Leonard F. Gostinski, P.E., R.L.S.
President

ASSOCIATES:
Bradford C. Gordon .....R.L.S.
Richard J. Hayes .....R.L.S.

WILEY & ASSOCIATES, INC.
SURVEYORS · ENGINEERS

TONTO VERDE MASTER DRAINAGE PLAN -- 1992

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Preliminary Drainage Report

July 1992

TONTO VERDE MASTER PLAN

JOB NO.3875A

Registered Professional Engineer (Civil)
CERTIFICATE NO.
6566
LEONARD
GOSTINSKI
Date Signed 7.15.92
ARIZONA, U.S.A.

Prepared by:

WILEY & ASSOCIATES INC.
Surveyors and Engineers
3200 North Hayden Road, Suite 130
Scottsdale, Arizona 85251
Telephone (602) 947-7507

Introduction

This report presents the results of a reconnaissance survey, performed by our firm, of a large area and the drainage patterns contained therein. We have identified the problems that will arise in development related to potential runoff in this watershed area and also will make recommendations pertinent to the planning and construction, based on our findings.

Field Reconnaissance

The area to be developed is located in Section 36, T.5N., R.6E., and Section 31, T.5N., R.7E., G&SRB&M, which lies between Pinnacle Peak and the Verde River in Maricopa County, Arizona.

The total area is relatively flat to rolling, except in washes, sloping from west to east at a grade of approximately two and one-half (2-1/2) percent. This area has a moderate growth of creosote bushes, palo verde, cacti and mesquite. The washes have fairly well defined channels, except where construction of fairways for golf courses have intercepted.

The site is covered by quartenary alluvium throughout the area. This portion of the project has two main drainage patterns traversing the area from west to east.

The source of the major portion of the alluvium over the site is the north end of the McDowell Mountains. On the ridges, the soil consists of clayey, silty, sand, and gravels (mostly decomposed granite). The material in the washes is silty sand, gravel, and small boulders.

The washes traversing the area will have the major part of their drainage areas lying to the west of this project.

The southern wash that contributes to the major flow into the subdivision enters the project from the west. At a point approximately three and one- half (3-1/2) miles outside the west boundary, one channel is separating to form two channels.

From visual observation and judging from the size of the two stream beds, it is our opinion that the flow will be divided 70% to the north and 30% to the south, into each of the branched streams.

There are other major washes traversing the project with the same drainage patterns and all are flowing nearly parallel to each other.

Some of the major washes flow into fairways and are in a definite channel where they enter the fairways. They also flow out of the golf course into natural channels.

In the southeastern portion of the project the channels are well-defined.

In general, the drainage into the fairways does not pose any problem from the standpoint of potential flood hazard, assuming the major runoff is diverted as shown on the Drainage Master Plan.

The lakes shown on the plan will accept some local runoff but should not be allowed to overflow. It is recommended that the lakes be cleaned periodically.

It is noted on the attached areal map outlining the breakdown of the drainage areas, that the portion of area "BB" which lies North of Rio Verde Drive will be eliminated from the overall runoff analysis. This is due to the fact that the original study was prepared prior to the construction of the present day Rio Verde Drive.

A physical inspection was conducted and it was determined that this condition does exist, which relieves the Tonto Verde and Tonto Vista proposed developments free of a great amount of runoff.

The client for Tonto Verde indicated that a diversion will be constructed on the north side of Rio Verde Drive and a portion of the channel will be relocated. This discharging into the Verde River. This will be pending County Highway Approval

The developer of Tonto Verde will apply for a waiver of Retention/Detention Requirements.

Assumptions and Procedures:

Preliminary drainage design for Tonto Verde Master Plan has been calculated for a 100 year storm.

The washes traversing the area all have the major part of their drainage area lying to the west of the project.

All drainage is contributed by washes originating directly west of the subdivision. Storm runoff was calculated by incorporating the pertinent parameters of the report in conjunction with Soil Conservation Service Isopluvial maps for 100 year storms of 6 and 24 hour duration.

Runoff coefficients used were weighted based on proposed land uses. More detailed coefficients will be established when the final design and detailed drainage study is prepared.

The Tonto Verde Master Plan has been enlarged from the original Master Plan dated 1974. Although the drainage patterns for this area have not changed, the runoff criteria has. This report reflects the changes in precipitation data and latest Maricopa County Flood District guidelines for drainage reports.

The drainage areas shown on Map #1 are extensions of the "Rio Verde Master Plan Drainage Study" dated 1974. The areas have been combined to give values for selected discharge points.

The basic runoff analysis begins with off-site flows originating west of the development and being directed easterly. The first drainage point being on the west boundary of "Verde River," a planned community that adjoins Tonto Verde on the West. "Verde River is undeveloped at this time, with the exception of eleven lakes. these lakes do not interrupt or intercept pre-development drainage patterns.

To develop discharge rates from "Verde River" onto Tonto Verde, two major assumptions were made:

1. Subsequent "Verde River" Master Drainage plans and development densities will have no major deviations from the existing plan (on file with Maricopa Flood Control District).
2. "Verde River" has filed for a waiver of retention/detention. We have assumed this condition in our design criteria..

These assumptions are made to ensure adequately engineered systems for storm water conveyance through Tonto Verde. Runoff from these developments will discharge into the Verde River (via Tonto National Forest and the Rio Verde Homestead) which is approximately 3000 feet to the east of the east boundary of Tonto Verde.

Criteria:

Due to the size of the watershed, the four large drainage areas will be analyzed for the 100 year 6 hour and 24 hour duration storms using the HEC-1 program. The Rational Method is used on the small drainage areas showing the 1 hour and 2 hour 100 year event (see summary) table page.

In an effort to reduce the volume of this report, a summary sheet is provided for the data input for each drainage area. Copies of the worksheets, tables and graphs used to determined the input are available from Wiley & Associates upon request.

Kb

The roughness coefficient for the watershed was determined using table 5.5, page 66 of the Hydraulic Design manual for Maricopa County (HDM). Natural desert conditions for pre-development areas were considered "Hillslopes, Alluvial Fan Areas". Post-development and existing development areas were considered "Urban" areas.

IA

Surface retention loss was determined using table 4.1, page 42 (HDM). Natural desert conditions for pre-development areas were considered "Hillslopes, Sonoran Desert (.15). Post development and existing development were weighted as follows:

Developed areas-

imperious area	25% @ .05	=.01
desert landscape	75% @ .10	=.08
developed areas		=.09

Target golf course-

60% hillside, Sonoran desert	@ .15	=.09
40% Lawn and Turf	@ .20	=.08
Target golf course		=.17

XKSAT

The Hydraulic conductivity at natural saturation was determined by weighing the XKSAT values of the soil types as provided by the "Soil Survey of Aguila-Carefree Area" study prepared by the United States Department of Agriculture, Soil Conservation Service in 1981 (see map #2)

DTHETA, PSIF

The volumetric moisture deficit and the wetting front capillary suction were determined by linear interpolation using the XKSAT values and table 4.2, page 46 (HDM).

RTIMP

The percent of the drainage basin that is impervious was considered "0" for pre-developed areas and weighed as 25% of the developed areas(excluding golf courses). This percentage is based on the City of Phoenix criteria for zoning Rt-18 which corresponds with the average developed lot sizes in Rio Verde in the last 5 years.

Precipitation Summary Table

Return Period	6 hour	24 hour	1 hour
2	1.53	1.77	1.24
5	1.90	2.40	1.41
10	2.20	2.83	1.62
25	2.60	3.38	1.90
50	3.00	3.88	2.21
100	3.35	4.39	2.42
100yr/2hr			1.74
100yr/5 min			.82
100yr/15 min			1.50
100yr/3 hr			2.95
100yr/12 hr			3.88

Rational Method

Drainage areas AB,AC,and CC are small drainage areas under 160 acres in size. Pre and post development conditions will be analyzed for the 100 year/1hour and the 100 year, 2 hour events.

"C" Factor Calculation

Target for golf course:

40%	lawns	.20	=	.08
60%	desert	.32	=	.19
				.27

Developed areas

impervious	25%	.90	=	.23
desert landscape	75%	.45	=	.34
				.57

Drainage Area Calculations

HEC-1 data will include: Routing diagram
Input sheet
Runoff summary

Each drainage area will include: Pre-devel. 6hr.
Pre-devel. 24hr.
Post-devel. 6hr.
Post-devel. 24hr.

A 5 and 1/4" floppy disk will be provided containing the data files.

Refer to Maps 1 and 3 for drainage area locations.

Computer Disk Index Data Files

6 hr Pre-development, Area L	PRL6. DAT
6 hr Post-development,Area L	PRL6. DAT
24hr Pre-development, Area L	PRL24 DAT
24hr Post-Development,Area L	PRL24.DAT
6 hr Pre-Development, Area N	PRN6. DAT
6 hr Post-Development,Area N	PON6. DAT
24hr Pre-Development, Area N	PRN24 DAT
24hr Post-Develoment, Area N	PON24 DAT
6 hr Pre-Development, Area S	PRES DAT
6 hr Post-Development,Area S	POSTS DAT
24hr Pre-Development, Area S	PRS24 DAT
24hr Post-Development,Area S	POS24 DAT
6 hr Pre-Development, Area Y	PRY6 DAT
6 hr Post-Development,Area Y	POY6 DAT
24hr Pre-Development, Area Y	PRY24 DAT
24hr Post-Development,Area Y	POY24 DAT

Drainage Areas M, L, O, P, Q, & R

These areas have been combined to obtain values at selected discharge points in the development. The runoff for this area originates approximately 8 miles West of this project at the Crest of the McDowell Mountains. Drainage area "M" collects the runoff and it is directed to the East. The runoff in area "M" splits with 70% of the runoff being diverted to drainage area "N" and 30% being directed to drainage area "L." Drainage area "L" directs the runoff Easterly to be collected in a developed channel that begins on the West boundary of the Rio Verde Community. Drainage area "L1" conveys the runoff from area "L" through the developed community through golf course fairways and developed channels. Drainage areas O, P & Q also discharge into Area "L1" through developed channels. The collective runoff for these areas is directed to a channel on the North boundary of Rio Verde Unit 12. Drainage area"R1" is collected at this point (see Map 3). The runoff continues Easterly through drainage area"R2" to Forest Road. Runoff continues through drainage area "R3" to the East boundary of Tonto Verde and discharges into the Tonto National Forest.

This drainage area is designated as Wash 10 of FIRM Map number 040013C1300D, revised to reflect LOMR dated May 24, 1989.

Presently, the runoff for this area crosses Forest Road in a ford. It is the intention of the developer to provide a structure to convey all storm water beneath the road. This structure will also be used as an underpass for golf carts, pedestrians and golf course vehicles.

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

  1         ID      DRAINAGE AREA L
  2         ID      PRE-DEVELOPMENT
  3         ID      6 HOUR
            *DIAGRAM
  4         IT       5                   200
  5         IO       5

  6         KK      M
  7         KM      SUB-BASIN M
  8         BA   5.263
  9         IN      15
 10         PB   3.174
 11         PC    .000    .013    .018    .028    .043    .055    .066    .078    .090    .102
 12         PC    .116    .132    .154    .199    .284    .464    .679    .812    .880    .922
 13         PC    .948    .961    .974    .987   1.000
 14         LG    .150    .350   6.000    .170    .000
 15         UC   1.450   1.052
 16         UA       0       3       5       8      12      20      43      75      90      96
 17         UA     100

 18         KK      D1
 19         KM      DIVERSION D1
 20         DT      D1
 21         DI       0     636    1272    1908    2544
 22         DQ       0     445     890    1336    1781

 23         KK      RO
 24         KM      ROUTE1
 25         RS     750    FLOW      -1
 26         RC     .04    .033     .04   29570    .021
 27         RX       0      45      90      97     104     110     155     200
 28         RY     100      95      90      90      90      90      95     100

 29         KK      L
 30         KM      SUB-BASIN L
 31         BA   2.597
 32         LG    .150    .300   8.100    .080    .000
 33         UC   1.417   1.254
 34         UA       0       3       5       8      12      20      43      75      90      96
 35         UA     100

 36         KK      C1
 37         KM      COMBINE L & D1
 38         HC       2

 39         KK      OP
 40         KM      SUB-BASIN OPQ
 41         BA    .117
 42         LG    .150    .390   6.300    .160    .000
 43         UC    .650    .586
 44         UA       0       3       5       8      12      20      43      75      90      96
 45         UA     100
```

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

  46          KK     C2
  47          KM     COMBINE OPQ&L
  48          HC      2

  49          KK     RT
  50          KM     ROUTE 2
  51          RS     80    FLOW     -1
  52          RC    .04    .033    .04   3700    .026
  53          RX      0      45     90     97     104    110    155    200
  54          RY    100      95     90     90      90     90     95    100

  55          KK     L1
  56          KM     SUB-BASIN L1
  57          BA   .090
  58          LG   .110    .350   7.500   .100    .190
  59          UC   .683    .646
  60          UA      0       5     16     30      65     77     84     90     94     97
  61          UA    100

  62          KK     C3
  63          KM     COMBINE AT L1
  64          HC      2

  65          KK      R
  66          KM     SUB-BASIN R
  67          BA   .034
  68          LG    .15    .350   7.500   .100       0
  69          UC   .383    .587
  70          UA      0       3      5      8      12     20     43     75     90     96
  71          UA    100

  72          KK     RH
  73          KM     ROUTE 3
  74          RS     84    FLOW     -1
  75          RC    .04    .033    .04   3220    .022
  76          RX      0      45     90     97     104    110    155    200
  77          RY    100      95     90     90      90     90     95    100

  78          KK     R1
  79          KM     SUB-BASIN R1
  80          BA   .073
  81          LG   .150    .350   7.500   .100    .000
  82          UC   .500    .591
  83          UA      0       3      5      8      12     20     43     75     90     96
  84          UA    100

  85          KK     C4
  86          KM     COMBINE R & R1
  87          HC      2
```

