PLAT NO. 404

303 S. TOPEKA • WICHITA, KANSAS 67202

Professional Engineering Consultants, P.A.

RETURN POSTAGE GUARANTEED

To: DRAINAGE PLAN AND SUPPORTING CALCULATIONS
FOR

NEWMARKET OFFICE TO WICHITA,
SEDGWICK COUNTY, KANSAS

PEC PROJECT NO. 36-06138-0161

NEWMARKET SQUARE
Wichita, Sedgwick County, Kansas
04/10/06

NewMarket Square is a 40.0 acre, commercial office development located in the northwest part of Wichita in Sedgwick County, Kansas. The future 40 acre development will consist of parking lots, buildings, storm sewer and detention ponds. This report contains a drawing of the drainage plan, supporting calculations and data for the NewMarket Square Drainage Plan.

Hydrology

The proposed plat lies in the SE 1/4, Section 31, T26S, R1W. The soil on-site is comprised of Shellabarger sandy loam (Sa), Vanoss silt loam (Va) and Waurika silt loam (Wb), which are classified in hydrologic groups B, B and D, respectively. The land is currently used for agricultural purposes and has short grass and bare ground throughout. The site is bordered to the north and east by residential properties, to the south by 29th Street North, and to the west currently by agriculture land. The area to the west of the proposed NewMarket Development will be a developed 137.5 acre residential development consisting of 233 lots, streets, and detention ponds. A natural drainage channel cuts through this site from the west property line (Fontana Development) to the east property line and then flowing to the south to 29th street were it passes through a 24" culvert. Existing site drains to the channel that runs through the property with an additional 267 cfs being contributed from the Fontana property. The proposed Basin A drains to the same outfall as the pre-developed flow. This post-development flow will flow through the series of ponds, with structures, and eventually to the natural drainage channel on the south side of 29th street. It was assumed in the design of this drainage plan that the culvert underneath 29th street would be improved along with the 29th street in the future and the flowline elevation set at 159.00.

The Rational Method was used to calculate runoff quantities. Runoff coefficients were estimated based on tables presented in the Design Aids section of this report using fully

developed conditions. Time of concentration was based on slope, flow velocity and length of flow through each basin and was not allowed to be less than 20 minutes. It was assumed in the post-development calculations that the proposed office park would be 50% impervious. The HEC-1 computer program was used to route the runoff through the ponds and determine the post-development conditions leaving the site.

The analysis was made based on the available site data which includes the following: 1" = 100' topographic map with 1' contours of the site, a Sedgwick County Soil Survey Map and noted references.

Design Aids

This section includes material used to assist in designing the drainage system. A 1" = 100' scale Drainage Plan map (Attachment A) and a 1" = 100' scale Four-Corner Plan map (Attachment B) are enclosed in the pockets.

References

Design of Urban Highway Drainage – The State of the Art, by Reitz & Jens, Inc., April 1980.

Drainage of Highway Pavements, Hydraulic Engineering Circular #12, by Tye Engineering, Inc., March 1984.

Interim Drainage and Storm Sewer Policy for Design Criteria and Documentation, City of Wichita, Kansas, 1985.

Soil Survey of Sedgwick County, Kansas, US Department of Agriculture, Soil Conservation Service, 1979.

Time of concentration (Tc) or travel time (Tt)

Project : NEWMARKET OFFICE **By:** SB **Date:** 4/10/2006
Location : Wichita, Kansas **Checked:** _____ **Date:** _____

Circle One Present Developed

Circle One Tc Tt through subarea

NOTES: Space for as many as two segments per flow type can be used for each worksheet.
Include map, schematic, or description of flow segments.

Sheet flow (Applicable to Tc only)

		Segment ID		
1. Surface description (Table 3-1)		AB		
2. Mannings roughness coeff., n (Table 3-1)		Grass		
		0.08		
3. Flow length, L (total L < 300 ft.)	ft	300		
4. Two-yr 24-hr rainfall, P2	in	3.60		
5. Calculated Land slope, s	ft/ft	0.022		
5a. Land Elevation For Upper End Of Flow Path		171.5		
5b. Land Elevation For Lower End Of Flow Path		165.0		
6. Compute Tt	hr	0.22	=	0.22

Shallow concentrated flow

		Segment ID		
7. Surface description (Paved or Unpaved)		BC		
		Unpaved		
8. Flow length, L	ft	900		
9. Calculated Watercourse slope, s	ft/ft	0.001		
9a. Land Elevation For Upper End Of Flow Path		165.0		
9b. Land Elevation For Lower End Of Flow Path		163.7		
10. Average velocity, V (Figure 3-1)	ft/s	0.61		
11. Tt = L/3600V Compute Tt	hr	0.41	=	0.41

Channel Flow

		Segment ID		
12. Cross sectional flow area, a		CD		
13. Wetted perimeter, Pw	sf	100.00		
14. Hydraulic radius, r = a/Pw Compute r	ft	60		
15. Channel slope, s	ft	1.667		
16. Manning's roughness coeff., n	ft/ft	0.001		
17 V = 1.49(r^0.667)(s^0.50)/n Compute V		0.011		
18. Flow length, L	ft/s	6.3		
19. Tt = L/3600V Compute Tt	ft	1050		
20. Watershed or subarea Tc or Tt (add Tt in steps 6,11, and 19)	hr	0.046	=	0.05
			hr	0.67

Reference Urban Hydrology for Small Watersheds
Technical Release 55, Soil Conservation Service
U.S. Department of Agriculture, June 1986

Use Time Of Concentration = 40 Minutes

Project: **NEWMARKET OFFICE**
Date: 4/10/2006
Prep. By: SRB

Manual Input

EXISTING

Total Area 50.00 Acres

Soil Group	**A** (% of Total Area)	**B** (% of Total Area)	**C** (% of Total Area)	**D** (% of Total Area)	**Total**
	0%	60%	0%	40%	100%
Acres	0.00	24.00	0.00	16.00	40.00

Land Use	**Commercial** (% of Total Area)	**Industrial** (% of Total Area)	**Multi-Family** (% of Total Area)	**Public** (% of Total Area)	**Single Family** (% of Total Area)	**Vacant/Agriculture** (% of Total Area)
Existing	0%	0%	0%	0%	20%	80%
Acres	0.00	0.00	0.00	0.00	10.00	40.00

	Existing	
Length of Flow	1900	ft
Slope	0.01	%
Waterflow Desc	Bare Ground/Ag.	
Avg Velocity	0.63	ft/sec
Tc	0.84	hours

15 min <= Tc <= 24 hrs

Runoff Coefficients * Used Soil Group C

Return Period (Years)	Commercial	Industrial	Multi-Family	Public	Single Family	Vacant/Agriculture
2	0.68	0.68	0.63	0.49	0.48	0.24
5	0.69	0.69	0.66	0.51	0.51	0.27
10	0.73	0.73	0.71	0.56	0.57	0.35
25	0.75	0.75	0.73	0.59	0.60	0.40
50	0.77	0.77	0.76	0.62	0.64	0.45
100	0.80	0.80	0.79	0.66	0.68	0.51

Existing Conditions

Return Period (Years)	Runoff Coefficient *	Rainfall Intensity (in/hr)	Area (Acres)	Runoff (cfs)
2	0.29	2.24	50.00	32.26
5	0.32	2.76	50.00	43.88
10	0.39	3.22	50.00	63.43
25	0.44	3.76	50.00	82.72
50	0.49	4.25	50.00	103.70
100	0.54	4.66	50.00	126.75

```
*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             FEBRUARY 1981             *
*           REVISED 02 AUG 88           *
*                                       *
*  RUN DATE  04/10/2006  TIME  15:18:09 *
*                                       *
*****************************************
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*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*  THE HYDROLOGIC ENGINEERING CENTER    *
*          609 SECOND STREET            *
*        DAVIS, CALIFORNIA 95616        *
*          (916) 551-1748               *
*                                       *
*****************************************
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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
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

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

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

           1           ID     MODIFIED FONTANA DRAINAGE PLAN (40-AC UNDEVELOPED TRACT D/S ADDED)
           2           ID     40- ACRE NEW MARKET OFFICE TRACT (PRE-PROJECT CONDITIONS)
           3           ID     BY BLB    DATE 03-13-04, MODIFIED BY PDF 4/10/06
*** LIST ***
*** FREE ***
                       *DIAGRAM
           4           IT      15 01JAN04    1200       0 02JAN04    2000
           5           IN      15 01JAN04    1200
           6           IO       0       5
           7           JR    PREC     7.8
                       *
                       *
                       *

           8           KK    BSN5
           9           KO       5
          10           BA   0.023
          11           PB    1.00
          12           PC   0.000   0.003   0.006   0.008   0.011   0.014   0.017   0.019   0.022   0.025
          13           PC   0.029   0.032   0.035   0.038   0.042   0.045   0.048   0.052   0.056   0.060
          14           PC   0.064   0.068   0.072   0.076   0.080   0.085   0.090   0.095   0.100   0.105
          15           PC   0.110   0.115   0.120   0.127   0.134   0.140   0.147   0.155   0.163   0.172
          16           PC   0.181   0.193   0.204   0.220   0.235   0.259   0.283   0.387   0.663   0.699
          17           PC   0.735   0.754   0.772   0.786   0.799   0.810   0.820   0.828   0.835   0.843
          18           PC   0.850   0.858   0.865   0.873   0.880   0.885   0.889   0.894   0.898   0.903
          19           PC   0.907   0.912   0.916   0.921   0.925   0.929   0.934   0.938   0.943   0.947
          20           PC   0.952   0.955   0.958   0.961   0.964   0.967   0.970   0.973   0.976   0.979
          21           PC   0.982   0.985   0.988   0.991   0.994   0.997   1.000
          22           LS       0      68      10
          23           UD   0.600
                       *
                       *

          24           KK   POND7
          25           KO       5
          26           RS       1    ELEV   162.0
          27           SA    2.55    2.71    2.88    3.06
          28           SE   171.0   172.0   173.0   174.0
          29           SQ       0     3.2     6.4     9.6    12.8    16.0    19.2    22.4    25.6    28.8
          30           SQ    32.0
          31           SE   171.0  171.35  171.56  171.73  171.88  172.02  172.16  172.28  172.40  172.52
          32           SE   172.6
                       *
                       *

          33           KK    BSN4
          34           KO       5
          35           BA   0.020
          36           PB    1.00
          37           PC   0.000   0.003   0.006   0.008   0.011   0.014   0.017   0.019   0.022   0.025
          38           PC   0.029   0.032   0.035   0.038   0.042   0.045   0.048   0.052   0.056   0.060
          39           PC   0.064   0.068   0.072   0.076   0.080   0.085   0.090   0.095   0.100   0.105
          40           PC   0.110   0.115   0.120   0.127   0.134   0.140   0.147   0.155   0.163   0.172
          41           PC   0.181   0.193   0.204   0.220   0.235   0.259   0.283   0.387   0.663   0.699
          42           PC   0.735   0.754   0.772   0.786   0.799   0.810   0.820   0.828   0.835   0.843
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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  43      PC  0.850  0.858  0.865  0.873  0.880  0.885  0.889  0.894  0.898  0.903
  44      PC  0.907  0.912  0.916  0.921  0.925  0.929  0.934  0.938  0.943  0.947
  45      PC  0.952  0.955  0.958  0.961  0.964  0.967  0.970  0.973  0.976  0.979
  46      PC  0.982  0.985  0.988  0.991  0.994  0.997  1.000
  47      LS      0     68     10
  48      UD  0.850
          *
          *

  49      KK  PD7&4
  50      KO      5
  51      HC      2      0
          *
          *

  52      KK  POND6
  53      KO      5
  54      RS      1   ELEV  162.0
  55      SA   1.85   1.99   2.14   2.29
  56      SE  170.0  171.0  172.0  173.0
  57      SQ      0    2.2    4.4    6.6    8.8   11.0   13.2   15.4   17.6   19.8
  58      SQ   22.0
  59      SE  170.0 170.72 171.11 171.42 171.77 172.21 172.75 173.40 174.14 174.98
  60      SE  175.9
          *
          *

  61      KK   BSN7
  62      KO      5
  63      BA  0.055
  64      PB   1.00
  65      PC  0.000  0.003  0.006  0.008  0.011  0.014  0.017  0.019  0.022  0.025
  66      PC  0.029  0.032  0.035  0.038  0.042  0.045  0.048  0.052  0.056  0.060
  67      PC  0.064  0.068  0.072  0.076  0.080  0.085  0.090  0.095  0.100  0.105
  68      PC  0.110  0.115  0.120  0.127  0.134  0.140  0.147  0.155  0.163  0.172
  69      PC  0.181  0.193  0.204  0.220  0.235  0.259  0.283  0.387  0.663  0.699
  70      PC  0.735  0.754  0.772  0.786  0.799  0.810  0.820  0.828  0.835  0.843
  71      PC  0.850  0.858  0.865  0.873  0.880  0.885  0.889  0.894  0.898  0.903
  72      PC  0.907  0.912  0.916  0.921  0.925  0.929  0.934  0.938  0.943  0.947
  73      PC  0.952  0.955  0.958  0.961  0.964  0.967  0.970  0.973  0.976  0.979
  74      PC  0.982  0.985  0.988  0.991  0.994  0.997  1.000
  75      LS      0     68     10
  76      UD  0.840
          *
          *

  77      KK   7PD6
  78      KO      5
  79      HC      2      0
          *
          *
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LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  80          KK   POND5
  81          KO      5
  82          RS      1    ELEV   159.0
  83          SA   2.67    2.84    3.01    3.19
  84          SE  167.0   168.0   169.0   170.0
  85          SQ      0     6.3    12.6    18.9    25.2    31.5    37.8    44.1    50.4    56.7
  86          SQ   63.0
  87          SE  167.0  167.55  167.87  168.14  168.39  168.61  168.82  169.01  169.20  169.38
  88          SE  169.6
              *
              *

  89          KK    BSN6
  90          KO      5
  91          BA  0.008
  92          PB   1.00
  93          PC  0.000   0.003   0.006   0.008   0.011   0.014   0.017   0.019   0.022   0.025
  94          PC  0.029   0.032   0.035   0.038   0.042   0.045   0.048   0.052   0.056   0.060
  95          PC  0.064   0.068   0.072   0.076   0.080   0.085   0.090   0.095   0.100   0.105
  96          PC  0.110   0.115   0.120   0.127   0.134   0.140   0.147   0.155   0.163   0.172
  97          PC  0.181   0.193   0.204   0.220   0.235   0.259   0.283   0.387   0.663   0.699
  98          PC  0.735   0.754   0.772   0.786   0.799   0.810   0.820   0.828   0.835   0.843
  99          PC  0.850   0.858   0.865   0.873   0.880   0.885   0.889   0.894   0.898   0.903
 100          PC  0.907   0.912   0.916   0.921   0.925   0.929   0.934   0.938   0.943   0.947
 101          PC  0.952   0.955   0.958   0.961   0.964   0.967   0.970   0.973   0.976   0.979
 102          PC  0.982   0.985   0.988   0.991   0.994   0.997   1.000
 103          LS      0      68      10
 104          UD  0.530
              *
              *

 105          KK    RTE6
 106          KO      5       5
 107          RT      0       0       3
              *
              *

 108          KK   OFFST
 109          BA  0.359
 110          PB   1.00
 111          PC  0.000   0.003   0.006   0.008   0.011   0.014   0.017   0.019   0.022   0.025
 112          PC  0.029   0.032   0.035   0.038   0.042   0.045   0.048   0.052   0.056   0.060
 113          PC  0.064   0.068   0.072   0.076   0.080   0.085   0.090   0.095   0.100   0.105
 114          PC  0.110   0.115   0.120   0.127   0.134   0.140   0.147   0.155   0.163   0.172
 115          PC  0.181   0.193   0.204   0.220   0.235   0.259   0.283   0.387   0.663   0.699
 116          PC  0.735   0.754   0.772   0.786   0.799   0.810   0.820   0.828   0.835   0.843
 117          PC  0.850   0.858   0.865   0.873   0.880   0.885   0.889   0.894   0.898   0.903
 118          PC  0.907   0.912   0.916   0.921   0.925   0.929   0.934   0.938   0.943   0.947
 119          PC  0.952   0.955   0.958   0.961   0.964   0.967   0.970   0.973   0.976   0.979
 120          PC  0.982   0.985   0.988   0.991   0.994   0.997   1.000
 121          LS      0      70      10
 122          UD  1.575
              *
              *
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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  123     KK   BSN8
  124     KO      5
  125     BA  0.027
  126     PB   1.00
  127     PC  0.000  0.003  0.006  0.008  0.011  0.014  0.017  0.019  0.022  0.025
  128     PC  0.029  0.032  0.035  0.038  0.042  0.045  0.048  0.052  0.056  0.060
  129     PC  0.064  0.068  0.072  0.076  0.080  0.085  0.090  0.095  0.100  0.105
  130     PC  0.110  0.115  0.120  0.127  0.134  0.140  0.147  0.155  0.163  0.172
  131     PC  0.181  0.193  0.204  0.220  0.235  0.259  0.283  0.387  0.663  0.699
  132     PC  0.735  0.754  0.772  0.786  0.799  0.810  0.820  0.828  0.835  0.843
  133     PC  0.850  0.858  0.865  0.873  0.880  0.885  0.889  0.894  0.898  0.903
  134     PC  0.907  0.912  0.916  0.921  0.925  0.929  0.934  0.938  0.943  0.947
  135     PC  0.952  0.955  0.958  0.961  0.964  0.967  0.970  0.973  0.976  0.979
  136     PC  0.982  0.985  0.988  0.991  0.994  0.997  1.000
  137     LS      0     68     10
  138     UD  0.490
          *
          *

  139     KK   6O8P5
  140     KO      5
  141     HC      4      0
          *
          *

  142     KK   POND4
  143     KO      5
  144     RS      1   ELEV  158.0
  145     SA   3.06   3.24   3.42   3.61
  146     SE  166.0  167.0  168.0  169.0
  147     SL  158.0  14.73    0.6    0.5
  148     SS  167.0   0.00    3.0    1.5
          *
          *

  149     KK   BSN10
  150     KO      5
  151     BA  0.021
  152     PB   1.00
  153     PC  0.000  0.003  0.006  0.008  0.011  0.014  0.017  0.019  0.022  0.025
  154     PC  0.029  0.032  0.035  0.038  0.042  0.045  0.048  0.052  0.056  0.060
  155     PC  0.064  0.068  0.072  0.076  0.080  0.085  0.090  0.095  0.100  0.105
  156     PC  0.110  0.115  0.120  0.127  0.134  0.140  0.147  0.155  0.163  0.172
  157     PC  0.181  0.193  0.204  0.220  0.235  0.259  0.283  0.387  0.663  0.699
  158     PC  0.735  0.754  0.772  0.786  0.799  0.810  0.820  0.828  0.835  0.843
  159     PC  0.850  0.858  0.865  0.873  0.880  0.885  0.889  0.894  0.898  0.903
  160     PC  0.907  0.912  0.916  0.921  0.925  0.929  0.934  0.938  0.943  0.947
  161     PC  0.952  0.955  0.958  0.961  0.964  0.967  0.970  0.973  0.976  0.979
  162     PC  0.982  0.985  0.988  0.991  0.994  0.997  1.000
  163     LS      0     68     10
  164     UD  0.670
          *
          *
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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  165     KK  10PD4
  166     KO      5
  167     HC      2       0
          *
          *

  168     KK  POND3
  169     KO      5
  170     RS      1    ELEV   162.0
  171     SA   1.70    1.83    1.98    2.12
  172     SE  166.0   167.0   168.0   169.0
  173     SL  158.5   14.73     0.6     0.5
  174     SS  168.0    0.00     3.0     1.5
          *
          *

  175     KK   BSN3
  176     KO      5
  177     BA  0.024
  178     PB   1.00
  179     PC  0.000   0.003   0.006   0.008   0.011   0.014   0.017   0.019   0.022   0.025
  180     PC  0.029   0.032   0.035   0.038   0.042   0.045   0.048   0.052   0.056   0.060
  181     PC  0.064   0.068   0.072   0.076   0.080   0.085   0.090   0.095   0.100   0.105
  182     PC  0.110   0.115   0.120   0.127   0.134   0.140   0.147   0.155   0.163   0.172
  183     PC  0.181   0.193   0.204   0.220   0.235   0.259   0.283   0.387   0.663   0.699
  184     PC  0.735   0.754   0.772   0.786   0.799   0.810   0.820   0.828   0.835   0.843
  185     PC  0.850   0.858   0.865   0.873   0.880   0.885   0.889   0.894   0.898   0.903
  186     PC  0.907   0.912   0.916   0.921   0.925   0.929   0.934   0.938   0.943   0.947
  187     PC  0.952   0.955   0.958   0.961   0.964   0.967   0.970   0.973   0.976   0.979
  188     PC  0.982   0.985   0.988   0.991   0.994   0.997   1.000
  189     LS      0      68      10
  190     UD  0.580
          *
          *

  191     KK   BSN2
  192     KO      5
  193     BA  0.025
  194     PB   1.00
  195     PC  0.000   0.003   0.006   0.008   0.011   0.014   0.017   0.019   0.022   0.025
  196     PC  0.029   0.032   0.035   0.038   0.042   0.045   0.048   0.052   0.056   0.060
  197     PC  0.064   0.068   0.072   0.076   0.080   0.085   0.090   0.095   0.100   0.105
  198     PC  0.110   0.115   0.120   0.127   0.134   0.140   0.147   0.155   0.163   0.172
  199     PC  0.181   0.193   0.204   0.220   0.235   0.259   0.283   0.387   0.663   0.699
  200     PC  0.735   0.754   0.772   0.786   0.799   0.810   0.820   0.828   0.835   0.843
  201     PC  0.850   0.858   0.865   0.873   0.880   0.885   0.889   0.894   0.898   0.903
  202     PC  0.907   0.912   0.916   0.921   0.925   0.929   0.934   0.938   0.943   0.947
  203     PC  0.952   0.955   0.958   0.961   0.964   0.967   0.970   0.973   0.976   0.979
  204     PC  0.982   0.985   0.988   0.991   0.994   0.997   1.000
  205     LS      0      68      10
  206     UD  0.670
          *
          *
```

