

C-1917

REPORT

TO

ED FLETCHER, MANAGER

ON THE VALUE OF THE PROPERTIES OF THE GUYAMACA

WATER COMPANY - JANUARY 1st, 1919

By

C. Harritt, Superintendent.

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VALUATION OF OUYAMAGA WATER SYSTEM

Explanation.

In previous valuations of this property, the reproduction costs have been based on prices of materials, labor, etc., prevailing prior to the War, or on prices in effect in 1914 and 1915 when market and labor conditions were unsettled owing to outbreak of the war in Europe. Obviously this system could not be reproduced during normal times, for the amount of money required during years of panic or near panic such as prevailed in 1914-15, neither could it have been reproduced at any time since 1912 for the amount of money required prior to that time.

In preparing this valuation the difficulty has been to arrive at a normal price for material, labor, etc., the present prices 1918-19 are higher than we may expect in the near future, though it is not reasonable to suppose that they will ever recede to a prewar basis. Therefore, an effort has been made to arrive at an average of prewar and present prices, for this purpose a tabulation showing cost of material purchased by this Company for every year since 1913 has been prepared. This table, with \$1.00 as the unit cost in 1913, is as follows:

Table No. 1

Average Yearly Costs of Materials Purchased by Cuyamaca Water Co.

1913	-	1.00
1914	-	1.19
1915	-	1.32
1916	-	1.44
1917	-	1.64
1918	-	1.90

For the same purpose the following Table showing prices paid for labor has been prepared based on \$1.00 per average for year 1913

Table No. 2

Average Yearly rate paid for labor by Cuyamaca Water Company.

1913	-	1.00
1914	-	1.125
1915	-	1.125
1916	-	1.250
1917	-	1.375
1918	-	1.500

In the above tabulation no account has been taken of the loss in efficiency of labor amounting to at least 33-1/3 percent. In other words, it is not believed that the average laborer will do more than two-thirds of the amount of work in 1918, that he would do in 1913.

Table No. 3

Average yearly rate paid for skilled labor, superintendence, etc., paid by Cuyamaca Company, including carpenters, mechanics, pipe men, foremen, superintendents, etc., also office help.

1913	-	1.00-
1914	-	1.056
1915	-	1.0821
1916	-	1.1321
1917	-	1.2143
1918	-	1.3107

While Table No. 1 shows the general upward trend of prices of supplies, it does not include all materials which would enter into the reconstruction of this system. Therefore, it has been found necessary in getting an average, to use, largely, the prices furnished by Mr. F. M. Faude in a recent valuation of this system, as representing cost prevailing prior to 1915. The prices used in this average, representing the higher prices since that time are based on bids received on proposed work, costs of similar work on the San Dieguito Mutual Water System, quotations received from local firms, quotations furnished the Volcan Land & Water Company, etc., and actual purchases made by Cuyamaca Water Co.

The quantities used in this valuation, as are the classification of materials, are those agreed upon by engineers representing the La Mesa, Spring Valley & Lemon Grove Irrigation District, the Caymanea Water Company, the Railroad Commission of the State of California, and the City of San Diego, during hearings before the Railroad Commission in 1914-1915, with such additions and deductions as have been made subsequent to that date.

The depreciation of the physical structures in a compilation of this kind is of the utmost importance and is the most difficult question to solve. In this case the writer has been intimately connected with this system for over ten years, has superintended the construction of a considerable portion of it, has maintained and operated it and has observed the actual deterioration of the various structures for this period of time. The probable life and annual depreciation of this system are based upon his personal observations. Also the unit costs are based largely upon the cost of work done under his direction, allowance being made for increased or decreased cost of materials, labor, etc.

CUYAMACA DAMCost Analysis

Stripping - 1½' deep, material, earth, clay, stones and boulders up to 1 man size. This material could be plowed, only with great difficulty. Also is difficult to handle with a scraper. 2 men at \$2.75 per day and 1 team at \$3.00 per day would handle 15 cu.yds. per day; cost per day \$8.50 - 15 yds = 56-2/3 cents per yard, as this material was later used in embankment and is charged up to same, a price of 40 cents was used.

