SURFACE WATER MANAGEMENT

APPENDIX H

STORMWATER CALCULATIONS

CURVE NUMBER SELECTION

Appendix A: Hydrologic soil groups

For Landfill Final Cover : CN 74
offsite Areas : CN 55

Soils are classified into hydrologic soil groups (HSG's) to indicate the minimum rate of infiltration obtained for bare soil after prolonged wetting. The HSG's, which are A, B, C, and D, are one element used in determining runoff curve numbers (see chapter 2). For the convenience of TR-55 users, exhibit A-1 lists the HSG classification of United States soils.

The infiltration rate is the rate at which water enters the soil at the soil surface. It is controlled by surface conditions. HSG also indicates the transmission rate—the rate at which the water moves within the soil. This rate is controlled by the soil profile. Approximate numerical ranges for transmission rates shown in the HSG definitions were first published by Musgrave (USDA 1955). The four groups are defined by SCS soil scientists as follows:

Group A soils have low runoff potential and high infiltration rates even when thoroughly wetted. They consist chiefly of deep, well to excessively drained sands or gravels and have a high rate of water transmission (greater than 0.30 in/hr).

Group B soils have moderate infiltration rates when thoroughly wetted and consist chiefly of moderately deep to deep, moderately well to well drained soils with moderately fine to moderately coarse textures. These soils have a moderate rate of water transmission (0.15-0.30 in/hr).

Group C soils have low infiltration rates when thoroughly wetted and consist chiefly of soils with a layer that impedes downward movement of water and soils with moderately fine to fine texture. These soils have a low rate of water transmission (0.05-0.15 in/hr).

Group D soils have high runoff potential. They have very low infiltration rates when thoroughly wetted and consist chiefly of clay soils with a high swelling potential, soils with a permanent high water table, soils with a claypan or clay layer at or near the surface, and shallow soils over nearly impervious material. These soils have a very low rate of water transmission (0-0.05 in/hr).

In exhibit A-1, some of the listed soils have an added modifier; for example, "Abrazo, gravelly." This refers to a gravelly phase of the Abrazo series that is found in SCS soil map legends.

Disturbed soil profiles

As a result of urbanization, the soil profile may be considerably altered and the listed group classification may no longer apply. In these circumstances, use the following to determine HSG according to the texture of the new surface soil, provided that significant compaction has not occurred (Brakensiek and Rawls 1983):

HSG	*Soil textures*	
A	Sand, loamy sand, or sandy loam	offsite
B	Silt loam or loam	
C	Sandy clay loam	Final Cover
D	Clay loam, silty clay loam, sandy clay, silty clay, or clay	

Drainage and group D soils

Some soils in the list are in group D because of a high water table that creates a drainage problem. Once these soils are effectively drained, they are placed in a different group. For example, Ackerman soil is classified as A/D. This indicates that the drained Ackerman soil is in group A and the undrained soil is in group D.

Table 2-2a.—Runoff curve numbers for urban areas[1]

Cover description		Curve numbers for hydrologic soil group—			
Cover type and hydrologic condition	Average percent impervious area[2]	A	B	C	D
Fully developed urban areas (vegetation established)					
Open space (lawns, parks, golf courses, cemeteries, etc.)[3]:					
Poor condition (grass cover < 50%)	55	68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only)[4]		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
Developing urban areas					
Newly graded areas (pervious areas only, no vegetation)[5]		77	86	91	94
Idle lands (CN's are determined using cover types similar to those in table 2-2c).					

[1]Average runoff condition, and $I_a = 0.2S$.
[2]The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using figure 2-3 or 2-4.
[3]CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.
[4]Composite CN's for natural desert landscaping should be computed using figures 2-3 or 2-4 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.
[5]Composite CN's to use for the design of temporary measures during grading and construction should be computed using figure 2-3 or 2-4, based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.

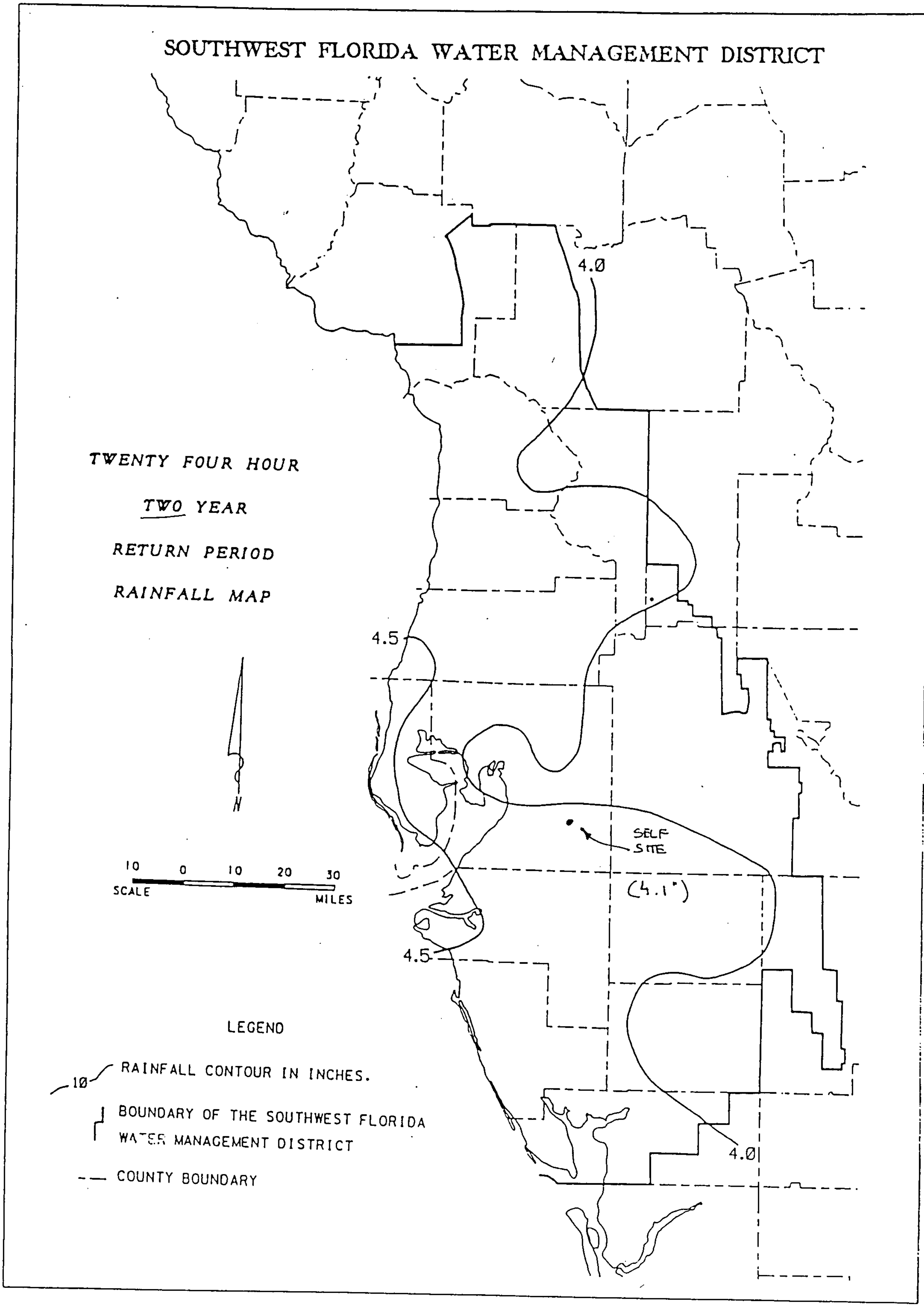

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
TWENTY FOUR HOUR
TWO YEAR
RETURN PERIOD
RAINFALL MAP
4.0
4.5
4.5
4.0
SELF SITE
(4.1")
N
10 0 10 20 30
SCALE
MILES
LEGEND
10 RAINFALL CONTOUR IN INCHES.
BOUNDARY OF THE SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
COUNTY BOUNDARY

Figure C-1

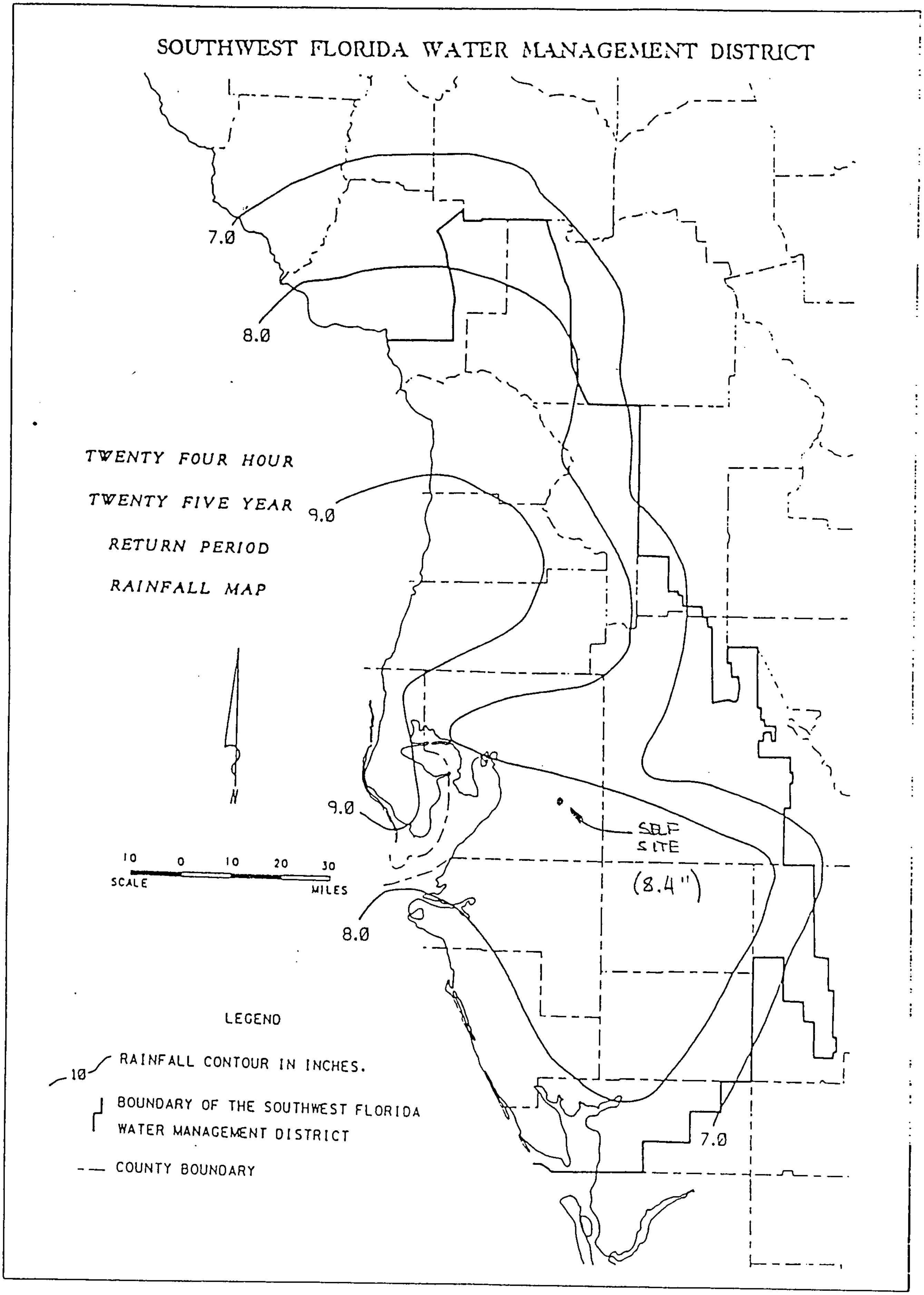

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
TWENTY FOUR HOUR
TWENTY FIVE YEAR
RETURN PERIOD
RAINFALL MAP
7.0
8.0
9.0
9.0
8.0
7.0
SELF SITE
(8.4")
N
10 0 10 20 30
SCALE
MILES
LEGEND
10 RAINFALL CONTOUR IN INCHES.
BOUNDARY OF THE SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
COUNTY BOUNDARY

Figure C-5

SUBSHED AREA DOWNCHUTE DISCHARGE

```
Quick TR-55 Ver.5.46   S/N:
Executed: 20:12:54   03-15-1994     c:\ppd\0990018\march\1.TCT

                                   SELF
                           LANDFILL TOP SUBSHED
                               Downchute 1
                                 3/15/94

                      Tc COMPUTATIONS FOR:

 SHEET FLOW (Applicable to Tc only)
     Segment ID                                        A-B
     Surface description                          FINAL COVER
     Manning's roughness coeff., n                     0.2400
     Flow length, L (total < or = 300)       ft        300.0
     Two-yr 24-hr rainfall, P2               in        4.100
     Land slope, s                        ft/ft        0.0500
                           0.8
          .007 * (n*L)
     T =  --------------                     hrs        0.35              =  0.35
             0.5    0.4
           P2   *   s

 SHALLOW CONCENTRATED FLOW
     Segment ID                                        B-C
     Surface (paved or unpaved)?                       Unpaved
     Flow length, L                          ft        250.0
     Watercourse slope, s                 ft/ft        0.0500

                              0.5
     Avg.V =   Csf *   (s)                 ft/s       3.6078
     where:    Unpaved Csf = 16.1345
               Paved   Csf = 20.3282

     T = L / (3600*V)                       hrs        0.02              =  0.02


 CHANNEL FLOW
     Segment ID                                        C-D
     Cross Sectional Flow Area, a         sq.ft        1.00
     Wetted perimeter, Pw                    ft        1.00
     Hydraulic radius, r = a/Pw              ft       1.000
     Channel slope, s                     ft/ft      %16.2000
     Manning's roughness coeff., n                    1.0000

                         2/3     1/2
          1.49   *   r     *   s
     V =  --------------------                ft/s     5.9971
                        n

     Flow length, L                          ft         850

     T = L / (3600*V)                       hrs        0.04              =  0.04

   ::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
                                            TOTAL TIME (hrs)        0.41
```

```
Quick TR-55 Ver.5.46   S/N:
Executed: 20:12:54   03-15-1994    c:\ppd\0990018\march\1.TCT

                                   SELF
                            LANDFILL TOP SUBSHED
                                Downchute 1
                                  3/15/94

                   Tc COMPUTATIONS FOR: TYP. SIDESLOPE

SHEET FLOW (Applicable to Tc only)
    Segment ID                                        A-B
    Surface description                           FINAL COVER
    Manning's roughness coeff., n                      0.2400
    Flow length, L (total < or = 300)        ft        120.0
    Two-yr 24-hr rainfall, P2                in        4.100
    Land slope, s                          ft/ft       0.2500
                         0.8
         .007 * (n*L)
    T =  --------------                     hrs         0.09              =  0.09
            0.5    0.4
          P2    *   s

SHALLOW CONCENTRATED FLOW
    Segment ID
    Surface (paved or unpaved)?
    Flow length, L                            ft          0.0
    Watercourse slope, s                    ft/ft      0.0000

                            0.5
    Avg.V =  Csf *   (s)                    ft/s       0.0000
    where:   Unpaved Csf = 16.1345
             Paved   Csf = 20.3282

    T = L / (3600*V)                         hrs         0.00              =  0.00


CHANNEL FLOW
    Segment ID                                        B-C
    Cross Sectional Flow Area, a           sq.ft         1.00
    Wetted perimeter, Pw                     ft          1.00
    Hydraulic radius, r = a/Pw               ft         1.000
    Channel slope, s                        ft/ft      %16.2000
    Manning's roughness coeff., n                      1.0000

                     2/3     1/2
         1.49   *  r    *  s
    V =  --------------------                ft/s       5.9971
                     n

    Flow length, L                            ft          1050

    T = L / (3600*V)                         hrs          0.05             =  0.05

   :::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
                                                  TOTAL TIME (hrs)          0.14
```

Quick TR-55 Ver.5.46 S/N:
Executed: 20:12:54 03-15-1994 c:\ppd\0990018\march\1.TCT

SUMMARY SHEET FOR Tc or Tt COMPUTATIONS
(Solved for Time using TR-55 Methods)

SELF
LANDFILL TOP SUBSHED
Downchute 1
3/15/94

Subarea descr.	Tc or Tt	Time (hrs)
	Tc	0.41
TYP. SIDESLOPE	Tc	0.14

Return Frequency: 25 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 06-14-1994 11:57:18
Watershed file: --> C:\PPD\0990018\1 .MOP
Hydrograph file: --> C:\PPD\0990018\125.HYD

SELF
Downchute 1
6/14/94

>>>> Input Parameters Used to Compute Hydrograph <<<<

Subarea Description	AREA (acres)	CN	Tc (hrs)	* Tt (hrs)	Precip. (in)	Runoff (in)	Ia/p input/used	
A	13.90	74.0	0.40	0.00	8.40	5.28	.08	.10
	10.60	74.0	0.10	0.00	8.40	5.28	.08	.10

* Travel time from subarea outfall to composite watershed outfall point.
Total area = 24.50 acres or 0.03828 sq.mi
Peak discharge = 119 cfs

>>>> Computer Modifications of Input Parameters <<<<<

Subarea Description	Input Values Tc (hr)	Input Values * Tt (hr)	Rounded Values Tc (hr)	Rounded Values * Tt (hr)	Ia/p Interpolated (Yes/No)	Ia/p Messages
A	0.41	0.00	0.40	0.00	No	Computed Ia/p < .1
	0.14	0.00	0.10	0.00	No	Computed Ia/p < .1

* Travel time from subarea outfall to composite watershed outfall point.

Return Frequency: 25 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 06-14-1994 11:57:18
Watershed file: --> C:\PPD\0990018\1 .MOP
Hydrograph file: --> C:\PPD\0990018\125.HYD

SELF
Downchute 1
6/14/94

>>>> Summary of Subarea Times to Peak <<<<

Subarea	Peak Discharge at Composite Outfall (cfs)	Time to Peak at Composite Outfall (hrs)
A	68	12.3
	88	12.1
Composite Watershed	119	12.1

```
Quick TR-55 Ver.5.46   S/N:
Executed: 20:13:14   03-15-1994    c:\ppd\0990018\march\2.TCT

                                        SELF
                                LANDFILL TOP SUBSHED
                                    Downchute 2
                                      3/15/94

                          Tc COMPUTATIONS FOR:

 SHEET FLOW (Applicable to Tc only)
     Segment ID                                        A-B
     Surface description                          FINAL COVER
     Manning's roughness coeff., n                       0.2400
     Flow length, L (total < or = 300)     ft        300.0
     Two-yr 24-hr rainfall, P2             in         4.100
     Land slope, s                       ft/ft       0.0500
                               0.8
          .007 * (n*L)
     T = --------------                   hrs         0.35              =  0.35
             0.5    0.4
           P2    *   s

 SHALLOW CONCENTRATED FLOW
     Segment ID                                        B-C
     Surface (paved or unpaved)?                    Unpaved
     Flow length, L                          ft        190.0
     Watercourse slope, s                  ft/ft       0.0500

                                 0.5
     Avg.V =  Csf *  (s)                  ft/s       3.6078
     where:   Unpaved Csf = 16.1345
              Paved   Csf = 20.3282

     T = L / (3600*V)                      hrs         0.01              =  0.01


 CHANNEL FLOW
     Segment ID                                        C-D
     Cross Sectional Flow Area, a        sq.ft         1.00
     Wetted perimeter, Pw                   ft         1.00
     Hydraulic radius, r = a/Pw             ft        1.000
     Channel slope, s                    ft/ft     %16.2000
     Manning's roughness coeff., n                   1.0000

                          2/3     1/2
          1.49   *   r    *   s
     V = --------------------              ft/s      5.9971
                         n

     Flow length, L                          ft        1150

     T = L / (3600*V)                       hrs        0.05              =  0.05

   :::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
                                                 TOTAL TIME (hrs)        0.42
```

```
Quick TR-55 Ver.5.46   S/N:
Executed: 20:13:14   03-15-1994    c:\ppd\0990018\march\2.TCT

                          SELF
                  LANDFILL TOP SUBSHED
                       Downchute 2
                         3/15/94

            Tc COMPUTATIONS FOR: TYP. SIDESLOPE

SHEET FLOW (Applicable to Tc only)
    Segment ID                                      A-B
    Surface description                        FINAL COVER
    Manning's roughness coeff., n                   0.2400
    Flow length, L (total < or = 300)     ft       300.0
    Two-yr 24-hr rainfall, P2             in       4.100
    Land slope, s                        ft/ft    0.2500
                        0.8
         .007 * (n*L)
    T =  --------------                  hrs       0.18          =  0.18
            0.5    0.4
          P2   *   s

SHALLOW CONCENTRATED FLOW
    Segment ID
    Surface (paved or unpaved)?
    Flow length, L                        ft         0.0
    Watercourse slope, s                 ft/ft    0.0000

                          0.5
    Avg.V =  Csf *  (s)                  ft/s     0.0000
    where:   Unpaved Csf = 16.1345
             Paved   Csf = 20.3282

    T = L / (3600*V)                     hrs       0.00          =  0.00


CHANNEL FLOW
    Segment ID                                      B-C
    Cross Sectional Flow Area, a         sq.ft      1.00
    Wetted perimeter, Pw                   ft       1.00
    Hydraulic radius, r = a/Pw             ft      1.000
    Channel slope, s                     ft/ft   %16.2000
    Manning's roughness coeff., n                 1.0000

                      2/3    1/2
         1.49   *  r    *  s
    V =  --------------------            ft/s     5.9971
                  n

    Flow length, L                         ft       1050

    T = L / (3600*V)                     hrs       0.05          =  0.05

  ::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
                                            TOTAL TIME (hrs)       0.23
```

Quick TR-55 Ver.5.46 S/N:
Executed: 20:13:14 03-15-1994 c:\ppd\0990018\march\2.TCT

SUMMARY SHEET FOR Tc or Tt COMPUTATIONS
(Solved for Time using TR-55 Methods)

SELF
LANDFILL TOP SUBSHED
Downchute 2
3/15/94

Subarea descr.	Tc or Tt	Time (hrs)
	Tc	0.42
TYP. SIDESLOPE	Tc	0.23

Return Frequency: 25 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 06-14-1994 11:59:38
Watershed file: --> C:\PPD\0990018\2 .MOP
Hydrograph file: --> C:\PPD\0990018\225.HYD

SELF
Downchute 2
6/14/94

>>>> Input Parameters Used to Compute Hydrograph <<<<

Subarea Description	AREA (acres)	CN	Tc (hrs)	* Tt (hrs)	Precip. (in)	Runoff (in)	Ia/p input/used	
B	29.10	74.0	0.40	0.00	8.40	5.28	.08	.10
	10.90	74.0	0.20	0.00	8.40	5.28	.08	.10

* Travel time from subarea outfall to composite watershed outfall point.
Total area = 40.00 acres or 0.06250 sq.mi
Peak discharge = 185 cfs

>>>> Computer Modifications of Input Parameters <<<<<

Subarea Description	Input Values Tc (hr)	* Tt (hr)	Rounded Values Tc (hr)	* Tt (hr)	Ia/p Interpolated (Yes/No)	Ia/p Messages
B	0.42	0.00	0.40	0.00	No	Computed Ia/p < .1
	0.23	0.00	0.20	0.00	No	Computed Ia/p < .1

* Travel time from subarea outfall to composite watershed outfall point.

Return Frequency: 25 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 06-14-1994 11:59:38
Watershed file: --> C:\PPD\0990018\2 .MOP
Hydrograph file: --> C:\PPD\0990018\225.HYD

SELF
Downchute 2
6/14/94

>>>> Summary of Subarea Times to Peak <<<<

Subarea	Peak Discharge at Composite Outfall (cfs)	Time to Peak at Composite Outfall (hrs)
B	142	12.3
	72	12.2
Composite Watershed	185	12.3

```
Quick TR-55 Ver.5.46   S/N:
Executed: 20:13:36   03-15-1994    c:\ppd\0990018\march\3.TCT

                                        SELF
                                 LANDFILL TOP SUBSHED
                                     Downchute 3
                                       3/15/94

                            Tc COMPUTATIONS FOR:

 SHEET FLOW (Applicable to Tc only)
     Segment ID                                        A-B
     Surface description                          FINAL COVER
     Manning's roughness coeff., n                      0.2400
     Flow length, L (total < or = 300)        ft       300.0
     Two-yr 24-hr rainfall, P2                in       4.100
     Land slope, s                         ft/ft      0.0500
                           0.8
           .007 * (n*L)
     T =   --------------                     hrs       0.35                 =   0.35
              0.5     0.4
           P2    *   s

 SHALLOW CONCENTRATED FLOW
     Segment ID
     Surface (paved or unpaved)?
     Flow length, L                           ft         0.0
     Watercourse slope, s                  ft/ft      0.0000

                               0.5
     Avg.V =   Csf *  (s)                    ft/s      0.0000
     where:    Unpaved Csf = 16.1345
               Paved   Csf = 20.3282

     T = L / (3600*V)                         hrs       0.00                 =   0.00

 CHANNEL FLOW
     Segment ID                                        B-C
     Cross Sectional Flow Area, a          sq.ft        1.00
     Wetted perimeter, Pw                     ft        1.00
     Hydraulic radius, r = a/Pw               ft       1.000
     Channel slope, s                      ft/ft    %16.2000
     Manning's roughness coeff., n                    1.0000

                         2/3     1/2
          1.49   *   r    *   s
     V =  --------------------                ft/s      5.9971
                     n

     Flow length, L                           ft        1500

     T = L / (3600*V)                         hrs       0.07                 =   0.07

   ::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
                                                  TOTAL TIME (hrs)           0.42
```

```
Quick TR-55 Ver.5.46   S/N:
Executed: 20:13:36   03-15-1994    c:\ppd\0990018\march\3.TCT

                                   SELF
                           LANDFILL TOP SUBSHED
                               Downchute 3
                                 3/15/94

                      Tc COMPUTATIONS FOR: TYP. SIDESLOPE

 SHEET FLOW (Applicable to Tc only)
     Segment ID                                      A-B
     Surface description                         FINAL COVER
     Manning's roughness coeff., n                     0.2400
     Flow length, L (total < or = 300)       ft        300.0
     Two-yr 24-hr rainfall, P2               in        4.100
     Land slope, s                         ft/ft       0.2500
                          0.8
          .007 * (n*L)
     T =  --------------                     hrs        0.18              =  0.18
             0.5    0.4
           P2    *   s

 SHALLOW CONCENTRATED FLOW
     Segment ID
     Surface (paved or unpaved)?
     Flow length, L                          ft          0.0
     Watercourse slope, s                  ft/ft      0.0000

                            0.5
     Avg.V =  Csf *  (s)                    ft/s      0.0000
     where:   Unpaved Csf = 16.1345
              Paved   Csf = 20.3282

     T = L / (3600*V)                        hrs        0.00              =  0.00


 CHANNEL FLOW
     Segment ID                                      B-C
     Cross Sectional Flow Area, a          sq.ft        1.00
     Wetted perimeter, Pw                     ft        1.00
     Hydraulic radius, r = a/Pw               ft       1.000
     Channel slope, s                      ft/ft     %16.2000
     Manning's roughness coeff., n                    1.0000

                       2/3    1/2
          1.49   *  r    *  s
     V =  --------------------              ft/s      5.9971
                    n

     Flow length, L                           ft        1050

     T = L / (3600*V)                        hrs        0.05              =  0.05

    ::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
                                                 TOTAL TIME (hrs)        0.23
```

Quick TR-55 Ver.5.46 S/N:
Executed: 20:13:36 03-15-1994 c:\ppd\0990018\march\3.TCT

SUMMARY SHEET FOR Tc or Tt COMPUTATIONS
(Solved for Time using TR-55 Methods)

SELF
LANDFILL TOP SUBSHED
Downchute 3
3/15/94

Subarea descr.	Tc or Tt	Time (hrs)
	Tc	0.42
TYP. SIDESLOPE	Tc	0.23

Quick TR-55 Version: 5.46 S/N: Page 1

Return Frequency: 25 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 06-14-1994 12:01:55
Watershed file: --> C:\PPD\0990018\3 .MOP
Hydrograph file: --> C:\PPD\0990018\325.HYD

SELF
Downchute 3
6/14/94

>>>> Input Parameters Used to Compute Hydrograph <<<<

Subarea Description	AREA (acres)	CN	Tc (hrs)	* Tt (hrs)	Precip. (in)	Runoff (in)	Ia/p input	Ia/p used
D	17.70	74.0	0.40	0.00	8.40	5.28	.08	.10
D	14.80	74.0	0.20	0.00	8.40	5.28	.08	.10

* Travel time from subarea outfall to composite watershed outfall point.
Total area = 32.50 acres or 0.05078 sq.mi
Peak discharge = 166 cfs

>>>> Computer Modifications of Input Parameters <<<<<

Subarea Description	Input Values Tc (hr)	Input Values * Tt (hr)	Rounded Values Tc (hr)	Rounded Values * Tt (hr)	Ia/p Interpolated (Yes/No)	Ia/p Messages
D	0.42	0.00	0.40	0.00	No	Computed Ia/p < .1
D	0.23	0.00	0.20	0.00	No	Computed Ia/p < .1

* Travel time from subarea outfall to composite watershed outfall point.

Return Frequency: 25 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 06-14-1994 12:01:55
Watershed file: --> C:\PPD\0990018\3 .MOP
Hydrograph file: --> C:\PPD\0990018\325.HYD

SELF
Downchute 3
6/14/94

>>>> Summary of Subarea Times to Peak <<<<

Subarea	Peak Discharge at Composite Outfall (cfs)	Time to Peak at Composite Outfall (hrs)
D	86	12.3
D	98	12.2
Composite Watershed	166	12.2

```
Quick TR-55 Ver.5.46   S/N:
Executed: 20:14:09   03-15-1994    c:\ppd\0990018\march\4.TCT

                                    SELF
                            LANDFILL TOP SUBSHED
                                Downchute 4
                                  3/15/94

                       Tc COMPUTATIONS FOR:

 SHEET FLOW (Applicable to Tc only)
     Segment ID                                      A-B
     Surface description                       FINAL COVER
     Manning's roughness coeff., n                  0.2400
     Flow length, L (total < or = 300)     ft       300.0
     Two-yr 24-hr rainfall, P2             in       4.100
     Land slope, s                       ft/ft      0.0500
                           0.8
          .007 * (n*L)
     T =  --------------                   hrs       0.35                =  0.35
              0.5    0.4
            P2    *   s

 SHALLOW CONCENTRATED FLOW
     Segment ID                                      B-C
     Surface (paved or unpaved)?                     Unpaved
     Flow length, L                          ft       200.0
     Watercourse slope, s                  ft/ft      0.0500

                             0.5
     Avg.V =   Csf *   (s)                 ft/s      3.6078
     where:    Unpaved Csf  = 16.1345
               Paved   Csf  = 20.3282

     T = L / (3600*V)                       hrs       0.02                =  0.02


 CHANNEL FLOW
     Segment ID                                      C-D
     Cross Sectional Flow Area, a        sq.ft        1.00
     Wetted perimeter, Pw                   ft        1.00
     Hydraulic radius, r = a/Pw             ft       1.000
     Channel slope, s                     ft/ft     %16.2000
     Manning's roughness coeff., n                   1.0000

                          2/3    1/2
         1.49   *   r    *   s
     V = --------------------               ft/s      5.9971
                    n

     Flow length, L                          ft         500

     T = L / (3600*V)                        hrs       0.02                =  0.02

   :::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
                                                   TOTAL TIME (hrs)         0.39
```

```
Quick TR-55 Ver.5.46   S/N:
Executed: 20:14:09   03-15-1994    c:\ppd\0990018\march\4.TCT

                          SELF
                   LANDFILL TOP SUBSHED
                       Downchute 4
                         3/15/94

             Tc COMPUTATIONS FOR: TYP. SIDESLOPE

SHEET FLOW (Applicable to Tc only)
    Segment ID                                        A-B
    Surface description                         FINAL COVER
    Manning's roughness coeff., n                   0.2400
    Flow length, L (total < or = 300)     ft        300.0
    Two-yr 24-hr rainfall, P2             in        4.100
    Land slope, s                      ft/ft       0.2500
                          0.8
         .007 * (n*L)
    T =  --------------              hrs           0.18          =  0.18
              0.5    0.4
           P2    *    s

SHALLOW CONCENTRATED FLOW
    Segment ID
    Surface (paved or unpaved)?
    Flow length, L                        ft          0.0
    Watercourse slope, s               ft/ft       0.0000

                             0.5
    Avg.V =   Csf *   (s)                ft/s      0.0000
    where:    Unpaved Csf = 16.1345
              Paved   Csf = 20.3282

    T = L / (3600*V)                     hrs        0.00          =  0.00


CHANNEL FLOW
    Segment ID                                       B-C
    Cross Sectional Flow Area, a       sq.ft         1.00
    Wetted perimeter, Pw                  ft         1.00
    Hydraulic radius, r = a/Pw            ft        1.000
    Channel slope, s                   ft/ft     %16.2000
    Manning's roughness coeff., n                  1.0000

                      2/3     1/2
         1.49   *   r    *   s
    V =  --------------------           ft/s      5.9971
                    n

    Flow length, L                        ft         1050

    T = L / (3600*V)                     hrs         0.05          =  0.05

::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
                                           TOTAL TIME (hrs)        0.23
```

Quick TR-55 Ver.5.46 S/N:
Executed: 20:14:09 03-15-1994 c:\ppd\0990018\march\4.TCT

SUMMARY SHEET FOR Tc or Tt COMPUTATIONS
(Solved for Time using TR-55 Methods)

SELF
LANDFILL TOP SUBSHED
Downchute 4
3/15/94

Subarea descr.	Tc or Tt	Time (hrs)
	Tc	0.39
TYP. SIDESLOPE	Tc	0.23

Return Frequency: 25 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 06-14-1994 12:05:51
Watershed file: --> C:\PPD\0990018\4 .MOP
Hydrograph file: --> C:\PPD\0990018\425.HYD

SELF
Downchute 4
6/14/94

>>>> Input Parameters Used to Compute Hydrograph <<<<

Subarea Description	AREA (acres)	CN	Tc (hrs)	* Tt (hrs)	Precip. (in)	Runoff (in)	Ia/p input/used	
D	11.80	74.0	0.40	0.00	8.40	5.28	.08	.10
D	6.00	74.0	0.20	0.00	8.40	5.28	.08	.10

* Travel time from subarea outfall to composite watershed outfall point.
Total area = 17.80 acres or 0.02781 sq.mi
Peak discharge = 86 cfs

>>>> Computer Modifications of Input Parameters <<<<<

Subarea Description	Input Values Tc (hr)	* Tt (hr)	Rounded Values Tc (hr)	* Tt (hr)	Ia/p Interpolated (Yes/No)	Ia/p Messages
D	0.39	0.00	0.40	0.00	No	Computed Ia/p < .1
D	0.23	0.00	0.20	0.00	No	Computed Ia/p < .1

* Travel time from subarea outfall to composite watershed outfall point.

Return Frequency: 25 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 06-14-1994 12:05:51
Watershed file: --> C:\PPD\0990018\4 .MOP
Hydrograph file: --> C:\PPD\0990018\425.HYD

SELF
Downchute 4
6/14/94

>>>> Summary of Subarea Times to Peak <<<<

Subarea	Peak Discharge at Composite Outfall (cfs)	Time to Peak at Composite Outfall (hrs)
D	58	12.3
D	40	12.2
Composite Watershed	86	12.2

```
Quick TR-55 Ver.5.46   S/N:
Executed: 20:14:39   03-15-1994    c:\ppd\0990018\march\5.TCT

                                    SELF
                             LANDFILL TOP SUBSHED
                                 Downchute 5
                                   3/15/94

                        Tc COMPUTATIONS FOR:

 SHEET FLOW (Applicable to Tc only)
     Segment ID                                        A-B
     Surface description                          FINAL COVER
     Manning's roughness coeff., n                      0.2400
     Flow length, L (total < or = 300)          ft     300.0
     Two-yr 24-hr rainfall, P2                  in     4.100
     Land slope, s                            ft/ft   0.0500
                        0.8
          .007 * (n*L)
     T =  --------------                       hrs      0.35                   =  0.35
             0.5    0.4
           P2    *   s

 SHALLOW CONCENTRATED FLOW
     Segment ID                                        B-C
     Surface (paved or unpaved)?                       Unpaved
     Flow length, L                             ft     150.0
     Watercourse slope, s                     ft/ft   0.0500

                              0.5
     Avg.V =  Csf *  (s)                       ft/s   3.6078
     where:   Unpaved Csf = 16.1345
              Paved   Csf = 20.3282

     T = L / (3600*V)                          hrs      0.01                   =  0.01


 CHANNEL FLOW
     Segment ID                                        C-D
     Cross Sectional Flow Area, a             sq.ft      1.00
     Wetted perimeter, Pw                       ft       1.00
     Hydraulic radius, r = a/Pw                 ft      1.000
     Channel slope, s                         ft/ft   %16.2000
     Manning's roughness coeff., n                    1.0000

                         2/3    1/2
          1.49  *  r    *  s
     V =  --------------------                 ft/s   5.9971
                     n

     Flow length, L                             ft        750

     T = L / (3600*V)                          hrs      0.03                   =  0.03

    :::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
                                                     TOTAL TIME (hrs)        0.40
```

```
Quick TR-55 Ver.5.46   S/N:
Executed: 20:14:39   03-15-1994    c:\ppd\0990018\march\5.TCT

                              SELF
                       LANDFILL TOP SUBSHED
                           Downchute 5
                             3/15/94

               Tc COMPUTATIONS FOR: TYP. SIDESLOPE

SHEET FLOW (Applicable to Tc only)
    Segment ID                                       A-B
    Surface description                        FINAL COVER
    Manning's roughness coeff., n                   0.2400
    Flow length, L (total < or = 300)     ft       300.0
    Two-yr 24-hr rainfall, P2             in       4.100
    Land slope, s                        ft/ft    0.2500
                            0.8
         .007 * (n*L)
    T =  --------------                  hrs       0.18          =  0.18
             0.5    0.4
          P2    *   s

SHALLOW CONCENTRATED FLOW
    Segment ID
    Surface (paved or unpaved)?
    Flow length, L                        ft         0.0
    Watercourse slope, s                 ft/ft    0.0000

                              0.5
    Avg.V =  Csf *  (s)                  ft/s     0.0000
    where:   Unpaved Csf = 16.1345
             Paved   Csf = 20.3282

    T = L / (3600*V)                     hrs       0.00          =  0.00


CHANNEL FLOW
    Segment ID                                      B-C
    Cross Sectional Flow Area, a        sq.ft       1.00
    Wetted perimeter, Pw                  ft        1.00
    Hydraulic radius, r = a/Pw            ft       1.000
    Channel slope, s                     ft/ft   %16.2000
    Manning's roughness coeff., n                  1.0000

                        2/3    1/2
         1.49   *  r    *  s
    V =  --------------------            ft/s     5.9971
                    n

    Flow length, L                        ft        1050

    T = L / (3600*V)                     hrs        0.05         =  0.05

   ::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
                                            TOTAL TIME (hrs)        0.23
```

Quick TR-55 Ver.5.46 S/N:
Executed: 20:14:39 03-15-1994 c:\ppd\0990018\march\5.TCT

SUMMARY SHEET FOR Tc or Tt COMPUTATIONS
(Solved for Time using TR-55 Methods)

SELF
LANDFILL TOP SUBSHED
Downchute 5
3/15/94

Subarea descr.	Tc or Tt	Time (hrs)
	Tc	0.40
TYP. SIDESLOPE	Tc	0.23

Return Frequency: 25 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 06-14-1994 12:08:25
Watershed file: --> C:\PPD\0990018\5 .MOP
Hydrograph file: --> C:\PPD\0990018\525.HYD

SELF
Downchute 5
6/14/94

>>>> Input Parameters Used to Compute Hydrograph <<<<

Subarea Description	AREA (acres)	CN	Tc (hrs)	* Tt (hrs)	Precip. (in)	Runoff (in)	Ia/p input/used	
D	19.60	74.0	0.40	0.00	8.40	5.28	.08	.10
D	15.10	74.0	0.20	0.00	8.40	5.28	.08	.10

* Travel time from subarea outfall to composite watershed outfall point.
Total area = 34.70 acres or 0.05422 sq.mi
Peak discharge = 176 cfs

>>>> Computer Modifications of Input Parameters <<<<<

Subarea Description	Input Values Tc (hr)	Input Values * Tt (hr)	Rounded Values Tc (hr)	Rounded Values * Tt (hr)	Ia/p Interpolated (Yes/No)	Ia/p Messages
D	0.40	0.00	**	**	No	Computed Ia/p < .1
D	0.23	0.00	0.20	0.00	No	Computed Ia/p < .1

* Travel time from subarea outfall to composite watershed outfall point.
** Tc & Tt are available in the hydrograph tables.

Return Frequency: 25 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 06-14-1994 12:08:25
Watershed file: --> C:\PPD\0990018\5 .MOP
Hydrograph file: --> C:\PPD\0990018\525.HYD

SELF
Downchute 5
6/14/94

>>>> Summary of Subarea Times to Peak <<<<

Subarea	Peak Discharge at Composite Outfall (cfs)	Time to Peak at Composite Outfall (hrs)
D	96	12.3
D	100	12.2
Composite Watershed	176	12.2

GABION DOWNCHUTE DESIGN

0990018.34
6/16/94

Trapezoidal Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name: GABION

Comment: Gabion Downchute Design

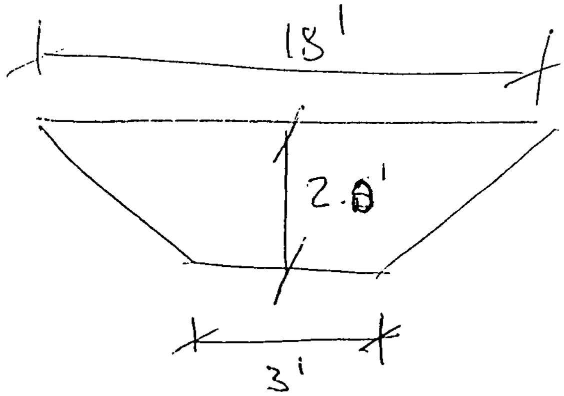
Solve For Depth

Given Input Data:

Bottom Width.....	3.00 ft
Left Side Slope..	3.00:1 (H:V)
Right Side Slope.	3.00:1 (H:V)
Manning's n......	0.027
Channel Slope....	0.2500 ft/ft
Discharge........	185.00 cfs

Computed Results:

Depth............	1.22 ft
Velocity.........	22.85 fps
Flow Area........	8.10 sf
Flow Top Width...	10.30 ft
Wetted Perimeter.	10.70 ft
Critical Depth...	2.53 ft
Critical Slope...	0.0099 ft/ft
Froude Number....	4.54 (flow is Supercritical)



∴ Use 6'+9' gabion (reno) mattress combination

Open Channel Flow Module, Version 3.21 (c) 1990
Haestad Methods, Inc. * 37 Brookside Rd * Waterbury, Ct 06708

SCS ENGINEERS, PC
ENVIRONMENTAL CONSULTANTS
2 CROSFIELD AVENUE
SUITE 422
WEST NYACK, NY 10994
14 353-5727
FAX 914 353-5731

Check Aerated Flow:

for $Q = 185$ cfs –

Calculate Boussinesq #:

$$Bou^{\#} = V_w / \sqrt{g R_w} \qquad V_w = 22.9 \text{ fps}$$

$$= 22.9 / \sqrt{(32.2)(0.8)} \qquad R_w = \frac{A}{P} = \frac{8.10}{10.70} = 0.8$$

$\therefore Bou^{\#} = \underline{4.5} < 7$ (7 indicates onset of aeration)

This indicates that even at the worst case peak flow condition at the site, the flow will not be aerated.

$\therefore$ Can use this standard cross-section for all of the downchute locations.