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

  207         KK   POND1
  208         KO      5
  209         RS      1    ELEV   162.0
  210         SA   0.36    0.43    0.49    0.57
  211         SE  170.0   171.0   172.0   173.0
  212         SQ      0     3.2     6.4     9.6    12.8    16.0    19.2    22.4    25.6    28.8
  213         SQ   32.0
  214         SE  170.0  170.17  170.27  170.35  170.42  170.49  170.56  170.62  170.67  170.73
  215         SE  170.8
              *
              *

  216         KK  3PD1&3
  217         KO      5
  218         HC      3       0
              *
              *

  219         KK   POND2
  220         KO      5
  221         RS      1    ELEV   158.0
  222         SA   2.08    2.23    2.38    2.54
  223         SE  166.0   167.0   168.0   169.0
  224         SQ      0    26.9    53.8    80.7   107.6   134.5   161.4   188.3   215.2   242.1
  225         SQ  269.0
  226         SE  166.0  166.50  166.79  167.03  167.25  167.45  167.63  167.81  167.98  168.14
  227         SE  168.3
              *
              *
              *

  228         KK   NORTH
  229         KO      5
  230         BA 0.0156
  231         PB   1.00
  232         PC  0.000   0.003   0.006   0.008   0.011   0.014   0.017   0.019   0.022   0.025
  233         PC  0.029   0.032   0.035   0.038   0.042   0.045   0.048   0.052   0.056   0.060
  234         PC  0.064   0.068   0.072   0.076   0.080   0.085   0.090   0.095   0.100   0.105
  235         PC  0.110   0.115   0.120   0.127   0.134   0.140   0.147   0.155   0.163   0.172
  236         PC  0.181   0.193   0.204   0.220   0.235   0.259   0.283   0.387   0.663   0.699
  237         PC  0.735   0.754   0.772   0.786   0.799   0.810   0.820   0.828   0.835   0.843
  238         PC  0.850   0.858   0.865   0.873   0.880   0.885   0.889   0.894   0.898   0.903
  239         PC  0.907   0.912   0.916   0.921   0.925   0.929   0.934   0.938   0.943   0.947
  240         PC  0.952   0.955   0.958   0.961   0.964   0.967   0.970   0.973   0.976   0.979
  241         PC  0.982   0.985   0.988   0.991   0.994   0.997   1.000
  242         LS      0      70       0
  243         UD   0.40
              *
              *
              *
```

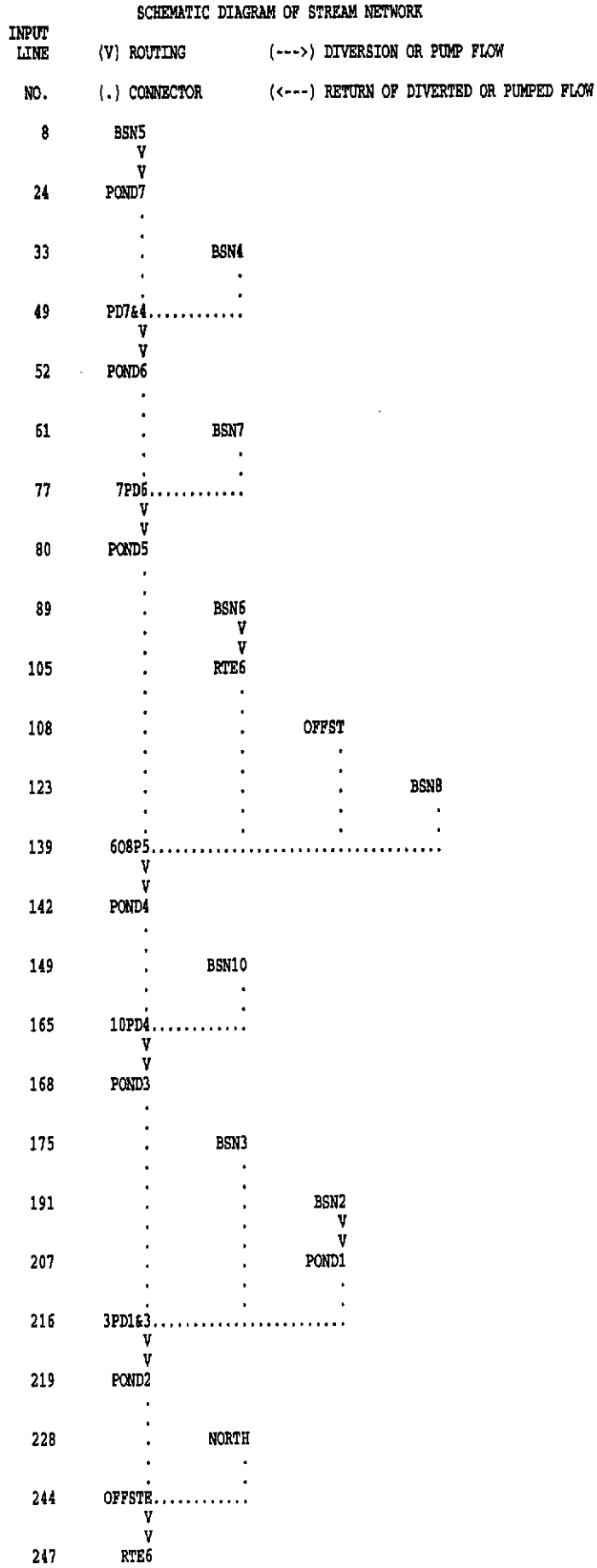
```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  244     KK  OFFSTE
  245     KO       5
  246     HC       2       0
          *
          *
          *
          *    ROUTE 267 CFS FROM FONTANA + 10 ACRER FROM THE NORTH TO 29TH STREET
          *

  247     KK    RTE6
  248     KO       5
  249     RT       0       0     2.0
          *
          *
          *

  250     KK  NM-UND
  251     KO       5
  252     BA  0.0625
  253     PB    1.00
  254     PC   0.000   0.003   0.006   0.008   0.011   0.014   0.017   0.019   0.022   0.025
  255     PC   0.029   0.032   0.035   0.038   0.042   0.045   0.048   0.052   0.056   0.060
  256     PC   0.064   0.068   0.072   0.076   0.080   0.085   0.090   0.095   0.100   0.105
  257     PC   0.110   0.115   0.120   0.127   0.134   0.140   0.147   0.155   0.163   0.172
  258     PC   0.181   0.193   0.204   0.220   0.235   0.259   0.283   0.387   0.663   0.699
  259     PC   0.735   0.754   0.772   0.786   0.799   0.810   0.820   0.828   0.835   0.843
  260     PC   0.850   0.858   0.865   0.873   0.880   0.885   0.889   0.894   0.898   0.903
  261     PC   0.907   0.912   0.916   0.921   0.925   0.929   0.934   0.938   0.943   0.947
  262     PC   0.952   0.955   0.958   0.961   0.964   0.967   0.970   0.973   0.976   0.979
  263     PC   0.982   0.985   0.988   0.991   0.994   0.997   1.000
  264     LS       0      70       0
  265     UD    0.40
          *
          *
          *

  266     KK    29TH
  267     KO       5
  268     HC       2       0
          *
          *
          *
          *
  269     ZZ
```


SCHEMATIC DIAGRAM OF STREAM NETWORK
INPUT LINE NO.
(V) ROUTING
(.) CONNECTOR
(---->) DIVERSION OR PUMP FLOW
(<----) RETURN OF DIVERTED OR PUMPED FLOW
8 BSN5
24 POND7
33 BSN4
49 PD7&4
52 POND6
61 BSN7
77 7PD6
80 POND5
89 BSN6
105 RTE6
108 OFFST
123 BSN8
139 608P5
142 POND4
149 BSN10
165 10PD4
168 POND3
175 BSN3
191 BSN2
207 POND1
216 3PD1&3
219 POND2
228 NORTH
244 OFFSTE
247 RTE6

```
                .
                :
  250           .      NM-UND
                .           .
                .           .
  266        29TH.............
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
**********************************************
*                                            *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)        *
*             FEBRUARY 1981                  *
*           REVISED 02 AUG 88                *
*                                            *
*  RUN DATE  04/10/2006  TIME  15:18:09      *
*                                            *
**********************************************

**********************************************
*                                            *
*    U.S. ARMY CORPS OF ENGINEERS            *
*  THE HYDROLOGIC ENGINEERING CENTER         *
*          609 SECOND STREET                 *
*        DAVIS, CALIFORNIA 95616             *
*          (916) 551-1748                    *
*                                            *
**********************************************

                      MODIFIED FONTANA DRAINAGE PLAN (40-AC UNDEVELOPED TRACT D/S ADDED)
                      40- ACRE NEW MARKET OFFICE TRACT (PRE-PROJECT CONDITIONS)
                      BY BLB    DATE 03-13-04, MODIFIED BY PDF 4/10/06

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

    IT         HYDROGRAPH TIME DATA
                     NMIN         15  MINUTES IN COMPUTATION INTERVAL
                    IDATE      1JAN 4  STARTING DATE
                    ITIME        1200  STARTING TIME
                       NQ         129  NUMBER OF HYDROGRAPH ORDINATES
                   NDDATE      2JAN 4  ENDING DATE
                   NDTIME        2000  ENDING TIME
                    ICENT          19  CENTURY MARK

                 COMPUTATION INTERVAL     .25 HOURS
                     TOTAL TIME BASE   32.00 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

    JP         MULTI-PLAN OPTION
                    NPLAN          1  NUMBER OF PLANS

    JR         MULTI-RATIO OPTION
                  RATIOS OF PRECIPITATION
                 7.80


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          **************
          *            *
  8 KK    *      BSN5  *
          *            *
          **************

  9 KO         OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          **************
          *            *
 24 KK    *     POND7  *
          *            *
          **************

 25 KO         OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
```

```
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


           ***************
           *             *
 33 KK     *      BSN4   *
           *             *
           ***************

 34 KO           OUTPUT CONTROL VARIABLES
                      IPRNT          5  PRINT CONTROL
                      IPLOT          5  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


           ***************
           *             *
 49 KK     *     PD7&4   *
           *             *
           ***************

 50 KO           OUTPUT CONTROL VARIABLES
                      IPRNT          5  PRINT CONTROL
                      IPLOT          5  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


           ***************
           *             *
 52 KK     *     POND6   *
           *             *
           ***************

 53 KO           OUTPUT CONTROL VARIABLES
                      IPRNT          5  PRINT CONTROL
                      IPLOT          5  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


           ***************
           *             *
 61 KK     *      BSN7   *
           *             *
           ***************

 62 KO           OUTPUT CONTROL VARIABLES
                      IPRNT          5  PRINT CONTROL
                      IPLOT          5  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


           ***************
           *             *
 77 KK     *      7PD6   *
           *             *
           ***************

 78 KO           OUTPUT CONTROL VARIABLES
                      IPRNT          5  PRINT CONTROL
```

```
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          **************
          *            *
 80 KK    *     POND5  *
          *            *
          **************

 81 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          5  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          **************
          *            *
 89 KK    *      BSN6  *
          *            *
          **************

 90 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          5  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          **************
          *            *
105 KK    *      RTE6  *
          *            *
          **************

106 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          5  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          **************
          *            *
108 KK    *     OFFST  *
          *            *
          **************

  5 IN          TIME DATA FOR INPUT TIME SERIES
                     JXMIN         15  TIME INTERVAL IN MINUTES
                     JXDATE      1JAN 4  STARTING DATE
                     JXTIME        1200  STARTING TIME

             SUBBASIN RUNOFF DATA

109 BA           SUBBASIN CHARACTERISTICS
                     TAREA          .36  SUBBASIN AREA

                 PRECIPITATION DATA

110 PB               STORM         1.00  BASIN TOTAL PRECIPITATION

111 PI             INCREMENTAL PRECIPITATION PATTERN
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .01       .01       .00       .01       .00       .01
```

.01	.00	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.02	.02	.02	.02	.10	.28	.04	.04
.02	.02	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00				

121 LS SCS LOSS RATE

STRTL	.86	INITIAL ABSTRACTION
CRVNBR	70.00	CURVE NUMBER
RTIMP	10.00	PERCENT IMPERVIOUS AREA

122 UD SCS DIMENSIONLESS UNITGRAPH

TLAG	1.58	LAG

***

UNIT HYDROGRAPH
34 END-OF-PERIOD ORDINATES

6.	19.	38.	65.	88.	100.	102.	96.	86.	72.
55.	42.	33.	26.	21.	16.	13.	10.	8.	6.
5.	4.	3.	2.	2.	1.	1.	1.	1.	1.
0.	0.	0.	0.						

****

HYDROGRAPH AT STATION OFFST

****

DA MON HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	DA MON HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1 JAN 1200	1	.00	.00	.00	0.	2 JAN 0415	66	.00	.00	.00	1.
1 JAN 1215	2	.00	.00	.00	0.	2 JAN 0430	67	.00	.00	.00	1.
1 JAN 1230	3	.00	.00	.00	0.	2 JAN 0445	68	.00	.00	.00	1.
1 JAN 1245	4	.00	.00	.00	0.	2 JAN 0500	69	.00	.00	.00	1.
1 JAN 1300	5	.00	.00	.00	0.	2 JAN 0515	70	.00	.00	.00	1.
1 JAN 1315	6	.00	.00	.00	0.	2 JAN 0530	71	.00	.00	.00	1.
1 JAN 1330	7	.00	.00	.00	0.	2 JAN 0545	72	.00	.00	.00	1.
1 JAN 1345	8	.00	.00	.00	0.	2 JAN 0600	73	.00	.00	.00	1.
1 JAN 1400	9	.00	.00	.00	0.	2 JAN 0615	74	.00	.00	.00	1.
1 JAN 1415	10	.00	.00	.00	0.	2 JAN 0630	75	.00	.00	.00	1.
1 JAN 1430	11	.00	.00	.00	0.	2 JAN 0645	76	.00	.00	.00	1.
1 JAN 1445	12	.00	.00	.00	0.	2 JAN 0700	77	.00	.00	.00	1.
1 JAN 1500	13	.00	.00	.00	0.	2 JAN 0715	78	.00	.00	.00	1.
1 JAN 1515	14	.00	.00	.00	0.	2 JAN 0730	79	.00	.00	.00	1.
1 JAN 1530	15	.00	.00	.00	0.	2 JAN 0745	80	.00	.00	.00	1.
1 JAN 1545	16	.00	.00	.00	0.	2 JAN 0800	81	.00	.00	.00	1.
1 JAN 1600	17	.00	.00	.00	0.	2 JAN 0815	82	.00	.00	.00	1.
1 JAN 1615	18	.00	.00	.00	0.	2 JAN 0830	83	.00	.00	.00	1.
1 JAN 1630	19	.00	.00	.00	0.	2 JAN 0845	84	.00	.00	.00	1.
1 JAN 1645	20	.00	.00	.00	0.	2 JAN 0900	85	.00	.00	.00	1.
1 JAN 1700	21	.00	.00	.00	0.	2 JAN 0915	86	.00	.00	.00	1.
1 JAN 1715	22	.00	.00	.00	0.	2 JAN 0930	87	.00	.00	.00	0.
1 JAN 1730	23	.00	.00	.00	0.	2 JAN 0945	88	.00	.00	.00	0.
1 JAN 1745	24	.00	.00	.00	0.	2 JAN 1000	89	.00	.00	.00	0.
1 JAN 1800	25	.00	.00	.00	0.	2 JAN 1015	90	.00	.00	.00	0.
1 JAN 1815	26	.01	.00	.00	0.	2 JAN 1030	91	.00	.00	.00	0.
1 JAN 1830	27	.01	.00	.00	0.	2 JAN 1045	92	.00	.00	.00	0.
1 JAN 1845	28	.00	.00	.00	0.	2 JAN 1100	93	.00	.00	.00	0.
1 JAN 1900	29	.01	.00	.00	0.	2 JAN 1115	94	.00	.00	.00	0.
1 JAN 1915	30	.00	.00	.00	0.	2 JAN 1130	95	.00	.00	.00	0.
1 JAN 1930	31	.01	.00	.00	0.	2 JAN 1145	96	.00	.00	.00	0.
1 JAN 1945	32	.01	.00	.00	0.	2 JAN 1200	97	.00	.00	.00	0.
1 JAN 2000	33	.00	.00	.00	0.	2 JAN 1215	98	.00	.00	.00	0.
1 JAN 2015	34	.01	.01	.00	0.	2 JAN 1230	99	.00	.00	.00	0.
1 JAN 2030	35	.01	.01	.00	0.	2 JAN 1245	100	.00	.00	.00	0.
1 JAN 2045	36	.01	.01	.00	0.	2 JAN 1300	101	.00	.00	.00	0.
1 JAN 2100	37	.01	.01	.00	0.	2 JAN 1315	102	.00	.00	.00	0.
1 JAN 2115	38	.01	.01	.00	0.	2 JAN 1330	103	.00	.00	.00	0.
1 JAN 2130	39	.01	.01	.00	1.	2 JAN 1345	104	.00	.00	.00	0.
1 JAN 2145	40	.01	.01	.00	1.	2 JAN 1400	105	.00	.00	.00	0.
1 JAN 2200	41	.01	.01	.00	1.	2 JAN 1415	106	.00	.00	.00	0.
1 JAN 2215	42	.01	.01	.00	1.	2 JAN 1430	107	.00	.00	.00	0.
1 JAN 2230	43	.01	.01	.00	1.	2 JAN 1445	108	.00	.00	.00	0.
1 JAN 2245	44	.02	.01	.00	1.	2 JAN 1500	109	.00	.00	.00	0.
1 JAN 2300	45	.02	.01	.00	1.	2 JAN 1515	110	.00	.00	.00	0.
1 JAN 2315	46	.02	.02	.00	1.	2 JAN 1530	111	.00	.00	.00	0.
1 JAN 2330	47	.02	.02	.00	1.	2 JAN 1545	112	.00	.00	.00	0.

1 JAN 2345	48	.10	.09	.01	1.	*	2 JAN 1600	113	.00	.00	.00	0.
2 JAN 0000	49	.28	.25	.03	1.	*	2 JAN 1615	114	.00	.00	.00	0.
2 JAN 0015	50	.04	.03	.00	2.	*	2 JAN 1630	115	.00	.00	.00	0.
2 JAN 0030	51	.04	.03	.00	3.	*	2 JAN 1645	116	.00	.00	.00	0.
2 JAN 0045	52	.02	.02	.00	4.	*	2 JAN 1700	117	.00	.00	.00	0.
2 JAN 0100	53	.02	.02	.00	5.	*	2 JAN 1715	118	.00	.00	.00	0.
2 JAN 0115	54	.01	.01	.00	5.	*	2 JAN 1730	119	.00	.00	.00	0.
2 JAN 0130	55	.01	.01	.00	5.	*	2 JAN 1745	120	.00	.00	.00	0.
2 JAN 0145	56	.01	.01	.00	5.	*	2 JAN 1800	121	.00	.00	.00	0.
2 JAN 0200	57	.01	.01	.00	5.	*	2 JAN 1815	122	.00	.00	.00	0.
2 JAN 0215	58	.01	.01	.00	4.	*	2 JAN 1830	123	.00	.00	.00	0.
2 JAN 0230	59	.01	.01	.00	4.	*	2 JAN 1845	124	.00	.00	.00	0.
2 JAN 0245	60	.01	.01	.00	3.	*	2 JAN 1900	125	.00	.00	.00	0.
2 JAN 0300	61	.01	.01	.00	3.	*	2 JAN 1915	126	.00	.00	.00	0.
2 JAN 0315	62	.01	.01	.00	2.	*	2 JAN 1930	127	.00	.00	.00	0.
2 JAN 0330	63	.01	.01	.00	2.	*	2 JAN 1945	128	.00	.00	.00	0.
2 JAN 0345	64	.01	.01	.00	2.	*	2 JAN 2000	129	.00	.00	.00	0.
2 JAN 0400	65	.01	.01	.00	1.	*						

TOTAL RAINFALL = 1.00, TOTAL LOSS = .90, TOTAL EXCESS = .10

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	32.00-HR
+ (CFS)	(HR)				
	(CFS)				
+ 5.	13.50	3.	1.	1.	1.
	(INCHES)	.069	.103	.104	.104
	(AC-FT)	1.	2.	2.	2.

CUMULATIVE AREA = .36 SQ MI

HYDROGRAPH AT STATION OFFST
PLAN 1, RATIO = 7.80

DA MON HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q		DA MON HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1 JAN 1200	1	.00	.00	.00	0.	*	2 JAN 0415	66	.04	.01	.03	77.
1 JAN 1215	2	.02	.02	.00	0.	*	2 JAN 0430	67	.03	.00	.03	70.
1 JAN 1230	3	.02	.02	.00	0.	*	2 JAN 0445	68	.04	.01	.03	64.
1 JAN 1245	4	.02	.01	.00	0.	*	2 JAN 0500	69	.03	.00	.03	58.
1 JAN 1300	5	.02	.02	.00	0.	*	2 JAN 0515	70	.04	.01	.03	53.
1 JAN 1315	6	.02	.02	.00	0.	*	2 JAN 0530	71	.03	.00	.03	49.
1 JAN 1330	7	.02	.02	.00	1.	*	2 JAN 0545	72	.04	.01	.03	45.
1 JAN 1345	8	.02	.01	.00	1.	*	2 JAN 0600	73	.03	.00	.03	41.
1 JAN 1400	9	.02	.02	.00	1.	*	2 JAN 0615	74	.04	.01	.03	39.
1 JAN 1415	10	.02	.02	.00	1.	*	2 JAN 0630	75	.03	.00	.03	36.
1 JAN 1430	11	.03	.03	.00	1.	*	2 JAN 0645	76	.03	.00	.03	34.
1 JAN 1445	12	.02	.02	.00	2.	*	2 JAN 0700	77	.04	.01	.03	33.
1 JAN 1500	13	.02	.02	.00	2.	*	2 JAN 0715	78	.03	.00	.03	32.
1 JAN 1515	14	.02	.02	.00	2.	*	2 JAN 0730	79	.04	.01	.03	31.
1 JAN 1530	15	.03	.03	.00	2.	*	2 JAN 0745	80	.03	.00	.03	30.
1 JAN 1545	16	.02	.02	.00	2.	*	2 JAN 0800	81	.04	.01	.03	29.
1 JAN 1600	17	.02	.02	.00	2.	*	2 JAN 0815	82	.02	.00	.02	29.
1 JAN 1615	18	.03	.03	.00	2.	*	2 JAN 0830	83	.02	.00	.02	28.
1 JAN 1630	19	.03	.03	.00	2.	*	2 JAN 0845	84	.02	.00	.02	28.
1 JAN 1645	20	.03	.03	.00	2.	*	2 JAN 0900	85	.02	.00	.02	27.
1 JAN 1700	21	.03	.03	.00	2.	*	2 JAN 0915	86	.02	.00	.02	26.
1 JAN 1715	22	.03	.03	.00	2.	*	2 JAN 0930	87	.02	.00	.02	25.
1 JAN 1730	23	.03	.03	.00	2.	*	2 JAN 0945	88	.02	.00	.02	24.
1 JAN 1745	24	.03	.03	.00	3.	*	2 JAN 1000	89	.02	.00	.02	23.
1 JAN 1800	25	.03	.03	.00	3.	*	2 JAN 1015	90	.02	.00	.02	22.
1 JAN 1815	26	.04	.04	.00	3.	*	2 JAN 1030	91	.02	.00	.02	21.
1 JAN 1830	27	.04	.04	.00	3.	*	2 JAN 1045	92	.02	.00	.02	21.
1 JAN 1845	28	.04	.04	.00	3.	*	2 JAN 1100	93	.02	.00	.02	20.
1 JAN 1900	29	.04	.04	.00	3.	*	2 JAN 1115	94	.02	.00	.02	20.
1 JAN 1915	30	.04	.04	.00	3.	*	2 JAN 1130	95	.02	.00	.02	20.
1 JAN 1930	31	.04	.04	.00	3.	*	2 JAN 1145	96	.02	.00	.02	20.
1 JAN 1945	32	.04	.03	.00	3.	*	2 JAN 1200	97	.02	.00	.02	19.
1 JAN 2000	33	.04	.03	.00	3.	*	2 JAN 1215	98	.00	.00	.00	19.
1 JAN 2015	34	.05	.05	.01	3.	*	2 JAN 1230	99	.00	.00	.00	19.
1 JAN 2030	35	.05	.05	.01	4.	*	2 JAN 1245	100	.00	.00	.00	18.
1 JAN 2045	36	.05	.04	.01	4.	*	2 JAN 1300	101	.00	.00	.00	16.
1 JAN 2100	37	.05	.04	.01	4.	*	2 JAN 1315	102	.00	.00	.00	15.

1	JAN	2115	38	.06	.05	.01	5.	*	2	JAN	1330	103	.00	.00	.00	13.
1	JAN	2130	39	.06	.05	.02	5.	*	2	JAN	1345	104	.00	.00	.00	10.
1	JAN	2145	40	.07	.05	.02	6.	*	2	JAN	1400	105	.00	.00	.00	8.
1	JAN	2200	41	.07	.05	.02	7.	*	2	JAN	1415	106	.00	.00	.00	7.
1	JAN	2215	42	.09	.06	.03	8.	*	2	JAN	1430	107	.00	.00	.00	5.
1	JAN	2230	43	.09	.06	.03	10.	*	2	JAN	1445	108	.00	.00	.00	4.
1	JAN	2245	44	.12	.08	.04	11.	*	2	JAN	1500	109	.00	.00	.00	3.
1	JAN	2300	45	.12	.07	.05	14.	*	2	JAN	1515	110	.00	.00	.00	3.
1	JAN	2315	46	.19	.11	.08	16.	*	2	JAN	1530	111	.00	.00	.00	2.
1	JAN	2330	47	.19	.10	.09	20.	*	2	JAN	1545	112	.00	.00	.00	2.
1	JAN	2345	48	.81	.37	.44	27.	*	2	JAN	1600	113	.00	.00	.00	1.
2	JAN	0000	49	2.15	.64	1.51	46.	*	2	JAN	1615	114	.00	.00	.00	1.
2	JAN	0015	50	.28	.06	.22	78.	*	2	JAN	1630	115	.00	.00	.00	1.
2	JAN	0030	51	.28	.06	.22	125.	*	2	JAN	1645	116	.00	.00	.00	1.
2	JAN	0045	52	.15	.03	.12	182.	*	2	JAN	1700	117	.00	.00	.00	0.
2	JAN	0100	53	.14	.03	.11	231.	*	2	JAN	1715	118	.00	.00	.00	0.
2	JAN	0115	54	.11	.02	.09	262.	*	2	JAN	1730	119	.00	.00	.00	0.
2	JAN	0130	55	.10	.02	.08	273.	*	2	JAN	1745	120	.00	.00	.00	0.
2	JAN	0145	56	.09	.02	.07	268.	*	2	JAN	1800	121	.00	.00	.00	0.
2	JAN	0200	57	.08	.01	.06	251.	*	2	JAN	1815	122	.00	.00	.00	0.
2	JAN	0215	58	.06	.01	.05	225.	*	2	JAN	1830	123	.00	.00	.00	0.
2	JAN	0230	59	.05	.01	.05	193.	*	2	JAN	1845	124	.00	.00	.00	0.
2	JAN	0245	60	.06	.01	.05	165.	*	2	JAN	1900	125	.00	.00	.00	0.
2	JAN	0300	61	.05	.01	.05	143.	*	2	JAN	1915	126	.00	.00	.00	0.
2	JAN	0315	62	.06	.01	.05	125.	*	2	JAN	1930	127	.00	.00	.00	0.
2	JAN	0330	63	.05	.01	.05	109.	*	2	JAN	1945	128	.00	.00	.00	0.
2	JAN	0345	64	.06	.01	.05	96.	*	2	JAN	2000	129	.00	.00	.00	0.
2	JAN	0400	65	.05	.01	.05	85.	*								
								*								

****

TOTAL RAINFALL = 7.80, TOTAL LOSS = 3.16, TOTAL EXCESS = 4.64

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	32.00-HR
+ (CFS)	(HR)					
		(CFS)				
+ 273.	13.50		136.	45.	34.	34.
		(INCHES)	3.529	4.622	4.644	4.644
		(AC-FT)	68.	88.	89.	89.

CUMULATIVE AREA = .36 SQ MI

*** ***

