Exhibit "C"

DESCRIPTION OF CUYAMACA SYSTEM

December 31, 1923

By C. Harritt, Superintendent

"Exhibit C"

DESCRIPTION OF CUYAMACA SYSTEM

HISTORICAL

The properties of the Cuyamaca Water Company were acquired from the San Diego Flume Company which was organized in 1886, the promoters in 1885 having filed water appropriations on the San Diego River at various points and on all its tributary branches. This Company was incorporated in 1886 and construction work was started immediately, the major portion of the works being completed in 1888 after overcoming many financial and physical difficulties. Construction on a lesser scale was carried on for a number of years thereafter, the total cost of this work up to February 14, 1891, as given by L. F. Doolittle, the then Secretary of the San Diego Flume Company, in a sworn statement, was $1,357,526.71. This did not include the cost of construction of the Eucalyptus Reservoir or of the La Mesa Dam. Including these two items and additional distribution facilities which were installed from time to time it is probable that the actual cost of the system up to the time of its acquisition by the present owners was in excess of $1,500,000.

Immediately after the incorporation in 1886 the San Diego Flume Company appropriated 2000 miner's inches of water near the head of Boulder Creek at or about the present site of Cuyamaca dam. Also 4000 miner's inches of water on the South Fork of the San Diego River at a point about one mile above its junction with the main river. Also 6000 miner's inches of water about 1000 feet below the junction of Boulder Creek with the San Diego River at about the point where the present Diverting

Dam is located. All the waters of Chocolate Creek up to the extent of 100 miner's inches and various other filings, in addition to which they acquired riparian and diversion rights on a large portion of the river frontage from Diverting Dam to the sea.

The Flume Company constructed Cuyamaca Reservoir, a diversion dam just below the junction of the Boulder Creek with the San Diego River, approximately 36 miles of wooden flume 5' 10" wide and one foot deep which was so designed that its ultimate capacity was to have been 100 second feet. They also constructed the La Mesa Dam, an earth-fill dam now submerged by the concrete Murray Dam, and a number of miles of transmission mains.

On June 1st, 1910, the property, including all rights of every character, was transferred to Ed Fletcher, and James A. Murray, now deceased, who immediately inaugurated a program of extensions and betterments, and on this date filed on all the waters of the San Diego River, both surface and subterranean, to the extent of 100,000 miner's inches.

In 1913 William G. Henshaw purchased an interest in the property. Mr. Henshaw has since retired from ownership and the property, consisting of the following, is now controlled by Ed Fletcher and associates.

1. CUYAMACA RESERVOIR

This property consists of 1074 acres of land, an earth-fill dam 37.5 feet high, 665 feet in length, containing 31,729 cu. yds. of material and floods an area of 930 acres, surrounded by approximately 10 miles of five wire fence. The reservoir

capacity is 11,595 acre feet under normal conditions. Flash boards have been provided for the spillway which increases its capacity approximately 2000 acre feet. The outlet elevation is 4600 feet, the draft being measured by weir at this point. The drainage area tributary to this reservoir is 12 square miles which is somewhat increased by the Kelly Ditch one and a half miles long which diverts a portion of the drainage from North Peak into the reservoir. This ditch required the excavation of approximately 12,000 cu. yds. of material. It should be noted that the rainfall at Cuyamaca is, with one exception, the highest of any point in San Diego County.

This reservoir is located on the headwaters of Boulder Creek, the channel of which carries the water from Cuyamaca to the San Diego River a quarter of a mile above the Diverting Dam, a distance of approximately 12½ miles, the water from Cuyamaca dropping, in this distance, 3800 feet. Approximately seven miles below Cuyamaca Dam extensive preliminary work has been done with the object of installing a hydro-electric plant, the necessary permits for which have been granted by the State and Federal authorities. Just prior to its junction with the San Diego River the draft from Cuyamaca, as well as the natural flow of Boulder Creek, is measured by weir.

A substantial keeper's house, barns, garage, water supply system and all necessary appurtenances are located at this point.

2. DIVERTING DAM

This is a rubble masonry structure 440 feet long, approximately 35 ft. in height, containing 5000 cu. yds. of material and is located about a quarter of a mile below the junction of Boulder Creek and the San Diego River at an elevation of 803 ft. and is within the boundaries of the Capitan Indian reservation. At this point is a good substantial keeper's house, barns, store houses, etc.

