

**SAN DIEGO COUNTY  
WATER AUTHORITY**



**SECOND ANNUAL REPORT  
1948**

SAN DIEGO COUNTY WATER AUTHORITY

# SECOND ANNUAL REPORT

*For Period*

*July 1, 1946 to June 30, 1948*

J. L. BURKHOLDER  
GENERAL MANAGER AND CHIEF ENGINEER



SAN DIEGO, CALIFORNIA  
1948



*First flow of water from San Diego Aqueduct at south portal of San Vicente Tunnel into San Vicente Reservoir, November 26, 1947.*

## LETTER OF TRANSMITTAL

San Diego, California  
December 1, 1948

BOARD OF DIRECTORS  
SAN DIEGO COUNTY WATER AUTHORITY

Gentlemen:

There is transmitted herewith the Second Annual Report of the San Diego County Water Authority for the period from July 1, 1946, to June 30, 1948. A separate report was not issued for the fiscal year 1946-47.

The report covers the construction activities of the Authority and the first seven months of delivery of Colorado River water in San Diego County.

Very truly yours,

J. L. BURKHOLDER,  
*General Manager and Chief Engineer.*

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**R O S T E R**

**DIRECTORS**

July 1, 1946 to June 30, 1948

Chula Vista.....	Arthur L. Lynds
Fallbrook Public Utility District.....	Emil J. Schmitz
Lakeside Irrigation District.....	Allen G. Mitchell
La Mesa, Lemon Grove and Spring Valley Irrigation District (To 2/12/48).....	W. H. Jennings M. J. Shelton
National City (To 8/5/47).....	George V. Johnson Delavan J. Dickson
Oceanside.....	Harold N. Beck
San Diego.....	Fred A. Heilbron Arthur H. Marston Fred W. Simpson Walter B. Whitcomb

**OFFICERS OF THE BOARD**

Chairman.....	Fred A. Heilbron
Vice-Chairman (To 8/5/47).....	George V. Johnson Arthur L. Lynds
Secretary (To 2/12/48).....	W. H. Jennings Delavan J. Dickson
Executive Secretary.....	Eleanor Longfellow
Treasurer.....	Walter B. Whitcomb

**EXECUTIVE OFFICERS AND OPERATING STAFF**

General Manager and Chief Engineer.....	J. L. Burkholder
General Counsel (To 2/12/48).....	Phil D. Swing W. H. Jennings
Assistant Chief Engineer.....	Richard S. Holmgren
Controller (To 2/13/47).....	Allen G. Mitchell Charles L. Royer
Assistant Controller (To 10/9/47).....	Arthur L. Lynds Mary G. Unger
Superintendent, Maintenance and Operation.....	A. B. Gale

**COMMITTEES OF THE BOARD**

June 30, 1948

**FINANCE AND BUDGET**

Walter B. Whitcomb, Chairman  
Harold N. Beck  
Arthur L. Lynds  
Allen G. Mitchell  
M. J. Shelton

**WATER PROBLEMS**

Arthur H. Marston, Chairman  
Delavan J. Dickson  
Arthur L. Lynds  
Emil J. Schmitz  
M. J. Shelton  
Fred W. Simpson

**LANDS AND RIGHTS OF WAY**

Fred A. Heilbron, Chairman  
Harold N. Beck  
Emil J. Schmitz  
Fred W. Simpson  
Walter B. Whitcomb

**PERSONNEL**

Arthur H. Marston, Chairman  
Delavan J. Dickson  
Allen G. Mitchell  
Emil J. Schmitz



Vice Chairman  
A. L. Lynds  
Chula Vista



Chairman  
Fred A. Heilbron  
San Diego



Secretary  
D. J. Dickson  
National City



Treasurer  
Walter B. Whitcomb  
San Diego



E. J. Schmitz  
Fallbrook Public  
Utility District



H. N. Beck  
Oceanside



A. G. Mitchell  
Lakeside Irrigation  
District



Arthur H. Marston  
San Diego



F. W. Simpson  
San Diego



M. J. Shelton  
La Mesa, Lemon Grove and  
Spring Valley Irrigation District

## SAN DIEGO COUNTY WATER AUTHORITY

MEMBER AGENCIES AS OF JUNE 30, 1948

<i>Member Agency</i>	<i>Date of Entry</i>
City of Chula Vista.....	June 9, 1944
Fallbrook Public Utility District.....	June 9, 1944
Lakeside Irrigation District.....	June 9, 1944
La Mesa, Lemon Grove and Spring Valley Irrigation District.....	June 9, 1944
City of National City.....	June 9, 1944
City of Oceanside.....	June 9, 1944
City of San Diego.....	June 9, 1944
 <i>Agencies which have withdrawn their corporate area from the Authority</i>	
	<i>Date of Withdrawal</i>
City of Coronado.....	May 10, 1946
Ramona Irrigation District.....	Aug. 21, 1946

## FOREWORD

The two-year period covered by this report has witnessed the fruition of the Authority's purpose to bring Colorado River water to San Diego County and to make it available to member agencies of the Authority. By the end of this period (June 30, 1948), the long and tedious procedure leading to the annexation of the corporate area of the Authority to The Metropolitan Water District of Southern California had been consummated, the construction of the 71-mile-long San Diego Aqueduct by the Navy Department had been useably completed to the point that it could be turned over to the Authority for operation and maintenance, and the Authority had constructed and placed in service some 33 miles of water lines required to distribute water from the aqueduct to the water systems of its member agencies. Through the joint efforts of the Authority and the participating Federal agencies, supported by the full co-operation of local organizations, it had been possible to complete these projects in time to prevent the drastic water shortages which had been imminent in the Authority area since the beginning of World War II.

### *Growth of San Diego County*

The County area has enjoyed in this period the highest annual increase in assessed valuation and population in its history. Details of this growth are shown in Table 1.

The major income of the population of San Diego County is obtained from four widely separated sources all of which, except for the Naval installations, show an increase in total payrolls over the last two years. From 1946 to 1948 payrolls in Naval establishments, including military and civilian personnel, dropped from \$105,306,505 to an estimated \$90,000,000; County agricultural returns increased from \$50,001,443 to \$55,000,000; industrial payrolls, from \$43,500,000 to \$65,000,000; and income from tourists, from \$30,000,000 to \$45,000,000. This represents an additional income to residents of San Diego County from these sources alone of about \$13,000,000 annually, an increase of 11 per cent.



*Bronze tablet at Lakeside Control Station.*

TABLE 1  
SAN DIEGO COUNTY  
GROWTH IN POPULATION AND ASSESSED VALUATION

Year	Population		Assessed Valuation	
	Total	Average Annual Increase	Total	Average Annual Increase
1900	35,090			
1910	61,665	2,658		
1920	112,248	5,058	\$ 87,310,991	+ \$16,489,775
1930	209,659	9,741	252,208,746	- 3,074,710
1940	289,348	7,969	221,461,643	+ 20,348,156
1944	443,875 (1)	38,632	302,854,269	+ 18,753,550
1946	502,804 (1)	29,465	340,361,370	+ 47,319,425
1948	585,000 (2)	41,100	435,000,220	

- (1) Special Census, U.S. Census Bureau, exclusive of emergency military personnel due to war.  
(2) Estimated by San Diego City Chamber of Commerce.

#### *Population and Assessed Valuation of Authority*

The total population residing within the Authority area in 1948 is estimated at 476,500, an increase of about 36,000 above that estimated for 1946. It is about 81 per cent of the estimated total population of the County. The estimated population figures for 1940, 1946, and 1948 are shown in Table 2, which shows the remarkable growth within the Authority area. San Diego City almost doubled its population in the 8-year period 1940 to 1948, while the other agencies have enjoyed even more outstanding rates of growth.

The assessed valuation of the Authority in 1947-48 was \$307,298,520, an increase of about \$38,500,000 above the assessed valuation in 1946-47. Included within the Authority is about 78 per cent of the total assessed valuation of \$393,525,920 for the entire County. The assessed valuation for 1947-48 of each agency in the Authority also is shown in Table 2.

TABLE 2

**AREA, POPULATION, AND ASSESSED VALUATION  
OF AUTHORITY MEMBER AGENCIES**

Agency	Area Sq. Mi.	Population				Assessed Valuation
		1940	U. S. Census	1946	Estimated 1948	
Chula Vista .....	5.06	5,138	12,500 (2)	14,200	\$ 10,143,090	\$ 10,901,560
Fallbrook Public Utility District .....	7.41	2,308 (1)	4,101	5,000	2,119,460	2,274,700
Lakeside Irrigation District .....	2.21	— (3)	— (3)	2,000	419,200	626,800
La Mesa, Lemon Grove & Spring Valley Irrigation District.....	28.55	17,140 (4)	32,400 (4)	40,000	20,664,540	26,834,740
National City .....	4.61	10,344	18,000 (2)	19,100	8,344,720	9,175,530
Oceanside .....	8.64	4,651	11,000 (2)	12,500	6,997,220	7,763,870
San Diego .....	95.53	203,341	362,658	380,000	258,610,290	281,309,690
<b>Total Authority .....</b>	<b>152.01</b>	<b>242,922</b>	<b>440,659</b>	<b>472,800</b>	<b>\$307,298,520</b>	<b>\$338,886,890</b>

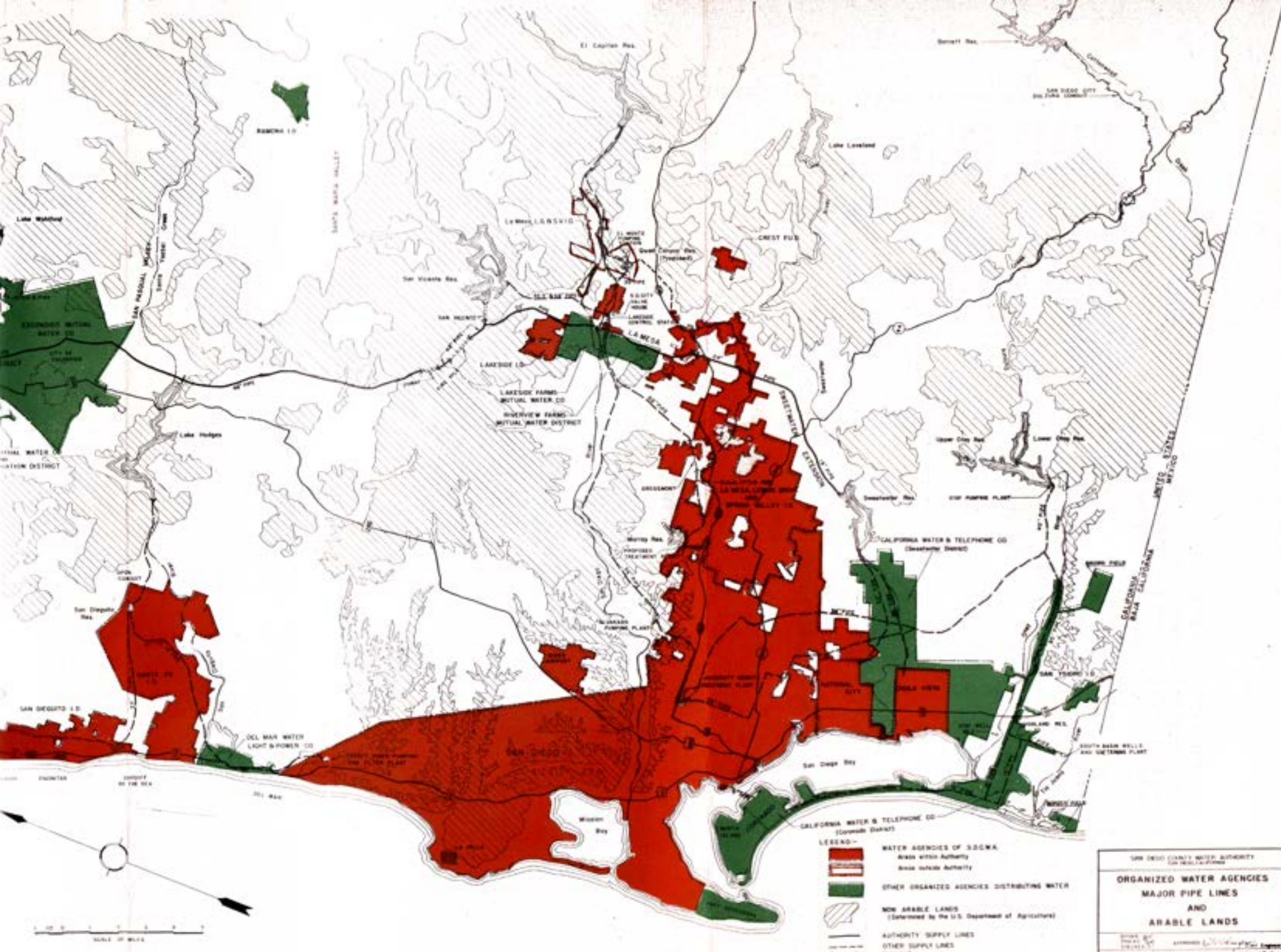
(1) Population of judicial townships which are composed largely of Authority member agencies.

(2) Estimated from U. S. Special Census taken between 6/6/44 and 6/21/46.

(3) Population was small and assumed included in La Mesa, Lemon Grove and Spring Valley Irrigation District.

(4) Estimate, based on U. S. Census figure for Township.



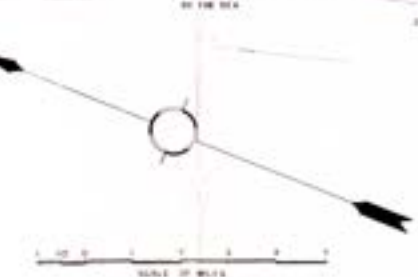


- LEGEND**
- WATER AGENCIES OF S.D.C.W.A.  
Area with Authority
  - Area outside Authority
  - OTHER ORGANIZED AGENCIES DISTRIBUTING WATER
  - NOW ARABLE LANDS  
(Determined by the U.S. Department of Agriculture)
  - AUTHORITY SUPPLY LINES
  - OTHER SUPPLY LINES
  - TUNNELS

SAN DIEGO COUNTY WATER AUTHORITY  
SAN DIEGO, CALIFORNIA

**ORGANIZED WATER AGENCIES  
MAJOR PIPE LINES  
AND  
ARABLE LANDS**

ENGINEER: *[Signature]*  
 CHECKED BY: *[Signature]*  
 DATE: MAY 1948 **M-180A**





a total of 41,044.5 acre-feet of water has been delivered. The distribution of this water among the several agencies is shown in Table 10.

The drought conditions which began in 1945 continued during the past two years (See Figure 2) with devastating effect on the water reserves of the County. Reservoirs, both surface and underground, in many instances are now almost exhausted. The arrival of Colorado River water in late 1947 narrowly averted a severe rationing of water in most of the Authority areas. All agencies are carrying on publicity programs urging consumers to be careful in their use of water. If no runoff occurs during the 1948-49 winter season, some rationing of water may be necessary, since local supplies will be depleted and the San Diego Aqueduct with its present one-half capacity cannot alone supply sufficient water to meet the full needs of its agencies.

#### *Preferential Water Rights of Member Agencies*

The County Water Authority Act provides (Sections 5-11) that each agency shall have the preferential right to purchase from the Authority for distribution by said agency, or any public utility empowered for the purpose, for beneficial use within such public agency, a portion of the water served by the Authority which bears the same ratio to all the water supply of the Authority as the total accumulation of amounts paid by each agency to the Authority on tax assessment or otherwise, excepting purchase of water, shall bear to the total of similar payments received by the Authority from all its agencies.

The total collections of the Authority from its member agencies for taxes and related charges for the period from the Authority's organization in 1944 to June 30, 1948, as shown in Table 21, are \$616,200.17. The total payments of each agency and its percentage of the whole are shown in Table 3 together with the preferred rights of each agency to the 100 c.f.s. capacity of the present aqueduct.

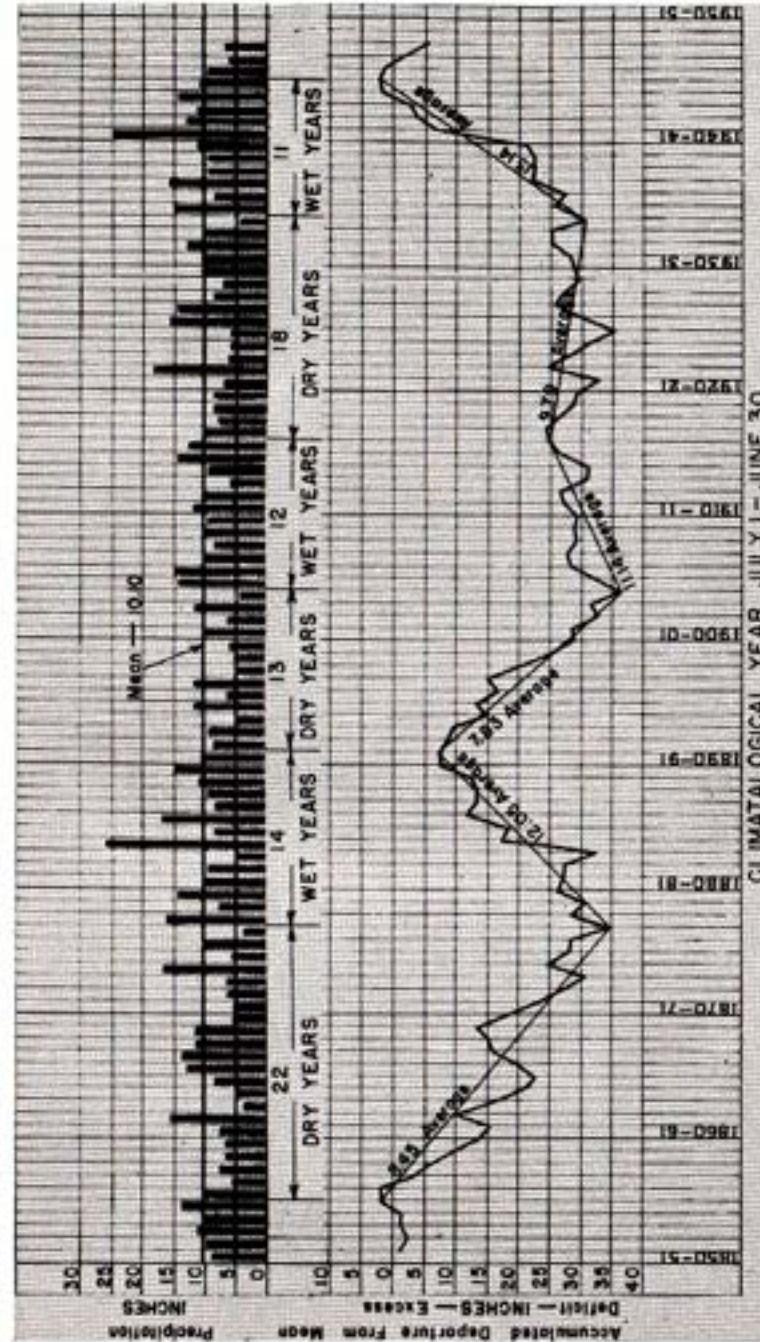


Figure 2. Rainfall Record for San Diego, Calif.

TABLE 3

FLOW OF WATER IN SAN DIEGO AQUEDUCT WHICH  
EACH AGENCY HAS PREFERENTIAL RIGHTS TO PURCHASE  
(as of June 30, 1948)

Agency	Total amount paid by each member agency to 6/30/48	Preferential Right		Equivalent acre-feet per year, assuming continuous flow ex- cept for 3% shutdown
		Percentage	Flow c.f.s. (1)	
Chula Vista .....	\$ 20,651.52	3.35	3.35	2,352.5
Fallbrook Public Utility Dist. ....	4,040.66	0.66	0.66	463.5
Lakeside Irrigation Dist. La Mesa, Lemon Grove & Spring Valley Irrigation District .....	773.02	0.12	0.12	84.3
National City .....	39,589.60	6.42	6.42	4,508.4
Occaside .....	17,493.97	2.84	2.84	1,994.4
San Diego .....	14,392.92	2.34	2.34	1,643.3
	519,258.48	84.27	84.27	59,178.4
Totals .....	\$616,200.17	100.00	100.00	70,224.8

(1) Based on average flow of 100 c.f.s. Actual experienced flows have varied from about 95 c.f.s. to a maximum of 104 c.f.s.

### CHRONOLOGY OF PERTINENT EVENTS

- 10-23-23 Preliminary studies of Colorado River as a source of additional water supply were begun by City of Los Angeles.
- 9-17-24 Colorado River Aqueduct Association organized at Pasadena, California.
- 6- 2-25 City of Los Angeles issued \$2,000,000 Colorado River project bonds for preliminary surveys and investigations.
- 4-15-26 City of San Diego filed application with the Division of Water Resources of the State of California for a permit to divert 155 c.f.s. from the Colorado River annually.
- 7-29-27 Metropolitan Water District Act enacted by California Legislature permitting noncontiguous cities and districts to cooperate in acquisition of domestic water supplies.
- 12- 6-28 The Metropolitan Water District of Southern California organized with eleven member cities.
- 4-24-30 Metropolitan Water District contracted with the United States for storage of water and for 36 per cent of the power generated at Hoover Dam.
- 4-26-30
- 8-18-31 Seven Party Water Agreement of 1930 signed by representatives of Palo Verde Irrigation District, Imperial Irrigation District, Coachella Valley County Water District, Metropolitan Water District of Southern California, City of Los Angeles, City of San Diego and County of San Diego fixing the priorities of the respective water rights in the Colorado River.
- 9-29-31 A construction bond issue of \$220,000,000 was approved by Metropolitan Water District electors.
- 1-25-33 Construction work on Colorado River Aqueduct was started on Coachella Tunnel at Fargo Adit.
- 2-15-33 Contract executed between Secretary of the Interior and The City of San Diego providing for 250,000 acre-feet of storage capacity in Boulder Reservoir, and for the delivery of 112,000 acre-feet of water to San Diego City and/or County each year at a point in the Colorado River immediately above Imperial Dam.
- 10- 2-34 Contract executed between Secretary of the Interior and The City of San Diego, providing for construction of capacity in All-American Canal Project for the diversion and carriage of 155 c.f.s. allotment of Colorado River water to The City and/or County of San Diego.
- 2-12-37 Hill-Ready-Buwalda report rendered to City of San Diego favoring further development of local resources, to be followed later by the construction of a trans-mountain con-

- nection to the Colorado River through the All-American Canal.
- 8-31-41 Initial stage of Colorado River aqueduct construction completed and water system placed in operating status.
- 5-17-43 County Water Authority Act as introduced in the California legislature by Senator Ed Fletcher approved by the Governor of California and filed with the Secretary of State.
- 5-28-43 Contract executed between Bureau of Reclamation and Federal Works Agency acting for the Government, and The City of San Diego, providing for report on estimated cost of an aqueduct connection between The Metropolitan Water District and the water systems serving San Diego and adjacent county areas.
- 5-29-43 Contract executed between the Bureau of Reclamation and the City Manager of The City of San Diego and the Chairman of the Board of Supervisors of San Diego County acting for the San Diego area, providing for a report on an aqueduct connection between All-American Canal and the water systems serving San Diego and adjacent county areas.
- 6-9-44 The San Diego County Water Authority organized, consisting of nine public agencies.
- 10-3-44 Appointment by President Roosevelt of a committee on San Diego water problems.
- 11-29-44 The President of the United States transmits a communication to the Senate approving the Report of the Committee on San Diego Water Problems, and advising that he has directed immediate construction by the Federal Government of an aqueduct connecting the Colorado River Aqueduct of The Metropolitan Water District with the water system of San Diego at its San Vicente Reservoir.
- 5-18-45 First contract on San Diego Aqueduct awarded by U. S. Navy for construction of Poway, Fire Hill, and San Vicente tunnels.
- 10-17-45 Contract executed between the U. S. Navy, acting for the Government, and The City of San Diego providing for the continuation of construction of the San Diego Aqueduct and lease of aqueduct to The City of San Diego, with privilege of later transferring to the Authority.
- 3-29-46 The Board of Directors of the Authority apply to the Board of Directors of the District for consent to annex the corpo-

- rate area of the Authority to the Metropolitan Water District.
- 5-10-46 The withdrawal of The City of Coronado from the Authority officially completed by filing of proceedings by Secretary of Authority in the office of the Secretary of State.
- 6-28-46 Board adopted Resolution No. 17, declaring intention to call an election to authorize incurring of bonded indebtedness of \$2,000,000 to construct distribution lines.
- 8-15-46 Proposed contract merging water rights of City of San Diego with those of the Metropolitan Water District approved by the Authority, and the General Manager and Chief Engineer authorized to execute same on behalf of Authority.
- 8-21-46 Withdrawal of Ramona Irrigation District from the Authority officially completed by filing of proceedings with Secretary of State.
- 9-6-46 Board of Directors of Authority made formal application to the Metropolitan Water District for consent to annex the corporate area of the Authority to the District.
- 9-23-46 City of San Diego executed Supplemental Agreement No. 1 covering assignment of City-Navy Lease Contract NOY-13300 to Authority.
- 10-4-46 Board of Directors of the Metropolitan Water District gave formal consent to annexation of the corporate area of the Authority to the District, and fixed terms and conditions of annexation.
- 10-21-46 A delegation of Authority and City officials appeared before President's Reconstituted Committee asking for refinancing of San Diego Aqueduct.
- 11-5-46 The Authority electors approved three propositions relative to proposed importation of Colorado River water: (1) annexation of corporate area of Authority to the Metropolitan Water District; (2) Supplemental Contract No. 1 transferring most of provisions of Aqueduct Lease-Purchase Contract from City to Authority; (3) incurring bonded indebtedness of \$2,000,000 for construction of branch lines. City of San Diego electors also approved Proposition No. 2.
- 12-17-46 The corporate area of the San Diego County Water Authority officially became annexed to The Metropolitan Water District of Southern California.
- 12-20-46 Authority sold its \$2,000,000 bond issue for branch lines to syndicate headed by Bank of America National Trust and Savings Association.

