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Aug. 1, 1912

Cost Analysis Sheet No. 1.

MATERIAL COST F. O. B. SAN DIEGO

<u>MATERIAL</u>	<u>UNIT</u>	<u>COST</u>
Brick	M	\$ 9.00
Redwood Clear Surfaced	M B.M.	38.75
R. O. P. Lumber	M B.M.	20.00
Structural Iron (small Lots)	lb.	.06
Paint (100# kegs)	lb.	.0875
Cement (Carload)	bbbl.	2.00
Sand	Cu. Yd.	1.00
Rock	Cu. Yd.	2.00
Pipe (See special sheets)		
Lead	Lb.	.06
Hemp	Lb.	.0425
Gate Fittings, etc. (See Grand Catalogue with discount sheet)		
Reinforcing Rods (Assorted)	lb.	.035

COST ANALYSIS SHEET NO. 2

San Diego, Aug. 1, 1912

	<u>Per 8 hr. Day</u>
Brick Layer	\$6.00 - 7.00
" " Helpers	3.00 - 3.50
Carpenters	4.00
" Helpers	2.50 - 3.00
Electricians	3.00 - 3.50
" Helpers	1.00 - 2.50
Hod Carriers	4.50
Lathers (Wood)	5.50
" (Iron)	5.50
Mechanics	3.50
" Helper	2.50
Painters	4.00
" Helpers	2.50 - 3.00
Plasterers	6.00
Plumbers	5.00
" Helpers	1.00 up
Roofers	5.00
" Helpers	3.00
Sheet Metal Workers	4.50
" " " Helpers	1.00 - up
Structural Iron Works.	3.50

COST OF RIVETED PIPE

The value of riveted pipe is determined in the following manner:

Weight of Pipe.

Based on finished shipping weights of pipes of various diameters and thickness as given by manufacturers of today.

Cost of Pipe Material.

There have been large fluctuations in the price of sheet and plates during recent years, and especially because of prices being so very low at the time of the preparation of this report, it has seemed advisable to adopt for our units the average prices for each material during the past five years, dating from Jan. 1, 1907.

For Sheets of No. 16 gauge, prices have fluctuated between 2.90 and 2.45 cents per pound, f.o.b. Los Angeles, while the average price for this period is 2.78 cents. The adopted prices for sheets are as follows:

Gauge 16	2.78 per pound
" 14	2.68 " "
" 12	2.65 " "
" 11	2.65 " "
" 10	2.53 " "
" 8	2.43 " "
" 3	2.34 " "

Pittsburg prices of steel plates have fluctuated between 2.13 cents at the beginning of the five year period in 1907 and 1.10 cents near the close of 1911, the yearly averages f.o.b. Los Angeles being 2.60, 2.44, 2.24, 2.29 and 2.12 cents per pound respectively, with five year average of 2.34 cents, which we have adopted.

It is of interest to note that the average for the past eight years is 2.55 cents, for the past four years 2.27 cents, and for the three years 1908-9-10 is 2.32 cents. These figures serve to justify the adopted unit based on five years of fluctuations.

While material from stock costs about .25 cents more than from the mill, we have not assumed that any pipe lines have been constructed in such haste as to demand this higher cost.

Shop Cost of Pipe Manufacture.

Quotations are usually made by manufacturers on the basis of delivery to the railroad station nearest to the site of the development or for complete erection of the pipe in the trench, the hauling from the railroad to foot of tramway or to delivery alongside of or in the trench, and the trench excavation and back-filling being made by purchaser. From our analysis of many quotations, our segregated costs are found as follows:

The shop cost depends on the diameter of the pipe and

the thickness of the material from which the pipe is made. The minimum unit price per lb. occurs for pipe about 24 inches in diameter by 1/4 inch thick and larger. Smaller and thinner pipe is more expensive, as is also the larger pipe which requires heavy plates and butt strapped joints.

For plain, easy and straight work, the shop cost is about 1.0 cent per lb. for pipe using 1/4 to 5/8 inch plate, while the bends will cost not less than 1.5 cents per pound and for thin pipe of small diameter this cost will become 7 or 8 cents per pound. The cost of dipping in an asphalt or mineral rubber bath is a function of the areas as regards the material used and of the weight and size as regards the handling. The average cost for dipping may be regarded as one cent per square foot counting one surface only.

We have therefore adopted the following shop costs for manufacturing pipes of average characteristics, and including a manufacturer's profit of 12 1/2 per cent.

	Ordinary Lap Riveted Pipe	Light Pipe as of No. 16 Sheet	Heavy Butt Strapped
Plates or Sheets f.o.b Los Angeles	2.34¢ lb.	2.78 ¢lb	2.34¢lb
Waste etc. 5%	.11	.14	.11
Shop Expenses	1.10	1.75	1.85
Dipping (average only)	.06	.35	.04
	<u>3.61</u>	<u>5.02</u>	<u>4.34</u>
Profit 12 1/2%	.45	.63	.54
Total cost from Mfr. f.o.b. Los Angeles or Cal. Terminal	4.06¢lb.	5.65¢lb	4.88¢lb

On the above basis, our prices for thin pipe, intermediate between 1/4 inch and No. 16 are as follows:

Gauge No. 14	5.30¢ lb.
12	5.10
11	5.10
10	4.75
8	4.34
7	4.25

Cost of Pipe Erection.

