UNITED STATES DEPARTMENT OF THE INTERIOR

Oscar L. Chapman, Secretary

BUREAU OF RECLAMATION

Michael W. Straus, Commissioner

REGION I - BOISE, IDAHO

Harold T. Nelson, Regional Director

DEFINITE PLAN REPORT, FIELD DRAFT

Minidoka Project, North Side Pumping Division

Idaho

APPENDIX B

PROJECT LANDS

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SUPPORTING DATA

(filed in the Burley Office)

Permanent record tracings, land classification field sheets, 400' to 1" (237 sheets).

Map tracing (index) showing location of land classification field sheets.

Permanent record tracings of topography field sheets, 400' to 1".

Permanent record tracings, land classification general map, investigated area, 2,000' to 1".

Reproducible sepia prints, general land classification map, three sheets, irrigable land boundary and "X" areas, 2,000' to 1".

Reproducible sepia prints, general land class maps (three sheets), irrigable lands as of June 1952, 2,000' to 1".

Reproducible sepia prints, general land class maps (three sheets), slick spots, alkali areas, salty areas, 2,000' to 1".

Permanent record tracings of topography, three sheets, 2,000' to 1".

Permanent record tracing, map of correlation areas, scale 21,120' to 1".

Map tracing showing location of infiltration experiments, 2,000' to 1".

Location map of borings made for regional soils laboratory appraisal of problem areas.

Transparency showing summary of well acreages and estimated costs.

Transparency showing soil profile groups and respective land classes with other factors favorable.

Transparency of minimum land classification specifications.

Transparencies of infiltration patterns and rate curves, 30 sheets.

1950 season farm development and groundwater supply, North Side Pumping Division, Minidoka Project.

Transparencies of deep boring profiles.

Regional laboratory interim report, leaching experiments, prisoner-of-war camp area, June 5, 1952.

Aerial photograph enlargements, investigated area, 400' to 1".

Tabulated results, field laboratory tests of samples collected during land classification survey.

Letter of Oct. 21, 1948, subject: laboratory report on boron content of four problem soils on North Side Pumping Division.

Letter of Sept. 28, 1951, subject: fall sampling of test plots, prisoner-of-war camp area.

Letter of Feb. 6, 1951, subject: acreage for definite plan report, North Side Pumping Division.

File of miscellaneous correspondence relative to various problems encountered in the process of conducting classification survey.

North Side Pumping Division
Minidoka Project

PROJECT LANDS APPENDIX

The North Side Pumping Division occupies a broad sweep of sagebrush-covered country lying to the north and west of the irrigated North Side Gravity Division. The pumping division lands lie at elevations 40 to 75 feet higher than the gravity lands. The soils of the pump lands, unlike those of the gravity lands, were derived from Aeolian rather than from alluvial deposits and are of uniformly higher quality. From the ~~123,000~~ 136881 acres investigated, an area of ~~69,600~~ 80,750 irrigable acres was selected for the pumping development (see land class map). About 90 per cent of the irrigable lands have excellent soils and smooth, gently undulating slopes. In crop adaptability and yields these lands will compare favorably with the best lands now under cultivation in the Upper Snake River Basin. The remaining 10 per cent of the irrigable land area is somewhat lower in adaptability and potential productivity but the usefulness of these less productive lands is enhanced by close association within farm units with better lands.

This report describes investigations of 123,000 acres of which 23709.1 acres were found to be irrigable. The remaining area of 13881 acres were investigated in 1959. The report on this area was prepared separately and describes an irrigable area of 7,040.9 acres.

PHYSICAL CONDITIONS

The successive lava flows which underlie the area created a terrain of irregular benches, pressure ridges and breaks which later was smoothed by loessal deposits ranging up to 45 feet deep. About 15 per cent of the area is now in the initial stage of modification by erosion and the drainage is indefinite. The remaining 85 per cent is in the early youth stage with a fairly well-defined drainage pattern.

The group 10 soils are the dominant group of soils on the division. From the description of Location 0, the top 17 inches of soil can hold 2.95 inches of available water. From the available information, 2.76 inches of this water can probably be used without injuring a shallow rooted crop. Thus, for a crop like potatoes it appears that 6.1 inches of water per irrigation could be applied. Beans would use 4.6 inches per irrigation. Alfalfa with a root system capable of utilizing at least 35 inches of soil would have a safe supply of about 5.9 inches of water, as much as 9.8 inches could be applied per irrigation for this crop.

Soils

Soils of the division were formed under a semi-arid climate from deep deposits of Aeolian material. The soil occupying the largest total acreage is identified by the USDA soil survey of the Minidoka area as the Portneuf series. A few shoestring land bodies with alluvial soils identified as Onyx series lie along the dry stream courses. Some very small areas of Minidoka and Winchester series lie within the eastern boundary but these, with the Onyx soils, total an insignificant percentage of the division acreage.

Although the division soils are largely Portneuf series, they have a broad range of variability when viewed from the standpoint of their economic value under irrigated agriculture. The Bureau of Reclamation detailed land classification survey upon which this report is based placed the soils in eight groups according to subsoil characteristics. These groups are identified as follows:

Group 10

Permeable soils which may have nodular subsoils, may have basalt bedrock at depths over 54 inches but no restriction of root growth above the basalt.

Group 20

Generally heavy textured throughout the profile, are colloidally stained with very apparent structural development. Found in low lying unfavorable positions in enclosed basins.

Group 30

Very compacted or weakly cemented subsoils, restricting roots but having penetrable understrata, may be nodular or platy, or both.

Group 40

Thin, impenetrable, limey caliche-like layer, stops roots, found at less than 36-inch depth. Will respond to subsoiling as profile is penetrable above and below restrictive layer.

Group 50

Substrata is indurated, may be nodular or platy. May have thin lime cappings with softer material between, stops root development.

Group 60

Lime cemented hardpan (caliche), indurated and impenetrable to roots.

Group 70

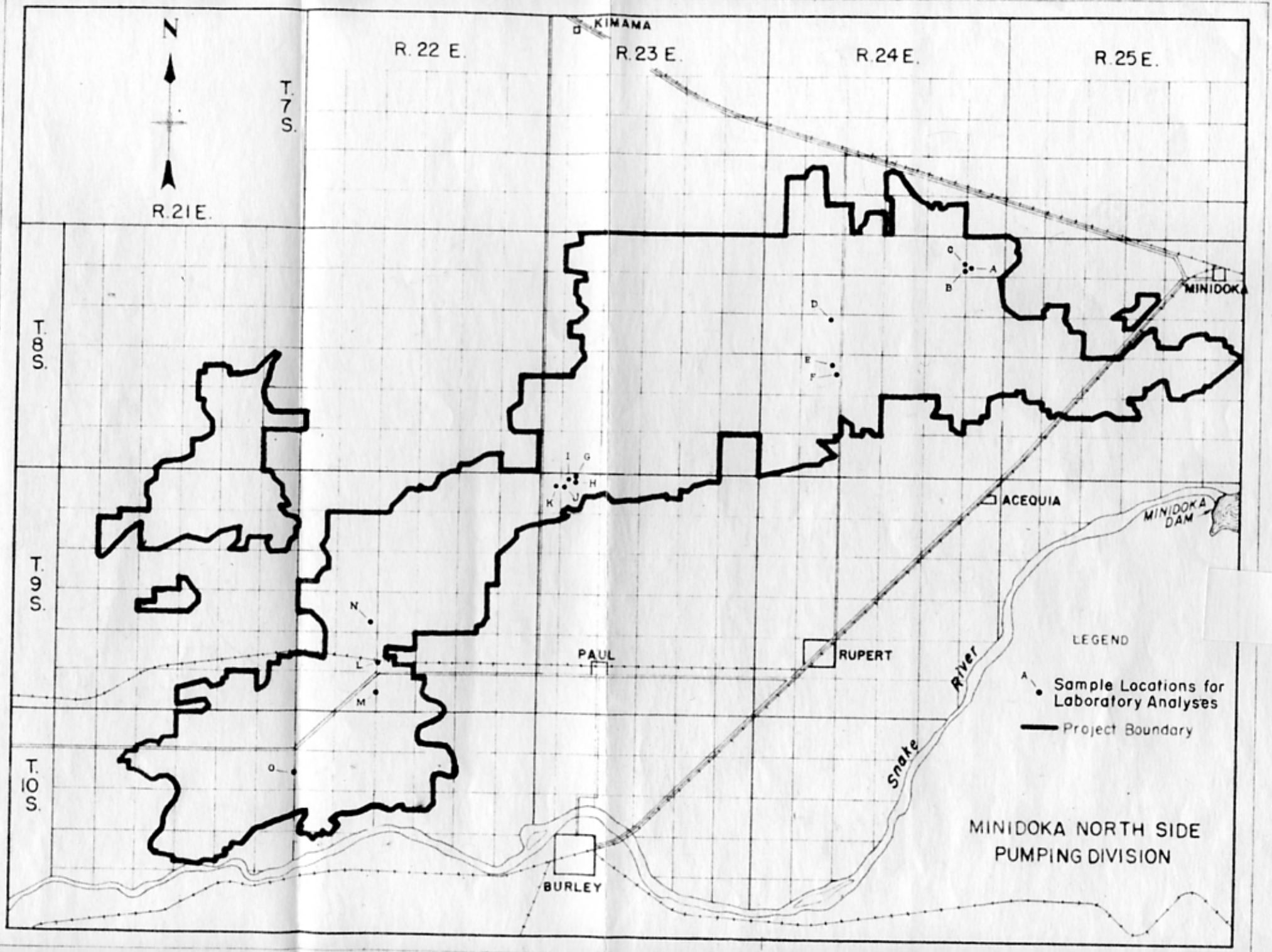
Crevieed basalt at less than 54 inches, stops roots.

Group 80

Scabland, shallow to basalt or hardpan.

Typical Profile

The profile of the typical division soil is characterized by a thin (½ to 3 inches thick) vesicular surface layer over a uniform, somewhat calcareous layer of silt loam which ranges from 6 to 20 inches thick. Below this is a highly calcareous layer averaging about two feet in thickness. A loose floury material commonly lies below the calcareous layer, ranging downward to below five feet. Varying degrees of compaction may exist throughout the profile, ranging from slight compaction to mild cementation. The zone of lime accumulation in places is nodular or less commonly laminar. Compaction in this horizon in places becomes sufficient to inhibit root penetration but the compact layer usually becomes penetrable upon wetting.


N
R.21E.
T.
7
S.
R.22 E.
KIMAMA
R.23 E.
R.24 E.
R.25 E.
T.
8
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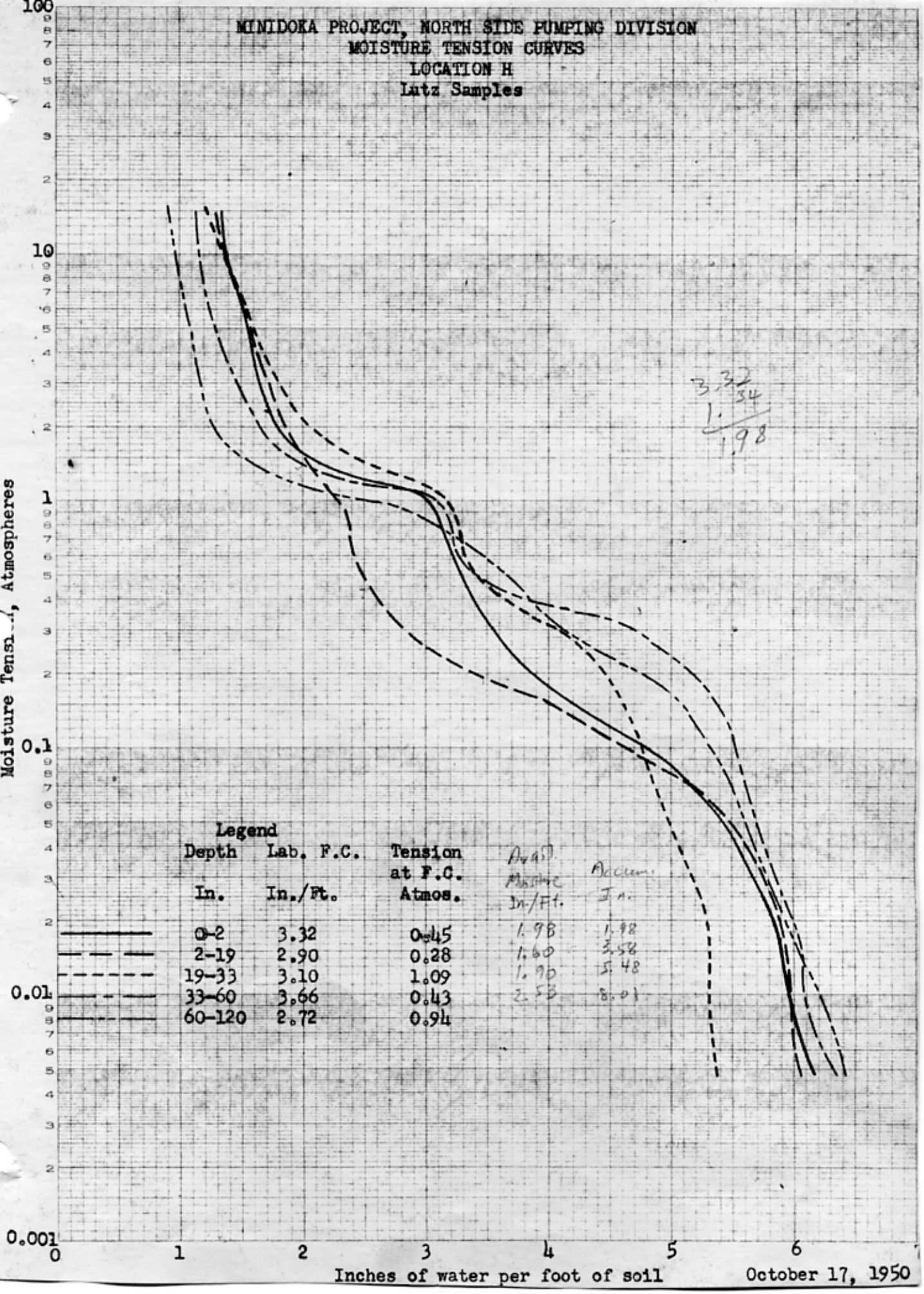
O
MINIDOKA
ACEQUIA
MINIDOKA DAM
PAUL
RUPERT
BURLEY
Snake River
LEGEND
Sample Locations for Laboratory Analyses
Project Boundary
MINIDOKA NORTH SIDE PUMPING DIVISION

MECHANICAL ANALYSES OF SOIL SEPARATES
PERCENT OF EACH PARTICLE SIZE

Minidoka Project, North Side Pumping Division

Location No.	Depth	Colloid	Clay	Silt	V. F. S.	F. S.	M. S.	C. S.	F. G.	Texture
H	0-2	8.0	13.5	37.5	45.0	4.0	0.0	0.0	0.0	Loam
	2-19	9.0	17.0	38.5	43.0	1.5	0.0	0.0	0.0	Loam
	19-33	8.0	15.0	39.0	42.5	3.5	0.0	0.0	0.0	Loam
	33-60	4.0	7.5	44.5	46.0	2.0	0.0	0.0	0.0	Loam
	60-120	5.5	8.5	37.5	53.0	1.0	0.0	0.0	0.0	Very fine sandy loam
O	0-17	11.0	16.5	39.5	43.0	1.0	0.0	0.0	0.0	Loam
	17-35	9.0	15.0	45.0	39.0	1.0	0.0	0.0	0.0	Loam
	35-50	3.5	7.0	42.0	50.0	1.0	0.0	0.0	0.0	Very fine sandy loam
	50-120	2.5	6.0	43.0	51.0	0.0	0.0	0.0	0.0	Very fine sandy loam
	120-140	2.0	6.0	46.0	46.0	2.0	0.0	0.0	0.0	Loam
	140-162	2.0	4.0	44.0	52.0	0.0	0.0	0.0	0.0	Very fine sandy loam

MINIDOKA PROJECT, NORTH SIDE PUMPING DIVISION
MOISTURE TENSION CURVES
LOCATION H
Lutz Samples



Legend Depth In.	Lab. F.C. In./Ft.	Tension at F.C. Atmos.	Avail. Moisture In/Ft.	Accum. In.
0-2	3.32	0.45	1.98	1.98
2-19	2.90	0.28	1.60	3.58
19-33	3.10	1.09	1.90	5.48
33-60	3.66	0.43	2.53	8.01
60-120	2.72	0.94		

3.32 / 34 / 1.98 / 1.98

October 17, 1950

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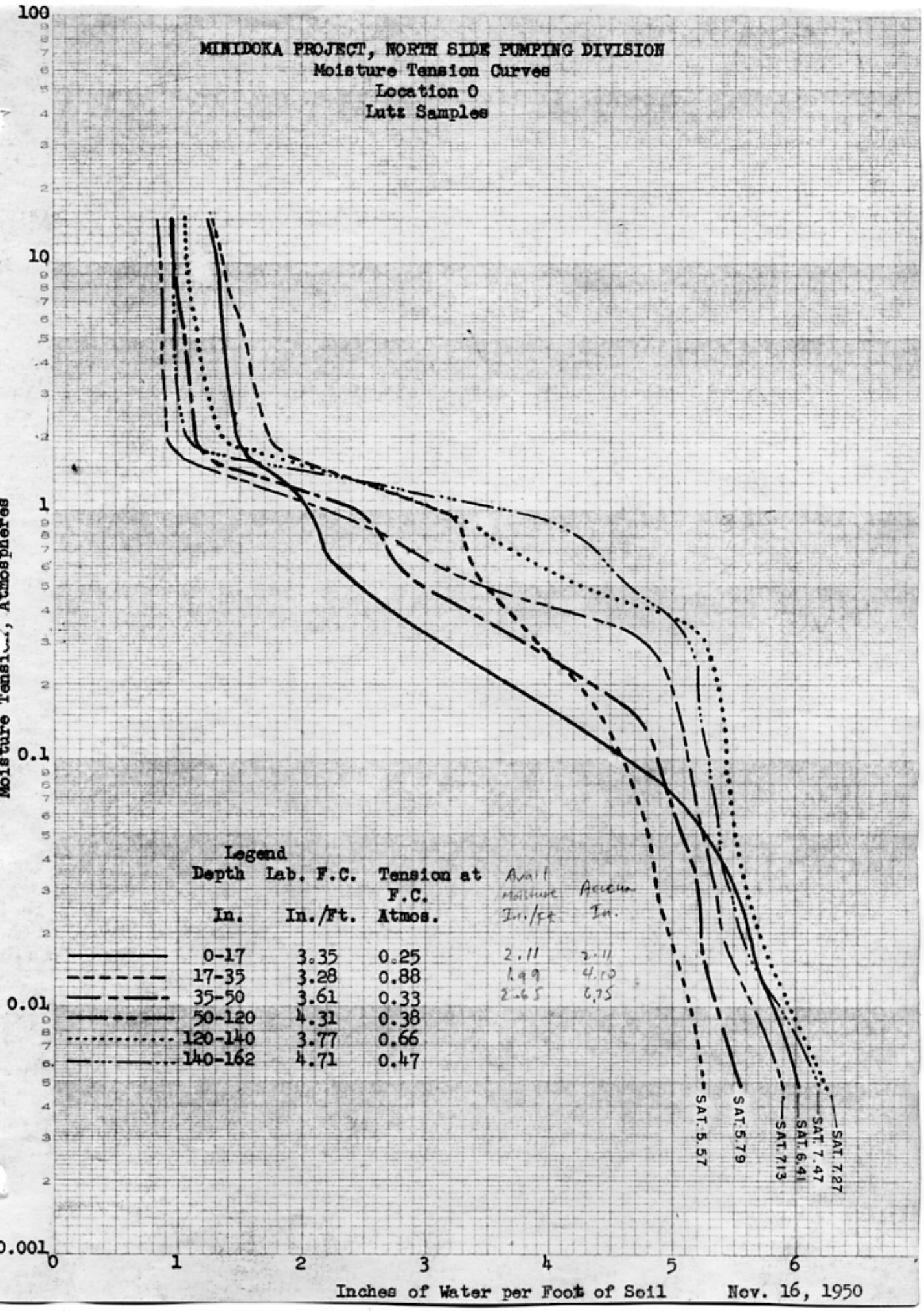
MINIDOKA PROJECT, NORTH SIDE PUMPING DIVISION
Moisture Tension Curves
Location 0
Lutz Samples



Legend Depth In.	Lab. F.C. In./Ft.	Tension at F.C. Atmos.	Avail Moisture In./Ft	Accum In.
0-17	3.35	0.25	2.11	2.11
17-35	3.28	0.88	1.99	4.10
35-50	3.61	0.33	2.65	6.75
50-120	4.31	0.38		
120-140	3.77	0.66		
140-162	4.71	0.47		

Nov. 16, 1950

50-120" Very light brownish-grey, floury, soft nodules, very fine sandy loam.

120-140" Nearly white, fairly loose loam with some small hard nodules.

140-162" Same, but a very fine sandy loam.

Location H, 30' S. of location G.

This is a normal group 10 soil with a good grass and sagebrush cover.

0-2" Grey, vesicular loam.

2-19" Light yellowish-brown, crumb-structured loam.

19-33" Grey, compact, nodular loam, platy near bottom stopping most roots.

33-60" Light, yellowish-brown, nodular, very friable loam.

60-120" Same only softer nodules, very fine sandy loam.

Water-holding Capacities of Typical Soils

The group 10 soils are the dominant group of soils on the division. From the description of Location G the top 17 inches of soil can hold 2.95 inches of available water. From the ~~U. S. figures~~ Information available 2.76 inches of this water can probably be used without injuring a shallow-rooted crop ~~by raising the F. S. to not over 3 atmospheres~~. Thus, for a crop like potatoes ~~with an estimated farm irrigation efficiency of 45 per cent~~ it appears that 6.1 inches of water per irrigation could be applied. Beans ~~of 60 per cent F. I. E.~~ would use 4.6 inches per irrigation. Alfalfa with a root system capable of utilizing at least 35 inches of soil (from the standpoint of practical irrigation) would have a safe supply of about 5.9 inches of water. ~~At 60 per cent F. I. E.~~ as much as 9.8 inches could be applied per irrigation for this crop.

Group 30 soils, represented by Location H, differ markedly from group 10 with respect to available moisture capacity. Shallow rooted crops like potatoes and beans will utilize about 19 inches of soil which can hold 2.65 inches of available moisture. It is estimated that 1.87 inches of water can be used between irrigations. For potatoes about 4.2 inches of water should be supplied for irrigation, whereas, beans would require only 3.1 inches per irrigation. Alfalfa will have an effective root zone of not over 30 inches. This depth of soil can hold 4.99 inches of water. Of this 3.67 inches of water can be used between each irrigation making a requirement of 6.1 inches per irrigation.

Group 30 soils, represented by Location H, differ markedly from group 10 with respect to available moisture capacity. Shallow-rooted crops like potatoes and beans will utilize about 19 inches of soil which can hold 2.65 inches of available moisture. From the f. s. curves we estimate that 1.87 inches of water can be safely consumptively used between irrigations. At a F. I. E of 45 per cent for potatoes about 4.2 inches of water should be supplied per irrigation, whereas, beans (F. I. E. of 60 per cent) would require only 3.1 inches of water per irrigation. Alfalfa (66 per cent F. I. E.) will have an effective root zone of not over 30 inches. This depth of soil can hold 4.99 inches of water. Of this 3.67 inches of water can be consumptively used between each irrigation making a requirement of 6.1 inches per irrigation.

Inches of Water Required per Irrigation to Hold the Available Moisture Level Between Field Capacity and a 3 Atmosphere Tension

Crop	Soil Group 10	Soil Group 30	Ratio Group 10 / Group 30
Potatoes	6.1	4.2	1.45
Beans	4.6	3.1	1.49
Alfalfa	9.8	6.1	1.61

Moisture Characteristics

Soil Description	Moisture Constants			Permeability (Disturbed Samples)	
	Lab. Field Cap.	Wilting Coef.	Avail. Moisture	Initial	Leached
	%	%	%	In. Per Hr.	In Per Hr.
Location O					
0-17"	22.6	8.6	14.0	0.42	0.47
17-35"	20.0	7.8	12.2	0.17	0.15
35-50"	21.6	5.7	15.9	0.30	0.31
50-120"	24.5	4.8	19.7	0.27	0.36
120-140"	22.6	6.5	16.1	0.21	0.20
140-162"	28.7	5.8	22.9	0.22	0.29
Location H					
0-2"	24.2	9.7	14.3	0.30	0.11
2-19"	20.4	9.2	11.2	0.35	0.46
19-33"	19.6	7.8	11.8	0.17	0.15
33-60"	24.4	7.5	16.9	0.24	0.19
60-120"	17.0	6.5	10.5	1.55	0.30

Topography

In topography as well as in soils, the investigated area is generally well adapted to irrigation farming. The eastern portion is made up of smooth to undulating land bodies separated by natural drainage courses. These drains are broad and flat in their upper reaches and generally steep and rough toward the lower ends where they spill into enclosed basins or make their way into the river valley along the south boundary of the area. There are a few high spots and depressions. Sand dunes and lava reefs are dominant features at the eastern extremity of the area.

Topography of the north central part is similar to that of the eastern portion except for the more numerous depressions or enclosed drainage basins, particularly in township 8 south, range 23 east.

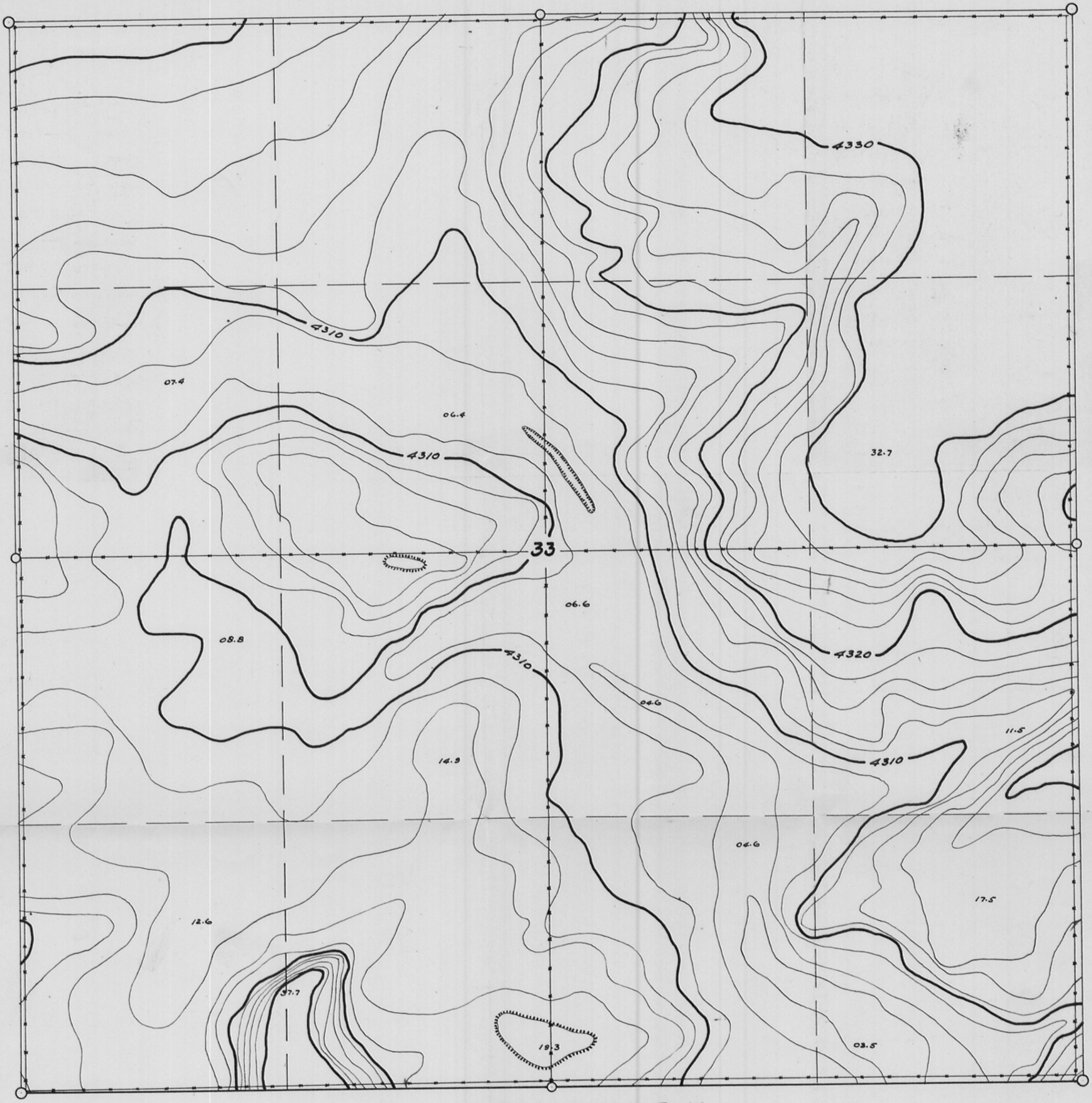
The southwestern portion has nearly ideal topography for farming, being composed chiefly of broad expanses of land with gentle slopes. It lies in a compact body and is broken by rough terrain only where it merges into non-arable lands along the east and south.

The extreme western part is characterized by fairly large land bodies with undulating slopes separated by long rocky ridges and rock-bordered drainageways.

The attached topographic maps show the general topography of the investigated area and the characteristic topography of the division.

Topographic characteristics of Unit B pose no serious water distribution problems as the water will be pumped from wells drilled on the highest points of the service areas. Use of these locations minimizes acreage loss because of high spots.

The situation is reversed on Unit A which derives its water from a central pumping plant. Several high areas within this unit are suspended from the irrigable acreage owing to potential distribution difficulties. Their inclusion pends determination of the feasibility of relift pump installations.



Sec. 33 T. 75. R. 23 E. B. M.

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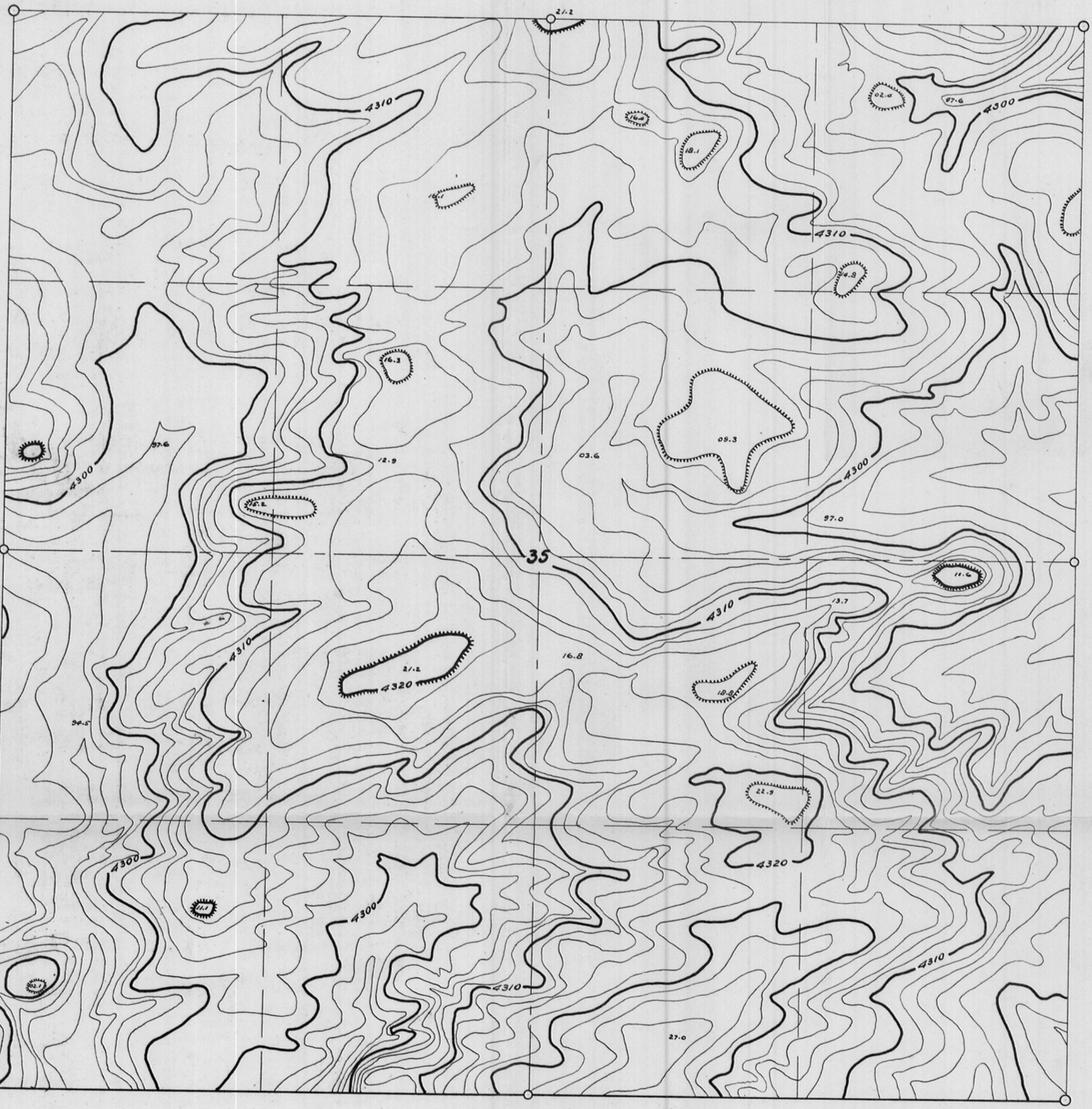

Sec. 35 T. 7S. R. 24 E. B. M.

2-H-7435

T. 7S.
T. 8S.
R. 23E.
R. 24E.
31.5
30.3
4330
27.8
23.7
4320
4320
4310
03.3
29.1
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G
98.6
02.5
36.9
4310
12.6
4330
4300
4300
29.2
4290
4320
M

Sec. 6 T.8S. R.24E. B.M.

2-H-846

Drainage

The division as a whole has excellent internal drainage. The soils are generally permeable and the underlying basalt is creviced. These facts confine the drainage problem to provision of works to dispose of surface runoff from irrigation waste and precipitation. This conclusion was reached after review of the several aspects of the drainage investigations which included (1) evaluation of the profile notes made during the detailed land classification survey, (2) infiltration tests made on a problem area, (3) deep borings made to determine the character of the understrata, (4) general observation of the basalt outcrops and study of well logs, and (5) observation of the area from topographic and erosion viewpoints.

The subject of drainage is covered in detail in the definite plan report. Soil characteristics as they affect drainage of the division are noted in the following paragraphs.

Permeability Tests

Borings for examination of the five-foot profile, at least 16 per 640 acres, were made during the classification survey. These profiles indicated that soils of the division are generally permeable. One area was selected for special study owing to the presence of rather high salinity and alkalinity conditions. The selected area is the largest body of land on the division so affected and it occupies a rather flat position.

Infiltration studies to determine soil permeabilities and leaching possibilities were made on undisturbed soils representative of this 600-acre area which lies near the old Prisoner-of-War Camp five miles west of Paul.

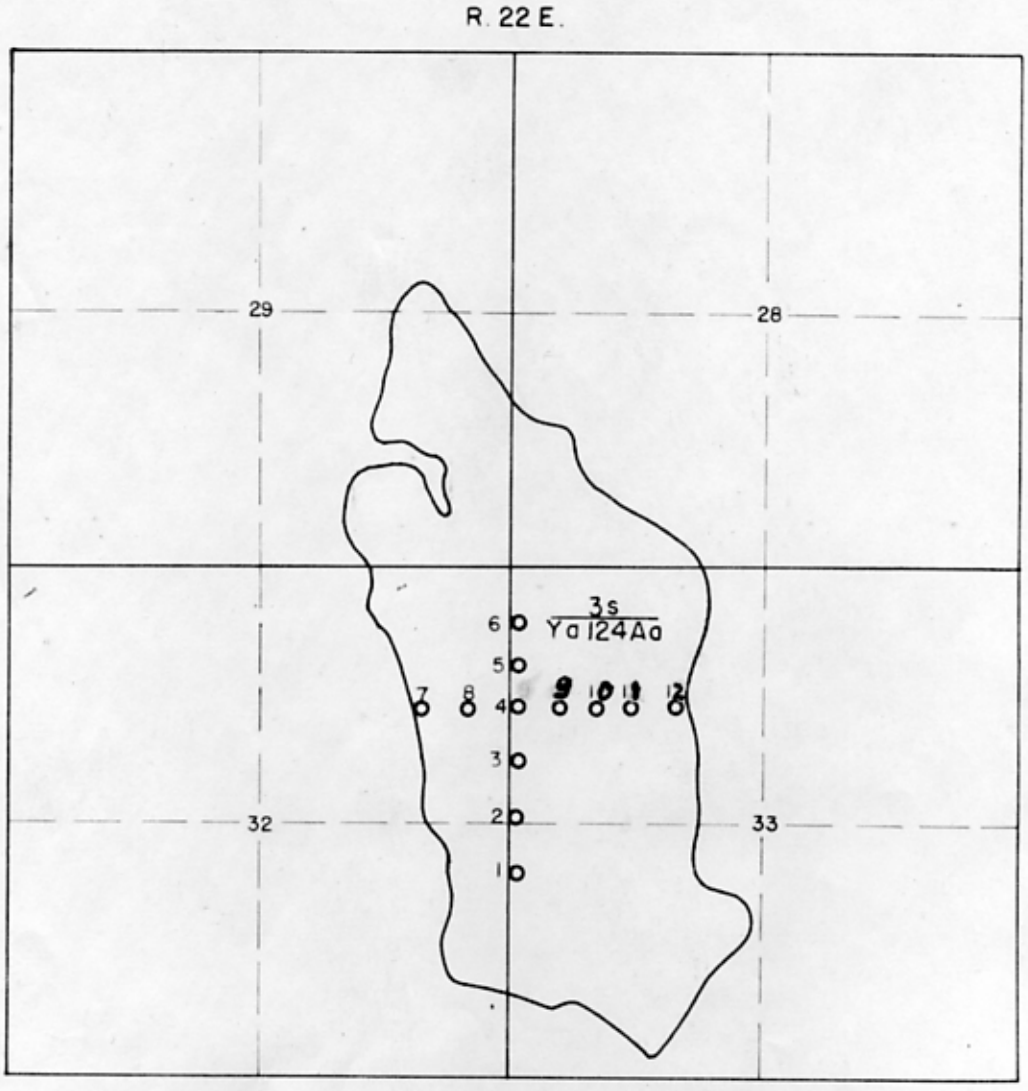
The method used involved setting cylinders, applying water and recording periodically the amount of water infiltrating the soil. After two 24-hour periods of water application, the holes were excavated to trace the extent of the wetted area. The 12 cylinders were placed about 500 feet apart in two lines, one approximately north and south, the other approximately east and west through the area (see location map). Water used in the tests was rated "good" on the Rubidoux scale by the Regional soils laboratory.

