

Rep. 25

REPORT ON PALA RESERVOIR

By William S. Post

January 13, 1915.

---- 0 ----

DESCRIPTION

This site is located at the lower or northerly end of the Pauma Ranch and the outlet has an altitude above sea of 660 feet. This elevation is sufficient to reach by gravity all of the mesas around Oceanside, Vista, San Marcos and Encinitas.

WATER SUPPLY

The calculation of water supply is based on the assumption that Warners Dam is constructed and diverting the entire quantity of water which has been determined as 25 million gallons daily. Also on the assumption that the Escondido Ditch is diverting 4,000 acre feet or  $3\frac{1}{2}$  million gallons daily. With these assumptions the safe yield of the Pala Reservoir will be 6,000 acre feet per year or 5.3 million gallons daily.

In addition to this for the last 10 years there would have been a waste or excess over and above the amount necessary to make 5.3 million gallons or about 6,000 acre feet per year which roughly is sufficient to take care of the riparian owners below the reservoir and secure constant conditions in the gravels of the river. This will result in the complete regulation of the river and there will be virtually no run-off into the ocean.

### THE RESERVOIR

The attached table shows the storage capacity at various heights and the height of 120 feet of water level has been selected as the proper amount to secure complete regulation. This contains 35,240 acre feet or 11 billion gallons. The acreage submerged in high water level would be 832 acres. Of this about 70 acres would be upon lands just north of the Panmo Ranch and the remainder on the Ranch proper.

### DAM

The dam has been figured as constructed in a similar manner to the proposed Carroll Dam. The maximum height is 125 feet, the length on top is 850 feet and the cost is estimated as \$651,000. This type of multiple arch dam is capable of outstanding overflow throughout its entire length and may act as a spillway at any time. It is therefore possible to construct this type of dam at various periods increasing the height as the requirements increase.

It will be noted that the cost of storing here is a low cost compared with other systems even if a reasonable allowance is made for the cost of a pipe line to the lands.

### PIPE LINES

The cost of conveying the water to the lands has not been estimated but would be noted that the pipe line would be about 15 miles long to serve the mesas around Vista.

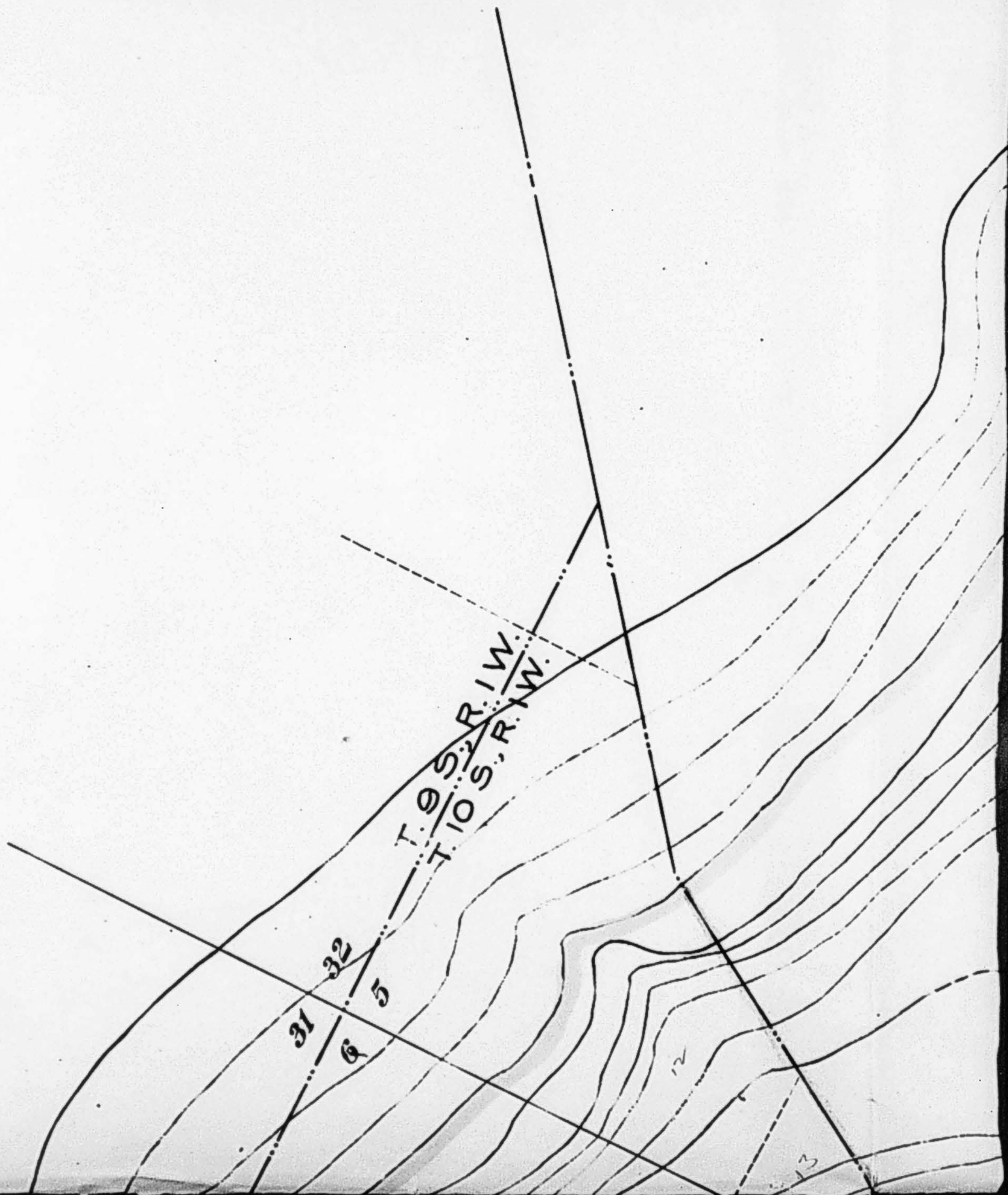
January 13, 1915.

