EXTRACT FROM MR.H.C.KELLOGG'S REPORT

ON SAN DIEGUITO RANCH.

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In planning a system for the irrigation of the San Dieguito Ranch lands, there are three elements which have to be made to harmonize. The quantity of water, the quality and character of the soil, and the cost of putting it on the land. The lands which I have included in this plan, all lie under the 200 foot contour. In planning the location of the pipe lines, I have carried a main gravity line from the upper pumping plant, and the lower pumping plant, to a pumping station, or what might be termed a booster plant, at the south west corner of the Azuna place; this being the most advantageous point from which the other pipe lines may be carried to the locations required. For a more definite idea of the location, capacity and size of pipe, you are referred to the map which forms a part of this report, and the tables giving all the data on these subjects. From this booster plant a main pipe line runs up to the lowest divide between the San Dieguito River Basin and Walnut Canyon. These pipe lines are designated as mains to distinguish them from the other pipe lines, which distribute the water to the other points on the tract, for the reason that their cost is distributed to the different sections or parcels of land. The contour map referred to as part of this report, was made from a survey by Merdith Jones, the original of which was handed me by the Manager of your Company, and has been of great assistance in the location of the pipe lines, and classification of the lands., For convenience in the description of the different tracts, and for estimating the length and cost of the pipe lines, I have marked them alphabetically, the mains being described as Ao, Al, etc. and the other sections as follows:-

"B" System,- The ditches and pipe lines for irrigation of the bottom lands in the San Dieguito Basin.

"C" System,- those lands lying between the 40 foot contour and the 160 ft.contour. The 160 ft.contour follows along the edge of the steep hill on the west side of the San Dieguito Basin, terminating at the domestic reservoir above the ranch house.

NOTE: The pipe lines are indicated upon the map by heavy broken lines.

"D" System,- includes all the lands under the 200 ft contour around the head, and along the sides of Walnut Canyon (sometimes designated as the Little San Elicjo) and also includes the lands sloping to the Rio San Elijo on the east side.

"E" System consists of the lands lying under the 200 foot contour above what is known as Dutch Draw, at the southeast corner of the ranch.

NOTE: Complete tables, giving all items of size, length capacity, size of pipe and cost, accompany and form a part of this report.

The estimated grade of these pipe lines is 7 ft. per mile. In their construction, outlet gates have been provided for at each 100 ft. The price for said gates is included in the price for the pipe.

NOTE: It will be noticed in referring to the tables that the capacity of the pipes is in excess of the estimated amount of water required. This gives more elasticity to the system, by providing an opportunity to accumulate a larger volume of water at any given point.

A reservoir on most convenient hill to pumping plant has been suggested, to furnish water for the Lockwood Mesa. I find a favorable location on hill amost directly west of booster plant at a distance of 48 50', marked "Domestic Reservoir". This is at an elevation of 320 ft. and about 2 miles from railroad., It is understood that the water is to be delivered to reservoir, and the consumers take water at that point.

COST:

12" pumping main 4656 ft.@ 76¢ -	$3538.56
Reservoir, capacity 2,701,350 gal	4757.00
Total Cost.	8295.56

GRAVITY LINE TO DEL MAR:

This line may start at pumping plant #2, (old plant) or from pipe running to #2 from booster plant. The line can be run along the County Road, would have to make a slight deviation at two points.

The plan includes a provision for the following supplies: 50,000 gals.per day for the Santa Fe Railway- 4", Del Mar,50", actual consumption 9", and domestic irrigation water for Lockwood Mesa and Cardiff. The water for Lockwood Mesa will be delivered at sump at foot of hill,250' high,19,560' from plant, and pumped through a 14" pipe 2000' in length to reservoir at top of hill about 4500' from point of use. The water for Del Mar, and AT&SF Ry Co. will be carried in 18" reinforced concrete pipe to small pumping reservoir on edge of hill and near railway,about 6640'. A part of this pipe line where the ground is hard,may be a good quality of concrete pipe, but the greater part should be reinforced with iron rings, and at the joints. The capacity of the line down to the Lockwood Mesa Junction is 200". Deducting water for railway and Del Mar leaves 145" for the lands and domestic water for Lockwood Mesa and Cardiff equal 1,879,200 gals.per day. The difference in cost between a pipe line to carry the water required for the Railway and Del Mar, and a larger pipe line, is comparatively small, and the opportunity to supply these lands with water,lying along the railroad, from the north bank of the San Dieguito River to Cardiff and beyond, will be very valuable. as the lands are good, and should the development continue, or increase, as many believe, there will be a demand for small tracts, as the opportunity to secure such land, where the climate,transportation and water facilities are all so favorable, can be obtained in very few places. The gravity line could be built with the pump at point of delivery to Lockwood Mesa system, and reservoir at Del Mar, from which the water could be taken by Railway Company into their distilling system, and by booster plant for Del Mar, and the remaining system completed when the demand required it.

METHOD OF OPERATION AND SALE OF WATER:

In furnishing a water supply,under conditions that might have to be used in a system where the water supply is partly

domestic water, and the lands irrigated belong to other parties, there is always a chance for disputes as to the method of delivery and the cost to the consumer, and experience teaches that there are too many elements of chance in said operation to make it a profitable investment,unless a provision is made for the sale of a water right to said lands, which is in some measure commensurate with the enhanced value of the land. The yearly cost of operation, including all the elements of pumping,maintenance,taxes,depreciation and delivery of water, can be figured up, and an assesment made per acre, or a price per inch can be made for the water delivered, based upon this cost. These charges may be estimated upon previous years, and the money collected in advance for each run,usually 30 days,and adjusted at the end of each year.

