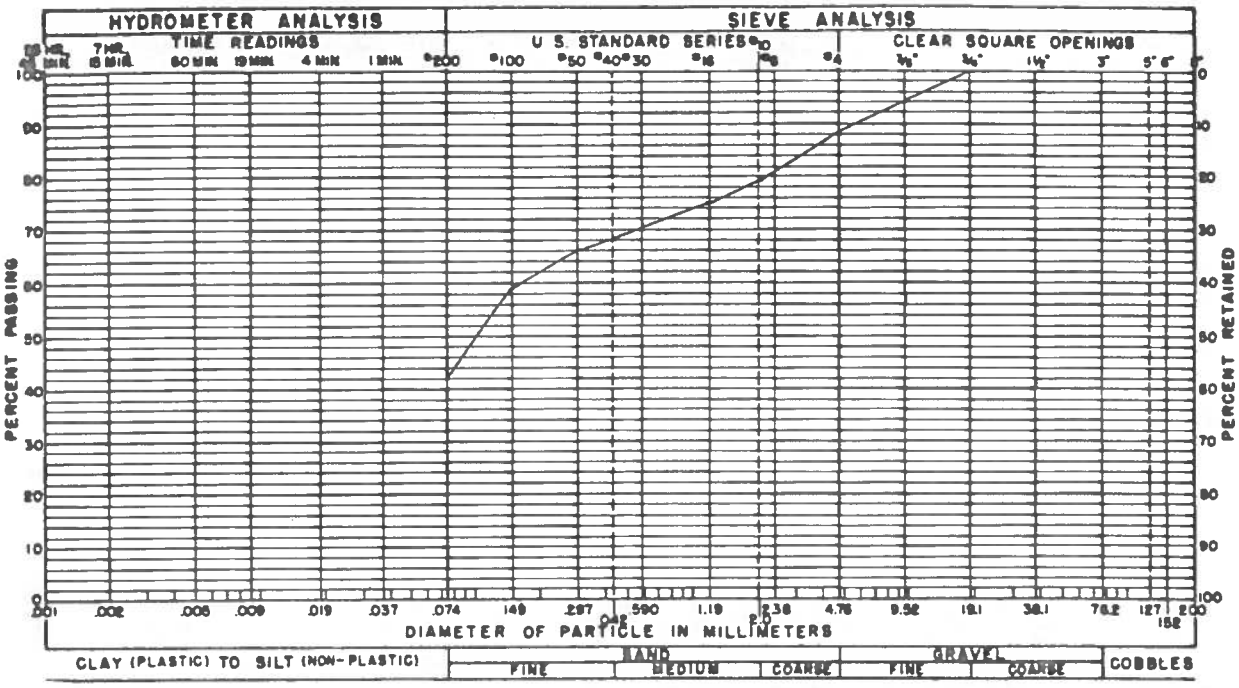
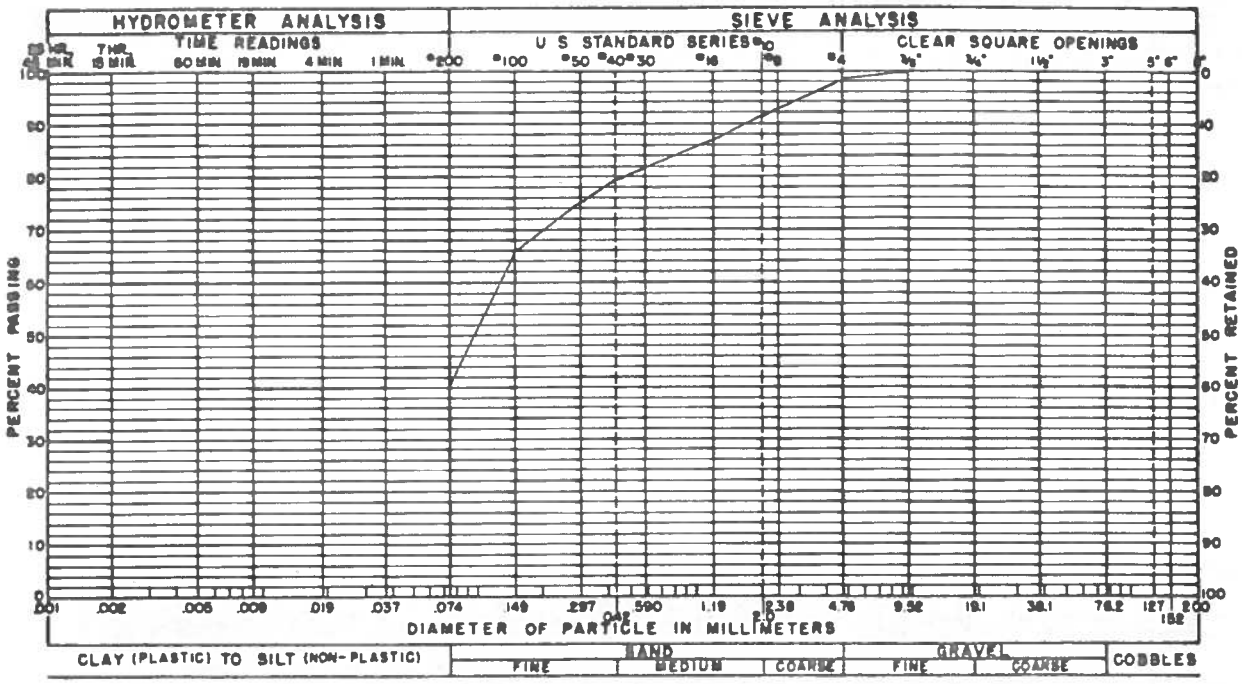


GRAVEL 12 % SAND 46 % SILT AND CLAY 42 %

LIQUID LIMIT 26 % PLASTICITY INDEX 9 %

SAMPLE OF Very Clayey Sand FROM Hole 2 at depth 1'-0"



GRAVEL 2 % SAND 58% SILT AND CLAY 40 %

LIQUID LIMIT 35 % PLASTICITY INDEX 10%

SAMPLE OF Very Clayey Sand FROM Hole 4 at depth 2'-0"

GRADATION TEST RESULTS

#5615W

Fig. 13

CA-2

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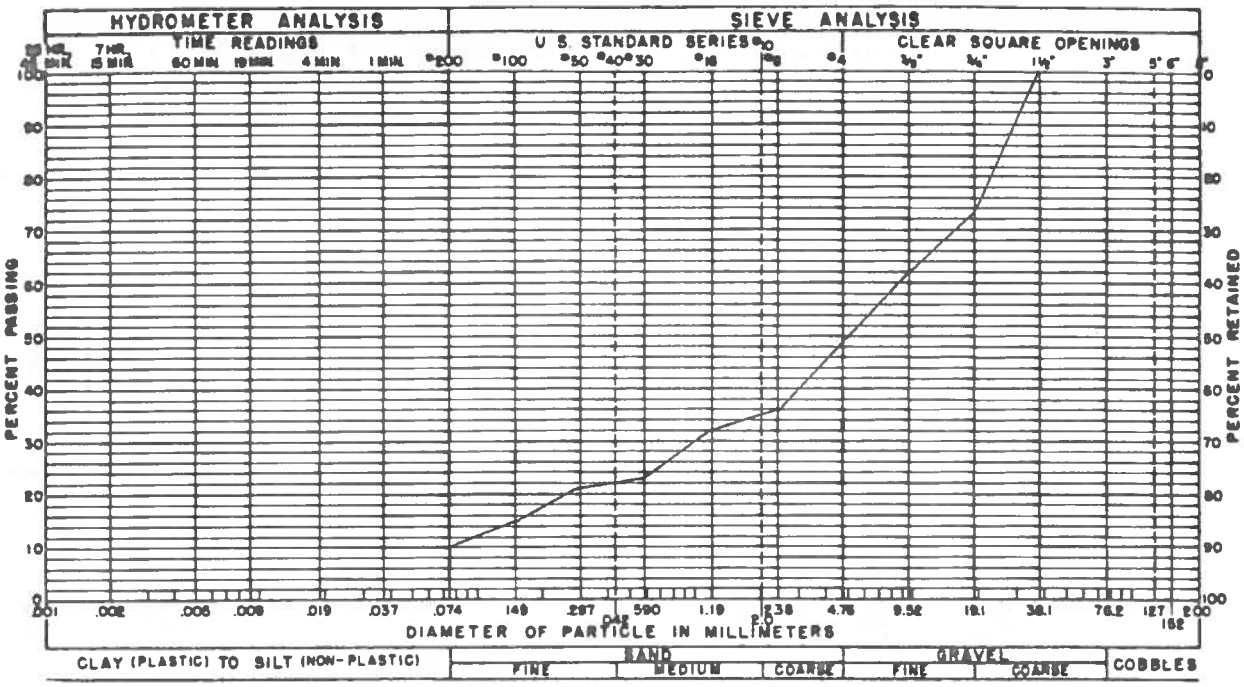
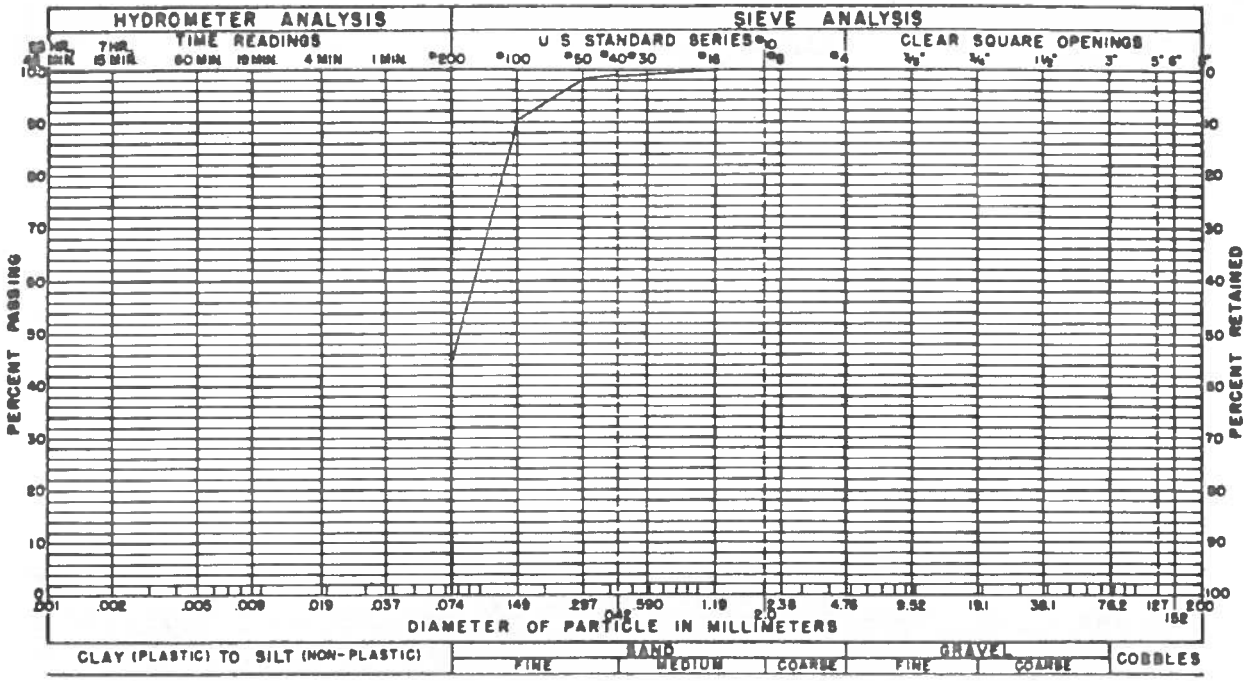


GRAVEL 51 % SAND 39 % SILT AND CLAY 10 %

LIQUID LIMIT % PLASTICITY INDEX %

SAMPLE OF Slightly Silty Sand and Gravel FROM Hole 6 at depth 2'-0"



GRAVEL 0 % SAND 55% SILT AND CLAY 45 %

LIQUID LIMIT 19 % PLASTICITY INDEX NP%

SAMPLE OF Very Silty Sand FROM Hole 7 at depth 4'-0"

GRADATION TEST RESULTS

#5615W

Fig. 14

CA-

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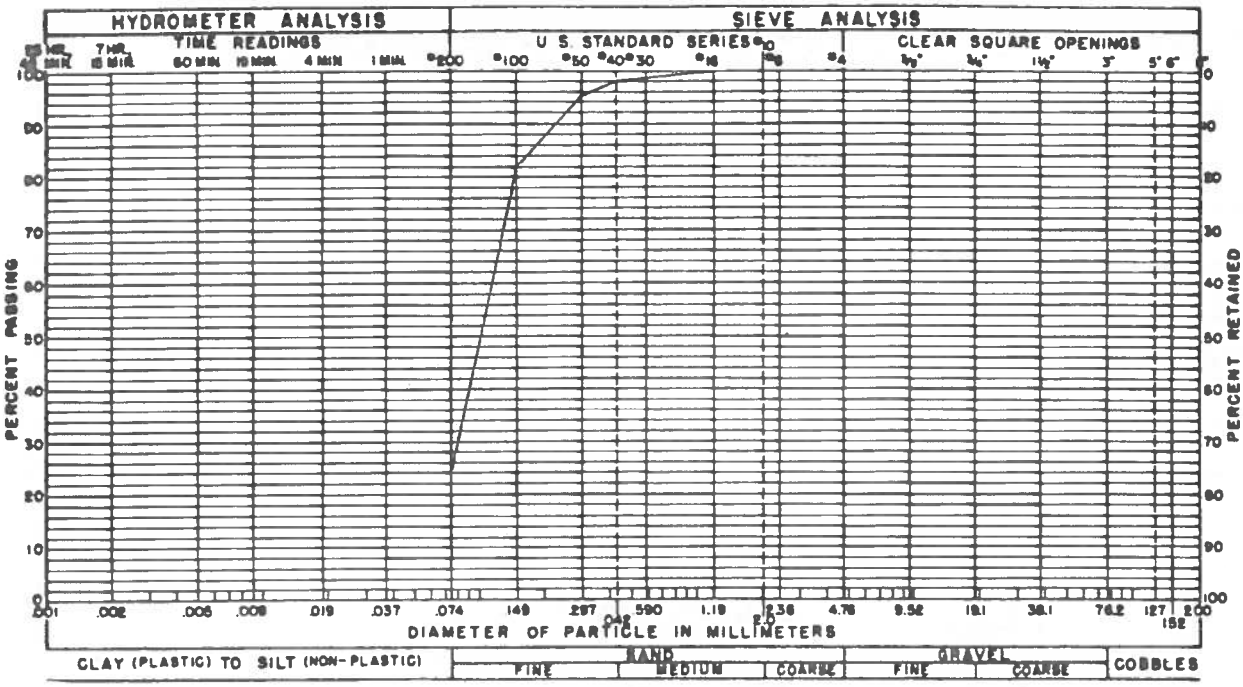
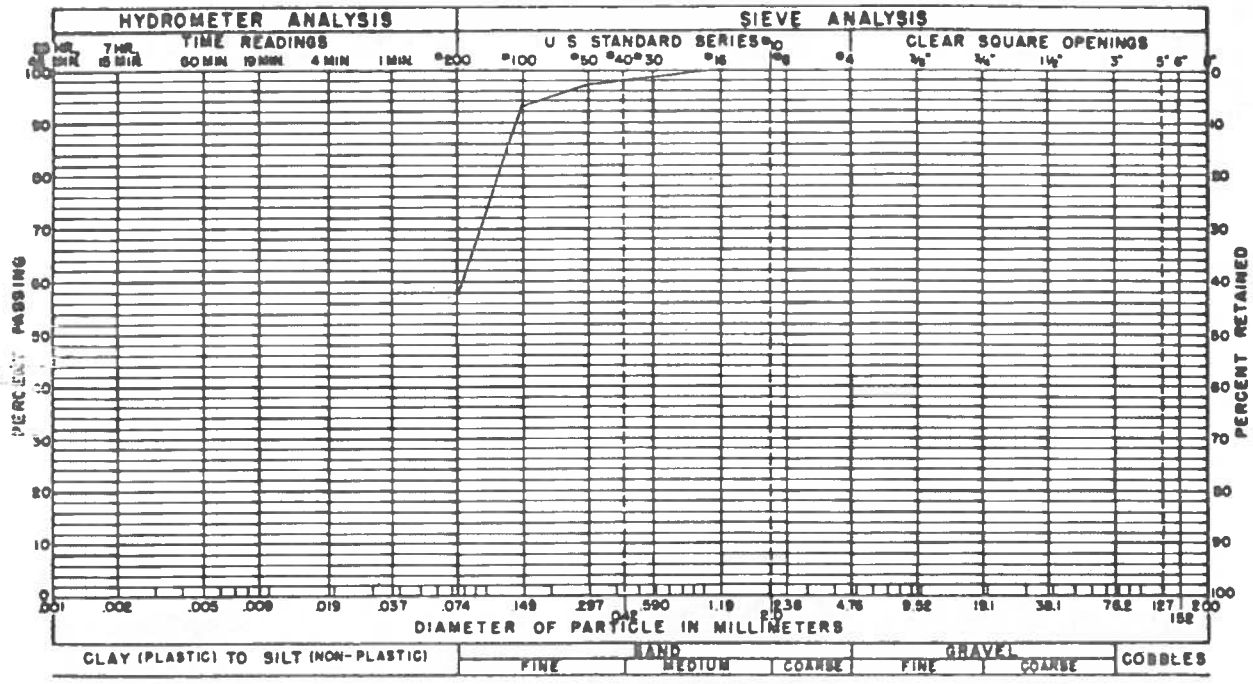
Consulting Soil and Foundation Engineers



GRAVEL 0 % SAND 75 % SILT AND CLAY 25 %

LIQUID LIMIT 19 % PLASTICITY INDEX NP %

SAMPLE OF Silty Sand FROM Hole 10 at depth 4'-0"



GRAVEL 0 % SAND 42% SILT AND CLAY 58 %

LIQUID LIMIT 30% PLASTICITY INDEX 6%

SAMPLE OF Very Sandy Silt FROM Hole 12 at depth 4'-0"

GRADATION TEST RESULTS

#5615W

Fig. 15

CA-

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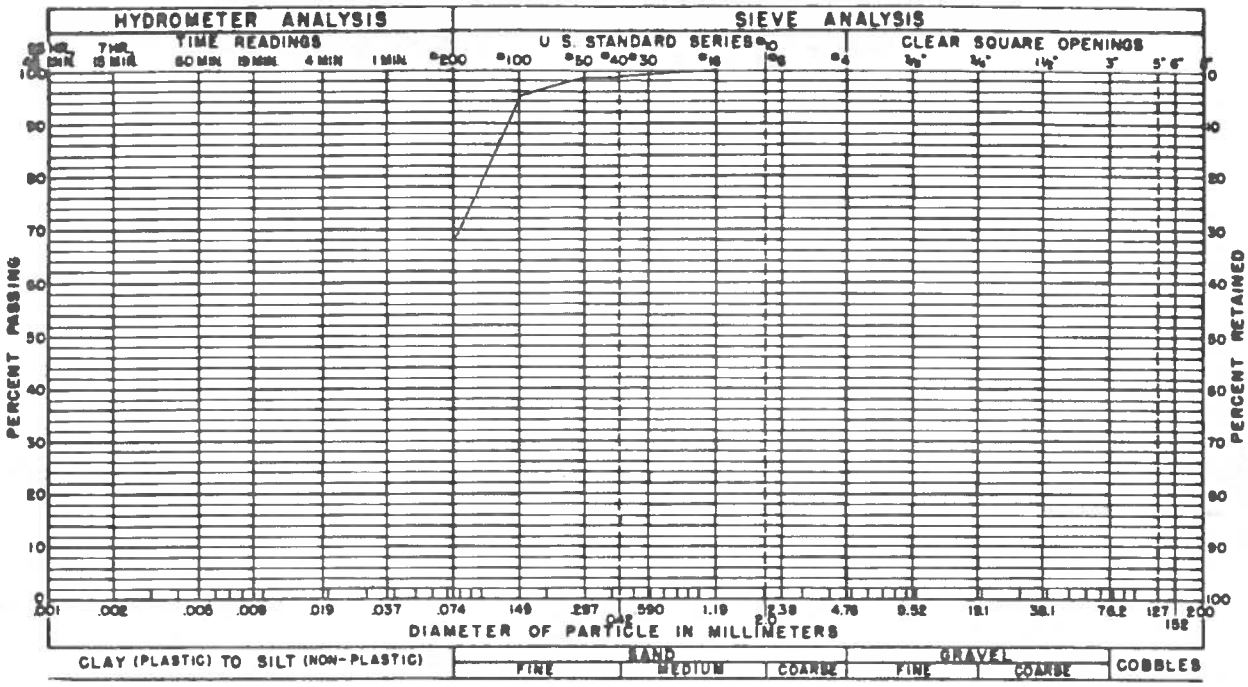
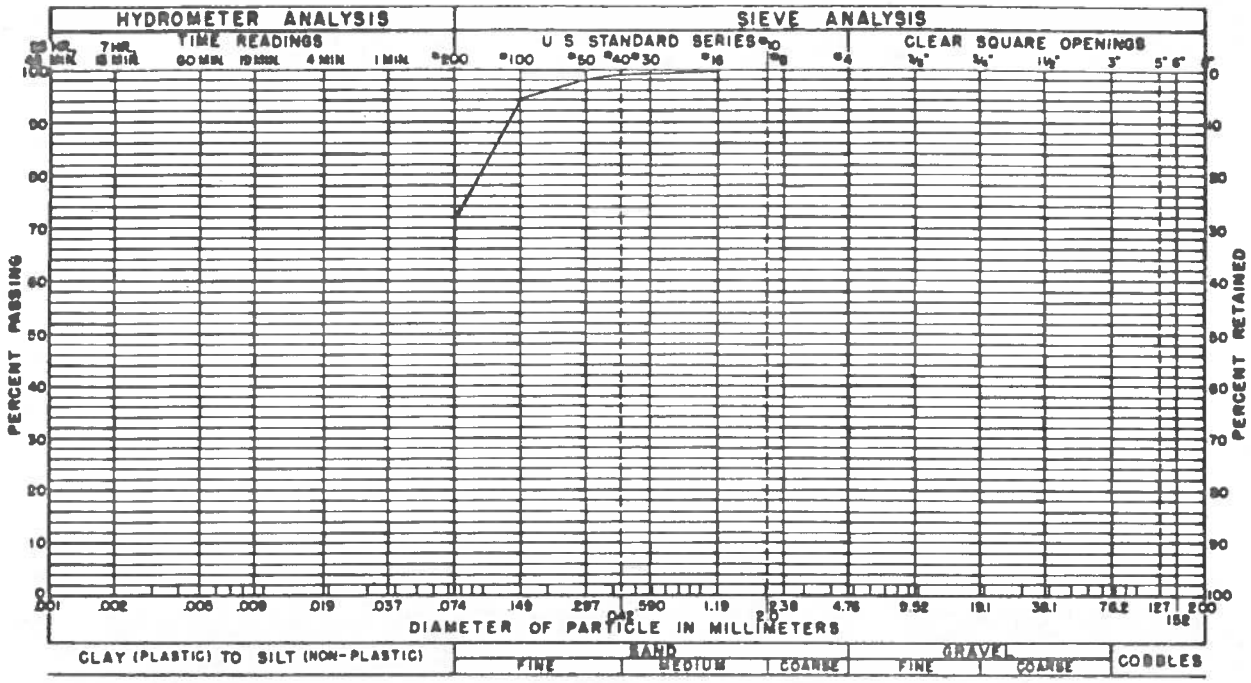


GRAVEL 0 % SAND 32% SILT AND CLAY 68 %

LIQUID LIMIT 25 % PLASTICITY INDEX 6%

SAMPLE OF Sandy Clay-Silt FROM Hole 15 at depth 4'-0"



GRAVEL 0 % SAND 28% SILT AND CLAY 72 %

LIQUID LIMIT 26 % PLASTICITY INDEX 7%

SAMPLE OF Sandy Clay-Silt FROM Hole 16 at depth 4'-0"

GRADATION TEST RESULTS

#5615W

Fig. 16

CA-

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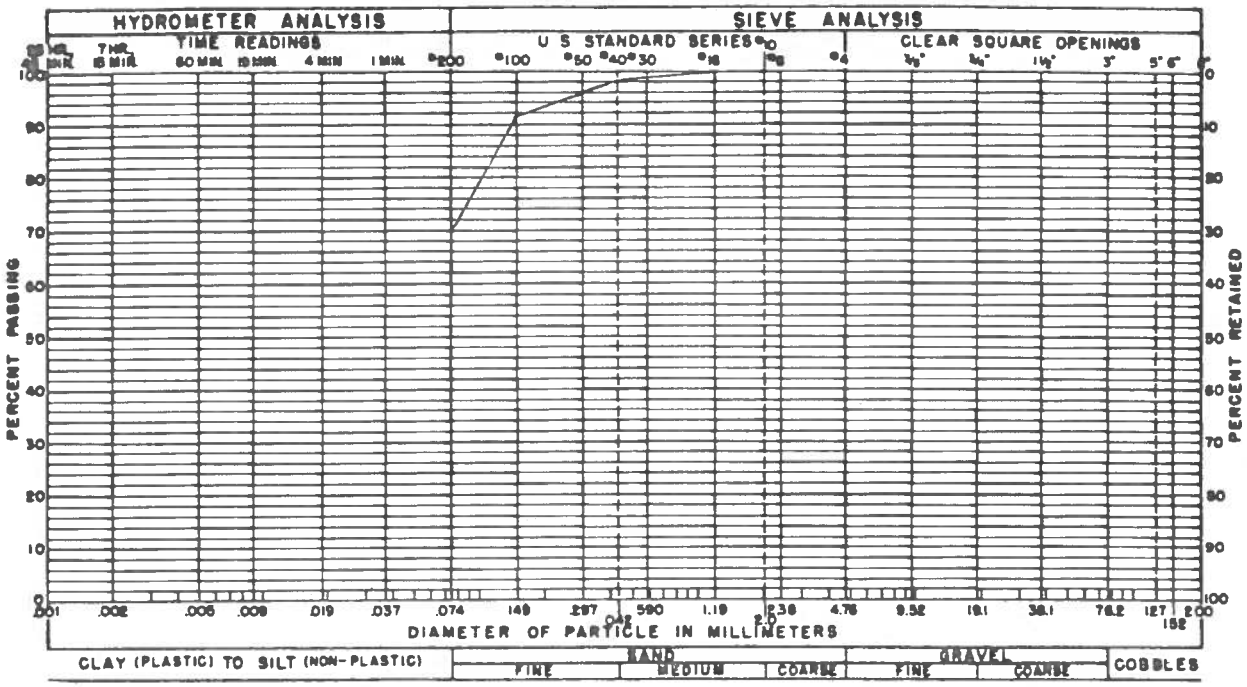
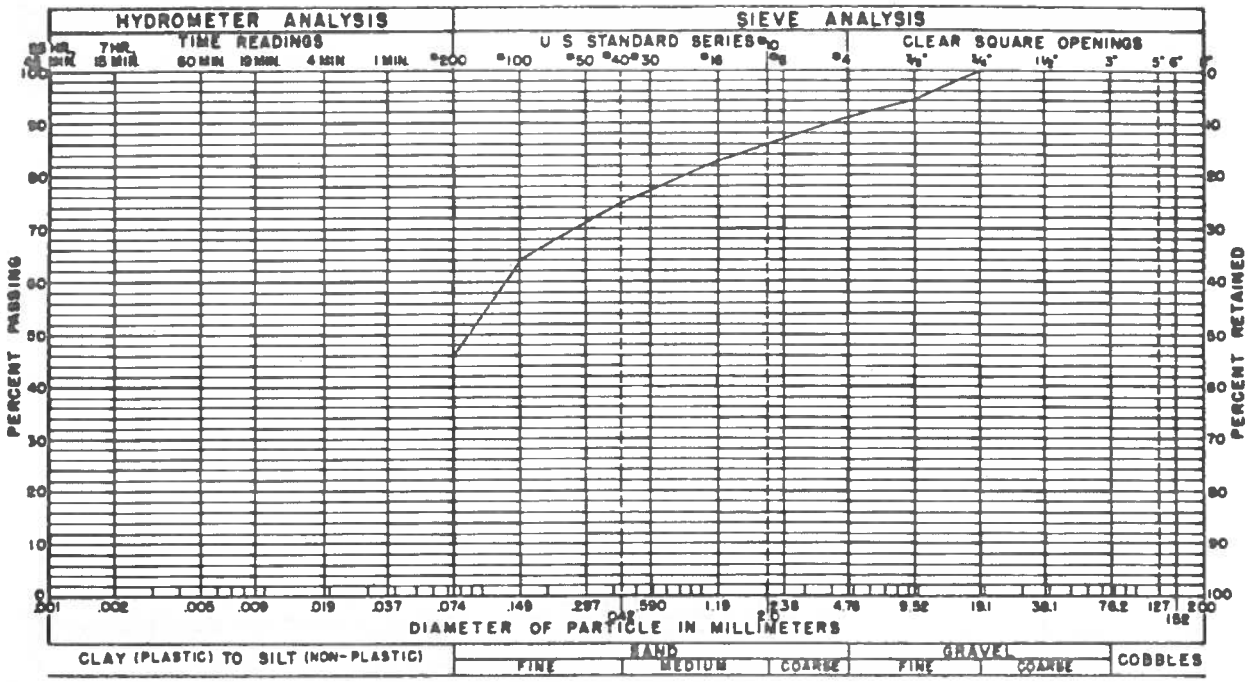


GRAVEL 0 % SAND 30% SILT AND CLAY 70 %

LIQUID LIMIT 28% PLASTICITY INDEX 10%

SAMPLE OF Sandy Clay FROM Hole 17 at depth 1'-0"



GRAVEL 9 % SAND 45% SILT AND CLAY 46 %

LIQUID LIMIT % PLASTICITY INDEX %

SAMPLE OF Clayey Sand to Sandy Clay Fill FROM Hole 18 at depth 1'-0"

GRADATION TEST RESULTS

#5615W

Fig. 17

CA-

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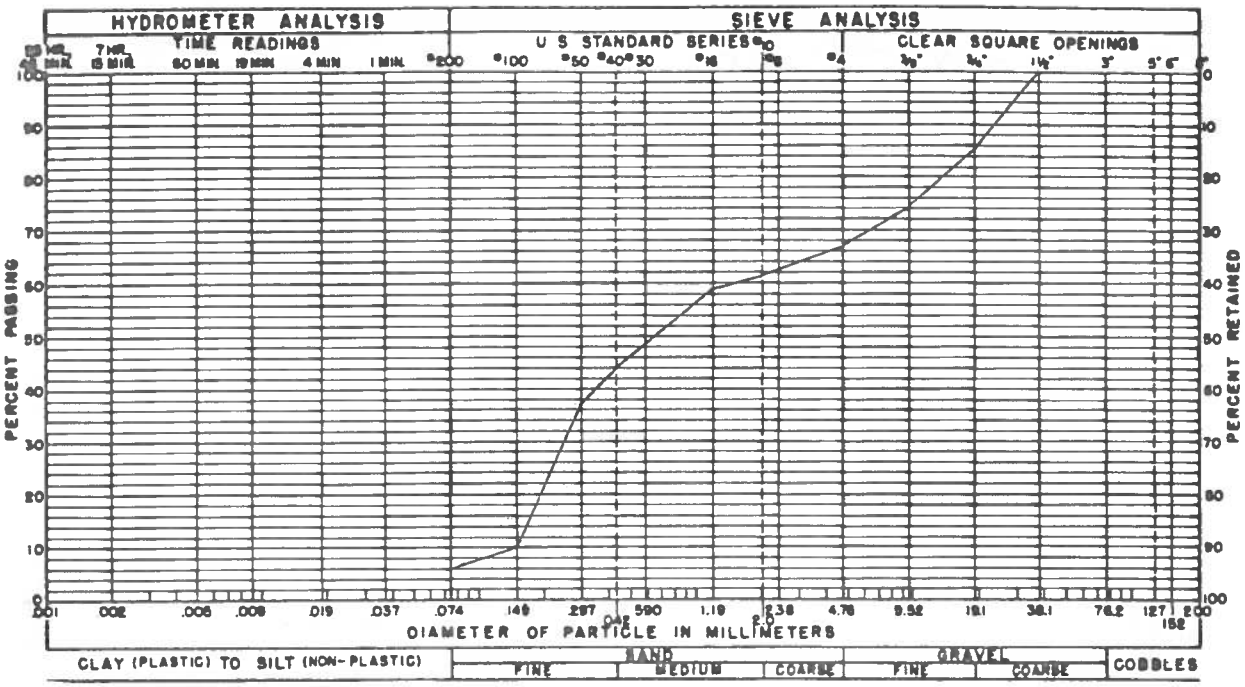
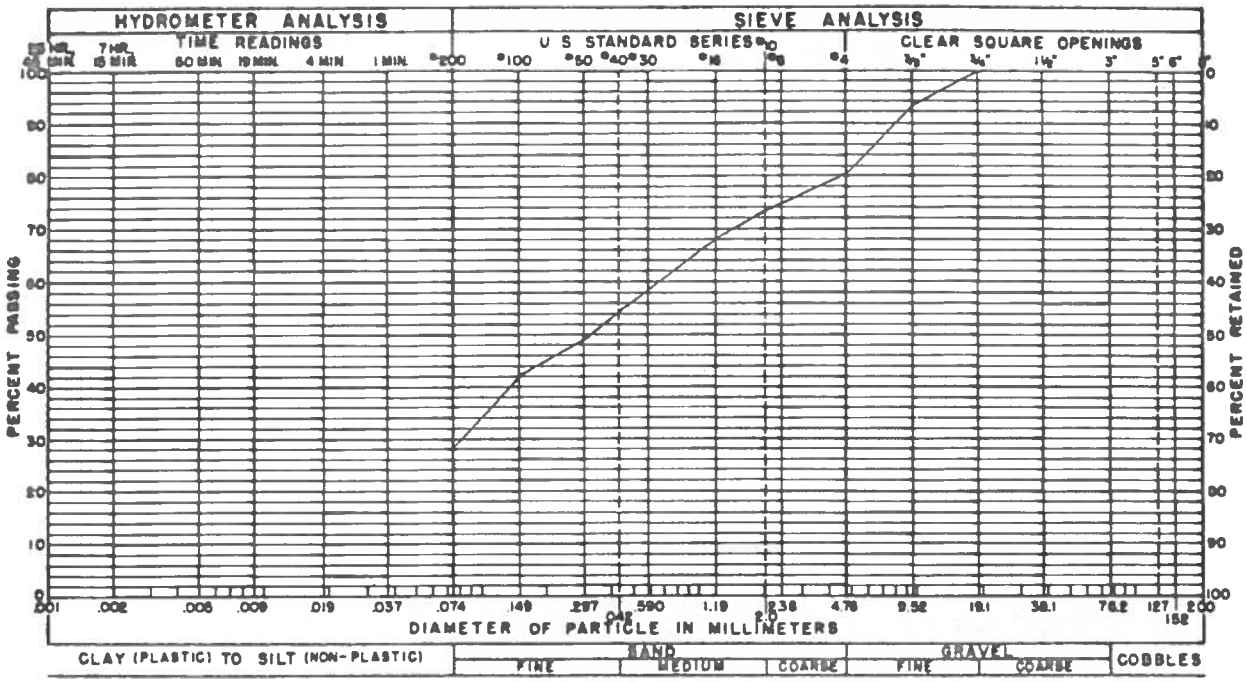


GRAVEL 33 % SAND 61% SILT AND CLAY 6 %

LIQUID LIMIT % PLASTICITY INDEX %

SAMPLE OF Slightly Silty Sand and Gravel FROM Hole 18 at depth 3'-0"



