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PLEASANT VALLEY WATER DISTRICT
COALINGA, CALIFORNIA

FACTUAL REPORT
APRIL 1986

SUMMERS ENGINEERING, INC.
CONSULTING ENGINEERS
HANFORD CALIFORNIA

PLEASANT VALLEY WATER DISTRICT

Coalinga, California

FACTUAL REPORT

April 1986

**SUMMERS ENGINEERING, INC.
Consulting Engineers
Hanford, California**

PLEASANT VALLEY WATER DISTRICT

Coalinga, California

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PLEASANT VALLEY WATER DISTRICT

BACKGROUND

Introduction

The Pleasant Valley Water District (Figure 1) is located in western Fresno County in California. The District, with an irrigable area of approximately 32,000 acres, was organized on January 23, 1963, in accordance with the Water District Law of the State of California for the purpose of contracting with the U. S. Bureau of Reclamation for a water supply. This water supply was to be delivered through the Coalinga Canal, formerly known as the Pleasant Valley Canal, a branch of the San Luis Canal. Although the canal and pumping plant were constructed with capacity for the Pleasant Valley Water District, the District is not yet able to receive the benefits of this facility.

The District is traversed by four intermittent streams, namely Los Gatos, Warthan, Jacalitos, and Zapato Chino Creeks. These four streams combine into the Arroyo Pasajero which flows northeasterly through the Guijarral Hills.

If a water supply contract can be obtained from the Bureau of Reclamation, the District will construct at their own expense the pumping plants, earthen canals and small reservoirs to provide the supply of water to the farmers as described in this report. The farmers will be able to install their own booster pumps at the reservoirs to provide the supply to their sprinkler systems. Sprinkler systems are in common use in the Valley

due to the limited water supply and topography. The proposed system, estimated at a cost of approximately \$7 million, will be financed locally by the farmers provided they can get a water supply contract with the Bureau of Reclamation to support such local funding. It is projected that the water cost, including Bureau of Reclamation charges, will be approximately \$60 per acre foot. The water needs of the District would be approximately 40,000 acre feet annually. No new land would be served by the proposed project.

Chevron USA owns approximately one-half of the agricultural lands within the boundaries of the District indicated by the shaded area on Figure 2. This land was originally acquired for oil exploration and development. These lands are currently leased to farmers in the area and are irrigated from the groundwater source. In projecting the water needs of the District, it was concluded that these lands would not receive a surface supply from the proposed project. In the event the Chevron properties stay in agricultural production by continuing to pump groundwater their land would receive little if any benefit from this proposed project since the groundwater supply would continue to be overdrafted. The producing oil fields within the District are northerly of the city of Coalinga and will not be served by the District.

A major concern of the District is the economic impact placed upon the area by the devastating earthquake on May 2, 1983. Figure 3 shows earthquake damage to existing irrigation facilities. This disaster brought a financial decline to the Pleasant Valley area and more significantly to the

community of Coalinga. It is a goal of the Pleasant Valley Water District to help restore an economic base by re-establishing agricultural production.

Climate

The climate for Pleasant Valley is characterized by a mild spring and fall, warm summers and cool winters with some fog and moderate rainfall. Table 1 shows the average monthly temperatures for the 14 year period from 1972 through 1985 as recorded at the Coalinga weather station. Also indicated in this tabulation is the average frost-free period and the maximum and minimum temperatures of record. Table 2 gives the average monthly rainfall for the same 14 year period. The area is rarely subjected to severe wind storms, hail or snowfall. The climatic conditions will allow a relatively long growing season and also permit the development of permanent crops.

Land

The lands within the boundaries of the District have been irrigated since the early 1900's using groundwater. Most of the lands are on gently sloping, coalescing, alluvial fans extending from the eastern slope of the Coast Range mountains. At the east central part of the District is a basin like area and around the outer edge are some foothill slopes and upland areas. Sediments on the fans and in the basin have been derived from calcareous and gypsiferous sandstones, shales, and conglomerates which contain variable amounts of soluble salts, most of which are sulfates. All of

TABLE 1
AVERAGE MONTHLY TEMPERATURES
(Coalinga Weather Station)

<u>Month</u>	<u>Maximum</u>	<u>Minimum</u>
January	56.0	35.7
February	64.2	39.1
March	67.8	41.6
April	75.5	44.6
May	86.0	51.8
June	93.5	58.9
July	97.8	64.1
August	95.4	62.5
September	90.4	58.6
October	80.6	49.1
November	65.9	40.1
December	57.6	35.9

Temperatures in degrees Fahrenheit average over a 14 year period. (1972 to 1985)

The average frost free period is 242 days.

The maximum temperature of 112° F occurred on July 27, 1975.

The minimum temperature of 18° F occurred on January 13, 1963.

TABLE 2
AVERAGE MONTHLY RAINFALL
(Coalinga Weather Station)

<u>Month</u>	<u>Average Rainfall (Inches)</u>
January	1.60
February	1.52
March	1.41
April	0.53
May	0.16
June	0.00
July	0.00
August	0.07
September	0.51
October	0.38
November	0.97
December	1.12
Average Annual Rainfall	8.27 Inches

Rainfall averaged over a 14-year period. (1972 to 1985)

the soils on the District lands reflect the characteristics of the parent material and are, for the most part, young or youthful.

These lands were classified by the Bureau of Reclamation and published in an undated report titled "Preliminary Report of Pleasant Valley." Table 3 gives the revised March 21, 1975 land classes for the study. Combining these various classifications into the principal categories is indicated in Table 4. The investigations were made to estimate the suitability of District lands for irrigated agriculture by examining the soil, topographic and drainage features of the lands. A summary of these land classes follows as provided by the Bureau of Reclamation:

The surface soils of the district are predominantly recent alluvial soils derived from the sedentary rock parent material of the surrounding hills. These soils are deep, light to medium textured and very gently sloping to slightly undulating in topography. They are for the most part free of harmful salts but there are a few areas that are slightly affected. The Bureau Land Classification places most of these soils in land class 1 or 2.

The report further states:

There does not appear to be any wide-spread sheets of clay or silt which act as barriers to water movement and would create large bodies of semi-perched or confined ground water....

Class 1 lands have features which favor high sustained yields of climatically adapted crops at relatively low production costs with no limiting features. The characteristics of class 2 lands may cause moderately reduced yields, or higher costs of production, or restricted crop adaptabilities, or a combination of these results. Class 3 lands are suitable to sustained irrigated agriculture in a lesser degree than classes 1 and 2 due to characteristics which produce one or more of the following results; relatively low yields, higher unit costs of production, and greatly restricted crop adaptabilities. Class 4 lands have topographic features which necessitate special practices to control the water or soil and drainage features which require a leaching program before an acceptable level of crop production can be reached. Class 5 lands are used for the production and distribution of oil and are considered non-irrigable inasmuch as it appears unlikely that this use would be changed for a long time. Class 6 lands have features unsuited for irrigated agriculture.

TABLE 3
LAND CLASSIFICATION *

<u>Class</u>	<u>Acreage</u>
1	16,658 Ac.
2s	9,876 Ac.
2st	421 Ac.
2sd	100 Ac.
2t	3,094 Ac.
3s	1,017 Ac.
3st	1,412 Ac.
3std	73 Ac.
3sd	146 Ac.
3t	489 Ac.
4Sst	1,161 Ac.
4std	234 Ac.
4sd	491 Ac.
5t	1,513 Ac.
6s	---
6t	30 Ac.
6st	801 Ac.
6std	1,717 Ac.
6sd	235 Ac.
Urban	147 Ac.
	39,615 Ac.

TABLE 4
COMBINED LAND CLASSIFICATION *

<u>Land Class</u>	<u>Acreage</u>	<u>Percentage Of Total</u>
Class 1	16,658 Ac.	42
Class 2	13,491 Ac.	34
Class 3	3,137 Ac.	8
Class 4	1,886 Ac.	5
Class 5	1,513 Ac.	4
Class 6	2,930 Ac.	7
	39,615 Ac.	100 %

* Source: USBR - Preliminary Report of Pleasant Valley Revised
March 21, 1975.

WATER

Groundwater

The District receives its water supply by pumping from existing groundwater sources. This source is declining in level and deteriorating in supply and quality. Table 5 shows water level changes of various wells within the District from 1960 to 1985. The safe yield of the groundwater basin has been calculated to be 5,000 acre feet per year.

Following the recent concerns regarding selenium and other trace elements in return flows in the San Joaquin Valley, the District undertook an investigation to determine the local conditions. A series of soil and groundwater samples were gathered in January 1985 and transmitted to a laboratory specializing in this work for a complete analysis. Copies of these analyses are shown in Tables 6 and 7. A review of the data indicates that the trace element concentrations in the District are relatively low and should not create any problems. However, Table 6 also indicates that only salt tolerant crops can be grown due to the high salt level in the groundwater supply. Figure 4 shows the locations of the sampling sites. The current cropping pattern is principally cotton and grain. With the development of a surface water supply, there will be a shift away from these salt-tolerant crops into orchard and row crops.