3. MAIN FLUME

This flume is 5' 10" wide and for the first six miles is 30 inches deep, the depth for the remaining distance being 20 inches. It has a grade of 4-3/4 feet per mile and a capacity of 31 sec. ft. About two miles below Diverting Dam, Sand Creek is crossed by means of a concrete conduit 1080 feet in length and a 40" concrete syphon 1230 feet in length, erected in 1913. At a point about seven miles below Diverting Dam the flume crosses the South Fork of the San Diego River by means of a 26" steel syphon erected in 1911 and a 24" steel syphon erected in 1916. On the south side of the South Fork is located the flume walker's cottage, etc. At this point is the junction of the diversion works carrying South Fork waters into the main flume and consisting of the following:

4. SOUTH FORK FEEDER

This consists of 2350 feet of 20" riveted steel pipe line laid in 1915 and a parallel wooden flume 2' x 3' 2350 ft. long, built in 1916, ending in a concrete forebay from which point a #60 steel flume 2500 ft. in length runs to a concrete diversion dam which diverts the flood water from the South Fork drainage area to the main flume. This drainage area is 44 sq. miles in extent.

Approximtely one mile below South Fork the water crosses the Chocolate Creek in a 30" steel syphon 2680 feet in length. This syphon is under a maximum head of 200 feet. At the outlet end of Chocolate syphon is located the Chocolate section house, garages, store houses, etc. Approximately nine miles below Chocolate section house or about eighteen miles below Diverting Dam is located the El Monte pumping plant pumping from the El Monte basin.

5. EL MONTE PUMPING PLANT

This is an extensive deposit of gravels covering approximately 1400 acres and in excess of 125 feet in depth. The safe yield of these gravels has been computed at 4 million gallons daily. Extensive pumping was done at this site during the big drought of 1899 to 1904. The old steam plant in use at that time was scrapped and an electrically driven centrifugal plant installed in 1914 and 1915. Additions were made to this

plant in 1919 and it now consists of seven wells from 84 to 95 ft. in depth, several hundred feet of suction lines, an 8" multiple stage centrifugal pump driven by a 200 h.p. motor, and discharges thru approximately a thousand feet of 20" steel pipe to a fore-bay thence thru a gravity line approximately 700 feet long to connect with the main flume. This plant is equipped with all necessary appurtenances and has a capacity of 3 million gallons daily against a total head of 320 feet.

Approximately 2½ miles below the El Monte pumping plant is the flume foreman's house, barns, store sheds, etc., as well as the flume walker's cottage.

Approximately 5 miles below the El Monte plant the flume enters the northeastern corner of the El Cajon Valley proper thru a tunnel approximately 1900 ft. in length and runs south along the eastern edge of the valley approximately six miles where it turns to the west and crosses the Sweetwater Pass thru a 39" concrete syphon 1250 ft. in length, built in 1919. About one mile below this point is located the El Cajon section house, store sheds, etc.

Three miles below the El Cajon section house the flume leaves the El Cajon Valley thru Eucalyptus Pass near Grossmont. Here is located the Grossmont pumping plant consisting of a 30 h.p. motor, 2 triplex pumps pumping against a total head of 400 feet, 4 concrete distribution reservoirs with capacity of 50,000 gallons each, and an extensive distribution system.

A thousand feet below this point is a 36" reinforced concrete pipe line 1950 feet in length carrying water to Grossmont reservoir formerly known as Murray Hill reservoir.

This is a distribution reservoir 570 feet in length, 35 feet high, containing 26,606 cu. yds. of earth, flooding 12 acres, and containing 127 acre feet of water.

4000 ft. below this point is the Eucalyptus reservoir at the end of the flume.

6. EUCALYPTUS RESERVOIR

This is a receiving or balancing reservoir and acts as a distribution reservoir for the high service area. It is of earth fill construction, 34 ft. in height and 275 feet in length. The elevation when full being 644 feet and the elevation of the outlet 620 feet. This reservoir covers three acres and has a capacity of 26 acre feet. The outlet elevation of this reservoir is the same as that of the Grossmont Reservoir previously mentioned and the outlets are connected by 5322 feet of reinforced concrete pipe of which 726 feet is thru a tunnel. At this site is located the Superintendent's house, pipe foreman's house, store house, black-smith shop, garages, etc.