Trench Excavation Cutoff trench about 10' x 7½', clay and solid rock. This trench could be excavated with teams, excepting the rock, at a cost of \$1.00 per yard, but as material was used and charged up to clay puddle, a price of 65 cents per yard is used.

Clay Puddle in Trench All hand tamped and hauled 400 feet - 90 cents per yard used.

Earth Embankment With ground loosened by plowing, the larger stones removed, etc., 2 men at \$2.75 and 1 team at \$3.00 would deposit 17 cu.yds. per day with average haul of 300 feet, hence price used is 50 cents per yard.

Clay Puddle Embankment Material hauled average of 400 feet, more difficult to handle than earth, would cost deposited on dam 60 cents per yard; wetting, rolling, etc., 15 cents per yard; cost used 75 cents per yard.

Riprap 15" thick - Material hauled 1100 feet, gathered up over large area, handled 5 times, all hand placed and chinked, price used ~~90~~ 15 cents per square foot.

KELLEY DITCHKelley Ditch

Earth Excavation Material largely moist clay and small boulders,
price used 65 cents per cu.yd.

Loose Rock Largely dragged out of trench by chain slings and mules.
\$1.25 per yard used.

Solid Rock Material very hard Granite, difficult to drill, shatters
well with powder, price used \$3.00 per yard.

Deferred Maintenance on Kelley Ditch. It will require an expenditure
of \$1,000 to repair the damage to this structure caused by 1916 floods.

DIVERTING DAM

Excavation

Solid Rock - At no time during the past six years could this material be excavated for less than \$3.00 per yard. This price will be used throughout this valuation.

Disintegrated Granite - This work was expensive owing to necessity of continuous pumping; price used \$1.00 per yard.

Rubble Masonry

Stone near site, sand 1000 ft. distant, cement hauled from Lakeside. Stone largely hammer dressed; price used \$8.00 per yard.

Gates

These gates installed cost in 1912 \$2,284.32. Price used \$3,000.

FLUME LINE, SECTION #1

Diverting Dam to Tunnel No. B.

Rough Redwood in place would cost as follows:

F O B - San Diego	37.00	
Freight	1.30	
Trucking	4.50	
Hauling	1.60	
Delivery to Bench	1.60	
Distributing on Bench	1.60	
Erecting	9.80	
	<u>57.40</u>	

See Sheet 4-A
for details.

S38 Redwood:

F O B San Diego	51.00	
Freight	1.30	
Trucking	4.50	
Hauling	1.60	
Delivery to Bench	1.60	
Distributing on Bench	1.60	
Erecting	8.80	
	<u>70.40</u>	

See Sheet 4-B
for details.

Rough Oregon Pine:

F O B San Diego	30.00	
Freight	1.30	
Trucking	4.50	
Hauling	1.60	
Delivery to Bench	1.60	
Distributing on Bench	1.60	
Erecting	15.30	
	<u>55.90</u>	

FLUME LINE, SECTION NO. 1

Cost of lumber, Rough Redwood, \$37.00 is average of regular wholesale prices of 1914 and 1918.

Freight is regular rate to Lakeside on car load of 20,000 feet.

Trucking is figured at 0.25 ^{ton} per/mile; lumber is figured at 1.6 tons per 1000 F B M. Average haul 10 miles.

Hence $1.6 \times 25 \times 10 = 4.00$ + cost of rebuilding and maintaining roads = 4.50 per 1000 F B M.

Hauling. A large portion of material entering into construction of flume could not be delivered by truck. Teams would be required. This would average 1.00 per ton or 1.60 per 1000 for all lumber used.

Delivery to Bench It would be necessary to use tramways, cableways, etc., for this work. Cost per ton 1.00 or 1.60 per 1000 for all lumber used.