Regional soils laboratory tests of three samples from each cylinder location profile (see attached tabulations) indicated average total salts in the plow zone of 0.04 per cent and average pH in the plow zone of 7.83. Top and bottom subsoil sections averaged 0.16 and 0.40 per cent respectively in total salts, 8.41 and 8.26 respectively in pH. All samples had a lime reaction of at least 1, and 26 of the 33 samples had a lime reaction of 3. In the five holes with highest salt content the high salt zone was below two feet and was underlain by open soil.

Amounts and rates of water infiltration are tabulated on the following page. The string of north-south holes (1 to 6 inclusive) consumed 66 to 90 inches of water, averaged 75 inches; the east-west string of holes (7 to 12 inclusive) consumed 98 to 129 inches, averaged 114 inches.

Possible drainage-impeding layers were found only in holes 5 and 12. Hole 5 had a clay loam compaction at 32-36 inches, hole 12 had a platy laminar layer at 32-38 inches. Cylinder tests on these layers indicated water would pass through these layers, although slowly (charts 5a and 12a).

LOCATION OF INFILTRATION STUDIES



o Infiltration Cylinders

Analyses of Sample Soils

Sample Number	Depth Inches	Lime	Salt %	pH	
				Sat.	1-5
1	0-24	3	0.03	8.17	8.60
	24-36	3	0.05	8.51	9.30
	36-60	3	0.06	8.51	9.33
2	0-24	3	0.05	8.50	9.32
	24-36	3	0.56	8.40	9.17
	36-72	2	0.46	8.37	9.23
3	0-24	3	0.03	7.98	8.80
	24-36	3	0.19	8.40	9.30
	36-58	3	0.43	8.37	9.27
4	0-20	1	0.05	7.50	8.30
	20-40	3	0.15	8.22	9.08
	40-60	3	0.22	8.38	9.10
6	0-13	2	0.03	7.82	8.52
	13-16	3	0.40	8.18	8.87
	36-48	3	0.71	8.18	8.90
7	0-22	3	0.05	8.00	8.82
	22-44	3	0.06	8.30	9.33
	44-60	2	0.30	8.15	8.65
8	0-20	2	0.04	7.34	8.12
	20-36	3	0.06	8.18	9.15
	36-60	3	0.10	8.13	8.98
9	0-20	3	0.03	7.68	8.45
	20-30	3	0.06	9.08	9.63
	30-60	3	0.56	8.12	8.69
10	0-20	2	0.04	7.42	7.79
	20-30	3	0.04	8.22	8.73
	30-60	3	0.67	8.09	8.28
11	0-20	2	0.03	7.88	8.40
	20-36	3	0.04	8.47	8.98
	36-60	3	0.69	8.12	8.42
12	0-32	3	0.07	7.92	8.57
	32-38	3	0.13	8.60	9.38
	38-60	3	0.23	8.49	9.57

AVERAGES OF SALT AND pH RETURNS leached soil

Section of Profile	Salt %	Salt pH
Surface Soil	0.04	7.83
Top of Subsoil	0.16	8.41
Bottom of subsoil	0.40	8.26
Entire Profile	0.20	8.17

WATER ANALYSIS

pH-7.90
Sp. C @ 25° C. - 517 micromhos October 26, 1950

Element or Ionic Group	m. e./l	P. P. M.
Boron		0.02
Carbonate	0.00	—
Bi-carbonate	3.43	209.
Chloride	0.79	28.
Sulphate	0.93	45.
Calcium	3.03	61.
Magnesium	0.84	10.
Potash	0.11	4.
Sodium	1.16	27.
Residual Na CO_3	None	—
Na Found	22.6%	
Na Possible	67.9%	
Rubidoux Lab. Rating	Good	

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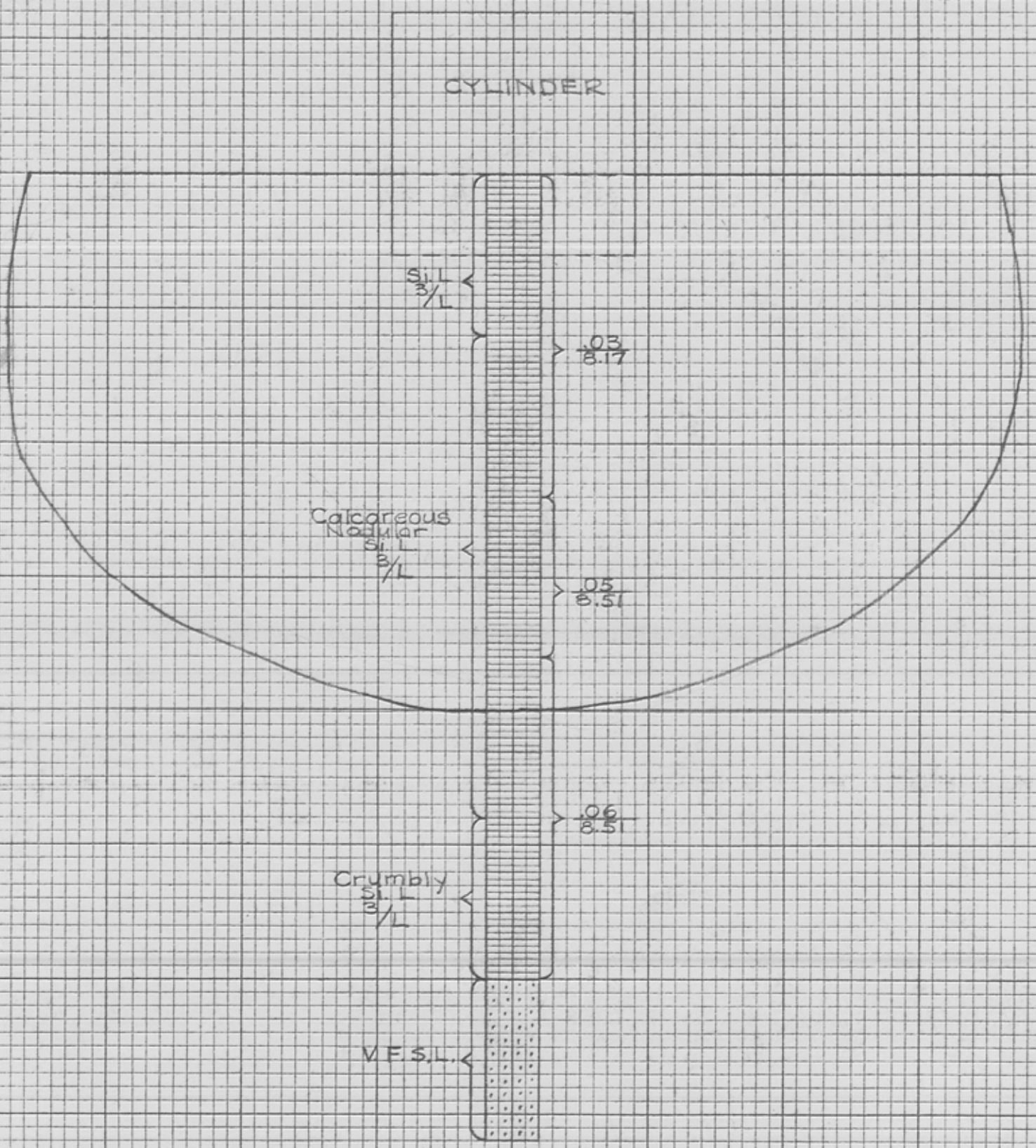
Pattern of Infiltration
Hole #1



SCALE 1" = 10"

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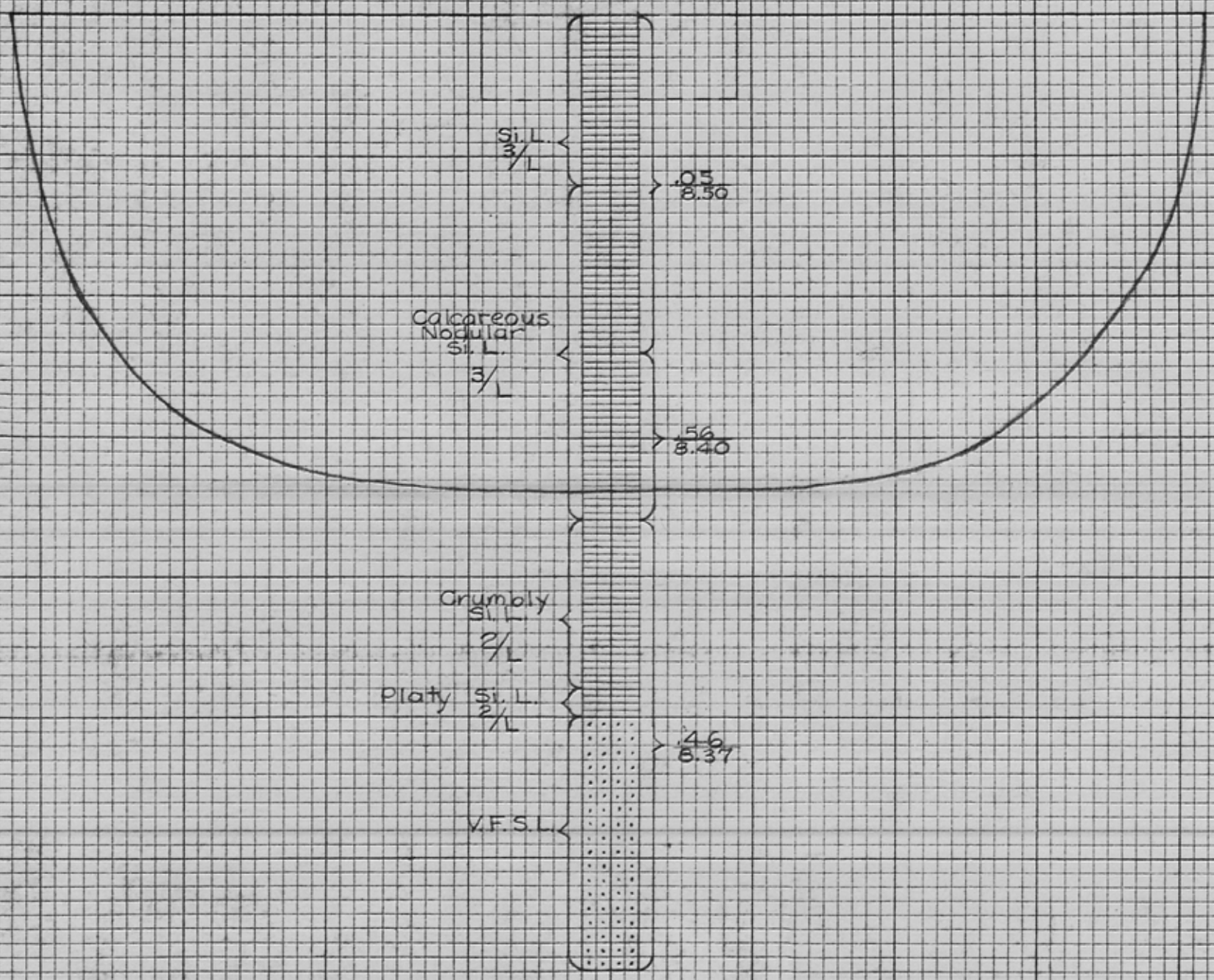
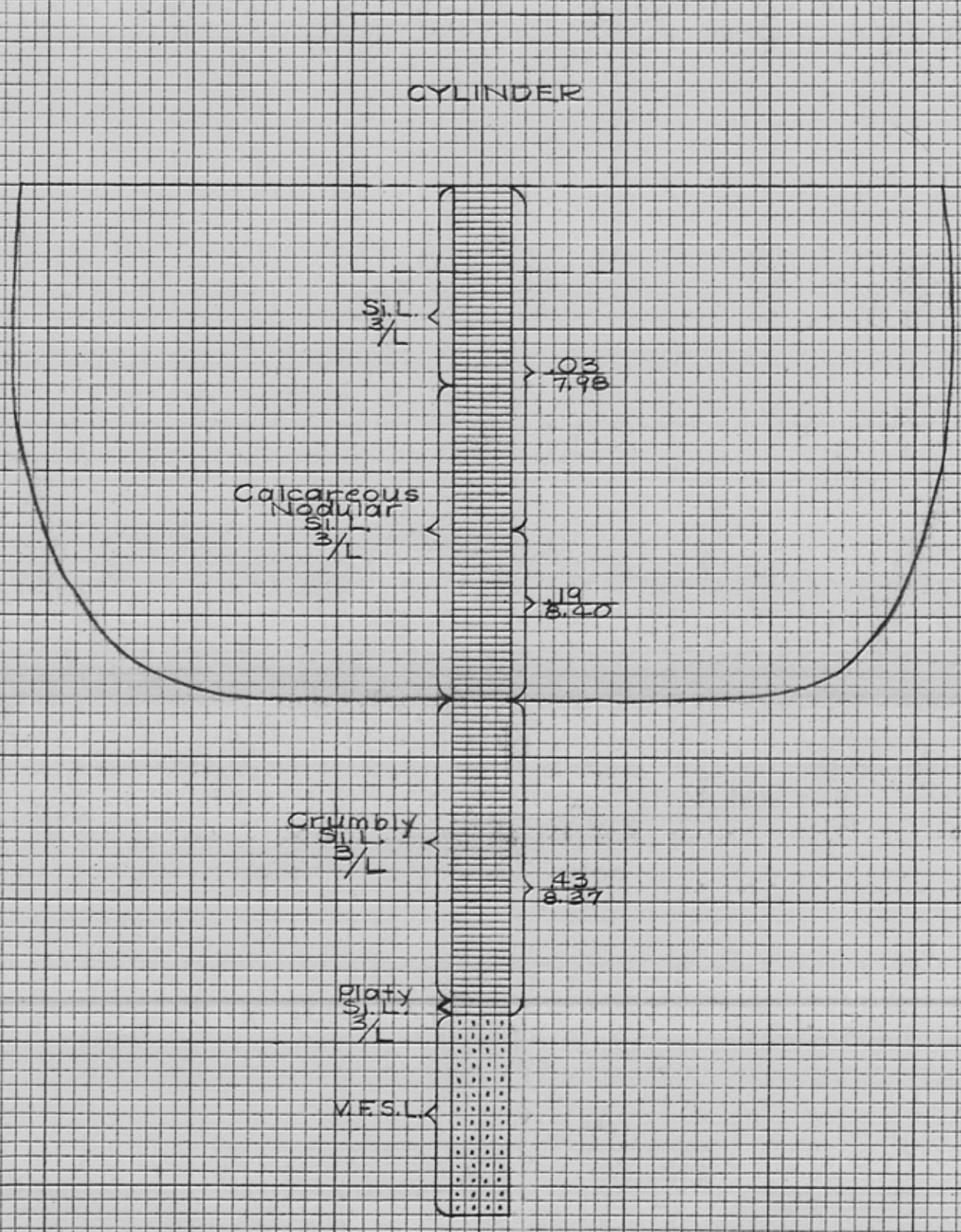
Pattern of Infiltration Hole #2



SCALE 1" = 10"

359-5L KEUFFEL & ESSER CO.
10 × 10 to the inch.
MADE IN U. S. A.

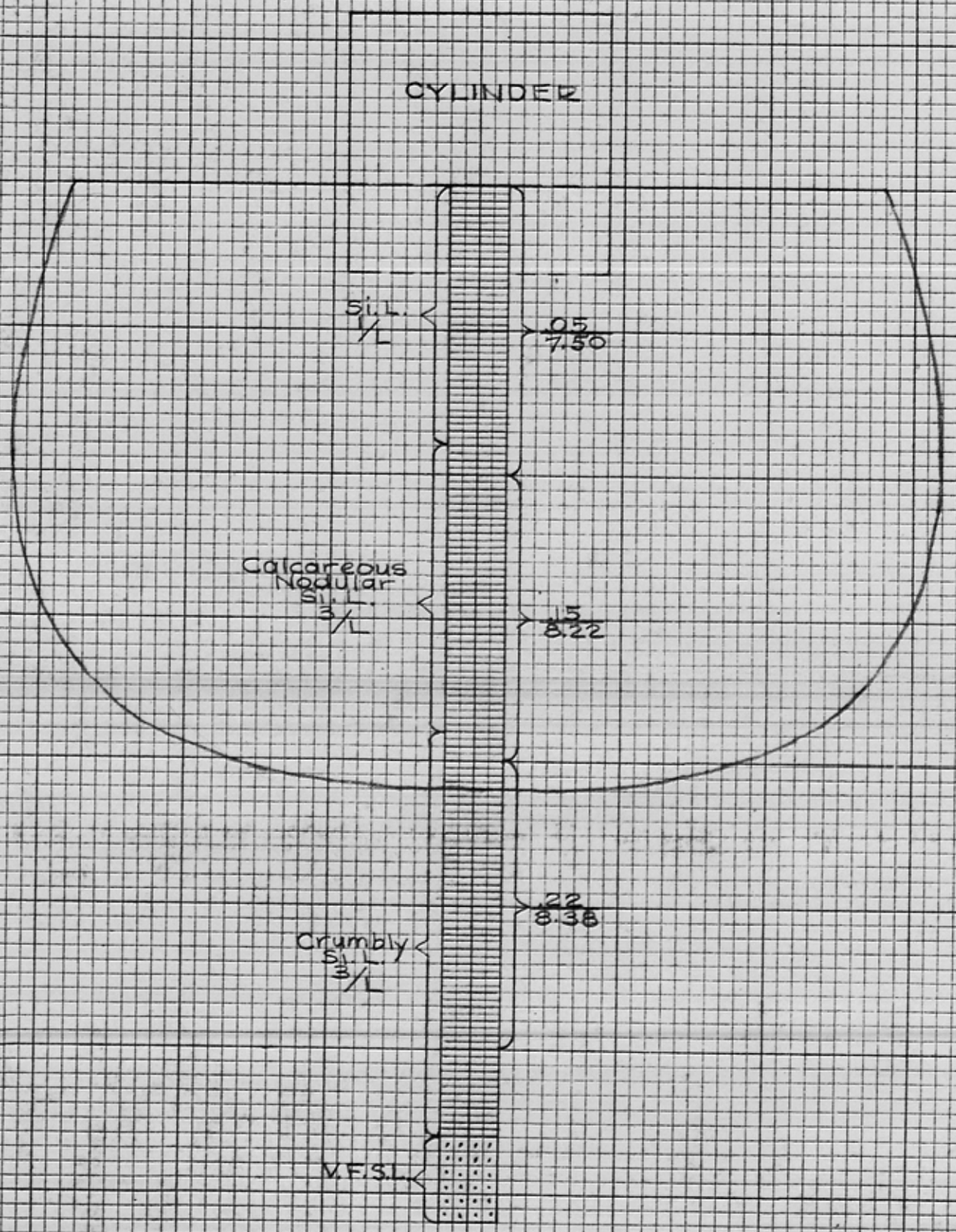
Pattern of Infiltration
Hole #3



SCALE 1" = 10"

359-5L KEUFFEL & ESSER CO.
10 × 10 to the inch.
MADE IN U. S. A.

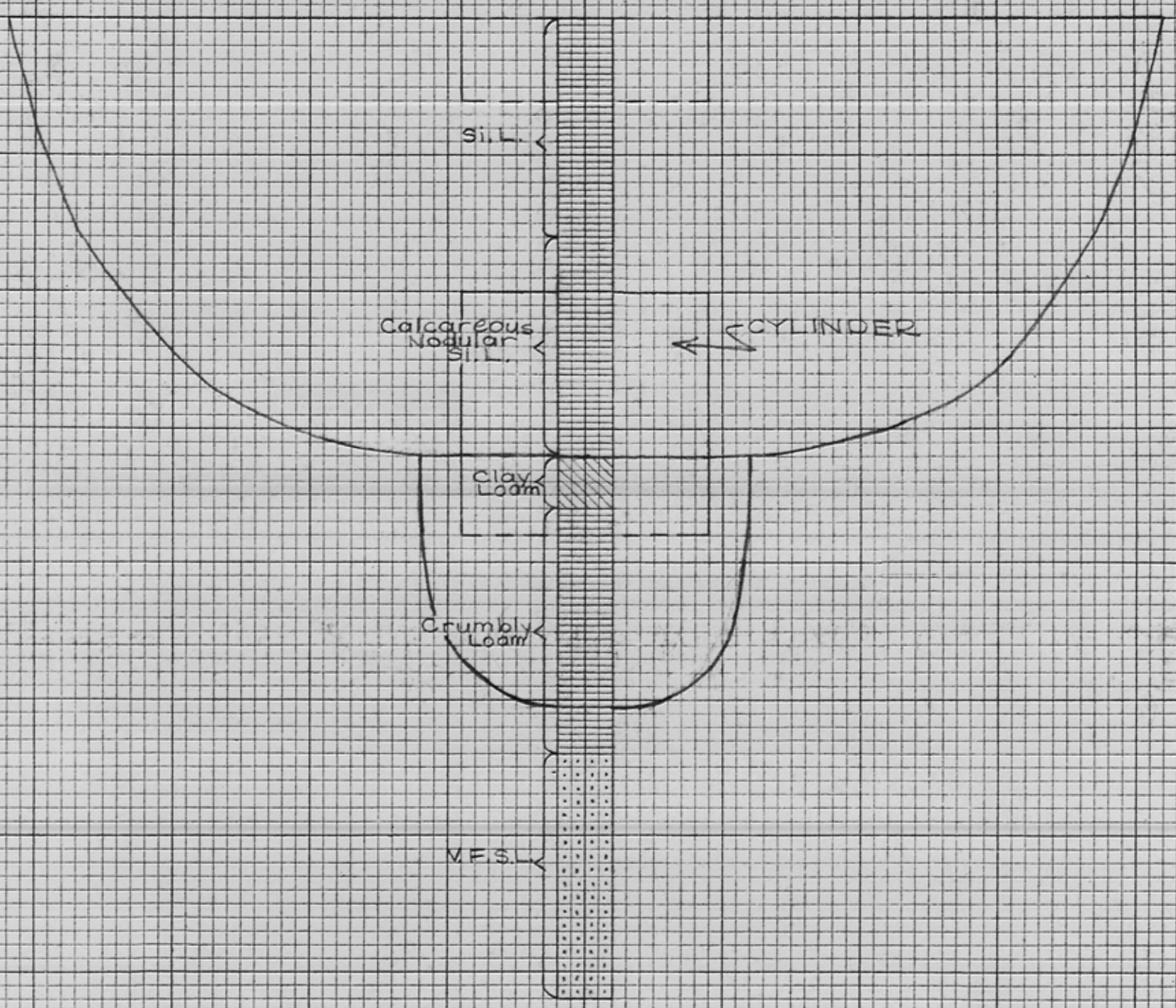
Pattern of Infiltration Hole #4



SCALE 1" = 10"

359-SL KEUFFEL & ESSER CO.
10 × 10 to the inch.
MADE IN U. S. A.

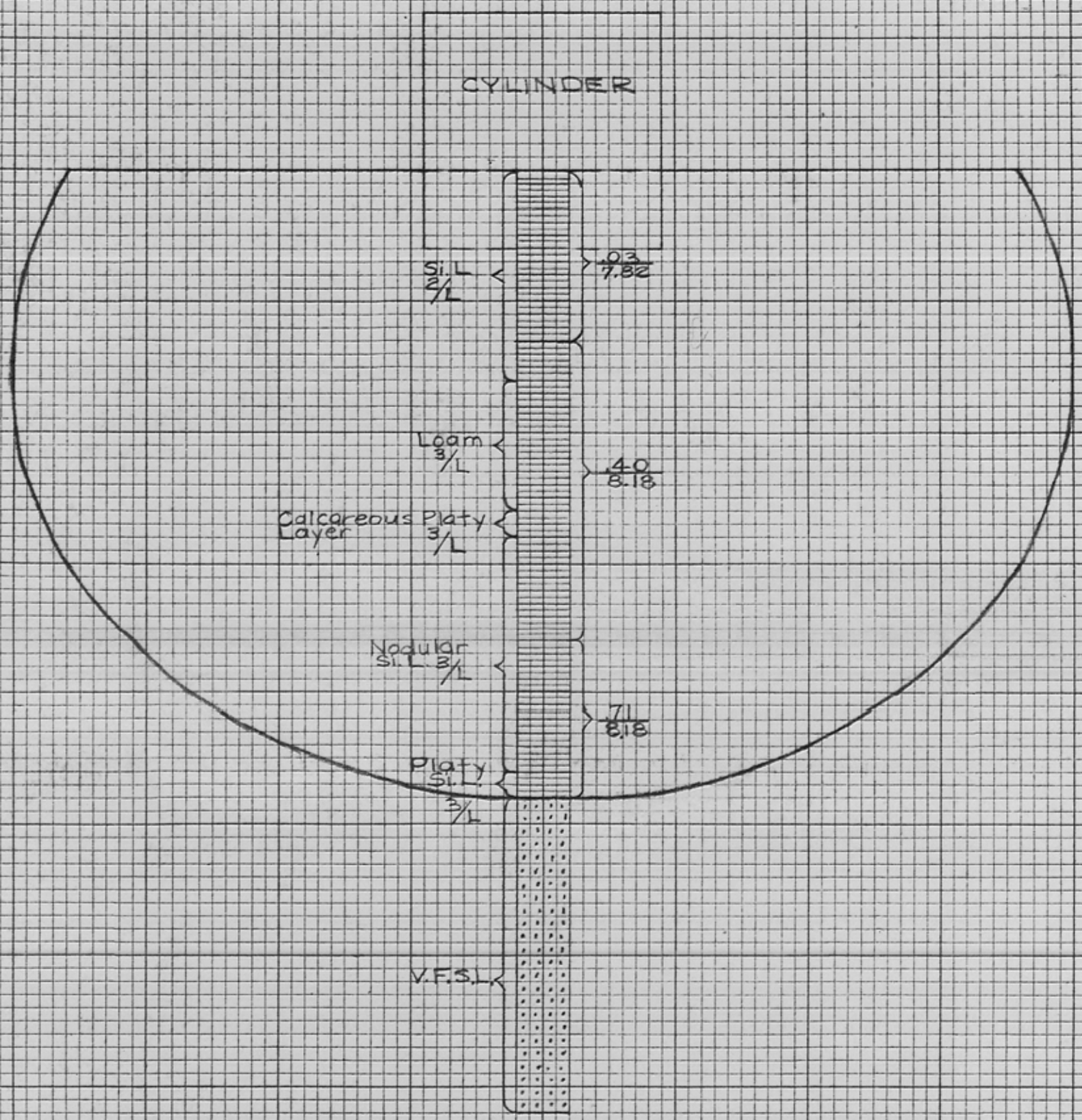
Pattern of Infiltration
Hole #5



SCALE 1" = 10'

Pattern of Infiltration

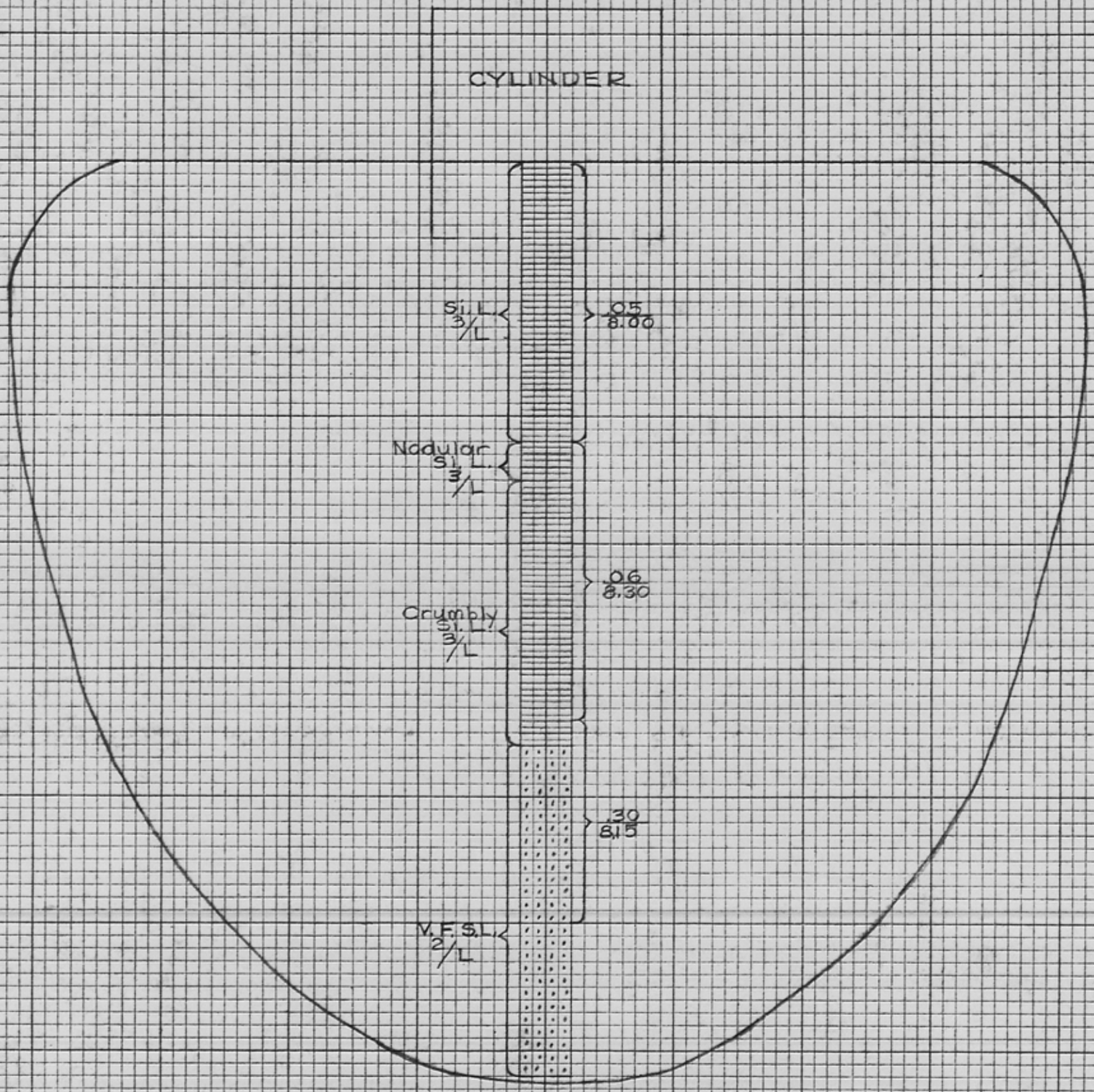
Hole #6



SCALE 1" = 10"

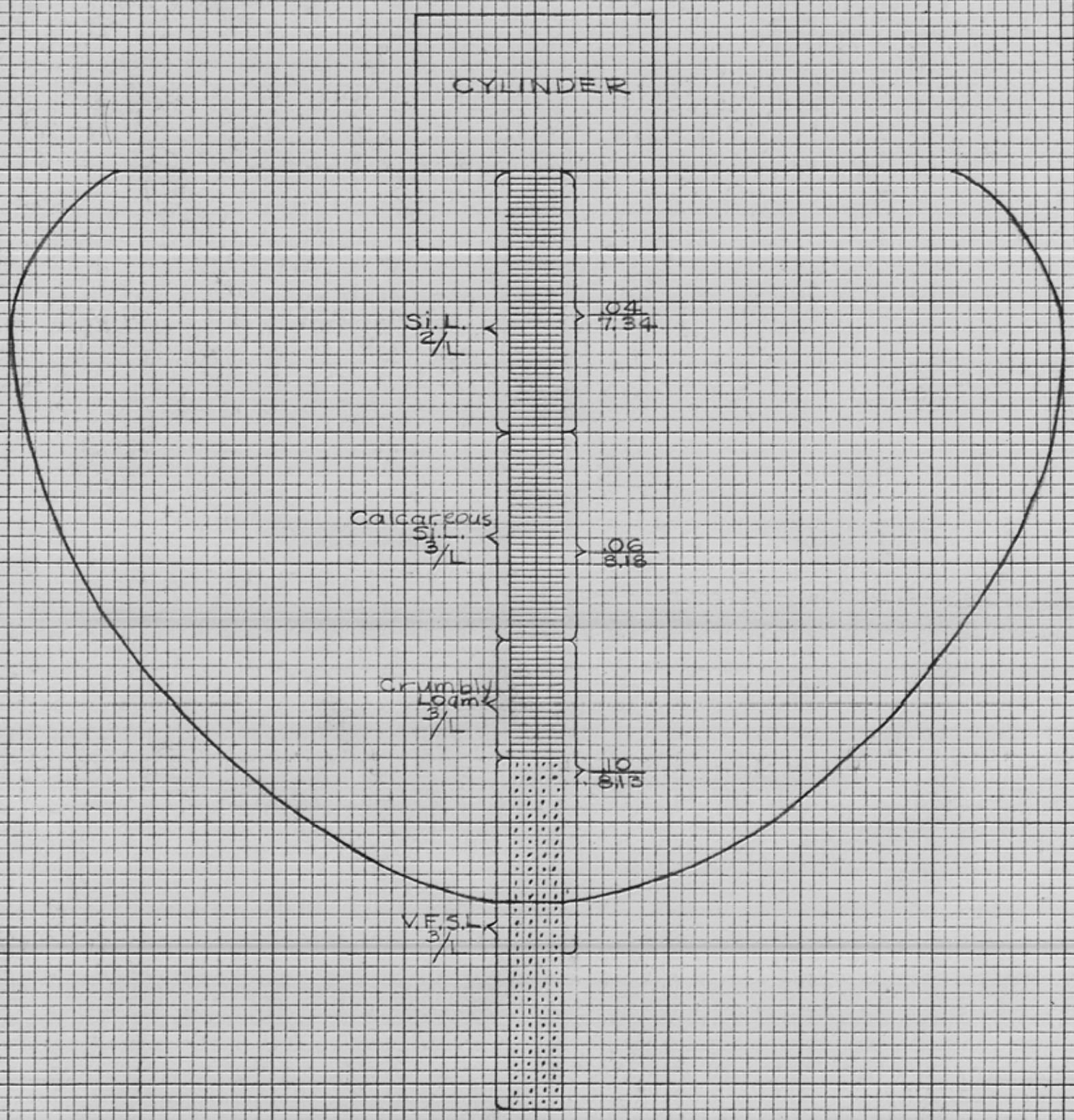
359-SL KEUFFEL & ESSER CO.
10 × 10 to the inch.
MADE IN U. S. A.