```
          **************
          *            *
123 KK    *      BSN8  *
          *            *
          **************
```

124 KO OUTPUT CONTROL VARIABLES

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

*** ***

```
          **************
          *            *
139 KK    *     6O8P5  *
          *            *
          **************
```

140 KO OUTPUT CONTROL VARIABLES

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

*** ***

```
          **************
          *            *
142 KK    *    POND4   *
          *            *
          **************

143 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          5  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          **************
          *            *
149 KK    *    BSN10   *
          *            *
          **************

150 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          5  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          **************
          *            *
165 KK    *    10PD4   *
          *            *
          **************

166 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          5  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          **************
          *            *
168 KK    *    POND3   *
          *            *
          **************

169 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          5  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          **************
          *            *
175 KK    *     BSN3   *
          *            *
          **************

176 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          5  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***
```

```
          **************
          *            *
191 KK    *      BSN2  *
          *            *
          **************

192 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          5  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          **************
          *            *
207 KK    *     POND1  *
          *            *
          **************

208 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          5  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          **************
          *            *
216 KK    *    3PD1&3  *
          *            *
          **************

217 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          5  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          **************
          *            *
219 KK    *     POND2  *
          *            *
          **************

220 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          5  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          **************
          *            *
228 KK    *     NORTH  *
          *            *
          **************

229 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          5  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***
```

```
          **************
          *            *
244 KK    *   OFFSTE   *
          *            *
          **************

245 KO         OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          **************
          *            *
247 KK    *     RTE6   *
          *            *
          **************

248 KO         OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          **************
          *            *
250 KK    *   NM-UND   *
          *            *
          **************

251 KO         OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          **************
          *            *
266 KK    *     29TH   *
          *            *
          **************

267 KO         OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE
```

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION RATIO 1 7.80
HYDROGRAPH AT					
+	BSN5	.02	1	FLOW	32.
				TIME	12.50
ROUTED TO					
+	POND7	.02	1	FLOW	12.
				TIME	13.50
			** PEAK STAGES IN FEET **		
			1	STAGE	171.83
				TIME	13.50
HYDROGRAPH AT					
+	BSN4	.02	1	FLOW	22.
				TIME	12.75
2 COMBINED AT					
+	PD7&4	.04	1	FLOW	31.
				TIME	13.00
ROUTED TO					
+	POND6	.04	1	FLOW	10.
				TIME	15.50
			** PEAK STAGES IN FEET **		
			1	STAGE	172.05
				TIME	15.50
HYDROGRAPH AT					
+	BSN7	.05	1	FLOW	61.
				TIME	12.75
2 COMBINED AT					
+	7PD6	.10	1	FLOW	64.
				TIME	12.75
ROUTED TO					
+	POND5	.10	1	FLOW	35.
				TIME	13.75
			** PEAK STAGES IN FEET **		
			1	STAGE	168.73
				TIME	13.75
HYDROGRAPH AT					
+	BSN6	.01	1	FLOW	12.
				TIME	12.50
ROUTED TO					
+	RTE6	.01	1	FLOW	12.
				TIME	13.25
HYDROGRAPH AT					
+	OFFST	.36	1	FLOW	273.
				TIME	13.50
HYDROGRAPH AT					
+	BSN8	.03	1	FLOW	40.
				TIME	12.25
4 COMBINED AT					
+	608P5	.49	1	FLOW	326.
				TIME	13.50
ROUTED TO					
+	POND4	.49	1	FLOW	232.
				TIME	14.50
			** PEAK STAGES IN FEET **		

```
                                        1   STAGE      168.71
                                            TIME        14.50

 HYDROGRAPH AT
+                BSN10       .02    1   FLOW          27.
                                            TIME        12.50

  2 COMBINED AT
+                10PD4       .51    1   FLOW         236.
                                            TIME        14.50

 ROUTED TO
+                POND3       .51    1   FLOW         224.
                                            TIME        15.50

                                        ** PEAK STAGES IN FEET **
                                        1   STAGE      168.52
                                            TIME        15.50

 HYDROGRAPH AT
+                 BSN3       .02    1   FLOW          33.
                                            TIME        12.50

 HYDROGRAPH AT
+                 BSN2       .03    1   FLOW          32.
                                            TIME        12.50

 ROUTED TO
+                POND1       .03    1   FLOW          31.
                                            TIME        12.75

                                        ** PEAK STAGES IN FEET **
                                        1   STAGE      170.78
                                            TIME        12.75

  3 COMBINED AT
+                3PD1&3      .56    1   FLOW         270.
                                            TIME        12.50

 ROUTED TO
+                POND2       .56    1   FLOW         267.
                                            TIME        12.75

                                        ** PEAK STAGES IN FEET **
                                        1   STAGE      168.29
                                            TIME        12.75

 HYDROGRAPH AT
+                NORTH       .02    1   FLOW          27.
                                            TIME        12.25

  2 COMBINED AT
+                OFFSTE      .58    1   FLOW         281.
                                            TIME        12.75

 ROUTED TO
+                 RTE6       .58    1   FLOW         281.
                                            TIME        13.25

 HYDROGRAPH AT
+                NM-UND      .06    1   FLOW         108.
                                            TIME        12.25

  2 COMBINED AT
+                 29TH       .64    1   FLOW         321.
                                            TIME        12.50


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

Project: **NEWMARKET OFFICE**
Date: 4/10/2006
Prep. By: SRB

Manual Input

POST-DEVELOPMENT

Total Area 50.00 Acres

Soil Group	**A** (% of Total Area)	**B** (% of Total Area)	**C** (% of Total Area)	**D** (% of Total Area)	**Total**
	0%	75%	0%	25%	100%
Acres	0.00	30.00		10.00	50.00

Land Use	**Commercial** (% of Total Area)	**Industrial** (% of Total Area)	**Multi-Family** (% of Total Area)	**Public** (% of Total Area)	**Single Family** (% of Total Area)	**Vacant/Agriculture** (% of Total Area)
Existing	40%	0%	0%	0%	20%	40%
Acres	20.00	0.00	0.00	0.00	10.00	20.00

	Developed	
Length of Flow	1300	ft
Slope	1.00	%
Waterflow Desc	IMP. AREA	
Avg Velocity	1.08	ft/sec
Tc	0.33	hours

15 min <= Tc <= 24 hrs

Runoff Coefficients * Used Soil Group B/D

Return Period (Years)	Commercial	Industrial	Multi-Family	Public	Single Family	Vacant/Agriculture
2	0.68	0.68	0.70	0.49	0.50	0.54
5	0.69	0.69	0.73	0.51	0.54	0.56
10	0.73	0.73	0.79	0.56	0.62	0.61
25	0.75	0.75	0.81	0.59	0.66	0.64
50	0.77	0.77	0.83	0.62	0.70	0.67
100	0.80	0.80	0.86	0.66	0.76	0.70

Existing Conditions

Return Period (Years)	Runoff Coefficient *	Rainfall Intensity (in/hr)	Area (Acres)	Runoff (cfs)
2	0.68	3.33	50.00	113.22
5	0.69	4.00	50.00	138.00
10	0.73	4.60	50.00	167.90
25	0.75	5.35	50.00	200.63
50	0.77	6.00	50.00	231.00
100	0.80	6.53	50.00	261.20

```
*****************************************
*                                       *
*  FLOOD HYDROGRAPH PACKAGE (HEC-1)     *
*           FEBRUARY 1981               *
*         REVISED 02 AUG 88             *
*                                       *
*  RUN DATE 04/10/2006  TIME 15:29:00   *
*                                       *
*****************************************
```


```
*****************************************
*                                       *
*   U.S. ARMY CORPS OF ENGINEERS        *
*  THE HYDROLOGIC ENGINEERING CENTER    *
*         609 SECOND STREET             *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 551-1748              *
*                                       *
*****************************************
```


```
X    X  XXXXXXX  XXXX          X
X    X  X       X    X       XX
X    X  X       X             X
XXXXXX  XXX     X       XXXX  X
X    X  X       X             X
X    X  X       X    X        X
X    X  XXXXXXX  XXXX         XXX
```

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

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

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

           1           ID     MODIFIED FONTANA DRAINAGE PLAN (40-AC NEW MARKET OFFICE SPACE TRACT ADDED)
           2           ID     DEVELOPED CONDITIONS
           3           ID     BY BLB    DATE 03-13-04, MODIFIED BY PDF 4/10/06
*** LIST ***
*** FREE ***
                       *DIAGRAM
           4           IT     15 01JAN04    1200       0 02JAN04    2000
           5           IN     15 01JAN04    1200
           6           IO      0      5
           7           JR   PREC    7.8
                       *
                       *
                       *

           8           KK   BSN5
           9           KO      5
          10           BA  0.023
          11           PB   1.00
          12           PC  0.000  0.003  0.006  0.008  0.011  0.014  0.017  0.019  0.022  0.025
          13           PC  0.029  0.032  0.035  0.038  0.042  0.045  0.048  0.052  0.056  0.060
          14           PC  0.064  0.068  0.072  0.076  0.080  0.085  0.090  0.095  0.100  0.105
          15           PC  0.110  0.115  0.120  0.127  0.134  0.140  0.147  0.155  0.163  0.172
          16           PC  0.181  0.193  0.204  0.220  0.235  0.259  0.283  0.387  0.663  0.699
          17           PC  0.735  0.754  0.772  0.786  0.799  0.810  0.820  0.828  0.835  0.843
          18           PC  0.850  0.858  0.865  0.873  0.880  0.885  0.889  0.894  0.898  0.903
          19           PC  0.907  0.912  0.916  0.921  0.925  0.929  0.934  0.938  0.943  0.947
          20           PC  0.952  0.955  0.958  0.961  0.964  0.967  0.970  0.973  0.976  0.979
          21           PC  0.982  0.985  0.988  0.991  0.994  0.997  1.000
          22           LS      0     68     10
          23           UD  0.600
                       *
                       *

          24           KK   POND7
          25           KO      5
          26           RS      1   ELEV  162.0
          27           SA   2.55   2.71   2.88   3.06
          28           SE  171.0  172.0  173.0  174.0
          29           SQ      0    3.2    6.4    9.6   12.8   16.0   19.2   22.4   25.6   28.8
          30           SQ   32.0
          31           SE  171.0 171.35 171.56 171.73 171.88 172.02 172.16 172.28 172.40 172.52
          32           SE  172.6
                       *
                       *

          33           KK   BSN4
          34           KO      5
          35           BA  0.020
          36           PB   1.00
          37           PC  0.000  0.003  0.006  0.008  0.011  0.014  0.017  0.019  0.022  0.025
          38           PC  0.029  0.032  0.035  0.038  0.042  0.045  0.048  0.052  0.056  0.060
          39           PC  0.064  0.068  0.072  0.076  0.080  0.085  0.090  0.095  0.100  0.105
          40           PC  0.110  0.115  0.120  0.127  0.134  0.140  0.147  0.155  0.163  0.172
          41           PC  0.181  0.193  0.204  0.220  0.235  0.259  0.283  0.387  0.663  0.699
          42           PC  0.735  0.754  0.772  0.786  0.799  0.810  0.820  0.828  0.835  0.843
```

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

  43      PC  0.850  0.858  0.865  0.873  0.880  0.885  0.889  0.894  0.898  0.903
  44      PC  0.907  0.912  0.916  0.921  0.925  0.929  0.934  0.938  0.943  0.947
  45      PC  0.952  0.955  0.958  0.961  0.964  0.967  0.970  0.973  0.976  0.979
  46      PC  0.982  0.985  0.988  0.991  0.994  0.997  1.000
  47      LS      0     68     10
  48      UD  0.850
          *
          *

  49      KK  PD7&4
  50      KO      5
  51      HC      2      0
          *
          *

  52      KK  POND6
  53      KO      5
  54      RS      1   ELEV  162.0
  55      SA   1.85   1.99   2.14   2.29
  56      SE  170.0  171.0  172.0  173.0
  57      SQ      0    2.2    4.4    6.6    8.8   11.0   13.2   15.4   17.6   19.8
  58      SQ   22.0
  59      SE  170.0 170.72 171.11 171.42 171.77 172.21 172.75 173.40 174.14 174.98
  60      SE  175.9
          *
          *

  61      KK   BSN7
  62      KO      5
  63      BA  0.055
  64      PB   1.00
  65      PC  0.000  0.003  0.006  0.008  0.011  0.014  0.017  0.019  0.022  0.025
  66      PC  0.029  0.032  0.035  0.038  0.042  0.045  0.048  0.052  0.056  0.060
  67      PC  0.064  0.068  0.072  0.076  0.080  0.085  0.090  0.095  0.100  0.105
  68      PC  0.110  0.115  0.120  0.127  0.134  0.140  0.147  0.155  0.163  0.172
  69      PC  0.181  0.193  0.204  0.220  0.235  0.259  0.283  0.387  0.663  0.699
  70      PC  0.735  0.754  0.772  0.786  0.799  0.810  0.820  0.828  0.835  0.843
  71      PC  0.850  0.858  0.865  0.873  0.880  0.885  0.889  0.894  0.898  0.903
  72      PC  0.907  0.912  0.916  0.921  0.925  0.929  0.934  0.938  0.943  0.947
  73      PC  0.952  0.955  0.958  0.961  0.964  0.967  0.970  0.973  0.976  0.979
  74      PC  0.982  0.985  0.988  0.991  0.994  0.997  1.000
  75      LS      0     68     10
  76      UD  0.840
          *
          *

  77      KK   7PD6
  78      KO      5
  79      HC      2      0
          *
          *
```

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

  80      KK   POND5
  81      KO      5
  82      RS      1    ELEV   159.0
  83      SA   2.67    2.84    3.01    3.19
  84      SE  167.0   168.0   169.0   170.0
  85      SQ      0     6.3    12.6    18.9    25.2    31.5    37.8    44.1    50.4    56.7
  86      SQ   63.0
  87      SE  167.0  167.55  167.87  168.14  168.39  168.61  168.82  169.01  169.20  169.38
  88      SE  169.6
          *
          *

  89      KK    BSN6
  90      KO      5
  91      BA  0.008
  92      PB   1.00
  93      PC  0.000   0.003   0.006   0.008   0.011   0.014   0.017   0.019   0.022   0.025
  94      PC  0.029   0.032   0.035   0.038   0.042   0.045   0.048   0.052   0.056   0.060
  95      PC  0.064   0.068   0.072   0.076   0.080   0.085   0.090   0.095   0.100   0.105
  96      PC  0.110   0.115   0.120   0.127   0.134   0.140   0.147   0.155   0.163   0.172
  97      PC  0.181   0.193   0.204   0.220   0.235   0.259   0.283   0.387   0.663   0.699
  98      PC  0.735   0.754   0.772   0.786   0.799   0.810   0.820   0.828   0.835   0.843
  99      PC  0.850   0.858   0.865   0.873   0.880   0.885   0.889   0.894   0.898   0.903
 100      PC  0.907   0.912   0.916   0.921   0.925   0.929   0.934   0.938   0.943   0.947
 101      PC  0.952   0.955   0.958   0.961   0.964   0.967   0.970   0.973   0.976   0.979
 102      PC  0.982   0.985   0.988   0.991   0.994   0.997   1.000
 103      LS      0      68      10
 104      UD  0.530
          *
          *

