Area Drainage Master Study

# BUCHANAN WASH

## Drainage / Storm Drain Master Plan

**Volume 2, Technical Appendix**

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Prepared for:

CITY OF PHOENIX, ARIZONA
*Engineering Department*
*Floodplain Management Section*

Index Number ST-886382
Contract Number 51372

Huitt-Zollars, Inc
6245 North 24th Parkway , Suite 201
Phoenix, Arizona 85016

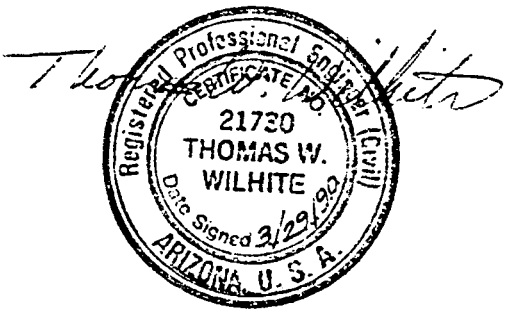
AREA DRAINAGE MASTER STUDY

# BUCHANAN WASH CONCEPTUAL DRAINAGE & STORM DRAIN MASTER PLAN REPORT MARICOPA COUNTY, ARIZONA

Prepared for:

City of Phoenix, Arizona
Floodplain Management Section
Engineering Department

Index Number ST-886382
Contract Number 51372




March 1990

Prepared by:

Huitt-Zollars, Inc.
6245 North 24th Parkway, Suite 201
Phoenix, Arizona

Huitt-Zollars Project No. 05-0049-01

VOLUME II
TECHNICAL APPENDIX
TABLE OF CONTENTS

Section

1.0 HEC-1 Analyses

- 1.1 Case 1: Existing Land Use Conditions Analysis
- 1.2 Case 2: Future Land Use Conditions Analysis
- 1.3 Case 3: Major Drainage Systems Analysis
- 1.4 Case 4: Storm Drain System Analysis
- 1.5 1987 Flood Insurance Study Model

2.0 Worksheets for Computing Weighted Runoff Curve Numbers

- 2.1 Case 1: Existing Land Use Conditions Analysis
- 2.2 Case 2: Future Land Use Conditions Analysis
- 2.3 Case 3: Major Drainage System Analysis
- 2.4 Case 4: Storm Drain System Analysis

SECTION 1.1
HEC-1 ANALYSIS

Case 1: Existing Land Use Conditions Analysis

Data Input File Name: 49C1.dat
Data Output File Name: 49C1.out

```
****************************************
*                                      *
*  FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*            FEBRUARY 1981             *
*          REVISED 30 OCT 81           *
*                                      *
* RUN DATE22-MAR-90     TIME14:43:59   *
*                                      *
****************************************
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****************************************
*                                      *
*   U.S. ARMY CORPS OF ENGINEERS       *
*  THE HYDROLOGIC ENGINEERING CENTER   *
*          609 SECOND STREET           *
*       DAVIS, CALIFORNIA 95616        *
*  (916) 440-3285 OR (FTS) 448-3285    *
*                                      *
****************************************
```

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

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

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. SEE SEPTEMBER 1981 INPUT DESCRIPTION FOR NEW DEFINITIONS.

HEC-1 INPUT PAGE 1

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

   1           ID        BUCHANAN WASH STUDY - CITY OF PHOENIX INDEX NO. ST-886382
   2           ID        CASE I   EXISTING CONDITIONS ANALYSIS
   3           ID        100 YR,  24 HOUR STORM EVENT
   4           IT       5                    288
   5           IO       5
   6           IN      30
               *DIAGRAM

   7           KK    SUB1
   8           KM        RUNOFF FROM SUBBASIN NO. 1
   9           BA    0.77
  10           LS              86                    86
  11           PB    4.13
  12           PC     0.0   0.005   0.009   0.010   0.013   0.019   0.021   0.028   0.032   0.044
  13           PC   0.057   0.100   0.660   0.745   0.776   0.800   0.816   0.830   0.840   0.850
  14           PC   0.861   0.868   0.878   0.884   0.891   0.900   0.905   0.912   0.919   0.923
```

```
 15          PC   0.930   0.934   0.939   0.944   0.950   0.958   0.961   0.963   0.969   0.971
 16          PC   0.974   0.979   0.981   0.985   0.989   0.991   0.993   0.996   1.000
 17          UK    1200   0.008   0.130      97
 18          UK     600   0.070   0.150       3
 19          RK    6000  0.0077   0.070    0.44    TRAP      10      10
 20          RK    2900  0.0066   0.050            TRAP      12       4

 21          KK   SUB1A
 22          KM        RUNOFF FROM SUBBASIN NO. 1A
 23          BA    0.37
 24          LS              85
 25          UK    1200   0.008   0.130     100
 26          RK     400   0.113   0.010   0.020    TRAP       2      10
 27          RK    6100   0.010   0.070    0.36    TRAP      10      10
 28          RK     350   0.006   0.050            TRAP      12       4

 29          KK   COMB1
 30          KM        COMBINATION OF SUB1 AND SUB1A
 31          HC       2

 32          KK  ROUTE1
 33          KM        ROUTE TO CONFLUENCE OF SUB2 AND SUB2A
 34          RK    2350   0.003   0.050            TRAP      13       4

 35          KK    SUB2
 36          KM        RUNOFF FROM SUBBASIN NO. 2
 37          BA    1.39
 38          LS              86                      86
 39          UK    1100   0.008   0.130      99
 40          UK     600   0.070   0.150       1
 41          RK   15700  0.0075   0.070    1.37    TRAP      10      10
 42          RK     750  0.0027   0.050            TRAP      13       4

 43          KK   SUB2A
 44          KM        RUNOFF FROM SUBBASIN NO. 2A
 45          BA    0.50
 46          LS              80
 47          UK    1400   0.008   0.130     100
 48          RK    5750   0.015   0.070    0.49    TRAP      10      10
                                          HEC-1 INPUT                                          PAGE  2

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

 49          RK     500  0.0026   0.050            TRAP      13       4

 50          KK   COMB2
 51          KM        COMBINATION OF ROUTE1, SUB2 AND SUB2A
 52          HC       3

 53          KK  ROUTE2
 54          KM        ROUTE TO CONFLUENCE OF SUB3, SUB3A AND SUB3B
 55          RK    3200  0.0028   0.050            TRAP      17       4
```

```
 56          KK    SUB3
 57          KM        RUNOFF FROM SUBBASIN NO. 3
 58          BA    0.58
 59          LS              80                        80
 60          UK     700   0.044   0.130      87
 61          UK     500   0.090   0.150      13
 62          RK    6300  0.0143   0.070    0.57    TRAP      10        3
 63          RK    2700  0.0022   0.050            TRAP      17        4

 64          KK   SUB3A
 65          KM        RUNOFF FROM SUBBASIN NO. 3A
 66          BA    0.68
 67          LS              86                        86
 68          UK    1800   0.008   0.130      80
 69          UK     500   0.010   0.130      20
 70          RK   12000  0.0073   0.070    0.65    TRAP      10       10
 71          RK     650  0.0015   0.050            TRAP      17        4

 72          KK   SUB3B
 73          KM        RUNOFF FROM SUBBASIN NO. 3B
 74          BA    0.46
 75          LS              82
 76          UK    1000   0.008    0.13     100
 77          RK     400   7.500    0.15    0.02    TRAP       5       10
 78          RK    6800   0.023    0.13            TRAP      10        3

 79          KK   COM3
 80          KM        COMBINATION OF ROUTE2, SUB3, SUB3A AND SUB3B
 81          HC       4

 82          KK  ROUTE3
 83          KM        ROUTE TO AREA 5  (TRIPLE 66" DIA RCP AT C.A.P.)
 84          RK    4800  0.0063   0.050            TRAP      20        4

 85          KK    SUB4
 86          KM        RUNOFF FROM SUBBASIN NO. 4
 87          BA    0.72
 88          LS              86                        86
 89          UK     650   0.015   0.130      94
 90          UK     500   0.080   0.150       6
 91          RK    9900  0.0076   0.070    0.24    TRAP      10       10
 92          RK    3600  0.0072   0.050            TRAP      20        4
```



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

 93          KK   SUB4A
 94          KM        RUNOFF FORM SUBBASIN NO. 4A
 95          BA    0.57
 96          LS              84                        84
```

```
 97          UK    2000   0.010    0.15      70
 98          UK    1200   0.015    0.15      30
 99          RK    4500   0.013   0.070    0.46    TRAP      10       5
100          RK    2600   0.008   0.050            TRAP      20       4

101          KK    SUB9
102          KM        RUNOFF FROM SUBBASIN NO. 9
103          BA    3.12
104          LS             87                      87
105          UK     950  0.0087   0.130      95
106          UK     500  0.0600   0.150       5
107          RK   25100  0.0078   0.070    2.45    TRAP      10       5
108          RK    2600  0.0023   0.050            TRAP      20       4

109          KK    SUB5
110          KM        COMBINATION OF RUNOFF ABOVE CAP CROSSING
111          HC       4

112          KK    RES5
113          KM        RESERVOIR STORAGE AT SUBBASIN NO. 4
114          RS       1    STOR     0.0
115          SV       0    0.11    7.71   30.60   79.48  164.73  293.46  463.36  670.00
116          SE    1493    1496    1500    1502    1504    1506    1508    1510    1512
117          SQ       0     153     420     480     731     887    1019    1135    1241    1339
118          SQ    1430
119          SE    1493 1495.75  1498.0  1498.5  1500.0    1502    1504    1506    1508    1510
120          SE    1512

121          KK    SUB6
122          KM        RUNOFF FROM SUBBASIN NO. 6
123          BA    0.43
124          LS             95                      95
125          UK     800   0.010    0.13      37
126          UK     550   0.04     0.15      63
127          RK    4500   0.078   0.070    0.13    TRAP      10       3
128          RK      10   0.008   0.050            TRAP      24       2

129          KK    RES6
130          KM        RESERVOIR STORAGE AT SUBBASIN NO. 6
131          RS       1    STOR     0.0
132          SV       0    2.98   10.59   23.57   41.57   70.00
133          SE    1504    1506    1508    1510    1512    1514
134          SQ       0       0    99.1   424.9  1118.7  2309.3
135          SE    1504    1506    1508    1510    1512    1514
```



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

136          KK   COMB6
137          KM        COMBINE HYDROGRAPHS AT CULVERT OUTLET
138          HC       2
```

```
139          KK  ROUTE4
140          KM        ROUTE FROM COMB6 TO COMB7
141          RK    4030  0.0044   0.055            TRAP      25       2

142          KK    SUB7
143          KM        RUNOFF FROM SUBBASIN NO. 7
144          BA    0.39
145          LS              90                       90
146          UK     800   0.007   0.130      54
147          UK     400   0.100   0.150      46
148          RK    3000   0.117   0.070    0.23    TRAP      10       3
149          RK    1580  0.0038   0.055            TRAP      25       2

150          KK   COMB7
151          KM        COMBINATION OF COMB6 AND SUB7
152          HC       2

153          KK  ROUTE5
154          KM        ROUTE COMB7 TO COMB8
155          RK    7200   0.005   0.055            TRAP      28       2

156          KK    SUB8
157          KM        RUNOFF FROM SUBBASIN NO. 8
158          BA     1.3
159          LS              85                       85
160          UK    1100   0.009    0.13      91
161          UK     500   0.060    0.15       9
162          RK    7700  0.0058   0.070    0.52    TRAP      10      10
163          RK    3900  0.0046   0.055            TRAP      28       2

164          KK   COMB8
165          KM        COMBINATION OF SUB8 AND ROUTE7
166          HC       2
167          ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

```
INPUT
 LINE      (V) ROUTING          (--->) DIVERSION
  NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED FLOW

   7        SUB1
               .
               .
  21           .       SUB1A
               .           .
               .           .
  29       COMB1............
               V
               V
  32      ROUTE1
               .
```

```
            .
 35         .        SUB2
            .           .
            .           .
 43         .           .       SUB2A
            .           .           .
            .           .           .
 50      COMB2.......................
            V
            V
 53     ROUTE2
            .
            .
 56         .        SUB3
            .           .
            .           .
 64         .           .       SUB3A
            .           .           .
            .           .           .
 72         .           .           .       SUB3B
            .           .           .           .
            .           .           .           .
 79      COMB3..................................
            V
            V
 82     ROUTE3
            .
            .
 85         .        SUB4
            .           .
            .           .
 93         .           .       SUB4A
            .           .           .
            .           .           .
101         .           .           .        SUB9
            .           .           .           .
            .           .           .           .
109       SUB5..................................
            V
            V
112       RES5
            .
            .
121         .        SUB6
            .           V
            .           V
129         .        RES6
            .           .
            .           .
136      COMB6............
            V
            V
```

```
 139      ROUTE4
               .
               .
 142           .        SUB7
               .           .
               .           .
 150       COMB7............
               V
               V
 153      ROUTE5
               .
               .
 156           .        SUB8
               .           .
               .           .
 164       COMB8............
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             FEBRUARY 1981             *
*           REVISED 30 OCT 81           *
*                                       *
*  RUN DATE22-MAR-90     TIME14:43:59   *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*  THE HYDROLOGIC ENGINEERING CENTER    *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*  (916) 440-3285 OR (FTS) 448-3285     *
*                                       *
*****************************************
```

BUCHANAN WASH STUDY - CITY OF PHOENIX INDEX NO. ST-886382
CASE I  EXISTING CONDITIONS ANALYSIS
100 YR,  24 HOUR STORM EVENT

```
  5 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      1    0  STARTING DATE
                      ITIME        0000  STARTING TIME
                         NQ         288  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE      1    0  ENDING DATE
                     NDTIME       2355  ENDING TIME

                 COMPUTATION INTERVAL    0.08 HOURS
                      TOTAL TIME BASE   23.92 HOURS
```

ENGLISH UNITS

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

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN 0. TO 183.
THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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 | SUB1 | 505. | 6.75 | 157. | 50. | 50. | 0.77 | | |
| HYDROGRAPH AT | SUB1A | 236. | 6.75 | 74. | 24. | 24. | 0.37 | | |
| 2 COMBINED AT | COMB1 | 741. | 6.75 | 231. | 73. | 73. | 1.14 | | |
| ROUTED TO | ROUTE1 | 735. | 6.92 | 232. | 73. | 73. | 1.14 | | |
| HYDROGRAPH AT | SUB2 | 637. | 7.00 | 278. | 90. | 90. | 1.39 | | |
| HYDROGRAPH AT | SUB2A | 227. | 6.92 | 80. | 26. | 26. | 0.50 | | |
| 3 COMBINED AT | COMB2 | 1592. | 6.92 | 590. | 190. | 190. | 3.03 | | |
| ROUTED TO | ROUTE2 | 1586. | 7.08 | 591. | 190. | 190. | 3.03 | | |
| HYDROGRAPH AT | SUB3 | 520. | 6.33 | 95. | 30. | 30. | 0.58 | | |
| HYDROGRAPH AT | SUB3A | 280. | 7.17 | 133. | 44. | 44. | 0.68 | | |
| HYDROGRAPH AT | | | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | SUB3B | 269. | 6.67 | 82. | 26. | 26. | 0.46 | |
| 4 COMBINED AT | | | | | | | | |
| | COMB3 | 2258. | 7.00 | 895. | 290. | 290. | 4.75 | |
| ROUTED TO | | | | | | | | |
| | ROUTE3 | 2242. | 7.08 | 889. | 288. | 288. | 4.75 | |
| HYDROGRAPH AT | | | | | | | | |
| | SUB4 | 381. | 6.67 | 143. | 46. | 46. | 0.72 | |
| HYDROGRAPH AT | | | | | | | | |
| | SUB4A | 291. | 6.67 | 106. | 34. | 34. | 0.57 | |
| HYDROGRAPH AT | | | | | | | | |
| | SUB9 | 1442. | 7.00 | 636. | 206. | 206. | 3.12 | |
| 4 COMBINED AT | | | | | | | | |
| | SUB5 | 4269. | 7.00 | 1770. | 574. | 574. | 9.16 | |
| ROUTED TO | | | | | | | | |
| | RES5 | 1304. | 9.25 | 1260. | 574. | 574. | 9.16 | |
| | | | | | | | | 1509.28 9.25 |
| HYDROGRAPH AT | | | | | | | | |
| | SUB6 | 956. | 6.00 | 132. | 39. | 39. | 0.43 | |
| ROUTED TO | | | | | | | | |
| | RES6 | 467. | 6.33 | 124. | 37. | 37. | 0.43 | |
| | | | | | | | | 1510.12 6.33 |
| 2 COMBINED AT | | | | | | | | |
| | COMB6 | 1386. | 7.08 | 1333. | 611. | 611. | 9.59 | |
| ROUTED TO | | | | | | | | |
| | ROUTE4 | 1384. | 7.17 | 1332. | 609. | 609. | 9.59 | |
| HYDROGRAPH AT | | | | | | | | |
| | SUB7 | 619. | 6.00 | 101. | 30. | 30. | 0.39 | |
| 2 COMBINED AT | | | | | | | | |
| | COMB7 | 1540. | 6.67 | 1381. | 639. | 639. | 9.98 | |
| ROUTED TO | | | | | | | | |
| | ROUTE5 | 1511. | 7.00 | 1375. | 634. | 634. | 9.98 | |
| HYDROGRAPH AT | | | | | | | | |
| | SUB8 | 708. | 6.83 | 248. | 79. | 79. | 1.30 | |
| 2 COMBINED AT | | | | | | | | |
| | COMB8 | 2202. | 6.92 | 1605. | 713. | 713. | 11.28 | |

SECTION 1.2
HEC-1 ANALYSIS

Case 2: Future Land Use Conditions Analysis

Data Input File Name: 49C2.dat
Data Output File Name: 49C2.out

```
****************************************
*************************************
*                                   *
*  FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*            FEBRUARY 1981          *
*          REVISED 30 OCT 81        *
*                                   *
* RUN DATE 1-JUL-89     TIME14:37:24 *
*                                   *
****************************************
```

```
*                                   *
*   U.S. ARMY CORPS OF ENGINEERS    *
* THE HYDROLOGIC ENGINEERING CENTER *
*        609 SECOND STREET          *
*      DAVIS, CALIFORNIA 95616      *
* (916) 440-3285 OR (FTS) 448-3285  *
*                                   *
*************************************
```

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

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

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE. THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. SEE SEPTEMBER 1981 INPUT DESCRIPTION FOR NEW DEFINITIONS.

HEC-1 INPUT PAGE 1

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

    1          ID        BUCHANAN WASH STUDY - CITY OF PHOENIX INDEX NO. ST-886382
    2          ID        CASE II   FUTURE LAND USE ANALYSIS
    3          ID        100 YR,  24 HOUR STORM EVENT
    4          IT       5                    288
    5          IO       5
    6          IN      30
               *DIAGRAM

    7          KK    SUB1
    8          KM        RUNOFF FROM SUBBASIN NO. 1
    9          BA   0.394
   10          LS             90                    98
   11          PB    4.13
   12          PC     0.0   0.005   0.009   0.010   0.013   0.019   0.021   0.028   0.032   0.044
   13          PC   0.057   0.100   0.660   0.745   0.776   0.800   0.816   0.830   0.840   0.850
   14          PC   0.861   0.868   0.878   0.884   0.891   0.900   0.905   0.912   0.919   0.923
```

```
 15          PC   0.930   0.934   0.939   0.944   0.950   0.958   0.961   0.963   0.969   0.971
 16          PC   0.974   0.979   0.981   0.985   0.989   0.991   0.993   0.996   1.000
 17          UK    1200   0.008   0.130      41
 18          UK     600   0.070   0.150      59
 19          RK    6000  0.0077   0.070    0.44    TRAP      10      10
 20          RK    2900  0.0066   0.050            TRAP      12       4

 21          KK   SUB1A
 22          KM        RUNOFF FROM SUBBASIN NO. 1A
 23          BA   0.184
 24          LS              91                      98
 25          UK    1200   0.008   0.130      24
 26          UK     600   0.070   0.150      76
 27          RK     400   0.113   0.010   0.020    TRAP       2      10
 28          RK    6100   0.010   0.070    0.18    TRAP      10      10
 29          RK     350   0.006   0.050            TRAP      12       4

 30          KK   COMB1
 31          KM        COMBINATION OF SUB1 AND SUB1A
 32          HC       2

 33          KK  ROUTE1
 34          KM        ROUTE TO CONFLUENCE OF SUB2 AND SUB2A
 35          RK    2350   0.003   0.050            TRAP      13       4

 36          KK    SUB2
 37          KM        RUNOFF FROM SUBBASIN NO. 2
 38          BA   0.659
 39          LS              89                      98
 40          UK    1100   0.008   0.130      44
 41          UK     600   0.070   0.150      56
 42          RK   15700  0.0075   0.070    0.65    TRAP      10      10
 43          RK     750  0.0027   0.050            TRAP      13       4
```



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

 44          KK   SUB2A
 45          KM        RUNOFF FROM SUBBASIN NO. 2A
 46          BA   0.246
 47          LS              89                      98
 48          UK    1400   0.008   0.130      34
 49          UK     600   0.070   0.150      66
 50          RK    5750   0.015   0.070    0.23    TRAP      10      10
 51          RK     500  0.0026   0.050            TRAP      13       4

 52          KK   COMB2
 53          KM        COMBINATION OF ROUTE1, SUB2 AND SUB2A
 54          HC       3

 55          KK  ROUTE2
```

```
 56          KM        ROUTE TO CONFLUENCE OF SUB3, SUB3A AND SUB3B
 57          RK    3200  0.0028   0.050            TRAP      17        4

 58          KK    SUB3
 59          KM        RUNOFF FROM SUBBASIN NO. 3
 60          BA   0.437
 61          LS              87                       98
 62          UK     700   0.044   0.130      57
 63          UK     500   0.090   0.150      43
 64          RK    6300  0.0143   0.070    0.42    TRAP      10        3
 65          RK    2700  0.0022   0.050            TRAP      17        4

 66          KK   SUB3A
 67          KM  ,     RUNOFF FROM SUBBASIN NO. 3A
 68          BA    0.44
 69          LS              89                       98
 70          UK    1800   0.008   0.130      58
 71          UK     500   0.010   0.130      42
 72          RK   12000  0.0073   0.070    0.41    TRAP      10       10
 73          RK     650  0.0015   0.050            TRAP      17        4

 74          KK   SUB3B
 75          KM        RUNOFF FROM SUBBASIN NO. 3B
 76          BA   0.472
 77          LS              86                       98
 78          UK    1000   0.008    0.13      65
 79          UK     500   0.010   0.130      35
 80          RK     400   7.500    0.15    0.02    TRAP       5       10
 81          RK    6800   0.023    0.13            TRAP      10        3

 82          KK   COMB3
 83          KM        COMBINATION OF ROUTE2, SUB3, SUB3A AND SUB3B
 84          HC       4

 85          KK  ROUTE3
 86          KM        ROUTE TO AREA 5  (TRIPLE 66" DIA RCP AT C.A.P.)
 87          RK    4800  0.0063   0.050            TRAP      20        4
```