GRAVEL 20 % SAND 52% SILT AND CLAY 28 %

LIQUID LIMIT 25% PLASTICITY INDEX 9%

SAMPLE OF Clayey, Gravelly Sand FROM Hole 19 at depth 4'-0"

GRADATION TEST RESULTS

#5615W

Fig. 18

CA-2

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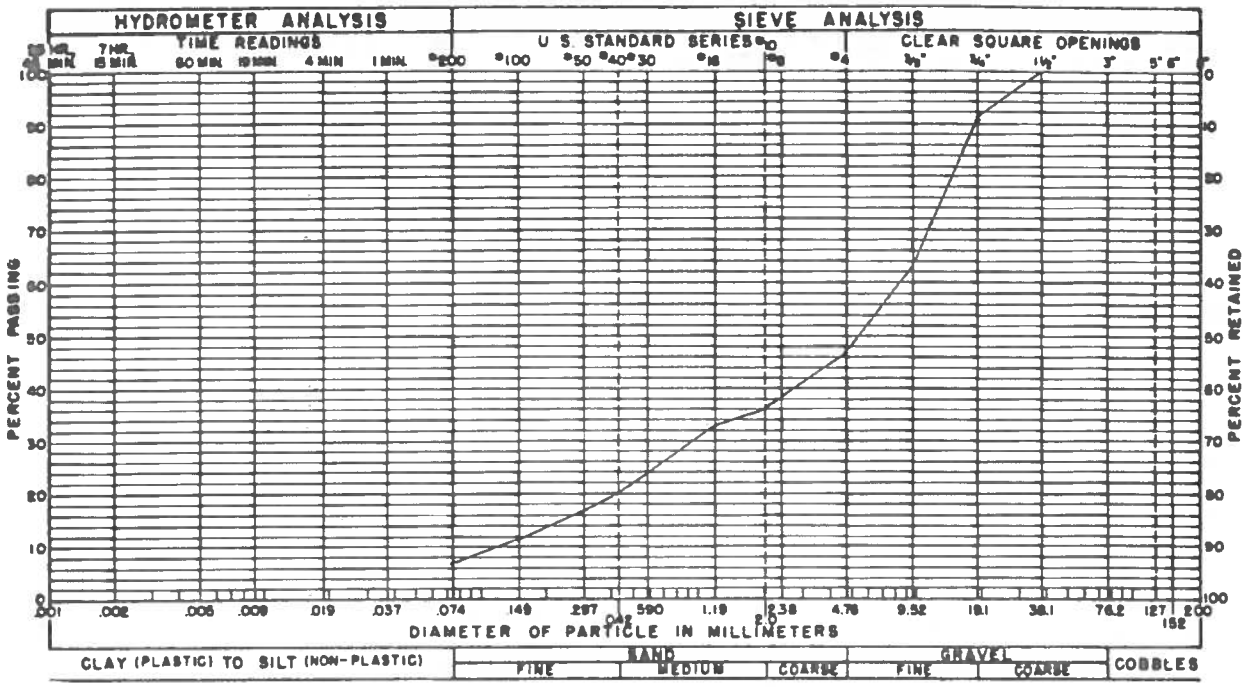
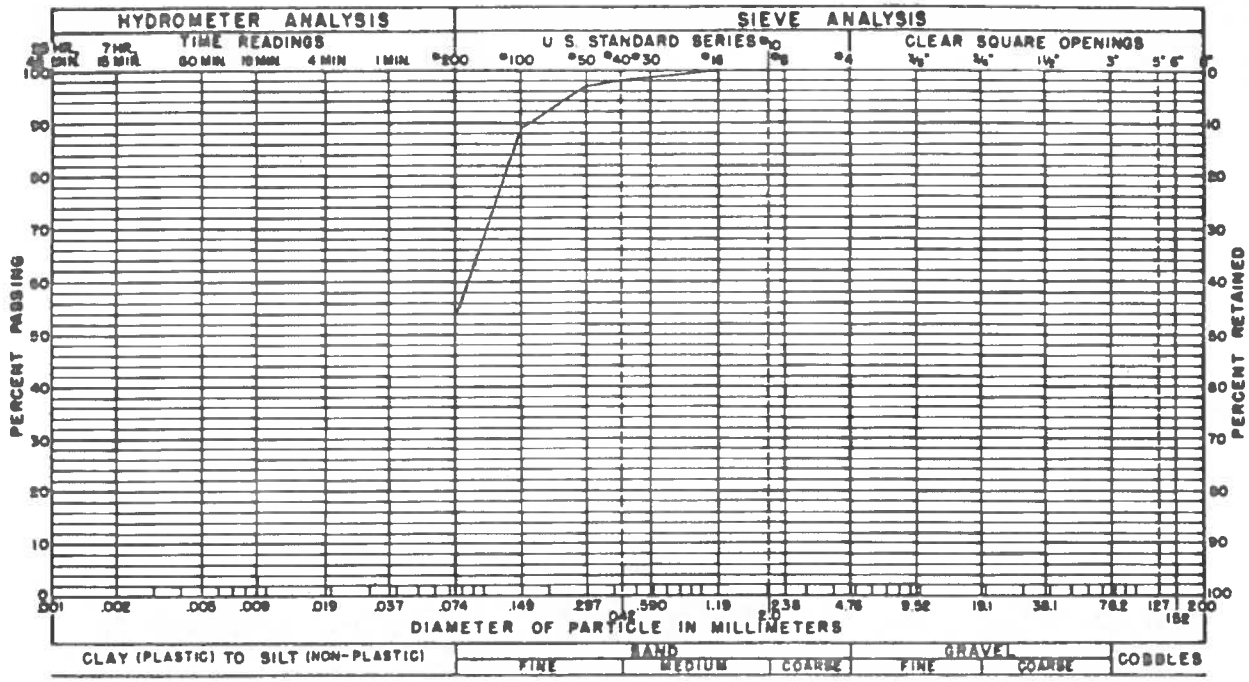


GRAVEL 53 % SAND 40% SILT AND CLAY 7 %

LIQUID LIMIT % PLASTICITY INDEX %

SAMPLE OF Slightly Silty Sand and Gravel FROM Hole 19 at depth 6'-0"



GRAVEL 0 % SAND 46% SILT AND CLAY 54 %

LIQUID LIMIT 21% PLASTICITY INDEX NP%

SAMPLE OF Very Sandy Silt FROM Hole 23 at depth 4'-0"

GRADATION TEST RESULTS

#5615W

Fig. 19

CA-

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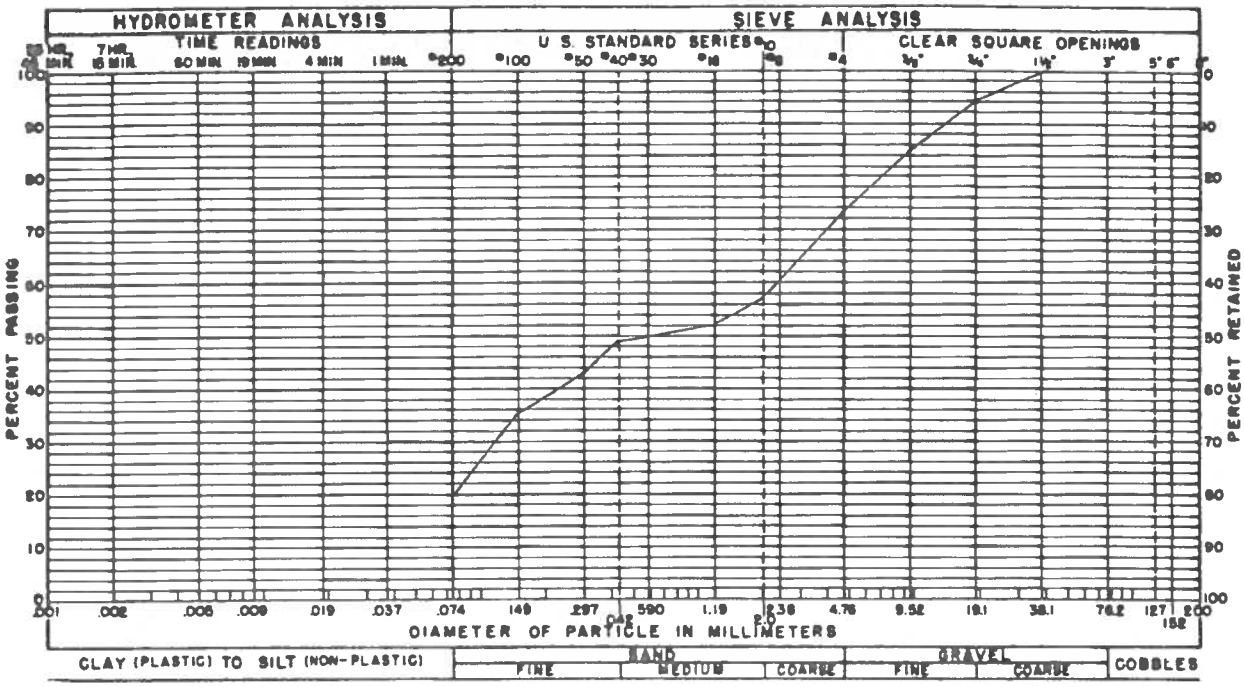
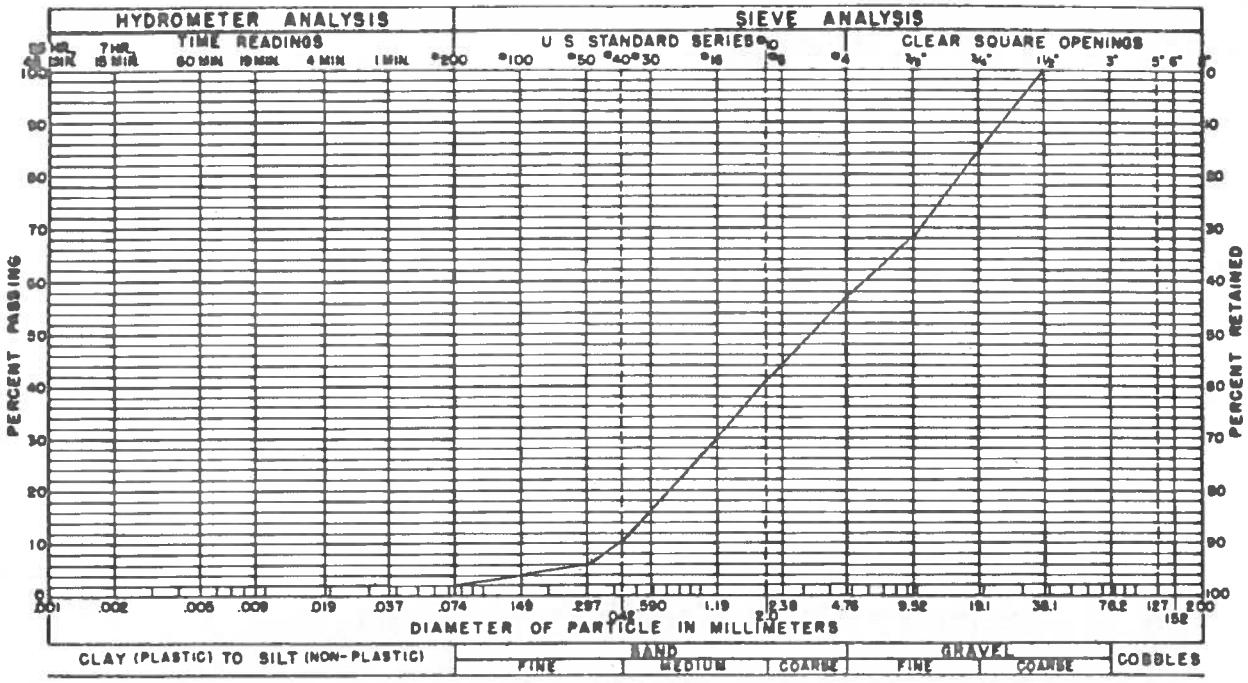


GRAVEL 27% SAND 54% SILT AND CLAY 19 %

LIQUID LIMIT % PLASTICITY INDEX %

SAMPLE OF Silty Sand and Gravel FROM Hole 24 at depth 5'-6"



GRAVEL 43 % SAND 55% SILT AND CLAY 2 %

LIQUID LIMIT % PLASTICITY INDEX %

SAMPLE OF Sand and Gravel FROM Hole 25 at depth 4'-0"

GRADATION TEST RESULTS

#5615W

Fig. 20

CA-

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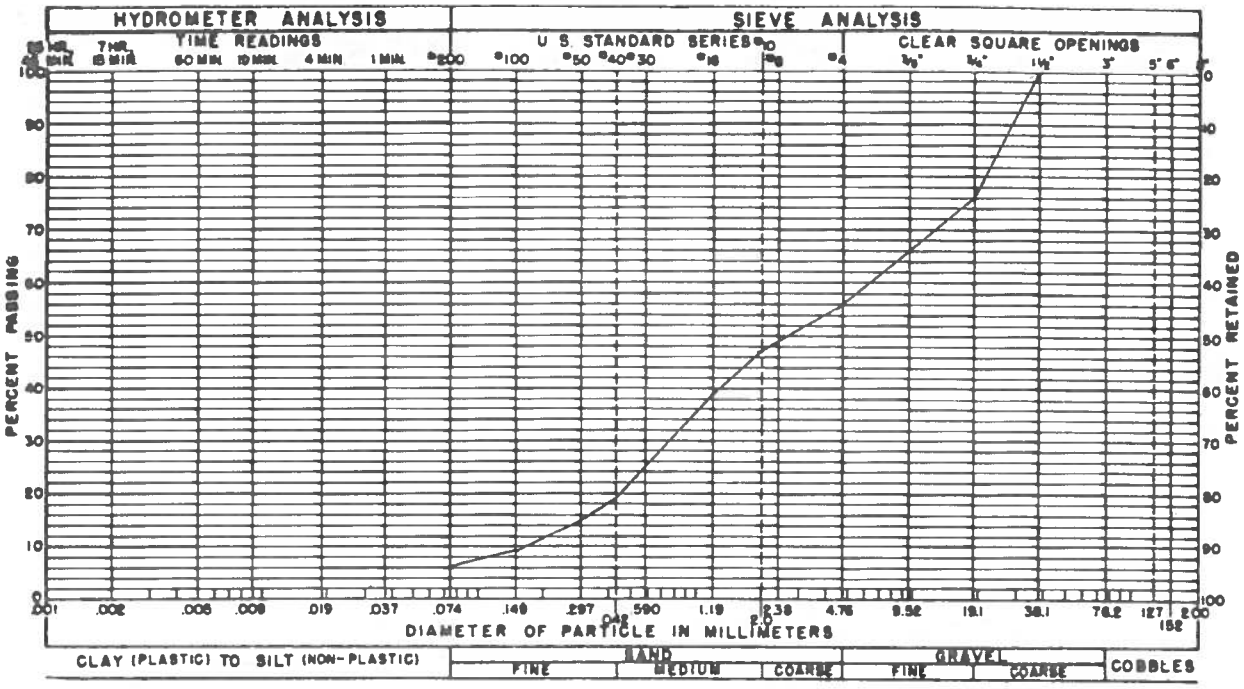
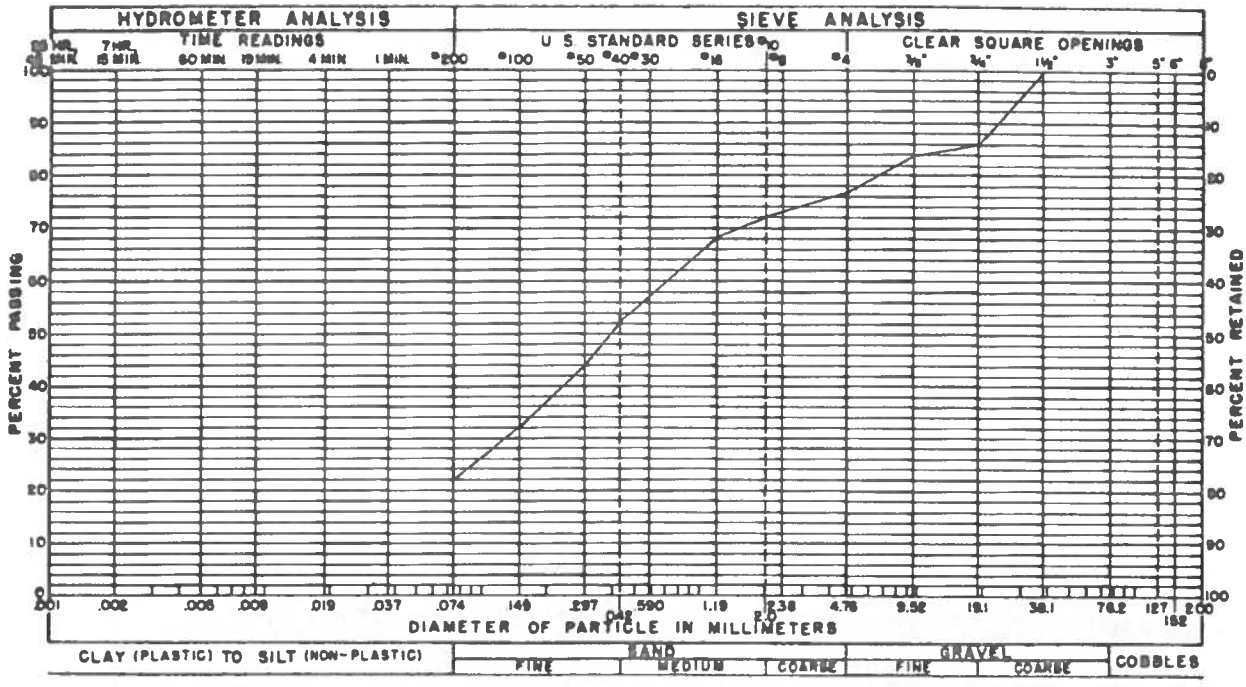


GRAVEL 44 % SAND 50% SILT AND CLAY 6 %

LIQUID LIMIT % PLASTICITY INDEX %

SAMPLE OF Slightly Silty Sand and Gravel FROM Hole 26 at depth 1'-0"



GRAVEL 23 % SAND 55% SILT AND CLAY 22 %

LIQUID LIMIT % PLASTICITY INDEX %

SAMPLE OF Silty Sand and Gravel Fill FROM Hole 27 at depth 1'-0"

GRADATION TEST RESULTS

Fig. 21

#5615W

CA-2

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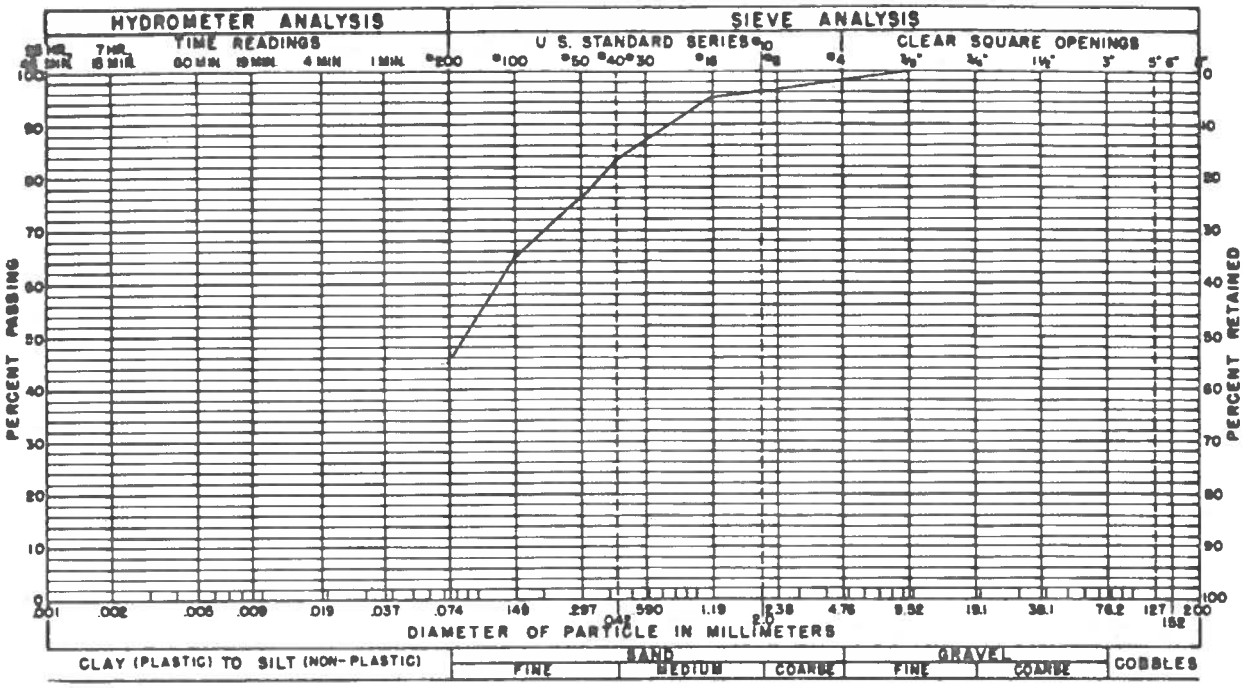
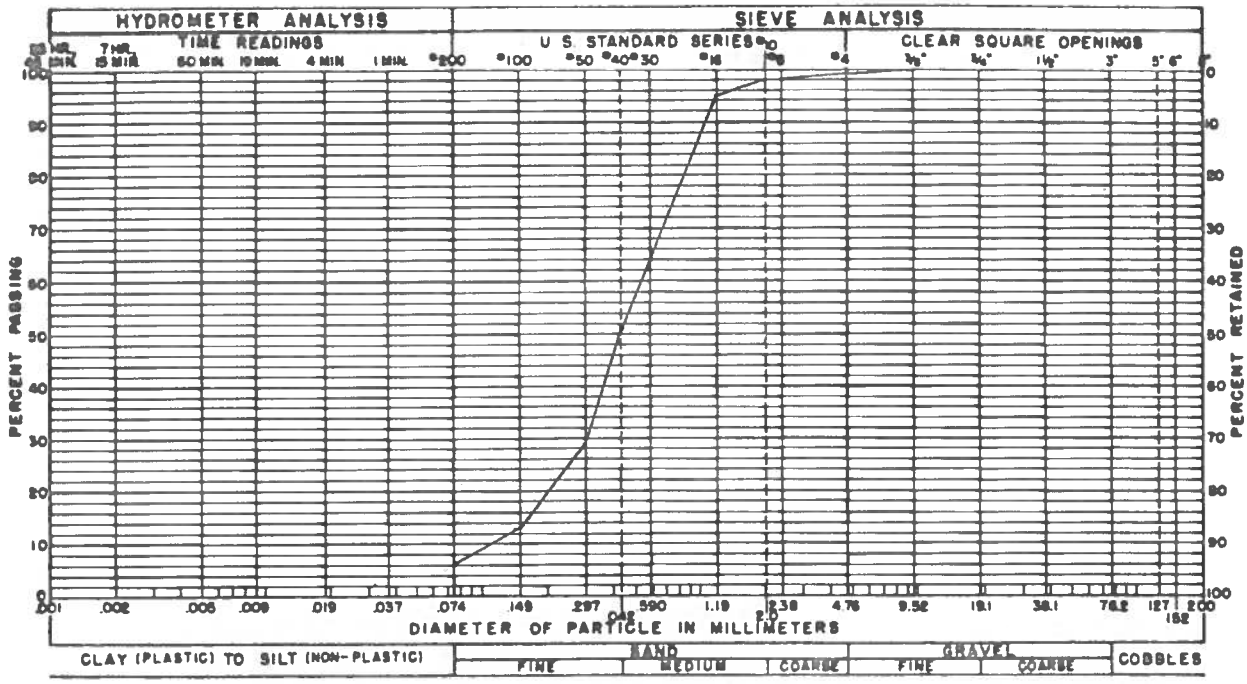


GRAVEL 2 % SAND 57% SILT AND CLAY 45 %

LIQUID LIMIT 28% PLASTICITY INDEX 5%

SAMPLE OF Very Silty Sand FROM Hole 27 at depth 4'-0"



GRAVEL 1 % SAND 93% SILT AND CLAY 6 %

LIQUID LIMIT % PLASTICITY INDEX %

SAMPLE OF Slightly Silty Sand FROM Hole 28 at depth 1'-0"

GRADATION TEST RESULTS

#5615W

Fig. 22

CA-

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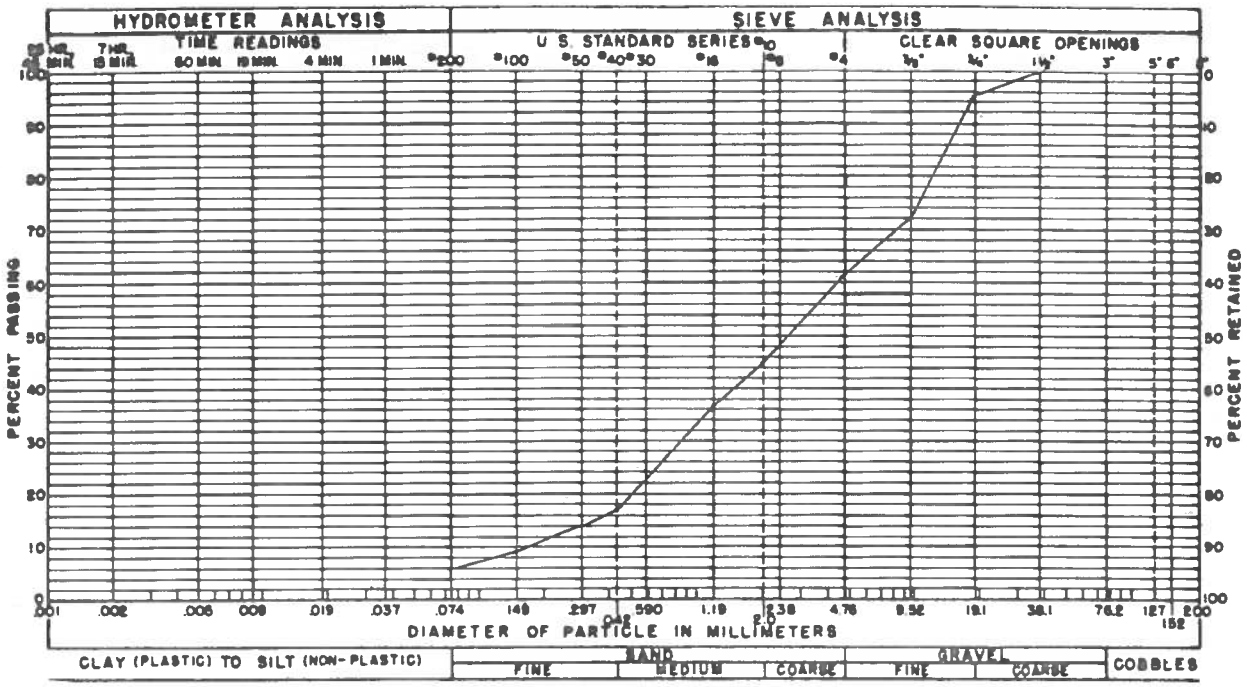
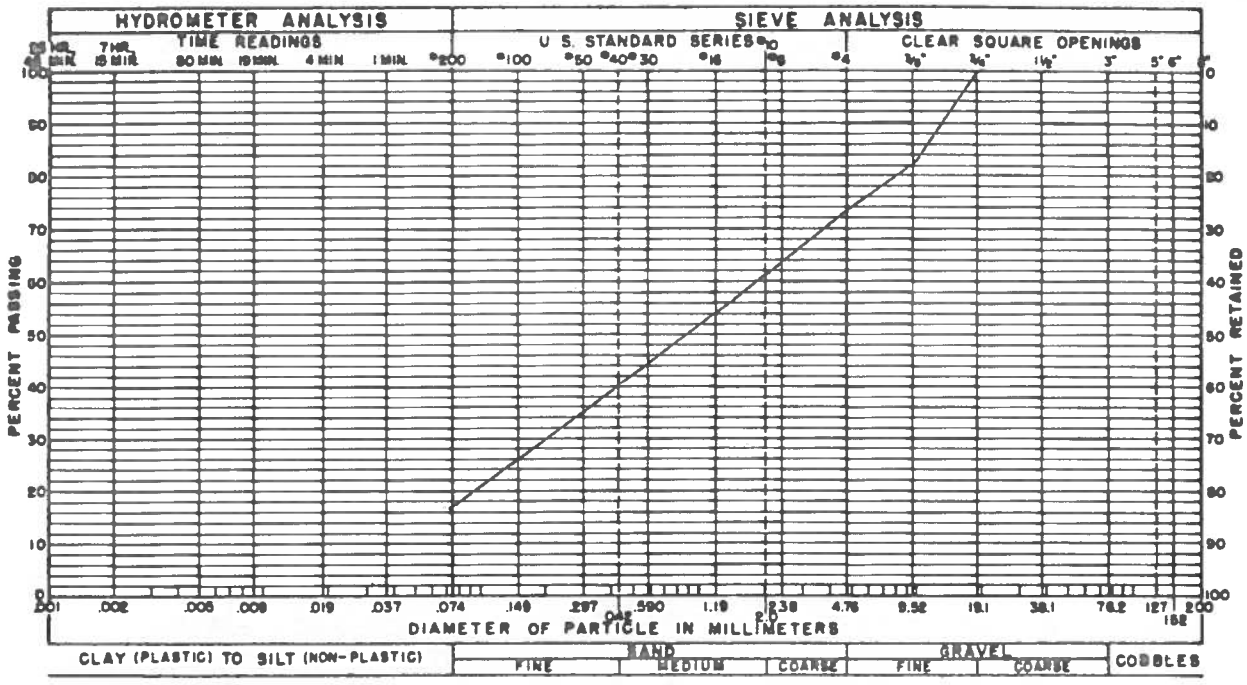


GRAVEL 39 % SAND 55% SILT AND CLAY 6 %

LIQUID LIMIT % PLASTICITY INDEX %

SAMPLE OF Slightly Silty Sand and Gravel FROM Hole 29 at depth 4'-0"



GRAVEL 27 % SAND 56% SILT AND CLAY 17 %

LIQUID LIMIT % PLASTICITY INDEX %

SAMPLE OF Silty Sand and Gravel FROM Hole 30 at depth 1'-0"

GRADATION TEST RESULTS

#5615W

Fig. 23

CA-2

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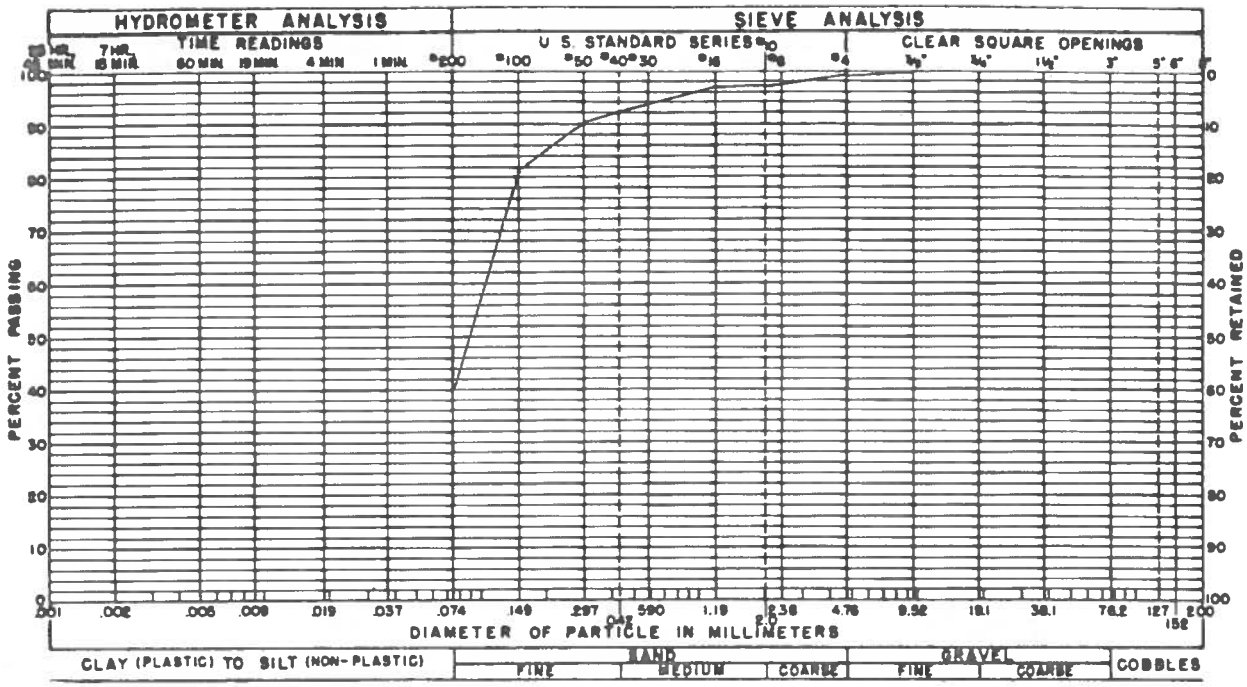
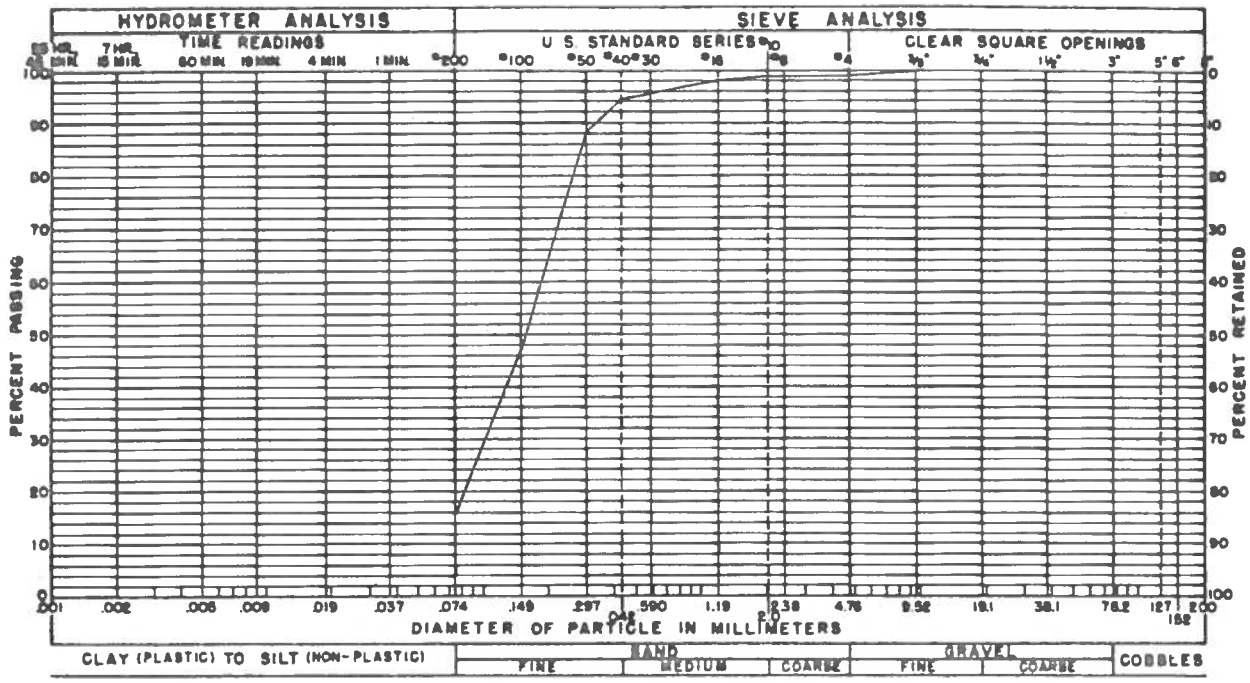
Consulting Soil and Foundation Engineers



GRAVEL 1 % SAND 59% SILT AND CLAY 40 %

LIQUID LIMIT 20 % PLASTICITY INDEX NP %

SAMPLE OF Very Silty Sand FROM Hole 32 at depth 2'-0"



