DRAINAGE ANALYSIS FOR:

SCOTTSDALE CORE NORTH

SCOTTSDALE, ARIZONA

PREPARED FOR:

CORE NORTH, INC.
7373 NORTH SCOTTSDALE ROAD, SUITE 285A
SCOTTSDALE, ARIZONA 85253

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PREPARED:

09/21/89

PRERARED IN CO-OPERATION WITH THE ARIZONA STATE LAND DEPARTMENT.

PRELIMINARY REPORT
DRAINAGE ANALYSIS FOR
STATE LANDS, 2,300 ACRES
North of Outer Loop Highway
Between Scottsdale Road and Pima Road

Submitted to:
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The contents of this report reflect the views of the author, who is responsible for the facts and accuracy of the data presented herein. The contents have not been approved by the Land Department and do not necessarily reflect the official views or policies of the Arizona State Land Department.

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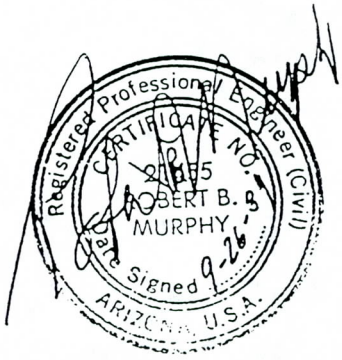

INTRODUCTION

Core North, Inc. currently holds a planning permit for approximately 2,300 acres of State Trust land in north Scottsdale (Figure 1). At the conclusion of the planning process, Core North, Inc. plans on purchasing and developing this property.

Carter Associates, Inc. has been retained to prepare a Preliminary Hydrology Study to be submitted as an element of the planning process. The purpose of this study is to identify and characterize the current hydrologic condition affecting the site. Further, the study is to develop criteria which will be used for the planning of both the drainage infrastructure and the overall site.

The scope of this study is preliminary in nature with emphasis on existing drainage conditions and criteria for planning the overall site. This study is meant to present conditions and criteria which we anticipate will have to be dealt with in the subsequent planning process.

The following report presents estimates of storm runoff flow rates and volumes impacting the site. The runoff flow rates and volumes originating from both on-site and off-site areas, approximate channel locations and sizes as well as retention/ detention locations and volumes are presented in the following test as well as Tables 1 through 3, Figures 1 through 6 and in the appendices.

PROJECT DESCRIPTION

The proposed project, which is comprised of approximately 2,300 acres of State Trust land, is located in Scottsdale, Arizona (Figure 1). The site is located within

Sections 23, 24, 25 and portions of 26 and 36 in T.4N., R.4E., of the Gila and Salt River Base and Meridian, Maricopa County. The project site is bounded on the north by Deer Valley Road, on the east by Pima Road, on the west by Scottsdale Road, and on the south by the proposed alignment of the Outer Loop Highway.

Although the development scheme of the project site is in the planning process, it is curently envisioned that the land uses will, in all likelihood, consist of residential, light industrial, office, medical, multi-family, resort and technical center. The resort currently has a golf course under consideration as an amenity. The proportions of various land uses will be determined as the planning process moves forward.

SITE DESCRIPTION

The site is currently in a relatively undeveloped state. There is a 365± foot wide power line easement extending from the southeast corner to the northwest corner of the site. the easement is currently cohabitated by Salt River Project (SRP), Arizona Public Service (APS) and Western Area Power Administration (WAPA).

The City of Scottsdale currently has a treatment plant located in the southeast quarter of Section 25. This site has an area of 20 acres. The proposed Outer Loop Highway right-of-way is located on the south edge of the project site (Figure 1). The design of the proposed freeway calls for drainage facilities to be constructed on the north side of the alignment on the State Trust land for which Core North holds the planning permit. The drainage facilities proposed consist of two substantial detention basins. One basin is to be located between Hayden Road and Pima Road

adjacent to the Outer Loop Highway alignment. A second proposed basin would be located north of the highway between Hayden Road and Scottsdale Road. These basins are meant to attenuate peak storm runoff flow from watersheds to the north and east such that conveyance facilities under the highway and through approved development to the south could be designed for significantly reduced peak discharge rates. Some of the conveyance facilities to the south of the highway in this area are preliminarily designed and it is our understanding that a portion of the overall system is currently under construction or constructed.

Along the south boundary of this approved development, south of the Outer Loop Highway, is the Central Arizona Project Canal (CAP). On the north side of the canal are large retention basins which were designed to store runoff from a maximum probable flood occurring from tributary areas to the north and east. The watershed area assumed tributaries to these retention basins was estimated by the Bureau of Reclamation based on undeveloped conditions that existed when the CAP was designed.

Topographically, the site slopes at approximate 1.5± percent from northeast to southwest. The overall surface of the site is generally quite uniform with no significant irregular changes in elevation.

The surface of the site is crossed perpendicular to the contour lines by numerous small washes. These washes form a complex system of braided and often interconnected runoff conveyance channels. These washes vary in depth from 0.5 feet to 4 feet.

The vegetative community in this area consists of, but is not limited to, the following species: Palo Verde, Ironwood Saguaro, Barrel Cacti, Salt Sage, etc.

OFF-SITE HYDROLOGY

The watershed area tributary to the Core North, Inc. planning area has recently been studied several times in conjunction with private development planning (Carter, 1988), Outer Loop Highway design (Simons and Li, 1987, 1989), FEMA flood insurance mapping and North Scottsdale Master Drainage planning (Water Resources Associates, 1989).

The results of these studies have varied substantially mainly due to the complex nature of the watershed area south and west of the McDowell Mountains. This area consists mainly of alluvial fans which are characterized by complex systems of interconnected and often changing washes. Additionally, the studies have used different methods and input data.

After reviewing the studies referenced above, Carter Associates has chosen to use the data presented in the Master Drainage Plan for North Scottsdale prepared for the City of Scottsdale. This study is currently being recommended by the City as a base line study for this area. The FEMA contractor conducting the flood insurance study in this part of Scottsdale is also using the results of this study in their work.

Tributary area to the Core North, Inc. site has been delineated into three separate watersheds (Figure 2). Carter Associates has obtained from the City of Scottsale

the computer input data for the area tributary to the 2,300 acre site. These data were modified to reflect changes in the watershed with respect to drainage patterns and development (Figure 3).

The flows crossing the north property boundary from sub-basin 32 and those sub-basins upstream in that watersheds were adjusted by reducing the overall watershed area downward by the area of sub-basin 32 on the 2,300 acre site. The same approach was taken for adjusting flows crossing the north property boundary in sub-basin 37 and sub-basins upstream of 37. The most easterly tributary area to the 2,300 acre site was handled in a similar manner. The tributary area not contributing was obtained by a reduction in the drainage area. This situation was noted due to Ironwood Village (Figure 3). As part of the drainage infrastructure for Ironwood Village, one large channel diverts flow to the south of the southeast corner of the site.

The wateshed characteristics for those areas tributary to the north and east property boundaries are described in detail in the Master Drainage Report for North Scottsdale.

ON-SITE MANAGEMENT OF RUNOFF

There are generally four governmental agencies that will have input with respect to the methodologies used in the hydrologic and hydraulic analysis of the on-site stormwater. They are: the Arizona State Land Department (ASLD), City of Scottsdale (COS), the Arizona Department of Transportation (ADOT) and the Federal Emergency Management Agency (FEMA).

The City of Scottsdale's development criteria requires sufficient drainage facilities to intercept, convey, store and discharge storm runoff for up to a 100-year rainfall. The City has suggested for baseline hydrology in this area the hydrologic plan for North Scottsdale. This plan is presented in a report entitled "General Drainage Plan for North Scottsdale, Arizona" (Water Resources Associates, 1989). This plan presents estimates of existing storm runoff onto and off of the Core North site. For purposes of this report, the drainage areas and watershed data were modified specifically for the Core North site, thus excluding data on areas not impacting this site. Table 1 lists the drainage basin numbers (Figure 3) and corresponding data that has been modified to analyze the site. Table 2 lists the drainage concentration points and corresponding 100-year return period of discharge values.

There are four significant flows entering this parcel (exception is Ironwood Village improvements). Table 2 lists the drainage subbasins with corresponding discharge values. Figures 2 through 4 identify the approximate locations of where the off-site rainfall runoff flows cross Pima Road or Deer Valley Road and onto Core North's site. Ironwood Village is a single-family and light commercial subdivision that is under construction at this time. Extensive channelization has, for the most part, been completed. The western most "collector" channel will accept runoff and convey it to a dip section in Pima Road. This conveyed flow will be more concentrated when flowing over Pima Road and onto the site than the remaining flows (sheet flow) that enter this project at the present ime.

Based on the current flow patterns, a series of channels will be necessary to collect and convey the off-site flows through the project area (Figure 5). Preliminary estimates have been made for collector channel sizes. Proposed locations of these

channels will be along the north and east property lines. Conveyance channels have also be preliminarily sized and are located to drain the runoff through the Core North project. The proposed channel size estimates were based on conveying the peak runoff from the 100-year, 24-hour return period event. A typical channel may consist of a trapizoidal section with 4:1 side slopes. For purposes of this report, a Mannings roughness of 0.035 (rock rip-rap or grouted rock rip-rap lining) was assumed. Longitudinal channel slopes were based on existing topography. Channel sizing estimates are presented in Appendix II.

Potentially, the main hydrologic impact ADOT will have on the State Trust land (or Core North planning of this area) will be on the collection and conveyance of storm flows through its right-of-way.

As stated in the Project Description section of this report, the proposed Outer Loop Highway (ADOT project) will be located on the south edge of the project (Figure 5). The design calls for detention basins to intercept flows from drainage areas 34 through 38 (detention basin located between Hayden Road and Scottsdale Road) and drainage areas 39 through 53 (detention basin located between Hayden and Pima Road). See Figures 4 and 5 for these proposed detention basin locations. The proposed collector conveyance channels, as stated above, will convey the off-site and some on-site flows to these basins. The outflow (weir and/or culvert) as proposed would drain under the Outer Loop Highway and into proposed collector/ conveyance channels in the State Trust land called Core South (Figure 5).

An alternative to detention basins at the currently proposed location is to detain all or a portion of the off-site flows in the power line easement (Figure 5). The electric

companies cohabitating the power line easement, SRP, APS and WAPA, have been verbally contacted concerning this alternative. They have indicated that the use of the power line easements for detention purposes appears to be an acceptable use. Approval of any use will be based on specific improvement plans. This alternative has the potential to substantially reduce the necessity for the large detention basins proposed along the Outer Loop Highway. If future hydrologic/hydraulic studies show that these alternative basins are not adequate, then the basins proposed along the Outer Loop Highway could be re-designed. If the alternative power line easement basins are implemented in future design, then the detention basins along the Outer Loop Highway would potentially be greatly scaled down.

The potential for using the power line easement for detention/retention appears to be significant in the northwest drainage area (drainage areas 30 through 33). A previous hydrology study indicates that one intermediate detention basin at Happy Valley Highway and Pima Road is planned. By utilizing the power line easement for detention/retention basins, the peak flows impacting Scottsdale Road and future development could potentially be reduced and better control.

Detention/retention volumes for the 2,300 acre parcel have been estimated based on an assumed mix of residential and commercial development. The volume of runoff associated with the 2,300-acre site was estimated by using the 100-year, 2-hour rainfall event of 2.82 inches (U.S. Department of Commerce, WBTM WR 44). Table 3 lists the estimated retention volumes per type of development and total volume to be stored for the entire parcel. The total storage volume required is approximately 440 acre-feet.