 105      KK    RTE6
 106      KO      5
 107      RT      0       0       3
          *
          *

 108      KK   OFFST
 109      KO      5
 110      BA  0.359
 111      PB   1.00
 112      PC  0.000   0.003   0.006   0.008   0.011   0.014   0.017   0.019   0.022   0.025
 113      PC  0.029   0.032   0.035   0.038   0.042   0.045   0.048   0.052   0.056   0.060
 114      PC  0.064   0.068   0.072   0.076   0.080   0.085   0.090   0.095   0.100   0.105
 115      PC  0.110   0.115   0.120   0.127   0.134   0.140   0.147   0.155   0.163   0.172
 116      PC  0.181   0.193   0.204   0.220   0.235   0.259   0.283   0.387   0.663   0.699
 117      PC  0.735   0.754   0.772   0.786   0.799   0.810   0.820   0.828   0.835   0.843
 118      PC  0.850   0.858   0.865   0.873   0.880   0.885   0.889   0.894   0.898   0.903
 119      PC  0.907   0.912   0.916   0.921   0.925   0.929   0.934   0.938   0.943   0.947
 120      PC  0.952   0.955   0.958   0.961   0.964   0.967   0.970   0.973   0.976   0.979
 121      PC  0.982   0.985   0.988   0.991   0.994   0.997   1.000
 122      LS      0      70      10
 123      UD  1.575
          *
          *
```

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

  124         KK   BSN8
  125         KO      5
  126         BA  0.027
  127         PB   1.00
  128         PC  0.000  0.003  0.006  0.008  0.011  0.014  0.017  0.019  0.022  0.025
  129         PC  0.029  0.032  0.035  0.038  0.042  0.045  0.048  0.052  0.056  0.060
  130         PC  0.064  0.068  0.072  0.076  0.080  0.085  0.090  0.095  0.100  0.105
  131         PC  0.110  0.115  0.120  0.127  0.134  0.140  0.147  0.155  0.163  0.172
  132         PC  0.181  0.193  0.204  0.220  0.235  0.259  0.283  0.387  0.663  0.699
  133         PC  0.735  0.754  0.772  0.786  0.799  0.810  0.820  0.828  0.835  0.843
  134         PC  0.850  0.858  0.865  0.873  0.880  0.885  0.889  0.894  0.898  0.903
  135         PC  0.907  0.912  0.916  0.921  0.925  0.929  0.934  0.938  0.943  0.947
  136         PC  0.952  0.955  0.958  0.961  0.964  0.967  0.970  0.973  0.976  0.979
  137         PC  0.982  0.985  0.988  0.991  0.994  0.997  1.000
  138         LS      0     68     10
  139         UD  0.490
              *
              *

  140         KK  6O8P5
  141         KO      5
  142         HC      4      0
              *
              *

  143         KK  POND4
  144         KO      5
  145         RS      1   ELEV  158.0
  146         SA   3.06   3.24   3.42   3.61
  147         SE  166.0  167.0  168.0  169.0
  148         SL  158.0  14.73    0.6    0.5
  149         SS  167.0   0.00    3.0    1.5
              *
              *

  150         KK  BSN10
  151         KO      5
  152         BA  0.021
  153         PB   1.00
  154         PC  0.000  0.003  0.006  0.008  0.011  0.014  0.017  0.019  0.022  0.025
  155         PC  0.029  0.032  0.035  0.038  0.042  0.045  0.048  0.052  0.056  0.060
  156         PC  0.064  0.068  0.072  0.076  0.080  0.085  0.090  0.095  0.100  0.105
  157         PC  0.110  0.115  0.120  0.127  0.134  0.140  0.147  0.155  0.163  0.172
  158         PC  0.181  0.193  0.204  0.220  0.235  0.259  0.283  0.387  0.663  0.699
  159         PC  0.735  0.754  0.772  0.786  0.799  0.810  0.820  0.828  0.835  0.843
  160         PC  0.850  0.858  0.865  0.873  0.880  0.885  0.889  0.894  0.898  0.903
  161         PC  0.907  0.912  0.916  0.921  0.925  0.929  0.934  0.938  0.943  0.947
  162         PC  0.952  0.955  0.958  0.961  0.964  0.967  0.970  0.973  0.976  0.979
  163         PC  0.982  0.985  0.988  0.991  0.994  0.997  1.000
  164         LS      0     68     10
  165         UD  0.670
              *
              *
```

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

  166     KK   10PD4
  167     KO       5
  168     HC       2       0
          *
          *

  169     KK   POND3
  170     KO       5
  171     RS       1    ELEV   162.0
  172     SA    1.70    1.83    1.98    2.12
  173     SE   166.0   167.0   168.0   169.0
  174     SL   158.5   14.73     0.6     0.5
  175     SS   168.0    0.00     3.0     1.5
          *
          *

  176     KK    BSN3
  177     KO       5
  178     BA   0.024
  179     PB    1.00
  180     PC   0.000   0.003   0.006   0.008   0.011   0.014   0.017   0.019   0.022   0.025
  181     PC   0.029   0.032   0.035   0.038   0.042   0.045   0.048   0.052   0.056   0.060
  182     PC   0.064   0.068   0.072   0.076   0.080   0.085   0.090   0.095   0.100   0.105
  183     PC   0.110   0.115   0.120   0.127   0.134   0.140   0.147   0.155   0.163   0.172
  184     PC   0.181   0.193   0.204   0.220   0.235   0.259   0.283   0.387   0.663   0.699
  185     PC   0.735   0.754   0.772   0.786   0.799   0.810   0.820   0.828   0.835   0.843
  186     PC   0.850   0.858   0.865   0.873   0.880   0.885   0.889   0.894   0.898   0.903
  187     PC   0.907   0.912   0.916   0.921   0.925   0.929   0.934   0.938   0.943   0.947
  188     PC   0.952   0.955   0.958   0.961   0.964   0.967   0.970   0.973   0.976   0.979
  189     PC   0.982   0.985   0.988   0.991   0.994   0.997   1.000
  190     LS       0      68      10
  191     UD   0.580
          *
          *

  192     KK    BSN2
  193     KO       5
  194     BA   0.025
  195     PB    1.00
  196     PC   0.000   0.003   0.006   0.008   0.011   0.014   0.017   0.019   0.022   0.025
  197     PC   0.029   0.032   0.035   0.038   0.042   0.045   0.048   0.052   0.056   0.060
  198     PC   0.064   0.068   0.072   0.076   0.080   0.085   0.090   0.095   0.100   0.105
  199     PC   0.110   0.115   0.120   0.127   0.134   0.140   0.147   0.155   0.163   0.172
  200     PC   0.181   0.193   0.204   0.220   0.235   0.259   0.283   0.387   0.663   0.699
  201     PC   0.735   0.754   0.772   0.786   0.799   0.810   0.820   0.828   0.835   0.843
  202     PC   0.850   0.858   0.865   0.873   0.880   0.885   0.889   0.894   0.898   0.903
  203     PC   0.907   0.912   0.916   0.921   0.925   0.929   0.934   0.938   0.943   0.947
  204     PC   0.952   0.955   0.958   0.961   0.964   0.967   0.970   0.973   0.976   0.979
  205     PC   0.982   0.985   0.988   0.991   0.994   0.997   1.000
  206     LS       0      68      10
  207     UD   0.670
          *
          *
```

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

  208     KK   POND1
  209     KO      5
  210     RS      1    ELEV   162.0
  211     SA   0.36    0.43    0.49    0.57
  212     SE  170.0   171.0   172.0   173.0
  213     SQ      0     3.2     6.4     9.6    12.8    16.0    19.2    22.4    25.6    28.8
  214     SQ   32.0
  215     SE  170.0  170.17  170.27  170.35  170.42  170.49  170.56  170.62  170.67  170.73
  216     SE  170.8
          *
          *

  217     KK  3PD1&3
  218     KO      5
  219     HC      3       0
          *
          *

  220     KK   POND2
  221     KO      5
  222     RS      1    ELEV   158.0
  223     SA   2.08    2.23    2.38    2.54
  224     SE  166.0   167.0   168.0   169.0
  225     SQ      0    26.9    53.8    80.7   107.6   134.5   161.4   188.3   215.2   242.1
  226     SQ  269.0
  227     SE  166.0  166.50  166.79  167.03  167.25  167.45  167.63  167.81  167.98  168.14
  228     SE  168.3
          *
          *
          *

  229     KK   PONDA
  230     KO      5
          *
          *   ASSUMED OUTLET   10  WEIR AT ELEV. 162.5
          *
  231     RS      1    ELEV   162.5
  232     SA   1.30    1.30
  233     SE  162.5   170.0
  234     SQ      0      35      70     105     140     175     210     245     280     315
  235     SQ  350.0
  236     SE  162.5  163.63  164.30  164.86  165.36  165.81  166.24  166.65  167.03  167.40
  237     SE  167.8
          *
          *   10 ACRES NORTH OF PROPOSED DEVELOPMENT
          *

  238     KK   NORTH
  239     KO      5
  240     BA  0.0156
  241     PB   1.00
  242     PC  0.000   0.003   0.006   0.008   0.011   0.014   0.017   0.019   0.022   0.025
  243     PC  0.029   0.032   0.035   0.038   0.042   0.045   0.048   0.052   0.056   0.060
  244     PC  0.064   0.068   0.072   0.076   0.080   0.085   0.090   0.095   0.100   0.105
```

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

  245     PC   0.110   0.115   0.120   0.127   0.134   0.140   0.147   0.155   0.163   0.172
  246     PC   0.181   0.193   0.204   0.220   0.235   0.259   0.283   0.387   0.663   0.699
  247     PC   0.735   0.754   0.772   0.786   0.799   0.810   0.820   0.828   0.835   0.843
  248     PC   0.850   0.858   0.865   0.873   0.880   0.885   0.889   0.894   0.898   0.903
  249     PC   0.907   0.912   0.916   0.921   0.925   0.929   0.934   0.938   0.943   0.947
  250     PC   0.952   0.955   0.958   0.961   0.964   0.967   0.970   0.973   0.976   0.979
  251     PC   0.982   0.985   0.988   0.991   0.994   0.997   1.000
  252     LS       0      70       0
  253     UD    0.40
          *
          *
          *

  254     KK  OFFSTE
  255     KO       5
  256     HC       2       0
          *
          *
          *
          *  ADDED 40 ACRES DEVELOPED OFFICE PARK   Tc=20 MINUTED, 50% IMPERVIOUS
          *
          *

  257     KK   DEV-1
  258     KO       5
  259     BA  0.0625
  260     PB    1.00
  261     PC   0.000   0.003   0.006   0.008   0.011   0.014   0.017   0.019   0.022   0.025
  262     PC   0.029   0.032   0.035   0.038   0.042   0.045   0.048   0.052   0.056   0.060
  263     PC   0.064   0.068   0.072   0.076   0.080   0.085   0.090   0.095   0.100   0.105
  264     PC   0.110   0.115   0.120   0.127   0.134   0.140   0.147   0.155   0.163   0.172
  265     PC   0.181   0.193   0.204   0.220   0.235   0.259   0.283   0.387   0.663   0.699
  266     PC   0.735   0.754   0.772   0.786   0.799   0.810   0.820   0.828   0.835   0.843
  267     PC   0.850   0.858   0.865   0.873   0.880   0.885   0.889   0.894   0.898   0.903
  268     PC   0.907   0.912   0.916   0.921   0.925   0.929   0.934   0.938   0.943   0.947
  269     PC   0.952   0.955   0.958   0.961   0.964   0.967   0.970   0.973   0.976   0.979
  270     PC   0.982   0.985   0.988   0.991   0.994   0.997   1.000
  271     LS       0      70      50
  272     UD    0.20
          *
          *
          *

  273     KK    29TH
  274     KO       5
  275     HC       2       0
          *
          *
          *
```
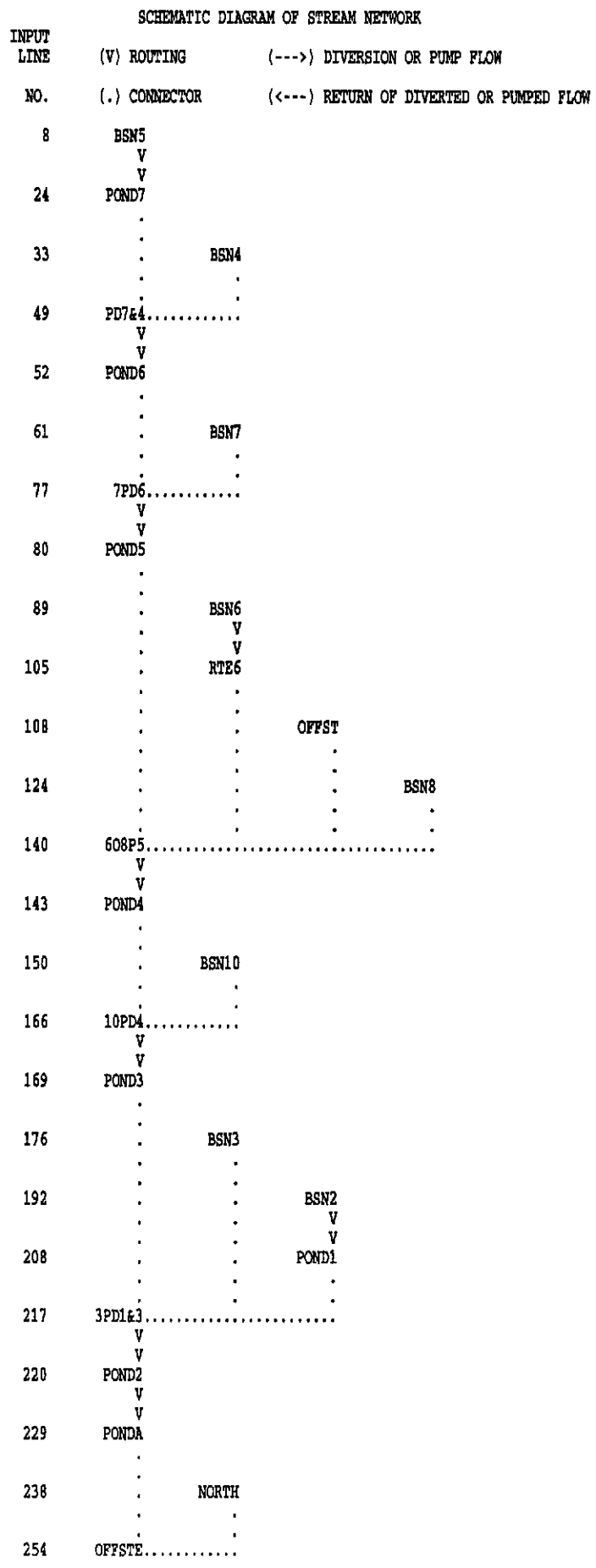

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  276     KK  PONDB
  277     KO      5
          *
          *   ASSUMED OUTLET   10  WEIR AT ELEV. 159.0
          *
  278     RS      1   ELEV  159.0
  279     SA   5.10   5.10
  280     SE  159.0  170.0
  281     SQ      0     35     70    105    140    175    210    245    280    315
  282     SQ  350.0
  283     SE  159.0 160.13 160.80 161.36 161.86 162.31 162.74 163.15 163.53 163.90
  284     SE  164.3
          *
          *
          *
  285     ZZ
```


SCHEMATIC DIAGRAM OF STREAM NETWORK
INPUT LINE NO.
(V) ROUTING
(.) CONNECTOR
(---->) DIVERSION OR PUMP FLOW
(<----) RETURN OF DIVERTED OR PUMPED FLOW
8 BSN5
24 POND7
33 BSN4
49 PD7&4
52 POND6
61 BSN7
77 7PD6
80 POND5
89 BSN6
105 RTE6
108 OFFST
124 BSN8
140 608P5
143 POND4
150 BSN10
166 10PD4
169 POND3
176 BSN3
192 BSN2
208 POND1
217 3PD1&3
220 POND2
229 PONDA
238 NORTH
254 OFFSTE

```
                .
                .
  257           .       DEV-1
                .         .
                .         .
  273        29TH.........
                V
                V
  276       PONDB

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION
```

```
*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             FEBRUARY 1981             *
*           REVISED 02 AUG 88           *
*                                       *
*  RUN DATE  04/10/2006  TIME  15:29:00 *
*                                       *
*****************************************
```


```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*  THE HYDROLOGIC ENGINEERING CENTER    *
*          609 SECOND STREET            *
*        DAVIS, CALIFORNIA 95616        *
*          (916) 551-1748               *
*                                       *
*****************************************
```


```
                    MODIFIED FONTANA DRAINAGE PLAN (40-AC NEW MARKET OFFICE SPACE TRACT ADDED)
                    DEVELOPED CONDITIONS
                    BY BLB    DATE 03-13-04, MODIFIED BY PDF 4/10/06

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

    IT          HYDROGRAPH TIME DATA
                      NMIN         15  MINUTES IN COMPUTATION INTERVAL
                     IDATE     1JAN 4  STARTING DATE
                     ITIME       1200  STARTING TIME
                        NQ        129  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE     2JAN 4  ENDING DATE
                    NDTIME       2000  ENDING TIME
                    ICENT          19  CENTURY MARK

                  COMPUTATION INTERVAL     .25 HOURS
                      TOTAL TIME BASE   32.00 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

    JP          MULTI-PLAN OPTION
                     NPLAN          1  NUMBER OF PLANS

    JR          MULTI-RATIO OPTION
                   RATIOS OF PRECIPITATION
                  7.80


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          ***************
          *             *
  8 KK    *      BSN5   *
          *             *
          ***************

  9 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          5  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          ***************
          *             *
 24 KK    *     POND7   *
          *             *
          ***************

 25 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
```

```
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


           ***************
           *             *
  33 KK    *      BSN4   *
           *             *
           ***************

  34 KO          OUTPUT CONTROL VARIABLES
                      IPRNT          5  PRINT CONTROL
                      IPLOT          5  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


           ***************
           *             *
  49 KK    *     PD7&4   *
           *             *
           ***************

  50 KO          OUTPUT CONTROL VARIABLES
                      IPRNT          5  PRINT CONTROL
                      IPLOT          5  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


           ***************
           *             *
  52 KK    *     POND6   *
           *             *
           ***************

  53 KO          OUTPUT CONTROL VARIABLES
                      IPRNT          5  PRINT CONTROL
                      IPLOT          5  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


           ***************
           *             *
  61 KK    *      BSN7   *
           *             *
           ***************

  62 KO          OUTPUT CONTROL VARIABLES
                      IPRNT          5  PRINT CONTROL
                      IPLOT          5  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


           ***************
           *             *
  77 KK    *     7PD6    *
           *             *
           ***************

  78 KO          OUTPUT CONTROL VARIABLES
                      IPRNT          5  PRINT CONTROL
```

```
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


           **************
           *            *
 80 KK     *     POND5  *
           *            *
           **************

 81 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


           **************
           *            *
 89 KK     *      BSN6  *
           *            *
           **************

 90 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


           **************
           *            *
105 KK     *      RTE6  *
           *            *
           **************

106 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


           **************
           *            *
108 KK     *     OFFST  *
           *            *
           **************

109 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


           **************
           *            *
124 KK     *      BSN8  *
           *            *
           **************

125 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
```

```
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


           **************
           *            *
 80 KK     *     POND5  *
           *            *
           **************

 81 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          5  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


           **************
           *            *
 89 KK     *      BSN6  *
           *            *
           **************

 90 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          5  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


           **************
           *            *
105 KK     *      RTE6  *
           *            *
           **************

106 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          5  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


           **************
           *            *
108 KK     *     OFFST  *
           *            *
           **************

109 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          5  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


           **************
           *            *
124 KK     *      BSN8  *
           *            *
           **************

125 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
```

```
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          ***************
          *             *
140 KK    *     6O8P5   *
          *             *
          ***************

141 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          ***************
          *             *
143 KK    *     POND4   *
          *             *
          ***************

144 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          ***************
          *             *
150 KK    *     BSN10   *
          *             *
          ***************

151 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          ***************
          *             *
166 KK    *     10PD4   *
          *             *
          ***************

167 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          ***************
          *             *
169 KK    *     POND3   *
          *             *
          ***************

170 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
```

```
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


           ***************
           *             *
176 KK     *      BSN3   *
           *             *
           ***************

177 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          5  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


           ***************
           *             *
192 KK     *      BSN2   *
           *             *
           ***************

193 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          5  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


           ***************
           *             *
208 KK     *     POND1   *
           *             *
           ***************

209 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          5  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


           ***************
           *             *
217 KK     *    3PD1&3   *
           *             *
           ***************

218 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          5  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


           ***************
           *             *
220 KK     *     POND2   *
           *             *
           ***************

221 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
```

```
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          **************
          *            *
229 KK    *     PONDA  *
          *            *
          **************

230 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          **************
          *            *
238 KK    *     NORTH  *
          *            *
          **************

239 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          **************
          *            *
254 KK    *    OFFSTE  *
          *            *
          **************

255 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          **************
          *            *
257 KK    *     DEV-1  *
          *            *
          **************

258 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          **************
          *            *
273 KK    *      29TH  *
          *            *
          **************

274 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
```

```
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          **************
          *            *
276 KK    *     PONDB  *
          *            *
          **************

277 KO         OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE
```