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

  88          KK     C8
  89          KM     COMBINE R & L
  90          HC      2

  91          KK     RF
  92          KM     ROUTE 4
  93          RS     18    FLOW     -1
  94          RC    .04    .033    .04    680    .021
  95          RX      0      45     90     97     104    110    155    200
  96          RY    100      95     90     90      90     90     95    100

  97          KK     R2
  98          KM     SUB-BASIN R2
  99          BA    .013
 100          LG    .150    .350  3.900   .330    .000
 101          UC    .250    .188
 102          UA      0       3      5      8      12     20     43     75     90     96
 103          UA    100

 104          KK     C5
 105          KM     COMBINE R2
 106          HC      2

 107          KK     RS
 108          KM     ROUTE 5
 109          RS     53    FLOW     -1
 110          RC    .04    .033    .04   2000    .022
 111          RX      0      45     90     97     104    110    155    200
 112          RY    100      95     90     90      90     90     95    100

 113          KK     R3
 114          KM     SUB-BASIN R3
 115          BA    .011
 116          LG    .150    .390  5.700   .180    .000
 117          UC    .517   1.117
 118          UA      0       3      5      8      12     20     43     75     90     96
 119          UA    100

 120          KK     C6
 121          KM     COMBINE R3
 122          HC      2
 123          ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

```
INPUT
 LINE     (V) ROUTING          (—)) DIVERSION OR PUMP FLOW

 NO.      (.) CONNECTOR        ((—) RETURN OF DIVERTED OR PUMPED FLOW

  6        M
           .
           .
 22        .———)      D1
 20       D1
           V
           V
 25       RO
           .
           .
 31        .         L
           .          .
           .          .
 38       C1............
           .
           .
 41        .         OP
           .          .
           .          .
 48       C2............
           V
           V
 51       RT
           .
           .
 57        .         L1
           .          .
           .          .
 64       C3............
           .
           .
 67        .          R
           .          V
           .          V
 74        .         RH
           .          .
           .          .
 80        .          .         R1
           .          .          .
           .          .          .
 87        .         C4............
           .          .
           .          .
 90       C8............
           V
           V
 93       RF
           .
           .
 99        .         R2
           .          .
           .          .
106       C5............
           V
           V
109       RS
           .
           .
115        .         R3
           .          .
           .          .
122       C6............
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

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	M	2585.	5.17	806.	293.	293.	5.26		
DIVERSION TO	D1	1809.	5.17	564.	205.	205.	5.26		
HYDROGRAPH AT	D1	775.	5.17	242.	88.	88.	5.26		
ROUTED TO	RO	842.	5.83	241.	88.	88.	5.26	92.34	5.83
HYDROGRAPH AT	L	1372.	5.17	491.	181.	181.	2.60		
2 COMBINED AT	C1	1954.	5.58	723.	269.	269.	7.86		
HYDROGRAPH AT	OP	84.	4.50	18.	6.	6.	.12		
2 COMBINED AT	C2	1976.	5.58	740.	275.	275.	7.98		
ROUTED TO	RT	2003.	5.75	740.	275.	275.	7.98	93.39	5.75
HYDROGRAPH AT	L1	69.	4.42	16.	6.	6.	.09		
2 COMBINED AT	C3	2017.	5.75	754.	281.	281.	8.07		
HYDROGRAPH AT	R	28.	4.33	6.	2.	2.	.03		
ROUTED TO	RH	28.	4.58	6.	2.	2.	.03	90.29	4.58
HYDROGRAPH AT	R1	60.	4.42	13.	5.	5.	.07		
2 COMBINED AT	C4	87.	4.50	19.	7.	7.	.11		
2 COMBINED AT	C8	2035.	5.75	772.	288.	288.	8.17		
ROUTED TO	RF	2062.	5.75	772.	288.	288.	8.17	93.62	5.75
HYDROGRAPH AT	R2	13.	4.17	2.	1.	1.	.01		
2 COMBINED AT	C5	2062.	5.75	773.	288.	288.	8.19		
ROUTED TO	RS	2018.	5.75	773.	288.	288.	8.19	93.54	5.75
HYDROGRAPH AT	R3	5.	4.58	2.	1.	1.	.01		
2 COMBINED AT	C6	2020.	5.75	775.	289.	289.	8.20		

*** NORMAL END OF HEC-1 ***

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

  1           ID      DRAINAGE AREA L
  2           ID      POST-DEVELOPMENT
  3           ID      6 HOUR
              *DIAGRAM
  4           IT       5                    200
  5           IO       5

  6           KK      M
  7           KM      SUB-BASIN M
  8           BA   5.263
  9           IN      15
 10           PB   3.171
 11           PC    .000    .013    .018    .028    .043    .055    .067    .078    .091    .103
 12           PC    .117    .133    .154    .200    .285    .464    .679    .811    .880    .922
 13           PC    .947    .961    .974    .987   1.000
 14           LG    .150    .350   6.000    .170    .000
 15           UC   1.467    .952
 16           UA       0       3       5       8      12      20      43      75      90      96
 17           UA     100

 18           KK      D1
 19           KM      DIVERSION D1
 20           DT      D1
 21           DI       0     636    1272    1908    2544
 22           DQ       0     445     890    1336    1781

 23           KK      RO
 24           KM      ROUTE1
 25           RS     750    FLOW      -1
 26           RC     .04    .033     .04   29570    .021
 27           RX       0      45      90      97     104     110     155     200
 28           RY     100      95      90      90      90      90      95     100

 29           KK      L
 30           KM      SUB-BASIN L
 31           BA   2.597
 32           LG    .150    .300   8.100    .080    .000
 33           UC   1.417   1.254
 34           UA       0       3       5       8      12      20      43      75      90      96
 35           UA     100

 36           KK      C1
 37           KM      COMBINE L & D1
 38           HC       2

 39           KK      OP
 40           KM      SUB-BASIN OPQ
 41           BA    .117
 42           LG    .170    .390   6.300    .160    .180
 43           UC    .283    .233
 44           UA       0       5      16      30      65      77      84      90      94      97
 45           UA     100
```

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

  46          KK     C2
  47          KM     COMBINE OPQ&L
  48          HC      2

  49          KK     RT
  50          KM     ROUTE 2
  51          RS     80    FLOW     -1
  52          RC    .04    .033    .04    3700    .026
  53          RX      0      45     90      97     104     110     155     200
  54          RY    100      95     90      90      90      90      95     100

  55          KK     L1
  56          KM     SUB-BASIN L1
  57          BA   .090
  58          LG   .110    .350   7.500    .100    .190
  59          UC   .300    .259
  60          UA      0       5     16      30      65      77      84      90      94      97
  61          UA    100

  62          KK     C3
  63          KM     COMBINE AT L1
  64          HC      2

  65          KK      R
  66          KM     SUB-BASIN R
  67          BA   .100
  68          LG    .12    .350   7.500    .100    .180
  69          UC   .300    .278
  70          UA      0       5     16      30      65      77      84      90      94      97
  71          UA    100

  72          KK     RH
  73          KM     ROUTE 3
  74          RS     84    FLOW     -1
  75          RC    .04    .033    .04    3220    .022
  76          RX      0      45     90      97     104     110     155     200
  77          RY    100      95     90      90      90      90      95     100

  78          KK     R1
  79          KM     SUB-BASIN R1
  80          BA   .097
  81          LG   .130    .350   7.500    .100    .170
  82          UC   .283    .241
  83          UA      0       5     16      30      65      77      84      90      94      97
  84          UA    100

  85          KK     C4
  86          KM     COMBINE R & R1
  87          HC      2
```

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

  88          KK     C8
  89          KM     COMBINE R & L
  90          HC      2

  91          KK     RF
  92          KM     ROUTE 4
  93          RS     18    FLOW     -1
  94          RC    .04    .033    .04    680    .021
  95          RX      0      45     90     97     104    110    155    200
  96          RY    100      95     90     90      90     90     95    100

  97          KK     R2
  98          KM     SUB-BASIN R2
  99          BA    .024
 100          LG    .130   .350   3.900   .330   .130
 101          UC    .117   .056
 102          UA      0       5     16     30     65     77     84     90     94     97
 103          UA    100

 104          KK     C5
 105          KM     COMBINE R2
 106          HC      2

 107          KK     RS
 108          KM     ROUTE 5
 109          RS     53    FLOW     -1
 110          RC    .04    .033    .04   2000    .022
 111          RX      0      45     90     97     104    110    155    200
 112          RY    100      95     90     90      90     90     95    100

 113          KK     R3
 114          KM     SUB-BASIN R3
 115          BA    .048
 116          LG    .120   .390   5.700   .180   .150
 117          UC    .200   .168
 118          UA      0       5     16     30     65     77     84     90     94     97
 119          UA    100

 120          KK     C6
 121          KM     COMBINE R3
 122          HC      2
 123          ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

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

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

  6         M
            .
            .
 20         .-------)      D1
 18        D1
            V
            V
 23        RO
            .
            .
 29         .          L
            .           .
            .           .
 36        C1............
            .
            .
 39         .          OP
            .           .
            .           .
 46        C2............
            V
            V
 49        RT
            .
            .
 55         .          L1
            .           .
            .           .
 62        C3............
            .
            .
 65         .           R
            .           V
            .           V
 72         .          RH
            .           .
            .           .
 78         .           .          R1
            .           .           .
            .           .           .
 85         .          C4............
            .           .
            .           .
 88        C8............
            V
            V
 91        RF
            .
            .
 97         .          R2
            .           .
            .           .
104        C5............
            V
            V
107        RS
            .
            .
113         .          R3
            .           .
            .           .
120        C6............
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

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	M	2721.	5.17	806.	292.	292.	5.26		
DIVERSION TO	D1	1905.	5.17	564.	205.	205.	5.26		
HYDROGRAPH AT	D1	816.	5.17	242.	88.	88.	5.26		
ROUTED TO	RO	919.	5.83	241.	88.	88.	5.26	92.44	5.83
HYDROGRAPH AT	L	1367.	5.17	490.	180.	180.	2.60		
2 COMBINED AT	C1	2031.	5.58	723.	268.	268.	7.86		
HYDROGRAPH AT	OP	126.	4.08	17.	6.	6.	.12		
2 COMBINED AT	C2	2031.	5.58	738.	274.	274.	7.98		
ROUTED TO	RT	1990.	5.75	738.	274.	274.	7.98	93.38	5.75
HYDROGRAPH AT	L1	104.	4.08	16.	6.	6.	.09		
2 COMBINED AT	C3	1991.	5.75	751.	280.	280.	8.07		
HYDROGRAPH AT	R	112.	4.17	18.	6.	6.	.10		
ROUTED TO	RH	117.	4.25	18.	6.	6.	.10	90.79	4.25
HYDROGRAPH AT	R1	114.	4.08	17.	6.	6.	.10		
2 COMBINED AT	C4	222.	4.25	35.	13.	13.	.20		
2 COMBINED AT	C8	1994.	5.75	784.	293.	293.	8.26		
ROUTED TO	RF	2038.	5.75	784.	293.	293.	8.26	93.60	5.75
HYDROGRAPH AT	R2	30.	4.00	3.	1.	1.	.02		
2 COMBINED AT	C5	2038.	5.75	787.	294.	294.	8.29		
ROUTED TO	RS	2032.	5.75	787.	294.	294.	8.29	93.55	5.75
HYDROGRAPH AT	R3	56.	4.00	7.	3.	3.	.05		
2 COMBINED AT	C6	2032.	5.75	793.	296.	296.	8.34		

*** NORMAL END OF HEC-1 ***

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

  1           ID      DRAINAGE AREA L
  2           ID      PRE-DEVELOPMENT
  3           ID      24 HOUR
              *DIAGRAM
  4           IT       5                    200
  5           ID       5

  6           KK      M
  7           KM      SUB-BASIN M
  8           BA   5.263
  9           IN      30
 10           PB   4.302
 11           PC    .000    .005    .011    .016    .022    .028    .035    .041    .048    .056
 12           PC    .068    .071    .080    .089    .098    .109    .120    .133    .147    .163
 13           PC    .181    .204    .235    .283    .663    .735    .772    .799    .820    .838
 14           PC    .854    .868    .880    .891    .902    .912    .921    .929    .937    .945
 15           PC    .952    .959    .965    .972    .978    .984    .989    .995   1.000
 16           LG    .150    .350   6.000    .170    .000
 17           UC   1.483    .964
 18           UA       0       3       5       8      12      20      43      75      90      96
 19           UA     100

 20           KK      D1
 21           KM      DIVERSION D1
 22           DT      D1
 23           DI       0     636    1272    1908    2544
 24           DQ       0     445     890    1336    1781

 25           KK      RO
 26           KM      ROUTE1
 27           RS     750    FLOW      -1
 28           RC     .04    .033     .04   29570    .021
 29           RX       0      45      90      97     104     110     155     200
 30           RY     100      95      90      90      90      90      95     100

 31           KK      L
 32           KM      SUB-BASIN L
 33           BA   2.597
 34           LG    .150    .300   8.100    .080    .000
 35           UC   1.467   1.304
 36           UA       0       3       5       8      12      20      43      75      90      96
 37           UA     100

 38           KK      C1
 39           KM      COMBINE L & D1
 40           HC       2

 41           KK      OP
 42           KM      SUB-BASIN OPQ
 43           BA    .117
 44           LG    .150    .390   6.300    .160    .000
 45           UC    .533    .471
 46           UA       0       3       5       8      12      20      43      75      90      96
 47           UA     100
```

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

 48           KK     C2
 49           KM     COMBINE OPQ&L
 50           HC      2

 51           KK     RT
 52           KM     ROUTE 2
 53           RS     80    FLOW     -1
 54           RC    .04    .033    .04    3700    .026
 55           RX      0      45     90      97     104     110     155     200
 56           RY    100      95     90      90      90      90      95     100

 57           KK     L1
 58           KM     SUB-BASIN L1
 59           BA   .090
 60           LG   .110    .350   7.500    .100    .190
 61           UC   .550    .508
 62           UA      0       5      16      30      65      77      84      90      94      97
 63           UA    100