PATTERN OF INFILTRATION HOLE #7



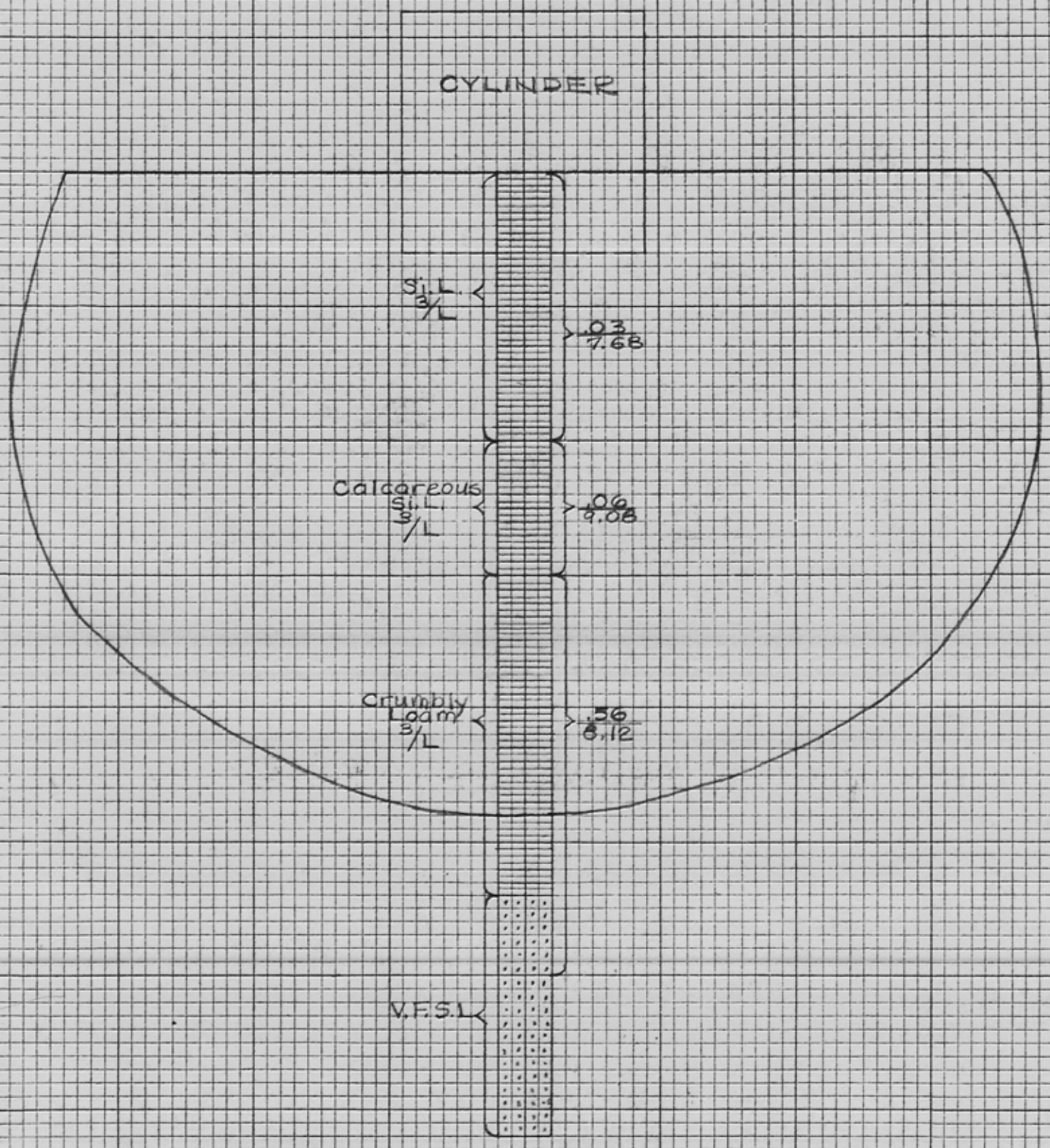
SCALE 1" = 10"

Pattern of Infiltration
Hole # 8



SCALE 1" = 10'

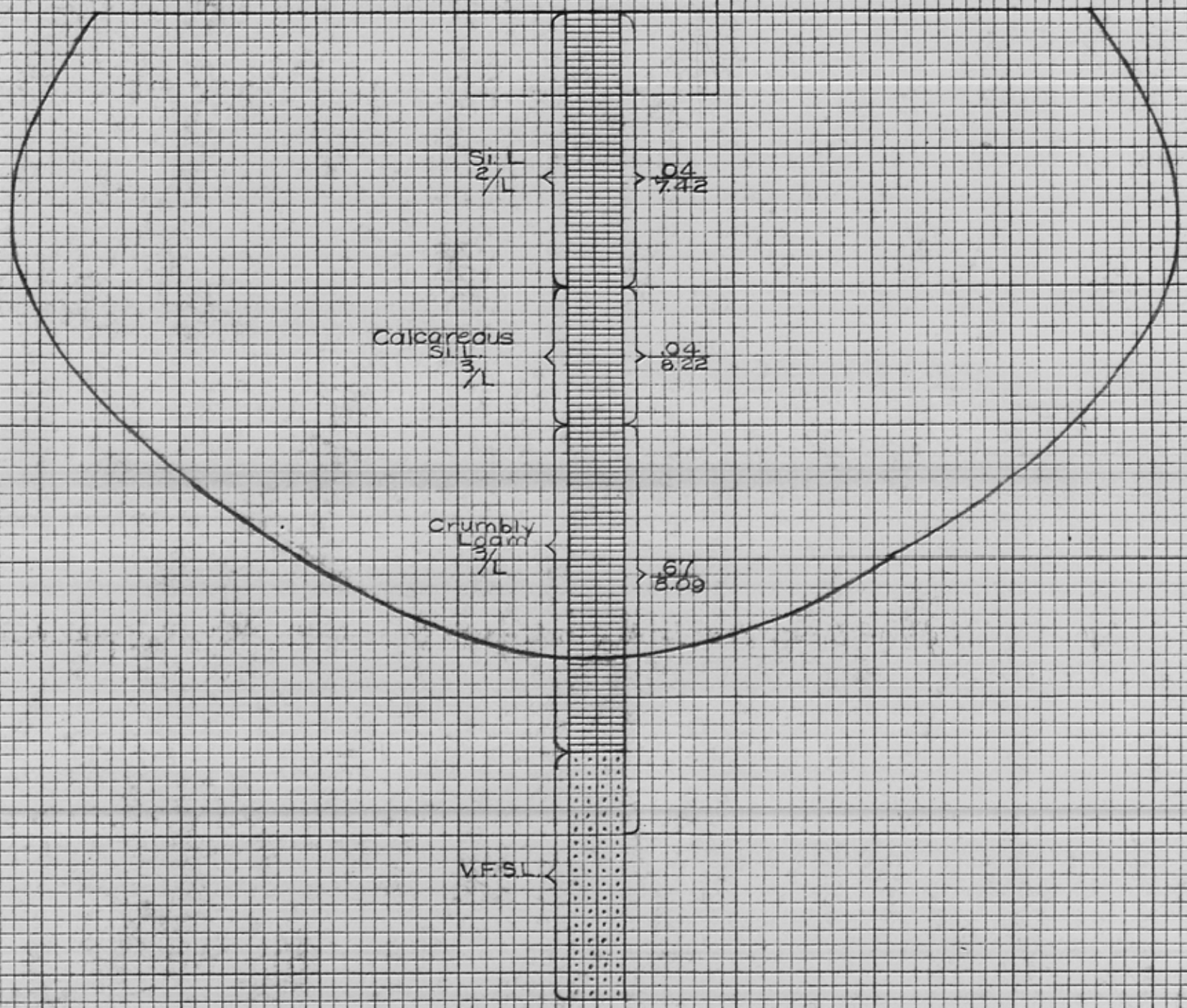
Pattern of Infiltration
Hole # 9



SCALE 1" = 10'

359-SL KEUFFEL & ESSER CO.
10 × 10 to the inch.
MADE IN U. S. A.

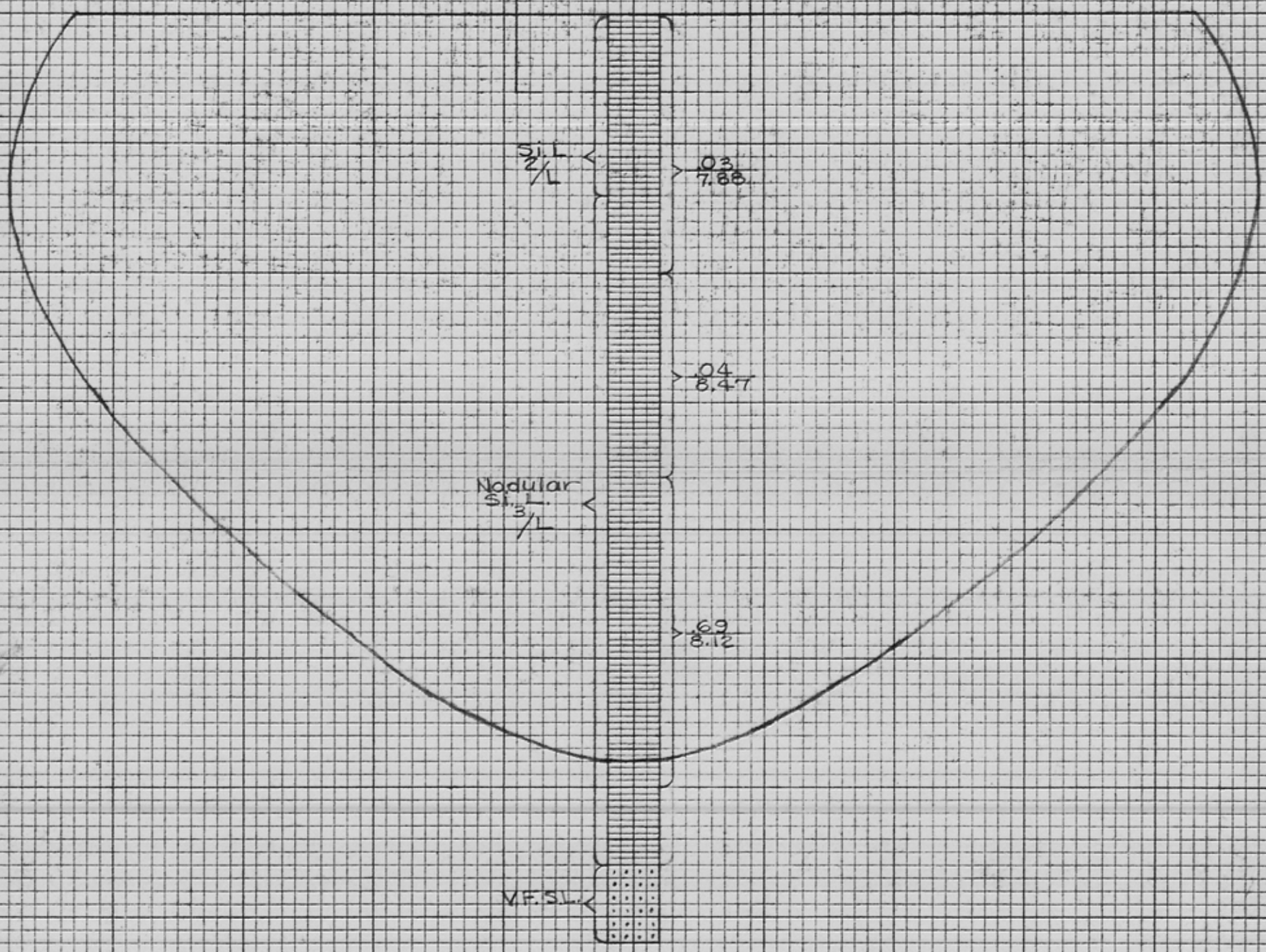
Pattern of Infiltration
Hole #10



SCALE 1" = 10"

359-5L KEUFFEL & ESSER CO.
10 × 10 to the inch.
MADE IN U. S. A.

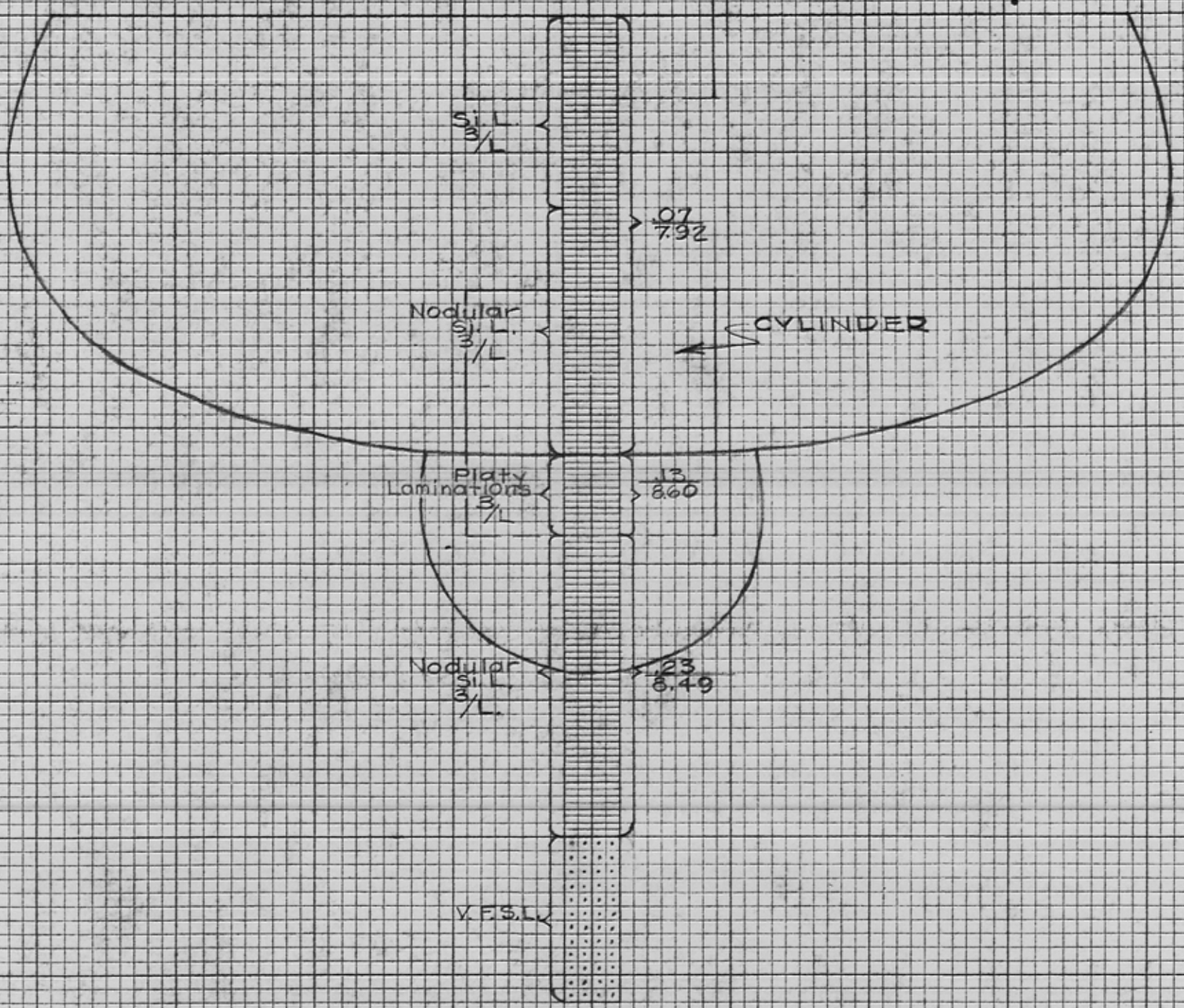
PATTERN OF INFILTRATION HOLE #11



SCALE 1" = 10"

359-5L KEUFFEL & ESSER CO.
10 × 10 to the Inch.
MADE IN U. S. A.

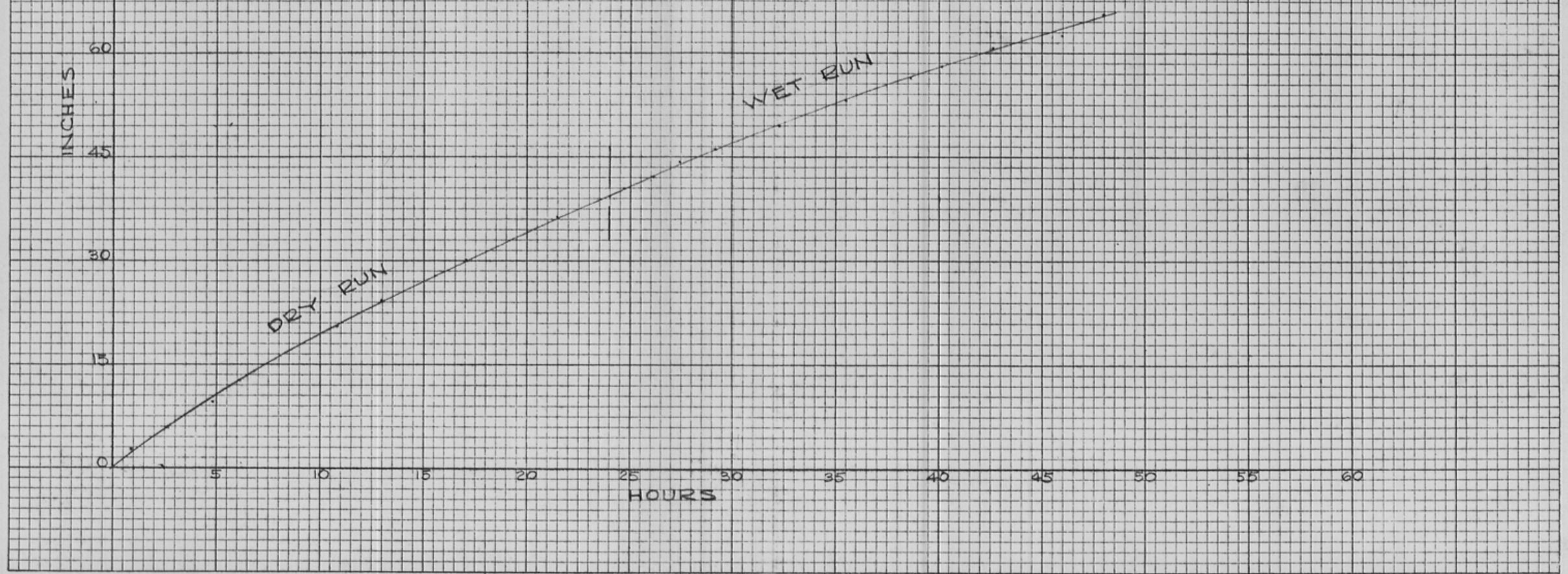
PATTERN OF INFILTRATION
HOLE # 12



SCALE, 1" = 10"

RATE OF INFILTRATION
HOLE NO. 1

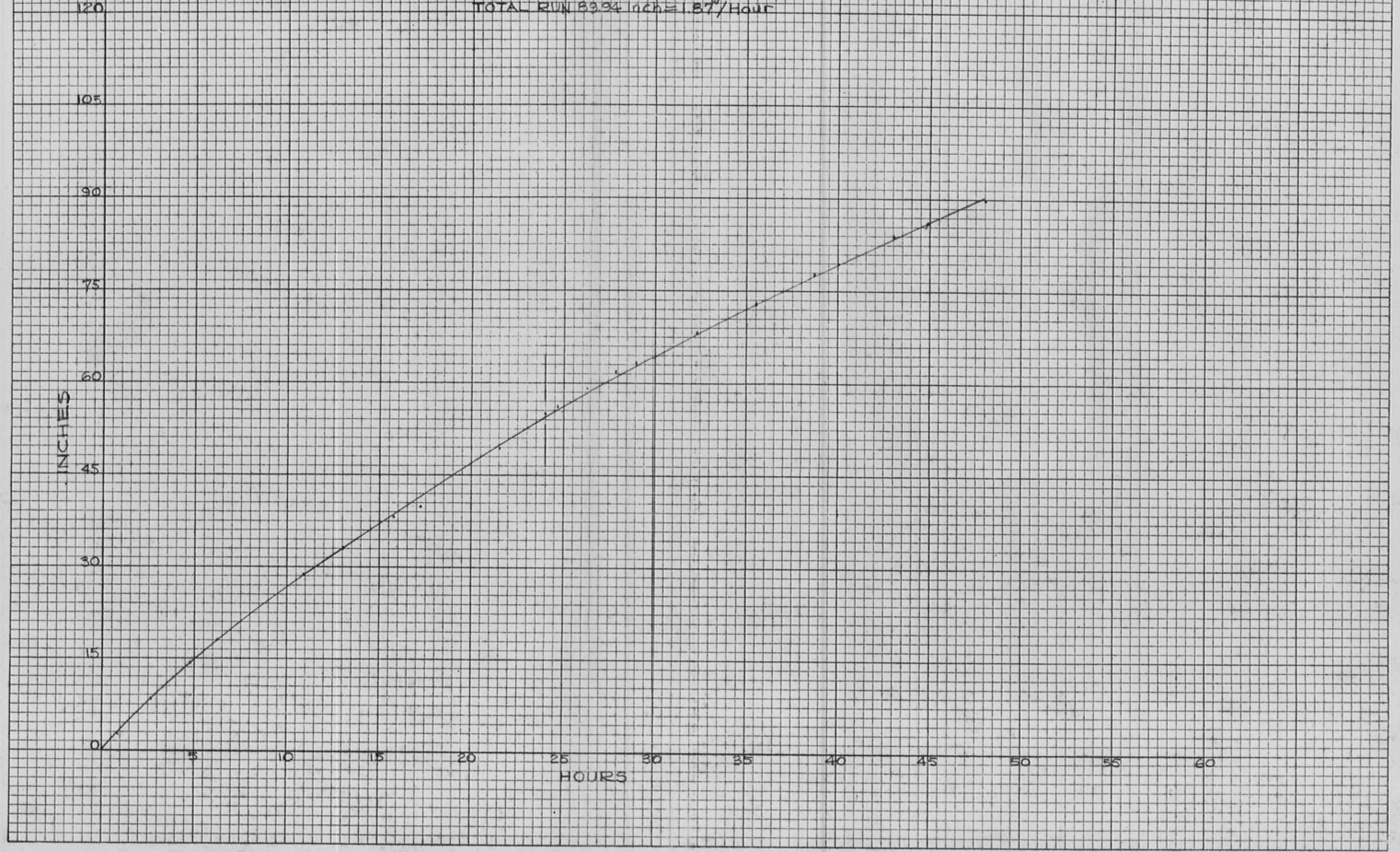
DRY RUN 39.56 Inch = 1.65"/Hour
WET RUN 26.31 Inch = 1.10"/ Hour
TOTAL RUN 65.87 Inch = 1.37"/ HOUR



359-5L KEUFFEL & ESSER CO.
10 X 10 to the inch.
MADE IN U.S.A.

RATE OF INFILTRATION
HOLE NO. 2

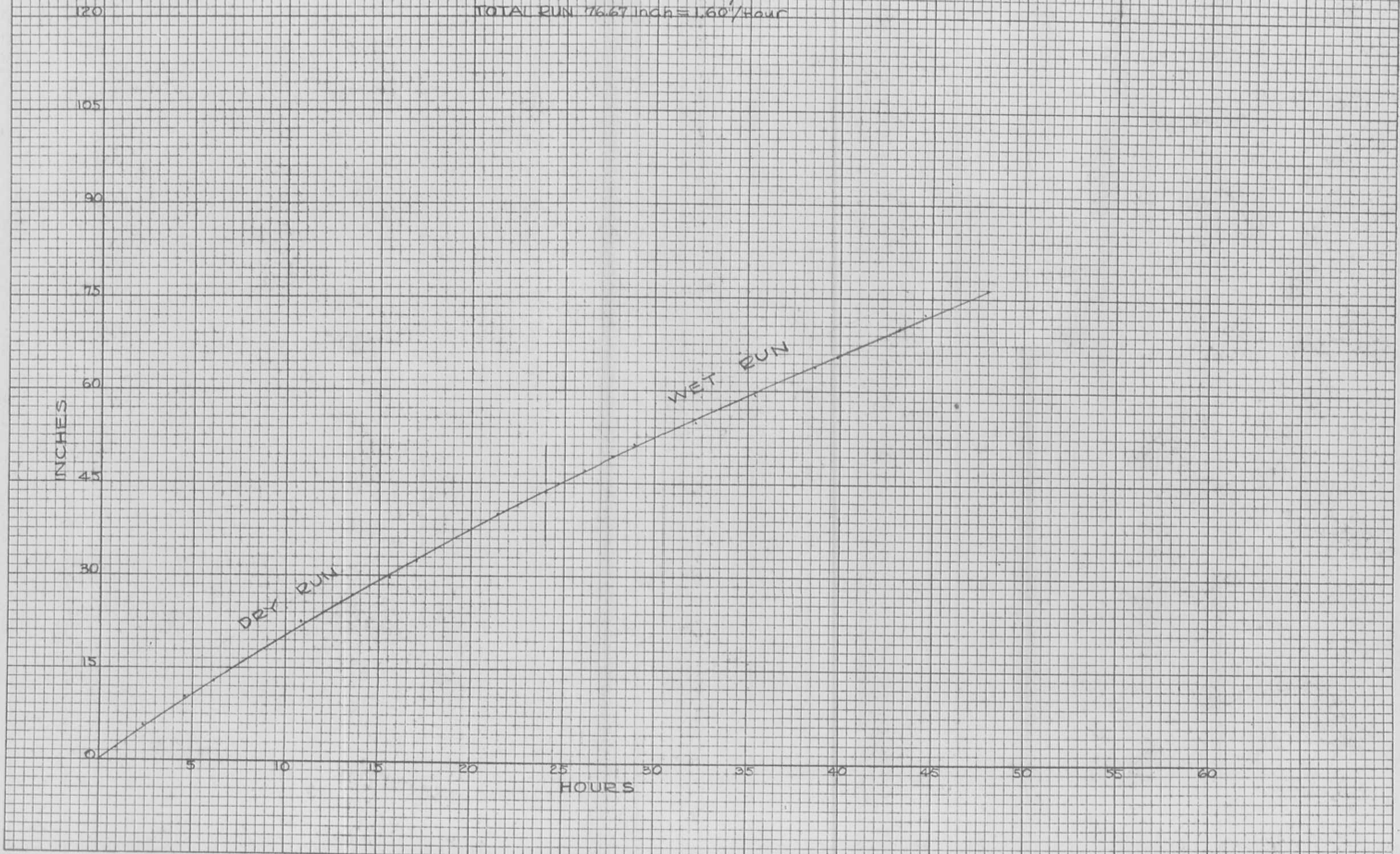
DRY RUN 55.19 Inch = 2.30"/Hour
WET RUN 34.75 Inch = 1.45"/Hour
TOTAL RUN 89.94 Inch = 1.87"/Hour



359-5L KEUFFEL & ESSER CO.
10 X 10 to the Inch.
MADE IN U.S.A.

RATE OF INFILTRATION
HOLE NO. 3

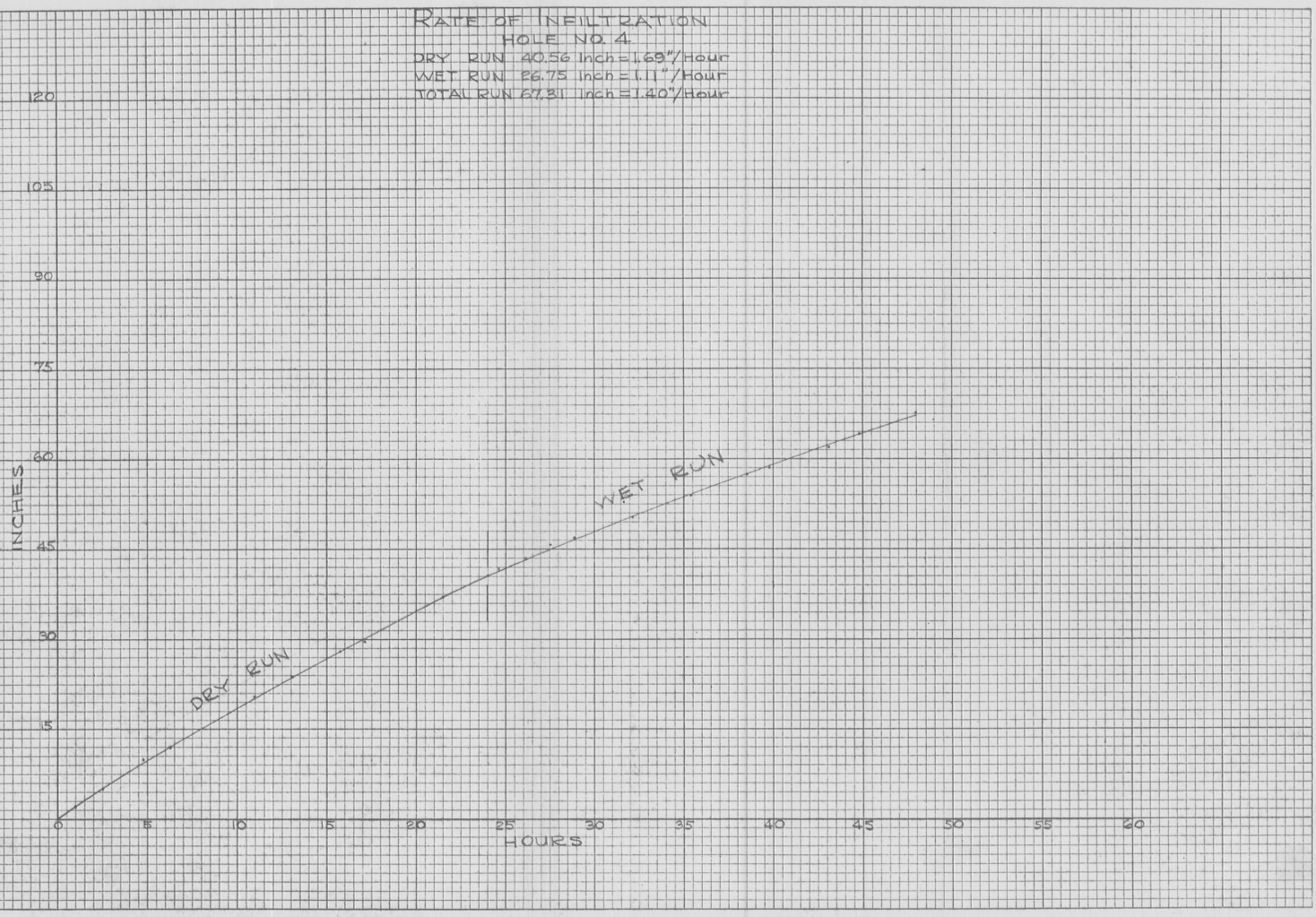
DRY RUN 45.81 Inch = 1.83"/Hour
WET RUN 32.86 Inch = 1.37"/Hour
TOTAL RUN 76.67 Inch = 1.60"/Hour



359-5L KEUFFEL & ESSER CO.
10 × 10 to the inch.
MADE IN U.S.A.

RATE OF INFILTRATION
HOLE NO. 4.

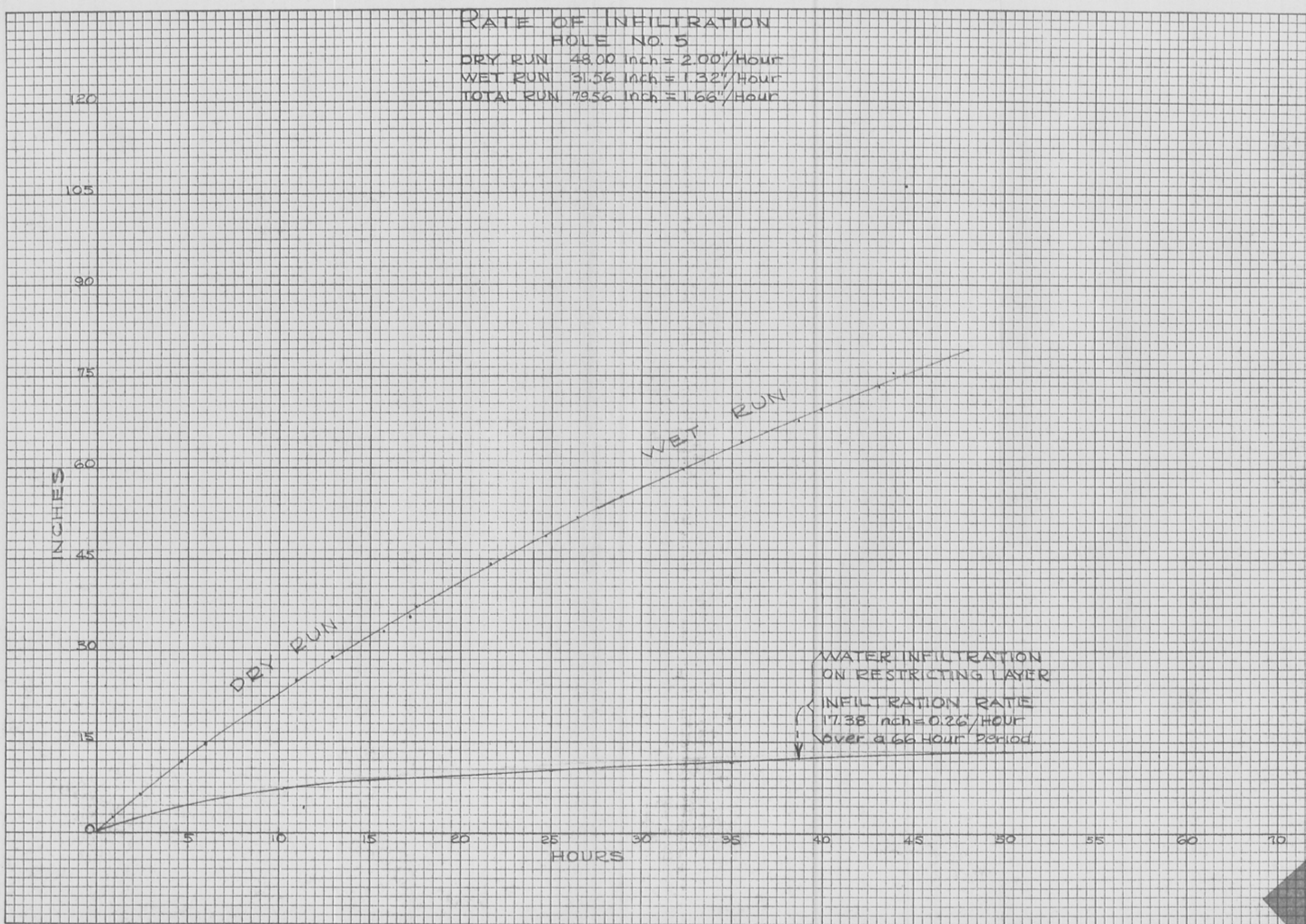
DRY RUN 40.56 Inch = 1.69"/Hour
WET RUN 26.75 Inch = 1.11"/Hour
TOTAL RUN 67.31 Inch = 1.40"/Hour



359-3L KEUFFEL & ESSER CO.
10 X 10 to the Inch.
MADE IN U. S. A.

RATE OF INFILTRATION
HOLE NO. 5

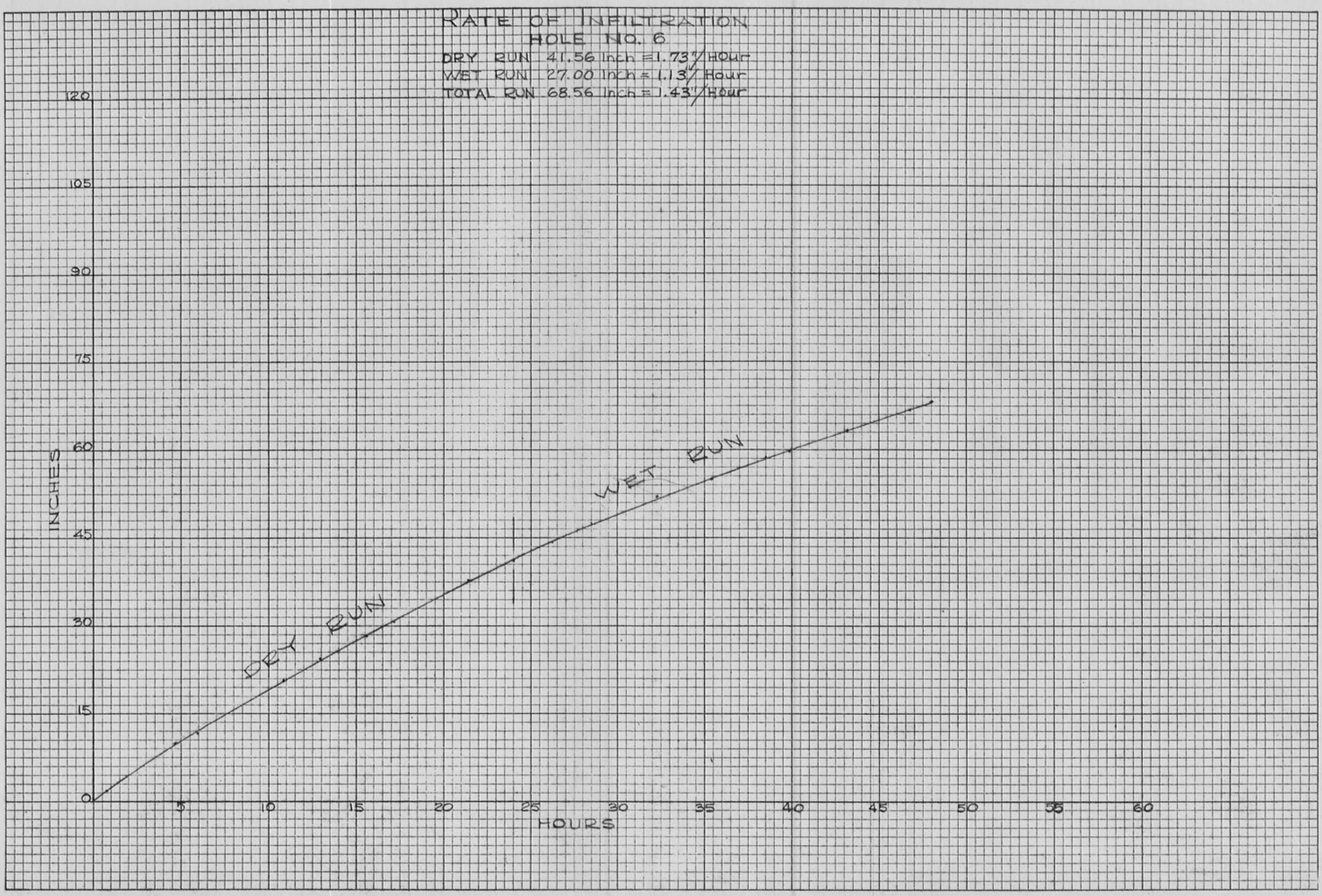
DRY RUN 48.00 Inch = 2.00"/Hour
WET RUN 31.56 Inch = 1.32"/Hour
TOTAL RUN 79.56 Inch = 1.66"/Hour



359-3L KEUFFEL & ESSER CO.
10 X 10 to the Inch.
MADE IN U.S.A.

