

**TABLE 19**  
**COUNTY OF YOLO**  
**YOLO COUNTY AIRPORT**  
**DRAINAGE PLAN UPDATE**  
**RATIONAL METHOD**  
**SUBBASIN RUNOFF COEFFICIENT CALCULATION SHEET**

Land Use	Effective Percent Impervious	Hydrologic Soil Group B			Hydrologic Soil Group C			Hydrologic Soil Group D		
		Runoff Coeff (C)	Area, ac	F X C X Area <sup>1</sup>	Runoff Coeff (C)	Area, ac	F X C X Area <sup>1</sup>	Runoff Coeff (C)	Area, ac	F X C X Area <sup>1</sup>
Central Commercial (CC)	95	0.86			0.87			0.87		
General Commercial (GC)	90	0.82			0.84			0.85		
Service Commercial (SC)	90	0.82			0.84			0.85		
Highway Commercial (HC)	90	0.82			0.84			0.85		
Business Park (BP)	90	0.82			0.87			0.85		
Industrial (I)	85	0.78			0.80			0.82		
Apartments	80	0.74			0.77			0.79		
Mobile Home Park	75	0.70			0.74			0.76		
Medium-Density Res. (MDR)	70	0.66			0.71			0.74		
Medium/Low-Density Residential (MLDR)	60	0.58			0.64			0.68		
Neighborhood Preservation (NP)	50	0.50			0.58			0.63		
Planned Neighborhood (PN)	50	0.50			0.58			0.63		
Low-Density Residential (LDR)	40	0.42			0.51			0.57		
Residential, 3-4 du/ac	30	0.34			0.45			0.52		
Very-Low-Density Residential (VLDR)	25	0.30			0.41			0.49		
Residential, 1-2 du/ac	20	0.26			0.38			0.46		
Rural Residential (RR)	15	0.22			0.35			0.43		
Residential, 0.2-.5 du/ac	10	0.18			0.32			0.41		
Agricultural Residential (AR)	5	0.14			0.28			0.38		
Open Space, Grassland	2	0.12			0.26			0.36		
Agricultural	2	0.26			0.41			0.51		
<b>TOTALS</b>			0.00	0.00		0.00	0.00		0.00	0.00

Total Area 0.00

Sum (Coeff X Area) 0.00

Weighted Subbasin

Runoff Coefficient

Sum (Coeff x Area)/Total Area

<sup>1</sup>Apply Runoff Coefficient Frequency F Factor of 0.83, 0.90, 1.00, 1.08, 1.15, and 1.24 to 10-Year Runoff Coefficient for Design Storm Return Periods of 2, 5, 10, 25, 50, and 100 years, respectively.

TABLE 20

COUNTY OF YOLO  
 YOLO COUNTY AIRPORT  
 DRAINAGE PLAN UPDATE

EQUIVALENT ROUGHNESS COEFFICIENT FOR CALCULATION  
 OF HYDRAULIC GRADE LINE FOR STORM DRAIN DESIGN

Pipe Material	Base Manning's Roughness Coefficient, $n_{base}$
Corrugated Metal	0.024
Concrete	0.015

Equivalent Entrance Loss Adjustment:  $n_1 = \left( \frac{0.087d^{1.49}}{lg} \right)^{1/2}$

Equivalent Exit Loss Adjustment:  $n_2 = \left( \frac{0.174d^{1.49}}{lg} \right)^{1/2}$

Where:

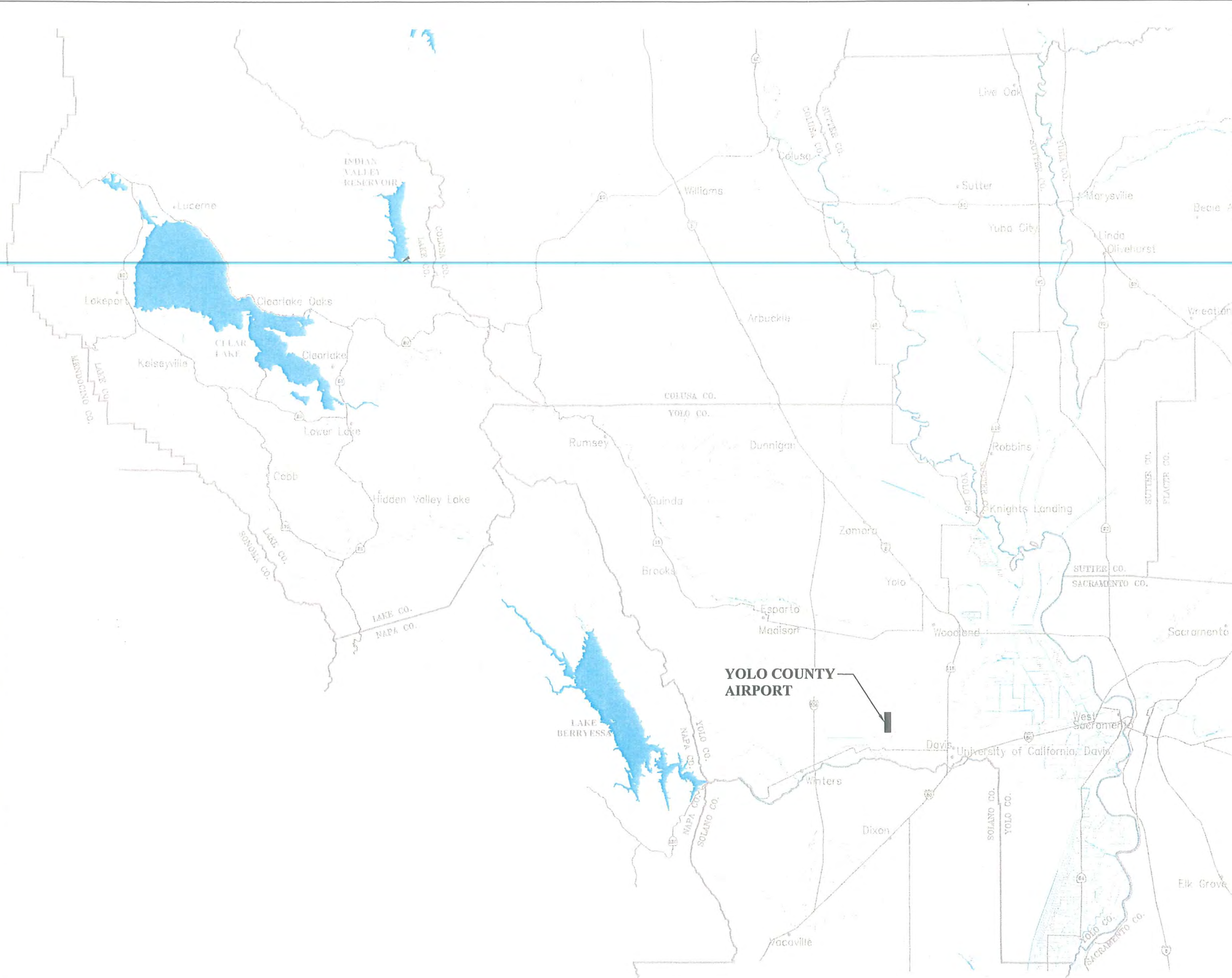
d = pipe diameter (ft.)

l = pipe length (ft.)

g = 32.2 ft./s<sup>2</sup>

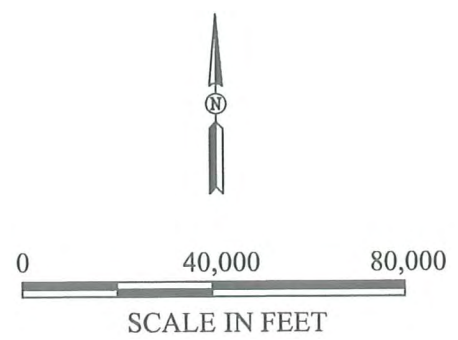
$$n_{total} = n_{base} + n_1 + n_2$$

Source: Chow, Ven Te, *Open Channel Hydraulics*, 1959.



**PROJECTION:**  
 NAD83, CA State Plane, Zone II, Feet.

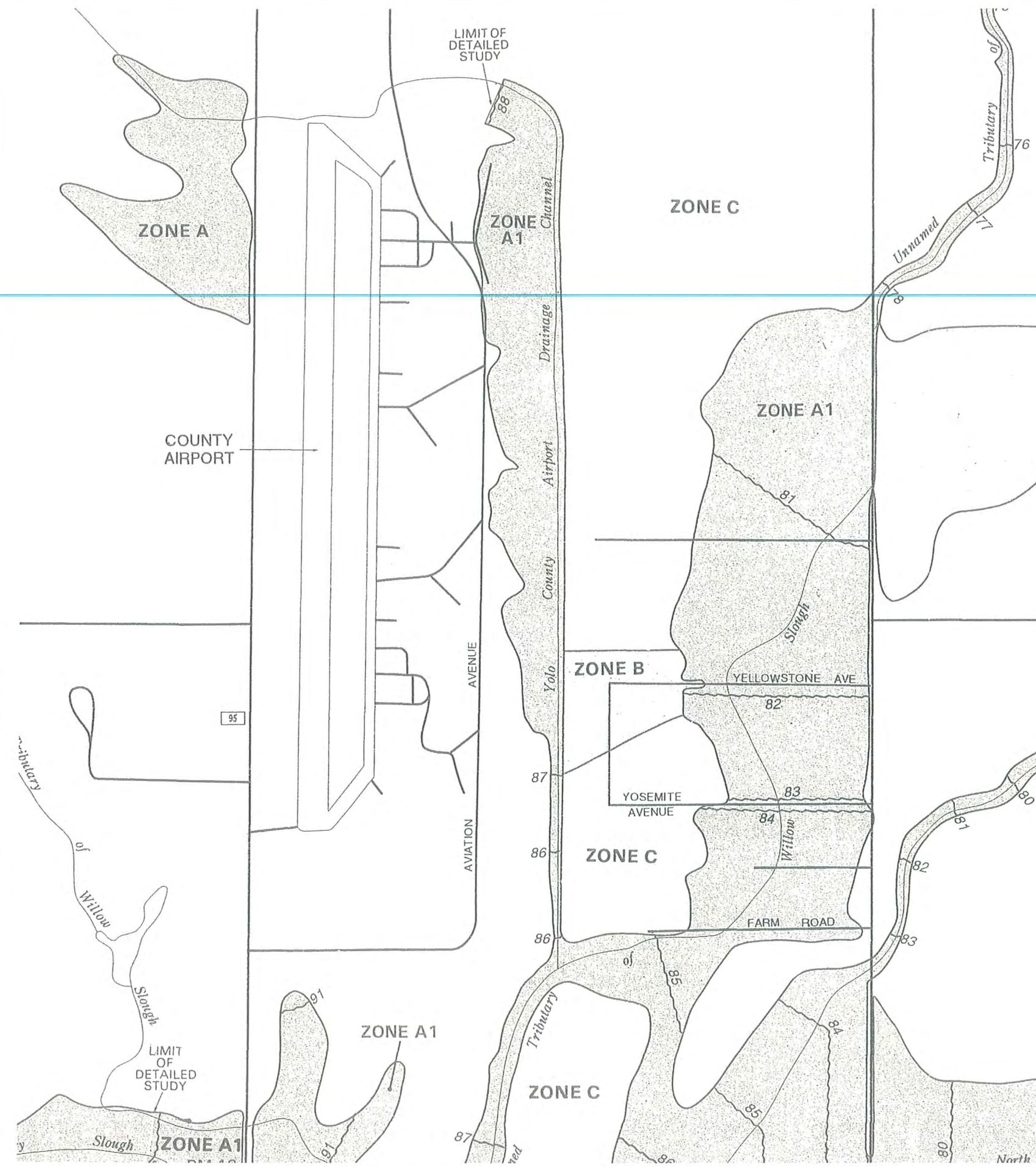
**SOURCES:**  
 The California Department of Forestry and Fire Protection,  
 Fire and Resource Assessment Program (calw22 - 1999)  
 "Yolo County Flood Control & Water Conservation  
 District Water Management Plan," Borcalli & Associates,  
 Inc., October 2000



COUNTY OF YOLO  
 YOLO COUNTY AIRPORT  
 DRAINAGE PLAN UPDATE  
**LOCATION MAP**



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**KEY TO MAP**

- 500-Year Flood Boundary —————
  - 100-Year Flood Boundary —————
  - Zone Designations\*
    - ZONE B
    - ZONE A1
    - ZONE A5
    - ZONE B
  - 100-Year Flood Boundary —————
  - 500-Year Flood Boundary —————
  - Base Flood Elevation Line With Elevation In Feet\*\*
    - 513
  - Base Flood Elevation in Feet Where Uniform Within Zone\*\*
    - (EL 987)
  - Elevation Reference Mark
    - RM7x
  - Zone D Boundary —————
  - River Mile
    - M1.5
  - Approximate 100- Year Flood Boundary
    - ZONE A
- \*\*Reference to the National Geodetic Vertical Datum of 1929

**UNDEVELOPED COASTAL BARRIERS†**

- Identified 1983
- Identified 1990
- Otherwise Protected Areas

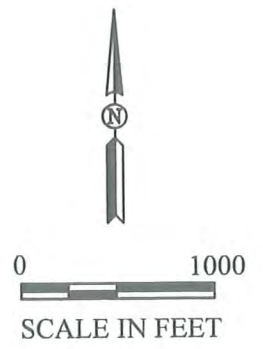
† Coastal barrier areas are normally located within or adjacent to special flood hazard areas.