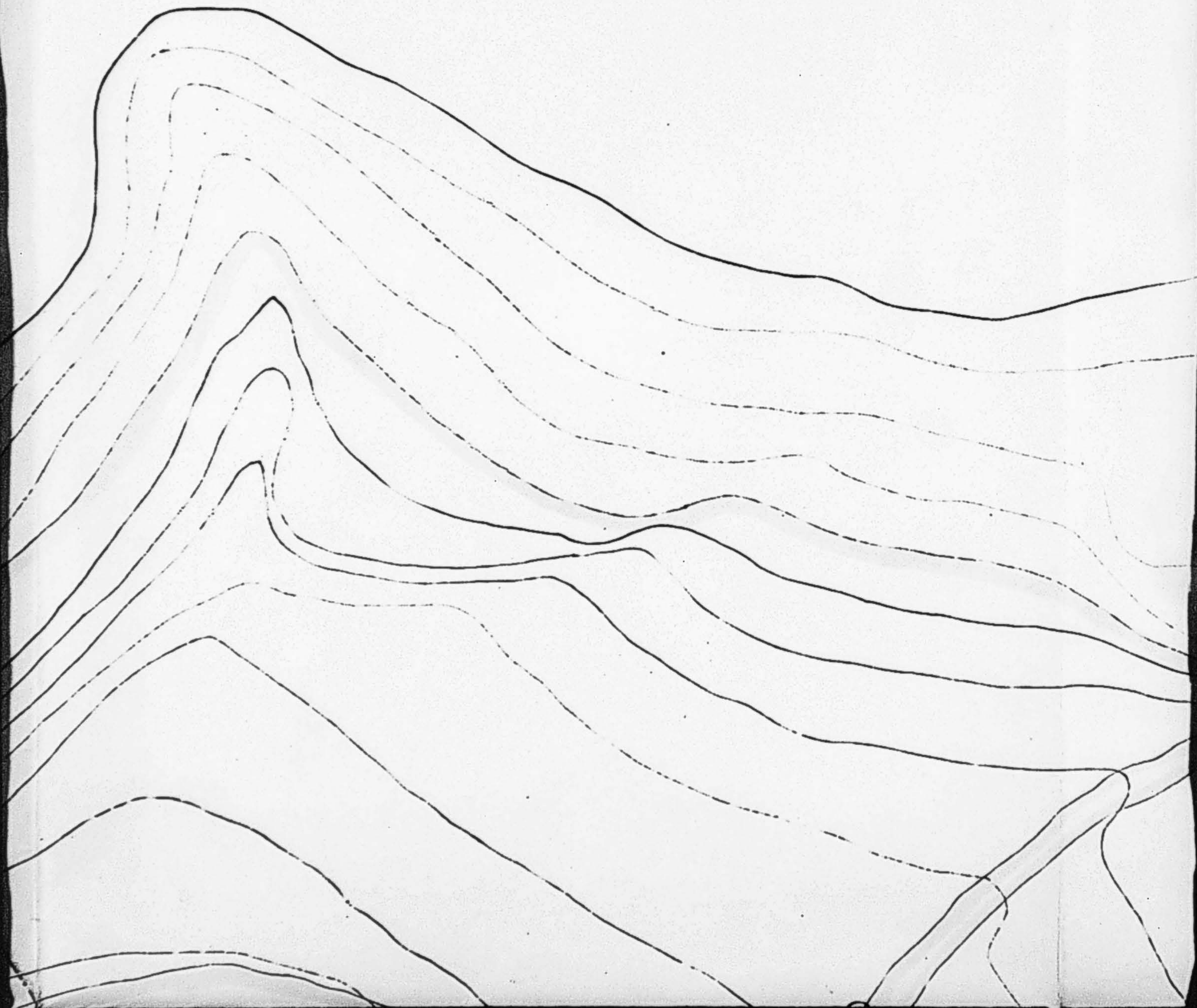
*William S. Fort*

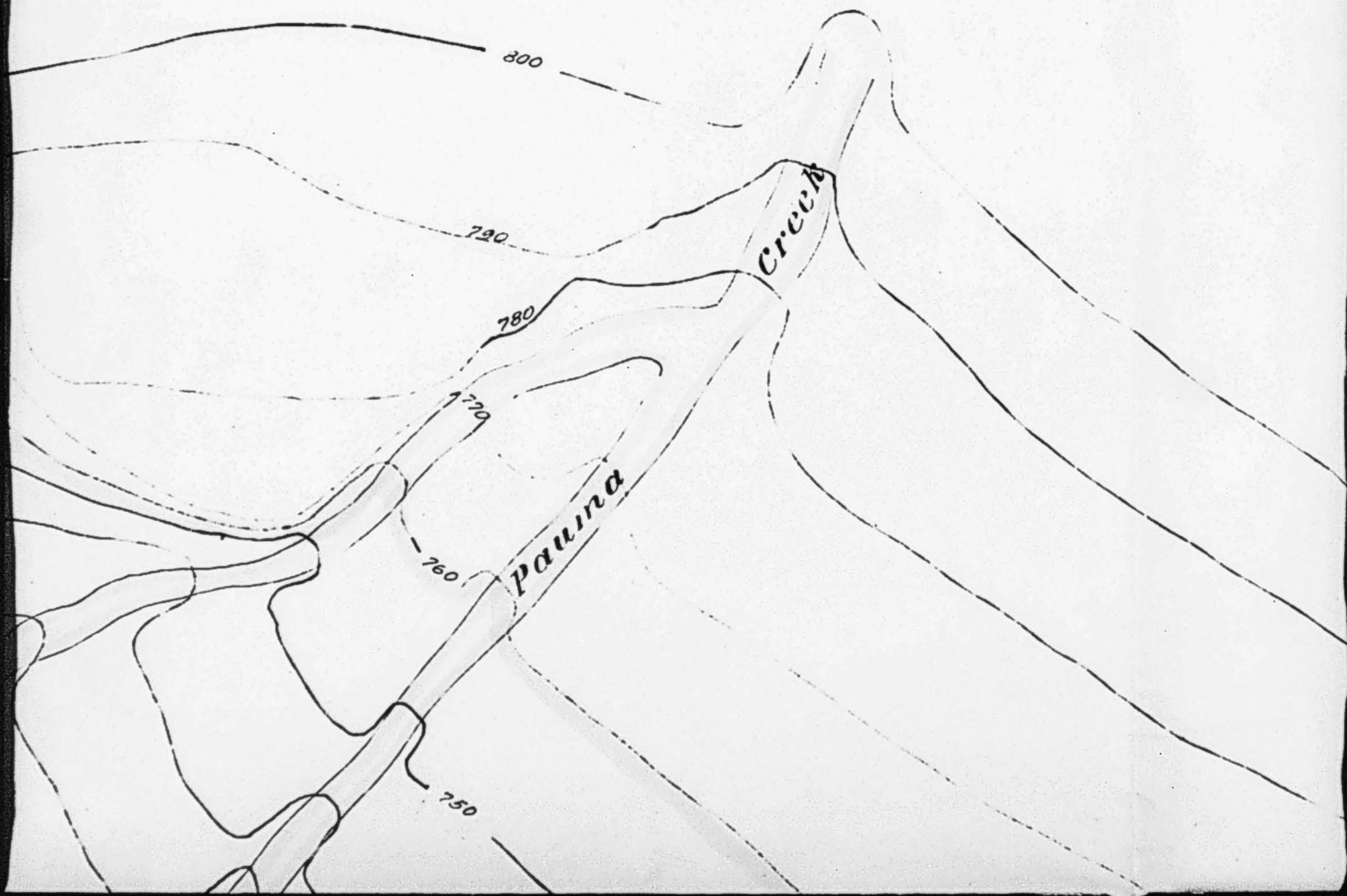
PALA RESERVOIR

TABLE OF CAPACITIES.

<u>Contour</u>	<u>Area Acres</u>	<u>Depth of Water</u>	<u>Capacity Acre-feet.</u>
660	0	0	0
670	5	10	20
680	12.7	20	110
690	28.8	30	320
700	65.0	40	790
710	124	50	1740
720	222	60	3470
730	321	70	6190
740	418	80	9890
750	535	90	14660
760	637	100	20520
770	737	110	27590
780	832	120	35240
790	937	130	44090
800	1035	140	53950
810	1137	150	64810







## TABLE OF CAPACITIES

CONTOUR	AREA ACRES	DEPTH	CAPACITY ACRE FT.
660	0	0	0
670	5	10	20
680	13	20	110
690	29	30	320
700	65	40	790
710	124	50	1740
720	222	60	3470
730	321	70	6190
740	418	80	9890
750	535	90	14660
760	637	100	20520
770	737	110	27390
780	832	120	35240
790	937	130	44090
800	1035	140	53950
810	1137	150	64810

*Water level for 100' dam* —

## F CAPACITIES

DEPTH	CAPACITY ACRE FT.
0	0
5	20
13	110
29	320
55	790
84	1740
12	3470
1	6190
8	9890
65	14660
87	20520 ✓
87	27390
82	35240
87	44090
85	53950
87	64810