7. LA MESA DITCH

La Mesa Ditch joins the main flume a few hundred feet above Eucalyptus Reservoir and carries flood water to the Murray dam. The total length is 3.68 miles of which 1237 feet is 36" redwood syphon. This ditch has a capacity of 31 second feet.

8. MURRAY RESERVOIR

The Murray Reservoir is a receiving basin at the end of the La Mesa Ditch and acts as a distribution reservoir for the low service area. The total height of the dam is 117 feet and stores water to a depth of 100 feet. The elevation of the outlet is 440 feet. The area flooded is 200 acres and the

capacity is 6085 acre feet or two billion gallons. The area of the watershed immediately tributary is 4.5 square miles. This reservoir is a multiple arch concrete structure and was erected in 1918 and completely submerges the old La Mesa Dam, an earthfill structure 65 feet in height. At this dam is located club house and grounds, keeper's house, garage, store house, chlorination plant, etc.

9. TRANSMISSION AND DISTRIBUTION MAINS - Length 56.58 miles.

From the Eucalyptus reservoir the water is transported into the high service area thru a 16" riveted steel pipe laid in 1914 and 1915. This line runs southwesterly a distance of approximately one mile to El Cajon Avenue which it follows to the easterly edge of the low service area approximately 3½ miles. At this point it is connected with a 24" redwood stave pipe 5000 ft. in length running due south from the Murray dam. From this connection the transmission line runs westerly on Cajon Avenue approximately three miles to a point about one and a half miles east of the westerly City limits of San Diego. Many distribution lines branch from these main transmission lines at various points as shown approximately on the attached map of the system. The sizes, lengths, and kind of each pipe is shown in tabulation headed "Pipe Lines" and included in this report. In order to make available for the high service area in time of emergency, waters stored in the Murray reservoir a pumping plant is located at the junction with the 24" wood line from Murray dam with the steel line from Eucalyptus. This plant consists of an 8" multiple stage centrifugal pump direct connected to 150 h.p. motor with all necessary appurtances.

The following is a brief inventory of the holdings of the Cuyamaca Water Company:

BRIEF INVENTORY

Collection System

Cuyamaca Dam

Kelly Ditch

Keeper's house

Barns

Garage

10 miles fence

Weir

Fletcher Damsite

Preliminary work, surveys, maps, etc. collected at cost of $25,000.

Diverting Dam

Keeper's house

Store houses, etc.

Floodage rights

Weir at mouth of Boulder Creek

South Fork

Diversion Dam

Rights to build Conejos Dam

2500' #60 steel flume

2350' 2' x 3' wood flume

2350' 20" steel pipe

Forebays, etc.

Capitan Damsite

Extensive exploratory work, maps, surveys, etc. at cost of approximately $100,000.

Monte Pump Plant

1 - 8" multiple stage centrifugal pump

1 - 200 h.p. motor

Priming pump

400' 12" standard screw pipe

750' 20" riveted steel "

1000' 16" " " "

Pump house

Operator's house

Transmission

Main Flume

5' 10" wide by 20" deep, 159,100' long of which approximately 30,000' is on trestles.

2500' #108 steel flume

Sand Creek Conduit 1080'

Sand Creek Syphon 42" concrete 1280' long

Square concrete conduit 427' "

Circular " " 207' "

Tunnels " lined 4183' "

Tunnel approaches, concrete 553' "

26" South Fork Syphon, steel 1455' "

24" " " " " 1435' "

30" Chocolate Syphon, steel 2680' "

39" Sweetwater " concrete 1250' "

La Mesa Ditch

3.68 miles including Alvarado syphon, 36" wood, length 1237'.

Murray supply line

Reinforced concrete pipe 36" 1950' long.

Buildings on Transmission System

Cottage and sheds at South Fork

Store house, garage, etc. at Chocolate

Cottage at Chocolate

Flume foreman's house at Los Coches

Barns, store houses, flume walker's house at Los Coches

Flume walker's house and sheds at El Cajon.