This method is the most satisfactory and economical,after the lands are sold to small holders. The method of collecting in advance makes them more careful in the use of water. In adopting a plan as outlined above,a stock company should be formed,with a specified number of shares of stock to each parcel of land, so that when the lands are held by individual owners, they will also own the water system. In this way,by providing for the delivery of a certain amount of water at the head of their system,the owner of the water would be protected by law in the receipt of a proper income from the water. In the present case, the owners of the land could pay a stipulated price per inch for the water delivered at sump, and the cost of pumping thereafter,- said cost to include maintenance,operation and their proportionate share of depreciation,taxes and interest on cost of necessary plant. If the land owners could not purchase outright, they could bond their stock company, and the company take their bonds; said stock and bonds to be appurtenant to and secured by the land.

WELLS:

Three wells have been bored at the bend of the river, just below the junction from LaJolla, the first one being bored close as possible to the River Channel, about 60 ft. from the south bank, and the second and third wells bored respectively at 65' and 148' north of the first one. This point was selected first because the solid rock in place appeared almost in a vertical position on the south bank,and the river made an almost right angle turn. (See map). I have found the deposits of gravel always deeper next to such a bank, while the finer sands are deposited well to the opposite side. Second, LaJolla Canyon running almost straight with the lower river, is indicative of a fault or seam. Well No.1.bored to depth of 65' to bedrock has a depth of 32 ft. of clear gravel and boulders. Well No.2 is 56' in depth and contains more sand and gravel, and only a few boulders. Well No.3 is mostly sand, some gravel. A pumping test of the first well with a 4" centrifugal pump, running at a spped of 1132 revolutions per minute, gave an estimated capacity of 90". The water lowered 6½ ft. during the pumping, but the water level returned to normal at once, when the pumping was stopped. I think this well will yield at least 200" of water. The second well was only equal to the capacity of the pump, and the third well produced very little water.

WATER TEST LOWER PLANT:

A test was made at old plant on December 1st, 1913, pumping one hour, beginning at 8.20 a.m.; at 9.15 a.m. depth to water was 29' 7" in the nearest well to the pump. At 9.30 a.m. pump stopped, - at 9.30, depth 13'9", normal level, lowering the water during pumping, 15'10", measured the water carefully with a current meter and found the quantity of water to equal 194". The depth to water at the end of pumping was at about sea level, and about 23 ft below the pump, but as before stated, the coarse gravel is mostly below this point, and by lowering the pump pit 6 or 8 feet, an inverted cone will be formed, and the yield would be at least doubled. The present amount pumped is all the load a 40 h.p. engine should carry. A cross section and log of wells made by G.C.Millett engineer of the company, and also a tabulated record of the water levels kept by Mr.McGuire, operator at the pumping station, will accompany this report.

A cross- section and log of the upper wells will also accompany, and form a part of this report.

Wells designated as Well No.4 and 5, have been bored in Walnut Canyon, the upper well, designated as No.4 was bored down 20 ft. into the granite, in the hopes of striking gravel or a crevice, but this was without result. Well No.5, after passing

through a strata of sand, also reached the granite. The location of these wells, which are a little more than one-fourth of a mile apart, are shown upon the map. Well No.6, was bored near the grant line on the east side of Rio San Elijo Canyon; this also reached granite, but no water was found. Well No.7, bored near the southwest corner of the grant, near the bridge, - no water of any consequence was found. A well is now being bored at the domestic plant in Walnut Canyon. Quite a wide strata of fine sand has been located, and the well is being drilled to greater depth; by putting in a perforated screened pipe a valuable supply of water may be secured, which will be sufficient to carry the walnut trees over the year. The log of all these wells, showing the conditions and class of material, will be made and attached to the report after said wells have been completed. If no favorable results are obtained, it will settle the question of water supply for all the territory west of the San Dieguito River basin, and south of the southerly line of the grant, as a number of wells have been bored at different points lower down the river, and the results have been unfavorable. The Dinsmore plant at the point of hill immediately south, has some driven wells which furnish about 28" of water, but all the other wells indicate a very poor quality of water, and in limited quantities.

WELL PIT AND PUMPING STATION AT UPPER PLANT.

The well pit should be placed at Well No.1, and the pit should go down at least 40'. This will be within the suction limit to the bottom of the well. The pit should be made of reinforced concrete, with an inside diameter of 9', and a wall 12" in thickness.

This will cost $25.13 per lineal foot	$1005.20
Engine base and concrete floors	64.00
Concrete retaining wall at base of building 5' high-------	125.00
Engine and pump house	100.00
	$1294.20
1-56 H.P. engine	1600.00
1-#10 Vertical Centrifugal pump	500.00
All necessary connecting pipes and valves	400.00
	$3794.20

LOWER PLANT:

The sea level fixes practical vacuum at 6 ft. That is, if it were a reservoir of water to the ocean, it could not be lowered below that level, but being a body of sand and gravel, with a gradient toward the ocean of about 7 ft. per mile, by leaving this sand and gravel undisturbed as has been already recommended, and liberally irrigating the bottom lands, I think the depressed cone caused by pumping at the plant will be protected., To do this, it will be necessary to lowdr the pump to 24 ft. below the surface, and connect the wells by a tunnel underground. This will have to be built on a true line and grade, and should be cemented. The present connecting pipe will have to be replaced by a larger pipe, also the suction pipes, as they are too small for pumping the water this plant will produce. The present discharge to ditch can still be used. The new discharge will be connected to booster plant on the opposite side.