DOWNCHUTE TRANSITION SWALE CALCULATION

Trapezoidal Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name: downchute

Comment: Transition - Downchute 1

Solve For Depth

Given Input Data:

Bottom Width.....	3.00 ft
Left Side Slope..	3.00:1 (H:V)
Right Side Slope.	3.00:1 (H:V)
Manning's n......	0.027
Channel Slope....	0.0200 ft/ft
Discharge........	119.00 cfs

Computed Results:

Depth............	1.78 ft
Velocity.........	8.00 fps
Flow Area........	14.87 sf
Flow Top Width...	13.69 ft
Wetted Perimeter.	14.27 ft
Critical Depth...	2.06 ft
Critical Slope...	0.0105 ft/ft
Froude Number....	1.35 (flow is Supercritical)

Trapezoidal Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name: downchute

Comment: Transition - Downchute 3

Solve For Depth

Given Input Data:

Bottom Width.....	5.00 ft
Left Side Slope..	2.00:1 (H:V)
Right Side Slope.	2.00:1 (H:V)
Manning's n......	0.027
Channel Slope....	0.0100 ft/ft
Discharge........	185.00 cfs

Computed Results:

Depth............	2.51 ft
Velocity.........	7.37 fps
Flow Area........	25.11 sf
Flow Top Width...	15.03 ft
Wetted Perimeter.	16.21 ft
Critical Depth...	2.51 ft
Critical Slope...	0.0099 ft/ft
Froude Number....	1.00 (flow is Critical)

Trapezoidal Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name: downchute

Comment: Transition - Downchute 4

Solve For Depth

Given Input Data:

Bottom Width.....	7.00 ft
Left Side Slope..	2.00:1 (H:V)
Right Side Slope.	2.00:1 (H:V)
Manning's n......	0.027
Channel Slope....	0.0600 ft/ft
Discharge........	86.00 cfs

Computed Results:

Depth............	0.90 ft
Velocity.........	10.83 fps
Flow Area........	7.94 sf
Flow Top Width...	10.61 ft
Wetted Perimeter.	11.03 ft
Critical Depth...	1.45 ft
Critical Slope...	0.0110 ft/ft
Froude Number....	2.21 (flow is Supercritical)

Trapezoidal Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name: downchute

Comment: Transition - Downchute 5

Solve For Depth

Given Input Data:

Bottom Width.....	7.00 ft
Left Side Slope..	2.00:1 (H:V)
Right Side Slope.	2.00:1 (H:V)
Manning's n......	0.027
Channel Slope....	0.1300 ft/ft
Discharge........	176.00 cfs

Computed Results:

Depth............	1.09 ft
Velocity.........	17.67 fps
Flow Area........	9.96 sf
Flow Top Width...	11.34 ft
Wetted Perimeter.	11.86 ft
Critical Depth...	2.18 ft
Critical Slope...	0.0099 ft/ft
Froude Number....	3.32 (flow is Supercritical)

VELOCITY DISSIPATOR DESIGN

Trapezoidal Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name: GABION2

Comment: Gabion Downchute Velocity Calculations (#1)

Solve For Depth

Given Input Data:

Bottom Width.....	3.00 ft
Left Side Slope..	3.00:1 (H:V)
Right Side Slope.	3.00:1 (H:V)
Manning's n......	0.027
Channel Slope....	0.2500 ft/ft
Discharge........	119.00 cfs

Computed Results:

Depth............	0.98 ft
Velocity.........	20.33 fps
Flow Area........	5.85 sf
Flow Top Width...	8.90 ft
Wetted Perimeter.	9.22 ft
Critical Depth...	2.06 ft
Critical Slope...	0.0105 ft/ft
Froude Number....	4.42 (flow is Supercritical)

Trapezoidal Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name: GABION2

Comment: Gabion Downchute Velocity Calculations (#2)

Solve For Depth

Given Input Data:

Bottom Width.....	3.00 ft
Left Side Slope..	3.00:1 (H:V)
Right Side Slope.	3.00:1 (H:V)
Manning's n......	0.027
Channel Slope....	0.2500 ft/ft
Discharge........	185.00 cfs

Computed Results:

Depth............	1.22 ft
Velocity.........	22.85 fps
Flow Area........	8.10 sf
Flow Top Width...	10.30 ft
Wetted Perimeter.	10.70 ft
Critical Depth...	2.53 ft
Critical Slope...	0.0099 ft/ft
Froude Number....	4.54 (flow is Supercritical)

Trapezoidal Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name: GABION2

Comment: Gabion Downchute Velocity Calculations (#3)

Solve For Depth

Given Input Data:

Bottom Width.....	3.00 ft
Left Side Slope..	3.00:1 (H:V)
Right Side Slope.	3.00:1 (H:V)
Manning's n......	0.027
Channel Slope....	0.2500 ft/ft
Discharge........	166.00 cfs

Computed Results:

Depth............	1.16 ft
Velocity.........	22.21 fps
Flow Area........	7.47 sf
Flow Top Width...	9.93 ft
Wetted Perimeter.	10.31 ft
Critical Depth...	2.41 ft
Critical Slope...	0.0100 ft/ft
Froude Number....	4.51 (flow is Supercritical)

Trapezoidal Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name: GABION2

Comment: Gabion Downchute Velocity Calculations (#4)

Solve For Depth

Given Input Data:

Bottom Width.....	3.00 ft
Left Side Slope..	3.00:1 (H:V)
Right Side Slope.	3.00:1 (H:V)
Manning's n......	0.027
Channel Slope....	0.2500 ft/ft
Discharge........	86.00 cfs

Computed Results:

Depth............	0.84 ft
Velocity.........	18.62 fps
Flow Area........	4.62 sf
Flow Top Width...	8.03 ft
Wetted Perimeter.	8.30 ft
Critical Depth...	1.76 ft
Critical Slope...	0.0110 ft/ft
Froude Number....	4.33 (flow is Supercritical)

Trapezoidal Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name: GABION2

Comment: Gabion Downchute Velocity Calculations (#5)

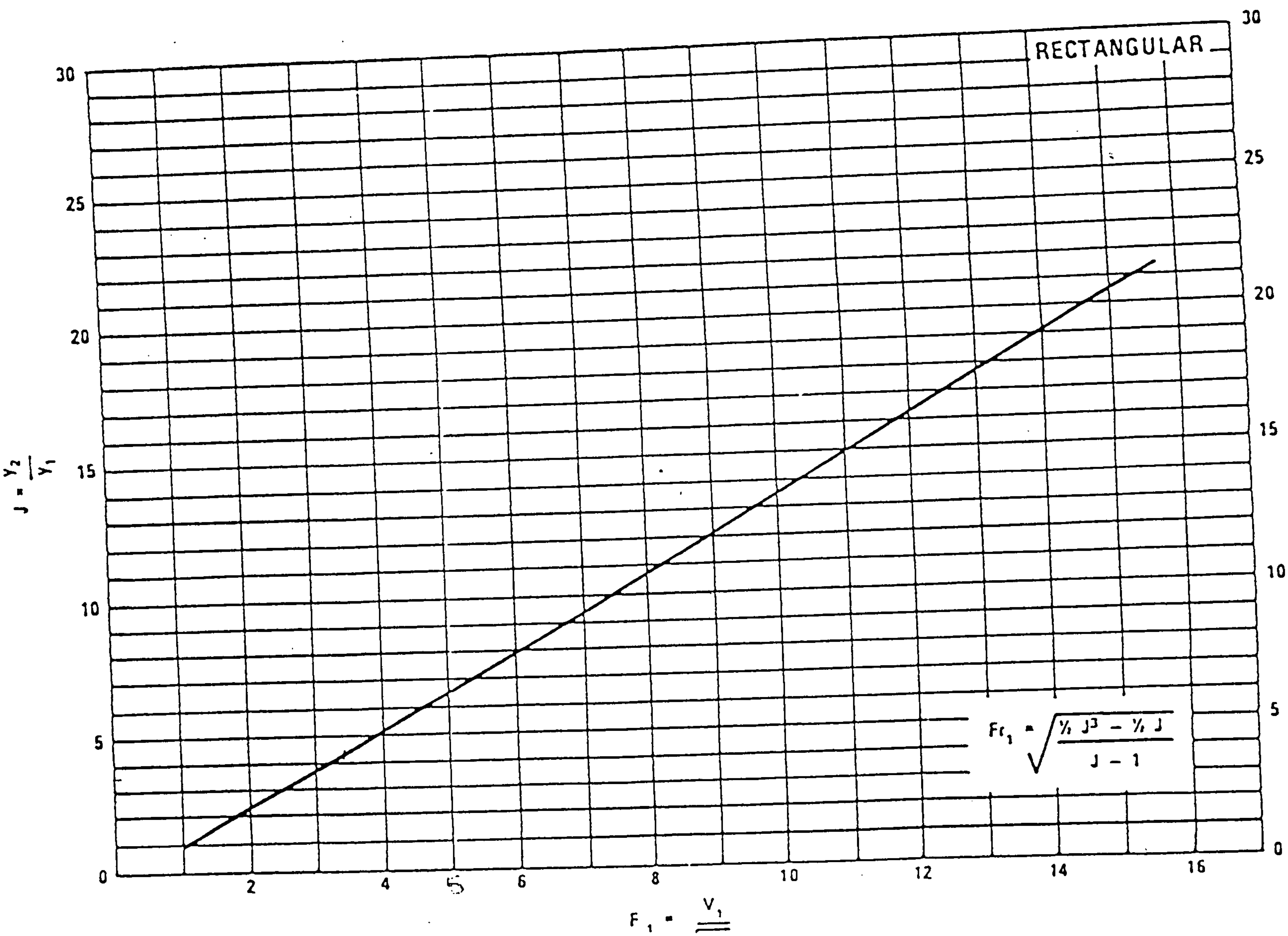
Solve For Depth

Given Input Data:

Bottom Width.....	3.00 ft
Left Side Slope..	3.00:1 (H:V)
Right Side Slope.	3.00:1 (H:V)
Manning's n......	0.027
Channel Slope....	0.2500 ft/ft
Discharge........	176.00 cfs

Computed Results:

Depth............	1.19 ft
Velocity.........	22.55 fps
Flow Area........	7.80 sf
Flow Top Width...	10.13 ft
Wetted Perimeter.	10.52 ft
Critical Depth...	2.47 ft
Critical Slope...	0.0100 ft/ft
Froude Number....	4.53 (flow is Supercritical)


RECTANGULAR
$J = \frac{Y_2}{Y_1}$
$Fr_1 = \sqrt{\frac{\frac{1}{2} J^3 - \frac{1}{2} J}{J - 1}}$
$F_1 = \frac{V_1}{}$
0
5
10
15
20
25
30
2
4
6
8
10
12
14
16

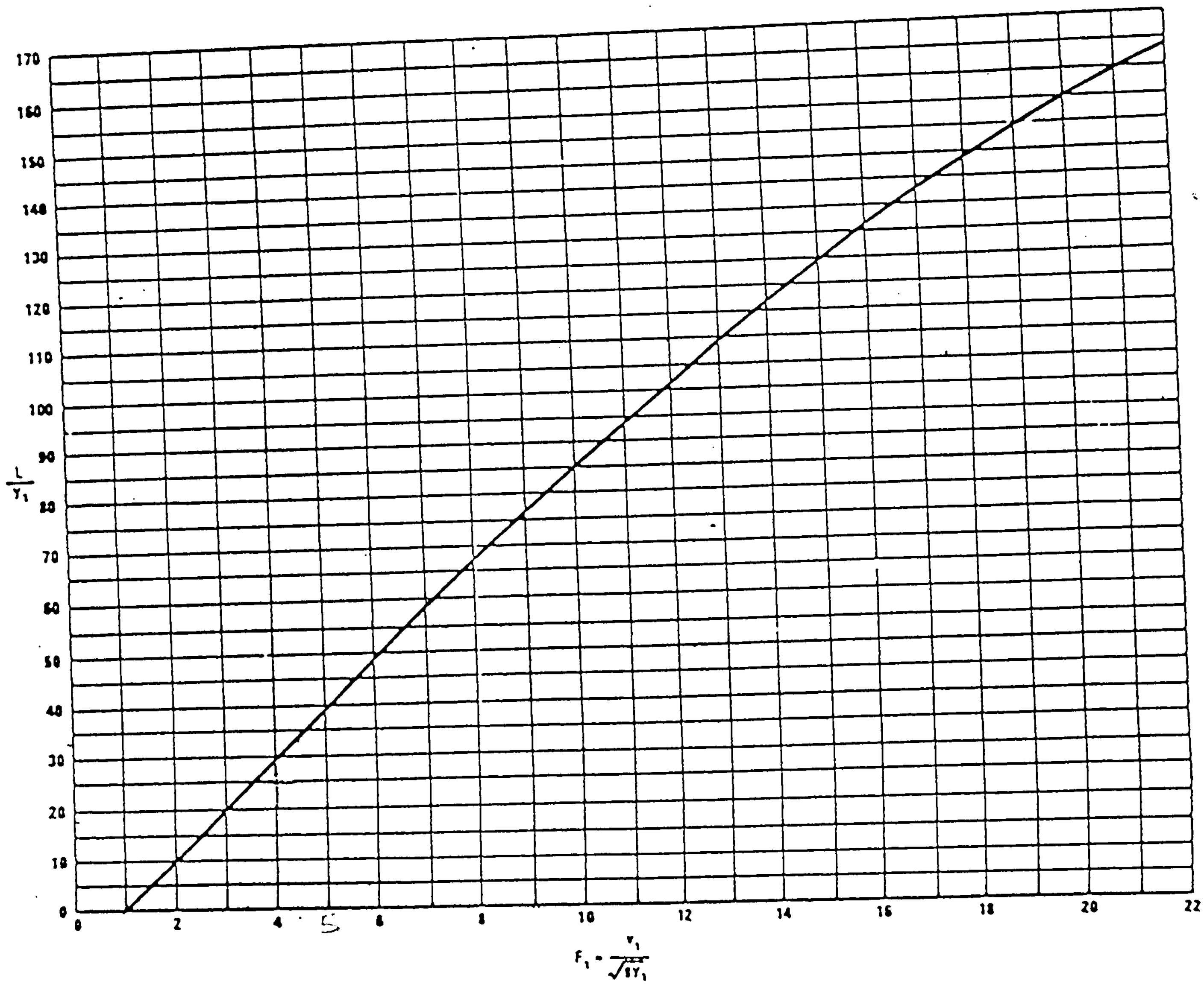


FIGURE VI-11. LENGTH OF JUMP IN TERMS OF y_1, RECTANGULAR CHANNEL

SCS ENGINEERS, PC
ENVIRONMENTAL CONSULTANTS
2 CROSFIELD AVENUE
SUITE 422
WEST NYACK, NY 10994
914 353-5727
FAX 914 353-5731

JOB 0990018.34
SHEET NO. 1 OF 3 SCALE
CALCULATED BY WEG DATE 3-7-94
CHECKED BY DATE

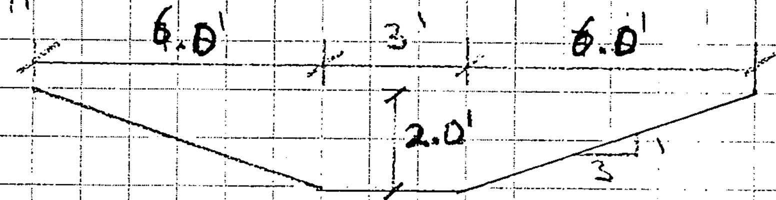
Problem: Design a velocity dissipator system for the SELF

Given: The following table presents flow rates:

Downchute	Receiving Basin	Peak Q_{25}
1	A	119 cfs
2	B	185*
3	D	166
4	D	86
5	D	176

(* enters existing velocity dissipator structure)

Typical Swale Cross-Section.



Material: Gabion Mattresses ($n = 0.027$)

"FlowMaster" printout provides flow data.

Solution

1) Calculate conjugate depth (D_2) and length of jump for each downchute. (see HEC-14 charts, Figures VI-11 + 17)

#	Q_{25}	D_1	F_r	D_2/D_1*	D_2	L/D_1*	L	Conclusions
1	119	0.98	4.4	5.6	5.5	33	32.3'	Build 6' tall thrust block
2	185	1.22	4.5	5.8	7.0	34	41.5'	" 7' " " "
3	166	1.16	4.5	5.8	6.7	34	39.4'	" 7' " " "
4	86	0.84	4.3	5.5	4.6	32	26.9'	" 6' " " "
5	176	1.19	4.5	5.8	6.9	34	40.5'	" 7' " " "

SCS ENGINEERS, PC

ENVIRONMENTAL CONSULTANTS
2 CROSFIELD AVENUE
SUITE 422
WEST NYACK, NY 10994
914 353-5727
FAX 914 353-5731

JOB 0990018.34
SHEET NO. 2 OF 3 SCALE
CALCULATED BY WEG DATE 3-7-94
CHECKED BY DATE

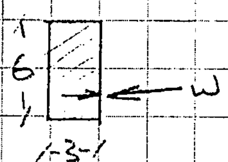
2) Calculate impact forces on thrust blocks:

$F = \rho Q (V_2 - V_1)$
$= (1.94)(176)(22.6)$

$\rho = 1.94$ slugs/ft^3
$Q = 176$ cfs
$V_2 = 0$ fps
$V_1 = 22.6$ fps

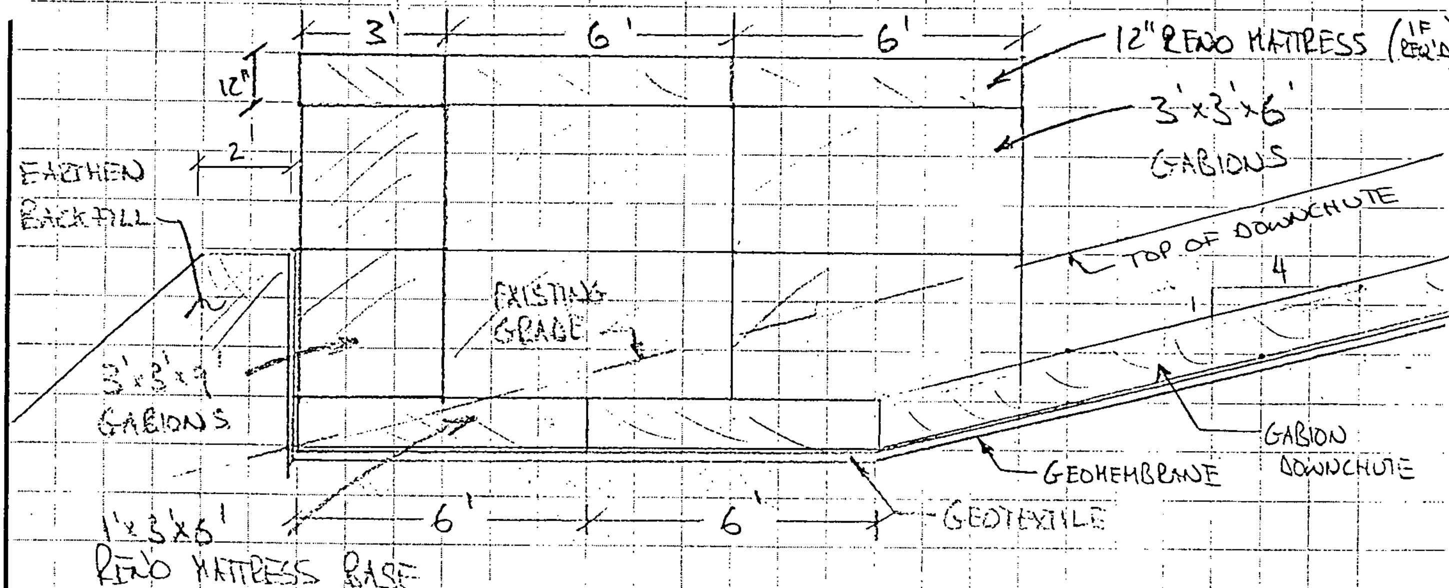
$\therefore F = 7{,}716.5$ lbs ←

Resisting Force



7' x 3' x 15' x 125 lbs/cf = 39,375 lbs →
(rip-rap)

$\therefore FS = 39{,}375 / 7{,}717 = 5.1$ OK

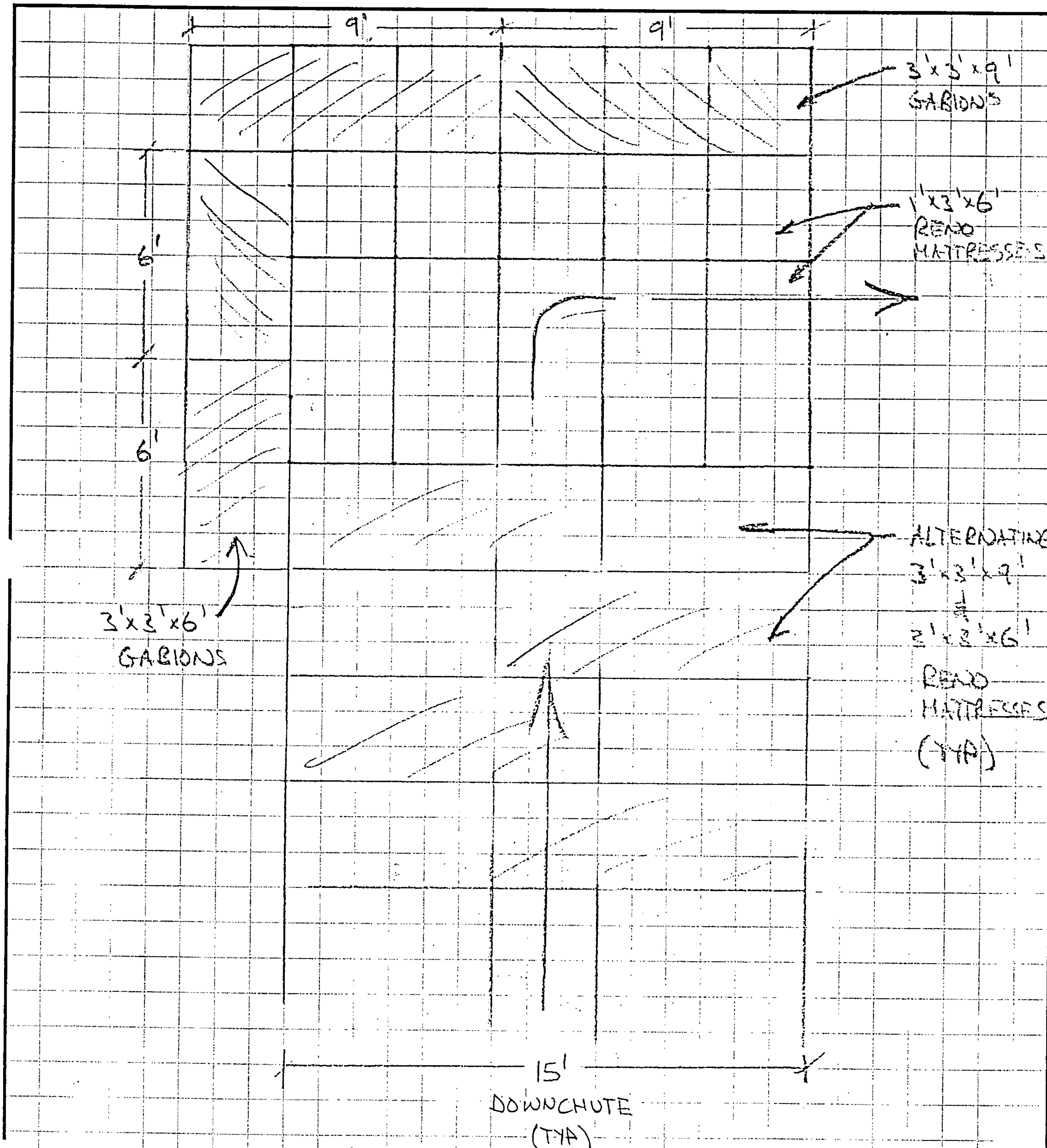


VELOCITY DISSIPATOR CROSS-SECTION

SCS ENGINEERS, PC

ENVIRONMENTAL CONSULTANTS
2 CROSFIELD AVENUE
SUITE 422
WEST NYACK, NY 10994
914 353-5727
FAX 914 353-5731

JOB 0990018.34
SHEET NO. 3 OF 3 SCALE
CALCULATED BY WEG DATE 3-7-94
CHECKED BY DATE



BASIN VOLUME DATA

POND-2 Version: 5.17
S/N:

SELF
BASIN A

CALCULATED 04-13-1994 17:38:06
DISK FILE: c:\ppd\0990018\A .VOL

Planimeter scale: 1 inch = 1 ft.

Elevation (ft)	Planimeter (sq.in.)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	* Volume (acre-ft)	Volume Sum (acre-ft)
123.50	18,000.00	0.41	0.00	0.00	0.00
124.00	111,571.00	2.56	4.00	0.67	0.67
125.00	116,704.00	2.68	7.86	2.62	3.29
126.00	122,998.00	2.82	8.25	2.75	6.04
127.00	129,306.00	2.97	8.69	2.90	8.93
128.00	135,937.00	3.12	9.13	3.04	11.98
129.00	142,908.00	3.28	9.60	3.20	15.18

* Incremental volume computed by the Conic Method for Reservoir Volumes.

POND-2 Version: 5.17
S/N:

SELF
BASIN B

CALCULATED 04-13-1994 17:38:27
DISK FILE: c:\ppd\0990018\B .VOL

Planimeter scale: 1 inch = 1 ft.

Elevation (ft)	Planimeter (sq.in.)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	* Volume (acre-ft)	Volume Sum (acre-ft)
126.00	191,706.00	4.40	0.00	0.00	0.00
127.00	234,621.00	5.39	14.66	4.89	4.89
128.00	248,463.00	5.70	16.63	5.54	10.43
129.00	257,358.00	5.91	17.42	5.81	16.24
130.00	266,697.00	6.12	18.05	6.02	22.25
131.00	274,698.00	6.31	18.64	6.21	28.46

* Incremental volume computed by the Conic Method for Reservoir Volumes.

POND-2 Version: 5.17
S/N:

SELF
BASIN C

CALCULATED 07-05-1994 11:12:37
DISK FILE: c:\ppd\0990018\C .VOL

Planimeter scale: 1 inch = 1 ft.

Elevation (ft)	Planimeter (sq.in.)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	* Volume (acre-ft)	Volume Sum (acre-ft)
127.00	79,321.00	1.82	0.00	0.00	0.00
128.00	114,961.00	2.64	6.65	2.22	2.22
129.00	124,254.00	2.85	8.24	2.75	4.96
130.00	133,978.00	3.08	8.89	2.96	7.93
131.00	144,790.00	3.32	9.60	3.20	11.12
132.00	156,475.00	3.59	10.37	3.46	14.58

* Incremental volume computed by the Conic Method for Reservoir Volumes.

POND-2 Version: 5.17
S/N:

SELF
BASIN D
SPILLWAY EL. 114.8

CALCULATED 04-13-1994 17:28:42
DISK FILE: c:\ppd\0990018\D .VOL

Planimeter scale: 1 inch = 1 ft.

Elevation (ft)	Planimeter (sq.in.)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	* Volume (acre-ft)	Volume Sum (acre-ft)
107.00	220,245.00	5.06	0.00	0.00	0.00
108.00	439,435.00	10.09	22.29	7.43	7.43
109.00	477,390.00	10.96	31.56	10.52	17.95
110.00	494,197.00	11.35	33.46	11.15	29.10
111.00	513,980.00	11.80	34.71	11.57	40.67
112.00	533,627.00	12.25	36.07	12.02	52.70
113.00	562,851.00	12.92	37.75	12.58	65.28
114.00	609,300.00	13.99	40.35	13.45	78.73
115.00	635,944.00	14.60	42.88	14.29	93.02
116.00	675,819.00	15.51	45.16	15.05	108.08

* Incremental volume computed by the Conic Method for Reservoir Volumes.

POND-2 Version: 5.17
S/N:

SELF
BASIN E

CALCULATED 04-14-1994 09:51:55
DISK FILE: c:\ppd\0990018\E .VOL

Planimeter scale: 1 inch = 1 ft.

Elevation (ft)	Planimeter (sq.in.)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	* Volume (acre-ft)	Volume Sum (acre-ft)
124.70	1.00	0.00	0.00	0.00	0.00
125.00	1,742.00	0.04	0.04	0.00	0.00
126.00	4,792.00	0.11	0.22	0.07	0.08
127.00	5,227.00	0.12	0.34	0.11	0.19
128.00	9,583.00	0.22	0.50	0.17	0.36
129.00	9,966.00	0.23	0.67	0.22	0.58

* Incremental volume computed by the Conic Method for Reservoir Volumes.

POND-2 Version: 5.17
S/N:

SELF
BASIN H
Leachate Treatment Plant

CALCULATED 06-16-1994 10:50:10
DISK FILE: c:\ppd\0990018\H .VOL

Planimeter scale: 1 inch = 1 ft.

Elevation (ft)	Planimeter (sq.in.)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	* Volume (acre-ft)	Volume Sum (acre-ft)
145.00	653.00	0.01	0.00	0.00	0.00
146.00	961.00	0.02	0.06	0.02	0.02
147.00	1,369.00	0.03	0.08	0.03	0.05
148.00	1,849.00	0.04	0.11	0.04	0.08

* Incremental volume computed by the Conic Method for Reservoir Volumes.

4

OFFSITE AREA HYDROGRAPHS

Area 1

Area 2 (Clay Borrow Area A)

Area 4 (Clay Borrow Area B)

Area 4 (Waste Tire Processing Area)

Borrow Area 1

Borrow Area 2

```
Quick TR-55 Ver.5.46   S/N:
Executed: 09:54:32   04-14-1994    c:\ppd\0990018\BORROW1.TCT

                                    SELF
                                Borrow Area 1
                            Discharge into Basin C


                    Tc COMPUTATIONS FOR:

 SHEET FLOW (Applicable to Tc only)
     Segment ID                                       A-B
     Surface description                          Sand
     Manning's roughness coeff., n                   0.0500
     Flow length, L (total < or = 300)        ft     300.0
     Two-yr 24-hr rainfall, P2                in     4.100
     Land slope, s                         ft/ft    0.0050
                             0.8
             .007 * (n*L)
     T =     --------------               hrs       0.25          =   0.25
                 0.5    0.4
               P2    *   s

 SHALLOW CONCENTRATED FLOW
     Segment ID                                       B-C
     Surface (paved or unpaved)?                    Unpaved
     Flow length, L                            ft    2700.0
     Watercourse slope, s                   ft/ft    0.0050

                              0.5
     Avg.V =   Csf *   (s)                 ft/s    1.1409
     where:    Unpaved Csf = 16.1345
               Paved   Csf = 20.3282

     T = L / (3600*V)                      hrs       0.66          =   0.66


 CHANNEL FLOW
     Segment ID
     Cross Sectional Flow Area, a        sq.ft        0.00
     Wetted perimeter, Pw                   ft        0.00
     Hydraulic radius, r = a/Pw             ft       0.000
     Channel slope, s                    ft/ft      0.0000
     Manning's roughness coeff., n                  0.0000

                        2/3     1/2
             1.49   *   r    *   s
     V =    --------------------              ft/s    0.0000
                         n

     Flow length, L                          ft            0

     T = L / (3600*V)                       hrs       0.00          =   0.00

::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
                                          TOTAL TIME (hrs)       0.91
```

Return Frequency: 25 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 04-13-1994 17:14:29
Watershed file: --> C:\PPD\0990018\BORROW1 .MOP
Hydrograph file: --> C:\PPD\0990018\BORROW1.HYD

Borrow Area #1
Discharge to Basin C

>>>> Input Parameters Used to Compute Hydrograph <<<<

Subarea Description	AREA (acres)	CN	Tc (hrs)	* Tt (hrs)	Precip. (in)	Runoff (in)	Ia/p input/used
1	85.50	55.0	1.00	0.00	8.40	3.06	.19 .10

* Travel time from subarea outfall to composite watershed outfall point.
Total area = 85.50 acres or 0.13359 sq.mi
Peak discharge = 146 cfs

>>>> Computer Modifications of Input Parameters <<<<<

Subarea Description	Input Values Tc (hr)	Input Values * Tt (hr)	Rounded Values Tc (hr)	Rounded Values * Tt (hr)	Ia/p Interpolated (Yes/No)	Ia/p Messages
1	0.91	0.00	1.00	0.00	No	--

* Travel time from subarea outfall to composite watershed outfall point.

```
Quick TR-55 Ver.5.46   S/N:
Executed: 17:10:03   04-13-1994    c:\ppd\0990018\BORROW2.TCT

                                  SELF
                              Borrow Area 2
                          Discharge into Basin D


                      Tc COMPUTATIONS FOR:

 SHEET FLOW (Applicable to Tc only)
     Segment ID                                      A-B
     Surface description                        Sand
     Manning's roughness coeff., n                   0.0500
     Flow length, L (total < or = 300)          ft    300.0
     Two-yr 24-hr rainfall, P2                  in    4.100
     Land slope, s                             ft/ft  0.0050
                         0.8
          .007 * (n*L)
     T =  --------------                        hrs      0.25              =  0.25
              0.5    0.4
           P2    *   s

 SHALLOW CONCENTRATED FLOW
     Segment ID                                      B-C
     Surface (paved or unpaved)?                     Unpaved
     Flow length, L                             ft    2700.0
     Watercourse slope, s                      ft/ft  0.0050

                           0.5
     Avg.V =  Csf *   (s)                      ft/s   1.1409
     where:   Unpaved Csf = 16.1345
              Paved   Csf = 20.3282

     T = L / (3600*V)                           hrs      0.66              =  0.66


 CHANNEL FLOW
     Segment ID
     Cross Sectional Flow Area, a             sq.ft      0.00
     Wetted perimeter, Pw                       ft       0.00
     Hydraulic radius, r = a/Pw                 ft      0.000
     Channel slope, s                          ft/ft   0.0000
     Manning's roughness coeff., n                     0.0000

                      2/3      1/2
          1.49   *   r    *   s
     V =  --------------------                 ft/s    0.0000
                     n

     Flow length, L                             ft          0

     T = L / (3600*V)                           hrs      0.00              =  0.00

    ::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
                                              TOTAL TIME (hrs)            0.91
```

Return Frequency: 25 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 04-13-1994 17:16:42
Watershed file: --> C:\PPD\0990018\BORROW2 .MOP
Hydrograph file: --> C:\PPD\0990018\BORROW2.HYD

Borrow Area #2
Discharge to Basin D

>>>> Input Parameters Used to Compute Hydrograph <<<<

Subarea Description	AREA (acres)	CN	Tc (hrs)	* Tt (hrs)	Precip. (in)	Runoff (in)	Ia/p input/used
2	68.50	55.0	1.00	0.00	8.40	3.06	.19 .10

* Travel time from subarea outfall to composite watershed outfall point.
Total area = 68.50 acres or 0.10703 sq.mi
Peak discharge = 117 cfs

>>>> Computer Modifications of Input Parameters <<<<<

Subarea Description	Input Values Tc (hr)	Input Values * Tt (hr)	Rounded Values Tc (hr)	Rounded Values * Tt (hr)	Ia/p Interpolated (Yes/No)	Ia/p Messages
2	0.91	0.00	1.00	0.00	No	--

* Travel time from subarea outfall to composite watershed outfall point.

TR-55 TABULAR HYDROGRAPH METHOD
Type II Distribution
(24 hr. Duration Storm)

Executed: 06-20-1994 21:29:16
Watershed file: --> c:\ppd\0990018\offsite\OS3D34 .WSD
Hydrograph file: --> c:\ppd\0990018\offsite\OS3D34 .HYD

Downchutes 3 and 4
Offsite Subshed 3 (Previously calculated)

>>>> Input Parameters Used to Compute Hydrograph <<<<

Subarea Description	AREA (acres)	CN	Tc (hrs)	* Tt (hrs)	Precip. (in)	Runoff (in)	Ia/p input/used	
Downchute 3	17.70	74.0	0.40	0.00	8.40	5.28	.08	.10
Downchute 3	14.80	74.0	0.20	0.00	8.40	5.28	.08	.10
Downchute 4	11.80	74.0	0.40	0.00	8.40	5.28	.08	.10
Downchute 4	6.00	74.0	0.20	0.00	8.40	5.28	.08	.10
Offsite Area 3	20.10	55.0	0.75	0.00	8.40	3.06	.19	.10

* Travel time from subarea outfall to composite watershed outfall point.
Total area = 70.40 acres or 0.11000 sq.mi
Peak discharge = 263 cfs

>>>> Computer Modifications of Input Parameters <<<<<

Subarea Description	Input Values Tc (hr)	* Tt (hr)	Rounded Values Tc (hr)	* Tt (hr)	Ia/p Interpolated (Yes/No)	Ia/p Messages
Downchute 3	0.42	0.00	0.40	0.00	No	Computed Ia/p < .1
Downchute 3	0.20	0.00	**	**	No	Computed Ia/p < .1
Downchute 4	0.39	0.00	0.40	0.00	No	Computed Ia/p < .1
Downchute 4	0.23	0.00	0.20	0.00	No	Computed Ia/p < .1
Offsite Area 3	0.65	0.00	0.75	0.00	No	--

* Travel time from subarea outfall to composite watershed outfall point.
** Tc & Tt are available in the hydrograph tables.

TR-55 TABULAR HYDROGRAPH METHOD
Type II Distribution
(24 hr. Duration Storm)

Executed: 06-14-1994 13:35:08
Watershed file: --> c:\ppd\0990018\offsite\OS3D34 .WSD
Hydrograph file: --> c:\ppd\0990018\offsite\OS3D34 .HYD

Downchutes 3 and 4
Offsite Subshed 3 (Previously calculated)

>>>> Summary of Subarea Times to Peak <<<<

Subarea	Peak Discharge at Composite Outfall (cfs)	Time to Peak at Composite Outfall (hrs)
Downchute 3	86	12.3
Downchute 3	98	12.2
Downchute 4	58	12.3
Downchute 4	40	12.2
Offsite Area 3	41	12.6
Composite Watershed	263	12.2

TR-55 TABULAR HYDROGRAPH METHOD
Type II Distribution
(24 hr. Duration Storm)

Executed: 06-14-1994 13:35:08
Watershed file: --> c:\ppd\0990018\offsite\OS3D34 .WSD
Hydrograph file: --> c:\ppd\0990018\offsite\OS3D34 .HYD

Downchutes 3 and 4
Offsite Subshed 3 (Previously calculated)

Composite Hydrograph Summary (cfs)

Subarea Description	11.0 hr	11.3 hr	11.6 hr	11.9 hr	12.0 hr	12.1 hr	12.2 hr	12.3 hr	12.4 hr
Downchute 3	3	4	5	11	21	40	68	86	84
Downchute 3	3	4	6	26	49	90	98	59	31
Downchute 4	2	2	4	7	14	26	46	58	56
Downchute 4	1	2	2	10	20	37	40	24	12
Offsite Area 3	1	2	2	3	4	7	11	19	28
al (cfs)	10	14	19	57	108	200	263	246	211

Subarea Description	12.5 hr	12.6 hr	12.7 hr	12.8 hr	13.0 hr	13.2 hr	13.4 hr	13.6 hr	13.8 hr
Downchute 3	63	44	32	24	15	11	9	8	7
Downchute 3	20	16	12	11	9	7	7	6	5
Downchute 4	42	29	21	16	10	7	6	5	5
Downchute 4	8	6	5	4	3	3	3	2	2
Offsite Area 3	37	41	39	35	24	17	12	9	7
Total (cfs)	170	136	109	90	61	45	37	30	26

TR-55 TABULAR HYDROGRAPH METHOD
Type II Distribution
(24 hr. Duration Storm)

Executed: 06-14-1994 13:35:08
Watershed file: --> c:\ppd\0990018\offsite\OS3D34 .WSD
Hydrograph file: --> c:\ppd\0990018\offsite\OS3D34 .HYD

Downchutes 3 and 4
Offsite Subshed 3 (Previously calculated)

Composite Hydrograph Summary (cfs)

Subarea Description	14.0 hr	14.3 hr	14.6 hr	15.0 hr	15.5 hr	16.0 hr	16.5 hr	17.0 hr	17.5 hr
Downchute 3	6	6	5	5	4	4	3	3	3
Downchute 3	5	4	4	4	3	3	3	2	2
Downchute 4	4	4	3	3	3	2	2	2	2
Downchute 4	2	2	2	1	1	1	1	1	1
Offsite Area 3	6	5	4	3	3	3	2	2	2
Total (cfs)	23	21	18	16	14	13	11	10	10

Subarea Description	18.0 hr	19.0 hr	20.0 hr	22.0 hr	26.0 hr
Downchute 3	3	2	2	2	0
Downchute 3	2	2	2	1	0
Downchute 4	2	2	1	1	0
Downchute 4	1	1	1	1	0
Offsite Area 3	2	2	1	1	0
Total (cfs)	10	9	7	6	0

POND-2 Version: 5.17
S/N:

Offsite Area No. 3
Serving as detention basin

CALCULATED 03-24-1994 14:39:09
DISK FILE: c:\ppd\0990018\march\AREA3 .VOL

Planimeter scale: 1 inch = 200 ft.

Elevation (ft)	Planimeter (sq.in.)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	* Volume (acre-ft)	Volume Sum (acre-ft)
125.00	0.05	0.05	0.00	0.00	0.00
126.00	0.07	0.06	0.16	0.05	0.05
127.00	0.12	0.11	0.26	0.09	0.14
128.00	1.05	0.96	1.40	0.47	0.61
129.00	1.95	1.79	4.07	1.36	1.96
130.00	3.28	3.01	7.12	2.37	4.34
131.00	4.46	4.10	10.62	3.54	7.88
132.00	6.80	6.24	15.40	5.13	13.01
133.00	8.10	7.44	20.50	6.83	19.84

* Incremental volume computed by the Conic Method for Reservoir Volumes.

Outlet Structure File: AREA3118.STR

POND-2 Version: 5.17 S/N:
Date Executed: Time Executed:

****
Existing 18" dia. CMP
Offsite Area No.3
(S-25)
****

***** COMPOSITE OUTFLOW SUMMARY ****

Elevation (ft)	Q (cfs)	Contributing Structures
125.00	0.0	
125.20	0.0	
125.40	0.0	
125.60	0.0	
125.80	0.0	
126.00	0.0	
126.20	0.0	
126.40	0.0	
126.60	0.0	
126.80	0.0	
127.00	16.4	1
127.20	17.2	1
127.40	18.0	1
127.60	18.8	1
127.80	19.5	1
128.00	20.1	1
128.20	20.8	1
128.40	21.4	1
128.60	22.1	1
128.80	22.7	1
129.00	23.3	1
129.20	23.8	1
129.40	24.4	1
129.60	24.9	1
129.80	25.5	1
130.00	26.0	1
130.20	26.5	1
130.40	27.0	1
130.60	27.5	1
130.80	28.0	1
131.00	28.5	1
131.20	29.0	1
131.40	29.4	1
131.60	29.9	1
131.80	30.3	1
132.00	30.8	1
132.20	31.2	1
132.40	31.6	1
132.60	32.1	1

Outlet Structure File: AREA3118.STR

POND-2 Version: 5.17 S/N:
Date Executed: Time Executed:

****
Existing 18" dia. CMP
Offsite Area No.3
(S-25)
****

Outlet Structure File: c:\ppd\0990018\offsite\AREA3118.STR
Planimeter Input File: c:\ppd\0990018\offsite\AREA3 .VOL
Rating Table Output File: c:\ppd\0990018\offsite\AREA3118.PND

Min. Elev.(ft) = 125 Max. Elev.(ft) = 132.999 Incr.(ft) = .2

Additional elevations (ft) to be included in table:
* *

****
SYSTEM CONNECTIVITY
****

Structure	No.	Q Table		Q Table
ORIFICE-VC	1		->	1

Outflow rating table summary was stored in file:
c:\ppd\0990018\offsite\AREA3118.PND

Outlet Structure File: AREA3118.STR

POND-2 Version: 5.17 S/N:
Date Executed: Time Executed:

****
Existing 18" dia. CMP
Offsite Area No.3
(S-25)
****

***** COMPOSITE OUTFLOW SUMMARY ****

Elevation (ft)	Q (cfs)	Contributing Structures
125.00	0.0	
125.20	0.0	
125.40	0.0	
125.60	0.0	
125.80	0.0	
126.00	0.0	
126.20	0.0	
126.40	0.0	
126.60	0.0	
126.80	0.0	
127.00	16.4	1
127.20	17.2	1
127.40	18.0	1
127.60	18.8	1
127.80	19.5	1
128.00	20.1	1
128.20	20.8	1
128.40	21.4	1
128.60	22.1	1
128.80	22.7	1
129.00	23.3	1
129.20	23.8	1
129.40	24.4	1
129.60	24.9	1
129.80	25.5	1
130.00	26.0	1
130.20	26.5	1
130.40	27.0	1
130.60	27.5	1
130.80	28.0	1
131.00	28.5	1
131.20	29.0	1
131.40	29.4	1
131.60	29.9	1
131.80	30.3	1
132.00	30.8	1
132.20	31.2	1
132.40	31.6	1
132.60	32.1	1
132.80	32.5	1

Outlet Structure File: AREA3118.STR

POND-2 Version: 5.17 S/N:
Date Executed: Time Executed:

```
*********************
Existing 18" dia. CMP
Offsite Area No.3
(S-25)
*********************
```

Outlet Structure File: c:\ppd\0990018\offsite\AREA3118.STR
Planimeter Input File: c:\ppd\0990018\offsite\AREA3   .VOL
Rating Table Output File: c:\ppd\0990018\offsite\AREA3118.PND

Min. Elev.(ft) = 125   Max. Elev.(ft) = 132.999   Incr.(ft) = .2

Additional elevations (ft) to be included in table:
* *

```
**********************************************
SYSTEM CONNECTIVITY
**********************************************
```

Structure	No.	Q Table	Q Table
ORIFICE-VC	1	->	1

Outflow rating table summary was stored in file:
c:\ppd\0990018\offsite\AREA3118.PND

```
**************************
*                        *
*  Existing 18" dia. CMP *
*    Offsite Area No.3   *
*                        *
*        (S-25)          *
*                        *
**************************
```

Inflow Hydrograph: c:\ppd\0990018\offsite\OS3D34   .HYD
Rating Table file: c:\ppd\0990018\offsite\AREA3118.PND

----INITIAL CONDITIONS----
Elevation =   125.00 ft
Outflow   =   0.00 cfs
Storage   =   0.00 ac-ft

GIVEN POND DATA			INTERMEDIATE ROUTING COMPUTATIONS	
ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (ac-ft)	2S/t (cfs)	2S/t + 0 (cfs)
125.00	0.0	0.000	0.0	0.0
125.20	0.0	0.010	2.3	2.3
125.40	0.0	0.020	4.8	4.8
125.60	0.0	0.031	7.4	7.4
125.80	0.0	0.042	10.3	10.3
126.00	0.0	0.055	13.3	13.3
126.20	0.0	0.069	16.6	16.6
126.40	0.0	0.084	20.3	20.3
126.60	0.0	0.101	24.4	24.4
126.80	0.0	0.120	29.0	29.0
127.00	16.4	0.141	34.1	50.5
127.20	17.2	0.173	41.8	59.0
127.40	18.0	0.229	55.3	73.3
127.60	18.8	0.315	76.3	95.1
127.80	19.5	0.439	106.3	125.8
128.00	20.1	0.608	147.1	167.2
128.20	20.8	0.815	197.2	218.0
128.40	21.4	1.052	254.6	276.0
128.60	22.1	1.321	319.8	341.9
128.80	22.7	1.625	393.2	415.9
129.00	23.3	1.964	475.3	498.6
129.20	23.8	2.344	567.2	591.0
129.40	24.4	2.769	670.0	694.4
129.60	24.9	3.241	784.4	809.3
129.80	25.5	3.764	910.9	936.4
130.00	26.0	4.339	1050.1	1076.1
130.20	26.5	4.962	1200.7	1227.2
130.40	27.0	5.626	1361.4	1388.4
130.60	27.5	6.332	1532.4	1559.9
130.80	28.0	7.083	1714.1	1742.1
131.00	28.5	7.879	1906.7	1935.2

GIVEN POND DATA

ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (ac-ft)
131.20	29.0	8.737
131.40	29.4	9.676
131.60	29.9	10.699
131.80	30.3	11.809
132.00	30.8	13.011
132.20	31.2	14.283
132.40	31.6	15.601
132.60	32.1	16.967
132.80	32.5	18.381
133.00	32.9	19.836

INTERMEDIATE ROUTING COMPUTATIONS

2S/t (cfs)	2S/t + 0 (cfs)
2114.4	2143.4
2341.5	2370.9
2589.1	2619.0
2857.8	2888.1
3148.7	3179.5
3456.5	3487.7
3775.5	3807.1
4106.0	4138.1
4448.2	4480.7
4800.3	4833.2

Time increment (t) = 0.100 hrs.

POND-2 Version: 5.17 S/N:
EXECUTED: 06-20-1994 20:24:41

,nd File: c:\ppd\0990018\offsite\AREA3118.PND
Inflow Hydrograph: c:\ppd\0990018\offsite\OS3D34 .HYD
Outflow Hydrograph: c:\ppd\0990018\offsite\OUT .HYD

INFLOW HYDROGRAPH / ROUTING COMPUTATIONS

TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
11.000	10.00	-----	0.0	0.0	0.00	125.00
11.100	11.00	21.0	21.0	21.0	0.00	126.43
11.200	13.00	24.0	20.6	45.0	12.18	126.95
11.300	14.00	27.0	19.3	47.6	14.20	126.97
11.400	16.00	30.0	18.4	49.3	15.42	126.99
11.500	17.00	33.0	18.4	51.4	16.48	127.02
11.600	19.00	36.0	20.9	54.4	16.77	127.09
11.700	32.00	51.0	36.1	71.9	17.92	127.38
11.800	44.00	76.0	73.7	112.1	19.19	127.71
11.900	57.00	101.0	134.3	174.7	20.20	128.03
12.000	108.00	165.0	256.0	299.3	21.65	128.47
12.100	200.00	308.0	516.7	564.0	23.65	129.14
12.200	263.00	463.0	928.4	979.7	25.66	129.86
12.300	246.00	509.0	1383.1	1437.4	27.14	130.46
12.400	211.00	457.0	1783.6	1840.1	28.25	130.90
12.500	170.00	381.0	2106.5	2164.6	29.04	131.22
12.600	136.00	306.0	2353.5	2412.5	29.48	131.43
12.700	109.00	245.0	2538.8	2598.5	29.86	131.58
12.800	90.00	199.0	2677.7	2737.8	30.08	131.69
12.900	75.00	165.0	2782.2	2842.7	30.23	131.77
13.000	61.00	136.0	2857.5	2918.2	30.35	131.82
13.100	53.00	114.0	2910.6	2971.5	30.44	131.86
13.200	45.00	98.0	2947.6	3008.6	30.51	131.88
13.300	41.00	86.0	2972.5	3033.6	30.55	131.90
13.400	37.00	78.0	2989.3	3050.5	30.58	131.91
13.500	34.00	71.0	2999.2	3060.3	30.60	131.92
13.600	30.00	64.0	3002.0	3063.2	30.60	131.92
13.700	28.00	58.0	2998.8	3060.0	30.59	131.92
13.800	26.00	54.0	2991.6	3052.8	30.58	131.91
13.900	24.00	50.0	2980.5	3041.6	30.56	131.91
14.000	23.00	47.0	2966.4	3027.5	30.54	131.90
14.100	22.00	45.0	2950.4	3011.4	30.51	131.88
14.200	22.00	44.0	2933.4	2994.4	30.48	131.87
14.300	21.00	43.0	2915.5	2976.4	30.45	131.86
14.400	20.00	41.0	2895.7	2956.5	30.42	131.85
14.500	19.00	39.0	2873.9	2934.7	30.38	131.83
14.600	18.00	37.0	2850.2	2910.9	30.34	131.82
14.700	18.00	36.0	2825.6	2886.2	30.30	131.80
14.800	17.00	35.0	2800.1	2860.6	30.26	131.78
14.900	16.00	33.0	2772.7	2833.1	30.22	131.76
15.000	16.00	32.0	2744.3	2804.7	30.18	131.74
15.100	16.00	32.0	2716.1	2776.3	30.13	131.72
15.200	15.00	31.0	2686.9	2747.1	30.09	131.70
15.300	15.00	30.0	2656.8	2716.9	30.05	131.67
15.400	14.00	29.0	2625.8	2685.8	30.00	131.65

nd File: c:\ppd\0990018\offsite\AREA3118.PND
Inflow Hydrograph: c:\ppd\0990018\offsite\OS3D34 .HYD
Outflow Hydrograph: c:\ppd\0990018\offsite\OUT .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
15.500	14.00	28.0	2593.9	2653.8	29.95	131.63
15.600	14.00	28.0	2562.1	2621.9	29.90	131.60
15.700	14.00	28.0	2530.4	2590.1	29.84	131.58
15.800	13.00	27.0	2497.8	2557.4	29.78	131.55
15.900	13.00	26.0	2464.4	2523.8	29.71	131.52
16.000	13.00	26.0	2431.1	2490.4	29.64	131.50
16.100	13.00	26.0	2398.0	2457.1	29.57	131.47
16.200	12.00	25.0	2364.0	2423.0	29.50	131.44
16.300	12.00	24.0	2329.1	2388.0	29.43	131.41
16.400	11.00	23.0	2293.4	2352.1	29.37	131.38
16.500	11.00	22.0	2256.8	2315.4	29.30	131.35
16.600	11.00	22.0	2220.3	2278.8	29.24	131.32
16.700	11.00	22.0	2184.0	2242.3	29.17	131.29
16.800	10.00	21.0	2146.7	2205.0	29.11	131.25
16.900	10.00	20.0	2108.7	2166.7	29.04	131.22
17.000	10.00	20.0	2070.7	2128.7	28.96	131.19
17.100	10.00	20.0	2033.0	2090.7	28.87	131.15
17.200	10.00	20.0	1995.4	2053.0	28.78	131.11
17.300	10.00	20.0	1958.0	2015.4	28.69	131.08
17.400	10.00	20.0	1920.8	1978.0	28.60	131.04
17.500	10.00	20.0	1883.8	1940.8	28.51	131.01
17.600	10.00	20.0	1847.0	1903.8	28.42	130.97
17.700	10.00	20.0	1810.3	1867.0	28.32	130.93
17.800	10.00	20.0	1773.9	1830.3	28.23	130.89
17.900	10.00	20.0	1737.6	1793.9	28.13	130.85
18.000	10.00	20.0	1701.5	1757.6	28.04	130.82
18.100	10.00	20.0	1665.6	1721.5	27.94	130.78
18.200	10.00	20.0	1629.9	1685.6	27.85	130.74
18.300	10.00	20.0	1594.4	1649.9	27.75	130.70
18.400	10.00	20.0	1559.1	1614.4	27.65	130.66
18.500	10.00	20.0	1524.0	1579.1	27.55	130.62
18.600	9.00	19.0	1488.1	1543.0	27.45	130.58
18.700	9.00	18.0	1451.4	1506.1	27.34	130.54
18.800	9.00	18.0	1415.0	1469.4	27.24	130.49
18.900	9.00	18.0	1378.7	1433.0	27.13	130.45
19.000	9.00	18.0	1342.7	1396.7	27.02	130.41
19.100	9.00	18.0	1306.8	1360.7	26.91	130.37
19.200	9.00	18.0	1271.2	1324.8	26.80	130.32
19.300	8.00	17.0	1234.9	1288.2	26.69	130.28
19.400	8.00	16.0	1197.7	1250.9	26.57	130.23
19.500	8.00	16.0	1160.8	1213.7	26.46	130.18
19.600	8.00	16.0	1124.1	1176.8	26.33	130.13
9.700	8.00	16.0	1087.7	1140.1	26.21	130.08
19.800	7.00	15.0	1050.5	1102.7	26.09	130.04
19.900	7.00	14.0	1012.6	1064.5	25.96	129.98
20.000	7.00	14.0	975.0	1026.6	25.82	129.93

