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CITY OF GLENDALE

ARROWHEAD RANCH DEVELOPMENT
GLENDALE, ARIZONA

SPECIFIC AREA PLAN
STORM DRAINAGE PLAN

APRIL 20, 1992

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INTRODUCTION

In July, 1982 a Storm Drainage Master Plan was prepared and submitted to the City of Glendale. This drainage plan provided for the utilization of recreational multi-purpose lakes and golf courses as a means of retarding and conveying runoff through the development. This revised analysis includes information developed for the City on the "As-Constructed" configuration of this system. In addition, land uses as presented in the Specific Plan have been utilized in the calculation of runoff coefficients. As specific projects are developed, more detailed analysis will be required to assure the adequacy of upstream and downstream conditions as well as stage-discharge relationships of new facilities.

OVERVIEW

The Arrowhead Ranch is served by several major drainage systems. The Lakes area (Section 20 - System I, see Exhibit 1) receives off-site flows through Thunderbird Park. The flows are first directed to a sedimentation basin located within the park, north of the developed lakes area. Storm water is then conveyed through a system of lakes to a drainage channel located east of 55th Avenue, crosses under the Agua Fria Freeway and enters the 55th Avenue drainage channel. Areas west of the channel and south of the Agua Fria Freeway (Section 29 - System XI) also drain into this channel. The channel then conveys the storm water runoff to Skunk Creek.

Sections 18 and 19 are served by two systems, Systems II and III. The proposed southerly system (System II) consists of a series of detention basins which will accept flows from the southern portion of Sections 18 and 19 (including the existing "Z" lake system) and then discharge into an existing ADOT storm drain located north of the Agua Fria Freeway. The other system (System III), is an existing system of lakes, streams and drainage structures that collect runoff water and diverts it into the lake recirculation system (streams) to be conveyed to an outlet structure located at 67th Avenue just south of Rose Garden Lane. This future structure will deliver water underneath 67th Avenue into System IV.

Sections 23 and 24 (System IV), located west of 67th Avenue and north of the Agua Fria Freeway will be served by a series of detention basins, lakes, drainage channels and storm drains. This integral system will also accept runoff from Sections 18 and 19 (System III) and deliver it into the existing Agua Fria Freeway drainage channel located just north of the Agua Fria Freeway, which will convey it to New River.

The area south of the Agua Fria Freeway, between 67th Avenue and the Agua Fria Freeway (Sections 25 and 26) is split into two major sub-systems (Systems V and VI). The easterly system (System V) collects water into the lakes and through a system of pipes and channels conveys the runoff to a drainage channel south of Union Hills Drive at 71st Avenue. The westerly system (System VI) collects runoff and conveys it in a southwesterly direction through a system of lakes, pipes and drainage swales to the Agua Fria Freeway drainage channel located just east of the Agua Fria Freeway and north of Union Hills Drive. The westerly section of Section 26 also contains two small independent systems (Systems VII and VIII) that each drain into ADOT storm drains that discharge to New River.

Section 30 will also be served by a system of detention basins, drainage channels and storm drains. The extreme westerly portion of this section (System IX), will drain south into 67th Avenue after having retarded the flow in local detention basins. The major system (System X) will be interconnected through open areas via wide open swales and channels, to deliver storm water runoff to Skunk Creek near Union Hills Drive.

All new developments will be required to comply with the City of Glendale Design Guidelines for Site Development and Infrastructure Construction. Compliance will be in the form of on-site detention and/or the participation in the regional system.

METHODOLOGY

Hydrology for this update utilizes the same methodology as was used in the previous updates to the Drainage Master Plan. The Soil Conservation Service (SCS) TR20 computer program is utilized using the rainfall tables for a 100-year, 24-hour storm as originally developed. For background information relating to the hydrologic analysis and the conditions assumed, refer to the "Arrowhead Ranch Preliminary Storm Drainage Master Plan", prepared by Dibble & Associates and dated July, 1982. For system model information, see the Appendix.

ANALYSIS

The analysis as contained herein, varies substantially from that which was prepared in 1982. The primary differences have resulted from the construction of the Arizona Department of Transportation Agua Fria Freeway, which bisected the Ranch and the proposed drainage system. As a result of that construction, ADOT has provided for a drainage system north of the Agua Fria Freeway to receive runoff from the Arrowhead Drainage System located in Sections 18/19/23 and 24. A summary of each system follows:

System I - Lakes rises range from 2.3 to 3.6 feet during the storm event (see Structure Summary). Discharge into the 55th Avenue drainage channel occurs under the ADOT Agua Fria Freeway. The discharge is estimated to be approximately 1,980 cfs. The channel has adequate capacity (4,495 cfs) to handle this flow (see Discharge Summary).

System II - This system discharges into the ADOT drainage system that is comprised of 42" culverts and open channel. The proposed System II requires modification of the existing 3' x 1.25' outlet structure (to 2' x 1.25') at Reservoir 5 at the west end of the "Z" lakes. System II also requires incorporation of two detention basins (No. 9 and No. 12) into the existing ADOT storm drain between 59th Avenue and 67th Avenue. The lakes and detention basins rise between 1.0 to 3.2 feet. Discharges into the ADOT system are consistent with the existing capacity.

System III - This lake system has functioned well in past storms. In an effort to reduce the magnitude of discharges crossing 67th Avenue and passing through System IV, and to take maximum advantage of the available storage capacity, the model assumes modifying the existing 70' storm discharge weir at Reservoir 10 (Lake W) to 25', and modifying the storm discharge weir at Lake 8 from 45' to 25'. With these modifications, the model indicates that the lakes rise between 1.6 and 2.9 feet, with the exception of Lake W, which rises 4.5 feet. This lake is designed to rise more than the typical lake. This rise will be dependent on the discharge structure ultimately built under 67th Avenue.

As previously discussed, the drainage model is based upon the Master Plan concept of passing System III flows beneath 67th Avenue and through the System IV drainage facilities. Note, however that the ADOT high-capacity channel, north of the Agua Fria Freeway, has been constructed on the east side of 67th Avenue and is under-utilized in the full development scenario from System II cross-section 112 to System IV cross-section 105 (see Discharge Summary).

Therefore, an alternative development scenario deviating from the Master Plan could involve routing the discharge from System III Reservoir 10 south along the east side of 67th Avenue to connect to the ADOT channel.

System IV - This detention basin and lake system receives flow from Sections 18/19 and conveys them on toward New River. Basins in this section rise between 1.0 and 2.8 feet. Discharge is into the ADOT channel system. These discharges are in all cases less than the ADOT system is designed to carry.

System V - This system has functioned well in past storms. The system conveys water through the section via lakes which rise between 0.5 and 2.9 feet. The discharge is to the 73rd Avenue channel with an estimated flow of 278 cfs. The existing channel has a capacity of 375+ cfs.

System VI - This system collects drainage in the western portion of Section 25 and conveys it under 75th Avenue. Runoff from the eastern portion of Section 26 is added and ultimately flows into a concrete channel east of the ADOT Agua Fria Freeway. The lakes in this system rise from between 0.6 and 4.5 feet. The two lakes that rise greater than 3 feet have adequate freeboard to operate in this manner. Discharge is approximately 36 cfs. The channel is adequately sized for this flow.

System VII and VIII - These systems collect runoff in small basins and conveys directly to an ADOT culvert system that passes under the Agua Fria Freeway and discharges into New River. The rise in these systems is between 0.8 and 2.2 feet with a discharge of 12 to 13 cfs. The ADOT facilities are adequately sized for this discharge.

System IX - This small system discharges directly into 67th Avenue. The detention basins rise between 2.5 and 2.8 feet and discharge approximately 14 cfs into 67th Avenue.

System X - This detention basin system collects most of the runoff from Section 30. The basins in this section rise from between 1.1 to 3.0 feet and discharge approximately 96 cfs to Skunk Creek under Union Hills Drive.

System XI - This system discharges directly into the 55th Avenue channel system. Detention basins rise between 1.8 and 2.9 feet and discharge approximately 38 cfs into the channel.

STRUCTURE SUMMARY
ARROWHEAD RANCH DEVELOPMENT
REVISED DRAINAGE MASTER PLAN

SYSTEM	SECTION	STRUCTURE	FACILITY	NORMAL WATER SURFACE OR BOTTOM	HIGH WATER SURFACE	RISE (FT)	STRUCTURE
I	20	1	SED BASIN	1,294.0	1,297.6	3.6	170' WEIR
		2	LAKE	1,294.0	1,296.4	2.4	120' WEIR
		3	LAKE	1,292.0	1,294.3	2.3	60' WEIR
		4	LAKE	1,292.0	1,295.0	3.0	50' WEIR
		5	LAKE	1,290.0	1,293.1	3.1	140' WEIR
II	19/20	1	LAKE	1,277.0	1,279.1	2.1	18" S.P.
		2	LAKE	1,276.5	1,278.4	1.9	22' WEIR
		3	LAKE	1,275.0	1,276.9	1.9	22' WEIR
		4	LAKE	1,272.0	1,273.7	1.7	22' WEIR
		5	LAKE	1,268.0	1,270.1	2.1	2'x1.25' GRATE (1)
		6	DET BASIN	1,261.0	1,262.0	1.0	12" S.P.
		7	DET BASIN	1,278.0	1,280.7	2.7	2-12" S.P.'S
		8	DET BASIN	1,271.0	1,274.1	3.1	2-12" S.P.'S
		9	DET BASIN	1,267.0	1,269.6	2.6	18" S.P.
		10	DET BASIN	1,265.0	1,267.7	2.7	18" S.P.
		11	DET BASIN	1,261.0	1,263.6	2.6	18" S.P.
		12	DET BASIN	1,261.0	1,264.1	3.1	30" S.P.
		13	DET BASIN	1,258.0	1,261.2	3.2	24" S.P.
		14	DET BASIN	1,259.0	1,261.5	2.5	18" S.P.
III	18	1	LAKE	1,303.0	1,305.3	2.3	14' WEIR
		2	LAKE	1,289.0	1,291.2	2.2	14' WEIR
		3	LAKE	1,300.0	1,301.9	1.9	50' WEIR
		4	LAKE	1,287.0	1,289.2	2.2	20' WEIR
		5	LAKE	1,297.0	1,298.9	1.9	20' WEIR
		6	LAKE	1,294.0	1,296.1	2.1	20' WEIR
		7	LAKE	1,290.0	1,291.8	1.8	30' WEIR
		8	LAKE	1,277.5	1,280.4	2.9	25' WEIR (2)
		9	LAKE	1,273.0	1,274.6	1.6	50' WEIR
		10	LAKE	1,265.0	1,269.5	4.5	3-48" S.P.'S & 1-25" WEIR (3)
IV	23/24	1	DET BASIN	1,277.0	1,278.0	1.0	18" S.P.
		2	DET BASIN	1,267.0	1,268.3	1.3	18" S.P.
		3	DET BASIN	1,257.0	1,259.1	2.1	18" S.P.
		4	DET BASIN	1,256.0	1,258.2	2.2	18" S.P.
		5	DET BASIN	1,256.0	1,257.9	1.9	18" S.P.
		6	DET BASIN	1,277.0	1,279.6	2.6	18" S.P.
		7	DET BASIN	1,272.0	1,274.4	2.4	24" S.P.
		8	DET BASIN	1,257.0	1,259.8	2.8	24" S.P.
		9	DET BASIN	1,256.0	1,258.3	2.3	24" S.P.