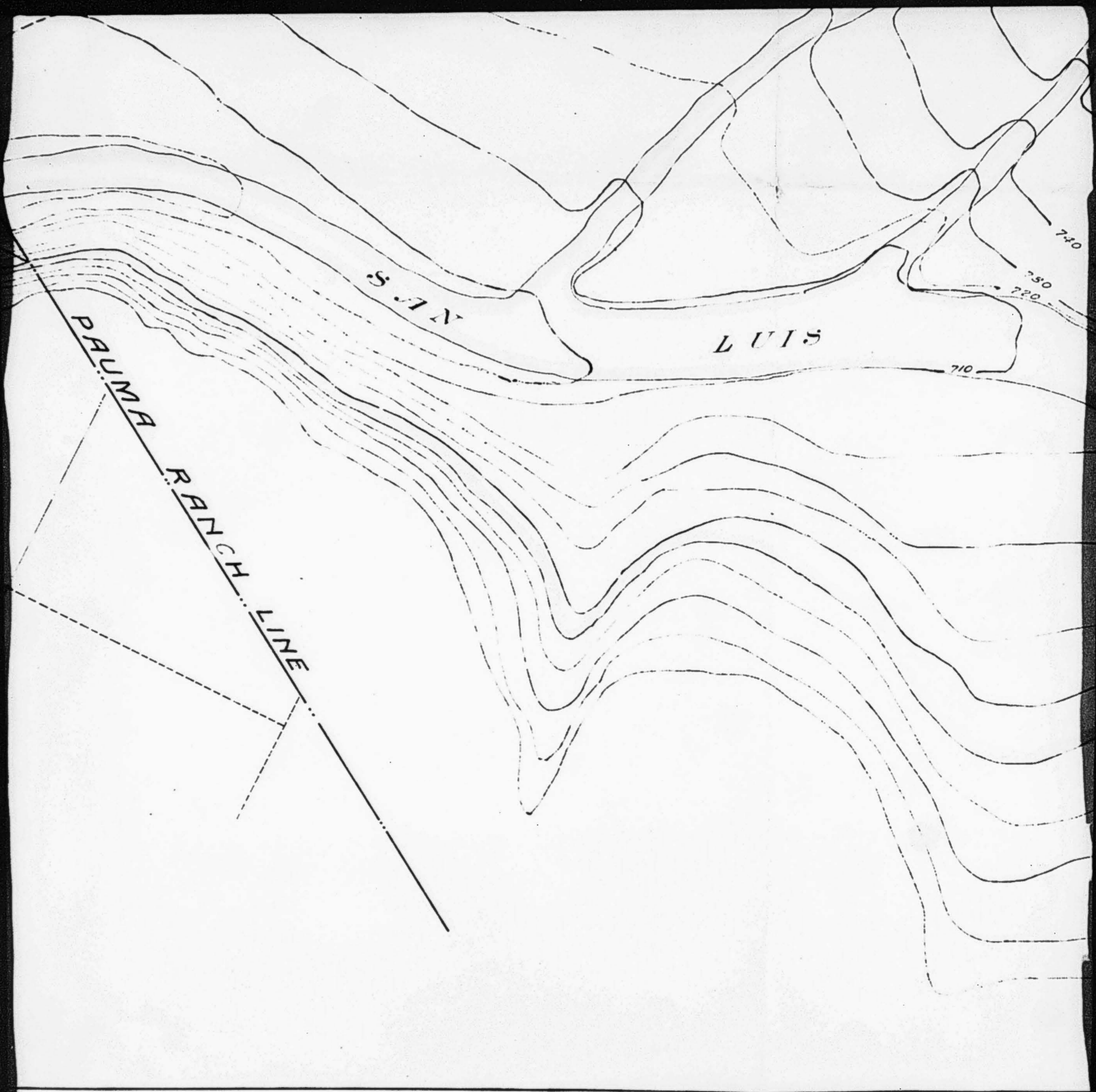
for 100' dam

760

760







SAN

LUIS

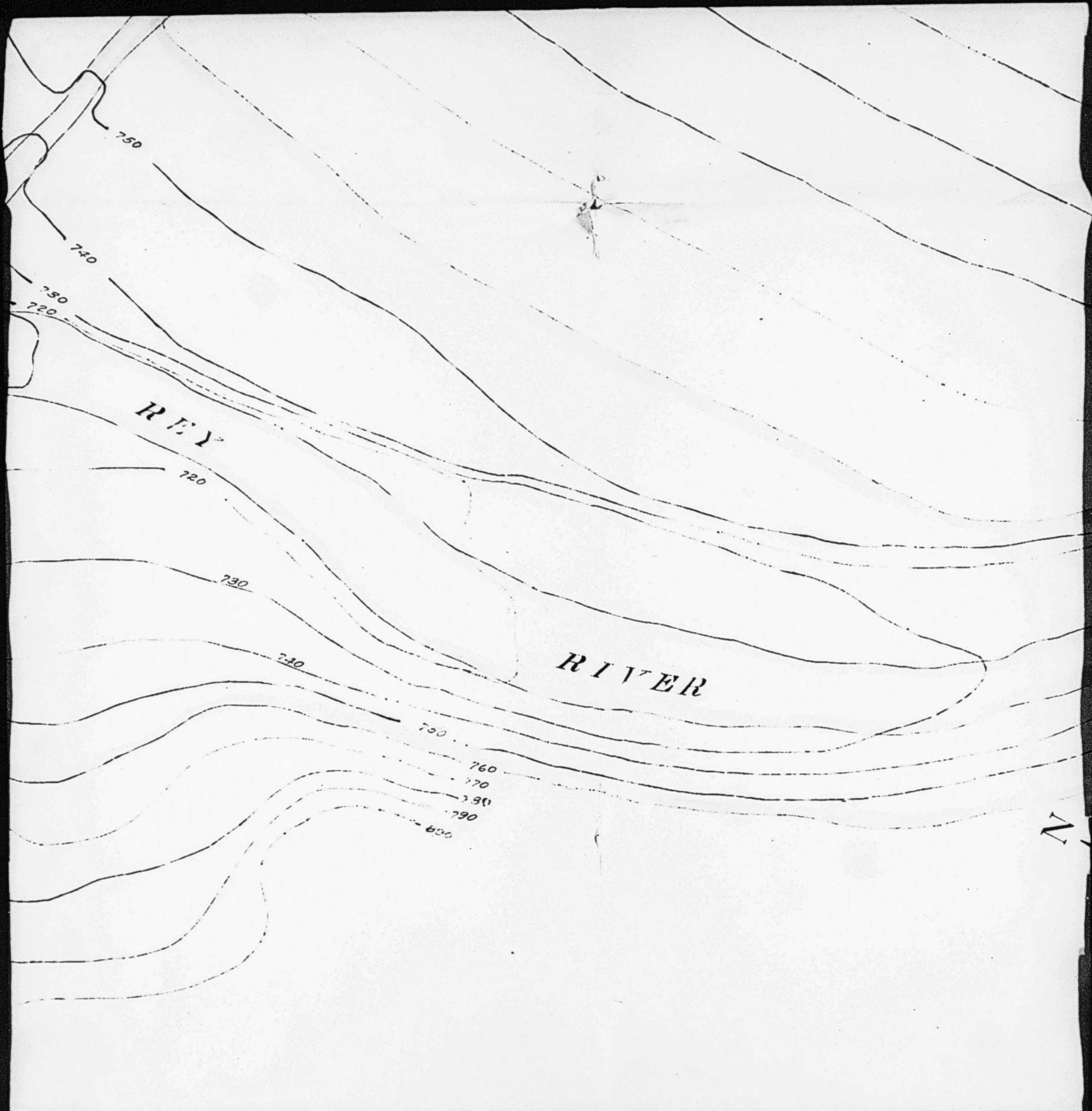
PAJUMA  
RANCH  
LINE

710

720

730


740

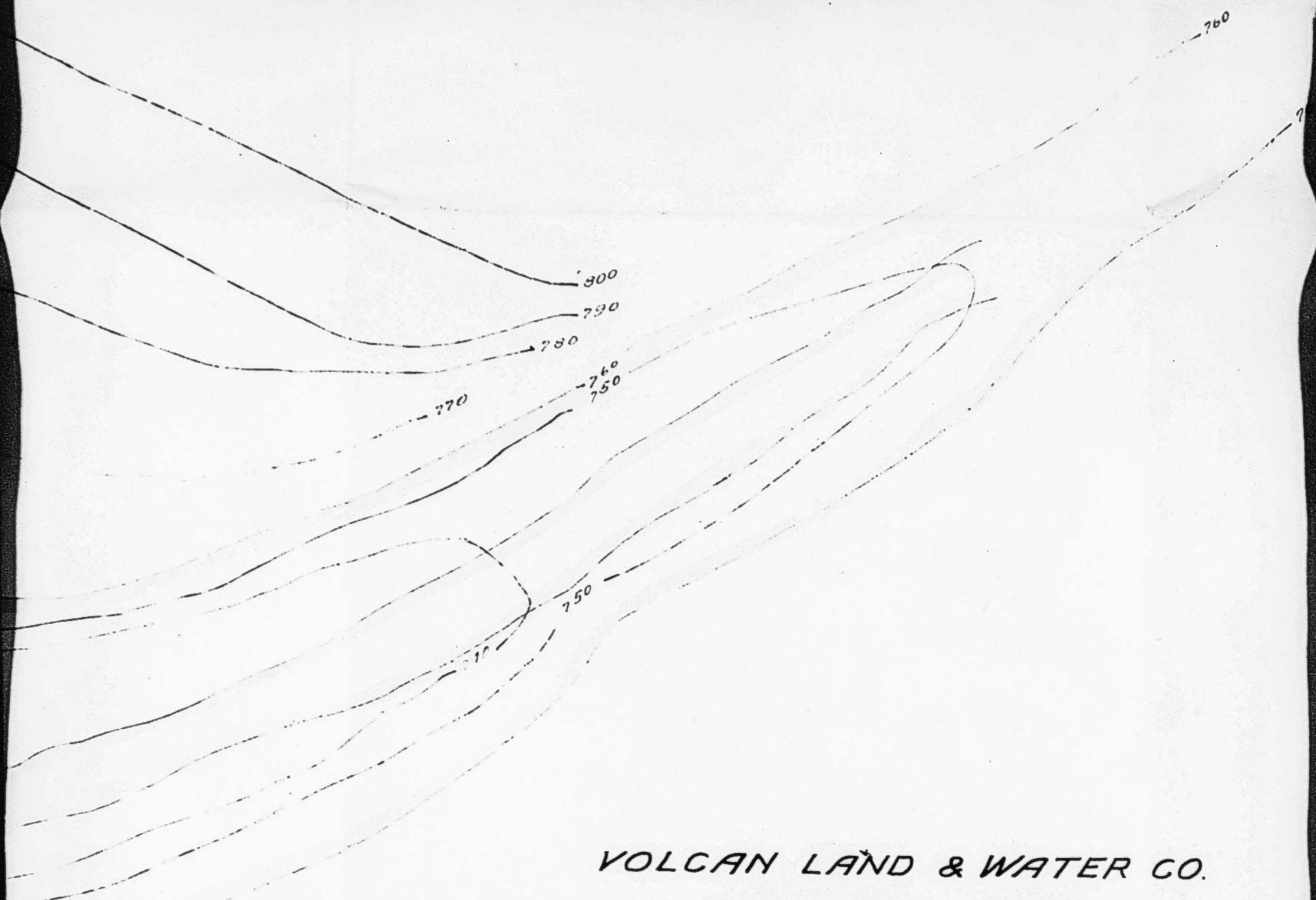


REY

RIVER

N

Water level for 100' dam 



**VOLCAN LAND & WATER CO.**

**CONTOUR MAP**

**OF**

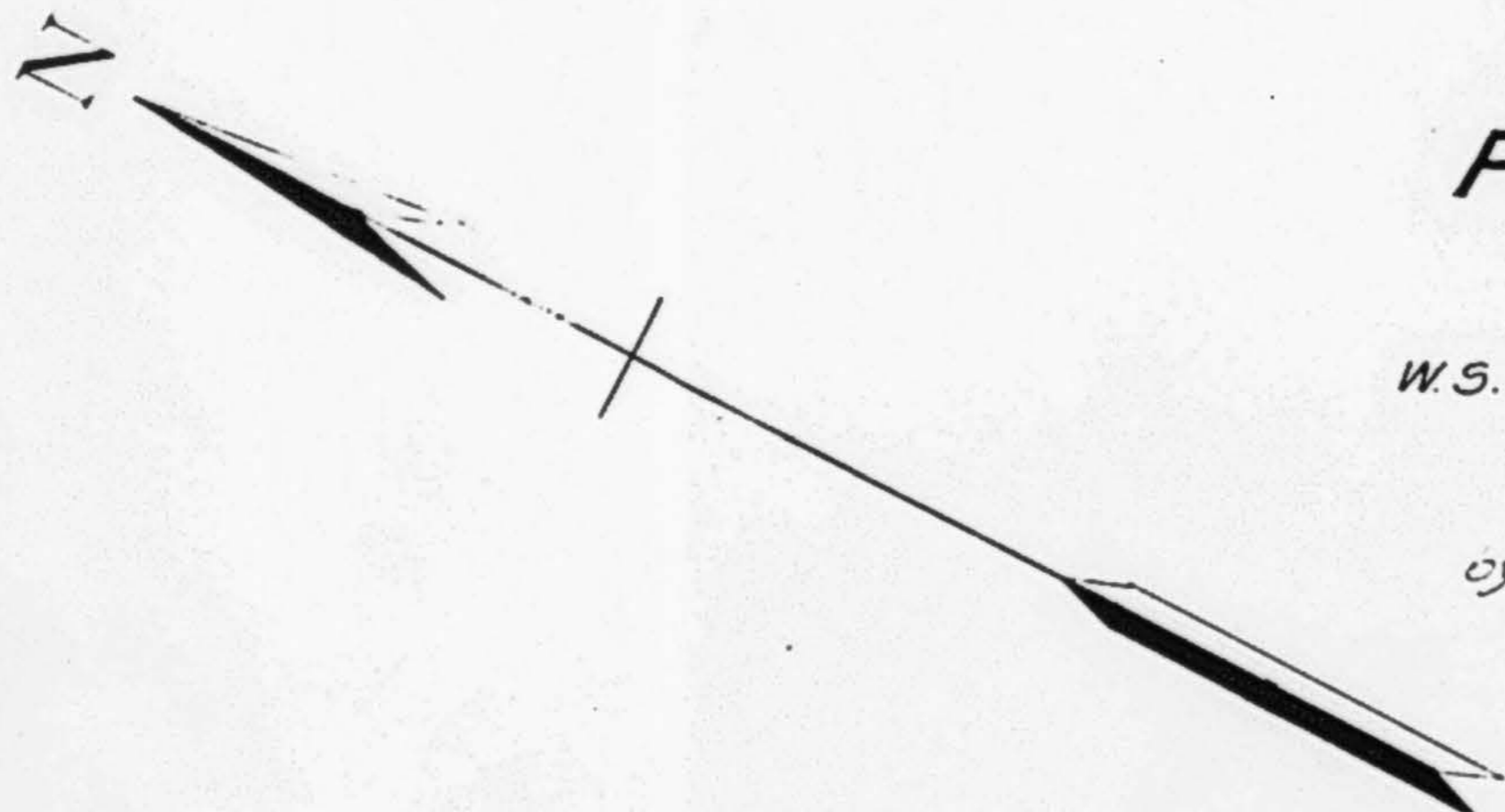
**PALA RESERVOIR**

**SCALE: 1" = 400'**

**W.S. POST, ENGR**

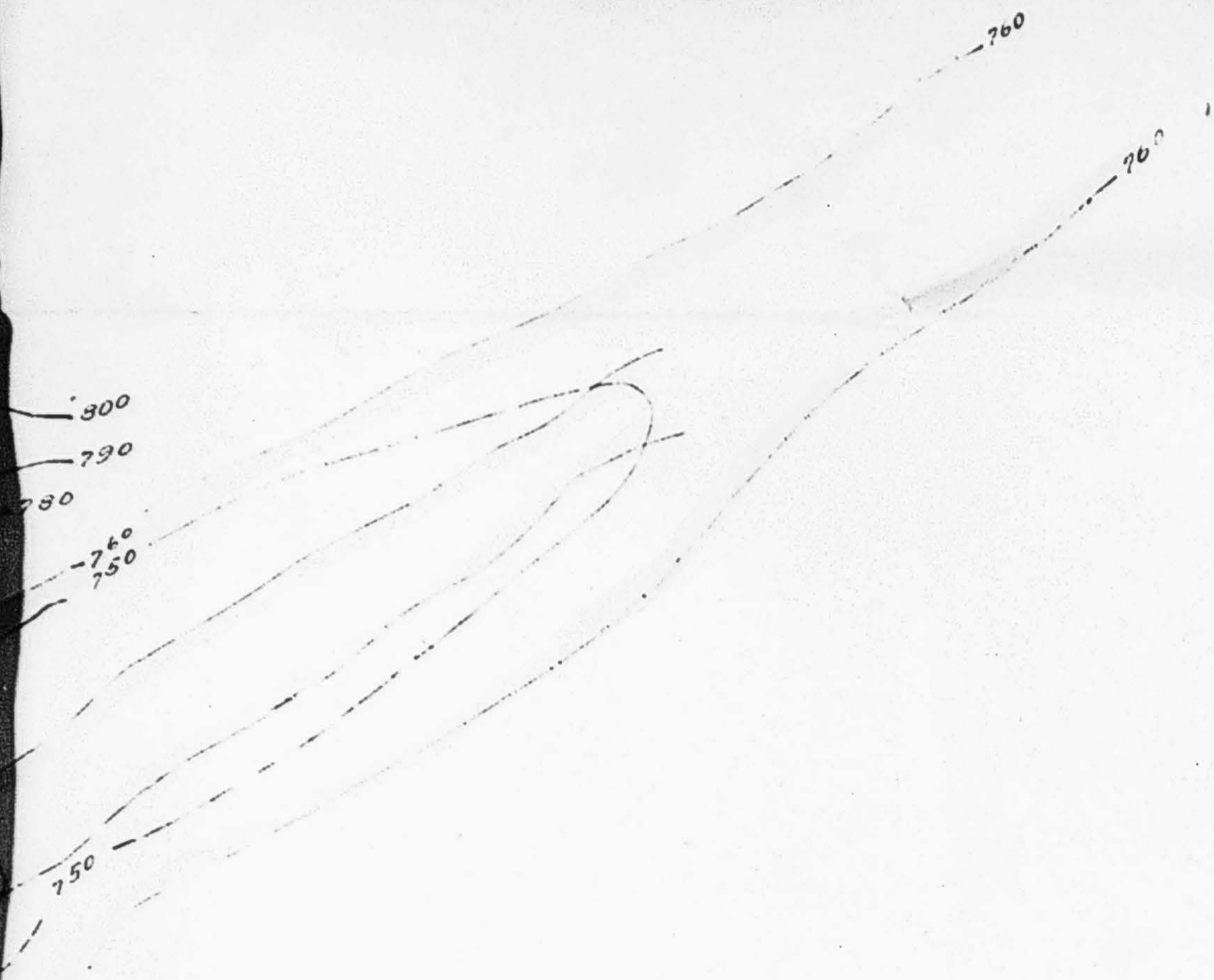
**JAN. 12, 1915**

*Plotted from plane-table survey  
by W. S. Post and W. D. McFadden, Dec. 23, 1914.*



Drawn  
File

o' dam



**VOLCAN LAND & WATER CO.**  
**CONTOUR MAP**  
**OF**  
**PALA RESERVOIR**

SCALE: 1" = 400'

W.S. POST, ENGR

JAN. 12, 1915

Plotted from plane-table survey  
by W.S. Post and W.D. McFadden, Dec. 23, 1914.

Drawing No 490  
File No F-20

Jan 1915  
WSP.

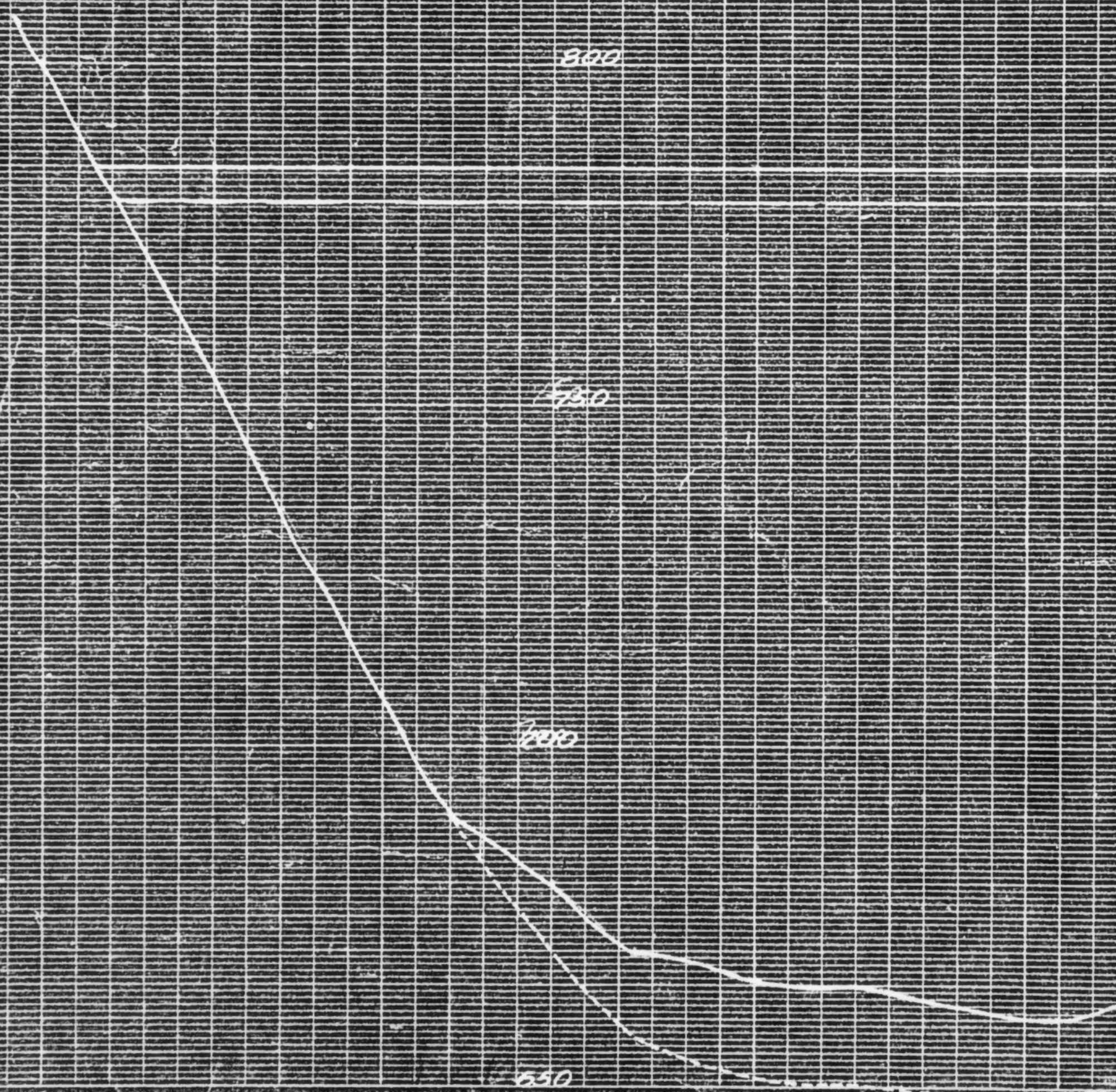
# Computation of Runoff available for Pala Reservoir considering Warner & Escondido depressions.

Season	Characte of year	Runoff by Pala	Runoff Warner - Div. by V.R.W. Co	Div. by Esc.	Escondido below Warner	Residual at Pala.