The cost of placing the pipe in the trench, of lining up the sections and riveting and calking same, including necessary tramways, hoisting machinery, yarding, storage etc., depends on

the weight, diameter and length of the pipe sections and conditions of location, climate, etc. Light pipe is used for low heads and light pressures, requiring but little calking etc. Heavy pipe under high heads requires more careful work in erection. The unit pound price for erection does not vary sufficiently to warrant graduated prices. Such prices must needs be varied for inaccessibility of location and the difficulty of working on steep hill-sides.

Small, thin pipe with drive joints may be erected in easy locations for three cents per lineal foot and increasing with difficulty of condition up to about 8 cents. For large or ordinary pipe in easily accessible locations we may adopt 0.75 cents per pound. For any erection in tunnels add 0.5 per pound.

Specials.

The above prices will include ordinary light manholes flanges, etc. but if specially heavy construction has been made for manholes, we figure same separately on special basis. If the pipe has been cut to special lengths and made to fit knuckle or special joints, such as submarine pipe, we establish the price for making the riveted pipe lengths in the shop and then figure a unit price per joint for joining to the special cast joint.

Plates or Sheets f.o.b Los Angeles	2.34¢ lb.	2.78 ¢lb	2.34¢lb
Waste etc. 5%	.11	.14	.11
Shop Expenses	1.10	1.75	1.85
Dipping (average only)	.06	.35	.04
	<u>3.61</u>	<u>5.02</u>	<u>4.34</u>
Profit 12 1/2%	.45	.63	.54
Total cost from Mfr. f.o.b. Los Angeles or Cal. Terminal	4.06¢lb.	5.65¢lb	4.88¢lb

On the above basis, our prices for thin pipe, intermediate between 1/4 inch and No. 16 are as follows:

Gauge No. 14	5.30¢ lb.
12	5.10
11	5.10
10	4.75
8	4.34
7	4.25

Cost of Pipe Erection.

The cost of placing the pipe in the trench, of lining up the sections and riveting and calking same, including necessary tramways, hoisting machinery, yarding, storage etc., depends on

COST ANALYSIS SHEET NO. 6

**TRENCH EXCAVATION**

IN DOLLARS PER CU. YD.

Depth of Trench	Easy Earth Loamy Sands Gravel		Medium Earth Stiff Clay		Hard Earth Hard Pan Wet Clay		Loose Rock		Solid Rock Blasting	
	Cu.Yds.	Cost per day cu.yd.	Cu.Yds.	Cost per day cu.yd.	Cu.Yds.	Cost per day cu.yd.	Cu.Yds.	Cost per day cu.yd.	Cu.yds.	Cost per day cu.yd.
2-5	11.0	.24	7.0	.39	5.0	.54	5.0	.75	2.0	1.5
5-7	9.0	.30	5.7	.47	4.2	.64	4.2	.80	2.0	1.6
7-13	4.0	.68	2.7	1.00	2.1	1.28	2.1	1.30	1.5	2.0#
13-16	3.0	.90	2.0	1.35	1.5	1.80	1.5	1.80	1.0	2.70#

REMARKS -

# 2 men in trench  
1 man on platform

# 1 man in trench  
1 man on platform

NOTE: The cost given above does not include cribbing, backfilling or removal of surplus earth.

Labor Costs based on a gang of 15 men at \$2.50 per 8 hr. and one foreman @ \$3.00 per 8 hr. day.

Tunnel excavation is from 4 to 5 times the cost of the same work in Trenches for headings and half that amount for benches. This applies to tunnels from 6 feet in height upward. Hood, Chf.

Engr. S.P. R. R.

COST ANALYSIS SHEET NO. 7.

References - Packet 809

Contractor Receipts.

#####

**FLUME**

Contract price for construction and material \$413292.

Overhaul charge 73686.

Stoppage " 1000.

Supplemental (omissions) 5886.

TOTAL for 8,810 M B.M. \$494286.

Contract Unit Cost per M 56.00

Taking as basis of cost for labor a comparison of contracts where labor conditions were same as San Diego (namely from \$3.50 to \$4.00) it has been found that flume framing costs

per M \$ 18.00

" " 1.00

Labor framing bridges, etc. \$ 19.00  
\$ 14.00

To this add cost of material, freight and haul

Freight to Lakeside " " \$ 1.25

Average haul is made up as follows:

Distance from Lakeside to Diverting Dam 16 Miles.  
" " " " end of flume 8 "

Hauling to distributing points every 2 miles, we have 2/3 of total haul to dam and 1/3 to end of flume.

2/3 of 16 10.6 miles

1/3 of 8 2.7 "

AVERAGE 6.65 "

25% of haul by way of Los Coches which is 4 miles from Lakeside

For this add 1 "  
Use ..... 7.65 "

References - Packet 809

Contractor Receipts.

Weight of M. B. M. 1.5 tons  
 Hauling by Truck per ton mile \$.20  
 " " " per M.B.M. .30  
 " " " " " " for average haul 7.65 miles - \$2.30

Price of R.O.P. \$20.00 per M.B.M.  
 Freight 1.25 " " " "  
 Haul 2.30 " " " "  
 Labor 14.00 " " " "  
 \$37.55 " " " "

Price of R.W. \$38.75 per M.B.M.  
 Freight 1.25 " " " "  
 Haul 2.30 " " " "  
 Labor 19.00 " " " "  
 \$61.30

FOR R. O. P. USE \$38.00

FOR R. W. USE 61.00

See Sheet No 1 for Material costs.

WK

8-12-12

BRICK LINING.