Pond File: c:\ppd\0990018\offsite\AREA3118.PND
Inflow Hydrograph: c:\ppd\0990018\offsite\OS3D34 .HYD
Outflow Hydrograph: c:\ppd\0990018\offsite\OUT .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
20.100	7.00	14.0	937.6	989.0	25.69	129.88
20.200	7.00	14.0	900.5	951.6	25.55	129.82
20.300	7.00	14.0	863.7	914.5	25.40	129.77
20.400	7.00	14.0	827.2	877.7	25.22	129.71
20.500	7.00	14.0	791.1	841.2	25.05	129.65
20.600	7.00	14.0	755.4	805.1	24.88	129.59
20.700	7.00	14.0	719.9	769.4	24.73	129.53
20.800	7.00	14.0	684.8	733.9	24.57	129.47
20.900	7.00	14.0	649.9	698.8	24.42	129.41
21.000	6.00	13.0	614.5	662.9	24.22	129.34
21.100	6.00	12.0	578.5	626.5	24.01	129.27
21.200	6.00	12.0	542.9	590.5	23.80	129.20
21.300	6.00	12.0	507.7	554.9	23.60	129.12
21.400	6.00	12.0	472.9	519.7	23.41	129.05
21.500	6.00	12.0	438.5	484.9	23.20	128.97
21.600	6.00	12.0	404.6	450.5	22.95	128.88
1.700	6.00	12.0	371.2	416.6	22.70	128.80
21.800	6.00	12.0	338.3	383.2	22.43	128.71
21.900	6.00	12.0	305.9	350.3	22.17	128.62
22.000	6.00	12.0	274.3	317.9	21.85	128.53
22.100	6.00	12.0	243.2	286.3	21.51	128.43
22.200	6.00	12.0	212.9	255.2	21.18	128.33
22.300	6.00	12.0	183.1	224.9	20.87	128.22
22.400	5.00	11.0	153.2	194.1	20.47	128.11
22.500	5.00	10.0	123.1	163.2	20.04	127.98
22.600	5.00	10.0	93.9	133.1	19.61	127.84
22.700	5.00	10.0	65.9	103.9	19.00	127.66
22.800	5.00	10.0	39.7	75.9	18.09	127.42
22.900	5.00	10.0	18.2	49.7	15.76	126.99
23.000	4.00	9.0	27.2	27.2	0.00	126.72
23.100	4.00	8.0	25.8	35.2	4.67	126.86
23.200	4.00	8.0	26.5	33.8	3.64	126.84
23.300	4.00	8.0	26.2	34.5	4.19	126.85
23.400	4.00	8.0	26.4	34.2	3.90	126.85
23.500	4.00	8.0	26.3	34.4	4.05	126.85
23.600	4.00	8.0	26.3	34.3	3.97	126.85
23.700	3.00	7.0	26.8	33.3	3.25	126.84
23.800	3.00	6.0	27.1	32.8	2.87	126.83
23.900	3.00	6.0	26.9	33.1	3.07	126.84
24.000	3.00	6.0	27.0	32.9	2.96	126.84
24.100	3.00	6.0	27.0	33.0	3.02	126.84
24.200	3.00	6.0	27.0	33.0	2.99	126.84
24.300	3.00	6.0	27.0	33.0	3.01	126.84
24.400	2.00	5.0	27.5	32.0	2.23	126.83
24.500	2.00	4.0	27.8	31.5	1.88	126.82
24.600	2.00	4.0	27.6	31.8	2.06	126.83

nd File: c:\ppd\0990018\offsite\AREA3118.PND
Inflow Hydrograph: c:\ppd\0990018\offsite\OS3D34 .HYD
Outflow Hydrograph: c:\ppd\0990018\offsite\OUT .HYD

INFLOW HYDROGRAPH / ROUTING COMPUTATIONS

TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
24.700	2.00	4.0	27.7	31.6	1.97	126.82
24.800	2.00	4.0	27.7	31.7	2.02	126.82
24.900	2.00	4.0	27.7	31.7	1.99	126.82
25.000	2.00	4.0	27.7	31.7	2.00	126.82
25.100	1.00	3.0	28.2	30.7	1.23	126.82
25.200	1.00	2.0	28.4	30.2	0.88	126.81
25.300	1.00	2.0	28.3	30.4	1.06	126.81
25.400	1.00	2.0	28.4	30.3	0.97	126.81
25.500	1.00	2.0	28.3	30.4	1.02	126.81
25.600	1.00	2.0	28.4	30.3	0.99	126.81
25.700	0.00	1.0	28.9	29.4	0.24	126.80
25.800	0.00	0.0	28.9	28.9	0.00	126.79
25.900	0.00	0.0	28.9	28.9	0.00	126.79

****************** SUMMARY OF ROUTING COMPUTATIONS ******************

```
Pond File:           c:\ppd\0990018\offsite\AREA3118.PND
Inflow Hydrograph:   c:\ppd\0990018\offsite\OS3D34   .HYD
Outflow Hydrograph:  c:\ppd\0990018\offsite\OUT      .HYD
```

Starting Pond W.S. Elevation = 125.00 ft

***** Summary of Peak Outflow and Peak Elevation *****

```
Peak Inflow    =  263.00 cfs
Peak Outflow   =   30.60 cfs
Peak Elevation =  131.92 ft
```

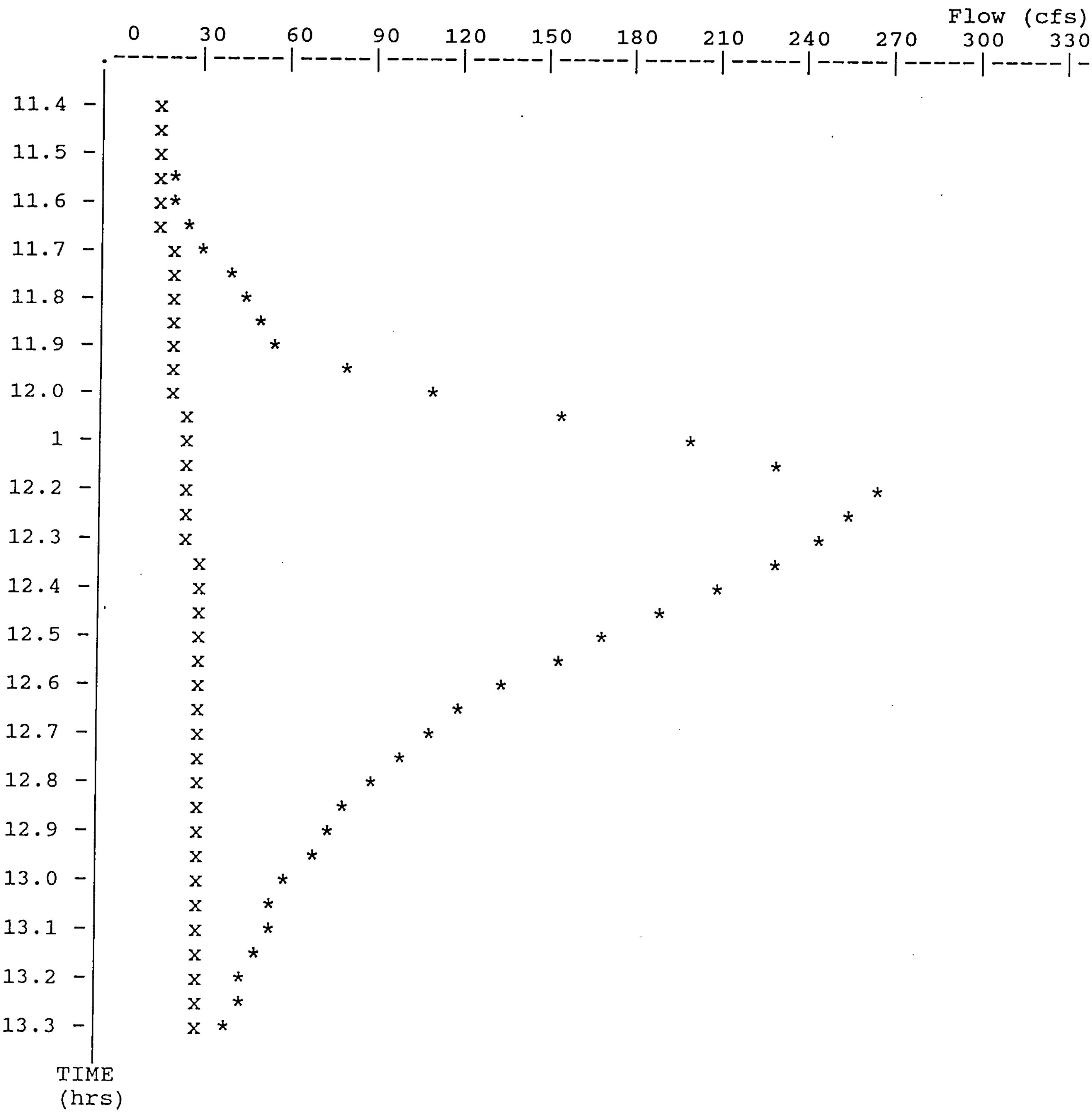
***** Summary of Approximate Peak Storage *****

```
Initial Storage          =     0.00 ac-ft
Peak Storage From Storm  =    12.53 ac-ft
                           ---------------
Total Storage in Pond    =    12.53 ac-ft
```

Warning: Inflow hydrograph truncated on left side.

POND-2 Version: 5.17 S/N:


```
Pond File:            c:\ppd\0990018\offsite\AREA3118.PND
Inflow Hydrograph:    c:\ppd\0990018\offsite\OS3D34   .HYD
Outflow Hydrograph:   c:\ppd\0990018\offsite\OUT      .HYD
                                              EXECUTED: 06-20-1994
Peak Inflow    =   263.00 cfs                           20:24:41
Peak Outflow   =    30.60 cfs
Peak Elevation =   131.92 ft
```




```
*  File:  c:\ppd\0990018\offsite\OS3D34   .HYD   Qmax =   263.0 cfs
x  File:  c:\ppd\0990018\offsite\OUT      .HYD   Qmax =    30.6 cfs
```

Outlet Structure File: AREA3236.STR

POND-2 Version: 5.17 S/N:
Date Executed: Time Executed:

****

Offsite Area No.3
@ S-25

****

***** COMPOSITE OUTFLOW SUMMARY ****

Elevation (ft)	Q (cfs)	Contributing Structures
125.00	0.0	
125.20	0.0	
125.40	0.0	
125.60	0.0	
125.80	0.0	
126.00	0.0	
126.20	0.0	
126.40	0.0	
126.60	0.0	
126.80	0.0	
127.00	0.0	
127.20	0.0	
127.40	0.0	
127.60	0.0	
127.80	0.0	
128.00	161.1	1 +2
128.20	166.4	1 +2
128.40	171.5	1 +2
128.60	176.5	1 +2
128.80	181.3	1 +2
129.00	186.1	1 +2
129.20	190.7	1 +2
129.40	195.1	1 +2
129.60	199.5	1 +2
129.80	203.8	1 +2
130.00	208.0	1 +2
130.20	212.1	1 +2
130.40	216.2	1 +2
130.60	220.1	1 +2
130.80	224.0	1 +2
131.00	227.9	1 +2
131.20	231.6	1 +2
131.40	235.3	1 +2
131.60	239.0	1 +2
131.80	242.6	1 +2
132.00	246.1	1 +2
132.20	249.6	1 +2
132.40	253.1	1 +2
132.60	256.5	1 +2
132.80	259.8	1 +2

Outlet Structure File: AREA3236.STR

POND-2 Version: 5.17
Date Executed:

S/N:
Time Executed:

****

Offsite Area No.3

@ 5-25

****

```
Outlet Structure File:     c:\ppd\0990018\march\AREA3236.STR
Planimeter Input File:     c:\ppd\0990018\march\AREA3   .VOL
Rating Table Output File:  c:\ppd\0990018\march\AREA3236.PND
```

Min. Elev.(ft) = 125   Max. Elev.(ft) = 132.999   Incr.(ft) = .2

Additional elevations (ft) to be included in table:

* *

****

SYSTEM CONNECTIVITY

****

Structure	No.	Q Table		Q Table
ORIFICE-VC	1		->	1
ORIFICE-VC	2		->	2

Outflow rating table summary was stored in file:
c:\ppd\0990018\march\AREA3236.PND

Outlet Structure File: AREA3236.STR

POND-2 Version: 5.17 S/N:

Date Executed: Time Executed:

****

Offsite Area No.3

@ S-25

****

>>>>>> Structure No. 1 <<<<<<

(Input Data)

ORIFICE-VC

Orifice - Vertical Circular

E1 elev.(ft)?	128
E2 elev.(ft)?	133
Orifice coeff.?	0.82
Invert elev.(ft)?	125
Datum elev.(ft)?	125
Diameter (ft)?	3

Outlet Structure File: AREA3236.STR

POND-2 Version: 5.17 S/N:
Date Executed: Time Executed:

****

Offsite Area No.3

@ S-25

****

>>>>>> Structure No. 2 <<<<<<
(Input Data)

ORIFICE-VC
Orifice - Vertical Circular

E1 elev.(ft)?	128
E2 elev.(ft)?	133
Orifice coeff.?	0.82
Invert elev.(ft)?	125
Datum elev.(ft)?	125
Diameter (ft)?	3

Offsite Area No.3

@ S-25

Inflow Hydrograph: c:\ppd\0990018\offsite\OS3D34 .HYD
Rating Table file: c:\ppd\0990018\offsite\AREA3236.PND

----INITIAL CONDITIONS----
Elevation = 125.00 ft
Outflow = 0.00 cfs
Storage = 0.00 ac-ft

GIVEN POND DATA			INTERMEDIATE ROUTING COMPUTATIONS	
ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (ac-ft)	2S/t (cfs)	2S/t + 0 (cfs)
125.00	0.0	0.000	0.0	0.0
125.20	0.0	0.010	2.3	2.3
125.40	0.0	0.020	4.8	4.8
125.60	0.0	0.031	7.4	7.4
125.80	0.0	0.042	10.3	10.3
126.00	0.0	0.055	13.3	13.3
126.20	0.0	0.069	16.6	16.6
126.40	0.0	0.084	20.3	20.3
126.60	0.0	0.101	24.4	24.4
126.80	0.0	0.120	29.0	29.0
127.00	0.0	0.141	34.1	34.1
127.20	0.0	0.173	41.8	41.8
127.40	0.0	0.229	55.3	55.3
127.60	0.0	0.315	76.3	76.3
127.80	0.0	0.439	106.3	106.3
128.00	161.1	0.608	147.1	308.2
128.20	166.4	0.815	197.2	363.6
128.40	171.5	1.052	254.6	426.1
128.60	176.5	1.321	319.8	496.3
128.80	181.3	1.625	393.2	574.5
129.00	186.1	1.964	475.3	661.4
129.20	190.7	2.344	567.2	757.9
129.40	195.1	2.769	670.0	865.1
129.60	199.5	3.241	784.4	983.9
129.80	203.8	3.764	910.9	1114.7
130.00	208.0	4.339	1050.1	1258.1
130.20	212.1	4.962	1200.7	1412.8
130.40	216.2	5.626	1361.4	1577.6
130.60	220.1	6.332	1532.4	1752.5
130.80	224.0	7.083	1714.1	1938.1
131.00	227.9	7.879	1906.7	2134.6

DISK FILES: OS3D34 .HYD ; AREA3236.PND

GIVEN POND DATA

ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (ac-ft)
131.20	231.6	8.737
131.40	235.3	9.676
131.60	239.0	10.699
131.80	242.6	11.809
132.00	246.1	13.011
132.20	249.6	14.283
132.40	253.1	15.601
132.60	256.5	16.967
132.80	259.8	18.381
133.00	263.1	19.836

INTERMEDIATE ROUTING COMPUTATIONS

2S/t (cfs)	2S/t + 0 (cfs)
2114.4	2346.0
2341.5	2576.8
2589.1	2828.1
2857.8	3100.4
3148.7	3394.8
3456.5	3706.1
3775.5	4028.6
4106.0	4362.5
4448.2	4708.0
4800.3	5063.4

Time increment (t) = 0.100 hrs.

POND-2 Version: 5.17 S/N:
EXECUTED: 06-14-1994 13:39:08

nd File: c:\ppd\0990018\offsite\AREA3236.PND
Inflow Hydrograph: c:\ppd\0990018\offsite\OS3D34 .HYD
Outflow Hydrograph: c:\ppd\0990018\offsite\OUT .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
11.000	10.00	-----	0.0	0.0	0.00	125.00
11.100	11.00	21.0	21.0	21.0	0.00	126.43
11.200	13.00	24.0	45.0	45.0	0.00	127.25
11.300	14.00	27.0	72.0	72.0	0.00	127.56
11.400	16.00	30.0	102.0	102.0	0.00	127.77
11.500	17.00	33.0	89.2	135.0	22.88	127.83
11.600	19.00	36.0	95.1	125.2	15.09	127.82
11.700	32.00	51.0	82.7	146.1	31.70	127.84
11.800	44.00	76.0	75.1	158.7	41.75	127.85
11.900	57.00	101.0	64.7	176.1	55.71	127.87
12.000	108.00	165.0	32.8	229.7	98.47	127.92
12.100	200.00	308.0	12.3	340.8	164.22	128.12
12.200	263.00	463.0	125.3	475.3	175.01	128.54
12.300	246.00	509.0	265.1	634.3	184.60	128.94
12.400	211.00	457.0	344.1	722.1	188.99	129.13
12.500	170.00	381.0	346.9	725.1	189.14	129.13
2.600	136.00	306.0	281.6	652.9	185.63	128.98
2.700	109.00	245.0	169.9	526.6	178.36	128.68
12.800	90.00	199.0	35.2	368.9	166.83	128.22
12.900	75.00	165.0	50.4	200.2	74.93	127.89
13.000	61.00	136.0	58.6	186.4	63.87	127.88
13.100	53.00	114.0	66.8	172.6	52.91	127.87
13.200	45.00	98.0	71.5	164.8	46.67	127.86
13.300	41.00	86.0	75.8	157.5	40.81	127.85
13.400	37.00	78.0	78.0	153.8	37.92	127.85
13.500	34.00	71.0	80.9	149.0	34.06	127.84
13.600	30.00	64.0	83.3	144.9	30.77	127.84
13.700	28.00	58.0	85.5	141.3	27.94	127.83
13.800	26.00	54.0	86.6	139.5	26.44	127.83
13.900	24.00	50.0	88.3	136.6	24.14	127.83
14.000	23.00	47.0	89.1	135.3	23.12	127.83
14.100	22.00	45.0	89.8	134.1	22.13	127.83
14.200	22.00	44.0	90.0	133.8	21.92	127.83
14.300	21.00	43.0	90.5	133.0	21.25	127.83
14.400	20.00	41.0	91.4	131.5	20.05	127.82
14.500	19.00	39.0	92.0	130.4	19.17	127.82
14.600	18.00	37.0	92.8	129.0	18.10	127.82
14.700	18.00	36.0	92.9	128.8	17.94	127.82
14.800	17.00	35.0	93.5	127.9	17.24	127.82
14.900	16.00	33.0	94.3	126.5	16.06	127.82
15.000	16.00	32.0	94.4	126.3	15.96	127.82
15.100	16.00	32.0	94.4	126.4	16.02	127.82
5.200	15.00	31.0	95.0	125.4	15.19	127.82
15.300	15.00	30.0	95.2	125.0	14.89	127.82
15.400	14.00	29.0	95.7	124.2	14.27	127.82

Pond File: c:\ppd\0990018\offsite\AREA3236.PND
Inflow Hydrograph: c:\ppd\0990018\offsite\OS3D34 .HYD
Outflow Hydrograph: c:\ppd\0990018\offsite\OUT .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
15.500	14.00	28.0	96.0	123.7	13.84	127.82
15.600	14.00	28.0	95.8	124.0	14.10	127.82
15.700	14.00	28.0	95.9	123.8	13.94	127.82
15.800	13.00	27.0	96.4	122.9	13.24	127.82
15.900	13.00	26.0	96.7	122.4	12.86	127.82
16.000	13.00	26.0	96.6	122.7	13.08	127.82
16.100	13.00	26.0	96.7	122.6	12.95	127.82
16.200	12.00	25.0	97.2	121.7	12.23	127.82
16.300	12.00	24.0	97.5	121.2	11.86	127.81
16.400	11.00	23.0	97.9	120.5	11.28	127.81
16.500	11.00	22.0	98.2	119.9	10.83	127.81
16.600	11.00	22.0	98.0	120.2	11.10	127.81
16.700	11.00	22.0	98.2	120.0	10.94	127.81
16.800	10.00	21.0	98.7	119.2	10.24	127.81
16.900	10.00	20.0	99.0	118.7	9.86	127.81
17.000	10.00	20.0	98.8	119.0	10.08	127.81
17.100	10.00	20.0	98.9	118.8	9.95	127.81
17.200	10.00	20.0	98.8	118.9	10.03	127.81
17.300	10.00	20.0	98.9	118.8	9.98	127.81
17.400	10.00	20.0	98.9	118.9	10.01	127.81
17.500	10.00	20.0	98.9	118.9	9.99	127.81
17.600	10.00	20.0	98.9	118.9	10.00	127.81
17.700	10.00	20.0	98.9	118.9	10.00	127.81
17.800	10.00	20.0	98.9	118.9	10.00	127.81
17.900	10.00	20.0	98.9	118.9	10.00	127.81
18.000	10.00	20.0	98.9	118.9	10.00	127.81
18.100	10.00	20.0	98.9	118.9	10.00	127.81
18.200	10.00	20.0	98.9	118.9	10.00	127.81
18.300	10.00	20.0	98.9	118.9	10.00	127.81
18.400	10.00	20.0	98.9	118.9	10.00	127.81
18.500	10.00	20.0	98.9	118.9	10.00	127.81
18.600	9.00	19.0	99.5	117.9	9.20	127.81
18.700	9.00	18.0	99.7	117.5	8.88	127.81
18.800	9.00	18.0	99.6	117.7	9.07	127.81
18.900	9.00	18.0	99.6	117.6	8.96	127.81
19.000	9.00	18.0	99.6	117.6	9.03	127.81
19.100	9.00	18.0	99.6	117.6	8.98	127.81
19.200	9.00	18.0	99.6	117.6	9.01	127.81
19.300	8.00	17.0	100.2	116.6	8.20	127.81
19.400	8.00	16.0	100.4	116.2	7.88	127.81
19.500	8.00	16.0	100.3	116.4	8.07	127.81
19.600	8.00	16.0	100.4	116.3	7.96	127.81
19.700	8.00	16.0	100.3	116.4	8.02	127.81
19.800	7.00	15.0	101.0	115.3	7.19	127.81
19.900	7.00	14.0	101.2	115.0	6.89	127.81
20.000	7.00	14.0	101.1	115.2	7.07	127.81

POND-2 Version: 5.17 S/N:
EXECUTED: 06-14-1994 13:39:08

nd File: c:\ppd\0990018\offsite\AREA3236.PND
Inflow Hydrograph: c:\ppd\0990018\offsite\OS3D34 .HYD
Outflow Hydrograph: c:\ppd\0990018\offsite\OUT .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
20.100	7.00	14.0	101.1	115.1	6.96	127.81
20.200	7.00	14.0	101.1	115.1	7.02	127.81
20.300	7.00	14.0	101.1	115.1	6.99	127.81
20.400	7.00	14.0	101.1	115.1	7.01	127.81
20.500	7.00	14.0	101.1	115.1	6.99	127.81
20.600	7.00	14.0	101.1	115.1	7.00	127.81
20.700	7.00	14.0	101.1	115.1	7.00	127.81
20.800	7.00	14.0	101.1	115.1	7.00	127.81
20.900	7.00	14.0	101.1	115.1	7.00	127.81
21.000	6.00	13.0	101.7	114.1	6.20	127.81
21.100	6.00	12.0	101.9	113.7	5.88	127.81
21.200	6.00	12.0	101.8	113.9	6.07	127.81
21.300	6.00	12.0	101.9	113.8	5.96	127.81
21.400	6.00	12.0	101.8	113.9	6.03	127.81
21.500	6.00	12.0	101.9	113.8	5.98	127.81
21.600	6.00	12.0	101.8	113.9	6.01	127.81
`1.700	6.00	12.0	101.9	113.8	5.99	127.81
‿1.800	6.00	12.0	101.9	113.9	6.00	127.81
21.900	6.00	12.0	101.9	113.9	6.00	127.81
22.000	6.00	12.0	101.9	113.9	6.00	127.81
22.100	6.00	12.0	101.9	113.9	6.00	127.81
22.200	6.00	12.0	101.9	113.9	6.00	127.81
22.300	6.00	12.0	101.9	113.9	6.00	127.81
22.400	5.00	11.0	102.4	112.9	5.20	127.81
22.500	5.00	10.0	102.7	112.4	4.88	127.81
22.600	5.00	10.0	102.5	112.7	5.07	127.81
22.700	5.00	10.0	102.6	112.5	4.96	127.81
22.800	5.00	10.0	102.6	112.6	5.03	127.81
22.900	5.00	10.0	102.6	112.6	4.98	127.81
23.000	4.00	9.0	103.2	111.6	4.21	127.81
23.100	4.00	8.0	103.4	111.2	3.87	127.80
23.200	4.00	8.0	103.3	111.4	4.07	127.81
23.300	4.00	8.0	103.4	111.3	3.96	127.80
23.400	4.00	8.0	103.3	111.4	4.03	127.80
23.500	4.00	8.0	103.4	111.3	3.98	127.80
23.600	4.00	8.0	103.3	111.4	4.01	127.80
23.700	3.00	7.0	103.9	110.3	3.20	127.80
23.800	3.00	6.0	104.2	109.9	2.88	127.80
23.900	3.00	6.0	104.0	110.2	3.07	127.80
24.000	3.00	6.0	104.1	110.0	2.96	127.80
24.100	3.00	6.0	104.1	110.1	3.02	127.80
?4.200	3.00	6.0	104.1	110.1	2.99	127.80
4.300	3.00	6.0	104.1	110.1	3.01	127.80
24.400	2.00	5.0	104.7	109.1	2.20	127.80
24.500	2.00	4.0	104.9	108.7	1.88	127.80
24.600	2.00	4.0	104.8	108.9	2.07	127.80

nd File: c:\ppd\0990018\offsite\AREA3236.PND
Inflow Hydrograph: c:\ppd\0990018\offsite\OS3D34 .HYD
Outflow Hydrograph: c:\ppd\0990018\offsite\OUT .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
24.700	2.00	4.0	104.9	108.8	1.96	127.80
24.800	2.00	4.0	104.8	108.9	2.02	127.80
24.900	2.00	4.0	104.9	108.8	1.99	127.80
25.000	2.00	4.0	104.8	108.9	2.01	127.80
25.100	1.00	3.0	105.4	107.8	1.20	127.80
25.200	1.00	2.0	105.7	107.4	0.88	127.80
25.300	1.00	2.0	105.5	107.7	1.07	127.80
25.400	1.00	2.0	105.6	107.5	0.96	127.80
25.500	1.00	2.0	105.6	107.6	1.02	127.80
25.600	1.00	2.0	105.6	107.6	0.99	127.80
25.700	0.00	1.0	106.2	106.6	0.21	127.80
25.800	0.00	0.0	106.2	106.2	0.00	127.80
25.900	0.00	0.0	106.2	106.2	0.00	127.80

****************** SUMMARY OF ROUTING COMPUTATIONS ******************

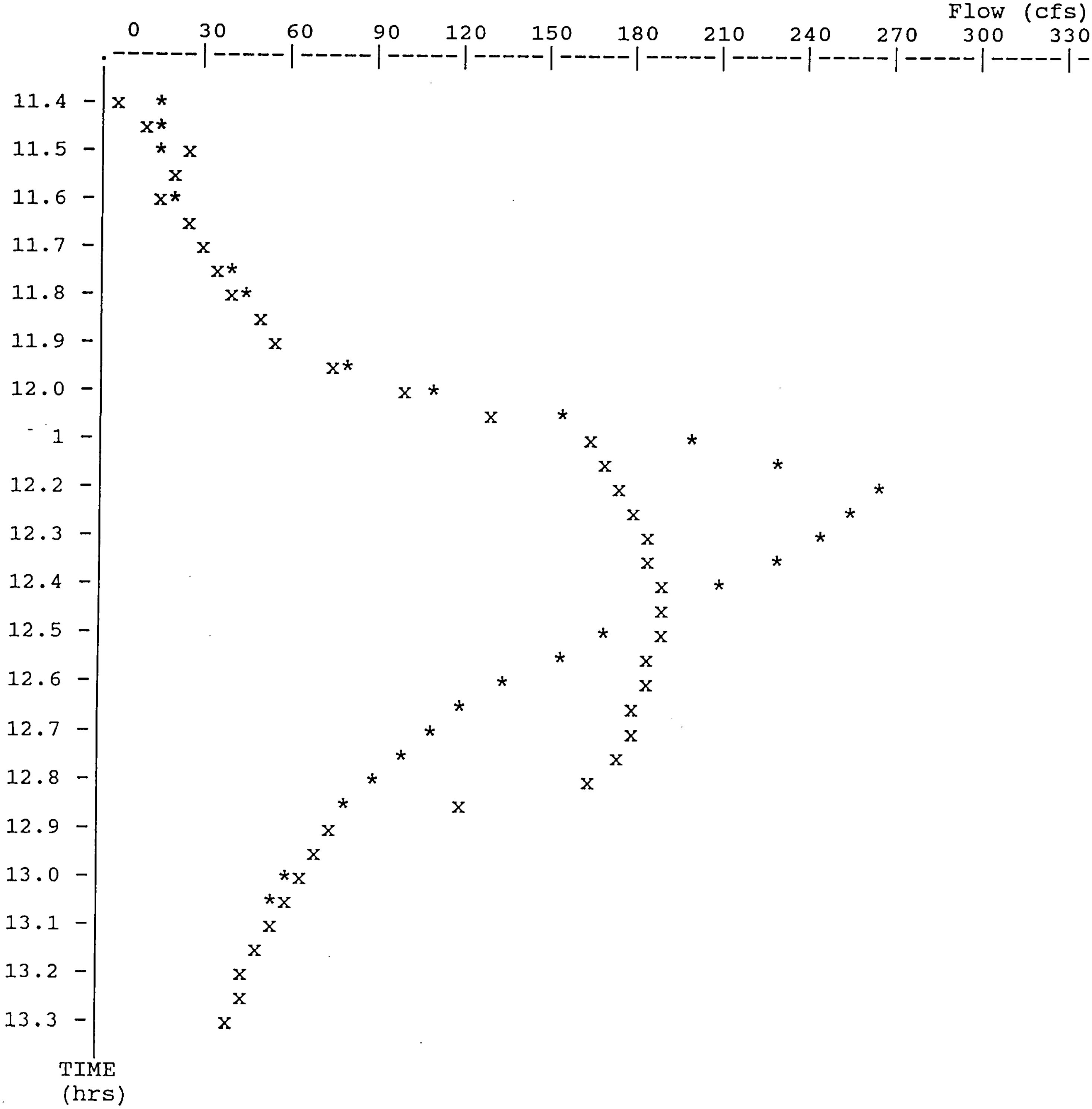
```
Pond File:           c:\ppd\0990018\offsite\AREA3236.PND
Inflow Hydrograph:   c:\ppd\0990018\offsite\OS3D34   .HYD
Outflow Hydrograph:  c:\ppd\0990018\offsite\OUT      .HYD

Starting Pond W.S. Elevation =   125.00 ft

        ***** Summary of Peak Outflow and Peak Elevation *****

                   Peak Inflow    =   263.00 cfs
                   Peak Outflow   =   189.14 cfs
                   Peak Elevation =   129.13 ft

         ***** Summary of Approximate Peak Storage *****

              Initial Storage          =     0.00 ac-ft
              Peak Storage From Storm  =     2.21 ac-ft
                                          ---------------
              Total Storage in Pond    =     2.21 ac-ft

       Warning: Inflow hydrograph truncated on left side.
```

POND-2 Version: 5.17 S/N: Page 8

Pond File: c:\ppd\0990018\offsite\AREA3236.PND
Inflow Hydrograph: c:\ppd\0990018\offsite\OS3D34 .HYD
Outflow Hydrograph: c:\ppd\0990018\offsite\OUT .HYD

EXECUTED: 06-14-1994
13:39:08

Peak Inflow = 263.00 cfs
Peak Outflow = 189.14 cfs
Peak Elevation = 129.13 ft



* File: c:\ppd\0990018\offsite\OS3D34 .HYD Qmax = 263.0 cfs
x File: c:\ppd\0990018\offsite\OUT .HYD Qmax = 189.1 cfs

TR-55 TABULAR HYDROGRAPH METHOD
Type II Distribution
(24 hr. Duration Storm)

Executed: 06-15-1994 14:04:32
Watershed file: --> c:\ppd\0990018\offsite\OS23D34 .WSD
Hydrograph file: --> c:\ppd\0990018\offsite\OS23D34 .HYD

Downchutes 3 and 4
Offsite Subsheds 2 and 3 (Previously calculated)

>>>> Input Parameters Used to Compute Hydrograph <<<<

Subarea Description	AREA (acres)	CN	Tc (hrs)	* Tt (hrs)	Precip. (in)	Runoff (in)	Ia/p input/used
Downchute 3	17.70	74.0	0.40	0.00	8.40	5.28	.08 .10
Downchute 3	14.80	74.0	0.20	0.00	8.40	5.28	.08 .10
Downchute 4	11.80	74.0	0.40	0.00	8.40	5.28	.08 .10
Downchute 4	6.00	74.0	0.20	0.00	8.40	5.28	.08 .10
Offsite Area 2	19.20	55.0	0.50	0.00	8.40	3.06	.19 .10
Offsite Area 3	20.10	55.0	0.75	0.00	8.40	3.06	.19 .10

* Travel time from subarea outfall to composite watershed outfall point.
Total area = 89.60 acres or 0.14000 sq.mi
Peak discharge = 291 cfs

>>>> Computer Modifications of Input Parameters <<<<<

Subarea Description	Input Values Tc (hr)	Input Values * Tt (hr)	Rounded Values Tc (hr)	Rounded Values * Tt (hr)	Ia/p Interpolated (Yes/No)	Ia/p Messages
Downchute 3	0.42	0.00	0.40	0.00	No	Computed Ia/p < .1
Downchute 3	0.20	0.00	**	**	No	Computed Ia/p < .1
Downchute 4	0.39	0.00	0.40	0.00	No	Computed Ia/p < .1
Downchute 4	0.23	0.00	0.20	0.00	No	Computed Ia/p < .1
Offsite Area 2	0.62	0.00	0.50	0.00	No	--
Offsite Area 3	0.65	0.00	0.75	0.00	No	--

* Travel time from subarea outfall to composite watershed outfall point.
** Tc & Tt are available in the hydrograph tables.

TR-55 TABULAR HYDROGRAPH METHOD
Type II Distribution
(24 hr. Duration Storm)

Executed: 06-15-1994 14:04:32
Watershed file: --> c:\ppd\0990018\offsite\OS23D34 .WSD
Hydrograph file: --> c:\ppd\0990018\offsite\OS23D34 .HYD

Downchutes 3 and 4
Offsite Subsheds 2 and 3 (Previously calculated)

>>>> Summary of Subarea Times to Peak <<<<

Subarea	Peak Discharge at Composite Outfall (cfs)	Time to Peak at Composite Outfall (hrs)
Downchute 3	86	12.3
Downchute 3	98	12.2
Downchute 4	58	12.3
Downchute 4	40	12.2
Offsite Area 2	49	12.4
Offsite Area 3	41	12.6
Composite Watershed	291	12.2

TR-55 TABULAR HYDROGRAPH METHOD
Type II Distribution
(24 hr. Duration Storm)

Executed: 06-15-1994 14:04:32
Watershed file: --> c:\ppd\0990018\offsite\OS23D34 .WSD
Hydrograph file: --> c:\ppd\0990018\offsite\OS23D34 .HYD

Downchutes 3 and 4
Offsite Subsheds 2 and 3 (Previously calculated)

Composite Hydrograph Summary (cfs)

Subarea Description	11.0 hr	11.3 hr	11.6 hr	11.9 hr	12.0 hr	12.1 hr	12.2 hr	12.3 hr	12.4 hr
Downchute 3	3	4	5	11	21	40	68	86	84
Downchute 3	3	4	6	26	49	90	98	59	31
Downchute 4	2	2	4	7	14	26	46	58	56
Downchute 4	1	2	2	10	20	37	40	24	12
Offsite Area 2	2	2	3	5	9	16	28	43	49
Offsite Area 3	1	2	2	3	4	7	11	19	28
Total (cfs)	12	16	22	62	117	216	291	289	260

Subarea Description	12.5 hr	12.6 hr	12.7 hr	12.8 hr	13.0 hr	13.2 hr	13.4 hr	13.6 hr	13.8 hr
Downchute 3	63	44	32	24	15	11	9	8	7
Downchute 3	20	16	12	11	9	7	7	6	5
Downchute 4	42	29	21	16	10	7	6	5	5
Downchute 4	8	6	5	4	3	3	3	2	2
Offsite Area 2	47	37	27	21	13	9	7	6	5
Offsite Area 3	37	41	39	35	24	17	12	9	7
Total (cfs)	217	173	136	111	74	54	44	36	31

TR-55 TABULAR HYDROGRAPH METHOD
Type II Distribution
(24 hr. Duration Storm)

Executed: 06-15-1994 14:04:32
Watershed file: --> c:\ppd\0990018\offsite\OS23D34 .WSD
Hydrograph file: --> c:\ppd\0990018\offsite\OS23D34 .HYD

Downchutes 3 and 4
Offsite Subsheds 2 and 3 (Previously calculated)

Composite Hydrograph Summary (cfs)

Subarea Description	14.0 hr	14.3 hr	14.6 hr	15.0 hr	15.5 hr	16.0 hr	16.5 hr	17.0 hr	17.5 hr
Downchute 3	6	6	5	5	4	4	3	3	3
Downchute 3	5	4	4	4	3	3	3	2	2
Downchute 4	4	4	3	3	3	2	2	2	2
Downchute 4	2	2	2	1	1	1	1	1	1
Offsite Area 2	4	4	3	3	3	2	2	2	2
Offsite Area 3	6	5	4	3	3	3	2	2	2
:al (cfs)	27	25	21	19	17	15	13	12	12

Subarea Description	18.0 hr	19.0 hr	20.0 hr	22.0 hr	26.0 hr
Downchute 3	3	2	2	2	0
Downchute 3	2	2	2	1	0
Downchute 4	2	2	1	1	0
Downchute 4	1	1	1	1	0
Offsite Area 2	2	1	1	1	0
Offsite Area 3	2	2	1	1	0
Total (cfs)	12	10	8	7	0

TR-55 TABULAR HYDROGRAPH METHOD
Type II Distribution
(24 hr. Duration Storm)

Executed: 06-15-1994 14:04:32
Watershed file: --> c:\ppd\0990018\offsite\OS23D34 .WSD
Hydrograph file: --> c:\ppd\0990018\offsite\OS23D34 .HYD

Downchutes 3 and 4
Offsite Subsheds 2 and 3 (Previously calculated)

Time (hrs)	Flow (cfs)	Time (hrs)	Flow (cfs)
11.0	12	14.8	20
11.1	13	14.9	20
11.2	15	15.0	19
11.3	16	15.1	19
11.4	18	15.2	18
11.5	20	15.3	18
11.6	22	15.4	17
11.7	35	15.5	17
11.8	49	15.6	17
11.9	62	15.7	16
12.0	117	15.8	16
12.1	216	15.9	15
12.2	291	16.0	15
12.3	289	16.1	15
12.4	260	16.2	14
12.5	217	16.3	14
12.6	173	16.4	13
12.7	136	16.5	13
12.8	111	16.6	13
12.9	92	16.7	13
13.0	74	16.8	12
13.1	64	16.9	12
13.2	54	17.0	12
13.3	49	17.1	12
13.4	44	17.2	12
13.5	40	17.3	12
13.6	36	17.4	12
13.7	34	17.5	12
13.8	31	17.6	12
13.9	29	17.7	12
14.0	27	17.8	12
14.1	26	17.9	12
14.2	26	18.0	12
14.3	25	18.1	12
14.4	24	18.2	12
14.5	22	18.3	11
14.6	21	18.4	11

TR-55 TABULAR HYDROGRAPH METHOD
Type II Distribution
(24 hr. Duration Storm)

Executed: 06-15-1994 14:04:32
Watershed file: --> c:\ppd\0990018\offsite\OS23D34 .WSD
Hydrograph file: --> c:\ppd\0990018\offsite\OS23D34 .HYD

Downchutes 3 and 4
Offsite Subsheds 2 and 3 (Previously calculated)

Time (hrs)	Flow (cfs)
18.6	11
18.7	11
18.8	10
18.9	10
19.0	10
19.1	10
19.2	10
19.3	9
19.4	9
19.5	9
19.6	9
19.7	9
19.8	8
19.9	8
20.0	8
20.1	8
20.2	8
20.3	8
20.4	8
20.5	8
20.6	8
20.7	8
20.8	8
20.9	8
21.0	8
21.1	7
21.2	7
21.3	7
21.4	7
21.5	7
21.6	7
21.7	7
21.8	7
21.9	7
22.0	7
22.1	7
22.2	7
22.3	6

Time (hrs)	Flow (cfs)
22.4	6
22.5	6
22.6	6
22.7	6
22.8	6
22.9	5
23.0	5
23.1	5
23.2	5
23.3	5
23.4	5
23.5	4
23.6	4
23.7	4
23.8	4
23.9	4
24.0	4
24.1	3
24.2	3
24.3	3
24.4	3
24.5	3
24.6	2
24.7	2
24.8	2
24.9	2
25.0	2
25.1	2
25.2	1
25.3	1
25.4	1
25.5	1
25.6	1
25.7	1
25.8	0
25.9	0

POND-2 Version: 5.17
S/N:

Offsite Area 2

CALCULATED 04-04-1994 18:30:23
DISK FILE: c:\ppd\0990018\offsite\AREA2 .VOL

Planimeter scale: 1 inch = 200 ft.

Elevation (ft)	Planimeter (sq.in.)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	* Volume (acre-ft)	Volume Sum (acre-ft)
120.00	0.02	0.02	0.00	0.00	0.00
121.00	0.03	0.03	0.07	0.02	0.02
122.00	0.03	0.03	0.08	0.03	0.05
123.00	0.03	0.03	0.08	0.03	0.08
124.00	0.07	0.06	0.13	0.04	0.12
125.00	0.20	0.18	0.36	0.12	0.24
126.00	0.40	0.37	0.81	0.27	0.51
127.00	0.68	0.62	1.47	0.49	1.00
128.00	1.00	0.92	2.30	0.77	1.77
129.00	1.64	1.51	3.60	1.20	2.97
130.00	3.31	3.04	6.68	2.23	5.20

* Incremental volume computed by the Conic Method for Reservoir Volumes.

Outlet Structure File: AREA23B .STR

POND-2 Version: 5.17 S/N:
Date Executed: Time Executed:

****
Offsite Areas 2 and 3
Downchutes 3 and 4
Existing 36" Dia. RCP
(S-22)
****

***** COMPOSITE OUTFLOW SUMMARY ****

Elevation (ft)	Q (cfs)	Contributing Structures
121.00	0.0	
121.50	0.0	
122.00	0.0	
122.50	0.0	
123.00	0.0	
123.50	0.0	
124.00	80.6	1
124.50	87.0	1
125.00	93.0	1
125.50	98.7	1
126.00	104.0	1
126.50	109.1	1
127.00	113.9	1
127.50	118.6	1
128.00	123.1	1
128.50	127.4	1
129.00	131.6	1
129.50	135.6	1
130.00	139.5	1

Outlet Structure File: AREA23B .STR

POND-2 Version: 5.17 S/N:
Date Executed: Time Executed:

****
Offsite Areas 2 and 3
Downchutes 3 and 4
Existing 36" Dia. RCP
(S-22)
****

Outlet Structure File: c:\ppd\0990018\offsite\AREA23B .STR
Planimeter Input File: c:\ppd\0990018\offsite\AREA23 .VOL
Rating Table Output File: c:\ppd\0990018\offsite\AREA23B .PND