ESTIMATE OF COST:

Pumping pit 24 ft. in depth and 9" in diameter 12" wall reinforced concrete @ $25.00 per ft.		$ 600.00
324 lineal ft. of tunnels to wells @ 3.60 per ft		1166.40
" " " " " timbering@ 7¢ per ft.		997.12
" " " " " concreting @ 1.30 per ft		416.00
		$3179.52
173' of well casing 9-5/8" con.wells @ 1.54	271.04	
49' " " " 10-5/8" " " @ 1.88	97.76	
99' " " " 11-5/8" " " @ 2.12	216.24	
30' " " " 8-5/8" Suct to#8 @ 1.21	39.93	
30' " " " 9-5/8" " #3 @ 1.54	50.82	
30' " " " 10-5/8" " #4 @ 1.88	72.04	
30' " " " 11-5/8" " #7 @ 2.12	69.96	
30' " " " 9-5/8" " #6 @ 1.54	50.82	868.61
		4048.13
#10 Centrifugal -special		4750.00
100 H.P. Gas engine		125.00
Total		8923.13

MAIN PUMPING STATION-BOOSTER PLANT:

Pump reservoir- 60' square 6' depth, capacity 216 cu.ft.equal to 300" for one hour 400 inches for 45 minutes. Lined with concrete 6" thick on the sides, reinforced with iron rods at the corners, bottom 4" thick, reinforced with wire 4" mesh.

Cost of excavation	$ 200.00
Concreting 1680 sq.ft sides, 3149 sq.ft bottom	452.52
4080 sq.ft wire and 20-3/8 x 12' rods	34.00
25'-18" drain pipe	8.75
Drain pit	15.00
Gate and stand pipe	24.00
Total	735.27
Engine base 6x16'x4'	119.00
Building with concrete floor	352.40
Building foundations	125.00
Power in two units #1-150 h.p. gas engine) #2-100 " " " (Includes all expense of setting up.	13500.00
1-#8 two step pump, centrifugal) 1-#6 " " " " (	1400.00
	$16231.67

DESCRIPTION	HEAD IN FEET:	FRICTION HEAD INCL:	QUANTITY OF WATER:	THEOR. H.P.	BRAKE H.P.	ENGINE RATING
Pumping Plant #1	40'to60'	45 to 65	250" to300"	28	required 56	56 to 60
#2	29 " 48	56	370" " 460"	43.6	87.2	85 " 10
Booster plant to C&D	170	190	290"	125.2	250	100 h.p. 150 h.p.
Water for gravity line to Del Mar Maybe from Plant #1 or a part of Plant #2	40' to'60	45 to 65	200"	20.4 to 30.1	41 to 60	

ESTIMATED COST GRAVITY LINE TO DEL MAR, WITH SUPPLY TO LOCKWOOD MESA

GRADE	LENGTH:	SIZE	:CAPACITY:	KIND OF PIPE	SUMPS AND RESERVOIRS:	PRICE:	EXTRAS.	COST.	REMKS
6.2' per mile	19560	20"	200"	Reinfor. concrete	Concrete $450	45¢	100	8802	to sump
		24"	290"					100	for booster Pl.
1.2	6440	18"	110"	"	871	40¢	200	2526	To
		30"	30% add.					200	Del
								871	Mar
				Total to Del Mar				12949	
250 Ele.	2000	14"	150"	#12 dou. riv	$4557	$1.05		2100	pipe
								4557	reserv
				Total cost of line to reservoir				$6657	
				" " " complete system				$ 19606	

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S U M M A R Y

DESCRIPTION	COST OF MACHINERY	COST OF MAIN PIPES	COST OF SUPPLY RESERVOIRS	COST OF LATERALS	TOTAL COST
Pumping Plt #1	$3794.20				
" " #2	8923.13				
Booster	16231.67				$28949.00
Storage reservoir at Plant #1			$5000.00		
" " #2			1662.00		6662.00
Pipe mains		$14478.00			14478.00
[illegible]					

DESCRIPTION	COST OF MACHINERY	COST OF MAIN PIPES	COST OF SUPPLY RESERVOIRS	COST OF LATERALS	TOTAL COST
Laterals to different systems				$29119.00	$29119.00
Total cost of Ranch System					$79208.00

Gravity line to Del Mar, including reservoir 12949.00
$92157.00

Total Ranch System, add 20% for overhead charges 15841.60
$107998.60

Add 20% to outside system. 2589.80

Total cost of complete system $110588.40

(The above does not include preliminary expense of boring wells.)

The total cost for machinery for all the water pumped to the ground level is $12,717.33, which equally distributed to all the lands would be $4.05 per acre, which is a proper charge. The lands to which the water has to be lifted should bear the additional cost of $16,231.67. This will amount to $7.50 per acre on hill lands; adding $4.05 per acre will make the total cost for the hill lands $11.55 per acre.

Total Cost per Acre for each system, for completed plant:

"B" System	"C" System	"D" System	"E" System
Bottom	Above House	Walnut Canyon	S.E.Cor.Ranch
$8.50	$29.25	$30.80	$25.15

COST OF OPERATING PLANT PER ANNUM:

From the average cost of power, under faily good conditions, with oil at 95 cents per barrel, I get 0.00313 cents per H. P. hour as the fuel cost. There are a few instances where better results are obtained. I find that the plant now operating on the ranch, from some figures given me by Mr. Faulkner, will give a coefficient of 0.00125 per H. P. hour, with oil at 80 cents per barrel on ground. This would reduce the fuel cost about 47 percent over the above figures, equal to a saving of $7.76 per annum per horse power. The following table of cost is however on basis of 0.00313 cents:

Cost of irrigating 1850 acres of hill land -

Fuel cost	$3960.00	per annum
Depreciation	3136.91	" "
Interest at 6%	4361.79	" "
Taxes 3% on 2/3ds valuation . .	1211.60	" "
Attendance and supervision . .	3000.00	" "
Total	$15670.30	" "

Which equals - $16.50 per H. P. hour fuel per annum
8.47 per acre per annum
59.35 per inch per annum
65.00 per H. P. per annum

Bottom lands - 975 acres -

Fuel cost per annum	$ 720.96
Depreciation	810.00
Interest	1457.93
Taxes	242.98
Supervision & attendance .	1800.00
Total	$5031.87

Which equals - $ 3.00 fuel per H.P. hr. per annum
15.50 per inch per annum
5.20 per acre per annum
10.48 per H.P. per annum

The above figures are far below the cost in many localities, the cost ranging from a minimum of $6.00 per acre to a maximum of $27.00 per acre.