GRAVEL 1 % SAND 83% SILT AND CLAY 16 %

LIQUID LIMIT % PLASTICITY INDEX NP %

SAMPLE OF Silty Sand FROM Hole 33 at depth 1'-0"

GRADATION TEST RESULTS

#5615W

Fig. 24

CA-

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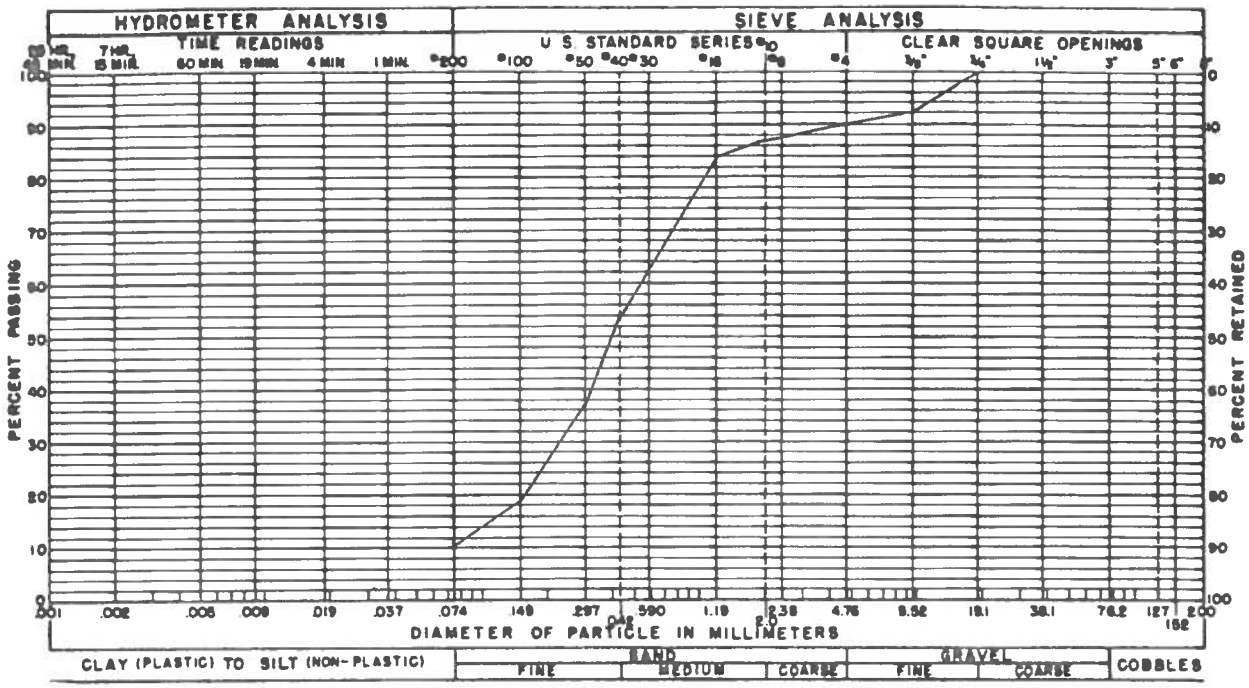
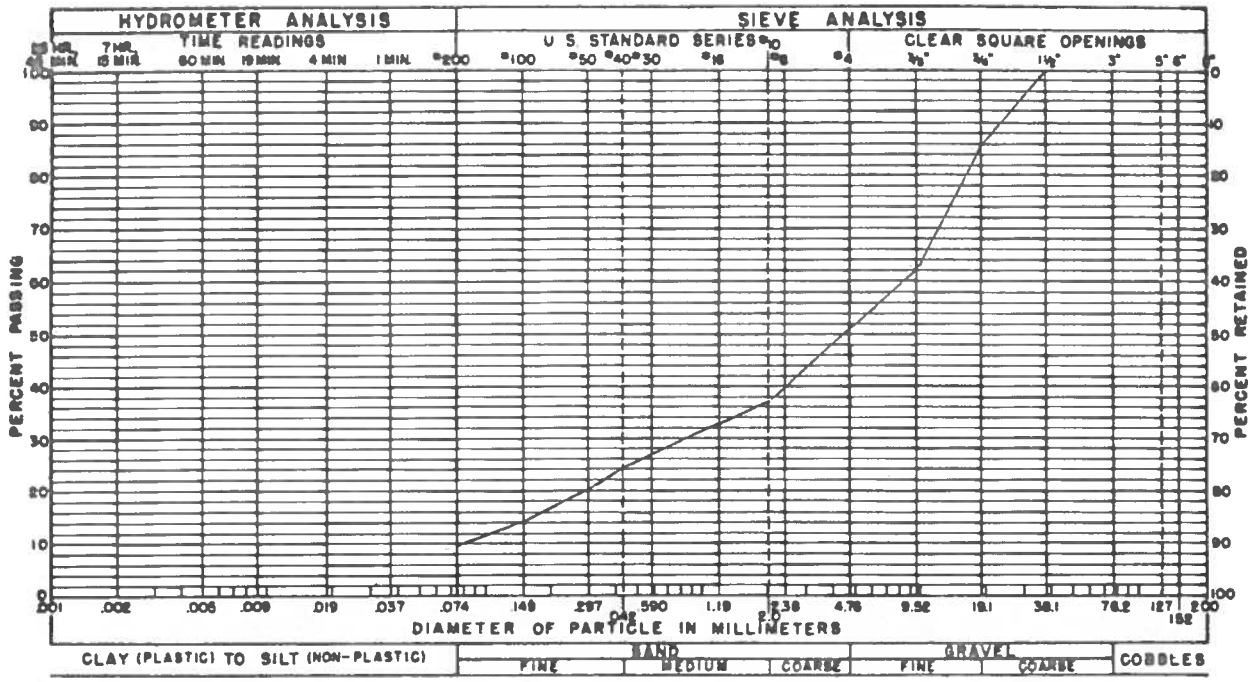
Consulting Soil and Foundation Engineers



GRAVEL 10 % SAND 80% SILT AND CLAY 10 %

LIQUID LIMIT % PLASTICITY INDEX %

SAMPLE OF Slightly Silty Sand FROM Hole 33 at depth 4'-0"



GRAVEL 49 % SAND 41% SILT AND CLAY 10 %

LIQUID LIMIT % PLASTICITY INDEX %

SAMPLE OF Slightly Silty Sand and Gravel FROM Hole 35 at depth 4'-0"

#5615W

GRADATION TEST RESULTS

Fig. 25

CA-

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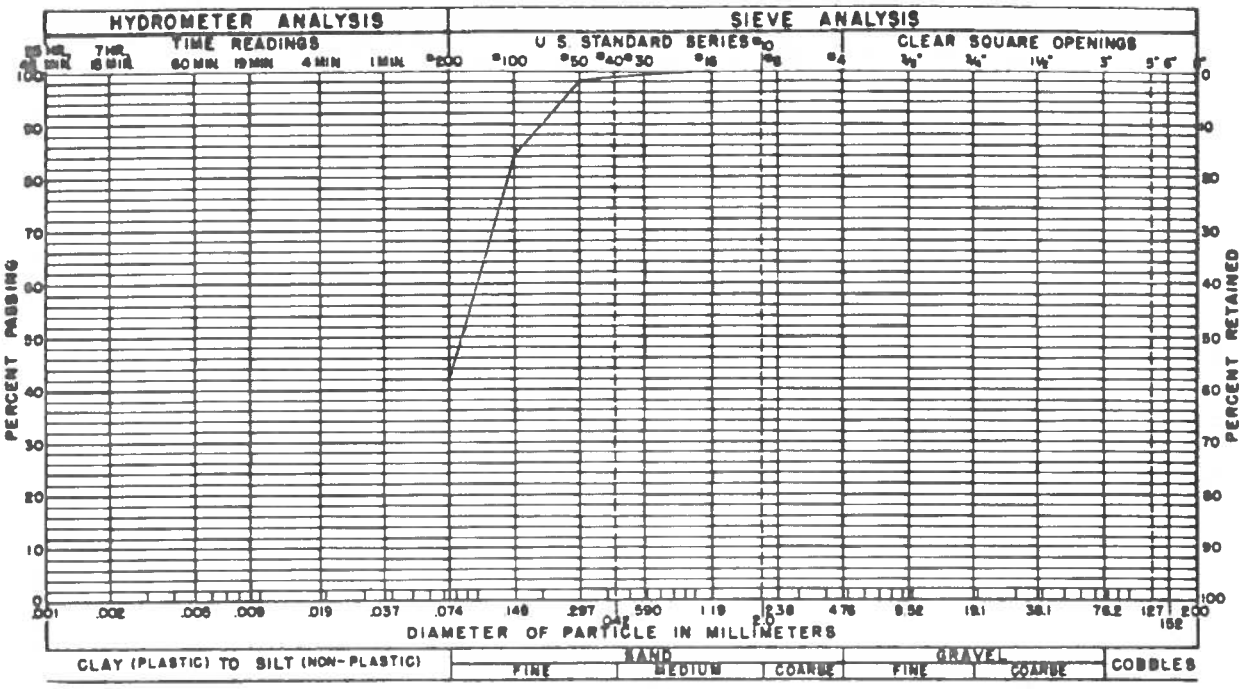
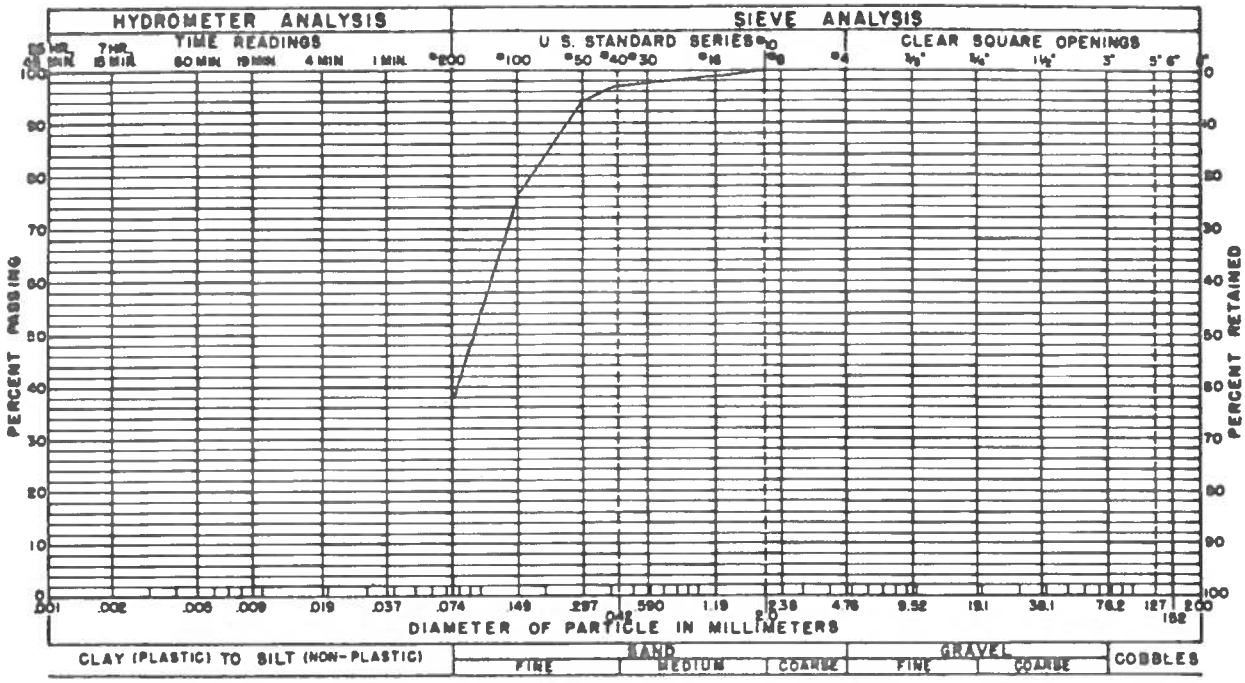


GRAVEL 0 % SAND 58% SILT AND CLAY 42 %

LIQUID LIMIT 20% PLASTICITY INDEX NP%

SAMPLE OF Very Silty Sand FROM Hole 38 at depth 1'-0"



GRAVEL 0 % SAND 63% SILT AND CLAY 37 %

LIQUID LIMIT 23% PLASTICITY INDEX NP%

SAMPLE OF Very Silty Sand FROM Hole 39 at depth 4'-0"

GRADATION TEST RESULTS

#5615W

Fig. 26

CA-2

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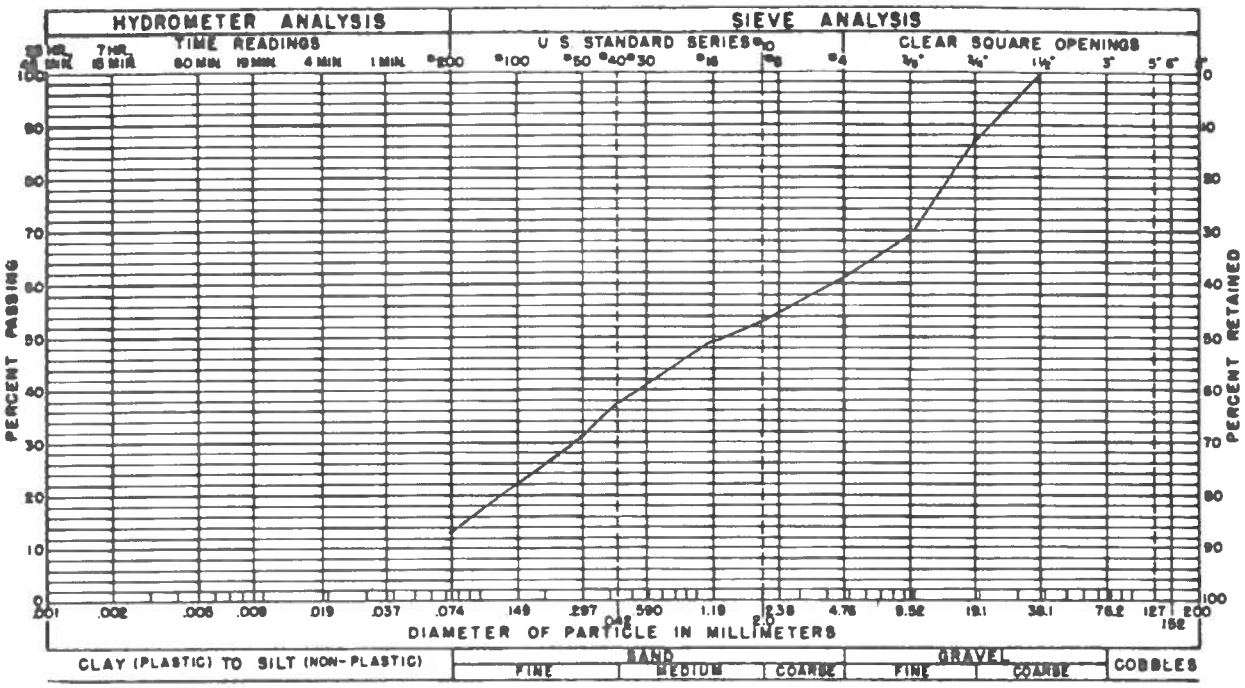
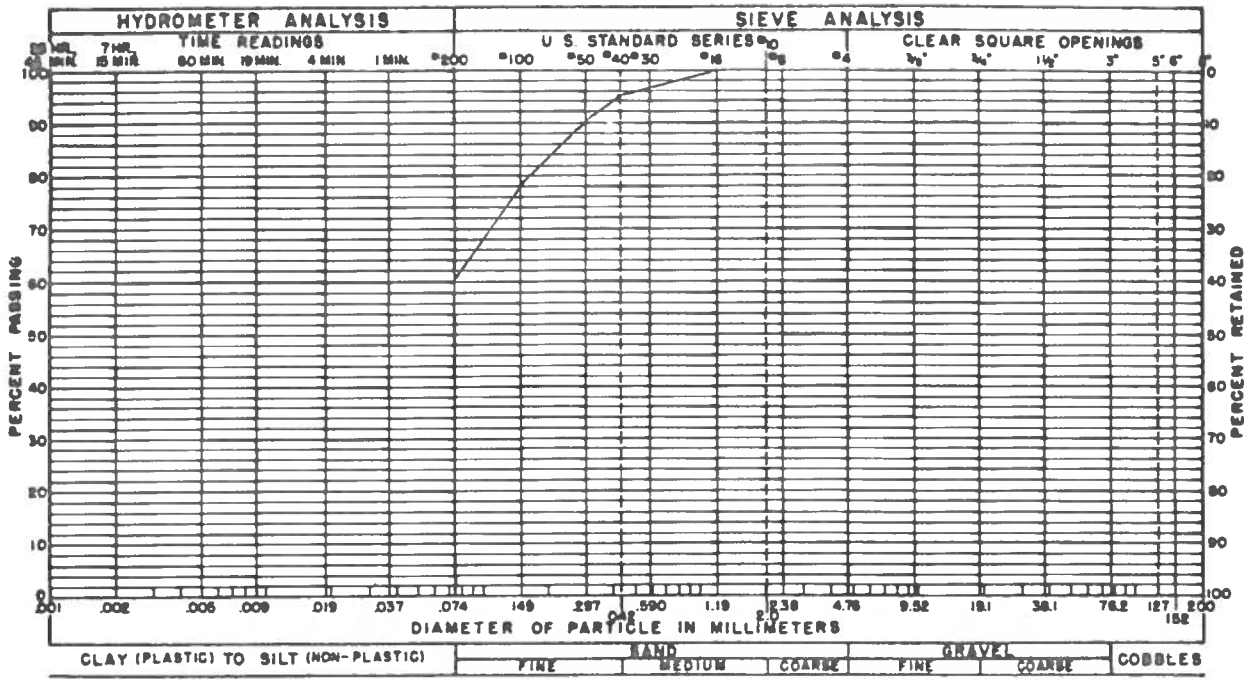


GRAVEL 39 % SAND 48% SILT AND CLAY 13 %

LIQUID LIMIT % PLASTICITY INDEX %

SAMPLE OF Silty Sand and Gravel FROM Hole 40 at depth 4'-0"



GRAVEL 0 % SAND 40% SILT AND CLAY 60 %

LIQUID LIMIT 31 % PLASTICITY INDEX 11%

SAMPLE OF Sandy Clay FROM Hole 41 at depth 1'-0"

GRADATION TEST RESULTS

#5615W

Fig. 27

CA-

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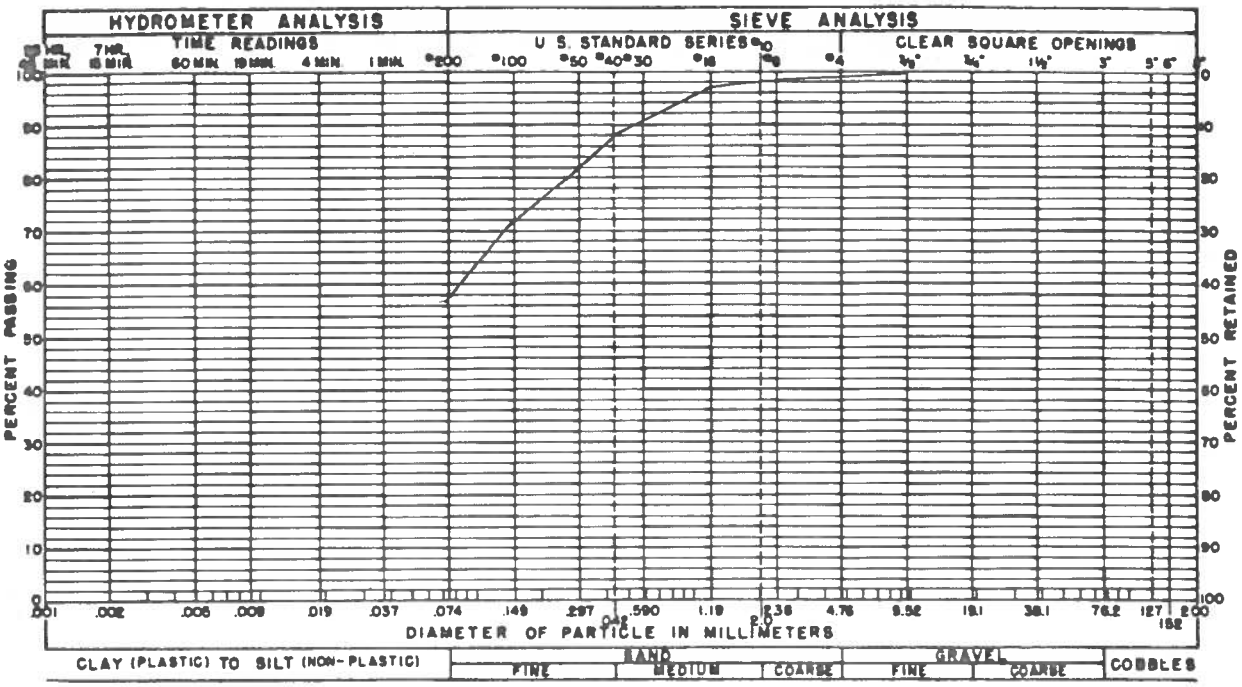
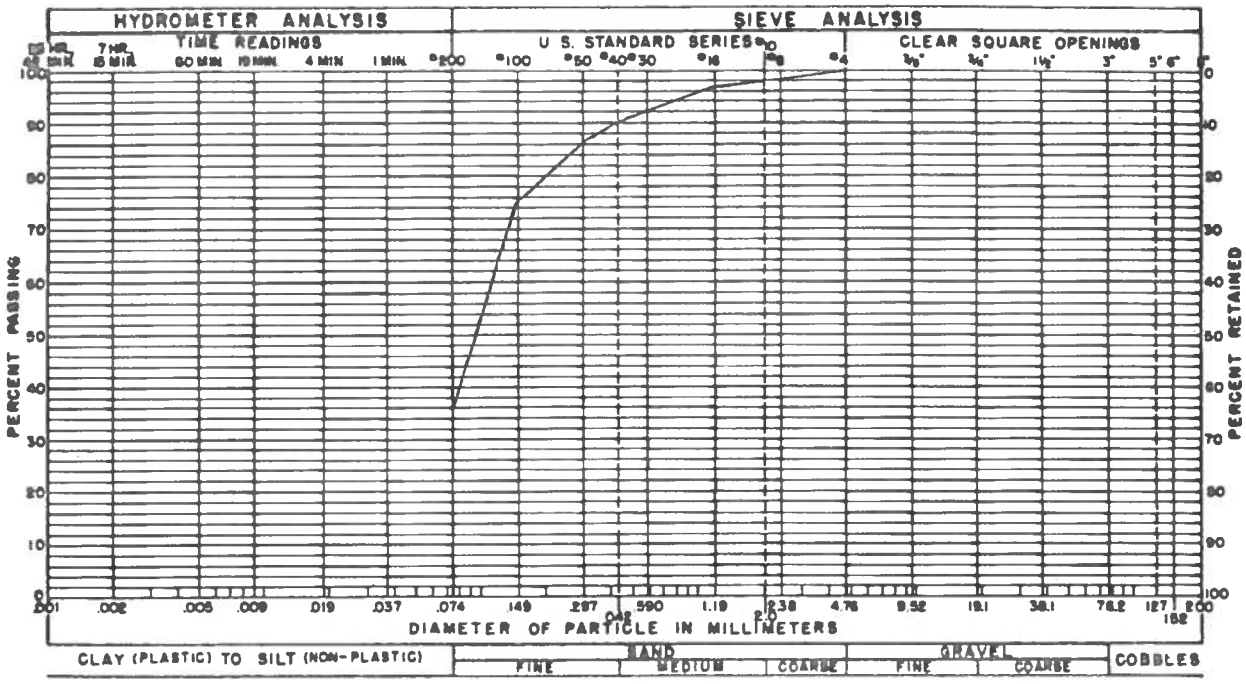


GRAVEL 1 % SAND 42% SILT AND CLAY 57 %

LIQUID LIMIT 27% PLASTICITY INDEX 7%

SAMPLE OF Sandy Clay FROM Hole 42 at depth 2'-0"



GRAVEL 0 % SAND 64% SILT AND CLAY 36 %

LIQUID LIMIT 21% PLASTICITY INDEX NP%

SAMPLE OF Very Silty Sand FROM Hole 43 at depth 1'-0"

#5615W

GRADATION TEST RESULTS

Fig. 28

CA-

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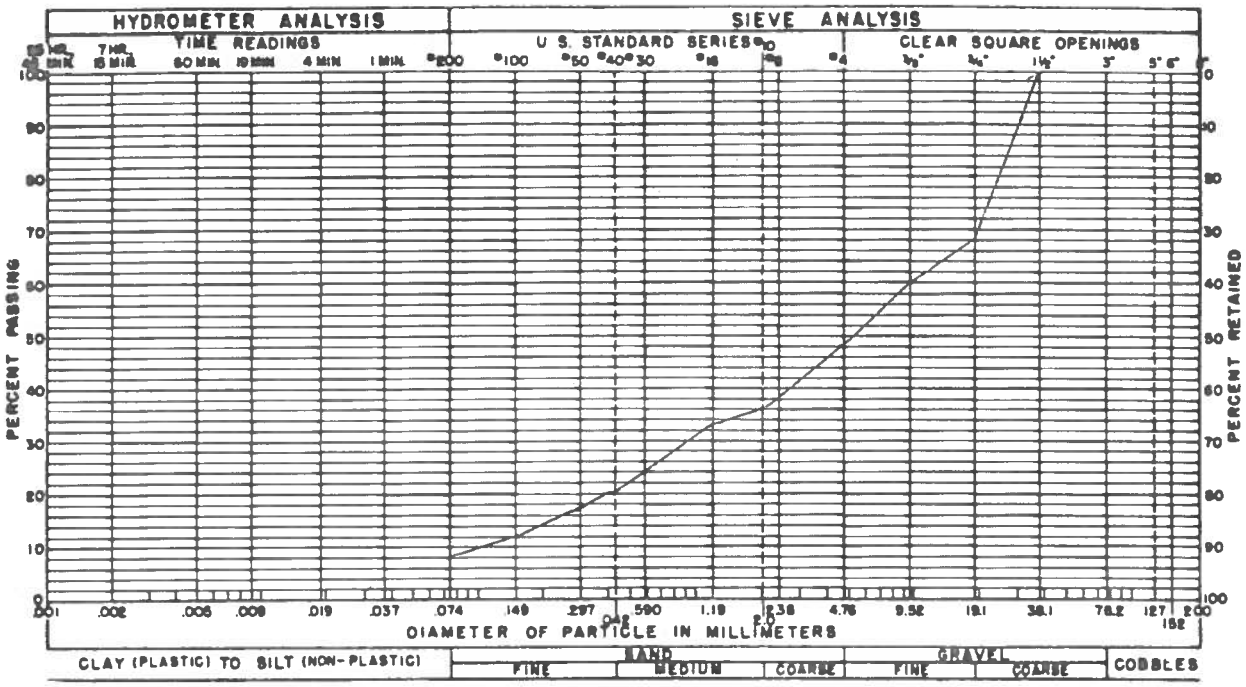
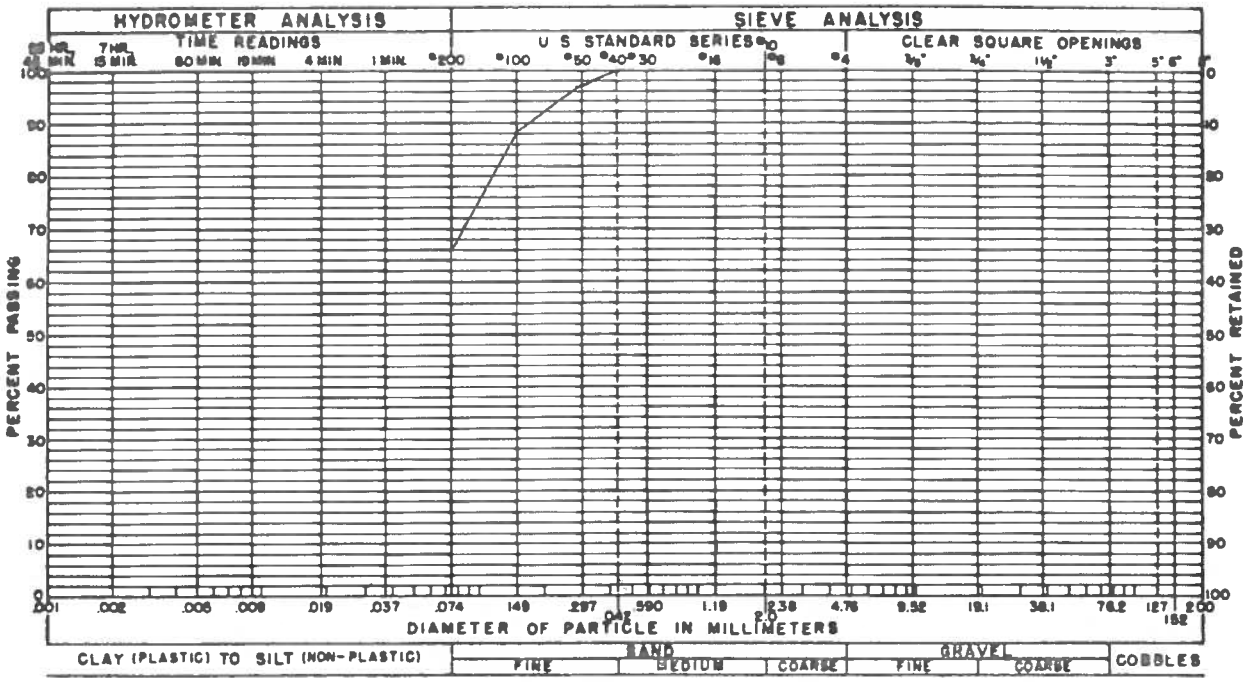


GRAVEL 52 % SAND 40% SILT AND CLAY 8 %

LIQUID LIMIT % PLASTICITY INDEX %

SAMPLE OF Slightly Silty Sand and Gravel FROM Hole 44 at depth 4'-0"



GRAVEL 0 % SAND 34% SILT AND CLAY 66 %

LIQUID LIMIT 34 % PLASTICITY INDEX 18%

SAMPLE OF Sandy Clay FROM Hole 46 at depth 1'-0"

GRADATION TEST RESULTS

#5615W

Fig. 29

CA-2

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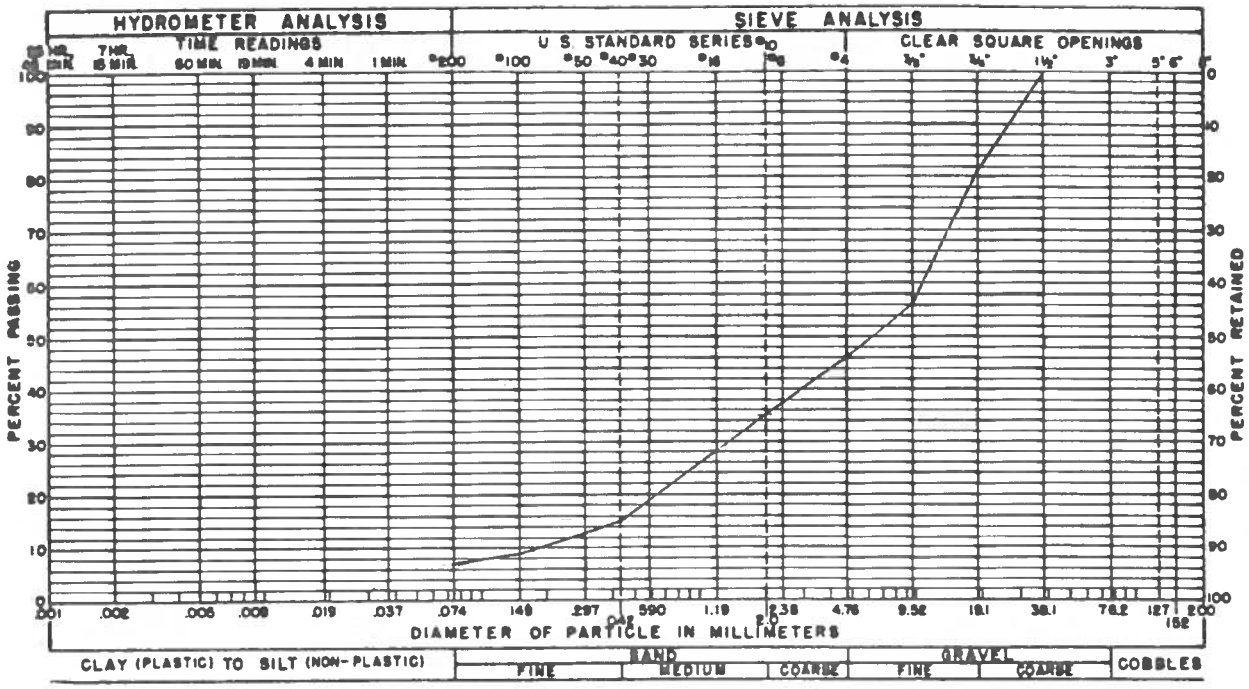
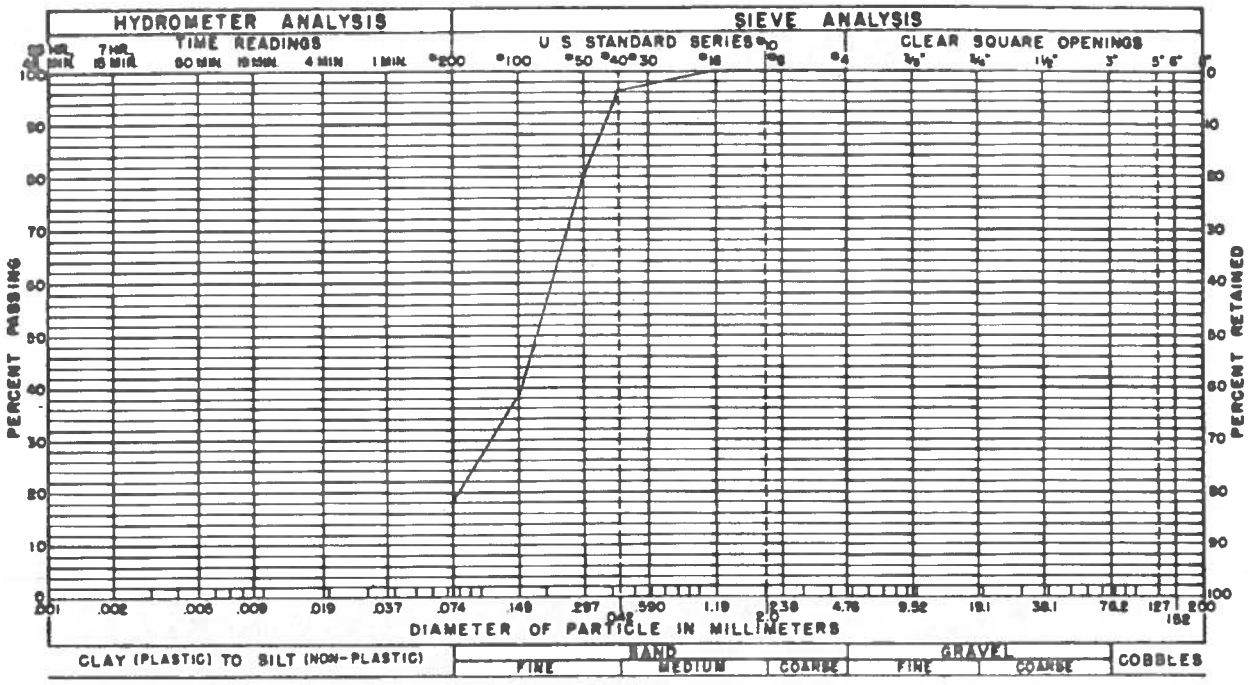


