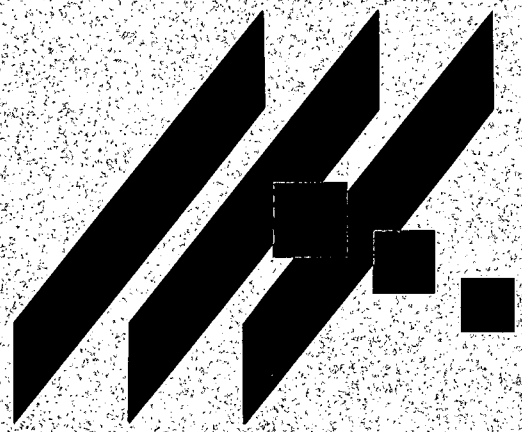
MKEC ENGINEERING CONSULTANTS, INC



DRAINAGE REPORT

FOR

THE WATERFRONT ADDITION

SEPTEMBER 2002

411 N. WEBB ROAD • WICHITA, KS 67206 • 316-684-9600 • FAX 316-684-5100

Drainage Report for The Waterfront Addition
Wichita, Kansas

Location

The site is located in Wichita, Sedgwick County, Kansas, on the northeast corner of Webb Road and 13th Street North. It lies in the Southwest Quarter, Section 9, Township 27 South, Range 2 East. The total site area is approximately 67 acres. The site is bounded by Webb Road to the west, 13th Street to the south, and undeveloped meadow area to the east. The Burlington Northern Railroad abuts the property to the north, with the Eastminster Addition to the north of the railroad. The site is shown on the Andover, Kansas Quadrangle located in Appendix A.

Soils

According to the NRCS (SCS) Sedgwick County Soil Survey (Appendix B), most of the site is in the Irwin Series (Ia: Irwin silty clay loam, with 1 to 3 percent slopes) and the Rose Hill Series (Rd: silty clay, 1 to 3 percent slopes). A small portion in the northwest corner of the site is in the Vanoss Series (Va: Vanoss silt loam, with 1 to 3 percent slopes). The Hydrological Soil Group (HSG) for the Irwin and Rose Hill series soils is D. The HSG for the Vanoss series soil is B. The Vanoss series comprises a very small portion of the area, therefore the drainage calculations were based on soil group D.

Pre-developed Conditions

Current Development
The site is currently undeveloped pasture land. The site is currently being used as a recreational area.

Current Landform and Slope
Slopes across the site range from 1-4% from east to west. An existing lake covers approximately 14 acres of the site, with a 1.5 acre silt pond to the north of the lake. Elevations on the site range from 1386 ft. in the northeast corner to 1369 ft. at the lake water surface. The lake is controlled on the south by a bridge under 13th St. North. The bridge opening is 27' wide.

Current Drainage Conditions
An area surrounding the existing lake is designated as Zone A (FIRM Panel 150, Sedgwick County, June 3, 1986) (shown in Appendix C). The remainder of the site is in Zone C.

Upstream of Site

Approximately 555 acres drain into the existing lake. Approximately 225 acres drains from the north to the Eastminster Addition, directly north of the site. This runoff passes through an existing detention facility east of the Eastminster Presbyterian Church, north of the railroad. An additional 105 acres drains to the existing 11'x9' reinforced concrete box (RCB) which passes under the railroad tracks. The runoff then passes through an existing channel and into the silt pond on the site. An additional 28 acres drains to the silt pond. An existing earthen dam separates the silt pond from the lake. The runoff must pass around the dam to the west and into the lake. An additional 196 acres drains to the existing lake. This includes approximately 48 acres from the west side of Webb Road. This area drains through an existing RCB under Webb Road and into the lake. Most of the developable area upstream of the site is already developed, with the exception of the area just west of Webb Road, which is currently undeveloped pasture land.

Current Runoff Characteristics

The pre-developed watershed is divided into nine different sub-watersheds: 1 is the area North of Eastminster, 2 is the tributary from the west, 3 is the area draining to the railroad, 4 is the area draining to the silt pond, 5 is the area north and east of the site, 6 is the area directly east of the site, 7 includes the site itself, 8 is the area to the west of Webb Road, and 9 is the area draining to the lake south of Webb Road. These areas have been shown on the Andover Quadrangle map in Appendix A. The TR-20 software model was used to calculate peak flows using the SCS 24-hour storm (results are shown in Appendix D). The curve numbers used for the sub-watersheds were calculated based on percentage of development within each sub-watershed. They range from 82 to 90.5. Peak discharge from the sub-watersheds and watershed for the 2, 5, 10, and 100-year return periods under existing conditions are shown in Table 1. Sub-watersheds 5, 6, 7, and 8 were modeled together for the existing conditions model.

Table 1. Pre-developed runoff.

Sub-Watershed	2-Year (cfs)	5-Year (cfs)	10-Year (cfs)	100-Year (cfs)
1	154	216	257	408
2	118	167	200	318
3	161	221	262	417
4	33	49	59	98
(5-8 Combined)	183	265	320	522
9	237	359	439	745
Total to Lake	740	1030	1185	1736
Total Exiting Lake	294	490	607	1091

Due to the complexity of modeling the lakes north and south of Webb Road as separate reservoirs, the lakes were combined and modeled as one reservoir. The lakes were modeled based on an existing control structure and spillway at the south end of the south lake. The existing weir is a concrete structure with a 12' wide notch at elevation 1368.7', and an additional 70' of width at elevation 1369.7'. Currently, there is a wood plank covering the 12' wide notch. However, this wood plank is not bonded to the concrete with a watertight seal, and water leaks out along the seam between the wood and concrete. The owner has indicated that the wood plank will be removed from the weir prior to the subject development. The lake was modeled without this weir in place, for both existing and proposed conditions. Rating curves for the weir were developed using the HY-8 computer software program.

Post-Developed Condition

Proposed Development

The site will develop as commercial lots. Uses anticipated include office buildings and restaurants.

Proposed Landform and Slope

Proposed slopes are expected to range from 0.5% to 3%. A proposed street will be constructed along the east and north sides of the development. Drainage from the east and north will be conveyed under the street through RCB's as shown on the Drainage & Utility Plan in Appendix E. Existing drainage patterns west and south of the proposed road will remain the same as existing. Some fill will likely be required along the lake banks, and a proposed seawall is to be constructed near the south end of the lake. Other improvements will include removal of the existing silt pond dam, and expansion of the lake into this area. An additional detention pond is proposed on the east side of the proposed road as well. The proposed lake expansion, removal of silt pond dam, and detention pond were all included in the proposed conditions hydrology model. Permits for filling in the mapped floodplain will be obtained from the Kansas Dept. of Agriculture, Division of Water Resources.

Proposed Runoff Characteristics

The TR-20 software model calculated peak flows for the developed watersheds using the SCS 24-hour storm (results are shown in Appendix F). Sub-watersheds 4 and 7 were changed to reflect increased runoff curve numbers and decreased times of concentration due to development. A curve number of 95.0 was used for the proposed developed areas, with a time of concentration estimated at 20-25 minutes. Runoff under the developed conditions for the 2, 5, 10, and 100-year return periods are shown in Table 2.

Table 2. Post-developed runoff.

Sub-Watershed	2-Year (cfs)	5-Year (cfs)	10-Year (cfs)	100-Year (cfs)
1	154	216	257	408
2	118	167	200	318
3	161	221	262	417
4	63	85	100	153
5	34	53	66	117
6	55	84	104	180
Total to Prop. Pond	89	137	170	296
Total out of Prop. Pond	44	70	95	190
7	142	187	217	325
8	43	69	86	153
9	237	359	439	744
Total to Lake	769	1107	1333	2109
Total Exiting Lake	218	405	532	1098

The additional runoff due to development of the site will have minimal impact on the watershed as whole. The short time of concentration for the developed area will allow the additional runoff to pass through the lake prior to the peak runoff from upstream. The proposed detention pond will also help to reduce flows into the existing lake facilities. Discharge from the south lake will increase by 7 cfs (0.6%). Water surface elevations for the lakes will increase by 0.01' under proposed conditions. A HEC-RAS hydraulic model was prepared and indicates a 100-year water surface elevation of 1372.14 for the north lake, and 1371.92 for the south lake. This model will be revised as the lake improvement designs are completed.

Proposed on-site storm water sewer systems have been included on the Drainage and Utility plan in Appendix E. Flows from the proposed sub-watersheds were determined using the rational method. Pipe sizes were determined using Manning's equation. Appendix G includes a spreadsheet with the results of these calculations.

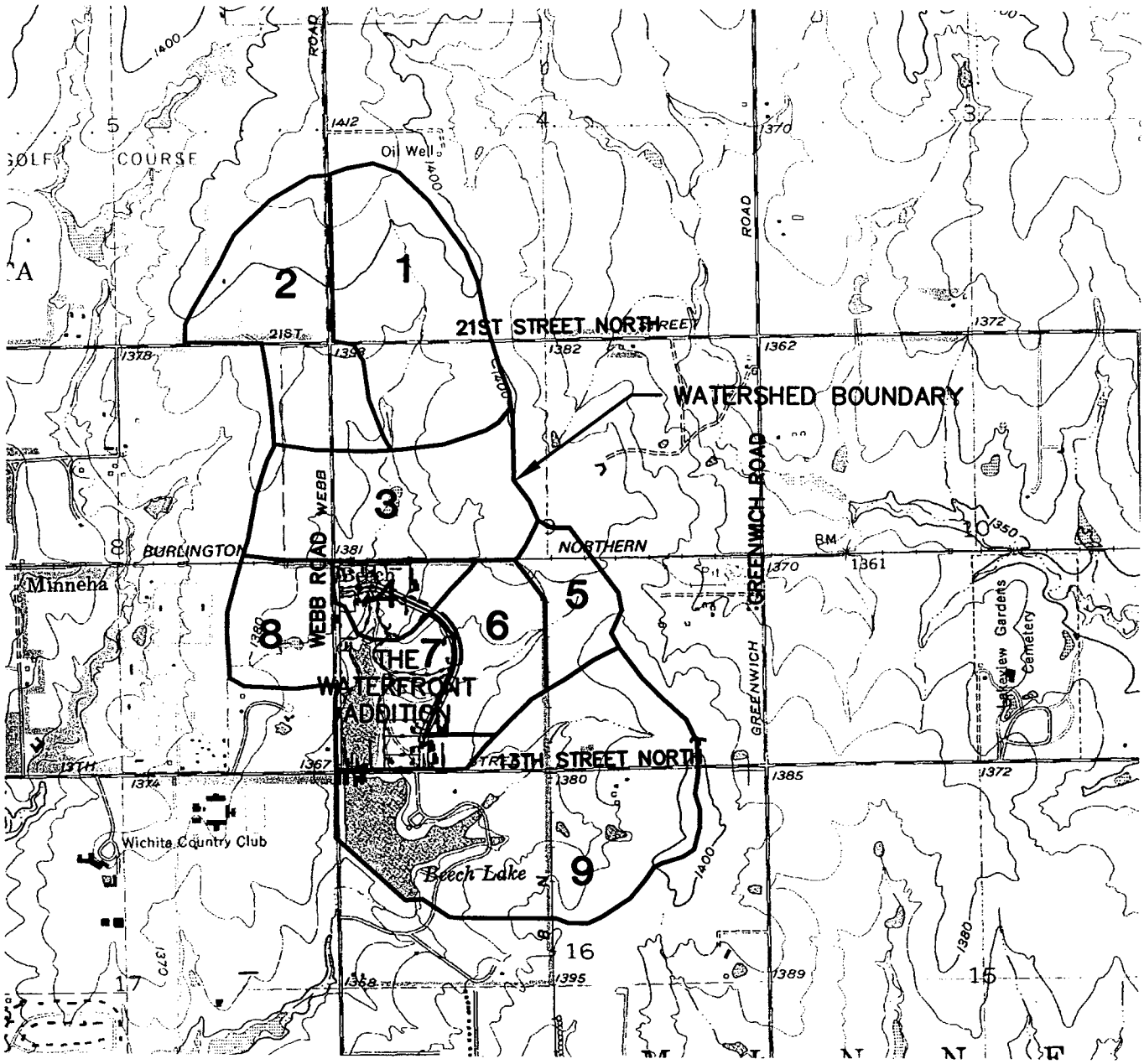
Summary

The Waterfront Addition is a proposed 67-acre development at the northeast corner of Webb Road and 13th St. North in Wichita, Kansas. The site is to be developed as commercial land uses. An existing 14-acre lake on the site will remain. The existing 1.5 acre silt pond will be excavated and included in the lake area. Additional bank treatments such as a seawall are also planned at various points around the lake. An additional 4-acre detention pond is planned east of the development. Hydrologic models for existing and proposed conditions with this report have shown that the development of this property will have minimal effects on properties downstream.

Discharge from the existing lake directly downstream of the site will increase by 0.6% as a result of this development. The required permits from the Division of Water Resources will be obtained prior to filling in the mapped floodplain.

Appendix A

Quadrangle



SCALE 1:24 000

1 MILE

7000 FEET

1 KILOMETER

CONTOUR INTERVAL 10 FEET

NATIONAL GEODETIC VERTICAL DATUM OF 1929

H:\CIVIL\02014\DWG\DRNG\02167QALOWG

MKEC ENGINEERING CONSULTANTS
411 N. WEBB ROAD
WICHITA, KS. 67206
316 - 684 - 9600

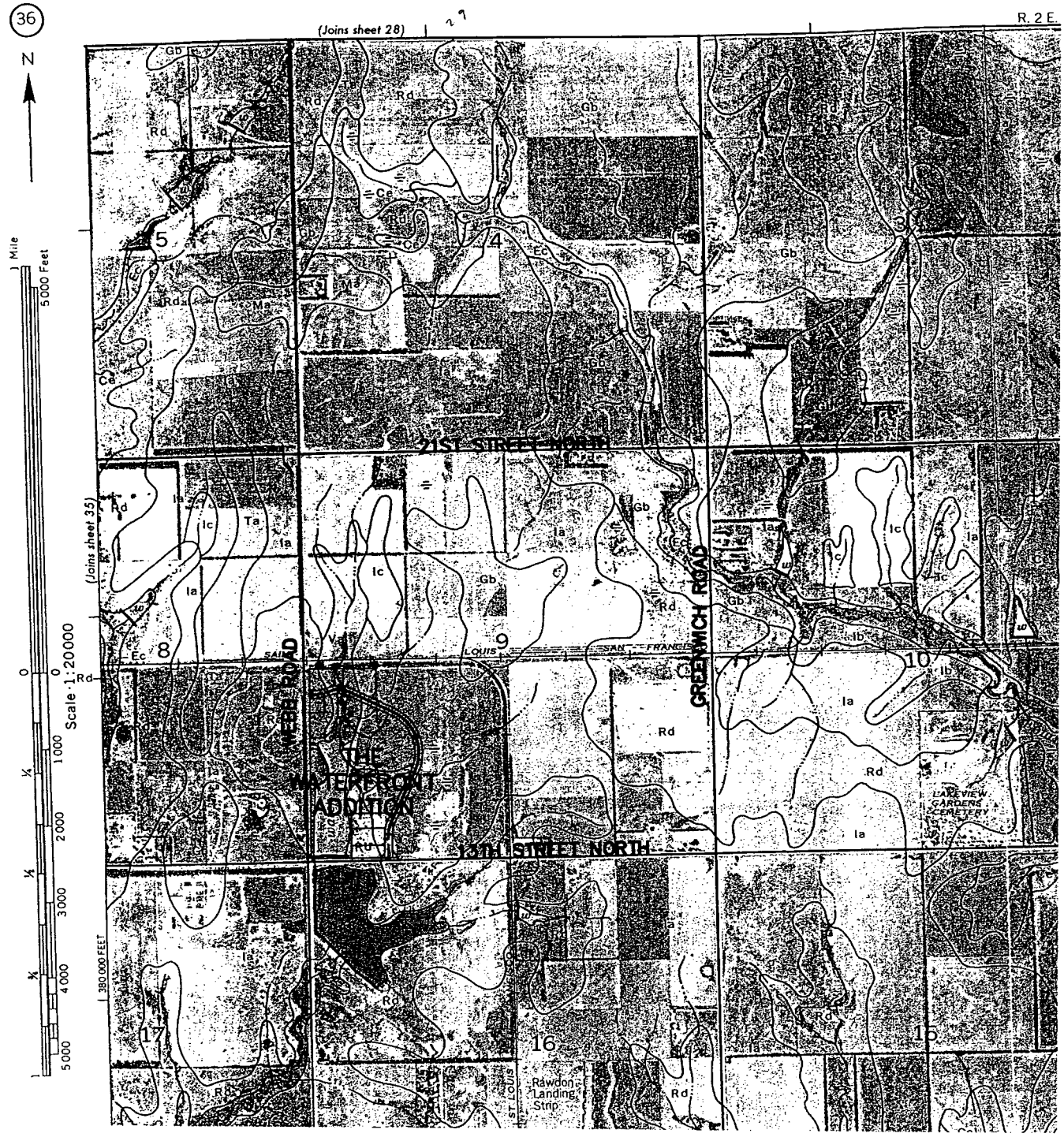
THE WATERFRONT ADDITION
PROJECT NAME

ANDOVER, KANSAS QUADRANGLE
SHEET TITLE

KLA	KLA	GJA
DESIGN BY.	DRAWN BY.	CHECKED BY.
JULY 2002	02014	1 / 1
DATE	JOB NO.	SHEET/OF

Appendix B

Soil Survey



MKEC ENGINEERING CONSULTANTS
411 N. WEBB ROAD
WICHITA, KS. 67206
316 - 684 - 9600

THE WATERFRONT ADDITION
PROJECT NAME

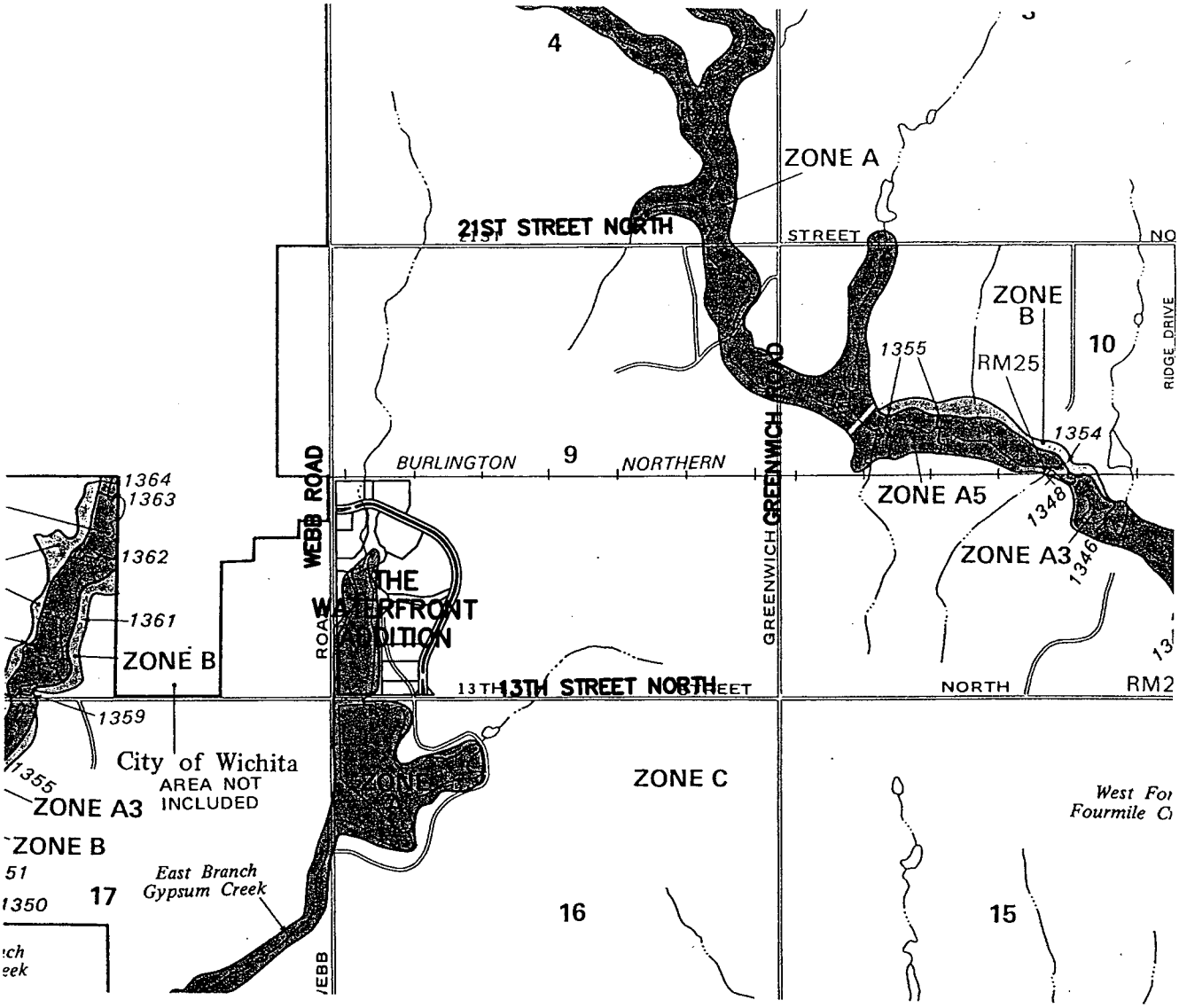
SOIL SURVEY OF SEDGWICK COUNTY, KANSAS
SHEET TITLE

KLA	KLA	GM
DESIGN BY:	DRAWN BY:	CHECKED BY:
SEPTEMBER 2002	02014	1 / 1
DATE	JOB NO.	SHEET/OF

H:\CIVIL\02014\DWG\DRWG\02014SSH.DWG

Appendix C

FIRM



NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

SEDGWICK
COUNTY,
KANSAS
(UNINCORPORATED AREAS)