NOTES: (1) MODIFY EXISTING 3' X 1.25' GRATE
(2) MODIFY EXISTING 45' WEIR
(3) MODIFY EXISTING 70' WEIR

STRUCTURE SUMMARY
ARROWHEAD RANCH DEVELOPMENT
REVISED DRAINAGE MASTER PLAN

SYSTEM	SECTION	STRUCTURE	FACILITY	NORMAL WATER SURFACE OR BOTTOM	HIGH WATER SURFACE	RISE (FT)	STRUCTURE
V	25	1	DET BASIN	1,243.0	1,245.2	2.2	18" S.P.
		2	LAKE	1,236.5	1,239.4	2.9	18" S.P.
		3	LAKE	1,230.0	1,231.8	1.8	36" S.P.
		4	LAKE	1,245.0	1,245.9	0.9	24" S.P.
		5	LAKE	1,240.0	1,241.4	1.4	40' WEIR
		6	LAKE	1,236.0	1,237.8	1.8	24" S.P.
		7	LAKE	1,228.0	1,228.5	0.5	24" S.P.
VI	25/26	1	DET BASIN	1,250.0	1,252.5	2.5	18" S.P.
		2	LAKE	1,242.0	1,246.5	4.5	40' WEIR
		3	LAKE	1,236.0	1,236.6	0.6	18" S.P.
		4	LAKE	1,237.0	1,238.0	1.0	24" S.P.
		5	LAKE	1,230.0	1,234.0	4.0	100' WEIR
		6	LAKE	1,230.0	1,230.9	0.9	24" S.P.
		7	LAKE	1,229.0	1,231.6	2.6	24" S.P.
		8	DET BASIN	1,229.0	1,231.4	2.4	18" S.P.
VII	26	1	LAKE	1,248.0	1,248.8	0.8	18" S.P.
		2	DET BASIN	1,245.0	1,247.2	2.2	18" S.P.
VIII	26	1	DET BASIN	1,236.0	1,238.0	2.0	18" S.P.
IX	30	1	DET BASIN	1,248.0	1,250.5	2.5	18" S.P.
		2	DET BASIN	1,246.0	1,248.8	2.8	18" S.P.
		3	DET BASIN	1,245.0	1,247.6	2.6	18" S.P.
X	30	1	DET BASIN	1,261.0	1,263.2	2.2	18" S.P.
		2	DET BASIN	1,260.0	1,262.7	2.7	18" S.P.
		3	DET BASIN	1,260.0	1,261.1	1.1	18" S.P.
		4	DET BASIN	1,258.0	1,259.9	1.9	18" S.P.
		5	DET BASIN	1,257.0	1,258.5	1.5	18" S.P.
		6	DET BASIN	1,256.0	1,258.0	2.0	18" S.P.
		7	DET BASIN	1,256.0	1,258.1	2.1	18" S.P.
		8	DET BASIN	1,270.0	1,272.4	2.4	18" S.P.
		9	DET BASIN	1,259.0	1,261.6	2.6	24" S.P.
		10	DET BASIN	1,257.0	1,260.0	3.0	24" S.P.
		11	DET BASIN	1,256.0	1,259.0	3.0	24" S.P.
		12	DET BASIN	1,255.0	1,257.4	2.4	18" S.P.
XI	29	1	DET BASIN	1,268.0	1,269.9	1.9	18" S.P.
		2	DET BASIN	1,266.0	1,268.9	2.9	18" S.P.
		3	DET BASIN	1,264.0	1,266.3	2.3	18" S.P.
		4	DET BASIN	1,262.0	1,263.8	1.8	18" S.P.

DISCHARGE SUMMARY
ARROWHEAD RANCH DEVELOPMENT
REVISED DRAINAGE MASTER PLAN

SYSTEM	SECTION	STRUCTURE X-SECTION	RECEIVING FACILITY	DISCHARGE (CFS)	CAPACITY (CFS)
I	20	5	55TH AVE CHANNEL	1,980	4,495
II	19/20	8	V-DITCH	14	43
		107	42" PIPE	42	61
		9	42" PIPE	14	61
		108	42" PIPE	27	61
		109	42" PIPE	40	61
		12	2-42" PIPES	41	54
		112	CONC. CHANNEL	63	644
		113	CONC. CHANNEL	76	644
III	18	10	FUTURE BOX CULVERT	319	???
IV	23/24	106	CONC. CHANNEL	88	644
		107	CONC. CHANNEL	446	644
		112	CONC. CHANNEL	470	689
		113	CONC. CHANNEL	492	726
V	25	114	73RD AVENUE CHANNEL	278	375+
VI	25/26	109	CONC. CHANNEL	36	114
VII	26	2	48" CULVERT	13	54
VIII	26	3	48" CULVERT	12	54
IX	30	3	67TH AVENUE	14	???
X	30	111	SKUNK CREEK @ UNION HILLS	96	???
X1	29	112	55TH AVENUE CHANNEL	38	
			(CUMULATIVE)	2,020	4,495

APPENDIX

Structure References A1
V-Ditch Channel Hydraulics A2
Outlet Rating Tables ..... A3 - A7
Section 20 - System I ..... A8 - A17
Section 19 - System II ..... A18 - A28
Section 18 - System III ..... A29 - A33
Section 23 - System IV ..... A34 - A45
Section 25 - System V ..... A46 - A55
Section 25 - System VI ..... A56 - A64
Section 26 - System VII & VIII ..... A65 - A70
Section 30 - System IX ..... A71 - A74
Section 30 - System X ..... A75 - A84
Section 29 - System XI ..... A85 - A91
Exhibit 1 - Drainage Schematic

STRUCTURE REFERENCES

Calculations for reservoir/detention basin stage/discharge/storage curves have been included in the Appendix. Data for several structures was obtained from previous reports as identified below.

SYSTEM II

Structure 2:	Structure 72	Ref. 2
Structure 3:	Structure 73	Ref. 2
Structure 4:	Structure 74	Ref. 2
Structure 5:	Structure 75	Ref. 2
Structure 6:	Structure 4	Ref. 1
Structure 9:	Structure 6	Ref. 1
Structure 10:	Structure 2	Ref. 1
Structure 14:	Structure 5	Ref. 1

SYSTEM III

Structure 1:	Structure 31	Ref. 2
Structure 2:	Structure 35	Ref. 2
Structure 3:	Structure 21	Ref. 2
Structure 4:	Structure 36	Ref. 2
Structure 5:	Structure 11	Ref. 2
Structure 6:	Structure 12	Ref. 2
Structure 7:	Structure 13	Ref. 2
Structure 8:	Structure 42	Ref. 2
Structure 9:	Structure 43	Ref. 2
Structure 10:	Structure 45	Ref. 2

REFERENCE 1: "Detention Basin Systems - Sections 18, 19 and 20" for Arrowhead Ranch Development, Dibble and Associates, July 1990.

REFERENCE 2: "Lake System Storm Drainage Master Plan for Arrowhead Ranch Section 18 and 19, Glendale, Arizona", URS Corporation, April 25, 1986

ADOT channel capacity west of 75th Avenue was obtained from Figure 5-3, Outer Loop Highway Drainage Design Summary Report by DeLeuw, Cather and Company.

ADOT pipe data east of 75th Avenue was obtained from ADOT's construction documents for "Agua Fria Loop 101, 75th Avenue to 31st Avenue Part 1" by Harza Engineering Co.

CHANNEL1

MAINLINE V-DITCH @ 59TH AVENUE
CHANNEL HYDRAULICS CHARACTERISTICS

```
**                        **
 **----------------------**
  **          2.00       **
   **       FT DEEP     **
    **                 **
     ****************
```

Q=	43	cfs
S=	0.002	ft/ft
n=	0.024	
b=	0	ft
z=	4	:1
TRIAL DEPTH=	2.00	ft

CALCULATED

FLOW=	43	CFS	CRITICAL DEPTH=	1.48	FT
NORMAL DEPTH=	2.00	FT	VELOCITY=	4.9	FPS
VELOCITY=	2.7	FPS	SLOPE=	0.0098	FT/FT
FROUDE #=	0.3				

HYDRAULIC CALCULATIONS
RETENTION BASIN OUTLET WORKS
ARROWHEAD RANCH DEVELOPMENT

WEIR C=3.25 ORIFICE C=0.6

RATING TABLES

12" STANDPIPE

LENGTH = 3.14 LF AREA = 0.79 SF

HEAD FT	WEIR FLOW CFS	ORIFICE FLOW CFS	RESULTING FLOW CFS
0.0	0.0	0.0	0.0
0.5	3.6	2.7	2.7
1.0	10.2	3.8	3.8
1.5	18.8	4.6	4.6
2.0	28.9	5.3	5.3
2.5	40.4	6.0	6.0
3.0	53.1	6.6	6.6

18" STANDPIPE

LENGTH = 4.71 LF AREA = 1.77 SF

HEAD FT	WEIR FLOW CFS	ORIFICE FLOW CFS	RESULTING FLOW CFS
0.0	0.0	0.0	0.0
0.5	5.4	6.0	5.4
1.0	15.3	8.5	8.5
1.5	28.1	10.4	10.4
2.0	43.3	12.0	12.0
2.5	60.5	13.5	13.5
3.0	79.6	14.7	14.7

HYDRAULIC CALCULATIONS
RETENTION BASIN OUTLET WORKS
ARROWHEAD RANCH DEVELOPMENT

WEIR C=3.25 ORIFICE C=0.6

24" STANDPIPE

LENGTH = 6.28 LF AREA = 3.14 SF

HEAD FT	WEIR FLOW CFS	ORIFICE FLOW CFS	RESULTING FLOW CFS
0.0	0.0	0.0	0.0
0.5	7.2	10.7	7.2
1.0	20.4	15.1	15.1
1.5	37.5	18.5	18.5
2.0	57.8	21.4	21.4
2.5	80.7	23.9	23.9
3.0	106.1	26.2	26.2

30" STANDPIPE

LENGTH = 7.85 LF AREA = 4.91 SF

HEAD FT	WEIR FLOW CFS	ORIFICE FLOW CFS	RESULTING FLOW CFS
0.0	0.0	0.0	0.0
0.5	9.0	16.7	9.0
1.0	25.5	23.6	23.6
1.5	46.9	28.9	28.9
2.0	72.2	33.4	33.4
2.5	100.9	37.4	37.4
3.0	132.6	40.9	40.9

HYDRAULIC CALCULATIONS
RETENTION BASIN OUTLET WORKS
ARROWHEAD RANCH DEVELOPMENT

WEIR C=3.25 ORIFICE C=0.6

36" STANDPIPE

LENGTH = 9.42 LF AREA = 7.07 SF

HEAD FT	WEIR FLOW CFS	ORIFICE FLOW CFS	RESULTING FLOW CFS
0.0	0.0	0.0	0.0
0.5	10.8	24.1	10.8
1.0	30.6	34.0	30.6
1.5	56.3	41.7	41.7
2.0	86.6	48.1	48.1
2.5	121.1	53.8	53.8
3.0	159.2	59.0	59.0