TABLE 5

MEASURED WATER LEVEL CHANGES

Well Number	Ground Surface to Standing Water Level				Change in Water Level	
	Date	Depth (ft.)	Date	Depth (ft.)	(ft.)	(ft./yr)
20/15-15L1	2/17/66	318	12/20/85	459	-141	-7.1
20/15-22D1	5/2/60	257	12/22/76	350	- 93	-5.6
20/15-25A1	5/3/60	153	12/20/85	283	-130	-5.2
20/15-29D1	12/15/64	258	12/16/82	386	-128	-7.1
20/15-32A1	12/15/64	226	12/16/82	271	- 45	-2.5
20/15-34B1	12/15/64	221	12/20/85	289	- 61	-3.4
20/15-34N2	12/18/64	207	12/20/85	296.5	- 89.5	-4.3
20/15-36Q1	12/18/64	159	12/20/85	219	- 60	-2.9
21/15-2E1	12/18/64	228	12/19/85	314	- 86	-4.1
21/15-4N4	12/18/64	307	12/16/82	329	- 22	-1.2
21/15-12M1	2/16/66	237	12/16/82	339	-102	-6.1
21/16-4E2	2/15/66	183	12/20/85	267	- 84	-4.2
21/16-8E1	12/18/64	193	2/2/78	245	- 52	-4.0
21/16-9N1	12/17/64	182	1/16/81	287.5	-105.5	-6.6
21/16-11E1	12/17/64	189	12/19/85	311	-122	-5.8
21/16-14N1	12/17/64	234	12/21/76	310	- 76	-6.3
21/16-22E1	12/17/64	232	12/15/82	348	-116	-6.4
21/16-22P1	12/17/64	286	12/19/85	364.9	-78.9	-3.8

Average = -4.8 ft./yr.

TABLE 6
WATER QUALITY ANALYSES OF IRRIGATION WELLS WITHIN ^{1/}
PLEASANT VALLEY WATER DISTRICT

Determination	Well #1	Well #2	Well #3	Well #4	Well #5
Calcium (Ca)	66	70	186	184	147
Magnesium (Mg)	46	85	160	134	108
Sodium (Na)	223	223	249	303	328
Carbonate (CO ₃)	0	0	0	0	0
Bicarbonate (HCO ₃)	159	153	120	151	199
Chloride (Cl)	45	146	338	337	363
Sulfate (SO ₄)	495	533	1390	1370	1130
Arsenic (As)	0.001	0.005	0.001	0.001	0.001
Cadmium (Cd)	<0.005	<0.005	<0.005	<0.005	<0.005
Chromium (Cr ⁺⁶)	<0.01	<0.01	<0.01	<0.01	<0.01
Lead (Pb)	<0.01	<0.01	<0.01	<0.01	<0.01
Mercury (Hg)	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Nickel (Ni)	<0.05	<0.05	<0.05	<0.05	<0.05
Selenium (Se)	0.001	0.008	0.003	0.006	0.004
Thallium (Tl)	<0.05	<0.05	<0.05	<0.05	<0.05
Iron (Fe)	0.05	0.05	<0.05	<0.05	<0.05
Hardness (CaCO ₃)	353	523	1120	1010	810
Boron (B)	0.55	2.05	1.00	1.30	1.50
PH (Std. Units)	7.9	7.9	7.8	7.7	7.6
Conductivity(micro- mhos/cm, @ 25°C)	1540	1850	2700	2850	2720
Percent Sodium (%)	57.8	48.0	32.5	39.5	46.8
Total Dissolved Solids (TDS)	1160	1450	2550	2420	2210
Sodium Adsorption Ratio:	5.2	4.2	3.2	4.1	5.0

<Means actual value less than the value shown. Lab limitations
prevented testing for lower values.

^{1/} Sampled January 5, 1985, all units milligrams/liter unless otherwise noted.
See Figure 5 for Well Locations

TABLE 7
SOIL ANALYSES WITHIN PLEASANT VALLEY WATER DISTRICT ^{1/}

Determination	Soil Boring Number and Depth											
	1		2		3		4		5		6	
	2'	4'	2'	4'	2'	4'	2'	4'	2'	4'	2'	4'
Calcium (Ca)	460	370	425	209	485	480	47	90	852	515	33	106
Magnesium (Mg)	255	290	295	69	205	186	17	90	329	172	30	78
Sodium (Na)	1340	1580	500	357	615	675	90	115	685	345	175	230
Chloride (Cl)	298	228	412	246	147	172	22	35	389	289	78	154
Arsenic (As)	0.004	0.004	0.001	0.002	0.002	0.002	0.001	0.001	0.002	0.002	0.001	<0.001
Cadmium (Cd)	0.005	<0.005	0.007	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Chromium (Cr ⁺⁶)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Lead (Pb)	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Mercury (Hg)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel (Ni)	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Selenium (Se)	0.003	0.011	0.018	0.029	0.011	0.007	0.003	0.003	0.025	0.010	0.013	0.005
Thallium (Tl)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05
Iron (Fe)	0.05	0.05	0.05	0.05	0.05	0.05	0.01	0.05	0.05	0.05	0.10	0.05
Boron (B)	4.05	4.70	2.4	2.4	2.01	2.00	0.40	0.75	1.65	1.40	1.85	1.75
pH (Std. Units)	7.6	8.0	7.9	8.0	8.0	7.8	8.2	8.3	7.9	7.9	8.4	8.2
Conductivity (micro-mhos/cm, @ 25°C)	6900	7600	5400	2680	4840	5140	780	1100	7300	4400	1060	1870
Sodium Adsorption Ratio	12.4	14.9	4.6	5.5	5.9	6.6	2.9	2.0	5.1	3.3	3.7	4.1

< Means actual value less than the value shown. Lab limitations prevented testing for lower values.

^{1/} Sampled January 5, 1985, all units milligrams/liter unless otherwise noted. See Figure 5 for Soil Boring Locations

Current Water Costs

The current cost of pumping the existing groundwater supply is approximately \$100. per acre foot. This cost is based upon using the Pacific Gas and Electric PA-1 energy schedule with an average lift of 430 feet. The water level is presently declining at the rate of approximately 5 feet per year. Energy costs and crop values are compared on Figure 5 over the last 10 years. The need to change cropping patterns and to reduce pumping costs by developing a surface water supply is essential to the survival of the agricultural industry in Pleasant Valley.

Surface Water

There is a very limited and highly unreliable surface water supply to lands within the District. This surface supply is derived from the storm runoff in the four streams which cross the District lands. It is only during a short runoff period that water can be diverted, principally for pre-irrigation in the spring months. There is recharge to the water-bearing aquifers, but the major quantity of the runoff is lost to the area. This has been well documented in problems that have arisen upslope of the San Luis Canal in the vicinity of Huron. It is at this point where the flood waters of the Arroyo Pasajero are impounded and deposit major silt loads which have created severe burdens on the operation and maintenance of the Aqueduct.

In the event that the principal agencies involved with the protection of the San Luis Canal-California Aqueduct, namely the U. S. Bureau of

Reclamation, California Department of Water Resources and the U. S. Corps of Engineers, conclude to build flood control reservoirs on the watersheds tributary to the Arroyo Pasajero, these waters could be put to beneficial use for recharge within the Pleasant Valley area.

Water Requirements

Table 8 shows the projected cropping pattern and the associated crop water requirements that would result from the implementation of the proposed project. These calculations are based on the assumption that only 16,400 acres of non-Chevron lands would receive a surface supply. This water would be provided mostly from the Coalinga Canal through the District's pending contract with the U. S. Bureau of Reclamation for a supply from the Central Valley Project. Some groundwater pumping would be continued to augment the total water available for irrigated agriculture. It is essential that the wells be maintained in an operable condition to meet the demand when the surface supply is interrupted due to drought conditions and/or shortage in the Sacramento-San Joaquin Delta. Table 9 shows the monthly volume of water required.

TABLE 8
WATER REQUIREMENTS

<u>Projected Cropping Pattern</u>			
<u>Crop</u>	<u>Water Requirement (A.F./Ac.)</u>	<u>Acreage (Ac.)</u>	<u>Total (A.F.)</u>
Cotton	3.0	4,800	14,400
Vegetables	2.5	5,100	12,750
Trees	2.4	1,300	3,120
Alfalfa Seed	2.9	1,800	5,220
Melons	1.4	2,400	3,360
Barley	1.1	<u>1,000</u>	<u>1,100</u>
		16,400 Ac.	39,950

say 40,000 A.F.

$$\text{Average Unit Rate} = \frac{40,000}{16,400} = 2.44 \text{ A.F./Ac.}$$

TABLE 9
PROJECTED WATER DELIVERY BY MONTH

<u>Month</u>	<u>Delivery (A.F.)</u>
January	200
February	400
March	1,600
April	3,500
May	7,000
June	10,000
July	9,700
August	5,000
September	2,500
October	100
November	0
December	<u>0</u>
	40,000 A.F./yr

DRAINAGE

Pleasant Valley is a closed groundwater basin with boundaries that nearly coincide with the boundaries of the Water District, Figure 6. Figure 7 shows the groundwater contours for December 1984 and the location of the cross section for Figure 8 of subsurface water table levels relative to the ground surface on both sides of the anticline ridge bordering the District. The only outlets to the groundwater basin are the Arroyo Pasajero Gap between the Anticline Ridge and the Gujarral Hills and the Polvadero Gap between the Gujarral Hills and the Kettleman Hills. There are subsurface barriers in both gaps which restrict the flow of water to the east. Due to the severe overdraft of the groundwater no flow has passed these barriers for many decades. The geology of the groundwater reservoir in Pleasant Valley is that of unconfined aquifers several thousand feet in thickness. Numerous investigations by federal agencies and local organizations substantiate this geological condition. A 1969 study by the Standard Oil Company of California (Chevron) developed a geological cross section as indicated on Figures 9 and 10.

