

Santa Ana, California.

September 22nd, 1916.

Mr. Ed Fletcher,

San Diego,

California.

Dear Sir:-

We beg leave to submit the following report on the best method for distributing water on the bottom lands of the San Dieguito Ranch.

From the reconnoissance made on September 20th in company with yourself and Mr. Post, and the map of the recent survey, which was made showing the elevations of the land on the corner of every ten acre square, we were able to agree upon a general plan for water distribution, which we believe will prove to be the most economical method.

The different features that effect this plan will be described under alphabetical heads as follows:-

- a. General conditions and changes made by recent floods.
- b. River control and channel.
- c. The method of irrigation.
  1. The general line of the pipe lines and levels
  2. The matter of applying the water to the land.
- d. Water system from the upper plant or from a supplementary plant at the upper end of the bottom lands under the following sub-heads:
  1. Water supply.
  2. Pipe line to Junction with pumping plant #2 (old plant).

5. Continuation of said pipe to the West side of irrigible lands North of River.

e. Water system South of River.

1. Water supply.

2. Pipe lines and gates.

a. GENERAL CONDITION AND CHANGES MADE BY RECENT FLOODS.

A comparison of the levels taken three years ago with those taken recently show a very large filling in on some of the lands. These are indicated on a shaded map prepared by Mr. Post; the general average of this filling is about two feet. Excepting where heavy sand has been deposited, the lands have been much improved by this filling. Quite a large area on the West side of the valley next to the river South of the present river, and West of the same has been changed to a good tillable soil, and also an area North of the river where the old channel of the river used to run has been changed from a low flat that was not considered good farming land to land which will produce good crops.

I therefore consider that the flood as a whole has not been of any great damage to the bottom lands.

a. RIVER CONTROL AND CHANNEL.

The River Channel has been changed from a crooked meander line along the West side of the Valley to a practical straight line from the point of the hill at pumping plant across to the ranch house, where it has been diverted by the impact against the hill to a channel running through through the bottom about one-fourth of the way across from the West Side.

I think that the channel could be maintained about on its present line from the pumping plant across to the hill and then it should be made to follow approximately along the line of the County road to the intersection of the old channel a short distance above the South line of the Ranch. The channel as it now is running through the valley cannot be very easily maintained in a uniform width owing to the alluvial soil, which contains no material sufficiently stable for banks, while the soil and portions of the old river bed along and next to the County Road would form more stable banks and would not cut up the lands to any such extent as on the present location. My idea is that a river channel of sufficient dimensions to carry the maximum floods would have to be of such large dimensions that it would reduce the acreage to a great extent, and would also cost a great deal of money for keeping it within the banks.

Owing to the fact that these floods are of very seldom occurrence and of short duration, I think the better policy would be not to attempt to control such floods in the banks of the stream but to build check wires along the South Bank to retard the high water and only maintain a channel to take care of the minimum flood waters and provide a drainage for the lands.

The condition of the lands at the present after the severest flood which has been known proved this theory to be correct. By running the main pipe line

on the highest ground and along the line of the greatest inclination across the valley and distributing the water at right angles in laterals, these laterals can be made to form a stay or dam against flood waters and will provide check dams that will so reduce the velocity that there will be little or no danger from cutting and the lands can be thus maintained on a uniform slope, and will not be liable to damage from over-flow.

c. THE METHOD OF IRRIGATION.

On this soil the water will have to be run in large streams in one hundred inch heads, and the irrigation should be conducted on the block or flood system. The limit or distance that is economical to run water by this system is approximately one thousand feet, and as it is possible that you will at some time desire to sell this land in twenty acre lots the relative dimensions to form the best unit of a sub-division would be about sixteen chains by twelve, which would make the lots 1056 feet wide in the direction in which the water will flow over the land and 825 feet wide along the line of the laterals. The water would then be distributed from the laterals in what is generally termed "lands or spaces", varying from 25 to 50 feet according to the rapidity in which the water will flow over the ground.