This runoff volume is based on an assumed mix of land uses. The on-site detention/retention basins will most likely be located in proposed golf course and/or park areas. The detention/retention outlet elevations should be equal to the 100-year high water elevation in adjacent conveyance channels unless approved by the City of Scottsdale's drainage administrator. On-site development runoff that has been detained shall be disposed of within 36 hours by bleeding the stormwater by use of culverts, weirs, and/or drywells. Drywells are discouraged by the City and must receive special approval from the City Water Resources Department and be registered with the State Department of Water Resources. Flows from the basins shall not exceed pre-development flows. If runoff is to be conveyed by an underground system, complete plans shall be submitted.

Currently, the entire parcel is in a Federal Emergency Management Agency (FEMA) "B" flood zone. A flood insurance study currently in progress by Cella Barr Associates on the alluvial fans in North Scottsdale indicates that the majority of the Core North site is in an "A" flood zone with specified depths. These potential flow depths range between one to three feet and potential velocities between 6 to 8 feet per second (fps). See Figure 6 for the preliminary alluvial fan study results on this project site. Approximately one-third of Section 24, according to this study, is classified as an "A" flood zone. This means that the parcel is in an area of 100-year flooding and base flood elevations and flood hazard have not been determined (Figure 5). Although this portion of the project was not analyzed for depth of flow and velocity over the alluvial fan, it can be assumed that since this area is similar to the remainder of the site, strong potential for similar "A" flood zone classification exists. Based on this assumption, the depth of flow in this area probably is between one and three feet and the velocities between 6 and 8 fps.

REFERENCES

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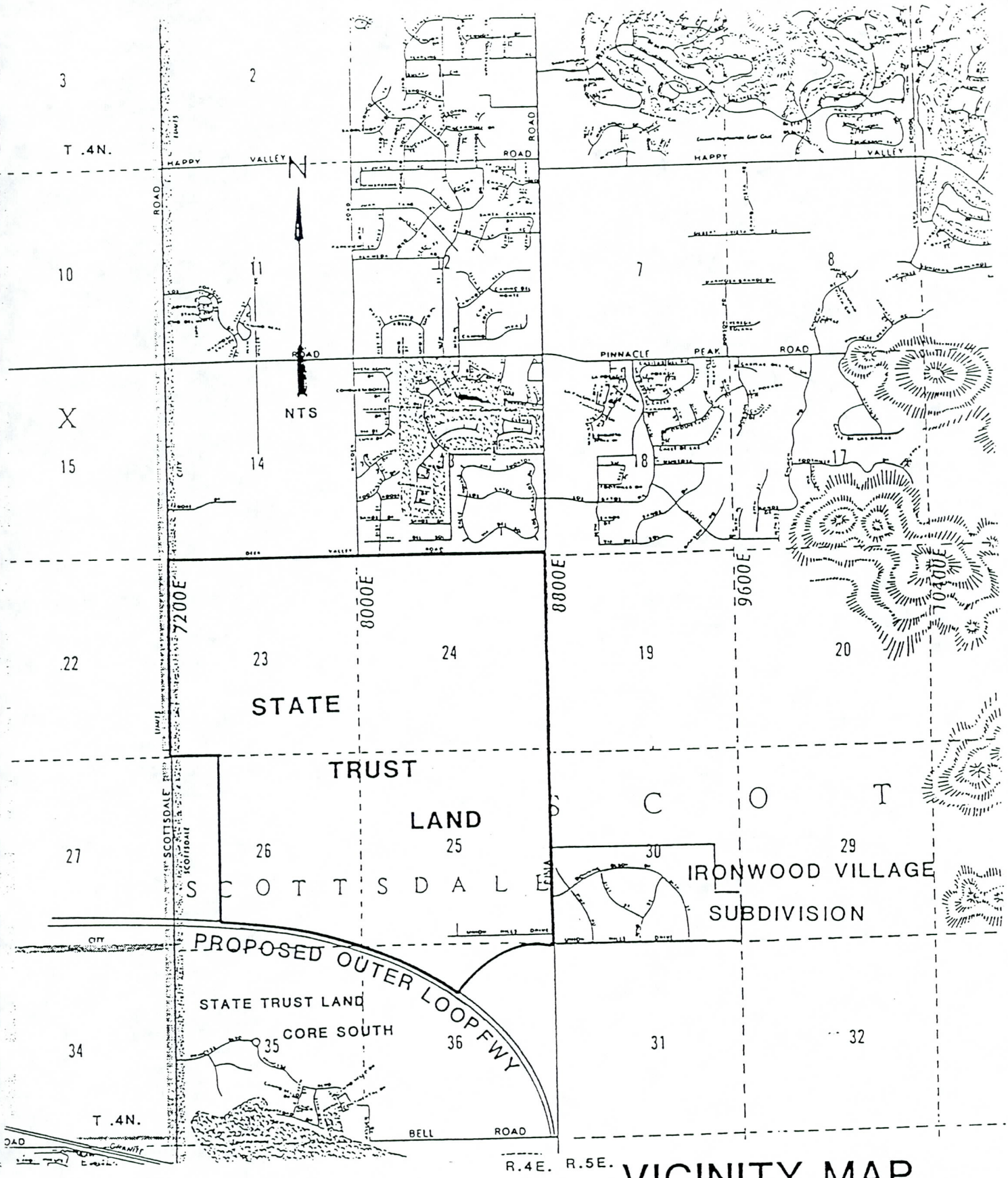

VICINITY MAP

FIGURE 1

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WATERSHED BOUNDARY MAP

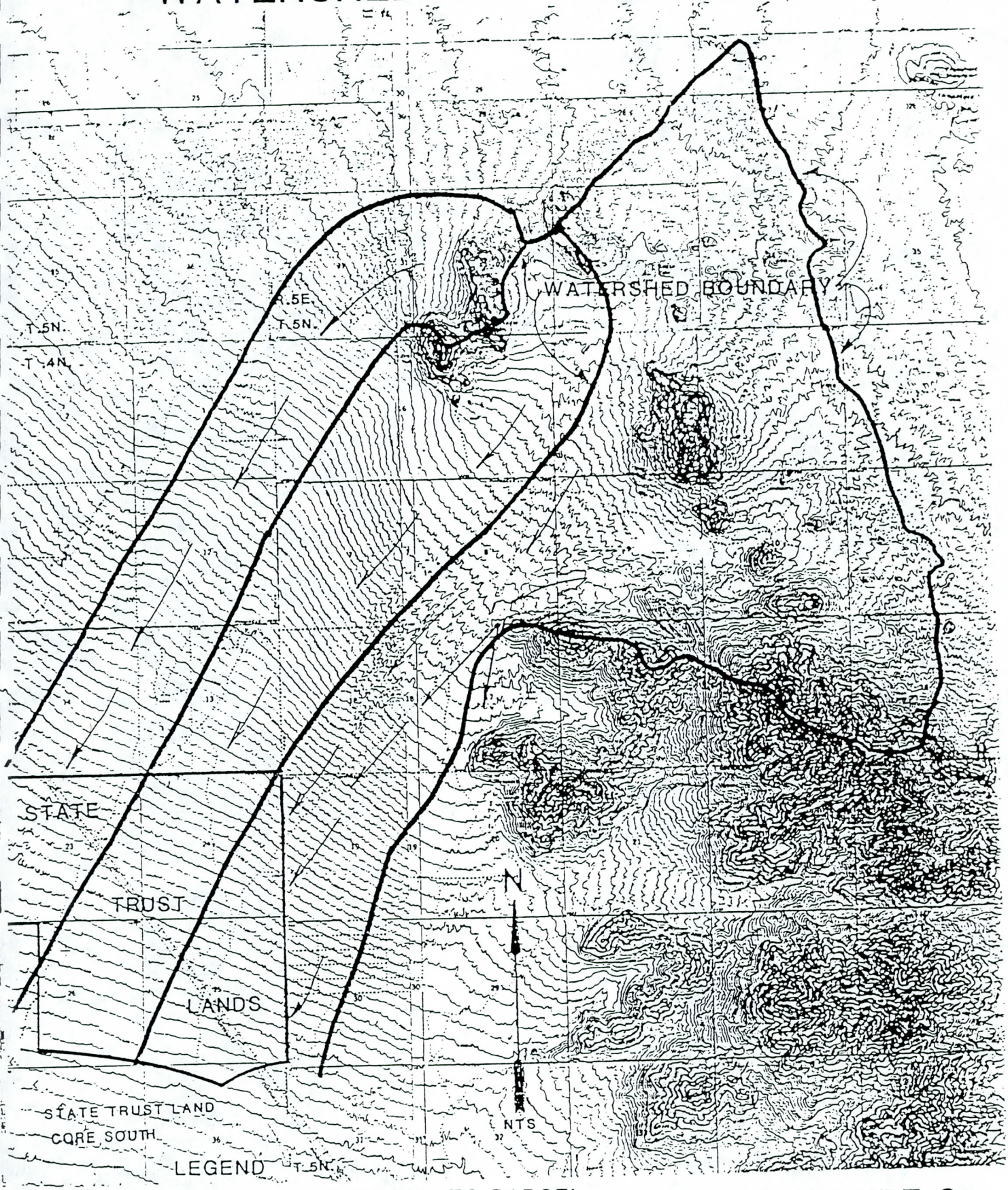
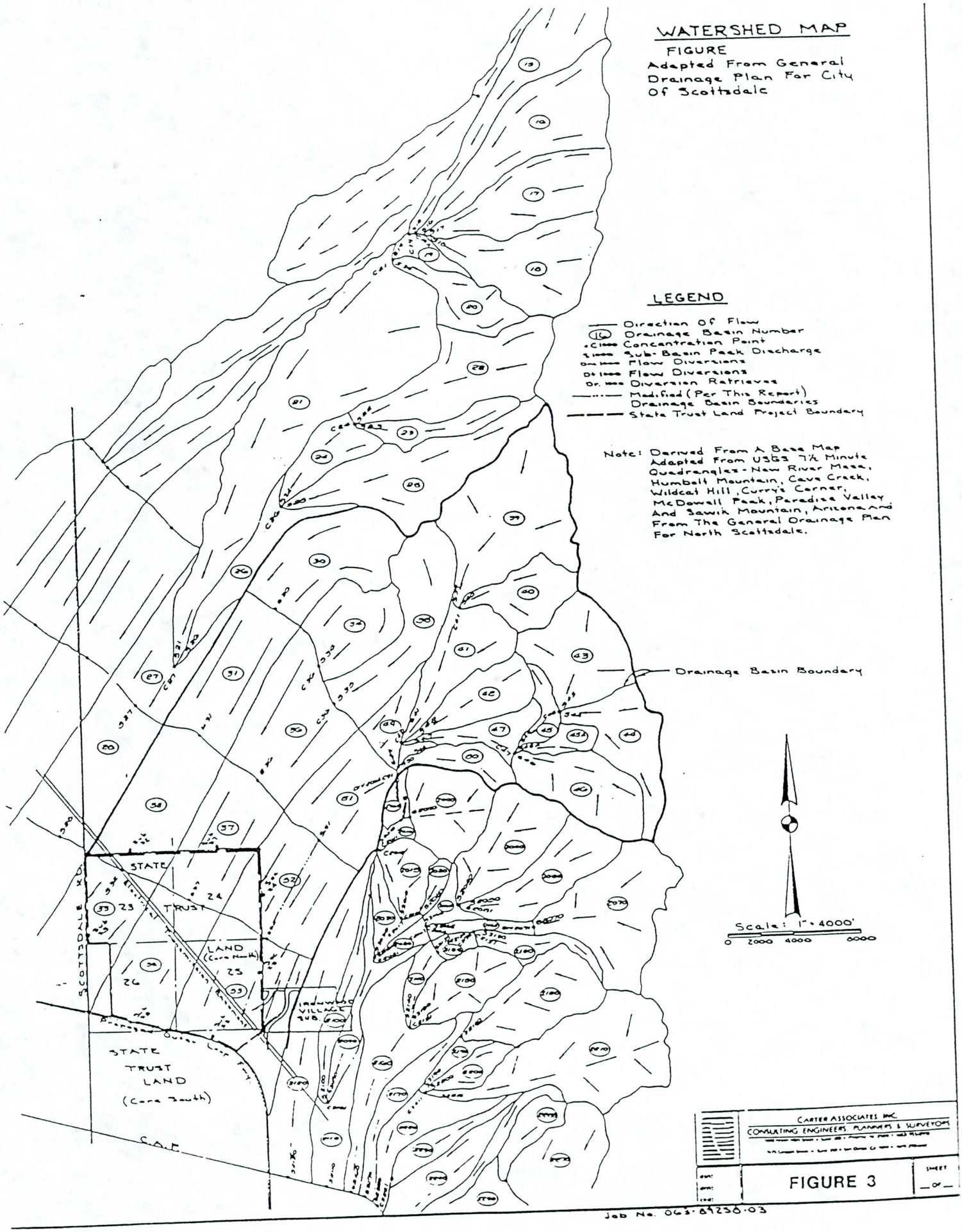