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

 88          KK    SUB4
 89          KM        RUNOFF FROM SUBBASIN NO. 4
 90          BA   0.513
 91          LS              88                       98
 92          UK     650   0.015   0.130      66
 93          UK     500   0.080   0.150      34
 94          RK    9900  0.0076   0.070    0.24    TRAP      10       10
 95          RK    3600  0.0072   0.050            TRAP      20        4

 96          KK   SUB4A
```

```
 97          KM        RUNOFF FORM SUBBASIN NO. 4A
 98          BA   0.584
 99          LS             88                      98
100          UK    2000   0.010    0.15      67
101          UK    1200   0.015    0.15      33
102          RK    4500   0.013   0.070    0.46    TRAP      10        5
103          RK    2600   0.008   0.050            TRAP      20        4

104          KK    SUB9
105          KM        RUNOFF FROM SUBBASIN NO. 9
106          BA   2.187
107          LS             90                      98
108          UK     950  0.0087   0.130      56
109          UK     500  0.0600   0.150      44
110          RK   25100  0.0078   0.070    1.72    TRAP      10        5
111          RK    2600  0.0023   0.050            TRAP      20        4

112          KK    SUB5
113          KM        COMBINATION OF RUNOFF ABOVE CAP CROSSING
114          HC       4

115          KK    RES5
116          KM        RESERVOIR STORAGE AT SUBBASIN NO. 4
117          RS       1    STOR     0.0
118          SV       0    0.11    7.71   30.60   79.48  164.73  293.46  463.36  670.00
119          SE    1493    1496    1500    1502    1504    1506    1508    1510    1512
120          SQ       0     153     420     480     731     887    1019    1135    1241    1339
121          SQ    1430
122          SE    1493 1495.75  1498.0  1498.5  1500.0    1502    1504    1506    1508    1510
123          SE    1512

124          KK    SUB6
125          KM        RUNOFF FROM SUBBASIN NO. 6
126          BA   0.436
127          LS             95                      98
128          UK     800   0.010    0.13      54
129          UK     550   0.04     0.15      46
130          RK    4500   0.078   0.070    0.13    TRAP      10        3
131          RK      10   0.008   0.050            TRAP      24        2
```



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


132          KK    RES6
133          KM        RESERVOIR STORAGE AT SUBBASIN NO. 6
134          RS       1    STOR     0.0
135          SV       0    2.98   10.59   23.57   41.57   70.00
136          SE    1504    1506    1508    1510    1512    1514
137          SQ       0       0    99.1   424.9  1118.7  2309.3
138          SE    1504    1506    1508    1510    1512    1514
```

```
139          KK   COMB6
140          KM        COMBINE HYDROGRAPHS AT CULVERT OUTLET
141          HC       2

142          KK  ROUTE4
143          KM        ROUTE FROM COMB6 TO COMB7
144          RK    4030  0.0044   0.055            TRAP      25       2

145          KK    SUB7
146          KM        RUNOFF FROM SUBBASIN NO. 7
147          BA   0.323
148          LS              95                       98
149          UK     800   0.007   0.130      50
150          UK     400   0.100   0.150      50
151          RK    3000   0.117   0.070    0.23    TRAP      10       3
152          RK    1580  0.0038   0.055            TRAP      25       2

153          KK   COMB7
154          KM        COMBINATION OF COMB6 AND SUB7
155          HC       2

156          KK  ROUTE5
157          KM        ROUTE COMB7 TO COMB8
158          RK    7200   0.005   0.055            TRAP      28       2

159          KK    SUB8
160          KM        RUNOFF FROM SUBBASIN NO. 8
161          BA   0.810
162          LS              92                       98
163          UK    1100   0.009    0.13      46
164          UK     500   0.060    0.15      54
165          RK    7700  0.0058   0.070    0.32    TRAP      10      10
166          RK    3900  0.0046   0.055            TRAP      28       2

167          KK   COMB8
168          KM        COMBINATION OF SUB8 AND ROUTE7
169          HC       2
170          ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

```
INPUT
 LINE      (V) ROUTING          (--->) DIVERSION
  NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED FLOW

   7        SUB1
                .
                .
  21            .       SUB1A
                .           .
                .           .
  30       COMB1............
                V
```

```
            V
33      ROUTE1
            .
            .
36          .        SUB2
            .           .
            .           .
44          .           .       SUB2A
            .           .           .
            .           .           .
52       COMB2.......................
            V
            V
55      ROUTE2
            .
            .
58          .        SUB3
            .           .
            .           .
66          .           .       SUB3A
            .           .           .
            .           .           .
74          .           .           .       SUB3B
            .           .           .           .
            .           .           .           .
82       COMB3..................................
            V
            V
85      ROUTE3
            .
            .
88          .        SUB4
            .           .
            .           .
96          .           .       SUB4A
            .           .           .
            .           .           .
104         .           .           .        SUB9
            .           .           .           .
            .           .           .           .
112       SUB5..................................
            V
            V
115       RES5
            .
            .
124         .        SUB6
            .           V
            .           V
132         .        RES6
            .           .
            .           .
```

```
 139       COMB6............
               V
               V
 142      ROUTE4
               .
               .
 145           .        SUB7
               .           .
               .           .
 153       COMB7............
               V
               V
 156      ROUTE5
               .
               .
 159           .        SUB8
               .           .
               .           .
 167       COMB8............

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION
*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             FEBRUARY 1981             *
*           REVISED 30 OCT 81           *
*                                       *
*  RUN DATE 1-JUL-89     TIME14:37:24   *
*                                       *
*****************************************
```

```
****************************************
*                                      *
*    U.S. ARMY CORPS OF ENGINEERS      *
*  THE HYDROLOGIC ENGINEERING CENTER   *
*          609 SECOND STREET           *
*       DAVIS, CALIFORNIA 95616        *
*  (916) 440-3285 OR (FTS) 448-3285    *
*                                      *
****************************************
```

```
                    BUCHANAN WASH STUDY - CITY OF PHOENIX INDEX NO. ST-886382
                    CASE II   FUTURE LAND USE ANALYSIS
                    100 YR,  24 HOUR STORM EVENT

  5 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      1    0  STARTING DATE
                      ITIME       0000  STARTING TIME
                         NQ        288  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE      1    0  ENDING DATE
                     NDTIME       2355  ENDING TIME
```

COMPUTATION INTERVAL 0.08 HOURS
TOTAL TIME BASE 23.92 HOURS

ENGLISH UNITS

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

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN 0. TO 183.
THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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 | SUB1 | 493. | 6.17 | 114. | 34. | 34. | 0.39 | | |
| HYDROGRAPH AT | SUB1A | 255. | 6.08 | 57. | 17. | 17. | 0.18 | | |
| 2 COMBINED AT | COMB1 | 747. | 6.17 | 171. | 51. | 51. | 0.58 | | |
| ROUTED TO | ROUTE1 | 734. | 6.25 | 173. | 52. | 52. | 0.58 | | |
| HYDROGRAPH AT | SUB2 | 430. | 6.58 | 180. | 56. | 56. | 0.66 | | |
| HYDROGRAPH AT | SUB2A | 359. | 6.08 | 73. | 22. | 22. | 0.25 | | |
| 3 COMBINED AT | COMB2 | 1405. | 6.25 | 426. | 130. | 130. | 1.48 | | |
| ROUTED TO | ROUTE2 | 1400. | 6.42 | 429. | 131. | 131. | 1.48 | | |
| HYDROGRAPH AT | SUB3 | 794. | 6.17 | 115. | 35. | 35. | 0.44 | | |
| HYDROGRAPH AT | | | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | SUB3A | 251. | 6.83 | 114. | 36. | 36. | 0.44 | |
| HYDROGRAPH AT | | | | | | | | |
| | SUB3B | 445. | 6.33 | 119. | 36. | 36. | 0.47 | |
| 4 COMBINED AT | | | | | | | | |
| | COMB3 | 2527. | 6.17 | 775. | 238. | 238. | 2.83 | |
| ROUTED TO | | | | | | | | |
| | ROUTE3 | 2491. | 6.42 | 770. | 236. | 236. | 2.83 | |
| HYDROGRAPH AT | | | | | | | | |
| | SUB4 | 377. | 6.50 | 127. | 39. | 39. | 0.51 | |
| HYDROGRAPH AT | | | | | | | | |
| | SUB4A | 495. | 6.25 | 148. | 46. | 46. | 0.58 | |
| HYDROGRAPH AT | | | | | | | | |
| | SUB9 | 1391. | 6.67 | 576. | 180. | 180. | 2.19 | |
| 4 COMBINED AT | | | | | | | | |
| | SUB5 | 4631. | 6.50 | 1619. | 501. | 501. | 6.12 | |
| ROUTED TO | | | | | | | | |
| | RES5 | 1287. | 8.58 | 1234. | 501. | 501. | 6.12 | |
| | | | | | | | | 1508.94 8.58 |
| HYDROGRAPH AT | | | | | | | | |
| | SUB6 | 936. | 6.08 | 140. | 41. | 41. | 0.44 | |
| ROUTED TO | | | | | | | | |
| | RES6 | 505. | 6.33 | 132. | 40. | 40. | 0.44 | |
| | | | | | | | | 1510.23 6.33 |
| 2 COMBINED AT | | | | | | | | |
| | COMB6 | 1547. | 6.50 | 1346. | 541. | 541. | 6.55 | |
| ROUTED TO | | | | | | | | |
| | ROUTE4 | 1545. | 6.67 | 1344. | 539. | 539. | 6.55 | |
| HYDROGRAPH AT | | | | | | | | |
| | SUB7 | 673. | 6.00 | 105. | 31. | 31. | 0.32 | |
| 2 COMBINED AT | | | | | | | | |
| | COMB7 | 1778. | 6.50 | 1399. | 570. | 570. | 6.88 | |
| ROUTED TO | | | | | | | | |
| | ROUTE5 | 1724. | 6.75 | 1392. | 566. | 566. | 6.88 | |
| HYDROGRAPH AT | | | | | | | | |
| | SUB8 | 750. | 6.42 | 230. | 70. | 70. | 0.81 | |

2 COMBINED AT

| | | | | | | |
|---|---|---|---|---|---|---|
| COMB8 | 2392. | 6.67 | 1591. | 636. | 636. | 7.68 |

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

SECTION 1.3
HEC-1 ANALYSIS

Case 3: Major Drainage System Analysis

Data Input File Name: 49C3.dat
Data Output File Name: 49C3.out

```
****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*            FEBRUARY 1981             *
*          REVISED 30 OCT 81           *
*                                      *
* RUN DATE 5-JUL-89     TIME09:41:04   *
*                                      *
****************************************
```

```
****************************************
*                                      *
*    U.S. ARMY CORPS OF ENGINEERS      *
*  THE HYDROLOGIC ENGINEERING CENTER   *
*          609 SECOND STREET           *
*       DAVIS, CALIFORNIA 95616        *
*  (916) 440-3285 OR (FTS) 448-3285    *
*                                      *
****************************************
```

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

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

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE. THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. SEE SEPTEMBER 1981 INPUT DESCRIPTION FOR NEW DEFINITIONS.

HEC-1 INPUT PAGE 1

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

   1           ID        BUCHANAN WASH STUDY - CITY OF PHOENIX INDEX NO. ST-886382
   2           ID        CASE III   PROPOSED MAJOR SYSTEM ANALYSIS
   3           ID        100 YR,  24 HOUR STORM EVENT
   4           IT       5                    288
   5           IO       5
   6           IN      30
               *DIAGRAM

   7           KK    SUB1
   8           KM        RUNOFF FROM TRACT 1/TRACT 3(SUBBASIN A)
   9           BA   0.821
  10           LS              86
  11           PB    4.13
  12           PC     0.0   0.005   0.009   0.010   0.013   0.019   0.021   0.028   0.032   0.044
  13           PC   0.057   0.100   0.660   0.745   0.776   0.800   0.816   0.830   0.840   0.850
  14           PC   0.861   0.868   0.878   0.884   0.891   0.900   0.905   0.912   0.919   0.923
  15           PC   0.930   0.934   0.939   0.944   0.950   0.958   0.961   0.963   0.969   0.971
```

```
 16          PC   0.974   0.979   0.981   0.985   0.989   0.991   0.993   0.996   1.000
 17          UK    1200   0.008   0.130     100
 18          RK    2200  0.0090   0.050    .211    TRAP      40       4
 19          RK    6300  0.0084   0.050            TRAP      40       4

 20          KK    SUB2
 21          KM        RUNOFF FROM TRACT 5(SUBBASIN A)
 22          BA   0.744
 23          LS              86
 24          UK    2000  0.0015   0.130     100
 25          RK    4200  0.0083   0.050            TRAP      25       4     YES

 26          KK    SUB3
 27          KM        RUNOFF FROM TRACT 7
 28          BA   1.019
 29          LS              86                       86
 30          UK    2500    .002    .130      70
 31          UK    2800    .009    .130      30
 32          RK    6400   .0056    .050            TRAP      50       4     YES

 33          KK    SUB4
 34          KM        RUNOFF FROM TRACT 8
 35          BA   0.573
 36          LS              79                       79
 37          UK    1800   .0004    .130      30
 38          UK    1500    .016    .130      70
 39          RK    2000    .014    .050            TRAP      25       4

 40          KK  ROUTE1
 41          KM        ROUTE SUB4 TO SUB3
 42          RK    3000   .0086    .050            TRAP      25       4

 43          KK   COMB1
 44          KM        COMBINATION OF SUB3/SUB4
 45          HC       2
                                        HEC-1 INPUT                                    PAGE  2

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


 46          KK  ROUTE2
 47          KM        ROUTE SUB3 TO SUB6
 48          RK    2500   .0028    .050            TRAP      75       4

 49          KK    SUB5
 50          KM        RUNOFF FROM TRACT 9
 51          BA    0.15
 52          LS              76                       76
 53          UK    1000    .030    .130      70
 54          UK    1000    .015    .130      30
 55          RK    1000    .020    .050            TRAP      25       4
```

```
 56          KK  ROUTE3
 57          KM        ROUTE SUB5 TO SUB6
 58          RK    3200    .009    .050            TRAP      25       4

 59          KK    SUB6
 60          KM        RUNOFF FORM TRACT 10
 61          BA    0.69
 62          LS              85                      85
 63          UK    1500    .007    .130      70
 64          UK    1000    .010    .050      30
 65          RK    4500   .0070    .050     .24    TRAP      20       4
 66          RK    1200   .0058    .050            TRAP      25       4

 67          KK   COMB2
 68          KM        COMBINATION OF SUB3/SUB5/SUB6
 69          HC       3

 70          KK  ROUTE4
 71          KM        ROUTE COMB2 TO SUB7
 72          RK    4780   .0036    .050            TRAP     125       4

 73          KK    SUB7
 74          KM        RUNOFF FROM TRACT 14
 75          BA   1.245
 76          LS              88                      88
 77          UK     650    .015    .130      66
 78          UK     500    .080    .150      34
 79          RK    3500   .0072    .050            TRAP     125       4

 80          KK   SUB11
 81          KM        RUNOFF FROM TRACT 13
 82          BA   0.316
 83          LS              79                      79
 84          UK    1500    .240    .130      45
 85          UK    1600   .0125    .130      55
 86          RK     500    .020    .050            TRAP      25       4
```



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


 87          KK  ROUTE5
 88          KM        ROUTE SUB11 TO SUB7
 89          RK    4700  0.0136    .050            TRAP      25       4

 90          KK   COMB3
 91          KM        COMBINATION OF SUB7/SUB6/SUB11
 92          HC       3

 93          KK  ROUTE7
 94          KM        ROUTE COMB3 TO SUB12 (@ CAP)
 95          RK    3000  0.0073    .050            TRAP     125       4
```

```
 96          KK    SUB8
 97          KM        RUNOFF FROM TRACT2/TRACT3(SUBBASIN B)
 98          BA   0.303
 99          LS              86                      86
100          UK     800    .010    .130      30
101          UK    7500   .0067    .130      70
102          RK    1200    .010    .050            TRAP      50       4

103          KK    SUB9
104          KM        RUNOFF FROM TRACT 5(SUBBASIN B)
105          BA   0.673
106          LS              86
107          UK    2500   .0048    .130     100
108          RK    4000   .0075    .050            TRAP      50       4     YES

109          KK   SUB10
110          KM        RUNOFF FROM TRACT 11
111          BA   1.147
112          LS              86
113          UK    3000   .0033    .130     100
114          RK    5000   .0075    .050            TRAP     100       4     YES

115          KK  ROUTE6
116          KM        ROUTE FROM SUB10 TO SUB12
117          RK    5500   .0083    .050            TRAP     100       4
118          RK    2600   .0004    .050            TRAP     100       4

119          KK   SUB12
120          KM        RUNOFF FROM TRACT 15  (@CAP)
121          BA   1.435
122          LS              98                      86
123          UK    1300    .123    .150      35
124          UK    2500    .008    .130      65
125          RK    2600   .0023    .050            TRAP      50       4

126          KK   COMB4
127          KM        COMBINATION OF SUB7/SUB12/SUB10
128          HC       3
```



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


129          KK    RES1
130          KM        RESERVOIR STORAGE UPSTREAM OF CAP
131          RS       1    STOR     0.0
132          SV       0    0.11     7.71    30.60    79.48   164.73   293.46   463.36   670.00
133          SE    1493    1496     1500     1502     1504     1506     1508     1510     1512
134          SQ       0     153      420      480      731      887     1019     1135     1241     1339
135          SQ    1430
136          SE    1493 1495.75  1498.0   1498.5   1500.0     1502     1504     1506     1508     1510
```

```
137          SE    1512

138          KK   SUB13
139          KM        RUNOFF FROM SUBBASIN NO. 13
140          BA    0.43
141          LS              95                        95
142          UK     800   0.010    0.13      37
143          UK     550   0.04     0.15      63
144          RK    4500   0.078   0.070    0.13    TRAP      10        3
145          RK      10   0.008   0.050            TRAP      24        2

146          KK    RES2
147          KM        RESERVOIR STORAGE AT SUBBASIN NO. 13
148          RS       1    STOR     0.0
149          SV       0    2.98   10.59   23.57   41.57   70.00
150          SE    1504    1506    1508    1510    1512    1514
151          SQ       0       0    99.1   424.9  1118.7  2309.3
152          SE    1504    1506    1508    1510    1512    1514

153          KK   COMB5
154          KM        COMBINE HYDROGRAPHS AT CULVERT OUTLET
155          HC       2

156          KK  ROUTE8
157          KM        ROUTE FROM COMB5 TO COMB6
158          RK    4030  0.0044   0.055            TRAP      25        2

159          KK   SUB14
160          KM        RUNOFF FROM SUBBASIN NO. 14
161          BA    0.39
162          LS              90                        90
163          UK     800   0.007   0.130      54
164          UK     400   0.100   0.150      46
165          RK    3000   0.117   0.070    0.23    TRAP      10        3
166          RK    1580  0.0038   0.055            TRAP      25        2

167          KK   COMB6
168          KM        COMBINATION OF COMB5 AND SUB6
169          HC       2

170          KK  ROUTE9
171          KM        ROUTE COMB6 TO COMB7
172          RK    7200   0.005   0.055            TRAP      28        2
```



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

173          KK   SUB15
174          KM        RUNOFF FROM SUBBASIN NO. 15
175          BA   1.343
176          LS              85                        85
```

```
177          UK    1100   0.009    0.13      91
178          UK     500   0.060    0.15       9
179          RK    7700  0.0058   0.070    0.52    TRAP      10       10
180          RK    3900  0.0046   0.055            TRAP      28        2

181          KK   COMB7
182          KM        COMBINATION OF SUB15 AND ROUTE9
183          HC       2
184          ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

```
INPUT
 LINE      (V) ROUTING          (--->) DIVERSION
  NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED FLOW

   7        SUB1
               V
               V
  20        SUB2 ***
               V
               V
  26        SUB3 ***
               .
               .
  33           .        SUB4
               .           V
               .           V
  40           .      ROUTE1
               .           .
               .           .
  43       COMB1............
               V
               V
  46      ROUTE2
               .
               .
  49           .        SUB5
               .           V
               .           V
  56           .      ROUTE3
               .           .
               .           .
  59           .           .        SUB6
               .           .           .
               .           .           .
  67       COMB2........................
               V
               V
  70      ROUTE4
               .
               .
  73           .        SUB7
```

```
            .           .
            .           .
 80         .           .       SUB11
            .           .           V
            .           .           V
 87         .           .      ROUTE5
            .           .           .
            .           .           .
 90      COMB3.......................
            V
            V
 93     ROUTE7
            .
            .
 96         .        SUB8
            .           V
            .           V
103         .        SUB9 ***
            .           V
            .           V
109         .       SUB10 ***
            .           V
            .           V
115         .      ROUTE6
            .           .
            .           .
119         .           .       SUB12
            .           .           .
            .           .           .
126      COMB4.......................
            V
            V
129       RES1
            .
            .
138         .       SUB13
            .           V
            .           V
146         .        RES2
            .           .
            .           .
153      COMB5............
            V
            V
156     ROUTE8
            .
            .
159         .       SUB14
            .           .
            .           .
167      COMB6............
            V
```

```
              V
  170      ROUTE9
                .
                .
  173           .       SUB15
                .          .
                .          .
  181       COMB7............
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             FEBRUARY 1981             *
*           REVISED 30 OCT 81           *
*                                       *
*  RUN DATE 5-JUL-89     TIME09:41:04   *
*                                       *
*****************************************
```

```
****************************************
*                                      *
*    U.S. ARMY CORPS OF ENGINEERS      *
*  THE HYDROLOGIC ENGINEERING CENTER   *
*          609 SECOND STREET           *
*       DAVIS, CALIFORNIA 95616        *
*  (916) 440-3285 OR (FTS) 448-3285    *
*                                      *
****************************************
```