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION RATIO 1
					7.80
HYDROGRAPH AT					
+	BSN5	.02	1	FLOW	32.
				TIME	12.50
ROUTED TO					
+	POND7	.02	1	FLOW	12.
				TIME	13.50
			** PEAK STAGES IN FEET **		
			1	STAGE	171.83
				TIME	13.50
HYDROGRAPH AT					
+	BSN4	.02	1	FLOW	22.
				TIME	12.75
2 COMBINED AT					
+	PD7&4	.04	1	FLOW	31.
				TIME	13.00
ROUTED TO					
+	POND6	.04	1	FLOW	10.
				TIME	15.50
			** PEAK STAGES IN FEET **		
			1	STAGE	172.05
				TIME	15.50
HYDROGRAPH AT					
+	BSN7	.05	1	FLOW	61.
				TIME	12.75
2 COMBINED AT					
+	7PD6	.10	1	FLOW	64.
				TIME	12.75
ROUTED TO					
+	POND5	.10	1	FLOW	35.
				TIME	13.75
			** PEAK STAGES IN FEET **		
			1	STAGE	168.73
				TIME	13.75
HYDROGRAPH AT					
+	BSN6	.01	1	FLOW	12.
				TIME	12.50
ROUTED TO					
+	RTE6	.01	1	FLOW	12.
				TIME	13.25
HYDROGRAPH AT					
+	OFFST	.36	1	FLOW	273.
				TIME	13.50
HYDROGRAPH AT					
+	BSN8	.03	1	FLOW	40.
				TIME	12.25
4 COMBINED AT					
+	6O8P5	.49	1	FLOW	326.
				TIME	13.50
ROUTED TO					
+	POND4	.49	1	FLOW	232.
				TIME	14.50
			** PEAK STAGES IN FEET **		

```
                                    1   STAGE      168.71
                                        TIME        14.50

 HYDROGRAPH AT
+                  BSN10       .02   1   FLOW         27.
                                        TIME        12.50

  2 COMBINED AT
+                  10PD4       .51   1   FLOW        236.
                                        TIME        14.50

 ROUTED TO
+                  POND3       .51   1   FLOW        224.
                                        TIME        15.50

                                    ** PEAK STAGES IN FEET **
                                    1   STAGE      168.52
                                        TIME        15.50

 HYDROGRAPH AT
+                   BSN3       .02   1   FLOW         33.
                                        TIME        12.50

 HYDROGRAPH AT
+                   BSN2       .03   1   FLOW         32.
                                        TIME        12.50

 ROUTED TO
+                  POND1       .03   1   FLOW         31.
                                        TIME        12.75

                                    ** PEAK STAGES IN FEET **
                                    1   STAGE      170.78
                                        TIME        12.75

  3 COMBINED AT
+                 3PD1&3       .56   1   FLOW        270.
                                        TIME        12.50

 ROUTED TO
+                  POND2       .56   1   FLOW        267.
                                        TIME        12.75

                                    ** PEAK STAGES IN FEET **
                                    1   STAGE      168.29
                                        TIME        12.75

 ROUTED TO
+                  PONDA       .56   1   FLOW        264.
                                        TIME        13.00

                                    ** PEAK STAGES IN FEET **
                                    1   STAGE      166.86
                                        TIME        13.00

 HYDROGRAPH AT
+                  NORTH       .02   1   FLOW         27.
                                        TIME        12.25

  2 COMBINED AT
+                 OFFSTE       .58   1   FLOW        274.
                                        TIME        13.00

 HYDROGRAPH AT
+                  DEV-1       .06   1   FLOW        184.
                                        TIME        12.00

  2 COMBINED AT
+                   29TH       .64   1   FLOW        411.
                                        TIME        12.00

 ROUTED TO
+                  PONDB       .64   1   FLOW        321.
                                        TIME        12.50

                                    ** PEAK STAGES IN FEET **
                                    1   STAGE      163.97
                                        TIME        12.50
```

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

```
*******************************************
*                                         *
*  FLOOD HYDROGRAPH PACKAGE  (HEC-1)      *
*           FEBRUARY 1981                 *
*          REVISED 02 AUG 88              *
*                                         *
* RUN DATE  04/10/2006  TIME  15:29:00    *
*                                         *
*******************************************
```


```
*****************************************
*                                       *
*   U.S. ARMY CORPS OF ENGINEERS        *
*  THE HYDROLOGIC ENGINEERING CENTER    *
*        609 SECOND STREET              *
*       DAVIS, CALIFORNIA 95616         *
*          (916) 551-1748               *
*                                       *
*****************************************
```


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

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

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

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

                  1           ID     MODIFIED FONTANA DRAINAGE PLAN (40-AC NEW MARKET OFFICE SPACE TRACT ADDED)
                  2           ID     DEVELOPED CONDITIONS
                  3           ID     BY BLB    DATE 03-13-04, MODIFIED BY PDF 4/10/06
*** LIST ***
*** FREE ***
                              *DIAGRAM
                  4           IT     15 01JAN04    1200       0 02JAN04    2000
                  5           IN     15 01JAN04    1200
                  6           IO      0      5
                  7           JR    PREC    7.8
                              *
                              *
                              *

                  8           KK    BSN5
                  9           KO       5
                 10           BA   0.023
                 11           PB    1.00
                 12           PC   0.000   0.003   0.006   0.008   0.011   0.014   0.017   0.019   0.022   0.025
                 13           PC   0.029   0.032   0.035   0.038   0.042   0.045   0.048   0.052   0.056   0.060
                 14           PC   0.064   0.068   0.072   0.076   0.080   0.085   0.090   0.095   0.100   0.105
                 15           PC   0.110   0.115   0.120   0.127   0.134   0.140   0.147   0.155   0.163   0.172
                 16           PC   0.181   0.193   0.204   0.220   0.235   0.259   0.283   0.387   0.663   0.699
                 17           PC   0.735   0.754   0.772   0.786   0.799   0.810   0.820   0.828   0.835   0.843
                 18           PC   0.850   0.858   0.865   0.873   0.880   0.885   0.889   0.894   0.898   0.903
                 19           PC   0.907   0.912   0.916   0.921   0.925   0.929   0.934   0.938   0.943   0.947
                 20           PC   0.952   0.955   0.958   0.961   0.964   0.967   0.970   0.973   0.976   0.979
                 21           PC   0.982   0.985   0.988   0.991   0.994   0.997   1.000
                 22           LS       0      68      10
                 23           UD   0.600
                              *
                              *

                 24           KK   POND7
                 25           KO       5
                 26           RS       1    ELEV   162.0
                 27           SA    2.55    2.71    2.88    3.06
                 28           SE   171.0   172.0   173.0   174.0
                 29           SQ       0     3.2     6.4     9.6    12.8    16.0    19.2    22.4    25.6    28.8
                 30           SQ    32.0
                 31           SE   171.0  171.35  171.56  171.73  171.88  172.02  172.16  172.28  172.40  172.52
                 32           SE   172.6
                              *
                              *

                 33           KK    BSN4
                 34           KO       5
                 35           BA   0.020
                 36           PB    1.00
                 37           PC   0.000   0.003   0.006   0.008   0.011   0.014   0.017   0.019   0.022   0.025
                 38           PC   0.029   0.032   0.035   0.038   0.042   0.045   0.048   0.052   0.056   0.060
                 39           PC   0.064   0.068   0.072   0.076   0.080   0.085   0.090   0.095   0.100   0.105
                 40           PC   0.110   0.115   0.120   0.127   0.134   0.140   0.147   0.155   0.163   0.172
                 41           PC   0.181   0.193   0.204   0.220   0.235   0.259   0.283   0.387   0.663   0.699
                 42           PC   0.735   0.754   0.772   0.786   0.799   0.810   0.820   0.828   0.835   0.843
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
   43     PC  0.850  0.858  0.865  0.873  0.880  0.885  0.889  0.894  0.898  0.903
   44     PC  0.907  0.912  0.916  0.921  0.925  0.929  0.934  0.938  0.943  0.947
   45     PC  0.952  0.955  0.958  0.961  0.964  0.967  0.970  0.973  0.976  0.979
   46     PC  0.982  0.985  0.988  0.991  0.994  0.997  1.000
   47     LS      0     68     10
   48     UD  0.850
          *
          *

   49     KK  PD7&4
   50     KO      5
   51     HC      2      0
          *
          *

   52     KK  POND6
   53     KO      5
   54     RS      1   ELEV  162.0
   55     SA   1.85   1.99   2.14   2.29
   56     SE  170.0  171.0  172.0  173.0
   57     SQ      0    2.2    4.4    6.6    8.8   11.0   13.2   15.4   17.6   19.8
   58     SQ   22.0
   59     SE  170.0 170.72 171.11 171.42 171.77 172.21 172.75 173.40 174.14 174.98
   60     SE  175.9
          *
          *

   61     KK   BSN7
   62     KO      5
   63     BA  0.055
   64     PB   1.00
   65     PC  0.000  0.003  0.006  0.008  0.011  0.014  0.017  0.019  0.022  0.025
   66     PC  0.029  0.032  0.035  0.038  0.042  0.045  0.048  0.052  0.056  0.060
   67     PC  0.064  0.068  0.072  0.076  0.080  0.085  0.090  0.095  0.100  0.105
   68     PC  0.110  0.115  0.120  0.127  0.134  0.140  0.147  0.155  0.163  0.172
   69     PC  0.181  0.193  0.204  0.220  0.235  0.259  0.283  0.387  0.663  0.699
   70     PC  0.735  0.754  0.772  0.786  0.799  0.810  0.820  0.828  0.835  0.843
   71     PC  0.850  0.858  0.865  0.873  0.880  0.885  0.889  0.894  0.898  0.903
   72     PC  0.907  0.912  0.916  0.921  0.925  0.929  0.934  0.938  0.943  0.947
   73     PC  0.952  0.955  0.958  0.961  0.964  0.967  0.970  0.973  0.976  0.979
   74     PC  0.982  0.985  0.988  0.991  0.994  0.997  1.000
   75     LS      0     68     10
   76     UD  0.840
          *
          *

   77     KK   7PD6
   78     KO      5
   79     HC      2      0
          *
          *
```

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

   80     KK   POND5
   81     KO       5
   82     RS       1    ELEV   159.0
   83     SA    2.67    2.84    3.01    3.19
   84     SE   167.0   168.0   169.0   170.0
   85     SQ       0     6.3    12.6    18.9    25.2    31.5    37.8    44.1    50.4    56.7
   86     SQ    63.0
   87     SE   167.0  167.55  167.87  168.14  168.39  168.61  168.82  169.01  169.20  169.38
   88     SE   169.6
          *
          *

   89     KK    BSN6
   90     KO       5
   91     BA   0.008
   92     PB    1.00
   93     PC   0.000   0.003   0.006   0.008   0.011   0.014   0.017   0.019   0.022   0.025
   94     PC   0.029   0.032   0.035   0.038   0.042   0.045   0.048   0.052   0.056   0.060
   95     PC   0.064   0.068   0.072   0.076   0.080   0.085   0.090   0.095   0.100   0.105
   96     PC   0.110   0.115   0.120   0.127   0.134   0.140   0.147   0.155   0.163   0.172
   97     PC   0.181   0.193   0.204   0.220   0.235   0.259   0.283   0.387   0.663   0.699
   98     PC   0.735   0.754   0.772   0.786   0.799   0.810   0.820   0.828   0.835   0.843
   99     PC   0.850   0.858   0.865   0.873   0.880   0.885   0.889   0.894   0.898   0.903
  100     PC   0.907   0.912   0.916   0.921   0.925   0.929   0.934   0.938   0.943   0.947
  101     PC   0.952   0.955   0.958   0.961   0.964   0.967   0.970   0.973   0.976   0.979
  102     PC   0.982   0.985   0.988   0.991   0.994   0.997   1.000
  103     LS       0      68      10
  104     UD   0.530
          *
          *

  105     KK    RTE6
  106     KO       5
  107     RT       0       0       3
          *
          *

  108     KK   OFFST
  109     KO       5
  110     BA   0.359
  111     PB    1.00
  112     PC   0.000   0.003   0.006   0.008   0.011   0.014   0.017   0.019   0.022   0.025
  113     PC   0.029   0.032   0.035   0.038   0.042   0.045   0.048   0.052   0.056   0.060
  114     PC   0.064   0.068   0.072   0.076   0.080   0.085   0.090   0.095   0.100   0.105
  115     PC   0.110   0.115   0.120   0.127   0.134   0.140   0.147   0.155   0.163   0.172
  116     PC   0.181   0.193   0.204   0.220   0.235   0.259   0.283   0.387   0.663   0.699
  117     PC   0.735   0.754   0.772   0.786   0.799   0.810   0.820   0.828   0.835   0.843
  118     PC   0.850   0.858   0.865   0.873   0.880   0.885   0.889   0.894   0.898   0.903
  119     PC   0.907   0.912   0.916   0.921   0.925   0.929   0.934   0.938   0.943   0.947
  120     PC   0.952   0.955   0.958   0.961   0.964   0.967   0.970   0.973   0.976   0.979
  121     PC   0.982   0.985   0.988   0.991   0.994   0.997   1.000
  122     LS       0      70      10
  123     UD   1.575
          *
          *
```

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

  124     KK   BSN8
  125     KO      5
  126     BA  0.027
  127     PB   1.00
  128     PC  0.000  0.003  0.006  0.008  0.011  0.014  0.017  0.019  0.022  0.025
  129     PC  0.029  0.032  0.035  0.038  0.042  0.045  0.048  0.052  0.056  0.060
  130     PC  0.064  0.068  0.072  0.076  0.080  0.085  0.090  0.095  0.100  0.105
  131     PC  0.110  0.115  0.120  0.127  0.134  0.140  0.147  0.155  0.163  0.172
  132     PC  0.181  0.193  0.204  0.220  0.235  0.259  0.283  0.387  0.663  0.699
  133     PC  0.735  0.754  0.772  0.786  0.799  0.810  0.820  0.828  0.835  0.843
  134     PC  0.850  0.858  0.865  0.873  0.880  0.885  0.889  0.894  0.898  0.903
  135     PC  0.907  0.912  0.916  0.921  0.925  0.929  0.934  0.938  0.943  0.947
  136     PC  0.952  0.955  0.958  0.961  0.964  0.967  0.970  0.973  0.976  0.979
  137     PC  0.982  0.985  0.988  0.991  0.994  0.997  1.000
  138     LS      0     68     10
  139     UD  0.490
          *
          *

  140     KK   608P5
  141     KO      5
  142     HC      4      0
          *
          *

  143     KK   POND4
  144     KO      5
  145     RS      1   ELEV  158.0
  146     SA   3.06   3.24   3.42   3.61
  147     SE  166.0  167.0  168.0  169.0
  148     SL  158.0  14.73    0.6    0.5
  149     SS  167.0   0.00    3.0    1.5
          *
          *

  150     KK  BSN10
  151     KO      5
  152     BA  0.021
  153     PB   1.00
  154     PC  0.000  0.003  0.006  0.008  0.011  0.014  0.017  0.019  0.022  0.025
  155     PC  0.029  0.032  0.035  0.038  0.042  0.045  0.048  0.052  0.056  0.060
  156     PC  0.064  0.068  0.072  0.076  0.080  0.085  0.090  0.095  0.100  0.105
  157     PC  0.110  0.115  0.120  0.127  0.134  0.140  0.147  0.155  0.163  0.172
  158     PC  0.181  0.193  0.204  0.220  0.235  0.259  0.283  0.387  0.663  0.699
  159     PC  0.735  0.754  0.772  0.786  0.799  0.810  0.820  0.828  0.835  0.843
  160     PC  0.850  0.858  0.865  0.873  0.880  0.885  0.889  0.894  0.898  0.903
  161     PC  0.907  0.912  0.916  0.921  0.925  0.929  0.934  0.938  0.943  0.947
  162     PC  0.952  0.955  0.958  0.961  0.964  0.967  0.970  0.973  0.976  0.979
  163     PC  0.982  0.985  0.988  0.991  0.994  0.997  1.000
  164     LS      0     68     10
  165     UD  0.670
          *
          *
```

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

  166     KK  10PD4
  167     KO      5
  168     HC      2       0
          *
          *

  169     KK  POND3
  170     KO      5
  171     RS      1    ELEV   162.0
  172     SA   1.70    1.83    1.98    2.12
  173     SE  166.0   167.0   168.0   169.0
  174     SL  158.5   14.73     0.6     0.5
  175     SS  168.0    0.00     3.0     1.5
          *
          *

  176     KK   BSN3
  177     KO      5
  178     BA  0.024
  179     PB   1.00
  180     PC  0.000   0.003   0.006   0.008   0.011   0.014   0.017   0.019   0.022   0.025
  181     PC  0.029   0.032   0.035   0.038   0.042   0.045   0.048   0.052   0.056   0.060
  182     PC  0.064   0.068   0.072   0.076   0.080   0.085   0.090   0.095   0.100   0.105
  183     PC  0.110   0.115   0.120   0.127   0.134   0.140   0.147   0.155   0.163   0.172
  184     PC  0.181   0.193   0.204   0.220   0.235   0.259   0.283   0.387   0.663   0.699
  185     PC  0.735   0.754   0.772   0.786   0.799   0.810   0.820   0.828   0.835   0.843
  186     PC  0.850   0.858   0.865   0.873   0.880   0.885   0.889   0.894   0.898   0.903
  187     PC  0.907   0.912   0.916   0.921   0.925   0.929   0.934   0.938   0.943   0.947
  188     PC  0.952   0.955   0.958   0.961   0.964   0.967   0.970   0.973   0.976   0.979
  189     PC  0.982   0.985   0.988   0.991   0.994   0.997   1.000
  190     LS      0      68      10
  191     UD  0.580
          *
          *

  192     KK   BSN2
  193     KO      5
  194     BA  0.025
  195     PB   1.00
  196     PC  0.000   0.003   0.006   0.008   0.011   0.014   0.017   0.019   0.022   0.025
  197     PC  0.029   0.032   0.035   0.038   0.042   0.045   0.048   0.052   0.056   0.060
  198     PC  0.064   0.068   0.072   0.076   0.080   0.085   0.090   0.095   0.100   0.105
  199     PC  0.110   0.115   0.120   0.127   0.134   0.140   0.147   0.155   0.163   0.172
  200     PC  0.181   0.193   0.204   0.220   0.235   0.259   0.283   0.387   0.663   0.699
  201     PC  0.735   0.754   0.772   0.786   0.799   0.810   0.820   0.828   0.835   0.843
  202     PC  0.850   0.858   0.865   0.873   0.880   0.885   0.889   0.894   0.898   0.903
  203     PC  0.907   0.912   0.916   0.921   0.925   0.929   0.934   0.938   0.943   0.947
  204     PC  0.952   0.955   0.958   0.961   0.964   0.967   0.970   0.973   0.976   0.979
  205     PC  0.982   0.985   0.988   0.991   0.994   0.997   1.000
  206     LS      0      68      10
  207     UD  0.670
          *
          *
```

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

  208     KK  POND1
  209     KO      5
  210     RS      1    ELEV   162.0
  211     SA   0.36    0.43    0.49    0.57
  212     SE  170.0   171.0   172.0   173.0
  213     SQ      0     3.2     6.4     9.6    12.8    16.0    19.2    22.4    25.6    28.8
  214     SQ   32.0
  215     SE  170.0  170.17  170.27  170.35  170.42  170.49  170.56  170.62  170.67  170.73
  216     SE  170.8
          *
          *

  217     KK  3PD1&3
  218     KO      5
  219     HC      3       0
          *
          *

  220     KK  POND2
  221     KO      5
  222     RS      1    ELEV   158.0
  223     SA   2.08    2.23    2.38    2.54
  224     SE  166.0   167.0   168.0   169.0
  225     SQ      0    26.9    53.8    80.7   107.6   134.5   161.4   188.3   215.2   242.1
  226     SQ  269.0
  227     SE  166.0  166.50  166.79  167.03  167.25  167.45  167.63  167.81  167.98  168.14
  228     SE  168.3
          *
          *
          *

  229     KK  PONDA
  230     KO      5
          *
          *   ASSUMED OUTLET   10  WEIR AT ELEV. 162.5
          *
  231     RS      1    ELEV   162.5
  232     SA   1.30    1.30
  233     SE  162.5   170.0
  234     SQ      0      35      70     105     140     175     210     245     280     315
  235     SQ  350.0
  236     SE  162.5  163.63  164.30  164.86  165.36  165.81  166.24  166.65  167.03  167.40
  237     SE  167.8
          *
          *   10 ACRES NORTH OF PROPOSED DEVELOPMENT
          *