BRICK LAYING Sewer or Conduit	-----	LABOR COSTS (Cement Mortar)
	<u>Manholes.</u>	<u>Crowded Work, &amp; Specials</u>
Masons	1 @ \$7.00	\$7.00
Helpers	1½ @ 3.50	<u>5.25</u>
Total Labor per day		\$ 12.25
No. of Brick per day		10.00
Labor Cost per M		12.25
Local Overhead 15%		<u>1.84</u>
		14.09
Contractors Profit 20%		<u>2.82</u>
		\$ 16.91
Adopted Unit per M .....		\$ 17.00

Cost of Earth & Rock Quantities.

Item & Detail	Unit	Unit Cost
Excavation Stripping Earth for Dams	Cu yd	.30
" Trenching & Light cribbing for Dams		1.25
" " Rock " "	" "	2.00
" Shallow Ditch Solid Rock	" "	1.25
" " Earth " "	" "	.40
" Flume bench cuts Solid Rock	" "	1.25
" " " Earth & L.R.	" "	.50
" Trench for Pipe- See Special Sheet		
" Tunnels - See Special Sheet		
" " L.R. 1-2 cy per lin.ft. to include temporary timbering prior to	Lin.Ft.	10.00
" " lining		
" " S.R. 1-2 cy per cu ft.	Lin.Ft.	9.00
Dry Masonry	Cu Ft.	4.00
Pointing & Cutting Rock for Rubble Masonry	Cy yd	2.00
Earth Fill Dams	" "	.45
Clay Puddle Fill Dams	" "	1.25
Beck Fill Trenches	" "	.18
Rip Rap Well laid	Sq.Ft.	.20
" " Loose	" "	.15
Authorities Knight & Hyde - San Diego Costs sheets Los Angeles, Aqueduct Contracts in and around Oakland Ludlow " on Spring Valley Water Co. S.F. Inspection of conditions of Cuyamaca System-Lane		

Concrete

Use 1.25 bbls cement.  
.5 cy sand  
1.0 " rock  
per Cu yd Concrete

Note this, thak care of waste in handling material

For Cyclopean assume 40% of tatal as large rock

As sand and rock may be easily obtained where masonry and concrete are used we will adopt:

50¢ per cy for sand

\$1.25 " " " crushed rock

.75 " " " large rock

Cost of concrete in place

Material

Cement	Sand	Rock	Labor mixing & Placing hand	Forms	Total
2.50	.25	1.25	1.50	.80	6.30

Cyclopean

60% of 6.30 - 3.78

40% " .75 - .30

Total 4.08

NOTE: To above costs add freight & haul for cement

Cost of Cement See sheet 1

FREIGHT FROM SAN DIEGO

MATERIAL	SHIPPING POINT	DIST.	RATE PER CL	CWT. LCL
Cement	Lakeside	22 miles	.08	.10
Lumber	"	22 "	.042	.08
Brick	"	22 "	.065	.10
Structural Iron	"	22 "	-	.10
Cast Iron Pipe	"	22 "	.075	.10
<hr/>				
Riveted S. Pipe	La Mesa	11.1 "	.075	.09
Cement	"	11.1 "	.055	.09
Lumber	"	11.1 "	.04	.067
Brick	"	11.1 "	.055	.09
Wood Stave Pipe	"	11.1 "	.05	.09
Iron Pipe	"	11.1 "	.09	.09
<hr/>				
Cement	Grossmont	14 "	.065	.09
Brick	"	" "	.055	.09
Structural Iron	"	" "	.09	.09
Lumber	"	" "	.04	.07
Iron Pipe	"	" "	.09	.09
Riveted Pipe	"	" "	.075	.09

HAULING PER TON

	Dist.	Rate	Total
Lakeside to Guymaca	34.5	.20	6.90
" " Diverting Dam	16	.20	3.20
Grossmont" Murray Hill Dam	1	.20	.20
La Mesa to Eucalyptus Dam	2	.20	.40
" to La Mesa Dam	2	.20	.40
Average over Distribution System from La Mesa.....	3.2	.20	.64

Cost of Cast Iron Pipe Laid

Size of Pipe	20"	24"
*Weight per foot	150	204.2
* " of yarn per joint	1.25	.50
* " " " " foot	.104	.125
* " " lead per Joint	37.	44.
* " " " " foot	3.08	3.67
Cost of Pipe per ton	35.50	35.50
" " " " foot	2.663	3.620
" " yarn " " @ .0425	.004	.005
" " lead " " @ .06	.185	.22
<u>Supplies &amp; Misc. 1% cost of Pipe</u>	.03	.04
Subtotal	2.882	3.885
4% Store room expense	.113	.153
Loading & Hauling one mile	.030	.041
Laying Calkin ect. per foot	.12	.16
	3.145	4.239
Use total per foot	3.15	4.25
For each extra mile haul add	.015	.02

\*Weight taken from table in United States Cast Iron Pipe & Foundry Co's catalogue.



Cost Analysis Sheet No. 14

P L A S T E R I N G .

MASONS	1 @ \$ 6.00
HELPERS	1 @ \$ 3.00
No of sq. ft. per day	700
Cost per square	\$1.30
Add 10% overhaul and 30% profit	1.82
Adopted per sq ft.	\$ .02

Cost Analysis Sheet No 15

P A I N T I N G

	<u>Cost</u>	<u>Unit</u>
1 coat	\$ .015	sq. ft.
2 coats	.025	" "
3 coats	.035	" "

STAIN

Shingles (dipped) \$ 3.00 per 1/4

---

WK

8-9-12

Weir at Cuyamaca Dam.