BUCHANAN WASH STUDY - CITY OF PHOENIX INDEX NO. ST-886382
CASE III  PROPOSED MAJOR SYSTEM ANALYSIS
100 YR,  24 HOUR STORM EVENT

```
  5 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      1    0  STARTING DATE
                      ITIME        0000  STARTING TIME
                         NQ         288  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE      1    0  ENDING DATE
                     NDTIME        2355  ENDING TIME

                 COMPUTATION INTERVAL    0.08 HOURS
                      TOTAL TIME BASE   23.92 HOURS

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

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN 0. TO 183.
THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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 | SUB1 | 624. | 6.67 | 167. | 53. | 53. | 0.82 | | |
| HYDROGRAPH AT | SUB2 | 814. | 6.83 | 309. | 102. | 102. | 1.57 | | |
| HYDROGRAPH AT | SUB3 | 1097. | 7.00 | 494. | 166. | 166. | 2.58 | | |
| HYDROGRAPH AT | SUB4 | 249. | 6.50 | 83. | 29. | 29. | 0.57 | | |
| ROUTED TO | ROUTE1 | 248. | 6.67 | 83. | 29. | 29. | 0.57 | | |
| 2 COMBINED AT | COMB1 | 1280. | 6.92 | 574. | 195. | 195. | 3.16 | | |
| ROUTED TO | ROUTE2 | 1275. | 7.08 | 575. | 195. | 195. | 3.16 | | |
| HYDROGRAPH AT | SUB5 | 102. | 6.33 | 22. | 7. | 7. | 0.15 | | |
| ROUTED TO | ROUTE3 | 97. | 6.42 | 22. | 7. | 7. | 0.15 | | |
| HYDROGRAPH AT | SUB6 | 405. | 6.33 | 138. | 44. | 44. | 0.69 | | |
| 3 COMBINED AT | COMB2 | 1636. | 7.00 | 724. | 246. | 246. | 4.00 | | |
| ROUTED TO | ROUTE4 | 1608. | 7.17 | 713. | 242. | 242. | 4.00 | | |
| HYDROGRAPH AT | SUB7 | 2183. | 6.08 | 296. | 90. | 90. | 1.25 | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| HYDROGRAPH AT | | | | | | | | |
| | SUB11 | 271. | 6.08 | 53. | 17. | 17. | 0.32 | |
| ROUTED TO | | | | | | | | |
| | ROUTE5 | 222. | 6.25 | 52. | 17. | 17. | 0.32 | |
| 3 COMBINED AT | | | | | | | | |
| | COMB3 | 2246. | 6.08 | 1033. | 349. | 349. | 5.56 | |
| ROUTED TO | | | | | | | | |
| | ROUTE7 | 2168. | 6.17 | 1026. | 347. | 347. | 5.56 | |
| HYDROGRAPH AT | | | | | | | | |
| | SUB8 | 134. | 6.25 | 53. | 19. | 19. | 0.30 | |
| HYDROGRAPH AT | | | | | | | | |
| | SUB9 | 338. | 6.58 | 186. | 64. | 64. | 0.98 | |
| HYDROGRAPH AT | | | | | | | | |
| | SUB10 | 649. | 7.67 | 396. | 137. | 137. | 2.12 | |
| ROUTED TO | | | | | | | | |
| | ROUTE6 | 648. | 7.83 | 389. | 134. | 134. | 2.12 | |
| HYDROGRAPH AT | | | | | | | | |
| | SUB12 | 1746. | 6.08 | 359. | 111. | 111. | 1.43 | |
| 3 COMBINED AT | | | | | | | | |
| | COMB4 | 3731. | 6.17 | 1739. | 593. | 593. | 9.12 | |
| ROUTED TO | | | | | | | | |
| | RES1 | 1272. | 9.50 | 1236. | 593. | 593. | 9.12 | |
| | | | | | | | | 1508.63 9.50 |
| HYDROGRAPH AT | | | | | | | | |
| | SUB13 | 956. | 6.00 | 132. | 39. | 39. | 0.43 | |
| ROUTED TO | | | | | | | | |
| | RES2 | 467. | 6.33 | 124. | 37. | 37. | 0.43 | |
| | | | | | | | | 1510.12 6.33 |
| 2 COMBINED AT | | | | | | | | |
| | COMB5 | 1490. | 6.42 | 1328. | 630. | 630. | 9.55 | |
| ROUTED TO | | | | | | | | |
| | ROUTE8 | 1481. | 6.50 | 1327. | 627. | 627. | 9.55 | |
| HYDROGRAPH AT | | | | | | | | |
| | SUB14 | 619. | 6.00 | 101. | 30. | 30. | 0.39 | |
| 2 COMBINED AT | | | | | | | | |
| | COMB6 | 1800. | 6.42 | 1394. | 657. | 657. | 9.94 | |

| | | | | | | |
|---|---|---|---|---|---|---|
| ROUTED TO | | | | | | |
| | ROUTE9 | 1727. | 6.67 | 1385. | 652. | 652. | 9.94 |
| HYDROGRAPH AT | | | | | | |
| | SUB15 | 731. | 6.83 | 256. | 82. | 82. | 1.34 |
| 2 COMBINED AT | | | | | | |
| | COMB7 | 2438. | 6.75 | 1637. | 734. | 734. | 11.28 |

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

SECTION 1.4
HEC-1 ANALYSIS

Case 4: Storm Drain System Analysis

Data Input File Name: 49C4.dat
Data Output File Name: 49C4.out

```
****************************************
*                                      *
*  FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*            FEBRUARY 1981             *
*          REVISED 30 OCT 81           *
*                                      *
* RUN DATE22-MAR-90     TIME14:50:03   *
*                                      *
****************************************
```

```
*************************************
*                                   *
*   U.S. ARMY CORPS OF ENGINEERS    *
* THE HYDROLOGIC ENGINEERING CENTER *
*        609 SECOND STREET          *
*      DAVIS, CALIFORNIA 95616      *
* (916) 440-3285 OR (FTS) 448-3285  *
*                                   *
*************************************
```

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

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

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE. THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. SEE SEPTEMBER 1981 INPUT DESCRIPTION FOR NEW DEFINITIONS.

HEC-1 INPUT PAGE 1

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

    1          ID        BUCHANAN WASH STUDY - CITY OF PHOENIX INDEX NO. ST-886382
    2          ID        CASE IV   PROPOSED STORM DRAIN SYSTEM ANALYSIS
    3          ID        2 YR,  24 HOUR STORM EVENT
    4          IT       5                    288
    5          IO       5
    6          IN      30
               *DIAGRAM

    7          KK    SUB1
    8          KM        RUNOFF FROM T3/SA/P2
    9          BA   0.614
   10          LS              86
   11          PB    1.70
   12          PC     0.0   0.005   0.009   0.010   0.013   0.019   0.021   0.028   0.032   0.044
   13          PC   0.057   0.100   0.660   0.745   0.776   0.800   0.816   0.830   0.840   0.850
   14          PC   0.861   0.868   0.878   0.884   0.891   0.900   0.905   0.912   0.919   0.923
   15          PC   0.930   0.934   0.939   0.944   0.950   0.958   0.961   0.963   0.969   0.971
```

```
 16          PC   0.974   0.979   0.981   0.985   0.989   0.991   0.993   0.996   1.000
 17          UK    1200   0.008   0.130     100
 18          RK    2200  0.0090   0.050    .211    TRAP      40       4
 19          RK    6300  0.0084   0.050            TRAP      40       4

 20          KK   SUB1A
 21          KM        RUNOFF FROM T3/SA/P1 (STORM DRAIN)
 22          BA   0.088
 23          LS             86
 24          UK    3000  0.0087   0.130     100
 25          RK    1250  0.0016   0.015            CIRC     1.5

 26          KK   SUB1B
 27          KM        RUNOFF FROM T3/SA/P3
 28          BA   0.119
 29          LS             86                       86
 30          UK    1600   0.013   0.150      40
 31          UK    2000  0.0065   0.130      60
 32          RK    1150  0.0035   0.015            CIRC    1.75

 33          KK  COMB1A
 34          KM        COMBINE FLOWS AT DOVE VALLEY RD FOR BASIN A
 35          HC       3

 36          KK   RTE1A
 37          KM        ROUTE TO 43RD AVE (SUB2)
 38          RK    4100  0.0088   0.050            TRAP      40       4

 39          KK    SUB2
 40          KM        RUNOFF FROM T5/SA/P2 (@43RD AVE)
 41          BA   0.287
 42          LS             86
 43          UK    2000  0.0015   0.130     100
 44          RK    4200  0.0083   0.050            TRAP      40       4
```



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


 45          KK   SUB2E
 46          KM        RUNOFF FROM TRACT 4
 47          BA   0.010
 48          LS             86
 49          UK    1500   0.012   0.150     100
 50          RK     700  0.0014   0.015            CIRC    1.25

 51          KK   SUB2A
 52          KM        RUNOFF FROM T5/SA/P1
 53          BA   0.195
 54          LS             86                       86
 55          UK     800  0.0175   0.150      15
 56          UK    3000  0.0063   0.130      85
```

```
 57          RK    1500  0.0007   0.015            CIRC    2.25             YES

 58          KK   SUB2B
 59          KM        RUNOFF FROM T5/SA/P3
 60          BA   0.028
 61          LS              86
 62          UK    1400  0.0079   0.150     100
 63          RK     800   0.005   0.015            CIRC    1.75             YES

 64          KK   SUB2C
 65          KM        RUNOFF FROM T5/SA/P4
 66          BA   0.141
 67          LS              86                       86
 68          UK    1100  0.0082   0.130      10
 69          UK    4500  0.0069   0.130      90
 70          RK    1500   0.002   0.015            CIRC     1.5

 71          KK   SUB2D
 72          KM        RUNOFF FROM T5/SA/P5
 73          BA   0.083
 74          LS              86
 75          UK    2300  0.0100   0.150     100
 76          RK     950  0.0011   0.015            CIRC    2.25             YES

 77          KK  COMB1B
 78          KM        COMBINE FLOWS AT 43RD AVE - BASIN A
 79          HC       4

 80          KK   RTE1B
 81          KM        ROUTE TO NW OUTER LOOP (SUB3)
 82          RK    6400  0.0056   0.050            TRAP      50       4

 83          KK    SUB3
 84          KM        RUNOFF FROM T7/P3
 85          BA   0.655
 86          LS              86                       86
 87          UK    2500    .002    .130      70
 88          UK    2800    .009    .130      30
 89          RK    3700   .0056    .050            TRAP      50       4
                                          HEC-1 INPUT                                                    PAGE  3

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


 90          KK   SUB3E
 91          KM        RUNOFF FROM T6/P2
 92          BA   0.070
 93          LS              86                       86
 94          UK    1000  0.0040   0.150     100
 95          RK    3200  0.0063   0.015            CIRC    1.25

 96          KK   SUB3D
```

```
 97          KM        RUNOFF FROM T6/P1
 98          BA   0.018
 99          LS             86
100          UK     700  0.0043   0.150     100
101          RK     500  0.0080   0.015           CIRC     1.0

102          KK  COMB1C
103          KM        COMBINE FLOWS AT 51ST AVE
104          HC       2

105          KK   RTE1C
106          KM        ROUTE TO NW OUTER LOOP (SUB3)
107          RK    3200  0.0056   0.050           TRAP      25       4

108          KK    SUB4
109          KM        RUNOFF FROM T8/P2
110          BA   0.190
111          LS             79
112          UK    1500    .016    .130     100
113          RK    2000    .014    .050           TRAP      25       4

114          KK   SUB4A
115          KM        RUNOFF FROM T8/P3
116          BA   0.055
117          LS             79
118          UK    1350   0.012   0.130     100
119          RK    1400  0.0029   0.015           CIRC    1.25

120          KK   SUB4B
121          KM        RUNOFF FROM T8/P1
122          BA   0.175
123          LS             79                      79
124          UK    1000   0.020   0.150      20
125          UK    2700   0.013   0.130      80
126          RK     900  0.0044   0.015           CIRC    1.25

127          KK  COMB1D
128          KM        COMBINE FLOWS AT 51ST AVE (SUB4)
129          HC       3

130          KK  ROUTE1
131          KM        ROUTE SUB4 TO SUB3
132          RK    3000   .0086    .050           TRAP      25       4
```



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


133          KK   SUB3A
134          KM        RUNOFF FROM T7/P1
135          BA   0.085
136          LS             86
```

```
137          UK    1400  0.0064   0.130     100
138          RK    1900  0.0075   0.015           CIRC     1.5

139          KK   SUB3B
140          KM        RUNOFF FROM T7/P5
141          BA   0.031
142          LS             86
143          UK     900  0.0056   0.130     100
144          RK    3100  0.0087   0.015           CIRC     1.0

145          KK   SUB3C
146          KM        RUNOFF FROM T7/P4
147          BA   0.160
148          LS             86
149          UK     500   0.010   0.150     100
150          RK    3300  0.0073   0.050    .144    TRAP      25       4
151          RK    1400  0.0079   0.015           CIRC    2.25             YES

152          KK   COMB1
153          KM        COMBINE FLOWS AT NW OUTER LOOP (SUB3)
154          HC       6

155          KK  ROUTE2
156          KM        ROUTE SUB3 TO SUB6
157          RK    2500   .0028    .050           TRAP      75       4

158          KK   SUB5G
159          KM        RUNOFF FROM T12/P2
160          BA   0.009
161          LS             79
162          UK     700   0.076   0.130     100
163          RK     200   0.021   0.015           CIRC    1.00

164          KK   SUB5H
165          KM        RUNOFF FROM T13/P1
166          BA   0.049
167          LS             79                       79
168          UK    1200    0.35   0.150      60
169          UK     450   0.044   0.130      40
170          RK     500   0.026   0.015           CIRC     1.0

171          KK  COMB2C
172          KM        COMBINE FLOWS AT DIXILETA DR/ NW OUTER LOOP
173          HC       2
```



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


174          KK   RTE3A
175          KM        ROUTE FLOWS IN STORM DRAIN SYSTEM - DIXILETA DR
176          RK    2250  0.0290   0.015           CIRC      1.
```

```
177          KK   SUB5F
178          KM        RUNOFF FROM T8/P4
179          BA   0.144
180          LS             79                      79
181          UK    1300  0.0550   0.150      40
182          UK    1200   0.024   0.130      60
183          RK    1700  0.0080   0.015           CIRC    1.75            YES

184          KK   SUB5E
185          KM        RUNOFF FROM T9/P2
186          BA   0.022
187          LS             76
188          UK    1300  0.0185   0.150     100
189          RK     400   0.008   0.015           CIRC    1.75            YES

190          KK   SUB5C
191          KM        RUNOFF FROM T13/P2A
192          BA   0.030
193          LS             79
194          UK     800   0.200   0.150     100
195          RK    2400  0.0379   0.015           CIRC     1.0

196          KK   SUB5B
197          KM        RUNOFF FROM T13/P2B
198          BA   0.023
199          LS             79
200          UK     800  0.0038   0.130     100
201          RK     900  0.0078   0.015           CIRC     1.0

202          KK  COMB2B
203          KM        COMBINE FLOWS AT INTERSECTION 51ST AND DIXILETA
204          HC       2

205          KK   SUB5A
206          KM        RUNOFF FROM T9/P1C
207          BA   0.019
208          LS             76
209          UK    2600   0.035   0.130     100
210          RK     250  0.0089   0.015           CIRC      1.            YES

211          KK    SUB5
212          KM        RUNOFF FROM T9/P1B
213          BA    0.051
214          LS             76
215          UK    2700    .036    .130     100
216          RK     300   .0089    .015           CIRC    1.25            YES
```



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

```
KK   SUB5D
KM        RUNOFF FROM T9/P1A
BA   0.058
LS              76
UK    3000   0.026   0.130     100
RK     300   0.026   0.050            TRAP      25        4

KK  COMB2A
KM        COMBINE FLOWS AT 51ST STREET
HC       3

KK  ROUTE3
KM        ROUTE SUB5 TO SUB6
RK    3200    .009    .050            TRAP      25        4

KK   SUB6B
KM        RUNOFF FROM T10/P4
BA   0.035
LS              85
UK    1800  0.0083   0.130     100
RK    2400  0.0071   0.015            CIRC     1.0

KK   SUB6C
KM        RUNOFF FROM T10/P3
BA   0.318
LS              85
UK    1000   0.008   0.130     100
RK    3100  0.0058   0.050    .270    TRAP      25        4
RK    1900  0.0063   0.015            CIRC     2.5             YES

KK    SUB6
KM        RUNOFF FORM T10/P2
BA   0.287
LS              85                       85
UK    2500    .007    .130      70
UK    1000    .010    .130      30
RK    1200   .0058    .050            TRAP      25        4

KK   SUB7F
KM        RUNOFF FROM T14/P3
BA   0.093
LS              86                       98
UK    1500  0.0087   0.130      30
UK     700   0.350   0.150      70
RK     500  0.0150   0.015            CIRC      3.

KK   SUB6A
KM        RUNOFF FORM T10/P1
BA   0.050
LS              85                       85
UK     500   0.004   0.130      40
UK    1000   0.013   0.100      60
```

```
 262          RK    1000   0.008   0.015            CIRC     3.5             YES
                                              HEC-1 INPUT                                                    PAGE  7

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


 263          KK   COMB2
 264          KM        COMBINE FLOWS AT DIXILETA DR (SUB6)
 265          HC       5

 266          KK  ROUTE4
 267          KM        ROUTE COMB2 TO SUB7
 268          RK    4780   .0036    .050            TRAP     125       4

 269          KK    SUB7
 270          KM        RUNOFF FROM T14/P1A/P2/P4/P5
 271          BA   0.873
 272          LS              88                       88
 273          UK     650    .015    .130      66
 274          UK     500    .080    .150      34
 275          RK    3500   .0072    .050            TRAP      50       4

 276          KK   SUB11
 277          KM        RUNOFF FROM T13/P3
 278          BA   0.138
 279          LS              79                       79
 280          UK    1500    .240    .130      45
 281          UK    1600   .0125    .130      55
 282          RK     500    .020    .050            TRAP      25       4

 283          KK  SUB11A
 284          KM        RUNOFF FROM T13/P4
 285          BA   0.076
 286          LS              79
 287          UK    1900  0.0279   0.130     100
 288          RK    1300   0.003   0.015            CIRC    1.25

 289          KK  COMB3A
 290          KM        COMBINE FLOWS AT 51ST STREET (SUB11)
 291          HC       2

 292          KK  ROUTE5
 293          KM        ROUTE SUB11 TO SUB7
 294          RK    4700  0.0136    .050            TRAP      25       4

 295          KK   SUB7B
 296          KM        RUNOFF FROM T14/P7A
 297          BA   0.034
 298          LS              88
 299          UK    1500  0.0073   0.130     100
 300          RK    1300  0.0032   0.015            CIRC    1.25
```

```
 301          KK   SUB7C
 302          KM        RUNOFF FROM T14/P7C
 303          BA   0.050
 304          LS             88
 305          UK    2500  0.0056   0.130     100
 306          RK    1000   0.004   0.015           CIRC     1.5            YES
                                          HEC-1 INPUT                                                    PAGE  8

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


 307          KK   SUB7D
 308          KM        RUNOFF FROM T14/P7B
 309          BA   0.111
 310          LS             88
 311          UK    3500  0.0060   0.130     100
 312          RK    1500  0.0033   0.015           CIRC    1.75            YES

 313          KK   SUB7E
 314          KM        RUNOFF FROM T14/P6
 315          BA   0.067
 316          LS             88
 317          UK    2200  0.0068   0.130     100
 318          RK    1000  0.0033   0.015           CIRC      2.            YES

 319          KK   SUB7A
 320          KM        RUNOFF FROM T14/P1B
 321          BA   0.017
 322          LS             88
 323          UK     250   0.001   0.130     100
 324          RK    2300   0.017   0.015           CIRC     1.0

 325          KK   COMB3
 326          KM        COMBINE FLOWS AT PATTON RD (SUB7)
 327          HC       5

 328          KK  ROUTE7
 329          KM        ROUTE COMB3 TO SUB12 (@ CAP)
 330          RK    3000  0.0073    .050           TRAP     125       4

 331          KK    SUB8
 332          KM        RUNOFF FROM T3/SB/P1
 333          BA   0.258
 334          LS             86                      86
 335          UK     800    .010    .130      30
 336          UK    7500   .0067    .130      70
 337          RK    1200    .010    .050           TRAP      50       4

 338          KK   SUB8A
 339          KM        RUNOFF FROM T3/SB/P2
 340          BA   0.045
 341          LS             86
```

```
342          UK    1100   0.010   0.130     100
343          RK    1000  0.0013   0.015           CIRC    1.75

344          KK  COMB4C
345          KM        COMBINE FLOWS AT DOVE VALLEY RD
346          HC       2

347          KK    SUB9
348          KM        RUNOFF FROM T5/SB/P2
349          BA   0.465
350          LS             86
351          UK    2500   .0048    .130     100
352          RK    4000   .0075    .050           TRAP      50       4     YES
```



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


353          KK   SUB9A
354          KM        RUNOFF FROM T5/SB/P1
355          BA   0.096
356          LS             86
357          UK    2000  0.0075   0.130     100
358          RK    1200  0.0067   0.050           TRAP      25       4
359          RK    1500  0.0011   0.015           CIRC    1.75

360          KK   SUB9B
361          KM        RUNOFF FROM T5/SB/P3
362          BA   0.065
363          LS             86
364          UK    1600  0.0088   0.130     100
365          RK    1300  0.0011   0.015           CIRC    2.25            YES

366          KK   SUB9C
367          KM        RUNOFF FROM T5/SB/P4
368          BA   0.047
369          LS             86
370          UK    1500  0.0067   0.130     100
371          RK    1100  0.0082   0.015           CIRC     1.0

372          KK  COMB4B
373          KM        COMBINE FLOWS AT NW OUTER LOOP (SUB9)
374          HC       3

375          KK   SUB10
376          KM        RUNOFF FROM T11/P3
377          BA   0.684
378          LS             86
379          UK    3000   .0033    .130     100
380          RK    5000   .0075    .050           TRAP     100       4     YES

381          KK  SUB10A
```

```
 382          KM        RUNOFF FROM T11/P1
 383          BA   0.167
 384          LS             86
 385          UK    1000  0.0050   0.130     100
 386          RK    2500  0.0052   0.050            TRAP      25       4
 387          RK    2000  0.0032   0.015            CIRC      2.

 388          KK  SUB10B
 389          KM        RUNOFF FROM T11/P2
 390          BA   0.151
 391          LS             86
 392          UK    2500  0.0072   0.130     100
 393          RK    1700  0.0032   0.015            CIRC     2.5             YES

 394          KK  SUB10C
 395          KM        RUNOFF FROM T11/P4
 396          BA   0.145
 397          LS             86
 398          UK    2000  0.0071   0.130     100
 399          RK    1800  0.0056   0.015            CIRC    1.75
                                              HEC-1 INPUT                                          PAGE 10

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


 400          KK  COMB4A
 401          KM        COMBINE FLOWS AT DIXILETA DR (SUB10)
 402          HC       3

 403          KK  ROUTE6
 404          KM        ROUTE FROM SUB10 TO SUB12
 405          RK    5500   .0083    .050            TRAP     100       4
 406          RK    2600   .0004    .050            TRAP     100       4

 407          KK   SUB12
 408          KM        RUNOFF FROM TRACT 15  (@CAP)
 409          BA   1.435
 410          LS             98                      86
 411          UK    1300    .123    .150      35
 412          UK    2500    .008    .130      65
 413          RK    2600   .0023    .050            TRAP      50       4

 414          KK   COMB4
 415          KM        COMBINATION OF SUB7/SUB12/SUB10
 416          HC       3

 417          KK    RES1
 418          KM        RESERVOIR STORAGE UPSTREAM OF CAP
 419          RS      1    STOR     0.0
 420          SV      0    0.11    7.71   30.60   79.48  164.73  293.46  463.36  670.00
 421          SE   1493    1496    1500    1502    1504    1506    1508    1510    1512
 422          SQ      0     153     420     480     731     887    1019    1135    1241    1339
```

```
423          SQ    1430
424          SE    1493 1495.75  1498.0  1498.5  1500.0    1502    1504    1506    1508    1510
425          SE    1512

426          KK   SUB13
427          KM        RUNOFF FROM SUBBASIN NO. 13
428          BA    0.43
429          LS              95                        95
430          UK     800   0.010    0.13      37
431          UK     550   0.04     0.15      63
432          RK    4500   0.078   0.070    0.13    TRAP      10       3
433          RK      10   0.008   0.050            TRAP      24       2

434          KK    RES2
435          KM        RESERVOIR STORAGE AT SUBBASIN NO. 13
436          RS       1    STOR     0.0
437          SV       0    2.98   10.59   23.57   41.57   70.00
438          SE    1504    1506    1508    1510    1512    1514
439          SQ       0       0    99.1   424.9  1118.7  2309.3
440          SE    1504    1506    1508    1510    1512    1514

441          KK   COMB5
442          KM        COMBINE HYDROGRAPHS AT CULVERT OUTLET
443          HC       2
```