- 1- 3-47 Chairman Heilbron and General Manager and Chief Engineer Burkholder elected to serve on Metropolitan Water District Board of Directors to represent the Authority.
- 1-27-47 Comptroller-General reports to the Congress questioning legality of expenditures on aqueduct.
- 2-25-47 Delegation from The City of San Diego, the Authority and the Metropolitan Water District appeared in Washington before Committee on Expenditures in Executive Departments regarding legality of expenditures on aqueduct.
- 5- 1-47 Committee on Expenditures in Executive Departments renders report to Congress recommending completion of aqueduct.
- 6-23-47 County Water Authority Act revised by amending Section 10 concerning annexations.
- 7- 2-47 Contract for construction of La Mesa-Sweetwater Extension awarded by the Board of Directors of the Authority to American Pipe and Construction Company.
- 7-24-47 Ordinance No. 33 adopted by the Board of Directors of the Authority fixing rate of \$12 per acre-foot for water delivered to member agencies.
- 8-28-47 Contract for Easterly Section of Fallbrook-Oceanside Branch awarded by Board of Directors of the Authority to Edward Green.
- 11-13-47 Contract for Westerly Section of Fallbrook-Oceanside Branch awarded by Board of Directors of the Authority to American Pipe and Construction Company.
- 11-24-47 Initial flow of Colorado River water passed through San Diego Aqueduct and discharged into San Vicente Reservoir.
- 12-11-47 Citizens' Aqueduct Celebration Committee sponsored a county-wide celebration commemorating the completion of the San Diego Aqueduct and the relief of an impending water shortage. Booklet entitled "San Diego's Quest for Water" presented to guests.
- 12-11-47 Water Authority took possession of San Diego Aqueduct for operation and maintenance on terms of informal interim agreement pending completion of the construction. The interim agreement was later replaced by Supplemental Agreement No. 3 to the Aqueduct Lease-Purchase Contract.
- 5-14-48 Construction contracts for the La Mesa-Sweetwater Extension formally completed.
- 6-28-48 Construction contracts for Fallbrook-Oceanside Branch completed.

## SECTION I

## THE SAN DIEGO AQUEDUCT

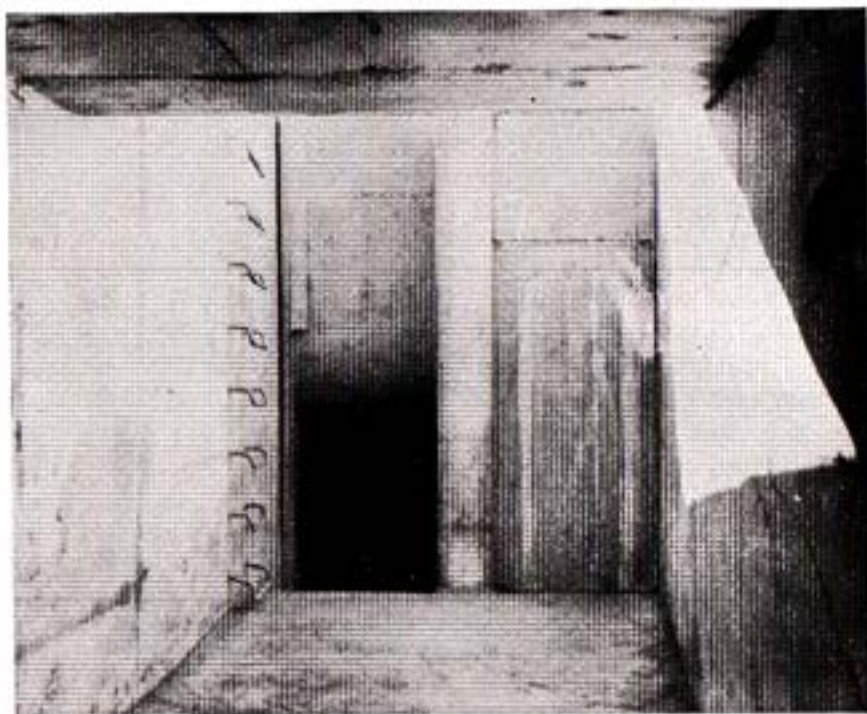
The completion of the San Diego Aqueduct in late November, 1947, narrowly averted imposition of water rationing in several of the most populous areas in the County. For the seven months' period ending June 30, 1948, the aqueduct, operating at maximum capacity, with only a brief shutdown, had delivered a total of more than 41,000 acre-feet of water to Authority agencies for distribution to consumers.

The idea of bringing Colorado River water to San Diego County had its birth in the early twenties when the matter was first discussed by officials of The City of San Diego. In 1926 the City made a filing with the State Division of Water Resources for the right to divert 112,000 acre-feet per annum from that stream. Later, in the early thirties, consideration was given to the possibility of annexing the City to the Metropolitan Water District, but no direct action looking toward the construction of an aqueduct for the purpose of bringing in such water was taken at that time. However, the great increase in the use of water following the declaration of World War II made it imperative that means be provided to augment the local supply as soon as possible by importation of water from the Colorado River. At that time investigations were undertaken looking toward the possibility of building an aqueduct.

*Events Leading to Construction*

The City and the County of San Diego entered into contracts with the Bureau of Reclamation in the Spring of 1943 for an investigation and report upon the feasibility of constructing an aqueduct. Surveys were started immediately and by the Fall of 1944 work had progressed to the point where a preliminary report, covering an aqueduct connecting the San Vicente Reservoir with the Metropolitan Water District's Aqueduct, could be made available to the President's Interdepartmental Committee which had been appointed to recommend the most feasible means available for augmenting the existing water supplies of the area.

The report of this committee, as submitted to the President on October 21, 1944, recommended the immediate construction by the Federal Government of an aqueduct extending from a point on the Colorado River Aqueduct of The Metropolitan Water District of Southern California near San Jacinto to the San Vicente Reservoir of the City of San Diego's water system. The President approved this report, directed the Bureau of Reclamation to complete plans and specifications for the work, and the Bureau of Yards and Docks, Navy



Looking into bifurcation structure from inside 72" pipe,  
San Diego aqueduct (Station 2200).

Department, to construct the aqueduct at Federal expense with the co-operation of the Bureau. Thus the construction of the San Diego Aqueduct was undertaken initially as a Federally-financed war emergency project, without any indication that local interests would be expected to reimburse the United States for any portion of the construction cost.

#### *Description of San Diego Aqueduct as Constructed*

The San Diego Aqueduct is a gravity conduit tapping the Colorado River Aqueduct of the Metropolitan Water District at the westerly portal of San Jacinto Tunnel and extending in a southerly direction to a point of discharge in San Vicente Reservoir. Its total length is 71.1 miles, of which 30.4 miles are in Riverside County and 40.7 miles are in San Diego County. Located on the aqueduct about two miles from its connection with the Colorado River Aqueduct at San Jacinto Tunnel is San Jacinto Reservoir in which 1800 acre-feet of water can be stored and used to supply the Authority whenever flow in the Colorado River

aqueduct is stopped. A location map and profile of the line are shown in Figure 3.

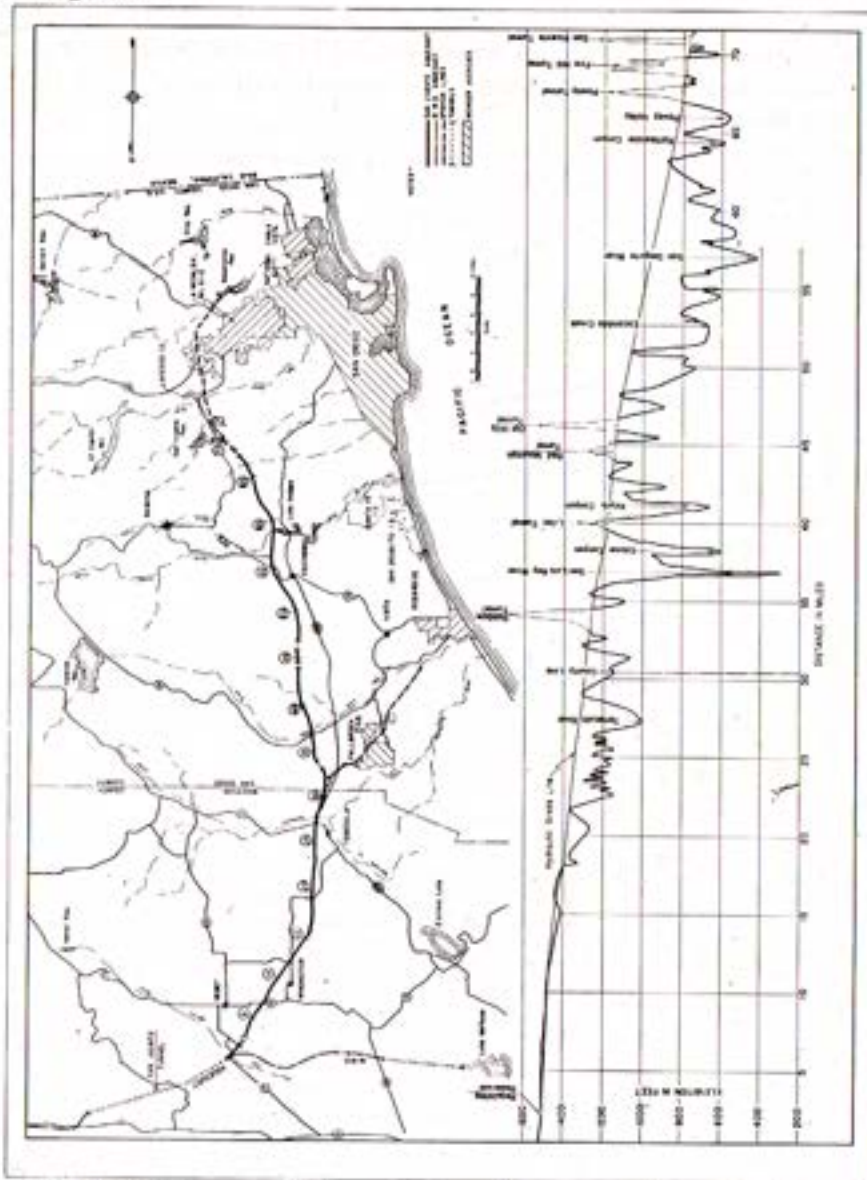


Figure 3. Plan and Profile—San Diego Aqueduct.

In general the aqueduct was designed to carry only one-half of its ultimate capacity of 165 c.f.s., but certain portions of the line, including tunnels and other inaccessible or specially difficult portions aggre-

gating 10 per cent of its length, were built to full capacity. Provision has been made for increasing the capacity when required by paralleling the present one-half capacity portions of the line. To this end bifurcation structures have been built where needed to permit installation of the second barrel with minimum interference to the operation of the present line.



Placing 72" pipe at North approach to Poway Tunnel (Station 214), San Diego Aqueduct.

As constructed, the aqueduct consists of precast reinforced concrete pipe and welded steel pipe ranging in size from 48 to 96 inches, a regulating reservoir, seven concrete-lined tunnels of six-foot horseshoe sections, and the appurtenant structures (See Table 4). Concrete pipe was employed for operating heads up to 550 feet and steel pipe was used for higher heads. Prefabricated in 12-foot and 16-foot lengths, the concrete pipe used in the aqueduct construction was of the standard lock-joint type with steel bell and spigot joint rings cast into the ends of the pipe. For pressure heads in excess of 125 feet, the walls of the pipe were reinforced with a light steel cylinder in addition to the spirally wound bars employed for the lower pressure heads. As laid in the trench, the joints between the pipe sections were sealed with synthetic rubber gaskets.

Over 9000 linear feet of 48-inch diameter welded steel pipe was employed in the construction of three siphons where operating pressure heads exceeded 550 feet. This pipe varied in thickness from 7/16 to 13/16 inches. It was protected inside and out with coal-tar enamel and cement mortar was applied over the outer coat.

TABLE 4  
SAN DIEGO AQUEDUCT—CONDUIT SIZES AND LENGTHS

Type	Length—feet	
	Unit	Total
<i>Tunnels—6-foot</i>		
Rainbow .....	4,694	
Lilac .....	500	
Red Mountain .....	3,053	
Oat Hills .....	3,592	
Poway .....	3,180	
Fire Hill .....	5,694	
San Vicente .....	2,455	
Total .....		23,168
<i>Reinforced Concrete Pipe</i>		
Diameter of 96" .....	10,645	
Diameter of 72" .....	65,420	
Diameter of 54" .....	114,734	
Diameter of 48" .....	149,090	
Total .....		339,889
<i>Steel Pipe—48" diameter</i>		
San Luis Rey Siphon .....	4,868	
Couser Canyon Siphon .....	800	
San Dieguito Siphon .....	3,595	
Total .....		9,263
Total Length of Conduit .....		372,320

### *Transfer of Navy Property to Authority*

Upon completion of the project, certain construction buildings and engineering equipment and supplies purchased with project funds were transferred to the Authority for use in the operation and maintenance of the aqueduct. The buildings transferred were a small group of frame structures used as division headquarters at Escondido. Of these buildings, three were moved to a nearby site purchased by the Authority for an operating headquarters and two were sold to the City of Escondido, which owned the land on which they were located. The equipment transferred consisted of surveying instruments and certain concrete testing laboratory items.

At the close of the work, a request was made to the Public Works Officer, Eleventh Naval District, that a complete set of engineering and construction records of the aqueduct be kept readily available in the San Diego area for the information of the two agencies operating the aqueduct. This resulted in a decision to file the original records in the Public Works Office of the Eleventh Naval District so that they would be readily available to the Authority and to the Metropolitan Water District when needed. Duplicate records on file at the Vista office were turned over to the Authority on the closing of that office, and those pertaining to the northerly half of the line have been transferred to the Metropolitan Water District for their files.

### *Total Cost of the Project*

The latest available cost of the project as given in the report of the Bureau of Reclamation entitled "Investigation, Design and Construction of the San Diego Aqueduct, U. S. Department of the Interior, Bureau of Reclamation" is as follows:

Bureau of Yards and Docks	
Construction and Supply Contracts.....	\$12,720,797.77 (1)
Rights of Way.....	243,525.00 (2)
Engineering and Overhead.....	890,200.00 (3)
<b>Total Bureau of Yards and Docks.....</b>	<b>\$13,854,522.77</b>
Bureau of Reclamation	
Actual Expenditures to August 15, 1948.....	\$ 269,289.37
<b>Grand Total Cost of Project.....</b>	<b>\$14,123,812.14</b>

- (1) This amount includes Contract NOy-11993 in connection with which a claim is on file to cover additional payments of approximately \$175,000.00.
- (2) There remain approximately 70 parcels of land for which complete costs are not available to present date.
- (3) This amount is subject to adjustment when final costs for all other items are available.



*Placing reinforcing steel for concrete bifurcation structure at North portal of San Vicente Tunnel.*

### *Personnel and Headquarters*

The Bureau of Reclamation personnel were responsible for location surveys, design work, and the preparation of specifications and final contract drawings. During the construction period the Bureau maintained a field office located first at Vista and later at Escondido. The personnel were principally engaged in checking the work in progress with the requirements of the plans and specifications.

The operations of the Bureau of Reclamation were under the general direction of Commissioners of Reclamation H. W. Bashore until December 14, 1945, and Michael W. Straus since December 17, 1945. The administration of the Aqueduct Project was under the direction of

E. A. Moritz, Regional Director, Region III, who also acted as liaison officer for the Bureau in its relations with the Navy. Walker R. Young, Chief Engineer, Branch of Design and Construction, supervised design work and preparation of specification and contract drawings. The field work was carried on from the Vista and Escondido offices under the direction of Engineer R. B. Ward until April 8, 1946, and under the direction of Engineer R. E. Burnett from that date to the completion of the work.

#### *Navy Department Personnel and Headquarters*

Construction of the aqueduct project was under the direction of Captain Alden K. Fogg, CEC, USN, Public Works Officer, Eleventh Naval District, San Diego. Field operations were under the direction of Commander Robert D. Thorson, CEC, USN, Resident Officer-in-Charge, with offices located at Vista, California. For administrative purposes the project was divided into three parts designated Northern, Central, and Southern Divisions with headquarters at Hemet, Vista, and Escondido respectively. Lt. Commander F. M. Hines, CEC, USNR, was in charge of the Northern and Central Divisions and Lt. Donald A. Gray, CEC, USNR, of the Southern Division.

General supervision of the project was under the Chief of the Bureau of Yards and Docks, Washington, D. C. Vice Admiral Ben Morecell, CEC, USN, was in charge of this office from the inception of this work to December, 1945, and was succeeded by the present incumbent, Rear Admiral J. J. Manning, CEC, USN.

#### *Construction Contracts*

In order to facilitate construction of the aqueduct project, the Navy Department divided the work into seven construction schedules and one material schedule, and proceeded to issue invitations for bids as rapidly as the contract drawings and specifications could be prepared by the Bureau of Reclamation (See Table 5). The first construction contract, covering the three southerly tunnels, was awarded to W. E. Callahan Construction Company and Gunther and Shirley on May 18, 1945. Four additional contracts were awarded before cessation of hostilities on August 14, 1945, or shortly thereafter. Soon after that time the United States moved to reduce war expenditures by cancelling many construction and supply contracts. The cancellation of existing contracts on the aqueduct project was ordered by the Secretary of the Navy on October 6, 1945, and was only averted by action on the part of officials of the City and the Authority, who flew to Washington and

in the course of a few days negotiated a contract with the Navy Department providing for the reimbursement to the United States of the construction cost of the aqueduct. This contract, known as the Aqueduct Lease-Purchase Contract (NOy-13300), was immediately executed by the City, with the understanding that it could be later transferred to the Authority upon the approval of the electors of both the City and the Authority.

The execution of the Aqueduct Lease-Purchase Contract on October 17, 1945, prevented the cancellation of the six favorable contracts previously awarded, and permitted the last two contracts, Schedules 6 and 7, to be awarded in November, 1945. The construction work was completed in about 2½ years after the date of awarding the first contract. Considering the physical difficulties encountered and the existing scarcity of men and materials, it is believed that this was an outstanding accomplishment. Plan and profile showing location of the various construction schedules of the aqueduct is shown by Figure 3.



*Excavating for 72" pipe, North approach to Poway Tunnel  
(Station 212), San Diego Aqueduct*

### *Aqueduct Lease-Purchase Contract and Supplemental Agreements*

The terms of the Aqueduct Lease-Purchase Contract provide for the completion of the aqueduct and its lease thereafter to the City or its assignee at an annual rental of \$500,000 until the true cost of construction, as defined in the contract, has been reimbursed to the United States. Provision is also made for transfer of title to the lessee when the terms of the contract have been fulfilled. The terms of this contract were later modified primarily in order to clear the way for its assignment to the Authority and to provide for the operation of the aqueduct pending the settlement by the United States of certain right-of-way matters.

Supplemental Agreement No. 1 was executed on September 23, 1946, by the United States, The City of San Diego, and the San Diego County Water Authority. It assigned the Aqueduct Lease-Purchase Contract, as amended, to the Authority upon the fulfillment of certain conditions all of which required a vote of the various interested electors to authorize the completion of the legal procedures involved therewith. An outline of the conditions follows:

- (a) That the Colorado River water rights of the City and/or County of San Diego be merged with the Colorado River water rights of the Metropolitan Water District.
- (b) That the assignment of the Aqueduct Lease-Purchase Contract from the City to the Authority, as provided for in the contract of October 17, 1945, be authorized by a vote of the electors of both the City and the Authority.
- (c) That the corporate area of the Authority shall be duly annexed to The Metropolitan Water District of Southern California.

At an election held on November 5, 1946, propositions covering the above conditions were submitted to the interested electors and were carried by an overwhelming majority of about 14 to 1.

The legal procedures incidental to the fulfillment of the various conditions under which Supplemental Agreement No. 1 would become effective were completed on December 17, 1946, when the Authority became formally annexed to the Metropolitan Water District.

Supplemental Agreement No. 2 was executed on October 29, 1946, in behalf of the United States and The City of San Diego with the approval of the Metropolitan Water District. It provides that the true cost of the aqueduct, as defined in the Aqueduct Lease-Purchase Con-

tract, shall include the cost of the transition and diversion structures constructed by the Government at the West Portal of the San Jacinto Tunnel, but that title to the aqueduct project when transferred to the City or its Assignee will not include these structures, since they are located on District lands and are an integral part of the District's water system.



*Cut-and-cover section, Southerly end of Fire Hill Tunnel, San Diego Aqueduct.*

Supplemental Agreement No. 3 was executed by the United States and the Authority as of December 11, 1947. At that time the aqueduct could not be formally transferred to the Authority under the terms of the original contract because the Navy had not completed the acquisition of rights of way. Severe drought conditions prevailed throughout the County and it was necessary that the works be placed in operation without waiting for the formal completion of construction. The Navy cooperated to this end by suggesting the execution of the supplemental agreement which would provide for the operation of the line by the Authority pending the settlement of the rights of way matters in the Federal court. The agreement entered into modifies the terms of the original contract by reducing the annual rental from \$500,000 to \$250,000, with payments to be made monthly instead of quarterly. Also it grants the Authority permission to arrange with the Metropolitan Water District for the operation and maintenance of the northerly half of the aqueduct. At the end of the fiscal year this agreement was still in force and its effective period remains indefinite.

*Operation of Northerly Half of Aqueduct by the Metropolitan Water District*

The Authority took possession of the aqueduct December 11, 1947, for operation and maintenance purposes under the provisions of Supplemental Agreement No. 3. The terms under which the Authority became annexed to the Metropolitan Water District provide that the District shall operate the northerly half of the aqueduct and repay the Authority for one-half of its annual payments to the United States under the terms of the Aqueduct Lease-Purchase Contract. On December 22, 1947, the District took over the operation and maintenance of the northerly half of the aqueduct from the Authority. The division point between District and Authority operation being a structure near the north end of the San Luis Rey siphon (Engineer's Station N 1920+00), this point being 5.9 miles south of the northern boundary line of San Diego County.

TABLE 5  
SCHEDULES OF CONTRACTS FOR SAN DIEGO AQUEDUCT  
(With completion dates and total costs)

Number Schedule	Contract Number	Description	Contract Dates			Contractor	Total Cost*
			Award	Actual Start	Completion Date		
1	NOy11993	Poway, Firehill and San Vicente Tunnels .....	5/18/45	10/22/45	8/29/47	W. E. Callahan Constr. Co. and Gunther & Shirley .....	\$ 1,049,700.00
2	NOy12575	Pipe Line and Structures Miles 2.6 to 21.9 .....	7/28/45	1/26/46	1/15/47	Concrete Pipe Constructors .....	2,214,852.00
3	NOy12759	Pipe Line and Structures Miles 46.8 to 71.3 .....	8/14/45	12/10/45	9/16/47	S. A. Healy Co .....	2,642,549.28
4	NOy12806	Rainbow, Lilac, Red Mtn. and Oat Hills Tunnels....	8/22/45	11/19/45	8/27/47	S. A. Healy Co. ....	833,519.91
5	NOy12498	Pipe line and Reservoir Miles 0 to 2.6 .....	9/5/45	9/12/45	10/18/46	Guy F. Atkinson Co. ..	1,169,681.84
6	NOy13095	Pipe Line and Structures Miles 21.9 to 46.8 .....	11/20/45	5/29/46	10/26/47	United Concrete Pipe Corp. ....	3,508,578.12
7	NOy13215	Steel Pipe-San Luis Rey R., Couser Cyn. and San Dieguito R. ....	11/20/45	12/27/45	11/15/46	Haddock-Engineers Ltd. ....	706,946.35
8	N5Sy-3213	Fabrication of Joint Ring Assemblies .....	5/14/45	10/26/45		American Pipe and Construction Co. ....	594,970.27
						Total Contract Amounts.....	\$12,720,797.77

\* These figures are tentative and may vary upon final settlement.

### *Construction Procedure*

Actual construction was initiated September 12, 1945, with a ground-breaking ceremony held at the San Jacinto River Crossing near the northerly end of the aqueduct. By December 28, 1945, work was proceeding on all schedules. Construction progress prior to June 30, 1946, is described in the First Annual Report of the Authority. On that date 12.92 miles of the total 66.14 miles of pipe had been laid, 1.95 miles of the total 4.40 miles of tunnels had been excavated, and the project was about 30 per cent completed. The construction methods followed the same general procedure as that described for the previous period. No unusual construction difficulties were encountered except for a slight earth movement in the Firchill Tunnel after holing through, which required that additional structural reinforcement be included in the lining. The aqueduct traverses some of the most rugged and inaccessible terrain in the inland valley section of San Diego County. A large amount of access road building was required before the contractors could bring in the heavy equipment required for the rapid prosecution of the work in this mountainous area.

Difficulty was experienced by the contractors throughout the execution of the work in obtaining needed materials, particularly steel and cement. Steel deliveries were governed by wartime priorities, and at times lack of steel threatened to shut down the work. Cement mills in the area though operating above their normal capacity could not meet the heavy demand of postwar construction. Sulphate-resistant cement used in the manufacture of concrete pipe for portions of the line was particularly difficult to obtain, since only one mill in this area produced this type of cement.

There was a general shortage of experienced construction labor at the time the work was being done. On the aqueduct the remote location of the work and the scarcity of living accommodations made it especially difficult to maintain forces required for scheduled progress. Minor labor troubles occurred, particularly on the tunnel contracts, but no great amount of time was lost due to strikes. In spite of these handicaps, the aqueduct was useably completed on October 26, 1947, only about three months beyond the date estimated for completion at the beginning of work.

Specifications for concrete pipe installed on the aqueduct required that leakage tests be made prior to acceptance of the work. The allowable loss per mile of conduit of the line was 100 gallons per 24 hours, multiplied by the inside diameter of the pipe in inches. On this basis

the total allowable loss for the 56 miles of concrete pipe line tested was 290,220 gallons per 24 hours. The total actual loss recorded was 75,485 gallons, or only 26% of the allowable. While this was a remarkably small loss, especially considering that pressures existed on parts of the line as high as 550 feet static head, experience with the test indicated that the loss would have been even smaller if the test sections of the line had been kept filled with water for a greater length of time to permit maximum absorption in the walls of the pipe before recording the losses.