Min. Elev.(ft) = 121 Max. Elev.(ft) = 129.999 Incr.(ft) = .5

Additional elevations (ft) to be included in table:
* *

****
SYSTEM CONNECTIVITY
****

Structure	No.	Q Table	Q Table
ORIFICE-VC	1	->	1

Outflow rating table summary was stored in file:
c:\ppd\0990018\offsite\AREA23B .PND

```
**************************
*                        *
*  Offsite Areas 2 and 3 *
*   Downchutes 3 and 4   *
*                        *
*         (S-22)         *
*                        *
**************************
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Inflow Hydrograph: c:\ppd\0990018\offsite\OS23D34 .HYD
Rating Table file: c:\ppd\0990018\offsite\AREA23B .PND

----INITIAL CONDITIONS----
Elevation = 121.00 ft
Outflow = 0.00 cfs
Storage = 0.02 ac-ft

GIVEN POND DATA			INTERMEDIATE ROUTING COMPUTATIONS	
ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (ac-ft)	2S/t (cfs)	2S/t + 0 (cfs)
121.00	0.0	0.023	5.5	5.5
121.50	0.0	0.037	8.9	8.9
122.00	0.0	0.050	12.2	12.2
122.50	0.0	0.064	15.5	15.5
123.00	0.0	0.078	18.9	18.9
123.50	0.0	0.096	23.1	23.1
124.00	80.6	0.123	29.7	110.3
124.50	87.0	0.171	41.4	128.4
125.00	93.0	0.261	63.2	156.2
125.50	98.7	0.398	96.4	195.1
126.00	104.0	0.586	141.9	245.9
126.50	109.1	0.837	202.5	311.6
127.00	113.9	1.163	281.4	395.3
127.50	118.6	1.651	399.6	518.2
128.00	123.1	2.427	587.3	710.4
128.50	127.4	3.529	853.9	981.3
129.00	131.6	4.984	1206.1	1337.7
129.50	135.6	6.942	1679.9	1815.5
130.00	139.5	9.583	2319.0	2458.5

Time increment (t) = 0.100 hrs.

ond File: c:\ppd\0990018\offsite\AREA23B .PND
Inflow Hydrograph: c:\ppd\0990018\offsite\OS23D34 .HYD
Outflow Hydrograph: c:\ppd\0990018\offsite\OUT .HYD

INFLOW HYDROGRAPH / ROUTING COMPUTATIONS

TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
11.000	12.00	-----	5.5	5.5	0.00	121.00
11.100	13.00	25.0	16.9	30.5	6.82	123.54
11.200	15.00	28.0	4.7	44.9	20.10	123.62
11.300	16.00	31.0	12.5	35.7	11.58	123.57
11.400	18.00	34.0	3.3	46.5	21.61	123.63
11.500	20.00	38.0	7.7	41.3	16.78	123.60
11.600	22.00	42.0	0.5	49.7	24.59	123.65
11.700	35.00	57.0	-6.1	57.5	31.83	123.70
11.800	49.00	84.0	-23.4	77.9	50.65	123.81
11.900	62.00	111.0	-31.7	87.6	59.62	123.87
12.000	117.00	179.0	-34.9	147.3	91.09	124.84
12.100	216.00	333.0	82.0	298.1	108.06	126.40
12.200	291.00	507.0	348.5	589.0	120.26	127.68
12.300	289.00	580.0	675.4	928.5	126.56	128.40
12.400	260.00	549.0	963.9	1224.4	130.26	128.84
12.500	217.00	477.0	1175.9	1440.9	132.46	129.11
12.600	173.00	390.0	1298.9	1565.9	133.51	129.24
12.700	136.00	309.0	1340.2	1607.9	133.86	129.28
12.800	111.00	247.0	1319.8	1587.2	133.69	129.26
12.900	92.00	203.0	1256.5	1522.8	133.15	129.19
13.000	74.00	166.0	1157.9	1422.5	132.31	129.09
13.100	64.00	138.0	1033.7	1295.9	131.11	128.94
13.200	54.00	118.0	892.9	1151.7	129.41	128.74
13.300	49.00	103.0	740.7	995.9	127.57	128.52
13.400	44.00	93.0	583.6	833.7	125.06	128.23
13.500	40.00	84.0	423.4	667.6	122.10	127.89
13.600	36.00	76.0	263.7	499.4	117.88	127.42
13.700	34.00	70.0	112.9	333.7	110.37	126.63
13.800	31.00	65.0	-14.4	177.9	96.18	125.28
13.900	29.00	60.0	4.1	45.6	20.73	123.63
14.000	27.00	56.0	-8.3	60.1	34.18	123.71
14.100	26.00	53.0	4.8	44.7	19.97	123.62
14.200	26.00	52.0	-5.5	56.8	31.13	123.69
14.300	25.00	51.0	4.1	45.5	20.71	123.63
14.400	24.00	49.0	-2.3	53.1	27.72	123.67
14.500	22.00	46.0	5.7	43.7	18.98	123.62
14.600	21.00	43.0	1.4	48.7	23.64	123.65
14.700	20.00	41.0	6.8	42.4	17.83	123.61
14.800	20.00	40.0	3.1	46.8	21.85	123.64
14.900	20.00	40.0	6.2	43.1	18.43	123.61
15.000	19.00	39.0	4.4	45.2	20.41	123.63
15.100	19.00	38.0	6.8	42.4	17.80	123.61
15.200	18.00	37.0	5.6	43.8	19.10	123.62
15.300	18.00	36.0	7.5	41.6	17.07	123.61
15.400	17.00	35.0	6.7	42.5	17.87	123.61

ond File: c:\ppd\0990018\offsite\AREA23B .PND
Inflow Hydrograph: c:\ppd\0990018\offsite\OS23D34 .HYD
Outflow Hydrograph: c:\ppd\0990018\offsite\OUT .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
15.500	17.00	34.0	8.2	40.7	16.26	123.60
15.600	17.00	34.0	6.9	42.2	17.63	123.61
15.700	16.00	33.0	8.9	39.9	15.54	123.60
15.800	16.00	32.0	8.1	40.9	16.39	123.60
15.900	15.00	31.0	9.6	39.1	14.74	123.59
16.000	15.00	30.0	9.2	39.6	15.22	123.59
16.100	15.00	30.0	9.5	39.2	14.81	123.59
16.200	14.00	29.0	10.1	38.5	14.23	123.59
16.300	14.00	28.0	10.5	38.1	13.80	123.59
16.400	13.00	27.0	11.0	37.5	13.24	123.58
16.500	13.00	26.0	11.4	37.0	12.79	123.58
16.600	13.00	26.0	11.0	37.4	13.18	123.58
16.700	13.00	26.0	11.3	37.0	12.85	123.58
16.800	12.00	25.0	11.9	36.3	12.20	123.58
16.900	12.00	24.0	12.3	35.9	11.83	123.57
17.000	12.00	24.0	12.0	36.3	12.15	123.58
17.100	12.00	24.0	12.2	36.0	11.88	123.57
17.200	12.00	24.0	12.0	36.2	12.11	123.58
17.300	12.00	24.0	12.2	36.0	11.91	123.57
17.400	12.00	24.0	12.0	36.2	12.08	123.57
17.500	12.00	24.0	12.2	36.0	11.93	123.57
17.600	12.00	24.0	12.1	36.2	12.06	123.57
17.700	12.00	24.0	12.2	36.1	11.95	123.57
17.800	12.00	24.0	12.1	36.2	12.04	123.57
17.900	12.00	24.0	12.1	36.1	11.97	123.57
18.000	12.00	24.0	12.1	36.1	12.03	123.57
18.100	12.00	24.0	12.1	36.1	11.98	123.57
18.200	12.00	24.0	12.1	36.1	12.02	123.57
18.300	11.00	23.0	13.0	35.1	11.06	123.57
18.400	11.00	22.0	13.1	35.0	10.95	123.57
18.500	11.00	22.0	13.0	35.1	11.04	123.57
18.600	11.00	22.0	13.1	35.0	10.96	123.57
18.700	11.00	22.0	13.0	35.1	11.03	123.57
18.800	10.00	21.0	13.9	34.0	10.05	123.56
18.900	10.00	20.0	14.0	33.9	9.96	123.56
19.000	10.00	20.0	13.9	34.0	10.04	123.56
19.100	10.00	20.0	14.0	33.9	9.97	123.56
19.200	10.00	20.0	13.9	34.0	10.03	123.56
19.300	9.00	19.0	14.8	32.9	9.05	123.56
19.400	9.00	18.0	14.9	32.8	8.96	123.56
19.500	9.00	18.0	14.8	32.9	9.04	123.56
19.600	9.00	18.0	14.9	32.8	8.97	123.56
9.700	9.00	18.0	14.8	32.9	9.03	123.56
19.800	8.00	17.0	15.7	31.8	8.05	123.55
19.900	8.00	16.0	15.8	31.7	7.96	123.55
20.000	8.00	16.0	15.8	31.8	8.04	123.55

ond File: c:\ppd\0990018\offsite\AREA23B .PND
Inflow Hydrograph: c:\ppd\0990018\offsite\OS23D34 .HYD
Outflow Hydrograph: c:\ppd\0990018\offsite\OUT .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
20.100	8.00	16.0	15.8	31.8	7.97	123.55
20.200	8.00	16.0	15.8	31.8	8.03	123.55
20.300	8.00	16.0	15.8	31.8	7.98	123.55
20.400	8.00	16.0	15.8	31.8	8.02	123.55
20.500	8.00	16.0	15.8	31.8	7.98	123.55
20.600	8.00	16.0	15.8	31.8	8.01	123.55
20.700	8.00	16.0	15.8	31.8	7.99	123.55
20.800	8.00	16.0	15.8	31.8	8.01	123.55
20.900	8.00	16.0	15.8	31.8	7.99	123.55
21.000	8.00	16.0	15.8	31.8	8.01	123.55
21.100	7.00	15.0	16.6	30.8	7.07	123.54
21.200	7.00	14.0	16.8	30.6	6.94	123.54
21.300	7.00	14.0	16.7	30.8	7.05	123.54
21.400	7.00	14.0	16.7	30.7	6.96	123.54
21.500	7.00	14.0	16.7	30.7	7.04	123.54
21.600	7.00	14.0	16.7	30.7	6.97	123.54
21.700	7.00	14.0	16.7	30.7	7.03	123.54
21.800	7.00	14.0	16.7	30.7	6.98	123.54
21.900	7.00	14.0	16.7	30.7	7.02	123.54
22.000	7.00	14.0	16.7	30.7	6.98	123.54
22.100	7.00	14.0	16.7	30.7	7.01	123.54
22.200	7.00	14.0	16.7	30.7	6.99	123.54
22.300	6.00	13.0	17.5	29.7	6.08	123.54
22.400	6.00	12.0	17.7	29.5	5.93	123.54
22.500	6.00	12.0	17.6	29.7	6.06	123.54
22.600	6.00	12.0	17.7	29.6	5.95	123.54
22.700	6.00	12.0	17.6	29.7	6.04	123.54
22.800	6.00	12.0	17.7	29.6	5.96	123.54
22.900	5.00	11.0	18.4	28.7	5.11	123.53
23.000	5.00	10.0	18.6	28.4	4.91	123.53
23.100	5.00	10.0	18.5	28.6	5.08	123.53
23.200	5.00	10.0	18.6	28.5	4.93	123.53
23.300	5.00	10.0	18.5	28.6	5.06	123.53
23.400	5.00	10.0	18.6	28.5	4.95	123.53
23.500	4.00	9.0	19.4	27.6	4.12	123.53
23.600	4.00	8.0	19.6	27.4	3.90	123.52
23.700	4.00	8.0	19.4	27.6	4.08	123.53
23.800	4.00	8.0	19.5	27.4	3.93	123.52
23.900	4.00	8.0	19.4	27.5	4.06	123.53
24.000	4.00	8.0	19.5	27.4	3.95	123.52
24.100	3.00	7.0	20.3	26.5	3.12	123.52
24.200	3.00	6.0	20.5	26.3	2.90	123.52
4.300	3.00	6.0	20.3	26.5	3.09	123.52
24.400	3.00	6.0	20.5	26.3	2.93	123.52
24.500	3.00	6.0	20.3	26.5	3.06	123.52
24.600	2.00	5.0	21.3	25.3	2.02	123.51

ond File: c:\ppd\0990018\offsite\AREA23B .PND
Inflow Hydrograph: c:\ppd\0990018\offsite\OS23D34 .HYD
Outflow Hydrograph: c:\ppd\0990018\offsite\OUT .HYD

INFLOW HYDROGRAPH | ROUTING COMPUTATIONS

TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
24.700	2.00	4.0	21.3	25.3	1.98	123.51
24.800	2.00	4.0	21.3	25.3	2.02	123.51
24.900	2.00	4.0	21.3	25.3	1.99	123.51
25.000	2.00	4.0	21.3	25.3	2.01	123.51
25.100	2.00	4.0	21.3	25.3	1.99	123.51
25.200	1.00	3.0	22.1	24.3	1.08	123.51
25.300	1.00	2.0	22.3	24.1	0.93	123.51
25.400	1.00	2.0	22.2	24.3	1.06	123.51
25.500	1.00	2.0	22.3	24.2	0.95	123.51
25.600	1.00	2.0	22.2	24.3	1.04	123.51
25.700	1.00	2.0	22.3	24.2	0.96	123.51
25.800	0.00	1.0	23.0	23.3	0.11	123.50
25.900	0.00	0.0	23.0	23.0	0.00	123.49

****************** SUMMARY OF ROUTING COMPUTATIONS ******************

```
Pond File:           c:\ppd\0990018\offsite\AREA23B .PND
Inflow Hydrograph:   c:\ppd\0990018\offsite\OS23D34 .HYD
Outflow Hydrograph:  c:\ppd\0990018\offsite\OUT     .HYD

Starting Pond W.S. Elevation =   121.00 ft
```

***** Summary of Peak Outflow and Peak Elevation *****

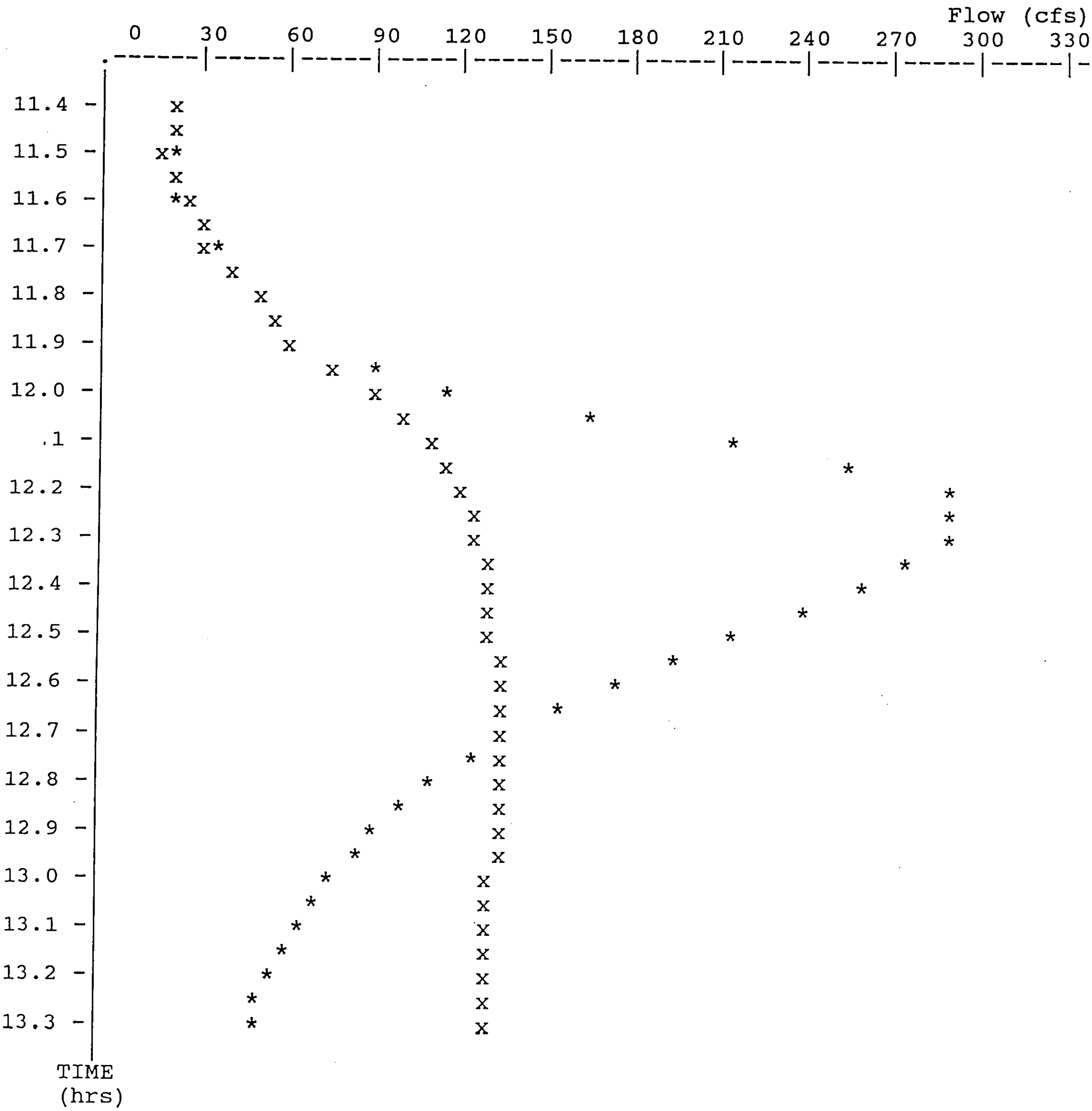
```
Peak Inflow     =   291.00 cfs
Peak Outflow    =   133.86 cfs
Peak Elevation  =   129.28 ft
```

***** Summary of Approximate Peak Storage *****

```
Initial Storage          =     0.02 ac-ft
Peak Storage From Storm  =     6.07 ac-ft
                             ---------------
Total Storage in Pond    =     6.09 ac-ft
```

Warning: Inflow hydrograph truncated on left side.

```
Pond File:            c:\ppd\0990018\offsite\AREA23B  .PND
Inflow Hydrograph:    c:\ppd\0990018\offsite\OS23D34  .HYD
Outflow Hydrograph:   c:\ppd\0990018\offsite\OUT      .HYD
                                                 EXECUTED: 06-15-1994
Peak Inflow    =   291.00 cfs                              14:06:12
Peak Outflow   =   133.86 cfs
Peak Elevation =   129.28 ft
```




```
*  File:  c:\ppd\0990018\offsite\OS23D34 .HYD    Qmax =   291.0 cfs
x  File:  c:\ppd\0990018\offsite\OUT     .HYD    Qmax =   133.9 cfs
```

POND-2 Version: 5.17
S/N:

Offsite Area Nos. 2 and 3
Acting as detention basin

"(Clay Borrow Areas A + B)

CALCULATED 04-04-1994 18:33:16
DISK FILE: c:\ppd\0990018\offsite\AREA3 .VOL

Planimeter scale: 1 inch = 200 ft.

Elevation (ft)	Planimeter (sq.in.)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	* Volume (acre-ft)	Volume Sum (acre-ft)
120.00	0.02	0.02	0.00	0.00	0.00
121.00	0.03	0.03	0.07	0.02	0.02
122.00	0.03	0.03	0.08	0.03	0.05
123.00	0.03	0.03	0.08	0.03	0.08
124.00	0.07	0.06	0.13	0.04	0.12
125.00	0.25	0.23	0.42	0.14	0.26
126.00	0.47	0.43	0.98	0.33	0.59
127.00	0.80	0.73	1.73	0.58	1.16
128.00	2.05	1.88	3.79	1.26	2.43
129.00	3.59	3.30	7.67	2.56	4.98
130.00	6.59	6.05	13.81	4.60	9.59
131.00	4.46	4.10	15.13	5.04	14.63
132.00	6.80	6.24	15.40	5.13	19.76
133.00	8.10	7.44	20.50	6.83	26.60

* Incremental volume computed by the Conic Method for Reservoir Volumes.

Outlet Structure File: AREA23 .STR

POND-2 Version: 5.17 S/N:
Date Executed: Time Executed:

****
Offsite Areas 2 and 3
Downchutes 3 and 4
(Clay Borrow Areas A+B)
****

***** COMPOSITE OUTFLOW SUMMARY ****

Elevation (ft)	Q (cfs)	Contributing Structures
121.00	0.0	
121.50	0.0	
122.00	0.0	
122.50	0.0	
123.00	0.0	
123.50	0.0	
124.00	161.1	1 +2
124.50	174.0	1 +2
125.00	186.1	1 +2
125.50	197.3	1 +2
126.00	208.0	1 +2
126.50	218.2	1 +2
127.00	227.9	1 +2
127.50	237.2	1 +2
128.00	246.1	1 +2
128.50	254.8	1 +2
129.00	263.1	1 +2
129.50	271.2	1 +2
130.00	279.1	1 +2
130.50	286.7	1 +2
131.00	294.2	1 +2
131.50	301.4	1 +2
132.00	308.5	1 +2
132.50	315.5	1 +2
133.00	322.2	1 +2

Outlet Structure File: AREA23 .STR

POND-2 Version: 5.17 S/N:
Date Executed: Time Executed:

****
Offsite Areas 2 and 3
Downchutes 3 and 4
(Clay Borrow Areas A+B)
****

Outlet Structure File: c:\ppd\0990018\offsite\AREA23 .STR
Planimeter Input File: c:\ppd\0990018\offsite\AREA23 .VOL
Rating Table Output File: c:\ppd\0990018\offsite\AREA23 .PND

Min. Elev.(ft) = 121 Max. Elev.(ft) = 132.999 Incr.(ft) = .5

Additional elevations (ft) to be included in table:
* *

****
SYSTEM CONNECTIVITY
****

Structure	No.	Q Table		Q Table
ORIFICE-VC	1		->	1
ORIFICE-VC	2		->	2

Outflow rating table summary was stored in file:
c:\ppd\0990018\offsite\AREA23 .PND

Outlet Structure File: AREA23 .STR

POND-2 Version: 5.17 S/N:
Date Executed: Time Executed:

****
Offsite Areas 2 and 3
Downchutes 3 and 4
(Clay Borrow Areas A+B)
****

>>>>>> Structure No. 1 <<<<<<
(Input Data)

ORIFICE-VC
Orifice - Vertical Circular

E1 elev.(ft)?	124
E2 elev.(ft)?	133
Orifice coeff.?	0.82
Invert elev.(ft)?	121
Datum elev.(ft)?	121
Diameter (ft)?	3

Outlet Structure File: AREA23   .STR

POND-2 Version: 5.17   S/N:
Date Executed: Time Executed:

****
Offsite Areas 2 and 3
Downchutes 3 and 4
(Clay Borrow Areas A+B)
****

>>>>>> Structure No. 2 <<<<<<
(Input Data)

ORIFICE-VC
Orifice - Vertical Circular

E1 elev.(ft)?	124
E2 elev.(ft)?	133
Orifice coeff.?	0.82
Invert elev.(ft)?	121
Datum elev.(ft)?	121
Diameter (ft)?	3

```
**************************
*                        *
*   Offsite Areas 2 and 3 *
*    Downchutes 3 and 4   *
*                        *
*  (Clay Borrow Areas A+B) *
*                        *
**************************
```

Inflow Hydrograph: c:\ppd\0990018\offsite\OS23D34 .HYD
Rating Table file: c:\ppd\0990018\offsite\AREA23 .PND

----INITIAL CONDITIONS----
Elevation = 121.00 ft
Outflow = 0.00 cfs
Storage = 0.02 ac-ft

GIVEN POND DATA			INTERMEDIATE ROUTING COMPUTATIONS	
ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (ac-ft)	2S/t (cfs)	2S/t + 0 (cfs)
121.00	0.0	0.023	5.5	5.5
121.50	0.0	0.037	8.9	8.9
122.00	0.0	0.050	12.2	12.2
122.50	0.0	0.064	15.5	15.5
123.00	0.0	0.078	18.9	18.9
123.50	0.0	0.096	23.1	23.1
124.00	161.1	0.123	29.7	190.8
124.50	174.0	0.171	41.4	215.4
125.00	186.1	0.261	63.2	249.3
125.50	197.3	0.398	96.4	293.7
126.00	208.0	0.586	141.9	349.9
126.50	218.2	0.837	202.5	420.7
127.00	227.9	1.163	281.4	509.3
127.50	237.2	1.651	399.6	636.8
128.00	246.1	2.427	587.3	833.4
128.50	254.8	3.529	853.9	1108.7
129.00	263.1	4.984	1206.1	1469.2
129.50	271.2	6.942	1679.9	1951.1
130.00	279.1	9.583	2319.0	2598.1

Time increment (t) = 0.100 hrs.

nd File: c:\ppd\0990018\offsite\AREA23 .PND
Inflow Hydrograph: c:\ppd\0990018\offsite\OS23D34 .HYD
Outflow Hydrograph: c:\ppd\0990018\offsite\OUT .HYD

INFLOW HYDROGRAPH / ROUTING COMPUTATIONS

TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
11.000	12.00	-----	5.5	5.5	0.00	121.00
11.100	13.00	25.0	16.3	30.5	7.09	123.52
11.200	15.00	28.0	3.6	44.3	20.37	123.56
11.300	16.00	31.0	12.6	34.6	11.00	123.53
11.400	18.00	34.0	1.5	46.6	22.53	123.57
11.500	20.00	38.0	8.0	39.5	15.74	123.55
11.600	22.00	42.0	-1.7	50.0	25.85	123.58
11.700	35.00	57.0	-6.6	55.3	30.95	123.60
11.800	49.00	84.0	-26.9	77.4	52.20	123.66
11.900	62.00	111.0	-33.0	84.1	58.55	123.68
12.000	117.00	179.0	-90.1	146.0	118.05	123.87
12.100	216.00	333.0	-124.8	242.9	183.82	124.91
12.200	291.00	507.0	-43.1	382.2	212.66	126.23
12.300	289.00	580.0	77.1	536.9	229.91	127.11
12.400	260.00	549.0	153.2	626.1	236.42	127.46
12.500	217.00	477.0	156.8	630.2	236.72	127.47
2.600	173.00	390.0	85.5	546.8	230.64	127.15
12.700	136.00	309.0	-34.3	394.5	214.44	126.32
12.800	111.00	247.0	-132.5	212.7	172.57	124.44
12.900	92.00	203.0	-20.6	70.5	45.55	123.64
13.000	74.00	166.0	-89.7	145.4	117.54	123.86
13.100	64.00	138.0	-0.1	48.3	24.23	123.58
13.200	54.00	118.0	-64.2	117.9	91.07	123.78
13.300	49.00	103.0	8.7	38.8	15.00	123.55
13.400	44.00	93.0	-49.4	101.7	75.55	123.73
13.500	40.00	84.0	12.5	34.6	11.06	123.53
13.600	36.00	76.0	-37.2	88.5	62.85	123.70
13.700	34.00	70.0	14.2	32.8	9.31	123.53
13.800	31.00	65.0	-28.6	79.2	53.89	123.67
13.900	29.00	60.0	15.5	31.4	7.97	123.52
14.000	27.00	56.0	-21.5	71.5	46.48	123.64
14.100	26.00	53.0	15.4	31.5	8.08	123.53
14.200	26.00	52.0	-17.7	67.4	42.53	123.63
14.300	25.00	51.0	13.7	33.3	9.79	123.53
14.400	24.00	49.0	-13.4	62.7	38.07	123.62
14.500	22.00	46.0	14.4	32.6	9.10	123.53
14.600	21.00	43.0	-8.5	57.4	32.93	123.60
14.700	20.00	41.0	14.5	32.5	9.03	123.53
14.800	20.00	40.0	-5.8	54.5	30.12	123.59
14.900	20.00	40.0	12.9	34.2	10.67	123.53
15.000	19.00	39.0	-3.4	51.9	27.64	123.59
15.100	19.00	38.0	12.6	34.6	11.03	123.53
.5.200	18.00	37.0	-1.2	49.6	25.39	123.58
15.300	18.00	36.0	12.4	34.8	11.18	123.53
15.400	17.00	35.0	0.8	47.4	23.33	123.57

POND-2 Version: 5.17 S/N:
EXECUTED: 06-15-1994 14:07:07

nd File: c:\ppd\0990018\offsite\AREA23 .PND
Inflow Hydrograph: c:\ppd\0990018\offsite\OS23D34 .HYD
Outflow Hydrograph: c:\ppd\0990018\offsite\OUT .HYD

INFLOW HYDROGRAPH — ROUTING COMPUTATIONS

TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
15.500	17.00	34.0	12.4	34.8	11.16	123.53
15.600	17.00	34.0	1.7	46.4	22.38	123.57
15.700	16.00	33.0	12.5	34.7	11.07	123.53
15.800	16.00	32.0	3.4	44.5	20.54	123.56
15.900	15.00	31.0	12.7	34.4	10.85	123.53
16.000	15.00	30.0	5.1	42.7	18.83	123.56
16.100	15.00	30.0	12.1	35.1	11.47	123.54
16.200	14.00	29.0	6.5	41.1	17.30	123.55
16.300	14.00	28.0	12.6	34.5	10.96	123.53
16.400	13.00	27.0	7.9	39.6	15.84	123.55
16.500	13.00	26.0	13.2	33.9	10.38	123.53
16.600	13.00	26.0	8.3	39.2	15.42	123.55
16.700	13.00	26.0	12.8	34.3	10.77	123.53
16.800	12.00	25.0	9.6	37.8	14.10	123.54
16.900	12.00	24.0	13.5	33.6	10.07	123.53
17.000	12.00	24.0	9.9	37.5	13.78	123.54
7.100	12.00	24.0	13.2	33.9	10.36	123.53
17.200	12.00	24.0	10.2	37.2	13.52	123.54
17.300	12.00	24.0	13.0	34.2	10.60	123.53
17.400	12.00	24.0	10.4	37.0	13.29	123.54
17.500	12.00	24.0	12.8	34.4	10.81	123.53
17.600	12.00	24.0	10.6	36.8	13.10	123.54
17.700	12.00	24.0	12.6	34.6	10.99	123.53
17.800	12.00	24.0	10.7	36.6	12.93	123.54
17.900	12.00	24.0	12.5	34.7	11.14	123.53
18.000	12.00	24.0	10.9	36.5	12.79	123.54
18.100	12.00	24.0	12.3	34.9	11.27	123.53
18.200	12.00	24.0	11.0	36.3	12.68	123.54
18.300	11.00	23.0	13.1	34.0	10.42	123.53
18.400	11.00	22.0	12.1	35.1	11.54	123.54
18.500	11.00	22.0	13.1	34.1	10.50	123.53
18.600	11.00	22.0	12.1	35.1	11.46	123.54
18.700	11.00	22.0	13.0	34.1	10.58	123.53
18.800	10.00	21.0	13.1	34.0	10.43	123.53
18.900	10.00	20.0	13.9	33.1	9.60	123.53
19.000	10.00	20.0	13.2	33.9	10.36	123.53
19.100	10.00	20.0	13.9	33.2	9.66	123.53
19.200	10.00	20.0	13.2	33.9	10.31	123.53
19.300	9.00	19.0	14.7	32.2	8.75	123.53
19.400	9.00	18.0	14.3	32.7	9.23	123.53
19.500	9.00	18.0	14.7	32.3	8.79	123.53
19.600	9.00	18.0	14.3	32.7	9.19	123.53
9.700	9.00	18.0	14.7	32.3	8.82	123.53
19.800	8.00	17.0	15.3	31.7	8.20	123.53
19.900	8.00	16.0	15.6	31.3	7.81	123.52
20.000	8.00	16.0	15.3	31.6	8.17	123.53

nd File: c:\ppd\0990018\offsite\AREA23 .PND
Inflow Hydrograph: c:\ppd\0990018\offsite\OS23D34 .HYD
Outflow Hydrograph: c:\ppd\0990018\offsite\OUT .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
20.100	8.00	16.0	15.6	31.3	7.84	123.52
20.200	8.00	16.0	15.3	31.6	8.15	123.53
20.300	8.00	16.0	15.6	31.3	7.86	123.52
20.400	8.00	16.0	15.3	31.6	8.13	123.53
20.500	8.00	16.0	15.6	31.3	7.88	123.52
20.600	8.00	16.0	15.4	31.6	8.11	123.53
20.700	8.00	16.0	15.6	31.4	7.90	123.52
20.800	8.00	16.0	15.4	31.6	8.09	123.53
20.900	8.00	16.0	15.5	31.4	7.92	123.52
21.000	8.00	16.0	15.4	31.5	8.08	123.53
21.100	7.00	15.0	16.5	30.4	6.97	123.52
21.200	7.00	14.0	16.4	30.5	7.03	123.52
21.300	7.00	14.0	16.5	30.4	6.97	123.52
21.400	7.00	14.0	16.4	30.5	7.03	123.52
21.500	7.00	14.0	16.4	30.4	6.98	123.52
21.600	7.00	14.0	16.4	30.4	7.02	123.52
21.700	7.00	14.0	16.4	30.4	6.98	123.52
21.800	7.00	14.0	16.4	30.4	7.02	123.52
21.900	7.00	14.0	16.4	30.4	6.98	123.52
22.000	7.00	14.0	16.4	30.4	7.02	123.52
22.100	7.00	14.0	16.4	30.4	6.99	123.52
22.200	7.00	14.0	16.4	30.4	7.01	123.52
22.300	6.00	13.0	17.4	29.4	6.03	123.52
22.400	6.00	12.0	17.4	29.4	5.98	123.52
22.500	6.00	12.0	17.4	29.4	6.02	123.52
22.600	6.00	12.0	17.4	29.4	5.98	123.52
22.700	6.00	12.0	17.4	29.4	6.02	123.52
22.800	6.00	12.0	17.4	29.4	5.98	123.52
22.900	5.00	11.0	18.3	28.4	5.06	123.52
23.000	5.00	10.0	18.4	28.3	4.95	123.52
23.100	5.00	10.0	18.3	28.4	5.05	123.52
23.200	5.00	10.0	18.4	28.3	4.96	123.52
23.300	5.00	10.0	18.3	28.4	5.04	123.52
23.400	5.00	10.0	18.4	28.3	4.96	123.52
23.500	4.00	9.0	19.2	27.4	4.07	123.51
23.600	4.00	8.0	19.4	27.2	3.93	123.51
23.700	4.00	8.0	19.2	27.4	4.06	123.51
23.800	4.00	8.0	19.4	27.2	3.94	123.51
23.900	4.00	8.0	19.3	27.4	4.05	123.51
24.000	4.00	8.0	19.4	27.3	3.95	123.51
24.100	3.00	7.0	20.2	26.4	3.08	123.51
24.200	3.00	6.0	20.3	26.2	2.92	123.51
24.300	3.00	6.0	20.2	26.3	3.07	123.51
24.400	3.00	6.0	20.3	26.2	2.93	123.51
24.500	3.00	6.0	20.2	26.3	3.06	123.51
24.600	2.00	5.0	21.2	25.2	1.98	123.51

nd File: c:\ppd\0990018\offsite\AREA23 .PND
Inflow Hydrograph: c:\ppd\0990018\offsite\OS23D34 .HYD
Outflow Hydrograph: c:\ppd\0990018\offsite\OUT .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
24.700	2.00	4.0	21.2	25.2	2.02	123.51
24.800	2.00	4.0	21.2	25.2	1.99	123.51
24.900	2.00	4.0	21.2	25.2	2.01	123.51
25.000	2.00	4.0	21.2	25.2	1.99	123.51
25.100	2.00	4.0	21.2	25.2	2.01	123.51
25.200	1.00	3.0	22.2	24.2	1.03	123.50
25.300	1.00	2.0	22.2	24.2	0.97	123.50
25.400	1.00	2.0	22.2	24.2	1.02	123.50
25.500	1.00	2.0	22.2	24.2	0.98	123.50
25.600	1.00	2.0	22.2	24.2	1.02	123.50
25.700	1.00	2.0	22.2	24.2	0.98	123.50
25.800	0.00	1.0	23.1	23.2	0.06	123.50
25.900	0.00	0.0	23.1	23.1	0.00	123.49

****************** SUMMARY OF ROUTING COMPUTATIONS ******************

Pond File: c:\ppd\0990018\offsite\AREA23 .PND
Inflow Hydrograph: c:\ppd\0990018\offsite\OS23D34 .HYD
Outflow Hydrograph: c:\ppd\0990018\offsite\OUT .HYD

Starting Pond W.S. Elevation = 121.00 ft

***** Summary of Peak Outflow and Peak Elevation *****

Peak Inflow = 291.00 cfs
Peak Outflow = 236.72 cfs
Peak Elevation = 127.47 ft = Peak Flood Elevation

< 130

***** Summary of Approximate Peak Storage *****

Initial Storage	=	0.02 ac-ft
Peak Storage From Storm	=	1.60 ac-ft
Total Storage in Pond	=	1.63 ac-ft

Warning: Inflow hydrograph truncated on left side.

```
Quick TR-55 Ver.5.46   S/N:
Executed: 11:26:55   04-14-1994    c:\ppd\0990018\OFFSITE4.TCT

                                   SELF
                                 Offsite 4
                  Waste Tire Processing and Storage Area


                    Tc COMPUTATIONS FOR: Offsite 4

 SHEET FLOW (Applicable to Tc only)
    Segment ID                                    A-B
    Surface description                      Grass
    Manning's roughness coeff., n                  0.2400
    Flow length, L (total < or = 300)    ft     300.0
    Two-yr 24-hr rainfall, P2             in     4.100
    Land slope, s                         ft/ft  0.0250
                          0.8
        .007 * (n*L)
    T = --------------                    hrs     0.46               =  0.46
           0.5    0.4
         P2    *   s

 SHALLOW CONCENTRATED FLOW
    Segment ID                                    B-C
    Surface (paved or unpaved)?                   Unpaved
    Flow length, L                        ft     550.0
    Watercourse slope, s                  ft/ft  0.0080

                            0.5
    Avg.V =  Csf *  (s)                   ft/s   1.4431
    where:   Unpaved Csf = 16.1345
             Paved   Csf = 20.3282

    T = L / (3600*V)                      hrs     0.11               =  0.11


 CHANNEL FLOW
    Segment ID                                    C-D
    Cross Sectional Flow Area, a          sq.ft    1.00
    Wetted perimeter, Pw                  ft       1.00
    Hydraulic radius, r = a/Pw            ft      1.000
    Channel slope, s                      ft/ft  %11.2500
    Manning's roughness coeff., n                1.0000

                         2/3    1/2
        1.49  *  r    *  s
    V = --------------------              ft/s   4.9976
                   n