FIGURE 2

063-89258-03

WATERSHED MAP

FIGURE
Adapted From General Drainage Plan For City Of Scottsdale



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CONSULTING ENGINEERS, PLANNERS & SURVEYORS

FIGURE 3

SHEET _ OF _

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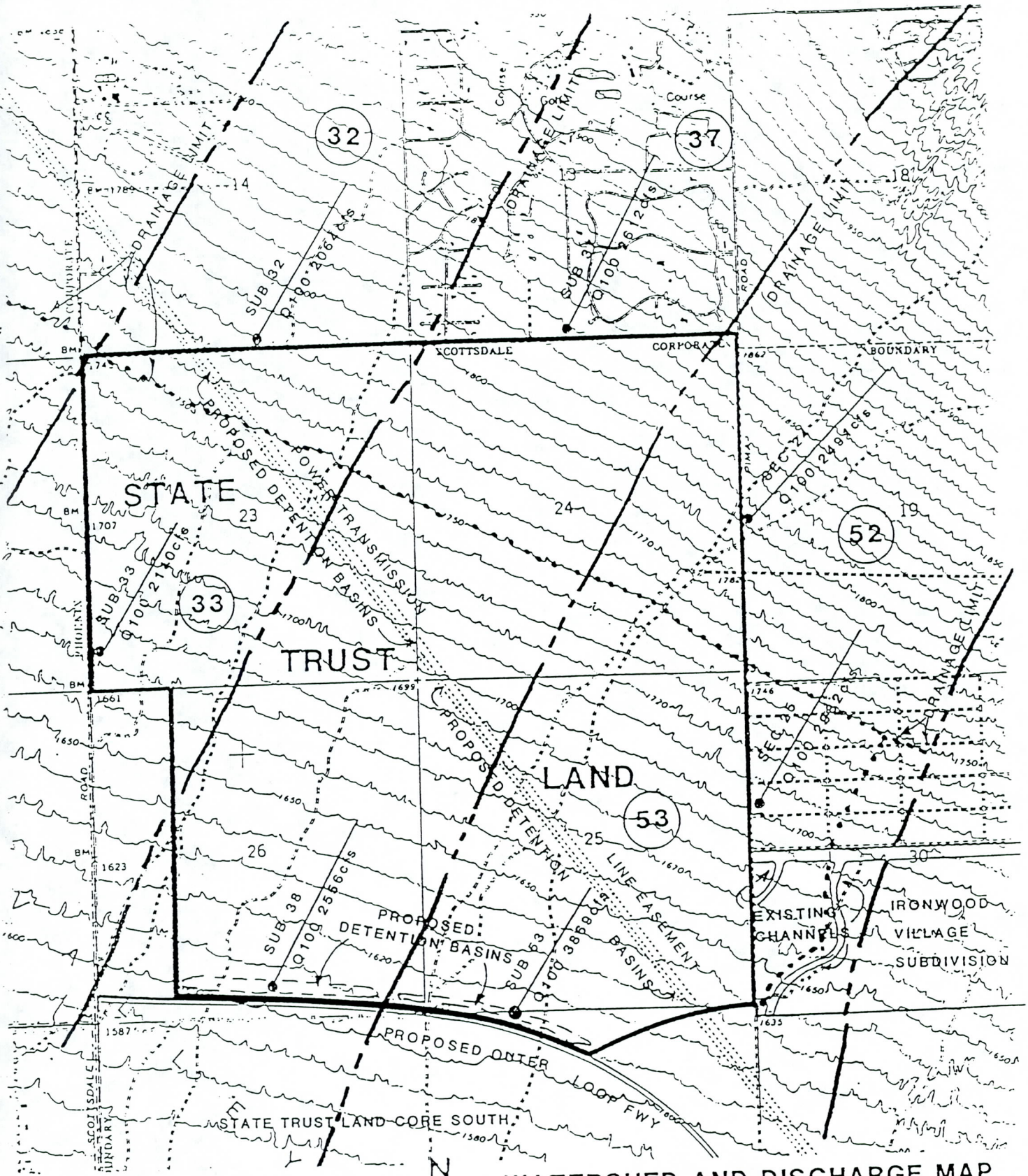

LEGEND

SUB 37 = CONCENTRATION POINT

Q100 = 100 YEAR DISCHARGE

WATERSHED AND DISCHARGE MAP

FIGURE 4

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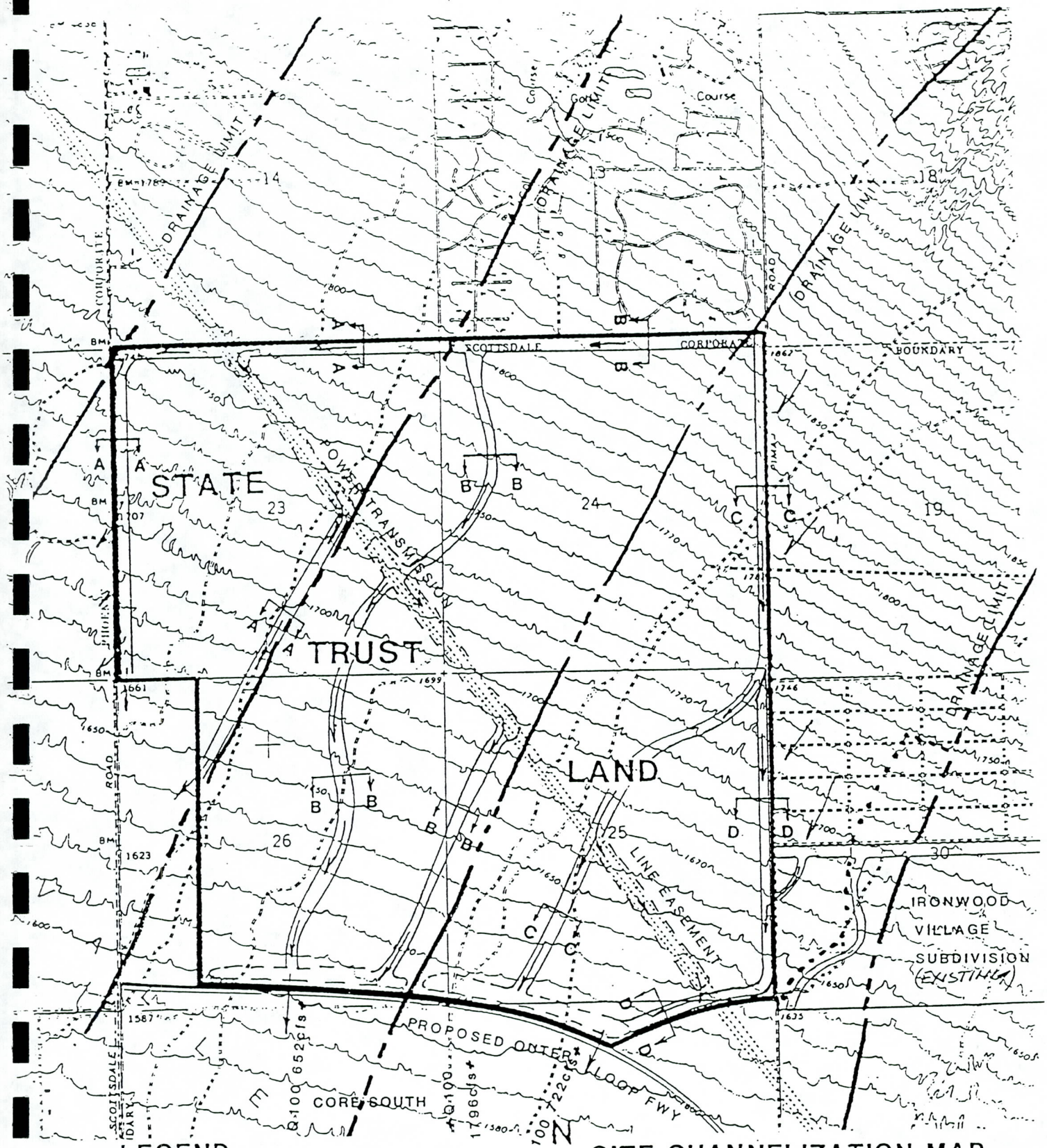

SITE CHANNELIZATION MAP

FIGURE 5

NOTE: FOR CROSS-SECTIONS SEE REPORT APPENDIX

+ DISCHARGE FROM REFERENCE 3

063-89258-03

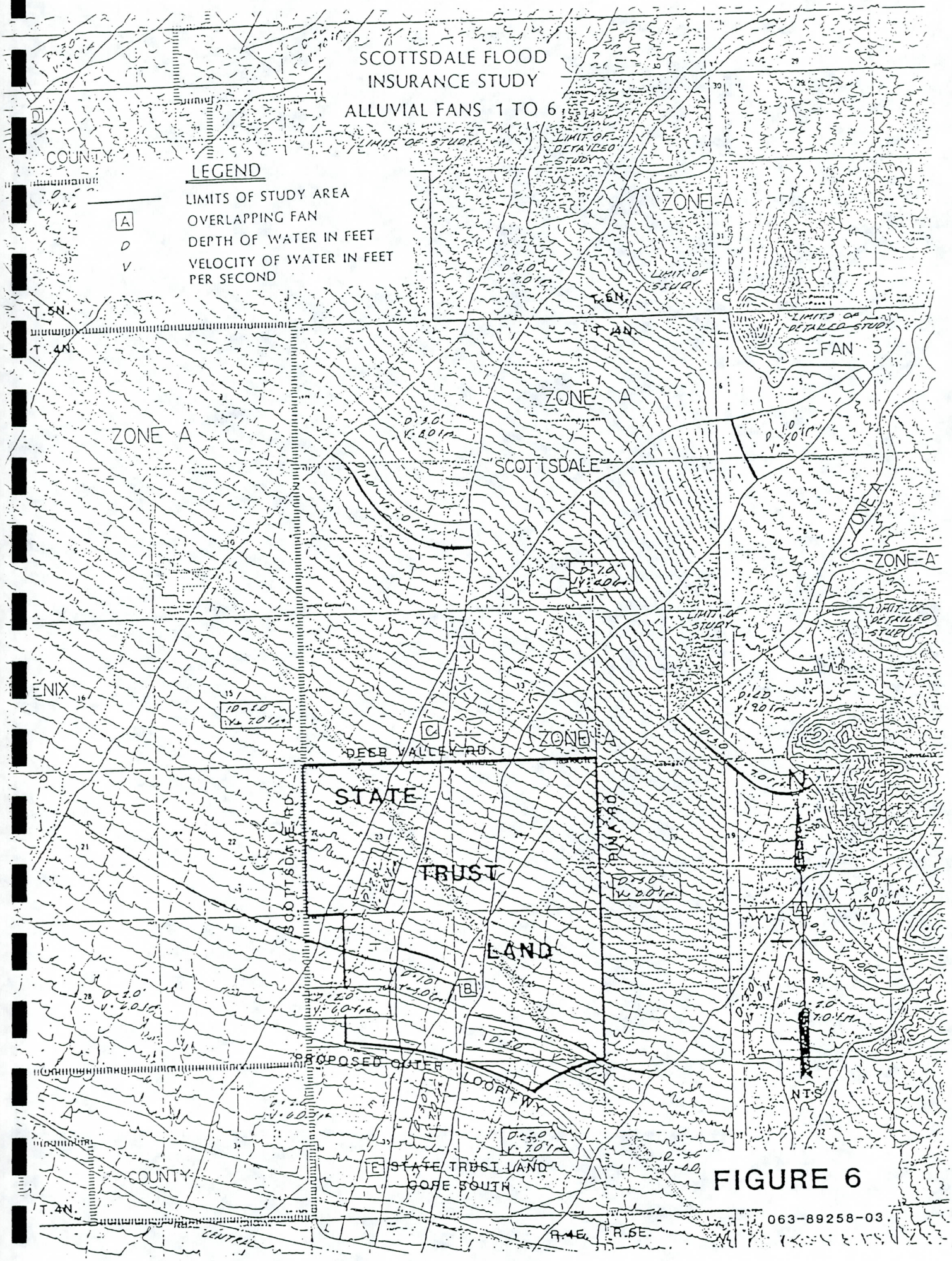

FIGURE 6

063-89258-03.