More detailed descriptions of the construction methods are contained in reports on the project by the Navy Department and the Bureau of Reclamation. The titles of these reports are "San Diego Aqueduct Project, Report on the Need, Preconstruction Planning, Administration, Construction History and Financing, Eleventh Naval District," dated July, 1948, and "Investigation, Design and Construction of the San Diego Aqueduct, U. S. Department of the Interior, Bureau of Reclamation," dated June, 1948.

### *Aqueduct Capacity Tests*

Tests to determine flow conditions in the aqueduct and its maximum capacity were started immediately after the aqueduct was placed in operation and were carried on during the period from November 24 to December 21, 1947. Interest in the tests was widespread because of the many unusual opportunities afforded for observing the flow of the water at open structures and for determining friction losses in several sizes of pipe. Personnel of the United States Navy, the Bureau of Reclamation, the Metropolitan Water District, the Los Angeles City Department of Water and Power, the City of San Diego Water Department, the La Mesa, Lemon Grove and Spring Valley Irrigation District, and the Water Authority assisted in carrying through the tests. Mr. Fred C. Scobey, Senior Irrigation Engineer, U. S. Department of Agriculture, an eminent hydraulic engineer with long experience in determining coefficients of pipe lines, directed the tests. Flow conditions at the inlet of inverted siphons were conducted by personnel of the Bureau of Reclamation. Final results of the tests are not yet available because calibration of the Venturi meter at the inlet of the aqueduct is required for checking purposes to make the data authentic. This cannot be done until such time as the demand for water slackens so that the aqueduct can be operated at low flows. Preliminary computations indicate that the safe flow of the aqueduct may be as much as 15 per cent greater than that used in the design.

## THE METROPOLITAN WATER DISTRICT

Negotiations leading to an agreement on the terms and conditions under which the Authority might annex its corporate area to The Metropolitan Water District of Southern California have been described in the First Annual Report. On April 19, 1946, the Authority Board of Directors formally accepted the principles and conditions governing the proposed annexation as set forth in the District's communication of April 5, 1946. Steps were then taken to complete the many legal procedures required to effect the annexation. The Authority electors on November 5, 1946, by more than a 14 to 1 majority voted to annex the corporate area of the Authority to The Metropolitan Water District of Southern California. The results of the election were deposited with the Secretary of State, and on December 17, 1946, the Authority area became the fifteenth agency to hold membership in the District.

*Annexation of Authority to District*

Under the terms of annexation, the Authority will pay the District, over a period of thirty years, a sum of \$13,045,000, in approximate equal installments, without interest, and pay the future assessments levied by the District. The District in turn will reimburse the Authority for the true cost of the northerly one-half of the San Diego Aqueduct, estimated at \$7,250,000, at the rate of \$250,000 annually, and will assume the operation and maintenance of this section of the aqueduct, and increase its capacity when the water demand makes this necessary. Ownership of this section of the aqueduct will be transferred by the Authority to the District when the United States is reimbursed for the cost and title thereto is received by the Authority.

Annexation of the Authority to the District was conditioned upon the merger of the Colorado River water rights of the City and/or County of San Diego with the water rights of the Metropolitan Water District. The contract providing for the merger was executed on behalf of the United States, The City of San Diego, the San Diego County Water Authority, and the Metropolitan Water District as of October 4, 1946, and was approved by a vote of a majority of the electors of the City and the Authority on November 5, 1946. Under its terms the District will administer the combined water rights of 1,212,000 acre-feet per annum to be diverted from the Colorado River at the intake of the Colorado River Aqueduct above Parker Dam.

*Authority's Representation on the Metropolitan Water District Board*

The Authority upon its annexation to the Metropolitan Water District became the second largest constituent area in the District, with two representatives on the Board of Directors and having 27 of the total 204 votes of the Board in the fiscal year 1946-47. Chairman Fred A. Heilbron and General Manager and Chief Engineer J. L. Burkholder were appointed as directors to represent the Authority at the meeting of the Board held on January 3, 1947, and they are still serving the Authority in this capacity.

*District Financing*

The Metropolitan Water District electors by vote on September 29, 1931, authorized the sale of \$220,000,000 in bonds to finance the construction of the then-proposed aqueduct project. A total of \$180,384,000 in bonds was issued to finance the initial stage of construction, in-

TABLE 6  
ASSESSED VALUATION AND TAX RATE OF THE  
METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

Fiscal Year	Assessed Valuation Total (1)	Tax Rate Per \$100 Secured (2)
1929-30.....	\$2,439,836,920	\$0.04
1930-31.....	2,431,684,250	.03
1931-32.....	2,382,184,445	.03
1932-33.....	1,936,051,180	.04
1933-34.....	1,654,403,890	.04
1934-35.....	1,587,147,565	.10
1935-36.....	1,783,531,020	.20
1936-37.....	1,789,160,685	.37
1937-38.....	1,827,765,725	.40
1938-39.....	1,896,966,255	.40
1939-40.....	1,910,152,190	.42
1940-41.....	1,841,248,450	.49
1941-42.....	1,900,599,934	.48
1942-43.....	2,001,924,735	.48
1943-44.....	2,005,496,430	.48
1944-45.....	2,109,192,795	.48
1945-46.....	2,159,731,425	.50
1946-47.....	2,413,186,570	.48
1947-48.....	3,443,212,822 (3)	.35
1948-49.....	3,883,081,225	.34

(1) Includes secured, unsecured, and public utility valuations.

(2) Unsecured tax rate is equal to rate set for previous year.

(3) First year in which Authority assessed valuation was added to District.

TABLE 7  
GENERAL BALANCE AS OF JUNE 30, 1948  
METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

ASSETS			
<i>Permanent:</i>			
Preliminary surveys, engineering and organization expense	\$ 4,631,317.57		
Original aqueduct construction	\$178,898,757.99		
Additions and betterments	1,518,739.65		
Morris Dam and appurtenant works	6,311,180.46		
San Diego Aqueduct (estimates)	6,500,000.00		
Parker Power House (estimates)	3,300,000.00	\$196,528,678.10	
Inventories	2,216.23	196,530,894.33	\$201,162,211.90
<i>Other Construction Costs:</i>			
Los Angeles	\$ 1,203,778.49		
Pasadena	209,737.73	\$ 1,413,516.22	
Unused Power & Water to 7/31/41	2,790,868.25		
Bond interest during construction	34,767,174.97	\$ 38,971,559.44	
Less interest received on construction funds		287,684.94	38,683,874.50
Inventories—Operation and Maintenance			27,686.11
<i>Cash:</i>			
On hand and on deposit	\$ 8,786,819.20		
Less outstanding demands	101,462.96		8,685,356.24
Government securities held			16,494,980.00
<i>Accounts Receivable:</i>			
Uncollected tax assessments—1947/48	\$ 373,525.30		
Uncollected tax assessments—prior years	316,084.88	\$ 689,610.18	
Miscellaneous	\$ 206,394.30		
Cash with employees	1,500.00		
Cash deposited with State Compensation Insurance fund	500.00		
Cash deposited with American Airlines, Inc.	425.00		
Interest receivable	31,994.02	240,813.32	930,423.50
<i>Accounts Receivable—deferred</i>			
U. S. Government rate adjustment	\$ 386,748.82		13,295,905.00
Annexation charges unassessed	12,909,156.18		13,295,905.00
			\$279,280,437.25

TABLE 7 (Continued)

LIABILITIES			
<i>Long Term Indebtedness:</i>			
Outstanding bonds	\$183,836,000.00		
Contractual obligation:			
City of Pasadena	4,584,000.00		
San Diego County Water Authority	6,437,500.00		
U. S. America—Parker Power House	3,300,000.00		\$198,157,500.00
<i>Accounts Payable Due:</i>			
Bond interest—coupons not presented	\$ 65,132.50		
Special deposits	73,905.47		
Miscellaneous	373,983.61		513,021.58
<i>Accrued Bond Interest—</i>			
Not due			2,808,711.68
Reserve for Depreciation			1,709,127.91
Reserve for Workmen's Compensation & Fire Insurance			86,585.74
<i>Capital Investment—</i>			
<i>Municipalities</i>			
Beverly Hills	\$ 3,816,076.90		
Burbank	3,122,178.10		
Compton	649,841.18		
Glendale	4,014,294.64		
Long Beach	10,634,766.15		
Los Angeles	84,062,703.35		
Pasadena	5,115,691.76		
San Marino	974,803.84		
Santa Monica	3,119,294.45		
Torrance	1,358,329.58		
Anaheim	549,665.44		
Fullerton	946,801.61		
Santa Ana	1,533,310.92		
Coastal Municipal Water District	461,465.79		
San Diego County Water Authority	1,384,422.86		
	\$121,743,646.57		
Withdrawn cities	14,079.76	121,757,726.33	
Annexation charges—unassessed		12,909,156.18	
		\$134,666,882.51	
Surplus—"Deficit"—this fiscal year	\$ 8,027,032.44		
Surplus—"Deficit"—prior fiscal year	52,155,115.83	60,182,146.27	\$ 74,484,736.24
Funds collected and applied to construction		1,421,330.69	
Work contributed by Municipalities (connections)		99,423.41	76,005,490.34
			\$279,280,437.25

cluding Parker Dam, the aqueduct, the distributing system, and the treatment works. Funds required to meet the debt and services and for operation and maintenance of the system have been largely obtained from the sale of water and power and from tax assessments.

The District levied its first taxes in the fiscal year of 1929-30 with a rate of 4 cents per \$100 on an assessed valuation of the District of \$2,439,836,920. The assessed valuation of the District and the established tax rate from that year to the present are contained in Table 6.

The assessed valuation of the District increased by \$1,030,026,252 in the fiscal year 1947-48, an increase of about 43 per cent. The Authority was annexed to the District on December 17, 1946. It was included in the tax levy for the first time in 1947-48 and accounted for \$307,298,040 of the increase. Excluding the Authority, the increase in assessed valuation of the remaining areas was 30 per cent, compared with an increase of about 14 per cent in the Authority's assessed valuation. The District's rate of increase was much greater than had prevailed in previous years due, in part, to a general blanket increase in assessed valuation in some areas.

#### Back Taxes

In addition to the basic tax rate levied against all property in the District, those agencies and areas which were annexed to the District after the initial tax levy, have been required by the terms of annexation to pay to the District the taxes which they would have paid had they been members of the District from its inception, together with delinquent interest to the date of annexation. In later years these back tax payments have amounted to substantial sums, and the District has permitted the payment to be spread over periods up to 30 years, with the District being empowered to levy an additional special tax on each area sufficient to meet the annual amounts due from the area on its back tax assessment. The total amount of money to be raised from the Authority for back taxes was fixed at \$13,045,000, payable in 30 annual payments of about \$434,600 per year. The special tax rate levied to meet these annual payments and the amounts raised by these levies are as follows:

1947-48—rate of 17¢ per \$100—\$452,744.32

1948-49—rate of 13¢ per \$100—\$459,423.88

A general balance sheet showing the financial condition of the District at the end of the fiscal year 1947-48 is contained in Table 7.

#### District Water Deliveries and Rates

During the year 1947-48 the total quantity of water delivered by the District to its member agencies practically doubled, due primarily to the large amount of water supplied to the San Diego County Water Authority. The quantities of water delivered during the last four years to the several agencies of the District is shown in Table 8. All agencies except San Marino took some water during the past year.

The rates for water delivered to member agencies continue to be \$8 per acre-foot for untreated water and \$7 per acre-foot additional, or \$15 per acre-foot, for treated water. Studies are under way to determine the feasibility of increasing these rates in the near future.

TABLE 8  
WATER DELIVERY  
Acre Feet

	1944-45	1945-46	1946-47	1947-48
<i>Softened Water</i>				
Anaheim .....	1,904.8	2,516.7	2,558.6	2,585.0
Beverly Hills .....	2,581.5	3,051.1	3,933.7	2,576.6
Burbank .....	746.5	624.1	1,492.8	1,720.6
Coastal M.W.D. ....	1,202.8	1,441.5	1,655.3	2,611.9
Compton .....	330.3	491.5	1,475.2	1,386.5
Fullerton .....	488.9	979.2	1,235.2	1,210.6
Glendale .....	0	0	527.6	906.4
Long Beach .....	4,943.0	9,582.6	10,815.1	13,855.1
Los Angeles .....	319.2	4,093.5	7,657.8	12,661.0
Pasadena .....	4,426.6	8,789.2	12,354.2	14,673.1
San Marino .....	0	0	0	0
Santa Ana .....	4,805.5	5,511.5	5,366.3	5,727.8
Santa Monica .....	8,806.7	9,471.3	10,224.4	10,606.0
Torrance .....	35.5	133.6	565.6	1,474.8
Spadra .....	176.9	163.7	212.4	79.3
Total .....	30,768.2	46,849.5	60,074.2	72,074.7
<i>Natural Water</i>				
S. D. County Water Auth. ....	—	—	—	41,093.5 (1)
U. S. Army .....	1,538.8	1,100.5	311.6	87.5
Grand Total .....	32,307.0	47,950.0	60,385.8	113,255.7
Expressed in other units these grand total quantities become:				
Cubic feet per second.....	44.6	66.2	83.4	156.43
Million gallons daily.....	28.84	42.78	53.90	101.12

(1) For 7-month period. First delivery of water to Authority was made on November 24, 1947.

*Quality of Water*

An average of several chemical analyses of Colorado River water at the San Jacinto Reservoir has been made by the District and is shown in Table 9. This analysis is believed to be indicative of the water supplied to the Authority during the past several months of operation. It is expected that monthly determination of the quality of water delivered to the Authority will be available during the next fiscal year.

TABLE 9

**ANALYSES OF SAMPLES FROM SAN JACINTO RESERVOIR**  
Average Analysis for period from December 1947 to November 1948

Constituent	Symbol	Parts Per Million
Silica.....	SiO <sub>2</sub>	10
Iron.....	Fe	.02
Calcium.....	Ca	79
Magnesium.....	Mg	28
Sodium and Potassium.....	Na & K	96
Carbonate.....	CO <sub>3</sub>	0
Bicarbonate.....	HCO <sub>3</sub>	138
Sulphate.....	SO <sub>4</sub>	289
Chloride.....	Cl	76
Nitrate.....	NO <sub>3</sub>	0.2
Total dissolved solids.....		647
Hardness as CaCO <sub>3</sub> Total.....		312
Carbonate.....		113
Noncarbonate.....		199
Free CO <sub>2</sub> .....		1
Hydrogen ion concentration (pH).....		8.2
"Percent sodium".....		40
Electrical conductivity (ECX10 <sup>6</sup> @25°C).....		1020

### SECTION III

#### OPERATION AND MAINTENANCE

The 1947-48 fiscal year witnessed a change in the principal activity of the Authority from construction to operation and maintenance. In December, 1947, the Authority took over the operation and maintenance of the southerly half of the San Diego Aqueduct. In April, 1948, the La Mesa-Sweetwater Extension was placed in operation, as was also the northerly section of the Fallbrook-Oceanside Branch. By the end of June, this latter water line had been completed to Oceanside, and the entire water system as now planned was in operation. Although the San Diego Aqueduct had been in operation for only about a 7-month period, by the end of the fiscal year it had delivered over 41,000 acre-feet of water to the agencies of the Authority—an amount equivalent to 48 per cent of the total quantity of water used by the agencies during the entire fiscal year. During this entire period, the demand for water was greater than the supply.

*Escondido Headquarters*

Following the transfer of the San Diego Aqueduct to the Authority, it became necessary to build up an operation and maintenance force and to obtain a central site for a yard and the buildings required for the storage of materials and the maintenance and repair of equipment employed in operating and maintaining the southerly one-half of the aqueduct and the branch lines to be later incorporated in the system. Escondido was selected for this purpose because existing highways and roads made all parts of the system easily accessible from this point. Also certain Navy Headquarters buildings proposed to be transferred to the Authority were located in Escondido on land leased to the Navy by the City, and it was hoped that this property could be acquired at a reasonable figure by the Authority. It later developed that more economical arrangements for a permanent headquarters could be worked out by purchasing a nearby block of land owned by the Santa Fe Land Improvement Company and occupied as an operating headquarters by the S. A. Healy Company, one of the aqueduct contractors. Possession of this property, designated as Block 107 in Escondido and bounded by Fourth, Fifth, Redwood, and Quince Streets, was taken on January 8, 1948, and active plans were developed for moving the Navy buildings to this site and for making necessary alterations.

The completed Escondido headquarters will consist of a maintenance shop and garage, office buildings, warehouses, and a residence for the

superintendent. Also it will include ample yard storage space, all to be protected by a chain-link fence. Pending completion of these facilities, the Authority early in 1948 took over the lease for the Navy headquarters site and Authority operation and maintenance forces occupied the building. The contract for moving these buildings to the new site was not entered into until June 28, 1948.

#### *Placing Aqueduct System in Operation*

The San Diego Aqueduct was placed in service November 24 to November 26, 1947. The head gate at the San Jacinto Regulating Reservoir was opened on the former date to permit the passage of about 15 c.f.s. into the line, and by 2 a.m. November 26 this flow had filled the aqueduct, and the first flow of Colorado River water was entering San Vicente Reservoir. The reservoir gates were then operated to obtain gradually increasing flows in order to provide a flow of 50 c.f.s. on December 1, 1948, when the capacity flow tests described in Section I were scheduled to begin. The testing program required that the flows from the regulating reservoir be maintained at rates varying from 30 c.f.s. to 104 c.f.s. At the completion of the tests on December 21, 1947, the aqueduct was placed in operation delivering its maximum flow of 104 c.f.s. to San Vicente Reservoir. At that time the Metropolitan Water District took over the operation of the northerly portion of the line extending from the west portal of San Jacinto Tunnel to the San Luis Rey River crossing.

At the beginning of operation of the San Diego Aqueduct, the Authority had under construction the La Mesa-Sweetwater Extension and the Fallbrook-Oceanside Branch. These branch lines when completed would enable the Authority to deliver Colorado River water to the six Authority agencies which, together with the City of San Diego, compose the Authority membership. At that time an emergency existed in the water supplies of National City, Chula Vista, and the La Mesa, Lemon Grove and Spring Valley Irrigation District which only the City of San Diego with its vast system of distribution lines could relieve. Under an agreement between the interested parties, a portion of the Colorado River water delivered to San Vicente Reservoir was charged by the Authority to the account of the three distressed agencies. Inter-connections between the distributing lines of the City and of the above-mentioned agencies having been installed, it was then possible to deliver Colorado River water from San Vicente Reservoir directly to these agencies. Suitable charges for transportation and

treatment of water so delivered were made by the City directly to the agencies. This arrangement remained in force until the completion of the La Mesa-Sweetwater Extension to the Lakeside Control Station and the delivery of water to the La Mesa, Lemon Grove and Spring Valley Irrigation District on March 23, 1948, and until the completion of the line between the Control Station and the Sweetwater Reservoir and the delivery of water to Chula Vista and National City on April 16, 1948.

Provision has been made at the Lakeside Control Station for delivery of Colorado River water to the Lakeside Irrigation District. It has as yet used no water, pending the construction by the District of a water line connecting the Control Station with the District's distribution system.

Colorado River water was first delivered to the Fallbrook Public Utility District upon the completion of the Fallbrook-Oceanside Branch to the Fallbrook Control Station on April 28, 1948. The westerly portion of this branch, extending from the station to the Oceanside wells was not useably completed until June 24, 1948, and this portion of the line has not as yet been placed in service.

#### *Completion of Branch Lines*

The formal completion dates for the several contracts as filed with the County Recorder's Office are as follows:

<i>Specification Number</i>	<i>Project and Contractor</i>	<i>Completion Date</i>
103	La Mesa-Sweetwater Extension American Pipe & Construction Company.....	May 14, 1948
104	Easterly Section of the Fallbrook-Oceanside Branch Edward Green .....	May 13, 1948
105	Westerly Section of the Fallbrook-Oceanside Branch American Pipe & Construction Company.....	June 28, 1948

#### *Acquisition of Maintenance Equipment*

All the problems involved in the maintenance of the water system now being operated by the Authority cannot be defined until more experience with the work is gained. For this reason the acquisition of heavy equipment was postponed until its need might be demonstrated. However it was realized at the outset of the work that perhaps the most urgent problem would be the upkeep of existing access roads and the construction of additional roads where needed. It was also realized

that the construction of 68 miles of pipe line in the mountainous region of the County would create extensive erosion problems which could endanger the pipe lines unless repairs were undertaken promptly.

The minimum amount of maintenance equipment required to meet the immediate needs of the Authority as expressed above consists of a road grader, a tractor-bulldozer, and a utility truck, all of medium-sized capacity. Delivery of the grader was made in May 1948, and at the end of the fiscal year orders had been placed for the other equipment. Automotive equipment purchased initially for operation and maintenance of the aqueduct consisted of two jeeps and two one-half ton pick-up trucks. Later, upon the completion of branch line construction, automotive equipment used on that work was transferred to operation and maintenance. The transferred equipment consisted of one jeep, one station wagon, and one one-half ton pick-up truck. Due to the steepness of the terrain, jeeps are essential for patrol work on the main aqueduct.

#### Patrol of Pipe Lines

When the aqueduct was first placed in operation drought conditions made it necessary that the aqueduct be immediately operated at maximum capacity. It was then deemed desirable to patrol the line each day in order to check the 25 open vent structures and the 39 air valves so that bottlenecks might be recognized and possible overflow prevented. A series of measurements were started, reflecting the freeboard in the open vent structure for various quantities of flow. These measurements have been continued and the data so obtained has been used to determine the maximum permissible flow. This data will serve also to indicate possible change in coefficient of flow at the various sections of the aqueduct. With the maximum permissible flows determined and all bottlenecks identified it became possible to reduce the frequency of inspection of the structure and thus reduced the time required for the patrol of the line. The present patrol schedule provides for a bi-weekly visit to each airvalve and open vent structure. Blow-offs and other structures are carefully inspected once each month. The operating valves and meters are inspected at least once each week and more frequently if changes in flow are to be made. Two regular patrols are maintained daily, both starting at Escondido, one taking the southerly portion of the aqueduct system and the other the northerly section.

TABLE 10  
WATER DELIVERY TO MEMBER AGENCIES  
1947-48

Agency	PREFERENTIAL RIGHTS as of 6/30/48 (1)		TOTAL SALES	MEAN ANNUAL DELIVERY (2)		MAXIMUM MONTHLY DELIVERY		MAXIMUM HOURLY DELIVERY	
	c.f.s.	acre-feet		c.f.s.	% of entitlement	c.f.s.	% of annual	c.f.s.	% of annual
Chula Vista and National City (California Water & Tele. Co.)	6.19	3,636.6	8.37	135	15.98	190	16.00	191	
Fallbrook Public Utility Dist.	0.66	690.6	5.44	825	6.20	114	8.50	156	
Lakeside Irrigation District	0.12	0	0	0	0	0	0	0	
La Mesa, Lemon Grove & Spring Valley Irrigation District	6.42	4,236.3	9.80	153	17.50	179	24.00	245	
Oceanside	2.34	0	0	0	0	0	0	0	
San Diego	84.27	32,461.0	74.73	89	85.02	114	104.00	139	
Totals	100.00	41,044.5	98.34	98	—	—	—	—	

(1) Based on present capacity of San Diego Aqueduct of 100 c.f.s.

(2) For period from date of first water delivery to June 30, 1948.

NOTE: Water was delivered to the California Water and Telephone Company and to the La Mesa, Lemon Grove and Spring Valley Irrigation District through the City of San Diego water system before the branch lines were placed in operation.

*Water Sales by Authority*

The total quantity of water delivered by the Authority to its member agencies from the date of beginning delivery on November 24, 1947, to June 30, 1948, was 41,044.5 acre-feet, as shown in Table 10. Except for water taken by The City of San Diego and the La Mesa, Lemon Grove and Spring Valley Irrigation District, a portion of which was stored in the San Vicente Reservoir of the City, all water delivered by the Authority was used to meet the immediate demands of the agencies. The City of Oceanside and the Lakeside Irrigation District did not take water during the period, having as yet installed no connections to the Authority lines. The total use of water in all the agencies of the Authority during the fiscal year was 85,937 acre-feet. The Authority in a period of only seven months supplied its agencies with 48 per cent of this total quantity.

The mean annual quantity of water in cubic feet per second delivered to Authority agencies and the preferential rights of agencies are also shown in Table 10. All agencies taking water, except The City of San Diego, used average amounts in excess of their preferred rights ranging from 135% for Chula Vista and National City to 825% for the Fallbrook Public Utility District. The maximum monthly deliveries varied from 114% to 190% of the mean annual deliveries, and the maximum hourly deliveries varied from 139% to 245% of the mean annual. These large variations in rate of water delivered to member agencies with the aqueduct operating at maximum capacity were only possible because of the large storage capacity in San Vicente Reservoir which permitted the City to vary its take of Colorado River water in order to permit needs of the other agencies to be met.

*Water Use of Member Agencies*

The total water use of member agencies of the Authority for the four years 1944-45 to 1947-48 inclusive is shown in Table 11. All water used prior to 1947-48 was obtained from local sources. The first Authority water was delivered on November 24, 1947, and the amount and percentage of Authority water actually used during the fiscal year 1947-48 are shown in that table. In the case of La Mesa, Lemon Grove and Spring Valley Irrigation District and of The City of San Diego, the use was somewhat less than the amount delivered because these agencies placed in storage in San Vicente Reservoir a portion of the water delivered to them.