RATE OF INFILTRATION
HOLE NO. 6

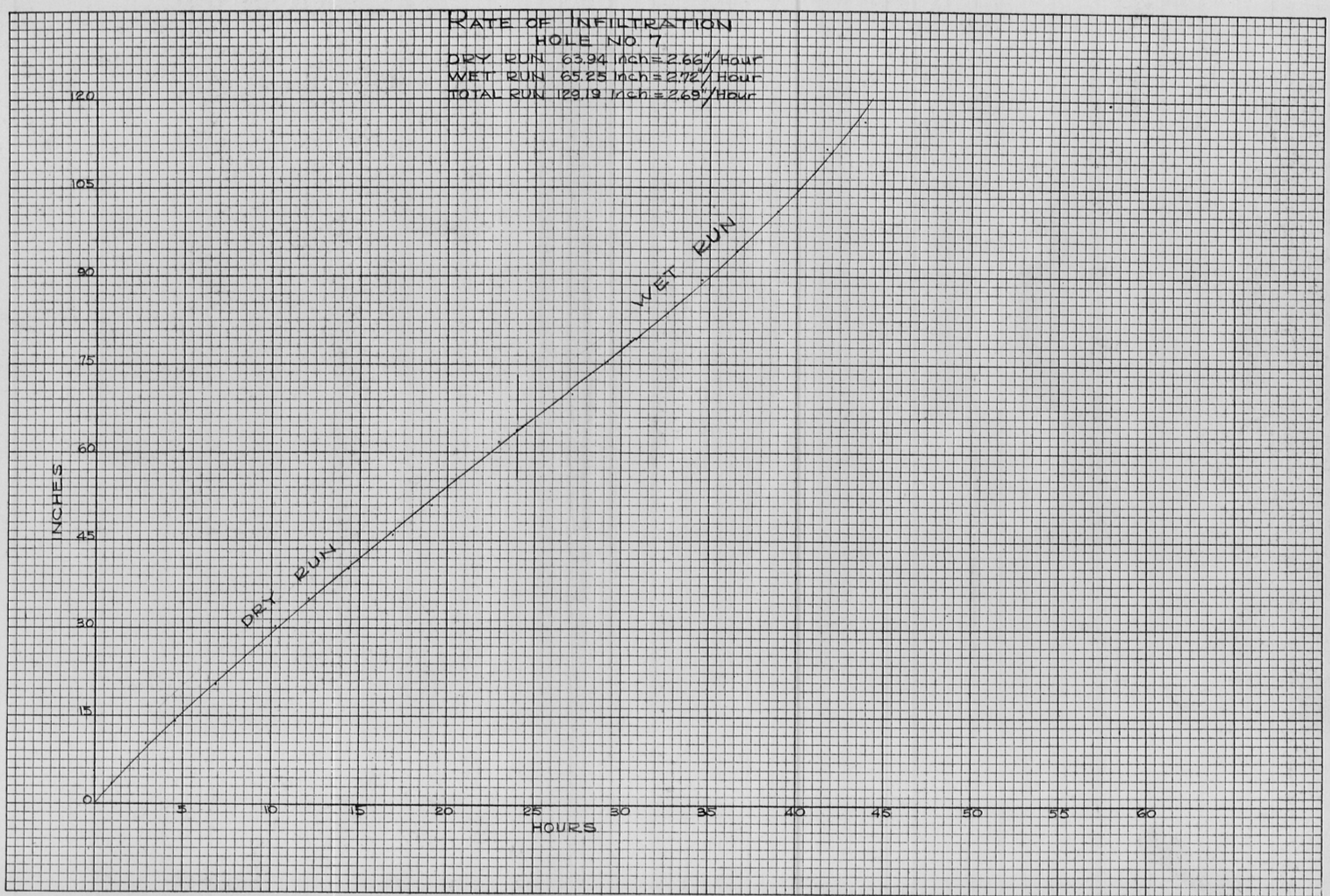
DRY RUN 41.56 Inch = 1.73" / Hour
WET RUN 27.00 Inch = 1.13" / Hour
TOTAL RUN 68.56 Inch = 1.43" / Hour



359-5L KEUFFEL & ESSER CO.
10 X 10 to the inch.
MADE IN U.S.A.

RATE OF INFILTRATION
HOLE NO. 7

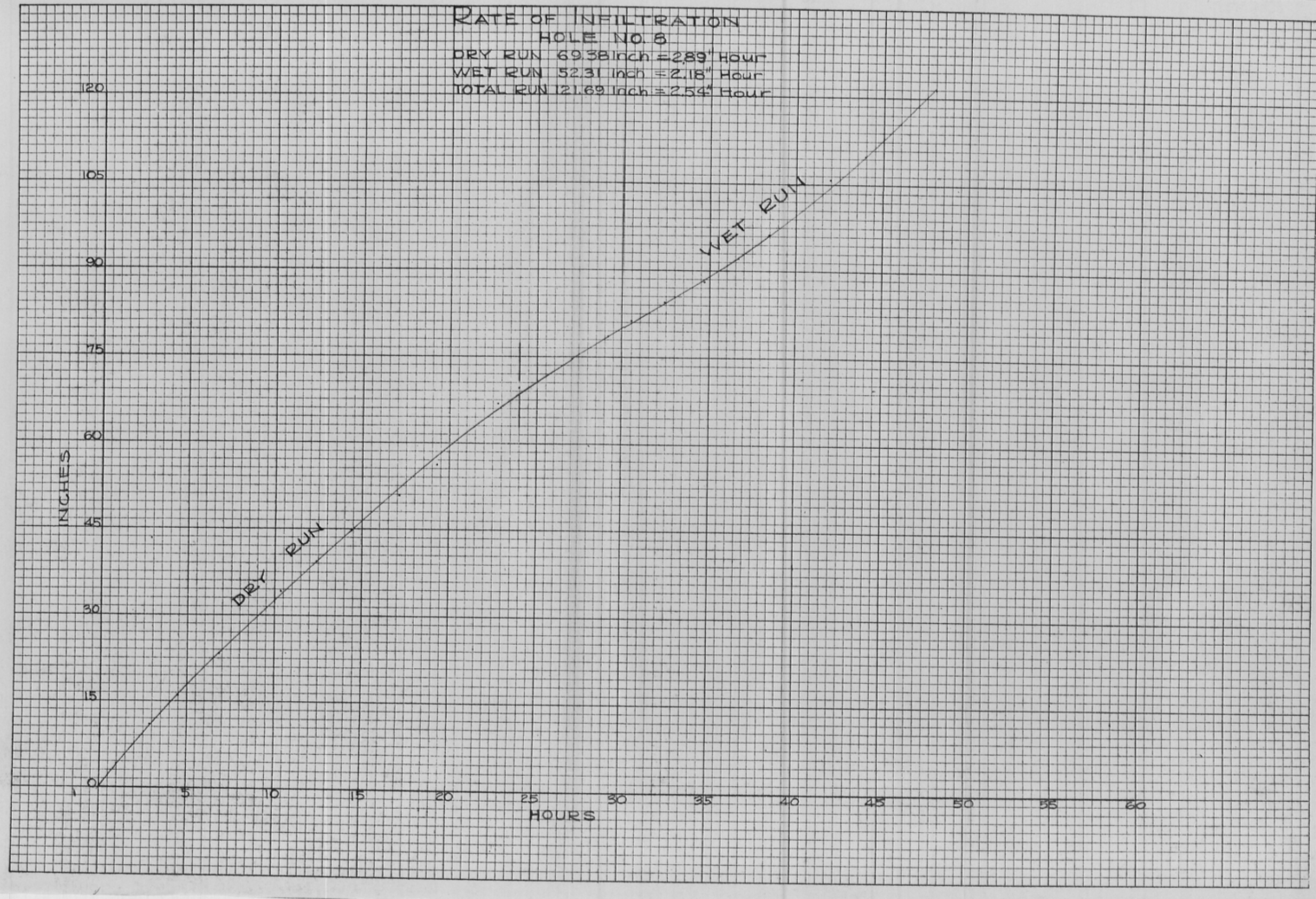
DRY RUN 63.94 Inch = 2.66" / Hour
WET RUN 65.25 Inch = 2.72" / Hour
TOTAL RUN 129.19 Inch = 2.69" / Hour



359-SL KEUFFEL & ESSER CO.
10 X 10 to the inch.
MADE IN U.S.A.

RATE OF INFILTRATION
HOLE NO. 8

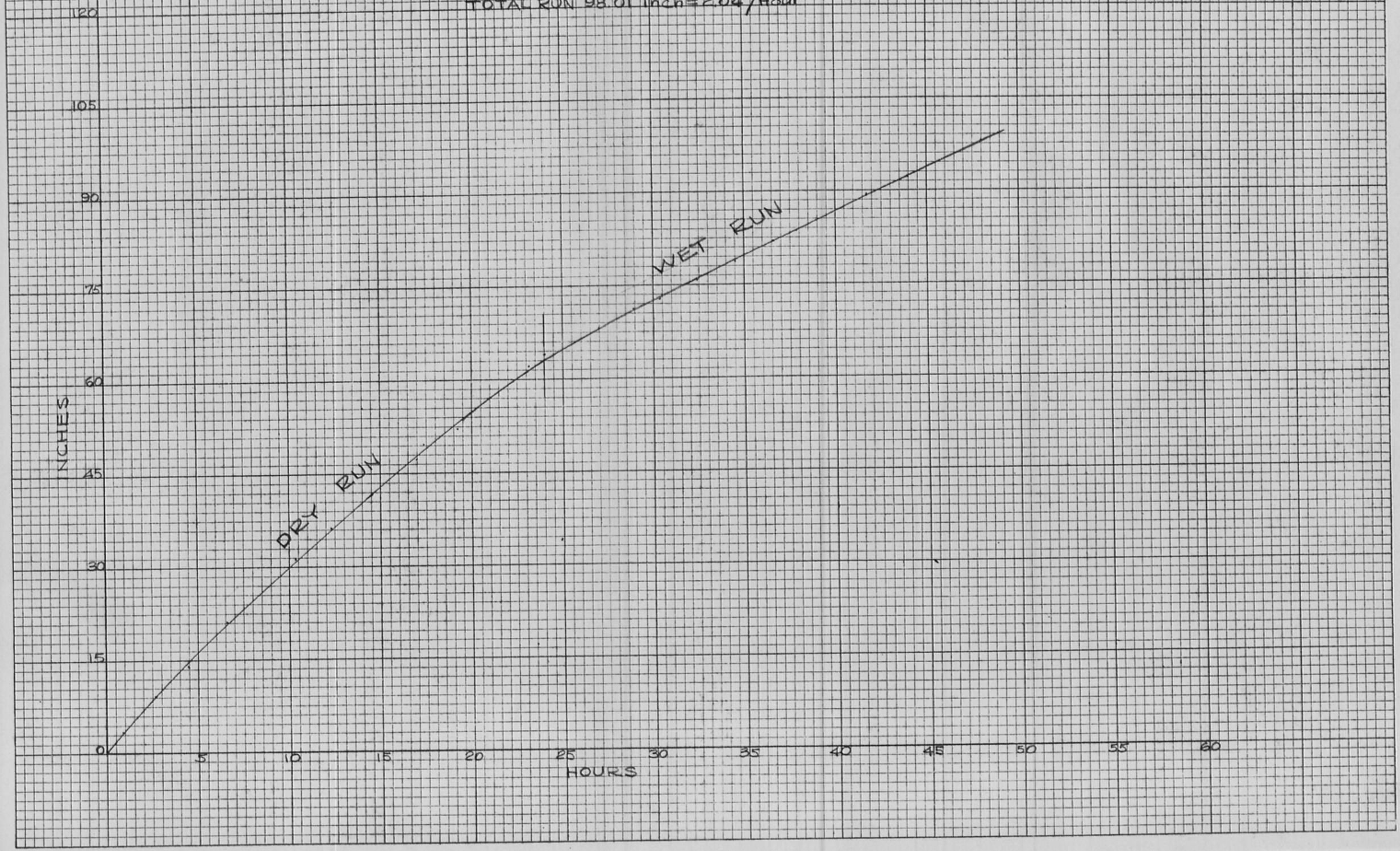
DRY RUN 69.38 Inch = 2.89" Hour
WET RUN 52.31 Inch = 2.18" Hour
TOTAL RUN 121.69 Inch = 2.54" Hour



359-5L KEUFFEL & ESSER CO.
10 X 10 to the Inch.
MADE IN U.S.A.

RATE OF INFILTRATION
HOLE NO. 9

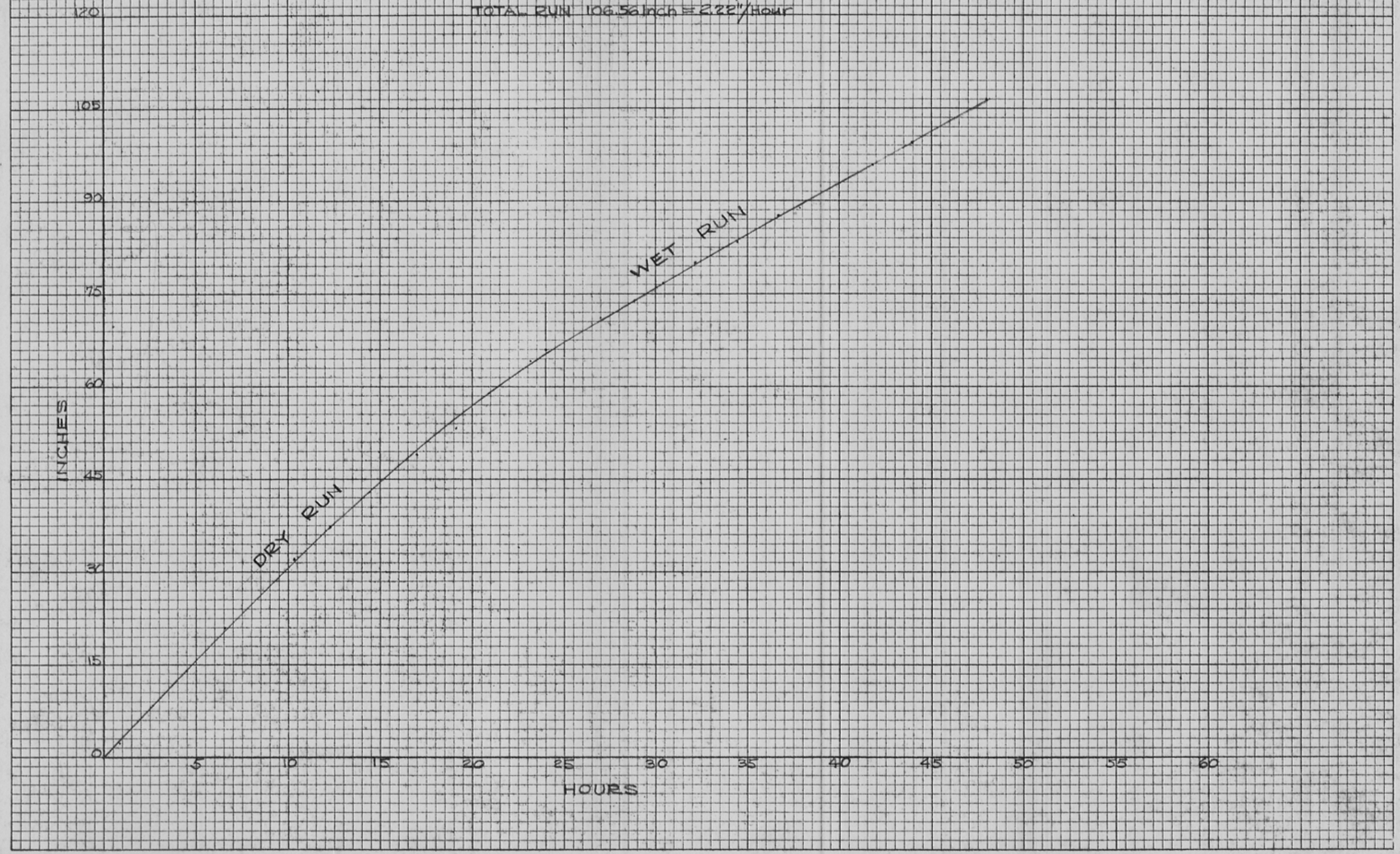
DRY RUN 64.13 Inch = 2.67"/Hour
WET RUN 33.88 Inch = 1.41"/Hour
TOTAL RUN 98.01 Inch = 2.04"/Hour



359-SL KEUFFEL & ESSER CO.
10 X 10 to the inch.
MADE IN U.S.A.

RATE OF INFILTRATION
HOLE NO. 10

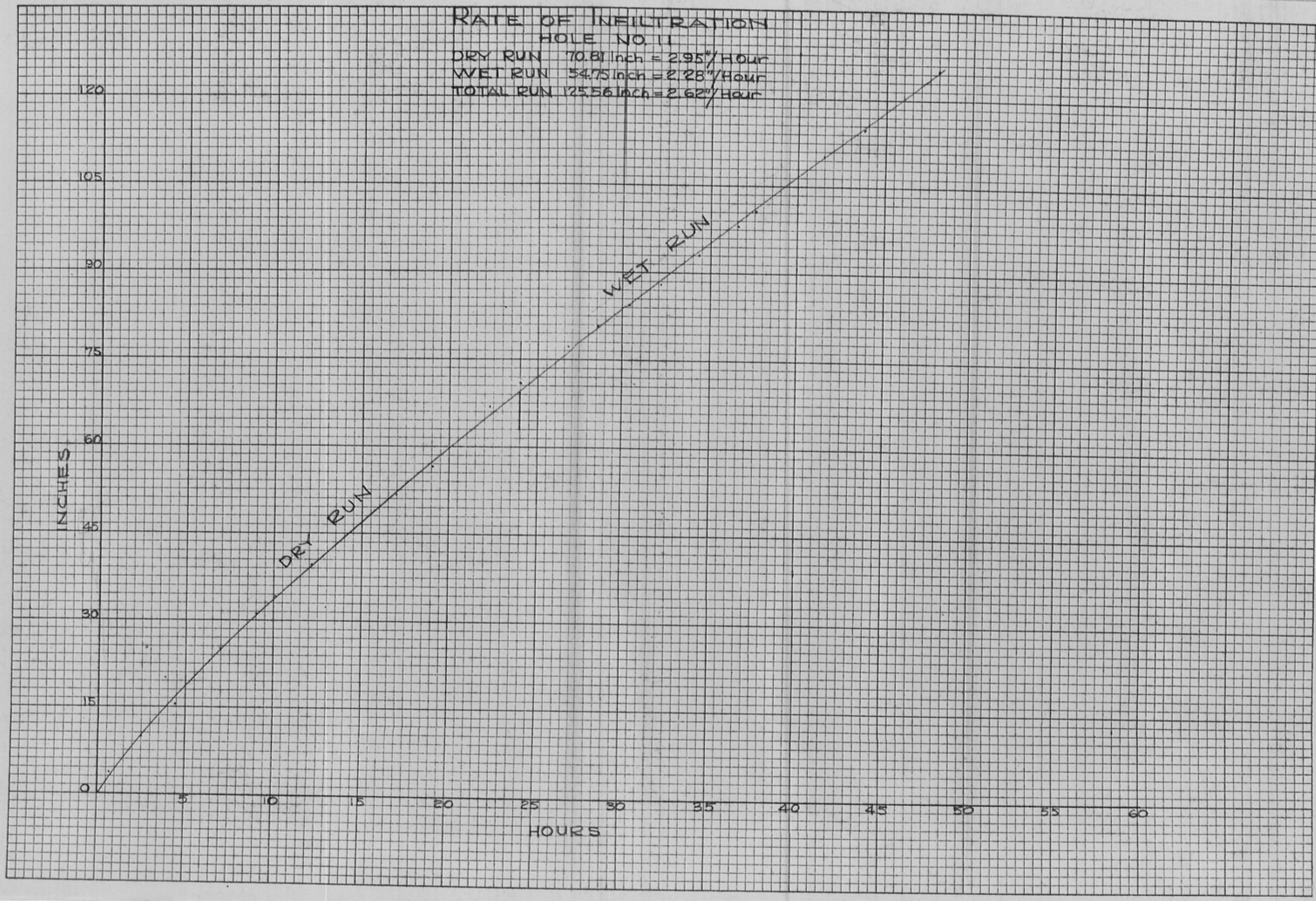
DRY RUN 66.00 Inch = 2.75"/Hour
WET RUN 40.56 Inch = 1.69"/Hour
TOTAL RUN 106.56 Inch = 2.22"/Hour



359-5L KEUFFEL & ESSER CO.
10 X 10 to the Inch.
MADE IN U.S.A.

RATE OF INFILTRATION
HOLE NO. 11

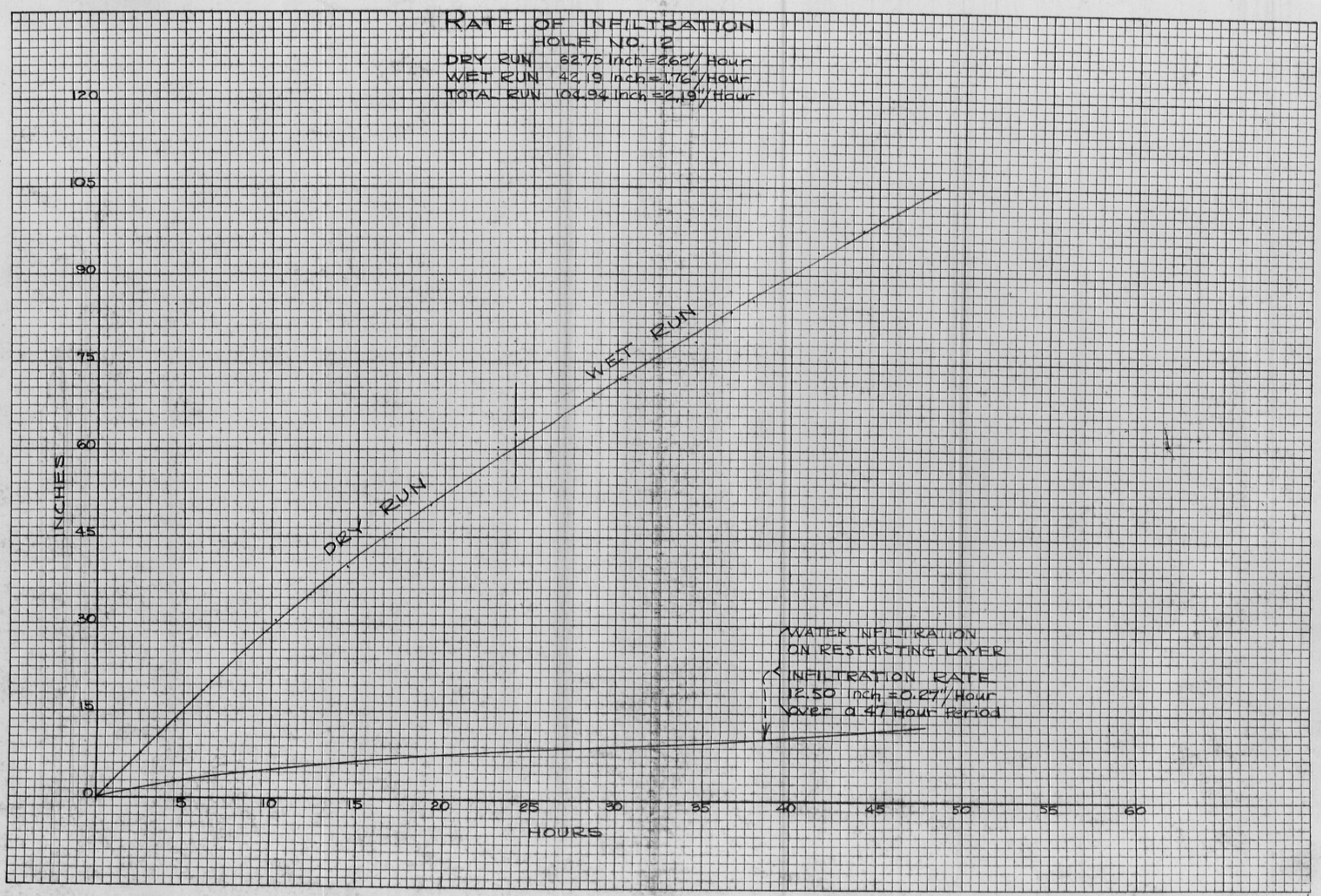
DRY RUN 70.81 Inch = 2.95"/Hour
WET RUN 54.75 Inch = 2.28"/Hour
TOTAL RUN 125.56 Inch = 2.62"/Hour



359-5L KEUFFEL & ESSER CO.
10 X 10 to the inch.
MADE IN U.S.A.

RATE OF INFILTRATION
HOLE NO. 12

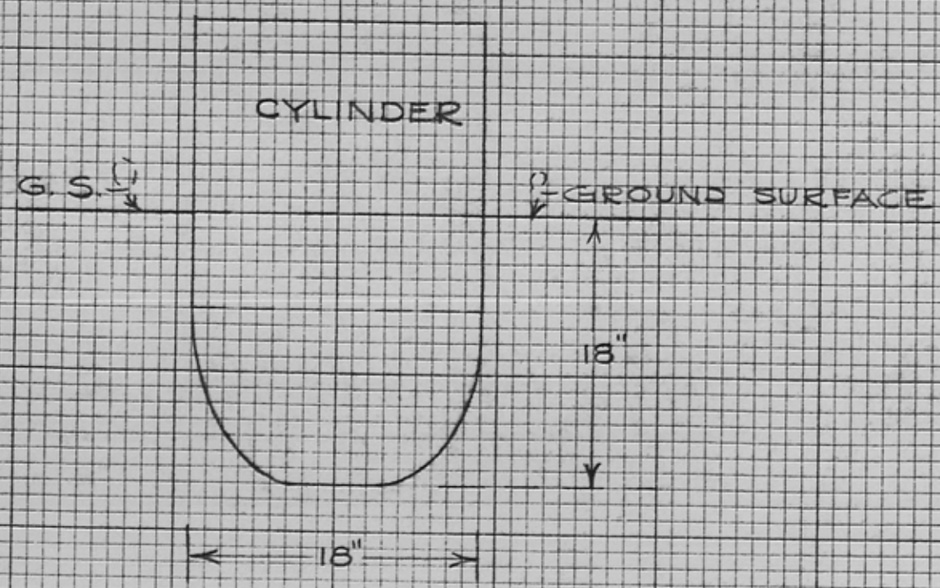
DRY RUN 62.75 Inch = 2.62" / Hour
WET RUN 42.19 Inch = 1.76" / Hour
TOTAL RUN 104.94 Inch = 2.19" / Hour



359-5L KEUFFEL & ESSER CO.
10 X 10 to the Inch.
MADE IN U.S.A.

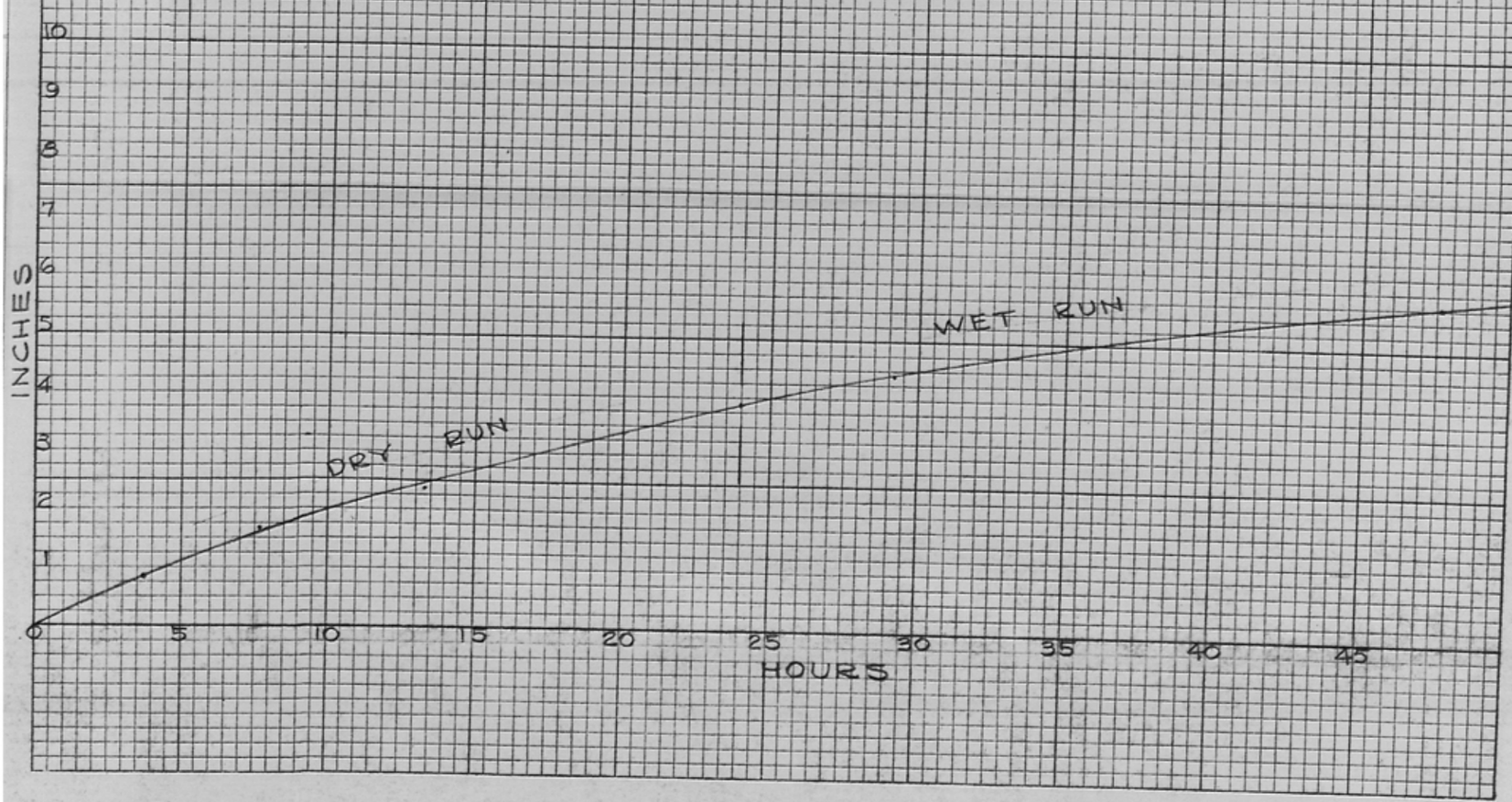
359-5L KEUFFEL & ESSER CO.
10 × 10 to the inch.
MADE IN U. S. A.

Pattern of Infiltration
Slick Spot No. 1



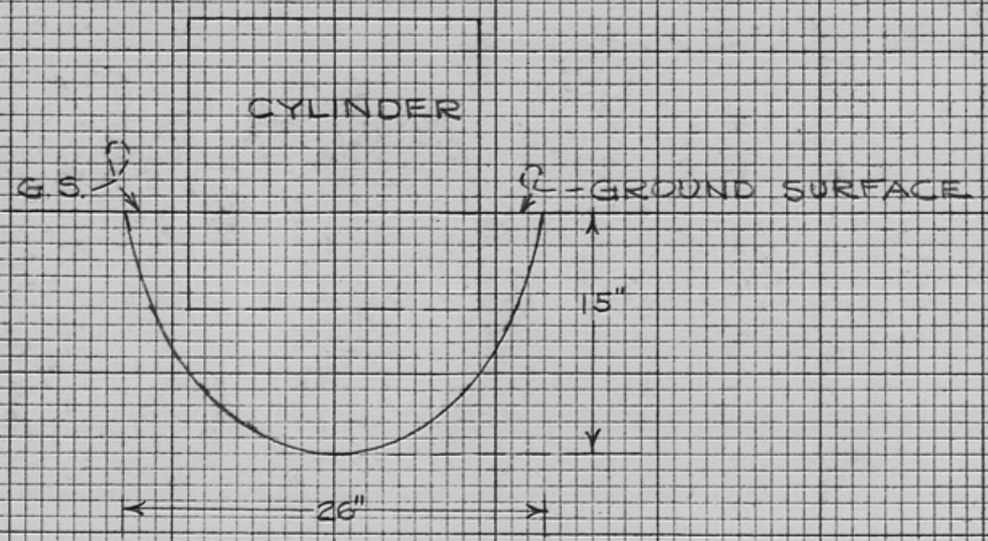
Rate of Infiltration
Slick Spot No. 1

DRY RUN 3.94 inch = 0.16"/Hour
WET RUN 1.81 inch = 0.08"/Hour
TOTAL RUN 5.75 inch = 0.12"/Hour



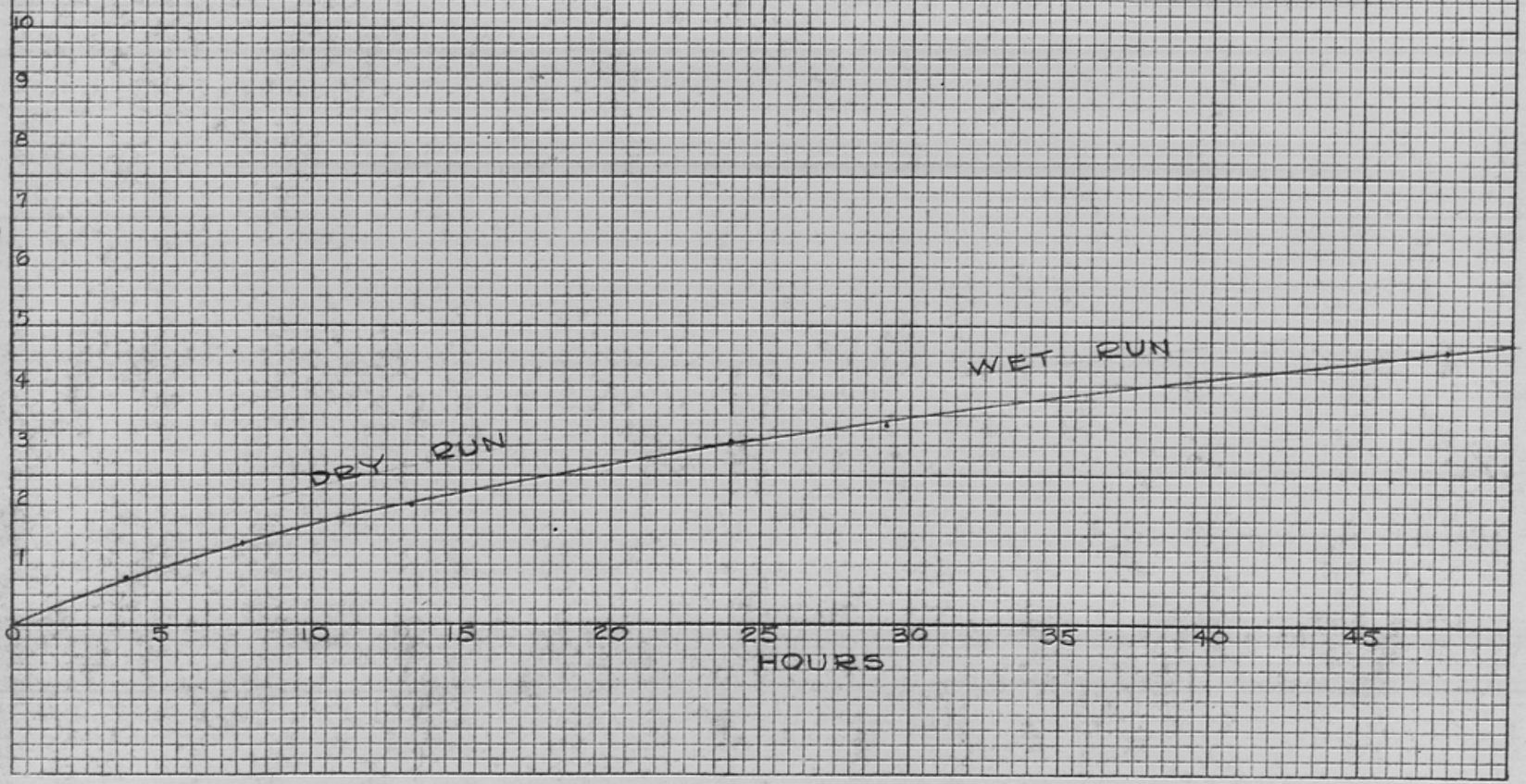
359-5L KEUFFEL & ESSER CO.
10 × 10 to the inch.
MADE IN U. S. A.

