

REPORT ON
CARROLL RESERVOIR - SAN DIEGUITO RANCH
IRRIGATION DEVELOPMENT

By William S. Post,
March 1, 1916.

GENERAL

This report deals with the use of the waters of the Santa Ysabel River (otherwise known as Bernardo or San Dieguito) stored in the Carroll Reservoir and conveyed and distributed on the San Dieguito Ranch and adjacent properties.

WATER SUPPLY OF CARROLL RESERVOIR

The report is based on the building of the Carroll Dam to a height of 100 feet and a storage capacity of 34,800 acre feet for the irrigation of 10,000 acres of land.

A 50 foot dam with a storage capacity of 3,250 acre feet may be said to be safe for the irrigation of 3,000 acres.

The maximum size of conduit to take care of 10,000 acres would call for 1,000 Miners Inch capacity or 20 second feet.

SURVEYS

Complete surveys, excavation and borings have been made of the Carroll Dam site. Bed rock is absolutely assured throughout and lies 10 to 15 feet below the stream bed.

The estimates are from exact data. The pipe line from the dam to the San Dieguito Ranch has been located, and shows:

From Carroll Dam to East Line of San Dieguito Ranch -----	4.6 miles
From East Line to West Line, beginning of Lockwood property -----	6.6 miles
Total -----	11.2 miles

PIPE LINE

The conduit line is planned to carry 20 second feet or 1,000 Miners Inches, on a grade of 1 ft. per 1,000 ft., to consist of 36 inch cement and Riveted Steel pipe.

CARROLL DAM AND RESERVOIR

The plan would be to build the Carroll Dam 50 ft. in height and thereafter raise say 10 feet per year as the irrigated acreage increased. The construction would be arched masonry type of concrete. The foundations are extremely hard trap rock.

THE PROJECT

The development would provide for 10,000 acres of land on the San Dieguito Ranch and Lockwood Mesa; the construction to be advanced by stages as the acreage is brought under cultivation and demand increases.

Several domestic areas are adjacent to these tracts which would yield a high income for water; and the expansion of domestic area due to an assured water supply will be large.

The construction would consist of Carroll Dam to 3,250 acre foot capacity; the Pipe Line of 36 inch diameter; an earth receiving reservoir on the San Dieguito Rancho of 4,000 acre feet capacity, which will be called, for convenience, San Dieguito Reservoir; and a pumping plant located on the bottom lands of the Ranch.

SAN DIEGUITO RESERVOIR

My study and survey shows that an important reservoir site is located on the northern portion of the San Dieguito Rancho. This reservoir at a height of 60 feet has a capacity of 4,000 acre feet. Fortunately it lies at a proper elevation to "key" in with the pipe line, and solves the entire problem of distribution as well as storage during the "building up" period. The pipe line will discharge directly into the Reservoir, filling it during the period of winter rains. It thus acts as an equalizer to distribute the water during the high demand period of summer. It is also at the correct elevation to be filled from the pumping plant on the bottom lands.

PUMPING PLANT

This plant is designed to supply 2 sec. ft. or 100 Miners Inches, drawing from the sands of water bearing land of the Ranch. The plant will have its highest utility before the completion of the Carroll Dam and will serve to advance the development and make a continuous supply immediately effective.

The cost of this plant and a pipe line connection to the San Dieguito Reservoir will be \$25,000.

HIGH SERVICE SYSTEM

THERE is also provided a small High Service Reservoir, auxiliary pump and a 16 inch high service pipe line. This will supply the semi-domestic area on the Coast and the higher San Dieguito Ranch areas.

COST

1. Carroll Dam, 50 ft. in height, with base sufficient to raise to 100 ft. gravity type, concrete with embedded rock; spillway entire length of dam.

Concrete, 38,500 cu.yd. in place at \$6,	\$231,000	
Outlet pipes, etc., " " -----	20,000	
Overhead - 15% -----	38,000	\$289,000

2. Conduit Line, 36 inch cement pipe (not reinforced), 36 inch Riveted Steel Pipe No. 10 U.S. Gage, Tunnel in soft sandstone.