TABLE 11  
SAN DIEGO COUNTY WATER AUTHORITY—TOTAL WATER USE OF MEMBER AGENCIES

Member Agency	ACRE-FEET OF WATER USED				From Local Sources		1947-48		Total Acre-feet
	1940-41	1941-42	1942-43	1943-44	1944-45	1945-46	1946-47	From Authority Supply Percent	
Chula Vista and National City (1) (California Water & Tele. Company)	7,501	9,588	9,075	9,963	9,288	10,799	10,518	35.4	10,266
Fallbrook Public Utility District	430	780	985	1,056	1,161	1,644	2,227	19.9	3,471
Lakeside Irrigation District	52	53	58	62	70	73	89	0	103
La Mesa, Lemon Grove and Spring Valley Irrigation District	4,895	4,903	6,454	7,316	7,423	8,920	9,788	34.4	10,290
City of Oceanside	1,149	1,189	1,507	1,713	1,881	2,304	2,520	0	2,787
City of San Diego (2)	32,490	39,310	49,823	56,378	59,830	63,991	57,327	6.4	59,020
Totals	46,517	55,823	67,902	76,488	79,653	87,731	82,469	13.5	85,937
Member Agency	From Local Supply		From Authority Supply		1947-48		Total		
	Acre-feet	Percent	Acre-feet	Percent	Acre-feet	Percent	Acre-feet	Percent	Acre-feet
Chula Vista and National City (1) (California Water & Tele. Company)	6,629	64.6	3,637	35.4	3,637	35.4	10,266	35.4	10,266
Fallbrook Public Utility District	2,780	80.1	691	19.9	691	19.9	3,471	19.9	3,471
Lakeside Irrigation District	103	100.0	0	0	0	0	103	0	103
La Mesa, Lemon Grove and Spring Valley Irrigation District	6,751	65.6	3,539 (3)	34.4	3,539 (3)	34.4	10,290	34.4	10,290
City of Oceanside	2,787	100.0	0	0	0	0	2,787	0	2,787
City of San Diego (2)	55,258	93.6	3,762 (3)	6.4	3,762 (3)	6.4	59,020	6.4	59,020
Totals	74,308	86.5	11,629 (3)	13.5	11,629 (3)	13.5	85,937	13.5	85,937

(1) Includes some water sold to areas adjacent to the two cities.  
(2) Including water sold by San Diego City to outside contract agencies.  
(3) A portion of water delivered by Authority remained in storage.

The use of water by the several agencies, except Chula Vista and National City which remained practically constant, continues to show an upward trend in spite of a drive by all agencies through newspaper publicity and leaflets urging their consumers to conserve water in view of a possible continuation of the present drought.

The water use per acre of Authority agencies for the year 1947-48 is shown in Table 12 on the basis of the estimated using water area within each agency. These areas have been determined from maps of water systems, aerial photographs, and personal inspection, and are believed to be approximately correct. It is of interest to note that there is fairly close agreement among all agencies except San Diego in the amount of water used per acre.

TABLE 12  
WATER USE PER ACRE  
1947-48

Agency	Gross Area	Estimated Water-using Area	Total Use of Water	Water Duty
	acres	acres	acre-feet	ac.-ft./acre
Chula Vista and National City (California Water & Tele. Co.).....	6,190	7,730 (1)	10,266	1.3
Fallbrook Public Utility Dist.....	4,740	2,500	3,471	1.4
Lakeside Irrigation District.....	1,415	75	103	1.4
La Mesa, Lemon Grove & Spring Valley Irrigation District.....	18,275	7,800	10,290	1.3
Oceanside .....	5,888	2,050	2,787	1.4
San Diego .....	63,031	24,060	50,534	2.1

(1) Includes areas adjacent to the two cities.

#### Quality of Water

The Authority has no facilities for making chemical analyses of the water delivered to its agencies. The Metropolitan Water District has made several chemical analyses of the water in the San Jacinto Reservoir. The average of such analyses made during the year 1947-48 is contained in Table 9 in Section II of this report.

#### Rules Governing the Sale and Delivery of Colorado River Water

The Board of Directors of the Authority by Ordinance No. 33 adopted on July 24, 1947, prescribed the rates at which Colorado River water would be sold to member agencies of the Authority and estab-

lished rules governing the sale and the delivery of such water as follows:

SECTION 1. That the rate for untreated water shall be \$4.00 per acre-foot plus the rate which the Authority pays to The Metropolitan Water District of Southern California for water, currently \$8.00 per acre-foot, making a total of \$12.00 per acre-foot, prorated to any fractional part of an acre-foot delivered.

SECTION 2. That the Authority, at its expense, shall provide for the delivery of water to each Agency at a single point mutually agreed upon by the Authority and the Agency, said expense to include necessary meters, control valves, and appurtenant structures. Any Agency desiring delivery of water at more than one point shall make request for the additional outlet or outlets and, if such request is granted by the Board, shall pay for the entire cost thereof. Any such additional outlets, including meters, control valves, and structures pertaining thereto shall be constructed, owned, and operated by the Authority.

SECTION 3. That the Authority shall be under no obligation to deliver water, or make any substantial change in the quantity of water delivered to any Agency, on less than eighteen (18) hours' notice from such Agency desiring or taking such water.

SECTION 4. That all water delivered by the Authority shall be metered. Meter readings shall be made on the last day of each calendar month. Meters shall be tested at intervals of not less than one year at the expense of the Authority. Any member agency may have the meter through which it is served tested at any time at its own expense, but such test shall be made by the Authority. Any Agency affected shall have the right to be represented by a qualified observer at and during any such tests. In the event that any such test shall disclose an error exceeding two per cent (2%), an adjustment shall be made in charges against the Agency affected covering the known or estimated period of duration of such error, but in no event exceeding six (6) months.

SECTION 5. That invoices stating the amount of water delivered to each Agency during each month shall be mailed to the chief executive of such Agency not later than the 5th day of the following month, and payment therefor shall be due on the first day of the next succeeding month.

SECTION 6. That in the event that any Agency shall desire invoices and other notices to be sent to some other officer or department of such Agency, notice of such desire shall be given the General Manager and Chief Engineer of the Authority in writing, and thereafter invoices and notices shall be mailed as desired by such Agency.

SECTION 7. That all notices and communications from Agencies whose areas are within the Authority relating to the service of water or the administration of these regulations by the Authority shall be addressed to the General Manager and Chief Engineer of the Authority at the offices of the San Diego County Water Authority, San Diego, California.

SECTION 8. This ordinance shall take effect and be in force from and after its adoption.

SECTION IV  
ENGINEERING

The engineering activities of the Authority during the past two-year period have been principally centered around two main projects, the completion of the San Diego Aqueduct and the authorization and construction of the aqueduct extension and branch lines. During the planning and construction stages of the San Diego Aqueduct project, the responsibilities of the Authority in this work were limited to the task of developing such changes in design and construction as might better adapt the completed work to the future needs of the Authority if the aqueduct was later taken over by it. Following the approval by the Board of Directors on June 28, 1946, of the general policy to be followed in delivering water to member agencies, work was started in September, 1946, on the location and design of the La Mesa-Sweetwater Extension. The undertaking of similar work on the Fallbrook-Oceanside Branch was not started until early in March, 1947. Employment of engineering personnel was at its peak from September, 1947, to March, 1948, inclusive, when construction of branch lines was being pushed all possible because of the impending shortage in water supplies.

*San Diego Aqueduct*

Throughout the construction of the San Diego Aqueduct the Authority engineering staff maintained close contact with the engineers of the Bureau of Reclamation and Navy Department in an effort to obtain a completed project which would best fill the needs of the Authority areas. To this end studies were made involving economic comparisons of half capacity versus full capacity construction for various portions of the line, and the possible future needs for diversion structures at various locations. Tentative designs were prepared and forwarded to the Bureau of Reclamation for the design covering two diversion structures required to serve the branch lines to be constructed by the Authority. Beginning in January, 1946, and continuing through the construction period an engineer inspector was maintained on the project for the purpose of gaining first-hand information and keeping records on the rate of progress and the character of materials encountered.



*Bronze tablet at Fallbrook Control Station.*

As the construction neared completion, a program of comprehensive flow tests to be carried out when the line was first placed in operation was mapped out in cooperation with the Metropolitan Water District and Fred C. Scobey, Senior Irrigation Engineer, U. S. Department of Agriculture. This program is described in Section I.

### *Branch Lines*

Preliminary studies of possible branch lines required to supply the widely separated member agencies of the Authority with Colorado River water are fully described in Section VIII of the Authority's First Annual Report. The recommended plan involved the construction of branch lines at an estimated cost of \$2,000,000. An election was held on November 5, 1946, to authorize the incurring of bonded indebtedness for this amount, and the electors by more than a 13 to 1 vote authorized the Authority to incur such indebtedness.

At that time it was realized that a continuation of the drought would cause a serious shortage in the water supply of Chula Vista, National City, and the La Mesa, Lemon Grove and Spring Valley Irrigation District by the summer of 1948, and that branch lines serving these agencies must be completed by that time in order to prevent great economic loss to these communities. Due to this emergency, an effort was made to expedite in every way possible the preparation of contract drawings and specifications and the letting of contracts. The time permitted for completion of the contracts was held to a minimum even though this may have resulted in slightly higher unit prices.

Construction drawings, estimates, specifications, and contracts for branch line construction were prepared in the engineering office, and bids were solicited by advertising and by mailing notices to leading California contractors. Competitive bids were received and contracts were awarded by the Directors to the low bidders. As the work proceeded, detailed working drawings were prepared promptly as needed by the contractors.

Early in the construction program the Authority was granted permission to use the Navy testing laboratory at Vista for testing concrete specimens and earth compaction samples. Upon completion of aqueduct construction, operation of this laboratory was turned over to the Authority and used throughout the remainder of the construction program. All phases of the construction work were inspected by qualified Authority personnel except for the fabrication of concrete and steel pipe in the vicinity of Los Angeles. In this case it was found that inspection could be handled more economically by a commercial firm of testing engineers.

### *Rights of Way*

As soon as final locations for the branch lines were established on

the ground property, surveys were made to obtain the data needed for preparing of right of way maps. Such maps were then prepared from the data supplied by these and previously recorded surveys in sufficient detail to show the property ties and to permit legal descriptions to be made therefrom for each parcel of land to be acquired. Ownership records of the various parcels were obtained by referring the right of way maps to commercial land title companies for a title search and report thereon.

Of the 32.5 miles of branch pipe lines constructed during this period, about 18.0 miles is located in rights of way for State and County roads, while the remaining 14.5 miles is located on private lands. Encroachment permits for the occupancy of the public rights of way with pipe lines and appurtenant structures were granted by the State Department of Public Works, Division of Highways, and by the County Road Commissioner upon request thereof by the Authority.

Where the pipe lines were to be constructed on private lands, permanent exclusive easements were obtained from the owners. In this case the agreements with the owners generally provided for a right of way width of 40 or 50 feet covering space for construction, operation, and maintenance of the line. They also provided the right of egress and ingress. Through groves and other high-valued lands, the width of the permanent right of way was reduced to as little as 20 feet, and temporary rights covering the use of an additional width during the construction period were secured. The agreements permit the owners to use of the land within the right of way for agricultural purpose, except for the planting of trees, but forbid the erection of any buildings thereon. Lands required for the control stations at Lakeside and Fallbrook were purchased in fee.

To facilitate the acquisition of right of way easements, the Board of Directors adopted ordinance No. 23 establishing a procedure governing the purchase and acquisition of rights of way and providing for the appointment of a Lands and Rights of Way Committee, appraisers and appraisal committees, and a right-of-way agent, and prescribing their respective rights and duties. Under the outlined procedure a fair value of each parcel of right of way required to be obtained was fixed by appraisal committees consisting of three persons representing the communities to be served by the branch lines proposed for construction. The right-of-way agent was authorized to acquire the various parcels of rights of way at prices not to exceed those fixed by the appraisal committees. If it was impossible to reach an agreement with the property

owners on the basis of the appraised value, the rights of way committee was empowered to set a higher figure or to recommend to the Board that the property be condemned. In general, easements were obtained within the value fixed by the appraisal committees. The only condemnation suit filed in the court was in connection with a piece of property owned by a foreigner who could not be located.

A detailed statement of the length of line on private and public lands and the number of right-of-way parcels obtained for each line is shown in Table 13.

TABLE 13  
RIGHTS OF WAY

Branch Line and Schedule	Length of Pipe Line	Rights of Way on Private Lands		Number of Parcels
		Feet	Per cent of Total	
<i>La Mesa-Sweetwater</i>				
Schedule 1 .....	21,956	13,793 ±	62.5	37
Schedule 2 .....	2,862	2,835 ±	98.9	6
Schedule 3 .....	62,359	15,599 ±	25.0	19
Total.....	87,177	32,227 ±	37.0	62
<i>Fallbrook-Oceanside</i>				
Easterly Section .....	31,973	7,987 ±	25.0	13
Westerly Section .....	52,756	36,341 ±	68.9	33
Total.....	84,729	44,328 ±	52.3	46

#### *Changes in Boundaries of Authority Area*

In order that the tax levies of the Authority shall cover all of the property legally within its corporate area, the boundary descriptions of the agencies as filed with the County and State authorities must be revised annually not later than February 1. Such revisions are made by compiling new legal descriptions and maps of areas that may have become annexed to the agencies and of any new agencies which may have become incorporated in the Authority during the period. During 1948 the preparation of these legal descriptions and maps was particularly arduous due to the necessity of preparing new maps and legal descriptions of the entire Authority area as of January 1948 for the use of the Metropolitan Water District in preparing similar records for filing on behalf of the District.

#### *Reports on Areas Seeking Annexation*

The engineering staff has rendered reports to the Board on all areas formally seeking annexation to the Authority. Such reports were of a factual nature, including among other things information on growth of area, its present water facilities, its outstanding indebtedness, and the estimated cost to the area of annexation to the Authority and the Metropolitan Water District. Reports covering the Santa Fe Irrigation District, San Dieguito Irrigation District, and the Crest Public Utility District have been made to the Board. Frequent requests are received for informal information on the eligibility of certain areas for annexation to the Authority and for estimates of costs of annexing.

#### *Report on enlarging the San Diego Aqueduct*

On March 11, 1948, by Resolution No. 85, the Board of Directors requested the General Manager and Chief Engineer to make an investigation and study of the need and feasibility of enlarging the San Diego Aqueduct. A report was submitted to the Board of Directors in June, 1948. This report was approved by the Board of Directors on July 29, 1948, and circulated among those interested and concerned with the San Diego Aqueduct.

#### *Miscellaneous Activities*

Plans were prepared for revamping the buildings at the Escondido maintenance and operations headquarters. Specifications covering the electrical, plumbing, and plastering work were issued and bids received, and recommendations for award presented to the Board. Work on this project was just getting under way at the end of the period.

All contract drawings and land plans prepared for the construction of the branch lines were revised to conform with the work as actually built. The revisions covered entirely the smaller changes made in the lines during construction due to unforeseen difficulties encountered when the site was uncovered.

The amount of water carried by the aqueduct and its distribution among the agencies of the Authority was computed for ten-day periods to provide basic data to The City of San Diego Water Department for their determination of the quantity of water in storage. These computations also form the basis for determining the monthly deliveries of water by the Authority to member agencies, for which they are billed.

## SECTION V CONSTRUCTION

Acting upon a report dated June 7, 1946, entitled "Report of General Manager and Chief Engineer Recommending a Plan for Distributing Colorado River Water to the Authority Agencies" the Board of Directors on June 28, 1946, adopted the plan recommended in the report requiring the Authority to construct at its expense the aqueduct extension and the branch lines required to deliver Colorado River water by gravity into existing water systems of member agencies at the most practical and economical point for the Authority.

No funds were available for beginning any portion of the work incident to distributing the water to be brought into the area by the San Diego Aqueduct until January, 1947, when the proceeds from the sale of \$2,000,000 of bonds became available. Engineering forces were then immediately employed and survey equipment was purchased as rapidly as it could be secured. Pending its arrival, a local engineering firm was employed to make the location surveys of the La Mesa-Sweetwater Extension.

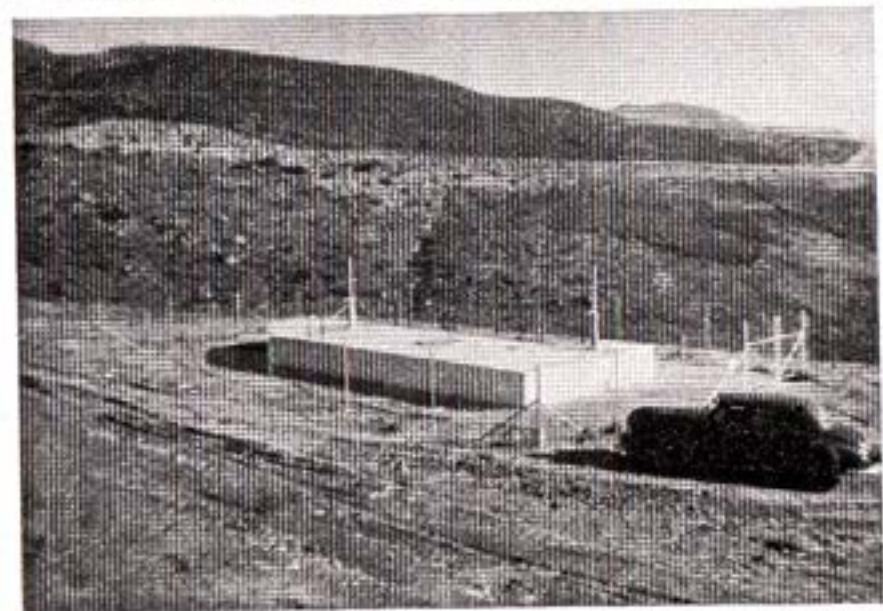
Due to the impending water shortage and the urgent need for delivering water to certain areas at the earliest possible date, the construction program was divided into several construction schedules and the work was advertised at three different times from May 26, 1947, to October 15, 1947. Satisfactory bids were received and construction under the awarded contracts was completed from May 14, 1948, to June 28, 1948.

### *La Mesa-Sweetwater Extension*

The La Mesa-Sweetwater Extension diverts from the San Diego Aqueduct at aqueduct South Station 49+55 in Slaughterhouse Canyon and extends generally southerly a distance of about 16.6 miles to the Sweetwater Reservoir. It supplies water to La Mesa, Lemon Grove and Spring Valley Irrigation District, the Lakeside Irrigation District, and the Cities of Chula Vista and National City. These cities are served by the California Water and Telephone Company, a private corporation which owns the Sweetwater Reservoir. The diversion works on the aqueduct consist of an open concrete structure containing regulating gates controlling the flow into the extension and the flow into San Vicente Reservoir. Normally this latter flow passes over a 30-foot weir, thus maintaining a practically constant pressure head on



*La Mesa-Sweetwater Extension—Laying first pipe on Sept. 18, 1947*



*Works on San Diego Aqueduct for diverting water to La Mesa-Sweetwater Extension.*

the head gate serving the extension. The diversion works are arranged so that changes in the amount of water delivered from the extension to various agencies can be controlled at a station located near Lakeside at milepost 4.7 miles without making changes in gate openings at the diversion structures.

The Lakeside Control Station is a reinforced concrete building approximately 16 feet by 40 feet in plan, containing a basement which houses the valves and metering devices serving four Authority agencies—the La Mesa, Lemon Grove and Spring Valley Irrigation District, the Lakeside Irrigation District, and the Cities of Chula Vista and National City. The upper floor provides space for valve controls and two Venturi instruments. The mercury wells in each instrument are connected with the Venturi tube by two small pipes which transfer the differential water pressures from the entrance and throat of the Venturi tube to the mercury wells and actuate the register, indicating and recording devices of the meter. These devices indicate and record the flow at any moment and totalize the quantity of water which has passed through the meter.



*Lakeside control station.*

The construction program on the La Mesa-Sweetwater Extension was divided into three schedules in order to insure the completion of the pipe line under the San Diego River during the dry season and to bring the earliest possible delivery of water to the La Mesa, Lemon Grove and Spring Valley Irrigation District. Schedule 1 included work from the diversion structures to Lakeside Avenue, on the north side of the San Diego River; Schedule 2 included all work incidental to crossing the San Diego River valley and including the Lakeside Control Station; and Schedule 3 included all work from the Control Station to the Sweetwater Reservoir. Five construction firms submitted bids, three of which covered all schedules of the work. The low bidder on each schedule was the American Pipe and Construction Company, and a contract covering the work as set forth in Specification No. 103 was entered into with this firm on July 8, 1947. Details covering costs and completion dates are shown in Table 14.

In order to further speed up the completion of the work under the San Diego River, a supply contract was awarded on June 10, 1947, to the American Pipe and Construction Company, of Los Angeles, for the manufacture and delivery at the trenchside of 3856 feet of 42-inch inside diameter concrete lock-joint cylinder pipe with rubber joint ring gaskets and the special fitting assemblies for appurtenant structures. The pipe was manufactured at the American Pipe and Construction Company's plant in El Cajon at an average rate of forty 16-foot sections per week, and was cured in a saturated steam bath for 72 hours before being hauled to trenchside. This procedure enabled the first actual construction work to be started on Schedule 2 on September 2, 1947, when a 2½ cubic-yard dragline started trench excavation in the river channel.

It had been hoped that the ground water level in the river channel would be lower than the bottom of the trench to be excavated, but test borings made just prior to beginning excavation indicated that the surface of the ground water was above the elevation of the pipe grade by as much as two feet along some 400 feet of the river bed section, and that the principal materials to be excavated would be coarse sand interspersed with strata of silt and fine sand. To permit excavation in the dry, the contractor elected to use well points for unwatering this portion of the site. The procedure followed was to first excavate a wide trench to a depth of about seven feet and to install in the trench a single line of well points spaced at about 4-foot intervals and extending six to eight feet below the pipe grade. When the water surface had been lowered by pumping, a narrower trench was excavated along

TABLE 14  
CONSTRUCTION CONTRACTS

Spec. Schedule No.	Contractor	Total Contract Amount	Work Started	Usably Completed	Contract Completion Date
<i>La Mesa-Sweetwater Extension</i>					
103	American Pipe & Construction Co.	\$ 377,332.63	Oct. 3, 1947	Mar. 22, 1948	May 14, 1948
2	"	57,237.51	Sept. 2, 1947	Mar. 22, 1948	May 14, 1948
3	"	643,927.80	Oct. 16, 1947	Apr. 16, 1948	May 14, 1948
	Total	\$1,078,497.94			
<i>Fallbrook-Oceanside Branch</i>					
104	Easterly	\$ 284,217.96	Nov. 17, 1947	Apr. 15, 1948	May 13, 1948
105	Westerly	353,940.87	Mar. 23, 1948	June 24, 1948	June 28, 1948
	Total	\$ 638,158.83			

the downstream side of the well point line to complete the excavation to grade depth about twelve feet below the river bed. The pipe was then laid in the dry and pumping was continued until the joints could be grouted and the trench backfilled. The laying of 42-inch diameter pipe proceeded from the Control Station northerly at an average rate of 950 feet a week for the entire length of 3856 feet and was completed on October 10, 1947, well ahead of the beginning of the rainy season. Elsewhere on the extension small amounts of ground water were encountered while excavating the pipe trench, but the well-point method of unwatering was not required to be used.



*La Mesa-Sweetwater Extension—Laying pipe along Hillside Drive—Station 200.*

Including the 42-inch pipe described above, the design of the extension employed six sizes of concrete pipe ranging from a maximum of 48 inches to a minimum of 18 inches, and three different types of concrete pipe—standard lock joint, American cylinder, and centrifugal (Refer to Table 15). The three types of pipes were manufactured in lengths of 16 feet, 31.5 feet, and 12 feet, respectively, each having the same general type of joint assembly, utilizing a rubber gasket for sealing purposes.

TABLE 15  
DISTRIBUTION LINES—PIPE AND APPURTENANCES

Branch and Material	Length feet	Size inches	Maximum Pressure Head feet	Manufacturers
<i>La Mesa-Sweetwater Extension</i>				
Main Shutoff Sluice Gate	64	42" x 48"	50	Chapman Valve Manufacturing Co.
Concrete pipe	3,854	48"	400	American Pipe & Construction Co.
"	20,900	42"	350	"
"	17,921	39"	400	"
"	20,433	27"	250	"
"	15,301	24"	125	"
"	8,704	18"	100	"
Venturi Meter		1-24" x 12"	400	Builder-Pacific, Inc.
"		1-20" x 10"	400	"
Displacement-type Meter		1-4"	400	Hersey Manufacturing Co.
Control Valves		2-24" plug	400	Nordstrom Valve Co.
"		2-20"	400	"
"		2-6"	400	"
<i>Fallbrook-Oceanside Branch</i>				
Steel Pipe	31,973	16"	625	Southern Pipe & Casing Co.
Concrete Pipe	53,756	14"	550	American Pipe & Construction Co.
Venturi Meters		2-12" x 6"	625	Builder-Pacific, Inc.
Control Valves		4-12" plug	625	Nordstrom Valve Co.

Due to the wide range in the nature of materials encountered in excavating the pipe trench, it was difficult to standardize on a single excavation procedure. Rock and hardpan formations were interspersed with softer formation throughout the length of the line, and it was generally more economical to drill continuously and to load and blast the holes only where hard materials were encountered, rather than to excavate the softer portions prior to drilling and later drill, blast, and excavate the harder materials. Excavation was accomplished through the various sections with either a dragline, a backhoe, ladder-type trencher, or a truck-mounted clamshell, depending upon soil formation and other conditions. Where rock occurred at pipe grade, the rock section was over-excavated six inches and backfilled to pipe grade with selected soft material well compacted. When the trench excavation was completed by machine methods the bottom was fine graded by hand, a screed being used to form a cradle to support the pipe.

Pipe laying was accomplished by a truck crane proceeding generally in an uphill direction from the blowoff structures. Each section was checked for line and grade after being placed in the trench, and was anchored by shoveling earth from the side of trench to support the pipe and heavy paper forms used for grouting the outer joints. Backfill was completed in two stages. In the first stage sufficient earth was pushed into the trench to cover the pipe to depths of two feet to three feet and was later consolidated by jetting until all portions of the fill were puddled. The remaining backfill was then placed and consolidated with the tractor bulldozer.

Before the backfill was completed, the pipe joint outside the rubber gasket was grouted with a wet mixture of sand and cement which was poured into one side of the joint near the top of the pipe. The grout being contained by the paper form held in place by the backfill filled both sides of the joint to the top of the pipe. Similar grouting methods were employed for the three types of pipes used on the extension line.