The annual cost of irrigation, which here will be $8.50 per acre for the hill lands and $5.00 per acre for bottom land, is less than in many localities where water is pumped successfully. The annual cost at Corona is from $24.00 to $27.00 per acre; at San Dimas, $24.20, and La Verne $18.15; and the pipe system is more conveniently located to the lands than in many instances. The bottom lands are alluvial fill, made from river deposits, well adapted to the growth of alfalfa, barley and other grains, also sugar beets. Some of the land contains considerable alkali, and a few of the low points should be drained. I think a good ditch along the south line, as deep as the river would permit, would be very advantageous, and tile the worst of the low spots. The flooding of the lands with the winter waters, as before recommended, will soon wash out the damaging alkali, and make the land very productive. When these developments are made, the two loops in the river above and below the headquarters which I have indicated by double red lines, should be cut off, so that the channel will follow continually around the foot of the hill.

VALUE OF WATER LANDS:

The value of water is determined from two points of view - the cost of developing, and its value to the land upon which it is used. These should be termed the two factors in the value of the property -

1. The water right.
2. The cost of the plant, or system of works.

In this instance the second factor has been estimated to be $107,998.60, equal to $8.50 per acre for bottom lands, and $46.16 per acre for hill lands. The water right being underground waters of the basin of the San Dieguito River within the San Dieguito Rancho, which extends across the basin on each side of the river, all within the watershed of the river, and cannot be disputed or assailed. It therefore represents the difference in cost between the cost of the system of works, plus the market value of the land before water was placed upon it; and the value of the land with water.

The system of works cost	$107,998.60,	average	$34.00	per	acre.
The land without water =	156,750.00	"	50.00	"	"
The land with water =	940,500.00	"	300.00	"	"
Value of water right	675,757.40	"	216.00	"	"

The commercial value of water is given as $1000.00 per inch, in many instances for irrigation, which would make this water worth $700,000.00 after it is developed. (A reasonably close check on the above figures.)

PIPE MAINS "A" SYSTEM.

DIVISION	HEAD	CAPACITY	SIZE	LENGTH	THICKNESS	WT PER FT.	KIND OF PIPE	GAUGE	COST PER FT.LAID	
Upper plant Ac to pumping sta.	Gravity	400"	24"	9000'	2½"	120#	cement		80¢	$ 7200.00
Lower Plant to A1 pumping Sta	"	400"	24"	1400'	2½"	120#	"		80¢	1120.00
P.P.S. to Divide A2	170' 130'	272	16"	4200'	.109"	22.55#	Dou.Riv.Stl	#12	1.24	5208.00
Across Divide A3	Gravity	250"	20"	950'	2½"	100#	Cement		Ext.Cut 60¢ 40¢	950.00
							Total Main Line			$14478.00

BOTTOM SYSTEM "B" DISTRIBUTING LATERALS

DIVISION	HEAD	CAPACITY	SIZE	LENGTH	THICKNESS	WT PER FT.	KIND OF PIPE	GAUGE	COST PER FT.LAID	
B1 across Creek	Gravity	100" "	12" "	600' 400'	1½" "	60# "	Cement Reinforced	Across River	22¢ 35¢	136.00 140.00
B2 Cement Ditch	"	2500"	4'x3½' slope	800'	4" lining- cement	11' Perimeter			90¢	720.00
B3 Cement	"	1200"	18"x3' ½ to 1 slope	2100'	4" lining-	8' "			65¢	1365.00
B4 & 5	"	300"	16" pipe	6800'	Cement pipe				25¢	1700.00
						Irrigating gates & Turnouts				280.00
						Total - - - - - - - - - - - -				$4341.00

"E" SYSTEM S.E. ABOVE DUTCH FLAT

DIVISION	HEAD	CAPACITY	SIZE	LENGTH	THICKNESS	KIND OF PIPE	GAUGE	PRICE PER FT	TOTAL
E 1	140'	60"	12"	100'	Across creek	Dou.Riv	#12	Ex ~~¢~~ 1.24	150.00
E 2	140'	60"	12"	1000'		"	#14	66¢	660.00
E3 and 4	Gravity	60"	12"	15500'	1¼"	Cement		22¢	3400.00
							Total		4210.00

COST OF PIPING ON DIFFERENT TRACTS

SYSTEM	DESCRIPTION	ACREAGE	AMOUNT OF WATER REQUIRED	CAPACITY OF PIPE	COST OF LAT.PIPES	COST OF MAINS	COST OF PIPING PER ACRE.
"B"	Bottom lands	975	1" to 4 acres 244"	325"	4331.00		4.45
"C"	Bet 40c & 160c	330	53"=1" to 7 ac	60" to 100"	3270.00	2544.30	17.70
"D"	Under 200c		170"=1" " 7 "	208"			
	Walnut Canyon	1190		100"	17298.00	9174.00	
	on Rio San Elijo	330	44" "			2390.00	19.24
"E"	On hill above Dutch Flat	310	44" "	60"	4210.00		13.60
		3135 acres	555				