Cost of lumber out ready to frame	\$ 8.10
Company's records 1912 add for delivery	2.00
Labor framing	5.00
Excavation, backfill, and rip rap	<u>10.00</u>
	\$ 25.00

Use \$25.00

Lane-WK

8-13-12

C L E A R I N G

While the contract price for clearing flume seems to be \$2.50 per acre past experience lead me to believe either the contractor lost or this figure is in error.

Recently Mr. Ruis who has charge of the flume told me that the labor cost on clearing under trestle No. 297, which is about 300 feet long, amounted to \$26.00: This would mean about \$ 78.00 per acre. Some difficulty would naturally be experienced with the bents but taking this into consideration I do not believe it high.

After noting the character of clearing along the entire line I believe it of a light character but not under \$10.00 per acre so we will adopt this figure of:

Clearing -- \$ 10.00 per Acre.

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T I M B E R I N G T U N N E L S .

Lumber	\$ 20.00	Y
Freight to Lakeside	1.25	
Haul	2.30	see sheet
Labor, framing, placing backfilling	<u>20.00</u>	
	\$ 43.55	

Sue \$ 44.00 per Y

Lane - WK

8-13-12

C O N C R E T E I N T U N N E L S .

CONCRETE	6.30	see sheet No.11
Freight to Lakeside	.50	" " " 12
Average Haul to Flume:		
7.65 x .25 tons x .20	<u>.38</u>	" " " 7 & 8
	7.18	

Use for straight concrete \$ 7.25 per cu yd.

Allow \$ 1.50 for pointing, Sorting and  
laying rock inclusive of any  
quarrying

Rubble 40% of 1.50	.60
Concrete 60% of 7.25	<u>4.35</u>
	4.95

Use for rubble masonry lining 5.00 per cu yd.

WK -Lane

8-15-12

CONCRETE AND RUBBLE MASONRY

DIVERTING DAM

Concrete	6.30	See sheet No 11
Freight and haul to dam	<u>1.20</u>	
	7.50	

Use \$ 7.50

Allow \$ 1.50 for pointing and sorting rock inclusive of quarrying.

60% concrete at \$7.50	\$4.50
40% rock at 1.50	<u>.60</u>
	5.10

Allow for jointing and laying rubble	<u>2.00</u>
	\$ 7.10

Use \$7.00

Lane - WK

8/13/12

H Y D R A U L I C F I L L .

According to Mr. J. D. Schuyler the La Mesa Dam originally planned for Rock Fill Dam was changed to the hydraulic fill type after bids of about \$1.00 per Cu.Yd. had been submitted. It was estimated that the hydraulic fill type of construction could be done for less than half this amount. Material was sluiced with a limited quantity of water about 2200' from the dam through wooden stave pipe. Owing to close proximity to the surface of cemented gravel trams were used in loosening material. On the whole there was however a great saving. Recent work such as the North Harwee Dam L. A. A. where material is sluiced about 1000 ft. from the dam through flume show a cost of .26 cents per Cu. Yd., in April Cost Reports, I believe that cost has been considerably reduced since then. 18 cents is the figure on the Dry Canon Dam completed.

At La Mesa the conditions are not so favorable now or at the time built. If reproduced now some means would have to be employed to elevate sluiced material owing to ownership of lands close to lake. However shall adopt 30 cents as a figure fair to present conditions and methods.

Lane-WK

8-14-12

COST OF VITRIFIED SALT GLAZED PIPE IN PLACE

	<u>Per Ft.</u>
Cost of pipe	\$ 1.50
Cu. Yd. Mortar to each 50 joints.	
For 67 joints 1 1/3 Cu Yd.	
Materials and placing	<u>.112</u>
	\$ 1.612

Use \$1.60

Note 1-1 Cement Mortar - 16 cu ft of fine sand and  
4 bbls of cement make 1 cu yd of mortar.

Cement	8.00		
Freight	.88	See sheet 12	
Hauling	.32	"	"
Sand	<u>1.00</u>	"	1
	10.20		

Mixing and

cementing per yd	<u>1.00</u>
	11.20

Lane-WK

LARGE CAST IRON SPECIALS.

The price to the water department of Los Angeles for special castings ranges from 4 to 5 cents per pound.

For Flanged machined and drilled castings  
Use 5. cents per pound.

For large light fittings add 15% to cost  
for erection.

CONCRETE AT LA MESA DAM

Concrete	\$6.30	See sheet No 11
Freight	.28	" " " 12
Haul	<u>.10</u>	" " " 12
	\$ 6.68	

Use \$6.75

Lane-WK  
8/15-12

24" Gate at La Mesa Dam

Weight 1350 lbs.

Crane Price 540.00 less 70% discount F.O.B. L.A.

Cost	162.00	
Freight L. A. to S. D.	2.70	
" S. D. to L. A.	1.22	See sheet No. 12
Haul	.27	" " " 12
Erection 15%	<u>24.30</u>	" " " 23
	190.49	

Use \$190.00

Lane-WK  
8-14-12

Redwood Wooden Stave  
La Mesa Ditch Line.

Average head assume 50'

Cost per ft.	1.94	
Cost for laying	.49	F. O. B. San Diego. Pacific Tank & Pipe Co. Aug.2, 1912.
Freight		
Wt per ft. 65 lbs.	.03	See sheet No. 12
Haul	<u>.01</u>	
	2.47	

Use \$2.50 per ft.