 64           KK     C3
 65           KM     COMBINE AT L1
 66           HC      2

 67           KK      R
 68           KM     SUB-BASIN R
 69           BA   .034
 70           LG    .15    .350   7.500    .100       0
 71           UC   .533    .846
 72           UA      0       3       5       8      12      20      43      75      90      96
 73           UA    100

 74           KK     RH
 75           KM     ROUTE 3
 76           RS     84    FLOW     -1
 77           RC    .04    .033    .04    3220    .022
 78           RX      0      45     90      97     104     110     155     200
 79           RY    100      95     90      90      90      90      95     100

 80           KK     R1
 81           KM     SUB-BASIN R1
 82           BA   .061
 83           LG   .150    .350   7.500    .100    .000
 84           UC   .550    .657
 85           UA      0       3       5       8      12      20      43      75      90      96
 86           UA    100

 87           KK     C4
 88           KM     COMBINE R & R1
 89           HC      2
```

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

  90          KK     C8
  91          KM     COMBINE R & L
  92          HC      2

  93          KK     RF
  94          KM     ROUTE 4
  95          RS     18    FLOW     -1
  96          RC    .04    .033    .04    680    .021
  97          RX      0      45     90     97     104    110    155    200
  98          RY    100      95     90     90      90     90     95    100

  99          KK     R2
 100          KM     SUB-BASIN R2
 101          BA    .013
 102          LG    .150    .350  3.900   .330    .000
 103          UC    .183    .133
 104          UA      0       3      5      8     12     20     43     75     90     96
 105          UA    100

 106          KK     C5
 107          KM     COMBINE R2
 108          HC      2

 109          KK     RS
 110          KM     ROUTE 5
 111          RS     53    FLOW     -1
 112          RC    .04    .033    .04   2000    .022
 113          RX      0      45     90     97     104    110    155    200
 114          RY    100      95     90     90      90     90     95    100

 115          KK     R3
 116          KM     SUB-BASIN R3
 117          BA    .011
 118          LG    .150    .390  5.700   .180    .000
 119          UC    .417    .879
 120          UA      0       3      5      8     12     20     43     75     90     96
 121          UA    100

 122          KK     C6
 123          KM     COMBINE R3
 124          HC      2
 125          ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

```
INPUT
 LINE      (V) ROUTING          (—)) DIVERSION OR PUMP FLOW

 NO.       (.) CONNECTOR        ((—) RETURN OF DIVERTED OR PUMPED FLOW

  6          M
             .
             .
 22          .———)      D1
 20         D1
             V
             V
 25         RO
             .
             .
 31          .         L
             .          .
             .          .
 38         C1............
             .
             .
 41          .         OP
             .          .
             .          .
 48         C2............
             V
             V
 51         RT
             .
             .
 57          .         L1
             .          .
             .          .
 64         C3............
             .
             .
 67          .          R
             .          V
             .          V
 74          .         RH
             .          .
             .          .
 80          .          .         R1
             .          .          .
             .          .          .
 87          .         C4............
             .          .
             .          .
 90         C8............
             V
             V
 93         RF
             .
             .
 99          .         R2
             .          .
             .          .
106         C5............
             V
             V
109         RS
             .
             .
115          .         R3
             .          .
             .          .
122         C6............
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

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	M	3535.	13.08	976.	353.	353.	5.26		
DIVERSION TO	D1	2475.	13.08	683.	247.	247.	5.26		
HYDROGRAPH AT	D1	1061.	13.08	293.	106.	106.	5.26		
ROUTED TO	RO	1157.	13.75	272.	98.	98.	5.26	92.74	13.75
HYDROGRAPH AT	L	1631.	13.08	564.	204.	204.	2.60		
2 COMBINED AT	C1	2506.	13.50	836.	303.	303.	7.86		
HYDROGRAPH AT	OP	140.	12.33	22.	8.	8.	.12		
2 COMBINED AT	C2	2522.	13.50	858.	310.	310.	7.98		
ROUTED TO	RT	2500.	13.67	851.	308.	308.	7.98	93.77	13.67
HYDROGRAPH AT	L1	107.	12.17	19.	7.	7.	.09		
2 COMBINED AT	C3	2511.	13.67	871.	315.	315.	8.07		
HYDROGRAPH AT	R	31.	12.33	7.	3.	3.	.03		
ROUTED TO	RH	31.	12.58	7.	3.	3.	.03	90.31	12.58
HYDROGRAPH AT	R1	64.	12.33	13.	5.	5.	.06		
2 COMBINED AT	C4	89.	12.42	20.	7.	7.	.09		
2 COMBINED AT	C8	2536.	13.67	891.	322.	322.	8.16		
ROUTED TO	RF	2593.	13.67	889.	322.	322.	8.16	94.02	13.67
HYDROGRAPH AT	R2	24.	12.00	2.	1.	1.	.01		
2 COMBINED AT	C5	2593.	13.67	891.	323.	323.	8.17		
ROUTED TO	RS	2605.	13.67	887.	321.	321.	8.17	93.99	13.67
HYDROGRAPH AT	R3	9.	12.25	2.	1.	1.	.01		
2 COMBINED AT	C6	2608.	13.67	889.	322.	322.	8.19		

*** NORMAL END OF HEC-1 ***

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

  1           ID      DRAINAGE AREA L
  2           ID      POST-DEVELOPMENT
  3           ID      24 HOUR
              *DIAGRAM
  4           IT       5                    200
  5           IO       5

  6           KK      M
  7           KM      SUB-BASIN M
  8           BA   5.263
  9           IN      30
 10           PB   4.302
 11           PC    .000    .005    .011    .016    .022    .028    .035    .041    .048    .056
 12           PC    .068    .071    .080    .089    .098    .109    .120    .133    .147    .163
 13           PC    .181    .204    .235    .283    .663    .735    .772    .799    .820    .838
 14           PC    .854    .868    .880    .891    .902    .912    .921    .929    .937    .945
 15           PC    .952    .959    .965    .972    .978    .984    .989    .995   1.000
 16           LG    .150    .350   6.000    .170    .000
 17           UC   1.483    .964
 18           UA      0       3       5       8      12      20      43      75      90      96
 19           UA    100

 20           KK      D1
 21           KM      DIVERSION D1
 22           DT      D1
 23           DI      0     636    1272    1908    2544
 24           DQ      0     445     890    1336    1781

 25           KK      RO
 26           KM      ROUTE1
 27           RS    750    FLOW      -1
 28           RC    .04    .033     .04   29570    .021
 29           RX      0      45      90      97     104     110     155     200
 30           RY    100      95      90      90      90      90      95     100

 31           KK      L
 32           KM      SUB-BASIN L
 33           BA   2.597
 34           LG    .150    .300   8.100    .080    .000
 35           UC   1.467   1.304
 36           UA      0       3       5       8      12      20      43      75      90      96
 37           UA    100

 38           KK      C1
 39           KM      COMBINE L & D1
 40           HC       2

 41           KK      OP
 42           KM      SUB-BASIN OPQ
 43           BA    .117
 44           LG    .170    .390   6.300    .160    .180
 45           UC    .217    .173
 46           UA      0       5      16      30      65      77      84      90      94      97
 47           UA    100
```

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

  48          KK     C2
  49          KM     COMBINE OPQ&L
  50          HC      2

  51          KK     RT
  52          KM     ROUTE 2
  53          RS     80    FLOW     -1
  54          RC    .04    .033    .04    3700    .026
  55          RX      0      45     90      97     104     110     155     200
  56          RY    100      95     90      90      90      90      95     100

  57          KK     L1
  58          KM     SUB-BASIN L1
  59          BA   .090
  60          LG   .110    .350   7.500    .100    .190
  61          UC   .217    .181
  62          UA      0       5     16      30      65      77      84      90      94      97
  63          UA    100

  64          KK     C3
  65          KM     COMBINE AT L1
  66          HC      2

  67          KK      R
  68          KM     SUB-BASIN R
  69          BA   .100
  70          LG    .12    .350   7.500    .100    .180
  71          UC   .217    .194
  72          UA      0       5     16      30      65      77      84      90      94      97
  73          UA    100

  74          KK     RH
  75          KM     ROUTE 3
  76          RS     84    FLOW     -1
  77          RC    .04    .033    .04    3220    .022
  78          RX      0      45     90      97     104     110     155     200
  79          RY    100      95     90      90      90      90      95     100

  80          KK     R1
  81          KM     SUB-BASIN R1
  82          BA   .097
  83          LG   .130    .350   7.500    .100    .170
  84          UC   .200    .164
  85          UA      0       5     16      30      65      77      84      90      94      97
  86          UA    100

  87          KK     C4
  88          KM     COMBINE R & R1
  89          HC      2
```

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

  90          KK      C8
  91          KM      COMBINE R & L
  92          HC       2

  93          KK      RF
  94          KM      ROUTE 4
  95          RS      18    FLOW      -1
  96          RC     .04    .033     .04     680    .021
  97          RX       0      45      90      97     104     110     155     200
  98          RY     100      95      90      90      90      90      95     100

  99          KK      R2
 100          KM      SUB-BASIN R2
 101          BA    .024
 102          LG    .130    .350   3.900    .330    .130
 103          UC    .100    .047
 104          UA       0       5      16      30      65      77      84      90      94      97
 105          UA     100

 106          KK      C5
 107          KM      COMBINE R2
 108          HC       2

 109          KK      RS
 110          KM      ROUTE 5
 111          RS      53    FLOW      -1
 112          RC     .04    .033     .04    2000    .022
 113          RX       0      45      90      97     104     110     155     200
 114          RY     100      95      90      90      90      90      95     100

 115          KK      R3
 116          KM      SUB-BASIN R3
 117          BA    .048
 118          LG    .120    .390   5.700    .180    .150
 119          UC    .167    .137
 120          UA       0       5      16      30      65      77      84      90      94      97
 121          UA     100

 122          KK      C6
 123          KM      COMBINE R3
 124          HC       2
 125          ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

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

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

  6          M
             .
             .
 22          .-------)      D1
 20         D1
             V
             V
 25         RO
             .
             .
 31          .          L
             .           .
             .           .
 38         C1............
             .
             .
 41          .          DP
             .           .
             .           .
 48         C2............
             V
             V
 51         RT
             .
             .
 57          .          L1
             .           .
             .           .
 64         C3............
             .
             .
 67          .           R
             .           V
             .           V
 74          .          RH
             .           .
             .           .
 80          .           .          R1
             .           .           .
             .           .           .
 87          .          C4............
             .           .
             .           .
 90         C8............
             V
             V
 93         RF
             .
             .
 99          .          R2
             .           .
             .           .
106         C5............
             V
             V
109         RS
             .
             .
115          .          R3
             .           .
             .           .
122         C6............
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

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	M	3535.	13.08	976.	353.	353.	5.26		
DIVERSION TO	D1	2475.	13.08	683.	247.	247.	5.26		
HYDROGRAPH AT	D1	1061.	13.08	293.	106.	106.	5.26		
ROUTED TO	RO	1157.	13.75	272.	98.	98.	5.26	92.74	13.75
HYDROGRAPH AT	L	1631.	13.08	564.	204.	204.	2.60		
2 COMBINED AT	C1	2506.	13.50	836.	303.	303.	7.86		
HYDROGRAPH AT	OP	220.	12.00	22.	8.	8.	.12		
2 COMBINED AT	C2	2506.	13.50	858.	310.	310.	7.98		
ROUTED TO	RT	2487.	13.67	851.	308.	308.	7.98	93.76	13.67
HYDROGRAPH AT	L1	176.	12.00	19.	7.	7.	.09		
2 COMBINED AT	C3	2487.	13.67	871.	315.	315.	8.07		
HYDROGRAPH AT	R	192.	12.00	21.	8.	8.	.10		
ROUTED TO	RH	196.	12.17	21.	8.	8.	.10	91.09	12.17
HYDROGRAPH AT	R1	195.	12.00	21.	7.	7.	.10		
2 COMBINED AT	C4	364.	12.00	42.	15.	15.	.20		
2 COMBINED AT	C8	2488.	13.67	913.	330.	330.	8.26		
ROUTED TO	RF	2543.	13.67	911.	330.	330.	8.26	93.99	13.67
HYDROGRAPH AT	R2	47.	12.00	4.	1.	1.	.02		
2 COMBINED AT	C5	2543.	13.67	915.	331.	331.	8.29		
ROUTED TO	RS	2549.	13.67	911.	330.	330.	8.29	93.95	13.67
HYDROGRAPH AT	R3	95.	12.00	9.	3.	3.	.05		
2 COMBINED AT	C6	2549.	13.67	920.	333.	333.	8.34		

*** NORMAL END OF HEC-1 ***

Drainage Areas M, N1, N2, N3, N4

The runoff for these areas originates approximately 8 miles West of this project at the crest of the McDowell Mountains. Drainage area "M" collects the runoff and it is directed to the East. The runoff splits with 30% of the runoff being diverted to Drainage area "L" and 70% being directed to Drainage area "N." Drainage area N1 directs the runoff Easterly to a point on the West boundary of "Verde River," an undeveloped community. Drainage area N2 directs runoff Easterly to the West boundary of Tonto Verde. Drainage area N3 directs runoff Easterly to Forest Road. Drainage area N4 directs runoff Easterly to the East boundary of Tonto Verde and discharges into the Tonto National Forest.

This drainage area is designated Wash 11 of FIRM Map number 04013C1300D, revised to reflect LOMR dated May 24, 1989.

Presently, the runoff for this area crosses Forest Road in a ford. It is the intention of the developer to provide a structure to convey all storm water beneath the road.

