17WAGFCD 01 91

Property of
Flood Control District of MC Library
Please Return to
2801 W. Durango
Phoenix, AZ 85009

A Hydrologic Analysis of Wagner Wash Watershed

Prepared by the
Flood Control District
of Maricopa County
Hydrology Division
Watershed Management Branch

April 1990
Revised January 1991

Table of Contents

1 **Introduction** 1

1.1 Purpose 1
1.2 Study Area 1

2 **Watershed Characteristics** 3

2.1 Watershed Delineation 3
2.2 Land Use 3
2.3 Soils 3
2.4 Topography 4

3 **Hydrologic Methods** 5

3.1 Model 5
3.2 Precipitation 5
3.3 Rainfall Excess 5
3.4 Unit Hydrograph 6
3.5 Channel Routing 6
3.6 Storage Routing 6

4 **Discussion** 7

5 **Conclusions** 12

References

Appendices

A Culvert and CAP Designs, Field Notes A-1
B Precipitation B-1
C Loss Rate Parameters C-1
D Unit Hydrograph Parameters D-1
E Rating Curves E-1
F HEC-1 Output F-1

1

Introduction

1.1 Purpose

The purpose of this study is to determine the 100-year peak discharge at critical points within the Wagner Wash watershed. The discharges will be used for floodplain delineation in the Wagner Wash Flood Insurance Study.

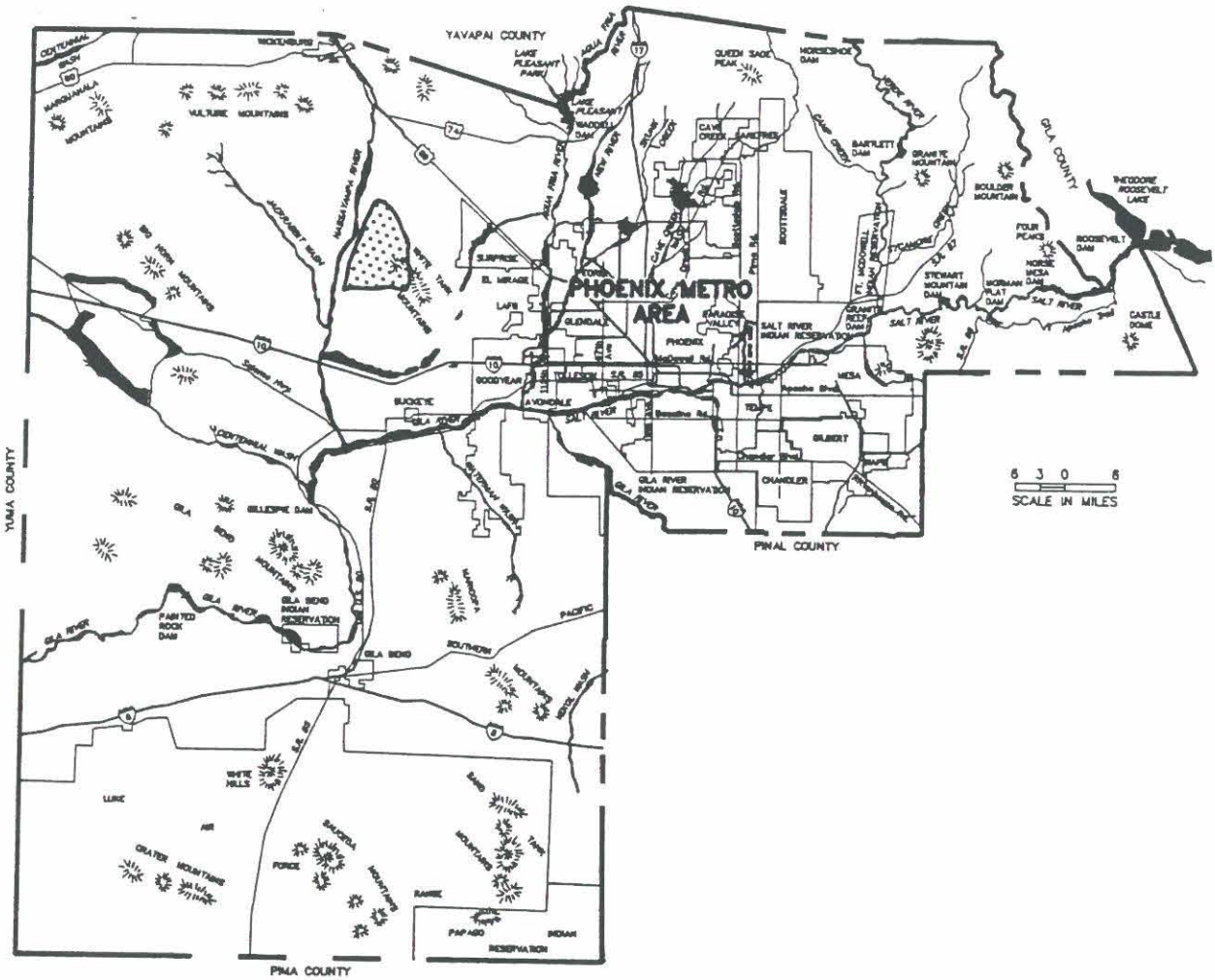
1.2 Study Area

Wagner Wash is an ephemeral wash in central Maricopa County located approximately 40 miles northwest of Metropolitan Phoenix as outlined on Figure 1. The watershed is characterized with broad alluvial slopes prone to sheet flow and with few small incised channels flowing from the White Tank mountains which lie to the east. Wagner Wash carries significant flows through the Sun Valley Parkway at two locations along its northwest curve. The wash then flows southwesterly to its confluence with the Hassayampa River at a point approximately 10 miles north of Interstate 10.

Approximately 8 miles of the Sun Valley Parkway is contained within the Wagner Wash watershed. Drainage through the parkway was designed for the 100-year, 1-hour storm by Collar, Williams, and White Engineering (1987). From the results of this study, it is estimated that most of the flows generated by the 100-year, 6-hour storm will pond behind the culverts and will be diverted downslope to adjacent culverts through collector channels, or, in some cases, overtop the road and continue downstream.

Approximately five miles of the Central Arizona Project (CAP) canals are contained within the Wagner Wash watershed. Design storage capacities and peak flows for two overchutes were obtained from the Bureau of Reclamation (1980). The total watershed area above the Hassayampa River confluence is roughly 42 square miles. The length of the main channel is approximately 14 miles. The elevation of the watershed ranges from 1,400 to 2,700 feet mean sea level. The average watershed slope is 1.80 percent.

Figure 1: Location Map for Wagner Wash Watershed.



= STUDY AREA

2

Watershed Characteristics

2.1 Watershed Delineation

The Wagner Wash study used four 7-½-minute series (1:24,000) USGS topographic maps; Daggs Tank, Wagner Wash Well, White Tank Mountains NE, and White Tank Mountains SE (see Plate 1). Subwatershed areas, elevations, watercourse lengths, and other pertinent information were determined from these maps.

The total area of this study is 42.07 square miles. The watershed was delineated into 77 subwatersheds ranging in size from 0.01 to 3.73 square miles. The design plans for the Sun Valley Parkway were used to delineate washes flowing through the parkway (see Appendix A-1).

A field survey of the culvert sizes and the surrounding topography adjacent to the Sun Valley Parkway indicates that many of the culverts would not overtop the parkway, but would flow downslope along the parkway to the next adjacent culvert downstream. The direction of flow along the parkway was determined for each culvert and modeled accordingly.

2.2 Land Use

There are two inhibiting man-made structures which alter natural runoff conditions within the watershed: the Central Arizona Project (CAP) and the Sun Valley Parkway. Land use within the watershed at this time is primarily cattle grazing, with few homes or roads, and a few small man-made stock tanks.

2.3 Soils

Two distinct units make up the study area (see Plate 2): the Mohall-Contine Unit and the Gunsight-Rillito-Chuckawalla Unit.

Mohall-Contine

The Mohall-Contine Unit consists of about 61 percent Mohall and similar soils, 36 percent Contine soils, and 3 percent components of minor extent. The Mohall and Contine soils are deep and well drained. They formed in alluvium derived dominantly from acid and basic igneous rock. The surface layer of both soils are loamy. In the Mohall soils the subsoil is loamy to a depth of 60 inches, where the soils are nongravelly to very gravelly, loamy to sandy, and calcareous. The subsoil of the Contine soils is clayey and is calcareous in the lower part. Of minor extent in this unit are Denure, Momoli, Pinamt, Tremant, and Rillito soils on fan terraces and Gadsen soils on narrow floodplains.

Gunsight-Rillito-Chuckawalla

The Gunsight-Rillito-Chuckawalla unit consists of about 27 percent Gunsight and similar soils, 19 percent Rillito soils, and 8 percent Chuckawalla soils. The remaining 46 percent is comprised of components of minor extent. Gunsight, Rillito, and Chuckawalla soils are derived dominantly from acid and basic igneous rock. In both Gunsight and Rillito units, the soils are very gravelly and loamy throughout. The surface layer of the Chuckawalla soils is gravelly, loamy, and strongly saline; below the subsoil to a depth of 60 inches or more the soils are very gravelly, loamy, calcareous, and strongly saline. Of minor extent in this unit are Denure, Beeline, Cipriano, Mohall, Momoli, Pinamt, and Tremant soils on fan terraces and Carrizo and Gilman soils on floodplains (Soil Conservation Service 1986).

2.4 Topography

Wagner Wash is characterized by shallow alluvial side slopes with an incised channel averaging 80 feet in width. The main channel has a relatively clean, sandy bottom with scattered areas of small shrubbery and grasses. The vegetation within the watershed is composed of various cacti species, creosote bushes, mesquite trees, palo verde trees, and other desert species. The vegetation is most dense along the overbanks of Wagner Wash.

3

Hydrologic Methods

3.1 Model

The hydrologic response of the Wagner Wash watershed to the 100-year, 6-hour storm was simulated using the U.S. Army Corps of Engineers HEC-1 (December 1988) computer program. The HEC-1 parameters were determined using the methods described in the *Hydrologic Design Manual for Maricopa County*, hereinafter referred to as the *Hydrology Manual* (Flood Control District of Maricopa County 1989). The computational interval used to determine the unit hydrograph for each subbasin was 3 minutes.

3.2 Precipitation

The 100-year, 6-hour storm total of 3.28 inches for the entire watershed was determined by using NOAA Atlas II procedures as described in the *Hydrology Manual* (see Appendix B). Rainfall was distributed in time using the historic storm of 1954 over the Queen Creek area (U.S. Army Corps of Engineers 1974). This curve was developed for the major peak producing event within Maricopa County and is prescribed by the *Hydrology Manual*. The distribution was developed based on total watershed size, and was generated within the Maricopa County Unit Hydrograph computer programs (MCUHP1 and MCUHP2) developed by the Flood Control District of Maricopa County.

Areal reduction was taken into account using JD records. The areal reduction curve for the 6-hour storm was taken from the *NOAA Technical Memorandum NWS HYDRO-40* (Miller, Frederick & Tracey 1973). This data was included in the program MCUHP1 to develop areal reduction for the watershed.

3.3 Rainfall Excess

The initial and uniform loss rate method of HEC-1 was used to determine rainfall losses. The parameters for the initial and uniform rates were developed as outlined in the *Hydrology Manual*. The range of values determined for this method were 0.64 to 0.82 inches for the initial loss rate plus initial abstractions (STRTL + IA), and 0.05 to 0.32 inches/hour for the uniform loss rate (CNSTL) (see Appendix C).

Since the loss rates are based upon hydrologic soil groups, the loss rates were weighted for each subbasin based upon the percentage soil present. The majority of the soils within this watershed consists of type B soils, with some D soils contained in the mountainous portion of the watershed.

3.4 Unit Hydrograph

The unit hydrographs for this watershed were determined using the methods prescribed in the *Hydrology Manual* (see Appendix D). Two methods to determine the hydrographs were used depending on the resulting time of concentration. The time of concentration was determined for most subwatersheds by applying the Papadakis method where the Clark Unit Hydrograph Method were applied. In other subwatersheds where the time of concentration was much longer than the time of excess rain, the S-graph methods were applied. (Subwatershed sizes within Wagner Wash do not exceed five square miles.)

The HEC-1 program does not use different computational time intervals for each subbasin. Therefore, an average computational time increment was chosen, allowing for good representation of the generated hydrograph by different methods (i.e., Clark Unit Hydrograph and S-Graph).

3.5 Channel Routing

The normal-depth routing method of the HEC-1 model was used for channel routing. This method uses channel cross-sections and normal-depth computations to route computed storm runoff hydrographs through given reaches. Channel cross-sections were altered to represent given sections.

The number of steps (NSTPS) per routing interval were obtained using the following equation:

NSTPS = reach length / average velocity / (NMIN x 60)

Channel characteristics were carefully evaluated for estimation of Manning's n values. The chosen values ranged from 0.02 to 0.04. Rough estimates of velocity for each routing reach were obtained by estimating channel cross-sections and flow rates, and applying these parameters to the Manning's equation. The estimated velocity was used to determine the number of steps needed for the routing parameter.

3.6 Storage Routing

Storage routing was performed using the design plans for the Sun Valley Parkway. The plans provided sufficient data to determine inlet flows through the culverts. Concentration in excess of the culvert capacity was routed downslope. Field survey has indicated that overflow at some culverts would not overtop the parkway but would flow downslope along the parkway to the next adjacent culvert. The direction of flow along the parkway was determined for each culvert and modeled accordingly.

The two overchutes located along the CAP allow the upper watersheds to be drained to the lower watershed. The design storage capacity and peak flows were obtained from the U.S. Bureau of Reclamation (1980) (see Appendix A-2) and used in the model. One-foot contour mapping was obtained from The Adams Group, a consulting firm. The contour mapping was used to obtain storage information for the contributing area behind the CAP.

4

Discussion

The peak discharge determined for Wagner Wash at the confluence with the Hassayampa River is 16,000 cfs. Reach velocities ranged from approximately 3 to 5 fps within routed reaches. The unit discharge for this 42 square mile watershed was 400 cfs per square mile, with a total excess of 0.92 inches for the watershed. The excess rainfall volume was equivalent to the excess generated by an SCS curve number for this given watershed.

Individual subbasin discharges per square mile varied based on subbasin size and physical characteristics. Tables 1A and 1B provide a detailed look at unit discharge and excess for each subbasin and for the concentration points.

The peak discharge of Wagner Wash at the confluence of the Hassayampa was compared with estimates from regional equations. The first source was *Methods for Estimating the Magnitude and Frequency of Floods in Arizona* (Roeske 1978), which produced an estimate of 14,800 cfs, and a unit discharge of 357 cfs per square mile. The second source was entitled *Estimation of Magnitude and Frequency of Floods in Pima County, Arizona, with Comparisons of Alternative Methods* (U.S. Geological Survey 1984). The last method produced a peak discharge of 10,500 cfs and a unit discharge of 238 cfs per square mile.

The Clark Unit Hydrograph method was verified by making a comparison of the calculated time of concentrations for various subbasins with similar time of concentration values from the Kirpich method and from the Upland method (TR-55). Table 2 provides the results of these comparisons. The three methods generated times of concentration which compare closely, therefore, the Clark Unit Hydrograph method was assumed to apply to this watershed.

A comparison was made between the design peak flows for the 100-year, 2-hour storm developed by Collar, Williams, and White Engineering (1987), and those flows generated for the 100-year, 6-hour storm developed by this study. Table 3 outlines the results of this comparison which indicate that the peak flows to the culverts generated by this study yield approximately a 50 percent higher discharge.

Table 1A: *Wagner Wash Peak Flow and Unit Discharge Data by Subbasin.*

Subbasin Name	Area, square mile	Peak Flow, cfs	Unit Discharge
SubPa	0.82	1,073	1,309
SubPb	0.99	1,170	1,182
SubPc	1.90	1,652	869
SubQa	1.00	1,121	1,121
SubQb	1.50	1,570	1,047
SubQc	0.80	815	1,019
SubRa	1.40	1,382	987
SubRb	2.20	2,025	920
SubA	0.22	256	1,164
SubA1	1.06	1,055	995
SubB1	1.25	1,322	1,058
SubC1	0.85	1,072	1,261
SubD1	0.34	325	956
SubG1	0.19	183	963
SubS	0.55	751	1,365
SubH1	0.25	473	1,892
SubI1	0.18	211	1,172
SubT	0.49	678	1,384
SubB	0.07	108	1,543
SubCU	0.51	1,138	2,231
Sub C	0.53	692	1,306
SubD	0.27	336	1,244
SubE	0.11	120	1,091
SubF	0.06	138	2,300
SubG	0.04	114	2,850
SubH	0.02	43	2,150
SubIUa	0.98	1,112	1,135
SubIUb	0.57	1,424	2,498
SubI	0.85	1,064	1,252
SubJ	0.26	298	1,146
SubK	0.12	108	900
SubL	1.36	1,190	875
SubU1	0.39	591	1,515
SubU	0.03	95	3,167
SubV1	0.45	526	1,169
SubV	0.11	220	2,000
SubM	1.59	1,227	787
SubW1	0.04	88	2,200
SubW	0.10	145	1,450
SubX1	0.04	99	2,475
SubX	0.08	105	1,313
SubN	0.89	972	1,092
SubY1	0.35	510	1,457
SubY	0.15	176	1,173
SubOU	0.84	1,640	1,952
SubC	1.61	1261	783
SubZ1	0.08	143	1,788
SubZ	0.16	221	1,381
Sub31	1.29	1,121	869
Sub30	0.01	65	6,500
Sub29	0.01	16	1,600
Sub28	0.01	53	5,300
Sub26	0.08	139	1,738
Sub25	0.06	109	1,817
Sub24	0.03	101	3,367
Sub23	1.23	1,097	892
Sub21	0.02	44	2,200
Sub20	0.03	88	2,933
Sub19	0.66	872	1,321
Sub18	0.02	92	4,600
Sub16U	1.08	1,158	1,072
Sub16	0.27	517	1,915
Sub14	0.01	58	5,800
Sub13	0.04	87	2,175
Sub11	0.05	121	2,420
Sub10	0.14	361	2,579
Sub9	0.02	93	4,650
Sub7	0.62	600	968
Sub6	0.95	764	804
Sub5	0.04	135	3,375
Sub3	0.18	285	1,583
Sub2	0.06	66	1,100
Sub1	0.54	610	1,130
Sub4	1.32	1,158	877
Sub8	0.78	909	1,165
Sub12	0.34	423	1,244
Sub15	0.12	135	1,125
Sub17	0.69	801	1,161
Sub22	0.23	199	865
Sub27	0.34	395	1,162
Sub32	0.32	345	1,078
Sub33	1.36	996	732
Sub34	0.50	596	1,192

Table 1B: *Concentration Point Discharges for Wagner Wash.*

Concentration Point	Peak Discharge	Concentration Point	Peak Discharge
P	1,948	CP-30	24
Q	1,447	CP-29	8
R	1,933	CP-28	21
ALL	4,556	CP-26	88
SR-PQ	226	CP-25	66
DCAP	113	CP-24	77
CP-A'S	1,159	CP-23	1,029
CP-11	873	CP-21	23
CP-12	1,723	CP-20	40
CP-13	2,894	CP-19	720
CP-14	3,446	CP-18	33
CP-2	1,472	CP-16	1,103
CP-3	1,610	CP-14	1,024
CP-4	1,662	CP-13	1,011
CP-5	1,693	CP-11	967
CP-6	1,693	CP-10	980
CP-7	1,668	CP-9	767
CP-IU	1,173	CP-7	1,184
CP-I	1,861	CP-6	626
CP-8	3,155	CP-5	50
CP-9	3,313	CP-3	160
CP-10	3,325	CP-2	166
CP-14A	5,906	COMB-1	448
CP-U	583	BRDG-2	10,353
CP-V	543	SR-1	10,296
CP-15	7,225	CP-A	10,964
CP-W	199	CP-B1	3,194
CP-X	164	CP-B	12,363
CP-16	8,079	CP-C1a	304
CP-Y	510	CP-C1	708
CP-17	8,904	CP-C2a	100
CP-O	2,163	CP-C2	220
CP-Z	297	CP-C	12,861
CP-18	10,358	CP-E	15,747

Table 2: Time of Concentration Comparison.

Subbasin Number	Time of Concentration			Subbasin Number	Time of Concentration		
	Papadakis	Kirpich	TR-55		Papadakis	Kirpich	TR-55
A	0.667	0.614		A1	*	1.363	
B	0.517	0.411		B1	*	1.290	
C	0.633	0.451		C1	*	1.067	
CU	0.367	0.692		D1	0.850	0.788	
D	0.667	0.614		G1	0.817	0.717	
E	0.683	0.514		H1	*	0.732	
F	0.400	0.309		I1	0.750	0.646	
G	0.317	0.229		1	*	1.093	
H	0.367	0.259		2	0.617	0.499	
IUa	0.767	0.647	0.506	3	0.583	0.511	
IUb	0.383	0.299	0.396	4	*	1.560	
I	0.667	0.645		5	0.300	0.210	
J	0.717	0.656		6	0.917	0.986	
K	0.767	0.658		7	0.883	0.901	
L	0.867	0.911		8	0.900	0.857	
M	0.983	1.119	1.080	9	0.233	0.413	0.147
N	*	1.225		10	0.367	0.659	
O	1.083	0.447		11	0.383	0.294	
OU	0.417	0.853	0.622	12	0.733	0.681	
Pa	*	1.069	1.310	13	0.383	0.290	
Pb	*	1.075	1.130	14	0.183	0.103	
Pc	*	1.275	1.250	15	0.667	0.571	
Qa	*	1.283	1.660	16	0.417	0.660	
Qb	*	1.291	1.440	16U	*	0.628	
Qc	*	1.049	0.970	17	0.867	0.922	
Ra	*	1.490	1.700	18	0.250	0.157	
Rb	*	1.452	1.470	19	*	0.959	
S	0.833	0.768		20	0.333	0.237	
T	*	0.841		21	0.567	0.139	
U1	*	0.748		22	0.850	0.763	
U	0.400	0.229		23	0.883	0.981	1.270
V1	0.900	0.799		24	0.300	0.184	
V	0.550	0.433		25	0.483	0.331	
W1	0.400	0.294		26	0.483	0.398	
W	0.667	0.461		27	0.733	0.695	
X1	0.350	0.264		28	0.183	0.103	
X	0.717	0.531		29	0.383	0.102	
Y1	0.950	0.872		30	0.150	0.082	
Y	*	0.621		31	0.867	0.948	1.350
Z1	0.567	0.433		32	0.783	0.722	0.660
Z	0.683	0.572		33	*	2.954	
				34	0.767	0.607	

*Values obtained were unrealistic, other methodologies are used.

Table 3: Design Capacity vs. Computed Flow.

Subbasin	Culvert Design	HEC-1 Peak Q	Subbasin	Culvert Design	HEC-1 Peak Q
A	111	263	14	32	56
CP-10	2,515	3,056	16	158	517
U1	432	494	18	50	77
V1	384	534	19	1,820	423
Y1	236	327	20	50	88
Z1	78	143	21	42	94
Z	9,679	221	23	1,565	1,006
3	30	285	24	63	101
5	65	135	25	103	109
6	1,036	1,135	26	124	139
7	780	600	28	40	53
9	26	93	29	66	23
10	217	310	30	39	60
11	61	121	31	1,538	685
13	68	87			

5

Conclusions

The peak flow obtained using the HEC-1 model with areal reduction yielded 16,000 cfs for the 100-year, 6-hour flood at the confluence of the Hassayampa River. The resulting estimate of peak flow has been compared with other methods and has been found to be reasonable.

The HEC-1 model provided subbasin peak flows at various concentration points on the watershed, and can be made useful for floodplain mapping or watershed planning models.

References

Collar, Williams, and White Engineering, April 1987, *Drainage Report: Sun Valley Parkway Phase II, CWW No. 850840-9, Maricopa County*, prepared for The Adams Group.

Flood Control District of Maricopa County, 1989, *Hydrologic Design Manual for Maricopa County, Arizona.*

Miller, J.F., Frederick, R.H., and Tracey, R.J., 1973, "Precipitation-Frequency Atlas of the Western United States," VIII: Arizona; NOAA Atlas 2. National Oceanic and Atmospheric Administration, Silver Spring, Maryland.

Roeske, R.H., 1978, *Methods for Estimating the Magnitude and Frequency of Floods in Arizona*, United States Geological Survey Water Resources Division.

Soil Conservation Service: See U.S. Department of Agriculture.

U.S. Army Corps of Engineers, Hydrologic Engineering Center, 1987 [1981], *HEC-1 Flood Hydrograph Package User's Manual*, Davis, California.

U.S. Army Corps of Engineers, 1974, "Gila River Basin, Arizona, New River and Phoenix City Streams, Design Memorandum No. 1, Hydrology Part 1," Los Angeles District.

U.S. Bureau of Reclamation, 1980, Reach 8 CAP location map and overchute information.

U.S. Department of Agriculture, Soil Conservation Service, 1986, (in cooperation with the U.S. Department of the Interior, Bureau of Indian Affairs and Bureau of Land Management, and the Arizona Agricultural Experiment Station), *Soil Survey of Aguila-Carefree Area, Parts of Maricopa and Pinal County, Arizona.*

U.S. Department of Agriculture, Soil Conservation Service, 1985, *National Engineering Handbook*, Water Resources Publications.

U.S. Geological Survey, 1984, *Estimation of Magnitude and Frequency of Floods in Pima County, Arizona, with Comparisons of Alternative Methods*, Water Resources Investigations Report 84-4142.

Zehr, R.M. and Myers, V.A., 1984, *Depth-Area Ratios in the Semi-Arid Southwest United States*, NOAA Technical Memorandum NWS HYDRO—40, Silver Spring, Maryland.

Appendices

A

Culvert and CAP Designs, Field Notes

Table A-1: *Sun Valley Parkway Phase II Design Data*

Design Drainage Basin	Study Subbasin No.	Watershed Area, acres	Peak Discharge, cfs
26	31	768	1,538
27	30	11	39
28	29	20	66
29	28	9	11
29	28	9	29
30	26	58	124
31	25	40	103
32	24	18	46
32	24	18	17
33	23	798	1,565
34	21	16	12
34	21	16	30
35	20	18	50
36	19	1,026	1,820
36		1,026	1,820
37	18	14	50
38	16	99	158
39	14	7	32
40	13	26	68
41	11	23	61
42	10	143	217
43	9	7	26
44	7	436	780
45	6	569	1,086
46	5	23	65
47	3		30
48-49	2	10,479	9,679
48-49	1	10,479	9,679
A-Y	0+	10,479	9,679
A-Y	Upper	10,479	9,679
B1-K1	Wagner	10,479	9,679
B1-K1	Wash	10,479	9,679
B1-K1		10,479	9,679

Table A-2: CAP Structures

Station Name	Size	Peak Qin, cfs	Storage Capacity, acre-feet	Peak Qout, cfs
181+00	18'x5'-6"	3,338	584	356
248+00	18'x6'-0" Overchutes	3,338	584	356

This is the design data on the two CAP overchutes contributing to the Wagner Wash watershed.

Wagner Wash crosses the CAP at stations 181+00 and 248+00 (U.S. Bureau of Reclamation 1980).

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT Field Notes PAGE 1 OF 3

DETAIL culvert size & types etc. COMPUTED SS DATE

CHECKED BY DATE

WS#/design Q	Height	Width	H/V	Comments	#	Size	Type	Slope	Comments
A/111	6	20	5:1	Small Pond	1	57x38	CSP	.12	Flows North
WAGNER SOUTH									
CP- /2815	7	60		Shallow sides	6	12x4	CBC	.015	Flows South
U_1 / 432	7	40		Shallow sides	2	10x3	CBC	.030	Drains U_1
V_1 /384	7.5	40		shallow (200x50)	2	10x3	CBC	<.01	Drains V_1
Y_1 W_1 /236	5	40		" (200x50)	1	10x4	CBC	<.01	Drains Y_1
Z_1 Y_1 /28	4	40		" (160x50)	2	28x20	CSP	<.01	
Z_1 /50	3			" (70x50)	2	35x24	CSP	<.01	
WAGNER WEST Z_1 Z	6	80	1:1	two share	3	10x4	CBC		Divert to ↓
					3	10x4	CBC		
0+ Upper CP-21	6	150	1:1	three share	3	12x6	CBC		Main & largest channel
					3	12x6	CBC		
					3	12x6	CBC		
1	4	30	1:1	two share	3	10x4	CBC		Divert to ↑
2	2				3	10x4	CBC		

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT WAGNER WASH - FIELD NOTES PAGE 2 OF 3

DETAIL CULVERT CHARACTERISTICS COMPUTED SS DATE

CHECKED BY DATE

WS# / design peak Q	Height	Width	H/V	Comments	#	Size	Type	Slope	Comments
3/30	3.5	No significant ponding			2	28x20	CSP	.01	Divert north to WW
5/65	5	2.0			1	57x38	CSP	.015	Divert ↑ (3)
6/1036	5	-			4	10x3	CBC	.01	Divert ↕
7/780	6	50			3	10x3	CBC	.01	stop divert
9/26	3	100	(100x20)		1	35x24	CSP		divert ↑ (7)
10/217	4	No sig.			1	10x3	CBC	.01-.02	Divert ↑ (9)
11/61	3	50	No sig (50x20)		2	42x29	CSP	.01-.02	Divert ↑ (10)
13/68	3	No significant ponding			2	42x29	CSP		Divert ↑ (11)
14/32	3	50	(50x30)		2	42x29	CSP		Divert ↑ (13)
16/158	3	50	(50x20)		1	10x3	CBC		Divert ↑ (14)
18/50	2.7	100	No sig (100x10)		2	35x24	CSP		Divert ↑ (16)
19/1820	4.5	300	(300x12)		3	12x3	CBC		Same ponding area
19/1820					3	10x4	CBC		
20/50	3	30	5:1		2	35x24	CSP		
21/30	2.5	6	No significant pond		2	28x20	CSP		Stop Diversion
21/12	2	7	No significant pond		1	28x20	CSP		Divert to ↑ (21)

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT WAGNER WASH - FIELD NOTES PAGE 3 OF 3

DETAIL culvert characteristics COMPUTED SS DATE

CHECKED BY DATE

WS#/design point	Height	Width	H/V	Comments	#	Size	Type	Slope	Comments
23/1565	6.5	90	5:1		4	10x4	CBC		Stop Divert
24/17	3	10	5:1	No Ponding	1	20x20	CSP		Divert ↑ (23)
24/46	2.5	10		No Ponding	2	35x24	CSP		Divert ↑ little or no ponding (24)
25/103	3	10		No Ponding	3	42x29	CSP		Divert ↑ (24)
26/124	4.5	50	3:1		2	49x33	CSP		Stop Divert
28/29	3.5	20	3:1		1	42x29	CSP		Divert ↑ (26)
28/11	2	No significant Ponding			1	20x20	CSP		Divert ↑ (28)
29/66	5	20	1:1		2	42x29	CSP		Divert ↑ (28)
30/39	3				1	42x29	CSP		1
31/1530	7	100	2:1		3	5x10	RCBC		One overtops to other -
ADD	7	200	3:1		3	5x10	RCBC		Whichever

B

Precipitation

ADDENDUM to "HYDROLOGIC DESIGN FOR HIGHWAY DRAINAGE IN ARIZONA" April 1975

Steps to be used to determine precipitation values for various durations and return periods.

STEP 1. From the precipitation maps in the manual "Hydrologic Design for Highway Drainage in Arizona", determine the precipitation values for the 6 and 24 hour duration storms for return periods of 2, 5, 10, 25, 50 and 100 years. Tabulate these values in Table 1 in the column headed 'Map Values'

WAGNER WASH

TABLE 1

Return Period (Years)	Precipitation Values (inches)			
	6 hour duration		24 hour duration	
	Map Value	Corrected Value	Map Value	Corrected Value
2	1.38	1.37	1.60	1.60
5	1.84	1.84	2.20	2.21
10	2.13	2.17	2.62	2.70
25	2.70	2.60	3.40	3.30
50	3.00	2.92	3.80	3.80
100	3.20	3.28	4.20	4.27

NOTE: There is a possibility of making an error while reading the maps because, (1) a site is not easy to locate precisely on a series of 12 maps, (2) there may be some slight registration differences in printing, and (3) precise interpolation between isolines is difficult. In order to minimize any errors in reading the maps, these values should be plotted on the diagram "Precipitation Depth versus Return Period" Fig. 1.

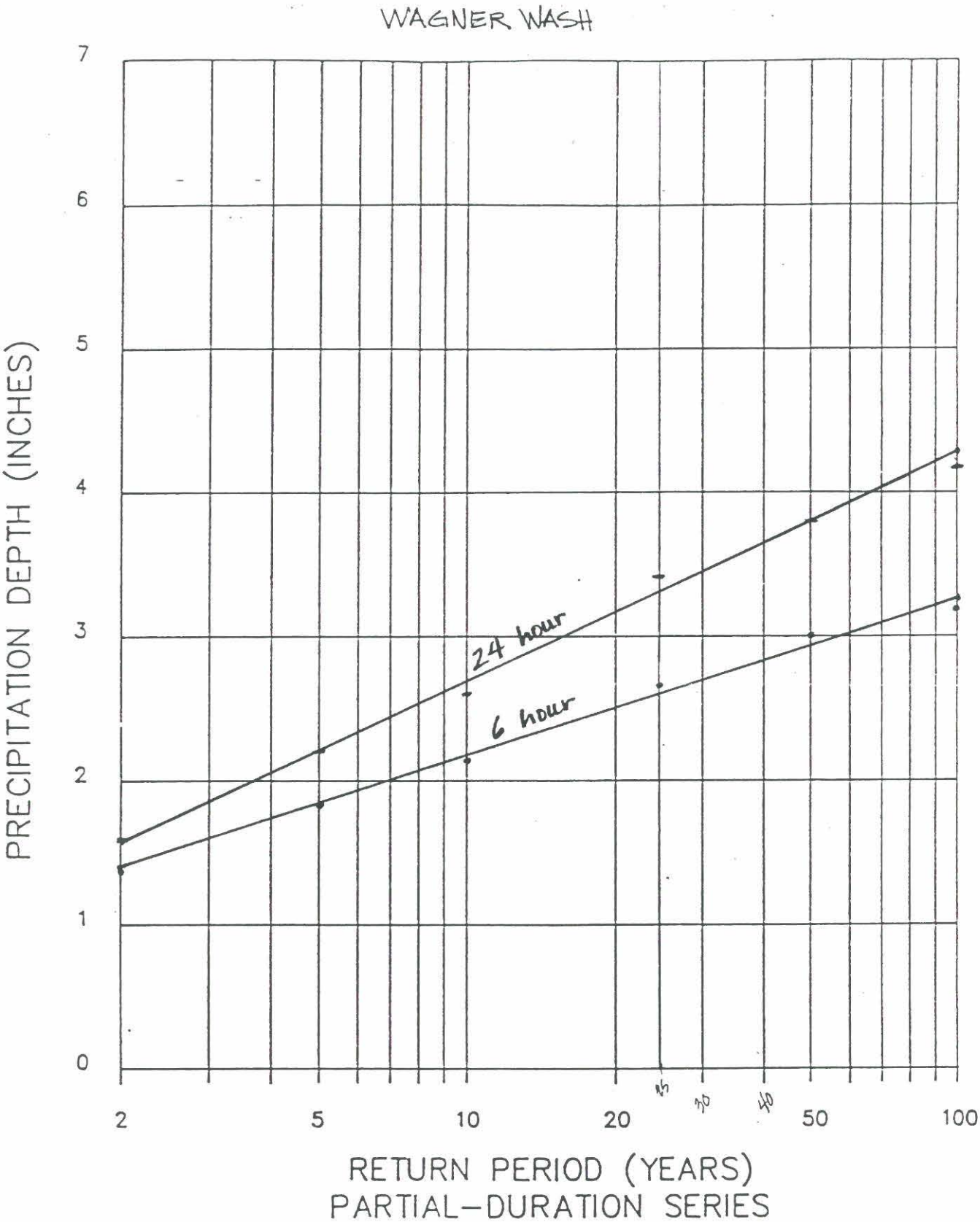


Figure 2.14
Percipitation Depth versus Return Period for Partial-Duration Series

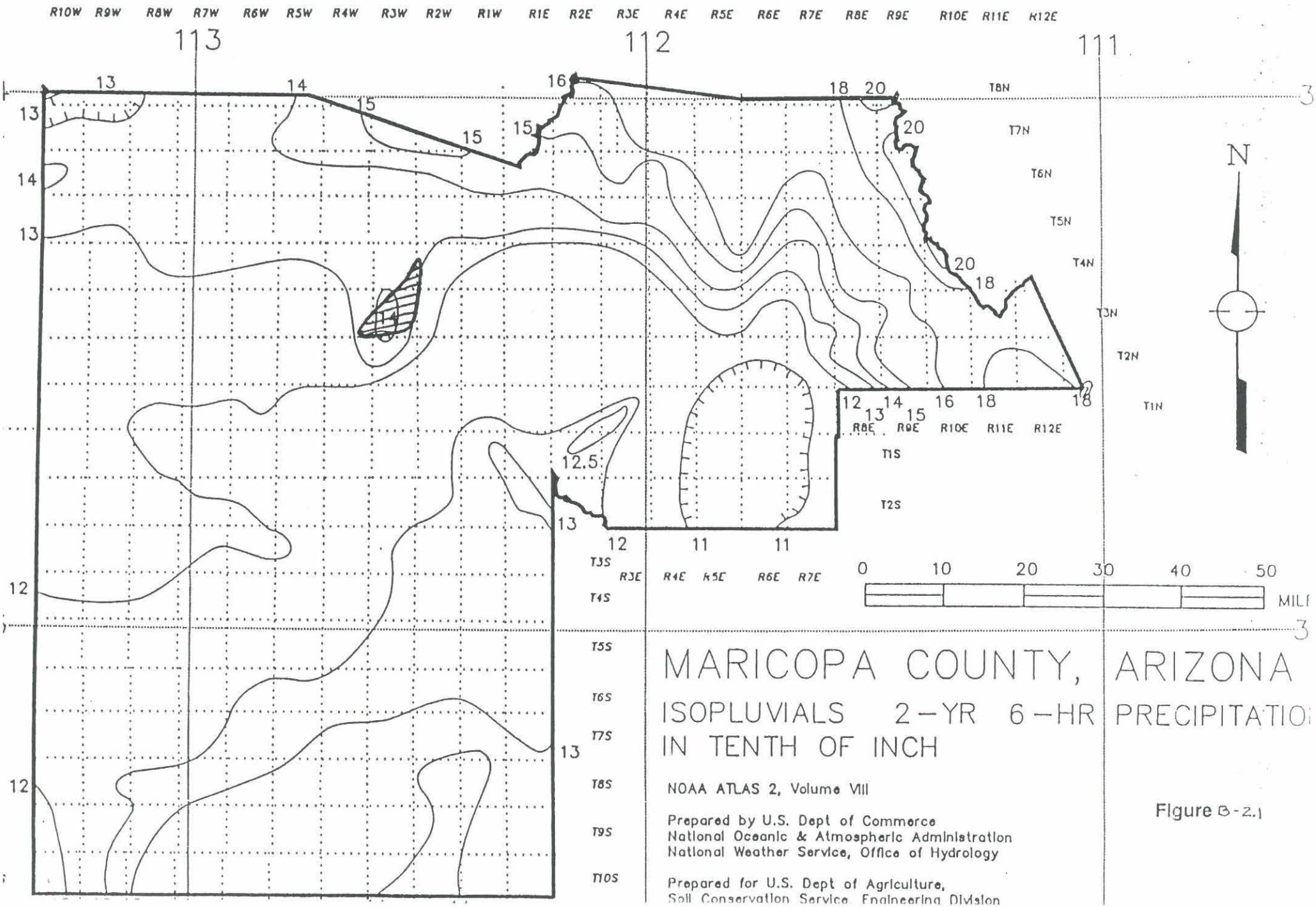

R10W R9W R8W R7W R6W R5W R4W R3W R2W R1W R1E R2E R3E R4E R5E R6E R7E R8E R9E R10E R11E R12E
113
112
111
T8N
T7N
T6N
T5N
T4N
T3N
T2N
T1N
T1S
T2S
T3S
T4S
T5S
T6S
T7S
T8S
T9S
T10S
N
0 10 20 30 40 50
MILE
MARICOPA COUNTY, ARIZONA
ISOPLUVIALS 2-YR 6-HR PRECIPITATION
IN TENTH OF INCH
NOAA ATLAS 2, Volume VIII
Prepared by U.S. Dept of Commerce
National Oceanic & Atmospheric Administration
National Weather Service, Office of Hydrology
Prepared for U.S. Dept of Agriculture,
Soil Conservation Service, Engineering Division

Figure B-2.1

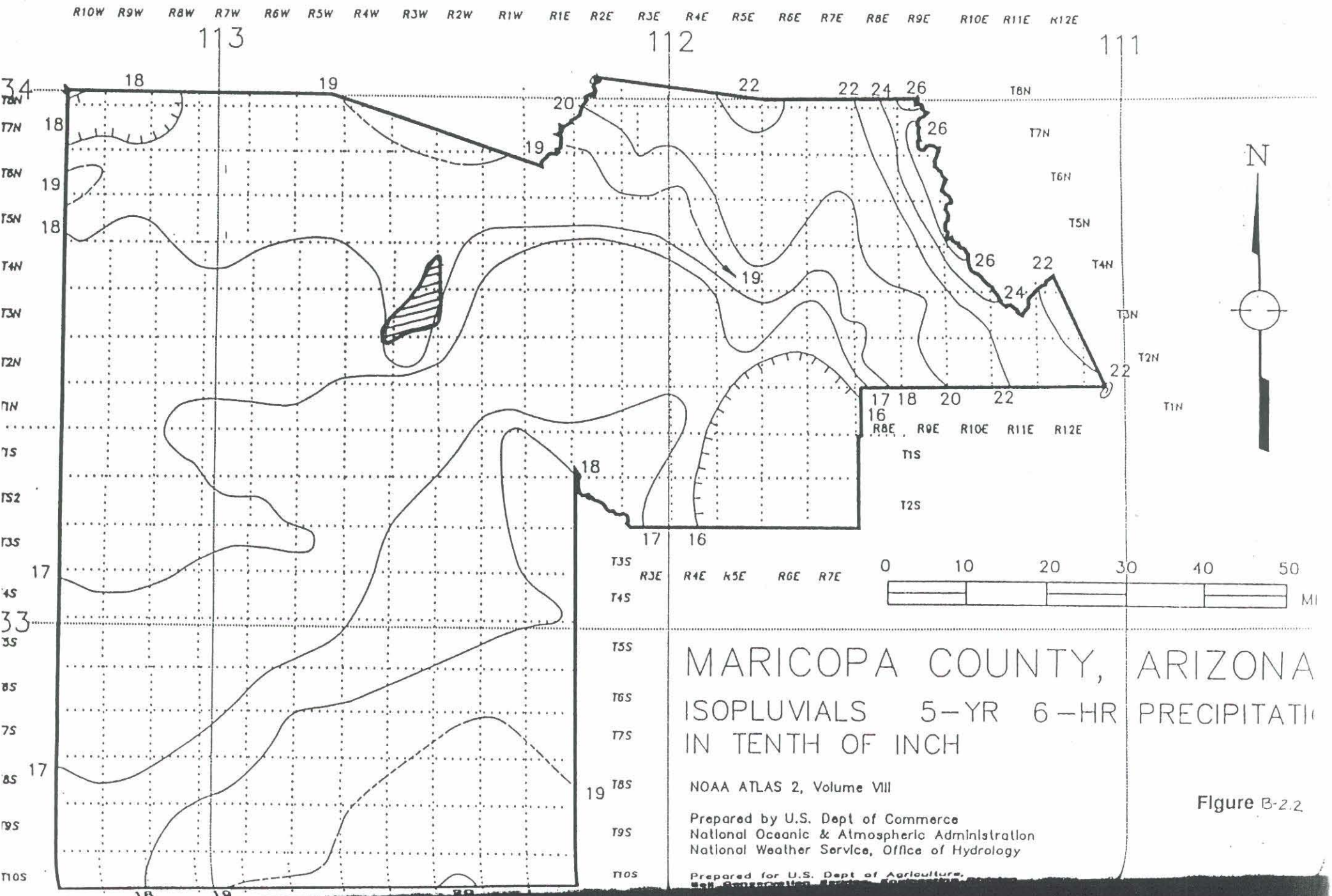

R10W R9W R8W R7W R6W R5W R4W R3W R2W R1W R1E R2E R3E R4E R5E R6E R7E R8E R9E R10E R11E R12E
113
112
111
34
33
T8N
T7N
T6N
T5N
T4N
T3N
T2N
T1N
T1S
T2S
T3S
T4S
T5S
T6S
T7S
T8S
T9S
T10S
N
0 10 20 30 40 50
MI
MARICOPA COUNTY, ARIZONA
ISOPLUVIALS 5-YR 6-HR PRECIPITATI
IN TENTH OF INCH
NOAA ATLAS 2, Volume VIII
Prepared by U.S. Dept of Commerce
National Oceanic & Atmospheric Administration
National Weather Service, Office of Hydrology
Prepared for U.S. Dept of Agriculture,

Figure B-2.2

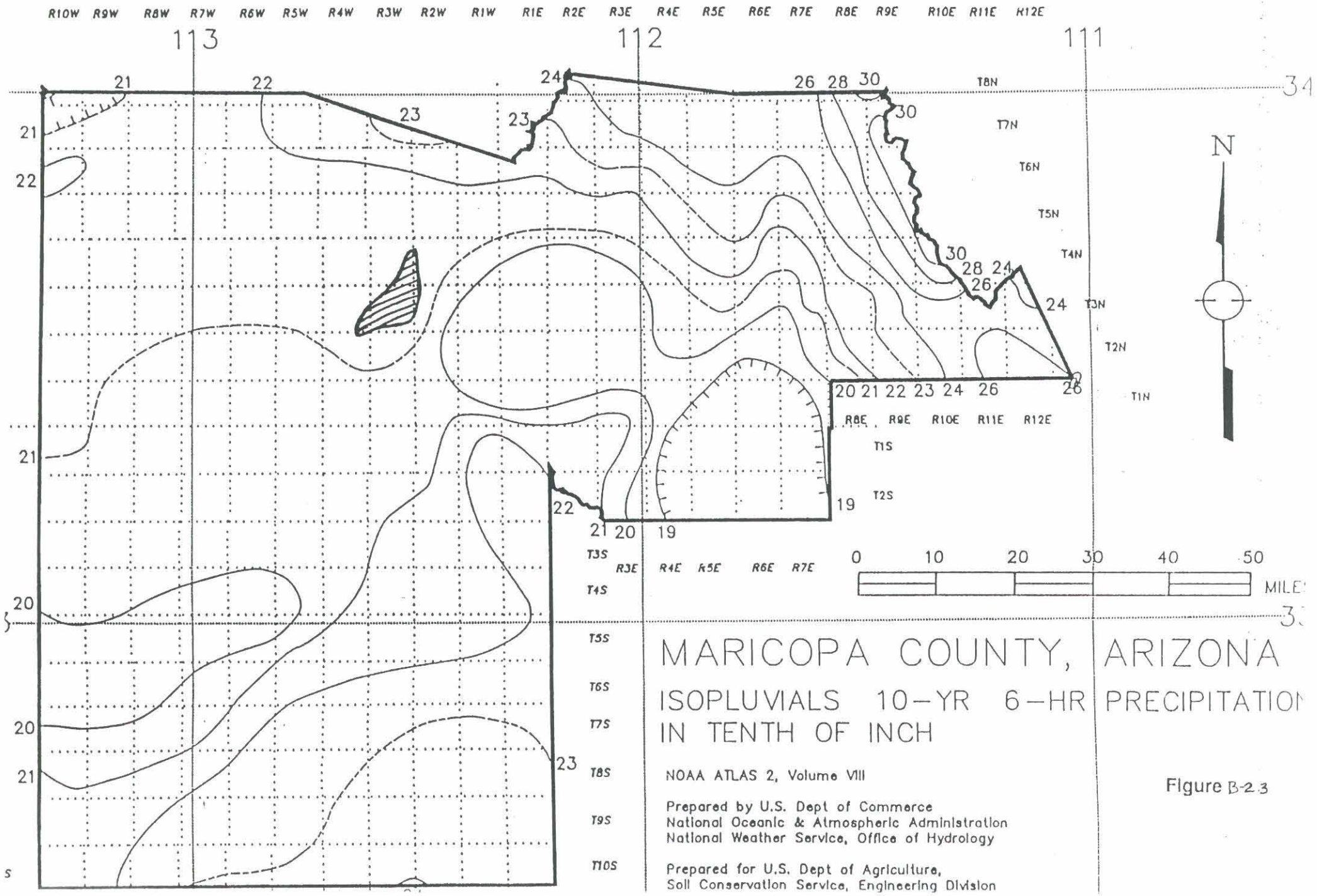
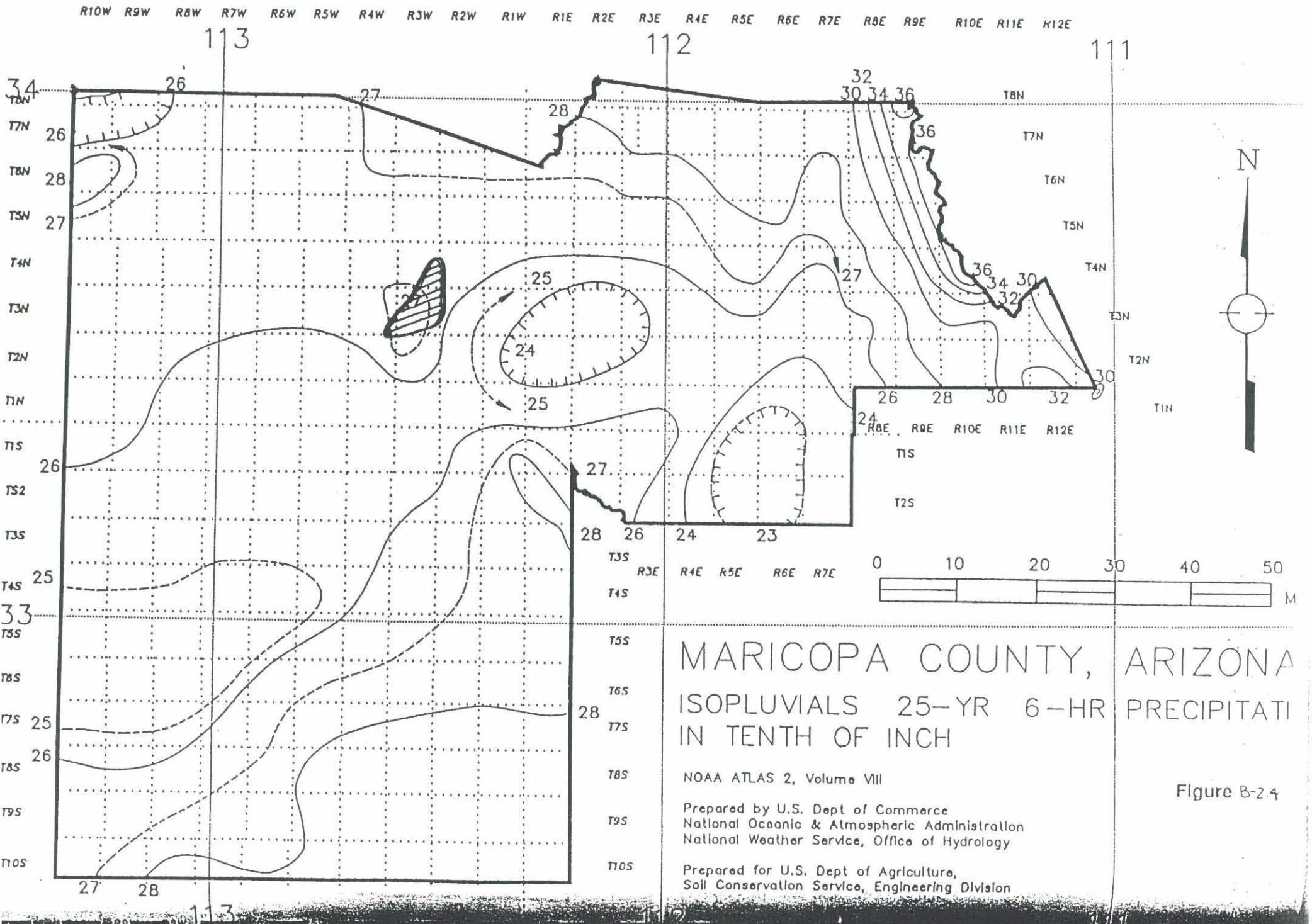