  238     KK  NORTH
  239     KO      5
  240     BA 0.0156
  241     PB   1.00
  242     PC  0.000   0.003   0.006   0.008   0.011   0.014   0.017   0.019   0.022   0.025
  243     PC  0.029   0.032   0.035   0.038   0.042   0.045   0.048   0.052   0.056   0.060
  244     PC  0.064   0.068   0.072   0.076   0.080   0.085   0.090   0.095   0.100   0.105
```

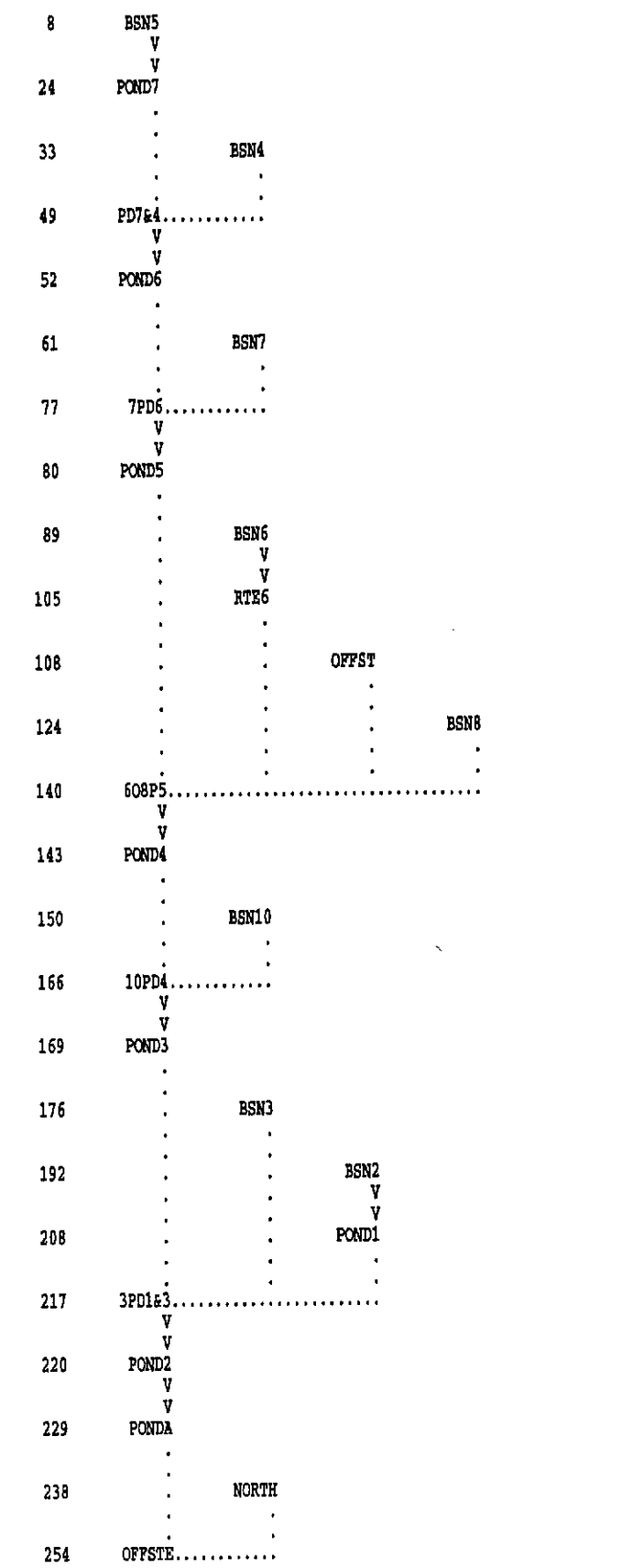
```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  245     PC  0.110  0.115  0.120  0.127  0.134  0.140  0.147  0.155  0.163  0.172
  246     PC  0.181  0.193  0.204  0.220  0.235  0.259  0.283  0.387  0.663  0.699
  247     PC  0.735  0.754  0.772  0.786  0.799  0.810  0.820  0.828  0.835  0.843
  248     PC  0.850  0.858  0.865  0.873  0.880  0.885  0.889  0.894  0.898  0.903
  249     PC  0.907  0.912  0.916  0.921  0.925  0.929  0.934  0.938  0.943  0.947
  250     PC  0.952  0.955  0.958  0.961  0.964  0.967  0.970  0.973  0.976  0.979
  251     PC  0.982  0.985  0.988  0.991  0.994  0.997  1.000
  252     LS      0     70      0
  253     UD   0.40
          *
          *
          *

  254     KK  OFFSTE
  255     KO      5
  256     HC      2      0
          *
          *
          *
          *  ADDED 40 ACRES DEVELOPED OFFICE PARK   Tc=20 MINUTED, 50% IMPERVIOUS
          *
          *

  257     KK   DEV-1
  258     KO      5
  259     BA 0.0625
  260     PB   1.00
  261     PC  0.000  0.003  0.006  0.008  0.011  0.014  0.017  0.019  0.022  0.025
  262     PC  0.029  0.032  0.035  0.038  0.042  0.045  0.048  0.052  0.056  0.060
  263     PC  0.064  0.068  0.072  0.076  0.080  0.085  0.090  0.095  0.100  0.105
  264     PC  0.110  0.115  0.120  0.127  0.134  0.140  0.147  0.155  0.163  0.172
  265     PC  0.181  0.193  0.204  0.220  0.235  0.259  0.283  0.387  0.663  0.699
  266     PC  0.735  0.754  0.772  0.786  0.799  0.810  0.820  0.828  0.835  0.843
  267     PC  0.850  0.858  0.865  0.873  0.880  0.885  0.889  0.894  0.898  0.903
  268     PC  0.907  0.912  0.916  0.921  0.925  0.929  0.934  0.938  0.943  0.947
  269     PC  0.952  0.955  0.958  0.961  0.964  0.967  0.970  0.973  0.976  0.979
  270     PC  0.982  0.985  0.988  0.991  0.994  0.997  1.000
  271     LS      0     70     50
  272     UD   0.20
          *
          *
          *

  273     KK   29TH
  274     KO      5
  275     HC      2      0
          *
          *
          *
```

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

  276     KK  PONDB
  277     KO      5
          *
          *   ASSUMED OUTLET   10  WEIR AT ELEV. 159.0
          *
  278     RS      1   ELEV  159.0
  279     SA   5.10   5.10
  280     SE  159.0  170.0
  281     SQ      0     35     70    105    140    175    210    245    280    315
  282     SQ  350.0
  283     SE  159.0 160.13 160.80 161.36 161.86 162.31 162.74 163.15 163.53 163.90
  284     SE  164.3
          *
          *
          *
  285     ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT LINE NO.

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



```
                .
                .
257             .       DEV-1
                .         .
                .         .
273          29TH.........
                V
                V
276          PONDB

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION
```

```
*****************************************
*                                       *
*  FLOOD HYDROGRAPH PACKAGE  (HEC-1)    *
*           FEBRUARY 1981               *
*         REVISED 02 AUG 88             *
*                                       *
* RUN DATE  04/10/2006  TIME  15:29:00  *
*                                       *
*****************************************
```


```
*****************************************
*                                       *
*   U.S. ARMY CORPS OF ENGINEERS        *
*  THE HYDROLOGIC ENGINEERING CENTER    *
*         609 SECOND STREET             *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 551-1748              *
*                                       *
*****************************************
```


```
                    MODIFIED FONTANA DRAINAGE PLAN (40-AC NEW MARKET OFFICE SPACE TRACT ADDED)
                    DEVELOPED CONDITIONS
                    BY BLB    DATE 03-13-04, MODIFIED BY PDF 4/10/06

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

    IT        HYDROGRAPH TIME DATA
                    NMIN        15  MINUTES IN COMPUTATION INTERVAL
                   IDATE     1JAN 4  STARTING DATE
                   ITIME      1200  STARTING TIME
                      NQ       129  NUMBER OF HYDROGRAPH ORDINATES
                  NDDATE     2JAN 4  ENDING DATE
                  NDTIME      2000  ENDING TIME
                   ICENT        19  CENTURY MARK

                COMPUTATION INTERVAL      .25 HOURS
                    TOTAL TIME BASE   32.00 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

    JP         MULTI-PLAN OPTION
                   NPLAN         1  NUMBER OF PLANS

    JR         MULTI-RATIO OPTION
                  RATIOS OF PRECIPITATION
                 7.80


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          **************
          *            *
  8 KK    *     BSN5   *
          *            *
          **************

  9 KO        OUTPUT CONTROL VARIABLES
                   IPRNT         5  PRINT CONTROL
                   IPLOT         5  PLOT CONTROL
                   QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          **************
          *            *
 24 KK    *    POND7   *
          *            *
          **************

 25 KO        OUTPUT CONTROL VARIABLES
                   IPRNT         5  PRINT CONTROL
```

```
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


           ***************
           *             *
 33 KK     *      BSN4   *
           *             *
           ***************

 34 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


           ***************
           *             *
 49 KK     *     PD7&4   *
           *             *
           ***************

 50 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


           ***************
           *             *
 52 KK     *     POND6   *
           *             *
           ***************

 53 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


           ***************
           *             *
 61 KK     *      BSN7   *
           *             *
           ***************

 62 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


           ***************
           *             *
 77 KK     *      7PD6   *
           *             *
           ***************

 78 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
```

```
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          ***************
          *             *
 80 KK    *     POND5   *
          *             *
          ***************

 81 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          ***************
          *             *
 89 KK    *      BSN6   *
          *             *
          ***************

 90 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          ***************
          *             *
105 KK    *      RTE6   *
          *             *
          ***************

106 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          ***************
          *             *
108 KK    *     OFFST   *
          *             *
          ***************

109 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          ***************
          *             *
124 KK    *      BSN8   *
          *             *
          ***************

125 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
```

```
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


           **************
           *            *
 80 KK     *    POND5   *
           *            *
           **************

 81 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


           **************
           *            *
 89 KK     *     BSN6   *
           *            *
           **************

 90 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


           **************
           *            *
105 KK     *     RTE6   *
           *            *
           **************

106 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


           **************
           *            *
108 KK     *    OFFST   *
           *            *
           **************

109 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


           **************
           *            *
124 KK     *     BSN8   *
           *            *
           **************

125 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
```

```
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          **************
          *            *
140 KK    *    608P5   *
          *            *
          **************

141 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          **************
          *            *
143 KK    *    POND4   *
          *            *
          **************

144 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          **************
          *            *
150 KK    *    BSN10   *
          *            *
          **************

151 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          **************
          *            *
166 KK    *    10PD4   *
          *            *
          **************

167 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          **************
          *            *
169 KK    *    POND3   *
          *            *
          **************

170 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
```

```
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


           **************
           *            *
176 KK     *      BSN3  *
           *            *
           **************

177 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


           **************
           *            *
192 KK     *      BSN2  *
           *            *
           **************

193 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


           **************
           *            *
208 KK     *     POND1  *
           *            *
           **************

209 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


           **************
           *            *
217 KK     *    3PD1&3  *
           *            *
           **************

218 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


           **************
           *            *
220 KK     *     POND2  *
           *            *
           **************

221 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
```

```
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


           ***************
           *             *
 229 KK    *     PONDA   *
           *             *
           ***************

 230 KO          OUTPUT CONTROL VARIABLES
                      IPRNT          5  PRINT CONTROL
                      IPLOT          5  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


           ***************
           *             *
 238 KK    *     NORTH   *
           *             *
           ***************

 239 KO          OUTPUT CONTROL VARIABLES
                      IPRNT          5  PRINT CONTROL
                      IPLOT          5  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


           ***************
           *             *
 254 KK    *    OFFSTE   *
           *             *
           ***************

 255 KO          OUTPUT CONTROL VARIABLES
                      IPRNT          5  PRINT CONTROL
                      IPLOT          5  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


           ***************
           *             *
 257 KK    *     DEV-1   *
           *             *
           ***************

 258 KO          OUTPUT CONTROL VARIABLES
                      IPRNT          5  PRINT CONTROL
                      IPLOT          5  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


           ***************
           *             *
 273 KK    *      29TH   *
           *             *
           ***************

 274 KO          OUTPUT CONTROL VARIABLES
                      IPRNT          5  PRINT CONTROL
```

```
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          ***************
          *             *
276 KK    *     PONDB   *
          *             *
          ***************

277 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          5  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE
```

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION RATIO 1 7.80
HYDROGRAPH AT					
+	BSN5	.02	1	FLOW	32.
				TIME	12.50
ROUTED TO					
+	POND7	.02	1	FLOW	12.
				TIME	13.50
			** PEAK STAGES IN FEET **		
			1	STAGE	171.83
				TIME	13.50
HYDROGRAPH AT					
+	BSN4	.02	1	FLOW	22.
				TIME	12.75
2 COMBINED AT					
+	PD7&4	.04	1	FLOW	31.
				TIME	13.00
ROUTED TO					
+	POND6	.04	1	FLOW	10.
				TIME	15.50
			** PEAK STAGES IN FEET **		
			1	STAGE	172.05
				TIME	15.50
HYDROGRAPH AT					
+	BSN7	.05	1	FLOW	61.
				TIME	12.75
2 COMBINED AT					
+	7PD6	.10	1	FLOW	64.
				TIME	12.75
ROUTED TO					
+	POND5	.10	1	FLOW	35.
				TIME	13.75
			** PEAK STAGES IN FEET **		
			1	STAGE	168.73
				TIME	13.75
HYDROGRAPH AT					
+	BSN6	.01	1	FLOW	12.
				TIME	12.50
ROUTED TO					
+	RTE6	.01	1	FLOW	12.
				TIME	13.25
HYDROGRAPH AT					
+	OFFST	.36	1	FLOW	273.
				TIME	13.50
HYDROGRAPH AT					
+	BSN8	.03	1	FLOW	40.
				TIME	12.25
4 COMBINED AT					
+	6O8P5	.49	1	FLOW	326.
				TIME	13.50
ROUTED TO					
+	POND4	.49	1	FLOW	232.
				TIME	14.50
			** PEAK STAGES IN FEET **		

```
                                    1   STAGE      168.71
                                        TIME        14.50

 HYDROGRAPH AT
+                   BSN10      .02   1   FLOW         27.
                                        TIME        12.50

  2 COMBINED AT
+                   10PD4      .51   1   FLOW        236.
                                        TIME        14.50

 ROUTED TO
+                   POND3      .51   1   FLOW        224.
                                        TIME        15.50

                                    ** PEAK STAGES IN FEET **
                                    1   STAGE      168.52
                                        TIME        15.50

 HYDROGRAPH AT
+                    BSN3      .02   1   FLOW         33.
                                        TIME        12.50

 HYDROGRAPH AT
+                    BSN2      .03   1   FLOW         32.
                                        TIME        12.50

 ROUTED TO
+                   POND1      .03   1   FLOW         31.
                                        TIME        12.75

                                    ** PEAK STAGES IN FEET **
                                    1   STAGE      170.78
                                        TIME        12.75

  3 COMBINED AT
+                  3PD1&3      .56   1   FLOW        270.
                                        TIME        12.50

 ROUTED TO
+                   POND2      .56   1   FLOW        267.
                                        TIME        12.75

                                    ** PEAK STAGES IN FEET **
                                    1   STAGE      168.29
                                        TIME        12.75

 ROUTED TO
+                   PONDA      .56   1   FLOW        264.
                                        TIME        13.00

                                    ** PEAK STAGES IN FEET **
                                    1   STAGE      166.86
                                        TIME        13.00

 HYDROGRAPH AT
+                   NORTH      .02   1   FLOW         27.
                                        TIME        12.25

  2 COMBINED AT
+                  OFFSTE      .58   1   FLOW        274.
                                        TIME        13.00

 HYDROGRAPH AT
+                   DEV-1      .06   1   FLOW        184.
                                        TIME        12.00

  2 COMBINED AT
+                    29TH      .64   1   FLOW        411.
                                        TIME        12.00

 ROUTED TO
+                   PONDB      .64   1   FLOW        321.
                                        TIME        12.50