The inner portion of the joint was filled with mortar generally after the backfilling was completed. For pipe sizes greater than eighteen inches, the mortar was worked into the joint with a trowel in such a manner as to leave a smooth junction between the two pipe ends. In the 18-inch pipe it was impossible for workmen to enter the line, and mortar was placed in the bell of the previously laid pipe prior to the insertion of the spigot. Excess mortar on the inside of the joint was then removed by pulling a bundle of burlap sacks called a rabbit past the joint.

A total of 34 reinforced concrete structures, including the Lakeside Control Station and the Lakeside Number Two diversion structure, were built as a part of the extension line. The 32 smaller structures were of two general types, manhole structures and valve vaults. The design of each of these types was varied to best fit the depth of pipe below ground surface and its location with respect to highways and other improvement. The Lakeside Control Station has been described elsewhere. Its construction involved the placing of 92 cubic yards of concrete. The Lakeside Number Two diversion structure consists of an underground vault designed to house the future installation of valves and meters serving the Eucalyptus Area of the Lakeside Irrigation District. Its construction involved the placing of 9 cubic yards of concrete. All work in connection with the construction of these monolithic reinforced concrete structures was performed by the prime contractor.

Construction difficulties were increased due to the fact that 32 per cent of the entire length of the extension was located in the surfaced portions of narrow public highways. In general it was impracticable to provide detours and special provisions were required to coordinate the work with the flow of traffic. Renewal of pavement damaged or removed during the performance of the work on Schedules 1 and 3 was necessary on about five miles of the line. No part of Schedule 2 was located in streets. The repaving and repair work was sublet by the prime contractor to companies specializing in paving work.

Other construction difficulties encountered in the progress of the work were nominal due in part to the below-normal rainfall which occurred during the construction period. In excavating the trench, several reaches of unstable material were encountered, and in these instances it was necessary to remove the wet mud and provide a firm base for the pipe by backfilling with heavy gravel. Heavy rains on February 5 and 6 caused considerable delay. In the Slaughterhouse Canyon reach, it was necessary to relay 29 sections of pipe that were floated or knocked out of line by slides previous to being backfilled.

#### *Fallbrook-Oceanside Branch*

The Fallbrook-Oceanside Branch diverts from the San Diego Aqueduct at North Station 1689+91.82 at a point about one-half mile east of Rainbow, and extends generally southwesterly a total distance of 16.2 miles to the City of Oceanside well field. It delivers water to distribution systems of the Fallbrook Public Utility District and the

City of Oceanside. The diversion works on the aqueduct consist of a concrete vault containing a 20-inch gate valve. This valve is used only for isolating the branch for repairs, the flow being regulated at the Fallbrook Control Station located 6.0 miles below the diversion structure.

The Fallbrook Control Station is a reinforced concrete building 12 feet by 24 feet in plan, containing a basement which houses the valves and metering devices serving Fallbrook Public Utility District and the City of Oceanside. The upper floor provides space for valve controls and two Venturi instruments, which function in the same manner as the instruments in the Lakeside Control Station described in this section.

The construction program of the Fallbrook-Oceanside Branch was divided into two schedules in order to expedite the delivery of water to the Fallbrook area. Schedule 1 included the easterly 6.0 miles of the line between the diversion structure and the Fallbrook Control Station located two miles southeasterly from Fallbrook. Contract drawings and specifications covering this schedule were prepared on the basis of soliciting alternate bids covering concrete cylinder pipe and welded steel pipe. Six contracting firms submitted bids, three for the concrete cylinder pipe alternate, one for the welded steel pipe alternate, and two for both alternates. The low bidder was Edward Green for welded steel pipe, and a contract covering the execution of the work was entered into on September 8, 1947.

Schedule 2 included the westerly 10.2 miles of the Fallbrook-Oceanside Branch between the Control Station and the Oceanside wells. Alternate bids covering reinforced concrete pipe and welded steel pipe were solicited also for the work in this schedule. Six contracting firms submitted bids, two for the concrete pipe and four for the steel pipe. The American Pipe and Construction Company submitted the low bid based on the use of concrete pipe, and a contract with this firm for the work was entered into on November 21, 1947.

Contract costs and beginning and completion dates for both schedules are shown in Table 14.

Construction work on the Easterly Section of the Fallbrook-Oceanside Branch was commenced on November 17, 1947, when the contractor, Edward Green, of Los Angeles, began excavation for the substructure of the control station. The beginning of construction work on the Easterly Section of the Fallbrook-Oceanside Branch was



*Fallbrook-Oceanside Branch—Laying first pipe Jan. 9, 1948.*

delayed for several weeks after the contract was entered into because the sub-contractor, the Southern Pipe and Casing Company, had difficulty in obtaining plate for fabricating the pipe. With the beginning of field construction, the work was pushed vigorously by the prime contractor to completion on May 13, 1948.

Due to the existing drought conditions, the first water was delivered on May 28, 1948, sixteen days in advance of the physical completion of the line.

Sixteen-inch inside diameter welded steel pipe was used throughout this schedule. The pipe was fabricated in 36-foot sections at the Azusa Plant of the Southern Pipe and Casing Company. This contractor also spun a  $3/32$ -inch coating of coal-tar enamel on the interior of each section. The  $3/4$ -inch gunite coating was placed on the exterior of the pipe in a nearby yard by the F. W. Case Construction Company, another sub-contractor.

Two thicknesses of steel plate were used in fabricating the pipe,  $3/16$  inch and  $1/4$  inch, the heavier pipe being employed for 23 per cent of the length of the line where heads in excess of about 500 feet were encountered. The work of fabricating the steel plate and apply-

ing protective coatings was begun on December 14, 1947, and completed on March 8, 1948, the average rate of production being 2665 feet per week.

The excavation of the pipe trench was accomplished by the use of a wheel-type excavator and a backhoe. Generally the backhoe was used only for the steep and rocky portions of the line. The depth of the trench was sufficient to permit a minimum cover of three feet over the top of pipe in all places other than road rights of way where the minimum was  $3\frac{1}{2}$  feet. No ground water was encountered at pipe grade except at the crossing of Live Oak Creek, where it was necessary to use well points in order to unwater the site and permit the installation of the pipe.

Laying of pipe began on January 9, 1948, proceeding generally easterly from the Control Station, a truck crane being used to place the 36-foot sections in the trench. By the end of March all the pipe was in the trench except for a 2000-foot reach at approximate Station 140 where rugged terrain made excavation and pipe laying difficult. This section of the line was completed by April 7, 1948.



*Fallbrook-Oceanside Branch—Laying Pipe along U.S. Highway No. 395.*

After the pipe was placed in the trench, the ends were joined together with Dresser couplings employing two rubber gaskets for sealing purposes, and earth was shoveled from the side of the trench to anchor the pipe. A concrete collar was then poured around the coupling as protection against corrosion. Backfilling of the trench was completed upon removal of collar forms, and the fill being consolidated by jetting and flooding. The maximum progress made in laying the pipe and pouring the joints was 4032 feet per week, the average rate being 2977 feet.

Construction work on the westerly section of the Fallbrook-Oceanside Branch was initiated on March 23, 1948, with drilling and blasting for trench excavation along Olive Hill Road. Except for a 2-mile stretch of line over the flank of Morro Hill where the large amounts of ledge rock were encountered, the materials in the pipe trench were principally decomposed granite. Ground water was encountered in only one short section of the line, the crossing of a drainage course on the Brenner property, approximate Station 560+00. Excavation was accomplished by a trench hoe and a ladder-type excavator, and was completed by May 19, 1948.

The 55,756 feet of 14-inch concrete cylinder pipe was manufactured in a 46-day period at the Southgate plant of the American Pipe and Construction Company in 31½ foot lengths at an average rate of 7688 feet per week. The completed sections were water cured and hauled from the plant direct to the trench side. Pipe laying started at the Fallbrook Control Station and progressed westerly along the line at an average rate of 8956 feet a week, a truck-mounted crane being employed for this purpose. A special section of pipe providing for a junction with the Oceanside supply line was laid on May 27, 1948, completing the laying of the westerly section of the Fallbrook-Oceanside Branch.

The placing of backfill and the protection of the pipe joints with grout and mortar were accomplished by similar methods to those employed by the same contractor on the La Mesa-Sweetwater Extension and described previously.

#### *Leakage Tests*

The specifications under which the La Mesa-Sweetwater Extension and the Fallbrook-Oceanside Branch were constructed provided that the pipe lines should be tested against a pressure equal to 125 per cent of the static head on the various sections of the line for a period of not less than four hours. They provided also that the leakage during

the test period should not exceed fifty gallons per inch of diameter per mile per 24 hours. The results of tests made on various portions of these lines are described below.

Schedules 1 and 2 of the La Mesa-Sweetwater Extension were tested on March 19, 1948. The measured leakage for the 4-hour test period of the 24,870 linear feet of pipe averaged 35 gallons per hour, only 9 per cent of the allowable leakage. Similar tests of Schedule 3 gave a measured leakage of 61 gallons per hour for the 24,005 linear feet of centrifugal concrete pipe, 30 per cent of the allowable leakage; and 29 gallons per hour for the 38,354 linear feet of concrete cylinder pipe, 8 per cent of the allowable leakage.

The Easterly Section of the Fallbrook-Oceanside Branch was tested on April 15, 1948. The measured leakage of the 31,973 linear feet of line for the 4-hour test period averaged 2 gallons per hour, only 3 per cent of the allowable leakage.

The Westerly Section similarly tested on June 8 and 9 showed a measured leakage of the 53,756 linear feet for the 4-hour test period averaging 15 gallons per hour, only 5 per cent of the allowable leakage.

#### *Equipment and Material Purchased by Authority*

In order to insure against the possibility of certain scarce equipment and materials becoming a bottleneck to the completion of construction of the branch lines, it was deemed advisable to issue separate specifications covering such equipment and materials and to advertise for their purchase in advance of awarding construction contracts. Accordingly, formal contracts were entered into late in May and early in June, 1948, with various low bidders for the purchase of sluice gates, valves, meters, flow-recording instruments, and lock-joint cylinder pipe. The excellent cooperation given by the contractors to whom awards of these supply contracts were made enabled the main construction program to proceed to completion without serious delay.

Table 16 lists the supply contracts and the cost of equipment and material purchased under each.

#### *Costs*

The amounts paid to the prime contractors on the La Mesa-Sweetwater Extension and the Fallbrook-Oceanside Branch are shown in Table 14, which also lists other pertinent data relative to the contracts.

Specification and Schedule Number	Description	Contractors	Contract Price
101 - 1	2 sluice gates.....	Chapman Valve Manufacturing Co. ....	\$ 3,523.95
- 2	10 manually operated plug valves.....	Crane Company .....	6,427.65
- 3	1 manually operated 20" gate valve.....	Crane Company .....	531.48
- 4	4 Venturi meter tubes and instruments.....	Builders-Pacific, Inc. ....	9,840.01
- 5	1 Displacement-type meter.....	Builders-Pacific, Inc. ....	540.18
102 -	3856 feet of 42" lock-joint cylinder concrete pipe.....	American Pipe & Construction Co. ....	73,454.30

## EQUIPMENT AND MATERIAL PURCHASED BY AUTHORITY

TABLE 16

It will be noted that such amounts paid the contractors aggregate a total of \$1,078,497.94 to American Pipe and Construction Company for the La Mesa-Sweetwater Extension and \$638,158.83 to Edward Green and the American Pipe and Construction Company for the Fallbrook-Oceanside Branch. The total of all payments made to contractors including the payments for supply contracts was \$1,810,974.33.

Unit construction costs, exclusive of administration and engineering, are shown by Table 17. Structure costs as shown cover average cost without regard to variation in depth of structure to fit actual locations.

TABLE 17  
UNIT CONSTRUCTION COSTS  
(Administration and engineering costs not included)

Item	Total Units	Total Cost	Cost per Unit in place
<i>La Mesa-Sweetwater Extension</i>			
<i>Pipe</i>			
48" Lock-joint (place only) (1) .....	64 ft	\$ 442	\$ 6.90
42" Lock-joint concrete .....	3,855 ft	112,201	29.11
39" Concrete cylinder .....	20,900 ft	358,855	17.17
27" Concrete cylinder .....	17,921 ft	213,258	11.90
24" Concrete cylinder .....	20,433 ft	208,791	10.22
24" Centrifugal concrete .....	15,301 ft	140,079	9.15
18" Centrifugal concrete .....	8,704 ft	73,179	8.41
<i>Structures</i>			
Basic pipe structure (2) .....	32 ea	19,804	619.00
Add for 6" blow-off (3) .....	— ea	—	115.00
Add for 4" air valve (3) .....	— ea	—	290.00
Add for 3" air valve (3) .....	— ea	—	205.00
Lakeside Control Station .....	— job	32,472	—
<i>Fallbrook-Oceanside Branch</i>			
<i>Pipe</i>			
16" Coated, lined, welded steel .....	31,972 ft	263,214	8.23
14" Concrete cylinder .....	53,756 ft	347,246	6.45
<i>Structures</i>			
Basic pipe structures (2) .....	46 ea	8,389	182.00
Add for 3" blow-off (3) .....	— ea	—	60.00
Add for 2" air valve (3) .....	— ea	—	100.00
Fallbrook Control Station .....	— job	21,327	—

- (1) Surplus pipe from San Diego Aqueduct construction.  
 (2) Average of all structures.  
 (3) Additional cost for adapting to particular purpose.

## SECTION VI FINANCING

The obligations of property within the Authority to meet the cost of acquiring and maintaining the facilities required to bring in and distribute Colorado River water and for defraying the cost of annexation to The Metropolitan Water District are substantially as follows:

- (1) The direct obligation of the Authority to repay to the United States the true cost of the San Diego Aqueduct at the annual rate of \$500,000, without interest, until the total cost is liquidated. Currently the annual rate is \$250,000 pending formal completion of the aqueduct by the Navy Department.
- (2) The direct obligation of the Authority to liquidate the \$2,000,000 bond issue for the construction of the aqueduct extension and branch lines, and to pay interest charges thereon, estimated to average \$106,000 annually for the 25-year period beginning 1946-47 and ending 1970-71.
- (3) The direct obligation of the Authority to operate and maintain the southerly one-half of the San Diego Aqueduct, together with the aqueduct extension and branch lines required to deliver water to its member agencies.
- (4) The obligation of all property located within the corporate areas of the Authority agencies to pay regular and special assessments of The Metropolitan Water District as determined by its annual tax levy against the secured and unsecured property within the District area.

To meet the above obligations, the Authority will have available a sum of money, currently \$125,000 per annum, paid by the Metropolitan Water District for liquidating its share of the cost of the San Diego Aqueduct, which amount will increase to \$250,000 upon formal completion of the aqueduct; also such revenues as may be derived from the sale of Colorado River water after paying the District charges for water. Any additional funds required by the Authority must be raised by assessments against member agencies. Such assessments can be met by direct payments to the Authority from any agency funds available for the purpose, or the agency may elect to have the assessment spread on the tax rolls if funds are not otherwise available.

### *Bond Issue*

The electors of the Authority at an election held November 5, 1946, authorized the issuance of two million dollars in bonds to provide funds for the construction of branch lines to the San Diego Aqueduct. Eight bids were received as a result of advertising the proposed sale of the bonds and the Board on December 20, 1946, accepted the offer of the Bank of America National Trust and Savings Association as requiring the lowest net interest cost to the Authority (2.19%). The bonds mature serially, with interest payable at 2½ per cent per annum for maturities to 1955 and 2 per cent for later maturities. A schedule of bonded debt and annual requirements is included herewith under Table 18.

### *Taxes*

The original tax rate of 4 cents per \$100 assessed valuation was continued for the fiscal year 1946-47. In 1947-48 the rate was increased to 14 cents per \$100 in order to meet the annual payments to the United States Government on the San Diego Aqueduct Lease-Purchase Contract and interest payments on the Improvement Fund Bonds. (The 1948-49 tax rate has been continued at 14 cents.)

### *Water Revenue*

Sale of water continued at full aqueduct capacity since delivery began in November, 1947. Revenues from this source, however, were greatly reduced by the provisions of Resolution No. 87 which established credits to all agencies for the purchase of water. Delivery of water by the Authority began at an earlier date than was originally contemplated. As a result, many of the Authority agencies found they could purchase more water than had been estimated as available to them in preparing their 1947-48 budgets, but had insufficient funds available for the purchase of their need for Authority water. To meet this situation, the Authority Board of Directors on April 8, 1948, adopted Resolution No. 87 establishing credits to all its member agencies. The credits were to be applied by the agencies against their purchases of water from the Authority, and were determined by applying the \$4 per acre-foot charged by the Authority above the District charge for natural water of \$8 per acre-foot to the approximate capacity flow of the Aqueduct for ninety days, and distributing that amount to the credit of each agency in the proportion of its participation in the Authority as of June 30, 1947. All agencies have availed themselves

of these credits except Lakeside Irrigation District and the City of Oceanside, which took no water during the fiscal year.

#### Audit

All accounts have been regularly audited by the firm of Everts & Esenoff, Certified Public Accountants, whose letter covering their examination of financial records for the fiscal year of 1947-48 is included herewith.

EVERTS and ESENOFF  
Certified Public Accountants  
Suite 726, First National Building  
San Diego, California

October 1, 1948

Board of Directors  
San Diego County Water Authority  
Union-Tribune Building  
San Diego 1, California

Gentlemen:

We have examined the financial records of the San Diego County Water Authority covering the period beginning July 1, 1947 and ending June 30, 1948. We have reviewed the system of internal control and the accounting procedures of the Authority, and have examined or tested the accounting records and other evidence by methods and to the extent we deemed appropriate. Our examination was made in accordance with generally accepted auditing standards and included all procedures which we considered necessary in the circumstances.

In our opinion the all funds balance sheet and related statements of revenues and expenditures and surplus balances present fairly the position of each fund of the Authority at June 30, 1948 and the results of operations for the fiscal year then ended, in accordance with generally accepted principles of governmental accounting applied on a basis consistent with that of the preceding year.

Yours very truly,

(signed) Hamilton Moody  
For Everts and Esenoff  
Certified Public Accountants

The following Tables 18 to 23 set forth the financial operations for the fiscal years 1946-47 and 1947-48.

TABLE 18

#### SCHEDULE OF BONDED DEBT AND ANNUAL REQUIREMENTS

Fiscal Year	Interest Payable (1)	Bond Principal Payable (2)	Total Cash Required
1946-47	\$ 20,375.00	\$ —	\$ 20,375.00
1947-48	40,750.00	—	40,750.00
1948-49	40,750.00	—	40,750.00
1949-50	40,750.00	—	40,750.00
1950-51	40,750.00	—	40,750.00
1951-52	40,750.00	—	40,750.00
1952-53	40,125.00	50,000.00	90,125.00
1953-54	38,875.00	50,000.00	88,875.00
1954-55	37,625.00	50,000.00	87,625.00
1955-56	36,500.00	50,000.00	86,500.00
1956-57	35,000.00	100,000.00	135,000.00
1957-58	33,000.00	100,000.00	133,000.00
1958-59	31,000.00	100,000.00	131,000.00
1959-60	29,000.00	100,000.00	129,000.00
1960-61	27,000.00	100,000.00	127,000.00
1961-62	24,500.00	150,000.00	174,500.00
1962-63	21,500.00	150,000.00	171,500.00
1963-64	18,500.00	150,000.00	168,500.00
1964-65	15,500.00	150,000.00	165,500.00
1965-66	12,500.00	150,000.00	162,500.00
1966-67	9,500.00	150,000.00	159,500.00
1967-68	7,000.00	100,000.00	107,000.00
1968-69	5,000.00	100,000.00	105,000.00
1969-70	3,000.00	100,000.00	103,000.00
1970-71	1,000.00	100,000.00	101,000.00
	<u>\$650,250.00</u>	<u>\$2,000,000.00</u>	<u>\$2,650,250.00</u>

(1) Interest rate on bonds maturing in 1953 to 1955 inclusive is 2½%; 1956 to 1971 inclusive, 2%; payable January 1 and July 1.

(2) Maturity day, January 1.

TABLE 19

## SAN DIEGO COUNTY WATER AUTHORITY

## COMPARATIVE ALL FUNDS BALANCE SHEET AT JUNE 30, 1948; JUNE 30, 1947; AND JUNE 30, 1946

ASSETS	Fiscal Year Ending		
	June 30, 1948	June 30, 1947	June 30, 1946
<i>Current Assets</i>			
Cash in treasury	\$ 440,306.61	\$ 191,482.65	\$ 26,702.50
Petty cash	100.00	100.00	100.00
Accounts receivable	75,570.00	0.00	0.00
Taxes receivable, delinquent	8,585.39	2,439.68	1,474.82
Prepayments	0.00	0.00	425.00
Total Current Assets	\$ 524,562.00	\$ 194,022.33	\$ 28,702.32
<i>Investments</i>			
Improvement Fund	\$ 0.00	\$ 1,851,783.16	\$ 0.00
<i>Contractual Obligations Receivable</i>			
Metropolitan Water District (1/2 of cost of San Diego Aqueduct)	\$ 7,437,500.00	\$ 0.00	\$ 0.00
<i>Construction Work in Progress</i>			
Plant	\$ 2,122,862.26	\$ 50,345.85	\$ 0.00
Organization, surveys, and other pre-construction expense	\$ 181,606.21	\$ 181,606.21	\$ 6,087.95
Participation rights in Metropolitan Water District	13,978,225.22	0.00	0.00
San Diego Aqueduct (estimated)	15,000,000.00	0.00	0.00
Total Plant	\$ 29,159,831.43	\$ 181,606.21	\$ 6,087.95
<i>Other Debts</i>			
Future requirements—Bond Fund	\$ 2,000,000.00	\$ 2,000,000.00	\$ 0.00
Future requirements—U. S. Contract Fund	7,437,500.00	0.00	0.00
Total Other Debts	\$ 9,437,500.00	\$ 2,000,000.00	0.00
<b>TOTAL ASSETS</b>	<b>\$ 48,682,255.69</b>	<b>\$ 4,277,757.55</b>	<b>\$ 34,790.27</b>

TABLE 19 (Continued) SAN DIEGO COUNTY WATER AUTHORITY  
COMPARATIVE ALL FUNDS BALANCE SHEET AT JUNE 30, 1948; JUNE 30, 1947; AND JUNE 30, 1946

LIABILITIES, RESERVES AND SURPLUS	Fiscal Year		
	June 30, 1948	June 30, 1947	June 30, 1946
<i>Current Liabilities</i>			
Accounts payable	\$ 47,902.40	\$ 6.49	\$ 254.68
Contracts payable	35,365.54	0.00	0.00
Notes payable	0.00	18,500.00	0.00
Bond interest coupons payable, matured	20,495.00	0.00	0.00
Total Current Liabilities	\$ 103,762.94	\$ 18,506.49	\$ 254.68
<i>Reverses</i>			
For petty cash	\$ 100.00	\$ 100.00	\$ 100.00
For uncollected taxes	8,585.39	2,439.68	1,474.82
For work in progress	2,122,862.26	50,345.85	0.00
For authorized expenditures—Improvement Fund	135,827.35	1,877,867.62	0.00
For undistributed preliminary expense	181,606.21	181,606.21	6,087.95
For encumbrances	19,923.66	117,386.44	200.00
Total Reserves	\$ 2,466,904.87	\$ 2,229,745.80	\$ 7,862.77
<i>Continuing Appropriations</i>			
Long Term Debt	\$ 104,341.94	\$ 11,450.51	0.00
Bonds outstanding, not due	\$ 2,000,000.00	\$ 2,000,000.00	\$ 0.00
Contractual obligations—U. S. Government	14,875,000.00	0.00	0.00
Due Metropolitan Water District for Authorities participation rights	12,591,719.19	0.00	0.00
Total Long Term Debt	\$ 29,466,719.19	\$ 2,000,000.00	\$ 0.00
<i>Surplus</i>			
Balance—General Fund	\$ 47,077.50	\$ 15,774.61	\$ 26,672.82
Balance—Bond, Interest and Sinking Fund	23,884.11	2,280.14	0.00
Balance—U. S. Contract Fund	83,059.31	0.00	0.00
Total Surplus	\$ 154,020.72	\$ 18,054.75	\$ 26,672.82
<i>Investment in Fixed Assets</i>			
Financed from U. S. Contract Fund	\$ 15,000,000.00	\$ 0.00	\$ 0.00
Financed from Agencies' contributions to the Metropolitan Water District	1,386,506.03	0.00	0.00
Total Investment in Fixed Assets	\$ 16,386,506.03	\$ 0.00	\$ 0.00
<b>TOTAL LIABILITIES, RESERVES AND SURPLUS</b>	<b>\$ 48,682,255.69</b>	<b>\$ 4,277,757.55</b>	<b>\$ 34,790.27</b>

SAN DIEGO COUNTY WATER AUTHORITY

TOTAL BANK BALANCES	\$ 148,999.12
LESS OUTSTANDING WARRANTS	322,382.14
NET AVAILABLE CASH ON DEPOSIT	\$ 671,581.26
	231,274.65
	\$ 440,306.61

TOTAL REQUIREMENTS	\$ 440,306.61
ADD: TAX COLLECTION FEE CHARGED BY SAN DIEGO COUNTY	1,147.44
	\$ 441,454.05

BUDGET EXPENDITURES	\$ 3,333,003.00
LESS REFUNDS	62,807.57
	\$ 3,270,195.43

TOTAL REVENUE	\$ 3,320,166.85
TOTAL EXPENDITURES	\$ 3,270,195.43
	\$ 49,971.42

CASH BALANCE FROM PRIOR YEAR	\$ 191,482.65
PROCEEDS OF LOAN	—
PROCEEDS OF SALE OF BONDS	—
PREMIUM AND INTEREST ON BONDS SOLD	—
TAXES COLLECTED	\$ 383,445.86
PENALTIES AND INTEREST	517.41
MISCELLANEOUS TAX ON OPTIONS	8.87
RECEIPTS IN LIEU OF TAXES	22,340.54
SALE OF SECURITIES	2,765,862.56
RENTALS	347,594.34
MISCELLANEOUS	72.50
	324.75
	109.87

COMPARATIVE STATEMENT OF CASH RECEIPTS AND DISBURSEMENTS  
SAN DIEGO COUNTY WATER AUTHORITY

TABLE 20

REVENUE	July 1, 1947 to June 30, 1948	July 1, 1946 to June 30, 1947	July 1, 1945 to June 30, 1946
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STATEMENT OF TAX ASSESSMENTS AND COLLECTIONS AS OF JUNE 30, 1948  
SAN DIEGO COUNTY WATER AUTHORITY

TABLE 19

Member Agency	Tax assessments to date	Adjustments	Tax collections	Interest and penalties	Tax on options	Receipts in lieu of taxes	Total collections	Uncollected June 30, 1948
Chula Vista	\$ 19,888.88	62.54	\$ 19,951.42	\$ 28.36	\$ 42.22	\$ 1,190.93	\$ 20,651.52	\$ 445.60
Fallbrook Public Util. Dist.	4,058.50	5.20	4,063.70	8.30	.22	143.34	4,040.66	175.30
Lakeside Irrigation District	50,199.88	—	50,199.88	98.14	—	—	773.02	16.97
La Mesa, Lemon Grove and Spring Valley Irrigation District	40,545.49	0.01	40,545.50	97.77	24.40	—	39,589.60	1,088.23
National City	16,278.31	2.72	16,281.03	25.52	47.9	1,513.75	17,493.97	612.97
Oceanside	46,769.31	69.51	46,838.82	16,149.21	11.5	1,269.92	44,592.92	379.72
San Diego	45,953,649	69,549	46,023,198	\$ 888,799.63	26.9	30,698.05	\$ 19,258,488	5,863.67
Total member agencies	\$ 588,888	\$ 69	\$ 588,957	\$ 743,772	\$ 111	\$ 34,615.99	\$ 616,200.17	\$ 8,382.46
Withdrawn cities	—	—	—	7.72	.15	186.64	4,341.28	2.93
	\$ 592,000	\$ 69	\$ 592,069	\$ 751	\$ 112	\$ 34,802.63	\$ 620,541.45	\$ 8,385.39

\* Corona - 5/10/46  
\* Ramona Irrig. Dist. - 5/10/46

STATUS OF TAX COLLECTIONS

TABLE 22

Fiscal year	Tax assessment	Taxes collected during fiscal year	Taxes uncollected at end of fiscal year	Per cent uncollected	Subsequent cancellations and additions by County Auditor	Taxes unpaid June 30, 1948
1945-46	\$ 96,151.56	\$ 94,656.51	\$ 1,474.82	1.53	\$ 1,374.33	\$ 100.49
1946-47	107,808.89	105,753.78	2,055.11	1.90	1,598.64	456.47
1947-48	389,591.57	381,563.14	8,028.43	2.06	—	8,028.43
1948-49	474,441.66	—	—	—	—	—

TABLE 23  
SAN DIEGO COUNTY WATER AUTHORITY  
AUTHORITY ASSESSED VALUATIONS AND TAX RATES

Fiscal year	Secured Real Personal	Public Utilities	Unsecured Personal	Total	Tax Rate per \$100	
					Secured	Unsecured
1945-46	\$212,082,975.00	\$28,253,700.00	\$29,960,130.00	\$270,296,805.00	\$0.04	\$0.00
1946-47	208,715,150.00 (1)	29,433,450.00	30,665,910.00	268,814,510.00	0.04	0.04
1947-48	233,579,990.00	32,740,680.00	40,977,850.00	307,298,520.00 (2)	0.14	0.04
1948-49	254,227,570.00	37,482,020.00	47,177,300.00	338,886,890.00	0.14	0.14

Debe limit 15 per cent of last equalized assessed valuation of Authority.  
Basis of assessment approximately 50 per cent.