R10W R9W R8W R7W R6W R5W R4W R3W R2W R1W R1E R2E R3E R4E R5E R6E R7E R8E R9E R10E R11E R12E
113
112
111
T8N
T7N
T6N
T5N
T4N
T3N
T2N
T1N
T1S
T2S
T3S
T4S
T5S
T6S
T7S
T8S
T9S
T10S
N
0 10 20 30 40 50
MILES
MARICOPA COUNTY, ARIZONA
ISOPLUVIALS 10-YR 6-HR PRECIPITATION
IN TENTH OF INCH
NOAA ATLAS 2, Volume VIII
Prepared by U.S. Dept of Commerce
National Oceanic & Atmospheric Administration
National Weather Service, Office of Hydrology
Prepared for U.S. Dept of Agriculture,
Soil Conservation Service, Engineering Division

Figure B-2.3



MARICOPA COUNTY, ARIZONA

ISOPLUVIALS 25-YR 6-HR PRECIPITATI
IN TENTH OF INCH

NOAA ATLAS 2, Volume VIII

Prepared by U.S. Dept of Commerce
National Oceanic & Atmospheric Administration
National Weather Service, Office of Hydrology

Prepared for U.S. Dept of Agriculture,
Soil Conservation Service, Engineering Division

Figure B-2.4

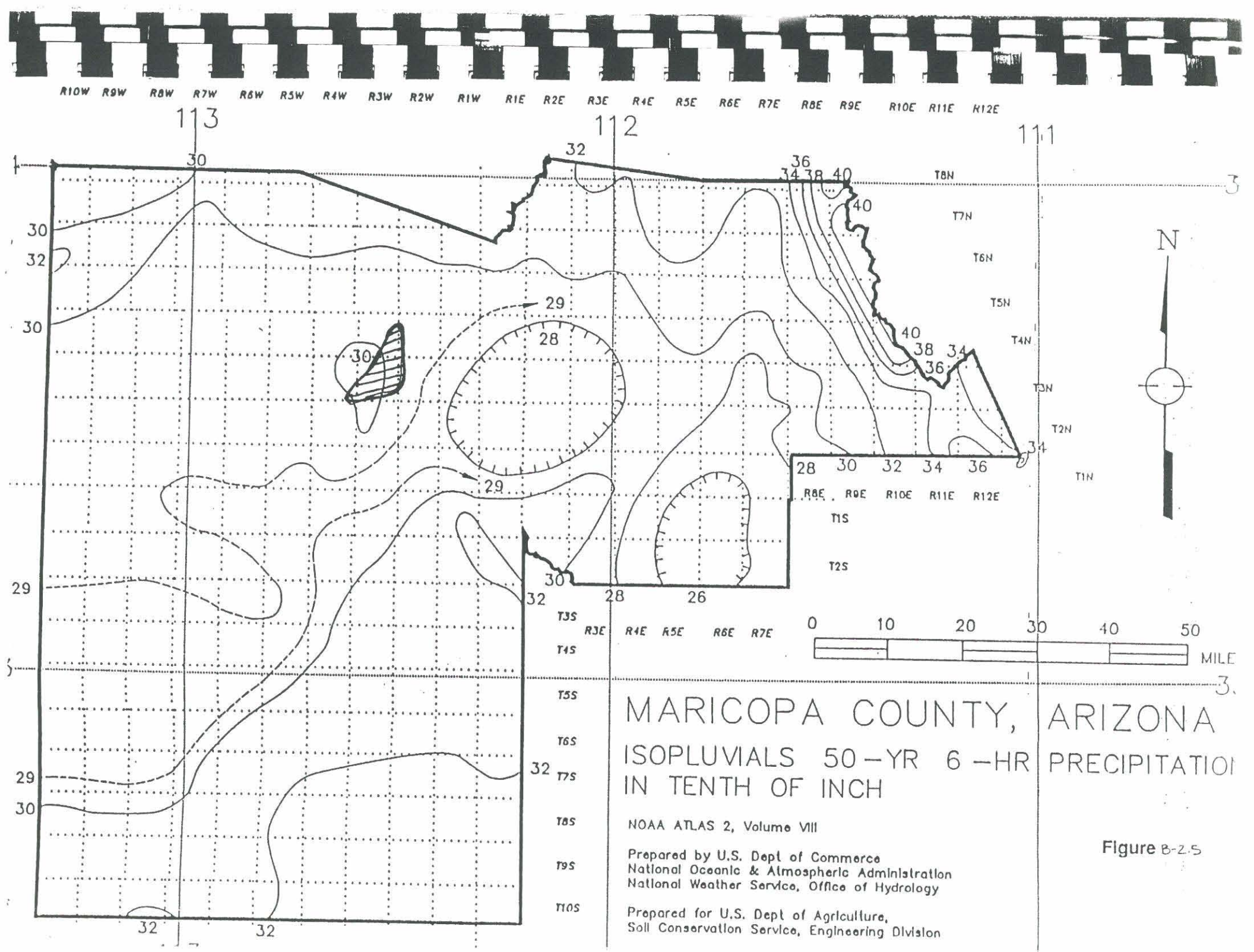
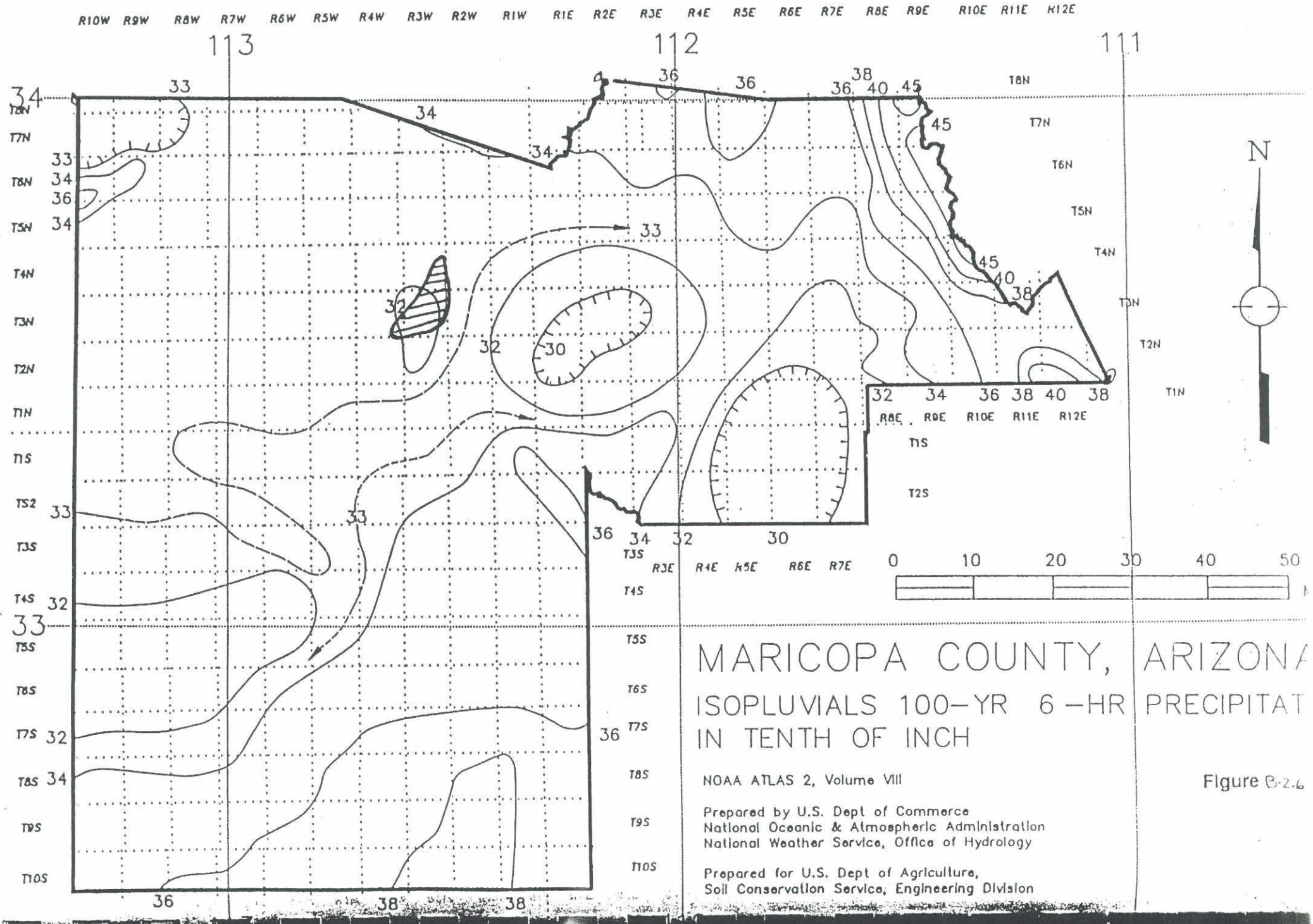

R10W R9W R8W R7W R6W R5W R4W R3W R2W R1W R1E R2E R3E R4E R5E R6E R7E R8E R9E R10E R11E R12E
113
112
111
T8N
T7N
T6N
T5N
T4N
T3N
T2N
T1N
T1S
T2S
T3S
T4S
T5S
T6S
T7S
T8S
T9S
T10S
R8E R9E R10E R11E R12E
R3E R4E R5E R6E R7E
N
0 10 20 30 40 50
MILE
MARICOPA COUNTY, ARIZONA
ISOPLUVIALS 50-YR 6-HR PRECIPITATIO
IN TENTH OF INCH
NOAA ATLAS 2, Volume VIII
Prepared by U.S. Dept of Commerce
National Oceanic & Atmospheric Administration
National Weather Service, Office of Hydrology
Prepared for U.S. Dept of Agriculture,
Soil Conservation Service, Engineering Division

Figure B-2.5



MARICOPA COUNTY, ARIZONA

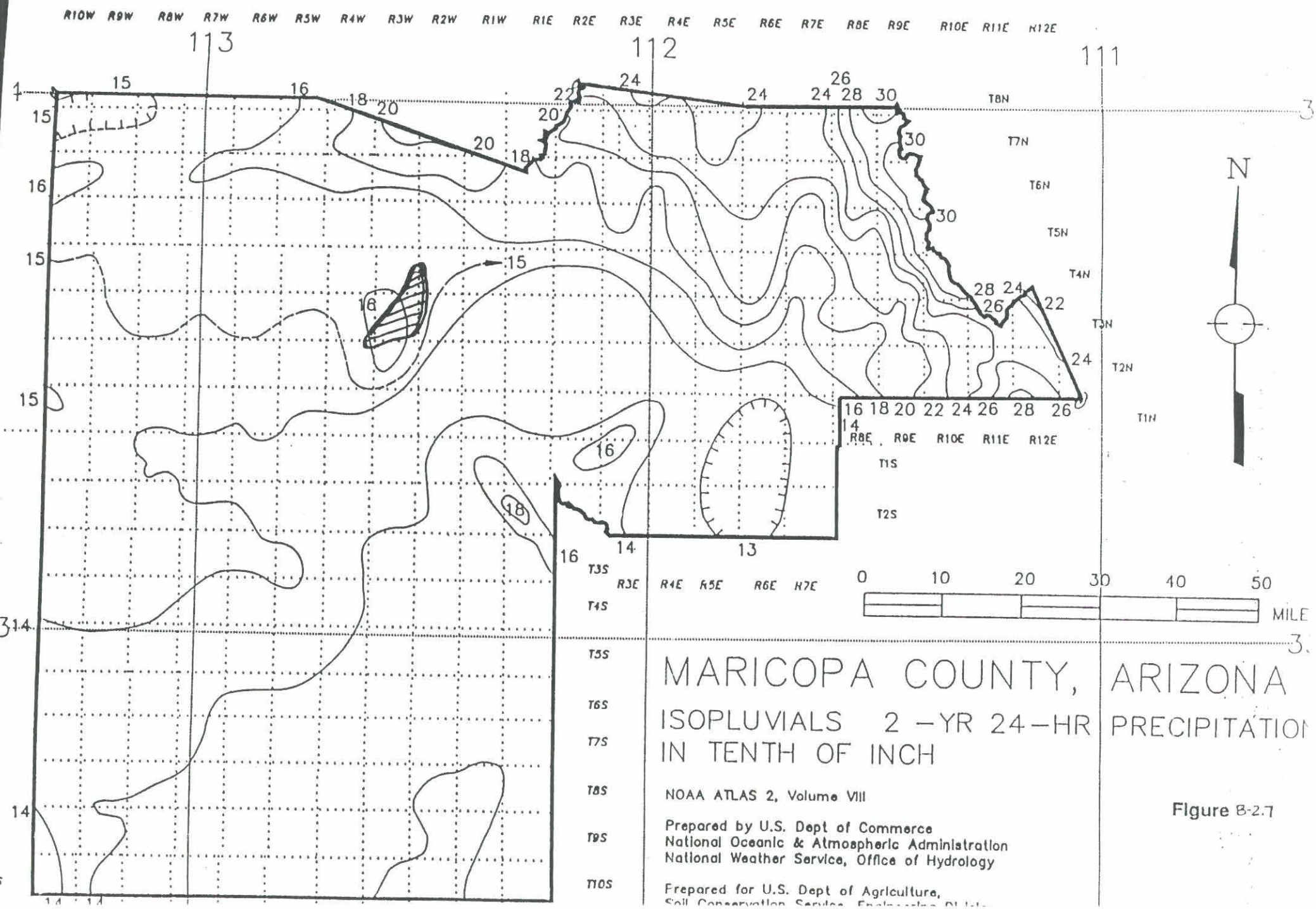
ISOPLUVIALS 100-YR 6-HR PRECIPITAT IN TENTH OF INCH

NOAA ATLAS 2, Volume VIII

Prepared by U.S. Dept of Commerce
National Oceanic & Atmospheric Administration
National Weather Service, Office of Hydrology

Prepared for U.S. Dept of Agriculture,
Soil Conservation Service, Engineering Division

Figure B-2.6



MARICOPA COUNTY, ARIZONA

ISOPLUVIALS 2 –YR 24–HR PRECIPITATION IN TENTH OF INCH

NOAA ATLAS 2, Volume VIII

Prepared by U.S. Dept of Commerce
National Oceanic & Atmospheric Administration
National Weather Service, Office of Hydrology

Prepared for U.S. Dept of Agriculture,
Soil Conservation Service, Engineering Division

Figure B-2.7

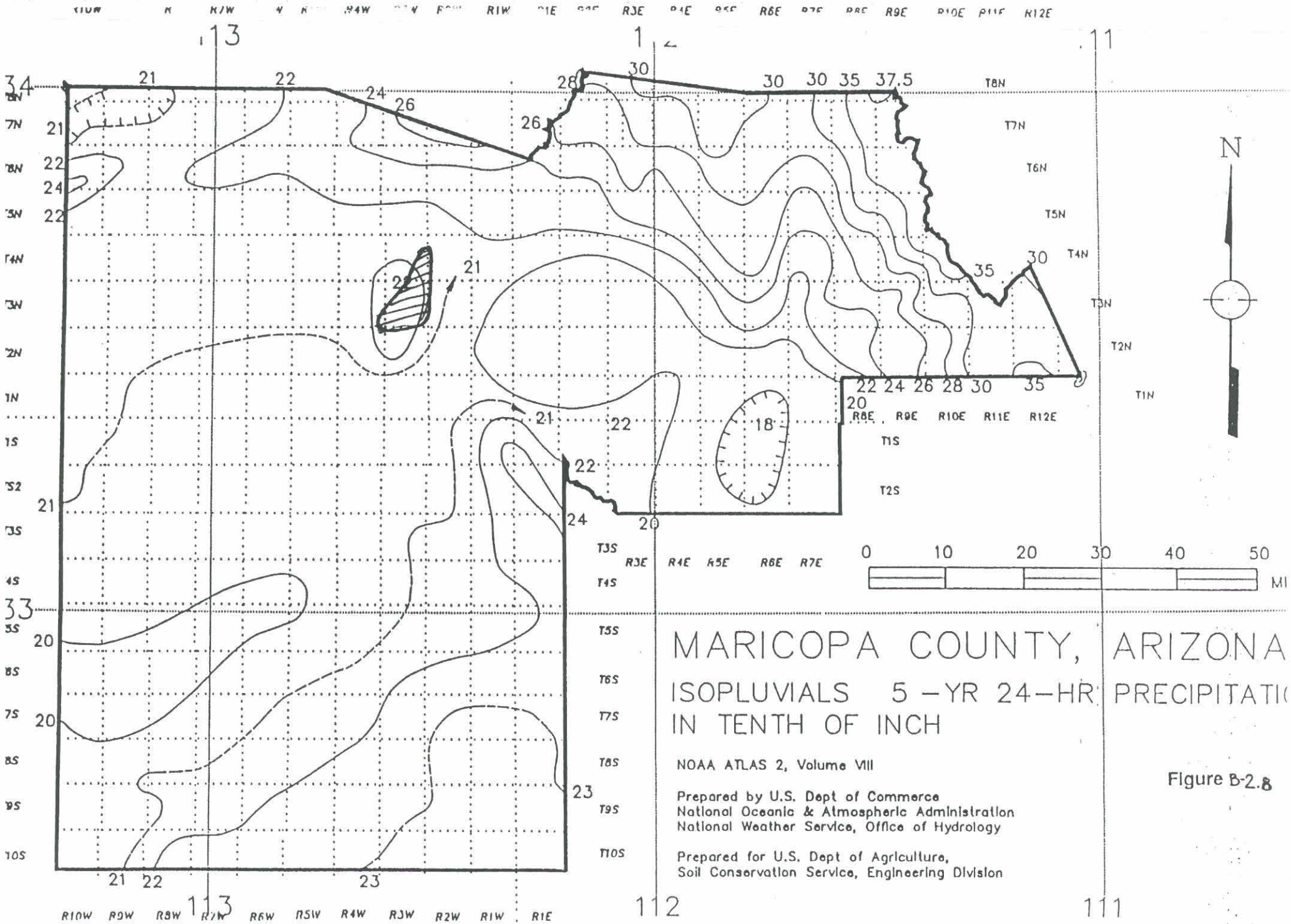
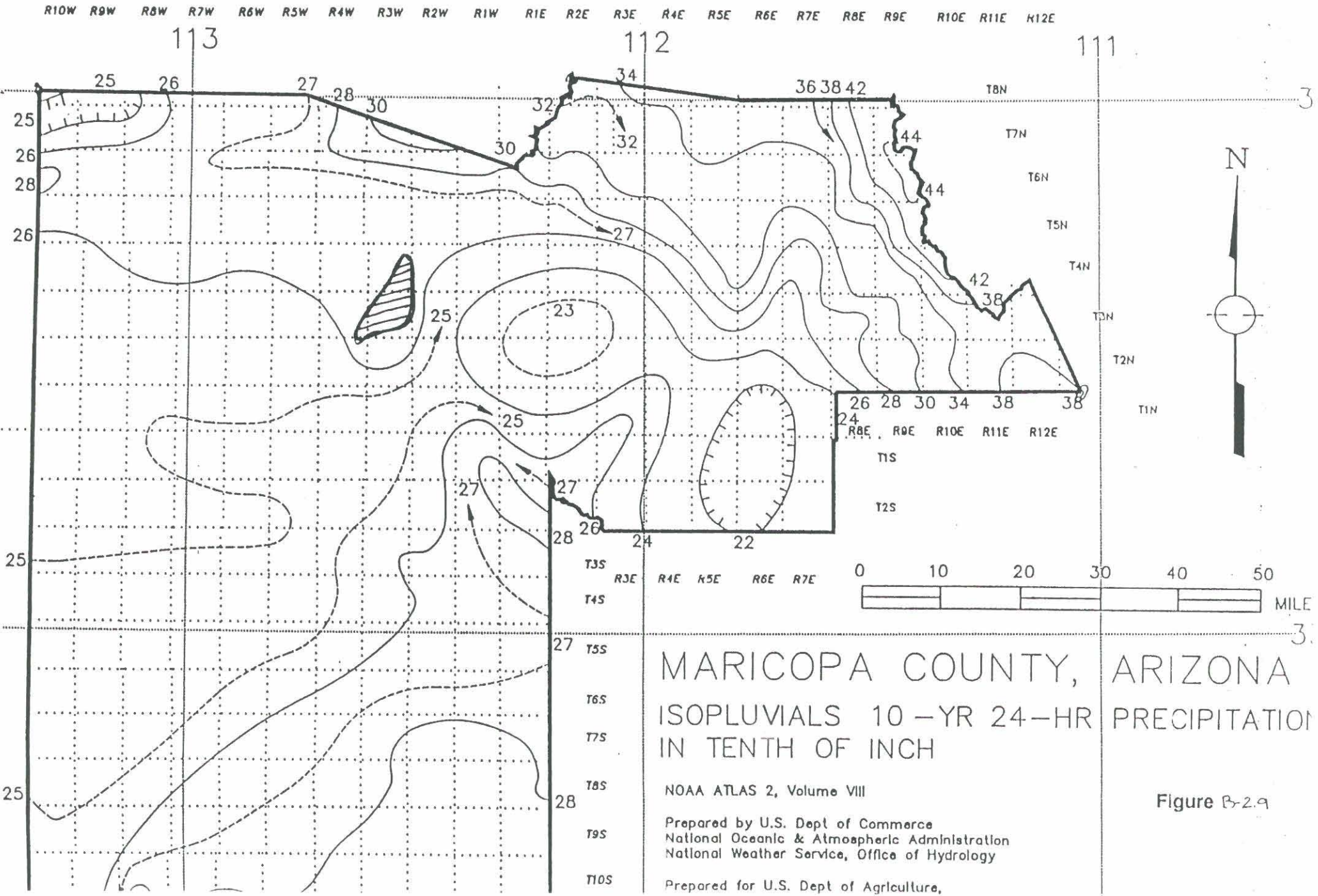

MARICOPA COUNTY, ARIZONA
ISOPLUVIALS 5 -YR 24-HR PRECIPITATI
IN TENTH OF INCH
NOAA ATLAS 2, Volume VIII
Prepared by U.S. Dept of Commerce
National Oceanic & Atmospheric Administration
National Weather Service, Office of Hydrology
Prepared for U.S. Dept of Agriculture,
Soil Conservation Service, Engineering Division
N
0 10 20 30 40 50
MI
T8N
T7N
T6N
T5N
T4N
T3N
T2N
T1N
T1S
T2S
T3S
T4S
T5S
T6S
T7S
T8S
T9S
T10S
R8E R9E R10E R11E R12E
R3E R4E R5E R6E R7E
R10W R9W R8W R7W R6W R5W R4W R3W R2W R1W R1E
34
33
113
112
111

Figure B-2.8



MARICOPA COUNTY, ARIZONA

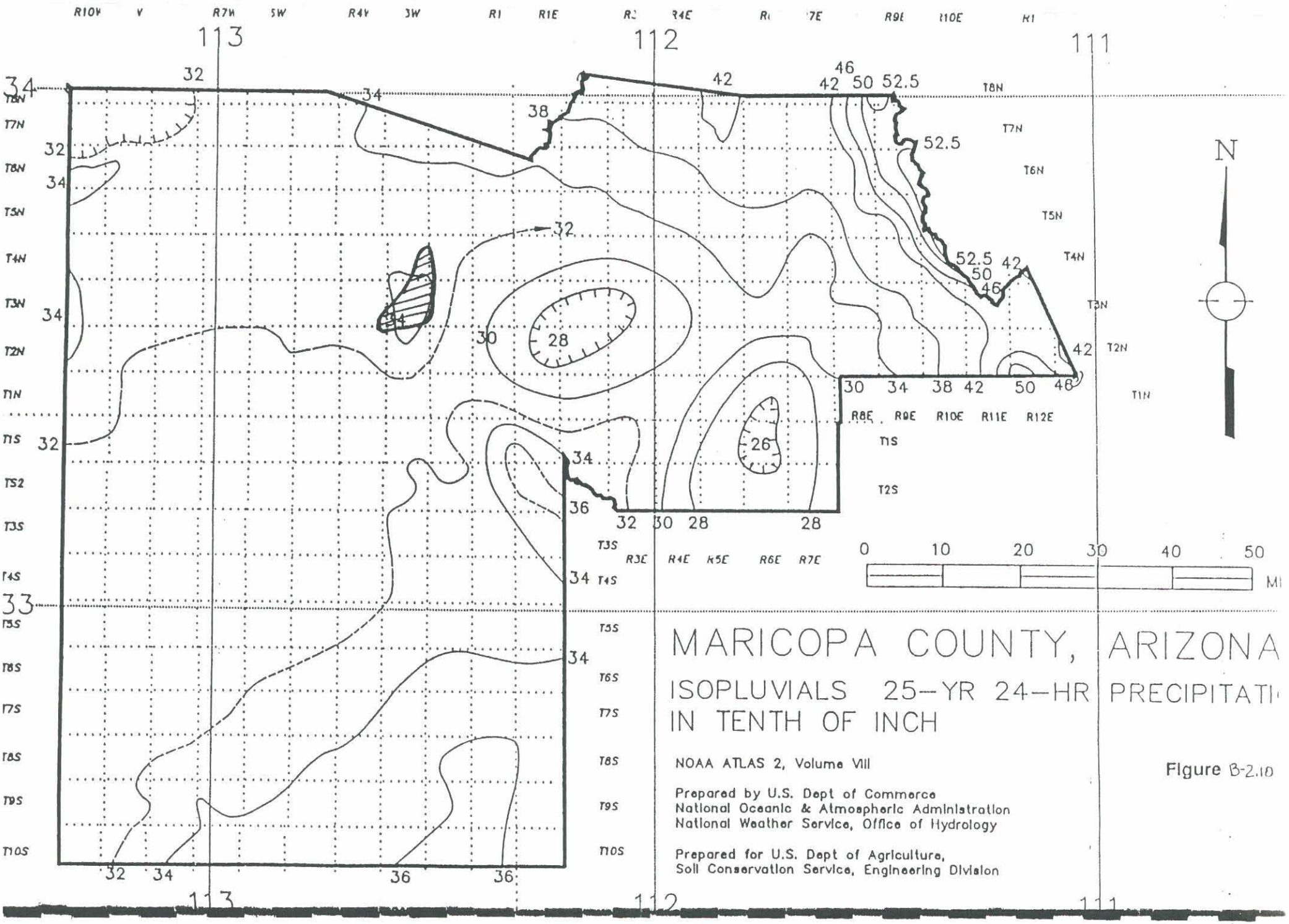
ISOPLUVIALS 10-YR 24-HR PRECIPITATION IN TENTH OF INCH

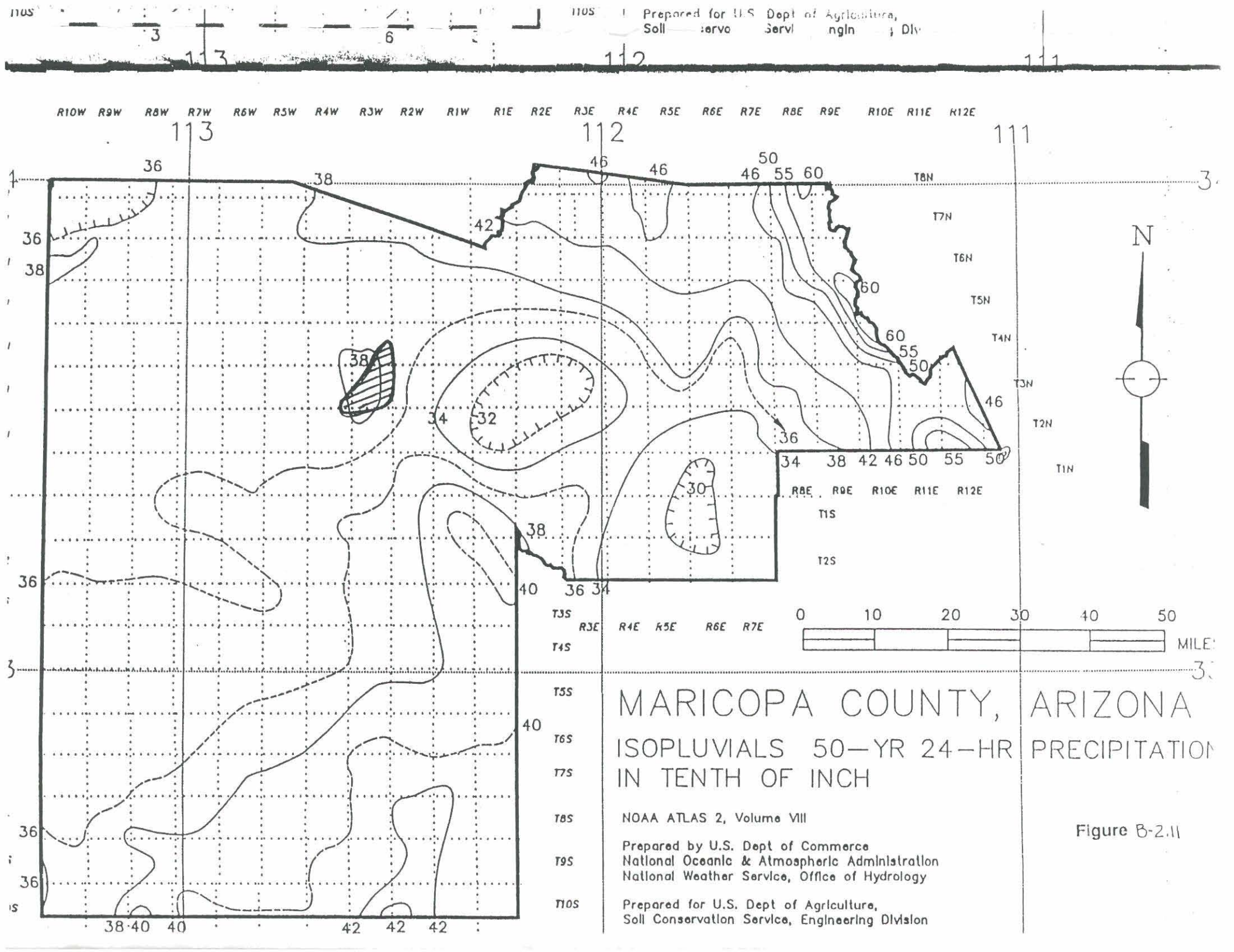
NOAA ATLAS 2, Volume VIII

Prepared by U.S. Dept of Commerce
National Oceanic & Atmospheric Administration
National Weather Service, Office of Hydrology

Prepared for U.S. Dept of Agriculture,

Figure B-2.9


MARICOPA COUNTY, ARIZONA
ISOPLUVIALS 25-YR 24-HR PRECIPITATI
IN TENTH OF INCH
NOAA ATLAS 2, Volume VIII
Prepared by U.S. Dept of Commerce
National Oceanic & Atmospheric Administration
National Weather Service, Office of Hydrology
Prepared for U.S. Dept of Agriculture,
Soil Conservation Service, Engineering Division
N
0 10 20 30 40 50
MI
113
112
111
34
33
T8N
T7N
T6N
T5N
T4N
T3N
T2N
T1N
T1S
T2S
T3S
T4S
T5S
T6S
T7S
T8S
T9S
T10S
R8E R9E R10E R11E R12E
R3E R4E R5E R6E R7E
R10W R9W R8W R7W R6W R5W R4W R3W R2W R1W R1E R2E R3E R4E R5E R6E R7E R8E R9E R10E R11E R12E
Figure B-2.10


MARICOPA COUNTY, ARIZONA
ISOPLUVIALS 50—YR 24—HR PRECIPITATION
IN TENTH OF INCH
NOAA ATLAS 2, Volume VIII
Prepared by U.S. Dept of Commerce
National Oceanic & Atmospheric Administration
National Weather Service, Office of Hydrology
Prepared for U.S. Dept of Agriculture,
Soil Conservation Service, Engineering Division
Figure B-2.11
N
0 10 20 30 40 50
MILES
R10W R9W R8W R7W R6W R5W R4W R3W R2W R1W R1E R2E R3E R4E R5E R6E R7E R8E R9E R10E R11E R12E
T8N T7N T6N T5N T4N T3N T2N T1N T1S T2S T3S T4S T5S T6S T7S T8S T9S T10S
113 112 111

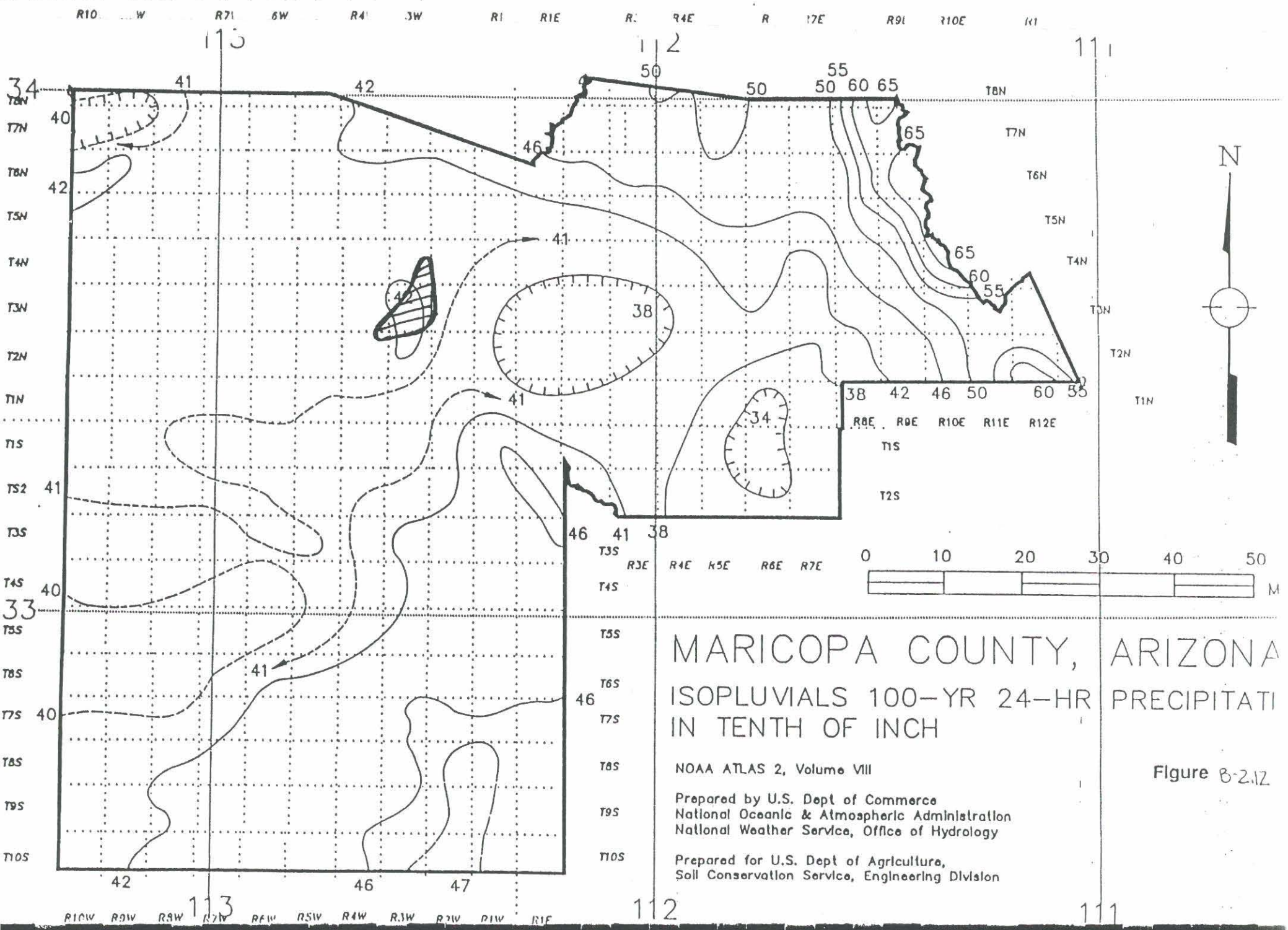

MARICOPA COUNTY, ARIZONA
ISOPLUVIALS 100-YR 24-HR PRECIPITATI
IN TENTH OF INCH
NOAA ATLAS 2, Volume VIII
Prepared by U.S. Dept of Commerce
National Oceanic & Atmospheric Administration
National Weather Service, Office of Hydrology
Prepared for U.S. Dept of Agriculture,
Soil Conservation Service, Engineering Division
N
0 10 20 30 40 50
M
T8N
T7N
T6N
T5N
T4N
T3N
T2N
T1N
T1S
T2S
T3S
T4S
T5S
T6S
T7S
T8S
T9S
T10S
R8E R9E R10E R11E R12E
R3E R4E R5E R6E R7E
R10W R9W R8W R7W R6W R5W R4W R3W R2W R1W R1E
113
112
111
34
33

Figure B-2.12

C

Loss Rate Parameters

Table C-1: *Surface Retention Loss for Various Land Surfaces in Maricopa County*

Land-use and/or Surface Cover	Surface Retention Loss IA, Inches
Natural	
Desert and rangeland, flat slope	0.35
Hillslopes, Sonoran Desert	0.15
Mountain, with vegetated sruface	0.25
Developed (Residential and Commercial)	
Lawn and turf	0.20
Desert landscape	0.10
Pavement	0.05
Agricultural	
Tilled fields and irrigated pasture	0.50

(Source: Flood Control District 1989)

Table C-2: *Initial Loss Plus Uniform Loss Rate Parameter Values for Bare Ground according to Hydrologic Soil Group*

Hydrologic Soil Group	Uniform Loss Rate CNSTL	Initial Loss, Inches IL [1]		
		Dry	Normal	Saturated
A	0.4	0.6	0.5	0
B	0.25	0.5	0.3	0
C	0.15	0.5	0.3	0
D	0.05	0.4	0.2	0

1. Selection of IL
   - Dry = Nonirrigated lands such as desert and rangeland.
   - Normal = Irrigated lawn, turf, and permanent pasture.
   - Saturated = Irrigated agricultural land.

(Source: Flood Control District 1989)

Table C-3: Initial and Uniform Soil Loss Parameters for Wagner Wash.

Subbasin	STRTL + IA	CNSTL	Subbasin	STRTL + IA	CNSTL
A	0.84	0.29	G1	0.80	0.28
B	0.82	0.26	H1	0.81	0.26
C	0.83	0.26	I1	0.81	0.26
CU	0.64	0.10	1	0.79	0.22
D	0.82	0.27	2	0.81	0.25
E	0.80	0.24	3	0.81	0.25
F	0.79	0.22	4	0.80	0.24
G	0.81	0.25	5	0.81	0.25
H	0.81	0.25	6	0.74	0.14
I	0.79	0.19	7	0.77	0.19
IU	0.78	0.16	8	0.82	0.29
J	0.81	0.25	9	0.81	0.32
K	0.81	0.25	10	0.74	0.13
L	0.80	0.25	11	0.81	0.32
M	0.79	0.22	12	0.82	0.32
N	0.78	0.24	13	0.81	0.32
O	0.78	0.22	14	0.81	0.32
OU	0.77	0.19	15	0.81	0.32
P	0.77	0.13	16	0.75	0.19
Q	0.79	0.16	16U	0.81	0.25
R	0.79	0.20	17	0.71	0.05
S	0.78	0.20	18	0.71	0.05
T	0.79	0.20	19	0.71	0.05
U	0.77	0.15	20	0.71	0.05
U1	0.77	0.18	21	0.71	0.05
V	0.79	0.22	22	0.80	0.29
V1	0.79	0.21	23	0.72	0.28
W	0.82	0.26	24	0.81	0.32
W1	0.81	0.25	25	0.81	0.32
X	0.82	0.26	26	0.81	0.32
X1	0.81	0.25	27	0.81	0.32
Y	0.80	0.22	28	0.81	0.32
Y1	0.80	0.23	29	0.81	0.32
Z	0.81	0.25	30	0.81	0.32
Z1	0.81	0.25	31	0.75	0.12
A1	0.81	0.25	32	0.81	0.26
B1	0.80	0.25	33	0.80	0.24
C1	0.81	0.25	34	0.74	0.28
D1	0.80	0.35			

D

Unit Hydrograph Parameters

Table D-1: *Parameters for MCUHP1 for the 100-year, 6-hour Storm at Wagner Wash.*

Subbasin	Area, Square Mile	Length, miles	Kb	Slope, ft/mile	STRTL+IA, inches	CNSTL, inch/hour
A	0.22	1.52	0.096	92.1	0.84	0.29
B	0.07	0.84	0.109	79.8	0.82	0.26
C	0.53	2.04	0.087	137.3	0.83	0.26
CU	0.51	1.80	0.087	427.8	0.64	0.10
D	0.27	1.52	0.094	92.1	0.82	0.27
E	0.11	1.20	0.104	90.8	0.80	0.24
F	0.06	0.60	0.110	85.0	0.79	0.22
G	0.04	0.48	0.115	118.0	0.81	0.25
H	0.02	0.44	0.122	72.7	0.81	0.25
I	0.85	2.60	0.082	237.7	0.79	0.19
IU	1.55	3.80	0.75	262.9	0.78	0.16
J	0.26	1.56	0.094	81.4	0.81	0.25
K	0.12	1.40	0.103	65.0	0.81	0.25
L	1.36	4.16	0.077	250.5	0.80	0.22
N	0.89	3.04	0.081	76.5	0.78	0.22
O	1.61	4.08	0.075	113.7	0.78	0.19
OU	0.84	2.12	0.082	417.0	0.77	0.13
S	0.55	1.24	0.086	33.9	0.78	0.20
U	0.03	0.24	0.118	29.2	0.77	0.15
V1	0.45	1.36	0.089	36.8	0.79	0.21
V	0.11	0.60	0.104	35.0	0.79	0.22
W1	0.04	0.52	0.115	73.1	0.81	0.25
W	0.10	0.72	0.105	43.1	0.82	0.26
X1	0.04	0.52	0.115	96.2	0.81	0.25
X	0.08	0.68	0.107	26.5	0.82	0.26
Y	0.15	1.04	0.100	41.3	0.80	0.22
Z1	0.08	0.60	0.107	35.0	0.81	0.25
Z	0.16	0.96	0.100	43.8	0.81	0.25
D1	0.34	1.76	0.092	64.2	0.80	0.35
G1	0.19	1.44	0.098	54.9	0.80	0.28
I1	0.18	1.16	0.098	46.6	0.81	0.26
2	0.06	1.00	0.110	68.0	0.81	0.25
3	0.18	1.04	0.098	69.2	0.81	0.25
5	0.04	0.36	0.115	83.3	0.81	0.25
6	0.95	4.16	0.090	203.8	0.74	0.14
7	0.62	2.40	0.085	84.6	0.77	0.19
8	0.78	1.60	0.083	42.5	0.82	0.29
9	0.02	0.20	0.122	70.0	0.81	0.32
10	0.14	0.82	0.101	156.1	0.74	0.13

(continued)

Table D-1: *Parameters for MCUHP1 for the 100-year, 6-hour Storm at Wagner Wash (continued).*

Subbasin	Area, Square Mile	Length, miles	K_b	Slope, ft/mile	STRTL+IA, inches	CNSTL, inch/hour
11	0.05	0.52	0.112	73.1	0.81	0.32
12	0.34	1.40	0.092	59.3	0.82	0.32
13	0.04	0.56	0.115	87.5	0.81	0.32
14	0.01	0.12	0.130	58.3	0.81	0.32
15	0.12	1.20	0.103	69.2	0.81	0.32
16	0.27	1.56	0.094	277.8	0.75	0.19
17	0.69	2.08	0.079	59.6	0.71	0.05
18	0.02	0.20	0.122	55.0	0.71	0.05
20	0.03	0.40	0.118	75.0	0.71	0.05
21	0.02	0.24	0.122	108.3	0.71	0.05
22	0.23	1.76	0.096	68.8	0.80	0.29
23	1.23	4.36	0.085	227.1	0.72	0.08
24	0.03	0.32	0.118	93.8	0.81	0.32
25	0.06	0.64	0.110	81.3	0.81	0.32
26	0.08	0.80	0.107	78.8	0.81	0.32
27	0.34	1.60	0.092	73.8	0.81	0.32
28	0.01	1.60	0.130	106.3	0.81	0.32
29	0.01	0.44	0.130	77.3	0.81	0.32
30	0.01	0.12	0.130	108.3	0.81	0.32
31	1.29	4.60	0.088	277.3	0.75	0.12
32	0.32	1.64	0.092	70.1	0.81	0.26
34	0.50	1.80	0.077	61.1	0.80	0.24

```
*****************************************************************************
*                                                                           *
*                              PROGRAM MCUHP1                               *
*                                                                           *
*                    THE MARICOPA COUNTY HYDROLOGY MANUAL                   *
*                                                                           *
*                FLOOD CONTROL DISTRICT OF MARICOPA COUNTY                  *
*                  3335 W. DURANGO, PHOENIX, ARIZONA 85009                  *
*                                                                           *
*   Program MCUHP1, Maricopa County Unit Hydrograph Procedure 1 computes Tc *
*   and R as required by the Clark Unit-Hydrograph option of HEC-1. It will *
*   also provide the rainfall pattern distribution.  Output will be a HEC-1 *
*   input file for immediate application.                                   *
*****************************************************************************

ENTER NAME OF OUTPUT FILE:

Enter 1 if single basin, 2 if multibasin design:

Enter 1 if  uniform rainfall over the watershed:
Enter 2 if centered rainfall (HEC-1, JD record):
ENTER THE SUB-BASIN NAME:
ENTER PHYSICAL CHARACTERISTICS OF THE BASIN:

*Note limit basin size to about 5 square miles,
 and/or Tc to less than 1.50 hours.

    BASIN AREA (square miles)
*WARNING* SELECTED AREA IS TOO LARGE
    BASIN AREA (square miles)
    FLOW PATH LENGTH (miles)
    RESISTANCE COEFFICIENT, Kb
    SLOPE (feet/mile)

ENTER METHOD OF SOIL LOSS COMPUTATIONS:

    1 = Initial/Uniform, 2 = Green-Ampt

    Enter STRTL, CNSTL, RTIMP (0-100)

ENTER SELECTED RAINFALL DISTRIBUTION:

Enter 1 for the 6-hour MCFCD Distribution
Enter 2 for the 2-hour MCFCD Distribution
Enter 3 for the 24-hour SCS TYPE-II distribution
ENTER POINT RAINFALL DEPTH OF A DESIRED FREQUENCY (inches):

ENTER ONE OF THE FOLLOWING (for the UA record):
   (1) - for an urban watershed
   (2) - for a natural watershed
   (3) - for manual input
```

DATA INPUT FOR SUB-BASIN: SUBA

Drainage Area= .220 Channel Length= 1.520 Kn= .096 SLOPE= 92.1 STRTL = .84 CNSTL= .29 RTIMP= .00
Rainfall Depth = 3.28
Rainfall Distribution is 100-year, 6-Hour

HEC-1 INPUT IS STORED IN FILE: WAG

TC = .667 hours, which is = 40.0 minutes R = .782 hours.

EXCESS RAINFALL VALUES IN 5-MINUTE INTERVALS

5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
.50	.50	.50	.20	.17	.09	.09	.08	.02	.02	.02	.02	.01	.01	.01	.01	.01	.00

If calculated TC is much longer than the duration of the most intense portion of the excess rainfall values, consider the S-graph procedures for this basin.

DATA INPUT FOR SUB-BASIN: SUBB

Drainage Area= .070 Channel Length= .840 Kn= .109 SLOPE= 79.8 STRTL = .82 CNSTL= .26 RTIMP= .00
Rainfall Depth = 3.28
Rainfall Distribution is 100-year, 6-Hour

HEC-1 INPUT IS STORED IN FILE: WAG

TC = .517 hours, which is = 31.0 minutes R = .704 hours.