Los Angeles, Cal., Aug.2, 1912.

Mr. Fulton Lane,  
% Guyamaca Water Company,  
San Diego, Calif.

Dear Sir:

Replying to your letter of July 30th, addressed to the National Wood Pipe Co., which has been succeeded by our company, we are pleased to quote you on the approximate amounts of Wooden Pipe, as specified in your letter, banded for the maximum gravity head pressures specified, delivered f.o.b. cars San Diego and laid by us, exclusive of unloading the cars, hauling and distributing materials, trenching and backfilling same, trestle work and keeping trench free from water and other obstructions. All prices quoted are merely approximate and for estimating purposes only.

PIPE PROVIDED WITH MORTISE AND TENON JOINTS.

For maximum pressure of	25'	50'	75'
8" pipe per foot . . . . .	44¢	46¢	47¢
Approx. Wt. per ft. . . . .	9#	9.2#	9.6#
18" pipe per foot . . . . .	.92¢	95¢	1.00
Approx. Wt. per ft . . . . .	22#	23#	24#

20" pipe per foot . . . . .	\$1.07	1.12	1.15
Approx. Wt. per foot . . . . .	24#	25#	27#

PIPE WITH INDIVIDUAL BANDED WOODEN COLLARS

For maximum pressure of . . . . .	100'
8" pipe per foot . . . . .	50¢
Approx. Wt. per foot . . . . .	10#

18" pipe per foot . . . . .	1.12
Approx. Wt. per foot . . . . .	25#

20" pipe per foot . . . . .	1.34
Approx. Wt. per foot . . . . .	29#

This pipe will be constructed of staves milled from clear Redwood Pipe lumber and banded with galvanized steel wire. The lengths will vary from 8' to 20' and joints or collars as specified will be furnished for connecting these lengths. After manufacturing the entire outside of Pipe will be covered with our special preservative coating and rolled in saw dust.

Covering your requirements on the larger sizes of Pipe we are quoting you as follows on our Continuous Stave Pipe, banded for the maximum gravity pressures specified as follows:

For maximum pressure of . . . . .	20'	50'	100'
24" Pipe material per foot . . . . .	\$1.17	\$1.28	1.60
Construction cost per foot . . . . .	.25	.29	.36
Approx. Wt. per foot . . . . .	40#	43#	50#
36" pipe material per foot . . . . .	\$1.69	1.94	2.47
Construction cost per foot . . . . .	.40¢	.49¢	.68¢
Approx. Wt. per foot . . . . .	59#	65#	79#

The above materials will be delivered knocked down for shipment, ready to set up, f.o.b. cars San Diego, and the construction cost quoted covers only the actual labor of constructing the pipe and does not include hauling, unloading the cars, trenching, back-filling, etc.

These materials will consist of staves milled from #1 clear dry Redwood Pipe lumber, dressing to not less than 1-7/16" in thickness. The ends of the staves will be cut off square and slotted to receive either a quarter sawed oak or steel tongue, as may be preferred.

To band the pipe we will furnish 1/2" round mild, steel bands, each band provided with a standard button head on one end and six inches of cold rolled thread fitted with hexagon nut and plate washer on the other end. To connect the ends of the bands we will furnish malleable iron shoes of our standard design.

Our figures also include bending the bands to circle and dipping both bands and shoes in a coating of refined asphaltum or asphaltum paint before shipment from the factory.

We again wish to call your attention to the fact that these are merely approximate figures and when you are ready to proceed with the installation of any of this pipe, we would be glad to receive your profiles and specifications and submit our very lowest figures.

Under separate cover, we are mailing to your address, copy of our Wooden Pipe Booklet, which we trust will be of interest to you.

Thanking you for the inquiry and awaiting your pleasure, we are

Yours very truly,

PACIFIC TANK & PIPE COMPANY.

(Sgd) By,

VJB:FS

Lane-WK

8-15-12

CONCRETE MURRAY HILL DAM

Concrete	6.30	See sheet No. 11
Freight	.33	" " " 12
Haul	<u>.05</u>	" " " 12
	6.68	

Use \$6.75

Land-WK

8-15-12



GATES MURRAY HILL DAM

Sluice gate 24" x 24" .....	\$160.00
Weight including operating Mechanism 1.5 ton	
Freight .....	2.70 see sht 12
Haul .1.....	.30 " " 12
Erection 15% .....	24.00 " " 23
Use .....	\$187.00

Gate Valve 24"

Wt 1350 lbs.

Crane price 540.00 less 70% discount F.O.B. L.A.	
Cost .....	\$162.00
Freight L. A. to S. D.....	2.70
" S. D. to Grossmont.....	1.22 See sht12
Haul.....	.14 " " 12
Erection 15% .....	24.30 " " 23
	\$190.36

Use .....\$190.00

Gate Valve 20"

Wt. 867 Lbs.

345.00 less 70%

Cost .....	\$104.00
Freight L. A. to S. D. ....	1.73
" " to Grossmont.....	.78 See Sht 12
Haul.....	.09 " " 12
Erection 15% .....	15.60 " " 23
	122.20

Use .....\$122.00

Lane-WK

8-15-12

C U Y A M A C A W A T E R C O M P A N Y .