The Bureau of Reclamation, in an unpublished preliminary report of Pleasant Valley on land classification, analyzed the problems of salt balance within the District. It was their conclusion that if there was no artificial recharge to the groundwater basin there would be sufficient space available that:

...it would be 60-70 years before shallow drains could be effective in providing outflow for salt balance....

The current plan is to irrigate an area of approximately 16,400 acres with a water supply from the Bureau of Reclamation together with groundwater pumping. This is a smaller irrigated area than was considered by the USBR in their 1964 study. There will be no new lands irrigated by this project. Minimum annual pumping should be 5,000 acre feet averaged over a several year period, which is the safe yield of the groundwater basin. An additional amount should also be pumped equal to the waters lost by deep percolation past the root zone. This should contribute another 5,000 acre feet per year to the District supply. Calculations have been made to determine the amount of available storage as a result of the overdraft upon the groundwater supply. Based upon a specific yield of 10.3% and assuming available space of approximately 200 feet above the current groundwater level, this would provide additional storage of 800,000 acre feet. Assuming the deep percolation past the root zone was not pumped, a maximum of 10,000 acre feet per year would enter the groundwater reservoir. With these conditions, flow across the subsurface barriers might commence in 80 years. With a conjunctive operation of groundwater together with the surface supply this would not occur and there does not appear to be any drainage problems that would impact the District lands within the life of a proposed repayment contract.

PROPOSED SYSTEM

Introduction

This section sets forth a proposed irrigation supply distribution system together with an estimate of cost. The proposed system includes pumps and discharge pipelines in combination with a canal system and reservoirs as shown in Figure 11.

Design Criteria

The following are the basic assumptions used in developing the proposed system:

1. Irrigation delivery requirement - 4,000 gallons per minute per section of land.
2. Irrigation water is provided for non-Chevron lands only.
3. Proposed system delivery points are to reservoirs along the canal alignment.
4. Landowners are responsible for on-farm delivery from the reservoirs.
5. Reservoirs are sized to provide a storage capacity of up to 1/2 hour at the maximum demand rate.

System Description

The system outlined in this study consists of two main pumping plants. These two separate conveyance facilities are designated the North Main

system and the South Main system. The North Main pumping plant is located in Section 9, T. 20 S., R. 16 E., on the west side of the Coalinga Canal. The South Main pumping plant is located in Section 35, T. 20 S., R. 16 E., at the end of the Coalinga Canal.

The North Main pumping station consists of three pumps providing a total of 130 cfs into three parallel 42 inch diameter steel pipes. The water is lifted to an elevation of 650 feet where it is discharged into an earthen canal. This water is conveyed by gravity to the North Lift station which is located in Section 24, T. 20 S., R. 15 E. The North Lift pump station supplies 44 cfs through a 42 inch steel pipeline to an elevation of 700 feet. At this point the water is discharged into an unlined canal that carries the water to a reservoir at its terminus. The remaining 86 cfs bypasses the North Lift pumping station and is conveyed by the North Main earthen channel to three reservoirs.

The South Main pumping station provides 98 cfs through two 42 inch steel pipes. The water is discharged from the pipes into a reservoir located in Section 11, T. 21 S., R. 16 E. The South Lift pumping station located at this reservoir provides 44 cfs through one 42 inch steel pipe. This pipe discharges the water into an unlined canal which conveys the water to a reservoir in Section 35, T. 21 S., R. 16 E. The remaining 54 cfs that bypasses the South Lift pumping station is conveyed through an earthen canal to a reservoir in Section 8, T. 21 S., R. 16 E.

It is recognized seepage will occur from the earthen canals. When economic conditions permit a canal lining program can be initiated. In the interim the losses can be recovered through groundwater pumping.

In the actual implementation of the project, an effort would be made to obtain steel pipe in any reasonable diameter to lower the cost depending upon the availability at the time of need. The combination of pipe sizes could be modified to reflect this cost saving effort.

A telemetry system would be installed to regulate the pumping plants to maintain desired levels in the reservoirs. Canal crossings would be provided such that any point along the alignment is no more than 1/2 mile from a crossing. Operational spill structures would be installed into existing channels. Inverted siphons and culverts were used for channel and road crossings.

Estimate of Cost

An estimate of cost for the proposed facilities has been prepared and is shown on Tables 10 and 11. This estimate of cost was developed using current data from suppliers of equipment, pumps and appurtenances and from previous experiences on work of a similar nature. An amount of 25% was added to the construction cost as contingencies, administration and engineering. No additional funds were allowed for inflation and all costs are in 1985 dollars.

TABLE 10

ESTIMATE OF COST
DISTRIBUTION SYSTEM

ITEM		NORTH MAIN (130 cfs)	NORTH LIFT (44 cfs)	SOUTH MAIN (98 cfs)	SOUTH LIFT (44 cfs)
1.	Pumping Facilities				
	a. Pump, Motor and Panels	\$ 473,000.	\$ 110,000.	\$ 278,000.	\$ 134,000.
	b. Structures	130,000.	35,000.	130,000.	55,000.
	c. Pump Station Valves	75,000.	25,000.	50,000.	25,000.
	d. Telemetry	30,000.	5,000.	30,000.	15,000.
2.	Pipelines				
	a. Steel Pump Discharge	783,750.	165,000.	1,567,500.	508,200.
	b. Creek Crossings	76,000.	-	15,000.	-
	c. Road Crossings	43,000.	-	6,000.	-
3.	Canals				
	a. Earthwork	266,000.	33,300.	67,000.	25,500.
	b. Control Structures	14,650.	-	3,000.	-
4.	Reservoirs				
	a. Earthwork	77,000.	26,000.	52,000.	26,000.
	b. Control Structures	18,600.	6,200.	14,000.	6,200.
5.	Right-of-Way	88,000.	14,000.	32,000.	14,000.
6.	Bridges	<u>56,000.</u>	<u>7,000.</u>	<u>14,000.</u>	<u>7,000.</u>
	Construction Cost	\$ 2,131,000.	\$ 426,500.	\$ 2,258,500.	\$ 815,900.
	25% Contingencies, Administration and Engineering	<u>534,000.</u>	<u>108,500.</u>	<u>561,500.</u>	<u>204,100.</u>
	Total Estimated Cost	\$ 2,665,000.	\$ 535,000.	\$ 2,820,000.	\$ 1,020,000.

TABLE 11

COST SUMMARY

<u>ITEM</u>	<u>COST</u>
1.North Main	\$ 2,665,000.
2.North Lift	535,000.
3.South Main	2,820,000.
4.South Lift	<u>1,020,000.</u>
TOTAL ESTIMATED COST	\$ 7,040,000.

FINANCIAL ANALYSIS

In order to determine the total cost per acre, it was necessary to evaluate the various elements that make up the delivery charges. It was assumed that the project would be financed through a bond issue for a 15 year period at an interest rate of 12%, Table 12. The charge by the Bureau of Reclamation for the water supply assumes that the delivery will be to qualified recipients in accordance with the Reclamation Reform Act of 1982 at a charge of \$12 an acre foot. The energy for this project would be from a power supply provided through the Bureau of Reclamation. The current energy costs were doubled to offset anticipated increases. In making the energy calculation the water supply was delivered to contour 700. Based on a conversation with the staff of the Westlands Water District, who operate the Coalinga Canal, it was concluded that a charge of \$3 per acre foot would be assumed for the O & M service. Meetings were held with the Department of Water Resources regarding the wheeling of the water supply through portions of the California Aqueduct. It was assumed that this would include wheeling through the state facilities from the Sacramento - San Joaquin Delta to the O'Neill Forebay. The Department of Water Resources stated that the charge for this wheeling service will be \$8.69 per acre foot. A value of \$9 was used in this cost analysis. It was further assumed that additional operation costs within the District would be approximately \$3 per acre foot. These various costs are tabulated and presented in Table 13. The total cost based on these assumptions is \$61.40 per acre foot annually which is equivalent to approximately \$150 per acre based upon the water requirement of 2.44 acre feet per acre.

TABLE 12

PROJECT FINANCING

District Data

Existing District Acreage	38,670 acres(±)
Approximate Non-Farmed Acreage	6,640 acres(±)
Present Irrigable Acreage	32,030 acres (say 32,000 acres)
Chevron Land In District	17,910 acres
Approximate Non-Farmed Chevron Acreage	3,350 acres
Present Chevron Irrigable Acreage	14,560 acres
Non-Chevron Irrigable Acreage	17,470 acres
Assumed Project Service Area	16,400 acres

Projected Average Water Use

40,000 AF / 16,400 acres = 2.44 AF/acre

Project Costs

Project Capital Cost (Table 11)	\$7,040,000.
Interest during Construction (1/2 yr. @ 12%)	<u>422,400.</u>
TOTAL COST	\$7,462,400.