We have therefore, adopted this spacing in formulating this system for irrigating the land, which would make the laterals 1056 feet apart, and if the lots are sub-divided in twenty acre tracts, each lot would be 825 feet along the line of the laterals.

d. WATER SYSTEM FROM THE UPPER PLANT OR FROM A SUPPLEMENTARY PLANT AT THE UPPER END OF THE BOTTOM LANDS UNDER THE FOLLOWING SUB HEADS:

1. WATER SUPPLY.

This water can either be taken from what is termed the upper plant or #1 of my report of the San Dieguito Ranch, or it may be developed by boring wells opposite the upper end of the bottom lands as platted in the recent survey. The upper plant designated as #1, will develop between 150 and 200" of water as indicated by the tests already made, but it will require the construction of 7000 additional feet of pipe line to reach the upper end of the tract supposed to be irrigated, and it might be more economical at present to build a plant at the upper end of the bottom lands. I am satisfied that 80 to 100" of water could be secured from such a plant; the only objection that I see to it is that it is near enough to the old plants to effect its supply in a short period after pumping begins, and it is not as favorable a point for developing water as at the upper plant.

From the upper end of the system, an eighteen inch pipe line should be run to a point just North of the old pumping plant a distance of 2760 feet and a junction made at this point with a pipe line to the old pumping plant, a distance of 1070 feet. The pipe line should also be continued along the North side of the irrigable lands to a distance of 1755 feet; this will supply all the lands North of the river.

e. WATER SYSTEM SOUTH OF RIVER.

1. WATER SUPPLY.

This will come from the old plant or if the connecting pipe line is built as advised, it would be supplied from the upper plant. The system proposed will consist of an 18 inch pipe running from the end of the galvanized iron flume as now constructed in a South-westerly direction as indicated on map. This pipe will be 18 inches in diameter and will have a capacity of about 200 inches. The gates will be put in at the location of the laterals already described to turn the water in to the laterals running both East and West. The laterals on the East side of this pipe line can be located at right angles to said pipe line and will have a sufficient grade to carry the water successfully, but the laterals on the West side will have to be located at acute angles as indicated upon the map, in order that the laterals should have the satisfactory grade, which would not be less than one-half inch to 100 feet. At this point where the laterals cross the present river channel levees should be constructed and riprapped with brush and a temporary flume or pipe could be placed on these levees. After one or two years however, the over-flow would fill in between these levees bringing the land to a uniform plane after which these temporary flumes could be removed. At a point opposite the edge <sup>of</sup> the hill on the West side of the road indicated on map as 16" lateral, a pipe line 16 inches in diameter should be constructed running West 3500 feet to accommodate the lands West of the County Road.

A complete system would also require the construction of a pipe line along the edge of the hill from the old pumping plant South-easterly to a point marked "Reservoir" on map and a pumping plant could be constructed at a well which was bored opposite what is known as "Dutch Draw"

This well tested at the time it was bored about 70 inches of water, and if this water was piped to the reservoir as above indicated it would furnish water sufficient for a tract of land in Dutch Draw of about 150 or 200 acres of land in the Southeast corner of the tract. When the land and water becomes more valuable and it is necessary to conserve the supply, pipe lines should be constructed along the lines of these laterals and gates put in at the corner of each subdivision.

ESTIMATE OF COST.

UPPER SYSTEM.

2760 feet of 18" Pipe at \$0.40	\$1104.00
1755 " " 16" " " 0.26	456.00
1070 " " 18" Reinforced Pipe	642.00
4 delivery gates at \$12.00 each	48.00
Special Gate at Junction of line of old pumping plant	15.00
	<u>\$2265.00</u>

LOWER SYSTEM.

920 feet of 18" Pipe at \$1.40	\$1968.00
3500 " " 16" " " .26	910.00
5 delivery gates at \$12.00	60.00
3 gates on 16" line 9.00	27.00
Earth ditches	1200.00
	<u>4165.00</u>

With the river protection and the dams across the present channel for laterals will cost approximately 1000.00

Total cost of System exclusive of Pumping plants will be. 7430.00

If the upper system is used the additional pipe lines will cost about \$600.00.

The pumping plant with the necessary connections of the upper system #1 would be \$2500.00, making the total cost of the water for Upper System \$3100.00 from Pumping Plant #1.

If the Supplementary Pumping Plant is put in the cost of the necessary pipe connection, which would be about 500 feet, would approximate \$2500.00.

Respectfully Submitted,

H. Clay Kellogg, Consulting Engr.

William S. Post

**Ed Fletcher Papers**

**1870-1955**

**MSS.81**

**Box: 38 Folder: 12**

**Business Records - Reports - Kellogg,  
H.C - "Distribution on Bottom Lands"**



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