COST OF MATERIAL

SCREW JOINTS

Kind of Pipe	Size Inches	Red Lead per Joint Lbs.	Cost of Red Lead per Joint Lb	Cost Red Lead at Trench per Joint	Average length Pipe Section	Cost of Material for joint per Ft of Pipe		
Casing Screw	3"	.0570	.06	.0034	.0034	18'	.0002	
	4"	.0608	.06	.0036	.0036	18'	.0002	
	6"	.0684	.06	.0041	.0041	18'	.0002	
	8"	.0779	.06	.0047	.0047	18'	.0003	
	10"	.0864	.06	.0052	.0052	18'	.0003	
	11"	.0906	.06	.0054	.0054	18'	.0003	
	12"	.0948	.06	.0057	.0057	18'	.0003	
	Standard	1 1/2"	.0537	.06	.0032	.0032	18'	.0002
		2"	.0604	.06	.0036	.0036	18'	.0002

Lane-WK  
8-16-12

Cost Analysis Sheet No. 30

CUYAMACA WATER COMPANY.

Labor - Cost of Trenching - Placing Pipe & Backfilling.

HARD GROUND.

Bases	9 men \$2.00	\$18.00
	1 man \$2.50	2.50
	Supervision	<u>.75</u>
	Total	\$21.25

Size of pipe	2" - 5"	6" - 12"	15" - 24"
Size of Trench	1" 6" x 2' 6"	2'0 x 2'6"	3" x 3'6"
Feet per day	212	96	75
Cost per foot	.10	.22	.30

Note; Wooden Stave Cost per ft. Trenching & Backfilling \$22.

Cost Analysis Sheet No. 31

CUYAMACA WATER COMPANY

DISTRIBUTION SYSTEM

Cost of Wooden Stave Pipe at Trench.

8"		
Cost	\$ .46	
Freight	.005	see sheet 12
Haul	<u>.003</u>	" " "
	\$ .468	

18"		
Cost	\$ .95	
Freight	.0115	see sheet 12
Haul	<u>.0075</u>	" " "
	\$ .9590	

20"		
Cost	\$ 1.34	
Freight	.0145	see sheet 12
Haul	<u>.0092</u>	" " "
	\$ 1.3637	

Lane-WK  
8-19-12

CUYAMACA WATER COMPANY

LABOR COST

SCREW JOINTS

Basis	1 man at \$2.00	-	\$ 2.00
	1 " " 2.50	-	2.50
	supervision		<u>.25</u>
	Total		\$ 4.75

Kind of Pipe	Screw Casing Lap Weld							
Size of Pipe	1-2"	3"	4"	6"	8"	10"	11"	12"
Joint per day	50	46	40	33	28	22	19	16
Cost per joint	\$ .0950	\$ .1033	\$ .1187	\$ .1439	\$ .1696	\$ .2159	\$ .2500	\$ .2969
Cost per foot 18' length	\$ .0053	\$ .0057	\$ .0066	\$ .0080	\$ .0094	\$ .0120	\$ .0139	\$ .0165

## CUYAMACA WATER COMPANY

## Cost of Pipe Delivered to Trench.

<u>Kind of Pipe</u>	<u>Size in Inches</u>	<u>Gage</u>	<u>Wt. lbs. per ft.</u>	<u>Cost per 100'</u>	<u>Cost per foot</u>	<u>Carting per lin.ft. .00107 per lb</u>	<u>Cost per linear ft. at trench</u>
Screw Casing	3"	1/8"	3.45	\$14.49	\$0.1449	.0037	.1486
	4"	1/8	5.56	20.43	.2043	.0059	.2102
	6"	3/16	10.46	32.78	.3278	.0116	.3394
	8"	3/16	15.41	56.05	.5605	.0164	.5769
	10"	3/16	20.36	79.10	.7910	.0216	.8126
	11"	3/16	23.83	94.00	.9400	.0254	.9654
	12"	3/16	26.30	115.95	1.1595	.0281	1.1876
Standard Screw	1 1/2"	5/32	2.68	8.26	.0826	.0029	.0855
	2"	5/32	3.61	10.60	.1060	.0039	.1099
Riveted Steel	4"	14	4.4		.2340	.0047	.2387
	6"	14	6.3		.3340	.0067	.3407
	8"	14	8.4		.4450	.0090	.4540
	15"	14	15.4		.8180	.0164	.8344
	20"	14	20.3		1.0400	.0216	1.0616

**CUYAMAGA WATER COMPANY**  
**Cost per lineal ft. in Trench.**

Pipe	size inches	Cost of pipe at trench per ft.	Cost of Trenching, Placing & Backfilling	Material Cost Joint per foot	Labor cost joint per foot	Total cost of Pipe in trench per foot.
Screw Casing	3	.1486	.1000	.0002	.0057	.2545
	4	.2102	.1000	.0002	.0066	.3190
	6	.3394	.2200	.0002	.0080	.5676
	8	.5769	.2200	.0003	.0094	.8066
	10	.8126	.2200	.0003	.0120	1.0449
	11	.9654	.2200	.0003	.0139	1.1996
	12	1.1876	.2200	.0003	.0165	1.4244
Standard Screw	1½	.0855	.1000	.0002	.0053	.1810
	2	.1099	.1000	.0002	.0053	.2154
Riveted Steel	4	.2387	.1000			.3387
	6	.3407	.2200			.5607
	8	.4540	.2200			.6740
	15	.8344	.3000			1.1344
	20	1.0616	.3000			1.3616
Wooden Stave	8	.4680	.2200			.6880
	18	.9590	.2200			1.1790
	20	1.3637	.2200			1.5837
	24	1.3200	.3100			1.6300

COST OF BUILDINGS

Recently the writer has occasion to appraise the value of all buildings taken over by Spring Valley Water Company in Pleasantos Valley and actual bills of material were taken; from these it was computed that these farm dwellings, barns, and sheds ranged from 4 cents to 12 cents per cubic foot. I also include here the cost of a new flume tenders house built by Cuyamaca Water Co.