PANEL 150 OF 300

COMMUNITY-PANEL NUMBER
200321 0150 A

EFFECTIVE DATE:
JUNE 3, 1986

Federal Emergency Management Agency

APPROXIMATE SCALE
2000 0 2000 FEET

MKEC ENGINEERING CONSULTANTS
411 N. WEBB ROAD
WICHITA, KS. 67206
316 - 684 - 9600

C:\CIVIL\02014\DWG\DRWG\02014FNL.DWG

THE WATERFRONT ADDITION
PROJECT NAME

FIRM PANEL 150 OF 300
SEDGWICK COUNTY, KANSAS
SHEET TITLE

KLA	KLA	GJA
DESIGN BY:	DRAWN BY:	CHECKED BY:

SEPTEMBER 2002	02014	1 / 1
DATE	JOB NO.	SHEET/OF

Appendix D

Existing TR-20 Output

```
1


 ****************80-80 LIST OF INPUT DATA FOR TR-20 HYDROLOGY*****************

 JOB TR-20                                FULLPRINT            SUMMARY   NOPLOTS
 TITLE 001 EASTMINSTER - BEECH LAKE - EAST BRANCH GYPSUM CREEK
 TITLE     BEECH2- W/O 2X12 16 AUG 2002  2,5,10,100-YR 24-HR STORM ZONE 5
 4 DIMHYD                  0.02                                                484
  8          .000        .030        .100        .190        .310
  8          .470        .660        .820        .930        .990
  8         1.000        .990        .930        .860        .780
  8          .680        .560        .460        .390        .330
  8          .280        .241        .207        .174        .147
  8          .126        .107        .091        .077        .066
  8          .055        .047        .040        .034        .029
  8          .025        .021        .018        .015        .013
  8          .011        .009        .008        .007        .006
  8          .005        .004        .003        .002        .001
  8          .000        .000        .000        .000        .000
 9 ENDTBL
 5 RAINFL 7                0.5
  8          .000        .002        .005        .009        .013
  8          .018        .023        .029        .035        .042
  8          .050        .059        .068        .078        .089
  8          .101        .114        .128        .144        .162
  8          .183        .208        .244        .339        .723
  8          .773        .802        .825        .844        .861
  8          .876        .890        .903        .914        .924
  8          .934        .943        .951        .959        .966
  8          .972        .977        .982        .986        .990
  8          .993        .996        .998       1.000       1.000
  9 ENDTBL
  3 STRUCT       10
  8                      1369.4      0.0         0.0
  8                      1370.4      6.0         0.279
  8                      1371.4      14.0        1.093
  8                      1372.4      30.0        2.269
  8                      1373.4      60.0        3.606
  8                      1374.4      320.0       7.212
  8                      1375.4      580.0       11.361
  8                      1376.4      760.0       16.450
  8                      1377.4      925.0       23.036
  8                      1378.4      1085.0      31.035
  8                      1379.4      1240.0      40.834
  9 ENDTBL
  3 STRUCT       14
  8                      1369.0      0.0         0.0
  8                      1370.0      38.0        0.639
  8                      1371.0      45.0        1.96
  8                      1372.0      310.0       4.11
1


 ********************80-80 LIST OF INPUT DATA (CONTINUED)*********************

  8                      1373.0      460.0       8.21
  8                      1374.0      522.0       15.16
  8                      1375.0      640.0       24.79
  8                      1376.0      1436.0      36.20
  9 ENDTBL
  3 STRUCT       18
```

```
 8                          1368.7       0.0          0.0
 8                          1369.7       100.0        39.6
 8                          1370.0       208.0        51.09
 8                          1371.0       647.0        103.87
 8                          1372.0       1365.0       165.53
 9 ENDTBL
 6 RUNOFF 1 001         1 0.1216       88.6         0.9092                    1
 6 REACH  3 002    1    2 1500.0       0.85         1.3                       1
 6 RUNOFF 1 002         1 0.0737       90.5         0.7025                    1
 6 ADDHYD 4 002    1 2 3                                                     1
 6 RUNOFF 1 005         5 0.1953       89.3         1.0958                    1
 6 RUNOFF 1 006         6 0.1566       88.3         1.1117                    1
 6 ADDHYD 4 007    5 6 7                                                     1
 6 RUNOFF 1 010         6 0.1638       90.1         0.775                     1
 6 ADDHYD 4 010    7 6 5                                                     1
 6 RESVOR 2     10 5    7 1369.4                                            1
 6 RUNOFF 1 014         6 0.0432       84.4         0.8117                    1
 6 ADDHYD 4 014    7 6 5                                                     1
 6 RESVOR 2     14 5    7 1369.0                                            1
 6 RUNOFF 1 016         6 0.3071       86.4         1.4333                    1
 6 ADDHYD 4 016    7 6 5                                                     1
 6 RUNOFF 1 018         6 0.3483       82.0         0.8666                    1
 6 ADDHYD 4 018    5 6 7                                                     1
 6 RESVOR 2     18 7    5 1368.7                                            1
   ENDATA
 7 INCREM 6              0.10
 7 COMPUT 7 001       18 0.0          3.50         1.0          7 2  11  01
   ENDCMP 1
 7 COMPUT 7 001       18 0.0          4.55         1.0          7 2  12  02
   ENDCMP 1
 7 COMPUT 7 001       18 0.0          5.25         1.0          7 2  13  03
   ENDCMP 1
 7 COMPUT 7 001       18 0.0          7.80         1.0          7 2  14  04
   ENDCMP 1
   ENDJOB 2

 ********************************END OF 80-80 LIST*********************************
1
 TR20 ------------------------------------------------------------------------
             EASTMINSTER - BEECH LAKE - EAST BRANCH GYPSUM CREEK          VERSION
 09/27/** BEECH2- W/O 2X12 16 AUG 2002  2,5,10,100-YR 24-HR STORM ZONE 510/01/90
 13:35:38                          PASS   1                              PAGE   1


   DIMENSIONLESS HYDROGRAPH TABLE ENTERED          TIME INCREMENT =    .02
 8                .0000       .0300       .1000       .1900       .3100
 8                .4700       .6600       .8200       .9300       .9900
 8               1.0000       .9900       .9300       .8600       .7800
 8                .6800       .5600       .4600       .3900       .3300
 8                .2800       .2410       .2070       .1740       .1470
 8                .1260       .1070       .0910       .0770       .0660
 8                .0550       .0470       .0400       .0340       .0290
 8                .0250       .0210       .0180       .0150       .0130
 8                .0110       .0090       .0080       .0070       .0060
 8                .0050       .0040       .0030       .0020       .0010
 8                .0000       .0000       .0000       .0000       .0000
9 ENDTBL
             COMPUTED PEAK RATE FACTOR =    484.00

1
 TR20 ------------------------------------------------------------------------
```

EXECUTIVE CONTROL INCREM MAIN TIME INCREMENT = .10 HOURS

EXECUTIVE CONTROL COMPUT FROM XSECTION 1 TO STRUCTURE 18
STARTING TIME = .00 RAIN DEPTH = 3.50 RAIN DURATION= 1.00
ANT. MOIST. COND. = 2 MAIN TIME INCREMENT = .10 HOURS
ALTERNATE NO.=11 STORM NO.= 1 RAIN TABLE NO.= 7

OPERATION RUNOFF XSECTION 1
OUTPUT HYDROGRAPH= 1 AREA= .12 SQ MI
INPUT RUNOFF CURVE= 89. TIME OF CONCENTRATION= .91 HOURS
COMPUTED INTERNAL TIME INCREMENT = .0992 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.33	103.6	(RUNOFF)

RUNOFF ABOVE BASEFLOW OF .00 CFS
2.32 WATERSHED INCHES; 182 CFS-HRS; 15.0 ACRE-FEET.

OPERATION REACH XSECTION 2
INPUT HYDROGRAPH 1 OUTPUT HYDROGRAPH 2
CHANNEL LENGTH 1500.00 FT
INPUT = COEFFICIENTS RELATED TO XSECTION AREA, X= .85, M= 1.30
MODIFIED ATT-KIN ROUTING COEFFICIENT = .57 PEAK TRAVEL TIME = .20 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.50	99.5	(NULL)

RUNOFF ABOVE BASEFLOW OF .00 CFS
2.32 WATERSHED INCHES; 182 CFS-HRS; 15.0 ACRE-FEET.

OPERATION RUNOFF XSECTION 2
OUTPUT HYDROGRAPH= 1 AREA= .07 SQ MI
INPUT RUNOFF CURVE= 91. TIME OF CONCENTRATION= .70 HOURS
COMPUTED INTERNAL TIME INCREMENT = .0937 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.20	76.9	(RUNOFF)

RUNOFF ABOVE BASEFLOW OF .00 CFS
2.49 WATERSHED INCHES; 118 CFS-HRS; 9.8 ACRE-FEET.