Distributing on Bench Cost would be 1.00 per ton or 1.60 per 1000.

Erecting - Rough Redwood 1 man at 4.00 and 2 men at 3.00 will place 40 mud planks = 600 F B M a day = \$15.00 per 1000.

1 man at 4.00 and 1 man at 3.00 will place 1000 F B M of 4" x 6" x 16' stringers, crossties posts and braces in one day = \$7.00 per 1000 FBM.

Putting upper sideboard cost \$7.40 per 1000. Average cost per 1000 feet = 9.80.

MAIN FLUME, SECTION NO. 1

Erecting - SSS Redwood

Cost of Lumber \$51.00 is average of regular wholesale prices of 1914 and 1918.

Freight, hauling, trucking, delivery to bench and Distributing, same as R. Redwood, Sheet 4-A.

Erecting 1 man at 4.00 and 1 man at 3.50 = 7.50 + 22 $\frac{1}{2}$ nails at 0.06 = 8.80 will place 1000 F B M in flume box.

Rough Oregon Pine

Cost of Lumber \$30.00 is average of regular wholesale prices of 1914 and 1918.

Freight, trucking, hauling, delivery to bench and distributing same as Redwood.

Erecting A 30 ft, 3 post trestle bent contains, with stringers, braces, etc., approximately 1000 F B M of lumber, would require 1 man at 5.00, 2 at 3.50, 1 man at 3.00 = 15.00 + 5 $\frac{1}{2}$ nails at 0.06 = 15.30

Caulking 20 $\frac{1}{2}$ Oakum at 10 $\frac{1}{2}$ to 1000 lin.ft. of seam required. 2 men at 3.00 will caulk 1000 feet per day = 8.00 per 1000, price used.

DEFERRED MAINTENANCE, MAIN FLUME

This structure has been given a future life of ten years, but in order to keep it in service for this length of time, the following expenditures will be necessary:

Relining throughout at the end of three years -----	\$ 60,000
Returning flume to grade -----	10,000
Doubling cross-ties, 31,000 at 0.75 -----	23,000
Side bracing -----	10,600
Extra Bents in Trestles -----	30,000
Incidentals -----	<u>10,000</u>
	\$143,600

This item is included for the reason that the major portion of this structure is good for at least 10 years, but if this deferred maintenance is not made up, the life of the flume will be reduced by at least 6 years.

To rebuild the flume, or replace it with any kind of conduit, would require an expenditure of from \$800,000 to \$1,000,000, involving an interest charge of from \$48,000 to \$60,000 per annum or for the six years from \$288,000 to \$360,000, not including depreciation. This heavy load can be saved the consumers by expending the \$143,600 above mentioned, amounting to only \$14,360 per year for the 10 years.

Flume Line, Section #2

Rough Redwood

F O B San Diego	37.00
Freight	1.30
Trenching	2.40
Hauling	1.60
Delivery to Bench	.80
Distributing on bench	.80
Erecting	9.80
	<u>53.70</u>

The flume on Section #2 is much more accessible than Section #1, prices have been lowered accordingly.

Rough Oregon Pine

F O B San Diego	30.00
Freight	1.30
Trenching	2.40
Hauling	1.60
Delivery to Bench	.50
Distributing on bench	.50
Erecting	15.30
	<u>51.60</u>

Prices lowered, same reason as above.

S3S Redwood

F O B San Diego	51.00
Freight	1.50
Trenching	2.40
Hauling	1.60
Delivery to bench	1.60
Distributing on bench	.90
Erecting	8.80
	<u>67.60</u>

Prices lowered same reason as above, but not to the same extent as this material would require more handling than either the R O P or R Redwood.

CONCRETE CONDUIT

Excavation - Disintegrated Granite

This varies from a soft crumbly earthy material which can be handled for 0.50 per yard to a soft rock requiring moderately heavy shooting. In this instance the actual cost was \$1.50 per yard which figure is used. On the flume bench the average character of the disintegrated granite could be handled for 0.80 which figure is used.