Distribution

Five Grossmont Reservoirs

Grossmont Pumping Plant

50,000 gallon tank at El Nido

Miles Reservoir No. 1

" " No. 2

Eucalyptus Reservoir

Murray Dam

La Mesa Pump station

Normal Heights shops

La Mesa Heights "

Miscellaneous equipment, telephone system, automobiles, tools, etc. valued at approximately $30,000, with materials and supplies on hand valued at approximately $ 30,000.

1800 meters and services ranging from 5/8 x 3/4 to 16".

56.58 miles of pipe as listed in detail on pages 15 and 16.

Lands and Rights of Way

Cuyamaca Reservoir		1074 Acres - 930 Acres flooded	
Capitan damsite	Approx.	160 "	which we control
Fletcher damsite	"	300 "	" " "
Mission Gorge damsite	"	317 "	" " "
Kelly Ditch		50 "	
Diverting Dam (easement)		8 "	
El Monte Pumping Plant:			
Valley		7.06 "	
Hillside		.79 "	
Main Flume rts. of way to Tunnel #6		136.29 "	
Main Flume rts. of way Tunnel #6 to Eucalyptus		91.50 "	
Murray 36" Supply Line		.47 "	
La Mesa Ditch Line		22.25 "	
Grossmont Resvrs. 1, 2, 3 and 4		.41 "	
Grossmont (formerly Murray Hill)		15.7 "	
Murray Eucalyptus Siphon (rt. of way)		1.19 "	
Eucalyptus Reservoir		4.71 "	
Eucalyptus Lands (condemned)		2. "	
Murray Reservoir:			
Owned		119.71 "	
Floodage rt.		120. "	
La Mesa Pipe Line		2.05 "	
Normal Heights shop		.273 "	
Rt. of way across all La Mesa Colony lands			

Lands and Rights of Way (Cont'd)

Conejos Reservoir rights

All franchises from County, Municipalities, etc.

Permit issued by Federal and State authorities for canal and power development on Boulder Creek

Permit granted by Federal authorities to pump from the gravels of the Capitan Indian reservation, granted in 1913.

Water appropriations as follows:

6000 miner's inches at Diverting Dam
4000 " " " South Fork
2000 " " " near head of Boulder Creek
100000 " " " Diverting Dam
500 " " " Capitan
44225 acre feet at Mission Gorge No. 3.

Certificate of due diligence issued by the State of California covering above filings.

It should be noted that the important original filings of the San Diego Flume Company made in 1886 were on the South Fork and at the Diverting Dam.

In addition to the various riparian rights and agreements transferred to Ed Fletcher and James A. Murray by the San Diego Flume Company, additional rights have been acquired until at this time the Cuyamaca Water Company own or control or have obtained the rights of diversion of a total riparian frontage of 210,000 feet out of a total of 406,000 feet from Diverting Dam to the ocean.

The following diversions have been made by the Cuyamaca Water Company and its predecessors:

Season	Ac. Ft.	Season	Ac. Ft.
1899-00	2600	1911-12	4127
1900-01	4741	1912-13	7306
1901-02	3620	1913-14	5263
1902-03	4868	1914-15	12066
1903-04	2266	1915-16	7402
1904-05	5180	1916-17	4023
1905-06	6731	1917-18	4498
1906-07	5997	1918-19	4303
1907-08	6895	1919-20	6196
1908-09	5817	1920-21	3625
1909-10	6371	1921-22	11265
1910-11	5393	1922-23	5502

The above diversions were of flood waters only and do not include stored waters in the Cuyamaca Dam.

By the construction of Fletcher dam at a cost of $400,000 and the Capitan dam at a cost of $1,500,000, and the Mission Gorge Dam No. 3 at a cost of $1,000,000, and construction of South Fork or Conejos Dam at a cost of $150,000, the normal yield of the system would be in excess of 25 million gallons daily not including yield of El Capitan.