                                    ** PEAK STAGES IN FEET **
                                    1   STAGE      163.97
                                        TIME        12.50
```

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

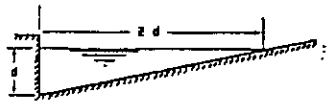
County	Expected 24-hour Storm Rainfall in Inches — Storm Frequency in Years						Normal Annual Precipitation
	100	50	25	10	5	2	Inches
Pawnee	6.6	6.0	5.2	4.5	3.7	2.8	23.3
Phillips	6.0	5.5	4.8	4.1	3.4	2.5	23.6
Pottawatomie	7.5	6.6	5.9	5.1	4.3	3.4	33.6
Pratt	7.2	6.4	5.6	4.8	4.1	3.0	24.6
Rawlins	5.5	5.0	4.3	3.6	3.1	2.3	21.0
Reno	7.4	6.6	5.8	5.0	4.2	3.2	27.7
Republic	6.8	6.0	5.4	4.6	3.9	2.9	28.6
Rice	7.3	6.4	5.6	4.8	4.1	3.0	26.6
Riley	7.4	6.5	5.8	5.1	4.3	3.3	33.5
Rooks	6.1	5.7	4.9	4.1	3.4	2.5	23.9
Rush	6.5	5.9	5.0	4.3	3.6	2.7	23.3
Russell	6.7	5.9	5.2	4.4	3.7	2.8	26.8
Saline	7.3	6.4	5.7	4.9	4.1	3.1	28.4
Scott	5.7	5.3	4.5	3.8	3.2	2.4	20.2
Sedgwick	7.8	7.0	6.1	5.3	4.5	3.5	30.6
Seward	6.0	5.7	4.8	4.2	3.5	2.6	19.8
Shawnee	7.8	6.8	6.1	5.3	4.5	3.5	34.7
Sheridan	5.7	5.3	4.5	3.8	3.2	2.4	21.3
Sherman	5.3	4.8	4.2	3.5	3.0	2.2	16.7
Smith	6.3	5.7	5.0	4.2	3.5	2.6	24.4
Stafford	7.1	6.2	5.5	4.7	4.0	2.9	25.1
Stanton	5.6	5.2	4.5	3.8	3.2	2.4	15.8
Stevens	5.9	5.5	4.7	4.1	3.4	2.5	19.7
Sumner	8.0	7.1	6.2	5.4	4.6	3.6	34.0

x-slope = 3/8"/ft = 0.03125%

z = 1/x-slope = 1/0.03125 = 32

n = 0.016

z/n = 32/0.016 = 2000 always



EQUATION: $Q = 0.56\left(\frac{z}{n}\right) S^{1/2} d^{8/3}$

n IS ROUGHNESS COEFFICIENT IN MANNING FORMULA APPROPRIATE TO MATERIAL IN BOTTOM OF CHANNEL

z IS RECIPROCAL OF CROSS SLOPE

REFERENCE: H. R. B. PROCEEDINGS 1946, PAGE 150, EQUATION (14)

EXAMPLE (SEE INSTRUCTION 1)

GIVEN: S = 0.03

z = 24, n = .02 ⟹ z/n = 1200

Q = 2.0 CFS

FIND: d = 0.22 BY FOLLOWING DASHED LINES

RATIO z/n

10000, 9000, 8000, 7000, 6000, 5000, 4000, 3000, 2000, 1000, 900, 800, 700, 600, 500, 400, 300, 200, 100, 90, 80, 70, 60, 50, 40, 30, 20, 10

TURNING LINE

DISCHARGE (Q) IN CFS

100, 70, 50, 30, 20, 10, 7, 5, 3, 2, 1, .7, .5, .3, .2, .1, .07, .05, .03, .02, .01

SLOPE OF CHANNEL (S) IN FT./FT.

.10, .08, .07, .06, .05, .04, .03, .02, .01, .008, .007, .006, .005, .004, .003, .002, .001

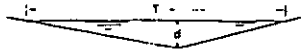
DEPTH AT CURB OR DEEPEST POINT (d) IN FT.

2.0, 1.0, .90, .70, .60, .50, .40, .30, .20, .10, .08, .07, .06, .05, .04, .03, .02, .01

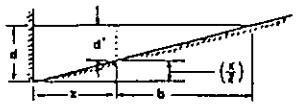
INSTRUCTIONS

1. CONNECT z/n RATIO WITH SLOPE (S) AND CONNECT DISCHARGE (Q) WITH POINT WHERE LINE CROSSES TURNING LINE. READ DEPTH AT CURB (d). Q CAN BE FOUND FROM d BY CONNECTING d WITH CROSSING OF TURNING LINE

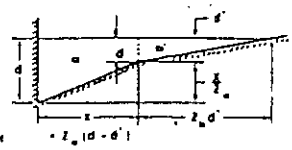
2. FOR SHALLOW V-SHAPED CHANNEL AS SHOWN USE NOMOGRAPH AS EXPLAINED IN INSTRUCTION 1 BUT WITH $z = \frac{T}{d}$.



3. TO DETERMINE DISCHARGE Q_x IN PORTION OF CHANNEL HAVING WIDTH x: DETERMINE DEPTH d FOR TOTAL DISCHARGE IN ENTIRE SECTION AS EXPLAINED IN 1. THEN USE NOMOGRAPH TO DETERMINE Q_b IN SECTION OF WIDTH b FOR DEPTH $d' = d - \left(\frac{x}{z}\right)$. THEN $Q_x = Q - Q_b$.



4. TO DETERMINE DISCHARGE (Q_T) IN COMPOSITE SECTION:- FOLLOW INSTRUCTION 3. TO OBTAIN DISCHARGE (Q_a) IN SECTION a AT ASSUMED DEPTH d BASED ON AN EXTENSION OF SLOPE RATIO z_a TO INTERSECT WATER SURFACE; OBTAIN Q_b FOR SLOPE RATIO z_b AND DEPTH d'; $d' = d - \frac{x}{z_a}$. THEN $Q_T = Q_a + Q_b$.



BUREAU OF PUBLIC ROADS
REV. JAN. 1968

NOMOGRAPH FOR FLOW IN TRIANGULAR CHANNELS

April 15, 1986

ATTACHMENT A
DRAINAGE CRITERIA MANUAL

RAINFALL INTENSITY TABLE FOR SEDGWICK COUNTY, KANSAS

The following tabulation contains rainfall intensity in inches per hour as derived from ESSA Weather Bureau Technical Paper 40 Modified to NWS Hydro-35, 1977 During First Hour

(t_c)

DURATION IN MINUTES	RETURN PERIODS OF 1-YR	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
5	i = 4.18	5.57	6.53	7.41	8.52	9.48	10.32
6	3.99	5.32	6.25	7.09	8.16	9.09	9.89
7	3.81	5.09	5.99	6.81	7.84	8.74	9.50
8	3.66	4.89	5.75	6.55	7.55	8.42	9.15
9	3.52	4.70	5.54	6.31	7.28	8.13	8.83
10	3.39	4.52	5.34	6.09	7.04	7.86	8.54
11	3.27	4.36	5.16	5.89	6.81	7.61	8.27
12	3.18	4.21	4.99	5.71	6.60	7.38	8.02
13	3.05	4.08	4.84	5.53	6.41	7.17	7.79
14	2.96	3.95	4.69	5.37	6.23	6.97	7.57
15	2.87	3.83	4.56	5.22	6.06	6.78	7.37
16	2.78	3.72	4.43	5.08	5.90	6.60	7.18
17	2.71	3.61	4.31	4.95	5.75	6.44	7.00
18	2.63	3.51	4.20	4.83	5.61	6.29	6.84
19	2.56	3.42	4.10	4.71	5.47	6.14	6.68
20	2.50	3.33	4.00	4.60	5.35	6.00	6.53
21	2.44	3.25	3.90	4.50	5.23	5.87	6.39
22	2.38	3.17	3.81	4.40	5.12	5.75	6.26
23	2.32	3.10	3.73	4.31	5.01	5.63	6.13
24	2.27	3.03	3.65	4.22	4.91	5.52	6.01
25	2.22	2.96	3.57	4.13	4.81	5.41	5.90
26	2.20	2.90	3.50	4.05	4.72	5.31	5.79
27	2.16	2.84	3.43	3.98	4.63	5.21	5.69
28	2.14	2.78	3.37	3.90	4.55	5.12	5.59
29	2.11	2.72	3.30	3.83	4.47	5.03	5.49
30	2.08	2.67	3.24	3.76	4.39	4.94	5.40
31	2.05	2.62	3.19	3.70	4.32	4.86	5.32
32	2.02	2.57	3.10	3.63	4.25	4.79	5.22
33	1.99	2.52	3.05	3.57	4.18	4.71	5.14
34	1.96	2.48	3.01	3.51	4.11	4.63	5.07
35	1.93	2.44	2.98	3.46	4.05	4.56	5.00
36	1.91	2.39	2.93	3.41	3.99	4.50	4.93
37	1.89	2.35	2.88	3.36	3.93	4.43	4.86
38	1.87	2.32	2.84	3.31	3.87	4.37	4.79
39	1.85	2.28	2.80	3.26	3.82	4.31	4.73
40	1.83	2.24	2.76	3.22	3.76	4.25	4.66
41	1.81	2.21	2.72	3.17	3.71	4.19	4.60
42	1.79	2.18	2.68	3.13	3.66	4.13	4.54
43	1.77	2.14	2.64	3.09	3.61	4.08	4.49
44	1.75	2.11	2.61	3.05	3.57	4.03	4.43
45	1.73	2.08	2.57	3.01	3.52	3.98	4.38

ATTACHMENT A CONTINUED
Page 2

DURATION IN MINUTES	RETURN PERIODS OF 1-YR	2-YR	.5-YR	10-YR	25-YR	50-YR	100-YR
46	1.70	2.05	2.54	2.97	3.48	3.93	4.33
47	1.67	2.02	2.50	2.93	3.44	3.88	4.28
48	1.66	2.00	2.47	2.90	3.39	3.84	4.23
49	1.64	1.97	2.44	2.86	3.35	3.79	4.18
50	1.61	1.95	2.41	2.83	3.32	3.75	4.13
51	1.59	1.92	2.38	2.79	3.28	3.71	4.09
52	1.56	1.89	2.35	2.76	3.24	3.67	4.05
53	1.54	1.86	2.33	2.73	3.20	3.63	4.00
54	1.52	1.84	2.30	2.70	3.17	3.59	3.96
55	1.50	1.81	2.27	2.67	3.14	3.55	3.92
56	1.47	1.79	2.25	2.64	3.10	3.51	3.88
57	1.45	1.76	2.22	2.61	3.07	3.48	3.84
58	1.43	1.74	2.20	2.59	3.04	3.44	3.81
59	1.42	1.72	2.18	2.56	3.01	3.41	3.77
60	1.40	1.69	2.15	2.53	2.98	3.37	3.73
61	1.38	1.67	2.13	2.51	2.95	3.34	3.70
62	1.36	1.65	2.11	2.48	2.92	3.31	3.67
63	1.34	1.63	2.09	2.46	2.89	3.28	3.63
64	1.33	1.61	2.07	2.44	2.86	3.25	3.60
65	1.31	1.59	2.05	2.41	2.84	3.22	3.57
66	1.30	1.57	2.03	2.39	2.81	3.19	3.54
67	1.28	1.56	2.01	2.37	2.79	3.16	3.51
68	1.26	1.54	1.99	2.35	2.76	3.13	3.48
69	1.25	1.52	1.97	2.33	2.74	3.10	3.45
70	1.24	1.50	1.95	2.31	2.71	3.08	3.42
71	1.22	1.49	1.93	2.28	2.69	3.05	3.39
72	1.21	1.47	1.92	2.26	2.67	3.02	3.36
73	1.20	1.46	1.90	2.25	2.64	3.00	3.34
74	1.18	1.44	1.88	2.23	2.63	2.98	3.31
75	1.17	1.43	1.86	2.21	2.61	2.95	3.29
76	1.16	1.41	1.85	2.19	2.58	2.93	3.26
77	1.15	1.40	1.83	2.17	2.55	2.90	3.24
78	1.13	1.38	1.82	2.15	2.53	2.88	3.22
79	1.12	1.37	1.80	2.14	2.50	2.86	3.19
80	1.11	1.36	1.79	2.12	2.48	2.84	3.16
81	1.10	1.34	1.77	2.10	2.46	2.82	3.13
82	1.09	1.33	1.76	2.08	2.43	2.79	3.10
83	1.08	1.32	1.74	2.06	2.41	2.76	3.07
84	1.07	1.31	1.73	2.04	2.39	2.74	3.04
85	1.06	1.30	1.72	2.02	2.37	2.71	3.01
86	1.05	1.28	1.70	2.00	2.34	2.69	2.99
87	1.04	1.27	1.69	1.99	2.32	2.66	2.96
88	1.03	1.26	1.68	1.97	2.30	2.64	2.93
89	1.02	1.25	1.68	1.95	2.28	2.62	2.91
90	1.01	1.24	1.66	1.93	2.26	2.59	2.88

DURATION IN MINUTES	RETURN PERIODS OF 1-YR	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
91	1.00	1.23	1.65	1.92	2.24	2.57	2.86
92	1.00	1.22	1.63	1.90	2.22	2.55	2.83
93	0.99	1.21	1.62	1.89	2.20	2.53	2.81
94	0.98	1.20	1.61	1.87	2.19	2.51	2.79
95	0.97	1.19	1.59	1.85	2.17	2.49	2.76
96	0.96	1.18	1.58	1.84	2.15	2.46	2.74
97	0.96	1.17	1.57	1.82	2.13	2.44	2.72
98	0.95	1.16	1.56	1.81	2.12	2.42	2.70
99	0.94	1.15	1.54	1.80	2.10	2.41	2.67
100	0.93	1.14	1.53	1.78	2.08	2.39	2.65
101	0.93	1.13	1.52	1.77	2.07	2.39	2.65
102	0.92	1.13	1.51	1.75	2.05	2.35	2.61
103	0.91	1.12	1.50	1.74	2.04	2.33	2.59
104	0.90	1.11	1.49	1.73	2.02	2.31	2.57
105	0.90	1.10	1.47	1.72	2.01	2.30	2.55
106	0.89	1.09	1.46	1.70	1.99	2.28	2.54
107	0.88	1.09	1.45	1.69	1.98	2.26	2.52
108	0.88	1.08	1.44	1.68	1.96	2.25	2.50
109	0.87	1.07	1.43	1.67	1.95	2.23	2.48
110	0.87	1.06	1.42	1.65	1.93	2.21	2.46
111	0.86	1.06	1.41	1.64	1.92	2.20	2.45
112	0.85	1.05	1.40	1.63	1.91	2.18	2.43
113	0.85	1.04	1.39	1.62	1.89	2.17	2.41
114	0.84	1.03	1.38	1.61	1.88	2.15	2.40
115	0.84	1.03	1.37	1.60	1.87	2.14	2.38
116	0.83	1.02	1.36	1.59	1.86	2.12	2.36
117	0.82	1.01	1.36	1.58	1.84	2.11	2.35
118	0.82	1.01	1.35	1.57	1.83	2.09	2.33
119	0.81	1.00	1.34	1.56	1.82	2.08	2.32
120	0.81	0.99	1.33	1.55	1.81	2.07	2.30

DURATION IN HOURS	RETURN PERIODS OF 1-YR	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
2	0.81	0.99	1.33	1.55	1.81	2.07	2.30
3	0.59	0.72	0.97	1.13	1.32	1.51	1.68
4	0.47	0.58	0.78	0.91	1.06	1.21	1.35
5	0.40	0.49	0.66	0.77	0.89	1.02	1.14
6	0.35	0.42	0.57	0.67	0.78	0.89	0.99
8	0.28	0.34	0.46	0.53	0.62	0.71	0.79
10	0.23	0.29	0.39	0.45	0.52	0.60	0.67
12	0.20	0.25	0.33	0.39	0.45	0.52	0.58
18	0.15	0.18	0.24	0.28	0.33	0.38	0.42
24	0.12	0.15	0.20	0.23	0.27	0.31	0.34

ATTACHMENT B

DRAINAGE CRITERIA MANUAL

INCREMENTAL INFILTRATION VALUES IN INCHES

Time Minutes**	SCS Hydrologic Soil Group			
	A	B	C	D
5	.33	.26	.19	.12
10	.25	.17	.09	.04
15	.18	.11	.05	.02
20	.13	.07	.03	.02
25	.10	.05	.03	.02
30	.08	.05	.03	.02
35	.08	.05	.03	.02
40	.08	.05	.03	.02
45	.08	.05	.03	.02
50	.08	.05	.03	.02