(1) City of Coronado and Ramona Irrigation District secured assessed valuation not included in this or subsequent tax levies by the Authority, they having withdrawn from the Authority prior to 1946-47.

(2) City of Coronado and Ramona Irrigation District not included in this or subsequent total valuation.

## SECTION VII

## LEGAL

During the period covered by the First Annual Report, the legal work was chiefly concerned with the organization of the Authority as an established and operating public agency, the preliminary steps to the construction of the San Diego Aqueduct, and the negotiations toward annexation to The Metropolitan Water District of Southern California. In the period following the close of the fiscal year 1945-46, the construction of the aqueduct and the annexation proceedings were successfully completed and the construction of the Authority's distribution lines was commenced after a successful bond election. The accomplishment of these several matters involved many legal problems in the negotiation of agreements and the preparation of contract documents, legislation, election proceedings, etc., all of which were ably and successfully handled by Mr. Phil D. Swing, then the General Counsel of the Authority. Since his interest in the Colorado River was first aroused as Attorney for the Imperial Irrigation District and District Attorney for Imperial County, Mr. Swing has been active for many years with matters pertaining to that river. As Congressman he was co-author of the Swing-Johnson Bill authorizing the construction of Hoover Dam, and the first major works for the control and regulation of the river. He is the author of the County Water Authority Act and has been active in the formation of the San Diego County Water Authority.

With the completion of construction on the San Diego Aqueduct and the delivery of Colorado River water to San Diego County, Mr. Swing felt that his job had been accomplished and, yielding to the demands of his extensive private practice and state-wide water interests, he resigned his position with the Authority early in 1948. Mr. W. H. Jennings, associated with the Authority as one of its organizers, original board members, and Secretary, was appointed as his successor.

#### Completion and Legalization of Aqueduct Construction

The construction of the San Diego Aqueduct was initiated by the Navy at the direction of the President of the United States acting under the War Powers Acts of Congress. With the termination of hostilities, the Navy refused to proceed with the work until The City of San Diego had entered into a contract for the repayment of the cost of construction. At the close of fiscal year 1945-46 the President

had reconstituted the original committee, which had recommended the construction in the first instance, for the purpose of considering whether or not some Government relief of the construction repayments as set up in the City-Navy Contract was in order. Before the committee had convened, the legality of any expenditure of Government funds was challenged by the Comptroller-General in a report to the Congress dated January 27, 1947, and again the matter of completing the construction was seriously threatened. The report went to the Senate Committee on Expenditures in Executive Departments, and a public hearing was set to be held in Washington, D. C., on February 25, 1947. Chairman Heilbron personally presented a statement to the Committee in support of the Authority contention that the Government was obligated by the President's directive of November 29, 1944, to complete the construction of the San Diego Aqueduct. The Committee recommended that legislation providing retroactive authorization for the construction of the aqueduct and ratifying the execution of the contract with The City of San Diego be introduced in Congress and enacted, and that the construction of the aqueduct be permitted to continue pending the action of the Congress on such legislation. A bill was hastily prepared authorizing the construction, confirming all steps taken, and ratifying the City-Navy Contract. Through the good offices of Congressman Fletcher and Senators Downey and Knowland, the bill was introduced in and guided through the Congress, being finally enacted and signed late in the Spring of 1948. The assistance of the Navy and the Metropolitan Water District was invaluable in the hearings on this bill. Fortunately, pending its enactment, the Navy was willing to assume the risk of continuing with the construction, and water was delivered through the aqueduct before the final passage of the legalizing measure.

The unfortunate by-product of the challenge to this legality of the procedure was the dissolution of the President's reconstituted committee without it submitting a report. It appeared necessary at the time to abandon efforts to obtain further Federal aid, in order to concentrate on obtaining Congressional approval of the assistance which already had been furnished.

#### *Annexation to the Metropolitan Water District*

The terms of the proposed annexation of the Authority to the Metropolitan Water District had been tentatively established prior to the end of fiscal year 1945-46. These included the merger of the San Diego City and/or County Colorado River Rights with those of the

Metropolitan, the payment by the Authority to the District of an amount equal to the tax assessments for which the property within the Authority would have been liable as a part of the District since its formation, and the assumption by the District of the cost of construction and subsequent operation, maintenance, and enlargement of the northerly half of the aqueduct. Contracts, assignments, and other documents necessary to make the merger effective were negotiated and prepared, and the procedure for calling a special election at which the electors would pass upon the proposition was studied. On November 5, 1946, the election was held and all propositions carried by a very satisfactory majority. After the election the Authority's Counsel completed the many details of the required legal procedure, and on December 17, 1946, the Secretary of State issued his certificate to the effect that the Authority was a duly constituted member agency of the District.

A comparison of assessed valuations showed that the Authority was second only to the City of Los Angeles among the District's members and entitled to two directors on the District's Board. Chairman Heilbron and General Manager and Chief Engineer Burkholder were the unanimous choice for the positions, and they continue to ably represent the Authority in that capacity.

#### *Issuance of Construction Bonds and Construction of Aqueduct Extension and Branch Lines*

In June, 1946, the Authority's directors had approved as a policy the construction at the expense of the Authority of branch lines which would deliver water from the aqueduct to each member agency. The General Manager and Chief Engineer had estimated the cost of the lines at two million dollars. Counsel prepared procedure for a bond election, and the issue was submitted to the voters at the Special Authority Election on November 5, 1946, the bonds being authorized by an overwhelming 11 to 1 majority. The Board had previously authorized the employment of the firm of O'Melveny and Myers, of Los Angeles, as bond counsel, and the able help and advice of Mr. James Beebe of that office greatly expedited the work of preparing the election procedure, furnishing the transcript of proceedings in support of bond counsel's opinion as to the legality of the issue, securing bidders, and issuing the bonds.

Pending the authorization and sale of the bonds, the detailed specifications, bid form, and contract documents for the construction of the La Mesa-Sweetwater Extension and the Fallbrook-Oceanside Branch Line were reviewed and approved as to form. Bids were taken and

contracts were awarded to the lowest bidder well within the estimated cost.

#### *Acquisition of Rights of Way and Access Roads*

In addition to the preparation of the transcript in connection with the bond issue and the bid and contract documents for the construction of branch lines, the legal department devoted considerable time and effort in formulating the proceedings for acquiring rights of way for the distribution lines. The Authority retained Mr. R. H. Brock as right-of-way agent early in 1947, and arranged for the appointment of local committees to set values on the rights of way for the pipe lines. Thanks to Mr. Brock's diligence and efficiency and the fairness of the appraisals, all rights of way for the 32.5 miles of aqueduct extension and branch lines were obtained by negotiations with the land owners. Counsel was required to file only one condemnation action covering one small parcel, the owner of which could not be located. The rights of way were thus acquired with the friendly cooperation of the affected land owners, and well within the estimates of their cost. All easements obtained were reviewed by the General Counsel and checked against the title records, and by April, 1948, the final report as to completion of acquisition of the rights of way was filed and accepted by the Board.

While the Government obtained all rights of way for the San Diego Aqueduct as a part of the construction program, it adopted the policy of requiring contractors to provide at their expense such access privileges or temporary easements to build new roads as might be required at the various locations. When the operation and maintenance of the line was turned over to the Authority, it developed that some of the property owners objected to the maintenance and patrol forces traveling access roads over which the Authority had no formal right. It was then necessary to negotiate with these property owners and secure the required permanent easements. At the close of the fiscal year the staff was engaged in this work, and the General Counsel was negotiating the acquisition of permanent rights of way with every hope of success.

#### *Legislation*

In addition to the legislation introduced in the Congress legalizing the construction of the aqueduct and the agreements entered into for the repayment of its cost, the Authority found it necessary to introduce in the State Legislature amendments to the County Water Authority Act, in order that the provisions for the admission of additional ter-

ritory within its boundaries would be consistent with the provisions governing such annexation to the Metropolitan Water District. The County Water Authority Act provided that annexations of territory to any of its individual members, under the procedure for the expansion of such members in the laws governing their organization, automatically constituted the annexed territory a part of the Authority. The Metropolitan Water District on the other hand recognized the automatic annexation of territory annexed to cities but required that any other type of member agency could annex additional territory only with the approval of the Metropolitan Water District Board, and then only on such terms as its Board of Directors approved. A conflict of law resulted in that any one of the Authority's member agencies could annex territory, with the consent of the Authority, which automatically became a part of the Authority but which did not then constitute a part of the Metropolitan Water District. Counsel for both the Authority and the District prepared legislation amending each act to make the procedure uniform. Bills were introduced early in the 1947 Session of the State Legislature and, with the able assistance and cooperation of the representatives of this County in the State Legislature, and particularly that of Assemblywoman Kathryn Niehouse, the bills were passed and signed by the Governor at the close of the Session. These amendments made substantial changes in the procedure for annexation to both the Authority and the District. While the right of any member agency of the Authority to annex territory to its corporate boundaries without the consent and approval of either the Authority or the District is preserved, the interests of other members are protected in that such annexation does not constitute automatic annexation to either the Authority or the District, and consequently the newly annexed territory does not participate in any of the water rights of the Authority or the District except through its participation in the right of the agency to which it is annexed, such agency's preferred entitlement not being increased by reason of the additional territory. Provision is made, however, for an increased preferred entitlement where the annexation to any member agency is approved by the Authority and consented to by the Metropolitan Water District, in which case both the Authority and the District reserve the right of providing terms and conditions which must be accepted by the annexing territory. This legislation was far reaching in its effect and constituted a major change in the County Water Authority Act. The Act as changed by the amendment is set forth in full later in this section.

### *Annexations and Withdrawals*

Prior to the annexation of the Authority to the Metropolitan Water District and before any indebtedness had been incurred by the Authority, two of the member agencies, The City of Coronado and the Ramona Irrigation District, had withdrawn from Authority membership. Both of these agencies had joined in the formation of the Authority so that they might be fully informed in regard to the procedure for bringing Colorado River water into the County, in the hope that additional water could be obtained for them without excessive cost. When the cost of continued membership could be ascertained with certainty, The City of Coronado and the Ramona Irrigation District decided to withdraw from membership in the Authority. The City of Coronado withdrew believing that its possible need for the water did not warrant the assumption of the substantial tax liability. Ramona Irrigation District, being located at some distance from the aqueduct and at an elevation requiring that all of its water be pumped, withdrew after its people had reached the conclusion that, badly as they needed the water, they could not afford its cost. As both withdrawals were accomplished to the satisfaction of the Authority's counsel prior to the incurring of any indebtedness either through annexation to the Metropolitan Water District or the voting of local bonds, both agencies were able to avoid any liability for further assessment by either the Authority or the Metropolitan Water District.

The Authority has received four formal applications for membership. The applications of the San Dieguito and the Santa Fe Irrigation Districts have been favorably considered by the Board of Directors of the Metropolitan Water District and the Authority. The applications of the Crest Public Utility District and the Steel Canyon Irrigation District were acted upon unfavorably. Later both Boards informally approved the annexation of the Crest Public Utility District to La Mesa, Lemon Grove and Spring Valley Irrigation District, one of the Authority's original member agencies. While the annexation of this additional area to the Authority and the Metropolitan Water District had not been completed at the close of the fiscal year, the legal details and technicalities of procedure have been worked out, and it is probable that this annexation will be completed prior to the close of the calendar year 1948.\*

\*Annexation elections were held in the Santa Fe Irrigation District and the San Dieguito Irrigation District on November 15, 1948, and a favorable vote was cast by 140 to 1 and 27 to 1 respectively. The Crest Public Utility District election held on November 19, 1948, was favorable to annexation by a vote of 137 to 1. All areas will be annexed to the District and the Authority by December 15, 1948.

### *Colorado River Matters*

The Authority has been active throughout its legal existence in the affairs of the Colorado River Board, which organization has been legally constituted to protect the rights of the State agencies to the waters of the Colorado River. The Authority has assisted in the formation of and cooperated with the Colorado River Association, a citizens' committee in which the County of San Diego has strong and able representation in a number of its outstanding citizens interested in water matters. Also the Authority has rendered active support to the State of California's effort to resolve the controversy between California and Arizona over the division of the waters of the Colorado River by securing Federal legislation authorizing the Supreme Court to settle the controversy.

### *Additional Aqueduct Capacity*

As the fiscal year drew towards a close, it became increasingly evident that the capacity of the present aqueduct must be increased at an earlier date than first contemplated. Many serious legal difficulties must be overcome in order to clear the way for the construction of the second barrel required to complete the present aqueduct, accomplishing the construction to full capacity. The aqueduct is the property of the United States until it is fully paid for under the terms of the Aqueduct Lease-Purchase Contract. The Authority is in possession under the terms of that contract, and its status is that of a tenant with option to purchase. Any additions or improvements to the line revert to the Government until and unless the line is paid for and title transferred to the Authority. While private financing of the new construction is not impossible, the legal barriers to be surmounted make such financing extremely impractical. The approach to Federal financing and construction requires considerable legal research as to possibilities and method. New negotiations with the legal staffs of the Metropolitan Water District and the Federal agencies and bureaus involved will be required, and possibly it will be necessary to secure new legislation in order to authorize the undertaking of the project by the Federal Government. This problem was the subject of intense study and many conferences in which the General Counsel participated with the staff. At the close of the fiscal year this matter was still under study, and progress was being made toward an early and successful solution of the problem.

## COUNTY WATER AUTHORITY ACT

*An act to provide for the organization, incorporation and government of county water authorities, authorizing and empowering such authorities to acquire water and water rights, and to acquire, construct, operate and manage works and property, to incur bonded indebtedness therefor, to provide for the taxation of property therein, and the performance of certain functions relating thereto by officers of county within which any such authority may be located, to provide for addition of areas thereto, and the exclusion of areas therefrom.*

[Chapter 545, Statutes of 1943, page 2090, passed the Senate April 16, 1943; passed the Assembly May 1, 1943; approved by Governor May 17, 1943; and filed with Secretary of State May 17, 1943, including the 1947 amendment (Stats. 1947, Chap. 922, effective June 23, 1947.)]

*The People of the State of California do enact as follows:*

Section 1. This act shall be known as the County Water Authority Act.

Sec. 2. The term "public agencies," wherever appearing in this act, shall be deemed to mean and include any municipal corporation of the State of California, whether organized under a freeholders' charter or under the provisions of general law, any municipal water district, any municipal utility district, any public utility district, any county water district, any irrigation district, organized under the laws of the State of California, or any other public corporation or agency of the State of California of similar character, with power to acquire and distribute water.

Sec. 3. County water authorities may be organized and incorporated hereunder by two or more public agencies in any county, which public agencies need not be contiguous, and when so incorporated, such authorities shall exercise the powers herein expressly granted, together with such implied powers as are necessary to carry out the objects and purposes of such authorities. Each such authority when so organized shall be a separate and independent political corporate entity.

Sec. 4. The procedure for organizing and incorporating a county water authority under the provisions of this act is as follows:

(1) Resolutions shall first be passed by the legislative bodies of the public agencies designated to be incorporated in the proposed authority, declaring that in their opinion public interest or necessity demands the creation and maintenance of a county water authority to be known as the "(giving the name) County Water Authority." Said resolutions shall contain a statement of the names of such public agencies as are intended to be incorporated in said authority. Certified copies of said resolutions shall be presented to the board of supervisors of the county within which said public agencies are located, requesting said board to call an election without delay for determining whether such authority shall be created.

If for any reason the legislative body of any public agency designated as intended to be incorporated fails or refuses to adopt the resolution above referred

to, then instead of said resolutions, a petition may be presented to the board of supervisors of said county on behalf of said public agency signed by qualified electors within the boundaries of any such public agency, in number to at least 10 per cent of the total vote cast at the last general State election within the territory of said public agency. Said petition shall contain substantially the same declarations and statements required to be contained in the resolutions hereinbefore mentioned. Such petition may be on separate papers but each paper shall contain the affidavit of the party who circulated it, certifying that each name signed thereto is the true signature of the person whose name it purports to be. The clerk of the board of supervisors of said county shall compare the signatures with the affidavits of registration and certify to the board of supervisors the sufficiency or insufficiency of said petition. If found and certified by said clerk as being sufficient such petition shall have all the force and effect of a resolution adopted by the legislative body of said public agency.

(2) Upon the receipt of the resolutions and petitions hereinbefore mentioned, said board of supervisors shall call an election within the territorial boundaries of the public agencies who have adopted such resolutions or on whose behalf a proper petition has been presented, for the purpose of determining whether the proposed county water authority shall be created and established.

(3) The board of supervisors of said county shall give notice of said election by publishing the same once a week for at least three weeks before the date of said election in a newspaper of general circulation, published within the proposed authority. In case no newspaper of general circulation is published within said proposed authority, said notice shall be posted for at least three weeks in not less than three public places within said proposed authority.

Said notice shall state, among other things, the name of the proposed authority and set forth the public agencies proposed to be included therein.

The ballot for said election shall contain such instructions as are required by law to be printed thereon, and in addition thereto there shall appear the following:

Shall the "(giving the name thereof) County Water Authority" be created and established:	Yes	
	No	

Said election and all matters pertaining thereto, not otherwise provided for herein, shall be held and conducted, and the results thereof ascertained, determined and declared in accordance with the general election laws of the State, as nearly as may be, and no person shall be entitled to vote at said election unless he or she be a qualified elector of one of the public agencies proposed to be incorporated in the proposed authority. Said election may be held on the same day as any other State, county or city election, and may be consolidated therewith.

The board of supervisors shall meet on Monday next succeeding the day of said election and canvass the votes cast thereat. They shall canvass the returns of each public agency separately and shall order and declare said authority created and established consisting of the public agencies in which a majority

of those who voted on the proposition voted in favor of the creation of said authority; provided, however, that the total number of electors in such approving public agencies be not less than two-thirds the number of the electors within the authority as first proposed, according to the register of voters used at said election.

The board of supervisors shall cause a certified copy of said order declaring the result of said election to be filed in the office of the Secretary of State, and with the legislative body of each of the public agencies in which said election was held. From and after the filing of said order in the office of the Secretary of State the establishment of said county water authority shall be deemed complete.

The board of supervisors calling the election shall make all provision for the holding thereof throughout the entire authority as proposed, and the cost thereof shall be a proper charge against the county. In case a special election is held exclusively on the proposition of organizing such an authority, the expenditure therefor shall be reimbursed to the county by means of a special tax on all of the taxable property within the public agencies which was proposed to be included in the authority, which tax shall be added to the next county tax bills by the proper officers of the county.

No informality in any proceeding or in the conduct of said election not substantially affecting adversely the legal rights of any citizen, shall be held to invalidate the incorporation of any county water authority, and any proceedings attacking the validity of said incorporation, shall be commenced within three months from the date of filing the aforesaid order with the Secretary of State, otherwise such incorporation and the legal existence of said county water authority shall be held to be valid and in every respect legal and incontestable.

Sec. 5. Any authority incorporated as herein provided shall have power:

- (1) To have perpetual succession.
- (2) To sue and be sued in all actions and proceedings and in all courts and tribunals of competent jurisdiction.
- (3) To adopt a corporate seal and alter it at pleasure.
- (4) To take by grant, purchase, bequest, devise or lease, and to hold, enjoy, lease, sell or otherwise dispose of, any and all real and personal property of any kind within or without the authority and within and without the State necessary or convenient to the full exercise of its powers; also to acquire, construct or operate, control and use any and all works, facilities and means necessary or convenient to the exercise of its powers, both within and without the authority, and within and without the State, and to do and perform any and all things necessary or convenient to the full exercise of the powers herein granted.
- (5) To have and exercise the power of eminent domain and in the manner provided by law for the condemnation of private property for public use, to take any property necessary to the exercise of the powers herein granted. In any proceeding relative to the exercise of such power of eminent domain, the authority shall have the same rights, powers and privileges as a municipal corporation.

(6) To construct and maintain works and establish and maintain facilities across or along any public street or highway and in, upon or over any vacant public lands which are now, or may become the property of the State of California; provided, however, that the authority shall promptly restore any such street or highway to its former state of usefulness as nearly as may be, and shall not use the same in such manner as to completely or unnecessarily impair the usefulness thereof. The grant of the right to use such vacant State lands shall be effective upon the filing by such authority with the Division of State Lands of the Department of Finance, of an application showing the boundaries, extent and locations of the lands, rights of way, or easements desired for such purposes. If the land, rights of way or easement for which application shall be made is for the construction of any aqueduct, ditch, pipe line, conduit, tunnel or other works for the conveyance of water, or for roads, or for poles, or towers and wires for the conveyance of electrical energy or for telephonic or telegraphic communication, no compensation shall be charged the authority therefor, unless in the opinion of the Chief of such Division of State Lands the construction of such works will render the remainder of the legal subdivision through which such works are to be constructed valueless or unsalable, in which event the authority shall pay for the lands to be taken and for such portion of any legal subdivision which, in the opinion of said Chief of the Division of State Lands, are rendered valueless or unsalable. If the lands for which application is made are for purposes other than the construction of roads or for works for the conveyance of water, or electricity or telephonic or telegraphic communication, such authority shall pay to the State for such lands at a reasonable amount determined by the Division of State Lands. Upon filing such application, accompanied by map or plat showing the location or proposed location of such works and/or facilities, the fee title to so much of such State lands as shall be found by the Chief of the Division of State Lands of the Department of Finance to be necessary or convenient to enable such authority to construct or maintain its works and/or to establish or maintain its facilities, shall be conveyed to such authority by patent executed by the Governor of the State of California, attested by the Secretary of State with the Great Seal of said State affixed, and countersigned by the registrar of State lands; if an easement or right of way only over such lands be sought by such authority, such easement or right of way shall be evidenced by permit or grant executed by such Chief of the Division of State Lands. The Chief of the Division of State Lands may reserve in such patents, grants or permits, easements and rights of way across any lands therein described for the construction of streets, roads and highways. Before any such patent, grant or permit shall be executed any compensation due to the State under the provisions hereof, must be paid. In the event that the duties or titles of any of the officers herein mentioned shall be changed by lawful authority, the functions herein required to be performed shall be performed by the appropriate officer or officers of the State of California. No fee shall be exacted from such authority for any patent, permit or grant so issued or for any service rendered hereunder. In the use of streets or highways the authority shall be subject to the reasonable rules and regulations of the governmental agency in charge thereof, concerning excavations and the refilling of excavations, the relaying of pavements and the protection of the public during periods of construction; provided, that the authority shall not be required to pay any license or permit

fees, or file any bonds. The authority may be required to pay reasonable inspection fees.