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

  1           ID      DRAINAGE AREA N
  2           ID      POST-DEVELOPMENT
  3           ID      24 HOUR
              *DIAGRAM
  4           IT       5                    200
  5           IO       5

  6           KK      M
  7           KM   SUB-BASIN M
  8           BA   5.263
  9           IN      30
 10           PB   4.346
 11           PC    .000    .005    .011    .016    .022    .028    .035    .041    .048    .056
 12           PC    .068    .071    .080    .089    .098    .109    .120    .133    .147    .163
 13           PC    .181    .204    .235    .283    .663    .735    .772    .799    .820    .838
 14           PC    .854    .868    .880    .891    .902    .912    .921    .929    .937    .945
 15           PC    .952    .959    .965    .972    .978    .984    .989    .995   1.000
 16           LG    .150    .350   6.000    .170    .000
 17           UC   1.483    .964
 18           UA       0       3       5       8      12      20      43      75      90      96
 19           UA     100

 20           KK      D1
 21           KM      DIVERSION D1
 22           DT      D1
 23           DI       0     697    1395    2092    2789
 24           DQ       0     209     419     628     836

 25           KK      R1
 26           KM      ROUTE1
 27           RS     525    FLOW      -1
 28           RC     .04    .033     .04   21014    .024
 29           RX       0      45      90      97     104     110     155     200
 30           RY     100      95      90      90      90      90      95     100

 31           KK      N1
 32           KM   SUB-BASIN N1
 33           BA   1.101
 34           LG    .150    .390   6.300    .160    .000
 35           UC   1.217   1.315
 36           UA       0       3       5       8      12      20      43      75      90      96
 37           UA     100

 38           KK    C1
 39           KM   COMBINE C1
 40           HC       2

 41           KK      R2
 42           KM   ROUTE2
 43           RS     100    FLOW      -1
 44           RC     .04    .033     .04    4013    .024
 45           RX       0      45      90      97     104     110     155     200
 46           RY     100      95      90      90      90      90      95     100
```

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

  47          KK     N2
  48          KM   SUB-BASIN N2
  49          BA   .110
  50          LG   .120    .350   3.500    .250    .160
  51          UC   .217    .191
  52          UA      0       5      16      30      65      77      84      90      94      97
  53          UA    100

  54          KK     C3
  55          KM   COMBINE C3
  56          HC      2

  57          KK     R3
  58          KM    ROUTE 3
  59          RS    105    FLOW      -1
  60          RC    .04    .033     .04    4170    .023
  61          RX      0      45      90      97     104     110     155     200
  62          RY    100      95      90      90      90      90      95     100

  63          KK     N3
  64          KM   SUB-BASIN N3
  65          BA   .145
  66          LG   .140    .330   7.800    .090    .100
  67          UC   .233    .183
  68          UA      0       5      16      30      65      77      84      90      94      97
  69          UA    100

  70          KK     C4
  71          KM   COMBINE C4
  72          HC      2

  73          KK     R4
  74          KM   ROUTE 4
  75          RS     50    FLOW      -1
  76          RC    .04    .033     .04    2006    .021
  77          RX      0      45      90      97     104     110     155     200
  78          RY    100      95      90      90      90      90      95     100

  79          KK     N4
  80          KM   SUB-BASIN N4
  81          BA   .053
  82          LG   .130    .280   8.300    .070    .120
  83          UC   .167    .125
  84          UA      0       5      16      30      65      77      84      90      94      97
  85          UA    100

  86          KK     C5
  87          KM   COMBINE C5
  88          HC      2
  89          ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

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

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

   6          M
              .
              .
  22          .-------)      D1
  20         D1
              V
              V
  25         R1
              .
              .
  31          .          N1
              .           .
              .           .
  38        C1 ............
              V
              V
  41         R2
              .
              .
  47          .          N2
              .           .
              .           .
  54         C3............
              V
              V
  57         R3
              .
              .
  63          .          N3
              .           .
              .           .
  70         C4............
              V
              V
  73         R4
              .
              .
  79          .          N4
              .           .
              .           .
  86         C5............
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

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	M	3583.	13.08	990.	358.	358.	5.26		
DIVERSION TO	D1	1073.	13.08	297.	107.	107.	5.26		
HYDROGRAPH AT	D1	2510.	13.08	693.	251.	251.	5.26		
ROUTED TO	R1	2556.	13.42	671.	243.	243.	5.26	93.87	13.42
HYDROGRAPH AT	N1	630.	12.92	199.	72.	72.	1.10		
2 COMBINED AT	C1	3048.	13.42	870.	315.	315.	6.36		
ROUTED TO	R2	3087.	13.50	864.	313.	313.	6.36	94.24	13.50
HYDROGRAPH AT	N2	203.	12.00	21.	7.	7.	.11		
2 COMBINED AT	C3	3087.	13.50	884.	320.	320.	6.47		
ROUTED TO	R3	3014.	13.67	877.	317.	317.	6.47	94.23	13.67
HYDROGRAPH AT	N3	286.	12.00	32.	12.	12.	.14		
2 COMBINED AT	C4	3017.	13.67	910.	329.	329.	6.62		
ROUTED TO	R4	3047.	13.50	906.	328.	328.	6.62	94.34	13.50
HYDROGRAPH AT	N4	116.	12.00	13.	5.	5.	.05		
2 COMBINED AT	C5	3050.	13.50	919.	332.	332.	6.67		

*** NORMAL END OF HEC-1 ***

Drainage Areas S1, S2, S3, S4

These drainage areas consist of drainage areas S, T, and U from the original Rio Verde Master Plan dated 1974. These areas were combined to give values at selected discharge points. Drainage Area S1 originates approximately 3,000 feet West of the West boundary of "Verde River," an undeveloped community. Runoff is directed Easterly to the West boundary of "Verde River." Drainage area S2 directs runoff Easterly to the West boundary of "Tonto Verde." Drainage area S3 directs runoff Easterly to the East boundary of Tonto Verde and discharges into the Rio Verde Homestead.

Presently, the runoff for this area crosses Forest Road in a ford. It is the intention of the developer to provide a structure to convey all storm water beneath the roadway.

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

  1           ID      DRAINAGE AREA S
  2           ID      PRE-DEVELOPMENT
  3           ID      6 HOUR
              *DIAGRAM
  4           IT       5                    200
  5           IO       5

  6           KK      S1
  7           KM   SUB-BASIN S1
  8           BA    .040
  9           IN      15
 10           PB   3.334
 11           PC    .000    .008    .016    .025    .033    .041    .050    .058    .066    .074
 12           PC    .087    .099    .118    .138    .216    .377    .834    .911    .931    .950
 13           PC    .962    .972    .983    .991   1.000
 14           LG    .150    .350   4.000    .340    .000
 15           UC    .400    .564
 16           UA       0       3       5       8      12      20      43      75      90      96
 17           UA     100

 18           KK      R1
 19           KM   ROUTE 1
 20           RS    80.5    FLOW      -1
 21           RC     .04    .033     .04    4224    .024
 22           RX       0      45      90      97     104     110     155     200
 23           RY     100      95      90      90      90      90      95     100

 24           KK      S2
 25           KM   SUB-BASIN S2
 26           BA    .108
 27           LG    .150    .350   6.000    .170    .000
 28           UC    .500    .510
 29           UA       0       3       5       8      12      20      43      75      90      96
 30           UA     100

 31           KK      C1
 32           KM      COMBINE 1
 33           HC       2

 34           KK      R2
 35           KM      ROUTE 2
 36           RS     105    FLOW      -1
 37           RC     .04    .033     .04    4220    .023
 38           RX       0      45      90      97     105     110     155     200
 39           RY     100      95      90      90      90      90      95     100

 40           KK      S3
 41           KM   SUB-BASIN S3
 42           BA    .147
 43           LG    .150    .280   8.300    .070    .000
 44           UC    .467    .396
 45           UA       0       3       5       8      12      20      43      75      90      96
 46           UA     100
```

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

  47          KK      C2
  48          KM      COMBINE 2
  49          HC       2

  50          KK      R3
  51          KM      ROUTE 3
  52          RS     113    FLOW     -1
  53          RC     .04    .033    .04    2005    .021
  54          RX       0      45     95      97     105     110     155     200
  55          RY     100      95     90      90      90      90      95     100

  56          KK      S4
  57          KM   SUB-BASIN S4
  58          BA    .079
  59          LG    .150    .280   8.300    .070    .000
  60          UC    .333    .214
  61          UA       0       3       5       8      12      20      43      75      90      96
  62          UA     100

  63          KK      C3
  64          KM      COMBINE 3
  65          HC       2
  66          ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

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

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

   6          S1
               V
               V
  18          R1
               .
               .
  24           .          S2
               .           .
               .           .
  31          C1............
               V
               V
  34          R2
               .
               .
  40           .          S3
               .           .
               .           .
  47          C2............
               V
               V
  50          R3
               .
               .
  56           .          S4
               .           .
               .           .
  63          C3............
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

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	S1	48.	4.25	7.	3.	3.	.04		
ROUTED TO	R1	49.	4.58	7.	3.	3.	.04	90.48	4.58
HYDROGRAPH AT	S2	150.	4.33	22.	8.	8.	.11		
2 COMBINED AT	C1	178.	4.42	29.	10.	10.	.15		
ROUTED TO	R2	182.	4.58	29.	10.	10.	.15	91.04	4.58
HYDROGRAPH AT	S3	261.	4.33	34.	12.	12.	.15		
2 COMBINED AT	C2	392.	4.42	63.	23.	23.	.30		
ROUTED TO	R3	397.	4.50	63.	23.	23.	.30	91.74	4.50
HYDROGRAPH AT	S4	194.	4.17	18.	7.	7.	.08		
2 COMBINED AT	C3	492.	4.42	82.	29.	29.	.37		

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

  1           ID      DRAINAGE AREA S
  2           ID      POST-DEVELOPMENT
  3           ID      6 HOUR
              *DIAGRAM
  4           IT       5                    200
  5           IO       5

  6           KK      S1
  7           KM   SUB-BASIN S1
  8           BA    .040
  9           IN      15
 10           PB   3.329
 11           PC    .000    .008    .016    .025    .033    .041    .050    .058    .066    .074
 12           PC    .087    .099    .118    .138    .216    .377    .834    .911    .931    .950
 13           PC    .962    .972    .983    .991   1.000
 14           LG    .150    .350   4.000    .340    .000
 15           UC    .400    .564
 16           UA       0       3       5       8      12      20      43      75      90      96
 17           UA     100

 18           KK      R1
 19           KM      ROUTE 1
 20           RS    80.5    FLOW      -1
 21           RC     .04    .033     .04    4224    .024
 22           RX       0      45      90      97     104     110     155     200
 23           RY     100      95      90      90      90      90      95     100

 24           KK      S2
 25           KM   SUB-BASIN S2
 26           BA    .174
 27           LG    .120    .350   6.000    .170    .160
 28           UC    .200    .141
 29           UA       0       5      16      30      65      77      84      90      94      97
 30           UA     100

 31           KK      C1
 32           KM      COMBINE 1
 33           HC       2

 34           KK      R2
 35           KM      ROUTE 2
 36           RS     105    FLOW      -1
 37           RC     .04    .033     .04    4220    .023
 38           RX       0      45      90      97     105     110     155     200
 39           RY     100      95      90      90      90      90      95     100

 40           KK      S3
 41           KM   SUB-BASIN S3
 42           BA    .157
 43           LG    .140    .280   8.300    .070    .110
 44           UC    .200    .149
 45           UA       0       5      16      30      65      77      84      90      94      97
 46           UA     100
```

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

  47          KK     C2
  48          KM     COMBINE 2
  49          HC      2

  50          KK     R3
  51          KM     ROUTE 3
  52          RS    113    FLOW     -1
  53          RC    .04    .033    .04    2005    .021
  54          RX      0      45     95      97     105     110     155     200
  55          RY    100      95     90      90      90      90      95     100

  56          KK     S4
  57          KM   SUB-BASIN S4
  58          BA   .119
  59          LG   .100    .280   8.300   .070    .200
  60          UC   .150    .070
  61          UA      0       5     16      30      65      77      84      90      94      97
  62          UA    100

  63          KK     C3
  64          KM     COMBINE 3
  65          HC      2
  66          ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

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

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

  6          S1
              V
              V
 18          R1
              .
              .
 24           .          S2
              .           .
              .           .
 31          C1............
              V
              V
 34          R2
              .
              .
 40           .          S3
              .           .
              .           .
 47          C2............
              V
              V
 50          R3
              .
              .
 56           .          S4
              .           .
              .           .
 63          C3............
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

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	S1	48.	4.25	7.	3.	3.	.04		
ROUTED TO	R1	49.	4.58	7.	3.	3.	.04	90.48	4.58
HYDROGRAPH AT	S2	468.	4.00	35.	13.	13.	.17		
2 COMBINED AT	C1	470.	4.00	42.	15.	15.	.21		
ROUTED TO	R2	497.	4.17	42.	15.	15.	.21	91.74	4.17
HYDROGRAPH AT	S3	441.	4.00	37.	13.	13.	.16		
2 COMBINED AT	C2	829.	4.08	79.	29.	29.	.37		
ROUTED TO	R3	836.	4.17	79.	29.	29.	.37	92.51	4.17
HYDROGRAPH AT	S4	422.	4.00	28.	10.	10.	.12		
2 COMBINED AT	C3	1108.	4.08	107.	39.	39.	.49		

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

  1           ID      DRAINAGE AREA S
  2           ID      POST-DEVELOPMENT
  3           ID      24 HOUR
              *DIAGRAM
  4           IT       5                   200
  5           IO       5

  6           KK      S1
  7           KM   SUB-BASIN S1
  8           BA    .040
  9           IN      30
 10           PB   4.390
 11           PC    .000    .005    .011    .016    .022    .028    .035    .041    .048    .056
 12           PC    .068    .071    .080    .089    .098    .109    .120    .133    .147    .163
 13           PC    .181    .204    .235    .283    .663    .735    .772    .799    .820    .838
 14           PC    .854    .868    .880    .891    .902    .912    .921    .929    .937    .945
 15           PC    .952    .959    .965    .972    .978    .984    .989    .995   1.000
 16           LG    .150    .350   4.000    .340    .000
 17           UC    .450    .643
 18           UA       0       3       5       8      12      20      43      75      90      96
 19           UA     100

 20           KK      R1
 21           KM      ROUTE 1
 22           RS      81    FLOW      -1
 23           RC     .04    .033     .04    4224    .024
 24           RX       0      45      90      97     104     110     155     200
 25           RY     100      95      90      90      90      90      95     100

 26           KK      S2
 27           KM   SUB-BASIN S2
 28           BA    .174
 29           LG    .120    .350   6.000    .170    .160
 30           UC    .233    .167
 31           UA       0       5      16      30      65      77      84      90      94      97
 32           UA     100

 33           KK      C1
 34           KM      COMBINE 1
 35           HC       2

 36           KK      R2
 37           KM      ROUTE 2
 38           RS     105    FLOW      -1
 39           RC     .04    .033     .04    4220    .023
 40           RX       0      45      90      97     105     110     155     200
 41           RY     100      95      90      90      90      90      95     100

 42           KK      S3
 43           KM   SUB-BASIN S3
 44           BA    .157
 45           LG    .140    .280   8.300    .070    .110
 46           UC    .233    .177
 47           UA       0       5      16      30      65      77      84      90      94      97
 48           UA     100
```