EXCESS RAINFALL VALUES IN 5-MINUTE INTERVALS

5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
.50	.50	.50	.20	.17	.09	.09	.08	.02	.02	.02	.02	.02	.01	.01	.01	.01	.01

If calculated TC is much longer than the duration of the most intense portion of the excess rainfall values, consider the S-graph procedures for this basin.

```
--------------------------------------------------------------------------------
                    DATA INPUT FOR SUB-BASIN: SUBC
--------------------------------------------------------------------------------
Drainage Area=   .530   Channel Length=  2.040  Kn=  .087  SLOPE= 377.5 STRTL
=  .83  CNSTL=  .26  RTIMP=    .00
Rainfall Depth =  3.28
Rainfall Distribution is 100-year, 6-Hour
--------------------------------------------------------------------------------
                    HEC-1 INPUT IS STORED IN FILE: WAG
--------------------------------------------------------------------------------
TC =  .417 hours, which is =   25.0 minutes       R =   .356 hours.
--------------------------------------------------------------------------------
               EXCESS RAINFALL VALUES IN 5-MINUTE INTERVALS
--------------------------------------------------------------------------------
     5  10  15  20  25  30  35  40  45  50  55  60  65  70  75  80  85  90
   .49 .49 .49 .20 .17 .09 .09 .08 .02 .02 .02 .02 .02 .02 .01 .01 .01 .01
--------------------------------------------------------------------------------
If calculated TC is much longer than the duration of the most intense portion
of the excess rainfall values, consider the S-graph procedures for this basin.
--------------------------------------------------------------------------------
```

```
--------------------------------------------------------------------------------
                    DATA INPUT FOR SUB-BASIN: SUBCU
--------------------------------------------------------------------------------
Drainage Area=   .510   Channel Length=  1.800  Kn=  .087  SLOPE= 132.8 STRTL
=  .64  CNSTL=  .10  RTIMP=    .00
Rainfall Depth =  3.28
Rainfall Distribution is 100-year, 6-Hour
--------------------------------------------------------------------------------
                    HEC-1 INPUT IS STORED IN FILE: WAG
--------------------------------------------------------------------------------
TC =  .583 hours, which is =   35.0 minutes       R =   .478 hours.
--------------------------------------------------------------------------------
               EXCESS RAINFALL VALUES IN 5-MINUTE INTERVALS
--------------------------------------------------------------------------------
     5  10  15  20  25  30  35  40  45  50  55  60  65  70  75  80  85  90
   .50 .49 .49 .20 .17 .16 .09 .09 .08 .02 .02 .02 .02 .02 .02 .01 .01 .01
--------------------------------------------------------------------------------
If calculated TC is much longer than the duration of the most intense portion
of the excess rainfall values, consider the S-graph procedures for this basin.
--------------------------------------------------------------------------------
```

```
--------------------------------------------------------------------------------
                    DATA INPUT FOR SUB-BASIN: SUBD
--------------------------------------------------------------------------------
Drainage Area=   .270   Channel Length=  1.520  Kn=  .094  SLOPE=  92.1 STRTL
=  .82  CNSTL=  .27  RTIMP=    .00
Rainfall Depth =  3.28
Rainfall Distribution is 100-year, 6-Hour
--------------------------------------------------------------------------------
                   HEC-1 INPUT IS STORED IN FILE: WAG
--------------------------------------------------------------------------------
TC =  .667 hours, which is =   40.0 minutes       R =   .696 hours.
--------------------------------------------------------------------------------
               EXCESS RAINFALL VALUES IN 5-MINUTE INTERVALS
--------------------------------------------------------------------------------
     5  10  15  20  25  30  35  40  45  50  55  60  65  70  75  80  85  90
   .50 .50 .50 .20 .17 .08 .08 .02 .02 .02 .02 .01 .01 .01 .01 .01 .01 .01
--------------------------------------------------------------------------------
If calculated TC is much longer than the duration of the most intense portion
of the excess rainfall values, consider the S-graph procedures for this basin.
--------------------------------------------------------------------------------
```

```
--------------------------------------------------------------------------------
                    DATA INPUT FOR SUB-BASIN: SUBE
--------------------------------------------------------------------------------
Drainage Area=   .110   Channel Length=  1.200  Kn=  .104  SLOPE=  90.8 STRTL
=  .80  CNSTL=  .24  RTIMP=    .00
Rainfall Depth =  3.28
Rainfall Distribution is 100-year, 6-Hour
--------------------------------------------------------------------------------
                   HEC-1 INPUT IS STORED IN FILE: WAG
--------------------------------------------------------------------------------
TC =  .683 hours, which is =   41.0 minutes       R =   .987 hours.
--------------------------------------------------------------------------------
               EXCESS RAINFALL VALUES IN 5-MINUTE INTERVALS
--------------------------------------------------------------------------------
     5  10  15  20  25  30  35  40  45  50  55  60  65  70  75  80  85  90
   .50 .50 .20 .17 .09 .09 .08 .02 .02 .02 .02 .02 .01 .01 .01 .01 .01 .00
--------------------------------------------------------------------------------
If calculated TC is much longer than the duration of the most intense portion
of the excess rainfall values, consider the S-graph procedures for this basin.
--------------------------------------------------------------------------------
```

```
--------------------------------------------------------------------------------
                    DATA INPUT FOR SUB-BASIN: SUBF
--------------------------------------------------------------------------------
Drainage Area=   .060   Channel Length=   .600  Kn=  .110  SLOPE=    .9 STRTL
=  .79  CNSTL=  .22  RTIMP=    .00
Rainfall Depth =  3.28
Rainfall Distribution is 100-year, 6-Hour
--------------------------------------------------------------------------------
                   HEC-1 INPUT IS STORED IN FILE: WAG
--------------------------------------------------------------------------------
TC = 1.417 hours, which is =   85.0 minutes       R =  1.799 hours.
 *WARNING* CALCULATED TC SEEMS TOO LONG.  CHECK PARAMETERS.
--------------------------------------------------------------------------------
               EXCESS RAINFALL VALUES IN 5-MINUTE INTERVALS
--------------------------------------------------------------------------------
     5  10  15  20  25  30  35  40  45  50  55  60  65  70  75  80  85  90
   .50 .50 .50 .20 .17 .09 .09 .08 .02 .02 .02 .02 .02 .01 .01 .01 .01 .01
--------------------------------------------------------------------------------
If calculated TC is much longer than the duration of the most intense portion
of the excess rainfall values, consider the S-graph procedures for this basin.
--------------------------------------------------------------------------------
```

```
--------------------------------------------------------------------------------
                    DATA INPUT FOR SUB-BASIN: SUBG
--------------------------------------------------------------------------------
Drainage Area=   .040   Channel Length=   .480  Kn=  .115  SLOPE= 118.0 STRTL
=  .81  CNSTL=  .25  RTIMP=    .00
Rainfall Depth =  3.28
Rainfall Distribution is 100-year, 6-Hour
--------------------------------------------------------------------------------
                   HEC-1 INPUT IS STORED IN FILE: WAG
--------------------------------------------------------------------------------
TC =  .317 hours, which is =   19.0 minutes       R =   .359 hours.
--------------------------------------------------------------------------------
               EXCESS RAINFALL VALUES IN 5-MINUTE INTERVALS
--------------------------------------------------------------------------------
     5  10  15  20  25  30  35  40  45  50  55  60  65  70  75  80  85  90
   .50 .50 .50 .20 .17 .09 .09 .08 .02 .02 .02 .02 .01 .01 .01 .01 .01 .00
--------------------------------------------------------------------------------
If calculated TC is much longer than the duration of the most intense portion
of the excess rainfall values, consider the S-graph procedures for this basin.
--------------------------------------------------------------------------------
```

```
--------------------------------------------------------------------------------
                    DATA INPUT FOR SUB-BASIN: SUBH
--------------------------------------------------------------------------------
Drainage Area=   .020   Channel Length=   .440  Kn=  .122  SLOPE=  72.7 STRTL
=  .81  CNSTL=  .25  RTIMP=    .00
Rainfall Depth =  3.28
Rainfall Distribution is 100-year, 6-Hour
--------------------------------------------------------------------------------
                   HEC-1 INPUT IS STORED IN FILE: WAG
--------------------------------------------------------------------------------
TC =  .367 hours, which is =   22.0 minutes       R =   .586 hours.
--------------------------------------------------------------------------------
               EXCESS RAINFALL VALUES IN 5-MINUTE INTERVALS
--------------------------------------------------------------------------------
     5  10  15  20  25  30  35  40  45  50  55  60  65  70  75  80  85  90
   .50 .50 .50 .20 .17 .09 .08 .02 .02 .02 .01 .01 .01 .01 .01 .01 .00 .00
--------------------------------------------------------------------------------
If calculated TC is much longer than the duration of the most intense portion
of the excess rainfall values, consider the S-graph procedures for this basin.
--------------------------------------------------------------------------------
```

```
--------------------------------------------------------------------------------
                    DATA INPUT FOR SUB-BASIN: SUBI
--------------------------------------------------------------------------------
Drainage Area=   .850   Channel Length=  2.600  Kn=  .082  SLOPE= 237.7 STRTL
=  .79  CNSTL=  .19  RTIMP=    .00
Rainfall Depth =  3.28
Rainfall Distribution is 100-year, 6-Hour
--------------------------------------------------------------------------------
                   HEC-1 INPUT IS STORED IN FILE: WAG
--------------------------------------------------------------------------------
TC =  .667 hours, which is =   40.0 minutes       R =   .556 hours.
--------------------------------------------------------------------------------
               EXCESS RAINFALL VALUES IN 5-MINUTE INTERVALS
--------------------------------------------------------------------------------
     5  10  15  20  25  30  35  40  45  50  55  60  65  70  75  80  85  90
   .42 .42 .20 .18 .11 .11 .10 .04 .04 .03 .03 .03 .03 .01 .01 .01 .01 .01
--------------------------------------------------------------------------------
If calculated TC is much longer than the duration of the most intense portion
of the excess rainfall values, consider the S-graph procedures for this basin.
--------------------------------------------------------------------------------
```

```
--------------------------------------------------------------------------------
                    DATA INPUT FOR SUB-BASIN: SUBIU
--------------------------------------------------------------------------------
Drainage Area=  1.550   Channel Length=  3.800  Kn=  .075  SLOPE= 262.9 STRTL
=  .78  CNSTL=  .16  RTIMP=    .00
Rainfall Depth =  3.28
Rainfall Distribution is 100-year, 6-Hour
--------------------------------------------------------------------------------
                   HEC-1 INPUT IS STORED IN FILE: WAG
--------------------------------------------------------------------------------
TC =  .717 hours, which is =   43.0 minutes       R =   .579 hours.
--------------------------------------------------------------------------------
               EXCESS RAINFALL VALUES IN 5-MINUTE INTERVALS
--------------------------------------------------------------------------------
     5  10  15  20  25  30  35  40  45  50  55  60  65  70  75  80  85  90
   .34 .34 .34 .21 .20 .13 .13 .13 .05 .05 .04 .03 .03 .02 .01 .01 .01 .01
--------------------------------------------------------------------------------
If calculated TC is much longer than the duration of the most intense portion
of the excess rainfall values, consider the S-graph procedures for this basin.
--------------------------------------------------------------------------------
```

```
--------------------------------------------------------------------------------
                    DATA INPUT FOR SUB-BASIN: SUBJ
--------------------------------------------------------------------------------
Drainage Area=   .260   Channel Length=  1.560  Kn=  .094  SLOPE=  81.4 STRTL
=  .81  CNSTL=  .25  RTIMP=    .00
Rainfall Depth =  3.28
Rainfall Distribution is 100-year, 6-Hour
--------------------------------------------------------------------------------
                   HEC-1 INPUT IS STORED IN FILE: WAG
--------------------------------------------------------------------------------
TC =  .717 hours, which is =   43.0 minutes       R =   .786 hours.
--------------------------------------------------------------------------------
               EXCESS RAINFALL VALUES IN 5-MINUTE INTERVALS
--------------------------------------------------------------------------------
     5  10  15  20  25  30  35  40  45  50  55  60  65  70  75  80  85  90
   .50 .50 .50 .20 .17 .08 .08 .02 .02 .02 .02 .02 .01 .01 .01 .01 .01 .01
--------------------------------------------------------------------------------
If calculated TC is much longer than the duration of the most intense portion
of the excess rainfall values, consider the S-graph procedures for this basin.
--------------------------------------------------------------------------------
```

DATA INPUT FOR SUB-BASIN: SUBK

Drainage Area= .120 Channel Length= 1.400 Kn= .103 SLOPE= 65.0 STRTL = .81 CNSTL= .25 RTIMP= .00
Rainfall Depth = 3.28
Rainfall Distribution is 100-year, 6-Hour

HEC-1 INPUT IS STORED IN FILE: WAG

TC = .767 hours, which is = 46.0 minutes R = 1.207 hours.

EXCESS RAINFALL VALUES IN 5-MINUTE INTERVALS

5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
.50	.50	.50	.20	.17	.09	.09	.08	.02	.02	.01	.01	.01	.01	.01	.00	.00	.00

If calculated TC is much longer than the duration of the most intense portion of the excess rainfall values, consider the S-graph procedures for this basin.

DATA INPUT FOR SUB-BASIN: SUBL

Drainage Area= 1.360 Channel Length= 4.160 Kn= .077 SLOPE= 250.5 STRTL = .80 CNSTL= .22 RTIMP= .00
Rainfall Depth = 3.28
Rainfall Distribution is 100-year, 6-Hour

HEC-1 INPUT IS STORED IN FILE: WAG

TC = .867 hours, which is = 52.0 minutes R = .829 hours.

EXCESS RAINFALL VALUES IN 5-MINUTE INTERVALS

5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
.36	.36	.21	.19	.13	.12	.12	.05	.05	.05	.03	.03	.03	.01	.01	.01	.01	.01

If calculated TC is much longer than the duration of the most intense portion of the excess rainfall values, consider the S-graph procedures for this basin.

```
--------------------------------------------------------------------------------
                    DATA INPUT FOR SUB-BASIN: SUBM
--------------------------------------------------------------------------------
Drainage Area=  1.560   Channel Length=  4.440  Kn=  .075  SLOPE= 166.7 STRTL
=  .79  CNSTL=  .24  RTIMP=    .00
Rainfall Depth =  3.28
Rainfall Distribution is 100-year, 6-Hour
--------------------------------------------------------------------------------
                    HEC-1 INPUT IS STORED IN FILE: WAG
--------------------------------------------------------------------------------
TC =  .983 hours, which is =   59.0 minutes       R =   .929 hours.
--------------------------------------------------------------------------------
               EXCESS RAINFALL VALUES IN 5-MINUTE INTERVALS
--------------------------------------------------------------------------------
     5  10  15  20  25  30  35  40  45  50  55  60  65  70  75  80  85  90
   .34 .34 .34 .21 .20 .13 .13 .13 .05 .05 .04 .03 .03 .02 .01 .01 .01 .01
--------------------------------------------------------------------------------
If calculated TC is much longer than the duration of the most intense portion
of the excess rainfall values, consider the S-graph procedures for this basin.
--------------------------------------------------------------------------------
```

```
--------------------------------------------------------------------------------
                    DATA INPUT FOR SUB-BASIN: SUBO
--------------------------------------------------------------------------------
Drainage Area=  1.610   Channel Length=  4.080  Kn=  .075  SLOPE=  41.7 STRTL
=  .78  CNSTL=  .19  RTIMP=    .00
Rainfall Depth =  3.28
Rainfall Distribution is 100-year, 6-Hour
--------------------------------------------------------------------------------
                    HEC-1 INPUT IS STORED IN FILE: WAG
--------------------------------------------------------------------------------
TC = 1.467 hours, which is =   88.0 minutes       R =  1.329 hours.
 *WARNING* CALCULATED TC SEEMS TOO LONG.  CHECK PARAMETERS.
--------------------------------------------------------------------------------
               EXCESS RAINFALL VALUES IN 5-MINUTE INTERVALS
--------------------------------------------------------------------------------
     5  10  15  20  25  30  35  40  45  50  55  60  65  70  75  80  85  90
   .34 .33 .33 .21 .20 .13 .13 .13 .05 .05 .05 .04 .03 .03 .02 .01 .01 .01
--------------------------------------------------------------------------------
If calculated TC is much longer than the duration of the most intense portion
of the excess rainfall values, consider the S-graph procedures for this basin.
--------------------------------------------------------------------------------
```

```
--------------------------------------------------------------------------------
                    DATA INPUT FOR SUB-BASIN: SUBOU
--------------------------------------------------------------------------------
Drainage Area=   .840   Channel Length=  2.120  Kn=  .082  SLOPE= 113.7 STRTL
=  .77  CNSTL=  .13  RTIMP=    .00
Rainfall Depth =  3.28
Rainfall Distribution is 100-year, 6-Hour
--------------------------------------------------------------------------------
                    HEC-1 INPUT IS STORED IN FILE: WAG
--------------------------------------------------------------------------------
TC =  .700 hours, which is =   42.0 minutes       R =   .502 hours.
--------------------------------------------------------------------------------
                EXCESS RAINFALL VALUES IN 5-MINUTE INTERVALS
--------------------------------------------------------------------------------
     5  10  15  20  25  30  35  40  45  50  55  60  65  70  75  80  85  90
   .43 .42 .42 .20 .18 .11 .10 .10 .04 .04 .03 .03 .03 .03 .01 .01 .01 .01
--------------------------------------------------------------------------------
If calculated TC is much longer than the duration of the most intense portion
of the excess rainfall values, consider the S-graph procedures for this basin.
--------------------------------------------------------------------------------
```

```
--------------------------------------------------------------------------------
                    DATA INPUT FOR SUB-BASIN: SUBS
--------------------------------------------------------------------------------
Drainage Area=   .550   Channel Length=  1.240  Kn=  .086  SLOPE=  33.9 STRTL
=  .78  CNSTL=  .20  RTIMP=    .00
Rainfall Depth =  3.28
Rainfall Distribution is 100-year, 6-Hour
--------------------------------------------------------------------------------
                    HEC-1 INPUT IS STORED IN FILE: WAG
--------------------------------------------------------------------------------
TC =  .833 hours, which is =   50.0 minutes       R =   .505 hours.
--------------------------------------------------------------------------------
                EXCESS RAINFALL VALUES IN 5-MINUTE INTERVALS
--------------------------------------------------------------------------------
     5  10  15  20  25  30  35  40  45  50  55  60  65  70  75  80  85  90
   .49 .48 .48 .20 .17 .09 .09 .09 .03 .02 .02 .02 .02 .01 .01 .01 .01 .01
--------------------------------------------------------------------------------
If calculated TC is much longer than the duration of the most intense portion
of the excess rainfall values, consider the S-graph procedures for this basin.
--------------------------------------------------------------------------------
```

```
--------------------------------------------------------------------------------
                    DATA INPUT FOR SUB-BASIN: SUBU
--------------------------------------------------------------------------------
Drainage Area=   .030   Channel Length=   .240  Kn=  .118  SLOPE=  29.2 STRTL
=  .77  CNSTL=  .15  RTIMP=    .00
Rainfall Depth =  3.28
Rainfall Distribution is 100-year, 6-Hour
--------------------------------------------------------------------------------
                   HEC-1 INPUT IS STORED IN FILE: WAG
--------------------------------------------------------------------------------
TC =  .400 hours, which is =   24.0 minutes       R =   .315 hours.
--------------------------------------------------------------------------------
               EXCESS RAINFALL VALUES IN 5-MINUTE INTERVALS
--------------------------------------------------------------------------------
     5  10  15  20  25  30  35  40  45  50  55  60  65  70  75  80  85  90
   .50 .50 .20 .17 .09 .09 .08 .02 .02 .02 .01 .01 .01 .01 .01 .01 .00 .00
--------------------------------------------------------------------------------
If calculated TC is much longer than the duration of the most intense portion
of the excess rainfall values, consider the S-graph procedures for this basin.
--------------------------------------------------------------------------------
```

```
--------------------------------------------------------------------------------
                    DATA INPUT FOR SUB-BASIN: SUBV1
--------------------------------------------------------------------------------
Drainage Area=   .450   Channel Length=  1.360  Kn=  .089  SLOPE=  36.8 STRTL
=  .79  CNSTL=  .21  RTIMP=    .00
Rainfall Depth =  3.28
Rainfall Distribution is 100-year, 6-Hour
--------------------------------------------------------------------------------
                   HEC-1 INPUT IS STORED IN FILE: WAG
--------------------------------------------------------------------------------
TC =  .900 hours, which is =   54.0 minutes       R =   .664 hours.
--------------------------------------------------------------------------------
               EXCESS RAINFALL VALUES IN 5-MINUTE INTERVALS
--------------------------------------------------------------------------------
     5  10  15  20  25  30  35  40  45  50  55  60  65  70  75  80  85  90
   .50 .50 .50 .20 .17 .08 .08 .02 .02 .02 .02 .01 .01 .01 .01 .01 .00 .00
--------------------------------------------------------------------------------
If calculated TC is much longer than the duration of the most intense portion
of the excess rainfall values, consider the S-graph procedures for this basin.
--------------------------------------------------------------------------------
```

```
--------------------------------------------------------------------------------
                    DATA INPUT FOR SUB-BASIN: SUBV
--------------------------------------------------------------------------------
Drainage Area=   .110   Channel Length=   .600  Kn=  .104  SLOPE=  35.0 STRTL
=  .79  CNSTL=  .22  RTIMP=    .00
Rainfall Depth =  3.28
Rainfall Distribution is 100-year, 6-Hour
--------------------------------------------------------------------------------
                   HEC-1 INPUT IS STORED IN FILE: WAG
--------------------------------------------------------------------------------
TC =  .550 hours, which is =   33.0 minutes       R =   .446 hours.
--------------------------------------------------------------------------------
               EXCESS RAINFALL VALUES IN 5-MINUTE INTERVALS
--------------------------------------------------------------------------------
     5  10  15  20  25  30  35  40  45  50  55  60  65  70  75  80  85  90
   .50 .50 .50 .20 .17 .09 .09 .08 .02 .02 .02 .02 .02 .01 .01 .01 .01 .01
--------------------------------------------------------------------------------
If calculated TC is much longer than the duration of the most intense portion
of the excess rainfall values, consider the S-graph procedures for this basin.
--------------------------------------------------------------------------------
```

```
--------------------------------------------------------------------------------
                    DATA INPUT FOR SUB-BASIN: SUBW1
--------------------------------------------------------------------------------
Drainage Area=   .040   Channel Length=   .520  Kn=  .115  SLOPE=  73.1 STRTL
=  .81  CNSTL=  .25  RTIMP=    .00
Rainfall Depth =  3.28
Rainfall Distribution is 100-year, 6-Hour
--------------------------------------------------------------------------------
                   HEC-1 INPUT IS STORED IN FILE: WAG
--------------------------------------------------------------------------------
TC =  .400 hours, which is =   24.0 minutes       R =   .497 hours.
--------------------------------------------------------------------------------
               EXCESS RAINFALL VALUES IN 5-MINUTE INTERVALS
--------------------------------------------------------------------------------
     5  10  15  20  25  30  35  40  45  50  55  60  65  70  75  80  85  90
   .50 .50 .50 .20 .17 .09 .09 .08 .02 .02 .02 .02 .01 .01 .01 .01 .01 .00
--------------------------------------------------------------------------------
If calculated TC is much longer than the duration of the most intense portion
of the excess rainfall values, consider the S-graph procedures for this basin.
--------------------------------------------------------------------------------
```

```
--------------------------------------------------------------------------------
                    DATA INPUT FOR SUB-BASIN: SUBW
--------------------------------------------------------------------------------
Drainage Area=   .100   Channel Length=   .720  Kn=  .105  SLOPE=  43.1 STRTL
=  .82  CNSTL=  .26  RTIMP=    .00
Rainfall Depth =  3.28
Rainfall Distribution is 100-year, 6-Hour
--------------------------------------------------------------------------------
                    HEC-1 INPUT IS STORED IN FILE: WAG
--------------------------------------------------------------------------------
TC =  .667 hours, which is =   40.0 minutes       R =   .674 hours.
--------------------------------------------------------------------------------
                EXCESS RAINFALL VALUES IN 5-MINUTE INTERVALS
--------------------------------------------------------------------------------
     5  10  15  20  25  30  35  40  45  50  55  60  65  70  75  80  85  90
   .50 .50 .20 .17 .09 .09 .08 .02 .02 .02 .02 .01 .01 .01 .01 .01 .00 .00
--------------------------------------------------------------------------------
If calculated TC is much longer than the duration of the most intense portion
of the excess rainfall values, consider the S-graph procedures for this basin.
--------------------------------------------------------------------------------
```

```
--------------------------------------------------------------------------------
                    DATA INPUT FOR SUB-BASIN: SUBX1
--------------------------------------------------------------------------------
Drainage Area=   .040   Channel Length=   .520  Kn=  .115  SLOPE=  96.2 STRTL
=  .81  CNSTL=  .25  RTIMP=    .00
Rainfall Depth =  3.28
Rainfall Distribution is 100-year, 6-Hour
--------------------------------------------------------------------------------
                    HEC-1 INPUT IS STORED IN FILE: WAG
--------------------------------------------------------------------------------
TC =  .350 hours, which is =   21.0 minutes       R =   .428 hours.
--------------------------------------------------------------------------------
                EXCESS RAINFALL VALUES IN 5-MINUTE INTERVALS
--------------------------------------------------------------------------------
     5  10  15  20  25  30  35  40  45  50  55  60  65  70  75  80  85  90
   .50 .50 .50 .20 .17 .09 .09 .08 .02 .02 .02 .02 .01 .01 .01 .01 .01 .00
--------------------------------------------------------------------------------
If calculated TC is much longer than the duration of the most intense portion
of the excess rainfall values, consider the S-graph procedures for this basin.
--------------------------------------------------------------------------------
```

DATA INPUT FOR SUB-BASIN: SUBX

Drainage Area= .080 Channel Length= .680 Kn= .107 SLOPE= 26.5 STRTL = .82 CNSTL= .26 RTIMP= .00
Rainfall Depth = 3.28
Rainfall Distribution is 100-year, 6-Hour

HEC-1 INPUT IS STORED IN FILE: WAG

TC = .717 hours, which is = 43.0 minutes R = .792 hours.

EXCESS RAINFALL VALUES IN 5-MINUTE INTERVALS

5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
.50	.50	.50	.20	.17	.09	.08	.02	.02	.02	.02	.01	.01	.01	.01	.01	.01	.01

If calculated TC is much longer than the duration of the most intense portion of the excess rainfall values, consider the S-graph procedures for this basin.

DATA INPUT FOR SUB-BASIN: SUBY

Drainage Area= .150 Channel Length= 1.040 Kn= .100 SLOPE= 41.3 STRTL = .80 CNSTL= .22 RTIMP= .00
Rainfall Depth = 3.28
Rainfall Distribution is 100-year, 6-Hour

HEC-1 INPUT IS STORED IN FILE: WAG

TC = .767 hours, which is = 46.0 minutes R = .838 hours.

EXCESS RAINFALL VALUES IN 5-MINUTE INTERVALS

5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
.50	.50	.50	.20	.17	.09	.08	.02	.02	.02	.02	.01	.01	.01	.01	.01	.01	.01

If calculated TC is much longer than the duration of the most intense portion of the excess rainfall values, consider the S-graph procedures for this basin.

```
--------------------------------------------------------------------------------
                    DATA INPUT FOR SUB-BASIN: SUBZ1
--------------------------------------------------------------------------------
Drainage Area=   .080   Channel Length=   .600  Kn=  .107  SLOPE=  35.0 STRTL
=  .81  CNSTL=  .25  RTIMP=    .00
Rainfall Depth =  3.28
Rainfall Distribution is 100-year, 6-Hour
--------------------------------------------------------------------------------
                   HEC-1 INPUT IS STORED IN FILE: WAG
--------------------------------------------------------------------------------
TC =  .567 hours, which is =   34.0 minutes       R =   .552 hours.
--------------------------------------------------------------------------------
               EXCESS RAINFALL VALUES IN 5-MINUTE INTERVALS
--------------------------------------------------------------------------------
     5  10  15  20  25  30  35  40  45  50  55  60  65  70  75  80  85  90
   .50 .50 .50 .20 .17 .09 .08 .02 .02 .02 .02 .01 .01 .01 .01 .01 .01 .01
--------------------------------------------------------------------------------
If calculated TC is much longer than the duration of the most intense portion
of the excess rainfall values, consider the S-graph procedures for this basin.
--------------------------------------------------------------------------------
```

```
--------------------------------------------------------------------------------
                    DATA INPUT FOR SUB-BASIN: SUBZ
--------------------------------------------------------------------------------
Drainage Area=   .160   Channel Length=   .960  Kn=  .100  SLOPE=  43.8 STRTL
=  .81  CNSTL=  .25  RTIMP=    .00
Rainfall Depth =  3.28
Rainfall Distribution is 100-year, 6-Hour
--------------------------------------------------------------------------------
                   HEC-1 INPUT IS STORED IN FILE: WAG
--------------------------------------------------------------------------------
TC =  .683 hours, which is =   41.0 minutes       R =   .667 hours.
--------------------------------------------------------------------------------
               EXCESS RAINFALL VALUES IN 5-MINUTE INTERVALS
--------------------------------------------------------------------------------
     5  10  15  20  25  30  35  40  45  50  55  60  65  70  75  80  85  90
   .50 .50 .50 .20 .17 .09 .09 .08 .02 .02 .01 .01 .01 .01 .01 .01 .00 .00
--------------------------------------------------------------------------------
If calculated TC is much longer than the duration of the most intense portion
of the excess rainfall values, consider the S-graph procedures for this basin.
--------------------------------------------------------------------------------
```

```
--------------------------------------------------------------------------------
                    DATA INPUT FOR SUB-BASIN: SUBD1
--------------------------------------------------------------------------------
Drainage Area=   .340   Channel Length=  1.760  Kn=  .092  SLOPE=  64.2 STRTL
=  .80  CNSTL=  .35  RTIMP=    .00
Rainfall Depth =  3.28
Rainfall Distribution is 100-year, 6-Hour
--------------------------------------------------------------------------------
                    HEC-1 INPUT IS STORED IN FILE: WAG
--------------------------------------------------------------------------------
TC =  .850 hours, which is =   51.0 minutes       R =   .898 hours.
--------------------------------------------------------------------------------
                EXCESS RAINFALL VALUES IN 5-MINUTE INTERVALS
--------------------------------------------------------------------------------
     5  10  15  20  25  30  35  40  45  50  55  60  65  70  75  80  85  90
   .50 .50 .50 .20 .17 .08 .08 .08 .02 .02 .02 .01 .01 .01 .01 .01 .01 .00
--------------------------------------------------------------------------------
If calculated TC is much longer than the duration of the most intense portion
of the excess rainfall values, consider the S-graph procedures for this basin.
--------------------------------------------------------------------------------
```

```
--------------------------------------------------------------------------------
                    DATA INPUT FOR SUB-BASIN: SUBG1
--------------------------------------------------------------------------------
Drainage Area=   .190   Channel Length=  1.440  Kn=  .098  SLOPE=  54.9 STRTL
=  .80  CNSTL=  .28  RTIMP=    .00
Rainfall Depth =  3.28
Rainfall Distribution is 100-year, 6-Hour
--------------------------------------------------------------------------------
                    HEC-1 INPUT IS STORED IN FILE: WAG
--------------------------------------------------------------------------------
TC =  .817 hours, which is =   49.0 minutes       R =  1.019 hours.
--------------------------------------------------------------------------------
                EXCESS RAINFALL VALUES IN 5-MINUTE INTERVALS
--------------------------------------------------------------------------------
     5  10  15  20  25  30  35  40  45  50  55  60  65  70  75  80  85  90
   .50 .50 .50 .20 .17 .09 .09 .08 .02 .02 .02 .01 .01 .01 .01 .00 .00 .00
--------------------------------------------------------------------------------
If calculated TC is much longer than the duration of the most intense portion
of the excess rainfall values, consider the S-graph procedures for this basin.
--------------------------------------------------------------------------------
```

```
--------------------------------------------------------------------------------
                    DATA INPUT FOR SUB-BASIN: SUBI1
--------------------------------------------------------------------------------
Drainage Area=   .180   Channel Length=  1.160  Kn=  .098  SLOPE=  46.6 STRTL
=  .81  CNSTL=  .26  RTIMP=    .00
Rainfall Depth =  3.28
Rainfall Distribution is 100-year, 6-Hour
--------------------------------------------------------------------------------
                    HEC-1 INPUT IS STORED IN FILE: WAG
--------------------------------------------------------------------------------
TC =  .750 hours, which is =   45.0 minutes       R =   .805 hours.
--------------------------------------------------------------------------------
                EXCESS RAINFALL VALUES IN 5-MINUTE INTERVALS
--------------------------------------------------------------------------------
     5  10  15  20  25  30  35  40  45  50  55  60  65  70  75  80  85  90
   .50 .50 .50 .20 .17 .09 .09 .08 .02 .02 .02 .01 .01 .01 .01 .01 .00 .00
--------------------------------------------------------------------------------
If calculated TC is much longer than the duration of the most intense portion
of the excess rainfall values, consider the S-graph procedures for this basin.
--------------------------------------------------------------------------------
```

```
--------------------------------------------------------------------------------
                    DATA INPUT FOR SUB-BASIN: SUB2
--------------------------------------------------------------------------------
Drainage Area=   .060   Channel Length=  1.000  Kn=  .110  SLOPE=  68.0 STRTL
=  .81  CNSTL=  .25  RTIMP=    .00
Rainfall Depth =  3.28
Rainfall Distribution is 100-year, 6-Hour
--------------------------------------------------------------------------------
                    HEC-1 INPUT IS STORED IN FILE: WAG
--------------------------------------------------------------------------------
TC =  .617 hours, which is =   37.0 minutes       R =  1.076 hours.
--------------------------------------------------------------------------------
                EXCESS RAINFALL VALUES IN 5-MINUTE INTERVALS
--------------------------------------------------------------------------------
     5  10  15  20  25  30  35  40  45  50  55  60  65  70  75  80  85  90
   .50 .50 .50 .20 .17 .09 .09 .08 .02 .02 .02 .02 .02 .01 .01 .01 .01 .01
--------------------------------------------------------------------------------
If calculated TC is much longer than the duration of the most intense portion
of the excess rainfall values, consider the S-graph procedures for this basin.
--------------------------------------------------------------------------------
```

```
--------------------------------------------------------------------------------
                    DATA INPUT FOR SUB-BASIN: SUB3
--------------------------------------------------------------------------------
Drainage Area=   .180   Channel Length=  1.040  Kn=  .098  SLOPE=  69.2 STRTL
=  .81  CNSTL=  .25  RTIMP=    .00
Rainfall Depth =  3.28
Rainfall Distribution is 100-year, 6-Hour
--------------------------------------------------------------------------------
                    HEC-1 INPUT IS STORED IN FILE: WAG
--------------------------------------------------------------------------------
TC =  .583 hours, which is =   35.0 minutes       R =   .558 hours.
--------------------------------------------------------------------------------
                EXCESS RAINFALL VALUES IN 5-MINUTE INTERVALS
--------------------------------------------------------------------------------
     5  10  15  20  25  30  35  40  45  50  55  60  65  70  75  80  85  90
   .50 .50 .50 .20 .17 .09 .09 .08 .02 .02 .02 .01 .01 .01 .01 .01 .00 .00
--------------------------------------------------------------------------------
If calculated TC is much longer than the duration of the most intense portion
of the excess rainfall values, consider the S-graph procedures for this basin.
--------------------------------------------------------------------------------
```

```
--------------------------------------------------------------------------------
                    DATA INPUT FOR SUB-BASIN: SUB5
--------------------------------------------------------------------------------
Drainage Area=   .040   Channel Length=   .360  Kn=  .115  SLOPE=  83.3 STRTL
=  .81  CNSTL=  .25  RTIMP=    .00
Rainfall Depth =  3.28
Rainfall Distribution is 100-year, 6-Hour
--------------------------------------------------------------------------------
                    HEC-1 INPUT IS STORED IN FILE: WAG
--------------------------------------------------------------------------------
TC =  .300 hours, which is =   18.0 minutes       R =   .269 hours.
--------------------------------------------------------------------------------
                EXCESS RAINFALL VALUES IN 5-MINUTE INTERVALS
--------------------------------------------------------------------------------
     5  10  15  20  25  30  35  40  45  50  55  60  65  70  75  80  85  90
   .50 .50 .50 .20 .17 .09 .09 .08 .02 .02 .02 .02 .01 .01 .01 .01 .01 .00
--------------------------------------------------------------------------------
If calculated TC is much longer than the duration of the most intense portion
of the excess rainfall values, consider the S-graph procedures for this basin.
--------------------------------------------------------------------------------
```

DATA INPUT FOR SUB-BASIN: SUB6

Drainage Area= .950 Channel Length= 4.160 Kn= .090 SLOPE= 203.8 STRTL = .74 CNSTL= .14 RTIMP= .00
Rainfall Depth = 3.28
Rainfall Distribution is 100-year, 6-Hour

HEC-1 INPUT IS STORED IN FILE: WAG

TC = .917 hours, which is = 55.0 minutes R = 1.082 hours.

EXCESS RAINFALL VALUES IN 5-MINUTE INTERVALS

5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
.41	.41	.41	.20	.18	.18	.11	.11	.11	.04	.04	.04	.03	.03	.03	.01	.01	.01

If calculated TC is much longer than the duration of the most intense portion of the excess rainfall values, consider the S-graph procedures for this basin.

DATA INPUT FOR SUB-BASIN: SUB7

Drainage Area= .620 Channel Length= 2.400 Kn= .085 SLOPE= 84.6 STRTL = .77 CNSTL= .19 RTIMP= .00
Rainfall Depth = 3.28
Rainfall Distribution is 100-year, 6-Hour

HEC-1 INPUT IS STORED IN FILE: WAG

TC = .883 hours, which is = 53.0 minutes R = .853 hours.

EXCESS RAINFALL VALUES IN 5-MINUTE INTERVALS

5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
.47	.47	.47	.20	.17	.09	.09	.09	.03	.03	.03	.03	.02	.02	.01	.01	.01	.01

If calculated TC is much longer than the duration of the most intense portion of the excess rainfall values, consider the S-graph procedures for this basin.

```
--------------------------------------------------------------------------------
                    DATA INPUT FOR SUB-BASIN: SUB8
--------------------------------------------------------------------------------
Drainage Area=   .780   Channel Length=  1.600  Kn=  .083  SLOPE=  42.5 STRTL
=  .82  CNSTL=  .29  RTIMP=    .00
Rainfall Depth =  3.28
Rainfall Distribution is 100-year, 6-Hour
--------------------------------------------------------------------------------
                   HEC-1 INPUT IS STORED IN FILE: WAG
--------------------------------------------------------------------------------
TC =  .900 hours, which is =   54.0 minutes       R =   .552 hours.
--------------------------------------------------------------------------------
               EXCESS RAINFALL VALUES IN 5-MINUTE INTERVALS
--------------------------------------------------------------------------------
     5  10  15  20  25  30  35  40  45  50  55  60  65  70  75  80  85  90
   .44 .43 .43 .20 .18 .10 .10 .10 .03 .03 .03 .03 .02 .01 .01 .01 .01 .01
--------------------------------------------------------------------------------
If calculated TC is much longer than the duration of the most intense portion
of the excess rainfall values, consider the S-graph procedures for this basin.
--------------------------------------------------------------------------------
```

```
--------------------------------------------------------------------------------
                    DATA INPUT FOR SUB-BASIN: SUB9
--------------------------------------------------------------------------------
Drainage Area=   .020   Channel Length=   .200  Kn=  .122  SLOPE=  70.0 STRTL
=  .81  CNSTL=  .32  RTIMP=    .00
Rainfall Depth =  3.28
Rainfall Distribution is 100-year, 6-Hour
--------------------------------------------------------------------------------
                   HEC-1 INPUT IS STORED IN FILE: WAG
--------------------------------------------------------------------------------
TC =  .233 hours, which is =   14.0 minutes       R =   .189 hours.
--------------------------------------------------------------------------------
               EXCESS RAINFALL VALUES IN 5-MINUTE INTERVALS
--------------------------------------------------------------------------------
     5  10  15  20  25  30  35  40  45  50  55  60  65  70  75  80  85  90
   .50 .50 .50 .20 .17 .09 .08 .02 .02 .02 .01 .01 .01 .01 .01 .01 .00 .00
--------------------------------------------------------------------------------
If calculated TC is much longer than the duration of the most intense portion
of the excess rainfall values, consider the S-graph procedures for this basin.
--------------------------------------------------------------------------------
```

```
--------------------------------------------------------------------------------
                    DATA INPUT FOR SUB-BASIN: SUB10
--------------------------------------------------------------------------------
Drainage Area=   .140   Channel Length=   .820  Kn=  .101  SLOPE=  89.0 STRTL
=  .74  CNSTL=  .13  RTIMP=    .00
Rainfall Depth =  3.28
Rainfall Distribution is 100-year, 6-Hour
--------------------------------------------------------------------------------
                    HEC-1 INPUT IS STORED IN FILE: WAG
--------------------------------------------------------------------------------
TC =  .450 hours, which is =   27.0 minutes       R =   .399 hours.
--------------------------------------------------------------------------------
                EXCESS RAINFALL VALUES IN 5-MINUTE INTERVALS
--------------------------------------------------------------------------------
     5  10  15  20  25  30  35  40  45  50  55  60  65  70  75  80  85  90
   .50 .50 .50 .20 .17 .09 .08 .02 .02 .02 .01 .01 .01 .01 .01 .01 .00 .00
--------------------------------------------------------------------------------
If calculated TC is much longer than the duration of the most intense portion
of the excess rainfall values, consider the S-graph procedures for this basin.
--------------------------------------------------------------------------------
```

```
--------------------------------------------------------------------------------
                    DATA INPUT FOR SUB-BASIN: SUB11
--------------------------------------------------------------------------------
Drainage Area=   .050   Channel Length=   .520  Kn=  .112  SLOPE=  73.1 STRTL
=  .81  CNSTL=  .32  RTIMP=    .00
Rainfall Depth =  3.28
Rainfall Distribution is 100-year, 6-Hour
--------------------------------------------------------------------------------
                    HEC-1 INPUT IS STORED IN FILE: WAG
--------------------------------------------------------------------------------
TC =  .383 hours, which is =   23.0 minutes       R =   .417 hours.
--------------------------------------------------------------------------------
                EXCESS RAINFALL VALUES IN 5-MINUTE INTERVALS
--------------------------------------------------------------------------------
     5  10  15  20  25  30  35  40  45  50  55  60  65  70  75  80  85  90
   .50 .50 .50 .20 .17 .09 .08 .02 .02 .02 .02 .01 .01 .01 .01 .01 .01 .00
--------------------------------------------------------------------------------
If calculated TC is much longer than the duration of the most intense portion
of the excess rainfall values, consider the S-graph procedures for this basin.
--------------------------------------------------------------------------------
```

```
--------------------------------------------------------------------------------
                    DATA INPUT FOR SUB-BASIN: SUB12
--------------------------------------------------------------------------------
Drainage Area=   .340   Channel Length=  1.400  Kn=  .092  SLOPE=  59.3 STRTL
=  .82  CNSTL=  .32  RTIMP=    .00
Rainfall Depth =  3.28
Rainfall Distribution is 100-year, 6-Hour
--------------------------------------------------------------------------------
                   HEC-1 INPUT IS STORED IN FILE: WAG
--------------------------------------------------------------------------------
TC =  .733 hours, which is =   44.0 minutes       R =   .635 hours.
--------------------------------------------------------------------------------
               EXCESS RAINFALL VALUES IN 5-MINUTE INTERVALS
--------------------------------------------------------------------------------
     5  10  15  20  25  30  35  40  45  50  55  60  65  70  75  80  85  90
   .50 .50 .50 .20 .17 .08 .08 .08 .02 .02 .02 .01 .01 .01 .01 .01 .01 .00
--------------------------------------------------------------------------------
If calculated TC is much longer than the duration of the most intense portion
of the excess rainfall values, consider the S-graph procedures for this basin.
--------------------------------------------------------------------------------
```

```
--------------------------------------------------------------------------------
                    DATA INPUT FOR SUB-BASIN: SUB13
--------------------------------------------------------------------------------
Drainage Area=   .040   Channel Length=   .560  Kn=  .115  SLOPE=  87.5 STRTL
=  .81  CNSTL=  .32  RTIMP=    .00
Rainfall Depth =  3.28
Rainfall Distribution is 100-year, 6-Hour
--------------------------------------------------------------------------------
                   HEC-1 INPUT IS STORED IN FILE: WAG
--------------------------------------------------------------------------------
TC =  .383 hours, which is =   23.0 minutes       R =   .503 hours.
--------------------------------------------------------------------------------
               EXCESS RAINFALL VALUES IN 5-MINUTE INTERVALS
--------------------------------------------------------------------------------
     5  10  15  20  25  30  35  40  45  50  55  60  65  70  75  80  85  90
   .50 .50 .50 .20 .17 .09 .09 .08 .02 .02 .02 .02 .01 .01 .01 .01 .01 .00
--------------------------------------------------------------------------------
If calculated TC is much longer than the duration of the most intense portion
of the excess rainfall values, consider the S-graph procedures for this basin.
--------------------------------------------------------------------------------
```

DATA INPUT FOR SUB-BASIN: SUB14

Drainage Area= .010 Channel Length= .120 Kn= .130 SLOPE= 58.3 STRTL = .81 CNSTL= .32 RTIMP= .00
Rainfall Depth = 3.28
Rainfall Distribution is 100-year, 6-Hour

HEC-1 INPUT IS STORED IN FILE: WAG

TC = .183 hours, which is = 11.0 minutes R = .142 hours.

EXCESS RAINFALL VALUES IN 5-MINUTE INTERVALS

5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
.50	.50	.50	.20	.17	.09	.09	.08	.02	.02	.02	.02	.01	.01	.01	.01	.01	.00

If calculated TC is much longer than the duration of the most intense portion of the excess rainfall values, consider the S-graph procedures for this basin.

DATA INPUT FOR SUB-BASIN: SUB15

Drainage Area= .120 Channel Length= 1.200 Kn= .103 SLOPE= 69.2 STRTL = .81 CNSTL= .32 RTIMP= .00
Rainfall Depth = 3.28
Rainfall Distribution is 100-year, 6-Hour

HEC-1 INPUT IS STORED IN FILE: WAG

TC = .667 hours, which is = 40.0 minutes R = .914 hours.