New Building, Sec. 5.

June, 1912.	7.75	for screen doors & screen
"	1.25	" hanging screen doors & painting
May,	2.30	" oil & tacks & putty
"	69.20	" lumber
"	.47	" Freight
"	4.65	" Board for carpenter
"	8.25	" " "
"	66.65	" paint, paper, brushes, etc.
"	17.67	" roofing paper & Hdware & Nails

Total .....\$178.19  
 30 days labor  
 1 carpenter  
 \$3.00            90.00

\$268.19

This figures about \$.09 a cu. ft. with skilled labor. There is on file the contract for the meter house which shows about 5 cents a cubic foot.

The writer has made inspection of all buildings as well as photographing same and will use figures between 5 and 12 cents as fits each case in his judgment.

-----

REINFORCED CONCRETE PIPE

This pipe being laid so recently, we will take as a basis the average cost from Mr. N. D. Whitman's letter, a copy of which is included.

36" Pipe . . . . \$2.12 per ft.  
 24" " . . . . 1.57 " "

Los Angeles, Cal., August 5, 1912.

Mr. Fulton Lane, C.E.,

% Cuyamaca Water Co.,  
 San Diego, Cal.

Dear Sir:-

Complying with your request for the cost of pipe which we laid for the Cuyamaca Water Company, Murry Hill Reservoir, will say that the prices paid are as follows:

1950 ft. of 36 inch pipe	at \$2.00 per ft.	\$3,900.00
27 " " 36 " "	at 1.85 " "	49.95
5286 " " 24 " "	at 1.45 " "	7,664.70
Extra work, materials, valves, openings, etc.		877.27

The price for pipe does not include the excavation or back filling which was done by the Cuyamaca Water Company as well as the 900 foot tunnel near the Eucalyptus Reservoir. The extra work was work done in connection with the pipe lines and dam and for which no specified price was mentioned in the contract.

Should you care to have a detailed statement in regard to the extra work, we will be glad to furnish you with the same or you could secure the same from the Cuyamaca Water Company as they have our original bills.

Very truly yours,

Reinforced Concrete Pipe Co.  
 N. D. Whitman (Signed)  
 Engineer.

LAND AND RIGHTS OF WAY

References, Letters & Memorandum pages 1,2,3,4,5,6,12.

While I wrote to six men in the locality of the Cuyamaca Watershed asking for the value which their judgment dictated along with their reasons, I received answers from only two - Mr. W. L. Dietrick and F. L. Blanc. Each arrived at the same valuation of \$100 per acre which has been used on the Cuyamaca lands.

For La Mesa Reservoir I obtained copies of a proposal of sale from M. C. Heslion on Feb. 16, 1911, of from \$225 to \$250 per acre. For this property I have used \$250 per acre.

Eucalyptus and Murray Hill.

The claim is made by Mr. Fletcher in a conversation relative to these values that land recently subdivided adjacent to Murray Hill Reservoir was selling for 7,8,9 and 10 hundred dollars per acre. In view of the few pieces which have changed hands at \$700 close to reservoir, I have placed a value of \$350 per acre. Eucalyptus in this same general locality should be valued the same.

Rights of ways in mountainous country are worth \$10 per acre. Below Los Coches we come into country that is subdivided and many acres under cultivation. The land uncultivated is sold for \$75.00 per acre.

Below Section No. 5 House we get into sections closer to the small towns and hence these hold more value. For these I have used \$150 per acre.

These prices were obtained through inquiries while I was making an inspection of the Flume.

I wish to state that I am not an expert on land values but as I have made many inquiries and considerable study of this subject I feel I am thoroughly justified in my conclusions.

OVERHEAD ANALYSIS

Distributing System, Cuyamaca Water Company

	--	
Material	60%	
Labor	30%	
Incidentals	<u>10%</u>	
	100%	
Material	60%	
Store 5%	<u>3%</u>	63%
Labor	30%	
Engineering 10%	3%	
Supervision 20%	<u>6%</u>	39%
Incidentals	<u>10%</u>	10%
	112%	
Insurance 3%	<u>.33%</u>	.33%
	112.33%	
General 1%	<u>1.12%</u>	1.12%
	113.45%	
Interest 1.3%	<u>1.48%</u>	1.48%
	114.93%	114.93%

Use 15%

Note: 8 months time ample for reproduction and on that basis interest is allowed for 4 months.

OVERHEAD ANALYSIS

Collective System  
of  
Cuyamaca Water Company

Material	60%	
Labor	30%	
Incidentals	<u>10%</u>	
	100%	
Material	60%	
Store Expense 5%	<u>3%</u>	63%
Labor	30%	
Engineering 10%	3%	
Supervision 20%	<u>6%</u>	39%
Incidentals	<u>10%</u>	10%
	112%	
Insurance 1%	<u>1.1%</u>	1.1%
	113.1%	
General 3%	<u>3.4%</u>	3.4%
	116.5%	
Interest 4%	<u>4.7%</u>	<u>4.7%</u>
	121.2%	121.2%

Use 20%

Note: Two years time is ample for reproduction  
and on that basis full interest is allowed for one  
year.



August 21, 1912.