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

  49          KK     C2
  50          KM     COMBINE 2
  51          HC      2

  52          KK     R3
  53          KM     ROUTE 3
  54          RS    113    FLOW     -1
  55          RC    .04    .033    .04    2005    .021
  56          RX      0      45     95      97     105     110     155     200
  57          RY    100      95     90      90      90      90      95     100

  58          KK     S4
  59          KM   SUB-BASIN S4
  60          BA   .119
  61          LG   .100    .280   8.300   .070    .200
  62          UC   .167    .079
  63          UA      0       5     16      30      65      77      84      90      94      97
  64          UA    100

  65          KK     C3
  66          KM     COMBINE 3
  67          HC      2
  68          ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

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

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

   6         S1
              V
              V
  20         R1
              .
              .
  26          .          S2
              .           .
              .           .
  33         C1............
              V
              V
  36         R2
              .
              .
  42          .          S3
              .           .
              .           .
  49         C2............
              V
              V
  52         R3
              .
              .
  58          .          S4
              .           .
              .           .
  65         C3............
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

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

  1           ID      DRAINAGE AREA N
  2           ID      PRE-DEVELOPMENT
  3           ID      6 HOUR
              *DIAGRAM
  4           IT       5                    200
  5           IO       5

  6           KK      M
  7           KM   SUB-BASIN M
  8           BA   5.263
  9           IN      15
 10           PB   3.194
 11           PC    .000    .012    .018    .027    .041    .052    .063    .074    .086    .097
 12           PC    .111    .126    .147    .192    .278    .461    .682    .817    .884    .925
 13           PC    .948    .962    .974    .988   1.000
 14           LG    .150    .350   6.000    .170    .000
 15           UC   1.483    .964
 16           UA       0       3       5       8      12      20      43      75      90      96
 17           UA     100

 18           KK      D1
 19           KM      DIVERSION D1
 20           DT      D1
 21           DI       0     697    1395    2092    2789
 22           DQ       0     209     419     628     836

 23           KK      R1
 24           KM      ROUTE1
 25           RS     525    FLOW      -1
 26           RC     .04    .033     .04   21014    .024
 27           RX       0      45      90      97     104     110     155     200
 28           RY     100      95      90      90      90      90      95     100

 29           KK      N1
 30           KM   SUB-BASIN N1
 31           BA   1.101
 32           LG    .150    .390   6.300    .160    .000
 33           UC   1.300   1.415
 34           UA       0       3       5       8      12      20      43      75      90      96
 35           UA     100

 36           KK    C1
 37           KM   COMBINE C1
 38           HC       2

 39           KK      R2
 40           KM   ROUTE2
 41           RS     100    FLOW      -1
 42           RC     .04    .033     .04    4013    .024
 43           RX       0      45      90      97     104     110     155     200
 44           RY     100      95      90      90      90      90      95     100
```

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

  45          KK     N2
  46          KM   SUB-BASIN N2
  47          BA   .106
  48          LG   .150    .350   3.500    .250    .000
  49          UC   .617    .624
  50          UA     0       3       5       8      12      20      43      75      90      96
  51          UA   100

  52          KK     C3
  53          KM   COMBINE C3
  54          HC     2

  55          KK     R3
  56          KM   ROUTE 3
  57          RS   105    FLOW      -1
  58          RC   .04    .033     .04    4170    .023
  59          RX     0      45      90      97     104     110     155     200
  60          RY   100      95      90      90      90      90      95     100

  61          KK     N3
  62          KM   SUB-BASIN N3
  63          BA   .130
  64          LG   .150    .330   7.800    .090    .000
  65          UC   .633    .592
  66          UA     0       3       5       8      12      20      43      75      90      96
  67          UA   100

  68          KK     C4
  69          KM   COMBINE C4
  70          HC     2

  71          KK     R4
  72          KM   ROUTE 4
  73          RS    50    FLOW      -1
  74          RC   .04    .033     .04    2006    .021
  75          RX     0      45      90      97     104     110     155     200
  76          RY   100      95      90      90      90      90      95     100

  77          KK     N4
  78          KM   SUB-BASIN N4
  79          BA   .057
  80          LG   .150    .280   8.300    .070    .000
  81          UC   .450    .360
  82          UA     0       3       5       8      12      20      43      75      90      96
  83          UA   100

  84          KK     C5
  85          KM   COMBINE C5
  86          HC     2
  87          ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

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

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

  6          M
              .
              .
 20          .-------)      D1
 18         D1
             V
             V
 23         R1
              .
              .
 29           .          N1
              .           .
              .           .
 36       C1  ............
             V
             V
 39         R2
              .
              .
 45           .          N2
              .           .
              .           .
 52         C3............
             V
             V
 55         R3
              .
              .
 61           .          N3
              .           .
              .           .
 68         C4............
             V
             V
 71         R4
              .
              .
 77           .          N4
              .           .
              .           .
 84         C5............
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

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	M	2789.	5.17	829.	301.	301.	5.26		
DIVERSION TO	D1	836.	5.17	249.	90.	90.	5.26		
HYDROGRAPH AT	D1	1953.	5.17	580.	210.	210.	5.26		
ROUTED TO	R1	1966.	5.67	579.	210.	210.	5.26	93.42	5.67
HYDROGRAPH AT	N1	460.	5.17	166.	61.	61.	1.10		
2 COMBINED AT	C1	2349.	5.50	740.	272.	272.	6.36		
ROUTED TO	R2	2402.	5.58	740.	272.	272.	6.36	93.77	5.58
HYDROGRAPH AT	N2	77.	4.50	16.	6.	6.	.11		
2 COMBINED AT	C3	2422.	5.58	753.	278.	278.	6.47		
ROUTED TO	R3	2407.	5.75	753.	278.	278.	6.47	93.81	5.75
HYDROGRAPH AT	N3	111.	4.50	24.	9.	9.	.13		
2 COMBINED AT	C4	2430.	5.75	773.	287.	287.	6.60		
ROUTED TO	R4	2389.	5.83	773.	287.	287.	6.60	93.87	5.83
HYDROGRAPH AT	N4	65.	4.33	12.	4.	4.	.06		
2 COMBINED AT	C5	2392.	5.83	782.	291.	291.	6.66		

*** NORMAL END OF HEC-1 ***

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

  1           ID      DRAINAGE AREA N
  2           ID      POST-DEVELOPMENT
  3           ID      6 HOUR
              *DIAGRAM
  4           IT       5                    200
  5           IO       5

  6           KK      M
  7           KM   SUB-BASIN M
  8           BA   5.263
  9           IN      15
 10           PB   3.194
 11           PC    .000    .012    .018    .027    .041    .052    .063    .074    .086    .097
 12           PC    .111    .126    .147    .192    .278    .461    .682    .817    .884    .925
 13           PC    .948    .962    .974    .988   1.000
 14           LG    .150    .350   6.000    .170    .000
 15           UC   1.483    .964
 16           UA       0       3       5       8      12      20      43      75      90      96
 17           UA     100

 18           KK      D1
 19           KM      DIVERSION D1
 20           DT      D1
 21           DI       0     697    1395    2092    2789
 22           DQ       0     209     419     628     836

 23           KK      R1
 24           KM      ROUTE1
 25           RS     525    FLOW      -1
 26           RC     .04    .033     .04   21014    .024
 27           RX       0      45      90      97     104     110     155     200
 28           RY     100      95      90      90      90      90      95     100

 29           KK      N1
 30           KM   SUB-BASIN N1
 31           BA   1.101
 32           LG    .150    .390   6.300    .160    .000
 33           UC   1.300   1.415
 34           UA       0       3       5       8      12      20      43      75      90      96
 35           UA     100

 36           KK    C1
 37           KM   COMBINE C1
 38           HC       2

 39           KK      R2
 40           KM   ROUTE2
 41           RS     100    FLOW      -1
 42           RC     .04    .033     .04    4013    .024
 43           RX       0      45      90      97     104     110     155     200
 44           RY     100      95      90      90      90      90      95     100
```

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

  45          KK     N2
  46          KM   SUB-BASIN N2
  47          BA   .110
  48          LG   .120    .350   3.500    .250    .160
  49          UC   .267    .241
  50          UA     0       5      16      30      65      77      84      90      94      97
  51          UA   100

  52          KK     C3
  53          KM   COMBINE C3
  54          HC     2

  55          KK     R3
  56          KM   ROUTE 3
  57          RS   105    FLOW     -1
  58          RC   .04    .033    .04    4170    .023
  59          RX     0      45     90      97     104     110     155     200
  60          RY   100      95     90      90      90      90      95     100

  61          KK     N3
  62          KM   SUB-BASIN N3
  63          BA   .145
  64          LG   .140    .330   7.800    .090    .100
  65          UC   .283    .227
  66          UA     0       5      16      30      65      77      84      90      94      97
  67          UA   100

  68          KK     C4
  69          KM   COMBINE C4
  70          HC     2

  71          KK     R4
  72          KM   ROUTE 4
  73          RS     50    FLOW     -1
  74          RC   .04    .033    .04    2006    .021
  75          RX     0      45     90      97     104     110     155     200
  76          RY   100      95     90      90      90      90      95     100

  77          KK     N4
  78          KM   SUB-BASIN N4
  79          BA   .053
  80          LG   .130    .280   8.300    .070    .120
  81          UC   .200    .153
  82          UA     0       5      16      30      65      77      84      90      94      97
  83          UA   100

  84          KK     C5
  85          KM   COMBINE C5
  86          HC     2
  87          ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

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

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

  6          M
             .
             .
 20          .-------)      D1
 18         D1
             V
             V
 23         R1
             .
             .
 29          .          N1
             .           .
             .           .
 36       C1 ............
             V
             V
 39         R2
             .
             .
 45          .          N2
             .           .
             .           .
 52         C3............
             V
             V
 55         R3
             .
             .
 61          .          N3
             .           .
             .           .
 68         C4............
             V
             V
 71         R4
             .
             .
 77          .          N4
             .           .
             .           .
 84         C5............
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

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	M	2789.	5.17	829.	301.	301.	5.26		
DIVERSION TO	D1	836.	5.17	249.	90.	90.	5.26		
HYDROGRAPH AT	D1	1953.	5.17	580.	210.	210.	5.26		
ROUTED TO	R1	1966.	5.67	579.	210.	210.	5.26	93.42	5.67
HYDROGRAPH AT	N1	460.	5.17	166.	61.	61.	1.10		
2 COMBINED AT	C1	2349.	5.50	740.	272.	272.	6.36		
ROUTED TO	R2	2402.	5.58	740.	272.	272.	6.36	93.77	5.58
HYDROGRAPH AT	N2	124.	4.08	17.	6.	6.	.11		
2 COMBINED AT	C3	2403.	5.58	749.	278.	278.	6.47		
ROUTED TO	R3	2391.	5.75	750.	278.	278.	6.47	93.79	5.75
HYDROGRAPH AT	N3	184.	4.08	27.	10.	10.	.14		
2 COMBINED AT	C4	2391.	5.75	772.	288.	288.	6.62		
ROUTED TO	R4	2354.	5.83	772.	288.	288.	6.62	93.85	5.83
HYDROGRAPH AT	N4	77.	4.00	11.	4.	4.	.05		
2 COMBINED AT	C5	2354.	5.83	781.	292.	292.	6.67		

*** NORMAL END OF HEC-1 ***

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

  1           ID      DRAINAGE AREA N
  2           ID      PRE-DEVELOPMENT
  3           ID      24 HOUR
              *DIAGRAM
  4           IT       5                    200
  5           IO       5

  6           KK      M
  7           KM   SUB-BASIN M
  8           BA   5.263
  9           IN      30
 10           PB   4.346
 11           PC    .000    .005    .011    .016    .022    .028    .035    .041    .048    .056
 12           PC    .068    .071    .080    .089    .098    .109    .120    .133    .147    .163
 13           PC    .181    .204    .235    .283    .663    .735    .772    .799    .820    .838
 14           PC    .854    .868    .880    .891    .902    .912    .921    .929    .937    .945
 15           PC    .952    .959    .965    .972    .978    .984    .989    .995   1.000
 16           LG    .150    .350   6.000    .170    .000
 17           UC   1.483    .964
 18           UA       0       3       5       8      12      20      43      75      90      96
 19           UA     100

 20           KK      D1
 21           KM      DIVERSION D1
 22           DT      D1
 23           DI       0     697    1395    2092    2789
 24           DQ       0     209     419     628     836

 25           KK      R1
 26           KM      ROUTE1
 27           RS     525    FLOW      -1
 28           RC     .04    .033     .04   21014    .024
 29           RX       0      45      90      97     104     110     155     200
 30           RY     100      95      90      90      90      90      95     100

 31           KK      N1
 32           KM   SUB-BASIN N1
 33           BA   1.101
 34           LG    .150    .390   6.300    .160    .000
 35           UC   1.217   1.315
 36           UA       0       3       5       8      12      20      43      75      90      96
 37           UA     100