PATTERN OF INFILTRATION
SLICK SPOT NO. 2



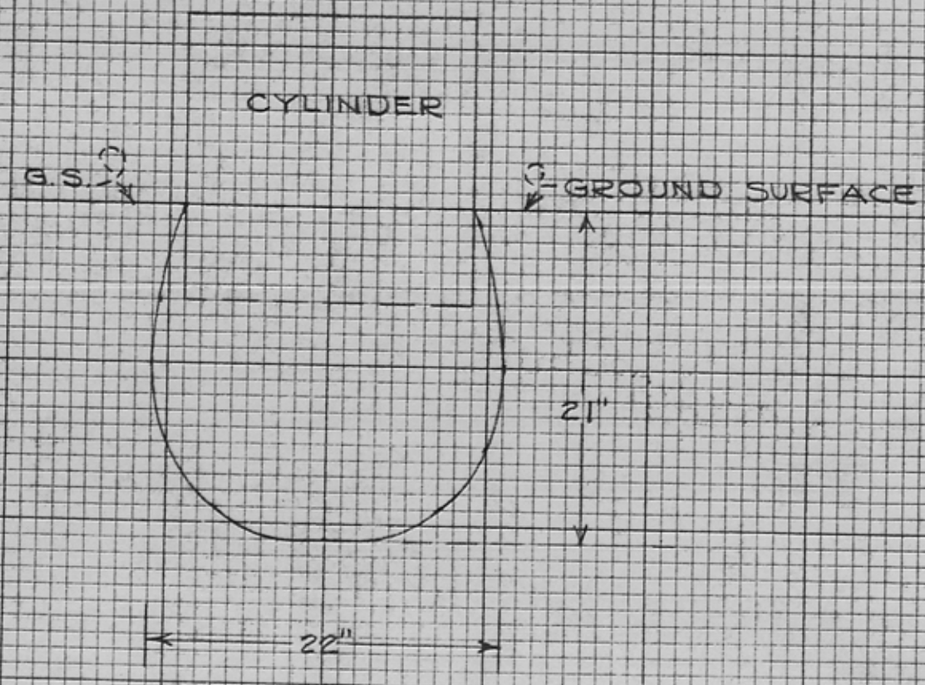
RATE OF INFILTRATION
SLICK SPOT NO. 2

DRY RUN 3.06 Inch = 0.13" / Hour
WET RUN 1.50 Inch = 0.06" / Hour
TOTAL RUN 4.56 Inch = 0.10" / Hour



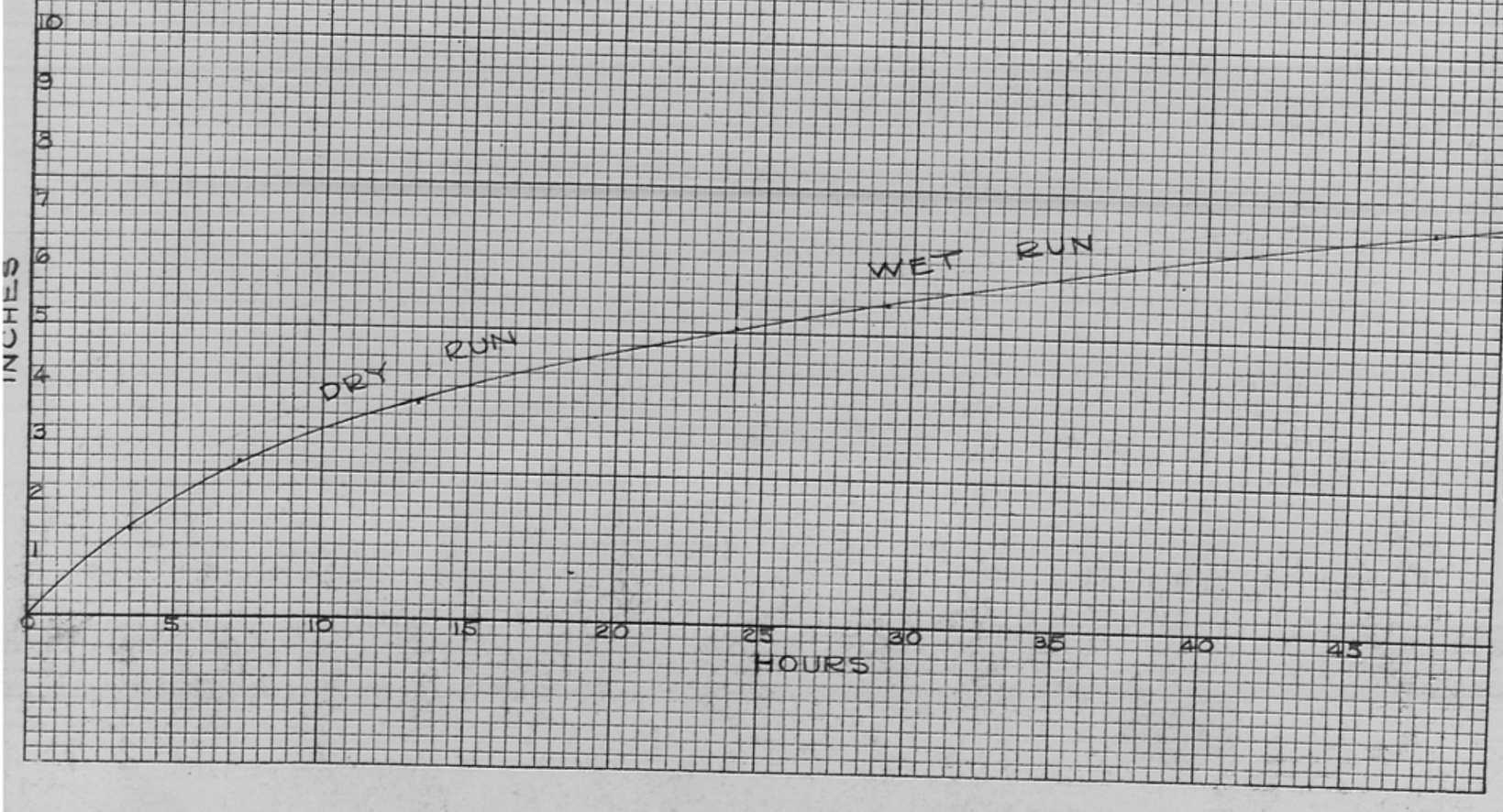
359-SL KEUFFEL & ESSER CO.
10 × 10 to the inch.
MADE IN U. S. A.

Pattern of Infiltration
Slick Spot No. 3



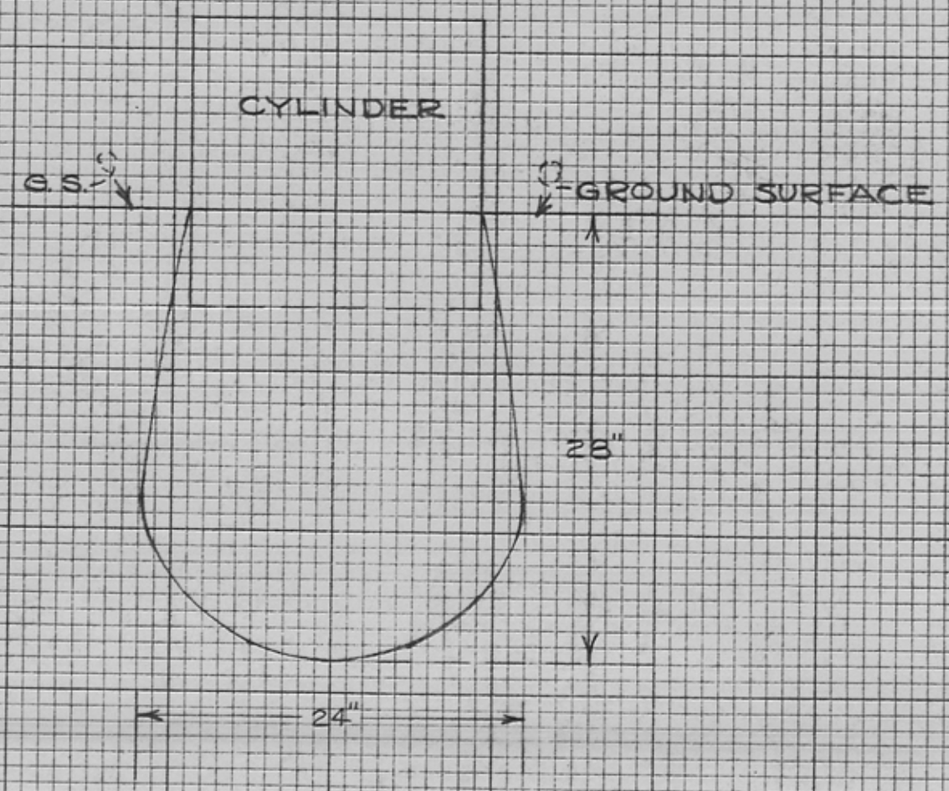
Rate of Infiltration
Slick Spot No. 3

DRY RUN	5.06 Inch = 0.21"/Hour
WET RUN	1.88 Inch = 0.08"/Hour
TOTAL RUN	6.94 Inch = 0.15"/Hour



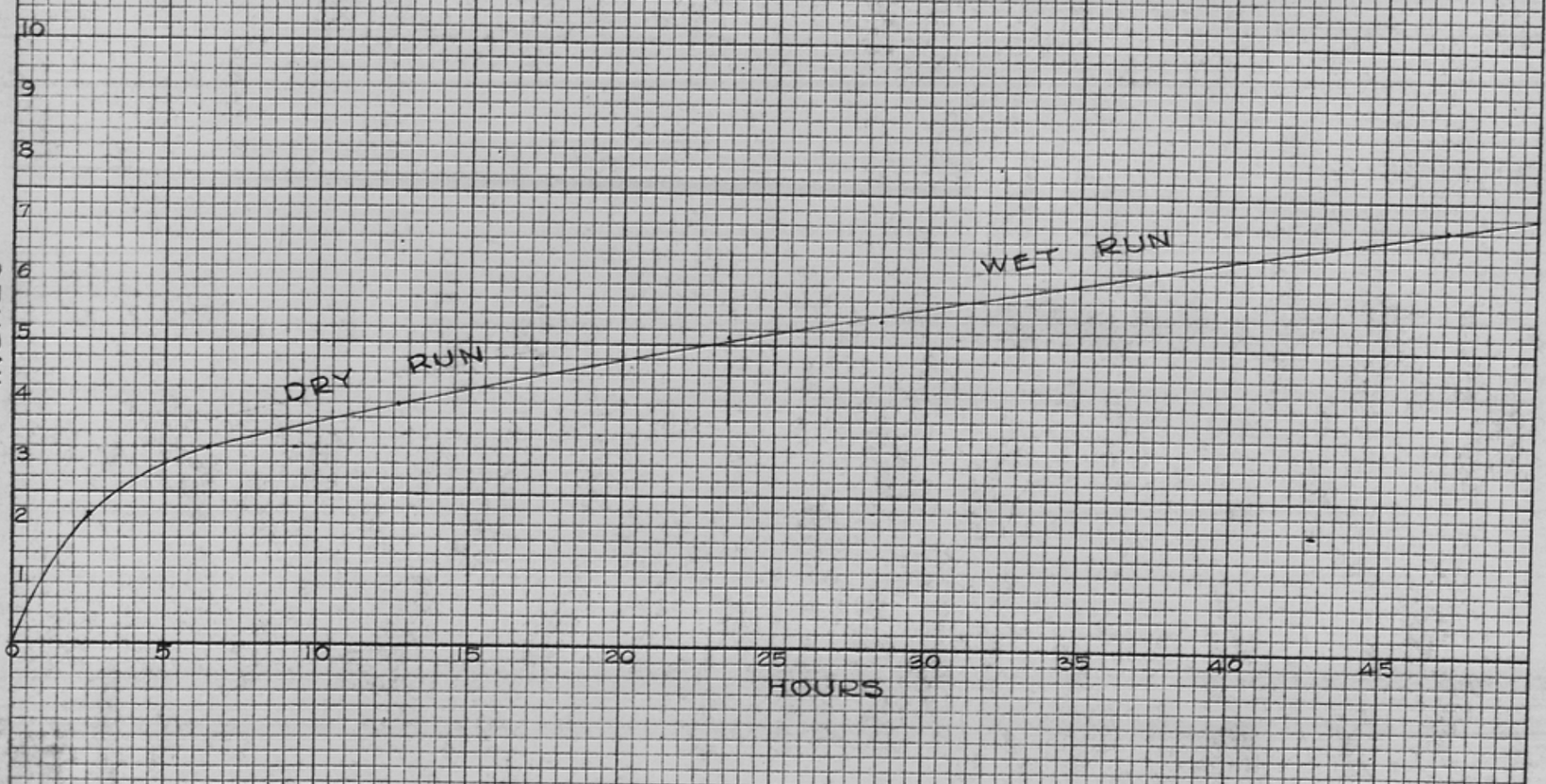
359-3L KEUFFEL & ESSER CO.
10 × 10 to the inch.
MADE IN U. S. A.

Pattern of Infiltration
Slick Spot No. 4



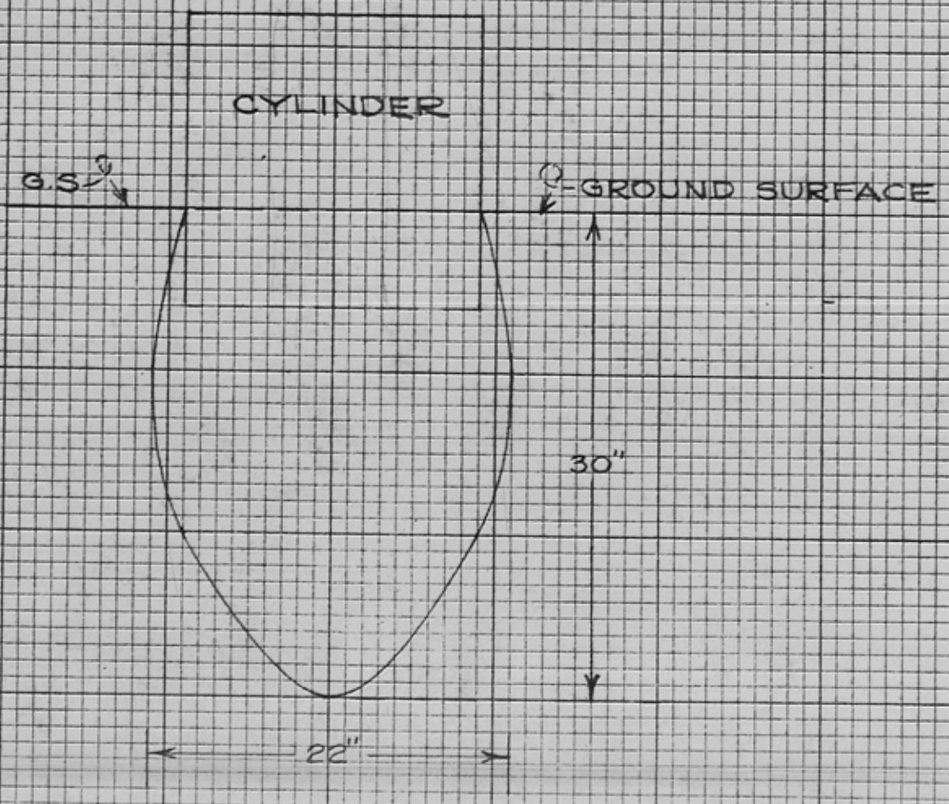
Rate of Infiltration
Slick Spot No. 4

DRY RUN 5.06 Inch = 0.21"/Hour
WET RUN 1.94 Inch = 0.08"/Hour
TOTAL RUN 7.00 Inch = 0.15"/Hour



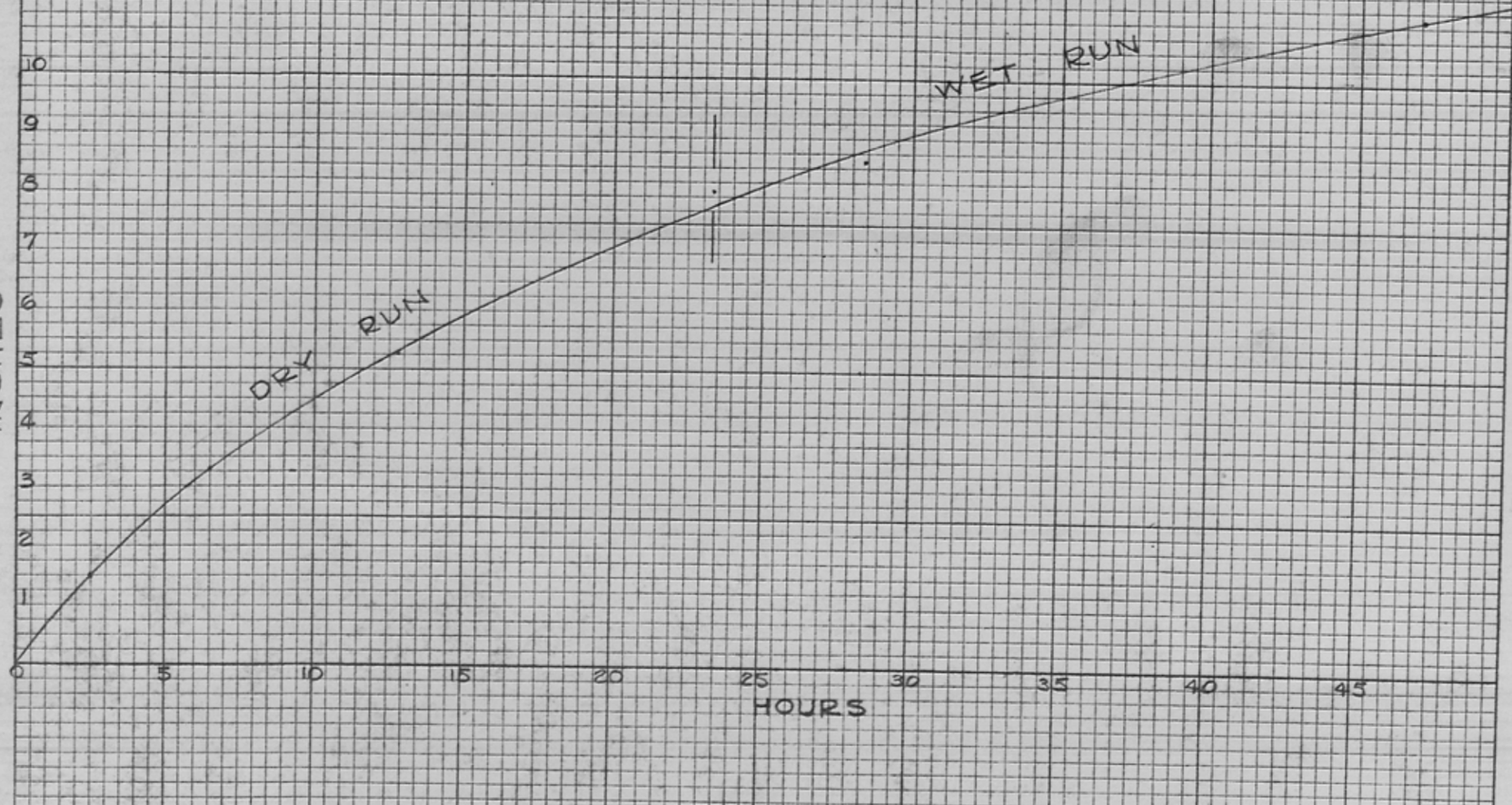
359-3L KEUFFEL & ESSER CO.
10 × 10 to the inch.
MADE IN U. S. A.

Pattern of Infiltration
Slick Spot No. 5



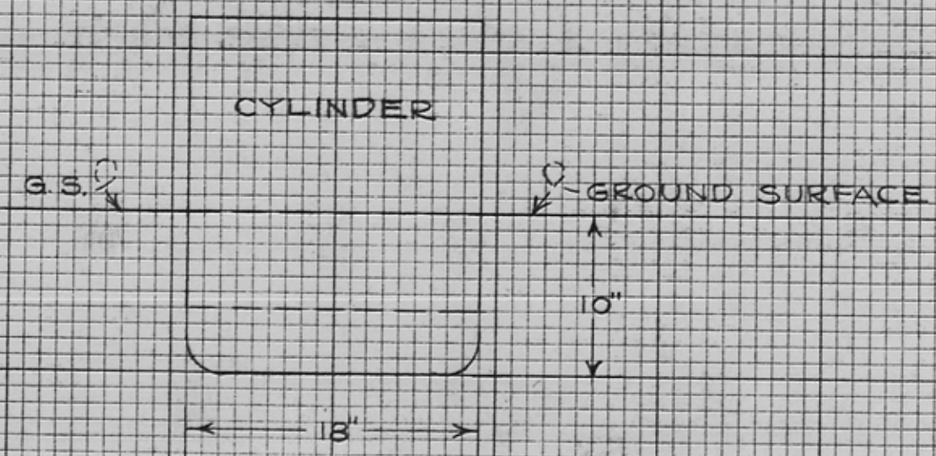
Rate of Infiltration
Slick Spot No. 5

DRY RUN 8.06 Inch = 0.34"/Hour
WET RUN 3.06 Inch = 0.13"/Hour
TOTAL RUN 11.12 Inch = 0.23"/Hour



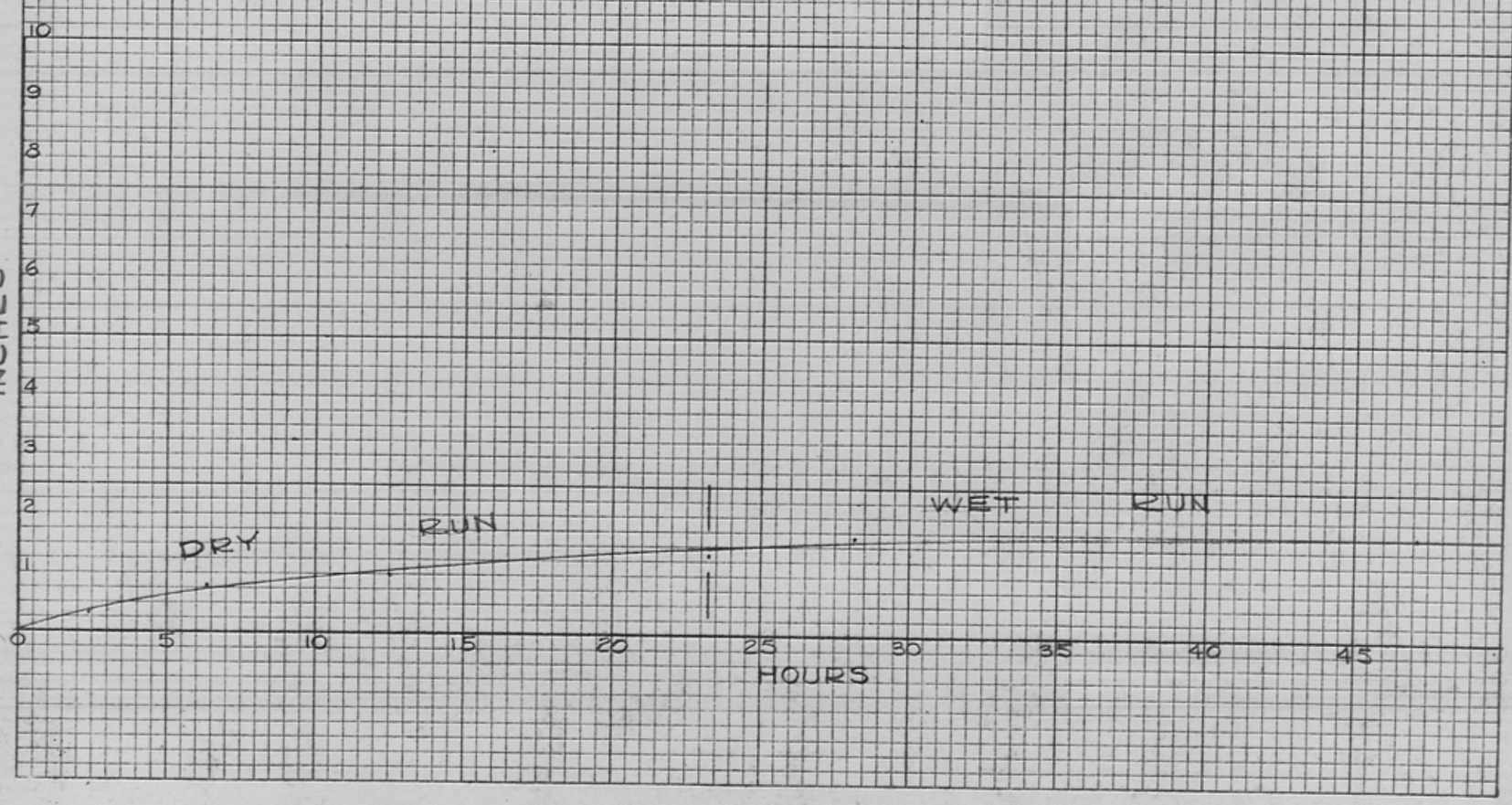
359-5L KEUFFEL & ESSER CO.
10 × 10 to the inch.
MADE IN U. S. A.

Pattern of Infiltration
Slick Spot No. 6



Rate of Infiltration
Slick Spot No. 6

DRY RUN 1.38 Inch = 0.06"/Hour
WET RUN 0.31 Inch = 0.01"/Hour
TOTAL RUN 1.69 Inch = 0.04"/Hour

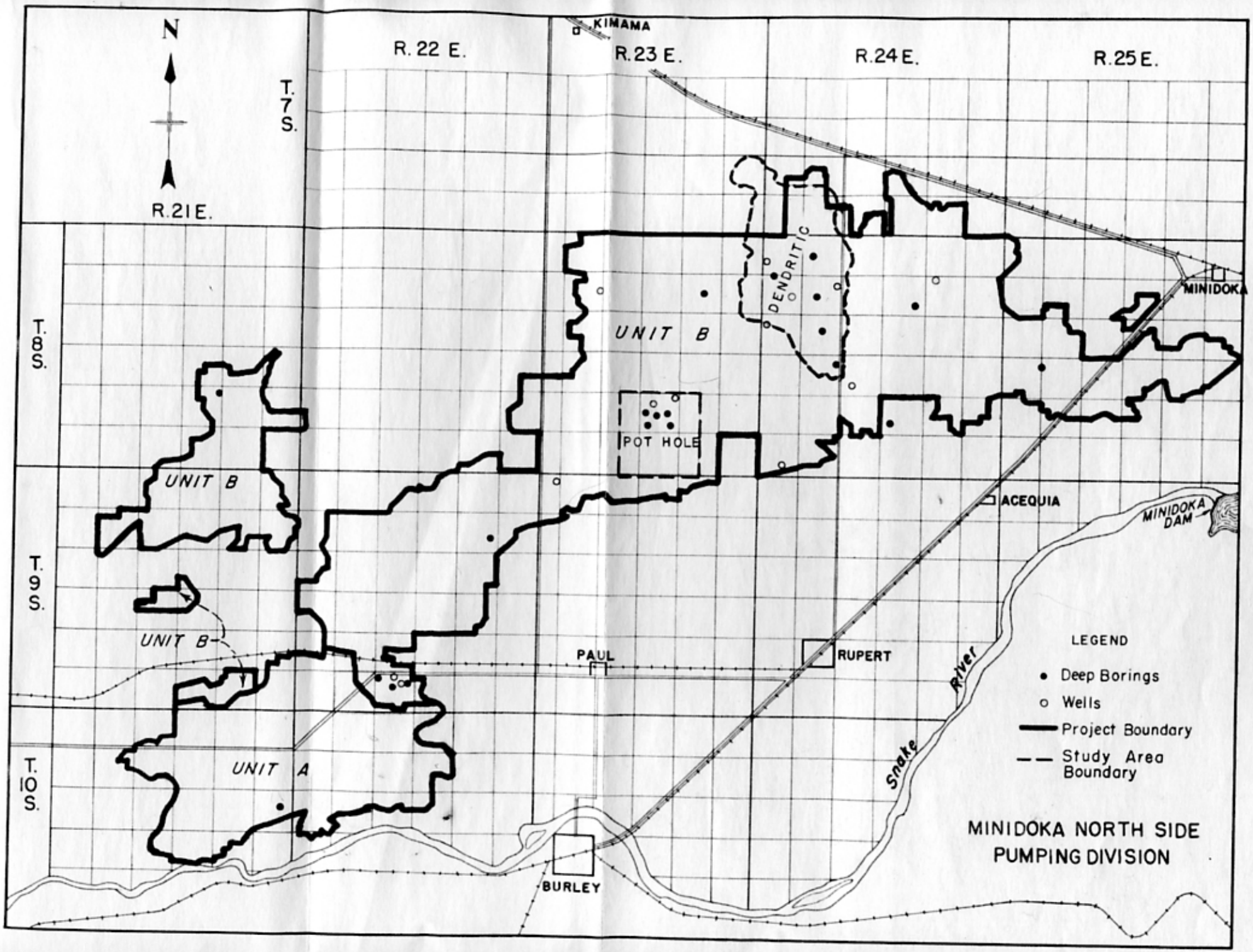


Deep Borings

To determine the nature of the soil material between the surface five-foot layer and the basalt bedrock, one deep boring was made in each township and additional borings were made in problem areas (see location map), employing an auger which readily penetrated to the rock. The subsoil over the basalt in most of the area is loose, floury, loessal very fine sandy loam and silt loam--nearly ideal material from a drainage standpoint. Lands in a narrow strip bordering Highway 25 near the old prisoner-of-war camp had deep-lying clay layers, but these layers were below 20 feet and occurred in only a few small areas of the strip, indicating that side movement of water through more permeable stratas would provide adequate sub-drainage. Except for this strip totaling some 300 acres, upon which additional drainage investigations are being undertaken, there appears to be no need for deep drains in connection with irrigation development.

That the basalt which underlies the entire area is generally permeable is evident from examination of basalt exposures adjacent to the area and the heavy canal losses through deep percolation from the Milner Gooding canal which has largely been blasted out of basalt along the west boundary of the area. Exposed lava swells and ridges nearly surround the division and these outcrops show pressure ridges and cracks, some of which manifest a sucking and blowing action which is caused by diurnal atmospheric pressure variations.

Five borings in a pothole area which collects surface runoff from irrigated test farms showed no free water accumulation on top of the basalt although soil immediately above the rock was saturated. Areas underlain by solid basalt apparently are not sufficiently extensive to cause development of a perched water table. In any event, the unimpeded lateral movement of water indicated by infiltration experiments would preclude the danger of such development.


N
R.21E.
T.7S.
R.22 E.
KIMAMA
R.23 E.
R.24E.
R.25E.
MINIDOKA
T.8S.
UNIT B
DENDRITIC
POT HOLE
UNIT B
ACEQUIA
MINIDOKA DAM
T.9S.
UNIT B
PAUL
RUPERT
Snake River
T.10S.
UNIT A
BURLEY
LEGEND
Deep Borings
Wells
Project Boundary
Study Area Boundary
MINIDOKA NORTH SIDE
PUMPING DIVISION

Saline and Alkaline Soils

Soils containing alkali (neutral salts, sodium salts, combinations of these two, and slick spots which may have resulted from sodium saturation) occur in scattered patches throughout the division. The largest body of lands so affected contains about 600 acres along highway 25 west of Paul. Of this area the 240-acre southern portion has soils with high percentages of sodium in association with neutral salts. The second largest salty area contains about 325 acres five miles north of Paul. Soils of this area do not have high pH values but total salt concentrations range from less than 0.2 to more than 0.5 percent. Small salty spots are scattered along the boundaries but the total salty acreage does not exceed 1,500 acres (see salinity map). The soils are generally permeable and the higher concentrations occur in the loose parent material. Heavier water applications will effect reclamation, and the time required depends upon the salt concentration. Once the reclamation process is begun the soil shold not be allowed to dry out until the concentration is 0.2 percent or less. Salt-free areas will not become salty as a result of this process on contiguous lands because of the good internal drainage inherent to all division lands.

Soils with high percentages of exchangeable sodium lie in scattered locations. Even in the alkali problem areas their occurrence is spotty. Reclamation of these soils is not apt to greatly reduce the productivity of much adjoining land.

Data excerpted from a regional soils laboratory report on slick spots, saline areas, and permeability and moisture-retention characteristics of typical areas, based on soil samples from locations shown on the attached map, were presented in a foregoing section.

Slick Spots

Slick spots occur in various concentrations over the division and where widely scattered, present no problem. Where they occur close together the land is less valuable for farming. The spots range from wagon-wheel size to a half-acre in extent, but smaller sizes predominate. They commonly occur on flat areas and are concentrated near the sources of drainageways. The typical profile is two to five inches of vesicular silt loam over six inches to one foot or more of reddish-brown clay with columnar or prismatic structure, below which is the loessal soil common to most of the division land. The spots are relatively impermeable to water, therefore root penetration is inhibited and corrective measures must be adopted to obtain maximum crop production. Most of the slick spots can be reclaimed by mechanical mixing as pointed out in the region soils laboratory report as follows:

" . . . the only quick way to eliminate slick spots is to mechanically destroy them. The amount of gypsum sufficient to replace the exchangeable sodium is fantastic, ranging from 14 to 60 or more tons per acre of slick spot surface. Slick spots on group 10 soils can be eliminated by removing the top 9 to 14 inches of soil, scattering and mixing this soil with normal topsoil, and refilling and leveling. Apparently a one-to-one mixture . . represents the maximum amount of slick spot topsoil that can be satisfactorily mixed with normal topsoil without critically lowering the permeability of the mixture. In some instances the possibility of reclamation suggested for group 10 soils will apply to slick spots with group 30 soils, in others the slick spots are too deep for total mechanical correction especially where the soils are group 50."

LAND CLASSIFICATION

Selection of the project area from the approximately 123,000 acres of sagebrush land investigated was based on an integrated analysis of the lands, considering both physical and economic factors in terms of comparable developed lands and requirements for this specific project. An "arability" classification was accomplished by field study of the physical conditions, correlated with factors of economic productive capacity. A further determination of "irrigability" was then made by

correlating additional economic considerations.

Objectives

The major objective of the classification was to separate, according to suitability, lands satisfactory for irrigation development which are termed "arable" or "irrigable" from inferior, nonarable or non-irrigable lands. The term "arable land" as used here, is defined as land which, in adequate units and when properly provided with the essential improvements of leveling, drainage, buildings, irrigation facilities and the like, will have a productive capacity, under sustained irrigation agriculture, sufficient to: meet all production expenses, including a reasonable return on investment; repay reasonable irrigation and improvement costs; and provide a satisfactory level of living for the farm family. "Irrigable land" is defined as arable land for which a water supply is available and which is provided with or planned to be provided with irrigation, drainage, flood protection, and other facilities as necessary for sustained irrigation utilization.

Methods

The survey was recorded on acetate overlays employing aerial photographs and detailed topography scaled 400 feet to the inch. The coverage was such that no essential feature was so far removed from a traversed line or located point that it could not be delineated satisfactorily. To properly appraise surface and subsoils, borings or pits to five-foot depths were made in at least each sixteenth corner. Profile samples collected from borings in each quarter corner and additional borings where required for accurate delineation were tested in the field laboratory for total salts, pH, and lime content. In areas where such content was the limiting factor, these tests provided essential data for the classification.

The investigated lands were initially separated into six classes, of which classes 1, 2, and 3 were arable, class 4 was limited arable, class 5 was temporarily non-arable pending further economic or engineering study, and class 6 was non-arable or unfit for irrigation farming.

Subsequent economic considerations as indicated in the attached letter of April 3, 1951, subject: land classification in relation to farm unit layout, resulted in deleting the class 4 lands from the irrigable category.

The class 5 lands were re-studied and reclassified in accordance with results of the study into the proper categories.

Additional details of the various factors involved in the final "irrigability" classification, particularly relating to the "X"-designated areas of the investigated area and their disposition, are presented ina following section.

In the mapping procedure (illustrated by the attached prints of tracings made from the field sheets) fraction symbols were used to record land characteristics as follows: The first digit of the numerator indicates the class of land, the following symbols s, t, or d indicate deficiencies in soil, topography, or drainage. The denominator may contain a Y indicating a problem followed by ss (slick spot) or alk (alkali), or where no problem exists, begins with the number indicating the soil group. For example in the number 124, the 1 indicates the soil group, the two indicates the sub-group, and the four indicates texture of the plow zone. This number, when followed by a numeral such as 16, indicates depth to the first critical condition in the profile such as lime accumulation zone or basalt bedrock. The final denominator letters A, B, or C denote the general gradient of the land body and a, b, or c designates the surface relief. On class 5 lands these figures precede the land class symbol which is in parentheses.

Standards and Specifications

Standards and specifications for the survey were formulated after observation of the area prior to initiation of the survey, and were based upon studies of correlation areas and Bureau records of operating projects. The soils were grouped into categories based upon subsoil characteristics relating to potential value under irrigation farming. The standards and specifications are listed on the attached charts.