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


444          KK  ROUTE8
445          KM        ROUTE FROM COMB5 TO COMB6
446          RK    4030  0.0044   0.055            TRAP      25       2

447          KK   SUB14
448          KM        RUNOFF FROM SUBBASIN NO. 14
449          BA    0.39
450          LS              90                        90
451          UK     800   0.007   0.130      54
452          UK     400   0.100   0.150      46
453          RK    3000   0.117   0.070    0.23    TRAP      10       3
454          RK    1580  0.0038   0.055            TRAP      25       2

455          KK   COMB6
456          KM        COMBINATION OF COMB5 AND SUB6
457          HC       2

458          KK  ROUTE9
459          KM        ROUTE COMB6 TO COMB7
460          RK    7200   0.005   0.055            TRAP      28       2

461          KK   SUB15
462          KM        RUNOFF FROM SUBBASIN NO. 15
```

```
463          BA   1.343
464          LS             85                     85
465          UK    1100   0.009    0.13      91
466          UK     500   0.060    0.15       9
467          RK    7700  0.0058   0.070    0.52    TRAP      10       10
468          RK    3900  0.0046   0.055            TRAP      28        2

469          KK   COMB7
470          KM        COMBINATION OF SUB15 AND ROUTE9
471          HC       2
472          ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

```
INPUT
 LINE      (V) ROUTING          (--->) DIVERSION
  NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED FLOW

   7        SUB1
              .
              .
  20          .       SUB1A
              .           .
              .           .
  26          .           .       SUB1B
              .           .           .
              .           .           .
  33      COMB1A.......................
              V
              V
  36       RTE1A
              .
              .
  39          .        SUB2
              .           .
              .           .
  45          .           .       SUB2E
              .           .           V
              .           .           V
  51          .           .       SUB2A ***
              .           .           V
              .           .           V
  58          .           .       SUB2B ***
              .           .           .
              .           .           .
  64          .           .           .       SUB2C
              .           .           .           V
              .           .           .           V
  71          .           .           .       SUB2D ***
              .           .           .           .
              .           .           .           .
  77      COMB1B...................................
              V
```

```
            V
 80      RTE1B
            .
            .
 83         .        SUB3
            .          .
            .          .
 90         .          .       SUB3E
            .          .          .
            .          .          .
 96         .          .          .       SUB3D
            .          .          .          .
            .          .          .          .
102         .          .      COMB1C............
            .          .          V
            .          .          V
105         .          .      RTE1C
            .          .          .
            .          .          .
108         .          .          .        SUB4
            .          .          .          .
            .          .          .          .
114         .          .          .          .       SUB4A
            .          .          .          .          .
            .          .          .          .          .
120         .          .          .          .          .       SUB4B
            .          .          .          .          .          .
            .          .          .          .          .          .
127         .          .          .     COMB1D......................
            .          .          .          V
            .          .          .          V
130         .          .          .     ROUTE1
            .          .          .          .
            .          .          .          .
133         .          .          .          .       SUB3A
            .          .          .          .          .
            .          .          .          .          .
139         .          .          .          .          .       SUB3B
            .          .          .          .          .          V
            .          .          .          .          .          V
145         .          .          .          .          .       SUB3C ***
            .          .          .          .          .          .
            .          .          .          .          .          .
152      COMB1.......................................................
            V
            V
155      ROUTE2
            .
            .
158         .       SUB5G
            .          .
            .          .
```

```
164          .           .       SUB5H
             .           .           .
             .           .           .
171          .      COMB2C............
             .           V
             .           V
174          .       RTE3A
             .           V
             .           V
177          .       SUB5F ***
             .           V
             .           V
184          .       SUB5E ***
             .           .
             .           .
190          .           .       SUB5C
             .           .           .
             .           .           .
196          .           .           .       SUB5B
             .           .           .           .
             .           .           .           .
202          .           .      COMB2B............
             .           .           V
             .           .           V
205          .           .       SUB5A ***
             .           .           V
             .           .           V
211          .           .        SUB5 ***
             .           .           .
             .           .           .
217          .           .           .       SUB5D
             .           .           .           .
             .           .           .           .
223          .      COMB2A........................
             .           V
             .           V
226          .      ROUTE3
             .           .
             .           .
229          .           .       SUB6B
             .           .           V
             .           .           V
235          .           .       SUB6C ***
             .           .           .
             .           .           .
242          .           .           .        SUB6
             .           .           .           .
             .           .           .           .
249          .           .           .           .       SUB7F
             .           .           .           .           V
             .           .           .           .           V
256          .           .           .           .       SUB6A ***
```

```
            .          .          .          .          .
            .          .          .          .          .
263      COMB2.............................................
            V
            V
266     ROUTE4
            .
            .
269         .        SUB7
            .          .
            .          .
276         .          .       SUB11
            .          .          .
            .          .          .
283         .          .          .     SUB11A
            .          .          .          .
            .          .          .          .
289         .          .     COMB3A............
            .          .          V
            .          .          V
292         .          .     ROUTE5
            .          .          .
            .          .          .
295         .          .          .      SUB7B
            .          .          .          V
            .          .          .          V
301         .          .          .      SUB7C ***
            .          .          .          V
            .          .          .          V
307         .          .          .      SUB7D ***
            .          .          .          V
            .          .          .          V
313         .          .          .      SUB7E ***
            .          .          .          .
            .          .          .          .
319         .          .          .          .      SUB7A
            .          .          .          .          .
            .          .          .          .          .
325      COMB3.............................................
            V
            V
328     ROUTE7
            .
            .
331         .        SUB8
            .          .
            .          .
338         .          .       SUB8A
            .          .          .
            .          .          .
344         .     COMB4C............
            .          V
```

```
            .           V
347         .        SUB9 ***
            .           .
            .           .
353         .           .       SUB9A
            .           .           V
            .           .           V
360         .           .       SUB9B ***
            .           .           .
            .           .           .
366         .           .           .       SUB9C
            .           .           .           .
            .           .           .           .
372         .      COMB4B.......................
            .           V
            .           V
375         .       SUB10 ***
            .           .
            .           .
381         .           .      SUB10A
            .           .           V
            .           .           V
388         .           .      SUB10B ***
            .           .           .
            .           .           .
394         .           .           .      SUB10C
            .           .           .           .
            .           .           .           .
400         .      COMB4A.......................
            .           V
            .           V
403         .      ROUTE6
            .           .
            .           .
407         .           .       SUB12
            .           .           .
            .           .           .
414       COMB4.......................
            V
            V
417        RES1
            .
            .
426         .       SUB13
            .           V
            .           V
434         .        RES2
            .           .
            .           .
441       COMB5............
            V
            V
```

```
444      ROUTE8
              .
              .
447           .       SUB14
              .           .
              .           .
455       COMB6............
              V
              V
458      ROUTE9
              .
              .
461           .       SUB15
              .           .
              .           .
469       COMB7............
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             FEBRUARY 1981             *
*           REVISED 30 OCT 81           *
*                                       *
*  RUN DATE22-MAR-90     TIME14:50:03   *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*  THE HYDROLOGIC ENGINEERING CENTER    *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*  (916) 440-3285 OR (FTS) 448-3285     *
*                                       *
*****************************************
```

BUCHANAN WASH STUDY - CITY OF PHOENIX INDEX NO. ST-886382
CASE IV  PROPOSED STORM DRAIN SYSTEM ANALYSIS
2 YR,  24 HOUR STORM EVENT

```
 5 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      1   0  STARTING DATE
                     ITIME       0000  STARTING TIME
                        NQ        288  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE      1   0  ENDING DATE
                    NDTIME       2355  ENDING TIME

                COMPUTATION INTERVAL    0.08 HOURS
                     TOTAL TIME BASE   23.92 HOURS
```

ENGLISH UNITS

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

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN 0. TO 183.
THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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 | SUB1 | 41. | 8.08 | 24. | 9. | 9. | 0.61 | | |
| HYDROGRAPH AT | SUB1A | 4. | 9.50 | 3. | 1. | 1. | 0.09 | | |
| HYDROGRAPH AT | SUB1B | 7. | 8.00 | 5. | 2. | 2. | 0.12 | | |
| 3 COMBINED AT | COMB1A | 51. | 8.08 | 31. | 12. | 12. | 0.82 | | |
| ROUTED TO | RTE1A | 51. | 8.42 | 31. | 11. | 11. | 0.82 | | |
| HYDROGRAPH AT | SUB2 | 8. | 11.92 | 7. | 4. | 4. | 0.29 | | |
| HYDROGRAPH AT | SUB2E | 1. | 7.75 | 0. | 0. | 0. | 0.01 | | |
| HYDROGRAPH AT | SUB2A | 8. | 6.92 | 7. | 3. | 3. | 0.20 | | |
| HYDROGRAPH AT | SUB2B | 10. | 7.00 | 8. | 3. | 3. | 0.23 | | |
| HYDROGRAPH AT | SUB2C | 4. | 11.42 | 4. | 2. | 2. | 0.14 | | |
| HYDROGRAPH AT | | | | | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | SUB2D | 8. | 8.75 | 7. | 3. | 3. | 0.22 |
| 4 COMBINED AT | | | | | | | |
| | COMB1B | 74. | 8.50 | 52. | 22. | 22. | 1.57 |
| ROUTED TO | | | | | | | |
| | RTE1B | 72. | 9.08 | 51. | 21. | 21. | 1.57 |
| HYDROGRAPH AT | | | | | | | |
| | SUB3 | 19. | 10.00 | 18. | 9. | 9. | 0.65 |
| HYDROGRAPH AT | | | | | | | |
| | SUB3E | 4. | 8.08 | 3. | 1. | 1. | 0.07 |
| HYDROGRAPH AT | | | | | | | |
| | SUB3D | 2. | 7.42 | 1. | 0. | 0. | 0.02 |
| 2 COMBINED AT | | | | | | | |
| | COMB1C | 6. | 7.67 | 4. | 1. | 1. | 0.09 |
| ROUTED TO | | | | | | | |
| | RTE1C | 6. | 8.33 | 4. | 1. | 1. | 0.09 |
| HYDROGRAPH AT | | | | | | | |
| | SUB4 | 6. | 8.42 | 4. | 2. | 2. | 0.19 |
| HYDROGRAPH AT | | | | | | | |
| | SUB4A | 2. | 8.42 | 1. | 0. | 0. | 0.05 |
| HYDROGRAPH AT | | | | | | | |
| | SUB4B | 4. | 7.92 | 3. | 1. | 1. | 0.17 |
| 3 COMBINED AT | | | | | | | |
| | COMB1D | 11. | 8.33 | 8. | 3. | 3. | 0.42 |
| ROUTED TO | | | | | | | |
| | ROUTE1 | 11. | 8.67 | 8. | 3. | 3. | 0.42 |
| HYDROGRAPH AT | | | | | | | |
| | SUB3A | 6. | 8.00 | 4. | 1. | 1. | 0.09 |
| HYDROGRAPH AT | | | | | | | |
| | SUB3B | 3. | 7.42 | 1. | 0. | 0. | 0.03 |
| HYDROGRAPH AT | | | | | | | |
| | SUB3C | 22. | 6.92 | 9. | 3. | 3. | 0.19 |
| 6 COMBINED AT | | | | | | | |
| | COMB1 | 117. | 9.00 | 87. | 38. | 38. | 3.00 |
| ROUTED TO | | | | | | | |
| | ROUTE2 | 116. | 9.25 | 87. | 38. | 38. | 3.00 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| HYDROGRAPH AT | SUB5G | 1. | 6.58 | 0. | 0. | 0. | 0.01 |
| HYDROGRAPH AT | SUB5H | 4. | 6.50 | 1. | 0. | 0. | 0.05 |
| 2 COMBINED AT | COMB2C | 5. | 6.50 | 1. | 1. | 1. | 0.06 |
| ROUTED TO | RTE3A | 5. | 6.58 | 1. | 1. | 1. | 0.06 |
| HYDROGRAPH AT | SUB5F | 10. | 6.67 | 5. | 2. | 2. | 0.20 |
| HYDROGRAPH AT | SUB5E | 10. | 6.75 | 5. | 2. | 2. | 0.22 |
| HYDROGRAPH AT | SUB5C | 3. | 6.50 | 1. | 0. | 0. | 0.03 |
| HYDROGRAPH AT | SUB5B | 1. | 8.50 | 0. | 0. | 0. | 0.02 |
| 2 COMBINED AT | COMB2B | 3. | 6.50 | 1. | 0. | 0. | 0.05 |
| HYDROGRAPH AT | SUB5A | 3. | 6.58 | 2. | 1. | 1. | 0.07 |
| HYDROGRAPH AT | SUB5 | 4. | 6.58 | 2. | 1. | 1. | 0.12 |
| HYDROGRAPH AT | SUB5D | 1. | 10.25 | 1. | 0. | 0. | 0.06 |
| 3 COMBINED AT | COMB2A | 14. | 6.67 | 8. | 3. | 3. | 0.40 |
| ROUTED TO | ROUTE3 | 13. | 7.08 | 8. | 3. | 3. | 0.40 |
| HYDROGRAPH AT | SUB6B | 2. | 8.42 | 1. | 0. | 0. | 0.04 |
| HYDROGRAPH AT | SUB6C | 25. | 7.58 | 14. | 5. | 5. | 0.35 |
| HYDROGRAPH AT | SUB6 | 13. | 7.33 | 10. | 4. | 4. | 0.29 |

| | | | | | | |
|---|---|---|---|---|---|---|
| HYDROGRAPH AT | | | | | | |
| | SUB7F | 76. | 6.00 | 10. | 3. | 3. | 0.09 |
| HYDROGRAPH AT | | | | | | |
| | SUB6A | 77. | 6.00 | 12. | 4. | 4. | 0.14 |
| 5 COMBINED AT | | | | | | |
| | COMB2 | 153. | 9.00 | 116. | 53. | 53. | 4.19 |
| ROUTED TO | | | | | | |
| | ROUTE4 | 150. | 9.58 | 116. | 51. | 51. | 4.19 |
| HYDROGRAPH AT | | | | | | |
| | SUB7 | 164. | 6.42 | 48. | 16. | 16. | 0.87 |
| HYDROGRAPH AT | | | | | | |
| | SUB11 | 6. | 6.67 | 3. | 1. | 1. | 0.14 |
| HYDROGRAPH AT | | | | | | |
| | SUB11A | 2. | 8.17 | 2. | 1. | 1. | 0.08 |
| 2 COMBINED AT | | | | | | |
| | COMB3A | 8. | 6.67 | 5. | 2. | 2. | 0.21 |
| ROUTED TO | | | | | | |
| | ROUTE5 | 7. | 7.42 | 5. | 2. | 2. | 0.21 |
| HYDROGRAPH AT | | | | | | |
| | SUB7B | 3. | 7.67 | 2. | 1. | 1. | 0.03 |
| HYDROGRAPH AT | | | | | | |
| | SUB7C | 5. | 7.92 | 4. | 1. | 1. | 0.08 |
| HYDROGRAPH AT | | | | | | |
| | SUB7D | 9. | 8.17 | 8. | 3. | 3. | 0.20 |
| HYDROGRAPH AT | | | | | | |
| | SUB7E | 13. | 8.42 | 11. | 4. | 4. | 0.26 |
| HYDROGRAPH AT | | | | | | |
| | SUB7A | 3. | 6.75 | 1. | 0. | 0. | 0.02 |
| 5 COMBINED AT | | | | | | |
| | COMB3 | 189. | 9.42 | 163. | 74. | 74. | 5.56 |
| ROUTED TO | | | | | | |
| | ROUTE7 | 188. | 9.58 | 161. | 73. | 73. | 5.56 |
| HYDROGRAPH AT | | | | | | |
| | SUB8 | 10. | 7.00 | 6. | 3. | 3. | 0.26 |
| HYDROGRAPH AT | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | SUB8A | 4. | 7.25 | 2. | 1. | 1. | 0.05 | |
| 2 COMBINED AT | | | | | | | | |
| | COMB4C | 14. | 7.08 | 8. | 4. | 4. | 0.30 | |
| HYDROGRAPH AT | | | | | | | | |
| | SUB9 | 27. | 7.83 | 22. | 10. | 10. | 0.77 | |
| HYDROGRAPH AT | | | | | | | | |
| | SUB9A | 5. | 8.67 | 4. | 1. | 1. | 0.10 | |
| HYDROGRAPH AT | | | | | | | | |
| | SUB9B | 9. | 8.08 | 6. | 2. | 2. | 0.16 | |
| HYDROGRAPH AT | | | | | | | | |
| | SUB9C | 3. | 8.08 | 2. | 1. | 1. | 0.05 | |
| 3 COMBINED AT | | | | | | | | |
| | COMB4B | 38. | 7.92 | 30. | 13. | 13. | 0.98 | |
| HYDROGRAPH AT | | | | | | | | |
| | SUB10 | 53. | 9.00 | 47. | 22. | 22. | 1.66 | |
| HYDROGRAPH AT | | | | | | | | |
| | SUB10A | 12. | 7.83 | 7. | 2. | 2. | 0.17 | |
| HYDROGRAPH AT | | | | | | | | |
| | SUB10B | 18. | 8.00 | 12. | 5. | 5. | 0.32 | |
| HYDROGRAPH AT | | | | | | | | |
| | SUB10C | 8. | 8.58 | 6. | 2. | 2. | 0.14 | |
| 3 COMBINED AT | | | | | | | | |
| | COMB4A | 76. | 8.67 | 63. | 29. | 29. | 2.12 | |
| ROUTED TO | | | | | | | | |
| | ROUTE6 | 76. | 9.42 | 62. | 27. | 27. | 2.12 | |
| HYDROGRAPH AT | | | | | | | | |
| | SUB12 | 397. | 6.17 | 94. | 32. | 32. | 1.43 | |
| 3 COMBINED AT | | | | | | | | |
| | COMB4 | 407. | 6.25 | 290. | 132. | 132. | 9.12 | |
| ROUTED TO | | | | | | | | |
| | RES1 | 379. | 6.67 | 289. | 132. | 132. | 9.12 | |
| | | | | | | | | 1497.65 6.67 |
| HYDROGRAPH AT | | | | | | | | |
| | SUB13 | 218. | 6.17 | 42. | 13. | 13. | 0.43 | |
| ROUTED TO | | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | RES2 | 78. | 6.92 | 35. | 11. | 11. | 0.43 | |
| | | | | | | | 1507.58 | 6.92 |
| 2 COMBINED AT | | | | | | | | |
| | COMB5 | 452. | 6.67 | 324. | 143. | 143. | 9.55 | |
| ROUTED TO | | | | | | | | |
| | ROUTE8 | 450. | 6.83 | 323. | 142. | 142. | 9.55 | |
| HYDROGRAPH AT | | | | | | | | |
| | SUB14 | 112. | 6.17 | 25. | 8. | 8. | 0.39 | |
| 2 COMBINED AT | | | | | | | | |
| | COMB6 | 504. | 6.75 | 343. | 150. | 150. | 9.94 | |
| ROUTED TO | | | | | | | | |
| | ROUTE9 | 475. | 7.17 | 336. | 147. | 147. | 9.94 | |
| HYDROGRAPH AT | | | | | | | | |
| | SUB15 | 73. | 8.42 | 46. | 17. | 17. | 1.34 | |
| 2 COMBINED AT | | | | | | | | |
| | COMB7 | 508. | 7.17 | 382. | 164. | 164. | 11.28 | |

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

SECTION 1.5
HEC-1 ANALYSIS

1987 Flood Insurance Study

Data Input File Name: RH6100.dat
Data Output File Name: RO6100.dat

1 ****

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

****

THIS HEC-1 VERSION CONTAINS ALL OPTIONS EXCEPT ECONOMICS, AND THE NUMBER OF PLANS ARE REDUCED TO 3



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

  1           ID        BUCHANAN WASH  -  FLOOD PLAIN DELINATION   REV. 1 MAR., 1987
  2           ID        100 YR,  6 HOUR STORM EVENT
  3           IT       5                     60
  4           IO       5
              *DIAGRAM

  5           KK    SUB1
  6           KM        RUNOFF FROM SUBBASIN NO. 1
  7           BA    1.15
  8           LS              86                     92
  9           PB    3.25
 10           PC     0.0   0.003   0.007   0.011   0.014   0.018   0.022   0.026   0.031   0.035
 11           PC   0.039   0.044   0.048   0.053   0.057   0.062   0.068   0.073   0.079   0.086
 12           PC   0.093   0.100   0.108   0.117   0.125   0.135   0.145   0.155   0.167   0.180
 13           PC   0.192   0.241   0.290   0.339   0.469   0.599   0.729   0.750   0.770   0.791
 14           PC   0.804   0.825   0.830   0.841   0.851   0.862   0.870   0.879   0.887   0.894
 15           PC   0.901   0.908   0.914   0.920   0.926   0.931   0.937   0.942   0.947   0.951
 16           PC   0.956   0.960   0.965   0.969   0.973   0.977   0.980   0.983   0.987   0.990
 17           PC   0.993   0.997   1.000
 18           UK    1200   0.008   0.130      97
 19           UK     600   0.070   0.150       3
 20           RK    6000  0.0077   0.070    1.15    TRAP      10      10
 21           RK    2900  0.0066   0.050            TRAP      12       4