GRAVEL 54 % SAND 39 % SILT AND CLAY 7 %

LIQUID LIMIT % PLASTICITY INDEX %

SAMPLE OF Slightly Silty Sand and Gravel FROM Hole 46 at depth 4'-0"



GRAVEL 0 % SAND 82% SILT AND CLAY 18 %

LIQUID LIMIT 19% PLASTICITY INDEX NP%

SAMPLE OF Silty Sand FROM Hole 47 at depth 2'-0"

GRADATION TEST RESULTS

#5615W

Fig. 30

CA-

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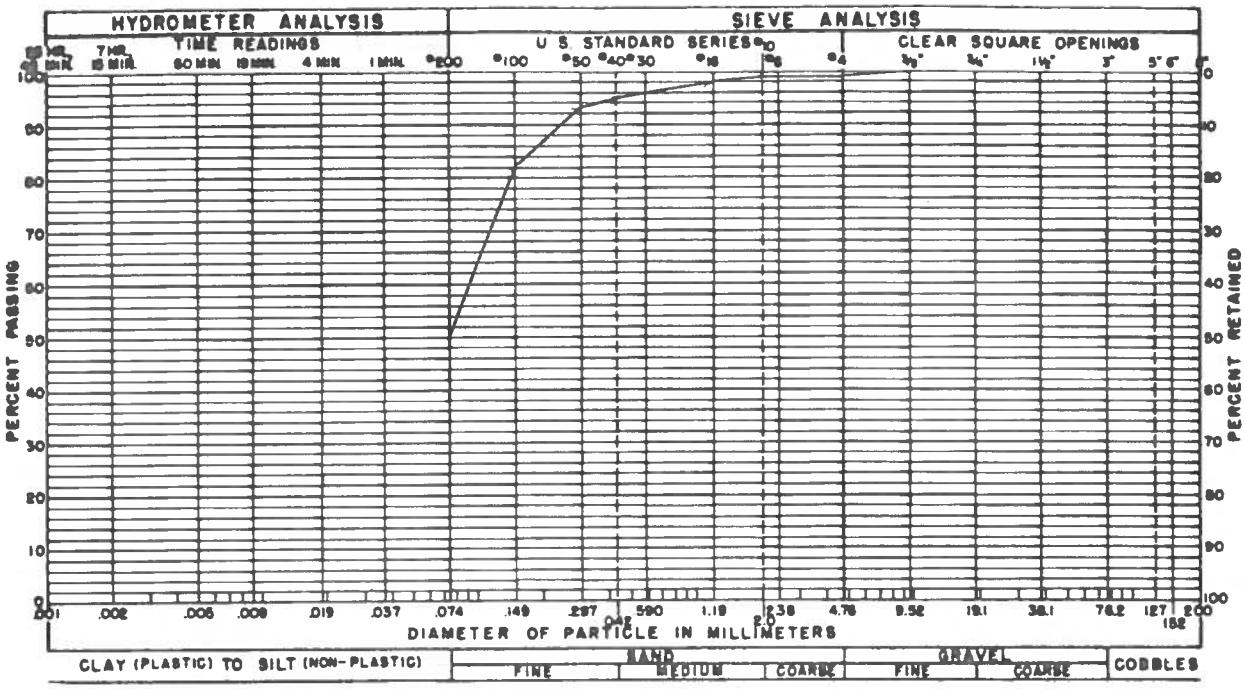
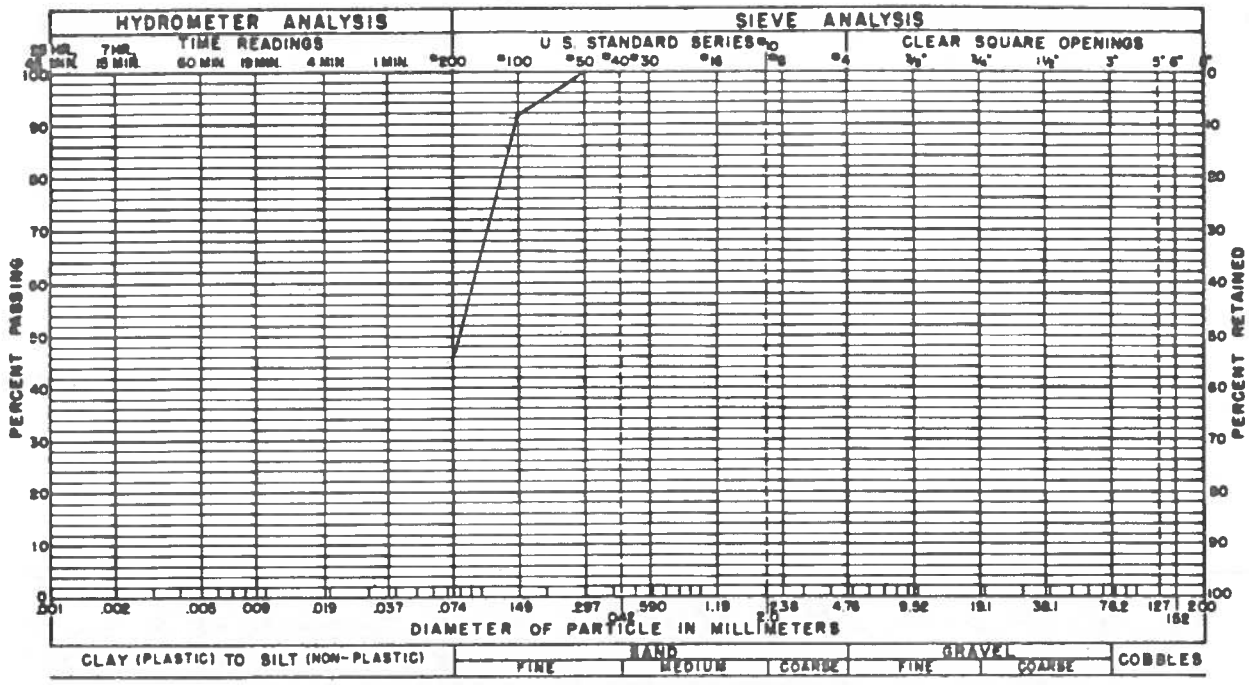


GRAVEL 1 % SAND 49% SILT AND CLAY 50 %

LIQUID LIMIT 24 % PLASTICITY INDEX NP%

SAMPLE OF Very Sandy Silt FROM Hole 48 at depth 2'-0"



GRAVEL 0 % SAND 54% SILT AND CLAY 46 %

LIQUID LIMIT 27 % PLASTICITY INDEX NP%

SAMPLE OF Very Silty Sand FROM Hole 51 at depth 1'-6"

GRADATION TEST RESULTS

#5615W

Fig. 31

CA-2

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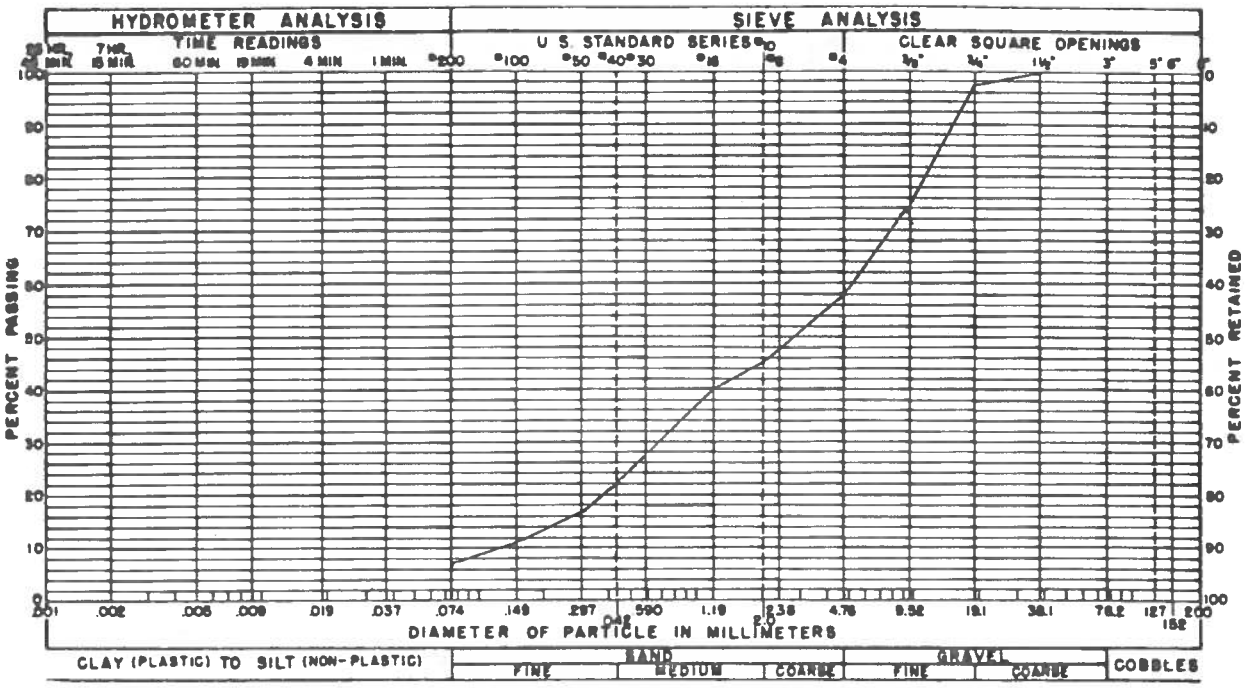
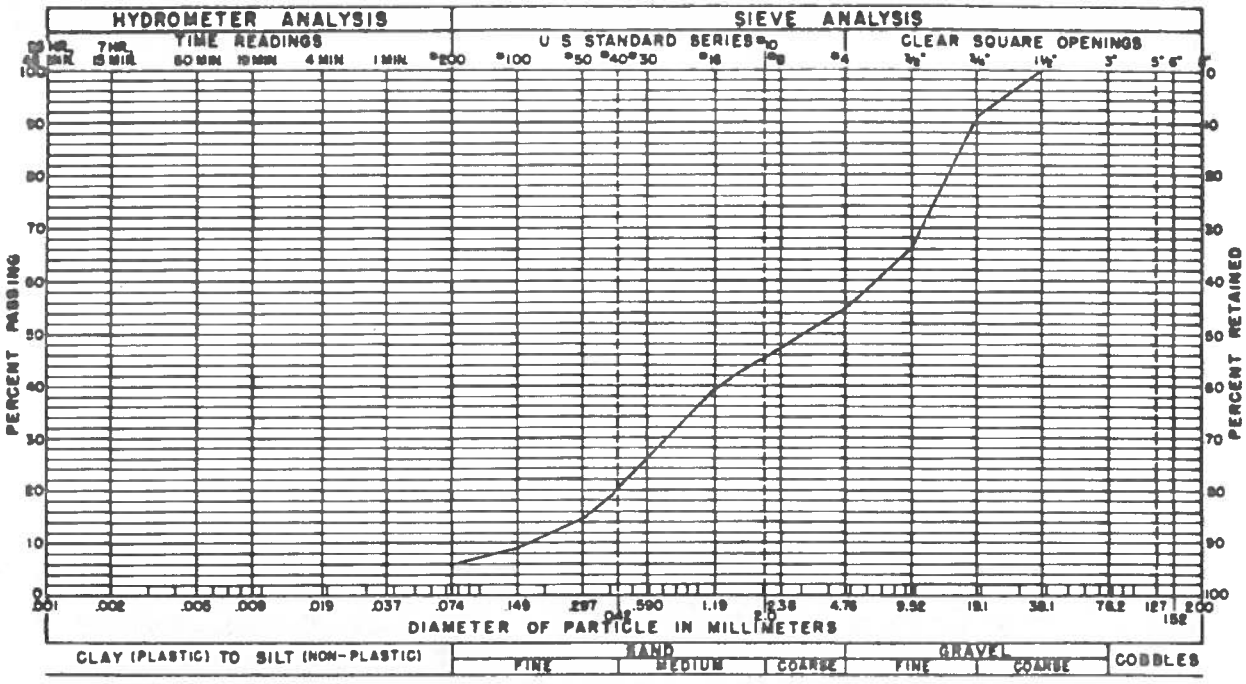


GRAVEL 42 % SAND 51% SILT AND CLAY 7 %

LIQUID LIMIT % PLASTICITY INDEX %

SAMPLE OF Slightly Silty Sand and Gravel FROM Hole 51 at depth 4'-0"



GRAVEL 45 % SAND 49% SILT AND CLAY 6 %

LIQUID LIMIT % PLASTICITY INDEX %

SAMPLE OF Slightly Silty Sand and Gravel FROM Hole 52 at depth 2'-0"

GRADATION TEST RESULTS

#5615W

Fig. 32

CA-2

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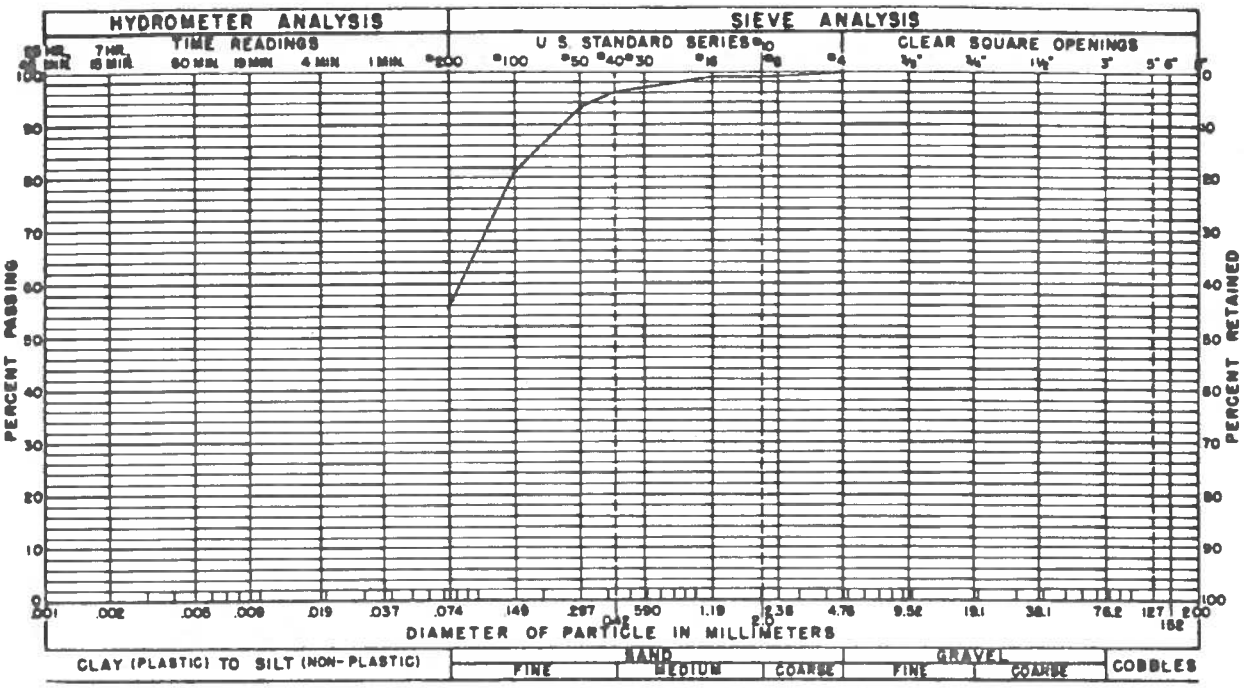
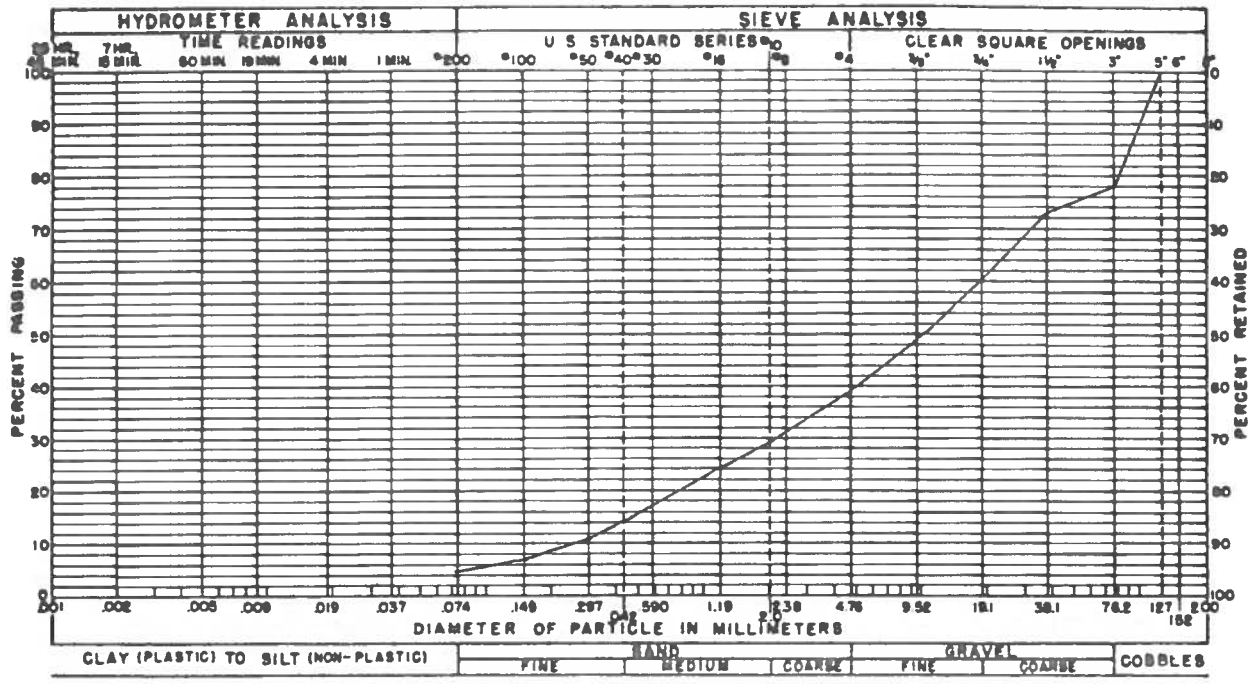


GRAVEL 0 % SAND 44% SILT AND CLAY 56 %

LIQUID LIMIT 26 % PLASTICITY INDEX 4%

SAMPLE OF Very Sandy Silt FROM Hole 53 at depth 2'-0"



GRAVEL 61 % SAND 34% SILT AND CLAY 5 %

LIQUID LIMIT % PLASTICITY INDEX %

SAMPLE OF Sand and Gravel FROM Hole 53 at depth 7'-0"

GRADATION TEST RESULTS

#5615W

Fig. 33

CA-2

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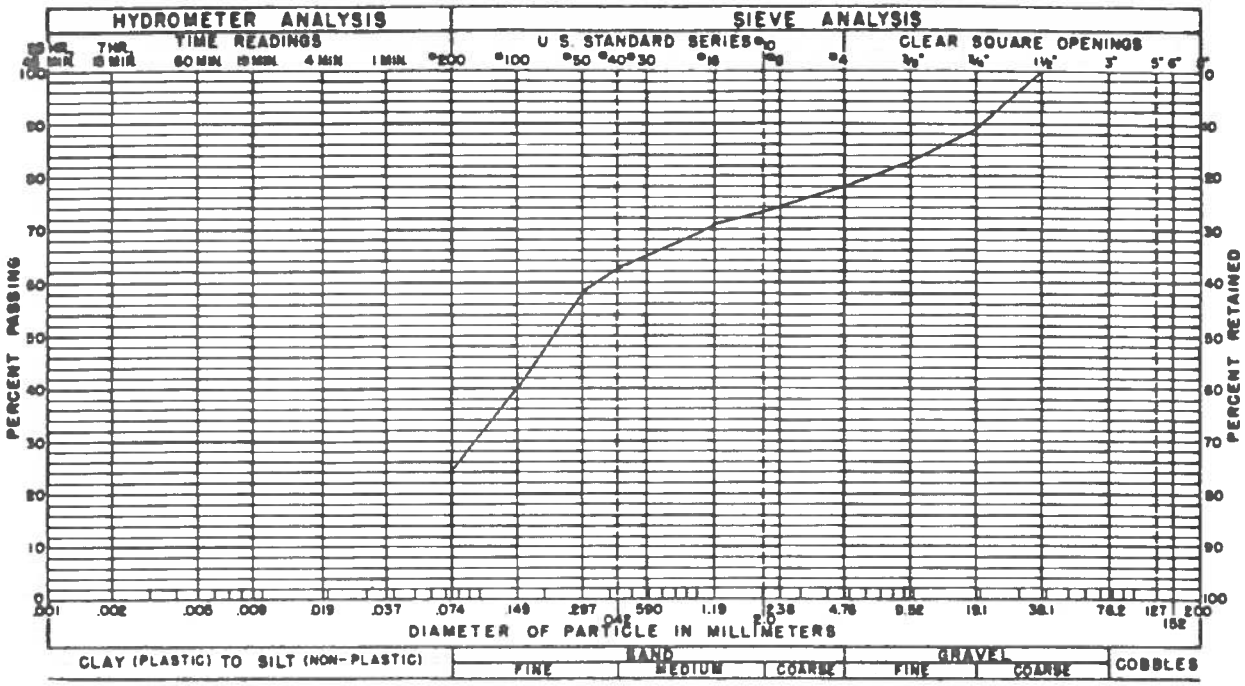
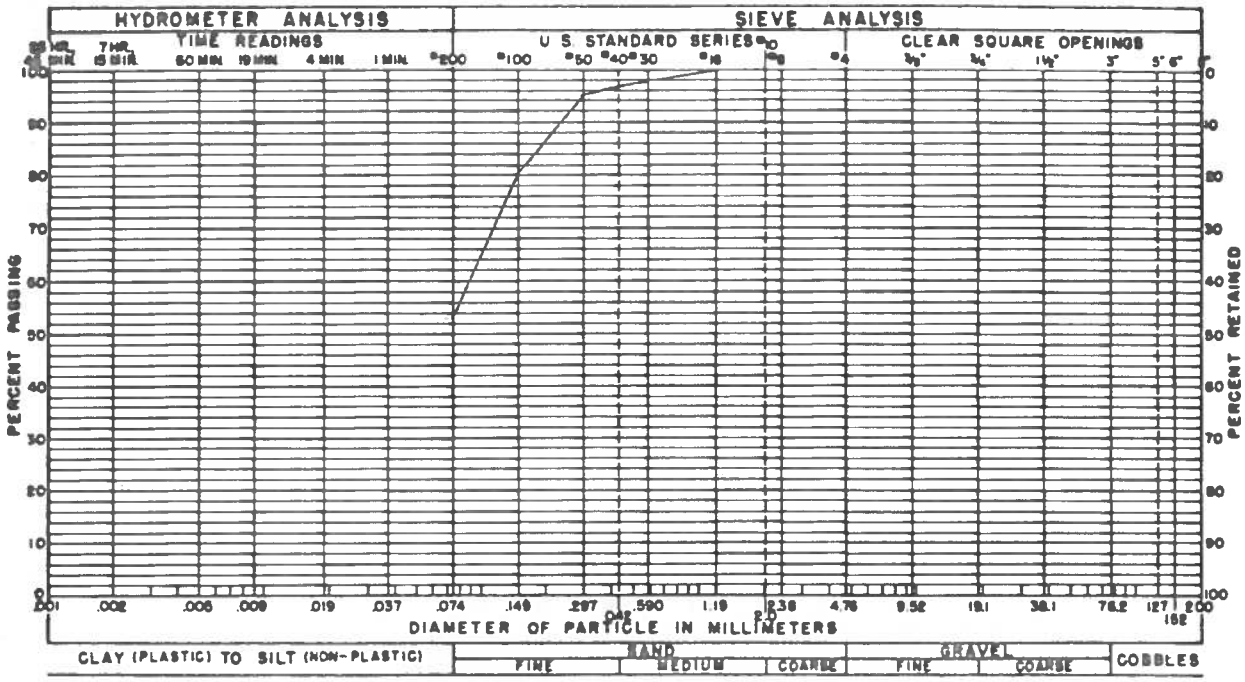


GRAVEL 22 % SAND 54% SILT AND CLAY 24 %

LIQUID LIMIT 19 % PLASTICITY INDEX NP %

SAMPLE OF Silty Sand and Gravel FROM Hole 54 at depth 2'-0"



GRAVEL 0 % SAND 47% SILT AND CLAY 53 %

LIQUID LIMIT 22% PLASTICITY INDEX 4%

SAMPLE OF Sandy Silt FROM Hole 55 at depth 2'-0"

GRADATION TEST RESULTS

#5615W

Fig. 34

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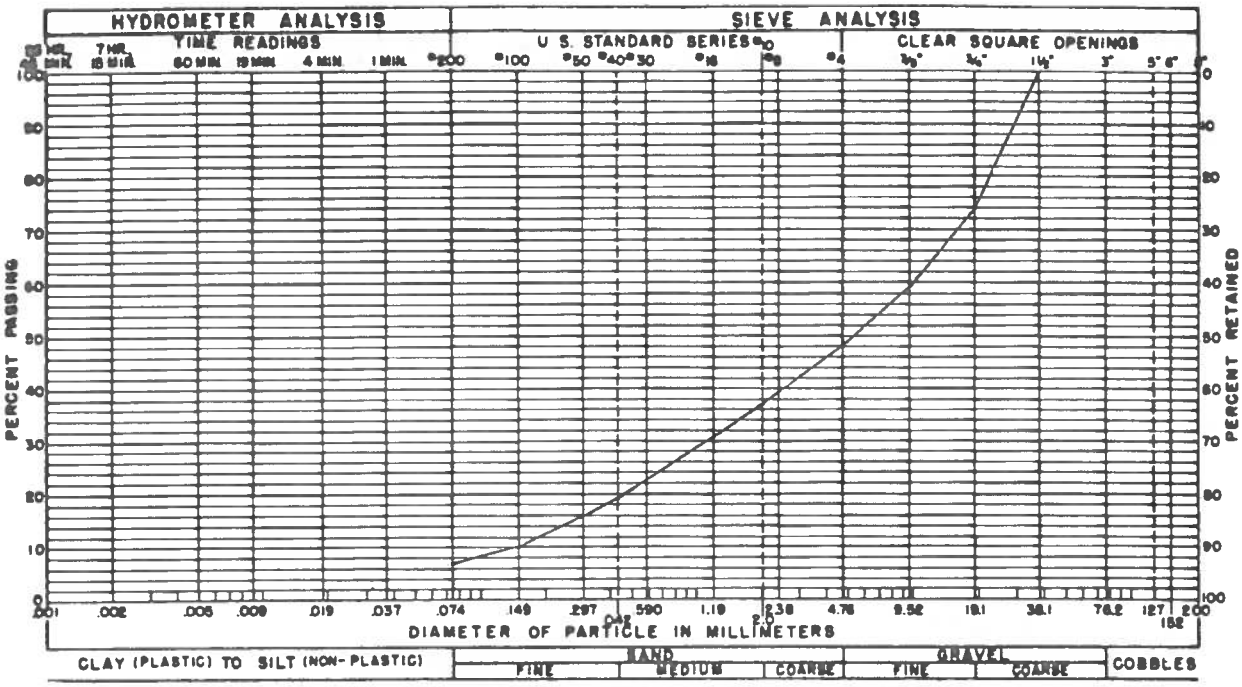
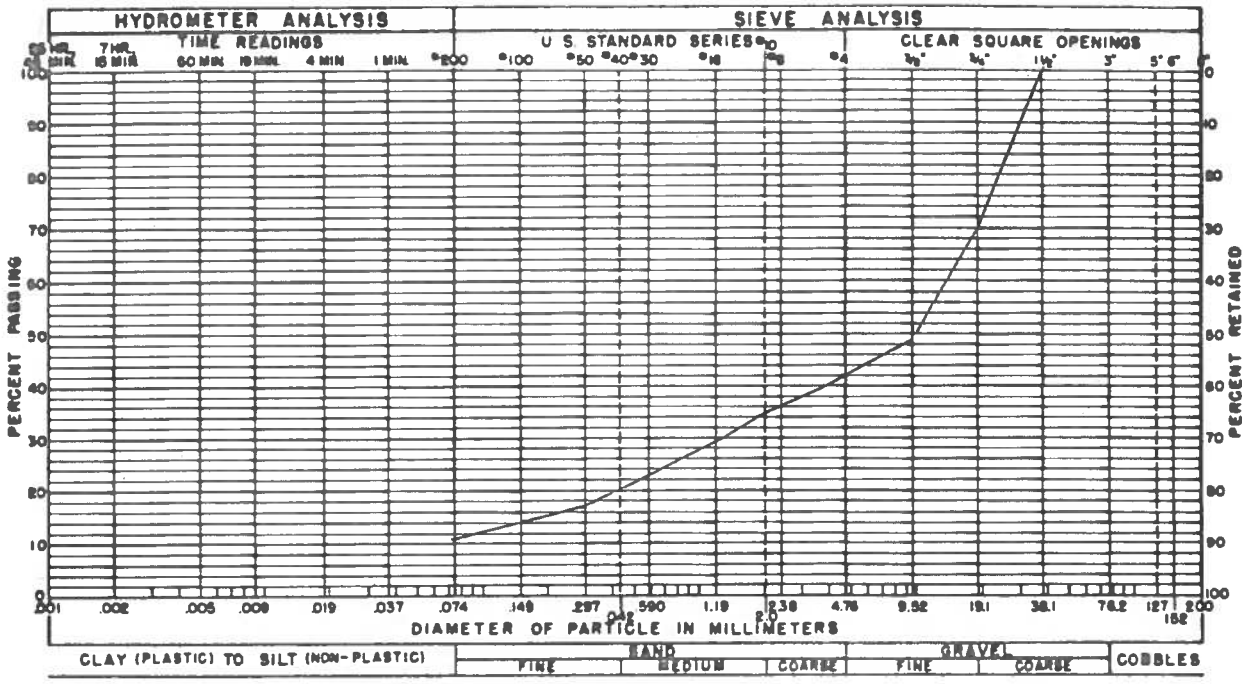


GRAVEL 52 % SAND 41% SILT AND CLAY 7 %

LIQUID LIMIT % PLASTICITY INDEX %

SAMPLE OF Slightly Silty Sand and Gravel FROM Hole 55 at depth 4'-0"



GRAVEL 58 % SAND 31% SILT AND CLAY 7 %

LIQUID LIMIT % PLASTICITY INDEX %

SAMPLE OF Slighlty Silty Sand and Gravel FROM Hole 58 at depth 4'-0"

GRADATION TEST RESULTS

#5615W

Fig. 35

CA-2

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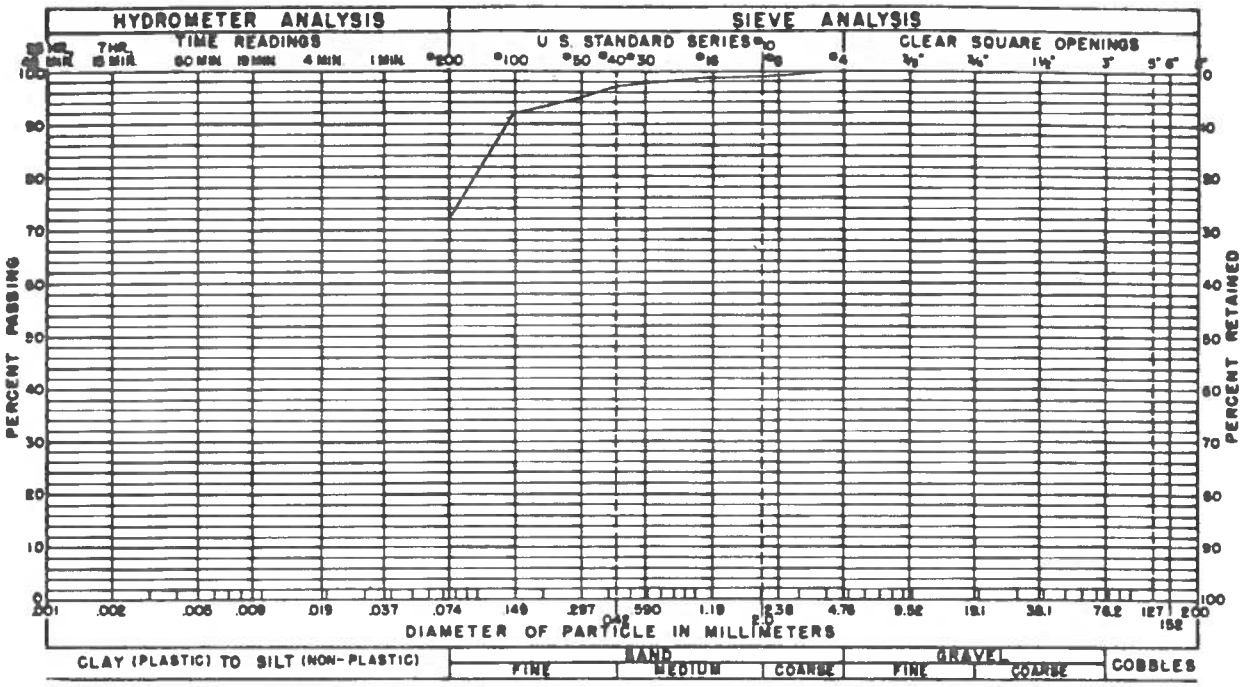
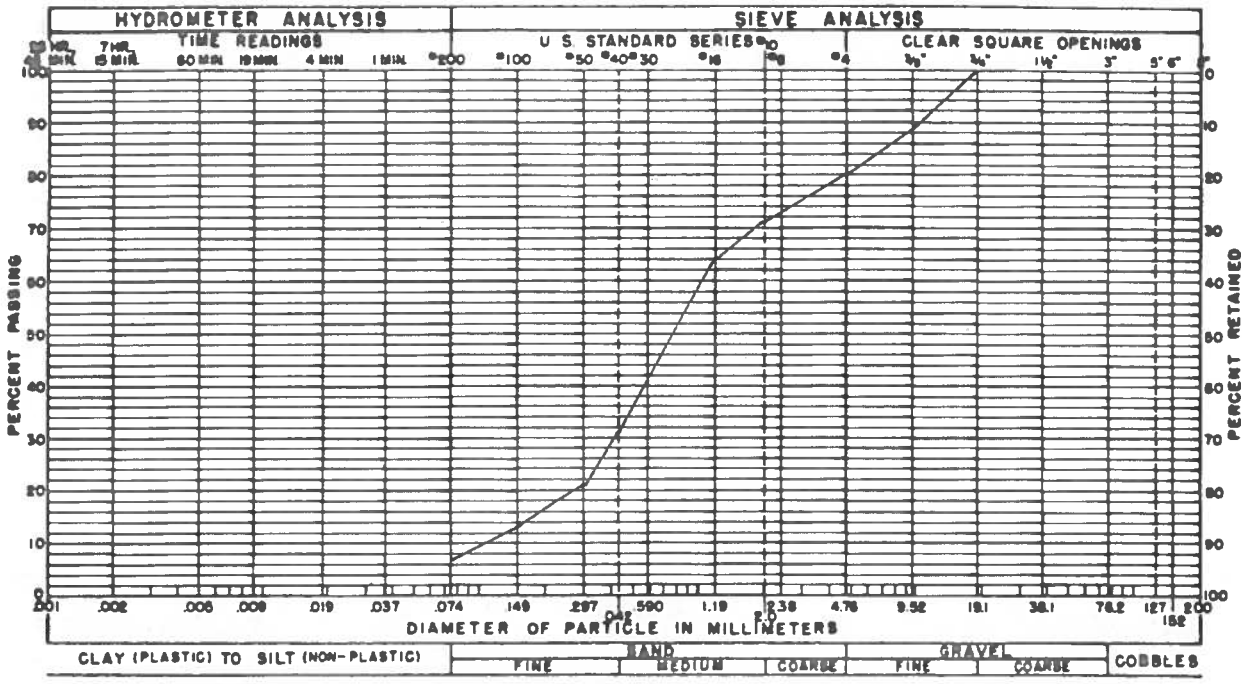