**\*EXPLANATION OF ZONE DESIGNATIONS**

ZONE	EXPLANATION
A	Areas of 100-year flood; base flood elevations and flood hazard factors not determined.
AO	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; average depths of inundation are shown, but no flood hazard factors are determined.
AH	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; base flood elevations are shown, but no flood hazard factors are determined.
A1-A30	Areas of 100-year flood; base flood elevations and flood hazard factors determined.
A99	Areas of 100-year flood to be protected by flood protection system under construction; base flood elevations and flood hazard factors not determined.
B	Areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood. (Medium shading)
C	Areas of minimal flooding. (No shading)
D	Areas of undetermined, but possible, flood hazards.
V	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors not determined.
V1-V30	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors determined.

**SOURCE:**

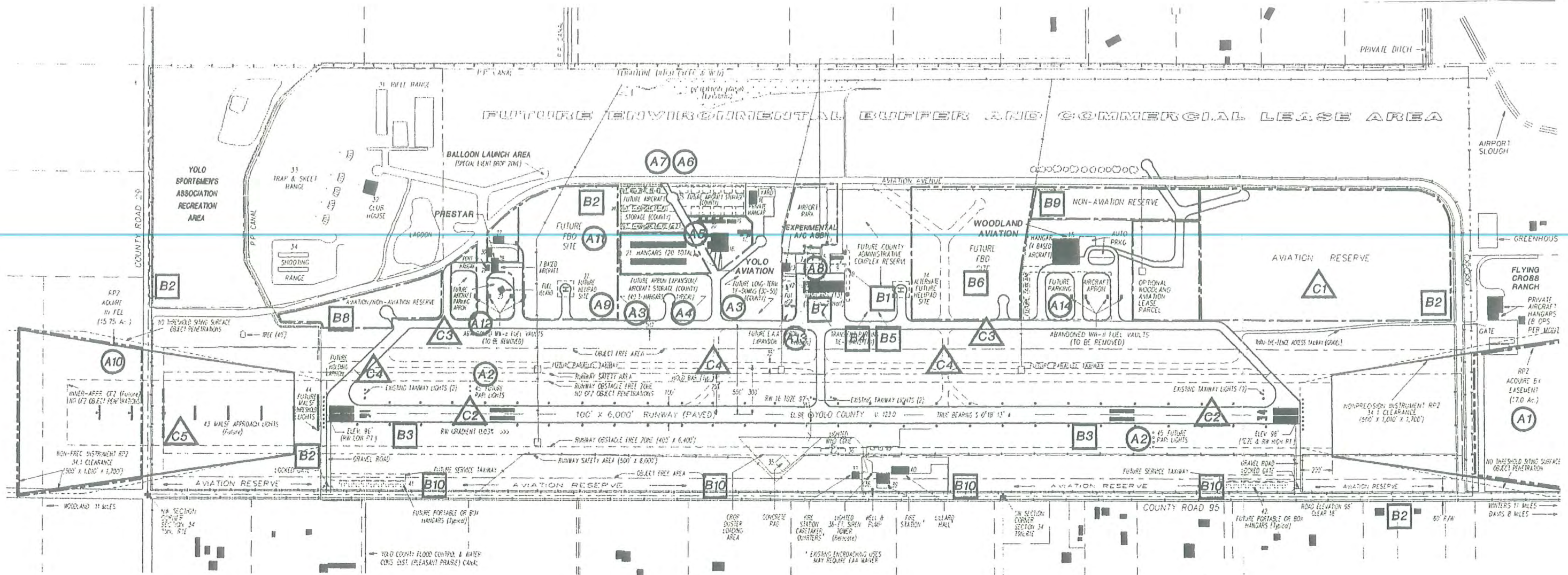
Federal Emergency Management Agency, Flood Insurance Rate Map Community Panel No. 060423-0555-C, March 23, 1999.



**COUNTY OF YOLO  
YOLO COUNTY AIRPORT  
DRAINAGE PLAN UPDATE**

**EFFECTIVE FIRM**





**Stage I (1998-2002)**  
(60,000 operations, 92 based aircraft)



A1	RWY 34 RPZ acquisition by easement
A2	PAPI/VASI installation
A3	County apron expansion (former Yolo Av.)
A4	T-hangar development
A5	Rehabilitate hardstand taxiway
A6	Hangar development
A7	County apron expansion (east of Yolo Av.)
A8	Equip. storage area fencing & related improvements
A9	Helipad site development
A10	RWY 16 RPZ acquisition in fee
A11	Future FBO site infrastructure
A12	Prestar Aviation apron expansion
A13	E.A.A. apron development
A14	Woodland Aviation apron expansion

**Stage II (2003-2007)**  
(79,000 operations, 106 based aircraft)

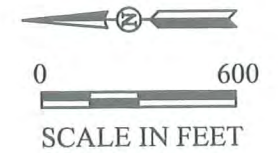


B1	Terminal building development
B2	Upgrade perimeter fencing
B3	Instrument runway marking/HIRL upgrade
B4	County apron expansion
B5	Hangar development
B6	Future FBO site infrastructure (N of Woodland Av.)
B7	Slurry seal existing county apron
B8	Leasehold site infrastructure (N of Prestar)
B9	Leasehold site infrastructure (E of Woodland Av.)
B10	West side hangar site preparation/development

**Stage III (2008-2015)**  
(101,000 operations, 145 based aircraft)



C1	Infrastructure for long term aviation development south of Woodland Aviation
C2	Resurface runway
C3	Resurface apron taxiway
C4	Parallel/connecting twy & holding apron const.
C5	MALSF approach lighting



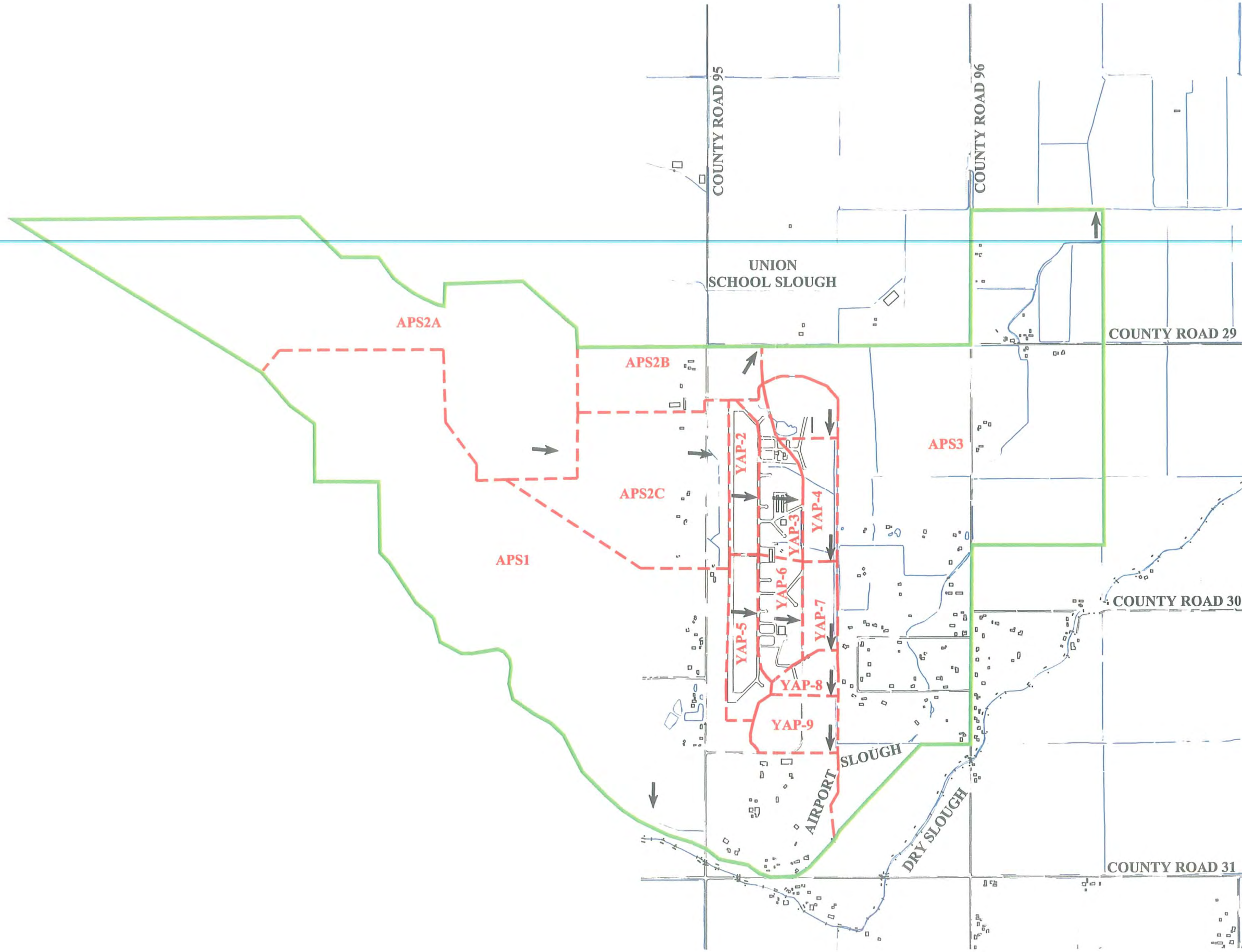
COUNTY OF YOLO  
YOLO COUNTY AIRPORT  
DRAINAGE PLAN UPDATE  
**AIRPORT LAND USE PLAN**



SOURCE:

P&D Consultants, Inc., "Final Environmental Assessment/Environmental Impact Report: Yolo County Airport Master Plan," May 2, 1998.

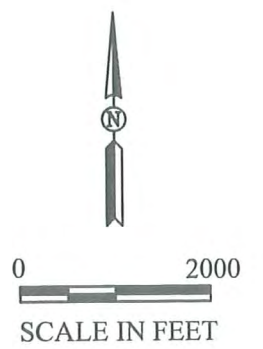
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**LEGEND**

- AIRPORT SLOUGH WATERSHED BOUNDARY
- - - AIRPORT SLOUGH INTERNAL SUBBASIN BOUNDARY
- ➔ DIRECTION OF OVERLAND DRAINAGE

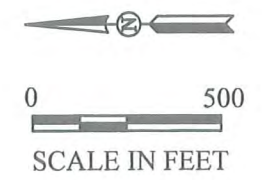
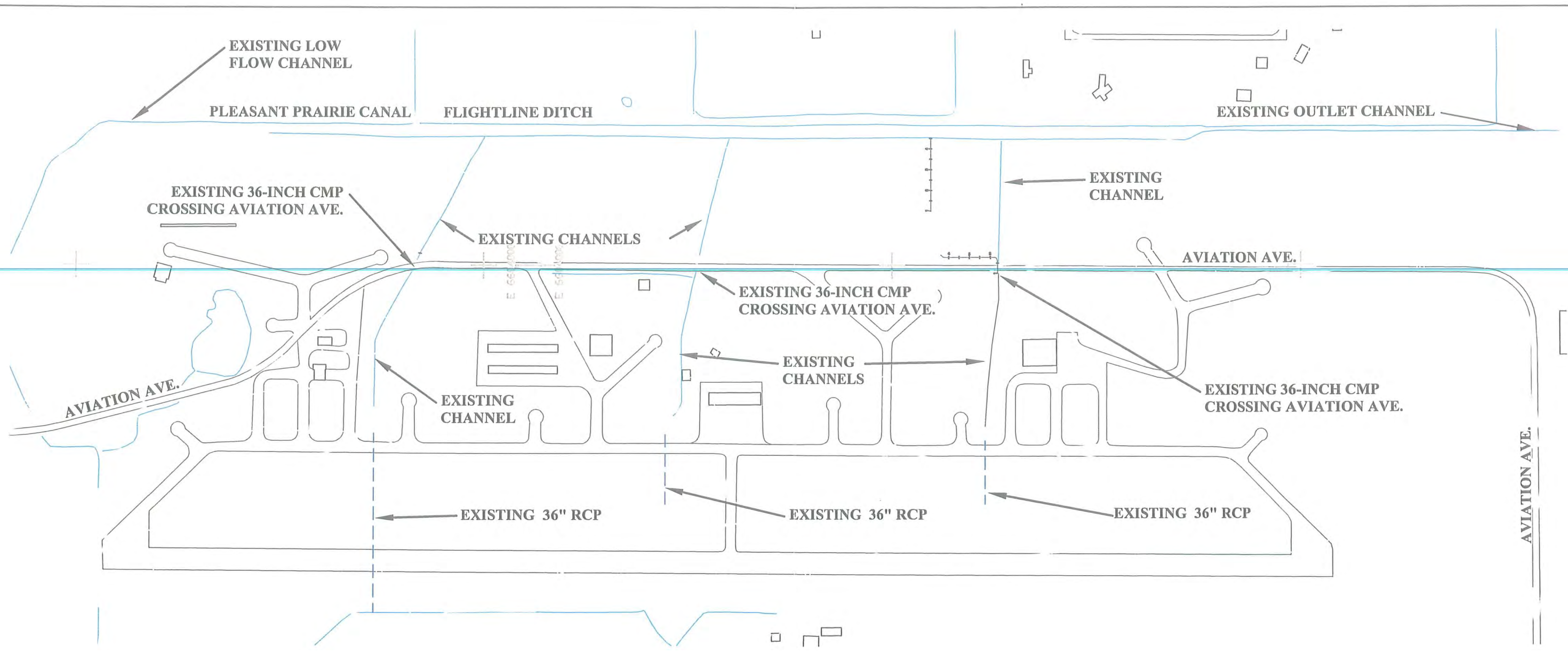
- SOURCES**
1. Topographic Mapping from Federal Emergency Management Agency, "Flood Insurance Study, Yolo County, Unincorporated Areas," Updated December 20, 2002.
  2. TopoDepot, Digital Topographic Mapping, 2002.