PIPE LINES

Kind	Size	Length in Feet
Standard Screw	3/4"	1453
" "	1"	8080
" "	1¼"	1315
" "	1½"	6366
" "	2"	82259
" "	2½"	17221
" "	3"	28159
" "	3½"	1145
" "	4"	3737
" "	6"	299
" "	8"	1400
" "	10"	162
" "	12"	820
O. D. Casing	3"	2050
" "	4"	13515
" "	6"	4318
" "	7"	115
" "	8"	3812
" "	10"	1525
" "	11"	389
" "	12"	4779
Cast Iron	2"	4295
" "	3"	9857
" "	4"	4910
" "	6"	7267

PIPE LINES (Cont'd)

Kind	Size	Length in Feet
Cast Iron	10"	15
" "	12"	1650
" "	16"	3080
Riveted Steel	4"	2555
" "	6"	1827
" "	8"	4820
" "	12"	8282
" "	14"	6427
" "	16"	20365
" "	18"	30
" "	20"	6857
Standard with Cement Jacket	3½"	986
Concrete Riveted Steel	15"	850
" " "	20"	3990
Math. Joint	6"	4651
" "	8"	4683
" "	12"	3238
Concrete	16"	400
"	18"	6350
"	24"	5320
"	36"	1965
Wood Stave	24"	5960
" "	36"	1237
		298746 or
		56.58 miles.

Not included in the above is 1600 feet of 6" cast iron pipe, 2900 ft. of 12" cast iron and 1800 ft. of 20" cast iron pipe now being delivered, the value of which has been included in the values as given for materials and supplies on hand.

In addition to the above inventory all maps, engineering studies, office records, and statistical data, miscellaneous office furniture, etc. is included.

Owing to the fact that neither the statistical records nor Company's books have been closed for the year 1923, the figures quoted herein are necessarily only very close approximations and are therefore subject to correction.

Submitted January 10th, 1924.

R 3 W.

R 2 W.

36 31
1 6

36 31
1 6

La Jolla

Pacific Beach

PACIFIC OCEAN

FALSE BAY

A.T.&S.F.R.R.