GRAVEL 0 % SAND 28% SILT AND CLAY 72 %

LIQUID LIMIT 41 % PLASTICITY INDEX 13 %

SAMPLE OF Sandy Silt FROM Hole 60 at depth 1'-6"



GRAVEL 20 % SAND 73% SILT AND CLAY 7 %

LIQUID LIMIT % PLASTICITY INDEX %

SAMPLE OF Slightly Silty Sand and Gravel FROM Hole 60 at depth 9'-0"

GRADATION TEST RESULTS

#5615W

Fig. 36

CA-2

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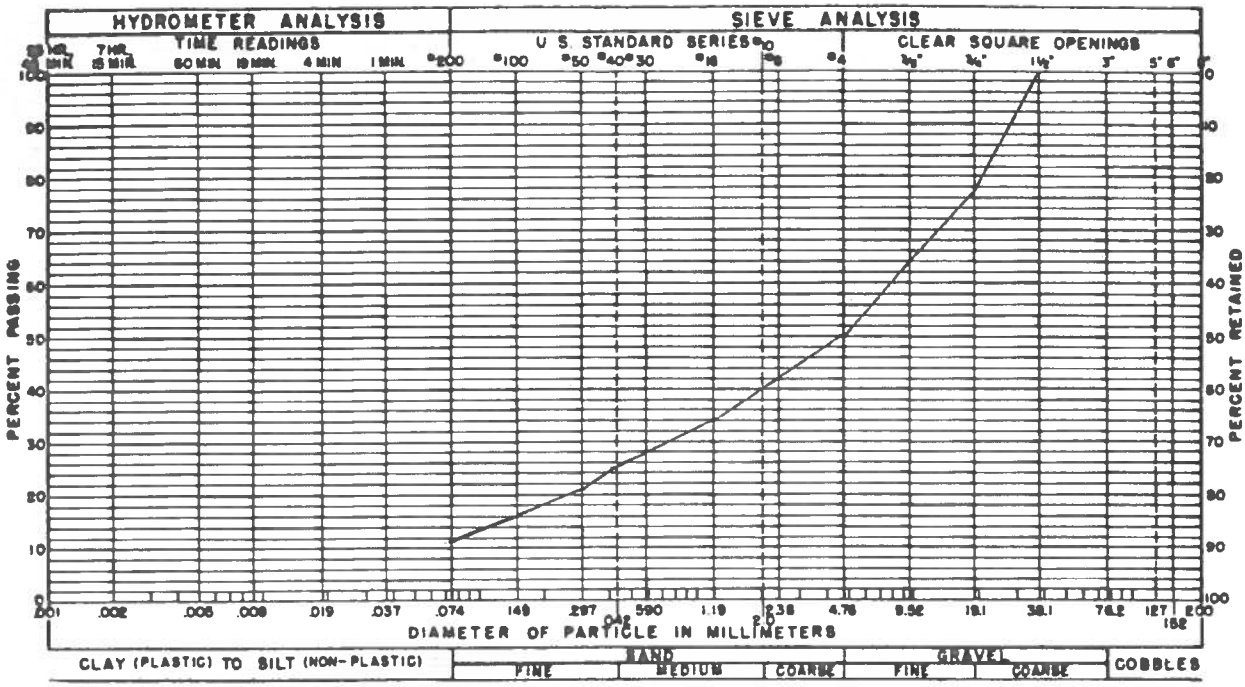
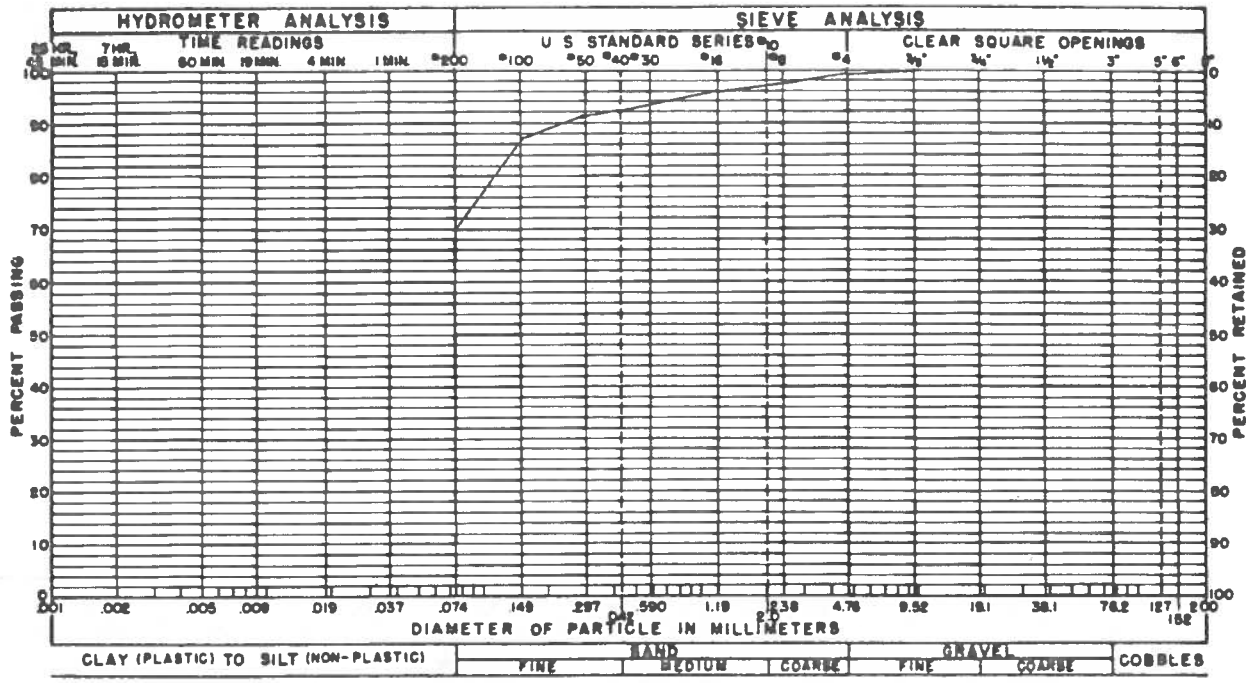


GRAVEL 50 % SAND 39 % SILT AND CLAY 11 %

LIQUID LIMIT % PLASTICITY INDEX %

SAMPLE OF Slightly Silty Sand and Gravel FROM Hole 61 at depth 2'-0"



GRAVEL 1 % SAND 29 % SILT AND CLAY 70 %

LIQUID LIMIT 43 % PLASTICITY INDEX 15 %

SAMPLE OF Sandy Silt FROM Hole 64 at depth 1'-0"

GRADATION TEST RESULTS

#5615W

Fig. 37

CA-

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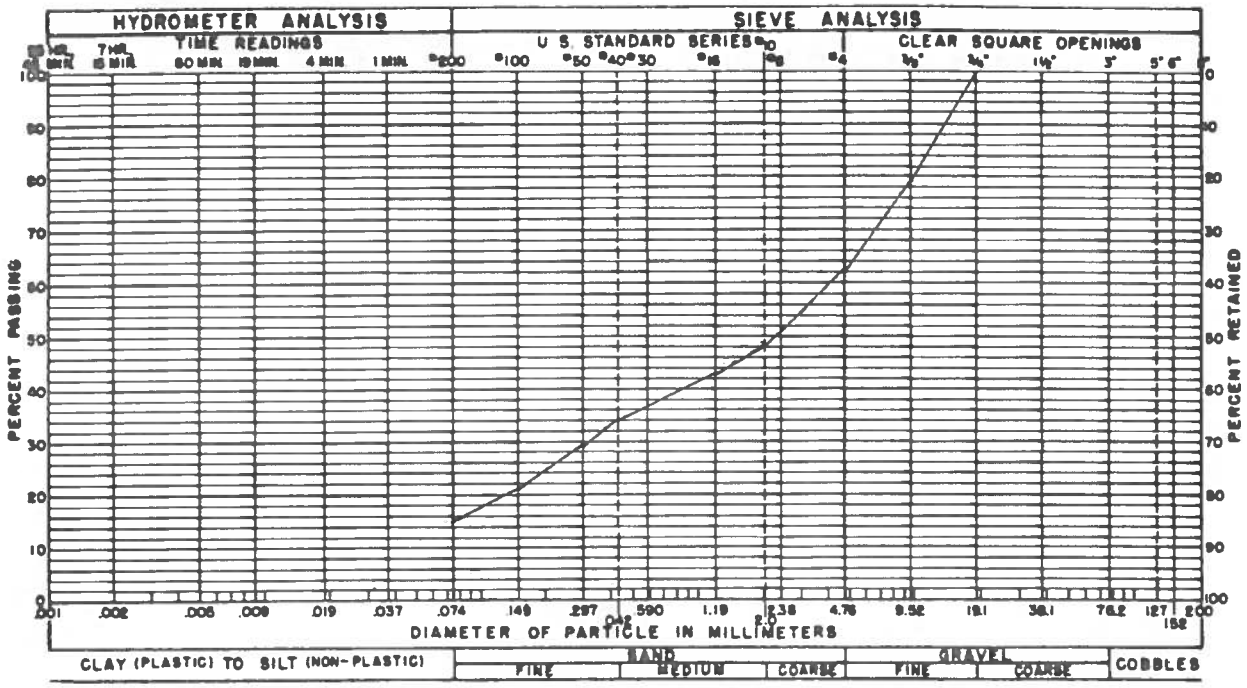
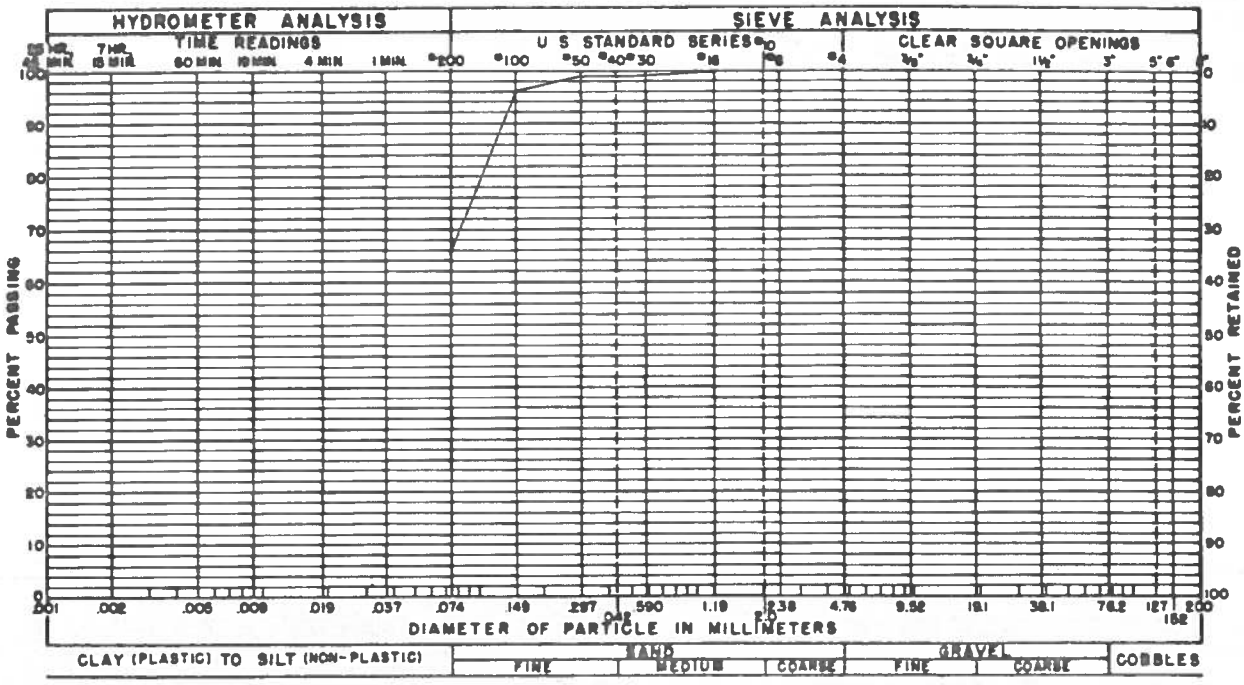


GRAVEL 38 % SAND 47 % SILT AND CLAY 15 %

LIQUID LIMIT % PLASTICITY INDEX %

SAMPLE OF Silty Sand and Gravel FROM Hole 65 at depth 2'-0"



GRAVEL 0 % SAND 34% SILT AND CLAY 66 %

LIQUID LIMIT 25% PLASTICITY INDEX 6%

SAMPLE OF Sandy Clay-Silt FROM Hole 66 at depth 4'-0"

#5615W

GRADATION TEST RESULTS

Fig. 38

CA-

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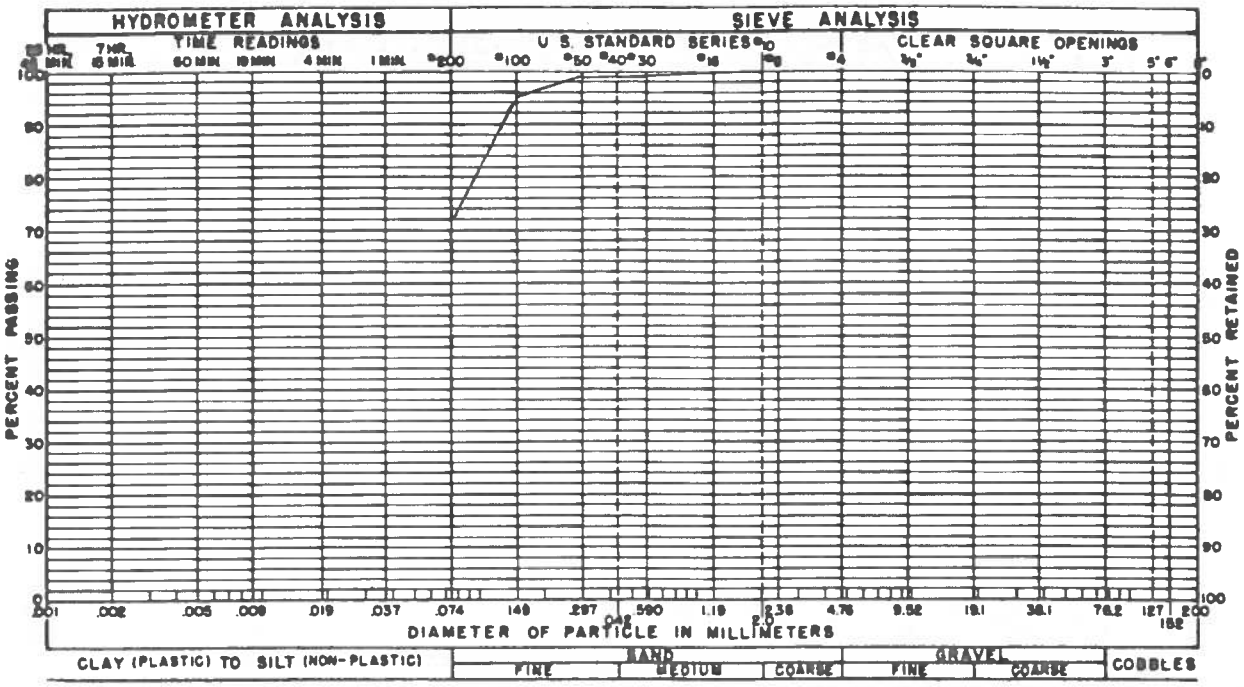
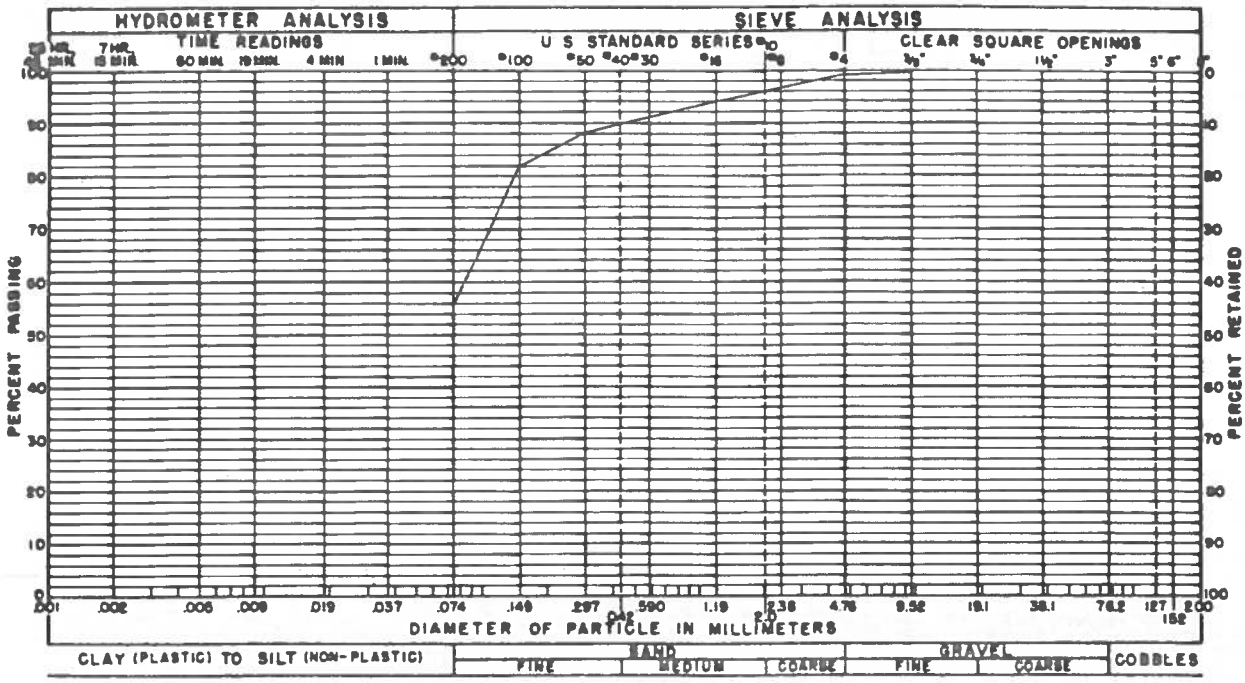


GRAVEL 0 % SAND 29% SILT AND CLAY 71 %

LIQUID LIMIT 22 % PLASTICITY INDEX 2%

SAMPLE OF Sandy Silt FROM Hole 67 at depth 4'-0"



GRAVEL 1 % SAND 43 % SILT AND CLAY 56%

LIQUID LIMIT 24 % PLASTICITY INDEX 7 %

SAMPLE OF Sandy Clay-Silt FROM Hole 69 at depth 4'-0"

GRADATION TEST RESULTS

#5615W

Fig. 39

CA-

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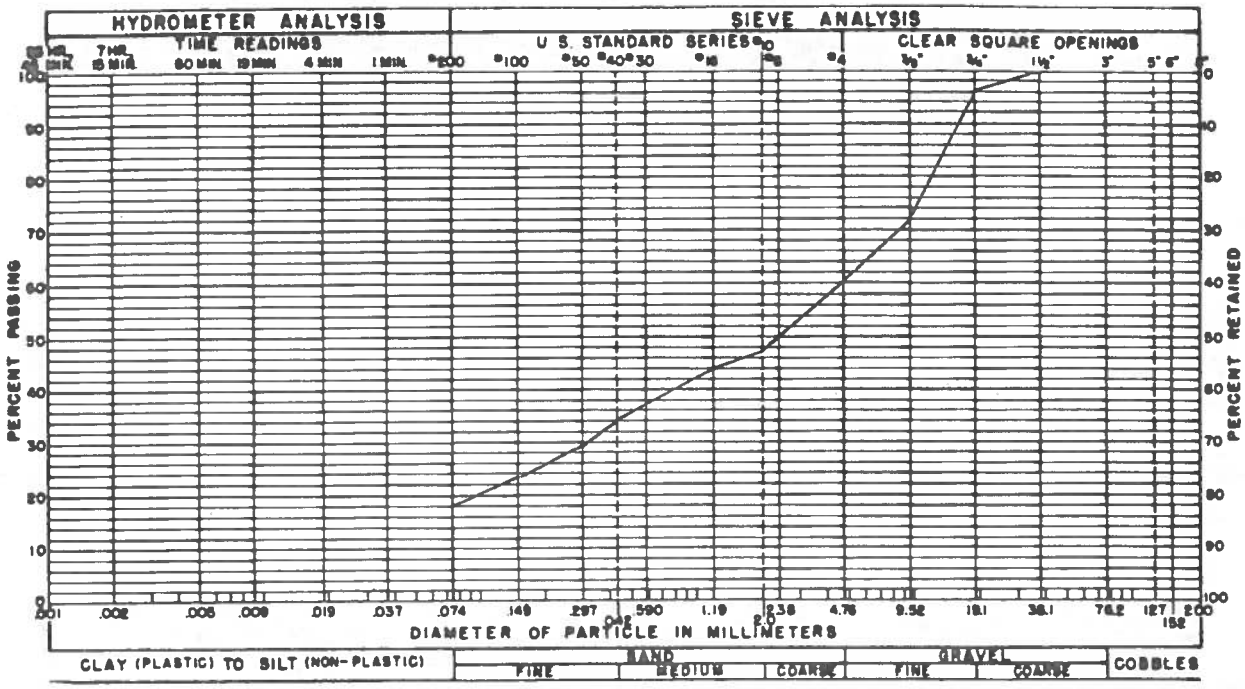
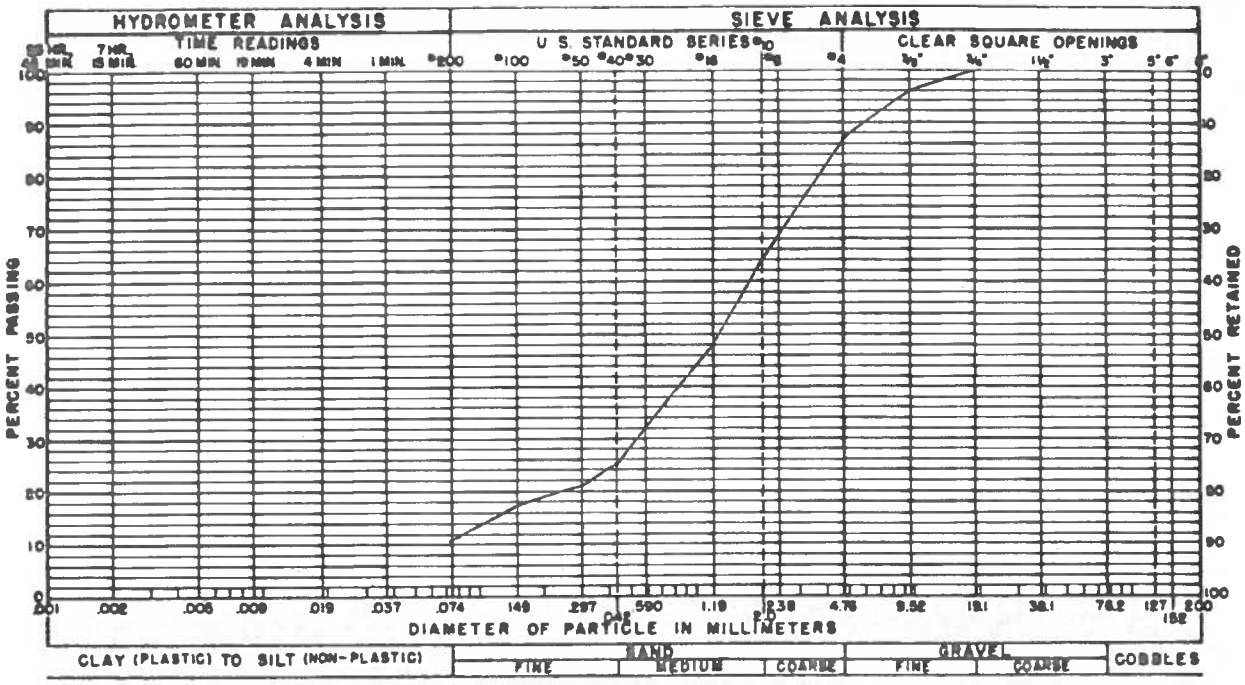


GRAVEL 40 % SAND 42% SILT AND CLAY 18 %

LIQUID LIMIT % PLASTICITY INDEX %

SAMPLE OF Silty Sand and Gravel FROM Hole 70 at depth 2'-0"



GRAVEL 13 % SAND 76% SILT AND CLAY 11 %

LIQUID LIMIT % PLASTICITY INDEX %

SAMPLE OF Slightly Silty Sand FROM Hole 71 at depth 1'-0"

GRADATION TEST RESULTS

#5615W

Fig. 40

CA-2

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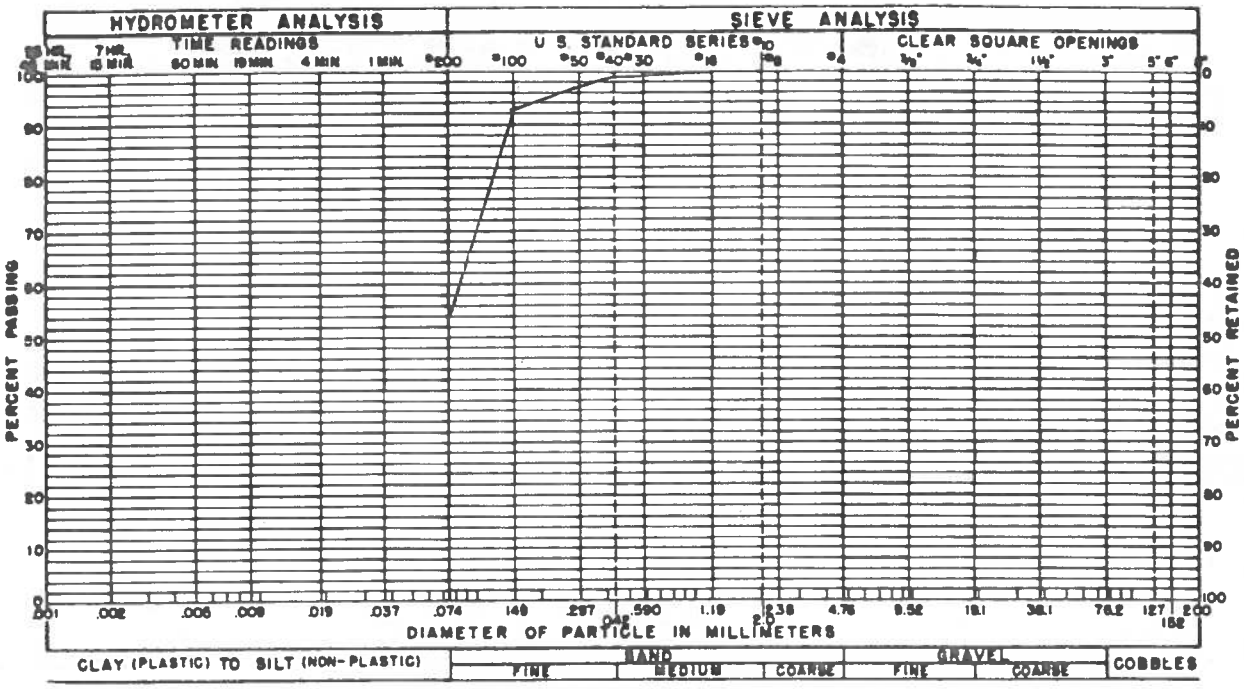
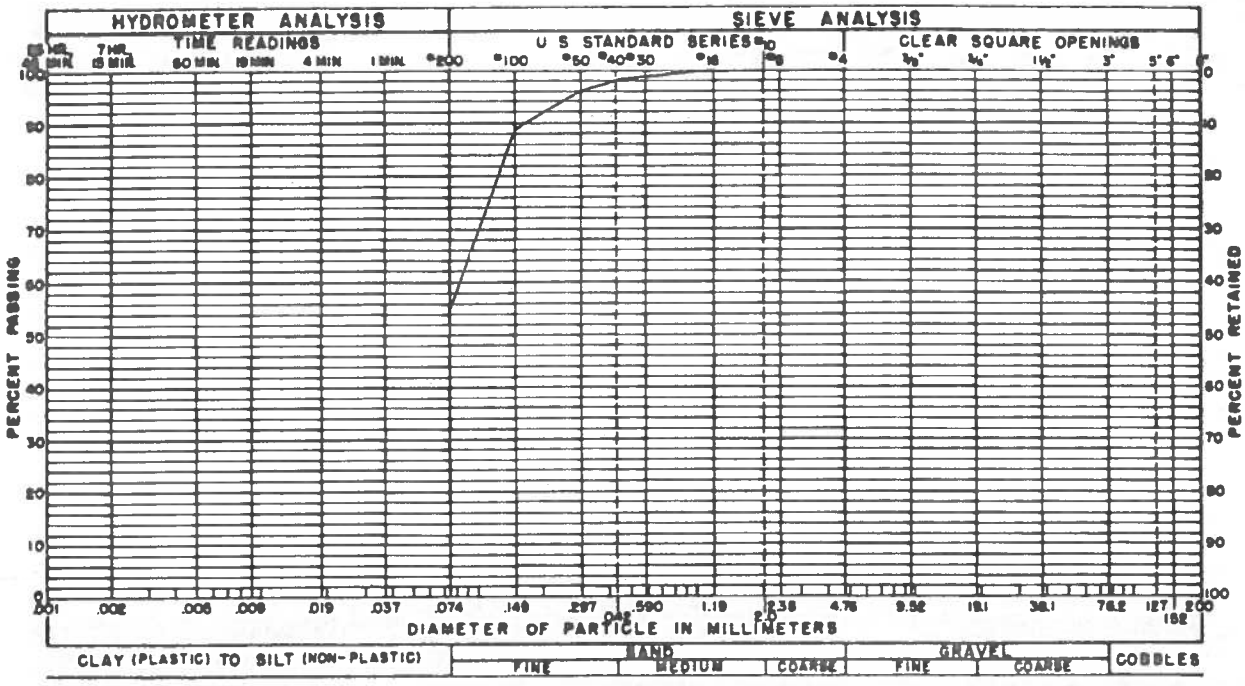


GRAVEL 0 % SAND 46% SILT AND CLAY 54 %

LIQUID LIMIT 23% PLASTICITY INDEX NP%

SAMPLE OF Sandy Silt FROM Hole 71 at depth 4'-0"



GRAVEL 0 % SAND 45% SILT AND CLAY 55 %

LIQUID LIMIT 20 % PLASTICITY INDEX NP%

SAMPLE OF Sandy Silt FROM Hole OH-1 at depth 4'-0"

GRADATION TEST RESULTS

#5615W

Fig. 41

CA-

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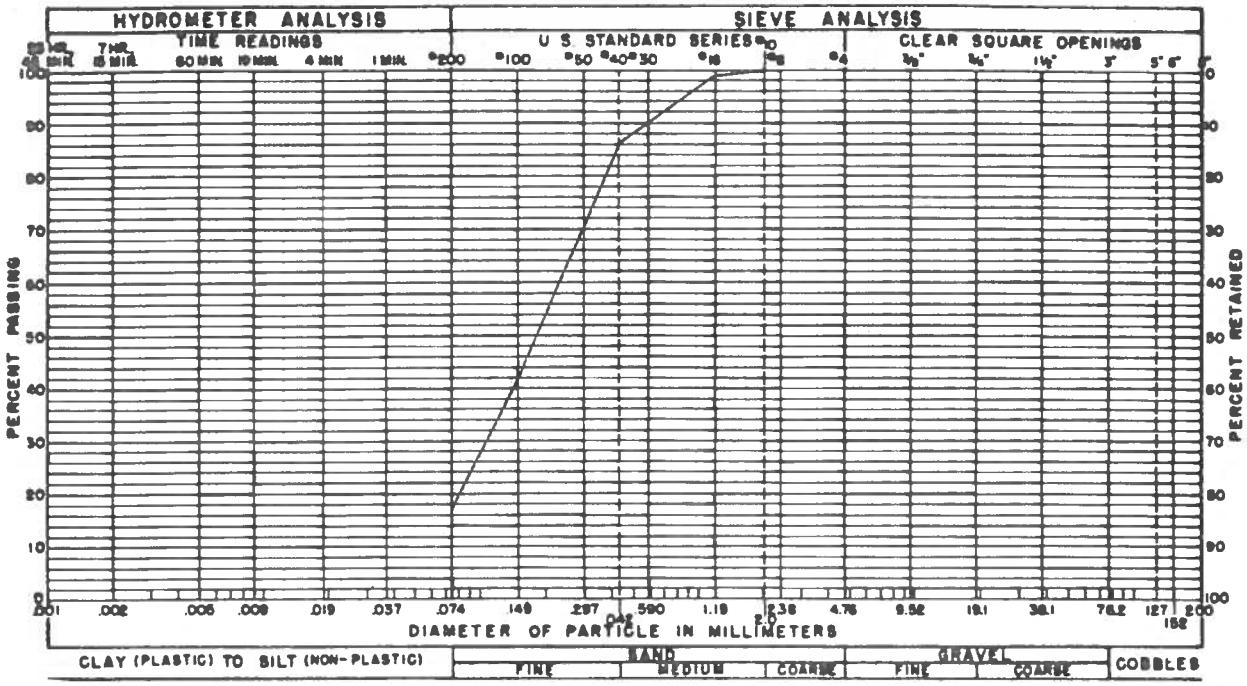
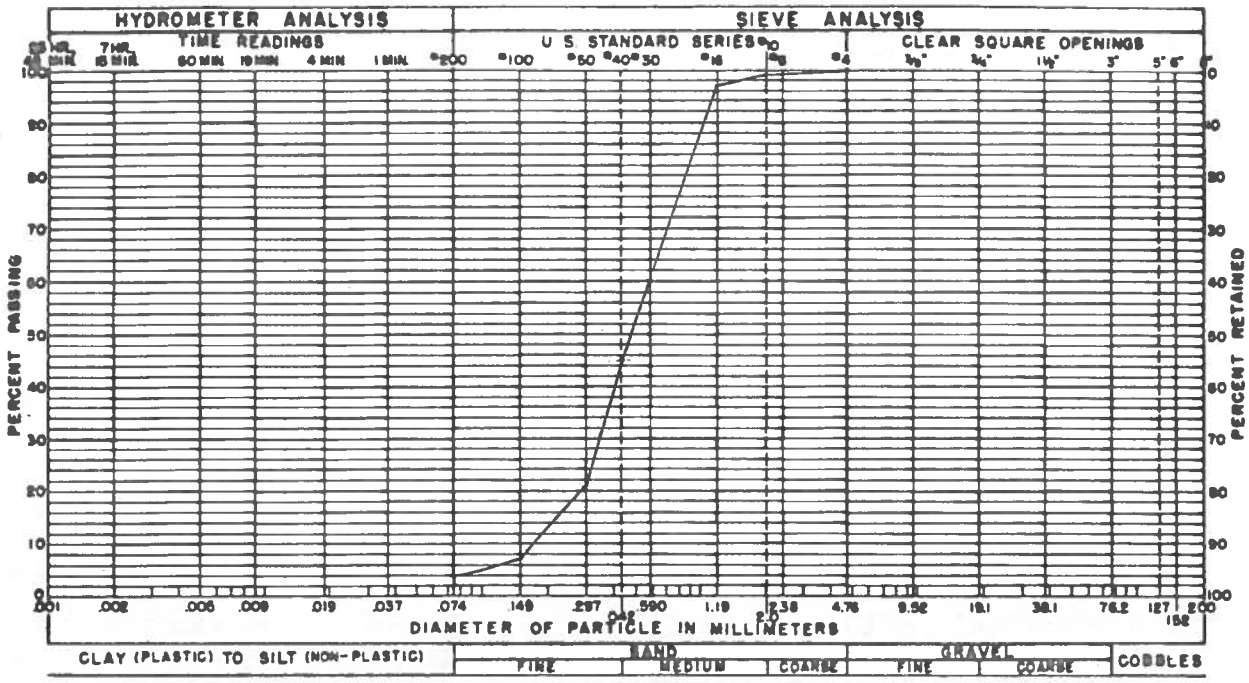