EXCESS RAINFALL VALUES IN 5-MINUTE INTERVALS

5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
.50	.50	.50	.20	.17	.09	.09	.08	.02	.02	.01	.01	.01	.01	.01	.00	.00	.00

If calculated TC is much longer than the duration of the most intense portion of the excess rainfall values, consider the S-graph procedures for this basin.

```
--------------------------------------------------------------------------------
                    DATA INPUT FOR SUB-BASIN: SUB16
--------------------------------------------------------------------------------
Drainage Area=   .270   Channel Length=  1.560  Kn=  .094  SLOPE= 277.8 STRTL
=  .75  CNSTL=  .19  RTIMP=    .00
Rainfall Depth =  3.28
Rainfall Distribution is 100-year, 6-Hour
--------------------------------------------------------------------------------
                   HEC-1 INPUT IS STORED IN FILE: WAG
--------------------------------------------------------------------------------
TC =  .417 hours, which is =   25.0 minutes       R =   .421 hours.
--------------------------------------------------------------------------------
               EXCESS RAINFALL VALUES IN 5-MINUTE INTERVALS
--------------------------------------------------------------------------------
     5  10  15  20  25  30  35  40  45  50  55  60  65  70  75  80  85  90
   .50 .50 .50 .20 .17 .08 .08 .02 .02 .02 .02 .01 .01 .01 .01 .01 .01 .01
--------------------------------------------------------------------------------
If calculated TC is much longer than the duration of the most intense portion
of the excess rainfall values, consider the S-graph procedures for this basin.
--------------------------------------------------------------------------------
```

```
--------------------------------------------------------------------------------
                    DATA INPUT FOR SUB-BASIN: SUB17
--------------------------------------------------------------------------------
Drainage Area=   .690   Channel Length=  2.080  Kn=  .079  SLOPE=  59.6 STRTL
=  .71  CNSTL=  .05  RTIMP=    .00
Rainfall Depth =  3.28
Rainfall Distribution is 100-year, 6-Hour
--------------------------------------------------------------------------------
                   HEC-1 INPUT IS STORED IN FILE: WAG
--------------------------------------------------------------------------------
TC =  .867 hours, which is =   52.0 minutes       R =   .701 hours.
--------------------------------------------------------------------------------
               EXCESS RAINFALL VALUES IN 5-MINUTE INTERVALS
--------------------------------------------------------------------------------
     5  10  15  20  25  30  35  40  45  50  55  60  65  70  75  80  85  90
   .45 .45 .45 .20 .17 .17 .10 .10 .10 .03 .03 .03 .03 .02 .02 .01 .01 .01
--------------------------------------------------------------------------------
If calculated TC is much longer than the duration of the most intense portion
of the excess rainfall values, consider the S-graph procedures for this basin.
--------------------------------------------------------------------------------
```

```
--------------------------------------------------------------------------------
                    DATA INPUT FOR SUB-BASIN: SUB18
--------------------------------------------------------------------------------
Drainage Area=   .020   Channel Length=   .200  Kn=  .122  SLOPE=  55.0 STRTL
=  .71  CNSTL=  .05  RTIMP=    .00
Rainfall Depth =  3.28
Rainfall Distribution is 100-year, 6-Hour
--------------------------------------------------------------------------------
                    HEC-1 INPUT IS STORED IN FILE: WAG
--------------------------------------------------------------------------------
TC =  .250 hours, which is =   15.0 minutes       R =   .204 hours.
--------------------------------------------------------------------------------
                EXCESS RAINFALL VALUES IN 5-MINUTE INTERVALS
--------------------------------------------------------------------------------
     5  10  15  20  25  30  35  40  45  50  55  60  65  70  75  80  85  90
   .50 .50 .50 .20 .17 .09 .08 .02 .02 .02 .01 .01 .01 .01 .01 .01 .00 .00
--------------------------------------------------------------------------------
If calculated TC is much longer than the duration of the most intense portion
of the excess rainfall values, consider the S-graph procedures for this basin.
--------------------------------------------------------------------------------
```

```
--------------------------------------------------------------------------------
                    DATA INPUT FOR SUB-BASIN: SUB20
--------------------------------------------------------------------------------
Drainage Area=   .030   Channel Length=   .400  Kn=  .118  SLOPE=  75.0 STRTL
=  .71  CNSTL=  .05  RTIMP=    .00
Rainfall Depth =  3.28
Rainfall Distribution is 100-year, 6-Hour
--------------------------------------------------------------------------------
                    HEC-1 INPUT IS STORED IN FILE: WAG
--------------------------------------------------------------------------------
TC =  .333 hours, which is =   20.0 minutes       R =   .388 hours.
--------------------------------------------------------------------------------
                EXCESS RAINFALL VALUES IN 5-MINUTE INTERVALS
--------------------------------------------------------------------------------
     5  10  15  20  25  30  35  40  45  50  55  60  65  70  75  80  85  90
   .50 .50 .50 .20 .17 .09 .09 .08 .02 .02 .02 .01 .01 .01 .01 .01 .01 .00
--------------------------------------------------------------------------------
If calculated TC is much longer than the duration of the most intense portion
of the excess rainfall values, consider the S-graph procedures for this basin.
--------------------------------------------------------------------------------
```

```
-----------------------------------------------------------------------------
                    DATA INPUT FOR SUB-BASIN: SUB21
-----------------------------------------------------------------------------
Drainage Area=   .020   Channel Length=   .240  Kn=  .122  SLOPE= 108.3 STRTL
=  .71  CNSTL=  .05  RTIMP=    .00
Rainfall Depth =  3.28
Rainfall Distribution is 100-year, 6-Hour
-----------------------------------------------------------------------------
                    HEC-1 INPUT IS STORED IN FILE: WAG
-----------------------------------------------------------------------------
TC =  .217 hours, which is =   13.0 minutes       R =   .201 hours.
-----------------------------------------------------------------------------
                EXCESS RAINFALL VALUES IN 5-MINUTE INTERVALS
-----------------------------------------------------------------------------
     5  10  15  20  25  30  35  40  45  50  55  60  65  70  75  80  85  90
   .50 .50 .50 .20 .17 .09 .08 .02 .02 .02 .01 .01 .01 .01 .01 .01 .00 .00
-----------------------------------------------------------------------------
If calculated TC is much longer than the duration of the most intense portion
of the excess rainfall values, consider the S-graph procedures for this basin.
-----------------------------------------------------------------------------
```

```
-----------------------------------------------------------------------------
                    DATA INPUT FOR SUB-BASIN: SUB22
-----------------------------------------------------------------------------
Drainage Area=   .230   Channel Length=  1.760  Kn=  .096  SLOPE=  68.8 STRTL
=  .80  CNSTL=  .29  RTIMP=    .00
Rainfall Depth =  3.28
Rainfall Distribution is 100-year, 6-Hour
-----------------------------------------------------------------------------
                    HEC-1 INPUT IS STORED IN FILE: WAG
-----------------------------------------------------------------------------
TC =  .850 hours, which is =   51.0 minutes       R =  1.122 hours.
-----------------------------------------------------------------------------
                EXCESS RAINFALL VALUES IN 5-MINUTE INTERVALS
-----------------------------------------------------------------------------
     5  10  15  20  25  30  35  40  45  50  55  60  65  70  75  80  85  90
   .50 .50 .50 .20 .17 .09 .09 .08 .02 .02 .02 .01 .01 .01 .01 .01 .00 .00
-----------------------------------------------------------------------------
If calculated TC is much longer than the duration of the most intense portion
of the excess rainfall values, consider the S-graph procedures for this basin.
-----------------------------------------------------------------------------
```

DATA INPUT FOR SUB-BASIN: SUB23

Drainage Area= 1.230 Channel Length= 4.360 Kn= .085 SLOPE= 227.1 STRTL = .72 CNSTL= .08 RTIMP= .00
Rainfall Depth = 3.28
Rainfall Distribution is 100-year, 6-Hour

HEC-1 INPUT IS STORED IN FILE: WAG

TC = .883 hours, which is = 53.0 minutes R = .931 hours.

EXCESS RAINFALL VALUES IN 5-MINUTE INTERVALS

5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
.37	.37	.37	.21	.19	.19	.12	.12	.12	.05	.05	.04	.03	.03	.03	.01	.01	.01

If calculated TC is much longer than the duration of the most intense portion of the excess rainfall values, consider the S-graph procedures for this basin.

DATA INPUT FOR SUB-BASIN: SUB24

Drainage Area= .030 Channel Length= .320 Kn= .118 SLOPE= 93.8 STRTL = .81 CNSTL= .32 RTIMP= .00
Rainfall Depth = 3.28
Rainfall Distribution is 100-year, 6-Hour

HEC-1 INPUT IS STORED IN FILE: WAG

TC = .300 hours, which is = 18.0 minutes R = .288 hours.

EXCESS RAINFALL VALUES IN 5-MINUTE INTERVALS

5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
.50	.50	.20	.17	.09	.09	.08	.02	.02	.02	.01	.01	.01	.01	.01	.01	.00	.00

If calculated TC is much longer than the duration of the most intense portion of the excess rainfall values, consider the S-graph procedures for this basin.

```
--------------------------------------------------------------------------------
                    DATA INPUT FOR SUB-BASIN: SUB25
--------------------------------------------------------------------------------
Drainage Area=   .060   Channel Length=   .640  Kn=  .110  SLOPE=  81.3 STRTL
=  .81  CNSTL=  .32  RTIMP=    .00
Rainfall Depth =  3.28
Rainfall Distribution is 100-year, 6-Hour
--------------------------------------------------------------------------------
                    HEC-1 INPUT IS STORED IN FILE: WAG
--------------------------------------------------------------------------------
TC =  .483 hours, which is =   29.0 minutes       R =   .574 hours.
--------------------------------------------------------------------------------
               EXCESS RAINFALL VALUES IN 5-MINUTE INTERVALS
--------------------------------------------------------------------------------
     5  10  15  20  25  30  35  40  45  50  55  60  65  70  75  80  85  90
   .50 .50 .20 .17 .09 .09 .08 .02 .02 .02 .02 .02 .01 .01 .01 .01 .01 .01
--------------------------------------------------------------------------------
If calculated TC is much longer than the duration of the most intense portion
of the excess rainfall values, consider the S-graph procedures for this basin.
--------------------------------------------------------------------------------
```

```
--------------------------------------------------------------------------------
                    DATA INPUT FOR SUB-BASIN: SUB26
--------------------------------------------------------------------------------
Drainage Area=   .080   Channel Length=   .800  Kn=  .107  SLOPE=  78.8 STRTL
=  .81  CNSTL=  .32  RTIMP=    .00
Rainfall Depth =  3.28
Rainfall Distribution is 100-year, 6-Hour
--------------------------------------------------------------------------------
                    HEC-1 INPUT IS STORED IN FILE: WAG
--------------------------------------------------------------------------------
TC =  .483 hours, which is =   29.0 minutes       R =   .583 hours.
--------------------------------------------------------------------------------
               EXCESS RAINFALL VALUES IN 5-MINUTE INTERVALS
--------------------------------------------------------------------------------
     5  10  15  20  25  30  35  40  45  50  55  60  65  70  75  80  85  90
   .50 .50 .50 .20 .17 .09 .08 .02 .02 .02 .02 .01 .01 .01 .01 .01 .01 .01
--------------------------------------------------------------------------------
If calculated TC is much longer than the duration of the most intense portion
of the excess rainfall values, consider the S-graph procedures for this basin.
--------------------------------------------------------------------------------
```

DATA INPUT FOR SUB-BASIN: SUB27

Drainage Area= .340 Channel Length= 1.600 Kn= .092 SLOPE= 73.8 STRTL = .81 CNSTL= .32 RTIMP= .00
Rainfall Depth = 3.28
Rainfall Distribution is 100-year, 6-Hour

HEC-1 INPUT IS STORED IN FILE: WAG

TC = .733 hours, which is = 44.0 minutes R = .706 hours.

EXCESS RAINFALL VALUES IN 5-MINUTE INTERVALS

5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
.50	.50	.50	.20	.17	.08	.08	.08	.02	.02	.02	.01	.01	.01	.01	.01	.01	.00

If calculated TC is much longer than the duration of the most intense portion of the excess rainfall values, consider the S-graph procedures for this basin.

DATA INPUT FOR SUB-BASIN: SUB28

Drainage Area= .010 Channel Length= 1.600 Kn= .130 SLOPE= 106.3 STRTL = .81 CNSTL= .32 RTIMP= .00
Rainfall Depth = 3.28
Rainfall Distribution is 100-year, 6-Hour

HEC-1 INPUT IS STORED IN FILE: WAG

TC = .817 hours, which is = 49.0 minutes R = 5.941 hours.

EXCESS RAINFALL VALUES IN 5-MINUTE INTERVALS

5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
.50	.50	.50	.20	.17	.09	.09	.08	.02	.02	.02	.02	.01	.01	.01	.01	.01	.00

If calculated TC is much longer than the duration of the most intense portion of the excess rainfall values, consider the S-graph procedures for this basin.

DATA INPUT FOR SUB-BASIN: SUB29

Drainage Area= .010 Channel Length= .440 Kn= .130 SLOPE= 170.0 STRTL = .81 CNSTL= .32 RTIMP= .00
Rainfall Depth = 3.28
Rainfall Distribution is 100-year, 6-Hour

HEC-1 INPUT IS STORED IN FILE: WAG

TC = .283 hours, which is = 17.0 minutes R = .653 hours.

EXCESS RAINFALL VALUES IN 5-MINUTE INTERVALS

5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
.50	.50	.50	.20	.17	.09	.09	.08	.02	.02	.02	.02	.01	.01	.01	.01	.01	.00

If calculated TC is much longer than the duration of the most intense portion of the excess rainfall values, consider the S-graph procedures for this basin.

DATA INPUT FOR SUB-BASIN: SUB30

Drainage Area= .010 Channel Length= .120 Kn= .130 SLOPE= 108.3 STRTL = .81 CNSTL= .32 RTIMP= .00
Rainfall Depth = 3.28
Rainfall Distribution is 100-year, 6-Hour

HEC-1 INPUT IS STORED IN FILE: WAG

TC = .150 hours, which is = 9.0 minutes R = .114 hours.

EXCESS RAINFALL VALUES IN 5-MINUTE INTERVALS

5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
.50	.50	.50	.20	.17	.09	.09	.08	.02	.02	.02	.02	.01	.01	.01	.01	.01	.00

If calculated TC is much longer than the duration of the most intense portion of the excess rainfall values, consider the S-graph procedures for this basin.

DATA INPUT FOR SUB-BASIN: SUB31

Drainage Area= 1.290 Channel Length= 4.600 Kn= .088 SLOPE= 277.3 STRTL = .75 CNSTL= .12 RTIMP= .00

Rainfall Depth = 3.28

Rainfall Distribution is 100-year, 6-Hour

HEC-1 INPUT IS STORED IN FILE: WAG

TC = .867 hours, which is = 52.0 minutes R = .926 hours.

EXCESS RAINFALL VALUES IN 5-MINUTE INTERVALS

5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
.37	.36	.36	.21	.19	.19	.12	.12	.12	.05	.05	.05	.03	.03	.03	.01	.01	.01

If calculated TC is much longer than the duration of the most intense portion of the excess rainfall values, consider the S-graph procedures for this basin.

DATA INPUT FOR SUB-BASIN: SUB32

Drainage Area= .320 Channel Length= 1.640 Kn= .092 SLOPE= 70.1 STRTL = .81 CNSTL= .26 RTIMP= .00

Rainfall Depth = 3.28

Rainfall Distribution is 100-year, 6-Hour

HEC-1 INPUT IS STORED IN FILE: WAG

TC = .783 hours, which is = 47.0 minutes R = .802 hours.

EXCESS RAINFALL VALUES IN 5-MINUTE INTERVALS

5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
.50	.50	.50	.20	.17	.08	.08	.02	.02	.02	.02	.01	.01	.01	.01	.01	.01	.00

If calculated TC is much longer than the duration of the most intense portion of the excess rainfall values, consider the S-graph procedures for this basin.

```
--------------------------------------------------------------------------------
                    DATA INPUT FOR SUB-BASIN: SUB34
--------------------------------------------------------------------------------
Drainage Area=   .500   Channel Length=  4.600  Kn=  .077  SLOPE=  13.9 STRTL
=  .80  CNSTL=  .24  RTIMP=    .00
Rainfall Depth =  3.28
Rainfall Distribution is 100-year, 6-Hour
--------------------------------------------------------------------------------
                   HEC-1 INPUT IS STORED IN FILE: WAG
--------------------------------------------------------------------------------
TC = 1.417 hours, which is =   85.0 minutes       R =  2.741 hours.
 *WARNING* CALCULATED TC SEEMS TOO LONG.  CHECK PARAMETERS.
--------------------------------------------------------------------------------
               EXCESS RAINFALL VALUES IN 5-MINUTE INTERVALS
--------------------------------------------------------------------------------
     5  10  15  20  25  30  35  40  45  50  55  60  65  70  75  80  85  90
   .50 .50 .50 .20 .17 .08 .08 .08 .02 .02 .02 .01 .01 .01 .01 .01 .00 .00
--------------------------------------------------------------------------------
If calculated TC is much longer than the duration of the most intense portion
of the excess rainfall values, consider the S-graph procedures for this basin.
--------------------------------------------------------------------------------

Enter 1 for a new sub-basin, 2 to STOP
```

Table D-2: *Parameters for MCUHP2 for the 100-year, 6-hour Storm at Wagner Wash.*

Subbasin	Area, Square Mile	Length, miles	Lca, miles	Slope, ft/mile	KN	LAG, hours
N	0.89	3.04	1.32	76.5	0.07	1.04
Pa	0.82	1.84	0.84	31.7	0.07	0.86
Pb	0.99	1.70	1.04	26.4	0.07	0.93
Pc	1.90	2.12	2.04	26.4	0.07	1.31
Qa	1.10	2.52	1.24	37.0	0.07	1.09
Qb	1.50	2.36	1.04	31.7	0.07	1.02
Qc	0.70	1.80	1.24	31.7	0.07	0.98
Ra	1.40	2.84	1.04	31.7	0.07	1.10
Rb	2.20	2.24	1.20	21.1	0.07	1.14
T	0.49	1.44	1.08	36.1	0.07	0.84
U1	0.39	1.24	1.08	36.3	0.07	0.79
Y1	0.35	1.64	0.96	42.7	0.07	0.82
A1	1.06	2.80	1.20	38.9	0.07	1.11
B1	1.25	2.92	1.00	49.0	0.07	1.00
C1	0.85	2.52	0.80	59.9	0.07	0.84
H1	0.25	1.36	0.56	46.3	0.07	0.61
1	0.54	3.08	1.48	84.4	0.07	1.07
4	1.32	3.08	1.48	33.1	0.07	1.28
16U	1.08	2.88	1.48	91.7	0.07	1.03
19	0.66	2.64	1.28	87.1	0.07	0.95
33	1.36	4.60	2.00	41.8	0.07	1.60

```
*****************************************************************************
*                                                                           *
*                              PROGRAM MCUHP2                               *
*                                                                           *
*                    THE MARICOPA COUNTY HYDROLOGY MANUAL                   *
*                                                                           *
*                                                                           *
*                 FLOOD CONTROL DISTRICT OF MARICOPA COUNTY                 *
*                  3335 W. DURANGO, PHOENIX, ARIZONA 85009                  *
*                                                                           *
*   Program MCUHP2, Maricopa County Unit Hydrograph Procedure2 provides the *
*   Unit-graph from the Phoenix Mountain or the Phoenix Valley S-graph.     *
*   It will also provide the rainfall pattern distribution.  Output will be *
*   presented in the form of a HEC-1 input file for immediate application.  *
*                                                                           *
*****************************************************************************

ENTER THE NAME OF THE OUTPUT FILE:

ENTER 1 IF SINGLE BASIN, 2 IF MULTIBASIN DESIGN:
ENTER 1 IF  UNIFORM RAINFALL OVER THE WATERSHED:
ENTER 2 IF CENTERED RAINFALL (HEC-1, JD RECORD):


    Enter the sub-basin name:


    Enter the basin area (Sq. Miles):
ENTER SELECTED RAINFALL DISTRIBUTION:

Enter 1 for 6-hour MCFCD distribution
Enter 2 for 2-hour MCFCD distribution
Enter 3 for 24-hour, SCS TYPE-II distribution

    Enter the point rainfall depth for a frequency of interest (inches):

    ENTER METHOD OF SOIL LOSS COMPUTATION:

    1 = Initial/Uniform, 2 = Green-Ampt

    Enter STRTL, CNSTL, RTIMP (0-100)


**S-GRAPH CONVERSION TO U-GRAPH (CODE BY T.W. HIEB, 12/89)***


Enter 1 for the Phoenix Valley S-graph, 2 for the Phoenix Mountain S-graph:

     Enter the basin LAG time (minutes):

      Enter hydrograph time step (minutes):
```

UNIT HYDROGRAPH FOR BASIN: SUBN

TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)
0.	0.	42.	324.	84.	327.
3.	48.	45.	352.	87.	301.
6.	48.	48.	374.	90.	282.
9.	48.	51.	416.	93.	258.
12.	48.	54.	479.	96.	238.
15.	72.	57.	560.	99.	223.
18.	158.	60.	638.	102.	191.
21.	178.	63.	590.	105.	159.
24.	203.	66.	523.	108.	138.
27.	228.	69.	474.	111.	91.
30.	246.	72.	437.	114.	85.
33.	264.	75.	407.	117.	84.
36.	280.	78.	384.	120.	79.
39.	300.	81.	357.	123.	79.

UNIT HYDROGRAPH FOR BASIN: SUBN

TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)
126.	70.	168.	15.		
129.	48.	171.	15.		
132.	48.	174.	15.		
135.	48.	177.	15.		
138.	48.	180.	15.		
141.	32.	183.	15.		
144.	15.	186.	15.		
147.	15.	189.	0.		
150.	15.	192.	0.		
153.	15.				
156.	15.				
159.	15.				
162.	15.				
165.	15.				

VOLUME OF CALCULATED HYDROGRAPH (Inches)= 1.00

INPUT DATA FOR SUB-BASIN: SUBN

Area= .89, Point rainfall depth= 3.3, Reduction coefficient= 1.00
Rainfall distribution is 6-hour
STRTL= .78 CNSTL= .22 RTIMP= .0
Phoenix Valley S-graph was selected.
Lag Time = 62.4 min., Hydrograph Time Step= 3min.

UNIT HYDROGRAPH FOR BASIN: SUBPa

TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)
0.	0.	42.	453.	84.	224.
3.	54.	45.	535.	87.	179.
6.	54.	48.	649.	90.	145.
9.	54.	51.	702.	93.	95.
12.	59.	54.	606.	96.	95.
15.	176.	57.	535.	99.	89.
18.	200.	60.	485.	102.	88.
21.	238.	63.	445.	105.	71.
24.	264.	66.	414.	108.	54.
27.	292.	69.	373.	111.	54.
30.	311.	72.	337.	114.	54.
33.	340.	75.	313.	117.	33.
36.	374.	78.	277.	120.	16.
39.	408.	81.	255.	123.	16.

UNIT HYDROGRAPH FOR BASIN: SUBPa

TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)
126.	16.				
129.	16.				
132.	16.				
135.	16.				
138.	16.				
141.	16.				
144.	16.				
147.	16.				
150.	16.				
153.	16.				
156.	0.				
159.	0.				

VOLUME OF CALCULATED HYDROGRAPH (Inches)= 1.00

INPUT DATA FOR SUB-BASIN: SUBPa

Area= .82
Rainfall distribution is 6-hour
STRTL= .77 CNSTL= .16 RTIMP= .0
Phoenix Valley S-graph was selected.
Lag Time = 51.6 min., Hydrograph Time Step= 3min.

UNIT HYDROGRAPH FOR BASIN: SUBPb

TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)
0.	0.	42.	455.	84.	312.
3.	60.	45.	498.	87.	288.
6.	60.	48.	584.	90.	260.
9.	60.	51.	690.	93.	218.
12.	60.	54.	792.	96.	172.
15.	158.	57.	718.	99.	125.
18.	210.	60.	629.	102.	106.
21.	243.	63.	569.	105.	103.
24.	281.	66.	523.	108.	98.
27.	306.	69.	486.	111.	98.
30.	330.	72.	452.	114.	72.
33.	355.	75.	411.	117.	60.
36.	382.	78.	374.	120.	60.
39.	420.	81.	349.	123.	60.

UNIT HYDROGRAPH FOR BASIN: SUBPb

TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)
126.	43.	168.	0.		
129.	18.	171.	0.		
132.	18.				
135.	18.				
138.	18.				
141.	18.				
144.	18.				
147.	18.				
150.	18.				
153.	18.				
156.	18.				
159.	18.				
162.	18.				
165.	18.				

VOLUME OF CALCULATED HYDROGRAPH (Inches)= 1.00

INPUT DATA FOR SUB-BASIN: SUBPb

Area= .99
Rainfall distribution is 6-hour
STRTL= .77 CNSTL= .16 RTIMP= .0
Phoenix Valley S-graph was selected.
Lag Time = 55.8 min., Hydrograph Time Step= 3min.

UNIT HYDROGRAPH FOR BASIN: SUBPC

TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)
0.	0.	42.	454.	84.	856.
3.	81.	45.	476.	87.	795.
6.	81.	48.	501.	90.	744.
9.	81.	51.	530.	93.	704.
12.	81.	54.	567.	96.	668.
15.	81.	57.	609.	99.	637.
18.	81.	60.	634.	102.	601.
21.	263.	63.	679.	105.	559.
24.	274.	66.	770.	108.	524.
27.	312.	69.	870.	111.	495.
30.	347.	72.	958.	114.	470.
33.	381.	75.	1080.	117.	431.
36.	399.	78.	1038.	120.	406.
39.	435.	81.	934.	123.	386.

UNIT HYDROGRAPH FOR BASIN: SUBPC

TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)
126.	363.	168.	81.	210.	25.
129.	312.	171.	81.	213.	25.
132.	264.	174.	81.	216.	25.
135.	234.	177.	58.	219.	25.
138.	187.	180.	25.	222.	25.
141.	144.	183.	25.	225.	25.
144.	144.	186.	25.	228.	25.
147.	143.	189.	25.	231.	25.
150.	134.	192.	25.	234.	25.
153.	134.	195.	25.	237.	0.
156.	134.	198.	25.	240.	0.
159.	111.	201.	25.		
162.	81.	204.	25.		
165.	81.	207.	25.		

VOLUME OF CALCULATED HYDROGRAPH (Inches)= 1.00

INPUT DATA FOR SUB-BASIN: SUBPC

Area= 1.90
Rainfall distribution is 6-hour
STRTL= .77 CNSTL= .16 RTIMP= .0
Phoenix Valley S-graph was selected.
Lag Time = 78.6 min., Hydrograph Time Step= 3min.

UNIT HYDROGRAPH FOR BASIN: SUBQa

TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)
0.	0.	42.	363.	84.	431.
3.	57.	45.	392.	87.	395.
6.	57.	48.	426.	90.	367.
9.	57.	51.	449.	93.	340.
12.	57.	54.	502.	96.	317.
15.	57.	57.	577.	99.	290.
18.	184.	60.	675.	102.	272.
21.	200.	63.	755.	105.	252.
24.	224.	66.	693.	108.	217.
27.	262.	69.	619.	111.	168.
30.	278.	72.	563.	114.	153.
33.	304.	75.	520.	117.	100.
36.	321.	78.	486.	120.	100.
39.	340.	81.	457.	123.	98.

UNIT HYDROGRAPH FOR BASIN: SUBQa

TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)
126.	93.	168.	17.		
129.	93.	171.	17.		
132.	83.	174.	17.		
135.	57.	177.	17.		
138.	57.	180.	17.		
141.	57.	183.	17.		
144.	57.	186.	17.		
147.	47.	189.	17.		
150.	17.	192.	17.		
153.	17.	195.	17.		
156.	17.	198.	0.		
159.	17.	201.	0.		
162.	17.				
165.	17.				

VOLUME OF CALCULATED HYDROGRAPH (Inches)= 1.00

INPUT DATA FOR SUB-BASIN: SUBQa

Area= 1.10
Rainfall distribution is 6-hour
STRTL= .79 CNSTL= .20 RTIMP= .0
Phoenix Valley S-graph was selected.
Lag Time = 65.4 min., Hydrograph Time Step= 3min.

UNIT HYDROGRAPH FOR BASIN: SUBQb

TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)
0.	0.	42.	566.	84.	538.
3.	83.	45.	620.	87.	499.
6.	83.	48.	659.	90.	461.
9.	83.	51.	747.	93.	420.
12.	83.	54.	890.	96.	393.
15.	141.	57.	993.	99.	352.
18.	271.	60.	1094.	102.	299.
21.	311.	63.	961.	105.	237.
24.	358.	66.	861.	108.	184.
27.	395.	69.	785.	111.	146.
30.	429.	72.	726.	114.	146.
33.	459.	75.	679.	117.	136.
36.	490.	78.	641.	120.	136.
39.	525.	81.	582.	123.	131.

UNIT HYDROGRAPH FOR BASIN: SUBQb

TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)
126.	83.	168.	25.		
129.	83.	171.	25.		
132.	83.	174.	25.		
135.	83.	177.	25.		
138.	60.	180.	25.		
141.	25.	183.	0.		
144.	25.	186.	0.		
147.	25.				
150.	25.				
153.	25.				
156.	25.				
159.	25.				
162.	25.				
165.	25.				

VOLUME OF CALCULATED HYDROGRAPH (Inches)= 1.00

INPUT DATA FOR SUB-BASIN: SUBQb

Area= 1.50
Rainfall distribution is 6-hour
STRTL= .79 CNSTL= .20 RTIMP= .0
Phoenix Valley S-graph was selected.
Lag Time = 61.2 min., Hydrograph Time Step= 3min.

UNIT HYDROGRAPH FOR BASIN: SUBQc

TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)
0.	0.	42.	290.	84.	239.
3.	40.	45.	311.	87.	220.
6.	40.	48.	345.	90.	201.
9.	40.	51.	400.	93.	188.
12.	40.	54.	474.	96.	162.
15.	85.	57.	532.	99.	133.
18.	134.	60.	481.	102.	115.
21.	154.	63.	424.	105.	72.
24.	183.	66.	385.	108.	71.
27.	197.	69.	355.	111.	69.
30.	216.	72.	331.	114.	66.
33.	229.	75.	311.	117.	66.
36.	244.	78.	282.	120.	48.
39.	266.	81.	260.	123.	40.

UNIT HYDROGRAPH FOR BASIN: SUBQc

TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)
126.	40.	168.	12.		
129.	40.	171.	12.		
132.	35.	174.	12.		
135.	12.	177.	0.		
138.	12.	180.	0.		
141.	12.				
144.	12.				
147.	12.				
150.	12.				
153.	12.				
156.	12.				
159.	12.				
162.	12.				
165.	12.				

VOLUME OF CALCULATED HYDROGRAPH (Inches)= 1.00

INPUT DATA FOR SUB-BASIN: SUBQc

Area= .70
Rainfall distribution is 6-hour
STRTL= .79 CNSTL= .20 RTIMP= .0
Phoenix Valley S-graph was selected.
Lag Time = 58.8 min., Hydrograph Time Step= 3min.

UNIT HYDROGRAPH FOR BASIN: SUBRa

TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)
0.	0.	42.	455.	84.	555.
3.	71.	45.	488.	87.	508.
6.	71.	48.	532.	90.	470.
9.	71.	51.	559.	93.	439.
12.	71.	54.	624.	96.	413.
15.	71.	57.	713.	99.	373.
18.	225.	60.	827.	102.	350.
21.	250.	63.	937.	105.	329.
24.	278.	66.	902.	108.	280.
27.	329.	69.	796.	111.	235.
30.	349.	72.	724.	114.	205.
33.	380.	75.	668.	117.	142.
36.	403.	78.	621.	120.	126.
39.	427.	81.	585.	123.	126.

UNIT HYDROGRAPH FOR BASIN: SUBRa

TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)
126.	118.	168.	22.		
129.	117.	171.	22.		
132.	117.	174.	22.		
135.	77.	177.	22.		
138.	71.	180.	22.		
141.	71.	183.	22.		
144.	71.	186.	22.		
147.	71.	189.	22.		
150.	31.	192.	22.		
153.	22.	195.	22.		
156.	22.	198.	0.		
159.	22.	201.	0.		
162.	22.				
165.	22.				

VOLUME OF CALCULATED HYDROGRAPH (Inches)= 1.00

INPUT DATA FOR SUB-BASIN: SUBRa

Area= 1.40
Rainfall distribution is 6-hour
STRTL= .79 CNSTL= .20 RTIMP= .0
Phoenix Valley S-graph was selected.
Lag Time = 66.0 min., Hydrograph Time Step= 3min.

UNIT HYDROGRAPH FOR BASIN: SUBRb

TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)
0.	0.	42.	665.	84.	884.
3.	108.	45.	715.	87.	841.
6.	108.	48.	773.	90.	773.
9.	108.	51.	822.	93.	715.
12.	108.	54.	880.	96.	670.
15.	108.	57.	988.	99.	631.
18.	295.	60.	1143.	102.	576.
21.	365.	63.	1289.	105.	536.
24.	415.	66.	1447.	108.	506.
27.	481.	69.	1325.	111.	447.
30.	519.	72.	1187.	114.	390.
33.	559.	75.	1084.	117.	311.
36.	596.	78.	1004.	120.	261.
39.	628.	81.	939.	123.	192.

UNIT HYDROGRAPH FOR BASIN: SUBRb

TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)
126.	192.	168.	33.	210.	0.
129.	185.	171.	33.		
132.	178.	174.	33.		
135.	178.	177.	33.		
138.	160.	180.	33.		
141.	108.	183.	33.		
144.	108.	186.	33.		
147.	108.	189.	33.		
150.	108.	192.	33.		
153.	107.	195.	33.		
156.	33.	198.	33.		
159.	33.	201.	33.		
162.	33.	204.	33.		
165.	33.	207.	0.		

VOLUME OF CALCULATED HYDROGRAPH (Inches)= 1.00

INPUT DATA FOR SUB-BASIN: SUBRb

Area= 2.20
Rainfall distribution is 6-hour
STRTL= .79 CNSTL= .20 RTIMP= .0
Phoenix Valley S-graph was selected.
Lag Time = 68.4 min., Hydrograph Time Step= 3min.

UNIT HYDROGRAPH FOR BASIN: SUBT

TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)
0.	0.	42.	293.	84.	120.
3.	33.	45.	362.	87.	94.
6.	33.	48.	410.	90.	64.
9.	33.	51.	407.	93.	58.
12.	43.	54.	351.	96.	55.
15.	108.	57.	313.	99.	54.
18.	125.	60.	285.	102.	47.
21.	150.	63.	263.	105.	33.
24.	165.	66.	241.	108.	33.
27.	180.	69.	216.	111.	33.
30.	195.	72.	197.	114.	23.
33.	211.	75.	179.	117.	10.
36.	235.	78.	162.	120.	10.
39.	255.	81.	146.	123.	10.

UNIT HYDROGRAPH FOR BASIN: SUBT

TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)
126.	10.				
129.	10.				
132.	10.				
135.	10.				
138.	10.				
141.	10.				
144.	10.				
147.	10.				
150.	10.				
153.	0.				
156.	0.				

VOLUME OF CALCULATED HYDROGRAPH (Inches)= 1.00

INPUT DATA FOR SUB-BASIN: SUBT

Area= .49
Rainfall distribution is 6-hour
STRTL= .79 CNSTL= .21 RTIMP= .0
Phoenix Valley S-graph was selected.
Lag Time = 50.4 min., Hydrograph Time Step= 3min.

UNIT HYDROGRAPH FOR BASIN: SUBU1

TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)
0.	0.	42.	297.	84.	62.
3.	28.	45.	344.	87.	49.
6.	28.	48.	346.	90.	47.
9.	28.	51.	295.	93.	46.
12.	51.	54.	262.	96.	40.
15.	95.	57.	237.	99.	28.
18.	113.	60.	219.	102.	28.
21.	132.	63.	197.	105.	28.
24.	146.	66.	177.	108.	15.
27.	159.	69.	162.	111.	8.
30.	173.	72.	142.	114.	8.
33.	192.	75.	131.	117.	8.
36.	212.	78.	111.	120.	8.
39.	238.	81.	84.	123.	8.

UNIT HYDROGRAPH FOR BASIN: SUBU1

TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)
126.	8.				
129.	8.				
132.	8.				
135.	8.				
138.	8.				
141.	8.				
144.	0.				
147.	0.				

VOLUME OF CALCULATED HYDROGRAPH (Inches)= 1.00

INPUT DATA FOR SUB-BASIN: SUBU1

Area= .39
Rainfall distribution is 6-hour
STRTL= .77 CNSTL= .18 RTIMP= .0
Phoenix Valley S-graph was selected.
Lag Time = 47.4 min., Hydrograph Time Step= 3min.

UNIT HYDROGRAPH FOR BASIN: SUBY1

TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)
0.	0.	42.	227.	84.	72.
3.	24.	45.	274.	87.	55.
6.	24.	48.	316.	90.	42.
9.	24.	51.	279.	93.	41.
12.	36.	54.	243.	96.	39.
15.	80.	57.	219.	99.	38.
18.	94.	60.	200.	102.	24.
21.	112.	63.	185.	105.	24.
24.	123.	66.	166.	108.	24.
27.	134.	69.	150.	111.	18.
30.	145.	72.	137.	114.	7.
33.	159.	75.	122.	117.	7.
36.	177.	78.	113.	120.	7.
39.	193.	81.	95.	123.	7.

UNIT HYDROGRAPH FOR BASIN: SUBY1

TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)
126.	7.				
129.	7.				
132.	7.				
135.	7.				
138.	7.				
141.	7.				
144.	7.				
147.	0.				
150.	0.				

VOLUME OF CALCULATED HYDROGRAPH (Inches)= 1.00

INPUT DATA FOR SUB-BASIN: SUBY1

Area= .35
Rainfall distribution is 6-hour
STRTL= .80 CNSTL= .23 RTIMP= .0
Phoenix Valley S-graph was selected.
Lag Time = 49.2 min., Hydrograph Time Step= 3min.

UNIT HYDROGRAPH FOR BASIN: SUBA1

TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)
0.	0.	42.	192.	84.	238.
3.	30.	45.	206.	87.	222.
6.	30.	48.	223.	90.	203.
9.	30.	51.	236.	93.	189.
12.	30.	54.	259.	96.	178.
15.	30.	57.	296.	99.	163.
18.	92.	60.	349.	102.	151.
21.	105.	63.	384.	105.	142.
24.	116.	66.	392.	108.	126.
27.	140.	69.	347.	111.	109.
30.	148.	72.	313.	114.	87.
33.	160.	75.	288.	117.	72.
36.	169.	78.	268.	120.	54.
39.	180.	81.	253.	123.	54.

UNIT HYDROGRAPH FOR BASIN: SUBA1

TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)
126.	51.	168.	9.		
129.	50.	171.	9.		
132.	50.	174.	9.		
135.	41.	177.	9.		
138.	30.	180.	9.		
141.	30.	183.	9.		
144.	30.	186.	9.		
147.	30.	189.	9.		
150.	23.	192.	9.		
153.	9.	195.	9.		
156.	9.	198.	9.		
159.	9.	201.	0.		
162.	9.	204.	0.		
165.	9.				

VOLUME OF CALCULATED HYDROGRAPH (Inches)= 1.00

INPUT DATA FOR SUB-BASIN: SUBA1

Area= .60
Rainfall distribution is 6-hour
STRTL= .81 CNSTL= .25 RTIMP= .0
Phoenix Valley S-graph was selected.
Lag Time = 66.6 min., Hydrograph Time Step= 3min.

UNIT HYDROGRAPH FOR BASIN: SUBB1

TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)
0.	0.	42.	497.	84.	437.
3.	70.	45.	534.	87.	410.
6.	70.	48.	577.	90.	370.
9.	70.	51.	669.	93.	342.
12.	70.	54.	799.	96.	318.
15.	134.	57.	890.	99.	269.
18.	230.	60.	892.	102.	210.
21.	269.	63.	777.	105.	180.
24.	312.	66.	702.	108.	124.
27.	339.	69.	643.	111.	124.
30.	371.	72.	597.	114.	118.
33.	397.	75.	561.	117.	115.
36.	423.	78.	521.	120.	115.
39.	452.	81.	474.	123.	76.

UNIT HYDROGRAPH FOR BASIN: SUBB1

TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)
126.	70.	168.	22.		
129.	70.	171.	22.		
132.	70.	174.	22.		
135.	57.	177.	22.		
138.	22.	180.	0.		
141.	22.	183.	0.		
144.	22.				
147.	22.				
150.	22.				
153.	22.				
156.	22.				
159.	22.				
162.	22.				
165.	22.				

VOLUME OF CALCULATED HYDROGRAPH (Inches)= 1.00

INPUT DATA FOR SUB-BASIN: SUBB1

Area= 1.25
Rainfall distribution is 6-hour
STRTL= .80 CNSTL= .25 RTIMP= .0
Phoenix Valley S-graph was selected.
Lag Time = 60.0 min., Hydrograph Time Step= 3min.

UNIT HYDROGRAPH FOR BASIN: SUBC1

TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)
0.	0.	42.	508.	84.	208.
3.	57.	45.	628.	87.	163.
6.	57.	48.	711.	90.	111.
9.	57.	51.	706.	93.	100.
12.	74.	54.	608.	96.	96.
15.	187.	57.	542.	99.	93.
18.	216.	60.	494.	102.	82.
21.	261.	63.	456.	105.	57.
24.	286.	66.	419.	108.	57.
27.	313.	69.	374.	111.	57.
30.	338.	72.	342.	114.	40.
33.	367.	75.	310.	117.	17.
36.	408.	78.	281.	120.	17.
39.	442.	81.	253.	123.	17.

UNIT HYDROGRAPH FOR BASIN: SUBC1

TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)
126.	17.				
129.	17.				
132.	17.				
135.	17.				
138.	17.				
141.	17.				
144.	17.				
147.	17.				
150.	17.				
153.	0.				
156.	0.				

VOLUME OF CALCULATED HYDROGRAPH (Inches)= 1.00

INPUT DATA FOR SUB-BASIN: SUBC1

Area= .85
Rainfall distribution is 6-hour
STRTL= .81 CNSTL= .25 RTIMP= .0
Phoenix Valley S-graph was selected.
Lag Time = 50.4 min., Hydrograph Time Step= 3min.

UNIT HYDROGRAPH FOR BASIN: SUBH1

TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)
0.	0.	42.	218.	84.	12.
3.	23.	45.	193.	87.	7.
6.	23.	48.	172.	90.	7.
9.	33.	51.	148.	93.	7.
12.	80.	54.	131.	96.	7.
15.	99.	57.	114.	99.	7.
18.	117.	60.	96.	102.	7.
21.	131.	63.	71.	105.	7.
24.	147.	66.	45.	108.	7.
27.	168.	69.	40.	111.	0.
30.	193.	72.	38.	114.	0.
33.	248.	75.	30.		
36.	296.	78.	23.		
39.	257.	81.	23.		

VOLUME OF CALCULATED HYDROGRAPH (Inches)= 1.00

INPUT DATA FOR SUB-BASIN: SUBH1

Area= .25
Rainfall distribution is 6-hour
STRTL= .81 CNSTL= .26 RTIMP= .0
Phoenix Valley S-graph was selected.
Lag Time = 36.6 min., Hydrograph Time Step= 3min.

UNIT HYDROGRAPH FOR BASIN: SUB1

TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)
0.	0.	42.	185.	84.	207.
3.	28.	45.	202.	87.	188.
6.	28.	48.	215.	90.	176.
9.	28.	51.	232.	93.	165.
12.	28.	54.	264.	96.	150.
15.	33.	57.	316.	99.	139.
18.	93.	60.	341.	102.	131.
21.	102.	63.	375.	105.	112.
24.	115.	66.	330.	108.	93.
27.	132.	69.	297.	111.	81.
30.	141.	72.	272.	114.	55.
33.	154.	75.	252.	117.	50.
36.	162.	78.	236.	120.	50.
39.	172.	81.	222.	123.	47.

UNIT HYDROGRAPH FOR BASIN: SUB1

TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)
126.	47.	168.	9.		
129.	45.	171.	9.		
132.	28.	174.	9.		
135.	28.	177.	9.		
138.	28.	180.	9.		
141.	28.	183.	9.		
144.	25.	186.	9.		
147.	9.	189.	9.		
150.	9.	192.	0.		
153.	9.	195.	0.		
156.	9.				
159.	9.				
162.	9.				
165.	9.				

VOLUME OF CALCULATED HYDROGRAPH (Inches)= 1.00

INPUT DATA FOR SUB-BASIN: SUB1

Area= .54
Rainfall distribution is 6-hour
STRTL= .79 CNSTL= .22 RTIMP= .0
Phoenix Valley S-graph was selected.
Lag Time = 64.2 min., Hydrograph Time Step= 3min.

UNIT HYDROGRAPH FOR BASIN: SUB4

TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)
0.	0.	42.	327.	84.	580.
3.	58.	45.	344.	87.	542.
6.	58.	48.	364.	90.	508.
9.	58.	51.	387.	93.	483.
12.	58.	54.	415.	96.	459.
15.	58.	57.	439.	99.	434.
18.	73.	60.	463.	102.	403.
21.	190.	63.	511.	105.	377.
24.	200.	66.	577.	108.	355.
27.	222.	69.	673.	111.	337.
30.	257.	72.	715.	114.	310.
33.	275.	75.	768.	117.	290.
36.	291.	78.	691.	120.	276.
39.	313.	81.	627.	123.	260.

UNIT HYDROGRAPH FOR BASIN: SUB4

TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)
126.	222.	168.	58.	210.	18.
129.	188.	171.	58.	213.	18.
132.	166.	174.	27.	216.	18.
135.	131.	177.	18.	219.	18.
138.	102.	180.	18.	222.	18.
141.	102.	183.	18.	225.	18.
144.	101.	186.	18.	228.	18.
147.	95.	189.	18.	231.	0.
150.	95.	192.	18.	234.	0.
153.	95.	195.	18.		
156.	71.	198.	18.		
159.	58.	201.	18.		
162.	58.	204.	18.		
165.	58.	207.	18.		

VOLUME OF CALCULATED HYDROGRAPH (Inches)= 1.00

INPUT DATA FOR SUB-BASIN: SUB4

Area= 1.32
Rainfall distribution is 6-hour
STRTL= .80 CNSTL= .40 RTIMP= .0
Phoenix Valley S-graph was selected.
Lag Time = 76.8 min., Hydrograph Time Step= 3min.

UNIT HYDROGRAPH FOR BASIN: SUB16U

TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)
0.	0.	42.	400.	84.	390.
3.	59.	45.	437.	87.	363.
6.	59.	48.	462.	90.	340.
9.	59.	51.	520.	93.	305.
12.	59.	54.	605.	96.	285.
15.	94.	57.	705.	99.	265.
18.	193.	60.	783.	102.	226.
21.	220.	63.	706.	105.	176.
24.	252.	66.	626.	108.	154.
27.	280.	69.	570.	111.	104.
30.	304.	72.	527.	114.	104.
33.	325.	75.	492.	117.	100.
36.	346.	78.	462.	120.	97.
39.	372.	81.	428.	123.	97.

UNIT HYDROGRAPH FOR BASIN: SUB16U

TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)
126.	71.	168.	18.		
129.	59.	171.	18.		
132.	59.	174.	18.		
135.	59.	177.	18.		
138.	59.	180.	18.		
141.	21.	183.	18.		
144.	18.	186.	0.		
147.	18.	189.	0.		
150.	18.				
153.	18.				
156.	18.				
159.	18.				
162.	18.				
165.	18.				

VOLUME OF CALCULATED HYDROGRAPH (Inches)= 1.00

INPUT DATA FOR SUB-BASIN: SUB16U

Area= 1.08
Rainfall distribution is 6-hour
STRTL= .81 CNSTL= .25 RTIMP= 10.0
Phoenix Valley S-graph was selected.
Lag Time = 61.8 min., Hydrograph Time Step= 3min.

UNIT HYDROGRAPH FOR BASIN: SUB19

TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)
0.	0.	42.	293.	84.	217.
3.	39.	45.	314.	87.	197.
6.	39.	48.	361.	90.	184.
9.	39.	51.	438.	93.	159.
12.	39.	54.	486.	96.	129.
15.	95.	57.	497.	99.	111.
18.	135.	60.	431.	102.	69.
21.	154.	63.	387.	105.	69.
24.	182.	66.	354.	108.	66.
27.	196.	69.	328.	111.	64.
30.	214.	72.	307.	114.	64.
33.	227.	75.	282.	117.	42.
36.	246.	78.	256.	120.	39.
39.	266.	81.	237.	123.	39.

UNIT HYDROGRAPH FOR BASIN: SUB19

TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)
126.	39.	168.	12.		
129.	25.	171.	0.		
132.	12.	174.	0.		
135.	12.				
138.	12.				
141.	12.				
144.	12.				
147.	12.				
150.	12.				
153.	12.				
156.	12.				
159.	12.				
162.	12.				
165.	12.				

VOLUME OF CALCULATED HYDROGRAPH (Inches)= 1.00

INPUT DATA FOR SUB-BASIN: SUB19

Area= .66
Rainfall distribution is 6-hour
STRTL= .71 CNSTL= .05 RTIMP= .0
Phoenix Valley S-graph was selected.
Lag Time = 57.0 min., Hydrograph Time Step= 3min.

UNIT HYDROGRAPH FOR BASIN: SUB33

TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)
0.	0.	42.	232.	84.	505.
3.	48.	45.	242.	87.	564.
6.	48.	48.	255.	90.	606.
9.	48.	51.	268.	93.	639.
12.	48.	54.	277.	96.	590.
15.	48.	57.	288.	99.	539.
18.	48.	60.	301.	102.	506.
21.	48.	63.	316.	105.	472.
24.	117.	66.	334.	108.	448.
27.	157.	69.	355.	111.	427.
30.	167.	72.	367.	114.	409.
33.	183.	75.	384.	117.	391.
36.	200.	78.	417.	120.	376.
39.	219.	81.	459.	123.	361.

UNIT HYDROGRAPH FOR BASIN: SUB33

TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)
126.	339.	168.	114.	210.	48.
129.	321.	171.	84.	213.	48.
132.	305.	174.	84.	216.	33.
135.	290.	177.	84.	219.	15.
138.	278.	180.	83.	222.	15.
141.	263.	183.	78.	225.	15.
144.	249.	186.	78.	228.	15.
147.	233.	189.	78.	231.	15.
150.	226.	192.	78.	234.	15.
153.	219.	195.	54.	237.	15.
156.	185.	198.	48.	240.	15.
159.	182.	201.	48.	243.	15.
162.	137.	204.	48.	246.	15.
165.	137.	207.	48.	249.	15.

UNIT HYDROGRAPH FOR BASIN: SUB33

TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)	TIME (cfs)	DISCHARGE (min.)
252.	15.				
255.	15.				
258.	15.				
261.	15.				
264.	15.				
267.	15.				
270.	15.				
273.	15.				
276.	15.				
279.	15.				
282.	15.				
285.	15.				
288.	0.				
291.	0.				

VOLUME OF CALCULATED HYDROGRAPH (Inches)= 1.00

INPUT DATA FOR SUB-BASIN: SUB33

Area= 1.36
Rainfall distribution is 6-hour
STRTL= .74 CNSTL= .28 RTIMP= .0
Phoenix Valley S-graph was selected.
Lag Time = 96.0 min., Hydrograph Time Step= 3min.

Stop - Program terminated.

Table D-3: *Equation for Estimating K_b in the Tc Equation.*

$K_b = m \log A + b$
Where A is drainage area, in acres

Land Classification	Equation Parameters m	Equation Parameters b
Urban	– 0.00625	0.04
Bare or nearly bare ground (bare, agricultural land, desert rangeland)	– 0.01375	0.08
Rough and/or moderate vegetation (hillslopes, alluvial fan)	– 0.025	0.15
Very rough and/or dense vegetation (mountains)	– 0.030	0.20

(Source: Flood Control District 1989)

Table D-4: *Values of the Synthetic Dimensionless Time-Area Relations for the Clark Unit Hydrograph.*

Time, as a percent of Time of Concentration	Contributing Area, as a Percent of Total Area		
	Urban Watersheds	Natural Watersheds	HEC-1 Default
0	0	0	0.0
10	5	3	4.5
20	16	5	12.6
30	30	8	23.2
40	65	12	35.8
50	77	20	50.0
60	84	43	64.2
70	90	75	76.8
80	94	90	87.4
90	97	96	95.5
100	100	100	100.0

(Source: Flood Control District 1989)

Worksheet 3: Time of concentration (T_c) or travel time (T_t)

Project WAGNER WASH By SS Date _____

Location SUB Pa Checked _____ Date _____

Circle one: (Present) Developed _____

Circle one: (T_c) T_t through subarea _____

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments.

Sheet flow (Applicable to T_c only)	Segment ID				
1. Surface description (table 3-1)		BARE			
2. Manning's roughness coeff., n (table 3-1) ..		0.13			
3. Flow length, L (total L $\leq$ 300 ft)	ft	300			
4. Two-yr 24-hr rainfall, P_2	in	1.5			
5. Land slope, s	ft/ft	.006			
6. $T_t = \frac{0.007\ (nL)^{0.8}}{P_2^{0.5}\ s^{0.4}}$ Compute T_t	hr	.82	+		= .82

Shallow concentrated flow	Segment ID				
7. Surface description (paved or unpaved)		UNDEVELOPED			
8. Flow length, L	ft	3000			
9. Watercourse slope, s	ft/ft	.006			
10. Average velocity, V (figure 3-1)	ft/s	1.2			
11. $T_t = \frac{L}{3600\ V}$ Compute T_t	hr	.69	+		= .69

Channel flow	Segment ID				
12. Cross sectional flow area, a	ft^2				
13. Wetted perimeter, p_w	ft				
14. Hydraulic radius, $r = \frac{a}{p_w}$ Compute r	ft				
15. Channel slope, s	ft/ft				
16. Manning's roughness coeff., n		mannings			
17. $V = \frac{1.49\ r^{2/3}\ s^{1/2}}{n}$ Compute V	ft/s	2.06			
18. Flow length, L	ft	6415			
19. $T_t = \frac{L}{3600\ V}$ Compute T_t	hr	.86	+		= .86

20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19) ..... hr 2.37

1.42 lag

Worksheet 3: Time of concentration (T_c) or travel time (T_t)

Project WAGNER WASH By SS Date _____

Location SUB Pb Checked _____ Date _____

Circle one: Present Developed

Circle one: T_c T_t through subarea

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments.