COUNTY OF YOLO  
YOLO COUNTY AIRPORT  
DRAINAGE PLAN UPDATE  
**EXISTING CONDITIONS  
SUBBASIN BOUNDARIES**



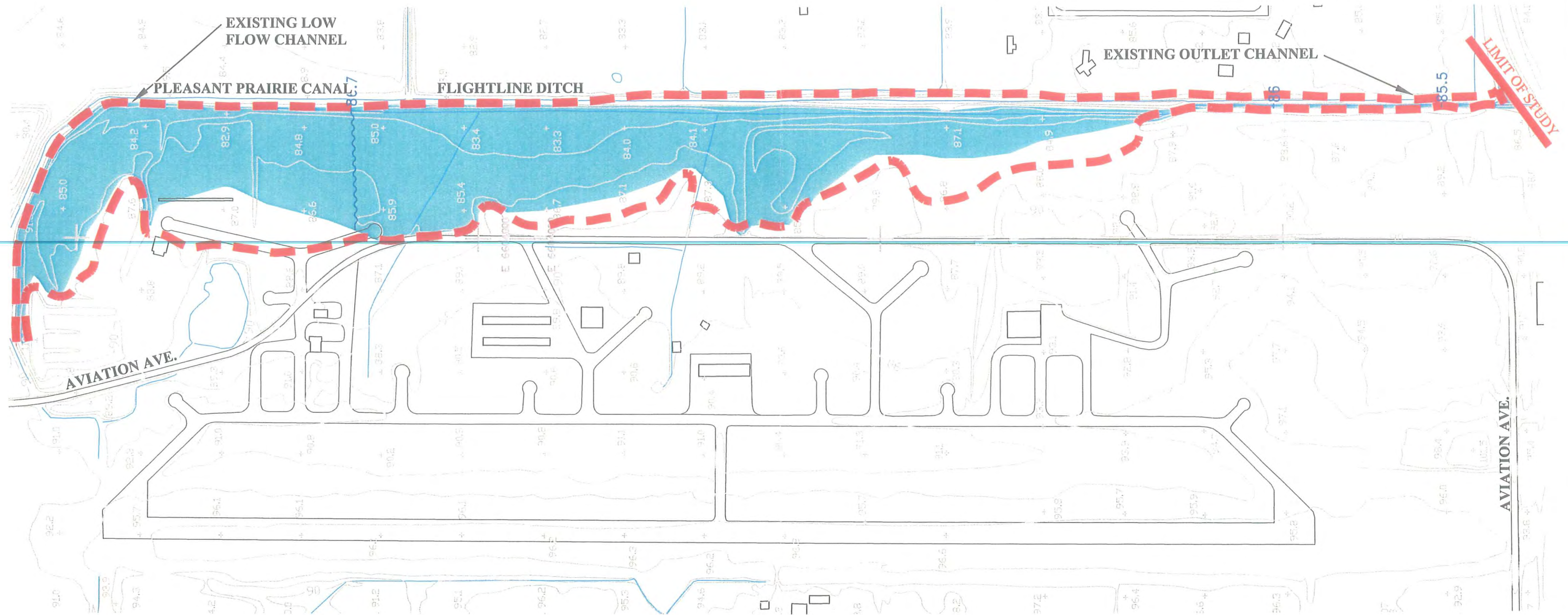
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**SOURCE:**  
 Topographic Mapping from Federal Emergency Management Agency,  
 "Flood Insurance Study, Yolo County, Unincorporated Areas,"  
 Updated December 20, 2002.

COUNTY OF YOLO  
 YOLO COUNTY AIRPORT  
 DRAINAGE PLAN UPDATE  
**EXISTING FACILITIES**





**LEGEND**

-  100-YEAR EXISTING CONDITIONS FLOODPLAIN (REVISED)
-  100-YEAR EXISTING CONDITIONS FLOODPLAIN (EFFECTIVE)
-  86.7 100-YEAR EXISTING CONDITIONS BASE FLOOD ELEVATION (REVISED)

**SOURCE:**

Topographic Mapping from Federal Emergency Management Agency, "Flood Insurance Study, Yolo County, Unincorporated Areas," Updated December 20, 2002.

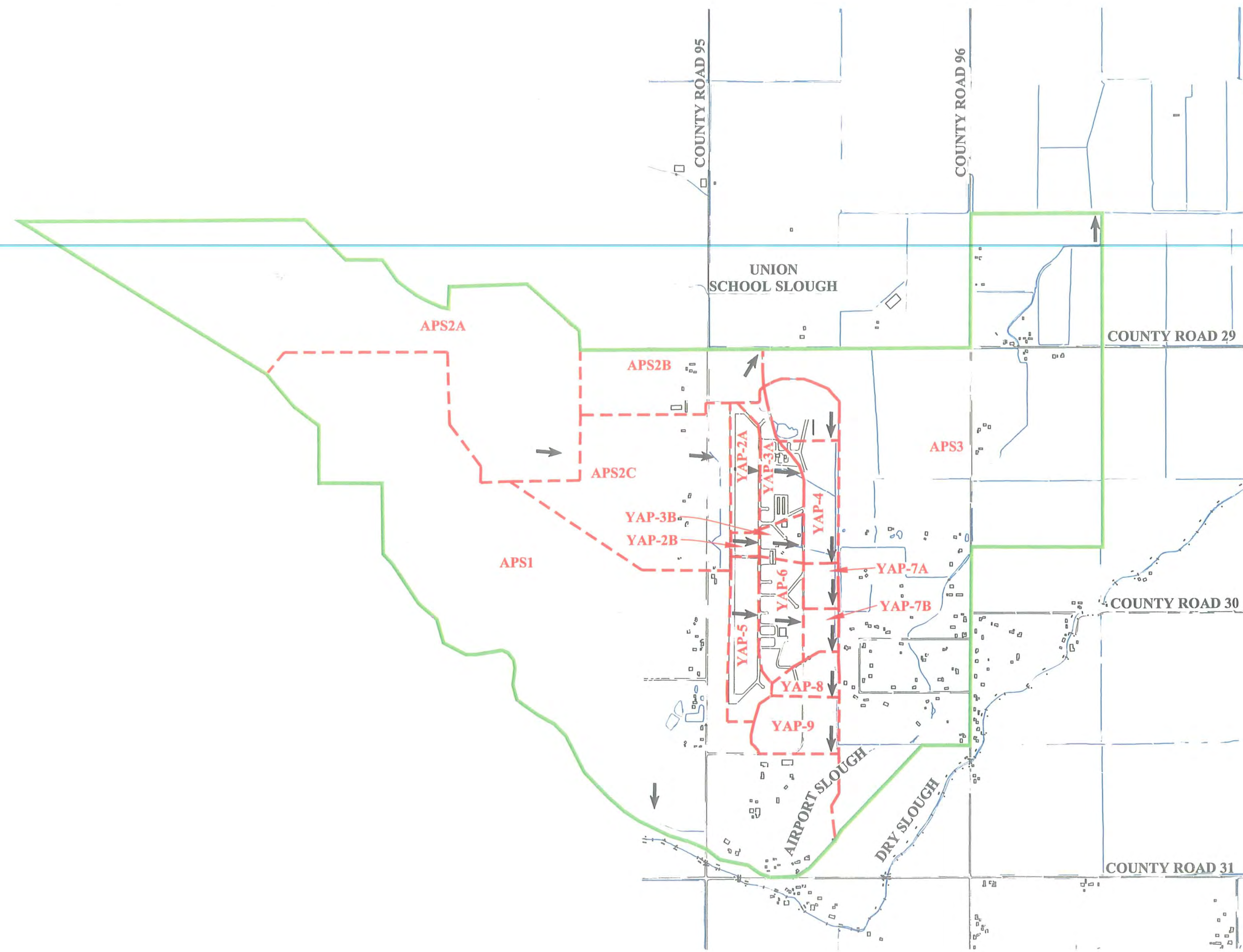


COUNTY OF YOLO  
 YOLO COUNTY AIRPORT  
 DRAINAGE PLAN UPDATE  
**EXISTING CONDITIONS  
 100-YEAR FLOODPLAIN**





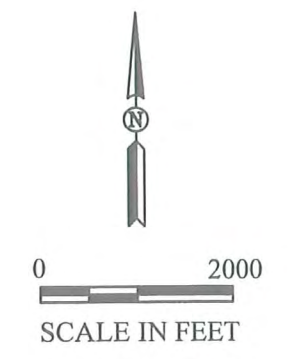
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**LEGEND**

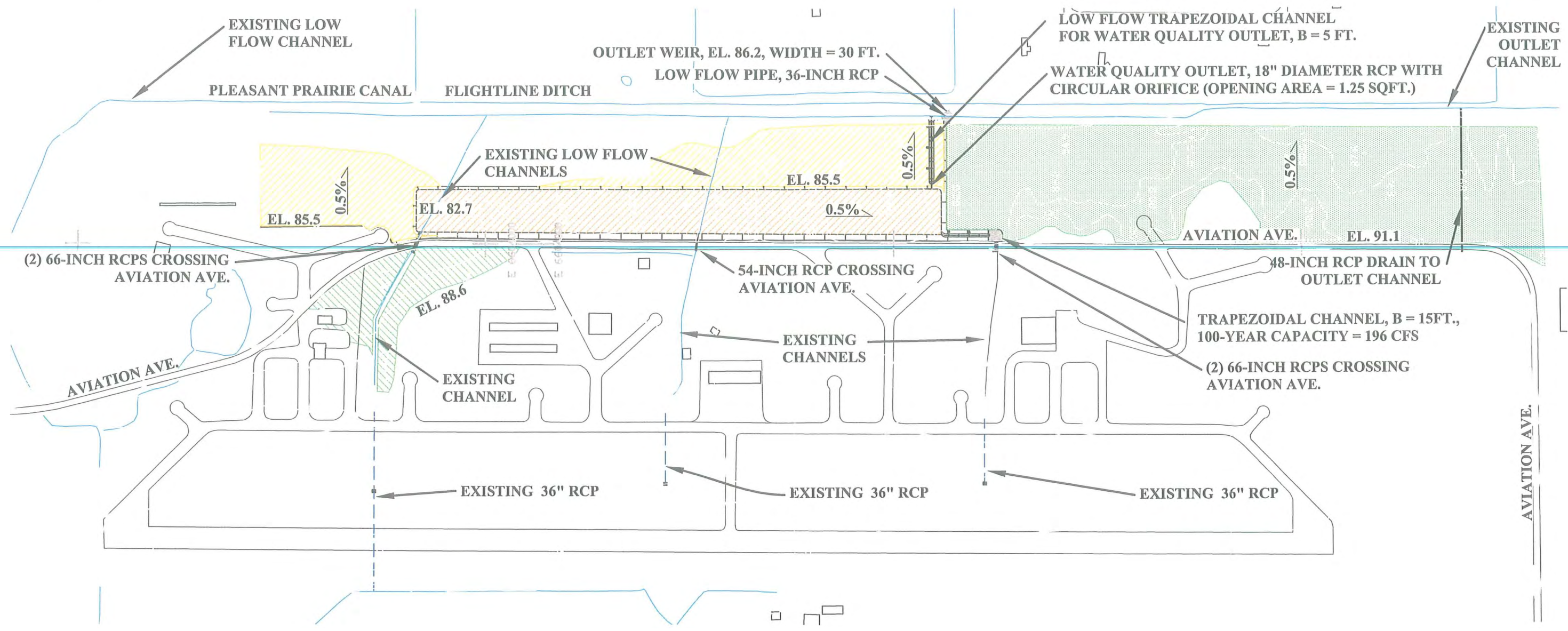
- AIRPORT SLOUGH WATERSHED BOUNDARY
- - - AIRPORT SLOUGH INTERNAL SUBBASIN BOUNDARY
- ➔ DIRECTION OF OVERLAND DRAINAGE




- SOURCES:**
1. Topographic Mapping from Federal Emergency Management Agency, "Flood Insurance Study, Yolo County, Unincorporated Areas," Updated December 20, 2002.
  2. TopoDepot, Digital Topographic Mapping, 2002.