GRAVEL 0 % SAND 83% SILT AND CLAY 17 %

LIQUID LIMIT % PLASTICITY INDEX NP %

SAMPLE OF Silty Sand FROM Hole OH-1 at depth 9'-0"



GRAVEL 0 % SAND 96% SILT AND CLAY 4 %

LIQUID LIMIT % PLASTICITY INDEX %

SAMPLE OF Sand FROM Hole OH-2 at depth 3'-0"

GRADATION TEST RESULTS

#5615W

Fig. 42

CA-2

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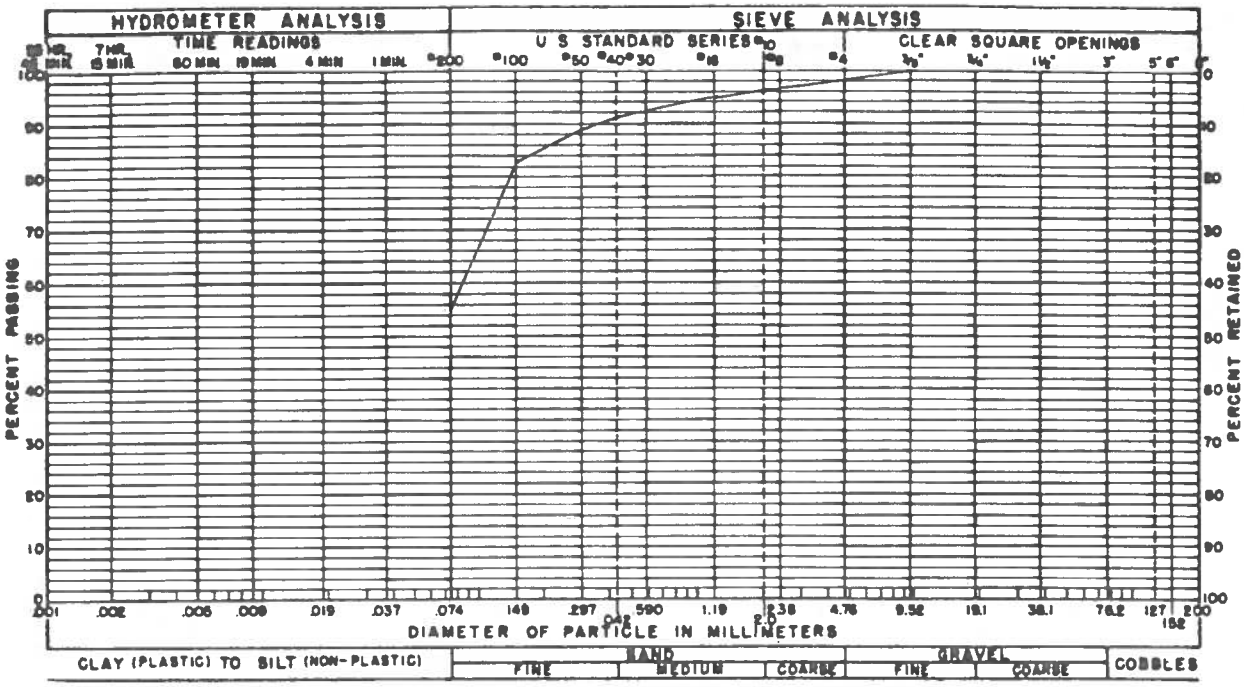
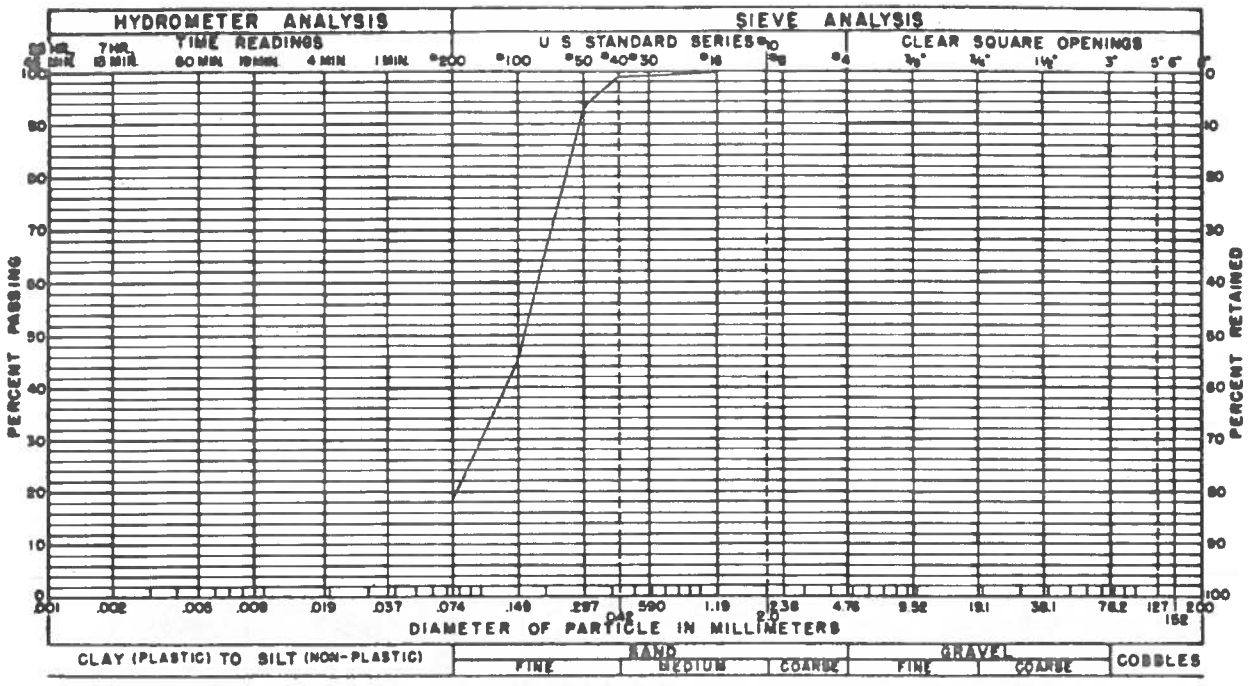


GRAVEL 2 % SAND 43% SILT AND CLAY 55 %

LIQUID LIMIT 30 % PLASTICITY INDEX 9 %

SAMPLE OF Sandy Silt FROM Hole OH-3 at depth 2'-0"



GRAVEL 0% SAND 81% SILT AND CLAY 19%

LIQUID LIMIT % PLASTICITY INDEX NP%

SAMPLE OF Silty Sand FROM Hole OH-3 at depth 4'-0"

GRADATION TEST RESULTS

#5615W

Fig. 43

CA-

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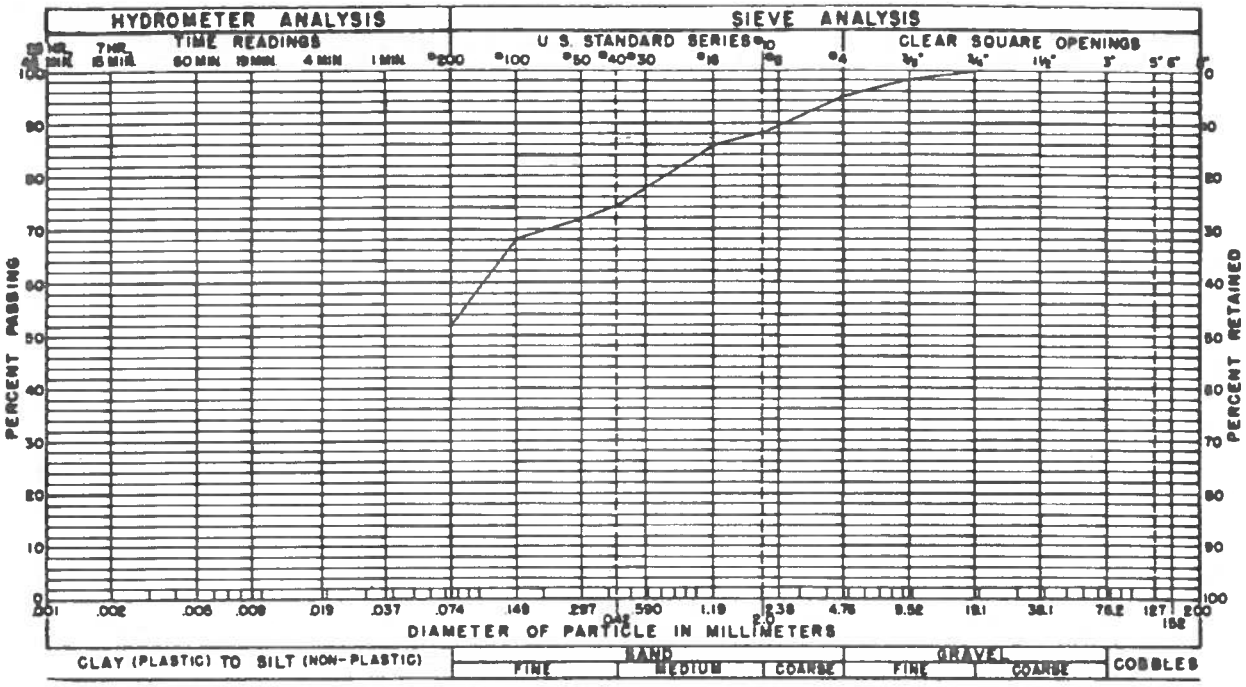
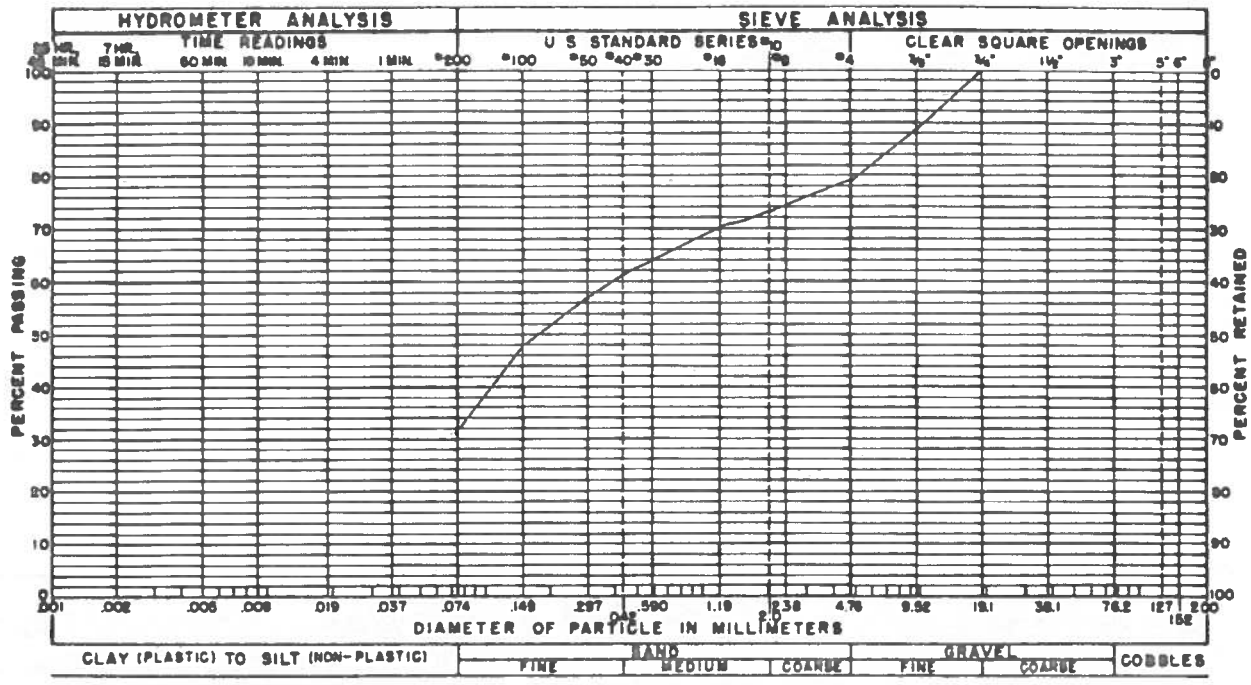


GRAVEL 5 % SAND 43% SILT AND CLAY 52 %

LIQUID LIMIT 30 % PLASTICITY INDEX 13%

SAMPLE OF Sandy Silt FROM Hole OH-4 at depth 1'-0"



GRAVEL 21 % SAND 48% SILT AND CLAY 31 %

LIQUID LIMIT 23 % PLASTICITY INDEX 4%

SAMPLE OF Silty, Gravelly Sand FROM Hole OH-5 at depth 1'-0"

GRADATION TEST RESULTS

#5615W

Fig. 44

CA-2

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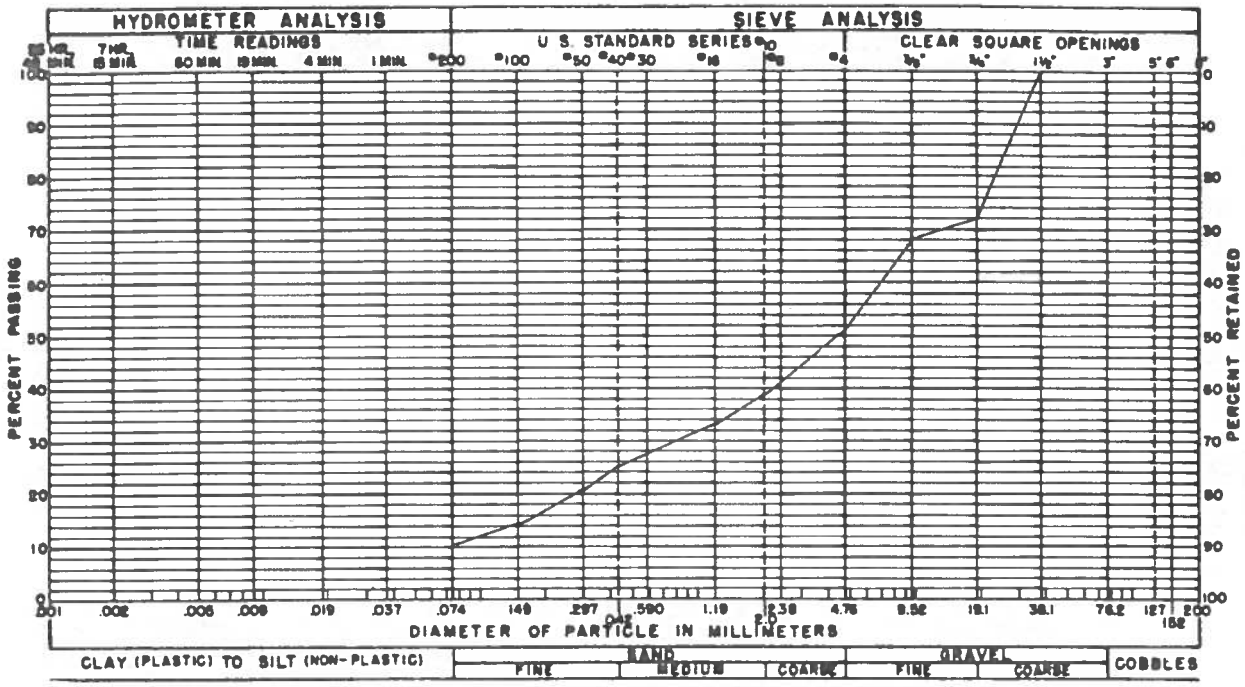
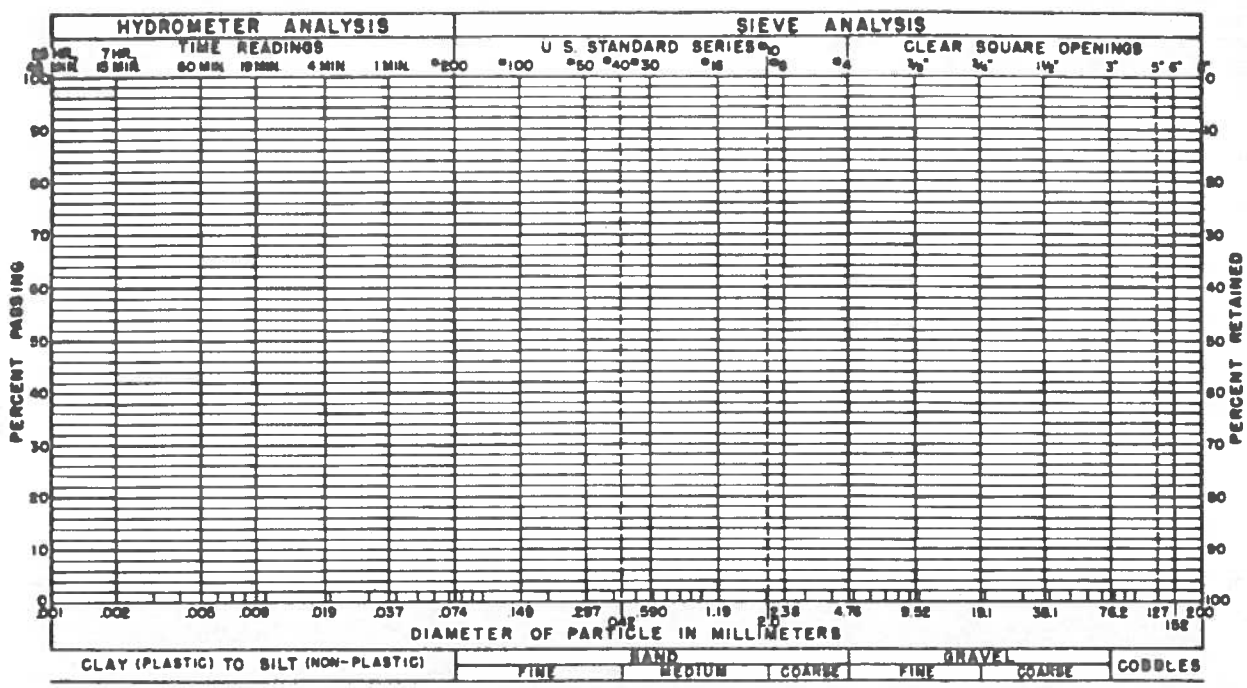


GRAVEL 49 % SAND 41% SILT AND CLAY 10 %

LIQUID LIMIT % PLASTICITY INDEX NP%

SAMPLE OF Slightly Silty Sand and Gravel FROM Hole OH-5 at depth 4'-0"



GRAVEL % SAND % SILT AND CLAY %

LIQUID LIMIT % PLASTICITY INDEX %

SAMPLE OF FROM

GRADATION TEST RESULTS

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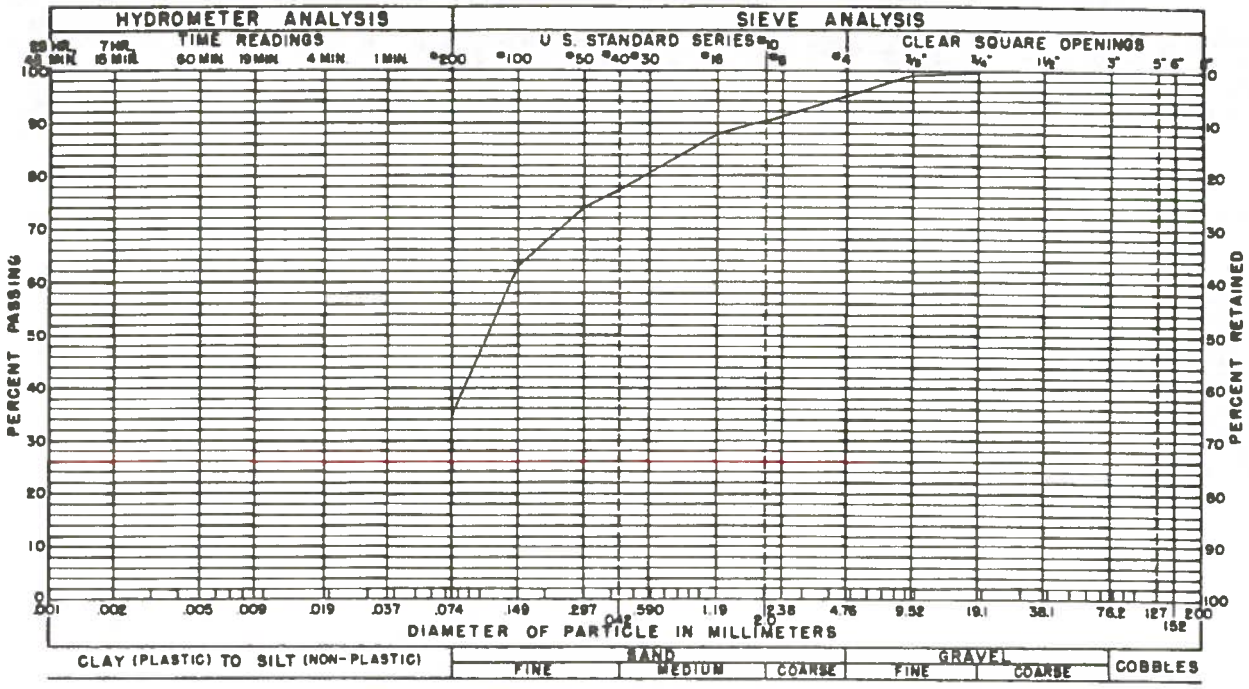
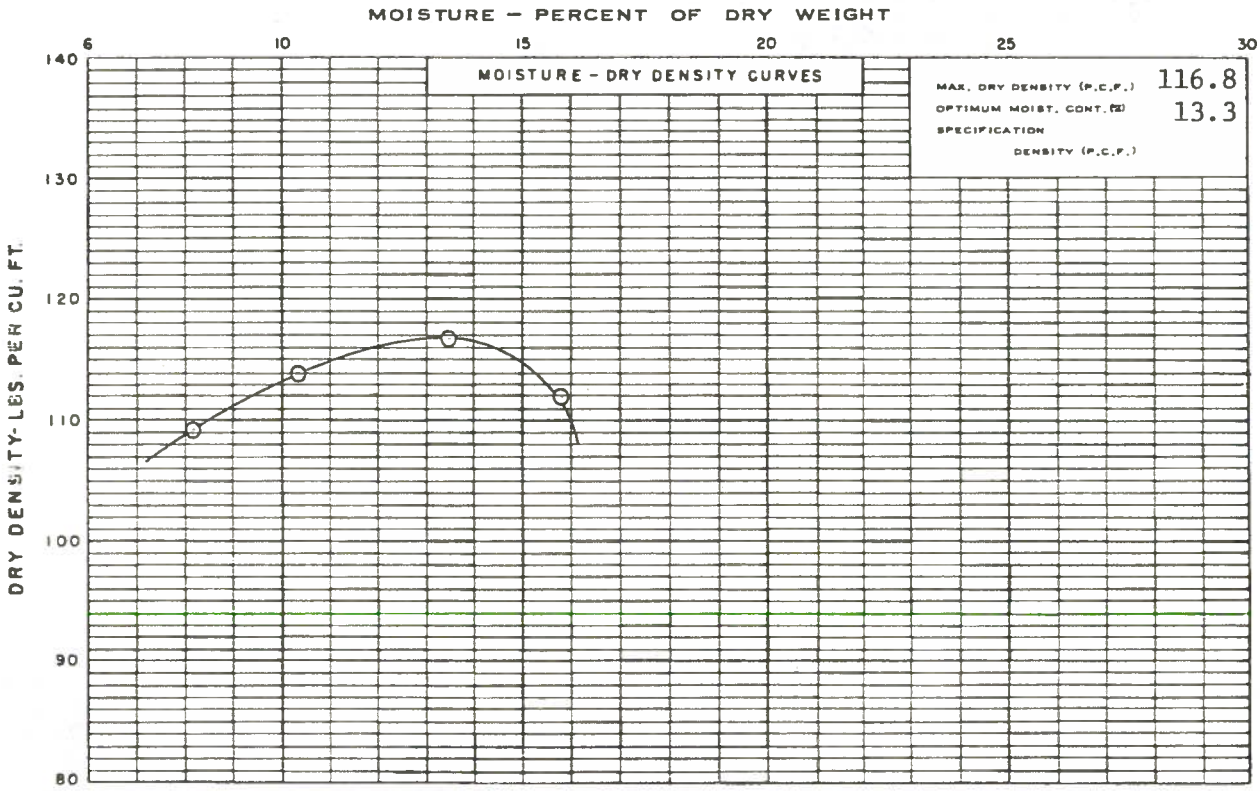
Consulting Engineers

Soil and Foundation Engineering



GRADATION TEST RESULTS

GRAVEL	5%	SAND	60 %	SILT AND CLAY	35 %
LIQUID LIMIT	25 %	PLASTICITY INDEX	6 %		



COMPACTION TEST RESULTS

COMPACTION TEST PROCEDURE ASTM D698-70, Method A

SAMPLE OF Silty-Clayey Sand

FROM [illegible] DEPTH 0'-0" to 5'-0"

Fig. 46

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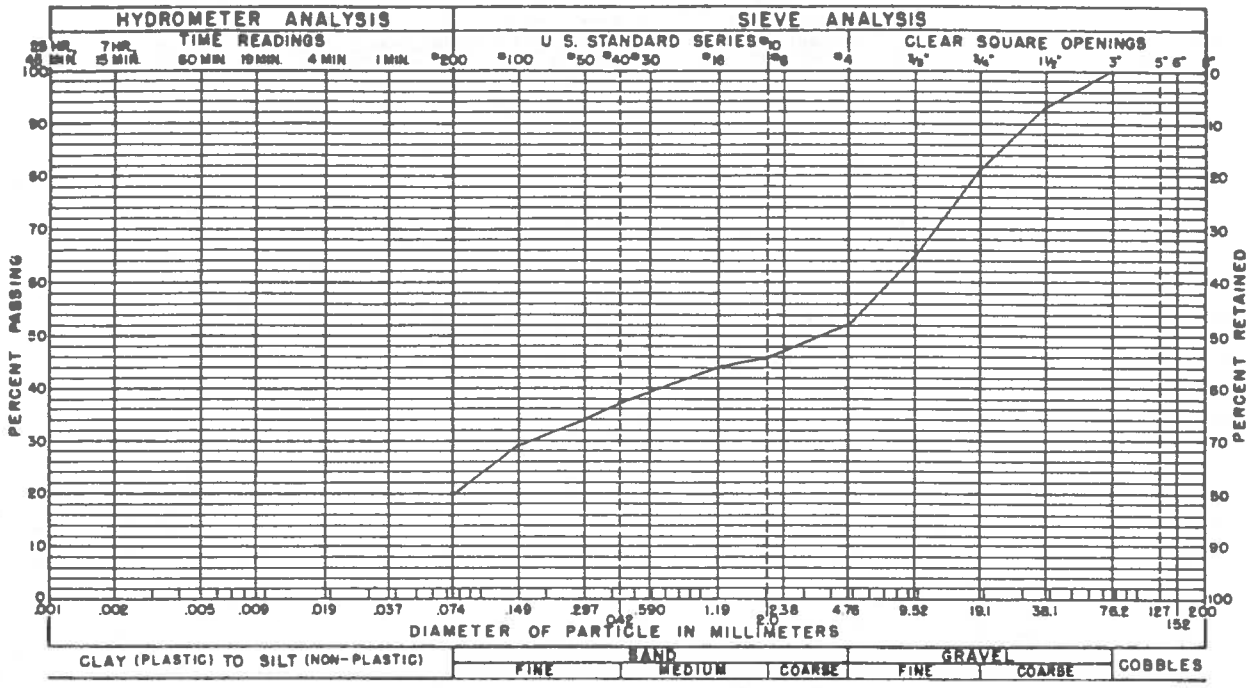
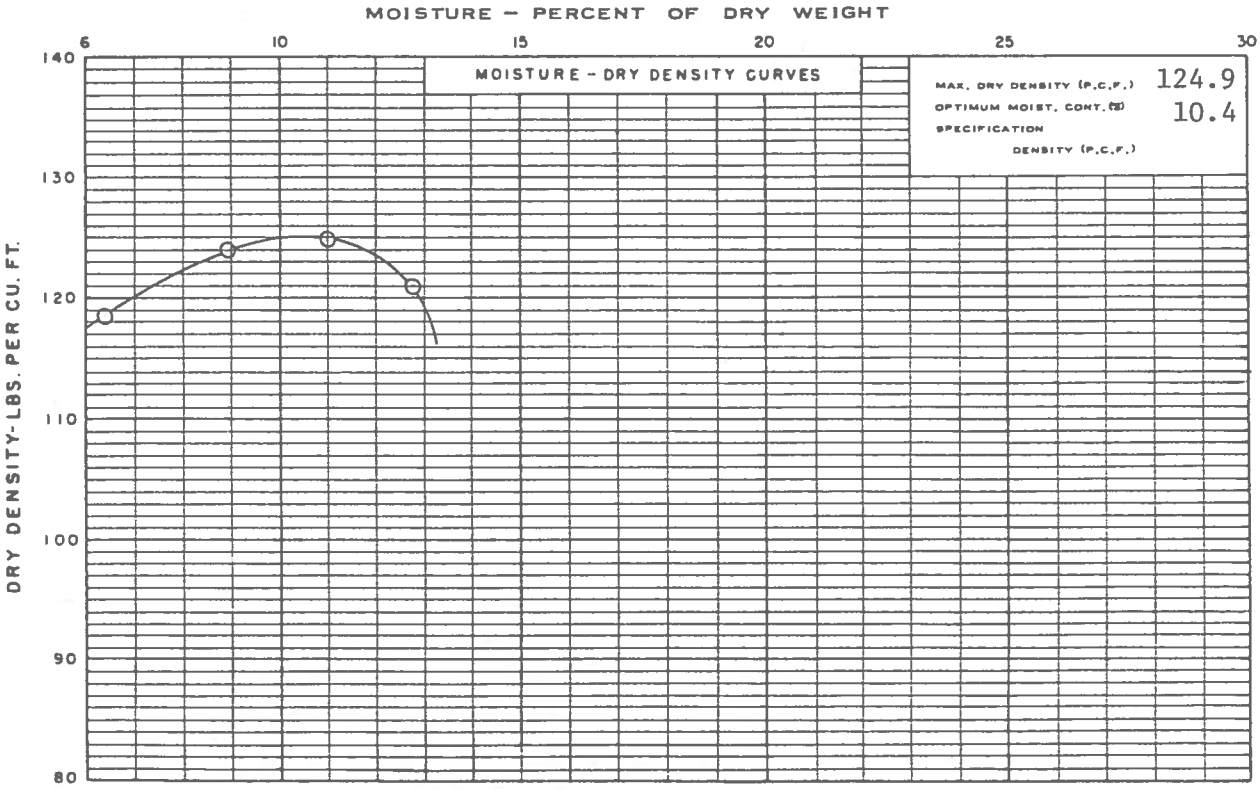


GRADATION TEST RESULTS

GRAVEL 48% SAND 32 % SILT AND CLAY 20 %

LIQUID LIMIT 29 % PLASTICITY INDEX 6 %



COMPACTION TEST RESULTS

COMPACTION TEST PROCEDURE ASTM D698-70, Method A

SAMPLE OF Silty Sand and Gravel

FROM Test Hole 6 DEPTH 0'-0" to 4'-0"

#5615W

Fig. 47

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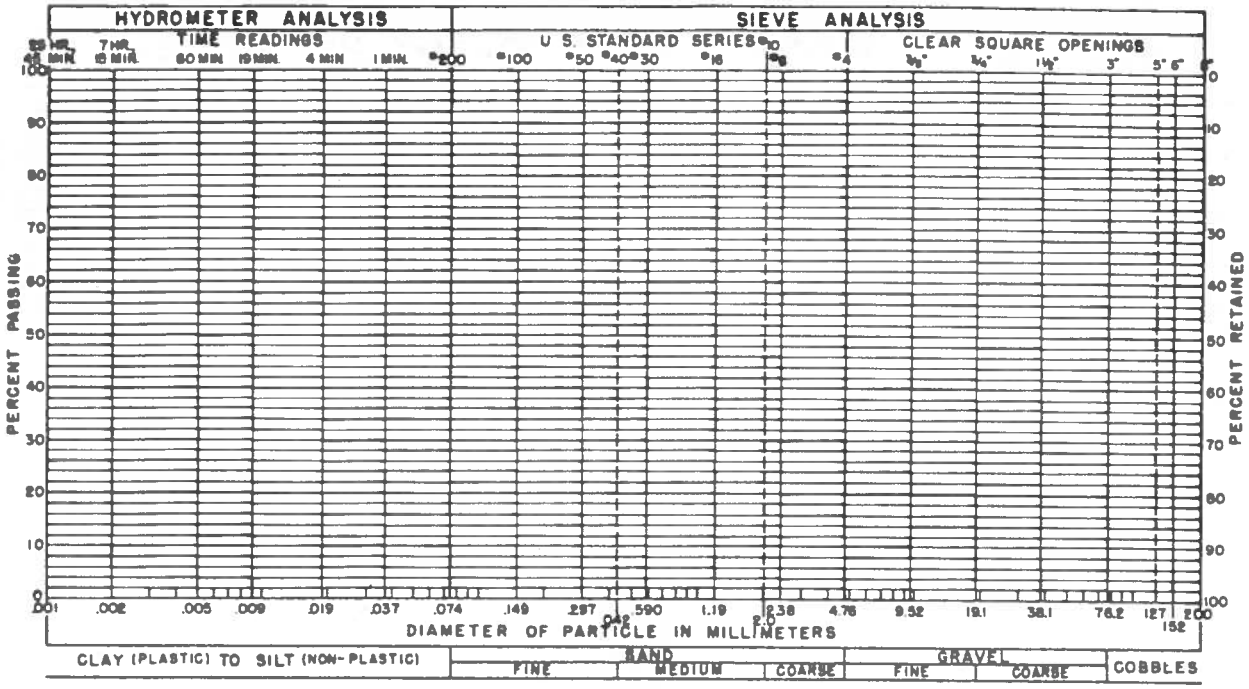
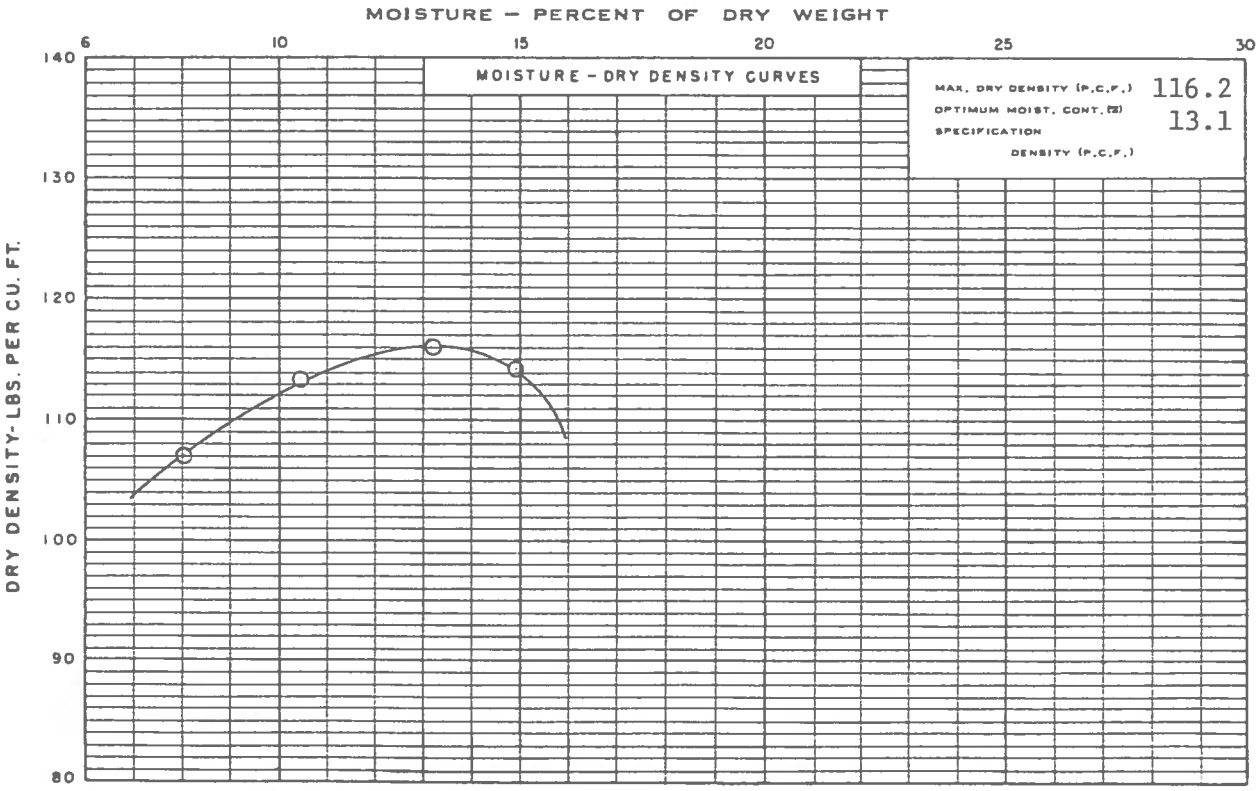