    Flow length, L                        ft       500

    T = L / (3600*V)                      hrs     0.03               =  0.03

 ::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
                                              TOTAL TIME (hrs)      0.60
```

Quick TR-55 Ver.5.46 S/N:
Executed: 11:26:55 04-14-1994 c:\ppd\0990018\OFFSITE4.TCT

SUMMARY SHEET FOR Tc or Tt COMPUTATIONS
(Solved for Time using TR-55 Methods)

SELF
Offsite 4
Waste Tire Processing and Storage Area

Subarea descr.	Tc or Tt	Time (hrs)
Offsite 4	Tc	0.60

Quick TR-55 Ver.5.46 S/N:
Executed: 11:26:15 04-14-1994

Waste Tire Storage/Processing Area
Offsite Area 4

RUNOFF CURVE NUMBER SUMMARY

::

Subarea Description	Area (acres)	CN (weighted)
	13.50	55

Quick TR-55 Ver.5.46 S/N:
Executed: 11:26:15 04-14-1994

Waste Tire Storage/Processing Area
Offsite Area 4

RUNOFF CURVE NUMBER DATA

Composite Area:

SURFACE DESCRIPTION	AREA (acres)	CN	
Sand/Typical	13.50	55	
COMPOSITE AREA --->	13.50	55.0	(55)

Return Frequency: 25 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 04-14-1994 11:27:29
Watershed file: --> C:\PPD\0990018\OFFSITE4.MOP
Hydrograph file: --> C:\PPD\0990018\OFFSITE4.HYD

SELF
Offsite 4
Waste Tire Storage and Processing Area

>>>> Input Parameters Used to Compute Hydrograph <<<<

Subarea Description	AREA (acres)	CN	Tc (hrs)	* Tt (hrs)	Precip. (in)	Runoff (in)	Ia/p input/used	
	13.50	55.0	0.50	0.00	8.40	3.06	.19	.10

* Travel time from subarea outfall to composite watershed outfall point.
Total area = 13.50 acres or 0.02109 sq.mi
Peak discharge = 34 cfs

>>>> Computer Modifications of Input Parameters <<<<<

Subarea Description	Input Values Tc (hr)	Input Values * Tt (hr)	Rounded Values Tc (hr)	Rounded Values * Tt (hr)	Ia/p Interpolated (Yes/No)	Ia/p Messages
	0.60	0.00	0.50	0.00	No	--

* Travel time from subarea outfall to composite watershed outfall point.

Return Frequency: 25 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 04-14-1994 11:27:29
Watershed file: --> C:\PPD\0990018\OFFSITE4.MOP
Hydrograph file: --> C:\PPD\0990018\OFFSITE4.HYD

SELF
Offsite 4
Waste Tire Storage and Processing Area

>>>> Summary of Subarea Times to Peak <<<<

Subarea	Peak Discharge at Composite Outfall (cfs)	Time to Peak at Composite Outfall (hrs)
	34	12.4
Composite Watershed	34	12.4

BEST AVAILABLE COPY

SCS ENGINEERS, PC

ENVIRONMENTAL CONSULTANTS
2 CROSFIELD AVENUE
SUITE 422
WEST NYACK, NY 10994
914 353-5727
FAX 914 353-5731

JOB 0990018.34
SHEET NO. 1 OF 1 SCALE
CALCULATED BY WSG DATE 4/14/94
CHECKED BY DATE

(S-23)

Problem: Calculate capacity of existing culvert draining [illegible] subarea #4. (Waste Tire Processing Area)

Given: Peak Q_{25} = 34 cfs
Pipe = 30" Ø CMP
Inv. El. in = 130.71
Inv. El. out = 129.50

Top of Road = El. 135

Sol'n:

Calculate capacity of the culvert - (assume inlet control)

$Q = C_d A \sqrt{2gh}$
$= 0.82 (4.9) \sqrt{64.4 (4.3)}$

$\therefore$ Capacity = 66.9 cfs OK

Q = 34 cfs
A = 4.91 sf
h = 135 - 130.7 = 4.3'
C_d = 0.82

Check Freeboard:

$34 = 0.82 (4.9) \sqrt{64.4\, h}$

$\therefore$ req'd h = 1.1' + 130.71 = el. 131.8

Freeboard available = 135 - 131.8 = 3.2' OK

SCS ENGINEERS, PC
ENVIRONMENTAL CONSULTANTS
2 CROSFIELD AVENUE
SUITE 422
WEST NYACK, NY 10994
(914) 353-5727
FAX 914 353-5731

JOB 0990018.34
SHEET NO. 1 OF 1 SCALE
CALCULATED BY WEG DATE 4/14/94
CHECKED BY DATE

Problem: Calculate the capacity of the existing pipe culvert draining Borrow Area #2 (S-21)

Given: 36" Ø RCP
Inv. El. in = 122.91 Top of Road = El. 131
Inv. El. out = 123.15

Peak Q_{25} = 132 cfs (BR2CULV.HYD)

Sol'n

1) Assuming inlet flow control, max flow capacity:

$Q = C_d A \sqrt{2gh}$

$= 0.82(7.07)\sqrt{2(32.2)6.4}$

$\therefore Q = 117.7$ cfs < 132 cfs (NG)

Q = 117 cfs
$C_d = 0.82$
A = 7.07 sf
h = 131 − 124.7 = 6.4'

Note: Road will overtop.

2) Add 24" Ø pipe to existing culvert. (Area = 3.14 sf)

Calculate req'd headwater depth to pass flow:

$132 = \left[0.82(7.07)\sqrt{64.4h}\right] + \left[0.82(3.14)\sqrt{64.4h}\right]$

$161.0 = 7.07\sqrt{64.4h} + 3.14\sqrt{64.4h}$

$= 10.21\sqrt{64.4h}$

$\therefore h = 3.9'$ + el. 123.2 = el. 127.1

Freeboard available = 131 − 127.1 = 3.9' ✓ OK

Executed 04-14-1994 11:40:36

Data directory: c:\ppd\0990018*.HYD

File Summary for Composite Hydrograph

Time (hrs)	BORROW2 (cfs)	OFFSITE4 (cfs)	BR2CULV (Total)
11.00	4.0	1.0	5.0
11.10	4.0	1.0	5.0
11.20	5.0	1.0	6.0
11.30	5.0	1.0	6.0
11.40	6.0	1.0	7.0
11.50	6.0	2.0	8.0
11.60	7.0	2.0	9.0
11.70	8.0	3.0	11.0
11.80	8.0	3.0	11.0
11.90	9.0	4.0	13.0
12.00	11.0	6.0	17.0
12.10	15.0	11.0	26.0
12.20	24.0	20.0	44.0
12.30	37.0	30.0	67.0
12.40	55.0	34.0	89.0
12.50	76.0	33.0	109.0
12.60	95.0	26.0	121.0
12.70	108.0	19.0	127.0
12.80	117.0	15.0	132.0 ← Peak Q_{25}
12.90	110.0	12.0	122.0
13.00	103.0	9.0	112.0
13.10	90.0	7.0	97.0
13.20	78.0	6.0	84.0
13.30	67.0	6.0	73.0
13.40	57.0	5.0	62.0
13.50	51.0	5.0	56.0
13.60	44.0	4.0	48.0
13.70	39.0	4.0	43.0
13.80	34.0	3.0	37.0
13.90	30.0	3.0	33.0
14.00	27.0	3.0	30.0
14.10	25.0	3.0	28.0
14.20	23.0	3.0	26.0
14.30	21.0	3.0	24.0
14.40	19.0	3.0	22.0
14.50	18.0	2.0	20.0
14.60	16.0	2.0	18.0
14.70	15.0	2.0	17.0
14.80	14.0	2.0	16.0
14.90	14.0	2.0	16.0

Executed 04-14-1994 11:40:36

Data directory: c:\ppd\0990018*.HYD

File Summary for Composite Hydrograph

Time (hrs)	BORROW2 (cfs)	OFFSITE4 (cfs)	BR2CULV (Total)
15.00	13.0	2.0	15.0
15.10	13.0	2.0	15.0
15.20	12.0	2.0	14.0
15.30	12.0	2.0	14.0
15.40	11.0	2.0	13.0
15.50	11.0	2.0	13.0
15.60	11.0	2.0	13.0
15.70	10.0	2.0	12.0
15.80	10.0	2.0	12.0
15.90	9.0	2.0	11.0
16.00	9.0	2.0	11.0
16.10	9.0	2.0	11.0
16.20	9.0	2.0	11.0
16.30	9.0	1.0	10.0
16.40	9.0	1.0	10.0
16.50	9.0	1.0	10.0
16.60	9.0	1.0	10.0
16.70	9.0	1.0	10.0
16.80	8.0	1.0	9.0
16.90	8.0	1.0	9.0
17.00	8.0	1.0	9.0
17.10	8.0	1.0	9.0
17.20	8.0	1.0	9.0
17.30	7.0	1.0	8.0
17.40	7.0	1.0	8.0
17.50	7.0	1.0	8.0
17.60	7.0	1.0	8.0
17.70	7.0	1.0	8.0
17.80	7.0	1.0	8.0
17.90	7.0	1.0	8.0
18.00	7.0	1.0	8.0
18.10	7.0	1.0	8.0
18.20	7.0	1.0	8.0
18.30	7.0	1.0	8.0
18.40	7.0	1.0	8.0
18.50	6.0	1.0	7.0
18.60	6.0	1.0	7.0
18.70	6.0	1.0	7.0
18.80	6.0	1.0	7.0
18.90	6.0	1.0	7.0
19.00	6.0	1.0	7.0

Executed 04-14-1994 11:40:36

Data directory: c:\ppd\0990018*.HYD

File Summary for Composite Hydrograph

Time (hrs)	BORROW2 (cfs)	OFFSITE4 (cfs)	BR2CULV (Total)
19.10	6.0	1.0	7.0
19.20	6.0	1.0	7.0
19.30	6.0	1.0	7.0
19.40	6.0	1.0	7.0
19.50	6.0	1.0	7.0
19.60	5.0	1.0	6.0
19.70	5.0	1.0	6.0
19.80	5.0	1.0	6.0
19.90	5.0	1.0	6.0
20.00	5.0	1.0	6.0
20.10	5.0	1.0	6.0
20.20	5.0	1.0	6.0
20.30	5.0	1.0	6.0
20.40	5.0	1.0	6.0
20.50	5.0	1.0	6.0
20.60	5.0	1.0	6.0
20.70	5.0	1.0	6.0
20.80	5.0	1.0	6.0
20.90	5.0	1.0	6.0
21.00	4.0	1.0	5.0
21.10	4.0	1.0	5.0
21.20	4.0	1.0	5.0
21.30	4.0	1.0	5.0
21.40	4.0	1.0	5.0
21.50	4.0	1.0	5.0
21.60	4.0	1.0	5.0
21.70	4.0	1.0	5.0
21.80	4.0	1.0	5.0
21.90	4.0	1.0	5.0
22.00	4.0	1.0	5.0
22.10	4.0	1.0	5.0
22.20	4.0	1.0	5.0
22.30	4.0	1.0	5.0
22.40	4.0	1.0	5.0
22.50	4.0	1.0	5.0
22.60	3.0	1.0	4.0
22.70	3.0	1.0	4.0
22.80	3.0	1.0	4.0
22.90	3.0	1.0	4.0
23.00	3.0	1.0	4.0
23.10	3.0	1.0	4.0

Executed 04-14-1994 11:40:36

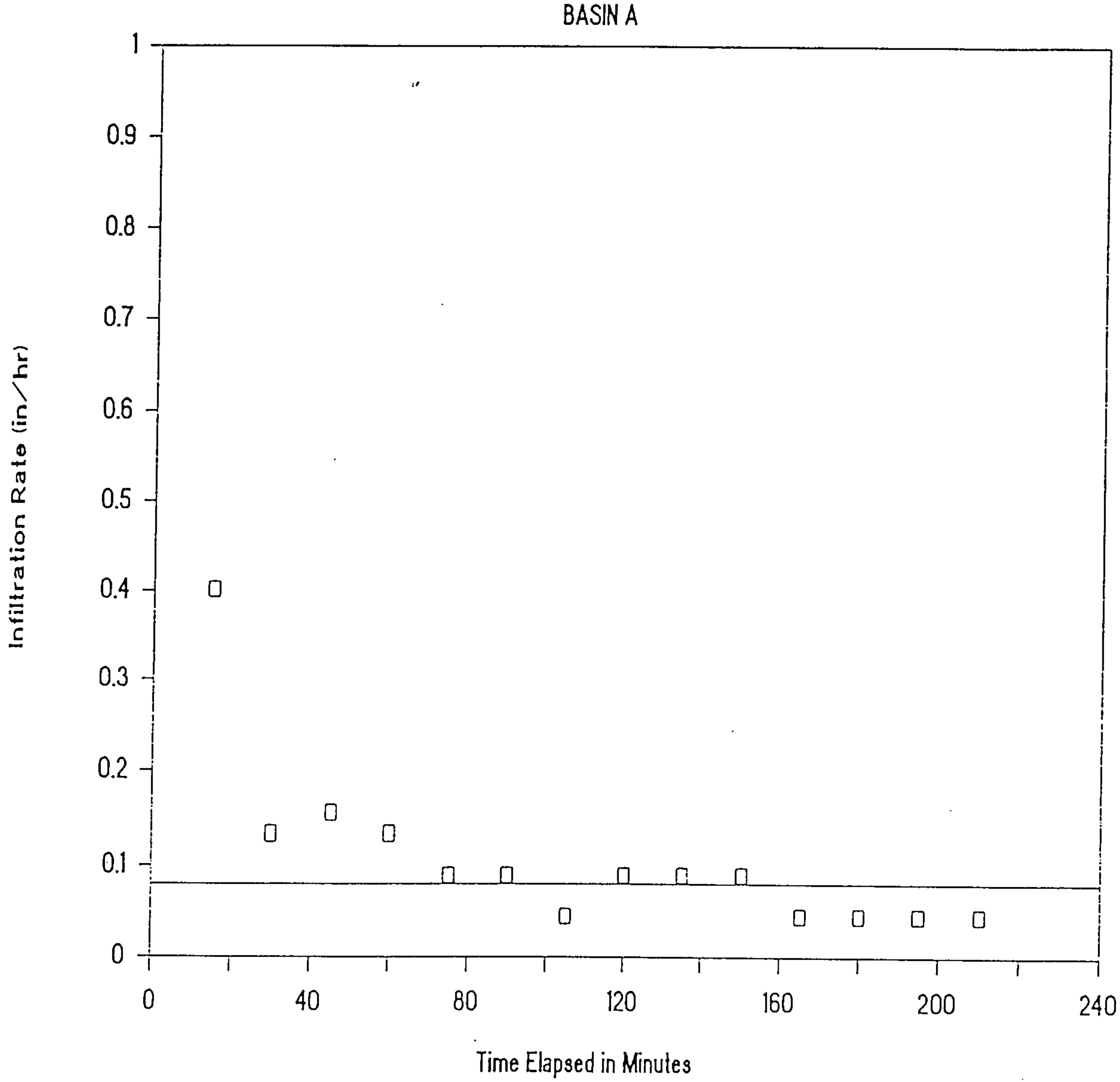
Data directory: c:\ppd\0990018*.HYD

File Summary for Composite Hydrograph

Time (hrs)	BORROW2 (cfs)	OFFSITE4 (cfs)	BR2CULV (Total)
23.20	3.0	1.0	4.0
23.30	3.0	1.0	4.0
23.40	3.0	1.0	4.0
23.50	2.0	1.0	3.0
23.60	2.0	1.0	3.0
23.70	2.0	1.0	3.0
23.80	2.0	1.0	3.0
23.90	2.0	1.0	3.0
24.00	2.0	0.0	2.0
24.10	2.0	0.0	2.0
24.20	2.0	0.0	2.0
24.30	2.0	0.0	2.0
24.40	2.0	0.0	2.0
24.50	2.0	0.0	2.0
24.60	1.0	0.0	1.0
24.70	1.0	0.0	1.0
24.80	1.0	0.0	1.0
24.90	1.0	0.0	1.0
25.00	1.0	0.0	1.0
25.10	1.0	0.0	1.0
25.20	1.0	0.0	1.0
25.30	1.0	0.0	1.0
25.40	1.0	0.0	1.0
25.50	0.0	0.0	0.0
25.60	0.0	0.0	0.0
25.70	0.0	0.0	0.0
25.80	0.0	0.0	0.0
25.90	0.0	0.0	0.0
26.00	0.0	0.0	0.0

BASIN INFILTRATION DATA

Double Ring Infiltration Test

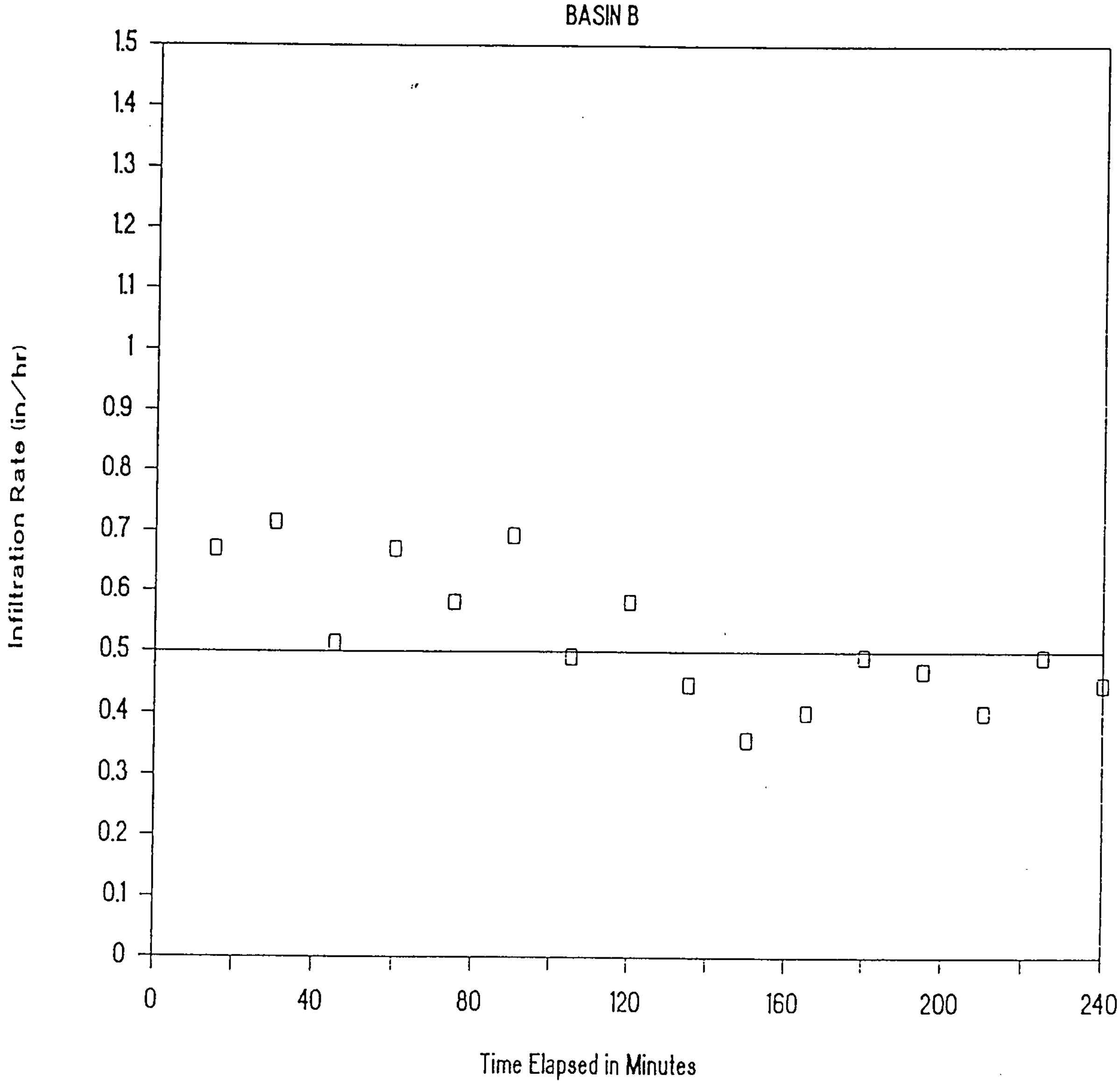


NOTES:

TEST DEPTH = 1 FEET
AVERAGE INFILTRATION RATE = 0.08 in./hr.

INFILTRATION Vs. TIME SOUTHEAST LANDFILL BASIN A PICNIC, FLORIDA		
Jammal & Associates, Inc. A Division of Professional Service Industries, Inc.		
DRAWN KEK	SCALE NOTED	PROJ. NO 775-45109
CHECKED SS	DATE APR 94	PLATE 1

Double Ring Infiltration Test



NOTES:

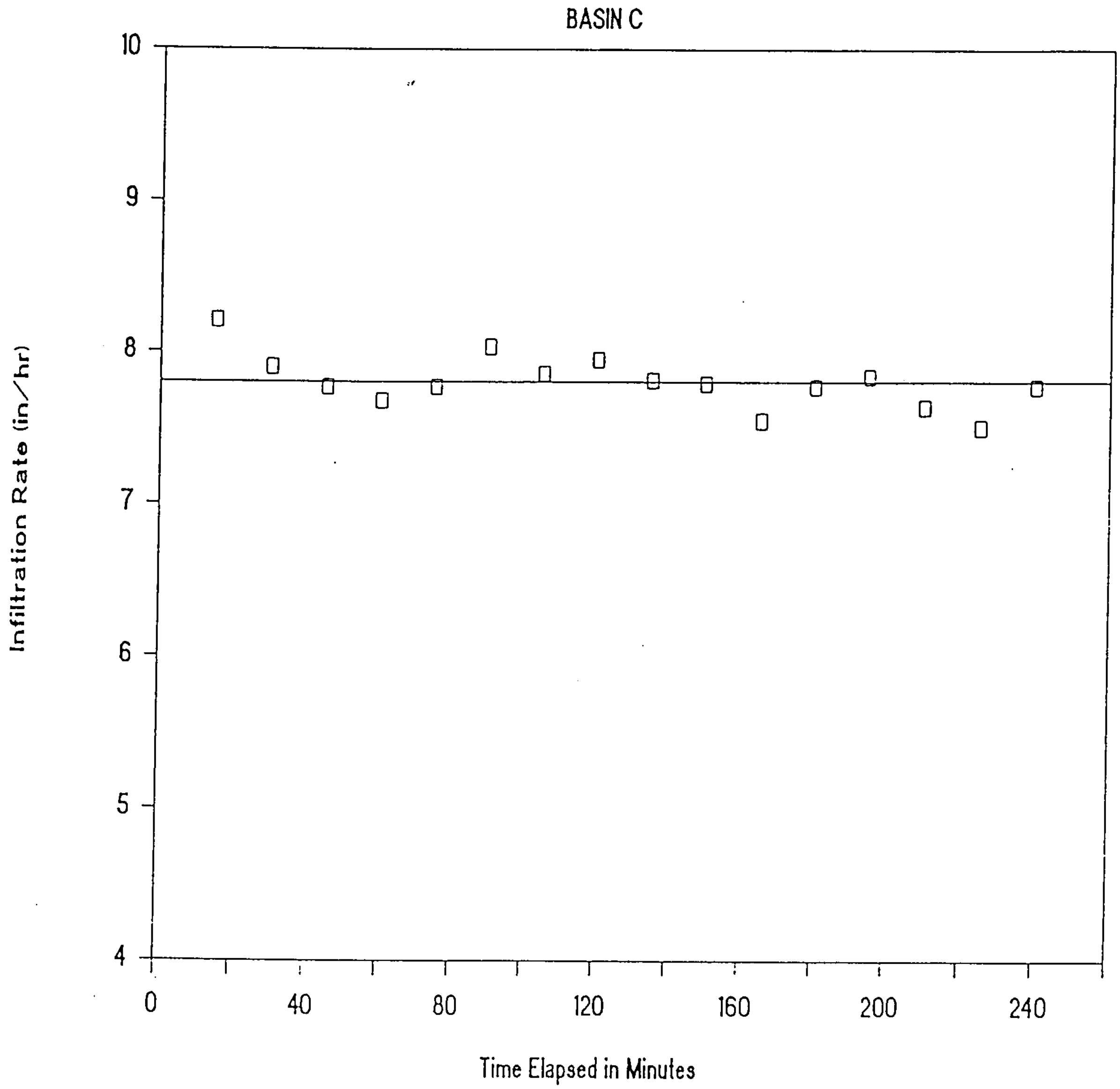
TEST DEPTH = 0 FEET
AVERAGE INFILTRATION RATE = 0.5 in./hr.

INFILTRATION Vs. TIME
SOUTHEAST LANDFILL
BASIN B
PICNIC, FLORIDA

psi Jammal & Associates, Inc.
A Division of Professional Service Industries, Inc.

DRAWN KEK	SCALE NOTED	PROJ NO. 775-45109
CHECKED SS	DATE APR 94	PLATE 2

Double Ring Infiltration Test



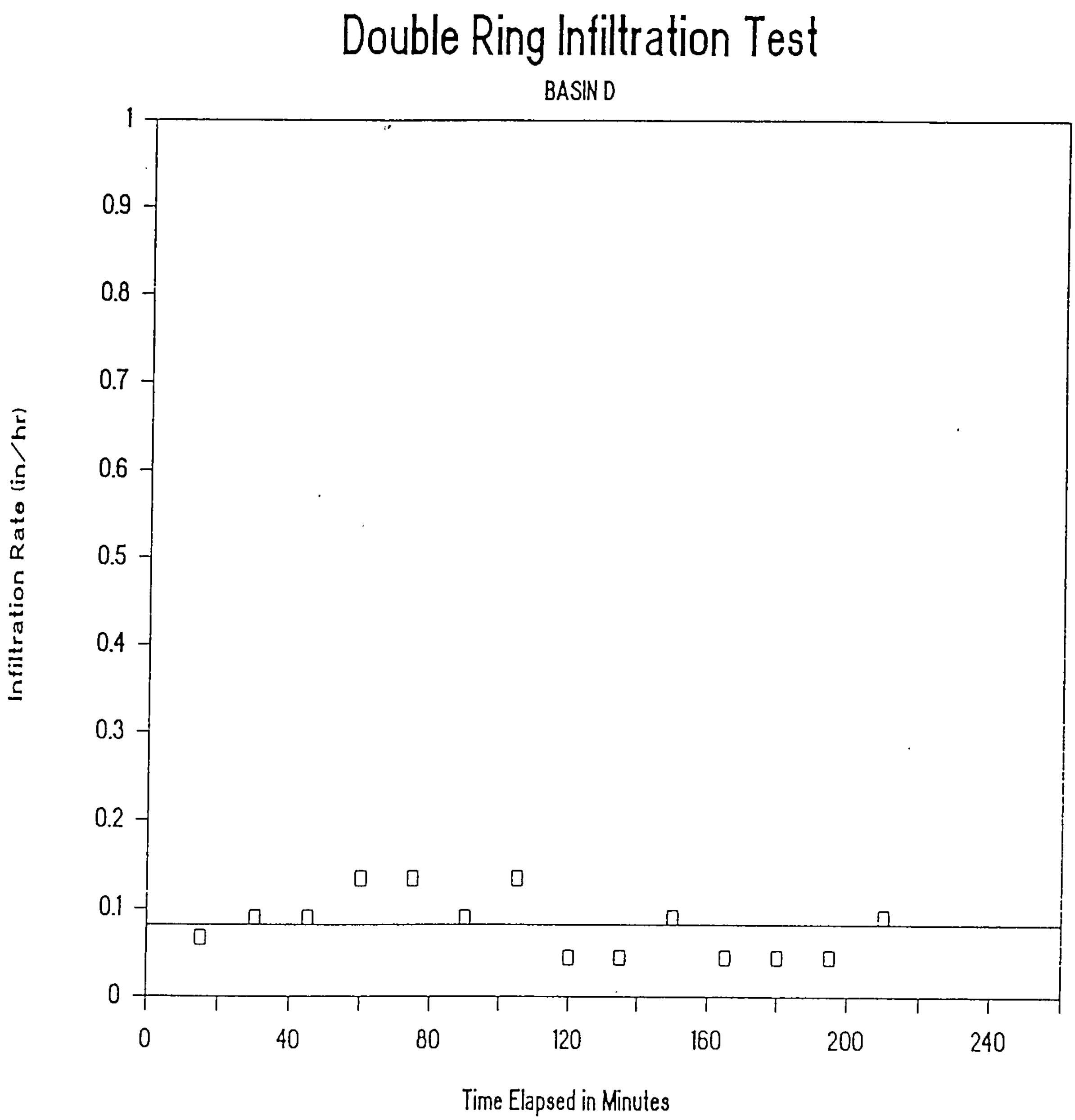
NOTES:

TEST DEPTH = 0 FEET
AVERAGE INFILTRATION RATE = 7.8 in./hr.

INFILTRATION Vs. TIME
SOUTHEAST LANDFILL
BASIN C
PICNIC, FLORIDA

Jammal & Associates, Inc.
A Division of Professional Service Industries, Inc.

DRAWN KEK	SCALE NOTED	PROJ. NO. 775-45109
CHECKED SS	DATE APR 94	PLATE 3



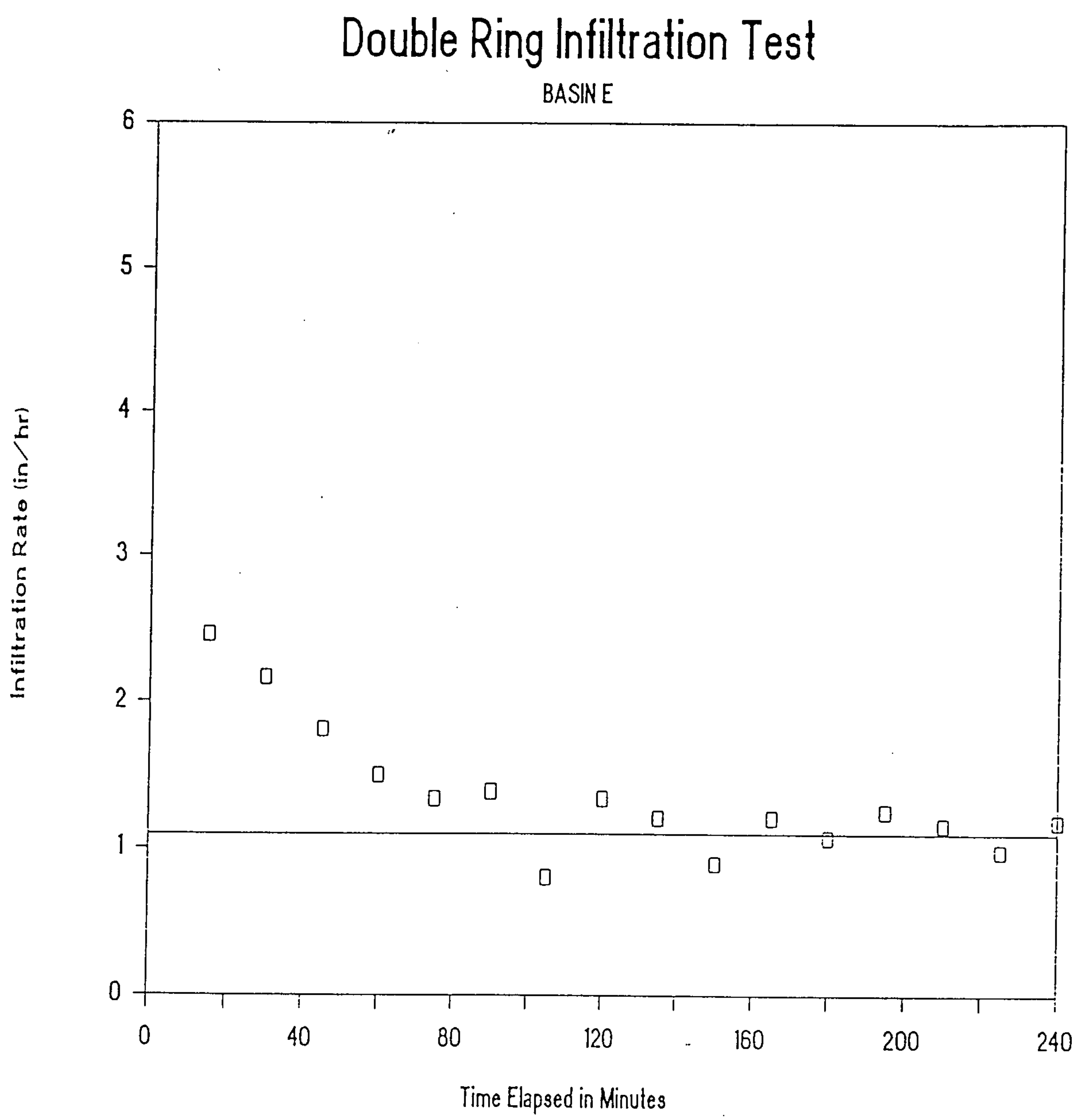
NOTES:

TEST DEPTH = 1 FEET
AVERAGE INFILTRATION RATE = 0.08 in./hr.

INFILTRATION Vs. TIME
SOUTHEAST LANDFILL
BASIN D
PICNIC, FLORIDA

psi Jammal & Associates, Inc.
A Division of Professional Service Industries, Inc.

DRAWN	SCALE	PROJ. NO.
KEK	NOTED	775-45109
CHECKED SS	DATE APR 94	PLATE 4



NOTES:

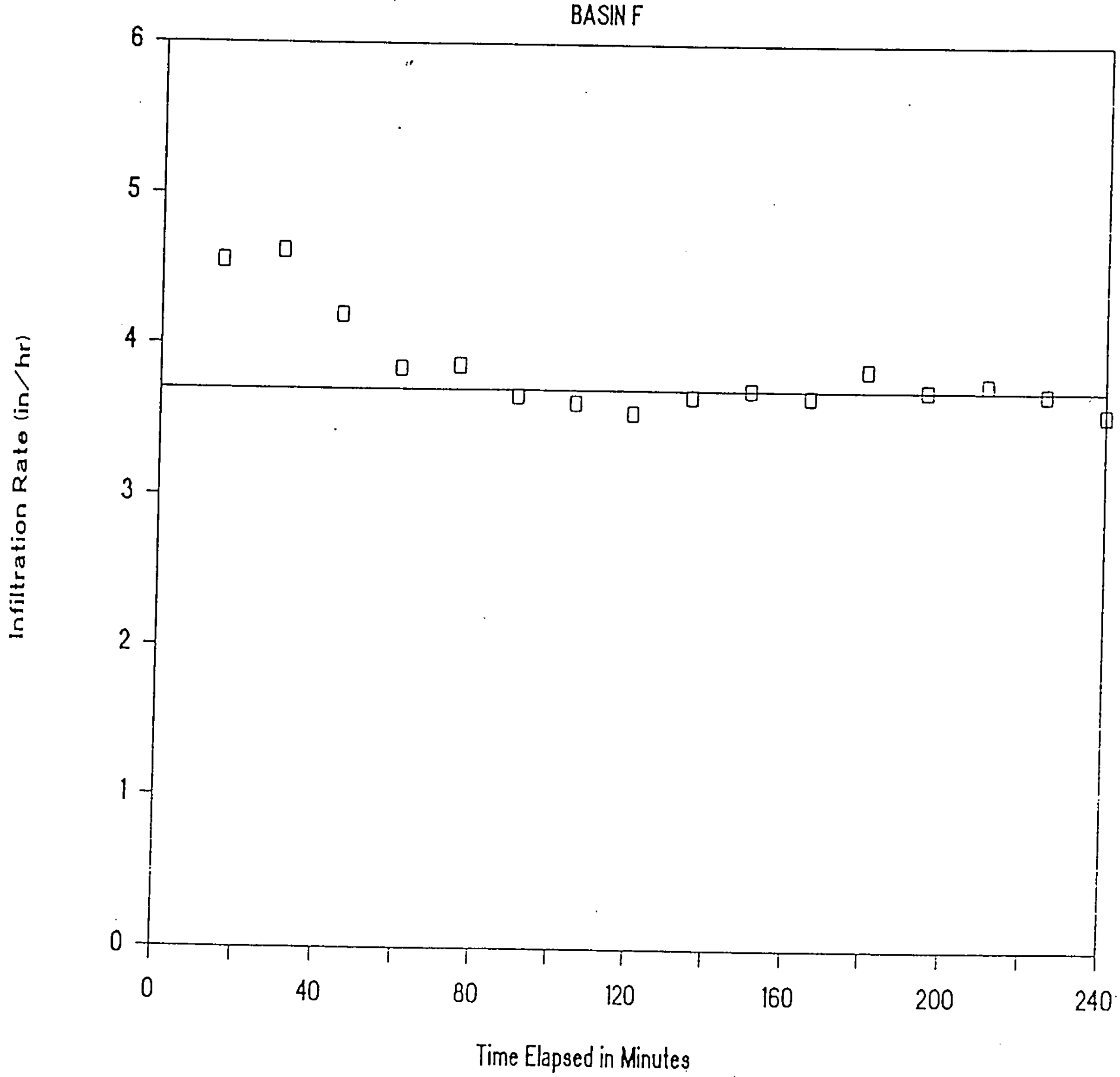
TEST DEPTH = 0 FEET
AVERAGE INFILTRATION RATE = 1.1 in./hr.

INFILTRATION Vs. TIME
SOUTHEAST LANDFILL
BASIN E
PICNIC, FLORIDA

psi Jammal & Associates, Inc.
A Division of Professional Service Industries, Inc.

DRAWN KEK	SCALE NOTED	PROJ NO 775-45109
CHECKED SS	DATE APR 94	PLATE 5

Double Ring Infiltration Test



NOTES:

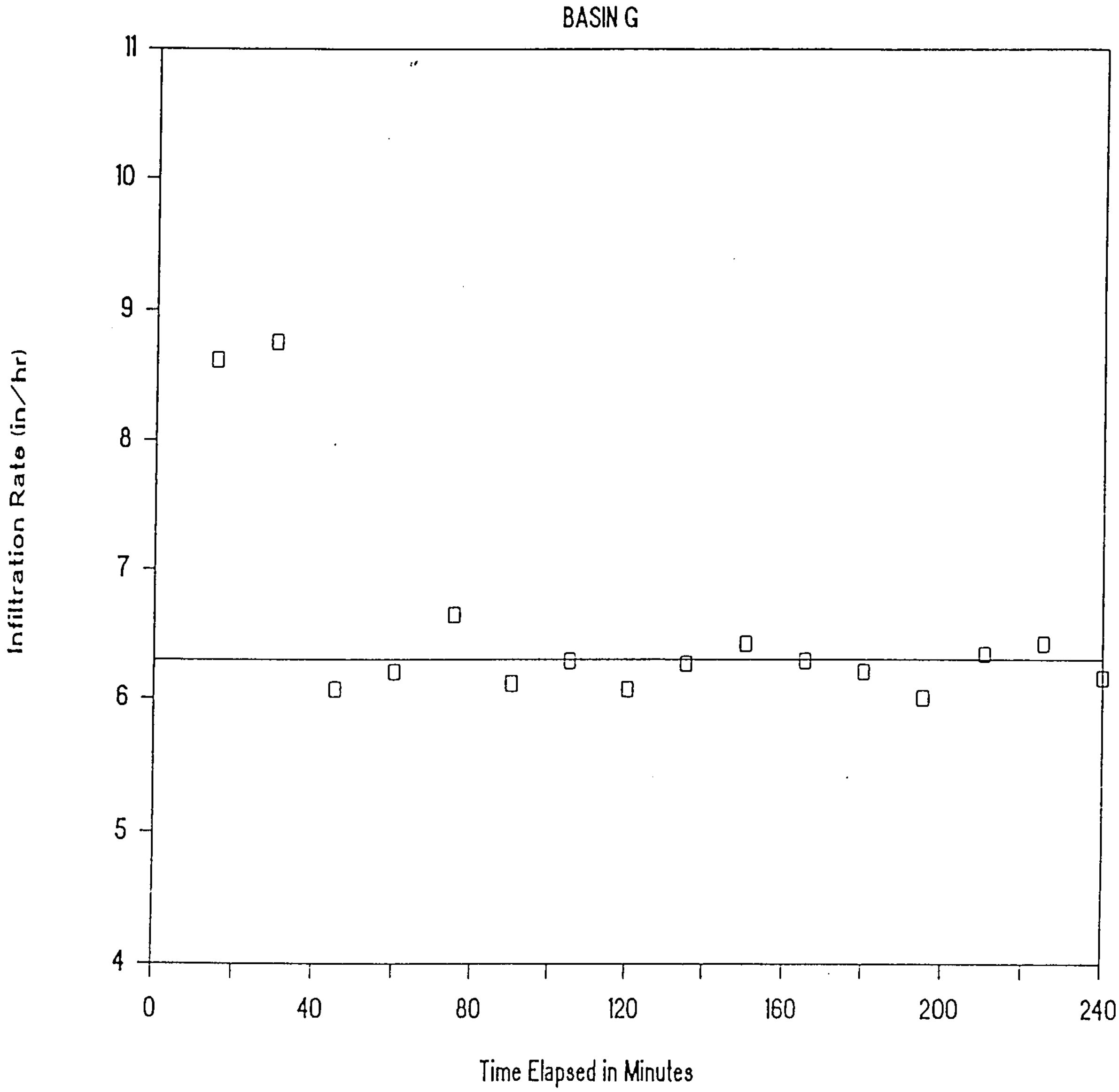
TEST DEPTH = 1.5 FEET
AVERAGE INFILTRATION RATE = 3.7 in./hr.

INFILTRATION Vs. TIME
SOUTHEAST LANDFILL
BASIN F
PICNIC, FLORIDA

Jammal & Associates, Inc.
A Division of Professional Service Industries, Inc.

DRAWN KEK	SCALE NOTED	PROJ. NO. 775-45109
CHECKED SS	DATE APR 94	PLATE 6

Double Ring Infiltration Test



NOTES:

TEST DEPTH = 1.5 FEET
AVERAGE INFILTRATION RATE = 6.3 in./hr.

INFILTRATION Vs. TIME
SOUTHEAST LANDFILL
BASIN G
PICNIC, FLORIDA

psi Jammal & Associates, Inc.
A Division of Professional Service Industries, Inc.

DRAWN	SCALE	PROJ. NO
KEK	NOTED	775-45109
CHECKED SS	DATE APR 94	PLATE 7

CLIENT	PROJECT S.E. LEACHATE TREATMENT PLANT		JOB NO. 990018.42
SUBJECT DETENTION POND PERCOLATION		BY CMS	DATE 12/4/91
		CHECKED ZKW	DATE 12/6/91

Basin H

BACKGROUND:

Detention pond must perc $\frac{1}{2}$" of stormwater runoff from the impervious area draining to the pond.

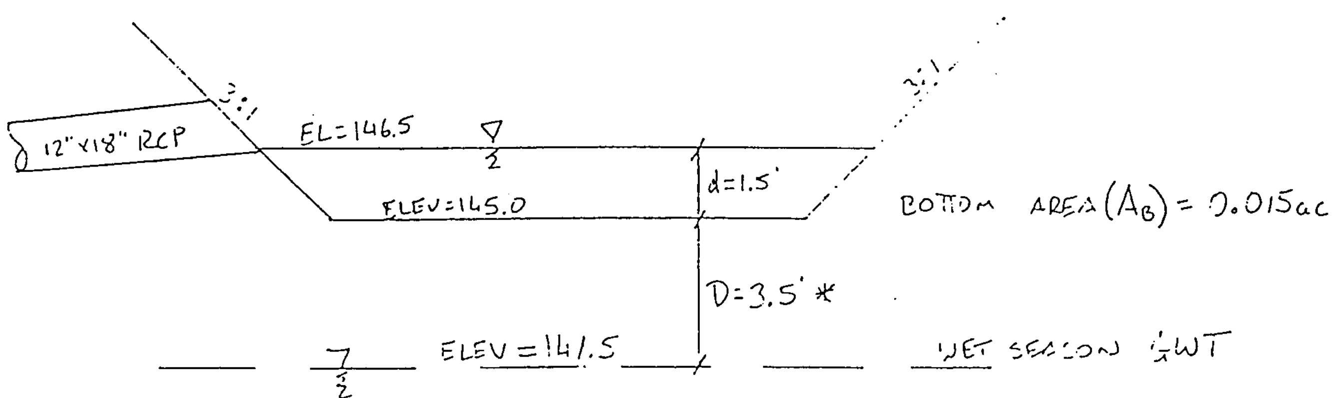
SITE DATA:

P = Rainfall for a 25yr, 24 hr storm = 9.5 inches (fig 5-13 FDOT 2A)

A_i = Impervious area draining to pond (asphalt, concrete sidewalk & roof)
A_i = 0.38 acres

S = required storage
= $\frac{1}{2}$" × 0.38ac (1/12)

<u>S = 0.02 ac-ft</u> This is the minimum volume to be stored in the pond and must percolate within 72 hours.



$\boxed{\text{Infiltration Rate} = 5.9 \text{ in/hr} *}$

* From: Subsurface Soil Exploration Report
11/26/91
By: Atlanta Testing and Engineering

BASIN DISCHARGE STRUCTURE AREA

Outlet Structure File: A .STR

POND-2 Version: 5.17 S/N:
Date Executed: Time Executed:

****
Basin A Existing Conditions

****

***** COMPOSITE OUTFLOW SUMMARY ****

Elevation (ft)	Q (cfs)	Contributing Structures
123.50	0.0	
124.00	0.0	1
124.50	10.3	1
125.00	29.1	1
125.50	53.5	1
126.00	65.8	1
126.50	73.5	1
127.00	80.6	1
127.50	87.0	1
128.00	94.0	1 +2
128.50	112.2	1 +2
129.00	137.6	1 +2

Outlet Structure File: A   .STR

POND-2 Version: 5.17   S/N:
Date Executed: Time Executed:

****
Basin A Existing Conditions

****

Outlet Structure File: c:\ppd\0990018\A   .STR
Planimeter Input File: c:\ppd\0990018\A   .VOL
Rating Table Output File: c:\ppd\0990018\A   .PND

Min. Elev.(ft) = 123.5   Max. Elev.(ft) = 128.999   Incr.(ft) = .5

Additional elevations (ft) to be included in table:
* *

****
SYSTEM CONNECTIVITY
****

Structure	No.	Q Table	Q Table
STAND PIPE	1	->	1
STAND PIPE	2	->	2

Outflow rating table summary was stored in file:
c:\ppd\0990018\A   .PND

Outlet Structure File: A .STR

POND-2 Version: 5.17 S/N:
Date Executed: Time Executed:

****
Basin A Existing Conditions

****

>>>>>> Structure No. 1 <<<<<<
(Input Data)

STAND PIPE
Stand Pipe with weir or orifice flow

E1 elev.(ft)?	124
E2 elev.(ft)?	129
Crest elev.(ft)?	124
Diameter (ft)?	3
Weir coefficient?	3.09
Orifice coefficient?	0.82
Start transition elev.(ft) @ ?	
Transition height (ft)?	

Outlet Structure File: A .STR

POND-2 Version: 5.17 S/N:
Date Executed: Time Executed:

****
Basin A Existing Conditions

****

>>>>>> Structure No. 2 <<<<<<
(Input Data)

STAND PIPE
Stand Pipe with weir or orifice flow

E1 elev.(ft)?	127.9
E2 elev.(ft)?	129
Crest elev.(ft)?	127.9
Diameter (ft)?	3
Weir coefficient?	3.09
Orifice coefficient?	0.82
Start transition elev.(ft) @ ?	
Transition height (ft)?	

Outlet Structure File: B .STR

POND-2 Version: 5.17 S/N:
Date Executed: Time Executed:

****
Basin B Existing Conditions

****

***** COMPOSITE OUTFLOW SUMMARY ****

Elevation (ft)	Q (cfs)	Contributing Structures
126.00	0.0	
126.50	0.0	
127.00	0.0	
127.50	0.0	
128.00	0.0	
128.50	0.0	
129.00	0.0	
129.50	0.0	
130.00	0.0	1
130.50	98.2	1
131.00	277.1	1

```
Outlet Structure File: B        .STR

POND-2 Version: 5.17            S/N:
Date Executed:                  Time Executed:


              **************************
              Basin B Existing Conditions


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


Outlet Structure File:     c:\ppd\0990018\B      .STR
Planimeter Input File:     c:\ppd\0990018\B      .VOL
Rating Table Output File:  c:\ppd\0990018\B      .PND


Min. Elev.(ft) = 126   Max. Elev.(ft) = 130.999   Incr.(ft) = .5

   Additional elevations (ft) to be included in table:
   * * * * * * * * * * * * * * * * * * * * * * * * * *


     **********************************************
                  SYSTEM CONNECTIVITY
     **********************************************

          Structure      No.   Q Table    Q Table
          ----------     ---   ------     -------
          WEIR-VR         1           ->    1

Outflow rating table summary was stored in file:
c:\ppd\0990018\B       .PND
```

Outlet Structure File: B .STR

POND-2 Version: 5.17 S/N:
Date Executed: Time Executed:

****
Basin B Existing Conditions

****

>>>>>> Structure No. 1 <<<<<<
(Input Data)

WEIR-VR
Weir - Vertical Rectangular

E1 elev.(ft)?	130
E2 elev.(ft)?	131
Weir coefficient?	3.09
Weir elev.(ft)?	130
Length (ft)?	90
Contracted/Suppressed (C/S)?	C

Outlet Structure File: C .STR

POND-2 Version: 5.17 S/N:
Date Executed: Time Executed:

****
Basin C Existing Conditions

****

***** COMPOSITE OUTFLOW SUMMARY ****

Elevation (ft)	Q (cfs)	Contributing Structures
127.00	0.0	
127.50	0.0	
128.00	0.0	1
128.50	22.8	1
129.00	32.3	1
129.50	39.6	1
130.00	45.7	1
130.50	72.8	2 +1
131.00	117.1	2 +1
131.50	172.3	2 +1
132.00	235.8	2 +1

Outlet Structure File: C .STR

POND-2 Version: 5.17 S/N:
Date Executed: Time Executed:

****
Basin C Existing Conditions

****

Outlet Structure File: c:\ppd\0990018\C .STR
Planimeter Input File: c:\ppd\0990018\C .VOL
Rating Table Output File: c:\ppd\0990018\C .PND

Min. Elev.(ft) = 127 Max. Elev.(ft) = 131.999 Incr.(ft) = .5

Additional elevations (ft) to be included in table:
* *

****
SYSTEM CONNECTIVITY
****

Structure	No.	Q Table	Q Table
WEIR-VR	2	->	2
ORIFICE	1	->	1

Outflow rating table summary was stored in file:
c:\ppd\0990018\C .PND

Outlet Structure File: D .STR

POND-2 Version: 5.17 S/N:
Date Executed: Time Executed:

****
Basin D Existing Conditions

****

***** COMPOSITE OUTFLOW SUMMARY ****

Elevation (ft)	Q (cfs)	Contributing Structures
107.00	0.0	
107.50	0.0	
108.00	0.0	
108.50	0.0	
109.00	0.0	
109.50	0.0	
110.00	0.0	
110.50	0.0	
111.00	0.0	
111.50	0.0	
112.00	0.0	
112.50	0.0	
113.00	0.0	
113.50	0.0	
114.00	0.0	
114.50	0.0	
115.00	24.9	1
115.50	162.6	1
116.00	364.1	1

Outlet Structure File: D .STR

POND-2 Version: 5.17 S/N:
Date Executed: Time Executed:

****
Basin D Existing Conditions

****

Outlet Structure File: c:\ppd\0990018\D .STR
Planimeter Input File: c:\ppd\0990018\D .VOL
Rating Table Output File: c:\ppd\0990018\D .PND

Min. Elev.(ft) = 107 Max. Elev.(ft) = 115.999 Incr.(ft) = .5

Additional elevations (ft) to be included in table:
* *

****
SYSTEM CONNECTIVITY
****

Structure	No.	Q Table		Q Table
WEIR-VR	1		->	1

Outflow rating table summary was stored in file:
c:\ppd\0990018\D .PND

Outlet Structure File: D .STR

POND-2 Version: 5.17 S/N:
Date Executed: Time Executed:

****
Basin D Existing Conditions

****

>>>>>> Structure No. 1 <<<<<<
(Input Data)

WEIR-VR
Weir - Vertical Rectangular

E1 elev.(ft)?	114.8
E2 elev.(ft)?	116
Weir coefficient?	3.09
Weir elev.(ft)?	114.8
Length (ft)?	90
Contracted/Suppressed (C/S)?	C

Outlet Structure File: E .STR

POND-2 Version: 5.17 S/N:
Date Executed: Time Executed:

****
Basin E Existing Conditions

****

***** COMPOSITE OUTFLOW SUMMARY ****

Elevation (ft)	Q (cfs)	Contributing Structures
124.70	0.0	
125.20	0.0	
125.70	0.0	
126.20	0.0	
126.70	0.2	1
127.20	11.2	1
127.70	30.4	1
128.20	64.2	1 +2
128.70	93.7	1 +2
129.00	0.0	

Outlet Structure File: E .STR

POND-2 Version: 5.17 S/N:
Date Executed: Time Executed:

****
Basin E Existing Conditions

****

Outlet Structure File: c:\ppd\0990018\E .STR
Planimeter Input File: c:\ppd\0990018\E .VOL
Rating Table Output File: c:\ppd\0990018\E .PND

Min. Elev.(ft) = 124.7 Max. Elev.(ft) = 128.999 Incr.(ft) = .5

Additional elevations (ft) to be included in table:
* *

****
SYSTEM CONNECTIVITY
****

Structure	No.	Q Table	Q Table
STAND PIPE	1	->	1
STAND PIPE	2	->	2

Outflow rating table summary was stored in file:
c:\ppd\0990018\E .PND

Outlet Structure File: E .STR

POND-2 Version: 5.17 S/N:
Date Executed: Time Executed:

****
Basin [redacted] Existing Conditions
E

****

>>>>>> Structure No. 1 <<<<<<
(Input Data)

STAND PIPE
Stand Pipe with weir or orifice flow

E1 elev.(ft)?	126.67
E2 elev.(ft)?	128.9
Crest elev.(ft)?	126.67
Diameter (ft)?	3
Weir coefficient?	3.09
Orifice coefficient?	0.82
Start transition elev.(ft) @ ?	
Transition height (ft)?	

Outlet Structure File: E .STR

POND-2 Version: 5.17 S/N:
Date Executed: Time Executed:

****
Basin [redacted] Existing Conditions
E

****

>>>>>> Structure No. 2 <<<<<<
(Input Data)

STAND PIPE
Stand Pipe with weir or orifice flow

E1 elev.(ft)?	127.74
E2 elev.(ft)?	128.9
Crest elev.(ft)?	127.74
Diameter (ft)?	3
Weir coefficient?	3.09
Orifice coefficient?	0.82
Start transition elev.(ft) @ ?	
Transition height (ft)?	

Outlet Structure File: H .STR

POND-2 Version: 5.17 S/N:
Date Executed: Time Executed:

****
Basin H Existing Conditions
Leachate Treatment Plant

****

***** COMPOSITE OUTFLOW SUMMARY ****

Elevation (ft)	Q (cfs)	Contributing Structures
145.00	0.0	
145.10	0.0	
145.20	0.0	
145.30	0.0	
145.40	0.0	
145.50	0.0	
145.60	0.0	
145.70	0.0	
145.80	0.0	
145.90	0.0	
146.00	0.0	
146.10	0.0	
146.20	0.0	
146.30	0.0	
146.40	0.0	
146.50	0.0	1
146.60	0.1	1
146.70	0.4	1
146.80	0.7	1
146.90	1.1	1
147.00	1.5	1
147.10	2.0	1
147.20	2.5	1
147.30	3.0	1
147.40	3.5	1
147.50	4.0	1
147.60	4.6	1
147.70	5.1	1
147.80	5.7	1
147.90	6.2	1
148.00	0.0	

Outlet Structure File: H .STR

POND-2 Version: 5.17 S/N:
Date Executed: Time Executed:

****
Basin H Existing Conditions
Leachate Treatment Plant

****

Outlet Structure File: c:\ppd\0990018\H .STR
Planimeter Input File: c:\ppd\0990018\H .VOL
Rating Table Output File: c:\ppd\0990018\H .PND

Min. Elev.(ft) = 145 Max. Elev.(ft) = 148 Incr.(ft) = .1

Additional elevations (ft) to be included in table:
* *

****
SYSTEM CONNECTIVITY
****

Structure	No.	Q Table		Q Table
WEIR-VR	1		->	1

Outflow rating table summary was stored in file:
c:\ppd\0990018\H .PND

Outlet Structure File: H .STR

POND-2 Version: 5.17 S/N:
Date Executed: Time Executed:

****
Basin H Existing Conditions
Leachate Treatment Plant

****

>>>>>> Structure No. 1 <<<<<<
(Input Data)

WEIR-VR
Weir - Vertical Rectangular

E1 elev.(ft)?	146.5
E2 elev.(ft)?	148
Weir coefficient?	3.09
Weir elev.(ft)?	146.5
Length (ft)?	1.5
Contracted/Suppressed (C/S)?	C

Outlet Structure File: H .STR

POND-2 Version: 5.17 S/N:
Date Executed: Time Executed:

****
Basin E Existing Conditions
Leachate Treatment Plant

****

***** COMPOSITE OUTFLOW SUMMARY ****

Elevation (ft)	Q (cfs)	Contributing Structures
145.00	0.0	
145.10	0.0	
145.20	0.0	
145.30	0.0	
145.40	0.0	
145.50	0.0	
145.60	0.0	
145.70	0.0	
145.80	0.0	
145.90	0.0	
146.00	0.0	
146.10	0.0	
146.20	0.0	
146.30	0.0	
146.40	0.0	
146.50	0.0	1
146.60	0.1	1
146.70	0.4	1
146.80	0.7	1
146.90	1.1	1
147.00	1.5	1
147.10	2.0	1
147.20	2.5	1
147.30	3.0	1
147.40	3.5	1
147.50	4.0	1
147.60	4.6	1
147.70	5.1	1
147.80	5.7	1
147.90	6.2	1
148.00	0.0	

Outlet Structure File: H .STR

POND-2 Version: 5.17 S/N:
Date Executed: Time Executed:

****
Basin H Existing Conditions
Leachate Treatment Plant

****

Outlet Structure File: c:\ppd\0990018\H .STR
Planimeter Input File: c:\ppd\0990018\H .VOL
Rating Table Output File: c:\ppd\0990018\H .PND

Min. Elev.(ft) = 145 Max. Elev.(ft) = 148 Incr.(ft) = .1

Additional elevations (ft) to be included in table:
* *

****
SYSTEM CONNECTIVITY
****

Structure	No.	Q Table		Q Table
WEIR-VR	1		->	1

Outflow rating table summary was stored in file:
c:\ppd\0990018\H .PND

Outlet Structure File: H .STR

POND-2 Version: 5.17 S/N:
Date Executed: Time Executed:

****
Basin E Existing Conditions
Leachate Treatment Plant

****

>>>>>> Structure No. 1 <<<<<<
(Input Data)

WEIR-VR
Weir - Vertical Rectangular

E1 elev.(ft)?	146.5
E2 elev.(ft)?	148
Weir coefficient?	3.09
Weir elev.(ft)?	146.5
Length (ft)?	1.5
Contracted/Suppressed (C/S)?	C

BASIN A ROUTING COMPUTATION

Quick TR-55 Version: 5.46 S/N:

Return Frequency: 25 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 06-15-1994 14:48:49
Watershed file: --> C:\PPD\0990018\A .MOP
Hydrograph file: --> C:\PPD\0990018\A25.HYD

SELF

>>>> Input Parameters Used to Compute Hydrograph <<<<

Subarea Description	AREA (acres)	CN	Tc (hrs)	* Tt (hrs)	Precip. (in)	Runoff (in)	Ia/p input/used	
	13.90	74.0	0.40	0.00	8.40	5.28	.08	.10
	9.20	74.0	0.10	0.00	8.40	5.28	.08	.10

* Travel time from subarea outfall to composite watershed outfall point.
Total area = 23.10 acres or 0.03609 sq.mi
Peak discharge = 108 cfs

>>>> Computer Modifications of Input Parameters <<<<<

Subarea Description	Input Values Tc (hr)	* Tt (hr)	Rounded Values Tc (hr)	* Tt (hr)	Ia/p Interpolated (Yes/No)	Ia/p Messages
	0.43	0.00	0.40	0.00	No	Computed Ia/p < .1
	0.14	0.00	0.10	0.00	No	Computed Ia/p < .1

* Travel time from subarea outfall to composite watershed outfall point.

Return Frequency: 25 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 06-15-1994 14:48:49
Watershed file: --> C:\PPD\0990018\A .MOP
Hydrograph file: --> C:\PPD\0990018\A25.HYD

SELF

>>>> Summary of Subarea Times to Peak <<<<

Subarea	Peak Discharge at Composite Outfall (cfs)	Time to Peak at Composite Outfall (hrs)
	68	12.3
	77	12.1
Composite Watershed	108	12.1

****
* Basin A Existing Conditions *
****

Inflow Hydrograph: c:\ppd\0990018\A25 .HYD
Rating Table file: c:\ppd\0990018\A .PND

----INITIAL CONDITIONS----
Elevation = 123.50 ft
Outflow = 0.00 cfs
Storage = 0.00 ac-ft

GIVEN POND DATA			INTERMEDIATE ROUTING COMPUTATIONS	
ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (ac-ft)	2S/t (cfs)	2S/t + 0 (cfs)
123.50	0.0	0.000	0.0	0.0
124.00	0.0	0.667	161.5	161.5
124.50	10.3	1.963	474.9	485.2
125.00	29.1	3.287	795.5	824.6
125.50	53.5	4.645	1124.0	1177.5
126.00	65.8	6.038	1461.3	1527.1
126.50	73.5	7.468	1807.3	1880.8
127.00	80.6	8.934	2162.0	2242.6
127.50	87.0	10.437	2525.8	2612.8
128.00	94.0	11.978	2898.8	2992.8
128.50	112.2	13.559	3281.2	3393.4
129.00	137.6	15.175	3672.4	3810.0

Time increment (t) = 0.100 hrs.

POND-2 Version: 5.17 S/N:
EXECUTED: 06-15-1994 14:49:29

ınd File: c:\ppd\0990018\A .PND
Inflow Hydrograph: c:\ppd\0990018\A25 .HYD
Outflow Hydrograph: c:\ppd\0990018\OUT .HYD

INFLOW HYDROGRAPH — ROUTING COMPUTATIONS

TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
11.000	4.00	-----	0.0	0.0	0.00	123.50
11.100	5.00	9.0	9.0	9.0	0.00	123.53
11.200	5.00	10.0	19.0	19.0	0.00	123.56
11.300	6.00	11.0	30.0	30.0	0.00	123.59
11.400	7.00	13.0	43.0	43.0	0.00	123.63
11.500	7.00	14.0	57.0	57.0	0.00	123.68
11.600	8.00	15.0	72.0	72.0	0.00	123.72
11.700	17.00	25.0	97.0	97.0	0.00	123.80
11.800	25.00	42.0	139.0	139.0	0.00	123.93
11.900	34.00	59.0	195.7	198.0	1.16	124.06
12.000	65.00	99.0	286.2	294.7	4.24	124.21
12.100	108.00	173.0	440.3	459.2	9.47	124.46
12.200	102.00	210.0	611.4	650.3	19.44	124.74
12.300	84.00	186.0	742.2	797.4	27.59	124.96
12.400	77.00	161.0	834.1	903.2	34.53	125.11
12.500	58.00	135.0	890.9	969.1	39.09	125.20
12.600	42.00	100.0	909.7	990.9	40.60	125.24
12.700	32.00	74.0	903.5	983.7	40.10	125.23
12.800	25.00	57.0	883.5	960.5	38.50	125.19
12.900	21.00	46.0	856.8	929.5	36.35	125.15
13.000	17.00	38.0	826.9	894.8	33.95	125.10
13.100	15.00	32.0	796.0	858.9	31.47	125.05
13.200	13.00	28.0	765.8	824.0	29.06	125.00
13.300	12.00	25.0	736.4	790.8	27.23	124.95
13.400	11.00	23.0	708.4	759.4	25.49	124.90
13.500	10.00	21.0	681.8	729.4	23.83	124.86
13.600	9.00	19.0	656.3	700.8	22.24	124.82
13.700	9.00	18.0	632.7	674.3	20.77	124.78
13.800	9.00	18.0	611.8	650.7	19.47	124.74
13.900	8.00	17.0	592.3	628.8	18.25	124.71
14.000	8.00	16.0	574.1	608.3	17.12	124.68
14.100	8.00	16.0	557.8	590.1	16.11	124.65
14.200	7.00	15.0	542.5	572.8	15.15	124.63
14.300	7.00	14.0	528.0	556.5	14.25	124.61
14.400	7.00	14.0	515.1	542.0	13.45	124.58
14.500	6.00	13.0	502.8	528.1	12.68	124.56
14.600	6.00	12.0	490.9	514.8	11.94	124.54
14.700	6.00	12.0	480.4	502.9	11.28	124.53
14.800	6.00	12.0	471.0	492.4	10.69	124.51
14.900	6.00	12.0	462.5	483.0	10.23	124.50
15.000	6.00	12.0	454.6	474.5	9.96	124.48
15.100	6.00	12.0	447.2	466.6	9.71	124.47
15.200	6.00	12.0	440.2	459.2	9.47	124.46
15.300	5.00	11.0	432.8	451.2	9.22	124.45
15.400	5.00	10.0	424.9	442.8	8.95	124.43

ond File: c:\ppd\0990018\A .PND
Inflow Hydrograph: c:\ppd\0990018\A25 .HYD
Outflow Hydrograph: c:\ppd\0990018\OUT .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
15.500	5.00	10.0	417.5	434.9	8.70	124.42
15.600	5.00	10.0	410.6	427.5	8.46	124.41
15.700	5.00	10.0	404.1	420.6	8.24	124.40
15.800	5.00	10.0	398.0	414.1	8.04	124.39
15.900	5.00	10.0	392.3	408.0	7.84	124.38
16.000	5.00	10.0	387.0	402.3	7.66	124.37
16.100	5.00	10.0	382.0	397.0	7.49	124.36
16.200	5.00	10.0	377.3	392.0	7.33	124.36
16.300	5.00	10.0	373.0	387.3	7.19	124.35
16.400	5.00	10.0	368.9	383.0	7.05	124.34
16.500	5.00	10.0	365.0	378.9	6.92	124.34
16.600	5.00	10.0	361.5	375.0	6.79	124.33
16.700	5.00	10.0	358.1	371.5	6.68	124.32
16.800	4.00	9.0	354.0	367.1	6.54	124.32
16.900	4.00	8.0	349.3	362.0	6.38	124.31
17.000	4.00	8.0	344.8	357.3	6.23	124.30
17.100	4.00	8.0	340.6	352.8	6.09	124.30
17.200	4.00	8.0	336.7	348.6	5.95	124.29
17.300	3.00	7.0	332.1	343.7	5.80	124.28
17.400	3.00	6.0	326.9	338.1	5.62	124.27
17.500	3.00	6.0	322.0	332.9	5.45	124.26
17.600	3.00	6.0	317.4	328.0	5.30	124.26
17.700	3.00	6.0	313.1	323.4	5.15	124.25
17.800	3.00	6.0	309.0	319.1	5.01	124.24
17.900	3.00	6.0	305.3	315.0	4.89	124.24
18.000	3.00	6.0	301.7	311.3	4.77	124.23
18.100	3.00	6.0	298.4	307.7	4.65	124.23
18.200	3.00	6.0	295.3	304.4	4.55	124.22
18.300	3.00	6.0	292.4	301.3	4.45	124.22
18.400	3.00	6.0	289.7	298.4	4.36	124.21
18.500	3.00	6.0	287.2	295.7	4.27	124.21
18.600	3.00	6.0	284.8	293.2	4.19	124.20
18.700	3.00	6.0	282.6	290.8	4.11	124.20
18.800	3.00	6.0	280.5	288.6	4.04	124.20
18.900	3.00	6.0	278.5	286.5	3.98	124.19
19.000	3.00	6.0	276.7	284.5	3.92	124.19
19.100	3.00	6.0	275.0	282.7	3.86	124.19
19.200	3.00	6.0	273.4	281.0	3.80	124.18
19.300	3.00	6.0	271.9	279.4	3.75	124.18
19.400	3.00	6.0	270.5	277.9	3.70	124.18
19.500	3.00	6.0	269.2	276.5	3.66	124.18
19.600	3.00	6.0	267.9	275.2	3.62	124.18
19.700	3.00	6.0	266.8	273.9	3.58	124.17
19.800	3.00	6.0	265.7	272.8	3.54	124.17
19.900	3.00	6.0	264.7	271.7	3.51	124.17
20.000	3.00	6.0	263.7	270.7	3.47	124.17

Pond File: c:\ppd\0990018\A .PND
Inflow Hydrograph: c:\ppd\0990018\A25 .HYD
Outflow Hydrograph: c:\ppd\0990018\OUT .HYD

INFLOW HYDROGRAPH — ROUTING COMPUTATIONS

TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
20.100	3.00	6.0	262.8	269.7	3.44	124.17
20.200	3.00	6.0	262.0	268.8	3.42	124.17
20.300	3.00	6.0	261.2	268.0	3.39	124.16
20.400	3.00	6.0	260.5	267.2	3.36	124.16
20.500	3.00	6.0	259.8	266.5	3.34	124.16
20.600	3.00	6.0	259.2	265.8	3.32	124.16
20.700	3.00	6.0	258.6	265.2	3.30	124.16
20.800	3.00	6.0	258.0	264.6	3.28	124.16
20.900	3.00	6.0	257.5	264.0	3.26	124.16
21.000	2.00	5.0	256.1	262.5	3.21	124.16
21.100	2.00	4.0	253.8	260.1	3.14	124.15
21.200	2.00	4.0	251.7	257.8	3.06	124.15
21.300	2.00	4.0	249.7	255.7	3.00	124.15
21.400	2.00	4.0	247.8	253.7	2.93	124.14
21.500	2.00	4.0	246.1	251.8	2.87	124.14
21.600	2.00	4.0	244.4	250.1	2.82	124.14
21.700	2.00	4.0	242.9	248.4	2.77	124.13
21.800	2.00	4.0	241.4	246.9	2.72	124.13
21.900	2.00	4.0	240.1	245.4	2.67	124.13
22.000	2.00	4.0	238.8	244.1	2.63	124.13
22.100	2.00	4.0	237.7	242.8	2.59	124.13
22.200	2.00	4.0	236.6	241.7	2.55	124.12
22.300	2.00	4.0	235.5	240.6	2.52	124.12
22.400	2.00	4.0	234.6	239.5	2.48	124.12
22.500	2.00	4.0	233.7	238.6	2.45	124.12
22.600	2.00	4.0	232.8	237.7	2.42	124.12
22.700	2.00	4.0	232.0	236.8	2.40	124.12
22.800	2.00	4.0	231.3	236.0	2.37	124.12
22.900	2.00	4.0	230.6	235.3	2.35	124.11
23.000	2.00	4.0	229.9	234.6	2.33	124.11
23.100	1.00	3.0	228.4	232.9	2.27	124.11
23.200	1.00	2.0	226.0	230.4	2.19	124.11
23.300	1.00	2.0	223.8	228.0	2.12	124.10
23.400	1.00	2.0	221.7	225.8	2.05	124.10
23.500	1.00	2.0	219.7	223.7	1.98	124.10
23.600	1.00	2.0	217.9	221.7	1.92	124.09
23.700	1.00	2.0	216.2	219.9	1.86	124.09
23.800	1.00	2.0	214.6	218.2	1.80	124.09
23.900	1.00	2.0	213.1	216.6	1.75	124.09
24.000	1.00	2.0	211.6	215.1	1.70	124.08
24.100	1.00	2.0	210.3	213.6	1.66	124.08
24.200	1.00	2.0	209.1	212.3	1.62	124.08
24.300	1.00	2.0	207.9	211.1	1.58	124.08
24.400	1.00	2.0	206.8	209.9	1.54	124.07
24.500	1.00	2.0	205.8	208.8	1.51	124.07
24.600	1.00	2.0	204.9	207.8	1.47	124.07

EXECUTED: 06-15-1994 14:49:29