Cement Pipe, 26,093 lin.ft. at \$3 in place -----	\$ 78,300	
R.S.Pipe, 2,590 lin.ft. at \$4 in place -----	11,400	
Tunnel - 2,140 lin.ft. at \$10 -----	21,400	
Overhead - 15% -----	16,700	\$127,800

3. San Dieguito Receiving Reservoir, 70 ft. high, containing 4,000 acre feet, earth type.

Earth Fill - 154,000 cu.yd. at \$0.30 --	\$ 46,200	
Gates, etc., -----	4,000	
Overhead - 15% -----	7,500	\$ 57,700

4. Pumping Plant and pipe line to San Dieguito Reservoir for capacity 1,000 gals. per minute ----- \$ 25,000

5. Pumping Plant - For High Service Area - Capacity 600 Gallons per Minute ----- \$ 15,000

6. High Service Reservoir ----- \$ 10,000

7. High Service Pipe Line - 16" Cement and Steel Riveted Pipe - 47,700 lin. ft. at \$1.50 ----- \$ 71,500

Total ----- \$596,000
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COST PER IRRIGATED ACRE.

Number of acres irrigated -----	10,000 acres
First Cost, (without reservoir lands and water right values) -----	\$ 596,000
First Cost (as above) per acre -----	\$ 60
Annual Fixed Charges (without interest on Reservoir lands or water) and Operating Expense -----	\$ 85,000
Annual Charges (as above) per acre --	\$ 8.50

In the preceding estimate of cost the value of lands is not included, nor are values of water Right. Detail distribution cost beyond the receiving reservoir and high service pipe line is not included. Distribution Cost is usually taken at \$20 to \$30 per acre served, according to location.

NECESSARY CONSTRUCTION

The initial construction necessary to place the proposition on an income basis is the construction of:

The Pipe Line.

- A portion of the San Dieguito Reservoir Dam.
- A temporary pumping plant at the Intake of the pipe line to serve until Carroll Dam is built.
- Distributing pipe system, to the extent of the acreage to be cropped.
- Pumping plant in the water-bearing lands of San Dieguito Ranch.
- High Service Pipe Line Reservoir and Auxiliary Pumping Plant.

The sum required to begin irrigation is \$170,000.

To secure the irrigation of 3,000 acres will require \$350,000.

PROTECTION OF WATER RIGHTS

If the water is not to be promptly put to beneficial use by building of the irrigation system and irrigating an extensive area, I recommend that the water right be protected by an immediate utilization as power to the full extent of 20 second feet or 1,000 Miners Inches.

William S. Fort.

T. 13 S., S. B. M.

R. 3 W.
R. 2 W.

CARROLL RESERVOIR

ENCINITAS

SAN DIEGUITO RESERVOIR

CONDUIT

15

22

23

CARRAVY

SYPHON

PUMP

HIGH SERVICE RES'R

PUMP

PIPE LINE

SAN DIEGUITO RANCHO

San Elijo Lagoon

35

36

CABLE-CRAWFORD et.al.

HIGH SERVICE

T. 13 S.
T. 14 S.

2

SAN DIEGUITO RIVER

Wilme Bernardo Rho.

Map
Accompanying Report
PROPOSED IRRIGATION OF SAN DIEGUITO
RANCHO et.al.