Concrete Lining

Actual cost was \$14.00 which figure is used.

SAND CREEK SIPHON

Excavation

Actual cost was 1.50 per yard which figure is used.

42" Reinforced Concrete Pipe Actual cost 4.05. Sand and Gravel furnished at less than cost \$5.00 used.

40" Steel Approximate cost in 1916 was \$10 per foot in place, which price is used.

Concrete The cost of concrete varies largely. In this valuation a price of from \$9.00 to \$20.00 per yard is used. \$20.00 being actual cost of lining in Sand Creek Conduit; also in concrete flume at Indian church.

TUNNELS

Tunnel No. 1

Excavation - Some disintegrated Granite, largely moderately hard granite, drills hard, breaks well, 12.50 per lin.ft. used.

Tunnel No. 2 Same as No. 1.

Tunnel No. 3 Tight disintegrated granite, "nigger heads" \$10 used.

Tunnel No. 4 304 lin.ft. same as No. 1 and 2.
395 lin.ft. very hard, tight, granite, drills slow and does not break well, \$18.00 used.

Tunnel No. 5 Same as No. 1.

Tunnel No. 6 " " " 1

Tunnel No. 7 1292 lin.ft. same as No. 1
610 lin.ft. hard granite, numbers of tight seams or fractures, drills hard, breaks well, long tram for muck, poor circulation, price used \$16.00

Tunnel No. 8 Same as No. 1

Timber in Tunnels Slow, painstaking work, price used \$100 per MBM

STEEL FLUME

South Fork Feeder

2450 lin.ft. of steel flume, erected in 1913, cost 2.53 per lin.ft., including boarding house loss, using old flume lumber, in reconstruction, new material would be used and a price of 3.80 is used.

Steel Flume on Main Flume Line

Actual cost in 1913 including loss on boarding house was \$5.90 per foot - 8.85 price used.

PIPE

3/4" pipe F O B San Diego	.08 average price, present cost .09 $\frac{1}{2}$
Hauling, Storing and Distributing	.01
Trenching	.07
Laying	.008
Backfill	.01
	<u>.178</u> - .18 used
1" pipe F O B San Diego	.10 average price, present cost .12 $\frac{1}{2}$
Hauling to yards, storing and distributing	.016
Trenching	.08
Laying	.01
Backfill	.015
	<u>.221</u> - .22 used.
1 $\frac{1}{2}$ " Pipe F O B San Diego	.125 average price, present cost .168
Delivery to yards, storing and distributing	.02
Trenching	.09
Laying	.015
Backfill	.015
	<u>.265</u> - .26 used.
2" pipe F O B San Diego	.17 average price, present cost .2285
Hauling to yards, storing and distributing	.02
Trenching	.09
Laying	.015
Backfill	.015
	<u>.310</u> - .31 used.
3" pipe F O B San Diego	.38 average price, present cost .4455
Hauling to yards, storing and distributing	.026
Trenching	.11
Laying	.05
Backfill	.02
	<u>.565</u> - .57 used.
4" pipe F O B San Diego	.65 average price, present cost .7655
Hauling to yards, storing and distributing	.04
Trenching	.14
Laying	.04
Backfill	.02
	<u>.89</u> price used.
4" O D Casing F O B San Diego	.335 average price, present price .432
Delivery to yds, storing and distributing	.025
Trenching	.14
Laying	.03
Backfill	.02
	<u>.551</u> price used