(Bond Issue 12%, 15 years, Capital Recovery Factor = 0.146824

Annual Cost \$7,462,400 x 0.146824 = \$1,095,659 (say \$1,096,000)

TABLE 13

WATER COST SUMMARY

Annualized Capital Cost

$$\text{\$1,096,000/yr} \div 40,000 \text{ AF/yr} = \text{\$ 27.40/AF}$$

Delivery ChargesCost/AF

1. Annual USBR water charge*	\\$ 12.00
2. Federal Energy Charge (Presently \\$0.012/KwHr±. Assume this will double in the future.)	7.00
3. Westlands Water District O&M Charge for Coalinga Canal	3.00
4. DWR Wheeling Charge	9.00
5. District O&M Costs	<u>3.00</u>
	\\$ 34.00/AF

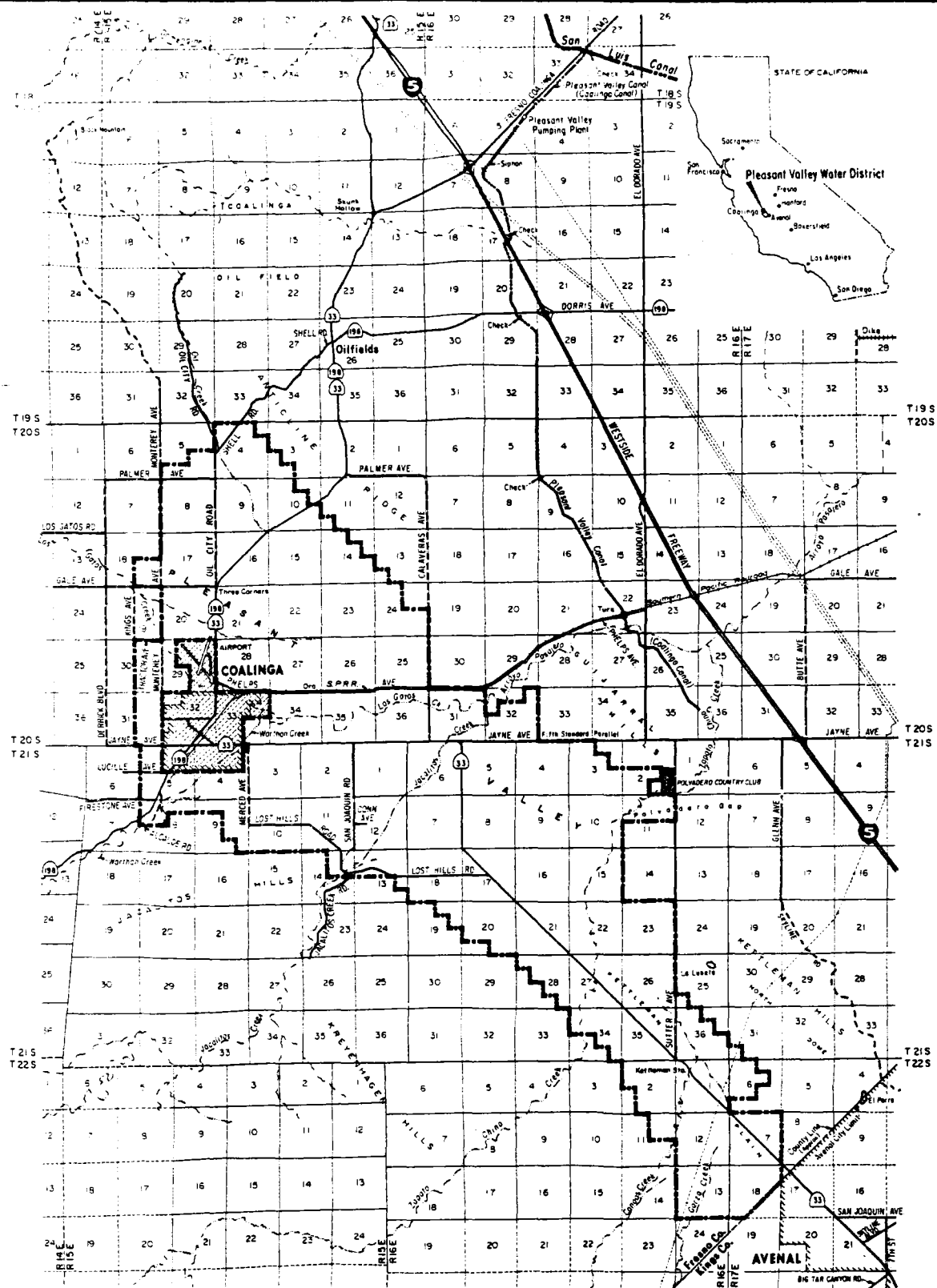
*Assumes delivery to qualified recipients to Elevation 700

Total Water Cost Per AF (Capital Cost + Delivery Charges)

$$\text{\$27.40/AF} + \text{\$34.00/AF} = \text{\$ 61.40/AF}$$

Total Water Cost per Acre

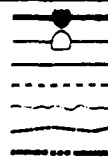
$$2.44 \text{ AF/acre} \times \text{\$ 61.40/AF} = 149.82 \quad \text{say } \text{\$150.00/acre}$$



LEGEND

Pleasant Valley Water District Boundary
 County Line
 Township Line
 Section Line
 Railroad
 Power Transmission Line
 Incorporated City

Interstate Highway
 State Highway
 County Road or City Street
 Other Road
 Creek, Canal, Ditch or Arroyo
 Pleasant Valley Canal (Coalinga Canal)
 San Luis Canal
 Lands Excluded from PVWD

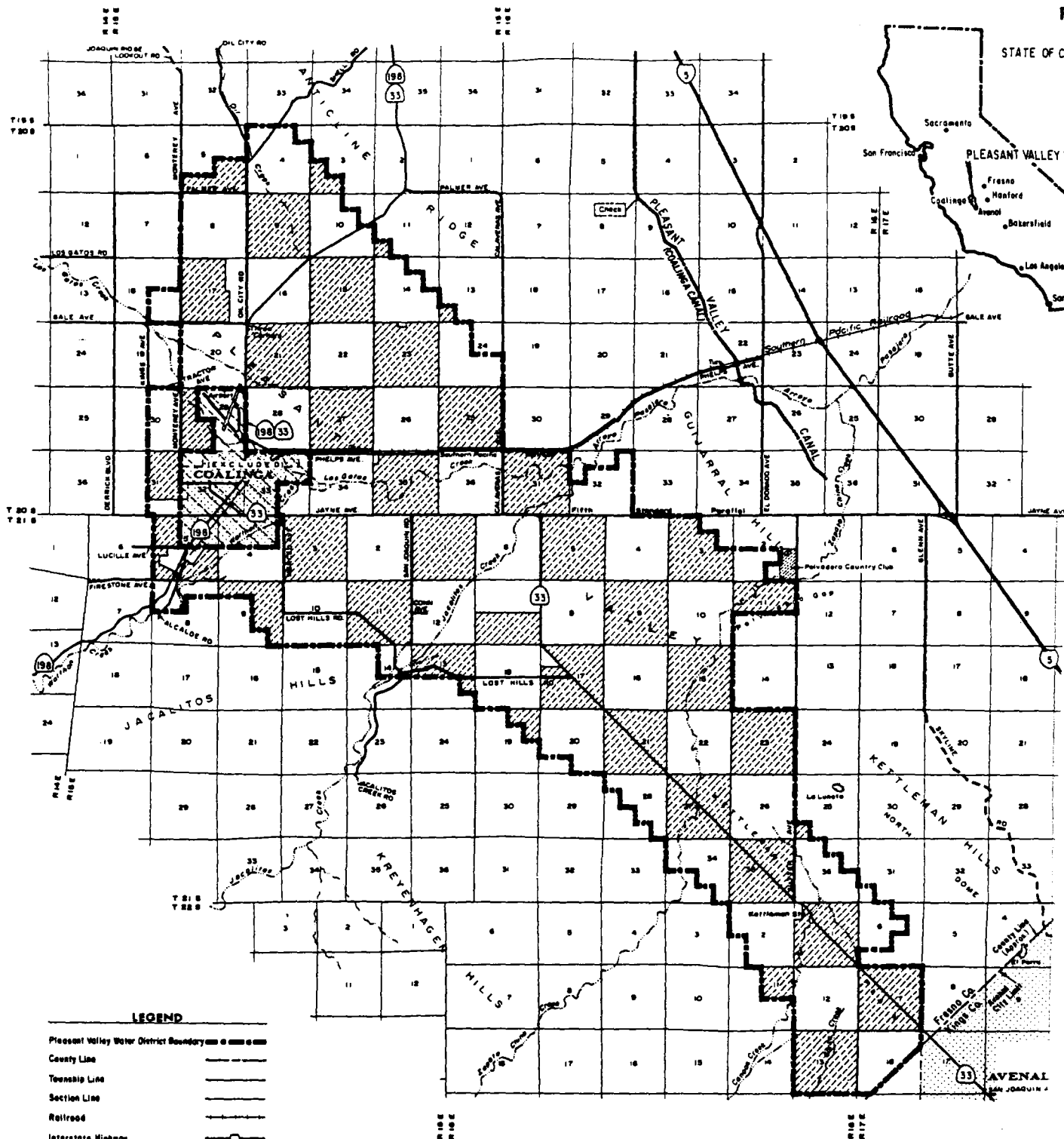


NORTH



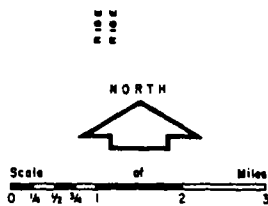
Scale of Miles
 0 1/4 1/2 1 2 3 4 5

PLEASANT VALLEY WATER DISTRICT
 COALINGA CALIFORNIA



LEGEND

- Pleasant Valley Water District Boundary
- County Line
- Township Line
- Section Line
- Railroad
- Interstate Highway
- State Highway
- County Road
- Other Road
- Creek, Canal, Ditch or Arroyo
- Coalinga Canal
- Incorporated City
- Lands Excluded From PVWD
- Lands Owned by Chevron USA, Inc.
1981 Fresno County Assessment Roll
Revised November, 1983