18" WEIR

LENGTH = 1.50 LF

HEAD FT	WEIR FLOW CFS
0.0	0.0
0.5	1.7
1.0	4.9
1.5	9.0
2.0	13.8
2.5	19.3
3.0	25.3

HYDRAULIC CALCULATIONS
RETENTION BASIN OUTLET WORKS
ARROWHEAD RANCH DEVELOPMENT

WEIR C=3.25 ORIFICE C=0.6

24" WEIR

LENGTH = 2.00 LF

HEAD FT	WEIR FLOW CFS
0.0	0.0
0.5	2.3
1.0	6.5
1.5	11.9
2.0	18.4
2.5	25.7
3.0	33.8

HYDRAULIC CALCULATIONS
RETENTION BASIN OUTLET WORKS
ARROWHEAD RANCH DEVELOPMENT

WEIR C = 3.5

GOLF WEIR - SWALE

LENGTH = 40 FT

HEAD (FT)	WEIR FLOW (CFS)
0.0	0
0.5	49
1.0	140
1.5	257
2.0	396
2.5	553
3.0	727

LENGTH = 100 FT

HEAD (FT)	WEIR FLOW (CFS)
0.0	0
0.5	124
1.0	350
1.5	643
2.0	990
2.5	1,383
3.0	1,819

```
JOB TR-20            ECON      FULLPRINT            SUMMARY    NOPLOTS
TLE    1  ARROWHEAD RANCH - SECTION 20 - SYSTEM I
TLE              RUN 1       (INPUT FILE SEC20_1.DAT)
5 RAINFL 2                0.020833333
8          0.000       0.004       0.008       0.013       0.018
           0.022       0.026       0.031       0.035       0.040
8          0.044       0.048       0.053       0.057       0.062
           0.066       0.071       0.075       0.080       0.093
           0.107       0.120       0.140       0.170       0.500
8          0.830       0.860       0.880       0.893       0.907
8          0.920       0.924       0.928       0.933       0.937
           0.942       0.947       0.951       0.956       0.960
           0.964       0.969       0.973       0.978       0.982
8          0.987       0.991       0.995       1.000       1.000
  ENDTBL
  STRUCT       01
8                      1294.0      0.          0.0
                       1294.5      156.        5.8
                       1295.0      442.        11.6
8                      1295.5      812.        17.5
8                      1296.0      1250.       23.4
                       1296.5      1747.       29.3
                       1297.0      2297.       35.3
8                      1297.5      2894.       41.3
                       1298.0      3536.       47.3
  ENDTBL
3 STRUCT       02
                       1294.0      0.          0.0
                       1294.5      276.        16.4
8                      1295.0      780.        33.1
8                      1295.5      1433.       49.8
                       1296.0      2206.       66.8
                       1296.5      3083.       83.9
8                      1297.0      4053.       101.1
                       1297.5      5107.       118.6
                       1298.0      6240.       136.2
9 ENDTBL
2 XSECTN     104       1.0
                       1294.0      0.          0.
8                      1294.5      74.         16.4
8                      1295.0      208.        33.1
                       1295.5      382.        49.8
                       1296.0      588.        66.8
8                      1296.5      822.        83.9
                       1297.0      1081.       101.1
                       1297.5      1362.       118.6
8                      1298.0      1664.       136.2
9 ENDTBL
2 XSECTN     107       1.0
8                      1294.0      0.          0.
8                      1294.5      202.        16.4
                       1295.0      572.        33.1
                       1295.5      1051.       49.8
8                      1296.0      1618.       66.8
                       1296.5      2261.       83.9
                       1297.0      2972.       101.1
8                      1297.5      3745.       118.6
8                      1298.0      4576.       136.2
9 ENDTBL
2 XSECTN     108       1.0
8                      1294.0      0.          0.
                       1294.5      110.        16.4
                       1295.0      312.        33.1
8                      1295.5      573.        49.8
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A8

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8                          1297.0        1621.         101.1
8                          1297.5        2043.         118.6
8                          1298.0        2496.         136.2
9 ENDTBL
2 XSECTN    109            1.0
8                          1294.0        0.            0.
8                          1294.5        92.          16.4
8                          1295.0        260.          33.1
8                          1295.5        478.          49.8
8                          1296.0        735.          66.8
8                          1296.5        1028.         83.9
8                          1297.0        1351.         101.1
8                          1297.5        1702.         118.6
8                          1298.0        2080.         136.2
9 ENDTBL
3 STRUCT        03
8                          1292.0        0.            0.0
8                          1292.5        55.           11.8
8                          1293.0        156.          23.7
8                          1293.5        287.          35.7
8                          1294.0        441.          47.9
8                          1294.5        617.          60.2
8                          1295.0        811.          72.6
8                          1295.5        1021.         85.1
8                          1296.0        1248.         97.7
9 ENDTBL
3 STRUCT        04
8                          1292.0        0.            0.0
8                          1292.5        46.           18.7
8                          1293.0        130.          37.5
8                          1293.5        239.          56.4
8                          1294.0        368.          75.5
8                          1294.5        514.          94.6
8                          1295.0        675.          113.8
8                          1295.5        851.          133.1
8                          1296.0        1040.         152.5
9 ENDTBL
3 STRUCT        05
8                          1290.0        0.            0.0
8                          1290.5        129.          18.4
8                          1291.0        364.          37.0
8                          1291.5        669.          55.6
8                          1292.0        1030.         74.4
8                          1292.5        1439.         93.2
8                          1293.0        1891.         112.2
8                          1293.5        2383.         131.2
8                          1294.0        2912.         150.3
9 ENDTBL
5 RUNOFF 1      11      1 3.560         89.           1.630         1 0 0 1 0 1
5 RUNOFF 1      12      3 0.225         92.           0.167         1 0 0 1 0 1
6 ADDHYD 4 101    1 3 4                                             1 0 0 1 0 1
5 RESVOR 2      01 4    1 1294.                                     1 0 0 1 0 1
5 RUNOFF 1      14      2 0.166         88.           0.167         1 0 0 1 0 1
6 ADDHYD 4 102    1 2 3                                             1 0 0 1 0 1
6 RUNOFF 1      13      1 0.050         92.           0.167         1 0 0 1 0 1
5 ADDHYD 4 103    3 1 2                                             1 0 0 1 0 1
5 RESVOR 2      02 2    1 1294.                                     1 0 0 1 0 1
6 DIVERT 6 104    1 2 3               0.667         107.          1 0 0 1 0 1
5 RUNOFF 1      15      4 0.095         90.           0.167         1 0 0 1 0 1
5 ADDHYD 4 105    2 4 1                                             1 0 0 1 0 1
6 RESVOR 2      03 1    2 1294.                                     1 0 0 1 0 1
6 RUNOFF 1      16      1 0.175         89.           0.167         1 0 0 1 0 1
5 ADDHYD 4 106    1 2 4                                             1 0 0 1 0 1
6 DIVERT 6 108    3 1 2               0.500         109.          1 0 0 1 0 1
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  ADDHYD 4 111    2 1 4                                          1 0 0 1 0 1
  RUNOFF 1     18      1 0.220        89.          0.167        1 0 0 1 0 1
5 ADDHYD 4 112    1 4 2                                          1 0 0 1 0 1
6 RUNOFF 1     19      1 0.227        89.          0.167        1 0 0 1 0 1
  ADDHYD 4 113    1 2 4                                          1 0 0 1 0 1
5 RESVOR 2     04 4    1 1292.                                   1 0 0 1 0 1
6 ADDHYD 4 114    1 3 2                                          1 0 0 1 0 1
  RESVOR 2     05 2    1 1290.                                   1 0 0 1 0 1
  ENDATA
7 LIST
  INCREM 6                0.10
  COMPUT 7     11     05 0.0          4.04         24.          2 2  24  1
  ENDCMP 1
  ENDJOB 2
```

SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
(A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION BEGIN (HR)	PRECIPITATION AMOUNT (IN)	PRECIPITATION DURATION (HR)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)
ALTERNATE 24 STORM 10													
TRUCTURE 11	RUNOFF	3.56	2	2	.10	.0	4.04	24.00	2.86	---	13.16	3065.94	861.2
TRUCTURE 12	RUNOFF	.22	2	2	.10	.0	4.04	24.00	3.15	---	12.45	378.38	1681.7
SECTION 101	ADDHYD	3.78	2	2	.10	.0	4.04	24.00	2.88	---	13.16	3091.79	816.9
TRUCTURE 1	RESVOR	3.78	2	2	.10	.0	4.04	24.00	2.88	1297.61	13.28	3040.54	803.3
TRUCTURE 14	RUNOFF	.17	2	2	.10	.0	4.04	24.00	2.76	---	12.45	261.71	1576.6
SECTION 102	ADDHYD	3.95	2	2	.10	.0	4.04	24.00	2.87	---	13.28	3056.74	773.7
TRUCTURE 13	RUNOFF	.05	2	2	.10	.0	4.04	24.00	3.15	---	12.45	84.08	1681.7
SECTION 103	ADDHYD	4.00	2	2	.10	.0	4.04	24.00	2.88	---	13.28	3061.87	765.3
STRUCTURE 2	RESVOR	4.00	2	2	.10	.0	4.04	24.00	2.88	1296.39	13.50	2896.60	724.0
SECTION 104	DIVERT	2.67	2	2	.10	.0	4.04	24.00	1.15	1296.39	13.50	772.27	289.4
SECTION 107	DIVERT	1.33	2	2	.10	.0	4.04	24.00	6.33	1296.39	13.50	2124.34	1594.4
TRUCTURE 15	RUNOFF	.09	2	2	.10	.0	4.04	24.00	2.95	---	12.45	155.04	1632.0
SECTION 105	ADDHYD	2.76	2	2	.10	.0	4.04	24.00	1.21	---	13.50	781.54	282.8
STRUCTURE 3	RESVOR	2.76	2	2	.10	.0	4.04	24.00	1.53	1294.34	14.16	559.96	202.6
STRUCTURE 16	RUNOFF	.17	2	2	.10	.0	4.04	24.00	2.86	---	12.45	280.85	1604.9
SECTION 106	ADDHYD	2.94	2	2	.10	.0	4.04	24.00	1.61	---	14.17	571.55	194.5
SECTION 108	DIVERT	.67	2	2	.10	.0	4.04	24.00	6.90	1296.39	13.50	1158.51	1739.1
SECTION 109	DIVERT	.67	2	2	.10	.0	4.04	24.00	5.76	1296.39	13.50	965.82	1449.8
SECTION 110	ADDHYD	3.60	2	2	.10	.0	4.04	24.00	2.59	---	13.65	1624.49	450.6
STRUCTURE 17	RUNOFF	.07	2	2	.10	.0	4.04	24.00	3.15	---	12.45	117.72	1681.7
SECTION 111	ADDHYD	.74	2	2	.10	.0	4.04	24.00	5.51	---	13.50	972.80	1321.4
STRUCTURE 18	RUNOFF	.22	2	2	.10	.0	4.04	24.00	2.86	---	12.45	353.07	1604.9
SECTION 112	ADDHYD	.96	2	2	.10	.0	4.04	24.00	4.90	---	13.49	994.06	1039.6
TRUCTURE 19	RUNOFF	.23	2	2	.10	.0	4.04	24.00	2.86	---	12.45	364.31	1604.9
SECTION 113	ADDHYD	1.18	2	2	.10	.0	4.04	24.00	4.51	---	12.48	1165.34	984.9
TRUCTURE 4	RESVOR	1.18	2	2	.10	.0	4.04	24.00	4.37	1294.97	14.27	666.22	563.1
SECTION 114	ADDHYD	4.79	2	2	.10	.0	4.04	24.00	3.03	---	13.76	2220.60	463.8
STRUCTURE 5	RESVOR	4.79	2	2	.10	.0	4.04	24.00	3.00	1293.09	14.29	1980.44	413.6

ARROWHEAD DRAINAGE MASTER PLAN
DRAINAGE CALCULATIONS

RUNOFF COEFFICIENT

SECTION 20
==========

LAND USE	AREA	RUNOFF COEFF (CN)	WEIGHTED AVERAGE	WEIGHTED CN
SUB-BASIN 14				
SF	73.7	83	6,117	
LAKE	32.7	100	3,270	
	106.4 AC		9,387	88
SUB-BASIN 15				
SF	37.1	83	3,079	
LAKE	23.5	100	2,350	
	60.6 AC		5,429	90
SUB-BASIN 16				
SF	70.2	83	5,827	
MF	4.7	85	400	
LAKE	36.8	100	3,680	
	111.7 AC		9,906	89
SUB-BASIN 18				
SF	24.4	83	2,025	
MF	79.1	85	6,723	
LAKE	37.3	100	3,730	
	140.8 AC		12,479	89

ARROWHEAD DRAINAGE MASTER PLAN
DRAINAGE CALCULATIONS
STORAGE DISCHARGE

SECTION 20
==========

RESERVOIR/STRUCTURE NO. 1

WEIR L = 170 FT
WIDTH (AV)= 350 FT
EQ LENGTH = 1,440 FT

ELEVATION	DEPTH (FT)	AREA (ACRES)	STORAGE (AF)	DISCHARGE (CFS)
1,294.0	0.0	11.57		
			5.8	
1,294.5	0.5	11.64		156
			11.6	
1,295.0	1.0	11.70		442
			17.5	
1,295.5	1.5	11.77		812
			23.4	
1,296.0	2.0	11.83		1,250
			29.3	
1,296.5	2.5	11.90		1,747
			35.3	
1,297.0	3.0	11.97		2,297
			41.3	
1,297.5	3.5	12.03		2,894
			47.3	
1,298.0	4.0	12.10		3,536

RESERVOIR/STRUCTURE NO. 2A

WEIR L = 80 FT
WIDTH (AV)= 200 FT
EQ LENGTH = 7,129 FT

ELEVATION	DEPTH (FT)	AREA (ACRES)	STORAGE (AF)	DISCHARGE (CFS)
1,294.0	0.0	32.73		
			16.4	
1,294.5	0.5	33.06		74
			33.1	
1,295.0	1.0	33.38		208
			49.8	
1,295.5	1.5	33.71		382
			66.8	
1,296.0	2.0	34.04		588
			83.9	
1,296.5	2.5	34.37		822
			101.1	
1,297.0	3.0	34.69		1,081
			118.6	
1,297.5	3.5	35.02		1,362
			136.2	
1,298.0	4.0	35.35		1,664