Cost Analysis Sheet No 40, cont'd.

CUYAMACA WATER CO.  
DISTRIBUTION SYSTEM.

Unit Costs - Valves and Specials.

Kind of pipe used on	Description	Size in.	Shipping Wt. lbs.	Cost F.O.B San Diego	Freight and Cartage .00122 per lb	Total cost in place
Riveted steel	Flange union	20"	120#	\$7.20	.122	\$7.322
	Reg gates	3	80	12.00	.10	12.10
	"	15	480	72.00	.596	72.586
	Guages	4 guages	10	1.35	.012	1.362
	Cap O I	20	185	10.10	.226	10.326
	Manhole & cover	24	125	7.50	.153	7.653

No Cost

August 21, 1912.

Cost Analysis Sheet No 40

C U Y A M A C A W A T E R C O .

DISTRIBUTION SYSTEM

Unit Cost - Valves and specials.

Kind of pipe used on	Description	Size in.	Shipping Wt. lbs	Cost F.O.B San Diego	Freight & Cartage .00122 per lb	Total cost in place
Screw casing	valves SE	2	5	\$2.25	.006	2.256
Standard screw	" "	3	15	4.90	.018	4.918
Riv steel	" HE	4	35	8.00	.042	8.042
"	"	6	70	12.75	.085	12.835
"	"	8	125	18.90	.15	19.05
"	"	10	185	31.50	.22	31.72
"	"	12	275	43.75	.33	44.08
"	"	15	480	72.00	.58	72.58
"	"	20	965	145.25	1.18	146.43
	tees	8"	53	8.00	.064	8.064
	" RS	15	48	34.00	.059	34.059
	"	24	75	63.00	.092	63.092
	crosses	10	167	25.00	.204	25.204
	"	24	400	33.00	.488	33.488
	elbows 90°	2	2	15.5¢	.002	0.157
	"	3	5	33.7¢	.006	0.343
	"	4	9	54¢	.011	0.551
	"	6	20	\$1.20	.024	1.224
	"	8	45	3.05	.055	3.105
	"	24	100	4.00	.122	4.122
	Brgs & Cocks service	1	3	45¢	.004	0.454
	saddle W I	2"	10	\$1.50	.012	1.512
	"	3"	8	.37	.010	0.38
	"	3"	9	.46	.011	0.471
	" C I	2	8	.40	.01	0.41
	"	4	11	.59	.013	0.603
	"	6	21	1.09	.026	1.116
	"	8	50	2.57	.061	2.631
	Ys RS	15	825	51.15	1.01	52.16
	Bushing	10	24	1.70	.029	1.729
	Flange union	10	77	4.75	.094	4.844
	"	12	107	5.15	.131	5.281

CT

DISTRIBUTION SYSTEM

Item	SIZE	Quantity	Rate	Total
Gate Valves	2"	13	\$2.256	\$ 29.33
"	3	5	4.918	24.59
"	4	14	8.042	112.59
"	6	10	12.835	128.35
"	8	6	19.05	114.30
"	10	1	31.72	31.72
"	12	1	44.08	44.08
"	15	4	72.58	290.32
"	20	3	146.43	439.29
Tees "	8	2	8.064	16.13
"	15	6	34.059	204.35
"	24	1	63.092	63.09
C I Crosses	10	1	25.204	25.20
"	24	1	33.488	33.49
Elbows	2"	8	0.157	1.26
"	3	2	0.343	.69
"	4	2	0.551	1.10
"	6	3	1.224	9.79
"	8	5	3.105	15.53
"	24	1	4.122	4.12
Brass Service				
Cock				
"	1	10	0.454	4.54
"	2	31	1.512	46.87
C I Saddle	2	8	0.38	3.04
W I Saddle	2	8	0.41	3.28
"	3	7	0.471	3.30
Brass Saddle	2	14	0.451	6.31
"	4	2	0.603	1.21
"	6	2	1.116	2.23
"	8	2	2.631	5.26
Ys	15	2	52.16	104.32
Bushing	10	2	1.729	3.46
Union Flanges	10	1	4.844	4.84
"	12	1	5.281	5.28
"	20	1	7.322	7.32
Reg P Gates	4	1	12.10	12.10
"	15	1	72.586	72.59
Manhole	24"	1	7.653	7.65
Press Gage		4	1.362	5.45
C I Cap	20	1	10.326	10.33

Add 15% for installing.....

\$ 1898 .70  
 285.00  
2184.

Lane WK  
 8-22-12

DEPRECIATION

Cuyamaca Water Co. Properties, Limits of Useful Life.

Buildings Brick ( Wisconsin Commission)	50 years
Frame Dwellings Do	35 years
Frame Stables, Sheds, etc Do	30 years
Frames Temporary built of old Flume Lumber	5 years
*Reservoirs	100 years
Flumes Redwood	28 years
Cast Iron Pipes large diameter	100 years
Steel pipe	10 to 25 years
Wood Stave Pipe	15 to 25 years
Wrought Iron Pipe	15 to 30 years
Tunnel timbers	20 to 35 years

\* Leonard Metcalfe p .24 Vol LXIV Trans.Am.Sec. C.E.1909

\* U.S. Government Allowance p.204 Foster's Valuation  
 of Public Utilities.

**Ed Fletcher Papers**

**1870-1955**

**MSS.81**

**Box: 54 Folder: 1**

**Business Records - Water Companies - Cuyamaca  
Water Company - Cost data appraisal by Fulton Lane**



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