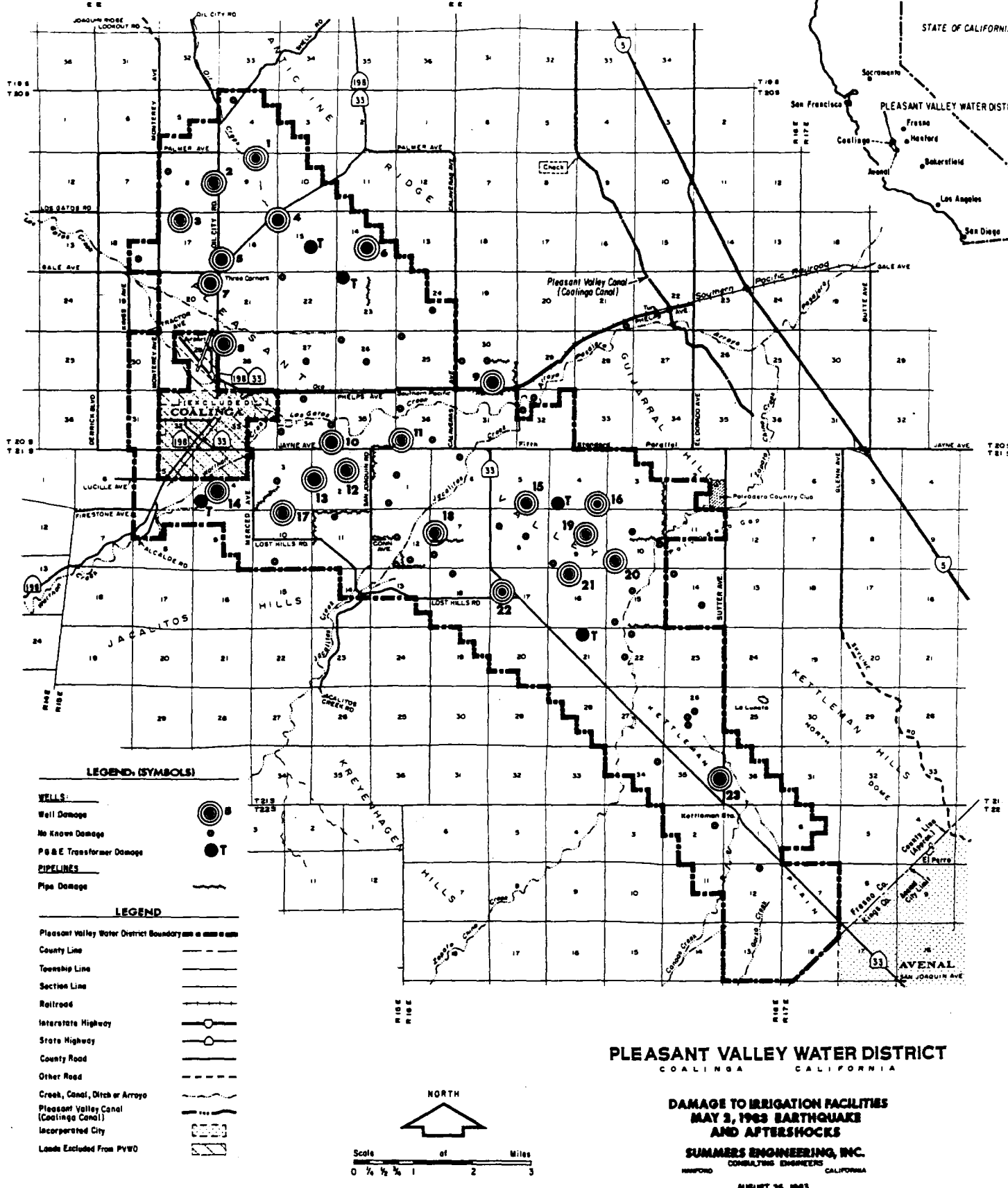


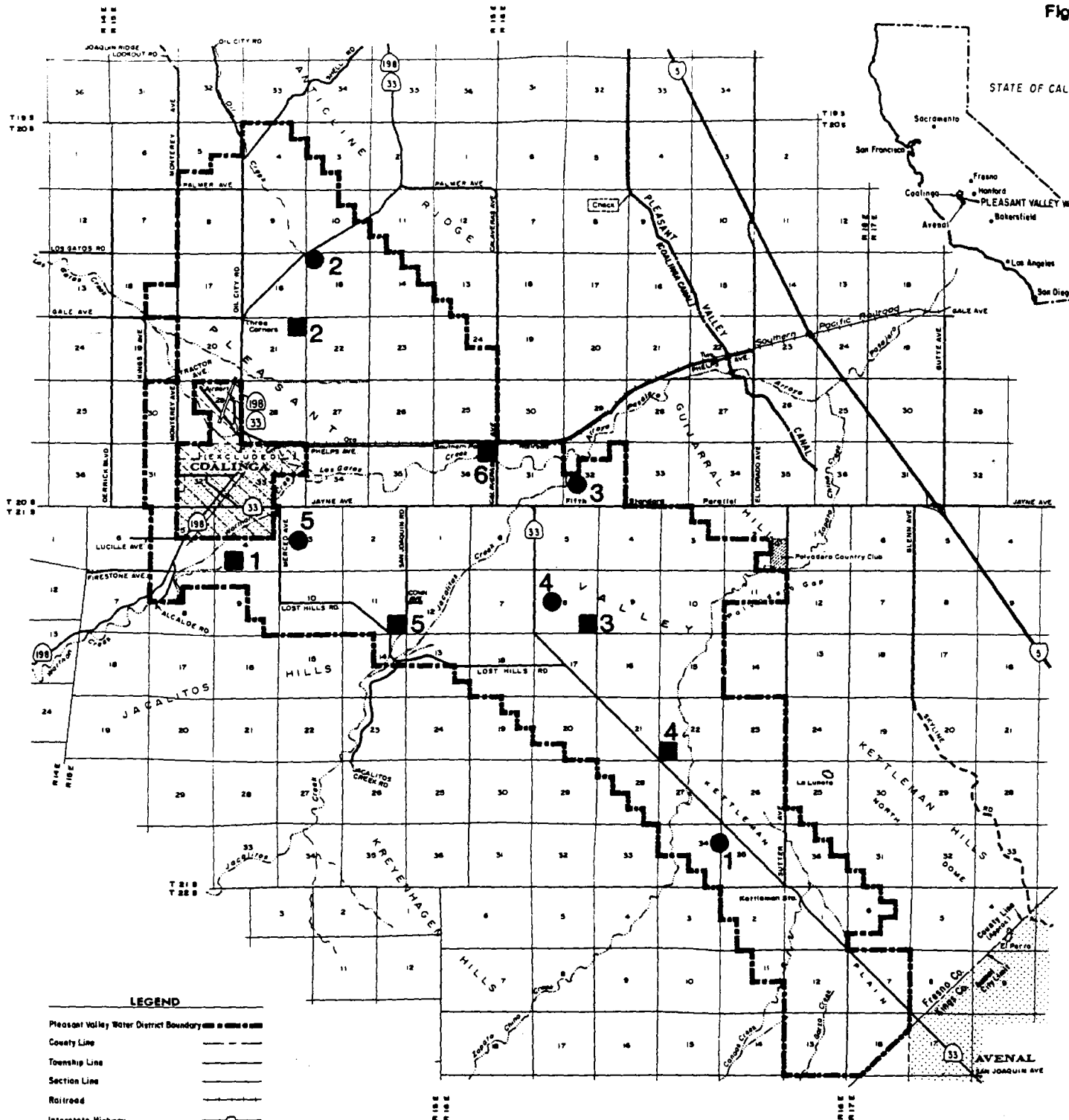
PLEASANT VALLEY WATER DISTRICT
COALINGA CALIFORNIA

CHEVRON LANDS

NOVEMBER 1984
SUMMERS ENGINEERING, INC.
CONSULTING ENGINEERS
HANFORD CALIFORNIA

Figure





LEGEND

- Pleasant Valley Water District Boundary
- County Line
- Township Line
- Section Line
- Railroad
- Interstate Highway
- State Highway
- County Road
- Other Road
- Creek, Canal, Ditch or Arroyo
- Pleasant Valley Canal (Coalinga Canal)
- Incorporated City
- Land Excluded from PVWD