ARROWHEAD DRAINAGE MASTER PLAN
DRAINAGE CALCULATIONS
STORAGE DISCHARGE

SECTION 20
==========

RESERVOIR/STRUCTURE NO. 2B

WEIR L = 100 FT AND 120 FT
WIDTH (AV)= 200 FT
EQ LENGTH = 7,129 FT

ELEVATION	DEPTH (FT)	AREA (ACRES)	STORAGE (AF)	DISCHARGE (CFS)
1,294.0	0.0	32.73		
			16.4	
1,294.5	0.5	33.06		202
			33.1	
1,295.0	1.0	33.38		572
			49.8	
1,295.5	1.5	33.71		1,051
			66.8	
1,296.0	2.0	34.04		1,618
			83.9	
1,296.5	2.5	34.37		2,261
			101.1	
1,297.0	3.0	34.69		2,972
			118.6	
1,297.5	3.5	35.02		3,745
			136.2	
1,298.0	4.0	35.35		4,576

RESERVOIR/STRUCTURE NO. 2C

WEIR L = 120 FT
WIDTH (AV)= 200 FT
EQ LENGTH = 7,129 FT

ELEVATION	DEPTH (FT)	AREA (ACRES)	STORAGE (AF)	DISCHARGE (CFS)
1,294.0	0.0	32.73		
			16.4	
1,294.5	0.5	33.06		110
			33.1	
1,295.0	1.0	33.38		312
			49.8	
1,295.5	1.5	33.71		573
			66.8	
1,296.0	2.0	34.04		882
			83.9	
1,296.5	2.5	34.37		1,233
			101.1	
1,297.0	3.0	34.69		1,621
			118.6	
1,297.5	3.5	35.02		2,043
			136.2	
1,298.0	4.0	35.35		2,496

ARROWHEAD DRAINAGE MASTER PLAN
DRAINAGE CALCULATIONS
STORAGE DISCHARGE

SECTION 20
==========

RESERVOIR/STRUCTURE NO. 2D

WEIR L = 100 FT
WIDTH (AV)= 200 FT
EQ LENGTH = 7,129 FT

ELEVATION	DEPTH (FT)	AREA (ACRES)	STORAGE (AF)	DISCHARGE (CFS)
1,294.0	0.0	32.73		
			16.4	
1,294.5	0.5	33.06		92
			33.1	
1,295.0	1.0	33.38		260
			49.8	
1,295.5	1.5	33.71		478
			66.8	
1,296.0	2.0	34.04		735
			83.9	
1,296.5	2.5	34.37		1,028
			101.1	
1,297.0	3.0	34.69		1,351
			118.6	
1,297.5	3.5	35.02		1,702
			136.2	
1,298.0	4.0	35.35		2,080

RESERVOIR/STRUCTURE NO. 2

WEIR L = 80 FT, 120 FT AND 100 FT
WIDTH (AV)= 200 FT
EQ LENGTH = 7,129 FT

ELEVATION	DEPTH (FT)	AREA (ACRES)	STORAGE (AF)	DISCHARGE (CFS)
1,294.0	0.0	32.73		
			16.4	
1,294.5	0.5	33.06		276
			33.1	
1,295.0	1.0	33.38		780
			49.8	
1,295.5	1.5	33.71		1,433
			66.8	
1,296.0	2.0	34.04		2,206
			83.9	
1,296.5	2.5	34.37		3,083
			101.1	
1,297.0	3.0	34.69		4,053
			118.6	
1,297.5	3.5	35.02		5,107
			136.2	
1,298.0	4.0	35.35		6,240

ARROWHEAD DRAINAGE MASTER PLAN
DRAINAGE CALCULATIONS
STORAGE DISCHARGE

SECTION 20
==========

RESERVOIR/STRUCTURE NO. 3

WEIR L = 60 FT
WIDTH (AV)= 200 FT
EQ LENGTH = 5,114 FT

ELEVATION	DEPTH (FT)	AREA (ACRES)	STORAGE (AF)	DISCHARGE (CFS)
1,292.0	0.0	23.48		
			11.8	
1,292.5	0.5	23.71		55
			23.7	
1,293.0	1.0	23.95		156
			35.7	
1,293.5	1.5	24.18		287
			47.9	
1,294.0	2.0	24.42		441
			60.2	
1,294.5	2.5	24.65		617
			72.6	
1,295.0	3.0	24.89		811
			85.1	
1,295.5	3.5	25.12		1,021
			97.7	
1,296.0	4.0	25.36		1,248

RESERVOIR/STRUCTURE NO. 4

WEIR L = 50 FT
WIDTH (AV)= 375 FT
EQ LENGTH = 4,336 FT

ELEVATION	DEPTH (FT)	AREA (ACRES)	STORAGE (AF)	DISCHARGE (CFS)
1,292.0	0.0	37.33		
			18.7	
1,292.5	0.5	37.53		46
			37.5	
1,293.0	1.0	37.73		130
			56.4	
1,293.5	1.5	37.93		239
			75.5	
1,294.0	2.0	38.13		368
			94.6	
1,294.5	2.5	38.33		514
			113.8	
1,295.0	3.0	38.52		675
			133.1	
1,295.5	3.5	38.72		851
			152.5	
1,296.0	4.0	38.92		1,040

ARROWHEAD DRAINAGE MASTER PLAN
DRAINAGE CALCULATIONS
STORAGE DISCHARGE

SECTION 20
==========

RESERVOIR/STRUCTURE NO. 5

WEIR L = 140 FT
WIDTH (AV)= 375 FT
EQ LENGTH = 4,275 FT

ELEVATION	DEPTH (FT)	AREA (ACRES)	STORAGE (AF)	DISCHARGE (CFS)
1,290.0	0.0	36.80		
			18.4	
1,290.5	0.5	37.00		129
			37.0	
1,291.0	1.0	37.19		364
			55.6	
1,291.5	1.5	37.39		669
			74.4	
1,292.0	2.0	37.59		1,030
			93.2	
1,292.5	2.5	37.78		1,439
			112.2	
1,293.0	3.0	37.98		1,891
			131.2	
1,293.5	3.5	38.17		2,383
			150.3	
1,294.0	4.0	38.37		2,912

```
JOB TR-20          ECON      FULLPRINT          SUMMARY   NOPLOTS
TITLE  1  ARROWHEAD RANCH - SECTION 18/19 - SYSTEM II
TITLE            RUN 4 - 4-16-92   (INPUT FILE SECT19_2.DAT)
 5 RAINFL 2              0.020833333
 8          0.000       0.004       0.008       0.013       0.018
 8          0.022       0.026       0.031       0.035       0.040
 8          0.044       0.048       0.053       0.057       0.062
 8          0.066       0.071       0.075       0.080       0.093
 8          0.107       0.120       0.140       0.170       0.500
 8          0.830       0.860       0.880       0.893       0.907
 8          0.920       0.924       0.928       0.933       0.937
 8          0.942       0.947       0.951       0.956       0.960
 8          0.964       0.969       0.973       0.978       0.982
 8          0.987       0.991       0.995       1.000       1.000
 9 ENDTBL
 3 STRUCT       01        SE          SQ          SV
 8                       1277.0      0.0         0.0
 8                       1279.0      0.01        3.60
 8                       1279.5      5.40        4.50
 8                       1280.0      8.50        5.40
 8                       1280.5      10.4        6.30
 8                       1281.0      12.0        7.20
 9 ENDTBL
 3 STRUCT       02
 8                       1276.5      0.0         0.00
 8                       1277.0      7.1         0.34
 8                       1277.5      14.1        0.70
 8                       1278.0      19.7        1.20
 8                       1278.5      42.4        1.60
 8                       1279.0      92.7        2.20
 8                       1279.5      164.8       2.70
 8                       1280.0      200.0       3.30
 9 ENDTBL
 3 STRUCT       03
 8                       1275.0      0.0         0.0
 8                       1275.5      8.70        0.30
 8                       1276.0      15.30       0.70
 8                       1276.5      22.30       1.10
 8                       1277.0      49.60       1.50
 8                       1277.5      106.00      2.00
 8                       1278.0      180.40      2.50
 9 ENDTBL
 3 STRUCT       04
 8                       1272.0      0.0         0.0
 8                       1272.5      8.70        0.30
 8                       1273.0      15.30       0.70
 8                       1273.5      22.30       1.10
 8                       1274.0      49.60       1.60
 8                       1274.5      106.0       2.00
 8                       1275.0      180.4       2.50
 9 ENDTBL
 3 STRUCT       05
 8                       1267.5      0.0         0.0
 8                       1268.0      0.85        1.75
 8                       1268.5      4.10        3.50
 8                       1269.0      8.16        5.31
 8                       1269.5      9.5         7.20
 8                       1270.0      13.40       9.15
 8                       1270.5      16.40       11.2
 8                       1271.0      19.00       13.3
 9 ENDTBL
 3 STRUCT       06
 8                       1261.0      0.0         0.0
```