 22           KK    SUB2
 23           KM        RUNOFF FROM SUBBASIN NO. 2
 24           BA    1.89
 25           LS              86                     92
 26           UK    1100   0.008   0.130      99
 27           UK     600   0.070   0.150       1
 28           RK   15700  0.0075   0.070    1.37    TRAP      10      10
 29           RK    2100  0.0033   0.050            TRAP      13       4     YES
```

```
 30          KK    SUB3
 31          KM        RUNOFF FROM SUBBASIN NO. 3
 32          BA    1.72
 33          LS              86                      92
 34          UK     700   0.044   0.130      87
 35          UK     500   0.090   0.150      13
 36          RK    6300  0.0143   0.070    0.46    TRAP      10       3
 37          RK    3100  0.0029   0.050            TRAP      17       4     YES

 38          KK    SUB4
 39          KM        RUNOFF FROM SUBBASIN NO. 4
 40          BA    1.29
 41          LS              86                      92
 42          UK     650   0.015   0.130      94
 43          UK     500   0.080   0.150       6
 44          RK    4500   0.013   0.070    0.24    TRAP      10       5
 45          RK    4900  0.0062   0.050            TRAP      20       4     YES
```



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


 46          KK    SUB9
 47          KM        RUNOFF FROM SUBBASIN NO. 9
 48          BA    3.12
 49          LS              86                      92
 50          UK     950  0.0087   0.130      95
 51          UK     500  0.0600   0.150       5
 52          RK   25100  0.0078   0.070    2.45    TRAP      10       5
 53          RK    2000  0.0020   0.050            TRAP      20       5

 54          KK    SUB5
 55          KM        COMBINATION OF RUNOFF ABOVE CAP CROSSING
 56          HC       2

 57          KK    RES5
 58          KM        RESERVOIR STORAGE AT SUBBASIN NO. 4
 59          RS       1    STOR     0.0
 60          SV       0    0.27     3.03    10.88    36.82   100.83   225.32   414.41   695.23
 61          SE    1493    1496     1500     1502     1504     1506     1508     1510     1512
 62          SQ       0     153      420      480      731      887     1019     1135     1241     1339
 63          SQ    1430
 64          SE    1493 1495.75   1498.0   1498.5   1500.0     1502     1504     1506     1508     1510
 65          SE    1512

 66          KK    SUB6
 67          KM        RUNOFF FROM SUBBASIN NO. 6
 68          BA    0.43
 69          LS              86                      92
 70          UK     800   0.010    0.13      37
 71          UK     550   0.04     0.15      63
```

```
 72          RK    4500   0.078   0.070    0.13    TRAP      10       3
 73          RK      10   0.008   0.050            TRAP      24       2

 74          KK    RES6
 75          KM        RESERVOIR STORAGE AT SUBBASIN NO. 6
 76          RS       1    STOR     0.0
 77          SV       0    2.98   10.59   23.57   41.57   70.00
 78          SE    1504    1506    1508    1510    1512    1514
 79          SQ       0       0    99.1   424.9  1118.7  2309.3
 80          SE    1504    1506    1508    1510    1512    1514

 81          KK   SUB6A
 82          KM        COMBINE HYDROGRAPHS AT CULVERT OUTLET
 83          HC       2

 84          KK    SUB7
 85          KM        RUNOFF FROM SUBBASIN NO. 7
 86          BA    0.39
 87          LS             86                      92
 88          UK     800   0.007   0.130      54
 89          UK     400   0.100   0.150      46
 90          RK    3000   0.117   0.070    0.06    TRAP      10       3
 91          RK    4100  0.0044   0.055            TRAP      25       2     YES
1                                          HEC-1 INPUT                                                    PAGE  3

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


 92          KK    SUB8
 93          KM        RUNOFF FROM SUBBASIN NO. 8
 94          BA     1.3
 95          LS             86                      92
 96          UK    1100   0.009    0.13      91
 97          UK     500   0.060    0.15       9
 98          RK    7700  0.0058   0.070    2.45    TRAP      10      10
 99          RK   10400  0.0035   0.055            TRAP      28       2     YES
100          ZZ
1
              SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

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

     5        SUB1
                V
                V
    22        SUB2 ***
                V
                V
    30        SUB3 ***
                V
```

```
            V
 38       SUB4 ***
            .
            .
 46         .        SUB9
            .          .
            .          .
 54       SUB5............
            V
            V
 57       RES5
            .
            .
 66         .        SUB6
            .          V
            .          V
 74         .        RES6
            .          .
            .          .
 81      SUB6A............
            V
            V
 84       SUB7 ***
            V
            V
 92       SUB8 ***
```

(***) 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

****

BUCHANAN WASH - FLOOD PLAIN DELINATION REV. 1 MAR., 1987

100 YR, 6 HOUR STORM EVENT

```
 4 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      1    0  STARTING DATE
                   ITIME        0000  STARTING TIME
                      NQ         60  NUMBER OF HYDROGRAPH ORDINATES
                  NDDATE      1    0  ENDING DATE
                  NDTIME        0455  ENDING TIME
```

COMPUTATION INTERVAL .08 HOURS
TOTAL TIME BASE 4.92 HOURS

ENGLISH UNITS

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN 0. TO 183.
THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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 | SUB1 | 724. | 3.75 | 184. | 184. | 184. | 1.15 | | |
| + | HYDROGRAPH AT | SUB2 | 1538. | 4.00 | 411. | 411. | 411. | 3.04 | | |
| + | HYDROGRAPH AT | SUB3 | 2221. | 3.25 | 718. | 718. | 718. | 4.76 | | |
| + | HYDROGRAPH AT | SUB4 | 3501. | 3.42 | 925. | 925. | 925. | 6.05 | | |
| + | HYDROGRAPH AT | SUB9 | 1389. | 4.17 | 385. | 385. | 385. | 3.12 | | |
| + | 2 COMBINED AT | SUB5 | 4113. | 3.42 | 1310. | 1310. | 1310. | 9.17 | | |
| + | ROUTED TO | RES5 | 1308. | 4.92 | 436. | 436. | 436. | 9.17 | | |
| + | | | | | | | | | 1509.37 | 4.92 |
| + | HYDROGRAPH AT | SUB6 | 743. | 3.08 | 106. | 106. | 106. | .43 | | |
| + | ROUTED TO | RES6 | 301. | 3.50 | 80. | 80. | 80. | .43 | | |
| + | | | | | | | | | 1509.24 | 3.50 |
| + | 2 COMBINED AT | SUB6A | 1433. | 4.17 | 515. | 515. | 515. | 9.60 | | |
| + | HYDROGRAPH AT | SUB7 | 1609. | 3.67 | 564. | 564. | 564. | 9.99 | | |

HYDROGRAPH AT

| | | | | | | |
|---|---|---|---|---|---|---|
| SUB8 | 2304. | 4.00 | 622. | 622. | 622. | 11.29 |

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

# SECTION 2.1
## Runoff Curve Number Worksheets

### Case 1: Existing Land Use Conditions Analysis

C1/P1

# Worksheet 2: Runoff curve number and runoff

Project BUCHANAN WASH By TWW Date 4/2/89

Location PHOENIX, AZ Checked ____ Date ____

Circle one: (Present) Developed SUBBASIN 1

## 1. Runoff curve number (CN)

| Soil name and hydrologic group (appendix A) | Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio) | CN 1/ Table 2-2 | CN 1/ Fig. 2-3 | CN 1/ Fig. 2-4 | Area ☐ acres ☒ mi² ☐ % | Product of CN x area |
|---|---|---|---|---|---|---|
| D | DESERT - FAIR COVER | 86 | | | 0.780 | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | Totals = 0.780 | |

1/ Use only one CN source per line.

CN (weighted) = $\frac{\text{total product}}{\text{total area}}$ = ____ = ____; Use CN = 86

## 2. Runoff

| | Storm #1 | Storm #2 | Storm #3 |
|---|---|---|---|
| Frequency ..... yr | | | |
| Rainfall, P (24-hour) ..... in | | | |
| Runoff, Q ..... in (Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.) | | | |

C1/P2

# Worksheet 2: Runoff curve number and runoff

Project BUCHANAN WASH By TWW Date 4/2/89

Location PHOENIX, AZ. Checked ____ Date ____

Circle one: (Present) Developed SUBBASIN 1A

## 1. Runoff curve number (CN)

| Soil name and hydrologic group (appendix A) | Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio) | CN 1/ Table 2-2 | CN 1/ Fig. 2-3 | CN 1/ Fig. 2-4 | Area ☐ acres ☒ mi² ☐ % | Product of CN x area |
|---|---|---|---|---|---|---|
| D | DESERT - FAIR COVER | 86 | | | .303 | 26.06 |
| B | DESERT - FAIR COVER | 72 | | | .051 | 3.67 |
| D | HILLSIDE | 98 | | | .016 | 1.57 |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | Totals = | 0.370 | 31.30 |

1/ Use only one CN source per line.

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{31.30}{0.370} = 84.6$; Use CN = 85

## 2. Runoff

| | | Storm #1 | Storm #2 | Storm #3 |
|---|---|---|---|---|
| Frequency ..... | yr | | | |
| Rainfall, P (24-hour) ..... | in | | | |
| Runoff, Q ..... (Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.) | in | | | |

C1/P3

# Worksheet 2: Runoff curve number and runoff

Project _____ By ____ Date _____

Location _____ Checked ____ Date _____

Circle one: (Present) Developed SUBBASIN 2

## 1. Runoff curve number (CN)

| Soil name and hydrologic group (appendix A) | Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio) | CN 1/ Table 2-2 | CN 1/ Fig. 2-3 | CN 1/ Fig. 2-4 | Area ☐ acres ☐ mi² ☐ % | Product of CN x area |
|---|---|---|---|---|---|---|
| D | | 86 | | | 1.390 | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | Totals = | 1.390 | |

1/ Use only one CN source per line.

CN (weighted) = $\frac{\text{total product}}{\text{total area}}$ = ____ = _____; Use CN = 86

## 2. Runoff

| | Storm #1 | Storm #2 | Storm #3 |
|---|---|---|---|
| Frequency ..... yr | | | |
| Rainfall, P (24-hour) ..... in | | | |
| Runoff, Q ..... in (Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.) | | | |

C1/P4

# Worksheet 2: Runoff curve number and runoff

Project BUCHANAN WASH By TWW Date 4/2/89

Location PHOENIX, AZ Checked ____ Date ____

Circle one: (Present) Developed SUBBASIN 2A

## 1. Runoff curve number (CN)

| Soil name and hydrologic group (appendix A) | Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio) | CN 1/ Table 2-2 | CN 1/ Fig. 2-3 | CN 1/ Fig. 2-4 | Area ☐acres ☐mi² ☐% | Product of CN x area |
|---|---|---|---|---|---|---|
| D | DESERT - FAIR COVER | 86 | | | 0.263 | 22.618 |
| B | " " " | 72 | | | 0.233 | 16.776 |
| B | HILLSIDE | 98 | | | .004 | 0.392 |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | Totals = | 0.500 | 39.786 |

1/ Use only one CN source per line.

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{39.786}{0.500} = 79.6$; Use CN = 80

## 2. Runoff

| | | Storm #1 | Storm #2 | Storm #3 |
|---|---|---|---|---|
| Frequency | yr | | | |
| Rainfall, P (24-hour) | in | | | |
| Runoff, Q (Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.) | in | | | |

C1/P5

# Worksheet 2: Runoff curve number and runoff

Project BUCHANAN WASH By TWW Date 4/2/89

Location PHOENIX, AZ Checked ____ Date ____

Circle one: (Present) Developed SUBBASIN 3

## 1. Runoff curve number (CN)

| Soil name and hydrologic group (appendix A) | Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio) | CN 1/ Table 2-2 | CN 1/ Fig. 2-3 | CN 1/ Fig. 2-4 | Area ☐ acres ☒ mi² ☐ % | Product of CN x area |
|---|---|---|---|---|---|---|
| D | | 86 | | | 0.096 | 8.256 |
| B | | 72 | | | 0.351 | 25.272 |
| | HILLSIDE (B & D SOILS) | 98 | | | 0.133 | 13.034 |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | Totals = | 0.580 | 46.562 |

1/ Use only one CN source per line.

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{46.562}{0.580} = 80.3$; Use CN = 80

## 2. Runoff

| | Storm #1 | Storm #2 | Storm #3 |
|---|---|---|---|
| Frequency ..... yr | | | |
| Rainfall, P (24-hour) ..... in | | | |
| Runoff, Q ..... in (Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.) | | | |

Ci/P6

# Worksheet 2: Runoff curve number and runoff

Project _____ By ____ Date _____

Location _____ Checked ____ Date _____

Circle one: (Present) Developed SUBBASIN 3A

## 1. Runoff curve number (CN)

| Soil name and hydrologic group (appendix A) | Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio) | CN 1/ Table 2-2 | CN 1/ Fig. 2-3 | CN 1/ Fig. 2-4 | Area ☐ acres ☒ mi² ☐ % | Product of CN x area |
|---|---|---|---|---|---|---|
| D | | 86 | | | 0.680 | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | Totals = | 0.680 | |

1/ Use only one CN source per line.

CN (weighted) = $\frac{\text{total product}}{\text{total area}}$ = ____ = _____; Use CN = 86

## 2. Runoff

| | Storm #1 | Storm #2 | Storm #3 |
|---|---|---|---|
| Frequency ..... yr | | | |
| Rainfall, P (24-hour) ..... in | | | |
| Runoff, Q ..... in (Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.) | | | |

C1/P7

# Worksheet 2: Runoff curve number and runoff

Project BUCHANAN WASH By TWW Date 4/2/89

Location PHOENIX, AZ Checked ____ Date ____

Circle one: (Present) Developed SUBBASIN 3B

## 1. Runoff curve number (CN)

| Soil name and hydrologic group (appendix A) | Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio) | CN 1/ Table 2-2 | CN 1/ Fig. 2-3 | CN 1/ Fig. 2-4 | Area ☐ acres ☐ mi² ☐ % | Product of CN x area |
|---|---|---|---|---|---|---|
| D | | 86 | | | 0.049 | 4.214 |
| B | | 72 | | | 0.255 | 18.360 |
| D | HILLSIDE | 98 | | | 0.146 | 14.308 |
| B | HILLSIDE | 98 | | | 0.010 | 0.980 |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | Totals = 0.460 | 37.862 |

1/ Use only one CN source per line.

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{37.862}{0.46} = 82.3$; Use CN = 82

## 2. Runoff

| | Storm #1 | Storm #2 | Storm #3 |
|---|---|---|---|
| Frequency ..... yr | | | |
| Rainfall, P (24-hour) ..... in | | | |
| Runoff, Q ..... in (Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.) | | | |

C1/P8

# Worksheet 2: Runoff curve number and runoff

Project _____ By ____ Date _____

Location _____ Checked ____ Date _____

Circle one: (Present) Developed SUBBASIN 1

## 1. Runoff curve number (CN)

| Soil name and hydrologic group (appendix A) | Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio) | CN 1/ Table 2-2 | CN 1/ Fig. 2-3 | CN 1/ Fig. 2-4 | Area ☐ acres ☐ mi² ☐ % | Product of CN x area |
|---|---|---|---|---|---|---|
| D | | 86 | | | 0.720 | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | Totals = | 0.720 | |

1/ Use only one CN source per line.

CN (weighted) = $\frac{\text{total product}}{\text{total area}}$ = ____ = _____; Use CN = 86

## 2. Runoff

| | Storm #1 | Storm #2 | Storm #3 |
|---|---|---|---|
| Frequency ..... yr | | | |
| Rainfall, P (24-hour) ..... in | | | |
| Runoff, Q ..... in (Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.) | | | |

# Worksheet 2: Runoff curve number and runoff

Project BUCHANAN WASH By TWW Date 4/6/89

Location PHOENIX, AZ Checked ____ Date ____

Circle one: ~~Present~~ Developed SUBBASIN 4A

## 1. Runoff curve number (CN)

| Soil name and hydrologic group (appendix A) | Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio) | CN 1/ Table 2-2 | CN 1/ Fig. 2-3 | CN 1/ Fig. 2-4 | Area ☐ acres ☐ mi² ☐ % | Product of CN x area |
|---|---|---|---|---|---|---|
| D | | 86 | | | 0.148 | 12.728 |
| B | | 72 | | | 0.231 | 16.632 |
| D | HILLSIDE | 95 | | | 0.166 | 16.268 |
| B | HILLSIDE | 98 | | | 0.025 | 2.45 |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | Totals = | 0.570 | 48.078 |

1/ Use only one CN source per line.

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{48.078}{.57} = 84.3$; Use CN = 84

## 2. Runoff

| | Storm #1 | Storm #2 | Storm #3 |
|---|---|---|---|
| Frequency ..... yr | | | |
| Rainfall, P (24-hour) ..... in | | | |
| Runoff, Q ..... in (Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.) | | | |

## Worksheet 2: Runoff curve number and runoff

Project BUCHANAN WASH By TWW Date 4/2/89

Location PHOENIX, AZ Checked _____ Date _____

Circle one: (Present) Developed SUBBASIN 6

### 1. Runoff curve number (CN)

| Soil name and hydrologic group (appendix A) | Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio) | CN 1/ Table 2-2 | CN 1/ Fig. 2-3 | CN 1/ Fig. 2-4 | Area ☐ acres ☐ mi² ☐ % | Product of CN x area |
|---|---|---|---|---|---|---|
| D | | 86 | | | 0.041 | 3.526 |
| B | | 72 | | | 0.039 | 2.808 |
| D | HILLSIDE | 98 | | | 0.350 | 34.30 |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | Totals = | 0.430 | 40.634 |

1/ Use only one CN source per line.

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{40.634}{.43} = 94.5$; Use CN = 95

### 2. Runoff

| | Storm #1 | Storm #2 | Storm #3 |
|---|---|---|---|
| Frequency ..... yr | | | |
| Rainfall, P (24-hour) ..... in | | | |
| Runoff, Q ..... in (Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.) | | | |

## Worksheet 2: Runoff curve number and runoff

Project BUCHANAN WASH By TWW Date 4/2/89

Location PHOENIX, AZ Checked ____ Date ____

Circle one: (Present) Developed SUBBASIN 7

### 1. Runoff curve number (CN)

| Soil name and hydrologic group (appendix A) | Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio) | CN 1/ Table 2-2 | CN 1/ Fig. 2-3 | CN 1/ Fig. 2-4 | Area ☐ acres ☒ mi² ☐ % | Product of CN x area |
|---|---|---|---|---|---|---|
| D | | 86 | | | 0.025 | 2.15 |
| B | | 72 | | | 0.116 | 8.352 |
| D | HILLSIDE | 98 | | | 0.249 | 24.402 |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | Totals = 0.390 | 34.904 |

1/ Use only one CN source per line.

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{34.904}{.39} = 89.5$; Use CN = 90

### 2. Runoff

| | | Storm #1 | Storm #2 | Storm #3 |
|---|---|---|---|---|
| Frequency | yr | | | |
| Rainfall, P (24-hour) | in | | | |
| Runoff, Q (Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.) | in | | | |

## Worksheet 2: Runoff curve number and runoff

Project BUCHANAN WASH By TNW Date 4/2/89

Location PHOENIX, AZ Checked ____ Date ____

Circle one: (Present) Developed SUBBASIN 8

### 1. Runoff curve number (CN)

| Soil name and hydrologic group (appendix A) | Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio) | CN 1/ Table 2-2 | CN 1/ Fig. 2-3 | CN 1/ Fig. 2-4 | Area ☐ acres ☐ mi² ☐ % | Product of CN x area |
|---|---|---|---|---|---|---|
| D | | 86 | | | 0.663 | 57.043 |
| C | | 81 | | | 0.049 | 3.969 |
| B | | 72 | | | 0.310 | 22.320 |
| D | HILLSIDE | 98 | | | 0.273 | 26.754 |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | Totals = | 1.30 | 110.491 |

1/ Use only one CN source per line.

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{110.491}{1.30} = 85.0$; Use CN = 85

### 2. Runoff

| | Storm #1 | Storm #2 | Storm #3 |
|---|---|---|---|
| Frequency ..... yr | | | |
| Rainfall, P (24-hour) ..... in | | | |
| Runoff, Q ..... in (Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.) | | | |

## Worksheet 2: Runoff curve number and runoff

Project BUCHANAN WASH By TWW Date 4/2/89

Location PHOENIX, AZ Checked ____ Date ____

Circle one: (Present) Developed SUBBASIN 9

### 1. Runoff curve number (CN)

| Soil name and hydrologic group (appendix A) | Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio) | CN 1/ Table 2-2 | CN 1/ Fig. 2-3 | CN 1/ Fig. 2-4 | Area ☐ acres ☒ mi² ☐ % | Product of CN x area |
|---|---|---|---|---|---|---|
| D | | 86 | | | 2.633 | 226.438 |
| B | | 72 | | | 0.144 | 10.368 |
| C | | 81 | | | 0.008 | 0.648 |
| D | HILLSIDE | 98 | | | 0.335 | 32.830 |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | Totals = | 3.120 270.284 |

1/ Use only one CN source per line.

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{270.284}{3.12} = 86.6$ Use CN = 87

### 2. Runoff

| | Storm #1 | Storm #2 | Storm #3 |
|---|---|---|---|
| Frequency ..... yr | | | |
| Rainfall, P (24-hour) ..... in | | | |
| Runoff, Q ..... in (Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.) | | | |

SECTION 2.2
Runoff Curve Number Worksheets

Case 2: Future Land Use Conditions Analysis

C2/P.1

# Worksheet 2: Runoff curve number and runoff

Project BUCHANAN WASH By JWW Date 5/1/89

Location PHOENIX, AZ Checked ____ Date ____

Circle one: Present (Developed) CASE II – SUBBASIN 1

## 1. Runoff curve number (CN)

| Soil name and hydrologic group (appendix A) | Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio) | CN 1/ Table 2-2 | CN 1/ Fig. 2-3 | CN 1/ Fig. 2-4 | Area ☐ acres ☒ mi² ☐ % | Product of CN x area | PRODUCT OF % IMP. × AREA |
|---|---|---|---|---|---|---|---|
| D | 10+ DU/AC (T3/P1) 85% IMP | | | 92 | 0.029* | 2.668 | 0.025 |
| D | MIXED USE (T3/P2) 85% IMP | | | 92 | 0.009* | 0.828 | 0.008 |
| D | 2-5 DU/AC (T4/P1) 48% IMP | | | 90 | 0.005* | 0.450 | 0.002 |
| D | 2-5 DU/AC (T5/P1) 48% IMP | | | 90 | 0.058* | 5.220 | 0.028 |
| D | 5-10 DU/AC (T5/P2) 74% IMP | | | 90 | 0.042* | 3.780 | 0.031 |
| D | 2-5 DU/AC (T6/P1) 48% IMP | | | 90 | 0.030* | 2.700 | 0.014 |
| D | 5-10 DU/AC (T6/P2) 74% IMP | | | 90 | 0.006* | 0.540 | 0.004 |
| D | 2-5 DU/AC (T7/P2) 48% IMP | | | 90 | 0.147* | 13.230 | 0.071 |
| D | 5-10 DU/AC (T7/P2) 74% IMP | | | 90 | 0.066* | 5.940 | 0.049 |
| D | 2-5 DU/AC (T10/P1) 48% IMP | | | 90 | 0.002* | 0.180 | 0.001 |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | Totals = 0.334 | 35.536 | 0.233 |

1/ Use only one CN source per line.