Irrigation Well ●

Soil Boring ■

NORTH

Scale of Miles
0 1/4 1/2 1 2 3

PLEASANT VALLEY WATER DISTRICT
COALINGA CALIFORNIA

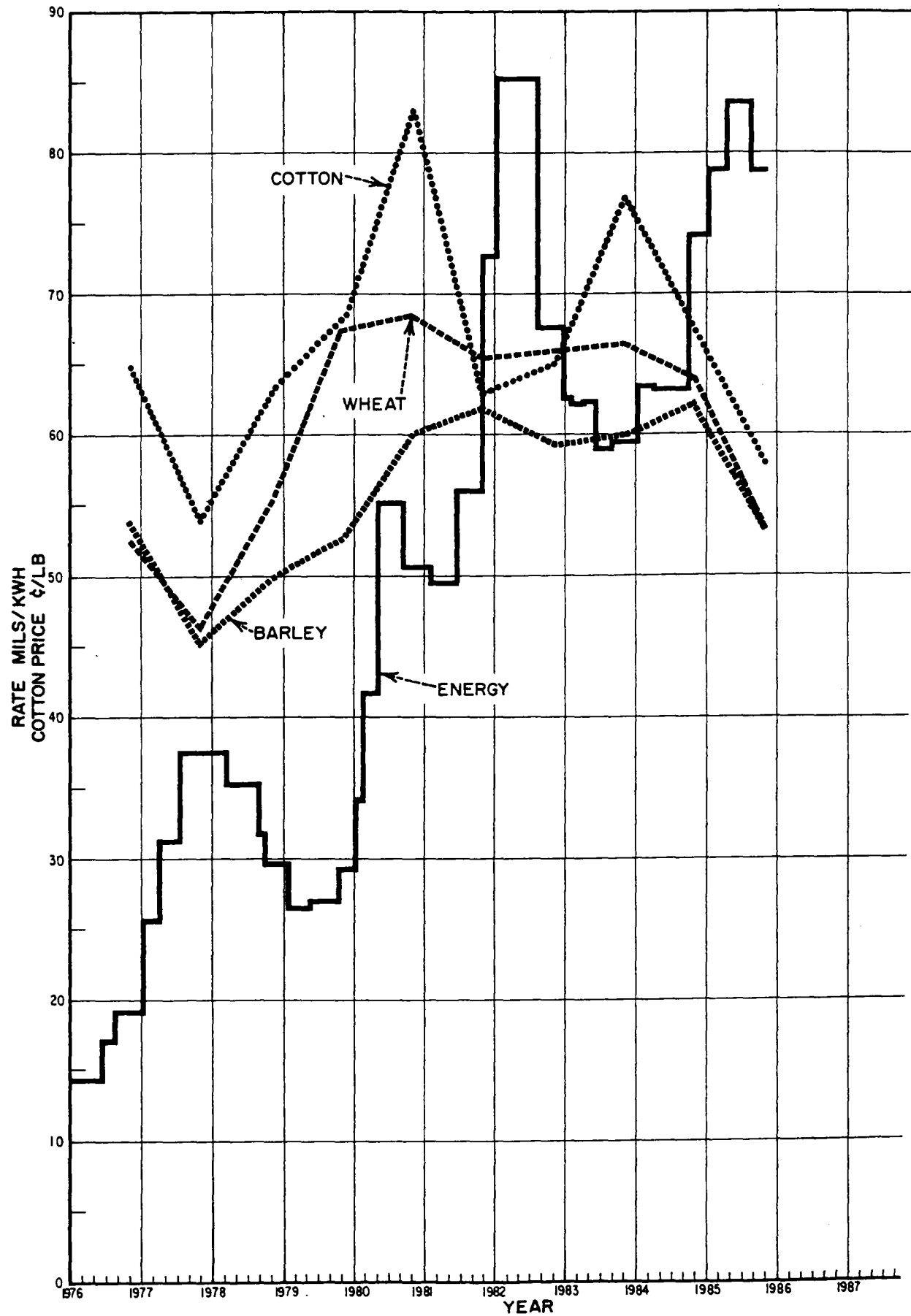
SAMPLE LOCATION MAP

NOVEMBER 1984

SUMMERS ENGINEERING, INC.
CONSULTING ENGINEERS
HANFORD CALIFORNIA

January 1985

P G & E PA-I AGRICULTURE POWER RATES
FOR TYPICAL WELL IN PLEASANT VALLEY WATER DISTRICT
COMPARED TO TYPICAL CROP VALUES



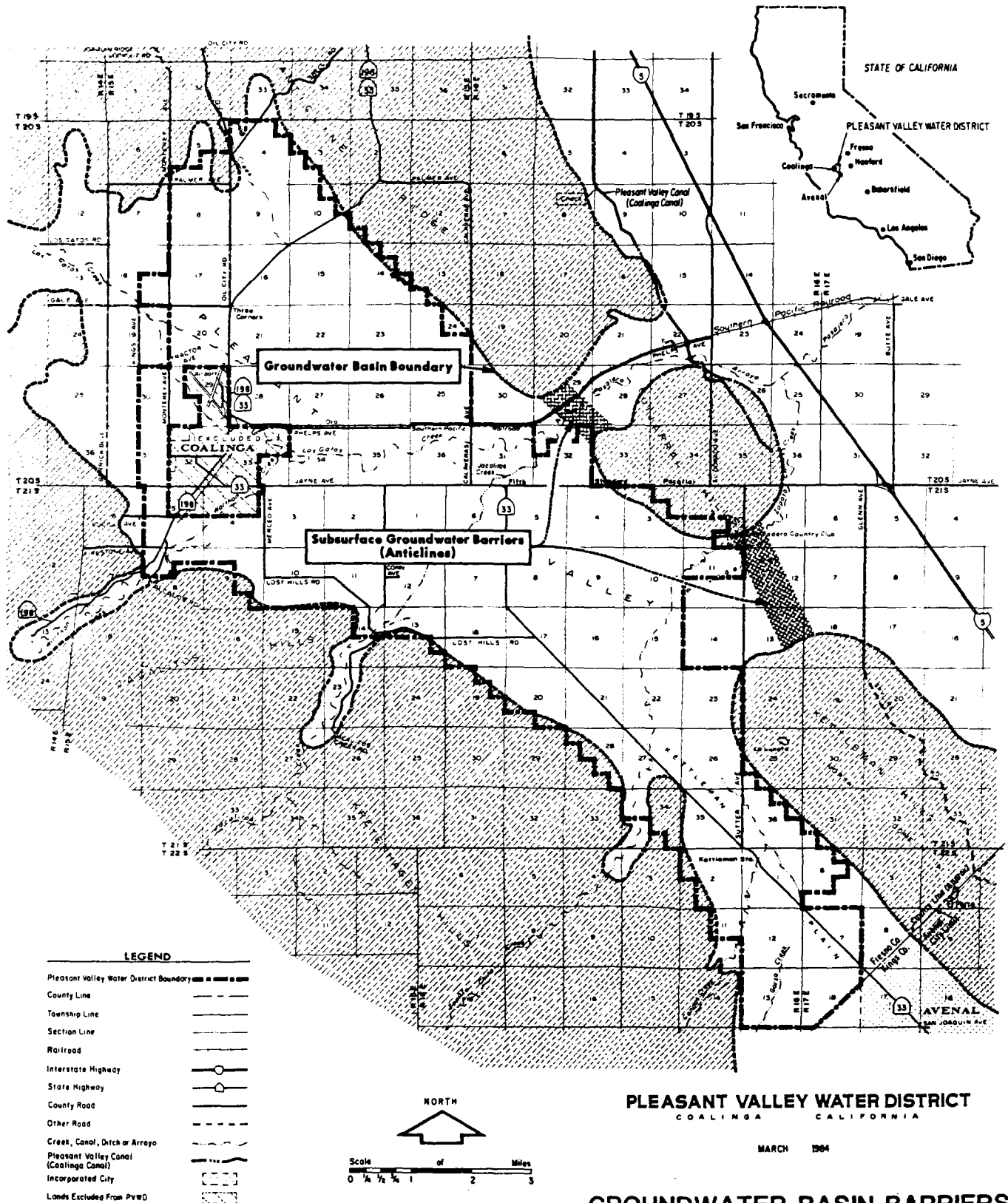
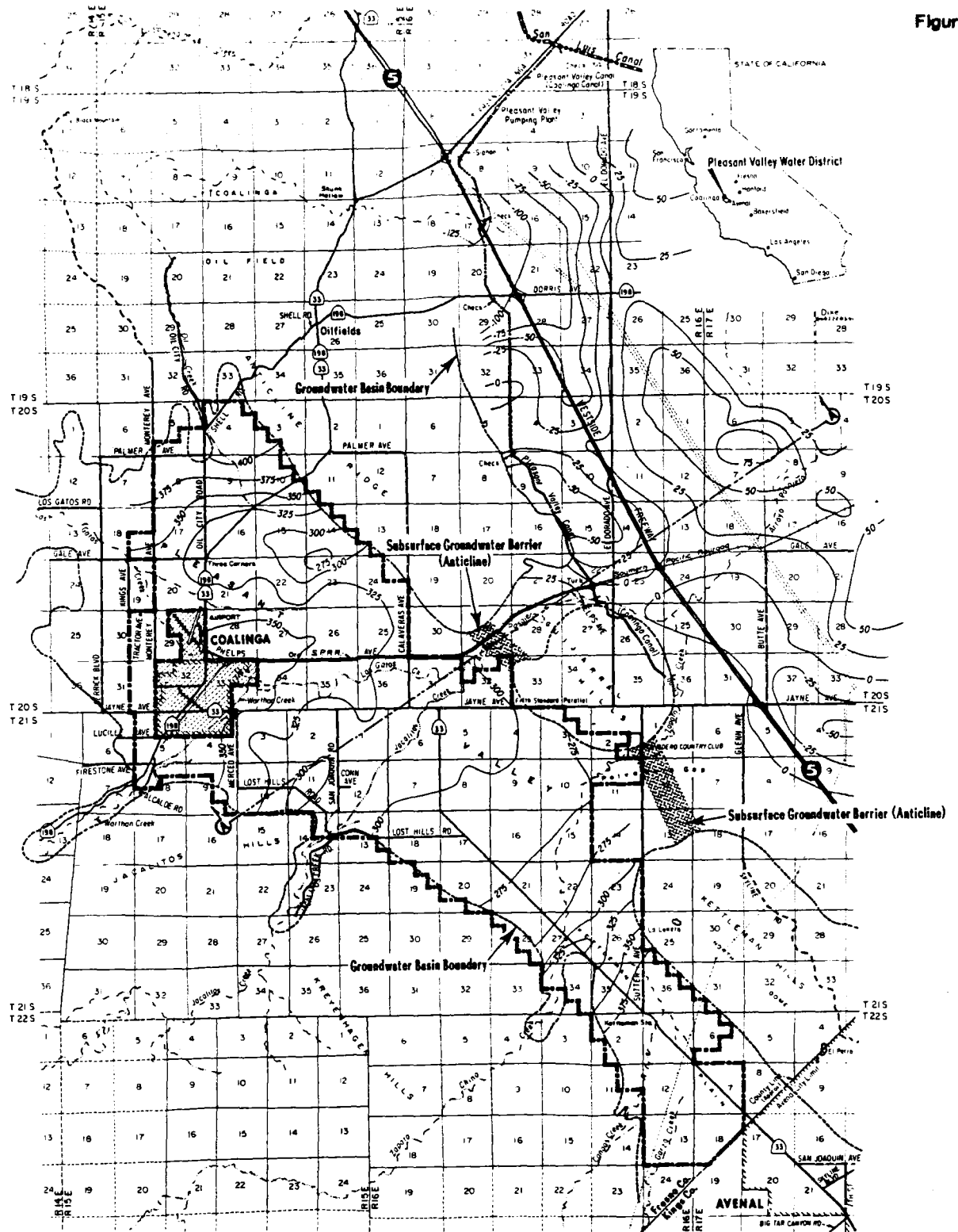