8		1262.0	3.80	1.60
8		1262.5	4.60	2.40
8		1263.0	5.30	3.30
8		1263.5	6.00	4.10
8		1264.0	6.60	5.00
9	ENDTBL			
3	STRUCT 07	CE	SQ	SV
8		1278.0	0.0	0.0
8		1278.5	5.40	1.90
8		1279.0	7.60	3.90
8		1279.5	9.20	5.90
8		1280.0	10.6	7.90
8		1280.5	12.0	9.90
8		1281.5	13.2	12.1
9	ENDTBL			
3	STRUCT 08			
8		1271.0	0.0	0.0
8		1271.5	5.40	0.8
8		1272.0	7.60	1.70
8		1272.5	9.20	2.80
8		1273.0	10.6	3.80
8		1273.5	12.0	4.90
8		1274.0	13.2	6.00
9	ENDTBL			
3	STRUCT 09			
8		1267.0	0.0	0.0
8		1267.5	5.40	0.50
8		1268.0	8.50	1.00
8		1268.5	10.4	1.50
8		1269.0	12.0	2.00
8		1269.5	13.5	2.60
8		1270.0	14.7	3.20
9	ENDTBL			
3	STRUCT 10			
8		1265.0	0.0	0.0
8		1265.5	5.40	0.78
8		1266.0	8.50	1.58
8		1266.5	10.4	2.40
8		1267.0	12.0	3.25
8		1267.5	13.5	4.13
8		1268.0	14.7	5.03
9	ENDTBL			
3	STRUCT 11			
8		1261.0	0.0	0.0
8		1261.5	5.40	0.80
8		1262.0	8.50	1.60
8		1262.5	10.4	2.40
8		1263.0	12.0	3.30
8		1263.5	13.5	4.10
8		1264.0	14.7	5.00
9	ENDTBL			
3	STRUCT 12			
8		1261.0	0.0	0.0
8		1261.5	9.00	0.80
8		1262.0	23.6	1.70
8		1262.5	28.9	2.60
8		1263.0	33.4	3.50
8		1263.5	37.4	4.40
8		1264.0	40.9	5.40
9	ENDTBL			
3	STRUCT 13			
8		1258.0	0.0	0.0
8		1258.5	7.20	0.40
8		1259.0	15.10	0.90

```
8                          1260.5      23.90       2.40
8                          1261.0      26.20       3.00
9 ENDTBL
3 STRUCT       14
8                          1259.0      0.0         0.0
8                          1259.5      5.40        0.50
8                          1260.0      8.50        0.90
8                          1260.5      10.40       1.40
8                          1261.0      12.0        1.80
8                          1261.5      13.5        2.50
8                          1262.0      14.7        3.00
9 ENDTBL
6 RUNOFF 1     21       1 0.035       82.         0.167       1 0 0 1 0 1
6 RESVOR 2     01 1     2 1277.                               1 0 0 1 0 1
6 RUNOFF 1     22       3 0.027       92.         0.167       1 0 0 1 0 1
6 ADDHYD 4 101    2 3 1                                       1 0 0 1 0 1
6 RESVOR 2     02 1     2 1276.5                              1 0 0 1 0 1
6 RUNOFF 1     23       1 0.009       86.         0.167       1 0 0 1 0 1
6 ADDHYD 4 102    1 2 3                                       1 0 0 1 0 1
6 RESVOR 2     03 3     1 1275.                               1 0 0 1 0 1
6 RUNOFF 1     24       2 0.006       87.         0.167       1 0 0 1 0 1
6 ADDHYD 4 103    1 2 3                                       1 0 0 1 0 1
6 RESVOR 2     04 3     1 1272.                               1 0 0 1 0 1
6 RUNOFF 1     25       2 0.051       85.         0.167       1 0 0 1 0 1
6 ADDHYD 4 104    1 2 3                                       1 0 0 1 0 1
6 RESVOR 2     05 3     4 1268.                               1 0 0 1 0 1
6 RUNOFF 1     27       1 0.123       82.         0.167       1 0 0 1 0 1
6 RESVOR 2     07 1     2 1278.                               1 0 0 1 0 1
6 RUNOFF 1     28       1 0.045       92.         0.167       1 0 0 1 0 1
6 ADDHYD 4 106    1 2 3                                       1 0 0 1 0 1
6 RESVOR 2     08 3     1 1271.                               1 0 0 1 0 1
6 RUNOFF 1     29       2 0.018       92.         0.167       1 0 0 1 0 1
6 ADDHYD 4 107    1 2 3                                       1 0 0 1 0 1
6 RESVOR 2     09 3     2 1267.                               1 0 0 1 0 1
6 RUNOFF 1     30       1 0.056       84.         0.167       1 0 0 1 0 1
6 RESVOR 2     10 1     3 1265.                               1 0 0 1 0 1
6 ADDHYD 4 108    3 2 1                                       1 0 0 1 0 1
6 RUNOFF 1     31       2 0.053       77.         0.167       1 0 0 1 0 1
6 ADDYHY 4 105    4 2 3                                       1 0 0 1 0 1
6 RESVOR 2     11 3     2 1261.                               1 0 0 1 0 1
6 ADDHYD 4 109    1 2 4                                       1 0 0 1 0 1
6 RUNOFF 1     32       1 0.035       85.         0.167       1 0 0 1 0 1
6 RUNOFF 1     26       2 0.018       84.         0.167       1 0 0 1 0 1
6 RESVOR 2     06 2     3 1261.                               1 0 0 1 0 1
6 ADDHYD 4 110    1 3 2                                       1 0 0 1 0 1
6 ADDHYD 4 111    4 2 1                                       1 0 0 1 0 1
6 RESVOR 2     12 1     3 1261.                               1 0 0 1 0 1
6 RUNOFF 1     33       2 0.039       92.         0.167       1 0 0 1 0 1
6 RESVOR 2     13 2     1 1258.                               1 0 0 1 0 1
6 ADDHYD 4 112    1 3 2                                       1 0 0 1 0 1
6 RUNOFF 1     34       1 0.037       82.         0.167       1 0 0 1 0 1
6 RESVOR 2     14 1     3 1259.                               1 0 0 1 0 1
6 ADDHYD 4 113    2 3 4                                       1 0 0 1 1 1
  ENDATA
7 LIST
7 INCREM 6                 0.10
7 COMPUT 7     21 113      0.0         4.04        24.         2 2  24  1
  ENDCMP 1
  ENDJOB 2
```

SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
(A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION BEGIN (HR)	PRECIPITATION AMOUNT (IN)	PRECIPITATION DURATION (HR)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)
ALTERNATE 24 STORM 10													
STRUCTURE 21	RUNOFF	.04	2	2	.10	.0	4.04	24.00	2.23	---	12.46	48.56	1387.6
STRUCTURE 1	RESVOR	.04	2	2	.10	.0	4.04	24.00	.30	1279.06	22.60	.69	19.8
STRUCTURE 22	RUNOFF	.03	2	2	.10	.0	4.04	24.00	3.15	---	12.45	45.41	1681.7
XSECTION 101	ADDHYD	.06	2	2	.10	.0	4.04	24.00	1.54	---	12.45	45.41	732.5
STRUCTURE 2	RESVOR	.06	2	2	.10	.0	4.04	24.00	1.55	1278.41	12.53	38.38	619.1
STRUCTURE 23	RUNOFF	.01	2	2	.10	.0	4.04	24.00	2.58	---	12.46	13.65	1516.7
XSECTION 102	ADDHYD	.07	2	2	.10	.0	4.04	24.00	1.68	---	12.49	51.39	723.9
STRUCTURE 3	RESVOR	.07	2	2	.10	.0	4.04	24.00	1.68	1276.85	12.65	41.23	580.7
STRUCTURE 24	RUNOFF	.01	2	2	.10	.0	4.04	24.00	2.67	---	12.46	9.28	1547.1
XSECTION 103	ADDHYD	.08	2	2	.10	.0	4.04	24.00	1.75	---	12.60	46.47	603.5
STRUCTURE 4	RESVOR	.08	2	2	.10	.0	4.04	24.00	1.75	1273.70	12.86	33.33	432.9
STRUCTURE 25	RUNOFF	.05	2	2	.10	.0	4.04	24.00	2.49	---	12.46	75.76	1485.5
XSECTION 104	ADDHYD	.13	2	2	.10	.0	4.04	24.00	2.05	---	12.47	92.84	725.3
TRUCTURE 5	RESVOR	.13	2	2	.10	.0	4.04	24.00	1.89	1270.06	15.03	13.78	107.7
TRUCTURE 27	RUNOFF	.12	2	2	.10	.0	4.04	24.00	2.23	---	12.46	170.67	1387.6
STRUCTURE 7	RESVOR	.12	2	2	.10	.0	4.04	24.00	2.03	1280.73	13.17	12.28	99.8
TRUCTURE 28	RUNOFF	.05	2	2	.10	.0	4.04	24.00	3.15	---	12.45	75.68	1681.7
XSECTION 106	ADDHYD	.17	2	2	.10	.0	4.04	24.00	2.33	---	12.46	86.35	514.0
STRUCTURE 8	RESVOR	.17	2	2	.10	.0	4.04	24.00	2.03	1274.13	15.16	13.50	80.4
TRUCTURE 29	RUNOFF	.02	2	2	.10	.0	4.04	24.00	3.15	---	12.45	30.27	1681.7
XSECTION 107	ADDHYD	.19	2	2	.10	.0	4.04	24.00	2.14	---	12.46	41.95	225.5
TRUCTURE 9	RESVOR	.19	2	2	.10	.0	4.04	24.00	1.97	1269.59	16.80	13.73	73.8
TRUCTURE 30	RUNOFF	.06	2	2	.10	.0	4.04	24.00	2.40	---	12.46	81.39	1453.4
STRUCTURE 10	RESVOR	.06	2	2	.10	.0	4.04	24.00	2.40	1267.73	12.76	14.05	250.9
XSECTION 108	ADDHYD	.24	2	2	.10	.0	4.04	24.00	2.07	---	12.89	27.12	112.1
STRUCTURE 31	RUNOFF	.05	2	2	.10	.0	4.04	24.00	1.84	---	12.46	64.42	1215.5
XSECTION 105	ADDHYD	.18	2	2	.10	.0	4.04	24.00	1.88	---	12.46	72.82	402.3
TRUCTURE 11	RESVOR	.18	2	2	.10	.0	4.04	24.00	1.79	1263.60	16.30*	13.75*	76.0
SECTION 109	ADDHYD	.42	2	2	.10	.0	4.04	24.00	1.95	---	13.17	39.94	94.4
STRUCTURE 32	RUNOFF	.04	2	2	.10	.0	4.04	24.00	2.49	---	12.46	51.99	1485.5
TRUCTURE 26	RUNOFF	.02	2	2	.10	.0	4.04	24.00	2.40	---	12.46	26.16	1453.4
STRUCTURE 6	RESVOR	.02	2	2	.10	.0	4.04	24.00	2.36	1261.96	12.80	3.71	206.1

SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
(A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION BEGIN (HR)	PRECIPITATION AMOUNT (IN)	PRECIPITATION DURATION (HR)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)
ALTERNATE 24 STORM 10													
SECTION 110	ADDHYD	.05	2	2	.10	.0	4.04	24.00	2.45	---	12.46	55.30	1043.4
XSECTION 111	ADDHYD	.48	2	2	.10	.0	4.04	24.00	2.01	---	12.47	91.22	191.6
STRUCTURE 12	RESVOR	.48	2	2	.10	.0	4.04	24.00	1.96	1264.05	15.86	41.26	86.7
STRUCTURE 33	RUNOFF	.04	2	2	.10	.0	4.04	24.00	3.15	---	12.45	65.59	1681.7
STRUCTURE 13	RESVOR	.04	2	2	.10	.0	4.04	24.00	3.15	1261.15	12.66	26.88	689.3
SECTION 112	ADDHYD	.51	2	2	.10	.0	4.04	24.00	2.05	---	12.79	63.10	122.5
STRUCTURE 34	RUNOFF	.04	2	2	.10	.0	4.04	24.00	2.23	---	12.46	51.34	1387.6
STRUCTURE 14	RESVOR	.04	2	2	.10	.0	4.04	24.00	2.23	1261.48	12.72	13.45	363.5
SECTION 113	ADDHYD	.55	2	2	.10	.0	4.04	24.00	2.06	---	12.76	76.50	138.6

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KHE based on Exist. Conditions

ARROWHEAD DRAINAGE MASTER PLAN
DRAINAGE CALCULATIONS

RUNOFF COEFFICIENT

SECTION 19
==========

LAND USE	AREA	AREA	RUNOFF COEFF (CN)	WEIGHTED AVERAGE	WEIGHTED CN
SUB-BASIN 21	22.4 AC	0.035 SM	82		82
SUB-BASIN 22	17.3 AC	0.027 SM	92		92
SUB-BASIN 23	5.8 AC	0.009 SM	86		86
SUB-BASIN 24	3.8 AC	0.006 SM	87		87
SUB-BASIN 25	32.6 AC	0.051 SM	85		85
SUB-BASIN 26	11.5 AC	0.018 SM	84		84
SUB-BASIN 27					
PARK	9.5		79	751	
R-1	69.0		82	5,658	
	78.5 AC			6,409	82
SUB-BASIN 28	28.7 AC	0.045 SM	92		92
SUB-BASIN 29	11.8 AC	0.018 SM	92		92
SUB-BASIN 30	36.1 AC	0.056 SM	84		84
SUB-BASIN 31					
GOLF	11.4		61	695	
R-3	22.5		85	1,913	
	33.9 AC	0.053 SM		2,608	77
SUB-BASIN 32	22.5 AC	0.035 SM	85		85
SUB-BASIN 33	23.9 AC	0.037 SM	82		82
SUB-BASIN 34	24.9 AC	0.039 SM	92		92

CITY OF GLENDALE
RETENTION VOLUME REQUIREMENTS
SECTIONS 18 & 19

SUB-BASIN DESIGNATION	AREA (ACRES)	RUNOFF COEFFICIENT	RETENTION VOLUME (AF)	SQUARE BASIN DIMENSION
32	22.49	85	3.9	240 X 240
34	24.93	92	4.7	260 X 260

RETENTION VOLUME = 7200 (Aa) (C) (I)

WHERE

Aa = AREA IN ACRES

C = COEFF OF RUNOFF

I = RAINFALL INTENSITY (100 YR 2 HR)

USE 1.25 IN/HR

BASIN DIMENSION ASSUMING 3 FT DEPTH WITH 1 FT FREEBOARD

ARROWHEAD DRAINAGE MASTER PLAN
DRAINAGE CALCULATIONS
STAGE DISCHARGE

SECTION 19 SYSTEM II

RESERVOIR/STRUCTURE NO. 5

2' X 1.25' TRASH RACK W/ 1/2" DIA. BARS AT 4" O.C.