(7) To borrow money and incur indebtedness and to issue bonds or other evidence of such indebtedness; provided, however, that no authority incorporated hereunder shall incur indebtedness which, in the aggregate, shall exceed fifteen (15) per cent of the taxable property of the authority as shown by the last equalized assessment roll of the county in which the authority is located.

(8) To levy and collect taxes for the purpose of carrying on the operations and paying the obligations of the authority; provided, however, that such taxes levied under this section exclusive of any tax levied to meet the bonded indebtedness of such authority and the interest thereon and exclusive of any tax levied to meet any obligation to the United States of America or to any board, department or agency thereof, shall not exceed five cents (\$0.05) on each such one hundred dollars (\$100) of assessed valuation.

(9) To enter into contracts, employ and retain personal services and employ laborers; to create, establish and maintain such offices and positions as shall be necessary and convenient for the transaction of the business of the authority, and to elect, appoint and employ such officers, attorneys, agents and employees therefor as shall be found by the board of directors to be necessary and convenient for the transaction of the business of the authority.

(10) To join with one or more other public corporations for the purpose of carrying out any of its powers, and for that purpose to contract with such other public corporation or corporations for the purpose of financing such acquisitions, constructions and operations. Such contracts may provide for contributions to be made by each party thereto and for the division and apportionment of the expenses of such acquisitions and operations, and the division and apportionment of the benefits, the services and products therefrom. Such contracts may contain such other and further covenants and agreements as may be necessary and convenient to accomplish the purposes hereof. The term "public corporation" as used in this subdivision shall be deemed to mean and include the United States or any public agency thereof or this or any other State or any political district, subdivision or public agency thereof.

(11) To acquire water and water rights within or without the State but not within the county in which the authority is organized and/or located; to develop, store and transport such water; to provide, sell and deliver water at wholesale for municipal, domestic and other beneficial uses and purposes; provided, each public agency, the area of which shall be a part of any authority incorporated hereunder, shall have a preferential right to purchase from the authority for distribution by such public agency, or any public utility therein empowered by said public agency for the purpose, for domestic, municipal and other beneficial uses within such public agency, a portion of the water served by the authority which shall, from time to time, bear the same ratio to all of the water supply of the authority as the total accumulation of amounts paid by such public agency to the authority on tax assessments and otherwise, excepting purchase of water, toward the capital cost and operating expense of the authority's works shall bear to the total payments received by the authority on account of tax assessments and otherwise, excepting purchase of water, toward such capital cost and operating expense; also to provide, sell and deliver surplus

water of the authority not needed or required for beneficial purposes by the public agencies, the corporate area of which is included in such authority, but giving preference to uses within the authority; provided, that the supplying of such surplus water shall, in every case, be subject to the paramount right of the authority to discontinue the same, in whole or in part, and to take and hold, or to provide, sell and deliver, such water for domestic, municipal or other beneficial uses within the authority upon one year's written notice to the purchaser or user of such surplus water, such notice to be given by the board of directors of the authority whenever it shall be determined and declared by resolution adopted by said board of directors by a two-thirds vote thereof that such water is needed or required by any public agency, the corporate area of which is included within said authority, for domestic, municipal or other beneficial uses therein; to fix the rates therefor, and to acquire, construct, operate and maintain any and all works, facilities, improvements and property necessary or convenient therefor.

(12) To cooperate and contract with United States under the Federal Reclamation Act of June 17, 1902, and all acts amendatory thereof or supplementary thereto, or any other act of Congress heretofore or hereafter enacted authorizing or permitting such cooperation, for the purposes of construction of works, necessary or proper for carrying out the purposes of said authority, or for the acquisition, purchase, extension, operation or maintenance of constructed works, or for a water supply, or for the assumption as principal or guarantor of indebtedness to the United States; also to borrow or procure money from the United States, or any agency thereof for the purpose of financing any of the operations of the authority.

Sec. 6. All powers, privileges and duties vested in or imposed upon any authority incorporated hereunder shall be exercised and performed by and through a board of directors; provided, however, that the exercise of any and all executive, administrative and ministerial powers may be by said board of directors delegated and redelegated to any of the offices created hereby or by the board of directors acting hereunder.

The board of directors herein referred to shall consist of at least one representative from each public agency, the area of which shall lie within the authority. Such representatives shall be designated and appointed by the chief executive officers of said public agencies, respectively, with the consent and approval of the legislative bodies of the said public agencies, respectively.

Members of the board of directors shall hold office for a term of six years, and until their successors are appointed and qualified; provided, that the terms of the members of the first board shall be determined by lot so that the terms of not less than one-half of the members shall be for three years and the terms of the remainder shall be six years; provided further, that every member shall be subject to recall by the voters of the public agency from which such member is appointed, in accordance with the recall provisions of the freeholders' charter or other law applicable to such public agency; and provided further, that any member may be recalled by the unanimous vote of the governing body of the public agency from which such member is appointed.

As a member of the board of directors, each representative shall be entitled to vote on all questions, orders, resolutions and ordinances coming before the

board, and shall be entitled to cast one vote for each five million dollars (\$5,000,000), or major fractional part thereof, of assessed valuation of property taxable for authority purposes in the public agency represented by him as shown by the last equalized assessment roll of the county and evidenced by the certificate of the county auditor; provided, that each representative shall have at least one vote and no public agency shall have votes exceeding in number the total number of votes of all the other public agencies whose corporate areas are included in such authority. In lieu of one representative, any public agency may at its option designate and appoint several representatives not exceeding one additional representative for each fifty million dollars (\$50,000,000) of assessed valuation, but such representatives shall cast the vote to which such public agency would otherwise be entitled as a unit and as a majority of such representatives present shall determine. The affirmative votes of members representing more than fifty (50) per cent of the total number of votes of all the members shall be necessary, and, except as otherwise herein provided, shall be sufficient to carry any order, resolution or ordinance coming before the board of directors; provided, however, any meeting may be adjourned or recessed from day to day or from time to time, by vote of the director or directors present, irrespective of the number of directors present or the number of votes represented at such meeting. For the purposes of this section, the term "major fractional part" shall be deemed to mean a fractional part larger than one-half.

Members of the first board of directors so constituted shall convene at the call of the clerk of the board of supervisors in the meeting room of the board of supervisors at the county seat of said county, and immediately upon convening, such board of directors shall elect from its membership a chairman, a vice chairman, and a secretary, who shall serve for a period of two years, or until their respective successors shall be elected and qualified.

Sec. 7. (a) Whenever the board of directors of any authority incorporated under this act shall, by ordinance adopted by a vote of a majority of the aggregate number of votes of all the members of the board of directors, determine that the interests of said authority and the public interest or necessity demand the acquisition, construction or completion of any public improvement or works, necessary or convenient to carry out the objects or purposes of said authority the cost of which will be too great to be paid out of the ordinary annual income and revenue of the authority, said board of directors may order the submission of the proposition of incurring bonded indebtedness, for the purposes set forth in the said ordinance, to the qualified voters of such district, at an election held for that purpose. Any election held for the purpose of submitting any proposition or propositions of incurring such bonded indebtedness may be held separately, or may be consolidated or held concurrently with any other election authorized by law at which the qualified electors of the authority are entitled to vote. The declaration of public interest or necessity herein required and the provision for the holding of such election may be included within one and the same ordinance, which ordinance, in addition to such declaration of public interest or necessity, shall recite the objects and purposes for which the indebtedness is proposed to be incurred, the estimated cost of the public works or improvements, the amount of the principal of the indebtedness to be incurred therefor and the maximum rate of interest to be paid on such indebtedness, which rate shall not exceed six (6) per cent per annum, payable semiannually.

Such ordinance shall also fix the date upon which such election shall be held and the manner of holding the same and the method of voting for or against incurring the proposed indebtedness. Such ordinance shall also fix the compensation to be paid the officers of the election and shall designate the precincts and polling places and shall appoint the officers of such election, which officers shall consist of one inspector, one judge and two clerks in each precinct. The description of precincts may be made by reference to any order or orders of the board of supervisors of the county in which the authority is situated, or by reference to any previous order or ordinance of the legislative body of any public agency, or by detailed description of such precincts. Precincts established by the board of supervisors of the county, to a number not exceeding six (6) may be consolidated for special elections held hereunder. In the event any bond election shall be called to be held concurrently with any other election or shall be consolidated therewith, the ordinance calling the election hereunder need not designate precincts or polling places or the names of officers of election, but shall contain reference to the act or order calling such other election and fixing the precincts and polling places and appointing election officers therefor.

(b) The ordinance provided for in subdivision (a) of this section shall be published once, at least ten (10) days before the date of the election therein called, in a newspaper of general circulation printed and published within the authority, and no other or further notice of such election or publication of the names of election officers or of the precincts or polling places need be given or made.

(c) The respective election boards shall conduct the election in their respective precincts in the manner prescribed by law for the holding of general elections, and shall make their returns to the secretary of the authority. At any regular or special meeting of the board of directors held not earlier than five (5) days following the date of such election, the returns thereof shall be canvassed and the results thereof declared. In the event that any election held hereunder shall be consolidated with any primary or general election and the proposition to incur indebtedness shall be printed upon a ballot containing other propositions, the returns of the election held hereunder shall be made with the returns of the primary or general election to the board of supervisors or other bodies whose duty it shall be to canvass the returns thereof, and the results of the election held hereunder shall be canvassed at the time and in the manner provided by law for the canvass of the returns of such primary or general election. It shall be the duty of such canvassing body to promptly certify and transmit to the board of directors of the authority a statement of the result of the vote upon the proposition submitted hereunder. Upon receipt of such certificates, it shall be the duty of the board of directors to tabulate and declare the results of the election held hereunder.

(d) In the event that it shall appear from said returns that a two-thirds majority of the electors voting on any proposition submitted hereunder at such election voted in favor of such proposition, the authority shall thereupon be authorized to issue and sell bonds of the authority in the amount and for the purpose or purposes and object or objects provided for in such proposition in such ordinance, and at a rate of interest, not exceeding the rate recited in said ordinance.

(e) The board of directors shall prescribe the form of the bonds issued by the authority and of the interest coupons to be attached thereto. Such bonds shall mature serially at times and in amounts to be fixed by the board of directors; provided, that the payment of said bonds shall begin not later than 10 years from the date thereof and be completed in not more than 50 years from said date. The bonds shall be issued in such denominations as the board of directors may determine, except that no bonds shall be of less denomination than one hundred dollars (\$100), nor of a greater denomination than fifty thousand dollars (\$50,000), and shall be payable on the day and at the place or places fixed in such bonds and with interest at the rate specified therein, which rate shall not be in excess of six per cent (6%) per annum, and shall be payable semiannually.

The board of directors may provide for the call and redemption of any or all of said bonds on any interest payment date prior to their fixed maturity at not exceeding the par value thereof and accrued interest plus a premium of not exceeding 5 per cent upon the principal amount of said bonds in which event a statement to that effect shall be set forth in the ordinance calling the election and the call price fixed by the board of directors shall be set forth on the face of the bond. Notice of such redemption shall be published once a week for three successive weeks in a newspaper of general circulation printed and published within the authority or if there be no such newspaper printed and published within the authority then the publication shall be made in a newspaper of general circulation printed and published within the county in which the said authority is situated, the first publication of which shall be at least 30 days prior to the date fixed for such redemption. After the date fixed for such redemption, interest on said bonds thereafter shall cease.

Such bonds shall be signed by the chairman of said board of directors, or by such other officers as said board of directors shall, by resolution adopted by a majority vote of its members, authorize and designate for that purpose, and such bonds shall also be signed by the controller, or assistant controller, and countersigned by the secretary of said board of directors. The coupons of said bonds shall be numbered consecutively, and signed by said controller, or assistant controller by his lithographed or engraved signature. All such signatures and countersignatures excepting that of the controller, or assistant controller, on said bonds, may be printed, lithographed or engraved.

(f) In case of any of such officers, whose signatures or countersignatures appear on the bonds or coupons, shall cease to be such officer before the delivery of such bonds to the purchaser, such signatures or countersignatures shall nevertheless be valid and sufficient for all purposes, the same as if they had remained in office until the delivery of such bonds.

(g) Such bonds shall not be sold at a price less than the par value thereof, together with accrued interest to the date of delivery, nor until notice calling for bids therefor shall have been published in a newspaper of general circulation published and circulated in the county wherein the principal place of business of said authority shall be located. Said notice, calling for bids, shall state the time for the receipt of such bids, which shall not be less than twenty (20) days after the first publication thereof. Such notice may offer the bonds at a fixed interest rate or with the interest rate undetermined, in which event the

bids shall contain a statement of the lowest rate of interest at which the bidder will take the bonds and pay par value or more therefor, together with accrued interest. Bids for such bonds shall be opened publicly and the results thereof publicly announced. Such bonds shall be sold to the highest bidder. "Highest bidder," as used in this subsection, shall mean the one which gives the authority the lowest net cost. Temporary, or interim, bonds or certificates, of any denomination whatsoever, to be signed by the controller or assistant controller, may be issued until the definitive bonds are executed and available for delivery.

(h) Such bonds may be issued and sold by said board of directors as they shall determine, and the proceeds thereof, excepting premium and accrued interest, shall be placed in the treasury of said authority to the credit of the proper improvement fund, and shall be applied exclusively to the purposes and objects mentioned in said ordinance; provided, that the interest on said bonds accruing during the construction period and for one year thereafter shall be deemed to be a construction cost within the meaning of the purposes and objects mentioned in said ordinance, and such interest may be paid from said proceeds of the sales of such bonds. Premium and accrued interest shall be placed in the fund to be applied to the payment of interest on, and the retirement of, the bonds so sold. For the purposes of this section, the construction period shall be deemed to end when the works, the construction of which shall have been authorized from the proceeds of any such bond issue, shall have been placed in operation to such extent as to result in the sale and delivery in the authority, of water transported and provided by means of such works.

(i) The board of directors may within ninety (90) days from the date of the election authorizing the issuance of bonds, cause to be brought in the name of the authority an action in the superior court of the county in which said authority is located, to determine the validity of any such bonds and the sufficiency of the provisions for the collection of an annual tax sufficient to pay the interest on such indebtedness as it falls due and to constitute a sinking fund for the payment of the principal thereof on or before maturity. Such action shall be in the nature of a proceeding in rem, and jurisdiction of all parties interested may be had by publication of summons for at least once a week for three (3) weeks in some newspaper of general circulation published in the county where the action is pending, such newspaper to be designated by the court having jurisdiction of the proceedings. Jurisdiction shall be complete within ten (10) days after the full publication of such summons in the manner herein provided. Anyone interested may at any time before the expiration of said ten (10) days appear and by proper proceedings contest the validity of such bonds and the sufficiency of the provision for the collection of an annual tax sufficient to pay the interest on such indebtedness as it falls due and to constitute a sinking fund for the payment of the principal thereof on or before maturity. Such action shall be speedily tried and judgment rendered declaring such bonds to be valid or invalid, and declaring the provision for the collection of an annual tax for said purposes, to be sufficient or insufficient. Either party may have the right to appeal to the Supreme Court at any time within thirty (30) days after the rendition of such judgment, which appeal must be heard and determined within three months from the time of taking such appeal. After the expiration of ninety (90) days from the date of the election authorizing the issuance of bonds, no action may be brought to contest or question

the validity of said bonds and proceedings in relation thereto or the sufficiency of the provision for the collection of an annual tax sufficient to pay the interest on such indebtedness as it falls due and to constitute a sinking fund for the payment of the principal thereof on or before maturity. If there be more than one action or proceeding involving the validity of any of such bonds, or the sufficiency of the provision for the collection of an annual tax sufficient for the said purposes, they shall be consolidated and tried together. The court hearing any proceeding or action inquiring into the regularity, legality or correctness of the proceedings leading up to the issuance of bonds or the validity of such bonds or the sufficiency of such provision for the collection of an annual tax, must disregard any error, irregularity or omission which does not affect the substantial rights of the parties to said action or proceeding. The rules of pleading and practice provided by the Code of Civil Procedure, which are not inconsistent with the provisions of this act, are applicable to all actions or proceedings herein provided for. The motion for a new trial of any such action or proceeding must be heard and determined within ten (10) days from the filing of the notice of intention. The costs on any proceeding or action herein provided for may be allowed and apportioned between the parties or taxed to the losing party, in the discretion of the court.

(j) The board of directors, so far as practicable, shall fix such rate or rates for water as will result in revenue which will pay the operating expenses of the authority, provide for repairs and maintenance, and provide for the payment of the interest and principal of the bonded debt. If, however, from any cause, the revenues of the authority shall be inadequate to pay the interest or principal of any bonded debt as the same becomes due, the board of directors shall, at the time of fixing the tax levy and in the manner for such tax levy provided, levy and collect annually until said bonds are paid or until there shall be a sum in the treasury of the authority set apart for that purpose sufficient to meet all sums coming due for principal and interest on such bonds, a tax sufficient to pay the annual interest on such bonds, or such part thereof as shall not be met from revenues of the authority, and also sufficient to pay such part of the principal of such bonds as shall become due before the time when money will be available from the next general tax levy, or such portion thereof as shall not be met from revenues of the authority; provided, however, that if the maturity of the indebtedness created by the issue of bonds be made to begin more than one year after the date of the issuance of such bonds, such tax shall be levied and collected at the time and in the manner aforesaid annually sufficient when added to revenues of the authority available for that purpose to pay the interest on such indebtedness as it falls due and also to constitute, together with the revenues of the authority available for such purpose, a sinking fund for the payment of the principal of such bonds on or before maturity. The taxes herein required to be levied and collected shall be in addition to all other taxes levied for authority purposes and shall be collected at the time and in the same manner as other authority taxes are collected and shall be used for no purpose other than the payment of such bonds and accruing interest.

(k) Coupon bonds issued hereunder, at the request of the holder, may be registered as to principal and interest in the holder's name on the books of the treasurer of the district, and the coupons surrendered and the principal and interest made payable only to the registered holder of the bond. For that

purpose the treasurer of the authority shall detach and cancel the coupons, and shall endorse a statement on the bonds that the coupon sheet issued therewith has been surrendered by the holder, and the coupons canceled by such treasurer, and that the principal and the semiannual interest are thereafter to be paid to the registered holder, or order, by draft, check or warrant drawn payable at a place of payment specified in the bond, after which no transfer shall be valid unless made on such treasurer's books by the registered holder, or by his attorney duly authorized, and similarly noted on the bond. After such registration, the principal and interest of such bond shall be payable only to the registered owner. Bonds registered under this paragraph may, with the consent of the authority and the holders of the bonds, be reconverted into coupon bonds at the expense of the holder thereof, and again reconverted into registered bonds from time to time, as the board of directors of the authority and the holders of the bonds may determine. In converting coupon bonds into registered bonds, coupon bonds may be exchanged for registered bonds of one hundred dollars (\$100) each, or multiples thereof, but not exceeding fifty thousand dollars (\$50,000) each, in which event new registered bonds shall be issued at the expense of the holder. Coupon bonds may be exchanged for other coupon bonds of one hundred dollars (\$100) each, or multiples thereof, but not exceeding fifty thousand dollars (\$50,000) each, in which event new coupon bonds shall be issued at the expense of the holder.

For each conversion or reconversion of a coupon or registered bond, the treasurer of the authority shall be entitled to charge and collect such fee as the board of directors of the authority may prescribe from time to time.

(1) All bonds heretofore or hereafter issued by any county water authority shall be legal investments for all trust funds, and for the funds of all insurance companies, banks, both commercial and savings and trust companies, and for the State school funds, and for all sinking funds under the control of the State Treasurer, and whenever any moneys or funds may by law now or hereafter enacted be invested in, or loaned upon the security of, bonds of cities, cities and counties, counties, or school districts in the State of California, such moneys or funds may be invested in, or loaned upon the security of, the bonds of such county water authority; and whenever bonds of cities, cities and counties, counties or school districts, by any law now or hereafter enacted, may be used as security for the faithful performance or execution of any court or private trust or of any other act, bonds of such county water authority may be so used.

Sec. 8. Any proposal to incur an indebtedness in excess of one million dollars (\$1,000,000), by contract other than by voting bonds, or expenditure of bond proceeds, for the acquisition, construction or completion of any public improvements or works or for the repayment of the costs thereof, and any proposal to purchase, lease, or otherwise acquire, rights, privileges or services by contract, the compensation for which shall be payable over a period of time exceeding five years, shall be submitted to the qualified electors of the authority for their approval and shall be voted upon at an election wherein proceedings shall be had, insofar as applicable, in the manner provided in this act for the authorization and issuance of the bonds of the authority, except that the vote of a majority of the electors voting upon the proposition shall be sufficient to authorize the incurring of such indebtedness. Notice of the election herein

provided for shall contain in addition to the information required in the case of bond elections, a statement of the maximum amount of money to be paid under said contract, exclusive of penalties and interest, and for what purposes it is to be expended and the property, improvements, works, rights, privileges or services to be acquired thereby. The ballots at such election shall contain a brief statement of the general purposes of said contract and the amount of the obligation to be assumed as aforesaid, with the words "Contract—Yes" and "Contract—No." The board of directors may submit such contract or proposed contract to the superior court of the county wherein the authority is located to determine the validity thereof and the legal authority of the board to enter into such contract, whereupon the same proceedings shall be held as are herein provided in the case of the judicial determination of the validity of bonds issued pursuant to this act, and with like effect.

Sec. 9. (a) Immediately after equalization and not later than the fifteenth day of August of each year, it shall be the duty of the auditor of the county wherein such authority shall lie, to prepare and deliver to the controller of the authority a certificate showing the assessed valuation of all property within the authority, and also such assessed valuation segregated according to public agencies, the areas of which lie within the authority.

(b) On or before the twentieth day of August the board of directors of the authority shall by resolution determine the amount of money necessary to be raised by taxation during the fiscal year beginning the first day of July next preceding and shall fix the rate of taxation of the authority, designating the number of cents upon each one hundred dollars (\$100) assessed valuation of taxable property and shall levy a tax accordingly:

(1) Sufficient, when taken with other revenues available for the purpose, to meet interest and sinking fund requirements on all outstanding bonded indebtedness of said authority; and sufficient, when taken with other revenues available for the purpose, to meet the payment of the principal and interest on any refunding bonds, or any bonds the issuance of which may have been authorized by the electors and which bonds have not been sold but which, in the judgment of the board of directors, will be sold prior to the time when money will be available from the next subsequent tax levy, and in case such bonds are not so issued and sold or such tax for any other reason is not required for said purpose, the tax so levied shall be applied to the payment of interest and/or principal on any refunding bonds, or on any bonds authorized by the electors, then outstanding or subsequently issued and/or sold; and

(2) For all other authority purposes.

(c) The board of directors shall also cause to be computed and shall declare in said resolution the amount of money to be derived from the area of the authority lying within each separate public agency by virtue of the tax levy. In such resolution the board shall also fix and determine the times and proportional amounts of installments in which any public agency may elect to make payment in lieu of taxes as hereinafter provided. The board shall immediately cause certified copies of such resolution to be transmitted to the presiding officer of the governing body of each such public agency.

(d) On or before the twenty-fifth day of August of each year the governing body of each such public agency may elect to pay out of its funds available for that purpose all or any portion of the amount of tax which would otherwise be levied upon property within such public agency. Such election shall be made by order upon motion, which order shall recite that such payment shall be made in cash concurrently with the certification of such order to the controller of the authority, or that such payment shall be made in installments and the times wherein such installments shall be payable and the amounts thereof, which amounts shall be in accordance with the requirements of the board of directors of the authority as approved by resolution. In the event that any public agency shall elect to pay in cash, or by deferred installments, money or any part thereof which would otherwise be levied upon property within the public agency, it shall immediately certify to the controller of the authority a copy of such order and a statement showing its financial condition, the funds from which such payments shall be made and the sources of revenue to be used therefor; provided, however, that in the event any public agency shall elect to pay in cash all or any portion of the amount of tax which would otherwise be levied upon property within such public agency to meet interest and sinking fund requirements on the outstanding bonded indebtedness of said authority, such amount so elected to be paid shall be deposited with the treasurer of said authority on or before the twenty-seventh day of August next following such election; and provided, also, that unless such payment is so made in the case of interest and sinking fund requirements, and unless such election, as to all other taxes, shall provide for payments in accordance with the resolution of the board of directors as hereinbefore provided for, then such election shall be ineffective for any purpose.

(e) Before the first day of September the controller of the authority shall cause to be prepared and transmitted to the auditor of the county in which the authority shall lie, a statement showing the tax rate to be applied to assessed property in each public agency, which rate shall be the rate fixed by resolution of the board of directors modified to the extent necessary to produce from each public agency only the amount of money apportioned thereto in said resolution, less any amount paid or undertaken to be paid by such public agency, or credited thereto as herein provided, but if any fraction of a cent occur, it must be taken as a full cent on each one hundred dollars (\$100).

(f) Upon receipt by the auditor of the county in which such authority shall lie, of a certified copy of the controller's statement showing the tax rate to be applied to assessed property in each public agency, and showing the public agencies, the assessed property in which is exempt therefrom, if any, it shall be the duty of the county officers to collect taxes for the benefit of the authority at the rate specified as herein provided. The taxes so levied shall be computed and collected at the same time and in the same manner required by law for the assessment, computation and collection of taxes for county purposes, and the property subject to such tax shall be subject to the same penalties for delinquency, and the same provisions of law relating to the sale of property for non-payment of county taxes and redemption thereof shall apply to the tax herein authorized. When so collected, such taxes shall be paid over to the treasurer of the authority, subject to the deduction herein authorized.

In consideration of services rendered hereunder, any county shall annually be entitled to deduct and retain for its own use and benefit an amount not exceeding 1 per cent on the first twenty-five thousand dollars (\$25,000) collected hereunder, and one-fourth of 1 per cent of any amount in excess of twenty-five thousand dollars (\$25,000) collected hereunder. The board of supervisors of each such county may provide such extra help as in their judgment may be necessary for the proper performance of duties hereunder.