1894-95	X	63 6 00	3 7 2 00	0	4 0 0 0	3 3 2 00
95-96	X	11,450	5 1 9 0	29.60	1 0 4 0	2 2 6 0
96-97	X	38,100	2 3 5 0 0	0	4 0 0 0	1 0 6 0 0
97-98	X	9,550	2 8 8 0	3 0 1 0	9 0 0	2 6 7 0
98-99	X	(3 1 8 0	0	1 8 9 0	4 7 0	8 7 0
1899-00	X	7 0 0 0	3 1 7 0	3 3 6 0	8 4 0	0
00 01	X	1 4 6 3 0	9 0 3 0	0	4 0 0 0	5 6 0 0
01--02	X	9 5 5 0	4 6 6 0	1 2 2 0	2 7 8 0	8 9 0
02-3	X	3 1 3 2 6	1 9 5 3 0	0	4 0 0 0	7 7 9 6
03 04		8 3 2 6	2 0 3 0	3 0 1 0	9 9 0	2 2 8 6
04-05		4 4 8 2 4	2 7 5 0 0	0	4 0 0 0	1 3 3 2 4
05-06		1 0 8,0 5 6	6 6 9 5 7	0	4 0 0 0	3 7 1 0 0
06-07		8 7,9 0 8	5 3 8 0 0	0	4 0 0 0	3 0 1 0 8
07-08		2 7,5 6 9	1 7,2 2 0	0	4 0 0 0	4 3 4 9
08-09		5 1,6 3 9	3 1 7 0 0	0	4 0 0 0	1 5 9 3 9
09-10		4 9 2 1 1	3 0 2 0 0	0	4 0 0 0	1 5 0 1 1
10-11		3 5,4 6 2	2 1 8 0 0	0	4 0 0 0	9 6 6 2
11-12	X	3 1,8 0 0	1 2 0 3 0	0	4 0 0 0	1 5 7 7 0
12-13		9 9 4 7	5 7 5 9	1 8 9 0	1 1 1 0	1 9 5
13-14		3 2 8 3 6	2 2 5 2 1	0	4 7 4 7	5 5 6 8