OPERATION ADDHYD XSECTION 2
INPUT HYDROGRAPHS 1,2 OUTPUT HYDROGRAPH 3

1
TR20 ----------

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.35	162.1	(NULL)

```
   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                  2.38 WATERSHED INCHES;      300 CFS-HRS;       24.8 ACRE-FEET.


OPERATION RUNOFF   XSECTION   5
        OUTPUT HYDROGRAPH=  5        AREA=     .20 SQ MI
        INPUT RUNOFF CURVE= 89.      TIME OF CONCENTRATION=  1.10 HOURS
        COMPUTED INTERNAL TIME INCREMENT =  .1012 HOURS

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      12.43                          153.5                        (RUNOFF)

   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                  2.38 WATERSHED INCHES;      300 CFS-HRS;       24.8 ACRE-FEET.


OPERATION RUNOFF   XSECTION   6
        OUTPUT HYDROGRAPH=  6        AREA=     .16 SQ MI
        INPUT RUNOFF CURVE= 88.      TIME OF CONCENTRATION=  1.11 HOURS
        COMPUTED INTERNAL TIME INCREMENT =  .1026 HOURS

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      12.45                          117.5                        (RUNOFF)

   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                  2.29 WATERSHED INCHES;      232 CFS-HRS;       19.2 ACRE-FEET.


OPERATION ADDHYD   XSECTION   7
        INPUT HYDROGRAPHS 5,6     OUTPUT HYDROGRAPH 7

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      12.44                          271.1                        (NULL)

   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                  2.34 WATERSHED INCHES;      532 CFS-HRS;       44.0 ACRE-FEET.


OPERATION RUNOFF   XSECTION  10
        OUTPUT HYDROGRAPH=  6        AREA=     .16 SQ MI
        INPUT RUNOFF CURVE= 90.      TIME OF CONCENTRATION=   .77 HOURS
        COMPUTED INTERNAL TIME INCREMENT =  .1033 HOURS

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      12.24                          161.3                        (RUNOFF)
1
 TR20 ------------------------------------------------------------------------
            EASTMINSTER - BEECH LAKE - EAST BRANCH GYPSUM CREEK        VERSION
 09/27/** BEECH2- W/O 2X12 16 AUG 2002  2,5,10,100-YR 24-HR STORM ZONE 510/01/90
 13:35:38                          PASS   1                              PAGE   4


   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                  2.45 WATERSHED INCHES;      260 CFS-HRS;       21.4 ACRE-FEET.


OPERATION ADDHYD   XSECTION  10
        INPUT HYDROGRAPHS 7,6     OUTPUT HYDROGRAPH 5

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      12.35                          418.8                        (NULL)

   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                  2.38 WATERSHED INCHES;      792 CFS-HRS;       65.4 ACRE-FEET.
```

```
OPERATION RESVOR   STRUCTURE 10
        INPUT HYDROGRAPH 5        OUTPUT HYDROGRAPH 7
        SURFACE ELEVATION=  1369.40

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)          PEAK ELEVATION(FEET)
      12.53                         386.3                        1374.66

   RUNOFF ABOVE BASEFLOW OF    .00 CFS
                2.38 WATERSHED INCHES;     791 CFS-HRS;      65.4 ACRE-FEET.


OPERATION RUNOFF   XSECTION  14
        OUTPUT HYDROGRAPH=  6       AREA=     .04 SQ MI
        INPUT RUNOFF CURVE= 84.     TIME OF CONCENTRATION=    .81 HOURS
        COMPUTED INTERNAL TIME INCREMENT =  .1082 HOURS

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)          PEAK ELEVATION(FEET)
      12.28                          33.3                        (RUNOFF)

   RUNOFF ABOVE BASEFLOW OF    .00 CFS
                1.96 WATERSHED INCHES;      55 CFS-HRS;       4.5 ACRE-FEET.


OPERATION ADDHYD   XSECTION  14
        INPUT HYDROGRAPHS 7,6     OUTPUT HYDROGRAPH 5

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)          PEAK ELEVATION(FEET)
      12.50                         413.5                        (NULL)

   RUNOFF ABOVE BASEFLOW OF    .00 CFS
                2.35 WATERSHED INCHES;     846 CFS-HRS;      69.9 ACRE-FEET.
1
 TR20 ---------------------------------------------------------------------------
            EASTMINSTER - BEECH LAKE - EAST BRANCH GYPSUM CREEK        VERSION
09/27/** BEECH2- W/O 2X12 16 AUG 2002  2,5,10,100-YR 24-HR STORM ZONE 510/01/90
13:35:38                          PASS   1                              PAGE   5


OPERATION RESVOR   STRUCTURE 14
        INPUT HYDROGRAPH 5        OUTPUT HYDROGRAPH 7
        SURFACE ELEVATION=  1369.00

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)          PEAK ELEVATION(FEET)
      12.73                         375.7                        1372.44

   RUNOFF ABOVE BASEFLOW OF    .00 CFS
                2.34 WATERSHED INCHES;     846 CFS-HRS;      69.9 ACRE-FEET.


OPERATION RUNOFF   XSECTION  16
        OUTPUT HYDROGRAPH=  6       AREA=     .31 SQ MI
        INPUT RUNOFF CURVE= 86.     TIME OF CONCENTRATION=  1.43 HOURS
        COMPUTED INTERNAL TIME INCREMENT =  .1012 HOURS

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)          PEAK ELEVATION(FEET)
      12.64                         183.2                        (RUNOFF)

   RUNOFF ABOVE BASEFLOW OF    .00 CFS
                2.13 WATERSHED INCHES;     422 CFS-HRS;      34.9 ACRE-FEET.
```

```
 OPERATION ADDHYD   XSECTION  16
         INPUT HYDROGRAPHS 7,6      OUTPUT HYDROGRAPH 5

    PEAK TIME(HRS)              PEAK DISCHARGE(CFS)          PEAK ELEVATION(FEET)
       12.69                         557.6                       (NULL)

    RUNOFF ABOVE BASEFLOW OF     .00 CFS
                   2.27 WATERSHED INCHES;     1268 CFS-HRS;      104.8 ACRE-FEET.


 OPERATION RUNOFF   XSECTION  18
         OUTPUT HYDROGRAPH=  6        AREA=     .35 SQ MI
         INPUT RUNOFF CURVE= 82.      TIME OF CONCENTRATION=    .87 HOURS
         COMPUTED INTERNAL TIME INCREMENT =  .0945 HOURS

    PEAK TIME(HRS)              PEAK DISCHARGE(CFS)          PEAK ELEVATION(FEET)
       12.31                         236.8                       (RUNOFF)

    RUNOFF ABOVE BASEFLOW OF     .00 CFS
                   1.78 WATERSHED INCHES;      400 CFS-HRS;       33.1 ACRE-FEET.


 OPERATION ADDHYD   XSECTION  18
         INPUT HYDROGRAPHS 5,6      OUTPUT HYDROGRAPH 7
1
 TR20 ------------------------------------------------------------------------
              EASTMINSTER - BEECH LAKE - EAST BRANCH GYPSUM CREEK        VERSION
 09/27/** BEECH2- W/O 2X12 16 AUG 2002  2,5,10,100-YR 24-HR STORM ZONE 510/01/90
 13:35:38                          PASS   1                                PAGE   6


    PEAK TIME(HRS)              PEAK DISCHARGE(CFS)          PEAK ELEVATION(FEET)
       12.51                         739.9                       (NULL)

    RUNOFF ABOVE BASEFLOW OF     .00 CFS
                   2.13 WATERSHED INCHES;     1668 CFS-HRS;      137.9 ACRE-FEET.


 OPERATION RESVOR   STRUCTURE 18
         INPUT HYDROGRAPH 7         OUTPUT HYDROGRAPH 5
         SURFACE ELEVATION=  1368.70

    PEAK TIME(HRS)              PEAK DISCHARGE(CFS)          PEAK ELEVATION(FEET)
       13.49                         294.1                      1370.20

    RUNOFF ABOVE BASEFLOW OF     .00 CFS
                   2.13 WATERSHED INCHES;     1665 CFS-HRS;      137.6 ACRE-FEET.


 EXECUTIVE CONTROL ENDCMP    COMPUTATIONS COMPLETED FOR PASS   1
1
 TR20 ------------------------------------------------------------------------
              EASTMINSTER - BEECH LAKE - EAST BRANCH GYPSUM CREEK        VERSION
 09/27/** BEECH2- W/O 2X12 16 AUG 2002  2,5,10,100-YR 24-HR STORM ZONE 510/01/90
 13:35:38                          PASS   2                                PAGE   7


 EXECUTIVE CONTROL COMPUT    FROM XSECTION   1  TO STRUCTURE 18
    STARTING TIME =    .00         RAIN DEPTH =  4.55       RAIN DURATION=  1.00
    ANT. MOIST. COND. = 2          MAIN TIME INCREMENT =   .10 HOURS
    ALTERNATE NO.=12               STORM NO.= 2             RAIN TABLE NO.= 7
```

```
 OPERATION RUNOFF   XSECTION   1
         OUTPUT HYDROGRAPH=  1        AREA=     .12 SQ MI
         INPUT RUNOFF CURVE= 89.      TIME OF CONCENTRATION=    .91 HOURS
         COMPUTED INTERNAL TIME INCREMENT =  .0992 HOURS

    PEAK TIME(HRS)              PEAK DISCHARGE(CFS)          PEAK ELEVATION(FEET)
       12.32                          146.0                       (RUNOFF)

    RUNOFF ABOVE BASEFLOW OF     .00 CFS
                   3.30 WATERSHED INCHES;      259 CFS-HRS;       21.4 ACRE-FEET.


 OPERATION REACH    XSECTION   2
         INPUT HYDROGRAPH 1         OUTPUT HYDROGRAPH 2
         CHANNEL LENGTH  1500.00 FT
         INPUT = COEFFICIENTS RELATED TO XSECTION AREA,  X=    .85,    M= 1.30
 MODIFIED ATT-KIN ROUTING COEFFICIENT =  .61      PEAK TRAVEL TIME =     .20 HOURS

    PEAK TIME(HRS)              PEAK DISCHARGE(CFS)          PEAK ELEVATION(FEET)
       12.49                          141.1                       (NULL)

    RUNOFF ABOVE BASEFLOW OF     .00 CFS
                   3.30 WATERSHED INCHES;      259 CFS-HRS;       21.4 ACRE-FEET.


 OPERATION RUNOFF   XSECTION   2
         OUTPUT HYDROGRAPH=  1        AREA=     .07 SQ MI
         INPUT RUNOFF CURVE= 91.      TIME OF CONCENTRATION=    .70 HOURS
         COMPUTED INTERNAL TIME INCREMENT =  .0937 HOURS

    PEAK TIME(HRS)              PEAK DISCHARGE(CFS)          PEAK ELEVATION(FEET)
       12.20                          107.0                       (RUNOFF)

    RUNOFF ABOVE BASEFLOW OF     .00 CFS
                   3.49 WATERSHED INCHES;      166 CFS-HRS;       13.7 ACRE-FEET.


 OPERATION ADDHYD   XSECTION   2
         INPUT HYDROGRAPHS 1,2      OUTPUT HYDROGRAPH 3

    PEAK TIME(HRS)              PEAK DISCHARGE(CFS)          PEAK ELEVATION(FEET)
       12.34                          229.1                       (NULL)
1
 TR20 ------------------------------------------------------------------------
              EASTMINSTER - BEECH LAKE - EAST BRANCH GYPSUM CREEK        VERSION
 09/27/** BEECH2- W/O 2X12 16 AUG 2002  2,5,10,100-YR 24-HR STORM ZONE 510/01/90
 13:35:38                          PASS   2                                PAGE   8


    RUNOFF ABOVE BASEFLOW OF     .00 CFS
                   3.37 WATERSHED INCHES;      425 CFS-HRS;       35.1 ACRE-FEET.


 OPERATION RUNOFF   XSECTION   5
         OUTPUT HYDROGRAPH=  5        AREA=     .20 SQ MI
         INPUT RUNOFF CURVE= 89.      TIME OF CONCENTRATION=  1.10 HOURS
         COMPUTED INTERNAL TIME INCREMENT =  .1012 HOURS

    PEAK TIME(HRS)              PEAK DISCHARGE(CFS)          PEAK ELEVATION(FEET)
       12.43                          215.6                       (RUNOFF)

    RUNOFF ABOVE BASEFLOW OF     .00 CFS
                   3.37 WATERSHED INCHES;      425 CFS-HRS;       35.1 ACRE-FEET.
```

```
 OPERATION RUNOFF   XSECTION   6
         OUTPUT HYDROGRAPH=  6        AREA=     .16 SQ MI
         INPUT RUNOFF CURVE= 88.      TIME OF CONCENTRATION=  1.11 HOURS
         COMPUTED INTERNAL TIME INCREMENT =  .1026 HOURS

    PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
       12.44                          167.0                        (RUNOFF)

    RUNOFF ABOVE BASEFLOW OF     .00 CFS
                   3.27 WATERSHED INCHES;      331 CFS-HRS;       27.3 ACRE-FEET.


 OPERATION ADDHYD   XSECTION   7
         INPUT HYDROGRAPHS 5,6      OUTPUT HYDROGRAPH 7

    PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
       12.43                          382.6                        (NULL)

    RUNOFF ABOVE BASEFLOW OF     .00 CFS
                   3.33 WATERSHED INCHES;      756 CFS-HRS;       62.4 ACRE-FEET.


 OPERATION RUNOFF   XSECTION  10
         OUTPUT HYDROGRAPH=  6        AREA=     .16 SQ MI
         INPUT RUNOFF CURVE= 90.      TIME OF CONCENTRATION=    .77 HOURS
         COMPUTED INTERNAL TIME INCREMENT =  .1033 HOURS

    PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
       12.24                          220.9                        (RUNOFF)

    RUNOFF ABOVE BASEFLOW OF     .00 CFS
                   3.45 WATERSHED INCHES;      365 CFS-HRS;       30.1 ACRE-FEET.
1
 TR20 ------------------------------------------------------------------------
            EASTMINSTER - BEECH LAKE - EAST BRANCH GYPSUM CREEK        VERSION
 09/27/** BEECH2- W/O 2X12 16 AUG 2002  2,5,10,100-YR 24-HR STORM ZONE 510/01/90
 13:35:38                          PASS   2                              PAGE   9


 OPERATION ADDHYD   XSECTION  10
         INPUT HYDROGRAPHS 7,6      OUTPUT HYDROGRAPH 5

    PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
       12.35                          586.5                        (NULL)

    RUNOFF ABOVE BASEFLOW OF     .00 CFS
                   3.37 WATERSHED INCHES;     1120 CFS-HRS;       92.6 ACRE-FEET.


 OPERATION RESVOR   STRUCTURE 10
         INPUT HYDROGRAPH 5         OUTPUT HYDROGRAPH 7
         SURFACE ELEVATION=  1369.40

    PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
       12.53                          539.6                       1375.24

    RUNOFF ABOVE BASEFLOW OF     .00 CFS
                   3.37 WATERSHED INCHES;     1120 CFS-HRS;       92.6 ACRE-FEET.


 OPERATION RUNOFF   XSECTION  14
         OUTPUT HYDROGRAPH=  6        AREA=     .04 SQ MI
```

```
        INPUT RUNOFF CURVE= 84.      TIME OF CONCENTRATION=    .81 HOURS
        COMPUTED INTERNAL TIME INCREMENT =  .1082 HOURS

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      12.27                          48.9                        (RUNOFF)

   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                2.89 WATERSHED INCHES;       81 CFS-HRS;        6.7 ACRE-FEET.


OPERATION ADDHYD   XSECTION  14
        INPUT HYDROGRAPHS 7,6      OUTPUT HYDROGRAPH 5

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      12.51                          579.0                       (NULL)

   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                3.33 WATERSHED INCHES;     1201 CFS-HRS;       99.2 ACRE-FEET.


OPERATION RESVOR   STRUCTURE 14
        INPUT HYDROGRAPH 5         OUTPUT HYDROGRAPH 7
        SURFACE ELEVATION=  1369.00
1
TR20 ------------------------------------------------------------------------
            EASTMINSTER - BEECH LAKE - EAST BRANCH GYPSUM CREEK        VERSION
09/27/** BEECH2- W/O 2X12 16 AUG 2002  2,5,10,100-YR 24-HR STORM ZONE 510/01/90
13:35:38                          PASS   2                              PAGE  10


   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      12.83                          477.5                       1373.28

   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                3.33 WATERSHED INCHES;     1200 CFS-HRS;       99.1 ACRE-FEET.


OPERATION RUNOFF   XSECTION  16
        OUTPUT HYDROGRAPH=  6        AREA=     .31 SQ MI
        INPUT RUNOFF CURVE= 86.      TIME OF CONCENTRATION=  1.43 HOURS
        COMPUTED INTERNAL TIME INCREMENT =  .1012 HOURS

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      12.63                          264.7                       (RUNOFF)

   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                3.09 WATERSHED INCHES;      612 CFS-HRS;       50.6 ACRE-FEET.


OPERATION ADDHYD   XSECTION  16
        INPUT HYDROGRAPHS 7,6      OUTPUT HYDROGRAPH 5

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      12.69                          737.1                       (NULL)

   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                3.24 WATERSHED INCHES;     1812 CFS-HRS;      149.7 ACRE-FEET.


OPERATION RUNOFF   XSECTION  18
        OUTPUT HYDROGRAPH=  6        AREA=     .35 SQ MI
        INPUT RUNOFF CURVE= 82.      TIME OF CONCENTRATION=    .87 HOURS
        COMPUTED INTERNAL TIME INCREMENT =  .0945 HOURS
```

```
   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)          PEAK ELEVATION(FEET)
      12.30                         359.1                       (RUNOFF)

   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                  2.68 WATERSHED INCHES;      603 CFS-HRS;       49.8 ACRE-FEET.


 OPERATION ADDHYD   XSECTION  18
         INPUT HYDROGRAPHS 5,6      OUTPUT HYDROGRAPH 7

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)          PEAK ELEVATION(FEET)
      12.50                         1029.7                      (NULL)
1
 TR20 ------------------------------------------------------------------------
             EASTMINSTER - BEECH LAKE - EAST BRANCH GYPSUM CREEK        VERSION
 09/27/** BEECH2- W/O 2X12 16 AUG 2002  2,5,10,100-YR 24-HR STORM ZONE 510/01/90
 13:35:38                          PASS   2                              PAGE  11


   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                  3.08 WATERSHED INCHES;     2414 CFS-HRS;      199.5 ACRE-FEET.


 OPERATION RESVOR   STRUCTURE 18
         INPUT HYDROGRAPH 7         OUTPUT HYDROGRAPH 5
         SURFACE ELEVATION=  1368.70

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)          PEAK ELEVATION(FEET)
      13.50                         490.1                       1370.64

   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                  2.94 WATERSHED INCHES;     2307 CFS-HRS;      190.6 ACRE-FEET.


 EXECUTIVE CONTROL ENDCMP    COMPUTATIONS COMPLETED FOR PASS   2
1
 TR20 ------------------------------------------------------------------------
             EASTMINSTER - BEECH LAKE - EAST BRANCH GYPSUM CREEK        VERSION
 09/27/** BEECH2- W/O 2X12 16 AUG 2002  2,5,10,100-YR 24-HR STORM ZONE 510/01/90
 13:35:38                          PASS   3                              PAGE  12


 EXECUTIVE CONTROL COMPUT    FROM XSECTION   1  TO STRUCTURE 18
    STARTING TIME =    .00         RAIN DEPTH =  5.25       RAIN DURATION=  1.00
    ANT. MOIST. COND. = 2          MAIN TIME INCREMENT =    .10 HOURS
    ALTERNATE NO.=13               STORM NO.= 3             RAIN TABLE NO.= 7


 OPERATION RUNOFF   XSECTION   1
         OUTPUT HYDROGRAPH=  1       AREA=     .12 SQ MI
         INPUT RUNOFF CURVE= 89.     TIME OF CONCENTRATION=    .91 HOURS
         COMPUTED INTERNAL TIME INCREMENT =  .0992 HOURS

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)          PEAK ELEVATION(FEET)
      12.32                         174.3                       (RUNOFF)

   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                  3.97 WATERSHED INCHES;      311 CFS-HRS;       25.7 ACRE-FEET.


 OPERATION REACH    XSECTION   2
         INPUT HYDROGRAPH 1         OUTPUT HYDROGRAPH 2
         CHANNEL LENGTH  1500.00 FT
```

```
        INPUT = COEFFICIENTS RELATED TO XSECTION AREA,  X=    .85,    M= 1.30
 MODIFIED ATT-KIN ROUTING COEFFICIENT =  .62      PEAK TRAVEL TIME =     .20 HOURS

    PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
       12.48                         169.0                        (NULL)

    RUNOFF ABOVE BASEFLOW OF     .00 CFS
                   3.97 WATERSHED INCHES;      311 CFS-HRS;       25.7 ACRE-FEET.


 OPERATION RUNOFF   XSECTION   2
         OUTPUT HYDROGRAPH=  1        AREA=     .07 SQ MI
         INPUT RUNOFF CURVE= 91.      TIME OF CONCENTRATION=    .70 HOURS
         COMPUTED INTERNAL TIME INCREMENT =  .0937 HOURS

    PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
       12.20                         125.6                        (RUNOFF)

    RUNOFF ABOVE BASEFLOW OF     .00 CFS
                   4.16 WATERSHED INCHES;      198 CFS-HRS;       16.4 ACRE-FEET.


 OPERATION ADDHYD   XSECTION   2
         INPUT HYDROGRAPHS 1,2      OUTPUT HYDROGRAPH 3

    PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
       12.34                         273.3                        (NULL)
1
 TR20 ------------------------------------------------------------------------
              EASTMINSTER - BEECH LAKE - EAST BRANCH GYPSUM CREEK         VERSION
 09/27/** BEECH2- W/O 2X12 16 AUG 2002  2,5,10,100-YR 24-HR STORM ZONE 510/01/90
 13:35:38                          PASS   3                              PAGE  13


    RUNOFF ABOVE BASEFLOW OF     .00 CFS
                   4.04 WATERSHED INCHES;      509 CFS-HRS;       42.1 ACRE-FEET.


 OPERATION RUNOFF   XSECTION   5
         OUTPUT HYDROGRAPH=  5        AREA=     .20 SQ MI
         INPUT RUNOFF CURVE= 89.      TIME OF CONCENTRATION=  1.10 HOURS
         COMPUTED INTERNAL TIME INCREMENT =  .1012 HOURS

    PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
       12.43                         257.3                        (RUNOFF)

    RUNOFF ABOVE BASEFLOW OF     .00 CFS
                   4.04 WATERSHED INCHES;      509 CFS-HRS;       42.1 ACRE-FEET.


 OPERATION RUNOFF   XSECTION   6
         OUTPUT HYDROGRAPH=  6        AREA=     .16 SQ MI
         INPUT RUNOFF CURVE= 88.      TIME OF CONCENTRATION=  1.11 HOURS
         COMPUTED INTERNAL TIME INCREMENT =  .1026 HOURS

    PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
       12.44                         199.7                        (RUNOFF)

    RUNOFF ABOVE BASEFLOW OF     .00 CFS
                   3.94 WATERSHED INCHES;      398 CFS-HRS;       32.9 ACRE-FEET.


 OPERATION ADDHYD   XSECTION   7
         INPUT HYDROGRAPHS 5,6      OUTPUT HYDROGRAPH 7
```

```
   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)          PEAK ELEVATION(FEET)
      12.43                         456.9                       (NULL)

   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                  3.99 WATERSHED INCHES;      907 CFS-HRS;       75.0 ACRE-FEET.


 OPERATION RUNOFF   XSECTION  10
         OUTPUT HYDROGRAPH=  6       AREA=     .16 SQ MI
         INPUT RUNOFF CURVE= 90.     TIME OF CONCENTRATION=    .77 HOURS
         COMPUTED INTERNAL TIME INCREMENT =  .1033 HOURS

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)          PEAK ELEVATION(FEET)
      12.24                         261.9                       (RUNOFF)

   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                  4.12 WATERSHED INCHES;      436 CFS-HRS;       36.0 ACRE-FEET.
1
 TR20 ------------------------------------------------------------------------
            EASTMINSTER - BEECH LAKE - EAST BRANCH GYPSUM CREEK        VERSION
 09/27/** BEECH2- W/O 2X12 16 AUG 2002  2,5,10,100-YR 24-HR STORM ZONE 510/01/90
 13:35:38                          PASS   3                              PAGE  14


 OPERATION ADDHYD   XSECTION  10
         INPUT HYDROGRAPHS 7,6     OUTPUT HYDROGRAPH 5

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)          PEAK ELEVATION(FEET)
      12.35                         699.0                       (NULL)

   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                  4.04 WATERSHED INCHES;     1343 CFS-HRS;      111.0 ACRE-FEET.


 OPERATION RESVOR   STRUCTURE 10
         INPUT HYDROGRAPH 5        OUTPUT HYDROGRAPH 7
         SURFACE ELEVATION=  1369.40

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)          PEAK ELEVATION(FEET)
      12.56                         624.5                      1375.65

   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                  4.04 WATERSHED INCHES;     1343 CFS-HRS;      111.0 ACRE-FEET.


 OPERATION RUNOFF   XSECTION  14
         OUTPUT HYDROGRAPH=  6       AREA=     .04 SQ MI
         INPUT RUNOFF CURVE= 84.     TIME OF CONCENTRATION=    .81 HOURS
         COMPUTED INTERNAL TIME INCREMENT =  .1082 HOURS

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)          PEAK ELEVATION(FEET)
      12.27                          59.4                       (RUNOFF)

   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                  3.54 WATERSHED INCHES;       99 CFS-HRS;        8.1 ACRE-FEET.


 OPERATION ADDHYD   XSECTION  14
         INPUT HYDROGRAPHS 7,6     OUTPUT HYDROGRAPH 5

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)          PEAK ELEVATION(FEET)
      12.51                         671.0                       (NULL)
```

```
   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                4.00 WATERSHED INCHES;     1442 CFS-HRS;      119.2 ACRE-FEET.


 OPERATION RESVOR   STRUCTURE 14
         INPUT HYDROGRAPH 5         OUTPUT HYDROGRAPH 7
         SURFACE ELEVATION=  1369.00
1
 TR20 ------------------------------------------------------------------------
              EASTMINSTER - BEECH LAKE - EAST BRANCH GYPSUM CREEK         VERSION
 09/27/** BEECH2- W/O 2X12 16 AUG 2002  2,5,10,100-YR 24-HR STORM ZONE 510/01/90
 13:35:38                              PASS   3                            PAGE  15


   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      12.93                          518.4                        1373.94

   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                4.00 WATERSHED INCHES;     1441 CFS-HRS;      119.1 ACRE-FEET.


 OPERATION RUNOFF   XSECTION  16
         OUTPUT HYDROGRAPH=  6        AREA=     .31 SQ MI
         INPUT RUNOFF CURVE= 86.      TIME OF CONCENTRATION=  1.43 HOURS
         COMPUTED INTERNAL TIME INCREMENT =  .1012 HOURS

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      12.63                          319.7                        (RUNOFF)

   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                3.74 WATERSHED INCHES;      742 CFS-HRS;       61.3 ACRE-FEET.


 OPERATION ADDHYD   XSECTION  16
         INPUT HYDROGRAPHS 7,6      OUTPUT HYDROGRAPH 5

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      12.72                          823.3                        (NULL)

   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                3.91 WATERSHED INCHES;     2183 CFS-HRS;      180.4 ACRE-FEET.


 OPERATION RUNOFF   XSECTION  18
         OUTPUT HYDROGRAPH=  6        AREA=     .35 SQ MI
         INPUT RUNOFF CURVE= 82.      TIME OF CONCENTRATION=   .87 HOURS
         COMPUTED INTERNAL TIME INCREMENT =  .0945 HOURS

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      12.30                          439.0                        (RUNOFF)

   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                3.30 WATERSHED INCHES;      741 CFS-HRS;       61.3 ACRE-FEET.


 OPERATION ADDHYD   XSECTION  18
         INPUT HYDROGRAPHS 5,6      OUTPUT HYDROGRAPH 7

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      12.44                         1185.2                        (NULL)
1
 TR20 ------------------------------------------------------------------------
              EASTMINSTER - BEECH LAKE - EAST BRANCH GYPSUM CREEK         VERSION
```

RUNOFF ABOVE BASEFLOW OF .00 CFS
3.73 WATERSHED INCHES; 2924 CFS-HRS; 241.7 ACRE-FEET.

OPERATION RESVOR STRUCTURE 18
INPUT HYDROGRAPH 7 OUTPUT HYDROGRAPH 5
SURFACE ELEVATION= 1368.70

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
13.58	606.6	1370.91

RUNOFF ABOVE BASEFLOW OF .00 CFS
3.58 WATERSHED INCHES; 2809 CFS-HRS; 232.1 ACRE-FEET.

EXECUTIVE CONTROL ENDCMP COMPUTATIONS COMPLETED FOR PASS 3
1
TR20 ----------
EASTMINSTER - BEECH LAKE - EAST BRANCH GYPSUM CREEK VERSION

EXECUTIVE CONTROL COMPUT FROM XSECTION 1 TO STRUCTURE 18
STARTING TIME = .00 RAIN DEPTH = 7.80 RAIN DURATION= 1.00
ANT. MOIST. COND. = 2 MAIN TIME INCREMENT = .10 HOURS
ALTERNATE NO.=14 STORM NO.= 4 RAIN TABLE NO.= 7

OPERATION RUNOFF XSECTION 1
OUTPUT HYDROGRAPH= 1 AREA= .12 SQ MI
INPUT RUNOFF CURVE= 89. TIME OF CONCENTRATION= .91 HOURS
COMPUTED INTERNAL TIME INCREMENT = .0992 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.32	277.3	(RUNOFF)

RUNOFF ABOVE BASEFLOW OF .00 CFS
6.44 WATERSHED INCHES; 505 CFS-HRS; 41.8 ACRE-FEET.

OPERATION REACH XSECTION 2
INPUT HYDROGRAPH 1 OUTPUT HYDROGRAPH 2
CHANNEL LENGTH 1500.00 FT
INPUT = COEFFICIENTS RELATED TO XSECTION AREA, X= .85, M= 1.30
MODIFIED ATT-KIN ROUTING COEFFICIENT = .67 PEAK TRAVEL TIME = .20 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.47	270.6	(NULL)

RUNOFF ABOVE BASEFLOW OF .00 CFS
6.44 WATERSHED INCHES; 505 CFS-HRS; 41.7 ACRE-FEET.