CARROLL CONDUIT
1 in. = 1 Mile

W. S. Post
Engr

Apr. 1916

R. 4 W.
R. 3 W.

DEL MAR

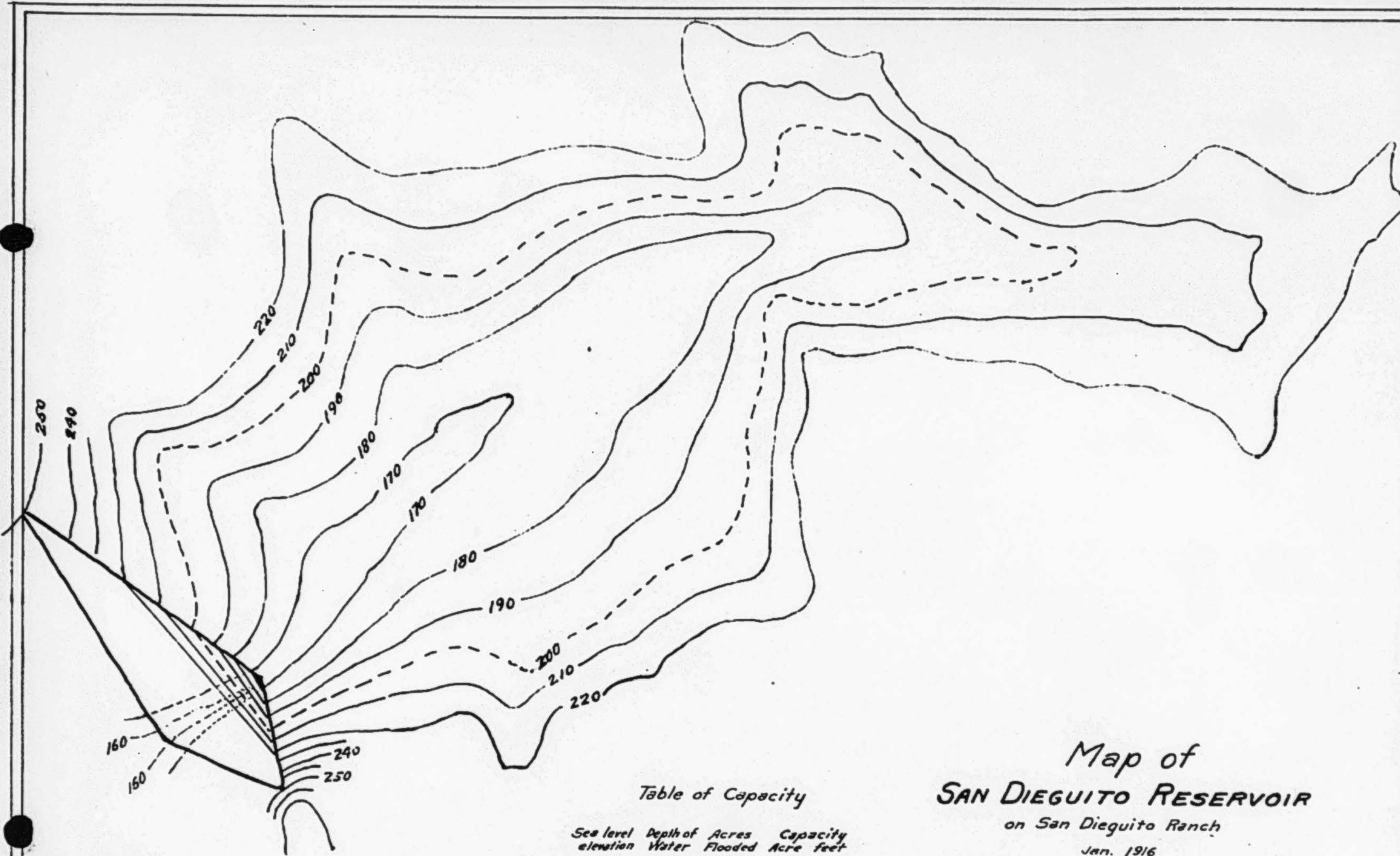


Table of Capacity

Sea level elevation	Depth of Water	Acres Flooded	Capacity Acre feet
160	0	0	0
170	10	10	50
180	20	32	320
190	30	50	880
200	40	87	1510
210	50	125	2650
220	60	163	4000

Map of
SAN DIEGUITO RESERVOIR
 on San Dieguito Ranch

Jan. 1916

1"=500'

W. S. Post
 Engr

Ed Fletcher Papers

1870-1955

MSS.81

Box: 41 Folder: 14

Business Records - Reports - Post, W.S - "Report on Carroll Reservoir-San Dieguito Ranch Irrigation Development"



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