COUNTY OF YOLO  
YOLO COUNTY AIRPORT  
DRAINAGE PLAN UPDATE  
**ULTIMATE CONDITIONS  
SUBBASIN BOUNDARIES**

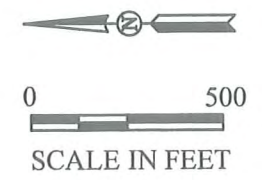




- LEGEND**
-  FILL AREA
  -  EXCAVATED AREA - DETENTION POND AREA
  -  EXCAVATION AREA - STORM WATER QUALITY TREATMENT POND AREA

**SOURCE:**

Topographic Mapping from Federal Emergency Management Agency, "Flood Insurance Study, Yolo County, Unincorporated Areas," Updated December 20, 2002.



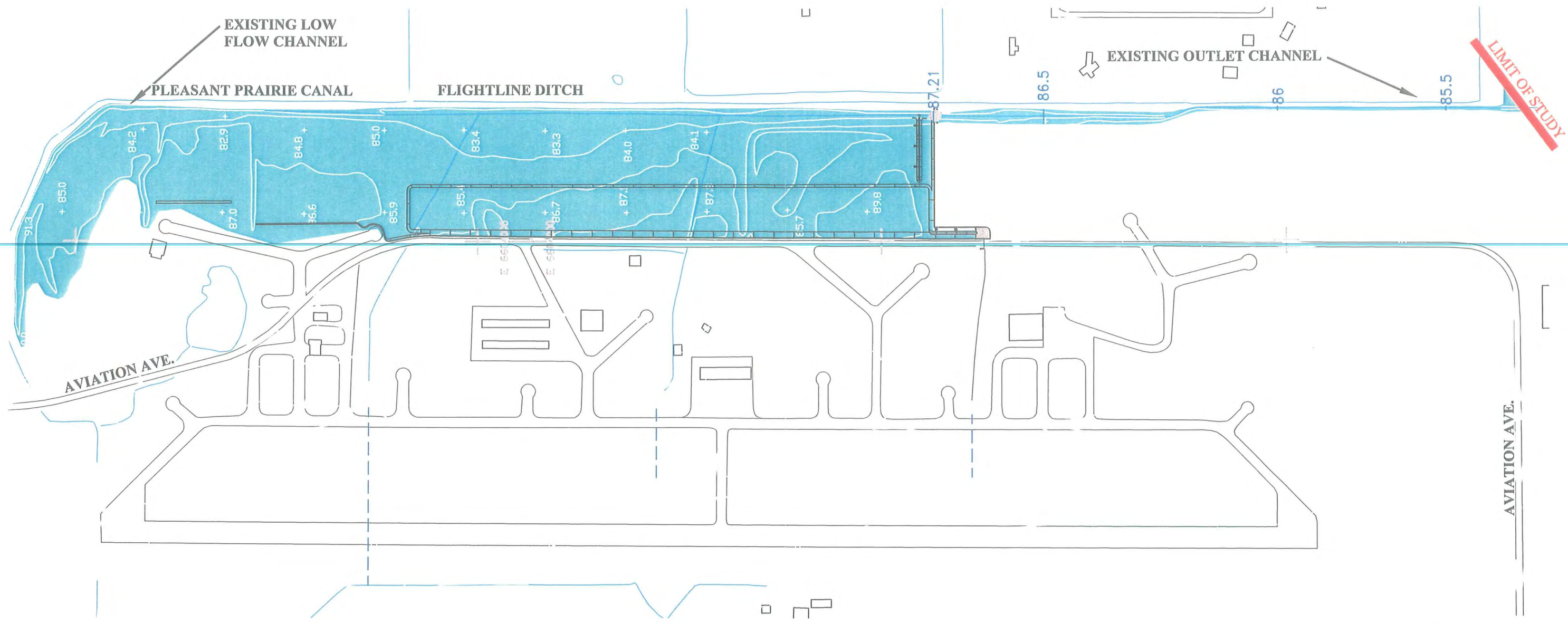
COF 1

COUNTY OF YOLO  
YOLO COUNTY AIRPORT  
DRAINAGE PLAN UPDATE  
**PROPOSED FACILITIES**





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**LEGEND**

-  100-YEAR ULTIMATE CONDITIONS FLOODPLAIN
-  86.7 100-YEAR ULTIMATE CONDITIONS BASE FLOOD ELEVATION

**SOURCE:**

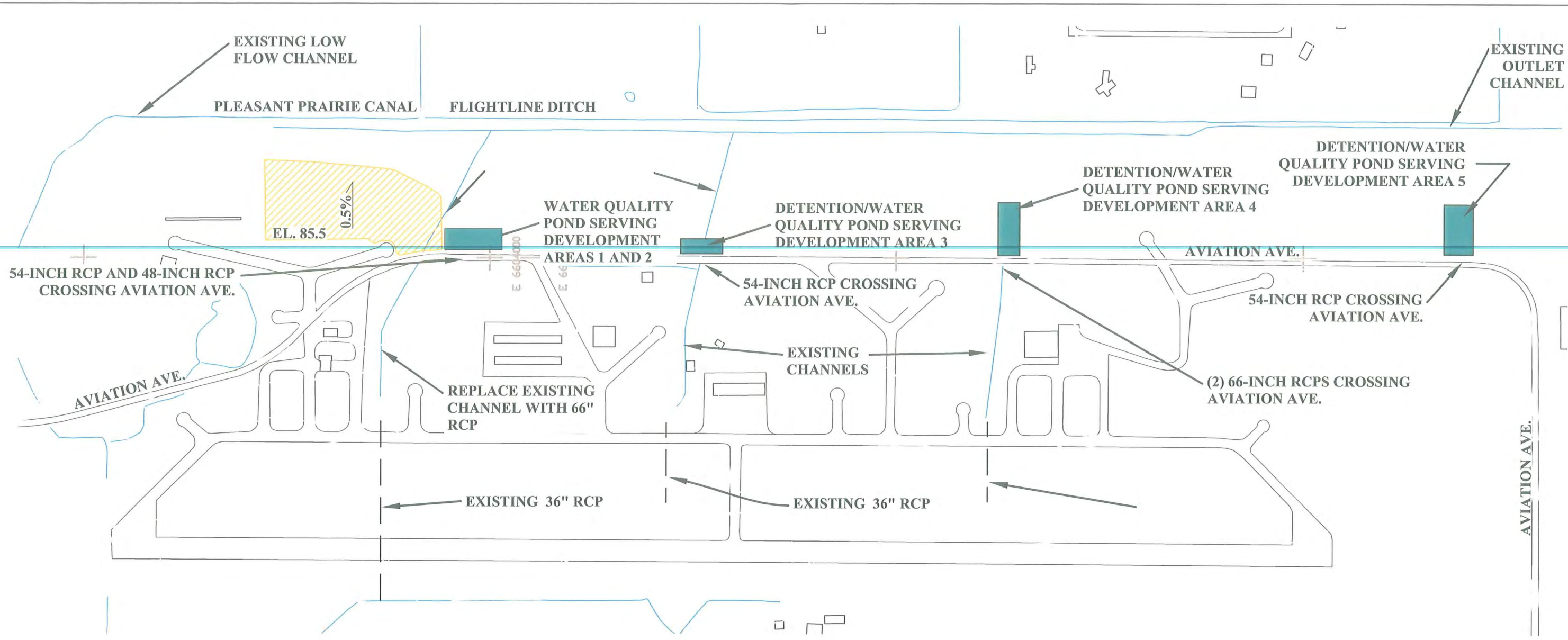
Topographic Mapping from Federal Emergency Management Agency,  
 "Flood Insurance Study, Yolo County, Unincorporated Areas,"  
 Updated December 20, 2002.





COUNTY OF YOLO  
 YOLO COUNTY AIRPORT  
 DRAINAGE PLAN UPDATE  
**ULTIMATE CONDITIONS  
 100-YEAR FLOODPLAIN**



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**LEGEND**

-  AREA EXCAVATED TO INCREASE FLOODPLAIN STORAGE
-  DETENTION/WATER QUALITY POND

**SOURCE:**

Topographic Mapping from Federal Emergency Management Agency,  
 "Flood Insurance Study, Yolo County, Unincorporated Areas,"  
 Updated December 20, 2002.

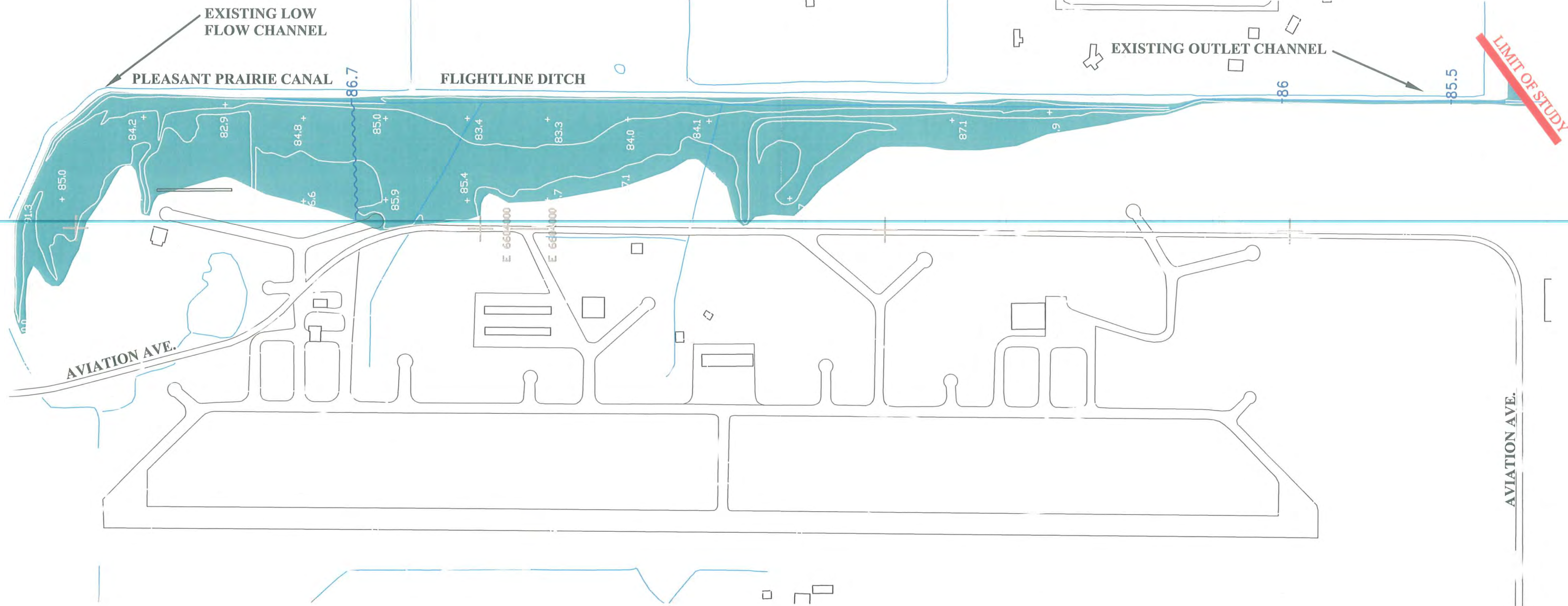


COUNTY OF YOLO  
 YOLO COUNTY AIRPORT  
 DRAINAGE PLAN UPDATE  
**PROPOSED FACILITIES**





RF 2

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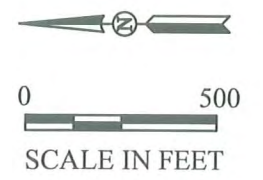


**LEGEND**

-  100-YEAR ULTIMATE CONDITIONS FLOODPLAIN
-  100-YEAR ULTIMATE CONDITIONS BASE FLOOD ELEVATION

**SOURCE:**

Topographic Mapping from Federal Emergency Management Agency,  
 "Flood Insurance Study, Yolo County, Unincorporated Areas,"  
 Updated December 20, 2002.