Sheet flow (Applicable to T_c only)		Segment ID				
1. Surface description (table 3-1)		BARE				
2. Manning's roughness coeff., n (table 3-1) ..		.13				
3. Flow length, L (total L ≤ 300 ft)	ft	250				
4. Two-yr 24-hr rainfall, P_2	in	1.5				
5. Land slope, s	ft/ft	.005				
6. $T_t = \frac{0.007\ (nL)^{0.8}}{P_2^{0.5}\ s^{0.4}}$ Compute T_t	hr	.77	+		=	.77

Shallow concentrated flow		Segment ID				
7. Surface description (paved or unpaved)		UNDEV				
8. Flow length, L	ft	2500				
9. Watercourse slope, s	ft/ft	.005				
10. Average velocity, V (figure 3-1)	ft/s	1.1				
11. $T_t = \frac{L}{3600\ V}$ Compute T_t	hr	.63	+		=	.63

Channel flow		Segment ID				
12. Cross sectional flow area, a	ft^2					
13. Wetted perimeter, p_w	ft					
14. Hydraulic radius, $r = \frac{a}{p_w}$ Compute r	ft					
15. Channel slope, s	ft/ft					
16. Manning's roughness coeff., n						
17. $V = \frac{1.49\ r^{2/3}\ s^{1/2}}{n}$ Compute V	ft/s	2.2				
18. Flow length, L	ft	6276				
19. $T_t = \frac{L}{3600\ V}$ Compute T_t	hr	.79	+		=	.79
20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19)	hr					2.19

1.31 Pag

Worksheet 3: Time of concentration (T_c) or travel time (T_t)

Project WAGNER WASH By SS Date _____

Location SubPc Checked _____ Date _____

Circle one: Present Developed _____

Circle one: T_c T_t through subarea _____

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments.

Sheet flow (Applicable to T_c only)		Segment ID				
1. Surface description (table 3-1)		BARE				
2. Manning's roughness coeff., n (table 3-1) ..		.13				
3. Flow length, L (total L ≤ 300 ft)	ft	250				
4. Two-yr 24-hr rainfall, P_2	in	1.5				
5. Land slope, s	ft/ft	.005				
6. $T_t = \frac{0.007\ (nL)^{0.8}}{P_2^{0.5}\ s^{0.4}}$ Compute T_t	hr	.77	+		=	.77

Shallow concentrated flow		Segment ID				
7. Surface description (paved or unpaved)		UNDEV				
8. Flow length, L	ft	2500				
9. Watercourse slope, s	ft/ft	.005				
10. Average velocity, V (figure 3-1)	ft/s	1.1				
11. $T_t = \frac{L}{3600\ V}$ Compute T_t	hr	.63	+		=	.63

Channel flow		Segment ID				
12. Cross sectional flow area, a	ft^2					
13. Wetted perimeter, p_w	ft					
14. Hydraulic radius, $r = \frac{a}{p_w}$ Compute r	ft					
15. Channel slope, s	ft/ft					
16. Manning's roughness coeff., n						
17. $V = \frac{1.49\ r^{2/3}\ s^{1/2}}{n}$ Compute V	ft/s	2.5				
18. Flow length, L	ft	8444				
19. $T_t = \frac{L}{3600\ V}$ Compute T_t	hr	.94	+		=	.94

20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19) ..... hr 2.34

1.40 lag

Worksheet 3: Time of concentration (T_c) or travel time (T_t)

Project WAGNER WASH By SS Date _____

Location SUB Qa Checked _____ Date _____

Circle one: Present Developed

Circle one: T_c T_t through subarea

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments.

Sheet flow (Applicable to T_c only)		Segment ID				
1. Surface description (table 3-1)		BARE				
2. Manning's roughness coeff., n (table 3-1) ..		0.13				
3. Flow length, L (total L $\leq$ 300 ft)	ft	300				
4. Two-yr 24-hr rainfall, P_2	in	1.5				
5. Land slope, s	ft/ft	.007				
6. $T_t = \frac{0.007\ (nL)^{0.8}}{P_2^{0.5}\ s^{0.4}}$ Compute T_t	hr	.78	+		=	.78

Shallow concentrated flow		Segment ID				
7. Surface description (paved or unpaved)		UNDEV				
8. Flow length, L	ft	3000				
9. Watercourse slope, s	ft/ft	.007				
10. Average velocity, V (figure 3-1)	ft/s	1.3				
11. $T_t = \frac{L}{3600\ V}$ Compute T_t	hr	.64	+		=	.64

Channel flow		Segment ID				
12. Cross sectional flow area, a	ft^2					
13. Wetted perimeter, p_w	ft					
14. Hydraulic radius, $r = \frac{a}{p_w}$ Compute r	ft					
15. Channel slope, s	ft/ft					
16. Manning's roughness coeff., n		mannings				
17. $V = \frac{1.49\ r^{2/3}\ s^{1/2}}{n}$ Compute V	ft/s	2.22				
18. Flow length, L	ft	10,006				
19. $T_t = \frac{L}{3600\ V}$ Compute T_t	hr	1.25	+		=	1.25
20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19)	hr					2.67

1.60 lag

Worksheet 3: Time of concentration (T_c) or travel time (T_t)

Project WAGNER WASH By SS Date _____

Location SUB Db Checked _____ Date _____

Circle one: Present Developed

Circle one: T_c T_t through subarea

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments.

Sheet flow (Applicable to T_c only)		Segment ID				
1. Surface description (table 3-1)		BARE				
2. Manning's roughness coeff., n (table 3-1) ..		.13				
3. Flow length, L (total L $\leq$ 300 ft)	ft	250				
4. Two-yr 24-hr rainfall, P_2	in	1.5				
5. Land slope, s	ft/ft	.006				
6. $T_t = \frac{0.007\ (nL)^{0.8}}{P_2^{0.5}\ s^{0.4}}$ Compute T_t	hr	.72	+		=	.72

Shallow concentrated flow		Segment ID				
7. Surface description (paved or unpaved)		UNDEV				
8. Flow length, L	ft	2000				
9. Watercourse slope, s	ft/ft	.006				
10. Average velocity, V (figure 3-1)	ft/s	1.2				
11. $T_t = \frac{L}{3600\ V}$ Compute T_t	hr	.46	+		=	.46

Channel flow		Segment ID				
12. Cross sectional flow area, a	ft^2					
13. Wetted perimeter, p_w	ft					
14. Hydraulic radius, $r = \frac{a}{p_w}$ Compute r	ft					
15. Channel slope, s	ft/ft					
16. Manning's roughness coeff., n						
17. $V = \frac{1.49\ r^{2/3}\ s^{1/2}}{n}$ Compute V	ft/s	2.4				
18. Flow length, L	ft	10,261				
19. $T_t = \frac{L}{3600\ V}$ Compute T_t	hr	1.18	+		=	1.18

20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19) ..... hr 2.36

1.42 lag

Worksheet 3: Time of concentration (T_c) or travel time (T_t)

Project WAGNER WASH By SS Date _____

Location SUB Qc Checked _____ Date _____

Circle one: Present Developed _____

Circle one: T_c T_t through subarea _____

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments.

Sheet flow (Applicable to T_c only)		Segment ID				
1. Surface description (table 3-1)		BARE				
2. Manning's roughness coeff., n (table 3-1) ..		.13				
3. Flow length, L (total L $\leq$ 300 ft)	ft	250				
4. Two-yr 24-hr rainfall, P_2	in	1.5				
5. Land slope, s	ft/ft	.006				
6. $T_t = \frac{0.007\ (nL)^{0.8}}{P_2^{0.5}\ s^{0.4}}$ Compute T_t	hr	.72	+		=	.72

Shallow concentrated flow		Segment ID				
7. Surface description (paved or unpaved)		UNDEV				
8. Flow length, L	ft	2500				
9. Watercourse slope, s	ft/ft	.006				
10. Average velocity, V (figure 3-1)	ft/s	1.2				
11. $T_t = \frac{L}{3600\ V}$ Compute T_t	hr	.58	+		=	.58

Channel flow		Segment ID				
12. Cross sectional flow area, a	ft^2					
13. Wetted perimeter, p_w	ft					
14. Hydraulic radius, $r = \frac{a}{p_w}$ Compute r	ft					
15. Channel slope, s	ft/ft					
16. Manning's roughness coeff., n						
17. $V = \frac{1.49\ r^{2/3}\ s^{1/2}}{n}$ Compute V	ft/s	2.73				
18. Flow length, L	ft	6754				
19. $T_t = \frac{L}{3600\ V}$ Compute T_t	hr	.69	+		=	.69
20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19)	hr					1.99

1.19

Worksheet 3: Time of concentration (T_c) or travel time (T_t)

Project WAGNER WASH By SS Date _____

Location SUBR4 Checked _____ Date _____

Circle one: Present Developed _____

Circle one: T_c T_t through subarea _____

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments.

Sheet flow (Applicable to T_c only)		Segment ID				
1. Surface description (table 3-1)		BARE				
2. Manning's roughness coeff., n (table 3-1) ..		.13				
3. Flow length, L (total L ≤ 300 ft)	ft	300				
4. Two-yr 24-hr rainfall, P_2	in	1.5				
5. Land slope, s	ft/ft	.006				
6. $T_t = \frac{0.007\ (nL)^{0.8}}{P_2^{0.5}\ s^{0.4}}$ Compute T_t	hr	.83	+		=	.83

Shallow concentrated flow		Segment ID				
7. Surface description (paved or unpaved)		UNDEV				
8. Flow length, L	ft	3000				
9. Watercourse slope, s	ft/ft	.006				
10. Average velocity, V (figure 3-1)	ft/s	1.3				
11. $T_t = \frac{L}{3600\ V}$ Compute T_t	hr	.64	+		=	.64

Channel flow		Segment ID				
12. Cross sectional flow area, a	ft^2					
13. Wetted perimeter, p_w	ft					
14. Hydraulic radius, $r = \frac{a}{p_w}$ Compute r	ft					
15. Channel slope, s	ft/ft					
16. Manning's roughness coeff., n		Mannings				
17. $V = \frac{1.49\ r^{2/3}\ s^{1/2}}{n}$ Compute V	ft/s	2.75				
18. Flow length, L	ft	11,695				
19. $T_t = \frac{L}{3600\ V}$ Compute T_t	hr	1.33	+		=	1.33
20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19)	hr					2.80

1.68 lag

Worksheet 3: Time of concentration (T_c) or travel time (T_t)

Project WAGNER WASH By SS Date

Location SVBR Checked Date

Circle one: Present Developed

Circle one: T_c T_t through subarea

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments.

Sheet flow (Applicable to T_c only)		Segment ID				
1. Surface description (table 3-1)		BARE				
2. Manning's roughness coeff., n (table 3-1) ..		.13				
3. Flow length, L (total L ≤ 300 ft)	ft	250				
4. Two-yr 24-hr rainfall, P_2	in	1.5				
5. Land slope, s	ft/ft	.004				
6. $T_t = \frac{0.007\ (nL)^{0.8}}{P_2^{0.5}\ s^{0.4}}$ Compute T_t	hr	.85	+		=	.85

Shallow concentrated flow		Segment ID				
7. Surface description (paved or unpaved)		UNDEV				
8. Flow length, L	ft	3000				
9. Watercourse slope, s	ft/ft	.004				
10. Average velocity, V (figure 3-1)	ft/s	1				
11. $T_t = \frac{L}{3600\ V}$ Compute T_t	hr	.83	+		=	.83

Channel flow		Segment ID				
12. Cross sectional flow area, a	ft^2					
13. Wetted perimeter, p_w	ft					
14. Hydraulic radius, $r = \frac{a}{p_w}$ Compute r	ft					
15. Channel slope, s	ft/ft					
16. Manning's roughness coeff., n		MANNINGS				
17. $V = \frac{1.49\ r^{2/3}\ s^{1/2}}{n}$ Compute V	ft/s	2.23				
18. Flow length, L	ft	8577				
19. $T_t = \frac{L}{3600\ V}$ Compute T_t	hr	1.07	+		=	1.07

20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19) ..... hr 2.75

1.65 lag

E

Rating Curves

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT WAGNER WASH PAGE 1 OF 8

DETAIL Rating Curves COMPUTED SS DATE

CHECKED BY DATE

SUBA	Height	length	~~Width~~ 20	Acft	SE	SV	SE	SQ
					0	0	0	0
FDR = 6	1	8.3	83	.002	1	.002	2	32.5
Slope = .12	2	16.7	334	.008	2	.008	3	61
width = 20	3	25	750	.017	3	.017	4	84
Design = CSP	4	33.3	1332	.031	4	.031	5	109
1-57x38	5	41.7	2085	.048	5	.048	6	128
ST =	6	50	3000	.069	6	.069		

SUB CP-14	Height	length	60 Width	Acft	SE	SV	SE	x6 SQ	
					0	0	0	0	
FDR = 7	1	66.7	3335	.077	1	.046	2	54	648
slope = .015	2	133.3	13330	.306	2	.184	3	96	1152
width = 60	3	200	30000	.690	3	.413	4	144	1728
Design = CBC	4	266.7	53340	1.224	4	.734	5	198	2376
6 12x5	5	333.3	83325	1.913	5	1.148	6	246	2952
ST =	6	400	120000	2.755	6	1.653	7	282	3384
	7	466.7	163334	3.750	7	2.250			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT WAGNER WASH PAGE 2 OF 8

DETAIL Rating Curves COMPUTED SS DATE

CHECKED BY DATE

SUB U_1

TOR = 7
Slope = .07
width = 40
Design = CBC
2-10x3
ST =

Height	length	Width (40)	Acft	SE	SV	SE	SQ (x2)	
				0	0	0	0	0
1	14.3	286	.007	1	.007	1	6	60
2	28.6	1144	.026	2	.026	2	17.5	175
3	42.9	2574	.059	3	.059	3	30	300
4	57.1	4568	.105	4	.105	4	44	440
5	71.4	7140	.164	5	.164	5	52	520
6	85.7	10284	.236	6	.236	6	62	620
7	100	14000	.321	7	.321	7	68	680

SUB V_1

TOR = 7.5
Slope = .05
width = 40
Design = CBC
2-10x3
ST =

Height	length	Width (40)	Acft	SE	SV	SE	SQ (x2)	
				0	0	0	0	0
1	20	400	.009	1	.009	1	6	60
2	40	1600	.037	2	.037	2	17.5	175
3	60	3600	.083	3	.083	3	30	300
4	80	6400	.147	4	.147	4	44	440
5	100	10000	.230	5	.230	5	52	520
6	120	14400	.331	6	.331	6	62	620
7	140	19600	.450	7	.450	7	68	680
7.5	150	22500	.517	7.5	.517	7.5	72	720

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT WAGNER WASH PAGE 3 OF 8

DETAIL Rating Curves COMPUTED SS DATE

CHECKED BY DATE

SUB Y_1

FDR = 5
Slope = .03
width = 40
Design = CBC
1-10x4
ST =

Height	length	width (AO)	Acft	SE	SV	SE	SQ	
				0	0	0	0	0
1	33.3	666	.015	1	.015	1.5	5.7	57
2	66.7	1334	.031	2	.031	2	8.8	88
3	100 ~~99.9~~	6000 ~~5994~~	.138	3	.138	3	15.5	155
4	133.2	10656	.245	4	.245	4	23	230
5	166.5	16650	.382	5	.382	5	30	300

SUB Z_1

FDR = 35
slope =
width = 40
Design = CSP
2-28x20
ST = 2-35x24

Height	length	width	Acft	SE	SV	SE	SQ
				0	0	0	0
1				1	.015	1	26
2				2	.031	2	14
3				3	.138	3	14
3.5	1167	8169	.188	3.5	.188	3.5	128

	(2x 28x20)	(2x 35x24)	(x2)	(x2)		
1	5.9	7	12	14	→	26
2	16.0	21	32	42		74
3	23	34	46	68		114
3.5	24	38	52	76		130

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT WAGNER WASH PAGE 4 OF 8

DETAIL Rating Curve COMPUTED SS DATE

CHECKED BY DATE

SUB WWest 3

FOR = 6
Slope = .03
width = 80
Design = 6-10x4
ST =

Height	length	width (80)	Acft
1	33.3	999	.023
2	66.7	5336	.123
3	99.9	11988	.275
4	133.2	21312	.489
5	166.5	33300	.764
6	200	48000	1.102

divert

SE	SV	SE	SQ (x6)	
0	0	0	0	0
1	.023	1	34.2	342
2	.123	2	52.8	528
3	.275	3	93	930
4	.489	4	138	1380
5	.764	5	180	1800
6	1.102	6	222	2220

SUB WW main(o)

FOR = 6
Slope = .03
width = 150
Design = 9-12x6
ST =

Height	length	width (150)	Acft
1	33.3	24975	.057
2	66.7	10005	.230
3	99.9	224775	.516
4	133.2	39960	.917
5	166.5	624375	1.433
6	200	90000	2.066

SE	SV	SE	SQ (9)	
0	0	0	0	0
1	.057		81	972
2	.230	2	144	1728
3	.516	3	216	2592
4	.917	4	306	3672
5	1.433	5	396	4752
6	2.066	6		

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT WAGNER WASH PAGE 5 OF 8

DETAIL Rating Curves COMPUTED SS DATE

CHECKED BY DATE

SUB 1 & 2

	Height	length	Width	Acft	SE	SV	SE	SQ	
			30					x6	
					0	0	0	0	0
FDR = 4	1	33.3	4995	.011	1	.011	1.5	34.2	342
Slope = .03	2	66.7	2001	.046	2	.046	2	52.8	528
width = 30	3	99.9	44955	.103	3	.103	3	93	930
Design = 670x4	4	133.2	7992	.183	4	.183	4	138	138

ST =

divert 4

SUB 6

	Height	length	Width	Acft	SE	SV	SE	SQ	
			40					x4	
					0	0	0	0	0
FDR = 5	1	25	500	.011	1	.011	1	12	120
Slope = .04	2	50	2000	.046	2	.046	2	34.8	348
width = 40	3	75	4500	.103	3	.103	3	60	600
Design = 4-10x3	4	100	8000	.184	4	.184	4	88	880
	5	125	12500	.287	5	.287	5	104	1040

ST =

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT WAGNER WASH PAGE 6 OF 8

DETAIL Rating Curves COMPUTED SS DATE

CHECKED BY DATE

SUB 7.

FOR = 6
Slope = .03
width = 40
Design = 3-10x3
ST =

	Height	length	Width (40)	Acft	SE	SV	SE	SQ (x3)	
					0	0	0	0	0
	1	33.3	666.	.015	1	.015	1	9	90
	2	66.7	2668	.061	2	.061	2	26.1	261
	3	99.9	5994	.138	3	.138	3	45	450
	4	133.2	10656	.245	4	.245	4	66	660
	5	166.7	16671	.383	5	.383	5	78	780
	6	200	24000	.551	6	.551	6	93	930

SUB 19 → add Q's

FOR = 4.5
Slope = .02
width = 50
Design = 3 12x3
3 10x4
ST =

	Height	length	Width (50)	Acft	SE	SV	SE	SQ
					0	0	0	0
	1	50	1250	.029	1	.029	1	286.2
	2	100	5000	.115	2	.115	2	570
	3	150	11250	.258	3	.258	3	1005
	4	200	20000	.459	4	.459	4	1554
	4.5	225	25125	.581	4.5	.581	45	1782

	(12x3) x3	(10x4) x3					
0	0	0	0	0			0
1	3.2	5.7	9.6	17.1	115.2	171	286.2
2	8.5	8.8	25.5	26.4	306	264	570
3	15	15.5	45	46.5	540	465	1005
4	21	23	63	69	756	690	1554
4.5	24	27	72	81	864	810	1782

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT WAGNER ~~[illegible]~~ WASH PAGE 7 OF 8

DETAIL Rating Curves COMPUTED SS DATE

CHECKED BY DATE

SUB 20

FDR = 3
Slope = .06
width = ~~30~~ 20
Design = 235x24

Height	Length	Width	Acft	SE	SV	SE	SQ (x2)
				0	0	0	0
1	16.7	167	.004	1	.004	1	14
2	33.3	666	.015	2	.015	2	42
3	50	1500	.034	3	.034	3	68

ST=

SUB 21 → small ponding

FDR = ~~.06~~ 2.5
Slope = ~~20~~ .06
width = 20
Design = 3-28x20

Height	Length	Width	Acft	SE	SQ	
				0	0	0
0	0	0	0	1	5.9	12
1	16.7	167	.004	2	16	32
2	33.3	666	.015	2.5	19	38
2.5	41.7	1042	.024			

ST=

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT WAGNER WASH PAGE 8 OF 8

DETAIL Rating Curves COMPUTED SS DATE

CHECKED BY DATE

SUB 23

FDR = 6.5
Slope = .04
width = 60
Design = 4-10x4
ST =

Height	length	Width (60)	Acft
1	25	750	.017
2	50	3000	.069
3	75	6750	.155
4	100	12000	.275
5	125	18750	.430
6	150	27000	.620
6.5	162.5	31687.5	.727

0	0	0
1	22.8	228
2	35.2	352
3	62	620
4	92	920
5	120	1000
6	148	1480
6.5	160	1600

SUB 26

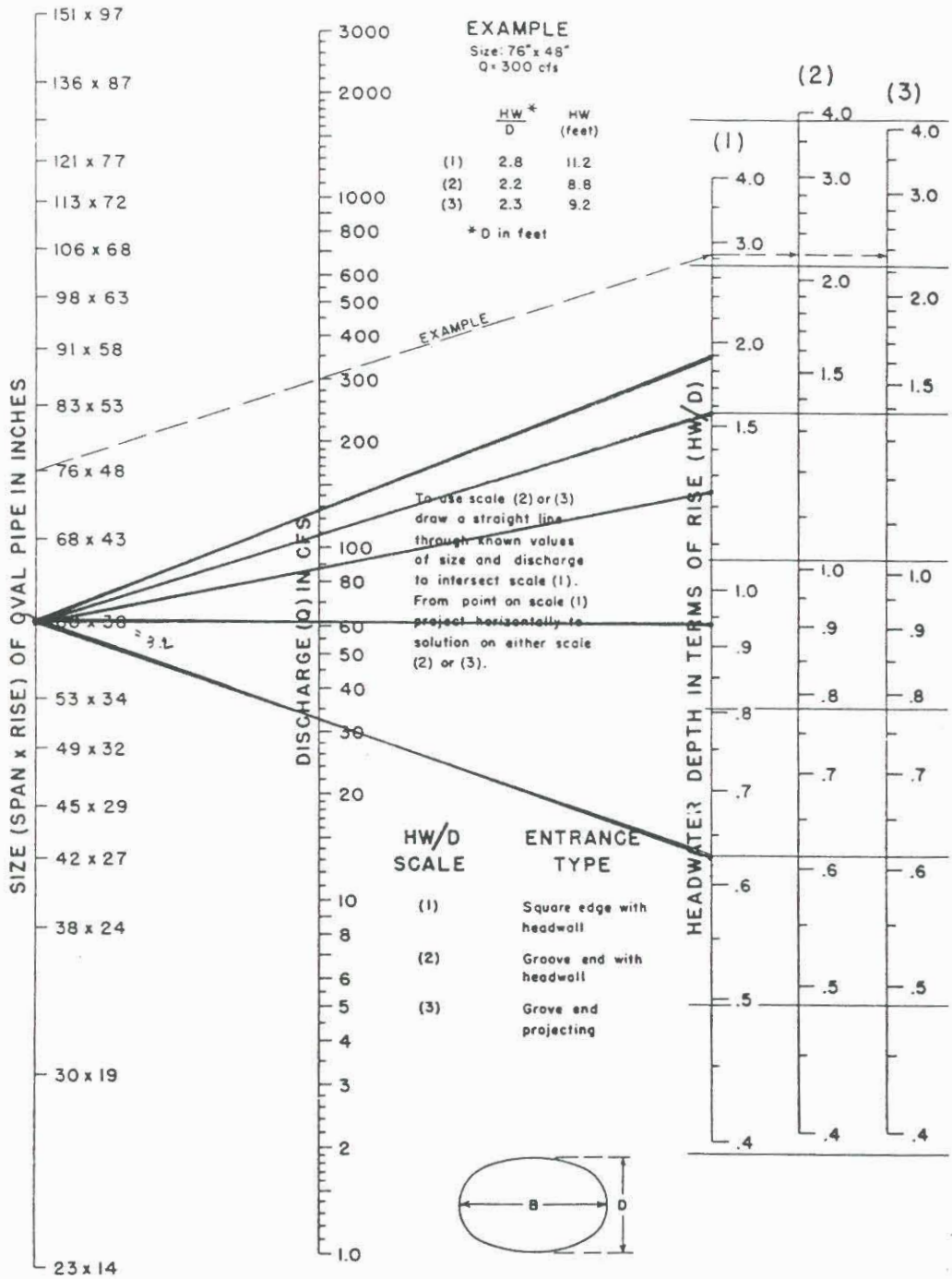
FDR = 4.5
slope = .04
width = 20
Design = 2-49x33
ST =

Height	length	Width (20)	Acft
1	25	250	.006
2	50	1000	.023
3	75	2250	.052
4	1125	4500	.103

SE	SV	SE	SQ (×2)
0	0	0	0
1	.006	1.5	33
2	.023	2.0	54
3	.052	3	94
4	.103	4	130

57 x 38

CHART 3



57 x 38 → 3.2!

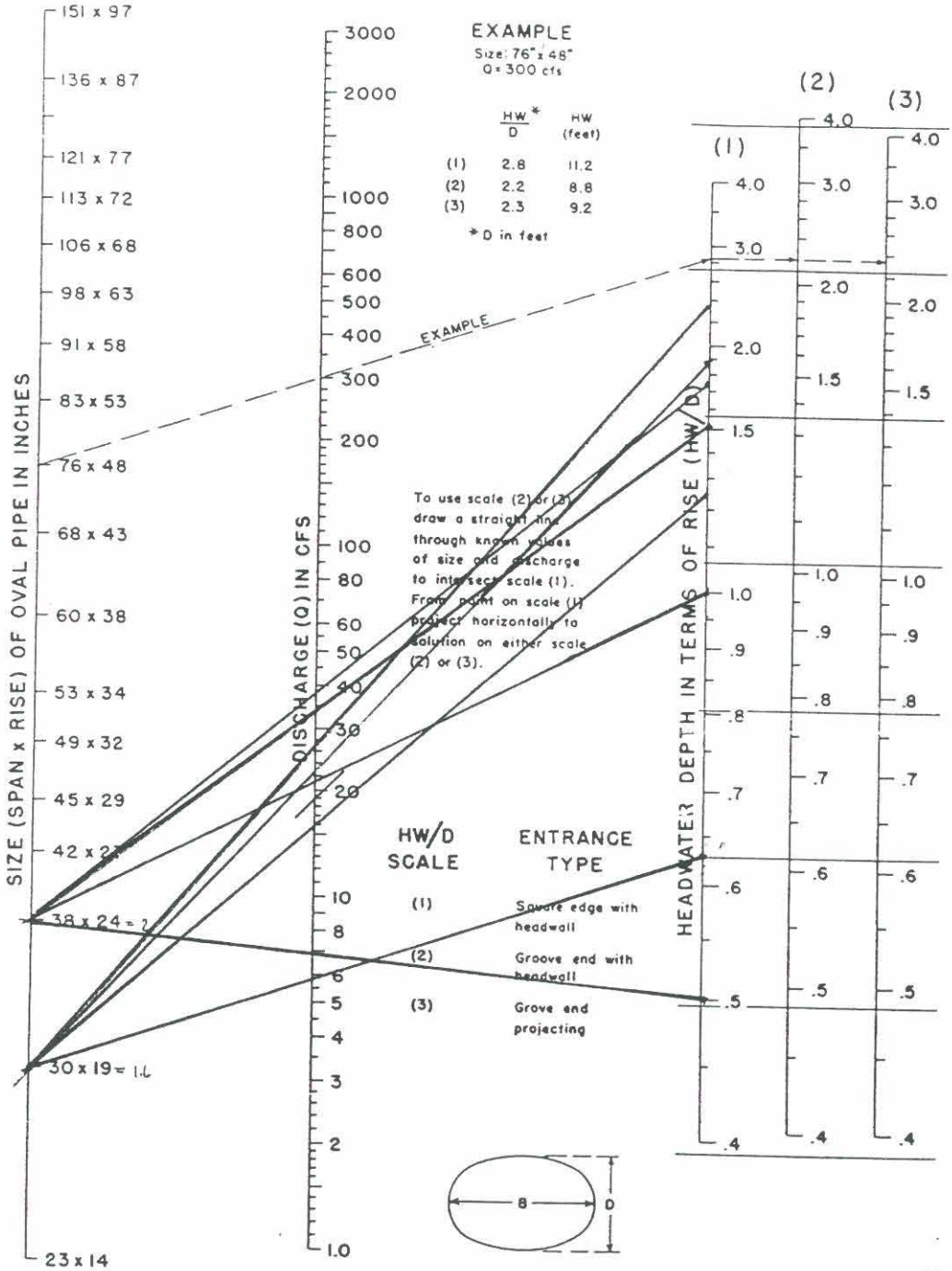
HW	HW/D	Q
2	.63	32.5
3	.94	61.0
4	1.25	84.0
5	1.56	109.0
6	1.88	128.0

BUREAU OF PUBLIC ROADS JAN. 1963

HEADWATER DEPTH FOR OVAL CONCRETE PIPE CULVERTS LONG AXIS HORIZONTAL WITH INLET CONTROL

DUD 4
2-28x20
2-35x24

CHART 3



28x20 35x24

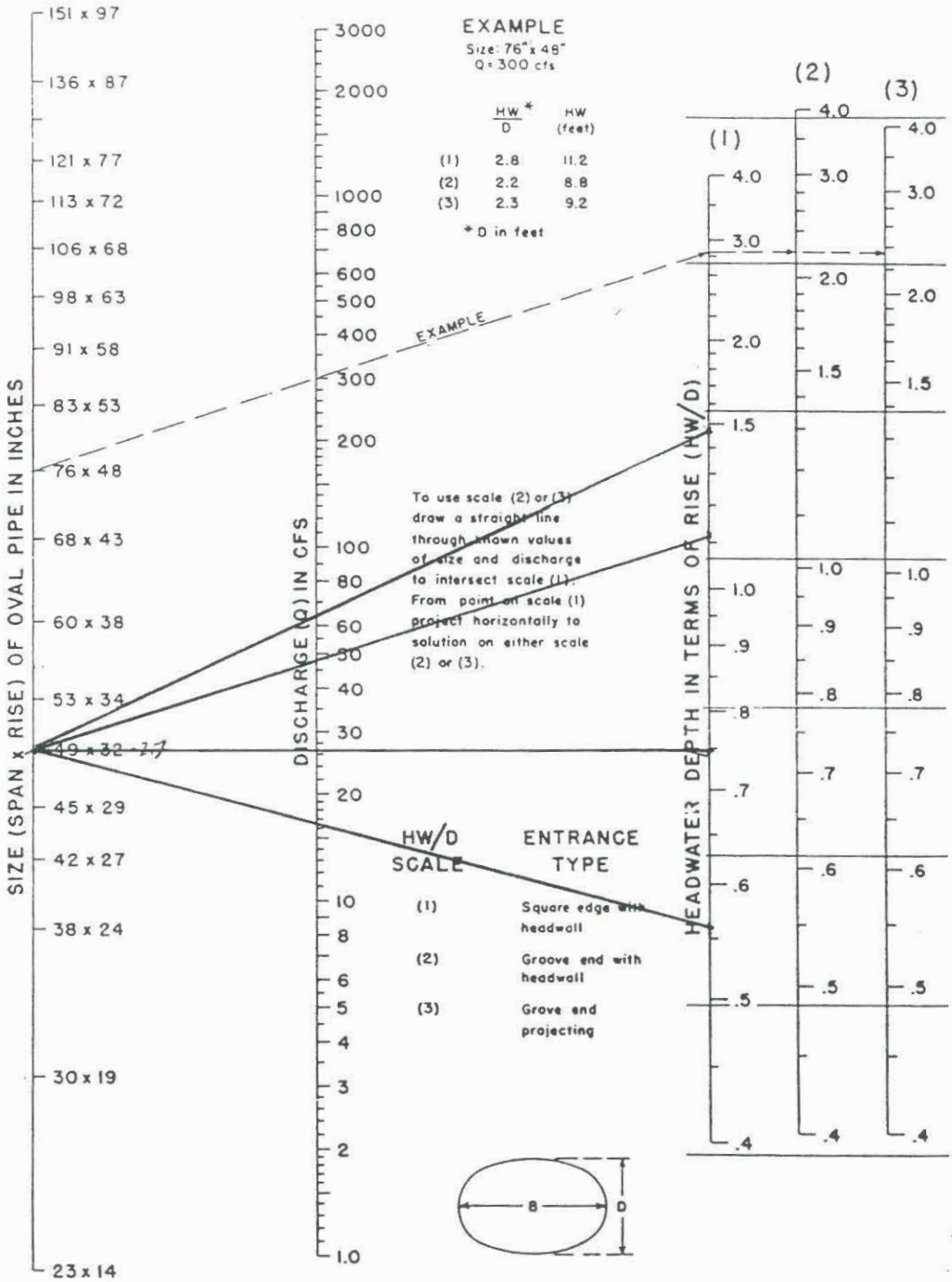
HW	HW/D	Q	HW	HW/D	Q
1	.63	5.9	1	.50	7.0
2	1.25	16.0	2	1.00	21.0
3	1.88	23.0	3	1.50	34.0
3.5	2.19	26.0	3.5	1.75	38.0

BUREAU OF PUBLIC ROADS JAN. 1963

HEADWATER DEPTH FOR OVAL CONCRETE PIPE CULVERTS LONG AXIS HORIZONTAL WITH INLET CONTROL

SUB 26
49 x 33

CHART 3



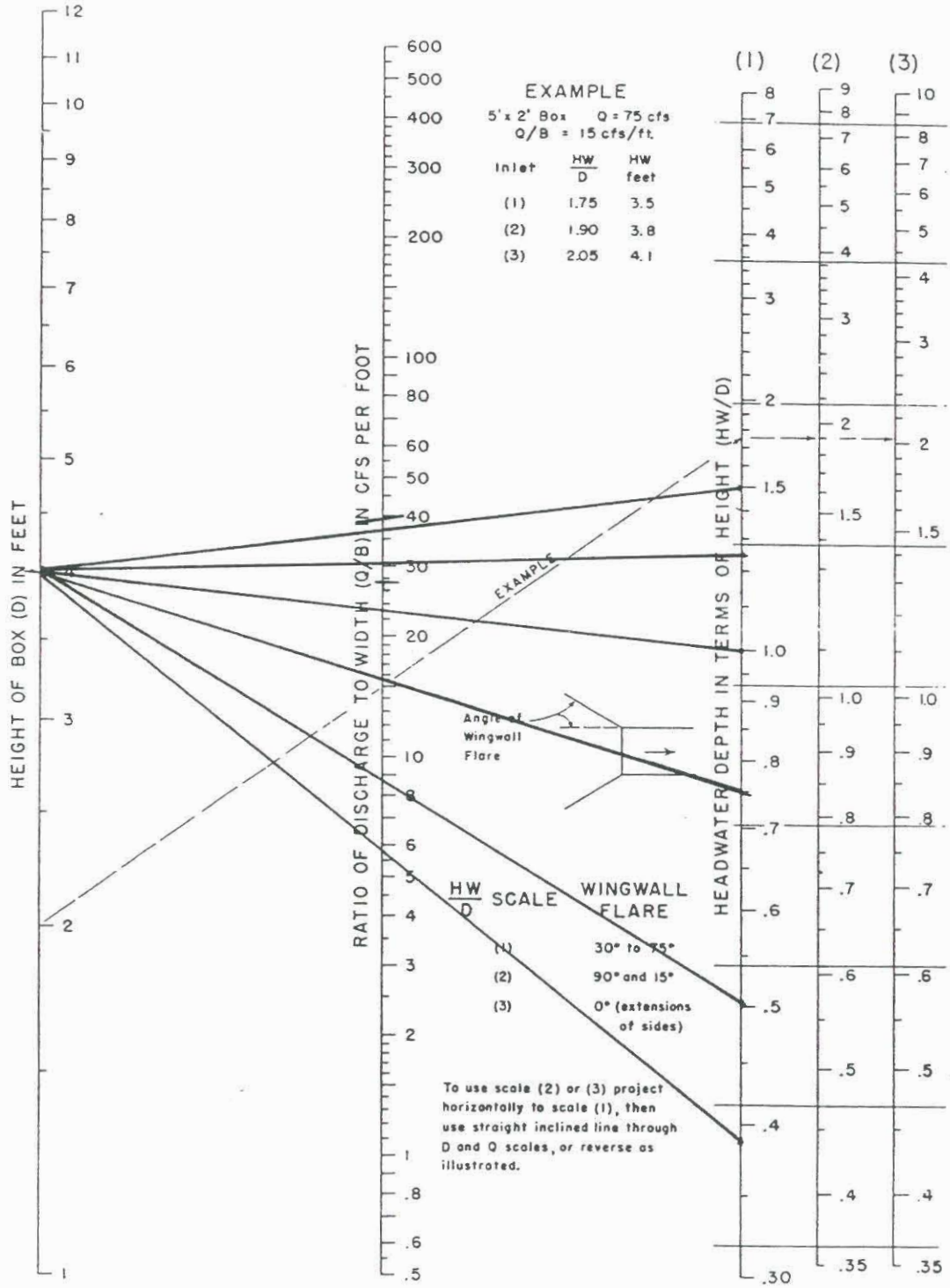
HEADWATER DEPTH FOR
OVAL CONCRETE PIPE CULVERTS
LONG AXIS HORIZONTAL
WITH INLET CONTROL

HW	HW/D	Q
1.5	.56	16.5
2	.74	27.0
3	1.11	47.0
4	1.49	65.0

BUREAU OF PUBLIC ROADS JAN. 1963

Box 1014

CHART I



HEADWATER DEPTH
FOR BOX CULVERTS
WITH INLET CONTROL

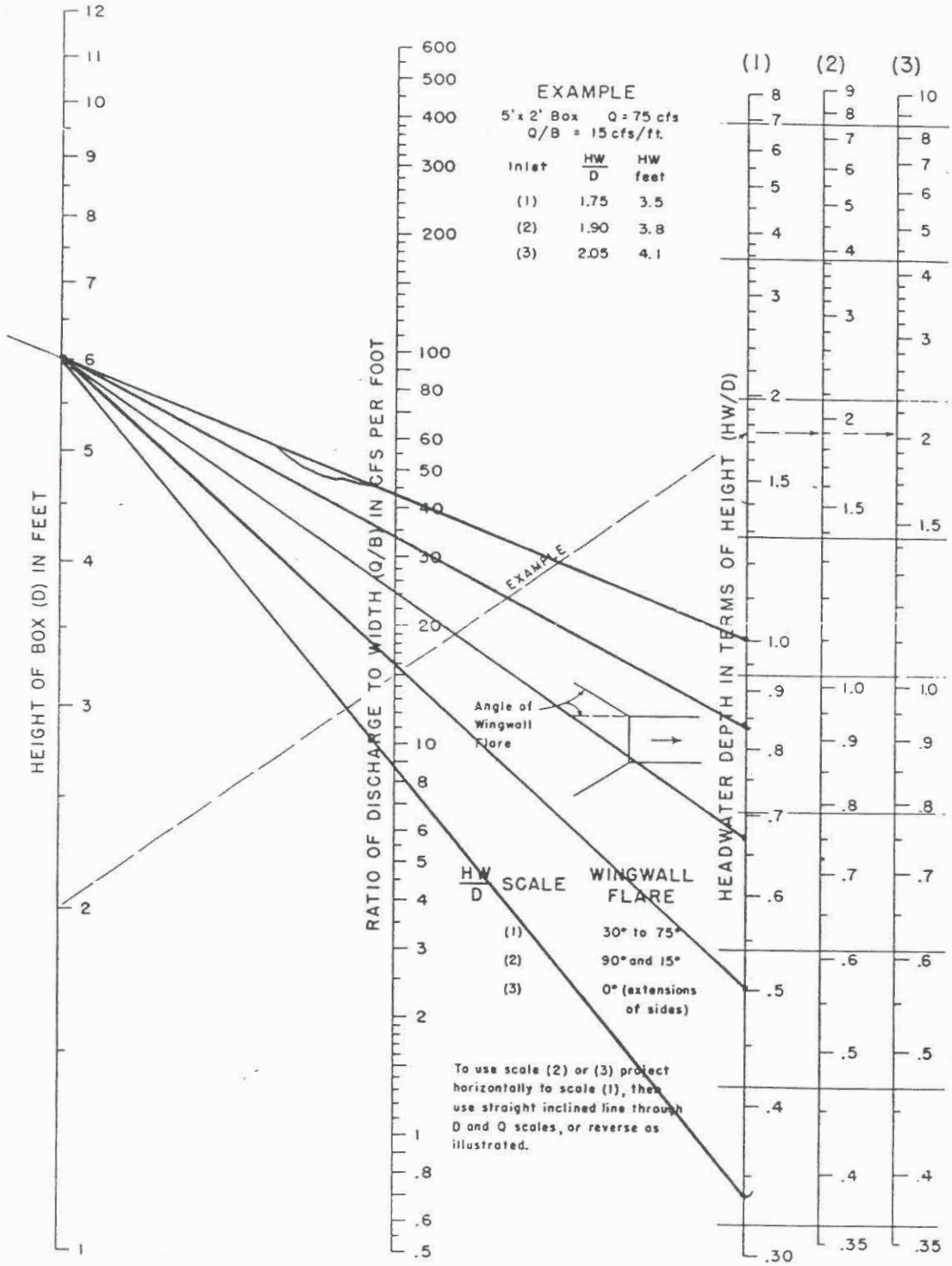
BUREAU OF PUBLIC ROADS JAN 1963

HW	HW/D	Q
1.5	.38	5.7
2	.50	8.8
3	.75	13.5
4	1	23
5	1.25	30
4.5	1.13	27
6.5	1.6	48

64

Box
12 x 6

CHART I



6ft

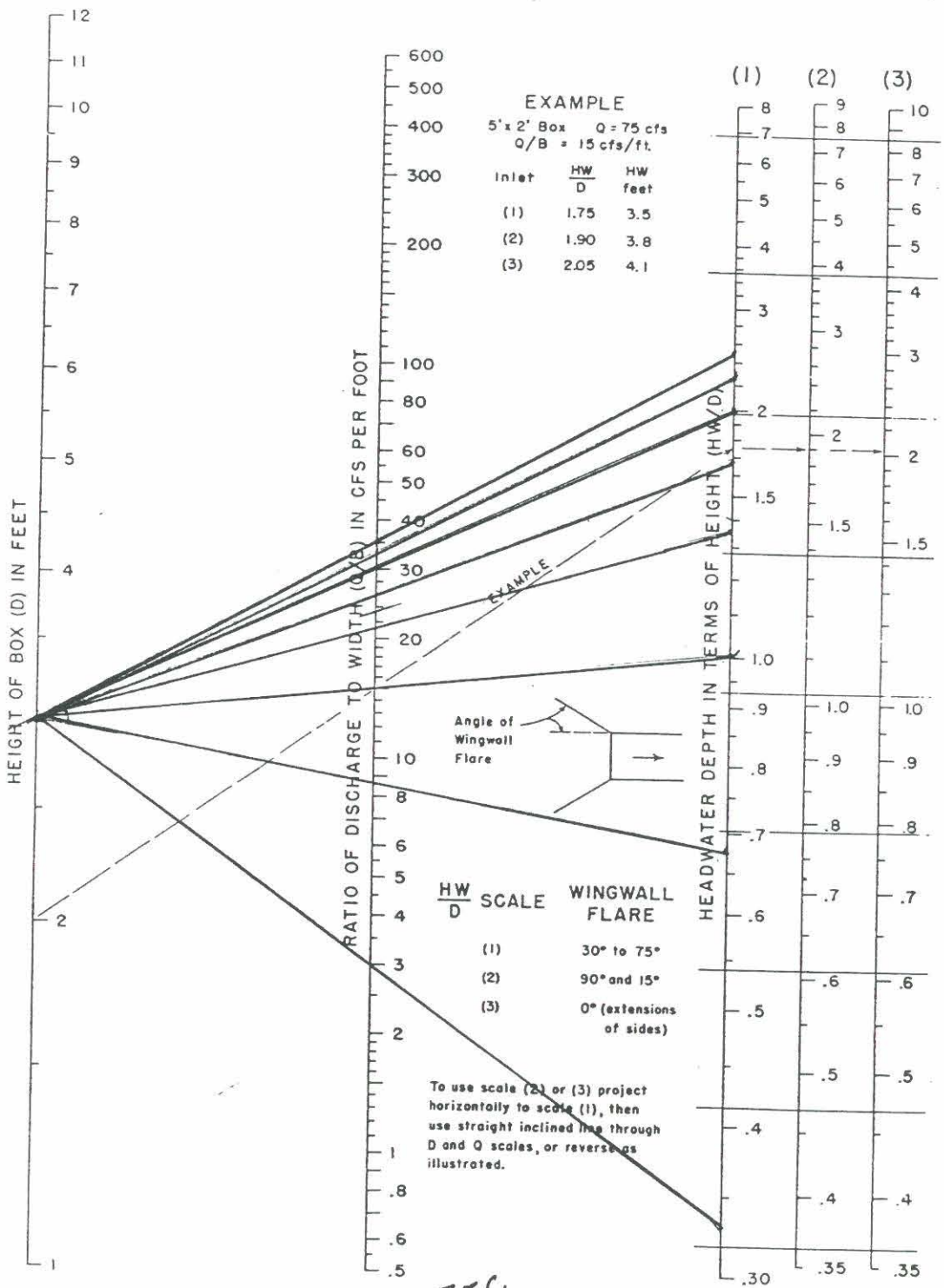
HEADWATER DEPTH
FOR BOX CULVERTS
WITH INLET CONTROL

BUREAU OF PUBLIC ROADS JAN. 1963

AW	HW/D	Q
2		
3	.33	9
4	.50	16
5	.67	24
6	.83	34

Box
10 x 3

CHART I



75ft

HEADWATER DEPTH
FOR BOX CULVERTS
WITH INLET CONTROL

BUREAU OF PUBLIC ROADS JAN. 1963

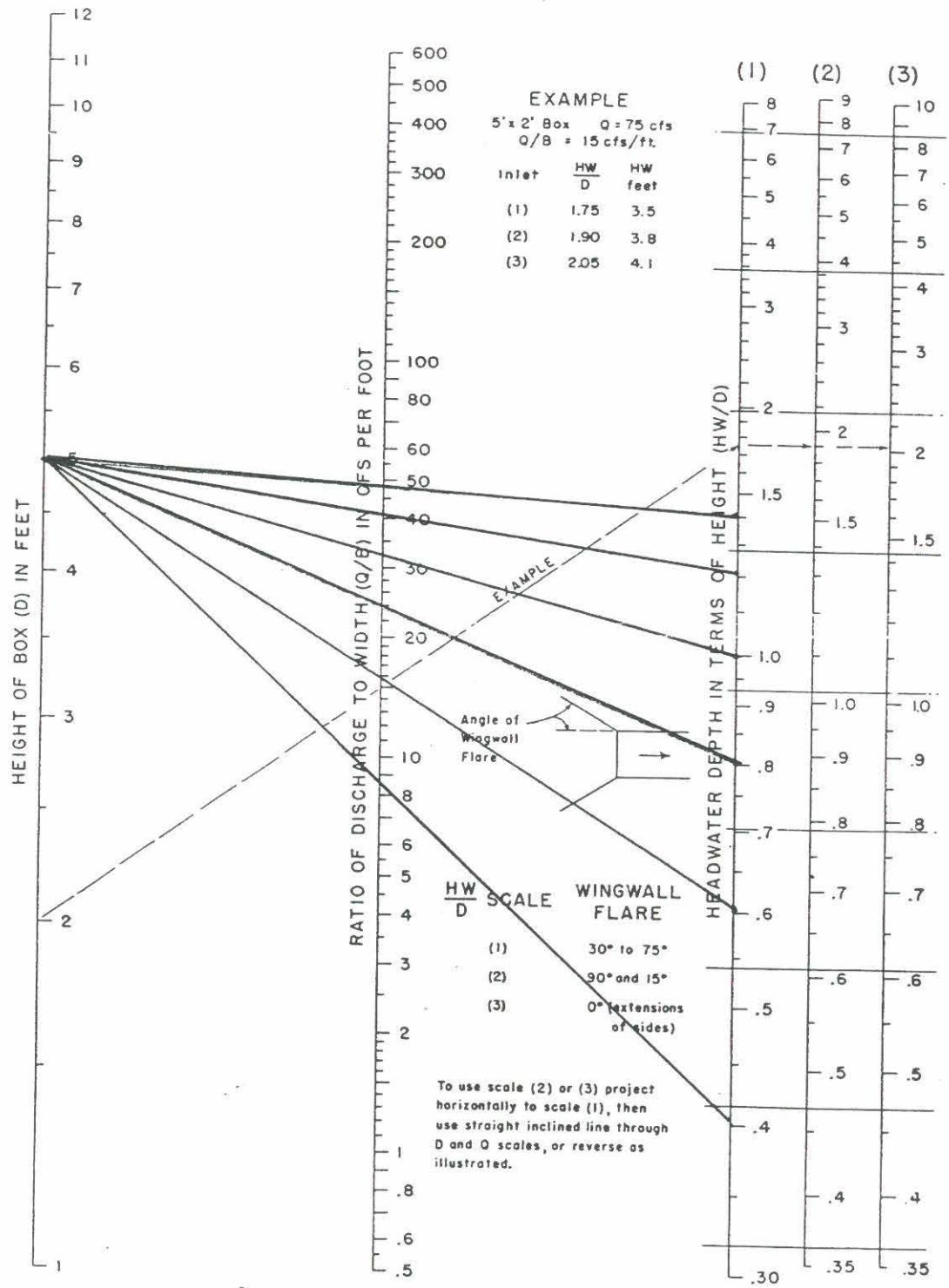
HW	HW/D	Q
1	.33	5
2	.67	8.7
3	1	15
4	1.33	22
5	1.67	26
6	2	31