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"C" SYSTEM DISTRIBUTING LATERALS

DIVISION	HEAD	CAPACITY	SIZE	LENGTH	THICKNESS	WT PER FT	KIND OF PIPE	GAUGE	COST PER FT LAID	TOTL
C 2 to Divide	Gravity	100"	12'	9600'	1¼"	50#	Cement		19¢	$1824.00
							384 gates at 1.25 ea			280.00
C 3 to Draw	"	100"	12"	1300'	1¼"	50#	Cement-includes gates		22¢	286.00
C 4 to Reservoir	"	100"	12"	4000'	1¼"	50#	Cement		22¢	880.00
							TOTAL OF "C" SYSTEM - - - - - - - - - - -			$3270.00

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"D" SYSTEM DISTRIBUTING LATERALS

DIVISION	HEAD	CAPACITY	SIZE	LENGTH	THICKNESS	WT PER FT	KIND OF PIPE	GAUGE	COST PER FT LAID	TOTL
D2	Gravity	100"	12"	24000'					22¢	5280.00
D1	"	208"	20"	10700'	2½"		Cement		25¢	3745.00
D3	"	208"	18"	500'	.078		Steel	#14	1.15	575.00
Cross line		132"	14"	300'	.078		"	"	1.10	330.00
D 4		100"	12"	6150'			Cement		22¢	1353.00
D 5		155"	16"	7600'			"		26¢	1976.00
D 6		100"	12"	3000'			"		22¢	660.00
D 7		100"	12"	6000'			"		22¢	1320.00
D 8		100"	12"	2800'			"		22¢	616.00
D 9		100"	12"	3200'			"		22¢	704.00
D 10		100"	12"	3200"			"		22¢	704.00

7 dividing gates at junction of pipe line at $5.00 each — 35.00

Total — $17298.00

LOWER PLANT.

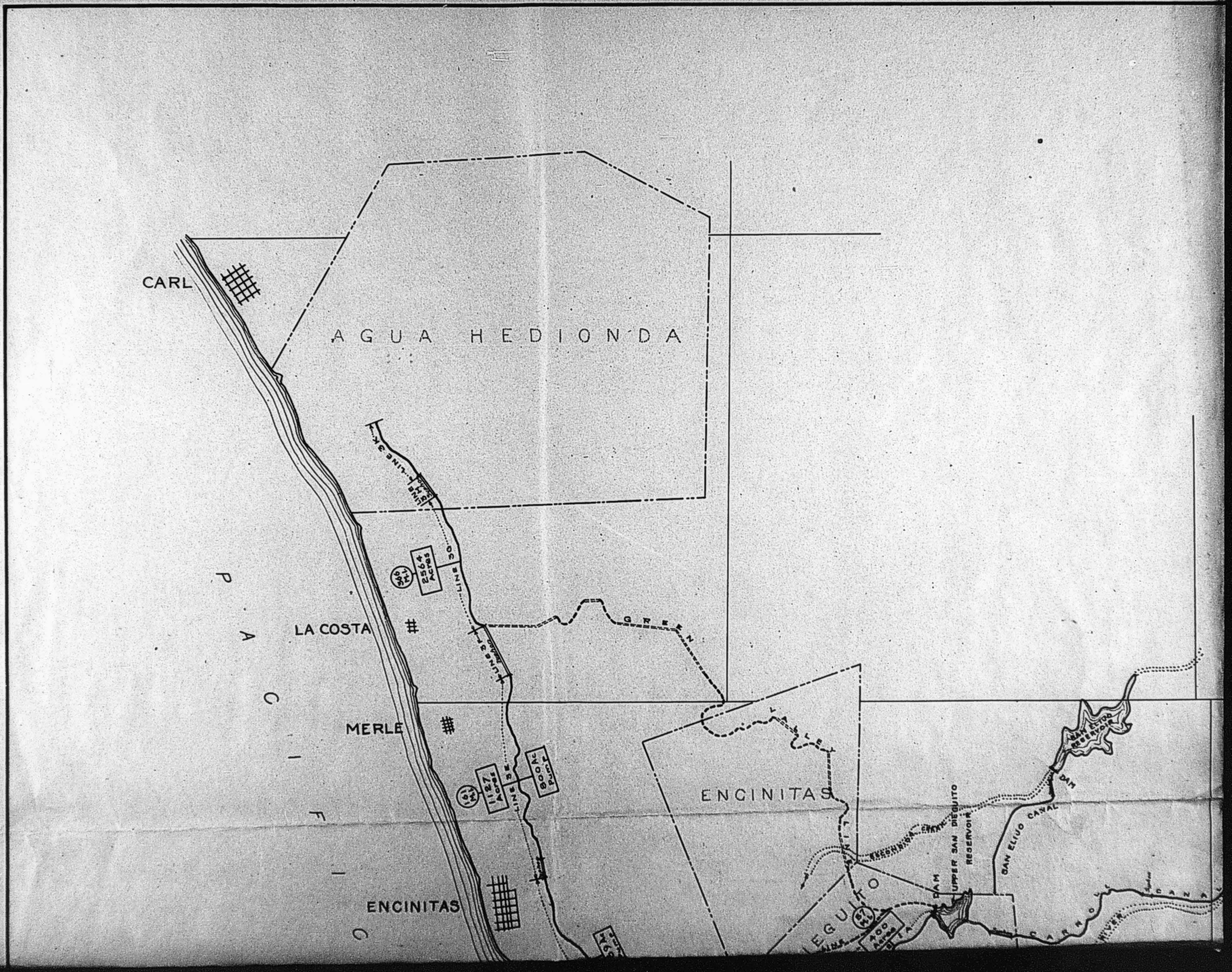
LOG OF SANTA FE WELLS NOS.5,7 and 1, for Nov.1913.