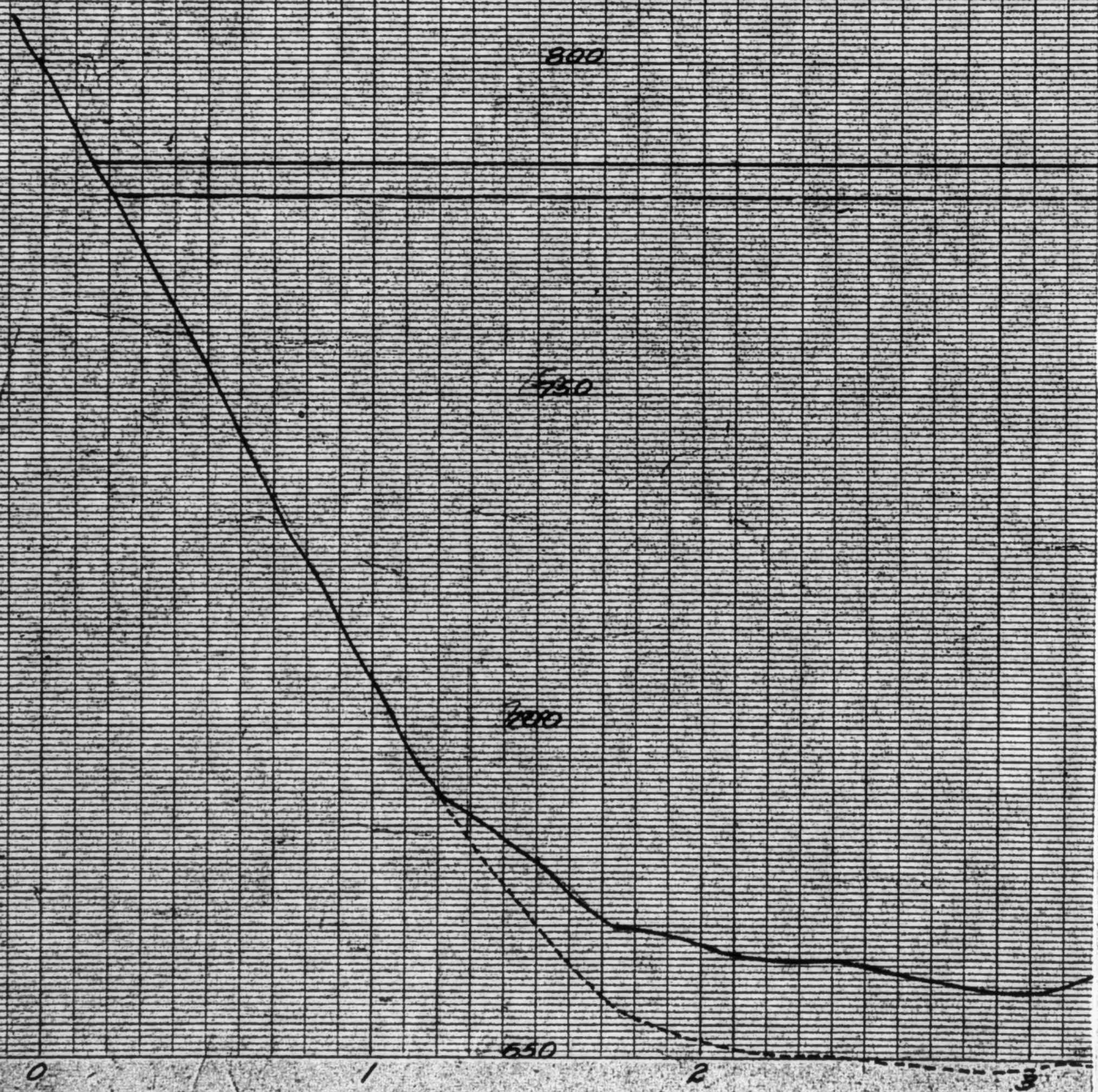
213,148

as per

↑  
assumed  
to total  
product  
except when  
no water



FILE PAPER

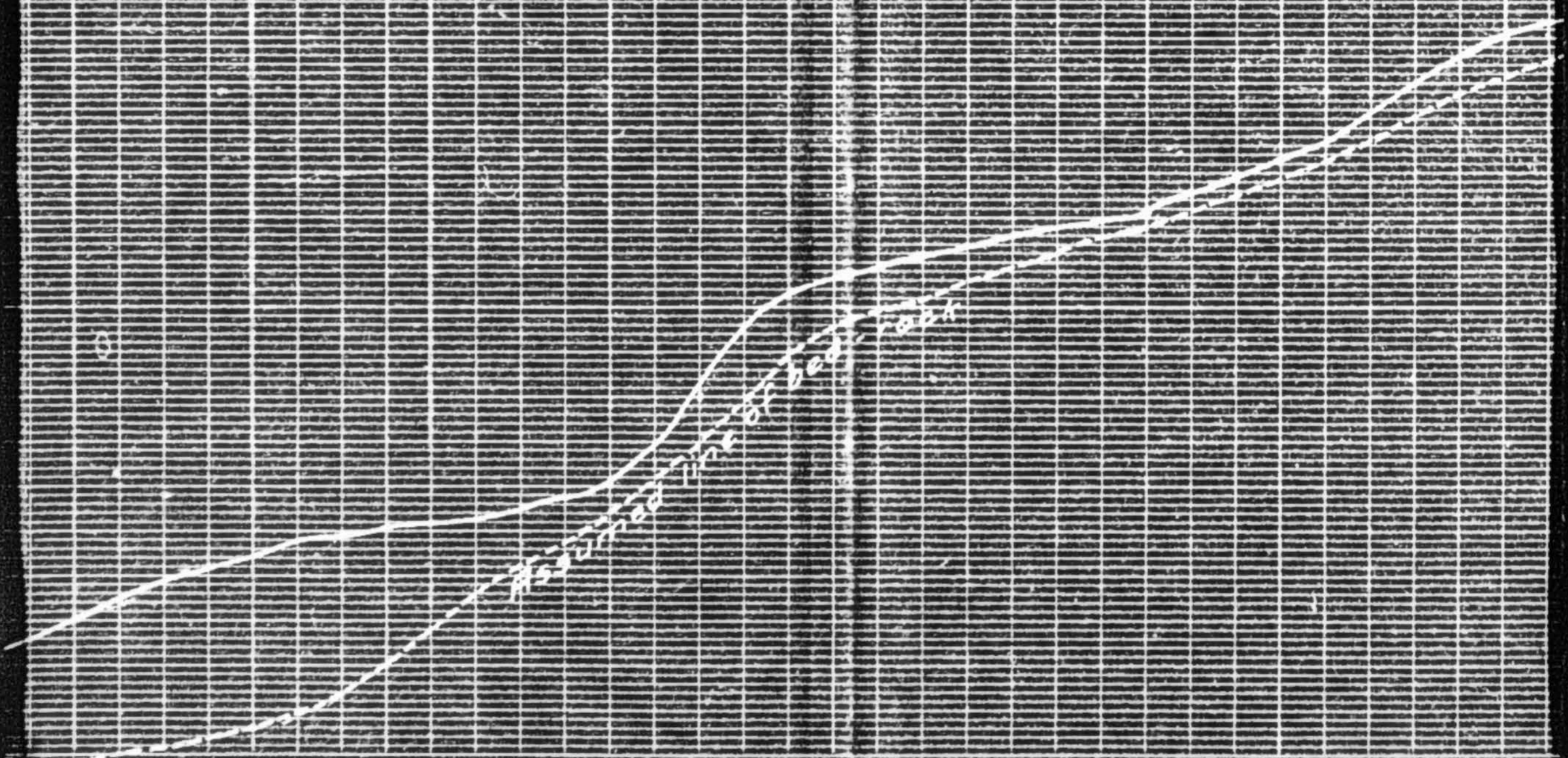




Total length 850

Top of dam pier 750

Water surface 750



4

5

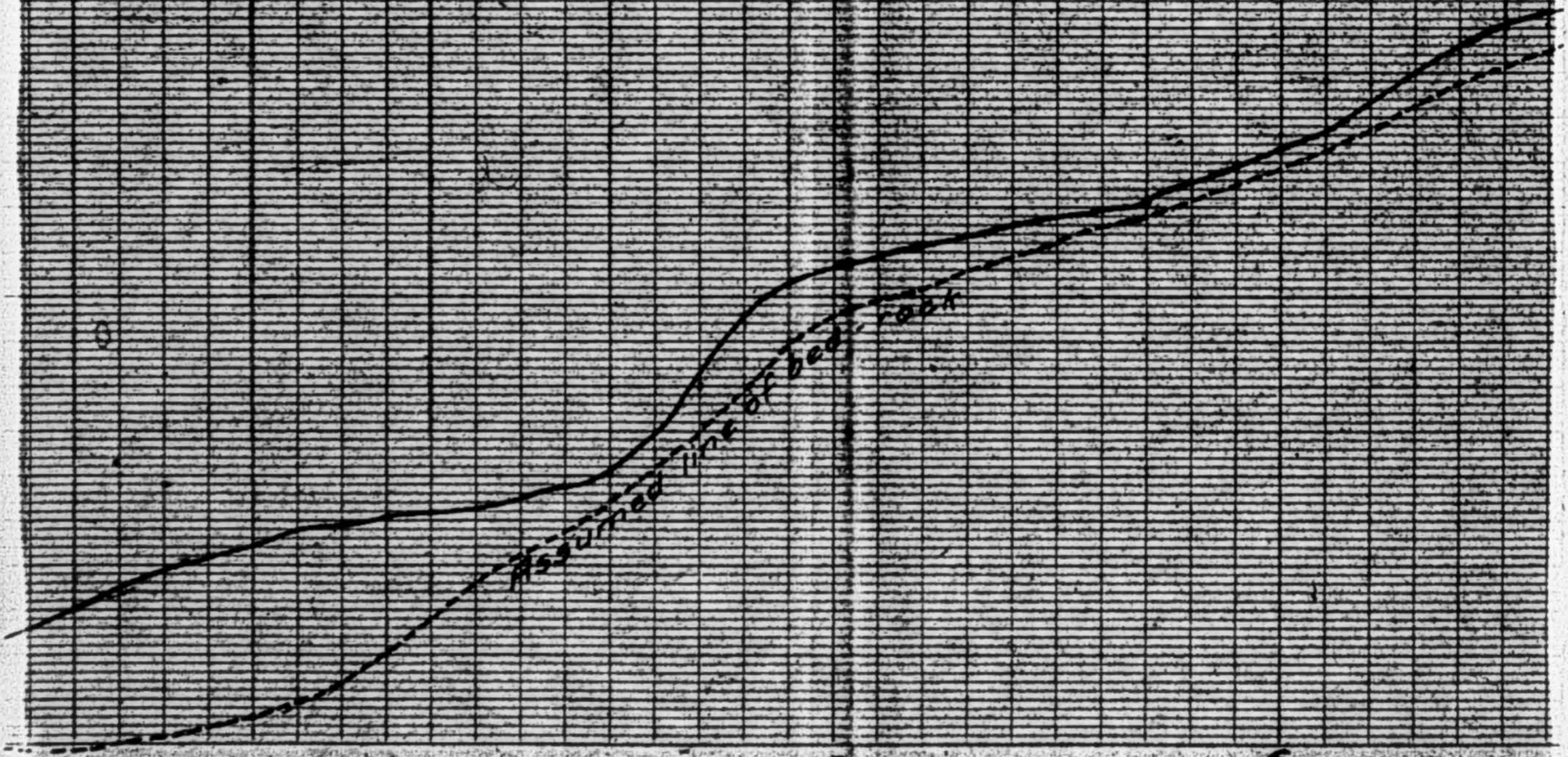
6

Perfect PROFILE PAPER.  
PLATE A.