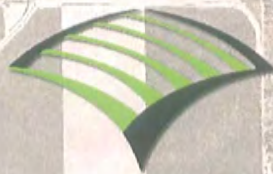


COUNTY OF YOLO  
 YOLO COUNTY AIRPORT  
 DRAINAGE PLAN UPDATE  
**ULTIMATE CONDITIONS  
 100-YEAR FLOODPLAIN**



**WOOD RODGERS**  
DEVELOPING INNOVATIVE DESIGN SOLUTIONS

Appendix A



**Appendix A**

# Solano & Yolo County Design Rainfall

This study was prepared at the request of Mr. Lee Frederiksen of Borcalli and Associates of Sacramento. It is intended to be used in selecting a design storm for any location in Solano or Yolo Counties for storm duration of five minutes to ten days and for return periods of 2 to 100 years.

This revision is to modify the Design Rainfalls on Table 1 for durations of over two days. Also return periods of 500, 1000 and 10,000 years were added to make this study useful to a broader range of users.

To find a design storm; first look up the mean annual precipitation (MAP) on (Figure 1) and then enter the MAP column of the Tables 1 for the desired storm duration and return period. The design rainfall shown on Table 1 is in parts, one each for return periods of 2.3, 5, 10, 25, 50 and 100 years. Table 1 is in units of inches.

The data of this study were from Climatological Data for California published by the National Climatic Data Center located in Ashville, N. C. Additional data were obtained from many sources including Mr. Jim Gibboney (916) 322 7159 of the Central District Office of the Department of Water Resources in Sacramento, the Vallejo City Water Works and Contra Costa County Public Works Department.

The methods used in this study to analyze rain records are similar to those used in Rainfall for Drainage Design, Bulletin 195 of the Department of Water Resources, and in Proceedings of a Workshop on County Hydrology Manuals, August 16-17, 1990, sponsored by Water Resources Center, University of California, published by Lighthouse publications, Mission Viejo, CA 92692.

Eighty-one rain gages listed on Table 2 were used in this study. These represent 2953 station years of data. Seventeen of the 82 gages are recording rain records. They are listed on Table 2. Table 2 contains the average annual extreme rainfalls at all of the rain records of this study. Some of the individual rainfall depth duration frequency tables may differ from the design rainfalls of Table 1, because 2953 station years of data are included in Table 1 and the longest individual record of this study is Sacramento with only 120 years of daily rainfall data.

All design storms were calculated as a fraction of the mean annual precipitation (MAP). The relationship between the maximum annual 1440 minute rainfall to the mean annual

precipitation (MAP) was shown on Figure 2. The non recording rain gage records were adjusted for fixed interval corrections by a factor of 1.14 so that all maximum daily data would be comparable with the data from the recording gages. The shorter records had a higher value of the ratio of the annual maximum daily to the MAP as shown on Figure 3. The final design value of the relationship between the average maximum one day and the average total annual rainfall was based on records with 70, or more years of data.

The tabulated extreme 1 day precipitation from the recording gages are intended to represent the actual maximum 1440 consecutive minutes for the year. Recording gage extreme rains usually average 14% higher than once a day fixed time observations.

The shorter records also had a larger value of the sample value coefficient of variation as shown on Figure 4. The longer records seem to converge on the design value of .352 that has been used since 1983, by the Department of Water Resources. The coefficient of variation for storms longer than one day are listed on Tables 6, 7 and 8, along with the regional coefficients of skew and Frequency Factors.

The ratios of short duration rainfalls to the one day (or 1440 minute) storm is based on the relationship shown at the bottom of page 6 of Table 2. These values were plotted on Figure 5.

Tables of design storms are for return periods of 2, 5, 10, 25, 50, 100, 500, 1000 and 10,000 years and storm durations of 5, 10, 15, 30 minutes, 1, 2, 3, 6, 12 hours, 1, 2, 3, 4, 6, 8, 10, 15, 20, 30, and 60 days and 1 year. The design storms are expressed in terms of the MAP which ranges in Solano and Yolo Counties from 14 to 40 inches. These tables were calculated for storm duration of 3 hours or less using the following relationship:

$$P_{ij} = (-.22 + .13047*MAP)*(1+K_j*CV)*T_i^{.43747}$$

where  $P_{ij}$  is the design precipitation for return period  $j$  and storm duration  $i$ .

MAP is the mean annual precipitation Figure 1

$(-.22 + .13047*MAP)$  is the fraction of MAP occurring in the average maximum day from Figure 2.

CV is the design value of the Coefficient of Variation, specifically .352 for this region of the Sacramento Valley drainage.



$T_i$  is the time in days (note for 5 min use 5 / 1440.)

$n$  is .43747, the slope of the log rain vs., log minutes shown on Figure 5.

$K_j$  is the frequency factor for the Pearsons Type III distribution (for storms of one day or less) with an of skew 1.1 as shown below:

Return Period Years	Frequency Factors
2	-.180
5	.745
10	1.341
25	2.066
50	2.420
100	3.087
200	3.575
500	4.300
1000	4.673
10000	6.185

Frequency factors represent the number of standard deviations in excess of the mean that are used to define storms of various return periods.

The mean annual precipitation (MAP) map Figure 1 is based on the 1951 to 1980 averages corresponding to the period used by the National Weather Service for their climatic normals.

The maximum rainfall for each calendar day from 1917 to 1989 at Davis was plotted on the cover of this study.

Notable large rainfalls in or near Solano and Yolo Counties during historic times include the April 20, 1880 storm at Mount Saint Helena at 4340 feet elevation, where 14.70 inches of rain fell in one day. No records of this event are available for Yolo or Solano Counties, but the largest ever daily rainfall of 5.28 inches occurred at Sacramento on this date. The return period for 5.28 inches in one day at Sacramento is over 500 years.

The December 19 to 27, 1955 deposited record high rainfalls in an area from Winters Northeastward to the Feather River Basin. The Winters-Lewis rain gage cough 14.13 inches in 8 days. The return period was over 1500 years.

The January 4 storm of the San Francisco Bay Area caused many deaths from land slides in Marin and Santa Cruz Counties. The highest rainfall reported for Solano County was 6.04 inches. This occurred at the Vallejo 4 N rain gage. The return period was about 1400 years.

In the last half century the biggest rainfall was during the Columbus Day storm of 1962. During October 12 to 14, 1962 a band of rainfalls with return periods in excess of 1000 years was scattered generally from Oakland northeastward to Marysville and to Alturas. The Solano - Yolo area was bracketed on both sides with heavy rains. The largest return period for the 3 day storm was 340 years at Mare Island, which had 8.28 inches. Davis had 7.81 inches in 3 days with a 275 year return period. It was fortunate that this storm fell on dry ground at the end of the normal summer drought, when there was a large soil moisture deficit to absorb the heavy rains.

The water year 1983 was the wettest year in the 109 years of record which were examined in Yolo and Solano Counties. There was extensive flooding in poorly drained areas due to the years having almost twice the average number of rainy days. At Sacramento where the record starts in 1850. there was 36.57 inches. The previous high year was 36.35 inches in 1853. The five wettest years in the region's history were followed by five of the driest years in the last decade.

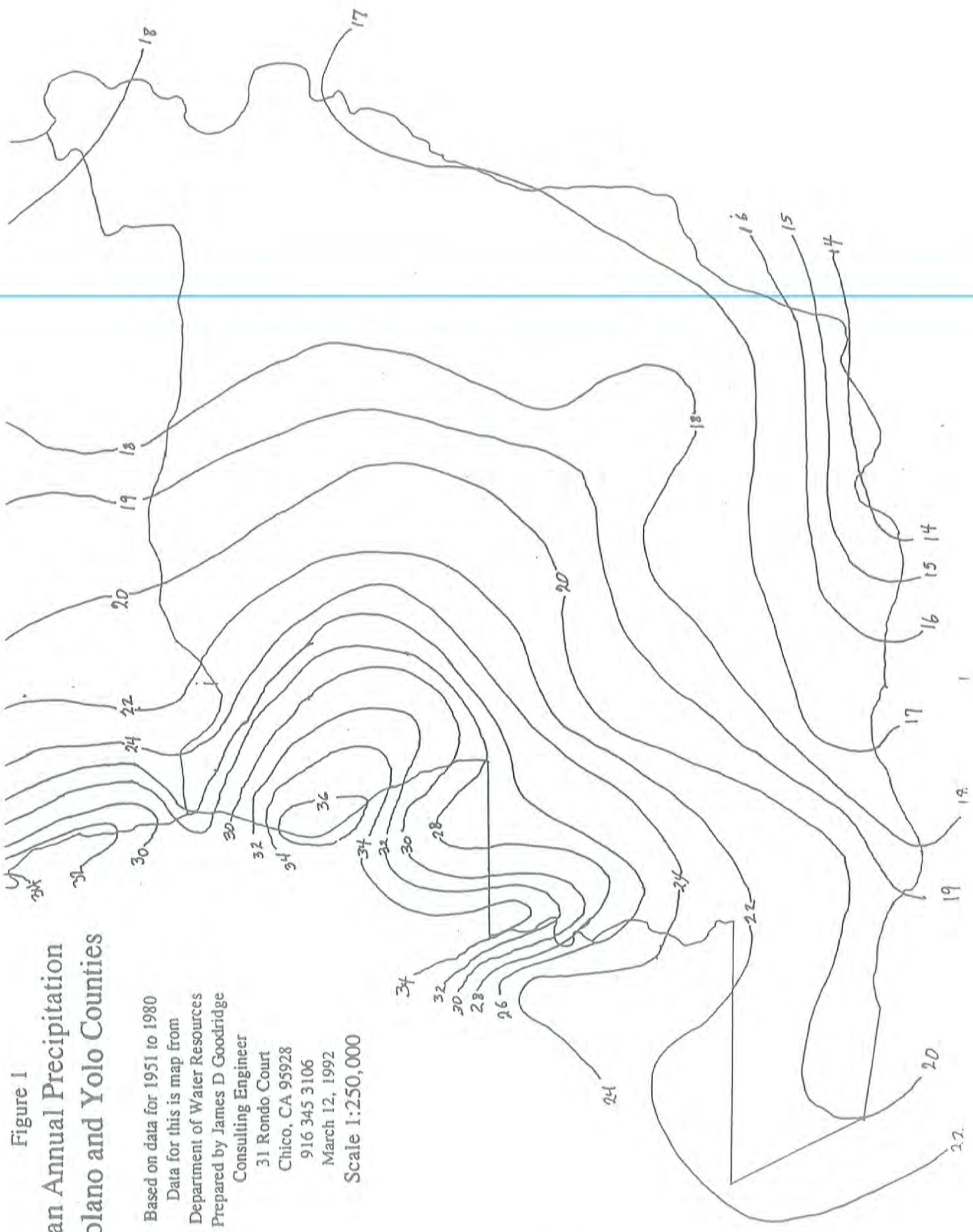
The storm of February 11 to 20, 1986 was heaviest in the Sierra Nevada and in the Napa River Basin as well as the streams draining into the Fairfield- Cordelia area. Record 10 day rainfalls occurs at Lake Curry, Green Valley and at Lake Frey. The Atlas Road rain gage reported 41.08 inches in 10 days which was 7.4 standard deviations above the mean 10 day storm total. The estimated return period is in excess of 100,000 years. Stream channels to the South East of Atlas Peak were lined with large boulders and swept clear of vegetation suggestive of a debris flow, after this storm.

The maximum 24 hour rainfall ever recorded in the San Francisco Bay drainage area was the 15.28 inches at Atlas Road on February 17, 1986. The previous maximum was the Mt. Saint Helena storm of April 1884. The highest ever one day rain in the Central Valley Drainage area was 17.60 at four Trees in the Feather River Basin also on February 17, 1986.

The 20 largest rainfalls at selected stations for each month are listed on Table 3. The maximum daily rainfall for each month at selected stations in or near Solano and Yolo counties is listed on Table 4. The maximum daily rainfall by months for all of California is listed on Table 5. Other data on extreme rainfalls are included, as well as a plot of 109 year trends in total annual rainfall in Yolo and Solano Counties.