55	.08	.05	.03	.02
60	.08	.05	.03	.02
65	.08	.05	.03	.02
70	.08	.05	.03	.02
75	.08	.05	.03	.02
80	.08	.05	.03	.02
85	.08	.05	.03	.02
90	.08	.05	.03	.02
95	.08	.05	.03	.02
100	.08	.05	.03	.02
105	.08	.05	.03	.02
110	.08	.05	.03	.02
115	.08	.05	.03	.02
120	.08	.05	.03	.02

**Time at end of the time increment

NOTE: Values for 125 minutes and additional 5 minute increments shall be the same as those shown for 120 minutes.

ATTACHMENT C

DRAINAGE CITERIA MANUAL

DEPRESSION STORAGE LOSSES

Surface Type	Total Loss (Inches)
Impervious:	
Paved Areas	0.1
Flat Roofs	0.1
Sloped Roofs	0.05
Pervious:	
Lawns and Grass	0.3
Wooded Areas and Open Fields	0.4

ATTACHMENT F

DETERMINATION OF DIMENSIONLESS WATERSHED CONVEYANCE FACTOR (Ø)

$$\emptyset = \emptyset_1 + \emptyset_2$$

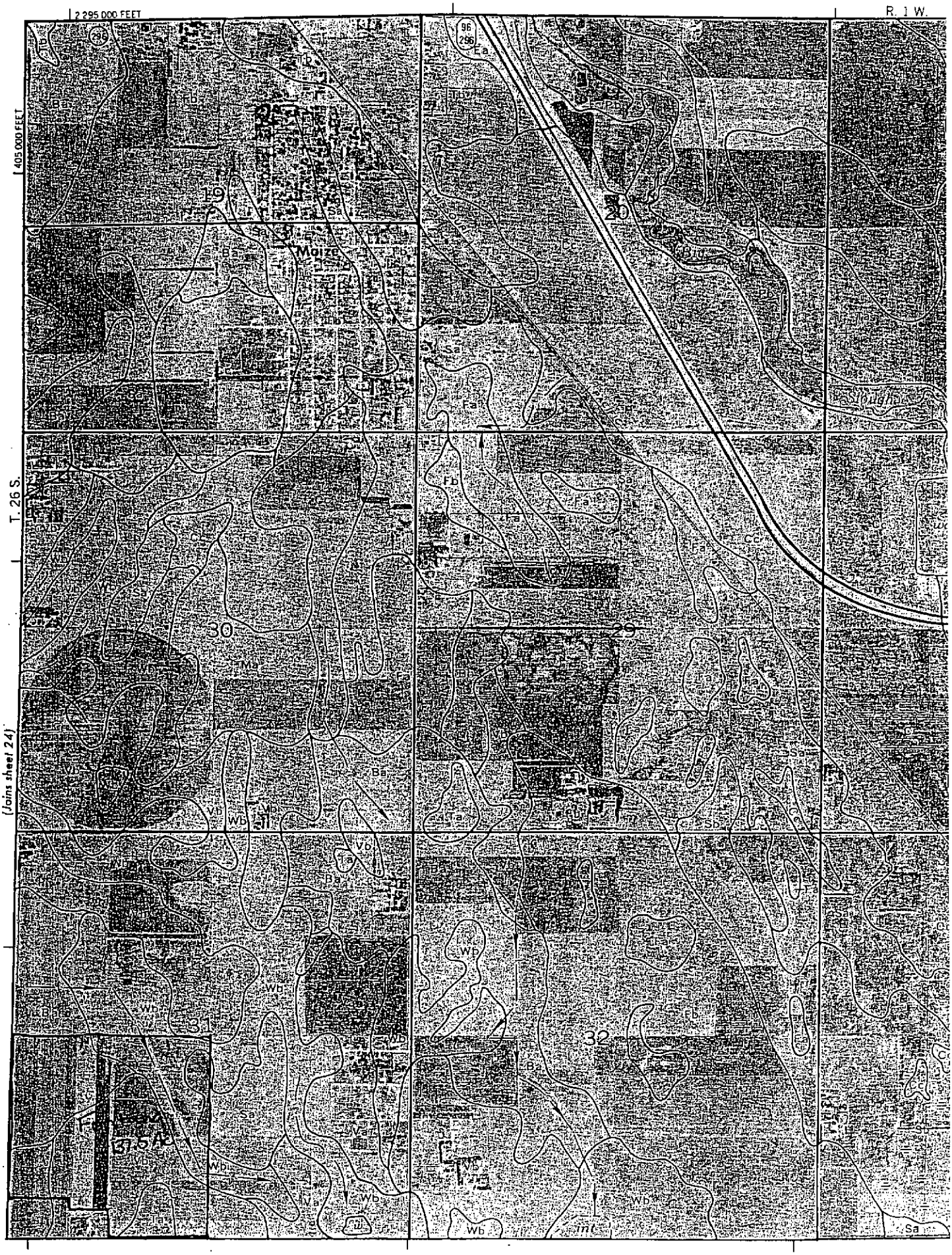
$\emptyset_1$	Classification
0.6	Extensive channel improvement and storm sewer system, closed conduit channel system
0.7	Moderate channel improvement and storm sewer system.
0.8	Some channel improvement and storm sewers, mainly cleaning and enlargement of existing channel.
0.9	Little channel improvement and storm sewers.
1.0	Natural channel conditions.

$\emptyset_2$	Classification
0.0	No channel vegetation.
0.1	Light channel vegetation.
0.2	Moderate channel vegetation.
0.3	Heavy channel vegetation.

EXHIBIT NO. 1

SOIL LEGEND

SYMBOL	HYDROLOGIC GROUP	NAME
Aa	B	Albion-Shellabarger sandy loams, 1 to 4 percent slopes
Ab	B	Albion and Shellabarger sandy loans, 7 to 15 percent slopes
Ba	C	Blanket silt loam, 0 to 1 percent slopes
Bb	C	Blanket silt loan, 1 to 3 percent slopes
Ca	B	Canadian fine sandy loan
Cb	B	Canadian-Waldeck fine sandy loams
Cc	D	Carwile fine sandy loam
Cd	B	Clark-Ost clay loams, 1 to 4 percent slopes
Ce	C	Clime silty clay, 3 to 6 percent slopes
Ea	B	Elandco silt loam
Eb	B	Elandco silt loam, occasionally flooded
Ec	B	Elandco silt loam, frequently flooded
Fa	B	Farnum loam, 0 to 1 percent slopes
Fb	B	Farnum loam, 1 to 3 percent slopes
Fc	B	Farnum loam, sandy substratum, 0 to 1 percent slopes
Ga	D	Goessel silty clay, 0 to 1 percent slopes
Gb	D	Goessel silty clay, 1 to 2 percent slopes
Ia	D	Irwin silty clay loam, 1 to 3 percent slopes
Ib	D	Irwin silty clay loam, 3 to 6 percent slopes
Ic	D	Irwin silty clay loam, 2 to 6 percent slopes, eroded
La	C	Lesho loam
Lb	A	Lincoln soils
Ma	B	Milan loam, 1 to 3 percent slopes
Mb	B	Milan form, 3 to 6 percent slopes
Mc	B	Milan clay loam, 2 to 6 percent slopes, eroded
Na	B	Naron fine sandy loam
Oc	D	Owens clay loam, 1 to 3 percent slopes
Od	D	Owens-Rock outcrop complex, 3 to 10 percent slopes
Pa		Pits
Pb	D	Plevna fine sandy loam
Pc	A	Pratt loamy fine sand, undulating
Pd	A	Pratt-Tivoli complex, rolling
Ra	D	Renfrow silty clay loam, 1 to 3 percent slopes
Rb	D	Renfrow silty clay loam, 3 to 6 percent slopes
Rc	D	Renfrow-Owens clay loams, 1 to 4 percent slopes
Rd	D	Rosehill silty clay, 1 to 3 percent slopes
Sa	B	Shellabarger sandy loam, 1 to 3 percent slopes
Sb	B	Shellabarger sandy loam, 3 to 6 percent slopes
Sc	B	Shellabarger sandy loam, 3 to 6 percent slopes, eroded
Ta	D	Tabler silty clay loam
Tb	D	Tabler-Drummond complex
Ua	B	Urban land-Canadian complex
Ub	B	Urban land-Elandco complex
Uc	B	Urban land-Farnum complex, 0 to 3 percent slopes
Ud	D	Urban land-Irwin complex, 1 to 3 percent slopes
Ue	D	Urban land-Tabler complex
Va	B	Vanoss silt loam, 0 to 1 percent slopes
Vb	B	Vanoss silt loam, 1 to 3 percent slopes
Vc	B	Vanoss silt loam, 3 to 6 percent slopes
Vd	B	Vanoss silt loam, 3 to 6 percent slopes, eroded
Ve	D	Vernon sandy loam, 1 to 3 percent slopes
Vf	D	Vernon sandy loam, 3 to 6 percent lopes
Wa	C	Waldeck sandy loam
Wb	D	Waurika silt loam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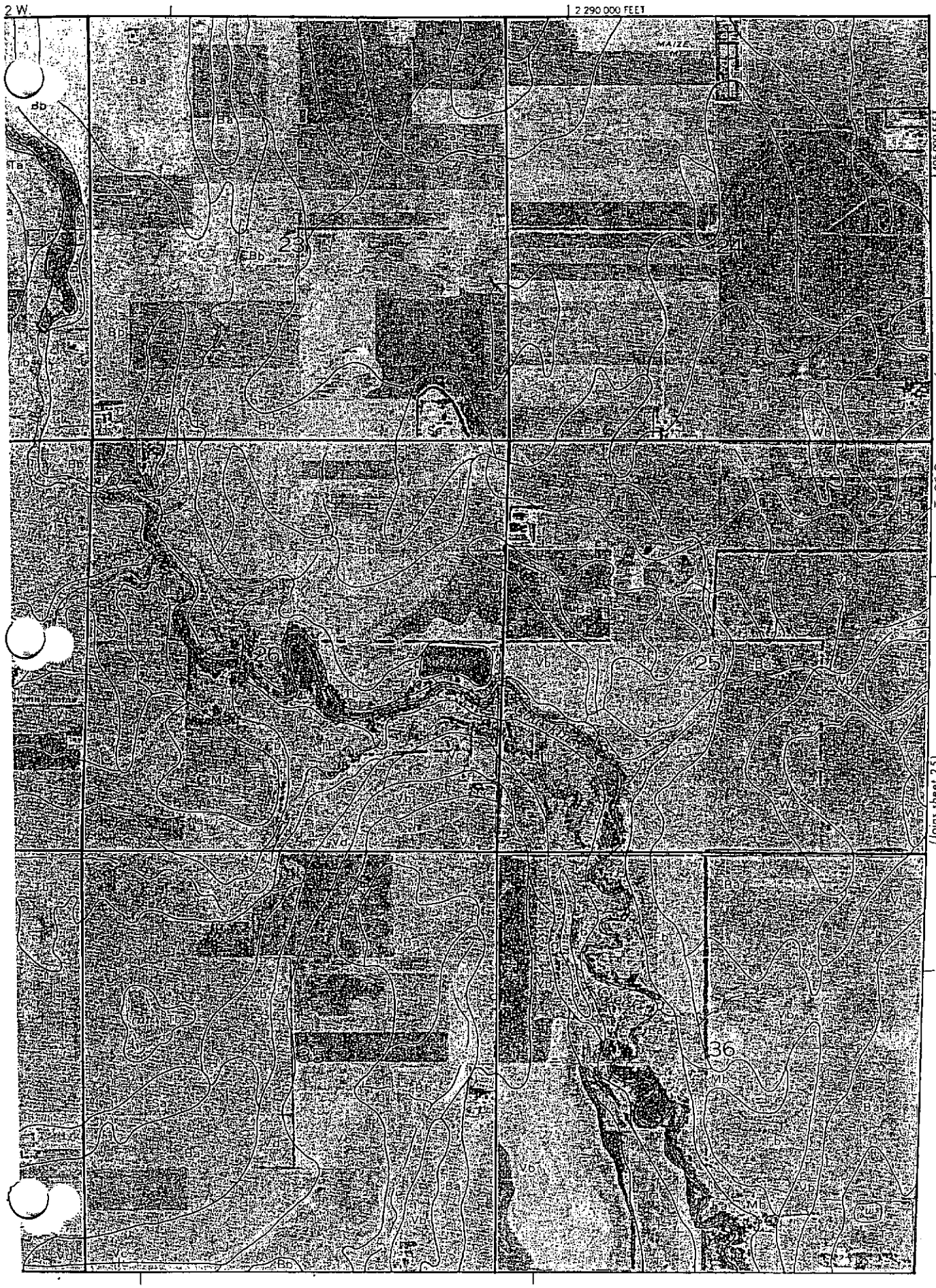

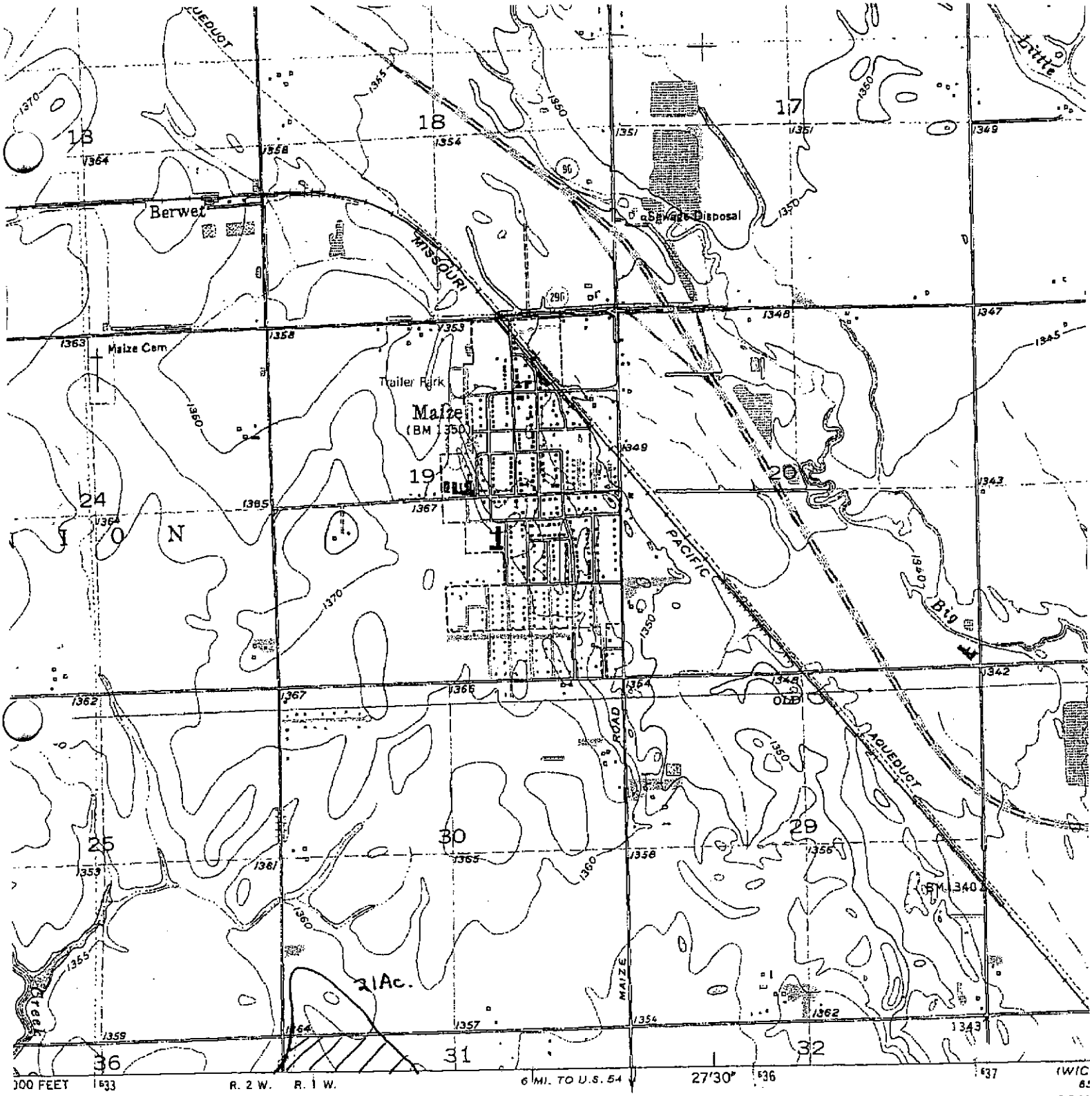

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n with State of Kansas agencies

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DECLINATION AT CENTER OF SHEET

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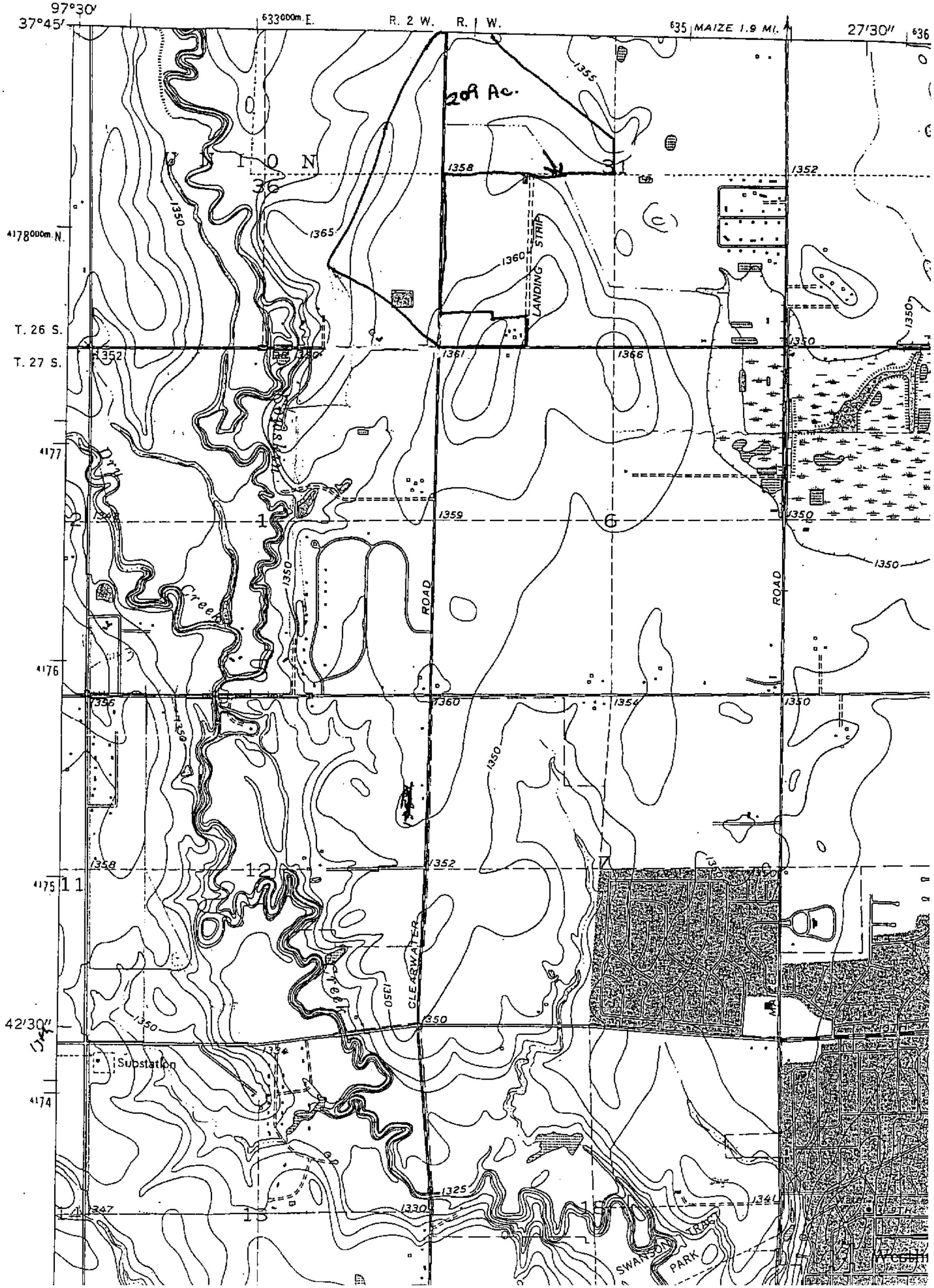
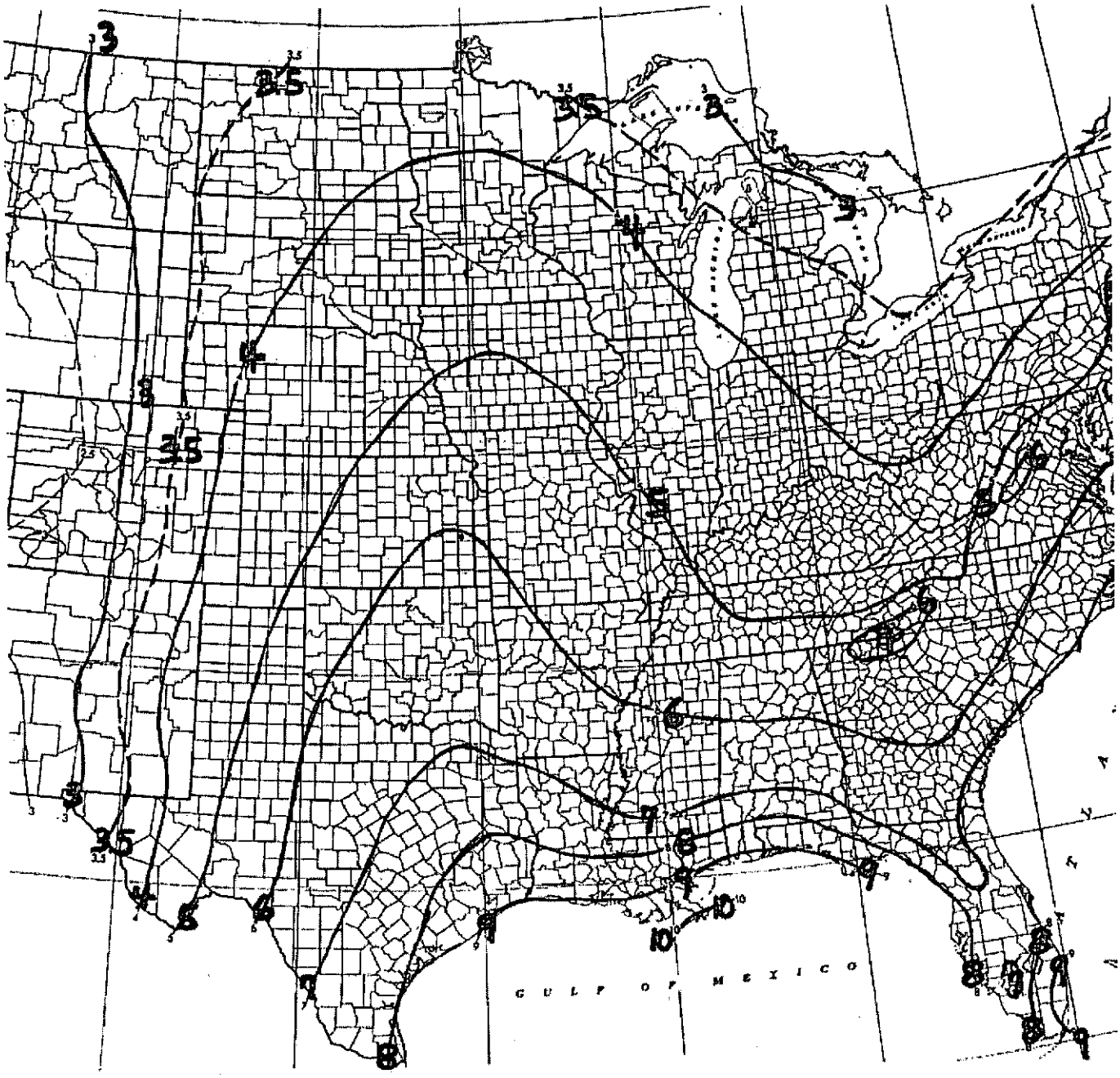
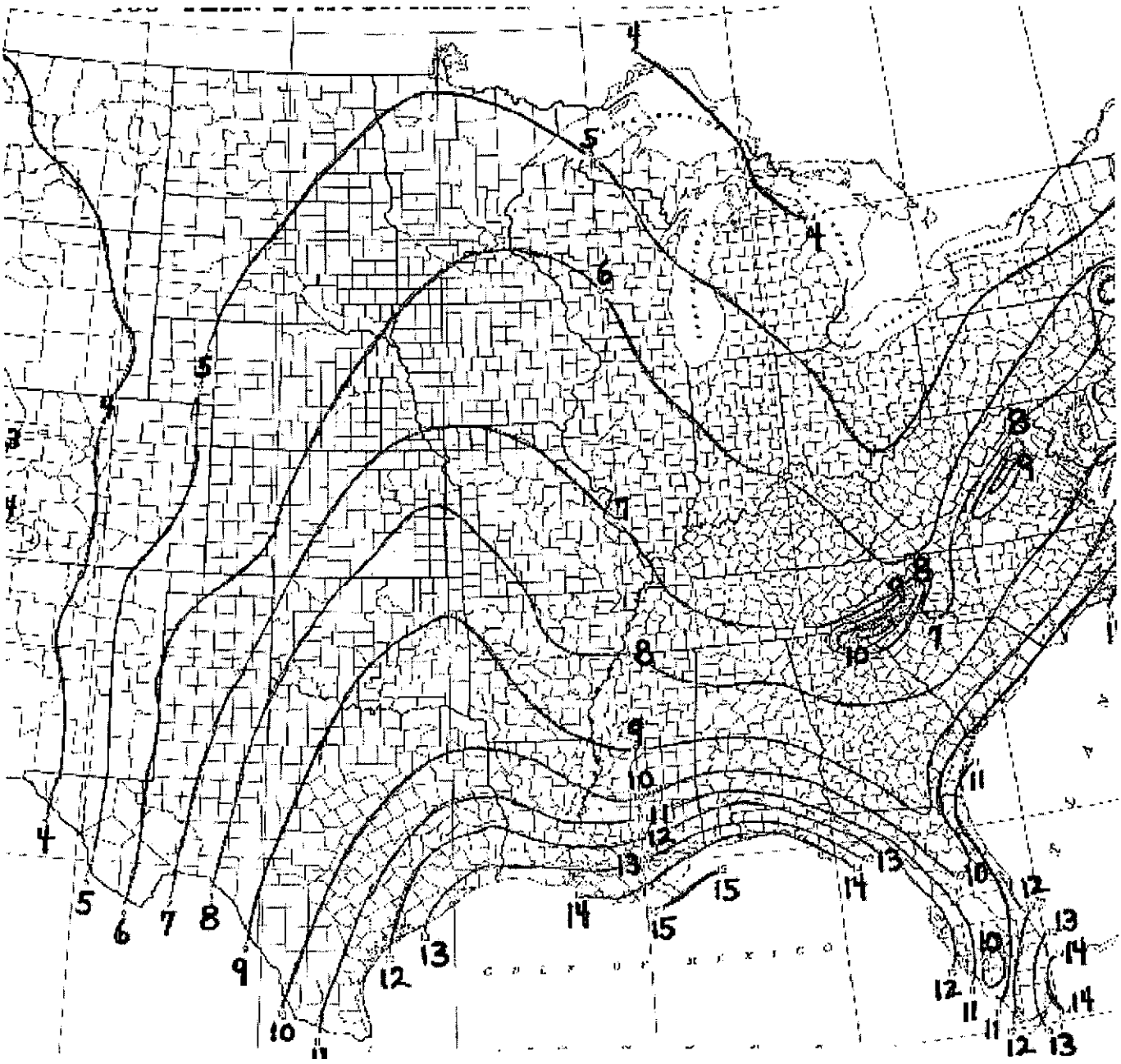
UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY



100 Year 6 Hour Rainfall (Inches)



100 Year 24 Hour Rainfall (Inches)



(3 pages)

ATTACHMENT D

DRAINAGE CRITERIA

RECOMMENDED RUNOFF COEFFICIENTS FOR RATIONAL METHOD
AND PERCENT IMPERVIOUS FOR UNIT HYDROGRAPH METHOD

Land Use or Surface Characteristics	Percent Impervious	Frequency 2	5	10	100
1. Business:					
Downtown Areas	95	0.84	0.85	0.87	0.91
Neighborhood Areas	70	0.68	0.69	0.73	0.80
2. Residential:					
Single Family (Soil Group D)					
1/8 Acre	50	0.57	0.61	0.66	0.79
1/4 Acre	38	0.50	0.54	0.62	0.76
1/3 Acre	30	0.46	0.50	0.59	0.73
1/2 Acre	25	0.42	0.48	0.56	0.72
3/4 Acre	22	0.42	0.46	0.55	0.71
1 Acre	20	0.41	0.45	0.54	0.71
Multi-Family (Soil Group D)					
Multi-Unit (detached)	60	0.62	0.66	0.72	0.82
Multi-Unit (attached)	65	0.64	0.68	0.73	0.83
Apartments	75	0.70	0.73	0.79	0.86
Single Family (Soil Group C)					
1/8 Acre	50	0.55	0.58	0.64	0.73
1/4 Acre	38	0.48	0.51	0.57	0.68
1/3 Acre	30	0.43	0.46	0.53	0.65
1/2 Acre	25	0.40	0.43	0.50	0.63
3/4 Acre	22	0.39	0.42	0.49	0.62
1 Acre	20	0.37	0.40	0.48	0.61
Multi-Family (Soil Group C)					
Multi-Unit (detached)	60	0.60	0.63	0.69	0.77
Multi-Unit (attached)	65	0.63	0.66	0.71	0.79
Apartments	75	0.68	0.72	0.77	0.83
Single-Family (Soil Group B)					
1/8 Acre	50	0.52	0.54	0.59	0.67
1/4 Acre	38	0.44	0.46	0.52	0.61
1/3 Acre	30	0.39	0.41	0.47	0.57
1/2 Acre	25	0.36	0.38	0.44	0.54
3/4 Acre	22	0.34	0.36	0.42	0.52
1 Acre	20	0.33	0.35	0.40	0.51
Multi-Family (Soil Group B)					
Multi-Unit (detached)	60	0.58	0.60	0.65	0.72
Multi-Unit (attached)	65	0.61	0.64	0.68	0.75
Apartments	75	0.67	0.70	0.74	0.80

Land Use or Surface Characteristics	Percent Impervious	Frequency 2	5	10	100
Single Family (Soil Group A)					
1/8 Acre	50	0.47	0.50	0.54	0.60
1/4 Acre	38	0.39	0.41	0.45	0.52
1/3 Acre	30	0.33	0.35	0.39	0.47
1/2 Acre	25	0.30	0.31	0.35	0.44
3/4 Acre	22	0.28	0.29	0.33	0.42
1 Acre	20	0.26	0.28	0.32	0.40
Multi-Family (Soil Group A)					
Multi-Unit (detached)	60	0.55	0.57	0.61	0.67
Multi-Unit (attached)	65	0.58	0.60	0.64	0.70
Apartments	75	0.65	0.68	0.72	0.77
3. Industrial:					
Light Areas	70	0.68	0.69	0.73	0.80
Heavy Areas	80	0.74	0.76	0.79	0.84
4. Playgrounds:	15	0.33	0.35	0.42	0.55
5. Schools:	40	0.49	0.51	0.56	0.66
6. Railroad Yard Areas:	30	0.43	0.45	0.50	0.62
Undeveloped Urban Areas: Offsite Flow Analysis (when land use not defined)	45	0.52	0.54	0.59	0.68
8. Streets:					
Paved	99	0.87	0.88	0.90	0.93
Gravel	00	0.24	0.26	0.33	0.48
9. Drive, Parking Lots and Walks:	96	0.87	0.87	0.88	0.89
10. Roofs:	90	0.80	0.85	0.90	0.93
11. Urban Lawn Areas (See Note No. 1 below):					
Soil Group A					
Slope less than 1%	00	0.08	0.09	0.13	0.23
Slope 1% to 4%	00	0.12	0.13	0.17	0.27
Slope more than 4%	00	0.16	0.17	0.21	0.31
Soil Group B					
Slope less than 1%	00	0.16	0.18	0.24	0.37
Slope 1% to 4%	00	0.20	0.22	0.28	0.41
Slope more than 4%	00	0.24	0.26	0.32	0.45
Soil Group C					
Slope less than 1%	00	0.24	0.27	0.35	0.51
Slope 1% to 4%	00	0.26	0.29	0.37	0.53
Slope more than 4%	00	0.28	0.31	0.39	0.55

Land Use or ace Characteristics	Percent Impervious	Frequency 2	5	10	100
Soil Group D					
Slope less than 1%	00	0.28	0.33	0.43	0.63
Slope 1% to 4%	00	0.30	0.35	0.45	0.65
Slope more than 4%	00	0.32	0.37	0.47	0.67

Note No. 1: Coefficients shown in the above table are for pervious open space areas with thick turf which includes pervious areas in parks and cemeteries. Coefficients shown above must be increased 0.02 for use with agricultural pasture areas. Coefficients shown above must be reduced by 0.04 for use with agricultural cultivated areas. Group A soils are well-drained, coarse textured sands with high infiltration rates. Group B soils are moderately well-drained, moderately coarse textured soils with moderate infiltration rates. Group C soils are moderately poor-drained, moderately fine textured soils with slow infiltration rates. Group D soils are poor-drained, fine textured soils with very slow infiltration rates.

GENERAL NOTE: These Rational Formula Coefficients may not be valid for basins 320 acres or larger.

ATTACHMENT E

DRAINAGE CRITERIA

AVERAGE OVERLAND FLOW VELOCITY FOR USE WITH URBANIZED AREAS

Surface Type	VELOCITY IN FEET/SECOND FOR SLOPES IN PERCENT SHOWN																			
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	20.0
Forest with Heavy Ground Litter or Meadow	0.03	0.04	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.16	0.21	0.28	0.33	0.39	0.46	0.53	0.60	0.72	1.10
Fallow or Minimum Tillage Cultivation	0.06	0.08	0.10	0.12	0.13	0.14	0.16	0.17	0.18	0.19	0.29	0.40	0.51	0.66	0.78	0.91	1.05	1.20	1.44	2.10
Short Grass Pasture or Lawns	0.09	0.13	0.15	0.18	0.20	0.21	0.23	0.25	0.26	0.28	0.45	0.60	0.77	0.96	1.17	1.33	1.50	1.68	1.98	3.20
Almost Bare Ground	0.16	0.22	0.28	0.31	0.35	0.38	0.41	0.44	0.46	0.49	0.70	0.85	1.05	1.26	1.50	1.75	2.03	2.32	2.79	4.40
Grassed Waterway	0.35	0.48	0.58	0.67	0.77	0.84	0.91	0.98	1.05	1.12	1.54	1.82	2.10	2.38	2.78	3.20	3.66	4.14	4.56	7.00
Paved Areas (Sheet Flow) or Shallow Gutter Flow	0.44	0.62	0.77	0.91	1.05	1.12	1.19	1.26	1.33	1.40	2.00	2.55	3.20	3.83	4.41	5.04	5.70	6.00	6.20	9.00