Nov.	DEPTH TO WATER WHEN PUMPING			DEPTH TO WATER WHEN IDLE		
	WELL NO.5	Well No.7	Well No.1	Well No.5	Well No.7	Well No.1
1				12'8½"	12'2"	13'1"
2				12'8½"	12'2"	13'1"
3				12'8½"	12'2"	13'1"
4	12'8½"	28'	13'4"			
5	12'9"	28'	13'7"			
6	12'9½"	28'	13'10"			
7	12'10"	28'	14'1"			
8	12'11"	28'	14'5"			
9						
10	12'11"	28'	14'5"			
11				12'11"	12'2"	14'5"Water
12				12'10"	12'2"	14'3"lowers
13				12'9"	12'2"	14'½"13" in
14				12'8½"	12'2"	13'11"Well #7
15				12'8½"	12'2"	13'10½" when
16				12'8"	12'2"	13'8"electric
17				12'8"	12'2"	13'8 motor
18				12'8"	12'-	13'7" runs 2
19				12'8"	11'11"	13'5" hours
20				12'8"	11'10½"	13'5"
21				12'8"	11'10½"	13'4½"
22				12'8"	11'10"	13'4"
23				12'8"	11'10"	13'4"
24				12'8"	11'10"	13'4"
25				12'7½"	11'10"	13'3½"
26				12'7½"	11'9½"	13'3½"
27				12'7"	11'9½"	13'3"
28				12'7"	11'9½"	13'3"
29				12'7"	11'9"	13'3"
30				12'7"	11'9"	13'3"

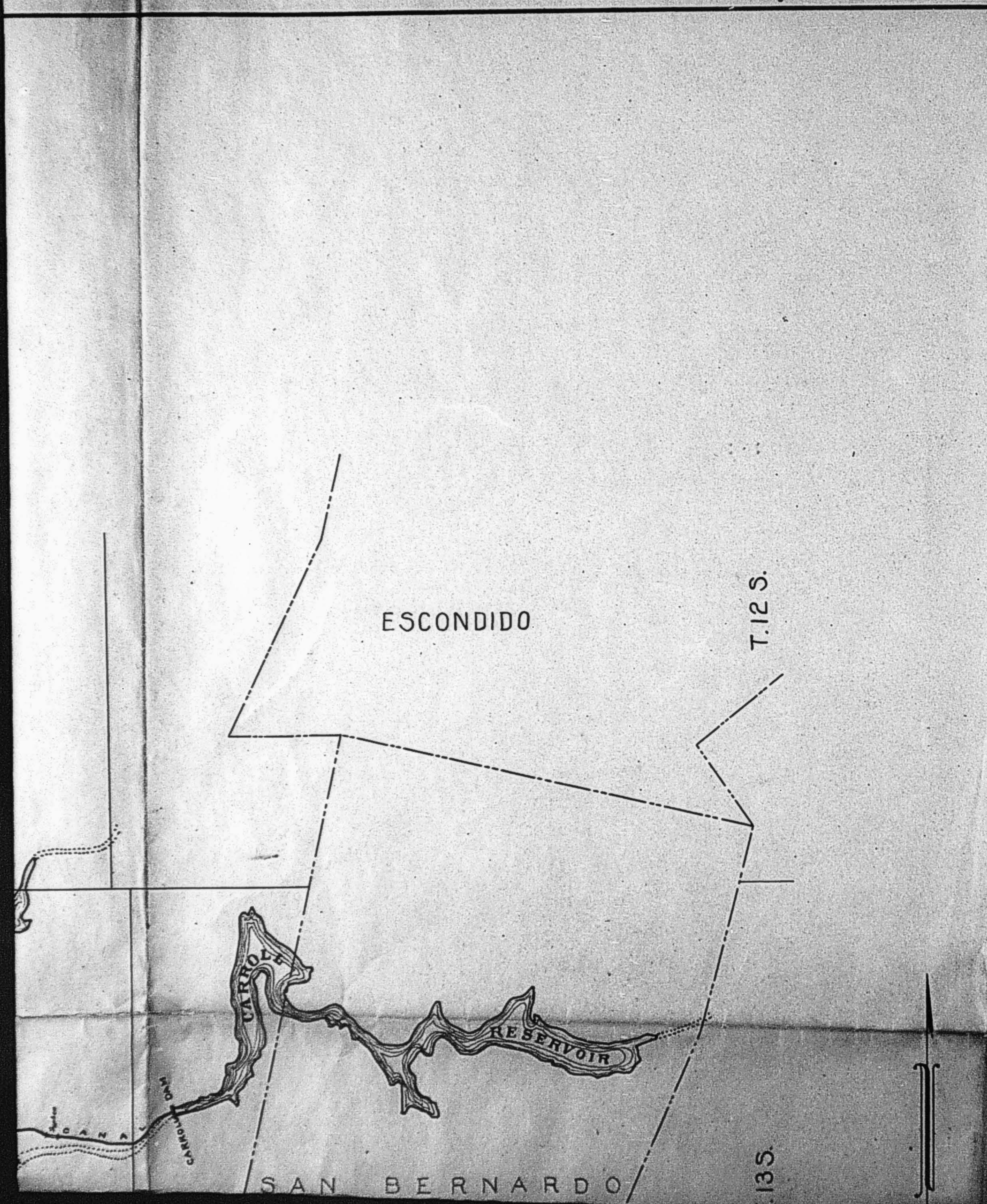
LOG OF EXPERIMENTAL WELLS

Bored in February, March and April, 1914.