```
 nd File:              c:\ppd\0990018\A      .PND
Inflow Hydrograph:     c:\ppd\0990018\A25    .HYD
Outflow Hydrograph:    c:\ppd\0990018\OUT    .HYD
```

INFLOW HYDROGRAPH / ROUTING COMPUTATIONS

TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
24.700	1.00	2.0	204.0	206.9	1.44	124.07
24.800	1.00	2.0	203.2	206.0	1.42	124.07
24.900	1.00	2.0	202.4	205.2	1.39	124.07
25.000	0.00	1.0	200.7	203.4	1.33	124.06
25.100	0.00	0.0	198.2	200.7	1.25	124.06
25.200	0.00	0.0	195.9	198.2	1.17	124.06
25.300	0.00	0.0	193.7	195.9	1.09	124.05
25.400	0.00	0.0	191.6	193.7	1.03	124.05
25.500	0.00	0.0	189.7	191.6	0.96	124.05
25.600	0.00	0.0	187.9	189.7	0.90	124.04
25.700	0.00	0.0	186.2	187.9	0.84	124.04
25.800	0.00	0.0	184.7	186.2	0.79	124.04
25.900	0.00	0.0	183.2	184.7	0.74	124.04

***************** SUMMARY OF ROUTING COMPUTATIONS *****************

```
Pond File:           c:\ppd\0990018\A       .PND
Inflow Hydrograph:   c:\ppd\0990018\A25     .HYD
Outflow Hydrograph:  c:\ppd\0990018\OUT     .HYD

Starting Pond W.S. Elevation =   123.50 ft

        ***** Summary of Peak Outflow and Peak Elevation *****

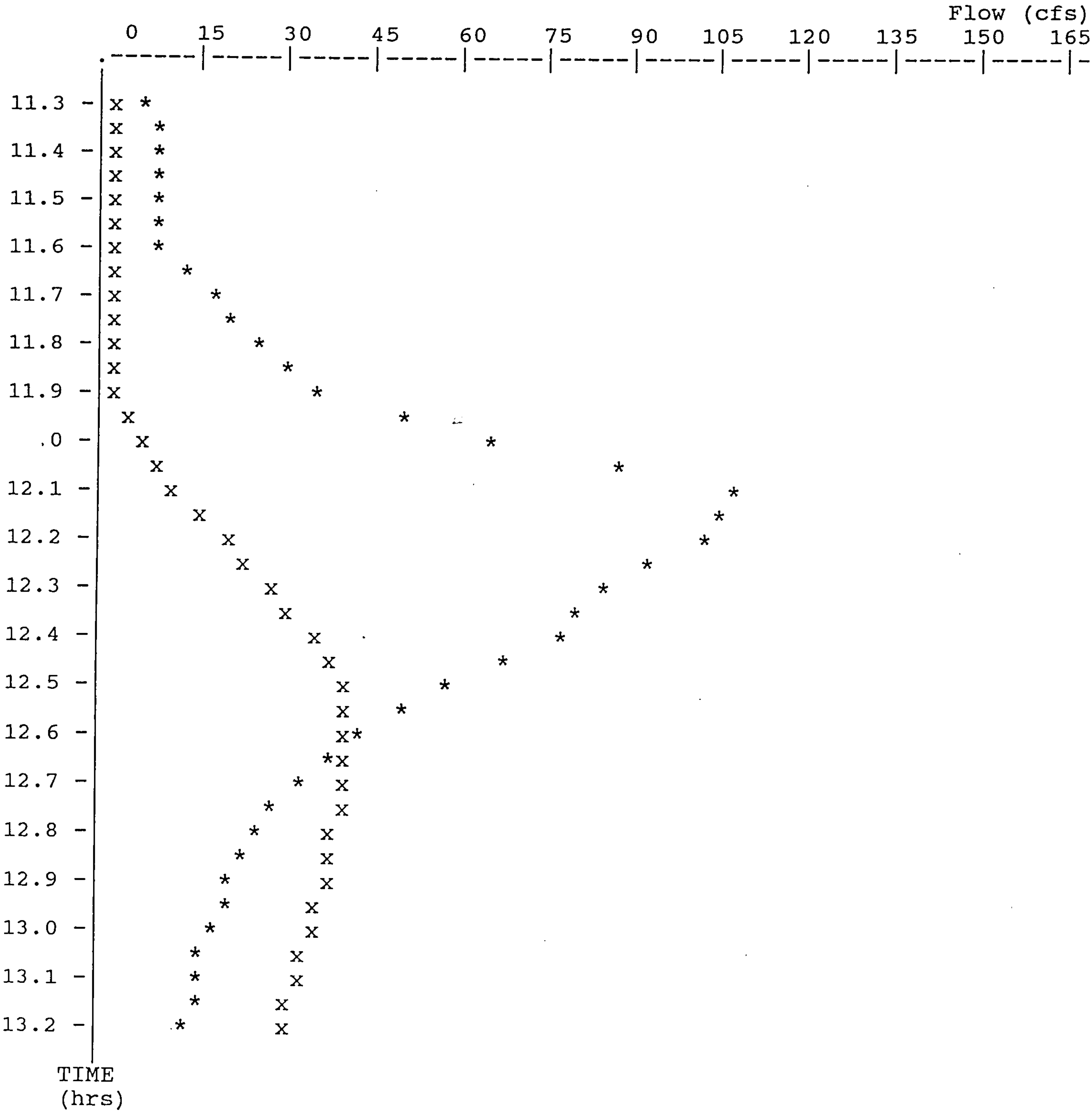
                     Peak Inflow    =   108.00 cfs
                     Peak Outflow   =    40.60 cfs
                     Peak Elevation =   125.24 ft

          ***** Summary of Approximate Peak Storage *****

              Initial Storage        =     0.00 ac-ft
              Peak Storage From Storm =    3.93 ac-ft
                                        ---------------
              Total Storage in Pond  =     3.93 ac-ft

        Warning: Inflow hydrograph truncated on left side.
```

```
Pond File:            c:\ppd\0990018\A        .PND
Inflow Hydrograph:    c:\ppd\0990018\A25      .HYD
Outflow Hydrograph:   c:\ppd\0990018\OUT      .HYD
                                                   EXECUTED: 06-15-1994
Peak Inflow     =   108.00 cfs                               14:49:29
Peak Outflow    =    40.60 cfs
Peak Elevation  =   125.24 ft
```




```
*  File:  c:\ppd\0990018\A25     .HYD   Qmax =   108.0 cfs
x  File:  c:\ppd\0990018\OUT     .HYD   Qmax =    40.6 cfs
```

BASIN B ROUTING COMPUTATION

Return Frequency: 25 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 06-17-1994 19:07:08
Watershed file: --> C:\PPD\0990018\B .MOP
Hydrograph file: --> C:\PPD\0990018\B25.HYD

SELF
Basin B

>>>> Input Parameters Used to Compute Hydrograph <<<<

Subarea Description	AREA (acres)	CN	Tc (hrs)	* Tt (hrs)	Precip. (in)	Runoff (in)	Ia/p input/used	
	29.10	74.0	0.40	0.00	8.40	5.28	.08	.10
	10.90	74.0	0.20	0.00	8.40	5.28	.08	.10

* Travel time from subarea outfall to composite watershed outfall point.
Total area = 40.00 acres or 0.06250 sq.mi
Peak discharge = 185 cfs

>>>> Computer Modifications of Input Parameters <<<<<

Subarea Description	Input Values Tc (hr)	Input Values * Tt (hr)	Rounded Values Tc (hr)	Rounded Values * Tt (hr)	Ia/p Interpolated (Yes/No)	Ia/p Messages
	0.44	0.00	0.40	0.00	No	Computed Ia/p < .1
	0.23	0.00	0.20	0.00	No	Computed Ia/p < .1

* Travel time from subarea outfall to composite watershed outfall point.

Return Frequency: 25 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 06-17-1994 19:07:08
Watershed file: --> C:\PPD\0990018\B .MOP
Hydrograph file: --> C:\PPD\0990018\B25.HYD

SELF
Basin B

>>>> Summary of Subarea Times to Peak <<<<

Subarea	Peak Discharge at Composite Outfall (cfs)	Time to Peak at Composite Outfall (hrs)
	142	12.3
	72	12.2
Composite Watershed	185	12.3

SCS ENGINEERS, PC
ENVIRONMENTAL CONSULTANTS
2 CROSFIELD AVENUE
SUITE 422
WEST NYACK, NY 10994
914 353-5727
FAX 914 353-5731

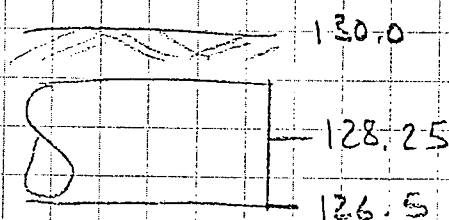
JOB 0990018.34
SHEET NO. ____ OF ____ SCALE ____
CALCULATED BY WEG DATE 4-4-94
CHECKED BY ____ DATE ____

Problem: Calculate the flow capacity of the existing (S-8) drop-inlet culverts @ Basin B (Downchute #2)

Given: $Q_{25} = 185$ cfs (S-8)
Pipe = 34" x 54" ERCP (2)
Inverts = 126.5 (in)
126.6 (out)

Solution:

Assume a 42" ø pipe (x2)



$Q = C_d A \sqrt{2gh}$

$C_d = 0.82$
$A = 9.62$ sf
$g = 32.2$
$Q = 92.5$ cfs

$92.5 = (0.82)(9.62)(\sqrt{64.4h})$

$\therefore h = 2.1'$

∴ For inlet control conditions, the headwater required to pass 185 cfs through the two 34" x 54" ERCP's is 2.1 feet (= el. 130.6). The addition of 7' tall gabion baskets around the existing structure will prevent roadway overtopping, and will also develop +6' of headwater to counteract basin tailwater conditions (outlet control).

```
********************************
*                              *
* Basin B Existing Conditions  *
*                              *
*                              *
*                              *
*                              *
********************************
```

Inflow Hydrograph: c:\ppd\0990018\B25 .HYD
Rating Table file: c:\ppd\0990018\B .PND

----INITIAL CONDITIONS----
Elevation = 126.00 ft
Outflow = 0.00 cfs
Storage = 0.00 ac-ft

GIVEN POND DATA			INTERMEDIATE ROUTING COMPUTATIONS	
ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (ac-ft)	2S/t (cfs)	2S/t + 0 (cfs)
126.00	0.0	0.000	0.0	0.0
126.50	0.0	2.319	561.3	561.3
127.00	0.0	4.885	1182.2	1182.2
127.50	0.0	7.618	1843.5	1843.5
128.00	0.0	10.430	2524.0	2524.0
128.50	0.0	13.307	3220.3	3220.3
129.00	0.0	16.235	3928.9	3928.9
129.50	0.0	19.216	4650.3	4650.3
130.00	0.0	22.250	5384.6	5384.6
130.50	98.2	25.334	6130.9	6229.1
131.00	277.1	28.458	6886.9	7164.0

Time increment (t) = 0.100 hrs.

POND-2 Version: 5.17 S/N:
EXECUTED: 06-17-1994   19:36:51

Pond File: c:\ppd\0990018\B .PND
Inflow Hydrograph: c:\ppd\0990018\B25 .HYD
Outflow Hydrograph: c:\ppd\0990018\OUT .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
11.000	6.00	-----	0.0	0.0	0.00	126.00
11.100	7.00	13.0	13.0	13.0	0.00	126.01
11.200	8.00	15.0	28.0	28.0	0.00	126.02
11.300	9.00	17.0	45.0	45.0	0.00	126.04
11.400	10.00	19.0	64.0	64.0	0.00	126.06
11.500	12.00	22.0	86.0	86.0	0.00	126.08
11.600	13.00	25.0	111.0	111.0	0.00	126.10
11.700	21.00	34.0	145.0	145.0	0.00	126.13
11.800	29.00	50.0	195.0	195.0	0.00	126.17
11.900	37.00	66.0	261.0	261.0	0.00	126.23
12.000	70.00	107.0	368.0	368.0	0.00	126.33
12.100	131.00	201.0	569.0	569.0	0.00	126.51
12.200	184.00	315.0	884.0	884.0	0.00	126.76
12.300	185.00	369.0	1253.0	1253.0	0.00	127.05
12.400	160.00	345.0	1598.0	1598.0	0.00	127.31
12.500	118.00	278.0	1876.0	1876.0	0.00	127.52
12.600	84.00	202.0	2078.0	2078.0	0.00	127.67
12.700	61.00	145.0	2223.0	2223.0	0.00	127.78
12.800	47.00	108.0	2331.0	2331.0	0.00	127.86
12.900	39.00	86.0	2417.0	2417.0	0.00	127.92
13.000	31.00	70.0	2487.0	2487.0	0.00	127.97
13.100	27.00	58.0	2545.0	2545.0	0.00	128.02
13.200	23.00	50.0	2595.0	2595.0	0.00	128.05
13.300	22.00	45.0	2640.0	2640.0	0.00	128.08
13.400	20.00	42.0	2682.0	2682.0	0.00	128.11
13.500	19.00	39.0	2721.0	2721.0	0.00	128.14
13.600	17.00	36.0	2757.0	2757.0	0.00	128.17
13.700	16.00	33.0	2790.0	2790.0	0.00	128.19
13.800	16.00	32.0	2822.0	2822.0	0.00	128.21
13.900	16.00	32.0	2854.0	2854.0	0.00	128.24
14.000	15.00	31.0	2885.0	2885.0	0.00	128.26
14.100	14.00	29.0	2914.0	2914.0	0.00	128.28
14.200	13.00	27.0	2941.0	2941.0	0.00	128.30
14.300	12.00	25.0	2966.0	2966.0	0.00	128.32
14.400	12.00	24.0	2990.0	2990.0	0.00	128.33
14.500	11.00	23.0	3013.0	3013.0	0.00	128.35
14.600	11.00	22.0	3035.0	3035.0	0.00	128.37
14.700	11.00	22.0	3057.0	3057.0	0.00	128.38
14.800	10.00	21.0	3078.0	3078.0	0.00	128.40
14.900	10.00	20.0	3098.0	3098.0	0.00	128.41
15.000	10.00	20.0	3118.0	3118.0	0.00	128.43
15.100	10.00	20.0	3138.0	3138.0	0.00	128.44
15.200	10.00	20.0	3158.0	3158.0	0.00	128.46
15.300	9.00	19.0	3177.0	3177.0	0.00	128.47
15.400	9.00	18.0	3195.0	3195.0	0.00	128.48

POND-2 Version: 5.17 S/N:
EXECUTED: 06-17-1994 19:36:51

ond File: c:\ppd\0990018\B .PND
Inflow Hydrograph: c:\ppd\0990018\B25 .HYD
Outflow Hydrograph: c:\ppd\0990018\OUT .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
15.500	9.00	18.0	3213.0	3213.0	0.00	128.49
15.600	9.00	18.0	3231.0	3231.0	0.00	128.51
15.700	9.00	18.0	3249.0	3249.0	0.00	128.52
15.800	8.00	17.0	3266.0	3266.0	0.00	128.53
15.900	8.00	16.0	3282.0	3282.0	0.00	128.54
16.000	8.00	16.0	3298.0	3298.0	0.00	128.55
16.100	8.00	16.0	3314.0	3314.0	0.00	128.57
16.200	8.00	16.0	3330.0	3330.0	0.00	128.58
16.300	7.00	15.0	3345.0	3345.0	0.00	128.59
16.400	7.00	14.0	3359.0	3359.0	0.00	128.60
16.500	7.00	14.0	3373.0	3373.0	0.00	128.61
16.600	7.00	14.0	3387.0	3387.0	0.00	128.62
16.700	7.00	14.0	3401.0	3401.0	0.00	128.63
16.800	7.00	14.0	3415.0	3415.0	0.00	128.64
16.900	7.00	14.0	3429.0	3429.0	0.00	128.65
17.000	7.00	14.0	3443.0	3443.0	0.00	128.66
17.100	7.00	14.0	3457.0	3457.0	0.00	128.67
17.200	7.00	14.0	3471.0	3471.0	0.00	128.68
17.300	7.00	14.0	3485.0	3485.0	0.00	128.69
17.400	7.00	14.0	3499.0	3499.0	0.00	128.70
17.500	7.00	14.0	3513.0	3513.0	0.00	128.71
17.600	7.00	14.0	3527.0	3527.0	0.00	128.72
17.700	7.00	14.0	3541.0	3541.0	0.00	128.73
17.800	6.00	13.0	3554.0	3554.0	0.00	128.74
17.900	6.00	12.0	3566.0	3566.0	0.00	128.74
18.000	6.00	12.0	3578.0	3578.0	0.00	128.75
18.100	6.00	12.0	3590.0	3590.0	0.00	128.76
18.200	6.00	12.0	3602.0	3602.0	0.00	128.77
18.300	6.00	12.0	3614.0	3614.0	0.00	128.78
18.400	6.00	12.0	3626.0	3626.0	0.00	128.79
18.500	6.00	12.0	3638.0	3638.0	0.00	128.79
18.600	5.00	11.0	3649.0	3649.0	0.00	128.80
18.700	5.00	10.0	3659.0	3659.0	0.00	128.81
18.800	5.00	10.0	3669.0	3669.0	0.00	128.82
18.900	5.00	10.0	3679.0	3679.0	0.00	128.82
19.000	5.00	10.0	3689.0	3689.0	0.00	128.83
19.100	5.00	10.0	3699.0	3699.0	0.00	128.84
19.200	5.00	10.0	3709.0	3709.0	0.00	128.84
19.300	5.00	10.0	3719.0	3719.0	0.00	128.85
19.400	5.00	10.0	3729.0	3729.0	0.00	128.86
19.500	4.00	9.0	3738.0	3738.0	0.00	128.87
19.600	4.00	8.0	3746.0	3746.0	0.00	128.87
19.700	4.00	8.0	3754.0	3754.0	0.00	128.88
19.800	4.00	8.0	3762.0	3762.0	0.00	128.88
19.900	4.00	8.0	3770.0	3770.0	0.00	128.89
20.000	4.00	8.0	3778.0	3778.0	0.00	128.89

EXECUTED: 06-17-1994 19:36:51

ɪnd File: c:\ppd\0990018\B .PND
Inflow Hydrograph: c:\ppd\0990018\B25 .HYD
Outflow Hydrograph: c:\ppd\0990018\OUT .HYD

INFLOW HYDROGRAPH ROUTING COMPUTATIONS

TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
20.100	4.00	8.0	3786.0	3786.0	0.00	128.90
20.200	4.00	8.0	3794.0	3794.0	0.00	128.90
20.300	4.00	8.0	3802.0	3802.0	0.00	128.91
20.400	4.00	8.0	3810.0	3810.0	0.00	128.92
20.500	4.00	8.0	3818.0	3818.0	0.00	128.92
20.600	4.00	8.0	3826.0	3826.0	0.00	128.93
20.700	4.00	8.0	3834.0	3834.0	0.00	128.93
20.800	4.00	8.0	3842.0	3842.0	0.00	128.94
20.900	4.00	8.0	3850.0	3850.0	0.00	128.94
21.000	4.00	8.0	3858.0	3858.0	0.00	128.95
21.100	4.00	8.0	3866.0	3866.0	0.00	128.96
21.200	4.00	8.0	3874.0	3874.0	0.00	128.96
21.300	4.00	8.0	3882.0	3882.0	0.00	128.97
21.400	4.00	8.0	3890.0	3890.0	0.00	128.97
21.500	4.00	8.0	3898.0	3898.0	0.00	128.98
21.600	4.00	8.0	3906.0	3906.0	0.00	128.98
21.700	4.00	8.0	3914.0	3914.0	0.00	128.99
21.800	4.00	8.0	3922.0	3922.0	0.00	129.00
21.900	4.00	8.0	3930.0	3930.0	0.00	129.00
22.000	4.00	8.0	3938.0	3938.0	0.00	129.01
22.100	4.00	8.0	3946.0	3946.0	0.00	129.01
22.200	4.00	8.0	3954.0	3954.0	0.00	129.02
22.300	4.00	8.0	3962.0	3962.0	0.00	129.02
22.400	4.00	8.0	3970.0	3970.0	0.00	129.03
22.500	4.00	8.0	3978.0	3978.0	0.00	129.03
22.600	3.00	7.0	3985.0	3985.0	0.00	129.04
22.700	3.00	6.0	3991.0	3991.0	0.00	129.04
22.800	3.00	6.0	3997.0	3997.0	0.00	129.05
22.900	3.00	6.0	4003.0	4003.0	0.00	129.05
23.000	3.00	6.0	4009.0	4009.0	0.00	129.06
23.100	3.00	6.0	4015.0	4015.0	0.00	129.06
23.200	3.00	6.0	4021.0	4021.0	0.00	129.06
23.300	3.00	6.0	4027.0	4027.0	0.00	129.07
23.400	3.00	6.0	4033.0	4033.0	0.00	129.07
23.500	2.00	5.0	4038.0	4038.0	0.00	129.08
23.600	2.00	4.0	4042.0	4042.0	0.00	129.08
23.700	2.00	4.0	4046.0	4046.0	0.00	129.08
23.800	2.00	4.0	4050.0	4050.0	0.00	129.08
23.900	2.00	4.0	4054.0	4054.0	0.00	129.09
24.000	2.00	4.0	4058.0	4058.0	0.00	129.09
24.100	2.00	4.0	4062.0	4062.0	0.00	129.09
24.200	2.00	4.0	4066.0	4066.0	0.00	129.10
24.300	2.00	4.0	4070.0	4070.0	0.00	129.10
24.400	2.00	4.0	4074.0	4074.0	0.00	129.10
24.500	2.00	4.0	4078.0	4078.0	0.00	129.10
24.600	1.00	3.0	4081.0	4081.0	0.00	129.11

POND-2 Version: 5.17 S/N:
EXECUTED: 06-17-1994 19:36:51

nd File: c:\ppd\0990018\B .PND
Inflow Hydrograph: c:\ppd\0990018\B25 .HYD
Outflow Hydrograph: c:\ppd\0990018\OUT .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
24.700	1.00	2.0	4083.0	4083.0	0.00	129.11
24.800	1.00	2.0	4085.0	4085.0	0.00	129.11
24.900	1.00	2.0	4087.0	4087.0	0.00	129.11
25.000	1.00	2.0	4089.0	4089.0	0.00	129.11
25.100	1.00	2.0	4091.0	4091.0	0.00	129.11
25.200	1.00	2.0	4093.0	4093.0	0.00	129.11
25.300	1.00	2.0	4095.0	4095.0	0.00	129.12
25.400	1.00	2.0	4097.0	4097.0	0.00	129.12
25.500	0.00	1.0	4098.0	4098.0	0.00	129.12
25.600	0.00	0.0	4098.0	4098.0	0.00	129.12
25.700	0.00	0.0	4098.0	4098.0	0.00	129.12
25.800	0.00	0.0	4098.0	4098.0	0.00	129.12
25.900	0.00	0.0	4098.0	4098.0	0.00	129.12

****************** SUMMARY OF ROUTING COMPUTATIONS ******************

Pond File:	c:\ppd\0990018\B	.PND
Inflow Hydrograph:	c:\ppd\0990018\B25	.HYD
Outflow Hydrograph:	c:\ppd\0990018\OUT	.HYD

Starting Pond W.S. Elevation = 126.00 ft

***** Summary of Peak Outflow and Peak Elevation *****

Peak Inflow	=	185.00 cfs
Peak Outflow	=	0.00 cfs
Peak Elevation	=	129.12 ft

***** Summary of Approximate Peak Storage *****

Initial Storage	=	0.00 ac-ft
Peak Storage From Storm	=	16.93 ac-ft

Total Storage in Pond	=	16.93 ac-ft

Warning: Inflow hydrograph truncated on left side.

>>>>>> Warning, peak outflow = last ordinate point. <<<<<<

>>>>>> Warning, peak outflow = last ordinate point. <<<<<<

POND-2 Version: 5.17 S/N: Page 7

Pond File: c:\ppd\0990018\B .PND
Inflow Hydrograph: c:\ppd\0990018\B25 .HYD
Outflow Hydrograph: c:\ppd\0990018\OUT .HYD

EXECUTED: 06-17-1994
19:36:51

Peak Inflow = 185.00 cfs
Peak Outflow = 0.00 cfs
Peak Elevation = 129.12 ft

```
                                                                 Flow (cfs)
        0    20    40    60    80   100   120   140   160   180   200   220
      .------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-
11.5 -|x   *
      |x   *
11.6 -|x   *
      |x    *
11.7 -|x     *
      |x       *
11.8 -|x        *
      |x         *
11.9 -|x          *
      |x               *
12.0 -|x                    *
      |x                             *
   1 -|x                                      *
      |x                                              *
12.2 -|x                                                      *
      |x                                                      *
12.3 -|x                                                       *
      |x                                                   *
12.4 -|x                                               *
      |x                                         *
12.5 -|x                                  *
      |x                             *
12.6 -|x                        *
      |x                     *
12.7 -|x                 *
      |x               *
12.8 -|x             *
      |x            *
12.9 -|x           *
      |x          *
13.0 -|x        *
      |x        *
13.1 -|x       *
      |x      *
13.2 -|x      *
      |x      *
13.3 -|x      *
      |x     *
   4 -|x     *
      |
    TIME
   (hrs)
```

BASIN C ROUTING COMPUTATION

```
********************************
*                              *
* Basin C Existing Conditions  *
*                              *
*                              *
*                              *
*                              *
********************************
```

Inflow Hydrograph: c:\ppd\0990018\BORROW2 .HYD
Rating Table file: c:\ppd\0990018\C .PND

----INITIAL CONDITIONS----
Elevation = 127.00 ft
Outflow = 0.00 cfs
Storage = 0.00 ac-ft

GIVEN POND DATA

ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (ac-ft)
127.00	0.0	0.000
127.50	0.0	1.006
128.00	0.0	2.217
128.50	22.8	3.563
129.00	32.3	4.963
129.50	39.6	6.416
130.00	45.7	7.926
130.50	72.8	9.494
131.00	117.1	11.125
131.50	172.3	12.820
132.00	235.8	14.579

INTERMEDIATE ROUTING COMPUTATIONS

2S/t (cfs)	2S/t + 0 (cfs)
0.0	0.0
243.6	243.6
536.6	536.6
862.3	885.1
1200.9	1233.2
1552.8	1592.4
1918.1	1963.8
2297.7	2370.5
2692.2	2809.3
3102.4	3274.7
3528.0	3763.8

Time increment (t) = 0.100 hrs.

POND-2 Version: 5.17 S/N:
EXECUTED: 07-05-1994 11:13:27

nd File: c:\ppd\0990018\C .PND
flow Hydrograph: c:\ppd\0990018\BORROW2 .HYD
Outflow Hydrograph: c:\ppd\0990018\OUT .HYD

INFLOW HYDROGRAPH

ROUTING COMPUTATIONS

TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
11.000	4.00	-----	0.0	0.0	0.00	127.00
11.100	4.00	8.0	8.0	8.0	0.00	127.02
11.200	5.00	9.0	17.0	17.0	0.00	127.03
11.300	5.00	10.0	27.0	27.0	0.00	127.06
11.400	6.00	11.0	38.0	38.0	0.00	127.08
11.500	6.00	12.0	50.0	50.0	0.00	127.10
11.600	7.00	13.0	63.0	63.0	0.00	127.13
11.700	8.00	15.0	78.0	78.0	0.00	127.16
11.800	8.00	16.0	94.0	94.0	0.00	127.19
11.900	9.00	17.0	111.0	111.0	0.00	127.23
12.000	11.00	20.0	131.0	131.0	0.00	127.27
12.100	15.00	26.0	157.0	157.0	0.00	127.32
12.200	24.00	39.0	196.0	196.0	0.00	127.40
12.300	37.00	61.0	257.0	257.0	0.00	127.52
12.400	55.00	92.0	349.0	349.0	0.00	127.68
12.500	76.00	131.0	480.0	480.0	0.00	127.90
12.600	95.00	171.0	636.0	651.0	7.48	128.16
.700	108.00	203.0	799.5	839.0	19.78	128.43
2.800	117.00	225.0	971.3	1024.5	26.60	128.70
12.900	110.00	227.0	1135.6	1198.3	31.35	128.95
13.000	103.00	213.0	1279.3	1348.6	34.64	129.16
13.100	90.00	193.0	1398.0	1472.3	37.16	129.33
13.200	78.00	168.0	1487.8	1566.0	39.06	129.46
13.300	67.00	145.0	1552.3	1632.8	40.26	129.55
13.400	57.00	124.0	1594.3	1676.3	40.98	129.61
13.500	51.00	108.0	1619.5	1702.3	41.41	129.65
13.600	44.00	95.0	1631.3	1714.5	41.61	129.66
13.700	39.00	83.0	1631.1	1714.3	41.60	129.66
13.800	34.00	73.0	1621.2	1704.1	41.44	129.65
13.900	30.00	64.0	1603.0	1685.2	41.13	129.63
14.000	27.00	57.0	1578.6	1660.0	40.71	129.59
14.100	25.00	52.0	1550.1	1630.6	40.23	129.55
14.200	23.00	48.0	1518.7	1598.1	39.69	129.51
14.300	21.00	44.0	1484.7	1562.7	39.00	129.46
14.400	19.00	40.0	1448.3	1524.7	38.23	129.41
14.500	18.00	37.0	1410.4	1485.3	37.42	129.35
14.600	16.00	34.0	1371.2	1444.4	36.59	129.29
14.700	15.00	31.0	1330.8	1402.2	35.74	129.24
14.800	14.00	29.0	1290.0	1359.8	34.87	129.18
14.900	14.00	28.0	1250.0	1318.0	34.02	129.12
15.000	13.00	27.0	1210.6	1277.0	33.19	129.06
15.100	13.00	26.0	1171.9	1236.6	32.37	129.00
.200	12.00	25.0	1134.3	1196.9	31.31	128.95
.300	12.00	24.0	1097.7	1158.3	30.25	128.89
15.400	11.00	23.0	1062.3	1120.7	29.23	128.84

EXECUTED: 07-05-1994 11:13:27

Pond File: c:\ppd\0990018\C .PND
Inflow Hydrograph: c:\ppd\0990018\BORROW2 .HYD
Outflow Hydrograph: c:\ppd\0990018\OUT .HYD

INFLOW HYDROGRAPH | ROUTING COMPUTATIONS

TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
15.500	11.00	22.0	1027.8	1084.3	28.24	128.79
15.600	11.00	22.0	995.2	1049.8	27.29	128.74
15.700	10.00	21.0	963.5	1016.2	26.38	128.69
15.800	10.00	20.0	932.5	983.5	25.48	128.64
15.900	9.00	19.0	902.3	951.5	24.61	128.60
16.000	9.00	18.0	872.8	920.3	23.76	128.55
16.100	9.00	18.0	844.9	890.8	22.95	128.51
16.200	9.00	18.0	820.2	862.9	21.34	128.47
16.300	9.00	18.0	798.7	838.2	19.73	128.43
16.400	9.00	18.0	780.1	816.7	18.32	128.40
16.500	9.00	18.0	763.9	798.1	17.10	128.38
16.600	9.00	18.0	749.8	781.9	16.04	128.35
16.700	9.00	18.0	737.5	767.8	15.12	128.33
16.800	8.00	17.0	726.0	754.5	14.26	128.31
16.900	8.00	16.0	715.1	742.0	13.44	128.29
17.000	8.00	16.0	705.7	731.1	12.73	128.28
17.100	8.00	16.0	697.5	721.7	12.11	128.27
17.200	8.00	16.0	690.3	713.5	11.57	128.25
17.300	7.00	15.0	683.3	705.3	11.04	128.24
17.400	7.00	14.0	676.2	697.3	10.51	128.23
17.500	7.00	14.0	670.1	690.2	10.05	128.22
17.600	7.00	14.0	664.8	684.1	9.65	128.21
17.700	7.00	14.0	660.2	678.8	9.30	128.20
17.800	7.00	14.0	656.2	674.2	9.00	128.20
17.900	7.00	14.0	652.7	670.2	8.74	128.19
18.000	7.00	14.0	649.7	666.7	8.51	128.19
18.100	7.00	14.0	647.1	663.7	8.31	128.18
18.200	7.00	14.0	644.8	661.1	8.14	128.18
18.300	7.00	14.0	642.8	658.8	7.99	128.18
18.400	7.00	14.0	641.1	656.8	7.86	128.17
18.500	6.00	13.0	638.7	654.1	7.68	128.17
18.600	6.00	12.0	635.8	650.7	7.46	128.16
18.700	6.00	12.0	633.2	647.8	7.27	128.16
18.800	6.00	12.0	631.0	645.2	7.11	128.16
18.900	6.00	12.0	629.1	643.0	6.96	128.15
19.000	6.00	12.0	627.4	641.1	6.84	128.15
19.100	6.00	12.0	626.0	639.4	6.73	128.15
19.200	6.00	12.0	624.7	638.0	6.63	128.15
19.300	6.00	12.0	623.6	636.7	6.55	128.14
19.400	6.00	12.0	622.7	635.6	6.48	128.14
19.500	6.00	12.0	621.8	634.7	6.41	128.14
19.600	5.00	11.0	620.2	632.8	6.29	128.14
19.700	5.00	10.0	618.0	630.2	6.13	128.13
19.800	5.00	10.0	616.0	628.0	5.98	128.13
19.900	5.00	10.0	614.3	626.0	5.85	128.13
20.000	5.00	10.0	612.9	624.3	5.74	128.13

EXECUTED: 07-05-1994 11:13:27

nd File: c:\ppd\0990018\C .PND
nflow Hydrograph: c:\ppd\0990018\BORROW2 .HYD
Outflow Hydrograph: c:\ppd\0990018\OUT .HYD

INFLOW HYDROGRAPH — ROUTING COMPUTATIONS

TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
20.100	5.00	10.0	611.6	622.9	5.64	128.12
20.200	5.00	10.0	610.5	621.6	5.56	128.12
20.300	5.00	10.0	609.5	620.5	5.49	128.12
20.400	5.00	10.0	608.6	619.5	5.42	128.12
20.500	5.00	10.0	607.9	618.6	5.37	128.12
20.600	5.00	10.0	607.3	617.9	5.32	128.12
20.700	5.00	10.0	606.7	617.3	5.28	128.12
20.800	5.00	10.0	606.2	616.7	5.24	128.11
20.900	5.00	10.0	605.8	616.2	5.21	128.11
21.000	4.00	9.0	604.6	614.8	5.12	128.11
21.100	4.00	8.0	602.7	612.6	4.97	128.11
21.200	4.00	8.0	601.0	610.7	4.84	128.11
21.300	4.00	8.0	599.5	609.0	4.73	128.10
21.400	4.00	8.0	598.2	607.5	4.64	128.10
21.500	4.00	8.0	597.1	606.2	4.55	128.10
21.600	4.00	8.0	596.2	605.1	4.48	128.10
21.700	4.00	8.0	595.3	604.2	4.42	128.10
1.800	4.00	8.0	594.6	603.3	4.36	128.10
21.900	4.00	8.0	594.0	602.6	4.32	128.09
22.000	4.00	8.0	593.4	602.0	4.27	128.09
22.100	4.00	8.0	592.9	601.4	4.24	128.09
22.200	4.00	8.0	592.5	600.9	4.21	128.09
22.300	4.00	8.0	592.2	600.5	4.18	128.09
22.400	4.00	8.0	591.8	600.2	4.16	128.09
22.500	4.00	8.0	591.6	599.8	4.14	128.09
22.600	3.00	7.0	590.5	598.6	4.05	128.09
22.700	3.00	6.0	588.6	596.5	3.92	128.09
22.800	3.00	6.0	587.0	594.6	3.80	128.08
22.900	3.00	6.0	585.7	593.0	3.69	128.08
23.000	3.00	6.0	584.5	591.7	3.60	128.08
23.100	3.00	6.0	583.4	590.5	3.52	128.08
23.200	3.00	6.0	582.5	589.4	3.45	128.08
23.300	3.00	6.0	581.7	588.5	3.39	128.07
23.400	3.00	6.0	581.0	587.7	3.34	128.07
23.500	2.00	5.0	579.6	586.0	3.23	128.07
23.600	2.00	4.0	577.4	583.6	3.07	128.07
23.700	2.00	4.0	575.6	581.4	2.93	128.06
23.800	2.00	4.0	573.9	579.6	2.81	128.06
23.900	2.00	4.0	572.5	577.9	2.70	128.06
24.000	2.00	4.0	571.3	576.5	2.61	128.06
24.100	2.00	4.0	570.3	575.3	2.53	128.06
24.200	2.00	4.0	569.3	574.3	2.46	128.05
4.300	2.00	4.0	568.5	573.3	2.40	128.05
4.400	2.00	4.0	567.8	572.5	2.35	128.05
24.500	2.00	4.0	567.2	571.8	2.30	128.05
24.600	1.00	3.0	565.8	570.2	2.20	128.05

```
 nd File:              c:\ppd\0990018\C        .PND
 .flow Hydrograph:     c:\ppd\0990018\BORROW2  .HYD
Outflow Hydrograph:    c:\ppd\0990018\OUT      .HYD
```

INFLOW HYDROGRAPH

ROUTING COMPUTATIONS

TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
24.700	1.00	2.0	563.7	567.8	2.04	128.04
24.800	1.00	2.0	561.9	565.7	1.91	128.04
24.900	1.00	2.0	560.4	563.9	1.79	128.04
25.000	1.00	2.0	559.0	562.4	1.68	128.04
25.100	1.00	2.0	557.8	561.0	1.59	128.03
25.200	1.00	2.0	556.8	559.8	1.52	128.03
25.300	1.00	2.0	555.9	558.8	1.45	128.03
25.400	1.00	2.0	555.1	557.9	1.39	128.03
25.500	0.00	1.0	553.5	556.1	1.27	128.03
25.600	0.00	0.0	551.3	553.5	1.11	128.02
25.700	0.00	0.0	549.4	551.3	0.96	128.02
25.800	0.00	0.0	547.7	549.4	0.84	128.02
25.900	0.00	0.0	546.3	547.7	0.73	128.02

****************** SUMMARY OF ROUTING COMPUTATIONS ******************

```
Pond File:            c:\ppd\0990018\C       .PND
Inflow Hydrograph:    c:\ppd\0990018\BORROW2 .HYD
Outflow Hydrograph:   c:\ppd\0990018\OUT     .HYD
```

Starting Pond W.S. Elevation = 127.00 ft

***** Summary of Peak Outflow and Peak Elevation *****

```
Peak Inflow    =  117.00 cfs
Peak Outflow   =   41.61 cfs
Peak Elevation =  129.66 ft
```

***** Summary of Approximate Peak Storage *****