 38           KK    C1
 39           KM   COMBINE C1
 40           HC       2

 41           KK      R2
 42           KM   ROUTE2
 43           RS     100    FLOW      -1
 44           RC     .04    .033     .04    4013    .024
 45           RX       0      45      90      97     104     110     155     200
 46           RY     100      95      90      90      90      90      95     100
```

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

 47         KK     N2
 48         KM   SUB-BASIN N2
 49         BA   .106
 50         LG   .150    .350   3.500    .250    .000
 51         UC   .550    .550
 52         UA     0       3       5       8      12      20      43      75      90      96
 53         UA   100

 54         KK     C3
 55         KM   COMBINE C3
 56         HC     2

 57         KK     R3
 58         KM   ROUTE 3
 59         RS   105    FLOW      -1
 60         RC   .04    .033     .04    4170    .023
 61         RX     0      45      90      97     104     110     155     200
 62         RY   100      95      90      90      90      90      95     100

 63         KK     N3
 64         KM   SUB-BASIN N3
 65         BA   .130
 66         LG   .150    .330   7.800    .090    .000
 67         UC   .567    .523
 68         UA     0       3       5       8      12      20      43      75      90      96
 69         UA   100

 70         KK     C4
 71         KM   COMBINE C4
 72         HC     2

 73         KK     R4
 74         KM   ROUTE 4
 75         RS    50    FLOW      -1
 76         RC   .04    .033     .04    2006    .021
 77         RX     0      45      90      97     104     110     155     200
 78         RY   100      95      90      90      90      90      95     100

 79         KK     N4
 80         KM   SUB-BASIN N4
 81         BA   .057
 82         LG   .150    .280   8.300    .070    .000
 83         UC   .383    .301
 84         UA     0       3       5       8      12      20      43      75      90      96
 85         UA   100

 86         KK     C5
 87         KM   COMBINE C5
 88         HC     2
 89         ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

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

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

   6          M
               .
               .
  22          .-------)      D1
  20         D1
              V
              V
  25         R1
               .
               .
  31          .          N1
               .           .
               .           .
  38       C1  ............
              V
              V
  41         R2
               .
               .
  47          .          N2
               .           .
               .           .
  54         C3............
              V
              V
  57         R3
               .
               .
  63          .          N3
               .           .
               .           .
  70         C4............
              V
              V
  73         R4
               .
               .
  79          .          N4
               .           .
               .           .
  86         C5............
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

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	M	3583.	13.08	990.	358.	358.	5.26		
DIVERSION TO	D1	1073.	13.08	297.	107.	107.	5.26		
HYDROGRAPH AT	D1	2510.	13.08	693.	251.	251.	5.26		
ROUTED TO	R1	2556.	13.42	671.	243.	243.	5.26	93.87	13.42
HYDROGRAPH AT	N1	630.	12.92	199.	72.	72.	1.10		
2 COMBINED AT	C1	3048.	13.42	870.	315.	315.	6.36		
ROUTED TO	R2	3087.	13.50	864.	313.	313.	6.36	94.24	13.50
HYDROGRAPH AT	N2	117.	12.33	20.	7.	7.	.11		
2 COMBINED AT	C3	3107.	13.50	884.	320.	320.	6.47		
ROUTED TO	R3	3029.	13.67	876.	317.	317.	6.47	94.24	13.67
HYDROGRAPH AT	N3	160.	12.33	29.	10.	10.	.13		
2 COMBINED AT	C4	3062.	13.42	905.	328.	328.	6.60		
ROUTED TO	R4	3113.	13.50	902.	326.	326.	6.60	94.38	13.50
HYDROGRAPH AT	N4	96.	12.17	14.	5.	5.	.06		
2 COMBINED AT	C5	3120.	13.50	916.	331.	331.	6.66		

*** NORMAL END OF HEC-1 ***

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	S1	38.	12.25	7.	2.	2.	.04		
ROUTED TO	R1	38.	12.58	7.	2.	2.	.04	90.37	12.58
HYDROGRAPH AT	S2	338.	12.00	34.	12.	12.	.17		
2 COMBINED AT	C1	341.	12.00	41.	15.	15.	.21		
ROUTED TO	R2	349.	12.17	41.	15.	15.	.21	91.45	12.17
HYDROGRAPH AT	S3	323.	12.00	39.	14.	14.	.16		
2 COMBINED AT	C2	647.	12.00	80.	29.	29.	.37		
ROUTED TO	R3	669.	12.08	80.	29.	29.	.37	92.25	12.08
HYDROGRAPH AT	S4	271.	12.00	30.	11.	11.	.12		
2 COMBINED AT	C3	878.	12.08	109.	40.	40.	.49		

Drainage Areas Y1, Y2, Y3, Y4

These drainage areas consist of drainage areas Y, V, W, X, Z, AA and BB from the original Rio Verde Master Plan dated 1974. These areas were combined to give values at selected discharge points. Drainage area Y1 originates approximately 3.5 miles West of the West boundary of "Verde River." Runoff is directed Easterly to the West boundary of "Verde River." Drainage area Y2 directs runoff Easterly to the West boundary of Tonto Verde. Drainage area Y3 directs runoff Easterly to Forest Road. Drainage area Y4 directs runoff Easterly to the East boundary of Tonto Verde and discharges into the Rio Verde Homestead.

Presently, the runoff for this area crosses Forest Road in a ford. It is the intention of the developer to provide a structure to convey all storm water beneath the roadway. This structure will also be used as an underpass for golf carts, pedestrians and golf course maintenance vehicles.

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

  1           ID      DRAINAGE AREA Y
  2           ID      PRE-DEVELOPMENT
  3           ID      6 HOUR
              *DIAGRAM
  4           IT       5                    200
  5           IO       5

  6           KK      Y1
  7           KM   SUB-BASIN Y1
  8           BA   1.786
  9           IN      15
 10           PB   3.270
 11           PC    .000    .009    .016    .025    .034    .042    .051    .059    .067    .076
 12           PC    .087    .100    .120    .162    .250    .448    .700    .840    .901    .939
 13           PC    .951    .963    .975    .988   1.000
 14           LG    .150    .350   3.700    .290    .000
 15           UC   1.283   1.240
 16           UA       0       3       5       8      12      20      43      75      90      96
 17           UA     100

 18           KK      R1
 19           KM      ROUTE 1
 20           RS      53    FLOW      -1
 21           RC     .04    .033     .04    2100    .024
 22           RX       0      45      90      97     104     110     155     200
 23           RY     100      95      90      90      90      90      95     100

 24           KK      Y2
 25           KM   SUB-BASIN Y2
 26           BA    .401
 27           LG    .150    .350   3.800    .300    .000
 28           UC    .583    .301
 29           UA       0       3       5       8      12      20      43      75      90      96
 30           UA     100

 31           KK      C1
 32           KM      COMBINE 1
 33           HC       2

 34           KK      R2
 35           KM      ROUTE 2
 36           RS      41    FLOW      -1
 37           RC     .04    .033     .04    1630    .023
 38           RX       0      45      90      97     105     110     155     200
 39           RY     100      95      90      90      90      90      95     100

 40           KK      Y3
 41           KM   SUB-BASIN Y3
 42           BA    .309
 43           LG    .150    .360   4.100    .230    .000
 44           UC    .583    .342
 45           UA       0       3       5       8      12      20      43      75      90      96
 46           UA     100
```

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

  47          KK      C2
  48          KM      COMBINE 2
  49          HC       2

  50          KK      R3
  51          KM      ROUTE 3
  52          RS      15    FLOW     -1
  53          RC     .04    .033    .04    600    .021
  54          RX       0      45     95     97     105    110    155    200
  55          RY     100      95     90     90      90     90     95    100

  56          KK      Y4
  57          KM   SUB-BASIN Y4
  58          BA    .106
  59          LG    .150    .370   4.700   .210    .000
  60          UC    .450    .274
  61          UA       0       3      5      8      12     20     43     75     90     96
  62          UA     100

  63          KK      C3
  64          KM      COMBINE 3
  65          HC       2
  66          ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

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

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

  6          Y1
              V
              V
 18          R1
              .
              .
 24           .          Y2
              .           .
              .           .
 31          C1............
              V
              V
 34          R2
              .
              .
 40           .          Y3
              .           .
              .           .
 47          C2............
              V
              V
 50          R3
              .
              .
 56           .          Y4
              .           .
              .           .
 63          C3............
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

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	Y1	867.	5.08	279.	102.	102.	1.79		
ROUTED TO	R1	868.	5.08	279.	102.	102.	1.79	92.29	5.08
HYDROGRAPH AT	Y2	438.	4.42	62.	22.	22.	.40		
2 COMBINED AT	C1	974.	4.92	340.	125.	125.	2.19		
ROUTED TO	R2	981.	5.00	340.	125.	125.	2.19	92.46	5.00
HYDROGRAPH AT	Y3	342.	4.42	52.	19.	19.	.31		
2 COMBINED AT	C2	1111.	4.83	392.	144.	144.	2.50		
ROUTED TO	R3	1117.	4.83	392.	144.	144.	2.50	92.87	4.83
HYDROGRAPH AT	Y4	129.	4.25	18.	6.	6.	.11		
2 COMBINED AT	C3	1162.	4.83	410.	150.	150.	2.60		

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

  1           ID      DRAINAGE AREA Y
  2           ID      POST-DEVELOPMENT
  3           ID      6 HOUR
              *DIAGRAM
  4           IT      5                   200
  5           ID      5

  6           KK      Y1
  7           KM   SUB-BASIN Y1
  8           BA   1.786
  9           IN      15
 10           PB   3.270
 11           PC    .000    .009    .016    .025    .034    .042    .051    .059    .067    .076
 12           PC    .087    .100    .120    .162    .250    .448    .700    .840    .901    .939
 13           PC    .951    .963    .975    .988   1.000
 14           LG    .150    .350   3.700    .290    .000
 15           UC   1.283   1.240
 16           UA      0       3       5       8      12      20      43      75      90      96
 17           UA    100

 18           KK      R1
 19           KM      ROUTE 1
 20           RS      53    FLOW      -1
 21           RC     .04    .033     .04    2100    .024
 22           RX       0      45      90      97     104     110     155     200
 23           RY     100      95      90      90      90      90      95     100

 24           KK      Y2
 25           KM   SUB-BASIN Y2
 26           BA    .314
 27           LG    .120    .350   3.800    .300    .160
 28           UC    .283    .155
 29           UA       0       5      16      30      65      77      84      90      94      97
 30           UA     100

 31           KK      C1
 32           KM      COMBINE 1
 33           HC       2

 34           KK      R2
 35           KM      ROUTE 2
 36           RS      41    FLOW      -1
 37           RC     .04    .033     .04    1630    .023
 38           RX       0      45      90      97     105     110     155     200
 39           RY     100      95      90      90      90      90      95     100

 40           KK      Y3
 41           KM   SUB-BASIN Y3
 42           BA    .302
 43           LG    .130    .360   4.100    .230    .140
 44           UC    .283    .156
 45           UA       0       5      16      30      65      77      84      90      94      97
 46           UA     100
```

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

  47          KK     C2
  48          KM     COMBINE 2
  49          HC      2

  50          KK     R3
  51          KM     ROUTE 3
  52          RS     15    FLOW     -1
  53          RC    .04    .033    .04     600    .021
  54          RX      0      45     95      97     105     110     155     200
  55          RY    100      95     90      90      90      90      95     100

  56          KK     Y4
  57          KM   SUB-BASIN Y4
  58          BA   .129
  59          LG   .120    .370   4.700    .210    .160
  60          UC   .200    .100
  61          UA      0       5      16      30      65      77      84      90      94      97
  62          UA    100

  63          KK     C3
  64          KM     COMBINE 3
  65          HC      2
  66          ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

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

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

  6          Y1
              V
              V
 18          R1
              .
              .
 24           .          Y2
              .           .
              .           .
 31          C1............
              V
              V
 34          R2
              .
              .
 40           .          Y3
              .           .
              .           .
 47          C2............
              V
              V
 50          R3
              .
              .
 56           .          Y4
              .           .
              .           .
 63          C3............
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

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	Y1	867.	5.08	279.	102.	102.	1.79		
ROUTED TO	R1	868.	5.08	279.	102.	102.	1.79	92.29	5.08
HYDROGRAPH AT	Y2	444.	4.08	49.	18.	18.	.31		
2 COMBINED AT	C1	871.	5.08	327.	120.	120.	2.10		
ROUTED TO	R2	870.	5.17	327.	120.	120.	2.10	92.32	5.17
HYDROGRAPH AT	Y3	446.	4.08	52.	19.	19.	.30		
2 COMBINED AT	C2	914.	4.08	377.	139.	139.	2.40		
ROUTED TO	R3	907.	4.17	377.	139.	139.	2.40	92.62	4.17
HYDROGRAPH AT	Y4	208.	4.00	22.	8.	8.	.13		
2 COMBINED AT	C3	1099.	4.08	399.	147.	147.	2.53		

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

  1           ID      DRAINAGE AREA Y
  2           ID      PRE-DEVELOPMENT
  3           ID      24 HOUR
              *DIAGRAM
  4           IT       5                    200
  5           IO       5

  6           KK      Y1
  7           KM   SUB-BASIN Y1
  8           BA   1.786
  9           IN      30
 10           PB   4.346
 11           PC    .000    .005    .011    .016    .022    .028    .035    .041    .048    .056
 12           PC    .068    .071    .080    .089    .098    .109    .120    .133    .147    .163
 13           PC    .181    .204    .235    .283    .663    .735    .772    .799    .820    .838
 14           PC    .854    .868    .880    .891    .902    .912    .921    .929    .937    .945
 15           PC    .952    .959    .965    .972    .978    .984    .989    .995   1.000
 16           LG    .150    .350   3.700    .290    .000
 17           UC   1.283   1.240
 18           UA       0       3       5       8      12      20      43      75      90      96
 19           UA     100

 20           KK      R1
 21           KM      ROUTE 1
 22           RS      53    FLOW      -1
 23           RC     .04    .033     .04    2100    .024
 24           RX       0      45      90      97     104     110     155     200
 25           RY     100      95      90      90      90      90      95     100

 26           KK      Y2
 27           KM   SUB-BASIN Y2
 28           BA    .401
 29           LG    .150    .350   3.800    .300    .000
 30           UC    .550    .282
 31           UA       0       3       5       8      12      20      43      75      90      96
 32           UA     100

 33           KK      C1
 34           KM      COMBINE 1
 35           HC       2

 36           KK      R2
 37           KM      ROUTE 2
 38           RS      41    FLOW      -1
 39           RC     .04    .033     .04    1630    .023
 40           RX       0      45      90      97     105     110     155     200
 41           RY     100      95      90      90      90      90      95     100

 42           KK      Y3
 43           KM   SUB-BASIN Y3
 44           BA    .309
 45           LG    .150    .360   4.100    .230    .000
 46           UC    .550    .321
 47           UA       0       3       5       8      12      20      43      75      90      96
 48           UA     100
```