GRADATION TEST RESULTS

GRAVEL 2 % SAND 38 % SILT AND CLAY 60 %

LIQUID LIMIT 24 % PLASTICITY INDEX 8 %



COMPACTION TEST RESULTS

COMPACTION TEST PROCEDURE ASTM D698-70, Method A

SAMPLE OF Very Sandy Clay

FROM Test Hole 8 DEPTH 0'-0" to 9'-0"

#5165W

Fig. 48

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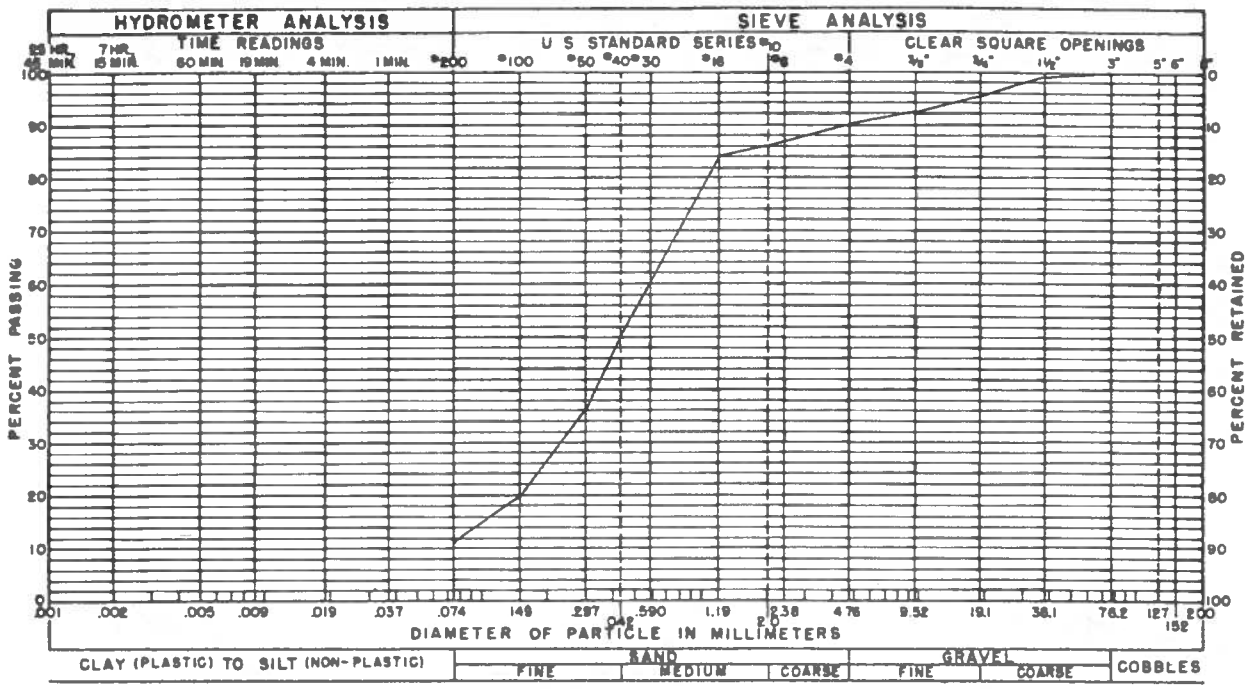
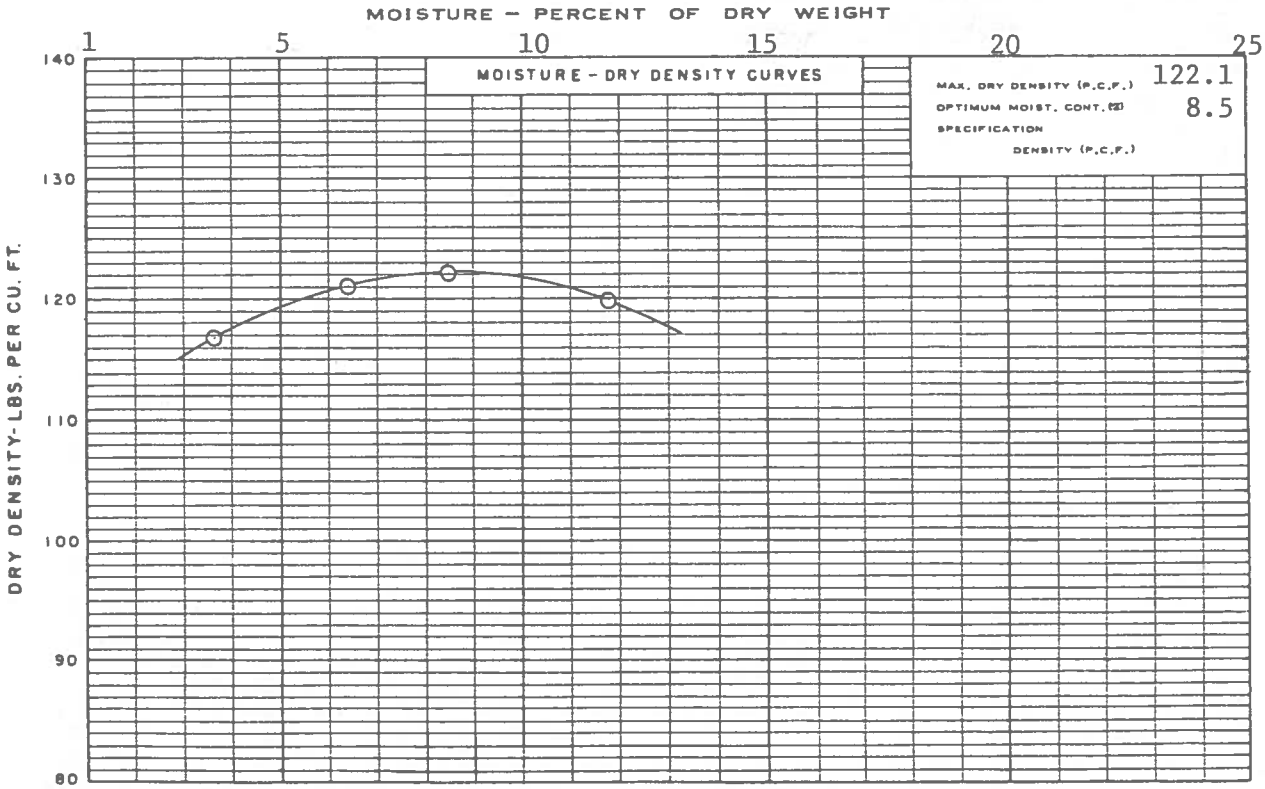


GRADATION TEST RESULTS

GRAVEL 10% SAND 79 % SILT AND CLAY 11 %

LIQUID LIMIT % PLASTICITY INDEX NP %



COMPACTION TEST RESULTS

COMPACTION TEST PROCEDURE ASTM D698-70, Method A

SAMPLE OF Slightly Silty Sand

FROM Test Hole 23 DEPTH 0'-0" to 3'-0"

#5615W

Fig. 49

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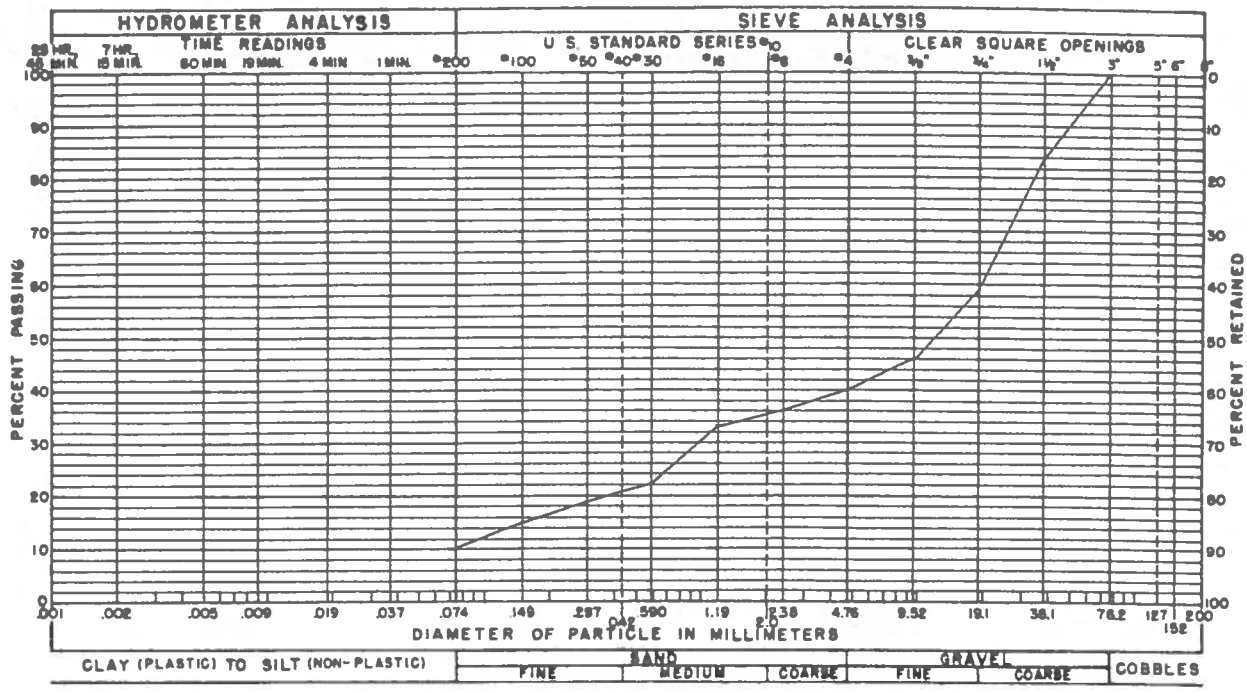
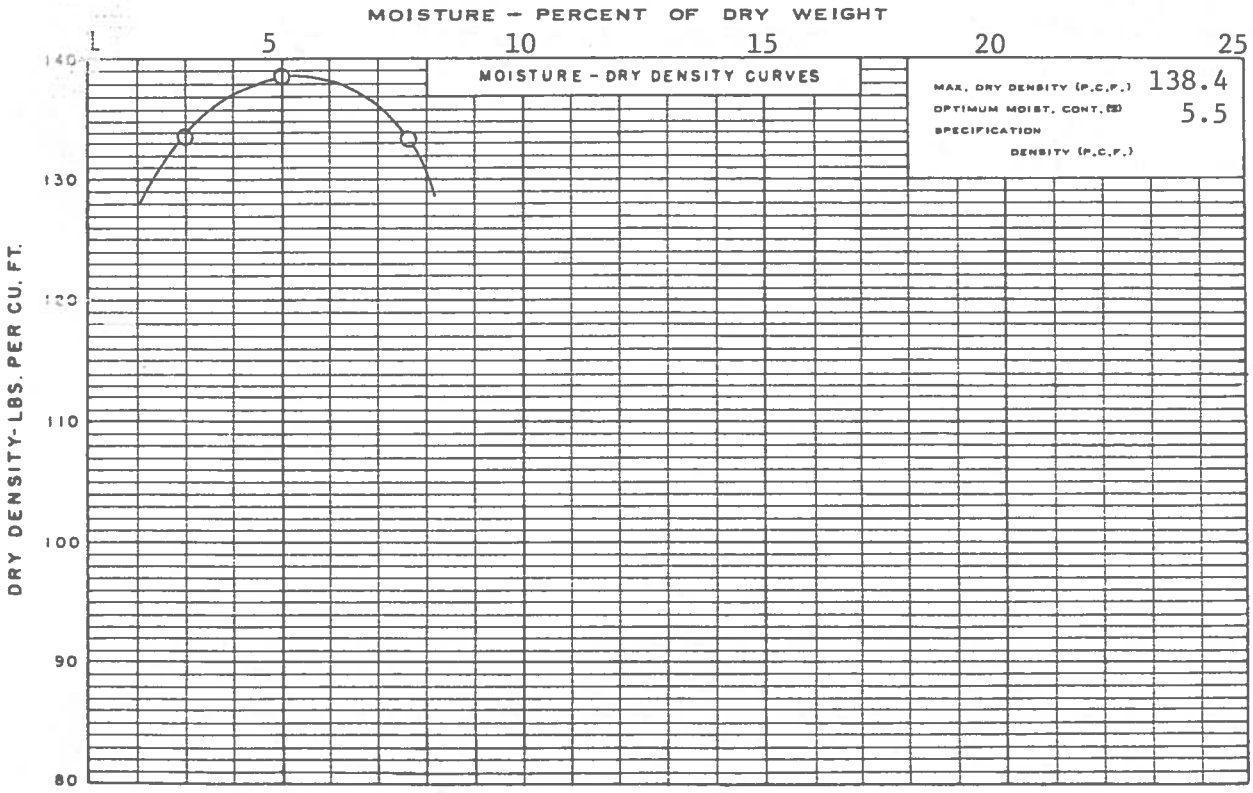


GRADATION TEST RESULTS

GRAVEL 40 % SAND 50 % SILT AND CLAY 10 %

LIQUID LIMIT % PLASTICITY INDEX NP %



COMPACTION TEST RESULTS

COMPACTION TEST PROCEDURE ASTM D698-70, Method C, -2", +3/4" Material Replaced

SAMPLE OF Slightly Silty Sand and Gravel

#5615W FROM Test Hole 37 DEPTH 0'-0" to 5'-0" Fig. 50

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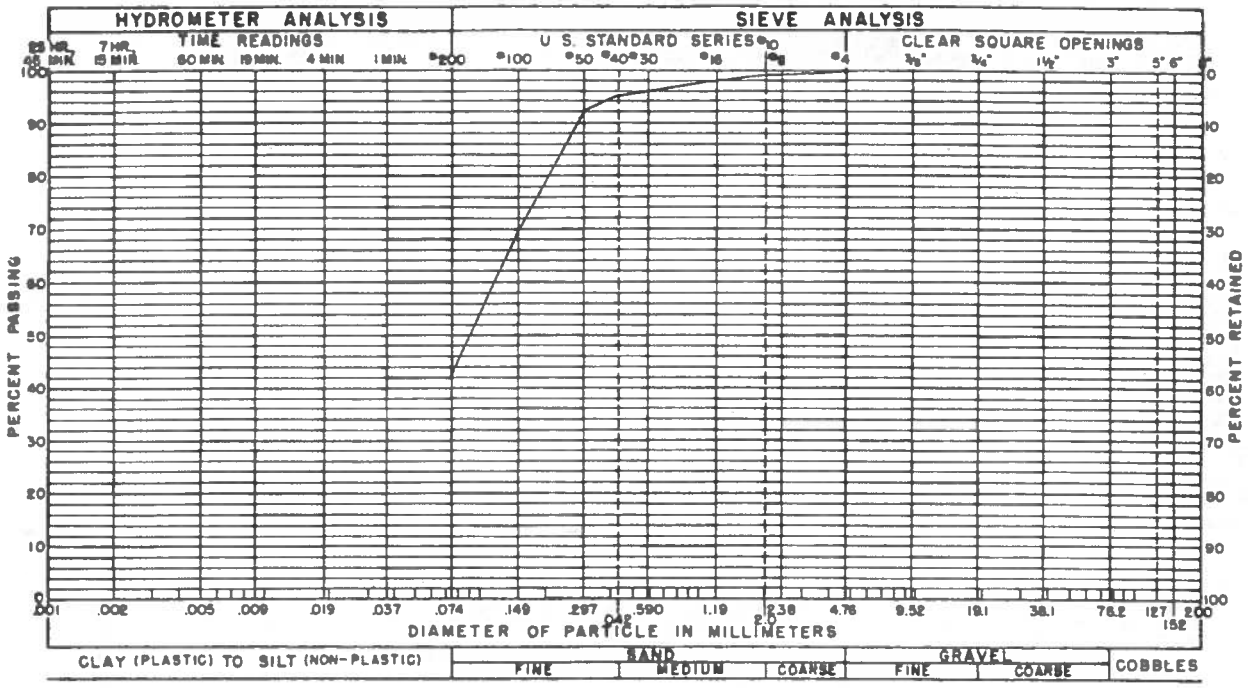
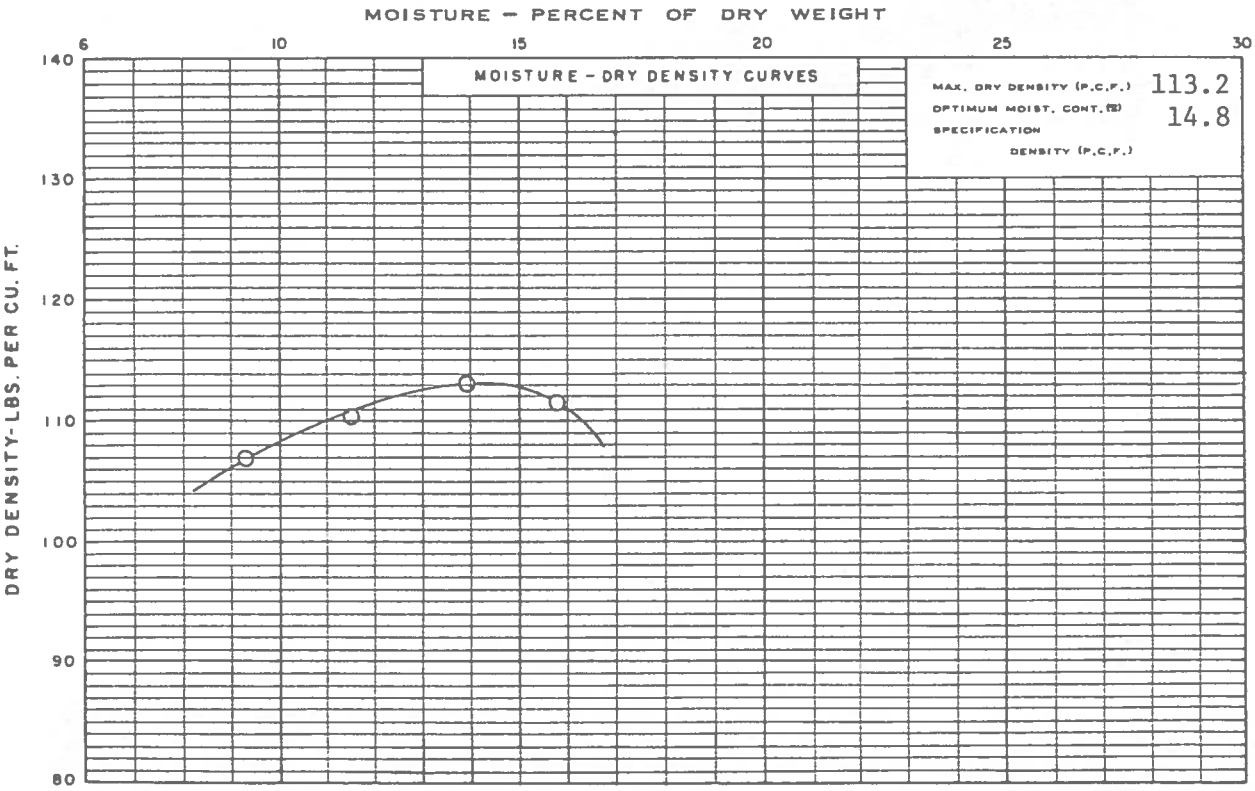


GRADATION TEST RESULTS

GRAVEL 0 % SAND 57 % SILT AND CLAY 43 %

LIQUID LIMIT 25 % PLASTICITY INDEX NP %



COMPACTION TEST RESULTS

COMPACTION TEST PROCEDURE ASTM D698-70, Method A

SAMPLE OF Very Silty Sand

FROM Test Hole 38 DEPTH 0'-6" to 4'-0"

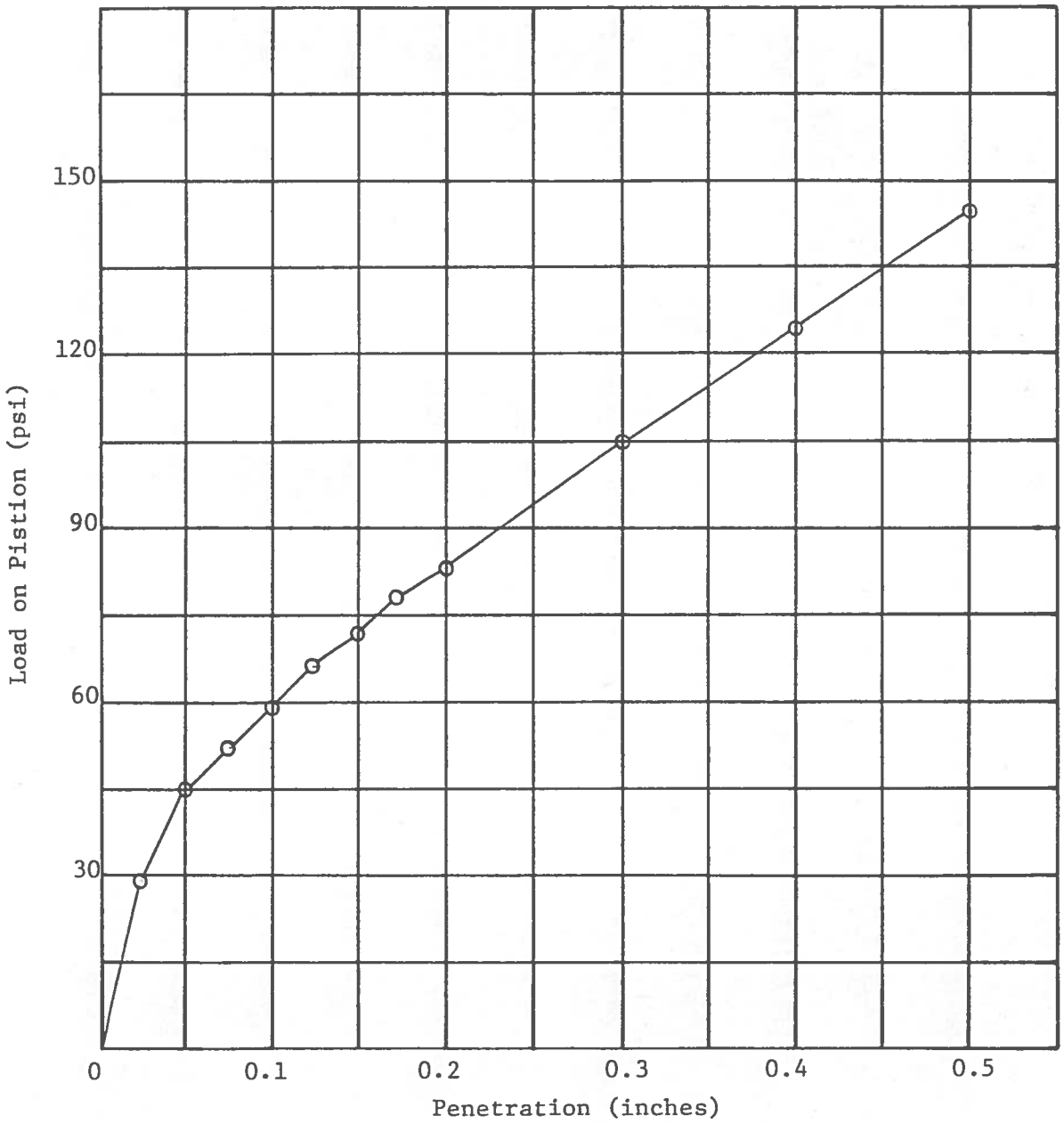
#5615W

Fig. 51

Hole 4

Depth 0'-0" to 5'-0"

Soil Type Silty-Clayey Sand
Remolded Moisture Content 14.2%
Remolded Density 109.4 pcf



LOAD-PENETRATION CURVE

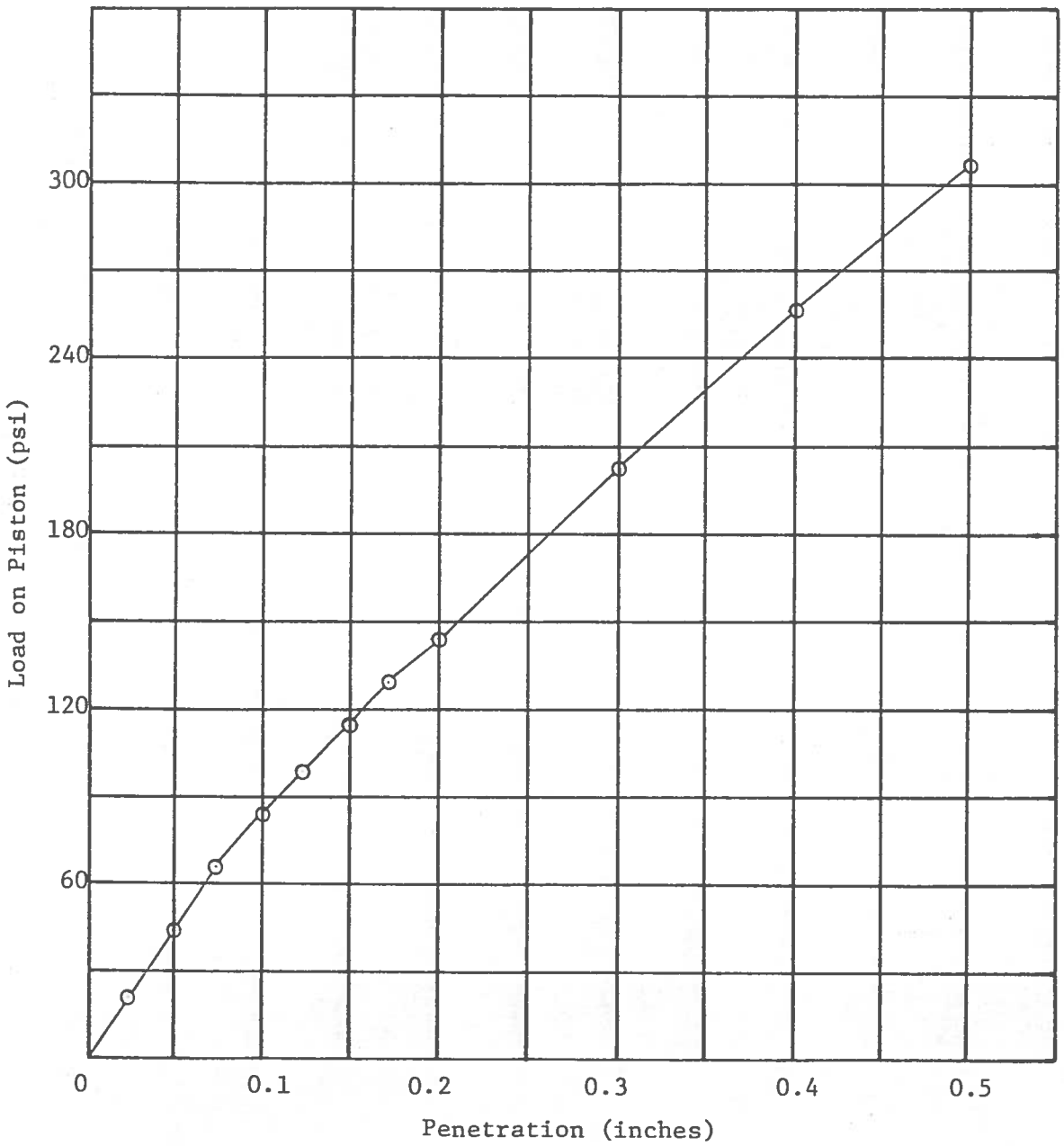
#5615W

Fig. 52

Hole 6

Depth 0'-0" to 4'-0"

Soil Type Silty Sand and Gravel
Remolded Moisture Content 10.4%
Remolded Density 118.0 pcf



LOAD-PENETRATION CURVE

#5615W

Fig. 53

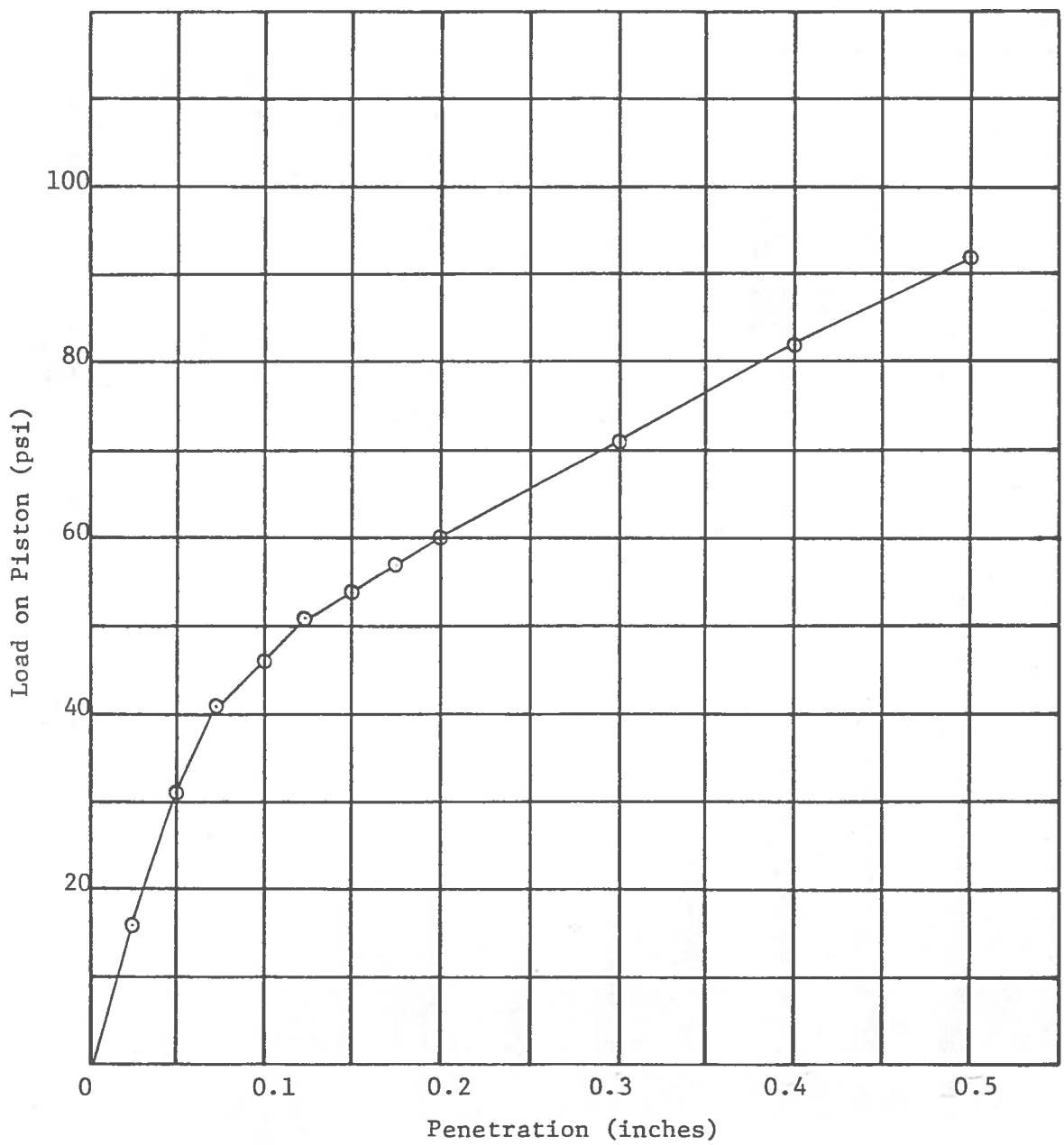
Hole Combined Sample from Hole 8 at depth 0'-0" to 9'-0" & Hole 17 at depth

Depth 0'-0" to 8'-0"

Soil Type Very Sandy Clay

Remolded Moisture Content 13.6%

Remolded Density 109.5 pcf



LOAD-PENETRATION CURVE

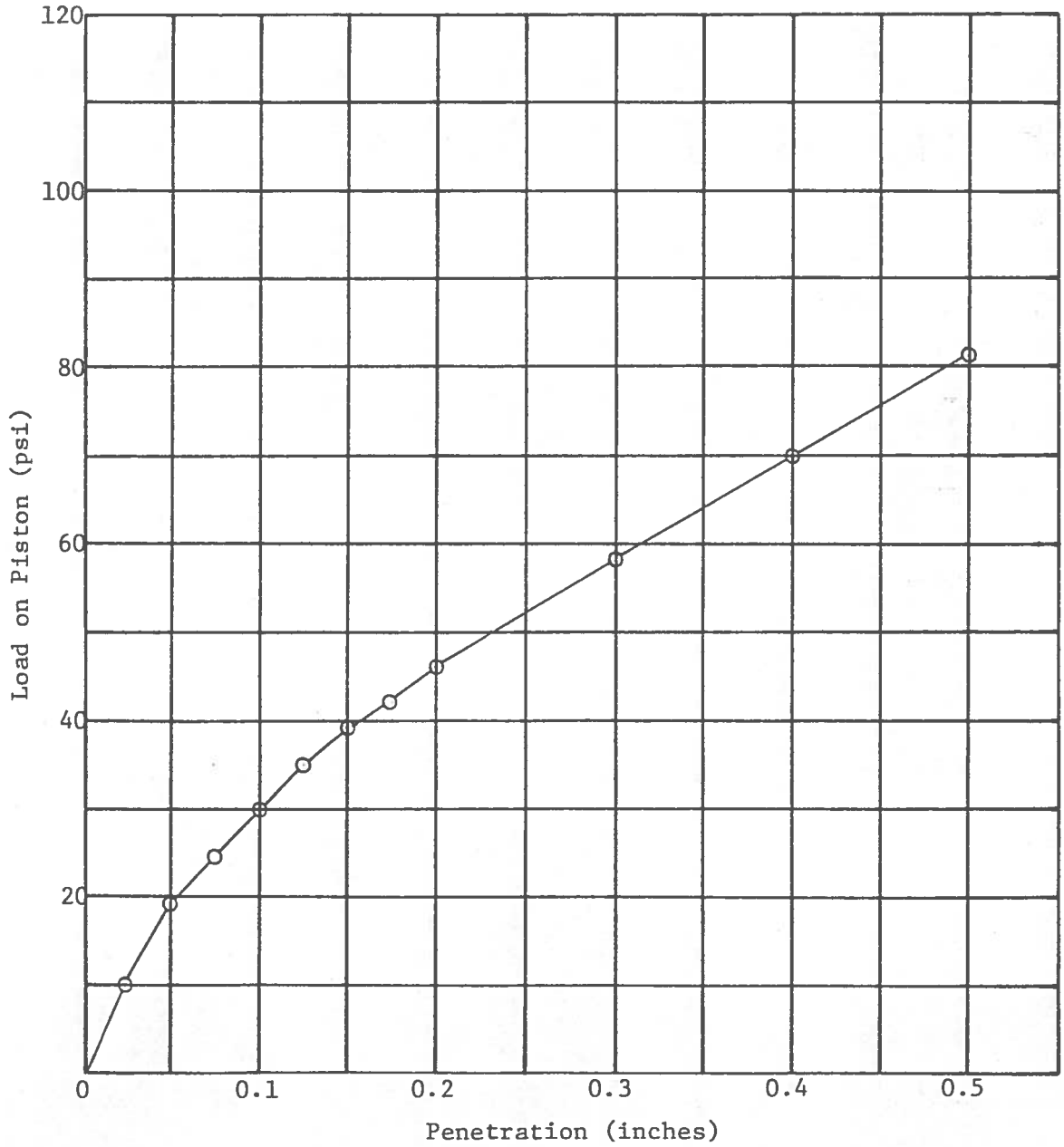
#5615W

Fig. 54

Hole 23

Depth 0'-0" to 3'-0"