Correlation Areas

As an aid in establishing suitable land classification standards and to coordinate the land classification and economic investigations, areas in the neighboring agricultural communities having similar lands,

PRELIMINARY SOIL PROFILE GROUPS AND CLASS WITH OTHER LAND FACTORS FAVORABLE, MINIDOKA NORTH SIDE EXTENSION PROJECT, RUPERT, IDAHO

SOIL GROUP NUMBER AND CHARACTERISTICS	SUB GROUP NUMBER AND CHARACTERISTICS 1/	SOME LIMITING CONDITIONS 2/	DEPTH IN 3/ INCHES	CLASS 4/
NUMBER 10 Permeable soils with no root restrictions. Basalt bedrock at depths over 54". Subsoil may be nodular but does not restrict roots.	110--- Sandy surface soils underlain by sand or loamy sand subsoil.	Soil texture must be at least a heavy loamy sand throughout profile.	60	3s
	120--- Medium textured calcareous subsoils. May have slight to medium compaction.	Depths to penetrable lime zone. " " " " "	14+ 14-	1 2s
	130--- Same as number 120 except for position. Occurs in drainageways.	Depths to penetrable lime zone.	18+	1 5/
	140--- Same as 210 except well drained.	Depth to penetrable lime zone.	18+	1 5/
NUMBER 20 Enclosed basin soils. Generally heavy textured throughout profile.	210--- Non-calcareous surface soils. Collodial staining. Very apparent structured development.	Will generally be non-arable because of drainage factor. Position generally unfavorable.		6d
NUMBER 30 Weakly cemented or very compacted subsoils restricting roots but having penetrable understrata.	310--- Very compact or weakly cemented semi-permeable subsoils. May be nodular or platy. Understrata not compact and generally contains small lime basalt particles.	Depth to zone restricting roots. " " " " " " " " " "	12-24 24-36 36+	4p 3s 2s
	320--- Root restriction throughout subsoil.	Same limiting conditions as 310.		
NUMBER 40 Thin impervious limey caliche like layer, stops roots. Permeable profile above and below.	410--- This soil is expected to respond favorably to subsoiling. Thin layer impenetrable to roots.	Depth to thin impervious layer. " " " " " " " " " "	12-30 30-42 42-54	5 (2s) 3s 2s
NUMBER 50 Substrata, indurated, hardpan, nodular or platy. Stops roots.	510--- Impenetrable to roots. Hardpan of such a nature that subsoiling believed impossible. May have thin limey cappings with softer material between.	Depth to impenetrable layer. " " " " " " " " " " " "	16-24 24-30 30-42 42-54	4p 3s 3s 2s
NUMBER 60 Impenetrable, indurated lime hardpan (caliche). Stops roots.	610--- Hardpan of such a nature that subsoiling believed impossible.	Depth to hardpan. " " " " " "	16-24 24-36 36-45	4p 4p 3s
NUMBER 70 Creviced basalt bedrock at less than 54". Roots stop on bedrock.	710--- Creviced basalt bedrock at less than 54".	Depth to creviced basalt bedrock. " " " " " " " " " " " " " " "	16-24 24-30 30-42 42-54	4p 3s 3s 2s
NUMBER 80 Scabland Shallow rock or hardpan or indurated lime layer.	810---	Depth to rock, hardpan or indurated lime layer.	16"	6s

1/ Mapping number, textural and depth symbols to be added in the field.
2/ If grade is lowered for some factor other than soil, topography, or drainage, the letter X will precede the class number and the reason will be put in parenthesis immediately following. Example: X3s (alkali).
3/ Depths to be added as fractions to sub-group number. Example: 510.26. the .26 indicates the area is 26" deep to indurated substrata, etc.
4/ High areas are to be outlined on field sheets and classified in parenthesis. 5h should precede the parenthesis.
Example:

$$\frac{5h(1)}{120.24\ As}$$

5/ Generally will be grade lower because of position in drainageways.

SOIL TEXTURE NUMBER

1 -- Sands
2 -- Loamy sands and loamy fine sands.
3 -- Sandy loams and fine sandy loams.
4 -- Loams, silts, and very fine sandy loams.
5 -- Silty clay loams, and light clay loams.
6 -- Very permeable, friable clays.
7 -- Permeable heavy clays.
8 -- Intractable, slowly permeable clays.

SLOPE

A -- 0-3 %
B -- 3-7 %
C -- 7-12%
D -- 12-18%
E -- 18% plus

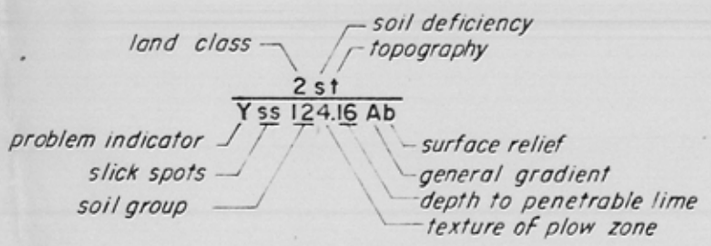
TOPOGRAPHY

SURFACE RELIEF

a -- Smooth. Floating or light grading.
b -- Irregular. Requires moderate grading on A slopes. May require some grading on B slopes.
c -- Irregular or undulating. Requires moderate grading on B slopes or C and D slopes where grading is not feasible and would require short runs.
d -- Strongly irregular. Grading not feasible. Irrigation not feasible.

LAND USE SYMBOLS

I -- Irrigated
Sg -- Sagebrush
X -- Idle, has been cleared but is not now being farmed. No clearing cost.
O -- Dry grain land.



Key Revisions

Explanation and corrections for footnotes above:

2/ Land areas originally mapped X 3 s (Alkali) etc., have been changed on the tracings of the field sheets according to the following interpretation:

X 3 s (alkali) changed to $\frac{3\ s}{Ya}$ X 2 s t (SS) or (slickspots) changed to $\frac{2\ s\ t}{Yss}$

$\frac{5\ (2s)}{414.26\ Aa}$ subsoiling problem due to thin hard layer $\frac{2\ s}{Y\ sub\ 414.26\ Aa}$

This was done to avoid confusing this symbolizat on with the X - 1, X - 2. etc., which was used areawise in the selection of the project lands. The Ya and Yss segregation draws attention to special problem areas which when ameliorated will likely result in a high quality of land.

/ The decimal fraction may represent the depth to various zones depending upon the most important factor. Example: If the penetrable lime accumulation zone is the only detrimental factor then the fraction will relate to the depth to that zone. If caliche is found in the profile and it is overlying basalt, then the fraction will be the depth of soil mantle overlying the caliche which in this case is the controlling factor.

The key was set up during the early stages of the investigation when the engineering plan called for gravity diversion and distribution from main canals. Since the plan changed to obtaining irrigation water by pumping from wells the importance of the high areas was largely nulified. This is due to the wells being located on the high areas. This segregation was eliminated from the tracings although it sill remains on the original field sheets.

TABLE 2

MINIMUM LAND CLASSIFICATION SPECIFICATIONS

North Side Pumping Division
Minidoka Project, Idaho

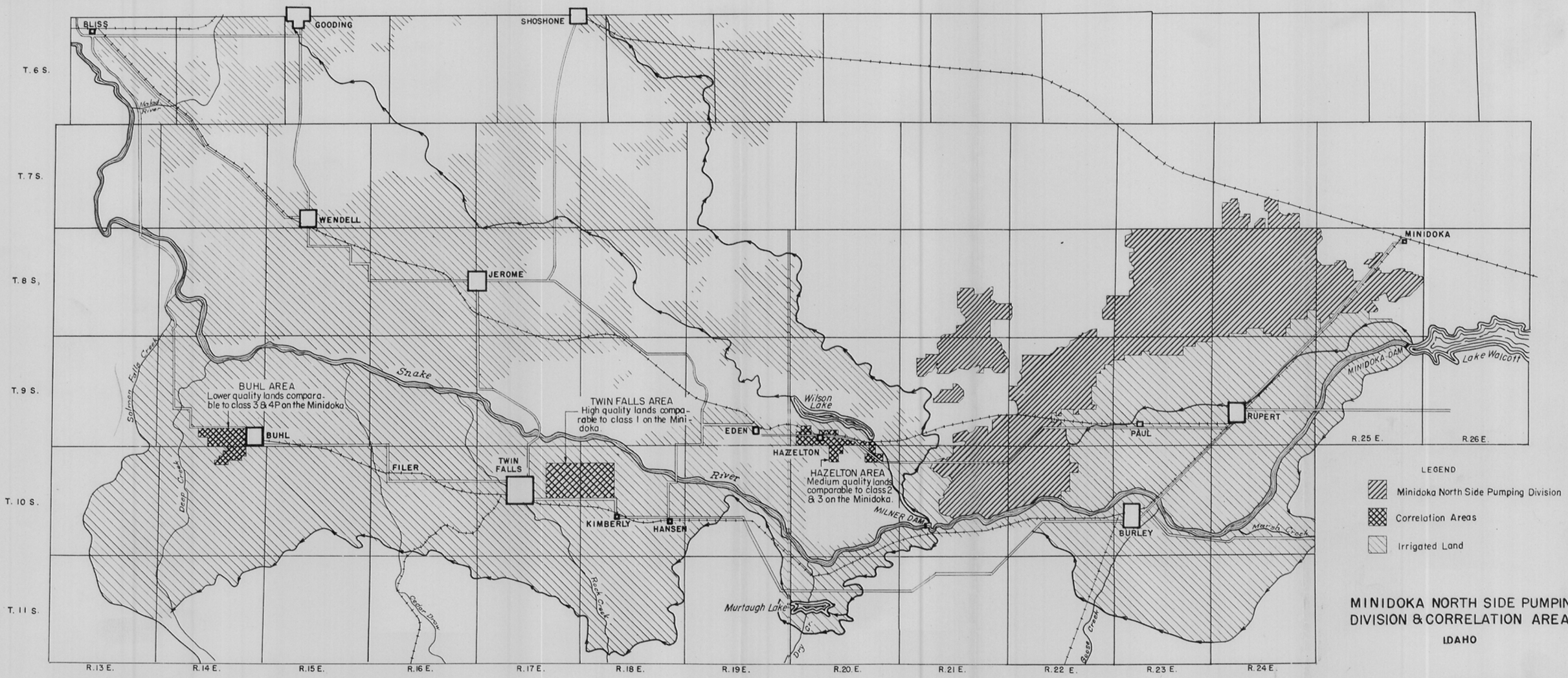
Land Characteristics	Class 1 "Arable"	Class 2 "Arable"	Class 3 "Arable"	Class 4P "Limited Arable"
		SOILS		
Texture	Sandy Loam to Friable Clay Loam	Loamy Sand to Very Permeable Clay	Loamy Sand to Permeable Clay	Loamy Sand to Permeable Clay
Depth: To sand, gravel or cobble.	36" plus--good free working soil of fine sandy loam or heavier; or 42" of sandy loam.	24" plus--good free working soil of fine sandy loam or heavier or 30" - 36" of sandy loam to loamy sand	18" plus--good free working soil of fine sandy loam or heavier or 24" - 30" of lighter textured soils.	
To creviced basalt or indurated nodular or silty platy, cemented hardpan. (Impenetrable to roots, but slightly permeable to water.)	54" plus	42" plus	30" plus	24" plus
To impervious indurated caliche hardpan.	60" plus	48" plus	36" plus	24" plus
To highly calcareous very compact semi permeable hardpan.		36" plus	24" plus	12" plus
To penetrable lime zone.	14" plus with 54" penetrable			
Alkalinity 2/	pH not to exceed 8.6	pH not to exceed 9.0	pH not to exceed 9.0 unless soil is calcareous; total salts are low.	pH not to exceed 9.0
Salinity 1/	Total salts not to exceed 0.2%	Total salts not to exceed 0.3%	Total salts not to exceed 0.5%. May be higher in open permeable soils and under good drainage condition.	If salt content exceeds 0.5%, must be under conditions where it can be controlled.
		TOPOGRAPHY		
Slopes	Smooth slopes up to 3% in general gradient in reasonably large bodies sloping in the same general plane.	Smooth slopes up to 7% in general gradient in reasonably large bodies sloping in the same plane; or rougher slopes which are less than 3% in general gradient.	Smooth slopes up to 12% in general gradient in reasonably large sized bodies sloping in the same plane; or rougher slopes which are less than 7% in general gradient.	Smooth slopes up to 18% in general gradient in reasonably large sized bodies; or rougher slopes which are less than 12% in general gradient.
Surface	Even enough to require only small amount of leveling and no heavy grading.	Moderate grading required, but in amounts found feasible at reasonable cost in comparable areas.	Heavy and expensive leveling required in spots, but in amounts found feasible in comparable irrigated areas.	Surface condition such that crop adaptability is very limited and management problems would be very complex.
Cover (loose rocks and vegetation)	None	Insufficient to modify productivity or cultural practices; or clearing costs small.	Sufficient to reduce productivity and interfer with cultural practices. Clearing required but at moderate costs.	Present in sufficient amounts to cause specific limited crop adaptability.
		DRAINAGE		
Soil and topography	Soil and topographic conditions such that no specific farm drainage requirement is anticipated.	Soil and topographic conditions such that some farm drainage may be required and if required, reclamation by artificial means is feasible at reasonable cost.	Soil and topographic conditions such that significant farm drainage will probably be required and if required, reclamation by artificial means may be expensive but feasible.	Soil and topographic conditions such that significant farm drainage will probably be required, and if required by artificial means, surface drainage is at least feasible.

CLASS 6--NONARABLE

Includes lands which do not meet the minimum requirements of the next higher class, and small areas of arable land lying within larger bodies of nonarable land.

1/ Average for Root Zone and must be under soil, water and drainage conditions such that concentration will not become greater.

2/ Where slick spot conditions show deterioration of the subsoils, the land class must reflect the proportionate area occupied, as follows: class 1 up to 10%, class 2 10% to 20%, class 3 20% to 30%; if greater than 30%, lands may be placed in a special Yss class if other conditions warrant, otherwise in class 6.


BLISS
GOODING
SHOSHONE
WENDELL
JEROME
BUHL
FILER
TWIN FALLS
KIMBERLY
HANSEN
EDEN
HAZELTON
PAUL
RUPERT
BURLEY
MINIDOKA
T. 6 S.
T. 7 S.
T. 8 S.
T. 9 S.
T. 10 S.
T. 11 S.
R. 13 E.
R. 14 E.
R. 15 E.
R. 16 E.
R. 17 E.
R. 18 E.
R. 19 E.
R. 20 E.
R. 21 E.
R. 22 E.
R. 23 E.
R. 24 E.
R. 25 E.
R. 26 E.
Malad River
Salmon Falls Creek
Deep Creek
Snake River
Cedar Draw
Rock Creek
Dry Creek
Murtaugh Lake
Wilson Lake
Milner Dam
Marsh Creek
Beets Creek
Minidoka Dam
Lake Walcott
BUHL AREA
Lower quality lands comparable to class 3 & 4P on the Minidoka
TWIN FALLS AREA
High quality lands comparable to class 1 on the Minidoka
HAZELTON AREA
Medium quality lands comparable to class 2 & 3 on the Minidoka.
LEGEND
Minidoka North Side Pumping Division
Correlation Areas
Irrigated Land
MINIDOKA NORTH SIDE PUMPING DIVISION & CORRELATION AREAS
IDAHO

SOIL PROFILE SYMBOLS

- GRAVEL OR COBBLE
- SANDS
- LOAMY SANDS
- SANDY LOAM
- LOAMS & SILT LOAMS
- CLAY LOAMS
- VERY PERMEABLE CLAYS
- PERMEABLE CLAYS
- SLOWLY PERMEABLE CLAYS
- CALCAREOUS HARDPAN
- CALICHE (INDURATED)
- SOLID ROCK

PROFILE REPRESENTS 5' DEPTH

18 % = TOTAL SALTS - 9.0 = PH
3/L = REACTION TO DILUTE HCL
2 = PROFILE NO.

1 — At S.E. Corner
0"-17" very fine sandy loam.
17"-36" very fine sandy loam - nodular
36"-60" buff loam - few nodules.
Plowed.

2 — At 16/7
No restriction
Plowed.

3 — 100' N. of 16/8
0"-21" loam.
21"-30" very fine sandy loam.
30"-60" buff very fine sandy loam.
Plowed.

4 — 100' S. of E 1/4
24"-60" loam. Few nodules. Slight compaction.
Plowed.

5 — At 16/6.
0"-40" light silt loam.
40"-60" loam.
Cleared.

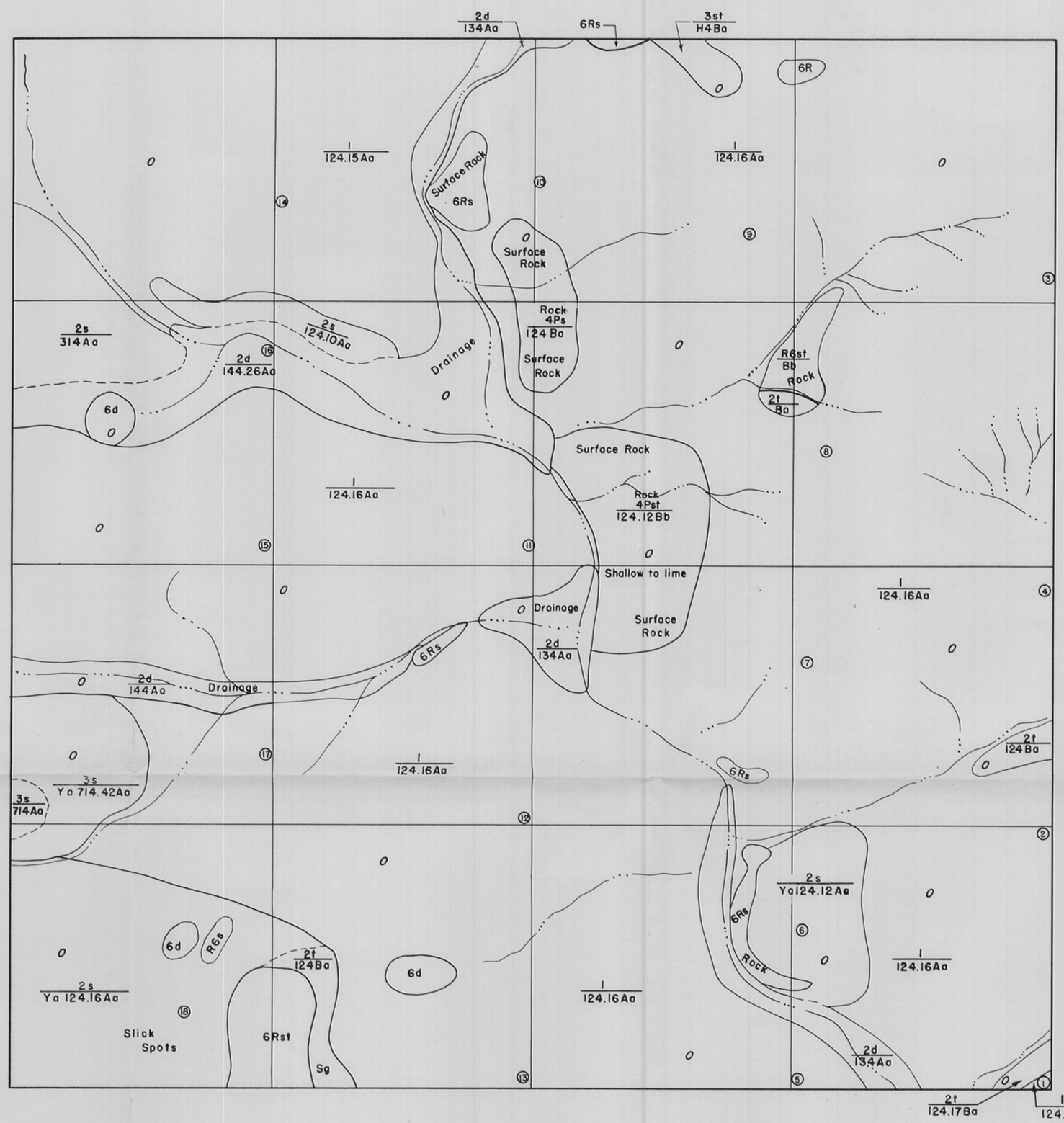
6 — 500' S. of 16/15
0"-24" light silt loam.
24"-36" medium compaction
36"-60" fine sandy loam. Slight compaction. Cleared.

7 — 460' S. of 16/14.
16"-60" loam, slight compaction.
Plowed.

8 — 600' N. and E. of 16/14
No root restriction.
Plowed.

9 — 400' NW of 16/9
16"-36" loam. Some nodules. Slight compaction.
36"-60" very fine sandy loam.
Plowed.

10 — 600' N. of 16/10
15"-36" loam. Few nodules
36"-60" very fine sandy loam. Slight compaction.
Plowed.



LEGEND

ARABLE LAND
- CLASS 1
- CLASS 2
- CLASS 3

LIMITED ARABLE LAND
- CLASS 4

TENTATIVELY NON ARABLE LAND
- CLASS 5

NON ARABLE LAND
- CLASS 6

REASONS FOR LOWER CLASS THAN "1"
- s = INFERIOR SOIL
- t = INFERIOR TOPOGRAPHY
- d = INFERIOR DRAINAGE
- R = SURFACE ROCK

(POS) = POSITION
② LOCATION OF PROFILE

11 — 100' N. of 16/13
17"-28" light silt loam. Medium compaction.
28"-60" loam. Slight compaction.
Plowed.

12 — At 16/16
18"-30" loam. Nodular. Slight compaction.
30"-60" loam. Slight compaction.
Plowed.

13 — At S. 1/4 (Not representative)
36"-54" loam. Some loose rock.
54" rock.
Plowed.

14 — 450' N. of 16/11.
0"-17" heavy silt loam. Nut-like.
17"-30" loam. Few nodules.
30"-60" loam. Slight compaction.
Plowed.

15 — 150' N. of 16/12
17"-26" loam. Nodules.
26"-56" sandy material. Compact.
Broken Ground.

16 — 250' S. of 16/11
0"-8" dark brown heavy silt loam.
8"-17" silty clay loam. Prismatic. Subangular.
17"-26" heavy silt loam, compact.

17 — 350' N. of 16/17
36"-48" loam, compact.
Plowed.

18 — 550' NW of 16/5
15"-30" light silt loam. Nodules.
30"-60" loam.
Plowed.

19

20

400 0 400 800
SCALE IN FEET

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

MINIDOKA PROJECT
NORTH SIDE PUMPING DIV. - IDAHO

DETAILED LAND CLASSIFICATION

DRAWN	R.E.S.	SUBMITTED	
TRACED	J.S.D.	RECOMMENDED	
CHECKED		APPROVED	

SEC. 33 T. 7S. R. 23E | BOISE, IDAHO, JULY 27, 1950

SOIL PROFILE SYMBOLS

- GRAVEL OR COBBLE
- SANDS
- LOAMY SANDS
- SANDY LOAM
- LOAMS & SILT LOAMS
- CLAY LOAMS
- VERY PERMEABLE CLAYS
- PERMEABLE CLAYS
- SLOWLY PERMEABLE CLAYS
- CALCAREOUS HARDPAN
- CALICHE (INDURATED)
- SOLID ROCK

PROFILE REPRESENTS 5' DEPTH

18 % = TOTAL SALTS - 9.0 = PH
3/L = REACTION TO DILUTE HCL
2 = PROFILE NO.

LEGEND

ARABLE LAND
- CLASS 1
- CLASS 2
- CLASS 3

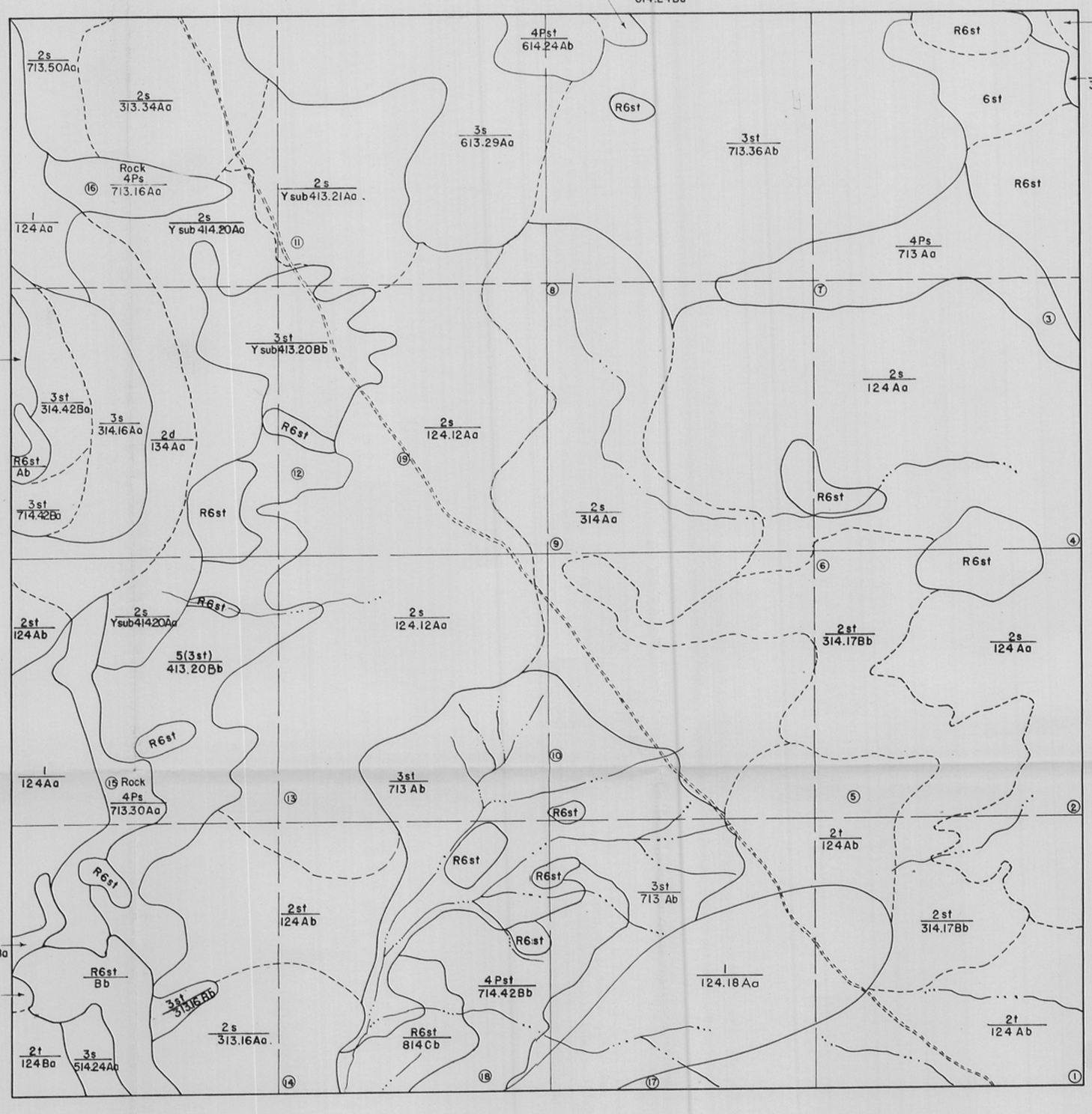
LIMITED ARABLE LAND
- CLASS 4

TENTATIVELY NON ARABLE LAND
- CLASS 5

NON ARABLE LAND
- CLASS 6

REASONS FOR LOWER CLASS THAN "1"
- s = INFERIOR SOIL
- t = INFERIOR TOPOGRAPHY
- d = INFERIOR DRAINAGE
- R = SURFACE ROCK
- (POS) = POSITION

② LOCATION OF PROFILE



1 — At SE corner
Heavy growth sage and wheatgrass

2 — At 16/7
24"-32" highly compacted. Root restriction.
Heavy growth sage and wheatgrass.

3 — 250' SW of 16/8
24" creviced basalt. Area to NE has scattered surface rock.
Heavy sage and wheatgrass.

4 — At E 1/4 corner.
22"-28" calcareous hardpan stopping roots.
Heavy growth sage and wheatgrass.

5 — 150' NE of 16/15
26" very slight root restriction

6 — At 16/14 corner
17"-22" medium compaction with slight root restriction
36"-60" loose with some rock
Medium growth sage and wheatgrass.

7 — At 16/9 corner
16"-20" compacted area with slight capping restricting roots
36" basalt bedrock
Fairly heavy growth sage and wheatgrass.

8 — At 16/10 corner
17"-28" compacted area with intermittent layers restricting roots.

9 — At 16/13 corner
17"-28" compacted area with intermittent layers restricting roots.

10 — 300' N. of 16/16
24"-42" scattered basalt rock
Med. growth sage and wheatgrass.

11 — 200' NE of 16/11
21"-26" compacted strata restricting roots
Heavy growth sage & wheatgrass.

12 — 400' N. of 16/12
20"-26" compacted strata restricting roots. 34" loose basalt rock.
Med. growth sage & wheatgrass.

13 — 100' N. of 16/17
32" basalt bedrock.
Med. growth sage and wheatgrass.

14 — At 16/5 corner.
16"-28" compacted area restricting roots.
Fairly hvy growth sage & wheatgrass.

15 — 500' NE of 16/4
36" basalt bedrock. Area spotted with outcroppings.
Mostly thick cheatgrass cover with spots of heavy sage & wheatgrass.

16 — 600' NE of 16/3
16" basalt bedrock. Depth varies thruout area. Some outcroppings.
Scattered scrubby sage & wheatgrass.

17 — 500' E. of S. 1/4 corner.
18"-36" slight compaction.
High sage and wheatgrass.

18 — 300' W. of S. 1/4 corner.
42" basalt bedrock.
30"-42" medium compaction.
Slick spots.
Scrubby sage and wheatgrass.

19 — 750' NE of 16/12
12"-22" slight compaction.
High and low sage and wheatgrass.

20

400 0 400 800
SCALE IN FEET

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

MINIDOKA PROJECT
NORTH SIDE PUMPING DIV. - IDAHO

DETAILED LAND CLASSIFICATION

DRAWN	HSM	SUBMITTED	
TRACED	JSD	RECOMMENDED	
CHECKED		APPROVED	

SEC 35 T. 7 S. R. 24 E. | BOISE, IDAHO, SEPT. 19, 1950

SOIL PROFILE SYMBOLS

GRAVEL OR COBBLE
SANDS
LOAMY SANDS
SANDY LOAM
LOAMS & SILT LOAMS
CLAY LOAMS
VERY PERMEABLE CLAYS
PERMEABLE CLAYS
SLOWLY PERMEABLE CLAYS
CALCAREOUS HARDPAN
CALICHE (INDURATED)
SOLID ROCK

PROFILE REPRESENTS 5' DEPTH

18 % = TOTAL SALTS - 9.0 = PH
3/L = REACTION TO DILUTE HCL
2 = PROFILE NO.

1 At NE corner
0"-18" friable
18"-34" compact, nodular
34"-60" loose, floury

2 At 16/1
0"-18" friable
18"-38" compact, nodular
38"-60" loose, floury

3 At N. 1/4
0"-18" friable
18"-34" compact, nodular
34"-60" loose, floury

4 At 16/2
0"-22" friable
22"-38" compact, nodular
38"-60" loose, floury

5 At NW corner
0"-22" friable
22"-42" compact, nodular
42"-60" loose, floury

6 At 16/3
0"-18" friable
18"-32" compact, nodular
32"-60" loose, floury.

7 At W. 1/4
0"-26" friable
26"-54" compact, nodular
54"-60" loose, floury

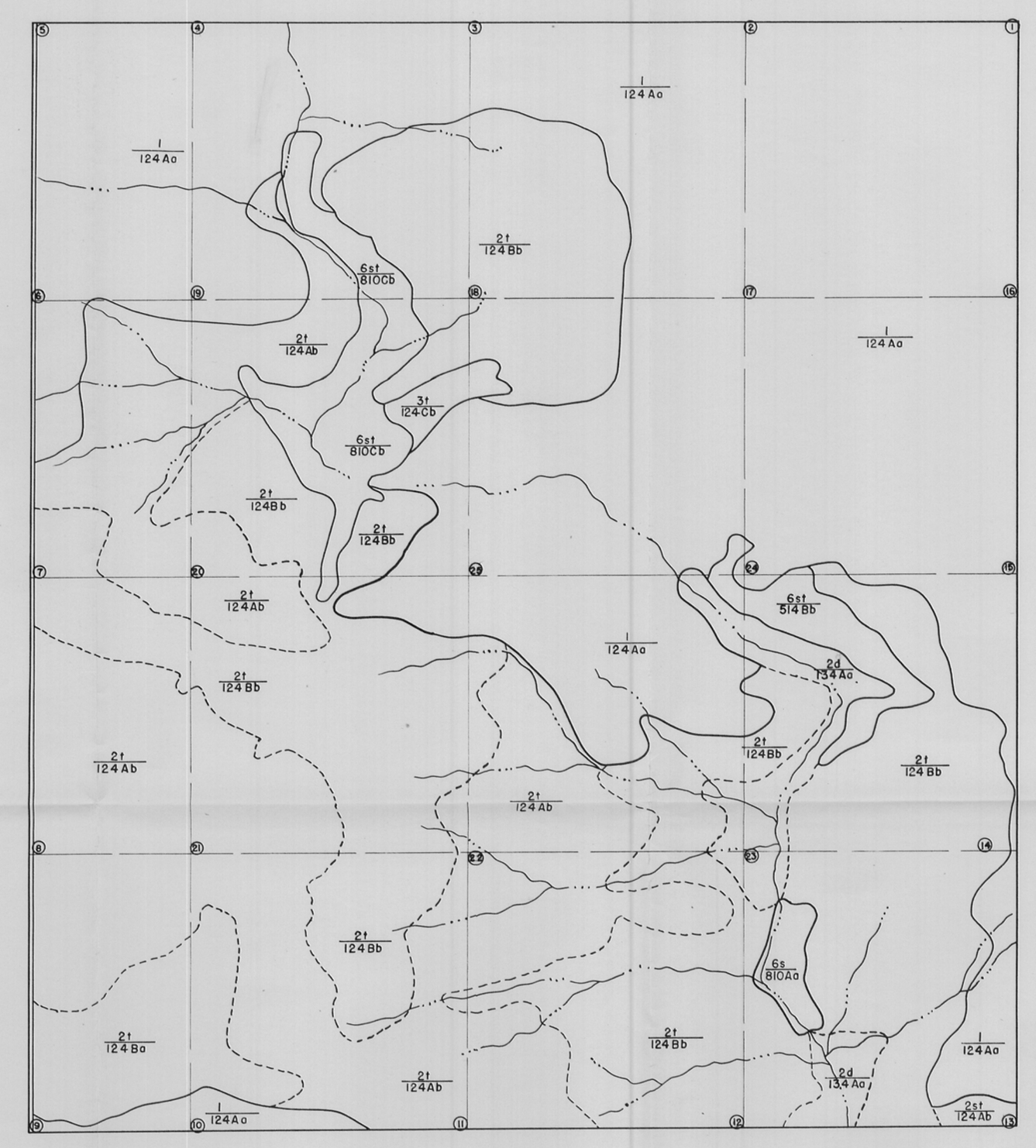
8 At 16/4
0"-18" friable
18"-34" compact, nodular
34"-60" loose, floury

9 At SW corner
0"-20" friable.
20"-34" compact, nodular
34"-60" loose, floury

10 At 16/5
0"-20" friable
20"-44" compact, nodular
44"-60" loose, floury

11 At S. 1/4
0"-18" friable, slightly calcareous.
18"-38" compact, nodular
38"-60" loose, floury

12 At 16/6
0"-18" friable
18"-38" compact, nodular
38"-60" loose, floury



13 At SE corner
0"-16" friable
16"-26" compact, nodular
26"-60" loose, floury

14 150' W. of 16/7
0"-14" friable
14"-30" compact, nodular
30"-60" loose, floury.

15 At E. 1/4
0"-18" friable
18"-48" compact, nodular
48"-60" loose, floury

16 At 16/8
0"-18" friable
18"-48" compact, nodular
48"-60" loose, floury.

LEGEND

ARABLE LAND
CLASS 1
CLASS 2
CLASS 3
LIMITED ARABLE LAND
CLASS 4
TENTATIVELY NON ARABLE LAND
CLASS 5
NON ARABLE LAND
CLASS 6

REASONS FOR LOWER CLASS THAN "1"
s = INFERIOR SOIL
t = INFERIOR TOPOGRAPHY
d = INFERIOR DRAINAGE
R = SURFACE ROCK
(POS) = POSITION

② LOCATION OF PROFILE

17 At 16/9
0"-16" friable
16"-26" compact, nodular
26"-60" loose, floury

18 At 16/10
0"-16 friable
16"-26" compact, nodular
26"-60" loose, floury.

19 At 16/11
0"-22" friable
22"-36" compact, nodular
36"-60" loose, floury

20 At 16/12
0"-18" friable
18"-38" compact, nodular
38"-60" loose, floury

21 At 16/17
0"-18" friable
18"-34" compact, nodular
34"-60" loose, floury

22 At 16/16
0"-18" friable
18"-44" compact, nodular
44"-60" loose, floury

23 At 16/15
0"-26" friable
26"-54" very compact, highly calcareous.
54"-60" creviced basalt rock.

24 At 16/14
0"-14" friable
14"-28" compact, nodular
28"-60" loose, floury

25 At 16/13
0"-18" friable
18"-34" compact, nodular
34"-60" loose, floury.

400 0 400 800
SCALE IN FEET

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

MINIDOKA PROJECT
NORTH SIDE PUMPING DIV. - IDAHO
DETAILED LAND CLASSIFICATION

DRAWN	F.R.M.	SUBMITTED	
TRACED	J.S.D.	RECOMMENDED	
CHECKED		APPROVED	

SEC. 6 T. 8 S R. 24 E. | BOISE, IDAHO, OCT. 31, 1950

climate, and anticipated types of farming were studied. These correlation areas were (1) lands immediately east of Twin Falls, (2) area near Hazelton, and (3) area near Buhl, all in Idaho. A land classification survey was made of these areas to assist in the correlation of the physical factors such as soils, topography, and drainage. A preliminary study of the division area permitted judging the comparability of physical factors. The class 1 lands of the division are similar in soil and topography to lands in the Twin Falls area, the class 2 and some of the class 3 lands are similar in these respects to lands of the Hazelton area, and the class 3 and 4P lands are similar to lands of the Buhl area. Economic investigations of these correlation areas were an aid to estimating the potential yielding capacity and crop distribution of the division, and additional information relating to these investigations is presented in the agricultural economy chapter of the Definite Plan report and in the attached letter of April 10, 1950, from the committee on size of farm, North Side Pumping Division, Minidoka Project.