```
Initial Storage          =     0.00 ac-ft
Peak Storage From Storm  =     6.91 ac-ft
                             ---------------
Total Storage in Pond    =     6.91 ac-ft
```

Warning: Inflow hydrograph truncated on left side.

BASIN D ROUTING COMPUTATION

Quick TR-55 Ver.5.46 S/N:
Executed: 17:25:17 04-04-1994

SUMMARY SHEET FOR Tc or Tt COMPUTATIONS
(Solved for Time using Length/Velocity)

SELF
BASIN D
MAIN CULVERT
TIME OF TRAVEL

	Subarea descr.	Tc or Tt	Time (hrs)
(Downchute 3)	SUBSHED C	Tt	0.22
(" 4)	SUBSHED D1	Tt	0.10
(" 5)	SUBSHED D2	Tt	0.07
	AREA 1	Tt	0.00
	AREA 2	Tt	0.04
	AREA 3	Tt	0.10

Quick TR-55 Ver.5.46 S/N:
Executed: 17:25:17 04-04-1994

SELF
BASIN D
MAIN CULVERT
TIME OF TRAVEL

Tc or Tt DATA

::

Subarea: SUBSHED C DESCRIPTION	LENGTH (feet)	VELOCITY (ft/sec)	TIME minutes		hours
CHANNEL FLOW	3200	4.00	13.3	=	0.22

	minutes		hours
TOTAL Tt --->	13.3	=	0.22

::::::::::::::::::::::::::::::::::

Subarea: SUBSHED D1 DESCRIPTION	LENGTH (feet)	VELOCITY (ft/sec)	TIME minutes		hours
CHANNEL FLOW	1500	4.00	6.3	=	0.10

	minutes		hours
TOTAL Tt --->	6.3	=	0.10

::::::::::::::::::::::::::::::::::

Subarea: SUBSHED D2 DESCRIPTION	LENGTH (feet)	VELOCITY (ft/sec)	TIME minutes		hours
CHANNEL FLOW	1000	4.00	4.2	=	0.07

	minutes		hours
TOTAL Tt --->	4.2	=	0.07

::::::::::::::::::::::::::::::::::

Quick TR-55 Ver.5.46   S/N:
Executed: 17:25:17   04-04-1994

Subarea: AREA 1 DESCRIPTION	LENGTH (feet)	VELOCITY (ft/sec)	TIME minutes		hours
CHANNEL FLOW	0	4.00	0.0	=	0.00
		TOTAL Tt --->	0.0	=	0.00

Subarea: AREA 2 DESCRIPTION	LENGTH (feet)	VELOCITY (ft/sec)	TIME minutes		hours
CHANNEL FLOW	575	4.00	2.4	=	0.04
		TOTAL Tt --->	2.4	=	0.04

Subarea: AREA 3 DESCRIPTION	LENGTH (feet)	VELOCITY (ft/sec)	TIME minutes		hours
CHANNEL FLOW	1500	4.00	6.3	=	0.10
		TOTAL Tt --->	6.3	=	0.10

TR-55 TABULAR HYDROGRAPH METHOD
Type II Distribution
(24 hr. Duration Storm)

Executed: 06-15-1994 16:18:47
Watershed file: --> c:\ppd\0990018\DTOTAL .WSD
Hydrograph file: --> c:\ppd\0990018\DTOTAL .HYD

Total Runoff to Basin D from Landfill
Downchutes 4 and 5, and
Offsite Areas 1, 2, and 3

>>>> Input Parameters Used to Compute Hydrograph <<<<

Subarea Description	AREA (acres)	CN	Tc (hrs)	* Tt (hrs)	Precip. (in)	Runoff (in)	Ia/p input/used	
Downchute 3	17.70	74.0	0.40	0.10	8.40	5.28	.08	.10
Downchute 3	14.80	74.0	0.20	0.10	8.40	5.28	.08	.10
Downchute 4	11.80	74.0	0.40	0.00	8.40	5.28	.08	.10
Downchute 4	6.00	74.0	0.20	0.10	8.40	5.28	.08	.10
Downchute 5	19.60	74.0	0.40	0.00	8.40	5.28	.08	.10
Downchute 5	15.10	74.0	0.20	0.00	8.40	5.28	.08	.10
Area 1	14.40	55.0	0.50	0.00	8.40	3.06	.19	.10
Area 2	19.20	55.0	0.50	0.10	8.40	3.06	.19	.10
Area 3	20.10	55.0	0.75	0.10	8.40	3.06	.19	.10

* Travel time from subarea outfall to composite watershed outfall point.
Total area = 138.70 acres or 0.2167 sq.mi
Peak discharge = 499 cfs

>>>> Computer Modifications of Input Parameters <<<<<

Subarea Description	Input Values Tc (hr)	Input Values * Tt (hr)	Rounded Values Tc (hr)	Rounded Values * Tt (hr)	Ia/p Interpolated (Yes/No)	Ia/p Messages
Downchute 3	0.42	0.10	0.40	0.10	No	Computed Ia/p < .1
Downchute 3	0.23	0.10	0.20	0.10	No	Computed Ia/p < .1
Downchute 4	0.39	0.04	0.40	0.00	No	Computed Ia/p < .1
Downchute 4	0.23	0.04	0.20	0.10	No	Computed Ia/p < .1
Downchute 5	0.40	0.00	**	**	No	Computed Ia/p < .1
Downchute 5	0.23	0.00	0.20	0.00	No	Computed Ia/p < .1
Area 1	0.52	0.00	0.50	0.00	No	--
Area 2	0.62	0.04	0.50	0.10	No	--
Area 3	0.65	0.10	0.75	0.10	No	--

* Travel time from subarea outfall to composite watershed outfall point.
Tc & Tt are available in the hydrograph tables.

TR-55 TABULAR HYDROGRAPH METHOD
Type II Distribution
(24 hr. Duration Storm)

Executed: 06-15-1994 16:18:47
Watershed file: --> c:\ppd\0990018\DTOTAL .WSD
Hydrograph file: --> c:\ppd\0990018\DTOTAL .HYD

Total Runoff to Basin D from Landfill
Downchutes 4 and 5, and
Offsite Areas 1, 2, and 3

>>>> Summary of Subarea Times to Peak <<<<

Subarea	Peak Discharge at Composite Outfall (cfs)	Time to Peak at Composite Outfall (hrs)
Downchute 3	81	12.4
Downchute 3	89	12.3
Downchute 4	58	12.3
Downchute 4	36	12.3
Downchute 5	96	12.3
Downchute 5	100	12.2
Area 1	36	12.4
Area 2	46	12.5
Area 3	39	12.7
Composite Watershed	499	12.3

TR-55 TABULAR HYDROGRAPH METHOD
Type II Distribution
(24 hr. Duration Storm)

Executed: 06-15-1994 16:18:47
Watershed file: --> c:\ppd\0990018\DTOTAL .WSD
Hydrograph file: --> c:\ppd\0990018\DTOTAL .HYD

Total Runoff to Basin D from Landfill
Downchutes 4 and 5, and
Offsite Areas 1, 2, and 3

Composite Hydrograph Summary (cfs)

Subarea Description	11.0 hr	11.3 hr	11.6 hr	11.9 hr	12.0 hr	12.1 hr	12.2 hr	12.3 hr	12.4 hr
Downchute 3	3	4	5	10	17	32	56	76	81
Downchute 3	2	3	5	11	21	40	73	89	69
Downchute 4	2	2	4	7	14	26	46	58	56
Downchute 4	1	1	2	4	8	16	30	36	28
Downchute 5	3	4	6	12	23	44	76	96	93
Downchute 5	3	4	6	26	50	92	100	60	31
Area 1	1	2	2	4	6	12	21	32	36
Area 2	1	2	3	5	7	13	23	36	44
Area 3	1	2	2	3	4	6	9	16	24
Total (cfs)	17	24	35	82	150	281	434	499	462

Subarea Description	12.5 hr	12.6 hr	12.7 hr	12.8 hr	13.0 hr	13.2 hr	13.4 hr	13.6 hr	13.8 hr
Downchute 3	69	52	38	29	17	12	10	8	7
Downchute 3	43	28	20	15	10	8	7	6	6
Downchute 4	42	29	21	16	10	7	6	5	5
Downchute 4	18	11	8	6	4	3	3	3	2
Downchute 5	70	48	35	26	17	12	10	9	8
Downchute 5	21	16	13	11	9	8	7	6	5
Area 1	35	28	20	16	10	7	5	4	4
Area 2	46	40	31	24	15	10	7	6	5
Area 3	32	38	39	37	27	18	13	10	8
Total (cfs)	376	290	225	180	119	85	68	57	50

TR-55 TABULAR HYDROGRAPH METHOD
Type II Distribution
(24 hr. Duration Storm)

Executed: 06-15-1994 16:18:47
Watershed file: --> c:\ppd\0990018\DTOTAL .WSD
Hydrograph file: --> c:\ppd\0990018\DTOTAL .HYD

Total Runoff to Basin D from Landfill
Downchutes 4 and 5, and
Offsite Areas 1, 2, and 3

Composite Hydrograph Summary (cfs)

Subarea Description	14.0 hr	14.3 hr	14.6 hr	15.0 hr	15.5 hr	16.0 hr	16.5 hr	17.0 hr	17.5 hr
Downchute 3	7	6	5	5	4	4	3	3	3
Downchute 3	5	5	4	4	3	3	3	3	2
Downchute 4	4	4	3	3	3	2	2	2	2
Downchute 4	2	2	2	2	1	1	1	1	1
Downchute 5	7	6	5	5	5	4	4	3	3
Downchute 5	5	4	4	4	3	3	3	2	2
Area 1	3	3	2	2	2	2	2	1	1
Area 2	4	4	3	3	3	2	2	2	2
Area 3	6	5	4	3	3	3	2	2	2
Total (cfs)	43	39	32	31	27	24	22	19	18

Subarea Description	18.0 hr	19.0 hr	20.0 hr	22.0 hr	26.0 hr
Downchute 3	3	2	2	2	0
Downchute 3	2	2	2	1	0
Downchute 4	2	2	1	1	0
Downchute 4	1	1	1	1	0
Downchute 5	3	3	2	2	0
Downchute 5	2	2	2	1	0
Area 1	1	1	1	1	0
Area 2	2	1	1	1	0
Area 3	2	2	1	1	0
Total (cfs)	18	16	13	11	0

TR-55 TABULAR HYDROGRAPH METHOD
Type II Distribution
(24 hr. Duration Storm)

Executed: 06-15-1994 16:18:47
Watershed file: --> c:\ppd\0990018\DTOTAL .WSD
Hydrograph file: --> c:\ppd\0990018\DTOTAL .HYD

Total Runoff to Basin D from Landfill
Downchutes 4 and 5, and
Offsite Areas 1, 2, and 3

Time (hrs)	Flow (cfs)	Time (hrs)	Flow (cfs)
11.0	17	14.8	32
11.1	19	14.9	31
11.2	22	15.0	31
11.3	24	15.1	30
11.4	28	15.2	29
11.5	31	15.3	29
11.6	35	15.4	28
11.7	51	15.5	27
11.8	66	15.6	26
11.9	82	15.7	26
12.0	150	15.8	25
12.1	281	15.9	25
12.2	434	16.0	24
12.3	499	16.1	24
12.4	462	16.2	23
12.5	376	16.3	23
12.6	290	16.4	22
12.7	225	16.5	22
12.8	180	16.6	21
12.9	150	16.7	21
13.0	119	16.8	20
13.1	102	16.9	20
13.2	85	17.0	19
13.3	76	17.1	19
13.4	68	17.2	19
13.5	63	17.3	18
13.6	57	17.4	18
13.7	54	17.5	18
13.8	50	17.6	18
13.9	46	17.7	18
14.0	43	17.8	18
14.1	42	17.9	18
14.2	40	18.0	18
14.3	39	18.1	18
14.4	37	18.2	18
14.5	34	18.3	17
14.6	32	18.4	17

SCS ENGINEERS, PC

ENVIRONMENTAL CONSULTANTS
2 CROSFIELD AVENUE
SUITE 422
WEST NYACK, NY 10994
914 353-5727
FAX 914 353-5731

JOB 0990018. 34
SHEET NO. ______ OF ______ SCALE ______
CALCULATED BY WEG DATE 4-6-94
CHECKED BY ______ DATE ______

Problem: Calculate the capacity of the dual 48"ϕ RCP culverts discharging into Basin A (S-20)

Given: Pipe ϕ = 48" (S-20) Top of Road = el. 125
Inv. in = 114.8
Inv. out = 115.3 (reverse slope exists)
Peak Q_{25} = 499 cfs

Solution:

Assuming inlet control -

$Q = C_d A \sqrt{2gh}$
$250 = 0.82(12.57)\sqrt{64.4h}$

$Q = 499\text{ cfs}/2 = 250\text{ cfs}$
$C_d = 0.82$
$2g = 64.4$
$A = 12.57\text{ sf}$

$\therefore h = 9.1'$ or el. 123.9 ✓

There is a freeboard of 1.1' remaining to the top of road.

Peak capacity of the dual culvert system - (25-yr storm)

$Q = C_d A \sqrt{2gh}$

$h = 125 - 115.3$
$= 9.7'$

$Q = (0.82)(12.57)\sqrt{64.4(9.7)}$
$= 258\text{ cfs}$

$\therefore$ Peak Capacity $= 2 \times 258$
$= 516\text{ cfs}$

F.S. = 1.0

Executed 06-15-1994 18:28:22

Data directory: c:\ppd\0990018*.HYD

File Summary for Composite Hydrograph

Time (hrs)	OFFSITE4 (cfs)	BORROW2 (cfs)	DTOTAL (cfs)	DALL (Total)
11.00	1.0	4.0	17.0	22.0
11.10	1.0	4.0	19.0	24.0
11.20	1.0	5.0	22.0	28.0
11.30	1.0	5.0	24.0	30.0
11.40	1.0	6.0	28.0	35.0
11.50	2.0	6.0	31.0	39.0
11.60	2.0	7.0	35.0	44.0
11.70	3.0	8.0	51.0	62.0
11.80	3.0	8.0	66.0	77.0
11.90	4.0	9.0	82.0	95.0
12.00	6.0	11.0	150.0	167.0
12.10	11.0	15.0	281.0	307.0
12.20	20.0	24.0	434.0	478.0
12.30	30.0	37.0	499.0	566.0
12.40	34.0	55.0	462.0	551.0
12.50	33.0	76.0	376.0	485.0
12.60	26.0	95.0	290.0	411.0
12.70	19.0	108.0	225.0	352.0
12.80	15.0	117.0	180.0	312.0
12.90	12.0	110.0	150.0	272.0
13.00	9.0	103.0	119.0	231.0
13.10	7.0	90.0	102.0	199.0
13.20	6.0	78.0	85.0	169.0
13.30	6.0	67.0	76.0	149.0
13.40	5.0	57.0	68.0	130.0
13.50	5.0	51.0	63.0	119.0
13.60	4.0	44.0	57.0	105.0
13.70	4.0	39.0	54.0	97.0
13.80	3.0	34.0	50.0	87.0
13.90	3.0	30.0	46.0	79.0
14.00	3.0	27.0	43.0	73.0
14.10	3.0	25.0	42.0	70.0
14.20	3.0	23.0	40.0	66.0
14.30	3.0	21.0	39.0	63.0
14.40	3.0	19.0	37.0	59.0
14.50	2.0	18.0	34.0	54.0
14.60	2.0	16.0	32.0	50.0
14.70	2.0	15.0	32.0	49.0
14.80	2.0	14.0	32.0	48.0
14.90	2.0	14.0	31.0	47.0

Executed 06-15-1994 18:28:22

Data directory: c:\ppd\0990018*.HYD

File Summary for Composite Hydrograph

Time (hrs)	OFFSITE4 (cfs)	BORROW2 (cfs)	DTOTAL (cfs)	DALL (Total)
15.00	2.0	13.0	31.0	46.0
15.10	2.0	13.0	30.0	45.0
15.20	2.0	12.0	29.0	43.0
15.30	2.0	12.0	29.0	43.0
15.40	2.0	11.0	28.0	41.0
15.50	2.0	11.0	27.0	40.0
15.60	2.0	11.0	26.0	39.0
15.70	2.0	10.0	26.0	38.0
15.80	2.0	10.0	25.0	37.0
15.90	2.0	9.0	25.0	36.0
16.00	2.0	9.0	24.0	35.0
16.10	2.0	9.0	24.0	35.0
16.20	2.0	9.0	23.0	34.0
16.30	1.0	9.0	23.0	33.0
16.40	1.0	9.0	22.0	32.0
16.50	1.0	9.0	22.0	32.0
16.60	1.0	9.0	21.0	31.0
16.70	1.0	9.0	21.0	31.0
16.80	1.0	8.0	20.0	29.0
16.90	1.0	8.0	20.0	29.0
17.00	1.0	8.0	19.0	28.0
17.10	1.0	8.0	19.0	28.0
17.20	1.0	8.0	19.0	28.0
17.30	1.0	7.0	18.0	26.0
17.40	1.0	7.0	18.0	26.0
17.50	1.0	7.0	18.0	26.0
17.60	1.0	7.0	18.0	26.0
17.70	1.0	7.0	18.0	26.0
17.80	1.0	7.0	18.0	26.0
17.90	1.0	7.0	18.0	26.0
18.00	1.0	7.0	18.0	26.0
18.10	1.0	7.0	18.0	26.0
18.20	1.0	7.0	18.0	26.0
18.30	1.0	7.0	17.0	25.0
18.40	1.0	7.0	17.0	25.0
18.50	1.0	6.0	17.0	24.0
18.60	1.0	6.0	17.0	24.0
18.70	1.0	6.0	17.0	24.0
18.80	1.0	6.0	16.0	23.0
18.90	1.0	6.0	16.0	23.0
19.00	1.0	6.0	16.0	23.0

Executed 06-15-1994 18:28:22

Data directory: c:\ppd\0990018*.HYD

File Summary for Composite Hydrograph

Time (hrs)	OFFSITE4 (cfs)	BORROW2 (cfs)	DTOTAL (cfs)	DALL (Total)
19.10	1.0	6.0	16.0	23.0
19.20	1.0	6.0	15.0	22.0
19.30	1.0	6.0	15.0	22.0
19.40	1.0	6.0	15.0	22.0
19.50	1.0	6.0	14.0	21.0
19.60	1.0	5.0	14.0	20.0
19.70	1.0	5.0	14.0	20.0
19.80	1.0	5.0	14.0	20.0
19.90	1.0	5.0	13.0	19.0
20.00	1.0	5.0	13.0	19.0
20.10	1.0	5.0	13.0	19.0
20.20	1.0	5.0	13.0	19.0
20.30	1.0	5.0	13.0	19.0
20.40	1.0	5.0	13.0	19.0
20.50	1.0	5.0	12.0	18.0
20.60	1.0	5.0	12.0	18.0
20.70	1.0	5.0	12.0	18.0
20.80	1.0	5.0	12.0	18.0
20.90	1.0	5.0	12.0	18.0
21.00	1.0	4.0	12.0	17.0
21.10	1.0	4.0	12.0	17.0
21.20	1.0	4.0	12.0	17.0
21.30	1.0	4.0	12.0	17.0
21.40	1.0	4.0	12.0	17.0
21.50	1.0	4.0	12.0	17.0
21.60	1.0	4.0	11.0	16.0
21.70	1.0	4.0	11.0	16.0
21.80	1.0	4.0	11.0	16.0
21.90	1.0	4.0	11.0	16.0
22.00	1.0	4.0	11.0	16.0
22.10	1.0	4.0	11.0	16.0
22.20	1.0	4.0	10.0	15.0
22.30	1.0	4.0	10.0	15.0
22.40	1.0	4.0	10.0	15.0
22.50	1.0	4.0	10.0	15.0
22.60	1.0	3.0	9.0	13.0
22.70	1.0	3.0	9.0	13.0
22.80	1.0	3.0	9.0	13.0
22.90	1.0	3.0	9.0	13.0
23.00	1.0	3.0	8.0	12.0
23.10	1.0	3.0	8.0	12.0

Executed 06-15-1994 18:28:22

Data directory: c:\ppd\0990018*.HYD

File Summary for Composite Hydrograph

Time (hrs)	OFFSITE4 (cfs)	BORROW2 (cfs)	DTOTAL (cfs)	DALL (Total)
23.20	1.0	3.0	8.0	12.0
23.30	1.0	3.0	7.0	11.0
23.40	1.0	3.0	7.0	11.0
23.50	1.0	2.0	7.0	10.0
23.60	1.0	2.0	7.0	10.0
23.70	1.0	2.0	6.0	9.0
23.80	1.0	2.0	6.0	9.0
23.90	1.0	2.0	6.0	9.0
24.00	0.0	2.0	6.0	8.0
24.10	0.0	2.0	5.0	7.0
24.20	0.0	2.0	5.0	7.0
24.30	0.0	2.0	5.0	7.0
24.40	0.0	2.0	4.0	6.0
24.50	0.0	2.0	4.0	6.0
24.60	0.0	1.0	4.0	5.0
24.70	0.0	1.0	4.0	5.0
24.80	0.0	1.0	3.0	4.0
24.90	0.0	1.0	3.0	4.0
25.00	0.0	1.0	3.0	4.0
25.10	0.0	1.0	2.0	3.0
25.20	0.0	1.0	2.0	3.0
25.30	0.0	1.0	2.0	3.0
25.40	0.0	1.0	2.0	3.0
25.50	0.0	0.0	1.0	1.0
25.60	0.0	0.0	1.0	1.0
25.70	0.0	0.0	1.0	1.0
25.80	0.0	0.0	1.0	1.0
25.90	0.0	0.0	0.0	0.0
26.00	0.0	0.0	0.0	0.0

```
*******************************
*                             *
* Basin D Existing Conditions *
*                             *
*                             *
*                             *
*                             *
*******************************
```

Inflow Hydrograph: c:\ppd\0990018\DALL .HYD
Rating Table file: c:\ppd\0990018\D .PND

----INITIAL CONDITIONS----
Elevation = 107.00 ft
Outflow = 0.00 cfs
Storage = 0.00 ac-ft

GIVEN POND DATA / INTERMEDIATE ROUTING COMPUTATIONS

ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (ac-ft)	2S/t (cfs)	2S/t + 0 (cfs)
107.00	0.0	0.000	0.0	0.0
107.50	0.0	3.085	746.7	746.7
108.00	0.0	7.429	1797.7	1797.7
108.50	0.0	12.580	3044.4	3044.4
109.00	0.0	17.949	4343.7	4343.7
109.50	0.0	23.477	5681.4	5681.4
110.00	0.0	29.101	7042.5	7042.5
110.50	0.0	34.830	8428.9	8428.9
111.00	0.0	40.673	9842.8	9842.8
111.50	0.0	46.628	11284.1	11284.1
112.00	0.0	52.697	12752.6	12752.6
112.50	0.0	58.905	14255.0	14255.0
113.00	0.0	65.281	15798.0	15798.0
113.50	0.0	71.873	17393.3	17393.3
114.00	0.0	78.732	19053.2	19053.2
114.50	0.0	85.802	20764.0	20764.0
115.00	24.9	93.024	22511.9	22536.8
115.50	162.6	100.437	24305.8	24468.4
116.00	364.1	108.064	26151.4	26515.5

Time increment (t) = 0.100 hrs.

POND-2 Version: 5.17 S/N:
EXECUTED: 06-15-1994   18:30:17

Pond File: c:\ppd\0990018\D .PND
Inflow Hydrograph: c:\ppd\0990018\DALL .HYD
Outflow Hydrograph: c:\ppd\0990018\OUT .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
11.000	22.00	-----	0.0	0.0	0.00	107.00
11.100	24.00	46.0	46.0	46.0	0.00	107.03
11.200	28.00	52.0	98.0	98.0	0.00	107.07
11.300	30.00	58.0	156.0	156.0	0.00	107.10
11.400	35.00	65.0	221.0	221.0	0.00	107.15
11.500	39.00	74.0	295.0	295.0	0.00	107.20
11.600	44.00	83.0	378.0	378.0	0.00	107.25
11.700	62.00	106.0	484.0	484.0	0.00	107.32
11.800	77.00	139.0	623.0	623.0	0.00	107.42
11.900	95.00	172.0	795.0	795.0	0.00	107.52
12.000	167.00	262.0	1057.0	1057.0	0.00	107.65
12.100	307.00	474.0	1531.0	1531.0	0.00	107.87
12.200	478.00	785.0	2316.0	2316.0	0.00	108.21
12.300	566.00	1044.0	3360.0	3360.0	0.00	108.62
12.400	551.00	1117.0	4477.0	4477.0	0.00	109.05
12.500	485.00	1036.0	5513.0	5513.0	0.00	109.44
12.600	411.00	896.0	6409.0	6409.0	0.00	109.77
12.700	352.00	763.0	7172.0	7172.0	0.00	110.05
12.800	312.00	664.0	7836.0	7836.0	0.00	110.29
12.900	272.00	584.0	8420.0	8420.0	0.00	110.50
13.000	231.00	503.0	8923.0	8923.0	0.00	110.67
13.100	199.00	430.0	9353.0	9353.0	0.00	110.83
13.200	169.00	368.0	9721.0	9721.0	0.00	110.96
13.300	149.00	318.0	10039.0	10039.0	0.00	111.07
13.400	130.00	279.0	10318.0	10318.0	0.00	111.16
13.500	119.00	249.0	10567.0	10567.0	0.00	111.25
13.600	105.00	224.0	10791.0	10791.0	0.00	111.33
13.700	97.00	202.0	10993.0	10993.0	0.00	111.40
13.800	87.00	184.0	11177.0	11177.0	0.00	111.46
13.900	79.00	166.0	11343.0	11343.0	0.00	111.52
14.000	73.00	152.0	11495.0	11495.0	0.00	111.57
14.100	70.00	143.0	11638.0	11638.0	0.00	111.62
14.200	66.00	136.0	11774.0	11774.0	0.00	111.67
14.300	63.00	129.0	11903.0	11903.0	0.00	111.71
14.400	59.00	122.0	12025.0	12025.0	0.00	111.75
14.500	54.00	113.0	12138.0	12138.0	0.00	111.79
14.600	50.00	104.0	12242.0	12242.0	0.00	111.83
14.700	49.00	99.0	12341.0	12341.0	0.00	111.86
14.800	48.00	97.0	12438.0	12438.0	0.00	111.89
14.900	47.00	95.0	12533.0	12533.0	0.00	111.93
15.000	46.00	93.0	12626.0	12626.0	0.00	111.96
15.100	45.00	91.0	12717.0	12717.0	0.00	111.99
15.200	43.00	88.0	12805.0	12805.0	0.00	112.02
15.300	43.00	86.0	12891.0	12891.0	0.00	112.05
15.400	41.00	84.0	12975.0	12975.0	0.00	112.07

POND-2 Version: 5.17 S/N:
EXECUTED: 06-15-1994 18:30:17

Pond File: c:\ppd\0990018\D .PND
Inflow Hydrograph: c:\ppd\0990018\DALL .HYD
Outflow Hydrograph: c:\ppd\0990018\OUT .HYD

INFLOW HYDROGRAPH | ROUTING COMPUTATIONS

TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
15.500	40.00	81.0	13056.0	13056.0	0.00	112.10
15.600	39.00	79.0	13135.0	13135.0	0.00	112.13
15.700	38.00	77.0	13212.0	13212.0	0.00	112.15
15.800	37.00	75.0	13287.0	13287.0	0.00	112.18
15.900	36.00	73.0	13360.0	13360.0	0.00	112.20
16.000	35.00	71.0	13431.0	13431.0	0.00	112.23
16.100	35.00	70.0	13501.0	13501.0	0.00	112.25
16.200	34.00	69.0	13570.0	13570.0	0.00	112.27
16.300	33.00	67.0	13637.0	13637.0	0.00	112.29
16.400	32.00	65.0	13702.0	13702.0	0.00	112.32
16.500	32.00	64.0	13766.0	13766.0	0.00	112.34
16.600	31.00	63.0	13829.0	13829.0	0.00	112.36
16.700	31.00	62.0	13891.0	13891.0	0.00	112.38
16.800	29.00	60.0	13951.0	13951.0	0.00	112.40
16.900	29.00	58.0	14009.0	14009.0	0.00	112.42
17.000	28.00	57.0	14066.0	14066.0	0.00	112.44
17.100	28.00	56.0	14122.0	14122.0	0.00	112.46
17.200	28.00	56.0	14178.0	14178.0	0.00	112.47
17.300	26.00	54.0	14232.0	14232.0	0.00	112.49
17.400	26.00	52.0	14284.0	14284.0	0.00	112.51
17.500	26.00	52.0	14336.0	14336.0	0.00	112.53
17.600	26.00	52.0	14388.0	14388.0	0.00	112.54
17.700	26.00	52.0	14440.0	14440.0	0.00	112.56
17.800	26.00	52.0	14492.0	14492.0	0.00	112.58
17.900	26.00	52.0	14544.0	14544.0	0.00	112.59
18.000	26.00	52.0	14596.0	14596.0	0.00	112.61
18.100	26.00	52.0	14648.0	14648.0	0.00	112.63
18.200	26.00	52.0	14700.0	14700.0	0.00	112.64
18.300	25.00	51.0	14751.0	14751.0	0.00	112.66
18.400	25.00	50.0	14801.0	14801.0	0.00	112.68
18.500	24.00	49.0	14850.0	14850.0	0.00	112.69
18.600	24.00	48.0	14898.0	14898.0	0.00	112.71
18.700	24.00	48.0	14946.0	14946.0	0.00	112.72
18.800	23.00	47.0	14993.0	14993.0	0.00	112.74
18.900	23.00	46.0	15039.0	15039.0	0.00	112.75
19.000	23.00	46.0	15085.0	15085.0	0.00	112.77
19.100	23.00	46.0	15131.0	15131.0	0.00	112.78
19.200	22.00	45.0	15176.0	15176.0	0.00	112.80
19.300	22.00	44.0	15220.0	15220.0	0.00	112.81
19.400	22.00	44.0	15264.0	15264.0	0.00	112.83
19.500	21.00	43.0	15307.0	15307.0	0.00	112.84
19.600	20.00	41.0	15348.0	15348.0	0.00	112.85
19.700	20.00	40.0	15388.0	15388.0	0.00	112.87
19.800	20.00	40.0	15428.0	15428.0	0.00	112.88
19.900	19.00	39.0	15467.0	15467.0	0.00	112.89
20.000	19.00	38.0	15505.0	15505.0	0.00	112.91

POND-2 Version: 5.17 S/N:
EXECUTED: 06-15-1994 18:30:17

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ıd File:            c:\ppd\0990018\D       .PND
Inflow Hydrograph:  c:\ppd\0990018\DALL    .HYD
Outflow Hydrograph: c:\ppd\0990018\OUT     .HYD
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INFLOW HYDROGRAPH — ROUTING COMPUTATIONS

TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
20.100	19.00	38.0	15543.0	15543.0	0.00	112.92
20.200	19.00	38.0	15581.0	15581.0	0.00	112.93
20.300	19.00	38.0	15619.0	15619.0	0.00	112.94
20.400	19.00	38.0	15657.0	15657.0	0.00	112.95
20.500	18.00	37.0	15694.0	15694.0	0.00	112.97
20.600	18.00	36.0	15730.0	15730.0	0.00	112.98
20.700	18.00	36.0	15766.0	15766.0	0.00	112.99
20.800	18.00	36.0	15802.0	15802.0	0.00	113.00
20.900	18.00	36.0	15838.0	15838.0	0.00	113.01
21.000	17.00	35.0	15873.0	15873.0	0.00	113.02
21.100	17.00	34.0	15907.0	15907.0	0.00	113.03
21.200	17.00	34.0	15941.0	15941.0	0.00	113.04
21.300	17.00	34.0	15975.0	15975.0	0.00	113.06
21.400	17.00	34.0	16009.0	16009.0	0.00	113.07
21.500	17.00	34.0	16043.0	16043.0	0.00	113.08
21.600	16.00	33.0	16076.0	16076.0	0.00	113.09
21.700	16.00	32.0	16108.0	16108.0	0.00	113.10
21.800	16.00	32.0	16140.0	16140.0	0.00	113.11
21.900	16.00	32.0	16172.0	16172.0	0.00	113.12
22.000	16.00	32.0	16204.0	16204.0	0.00	113.13
22.100	16.00	32.0	16236.0	16236.0	0.00	113.14
22.200	15.00	31.0	16267.0	16267.0	0.00	113.15
22.300	15.00	30.0	16297.0	16297.0	0.00	113.16
22.400	15.00	30.0	16327.0	16327.0	0.00	113.17
22.500	15.00	30.0	16357.0	16357.0	0.00	113.18
22.600	13.00	28.0	16385.0	16385.0	0.00	113.18
22.700	13.00	26.0	16411.0	16411.0	0.00	113.19
22.800	13.00	26.0	16437.0	16437.0	0.00	113.20
22.900	13.00	26.0	16463.0	16463.0	0.00	113.21
23.000	12.00	25.0	16488.0	16488.0	0.00	113.22
23.100	12.00	24.0	16512.0	16512.0	0.00	113.22
23.200	12.00	24.0	16536.0	16536.0	0.00	113.23
23.300	11.00	23.0	16559.0	16559.0	0.00	113.24
23.400	11.00	22.0	16581.0	16581.0	0.00	113.25
23.500	10.00	21.0	16602.0	16602.0	0.00	113.25
23.600	10.00	20.0	16622.0	16622.0	0.00	113.26
23.700	9.00	19.0	16641.0	16641.0	0.00	113.26
23.800	9.00	18.0	16659.0	16659.0	0.00	113.27
23.900	9.00	18.0	16677.0	16677.0	0.00	113.28
24.000	8.00	17.0	16694.0	16694.0	0.00	113.28
24.100	7.00	15.0	16709.0	16709.0	0.00	113.29
24.200	7.00	14.0	16723.0	16723.0	0.00	113.29
24.300	7.00	14.0	16737.0	16737.0	0.00	113.29
24.400	6.00	13.0	16750.0	16750.0	0.00	113.30
24.500	6.00	12.0	16762.0	16762.0	0.00	113.30
24.600	5.00	11.0	16773.0	16773.0	0.00	113.31

ınd File: c:\ppd\0990018\D .PND
Inflow Hydrograph: c:\ppd\0990018\DALL .HYD
Outflow Hydrograph: c:\ppd\0990018\OUT .HYD

INFLOW HYDROGRAPH / ROUTING COMPUTATIONS

TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
24.700	5.00	10.0	16783.0	16783.0	0.00	113.31
24.800	4.00	9.0	16792.0	16792.0	0.00	113.31
24.900	4.00	8.0	16800.0	16800.0	0.00	113.31
25.000	4.00	8.0	16808.0	16808.0	0.00	113.32
25.100	3.00	7.0	16815.0	16815.0	0.00	113.32
25.200	3.00	6.0	16821.0	16821.0	0.00	113.32
25.300	3.00	6.0	16827.0	16827.0	0.00	113.32
25.400	3.00	6.0	16833.0	16833.0	0.00	113.32
25.500	1.00	4.0	16837.0	16837.0	0.00	113.33
25.600	1.00	2.0	16839.0	16839.0	0.00	113.33
25.700	1.00	2.0	16841.0	16841.0	0.00	113.33
25.800	1.00	2.0	16843.0	16843.0	0.00	113.33
25.900	0.00	1.0	16844.0	16844.0	0.00	113.33
26.000	0.00	0.0	16844.0	16844.0	0.00	113.33

****************** SUMMARY OF ROUTING COMPUTATIONS ******************

Pond File:	c:\ppd\0990018\D	.PND
Inflow Hydrograph:	c:\ppd\0990018\DALL	.HYD
Outflow Hydrograph:	c:\ppd\0990018\OUT	.HYD

Starting Pond W.S. Elevation = 107.00 ft

***** Summary of Peak Outflow and Peak Elevation *****

Peak Inflow	=	566.00 cfs
Peak Outflow	=	0.00 cfs
Peak Elevation	=	113.33 ft

***** Summary of Approximate Peak Storage *****

Initial Storage	=	0.00 ac-ft
Peak Storage From Storm	=	69.60 ac-ft
Total Storage in Pond	=	69.60 ac-ft

Warning: Inflow hydrograph truncated on left side.

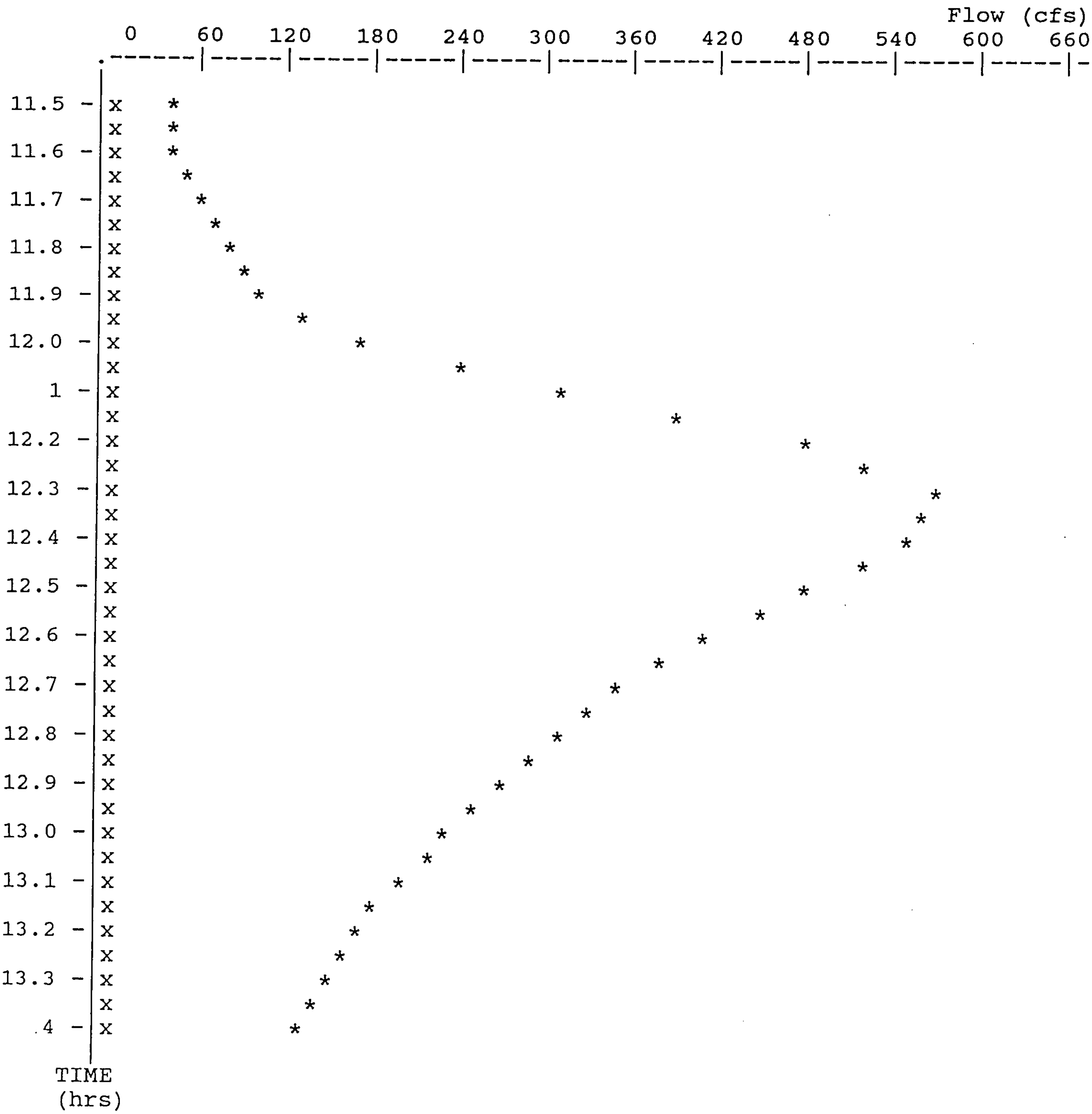
>>>>>> Warning, peak outflow = last ordinate point. <<<<<<

>>>>>> Warning, peak outflow = last ordinate point. <<<<<<

Pond File: c:\ppd\0990018\D .PND
Inflow Hydrograph: c:\ppd\0990018\DALL .HYD
Outflow Hydrograph: c:\ppd\0990018\OUT .HYD

EXECUTED: 06-15-1994
18:30:17

Peak Inflow = 566.00 cfs
Peak Outflow = 0.00 cfs
Peak Elevation = 113.33 ft



BASIN E ROUTING COMPUTATION

```
Quick TR-55 Ver.5.46   S/N:
Executed: 09:57:42   04-14-1994    c:\ppd\0990018\E.TCT

                                        SELF
                                  Basin E Subshed


                         Tc COMPUTATIONS FOR: E

 SHEET FLOW (Applicable to Tc only)
     Segment ID                                        A-B
     Surface description                          Grass
     Manning's roughness coeff., n                       0.2400
     Flow length, L (total < or = 300)       ft        60.0
     Two-yr 24-hr rainfall, P2               in        4.100
     Land slope, s                         ft/ft      0.0170
                          0.8
          .007 * (n*L)
     T =  --------------                  hrs         0.15              =   0.15
              0.5    0.4
           P2    *   s

 SHALLOW CONCENTRATED FLOW
     Segment ID
     Surface (paved or unpaved)?
     Flow length, L                          ft         0.0
     Watercourse slope, s                  ft/ft     0.0000

                            0.5
     Avg.V =  Csf *  (s)                   ft/s      0.0000
     where:   Unpaved Csf = 16.1345
              Paved   Csf = 20.3282

     T = L / (3600*V)                      hrs        0.00              =   0.00


 CHANNEL FLOW
     Segment ID                                        B-C
     Cross Sectional Flow Area, a        sq.ft         1.00
     Wetted perimeter, Pw                   ft         1.00
     Hydraulic radius, r = a/Pw             ft        1.000
     Channel slope, s                     ft/ft      4.0500
     Manning's roughness coeff., n                   1.0000

                         2/3    1/2
          1.49   *  r     *  s
     V =  --------------------             ft/s      2.9986
                    n

     Flow length, L                         ft          280

     T = L / (3600*V)                      hrs        0.03              =   0.03

  :::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
                                              TOTAL TIME (hrs)          0.17
```

Quick TR-55 Ver.5.46 S/N:
Executed: 09:57:42 04-14-1994 c:\ppd\0990018\E.TCT

SUMMARY SHEET FOR Tc or Tt COMPUTATIONS
(Solved for Time using TR-55 Methods)

SELF
Basin E Subshed

Subarea descr.	Tc or Tt	Time (hrs)
E	Tc	0.17

Quick TR-55 Ver.5.46   S/N:
Executed: 12:48:45   06-14-1994

SELF
SUBSHED E

RUNOFF CURVE NUMBER DATA

Composite Area:

SURFACE DESCRIPTION	AREA (acres)	CN	
Grassed Area	0.66	74	
Impervious Area	0.40	98	
COMPOSITE AREA --->	1.06	83.1	(83)

Return Frequency: 25 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 06-20-1994 22:42:51
Watershed file: --> C:\PPD\0990018\E .MOP
Hydrograph file: --> C:\PPD\0990018\E25.HYD

SELF
Subshed E

>>>> Input Parameters Used to Compute Hydrograph <<<<

Subarea Description	AREA (acres)	CN	Tc (hrs)	* Tt (hrs)	Precip. (in)	Runoff (in)	Ia/p input/used
	1.06	83.0	0.20	0.00	8.40	6.36	.05 .10

* Travel time from subarea outfall to composite watershed outfall point.
Total area = 1.06 acres or 0.00166 sq.mi
Peak discharge = 8 cfs

>>>> Computer Modifications of Input Parameters <<<<<

Subarea Description	Input Values Tc (hr)	Input Values * Tt (hr)	Rounded Values Tc (hr)	Rounded Values * Tt (hr)	Ia/p Interpolated (Yes/No)	Ia/p Messages
	0.17	0.00	0.20	0.00	No	Computed Ia/p < .1

* Travel time from subarea outfall to composite watershed outfall point.

Return Frequency: 25 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 06-20-1994 22:42:51
Watershed file: --> C:\PPD\0990018\E .MOP
Hydrograph file: --> C:\PPD\0990018\E25.HYD

SELF
Subshed E

>>>> Summary of Subarea Times to Peak <<<<

Subarea	Peak Discharge at Composite Outfall (cfs)	Time to Peak at Composite Outfall (hrs)
	8	12.1
Composite Watershed	8	12.1

```
*********************************
*                               *
* Basin E Existing Conditions   *
*                               *
*                               *
*                               *
*                               *
*********************************
```

Inflow Hydrograph: c:\ppd\0990018\E25 .HYD
Rating Table file: c:\ppd\0990018\E .PND

----INITIAL CONDITIONS----
Elevation = 124.70 ft
Outflow = 0.00 cfs
Storage = 0.00 ac-ft

GIVEN POND DATA

ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (ac-ft)
124.70	0.0	0.000
125.20	0.0	0.013
125.70	0.0	0.047
126.20	0.0	0.098
126.70	0.2	0.156
127.20	11.2	0.217
127.70	30.4	0.298
128.20	64.2	0.403
128.70	93.7	0.515

INTERMEDIATE ROUTING COMPUTATIONS

2S/t (cfs)	2S/t + 0 (cfs)
0.0	0.0
3.2	3.2
11.4	11.4
23.8	23.8
37.7	37.9
52.5	63.7
72.0	102.4
97.5	161.7
124.6	218.3

Time increment (t) = 0.100 hrs.

nd File: c:\ppd\0990018\E .PND
Inflow Hydrograph: c:\ppd\0990018\E25 .HYD
Outflow Hydrograph: c:\ppd\0990018\OUT .HYD

INFLOW HYDROGRAPH

ROUTING COMPUTATIONS

TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
11.000	0.00	-----	0.0	0.0	0.00	124.70
11.100	0.00	0.0	0.0	0.0	0.00	124.70
11.200	0.00	0.0	0.0	0.0	0.00	124.70
11.300	0.00	0.0	0.0	0.0	0.00	124.70
11.400	0.00	0.0	0.0	0.0	0.00	124.70
11.500	0.00	0.0	0.0	0.0	0.00	124.70
11.600	0.00	0.0	0.0	0.0	0.00	124.70
11.700	1.00	1.0	1.0	1.0	0.00	124.86
11.800	1.00	2.0	3.0	3.0	0.00	125.17
11.900	2.00	3.0	6.0	6.0	0.00	125.37
12.000	4.00	6.0	12.0	12.0	0.00	125.73
12.100	8.00	12.0	24.0	24.0	0.00	126.21
12.200	8.00	16.0	37.8	40.0	1.11	126.74
12.300	5.00	13.0	39.4	50.8	5.70	126.95
12.400	3.00	8.0	38.9	47.4	4.25	126.88
12.500	2.00	5.0	38.4	43.9	2.76	126.82
2.600	1.00	3.0	38.0	41.4	1.69	126.77
12.700	1.00	2.0	37.8	40.0	1.10	126.74
12.800	1.00	2.0	37.7	39.8	1.02	126.74
12.900	1.00	2.0	37.7	39.7	1.00	126.74
13.000	1.00	2.0	37.7	39.7	1.00	126.74
13.100	1.00	2.0	37.7	39.7	1.00	126.74
13.200	1.00	2.0	37.7	39.7	1.00	126.74
13.300	1.00	2.0	37.7	39.7	1.00	126.74
13.400	1.00	2.0	37.7	39.7	1.00	126.74
13.500	1.00	2.0	37.7	39.7	1.00	126.74
13.600	1.00	2.0	37.7	39.7	1.00	126.74
13.700	0.00	1.0	37.6	38.7	0.57	126.72
13.800	0.00	0.0	37.2	37.6	0.20	126.69
13.900	0.00	0.0	36.8	37.2	0.19	126.68
14.000	0.00	0.0	36.4	36.8	0.19	126.66
14.100	0.00	0.0	36.1	36.4	0.18	126.65
14.200	0.00	0.0	35.7	36.1	0.17	126.64
14.300	0.00	0.0	35.4	35.7	0.17	126.62
14.400	0.00	0.0	35.1	35.4	0.16	126.61
14.500	0.00	0.0	34.7	35.1	0.16	126.60
14.600	0.00	0.0	34.4	34.7	0.16	126.59
14.700	0.00	0.0	34.1	34.4	0.15	126.58
14.800	0.00	0.0	33.8	34.1	0.15	126.57
14.900	0.00	0.0	33.6	33.8	0.14	126.56
15.000	0.00	0.0	33.3	33.6	0.14	126.55
15.100	0.00	0.0	33.0	33.3	0.13	126.54
.5.200	0.00	0.0	32.7	33.0	0.13	126.53
15.300	0.00	0.0	32.5	32.7	0.13	126.52
15.400	0.00	0.0	32.2	32.5	0.12	126.51

EXECUTED: 06-20-1994 22:46:36

nd File: c:\ppd\0990018\E .PND
Inflow Hydrograph: c:\ppd\0990018\E25 .HYD
Outflow Hydrograph: c:\ppd\0990018\OUT .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
15.500	0.00	0.0	32.0	32.2	0.12	126.50
15.600	0.00	0.0	31.8	32.0	0.12	126.49
15.700	0.00	0.0	31.5	31.8	0.11	126.48
15.800	0.00	0.0	31.3	31.5	0.11	126.48
15.900	0.00	0.0	31.1	31.3	0.11	126.47
16.000	0.00	0.0	30.9	31.1	0.10	126.46
16.100	0.00	0.0	30.7	30.9	0.10	126.45
16.200	0.00	0.0	30.5	30.7	0.10	126.45
16.300	0.00	0.0	30.3	30.5	0.10	126.44
16.400	0.00	0.0	30.1	30.3	0.09	126.43
16.500	0.00	0.0	30.0	30.1	0.09	126.42
16.600	0.00	0.0	29.8	30.0	0.09	126.42
16.700	0.00	0.0	29.6	29.8	0.08	126.41
16.800	0.00	0.0	29.4	29.6	0.08	126.41
16.900	0.00	0.0	29.3	29.4	0.08	126.40
17.000	0.00	0.0	29.1	29.3	0.08	126.39
17.100	0.00	0.0	29.0	29.1	0.08	126.39
17.200	0.00	0.0	28.8	29.0	0.07	126.38
17.300	0.00	0.0	28.7	28.8	0.07	126.38
17.400	0.00	0.0	28.5	28.7	0.07	126.37
17.500	0.00	0.0	28.4	28.5	0.07	126.37
17.600	0.00	0.0	28.3	28.4	0.07	126.36
17.700	0.00	0.0	28.2	28.3	0.06	126.36
17.800	0.00	0.0	28.0	28.2	0.06	126.35
17.900	0.00	0.0	27.9	28.0	0.06	126.35
18.000	0.00	0.0	27.8	27.9	0.06	126.35
18.100	0.00	0.0	27.7	27.8	0.06	126.34
18.200	0.00	0.0	27.6	27.7	0.06	126.34
18.300	0.00	0.0	27.5	27.6	0.05	126.33
18.400	0.00	0.0	27.4	27.5	0.05	126.33
18.500	0.00	0.0	27.3	27.4	0.05	126.33
18.600	0.00	0.0	27.2	27.3	0.05	126.32
18.700	0.00	0.0	27.1	27.2	0.05	126.32
18.800	0.00	0.0	27.0	27.1	0.05	126.32
18.900	0.00	0.0	26.9	27.0	0.04	126.31
19.000	0.00	0.0	26.8	26.9	0.04	126.31
19.100	0.00	0.0	26.7	26.8	0.04	126.31
19.200	0.00	0.0	26.6	26.7	0.04	126.30
19.300	0.00	0.0	26.5	26.6	0.04	126.30
19.400	0.00	0.0	26.5	26.5	0.04	126.30
19.500	0.00	0.0	26.4	26.5	0.04	126.29
19.600	0.00	0.0	26.3	26.4	0.04	126.29
19.700	0.00	0.0	26.2	26.3	0.04	126.29
19.800	0.00	0.0	26.2	26.2	0.03	126.29
19.900	0.00	0.0	26.1	26.2	0.03	126.28
20.000	0.00	0.0	26.0	26.1	0.03	126.28

nd File: c:\ppd\0990018\E .PND
Inflow Hydrograph: c:\ppd\0990018\E25 .HYD
Outflow Hydrograph: c:\ppd\0990018\OUT .HYD

INFLOW HYDROGRAPH / ROUTING COMPUTATIONS

TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
20.100	0.00	0.0	26.0	26.0	0.03	126.28
20.200	0.00	0.0	25.9	26.0	0.03	126.28
20.300	0.00	0.0	25.9	25.9	0.03	126.28
20.400	0.00	0.0	25.8	25.9	0.03	126.27
20.500	0.00	0.0	25.7	25.8	0.03	126.27
20.600	0.00	0.0	25.7	25.7	0.03	126.27
20.700	0.00	0.0	25.6	25.7	0.03	126.27
20.800	0.00	0.0	25.6	25.6	0.03	126.26
20.900	0.00	0.0	25.5	25.6	0.03	126.26
21.000	0.00	0.0	25.5	25.5	0.02	126.26
21.100	0.00	0.0	25.4	25.5	0.02	126.26
21.200	0.00	0.0	25.4	25.4	0.02	126.26
21.300	0.00	0.0	25.3	25.4	0.02	126.26
21.400	0.00	0.0	25.3	25.3	0.02	126.25
21.500	0.00	0.0	25.3	25.3	0.02	126.25
21.600	0.00	0.0	25.2	25.3	0.02	126.25
21.700	0.00	0.0	25.2	25.2	0.02	126.25
21.800	0.00	0.0	25.1	25.2	0.02	126.25
21.900	0.00	0.0	25.1	25.1	0.02	126.25
22.000	0.00	0.0	25.1	25.1	0.02	126.25
22.100	0.00	0.0	25.0	25.1	0.02	126.24
22.200	0.00	0.0	25.0	25.0	0.02	126.24
22.300	0.00	0.0	25.0	25.0	0.02	126.24
22.400	0.00	0.0	24.9	25.0	0.02	126.24
22.500	0.00	0.0	24.9	24.9	0.02	126.24
22.600	0.00	0.0	24.9	24.9	0.02	126.24
22.700	0.00	0.0	24.8	24.9	0.02	126.24
22.800	0.00	0.0	24.8	24.8	0.01	126.24
22.900	0.00	0.0	24.8	24.8	0.01	126.24
23.000	0.00	0.0	24.8	24.8	0.01	126.23
23.100	0.00	0.0	24.7	24.8	0.01	126.23
23.200	0.00	0.0	24.7	24.7	0.01	126.23
23.300	0.00	0.0	24.7	24.7	0.01	126.23
23.400	0.00	0.0	24.6	24.7	0.01	126.23
23.500	0.00	0.0	24.6	24.6	0.01	126.23
23.600	0.00	0.0	24.6	24.6	0.01	126.23
23.700	0.00	0.0	24.6	24.6	0.01	126.23
23.800	0.00	0.0	24.6	24.6	0.01	126.23
23.900	0.00	0.0	24.5	24.6	0.01	126.23
24.000	0.00	0.0	24.5	24.5	0.01	126.23
24.100	0.00	0.0	24.5	24.5	0.01	126.23
24.200	0.00	0.0	24.5	24.5	0.01	126.22
24.300	0.00	0.0	24.5	24.5	0.01	126.22
24.400	0.00	0.0	24.4	24.5	0.01	126.22
24.500	0.00	0.0	24.4	24.4	0.01	126.22
24.600	0.00	0.0	24.4	24.4	0.01	126.22

nd File: c:\ppd\0990018\E .PND
Inflow Hydrograph: c:\ppd\0990018\E25 .HYD
Outflow Hydrograph: c:\ppd\0990018\OUT .HYD

INFLOW HYDROGRAPH

ROUTING COMPUTATIONS

TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
24.700	0.00	0.0	24.4	24.4	0.01	126.22
24.800	0.00	0.0	24.4	24.4	0.01	126.22
24.900	0.00	0.0	24.4	24.4	0.01	126.22
25.000	0.00	0.0	24.3	24.4	0.01	126.22
25.100	0.00	0.0	24.3	24.3	0.01	126.22
25.200	0.00	0.0	24.3	24.3	0.01	126.22
25.300	0.00	0.0	24.3	24.3	0.01	126.22
25.400	0.00	0.0	24.3	24.3	0.01	126.22
25.500	0.00	0.0	24.3	24.3	0.01	126.22
25.600	0.00	0.0	24.3	24.3	0.01	126.22
25.700	0.00	0.0	24.2	24.3	0.01	126.22
25.800	0.00	0.0	24.2	24.2	0.01	126.22
25.900	0.00	0.0	24.2	24.2	0.01	126.21

****************** SUMMARY OF ROUTING COMPUTATIONS ******************

```
Pond File:           c:\ppd\0990018\E       .PND
Inflow Hydrograph:   c:\ppd\0990018\E25     .HYD
Outflow Hydrograph:  c:\ppd\0990018\OUT     .HYD

Starting Pond W.S. Elevation =   124.70 ft

        ***** Summary of Peak Outflow and Peak Elevation *****

                    Peak Inflow    =     8.00 cfs
                    Peak Outflow   =     5.70 cfs
                    Peak Elevation =   126.95 ft

        ***** Summary of Approximate Peak Storage *****

              Initial Storage           =     0.00 ac-ft
              Peak Storage From Storm   =     0.19 ac-ft
                                          ---------------
              Total Storage in Pond     =     0.19 ac-ft
```

```
Pond File:             c:\ppd\0990018\E        .PND
Inflow Hydrograph:     c:\ppd\0990018\E25      .HYD
Outflow Hydrograph:    c:\ppd\0990018\OUT      .HYD
                                                     EXECUTED: 06-20-1994
Peak Inflow     =      8.00 cfs                                  22:46:36
Peak Outflow    =      5.70 cfs
Peak Elevation =     126.95 ft
```