Old Town

SAN

PUEBLO LANDS OF SAN DIEGO

BAY OF SAN DIEGO

UNIVERSITY HTS RES'R

Mission Gorge Damsite No. 3

DIEGO

Old Mission Dam

Sycamore

Grantville

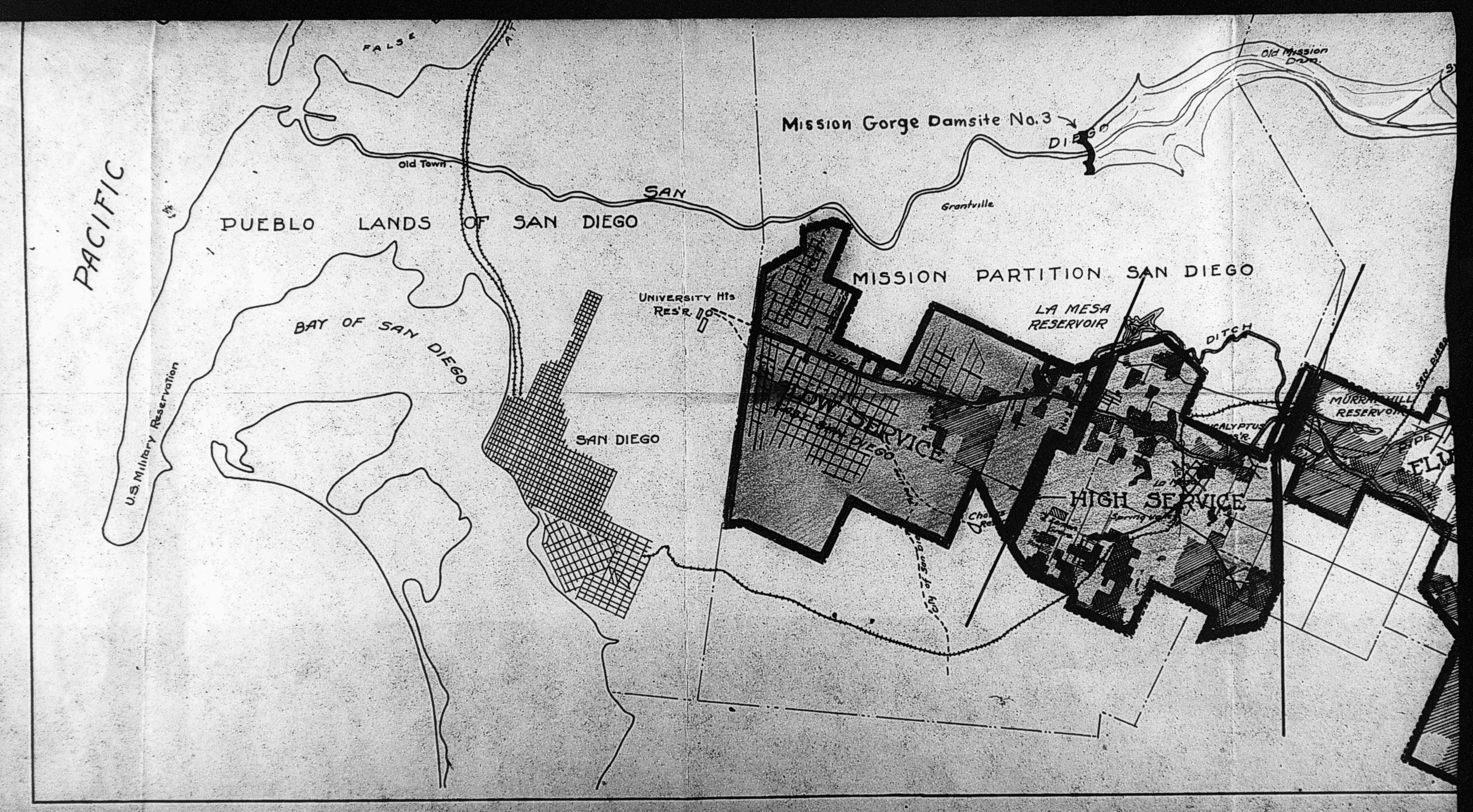
MISSION PARTITION SAN DIEGO

LA MESA RESERVOIR

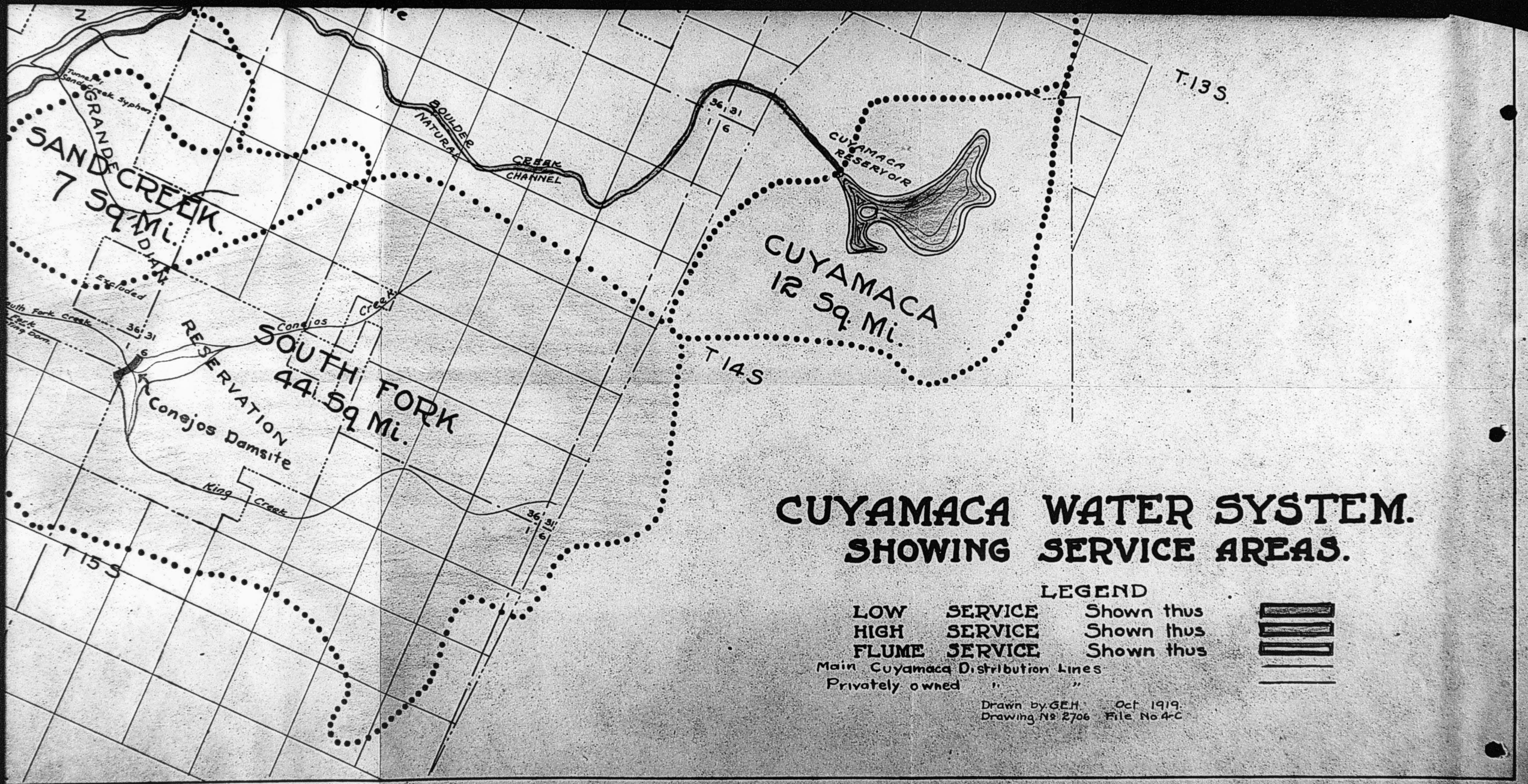
DITCH

R.1W.
36 31
1 6
R.1E
SAN VICENTE
MERIDIAN
SAN BERNARDINO
T14S.
Foster
CAPITAN
Old Mission Dam.
Sycamore Canon
El Monte Lands and Pumping Plant
RIVER
El Capitan Damsite No 1
Lakeside
Tunnel #5
FLUME
Tunnel #6
Tunnel #3
EL CAJON
SAN DIEGO & ARIZONA R.R.
Tunnel #1 Sand Creek Syphon
GRAND
7 Sq. Mi.
Excluded
South Fork Syphon
CHOCOLATE SYPHON
South Fork Diverting Dam
South Fork Creek
Creek


SANTA YSABEL
T.12S.
R3E.
R2E
R4E
San Diego River
DIVERTING DAM
91 Sq. Mi.
Cedar Creek
Inaja I.R.
Fletcher Damsite
DIVERTING DAM
T.13S.
BOULDER CREEK
NATURAL CHANNEL
CUYAMACA RESERVOIR
CUYAMACA
12 Sq. Mi.
T.14S.
CREEK
Sq. Mi.
Excluded
Conejos
Creek
SOUTH


PACIFIC
FALSE
Old Town.
SAN
PUEBLO LANDS OF SAN DIEGO
Mission Gorge Damsite No. 3