NO. OF WELL	DEPTH	DESCRIPTION AND REMARKS
4	40'	Located in creek at road, crossing 1/2 mile above house
	60'	Through clay soil to rock. End of 12" pipe. Went 20' into solid rock - some heavy blue clay - no water.
5	55' 65'	1100' down stream from #4 Through top soil and clay, 10' of sand and gravel, to rock. Well perforated. Filled with sand in pumping. Estimated water at about 5 gallons per minute.
6	43'	Well located about 125' east of west line of Rancho and 80' south of ranch road, being 50' east and 40' south of point selected. To solid formation - no water. (Log not complete)
7		Point near the southeast corner of Rancho. No water - Log not finished.
8		At domestic well near house. At this point windmill pumps about 7 gallons per minute.



CARL
AGUA HEDIONDA
P A C I F I C
LA COSTA
MERLE
ENCINITAS
LINE 3K
LINE 3H
LINE 3G
346 M.L.
2564 Acres
LINE 3F
LINE 3E
161 M.L.
1127 Acres
800 Ac Pump
G R E E N
V A L L E Y
ENCINITAS
L I N E
EGUITO
ESCONDIDA CREEK
UPPER SAN DIEGUITO RESERVOIR
DAM
SAN ELIJO CANAL
SAN ELIJO RESERVOIR
DAM
87 M.L.
400 Acres
C A R R O L L
C A N A L
RIVER



PIPE TABLE (c)

Line	Local Requirement Miners Inches	Total Water to be passed by each Section	Approximate Size based on 0.8 ft. per 1000 ft. (b)
1 A	57	301	(a) 26"
2 B	14	244	24"
2 C	46	230	22"
2 D	35	184	20"
2 E	50	50	12"
2 F	35	99	18"
2 G	64	64	14"
Total	301		

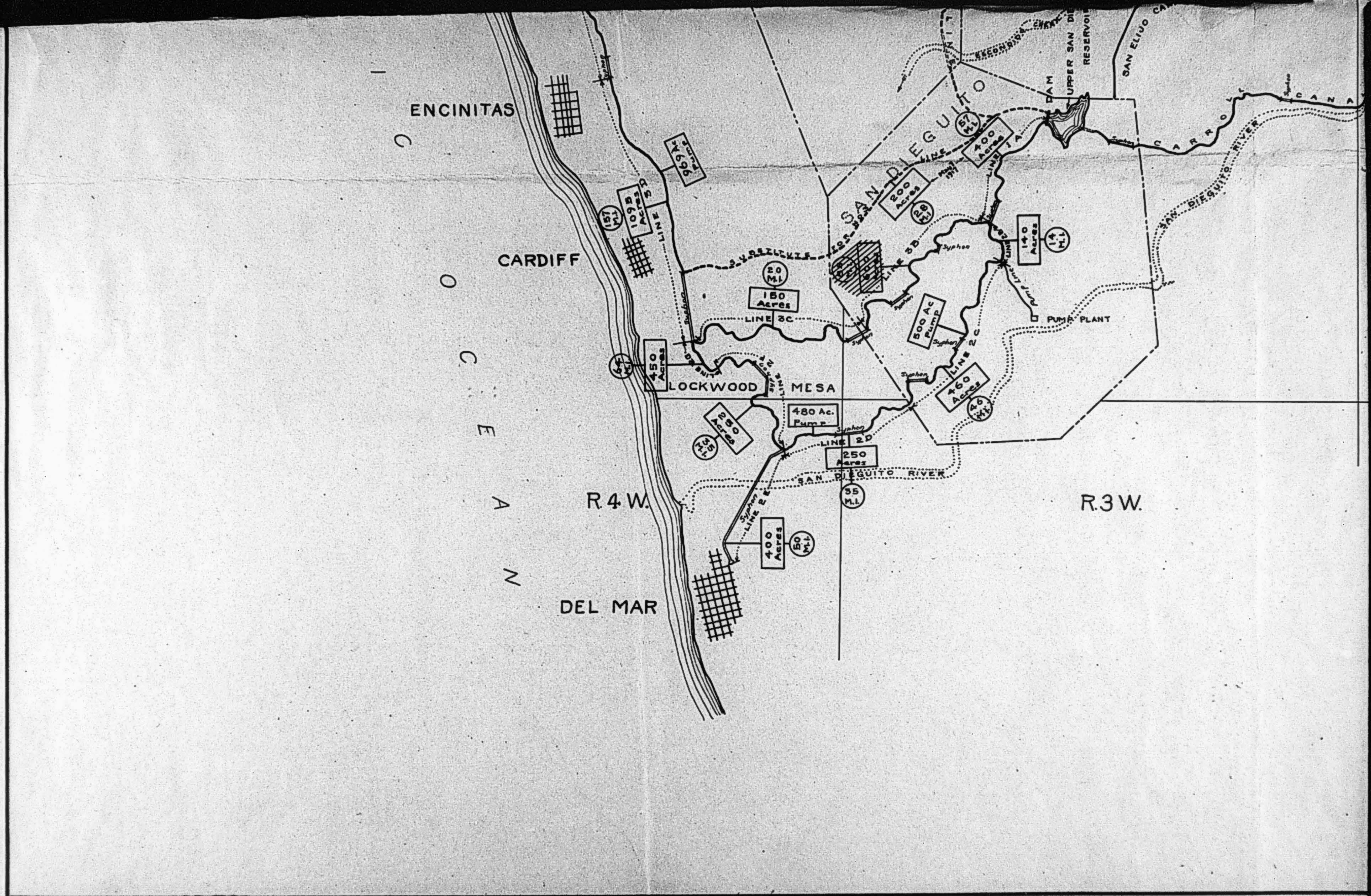
(a) Decreased from Kelloggs 34"