TABLE 1
MODIFIED HYDROLOGIC DATA FOR
DRAINAGE TO STATE TRUST LANDS

WSD* No.	COS** Area (acre)	Modified Area (acre)	COS Basin Length (feet)	Modified Basin Length (feet)	COS Impervious (%)	Modified Impervious (%)
Flow to North Property Line (Existing)						
32	1.3985	1.1942	9,300	8,000	2.99	3.50
37	1.1896	0.7260	8,433	5,000	9.58	15.70
Flow to East Property Line (Existing)						
52	1.3557	1.1537	6,633	6,633	1.15	7.72
53	1.7471	0.404	7,767	4,500	0	16.60
Flow to South Central and West Property Lines (Existing)						
33	1.5717	0.6026	9,500	6,800	0	0
38	1.2597	1.2543	8,300	8,300	0	0
Flow to South and East Property Lines (Existing)						
53	1.7471	1.2634	7,767	7,000	0	1.5

*WSD - Watershed or drainage area.

**COS - City of Scottsdale, "Watershed Sub-Basin Delineation and HEC-1 Routing Schematic" Data (existing condition) and HEC-1 Hydrologic Data

TABLE 2

DISCHARGE TABLE

Concentration Point	Comments	Discharge (cfs)
Sub 32	Along north property line	2,064
Sub 37	Along north property line	2,612
Sec 24	Along east property line	2,491
Sec 25	Along east property line	2,982
Sub 33	Along west property line	2,110
Sub 38	Along south property line	2,556
Sub 53	Along south property line	3,869

TABLE 3

DETENTION/RETENTION TABLE FOR
ASSUMED MIXED DEVELOPMENT

Land Use/ Zoning	Area (ac)	CN	Run-off in Inches	Retention Volume (ac-ft)
East Drainage Area				
SF	104.3	91	1.91	16.6
Low SF	63.4	89	1.74	9.2
MF	6.9	95	2.27	1.3
MED	195.1	93	2.08	33.8
C	23.6	96	2.38	4.6
O	21.4	95	2.27	4.0
TECH	72.9	95	2.27	14.4
LT IND	210.6	96	2.38	41.8
Sewage Treatment Plant	39.6	93	2.08	6.9
Park/Detention Basins	131.5	98	2.59	28.4
Golf Course	61.4	75	0.85	12.7
Overhead Trans. Lines	47.8	85	1.44	5.7
IND	43.2	96	2.38	8.5
				188
Central Drainage Area				
SF	87.6	91	1.91	13.9
Low SF	163.0	89	1.74	23.6
MED	129.7	93	2.08	22.5
MF	20.2	95	2.27	3.8
COM	32.4	96	2.38	6.4
LT IND	130.2	96	2.38	25.6
IND	42.5	97	2.48	8.8
Golf Course	87.4	75	0.85	6.2
Park/Detention/Channel	97.0	98	2.59	20.9
Corp Headquarters/Hotel	82.4	93	2.08	14.3
O	50.5	95	2.27	9.6
TECH	34.2	95	2.27	6.5
Overhead Trans. Lines	41.0	85	1.44	4.9
				167

TABLE 3 (continued)

Land Use/ Zoning	Area (ac)	CN	Run-off in Inches	Retention Volume (ac-ft)
West Drainage Area				
SF	91.8	91	1.91	14.6
MED	304.0	93	2.08	52.7
MF	46.0	95	2.27	8.7
O	24.2	95	2.27	4.6
DET	12.2	98	2.59	2.6
Overhead Trans. lines	11.0	85	1.44	1.3
				85

Total assumed mixed development layout retention required.
Total = East DA + Central DA + West DA
= 167 +188 + 85
= 440 ac-ft

APPENDIX I

FLOW TO EAST PROPERTY LINE


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

    1     ID    SEPT. 13, 1989
    2     ID    TRYHUS STATE LANDS - 2356 ACRES
    3     ID    FLOW TO EAST PROPERTY LINE                EXISTING CONDITION
    4     ID    MODEL TREP.D99,--- SUB-BASIN SERIES 39 TO 53--OUTER LOOP WATERSHED
    5     ID    GENERAL DRAINAGE PLAN FOR NORTH SCOTTSDALE, EXISTING CONDITIONS
    6     ID    100-YR, 24-HR STORM, USING SCS TYPE IIA RAINFALL DISTRIBUTION
    7     ID    RAINFALL FROM NOAA ATLAS, USING 10 SQ MI AREAL REDUCTION FACTOR
          *DIAGRAM
    8     IT      5 24JUL89      0     289
    9     IO      5      0
   10     IN     30 24JUL89      0

   11     KK  SUB39
   12     KM      RUNOFF FROM SUB-BASIN 39
   13     BA  1.9422
   14     PB   4.32
   15     PC     0   .005   .009   .010   .013   .019   .021   .028   .032   .044
   16     PC  .057   .100   .660   .745   .776   .800   .816   .830   .840   .850
   17     PC  .861   .868   .878   .884   .891   .900   .905   .912   .919   .923
   18     PC  .930   .934   .939   .944   .950   .958   .961   .963   .969   .971
   19     PC  .974   .979   .981   .985   .989   .991   .993   .996  1.000
   20     LS            85  1.60
   21     UK   330  .0433    .20   100
   22     RK 11240  .0253   .045         TRAP     30      3

   23     KK  SUB40
   24     KM      RUNOFF FROM SUB-BASIN 40
   25     BA  .5844
   26     LS            83  1.06
   27     UK   160  .0627    .20   100
   28     RK  7000  .0350   .045         TRAP     20      3

   29     KK  CP41
   30     KM      COMBINE HYDROGRAPHS SUB39 & SUB40
   31     HC    2

   32     KK  SUB41
   33     KM      RUNOFF FROM SUB-BASIN 41 & ROUTE CP 41
   34     BA  .7911
   35     LS            74  2.04
   36     UK   280  .2386    .20   100
   37     RK  9400  .0282   .045         TRAP     50      3    YES

   38     KK  SUB42
   39     KM      RUNOFF FROM SUB-BASIN 42
   40     BA  .5844
   41     LS            78  1.24
   42     UK   280  .2386    .20   100
   43     RK  8750  .0573   .045         TRAP     20      3
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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  44      KK  SUB43
  45      KM       RUNOFF FROM SUB-BASIN 43
  46      BA 1.0708
  47      LS             85    1.03
  48      UK    260   .0515     .20     100
  49      RK   7400   .0255     .045           TRAP      25       3

  50      KK  SUB44
  51      KM       RUNOFF FROM SUB-BASIN 44
  52      BA  .8537
  53      LS             85
  54      UK    260   .0515     .20     100
  55      RK   9840   .0622     .045           TRAP      25       3

  56      KK   CP45
  57      KM       COMBINE HYDROGRAPHS SUB43 & SUB44
  58      HC      2

  59      KK  SUB45
  60      KM       RUNOFF FROM SUB-BASIN 45 & ROUTE CP 45
  61      BA  .2037
  62      LS             81
  63      UK    125   .1166     .20     100
  64      RK   3600   .0366     .045           TRAP      30       3    YES

  65      KK SUB45A
  66      KM       RUNOFF FROM SUB 45A
  67      BA  .1720
  68      LS             86
  69      UK    275   .2200     .20     100
  70      RK   5400   .0411     .045           TRAP      15       3

  71      KK  SUB46
  72      KM       RUNOFF FROM SUB-BASIN 46
  73      BA  .9268
  74      LS             86
  75      UK    265   .4958     .20     100
  76      RK   3300   .2271     .045    .111   TRAP      10       3
  77      RK   7100   .0535     .045           TRAP      25       3

  78      KK   CP47
  79      KM       COMBINE HYDROGRAPHS SUB45, SUB45A, & SUB46
  80      HC      3

  81      KK  SUB47
  82      KM       RUNOFF FROM SUB-BASIN 47 & ROUTE CP 47
  83      BA  .3757
  84      LS             77    1.28
  85      UK    375   .1000     .20     100
  86      RK   9600   .0217     .045           TRAP      50       3    YES
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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  87      KK   CP48
  88      KM       COMBINE HYDROGRAPHS SUB41, SUB42, & SUB47
  89      HC     3

  90      KK   SUB48
  91      KM       RUNOFF FROM SUB-BASIN 48 & ROUTE CP 48
  92      BA  .0438
  93      LS            73   4.14
  94      UK   150  .0733    .20    100
  95      RK  1300  .0338    .045          TRAP     75      3     YES

  96      KK   SUB49
  97      KM       RUNOFF FROM SUB-BASIN 49
  98      BA  .3528
  99      LS            79   1.88
 100      UK   135  .0758    .20    100
 101      RK  5400  .0370    .045          TRAP     30      3

 102      KK   SUB50
 103      KM       RUNOFF FROM SUB-BASIN 50
 104      BA  .3580
 105      LS            84   1.39
 106      UK   300  .3555    .20    100
 107      RK   730  .1506    .045   .036   TRAP     10      3
 108      RK  6400  .0453    .045          TRAP     25      3

 109      KK   CP51
 110      KM       COMBINE HYDROGRAPHS SUB48, SUB49, & SUB50
 111      HC     3

 112      KK   2004    DIV
 113      KM       DIVERT FLOW TO SUB 2005
 114      KM       THIS DIVERT OCCURS AT A BRAIDED CHANNEL BIFURCATION LOCATED 1000 FEET
 115      KM       SOUTH OF THE EAST END OF PINNACLE PEAK ROAD.
 116      KM       THIS IS AN ACTIVE ALLUVIAL FAN APEX.
 117      DT   2003
 118      DI     0   15000
 119      DQ     0    7500

 120      KK   SUB51
 121      KM       RUNOFF FROM SUB-BASIN 51 & ROUTE NON-DIVERTED FLOW FROM DIV 2004
 122      BA 1.0675
 123      LS            72   4.06
 124      UK    94  .0213    .10    100
 125      RK  6400  .0329    .045          TRAP   1500      2     YES