OPERATION RUNOFF XSECTION 2
OUTPUT HYDROGRAPH= 1 AREA= .07 SQ MI
INPUT RUNOFF CURVE= 91. TIME OF CONCENTRATION= .70 HOURS
COMPUTED INTERNAL TIME INCREMENT = .0937 HOURS

```
   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      12.20                          197.3                        (RUNOFF)

   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                  6.66 WATERSHED INCHES;      317 CFS-HRS;       26.2 ACRE-FEET.


 OPERATION ADDHYD   XSECTION   2
         INPUT HYDROGRAPHS 1,2      OUTPUT HYDROGRAPH 3

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      12.34                          436.0                        (NULL)
1
 TR20 ------------------------------------------------------------------------
            EASTMINSTER - BEECH LAKE - EAST BRANCH GYPSUM CREEK        VERSION
 09/27/** BEECH2- W/O 2X12 16 AUG 2002  2,5,10,100-YR 24-HR STORM ZONE 510/01/90
 13:35:38                          PASS   4                              PAGE  18


   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                  6.52 WATERSHED INCHES;      822 CFS-HRS;       67.9 ACRE-FEET.


 OPERATION RUNOFF   XSECTION   5
         OUTPUT HYDROGRAPH=  5        AREA=     .20 SQ MI
         INPUT RUNOFF CURVE= 89.      TIME OF CONCENTRATION=  1.10 HOURS
         COMPUTED INTERNAL TIME INCREMENT =  .1012 HOURS

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      12.42                          408.2                        (RUNOFF)

   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                  6.52 WATERSHED INCHES;      822 CFS-HRS;       68.0 ACRE-FEET.


 OPERATION RUNOFF   XSECTION   6
         OUTPUT HYDROGRAPH=  6        AREA=     .16 SQ MI
         INPUT RUNOFF CURVE= 88.      TIME OF CONCENTRATION=  1.11 HOURS
         COMPUTED INTERNAL TIME INCREMENT =  .1026 HOURS

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      12.43                          318.1                        (RUNOFF)

   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                  6.40 WATERSHED INCHES;      647 CFS-HRS;       53.5 ACRE-FEET.


 OPERATION ADDHYD   XSECTION   7
         INPUT HYDROGRAPHS 5,6      OUTPUT HYDROGRAPH 7

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      12.43                          726.2                        (NULL)

   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                  6.47 WATERSHED INCHES;     1469 CFS-HRS;      121.4 ACRE-FEET.


 OPERATION RUNOFF   XSECTION  10
         OUTPUT HYDROGRAPH=  6        AREA=     .16 SQ MI
         INPUT RUNOFF CURVE= 90.      TIME OF CONCENTRATION=   .77 HOURS
         COMPUTED INTERNAL TIME INCREMENT =  .1033 HOURS

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      12.24                          416.9                        (RUNOFF)
```

```
   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                  6.62 WATERSHED INCHES;      700 CFS-HRS;       57.9 ACRE-FEET.
1
 TR20 ----------------------------------------------------------------------------
              EASTMINSTER - BEECH LAKE - EAST BRANCH GYPSUM CREEK          VERSION
 09/27/** BEECH2- W/O 2X12 16 AUG 2002  2,5,10,100-YR 24-HR STORM ZONE 510/01/90
 13:35:38                              PASS   4                            PAGE  19


 OPERATION ADDHYD   XSECTION  10
         INPUT HYDROGRAPHS 7,6     OUTPUT HYDROGRAPH 5

    PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
       12.34                         1110.6                        (NULL)

    RUNOFF ABOVE BASEFLOW OF     .00 CFS
                  6.52 WATERSHED INCHES;     2170 CFS-HRS;      179.3 ACRE-FEET.


 OPERATION RESVOR   STRUCTURE 10
         INPUT HYDROGRAPH 5         OUTPUT HYDROGRAPH 7
         SURFACE ELEVATION=  1369.40

    PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
       12.63                         909.2                         1377.30

    RUNOFF ABOVE BASEFLOW OF     .00 CFS
                  6.52 WATERSHED INCHES;     2169 CFS-HRS;      179.3 ACRE-FEET.


 OPERATION RUNOFF   XSECTION  14
         OUTPUT HYDROGRAPH=  6        AREA=     .04 SQ MI
         INPUT RUNOFF CURVE= 84.      TIME OF CONCENTRATION=    .81 HOURS
         COMPUTED INTERNAL TIME INCREMENT =  .1082 HOURS

    PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
       12.27                          98.5                         (RUNOFF)

    RUNOFF ABOVE BASEFLOW OF     .00 CFS
                  5.95 WATERSHED INCHES;      166 CFS-HRS;       13.7 ACRE-FEET.


 OPERATION ADDHYD   XSECTION  14
         INPUT HYDROGRAPHS 7,6     OUTPUT HYDROGRAPH 5

    PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
       12.57                         976.8                         (NULL)

    RUNOFF ABOVE BASEFLOW OF     .00 CFS
                  6.47 WATERSHED INCHES;     2335 CFS-HRS;      193.0 ACRE-FEET.


 OPERATION RESVOR   STRUCTURE 14
         INPUT HYDROGRAPH 5         OUTPUT HYDROGRAPH 7
         SURFACE ELEVATION=  1369.00
1
 TR20 ----------------------------------------------------------------------------
              EASTMINSTER - BEECH LAKE - EAST BRANCH GYPSUM CREEK          VERSION
 09/27/** BEECH2- W/O 2X12 16 AUG 2002  2,5,10,100-YR 24-HR STORM ZONE 510/01/90
 13:35:38                              PASS   4                            PAGE  20
```

```
   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      12.95                          850.8                        1375.26

   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                  6.47 WATERSHED INCHES;     2335 CFS-HRS;      193.0 ACRE-FEET.


OPERATION RUNOFF   XSECTION  16
        OUTPUT HYDROGRAPH=  6        AREA=     .31 SQ MI
        INPUT RUNOFF CURVE= 86.      TIME OF CONCENTRATION=  1.43 HOURS
        COMPUTED INTERNAL TIME INCREMENT =  .1012 HOURS

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      12.62                          521.8                        (RUNOFF)

   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                  6.19 WATERSHED INCHES;     1226 CFS-HRS;      101.3 ACRE-FEET.


OPERATION ADDHYD   XSECTION  16
        INPUT HYDROGRAPHS 7,6      OUTPUT HYDROGRAPH 5

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      12.87                          1312.0                       (NULL)

   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                  6.37 WATERSHED INCHES;     3561 CFS-HRS;      294.3 ACRE-FEET.


OPERATION RUNOFF   XSECTION  18
        OUTPUT HYDROGRAPH=  6        AREA=     .35 SQ MI
        INPUT RUNOFF CURVE= 82.      TIME OF CONCENTRATION=   .87 HOURS
        COMPUTED INTERNAL TIME INCREMENT =  .0945 HOURS

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      12.30                          745.1                        (RUNOFF)

   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                  5.67 WATERSHED INCHES;     1273 CFS-HRS;      105.2 ACRE-FEET.


OPERATION ADDHYD   XSECTION  18
        INPUT HYDROGRAPHS 5,6      OUTPUT HYDROGRAPH 7

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      12.45                          1736.1                       (NULL)
      12.77                          1684.6                       (NULL)
1
TR20 ------------------------------------------------------------------------
          EASTMINSTER - BEECH LAKE - EAST BRANCH GYPSUM CREEK        VERSION
09/27/** BEECH2- W/O 2X12 16 AUG 2002  2,5,10,100-YR 24-HR STORM ZONE 510/01/90
13:35:38                          PASS   4                            PAGE  21


   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                  6.17 WATERSHED INCHES;     4835 CFS-HRS;      399.5 ACRE-FEET.


OPERATION RESVOR   STRUCTURE 18
        INPUT HYDROGRAPH 7         OUTPUT HYDROGRAPH 5
        SURFACE ELEVATION=  1368.70

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      13.36                          1091.2                       1371.62
```

RUNOFF ABOVE BASEFLOW OF .00 CFS
5.99 WATERSHED INCHES; 4698 CFS-HRS; 388.2 ACRE-FEET.

EXECUTIVE CONTROL ENDCMP COMPUTATIONS COMPLETED FOR PASS 4

SUMMARY TABLE 1

SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL IN ORDER PERFORMED.
A CHARACTER FOLLOWING THE PEAK DISCHARGE TIME AND RATE (CFS) INDICATES:
F-FLAT TOP HYDROGRAPH T-TRUNCATED HYDROGRAPH R-RISING TRUNCATED HYDROGRAPH

XSECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)
RAINFALL OF 3.50 inches AND 24.00 hr DURATION, BEGINS AT .0 hrs.							
RAINTABLE NUMBER 7, AMC 2							
MAIN TIME INCREMENT .10 HOURS							
ALTERNATE 11 STORM 1							
XSECTION 1	RUNOFF	.12	2.32	---	12.33	104	866.7
XSECTION 2	REACH	.12	2.32	---	12.50	100	833.3
XSECTION 2	RUNOFF	.07	2.49	---	12.20	77	1100.0
XSECTION 2	ADDHYD	.20	2.38	---	12.35	162	810.0
XSECTION 5	RUNOFF	.20	2.38	---	12.43	154	770.0
XSECTION 6	RUNOFF	.16	2.29	---	12.45	118	737.5
XSECTION 7	ADDHYD	.35	2.34	---	12.44	271	774.3
XSECTION 10	RUNOFF	.16	2.45	---	12.24	161	1006.3
XSECTION 10	ADDHYD	.52	2.38	---	12.35	419	805.8
STRUCTURE 10	RESVOR	.52	2.38	1374.66	12.53	386	742.3
XSECTION 14	RUNOFF	.04	1.96	---	12.28	33	825.0
XSECTION 14	ADDHYD	.56	2.35	---	12.50	414	739.3
STRUCTURE 14	RESVOR	.56	2.34	1372.44	12.73	376	671.4
XSECTION 16	RUNOFF	.31	2.13	---	12.64	183	590.3
XSECTION 16	ADDHYD	.87	2.27	---	12.69	558	641.4
XSECTION 18	RUNOFF	.35	1.78	---	12.31	237	677.1
XSECTION 18	ADDHYD	1.21	2.13	---	12.51	740	611.6
STRUCTURE 18	RESVOR	1.21	2.13	1370.20	13.49	294	243.0
RAINFALL OF 4.55 inches AND 24.00 hr DURATION, BEGINS AT .0 hrs.							
ALTERNATE 12 STORM 2							
XSECTION 1	RUNOFF	.12	3.30	---	12.32	146	1216.7
XSECTION 2	REACH	.12	3.30	---	12.49	141	1175.0
XSECTION 2	RUNOFF	.07	3.49	---	12.20	107	1528.6
XSECTION 2	ADDHYD	.20	3.37	---	12.34	229	1145.0
XSECTION 5	RUNOFF	.20	3.37	---	12.43	216	1080.0

SUMMARY TABLE 1

SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL IN ORDER PERFORMED.
A CHARACTER FOLLOWING THE PEAK DISCHARGE TIME AND RATE (CFS) INDICATES:
F-FLAT TOP HYDROGRAPH T-TRUNCATED HYDROGRAPH R-RISING TRUNCATED HYDROGRAPH

XSECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)
ALTERNATE 12 STORM 2							
XSECTION 6	RUNOFF	.16	3.27	---	12.44	167	1043.8
XSECTION 7	ADDHYD	.35	3.33	---	12.43	383	1094.3
XSECTION 10	RUNOFF	.16	3.45	---	12.24	221	1381.3
XSECTION 10	ADDHYD	.52	3.37	---	12.35	586	1126.9
STRUCTURE 10	RESVOR	.52	3.37	1375.24	12.53	540	1038.5
XSECTION 14	RUNOFF	.04	2.89	---	12.27	49	1225.0
XSECTION 14	ADDHYD	.56	3.33	---	12.51	579	1033.9
STRUCTURE 14	RESVOR	.56	3.33	1373.28	12.83	477	851.8
XSECTION 16	RUNOFF	.31	3.09	---	12.63	265	854.8
XSECTION 16	ADDHYD	.87	3.24	---	12.69	737	847.1
XSECTION 18	RUNOFF	.35	2.68	---	12.30	359	1025.7
XSECTION 18	ADDHYD	1.21	3.08	---	12.50	1030	851.2
STRUCTURE 18	RESVOR	1.21	2.94	1370.64	13.50	490	405.0

RAINFALL OF 5.25 inches AND 24.00 hr DURATION, BEGINS AT .0 hrs.

ALTERNATE 13 STORM 3							
XSECTION 1	RUNOFF	.12	3.97	---	12.32	174	1450.0
XSECTION 2	REACH	.12	3.97	---	12.48	169	1408.3
XSECTION 2	RUNOFF	.07	4.16	---	12.20	126	1800.0
XSECTION 2	ADDHYD	.20	4.04	---	12.34	273	1365.0
XSECTION 5	RUNOFF	.20	4.04	---	12.43	257	1285.0
XSECTION 6	RUNOFF	.16	3.94	---	12.44	200	1250.0
XSECTION 7	ADDHYD	.35	3.99	---	12.43	457	1305.7
XSECTION 10	RUNOFF	.16	4.12	---	12.24	262	1637.5
XSECTION 10	ADDHYD	.52	4.04	---	12.35	699	1344.2
STRUCTURE 10	RESVOR	.52	4.04	1375.65	12.56	624	1200.0
XSECTION 14	RUNOFF	.04	3.54	---	12.27	59	1475.0
XSECTION 14	ADDHYD	.56	4.00	---	12.51	671	1198.2
STRUCTURE 14	RESVOR	.56	4.00	1373.94	12.93	518	925.0

1
TR20 ----------

SUMMARY TABLE 1

SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL IN ORDER PERFORMED.

A CHARACTER FOLLOWING THE PEAK DISCHARGE TIME AND RATE (CFS) INDICATES:
F-FLAT TOP HYDROGRAPH T-TRUNCATED HYDROGRAPH R-RISING TRUNCATED HYDROGRAPH

XSECTION/ STRUCTURE ID		STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	TIME (HR)	RATE (CFS)	RATE (CSM)
ALTERNATE 13 STORM 3								
XSECTION	16	RUNOFF	.31	3.74	---	12.63	320	1032.3
XSECTION	16	ADDHYD	.87	3.91	---	12.72	823	946.0
XSECTION	18	RUNOFF	.35	3.30	---	12.30	439	1254.3
XSECTION	18	ADDHYD	1.21	3.73	---	12.44	1185	979.3
STRUCTURE	18	RESVOR	1.21	3.58	1370.91	13.58	607	501.7
RAINFALL OF 7.80 inches AND 24.00 hr DURATION, BEGINS AT .0 hrs.								
ALTERNATE 14 STORM 4								
XSECTION	1	RUNOFF	.12	6.44	---	12.32	277	2308.3
XSECTION	2	REACH	.12	6.44	---	12.47	271	2258.3
XSECTION	2	RUNOFF	.07	6.66	---	12.20	197	2814.3
XSECTION	2	ADDHYD	.20	6.52	---	12.34	436	2180.0
XSECTION	5	RUNOFF	.20	6.52	---	12.42	408	2040.0
XSECTION	6	RUNOFF	.16	6.40	---	12.43	318	1987.5
XSECTION	7	ADDHYD	.35	6.47	---	12.43	726	2074.3
XSECTION	10	RUNOFF	.16	6.62	---	12.24	417	2606.3
XSECTION	10	ADDHYD	.52	6.52	---	12.34	1111	2136.5
STRUCTURE	10	RESVOR	.52	6.52	1377.30	12.63	909	1748.1
XSECTION	14	RUNOFF	.04	5.95	---	12.27	98	2450.0
XSECTION	14	ADDHYD	.56	6.47	---	12.57	977	1744.6
STRUCTURE	14	RESVOR	.56	6.47	1375.26	12.95	851	1519.6
XSECTION	16	RUNOFF	.31	6.19	---	12.62	522	1683.9
XSECTION	16	ADDHYD	.87	6.37	---	12.87	1312	1508.0
XSECTION	18	RUNOFF	.35	5.67	---	12.30	745	2128.6
XSECTION	18	ADDHYD	1.21	6.17	---	12.45	1736	1434.7
STRUCTURE	18	RESVOR	1.21	5.99	1371.62	13.36	1091	901.7

SUMMARY TABLE 2

MODIFIED ATT-KIN REACH ROUTING IN ORDER PERFORMED.
QUESTION MARK (?) AFTER: OUTFLOW PEAK - MAX. NUMBER ROUTING ITERATIONS USED;
ATT-KIN COEFF - VALUE OUTSIDE ACCEPTABLE LIMITS.

XSEC ID	REACH LENGTH (FT)	FLOOD PLAIN LENGTH (FT)	HYDROGRAPH INFORMATION INFLOW PEAK (CFS)	INFLOW TIME (HR)	OUTFLOW PEAK (CFS)	OUTFLOW TIME (HR)	ROUTING PARAMETERS Q-A EQ. COEFF (X)	Q-A EQ. POWER (M)	LENGTH FACTOR (K*)	PEAK RATIO Q/I (Q*)	ATT-KIN COEFF (C)

BASEFLOW IS .0 CFS

ALTERNATE 11 STORM 1

2	1500	103	12.3	100	12.5	.85	1.30	.045	.963	.57

ALTERNATE 12 STORM 2

2	1500	146	12.3	141	12.5	.85	1.30	.040	.968	.61

ALTERNATE 13 STORM 3

2	1500	174	12.3	169	12.5	.85	1.30	.038	.970	.62

ALTERNATE 14 STORM 4

2	1500	277	12.3	270	12.5	.85	1.30	.032	.973	.67?

1

SUMMARY TABLE 3

STORM DISCHARGES (CFS) AT XSECTIONS AND STRUCTURES FOR ALL ALTERNATES

XSECTION/ STRUCTURE ID		DRAINAGE AREA (SQ MI)	STORM NUMBERS..... 1	2	3	4
STRUCTURE 18		1.21				
	ALTERNATE 11		294	*********	*********	*********
	ALTERNATE 12		*********	490	*********	*********
	ALTERNATE 13		*********	*********	607	*********
	ALTERNATE 14		*********	*********	*********	1091
STRUCTURE 14		.56				
	ALTERNATE 11		376	*********	*********	*********
	ALTERNATE 12		*********	477	*********	*********
	ALTERNATE 13		*********	*********	518	*********
	ALTERNATE 14		*********	*********	*********	851
STRUCTURE 10		.52				
	ALTERNATE 11		386	*********	*********	*********
	ALTERNATE 12		*********	540	*********	*********
	ALTERNATE 13		*********	*********	624	*********
	ALTERNATE 14		*********	*********	*********	909
XSECTION 1		.12				
	ALTERNATE 11		104	*********	*********	*********
	ALTERNATE 12		*********	146	*********	*********
	ALTERNATE 13		*********	*********	174	*********
	ALTERNATE 14		*********	*********	*********	277
XSECTION 2		.20				
	ALTERNATE 11		162	*********	*********	*********

ALTERNATE	12	*********	229	*********	*********
ALTERNATE	13	*********	*********	273	*********
ALTERNATE	14	*********	*********	*********	436

XSECTION 5 .20

ALTERNATE	11	154	*********	*********	*********
ALTERNATE	12	*********	216	*********	*********
ALTERNATE	13	*********	*********	257	*********
ALTERNATE	14	*********	*********	*********	408

XSECTION 6 .16

ALTERNATE	11	118	*********	*********	*********
ALTERNATE	12	*********	167	*********	*********
ALTERNATE	13	*********	*********	200	*********
ALTERNATE	14	*********	*********	*********	318

1

SUMMARY TABLE 3

STORM DISCHARGES (CFS) AT XSECTIONS AND STRUCTURES FOR ALL ALTERNATES

XSECTION/ STRUCTURE ID		DRAINAGE AREA (SQ MI)	STORM NUMBERS..... 1	2	3	4
XSECTION 7		.35				
ALTERNATE	11		271	*********	*********	*********
ALTERNATE	12		*********	383	*********	*********
ALTERNATE	13		*********	*********	457	*********
ALTERNATE	14		*********	*********	*********	726
XSECTION 10		.52				
ALTERNATE	11		419	*********	*********	*********
ALTERNATE	12		*********	586	*********	*********
ALTERNATE	13		*********	*********	699	*********
ALTERNATE	14		*********	*********	*********	1111
XSECTION 14		.56				
ALTERNATE	11		414	*********	*********	*********
ALTERNATE	12		*********	579	*********	*********
ALTERNATE	13		*********	*********	671	*********
ALTERNATE	14		*********	*********	*********	977
XSECTION 16		.87				
ALTERNATE	11		558	*********	*********	*********
ALTERNATE	12		*********	737	*********	*********
ALTERNATE	13		*********	*********	823	*********
ALTERNATE	14		*********	*********	*********	1312
XSECTION 18		1.21				
ALTERNATE	11		740	*********	*********	*********

```
    ALTERNATE   12              *********      1030 ********* *********
    ALTERNATE   13              ********* *********      1185 *********
    ALTERNATE   14              ********* ********* *********      1736

 *** WARNING - UNEXPECTED RECORD(S) ENCOUNTERED WHEN LOOKING FOR "JOB" RECORD.
               IMAGES OF FIRST 10 RECORDS IGNORED FOLLOWS:                  ***



 END OF  1 JOBS IN THIS RUN
1


                      SCS  TR-20,  VERSION 10/01/90
                                   FILES

     INPUT  = beech2.t20
     OUTPUT = beech2.out                                , DATED 09/27/**,13:35:38

              FILES GENERATED - DATED 09/27/**,13:35:38

                                NONE!

                *** TR-20 RUN COMPLETED ***
```

Appendix E

Drainage and Utility Plan

Appendix F

Proposed TR-20 Output

1

**********80-80 LIST OF INPUT DATA FOR TR-20 HYDROLOGY**********

```
JOB TR-20                        FULLPRINT          SUMMARY   NOPLOTS
TITLE 001 EASTMINSTER - BEECH LAKE - EAST BRANCH GYPSUM CREEK
TITLE     BEECHPR2.T20 2-6'x3' 20 SEP 02  2,5,10,100-YR 24-HR STORM ZONE 5
4 DIMHYD                0.02                                              484
 8          .000         .030         .100         .190         .310
 8          .470         .660         .820         .930         .990
 8         1.000         .990         .930         .860         .780
 8          .680         .560         .460         .390         .330
 8          .280         .241         .207         .174         .147
 8          .126         .107         .091         .077         .066
 8          .055         .047         .040         .034         .029
 8          .025         .021         .018         .015         .013
 8          .011         .009         .008         .007         .006
 8          .005         .004         .003         .002         .001
 8          .000         .000         .000         .000         .000
 9 ENDTBL
 5 RAINFL 7              0.5
 8          .000         .002         .005         .009         .013
 8          .018         .023         .029         .035         .042
 8          .050         .059         .068         .078         .089
 8          .101         .114         .128         .144         .162
 8          .183         .208         .244         .339         .723
 8          .773         .802         .825         .844         .861
 8          .876         .890         .903         .914         .924
 8          .934         .943         .951         .959         .966
 8          .972         .977         .982         .986         .990
 8          .993         .996         .998        1.000        1.000
 9 ENDTBL
 3 STRUCT      10
 8                      1369.4         0.0          0.0
 8                      1370.4         6.0          0.279
 8                      1371.4        14.0          1.093
 8                      1372.4        30.0          2.269
 8                      1373.4        60.0          3.606
 8                      1374.4       320.0          7.212
 8                      1375.4       580.0         11.361
 8                      1376.4       760.0         16.450
 8                      1377.4       925.0         23.036
 8                      1378.4      1085.0         31.035
 8                      1379.4      1240.0         40.834
 9 ENDTBL
 3 STRUCT      16
 8                      1372.0         0.0          0.0
 8                      1373.0        36.5          2.98
 8                      1374.0        75.9          6.12
 8                      1375.0       158.7          9.44
```