ASSUMED Q	TRSH RACK VELOCITY	TRSH RACK LOSSES	PIPE/ORIF. LOSSES	H FT.	W.S. ELEV.	W.S. EL. ACTUAL	ACTUAL Q
2.0	0.90	0.003	0.019	0.022	1269.02		
4.0	1.80	0.013	0.075	0.089	1269.08		
6.0	2.70	0.030	0.170	0.199	1269.19		
8.0	3.60	0.053	0.302	0.355	1269.35		
10.0	4.50	0.082	0.472	0.554	1269.55	1269.50	9.50
12.0	5.40	0.119	0.679	0.798	1269.79		
14.0	6.30	0.161	0.924	1.086	1270.08	1270.00	13.40
16.0	7.20	0.211	1.207	1.418	1270.41	1270.50	16.40
18.0	8.12	0.268	1.536	1.804	1270.80		
20.0	9.02	0.331	1.895	2.226	1271.22	1271.00	19.00

TRASH RACK LOSSES = $(0.262 \times V^2)/(2g)$

PIPE & ORIF LOSSES = $(1.5 \times V^2)/(2g)$

H = SUM OFF LOSSES

W.S. ELEV. = 1269.00 + H

HYDRAULIC CALCULATIONS
DETENTION BASIN VOLUMES
ARROWHEAD RANCH DEVELOPMENT

RATING TABLES

BASIN 7

SURFACE LENGTH= 360 FT
SURFACE WIDTH = 515 FT
SURFACE AREA = 4.3 ACRES

W.S. ELEV	DEPTH FT	VOLUME AF
1,278.0	0.0	0.0
1,278.5	0.5	1.9
1,279.0	1.0	3.9
1,279.5	1.5	5.9
1,280.0	2.0	7.9
1,280.5	2.5	9.9
1,281.0	3.0	12.1

BASIN 8

SURFACE LENGTH= 295 FT
SURFACE WIDTH = 295 FT
SURFACE AREA = 2.0 ACRES

W.S. ELEV	DEPTH FT	VOLUME AF
1,271.0	0.0	0.0
1,271.5	0.5	0.8
1,272.0	1.0	1.7
1,272.5	1.5	2.8
1,273.0	2.0	3.8
1,273.5	2.5	4.9
1,274.0	3.0	6.0

HYDRAULIC CALCULATIONS
DETENTION BASIN VOLUMES
ARROWHEAD RANCH DEVELOPMENT

BASIN 11

SURFACE LENGTH= 235 FT
SURFACE WIDTH = 335 FT
SURFACE AREA = 1.8 ACRES

W.S. ELEV	DEPTH FT	VOLUME AF
1,261.0	0.0	0.0
1,261.5	0.5	0.8
1,262.0	1.0	1.6
1,262.5	1.5	2.4
1,263.0	2.0	3.2
1,263.5	2.5	4.1
1,264.0	3.0	5.0

BASIN 12

SURFACE LENGTH= 240 FT
SURFACE WIDTH = 240 FT
SURFACE AREA = 1.3 ACRES

W.S. ELEV	DEPTH FT	VOLUME AF
1,261.0	0.0	0.0
1,261.5	0.5	0.8
1,262.0	1.0	1.7
1,262.5	1.5	2.6
1,263.0	2.0	3.5
1,263.5	2.5	4.4
1,264.0	3.0	5.4

HYDRAULIC CALCULATIONS
DETENTION BASIN VOLUMES
ARROWHEAD RANCH DEVELOPMENT

BASIN 13

SURFACE LENGTH= 260 FT
SURFACE WIDTH = 260 FT
SURFACE AREA = 1.6 ACRES

W.S. ELEV	DEPTH FT	VOLUME AF
1,258.0	0.0	0.0
1,258.5	0.5	0.4
1,259.0	1.0	0.9
1,259.5	1.5	1.4
1,260.0	2.0	1.9
1,260.5	2.5	2.4
1,261.0	3.0	3.0

```
JOB TR-20            ECON      FULLPRINT            SUMMARY    NOPLOTS
TITLE    1  ARROWHEAD RANCH - SECTION 18 - SYSTEM III
TITLE              RUN 3       (INPUT FILE SEC18_3.DAT)
 5 RAINFL 2                0.020833333
 8            0.000        0.004        0.008        0.013        0.018
 8            0.022        0.026        0.031        0.035        0.040
 8            0.044        0.048        0.053        0.057        0.062
 8            0.066        0.071        0.075        0.080        0.093
 8            0.107        0.120        0.140        0.170        0.500
 8            0.830        0.860        0.880        0.893        0.907
 8            0.920        0.924        0.928        0.933        0.937
 8            0.942        0.947        0.951        0.956        0.960
 8            0.964        0.969        0.973        0.978        0.982
 8            0.987        0.991        0.995        1.000        1.000
 9 ENDTBL
 3 STRUCT       01
 8                         1303.0       0.0          0.0
 8                         1303.5       12.0         1.32
 8                         1304.0       13.5         2.66
 8                         1304.5       15.4         4.05
 8                         1305.0       29.6         5.49
 9 ENDTBL
 3 STRUCT       02
 8                         1289.0       0.0          0.0
 8                         1289.5       6.5          1.20
 8                         1290.0       17.2         2.42
 8                         1290.5       51.0         3.67
 8                         1291.0       118.5        4.95
 9 ENDTBL
 3 STRUCT       03
 8                         1300.0       0.0          0.0
 8                         1300.5       11.32        1.39
 8                         1301.0       18.50        2.81
 8                         1301.5       24.75        4.30
 8                         1302.0       68.41        5.86
 8                         1302.5       175.58       7.44
 8                         1303.0       515.84       9.19
 8                         1303.5       478.47       10.97
 8                         1304.0       662.59       12.81
 9 ENDTBL
 3 STRUCT       04
 8                         1287.0       0.0          0.0
 8                         1287.5       34.65        0.45
 8                         1288.0       79.50        0.90
 8                         1288.5       127.20       1.37
 8                         1289.0       170.70       1.85
 9 ENDTBL
 3 STRUCT       05
 8                         1297.0       0.0          0.0
 8                         1297.5       8.15         0.44
 8                         1298.0       14.50        0.89
 8                         1298.5       28.24        1.38
 8                         1299.0       64.15        1.89
 8                         1299.5       117.14       2.43
 8                         1300.0       178.85       3.00
 8                         1300.5       250.28       3.60
 8                         1301.0       329.60       4.23
 9 ENDTBL
 3 STRUCT       06
 8                         1294.0       0.0          0.0
 8                         1294.5       8.15         0.62
 8                         1295.0       21.60        1.25
 8                         1295.5       59.15        1.90
 8                         1296.0       110.62       2.60
 8                         1296.5       172.74       3.33
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8                                1297.5      323.46      4.88
8                                1298.0      410.25      5.70
9 ENDTBL
3 STRUCT        07
8                                1290.0      0.0         0.0
8                                1290.5      55.37       0.42
8                                1291.0      139.73      0.85
8                                1291.5      246.52      1.32
8                                1292.0      361.01      1.81
8                                1292.5      489.63      2.35
9 ENDTBL
3 STRUCT        08
8                                1277.5      0.0         0.0
8                                1278.0      47.73       3.63
8                                1278.5      149.77      7.31
8                                1279.0      274.47      11.10
8                                1279.5      422.96      14.99
8                                1280.0      590.56      19.00
8                                1280.5      776.30      27.29
9 ENDTBL
3 STRUCT        09
8                                1273.0      0.0         0.0
8                                1273.5      72.24       0.79
8                                1274.0      202.66      1.58
8                                1274.5      372.95      2.41
8                                1275.0      558.36      3.26
9 ENDTBL
3 STRUCT        10
8                                1265.0      0.0         0.0
8                                1265.5      0.0         4.10
8                                1266.0      18.0        6.80
8                                1266.5      36.0        9.60
8                                1267.0      54.0        12.5
8                                1267.5      72.0        15.5
8                                1268.0      105.0       21.6
8                                1268.5      204.4       24.7
8                                1269.0      359.2       28.0
8                                1269.5      539.2       31.2
8                                1270.0      746.9       34.6
9 ENDTBL
6 RUNOFF 1      41       1 0.023        86.         0.167       1 0 0 1 0 1
6 RUNOFF 1      42       2 0.070        80.         0.167       1 0 0 1 0 1
6 ADDHYD 4 101    1 2 3                                         1 0 0 1 0 1
6 RESVOR 2      01 3     1 1303.                                1 0 0 1 0 1
6 RUNOFF 1      43       2 0.007        68.         0.167       1 0 0 1 0 1
6 ADDHYD 4 102    1 2 3                                         1 0 0 1 0 1
6 RUNOFF 1      44       1 0.034        81.         0.167       1 0 0 1 0 1
6 ADDHYD 4 103    1 3 2                                         1 0 0 1 0 1
6 RUNOFF 1      45       1 0.017        92.         0.167       1 0 0 1 0 1
6 RUNOFF 1      46       3 0.057        85.         0.167       1 0 0 1 0 1
6 ADDHYD 4 104    1 3 4                                         1 0 0 1 0 1
6 RESVOR 2      03 4     1 1300.                                1 0 0 1 0 1
6 RUNOFF 1      47       3 0.034        84.         0.167       1 0 0 1 0 1
6 ADDHYD 4 105    1 3 4                                         1 0 0 1 0 1
6 ADDHYD 4 106    2 4 1                                         1 0 0 1 0 1
6 RESVOR 2      02 1     4 1289.                                1 0 0 1 0 1
6 RUNOFF 1      48       2 0.057        83.         0.167       1 0 0 1 0 1
6 ADDHYD 4 107    1 2 4                                         1 0 0 1 0 1
6 RESVOR 2      04 4     3 1285.  1287                          1 0 0 1 0 1
6 ~~ADDHYD 4 108    1 3 2~~                                     1 0 0 1 0 1
6 RUNOFF 1      49       1 0.037        61.         0.167       1 0 0 1 0 1
6 ADDHYD 4 109    1 2 3                                         1 0 0 1 0 1
6 RUNOFF 1      50       2 0.022        84.         0.167       1 0 0 1 0 1
6 ADDHYD 4 110    3 2 1                                         1 0 0 1 0 1
6 RUNOFF 1      52       2 0.010        [illegible]
```

```
6 ADDHYD 4 111    2 3 4                                                  1 0 0 1 0 1
6 RESVOR 2     05 4    2 1297.                                           1 0 0 1 0 1
6 RUNOFF 1     54      3 0.027          92.            0.167            1 0 0 1 0 1
6 RUNOFF 1     55      4 0.020          88.            0.167            1 0 0 1 0 1
6 ADDHYD 4 112    3 4 5                                                  1 0 0 1 0 1
6 ADDHYD 4 113    2 5 3                                                  1 0 0 1 0 1
6 RESVOR 2     06 3    2 1294.                                           1 0 0 1 0 1
6 RUNOFF 1     56      3 0.040          83.            0.167            1 0 0 1 0 1
6 RUNOFF 1     57      4 0.104          82.            0.167            1 0 0 1 0 1
6 ADDHYD 4 114    3 4 5                                                  1 0 0 1 0 1
6 ADDHYD 4 115    2 5 3                                                  1 0 0 1 0 1
6 RESVOR 2     07 3    2 1290.                                           1 0 0 1 0 1
6 RUNOFF 1     58      3-0.006          79.            0.167            1 0 0 1 0 1
6 ADDHYD 4 116    2 3 4                                                  1 0 0 1 0 1
6 RUNOFF 1     51      2 0.128          85.            0.167            1 0 0 1 0 1
6 ADDHYD 4 117    1 2 3                                                  1 0 0 1 0 1
6 ADDHYD 4 118    4 3 1                                                  1 0 0 1 0 1
6 RESVOR 2     08 1    2 1277.                                           1 0 0 1 0 1
6 RESVOR 2     09 2    1 1273.                                           1 0 0 1 0 1
6 RUNOFF 1     60      2 0.032          88.            0.167            1 0 0 1 0 1
6 ADDHYD 4 119    1 2 3                                                  1 0 0 1 0 1
6 RUNOFF 1     59      1 0.055          78.            0.167            1 0 0 1 0 1
6 ADDHYD 4 120    3 1 2                                                  1 0 0 1 0 1
6 RUNOFF 1     61      1 0.037          84.            0.167            1 0 0 1 0 1
6 ADDHYD 4 121    2 1 3                                                  1 0 0 1 0 1
6 RESVOR 2     10 3    1 1265.                                           1 0 0 1 1 1
  ENDATA
7 LIST
7 INCREM 6              0.10
7 COMPUT 7     41     10 0.0            4.04           24.              2 2  24  1
  ENDCMP 1
  ENDJOB 2
```

SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
(A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

ECTION/ TRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION BEGIN (HR)	PRECIPITATION AMOUNT (IN)	PRECIPITATION DURATION (HR)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)
ALTERNATE 24 STORM 10													
RUCTURE 41	RUNOFF	.02	2	2	.10	.0	4.04	24.00	2.58	---	12.46	34.88	1516.7
STRUCTURE 42	RUNOFF	.07	2	2	.10	.0	4.04	24.00	2.07	---	12.46	92.38	1319.7
ECTION 101	ADDHYD	.09	2	2	.10	.0	4.04	24.00	2.20	---	12.46	127.26	1368.3
RUCTURE 1	RESVOR	.09	2	2	.10	.0	4.04	24.00	2.20	1305.32	12.70	38.74	416.6
TRUCTURE 43	RUNOFF	.01	2	2	.10	.0	4.04	24.00	1.23	---	12.47	6.28	897.1
ECTION 102	ADDHYD	.10	2	2	.10	.0	4.04	24.00	2.13	---	12.63	41.67	416.7
RUCTURE 44	RUNOFF	.03	2	2	.10	.0	4.04	24.00	2.15	---	12.46	46.03	1353.8
XSECTION 103	ADDHYD	.13	2	2	.10	.0	4.04	24.00	2.14	---	12.50	82.49	615.6
RUCTURE 45	RUNOFF	.02	2	2	.10	.0	4.04	24.00	3.15	---	12.45	28.59	1681.7
RUCTURE 46	RUNOFF	.06	2	2	.10	.0	4.04	24.00	2.49	---	12.46	84.67	1485.5
ECTION 104	ADDHYD	.07	2	2	.10	.0	4.04	24.00	2.64	---	12.46	113.25	1530.4
UCTURE 3	RESVOR	.07	2	2	.10	.0	4.04	24.00	2.64	1301.91	12.63	60.58	818.6
RUCTURE 47	RUNOFF	.03	2	2	.10	.0	4.04	24.00	2.40	---	12.46	49.42	1453.4
SECTION 105	ADDHYD	.11	2	2	.10	.0	4.04	24.00	2.57	---	12.52	100.22	928.0
CTION 106	ADDHYD	.24	2	2	.10	.0	4.04	24.00	2.33	---	12.51	182.47	754.0
TRUCTURE 2	RESVOR	.24	2	2	.10	.0	4.04	24.00	2.32	1291.18	12.65	142.87	590.4
UCTURE 48	RUNOFF	.06	2	2	.10	.0	4.04	24.00	2.32	---	12.46	80.98	1420.8
CTION 107	ADDHYD	.30	2	2	.10	.0	4.04	24.00	2.32	---	12.53	203.35	680.1
RUCTURE 4	RESVOR	.30	2	2	.10	.0	4.04	24.00	2.32	1289.16	12.63	184.75	617.9
RUCTURE 49	RUNOFF	.04	2	2	.10	.0	4.04	24.00	.83	---	12.48	24.20	654.2
CTION 109	ADDHYD	.34	2	2	.10	.0	4.04	24.00	2.15	---	12.59	200.62	597.1
RUCTURE 50	RUNOFF	.02	2	2	.10	.0	4.04	24.00	2.40	---	12.46	31.98	1453.4
CTION 110	ADDHYD	.36	2	2	.10	.0	4.04	24.00	2.17	---	12.55	224.79	627.9
UCTURE 52	RUNOFF	.01	2	2	.10	.0	4.04	24.00	3.15	---	12.45	16.82	1681.7
TRUCTURE 53	RUNOFF	.03	2	2	.10	.0	4.04	24.00	2.67	---	12.46	46.41	1547.1
TION 111	ADDHYD	.04	2	2	.10	.0	4.04	24.00	2.79	---	12.45	63.23	1580.7
RUCTURE 5	RESVOR	.04	2	2	.10	.0	4.04	24.00	2.79	1298.89	12.51	56.36	1409.1
RUCTURE 54	RUNOFF	.03	2	2	.10	.0	4.04	24.00	3.15	---	12.45	45.41	1681.7
CTURE 55	RUNOFF	.02	2	2	.10	.0	4.04	24.00	2.76	---	12.45	31.53	1576.6
TION 112	ADDHYD	.05	2	2	.10	.0	4.04	24.00	2.99	---	12.45	76.94	1636.9
TION 113	ADDHYD	.09	2	2	.10	.0	4.04	24.00	2.90	---	12.46	132.55	1523.6
CTURE 6	RESVOR	.09	2	2	.10	.0	4.04	24.00	2.89	1296.08	12.54	119.94	1378.6

SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
(A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION BEGIN (HR)	PRECIPITATION AMOUNT (IN)	PRECIPITATION DURATION (HR)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)
ALTERNATE 24 STORM 10													
TRUCTURE 56	RUNOFF	.04	2	2	.10	.0	4.04	24.00	2.32	---	12.46	56.83	1420.8
TRUCTURE 57	RUNOFF	.10	2	2	.10	.0	4.04	24.00	2.24	---	12.46	144.31	1387.6
XSECTION 114	ADDHYD	.14	2	2	.10	.0	4.04	24.00	2.26	---	12.46	201.14	1396.8
SECTION 115	ADDHYD	.23	2	2	.10	.0	4.04	24.00	2.50	---	12.47	317.98	1376.5
TRUCTURE 7	RESVOR	.23	2	2	.10	.0	4.04	24.00	2.50	1291.76	12.49	306.27	1325.8
STRUCTURE 58	RUNOFF	.01	2	2	.10	.0	4.04	24.00	1.99	---	12.46	7.71	1285.2
SECTION 116	ADDHYD	.24	2	2	.10	.0	4.04	24.00	2.49	---	12.49	313.85	1324.3
STRUCTURE 51	RUNOFF	.13	2	2	.10	.0	4.04	24.00	2.49	---	12.46	190.14	1485.5
XSECTION 117	ADDHYD	.49	2	2	.10	.0	4.04	24.00	2.25	---	12.49	406.18	835.8
SECTION 118	ADDHYD	.72	2	2	.10	.0	4.04	24.00	2.33	---	12.49	720.00	995.8
STRUCTURE 8	RESVOR	.72	2	2	.10	.0	4.04	24.00	2.32	1280.39	12.73	409.46	566.3
TRUCTURE 9	RESVOR	.72	2	2	.10	.0	4.04	24.00	2.32	1274.59	12.80	406.83	562.7
TRUCTURE 60	RUNOFF	.03	2	2	.10	.0	4.04	24.00	2.76	---	12.45	50.45	1576.6
XSECTION 119	ADDHYD	.76	2	2	.10	.0	4.04	24.00	2.34	---	12.76	413.51	547.7
TRUCTURE 59	RUNOFF	.05	2	2	.10	.0	4.04	24.00	1.92	---	12.46	68.78	1250.5
SECTION 120	ADDHYD	.81	2	2	.10	.0	4.04	24.00	2.31	---	12.55	463.34	572.0
STRUCTURE 61	RUNOFF	.04	2	2	.10	.0	4.04	24.00	2.40	---	12.46	53.78	1453.4
SECTION 121	ADDHYD	.85	2	2	.10	.0	4.04	24.00	2.31	---	12.52	511.69	604.1
TRUCTURE 10	RESVOR	.85	2	2	.10	.0	4.04	24.00	2.21	1269.45	13.43	319.00	376.6

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Kite based on exist. Conditions

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OB TR-20            ECON      FULLPRINT            SUMMARY    NOPLOTS
ITLE   1  ARROWHEAD RANCH - SECTION 25/26 - SYSTEM VI
ITLE            RUN 6       (INPUT FILE SEC25_6.DAT)
5 RAINFL 2                0.020833333
8          0.000       0.004       0.008       0.013       0.018
8          0.022       0.026       0.031       0.035       0.040
8          0.044       0.048       0.053       0.057       0.062
8          0.066       0.071       0.075       0.080       0.093
8          0.107       0.120       0.140       0.170       0.500
8          0.830       0.860       0.880       0.893       0.907
8          0.920       0.924       0.928       0.933       0.937
8          0.942       0.947       0.951       0.956       0.960
8          0.964       0.969       0.973       0.978       0.982
8          0.987       0.991       0.995       1.000       1.000
9 ENDTBL
3 STRUCT       01          SE          SL          SV
8                          1250.0      0.0         0.0
8                          1250.5      5.4         1.3
8                          1251.0      8.5         2.7
8                          1251.5      10.4        4.1
8                          1252.0      12.0        5.6
8                          1252.5      13.5        7.0
8                          1253.0      14.7        8.5
8                          1253.5      15.9        10.1
8                          1254.0      17.1        11.6
9 ENDTBL
3 STRUCT       02
8                          1242.0      0.0         0.0
8                          1242.5      0.01        1.4
8                          1243.0      0.02        2.9
8                          1243.5      0.03        4.4
8                          1244.0      0.04        5.9
8                          1244.5      0.05        7.4
8                          1245.0      0.06        9.0
8                          1245.5      0.07        10.6
8                          1247.8      0.08        18.5
8                          1248.3      49.0        20.3
8                          1248.8      140.0       22.1
9 ENDTBL
3 STRUCT       03
8                          1236.0      0.0         0.0
8                          1236.5      5.4         2.3
8                          1237.0      8.5         4.6
8                          1237.5      10.4        6.9
8                          1238.0      12.0        9.3
8                          1238.5      13.5        11.7
8                          1239.0      14.7        14.2
9 ENDTB
3 STRUCT       04
8                          1237.0      0.0         0.0
8                          1237.5      7.2         1.7
8                          1237.0      15.1        3.4
8                          1237.5      18.5        5.2
8                          1238.0      21.4        7.0
8                          1238.5      23.9        8.8
8                          1239.0      26.2        10.7
9 ENDTBL
3 STRUCT       05
8                          1230.0      0.0         0.0
8                          1230.5      0.01        1.8
8                          1231.0      0.02        3.7
8                          1231.5      0.03        5.6
8                          1232.0      0.04        7.5
8                          1232.5      0.05        9.4
```

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8                          1233.8        0.08          14.7
8                          1234.3        124.0         16.8
8                          1234.8        350.0         19.0
9 ENDTBL
3 STRUCT        06
8                          1230.0        0.0           0.0
8                          1230.5        7.2           0.5
8                          1231.0        15.1          1.1
8                          1231.5        18.5          1.7
8                          1232.0        21.4          2.3
8                          1232.5        23.9          2.9
8                          1233.0        26.2          3.5
9 ENDTBL
3 STRUCT        07
8                          1229.0        0.0           0.0
8                          1229.5        7.2           1.9
8                          1230.0        15.1          3.8
8                          1230.5        18.5          5.8
8                          1231.0        21.4          7.8
8                          1231.5        23.9          9.8
8                          1232.0        26.2          11.9
9 ENDTBL
3 STRUCT        08
8                          1229.0        0.0           0.0
8                          1229.5        5.4           1.4
8                          1230.0        8.5           2.9
8                          1230.5        10.4          4.4
8                          1231.0        12.0          5.9
8                          1231.5        13.5          7.4
8                          1232.0        14.7          9.0
9 ENDTBL
6 RUNOFF 1     91       1 0.069         88.           0.200         1 0 0 1 0 1
6 RESVOR 2     01 1     2 1250.                                     1 0 0 1 0 1
6 RUNOFF 1     92       3 0.033         84.           0.167         1 0 0 1 0 1
6 ADDHYD 4 101    2 3 1                                              1 0 0 1 0 1
6 RESVOR 2     02 1     2 1242.                                     1 0 0 1 0 1
6 RUNOFF 1     93       1 0.061         71.           0.200         1 0 0 1 0 1
6 ADDHYD 4 102    1 2 3                                              1 0 0 1 0 1
6 RESVOR 2     03 3     1 1236.                                     1 0 0 1 0 1
6 RUNOFF 1     94       2 0.077         76.           0.200         1 0 0 1 0 1
6 ADDHYD 4 103    1 2 3                                              1 0 0 1 0 1
6 RUNOFF 1     95       2 0.068         75.           0.167         1 0 0 1 0 1
6 ADDHYD 4 104    2 3 1                                              1 0 0 1 0 1
6 RUNOFF 1     96       2 0.086         84.           0.300         1 0 0 1 0 1
6 RESVOR 2     04 2     3 1237.                                     1 0 0 1 0 1
6 RUNOFF 1     97       2 0.071         71.           0.800         1 0 0 1 0 1
6 ADDHYD 4 105    2 3 4                                              1 0 0 1 0 1
6 ADDHYD 4 106    1 4 2                                              1 0 0 1 0 1
6 RESVOR 2     05 2     1 1230.                                     1 0 0 1 0 1
6 RUNOFF 1     98       2 0.018         84.           0.167         1 0 0 1 0 1
6 RESVOR 2     06 2     3 1230.                                     1 0 0 1 0 1
6 ADDHYD 4 107    1 3 2                                              1 0 0 1 0 1
6 RUNOFF 1     99       1 0.047         84.           0.167         1 0 0 1 0 1
6 ADDHYD 4 108    1 2 3                                              1 0 0 1 0 1
6 RESVOR 2     07 3     1 1229.                                     1 0 0 1 0 1
6 RUNOFF 1     90       2 0.077         85.           0.300         1 0 0 1 0 1
6 RESVOR 2     08 2     3 1229.                                     1 0 0 1 0 1
6 ADDHYD 4 109    1 3 2                                              1 0 0 1 0 1
  ENDATA
7 LIST
7 INCREM 6                 0.10
7 COMPUT 7     91 109      0.0           4.04          24.           2 2  24  1
  ENDCMP 1
  ENDJOB 2
```

SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
(A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION BEGIN (HR)	PRECIPITATION AMOUNT (IN)	PRECIPITATION DURATION (HR)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)
ALTERNATE 24 STORM 10													
STRUCTURE 91	RUNOFF	.07	2	2	.10	.0	4.04	24.00	2.76	---	12.46	106.97	1550.3
STRUCTURE 1	RESVOR	.07	2	2	.10	.0	4.04	24.00	2.73	1252.49	12.88	13.46	195.1
STRUCTURE 92	RUNOFF	.03	2	2	.10	.0	4.04	24.00	2.40	---	12.46	47.96	1453.4
SECTION 101	ADDHYD	.10	2	2	.10	.0	4.04	24.00	2.62	---	12.46	59.90	587.2
STRUCTURE 2	RESVOR	.10	2	2	.10	.0	4.04	24.00	.02	1246.54	29.90?	.07?	.7
STRUCTURE 93	RUNOFF	.06	2	2	.10	.0	4.04	24.00	1.42	---	12.48	59.45	974.5
SECTION 102	ADDHYD	.16	2	2	.10	.0	4.04	24.00	.54	---	12.48	59.47	364.8
STRUCTURE 3	RESVOR	.16	2	2	.10	.0	4.04	24.00	.51	1236.64	13.01	6.27	38.4
STRUCTURE 94	RUNOFF	.08	2	2	.10	.0	4.04	24.00	1.77	---	12.47	88.62	1151.0
SECTION 103	ADDHYD	.24	2	2	.10	.0	4.04	24.00	.91	---	12.47	93.60	390.0
STRUCTURE 95	RUNOFF	.07	2	2	.10	.0	4.04	24.00	1.69	---	12.46	77.86	1145.0
SECTION 104	ADDHYD	.31	2	2	.10	.0	4.04	24.00	1.09	---	12.47	171.41	556.5
STRUCTURE 96	RUNOFF	.09	2	2	.10	.0	4.04	24.00	2.40	---	12.48	117.05	1361.1
STRUCTURE 4	RESVOR	.09	2	2	.10	.0	4.04	24.00	2.39	1237.99	12.94	21.37	248.5
STRUCTURE 97	RUNOFF	.07	2	2	.10	.0	4.04	24.00	1.42	---	12.74	47.11	663.5
SECTION 105	ADDHYD	.16	2	2	.10	.0	4.04	24.00	1.95	---	12.75	68.13	434.0
SECTION 106	ADDHYD	.47	2	2	.10	.0	4.04	24.00	1.38	---	12.48	226.03	486.1
STRUCTURE 5	RESVOR	.47	2	2	.10	.0	4.04	24.00	.79	1234.01	13.45	52.45	112.8
STRUCTURE 98	RUNOFF	.02	2	2	.10	.0	4.04	24.00	2.40	---	12.46	26.16	1453.4
STRUCTURE 6	RESVOR	.02	2	2	.10	.0	4.04	24.00	2.40	1230.93	12.63	14.04	779.9
SECTION 107	ADDHYD	.48	2	2	.10	.0	4.04	24.00	.85	---	13.42	59.99	124.2
STRUCTURE 99	RUNOFF	.05	2	2	.10	.0	4.04	24.00	2.40	---	12.46	68.31	1453.4
SECTION 108	ADDHYD	.53	2	2	.10	.0	4.04	24.00	.98	---	12.46	81.05	152.9
STRUCTURE 7	RESVOR	.53	2	2	.10	.0	4.04	24.00	.94	1231.56	16.64	24.20	45.7
STRUCTURE 90	RUNOFF	.08	2	2	.10	.0	4.04	24.00	2.49	---	12.48	107.41	1394.9
STRUCTURE 8	RESVOR	.08	2	2	.10	.0	4.04	24.00	2.45	1231.35	13.08	13.05	169.4
SECTION 109	ADDHYD	.61	2	2	.10	.0	4.04	24.00	1.13	---	15.41	35.49	58.5

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ARROWHEAD DRAINAGE MASTER PLAN
DRAINAGE CALCULATIONS

RUNOFF COEFFICIENT

SECTION 25/26

LAND USE	AREA	AREA	RUNOFF COEFF (CN)	WEIGHTED AVERAGE	WEIGHTED CN
SUB-BASIN 91					
SPEC C-2	23.2		88	2,042	
TWN HOUSE	6.4		85	544	
SPEC C-2	14.9		88	1,311	
	44.5 AC	0.070 SM		3,897	88
SUB-BASIN 92	20.8 AC	0.033 SM	84		84
SUB-BASIN 93					
R-1-6	16.8		84	1,411	
GOLF	22.4		61	1,366	
	39.2 AC	0.061 SM		2,778	71
SUB-BASIN 94					
R-1-6	32.7		84	2,747	
GOLF	16.3		61	994	
	49.0 AC	0.077 SM		3,741	76
SUB-BASIN 95					
R-1-6	26.7		84	2,243	
GOLF	16.8		61	1,025	
	43.5 AC	0.068 SM		3,268	75
SUB-BASIN 96	54.9 AC	0.086 SM	84		84

ARROWHEAD DRAINAGE MASTER PLAN
DRAINAGE CALCULATIONS

RUNOFF COEFFICIENT

SECTION 25/26
==========

LAND USE	AREA	AREA	RUNOFF COEFF (CN)	WEIGHTED AVERAGE	WEIGHTED CN
SUB-BASIN 97					
R-1-6	20.2		84	1,697	
GOLF	25.1		61	1,531	
	45.3 AC	0.071 SM		3,228	71
SUB-BASIN 98	11.6 AC	0.018 SM	84		84
SUB-BASIN 99					
R-1-6	20.0		84	1,680	
R-1-6	10.5		84	882	
	30.5 AC	0.048 SM		2,562	84
SUB-BASIN 90					
R-1-6	42.3		84	3,553	
C-2	7.1		92	653	
	49.4 AC	0.077 SM		4,206	85

A 60

CITY OF GLENDALE
RETENTION VOLUME REQUIREMENTS
SECTIONS 25 & 26

SUB-BASIN DESIGNATION	AREA (ACRES)	RUNOFF COEFFICIENT	RETENTION VOLUME (AF)	SQUARE BASIN DIMENSION
90	49.4	85	8.7	350 X 350
91	44.5	88	8.1	340 X 340

RETENTION VOLUME = 7200 (Aa) (C) (I)

WHERE

Aa = AREA IN ACRES

C = COEFF OF RUNOFF

I = RAINFALL INTENSITY (100 YR 2 HR)

USE 1.25 IN/HR

BASIN DIMENSION ASSUMING 3 FT DEPTH WITH 1 FT FREEBOARD

STRUCTURE TABLE
SECTIONS 25/26

SUB-BASIN DESIG	STRUCT NO.	BASIN DIMENSION	ELEVATION	VOLUME
90	8	350	1,229.0	0
			1,229.5	1.42
			1,230.0	2.88
			1,230.5	4.36
			1,231.0	5.88
			1,231.5	7.44
			1,232.0	9.03
			1,232.5	10.65
			1,233.0	12.30

SUB-BASIN DESIG	STRUCT NO.	BASIN DIMENSION	ELEVATION	VOLUME
91	1	340	1,250.0	0
			1,250.5	1.34
			1,251.0	2.72
			1,251.5	4.12
			1,252.0	5.56
			1,252.5	7.03
			1,253.0	8.53
			1,253.5	10.07
			1,254.0	11.64

STRUCTURE TABLE
SECTIONS 25/26

SUB-BASIN DESIG	STRUCT NO.	LAKE AREA	LAKE DIMENSION	ELEVATION	VOLUME
	2	2.8	349	1,242.0	0
				1,242.5	1.42
				1,243.0	2.86
				1,243.5	4.35
				1,244.0	5.86
				1,244.5	7.41
				1,245.0	8.99
				1,245.5	10.60
				1,246.0	12.25
				1,247.8	18.47
				1,248.3	20.28
				1,248.8	22.12

SUB-BASIN DESIG	STRUCT NO.	LAKE AREA	LAKE DIMENSION	ELEVATION	VOLUME
	3	4.48	442	1,236.0	0
				1,236.5	2.26
				1,237.0	4.56
				1,237.5	6.90
				1,238.0	9.29
				1,238.5	11.71
				1,239.0	14.18
				1,239.5	16.69
				1,240.0	19.24

SUB-BASIN DESIG	STRUCT NO.	LAKE AREA	LAKE DIMENSION	ELEVATION	VOLUME
	4	3.35	382	1,237.0	0
				1,237.5	1.69
				1,238.0	3.42
				1,238.5	5.18
				1,239.0	6.98
				1,239.5	8.82
				1,240.0	10.69
				1,240.5	12.60
				1,241.0	14.55

SUB-BASIN DESIG	STRUCT NO.	LAKE AREA	LAKE DIMENSION	ELEVATION	VOLUME
	5	3.59	395	1,230.0	0
				1,230.5	1.81
				1,231.0	3.66
				1,231.5	5.55
				1,232.0	7.47
				1,232.5	9.43
				1,233.0	11.43
				1,233.5	13.47
				1,233.8	14.71
				1,234.3	16.81
				1,234.8	18.95

SUB-BASIN DESIG	STRUCT NO.	LAKE AREA	LAKE DIMENSION	ELEVATION	VOLUME
	6	1.05	214	1,230.0	0
				1,230.5	0.53
				1,231.0	1.09
				1,231.5	1.66
				1,232.0	2.26
				1,232.5	2.88
				1,233.0	3.51
				1,233.5	4.17
				1,234.0	4.85

SUB-BASIN DESIG	STRUCT NO.	LAKE AREA	LAKE DIMENSION	ELEVATION	VOLUME
	7	3.74	404	1,229.0	0
				1,229.5	1.89
				1,230.0	3.81
				1,230.5	5.78
				1,231.0	7.78
				1,231.5	9.82
				1,232.0	11.90
				1,232.5	14.01
				1,233.0	16.17

HAVE ASSUMED LAKES TO BE SQUARE FOR VOLUMES

THE

ARROWHEAD RANCH

DRAINAGE SCHEMATIC

APRIL 1992

EXHIBIT I

DIBBLE & ASSOCIATES
CONSULTING ENGINEERS
PHOENIX - ARIZONA

LEGEND

45	DRAINAGE AREA NUMBER (STRUCTURE)
8	RESERVOIR (LAKE) W/STRUCTURE NUMBER
105	CROSS-SECTION NUMBER
10	DETENTION BASIN

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