 126      KK   SUB52
 127      KM       RUNOFF FROM SUB-BASIN 52 & ROUTE SUB 51
 128      BA 1.1537
 129      LS            71   7.72
 130      UK    76  .0213    .10    100
 131      RK  6633  .0300    .045          TRAP   2500      2     YES
```

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

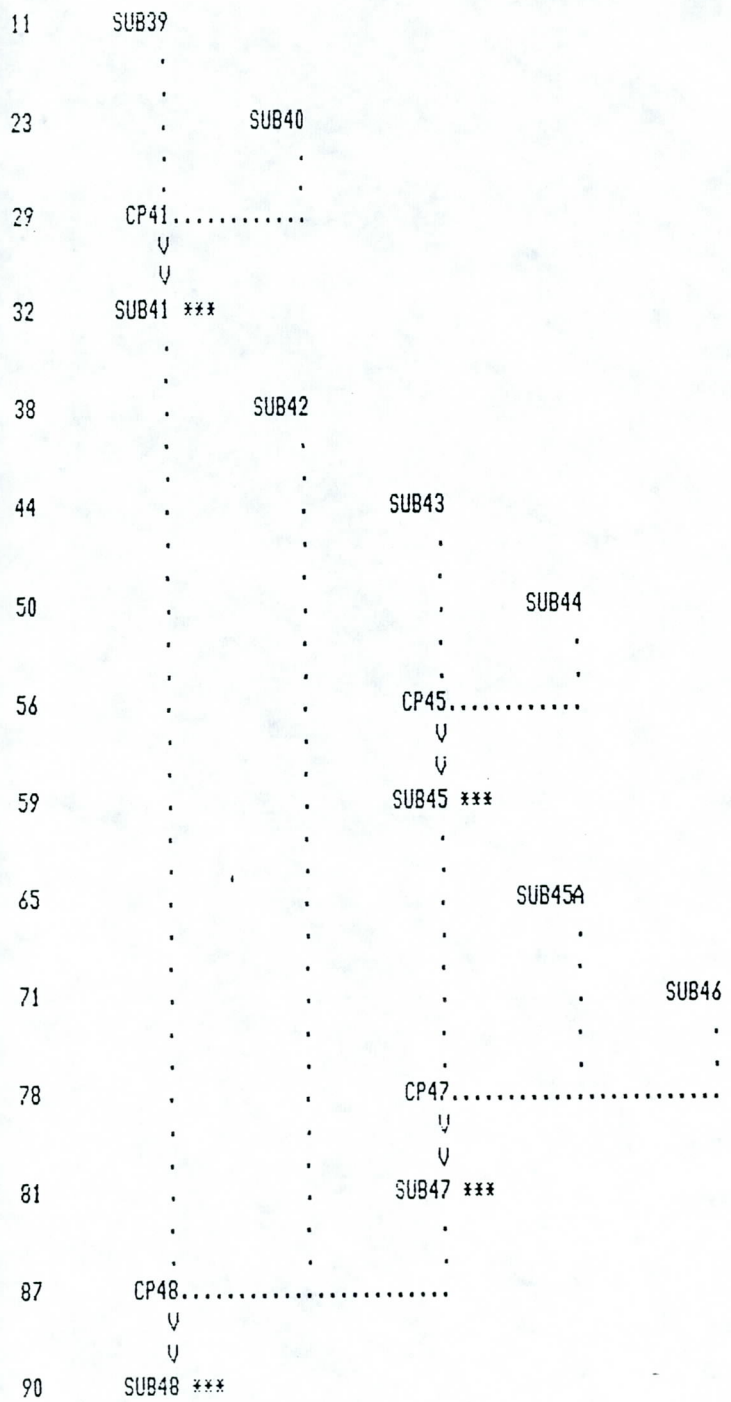
  132     KK  SEC25        FLOW DRAINING TO SECTION 25--EAST BOUNDARY
  133     KM               SEC24 = FLOW DRAINING TO SECTION 24--EAST BOUNDARY
  134     DT  SEC24
  135     DI     0    5454
  136     DQ     0    2491

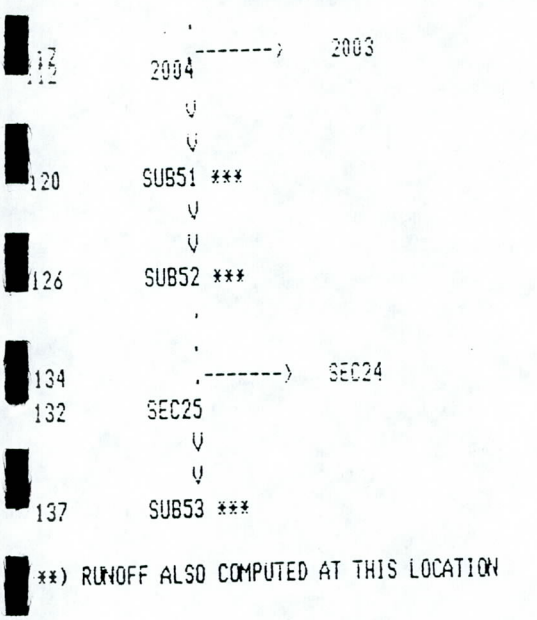
  137     KK  SUB53
  138     KM       RUNOFF FROM SUB-BASIN 53 & ROUTE SUB 52
  139     BA   .404
  140     LS             74   16.6
  141     UK     67  .0213    .10    100
  142     RK   4500  .0196    .045          TRAP    100      2    YES
  143     ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT LINE NO.

(V) ROUTING
(.) CONNECTOR
(---)) DIVERSION OR PUMP FLOW
((---) RETURN OF DIVERTED OR PUMPED FLOW





**) RUNOFF ALSO COMPUTED AT THIS LOCATION

****

FLOOD HYDROGRAPH PACKAGE HEC-1 (IBM XT 512K VERSION) -FEB 1,1985

U.S. ARMY CORPS OF ENGINEERS, THE HYDROLOGIC ENGINEERING CENTER, 609 SECOND STREET, DAVIS, CA. 95616

****

SEPT. 13, 1989
TRYHUS STATE LANDS - 2356 ACRES
FLOW TO EAST PROPERTY LINE EXISTING CONDITION
MODEL TREP.D99,--- SUB-BASIN SERIES 39 TO 53--OUTER LOOP WATERSHED
GENERAL DRAINAGE PLAN FOR NORTH SCOTTSDALE, EXISTING CONDITIONS
100-YR, 24-HR STORM, USING SCS TYPE IIA RAINFALL DISTRIBUTION
RAINFALL FROM NOAA ATLAS, USING 10 SQ MI AREAL REDUCTION FACTOR

9 IO OUTPUT CONTROL VARIABLES

IPRNT	5	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

IT HYDROGRAPH TIME DATA

NMIN	5	MINUTES IN COMPUTATION INTERVAL
IDATE	24JUL89	STARTING DATE
ITIME	0000	STARTING TIME
NQ	289	NUMBER OF HYDROGRAPH ORDINATES
NDDATE	25JUL89	ENDING DATE
NDTIME	0000	ENDING TIME

COMPUTATION INTERVAL .08 HOURS
TOTAL TIME BASE 24.00 HOURS

ENGLISH UNITS

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			BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
				6-HOUR	24-HOUR	72-HOUR			
HYDROGRAPH AT	SUB39	3801.	6.17	441.	134.	134.	1.94		
HYDROGRAPH AT	SUB40	1330.	6.08	127.	39.	39.	.58		
2 COMBINED AT	CP41	5128.	6.08	568.	173.	173.	2.53		
HYDROGRAPH AT	SUB41	5556.	6.17	701.	214.	214.	3.32		
HYDROGRAPH AT	SUB42	1121.	6.08	104.	32.	32.	.58		
HYDROGRAPH AT	SUB43	2493.	6.08	248.	75.	75.	1.07		
HYDROGRAPH AT	SUB44	1973.	6.08	196.	59.	59.	.85		
2 COMBINED AT	CP45	4466.	6.08	444.	134.	134.	1.92		
HYDROGRAPH AT,	SUB45	4518.	6.08	486.	147.	147.	2.13		
HYDROGRAPH AT	SUB45A	426.	6.08	42.	13.	13.	.17		
HYDROGRAPH AT	SUB46	2299.	6.08	231.	68.	68.	.93		
3 COMBINED AT	CP47	7243.	6.08	758.	228.	228.	3.23		
HYDROGRAPH AT	SUB47	6981.	6.17	850.	256.	256.	3.60		
3 COMBINED AT	CP48	13502.	6.17	1654.	503.	503.	7.50		
HYDROGRAPH AT	SUB48	13137.	6.17	1659.	504.	504.	7.55		
HYDROGRAPH AT	SUB49	711.	6.08	66.	20.	20.	.35		
HYDROGRAPH AT									

3 COMBINED AT	CP51	14350.	6.17	1804.	550.	550.	8.26
DIVERSION TO	2003	7190.	6.17	902.	275.	275.	8.26
HYDROGRAPH AT	2004	7190.	6.17	902.	275.	275.	8.26
HYDROGRAPH AT	SUB51	6941.	6.33	1028.	320.	320.	9.33
HYDROGRAPH AT	SUB52	5454.	6.58	1147.	367.	367.	10.48
DIVERSION TO	SEC24	2491.	6.58	524.	168.	168.	10.48
HYDROGRAPH AT	SEC25	2963.	6.58	623.	199.	199.	10.48
HYDROGRAPH AT	SUB53	2982.	6.67	681.	220.	220.	10.88

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

FLOW TO NORTH PROPERTY LINE


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

    1     ID    SEPT. 14, 1989
    2     ID    TRYHUS STATE LANDS - 2356 ACRES
    3     ID    FLOW TO NORTH PROPERTY LINE              EXISTING CONDITION
    4     ID    MODEL TRNP.D99,--- SUB-BASIN SERIES 30 TO 32 AND 34 TO 37
    5     ID    GENERAL DRAINAGE PLAN FOR NORTH SCOTTSDALE, EXISTING CONDITIONS
    6     ID    100-YR, 24-HR STORM, USING SCS TYPE IIA RAINFALL DISTRIBUTION
    7     ID    RAINFALL FROM NOAA ATLAS, USING 10 SQ MI AREAL REDUCTION FACTOR
          *DIAGRAM
    8     IT     5 24JUL89     0    289
    9     IO     5     0
   10     IN    30 24JUL89     0

   11     KK  SUB30
   12     KM      RUNOFF FROM SUB-BASIN 30
   13     BA 1.3296
   14     PB  4.32
   15     PC     0   .005   .009   .010   .013   .019   .021   .028   .032   .044
   16     PC  .057   .100   .660   .745   .776   .800   .816   .830   .840   .850
   17     PC  .861   .868   .878   .884   .891   .900   .905   .912   .919   .923
   18     PC  .930   .934   .939   .944   .950   .958   .961   .963   .969   .971
   19     PC  .974   .979   .981   .985   .989   .991   .993   .996  1.000
   20     LS           82  1.52
   21     UK   110  .0408   .20   100
   22     RK 10640  .0371   .045         TRAP    50    100

   23     KK  SUB31
   24     KM      RUNOFF FROM SUB-BASIN 31 & ROUTE SUB 30
   25     BA 1.2325
   26     LS           74  3.20
   27     UK   102  .0213   .10   100
   28     RK  9450  .0228   .045         TRAP    50    130    YES

   29     KK  SUB32
   30     KM      RUNOFF FROM SUB-BASIN 32 & ROUTE SUB 31
   31     BA 1.1942
   32     LS           74   3.5
   33     UK    67  .0213   .10   100
   34     RK  8000  .0214   .045         TRAP    50    130    YES

   35     KK  SUB34
   36     KM      RUNOFF FROM SUB-BASIN 34
   37     BA  .8433
   38     LS           77  2.43
   39     UK   110  .0408   .20   100
   40     RK  6800  .0644   .045         TRAP    50    100

   41     KK  SUB35
   42     KM      RUNOFF FROM SUB-BASIN 35
   43     BA 1.2879
   44     LS           79  1.43
   45     UK   265  .0381   .20   100
   46     RK 13000  .0319   .045         TRAP    50    100
```