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

  49          KK     C2
  50          KM     COMBINE 2
  51          HC      2

  52          KK     R3
  53          KM     ROUTE 3
  54          RS     15    FLOW     -1
  55          RC    .04    .033    .04     600    .021
  56          RX      0      45     95      97     105     110     155     200
  57          RY    100      95     90      90      90      90      95     100

  58          KK     Y4
  59          KM   SUB-BASIN Y4
  60          BA   .106
  61          LG   .150    .370   4.700    .210    .000
  62          UC   .417    .251
  63          UA      0       3       5       8      12      20      43      75      90      96
  64          UA    100

  65          KK     C3
  66          KM     COMBINE 3
  67          HC      2
  68          ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

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

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

  6          Y1
              V
              V
 20          R1
              .
              .
 26           .          Y2
              .           .
              .           .
 33          C1............
              V
              V
 36          R2
              .
              .
 42           .          Y3
              .           .
              .           .
 49          C2............
              V
              V
 52          R3
              .
              .
 58           .          Y4
              .           .
              .           .
 65          C3............
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

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	Y1	1009.	12.92	306.	111.	111.	1.79		
ROUTED TO	R1	1008.	13.00	304.	110.	110.	1.79	92.47	13.00
HYDROGRAPH AT	Y2	575.	12.25	70.	25.	25.	.40		
2 COMBINED AT	C1	1118.	12.92	375.	136.	136.	2.19		
ROUTED TO	R2	1123.	12.92	374.	135.	135.	2.19	92.65	12.92
HYDROGRAPH AT	Y3	440.	12.33	57.	21.	21.	.31		
2 COMBINED AT	C2	1240.	12.92	431.	156.	156.	2.50		
ROUTED TO	R3	1242.	12.92	431.	156.	156.	2.50	93.02	12.92
HYDROGRAPH AT	Y4	170.	12.17	20.	7.	7.	.11		
2 COMBINED AT	C3	1320.	12.33	450.	163.	163.	2.60		

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

  1           ID      DRAINAGE AREA Y
  2           ID      POST-DEVELOPMENT
  3           ID      24 HOUR
              *DIAGRAM
  4           IT       5                    200
  5           IO       5

  6           KK      Y1
  7           KM   SUB-BASIN Y1
  8           BA   1.786
  9           IN      30
 10           PB   4.346
 11           PC    .000    .005    .011    .016    .022    .028    .035    .041    .048    .056
 12           PC    .068    .071    .080    .089    .098    .109    .120    .133    .147    .163
 13           PC    .181    .204    .235    .283    .663    .735    .772    .799    .820    .838
 14           PC    .854    .868    .880    .891    .902    .912    .921    .929    .937    .945
 15           PC    .952    .959    .965    .972    .978    .984    .989    .995   1.000
 16           LG    .150    .350   3.700    .290    .000
 17           UC   1.283   1.240
 18           UA      0       3       5       8      12      20      43      75      90      96
 19           UA    100

 20           KK      R1
 21           KM      ROUTE 1
 22           RS      53    FLOW      -1
 23           RC     .04    .033     .04    2100    .024
 24           RX      0      45      90      97     104     110     155     200
 25           RY    100      95      90      90      90      90      95     100

 26           KK      Y2
 27           KM   SUB-BASIN Y2
 28           BA    .314
 29           LG    .120    .350   3.800    .300    .160
 30           UC    .250    .135
 31           UA      0       5      16      30      65      77      84      90      94      97
 32           UA    100

 33           KK      C1
 34           KM      COMBINE 1
 35           HC       2

 36           KK      R2
 37           KM      ROUTE 2
 38           RS      41    FLOW      -1
 39           RC     .04    .033     .04    1630    .023
 40           RX      0      45      90      97     105     110     155     200
 41           RY    100      95      90      90      90      90      95     100