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{35.536}{.334} = 90.2$ Use CN = 90

% IMP (WEIGHTED) $= \frac{0.233}{0.334} \times 100 = 59\%$

* 50% OF AREA CONTRIBUTING

## 2. Runoff

| | Storm #1 | Storm #2 | Storm #3 |
|---|---|---|---|
| Frequency ..... yr | | | |
| Rainfall, P (24-hour) ..... in | | | |
| Runoff, Q ..... in (Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.) | | | |

C2/P2

# Worksheet 2: Runoff curve number and runoff

Project _____ By _____ Date _____

Location _____ Checked _____ Date _____

Circle one: Present (Developed) CASE II - SUBBASIN 1A

## 1. Runoff curve number (CN)

| Soil name and hydrologic group (appendix A) | Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio) | CN 1/ Table 2-2 | CN 1/ Fig. 2-3 | CN 1/ Fig. 2-4 | Area ☐ acres ☐ mi² ☐ % | Product of CN x area | PRODUCT OF %IMP × AREA |
|---|---|---|---|---|---|---|---|
| 80% D | 5-10 DU/AC (T6/P2) 74% IMP | | | 85.2 | 0.009* | 0.767 | 0.666 |
| 95% D + 5% B | 5-10 DU/AC (T7/P2) 74% IMP | | | 89.4 | 0.014* | 1.252 | 1.036 |
| 95% D + 5% B | 10+ DU/AC (T7/P3) 85% IMP | | | 91.8 | 0.064* | 5.875 | 5.440 |
| D | 2-5 DU/AC (T8/P1) 43% IMP | | | 90 | 0.027* | 2.430 | 1.296 |
| D | HILLSIDE 38% IMP | | | 98 | 0.016 | 1.568 | 1.568 |
| 70% D + 30% B | 5-10 DU/AC (T8/P3) 74% IMP | | | 88.2 | 0.053* | 4.675 | 3.922 |
| D | 2-5 DU/AC (T10/P1) 43% IMP | | | 90 | 0.001* | 0.090 | 0.048 |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | Totals = | 0.134 | 16.657 | 13.976 |

1/ Use only one CN source per line.

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{16.657}{0.134} = 90.5$; Use CN = 91

%IMPERVIOUS (WEIGHTED) = $\frac{13.976}{0.134} = 76.0\%$

## 2. Runoff

| | Storm #1 | Storm #2 | Storm #3 |
|---|---|---|---|
| Frequency ..... yr | | | |
| Rainfall, P (24-hour) ..... in | | | |
| Runoff, Q ..... in (Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.) | | | |

*50% OF AREA CONTRIBUTING

C2/P3

# Worksheet 2: Runoff curve number and runoff

Project _____ By _____ Date _____

Location _____ Checked _____ Date _____

Circle one: Present (Developed) CASE II - SUBBASIN 2

## 1. Runoff curve number (CN)

| Soil name and hydrologic group (appendix A) | Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio) | CN 1/ Table 2-2 | CN 1/ Fig. 2-3 | CN 1/ Fig. 2-4 | Area ☐ acres ☒ mi² ☐ % | Product of CN x area | PRODUCT OF % IMP x AREA |
|---|---|---|---|---|---|---|---|
| D | 0-2 DU/AC (T1/P1) 25%/IMP | | | 87 | 0.107 | 9.309 | 2.996 |
| D | INTERSTATE 17 0.7%/IMP | | | 86 | 0.097 | 8.342 | 5.320 |
| D | 10+ DU/AC (T3/P2) 35%/IMP | | | 92 | 0.035* | 3.220 | 2.975 |
| D | COMMERCIAL (T3/P3) 95%/IMP | | | 95 | 0.043* | 4.085 | 4.085 |
| D | 2-5 DU/AC (T5/P1) 48%/IMP | | | 90 | 0.103* | 9.270 | 4.944 |
| D | 5-10 DU/AC (T5/P2) 74%/IMP | | | 90 | 0.099* | 8.910 | 7.326 |
| D | MIXED USE (T5/P3) 85%/IMP | | | 92 | 0.001* | 0.092 | 0.085 |
| D | 2-5 DU/AC (T7/P1) 48%/IMP | | | 90 | 0.111* | 9.990 | 5.328 |
| D | 5-10 DU/AC (T7/P2) 74%/IMP | | | 90 | 0.002* | 0.180 | 0.143 |
| D | 2-5 DU/AC (T1/P1) 45%/IMP | | | 90 | 0.061* | 5.490 | 2.723 |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | Totals = | | | | 0.659 | 58.888 | 36.635 |

1/ Use only one CN source per line.

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{58.888}{.659} = 89.4$ Use CN = 89

% IMP. (WEIGHTED) = $\frac{36.635}{.659} = 55.6\%$ USE 56%

## 2. Runoff

| | Storm #1 | Storm #2 | Storm #3 |
|---|---|---|---|
| Frequency ..... yr | | | |
| Rainfall, P (24-hour) ..... in | | | |
| Runoff, Q ..... in (Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.) | | | |

* 50% OF AREA CONTRIBUTING

C2/P4

# Worksheet 2: Runoff curve number and runoff

Project _____ By _____ Date _____

Location _____ Checked _____ Date _____

Circle one: Present (Developed) CASE II – SUBBASIN 2A

## 1. Runoff curve number (CN)

| Soil name and hydrologic group (appendix A) | Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio) | CN 1/ Table 2-2 | CN 1/ Fig. 2-3 | CN 1/ Fig. 2-4 | Area ☐ acres ☒ mi² ☐ % | Product of CN x area | Product of % imp x AREA |
|---|---|---|---|---|---|---|---|
| D | 10+ DU/AC (T7/P3) 85% Imp | | | 92 | 0.018* | 1.656 | 1.530 |
| 80% D + 20% B | COMMERCIAL (T7/P4) 95% Imp | | | 95 | 0.036* | 3.42 | 3.420 |
| 80% B + 20% D | 2-5 DU/AC (T8/P1) 43% Imp | | | 83.6 | 0.034* | 2.842 | 1.632 |
| 70% D + 30% B | 5-10 DU/AC (T3/P3) 74% Imp | | | 88.2 | 0.075* | 6.630 | 5.772 |
| B | HILLSIDE (T8/P4) 50% Imp | | | 98 | 0.004 | 0.392 | 0.200 |
| B | 2-5 DU/AC (T9/P1) 43% Imp | | | 82 | 0.003* | 0.246 | 0.144 |
| 90% D + 10% B | 2-5 DU/AC (T10/P1) 48% Imp | | | 89.2 | 0.073* | 6.512 | 3.504 |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | Totals = | 0.246 | 21.948 | 16.202 |

1/ Use only one CN source per line.

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{21.948}{.246} = 89.2$; Use CN = 89

% IMPERVIOUS (WEIGHTED) = $\frac{16.202}{.246} = 65.9\%$

USE 66%

## 2. Runoff

| Storm #1 | Storm #2 | Storm #3 |
|---|---|---|
| | | |
| | | |
| | | |

Frequency ..... yr

Rainfall, P (24-hour) ..... in

Runoff, Q ..... in
(Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.)

* 50% OF AREA CONTRIBUTING

C2/P5

# Worksheet 2: Runoff curve number and runoff

Project _____ By _____ Date _____

Location _____ Checked _____ Date _____

Circle one: Present (Developed) CASE II - SUBBASIN 5

## 1. Runoff curve number (CN)

| Soil name and hydrologic group (appendix A) | Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio) | CN 1/ Table 2-2 | CN 1/ Fig. 2-3 | CN 1/ Fig. 2-4 | Area ☐ acres ☐ mi² ☐ % | Product of CN x area | Product of % Imp x AREA |
|---|---|---|---|---|---|---|---|
| 70% B - 30% D | 2-5 DU/AC (T3/P1) 48% Imp | | | 84.4 | 0.059* | 4.980 | 2.832 |
| B | 5-10 DU/AC (T3/P3) 74% Imp | | | 84 | 0.011* | 0.924 | 0.814 |
| B | HILLSIDE (T3/P4) 50% Imp | | | 98 | 0.008 | 0.784 | 0.400 |
| 70% B + 30% D | 2-5 DU/AC (T9/P1) 48% Imp | | | 84.4 | 0.074* | 6.246 | 3.552 |
| 95% B + 5% D | 2-5 DU/AC (T10/P1) 48% Imp | | | 82.4 | 0.031* | 2.554 | 1.488 |
| D | 0-2 DU/AC (T10/P4) 23% Imp | | | 87 | 0.013 | 1.131 | 0.364 |
| D | HILLSIDE (T12/P2) 50% Imp | | | 98 | 0.007 | 0.686 | 0.350 |
| 90% D + 10% B | HILLSIDE (T13/P1) 50% Imp | | | 98 | 0.038 | 3.724 | 1.900 |
| B | 0-2 DU/AC (T13/P2) 23% Imp | | | 80 | 0.064 | 5.120 | 1.792 |
| D | HILLSIDE (T13/P3) 50% Imp | | | 98 | 0.031 | 3.038 | 1.550 |
| B | 0-2 DU/AC (T14/P1) 23% Imp | | | 80 | 0.052 | 4.160 | 1.456 |
| D | HILLSIDE (T14/P2) 50% Imp | | | 98 | 0.049 | 4.802 | 2.450 |
| | | | | | | | |
| | | | | | | | |
| | | | | Totals = | 0.437 | 38.149 | 18.948 |

1/ Use only one CN source per line.

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{38.149}{.437} = 87.3$ ; Use CN = 87

% Imp (WTD) = $\frac{18.943}{.437}$ = 43.4 USE 43%

## 2. Runoff

| | Storm #1 | Storm #2 | Storm #3 |
|---|---|---|---|
| Frequency ..... yr | | | |
| Rainfall, P (24-hour) ..... in | | | |
| Runoff, Q ..... in (Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.) | | | |

*50% OF AREA CONTRIBUTING.

C2/P6

# Worksheet 2: Runoff curve number and runoff

Project _____ By ____ Date _____

Location _____ Checked ____ Date _____

Circle one: Present (Developed) CASE II - SUBBASIN 3A

## 1. Runoff curve number (CN)

| Soil name and hydrologic group (appendix A) | Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio) | CN 1/ Table 2-2 | CN 1/ Fig. 2-3 | CN 1/ Fig. 2-4 | Area ☐ acres ☒ mi² ☐ % | Product of CN x area | PRODUCT OF % IMP X AREA |
|---|---|---|---|---|---|---|---|
| D | MIXED USE (T3/P2) 85% IMP | | | 92 | 0.001* | 0.092 | 0.085 |
| D | 2-5 DU/AC (T5/P1) 48% IMP | | | 90 | 0.035* | 3.150 | 1.680 |
| D | 5-10 DU/AC (T5/P2) 74% IMP | | | 90 | 0.030* | 2.700 | 2.220 |
| D | MIXED USE (T5/P3) 85% IMP | | | 92 | 0.003* | 0.736 | 0.680 |
| D | 2-5 DU/AC (T7/P1) 48% IMP | | | 90 | 0.016* | 1.440 | 0.768 |
| D | 2-5 DU/AC (T10/P1) 48% IMP | | | 90 | 0.159* | 14.310 | 7.632 |
| D | 2-5 DU/AC (T11/P1) 48% IMP | | | 90 | 0.002* | 0.180 | 0.096 |
| D | 0-2 DU/AC (T14/P1) 28% IMP | | | 87 | 0.189 | 16.443 | 5.292 |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | Totals = | 0.440 | 39.051 | 18.453 |

1/ Use only one CN source per line.

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{39.051}{.440} = 88.8$; Use CN = 89

% IMP (WTD) = $\frac{18.453}{0.440} = 41.9$ USE 42%

## 2. Runoff

| | Storm #1 | Storm #2 | Storm #3 |
|---|---|---|---|
| Frequency ..... yr | | | |
| Rainfall, P (24-hour) ..... in | | | |
| Runoff, Q ..... in (Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.) | | | |

C2/P7

# Worksheet 2: Runoff curve number and runoff

Project _____ By _____ Date _____

Location _____ Checked _____ Date _____

Circle one: Present (Developed) CASE II - SUBBASIN 3B

## 1. Runoff curve number (CN)

| Soil name and hydrologic group (appendix A) | Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio) | CN 1/ Table 2-2 | CN 1/ Fig. 2-3 | CN 1/ Fig. 2-4 | Area ☐ acres ☒ mi² ☐ % | Product of CN x area | PRODUCT OF %IMP × AREA |
|---|---|---|---|---|---|---|---|
| 60% D + 40% B | HILLSIDE (T13/P1) 50% IMP | | | 98 | 0.024 | 2.352 | 1.200 |
| 80% B + 20% D | 0-2 DU/AC (T13/P2) 28% IMP | | | 81.4 | 0.152 | 12.373 | 4.256 |
| D | HILLSIDE (T13/P3) 50% IMP | | | 98 | 0.011 | 1.078 | 0.550 |
| B | 0-2 DU/AC (T14/P1) 28% IMP | | | 80 | 0.164 | 13.120 | 4.592 |
| D | HILLSIDE (T14/P2) 50% IMP | | | 98 | 0.106 | 10.388 | 5.300 |
| D | HILLSIDE (T14/P3) 50% IMP | | | 98 | 0.015 | 1.470 | 0.750 |
| | | | | | | | |
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| | | | | | | | |
| | | | | | | | |
| 1/ Use only one CN source per line. | | | | Totals = | 0.472 | 40.781 | 16.648 |

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{40.781}{.472} = 86.4$ Use CN = 86

## 2. Runoff

% IMP (WTD) = $\frac{16.648}{.472} = 35.3$ USE 35%

| Storm #1 | Storm #2 | Storm #3 |
|---|---|---|
| | | |
| | | |
| | | |

Frequency ..... yr

Rainfall, P (24-hour) ..... in

Runoff, Q ..... in
(Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.)

C2/P8

# Worksheet 2: Runoff curve number and runoff

Project _____ By ____ Date _____

Location _____ Checked ____ Date _____

Circle one: Present (Developed) CASE II - SUBBASIN 4

## 1. Runoff curve number (CN)

| Soil name and hydrologic group (appendix A) | Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio) | CN 1/ Table 2-2 | CN 1/ Fig. 2-3 | CN 1/ Fig. 2-4 | Area ☐ acres ☒ mi² ☐ % | Product of CN x area | |
|---|---|---|---|---|---|---|---|
| D | 2-5 DU/AC (T5/P1) 48% IMP | | | 90 | 0.039* | 3.510 | 1.872 |
| D | 5-10 DU/AC (T6/P2) 74% IMP | | | 90 | 0.005* | 0.540 | 0.444 |
| D | 2-5 DU/AC (T10/P1) 43% IMP | | | 90 | 0.021* | 1.890 | 1.008 |
| D | 2-5 DU/AC (T11/P1) 48% IMP | | | 90 | 0.079* | 7.110 | 3.792 |
| D | 0-2 DU/AC (T14/P1) 28% IMP | | | 87 | 0.306 | 26.622 | 3.568 |
| D | 0-2 DU/AC (T15/P1) 23% IMP | | | 87 | 0.062 | 5.394 | 1.736 |
| | | | | | | | |
| | | | | | | | |
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| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | Totals = | 0.513 | 45.066 | 17.420 |

1/ Use only one CN source per line.

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{45.066}{.513} = 87.8$ Use CN = 88

## 2. Runoff

% IMP (WTD) = $\frac{17.420}{0.513} = 34.0\%$

| | Storm #1 | Storm #2 | Storm #3 |
|---|---|---|---|
| Frequency ..... yr | | | |
| Rainfall, P (24-hour) ..... in | | | |
| Runoff, Q ..... in (Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.) | | | |

C2/P9

# Worksheet 2: Runoff curve number and runoff

Project _____ By _____ Date _____

Location _____ Checked _____ Date _____

Circle one: Present (Developed) CASE II - SUBBASIN 4A

## 1. Runoff curve number (CN)

| Soil name and hydrologic group (appendix A) | Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio) | CN 1/ Table 2-2 | CN 1/ Fig. 2-3 | CN 1/ Fig. 2-4 | Area ☐ acres ☒ mi² ☐ % | Product of CN x area | |
|---|---|---|---|---|---|---|---|
| D | 0-2 DU/AC (T13/P2) 28% IMP | | | 87 | 0.012 | 1.044 | 0.336 |
| B | 0-2 DU/AC (T14/P1) 28% IMP | | | 80 | 0.145 | 11.600 | 4.060 |
| D | HILLSIDE (T14/P3) 50% IMP | | | 98 | 0.031 | 3.038 | 1.550 |
| 70%D+30%B | 0-2 DU/AC (T15/P1) 28% IMP | | | 84.9 | 0.183 | 15.537 | 5.124 |
| 70%D+30%B | HILLSIDE (T15/P2) 50% IMP | | | 98 | 0.043 | 4.214 | 2.150 |
| 90%D+10%B | HILLSIDE (T15/P3) 50% IMP | | | 98 | 0.117 | 11.466 | 5.850 |
| D | FLOODPLAIN (T15/P7) 0% IMP | | | 86 | 0.053 | 4.558 | 0.000 |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | Totals = | 0.584 | 51.457 | 19.070 |

1/ Use only one CN source per line.

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{51.457}{.584} = 88.1$ Use CN = 88

## 2. Runoff

% IMP (WTD) = $\frac{19.070}{.584} = 32.7$ USE 33%

| Storm #1 | Storm #2 | Storm #3 |
|---|---|---|
| | | |
| | | |
| | | |

Frequency ..... yr

Rainfall, P (24-hour) ..... in

Runoff, Q ..... in
(Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.)

C2/P10

# Worksheet 2: Runoff curve number and runoff

Project ______ By ______ Date ______

Location ______ Checked ______ Date ______

Circle one: Present (Developed) CASE II - SUBBASIN 6

1. Runoff curve number (CN)

| Soil name and hydrologic group (appendix A) | Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio) | CN [1/] Table 2-2 | CN [1/] Fig. 2-3 | CN [1/] Fig. 2-4 | Area ☐ acres ☒ mi² ☐ % | Product of CN x area | |
|---|---|---|---|---|---|---|---|
| 50% B+50% D | 0-2 DU/AC (T16/P1) 28% IMP | | | 83.5 | 0.086 | 7.181 | 2.408 |
| D | HILLSIDE (T16/P2) 50% IMP | | | 98 | 0.350 | 34.30 | 17.500 |
| | | | | | | | |
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| | | | | Totals = | 0.436 | 41.481 | 19.908 |

1/ Use only one CN source per line.

CN (weighted) = total product / total area = 41.481 / .436 = 95.1; Use CN = 95

2. Runoff   % IMP (WT'D) = 19.908 / 0.436 = 45.7  USE 46%

| | Storm #1 | Storm #2 | Storm #3 |
|---|---|---|---|
| Frequency ............ yr | | | |
| Rainfall, P (24-hour) ............ in | | | |
| Runoff, Q ............ in (Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.) | | | |

C2/P11

# Worksheet 2: Runoff curve number and runoff

Project ______________________ By _____ Date _______

Location ______________________ Checked _____ Date _______

Circle one: Present (Developed) CASE II - SUBBASIN 7

## 1. Runoff curve number (CN)

| Soil name and hydrologic group (appendix A) | Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio) | CN [1/] Table 2-2 | CN [1/] Fig. 2-3 | CN [1/] Fig. 2-4 | Area ☐ acres ☒ mi² ☐ % | Product of CN x area | |
|---|---|---|---|---|---|---|---|
| D | HILLSIDE (T1G/P2) 50% IMP | | | 98 | 0.249 | 24.402 | 12.450 |
| 50% D & 50% B | 2-5 DU/AC (T1G/P3) 48% IMP | | | 86 | 0.074* | 6.364 | 3.552 |
| | | | | | | | |
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| | | | | | | | |
| | | | | Totals = | 0.323 | 30.766 | 16.002 |

[1/] Use only one CN source per line.

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{30.766}{.323} = 95.3$; Use CN = 95

## 2. Runoff

% IMP (WT'D) = $\frac{16.002}{0.323} = 49.5$ USE 50%

| | Storm #1 | Storm #2 | Storm #3 |
|---|---|---|---|
| Frequency ........ yr | | | |
| Rainfall, P (24-hour) ........ in | | | |
| Runoff, Q ........ in (Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.) | | | |

C2/P12

# Worksheet 2: Runoff curve number and runoff

Project _____ By _____ Date _____

Location _____ Checked _____ Date _____

Circle one: Present (Developed) CASE II – SUBBASIN 8

## 1. Runoff curve number (CN)

| Soil name and hydrologic group (appendix A) | Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio) | CN 1/ Table 2-2 | CN 1/ Fig. 2-3 | CN 1/ Fig. 2-4 | Area ☐ acres ☒ mi² ☐ % | Product of CN x area | |
|---|---|---|---|---|---|---|---|
| D | HILLSIDE (T16/P2) 50%/IMP | | | 98 | 0.077 | 7.546 | 3.850 |
| 65% D, 25% B, 10% C | 2-5 DU/AC (T16/P3) 48%/IMP | | | 87.7 | 0.342* | [illegible] | 16.416 |
| 90% D + 10% B | MIXED USE (T16/P4) 85%/IMP | | | 91.5 | 0.119* | 10.882 | 10.115 |
| D | HILLSIDE (T16/P5) 50%/IMP | | | 98 | 0.069 | 6.762 | 3.45 |
| D | HILLSIDE (T17/P1) 50%/IMP | | | 98 | 0.127 | 12.446 | 6.35 |
| 60% B + 40% D | 2-5 DU/AC (T17/P4) 48%/IMP | | | 85.2 | 0.076* | 6.475 | 3.648 |
| | | | | | | | |
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| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | Totals = | 0.810 | 74.111 | 43.829 |

1/ Use only one CN source per line.

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{74.111}{.810} = 91.5$ Use CN = 92

## 2. Runoff

%/IMP (WT'D) = $\frac{43.829}{0.810} = 54.1$ USE 54%

| Storm #1 | Storm #2 | Storm #3 |
|---|---|---|
| | | |
| | | |
| | | |

Frequency ..... yr

Rainfall, P (24-hour) ..... in

Runoff, Q ..... in
(Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.)