Figure 1  
 Mean Annual Precipitation  
 in Solano and Yolo Counties

Based on data for 1951 to 1980  
 Data for this map from  
 Department of Water Resources  
 Prepared by James D Goodridge  
 Consulting Engineer  
 31 Rondo Court  
 Chico, CA 95928  
 916 345 3106  
 March 12, 1992  
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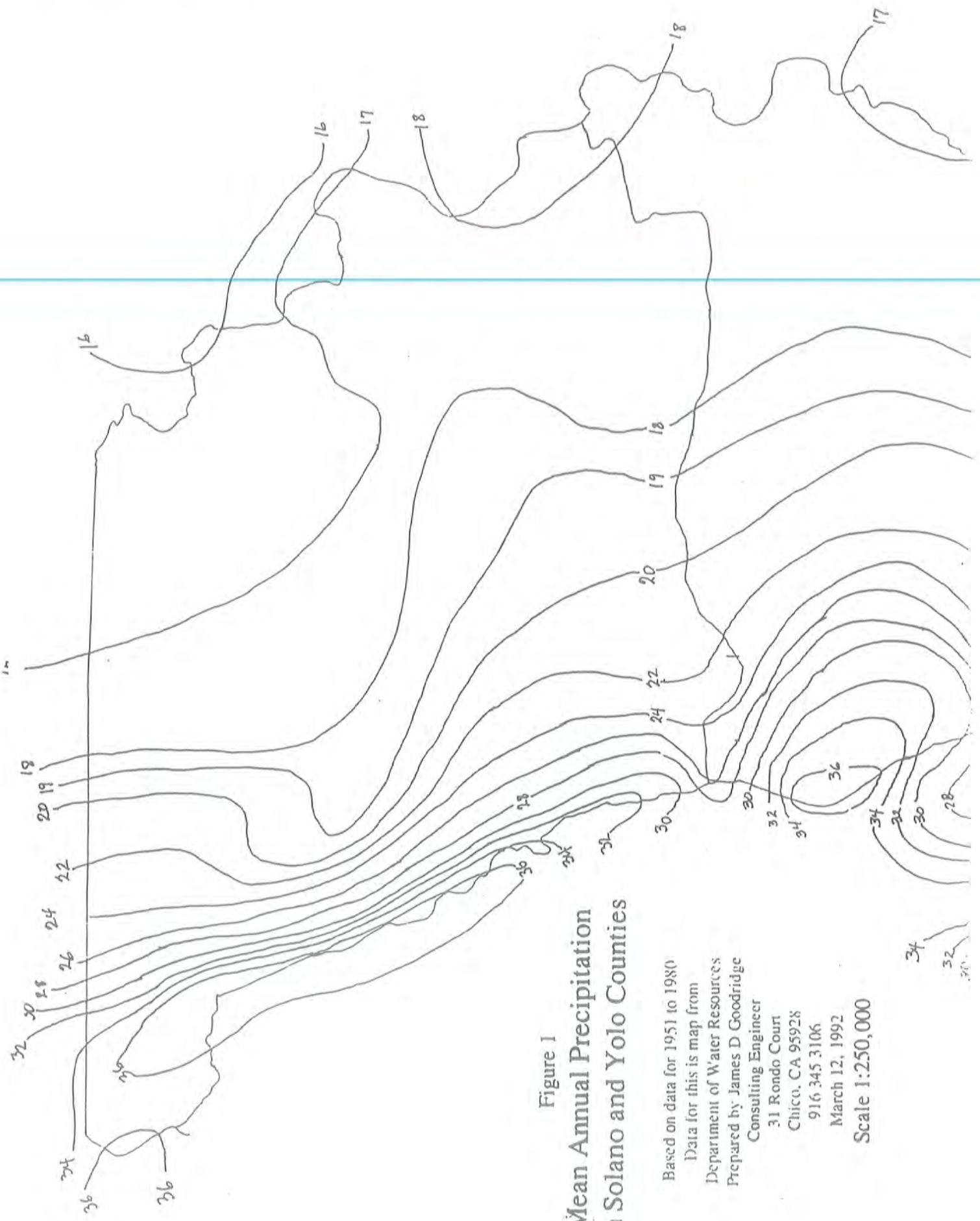


Figure 1  
**Mean Annual Precipitation  
 in Solano and Yolo Counties**

Based on data for 1951 to 1980  
 Data for this map from  
 Department of Water Resources  
 Prepared by James D. Goodridge  
 Consulting Engineer  
 31 Rondo Court  
 Chico, CA 95928  
 916.345.3106  
 March 12, 1992  
 Scale 1:250,000