 42           KK      Y3
 43           KM   SUB-BASIN Y3
 44           BA    .302
 45           LG    .130    .360   4.100    .230    .140
 46           UC    .250    .135
 47           UA      0       5      16      30      65      77      84      90      94      97
 48           UA    100
```

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

  49          KK      C2
  50          KM      COMBINE 2
  51          HC       2

  52          KK      R3
  53          KM      ROUTE 3
  54          RS      15    FLOW     -1
  55          RC     .04    .033    .04    600    .021
  56          RX       0      45     95     97     105    110    155    200
  57          RY     100      95     90     90      90     90     95    100

  58          KK      Y4
  59          KM    SUB-BASIN Y4
  60          BA    .129
  61          LG    .120    .370   4.700   .210   .160
  62          UC    .167    .081
  63          UA       0       5     16     30     65     77     84     90     94     97
  64          UA     100

  65          KK      C3
  66          KM      COMBINE 3
  67          HC       2
  68          ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

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

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

  6          Y1
              V
              V
 20          R1
              .
              .
 26           .          Y2
              .           .
              .           .
 33          C1............
              V
              V
 36          R2
              .
              .
 42           .          Y3
              .           .
              .           .
 49          C2............
              V
              V
 52          R3
              .
              .
 58           .          Y4
              .           .
              .           .
 65          C3............
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

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	Y1	1009.	12.92	306.	111.	111.	1.79		
ROUTED TO	R1	1008.	13.00	304.	110.	110.	1.79	92.47	13.00
HYDROGRAPH AT	Y2	598.	12.00	55.	20.	20.	.31		
2 COMBINED AT	C1	1010.	13.00	360.	130.	130.	2.10		
ROUTED TO	R2	1010.	13.00	359.	130.	130.	2.10	92.50	13.00
HYDROGRAPH AT	Y3	594.	12.00	56.	20.	20.	.30		
2 COMBINED AT	C2	1215.	12.00	415.	150.	150.	2.40		
ROUTED TO	R3	1208.	12.08	415.	150.	150.	2.40	92.98	12.08
HYDROGRAPH AT	Y4	268.	12.00	24.	9.	9.	.13		
2 COMBINED AT	C3	1463.	12.00	439.	159.	159.	2.53		

Drainage Area AB

Drainage Area AB originates East of Forest Road and adjacent to the South boundary of Tonto Verde. Runoff is directed to the East discharging into the Tonto National Forest.

HYDROLOGIC DESIGN DATA SHEET
RATIONAL METHOD

WILEY & ASSOCIATES INC.
SURVEYORS AND ENGINEERS
3200 N. HAYDEN RD. #130
SCOTTSDALE, AZ. 85251

LOCATION DATA:

Project: TONTO VERDE MASTER PLAN -- 1992
Location: SEC. 31,T5N,R7E, & SEC. 36, T5N,R6E, MARICOPA COUNTY.
Project No.: 3875A Station:
Name of Stream: Drng.Area: AB-PRE

DESIGN DATA:

Drainage Area:	31.00	acres
Drainage Length:	2700.00	feet
Top of Drainage Area	1600.00	feet
Bottom of Drainage Area	1550.00	feet
Drainage Area Slope:	1.8519	%
Time of Concentration (Tc)	15.56	minutes (min. 5 minutes)
Runoff Coefficient (C)	0.32	

DESIGN COMPUTATIONS:

Design Frequency (Yr)	Precipitation Data 6 Hr.	24 Hr.	1 Hr.	Rainfall Intensity (In./Hr.)	Peak Discharge Q = CIA (cfs)
5	1.90	2.40	1.41		ERR
10	2.20	2.83	1.62		ERR
25	2.60	3.38	1.90		ERR
50	3.00	3.88	2.21		ERR
100	3.35	4.39	2.42	5.9	59
100YR/2HR.			2.74	6.15	61

REMARKS:

Computed By:L.F.G. Date: JULY 14,1992

HYDROLOGIC DESIGN DATA SHEET
RATIONAL METHOD

WILEY & ASSOCIATES INC.
SURVEYORS AND ENGINEERS
3200 N. HAYDEN RD. #130
SCOTTSDALE, AZ. 85251

LOCATION DATA:

Project: TONTO VERDE MASTER PLAN -- 1992
Location: SEC. 31,T5N,R7E, & SEC. 36, T5N,R6E, MARICOPA COUNTY.
Project No.: 3875A Station:
Name of Stream: Drng.Area: AB-PST

DESIGN DATA:

Drainage Area:	21.30	acres
Drainage Length:	2000.00	feet
Top of Drainage Area	1589.00	feet
Bottom of Drainage Area	1550.00	feet
Drainage Area Slope:	1.9500	%
Time of Concentration (Tc)	12.11	minutes (min. 5 minutes)
Runoff Coefficient (C)	0.31	

DESIGN COMPUTATIONS:

Design Frequency (Yr)	Precipitation Data 6 Hr.	24 Hr.	1 Hr.	Rainfall Intensity (In./Hr.)	Peak Discharge Q = CIA (cfs)
5	1.90	2.40	1.41		ERR
10	2.20	2.83	1.62		ERR
25	2.60	3.38	1.90		ERR
50	3.00	3.88	2.21		ERR
100	3.35	4.39	2.42	6.13	40
100YR/2HR.			2.74	6.9	46

REMARKS:

Computed By:L.F.G. Date: JULY 14,1992

Drainage Area AC

Drainage area AC originates approximately 300 feet West of the East boundary of Tonto Verde near the Northeast corner of Tonto Verde. Runoff is directed to the East and discharges into the Rio Verde Homestead.

HYDROLOGIC DESIGN DATA SHEET
RATIONAL METHOD

WILEY & ASSOCIATES INC.
SURVEYORS AND ENGINEERS
3200 N. HAYDEN RD. #130
SCOTTSDALE, AZ. 85251

LOCATION DATA:

Project: TONTO VERDE MASTER PLAN -- 1992
Location: SEC. 31,T5N,R7E, & SEC. 36, T5N,R6E, MARICOPA COUNTY.
Project No.: 3875A Station:
Name of Stream: Drng.Area: AC-PRE

DESIGN DATA:

Drainage Area:	17.91	acres
Drainage Lengtn:	700.00	feet
Top of Drainage Area	1570.00	feet
Bottom of Drainage Area	1550.00	feet
Drainage Area Slope:	2.8571	%
Time of Concentration (Tc)	4.67	minutes (min. 5 minutes)
Runoff Coefficient (C)	0.32	

DESIGN COMPUTATIONS:

Design Frequency (Yr)	Precipitation Data 6 Hr.	24 Hr.	1 Hr.	Rainfall Intensity (In./Hr.)	Peak Discharge Q = CIA (cfs)
5	1.90	2.40	1.41		ERR
10	2.20	2.83	1.62		ERR
25	2.60	3.38	1.90		ERR
50	3.00	3.88	2.21		ERR
100	3.35	4.39	2.42	8.5	49
100YR/2HR.			2.74	9.05	52

REMARKS:

Computed By:L.F.G. Date: JULY 14,1992

HYDROLOGIC DESIGN DATA SHEET
RATIONAL METHOD

WILEY & ASSOCIATES INC.
SURVEYORS AND ENGINEERS
3200 N. HAYDEN RD. #130
SCOTTSDALE, AZ. 85251

LOCATION DATA:

Project: TONTO VERDE MASTER PLAN -- 1992
Location: SEC. 31, T5N, R7E, & SEC. 36, T5N, R6E, MARICOPA COUNTY.
Project No.: 3875A Station:
Name of Stream: Drng. Area: AC-PST

DESIGN DATA:

Drainage Area:	13.40	acres
Drainage Length:	600.00	feet
Top of Drainage Area	1565.00	feet
Bottom of Drainage Area	1550.00	feet
Drainage Area Slope:	2.5000	%
Time of Concentration (Tc)	4.36	minutes (min. 5 minutes)
Runoff Coefficient (C)	0.57	

DESIGN COMPUTATIONS:

Design Frequency (Yr)	Precipitation Data 6 Hr.	24 Hr.	1 Hr.	Rainfall Intensity (In./Hr.)	Peak Discharge Q = CIA (cfs)
5	1.90	2.40	1.41		ERR
10	2.20	2.83	1.62		ERR
25	2.60	3.38	1.90		ERR
50	3.00	3.88	2.21		ERR
100	3.35	4.39	2.42	8.5	65
100YR/2HR.			2.74	9.05	69

REMARKS:

Computed By: L.F.G. Date: JULY 14, 1992

Drainage Area CC

Runoff for area CC originates on the South of Rio Verde drive and is directed to the East along Rio Verde drive and discharges into Tonto National Forest at the Northeast corner of Tonto Verde.

HYDROLOGIC DESIGN DATA SHEET
RATIONAL METHOD

WILEY & ASSOCIATES INC.
SURVEYORS AND ENGINEERS
3200 N. HAYDEN RD. #130
SCOTTSDALE, AZ. 85251

LOCATION DATA:

Project: TONTO VERDE MASTER PLAN -- 1992
Location: SEC. 31, T5N, R7E, & SEC. 36, T5N, R6E, MARICOPA COUNTY.
Project No.: 3875A Station:
Name of Stream: Drng. Area: CC-PRE

DESIGN DATA:

Drainage Area:	22.72	acres
Drainage Length:	7000.00	feet
Top of Drainage Area	1700.00	feet
Bottom of Drainage Area	1550.00	feet
Drainage Area Slope:	2.1429	%
Time of Concentration (Tc)	30.66	minutes (min. 5 minutes)
Runoff Coefficient (C)	0.32	

DESIGN COMPUTATIONS:

Design Frequency (Yr)	Precipitation Data 6 Hr.	24 Hr.	1 Hr.	Rainfall Intensity (In./Hr.)	Peak Discharge Q = CIA (cfs)
5	1.90	2.40	1.41		ERR
10	2.20	2.83	1.62		ERR
25	2.60	3.38	1.90		ERR
50	3.00	3.88	2.21		ERR
100	3.35	4.39	2.42	3.8	28
100YR/2HR.			2.74	4.3	31

REMARKS:

Computed By: L.F.G. Date: JULY 14, 1992

HYDROLOGIC DESIGN DATA SHEET
RATIONAL METHOD

WILEY & ASSOCIATES INC.
SURVEYORS AND ENGINEERS
3200 N. HAYDEN RD. #130
SCOTTSDALE, AZ. 85251

LOCATION DATA:

Project: TONTO VERDE MASTER PLAN -- 1992
Location: SEC. 31,T5N,R7E, & SEC. 36, T5N,R6E, MARICOPA COUNTY.
Project No.: 3875A Station:
Name of Stream: Drng.Area:CC-PST

DESIGN DATA:

Drainage Area:	9.43	acres
Drainage Length:	5800.00	feet
Top of Drainage Area	1680.00	feet
Bottom of Drainage Area	1550.00	feet
Drainage Area Slope:	2.2414	%
Time of Concentration (Tc)	26.08	minutes (min. 5 minutes)
Runoff Coefficient (C)	0.55	

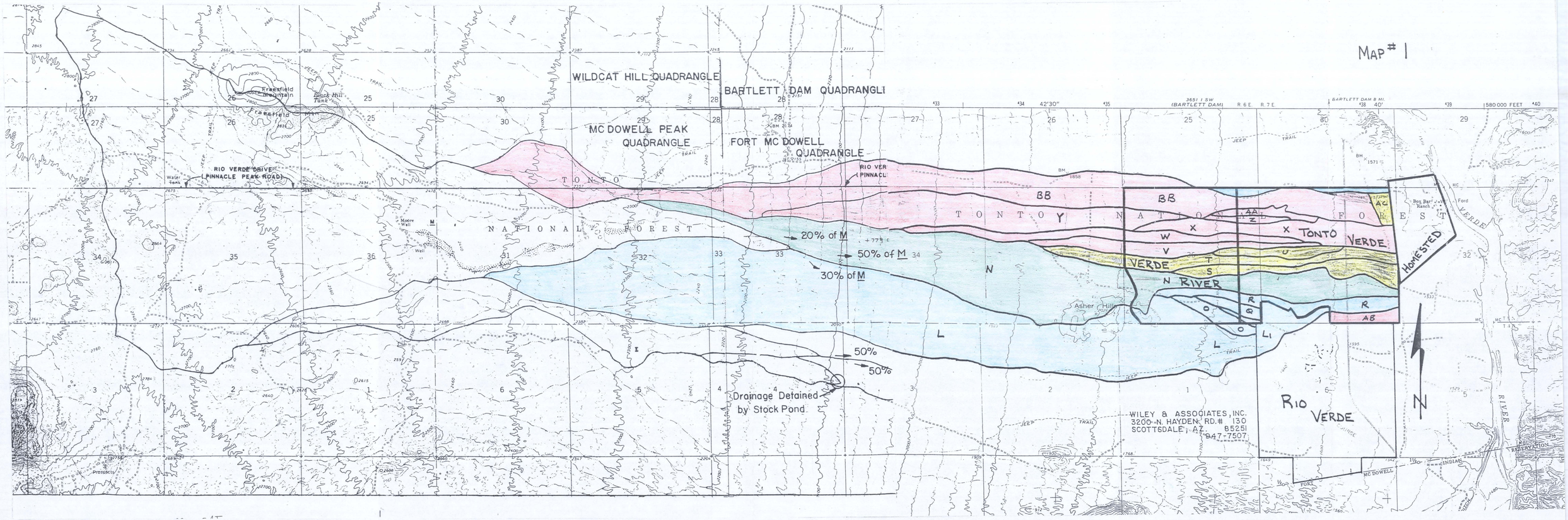
DESIGN COMPUTATIONS:

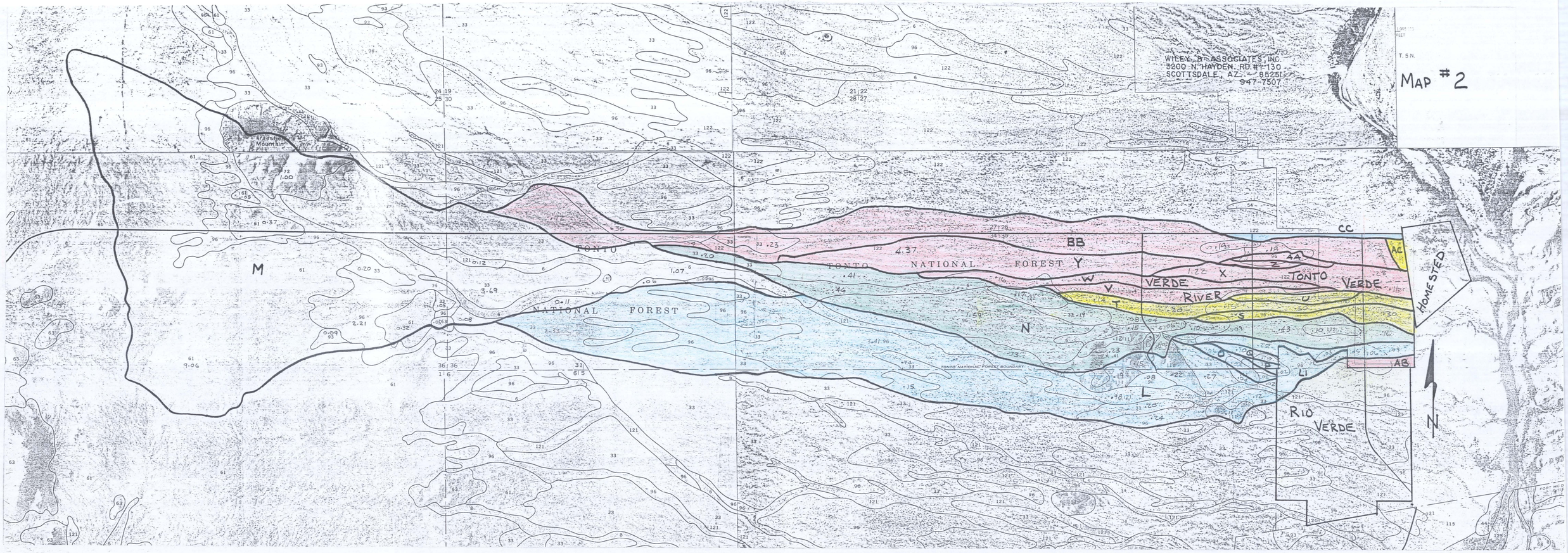
Design Frequency (Yr)	Precipitation Data 6 Hr.	24 Hr.	1 Hr.	Rainfall Intensity (In./Hr.)	Peak Discharge Q = CIA (cfs)
5	1.90	2.40	1.41		ERR
10	2.20	2.83	1.62		ERR
25	2.60	3.38	1.90		ERR
50	3.00	3.88	2.21		ERR
100	3.35	4.39	2.42	3.85	20
100YR/2HR.			2.74	4.6	24

REMARKS:

Computed By:L.F.G. Date: JULY 14,1992

MAP # 1


WILDCAT HILL QUADRANGLE
BARTLETT DAM QUADRANGLI
MC DOWELL PEAK QUADRANGLE
FORT MC DOWELL QUADRANGLE
Freestield Mountain
Black Hill Tank
RIO VERDE DRIVE (PINNACLE PEAK ROAD)
Water Tank
Moore Well
Well
Prescotte
TONTO NATIONAL FOREST
RIO VER (PINNACL
BB
AA
AC
W
X
V
T
S
U
R
AB
Q
O
L
LI
N
TONTO VERDE
VERDE RIVER
HOMESTED
Box Bar Ranch
Ford
Asher Hills
20% of M
50% of M
30% of M
50%
50%
Drainage Detained by Stock Pond
WILEY & ASSOCIATES, INC.
3200 N. HAYDEN RD. # 130
SCOTTSDALE, AZ 85251
947-7507
RIO VERDE
N
MC DOWELL
FORT
INDIAN RESERVATION
RIVER
3651 I SW (BARTLETT DAM)
R 6 E
R 7 E
BARTLETT DAM 8 MI.
42'30"
40'
580 000 FEET


WILEY, B. ASSOCIATES, INC.
3200 N. HAYDEN, RD. #-130
SCOTTSDALE, AZ. 85251
947-7507
MAP #2
T. 5 N.
TONTO NATIONAL FOREST
TONTO NATIONAL FOREST
TONTO NATIONAL FOREST BOUNDARY
VERDE RIVER
TONTO VERDE
RIO VERDE
HOMESTED
M
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L
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V
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BB
CC
AC
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S
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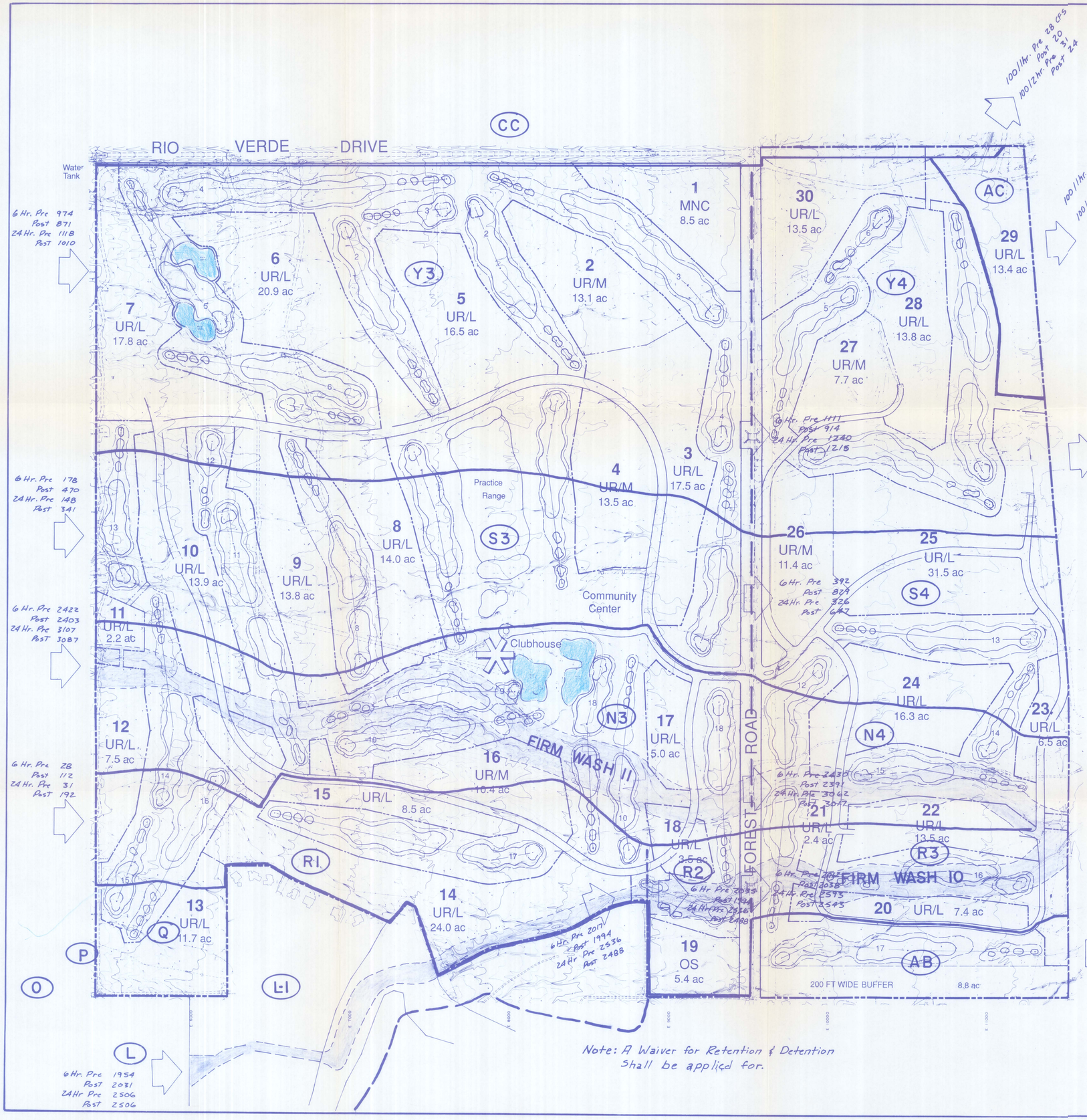
P
LI
N

DEVELOPMENT MASTER PLAN

Tonto Verde

MARICOPA COUNTY, ARIZONA

PREPARED FOR: RIO VERDE SERVICES, INC.
25609 DANNY LANE
RIO VERDE, AZ 85263
602-471-7247



CORNOYER HEDRICK

WILEY & ASSOCIATES, INC.
SURVEYORS, ENGINEERS
8020 E. GRAY ROAD, SUITE 130
SCOTTSDALE, AZ 85251
(602) 998-8566
EARLE L. SLYDER L.S.
LEONARD GOSTINSKI P.E.

TONTO VERDE MASTER DRAINAGE PLAN 1992

DESIGN	CHECK	PROJECT NO.	SHEET
DRAWN LG	DATE 7-92	3875-A	1 OF 1

6-16-92