C2/P13

# Worksheet 2: Runoff curve number and runoff

Project _____ By ____ Date _____

Location _____ Checked ____ Date _____

Circle one: Present (Developed) CASE II - SUBBASIN 9

## 1. Runoff curve number (CN)

| Soil name and hydrologic group (appendix A) | Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio) | CN 1/ Table 2-2 | CN 1/ Fig. 2-3 | CN 1/ Fig. 2-4 | Area ☐ acres ☒ mi² ☐ % | Product of CN x area | |
|---|---|---|---|---|---|---|---|
| D | 0-2 DU/AC (T1/P1) 28% IMP | | | 87 | 0.106 | 9.222 | 2.968 |
| D | 0-2 DU/AC (T2/P1) 28% IMP | | | 87 | 0.192 | 16.704 | 5.376 |
| D | MIXED USE (T3/P2) 85% IMP | | | 92 | 0.054* | 4.968 | 4.590 |
| D | 2-5 DU/AC (T5/P1) 48% IMP | | | 90 | 0.036* | 3.24 | 1.728 |
| D | 5-10 DU/AC (T5/P2) 74% IMP | | | 90 | 0.004* | 0.36 | 0.296 |
| D | MIXED USE (T5/P3) 85% IMP | | | 92 | 0.254* | 23.368 | 21.590 |
| D | 2-5 DU/AC (T11/P1) 48% IMP | | | 90 | 0.455* | 40.95 | 21.840 |
| D | MIXED USE (T11/P2) 85% IMP | | | 92 | 0.044* | 4.048 | 3.740 |
| D | 0-2 DU/AC (T14/P1) 28% IMP | | | 87 | 0.191 | 16.617 | 5.348 |
| D | 0-2 DU/AC (T15/P1) 28% IMP | | | 87 | 0.284 | 24.708 | 7.952 |
| D | HILLSIDE (T15/P4) 50% IMP | | | 98 | 0.111 | 10.878 | 5.550 |
| D | HILLSIDE (T15/P5) 50% IMP | | | 98 | 0.224 | 21.952 | 11.200 |
| D | MIXED USE (T15/P6) 85% IMP | | | 92 | 0.057 | 5.244 | 4.845 |
| D | FLOODPLAIN (T15/P7) 0% IMP | | | 86 | 0.175 | 15.05 | 0.000 |
| | | | | Totals = | 2.187 | 197.309 | 97.023 |

1/ Use only one CN source per line.

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{197.309}{2.187} = 90.2$ Use CN = 90

## 2. Runoff

% IMP (WT'D) = $\frac{97.023}{2.187} = 44.4$ USE 44%

| Storm #1 | Storm #2 | Storm #3 |
|---|---|---|
| | | |
| | | |
| | | |

Frequency ..... yr

Rainfall, P (24-hour) ..... in

Runoff, Q ..... in
(Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.)

# SECTION 2.3
## Runoff Curve Number Worksheets

### Case 3: Major Drainage System Analysis

C3/P1

# Worksheet 2: Runoff curve number and runoff

Project BUCHANAN WASH By TWW Date 5/26/89

Location PHOENIX AZ Checked ____ Date ____

Circle one: Present Developed CASE II (SUB 1)

TRACT 1 TRACT 5 SUBBASIN A

1. Runoff curve number (CN)

| Soil name and hydrologic group (appendix A) | Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio) | CN 1/ Table 2-2 | CN 1/ Fig. 2-3 | CN 1/ Fig. 2-4 | Area ☐ acres ☒ mi² ☐ % | Product of CN x area |
|---|---|---|---|---|---|---|
| 1 | TRACT 1 UNDEVELOPED SUBBASIN A DESERT FAIR COVER | 86 | | | 0.821 | 70.606 |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | Totals = | .821 | 70.606 |

1/ Use only one CN source per line.

CN (weighted) = $\frac{\text{total product}}{\text{total area}}$ = ____ = ____; Use CN = 86

2. Runoff

| | Storm #1 | Storm #2 | Storm #3 |
|---|---|---|---|
| Frequency ..... yr | | | |
| Rainfall, P (24-hour) ..... in | | | |
| Runoff, Q ..... in (Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.) | | | |

C3/P2

# Worksheet 2: Runoff curve number and runoff

Project _____ By _____ Date _____

Location _____ Checked _____ Date _____

Circle one: Present Developed PART II (SUB-2)

TRACT 5/TRACT 4

1. Runoff curve number (CN)

| Soil name and hydrologic group (appendix A) | Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio) | CN 1/ Table 2-2 | CN 1/ Fig. 2-3 | CN 1/ Fig. 2-4 | Area ☐ acres ☒ mi² ☐ % | Product of CN x area |
|---|---|---|---|---|---|---|
| D | TRACT 5 SUBBASIN 2 DEVELOPED - FULL INFIL | 86 | | | 0.734 | |
| D | TRACT 4 | 86 | | | 0.010 | |
| | | | | | | |
| | | | | | | |
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| | | | | | | |
| | | | | | | |
| | | | | Totals = | 0.744 | |

1/ Use only one CN source per line.

CN (weighted) = $\frac{\text{total product}}{\text{total area}}$ = _____ = _____; Use CN = 86

2. Runoff

| | Storm #1 | Storm #2 | Storm #3 |
|---|---|---|---|
| Frequency ..... yr | | | |
| Rainfall, P (24-hour) ..... in | | | |
| Runoff, Q ..... in (Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.) | | | |

C3/P3

# Worksheet 2: Runoff curve number and runoff

Project _____ By _____ Date _____

Location _____ Checked _____ Date _____

Circle one: Present Developed PHASE III (SUB 2) TRACT 6

1. Runoff curve number (CN)

| Soil name and hydrologic group (appendix A) | Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio) | CN 1/ Table 2-2 | CN 1/ Fig. 2-3 | CN 1/ Fig. 2-4 | Area ☐ acres ☒ mi² ☐ % | Product of CN x area |
|---|---|---|---|---|---|---|
| [illegible] | [illegible] | [illegible] | | | .982 | 84.452 |
| [illegible] | [illegible] | 72 | | | .037 | 2.664 |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | Totals = | 1.019 87.116 |

1/ Use only one CN source per line.

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{87.116}{1.019} = 85.5$; Use CN = 86

2. Runoff

| | Storm #1 | Storm #2 | Storm #3 |
|---|---|---|---|
| Frequency ..... yr | | | |
| Rainfall, P (24-hour) ..... in | | | |
| Runoff, Q ..... in (Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.) | | | |

C3/P4

# Worksheet 2: Runoff curve number and runoff

Project _____ By _____ Date _____

Location _____ Checked _____ Date _____

Circle one: Present Developed [illegible] (Sub-1)

TRACT B/TRACT C

1. Runoff curve number (CN)

| Soil name and hydrologic group (appendix A) | Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio) | CN 1/ Table 2-2 | CN 1/ Fig. 2-3 | CN 1/ Fig. 2-4 | Area ☐ acres ☐ mi² ☐ % | Product of CN x area |
|---|---|---|---|---|---|---|
| D | [illegible] | [illegible] | | | .241 | 20.726 |
| B | | [illegible] | | | [illegible] | 21.456 |
| HOUSING | | [illegible] | | | .034 | 3.332 |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | Totals = | 0.573 / 45.514 |

1/ Use only one CN source per line.

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{45.514}{.573} = 79.4$; Use CN = 79

2. Runoff

| | Storm #1 | Storm #2 | Storm #3 |
|---|---|---|---|
| Frequency ..... yr | | | |
| Rainfall, P (24-hour) ..... in | | | |
| Runoff, Q ..... in (Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.) | | | |

C3/P5

# Worksheet 2: Runoff curve number and runoff

Project _____ By _____ Date _____

Location _____ Checked _____ Date _____

Circle one: Present Developed CASE III (SUB 5)
TRACT 9

1. Runoff curve number (CN)

| Soil name and hydrologic group (appendix A) | Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio) | CN 1/ Table 2-2 | CN 1/ Fig. 2-3 | CN 1/ Fig. 2-4 | Area ☐ acres ☒ mi² ☐ % | Product of CN x area |
|---|---|---|---|---|---|---|
| D | DESERT - FAIR COVER | 86 | | | .041 | 3.526 |
| B | " | 72 | | | .109 | 7.848 |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | Totals = 0.150 | 11.374 |

1/ Use only one CN source per line.

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{11.374}{.150} = 75.8$; Use CN = 76

2. Runoff

| | Storm #1 | Storm #2 | Storm #3 |
|---|---|---|---|
| Frequency ..... yr | | | |
| Rainfall, P (24-hour) ..... in | | | |
| Runoff, Q ..... in (Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.) | | | |

C3/P6

# Worksheet 2: Runoff curve number and runoff

Project _____ By _____ Date _____

Location _____ Checked _____ Date _____

Circle one: Present Developed CASE III (SUB 6)
TRACT 10

## 1. Runoff curve number (CN)

| Soil name and hydrologic group (appendix A) | Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio) | CN 1/ Table 2-2 | CN 1/ Fig. 2-3 | CN 1/ Fig. 2-4 | Area ☐ acres ☒ mi² ☐ % | Product of CN x area |
|---|---|---|---|---|---|---|
| D | DESERT - FAIR COVER | 86 | | | .617 | 53.062 |
| B | " | 72 | | | .073 | 5.256 |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| 1/ Use only one CN source per line. | | | | Totals = | .690 | 58.318 |

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{58.318}{.690} = 84.5$; Use CN = 85

## 2. Runoff

| | Storm #1 | Storm #2 | Storm #3 |
|---|---|---|---|
| Frequency ..... yr | | | |
| Rainfall, P (24-hour) ..... in | | | |
| Runoff, Q ..... in (Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.) | | | |

C3/P7

# Worksheet 2: Runoff curve number and runoff

Project _____ By _____ Date _____

Location _____ Checked _____ Date _____

Circle one: Present Developed CASE III (SUB 7)

TRACT 14

## 1. Runoff curve number (CN)

| Soil name and hydrologic group (appendix A) | Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio) | CN 1/ Table 2-2 | CN 1/ Fig. 2-3 | CN 1/ Fig. 2-4 | Area ☐ acres ☒ mi² ☐ % | Product of CN x area |
|---|---|---|---|---|---|---|
| D | DESERT-FAIR COVER | 96 | | | 1.045 | 89.320 |
| HILLSIDE | | 98 | | | 0.200 | 19.600 |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | Totals = | 1.245 / 109.470 |

1/ Use only one CN source per line.

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{109.47}{1.245} = 87.9$; Use CN = 88

## 2. Runoff

| | Storm #1 | Storm #2 | Storm #3 |
|---|---|---|---|
| Frequency ..... yr | | | |
| Rainfall, P (24-hour) ..... in | | | |
| Runoff, Q ..... in (Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.) | | | |

C3/PB

# Worksheet 2: Runoff curve number and runoff

Project _____ By _____ Date _____

Location _____ Checked _____ Date _____

Circle one: Present Developed CASE III (SUB B)

TRACT 2 / TRACT 3, SUBBASIN B

1. Runoff curve number (CN)

| Soil name and hydrologic group (appendix A) | Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio) | CN 1/ Table 2-2 | CN 1/ Fig. 2-3 | CN 1/ Fig. 2-4 | Area ☐ acres ☒ mi² ☐ % | Product of CN x area |
|---|---|---|---|---|---|---|
| D | DESERT - FAIR COVER | 86 | | | 0.303 | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | Totals = 0.303 | |

1/ Use only one CN source per line.

CN (weighted) = $\frac{\text{total product}}{\text{total area}}$ = ____ = _____; Use CN = 86

2. Runoff

| | | Storm #1 | Storm #2 | Storm #3 |
|---|---|---|---|---|
| Frequency ..... | yr | | | |
| Rainfall, P (24-hour) ..... | in | | | |
| Runoff, Q ..... (Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.) | in | | | |

C3/P9

# Worksheet 2: Runoff curve number and runoff

Project _____ By _____ Date _____

Location _____ Checked _____ Date _____

Circle one: Present Developed CASE III (SUB 9)

TRACT 5, SUBBASIN B

1. Runoff curve number (CN)

| Soil name and hydrologic group (appendix A) | Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio) | CN 1/ Table 2-2 | CN 1/ Fig. 2-3 | CN 1/ Fig. 2-4 | Area ☐ acres ☐ mi² ☐ % | Product of CN x area |
|---|---|---|---|---|---|---|
| D | DESERT - FAIR COVER | 86 | | | 0.673 | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | Totals = 0.673 | |

1/ Use only one CN source per line.

CN (weighted) = $\frac{\text{total product}}{\text{total area}}$ = _____ = _____; Use CN = 86

2. Runoff

| | Storm #1 | Storm #2 | Storm #3 |
|---|---|---|---|
| Frequency ..... yr | | | |
| Rainfall, P (24-hour) ..... in | | | |
| Runoff, Q ..... in (Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.) | | | |

C3/P10

# Worksheet 2: Runoff curve number and runoff

Project _____ By _____ Date _____

Location _____ Checked _____ Date _____

Circle one: Present Developed CASE III TRACT 11 (SUB 10)

1. Runoff curve number (CN)

| Soil name and hydrologic group (appendix A) | Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio) | CN 1/ Table 2-2 | CN 1/ Fig. 2-3 | CN 1/ Fig. 2-4 | Area ☐ acres ☒ mi² ☐ % | Product of CN x area |
|---|---|---|---|---|---|---|
| D | DESERT - FAIR COVER | 86 | | | 1.147 | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | Totals = | | |

1/ Use only one CN source per line.

CN (weighted) = $\frac{\text{total product}}{\text{total area}}$ = _____ = _____; Use CN = 86

2. Runoff

| | Storm #1 | Storm #2 | Storm #3 |
|---|---|---|---|
| Frequency ..... yr | | | |
| Rainfall, P (24-hour) ..... in | | | |
| Runoff, Q ..... in (Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.) | | | |

C3/P11

# Worksheet 2: Runoff curve number and runoff

Project _____ By _____ Date _____

Location _____ Checked _____ Date _____

Circle one: Present Developed CASE III (SUB 11)

TRACT 13

1. Runoff curve number (CN)

| Soil name and hydrologic group (appendix A) | Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio) | CN 1/ Table 2-2 | CN 1/ Fig. 2-3 | CN 1/ Fig. 2-4 | Area ☐ acres ☒ mi² ☐ % | Product of CN x area |
|---|---|---|---|---|---|---|
| D | DESERT - FAIR COVER | 86 | | | .103 | 8.858 |
| B | " | 72 | | | .186 | 13.392 |
| HILLSIDE | | 98 | | | .027 | 2.646 |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | Totals = | .316 | 24.896 |

1/ Use only one CN source per line.

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{24.896}{.316} = 78.8$; Use CN = 79

2. Runoff

| | Storm #1 | Storm #2 | Storm #3 |
|---|---|---|---|
| Frequency ..... yr | | | |
| Rainfall, P (24-hour) ..... in | | | |
| Runoff, Q ..... in (Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.) | | | |

C3/P12

# Worksheet 2: Runoff curve number and runoff

Project _____ By _____ Date _____

Location _____ Checked _____ Date _____

Circle one: Present Developed CASE III (SUB 12) TRACT 15

1. Runoff curve number (CN)

| Soil name and hydrologic group (appendix A) | Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio) | CN 1/ Table 2-2 | CN 1/ Fig. 2-3 | CN 1/ Fig. 2-4 | Area ☐ acres ☐ mi² ☐ % | Product of CN x area |
|---|---|---|---|---|---|---|
| D | DESERT - FAIR COVER | 86 | | | 0.947 | 81.442 |
| | | | | | | |
| HILLSIDE | | 98 | | | 0.488 | 47.824 |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | Totals = | 1.435 / 129.266 |

1/ Use only one CN source per line.

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{129.266}{1.435} = 90.1$; Use CN = 90

2. Runoff

| | Storm #1 | Storm #2 | Storm #3 |
|---|---|---|---|
| Frequency ..... yr | | | |
| Rainfall, P (24-hour) ..... in | | | |
| Runoff, Q ..... in (Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.) | | | |

C3/P13

# Worksheet 2: Runoff curve number and runoff

Project _____ By _____ Date _____

Location _____ Checked _____ Date _____

Circle one: Present Developed CASE III (SUB13)

TRACT 16, SUBBASIN A
(SEE CASE I, SUBBASIN 6)

1. Runoff curve number (CN)

| Soil name and hydrologic group (appendix A) | Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio) | CN 1/ Table 2-2 | CN 1/ Fig. 2-3 | CN 1/ Fig. 2-4 | Area ☐ acres ☒ mi² ☐ % | Product of CN x area |
|---|---|---|---|---|---|---|
| D | DESERT - FAIR COVER | 86 | | | .041 | 3.526 |
| B | " | 72 | | | .039 | 2.808 |
| HILLSIDE | | 98 | | | 0.350 | 34.30 |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | Totals = | 0.430 | 40.634 |

1/ Use only one CN source per line.

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{40.634}{.43} = 94.5$; Use CN = 95

2. Runoff

| | Storm #1 | Storm #2 | Storm #3 |
|---|---|---|---|
| Frequency ..... yr | | | |
| Rainfall, P (24-hour) ..... in | | | |
| Runoff, Q ..... in (Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.) | | | |

C3/P14

# Worksheet 2: Runoff curve number and runoff

Project _____ By _____ Date _____

Location _____ Checked _____ Date _____

Circle one: Present Developed

CASE III (SUB 14)
TRACT 16, SUBBASIN B
(SEE CASE I, SUBBASIN 7)

## 1. Runoff curve number (CN)

| Soil name and hydrologic group (appendix A) | Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio) | CN 1/ Table 2-2 | CN 1/ Fig. 2-3 | CN 1/ Fig. 2-4 | Area ☐ acres ☐ mi² ☐ % | Product of CN x area |
|---|---|---|---|---|---|---|
| D | DESERT - FAIR COVER | 86 | | | 0.025 | 2.150 |
| B | " | 72 | | | 0.116 | 8.352 |
| HILLSIDE | | 98 | | | 0.249 | 24.402 |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | Totals = | .390 | 34.904 |

1/ Use only one CN source per line.

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{34.904}{.39} = 89.5$; Use CN = 90

## 2. Runoff

| | Storm #1 | Storm #2 | Storm #3 |
|---|---|---|---|
| Frequency ..... yr | | | |
| Rainfall, P (24-hour) ..... in | | | |
| Runoff, Q ..... in (Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.) | | | |

C3/P15

# Worksheet 2: Runoff curve number and runoff

Project _____ By _____ Date _____

Location _____ Checked _____ Date _____

Circle one: Present Developed

CASE III (SUB15)
TRACT 16, SUBBASIN C/TRACT 17
(SEE CASE I, SUBBASIN 2)

## 1. Runoff curve number (CN)

| Soil name and hydrologic group (appendix A) | Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio) | CN 1/ Table 2-2 | CN 1/ Fig. 2-3 | CN 1/ Fig. 2-4 | Area ☐ acres ☒ mi² ☐ % | Product of CN x area |
|---|---|---|---|---|---|---|
| D | DESERT - FAIR COVER | 86 | | | 0.761 | 65.446 |
| B | | 72 | | | 0.316 | 22.752 |
| HILLSIDE | | 98 | | | 0.266 | 26.068 |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | Totals = | 1.343 | 114.266 |

1/ Use only one CN source per line.

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{114.266}{1.343} = 85.1$; Use CN = 85

## 2. Runoff

| | Storm #1 | Storm #2 | Storm #3 |
|---|---|---|---|
| Frequency ..... yr | | | |
| Rainfall, P (24-hour) ..... in | | | |
| Runoff, Q ..... in (Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.) | | | |

# SECTION 2.4
## Runoff Curve Number Worksheets

### Case 4: Storm Drain System Analysis

C4/P1

# Worksheet 2: Runoff curve number and runoff

Project BUCHANAN WASH By TWW Date 6/5/89

Location PHOENIX, AZ Checked _____ Date _____

Circle one: Present Developed CASE 4
SUBBASINS 1, 1A & 1B

## 1. Runoff curve number (CN)

| Soil name and hydrologic group (appendix A) | Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio) | CN 1/ Table 2-2 | CN 1/ Fig. 2-3 | CN 1/ Fig. 2-4 | Area ☐ acres ☒ mi² ☐ % | Product of CN x area |
|---|---|---|---|---|---|---|
| D | SUB 1 - TRACT 1/I-17/TRACT 3 DESERT W/ FAIR COVER | 86 | | | 0.614 | |
| D | SUB 1A DESERT W/ FAIR COVER | 86 | | | 0.088 | |
| D | SUB 1B DESERT W/ FRIR COVER | 86 | | | 0.119 | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | Totals = 0.821 | |

1/ Use only one CN source per line.

CN (weighted) = $\frac{\text{total product}}{\text{total area}}$ = ____ = _____; Use CN = 86

## 2. Runoff

| | | Storm #1 | Storm #2 | Storm #3 |
|---|---|---|---|---|
| Frequency ..... | yr | | | |
| Rainfall, P (24-hour) ..... | in | | | |
| Runoff, Q ..... (Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.) | in | | | |

C4/P2

# Worksheet 2: Runoff curve number and runoff

Project _____ By _____ Date _____

Location _____ Checked _____ Date _____

Circle one: Present Developed

CASE 4
SUB 2, 2A, 2B, 2C, 2D AND 2E

## 1. Runoff curve number (CN)

| Soil name and hydrologic group (appendix A) | Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio) | CN 1/ Table 2-2 | CN 1/ Fig. 2-3 | CN 1/ Fig. 2-4 | Area ☐ acres ☒ mi² ☐ % | Product of CN x area |
|---|---|---|---|---|---|---|
| D | SUB 2 DESERT - FAIR COVER | 86 | | | .287 | |
| D | SUB 2A DESERT | 86 | | | .195 | |
| D | SUB 2B DESERT | 86 | | | .028 | |
| D | SUB 2C DESERT | 86 | | | .141 | |
| D | SUB 2D DESERT | 86 | | | .083 | |
| D | SUB 2E DESERT | | | | .010 | |
| | | | | | | |
| | | | | Totals = | 0.744 | |

1/ Use only one CN source per line.

CN (weighted) = $\frac{\text{total product}}{\text{total area}}$ = ____ = _____; Use CN = 86

## 2. Runoff

| | Storm #1 | Storm #2 | Storm #3 |
|---|---|---|---|
| Frequency ..... yr | | | |
| Rainfall, P (24-hour) ..... in | | | |
| Runoff, Q ..... in (Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.) | | | |

C4/P3

# Worksheet 2: Runoff curve number and runoff

Project _____ By _____ Date _____

Location _____ Checked _____ Date _____

Circle one: Present Developed CASE 4

SUB 3, 3A, 3B, 3C, 3D & 3E

## 1. Runoff curve number (CN)

| Soil name and hydrologic group (appendix A) | Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio) | CN 1/ Table 2-2 | CN 1/ Fig. 2-3 | CN 1/ Fig. 2-4 | Area ☐ acres ☒ mi² ☐ % | Product of CN x area |
|---|---|---|---|---|---|---|
| 96% D<br>4% B | SUB 3<br>DESERT – FAIR COVER | 85.5 | | | .655 | |
| D | SUB 3A | 86 | | | .085 | |
| D | SUB 3B | 86 | | | .031 | |
| D | SUB 3C | 86 | | | .160 | |
| D | SUB 3D | 86 | | | .018 | |
| D | SUB 3E | 86 | | | .070 | |
| | | | | | | |
| | | | | Totals = | 1.019 | |

1/ Use only one CN source per line.