```
                                                              Flow (cfs)
      0.0   1.0   2.0   3.0   4.0   5.0   6.0   7.0   8.0   9.0  10.0  11.0
      .-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-
      |
11.3 -|x
      |x
11.4 -|x
      |x
11.5 -|x
      |x
11.6 -|x
      |x  *
11.7 -|x     *
      |x     *
11.8 -|x     *
      |x        *
11.9 -|x           *
      |x                 *
   0 -|x                       *
      |x                                   *
12.1 -|x                                               *
      |  x                                             *
12.2 -|      x                                         *
      |                    x                  *
12.3 -|                              *   x
      |                        *     x
12.4 -|                  *      x
      |               *     x
12.5 -|            *    x
      |         *   x
12.6 -|      *   x
      |      * x
12.7 -|      *x
      |      x
12.8 -|      x
      |      x
12.9 -|      x
      |      x
13.0 -|      x
      |      x
13.1 -|      x
      |      x
13.2 -|      x
      |
    TIME
    (hrs)
```

```
*  File:  c:\ppd\0990018\E25      .HYD   Qmax =      8.0 cfs
x  File:  c:\ppd\0990018\OUT      .HYD   Qmax =      5.7 cfs
```

BASIN H ROUTING COMPUTATION

```
Quick TR-55 Ver.5.46   S/N:
Executed: 10:27:49   06-16-1994    c:\ppd\0990018\H.TCT

                                   SELF
                             Basin H Subshed
                        Leachate Treatment Plant


                      Tc COMPUTATIONS FOR: H

 SHEET FLOW (Applicable to Tc only)
     Segment ID                                      A-B
     Surface description                         Grass
     Manning's roughness coeff., n                    0.2400
     Flow length, L (total < or = 300)       ft       300.0
     Two-yr 24-hr rainfall, P2               in       4.100
     Land slope, s                         ft/ft      0.0100
                               0.8
          .007 * (n*L)
     T =  --------------                     hrs       0.67          =   0.67
              0.5     0.4
            P2    *   s

 SHALLOW CONCENTRATED FLOW
     Segment ID                                      B-C
     Surface (paved or unpaved)?                    Unpaved
     Flow length, L                          ft       100.0
     Watercourse slope, s                  ft/ft      0.0100

                                0.5
     Avg.V =  Csf *  (s)                   ft/s      1.6135
     where:   Unpaved Csf = 16.1345
              Paved   Csf = 20.3282

     T = L / (3600*V)                        hrs       0.02          =   0.02


 CHANNEL FLOW
     Segment ID
     Cross Sectional Flow Area, a         sq.ft        0.00
     Wetted perimeter, Pw                    ft        0.00
     Hydraulic radius, r = a/Pw              ft       0.000
     Channel slope, s                      ft/ft     0.0000
     Manning's roughness coeff., n                   0.0000

                           2/3     1/2
          1.49    *   r    *   s
     V =  --------------------              ft/s     0.0000
                      n

     Flow length, L                          ft           0

     T = L / (3600*V)                        hrs       0.00          =   0.00

   :::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
                                              TOTAL TIME (hrs)        0.68
```

Return Frequency: 25 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 06-16-1994 10:28:25
Watershed file: --> C:\PPD\0990018\H .MOP
Hydrograph file: --> C:\PPD\0990018\H25.HYD

SELF
Subshed H

>>>> Input Parameters Used to Compute Hydrograph <<<<

Subarea Description	AREA (acres)	CN	Tc (hrs)	* Tt (hrs)	Precip. (in)	Runoff (in)	Ia/p input/used
	0.49	92.0	0.75	0.00	8.40	7.44	.02 .10

* Travel time from subarea outfall to composite watershed outfall point.
Total area = 0.49 acres or 0.00077 sq.mi
Peak discharge = 2 cfs

>>>> Computer Modifications of Input Parameters <<<<<

Subarea Description	Input Values Tc (hr)	Input Values * Tt (hr)	Rounded Values Tc (hr)	Rounded Values * Tt (hr)	Ia/p Interpolated (Yes/No)	Ia/p Messages
	0.68	0.00	0.75	0.00	No	Computed Ia/p < .1

* Travel time from subarea outfall to composite watershed outfall point.

Quick TR-55 Ver.5.46 S/N:
Executed: 10:22:50 06-16-1994

SELF
SUBSHED H

RUNOFF CURVE NUMBER DATA

Composite Area:

SURFACE DESCRIPTION	AREA (acres)	CN	
Grassed Area	0.08	61	
Impervious Area	0.38	98	
Basin	0.03	100	
COMPOSITE AREA --->	0.49	92.1	(92)

```
POND-2 Version: 5.17 S/N:
EXECUTED: 06-16-1994   10:53:25
```



```
**********************************
*                                *
* Basin H Existing Conditions    *
*   Leachate Treatment Plant     *
*                                *
*                                *
*                                *
**********************************
```

Inflow Hydrograph: c:\ppd\0990018\H25 .HYD
Rating Table file: c:\ppd\0990018\H .PND

----INITIAL CONDITIONS----
Elevation = 145.00 ft
Outflow = 0.00 cfs
Storage = 0.00 ac-ft

GIVEN POND DATA			INTERMEDIATE ROUTING COMPUTATIONS	
ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (ac-ft)	2S/t (cfs)	2S/t + 0 (cfs)
145.00	0.0	0.000	0.0	0.0
145.10	0.0	0.002	0.4	0.4
145.20	0.0	0.003	0.8	0.8
145.30	0.0	0.005	1.2	1.2
145.40	0.0	0.007	1.6	1.6
145.50	0.0	0.008	2.0	2.0
145.60	0.0	0.010	2.5	2.5
145.70	0.0	0.012	2.9	2.9
145.80	0.0	0.014	3.4	3.4
145.90	0.0	0.016	3.9	3.9
146.00	0.0	0.018	4.5	4.5
146.10	0.0	0.021	5.0	5.0
146.20	0.0	0.023	5.6	5.6
146.30	0.0	0.025	6.2	6.2
146.40	0.0	0.028	6.8	6.8
146.50	0.0	0.031	7.4	7.4
146.60	0.1	0.033	8.0	8.1
146.70	0.4	0.036	8.7	9.1
146.80	0.7	0.039	9.4	10.1
146.90	1.1	0.042	10.1	11.2
147.00	1.5	0.045	10.9	12.4
147.10	2.0	0.048	11.7	13.7
147.20	2.5	0.052	12.5	15.0
147.30	3.0	0.055	13.3	16.3
147.40	3.5	0.058	14.1	17.6
147.50	4.0	0.062	15.0	19.0
147.60	4.6	0.066	15.9	20.5
147.70	5.1	0.070	16.8	21.9
147.80	5.7	0.074	17.8	23.5
147.90	6.2	0.078	18.8	25.0

Time increment (t) = 0.100 hrs.

ond File: c:\ppd\0990018\H .PND
Inflow Hydrograph: c:\ppd\0990018\H25 .HYD
Outflow Hydrograph: c:\ppd\0990018\OUT .HYD

INFLOW HYDROGRAPH ROUTING COMPUTATIONS

TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
11.000	0.00	-----	0.0	0.0	0.00	145.00
11.100	0.00	0.0	0.0	0.0	0.00	145.00
11.200	0.00	0.0	0.0	0.0	0.00	145.00
11.300	0.00	0.0	0.0	0.0	0.00	145.00
11.400	0.00	0.0	0.0	0.0	0.00	145.00
11.500	0.00	0.0	0.0	0.0	0.00	145.00
11.600	0.00	0.0	0.0	0.0	0.00	145.00
11.700	0.00	0.0	0.0	0.0	0.00	145.00
11.800	0.00	0.0	0.0	0.0	0.00	145.00
11.900	0.00	0.0	0.0	0.0	0.00	145.00
12.000	0.00	0.0	0.0	0.0	0.00	145.00
12.100	0.00	0.0	0.0	0.0	0.00	145.00
12.200	1.00	1.0	1.0	1.0	0.00	145.26
12.300	1.00	2.0	3.0	3.0	0.00	145.71
12.400	2.00	3.0	6.0	6.0	0.00	146.27
12.500	2.00	4.0	8.7	10.0	0.66	146.79
12.600	2.00	4.0	9.5	12.7	1.61	147.02
12.700	2.00	4.0	9.6	13.5	1.92	147.08
12.800	2.00	4.0	9.7	13.6	1.98	147.10
12.900	2.00	4.0	9.7	13.7	2.00	147.10
13.000	1.00	3.0	9.5	12.7	1.61	147.02
13.100	1.00	2.0	9.1	11.5	1.17	146.92
13.200	1.00	2.0	9.0	11.1	1.05	146.89
13.300	1.00	2.0	9.0	11.0	1.01	146.88
13.400	1.00	2.0	9.0	11.0	1.00	146.88
13.500	1.00	2.0	9.0	11.0	1.00	146.88
13.600	1.00	2.0	9.0	11.0	1.00	146.88
13.700	0.00	1.0	8.7	10.0	0.65	146.78
13.800	0.00	0.0	8.1	8.7	0.26	146.65
13.900	0.00	0.0	7.9	8.1	0.10	146.60
14.000	0.00	0.0	7.8	7.9	0.07	146.57
14.100	0.00	0.0	7.7	7.8	0.05	146.55
14.200	0.00	0.0	7.6	7.7	0.04	146.54
14.300	0.00	0.0	7.6	7.6	0.03	146.53
14.400	0.00	0.0	7.5	7.6	0.02	146.52
14.500	0.00	0.0	7.5	7.5	0.02	146.52
14.600	0.00	0.0	7.5	7.5	0.01	146.51
14.700	0.00	0.0	7.4	7.5	0.01	146.51
14.800	0.00	0.0	7.4	7.4	0.01	146.51
14.900	0.00	0.0	7.4	7.4	0.00	146.50
15.000	0.00	0.0	7.4	7.4	0.00	146.50
15.100	0.00	0.0	7.4	7.4	0.00	146.50
.5.200	0.00	0.0	7.4	7.4	0.00	146.50
15.300	0.00	0.0	7.4	7.4	0.00	146.50
15.400	0.00	0.0	7.4	7.4	0.00	146.50

ond File: c:\ppd\0990018\H .PND
Inflow Hydrograph: c:\ppd\0990018\H25 .HYD
Outflow Hydrograph: c:\ppd\0990018\OUT .HYD

INFLOW HYDROGRAPH — ROUTING COMPUTATIONS

TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
15.500	0.00	0.0	7.4	7.4	0.00	146.50
15.600	0.00	0.0	7.4	7.4	0.00	146.50
15.700	0.00	0.0	7.4	7.4	0.00	146.50
15.800	0.00	0.0	7.4	7.4	0.00	146.50
15.900	0.00	0.0	7.4	7.4	0.00	146.50
16.000	0.00	0.0	7.4	7.4	0.00	146.50
16.100	0.00	0.0	7.4	7.4	0.00	146.50
16.200	0.00	0.0	7.4	7.4	0.00	146.50
16.300	0.00	0.0	7.4	7.4	0.00	146.50
16.400	0.00	0.0	7.4	7.4	0.00	146.50
16.500	0.00	0.0	7.4	7.4	0.00	146.50
16.600	0.00	0.0	7.4	7.4	0.00	146.50
16.700	0.00	0.0	7.4	7.4	0.00	146.50
16.800	0.00	0.0	7.4	7.4	0.00	146.50
16.900	0.00	0.0	7.4	7.4	0.00	146.50
17.000	0.00	0.0	7.4	7.4	0.00	146.50
17.100	0.00	0.0	7.4	7.4	0.00	146.50
17.200	0.00	0.0	7.4	7.4	0.00	146.50
17.300	0.00	0.0	7.4	7.4	0.00	146.50
17.400	0.00	0.0	7.4	7.4	0.00	146.50
17.500	0.00	0.0	7.4	7.4	0.00	146.50
17.600	0.00	0.0	7.4	7.4	0.00	146.50
17.700	0.00	0.0	7.4	7.4	0.00	146.50
17.800	0.00	0.0	7.4	7.4	0.00	146.50
17.900	0.00	0.0	7.4	7.4	0.00	146.50
18.000	0.00	0.0	7.4	7.4	0.00	146.50
18.100	0.00	0.0	7.4	7.4	0.00	146.50
18.200	0.00	0.0	7.4	7.4	0.00	146.50
18.300	0.00	0.0	7.4	7.4	0.00	146.50
18.400	0.00	0.0	7.4	7.4	0.00	146.50
18.500	0.00	0.0	7.4	7.4	0.00	146.50
18.600	0.00	0.0	7.4	7.4	0.00	146.50
18.700	0.00	0.0	7.4	7.4	0.00	146.50
18.800	0.00	0.0	7.4	7.4	0.00	146.50
18.900	0.00	0.0	7.4	7.4	0.00	146.50
19.000	0.00	0.0	7.4	7.4	0.00	146.50
19.100	0.00	0.0	7.4	7.4	0.00	146.50
19.200	0.00	0.0	7.4	7.4	0.00	146.50
19.300	0.00	0.0	7.4	7.4	0.00	146.50
19.400	0.00	0.0	7.4	7.4	0.00	146.50
19.500	0.00	0.0	7.4	7.4	0.00	146.50
19.600	0.00	0.0	7.4	7.4	0.00	146.50
19.700	0.00	0.0	7.4	7.4	0.00	146.50
19.800	0.00	0.0	7.4	7.4	0.00	146.50
19.900	0.00	0.0	7.4	7.4	0.00	146.50
20.000	0.00	0.0	7.4	7.4	0.00	146.50

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Inflow Hydrograph: c:\ppd\0990018\H25 .HYD
Outflow Hydrograph: c:\ppd\0990018\OUT .HYD

INFLOW HYDROGRAPH ROUTING COMPUTATIONS

TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
20.100	0.00	0.0	7.4	7.4	0.00	146.50
20.200	0.00	0.0	7.4	7.4	0.00	146.50
20.300	0.00	0.0	7.4	7.4	0.00	146.50
20.400	0.00	0.0	7.4	7.4	0.00	146.50
20.500	0.00	0.0	7.4	7.4	0.00	146.50
20.600	0.00	0.0	7.4	7.4	0.00	146.50
20.700	0.00	0.0	7.4	7.4	0.00	146.50
20.800	0.00	0.0	7.4	7.4	0.00	146.50
20.900	0.00	0.0	7.4	7.4	0.00	146.50
21.000	0.00	0.0	7.4	7.4	0.00	146.50
21.100	0.00	0.0	7.4	7.4	0.00	146.50
21.200	0.00	0.0	7.4	7.4	0.00	146.50
21.300	0.00	0.0	7.4	7.4	0.00	146.50
21.400	0.00	0.0	7.4	7.4	0.00	146.50
21.500	0.00	0.0	7.4	7.4	0.00	146.50
21.600	0.00	0.0	7.4	7.4	0.00	146.50
21.700	0.00	0.0	7.4	7.4	0.00	146.50
21.800	0.00	0.0	7.4	7.4	0.00	146.50
21.900	0.00	0.0	7.4	7.4	0.00	146.50
22.000	0.00	0.0	7.4	7.4	0.00	146.50
22.100	0.00	0.0	7.4	7.4	0.00	146.50
22.200	0.00	0.0	7.4	7.4	0.00	146.50
22.300	0.00	0.0	7.4	7.4	0.00	146.50
22.400	0.00	0.0	7.4	7.4	0.00	146.50
22.500	0.00	0.0	7.4	7.4	0.00	146.50
22.600	0.00	0.0	7.4	7.4	0.00	146.50
22.700	0.00	0.0	7.4	7.4	0.00	146.50
22.800	0.00	0.0	7.4	7.4	0.00	146.50
22.900	0.00	0.0	7.4	7.4	0.00	146.50
23.000	0.00	0.0	7.4	7.4	0.00	146.50
23.100	0.00	0.0	7.4	7.4	0.00	146.50
23.200	0.00	0.0	7.4	7.4	0.00	146.50
23.300	0.00	0.0	7.4	7.4	0.00	146.50
23.400	0.00	0.0	7.4	7.4	0.00	146.50
23.500	0.00	0.0	7.4	7.4	0.00	146.50
23.600	0.00	0.0	7.4	7.4	0.00	146.50
23.700	0.00	0.0	7.4	7.4	0.00	146.50
23.800	0.00	0.0	7.4	7.4	0.00	146.50
23.900	0.00	0.0	7.4	7.4	0.00	146.50
24.000	0.00	0.0	7.4	7.4	0.00	146.50
24.100	0.00	0.0	7.4	7.4	0.00	146.50
24.200	0.00	0.0	7.4	7.4	0.00	146.50
24.300	0.00	0.0	7.4	7.4	0.00	146.50
24.400	0.00	0.0	7.4	7.4	0.00	146.50
24.500	0.00	0.0	7.4	7.4	0.00	146.50
24.600	0.00	0.0	7.4	7.4	0.00	146.50

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Inflow Hydrograph: c:\ppd\0990018\H25 .HYD
Outflow Hydrograph: c:\ppd\0990018\OUT .HYD

INFLOW HYDROGRAPH | ROUTING COMPUTATIONS

TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
24.700	0.00	0.0	7.4	7.4	0.00	146.50
24.800	0.00	0.0	7.4	7.4	0.00	146.50
24.900	0.00	0.0	7.4	7.4	0.00	146.50
25.000	0.00	0.0	7.4	7.4	0.00	146.50
25.100	0.00	0.0	7.4	7.4	0.00	146.50
25.200	0.00	0.0	7.4	7.4	0.00	146.50
25.300	0.00	0.0	7.4	7.4	0.00	146.50
25.400	0.00	0.0	7.4	7.4	0.00	146.50
25.500	0.00	0.0	7.4	7.4	0.00	146.50
25.600	0.00	0.0	7.4	7.4	0.00	146.50
25.700	0.00	0.0	7.4	7.4	0.00	146.50
25.800	0.00	0.0	7.4	7.4	0.00	146.50
25.900	0.00	0.0	7.4	7.4	0.00	146.50

```
***************** SUMMARY OF ROUTING COMPUTATIONS *****************

Pond File:            c:\ppd\0990018\H        .PND
Inflow Hydrograph:    c:\ppd\0990018\H25      .HYD
Outflow Hydrograph:   c:\ppd\0990018\OUT      .HYD

Starting Pond W.S. Elevation =   145.00 ft

         ***** Summary of Peak Outflow and Peak Elevation *****

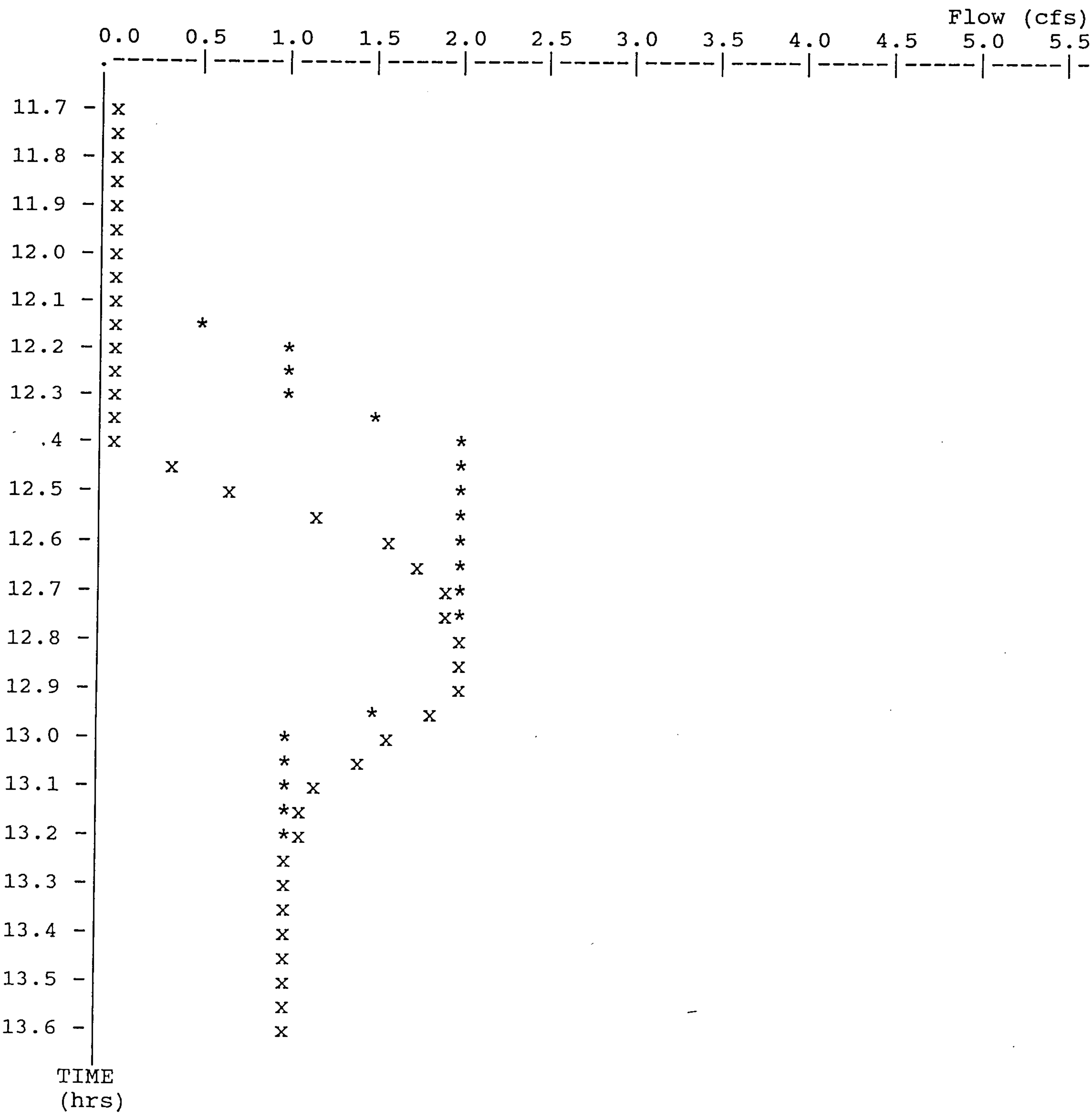
                      Peak Inflow    =     2.00 cfs
                      Peak Outflow   =     2.00 cfs
                      Peak Elevation =   147.10 ft

           ***** Summary of Approximate Peak Storage *****

               Initial Storage          =     0.00 ac-ft
               Peak Storage From Storm  =     0.05 ac-ft
                                           ---------------
               Total Storage in Pond    =     0.05 ac-ft
```

POND-2 Version: 5.17 S/N:

```
Pond File:           c:\ppd\0990018\H        .PND
Inflow Hydrograph:   c:\ppd\0990018\H25      .HYD
Outflow Hydrograph:  c:\ppd\0990018\OUT      .HYD
                                                  EXECUTED: 06-16-1994
Peak Inflow     =     2.00 cfs                              10:53:25
Peak Outflow    =     2.00 cfs
Peak Elevation  =   147.10 ft
```

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x  File:  c:\ppd\0990018\OUT     .HYD   Qmax =     2.0 cfs
```

EVAPORATION AREA
WATER BALANCE ANALYSIS
AND DRAINAGE ASSESSMENT

CS ENGINEERS, PC
ENVIRONMENTAL CONSULTANTS
2 CROSFIELD AVENUE
SUITE 422
'EST NYACK, NY 10994
4 353-5727
FAX 914 353-5731

JOB 0990018 34
SHEET NO. 1 OF 2 SCALE
CALCULATED BY WEG DATE 4/11/94
CHECKED BY DATE

Problem: Calculate the current water balance for the SELF "evaporation area" to estimate minimum subshed required to maintain existing wetlands

Given: Total Contributing Subshed = 35.8 ac.
Wetland Subshed = 8.5 ac.

Solution:

Evapotranspiration Rate Data:

1) South Pasco Co. = 53 in/yr (11 method/25 yr data)
2) SELF HELP Model = 56 in/yr

∴ Avg. Evapotrans. = 54.5 in/yr

Rainfall Rate Data:

Atlas of Florida = 52-56 in/yr

∴ Avg. Rainfall = 54 in/yr

Ratio = 1:1

Conclusions

The presence of vegetation does not assist or hinder the rate of evaporation/transpiration compared to non-vegetated areas, based on information provided in the textbook Wetlands (Mitsch and Gosselink, Van Nostrand and Reinhold, 1986).

It therefore follows that the ±9 acres of wetlands are dependant only on the water directly falling and collected in the immediate area of the wetland (Rainfall/Evapotrans. ratio = 1:1). Outlying subsheds to the wetland apparently do not contribute any appreciable water inflows.

∴ Redirecting the future runoff from the eastern/southeastern perimeter

GCS ENGINEERS, PC
ENVIRONMENTAL CONSULTANTS
2 CROSFIELD AVENUE
SUITE 422
'EST NYACK, NY 10994
4 353-5727
FAX 914 353-5731

JOB 099 0018. 34
SHEET NO. 2 OF 2 SCALE
CALCULATED BY WEG DATE 4/11/94
CHECKED BY DATE

swale to Basin "B" will not adversely impact the existing wetland vegetation.

If the swale is chosen to continue to direct stormwater runoff to the wetland area, an overflow should be provided to maintain the existing water level at the site.

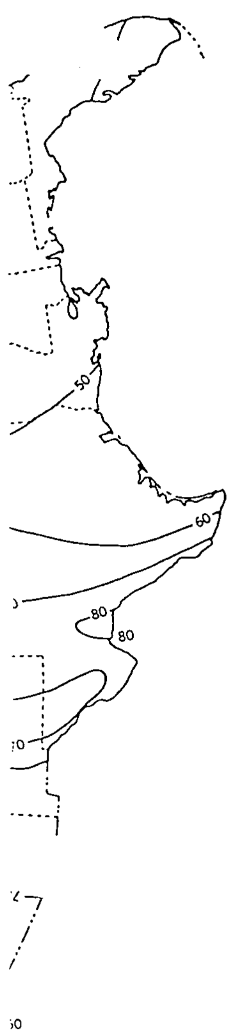

Figure 2-16 Average annual lake evaporation (in inches). (*U.S. National Weather Service*)

2-17 Variations in evaporation and transpiration Figure 2-16 shows average annual lake evaporation values[1] for the United States. The figure might also be described as showing the *evaporation potential* (Sec. 2-15). In many parts of the country evaporation potential substantially exceeds annual precipitation. In these areas construction of a reservoir means a large loss of water through evaporation. Where evaporation potential is high, runoff (Fig. 2-12) tends to be low, since runoff is essentially the residual after evapotranspiration requirements are subtracted from precipitation. The pattern of transpiration in the United States would be quite similar to that of evaporation, modified by the vegetal characteristics of the different regions of the country. In a desert region with little or no vegetation, transpiration is necessarily low, although evaporation potential is high. In no case can evapotranspiration exceed precipitation except when water from another basin is available to augment the local supply.

Variation in evaporation from year to year is much less than the variations in streamflow or precipitation. Extreme variations in annual consumptive use are about ± 25 percent of the mean annual value. Variations in measured pan evaporation generally fall within this range. The limited variation might be expected since mean annual humidity, temperature, and wind vary only moderately from

[1] "Climatic Atlas of the United States," U.S. Weather Bureau, 1968.

Table 2-3 Mean monthly and annual Class A pan evaporation at selected stations* (in inches)

Month	Newark, Calif.	W. Palm Beach, Fla.	Vicksburg, Miss.	Seattle, Wash.	Norris, Tenn.	Ithaca, N.Y.	Lincoln, Neb.	Hoaeae, Hawaii	Bartlett Dam, Ariz.
January	1.36	3.42	1.67	†	1.01	†	†	3.56	4.09
February	1.90	3.73	2.10	0.89	1.32	†	†	3.85	4.50
March	3.42	4.99	3.79	1.76	2.65	†	†	4.73	7.10
April	5.05	6.11	4.96	2.91	4.08	†	5.73	5.44	10.43
May	7.19	6.54	5.95	4.40	5.52	4.29	7.00	5.99	14.55
June	8.27	6.20	6.60	4.77	6.15	5.16	8.58	6.37	17.03
July	8.75	6.88	7.13	6.28	5.88	5.87	10.54	7.00	17.23
August	7.73	6.37	6.68	4.97	5.24	4.94	8.78	7.00	14.50
September	6.60	5.18	5.06	3.25	4.33	3.35	6.94	5.88	12.70
October	4.32	4.87	3.91	1.55	2.96	2.14	4.63	5.28	9.25
November	2.35	3.60	2.34	0.65	1.61	†	†	3.88	6.06
December	1.26	2.98	1.42	0.53	0.94	†	†	3.57	4.19
Year (in.)	58.20	60.87	51.61	......	41.69	......	......	62.55	121.63
(mm)	1478	1546	1311	......	1059	......	......	1589	3089

* Mean Monthly and Annual Evaporation from Free Water Surface, *U.S. Weather Bur. Tech. Paper* 13 1950.

† Pan inoperative because of ice.

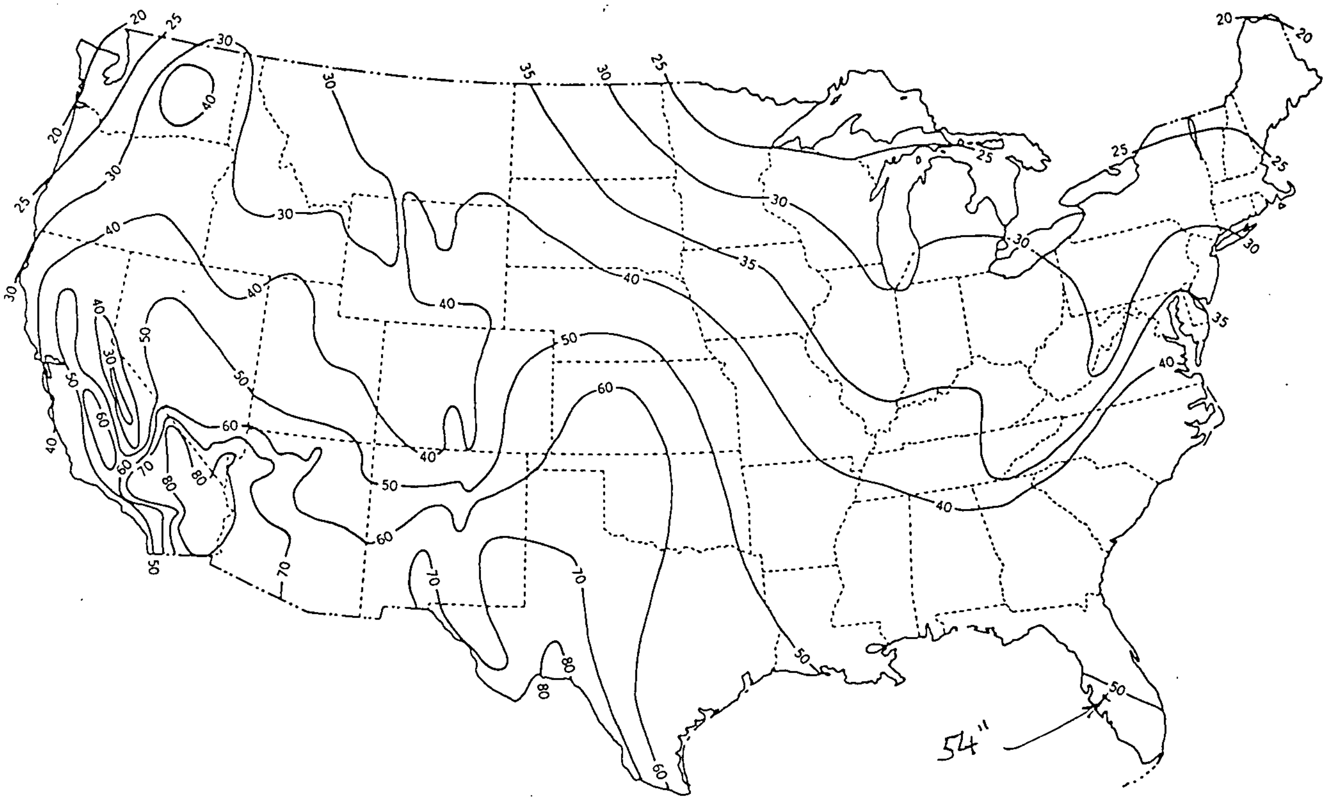

Figure 2-16 Average annual lake evaporation (in inches). *(U.S. National Weather Service)*

2-17 Variations in
annual lake evapor
described as showin
country evaporation
areas construction c
Where evaporation
runoff is essentially
tracted from precip
would be quite simi
istics of the differen
vegetation, transpir
high. In no case car
from another basin
Variation in eva
streamflow or preci
about ±25 percent
ation generally fall
since mean annual

[1] "Climatic Atlas of

Table 2-3 Mean mo
inches)

Month	Newark, Calif.
January	1.36
February	1.90
March	3.42
April	5.05
May	7.19
June	8.27
July	8.75
August	7.73
September	6.60
October	4.32
November	2.35
December	1.26
Year (in.)	58.20
(mm)	1478

* Mean Monthly an
1950.
† Pan inoperative be

WETLANDS

William J. Mitsch
School of Natural Resources
The Ohio State University
Columbus, Ohio

and

James G. Gosselink
Center for Wetland Resources
Louisiana State University
Baton Rouge, Louisiana

VNR VAN NOSTRAND REINHOLD
New York

creased wind speed. This equation assumes an adequate supply of water for capillary movement in the soil or for access by rooted plants. When water supply is limited (not a frequent occurrence in wetlands), evapotranspiration is limited as well. Evapotranspiration can also be physiologically limited by certain plants through the closing of leaf stomata despite adequate moisture (Lee, 1980).

Evapotranspiration can be determined with any number of empirical equations that use easily measured meteorological variables, or by various direct measures. Several of these relationships are described by Chow (1964). One of the most frequently used empirical equations for evapotranspiration from terrestrial ecosystems, which has been applied with some success to wetlands, is the Thornthwaite equation for potential evapotranspiration (Chow, 1964):

$$ET_i = 16(10T_i/I)^a \qquad (4.12)$$

where

ET_i = potential evapotranspiration for month i, mm/mo
T_i = mean monthly temperature, °C
I = local heat index = $\sum_{i=1}^{12} (T_i/5)^{1.514}$
$a = (0.675 \times I^3 - 77.1 \times I^2 + 17{,}920 \times I + 492{,}390) \times 10^{-6}$

This equation was used to determine evapotranspiration from the Okefenokee Swamp in Georgia by Rykiel (1977). For a 26-year period examined in that study, average evapotranspiration ranged from 21 mm/mo in December to 179 mm/mo in July.

Another empirical relationship for describing summer evapotranspiration was developed by Scheffe (1978) and was described by Hammer and Kadlec (1983). The equation, which was used individually for sedge, willow, leatherleaf, and cattail vegetation covers, is:

$$ET = \alpha + \beta B + \delta C + \gamma D + \lambda E \qquad (4.13)$$

where α, β, δ, γ, λ = correlation coefficients; B = incident radiation (measured by pyranograph); C = air temperature; D = relative humidity; and E = wind speed.

The equation gave estimates that are better than some more frequently used evapotranspiration relationships, although when the results of using this model were compared to actual measurements, the radiation term was shown to dominate (Hammer and Kadlec, 1983).

Because of the many meteorological and biological factors that affect evapotranspiration, none of the many empirical relationships, including the Thornthwaite and Hammer and Kadlec equations, is entirely satisfactory for

estimating wetland evapotranspiration. Lee (1980, p. 180) cautions that there is "no reliable method of estimating evapotranspiration rates based on simple weather-element data or potential evapotranspiration." Nevertheless, these equations of potential evapotranspiration offer the most cost effective first approximations for estimating water loss. Furthermore they may be more reliable when applied to wetlands that are only rarely devoid of an adequate water supply than to upland terrain where evapotranspiration can be limited by a lack of soil water.

Several direct measurement techniques can be used in wetlands to determine evapotranspiration. Evapotranspiration from wetlands has been calculated from measurements of the increase in water vapor in air flowing through vegetation chambers (Brown, 1981), and from observing the diurnal cycles of groundwater or surface water in wetlands (Mitsch, Dorge, and Weimhoff, 1977; Heimburg, 1984). This latter method, described in Figure 4-10, can be calculated as follows:

$$ET = S_y\,(24\,h \pm s) \qquad (4.14)$$

where

ET = evapotranspiration, mm/day
S_y = specific yield of aquifer (unitless)
= 1.0 for standing water wetlands
< 1.0 for groundwater wetlands
h = hourly rise in water level from midnight to 4 AM, mm/hr
s = net fall (+) or rise (−) of water table or water surface in one day

The pattern assumes active "pumping" of water by vegetation during the day and a constant rate of recharge equal to the midnight to 4 AM rate. This method also assumes that evapotranspiration is negligible around midnight and that the water table around this time approximates the daily mean. The water level is usually at or near the root zone in many wetlands, a necessary condition for this method to accurately measure evapotranspiration (Todd, 1964).

A question about evapotranspiration from wetlands that does not have a uniform answer in the literature is, "Does the presence of wetland vegetation increase or decrease the loss of water over that which would occur from an open body of water?" Data from individual studies conflict. Eggelsmann (1963) found evaporation from bogs in Germany to be generally less than that from open water except during wet summer months. In studies of evapotranspiration from small bogs in northern Minnesota, Bay (1967) found it to be 88% to 121% of open water evaporation. Eisenlohr (1966) found 10% lower evapotranspiration from vegetated prairie potholes than from nonvegetated potholes in North Dakota. Hall, Rutherford, and Byers (1972) estimated through a series of measurements and calculations that a stand of

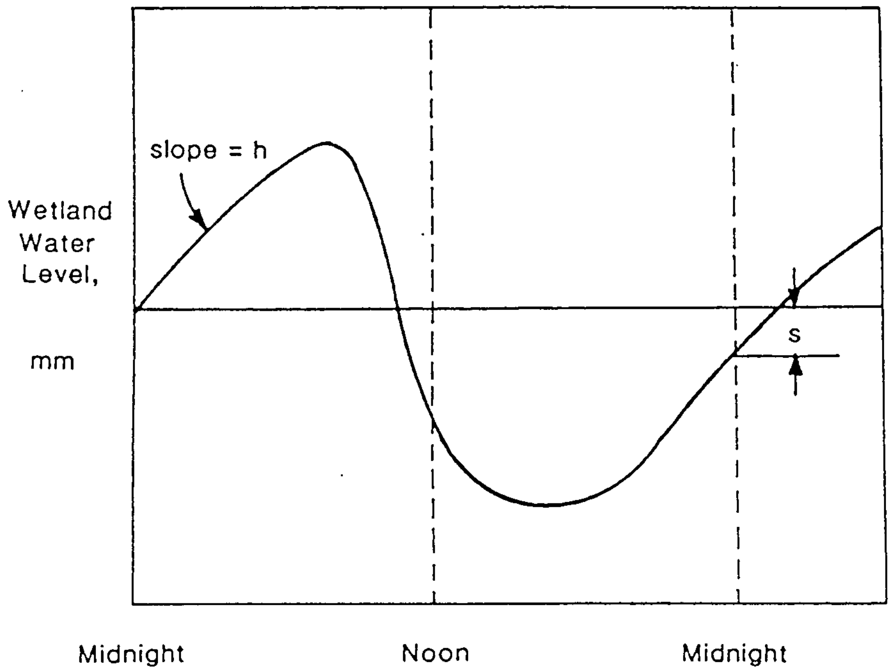

Figure 4-10. Diurnal water fluctuation in wetland used to calculate evapotranspiration with Equation 4.14. *(After Todd, 1964, p. 13–36)*

vegetation in a small New Hampshire wetland lost 80% more water than did the open water in the wetland. In a forested pond cypress dome in north-central Florida, Heimburg (1984) found that swamp evapotranspiration was about 80% of pan evaporation during the dry season (spring and fall) and as low as 60% of pan evaporation during the wet season (summer). Brown (1981) found that transpiration losses from pond cypress wetlands were lower than evaporation from an open water surface even with adequate standing water. The conflicting measurements and the difficulty of measuring evaporation and evapotranspiration led Linacre (1976) to conclude that neither the presence of wetland vegetation nor the type of vegetation had major influences on evaporation rates, at least during the active growing season. This is probably a reasonable conclusion for most wetlands, although it is clear that the type of wetland ecosystem and the season are important considerations. Ingram (1983), for example, found that fens have about 40% more evapotranspiration than do treeless bogs, and that evaporation from the bogs

is less than potential evapotranspiration in the summer and greater than potential evapotranspiration in the winter. Furthermore, H. T. Odum (1984, p. 431) concluded that the draining of Florida cypress swamps and their "replacement with either open water or other kinds of vegetation may decrease available water, increasing frequency of drought, raising microclimate temperatures in summer, and reducing productivity of natural and agricultural ecosystems."

Tides

The periodic and predictable tidal inundation of coastal salt marshes, mangroves, and freshwater tidal marshes is a major hydrologic feature of these wetlands. The tide acts as a stress by causing submergence, saline soils, and soil anaerobiosis; it acts as a subsidy by removing excess salts, reestablishing aerobic conditions, and providing nutrients. Tides also shift and alter the sediment patterns in coastal wetlands, causing a uniform surface to develop.

Typical tidal patterns for several coastal areas in the Atlantic and Gulf coasts of the United States are shown in Figure 4-11*a*. Seasonal as well as diurnal patterns exist in the tidal rhythms. Annual variations of mean monthly sea level are as great as 25 cm (Fig. 4-11*b*). Tides also have significant bimonthly patterns because they are generated by the gravitational pull of the moon and, to a lesser extent, the sun. When the sun and moon are in line and pull together, which occurs almost every two weeks, spring tides, or tides of the greatest amplitude, develop. When the sun and the moon are at right angles, neap tides, or tides of least amplitude, occur. Spring tides occur roughly at full and new moons, while neap tides occur during the first and third quarters.

Tides vary more locally than regionally, with the primary determinant being the coastline configuration. In North America, tidal amplitudes vary from less than 1 meter in the Texas Gulf Coast to several meters in the Bay of Fundy in Nova Scotia. Tidal amplitude can actually increase as one progresses inland in some funnel-shaped estuaries (W. E. Odum et al., 1984).

Typically on a rising tide, water flows up tidal creek channels until the channels are bank-full. It overflows first at the upstream end, where tidal creeks break up into small creeklets that lack natural levees. The overflowing water spreads back downstream over the marsh surface. On falling tides, the flows are reversed. At low tides, water continues to drain through the natural levee sediments into adjacent creeks because these sediments tend to be relatively coarse; in the marsh interior where sediments are finer, drainage is poor and water is often impounded in small depressions in the marsh.

CALCULATIONS

SCS ENGINEERS

SHEET 1 OF 2

CLIENT HCDSW	PROJECT SELF	JOB NO. 990018.34
SUBJECT ASSESSMENT OF EVAPORATION AREA DRAINAGE.	BY FU / CHECKED [signature]	DATE 7-20-94 / DATE 7/20/94

- PURPOSE: • ASSESS EXISTING STORMWATER DRAINAGE PATTERN IN EVAPORATION AREA
  - PROPOSE MODIFICATION FOR EXISTING CONDITION.

- GIVEN:
  - 25 YR-24 HR RAINFALL = 8.4"
    4 YR-24 HR RAINFALL = 4.0"
  - GRASS AREA CN = 55.
    WATER SURFACE AND PAVED AREA CN=95
  - TOTAL CONTRIBUTION AREA (INCLUDING BASIN) = 30.5 AC.
    BASIN SURFACE AREA @ EL. 125 FT = 9.02 AC
  - ASSUMED INFILTRATION = ∅ (conservative)

- SOLUTION.
  - BASIN VOLUME.

    SINCE THERE IS NO DISCHARGE STRUCTURE IN THE EVAPORATION POND AND THE ONLY DISCHARGE METHOD IS THROUGH EVAPORATION AND INFILTRATION, THE EVAPORATION POND CAN BE MODELED AS A RETENTION BASIN.

    BASED ON 1992 AND 1994 TOPO., THE BASIN BOTTOM ELEVATION CAN BE ASSUMED AT 123 FT. TOP ELEVATION IS 124 FT; AVERAGE SIDESLOPE IS 10:1.

    BASIN AREAS WERE MEASURED WITH ACAD, AND STORAGE VOLUME CALCULATED WITH POND-2.

ELEVATION	AREA (AC)	VOLUME (AC-FT)
123	7.66	0
124	8.34	8.00
125	9.02	16.68

SCS ENGINEERS

SHEET 2 OF 2

CLIENT HCDSW	PROJECT SELF		JOB NO. 940018.34
SUBJECT ASSESSMENT OF EVAPORATION AREA DRAINAGE.		BY FU	DATE 7-20-94
		CHECKED	DATE 7/20/94

- CONCENTRITION TIME T_c.

SHEET FLOW DISTANCE = 200 FT SLOPE = 2.5%

SHALLOW FLOW DISTANCE = 650 FT SLOPE = 0.6%

CHANNEL FLOW DISTANCE = 350 FT ASSUMPE FLOW SPEED = 3.0 FT/S

ESTIMATE T_c WITH QTR55:

$T_c = 0.50$ HR

- WEIGHTED CN

WATER SURFACE, AREA = 9.0 AC CN = 98

PAVED AREA AREA = 0.4 AC CN = 95

GRASS AREA AREA = 30.5 - 9.0 - 0.4 = 21.1 AC CN = 55

ESTIMATED CN WITH QTR55:

WEIGHTED CN = 68

- HYDROGRAPH AND TOTAL RETENTION VOLUME RRD.

CALCULATE HYDROGRAPH WITH QTR55

$Q_{PEAK} = 115$ CFQ

RUNOFF = 4.57 IN

TOTAL REQUIRED RETENTION VOLUME.

$V = 30.5\ AC \times (\frac{4.57}{12})\ FT$

$= 11.62$ AC-FT < 16.68 AC.FT

OK

Quick TR-55 Ver.5.46   S/N:
Executed: 15:35:11   07-20-1994

RETENTION BASION DESIGN
FOR EVAPORATION AREA
SOUTHEAST LANDFILL

RUNOFF CURVE NUMBER DATA

Composite Area:

SURFACE DESCRIPTION	AREA (acres)	CN	
GOOD GRASS	21.10	55	
WATER SURFACE	9.00	98	
PAVED AREA	0.40	95	
COMPOSITE AREA --->	30.50	68.2	(68)

```
Quick TR-55 Ver.5.46   S/N:
Executed: 15:34:44   07-20-1994     C:\HYDRO\PPDATA\ESCMB\EVPOR.TCT

                              RETENTION BASIN DESIGN
                                 EVAPORATION AREA
                                  SOUTHEAST AREA


                         Tc COMPUTATIONS FOR:

 SHEET FLOW (Applicable to Tc only)
     Segment ID                                          A-B
     Surface description                           GOOD GRASS
     Manning's roughness coeff., n                        0.2400
     Flow length, L (total < or = 300)      ft            200.0
     Two-yr 24-hr rainfall, P2               in            4.000
     Land slope, s                          ft/ft         0.0250
                          0.8
          .007 * (n*L)
     T =  --------------                    hrs           0.34          =  0.34
             0.5    0.4
           P2    *   s

 SHALLOW CONCENTRATED FLOW
     Segment ID                                          B-C
     Surface (paved or unpaved)?                         Unpaved
     Flow length, L                          ft            650.0
     Watercourse slope, s                   ft/ft         0.0070

                            0.5
     Avg.V =   Csf *   (s)                  ft/s          1.3499
     where:    Unpaved Csf = 16.1345
               Paved   Csf = 20.3282

     T = L / (3600*V)                       hrs           0.13          =  0.13


 CHANNEL FLOW
     Segment ID                                          C-D
     Cross Sectional Flow Area, a           sq.ft          1.00
     Wetted perimeter, Pw                    ft            1.00
     Hydraulic radius, r = a/Pw              ft            1.000
     Channel slope, s                       ft/ft          4.0500
     Manning's roughness coeff., n                         1.0000

                          2/3      1/2
         1.49   *   r    *   s
     V = --------------------               ft/s          2.9986
                     n

     Flow length, L                          ft             350

     T = L / (3600*V)                       hrs           0.03          =  0.03

    :::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
                                                 TOTAL TIME (hrs)       0.50
```

Return Frequency: 25 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 07-20-1994 15:27:11
Watershed file: --> C:\HYDRO\PPDATA\ESCMB\EVPOR .MOP
Hydrograph file: --> C:\HYDRO\PPDATA\ESCMB\EVPOR25.HYD

RETENTION BASIN DESIGN
FOR EVAPORATION AREA
SOUTHEAST LANDFILL

>>>> Input Parameters Used to Compute Hydrograph <<<<

Subarea Description	AREA (acres)	CN	Tc (hrs)	* Tt (hrs)	Precip. (in)	Runoff (in)	Ia/p input/used
	30.50	68.0	0.50	0.00	8.40	4.57	.11 .10

* Travel time from subarea outfall to composite watershed outfall point.
Total area = 30.50 acres or 0.04766 sq.mi
Peak discharge = 115 cfs

>>>> Computer Modifications of Input Parameters <<<<<

Subarea Description	Input Values Tc (hr)	Input Values * Tt (hr)	Rounded Values Tc (hr)	Rounded Values * Tt (hr)	Ia/p Interpolated (Yes/No)	Ia/p Messages
	0.50	0.00	**	**	No	--

* Travel time from subarea outfall to composite watershed outfall point.
** Tc & Tt are available in the hydrograph tables.

POND-2 Version: 5.17
S/N:

RETENTION BASIN DESIGN
FOR EVAPORATION AREA
SOUTHEAST LANDFILL

CALCULATED 07-20-1994 15:31:45
DISK FILE: c:\hydro\ppdata\91834\EVPOR .VOL

Planimeter scale: 1 inch = 1 ft.

Elevation (ft)	Planimeter (sq.in.)	Area (acres)	A1+A2+sqr(A1*A2) (acres)		* Volume (acre-ft)	Volume Sum (acre-ft)
123.00	333,670.00	7.66	0.00		0.00	0.00
124.00	363,290.00	8.34	23.99		8.00	8.00
124.70	*I*	8.81	25.73	6.00		14.00
125.00	392,910.00	9.02	26.03		8.68	16.68

I ---> Interpolated area from closest two planimeter readings.

* Incremental volume computed by the Conic Method for Reservoir Volumes.