7.5 25 36

4.5 1.5

Box
12 x 5

CHART I



7A

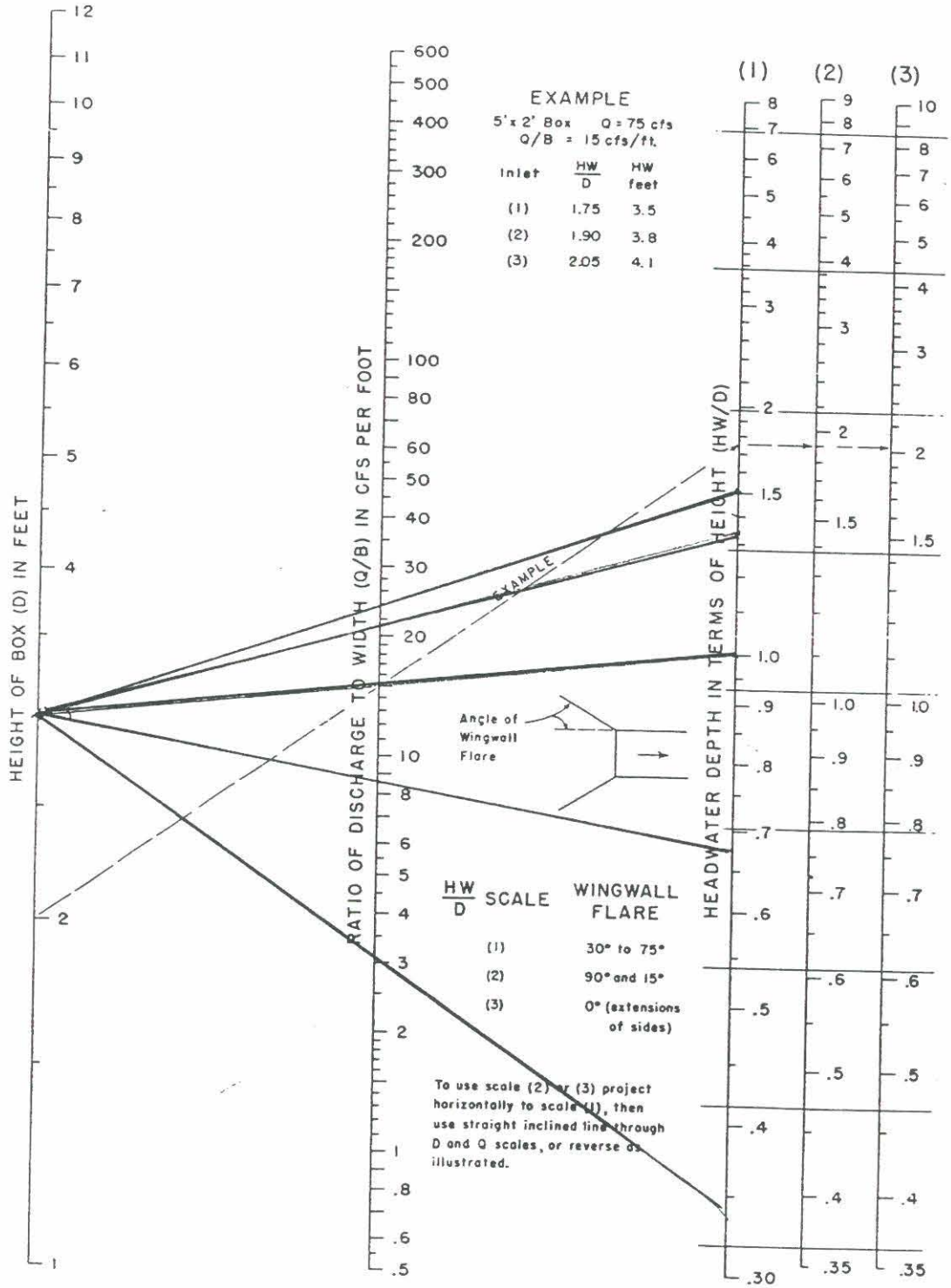
HEADWATER DEPTH
FOR BOX CULVERTS
WITH INLET CONTROL

BUREAU OF PUBLIC ROADS JAN. 1963

HW	HW/D	Q (x6)
2	.4	9
3	.6	16
4	.8	24
5	1	33
6	1.2	41

Box
12 x 3

CHART I



HEADWATER DEPTH
FOR BOX CULVERTS
WITH INLET CONTROL

BUREAU OF PUBLIC ROADS JAN. 1963

HW	HW/D	Q
1	.33	32
2	.67	85
3	1	15
4	1.33	21
4.5	1.50	24

F

HEC-1 Output

```
1****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*            SEPTEMBER 1990            *
*             VERSION 4.0              *
*                                      *
* RUN DATE  03/21/1991  TIME  08:10:19 *
*                                      *
****************************************
```

```
****************************************
*                                      *
*   U.S. ARMY CORPS OF ENGINEERS       *
*   HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET            *
*      DAVIS, CALIFORNIA 95616         *
*          (916) 756-1104              *
*                                      *
****************************************
```

```
X     X  XXXXXXX   XXXXX          X
X     X  X       X     X        XX
X     X  X       X               X
XXXXXXX  XXXX    X       XXXXX   X
X     X  X       X               X
X     X  X       X     X         X
X     X  XXXXXXX   XXXXX         XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  1           ID
  2           ID      100 YEAR, 6 HOUR STORM
  3           ID      WAGNER WASH
  4           ID      FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
  5           ID      JUNE 1990, SS
  6           ID      REVISED DEC 1990, SS
  7           ID      UTILIZING MCFCD PRESCRIBED METHODS
  8           ID      AREAL REDUCTION
  9           ID      CLARK UNIT HYDROGRAPH PLUS S-GRAPH WHERE NEEDED
              *DIAGRAM
 10           IT      3                   300
 11           IO      5       0
              * MARICOPA COUNTY RAINFALL DISTRIBUTION
              * WITH AREAL REDUCTION BASED UPON BASIN AREA
              * BASED UPON BASIN AREACUHP1 PROGRAM DEVELOPED BY M
 12           IN      15
```

```
13        JD   3.28     .5
14        PC    0.0    .005    .009    .014    .022    .030    .038    .047    .054    .062
15        PC   .075    .088    .107    .127    .205    .366    .823    .900    .920    .939
16        PC   .952    .965    .977    .988   1.000
17        JD   3.21     2.8
18        PC    0.0   0.006    .012    .020    .031    .039    .049    .057    .067    .076
19        PC   .087    .100    .120    .163    .252    .451    .694    .837    .900    .938
20        PC   .967    .985    .990    .990   1.000
21        JD   3.02      16
22        PC   0.00    .015    .020    .030    .048    .063    .076    .090    .105    .119
23        PC   .135    .152    .175    .222    .304    .472    .670    .796    .868    .912
24        PC   .946    .974    .980    .987   1.000
25        JD   2.66      90
26        PC   0.00    .021    .035    .051    .071    .087    .105    .125    .143    .160
27        PC   .179    .201    .232    .281    .364    .500    .658    .773    .841    .888
28        PC   .927    .958    .965    .976   1.000

29        KK   SUBPa
30        BA    .82
31        LU    .77     .16
32        UI     54      54      54      59     176     200     238     264     292     311
33        UI    340     374     408     453     535     649     702     606     535     485
34        UI    445     414     373     337     313     277     255     224     179     145
35        UI     95      95      89      88      71      54      54      54      33      16
36        UI     16      16      16      16      16      16      16      16      16      16
37        UI     16       0       0       0       0       0       0       0       0       0

38        KK    RPa
39        RL                     5
40        RS      5    FLOW     -1
41        RC    .08     .06     .08    8976    .005
42        RX      0      60      70      80      95     105     115     155
43        RY      4       1      .5       0       0      .5       1       4
```



```
LINE      ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

44        KK   SUBPb
45        BA    .99
46        LU    .77     .16
47        UI     60      60      60      60     158     210     243     281     306     330
48        UI    355     382     420     455     498     584     590     792     718     629
49        UI    569     523     486     452     411     374     349     312     288     260
50        UI    218     172     125     106     103      98      98      72      60      60
51        UI     60      43      18      18      18      18      18      18      18      18
52        UI     18      18      18      18      18       0       0       0       0       0

53        KK      -
54        HC      2

55        KK    RPb
56        RL                     5
57        RS      7    FLOW     -1
```

```
 58          RC     .08     .06     .08   11194    .005
 59          RX       0      80      90     100     110     120     130     210
 60          RY       5       1      .5       0       0      .5       1       5

 61          KK   SUBPc
 62          BA     1.9
 63          LU     .77     .16
 64          UI      81      81      81      81      81      81     263     274     312     347
 65          UI     381     399     435     454     476     501     530     567     609     634
 66          UI     679     770     870     958    1080    1038     934     856     795     744
 67          UI     704     668     637     601     559     524     495     470     431     406
 68          UI     386     363     312     264     234     187     144     144     143     134
 69          UI     134     134     111      81      81      81      81      81      58      25
 70          UI      25      25      25      25      25      25      25      25      25      25
 71          UI      25      25      25      25      25      25      25      25       0       0

 72          KK       P
 73          HC       2

 74          KK   SUBQa
 75          BA     1.0
 76          LU     .79     .20
 77          UI      57      57      57      57      57     184     200     224     262     278
 78          UI     304     321     340     363     392     426     449     502     577     675
 79          UI     755     693     619     563     520     486     157     431     395     367
 80          UI     340     317     290     272     252     217     168     153     100     100
 81          UI      98      93      93      83      57      57      57      57      47      17
 82          UI      17      17      17      17      17      17      17      17      17      17
 83          UI      17      17      17       0       0       0       0       0       0       0

 84          KK     RQa
 85          RL                      5
 86          RS       8    FLOW      -1
 87          RC     .08     .06     .08   12461    .006
 88          RX       0      60      70      80      95     105     115     155
 89          RY       4       1      .5       0       0      .5       1       4
```



```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 90          KK     Qb
 91          BA     1.5
 92          LU     .79     .20
 93          UI      83      83      83      83     141     271     311     358     395     429
 94          UI     459     490     525     566     620     659     747     890     993    1094
 95          UI     961     861     785     726     679     641     582     538     499     461
 96          UI     420     393     352     299     237     184     146     146     136     136
 97          UI     131      83      83      83      83      60      25      25      25      25
 98          UI      25      25      25      25      25      25      25      25      25      25

 99          KK       -
100          HC       2
```

```
101        KK     RQ
102        RL                   5
103        RS     6    FLOW    -1
104        RC   .08     .06   .08   9504   .006
105        RX     0      80    90    100    110    120    130    210
106        RY     5       1    .5      0      0     .5      1      5

107        KK   SUBQc
108        BA     0.8
109        LU    .79     .20
110        UI     40      40    40     40     85    134    154    183    197    216
111        UI    229     244   266    290    311    345    400    474    532    481
112        UI    424     385   355    331    311    282    260    239    220    201
113        UI    188     162   133    115     72     71     69     66     66     48
114        UI     40      40    40     35     12     12     12     12     12     12
115        UI     12      12    12     12     12     12     12     12      0      0

116        KK      Q
117        HC      2

118        KK   SUBRa
119        BA     1.4
120        LU    .79     .20
121        UI     71      71    71     71     71    225    250    278    329    349
122        UI    380     403   427    488    532    559    624    713    817    937
123        UI    902     796   724    668    621    585    508    470    439    413
124        UI    373     350   329    280    235    205    142    126    126    118
125        UI    117     117    77     71     71     71     71     31     22     22
126        UI     22      22    22     22     22     22     22     22     22     22
127        UI     22      22    22      0      0      0      0      0      0      0

128        KK    RRa
129        RL                   5
130        RS     7    FLOW    -1
131        RC   .08     .06   .08  11827   .004
132        RX     0      80    90    100    110    120    130    210
133        RY     5       1    .5      0      0     .5      1      5
```



```
LINE       ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


134        KK   SUBRb
135        BA     2.2
136        LU    .79      .2
137        UI    108     108   108    108    108    295    365    415    481    519
138        UI    559     596   628    665    715    773    822    880    988   1143
139        UI   1289    1447  1325   1187   1084   1004    939    884    841    773
140        UI    715     670   631    576    236    506    447    390    311    261
141        UI    192     192   185    178    178    160    108    108    108    108
142        UI     33      33    33     33     33     33     33     33     33     33
143        UI     33      33    33     33     33     33     33      0      0      0

144        KK      R
```

```
145          HC       2

146          KK     ALL
147          HC       3

148          KK   SR-PQ
149          KM   ROUTE FLOW THROUGH DETENTION UP CAP
150          RL                     10
151          RS       1    STOR      -1
152          SV       0     553    1148    2316    2705
153          SE    1543    1550    1552    1555    1556
154          SQ       0       0     128     587     600
155          SE    1543    1550    1552    1555    1556
156          ST    1556   13200     3.2     1.5

157          KK    DCAP
158          KM   HALF OF FLOW COMING OUT OF EITHER CHUTE.
159          DT      DR
160          DI       0     100     500     800
161          DQ       0      50     250     400

162          KK    SUBA
163          BA     .22
164          LU     .84     .29
165          UC    .667    .782
166          UA       0       3       5       8      12      20      43      75      90      96
167          UA     100

168          KK    SR-A
169          KM    ROUTE THROUGH STRUCTURE
170          KM    1-57X38 CSP
171          RL                      5
172          RS       1    STOR      -1
173          SV       0    .002    .008    .017    .031    .048    .069
174          SE       0       1       2       3       4       5       6
175          SQ       0    32.5      61      84     109     128
176          SE       0       2       3       4       5       6
177          ST       6     150      .2     1.5
```



```
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

178          KK   RA-A1
179          KM    ROUTE A THROUGH A1
180          RL                      5
181          RS       5    FLOW      -1
182          RC    .040    .035    .040   12000    .010
183          RX       0      50      55      58      63      68      73     123
184          RY     3.0     2.0     1.0       0       0     1.0     2.0     3.0

185          KK   SUBA1
186          BA    1.06
187          LU     .81     .25
```

```
188        UI     54     54     54     54     54    163    186    206    247    261
189        UI    283    299    318    339    363    394    417    457    524    616
190        UI    678    692    612    553    509    474    446    420    393    358
191        UI    335    315    289    267    252    223    193    154    127     95
192        UI     95     91     88     88     72     54     54     54     54     40
193        UI     16     16     16     16     16     16     16     16     16     16
194        UI     16     16     16     16     16     16      0      0      0      0

195        KK  CP-A'S
196        KM    CONCENTRATION POINT A'S
197        KM    SUBA + SUBA1
198        HC      2

199        KK  A'S-11
200        KM    ROUTE A'S TO 11
201        RL                   5
202        RS      2   FLOW    -1
203        RC   .040   .035  .040   4300    .02
204        RX      0     90    95    100    115    120    125    205
205        RY    3.5    1.5   1.0      0      0    1.0    1.5    3.5

206        KK   CP-11
207        KM    CONCENTRATION POINT 11
208        KM    SUBP + SUBQ + CP-A'S
209        HC      2

210        KK  R11-12
211        KM    ROUTE 11 TO 12
212        RL                   5
213        RS      2   FLOW    -1
214        RC   .040   .035  .040   2000   .015
215        RX      0     50    55     60    100    105    110    160
216        RY    4.5    3.0   1.0      0      0    1.0    3.0    4.5

217        KK   SUBB1
218        BA    1.25
219        LU     .80    .25
220        UI      70     70     70     70    134    230    269    312    339    371
221        UI     397    423    452    497    534    577    669    799    890    892
222        UI     777    702    643    597    561    521    474    437    410    370
223        UI     342    318    269    210    180    124    124    118    115    115
224        UI      76     70     70     70     57     22     22     22     22     22
225        UI      22     22     22     22     22     22     22     22     22      0
```



```
LINE       ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

226        KK   CP-12
227        KM    CONCENTRATION POINT 12
228        KM    SUBB1 + SUBA1 +CP-11
229        HC      2

230        KK  R12-13
```

```
231          KM    ROUTE 12 TO 13
232          RL                     5
233          RS      3    FLOW     -1
234          RC   .040    .035   .040    5500    .015
235          RX      0      50     55      60     100     105     110     160
236          RY    4.5     3.0    1.0       0       0     1.0     3.0     4.5

237          KK   SUBC1
238          BA    .85
239          LU    .81     .25
240          UI     57      57     57      74     187     216     261     286     313     338
241          UI    367     408    442     508     628     711     706     608     542     494
242          UI    456     419    374     342     310     281     253     208     163     111
243          UI    100      96     93      82      57      57      57      40      17      17
244          UI     17      17     17      17      17      17      17      17      17      17

245          KK  RC1-13
246          KM    ROUTE C1 TO 13
247          RL                     5
248          RS      1    FLOW     -1
249          RC   .040    .035   .040    2500    .015
250          RX      0      50     55      60     100     105     110     160
251          RY    4.5     3.0    1.0       0       0     1.0     3.0     4.5

252          KK   SUBD1
253          BA    .34
254          LU    .80     .35
255          UC   .850    .898
256          UA      0       3      5       8      12      20      43      75      90      96
257          UA    100

258          KK  RD1-13
259          KM    ROUTE D1 TO 13
260          RL                     5
261          RS      1    FLOW     -1
262          RC   .040    .035   .040    1800    .015
263          RX      0      50     55      60     100     105     110     160
264          RY    4.5     3.0    1.0       0       0     1.0     3.0     4.5

265          KK   SUBG1
266          BA    .19
267          LU    .80     .28
268          UC   .817   1.019
269          UA      0       3      5       8      12      20      43      75      90      96
270          UA    100
```



```
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

271          KK    SUBS
272          BA     .55
273          LU     .78     .20
274          UC    .833    .505
```

```
275        UA      0      3      5      8     12     20     43     75     90     96
276        UA    100

277        KK   CP-13
278        KM    CONCENTRATION POINT 13
279        KM    SUBS + SUBR + CP-14
280        HC      5

281        KK  R13-14
282        KM    ROUTE 13 TO 14
283        RL                   5
284        RS      2    FLOW     -1
285        RC   .040    .035   .040   3000    .015
286        RX      0      20     55     60    100    105    140    160
287        RY    4.5     1.5    0.5      0      0    0.5    1.5    4.5

288        KK   SUBH1
289        BA    .25
290        LU    .81     .26
291        UI     23      23     33     80     99    117    131    147    168    193
292        UI    248     296    257    218    193    172    148    131    114     96
293        UI     71      45     40     38     30     23     23     12      7      7
294        UI      7       7      7      7      7      7      0      0      0      0

295        KK  RH1-14
296        KM    ROUTE H1 TO 14
297        RL                   5
298        RS      1    FLOW     -1
299        RC   .040    .035   .040   1500    .015
300        RX      0      50     55     60    100    105    110    160
301        RY    4.5     3.0    1.0      0      0    1.0    3.0    4.5

302        KK   SUBI1
303        BA    .18
304        LU    .81     .26
305        UC   .750    .805
306        UA      0       3      5      8     12     20     43     75     90     96
307        UA    100

308        KK     DR
309        KM   RETRIEVE FLOWS FROM CAP OVERCHUTE AT ST. 181+00
310        DR     DR

311        KK    RR-T
312        RL                   5
313        RS      5    FLOW     -1
314        RC   .040    .035   .040   7500     .02
315        RX      0      60     65     70     85     90     95    145
316        RY    3.5     3.0    1.0      0      0    1.0    3.0    3.5
```



```
LINE       ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
```

```
317        KK    SUBT
318        BA     .49
319        LU     .79     .21
320        UI      33      33      33      43     108     125     150     165     180     195
321        UI     211     235     255     293     362     410     407     351     313     285
322        UI     263     241     216     197     179     162     146     120      94      64
323        UI      58      55      54      47      33      33      33      23      10      10
324        UI      10      10      10      10      10      10      10      10      10      10

325        KK   CP-14
326        KM    CONCENTRATION POINT 14
327        KM    SUBT + SUBI + SUBH + CP-13+ SUBR
328        KM    ALL CONTRIBUTING WATERSHEDS ON UPSTREAM SIDE OF BRIDGE
329        HC       5

330        KK    SUBB
331        BA     .07
332        LU     .82     .26
333        UC    .517    .704
334        UA       0       3       5       8      12      20      43      75      90      96
335        UA     100

336        KK    R1-2
337        KM    ROUTE 1 TO 2
338        RL                     5
339        RS       1    FLOW      -1
340        RC    .025    .020    .025    1500    .020
341        RX       0       5      10      15     165     170     175     180
342        RY     8.0     7.0     6.0       0       0     6.0     7.0     8.0

343        KK   SUBCU
344        BA     .51
345        LU     .64     .10
346        UC    .367    .285
347        UA       0       3       5       8      12      20      43      75      90      96
348        UA     100

349        KK   RCU-2
350        KM    ROUTE CU TO 2
351        RL                     5
352        RS       4    FLOW      -1
353        RC    .040    .035    .040   10600    .02
354        RX       0      60      65      70      85      90      95     145
355        RY     3.5     3.0     1.0       0       0     1.0     3.0     3.5

356        KK    SUBC
357        BA     .53
358        LU     .83     .26
359        UC    .633    .566
360        UA       0       3       5       8      12      20      43      75      90      96
361        UA     100
```



```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
```

```
KK    CP-2
KM    CONCENTRATION POINT 2
KM    SUBCU + SUBC + CP-1
HC      3

KK    R2-3
KM    ROUTE 2 TO 3
RL                    5
RS      1    FLOW    -1
RC   .025    .020   .025   3000   .020
RX      0       5     10     15    165    170    175    180
RY    8.0     7.0    6.0      0      0    6.0    7.0    8.0

KK    SUBD
BA    .27
LU    .82     .27
UC   .667    .696
UA      0       3      5      8     12     20     43     75     90     96
UA    100

KK    CP-3
KM    CONCENTRATION POINT 3
KM    SUBD + CP-2
HC      2

KK    R3-4
KM    ROUTE 3 TO 4
RL                    5
RS      1    FLOW    -1
RC   .025    .020   .025    800   .020
RX      0       5     10     15    165    170    175    180
RY    8.0     7.0    6.0      0      0    6.0    7.0    8.0

KK    SUBE
BA    .11
LU    .80     .24
UC   .683    .987
UA      0       3      5      8     12     20     43     75     90     96
UA    100

KK    CP-4
KM    CONCENTRATION POINT 4
KM    SUBE + CP-3
HC      2

KK    R4-5
KM    ROUTE 4 TO 5
RL                    5
RS      1    FLOW    -1
RC   .025    .020   .025   1000   .020
RX      0       5     10     15    165    170    175    180
RY    8.0     7.0    6.0      0      0    6.0    7.0    8.0
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 407          KK    SUBF
 408          BA     .06
 409          LU     .79     .22
 410          UC    .400    .442
 411          UA       0       3       5       8      12      20      43      75      90      96
 412          UA     100

 413          KK    CP-5
 414          KM    CONCENTRATION POINT 5
 415          KM    SUBF + CP-4
 416          HC       2

 417          KK    R5-6
 418          KM    ROUTE 5 TO 6
 419          RL                     5
 420          RS       1    FLOW     -1
 421          RC    .025    .020    .025    1300    .020
 422          RX       0       5      10      15     165     170     175     180
 423          RY     8.0     7.0     6.0       0       0     6.0     7.0     8.0

 424          KK    SUBG
 425          BA     .04
 426          LU     .81     .25
 427          UC    .317    .359
 428          UA       0       3       5       8      12      20      43      75      90      96
 429          UA     100

 430          KK    CP-6
 431          KM    CONCENTRATION POINT 6
 432          KM    SUBG + CP-5
 433          HC       2

 434          KK    R6-7
 435          KM    ROUTE 6 TO 7
 436          RL                     5
 437          RS       1    FLOW     -1
 438          RC    .025    .020    .025    2000    .020
 439          RX       0       5      10      15     165     170     175     180
 440          RY     8.0     7.0     6.0       0       0     6.0     7.0     8.0

 441          KK    SUBH
 442          BA     .02
 443          LU     .81     .25
 444          UC    .367    .586
 445          UA       0       3       5       8      12      20      43      75      90      96
 446          UA     100

 447          KK    CP-7
 448          KM    CONCENTRATION POINT 7
```

```
449          KM    SUBH + CP-6
450          HC       2
```



```
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

451          KK    R7-8
452          KM    ROUTE 7 TO 8
453          RL                      5
454          RS       1    FLOW      -1
455          RC    .025    .020    .025    1800    .020
456          RX       0       5      10      15     165     170     175     180
457          RY     8.0     7.0     6.0       0       0     6.0     7.0     8.0

458          KK  SUBIUa
459          BA     .98
460          LU     .78     .16
461          UC    .767    .628
462          UA       0       3       5       8      12      20      43      75      90      96
463          UA     100

464          KK    RIUa
465          RL                      5
466          RS       4    FLOW      -1
467          RC     .04    .035     .04    9504     .03
468          RX       0      40      85      90     105     110     135     175
469          RY     3.5     1.5     1.0       0       0     1.0     1.5     3.5

470          KK  SUBIUb
471          BA     .57
472          LU     .78     .16
473          UC    .383    .187
474          UA       0       3       5       8      12      20      43      75      90      96
475          UA     100

476          KK     CIU
477          HC       2

478          KK   IUR-I
479          KM    ROUTE IU THROUGH I
480          RL                      5
481          RS       2    FLOW      -1
482          RC    .040    .035    .040    5100     .02
483          RX       0      40      85      90     105     110     135     175
484          RY     3.5     1.5     1.0       0       0     1.0     1.5     3.5

485          KK    SUBI
486          BA     .85
487          LU     .79     .19
488          UC    .667    .556
489          UA       0       3       5       8      12      20      43      75      90      96
490          UA     100
```

```
                .           .           .
485             .           .           .        SUBI
                .           .           .           .
                .           .           .           .
491             .           .        CP-I............
                .           .           .
                .           .           .
495             .        CP-8............
                .           V
                .           V
499             .        R8-9
                .           .
                .           .
506             .           .        SUBJ
                .           .           .
                .           .           .
512             .        CP-9............
                .           V
                .           V
516             .       R9-10
                .           .
                .           .
523             .           .        SUBK
                .           .           .
                .           .           .
529             .       CP-10............
                .           .
                .           .
534     CP-14A............
            V
            V
539     R14-15
            .
            .
546             .        SUBL
                .           .
                .           .
552             .           .       SUBU1
                .           .           V
                .           .           V
560             .           .       SR-U1
                .           .           V
                .           .           V
570             .           .       U1R-U
                .           .           .
                .           .           .
577             .           .           .        SUBU
                .           .           .           .
                .           .           .           .
583             .           .        CP-U............
                .           .           V
                .           .           V
587             .           .       RU-15
                .           .           .
```

```
491          KK    CP-I
492          KM    CONCENTRATION POINT I
493          KM    SUBIU + SUBI
494          HC       2
```



```
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


495          KK    CP-8
496          KM    CONCENTRATION POINT 8
497          KM    CP-I + CP-7
498          HC       2

499          KK    R8-9
500          KM    ROUTE 8 TO 9
501          RL                      5
502          RS       1    FLOW     -1
503          RC    .025    .020    .025    1000    .020
504          RX       0       5      10      15     165     170     175     180
505          RY     8.0     7.0     6.0       0       0     6.0     7.0     8.0

506          KK    SUBJ
507          BA     .26
508          LU     .81     .25
509          UC    .717    .786
510          UA       0       3       5       8      12      20      43      75      90      96
511          UA     100

512          KK    CP-9
513          KM    CONCENTRATION POINT 9
514          KM    SUB8 + CP-8
515          HC       2

516          KK   R9-10
517          KM    ROUTE 9 TO 10
518          RL                      5
519          RS       1    FLOW     -1
520          RC    .025    .020    .025    2500    .020
521          RX       0       5      10      15     165     170     175     180
522          RY     8.0     7.0     6.0       0       0     6.0     7.0     8.0

523          KK    SUBK
524          BA     .12
525          LU     .81     .25
526          UC    .767   1.207
527          UA       0       3       5       8      12      20      43      75      90      96
528          UA     100

529          KK   CP-10
530          KM    CONCENTRATION POINT 10
531          KM    SUBK + CP-9
532          KM   ALL FLOW IN THE INTERCEPTOR CHANNEL
533          HC       2
```

```
534          KK  CP-14A
535          KM    CONCENTRATION POINT 14A
536          KM    CP-16 + CP-10
537          KM    ALL CONTRIBUTING WATERSHEDS ON DOWNSTREAM SIDE OF BRIDGE
538          HC       2
```



```
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

539          KK  R14-15
540          KM    ROUTE 14 TO 15
541          RL                     5
542          RS       2    FLOW     -1
543          RC    .040    .035    .040    3000    .015
544          RX       0      85      86      87     167     168     169     219
545          RY     6.5     1.0     0.5       0       0     0.5     1.0     6.5

546          KK    SUBL
547          BA    1.36
548          LU     .80     .22
549          UC    .867    .829
550          UA       0       3       5       8      12      20      43      75      90      96
551          UA     100

552          KK   SUBU1
553          BA     .39
554          LU     .77     .18
555          UI      28      28      28      51      95     113     132     146     159     173
556          UI     192     212     238     297     344     346     295     262     237     219
557          UI     197     177     162     142     131     111      84      62      49      47
558          UI      46      40      28      28      28      15       8       8       8       8
559          UI       8       8       8       8       8       8       8       0       0       0

560          KK   SR-U1
561          KM    ROUTE THROUGH STRUCTURE
562          KM    2-10X3 RCBC
563          RL                     5
564          RS       1    STOR     -1
565          SV       0    .007    .026    .059    .105    .164    .236    .321
566          SE       0       1       2       3       4       5       6       7
567          SQ       0      60     175     300     440     520     620     680
568          SE       0       1       2       3       4       5       6       7
569          ST       7     100      .2     1.5

570          KK   U1R-U
571          KM    ROUTE U1 THROUGH U
572          RL                     5
573          RS       1    FLOW     -1
574          RC    .040    .035    .040    1500    .010
575          RX       0      50      55      58      63      68      73     123
576          RY     3.0     1.0     0.5       0       0     0.5     1.0     3.0
```

```
577          KK    SUBU
578          BA     .03
579          LU     .77      .15
580          UC    .400     .315
581          UA       0        3        5        8       12       20       43       75       90       96
582          UA     100
```



```
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

583          KK    CP-U
584          KM    CONCENTRATION POINT U
585          KM    SUBU1 + SUBU
586          HC       2

587          KK   RU-15
588          KM    ROUTE U TO 15
589          RL                         5
590          RS       2    FLOW       -1
591          RC    .040     .035     .040     2300     .015
592          RX       0       50       51       52      132      133      134      184
593          RY     5.0      4.0      0.5        0        0      0.5      4.0      5.0

594          KK   SUBV1
595          BA     .45
596          LU     .79      .21
597          UC    .900     .664
598          UA       0        3        5        8       12       20       43       75       90       96
599          UA     100

600          KK   SR-V1
601          KM    ROUTE THROUGH STRUCTURE
602          KM    2-10X3 RCBC
603          RL                         5
604          RS       1    STOR       -1
605          SV       0     .009     .037     .083     .147     .230     .331     .450     .517
606          SE       0        1        2        3        4        5        6        7      7.5
607          SQ       0       60      175      300      440      520      620      680      720
608          SE       0        1        2        3        4        5        6        7      7.5
609          ST     7.5      100       .2      1.5

610          KK   V1R-V
611          KM    ROUTE V1 THROUGH V
612          RL                         5
613          RS       1    FLOW       -1
614          RC    .040     .035     .040     2800     .010
615          RX       0       50       55       58       63       68       73      123
616          RY     3.0      1.0      0.5        0        0      0.5      1.0      3.0

617          KK    SUBV
618          BA     .11
619          LU     .79      .22
620          UC    .550     .446
```

```
621        UA       0       3       5       8      12      20      43      75      90      96
622        UA     100

623        KK    CP-V
624        KM    CONCENTRATION POINT V
625        KM    SUBV1 + SUBV
626        HC       2
```



```
LINE       ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


627        KK   CP-15
628        KM    CONCENTRATION POINT 15
629        KM    CP-U + CP-V + CP-17
630        HC       4

631        KK  R15-16
632        KM   ROUTE 15 TO 16
633        RL                      5
634        RS       2    FLOW      -1
635        RC    .040    .035    .040    3000    .015
636        RX       0      90      91      92     172     173     174     224
637        RY     7.0     1.0     0.5       0       0     0.5     1.0     7.0

638        KK    SUBM
639        BA    1.56
640        LU     .79     .24
641        UC    .983    .929
642        UA       0       3       5       8      12      20      43      75      90      96
643        UA     100

644        KK   SUBW1
645        BA     .04
646        LU     .81     .25
647        UC    .400    .497
648        UA       0       3       5       8      12      20      43      75      90      96
649        UA     100

650        KK   W1R-W
651        KM    ROUTE W1 THROUGH W
652        RL                      5
653        RS       2    FLOW      -1
654        RC    .040    .035    .040    3300    .010
655        RX       0      50      55      58      63      68      73     123
656        RY     3.0     2.0     1.0       0       0     1.0     2.0     3.0

657        KK    SUBW
658        BA     .10
659        LU     .82     .26
660        UC    .667    .674
661        UA       0       3       5       8      12      20      43      75      90      96
662        UA     100
```

```
663          KK    CP-W
664          KM    CONCENTRATION POINT W
665          KM    SUBW1 + SUBW
666          HC       2

667          KK   RW-16
668          KM    ROUTE W TO 16
669          RL                     5
670          RS       1    FLOW     -1
671          RC    .040    .035    .040    1000    .015
672          RX       0      50      51      52     132     133     134     184
673          RY     5.0     4.0     0.5       0       0     0.5     4.0     5.0
1                                          HEC-1 INPUT                                                    PAGE 16

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


674          KK   SUBX1
675          BA     .04
676          LU     .81     .25
677          UC    .350    .428
678          UA       0       3       5       8      12      20      43      75      90      96
679          UA     100

680          KK   X1R-X
681          KM    ROUTE X1 THROUGH X
682          RL                     5
683          RS       2    FLOW     -1
684          RC    .040    .035    .040    3000    .010
685          RX       0      50      55      58      63      68      73     123
686          RY     3.0     2.0     1.0       0       0     1.0     2.0     3.0

687          KK    SUBX
688          BA     .08
689          LU     .82     .26
690          UC    .717    .792
691          UA       0       3       5       8      12      20      43      75      90      96
692          UA     100

693          KK    CP-X
694          KM    CONCENTRATION POINT X
695          KM    SUBX1 + SUBX
696          HC       2

697          KK   CP-16
698          KM    CONCENTRATION POINT 16
699          KM    CP-W + CP-X + CP-15
700          HC       4

701          KK  R16-17
702          KM    ROUTE 16 TO 17
703          RL                     5
704          RS       2    FLOW     -1
705          RC    .040    .035    .040    3000    .015
```

```
706        RX      0     80     81     82    162    163    164    214
707        RY    8.0    1.0    0.5      0      0    0.5    1.0    8.0

708        KK   SUBN
709        BA    .89
710        LU    .78    .22
711        UI     48     48     48     48     72    158    178    203    228    246
712        UI    264    280    300    324    352    374    416    479    560    638
713        UI    590    523    474    437    407    384    357    327    301    282
714        UI    258    238    223    191    159    138     91     85     84     79
715        UI     79     70     48     48     48     48     32     15     15     15
716        UI     15     15     15     15     15     15     15     15     15     15
717        UI     15     15      0      0      0      0      0      0      0      0
1                                        HEC-1 INPUT                                                    PAGE 17

LINE       ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


718        KK   SUBY1
719        BA    .35
720        LU    .80    .23
721        UI     24     24     24     36     80     94    112    123    134    145
722        UI    159    177    193    227    274    316    279    243    219    200
723        UI    185    166    150    137    122    113     95     72     55     42
724        UI     41     39     38     24     24     24     18      7      7      7
725        UI      7      7      7      7      7      7      7      7      0      0

726        KK   SR-Y1
727        KM    ROUTE THROUGH STRUCTURE
728        KM    1-10X4 RCBC
729        RL                     5
730        RS      1   STOR     -1
731        SV      0   .015   .031   .138   .245   .382
732        SE      0      1      2      3      4      5
733        SQ      0     57     88    155    230    300
734        SE      0    1.5      2      3      4      5
735        ST      5    100     .2    1.5

736        KK   Y1R-Y
737        KM    ROUTE Y1 THROUGH Y
738        RL                     5
739        RS      2   FLOW     -1
740        RC   .040   .035   .040   4800   .010
741        RX      0     50     55     58     63     68     73    123
742        RY    3.0    2.0    1.0      0      0    1.0    2.0    3.0

743        KK   SUBY
744        BA    .15
745        LU    .80    .22
746        UC   .767   .838
747        UA      0      3      5      8     12     20     43     75     90     96
748        UA    100

749        KK   CP-Y
```

```
750          KM    CONCENTRATION POINT Y
751          KM    SUBY1 + SUBY
752          HC       2

753          KK   CP-17
754          KM    CONCENTRATION POINT 17
755          KM    SUBN + CP-Y + CP-19
756          HC       3

757          KK  R17-18
758          KM    ROUTE 17 TO 18
759          RL                      5
760          RS       1    FLOW      -1
761          RC    .040    .035    .040    2000    .015
762          RX       0      85      86      87     167     168     169     219
763          RY     8.0     1.0     0.5       0       0     0.5     1.0     8.0
```



```
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


764          KK   SUBOU
765          BA     .84
766          LU     .77     .13
767          UC    .417    .282
768          UA       0       3       5       8      12      20      43      75      90      96
769          UA     100

770          KK   OUR-O
771          KM    ROUTE OU THROUGH O
772          RL                      5
773          RS       5    FLOW      -1
774          RC    .040    .035    .040   16000     .02
775          RX       0      60      65      70      85      90      95     145
776          RY     4.5     2.0     1.0       0       0     1.0     2.0     4.5

777          KK    SUBO
778          BA    1.61
779          LU     .78     .19
780          UC   1.083    .949
781          UA       0       3       5       8      12      20      43      75      90      96
782          UA     100

783          KK    CP-O
784          KM    CONCENTRATION POINT O
785          KM    SUBOU + SUB O
786          HC       2

787          KK   SUBZ1
788          BA     .08
789          LU     .81     .25
790          UC    .567    .552
791          UA       0       3       5       8      12      20      43      75      90      96
792          UA     100
```

```
 793          KK   SR-Z1
 794          KM    ROUTE THROUGH STRUCTURE
 795          KM    2-28X20 CSP + 2-35X24 CSP
 796          RL                        5
 797          RS       1    STOR      -1
 798          SV       0    .015    .031    .138    .188
 799          SE       0       1       2       3     3.5
 800          SQ       0      26      74     114     128
 801          SE       0       1       2       3     3.5
 802          ST     3.5     100      .2     1.5

 803          KK   Z1R-Z
 804          KM    ROUTE Z1 THROUGH SUBZ
 805          RL                        5
 806          RS       2    FLOW      -1
 807          RC    .040    .035    .040    4500    .010
 808          RX       0      50      55      58      63      68      73     123
 809          RY     3.0     2.0     1.0       0       0     1.0     2.0     3.0
1                                          HEC-1 INPUT                                                    PAGE 19

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 810          KK    SUBZ
 811          BA     .16
 812          LU     .81     .25
 813          UC    .683    .667
 814          UA       0       3       5       8      12      20      43      75      90      96
 815          UA     100

 816          KK    CP-Z
 817          KM    CONCENTRATION POINT Z
 818          KM    SUBZ1 + SUBZ
 819          HC       2

 820          KK   CP-18
 821          KM   O+Z+CP-17
 822          HC       3

 823          KK   SUB31
 824          BA    1.29
 825          LU     .75     .12
 826          UC    .867    .926
 827          UA       0       3       5       8      12      20      43      75      90      96
 828          UA     100

 829          KK   DIV31
 830          KM   DIVERT ALL CULVERT FLOW TO BE RETRIEVED LATER
 831          DT     D31
 832          DI       0    1000
 833          DQ       0    1000

 834          KK   SUB30
```

```
835          BA     .01
836          LU     .81     .32
837          UC    .150    .114
838          UA       0       3       5       8      12      20      43      75      90      96
839          UA     100

840          KK   CP-30
841          HC       2

842          KK   DIV30
843          KM   DIVERT CULVERT FLOWS AT CP-30
844          DT     D30
845          DI       0    1000
846          DQ       0    1000

847          KK   SUB29
848          BA     .01
849          LU     .81     .32
850          UC    .383    .914
851          UA       0       3       5       8      12      20      43      75      90      96
852          UA     100
```



```
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


853          KK   CP-29
854          HC       2

855          KK   DIV29
856          KM    DIVERT CULVERT FLOW AT CP-29
857          DT     D29
858          DI       0      66    5000
859          DQ       0      66      66

860          KK   SUB28
861          BA     .01
862          LU     .81     .32
863          UC    .183    .179
864          UA       0       3       5       8      12      20      43      75      90      96
865          UA     100

866          KK   CP-28
867          KM   COMBINE 28 AND OVERFLOWS FROM 29
868          HC       2

869          KK   DIV28
870          KM    DIVERT CULVERT FLOW AT CP-28
871          DT     D28
872          DI       0      30    5000
873          DQ       0      30      30

874          KK   SUB26
875          BA     .08
```

```
876          LU     .81     .32
877          UC    .483    .583
878          UA       0       3       5       8      12      20      43      75      90      96
879          UA     100

880          KK   CP-26
881          KM   COMBINE SUB26 WITH OVERFLOW FROM 28
882          HC       2

883          KK   SR-26
884          KM    ROUTE THROUGH STRUCTURE
885          KM    2-49X33 CSP
886          RL                      5
887          RS       1    STOR      -1
888          SV       0    .006    .023    .052    .103
889          SE       0       1       2       3       4
890          SQ       0      33      54      94     130
891          SE       0     1.5       2       3       4
892          ST       4     100      .2     1.5

893          KK   DIV26
894          KM   DIVERT CULVERT FLOWS AT CP-26
895          DT     D26
896          DI       0    5000
897          DQ       0    5000
```



```
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


898          KK   SUB25
899          BA     .06
900          LU     .81     .32
901          UC    .483    .574
902          UA       0       3       5       8      12      20      43      75      90      96
903          UA     100

904          KK   CP-25
905          HC       2

906          KK   DIV25
907          KM    DIVERT OVERFLOW TO SUB24
908          DT     D25
909          DI       0       0     200     500    5000
910          DQ       0       0      97     397    4897

911          KK   SUB24
912          BA     .03
913          LU     .81     .32
914          UC    .300    .288
915          UA       0       3       5       8      12      20      43      75      90      96
916          UA     100

917          KK   CP-24
```

```
918          KM   COMBINE SUB24 WITH OVERFLOWS FROM SUB25
919          HC       2

920          KK   DIV24
921          KM    DIVERT CULVERT FLOW AT CP-24
922          DT     D24
923          DI       0      17     500
924          DQ       0      17      17

925          KK   SUB23
926          BA    1.23
927          LU     .72     .08
928          UC    .883    .931
929          UA       0       3       5       8      12      20      43      75      90      96
930          UA     100

931          KK   CP-23
932          KM   COMBINE FLOWS FROM SUB23 AND OVERFLOWS FROM SUB24
933          HC       2

934          KK   SR-23
935          KM    ROUTE THROUGH STRUCTURE
936          KM    4-10X4 RCBC
937          RL                     5
938          RS       1    STOR     -1
939          SV       0    .017    .069    .155    .275    .430    .620    .727
940          SE       0       1       2       3       4       5       6     6.5
941          SQ       0     228     352     620     920    1200    1480    1600
942          SE       0       1       2       3       4       5       6     6.5
943          ST     6.5     100      .2     1.5
```



```
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

944          KK   DIV23
945          KM   DIVERT CULVERT FLOWS AT CP-23
946          DT     D23
947          DI       0    5000
948          DQ       0    5000

949          KK   SUB21
950          BA     .02
951          LU     .71     .05
952          UC    .567    .552
953          UA       0       3       5       8      12      20      43      75      90      96
954          UA     100

955          KK   CP-21
956          HC       2

957          KK   SR-21
958          KM    ROUTE THROUGH STRUCTURE
959          KM    1-28X30 CSP
```

```
 960          RL                      5
 961          RS      1    STOR      -1
 962          SV      0    .004    .015    .024
 963          SE      0       1       2     2.5
 964          SQ      0      12      32      38
 965          SE      0       1       2     2.5
 966          ST    2.5     100      .2     1.5

 967          KK   DIV21
 968          KM   DIVERT CULVERT FLOW AT CP-21
 969          DT    D21
 970          DI      0    5000
 971          DQ      0    5000

 972          KK   SUB20
 973          BA    .03
 974          LU    .71     .05
 975          UC   .333    .388
 976          UA      0       3       5       8      12      20      43      75      90      96
 977          UA    100

 978          KK   CP-20
 979          HC      2

 980          KK   RS-20
 981          KM    ROUTE THROUGH STRUCTURE
 982          KM    2-35X24  CSP
 983          RL                      5
 984          RS      1    STOR      -1
 985          SV      0    .004    .015    .034
 986          SE      0       1       2       3
 987          SQ      0      14      42      68
 988          SE      0       1       2       3
 989          ST      3     100      .2     1.5
```



```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 990          KK   DIV20
 991          KM   DIVERT CULVERT FLOWS AT CP-20
 992          DT    D20
 993          DI      0    5000
 994          DQ      0    5000

 995          KK   SUB19
 996          BA    .66
 997          LU    .71     .05
 998          UI     39      39      39      39      95     135     154     182     196     214
 999          UI    227     246     266     293     314     361     438     486     497     431
1000          UI    387     354     328     307     282     256     237     217     197     184
1001          UI    159     129     111      59      59      55      54      54      42      39
1002          UI     39      39      25      12      12      12      12      12      12      12
1003          UI     12      12      12      12      12      12       0       0       0       0
```

```
1004        KK   CP-19
1005        HC      2

1006        KK   SR-19
1007        KM    ROUTE THROUGH STRUCTURE
1008        KM    3-10X4 RCBC + 3-12X3 RCBC
1009        RL                      5
1010        RS      1    STOR      -1
1011        SV      0    .029    .115    .258    .459    .581
1012        SE      0       1       2       3       4     4.5
1013        SQ      0     267     519     915    1320    1530
1014        SE      0       1       2       3       4     4.5
1015        ST    4.5     100      .2     1.5

1016        KK   DIV19
1017        KM   DIVERT CULVERT FLOWS AT CP-19
1018        DT     D19
1019        DI      0    5000
1020        DQ      0    5000

1021        KK   SUB18
1022        BA     .02
1023        LU     .71     .05
1024        UC    .250    .204
1025        UA      0       3       5       8      12      20      43      75      90      96
1026        UA    100

1027        KK   CP-18
1028        HC      2

1029        KK   DIV18
1030        KM    DIVERT CULVERT FLOW FROM SUB 18
1031        DT     D18
1032        DI      0      50    5000
1033        DQ      0      50      50
```



```
LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1034        KK  SUB16U
1035        BA   1.08
1036        LU    .81     .25
1037        UI     59      59      59      59      94     193     220     252     280     304
1038        UI    325     346     372     400     437     462     520     605     705     783
1039        UI    806     626     570     527     482     462     428     390     363     340
1040        UI    305     285     265     226     176     154     104     104     100      97
1041        UI     97      71      59      59      59      59      21      18      18      18
1042        UI     18      18      18      18      18      18      18      18      18      18
1043        UI     18       0       0       0       0       0       0       0       0       0

1044        KK  6UR-16
1045        KM    ROUTE 16U THROUGH 16
```

```
1046        RL                      5
1047        RS      3    FLOW      -1
1048        RC    .040    .035    .040    6800    .020
1049        RX      0      50      55      60      90      95     100     150
1050        RY    4.5     4.0     1.0       0       0     1.0     4.0     4.5

1051        KK   SUB16
1052        BA     .27
1053        LU     .75     .19
1054        UC    .417    .421
1055        UA      0       3       5       8      12      20      43      75      90      96
1056        UA    100

1057        KK   CP-16
1058        KM    CONCENTRATION POINT 16
1059        KM    SUB16U + SUB16 + OVERFLOW FROM SUB 18
1060        HC      3

1061        KK   DIV16
1062        KM    DIVERT CULVERT FLOWS AT CP-16
1063        DT     D16
1064        DI      0     158    5000
1065        DQ      0      42      42

1066        KK   SUB14
1067        BA     .01
1068        LU     .81     .32
1069        UC    .183    .142
1070        UA      0       3       5       8      12      20      43      75      90      96
1071        UA    100

1072        KK   CP-14
1073        KM   COMBINE FLOWS FROM SUB-14 WITH OVERFLOWS FROM CP-16
1074        HC      2

1075        KK   DIV14
1076        KM    DIVERT CULVERT FLOWS AT CP-14
1077        DT     D14
1078        DI      0      32    5000
1079        DQ      0      32      32
```



```
LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


1080        KK   SUB13
1081        BA     .04
1082        LU     .81     .32
1083        UC    .383    .503
1084        UA      0       3       5       8      12      20      43      75      90      96
1085        UA    100

1086        KK   CP-13
1087        KM   COMBIME SUB-13 WITH OVERFLOWS FROM CP-14
```

```
1088        HC      2

1089        KK   DIV13
1090        KM    DIVERT CULVERT FLOW AT CP-13
1091        DT     D13
1092        DI       0      68    5000
1093        DQ       0      68      68

1094        KK   SUB11
1095        BA     .05
1096        LU     .81     .32
1097        UC    .383    .417
1098        UA       0       3       5       8      12      20      43      75      90      96
1099        UA     100

1100        KK   CP-11
1101        KM   FLOWS FROM SUB-11 AND OVERFLOWS FROM CP-13
1102        HC       2

1103        KK   DIV11
1104        KM    DIVERT CULVERT FLOWS AT CP-11
1105        DT     D11
1106        DI       0      61    5000
1107        DQ       0      61      61

1108        KK   SUB10
1109        BA     .14
1110        LU     .74     .13
1111        UC    .367    .318
1112        UA       0       3       5       8      12      20      43      75      90      96
1113        UA     100

1114        KK   CP-10
1115        HC       2

1116        KK   DIV10
1117        KM    DIVERT CULVERT FLOWS AT CP-10
1118        DT     D10
1119        DI       0     217    5000
1120        DQ       0     217     217
```



```
LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


1121        KK    SUB9
1122        BA     .02
1123        LU     .81     .32
1124        UC    .233    .181
1125        UA       0       3       5       8      12      20      43      75      90      96
1126        UA     100

1127        KK    CP-9
1128        KM   COMBINE SUB9 AND OVERFLOWS FROM CP-10
```

```
1129        HC      2

1130        KK    DIV9
1131        KM    DIVERT CULVERT FLOWS AT CP-9
1132        DT      D9
1133        DI       0      26    5000
1134        DQ       0      26      26

1135        KK    SUB7
1136        BA     .62
1137        LU     .77     .19
1138        UC    .883    .853
1139        UA       0       3       5       8      12      20      43      75      90      96
1140        UA     100

1141        KK    CP-7
1142        KM    COMBINE SUB7 AND OVERFLOWS FROM CP-9
1143        HC      2

1144        KK    SR-7
1145        KM    ROUTE THROUGH STRUCTURE
1146        KM    3-10X3 RCBC
1147        RL                     5
1148        RS       1    STOR     -1
1149        SV       0    .015    .061    .138    .245    .383    .551
1150        SE       0       1       2       3       4       5       6
1151        SQ       0      90     261     450     660     780     930
1152        SE       0       1       2       3       4       5       6
1153        ST       6     100      .2     1.5

1154        KK    DIV7
1155        KM    DIVERT ALL CULVERT FLOW TO BE RETRIEVED DOWNSTREAM
1156        DT      D7
1157        DI       0    5000
1158        DQ       0    5000

1159        KK    SUB6
1160        BA     .95
1161        LU     .74     .14
1162        UC    .917   1.082
1163        UA       0       3       5       8      12      20      43      75      90      96
1164        UA     100
```



```
LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


1165        KK    CP-6
1166        HC      2

1167        KK    DIV6
1168        KM    DIVERT PIPEFLOW TO SUB8
1169        DT      D6
1170        DI       0    1086    2000    3000    5000
```

```
1171        DQ      0    1086    1086    1086    1086

1172        KK    SUB5
1173        BA     .04
1174        LU     .81     .25
1175        UC    .300    .269
1176        UA       0       3       5       8      12      20      43      75      90      96
1177        UA     100

1178        KK    CP-6
1179        KM    COMBINE SUB5 WITH OVERFLOWS FROM CP-6
1180        HC       2

1181        KK    DIV5
1182        KM    DIVERT CULVERT FLOW AT CP-5
1183        DT      D5
1184        DI       0      65     100     200    1000    5000
1185        DQ       0      65      65      65      65      65

1186        KK    SUB3
1187        BA     .18
1188        LU     .81     .25
1189        UC    .583    .558
1190        UA       0       3       5       8      12      20      43      75      90      96
1191        UA     100

1192        KK    CP-3
1193        KM   COMBINE SUB3 WITH OVERFLOWS FROM CP-5
1194        HC       2

1195        KK    DIV3
1196        KM    DIVERT CULVERT FLOW AT CP-3
1197        DT      D3
1198        DI       0      30     100     500    1000
1199        DQ       0      30      30      30      30

1200        KK    SUB2
1201        BA     .06
1202        LU     .81     .25
1203        UC    .617   1.076
1204        UA       0       3       5       8      12      20      43      75      90      96
1205        UA     100
```



```
LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


1206        KK    CP-2
1207        KM    COMBINE SUB2 WITH OVERFLOWS FROM CP-3
1208        HC       2

1209        KK    DIV2
1210        KM    DIVERT CULVERT FLOW AT CP-2
1211        DT      D2
```

```
1212        DI      0    1383    2000    5000   10000
1213        DQ      0    1383    1383    1383    1383

1214        KK    SUB1
1215        BA     .54
1216        LU     .79     .22
1217        UI      28      28      28      28      33      93     102     115     132     141
1218        UI     154     162     172     185     202     215     232     264     316     341
1219        UI     375     330     297     272     252     236     222     207     188     176
1220        UI     165     150     139     131     112      93      81      55      50      50
1221        UI      47      47      45      28      28      28      28      25       9       9
1222        UI       9       9       9       9       9       9       9       9       9       9
1223        UI       9       9       9       0       0       0       0       0       0       0

1224        KK  COMB-1
1225        KM    COMBINE OVERFLOWS FROM 2 WITH SUB1
1226        HC       2

1227        KK   BRDG2
1228        KM    ALL WATERSHEDS ABOVE SECOND CROSSING OF WAGNER UNDER SUN VALLEY PKWY
1229        HC       2

1230        KK    SR-1
1231        KM    ROUTE THROUGH STRUCTURE
1232        KM    6-10X4 RCBC
1233        RL                     5
1234        RS       1    STOR     -1
1235        SV       0    .011    .046    .103    .083
1236        SE       0       1       2       3       4
1237        SQ       0     342     528     930    1380
1238        SE       0       1       2       3       4
1239        ST       4    1000      .2     1.5

1240        KK    R1-A
1241        KM    ROUTE BRDG2 TO CP-A
1242        RL                     5
1243        RS       2    FLOW     -1
1244        RC    .040    .035    .040    3300    .015
1245        RX       0      50      51      52     202     203     204     284
1246        RY     7.0     2.0     0.5       0       0     0.5     2.0     7.0

1247        KK    SUB4
1248        BA    1.32
1249        LU     .80     .24
1250        UI      58      58      58      58      58      73     190     200     222     257
1251        UI     275     291     313     327     344     364     387     415     439     463
1252        UI     511     577     673     715     768     691     627     580     542     508
```



```
LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1253        UI     483     459     434     403     377     355     337     310     290     276
1254        UI     260     222     188     166     131     102     102     101      95      95
1255        UI      95      71      58      58      58      58      58      27      18      18
```

```
1256        UI      18      18      18      18      18      18      18      18      18      18
1257        UI      18      18      18      18      18      18       0       0       0       0

1258        KK      D2
1259        KM   RETRIEVE FLOWS FROM CULVERT AT SUB-2
1260        DR      D2

1261        KK     RD2
1262        KM   ROUTE FLOWS FROM SUB-2 CULVERT TO CP-A
1263        RL                      5
1264        RS       2    FLOW      -1
1265        RC    .040    .035    .040    3000     .01
1266        RX       0      60      65      70      85      90      95     145
1267        RY     3.5     3.0     1.0       0       0     1.0     3.0     3.5

1268        KK      D3
1269        KM    RETRIEVE FLOWS FROM THE CULVERT AT SUB-3
1270        DR      D3

1271        KK     RD3
1272        KM   ROUTE FLOWS FROM SUB-2 CULVERT TO CP-A
1273        RL                      5
1274        RS       2    FLOW      -1
1275        RC    .040    .030    .040    2300    .013
1276        RX       0      60      65      70      85      90      95     145
1277        RY     3.5     3.0     1.0       0       0     1.0     3.0     3.5

1278        KK    CP-A
1279        KM    CONCENTRATION POINT A
1280        KM    SUB4 + BRDG2+ D2+D3
1281        HC       4

1282        KK    RA-B
1283        KM    ROUTE CP-A TO CP-B
1284        RL                      5
1285        RS       2    FLOW      -1
1286        RC    .040     .035    .04    5200    .015
1287        RX       0      50      51      52     202     203     204     284
1288        RY     7.0     6.0     0.5       0       0     0.5     6.0     7.0

1289        KK    SUB8
1290        BA     .78
1291        LU     .82     .29
1292        UC    .900    .552
1293        UA       0       3       5       8      12      20      43      75      90      96
1294        UA     100
```



```
LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1295        KK      D5
1296        KM   RETRIEVE FLOWS FROM THE CULVERTS AT SUB5
1297        DR      D5
```

```
1298        KK     RD5
1299        KM   ROUTE FLOWS TO CP-B
1300        RL                     5
1301        RS      2    FLOW     -1
1302        RC    .04    .035    .04    7500    0.01
1303        RX      0      60     65      70      85      90      95     145
1304        RY    3.5       2      1       0       0       1       2     3.5

1305        KK      D6
1306        KM   RETRIEVE FLOWS FROM THE CULVERT AT SUB-6
1307        DR      D6

1308        KK     RD5
1309        RL                     5
1310        RS      2    FLOW     -1
1311        RC    .04    .035    .04    6800    0.01
1312        RX      0      60     65      70      85      90      95     145
1313        RY    4.5       2      1       0       0       1       2     4.5

1314        KK      D7
1315        KM   RETRIEVE FLOWS FROM THE CULVERT AT SUB-7
1316        DR      D7

1317        KK     RD7
1318        KM    ROUTE CULVERT FLOW TO CP-B
1319        RL                     5
1320        RS      2    FLOW     -1
1321        RC    .04    .035    .04    6600     .01
1322        RX      0      60     65      70      85      90      95     145
1323        RY    3.5       2      1       0       0       1       2     3.5

1324        KK   CP-B1
1325        KM   COMBINE ALL CULVERT FLOWS
1326        HC      3    .001

1327        KK    CP-B
1328        KM    CONCENTRATION POINT B
1329        KM    ALL WATERSHEDS CONTRIBUTING TO CONCENTRATION POINT B
1330        HC      3

1331        KK    RB-C
1332        KM    ROUTE CP-B TO CP-C
1333        RL                     5
1334        RS      1    FLOW     -1
1335        RC   .040    .035   .040    2100    .015
1336        RX      0      85     86      87     237     238     239     319
1337        RY   10.0     9.0    0.5       0       0     0.5     9.0    10.0
```



```
LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1338        KK      D9
```

```
1339          DR      D9

1340          KK     D10
1341          DR     D10

1342          KK     D11
1343          DR     D11

1344          KK  CP-C1A
1345          HC       3    .001

1346          KK    RC1A
1347          KM    ROUTE D9,D10 AND D11 TO CP-C
1348          RL                      5
1349          RS       4    FLOW      -1
1350          RC    .040    .035    .040    7300     .02
1351          RX       0      60      65      70      85      90      95     145
1352          RY     3.5     3.0     1.0       0       0     1.0     3.0     3.5

1353          KK   SUB12
1354          BA     .34
1355          LU     .82     .32
1356          UC    .733    .635
1357          UA       0       3       5       8      12      20      43      75      90      96
1358          UA     100

1359          KK   CP-C1
1360          KM   D9+D10+D11+SUB12
1361          HC       2

1362          KK     D13
1363          DR     D13

1364          KK     D14
1365          DR     D14

1366          KK     C2A
1367          KM   COMBINE FLOWS FROM CP-13,CP-14
1368          HC       2    .001

1369          KK    RC2A
1370          KM   ROUTE RETRIEVED FLOWS FROM CULVERTS AT CP-11, CP-13, CP-14 TO CP-C
1371          RL                      5
1372          RS       6    FLOW      -1
1373          RC    .040    .035    .040    6600     .02
1374          RX       0      60      65      70      85      90      95     145
1375          RY     3.5     3.0     1.0       0       0     1.0     3.0     3.5
```



```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


1376          KK   SUB15
1377          BA     .12
```

```
1378        LU     .81     .32
1379        UC    .667    .914
1380        UA       0       3       5       8      12      20      43      75      90      96
1381        UA     100

1382        KK   CP-C2
1383        KM   D1,D14,SUB15
1384        HC       2

1385        KK    CP-C
1386        KM    CONCENTRATION POINT C
1387        KM    ALL WATERSHEDS CONTRIBUTING TO CONCENTRATION POINT C
1388        HC       3

1389        KK    RC-D
1390        KM    ROUTE CP-C TO CP-D
1391        RL                     5
1392        RS       3    FLOW     -1
1393        RC    .040    .035    .040    4500    .015
1394        RX       0      85      86      87     237     238     239     319
1395        RY    10.0     9.0     0.5       0       0     0.5     9.0    10.0

1396        KK     D16
1397        DR     D16

1398        KK    RD16
1399        KM   ROUTE CULVERT FLOW FROM 16 THROUGH 17
1400        RL                     5
1401        RS       5    FLOW     -1
1402        RC    .040    .035    .040   10500    .020
1403        RX       0      50      55      60      90      95     100     150
1404        RY     4.5     4.0     1.0       0       0     1.0     4.0     4.5

1405        KK   SUB17
1406        BA     .69
1407        LU     .71     .05
1408        UC    .867    .701
1409        UA       0       3       5       8      12      20      43      75      90      96
1410        UA     100

1411        KK      D1
1412        KM   COMBINE RD16 AND SUB17
1413        HC       2

1414        KK     D18
1415        KM    RETRIEVE CULVERT FLOW FROM CP-18
1416        DR     D18
```



```
LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


1417        KK     D19
1418        KM   RETRIEVE CULVERT FLOW FROM CP-19
```

```
1419        DR     D19

1420        KK     D20
1421        KM   RETRIEVE CULVERT FLOW FROM CP-20
1422        DR     D20

1423        KK     D21
1424        KM   RETRIEVE CULVERT FLOW FROM CP-21
1425        DR     D21

1426        KK     D2A
1427        KM   COMBINE D18,D19,D20 AND D21
1428        HC       4    .001

1429        KK    RD2A
1430        KM    ROUTE FLOW D2A TO CP-D
1431        RL                     5
1432        RS       4    FLOW     -1
1433        RC    .040    .035    .040    8600    .020
1434        RX       0      50      55      60      90      95     100     150
1435        RY     4.5     4.0     1.0       0       0     1.0     4.0     4.5

1436        KK   SUB22
1437        BA     .23
1438        LU     .80     .29
1439        UC    .850   1.122
1440        UA       0       3       5       8      12      20      43      75      90      96
1441        UA     100

1442        KK      D2
1443        KM   ALSO COMBINE SUB22
1444        HC       2

1445        KK     D23
1446        DR     D23

1447        KK   R23-D
1448        KM    ROUTE SUB23 TO D
1449        RL                     5
1450        RS       3    FLOW     -1
1451        RC    .040    .035    .040    8300    .020
1452        RX       0      50      55      60      90      95     100     150
1453        RY     4.5     4.0     1.0       0       0     1.0     4.0     4.5

1454        KK     D24
1455        DR     D24
```



```
LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


1456        KK   R24-D
1457        KM    ROUTE SUB24 TO CP-D
1458        RL                     5
```

```
1459        RS       6    FLOW      -1
1460        RC    .040     .035    .04    8250     .02
1461        RX       0       60     65      70      85      90      95     145
1462        RY     3.5      3.0    1.0       0       0     1.0     3.0     3.5

1463        KK     D25
1464        DR     D25

1465        KK   R25-D
1466        KM    ROUTE SUB25 TO CP-D
1467        RL                     5
1468        RS       6    FLOW      -1
1469        RC    .040     .035    .040    8200     .02
1470        RX       0       60     65      70      85      90      95     145
1471        RY     3.5      3.0    1.0       0       0     1.0     3.0     3.5

1472        KK     D26
1473        DR     D26

1474        KK   R26-D
1475        KM    ROUTE SUB26 TO D
1476        RL                     5
1477        RS       4    FLOW      -1
1478        RC    .040     .035    .040    7600     .02
1479        RX       0       60     65      70      85      90      95     145
1480        RY     3.5      3.0    1.0       0       0     1.0     3.0     3.5

1481        KK   SUB27
1482        BA     .34
1483        LU     .81      .32
1484        UC    .733     .706
1485        UA       0        3      5       8      12      20      43      75      90      96
1486        UA     100

1487        KK      D3
1488        KM   COMBINE D23,D24,D25,D26,SUB27
1489        HC       5

1490        KK     D28
1491        DR     D28

1492        KK   R28-D
1493        KM    ROUTE SUB28 TO D
1494        RL                     5
1495        RS       7    FLOW      -1
1496        RC    .040     .035    .040    8200     .02
1497        RX       0       60     65      70      85      90      95     145
1498        RY     3.5      3.0    1.0       0       0     1.0     3.0     3.5
```



```
LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1499        KK     D29
```

```
1500        DR    D29

1501        KK   R29-D
1502        KM    ROUTE SUB29 TO D
1503        RL                     5
1504        RS     5    FLOW     -1
1505        RC   .040   .035   .040   8320    .02
1506        RX     0     60     65     70     85     90     95    145
1507        RY   3.5    3.0    1.0      0      0    1.0    3.0    3.5

1508        KK    D30
1509        DR    D30

1510        KK   R30-D
1511        KM    ROUTE SUB30 TO D
1512        RL                     5
1513        RS     5    FLOW     -1
1514        RC   .040   .035   .040   8320    .02
1515        RX     0     60     65     70     85     90     95    145
1516        RY   3.5    3.0      1      0      0    1.0    3.0    3.5

1517        KK    D31
1518        DR    D31

1519        KK   RD31
1520        KM    ROUTE SUB31 TO D
1521        RL                     5
1522        RS     3    FLOW     -1
1523        RC   .040   .035   .040   8300   .020
1524        RX     0     50     55     60     90     95    100    150
1525        RY   4.5    4.0    1.0      0      0    1.0    4.0    4.5

1526        KK   SUB32
1527        BA    .32
1528        LU    .81    .26
1529        UC   .783   .802
1530        UA     0      3      5      8     12     20     43     75     90     96
1531        UA   100

1532        KK     D4
1533        KM   COMBINE D28, D29, D30, D31 AND SUB32
1534        HC      5

1535        KK      D
1536        KM   COMBINE RCP-C, D1, D2, D3, AND D4
1537        HC      5

1538        KK   RD-E
1539        KM    ROUTE D TO E
1540        RL                     5
1541        RS     4    FLOW     -1
1542        RC   .040   .035   .040   7800   .015
1543        RX     0     85     86     87    237    238    239    319
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1544          RY    10.0     9.0     0.5       0       0     0.5     9.0    10.0

1545          KK   SUB33
1546          BA    1.36
1547          LU     .80     .24
1548          UI      48      48      48      48      48      48      48     117     157     167
1549          UI     183     200     219     232     242     255     268     277     288     301
1550          UI     316     334     355     367     384     417     459     505     564     606
1551          UI     639     590     539     506     472     448     427     409     391     376
1552          UI     361     339     321     305     290     278     263     249     233     226
1553          UI     219     185     182     137     137     114      84      84      84      83
1554          UI      78      78      78      78      54      48      48      48      48      48
1555          UI      48      33      15      15      15      15      15      15      15      15
1556          UI      15      15      15      15      15      15      15      15      15      15
1557          UI      15      15      15      15      15       0       0       0       0       0

1558          KK   R33-E
1559          KM    ROUTE 33 TO E
1560          RL                     5
1561          RS       2    FLOW     -1
1562          RC    .040    .035    .040    4150    .015
1563          RX       0      50      51      52     202     203     204     284
1564          RY     7.0     6.0     0.5       0       0     0.5     6.0     7.0

1565          KK   SUB34
1566          BA    0.50
1567          LU     .74     .28
1568          UC    .767    .655
1569          UA       0       3       5       8      12      20      43      75      90      96
1570          UA     100

1571          KK    CP-E
1572          KM    CONCENTRATION POINT E
1573          KM    ALL WATERSHEDS CONTRIBUTING TO WAGNER WASH
1574          KM    INTO THE CONFLUENCE AT THE HASSAYAMPA RIVER
1575          HC       3
1576          ZZ
```