Old Mission Dam.
Grantville
MISSION PARTITION SAN DIEGO
LA MESA RESERVOIR
DITCH
UNIVERSITY HTS RES'R.
BAY OF SAN DIEGO
U.S. Military Reservation
SAN DIEGO
LOW SERVICE
HIGH SERVICE
MURRAY HILL RESERVOIR
PIPE


Sycamore Can
El Monte Lands and Pumping Plant
RIVER
El Capitan Damsite No 1
Lakeside
Monte Pumping Plant
Tunnel #5
Tunnel #4
FLUME
Tunnel #6
EL CAJON
CUYAMACA
SAN DIEGO & ARIZONA R.R.
MURRAY HILL RESERVOIR
PIPE
FLUME
El Cajon
Tunnel #7
Tunnel #3
South Fork Syphon
CHOCOLATE SYPHON
Chocolate Creek
South Fork Creek
South Fork Diverting Dam
Tunnel #1
Sand Creek Syphon
GRANDE
SAND CREEK
7 Sq. Mi.
Excluded
Conej
36 31
1 6
T 15 S
T 16 S
SYCUAN I.R.



CUYAMACA WATER SYSTEM.
SHOWING SERVICE AREAS.

LEGEND

LOW	SERVICE	Shown thus
HIGH	SERVICE	Shown thus
FLUME	SERVICE	Shown thus

Main Cuyamaca Distribution Lines
Privately owned " "

Drawn by G.E.H. Oct 1919
Drawing No. 2706 File No. 4-C

Ed Fletcher Papers

1870-1955

MSS.81

Box: 37 Folder: 6

Business Records - Reports - Harritt, C - "Report: Description of Cuyamaca System"