1

**********80-80 LIST OF INPUT DATA (CONTINUED)**********

```
 8                      1376.0       231.5         12.94
 8                      1377.0       356.0         16.61
 8                      1378.0       380.5         20.47
 9 ENDTBL
 3 STRUCT      20
 8                      1368.7         0.0          0.0
```

```
  8                          1369.7        100.0        41.3
  8                          1370.0        208.0        53.3
  8                          1371.0        647.0        107.8
  8                          1372.0        1365.0       171.3
  9 ENDTBL
  6 RUNOFF 1 001         1 0.1216        88.6         0.9092                  1
  6 REACH  3 002    1    2 1500.0        0.85         1.3                     1
  6 RUNOFF 1 002         1 0.0737        90.5         0.7025                  1
  6 ADDHYD 4 002    1 2 3                                                    1
  6 RUNOFF 1 005         5 0.1953        89.3         1.0958                  1
  6 RUNOFF 1 006         6 0.1566        88.3         1.1117                  1
  6 ADDHYD 4 007    5 6 7                                                    1
  6 RUNOFF 1 010         6 0.1638        90.1         0.775                   1
  6 ADDHYD 4 010    7 6 5                                                    1
  6 RESVOR 2     10 5    7 1369.4                                           1
  6 RUNOFF 1 014         6 0.0432        93.0         0.333                   1
  6 ADDHYD 4 014    7 6 5                                                    1
  6 RUNOFF 1 015         4 0.0531        78.0         0.700                   1
  6 RUNOFF 1 016         6 0.0844        80.0         0.792                   1
  6 ADDHYD 4 016    4 6 7                                                    1
  6 RESVOR 2     16 7    6 1372.0                                           1
  6 RUNOFF 1 017         4 0.0948        96.3         0.42                    1
  6 ADDHYD 4 017    4 6 7                                                    1
  6 RUNOFF 1 018         6 0.0739        78.0         0.79                    1
  6 ADDHYD 4 018    6 7 4                                                    1
  6 ADDHYD 4 019    4 5 6                                                    1
  6 RUNOFF 1 020         5 0.3483        82.0         0.866                   1
  6 ADDHYD 4 020    6 5 7                                                    1
  6 RESVOR 2     20 7    5 1369.7                                           1
    ENDATA
  7 INCREM 6              0.10
  7 COMPUT 7 001       20 0.0          3.50         1.0          7 2  11  01
    ENDCMP 1
  7 COMPUT 7 001       20 0.0          4.55         1.0          7 2  12  02
    ENDCMP 1
  7 COMPUT 7 001       20 0.0          5.25         1.0          7 2  13  03
    ENDCMP 1
  7 COMPUT 7 001       20 0.0          7.80         1.0          7 2  14  04
    ENDCMP 1
    ENDJOB 2
1


 **********80-80 LIST OF INPUT DATA (CONTINUED)**********


 **********END OF 80-80 LIST**********
1
 TR20 ------------------------------------------------------------------------
              EASTMINSTER - BEECH LAKE - EAST BRANCH GYPSUM CREEK        VERSION
 09/27/** BEECHPR2.T20 2-6'x3'20 SEP 2002  2,5,10,100-YR 24-HR STORM ZON10/01/90
 13:36:02                          PASS   1                              PAGE   1


   DIMENSIONLESS HYDROGRAPH TABLE ENTERED          TIME INCREMENT =    .02
 8                .0000       .0300       .1000       .1900       .3100
 8                .4700       .6600       .8200       .9300       .9900
 8               1.0000       .9900       .9300       .8600       .7800
 8                .6800       .5600       .4600       .3900       .3300
 8                .2800       .2410       .2070       .1740       .1470
```

```
 8                .1260       .1070       .0910       .0770       .0660
 8                .0550       .0470       .0400       .0340       .0290
 8                .0250       .0210       .0180       .0150       .0130
 8                .0110       .0090       .0080       .0070       .0060
 8                .0050       .0040       .0030       .0020       .0010
 8                .0000       .0000       .0000       .0000       .0000
9 ENDTBL
             COMPUTED PEAK RATE FACTOR =    484.00

1
 TR20 ------------------------------------------------------------------------
              EASTMINSTER - BEECH LAKE - EAST BRANCH GYPSUM CREEK        VERSION
 09/27/** BEECHPR2.T20 2-6'x3'20 SEP 2002  2,5,10,100-YR 24-HR STORM ZON10/01/90
 13:36:02                          PASS   1                                PAGE   2


 EXECUTIVE CONTROL INCREM    MAIN TIME INCREMENT =    .10 HOURS


 EXECUTIVE CONTROL COMPUT    FROM XSECTION   1  TO STRUCTURE 20
    STARTING TIME =    .00          RAIN DEPTH =  3.50       RAIN DURATION=  1.00
    ANT. MOIST. COND. = 2           MAIN TIME INCREMENT =    .10 HOURS
    ALTERNATE NO.=11                STORM NO.= 1             RAIN TABLE NO.= 7


 OPERATION RUNOFF   XSECTION   1
         OUTPUT HYDROGRAPH=  1       AREA=     .12 SQ MI
         INPUT RUNOFF CURVE= 89.     TIME OF CONCENTRATION=    .91 HOURS
         COMPUTED INTERNAL TIME INCREMENT =  .0992 HOURS

    PEAK TIME(HRS)              PEAK DISCHARGE(CFS)          PEAK ELEVATION(FEET)
       12.33                          103.6                       (RUNOFF)

    RUNOFF ABOVE BASEFLOW OF     .00 CFS
                   2.32 WATERSHED INCHES;     182 CFS-HRS;      15.0 ACRE-FEET.


 OPERATION REACH    XSECTION   2
         INPUT HYDROGRAPH 1        OUTPUT HYDROGRAPH 2
         CHANNEL LENGTH  1500.00 FT
         INPUT = COEFFICIENTS RELATED TO XSECTION AREA,  X=    .85,   M= 1.30
 MODIFIED ATT-KIN ROUTING COEFFICIENT =  .57     PEAK TRAVEL TIME =     .20 HOURS

    PEAK TIME(HRS)              PEAK DISCHARGE(CFS)          PEAK ELEVATION(FEET)
       12.50                           99.5                       (NULL)

    RUNOFF ABOVE BASEFLOW OF     .00 CFS
                   2.32 WATERSHED INCHES;     182 CFS-HRS;      15.0 ACRE-FEET.


 OPERATION RUNOFF   XSECTION   2
         OUTPUT HYDROGRAPH=  1       AREA=     .07 SQ MI
         INPUT RUNOFF CURVE= 91.     TIME OF CONCENTRATION=    .70 HOURS
         COMPUTED INTERNAL TIME INCREMENT =  .0937 HOURS

    PEAK TIME(HRS)              PEAK DISCHARGE(CFS)          PEAK ELEVATION(FEET)
       12.20                           76.9                       (RUNOFF)

    RUNOFF ABOVE BASEFLOW OF     .00 CFS
                   2.49 WATERSHED INCHES;     118 CFS-HRS;       9.8 ACRE-FEET.


 OPERATION ADDHYD   XSECTION   2
```

```
        INPUT HYDROGRAPHS 1,2     OUTPUT HYDROGRAPH 3
1
 TR20 ------------------------------------------------------------------------
           EASTMINSTER - BEECH LAKE - EAST BRANCH GYPSUM CREEK        VERSION
 09/27/** BEECHPR2.T20 2-6'x3'20 SEP 2002  2,5,10,100-YR 24-HR STORM ZON10/01/90
 13:36:02                          PASS   1                                PAGE   3


    PEAK TIME(HRS)              PEAK DISCHARGE(CFS)          PEAK ELEVATION(FEET)
       12.35                          162.1                        (NULL)

    RUNOFF ABOVE BASEFLOW OF     .00 CFS
                   2.38 WATERSHED INCHES;      300 CFS-HRS;       24.8 ACRE-FEET.


 OPERATION RUNOFF   XSECTION   5
         OUTPUT HYDROGRAPH=  5        AREA=     .20 SQ MI
         INPUT RUNOFF CURVE= 89.      TIME OF CONCENTRATION=  1.10 HOURS
         COMPUTED INTERNAL TIME INCREMENT =  .1012 HOURS

    PEAK TIME(HRS)              PEAK DISCHARGE(CFS)          PEAK ELEVATION(FEET)
       12.43                          153.5                        (RUNOFF)

    RUNOFF ABOVE BASEFLOW OF     .00 CFS
                   2.38 WATERSHED INCHES;      300 CFS-HRS;       24.8 ACRE-FEET.


 OPERATION RUNOFF   XSECTION   6
         OUTPUT HYDROGRAPH=  6        AREA=     .16 SQ MI
         INPUT RUNOFF CURVE= 88.      TIME OF CONCENTRATION=  1.11 HOURS
         COMPUTED INTERNAL TIME INCREMENT =  .1026 HOURS

    PEAK TIME(HRS)              PEAK DISCHARGE(CFS)          PEAK ELEVATION(FEET)
       12.45                          117.5                        (RUNOFF)

    RUNOFF ABOVE BASEFLOW OF     .00 CFS
                   2.29 WATERSHED INCHES;      232 CFS-HRS;       19.2 ACRE-FEET.


 OPERATION ADDHYD   XSECTION   7
         INPUT HYDROGRAPHS 5,6     OUTPUT HYDROGRAPH 7

    PEAK TIME(HRS)              PEAK DISCHARGE(CFS)          PEAK ELEVATION(FEET)
       12.44                          271.1                        (NULL)

    RUNOFF ABOVE BASEFLOW OF     .00 CFS
                   2.34 WATERSHED INCHES;      532 CFS-HRS;       44.0 ACRE-FEET.


 OPERATION RUNOFF   XSECTION  10
         OUTPUT HYDROGRAPH=  6        AREA=     .16 SQ MI
         INPUT RUNOFF CURVE= 90.      TIME OF CONCENTRATION=   .77 HOURS
         COMPUTED INTERNAL TIME INCREMENT =  .1033 HOURS

    PEAK TIME(HRS)              PEAK DISCHARGE(CFS)          PEAK ELEVATION(FEET)
       12.24                          161.3                        (RUNOFF)
1
 TR20 ------------------------------------------------------------------------
           EASTMINSTER - BEECH LAKE - EAST BRANCH GYPSUM CREEK        VERSION
 09/27/** BEECHPR2.T20 2-6'x3'20 SEP 2002  2,5,10,100-YR 24-HR STORM ZON10/01/90
 13:36:02                          PASS   1                                PAGE   4


    RUNOFF ABOVE BASEFLOW OF     .00 CFS
```

```
                2.45 WATERSHED INCHES;      260 CFS-HRS;       21.4 ACRE-FEET.


OPERATION ADDHYD   XSECTION  10
        INPUT HYDROGRAPHS 7,6      OUTPUT HYDROGRAPH 5

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      12.35                          418.8                        (NULL)

   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                2.38 WATERSHED INCHES;      792 CFS-HRS;       65.4 ACRE-FEET.


OPERATION RESVOR   STRUCTURE 10
        INPUT HYDROGRAPH 5         OUTPUT HYDROGRAPH 7
        SURFACE ELEVATION=  1369.40

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      12.53                          386.3                       1374.66

   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                2.38 WATERSHED INCHES;      791 CFS-HRS;       65.4 ACRE-FEET.


OPERATION RUNOFF   XSECTION  14
        OUTPUT HYDROGRAPH=  6        AREA=     .04 SQ MI
        INPUT RUNOFF CURVE= 93.      TIME OF CONCENTRATION=    .33 HOURS
        COMPUTED INTERNAL TIME INCREMENT =  .0444 HOURS

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      12.01                           63.4                        (RUNOFF)

   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                2.73 WATERSHED INCHES;       76 CFS-HRS;        6.3 ACRE-FEET.


OPERATION ADDHYD   XSECTION  14
        INPUT HYDROGRAPHS 7,6      OUTPUT HYDROGRAPH 5

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      12.51                          399.2                        (NULL)

   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                2.40 WATERSHED INCHES;      867 CFS-HRS;       71.7 ACRE-FEET.
1
 TR20 ------------------------------------------------------------------------
              EASTMINSTER - BEECH LAKE - EAST BRANCH GYPSUM CREEK        VERSION
 09/27/** BEECHPR2.T20 2-6'x3'20 SEP 2002  2,5,10,100-YR 24-HR STORM ZON10/01/90
 13:36:02                          PASS   1                                PAGE   5


OPERATION RUNOFF   XSECTION  15
        OUTPUT HYDROGRAPH=  4        AREA=     .05 SQ MI
        INPUT RUNOFF CURVE= 78.      TIME OF CONCENTRATION=    .70 HOURS
        COMPUTED INTERNAL TIME INCREMENT =  .0933 HOURS

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      12.21                           33.7                        (RUNOFF)

   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                1.49 WATERSHED INCHES;       51 CFS-HRS;        4.2 ACRE-FEET.
```

```
 OPERATION RUNOFF   XSECTION  16
         OUTPUT HYDROGRAPH=  6        AREA=     .08 SQ MI
         INPUT RUNOFF CURVE= 80.      TIME OF CONCENTRATION=    .79 HOURS
         COMPUTED INTERNAL TIME INCREMENT =  .1056 HOURS

    PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
       12.27                          55.1                        (RUNOFF)

    RUNOFF ABOVE BASEFLOW OF     .00 CFS
                  1.64 WATERSHED INCHES;       89 CFS-HRS;        7.4 ACRE-FEET.


 OPERATION ADDHYD   XSECTION  16
         INPUT HYDROGRAPHS 4,6      OUTPUT HYDROGRAPH 7

    PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
       12.24                          88.5                        (NULL)

    RUNOFF ABOVE BASEFLOW OF     .00 CFS
                  1.58 WATERSHED INCHES;      140 CFS-HRS;       11.6 ACRE-FEET.


 OPERATION RESVOR   STRUCTURE 16
         INPUT HYDROGRAPH 7         OUTPUT HYDROGRAPH 6
         SURFACE ELEVATION=  1372.00

    PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
       12.74                          44.1                       1373.19

    RUNOFF ABOVE BASEFLOW OF     .00 CFS
                  1.58 WATERSHED INCHES;      140 CFS-HRS;       11.6 ACRE-FEET.


 OPERATION RUNOFF   XSECTION  17
         OUTPUT HYDROGRAPH=  4        AREA=     .09 SQ MI
         INPUT RUNOFF CURVE= 96.      TIME OF CONCENTRATION=    .42 HOURS
         COMPUTED INTERNAL TIME INCREMENT =  .0560 HOURS
1
 TR20 ------------------------------------------------------------------------
              EASTMINSTER - BEECH LAKE - EAST BRANCH GYPSUM CREEK        VERSION
 09/27/** BEECHPR2.T20 2-6'x3'20 SEP 2002  2,5,10,100-YR 24-HR STORM ZON10/01/90
 13:36:02                          PASS   1                                PAGE   6


    PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
       12.05                         141.8                        (RUNOFF)

    RUNOFF ABOVE BASEFLOW OF     .00 CFS
                  3.07 WATERSHED INCHES;      188 CFS-HRS;       15.5 ACRE-FEET.


 OPERATION ADDHYD   XSECTION  17
         INPUT HYDROGRAPHS 4,6      OUTPUT HYDROGRAPH 7

    PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
       12.08                         160.4                        (NULL)

    RUNOFF ABOVE BASEFLOW OF     .00 CFS
                  2.19 WATERSHED INCHES;      329 CFS-HRS;       27.1 ACRE-FEET.


 OPERATION RUNOFF   XSECTION  18
         OUTPUT HYDROGRAPH=  6        AREA=     .07 SQ MI
         INPUT RUNOFF CURVE= 78.      TIME OF CONCENTRATION=    .79 HOURS
```

```
        COMPUTED INTERNAL TIME INCREMENT =  .1053 HOURS

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      12.27                          43.3                        (RUNOFF)

   RUNOFF ABOVE BASEFLOW OF    .00 CFS
                1.50 WATERSHED INCHES;      71 CFS-HRS;       5.9 ACRE-FEET.


 OPERATION ADDHYD   XSECTION  18
        INPUT HYDROGRAPHS 6,7     OUTPUT HYDROGRAPH 4

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      12.11                          198.1                       (NULL)

   RUNOFF ABOVE BASEFLOW OF    .00 CFS
                2.02 WATERSHED INCHES;     400 CFS-HRS;      33.0 ACRE-FEET.


 OPERATION ADDHYD   XSECTION  19
        INPUT HYDROGRAPHS 4,5     OUTPUT HYDROGRAPH 6

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      12.29                          532.6                       (NULL)
1
 TR20 ------------------------------------------------------------------------
            EASTMINSTER - BEECH LAKE - EAST BRANCH GYPSUM CREEK        VERSION
 09/27/** BEECHPR2.T20 2-6'x3'20 SEP 2002  2,5,10,100-YR 24-HR STORM ZON10/01/90
 13:36:02                          PASS   1                                PAGE   7


   RUNOFF ABOVE BASEFLOW OF    .00 CFS
                2.27 WATERSHED INCHES;    1267 CFS-HRS;     104.7 ACRE-FEET.


 OPERATION RUNOFF   XSECTION  20
        OUTPUT HYDROGRAPH=  5       AREA=     .35 SQ MI
        INPUT RUNOFF CURVE= 82.     TIME OF CONCENTRATION=    .87 HOURS
        COMPUTED INTERNAL TIME INCREMENT =  .0945 HOURS

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      12.31                          236.8                       (RUNOFF)

   RUNOFF ABOVE BASEFLOW OF    .00 CFS
                1.78 WATERSHED INCHES;     400 CFS-HRS;      33.1 ACRE-FEET.


 OPERATION ADDHYD   XSECTION  20
        INPUT HYDROGRAPHS 6,5     OUTPUT HYDROGRAPH 7

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      12.30                          769.3                       (NULL)

   RUNOFF ABOVE BASEFLOW OF    .00 CFS
                2.13 WATERSHED INCHES;    1667 CFS-HRS;     137.8 ACRE-FEET.


 OPERATION RESVOR   STRUCTURE 20
        INPUT HYDROGRAPH 7        OUTPUT HYDROGRAPH 5
        SURFACE ELEVATION=  1369.70

 *** MESSAGE - STRUCTURE 20, USER ENTERED STARTING ELEVATION ( 1369.7 FEET)
               WILL DECREASE OUTFLOW HYDROGRAPH VOLUME.                    ***
```

```
   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      13.55                         217.8                        1370.02

   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                  .20 WATERSHED INCHES;      154 CFS-HRS;       12.7 ACRE-FEET.


 EXECUTIVE CONTROL ENDCMP    COMPUTATIONS COMPLETED FOR PASS   1
1
 TR20 ------------------------------------------------------------------------
            EASTMINSTER - BEECH LAKE - EAST BRANCH GYPSUM CREEK        VERSION
 09/27/** BEECHPR2.T20 2-6'x3'20 SEP 2002  2,5,10,100-YR 24-HR STORM ZON10/01/90
 13:36:02                          PASS   2                              PAGE   8



 EXECUTIVE CONTROL COMPUT    FROM XSECTION   1  TO STRUCTURE 20
    STARTING TIME =    .00          RAIN DEPTH =  4.55       RAIN DURATION=  1.00
    ANT. MOIST. COND. = 2           MAIN TIME INCREMENT =    .10 HOURS
    ALTERNATE NO.=12                STORM NO.= 2             RAIN TABLE NO.= 7


 OPERATION RUNOFF   XSECTION   1
         OUTPUT HYDROGRAPH=  1       AREA=     .12 SQ MI
         INPUT RUNOFF CURVE= 89.     TIME OF CONCENTRATION=    .91 HOURS
         COMPUTED INTERNAL TIME INCREMENT =  .0992 HOURS

    PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
       12.32                         146.0                        (RUNOFF)

    RUNOFF ABOVE BASEFLOW OF     .00 CFS
                  3.30 WATERSHED INCHES;      259 CFS-HRS;       21.4 ACRE-FEET.


 OPERATION REACH    XSECTION   2
         INPUT HYDROGRAPH 1         OUTPUT HYDROGRAPH 2
         CHANNEL LENGTH  1500.00 FT
         INPUT = COEFFICIENTS RELATED TO XSECTION AREA,  X=    .85,   M= 1.30
 MODIFIED ATT-KIN ROUTING COEFFICIENT =  .61     PEAK TRAVEL TIME =     .20 HOURS

    PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
       12.49                         141.1                        (NULL)

    RUNOFF ABOVE BASEFLOW OF     .00 CFS
                  3.30 WATERSHED INCHES;      259 CFS-HRS;       21.4 ACRE-FEET.


 OPERATION RUNOFF   XSECTION   2
         OUTPUT HYDROGRAPH=  1       AREA=     .07 SQ MI
         INPUT RUNOFF CURVE= 91.     TIME OF CONCENTRATION=    .70 HOURS
         COMPUTED INTERNAL TIME INCREMENT =  .0937 HOURS

    PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
       12.20                         107.0                        (RUNOFF)

    RUNOFF ABOVE BASEFLOW OF     .00 CFS
                  3.49 WATERSHED INCHES;      166 CFS-HRS;       13.7 ACRE-FEET.


 OPERATION ADDHYD   XSECTION   2
         INPUT HYDROGRAPHS 1,2     OUTPUT HYDROGRAPH 3

    PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
       12.34                         229.1                        (NULL)
```

RUNOFF ABOVE BASEFLOW OF .00 CFS
3.37 WATERSHED INCHES; 425 CFS-HRS; 35.1 ACRE-FEET.

OPERATION RUNOFF XSECTION 5
OUTPUT HYDROGRAPH= 5 AREA= .20 SQ MI
INPUT RUNOFF CURVE= 89. TIME OF CONCENTRATION= 1.10 HOURS
COMPUTED INTERNAL TIME INCREMENT = .1012 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.43	215.6	(RUNOFF)

RUNOFF ABOVE BASEFLOW OF .00 CFS
3.37 WATERSHED INCHES; 425 CFS-HRS; 35.1 ACRE-FEET.

OPERATION RUNOFF XSECTION 6
OUTPUT HYDROGRAPH= 6 AREA= .16 SQ MI
INPUT RUNOFF CURVE= 88. TIME OF CONCENTRATION= 1.11 HOURS
COMPUTED INTERNAL TIME INCREMENT = .1026 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.44	167.0	(RUNOFF)

RUNOFF ABOVE BASEFLOW OF .00 CFS
3.27 WATERSHED INCHES; 331 CFS-HRS; 27.3 ACRE-FEET.

OPERATION ADDHYD XSECTION 7
INPUT HYDROGRAPHS 5,6 OUTPUT HYDROGRAPH 7

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.43	382.6	(NULL)

RUNOFF ABOVE BASEFLOW OF .00 CFS
3.33 WATERSHED INCHES; 756 CFS-HRS; 62.4 ACRE-FEET.