### Solano and Yolo Design Rainfall

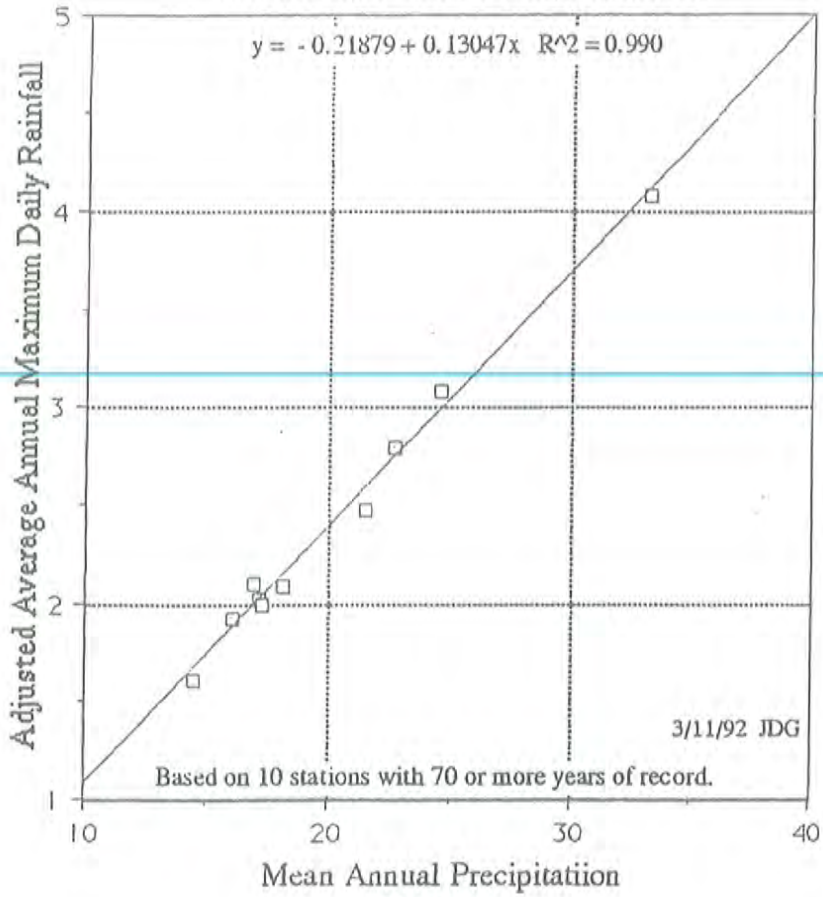


Figure 2

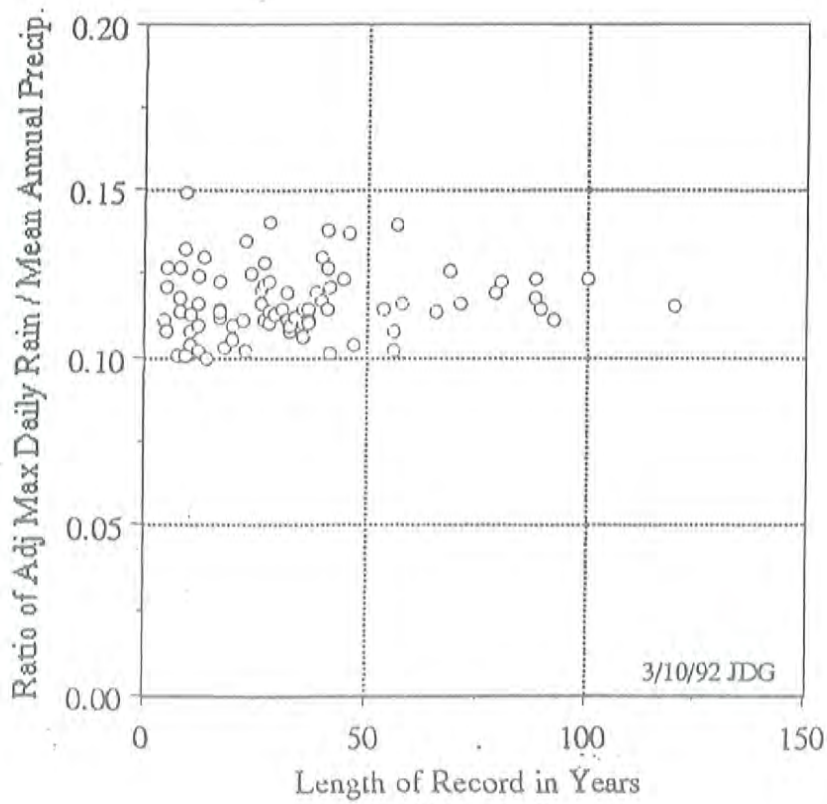


Figure 3

### Solano & Yolo County Resign Rainfall

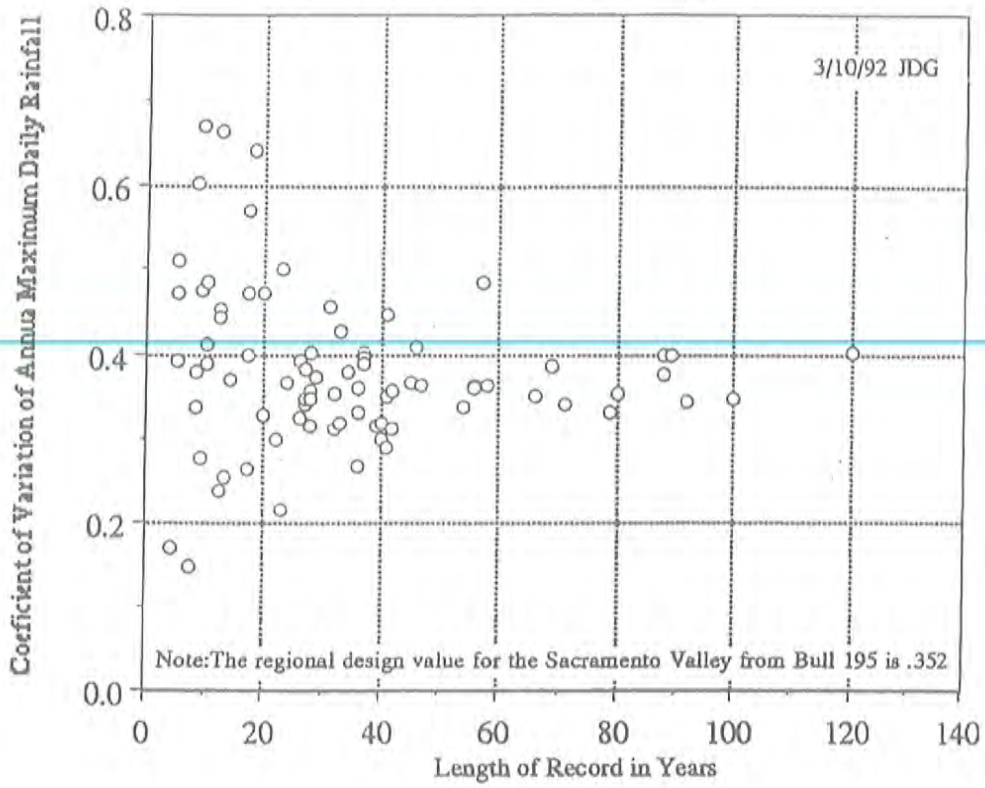


Figure 4

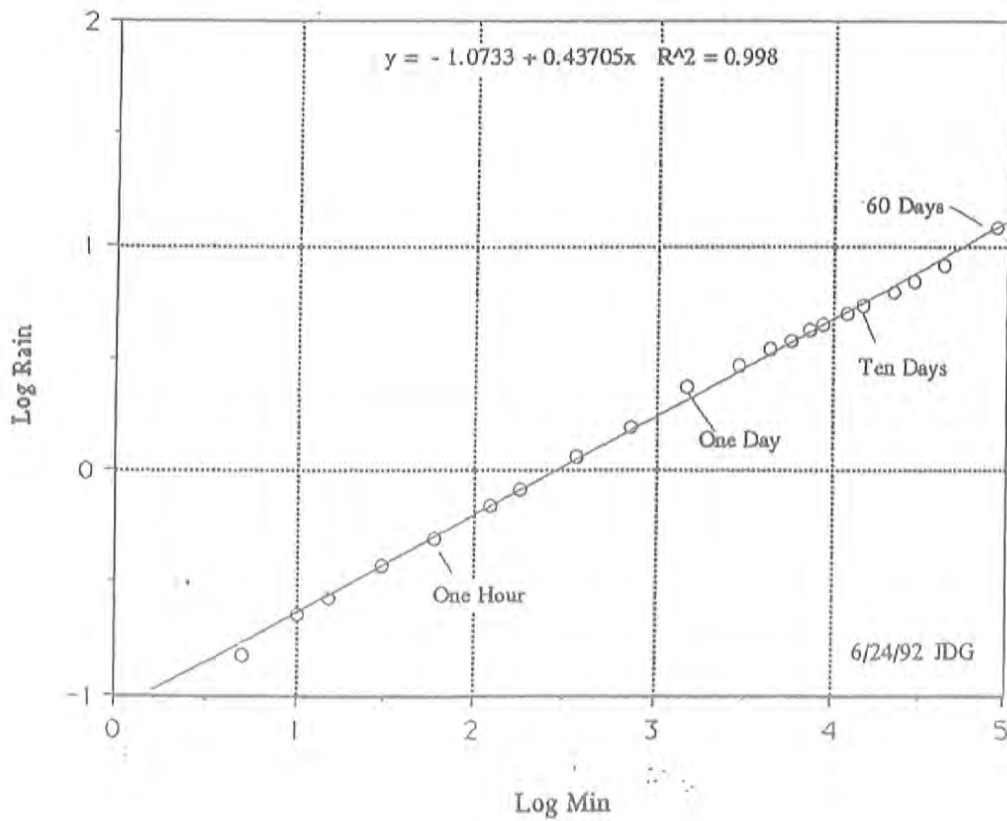


Figure 5

Table 1

Mean		2 Year Storm for Solano and Yolo Counties																					
Ann	Precip	5M	10M	15M	30M	1H	2H	3H	6H	12H	24H	2D	3D	4D	5D	6D	8D	10D	15D	20D	30D	60D	Year
14	0.13	0.18	0.22	0.29	0.40	0.54	0.64	0.80	1.07	1.60	2.02	2.37	2.62	2.87	3.07	3.46	3.72	4.26	4.76	5.61	8.26	13.86	
15	0.14	0.20	0.23	0.32	0.43	0.58	0.70	0.86	1.16	1.73	2.18	2.56	2.84	3.10	3.32	3.74	4.02	4.60	5.14	6.06	8.93	14.99	
16	0.16	0.21	0.25	0.34	0.46	0.63	0.75	0.92	1.25	1.86	2.34	2.75	3.05	3.34	3.57	4.02	4.32	4.95	5.53	6.52	9.60	16.12	
17	0.17	0.23	0.27	0.37	0.49	0.67	0.80	0.99	1.33	1.99	2.51	2.94	3.26	3.57	3.82	4.30	4.62	5.29	5.92	6.97	10.27	17.24	
18	0.18	0.24	0.29	0.39	0.53	0.71	0.85	1.05	1.42	2.12	2.67	3.14	3.48	3.80	4.07	4.58	4.92	5.64	6.30	7.43	10.94	18.37	
19	0.19	0.26	0.30	0.41	0.56	0.76	0.90	1.12	1.51	2.24	2.83	3.33	3.69	4.03	4.32	4.86	5.23	5.98	6.69	7.88	11.61	19.49	
20	0.20	0.27	0.32	0.44	0.59	0.80	0.96	1.18	1.59	2.37	3.00	3.52	3.90	4.27	4.57	5.14	5.53	6.33	7.08	8.34	12.28	20.62	
22	0.22	0.30	0.36	0.48	0.66	0.89	1.06	1.31	1.77	2.63	3.33	3.90	4.33	4.73	5.06	5.70	6.13	7.02	7.85	9.25	13.62	22.87	
24	0.24	0.33	0.39	0.53	0.72	0.98	1.16	1.44	1.94	2.89	3.65	4.29	4.75	5.20	5.56	6.27	6.73	7.71	8.62	10.16	14.96	25.12	
26	0.26	0.36	0.43	0.58	0.79	1.06	1.27	1.57	2.11	3.15	3.98	4.67	5.18	5.67	6.06	6.83	7.34	8.40	9.39	11.07	16.30	27.37	
28	0.29	0.39	0.46	0.63	0.85	1.15	1.37	1.70	2.29	3.41	4.31	5.06	5.61	6.13	6.56	7.39	7.94	9.09	10.17	11.98	17.64	29.63	
30	0.31	0.42	0.50	0.68	0.91	1.24	1.48	1.83	2.46	3.67	4.64	5.44	6.03	6.60	7.06	7.95	8.55	9.79	10.94	12.89	18.99	31.88	
32	0.33	0.45	0.53	0.72	0.98	1.33	1.58	1.96	2.64	3.93	4.96	5.83	6.46	7.06	7.56	8.51	9.15	10.48	11.71	13.80	20.33	34.13	
34	0.35	0.48	0.57	0.77	1.04	1.41	1.69	2.09	2.81	4.19	5.29	6.21	6.88	7.53	8.06	9.07	9.75	11.17	12.49	14.71	21.67	36.38	
36	0.37	0.51	0.60	0.82	1.11	1.50	1.79	2.22	2.98	4.45	5.62	6.60	7.31	8.00	8.56	9.63	10.36	11.86	13.26	15.62	23.01	38.63	
38	0.40	0.54	0.64	0.87	1.17	1.59	1.90	2.35	3.16	4.71	5.94	6.98	7.74	8.46	9.05	10.20	10.96	12.55	14.03	16.53	24.35	40.88	
40	0.42	0.56	0.67	0.91	1.24	1.68	2.00	2.47	3.33	4.97	6.27	7.36	8.16	8.93	9.55	10.76	11.56	13.24	14.80	17.44	25.69	43.14	
Mean		5 Year Storm for Solano and Yolo Counties																					
Ann	Precip	5M	10M	15M	30M	1H	2H	3H	6H	12H	24H	2D	3D	4D	5D	6D	8D	10D	15D	20D	30D	60D	Year
14	0.17	0.23	0.28	0.37	0.51	0.68	0.82	1.11	1.50	2.03	2.54	2.99	3.31	3.62	3.88	4.36	4.69	5.37	6.01	7.08	10.42	17.50	
15	0.18	0.25	0.30	0.40	0.55	0.74	0.88	1.20	1.62	2.19	2.75	3.23	3.58	3.92	4.19	4.72	5.07	5.81	6.49	7.65	11.27	18.92	
16	0.20	0.27	0.32	0.43	0.59	0.80	0.95	1.29	1.74	2.36	2.96	3.47	3.85	4.21	4.50	5.07	5.45	6.24	6.98	8.23	12.11	20.34	
17	0.21	0.29	0.34	0.46	0.63	0.85	1.02	1.38	1.86	2.52	3.16	3.72	4.12	4.50	4.82	5.43	5.83	6.68	7.47	8.80	12.96	21.76	
18	0.23	0.31	0.36	0.49	0.67	0.91	1.08	1.47	1.98	2.69	3.37	3.96	4.39	4.80	5.13	5.78	6.21	7.12	7.96	9.37	13.81	23.18	
19	0.24	0.32	0.39	0.52	0.71	0.96	1.15	1.56	2.11	2.85	3.58	4.20	4.66	5.09	5.45	6.14	6.60	7.55	8.44	9.95	14.65	24.60	
20	0.25	0.34	0.41	0.55	0.75	1.02	1.21	1.64	2.23	3.02	3.78	4.44	4.92	5.39	5.76	6.49	6.98	7.99	8.93	10.52	15.50	26.03	
22	0.28	0.38	0.45	0.62	0.83	1.13	1.35	1.82	2.47	3.35	4.20	4.93	5.46	5.98	6.39	7.20	7.74	8.86	9.91	11.67	17.19	28.87	
24	0.31	0.42	0.50	0.68	0.92	1.24	1.48	2.00	2.71	3.68	4.61	5.41	6.00	6.56	7.02	7.91	8.50	9.73	10.88	12.82	18.89	31.71	
26	0.34	0.46	0.54	0.74	1.00	1.35	1.61	2.18	2.96	4.00	5.02	5.90	6.54	7.15	7.65	8.62	9.26	10.61	11.86	13.97	20.58	34.55	
28	0.36	0.49	0.59	0.80	1.08	1.46	1.75	2.36	3.20	4.33	5.44	6.38	7.08	7.74	8.28	9.33	10.02	11.48	12.83	15.12	22.27	37.39	
30	0.39	0.53	0.63	0.86	1.16	1.57	1.88	2.54	3.44	4.66	5.85	6.87	7.61	8.33	8.91	10.03	10.79	12.35	13.81	16.27	23.96	40.24	
32	0.42	0.57	0.68	0.92	1.24	1.68	2.01	2.72	3.69	4.99	6.26	7.35	8.15	8.92	9.54	10.74	11.55	13.22	14.78	17.42	25.66	43.08	
34	0.45	0.61	0.72	0.98	1.33	1.79	2.14	2.90	3.93	5.32	6.68	7.84	8.69	9.50	10.17	11.45	12.31	14.10	15.76	18.57	27.35	45.92	
36	0.47	0.64	0.77	1.04	1.41	1.91	2.28	3.08	4.17	5.65	7.09	8.32	9.23	10.09	10.80	12.16	13.07	14.97	16.74	19.72	29.04	48.76	
38	0.50	0.68	0.81	1.10	1.49	2.02	2.41	3.26	4.42	5.98	7.50	8.81	9.76	10.68	11.43	12.87	13.83	15.84	17.71	20.87	30.73	51.61	
40	0.53	0.72	0.86	1.16	1.57	2.13	2.54	3.44	4.66	6.31	7.92	9.30	10.30	11.27	12.06	13.58	14.60	16.71	18.69	22.02	32.43	54.45	
Mean		10 Year Storm for Solano and Yolo Counties																					
Ann	Precip	5M	10M	15M	30M	1H	2H	3H	6H	12H	24H	2D	3D	4D	5D	6D	8D	10D	15D	20D	30D	60D	Year
14	0.20	0.27	0.32	0.43	0.59	0.80	0.95	1.18	1.59	2.37	2.97	3.48	3.86	4.22	4.52	5.09	5.47	6.26	7.00	8.25	12.15	20.41	
15	0.21	0.29	0.35	0.47	0.64	0.86	1.03	1.27	1.72	2.56	3.21	3.77	4.17	4.57	4.89	5.50	5.91	6.77	7.57	8.92	13.14	22.07	
16	0.23	0.31	0.37	0.51	0.68	0.93	1.11	1.37	1.84	2.75	3.45	4.05	4.49	4.91	5.25	5.92	6.36	7.28	8.14	9.59	14.13	23.72	
17	0.25	0.33	0.40	0.54	0.73	0.99	1.18	1.47	1.97	2.94	3.69	4.33	4.80	5.25	5.62	6.33	6.80	7.79	8.71	10.26	15.12	25.38	
18	0.26	0.36	0.43	0.58	0.78	1.06	1.26	1.56	2.10	3.13	3.93	4.62	5.12	5.60	5.99	6.74	7.25	8.30	9.28	10.93	16.10	27.04	
19	0.28	0.38	0.45	0.61	0.83	1.12	1.34	1.66	2.23	3.33	4.17	4.90	5.43	5.94	6.35	7.16	7.69	8.81	9.85	11.60	17.09	28.69	
20	0.30	0.40	0.48	0.65	0.88	1.19	1.42	1.75	2.36	3.52	4.41	5.18	5.74	6.28	6.72	7.57	8.14	9.32	10.42	12.27	18.08	30.35	
22	0.33	0.44	0.53	0.72	0.97	1.32	1.57	1.94	2.62	3.90	4.90	5.75	6.37	6.97	7.46	8.40	9.02	10.33	11.55	13.61	20.05	33.67	
24	0.36	0.49	0.58	0.79	1.07	1.45	1.73	2.13	2.88	4.29	5.38	6.31	7.00	7.65	8.19	9.22	9.91	11.35	12.69	14.95	22.02	36.98	
26	0.39	0.53	0.63	0.86	1.16	1.57	1.88	2.33	3.13	4.67	5.86	6.88	7.62	8.34	8.92	10.05	10.80	12.37	13.83	16.29	24.00	40.30	
28	0.42	0.57	0.69	0.93	1.26	1.70	2.04	2.52	3.39	5.05	6.34	7.44	8.25	9.03	9.66	10.88	11.69	13.39	14.97	17.63	25.97	43.61	
30	0.46	0.62	0.74	1.00	1.35	1.83	2.19	2.71	3.65	5.44	6.82	8.01	8.88	9.71	10.39	11.70	12.58	14.40	16.10	18.98	27.95	46.92	
32	0.49	0.66	0.79	1.07	1.45	1.96	2.34	2.90	3.91	5.82	7.31	8.58	9.51	10.40	11.13	12.53	13.47	15.42	17.24	20.32	29.92	50.24	
34	0.52	0.71	0.84	1.14	1.55	2.09	2.50	3.09	4.16	6.21	7.79	9.14	10.13	11.08	11.86	13.36	14.36	16.44	18.38	21.66	31.89	53.55	
36	0.55	0.75	0.89	1.21	1.64	2.22	2.65	3.28	4.42	6.59	8.27	9.71	10.76	11.77	12.59	14.18	15.24	17.46	19.52	23.00	33.87	56.87	
38	0.59	0.79	0.95	1.28	1.74	2.35	2.81	3.47	4.68	6.98	8.75	10.27	11.39	12.46	13.33	15.01	16.13	18.47	20.65	24.34	35.84	60.18	
40	0.62	0.84	1.00	1.35	1.83	2.48	2.96	3.67	4.94	7.36	9.23	10.84	12.01	13.14	14.06	15.84	17.02	19.49	21.79	25.68	37.82	63.50	