Total length 0.50

Top of dam. Elev. 750.7

Water surface 782.7



Assumed line of bed

bed rock



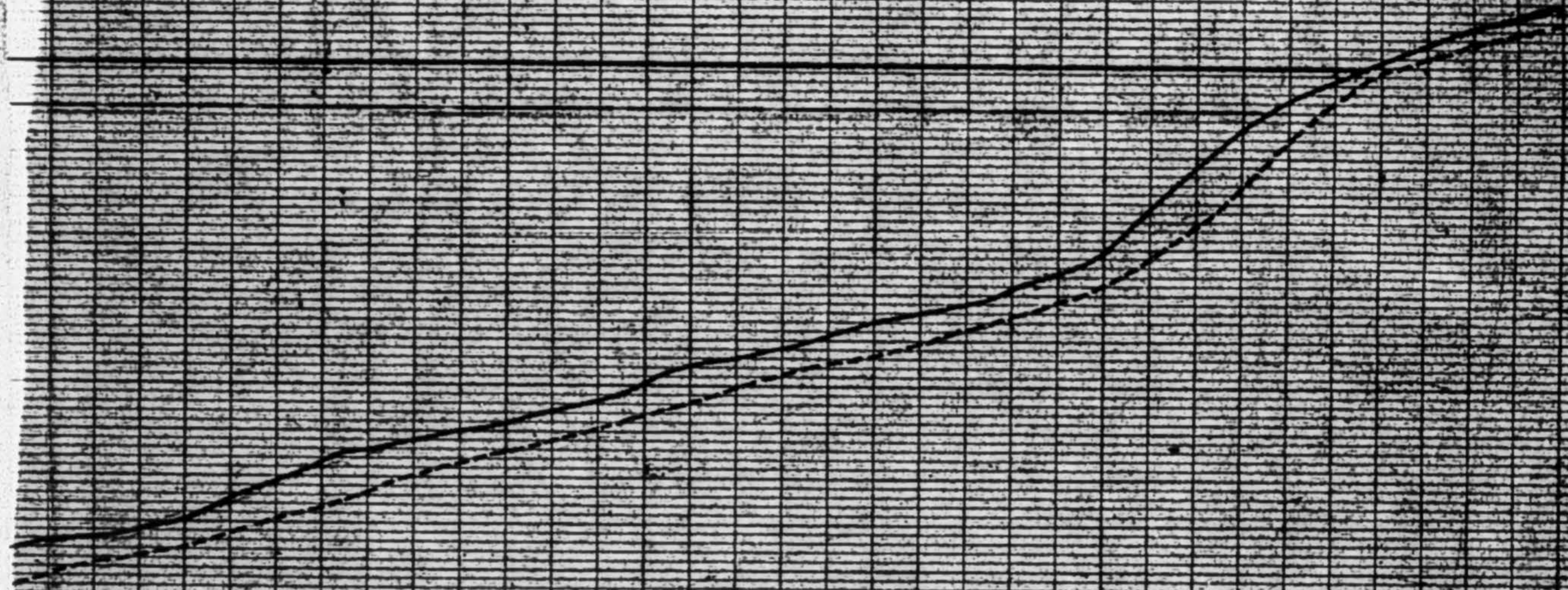
VOLCAN LAND & WATER CO.  
CROSS SECTION  
OF  
PALA RESERVOIR  
FIT DAMSITE

W.S. POST, ENGINEER

JAN 14, 1915

Drawing No 4915

FILE NO 1-1910



**VOLCAN LAND & WATER CO.**  
**CROSS-SECTION**  
**OF**  
**PALA RESERVOIR**  
**AT DAMSITE**

W.S. POST, ENGR

JAN 14, 1915

Drawing No 495

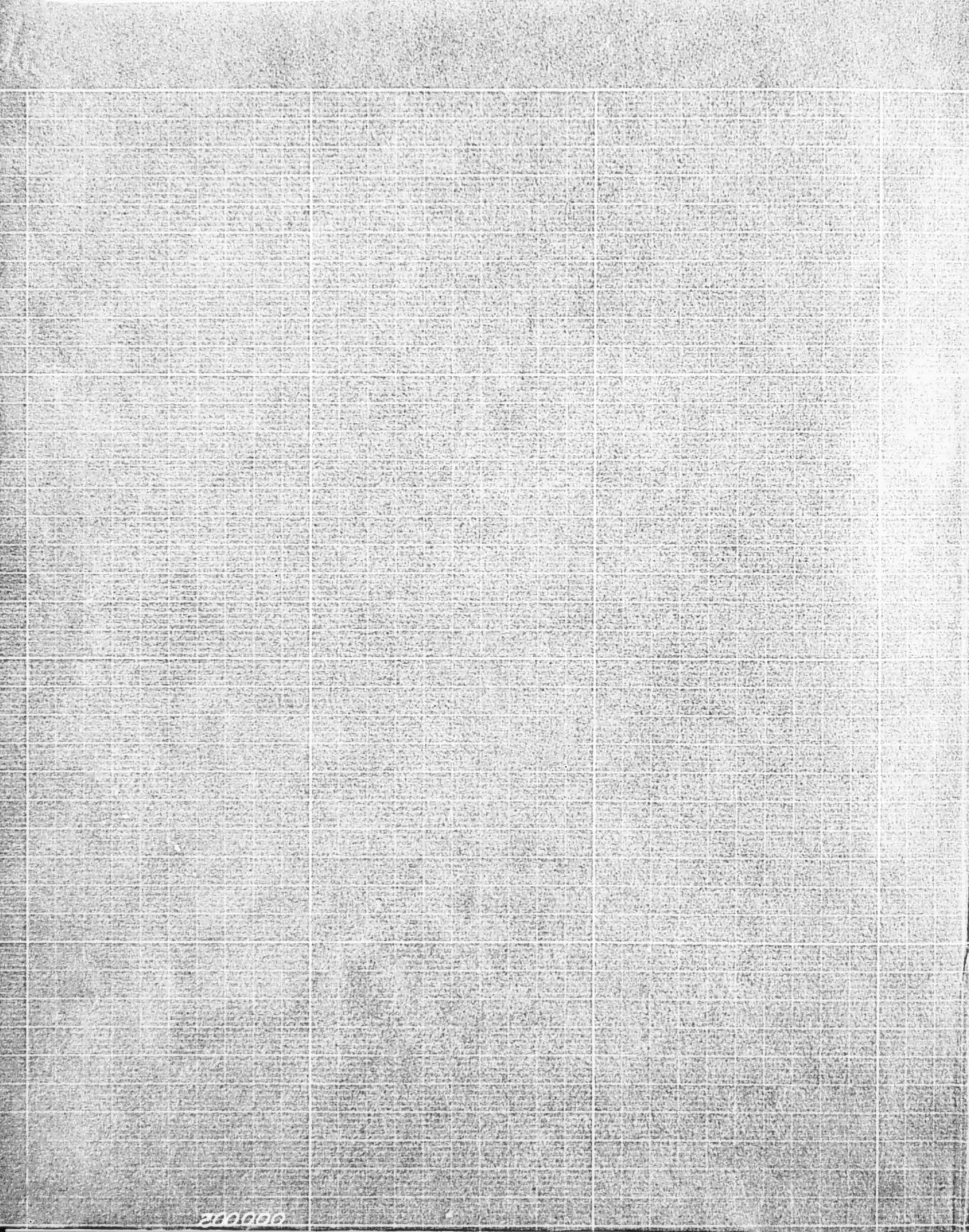
FILE NO T 80

7

8

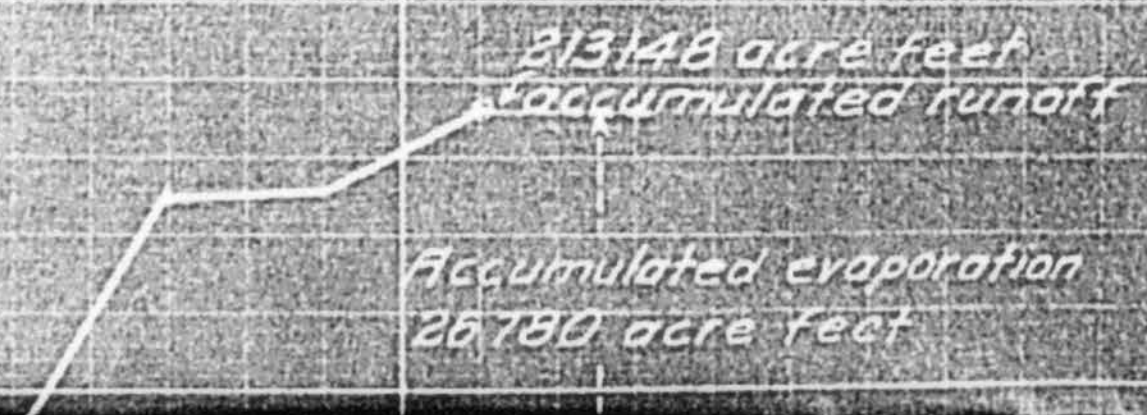
9

10



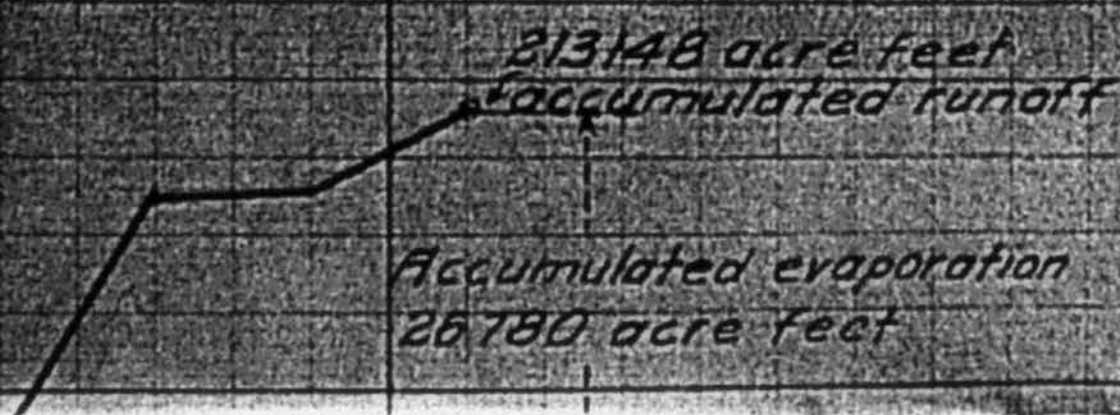
000000





213,480 acre feet  
Accumulated runoff

Accumulated evaporation  
26,780 acre feet

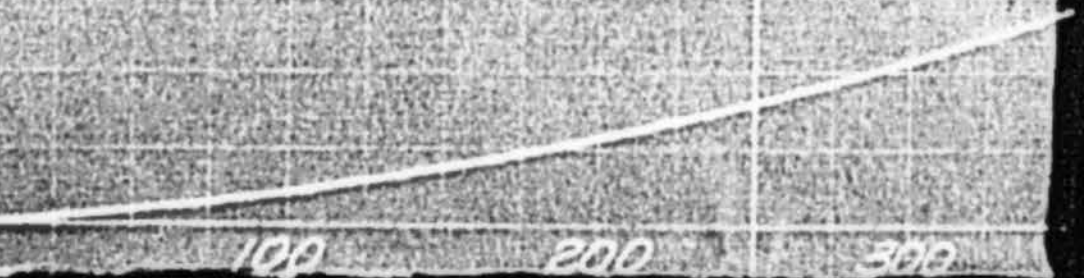




CAPACITY IN ACRES FEET

35000  
30000  
25000  
20000  
15000  
10000  
5000  
0

0 100 200 300

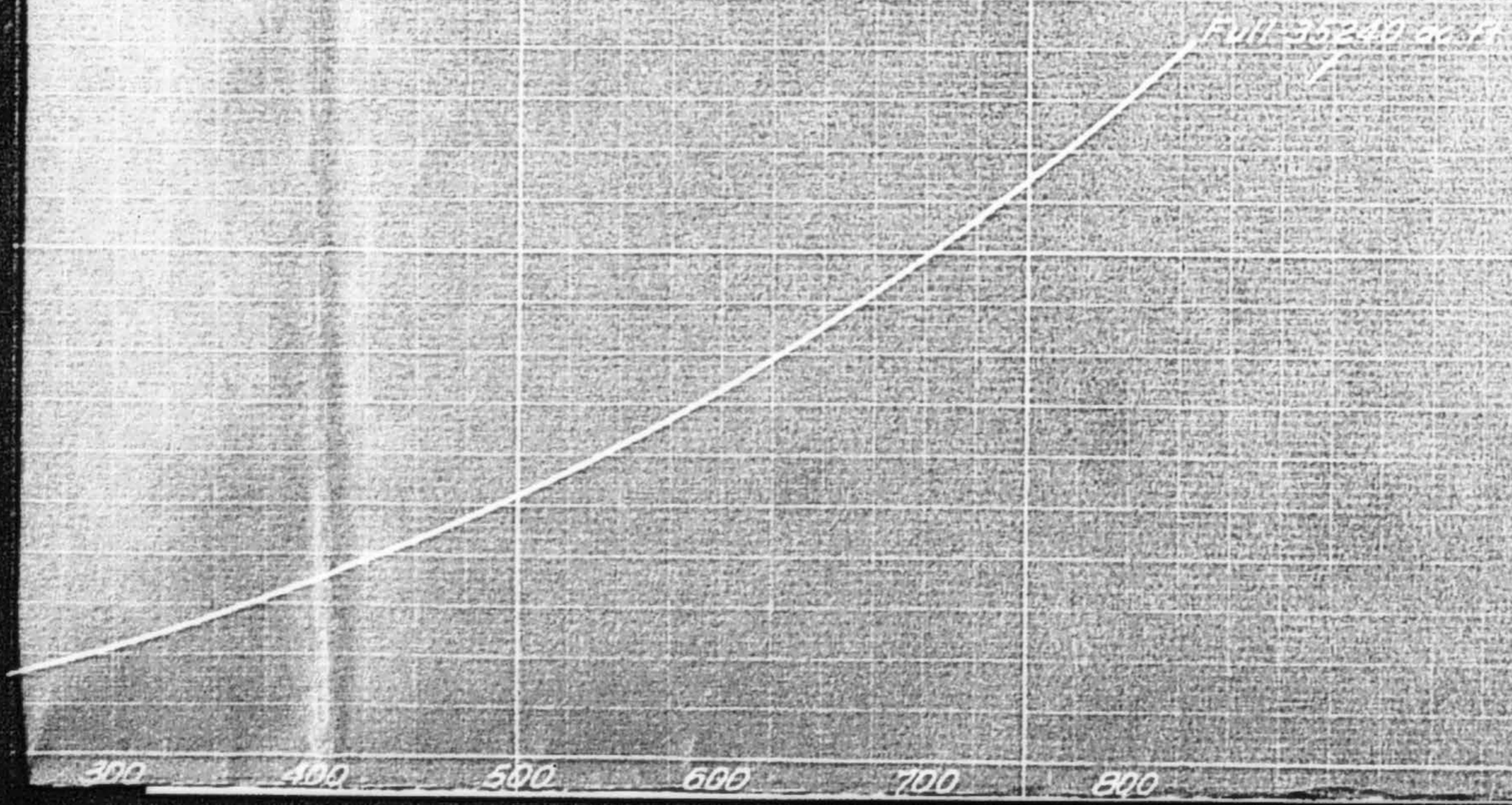


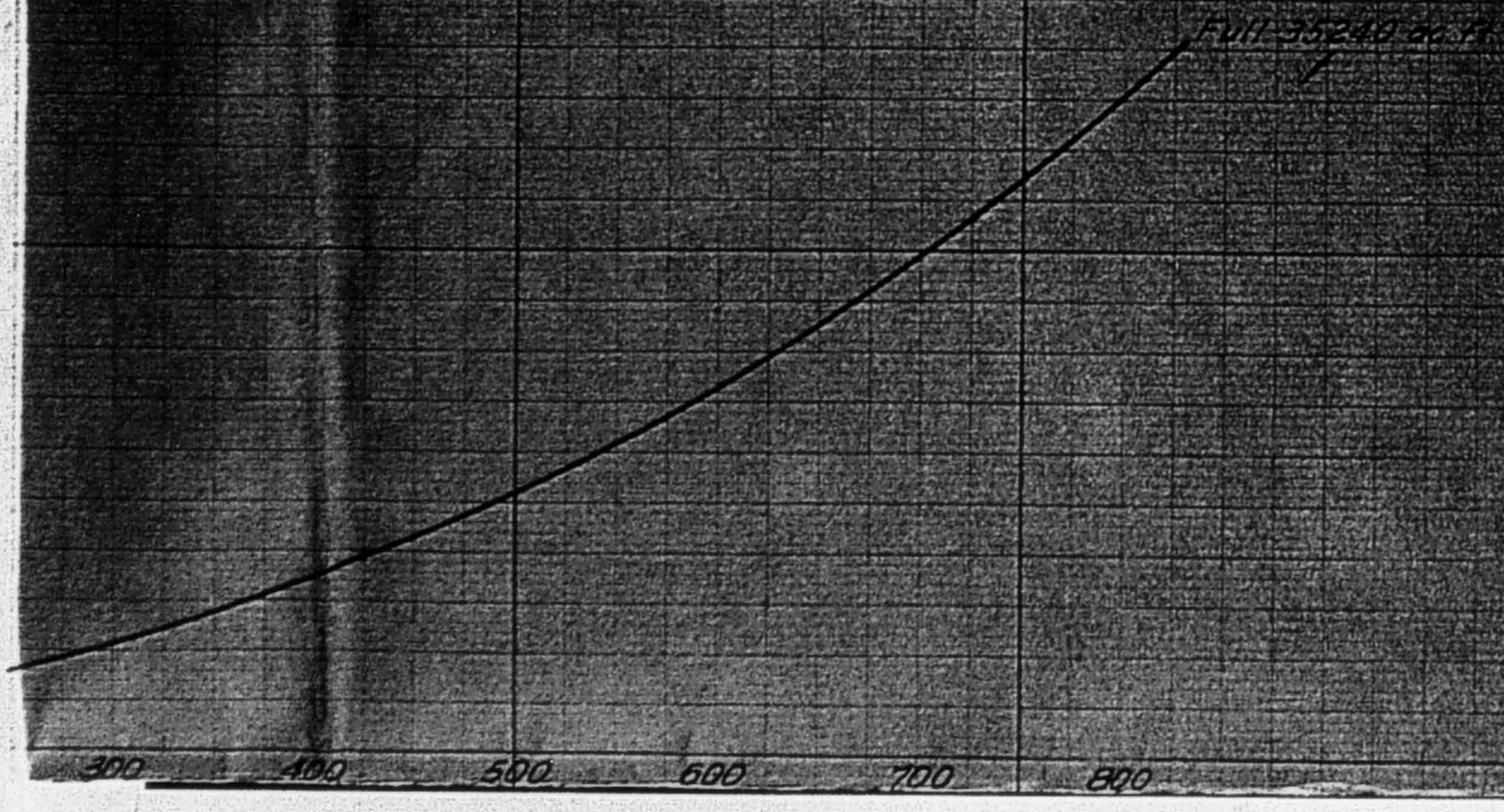
CAPACITY IN SQUARE FEET

35000  
30000  
25000  
20000  
15000  
10000  
5000  
0

0 100 200 300







200000

150000

100000

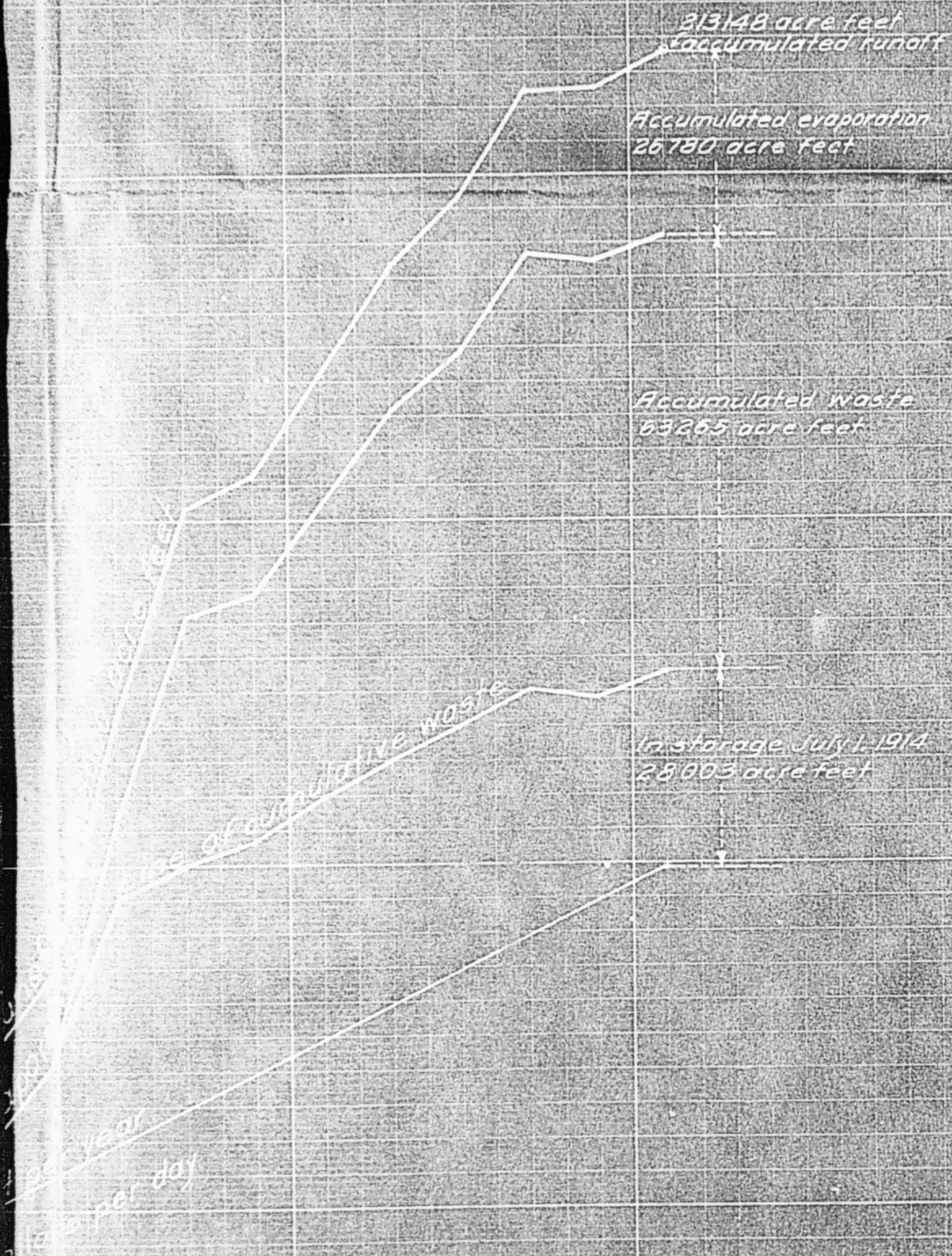
50000

0

1894 1895 1896 1897 1898 1899 1900 1901 1902 1903 1904 1905 1906