OPERATION RUNOFF XSECTION 10
OUTPUT HYDROGRAPH= 6 AREA= .16 SQ MI
INPUT RUNOFF CURVE= 90. TIME OF CONCENTRATION= .77 HOURS
COMPUTED INTERNAL TIME INCREMENT = .1033 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.24	220.9	(RUNOFF)

RUNOFF ABOVE BASEFLOW OF .00 CFS
3.45 WATERSHED INCHES; 365 CFS-HRS; 30.1 ACRE-FEET.

OPERATION ADDHYD XSECTION 10

INPUT HYDROGRAPHS 7,6 OUTPUT HYDROGRAPH 5

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.35	586.5	(NULL)

RUNOFF ABOVE BASEFLOW OF .00 CFS
3.37 WATERSHED INCHES; 1120 CFS-HRS; 92.6 ACRE-FEET.

OPERATION RESVOR STRUCTURE 10
INPUT HYDROGRAPH 5 OUTPUT HYDROGRAPH 7
SURFACE ELEVATION= 1369.40

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.53	539.6	1375.24

RUNOFF ABOVE BASEFLOW OF .00 CFS
3.37 WATERSHED INCHES; 1120 CFS-HRS; 92.6 ACRE-FEET.

OPERATION RUNOFF XSECTION 14
OUTPUT HYDROGRAPH= 6 AREA= .04 SQ MI
INPUT RUNOFF CURVE= 93. TIME OF CONCENTRATION= .33 HOURS
COMPUTED INTERNAL TIME INCREMENT = .0444 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.01	85.3	(RUNOFF)

RUNOFF ABOVE BASEFLOW OF .00 CFS
3.75 WATERSHED INCHES; 105 CFS-HRS; 8.6 ACRE-FEET.

OPERATION ADDHYD XSECTION 14
INPUT HYDROGRAPHS 7,6 OUTPUT HYDROGRAPH 5

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.51	556.6	(NULL)

RUNOFF ABOVE BASEFLOW OF .00 CFS
3.40 WATERSHED INCHES; 1225 CFS-HRS; 101.2 ACRE-FEET.

OPERATION RUNOFF XSECTION 15
OUTPUT HYDROGRAPH= 4 AREA= .05 SQ MI
INPUT RUNOFF CURVE= 78. TIME OF CONCENTRATION= .70 HOURS
COMPUTED INTERNAL TIME INCREMENT = .0933 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.21	53.5	(RUNOFF)

RUNOFF ABOVE BASEFLOW OF .00 CFS
2.34 WATERSHED INCHES; 80 CFS-HRS; 6.6 ACRE-FEET.

OPERATION RUNOFF XSECTION 16
OUTPUT HYDROGRAPH= 6 AREA= .08 SQ MI
INPUT RUNOFF CURVE= 80. TIME OF CONCENTRATION= .79 HOURS
COMPUTED INTERNAL TIME INCREMENT = .1056 HOURS

```
   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      12.27                          83.8                        (RUNOFF)

   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                  2.50 WATERSHED INCHES;      136 CFS-HRS;       11.3 ACRE-FEET.


 OPERATION ADDHYD   XSECTION  16
         INPUT HYDROGRAPHS 4,6      OUTPUT HYDROGRAPH 7

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      12.24                          136.8                       (NULL)

   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                  2.44 WATERSHED INCHES;      216 CFS-HRS;       17.9 ACRE-FEET.


 OPERATION RESVOR   STRUCTURE 16
         INPUT HYDROGRAPH 7         OUTPUT HYDROGRAPH 6
         SURFACE ELEVATION=  1372.00

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      12.72                          69.6                        1373.84

   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                  2.44 WATERSHED INCHES;      216 CFS-HRS;       17.9 ACRE-FEET.


 OPERATION RUNOFF   XSECTION  17
         OUTPUT HYDROGRAPH=  4        AREA=     .09 SQ MI
         INPUT RUNOFF CURVE= 96.      TIME OF CONCENTRATION=    .42 HOURS
         COMPUTED INTERNAL TIME INCREMENT =  .0560 HOURS

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      12.05                          186.8                       (RUNOFF)
1
 TR20 ------------------------------------------------------------------------
            EASTMINSTER - BEECH LAKE - EAST BRANCH GYPSUM CREEK        VERSION
 09/27/** BEECHPR2.T20 2-6'x3'20 SEP 2002  2,5,10,100-YR 24-HR STORM ZON10/01/90
 13:36:02                          PASS   2                              PAGE  12


   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                  4.12 WATERSHED INCHES;      252 CFS-HRS;       20.8 ACRE-FEET.


 OPERATION ADDHYD   XSECTION  17
         INPUT HYDROGRAPHS 4,6      OUTPUT HYDROGRAPH 7

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      12.09                          218.1                       (NULL)

   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                  3.12 WATERSHED INCHES;      468 CFS-HRS;       38.7 ACRE-FEET.


 OPERATION RUNOFF   XSECTION  18
         OUTPUT HYDROGRAPH=  6        AREA=     .07 SQ MI
         INPUT RUNOFF CURVE= 78.      TIME OF CONCENTRATION=    .79 HOURS
         COMPUTED INTERNAL TIME INCREMENT =  .1053 HOURS

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      12.26                          69.1                        (RUNOFF)
```

```
   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                  2.33 WATERSHED INCHES;      111 CFS-HRS;        9.2 ACRE-FEET.


 OPERATION ADDHYD   XSECTION  18
         INPUT HYDROGRAPHS 6,7      OUTPUT HYDROGRAPH 4

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      12.12                         279.6                        (NULL)

   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                  2.93 WATERSHED INCHES;      579 CFS-HRS;       47.9 ACRE-FEET.


 OPERATION ADDHYD   XSECTION  19
         INPUT HYDROGRAPHS 4,5      OUTPUT HYDROGRAPH 6

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      12.31                         747.6                        (NULL)

   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                  3.23 WATERSHED INCHES;     1804 CFS-HRS;      149.1 ACRE-FEET.
1
 TR20 ---------------------------------------------------------------------------
              EASTMINSTER - BEECH LAKE - EAST BRANCH GYPSUM CREEK         VERSION
 09/27/** BEECHPR2.T20 2-6'x3'20 SEP 2002  2,5,10,100-YR 24-HR STORM ZON10/01/90
 13:36:02                          PASS   2                                PAGE  13


 OPERATION RUNOFF   XSECTION  20
         OUTPUT HYDROGRAPH=  5        AREA=     .35 SQ MI
         INPUT RUNOFF CURVE= 82.      TIME OF CONCENTRATION=    .87 HOURS
         COMPUTED INTERNAL TIME INCREMENT =  .0945 HOURS

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      12.30                         359.1                        (RUNOFF)

   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                  2.68 WATERSHED INCHES;      602 CFS-HRS;       49.8 ACRE-FEET.


 OPERATION ADDHYD   XSECTION  20
         INPUT HYDROGRAPHS 6,5      OUTPUT HYDROGRAPH 7

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      12.31                        1106.7                        (NULL)

   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                  3.07 WATERSHED INCHES;     2406 CFS-HRS;      198.9 ACRE-FEET.


 OPERATION RESVOR   STRUCTURE 20
         INPUT HYDROGRAPH 7         OUTPUT HYDROGRAPH 5
         SURFACE ELEVATION=  1369.70

 *** MESSAGE - STRUCTURE 20, USER ENTERED STARTING ELEVATION ( 1369.7 FEET)
               WILL DECREASE OUTFLOW HYDROGRAPH VOLUME.                      ***

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      13.32                         405.0                       1370.45

   RUNOFF ABOVE BASEFLOW OF     .00 CFS
```

```
                1.12 WATERSHED INCHES;      880 CFS-HRS;       72.7 ACRE-FEET.


 EXECUTIVE CONTROL ENDCMP    COMPUTATIONS COMPLETED FOR PASS   2
1
 TR20 ------------------------------------------------------------------------
             EASTMINSTER - BEECH LAKE - EAST BRANCH GYPSUM CREEK        VERSION
 09/27/** BEECHPR2.T20 2-6'x3'20 SEP 2002  2,5,10,100-YR 24-HR STORM ZON10/01/90
 13:36:02                          PASS   3                                PAGE  14



 EXECUTIVE CONTROL COMPUT    FROM XSECTION   1  TO STRUCTURE 20
    STARTING TIME =   .00          RAIN DEPTH =  5.25       RAIN DURATION=  1.00
    ANT. MOIST. COND. = 2          MAIN TIME INCREMENT =   .10 HOURS
    ALTERNATE NO.=13               STORM NO.= 3             RAIN TABLE NO.= 7


 OPERATION RUNOFF   XSECTION   1
         OUTPUT HYDROGRAPH=  1        AREA=     .12 SQ MI
         INPUT RUNOFF CURVE= 89.      TIME OF CONCENTRATION=    .91 HOURS
         COMPUTED INTERNAL TIME INCREMENT =  .0992 HOURS

    PEAK TIME(HRS)              PEAK DISCHARGE(CFS)          PEAK ELEVATION(FEET)
       12.32                          174.3                       (RUNOFF)

    RUNOFF ABOVE BASEFLOW OF     .00 CFS
                   3.97 WATERSHED INCHES;      311 CFS-HRS;       25.7 ACRE-FEET.


 OPERATION REACH    XSECTION   2
         INPUT HYDROGRAPH 1         OUTPUT HYDROGRAPH 2
         CHANNEL LENGTH  1500.00 FT
         INPUT = COEFFICIENTS RELATED TO XSECTION AREA,  X=    .85,   M= 1.30
 MODIFIED ATT-KIN ROUTING COEFFICIENT =  .62      PEAK TRAVEL TIME =     .20 HOURS

    PEAK TIME(HRS)              PEAK DISCHARGE(CFS)          PEAK ELEVATION(FEET)
       12.48                          169.0                       (NULL)

    RUNOFF ABOVE BASEFLOW OF     .00 CFS
                   3.97 WATERSHED INCHES;      311 CFS-HRS;       25.7 ACRE-FEET.


 OPERATION RUNOFF   XSECTION   2
         OUTPUT HYDROGRAPH=  1        AREA=     .07 SQ MI
         INPUT RUNOFF CURVE= 91.      TIME OF CONCENTRATION=    .70 HOURS
         COMPUTED INTERNAL TIME INCREMENT =  .0937 HOURS

    PEAK TIME(HRS)              PEAK DISCHARGE(CFS)          PEAK ELEVATION(FEET)
       12.20                          125.6                       (RUNOFF)

    RUNOFF ABOVE BASEFLOW OF     .00 CFS
                   4.16 WATERSHED INCHES;      198 CFS-HRS;       16.4 ACRE-FEET.


 OPERATION ADDHYD   XSECTION   2
         INPUT HYDROGRAPHS 1,2      OUTPUT HYDROGRAPH 3

    PEAK TIME(HRS)              PEAK DISCHARGE(CFS)          PEAK ELEVATION(FEET)
       12.34                          273.3                       (NULL)
1
 TR20 ------------------------------------------------------------------------
             EASTMINSTER - BEECH LAKE - EAST BRANCH GYPSUM CREEK        VERSION
 09/27/** BEECHPR2.T20 2-6'x3'20 SEP 2002  2,5,10,100-YR 24-HR STORM ZON10/01/90
```

RUNOFF ABOVE BASEFLOW OF .00 CFS
4.04 WATERSHED INCHES; 509 CFS-HRS; 42.1 ACRE-FEET.

OPERATION RUNOFF XSECTION 5
OUTPUT HYDROGRAPH= 5 AREA= .20 SQ MI
INPUT RUNOFF CURVE= 89. TIME OF CONCENTRATION= 1.10 HOURS
COMPUTED INTERNAL TIME INCREMENT = .1012 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.43	257.3	(RUNOFF)

RUNOFF ABOVE BASEFLOW OF .00 CFS
4.04 WATERSHED INCHES; 509 CFS-HRS; 42.1 ACRE-FEET.

OPERATION RUNOFF XSECTION 6
OUTPUT HYDROGRAPH= 6 AREA= .16 SQ MI
INPUT RUNOFF CURVE= 88. TIME OF CONCENTRATION= 1.11 HOURS
COMPUTED INTERNAL TIME INCREMENT = .1026 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.44	199.7	(RUNOFF)

RUNOFF ABOVE BASEFLOW OF .00 CFS
3.94 WATERSHED INCHES; 398 CFS-HRS; 32.9 ACRE-FEET.

OPERATION ADDHYD XSECTION 7
INPUT HYDROGRAPHS 5,6 OUTPUT HYDROGRAPH 7

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.43	456.9	(NULL)

RUNOFF ABOVE BASEFLOW OF .00 CFS
3.99 WATERSHED INCHES; 907 CFS-HRS; 75.0 ACRE-FEET.

OPERATION RUNOFF XSECTION 10
OUTPUT HYDROGRAPH= 6 AREA= .16 SQ MI
INPUT RUNOFF CURVE= 90. TIME OF CONCENTRATION= .77 HOURS
COMPUTED INTERNAL TIME INCREMENT = .1033 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.24	261.9	(RUNOFF)

RUNOFF ABOVE BASEFLOW OF .00 CFS
4.12 WATERSHED INCHES; 436 CFS-HRS; 36.0 ACRE-FEET.

1
TR20 ----------
EASTMINSTER - BEECH LAKE - EAST BRANCH GYPSUM CREEK VERSION
09/27/** BEECHPR2.T20 2-6'x3'20 SEP 2002 2,5,10,100-YR 24-HR STORM ZON10/01/90
13:36:02 PASS 3 PAGE 16

OPERATION ADDHYD XSECTION 10
INPUT HYDROGRAPHS 7,6 OUTPUT HYDROGRAPH 5

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.35	699.0	(NULL)

```
   RUNOFF ABOVE BASEFLOW OF    .00 CFS
                4.04 WATERSHED INCHES;     1343 CFS-HRS;      111.0 ACRE-FEET.


OPERATION RESVOR   STRUCTURE 10
        INPUT HYDROGRAPH 5         OUTPUT HYDROGRAPH 7
        SURFACE ELEVATION=  1369.40

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      12.56                          624.5                        1375.65

   RUNOFF ABOVE BASEFLOW OF    .00 CFS
                4.04 WATERSHED INCHES;     1343 CFS-HRS;      111.0 ACRE-FEET.


OPERATION RUNOFF   XSECTION  14
        OUTPUT HYDROGRAPH=  6        AREA=     .04 SQ MI
        INPUT RUNOFF CURVE= 93.      TIME OF CONCENTRATION=    .33 HOURS
        COMPUTED INTERNAL TIME INCREMENT =  .0444 HOURS

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      12.01                           99.9                        (RUNOFF)

   RUNOFF ABOVE BASEFLOW OF    .00 CFS
                4.44 WATERSHED INCHES;      124 CFS-HRS;       10.2 ACRE-FEET.


OPERATION ADDHYD   XSECTION  14
        INPUT HYDROGRAPHS 7,6      OUTPUT HYDROGRAPH 5

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      12.53                          643.2                        (NULL)

   RUNOFF ABOVE BASEFLOW OF    .00 CFS
                4.07 WATERSHED INCHES;     1467 CFS-HRS;      121.2 ACRE-FEET.


OPERATION RUNOFF   XSECTION  15
        OUTPUT HYDROGRAPH=  4        AREA=     .05 SQ MI
        INPUT RUNOFF CURVE= 78.      TIME OF CONCENTRATION=    .70 HOURS
        COMPUTED INTERNAL TIME INCREMENT =  .0933 HOURS
1
 TR20 ---------------------------------------------------------------------------
            EASTMINSTER - BEECH LAKE - EAST BRANCH GYPSUM CREEK        VERSION
 09/27/** BEECHPR2.T20 2-6'x3'20 SEP 2002  2,5,10,100-YR 24-HR STORM ZON10/01/90
 13:36:02                          PASS   3                                PAGE  17


   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      12.21                           66.4                        (RUNOFF)

   RUNOFF ABOVE BASEFLOW OF    .00 CFS
                2.92 WATERSHED INCHES;      100 CFS-HRS;        8.3 ACRE-FEET.


OPERATION RUNOFF   XSECTION  16
        OUTPUT HYDROGRAPH=  6        AREA=     .08 SQ MI
        INPUT RUNOFF CURVE= 80.      TIME OF CONCENTRATION=    .79 HOURS
        COMPUTED INTERNAL TIME INCREMENT =  .1056 HOURS

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      12.26                          104.3                        (RUNOFF)
```

```
   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                  3.11 WATERSHED INCHES;      169 CFS-HRS;       14.0 ACRE-FEET.


 OPERATION ADDHYD   XSECTION  16
        INPUT HYDROGRAPHS 4,6      OUTPUT HYDROGRAPH 7

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      12.24                          170.1                        (NULL)

   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                  3.04 WATERSHED INCHES;      269 CFS-HRS;       22.3 ACRE-FEET.


 OPERATION RESVOR   STRUCTURE 16
        INPUT HYDROGRAPH 7         OUTPUT HYDROGRAPH 6
        SURFACE ELEVATION=  1372.00

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      12.68                           95.1                        1374.23

   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                  3.04 WATERSHED INCHES;      269 CFS-HRS;       22.3 ACRE-FEET.


 OPERATION RUNOFF   XSECTION  17
        OUTPUT HYDROGRAPH=  4        AREA=     .09 SQ MI
        INPUT RUNOFF CURVE= 96.      TIME OF CONCENTRATION=    .42 HOURS
        COMPUTED INTERNAL TIME INCREMENT =  .0560 HOURS

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      12.05                          216.7                        (RUNOFF)
1
 TR20 ------------------------------------------------------------------------
             EASTMINSTER - BEECH LAKE - EAST BRANCH GYPSUM CREEK        VERSION
 09/27/** BEECHPR2.T20 2-6'x3'20 SEP 2002  2,5,10,100-YR 24-HR STORM ZON10/01/90
 13:36:02                          PASS   3                                PAGE  18


   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                  4.81 WATERSHED INCHES;      294 CFS-HRS;       24.3 ACRE-FEET.


 OPERATION ADDHYD   XSECTION  17
        INPUT HYDROGRAPHS 4,6      OUTPUT HYDROGRAPH 7

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      12.09                          257.4                        (NULL)

   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                  3.76 WATERSHED INCHES;      564 CFS-HRS;       46.6 ACRE-FEET.


 OPERATION RUNOFF   XSECTION  18
        OUTPUT HYDROGRAPH=  6        AREA=     .07 SQ MI
        INPUT RUNOFF CURVE= 78.      TIME OF CONCENTRATION=    .79 HOURS
        COMPUTED INTERNAL TIME INCREMENT =  .1053 HOURS

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      12.26                           86.1                        (RUNOFF)

   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                  2.92 WATERSHED INCHES;      139 CFS-HRS;       11.5 ACRE-FEET.
```

```
 OPERATION ADDHYD   XSECTION  18
         INPUT HYDROGRAPHS 6,7      OUTPUT HYDROGRAPH 4

    PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
       12.12                          334.5                        (NULL)

    RUNOFF ABOVE BASEFLOW OF     .00 CFS
                   3.56 WATERSHED INCHES;      703 CFS-HRS;       58.1 ACRE-FEET.


 OPERATION ADDHYD   XSECTION  19
         INPUT HYDROGRAPHS 4,5      OUTPUT HYDROGRAPH 6

    PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
       12.29                          894.0                        (NULL)

    RUNOFF ABOVE BASEFLOW OF     .00 CFS
                   3.89 WATERSHED INCHES;     2170 CFS-HRS;      179.3 ACRE-FEET.
1
 TR20 ---------------------------------------------------------------------------
              EASTMINSTER - BEECH LAKE - EAST BRANCH GYPSUM CREEK        VERSION
 09/27/** BEECHPR2.T20 2-6'x3'20 SEP 2002  2,5,10,100-YR 24-HR STORM ZON10/01/90
 13:36:02                              PASS   3                              PAGE  19


 OPERATION RUNOFF   XSECTION  20
         OUTPUT HYDROGRAPH=  5        AREA=     .35 SQ MI
         INPUT RUNOFF CURVE= 82.      TIME OF CONCENTRATION=    .87 HOURS
         COMPUTED INTERNAL TIME INCREMENT =  .0945 HOURS

    PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
       12.30                          438.9                        (RUNOFF)

    RUNOFF ABOVE BASEFLOW OF     .00 CFS
                   3.30 WATERSHED INCHES;      741 CFS-HRS;       61.3 ACRE-FEET.


 OPERATION ADDHYD   XSECTION  20
         INPUT HYDROGRAPHS 6,5      OUTPUT HYDROGRAPH 7

    PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
       12.30                         1332.7                        (NULL)

    RUNOFF ABOVE BASEFLOW OF     .00 CFS
                   3.72 WATERSHED INCHES;     2911 CFS-HRS;      240.6 ACRE-FEET.


 OPERATION RESVOR   STRUCTURE 20
         INPUT HYDROGRAPH 7         OUTPUT HYDROGRAPH 5
         SURFACE ELEVATION=  1369.70

 *** MESSAGE - STRUCTURE 20, USER ENTERED STARTING ELEVATION ( 1369.7 FEET)
               WILL DECREASE OUTFLOW HYDROGRAPH VOLUME.                      ***

    PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
       13.25                          532.3                       1370.74

    RUNOFF ABOVE BASEFLOW OF     .00 CFS
                   1.76 WATERSHED INCHES;     1378 CFS-HRS;      113.9 ACRE-FEET.


 EXECUTIVE CONTROL ENDCMP    COMPUTATIONS COMPLETED FOR PASS   3
```

EXECUTIVE CONTROL COMPUT FROM XSECTION 1 TO STRUCTURE 20
STARTING TIME = .00 RAIN DEPTH = 7.80 RAIN DURATION= 1.00
ANT. MOIST. COND. = 2 MAIN TIME INCREMENT = .10 HOURS
ALTERNATE NO.=14 STORM NO.= 4 RAIN TABLE NO.= 7

OPERATION RUNOFF XSECTION 1
OUTPUT HYDROGRAPH= 1 AREA= .12 SQ MI
INPUT RUNOFF CURVE= 89. TIME OF CONCENTRATION= .91 HOURS
COMPUTED INTERNAL TIME INCREMENT = .0992 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.32	277.3	(RUNOFF)

RUNOFF ABOVE BASEFLOW OF .00 CFS
6.44 WATERSHED INCHES; 505 CFS-HRS; 41.8 ACRE-FEET.