PIPE

6" O D Casing F O B San Diego	.60	average price, present price .78
Hauling to yds, storing & distr.	.04	
Trenching	.14	
Laying	.04	
Backfill	.02	
	<u>.84</u>	price used.
8" O D Casing F O B San Diego	.90	average price, present price 1.1635
Hauling to yds, storing & distr.	.05	
Trenching	.20	
Laying	.05	
Backfill	.05	
	<u>1.25</u>	price used.
10" O D Casing F O B San Diego	1.25	average price, present price 1.653
Hauling to yds, storing & distr.	.07	
Trenching	.35	
Laying	.08	
Backfill	.07	
	<u>1.82</u>	price used.
12" O D Casing F O B San Diego	1.78	average price, present price 2.337
Hauling to yds, storing & distr.	.08	
Trenching	.35	
Laying	.10	
Backfill	.07	
	<u>2.38</u>	price used.
6" Standard F O B San Diego	1.00	avg price, present price 1.47
Hauling to yds, storing & distr.	.06	
Trenching	.20	
Laying	.05	
Backfill	.05	
	<u>1.36</u>	price used.
4" Riveted Steel F O B San Diego	.35	avg price, present price .45
Delivery to yds, storing & distr.	.026	
Trenching	.14	
Laying	.02	
Backfill	.02	
	<u>.556</u>	-.56 price used.
6" Riveted Steel F O B San Diego	.50	avg price, present price .65
Delivery to yds, storing & distr.	.03	
Trenching	.14	
Laying	.03	
Backfill	.02	
	<u>.72</u>	price used.
8" Riveted Steel F O B San Diego	.62	avg price, present .79
Hauling to yds, storing & distr.	.04	
Trenching	.20	
Laying	.05	
Backfill	.05	
	<u>.96</u>	price used.

PIPE

14" Riveted Steel F O B San Diego 1.00 avg price, present 1.31
 Hauling to yds, storing and distr. .06
 Trenching .38
 Laying .05
 Backfill .11
1.60 price used.

16" Riveted Steel F O B San Diego 1.14 avg price, present 1.43
 Hauling to yds, storing & distr. .07
 Trenching .38
 Laying .06
 Backfill .11
1.76 price used.

20" 12 gage Riveted steel F O B San Diego 1.90 avg price, present 2.25
 Hauling to yds, storing & distr. .08
 Trenching .45
 Laying .08
 Backfill .14
2.65 price used.

24" #12 Riveted steel F O B San Diego 2.25 avg price, present 2.90
 Hauling to yds, storing & distr. .10
 Laying .10
2.35 price used.

Trenching costs on this pipe, South Fork Siphon, given separately.

24" #10 Riveted steel F O B San Diego 2.90 avg price, present 3.69
 Hauling to yds, storing & distr. .10
 Laying .10
3.10 price used.

Trenching and backfill on this pipe, South Fork Siphon, given separately

26" #12 Riveted Steel F O B San Diego 2.45 avg price, present 3.15
 Hauling to yds, storing & distr. .11
 Laying .10
2.66 price used.

26" #10 Riveted Steel F O B San Diego 3.07 avg price, present 4.01
 Hauling to yds, storing & distr. .11
 Laying .10
3.28 price used.

PIPE

30" #12 Riveted Steel F O B San Diego	2.77 avg price, present 3.58
Hauling, storing & Distr.	.15
Laying	.15
	<u>3.07</u> price used.
Trenching & backfill on this pipe, Chocolate Siphon, given separately.	
30" #10 Riveted Steel F O B San Diego	3.48 avg price, present 4.58
Hauling, storing & distr.	.15
Laying	.15
	<u>3.78</u> price used.
Trenching & Backfill on this pipe, Chocolate Siphon, given separately.	

GATES

1" cast Gate Cap	1.50 avg price, present 2.00
Gate Well	1.50
	2.00
	<u>5.00</u> price used includes labor, nipples, etc.
2" cast Gate cap	4.00 avg price, present 5.10
Gate well	1.50
Labor, etc.	2.00
	.75
	<u>8.25</u> price used.
3" Cast Gate cap	8.00 avg price, present 11.20
Gate well	1.50
Labor, etc.	2.00
	1.75
	<u>13.25</u> price used.
4" cast Gate cap	11.35 avg price, present 15.10
Gate well	1.50
Labor, etc.	2.00
	2.00
	<u>16.85</u> price used.
6" Cast Gate cap	19.75 avg price, present 26.00
Gate Well	1.50
Labor, etc.	2.00
	2.00
	<u>25.25</u> price used.
8" Cast Gate cap	24.50 1917 price
Gate Well	1.50
Labor, etc.	2.00
	2.00
	<u>30.00</u> price used.