Figure 7



LEGEND

Pleasant Valley Water District Boundary	-----	Interstate Highway	=====
County Line	-----	State Highway	=====
Township Line	-----	County Road or City Street	-----
Section Line	-----	Other Road	-----
Railroad	-----	Creek, Canal, Ditch or Arroyo	-----
Power Transmission Line	-----	Pleasant Valley Canal (Coalinga Canal)	-----
Incorporated City	=====	San Luis Canal	-----
Lands Excluded from PVWD	=====		

**GROUNDWATER CONTOURS
DECEMBER 1984**

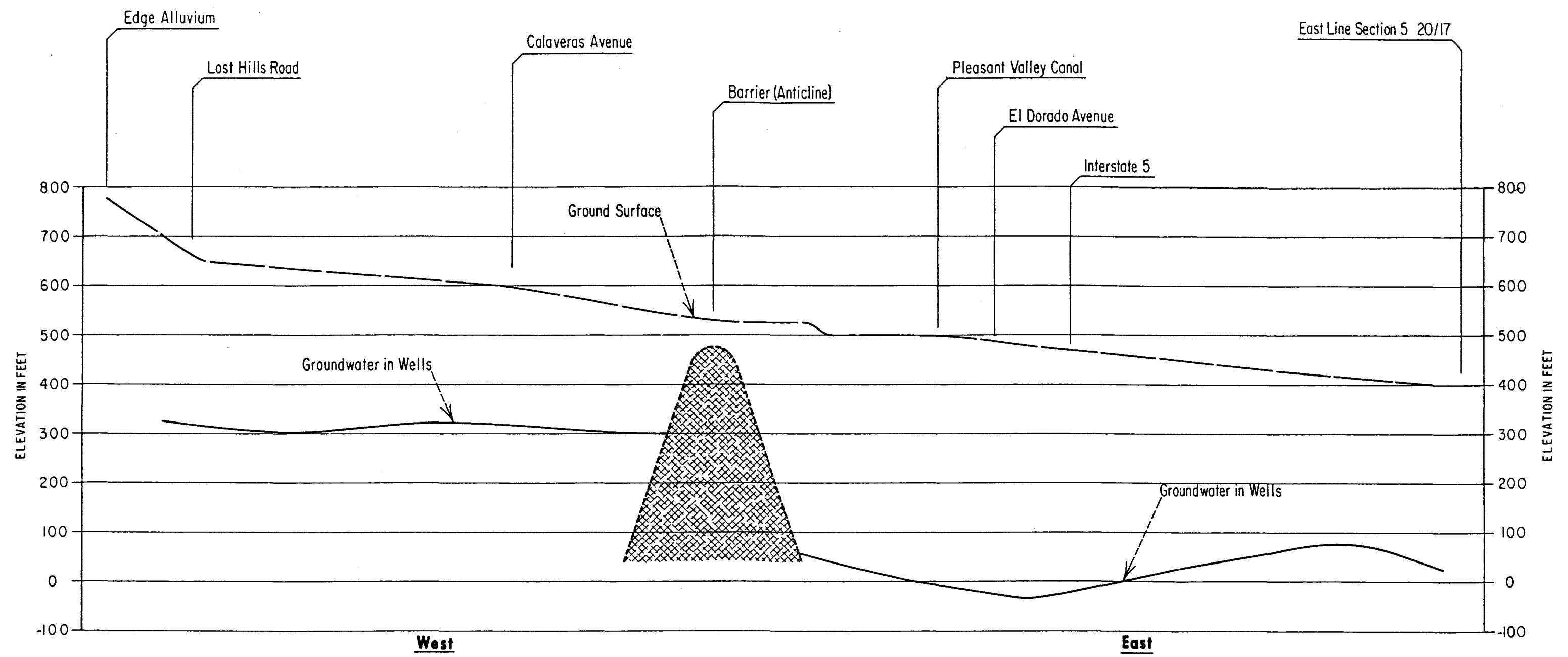
Lines of Equal Elevation of Water in Wells 300
Source: Department of Water Resources & Westlands Water District



**PLEASANT VALLEY WATER DISTRICT
COALINGA CALIFORNIA**

MARCH 1985

SUMMERS ENGINEERING, INC.
CONSULTING ENGINEERS
HAYWARD CALIFORNIA



SECTION A-A
EAST-WEST SECTION THROUGH PLEASANT VALLEY WATER DISTRICT
(SEE FIGURE 7 FOR LOCATION)