Soil Type Slightly Silty Sand
Remolded Moisture Content 9.2%
Remolded Density 114.9 pcf



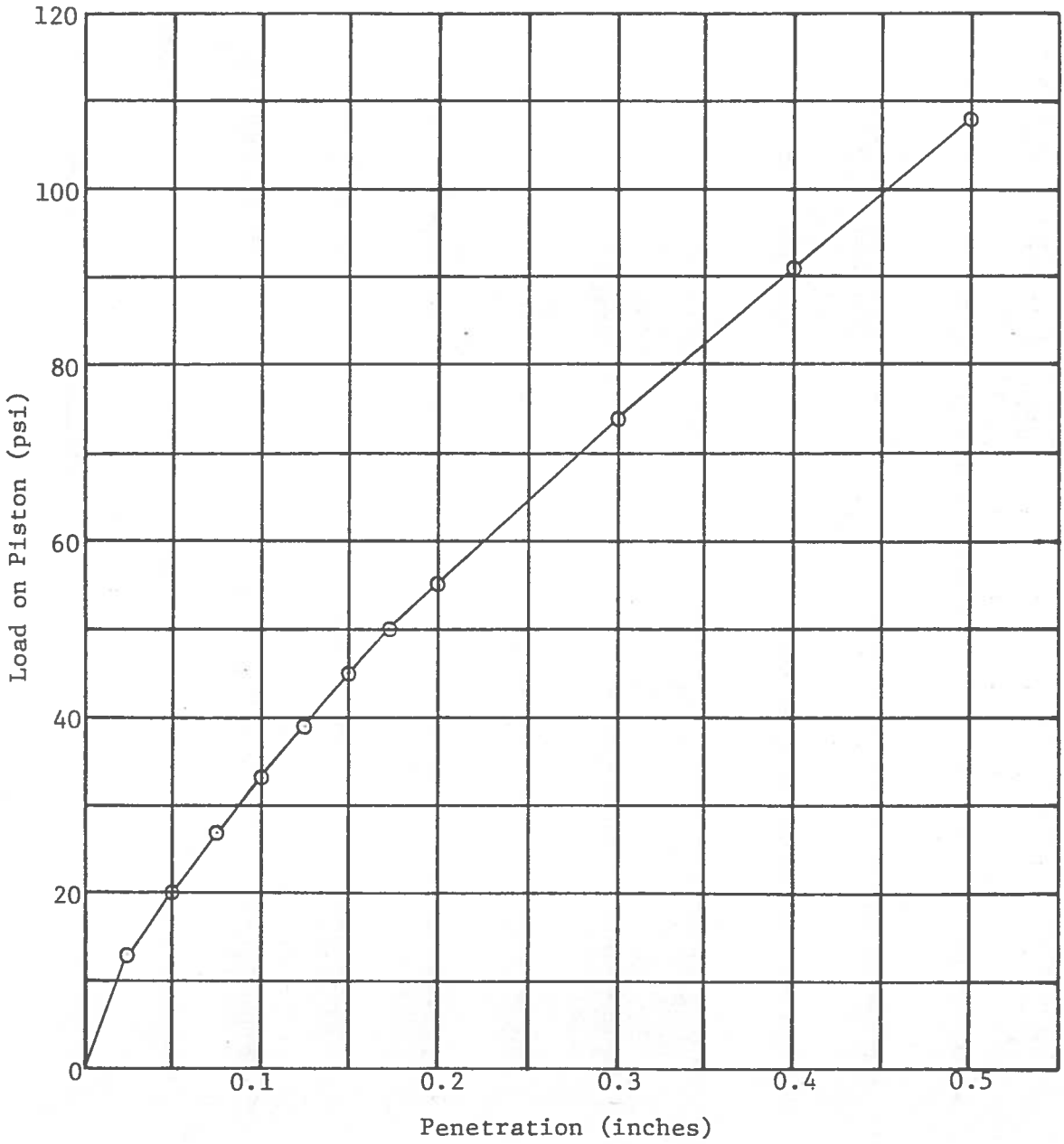
LOAD-PENETRATION CURVE

#5615W

Fig. 55

Hole Combined Sample from Hole 37 at depth 0'-0" to 5'-0" & Hole 52 at depth
Depth 0'-6" to 4'-0"

Soil Type Slightly Silty Sand & Gravel
Remolded Moisture Content 5.5%
Remolded Density 131.1 pcf



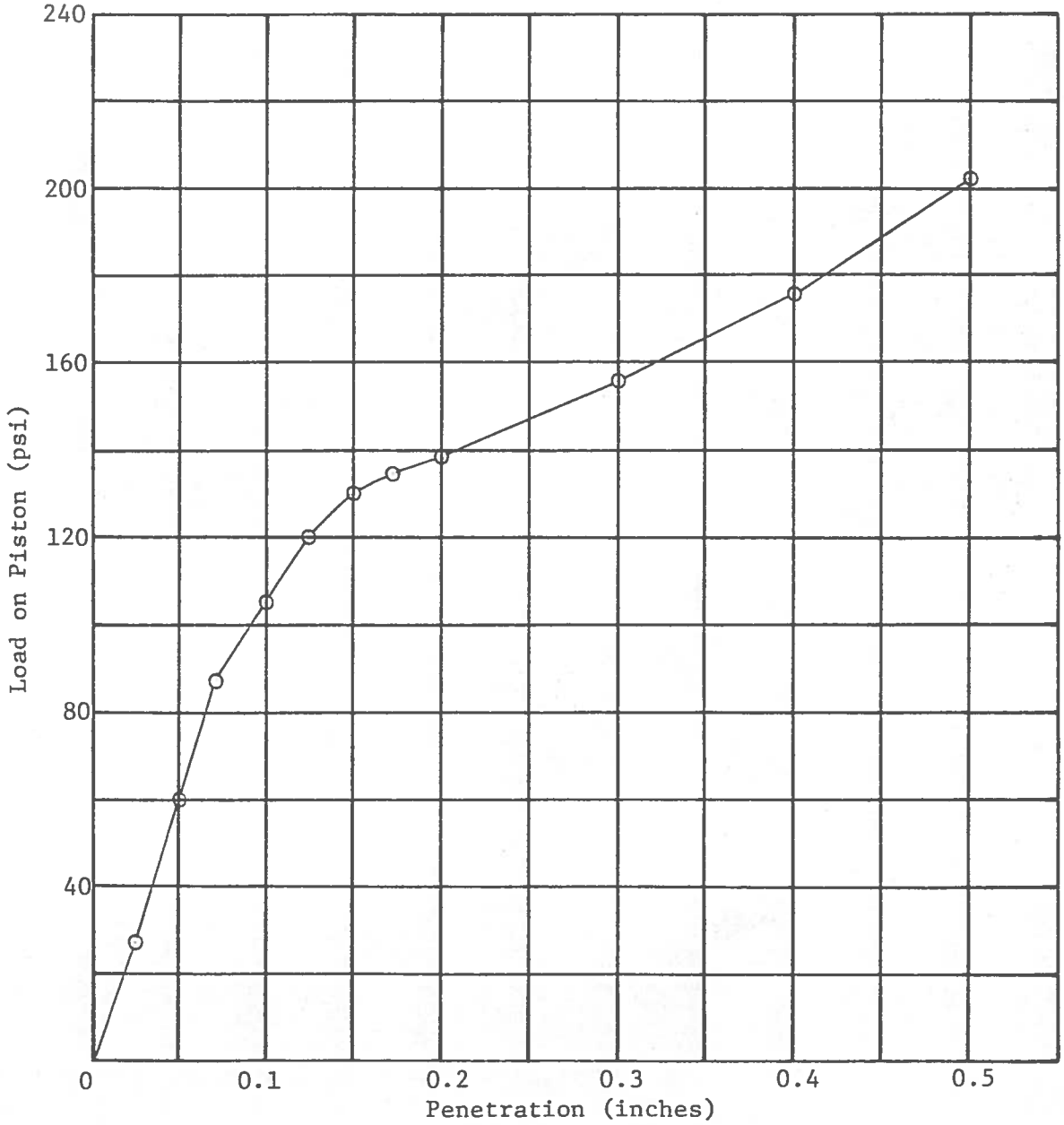
LOAD-PENETRATION CURVE

#5615W

Fig. 56

Hole Combined Sample from Hole 38 at depth 0'-6" to 4'-0" & Observation Well
Depth OH-3 at depth 1'-0" to 7'-6"

Soil Type Very Silty Sand
Remolded Moisture Content 14.4%
Remolded Density 106.9 pcf



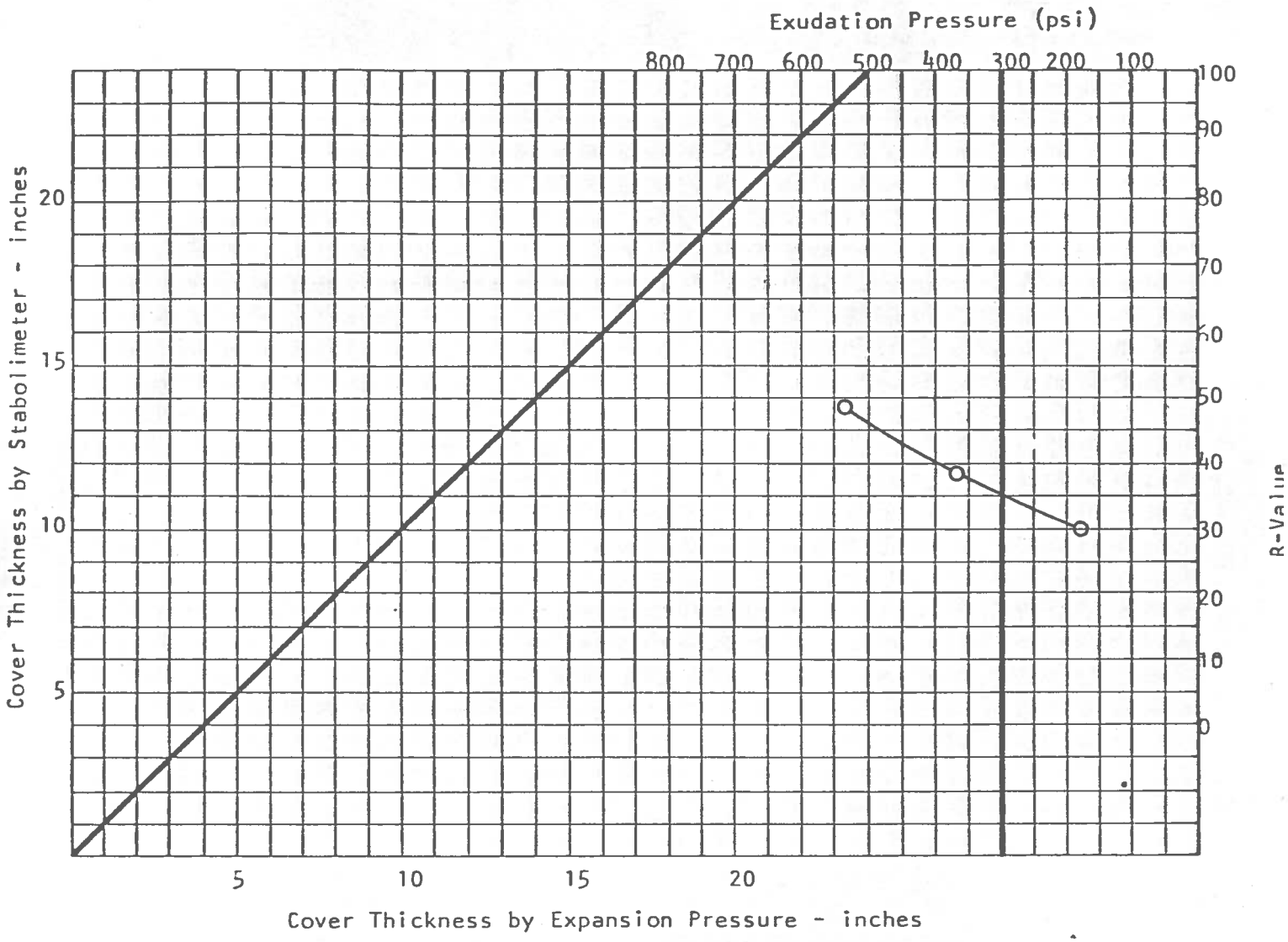
LOAD-PENETRATION CURVE

#5615W

Fig. 57

Hveem Stabilometer Test

Test Specimen	1	2	3	R-Value
Moisture Content at Compaction %	12.4	13.9	15.2	
Density - pcf	122.1	116.1	114.6	
R-Value by Exudation Pressure	49	39	30	35
R-Value by Expansion Pressure				



Soil Type Very Sandy Clay

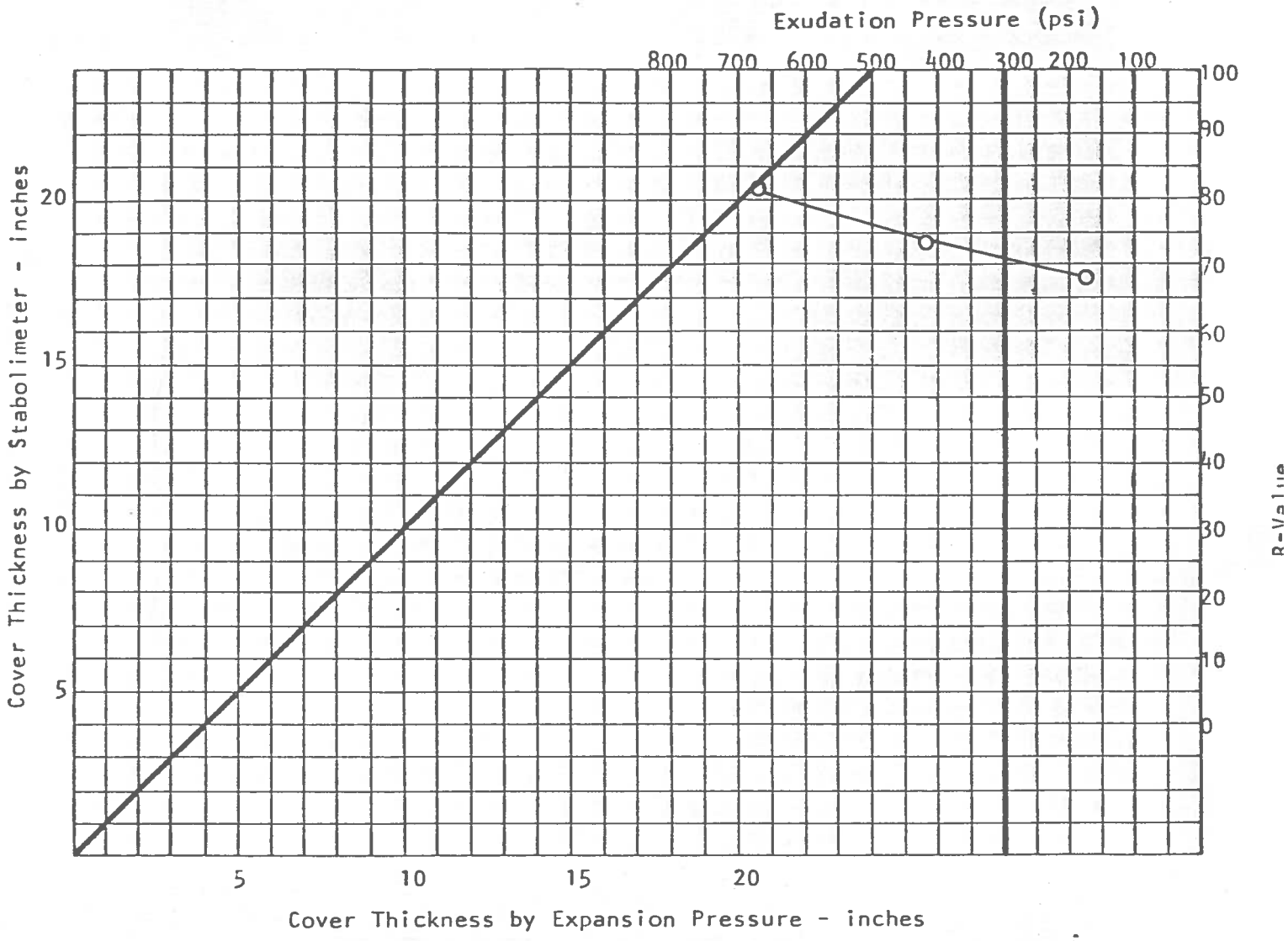
From Test Hole 8 at depth 0'-0" to 9'-0" & Test Hole 17 at depth 0'-0" to 8'-0"

Gravel 2% Sand 38% Silt and Clay 60%

Liquid Limit 24% Plasticity Index 8%

Hveem Stabilometer Test

Test Specimen	1	2	3	R-Value
Moisture Content at Compaction %	5.7	7.9	8.4	
Density - pcf	139.7	138.0	129.0	
R-Value by Exudation Pressure	81	74	68	71
R-Value by Expansion Pressure				



Soil Type Slightly Silty Sand and Gravel

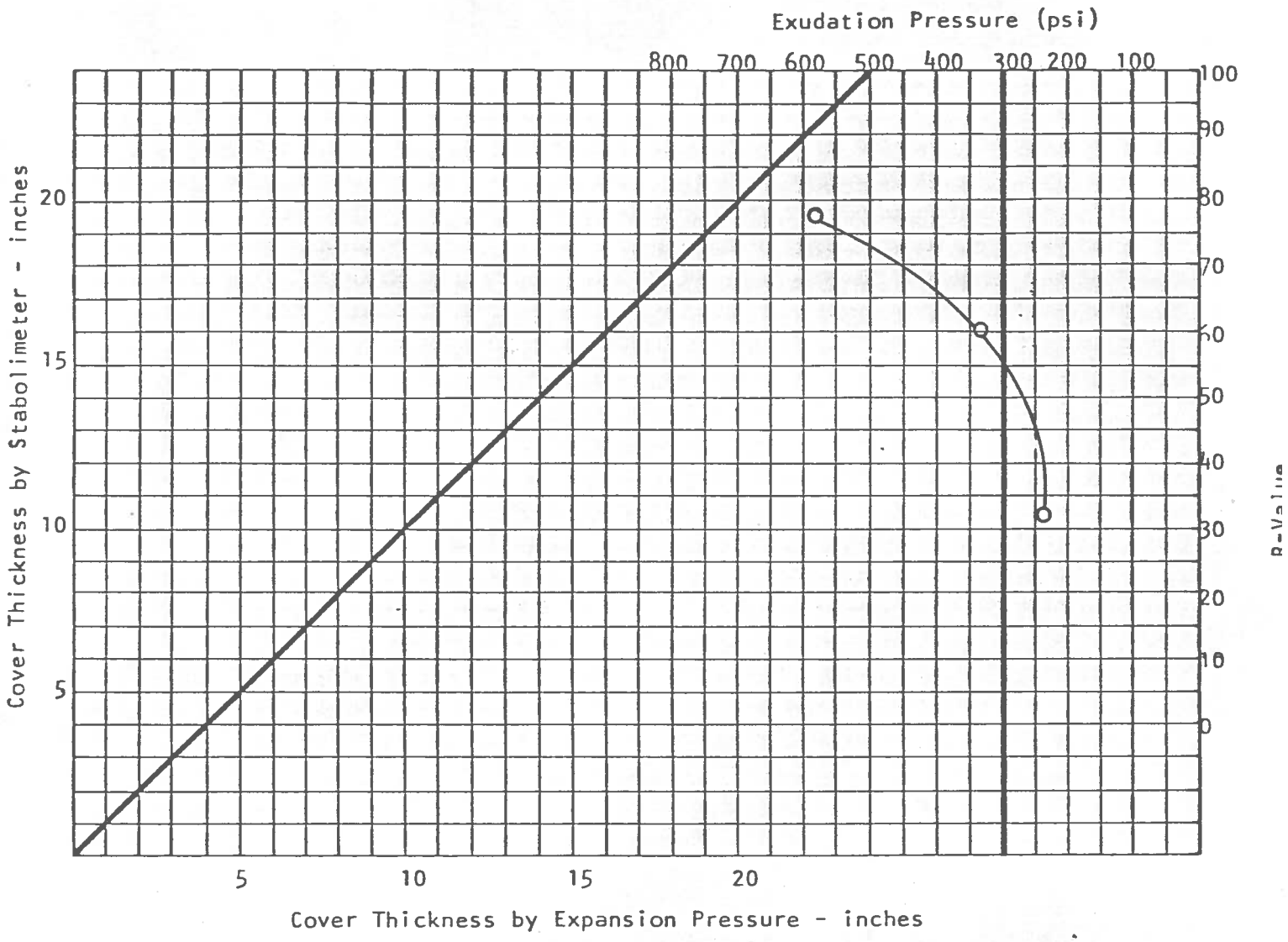
From Test Hole 37 at depth 0'-0" to 5'-0" & Test Hole 52 at depth 0'-6" to 4'-0"

Gravel 40% Sand 50% Silt and Clay 10%

Liquid Limit % Plasticity Index NP%

Hveem Stabilometer Test

Test Specimen	1	2	3	R-Value
Moisture Content at Compaction %	11.3	12.0	13.9	
Density - pcf	122.6	121.2	115.2	
R-Value by Exudation Pressure	78	60	32	55
R-Value by Expansion Pressure				



Soil Type Very Silty Sand

From Test Hole 38 at depth 0'-6" to 4'-0" & Observation Well OH-3 at depth 1'-0" to 7'-6

Gravel 0 % Sand 57 % Silt and Clay 43%

Liquid Limit 25 % Plasticity Index NP%

#5615W

Fig. 60

JOB NO. 5615W

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TABLE I

SUMMARY OF LABORATORY TEST RESULTS

HOLE	DEPTH (FEET)	NATURAL MOISTURE (%)	NATURAL DRY DENSITY (PCF)	ATTERBERG LIMITS		HIGHWAY RESEARCH BD CLASSI-FICATION	WATER SOLUBLE SULFATE (%)	GRADATION ANALYSIS			SOIL TYPE
				LIQUID LIMIT (%)	PLASTICITY INDEX (%)			+#4 (%)	-#4 +#200(%)	-#200 (%)	
2	1	12.7	100.3	26	9	A-4		12	46	42	Very Clayey Silt
4	2	14.8	98.7	35	10	A-4	0.01	2	58	40	Very Clayey Sand
	0 - 5	6.8		25	6			5	60	35	Silty-Clayey Sand
6	2	1.1				A-1-a		51	39	10	Slightly Silty Sand and Gravel
	0 - 4	6.8		29	6			48	32	20	Silty Sand and Gravel
7	4	4.2	99.4	19	NP	A-4	0.01	0	55	45	Very Silty Sand
8	0 - 9	4.5		24	7					58	Sandy Clay-Silt
10	4	3.5	98.7	19	NP	A-4	0.01	0	75	25	Silty Sand
12	4	14.4	100.4	30	6	A-4		0	42	58	Very Sandy Silt
15	4	10.7	95.5	25	6	A-4		0	32	68	Sandy Clay-Silt
16	4	14.0	106.8	26	7	A-4		0	28	72	Sandy Clay-Silt
17	1	20.7	104.7	28	10	A-4		0	30	70	Sandy Clay
	0 - 8	14.4		25	9					63	Sandy Clay

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TABLE I

SUMMARY OF LABORATORY TEST RESULTS

HOLE	DEPTH (FEET)	NATURAL MOISTURE (%)	NATURAL DRY DENSITY (PCF)	ATTERBERG LIMITS		HIGHWAY RESEARCH BD CLASSI-FICATION	WATER SOLUBLE SULFATE (%)	GRADATION ANALYSIS			SOIL TYPE
				LIQUID LIMIT (%)	PLASTICITY INDEX (%)			+#4 (%)	-#4 +#200(%)	-#200 (%)	
18	1	15.7				A-4		9	45	46	Clayey Sand to Sandy
											Clay Fill
	3	11.0				A-1-b		33	61	6	Slightly Silty Sand
											and Gravel
19	4	13.6	115.6	25	9	A-2-4	0.01	20	52	28	Clayey, Gravelly Sand
	6	6.7	115.3			A-1-a		53	40	7	Slightly Silty Sand
											and Gravel
23	4	9.3	107.8	21	NP	A-4		0	46	54	Very Sandy Silt
24	5.5	1.0	104.5			A-1-b		27	54	19	Silty Sand and Gravel
25	4	5.3	105.6			A-1-a		43	55	2	Sand and Gravel
26	1	1.7	105.5			A-1-a		44	50	6	Slightly Silty Sand
											and Gravel
27	1	9.8	76.1			A-2-4		23	55	22	Silty Sand and Gravel
											Fill
	4	28.3	90.7	28	5	A-4	0.01	2	57	45	Very Silty Sand
28	1	4.4	103.2			A-4		1	93	6	Slightly Silty Sand
	0 - 3	4.8			NP			10	79	11	Slightly Silty Sand

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TABLE I

SUMMARY OF LABORATORY TEST RESULTS

HOLE	DEPTH (FEET)	NATURAL MOISTURE (%)	NATURAL DRY DENSITY (PCF)	ATTERBERG LIMITS		HIGHWAY RESEARCH BD CLASSI-FICATION	WATER SOLUBLE SULFATE (%)	GRADATION ANALYSIS			SOIL TYPE
				LIQUID LIMIT (%)	PLASTICITY INDEX (%)			+#4 (%)	-#4 +#200(%)	-#200 (%)	
29	4	6.6	113.1			A-1-a		39	55	6	Slightly Silty Sand and Gravel
30	1	12.6	105.8			A-1-b		27	56	17	Silty Sand and Gravel
32	2	21.0	104.3	20	NP	A-4		1	59	40	Very Silty Sand
33	1	10.5	82.4		NP	A-2-4		1	83	16	Silty Sand
	4	18.3	104.7			A-3		10	80	10	Slightly Silty Sand
35	4	3.3	117.4			A-1-a		49	41	10	Slightly Silty Sand and Gravel
37	0 - 5	18.1		26	NP					13	Slightly Silty Sand and Gravel
38	1	23.6	96.7	20	NP	A-4	0.01	0	58	42	Very Silty Sand
	0.5 - 4	15.9		21	NP					44	Very Silty Sand
39	4	17.8	103.6	23	NP	A-4		0	63	37	Very Silty Sand
40	4	10.9	85.7			A-1-a		39	48	13	Silty Sand and Gravel
41	1	21.4	99.0	31	11	A-6	0.01	0	40	60	Sandy Clay
42	2	18.0	106.2	27	7	A-4		1	42	57	Sandy Clay

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TABLE I

SUMMARY OF LABORATORY TEST RESULTS

HOLE	DEPTH (FEET)	NATURAL MOISTURE (%)	NATURAL DRY DENSITY (PCF)	ATTERBERG LIMITS		HIGHWAY RESEARCH BD. CLASSI-FICATION	WATER SOLUBLE SULFATE (%)	GRADATION ANALYSIS			SOIL TYPE
				LIQUID LIMIT (%)	PLASTICITY INDEX (%)			+#4 (%)	-#4 +#200(%)	-#200 (%)	
43	1	13.2	101.9	21	NP	A-4		0	64	36	Very Silty Sand
44	4	4.1	101.8			A-1-a		52	40	8	Slightly Silty Sand and Gravel
46	1	18.1	104.9	34	18	A-6		0	34	66	Sandy Clay
	4	6.5				A-1-a		54	39	7	Slightly Silty Sand and Gravel
47	2	14.9	105.5	19	NP	A-2-4		0	82	18	Silty Sand
48	2	16.7	85.1	24	NP	A-4	0.01	0	54	46	Very Silty Sand
51	1.5	21.4	100.6	27	NP	A-4	0.01	0	54	46	Very Silty Sand
	4	7.0	102.7			A-1-a		42	51	7	Slightly Silty Sand and Gravel
52	2	5.2	105.7			A-1-a		45	49	6	Slightly Silty Sand and Gravel
	0.5 - 4	8.8		18	NP					6	Slightly Silty Sand and Gravel
53	2	22.1	102.6	26	4	A-4		0	44	56	Very Sandy Silt
	7	7.1	113.7			A-1-a		61	34	5	Sand and Gravel
54	2	6.2	96.9	19	NP	A-2-3		22	54	24	Silty Sand and Gravel

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TABLE I

SUMMARY OF LABORATORY TEST RESULTS

HOLE	DEPTH (FEET)	NATURAL MOISTURE (%)	NATURAL DRY DENSITY (PCF)	ATTERBERG LIMITS		HIGHWAY RESEARCH BD CLASSI-FICATION	WATER SOLUBLE SULFATE (%)	GRADATION ANALYSIS			SOIL TYPE
				LIQUID LIMIT (%)	PLASTICITY INDEX (%)			+#4 (%)	-#4 +#200(%)	-#200 (%)	
55	2	20.5	103.7	22	4	A-4		0	47	53	Sandy Silt
	4	7.2	110.1			A-1-a		52	41	7	Slightly Silty Sand and Gravel
58	4	3.8	96.5			A-1-a		58	31	11	Slightly Silty Sand and Gravel
60	1.5	16.3	90.6	41	13	A-7-6		0	28	72	Sandy Silt
	9	1.1	115.0			A-1-a		20	73	7	Slgihtly Silty Sand and Gravel
61	2	2.1	105.5			A-1-a		50	39	11	Slightly Silty Sand and Gravel
64	1	14.4	84.1	43	15	A-7-6		1	29	70	Sandy Silt
	0 - 6.5	11.0		35	12					64	Sand-Silt
65	2	3.1	92.3			A-1-a		38	47	15	Silty Sand and Gravel
66	4	15.2	96.8	25	6	A-4	0.01	0	34	66	Sandy Clay-Silt
67	4	10.7	93.3	22	2	A-4		0	29	71	Sandy Silt
69	4	11.3	106.0	24	7	A-4	1.95	1	43	56	Sandy Clay-Silt
70	2	5.6	96.7			A-1-b		40	42	18	Silty Sand and Gravel

JOB NO. 5615W

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TABLE I

SUMMARY OF LABORATORY TEST RESULTS

HOLE	DEPTH (FEET)	NATURAL MOISTURE (%)	NATURAL DRY DENSITY (PCF)	ATTERBERG LIMITS		HIGHWAY RESEARCH BD CLASSI-FICATION	WATER SOLUBLE SULFATE (%)	GRADATION ANALYSIS			SOIL TYPE
				LIQUID LIMIT (%)	PLASTICITY INDEX (%)			+#4 (%)	-#4 +#200(%)	-#200 (%)	
71	1	1.6	100.7			A-1-a		13	76	11	Slightly Silty Sand
	4	5.6	94.2	23	NP	A-4		0	46	54	Sandy Silt
OH-1	4	21.6	96.1	20	NP	A-4		0	45	55	Sandy Silt
	9	17.9	107.8		NP	A-2-4		0	83	17	Silty Sand
OH-2	3	18.0	94.4			A-2-4		0	96	4	Sand
OH-3	2	20.1	95.3	30	9	A-4		2	43	55	Sandy Silt
	4	25.8	97.6		NP	A-2-4		0	81	19	Silty Sand
	0 - 7.5	27.7		25	NP					35	Silty Sand
OH-4	1	14.4	116.0	30	13	A-4		5	43	52	Sandy Silt
	5 - 7.5	34.0		30	5					39	Silty Sand
OH-5	1	11.9	90.9	23	4	A-2-4		21	48	31	Silty, Gravelly Sand
	4	7.6	111.0		NP	A-1-a		49	41	10	Slightly Silty Sand and Gravel

TABLE II

SUMMARY OF CBR TEST DATA

SAMPLE LOCATION		ATTERBERG LIMITS				ASTM D698		MOLDED			MOISTURE CONT. AFTER SOAKING		
Hole	Depth (ft)	Liquid Limit (%)	Plasticity Index (%)	-200 Content (%)	Highway Research Board Classification	Optimum Moisture Content (%)	Maximum Dry Density (pcf)	Moisture Content (%)	Dry Density (pcf)	Swell (%)	Top 1" (%)	Average (%)	CBR Value (%)
4	0'-0" to 5'-0"	25	6	35	A-2-4	13.3	116.8	14.2	109.4		17.1	16.5	6
6	0'-0" to 4'-0"	29	6	20	A-1-b	10.4	124.9	10.4	118.0		11.6	11.4	8
8	0'-0" to 9'-0" and	24	8	60	A-4	13.1	116.2	13.6	109.5		19.4	18.3	5
17	0'-0" to 8'-0"												
28	0'-0" to 3'-0"		NP	11	A-2-4	8.5	122.1	9.2	144.9		13.8	13.4	11
37	0'-0" to 5'-0" and		NP	10	A-1-a	5.5	138.4	5.5	131.1		7.1	6.9	38
52	0'-6" to 4'-0"												
38	1'-0" to 7'-6" and	25	NP	43	A-4	14.8	113.2	14.4	106.9		21.0	19.4	3
DH3	0'-6" to 4'-0"												

TABLE III

SUMMARY OF HVEEM STABILOMETER TESTS

Sample Location Hole	Sample Location Depth (ft.)	Test Specimen	Moisture Content at Compaction (%)	Density (pcf)	R-Vaule By Exudation Pressure	Design R-Value at 300 psi Exudation Pressures
8	0'-0" to 9'-0"	1	12.4	122.1	49	35
17	0'-0" to 8'-0"	2	13.9	116.1	39	
		3	15.2	114.6	30	
37	0'-0" to 5'-0"	1	5.7	139.7	81	71
52	0'-6" to 4'-0"	2	7.9	138.0	73	
		3	8.4	129.0	68	
38	0'-6" to 4'-0"	1	11.3	122.6	78	55
OH-3	1'-0" to 7'-6"	2	12.0	121.2	60	
		3	13.9	115.2	32	

TABLE IV

SUMMARY OF PAVEMENT SECTIONS

Street Type	Soil Type	Area I	Area II	Area III
Minor Arterial	SM - GM		2" PMP, 4" PMP, or 3" PMP, 5" Base Course	
	SM - ML		3" PMP, 8" PMP or 2" PMP, 6" PMP, 9" Base Course	
	CL	2" PMP, 6½" PMP or 2" PMP, 4" PMP, 8" Base Course		
Collector	SM - GM		1½" PMP, 4" PMP or 2" PMP, 5" Base Course	1½" PMP, 4" PMP or 2" PMP, 5" Base Course
	SM - ML		2" PMP, 6½" PMP or 2" PMP, 4" PMP, 7" Base Course	
	CL	2" PMP, 4" PMP or 3" PMP, 8" Base Course		
	ML			2" PMP, 4" PMP or 3" PMP, 8" Base Course
Local	SM - GM		1½" PMP, 4" PMP, or 2" PMP, 4" Base Course	1½" PMP, 4" PMP or 2" PMP, 4" Base Course
	SM - ML		2" PMP, 4" PMP or 2" PMP, 8" Base Course	
	CL	1½" PMP, 4" PMP or 2" PMP, 5" Base Course		
	ML			1½" PMP, 4" PMP or 2" PMP, 5" Base Course