OPERATION REACH XSECTION 2
INPUT HYDROGRAPH 1 OUTPUT HYDROGRAPH 2
CHANNEL LENGTH 1500.00 FT
INPUT = COEFFICIENTS RELATED TO XSECTION AREA, X= .85, M= 1.30
MODIFIED ATT-KIN ROUTING COEFFICIENT = .67 PEAK TRAVEL TIME = .20 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.47	270.6	(NULL)

RUNOFF ABOVE BASEFLOW OF .00 CFS
6.44 WATERSHED INCHES; 505 CFS-HRS; 41.7 ACRE-FEET.

OPERATION RUNOFF XSECTION 2
OUTPUT HYDROGRAPH= 1 AREA= .07 SQ MI
INPUT RUNOFF CURVE= 91. TIME OF CONCENTRATION= .70 HOURS
COMPUTED INTERNAL TIME INCREMENT = .0937 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.20	197.3	(RUNOFF)

RUNOFF ABOVE BASEFLOW OF .00 CFS
6.66 WATERSHED INCHES; 317 CFS-HRS; 26.2 ACRE-FEET.

OPERATION ADDHYD XSECTION 2
INPUT HYDROGRAPHS 1,2 OUTPUT HYDROGRAPH 3

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.34	436.0	(NULL)

RUNOFF ABOVE BASEFLOW OF .00 CFS

```
                6.52 WATERSHED INCHES;     822 CFS-HRS;      67.9 ACRE-FEET.


 OPERATION RUNOFF   XSECTION   5
         OUTPUT HYDROGRAPH=  5        AREA=     .20 SQ MI
         INPUT RUNOFF CURVE= 89.      TIME OF CONCENTRATION=  1.10 HOURS
         COMPUTED INTERNAL TIME INCREMENT =  .1012 HOURS

    PEAK TIME(HRS)              PEAK DISCHARGE(CFS)          PEAK ELEVATION(FEET)
       12.42                         408.2                       (RUNOFF)

    RUNOFF ABOVE BASEFLOW OF     .00 CFS
                6.52 WATERSHED INCHES;     822 CFS-HRS;      68.0 ACRE-FEET.


 OPERATION RUNOFF   XSECTION   6
         OUTPUT HYDROGRAPH=  6        AREA=     .16 SQ MI
         INPUT RUNOFF CURVE= 88.      TIME OF CONCENTRATION=  1.11 HOURS
         COMPUTED INTERNAL TIME INCREMENT =  .1026 HOURS

    PEAK TIME(HRS)              PEAK DISCHARGE(CFS)          PEAK ELEVATION(FEET)
       12.43                         318.1                       (RUNOFF)

    RUNOFF ABOVE BASEFLOW OF     .00 CFS
                6.40 WATERSHED INCHES;     647 CFS-HRS;      53.5 ACRE-FEET.


 OPERATION ADDHYD   XSECTION   7
         INPUT HYDROGRAPHS 5,6     OUTPUT HYDROGRAPH 7

    PEAK TIME(HRS)              PEAK DISCHARGE(CFS)          PEAK ELEVATION(FEET)
       12.43                         726.2                       (NULL)

    RUNOFF ABOVE BASEFLOW OF     .00 CFS
                6.47 WATERSHED INCHES;    1469 CFS-HRS;     121.4 ACRE-FEET.


 OPERATION RUNOFF   XSECTION  10
         OUTPUT HYDROGRAPH=  6        AREA=     .16 SQ MI
         INPUT RUNOFF CURVE= 90.      TIME OF CONCENTRATION=   .77 HOURS
         COMPUTED INTERNAL TIME INCREMENT =  .1033 HOURS

    PEAK TIME(HRS)              PEAK DISCHARGE(CFS)          PEAK ELEVATION(FEET)
       12.24                         416.9                       (RUNOFF)

    RUNOFF ABOVE BASEFLOW OF     .00 CFS
                6.62 WATERSHED INCHES;     700 CFS-HRS;      57.9 ACRE-FEET.
1
 TR20 ------------------------------------------------------------------------
              EASTMINSTER - BEECH LAKE - EAST BRANCH GYPSUM CREEK        VERSION
 09/27/** BEECHPR2.T20 2-6'x3'20 SEP 2002  2,5,10,100-YR 24-HR STORM ZON10/01/90
 13:36:02                          PASS   4                                PAGE  22


 OPERATION ADDHYD   XSECTION  10
         INPUT HYDROGRAPHS 7,6     OUTPUT HYDROGRAPH 5

    PEAK TIME(HRS)              PEAK DISCHARGE(CFS)          PEAK ELEVATION(FEET)
       12.34                        1110.6                       (NULL)

    RUNOFF ABOVE BASEFLOW OF     .00 CFS
                6.52 WATERSHED INCHES;    2170 CFS-HRS;     179.3 ACRE-FEET.
```

```
OPERATION RESVOR   STRUCTURE 10
        INPUT HYDROGRAPH 5         OUTPUT HYDROGRAPH 7
        SURFACE ELEVATION=  1369.40

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      12.63                          909.2                        1377.30

   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                  6.52 WATERSHED INCHES;     2169 CFS-HRS;      179.3 ACRE-FEET.


OPERATION RUNOFF   XSECTION  14
        OUTPUT HYDROGRAPH=  6        AREA=      .04 SQ MI
        INPUT RUNOFF CURVE= 93.      TIME OF CONCENTRATION=    .33 HOURS
        COMPUTED INTERNAL TIME INCREMENT =  .0444 HOURS

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      12.01                          153.2                        (RUNOFF)

   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                  6.95 WATERSHED INCHES;      194 CFS-HRS;       16.0 ACRE-FEET.


OPERATION ADDHYD   XSECTION  14
        INPUT HYDROGRAPHS 7,6      OUTPUT HYDROGRAPH 5

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      12.60                          933.7                        (NULL)

   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                  6.55 WATERSHED INCHES;     2363 CFS-HRS;      195.3 ACRE-FEET.


OPERATION RUNOFF   XSECTION  15
        OUTPUT HYDROGRAPH=  4        AREA=      .05 SQ MI
        INPUT RUNOFF CURVE= 78.      TIME OF CONCENTRATION=    .70 HOURS
        COMPUTED INTERNAL TIME INCREMENT =  .0933 HOURS
1
 TR20 ----------------------------------------------------------------------
            EASTMINSTER - BEECH LAKE - EAST BRANCH GYPSUM CREEK        VERSION
 09/27/** BEECHPR2.T20 2-6'x3'20 SEP 2002  2,5,10,100-YR 24-HR STORM ZON10/01/90
 13:36:02                          PASS   4                                PAGE  23


   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      12.20                          116.9                        (RUNOFF)

   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                  5.19 WATERSHED INCHES;      178 CFS-HRS;       14.7 ACRE-FEET.


OPERATION RUNOFF   XSECTION  16
        OUTPUT HYDROGRAPH=  6        AREA=      .08 SQ MI
        INPUT RUNOFF CURVE= 80.      TIME OF CONCENTRATION=    .79 HOURS
        COMPUTED INTERNAL TIME INCREMENT =  .1056 HOURS

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      12.26                          179.5                        (RUNOFF)

   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                  5.43 WATERSHED INCHES;      296 CFS-HRS;       24.4 ACRE-FEET.
```

```
 OPERATION ADDHYD   XSECTION  16
         INPUT HYDROGRAPHS 4,6      OUTPUT HYDROGRAPH 7

    PEAK TIME(HRS)              PEAK DISCHARGE(CFS)          PEAK ELEVATION(FEET)
       12.23                          295.6                       (NULL)

    RUNOFF ABOVE BASEFLOW OF     .00 CFS
                   5.34 WATERSHED INCHES;      474 CFS-HRS;       39.1 ACRE-FEET.


 OPERATION RESVOR   STRUCTURE 16
         INPUT HYDROGRAPH 7         OUTPUT HYDROGRAPH 6
         SURFACE ELEVATION=  1372.00

    PEAK TIME(HRS)              PEAK DISCHARGE(CFS)          PEAK ELEVATION(FEET)
       12.60                          189.6                      1375.42

    RUNOFF ABOVE BASEFLOW OF     .00 CFS
                   5.34 WATERSHED INCHES;      474 CFS-HRS;       39.2 ACRE-FEET.


 OPERATION RUNOFF   XSECTION  17
         OUTPUT HYDROGRAPH=  4        AREA=     .09 SQ MI
         INPUT RUNOFF CURVE= 96.      TIME OF CONCENTRATION=    .42 HOURS
         COMPUTED INTERNAL TIME INCREMENT =  .0560 HOURS

    PEAK TIME(HRS)              PEAK DISCHARGE(CFS)          PEAK ELEVATION(FEET)
       12.05                          325.0                       (RUNOFF)
1
 TR20 ------------------------------------------------------------------------
              EASTMINSTER - BEECH LAKE - EAST BRANCH GYPSUM CREEK        VERSION
 09/27/** BEECHPR2.T20 2-6'x3'20 SEP 2002  2,5,10,100-YR 24-HR STORM ZON10/01/90
 13:36:02                          PASS   4                                PAGE  24


    RUNOFF ABOVE BASEFLOW OF     .00 CFS
                   7.35 WATERSHED INCHES;      450 CFS-HRS;       37.2 ACRE-FEET.


 OPERATION ADDHYD   XSECTION  17
         INPUT HYDROGRAPHS 4,6      OUTPUT HYDROGRAPH 7

    PEAK TIME(HRS)              PEAK DISCHARGE(CFS)          PEAK ELEVATION(FEET)
       12.12                          408.8                       (NULL)

    RUNOFF ABOVE BASEFLOW OF     .00 CFS
                   6.16 WATERSHED INCHES;      924 CFS-HRS;       76.3 ACRE-FEET.


 OPERATION RUNOFF   XSECTION  18
         OUTPUT HYDROGRAPH=  6        AREA=     .07 SQ MI
         INPUT RUNOFF CURVE= 78.      TIME OF CONCENTRATION=    .79 HOURS
         COMPUTED INTERNAL TIME INCREMENT =  .1053 HOURS

    PEAK TIME(HRS)              PEAK DISCHARGE(CFS)          PEAK ELEVATION(FEET)
       12.25                          153.1                       (RUNOFF)

    RUNOFF ABOVE BASEFLOW OF     .00 CFS
                   5.20 WATERSHED INCHES;      248 CFS-HRS;       20.5 ACRE-FEET.


 OPERATION ADDHYD   XSECTION  18
         INPUT HYDROGRAPHS 6,7      OUTPUT HYDROGRAPH 4
```

```
   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      12.16                          553.8                        (NULL)

   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                  5.93 WATERSHED INCHES;     1172 CFS-HRS;       96.8 ACRE-FEET.


 OPERATION ADDHYD   XSECTION  19
         INPUT HYDROGRAPHS 4,5      OUTPUT HYDROGRAPH 6

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      12.24                         1373.3                        (NULL)

   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                  6.33 WATERSHED INCHES;     3535 CFS-HRS;      292.1 ACRE-FEET.
1
 TR20 ------------------------------------------------------------------------
             EASTMINSTER - BEECH LAKE - EAST BRANCH GYPSUM CREEK         VERSION
 09/27/** BEECHPR2.T20 2-6'x3'20 SEP 2002  2,5,10,100-YR 24-HR STORM ZON10/01/90
 13:36:02                          PASS   4                                PAGE  25


 OPERATION RUNOFF   XSECTION  20
         OUTPUT HYDROGRAPH=  5        AREA=     .35 SQ MI
         INPUT RUNOFF CURVE= 82.      TIME OF CONCENTRATION=    .87 HOURS
         COMPUTED INTERNAL TIME INCREMENT =  .0945 HOURS

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      12.30                          744.1                        (RUNOFF)

   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                  5.66 WATERSHED INCHES;     1273 CFS-HRS;      105.2 ACRE-FEET.


 OPERATION ADDHYD   XSECTION  20
         INPUT HYDROGRAPHS 6,5      OUTPUT HYDROGRAPH 7

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      12.28                         2108.7                        (NULL)

   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                  6.14 WATERSHED INCHES;     4808 CFS-HRS;      397.3 ACRE-FEET.


 OPERATION RESVOR   STRUCTURE 20
         INPUT HYDROGRAPH 7         OUTPUT HYDROGRAPH 5
         SURFACE ELEVATION=  1369.70

 *** MESSAGE - STRUCTURE 20, USER ENTERED STARTING ELEVATION ( 1369.7 FEET)
               WILL DECREASE OUTFLOW HYDROGRAPH VOLUME.                    ***

   PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
      13.15                         1098.3                       1371.63

   RUNOFF ABOVE BASEFLOW OF     .00 CFS
                  4.16 WATERSHED INCHES;     3257 CFS-HRS;      269.2 ACRE-FEET.


 EXECUTIVE CONTROL ENDCMP    COMPUTATIONS COMPLETED FOR PASS   4
1
 TR20 ------------------------------------------------------------------------
             EASTMINSTER - BEECH LAKE - EAST BRANCH GYPSUM CREEK         VERSION
 09/27/** BEECHPR2.T20 2-6'x3'20 SEP 2002  2,5,10,100-YR 24-HR STORM ZON10/01/90
```

SUMMARY TABLE 1

SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL IN ORDER PERFORMED.
A CHARACTER FOLLOWING THE PEAK DISCHARGE TIME AND RATE (CFS) INDICATES:
F-FLAT TOP HYDROGRAPH T-TRUNCATED HYDROGRAPH R-RISING TRUNCATED HYDROGRAPH

XSECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)
RAINFALL OF 3.50 inches AND 24.00 hr DURATION, BEGINS AT .0 hrs.							
RAINTABLE NUMBER 7, AMC 2							
MAIN TIME INCREMENT .10 HOURS							
ALTERNATE 11 STORM 1							
XSECTION 1	RUNOFF	.12	2.32	---	12.33	104	866.7
XSECTION 2	REACH	.12	2.32	---	12.50	100	833.3
XSECTION 2	RUNOFF	.07	2.49	---	12.20	77	1100.0
XSECTION 2	ADDHYD	.20	2.38	---	12.35	162	810.0
XSECTION 5	RUNOFF	.20	2.38	---	12.43	154	770.0
XSECTION 6	RUNOFF	.16	2.29	---	12.45	118	737.5
XSECTION 7	ADDHYD	.35	2.34	---	12.44	271	774.3
XSECTION 10	RUNOFF	.16	2.45	---	12.24	161	1006.3
XSECTION 10	ADDHYD	.52	2.38	---	12.35	419	805.8
STRUCTURE 10	RESVOR	.52	2.38	1374.66	12.53	386	742.3
XSECTION 14	RUNOFF	.04	2.73	---	12.01	63	1575.0
XSECTION 14	ADDHYD	.56	2.40	---	12.51	399	712.5
XSECTION 15	RUNOFF	.05	1.49	---	12.21	34	680.0
XSECTION 16	RUNOFF	.08	1.64	---	12.27	55	687.5
XSECTION 16	ADDHYD	.14	1.58	---	12.24	89	635.7
STRUCTURE 16	RESVOR	.14	1.58	1373.19	12.74	44	314.3
XSECTION 17	RUNOFF	.09	3.07	---	12.05	142	1577.8
XSECTION 17	ADDHYD	.23	2.19	---	12.08	160	695.7
XSECTION 18	RUNOFF	.07	1.50	---	12.27	43	614.3
XSECTION 18	ADDHYD	.31	2.02	---	12.11	198	638.7
XSECTION 19	ADDHYD	.87	2.27	---	12.29	533	612.6
XSECTION 20	RUNOFF	.35	1.78	---	12.31	237	677.1
XSECTION 20	ADDHYD	1.21	2.13	---	12.30	769	635.5
STRUCTURE 20	RESVOR	1.21	.20	1370.02	13.55	218	180.2

1
TR20 ----------
EASTMINSTER - BEECH LAKE - EAST BRANCH GYPSUM CREEK VERSION
09/27/** BEECHPR2.T20 2-6'x3'20 SEP 2002 2,5,10,100-YR 24-HR STORM ZON10/01/90

SUMMARY TABLE 1

SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL IN ORDER PERFORMED.
A CHARACTER FOLLOWING THE PEAK DISCHARGE TIME AND RATE (CFS) INDICATES:
F-FLAT TOP HYDROGRAPH T-TRUNCATED HYDROGRAPH R-RISING TRUNCATED HYDROGRAPH

XSECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA	RUNOFF AMOUNT	PEAK DISCHARGE ELEVATION	PEAK DISCHARGE TIME	PEAK DISCHARGE RATE	PEAK DISCHARGE RATE

			(SQ MI)	(IN)	(FT)	(HR)	(CFS)	(CSM)

RAINFALL OF 4.55 inches AND 24.00 hr DURATION, BEGINS AT .0 hrs.

ALTERNATE 12 STORM 2

XSECTION	1	RUNOFF	.12	3.30	---	12.32	146	1216.7
XSECTION	2	REACH	.12	3.30	---	12.49	141	1175.0
XSECTION	2	RUNOFF	.07	3.49	---	12.20	107	1528.6
XSECTION	2	ADDHYD	.20	3.37	---	12.34	229	1145.0
XSECTION	5	RUNOFF	.20	3.37	---	12.43	216	1080.0
XSECTION	6	RUNOFF	.16	3.27	---	12.44	167	1043.8
XSECTION	7	ADDHYD	.35	3.33	---	12.43	383	1094.3
XSECTION	10	RUNOFF	.16	3.45	---	12.24	221	1381.3
XSECTION	10	ADDHYD	.52	3.37	---	12.35	586	1126.9
STRUCTURE	10	RESVOR	.52	3.37	1375.24	12.53	540	1038.5
XSECTION	14	RUNOFF	.04	3.75	---	12.01	85	2125.0
XSECTION	14	ADDHYD	.56	3.40	---	12.51	557	994.6
XSECTION	15	RUNOFF	.05	2.34	---	12.21	53	1060.0
XSECTION	16	RUNOFF	.08	2.50	---	12.27	84	1050.0
XSECTION	16	ADDHYD	.14	2.44	---	12.24	137	978.6
STRUCTURE	16	RESVOR	.14	2.44	1373.84	12.72	70	500.0
XSECTION	17	RUNOFF	.09	4.12	---	12.05	187	2077.8
XSECTION	17	ADDHYD	.23	3.12	---	12.09	218	947.8
XSECTION	18	RUNOFF	.07	2.33	---	12.26	69	985.7
XSECTION	18	ADDHYD	.31	2.93	---	12.12	280	903.2
XSECTION	19	ADDHYD	.87	3.23	---	12.31	748	859.8
XSECTION	20	RUNOFF	.35	2.68	---	12.30	359	1025.7
XSECTION	20	ADDHYD	1.21	3.07	---	12.31	1107	914.9
STRUCTURE	20	RESVOR	1.21	1.12	1370.45	13.32	405	334.7

SUMMARY TABLE 1

SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL IN ORDER PERFORMED.
A CHARACTER FOLLOWING THE PEAK DISCHARGE TIME AND RATE (CFS) INDICATES:
F-FLAT TOP HYDROGRAPH T-TRUNCATED HYDROGRAPH R-RISING TRUNCATED HYDROGRAPH

XSECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)

RAINFALL OF 5.25 inches AND 24.00 hr DURATION, BEGINS AT .0 hrs.

ALTERNATE 13 STORM 3

XSECTION	1	RUNOFF	.12	3.97	---	12.32	174	1450.0
XSECTION	2	REACH	.12	3.97	---	12.48	169	1408.3
XSECTION	2	RUNOFF	.07	4.16	---	12.20	126	1800.0
XSECTION	2	ADDHYD	.20	4.04	---	12.34	273	1365.0
XSECTION	5	RUNOFF	.20	4.04	---	12.43	257	1285.0

XSECTION	6	RUNOFF	.16	3.94	---	12.44	200	1250.0
XSECTION	7	ADDHYD	.35	3.99	---	12.43	457	1305.7
XSECTION	10	RUNOFF	.16	4.12	---	12.24	262	1637.5
XSECTION	10	ADDHYD	.52	4.04	---	12.35	699	1344.2
STRUCTURE	10	RESVOR	.52	4.04	1375.65	12.56	624	1200.0
XSECTION	14	RUNOFF	.04	4.44	---	12.01	100	2500.0
XSECTION	14	ADDHYD	.56	4.07	---	12.53	643	1148.2
XSECTION	15	RUNOFF	.05	2.92	---	12.21	66	1320.0
XSECTION	16	RUNOFF	.08	3.11	---	12.26	104	1300.0
XSECTION	16	ADDHYD	.14	3.04	---	12.24	170	1214.3
STRUCTURE	16	RESVOR	.14	3.04	1374.23	12.68	95	678.6
XSECTION	17	RUNOFF	.09	4.81	---	12.05	217	2411.1
XSECTION	17	ADDHYD	.23	3.76	---	12.09	257	1117.4
XSECTION	18	RUNOFF	.07	2.92	---	12.26	86	1228.6
XSECTION	18	ADDHYD	.31	3.56	---	12.12	335	1080.6
XSECTION	19	ADDHYD	.87	3.89	---	12.29	894	1027.6
XSECTION	20	RUNOFF	.35	3.30	---	12.30	439	1254.3
XSECTION	20	ADDHYD	1.21	3.72	---	12.30	1333	1101.7
STRUCTURE	20	RESVOR	1.21	1.76	1370.74	13.25	532	439.7

1

SUMMARY TABLE 1

SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL IN ORDER PERFORMED.
A CHARACTER FOLLOWING THE PEAK DISCHARGE TIME AND RATE (CFS) INDICATES:
F-FLAT TOP HYDROGRAPH T-TRUNCATED HYDROGRAPH R-RISING TRUNCATED HYDROGRAPH

XSECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)

RAINFALL OF 7.80 inches AND 24.00 hr DURATION, BEGINS AT .0 hrs.