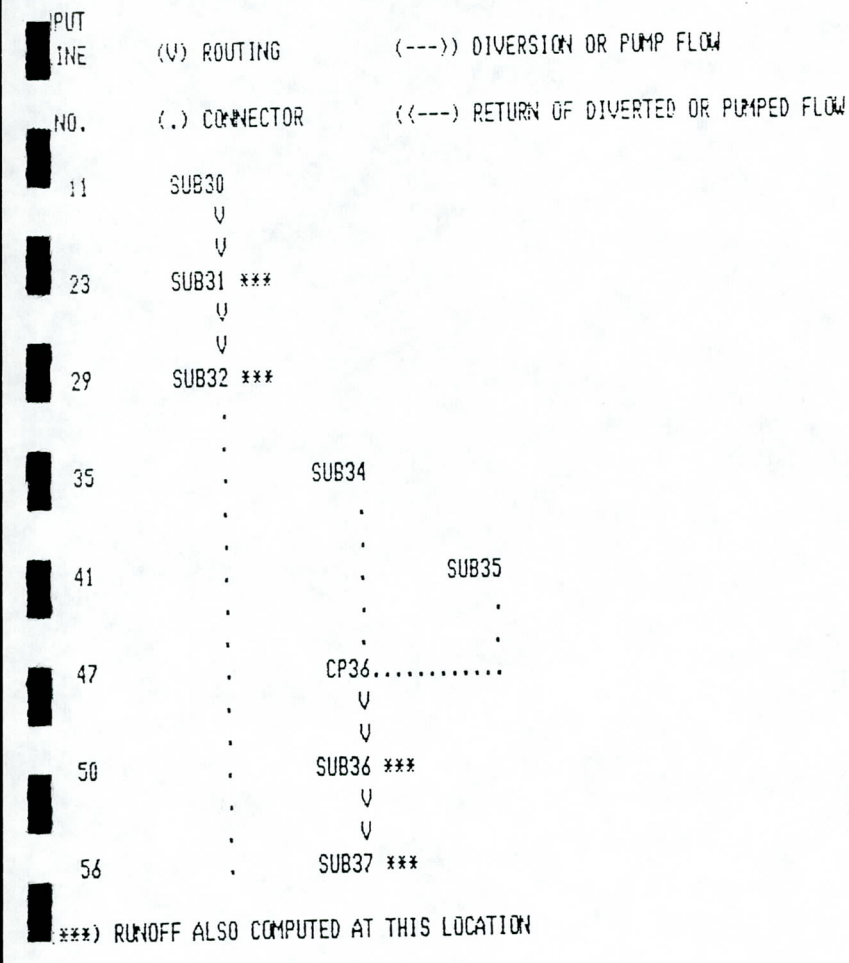
```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  47      KK   CP36
  48      KM        COMBINE HYDROGRAPHS SUB34 & SUB35
  49      HC        2

  50      KK   SUB36
  51      KM        RUNOFF FROM SUB-BASIN 36 & ROUTE CP 36
  52      BA   1.4538
  53      LS              72     2.11
  54      UK     116   .0213     .10     100
  55      RK    7767   .0281     .045            TRAP      50     130     YES

  56      KK   SUB37
  57      KM        RUNOFF FROM SUB-BASIN 37 & ROUTE SUB 36
  58      BA   0.726
  59      LS              74     15.7
  60      UK      61   .0213     .10     100
  61      RK    5000   .0237     .045            TRAP      50     130     YES
  62      ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK



***) RUNOFF ALSO COMPUTED AT THIS LOCATION

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FLOOD HYDROGRAPH PACKAGE HEC-1 (IBM XT 512K VERSION) -FEB 1,1985

U.S. ARMY CORPS OF ENGINEERS, THE HYDROLOGIC ENGINEERING CENTER, 609 SECOND STREET, DAVIS, CA. 95616

****

SEPT. 14, 1989
TRYHUS STATE LANDS - 2356 ACRES
FLOW TO NORTH PROPERTY LINE EXISTING CONDITION
MODEL TRNP.D99,--- SUB-BASIN SERIES 30 TO 32 AND 34 TO 37
GENERAL DRAINAGE PLAN FOR NORTH SCOTTSDALE, EXISTING CONDITIONS
100-YR, 24-HR STORM, USING SCS TYPE IIA RAINFALL DISTRIBUTION
RAINFALL FROM NOAA ATLAS, USING 10 SQ MI AREAL REDUCTION FACTOR

9 10 OUTPUT CONTROL VARIABLES

IPRNT	5	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

IT HYDROGRAPH TIME DATA

NMIN	5	MINUTES IN COMPUTATION INTERVAL
IDATE	24JUL89	STARTING DATE
ITIME	0000	STARTING TIME
NQ	289	NUMBER OF HYDROGRAPH ORDINATES
NDDATE	25JUL89	ENDING DATE
NDTIME	0000	ENDING TIME

COMPUTATION INTERVAL .08 HOURS
TOTAL TIME BASE 24.00 HOURS

ENGLISH UNITS

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			BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
				6-HOUR	24-HOUR	72-HOUR			
HYDROGRAPH AT	SUB30	1903.	6.17	275.	84.	84.	1.33		
HYDROGRAPH AT	SUB31	1876.	6.42	459.	144.	144.	2.56		
HYDROGRAPH AT	SUB32	2064.	6.67	636.	203.	203.	3.76		
HYDROGRAPH AT	SUB34	1262.	6.08	145.	45.	45.	.84		
HYDROGRAPH AT	SUB35	995.	6.42	231.	73.	73.	1.29		
2 COMBINED AT	CP36	2025.	6.17	375.	118.	118.	2.13		
HYDROGRAPH AT	SUB36	2414.	6.25	574.	183.	183.	3.58		
HYDROGRAPH AT	SUB37	2612.	6.42	699.	224.	224.	4.31		

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

FLOW TO SOUTH
AND EAST PROPERTY LINE


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

    1     ID      SEPT. 12,1989
    2     ID      TRYHUS STATE LANDS - 2356 ACRES
    3     ID      FLOW TO SOUTH AND EAST PROPERTY LINES  EXISTING CONDITIONS
    4     ID      MODEL TRSP.D99,--- SUB-BASIN SERIES 39 TO 53--OUTER LOOP WATERSHED
    5     ID      GENERAL DRAINAGE PLAN FOR NORTH SCOTTSDALE, EXISTING CONDITIONS
    6     ID      100-YR, 24-HR STORM, USING SCS TYPE IIA RAINFALL DISTRIBUTION
    7     ID      RAINFALL FROM NOAA ATLAS, USING 10 SQ MI AREAL REDUCTION FACTOR
          *DIAGRAM
    8     IT     5 24JUL89      0     289
    9     IO     5      0
   10     IN    30 24JUL89      0

   11     KK  SUB39
   12     KM      RUNOFF FROM SUB-BASIN 39
   13     BA 1.9422
   14     PB  4.32
   15     PC     0   .005   .009   .010   .013   .019   .021   .028   .032   .044
   16     PC  .057   .100   .660   .745   .776   .800   .816   .830   .840   .850
   17     PC  .861   .868   .878   .884   .891   .900   .905   .912   .919   .923
   18     PC  .930   .934   .939   .944   .950   .958   .961   .963   .969   .971
   19     PC  .974   .979   .981   .985   .989   .991   .993   .996  1.000
   20     LS            85  1.60
   21     UK   330  .0433    .20    100
   22     RK 11240  .0253   .045          TRAP     30      3

   23     KK  SUB40
   24     KM      RUNOFF FROM SUB-BASIN 40
   25     BA  .5844
   26     LS            83  1.06
   27     UK   160  .0627    .20    100
   28     RK  7000  .0350   .045          TRAP     20      3

   29     KK  CP41
   30     KM      COMBINE HYDROGRAPHS SUB39 & SUB40
   31     HC    2

   32     KK  SUB41
   33     KM      RUNOFF FROM SUB-BASIN 41 & ROUTE CP 41
   34     BA  .7911
   35     LS            74  2.04
   36     UK   280  .2386    .20    100
   37     RK  9400  .0282   .045          TRAP     50      3    YES

   38     KK  SUB42
   39     KM      RUNOFF FROM SUB-BASIN 42
   40     BA  .5844
   41     LS            78  1.24
   42     UK   280  .2386    .20    100
   43     RK  8750  .0573   .045          TRAP     20      3
```

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

  44      KK  SUB43
  45      KM       RUNOFF FROM SUB-BASIN 43
  46      BA  1.0708
  47      LS            85    1.03
  48      UK    260   .0515    .20     100
  49      RK   7400   .0255    .045           TRAP     25       3

  50      KK  SUB44
  51      KM       RUNOFF FROM SUB-BASIN 44
  52      BA  .8537
  53      LS            85
  54      UK    260   .0515    .20     100
  55      RK   9840   .0622    .045           TRAP     25       3

  56      KK  CP45
  57      KM       COMBINE HYDROGRAPHS SUB43 & SUB44
  58      HC     2

  59      KK  SUB45
  60      KM       RUNOFF FROM SUB-BASIN 45 & ROUTE CP 45
  61      BA  .2037
  62      LS            81
  63      UK    125   .1166    .20     100
  64      RK   3600   .0366    .045           TRAP     30       3     YES

  65      KK  SUB45A
  66      KM       RUNOFF FROM SUB 45A
  67      BA  .1720
  68      LS            86
  69      UK    275   .2200    .20     100
  70      RK   5400   .0411    .045           TRAP     15       3

  71      KK  SUB46
  72      KM       RUNOFF FROM SUB-BASIN 46
  73      BA  .9268
  74      LS            86
  75      UK    265   .4958    .20     100
  76      RK   3300   .2271    .045    .111   TRAP     10       3
  77      RK   7100   .0535    .045           TRAP     25       3

  78      KK  CP47
  79      KM       COMBINE HYDROGRAPHS SUB45, SUB45A, & SUB46
  80      HC     3

  81      KK  SUB47
  82      KM       RUNOFF FROM SUB-BASIN 47 & ROUTE CP 47
  83      BA  .3757
  84      LS            77    1.28
  85      UK    375   .1000    .20     100
  86      RK   9600   .0217    .045           TRAP     50       3     YES
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```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  87      KK   CP48
  88      KM        COMBINE HYDROGRAPHS SUB41, SUB42, & SUB47
  89      HC        3

  90      KK   SUB48
  91      KM        RUNOFF FROM SUB-BASIN 48 & ROUTE CP 48
  92      BA   .0438
  93      LS             73    4.14
  94      UK    150   .0733     .20     100
  95      RK   1300   .0338     .045            TRAP      75        3     YES

  96      KK   SUB49
  97      KM        RUNOFF FROM SUB-BASIN 49
  98      BA   .3528
  99      LS             79    1.88
 100      UK    135   .0758     .20     100
 101      RK   5400   .0370     .045            TRAP      30        3

 102      KK   SUB50
 103      KM        RUNOFF FROM SUB-BASIN 50
 104      BA   .3580
 105      LS             84    1.39
 106      UK    300   .3555     .20     100
 107      RK    730   .1506     .045    .036    TRAP      10        3
 108      RK   6400   .0453     .045            TRAP      25        3

 109      KK   CP51
 110      KM        COMBINE HYDROGRAPHS SUB48, SUB49, & SUB50
 111      HC        3

 112      KK   2004     DIV
 113      KM        DIVERT FLOW TO SUB 2005
 114      KM        THIS DIVERT OCCURS AT A BRAIDED CHANNEL BIFURCATION LOCATED 1000 FEET
 115      KM        SOUTH OF THE EAST END OF PINNACLE PEAK ROAD.
 116      KM        THIS IS AN ACTIVE ALLUVIAL FAN APEX.
 117      DT   2003
 118      DI        0   15000
 119      DQ        0    7500