Table 1

Mean		25 Year Storm for Solano and Yolo Counties																					
Ann																							
Precip		5M	10M	15M	30M	1H	2H	3H	6H	12H	24H	2D	3D	4D	5D	6D	8D	10D	15D	20D	30D	60D	Year
14	0.23	0.32	0.38	0.51	0.69	0.94	1.12	1.38	1.86	2.78	3.48	4.09	4.53	4.96	5.30	5.97	6.42	7.35	8.22	9.68	14.26	23.95	
15	0.25	0.34	0.41	0.55	0.75	1.01	1.21	1.49	2.01	3.00	3.76	4.42	4.90	5.36	5.73	6.46	6.94	7.95	8.89	10.47	15.42	25.89	
16	0.27	0.37	0.44	0.59	0.80	1.09	1.30	1.61	2.16	3.23	4.05	4.75	5.27	5.76	6.16	6.94	7.46	8.54	9.55	11.26	16.58	27.84	
17	0.29	0.39	0.47	0.63	0.86	1.16	1.39	1.72	2.32	3.45	4.33	5.08	5.63	6.16	6.59	7.43	7.98	9.14	10.22	12.04	17.74	29.78	
18	0.31	0.42	0.50	0.68	0.92	1.24	1.48	1.83	2.47	3.68	4.61	5.42	6.00	6.57	7.03	7.91	8.50	9.74	10.89	12.83	18.89	31.72	
19	0.33	0.44	0.53	0.72	0.97	1.32	1.57	1.94	2.62	3.90	4.90	5.75	6.37	6.97	7.46	8.40	9.03	10.34	11.56	13.61	20.05	33.67	
20	0.35	0.47	0.56	0.76	1.03	1.39	1.66	2.06	2.77	4.13	5.18	6.08	6.74	7.37	7.89	8.88	9.55	10.93	12.22	14.40	21.21	35.61	
22	0.38	0.52	0.62	0.84	1.14	1.54	1.84	2.28	3.07	4.58	5.74	6.74	7.47	8.18	8.75	9.85	10.59	12.13	13.56	15.97	23.53	39.50	
24	0.42	0.57	0.68	0.92	1.25	1.70	2.03	2.50	3.37	5.03	6.31	7.41	8.21	8.98	9.61	10.82	11.63	13.32	14.89	17.55	25.84	43.39	
26	0.46	0.62	0.74	1.01	1.36	1.85	2.21	2.73	3.68	5.48	6.88	8.07	8.95	9.79	10.47	11.79	12.67	14.51	16.23	19.12	28.16	47.28	
28	0.50	0.67	0.81	1.09	1.48	2.00	2.39	2.95	3.98	5.93	7.44	8.74	9.68	10.59	11.33	12.76	13.72	15.71	17.56	20.69	30.48	51.17	
30	0.54	0.73	0.87	1.17	1.59	2.15	2.57	3.18	4.28	6.38	8.01	9.40	10.42	11.40	12.19	13.73	14.76	16.90	18.90	22.26	32.79	55.06	
32	0.57	0.78	0.93	1.26	1.70	2.30	2.75	3.40	4.58	6.83	8.57	10.06	11.15	12.20	13.05	14.70	15.80	18.09	20.23	23.84	35.11	58.95	
34	0.61	0.83	0.99	1.34	1.81	2.46	2.93	3.63	4.89	7.28	9.14	10.73	11.89	13.01	13.92	15.67	16.84	19.29	21.57	25.41	37.42	62.84	
36	0.65	0.88	1.05	1.42	1.93	2.61	3.11	3.85	5.19	7.73	9.70	11.39	12.63	13.81	14.78	16.64	17.89	20.48	22.90	26.98	39.74	66.73	
38	0.69	0.93	1.11	1.50	2.04	2.76	3.30	4.08	5.49	8.18	10.27	12.06	13.36	14.62	15.64	17.61	18.93	21.68	24.24	28.56	42.06	70.62	
40	0.73	0.98	1.17	1.59	2.15	2.91	3.48	4.30	5.79	8.64	10.83	12.72	14.10	15.42	16.50	18.58	19.97	22.87	25.57	30.13	44.37	74.51	

Mean		50 Year Storm for Solano and Yolo Counties																					
Ann																							
Precip		5M	10M	15M	30M	1H	2H	3H	6H	12H	24H	2D	3D	4D	5D	6D	8D	10D	15D	20D	30D	60D	Year
14	0.26	0.35	0.42	0.56	0.76	1.03	1.24	1.53	2.06	3.07	3.85	4.52	5.01	5.48	5.86	6.60	7.10	8.13	9.09	10.71	15.77	26.48	
15	0.28	0.38	0.45	0.61	0.83	1.12	1.34	1.65	2.23	3.32	4.16	4.89	5.42	5.93	6.34	7.14	7.67	8.79	9.83	11.58	17.05	28.63	
16	0.30	0.41	0.48	0.66	0.89	1.20	1.44	1.78	2.39	3.57	4.48	5.25	5.82	6.37	6.82	7.68	8.25	9.45	10.56	12.45	18.33	30.78	
17	0.32	0.43	0.52	0.70	0.95	1.29	1.54	1.90	2.56	3.82	4.79	5.62	6.23	6.82	7.29	8.21	8.83	10.11	11.30	13.32	19.61	32.93	
18	0.34	0.46	0.55	0.75	1.01	1.37	1.64	2.03	2.73	4.07	5.10	5.99	6.64	7.26	7.77	8.75	9.40	10.77	12.04	14.19	20.89	35.08	
19	0.36	0.49	0.59	0.79	1.07	1.46	1.74	2.15	2.89	4.32	5.41	6.36	7.04	7.71	8.24	9.28	9.98	11.43	12.78	15.06	22.17	37.23	
20	0.38	0.52	0.62	0.84	1.14	1.54	1.84	2.27	3.06	4.56	5.73	6.72	7.45	8.15	8.72	9.82	10.56	12.09	13.52	15.92	23.45	39.38	
22	0.43	0.58	0.69	0.93	1.26	1.71	2.04	2.52	3.40	5.06	6.35	7.46	8.26	9.04	9.67	10.89	11.71	13.41	14.99	17.66	26.01	43.68	
24	0.47	0.63	0.76	1.02	1.38	1.88	2.24	2.77	3.73	5.56	6.98	8.19	9.08	9.93	10.63	11.97	12.86	14.73	16.47	19.40	28.58	47.98	
26	0.51	0.69	0.82	1.11	1.51	2.04	2.44	3.02	4.07	6.06	7.60	8.93	9.89	10.82	11.58	13.04	14.01	16.05	17.94	21.14	31.14	52.28	
28	0.55	0.75	0.89	1.21	1.63	2.21	2.64	3.27	4.40	6.56	8.23	9.66	10.71	11.71	12.53	14.11	15.17	17.37	19.42	22.88	33.70	56.58	
30	0.59	0.80	0.96	1.30	1.76	2.38	2.84	3.51	4.73	7.06	8.85	10.39	11.52	12.60	13.48	15.18	16.32	18.69	20.89	24.62	36.26	60.88	
32	0.63	0.86	1.03	1.39	1.88	2.55	3.04	3.76	5.07	7.56	9.48	11.13	12.33	13.49	14.44	16.26	17.47	20.01	22.37	26.36	38.82	65.18	
34	0.68	0.92	1.09	1.48	2.01	2.72	3.24	4.01	5.40	8.05	10.10	11.86	13.15	14.38	15.39	17.33	18.63	21.33	23.85	28.10	41.38	69.48	
36	0.72	0.97	1.16	1.57	2.13	2.88	3.44	4.26	5.74	8.55	10.73	12.60	13.96	15.27	16.34	18.40	19.78	22.65	25.32	29.84	43.94	73.78	
38	0.76	1.03	1.23	1.66	2.25	3.05	3.64	4.51	6.07	9.05	11.35	13.33	14.77	16.16	17.29	19.47	20.93	23.97	26.80	31.58	46.51	78.09	
40	0.80	1.09	1.30	1.76	2.38	3.22	3.84	4.76	6.41	9.55	11.98	14.06	15.59	17.05	18.24	20.55	22.08	25.29	28.27	33.32	49.07	82.39	

Mean		100 Year Storm for Solano and Yolo Counties																					
Ann																							
Precip		5M	10M	15M	30M	1H	2H	3H	6H	12H	24H	2D	3D	4D	5D	6D	8D	10D	15D	20D	30D	60D	Year
14	0.28	0.38	0.46	0.62	0.83	1.13	1.35	1.67	2.25	3.35	4.21	4.94	5.47	5.99	6.41	7.21	7.75	8.88	9.93	11.70	17.23	28.93	
15	0.30	0.41	0.49	0.67	0.90	1.22	1.46	1.81	2.43	3.63	4.55	5.34	5.92	6.47	6.93	7.80	8.38	9.60	10.73	12.65	18.63	31.28	
16	0.33	0.44	0.53	0.72	0.97	1.31	1.57	1.94	2.61	3.90	4.89	5.74	6.36	6.96	7.45	8.39	9.01	10.32	11.54	13.60	20.03	33.63	
17	0.35	0.47	0.57	0.77	1.04	1.41	1.68	2.08	2.80	4.17	5.23	6.14	6.81	7.45	7.97	8.97	9.64	11.04	12.35	14.55	21.43	35.98	
18	0.37	0.51	0.60	0.82	1.11	1.50	1.79	2.21	2.98	4.44	5.57	6.54	7.25	7.93	8.49	9.56	10.27	11.76	13.15	15.50	22.83	38.33	
19	0.40	0.54	0.64	0.87	1.17	1.59	1.90	2.35	3.16	4.71	5.91	6.94	7.70	8.42	9.01	10.14	10.90	12.49	13.96	16.45	24.22	40.67	
20	0.42	0.57	0.68	0.92	1.24	1.68	2.01	2.48	3.35	4.99	6.26	7.34	8.14	8.91	9.53	10.73	11.53	13.21	14.77	17.40	25.62	43.02	
22	0.46	0.63	0.75	1.02	1.38	1.87	2.23	2.75	3.71	5.53	6.94	8.15	9.03	9.88	10.57	11.90	12.79	14.65	16.38	19.30	28.42	47.72	
24	0.51	0.69	0.82	1.12	1.51	2.05	2.45	3.03	4.08	6.08	7.62	8.95	9.92	10.85	11.61	13.07	14.05	16.09	17.99	21.20	31.22	52.42	
26	0.56	0.75	0.90	1.22	1.65	2.23	2.67	3.30	4.44	6.62	8.31	9.75	10.81	11.82	12.65	14.25	15.31	17.53	19.60	23.10	34.02	57.12	
28	0.60	0.81	0.97	1.32	1.78	2.42	2.88	3.57	4.81	7.16	8.99	10.55	11.70	12.80	13.69	15.42	16.57	18.98	21.22	25.00	36.82	61.82	
30	0.65	0.88	1.05	1.42	1.92	2.60	3.10	3.84	5.17	7.71	9.67	11.36	12.59	13.77	14.73	16.59	17.83	20.42	22.83	26.90	39.61	66.52	
32	0.69	0.94	1.12	1.52	2.06	2.78	3.32	4.11	5.54	8.25	10.36	12.16	13.47	14.74	15.77	17.76	19.09	21.86	24.44	28.80	42.41	71.21	
34	0.74	1.00	1.19	1.62	2.19	2.97	3.54	4.38	5.90	8.80	11.04	12.96	14.36	15.71	16.81	18.93	20.35	23.30	26.05	30.70	45.21	75.91	
36	0.78	1.06	1.27	1.72	2.33	3.15	3.76	4.65	6.27	9.34	11.72	13.76	15.25	16.69	17.85	20.10	21.61	24.74	27.67	32.60	48.01	80.61	
38	0.83	1.12	1.34	1.82	2.46	3.33	3.98	4.92	6.63	9.89	12.40	14.56	16.14	17.66	18.89	21.28	22.87	26.19	29.28	34.50	50.81	85.31	
40	0.88	1.19	1.42	1.92	2.60	3.52	4.20	5.20	7.00	10.43	13.09	15.37	17.03	18.63	19.93	22.45	24.13	27.63	30.89	36.40	53.61	90.01	





# Figure 1 Mean Annual Precipitation in Solano and Yolo Counties

Based on data for 1951 to 1980  
Data for this is map from  
Department of Water Resources  
Prepared by James D Goodridge  
Consulting Engineer  
31 Rondo Court  
Chico, CA 95928  
916 345 3106  
March 12, 1992  
Scale 1:250,000