CN (weighted) = $\frac{\text{total product}}{\text{total area}}$ = ____ = 86; Use CN = 86

## 2. Runoff

| | Storm #1 | Storm #2 | Storm #3 |
|---|---|---|---|
| Frequency ..... yr | | | |
| Rainfall, P (24-hour) ..... in | | | |
| Runoff, Q ..... in (Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.) | | | |

C4/P4

# Worksheet 2: Runoff curve number and runoff

Project _____ By _____ Date _____

Location _____ Checked _____ Date _____

Circle one: Present Developed CASE 4
SUB 4, 4A, 4B, 5F & 5G

## 1. Runoff curve number (CN)

| Soil name and hydrologic group (appendix A) | Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio) | CN 1/ Table 2-2 | CN 1/ Fig. 2-3 | CN 1/ Fig. 2-4 | Area ☐ acres ☒ mi² ☐ % | Product of CN x area |
|---|---|---|---|---|---|---|
| 42% D<br>52% B<br>6% HILLSIDE | SUB 4<br>DESERT · FAIR COVER | 86<br>72<br>98 | | | 0.080<br>0.099<br>0.011 | |
| 42% D<br>52% B<br>6% HILLSIDE | SUB 4A<br>DESERT | 86<br>72<br>98 | | | 0.023<br>0.029<br>0.003 | |
| 42% D<br>52% B<br>6% HILLSIDE | SUB 4B<br>DESERT | 86<br>72<br>98 | | | 0.074<br>0.091<br>0.010 | |
| 42% D<br>52% B<br>6% HILLSIDE | SUB 5F<br>DESERT | 86<br>72<br>98 | | | 0.060<br>0.075<br>0.009 | |
| 42% D<br>52% B<br>6% HILLSIDE | SUB 5G<br>DESERT | 86<br>72<br>98 | | | .004<br>.004<br>0.001 | |
| | | | | | | |
| | | | | | | |
| | | | | | Totals = 0.573 | |

1/ Use only one CN source per line.

CN (weighted) = $\frac{\text{total product}}{\text{total area}}$ = _____ = _____; Use CN = 79

## 2. Runoff

| | Storm #1 | Storm #2 | Storm #3 |
|---|---|---|---|
| Frequency ..... yr | | | |
| Rainfall, P (24-hour) ..... in | | | |
| Runoff, Q ..... in (Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.) | | | |

C4/P5

# Worksheet 2: Runoff curve number and runoff

Project _____ By _____ Date _____

Location _____ Checked _____ Date _____

Circle one: Present Developed CASE 4 SUB 5, 5A, 5D & 5E

## 1. Runoff curve number (CN)

| Soil name and hydrologic group (appendix A) | Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio) | CN 1/ Table 2-2 | CN 1/ Fig. 2-3 | CN 1/ Fig. 2-4 | Area ☐ acres ☒ mi² ☐ % | Product of CN x area |
|---|---|---|---|---|---|---|
| 73% B | SUB 5 | 72 | | | .037 | |
| 27% D | DESERT - FAIR COVER | 86 | | | .014 | |
| 73% B | SUB 5A | 72 | | | .014 | |
| 27% D | DESERT | 86 | | | .005 | |
| 73% B | SUB 5D | 72 | | | .042 | |
| 27% D | DESERT | 86 | | | .016 | |
| 73% B | SUB 5E | 72 | | | .016 | |
| 27% D | DESERT | 86 | | | .006 | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | Totals = | .150 | |

1/ Use only one CN source per line.

CN (weighted) = $\frac{\text{total product}}{\text{total area}}$ = _____ = _____; Use CN = 76

## 2. Runoff

| | Storm #1 | Storm #2 | Storm #3 |
|---|---|---|---|
| Frequency ..... yr | | | |
| Rainfall, P (24-hour) ..... in | | | |
| Runoff, Q ..... in (Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.) | | | |

C4/P6

# Worksheet 2: Runoff curve number and runoff

Project _____ By _____ Date _____

Location _____ Checked _____ Date _____

Circle one: Present Developed CASE 4

SUB 6, 6A, 6B & 6C

## 1. Runoff curve number (CN)

| Soil name and hydrologic group (appendix A) | Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio) | CN 1/ Table 2-2 | CN 1/ Fig. 2-3 | CN 1/ Fig. 2-4 | Area ☐ acres ☒ mi² ☐ % | Product of CN x area |
|---|---|---|---|---|---|---|
| 89% D | SUB 6 | 86 | | | .241 | |
| 11% B | DESERT - FAIR COVER | 72 | | | .046 | |
| 89% D | SUB 6A | 86 | | | .042 | |
| 11% B | DESERT | 72 | | | .008 | |
| 89% D | SUB 6B | 86 | | | .029 | |
| 11% B | DESERT | 72 | | | .006 | |
| 89% D | SUB 6C | 86 | | | .267 | |
| 11% B | DESERT | 72 | | | .051 | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | Totals = | 0.690 | |

1/ Use only one CN source per line.

CN (weighted) = $\frac{\text{total product}}{\text{total area}}$ = _____ = _____; Use CN = 85

## 2. Runoff

| | Storm #1 | Storm #2 | Storm #3 |
|---|---|---|---|
| Frequency ..... yr | | | |
| Rainfall, P (24-hour) ..... in | | | |
| Runoff, Q ..... in (Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.) | | | |

C4/P7

# Worksheet 2: Runoff curve number and runoff

Project _____ By ____ Date _____

Location _____ Checked ____ Date _____

Circle one: Present Developed CASE 4

SUB 7, 7A, 7B, 7C, 7D, 7E & 7F

## 1. Runoff curve number (CN)

| Soil name and hydrologic group (appendix A) | Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio) | CN 1/ Table 2-2 | CN 1/ Fig. 2-3 | CN 1/ Fig. 2-4 | Area ☐ acres ☒ mi² ☐ % | Product of CN x area |
|---|---|---|---|---|---|---|
| 84% D | SUB 7 | 86 | | | .733 | |
| 16% HILLSIDE | DESERT - FAIR COVER | 98 | | | .140 | |
| 84% D | SUB 7A | 86 | | | .014 | |
| 16% HILLSIDE | DESERT | 98 | | | .003 | |
| 84% D | SUB 7B | 86 | | | .029 | |
| 16% HILLSIDE | DESERT | 98 | | | .005 | |
| 84% D | SUB 7C | 86 | | | .042 | |
| 16% HILLSIDE | DESERT | 98 | | | .008 | |
| 84% D | SUB 7D | 86 | | | .093 | |
| 16% HILLSIDE | DESERT | 98 | | | .018 | |
| 84% D | SUB 7E | 86 | | | .056 | |
| 16% HILLSIDE | DESERT | 98 | | | .011 | |
| 84% D | SUB 7F | 86 | | | .078 | |
| 16% HILLSIDE | DESERT | 98 | | | .015 | |
| | | | | Totals = | 1.245 | |

1/ Use only one CN source per line.

CN (weighted) = $\frac{\text{total product}}{\text{total area}}$ = ____ = _____; Use CN = 88

## 2. Runoff

| | Storm #1 | Storm #2 | Storm #3 |
|---|---|---|---|
| Frequency ..... yr | | | |
| Rainfall, P (24-hour) ..... in | | | |
| Runoff, Q ..... in (Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.) | | | |

C4/P8

# Worksheet 2: Runoff curve number and runoff

Project _____ By _____ Date _____

Location _____ Checked _____ Date _____

Circle one: Present Developed CASE 4

SUB 8 & 8A

## 1. Runoff curve number (CN)

| Soil name and hydrologic group (appendix A) | Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio) | CN 1/ Table 2-2 | CN 1/ Fig. 2-3 | CN 1/ Fig. 2-4 | Area ☐ acres ☒ mi² ☐ % | Product of CN x area |
|---|---|---|---|---|---|---|
| D | SUB 8 DESERT - FAIR COVER | 86 | | | .258 | |
| D | SUB 8A DESERT | 86 | | | .045 | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | Totals = | .303 | |

1/ Use only one CN source per line.

CN (weighted) = $\frac{\text{total product}}{\text{total area}}$ = _____ = _____; Use CN = 86

## 2. Runoff

| | Storm #1 | Storm #2 | Storm #3 |
|---|---|---|---|
| Frequency ..... yr | | | |
| Rainfall, P (24-hour) ..... in | | | |
| Runoff, Q ..... in (Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.) | | | |

C4/P9

# Worksheet 2: Runoff curve number and runoff

Project _____ By _____ Date _____

Location _____ Checked _____ Date _____

Circle one: Present Developed

CASE 4
SUB 9, 9A, 9B & 9C

## 1. Runoff curve number (CN)

| Soil name and hydrologic group (appendix A) | Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio) | CN 1/ Table 2-2 | CN 1/ Fig. 2-3 | CN 1/ Fig. 2-4 | Area ☐ acres ☒ mi² ☐ % | Product of CN x area |
|---|---|---|---|---|---|---|
| D | SUB 9 DESERT - FAIR COVER | 86 | | | .465 | |
| D | SUB 9A DESERT | 86 | | | .096 | |
| D | SUB 9B DESERT | 86 | | | .065 | |
| D | SUB 9C DESERT | 86 | | | .047 | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | Totals = | 0.673 | |

1/ Use only one CN source per line.

CN (weighted) = $\frac{\text{total product}}{\text{total area}}$ = ____ = _____; Use CN = 86

## 2. Runoff

| | Storm #1 | Storm #2 | Storm #3 |
|---|---|---|---|
| Frequency ..... yr | | | |
| Rainfall, P (24-hour) ..... in | | | |
| Runoff, Q ..... in (Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.) | | | |

C4/P10

# Worksheet 2: Runoff curve number and runoff

Project _____ By _____ Date _____

Location _____ Checked _____ Date _____

Circle one: Present Developed CASE 4
SUB 10, 10A, 10B & 10C

## 1. Runoff curve number (CN)

| Soil name and hydrologic group (appendix A) | Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio) | CN 1/ Table 2-2 | CN 1/ Fig. 2-3 | CN 1/ Fig. 2-4 | Area ☐ acres ☒ mi² ☐ % | Product of CN x area |
|---|---|---|---|---|---|---|
| D | SUB 10 DESERT - FAIR COVER | 86 | | | .684 | |
| D | SUB 10A DESERT | 86 | | | .167 | |
| D | SUB 10B DESERT | 86 | | | .151 | |
| D | SUB 10C DESERT | 86 | | | .145 | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | Totals = | 1.147 | |

1/ Use only one CN source per line.

CN (weighted) = $\frac{\text{total product}}{\text{total area}}$ = _____ = _____; Use CN = 86

## 2. Runoff

| | Storm #1 | Storm #2 | Storm #3 |
|---|---|---|---|
| Frequency ..... yr | | | |
| Rainfall, P (24-hour) ..... in | | | |
| Runoff, Q ..... in (Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.) | | | |

C4/P11

# Worksheet 2: Runoff curve number and runoff

Project _____ By _____ Date _____

Location _____ Checked _____ Date _____

Circle one: Present Developed CASE 4
SUB 11, 11A, 5B, 5C & 5H

## 1. Runoff curve number (CN)

| Soil name and hydrologic group (appendix A) | Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio) | CN 1/ Table 2-2 | CN 1/ Fig. 2-3 | CN 1/ Fig. 2-4 | Area ☐ acres ☒ mi² ☐ % | Product of CN x area |
|---|---|---|---|---|---|---|
| 58% B<br>33% D<br>9% HILLSIDE | SUB 11<br>DESERT - FAIR COVER | 72<br>86<br>98 | | | .080<br>.046<br>.012 | |
| 58% B<br>33% D<br>9% HILLSIDE | SUB 11A<br>DESERT | 72<br>86<br>98 | | | .044<br>.025<br>.007 | |
| 58% B<br>33% D<br>9% HILLSIDE | SUB 5B<br>DESERT | 72<br>86<br>98 | | | .013<br>.008<br>.002 | |
| 58% B<br>33% D<br>9% HILLSIDE | SUB 5C<br>DESERT | 72<br>86<br>98 | | | .017<br>.010<br>.003 | |
| 58% B<br>33% D<br>9% HILLSIDE | SUB 5H<br>DESERT | 72<br>86<br>98 | | | .028<br>.016<br>.005 | |
| | | | | | | |
| | | | | | | |
| | | | | Totals = | 0.316 | |

1/ Use only one CN source per line.

CN (weighted) = $\frac{\text{total product}}{\text{total area}}$ = ____ = _____; Use CN = 79

## 2. Runoff

| | Storm #1 | Storm #2 | Storm #3 |
|---|---|---|---|
| Frequency ..... yr | | | |
| Rainfall, P (24-hour) ..... in | | | |
| Runoff, Q ..... in (Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.) | | | |

C4/P12

# Worksheet 2: Runoff curve number and runoff

Project _____ By ____ Date _____

Location _____ Checked ____ Date _____

Circle one: Present Developed CASE 4 SUB 12

## 1. Runoff curve number (CN)

| Soil name and hydrologic group (appendix A) | Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio) | CN 1/ Table 2-2 | CN 1/ Fig. 2-3 | CN 1/ Fig. 2-4 | Area ☐ acres ☐ mi² ☐ % | Product of CN x area |
|---|---|---|---|---|---|---|
| D | DESERT - FAIR COVER | 86 | | | .947 | |
| HILLSIDE | | 98 | | | .488 | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | Totals = | 1.435 | |

1/ Use only one CN source per line.

CN (weighted) = $\frac{\text{total product}}{\text{total area}}$ = ____ = _____; Use CN = 90

## 2. Runoff

| | Storm #1 | Storm #2 | Storm #3 |
|---|---|---|---|
| Frequency ..... yr | | | |
| Rainfall, P (24-hour) ..... in | | | |
| Runoff, Q ..... in (Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.) | | | |

C4/P13

# Worksheet 2: Runoff curve number and runoff

Project _____ By _____ Date _____

Location _____ Checked _____ Date _____

Circle one: Present Developed CASE 4 SUB 13

## 1. Runoff curve number (CN)

| Soil name and hydrologic group (appendix A) | Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio) | CN 1/ Table 2-2 | CN 1/ Fig. 2-3 | CN 1/ Fig. 2-4 | Area ☐ acres ☐ mi² ☐ % | Product of CN x area |
|---|---|---|---|---|---|---|
| D | DESERT - FAIR COVER | 86 | | | .041 | |
| B | DESERT | 72 | | | .039 | |
| HILLSIDE | | 98 | | | .350 | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | Totals = | .430 |

1/ Use only one CN source per line.

CN (weighted) = $\frac{\text{total product}}{\text{total area}}$ = _____ = _____; Use CN = 95

## 2. Runoff

| | Storm #1 | Storm #2 | Storm #3 |
|---|---|---|---|
| Frequency ..... yr | | | |
| Rainfall, P (24-hour) ..... in | | | |
| Runoff, Q ..... in (Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.) | | | |

C4/P14

# Worksheet 2: Runoff curve number and runoff

Project _____ By ____ Date _____

Location _____ Checked ____ Date _____

Circle one: Present Developed CASE 4 SUB 14

## 1. Runoff curve number (CN)

| Soil name and hydrologic group (appendix A) | Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio) | CN 1/ Table 2-2 | CN 1/ Fig. 2-3 | CN 1/ Fig. 2-4 | Area ☐ acres ☐ mi² ☐ % | Product of CN x area |
|---|---|---|---|---|---|---|
| D | DESERT - FAIR COVER | 86 | | | .025 | |
| B | DESERT | 72 | | | .116 | |
| HILLSIDE | | 98 | | | .249 | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | Totals = | .390 | |

1/ Use only one CN source per line.

CN (weighted) = $\frac{\text{total product}}{\text{total area}}$ = ____ = _____; Use CN = 90

## 2. Runoff

| | Storm #1 | Storm #2 | Storm #3 |
|---|---|---|---|
| Frequency ..... yr | | | |
| Rainfall, P (24-hour) ..... in | | | |
| Runoff, Q ..... in (Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.) | | | |

C4/P15

# Worksheet 2: Runoff curve number and runoff

Project _____ By ____ Date _____

Location _____ Checked ____ Date _____

Circle one: Present Developed CASE 4 SUB 15

## 1. Runoff curve number (CN)

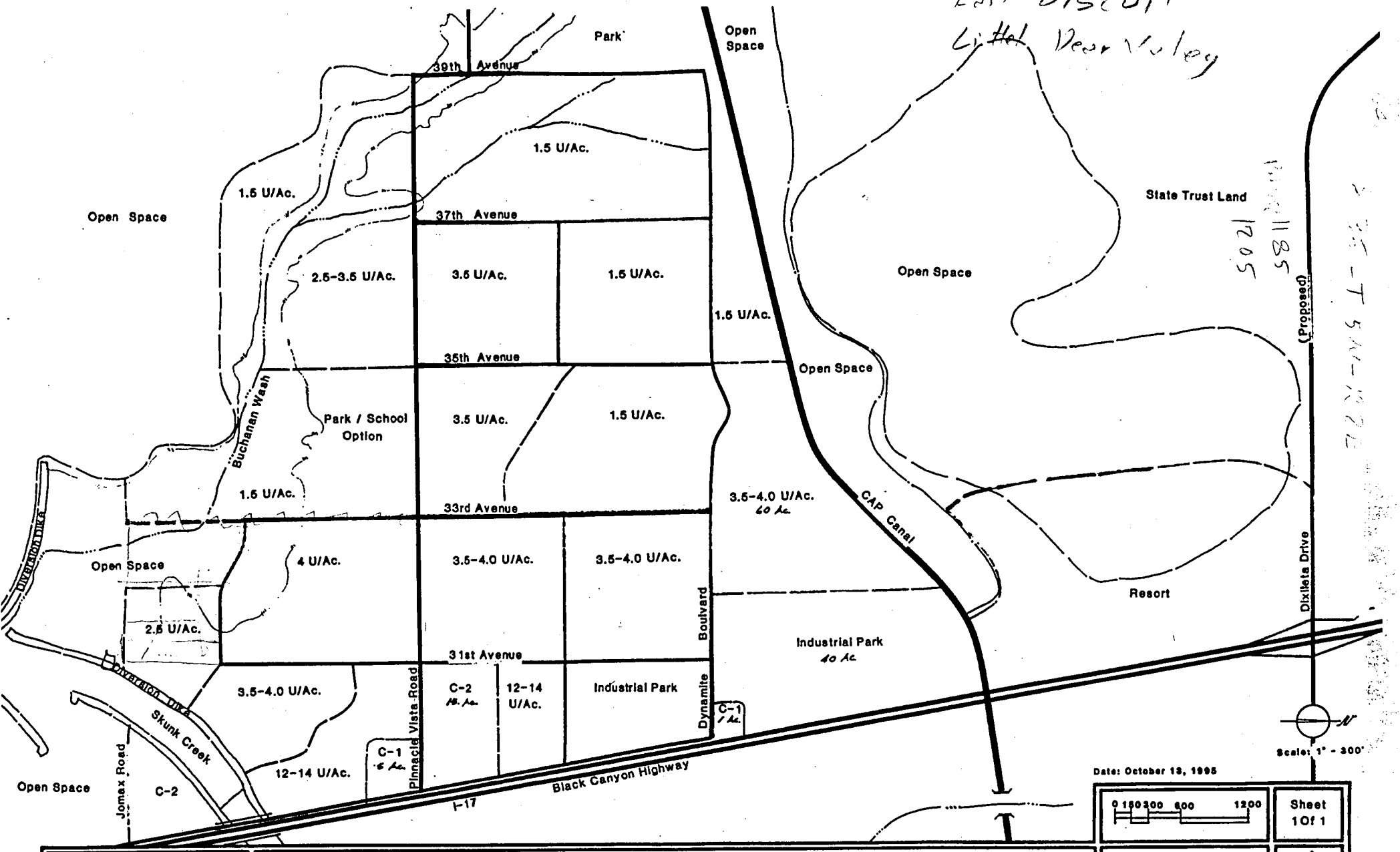
| Soil name and hydrologic group (appendix A) | Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio) | CN 1/ Table 2-2 | CN 1/ Fig. 2-3 | CN 1/ Fig. 2-4 | Area ☐ acres ☒ mi² ☐ % | Product of CN x area |
|---|---|---|---|---|---|---|
| D | DESERT - FAIR COVER | 86 | | | .761 | |
| B | DESERT | 72 | | | .316 | |
| HILLSIDE | | 98 | | | .266 | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | Totals = 1.343 | |

1/ Use only one CN source per line.

CN (weighted) = $\frac{\text{total product}}{\text{total area}}$ = ____ = _____; Use CN = 85

## 2. Runoff

| | Storm #1 | Storm #2 | Storm #3 |
|---|---|---|---|
| Frequency ..... yr | | | |
| Rainfall, P (24-hour) ..... in | | | |
| Runoff, Q ..... in (Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.) | | | |


Park
Open Space
39th Avenue
1.5 U/Ac.
1.5 U/Ac.
Open Space
37th Avenue
2.5-3.5 U/Ac.
3.5 U/Ac.
1.5 U/Ac.
1.5 U/Ac.
35th Avenue
Open Space
Buchanan Wash
Park / School Option
3.5 U/Ac.
1.5 U/Ac.
1.5 U/Ac.
33rd Avenue
3.5-4.0 U/Ac.
60 Ac.
CAP Canal
Open Space
4 U/Ac.
3.5-4.0 U/Ac.
3.5-4.0 U/Ac.
Diversion Dike
2.5 U/Ac.
31st Avenue
Industrial Park
40 Ac.
Resort
Dixileta Drive
(Proposed)
State Trust Land
Open Space
Boulevard
Dynamite
Pinnacle Vista Road
3.5-4.0 U/Ac.
C-2
18 Ac.
12-14 U/Ac.
Industrial Park
C-1
7 Ac.
Diversion Dike
Skunk Creek
C-1
6 Ac.
12-14 U/Ac.
Jomax Road
C-2
Open Space
I-17
Black Canyon Highway
N
Scale: 1" = 300'
Date: October 13, 1995
0 150 300 600 1200
Sheet 1 Of 1
WESTERN LANDSCAPE ARCHITECTS, INC.
2216 W. Anderson Dr.
Phoenix, Az. 85023
602/863-0538
I-17 AND PINNACLE VISTA ROAD MASTER PLAN
PHOENIX, ARIZONA