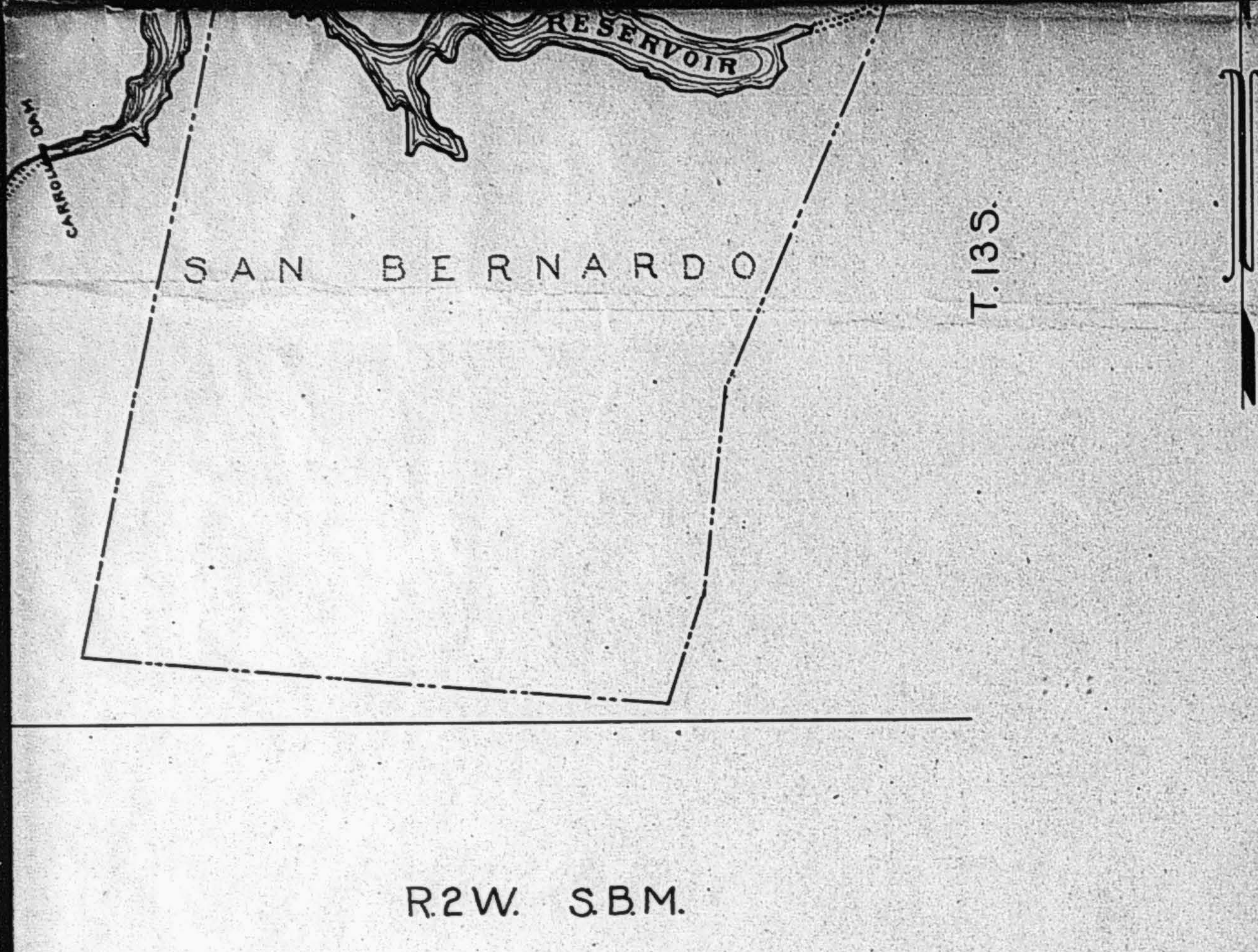
(b) Complete survey may show that this size will be increased 2 inches, due to lessened grade.

(c) See Kellogg Report Pages 9b & 9e

NOTE

Line 1 A and Line 2 limited to their irrigation loading.
(No provision for Cardiff and Encinitas.) May 7, 1917 - W. S. Post.


ENCINITAS
CARDIFF
OCEAN
LOCKWOOD MESA
DEL MAR
R.4 W.
R.3 W.
SAN DIEGUITO
SAN DIEGUITO RIVER
CARROLL CANAL
UPPER SAN DIEGUITO RESERVOIR
SAN ELIJO CANYON
DAM
PUMP PLANT
LINE 3C
LINE 3D
LINE 2C
LINE 2D
LINE 2E
LINE 1A
969 Ac.
1095 Acres
157 M.I.
20 M.I.
150 Acres
450 Acres
250 Acres
35 M.I.
480 Ac. Pump
250 Acres
35 M.I.
400 Acres
50 M.I.
500 Ac. Pump
460 Acres
46 M.I.
140 Acres
14 M.I.
200 Acres
28 M.I.
400 Acres
57 M.I.
Syphon



═NOTE═

Line 1 A and Line 2 limited to their irrigation loading.
(No provision for Cardiff and Encinitas.) May 7, 1917 - W. S. Post.

SAN DIEGUITO MUTUAL WATER CO.
DIAGRAM
of

Acreage assigned shown thus [Acres]
Miners Inches of water assigned shown thus (M.I.)
by Kellogg and Post Dec. 1916

Scale $\frac{1}{62500}$

Drawing Nº 156
File Nº S 4