GATES

10" cast	40.00	1917 price
Labor, etc.	<u>5.00</u>	
	45.00	price used.
12" Cast	72.00	1917 price
Labor, etc.	<u>8.00</u>	
	80.00	price used.
15" Cast	105.00	cost 1910 + 50%
Labor, etc.	<u>10.00</u>	
	115.00	price used.
14" cast	100.00	
Labor, etc.	<u>10.00</u>	
	110.00	price used.
16" Cast	125.00	
Labor, etc.	<u>10.00</u>	
	135.00	price used.
20" cast	175.00	
Labor, etc.	<u>15.00</u>	
	190.00	price used.
24" cast	250.00	
Labor, etc.	<u>15.00</u>	
	265.00	price used.

On all of above where boxes, covers, etc., were used, they have been charged separately.

CAST IRON PIPE

4" Cast F O B San Diego, Ton 59.25 =	.65 ft., avg price, present	.92
Hauling, storage & distr.		.15
Trenching, bell holes, etc.		.20
Lead - 3/4# per foot at .07 #		.045
Laying, caulking, etc.		.025
Backfill		.05
	<u>1.12</u>	price used.

6" Cast F O B San Diego, Ton 56.50 =	.94 ft., avg price, present	1.33
Hauling, storage, distr.		.20
Trenching, Bell Holes, etc.,		.22
Lead 1# per foot at .07		.07
Laying, caulking, etc.,		.05
Backfill		.06
	<u>1.54</u>	price used.

36" Reinforced Concrete pipe line - Flume to Murray Hill.

Excavation

Principal items of expense was trenching the cemented Gravels. This material is most difficult to work, requiring shooting, drills with great difficulty. Price used 2.50 per yard.

This Company paid contractors on Murray Dam 3.22 for this class of material. Trench on El Cajon Ave. pipe line in 1914 cost 3.52 per yard of cemented gravel.

Pipe - 36" Concrete Pipe

Pipe is only partly reinforced. \$3.25 per foot is price used. Cost in 1911, \$2.00.

24" Reinforced Concrete Pipe line, Murray Hill to Eucalyptus. Price used 2.40; is based on bids received for similar pipe and under similar heads received in 1918, as follows:

31 to 60 ft. head	2.40
60 to 90 " "	2.80

Trenching for Pipe

Costs of this work vary largely, according to size of trench, character of material encountered, etc. On this system trenches vary from 14"x16" for service pipe to 60"x60" for the 36" line from Flume to Murray Hill Dam.

Following tabulation gives cost per yard of material excavated by hand from trench through different materials in 1911 (actual costs) for Cajon Ave. pipe lines.

Hardpan, cemented, shot	- - - - -	per yard	3.50
Hardpan	- - - - -	" "	1.84
Cemented clay	- - - - -	" "	1.13
Adobe	- - - - -	" "	1.00
Adobe and hardpan	- - - - -	" "	1.59
Hardpan	- - - - -	" "	1.63

WATER RIGHTS

It is probable that this system will ultimately be developed to a point where it is capable of delivering 12,000 acre feet per annum. This is equivalent to a continuous flow of 828.75 Miners Inches. It is believed that, with considerable pumping through years of light rainfall, this amount can, and eventually will be utilized. The riparian rights owned and controlled by the Cuyamaca Water Company are of great value in this connection and should be included in "Water Right Values".

The water rights owned are so extensive as to control absolutely the flow of the San Diego River.

Price used \$1500 per M.I. - $828.75 \times 1500 = \$1,243,125.$

Ed Fletcher Papers

1870-1955

MSS.81

Box: 37 Folder: 5

**Business Records - Reports - Harritt, C - "Report:
Value of the Properties of the Cuyamaca Water Co."**



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