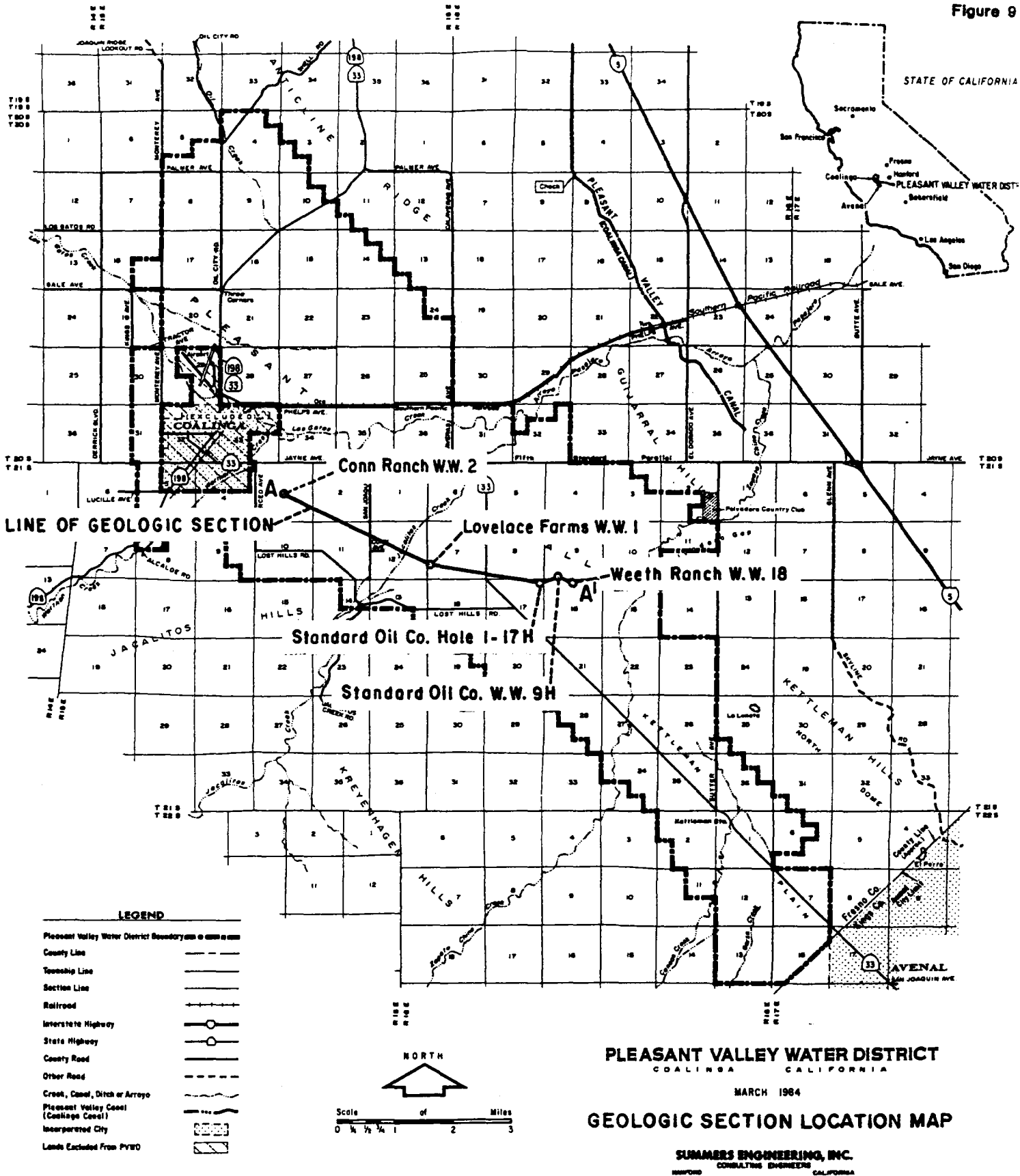
PLEASANT VALLEY WATER DISTRICT
COALINGA CALIFORNIA

GROUNDWATER PROFILE

SUMMERS ENGINEERING, INC.
CONSULTING ENGINEERS
HANFORD CALIFORNIA

MARCH 1985

Figure 9



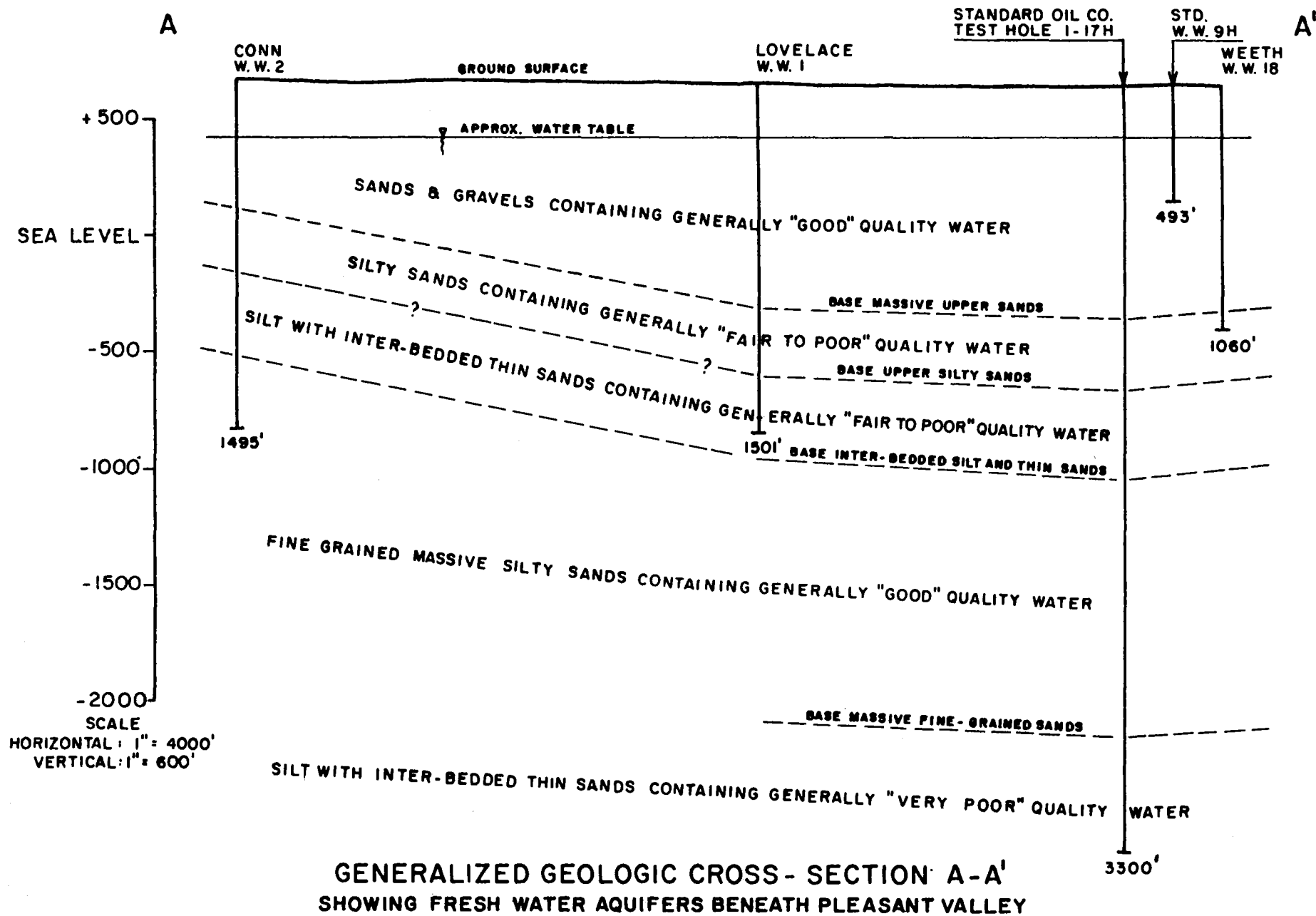
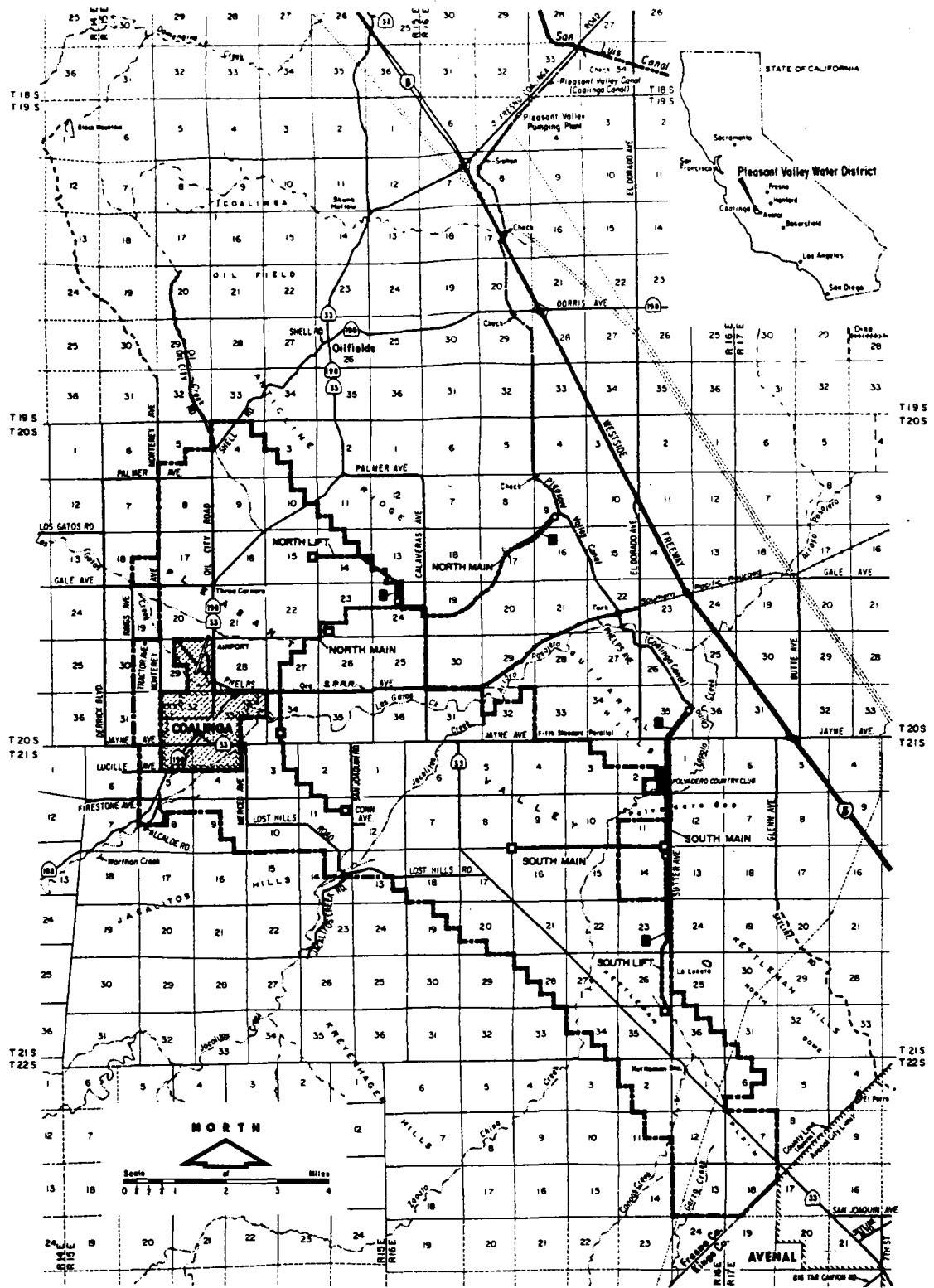


Figure 11



LEGEND

Pleasant Valley Water District Boundary
County Line
Township Line
Section Line
Railroad
Power Transmission Line
Incorporated City

Interstate Highway
State Highway
County Road or City Street
Other Road
Creek, Canal, Ditch or Arroyo
Pleasant Valley Canal (Coalinga Canal)
San Luis Canal
Lands Excluded from PVWD

DISTRIBUTION SYSTEM LEGEND

PUMP STATION
STORAGE RESERVOIR
PIPELINE
CANAL

**PLEASANT VALLEY WATER DISTRICT
COALINGA CALIFORNIA
DISTRIBUTION SYSTEM**

SUMMERS ENGINEERING, INC.
CONSULTING ENGINEERS
HAWTHORNE CALIFORNIA
AUGUST 1966