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

```
INPUT
 LINE     (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

  NO.     (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

   29      SUBPa
              V
              V
   38        RPa
              .
              .
   44         .        SUBPb
```

```
            .           .
            .           .
 53         -............
            V
            V
 55       RPb
            .
            .
 61         .       SUBPc
            .           .
            .           .
 72         P............
            .
            .
 74         .       SUBQa
            .           V
            .           V
 84         .         RQa
            .           .
            .           .
 90         .           .          Qb
            .           .           .
            .           .           .
 99         .           -............
            .           V
            .           V
101         .          RQ
            .           .
            .           .
107         .           .       SUBQc
            .           .           .
            .           .           .
116         .           Q............
            .           .
            .           .
118         .           .       SUBRa
            .           .           V
            .           .           V
128         .           .         RRa
            .           .           .
            .           .           .
134         .           .           .       SUBRb
            .           .           .           .
            .           .           .           .
144         .           .           R............
            .           .           .
            .           .           .
146       ALL........................
            V
            V
148      SR-PQ
            .
            .
159         .------->      DR
```

```
157      DCAP
            .
            .
162         .        SUBA
            .          V
            .          V
168         .        SR-A
            .          V
            .          V
178         .      RA-A1
            .          .
            .          .
185         .          .       SUBA1
            .          .           .
            .          .           .
195         .     CP-A'S............
            .          V
            .          V
199         .     A'S-11
            .          .
            .          .
206     CP-11............
            V
            V
210     R11-12
            .
            .
217         .      SUBB1
            .          .
            .          .
226     CP-12............
            V
            V
230     R12-13
            .
            .
237         .      SUBC1
            .          V
            .          V
245         .     RC1-13
            .          .
            .          .
252         .          .       SUBD1
            .          .           V
            .          .           V
258         .          .      RD1-13
            .          .           .
            .          .           .
265         .          .           .      SUBG1
            .          .           .          .
            .          .           .          .
271         .          .           .          .       SUBS
            .          .           .          .          .
            .          .           .          .          .
```

```
277     CP-13.............................................
            V
            V
281     R13-14
            .
            .
288         .       SUBH1
            .           V
            .           V
295         .       RH1-14
            .           .
            .           .
302         .           .       SUBI1
            .           .           .
            .           .           .
310         .           .           .           .<-------       DR
308         .           .           .         DR
            .           .           .          V
            .           .           .          V
311         .           .           .       RR-T
            .           .           .           .
            .           .           .           .
317         .           .           .           .       SUBT
            .           .           .           .           .
            .           .           .           .           .
325     CP-14.............................................
            .
            .
330         .       SUBB
            .           V
            .           V
336         .       R1-2
            .           .
            .           .
343         .           .       SUBCU
            .           .           V
            .           .           V
349         .           .       RCU-2
            .           .           .
            .           .           .
356         .           .           .       SUBC
            .           .           .           .
            .           .           .           .
362         .       CP-2......................
            .           V
            .           V
366         .       R2-3
            .           .
            .           .
373         .           .       SUBD
            .           .           .
            .           .           .
379         .       CP-3............
            .           V
```

```
          .          V
383       .       R3-4
          .          .
          .          .
390       .          .        SUBE
          .          .           .
          .          .           .
396       .       CP-4............
          .          V
          .          V
400       .       R4-5
          .          .
          .          .
407       .          .        SUBF
          .          .           .
          .          .           .
413       .       CP-5............
          .          V
          .          V
417       .       R5-6
          .          .
          .          .
424       .          .        SUBG
          .          .           .
          .          .           .
430       .       CP-6............
          .          V
          .          V
434       .       R6-7
          .          .
          .          .
441       .          .        SUBH
          .          .           .
          .          .           .
447       .       CP-7............
          .          V
          .          V
451       .       R7-8
          .          .
          .          .
458       .          .     SUBIUa
          .          .          V
          .          .          V
464       .          .       RIUa
          .          .           .
          .          .           .
470       .          .           .     SUBIUb
          .          .           .           .
          .          .           .           .
476       .          .        CIU............
          .          .          V
          .          .          V
478       .          .      IUR-I
          .          .           .
```

```
          .          .          .
594       .          .          .      SUBV1
          .          .          .          V
          .          .          .          V
600       .          .          .      SR-V1
          .          .          .          V
          .          .          .          V
610       .          .          .      V1R-V
          .          .          .          .
          .          .          .          .
617       .          .          .          .        SUBV
          .          .          .          .           .
          .          .          .          .           .
623       .          .          .      CP-V............
          .          .          .          .
          .          .          .          .
627    CP-15.................................
          V
          V
631    R15-16
          .
          .
638       .       SUBM
          .          .
          .          .
644       .          .     SUBW1
          .          .         V
          .          .         V
650       .          .     W1R-W
          .          .         .
          .          .         .
657       .          .         .      SUBW
          .          .         .         .
          .          .         .         .
663       .          .      CP-W............
          .          .         V
          .          .         V
667       .          .     RW-16
          .          .         .
          .          .         .
674       .          .         .      SUBX1
          .          .         .         V
          .          .         .         V
680       .          .         .      X1R-X
          .          .         .         .
          .          .         .         .
687       .          .         .         .        SUBX
          .          .         .         .           .
          .          .         .         .           .
693       .          .         .      CP-X............
          .          .         .         .
          .          .         .         .
697    CP-16.................................
          V
```

```
            V
701     R16-17
            .
            .
708         .        SUBN
            .          .
            .          .
718         .          .      SUBY1
            .          .          V
            .          .          V
726         .          .      SR-Y1
            .          .          V
            .          .          V
736         .          .      Y1R-Y
            .          .          .
            .          .          .
743         .          .          .        SUBY
            .          .          .          .
            .          .          .          .
749         .          .       CP-Y............
            .          .          .
            .          .          .
753     CP-17......................
            V
            V
757     R17-18
            .
            .
764         .       SUBOU
            .          V
            .          V
770         .       OUR-O
            .          .
            .          .
777         .          .       SUBO
            .          .          .
            .          .          .
783         .       CP-O............
            .          .
            .          .
787         .          .      SUBZ1
            .          .          V
            .          .          V
793         .          .      SR-Z1
            .          .          V
            .          .          V
803         .          .      Z1R-Z
            .          .          .
            .          .          .
810         .          .          .        SUBZ
            .          .          .          .
            .          .          .          .
816         .          .       CP-Z............
            .          .          .
```

```
                .           .           .
820         CP-18.......................
                .
                .
823             .       SUB31
                .           .
                .           .
831             .           .-------->      D31
829             .       DIV31
                .           .
                .           .
834             .           .       SUB30
                .           .           .
                .           .           .
840             .       CP-30............
                .           .
                .           .
844             .           .-------->      D30
842             .       DIV30
                .           .
                .           .
847             .           .       SUB29
                .           .           .
                .           .           .
853             .       CP-29............
                .           .
                .           .
857             .           .-------->      D29
855             .       DIV29
                .           .
                .           .
860             .           .       SUB28
                .           .           .
                .           .           .
866             .       CP-28............
                .           .
                .           .
871             .           .-------->      D28
869             .       DIV28
                .           .
                .           .
874             .           .       SUB26
                .           .           .
                .           .           .
880             .       CP-26............
                .           V
                .           V
883             .       SR-26
                .           .
                .           .
895             .           .-------->      D26
893             .       DIV26
                .           .
                .           .
```

```
898          .           .       SUB25
             .           .           .
             .           .           .
904          .       CP-25............
             .           .
             .           .
908          .           .------->     D25
906          .       DIV25
             .           .
             .           .
911          .           .       SUB24
             .           .           .
             .           .           .
917          .       CP-24............
             .           .
             .           .
922          .           .------->     D24
920          .       DIV24
             .           .
             .           .
925          .           .       SUB23
             .           .           .
             .           .           .
931          .       CP-23............
             .           V
             .           V
934          .       SR-23
             .           .
             .           .
946          .           .------->     D23
944          .       DIV23
             .           .
             .           .
949          .           .       SUB21
             .           .           .
             .           .           .
955          .       CP-21............
             .           V
             .           V
957          .       SR-21
             .           .
             .           .
969          .           .------->     D21
967          .       DIV21
             .           .
             .           .
972          .           .       SUB20
             .           .           .
             .           .           .
978          .       CP-20............
             .           V
             .           V
980          .       RS-20
             .           .
```

```
                .           .
992             .           .------->     D20
990             .       DIV20
                .           .
                .           .
995             .           .       SUB19
                .           .           .
                .           .           .
1004            .       CP-19............
                .           V
                .           V
1006            .       SR-19
                .           .
                .           .
1018            .           .------->     D19
1016            .       DIV19
                .           .
                .           .
1021            .           .       SUB18
                .           .           .
                .           .           .
1027            .       CP-18............
                .           .
                .           .
1031            .           .------->     D18
1029            .       DIV18
                .           .
                .           .
1034            .           .      SUB16U
                .           .           V
                .           .           V
1044            .           .      6UR-16
                .           .           .
                .           .           .
1051            .           .           .       SUB16
                .           .           .           .
                .           .           .           .
1057            .       CP-16........................
                .           .
                .           .
1063            .           .------->     D16
1061            .       DIV16
                .           .
                .           .
1066            .           .       SUB14
                .           .           .
                .           .           .
1072            .       CP-14............
                .           .
                .           .
1077            .           .------->     D14
1075            .       DIV14
                .           .
                .           .
```

```
1080        .           .       SUB13
            .           .           .
            .           .           .
1086        .       CP-13............
            .           .
            .           .
1091        .           .------->     D13
1089        .       DIV13
            .           .
            .           .
1094        .           .       SUB11
            .           .           .
            .           .           .
1100        .       CP-11............
            .           .
            .           .
1105        .           .------->     D11
1103        .       DIV11
            .           .
            .           .
1108        .           .       SUB10
            .           .           .
            .           .           .
1114        .       CP-10............
            .           .
            .           .
1118        .           .------->     D10
1116        .       DIV10
            .           .
            .           .
1121        .           .        SUB9
            .           .           .
            .           .           .
1127        .        CP-9............
            .           .
            .           .
1132        .           .------->      D9
1130        .        DIV9
            .           .
            .           .
1135        .           .        SUB7
            .           .           .
            .           .           .
1141        .        CP-7............
            .           V
            .           V
1144        .        SR-7
            .           .
            .           .
1156        .           .------->      D7
1154        .        DIV7
            .           .
            .           .
1159        .           .        SUB6
```

```
                .           .           .
                .           .           .
1165            .        CP-6............
                .           .
                .           .
1169            .           .-------->      D6
1167            .        DIV6
                .           .
                .           .
1172            .           .        SUB5
                .           .           .
                .           .           .
1178            .        CP-6............
                .           .
                .           .
1183            .           .-------->      D5
1181            .        DIV5
                .           .
                .           .
1186            .           .        SUB3
                .           .           .
                .           .           .
1192            .        CP-3............
                .           .
                .           .
1197            .           .-------->      D3
1195            .        DIV3
                .           .
                .           .
1200            .           .        SUB2
                .           .           .
                .           .           .
1206            .        CP-2............
                .           .
                .           .
1211            .           .-------->      D2
1209            .        DIV2
                .           .
                .           .
1214            .           .        SUB1
                .           .           .
                .           .           .
1224            .      COMB-1............
                .           .
                .           .
1227         BRDG2............
                V
                V
1230         SR-1
                V
                V
1240         R1-A
                .
                .
```

```
1080        .           .       SUB13
            .           .           .
            .           .           .
1086        .       CP-13............
            .           .
            .           .
1091        .           .------->     D13
1089        .       DIV13
            .           .
            .           .
1094        .           .       SUB11
            .           .           .
            .           .           .
1100        .       CP-11............
            .           .
            .           .
1105        .           .------->     D11
1103        .       DIV11
            .           .
            .           .
1108        .           .       SUB10
            .           .           .
            .           .           .
1114        .       CP-10............
            .           .
            .           .
1118        .           .------->     D10
1116        .       DIV10
            .           .
            .           .
1121        .           .        SUB9
            .           .           .
            .           .           .
1127        .        CP-9............
            .           .
            .           .
1132        .           .------->      D9
1130        .        DIV9
            .           .
            .           .
1135        .           .        SUB7
            .           .           .
            .           .           .
1141        .        CP-7............
            .           V
            .           V
1144        .        SR-7
            .           .
            .           .
1156        .           .------->      D7
1154        .        DIV7
            .           .
            .           .
1159        .           .        SUB6
```

```
                .           .           .
                .           .           .
1165            .        CP-6............
                .           .
                .           .
1169            .           .------->      D6
1167            .        DIV6
                .           .
                .           .
1172            .           .        SUB5
                .           .           .
                .           .           .
1178            .        CP-6............
                .           .
                .           .
1183            .           .------->      D5
1181            .        DIV5
                .           .
                .           .
1186            .           .        SUB3
                .           .           .
                .           .           .
1192            .        CP-3............
                .           .
                .           .
1197            .           .------->      D3
1195            .        DIV3
                .           .
                .           .
1200            .           .        SUB2
                .           .           .
                .           .           .
1206            .        CP-2............
                .           .
                .           .
1211            .           .------->      D2
1209            .        DIV2
                .           .
                .           .
1214            .           .        SUB1
                .           .           .
                .           .           .
1224            .      COMB-1............
                .           .
                .           .
1227         BRDG2............
                V
                V
1230          SR-1
                V
                V
1240          R1-A
                .
                .
```

```
1247          .          SUB4
              .            .
              .            .
1260          .            .            .<-------       D2
1258          .            .          D2
              .            .           V
              .            .           V
1261          .            .         RD2
              .            .           .
              .            .           .
1270          .            .           .            .<-------       D3
1268          .            .           .          D3
              .            .           .           V
              .            .           .           V
1271          .            .           .         RD3
              .            .           .           .
              .            .           .           .
1278       CP-A.................................
              V
              V
1282       RA-B
              .
              .
1289          .          SUB8
              .            .
              .            .
1297          .            .            .<-------       D5
1295          .            .          D5
              .            .           V
              .            .           V
1298          .            .         RD5
              .            .           .
              .            .           .
1307          .            .           .            .<-------       D6
1305          .            .           .          D6
              .            .           .           V
              .            .           .           V
1308          .            .           .         RD5
              .            .           .           .
              .            .           .           .
1316          .            .           .           .            .<-------       D7
1314          .            .           .           .          D7
              .            .           .           .           V
              .            .           .           .           V
1317          .            .           .           .         RD7
              .            .           .           .           .
              .            .           .           .           .
1324          .            .       CP-B1......................
              .            .           .
              .            .           .
1327       CP-B......................
              V
              V
1331       RB-C
```

```
          .
          .
1339      .          .<-------      D9
1338      .        D9
          .          .
          .          .
1341      .          .          .<-------     D10
1340      .          .        D10
          .          .          .
          .          .          .
1343      .          .          .          .<-------     D11
1342      .          .          .        D11
          .          .          .          .
          .          .          .          .
1344      .     CP-C1A.......................
          .        V
          .        V
1346      .      RC1A
          .          .
          .          .
1353      .          .      SUB12
          .          .          .
          .          .          .
1359      .     CP-C1............
          .          .
          .          .
1363      .          .          .<-------     D13
1362      .          .        D13
          .          .          .
          .          .          .
1365      .          .          .          .<-------     D14
1364      .          .          .        D14
          .          .          .          .
          .          .          .          .
1366      .          .        C2A............
          .          .          V
          .          .          V
1369      .          .      RC2A
          .          .          .
          .          .          .
1376      .          .          .      SUB15
          .          .          .          .
          .          .          .          .
1382      .          .     CP-C2............
          .          .          .
          .          .          .
1385   CP-C.......................
          V
          V
1389   RC-D
          .
          .
1397      .          .<-------      D16
1396      .        D16
```

```
                .
                .
1339            .          .<-------      D9
1338            .        D9
                .          .
                .          .
1341            .          .          .<-------      D10
1340            .          .        D10
                .          .          .
                .          .          .
1343            .          .          .          .<-------      D11
1342            .          .          .        D11
                .          .          .          .
                .          .          .          .
1344            .     CP-C1A.......................
                .        V
                .        V
1346            .      RC1A
                .          .
                .          .
1353            .          .      SUB12
                .          .          .
                .          .          .
1359            .     CP-C1............
                .          .
                .          .
1363            .          .          .<-------      D13
1362            .          .        D13
                .          .          .
                .          .          .
1365            .          .          .          .<-------      D14
1364            .          .          .        D14
                .          .          .          .
                .          .          .          .
1366            .          .        C2A............
                .          .          V
                .          .          V
1369            .          .      RC2A
                .          .          .
                .          .          .
1376            .          .          .      SUB15
                .          .          .          .
                .          .          .          .
1382            .          .     CP-C2............
                .          .          .
                .          .          .
1385         CP-C.......................
                V
                V
1389         RC-D
                .
                .
1397            .          .<-------      D16
1396            .        D16
```

```
1247          .        SUB4
              .          .
              .          .
1260          .          .          .<-------      D2
1258          .          .        D2
              .          .         V
              .          .         V
1261          .          .       RD2
              .          .         .
              .          .         .
1270          .          .         .          .<-------      D3
1268          .          .         .        D3
              .          .         .         V
              .          .         .         V
1271          .          .         .       RD3
              .          .         .         .
              .          .         .         .
1278       CP-A.................................
              V
              V
1282       RA-B
              .
              .
1289          .        SUB8
              .          .
              .          .
1297          .          .          .<-------      D5
1295          .          .        D5
              .          .         V
              .          .         V
1298          .          .       RD5
              .          .         .
              .          .         .
1307          .          .         .          .<-------      D6
1305          .          .         .        D6
              .          .         .         V
              .          .         .         V
1308          .          .         .       RD5
              .          .         .         .
              .          .         .         .
1316          .          .         .         .          .<-------      D7
1314          .          .         .         .        D7
              .          .         .         .         V
              .          .         .         .         V
1317          .          .         .         .       RD7
              .          .         .         .         .
              .          .         .         .         .
1324          .          .      CP-B1......................
              .          .         .
              .          .         .
1327       CP-B......................
              V
              V
1331       RB-C
```

```
                .          V
                .          V
1398            .       RD16
                .          .
                .          .
1405            .          .      SUB17
                .          .         .
                .          .         .
1411            .        D1............
                .          .
                .          .
1416            .          .         .<-------     D18
1414            .          .       D18
                .          .         .
                .          .         .
1419            .          .         .          .<-------     D19
1417            .          .         .        D19
                .          .         .          .
                .          .         .          .
1422            .          .         .          .          .<-------     D20
1420            .          .         .          .        D20
                .          .         .          .          .
                .          .         .          .          .
1425            .          .         .          .          .          .<-------     D21
1423            .          .         .          .          .        D21
                .          .         .          .          .          .
                .          .         .          .          .          .
1426            .          .       D2A.................................
                .          .         V
                .          .         V
1429            .          .      RD2A
                .          .         .
                .          .         .
1436            .          .         .      SUB22
                .          .         .          .
                .          .         .          .
1442            .          .       D2............
                .          .         .
                .          .         .
1446            .          .         .          .<-------     D23
1445            .          .         .        D23
                .          .         .          V
                .          .         .          V
1447            .          .         .      R23-D
                .          .         .          .
                .          .         .          .
1455            .          .         .          .          .<-------     D24
1454            .          .         .          .        D24
                .          .         .          .          V
                .          .         .          .          V
1456            .          .         .          .      R24-D
                .          .         .          .          .
                .          .         .          .          .
1464            .          .         .          .          .          .<-------     D25
```

```
1463    .         .         .         .         .         D25
        .         .         .         .         .          V
        .         .         .         .         .          V
1465    .         .         .         .         .       R25-D
        .         .         .         .         .          .
        .         .         .         .
1473    .         .         .         .         .          .          .<-------     D26
1472    .         .         .         .         .          .       D26
        .         .         .         .         .          .        V
        .         .         .         .         .          .        V
1474    .         .         .         .         .          .     R26-D
        .         .         .         .         .          .        .
        .         .         .         .         .          .        .
1481    .         .         .         .         .          .        .       SUB27
        .         .         .         .         .          .        .          .
        .         .         .         .         .          .        .          .
1487    .         .         .       D3.........................................
        .         .         .         .
        .         .         .         .
1491    .         .         .         .      .<-------     D28
1490    .         .         .         .   D28
        .         .         .         .    V
        .         .         .         .    V
1492    .         .         .         .  R28-D
        .         .         .         .    .
        .         .         .         .    .
1500    .         .         .         .         .<-------     D29
1499    .         .         .         .         D29
        .         .         .         .          V
        .         .         .         .          V
1501    .         .         .         .       R29-D
        .         .         .         .          .
        .         .         .         .          .
1509    .         .         .         .         .          .<-------     D30
1508    .         .         .         .         .       D30
        .         .         .         .         .        V
        .         .         .         .         .        V
1510    .         .         .         .         .     R30-D
        .         .         .         .         .        .
        .         .         .         .         .        .
1518    .         .         .         .         .         .          .<-------     D31
1517    .         .         .         .         .         .       D31
        .         .         .         .         .         .        V
        .         .         .         .         .         .        V
1519    .         .         .         .         .         .      RD31
        .         .         .         .         .         .          .
        .         .         .         .         .         .          .
1526    .         .         .         .         .         .          .       SUB32
        .         .         .         .         .         .          .          .
        .         .         .         .         .         .          .          .
1532    .         .         .         .      D4.........................................
        .         .         .         .         .
        .         .         .         .         .
1535    D.........................................
```

```
                V
                V
 538         RD-E
                .
                .
1545            .        SUB33
                .           V
                .           V
1558            .        R33-E
                .           .
                .           .
1565            .           .        SUB34
                .           .           .
                .           .           .
1571         CP-E.......................
```

(*) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1: ****************************************
*                                        *
   FLOOD HYDROGRAPH PACKAGE  (HEC-1)     *
            SEPTEMBER 1990               *
*            VERSION 4.0                 *
                                         *
  RUN DATE  03/27/1991  TIME  09:51:06   *
*                                        *
******************************************
```

```
****************************************
*                                      *
*   U.S. ARMY CORPS OF ENGINEERS       *
*   HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET            *
*      DAVIS, CALIFORNIA 95616         *
*          (916) 756-1104              *
*                                      *
****************************************
```

100 YEAR, 6 HOUR STORM
WAGNER WASH
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
JUNE 1990, SS
REVISED DEC 1990, SS
UTILIZING MCFCD PRESCRIBED METHODS
AREAL REDUCTION
CLARK UNIT HYDROGRAPH PLUS S-GRAPH WHERE NEEDED

```
 11 IO          OUTPUT CONTROL VARIABLES
                      IPRNT          5  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE

    IT          HYDROGRAPH TIME DATA
                       NMIN          3  MINUTES IN COMPUTATION INTERVAL
                      IDATE      1   0  STARTING DATE
                      ITIME       0000  STARTING TIME
                         NQ        300  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE      1   0  ENDING DATE
                     NDTIME       1457  ENDING TIME
                      ICENT         19  CENTURY MARK
```

```
          COMPUTATION INTERVAL      .05 HOURS
               TOTAL TIME BASE   14.95 HOURS

     ENGLISH UNITS
          DRAINAGE AREA          SQUARE MILES
          PRECIPITATION DEPTH    INCHES
          LENGTH, ELEVATION      FEET
          FLOW                   CUBIC FEET PER SECOND
          STORAGE VOLUME         ACRE-FEET
          SURFACE AREA           ACRES
          TEMPERATURE            DEGREES FAHRENHEIT

13 JD       INDEX STORM NO. 1
                STRM        3.28  PRECIPITATION DEPTH
                TRDA         .50  TRANSPOSITION DRAINAGE AREA

14 PI        PRECIPITATION PATTERN
                .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                .00      .00      .00      .00      .00      .02      .02      .02      .02      .02
                .03      .03      .03      .03      .03      .09      .09      .09      .09      .09
                .02      .02      .02      .02      .02      .00      .00      .00      .00      .00
                .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                .00      .00      .00      .00      .00      .00      .00      .00      .00      .00

17 JD       INDEX STORM NO. 2
                STRM        3.21  PRECIPITATION DEPTH
                TRDA        2.80  TRANSPOSITION DRAINAGE AREA

18 PI        PRECIPITATION PATTERN
                .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                .01      .01      .01      .01      .01      .02      .02      .02      .02      .02
                .04      .04      .04      .04      .04      .05      .05      .05      .05      .05
                .03      .03      .03      .03      .03      .01      .01      .01      .01      .01
                .01      .01      .01      .01      .01      .01      .01      .01      .01      .01
                .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                .00      .00      .00      .00      .00      .00      .00      .00      .00      .00

21 JD       INDEX STORM NO. 3
                STRM        3.02  PRECIPITATION DEPTH
                TRDA       16.00  TRANSPOSITION DRAINAGE AREA