ALTERNATE 14 STORM 4

XSECTION	1	RUNOFF	.12	6.44	---	12.32	277	2308.3
XSECTION	2	REACH	.12	6.44	---	12.47	271	2258.3
XSECTION	2	RUNOFF	.07	6.66	---	12.20	197	2814.3
XSECTION	2	ADDHYD	.20	6.52	---	12.34	436	2180.0
XSECTION	5	RUNOFF	.20	6.52	---	12.42	408	2040.0
XSECTION	6	RUNOFF	.16	6.40	---	12.43	318	1987.5
XSECTION	7	ADDHYD	.35	6.47	---	12.43	726	2074.3
XSECTION	10	RUNOFF	.16	6.62	---	12.24	417	2606.3
XSECTION	10	ADDHYD	.52	6.52	---	12.34	1111	2136.5
STRUCTURE	10	RESVOR	.52	6.52	1377.30	12.63	909	1748.1
XSECTION	14	RUNOFF	.04	6.95	---	12.01	153	3825.0
XSECTION	14	ADDHYD	.56	6.55	---	12.60	934	1667.9
XSECTION	15	RUNOFF	.05	5.19	---	12.20	117	2340.0
XSECTION	16	RUNOFF	.08	5.43	---	12.26	180	2250.0
XSECTION	16	ADDHYD	.14	5.34	---	12.23	296	2114.3
STRUCTURE	16	RESVOR	.14	5.34	1375.42	12.60	190	1357.1

XSECTION	17	RUNOFF	.09	7.35	---	12.05	325	3611.1
XSECTION	17	ADDHYD	.23	6.16	---	12.12	409	1778.3
XSECTION	18	RUNOFF	.07	5.20	---	12.25	153	2185.7
XSECTION	18	ADDHYD	.31	5.93	---	12.16	554	1787.1
XSECTION	19	ADDHYD	.87	6.33	---	12.24	1373	1578.2
XSECTION	20	RUNOFF	.35	5.66	---	12.30	744	2125.7
XSECTION	20	ADDHYD	1.21	6.14	---	12.28	2109	1743.0
STRUCTURE	20	RESVOR	1.21	4.16	1371.63	13.15	1098	907.4

1

SUMMARY TABLE 2

MODIFIED ATT-KIN REACH ROUTING IN ORDER PERFORMED.
QUESTION MARK (?) AFTER: OUTFLOW PEAK - MAX. NUMBER ROUTING ITERATIONS USED;
ATT-KIN COEFF - VALUE OUTSIDE ACCEPTABLE LIMITS.

			HYDROGRAPH INFORMATION				ROUTING PARAMETERS				
			INFLOW		OUTFLOW		Q-A EQ.			PEAK	ATT-
XSEC ID	REACH LENGTH (FT)	FLOOD PLAIN LENGTH (FT)	PEAK (CFS)	TIME (HR)	PEAK (CFS)	TIME (HR)	COEFF (X)	POWER (M)	LENGTH FACTOR (K*)	RATIO Q/I (Q*)	KIN COEFF (C)
BASEFLOW IS .0 CFS											
ALTERNATE 11 STORM 1											
2	1500		103	12.3	100	12.5	.85	1.30	.045	.963	.57
ALTERNATE 12 STORM 2											
2	1500		146	12.3	141	12.5	.85	1.30	.040	.968	.61
ALTERNATE 13 STORM 3											
2	1500		174	12.3	169	12.5	.85	1.30	.038	.970	.62
ALTERNATE 14 STORM 4											
2	1500		277	12.3	270	12.5	.85	1.30	.032	.973	.67?

1

SUMMARY TABLE 3

STORM DISCHARGES (CFS) AT XSECTIONS AND STRUCTURES FOR ALL ALTERNATES

XSECTION/ STRUCTURE ID	DRAINAGE AREA (SQ MI)	STORM NUMBERS..... 1	2	3	4
STRUCTURE 20	1.21				

ALTERNATE	11		218	*********	*********	*********
ALTERNATE	12	*********	405	*********	*********
ALTERNATE	13	*********	*********	532	*********
ALTERNATE	14	*********	*********	*********	1098

STRUCTURE 16 .14

ALTERNATE	11		44	*********	*********	*********
ALTERNATE	12	*********	70	*********	*********
ALTERNATE	13	*********	*********	95	*********
ALTERNATE	14	*********	*********	*********	190

STRUCTURE 10 .52

ALTERNATE	11		386	*********	*********	*********
ALTERNATE	12	*********	540	*********	*********
ALTERNATE	13	*********	*********	624	*********
ALTERNATE	14	*********	*********	*********	909

XSECTION 1 .12

ALTERNATE	11		104	*********	*********	*********
ALTERNATE	12	*********	146	*********	*********
ALTERNATE	13	*********	*********	174	*********
ALTERNATE	14	*********	*********	*********	277

XSECTION 2 .20

ALTERNATE	11		162	*********	*********	*********
ALTERNATE	12	*********	229	*********	*********
ALTERNATE	13	*********	*********	273	*********
ALTERNATE	14	*********	*********	*********	436

XSECTION 5 .20

ALTERNATE	11		154	*********	*********	*********
ALTERNATE	12	*********	216	*********	*********
ALTERNATE	13	*********	*********	257	*********
ALTERNATE	14	*********	*********	*********	408

XSECTION 6 .16

ALTERNATE	11		118	*********	*********	*********
ALTERNATE	12	*********	167	*********	*********
ALTERNATE	13	*********	*********	200	*********
ALTERNATE	14	*********	*********	*********	318

SUMMARY TABLE 3

STORM DISCHARGES (CFS) AT XSECTIONS AND STRUCTURES FOR ALL ALTERNATES

XSECTION/ STRUCTURE ID	DRAINAGE AREA (SQ MI)	STORM NUMBERS..... 1	2	3	4
XSECTION 7	.35				

```
---------------------------
   ALTERNATE   11                271 ********* ********* *********
   ALTERNATE   12          *********       383 ********* *********
   ALTERNATE   13          ********* *********       457 *********
   ALTERNATE   14          ********* ********* *********       726

XSECTION   10          .52
---------------------------
   ALTERNATE   11                419 ********* ********* *********
   ALTERNATE   12          *********       586 ********* *********
   ALTERNATE   13          ********* *********       699 *********
   ALTERNATE   14          ********* ********* *********      1111

XSECTION   14          .56
---------------------------
   ALTERNATE   11                399 ********* ********* *********
   ALTERNATE   12          *********       557 ********* *********
   ALTERNATE   13          ********* *********       643 *********
   ALTERNATE   14          ********* ********* *********       934

XSECTION   15          .05
---------------------------
   ALTERNATE   11                 34 ********* ********* *********
   ALTERNATE   12          *********        53 ********* *********
   ALTERNATE   13          ********* *********        66 *********
   ALTERNATE   14          ********* ********* *********       117

XSECTION   16          .14
---------------------------
   ALTERNATE   11                 89 ********* ********* *********
   ALTERNATE   12          *********       137 ********* *********
   ALTERNATE   13          ********* *********       170 *********
   ALTERNATE   14          ********* ********* *********       296

XSECTION   17          .23
---------------------------
   ALTERNATE   11                160 ********* ********* *********
   ALTERNATE   12          *********       218 ********* *********
   ALTERNATE   13          ********* *********       257 *********
   ALTERNATE   14          ********* ********* *********       409

XSECTION   18          .31
---------------------------
   ALTERNATE   11                198 ********* ********* *********
   ALTERNATE   12          *********       280 ********* *********
   ALTERNATE   13          ********* *********       335 *********
1
TR20 ------------------------------------------------------------------------
            EASTMINSTER - BEECH LAKE - EAST BRANCH GYPSUM CREEK        VERSION
09/27/** BEECHPR2.T20 2-6'x3'20 SEP 2002  2,5,10,100-YR 24-HR STORM ZON10/01/90
13:36:02                                                              PAGE   33


                          SUMMARY TABLE 3
                          ---------------
STORM DISCHARGES (CFS) AT XSECTIONS AND STRUCTURES FOR ALL ALTERNATES

XSECTION/          DRAINAGE
STRUCTURE            AREA       STORM NUMBERS.....
  ID                 (SQ MI)          1         2         3         4


XSECTION   18          .31
---------------------------
```

```
   ALTERNATE   14              ********* ********* *********       554

 XSECTION   19          .87
 ---------------------------
   ALTERNATE   11                    533 ********* ********* *********
   ALTERNATE   12              ********* ********* ********* *********
   ALTERNATE   13              ********* ********* ********* *********
   ALTERNATE   14              ********* ********* *********      1373

 XSECTION   20         1.21
 ---------------------------
   ALTERNATE   11                    769 ********* ********* *********
   ALTERNATE   12              ********* ********* ********* *********
   ALTERNATE   13              ********* ********* ********* *********
   ALTERNATE   14              ********* ********* *********      2109

 *** WARNING - UNEXPECTED RECORD(S) ENCOUNTERED WHEN LOOKING FOR "JOB" RECORD.
               IMAGES OF FIRST 10 RECORDS IGNORED FOLLOWS:                  ***



 END OF  1 JOBS IN THIS RUN
1



                     SCS  TR-20,  VERSION 10/01/90
                                  FILES

     INPUT  = beechpr2.t20
     OUTPUT = beechpr2.out                          , DATED 09/27/**,13:36:02

              FILES GENERATED - DATED 09/27/**,13:36:02

                                NONE!

               *** TR-20 RUN COMPLETED ***
```

Appendix G

Pipe Sizing Calculations

9/30/02

DRAINAGE ANALYSIS SUMMARY
Waterfront Addition

Soil Group D

Area ID	Area	Accum. Area	C2	C5	C10	C100	Elev Max	Elev Min	Flow Length	Tc2 Calc	Avg V2	Tc5 Calc	Avg V5	Tc10 Calc	Avg V10	Tc100 Calc	Avg V100	Tc2 min	Tc5 min	Tc10 min	Tc100 min	I2 in/hr	I5 in/hr	I10 in/hr	I100 in/hr	Q2 cfs	Q5 cfs	Q10 cfs	Q100 cfs
	ac	ac																										
A	1.8	1.8	0.68	0.69	0.73	0.80	78.0	73.0	350	9.49	0.44	9.26	0.45	8.36	0.50	6.78	0.61	15	15	15	15	3.83	4.56	5.22	7.37	4.58	5.54	6.71	10.38
B	0.9	0.9	0.68	0.69	0.73	0.80	78.0	69.0	350	10.32	0.57	10.08	0.58	9.09	0.64	7.37	0.79	15	15	15	15	3.83	4.56	5.22	7.37	2.29	2.77	3.35	5.19
A+B	2.6	2.6	0.68	0.69	0.73	0.80	78.0	69.0	350	10.32	0.57	10.08	0.58	9.09	0.64	7.37	0.79	15	15	15	15	3.83	4.56	5.22	7.37	6.88	8.31	10.06	15.57
C	0.9	0.9	0.68	0.69	0.73	0.80	78.0	69.0	350	10.32	0.57	10.08	0.58	9.09	0.64	7.37	0.79	15	15	15	15	3.83	4.56	5.22	7.37	2.24	2.71	3.28	5.07
A+B+C	3.5	3.5	0.68	0.69	0.73	0.80	78.0	69.0	350	10.32	0.57	10.08	0.58	9.09	0.64	7.37	0.79	15	15	15	15	3.83	4.56	5.22	7.37	9.12	11.01	13.34	20.64
D	2.3	2.3	0.68	0.69	0.73	0.80	78.5	73.0	300	10.70	0.47	10.44	0.48	9.43	0.53	7.64	0.65	15	15	15	15	3.83	4.56	5.22	7.37	5.96	7.21	8.73	13.50
A+B+C+D	5.8	5.8	0.68	0.69	0.73	0.80	78.5	69.0	400	11.33	0.59	11.06	0.60	9.98	0.67	8.09	0.82	15	15	15	15	3.83	4.56	5.22	7.37	15.08	18.22	22.06	34.14
E	1.2	1.2	0.68	0.69	0.73	0.80	76.0	71.5	230	9.17	0.42	8.95	0.43	8.08	0.47	6.55	0.59	15	15	15	15	3.83	4.56	5.22	7.37	3.07	3.71	4.50	6.96
A+B+C+D+E	7.0	7.0	0.68	0.69	0.73	0.80	78.5	69.0	550	14.78	0.62	14.43	0.64	13.02	0.70	10.56	0.87	15	15	15	15	3.42	4.20	5.08	7.37	18.15	21.93	26.56	41.10
F	6.9	6.9	0.68	0.69	0.73	0.80	87.5	78.0	750	19.14	0.65	18.68	0.67	16.86	0.74	13.67	0.91	19	19	17	15	3.83	4.56	5.22	7.37	16.00	19.94	25.51	40.56
G	0.5	0.5	0.68	0.69	0.73	0.80	83.5	76.5	350	11.23	0.52	10.96	0.53	9.89	0.59	8.02	0.73	15	15	15	15	3.42	4.20	5.08	7.37	1.30	1.57	1.91	2.95
F+G	7.4	7.4	0.68	0.69	0.73	0.80	87.5	76.5	800	19.23	0.69	18.77	0.71	16.94	0.79	13.74	0.97	19	19	17	15	3.83	4.56	5.22	7.37	1.43	1.73	2.10	3.24
H	0.6	0.6	0.68	0.69	0.73	0.80	83.0	76.5	350	11.51	0.51	11.23	0.52	10.14	0.58	8.22	0.71	15	15	15	15	3.33	4.10	4.95	7.37	17.96	22.43	28.66	46.76
F+G+H	7.9	7.9	0.68	0.69	0.73	0.80	87.5	76.5	850	20.23	0.70	19.74	0.72	17.82	0.80	14.45	0.98	20	20	18	15	3.83	4.56	5.22	7.37	7.92	9.57	11.58	17.92
I	3.0	3.0	0.68	0.69	0.73	0.80	82.5	73.0	450	12.50	0.60	12.20	0.61	11.01	0.68	8.93	0.84	15	15	15	15	3.83	4.56	5.22	7.37	23.12	28.23	36.84	63.01
F+G+H+I	11.0	11.0	0.68	0.69	0.73	0.80	87.5	73.0	1150	23.73	0.81	23.17	0.83	20.91	0.92	16.95	1.13	24	23	21	17	3.10	3.73	4.60	7.18	2.84	3.43	4.15	6.43
J	1.1	1.1	0.68	0.69	0.73	0.80	81.0	76.0	300	11.04	0.45	10.78	0.46	9.73	0.51	7.89	0.63	15	15	15	15	3.83	4.56	5.22	7.37	23.78	29.71	37.94	65.99
F+G+H+I+J	12.1	12.1	0.68	0.69	0.73	0.80	87.5	73.0	1300	26.28	0.82	25.66	0.84	23.15	0.94	18.77	1.15	26	26	23	19	2.90	3.57	4.31	6.84	2.28	2.77	3.54	6.07
K	1.0	1.0	0.68	0.69	0.73	0.80	84.0	76.5	800	21.85	0.61	21.33	0.63	19.25	0.69	15.61	0.85	22	21	19	16	3.25	3.90	4.71	7.37	2.10	2.56	3.27	5.60
L	1.0	1.0	0.68	0.69	0.73	0.80	84.0	76.5	850	22.98	0.62	22.43	0.63	20.24	0.70	16.41	0.86	23	22	20	16	3.17	3.81	4.60	7.18	4.27	5.21	6.65	11.37
K+L	2.0	2.0	0.68	0.69	0.73	0.80	75.5	73.0	540	22.71	0.40	22.17	0.41	20.01	0.45	16.22	0.55	23	22	20	16	3.17	3.81	4.60	7.18	1.60	1.95	2.48	4.25
M	0.7	0.7	0.68	0.69	0.73	0.80	75.5	74.0	540	26.92	0.33	26.28	0.34	23.72	0.38	19.23	0.47	27	26	24	19	2.90	3.50	4.31	6.68	1.24	1.52	1.98	3.37
N	0.6	0.6	0.68	0.69	0.73	0.80	75.5	73.0	600	24.79	0.40	24.20	0.41	21.84	0.46	17.71	0.56	25	24	22	18	3.03	3.65	4.50	7.00	2.82	3.45	4.50	7.67
M+N	1.4	1.4	0.68	0.69	0.73	0.80	81.0	76.0	550	18.30	0.50	17.87	0.51	16.12	0.57	13.07	0.70	18	18	16	15	3.51	4.31	5.08	7.37	6.21	7.73	9.64	15.33
O	2.6	2.6	0.68	0.69	0.73	0.80	74.5	72.5	400	19.05	0.35	18.60	0.36	16.78	0.40	13.61	0.49	19	19	17	15	3.72	4.43	5.22	7.37	12.42	15.48	19.80	31.48
P	5.3	5.3	0.68	0.69	0.73	0.80	80.5	72.5	600	16.83	0.59	16.42	0.61	14.82	0.67	12.02	0.83	17	16	15	15	3.83	4.56	5.22	7.37	13.20	15.96	19.89	30.78
Q	5.2	5.2	0.68	0.69	0.73	0.80	73.5	72.0	200	11.77	0.28	11.49	0.29	10.37	0.32	8.41	0.40	15	15	15	15	3.61	4.31	5.22	7.37	14.04	17.01	21.80	33.73
R	0.5	0.5	0.68	0.69	0.73	0.80	80.5	72.0	660	17.85	0.62	17.43	0.63	15.73	0.70	12.75	0.86	18	17	16	15	3.83	4.56	5.22	7.37	1.38	1.67	2.02	3.12
Q+R	5.7	5.7	0.68	0.69	0.73	0.80	75.0	71.5	250	10.69	0.39	10.43	0.40	9.41	0.44	7.63	0.55	15	15	15	15	3.51	4.20	5.08	7.37	14.92	18.11	23.18	36.85
S	0.5	0.5	0.68	0.69	0.73	0.80	80.5	71.5	710	18.61	0.64	18.17	0.65	16.40	0.72	13.30	0.89	19	18	16	15	3.51	4.20	5.08	7.37	8.27	10.32	13.19	22.05
Q+R+S	6.3	6.3	0.68	0.69	0.73	0.80	75.0	72.5	500	21.30	0.39	20.79	0.40	18.76	0.44	15.21	0.55	21	21	19	15	3.25	4.00	4.83	7.37	19.70	24.13	31.43	53.39
T	3.7	3.7	0.68	0.69	0.73	0.80	80.5	71.5	1100	26.81	0.68	26.17	0.70	23.62	0.78	19.15	0.96	27	26	24	19	2.90	3.50	4.31	6.68	0.63	0.76	0.91	1.42
Q+R+S+T	10.0	10.0	0.68	0.69	0.73	0.80	75.5	73.5	200	10.69	0.31	10.44	0.32	9.42	0.35	7.64	0.44	15	15	15	15	3.83	4.56	5.22	7.37	0.81	0.98	1.18	1.83
U	0.2	0.2	0.68	0.69	0.73	0.80	75.5	74.0	250.0	14.17	0.29	13.83	0.30	12.48	0.33	10.12	0.41	15	15	15	15	3.61	4.31	5.22	7.37	7.14	8.65	11.09	17.16
V	0.3	0.3	0.68	0.69	0.73	0.80	81.0	74.0	600	17.59	0.57	17.17	0.58	15.50	0.65	12.56	0.80	18	18	16	15	3.51	4.31	5.08	7.37	7.52	9.37	11.68	18.57
O+V	2.9	2.9	0.68	0.69	0.73	0.80	81.0	73.5	650.0	18.38	0.59	17.94	0.60	16.19	0.67	13.13	0.83	18	17	15	15	3.61	4.31	5.22	7.37	16.40	20.50	26.15	45.37
O+V+U	3.2	3.2	0.68	0.69	0.73	0.80	81.0	72.5	1100	27.32	0.67	26.67	0.69	24.07	0.76	19.52	0.94	27	27	24	20	2.84	3.50	4.22	6.68				
O+V+U+P	8.5																												

ID #	Q5			
Inlet Size	Pipe Size	Min Slope		
ft	in	%		
	18	0.32%		
	15	0.40%		
	24	0.21%		
	15	0.40%		
	30	0.16%		
	24	0.21%		
	36	0.12%		
	15	0.40%		
	36	0.12%		
	12	0.40%		
	36	0.12%		
	12	0.40%		
	30	0.12%		
	24	0.21%		
	42	0.12%		
	15	0.40%		
	42	0.12%		
	15	0.40%		
	15	0.40%		
	18	0.32%		
	12	0.40%		
	12	0.40%		
	15	0.40%		
	24	0.21%		
	30	0.16%		
	30	0.16%		
	12	0.40%		
	36	0.12%		
	12	0.40%		
	36	0.12%		
	24	0.21%		
	42	0.12%		
	12	0.40%		
	12	0.40%		
	24	0.21%		
	36	0.12%		