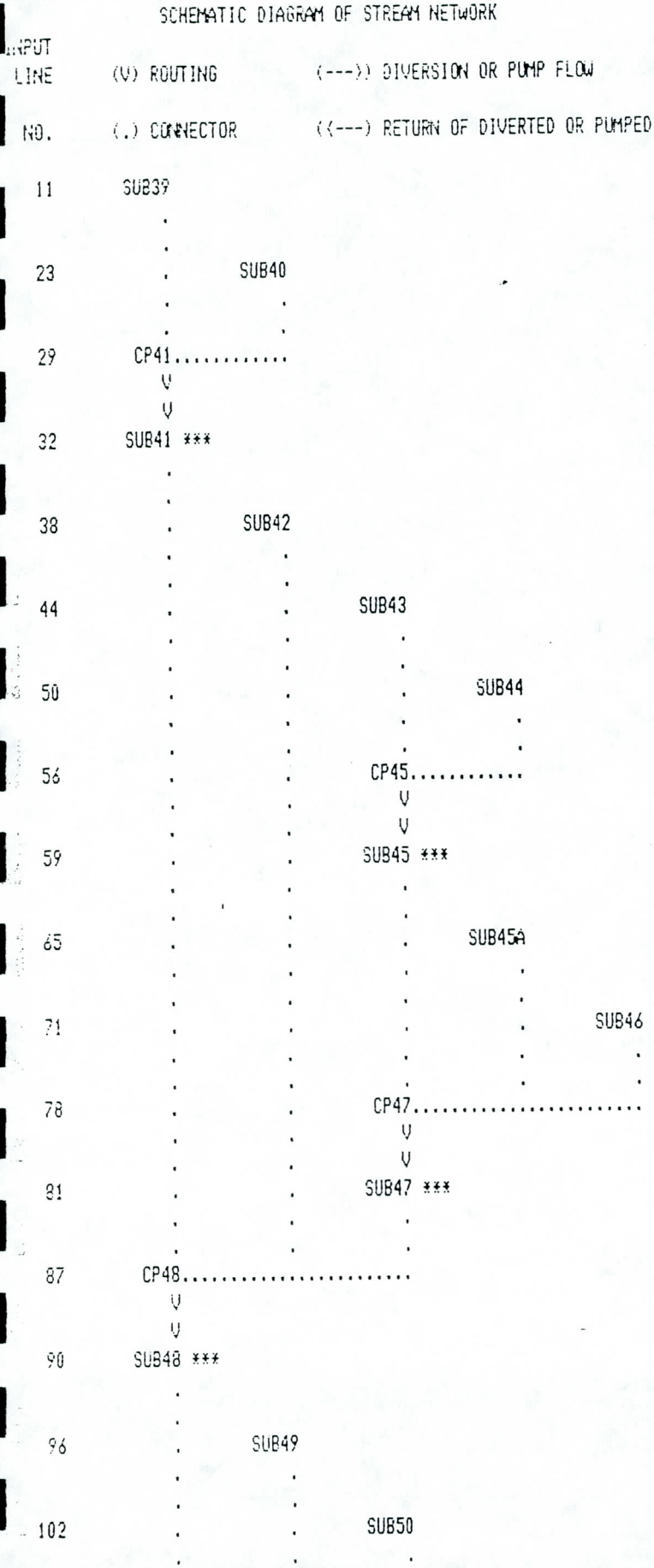
 120      KK   SUB51
 121      KM        RUNOFF FROM SUB-BASIN 51 & ROUTE NON-DIVERTED FLOW FROM DIV 2004
 122      BA  1.0675
 123      LS             72    4.06
 124      UK     94   .0213     .10     100
 125      RK   6400   .0329     .045            TRAP    1500        2     YES

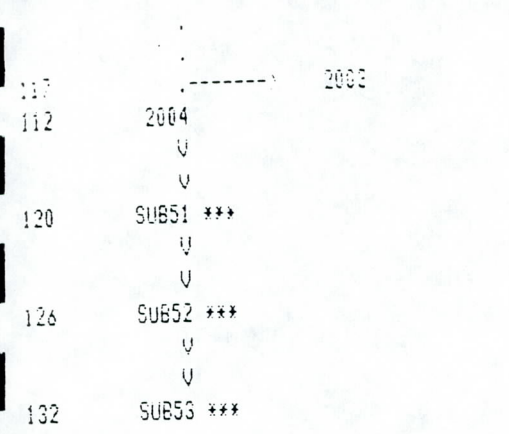
 126      KK   SUB52
 127      KM        RUNOFF FROM SUB-BASIN 52 & ROUTE SUB 51
 128      BA  1.3557
 129      LS             71    1.15
 130      UK     76   .0213     .10     100
 131      RK   6633   .0300     .045            TRAP    2500        2     YES
```

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

  132     KK  SUB53
  133     KM       RUNOFF FROM SUB-BASIN 53 & ROUTE SUB 52
  134     BA  1.2634
  135     LS              74     1.5
  136     UK      67   .0213     .10     100
  137     RK    7000   .0196     .045            TRAP    3500       2     YES
  138     ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK





***) RUNOFF ALSO COMPUTED AT THIS LOCATION

****

FLOOD HYDROGRAPH PACKAGE HEC-1 (IBM XT 512K VERSION) -FEB 1,1985

U.S. ARMY CORPS OF ENGINEERS, THE HYDROLOGIC ENGINEERING CENTER, 609 SECOND STREET, DAVIS, CA. 95616

****

SEPT. 12,1989
TRYHUS STATE LANDS - 2356 ACRES
FLOW TO SOUTH AND EAST PROPERTY LINES EXISTING CONDITIONS
MODEL TRSP.D99,--- SUB-BASIN SERIES 39 TO 53--OUTER LOOP WATERSHED
GENERAL DRAINAGE PLAN FOR NORTH SCOTTSDALE, EXISTING CONDITIONS
100-YR, 24-HR STORM, USING SCS TYPE IIA RAINFALL DISTRIBUTION
RAINFALL FROM NOAA ATLAS, USING 10 SQ MI AREAL REDUCTION FACTOR

9 IO OUTPUT CONTROL VARIABLES

IPRNT	5	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

IT HYDROGRAPH TIME DATA

NMIN	5	MINUTES IN COMPUTATION INTERVAL
IDATE	24JUL89	STARTING DATE
ITIME	0000	STARTING TIME
NQ	289	NUMBER OF HYDROGRAPH ORDINATES
NQDATE	25JUL89	ENDING DATE
NQTIME	0000	ENDING TIME

COMPUTATION INTERVAL .08 HOURS
TOTAL TIME BASE 24.00 HOURS

ENGLISH UNITS

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			BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
				6-HOUR	24-HOUR	72-HOUR			
HYDROGRAPH AT	SUB39	3801.	6.17	441.	134.	134.	1.94		
HYDROGRAPH AT	SUB40	1330.	6.08	127.	39.	39.	.58		
2 COMBINED AT	CP41	5128.	6.08	568.	173.	173.	2.53		
HYDROGRAPH AT	SUB41	5556.	6.17	701.	214.	214.	3.32		
HYDROGRAPH AT	SUB42	1121.	6.08	104.	32.	32.	.58		
HYDROGRAPH AT	SUB43	2493.	6.08	248.	75.	75.	1.07		
HYDROGRAPH AT	SUB44	1973.	6.08	196.	59.	59.	.85		
2 COMBINED AT	CP45	4466.	6.08	444.	134.	134.	1.92		
HYDROGRAPH AT	SUB45	4518.	6.08	486.	147.	147.	2.13		
HYDROGRAPH AT	SUB45A	426.	6.08	42.	13.	13.	.17		
HYDROGRAPH AT	SUB46	2299.	6.08	231.	68.	68.	.93		
3 COMBINED AT	CP47	7243.	6.08	758.	228.	228.	3.23		
HYDROGRAPH AT	SUB47	6981.	6.17	850.	256.	256.	3.60		
3 COMBINED AT	CP48	13502.	6.17	1654.	503.	503.	7.50		
HYDROGRAPH AT	SUB48	13137.	6.17	1659.	504.	504.	7.55		
HYDROGRAPH AT	SUB49	711.	6.08	66.	20.	20.	.35		

COMBINED AT	CP51	14380.	6.17	1804.	550.	550.	9.26
DIVERSION TO	2003	7190.	6.17	902.	275.	275.	8.26
HYDROGRAPH AT	2004	7190.	6.17	902.	275.	275.	8.26
HYDROGRAPH AT	SUB51	6941.	6.33	1028.	320.	320.	9.33
HYDROGRAPH AT	SUB52	5496.	6.58	1155.	370.	370.	10.68
HYDROGRAPH AT	SUB53	3869.	7.00	1255.	419.	419.	11.95

** NORMAL END OF HEC-1 ***

FLOW TO SOUTH CENTRAL AND WEST PROPERTY LINES

HEC-1 INPUT


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

    1     ID      SEPT. 12,1989
    2     ID      TRYHUS STATE LANDS - 2356 ACRES          EXISTING CONDITIONS
    3     ID      FLOW TO SOUTH CENTRAL AND WEST PROPERTY LINE
    4     ID      MODEL TRWP.D99.--- SUB-BASIN SERIES 30 TO 32 AND 34 TO 37
    5     ID      GENERAL DRAINAGE PLAN FOR NORTH SCOTTSDALE, EXISTING CONDITIONS
    6     ID      100-YR, 24-HR STORM, USING SCS TYPE IIA RAINFALL DISTRIBUTION
    7     ID      RAINFALL FROM NOAA ATLAS, USING 10 SQ MI AREAL REDUCTION FACTOR
          *DIAGRAM
    8     IT      5 24JUL89      0     289
    9     IO      5      0
   10     IN     30 24JUL89      0

   11     KK  SUB30
   12     KM       RUNOFF FROM SUB-BASIN 30
   13     BA 1.3296
   14     PB   4.32
   15     PC      0   .005   .009   .010   .013   .019   .021   .028   .032   .044
   16     PC   .057   .100   .660   .745   .776   .800   .816   .830   .840   .850
   17     PC   .861   .868   .878   .884   .891   .900   .905   .912   .919   .923
   18     PC   .930   .934   .939   .944   .950   .958   .961   .963   .969   .971
   19     PC   .974   .979   .981   .985   .989   .991   .993   .996  1.000
   20     LS             82  1.52
   21     UK    110  .0408    .20    100
   22     RK  10640  .0371    .045          TRAP     50     100

   23     KK  SUB31
   24     KM       RUNOFF FROM SUB-BASIN 31 & ROUTE SUB 30
   25     BA 1.2325
   26     LS             74  3.20
   27     UK    102  .0213    .10    100
   28     RK   9450  .0228    .045          TRAP     50     130     YES

   29     KK  SUB32
   30     KM       RUNOFF FROM SUB-BASIN 32 & ROUTE SUB 31
   31     BA 1.3985
   32     LS             74  2.99
   33     UK     67  .0213    .10    100
   34     RK   9300  .0214    .045          TRAP     50     130     YES

   35     KK  SUB33
   36     KM       RUNOFF FROM SUB-BASIN 33 & ROUTE SUB 32
   37     BA 0.6026
   38     LS             74
   39     UK     89  .0213    .10    100
   40     RK   4500  .0161    .045          TRAP     50     175     YES

   41     KK  SUB34
   42     KM       RUNOFF FROM SUB-BASIN 34
   43     BA  .8433
   44     LS             77  2.43
   45     UK    110  .0408    .20    100
   46     RK   6800  .0644    .045          TRAP     50     100
```