Review of Classification

The classification survey was reviewed by technicians of the University of Idaho Soils Department and the Project Planning and Operation and Maintenance Branches of the Bureau of Reclamation. Conclusions and recommendations of this group are summarized in the attached trip report of Mr. G. O. Baker, professor of agronomy and soils, University of Idaho, which gave rise to the following

UNITED STATES
DEPARTMENT OF THE INTERIOR

BUREAU OF RECLAMATION

740

Regional Office, Region 1
Box 937, Boise, Idaho

Received
Plan Dept.
April 17, 1951

COPY

April 3, 1951

Memorandum

To: Assistant Regional Director - Technical
Through: Regional Planning Engineer

From: Chief, Economic Resources Division

Subject: Land Classification in relation to farm unit layout, North Side Pumping Division, Minidoka Project, Idaho

The Minidoka Project Office is now engaged in the preliminary layout of farm units on the North Side Pumping Division. As previously directed, this work is being performed under the technical supervision of the Branch of O&M. In doing this work, it is necessary to have the information on the land classification if the units are to be laid out in accordance with previous agreements. The discussions which we held with the University of Idaho resulted in several recommendations with respect to farm layout units which involve information on land classification. These recommendations are:

1. In the process of laying out farm units, minor adjustments in the delineations between Class 3 and Class 4 land should be made to conform with farm field layouts as they influence practical farm practices and the classification changed accordingly.

2. Class 4 will not be included in farm units as irrigable land. Water will not be provided for them, and they will not be required to pay water charges.

3. The amount of Class 3 land to be included in each farm unit should be limited as indicated in the recommendations of the Size of Farm Committee.

4. Where there is a choice of Class 3 lands to be included in farm units, the best of these lands should be selected within limits of engineering construction and delivery of water.

5. The above determinations involving the re-examination or selection of lands should be made by an individual trained in soils.

If O&M is to carry out these recommendations in the process of laying out farm units, it is essential that the land classification be completed and made available to them with a complete land classification report.

In recognition of this need for the land classification, the Boise Project Planning Office is taking immediate steps to complete it. In the process of completing the land classification, they will change all land now designated as Class 3x to Class 3 where they meet the specifications for that class—those in the vicinity of the Prisoner-of-War area excepted. The lands in that area will be designated as Class 5s (3s) pending the decision regarding the possibility of reclaiming them. These studies on the Prisoner-of-War area will be carried forward under the joint supervision of Planning and O&M. If it is necessary to plan farm units on these lands immediately, it is suggested they be treated as other Class 3 lands.

Thus, the final tracing which will be turned over to O&M will, among other things, show class 3, class 4, and class 5s (3s) land. In laying out the farm units, O&M will make the choice of the better quality class 3 lands, and they will make such refinements in the boundary between class 3 and class 4 lands as now appear warranted in terms of the decision to eliminate class 4 from the irrigable area. If there are any class 5 lands in addition to the Prisoner-of-War area left on the tracings when they are turned over to O&M, O&M will be responsible for disposing of them. Also in the process of laying out farm units, it may become evident that there are lands which are either high or isolated.

O&M will be responsible for carrying forward all changes or corrections onto the tracings or an official copy of them so the irrigable acreage can be determined at a later date. Class 3 or Class 4 lands included in the farm boundary, but not considered as part of the irrigable acreage, should be appropriately designated. Class 3 might be designated as Class 6u(3), Class 4 as 6(4), and high or isolated areas as 6i or 6h followed by the original land class in parentheses.

Obviously all this work in relation to project development should be performed at the field level by project personnel. However, inasmuch as the present work load does not justify employment of a qualified soils man in the project office, it is suggested that during the interim period this work be performed by the Branch of O&M.

These suggestions are based upon discussions with individuals concerned. By and large, the individuals concerned agree with this procedure. However, there are some minor differences of opinion

on certain points. Nevertheless, I would recommend that you approve this memorandum which will then constitute a directive to the offices concerned to proceed accordingly.

/s/ J. Karl Lee
by H. N. W.

Chief, Economic Resources Division

I concur:

/s/ E. N. Torbert
Regional Planning Engineer

Approved: April 16, 1951

/s/ F. M. Clinton
Assistant Regional Director

Copy to: 740 (Attn. H. N. Watenpaugh)
400 (Attn. Poulson)
District Manager, Central Snake River District, Boise
(Attn. District Planning Engineer)
Minidoka Project Office (in duplicate)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

COPY

Regional Office, Region 1
Box 937, Boise, Idaho

April 10, 1950

To: Regional Director, Region 1

From: Committee on Size of Farm - North Side Pumping Division, Minidoka Project

Subject: Size of Farm - North Side Pumping Division, Minidoka Project

A committee including representatives of the University of Idaho, the Farmers Home Administration, and the Bureau of Reclamation, appointed to consider the general question of size of farm on the North Side Pumping Division, met in Boise, Idaho, April 6, 1950. The following individuals were present:

Mr. C. O. Youngstrom - University of Idaho, Extension Division
Mr. Paul A. Eke - University of Idaho, Experiment Station
Mr. Virgil Kennedy - University of Idaho, Extension Division
Mr. Robert W. Wilcox - University of Idaho, Extension Division
Mr. Karl J. Magleby - F. H. A.
Mr. W. N. Young - F. H. A.
Mr. L. K. Saum - F. H. A.
Mr. O. L. Kime - U. S. Bureau of Reclamation
Mr. G. G. Stamm - U. S. Bureau of Reclamation
Mr. M. L. Tillery - U. S. Bureau of Reclamation
Mr. Wm. W. Gorton - U. S. Bureau of Reclamation
Mr. J. Karl Lee - U. S. Bureau of Reclamation

The Committee arrived at the following conclusions:

(1) Only full-time, family-size farms should be laid out on the North Side Pumping Division.

(2) No farm should be composed entirely of class 3 land.

(3) If it is permitted by law, it would be desirable to include noncontiguous land in farm units in order to make proper use of class 3 land.

(4) When the topography and other factors are favorable, farm units should be laid out on the basis of the common rectangular survey. However, when advantages can be gained from the standpoint of farm organization or operation, departure should be made from the rectangular survey or regular subdivisions.

(5) The average size of farm on class 1 lands should be approximately 80 arable acres. Individually they should not vary more than 5 percent below this size to 15 per cent.

(6) The average size of farm on class 2 land should be about 100 arable acres. Individually they should not vary more than 20 per cent, either smaller or larger, from this size.

(7) Where class 3 lands are involved, they should be combined with at least 60 acres of class 1 land, or the equivalent thereof in class 2 (75 acres).

(8) In combining various classes, 2 acres of class 3 may be substituted for 1 acre of class 1 and 1.25 acres of class 2 for 1 acre of class 1.

(9) Class 4P lands should be excluded from a paying class and considered nonirrigable.

We recommend these conclusions be followed as closely as possible in laying out farm units on the North Side Pumping Division.

For the University:

/s/ C. O. Youngstrom
C. O. Youngstrom

/s/ Paul A. Eke
Paul A. Eke

For the Farmers Home Administration:

/s/ Karl J. Magleby
Karl J. Magleby

/s/ W. N. Young
W. N. Young

For the Bureau of Reclamation:

/s/ O. L. Kime
O. L. Kime

/s/ G. C. Stamm
G. C. Stamm

/s/ J. Karl Lee
J. Karl Lee

Copy to: C. O. Youngstrom, Univ. of Idaho
Karl J. Magleby, F. H. A.
C. C. Stamm, R. O., Bur. of Reclamation
O. L. Kime, Rupert, Idaho (In duplicate)
Paul A. Eke, Univ. of Idaho
L. K. Saum, F. H. A.

JKLee:alw

COPY

REPORT OF TRIP OVER THE MINIDOKA NORTH SIDE PUMPING UNIT
April 24-28, 1950

1. Soil Classification:

a. The soil classification of the area, as a whole, was exceptionally well done. The slope classes especially in class 3 and 4 may be too high. However, it was recommended at the meeting in Rupert on April 28, that class 4 land be thrown out and where there is more class 3 land than permitted in a farm unit, that a re-evaluation be made of the class 3 land and include only the better portion.

b. The area east of the highway to Minidoka from Rupert should be rechecked. It appears to me the land may not be as good as the classification indicates.

c. The area covered by the reconnaissance should have a detailed classification.

2. Slick spots:

More information should be obtained on the slick spots areas in the project. This should include chemical and possibly other analyses of profile samples from various sections of the project, and observations on the development farms in the persistence of these spots when land is under cultivation.

3. Salts:

In areas where salts are present more information is desirable such as chemical analysis for characterizing, and determining amount of salts, laboratory work on rapidity of salt removal and field studies to determine what will happen under normal farming practices. (The proposed development farm at the old P. W. Camp should answer many of the questions.)

4. Priority of development:

It seems to me to be desirable to develop the best land first. If conditions should develop which would limit the number of wells, it would not be to the best interests of Idaho to have the lower classes of land developed when there is still class 1 land that could have been developed.

An exception to this statement would be the development of one unit in each of the possible problem areas so definite information could be obtained on what may be expected should the land be developed.

5. Drainage:

Max Jensen's report ably covers this problem, but I would like to re-emphasize one phase--namely, more information is needed on the character of the underlying strata at 25-40 foot depths. There may be areas where an impervious clay layer may hold up the water and create a local drainage problem.

Conclusion:

In general, the classification of the land was excellent. Some rechecking should be done in limited areas. The areas that may become problem areas should have additional research work conducted on them.

This project has the best potential irrigated lands of any I have seen in Idaho. The Bureau of Reclamation is to be commended on the method being used to prove the farms before opening them for homesteading.

/s/ G. O. B.

G. Orien Baker
Professor of Agronomy (Soils)
University of Idaho

re-investigation: (1) The area east of Rupert-Minidoka Highway was rechecked and found to be mapped according to specifications with minor exceptions which were corrected. (2) Personnel from the Region 1 Laboratory investigated slick spots and salt conditions and their conclusions are summarized in the foregoing salinity and alkalinity section. (3) Deep borings and infiltration studies were made, as reported in detail in the Drainage Appendix. (4) In reference to (1c) of the trip report, the reconnaissance area was covered by a detailed land classification survey employing the same standards and specifications used in classifying the original area. Results of this detailed survey indicated 5,600 acres of arable land as compared to the estimated 7,540 acres disclosed by the brief earlier survey. (See the attached tabulation.)

Description of Land Classes

The classification of lands under the specifications established land classes with characteristics as follows:

Land Classes

Class 1: - Lands of class 1 quality have group 10 and sub-groups 120, 130, and 140 soils. The plow zone textures fall in the range of 3 and 4. Thus only the deep, permeable, medium textured soils without restrictions to root growth are contained in this land class. The surface soils are generally more than 14 inches deep over the slightly compact calcareous zone. All of these soils are more than 54 inches to creviced basalt, most of them being more than 20 feet deep over this formation. They are the best of the soils described by the United States Department of Agriculture as Portneuf and Onyx.

All of the class 1 soils occupy gently-sloping, smooth uplands or, to a minor extent, the broader channels or delta-like bottoms of the area. The lands may range up to 3% in general gradient but the slopes usually are one-half to two per cent.

Most of the class 1 lands lie in large bodies. A large number of farms will be almost entirely of class 1 inasmuch as whole sections; and, in some cases, several contiguous sections of land are composed mainly of this class.

These lands are free from harmful accumulations of salts and have no drainage problems.

As indicated, these lands are of exceedingly high quality, are well adapted to all crops grown in the area, and are capable of sustained yields under common agricultural practices. They can be prepared for irrigation at relatively low cost. Lands of this class comprise ~~47%~~ 50 of the total irrigable acreage.

Class 2: - Lands of this class have group 10, 40, 50, or 70 soils. The group 10 soils in this class are slightly shallower to the lime accumulation zone than those of class one, ranging from 6" to 14" to this layer and averaging about 11 inches. On group 30 soils the depth limitation is to the zone restricting roots which is 36" minimum and averages about 40". The group 40 soils are at least 42 inches deep above the impervious layer, but the acreage of class 2 lands with this soil is negligible. The group 50 soils are 42 inches or more in depth over the impenetrable layer. The group 70 soils average about 45" above the basalt but are not less than 42".

Most of the class 2 lands are found in large bodies and topographically are, in general, gently rolling and smooth. Portions of these lands are steeper than 3 per cent (but under 7 per cent) slope, or are uneven enough to slightly interfere with irrigation practices. Thus the value of some of the class 2 lands for irrigation is somewhat below that of class 1 land because water application costs will be higher. Other class 2 lands will require some land preparation costs owing to uneveness of surface relief.

Some small areas occupy low-lying positions along meandering drainage courses and their development will involve some expenditure for farm drainage.

In small areas the class 2 lands contain sufficient white alkali to require corrective measures and possibly to lower, the yielding capacity during the correction. More water than normally required may be necessary before full production can be attained. Slick spots on some class 2 lands will require special attention during development as outlined previously.

Crop adaptability of these lands after development is as wide as that of class 1 lands, but the higher preparation cost requirement is the basis for placing them in the lower class. These lands, from an overall standpoint, are of high quality and, as is shown by similar lands presently irrigated, are capable of sustained yields under common agricultural practices. The class 2 lands comprise about 37 of the total irrigable land of the Division.

Class 3: - The class 3 lands are found in large bodies in certain sections and in relatively small bodies in other sections. The soil groups range from 10 to and including group 70, except 20 and 80, although from an acreage standpoint the group 30 soils are dominant. The soils may be shallow to the lime zone (6 inches or less), to the impermeable layer (24 inches to 36 inches) or in group 60, 36 inches to 45 inches to the hardpan and in group 70, 30 to 42 inches to basalt bedrock.

The topographic features of these lands may be slopes of 8 or 9 per cent. Those with lesser slopes may have uneven surface relief. These features of high gradient or rough relief reduce the desirability of these lands for row crops.

Class 3 contains the higher concentrations of salts which, where occurring in combination with the heavier subsoils, may be a limiting factor in crop adaptability. The numerous slick spots in some areas of class 3 increase development costs.

Only 13 per cent of the division acreage is comprised of class 3 lands, some of which will be excluded in compliance with economic decisions which limit their inclusion to a per cent of the farm unit as explained in the Economics chapter of this report.

In nearby areas, lands of this type have proven satisfactory for development under reasonable water charges. Their development has been especially successful where they comprise only a small portion of the farm. They are generally best adapted to the production of forage and cereal crops.

The lands classed as 3 because of high sodium and high total salts, in combination with slick spots, are the lowest quality of the irrigable lands; therefore if there is a choice of lands in farm unit layout, they should be considered last for inclusion.

Class 4P: - These lands were originally mapped in the progress of survey but have since been excluded from the assessable acreage due to economic considerations. Soil groups 30, 50, 60, and 70 are found in this class and they are generally shallow (12 to 24 inclusive) to the impenetrable layers associated with these soils.

Topographically, they occupy the steeper slopes ranging up to 18 per cent where smooth and not more than 12 per cent where rough. They are limited in productivity and in adaptability. They were originally mapped for pasture lands, but the high cost of water and the small total acreage of class 4 lands contributed to their exclusion.

Class 5: - This category designates temporarily suspended problem lands requiring special studies to determine irrigability, such as the high areaswhich could not be irrigated by gravity distribution systems without special works. These problems were largely resolved on Unit B by changes in the over-all plan which provided for pumping from wells located on the high areas rather than obtaining water by canal from Snake River. Conversely, the new plan for obtaining water from the river for Unit A lands by installing a central pumping plant resulting in the suspension of certain high areas pending determination of the feasibility of relift pumping to these areas. The latter are designated X-2A as shown on the general land classification map.

Another special problem area was selected for testing possibilities of salt removal. This 434-acre tract was placed in class 5 by regional office specialists pending results of the tests, programmed for continuation during 1952-53, and is the only remaining class 5 area on the division.

Irrigability Classification

In the selection of the irrigable lands from the arable lands of the area investigated, some areas were rejected and others were temporarily suspended (see land classification map). In Unit A, there remains some question as to the feasibility of relifting water to approximately 115 arable acres of isolated high area. Because of this question, these areas were designated X-2a and were not included in the irrigable area.

State or privately-owned lands consisting mostly of school sections (designated X-1 on the map) were not considered as part of Unit B. The source of water for Unit B lands will be from wells located on topographically desirable points. When individual owners of these lands have made water-right filings, the arable lands of these tracts will be considered for inclusion if the owners so desire.

Scattered lands which, because of their position or shape are unsuitable as part of an economic farm unit, and areas which overlap into established irrigation systems were designated X-2.

Areas largely of low quality land owing to shallow or salty soils were designated X-3 and excluded. A tract of rough rolling class 3 and 4 lands on the southeastern margin of Unit B was designated X-4 and excluded. The X-5 area on the eastern end of the investigated area is the transition between high quality lands of the division and the rocky wasteland north of Lake Walcott. The shoestring bodies of good land

between the dunes and outcrops are too small to make farm units, would be hard to irrigate, and would be subject permanently to damage by moving sand. This entire area therefore was excluded.

Resurvey of Western Portion, Unit B

Subsequent to completion of the detailed survey of Unit A and the major portion of Unit B, a detailed survey was made of the western portion of the latter unit which was previously covered by reconnaissance to estimate the arable land acreage. The detailed coverage of the western portion employed the same standards, specifications, and methods used on the major area. The detailed survey disclosed a total of 18,85 acres suitable for inclusion in farm units as compared to the 7,540 arable acre-estimate based on reconnaissance ~~(see tabulation)~~. The scattered nature of the high quality land bodies and the rather large proportion of lower quality lands influenced the arable acreage reduction. This reduction, however, was partially offset by including some of the marginal areas originally suspended from the arable area of the unit.

THE SELECTED AREA

The area selected for development of the division is divided into two units on the basis of the source of water. Unit A has 13,650 ~~12,850 and~~ irrigable acres served by pumping from Snake River. Unit B has 67,100 ~~50,810~~ ~~not~~ irrigable acres served from wells. Unit A is adapted to development in a single block, Unit B is adapted to step-by-step development. The units are outlined on the land classification map and acreages by land classes are shown in the attached tabulation.

Unit A

The determination of the area and total acreage to be included in Unit A was based on water supply and engineering considerations in addition to quality and position of the lands. The allocation of 47,000 acre-feet storage space in American Falls reservoir established the maximum servable acreage, engineering considerations involving relift pumps to high areas and the relative economy of wells in lower areas fixed the final acreage in this unit.

Lying in the southwest portion of the division, Unit A is a compact area of very high quality lands (73 percent class 1) in large gently sloping bodies ideal for irrigation. The lands are higher in elevation than adjoining areas. To the north they merge into Unit B lands. The undulating topography with natural drainageways, and deep permeable soils over creviced basalt minimize drainage problems.

Unit B

Unit B has four natural development areas. The first is the eastern portion--a large expanse of high quality lands suited to intensive cropping. It has a fairly well-defined drainage pattern which differentiates it from the second area adjoining it on the west which also contains high quality lands, however, the drainage of the latter is largely to enclosed basins through more-or-less indistinct channels. This area adjoins the north edge of Unit A and is bounded on the north and west by rocky waste-land. The third area, adjoining Unit A on the northwest, was Partially excluded from the division after detailed studies which disclosed a preponderance of low quality lands. The fourth area at the northwestern extremity of the division is bounded on the north and west by lava outcrops. It has a fairly large area of high quality lands but is separated from the remainder of the unit by an area of rough topography and shallow soils

LAND CLASSIFICATION SUMMARY

North Side Pumping Division
Minidoka Project, Idaho

	Arable	Irrigable
	(Acres)	
Unit A		
Class 1	10,375	9,960
Class 2	3,150	3,030
Class 3	690	660
Subtotals	14,215	13,650
Unit B		
Class 1	28,650	26,800.8
Class 2	26,475	24,040.5
Class 3	14,775	9,217.8
Subtotals	69,900	60,059.1
TOTALS	84,115	73,709.1

Revised 7/10/56

LAND CLASSIFICATION SUMMARY

North Side Pumping Division
Minidoka Project, Idaho

Acreages as of February 1, 1951, after Service Area Layout completed.

	Arable	Irrigable 1/	Net Irrigable 2/
	(Acres)		
Unit A			
Class 1	10,375	9,960	9,360
Class 2	3,150	3,030	2,850
Class 3	690	660	620
Subtotals	14,215	13,650	12,830
Unit B 3/			
Class 1	27,290	26,200	24,630
Class 2	23,020	22,100	20,780
Class 3	7,870	7,550	7,100
Subtotals	58,180	55,850	52,510
TOTALS	72,395	69,500	65,340

1/ Arable less 4% for additional right of way.

2/ Irrigable less 6% for farmsteads, farm roads, and farm ditches.

3/ Totals reflect resurvey results on portion of Unit B.

see revised sheet
Revised 7/10/53

LAND CLASSIFICATION SUMMARY

North Side Pumping Division
Minidoka Project, Idaho

Acreages as of February 1, 1951, after Farm Unit Layout Completed.

	Arable	Irrigable [1]	Net Irrigable [2]
	(Acres)		
Unit A			
Class 1	10,375	9,960	9,360
Class 2	3,150	3,030	2,850
Class 3	690	660	620
Subtotals	14,215	13,650	12,830
Unit B			
Class 1	27,290	26,200	24,630
Class 2	23,020	22,100	20,780
Class 3	7,870	7,550	7,100
Subtotals	58,180	55,850	52,510
Unit B Northwest Area [3]			
Class 1	3,285	3,150	2,960
Class 2	2,475	2,380	2,240
Class 3	435	420	395
Subtotals	6,195	5,950	5,595
TOTALS	78,590	75,450	70,935

1/ Arable less 4% for additional rights-of-way.
2/ Irrigable less 6% for farmsteads, farm roads, and farm ditches.
3/ Totals reflect resurvey results on portion of Unit B.

over basalt interspersed with rock outcrops. This area should be developed last as the depth to ground water may be excessive for economical pumping.

DEVELOPMENT

Unit A lends itself to development in one block because of its compactness and the fact the water supply will be derived from one central pumping plant. Unit B will obtain water from a large number of wells and should be developed by natural areas starting with the one on the east end of the division and progressing to the west as the ground-water supply is proven by use. Should the supply prove inadequate for the entire Unit B acreage, the poorer lands and those with greater depth to ground water should be left undeveloped.

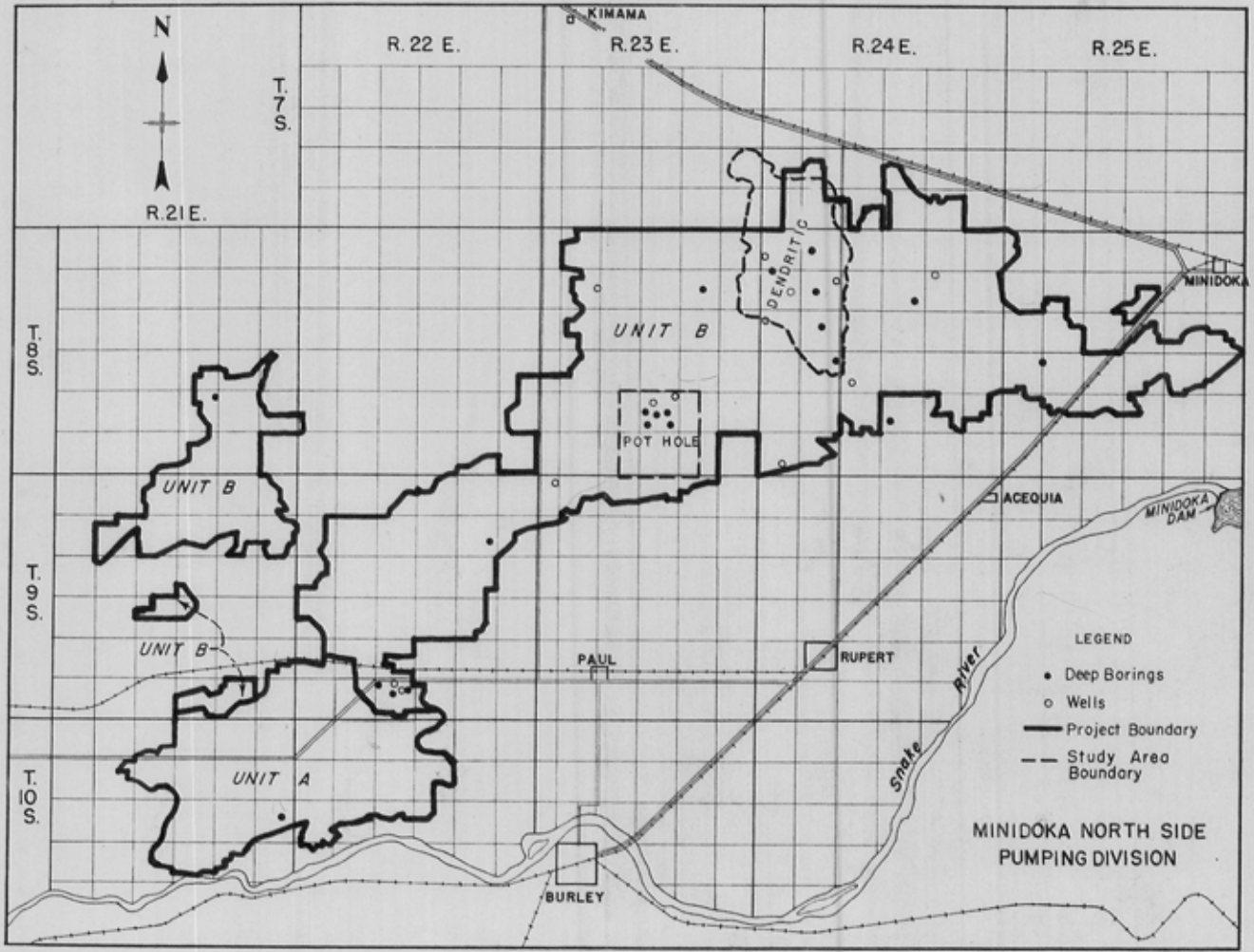
Lands placed in lower classes than 1 because of shallow soil over penetrable lime zone should not be graded to eliminate surface irregularities. Smoothing these lands with a float or land plane should be done without exposing the calcareous layer, and deep cuts should be avoided as stripping the topsoil from this layer will result in an excess of calcium in the root feeding zone, causing a lessening of availability of nutrients to plants, restriction of bacterial activity, and restriction of normal root development. Heavy applications of manure over a long period would be required to alleviate this condition. It would be highly desirable for the Bureau to clear and level the division lands so that careful control of this development phase can be maintained.

Surface soils of most division lands are light and high winds are common, therefore care must be taken to prevent excessive wind erosion after clearing. After crops have been established, the wide diversification possible will aid in halting or minimizing wind erosion. Careful water application on the rolling lands will help prevent water erosion.

The early establishment of a higher organic material content in the topsoil by plowing under straw, green manure crops and barnyard manure will materially assist in stabilizing the soil and hasten the period of full crop production.

In selecting the division area, lands with major drainage problems were excluded. In general the area is undulating to rolling and the permeable subsoils, underlying parent material, and creviced basalt provide good internal drainage; however, in localized areas some provision for drainage must be made. In township 8 south, range 23 east, and to a lesser extent in range 24 east, the construction of connecting drains may be necessary to provide drainage and permit reuse of water or disposal of it through drainage wells.

- - -


N
R.21E.
R.22 E.
R.23 E.
R.24 E.
R.25 E.
T.7 S.
T.8 S.
T.9 S.
T.10 S.
KIMAMA
MINIDOKA
DENDRITIC
UNIT B
POT HOLE
UNIT B
UNIT B
UNIT A
ACEQUIA
MINIDOKA DAM
PAUL
RUPERT
BURLEY
Snake River
LEGEND
Deep Borings
Wells
Project Boundary
Study Area Boundary
MINIDOKA NORTH SIDE
PUMPING DIVISION

LEGEND

PUBLIC ROADS

RAILROADS

TRANSMISSION LINE

COUNTY LINE

T. 9 S.
T. 10 S.

R. 20 E.
R. 21 E.
R. 22 E.

JEROME COUNTY
MINIDOKA COUNTY
MINIDOKA COUNTY
CASSIA COUNTY

TO JEROME

STATE HI-WAY NO. 25

TO RUPERT

UNDER CULTIVATION

44 KV. TRANSMISSION LINE

P.A. Lat.

PUMP No. 1

MILNER DIVERSION DAM

Milner-Gooding Canal

PACIFIC UNION R.R.

NORTH SIDE BRANCH

SNAKE RIVER

MAIN DRAIN

LATERAL

0 2000 4000 6000
Scale of Feet

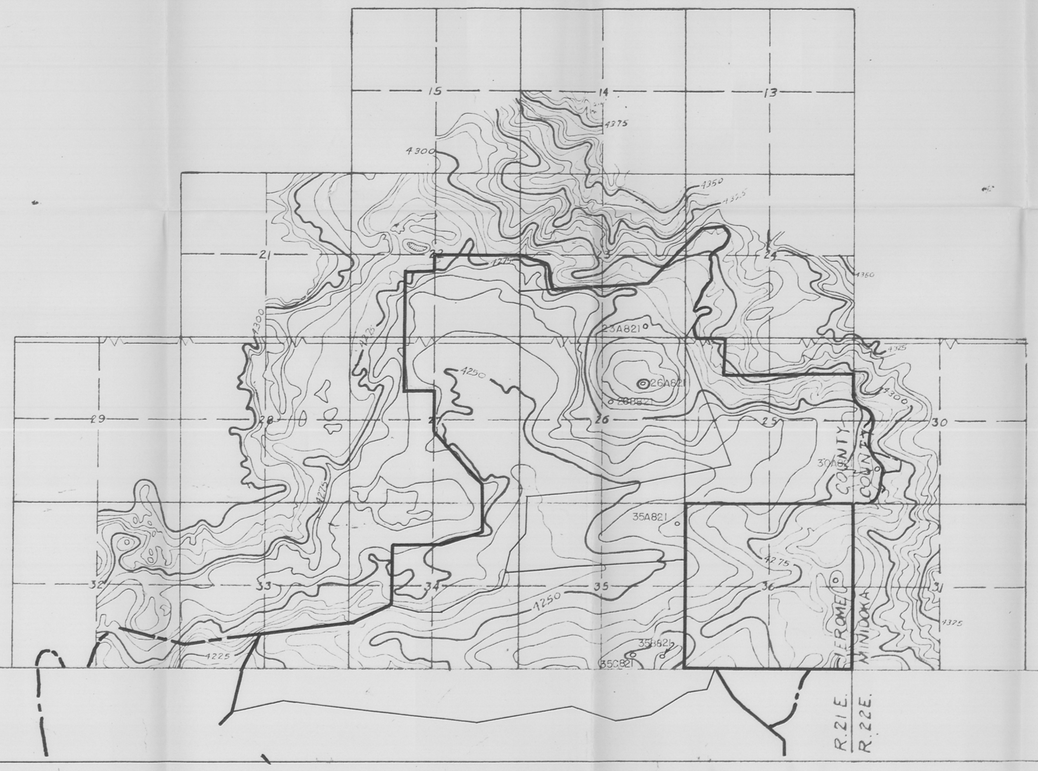
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

MINIDOKA NORTH SIDE PUMPING EXTENSION
UNIT "B" WELL LAYOUT

E.E.M.

5.0(M) P. 36 — APPROVED NOV. 1947 — SHEET 2 OF 3 — 701-107-2833

T. 7 S.
T. 8 S.
LINCOLN COUNTY
MINIDOKA COUNTY
TO SHOSHONE
UNION PACIFIC
11-WAY
MAIN LINE
AMERICAN FALLS
SHOSHONE FALLS
TRANSMISSION LINE
TO AMERICAN FALLS
TWIN FALLS
NO. 24
R. R.
STATE
UNION
ACEQUIA
MAIN
B-1
LATERAL
TO RUPERT
SNAKE
MINIDOKA COUNTY
CASSIA COUNTY
RIVER
MINIDOKA DAM
POWER HOUSE
LAKE
WALCOTT
R22E
R23E
R24E
R25E
N
MINIDOKA NORTH SIDE
PUMPING EXTENSION
UNIT "B" WELL LAYOUT
E. M.
50(M) 1-31
SHEET 1 OF 3
701-107-2833



T.8S
T.9S.

R. 20E
R. 21 E.

R.21.E.
R.22E.

R.22E
R.23E.