(g) Whenever any real property situated in any authority organized hereunder and upon which a tax shall have been levied, as herein provided, shall be sold for taxes and shall be redeemed, the money paid for such redemption, except advertising costs, shall be apportioned and paid in part to such authority in the proportion which the tax due to such authority shall bear to the total tax for which such property shall have been sold. All taxes levied together with penalties, interests and costs under the provisions of this act shall be a lien upon the property upon which levied, and the enforcement of the collection of such tax shall be had in the same manner and by the same means as is or shall be provided by law for the enforcement of liens for county taxes, and all of the provisions of law relating to the enforcement of such taxes are hereby made a part of this act so far as applicable.

(h) Public agencies, the areas of which are included within any county water authority incorporated hereunder, are hereby authorized to pay to any such authority, out of funds derived from the sale of water or other funds not appropriated to some other use, such amounts as may be determined upon by the governing bodies thereof, respectively, such payments may be made in avoidance of taxes as herein provided, or otherwise, and are hereby declared to be for a public purpose and shall not be deemed gratuitous or in the nature of gifts, but shall be deemed payments for water or services in connection with the distribution of water. Any public agency making any such payment to any authority incorporated hereunder, whether in avoidance of taxes or otherwise, shall receive credit therefor and the amount of the payment so made by any public agency shall be deducted from the amount of taxes which would otherwise be levied against property lying therein as herein provided. In the event that payment so made by any public agency shall exceed the amount of taxes which would otherwise have been levied against property within such public agency, the amount of such excess without interest shall be carried over and applied in reduction of taxes levied, or which would otherwise have been levied during the ensuing year or years.

Any public agency, including a county, which shall have incurred expenses in negotiating contracts or in the investigation of or preliminary work upon any works or projects or in making payments on account of any such contracts, works or projects, taken over by the authority, may receive, and the authority so taking over any such contracts, works or projects may make to such public agency, reimbursement for all such sums so expended, or to be expended, for expenses incurred in such negotiations for, investigation of, preliminary work upon, or payments made on account of the contracts, works or projects so taken over by the authority, to the extent that the board of directors of the authority shall find that such expenditures have benefited such authority, it being the intention of this provision to permit the authority to purchase, and the public agency to sell, assign and transfer such contracts, works or projects taken over

by such authority. The sum so to be paid by such authority to such public agency shall be such amount as may be mutually agreed upon.

As an alternative to the purchase and sale of any contracts, works or projects taken over by the authority, as hereinabove provided, any public agency which shall have incurred expenses in negotiating contracts or in the investigation of or preliminary work upon any such works or projects or in making payments on account of any such contracts, works or projects taken over by the authority, may certify the amount thereof, without interest, to the board of directors of said authority at any time within four (4) years from the date of the incorporation of such authority, or the incurring of such expenses, if such authority be already incorporated, and if allowed by the board of directors, such amount shall be credited to the public agency which incurred the same, and such expenditures shall be considered as a payment of money made as herein provided for which deduction shall be made from the amount of taxes which would otherwise be levied against property lying within such public agency.

Any public agency which shall incur expenses in preliminary work in preparing for the incorporation of or in the incorporation of any authority hereunder likewise may certify the amount thereof, without interest, to the board of directors of said authority at any time within four (4) years from the date of the incorporation of such authority, and if allowed by the board of directors, such amount shall be credited to the public agency incurring the same, and shall be considered as a payment of money made as herein provided, for which deduction shall be made from the amount of taxes which would otherwise be levied against property lying within such public agency.

No such payments of money made in lieu of taxes or otherwise, or such credit allowed by such board of directors, as hereinabove provided, shall apply to reduce the amount of taxes which would otherwise be levied against the property within such public agencies respectively, to meet interest and sinking fund requirements on outstanding bonded indebtedness of such authority.

Such certification and allowance shall be made on or before the first Monday in July, and the amount of money to be raised by taxation shall be computed with reference to the credit to be allowed as herein provided, but such credit may, in the discretion of the board of directors, be considered in connection with the amount of money to be raised by the next tax levy, or may be spread over subsequent years, not to exceed five.

(i) If any public agency shall fail to comply with the terms of the order relating to payments to be made to the authority in lieu of taxation, or if any public agency annexed to the authority shall fail to comply with the terms and conditions fixed by the board of directors and upon which such annexation occurred, the amount of the delinquency, plus a penalty of 8 per cent shall be added to the taxes to be collected during the ensuing fiscal year, from the property within such delinquent public agency, and thereafter for a period of two (2) years no order or ordinance shall be sufficient to exempt the property in said public agency from taxation hereunder unless it be accompanied by payment in cash of the amount which would otherwise be collected from owners of property within the public agency, together with all moneys due but unpaid under any previous order, or annexation provision.

(j) All provisions herein, or in any ordinance adopted pursuant hereto, relating to the respective times when the various acts pertaining to the levy of taxes are to be performed, are directory only, and failure to perform any such act or acts within the time so specified shall not impair the legal authority herein conferred to perform all subsequent acts relating to the levy of such taxes. In the event that any of the provisions of law respecting the time and manner of assessing property for purposes of taxation, of equalizing such assessments, of certifying such assessed valuation to the taxing authorities, of making the tax levies, of certifying such tax levies to the proper authorities for extension upon the tax rolls, and for enforcement and collection of such taxes or of performing any other act regarding the assessment, levy or collection of taxes be amended, changed, repealed or newly enacted, and as a result thereof, it should appear to the board of directors of the authority that the time schedule provided herein respecting the levy of authority taxes be no longer consistent with such modified tax procedure, then said board of directors by ordinance may prescribe a new schedule setting forth the times when the various acts herein required to be done in levying authority taxes shall be performed. Nothing contained in this paragraph shall relieve the board of directors of its duty to provide adequate funds, by annual tax levies if necessary, to meet the interest and principal requirements of the bonded debts as they fall due.

(k) For the purpose of assessing and collecting, under the provisions of Section 9(a) of Article XIII of the Constitution of the State of California, the taxes levied by any authority incorporated hereunder, the rate for taxes levied for the preceding tax year, as such phrase is employed in said section of the Constitution, shall be the rate fixed for such preceding tax year by the board of directors of such authority pursuant to Section 9, subdivision (b) of this act. In the event that any public agency, pursuant to the provisions of Section 9, subdivision (d) of this act, shall elect to pay the whole or any portion of the amount of taxes to be derived from the area of the authority within such public agency, as such amount shall have been fixed by resolution of the board of directors, a refund shall be made by the authority to each taxpayer thereof who shall have theretofore paid any tax collected under the provisions of said section of the Constitution, in the proportion that such public agency shall have so elected to pay the amount so to be derived. The board of directors shall adopt regulations providing for the presentation and audit and payment of claims for such refunds. No claim for such refund shall be granted unless such claim shall have been filed within one year from the date when the right to such refund shall have accrued.

Sec. 10. (a) For the purposes of this section, the following definitions shall apply to the terms used therein; the term "city" shall mean and include any municipal corporation or municipality of the State of California, whether organized under a freeholder's charter or under the provisions of general law of the type and class of cities and incorporated towns; the term "water district" shall mean and include any municipal water district, municipal utility district, public utility district, county water district, irrigation district or any other public corporation or agency of the State of California of similar character.

(b) Territory may be annexed to any county water authority organized hereunder by one of the following methods:

(1) By annexation to, or consolidation with, the area of any city, the area of which, as a separate unit, shall have become a part of any county water authority organized hereunder, such annexation or consolidation to occur upon compliance with the provisions of law governing such annexation to, or consolidation with, the area of such city. Upon completion of such annexation to, or consolidation with, such city in compliance with the provisions of law applicable thereto, such territory shall become, and be, a part of such county water authority, and the taxable property therein shall be subject to taxation thereafter for the purposes of said county water authority, including the payment of bonds and other obligations of such authority at the time authorized or outstanding.

(2) By annexation to, or consolidation with, any city which, as a separate unit, shall have become a part of any water district the area of which water district, as a separate unit, shall have become a part of any county water authority organized hereunder, in instances where, under the applicable provisions of law governing the change of boundaries of such water district, such annexation or consolidation automatically will result in the enlargement of the area of such water district, such annexation or consolidation to occur upon compliance with the provisions of law governing such annexation to, or consolidation with, the area of such city. Upon completion of such annexation to, or consolidation with, such city in compliance with the provisions of law applicable thereto, such territory shall become, and be a part of such water district, and of such county water authority, and the taxable property therein shall be subject to taxation thereafter for the purposes of said water district and of said county water authority, including the payment of bonds and other obligations of such water district and of such county water authority at the time authorized or outstanding. If any such territory shall have been so annexed to, or consolidated with, any such city prior to the effective date of this subparagraph (2), under conditions which would have resulted in the enlargement of the area of such county water authority had the foregoing provisions of this subparagraph (2) then been in effect, upon compliance with the following provisions of this subparagraph (2), such territory shall be annexed to, and shall become and be a part of, such county water authority, and shall be a part of such water district for all purposes, the last-mentioned provisions being as follows:

(aa) The governing body of such city, at any time after the effective date of this subparagraph (2), may adopt an ordinance which, after reciting that such territory has been annexed to, or consolidated with, such city by proceedings theretofore taken under statutory authority, and after referring to the applicable statutes and to the date and place of filing of the certificate or certificates evidencing such annexation or consolidation, shall describe such territory and shall determine and declare that the said territory shall be, and thereby is, annexed to such county water authority, and said ordinance shall further determine and declare that the said territory shall become and be, and thereby is, a part of such county water authority, and shall be, and thereby is, a part of such water district for all purposes.

(bb) The governing body, or clerk thereof, of such city shall file a certified copy of such ordinance with the Secretary of State of the State of California. Upon the filing of said certified copy of such ordinance in the office of the Sec-

retary of State, such territory shall become, and be, a part of such county water authority, and shall be a part of such water district for all purposes, and the taxable property therein shall be subject to taxation thereafter for the purposes of said county water authority and of said water district, including the payment of bonds and other obligations of such county water authority at the time authorized or outstanding.

(cc) Upon the filing in his office of the aforesaid certified copy of such ordinance, the Secretary of State shall, within 10 days, issue his certificate, describing such territory, reciting the filing of said certified copy of such ordinance in his office and the annexation of said territory to such county water authority, and declaring that the said territory is a part of said county water authority and of such water district. The Secretary of State shall transmit the original of his said certificate to the secretary of such county water authority and a duplicate original of his said certificate to the clerk of the governing body of such water district, and shall forward a certified copy of his said certificate to the county clerk of the county in which such county water authority is situated.

(3) Upon terms and conditions fixed by the board of directors of such county water authority and in the manner provided in paragraph (c) hereof, by direct annexation, as a separate unit, of the corporate area of any water district or city.

(4) Upon terms and conditions fixed by the board of directors of such county water authority and in the manner provided in paragraph (d) hereof, by annexation to, or consolidation with, any water district, the area of which, in whole or in part, is included within such county water authority as a separate unit; provided, that unless such territory shall be so annexed to such county water authority with the consent of such board of directors, the annexation of such territory to, or the consolidation of such territory with, any such water district shall not authorize or entitle such water district or such territory to demand or receive any water from such county water authority for use in such territory; and provided further, that, except where automatic annexation results under the conditions mentioned in subparagraph (2) of this paragraph (b), nothing in this act shall prevent the annexation of territory to, or the consolidation of territory with, any such water district for its local purposes only and without annexing such territory to such county water authority, and such local annexation or consolidation may occur without requesting or obtaining the consent thereto of the board of directors of such county water authority.

(c) The governing body of any water district or city may apply to the board of directors of such county water authority for consent to annex the corporate area of such water district or city to the county water authority. The board of directors may grant or deny such application and in granting the same may fix the terms and conditions upon which the corporate area of such water district or city may be annexed to and become a part of the county water authority. Such terms and conditions may provide, among other things, for the levy by such county water authority of special taxes upon taxable property within such water district or city, in addition to the taxes elsewhere in this act authorized to be levied by such county water authority, and in case such terms and conditions shall provide for the levy of such special taxes, the board of directors in fixing such terms and conditions shall specify the aggregate amount to be so raised and the number of years prescribed for raising such aggregate sum, and

that substantially equal annual levies will be made for the purpose of raising such sum over the period so prescribed. The action of the board of directors evidenced by resolution shall be promptly transmitted to the governing body of such applying water district or city, and if such action shall grant consent to such annexation, such governing body may thereupon submit to the qualified electors of such water district or city at any general or special election held therein, the proposition of such annexation subject to the terms and conditions fixed as herein provided. Notice of such election shall be given by posting or publication; when given by posting such notices shall be posted at least ten (10) days and in three public places in the water district or city; when given by publication such notice shall be published once at least ten (10) days before the date fixed for the election in a newspaper of general circulation published in the water district or city. Such notice shall contain the substance of the terms and conditions fixed by the board of directors, as herein provided. Such election shall be conducted and the returns thereof canvassed in the manner provided by law for elections in such water district or city. If such proposition shall receive the affirmative vote of a majority of electors of such water district or city voting thereon at such election, the governing body of such water district or city shall certify the result of such election on said proposition to the board of directors of said authority, together with a legal description of the boundaries of the corporate area of such water district or city, accompanied by a map or plat indicating such boundaries. A certificate of proceedings hereunder shall be made by the secretary of the authority and filed with the Secretary of State. Upon the filing thereof in the office of the Secretary of State, the corporate area of such water district or city shall become, and be, an integral part of such county water authority, and the taxable property therein shall be subject to taxation thereafter for the purposes of said county water authority, including the payment of bonds and other obligations of such authority at the time authorized or outstanding, and the board of directors of such county water authority shall be empowered to do all things necessary to enforce and make effective the terms and conditions of annexation fixed as hereinabove authorized. Upon the filing in his office of the aforesaid certificate of proceedings the Secretary of State shall, within ten (10) days, issue his certificate, reciting the filing of said papers in his office and the annexation of the corporate area of such water district or city to such county water authority. The Secretary of State shall transmit the original of his said certificate to the secretary of such county water authority and shall forward a certified copy thereof to the county clerk of the county in which such county water authority is situated.

(1) In the event that a water district shall apply to a county water authority for consent to annex its corporate area, as a separate unit, which water district shall include as a part of its corporate area one or more cities, the corporate areas of which cities are already included within such county water authority as separate units, then that fact shall be taken into consideration by the board of directors of such county water authority in fixing the terms and conditions upon which said water district may be annexed to such county water authority, to the end that the areas within said cities which are already a part of such county water authority, shall not be required to assume any greater financial burden or obligation to such county water authority than they would have had if they had remained a part of such county water authority as separate units.

That concurrently with any election called by a water district to submit to the qualified electors of such water district, the question of whether the terms and conditions fixed by the board of directors of such county water authority for annexation shall be approved, the governing bodies of said cities may call and hold elections within their respective corporate limits to determine whether or not such cities shall withdraw from such county water authority as separate units, and said proposed withdrawal may be made and submitted conditioned upon and effective when the said water district shall have finally been annexed to such county water authority.

The effect of such concurrent elections, if a majority of the electors of the said water district voting thereat vote in favor of annexation, and a majority of the electors of said cities voting thereat vote in favor of withdrawing, shall be that the said water district thereafter shall be authorized to exercise the privileges and to discharge the duties prescribed in this act for public agencies the areas of which, as separate units, are included within the said authority, in place of and instead of said cities so withdrawing. That notwithstanding anything to the contrary in Section 11 of this act, the areas within said cities shall remain a part of such county water authority and shall not be excluded therefrom notwithstanding the fact that said cities, as corporate entities, have withdrawn from said authority.

In the event that said water district does annex to such county water authority, then the directors representing said cities on the board of directors of such county water authority, shall continue to act until their successors have been chosen and designated by the appropriate officers of said water district and have qualified as members of the board of directors of such county water authority, after which time the said directors representing said cities, shall no longer be entitled to sit or vote on said board.

(d) The governing body of any water district, the area of which, in whole or in part, is included within such county water authority as a separate unit, may apply to the board of directors of such county water authority for consent to annex to such county water authority territory which it is sought to annex to, or consolidate with, such water district, or territory which, without making the same a part of such county water authority, already has been annexed to, or consolidated with, such water district. The board of directors may grant or deny such application and in granting the same may fix the terms and conditions upon which such territory may be annexed to, and become a part of, the county water authority. Such terms and conditions may provide, among other things, for the levy by such county water authority of special taxes upon taxable property within such territory in addition to the taxes elsewhere in this act authorized to be levied by such county water authority, and in case such terms and conditions shall provide for the levy of such special taxes, the board of directors in fixing such terms and conditions shall specify the aggregate amount to be so raised and the number of years prescribed for raising such aggregate sum, and that substantially equal annual levies will be made for the purpose of raising such sum over the period so prescribed. The action of the board of directors evidenced by resolution shall be promptly transmitted to the governing body of such applying water district, and if such action shall grant consent to such annexation, such territory may be annexed to such county water authority as provided in subdivisions (1) or (2) thereof.

(1) If such territory has not theretofore been annexed to or consolidated with such water district, upon completion of such annexation to, or consolidation with, such water district in compliance with the provisions of law applicable thereto, including this Section 10, such territory shall become and be a part of such county water authority and the taxable property therein shall be subject to taxation thereafter for the purposes of said county water authority, including the payment of bonds and other obligations of such authority at the time authorized or outstanding, and the board of directors of such county water authority shall be empowered to do all things necessary to enforce and make effective the terms and conditions of annexation fixed as hereinabove authorized; provided, that if the applicable provisions of law governing such annexation to, or consolidation with, such water district shall require any notice of any election called for the purpose of determining whether such proposed annexation or consolidation shall occur, or shall require any notice of hearing or other notice to be given to the residents or electors of, or owners of property in, such territory, such notice shall contain the substance of the terms and conditions of annexation to such county water authority fixed by the board of directors of such authority as herein provided; and provided further, that the governing body of such water district or other officer thereof having the duty of certifying the proceedings resulting in such annexation to, or consolidation with, such water district, pursuant to the provisions of law applicable thereto, shall include in such certification a record of the proceedings by which such territory has been annexed to such county water authority in accordance with the provisions hereof, and shall file a duplicate of such certificate with the board of directors of such county water authority.

(2) If the territory sought to be annexed to such county water authority theretofore has been annexed to, or consolidated with, such water district, the governing body of such water district, upon being advised of the action of the board of directors of such county water authority, as above provided, and if such action shall grant consent to such annexation, may submit to the qualified electors of such territory, at any general or special election held therein, the proposition of such annexation to such county water authority subject to the terms and conditions fixed by the board of directors of such county water authority, as herein provided. Notice of such election shall be given by posting or publication; when given by posting such notice shall be posted at least ten (10) days and in three public places in such territory; when given by publication such notice shall be published once at least ten (10) days before the date fixed for the election in a newspaper of general circulation published in such water district. Such notice shall contain the substance of the terms and conditions fixed by the board of directors, as herein provided. Such election shall be conducted and the returns thereof canvassed by the governing body of such water district in the manner provided by law for elections in such water district. If such proposition shall receive the affirmative vote of a majority of electors of such territory voting thereon at such election, the governing body of such water district shall certify the result of such election on said proposition to the board of directors of said authority. A certificate of proceedings hereunder shall be made by the secretary of the authority and filed with the Secretary of State. Upon the filing thereof in the office of the Secretary of State, such territory shall become, and be, a part of such county water authority, and the taxable property

therein shall be subject to taxation thereafter for the purposes of said county water authority, including the payment of bonds and other obligations of such authority at the time authorized or outstanding, and the board of directors of such county water authority shall be empowered to do all things necessary to enforce and make effective the terms and conditions of annexation of such territory to such county water authority fixed by said board of directors as hereinabove authorized. Upon the filing in his office of the aforesaid certificate of proceedings the Secretary of State shall, within ten (10) days, issue his certificate, reciting the filing of said papers in his office and the annexation of such territory to such county water authority. The Secretary of State shall transmit the original of his said certificate to the secretary of such county water authority and shall forward a certified copy thereof to the county clerk of the county in which such county water authority is situated.

(e) The validity of any proceedings for the annexation to any authority organized hereunder, of the corporate area of a water district or city as a separate unit, or of territory annexed to, or consolidated with, a water district or city which, as a unit, shall have been included within such authority, shall not be contested in any action unless such action shall have been brought within three months after the completion of such annexation, or, in case such annexation is completed prior to the time that this paragraph takes effect, then within three months after this paragraph shall have become effective.

(f) Whenever territory is annexed to or consolidated with any water district, the corporate area of which, as a unit, shall have become a part of any county water authority organized hereunder, irrespective of whether such territory is annexed to and becomes a part of such county water authority, or whenever territory is annexed to any city under the conditions mentioned in subparagraph (1) or subparagraph (2) of paragraph (b) of this section, or whenever territory previously annexed to any city is annexed to such county water authority under the conditions mentioned in subparagraph (2) of paragraph (b) of this section, the governing or legislative body, or clerk thereof, of such water district or city, shall file with the board of directors of such county water authority a statement of the change of boundaries of such water district or city, setting forth the legal description of the boundaries of such water district or city, as so changed, and of the part thereof within such county water authority, which statement shall be accompanied by a map or plat indicating such boundaries.

(g) The inclusion in a county water authority of the corporate area, in whole or in part, of any municipal water district, municipal utility district, public utility district, county water district, irrigation district, or other public corporation or agency of the State of California of similar character, referred to in Section 2 of this act, shall not destroy the identity or legal existence or impair the powers of any such municipal water district, municipal utility district, public utility district, county water district, irrigation district, or other public corporation or agency of the State of California of similar character, notwithstanding the identity of purpose or substantial identity of purpose of such county water authority.

(h) In determining the number of members of the board of directors of a county water authority organized hereunder, and the number of votes to be cast

by such directors, from the component public agencies, the corporate areas of which, in whole or in part, are included as units within such county water authority, there shall be considered only the assessed valuation of the property taxable for authority purposes lying in such public agencies and in such authority. Such directors shall be appointed by the chief executive officers, with the consent and approval of the governing bodies, of such component public agencies, respectively, without regard to whether any such chief executive officers or members of such governing bodies have been chosen from, or represent, areas of their respective public agencies which lie outside of such county water authority. The phrase "any water district, the corporate area of which is included within said authority" and the phrase "each city, the area of which shall be a part of any authority incorporated hereunder," and like phrases, used elsewhere in this act, shall be deemed to mean and refer to any water district or city, the corporate area of which either in whole or in part, is included within such county water authority, but the duties and obligations of such county water authority shall extend only to that part of the corporate area of such water district or city which shall lie within such county water authority. As to any such water district, city or public agency, the corporate area of which lies partly within and partly without such county water authority, the word "therein" and the phrase "within such city" and like words and phrases, used elsewhere in this act, shall be deemed to mean and refer to that part of the corporate area of such water district, city or public agency which lies within such county water authority. The charges for water supplied by such county water authority to any component public agency, pursuant to its request, shall be and become an obligation of such public agency, irrespective of whether the entire corporate area of such public agency is included within such county water authority, and such authority in administrative and contractual matters shall deal with the chief executive officers and governing bodies and other proper officials of such component public agencies as chosen or constituted under applicable laws governing the respective public agencies.

Sec. 11. Any public agency whose corporate area has become or is a part of any authority may withdraw therefrom in the following manner:

The governing body of any such public agency may submit to the electors thereof at any general or special election the proposition of withdrawing from any authority incorporated thereunder. Notice of such election shall be given in the manner provided in subdivision (b) of Section 10 hereof. Such election shall be conducted and the returns thereof canvassed in the manner provided by law for conduct of elections in said public agency. In the event that the majority of the electors voting thereon vote in favor of such withdrawal, the result thereof shall be certified by the governing body of such public agency to the board of directors of the authority. A certificate of the proceedings hereunder shall be made by the secretary of the authority and filed with the Secretary of State, and upon the filing of such certificate the area of the public agency so withdrawing shall be excluded from the said authority, and shall no longer be a part thereof; provided, however, that the property within the said public agency as it shall exist at the time of such exclusion shall continue taxable for the purpose of paying said bonded and other indebtedness outstanding or contracted for, at the time of such exclusion and until such bonded or other indebtedness shall have been satisfied.

Sec. 12. Except as herein provided, no director or any other officer or employee of the authority shall in any manner be interested, directly or indirectly, in any contract awarded or to be awarded by the board of directors, or made or to be made by such officer or employee pursuant to discretionary authority vested in him, or in the profits to be derived therefrom. Notwithstanding the fact that such director or other officer or employee of the authority may be a stockholder or bondholder or director or other officer or employee of a corporation contracting with the authority, contracts may be made with such corporation for its general benefit unless such director or officer or employee of the authority shall own or control, directly or indirectly, stock or bonds to an amount exceeding five per centum (5%) of the total amount of the stock or bonds, respectively, of such contracting corporation issued and outstanding. For any violation of this section such director or other officer or employee of the authority shall be deemed guilty of a misdemeanor, and such conviction shall work a forfeiture of his office, or employment, and he shall be punished by a fine not exceeding five hundred dollars (\$500), or by imprisonment in the county jail not exceeding six (6) months or by both such fine and imprisonment.

Sec. 13. All matters and things necessary for the proper administration of the affairs of said authority which are not provided for in this act shall be provided for by the board of directors of the authority by ordinance. Any action required by this act to be done by resolution may be done, with equal validity, by ordinance.

Sec. 14. The treasurer of any authority organized under the provisions of this act is hereby expressly authorized to deposit funds of such authority in banks in the manner provided by law for the deposit of moneys of a municipality or other public or municipal corporation.

Sec. 15. The fiscal year of any authority incorporated hereunder shall commence on the first day of July of each year and shall continue until the close of the thirtieth day of June of the year following. As promptly as shall be possible after the close of each fiscal year, it shall be the duty of the controller of the authority to prepare and transmit to the chief executive officer of each public agency, the area of which shall lie within the authority, a statement of revenues and expenditures in such detail as shall be prescribed by the board of directors; also a statement of the amount of water stored by the authority and the amounts used by the respective public agencies, the areas of which shall lie within the authority.

Sec. 16. If any section, subsection, sentence, clause or phrase of this act is for any reason held to be unconstitutional, such decision shall not affect the validity of the remaining portions of this act. The Legislature hereby declares that it would have passed this act, and each section, subsection, sentence, clause and phrase thereof, irrespective of the fact that any one or more other sections, subsections, sentences, clauses or phrases be declared unconstitutional.

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