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

  47      KK  SUB35
  48      KM       RUNOFF FROM SUB-BASIN 35
  49      BA  1.2879
  50      LS             79    1.43
  51      UK     265  .0381     .20     100
  52      RK   13000  .0319     .045            TRAP      50      100

  53      KK   CP36
  54      KM       COMBINE HYDROGRAPHS SUB34 & SUB35
  55      HC       2

  56      KK   SUB36
  57      KM       RUNOFF FROM SUB-BASIN 36 & ROUTE CP 36
  58      BA  1.4538
  59      LS             72    2.11
  60      UK     116  .0213     .10     100
  61      RK    7767  .0281     .045            TRAP      50      130     YES

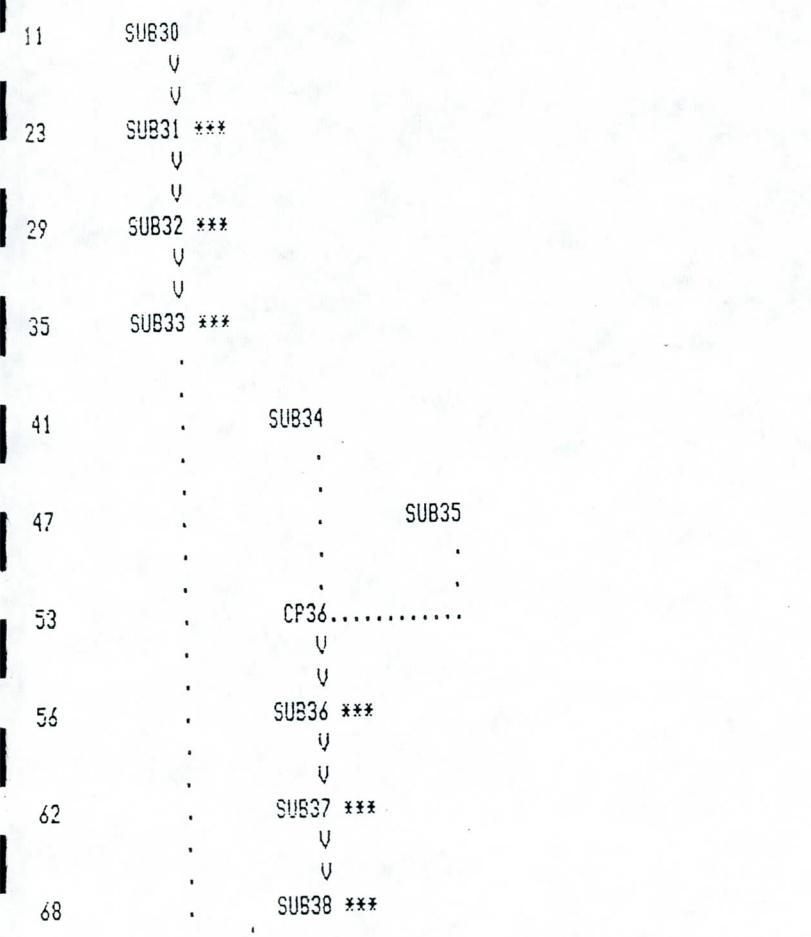
  62      KK   SUB37
  63      KM       RUNOFF FROM SUB-BASIN 37 & ROUTE SUB 36
  64      BA  1.1896
  65      LS             74    9.58
  66      UK      61  .0213     .10     100
  67      RK    8433  .0237     .045            TRAP      50      130     YES

  68      KK   SUB38
  69      KM       RUNOFF FROM SUB-BASIN 38 & ROUTE SUB 37
  70      BA  1.2543
  71      LS             74
  72      UK      84  .0213     .10     100
  73      RK    8300  .0176     .045            TRAP      50      150     YES
  74      ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

PUT
INE (V) ROUTING (---)) DIVERSION OR PUMP FLOW

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



***) RUNOFF ALSO COMPUTED AT THIS LOCATION

****
FLOOD HYDROGRAPH PACKAGE HEC-1 (IBM XT 512K VERSION) -FEB 1,1985
U.S. ARMY CORPS OF ENGINEERS, THE HYDROLOGIC ENGINEERING CENTER, 609 SECOND STREET, DAVIS, CA. 95616
****

SEPT. 12,1989
TRYHUS STATE LANDS - 2356 ACRES EXISTING CONDITIONS
FLOW TO SOUTH CENTRAL AND WEST PROPERTY LINE
MODEL TRWP.D99.--- SUB-BASIN SERIES 30 TO 32 AND 34 TO 37
GENERAL DRAINAGE PLAN FOR NORTH SCOTTSDALE, EXISTING CONDITIONS
100-YR, 24-HR STORM, USING SCS TYPE IIA RAINFALL DISTRIBUTION
RAINFALL FROM NOAA ATLAS, USING 10 SQ MI AREAL REDUCTION FACTOR

9 IO OUTPUT CONTROL VARIABLES

IPRNT	5	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

IT HYDROGRAPH TIME DATA

NMIN	5	MINUTES IN COMPUTATION INTERVAL
IDATE	24JUL89	STARTING DATE
ITIME	0000	STARTING TIME
NQ	289	NUMBER OF HYDROGRAPH ORDINATES
NDDATE	25JUL89	ENDING DATE
NDTIME	0000	ENDING TIME

COMPUTATION INTERVAL .08 HOURS
TOTAL TIME BASE 24.00 HOURS

ENGLISH UNITS

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			BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
				6-HOUR	24-HOUR	72-HOUR			
HYDROGRAPH AT	SUB30	1903.	6.17	275.	84.	84.	1.33		
HYDROGRAPH AT	SUB31	1876.	6.42	459.	144.	144.	2.56		
HYDROGRAPH AT	SUB32	2055.	6.67	664.	212.	212.	3.96		
HYDROGRAPH AT	SUB33	2110.	6.83	744.	240.	240.	4.56		
HYDROGRAPH AT	SUB34	1262.	6.08	145.	45.	45.	.84		
HYDROGRAPH AT	SUB35	995.	6.42	231.	73.	73.	1.29		
2 COMBINED AT	CP36	2025.	6.17	375.	118.	118.	2.13		
HYDROGRAPH AT	SUB36	2414.	6.25	574.	183.	183.	3.58		
HYDROGRAPH AT	SUB37	2533.	6.58	762.	245.	245.	4.77		
HYDROGRAPH AT	SUB38	2556.	6.83	928.	302.	302.	6.03		

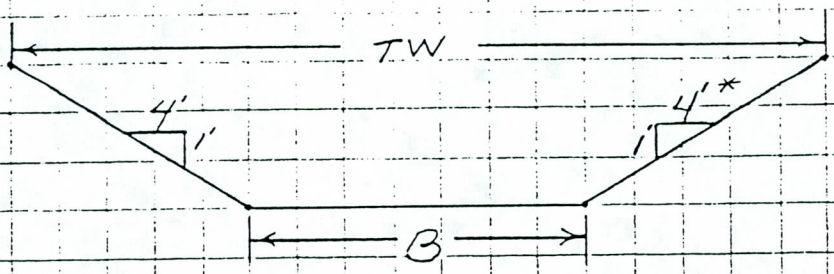
*** NORMAL END OF HEC-1 ***

APPENDIX II

CARTER ASSOCIATES, INC.
ENGINEERING
SURVEYING
PLANNING

Project No. 063-89258-03
Project Name CORE NORTH
Sheet No. _____ of _____
Calculated by RWM Date 2
Checked by _____ Date _____

TYPICAL CHANNEL



TW = TOP WIDTH
B = BOTTOM WIDTH
H = DEPTH OF FLOW PLUS 1' FREEBOARD

* ALL SIDESLOPE EQUAL TO 4:1; SIDESLOPE PROTECTION SHALL BE RIPRAP plus FILTER FABRIC, GROUTED RIPRAP AND/OR EQUIVOLENT OR BETTER

SECTION	TYACAL SLOPE %	TW (FT)	B (FT)	H (FT)	Q (CFS)
A-A	2	66	25	5.13	2100
B-B	1	87		5.60	2600
C-C	2	69		5.52	2500
D-D*	2	99		5.13	5400

Phoenix
5080 North 40th Street
Suite 300

San Diego
7675 Dagget Street
Suite 350

SECTION A-A
FLOW ALONG WEST PROPERTY LINE
Q100 2110cfs

TRAPEZOIDAL CHANNEL ANALYSIS
NORMAL DEPTH COMPUTATION

Flow Rate (cubic feet per second)	2100
Channel Bottom Slope (feet per foot)	.02
Manning's Roughness Coefficient (n-value)	.035
Channel Side Slope - Left Side (horizontal/vertical)	4
Channel Side Slope - Right Side (horizontal/vertical)	4
Channel Bottom Width (feet)	25

*** RESULTS ***

NORMAL DEPTH (FEET)	4.13
Flow Velocity (feet per second)	12.23
Froude Number	1.253
Velocity Head (feet)	2.32
Energy Head (feet)	6.46
Cross-Sectional Area of Flow (square feet)	171.77
Top Width of Flow (feet)	58.08

<Enter>: Repeat, <R>eport, or <Esc>: End

SECTION B-B
FLOW IN CENTRAL
WATERSHED
Q100 2556 to 2610cfs

TRAPEZOIDAL CHANNEL ANALYSIS
NORMAL DEPTH COMPUTATION

Flow Rate (cubic feet per second)	2600
Channel Bottom Slope (feet per foot)	.01
Manning's Roughness Coefficient (n-value)	.035
Channel Side Slope - Left Side (horizontal/vertical)	4
Channel Side Slope - Right Side (horizontal/vertical)	4
Channel Bottom Width (feet)	40
*** RESULTS ***	
NORMAL DEPTH (FEET)	4.60
Flow Velocity (feet per second)	9.68
Froude Number	0.913
Velocity Head (feet)	1.46
Energy Head (feet)	6.05
Cross-Sectional Area of Flow (square feet)	268.46
Top Width of Flow (feet)	76.78

<Enter>: Repeat, <R>eport, or <Esc>: End

SECTION C-C
FLOW ALONG EAST PROPERTY LINE
Q100 2491cfs

TRAPEZOIDAL CHANNEL ANALYSIS
NORMAL DEPTH COMPUTATION

Flow Rate (cubic feet per second)	2500
Channel Bottom Slope (feet per foot)	.02
Manning's Roughness Coefficient (n-value)	.035
Channel Side Slope - Left Side (horizontal/vertical)	4
Channel Side Slope - Right Side (horizontal/vertical)	4
Channel Bottom Width (feet)	25

*** RESULTS ***

NORMAL DEPTH (FEET)	4.52
Flow Velocity (feet per second)	12.84
Froude Number	1.268
Velocity Head (feet)	2.56
Energy Head (feet)	7.08
Cross-Sectional Area of Flow (square feet)	194.73
Top Width of Flow (feet)	61.16

<Enter>: Repeat, <R>eport, or <Esc>: End

SECTION D-D
COMBINED FLOWS ALONG THE EAST PROPERTY LINE
Q100 5473cfs

TRAPEZOIDAL CHANNEL ANALYSIS
NORMAL DEPTH COMPUTATION

Flow Rate (cubic feet per second)	5400
Channel Bottom Slope (feet per foot)	.02
Manning's Roughness Coefficient (n-value)	.035
Channel Side Slope - Left Side (horizontal/vertical)	4
Channel Side Slope - Right Side (horizontal/vertical)	4
Channel Bottom Width (feet)	50

*** RESULTS ***

NORMAL DEPTH (FEET)	5.13
Flow Velocity (feet per second)	14.92"
Froude Number	1.319
Velocity Head (feet)	3.46
Energy Head (feet)	8.59
Cross-Sectional Area of Flow (square feet)	361.82
Top Width of Flow (feet)	91.04

<Enter>: Repeat, <R>eport, or <Esc>: End