UNIT "B" WELL LAYOUT

701-107-2833

NORTH SIDE PUMPING DIVISION
CENTRAL VALLEY PROJECT

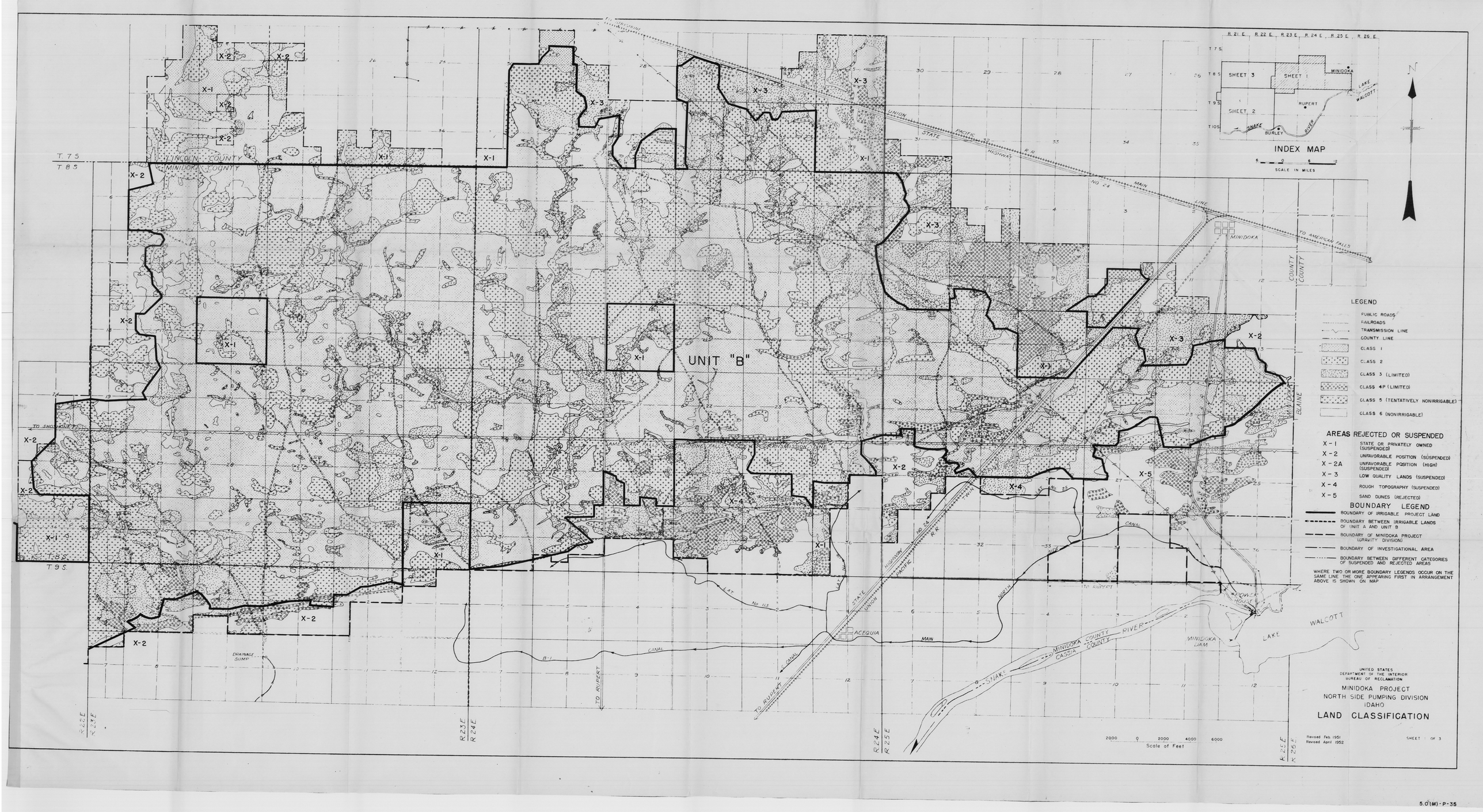
SUMMARY OF WELL ACREAGES AND ESTIMATED COSTS

1	2	3	4	5	6	7	8	9	10	11	12	13
Well No.	Single or Inter-connected	Irrigable Acreage Class 1	Class 2	Class 3	Total	C.F.S.	Surface Elevation	Est. Gr. Water Elevation	Depth to Water	Depth to Water + Drawdown	K. W. Load	Est. Cost Pump & Motor Dollars
6A824	I	283.5	365.2	8.7	657.4	10.1*	4346.6*	4116.8*	229.8*	235.0*	286.5*	12,760*
18A824	I	335.5	196.7	61.1	593.3	9.1*	4298.0*	4116.4*	181.6*	188.1*	207.0*	10,900*
21A824	S	331.4	306.2	45.2	682.8	10.6*	4274.3*	4122.5	151.8	157.0	199.5	9,800*
8A823	S	389.8	195.3	1.9	587.0	9.04*	4337.5*	4103.8*	233.7	234.7*	256.5*	12,220*
27A823	I	217.5	53.1	24.2	294.8	4.5*	4293.5*	4106.8*	186.7*	190.7*	103.5*	6,080*
6A923	I	--	215.3	288.6	503.9	7.74*	4276.1*	4100.4*	175.7*	176.9*	164.5*	8,160*
27C823	I	235.3	39.8	--	275.1	4.46*	4284.7*	4105.5*	179.2*	195.1*	106.0*	4,730*
11A824	I	552.5	419.9	20.4	992.8	7.8*	4308.9*	4136.0*	167.9*	167.9*	153.0*	6,050*
11B824	I					7.3	4295.3	4137.0	158.3	163.0	144.0	7,550
7B824	I	230.5	242.7	28.3	501.5	7.8*	4290.4	4120.1	170.3*	171.4*	168.5*	6,750*
13A824	I	812.6	338.1	80.3	1231.0	9.5	4295.4	4138.0	157.4	162.0	186.5	9,350
13B824	I					9.5	4275.0	4139.5	135.5	141.0	162.0	8,300
19A825	S	541.2	89.0	10.7	640.9	9.9	4263.0	4142.0	121.0	126.0	151.0	7,800
3A824	I	539.5	288.5	83.7	911.7	7.0	4320.6	4134.0	186.6	192.0	162.5	8,300
3B824	I					7.0	4321.0	4134.5	186.5	192.0	162.5	8,300
2A824	I	110.9	258.4	81.3	450.6	7.0	4326.5	4134.5	192.0	197.0	166.5	8,600
10A824	I	415.2	433.7	68.9	917.8	7.06	4304.5	4134.0	170.5	176.0	150.0	7,750
10B824	I					7.06	4292.0	4134.0	158.0	163.0	139.0	7,300
34A724	S	72.8	380.6	102.6	556.0	8.55	4324.0	4130.0	194.0	199.0	206.0	10,250
20A824	S	126.2	136.6	157.7	420.5	6.49	4268.0	4126.0	142.0	147.0	115.5	6,400
35A724	I	11.6	208.9	148.1	368.6	5.67	4328.5	4133.0	195.5	199.0	136.5	7,150
15A824	S	267.6	77.8	6.9	352.3	5.42	4284.1	4134.0	150.1	155.0	103.0	6,000
21B824	S	340.9	61.6	13.6	416.1	6.4	4281.0	4132.5	148.5	154.0	119.0	6,550
22A824	S	242.0	65.3	--	307.3	4.92	4272.8	4138.0	134.8	140.0	83.3	5,400
14A824	S	276.1	201.6	--	477.7	7.60	4272.5	4138.0	134.5	140.0	130.0	6,950
23A824	S	352.7	101.3	12.0	466.0	7.47	4278.0	4141.0	136.0	143.0	129.0	6,900
28A824	S	65.4	422.9	75.7	564.0	9.05	4259.0	4143.0	116.0	121.0	132.5	7,000
19B825	S	477.2	87.8	12.5	577.5	9.25	4268.9	4143.0	125.9	131.0	147.0	7,575
15A825	I	221.9	816.6	259.6	1298.1	10.4	4295.8	4144.0	151.8	157.0	198.0	9,900
21A825	I					10.4	4286.5	4143.5	143.0	148.0	186.5	9,350
14A825	I	486.8	411.9	103.2	1001.9	8.05	4303.0	4145.0	158.0	163.0	159.0	8,200
23A825	I					8.05	4302.5	4145.0	157.5	163.0	159.0	8,200
13A825	S	40.1	288.0	27.9	356.0	5.83	4298.7	4147.0	123.7	129.0	91.0	5,625
4A824	I	226.8	553.7	127.7	908.2	7.28	4317.3	4130.0	187.3	192.0	169.0	8,600
33A724	I					7.28	4334.5	4130.5	204.0	209.0	184.0	9,300
31A724	I	543.5	172.8	19.2	735.5	5.9	4352.0	4123.0	229.0	234.0	167.0	8,525
6B824	I					5.9	4340.5	4121.0	219.5	225.0	161.0	8,250
30A724	S	136.4	354.7	129.1	620.2	10.0	4363.7	4123.5	240.2	245.0	296.5	13,350
32A724	I	770.5	252.5	110.4	1133.4	9.1	4333.7	4127.5	206.2	211.0	232.0	11,300
5A824	I					9.1	4332.8	4128.0	204.8	210.0	231.0	11,275
8A824	I	136.8	389.9	25.5	552.2	8.5*	4303.52*	4125.4*	178.1*	183.1*	186.0*	9,500*
1A823	I	1189.8	393.9	116.2	1699.9	9.07	4351.6	4116.5	235.1	240.0	264.0	12,400
1B823	I					9.07	4330.0	4113.5	216.5	222.0	244.0	11,750
1C823	I					9.07	4341.4	4117.0	224.4	229.0	251.9	12,000
3A823	S	428.3	75.4	36.5	540.2	8.65	4335.0	4104.5	230.5	236.0	247.5	11,900
12A823	I					7.60	4324.6	4114.5	210.1	215.0	198.0	9,900
12B823	I	885.3	456.5	82.1	1423.9	7.60	4326.5	4114.0	212.5	218.0	201.0	10,000
12C823	I					7.60	4318.0	4113.5	199.5	205.0	188.5	9,500
5A823	S	302.5	177.6	15.4	495.5	7.94	4344.9	4102.5	242.4	247.0	237.5	11,500
4A823	I	578.0	508.8	5.8	1092.6	8.75	4341.1	4103.0	238.1	243.0	257.3	12,200
5B823	I					8.75	4347.3	4102.5	244.8	250.0	264.7	12,450
10A823	S	150.8	105.6	1.4	257.8	4.13	4312.3	4104.5	207.8	213.0	100.5	6,150
10B823	I					7.96	4322.2	4104.0	218.2	223.0	214.8	10,600
15A823	I	929.7	470.4	89.8	1489.9	7.96	4317.0	4104.0	213.0	218.0	210.0	10,400
14A823	I					7.96	4308.0	4105.5	202.5	208.0	200.3	10,000
22A823	S	242.5	111.4	9.6	363.5	5.83	4299.5	4106.0	193.5	199.0	140.5	7,300
15B823	I	80.7	26.4	21.1	128.2	2.06	4299.9	4105.0	194.9	200.0	49.6	4,500
23A823	S	450.1	103.7	77.8	631.6	10.1	4306.0	4107.0	199.0	204.0	249.3	11,950
20A823	S	40.9	125.8	124.3	291.0	4.06	4272.4	4114.0	158.4	163.0	92.0	5,650
24A823	S	154.2	42.7	2.9	199.8	3.2	4287.0	4113.5	173.5	179.0	69.3	5,000
24B823	S	305.4	103.7	86.9	496.0	7.95	4278.6	4117.0	161.6	167.0	160.6	8,250
25A823	S	226.2	12.5	32.6	271.3	4.35	4287.7	4116.0	151.7	157.0	82.5	5,225
19A824	S	113.5	178.6	12.5	304.7	4.87	4253.1	4124.0	129.0	134.0	79.0	5,200
31A824	I	503.9	220.3	94.6	818.8	6.56	4280.2	4127.5	152.7	158.0	125.5	6,700
31B824	I					6.56	4292.8	4130.0	162.8	168.0	133.5	7,075
29A824	S	50.0	74.9	40.8	165.7	2.66	4286.2	4131.0	155.2	140.0	45.1	4,350
30A824	S	314.3	288.2	13.4	615.9	9.87	4266.7	4125.0	148.7	149.0	170.0	9,025
29B824	S	136.1	136.8	10.6	283.5	4.54	4254.1	4134.5	119.6	125.0	68.7	4,925
17A823	S	450.3	20.2	92.6	563.1	9.02	4303.0	4103.0	200.0	205.0	224.0	11,025
24A822	I	574.8	289.9	164.6	1029.3	8.25	4344.3	4108.0	236.3	241.0	240.5	11,825
25A822	I					8.25	4324.0	4107.0	217.0	222.0	221.6	10,875
21A823	S	390.3	38.9	13.9	443.1	7.1	4294.7	4105.0	189.7	195.0	167.5	8,525
29A823	I	755.6	172.8	80.2	1008.6	8.07	4291.4	4107.0	184.4	189.0	184.5	9,300
29B823	I					8.07	4290.3	4106.5	186.8	192.0	187.5	9,400
35A823	S	93.2	45.1	7.7	146.0	2.34	4276.7	4105.0	171.7	177.0	60.0	4,500
35B823	S	130.2	106.6	--	236.8	3.79	4278.4	4109.5	168.9	169.0	77.5	5,175
35C823	S	280.9	59.0	8.6	348.5	5.39	4278.2	4105.0	168.2	173.0	117.0	6,475
28A823	I	459.8	271.5	337.7	1069.0	8.56	4287.4	4105.0	182.4	187.0	184.0	9,700
33A823	I					8.56	4278.3	4104.0	174.3	179.0	185.4	9,400
27B823	S	280.4	136.8	21.1	438.3	7.01	4278.4	4104.0	169.4	174.0	148.0	7,650
3A923	S	2.5	207.8	78.7	289.0	4.63	4272.2	4101.0	171.2	176.0	38.6	5,800
31A823	I	--	320.2	47.9	368.1	5.9	4280.0	4103.0	177.0	183.0	130.0	6,950
35A822	I	123.0	716.1	721.9	1561.0	8.33	4312.9	4081.5	231.4	236.0	237.9	11,525
35B822	I					8.33	4297.0	4081.5	215.5	221.0	222.8	11,000
2A922	I					8.33	4294.8	4075.0	219.8	225.0	226.8	11,100
6B923	S	--	236.2	40.8	277.0	4.43	4255.5	4066.5	189.0	194.0	93.3	5,700
3A922	I	357.0	458.4	112.1	927.5	7.43	4295.0	4063.0	232.0	237.0	213.1	10,600
3B922	I					7.43	4290.0	4063.5	226.5	232.0	208.5	10,325
10A922	S	132.0	19.5	119.9	271.4	4.35	4261.3	4066.0	195.3	200.0	105.3	6,025
15A922	I	49.2	634.6	230.9	914.7	7.32	4257.1	4067.0	190.1	195.0	172.7	8,800
15B922	I					7.32	4258.2	4046.0	212.2	217.0	192.2	9,700
23A922	S	26.2	174.4	115.8	316.4	5.06	4251.6	4077.0	174.6	180.0	110.5	6,275
22A922	I	194.8	487.2	171.3	853.3	6.85	4259.5	4021.0	238.5	244.0	202.5	10,100
22B922	I					6.85	4257.7	4038.0	219.7	225.0	187.0	9,400
9A922	S	211.9	147.3	9.5	368.7	5.9	4259.1	4030.5	228.6	234.0	187.0	8,500
7A922	I	729.0	752.3	197.8	1679.1	8.97	4283.0	4005.5	277.5	283.0	307.0	13,725
7B922	I					8.97	4275.0	4004.5	270.5	276.0	300.0	13,500
17A922	I					8.97	4284.5	3990.5	256.0	261.0	283.0	13,000
20A922	I	227.8	152.0	462.5	842.3	10.3	4259.3	4004.5	254.8	260.0	324.0	14,300
20B922	I					8.17	4237.1	3996.5	240.6	246.0	94.2	5,700
28A922	S	--	228.9	106.1	335.0	5.36	4237.1	4007.0	230.1	235.0	152.5	7,900
19A922	S	90.5	279.6	111.4	481.5	7.73	4252.0	3974.0	278.0	283.0	265.0	12,425
29A922	I	1.9	106.8	--	108.7	1.74	4238.5	3990.5	242.0	247.0	52.0	4,575
28B922	S	140.2	17.8	99.6	257.6	4.14	4242.4	4012.5	229.9	235.0	118.0	6,500
33B922	S	73.0	351.3	234.0	658.3	10.54	4243.4	4015.0	228.4	233.0	298.0	13,450
34A921	I	--	66.5	60.4	126.9	2.04	4204.1	3914.5	289.6	295.0	72.7	5,100
26A821	I	1027.7	288.7	102.0	1418.4	7.56	4283.6	4005.5	278.1	303.0	277.5	12,800
26B821	I					7.56	4275.2	4002.5	275.7	281.0	257.0	12,150
23A821	I					7.56	4283.1	4009.5	273.6	279.0	256.0	12,150
30A821	S	200.7	124.3	--	325.0	5.21	4290.6	4021.5	269.1	274.0	173.0	8,800
35A821	S	298.0	--	--	298.0	4.78	4262.5	4000.5	262.0	267.0	154.5	7,925
35B821	I	887.3	139.5	--	1026.8	8.22	4291.9	3994.0	297.9	303.0	292.0	13,275
35C821	I					8.22	4275.2	3989.5	285.7	291.0	290.0	13,225
1A921	S	339.5	155.8	--	495.3	7.94	4291.2	3992.0	299.2	304.0	292.0	13,275
3A921	S	88.4	55.6	--	144.0	2.51	4252.5	3972.0	280.5	286.0	79.8	5,250
3B921	S	311.8	115.2	--	427.0	6.82	4246.7	3964.5	282.2	287.0	237.0	11,500
12A921	S	--	163.2	--	163.2	2.82	4270.8	3980.0	290.8	296.0	93.7	5,700
11A921	S	---	156.0	39.4	195.4	3.13	4284.1	3972.5	311.6	317.0	120.0	6,550
11B921	I	--	331.2	61.4	392.6	6.3	4274.6	3960.0	308.6	314.0	239.0	11,600
10A921	I	--	393.6	24.5	418.1	8.7	4239.3	3960.5	278.8	284.0	230.0	11,200
22A921	S	--	241.4	88.3	329.7	5.27	4258.9	3931.0	327.9	333.0	212.0	10,500
35A921	S	25.0	128.4	--	153.4	2.46	4235.0	3937.5	297.5	303.0	90.0	5,600
35D823	S	127.8	161.8	6.2	295.8	4.74	4273.6	4104.5	169.1	174.0	99.7	5,875
3A921	S	--	212.2	102.2	314.4	5.03	4225.0	3925.0	300.0	305.0	186.0	9,400
1A824	S	--	239.0	105.6	344.6	5.52	4305.5	4136.0	169.5	175.0	117.0	6,500
12A824	S	--	191.5	92.6	284.1	4.56	4285.0	4137.5	147.5	153.0	84.3	5,500
17A825	S	97.1	133.4	128.2	358.7	5.75	4260.9	4141.0	119.9	125.0	86.3	5,550
29A825	I	60.6	--	15.4	76.0	1.22	4234.1	4143.0	91.1	96.0	14.2	3,550
20A825	I	78.3	25.4	--	103.7	1.66	4256.8	4143.0	113.8	119.0	24.0	3,850
10A825	S	--	219.4	41.3	260.7	4.18	4306.0	4141.5	164.5	170.0	86.0	5,550
27A724	S	--	79.2	90.2	169.4	2.72	4327.0	4128.0	199.0	204.0	67.2	4,900
Total 131:		26,189.7	22,092.1	7,553.6	55,835.4	887.4			Ave. 201.8		22,247.0	1,135,850.
Rounded Totals		26,200.0	22,100.0	7,550.0	55,850.0							

Asterisks indicate the following:

Column 7 - Actual capacities specified for pumps installed.
Column 8 - Maximum water surface elevations in stilling pools as constructed.
Column 9 - Ground water surface in drilled wells.
Column 10 - Depth from surface of stilling pool to static ground water. All others are from ground surface to estimated static ground water.
Column 11 - Depth to water plus measured drawdowns. Remainder are plus estimated drawdown.
Column 12 - Kilowatt load computed by C.F.S. X (Depth to water drawdown) X .0846 ÷ 70% efficiency.
Column 13 - Actual bid prices.

Revised April 8, 1952
X-107-505


UNIT "B"
INDEX MAP
SCALE IN MILES
LEGEND
PUBLIC ROADS
RAILROADS
TRANSMISSION LINE
COUNTY LINE
CLASS 1
CLASS 2
CLASS 3 (LIMITED)
CLASS 4P (LIMITED)
CLASS 5 (TENTATIVELY NONIRRIGABLE)
CLASS 6 (NONIRRIGABLE)
AREAS REJECTED OR SUSPENDED
X-1 STATE OR PRIVATELY OWNED (SUSPENDED)
X-2 UNFAVORABLE POSITION (SUSPENDED)
X-2A UNFAVORABLE POSITION (HIGH) (SUSPENDED)
X-3 LOW QUALITY LANDS (SUSPENDED)
X-4 ROUGH TOPOGRAPHY (SUSPENDED)
X-5 SAND DUNES (REJECTED)
BOUNDARY LEGEND
BOUNDARY OF IRRIGABLE PROJECT LAND
BOUNDARY BETWEEN IRRIGABLE LANDS OF UNIT A AND UNIT B
BOUNDARY OF MINIDOKA PROJECT (GRAVITY DIVISION)
BOUNDARY OF INVESTIGATIONAL AREA
BOUNDARY BETWEEN DIFFERENT CATEGORIES OF SUSPENDED AND REJECTED AREAS
WHERE TWO OR MORE BOUNDARY LEGENDS OCCUR ON THE SAME LINE THE ONE APPEARING FIRST IN ARRANGEMENT ABOVE IS SHOWN ON MAP
UNITED STATES DEPARTMENT OF THE INTERIOR BUREAU OF RECLAMATION
MINIDOKA PROJECT
NORTH SIDE PUMPING DIVISION
IDAHO
LAND CLASSIFICATION
Revised Feb. 1951
Revised April 1952
SHEET 1 OF 3
Scale of Feet
5.0(M)-P-35

T.8S.
T.9S.

T.9S.
T.10S.

JEROME COUNTY
MINIDOKA COUNTY

UNIT "B"

UNIT "A"

X-1
X-2
X-2A
X-3

N

CANAL
NORTH SIDE
MAIN
BRANCH
LATERAL
D-9E
D-9A
D-21
D-14
DRAIN
TO RUPERT
TO JEROME
STATE HIGHWAY NO. 25
44 KV. TRANSMISSION LINE
PUMP LATERAL
GOODING
MILNER
MILNER DIVERSION DAM
JEROME COUNTY
TWIN FALLS COUNTY
MINIDOKA COUNTY
CASSIA COUNTY
SNAKE RIVER

R.20E. R.21E.
R.21E. R.22E.
R.22E. R.23E.

LEGEND

- PUBLIC ROADS
- RAILROADS
- TRANSMISSION LINES
- COUNTY LINES
- CLASS 1
- CLASS 2
- CLASS 3 (LIMITED)
- CLASS 4P (LIMITED)
- CLASS 5 (TENTATIVELY NONIRRIGABLE)
- CLASS 6 (NONIRRIGABLE)

AREAS REJECTED OR SUSPENDED

X-1	STATE OR PRIVATELY OWNED (SUSPENDED)
X-2	UNFAVORABLE POSITION (SUSPENDED)
X-2A	UNFAVORABLE POSITION (HIGH) (SUSPENDED)
X-3	LOW QUALITY LANDS (SUSPENDED)
X-4	ROUGH TOPOGRAPHY (SUSPENDED)
X-5	SAND DUNES (REJECTED)

R 21 E. R 22 E. R 23 E. R 24 E. R 25 E. R 26 E.
T. 7 S.
T 8 S.
T 9 S.
T 10 S.
SHEET 3
SHEET 1
SHEET 2
MINIDOKA
RUPERT
BURLEY
LAKE WALCOTT
SNAKE RIVER

INDEX MAP

6 0 6 12
SCALE IN MILES

BOUNDARY LEGEND

- BOUNDARY OF IRRIGABLE PROJECT LAND
- BOUNDARY BETWEEN IRRIGABLE LANDS OF UNIT A AND UNIT B
- BOUNDARY OF MINIDOKA PROJECT (GRAVITY DIVISION)
- BOUNDARY OF INVESTIGATIONAL AREA
- BOUNDARY BETWEEN DIFFERENT CATEGORIES OF SUSPENDED AND REJECTED AREAS

WHERE TWO OR MORE BOUNDARY LEGENDS OCCUR ON THE SAME LINE THE ONE APPEARING FIRST IN THE ARRANGEMENT ABOVE IS SHOWN ON THE MAP.

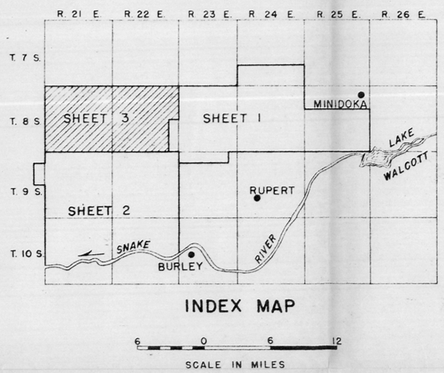
2000 0 2000 4000 6000
Scale of Feet

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

MINIDOKA PROJECT
NORTH SIDE PUMPING DIVISION
IDAHO
LAND CLASSIFICATION

Revised Feb. 1951
Revised April 1952

SHEET 2 OF 3



INDEX MAP

LEGEND

- PUBLIC ROADS
- RAILROADS
- TRANSMISSION LINE
- COUNTY LINE
- CLASS 1
- CLASS 2
- CLASS 3 (LIMITED)
- CLASS 4P (LIMITED)
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- CLASS 6 (NONIRRIGABLE)

AREAS REJECTED OR SUSPENDED

X - 1	STATE OR PRIVATELY OWNED (SUSPENDED)
X - 2	UNFAVORABLE POSITION (SUSPENDED)
X - 2A	UNFAVORABLE POSITION (HIGH) (SUSPENDED)
X - 3	LOW QUALITY LANDS (SUSPENDED)
X - 4	ROUGH TOPOGRAPHY (SUSPENDED)
X - 5	SAND DUNES (REJECTED)

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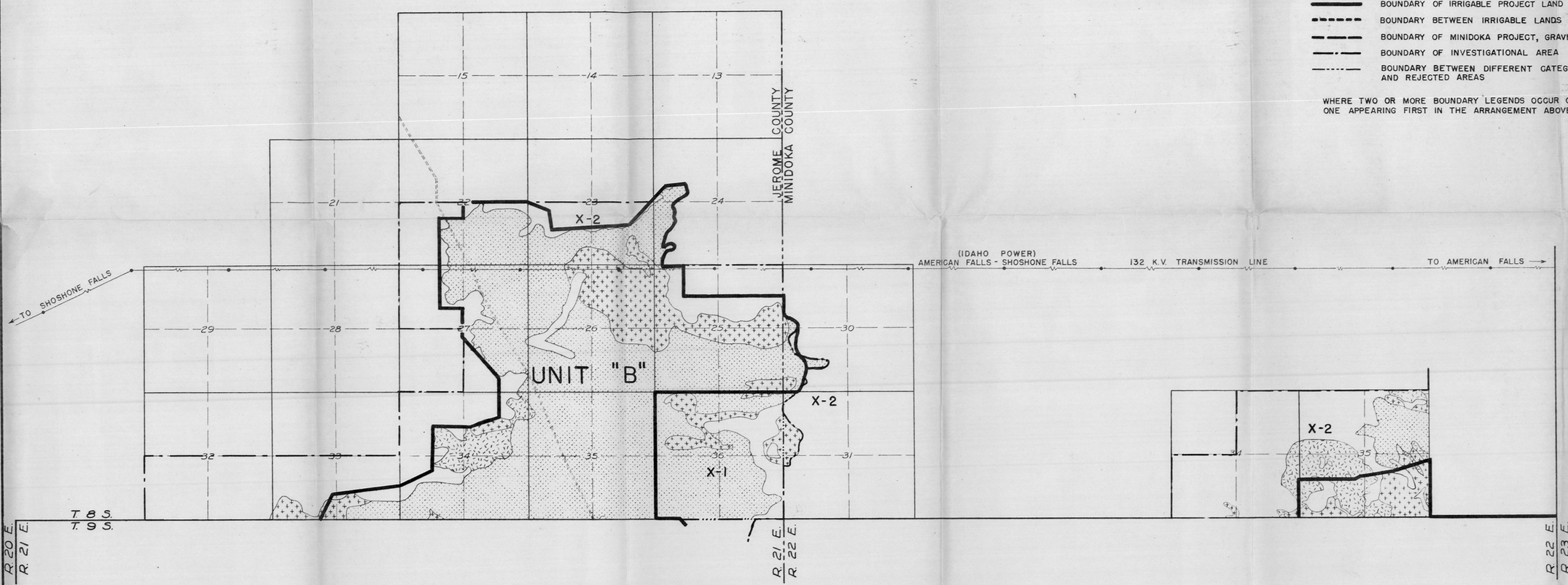

2000 0 2000 4000 6000
Scale of Feet

UNITED STATES
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IDAHO

LAND CLASSIFICATION

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NORTH SIDE PUMPING DIVISION
IDAHO
LAND CLASSIFICATION
INVESTIGATED AREA

JUNE 1950

T. 8 S.
T. 9 S.

T. 9 S.
T. 10 S.

JEROME COUNTY
MINIDOKA COUNTY

LEGEND

- PUBLIC ROADS
- RAILROADS
- TRANSMISSION LINES
- COUNTY LINES
- CLASS 1
- CLASS 2
- CLASS 3
- CLASS 4
- CLASS 5
- CLASS 6

N

TO JEROME

MILNER

GOODING

STATE HIGHWAY NO. 23

44 KV. TRANSMISSION LINE

EAGLE

PUMP LIFT

MILNER DIVERSION DAM

JEROME COUNTY

TWIN FALLS COUNTY

SNAKE RIVER

MINIDOKA COUNTY
CASSIA COUNTY

NORTH SIDE CANAL

UNION PACIFIC R.R.

NORTH SIDE BRANCH

TO RUPERT

D-31

D-3

D-21 DRAIN

D-14 MAIN

R.20 E.
R.21 E.

R.21 E.
R.22 E.

R.22 E.
R.23 E.

R 21 E R 22 E R 23 E R 24 E R 25 E R 26 E

T. 7 S.
T. 8 S.
T. 9 S.
T. 10 S.

SHEET 3
SHEET 1
SHEET 2

MINIDOKA
LAKE WALCOTT
RUPERT
BURLEY
SNAKE RIVER

INDEX MAP

6 0 6 12
SCALE IN MILES

2000 0 2000 4000 6000
Scale of Feet

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NORTH SIDE PUMPING DIVISION
IDAHO

LAND CLASSIFICATION INVESTIGATED AREA

JUNE 1948

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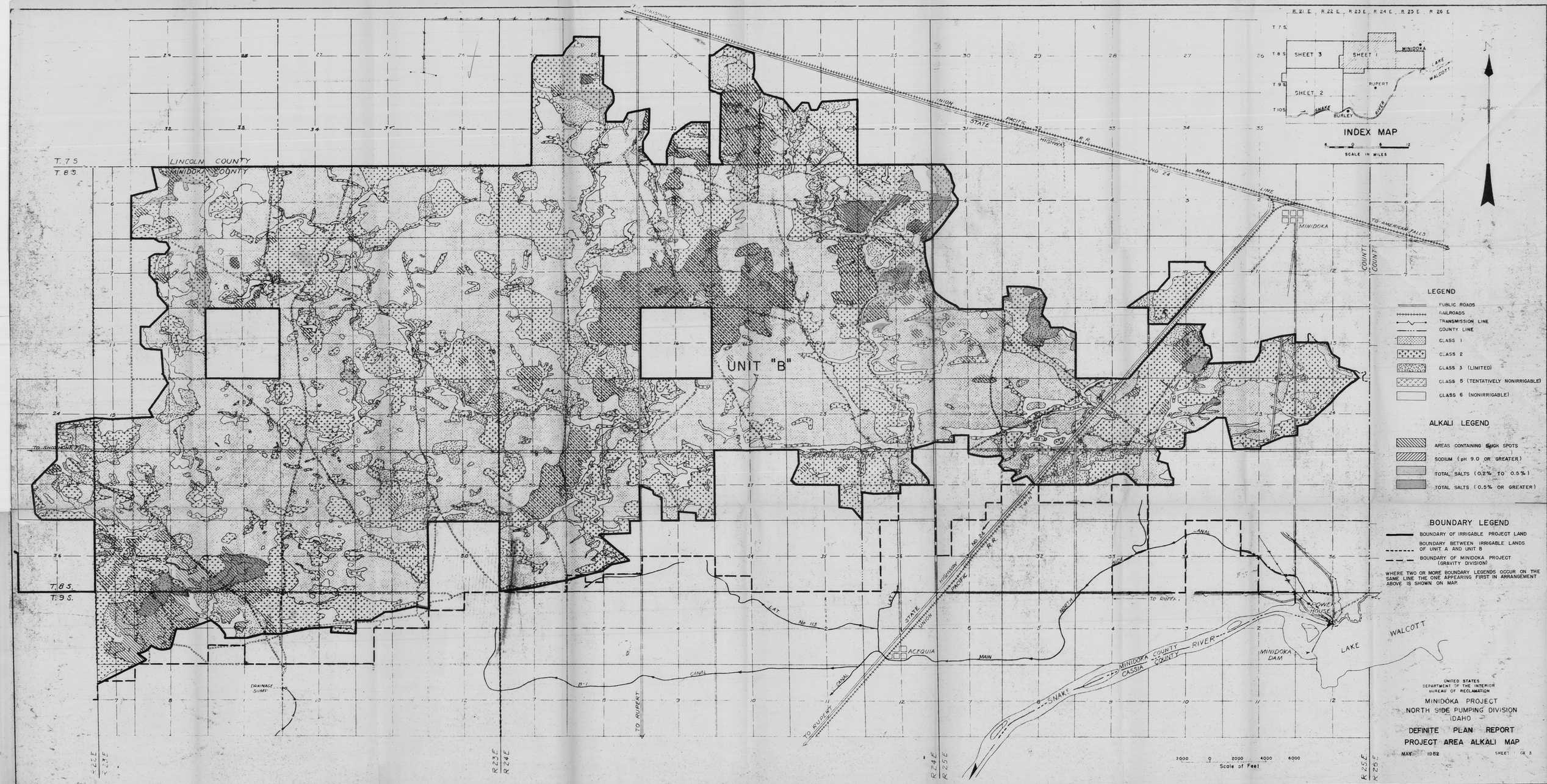
R 21 E. R 22 E. R 23 E. R 24 E. R 25 E. R 26 E.
T 7 S.
T 8 S.
T 9 S.
T 10 S.
SHEET 3
SHEET 1
SHEET 2
MINIDOKA
RUPERT
BURLEY
LAKE WALCOTT
SNAKE RIVER
INDEX MAP
SCALE IN MILES
LINCOLN COUNTY
MINIDOKA COUNTY
T. 7 S.
T 8 S.
UNION PACIFIC STATE HIGHWAY
R.R.
NO 24 MAIN LINE
TO AMERICAN FALLS
MINIDOKA
COUNTY
COUNTY
UNIT "B"
TO SHOSHONE FALLS
AMERICAN FALLS RESERVOIR DISTRICT
TRANSMISSION LINE
T. 8 S.
T. 9 S.
LATERAL No 113
LATERAL
ACEQUIA
MAIN CANAL
B-1 LATERAL
TO RUPERT
TO RUPERT
DRAINAGE SUMP
NORTH SIDE CANAL
TO RUPERT
POWER HOUSE
MINIDOKA DAM
WALCOTT LAKE
MINIDOKA COUNTY
CASSIA COUNTY
SNAKE RIVER
R 22 E
R 23 E
R 24 E
R 25 E
R 26 E
2000 0 2000 4000 6000
Scale of Feet
LEGEND
PUBLIC ROADS
RAILROADS
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ALKALI LEGEND
AREAS CONTAINING SPOTS
SODIUM (pH 9.0 OR GREATER)
TOTAL SALTS (0.2% TO 0.5%)
TOTAL SALTS (0.5% OR GREATER)
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DEFINITE PLAN REPORT
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MAY 1952
SHEET OF 3

T.8S.
T.9S.

T.9S.
T.10S.

UNIT "B"

UNIT "B"

UNIT "B"

UNIT "A"

N

CANAL

UNION PACIFIC R.R.

GOODING

MILNER

TO JEROME

STATE HIGHWAY NO. 25

44 KV. TRANSMISSION LINE

SIDE BRANCH

TO RUPERT

D-9L

D-21

DRAIN

D-14

MAIN

SNAKE RIVER

MINIDOKA COUNTY

CASSIA COUNTY

JEROME COUNTY

TWIN FALLS COUNTY

MILNER DIVERSION DAM

R.20E.
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6 0 6 12
SCALE IN MILES

ALKALI LEGEND

- AREAS CONTAINING SLICK SPOTS
- SODIUM (pH 9.0 OR GREATER)
- TOTAL SALTS (0.2% TO 0.5%)
- TOTAL SALTS (0.5% OR GREATER)

2000 0 2000 4000 6000
Scale of Feet

UNITED STATES
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NORTH SIDE PUMPING DIVISION
IDAHO

DEFINITE PLAN REPORT
PROJECT AREA ALKALI MAP

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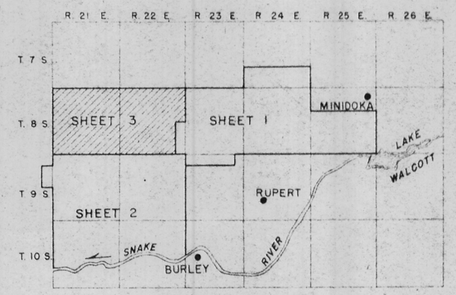

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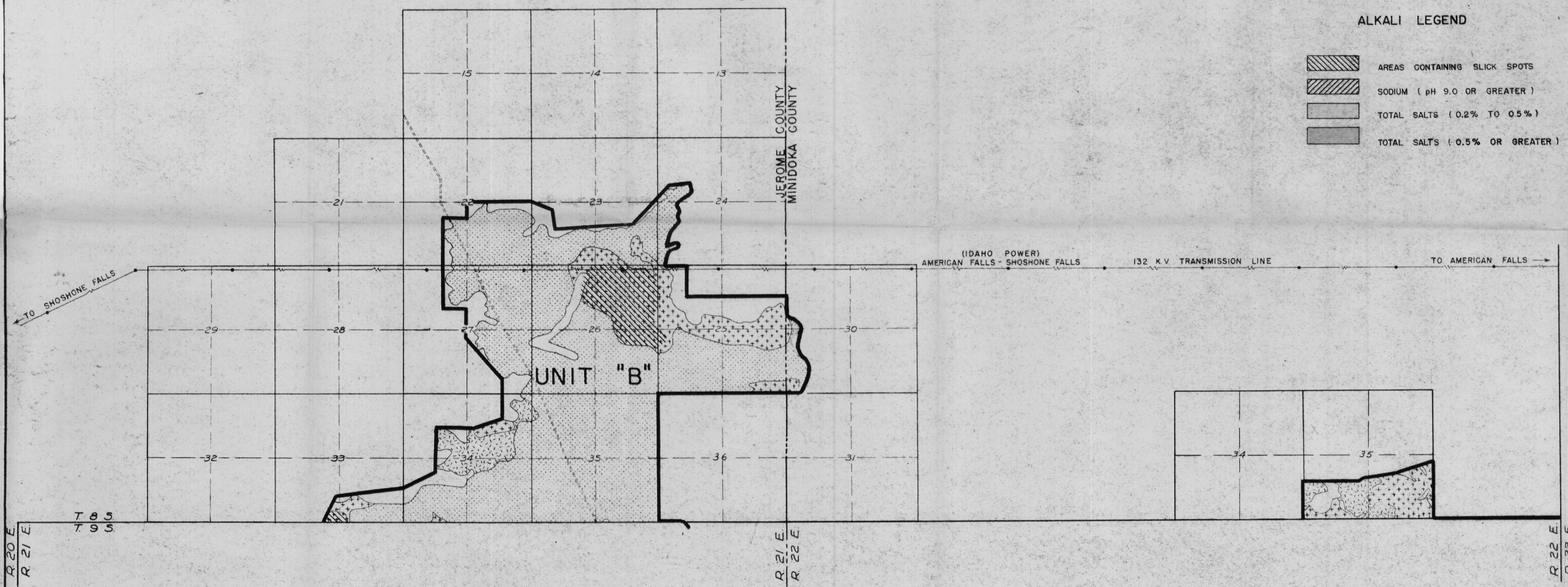

2000 0 2000 4000 6000

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DEFINITE PLAN REPORT
PROJECT AREA ALKALI MAP

Revised May 1952

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