22 PI        PRECIPITATION PATTERN
```

	HYDROGRAPH AT						
+		SUBPc	1652.	5.15	431.	173.	173.	1.90
	2 COMBINED AT						
+		P	1972.	5.60	723.	290.	290.	3.71
	HYDROGRAPH AT						
+		SUBQa	1121.	4.90	235.	94.	94.	1.00
	ROUTED TO						
		RQa	785.	5.80	184.	74.	74.	1.00
	HYDROGRAPH AT						
		Qb	1570.	4.85	327.	131.	131.	1.50
	2 COMBINED AT						
		-	1468.	4.85	507.	203.	203.	2.50
	ROUTED TO						
		RQ	1253.	5.85	443.	178.	178.	2.50
	HYDROGRAPH AT						
		SUBQc	815.	4.80	154.	62.	62.	.80
	2 COMBINED AT						
+		Q	1456.	5.50	585.	235.	235.	3.30
	HYDROGRAPH AT						
+		SUBRa	1382.	4.85	288.	116.	116.	1.40
	ROUTED TO						
+		RRa	862.	6.00	228.	91.	91.	1.40
	HYDROGRAPH AT						
+		SUBRb	2025.	4.95	472.	189.	189.	2.20
	2 COMBINED AT						
		R	1933.	5.00	683.	274.	274.	3.60
	3 COMBINED AT						
		ALL	4571.	5.45	1824.	733.	733.	10.61
	ROUTED TO						
		SR-PQ	227.	8.50	216.	129.	129.	10.61
	DIVERSION TO						
		DR	113.	8.50	108.	65.	65.	10.61
	HYDROGRAPH AT						
		DCAP	113.	8.50	108.	65.	65.	10.61
	HYDROGRAPH AT						
+		SUBA	256.	4.50	46.	19.	19.	.22

.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.01	.01	.01	.01	.01	.02	.02	.02	.02	.02
.03	.03	.03	.03	.03	.04	.04	.04	.04	.04
.03	.03	.03	.03	.03	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

25 JD INDEX STORM NO. 4

STRM 2.66 PRECIPITATION DEPTH

TRDA 90.00 TRANSPOSITION DRAINAGE AREA

26 PI PRECIPITATION PATTERN

.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.02	.02	.02	.02	.02
.03	.03	.03	.03	.03	.03	.03	.03	.03	.03
.02	.02	.02	.02	.02	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

RUNOFF SUMMARY

FLOW IN CUBIC FEET PER SECOND

TIME IN HOURS, AREA IN SQUARE MILES

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
HYDROGRAPH AT									
	SUBPa	1073.	4.70	187.	75.	75.	.82		
ROUTED TO									
	RPa	733.	5.40	153.	61.	61.	.82		
HYDROGRAPH AT									
	SUBPb	1170.	4.75	223.	90.	90.	.99		
2 COMBINED AT									
	-	1379.	5.10	374.	150.	150.	1.81		
ROUTED TO									
+	RPb	1067.	6.00	310.	124.	124.	1.81		

ROUTED TO							
+	SR-A	257.	4.50	46.	19.	19.	.22
ROUTED TO							
+	RA-A1	167.	5.25	36.	14.	14.	.22
HYDROGRAPH AT							
	SUBA1	1055.	4.95	222.	89.	89.	1.06
2 COMBINED AT							
	CP-A'S	1159.	4.95	255.	102.	102.	1.28
ROUTED TO							
	A'S-11	1086.	5.10	245.	98.	98.	1.28
2 COMBINED AT							
	CP-11	873.	5.15	289.	149.	149.	11.89
ROUTED TO							
	R11-12	861.	5.20	278.	141.	141.	11.89
HYDROGRAPH AT							
	SUBB1	1322.	4.85	262.	105.	105.	1.25
2 COMBINED AT							
+	CP-12	1723.	5.05	497.	231.	231.	13.14
ROUTED TO							
+	R12-13	1680.	5.15	466.	208.	208.	13.14
HYDROGRAPH AT							
+	SUBC1	1072.	4.70	179.	72.	72.	.85
ROUTED TO							
	RC1-13	1042.	4.75	172.	69.	69.	.85
HYDROGRAPH AT							
	SUBD1	325.	4.65	71.	28.	28.	.34
ROUTED TO							
	RD1-13	311.	4.70	63.	25.	25.	.34
HYDROGRAPH AT							
	SUBG1	183.	4.60	41.	16.	16.	.19
HYDROGRAPH AT							
	SUBS	751.	4.60	121.	49.	49.	.55
5 COMBINED AT							
+	CP-13	2894.	4.95	787.	337.	337.	15.07
ROUTED TO							
+	R13-14	2851.	5.00	763.	322.	322.	15.07

2 COMBINED AT							
+	CP-4	1662.	4.55	272.	109.	109.	1.49
ROUTED TO							
+	R4-5	1641.	4.55	262.	105.	105.	1.49
HYDROGRAPH AT							
+	SUBF	138.	4.25	13.	5.	5.	.06
2 COMBINED AT							
	CP-5	1693.	4.55	274.	110.	110.	1.55
ROUTED TO							
	R5-6	1664.	4.60	264.	106.	106.	1.55
HYDROGRAPH AT							
	SUBG	114.	4.20	9.	4.	4.	.04
2 COMBINED AT							
	CP-6	1693.	4.55	272.	109.	109.	1.59
ROUTED TO							
	R6-7	1654.	4.60	257.	103.	103.	1.59
HYDROGRAPH AT							
+	SUBH	43.	4.25	5.	2.	2.	.02
2 COMBINED AT							
+	CP-7	1668.	4.60	261.	105.	105.	1.61
ROUTED TO							
+	R7-8	1630.	4.65	247.	99.	99.	1.61
HYDROGRAPH AT							
+	SUBIUa	1112.	4.55	221.	89.	89.	.98
ROUTED TO							
	RIUa	969.	4.85	198.	79.	79.	.98
HYDROGRAPH AT							
	SUBIUb	1424.	4.20	129.	52.	52.	.57
2 COMBINED AT							
	CIU	1173.	4.25	325.	131.	131.	1.55
ROUTED TO							
	IUR-I	1072.	4.90	308.	124.	124.	1.55
HYDROGRAPH AT							
	SUBI	1064.	4.50	187.	75.	75.	.85
2 COMBINED AT							
+	CP-I	1861.	4.55	493.	198.	198.	2.40

HYDROGRAPH AT							
+	SUBH1	473.	4.45	54.	21.	21.	.25
ROUTED TO							
+	RH1-14	460.	4.50	51.	20.	20.	.25
HYDROGRAPH AT							
+	SUBI1	211.	4.55	39.	15.	15.	.18
HYDROGRAPH AT							
	DR	113.	8.50	108.	65.	65.	10.61
ROUTED TO							
	RR-T	96.	8.75	91.	51.	51.	10.61
HYDROGRAPH AT							
	SUBT	678.	4.70	108.	43.	43.	.49
5 COMBINED AT							
	CP-14	3446.	4.90	971.	434.	434.	15.99
HYDROGRAPH AT							
	SUBB	108.	4.35	15.	6.	6.	.07
ROUTED TO							
+	R1-2	76.	4.45	7.	3.	3.	.07
HYDROGRAPH AT							
+	SUBCU	1138.	4.20	130.	52.	52.	.51
ROUTED TO							
+	RCU-2	931.	4.50	116.	47.	47.	.51
HYDROGRAPH AT							
+	SUBC	692.	4.45	110.	44.	44.	.53
3 COMBINED AT							
	CP-2	1472.	4.45	229.	92.	92.	1.11
ROUTED TO							
	R2-3	1402.	4.55	204.	82.	82.	1.11
HYDROGRAPH AT							
	SUBD	336.	4.50	57.	23.	23.	.27
2 COMBINED AT							
	CP-3	1610.	4.55	258.	104.	104.	1.38
ROUTED TO							
	R3-4	1598.	4.55	250.	100.	100.	1.38
HYDROGRAPH AT							
+	SUBE	120.	4.50	24.	10.	10.	.11

2 COMBINED AT							
+	CP-8	3155.	4.65	713.	286.	286.	4.01
ROUTED TO							
+	R8-9	3135.	4.65	701.	281.	281.	4.01
HYDROGRAPH AT							
+	SUBJ	298.	4.50	56.	22.	22.	.26
2 COMBINED AT							
	CP-9	3313.	4.65	749.	301.	301.	4.27
ROUTED TO							
	R9-10	3265.	4.70	721.	289.	289.	4.27
HYDROGRAPH AT							
	SUBK	108.	4.60	26.	10.	10.	.12
2 COMBINED AT							
	CP-10	3325.	4.70	742.	298.	298.	4.39
2 COMBINED AT							
	CP-14A	5906.	4.85	1565.	669.	669.	20.38
ROUTED TO							
+	R14-15	5855.	4.90	1532.	645.	645.	20.38
HYDROGRAPH AT							
+	SUBL	1190.	4.70	290.	116.	116.	1.36
HYDROGRAPH AT							
+	SUBU1	591.	4.65	88.	35.	35.	.39
ROUTED TO							
+	SR-U1	591.	4.65	88.	35.	35.	.39
ROUTED TO							
	U1R-U	566.	4.70	86.	34.	34.	.39
HYDROGRAPH AT							
	SUBU	95.	4.25	7.	3.	3.	.03
2 COMBINED AT							
	CP-U	583.	4.70	93.	37.	37.	.42
ROUTED TO							
	RU-15	554.	4.75	83.	33.	33.	.42
HYDROGRAPH AT							
	SUBV1	526.	4.65	98.	39.	39.	.45
ROUTED TO							
+	SR-V1	524.	4.65	98.	39.	39.	.45

	ROUTED TO						
+		V1R-V	466.	4.85	93.	38.	38.	.45
	HYDROGRAPH AT						
+		SUBV	220.	4.35	24.	10.	10.	.11
	2 COMBINED AT						
+		CP-V	543.	4.80	117.	47.	47.	.56
	4 COMBINED AT						
		CP-15	7225.	4.90	1902.	794.	794.	22.72
	ROUTED TO						
		R15-16	7172.	4.95	1869.	770.	770.	22.72
	HYDROGRAPH AT						
		SUBM	1227.	4.80	328.	132.	132.	1.56
	HYDROGRAPH AT						
		SUBW1	88.	4.25	9.	4.	4.	.04
	ROUTED TO						
		W1R-W	71.	4.45	8.	3.	3.	.04
	HYDROGRAPH AT						
+		SUBW	145.	4.45	22.	9.	9.	.10
	2 COMBINED AT						
+		CP-W	199.	4.45	29.	12.	12.	.14
	ROUTED TO						
+		RW-16	187.	4.50	24.	10.	10.	.14
	HYDROGRAPH AT						
+		SUBX1	99.	4.25	9.	4.	4.	.04
	ROUTED TO						
		X1R-X	81.	4.40	8.	3.	3.	.04
	HYDROGRAPH AT						
		SUBX	105.	4.50	17.	7.	7.	.08
	2 COMBINED AT						
		CP-X	164.	4.45	25.	10.	10.	.12
	4 COMBINED AT						
		CP-16	8079.	4.90	2144.	881.	881.	24.54
	ROUTED TO						
		R16-17	8027.	4.95	2112.	859.	859.	24.54
	HYDROGRAPH AT						
+		SUBN	972.	4.85	194.	78.	78.	.89

	HYDROGRAPH AT						
+		SUBY1	510.	4.65	76.	30.	30.	.35
	ROUTED TO						
+		SR-Y1	507.	4.65	76.	30.	30.	.35
	ROUTED TO						
+		Y1R-Y	406.	4.95	71.	29.	29.	.35
	HYDROGRAPH AT						
		SUBY	176.	4.55	33.	13.	13.	.15
	2 COMBINED AT						
		CP-Y	510.	4.90	103.	41.	41.	.50
	3 COMBINED AT						
		CP-17	8904.	4.95	2327.	946.	946.	25.93
	ROUTED TO						
		R17-18	8863.	5.00	2305.	933.	933.	25.93
	HYDROGRAPH AT						
		SUBOU	1640.	4.25	196.	79.	79.	.84
	ROUTED TO						
		OUR-O	1179.	4.70	172.	69.	69.	.84
	HYDROGRAPH AT						
+		SUBO	1261.	4.90	354.	142.	142.	1.61
	2 COMBINED AT						
+		CP-O	2163.	4.80	523.	210.	210.	2.45
	HYDROGRAPH AT						
+		SUBZ1	143.	4.40	17.	7.	7.	.08
	ROUTED TO						
		SR-Z1	141.	4.40	17.	7.	7.	.08
	ROUTED TO						
		Z1R-Z	113.	4.65	15.	6.	6.	.08
	HYDROGRAPH AT						
		SUBZ	221.	4.50	34.	14.	14.	.16
	2 COMBINED AT						
		CP-Z	297.	4.55	49.	20.	20.	.24
	3 COMBINED AT						
		CP-18	10358.	4.95	2727.	1102.	1102.	28.62
	HYDROGRAPH AT						
		SUB31	1121.	4.70	306.	123.	123.	1.29

	DIVERSION TO						
+		D31	1121.	4.70	306.	123.	123.	1.29
	HYDROGRAPH AT						
+		DIV31	0.	.05	0.	0.	0.	1.29
	HYDROGRAPH AT						
+		SUB30	65.	4.05	3.	1.	1.	.01
	2 COMBINED AT						
+		CP-30	24.	4.05	2.	1.	1.	1.30
	DIVERSION TO						
		D30	24.	4.05	2.	1.	1.	1.30
	HYDROGRAPH AT						
		DIV30	0.	.05	0.	0.	0.	1.30
	HYDROGRAPH AT						
		SUB29	16.	4.25	2.	1.	1.	.01
	2 COMBINED AT						
		CP-29	8.	4.35	2.	1.	1.	1.31
	DIVERSION TO						
		D29	8.	4.35	2.	1.	1.	1.31
	HYDROGRAPH AT						
+		DIV29	0.	.05	0.	0.	0.	1.31
	HYDROGRAPH AT						
+		SUB28	53.	4.10	3.	1.	1.	.01
	2 COMBINED AT						
+		CP-28	21.	4.10	2.	1.	1.	1.32
	DIVERSION TO						
+		D28	21.	4.10	2.	1.	1.	1.32
	HYDROGRAPH AT						
		DIV28	0.	.05	0.	0.	0.	1.32
	HYDROGRAPH AT						
		SUB26	139.	4.35	17.	7.	7.	.08
	2 COMBINED AT						
		CP-26	88.	4.35	16.	6.	6.	1.40
	ROUTED TO						
		SR-26	87.	4.35	16.	6.	6.	1.40
	DIVERSION TO						
		D26	87.	4.35	16.	6.	6.	1.40

	HYDROGRAPH AT						
+		DIV26	0.	.05	0.	0.	0.	1.40
	HYDROGRAPH AT						
+		SUB25	109.	4.35	13.	5.	5.	.06
	2 COMBINED AT						
+		CP-25	66.	4.35	12.	5.	5.	1.46
	DIVERSION TO						
+		D25	32.	4.35	6.	2.	2.	1.46
	HYDROGRAPH AT						
		DIV25	34.	4.35	6.	2.	2.	1.46
	HYDROGRAPH AT						
		SUB24	101.	4.20	7.	3.	3.	.03
	2 COMBINED AT						
		CP-24	77.	4.25	12.	5.	5.	1.49
	DIVERSION TO						
		D24	17.	3.90	5.	2.	2.	1.49
	HYDROGRAPH AT						
+		DIV24	60.	4.25	7.	3.	3.	1.49
	HYDROGRAPH AT						
+		SUB23	1097.	4.70	307.	123.	123.	1.23
	2 COMBINED AT						
+		CP-23	1029.	4.75	310.	125.	125.	2.72
	ROUTED TO						
+		SR-23	1029.	4.80	310.	125.	125.	2.72
	DIVERSION TO						
		D23	1029.	4.80	310.	125.	125.	2.72
	HYDROGRAPH AT						
		DIV23	0.	.05	0.	0.	0.	2.72
	HYDROGRAPH AT						
		SUB21	44.	4.40	6.	2.	2.	.02
	2 COMBINED AT						
		CP-21	23.	4.50	5.	2.	2.	2.74
	ROUTED TO						
		SR-21	23.	4.50	5.	2.	2.	2.74
	DIVERSION TO						
+		D21	23.	4.50	5.	2.	2.	2.74

	HYDROGRAPH AT						
+		DIV21	0.	.05	0.	0.	0.	2.74
	HYDROGRAPH AT						
+		SUB20	88.	4.20	8.	3.	3.	.03
	2 COMBINED AT						
+		CP-20	40.	4.25	8.	3.	3.	2.77
	ROUTED TO						
+		RS-20	40.	4.25	8.	3.	3.	2.77
	DIVERSION TO						
		D20	40.	4.25	8.	3.	3.	2.77
	HYDROGRAPH AT						
		DIV20	0.	.05	0.	0.	0.	2.77
	HYDROGRAPH AT						
		SUB19	872.	4.80	172.	69.	69.	.66
	2 COMBINED AT						
		CP-19	720.	4.80	166.	67.	67.	3.43
	ROUTED TO						
+		SR-19	720.	4.80	166.	67.	67.	3.43
	DIVERSION TO						
+		D19	720.	4.80	166.	67.	67.	3.43
	HYDROGRAPH AT						
+		DIV19	0.	.05	0.	0.	0.	3.43
	HYDROGRAPH AT						
+		SUB18	92.	4.15	6.	2.	2.	.02
	2 COMBINED AT						
		CP-18	33.	4.15	5.	2.	2.	3.45
	DIVERSION TO						
		D18	33.	4.15	5.	2.	2.	3.45
	HYDROGRAPH AT						
		DIV18	0.	.05	0.	0.	0.	3.45
	HYDROGRAPH AT						
		SUB16U	1158.	4.85	228.	91.	91.	1.08
	ROUTED TO						
		6UR-16	1103.	4.95	210.	84.	84.	1.08
	HYDROGRAPH AT						
+		SUB16	517.	4.30	61.	24.	24.	.27

	3 COMBINED AT						
+		CP-16	1103.	4.95	262.	105.	105.	4.80
	DIVERSION TO						
+		D16	42.	4.00	20.	8.	8.	4.80
	HYDROGRAPH AT						
+		DIV16	1023.	4.95	235.	94.	94.	4.80
	HYDROGRAPH AT						
+		SUB14	58.	4.10	3.	1.	1.	.01
	2 COMBINED AT						
		CP-14	1024.	4.95	237.	95.	95.	4.81
	DIVERSION TO						
		D14	32.	3.75	18.	7.	7.	4.81
	HYDROGRAPH AT						
		DIV14	992.	4.95	219.	88.	88.	4.81
	HYDROGRAPH AT						
		SUB13	87.	4.25	9.	4.	4.	.04
	2 COMBINED AT						
		CP-13	1011.	4.95	226.	91.	91.	4.85
	DIVERSION TO						
+		D13	68.	3.90	31.	12.	12.	4.85
	HYDROGRAPH AT						
+		DIV13	943.	4.95	195.	78.	78.	4.85
	HYDROGRAPH AT						
+		SUB11	121.	4.25	11.	4.	4.	.05
	2 COMBINED AT						
		CP-11	967.	4.90	204.	82.	82.	4.90
	DIVERSION TO						
		D11	61.	3.95	24.	10.	10.	4.90
	HYDROGRAPH AT						
		DIV11	906.	4.90	180.	72.	72.	4.90
	HYDROGRAPH AT						
		SUB10	361.	4.25	34.	13.	13.	.14
	2 COMBINED AT						
		CP-10	980.	4.90	211.	85.	85.	5.04
	DIVERSION TO						
+		D10	217.	4.10	75.	30.	30.	5.04

	HYDROGRAPH AT						
+		DIV10	763.	4.90	135.	54.	54.	5.04
	HYDROGRAPH AT						
+		SUB9	93.	4.10	5.	2.	2.	.02
	2 COMBINED AT						
+		CP-9	767.	4.85	139.	56.	56.	5.06
	DIVERSION TO						
+		D9	26.	4.10	9.	3.	3.	5.06
	HYDROGRAPH AT						
		DIV9	741.	4.85	130.	52.	52.	5.06
	HYDROGRAPH AT						
		SUB7	600.	4.65	138.	55.	55.	.62
	2 COMBINED AT						
		CP-7	1184.	4.85	257.	103.	103.	5.68
	ROUTED TO						
		SR-7	1184.	4.85	257.	103.	103.	5.68
	DIVERSION TO						
		D7	1184.	4.85	257.	103.	103.	5.68
	HYDROGRAPH AT						
+		DIV7	0.	.05	0.	0.	0.	5.68
	HYDROGRAPH AT						
+		SUB6	764.	4.75	221.	89.	89.	.95
	2 COMBINED AT						
+		CP-6	626.	4.85	208.	84.	84.	6.63
	DIVERSION TO						
+		D6	626.	4.85	208.	84.	84.	6.63
	HYDROGRAPH AT						
		DIV6	0.	.05	0.	0.	0.	6.63
	HYDROGRAPH AT						
		SUB5	135.	4.20	9.	4.	4.	.04
	2 COMBINED AT						
		CP-6	50.	4.20	8.	3.	3.	6.67
	DIVERSION TO						
		D5	50.	4.20	8.	3.	3.	6.67
	HYDROGRAPH AT						
		DIV5	0.	.05	0.	0.	0.	6.67

HYDROGRAPH AT							
+	SUB3	285.	4.40	39.	16.	16.	.18
2 COMBINED AT							
+	CP-3	160.	4.50	34.	14.	14.	6.85
DIVERSION TO							
+	D3	30.	3.95	13.	5.	5.	6.85
HYDROGRAPH AT							
+	DIV3	130.	4.50	22.	9.	9.	6.85
HYDROGRAPH AT							
	SUB2	66.	4.45	13.	5.	5.	.06
2 COMBINED AT							
	CP-2	166.	4.55	33.	13.	13.	6.91
DIVERSION TO							
	D2	166.	4.55	33.	13.	13.	6.91
HYDROGRAPH AT							
	DIV2	0.	.05	0.	0.	0.	6.91
HYDROGRAPH AT							
	SUB1	610.	4.90	118.	47.	47.	.54
2 COMBINED AT							
+	COMB-1	448.	4.90	107.	43.	43.	7.45
2 COMBINED AT							
+	BRDG2	10353.	4.95	2731.	1103.	1103.	36.07
ROUTED TO							
+	SR-1	10296.	4.95	2712.	1095.	1095.	36.07
ROUTED TO							
	R1-A	10183.	5.00	2654.	1065.	1065.	36.07
HYDROGRAPH AT							
	SUB4	1158.	5.10	279.	112.	112.	1.32
HYDROGRAPH AT							
	D2	166.	4.55	33.	13.	13.	6.91
ROUTED TO							
	RD2	156.	4.65	28.	11.	11.	6.91
HYDROGRAPH AT							
	D3	30.	3.95	13.	5.	5.	6.85
ROUTED TO							
+	RD3	25.	4.70	10.	4.	4.	6.85

4 COMBINED AT							
+	CP-A	10964.	5.00	2878.	1156.	1156.	37.39
ROUTED TO							
+	RA-B	10847.	5.10	2794.	1121.	1121.	37.39
HYDROGRAPH AT							
+	SUB8	909.	4.65	160.	64.	64.	.78
HYDROGRAPH AT							
	D5	50.	4.20	8.	3.	3.	6.67
ROUTED TO							
	RD5	17.	4.75	2.	1.	1.	6.67
HYDROGRAPH AT							
	D6	626.	4.85	208.	84.	84.	6.63
ROUTED TO							
	RD5	569.	5.15	189.	76.	76.	6.63
HYDROGRAPH AT							
	D7	1184.	4.85	257.	103.	103.	5.68
ROUTED TO							
+	RD7	1093.	5.10	240.	96.	96.	5.68
3 COMBINED AT							
+	CP-B1	3276.	5.00	603.	242.	242.	.00
3 COMBINED AT							
+	CP-B	12394.	5.05	3220.	1293.	1293.	38.17
ROUTED TO							
+	RB-C	12355.	5.10	3186.	1279.	1279.	38.17
HYDROGRAPH AT							
	D9	26.	4.10	9.	3.	3.	5.06
HYDROGRAPH AT							
	D10	217.	4.10	75.	30.	30.	5.04
HYDROGRAPH AT							
	D11	61.	3.95	24.	10.	10.	4.90
3 COMBINED AT							
	CP-C1A	304.	4.05	82.	33.	33.	.00
ROUTED TO							
	RC1A	285.	4.80	71.	28.	28.	.00
HYDROGRAPH AT							
+	SUB12	423.	4.50	71.	28.	28.	.34

	2 COMBINED AT						
+		CP-C1	708.	4.50	160.	64.	64.	.34
	HYDROGRAPH AT						
+		D13	68.	3.90	31.	12.	12.	4.85
	HYDROGRAPH AT						
+		D14	32.	3.75	18.	7.	7.	4.81
	2 COMBINED AT						
		C2A	100.	3.95	36.	14.	14.	.00
	ROUTED TO						
		RC2A	85.	4.80	28.	11.	11.	.00
	HYDROGRAPH AT						
		SUB15	135.	4.50	26.	10.	10.	.12
	2 COMBINED AT						
		CP-C2	220.	4.50	59.	24.	24.	.12
	3 COMBINED AT						
		CP-C	12890.	5.10	3376.	1355.	1355.	38.63
	ROUTED TO						
+		RC-D	12794.	5.15	3306.	1327.	1327.	38.63
	HYDROGRAPH AT						
+		D16	42.	4.00	20.	8.	8.	4.80
	ROUTED TO						
+		RD16	4.	6.40	1.	0.	0.	4.80
	HYDROGRAPH AT						
+		SUB17	801.	4.65	180.	72.	72.	.69
	2 COMBINED AT						
		D1	801.	4.65	180.	72.	72.	.69
	HYDROGRAPH AT						
		D18	33.	4.15	5.	2.	2.	3.45
	HYDROGRAPH AT						
		D19	720.	4.80	166.	67.	67.	3.43
	HYDROGRAPH AT						
		D20	40.	4.25	8.	3.	3.	2.77
	HYDROGRAPH AT						
		D21	23.	4.50	5.	2.	2.	2.74
	4 COMBINED AT						
+		D2A	1516.	4.80	212.	84.	84.	.00

	ROUTED TO						
+		RD2A	1397.	4.90	186.	74.	74.	.00
	HYDROGRAPH AT						
+		SUB22	199.	4.65	49.	20.	20.	.23
	2 COMBINED AT						
+		D2	1397.	4.90	231.	93.	93.	.23
	HYDROGRAPH AT						
-		D23	1029.	4.80	310.	125.	125.	2.72
	ROUTED TO						
		R23-D	980.	4.95	278.	111.	111.	2.72
	HYDROGRAPH AT						
		D24	17.	3.90	5.	2.	2.	1.49
	ROUTED TO						
		R24-D	1.	5.40	0.	0.	0.	1.49
	HYDROGRAPH AT						
		D25	32.	4.35	6.	2.	2.	1.46
	ROUTED TO						
+		R25-D	9.	5.05	1.	0.	0.	1.46
	HYDROGRAPH AT						
+		D26	87.	4.35	16.	6.	6.	1.40
	ROUTED TO						
+		R26-D	60.	4.75	9.	4.	4.	1.40
	HYDROGRAPH AT						
+		SUB27	395.	4.55	71.	28.	28.	.34
	5 COMBINED AT						
		D3	1619.	4.80	370.	149.	149.	.34
	HYDROGRAPH AT						
		D28	21.	4.10	2.	1.	1.	1.32
	ROUTED TO						
		R28-D	0.	.05	0.	0.	0.	1.32
	HYDROGRAPH AT						
		D29	8.	4.35	2.	1.	1.	1.31
	ROUTED TO						
		R29-D	0.	.05	0.	0.	0.	1.31
	HYDROGRAPH AT						
+		D30	24.	4.05	2.	1.	1.	1.30

	ROUTED TO						
+		R30-D	0.	.05	0.	0.	0.	1.30
	HYDROGRAPH AT						
+		D31	1121.	4.70	306.	123.	123.	1.29
	ROUTED TO						
+		RD31	1066.	4.85	274.	110.	110.	1.29
	HYDROGRAPH AT						
		SUB32	345.	4.55	68.	27.	27.	.32
	5 COMBINED AT						
		D4	1543.	4.80	346.	139.	139.	.32
	5 COMBINED AT						
		D	15384.	5.10	4126.	1656.	1656.	40.21
	ROUTED TO						
		RD-E	15212.	5.20	4002.	1606.	1606.	40.21
	HYDROGRAPH AT						
		SUB33	996.	5.40	287.	115.	115.	1.36
	ROUTED TO						
+		R33-E	902.	5.50	233.	94.	94.	1.36
	HYDROGRAPH AT						
+		SUB34	596.	4.55	108.	43.	43.	.50
	3 COMBINED AT						
+		CP-E	15747.	5.20	4207.	1688.	1688.	42.07

1 SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION SR-PQ
(PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED DURING BREACH FORMATION)

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1550.00	1556.00	1556.00
STORAGE	553.	2705.	2705.
OUTFLOW	0.	600.	600.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	1552.93	.00	1511.	271.	.00	8.20	.00

PLAN 2 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1550.00	1556.00	1556.00
STORAGE	553.	2705.	2705.
OUTFLOW	0.	600.	600.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	1552.88	.00	1492.	263.	.00	8.35	.00

PLAN 3 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1550.00	1556.00	1556.00
STORAGE	553.	2705.	2705.
OUTFLOW	0.	600.	600.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW `CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	1552.57	.00	1371.	216.	.00	8.50	.00

PLAN 4 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1550.00	1556.00	1556.00
STORAGE	553.	2705.	2705.
OUTFLOW	0.	600.	600.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	1552.08	.00	1179.	140.	.00	8.75	.00

SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION SR-A
(PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED DURING BREACH FORMATION)

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	.00	6.00	6.00
STORAGE	0.	0.	0.
OUTFLOW	0.	128.	128.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	7.73	1.73	0.	229.	.80	4.50	.00

PLAN 2 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	.00	6.00	6.00
STORAGE	0.	0.	0.
OUTFLOW	0.	128.	128.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	6.99	.99	0.	176.	.80	4.65	.00

PLAN 3 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	.00	6.00	6.00
STORAGE	0.	0.	0.
OUTFLOW	0.	128.	128.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	6.35	.35	0.	141.	.45	4.65	.00

PLAN 4 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	.00	6.00	6.00
STORAGE	0.	0.	0.
OUTFLOW	0.	128.	128.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	4.66	.00	0.	100.	.00	4.65	.00

SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION SR-U1
(PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED DURING BREACH FORMATION)

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	.00	7.00	7.00
STORAGE	0.	0.	0.
OUTFLOW	0.	680.	680.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	5.53	.00	0.	573.	.00	4.65	.00

PLAN 2 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	.00	7.00	7.00
STORAGE	0.	0.	0.
OUTFLOW	0.	680.	680.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	4.11	.00	0.	448.	.00	4.65	.00

PLAN 3 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	.00	7.00	7.00
STORAGE	0.	0.	0.
OUTFLOW	0.	680.	680.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	3.45	.00	0.	363.	.00	4.65	.00

PLAN 4 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	.00	7.00	7.00
STORAGE	0.	0.	0.
OUTFLOW	0.	680.	680.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	2.70	.00	0.	263.	.00	4.65	.00

SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION SR-V1

(PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED DURING BREACH FORMATION)

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	.00	7.50	7.50
STORAGE	0.	1.	1.
OUTFLOW	0.	720.	720.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	4.96	.00	0.	517.	.00	4.65	.00

PLAN 2 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	.00	7.50	7.50
STORAGE	0.	1.	1.
OUTFLOW	0.	720.	720.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	3.77	.00	0.	408.	.00	4.75	.00

PLAN 3 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	.00	7.50	7.50
STORAGE	0.	1.	1.
OUTFLOW	0.	720.	720.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	3.21	.00	0.	329.	.00	4.75	.00

PLAN 4 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	.00	7.50	7.50
STORAGE	0.	1.	1.
OUTFLOW	0.	720.	720.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	2.52	.00	0.	240.	.00	4.80	.00

SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION SR-Y1

(PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED DURING BREACH FORMATION)

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	.00	5.00	5.00
STORAGE	0.	0.	0.
OUTFLOW	0.	300.	300.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	6.90	1.90	1.	485.	.65	4.70	.00

PLAN 2 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	.00	5.00	5.00
STORAGE	0.	0.	0.
OUTFLOW	0.	300.	300.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	5.90	.90	1.	380.	.60	4.70	.00

PLAN 3 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	.00	5.00	5.00
STORAGE	0.	0.	0.
OUTFLOW	0.	300.	300.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	5.09	.09	0.	307.	.15	4.70	.00

PLAN 4 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	.00	5.00	5.00
STORAGE	0.	0.	0.
OUTFLOW	0.	300.	300.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	3.87	.00	0.	220.	.00	4.70	.00

1 SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION SR-Z1

(PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED DURING BREACH FORMATION)

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	.00	3.50	3.50
STORAGE	0.	0.	0.
OUTFLOW	0.	128.	128.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	2.87	.00	0.	109.	.00	4.45	.00

PLAN 2 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	.00	3.50	3.50
STORAGE	0.	0.	0.
OUTFLOW	0.	128.	128.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	2.15	.00	0.	80.	.00	4.50	.00

PLAN 3 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	.00	3.50	3.50
STORAGE	0.	0.	0.
OUTFLOW	0.	128.	128.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	1.78	.00	0.	64.	.00	4.50	.00

PLAN 4 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	.00	3.50	3.50
STORAGE	0.	0.	0.
OUTFLOW	0.	128.	128.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	1.41	.00	0.	45.	.00	4.55	.00

1 SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION SR-26

(PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED DURING BREACH FORMATION)

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	.00	4.00	4.00
STORAGE	0.	0.	0.
OUTFLOW	0.	130.	130.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	3.33	.00	0.	106.	.00	4.35	.00

PLAN 2 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	.00	4.00	4.00
STORAGE	0.	0.	0.
OUTFLOW	0.	130.	130.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	2.55	.00	0.	76.	.00	4.45	.00

PLAN 3 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	.00	4.00	4.00
STORAGE	0.	0.	0.
OUTFLOW	0.	130.	130.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	2.14	.00	0.	60.	.00	4.45	.00

PLAN 4 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	.00	4.00	4.00
STORAGE	0.	0.	0.
OUTFLOW	0.	130.	130.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	1.71	.00	0.	42.	.00	4.45	.00

SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION SR-23
(PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED DURING BREACH FORMATION)

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	.00	6.50	6.50
STORAGE	0.	1.	1.
OUTFLOW	0.	1600.	1600.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	5.15	.00	0.	1242.	.00	4.65	.00

PLAN 2 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	.00	6.50	6.50
STORAGE	0.	1.	1.
OUTFLOW	0.	1600.	1600.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	4.38	.00	0.	1027.	.00	4.80	.00

PLAN 3 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	.00	6.50	6.50
STORAGE	0.	1.	1.
OUTFLOW	0.	1600.	1600.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	3.78	.00	0.	853.	.00	4.80	.00

PLAN 4 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	.00	6.50	6.50
STORAGE	0.	1.	1.
OUTFLOW	0.	1600.	1600.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	3.08	.00	0.	644.	.00	4.80	.00

SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION SR-21
(PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED DURING BREACH FORMATION)

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	.00	2.50	2.50
STORAGE	0.	0.	0.
OUTFLOW	0.	38.	38.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	1.89	.00	0.	30.	.00	4.40	.00

PLAN 2 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	.00	2.50	2.50
STORAGE	0.	0.	0.
OUTFLOW	0.	38.	38.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	1.52	.00	0.	22.	.00	4.50	.00

PLAN 3 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	.00	2.50	2.50
STORAGE	0.	0.	0.
OUTFLOW	0.	38.	38.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	1.32	.00	0.	18.	.00	4.50	.00

PLAN 4 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	.00	2.50	2.50
STORAGE	0.	0.	0.
OUTFLOW	0.	38.	38.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	1.09	.00	0.	14.	.00	4.55	.00

SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION RS-20
(PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED DURING BREACH FORMATION)

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	.00	3.00	3.00
STORAGE	0.	0.	0.
OUTFLOW	0.	68.	68.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	2.61	.00	0.	58.	.00	4.25	.00

PLAN 2 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	.00	3.00	3.00
STORAGE	0.	0.	0.
OUTFLOW	0.	68.	68.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	1.94	.00	0.	40.	.00	4.25	.00

PLAN 3 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	.00	3.00	3.00
STORAGE	0.	0.	0.
OUTFLOW	0.	68.	68.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	1.66	.00	0.	32.	.00	4.25	.00

PLAN 4 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	.00	3.00	3.00
STORAGE	0.	0.	0.
OUTFLOW	0.	68.	68.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	1.35	.00	0.	24.	.00	4.25	.00

SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION SR-19

(PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED DURING BREACH FORMATION)

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	.00	4.50	4.50
STORAGE	0.	1.	1.
OUTFLOW	0.	1530.	1530.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	2.96	.00	0.	899.	.00	4.80	.00

PLAN 2 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	.00	4.50	4.50
STORAGE	0.	1.	1.
OUTFLOW	0.	1530.	1530.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	2.54	.00	0.	734.	.00	4.80	.00

PLAN 3 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	.00	4.50	4.50
STORAGE	0.	1.	1.
OUTFLOW	0.	1530.	1530.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	2.23	.00	0.	612.	.00	4.80	.00

PLAN 4 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	.00	4.50	4.50
STORAGE	0.	1.	1.
OUTFLOW	0.	1530.	1530.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	1.78	.00	0.	463.	.00	4.80	.00

SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION SR-7
(PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED DURING BREACH FORMATION)

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	.00	6.00	6.00
STORAGE	0.	1.	1.
OUTFLOW	0.	930.	930.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	9.20	3.20	1.	1524.	1.00	4.90	.00

PLAN 2 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	.00	6.00	6.00
STORAGE	0.	1.	1.
OUTFLOW	0.	930.	930.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	8.11	2.11	1.	1309.	.85	4.85	.00

PLAN 3 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	.00	6.00	6.00
STORAGE	0.	1.	1.
OUTFLOW	0.	930.	930.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	6.44	.44	1.	1003.	.40	4.85	.00

PLAN 4 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	.00	6.00	6.00
STORAGE	0.	1.	1.
OUTFLOW	0.	930.	930.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	3.74	.00	0.	606.	.00	4.85	.00

1 SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION SR-1
(PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED DURING BREACH FORMATION)

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	.00	4.00	4.00
STORAGE	0.	0.	0.
OUTFLOW	0.	1380.	1380.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	17.75	13.75	0.	17772.	2.60	4.85	.00

PLAN 2 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	.00	4.00	4.00
STORAGE	0.	0.	0.
OUTFLOW	0.	1380.	1380.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	15.76	11.76	0.	14743.	2.70	4.90	.00

PLAN 3 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	.00	4.00	4.00
STORAGE	0.	0.	0.
OUTFLOW	0.	1380.	1380.

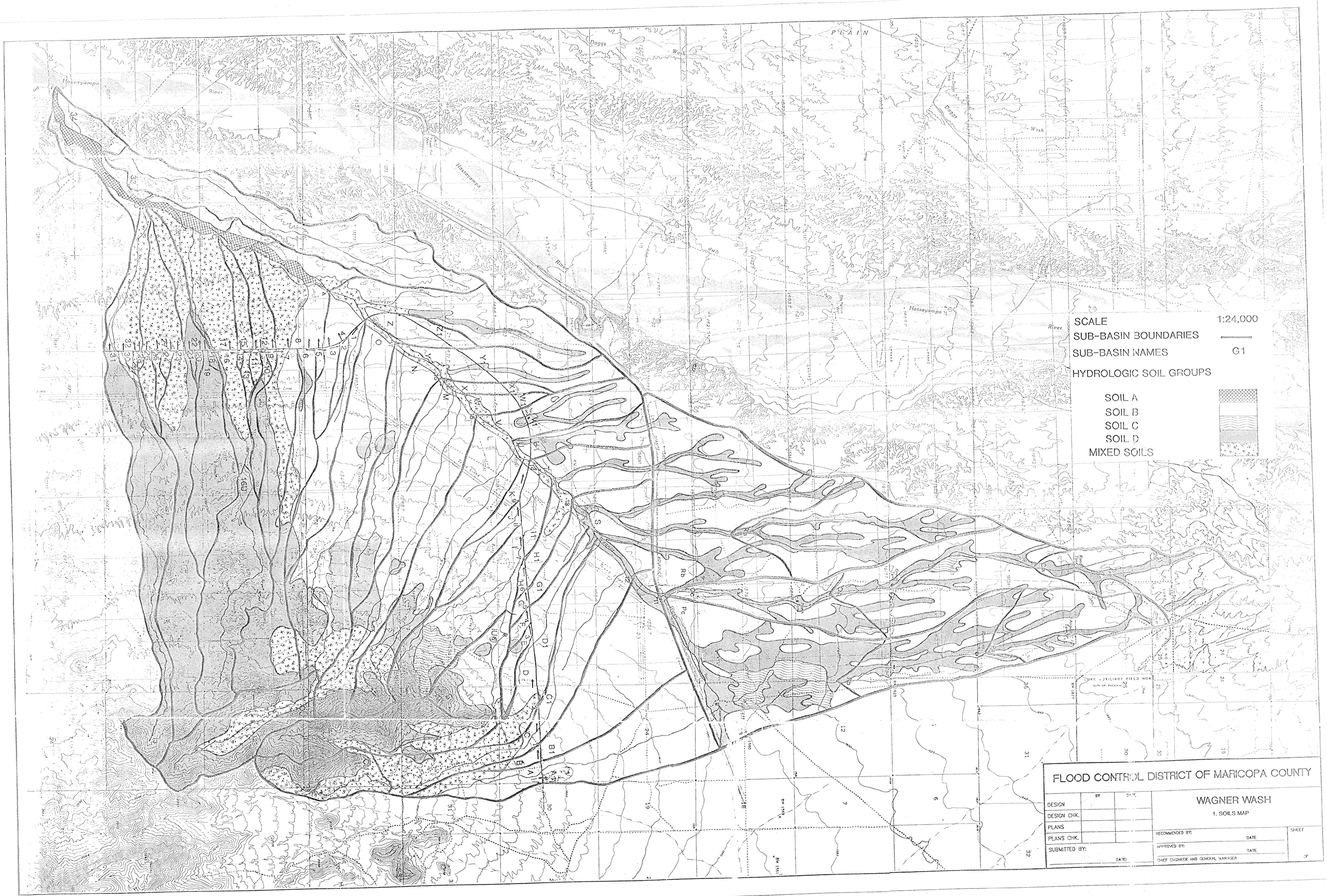
RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	13.78	9.78	0.	11892.	2.65	4.95	.00

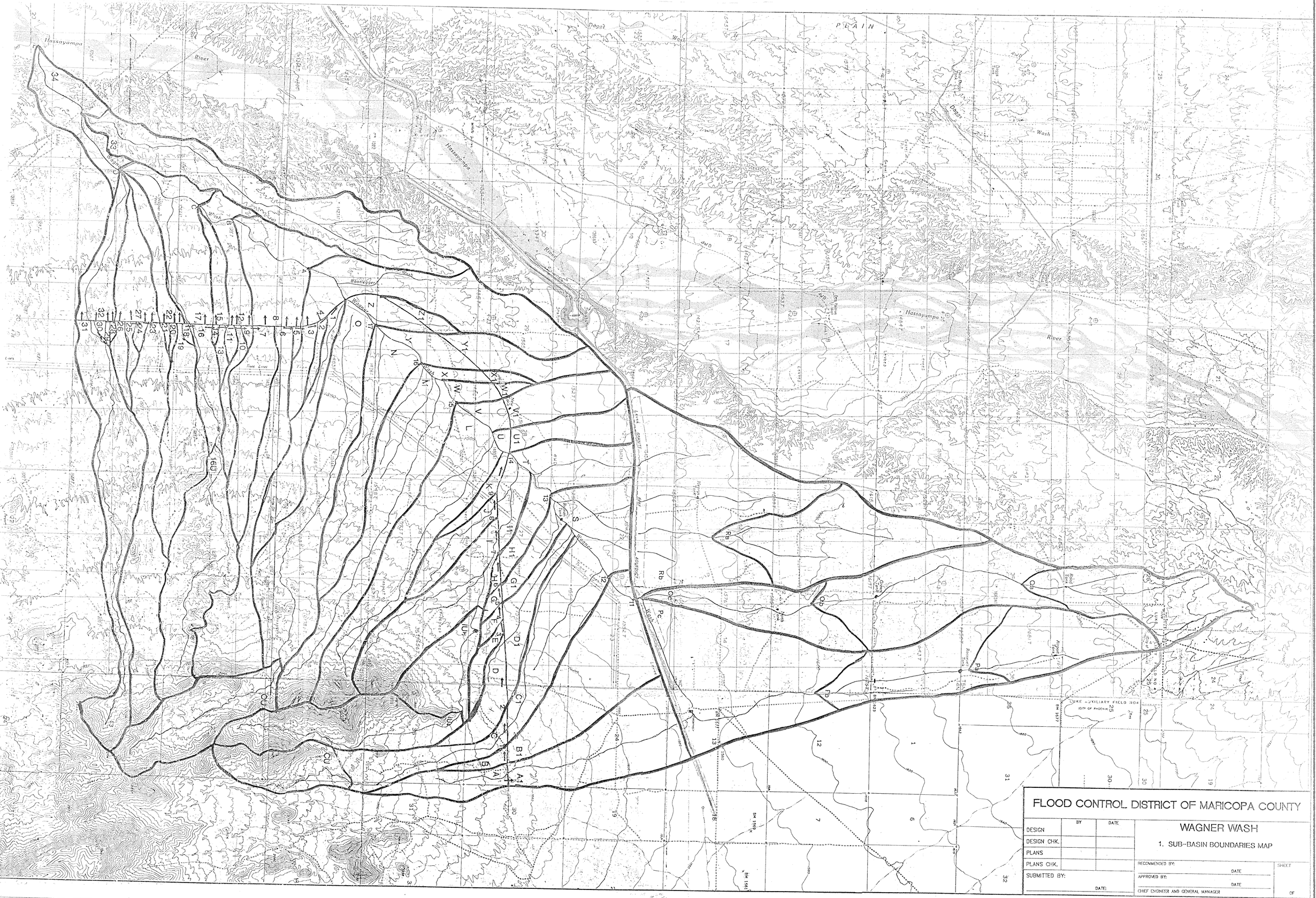
PLAN 4 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	.00	4.00	4.00
STORAGE	0.	0.	0.
OUTFLOW	0.	1380.	1380.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	11.21	7.21	0.	8502.	2.55	4.95	.00

*** NORMAL END OF HEC-1 ***


SCALE 1:24,000
SUB-BASIN BOUNDARIES
SUB-BASIN NAMES G1
HYDROLOGIC SOIL GROUPS
SOIL A
SOIL B
SOIL C
SOIL D
MIXED SOILS
Hassayampa River
Daggs Wash
PLAIN
Hoolegger
Rb
Pc
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
DESIGN
DESIGN CHK.
PLANS
PLANS CHK.
SUBMITTED BY:
DATE:
BY
DATE
WAGNER WASH
1. SOILS MAP
RECOMMENDED BY:
DATE
APPROVED BY:
DATE
CHIEF ENGINEER AND GENERAL MANAGER
SHEET
OF



FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

	BY	DATE
DESIGN		
DESIGN CHK.		
PLANS		
PLANS CHK.		
SUBMITTED BY:		DATE:

WAGNER WASH

1. SUB-BASIN BOUNDARIES MAP

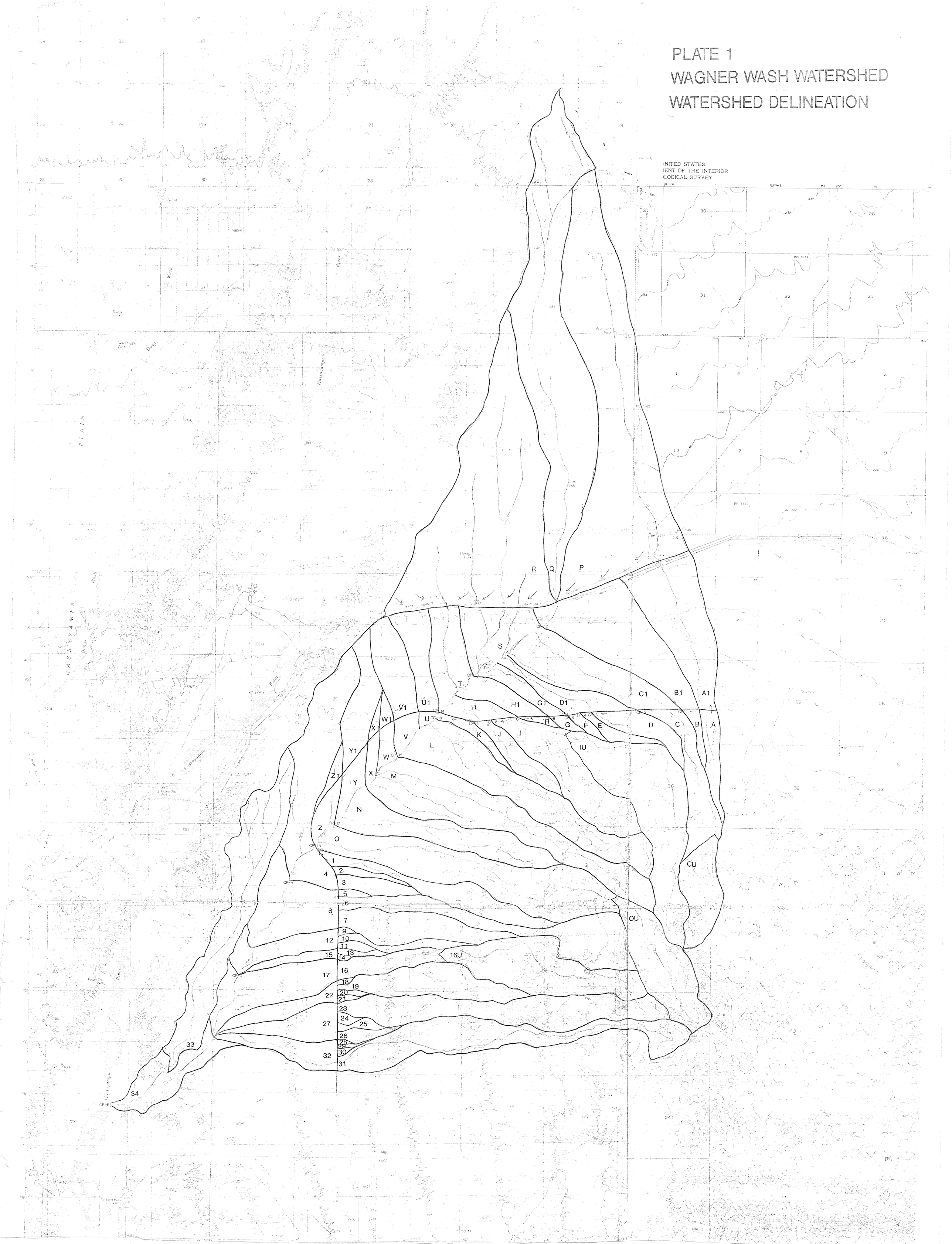
RECOMMENDED BY: DATE

APPROVED BY: DATE

CHIEF ENGINEER AND GENERAL MANAGER

SHEET OF

PLATE 1
WAGNER WASH WATERSHED
WATERSHED DELINEATION



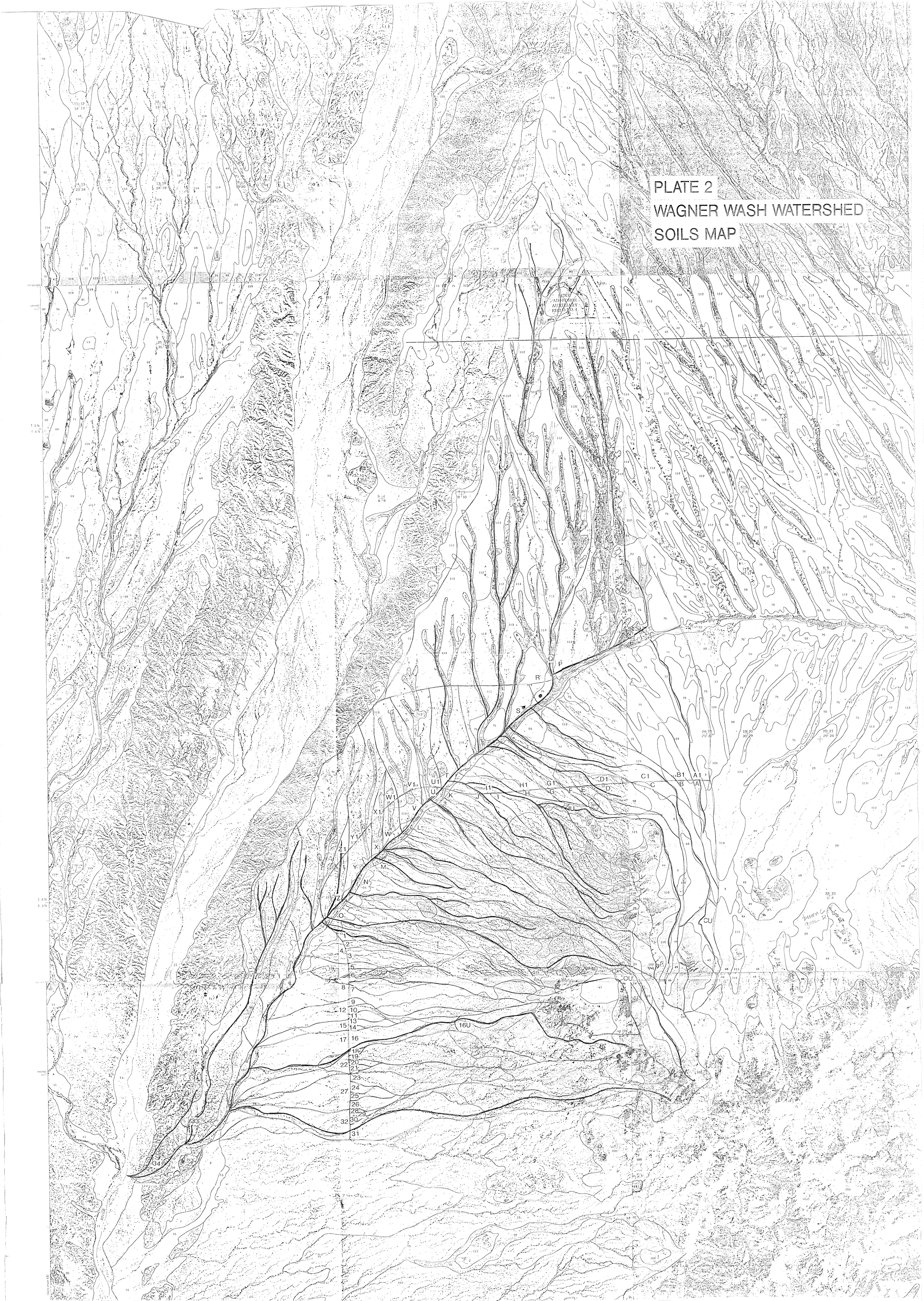


PLATE 2
WAGNER WASH WATERSHED
SOILS MAP
HASSAYAMPA RIVER
LUKE AIR FORCE AUXILIARY FIELD NO. 4
PATTON ROAD
T. 5 N.
T. 4 N.
T. 4 N.
T. 3 N.
(Joins sheet 30)
(Joins sheet 42)