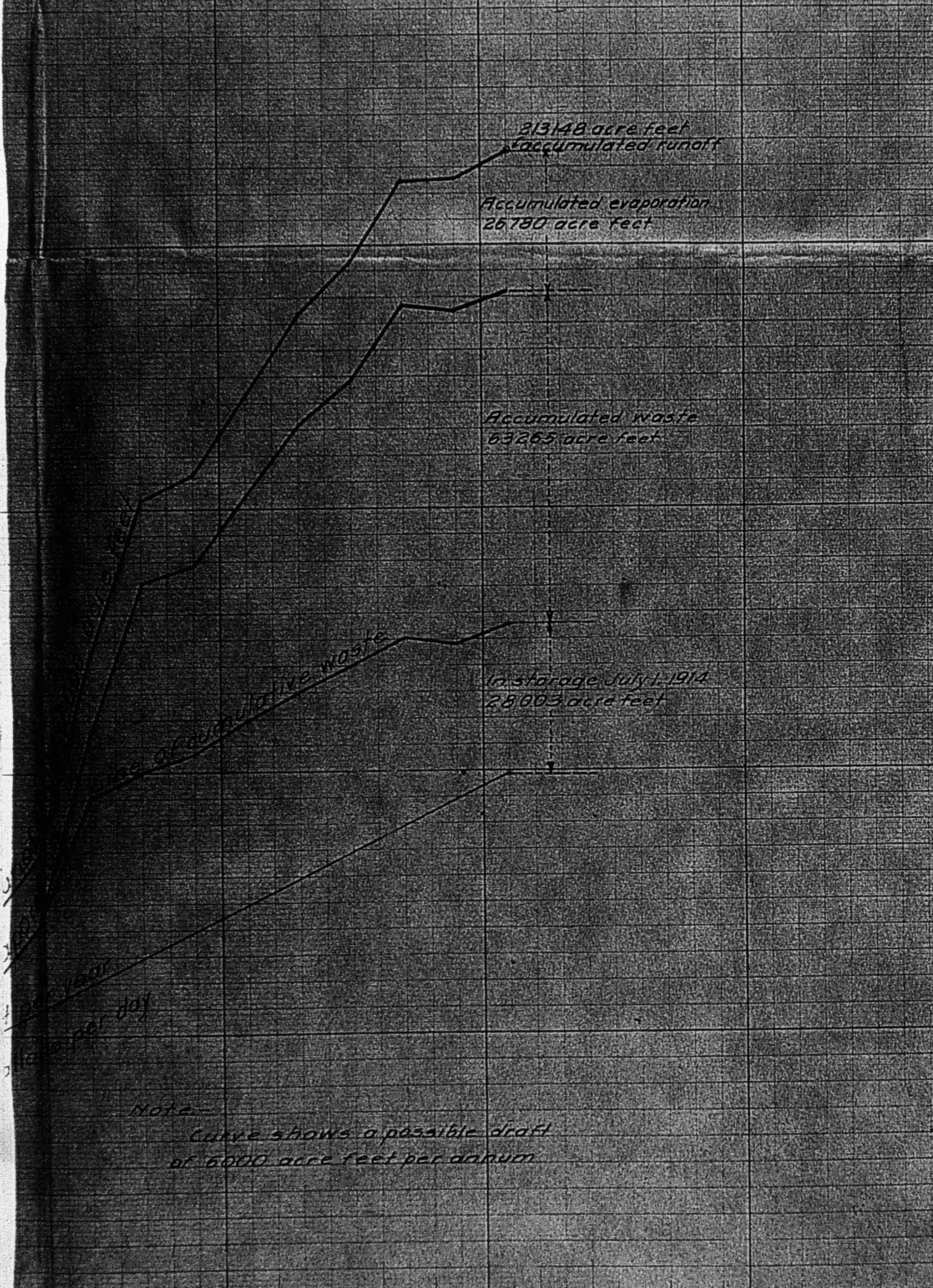
1st year of ...  
 2nd year of ...  
 3rd year of ...  
 4th year of ...  
 5th year of ...





Note -  
 Curve shows a possible draft  
 of 5000 acre feet per annum

1905 | 1906 | 1907 | 1908 | 1909 | 1910 | 1911 | 1912 | 1913 | 1914 | 1915



Note

Curve shows a possible draft of 6000 acre feet per annum

1905 | 1906 | 1907 | 1908 | 1909 | 1910 | 1911 | 1912 | 1913 | 1914 | 1915



CAPACITY IN FEET

25000  
20000  
15000  
10000  
5000  
0

0 100

NOTE:

Runoff used here is the runoff from the drainage area between Marnet dam and Palo dam minus 4000 acre feet per year diverted by Escudido ditch.

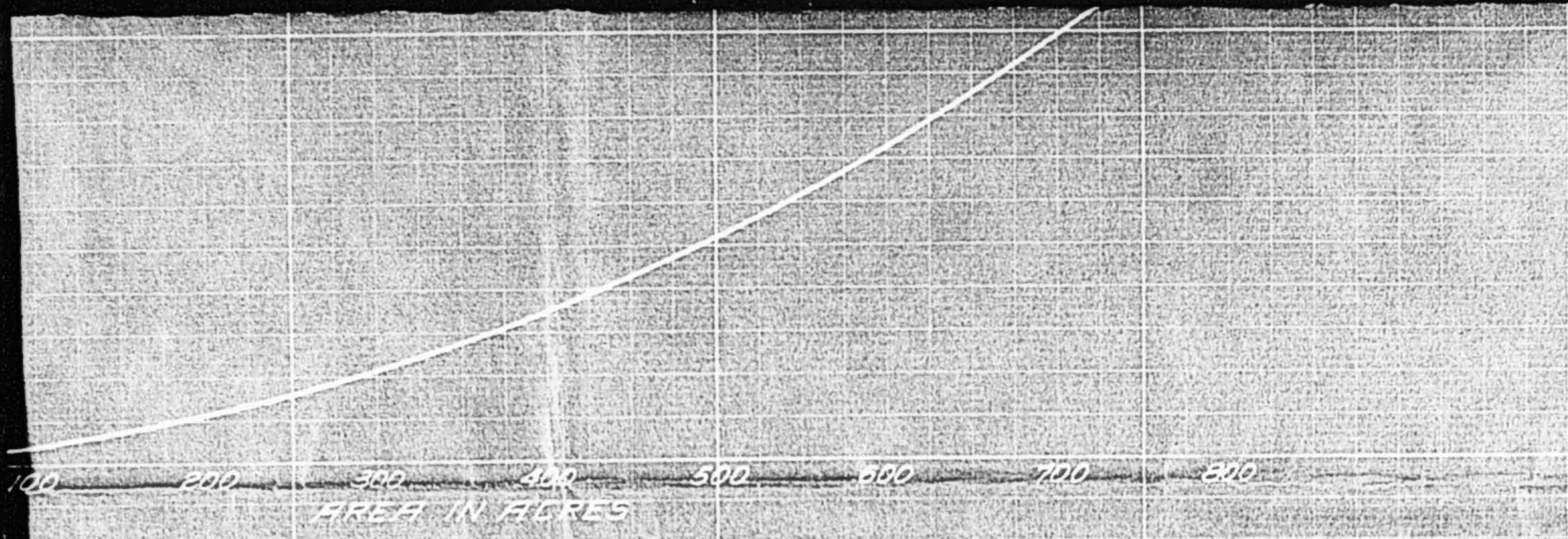
CAPACITY IN ACRES

25000  
20000  
15000  
10000  
5000  
0

0 100

NOTE:

Runoff used here is the runoff from the drainage area between Warner dam and Palo dam minus 4000 acre feet per year diverted by Escobido ditch.



VOLCAN LAND & WATER CO  
 MASS CURVE  
 OF  
 PALM RESERVOIR

W. E. POST, ENGR

JAN 14, 1915

DRAWING NO. 494  
 REC. NO. 5-80

100 200 300 400 500 600 700 800  
AREA IN ACRES

VOLCAN LAND & WATER CO  
MASS CURVE  
OF  
PALM RESERVOIR

W.S. POST, ENGR.

JAN 14, 1915

Drawing No. 494

File No. E-80

500 600 700 800

AND WATER CO  
IS CURVE  
OF  
RESERVOIR

JAN 19, 1915

STATION NO 494

FILE NO. 6-80

500 600 700 800

AND WATER CO.  
IS CURVE  
OF  
RESERVOIR

JAN 14, 1915

Drawing No. 994  
File No. E-80

**Ed Fletcher Papers**

**1870-1955**

**MSS.81**

**Box: 41 Folder: 8**

**Business Records - Reports - Post, W.S -  
"Report on Pala Reservoir [with maps]"**



**Copyright:** UC Regents

**Use:** This work is available from the UC San Diego Libraries. This digital copy of the work is intended to support research, teaching, and private study.

**Constraints:** This work is protected by the U.S. Copyright Law (Title 17, U.S.C.). Use of this work beyond that allowed by "fair use" requires written permission of the UC Regents. Permission may be obtained from the UC San Diego Libraries department having custody of the work (<http://libraries.ucsd.edu/collections/mscl/>). Responsibility for obtaining permissions and any use and distribution of this work rests exclusively with the user and not the UC San Diego Libraries.