Catchment ID Map 1 of 2

GLENWOOD CIRCLE
STILWATER DR
LAKEFRONT LINKS DR
MOONRISE DR
CLARK LOHR ROAD
HINES DR
TRACI LN
SNOW BIRD LN
ORCHARD DR
BRACKEN DRIVE
BENCH ROAD
SUMMIT DR
GLEN MEADOW ROAD
WHITE OAK DR
N SHORE DR
HARVEY PENINSULA ROAD
OAK WAY RD
S SHORE RD
SKY VALLEY DR
PINEY POINT DR
RIDGE RD
SAWMILL HOLLOW RD
HIGH POINT DR
DEER RUN LANE
VALLEY VIEW DR
ACORN LANE
N SHORELINE DR
UPPER SNAGGY MOUNTAIN RD

213
121
160B1
160B3
160B2
160A
207A1
207A2
207B
123
193A2
193B
193A1
141A2
141A1
141B

1 in = 750 ft

N

Catchment ID
Map 2 of 2

Upstream Side of
North Glade Run Culvert

89

Downstream Side of
North Glade Run Culvert

1 in = 1,750 ft

N

NOAA Atlas 14, Volume 2, Version 3
Location name: Swanton, Maryland, US*
Latitude: 39.4999°, Longitude: -79.2811°
Elevation: 2600 ft*
* source: Google Maps

POINT PRECIPITATION FREQUENCY ESTIMATES

G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M.Yekta, and D. Riley

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

AMS-based point precipitation frequency estimates with 90% confidence intervals (in inches/hour)[1]

Duration	Annual exceedance probability (1/years)								
	1/2	1/5	1/10	1/25	1/50	1/100	1/200	1/500	1/1000
5-min	**3.90** (3.50–4.34)	**4.91** (4.40–5.47)	**5.72** (5.11–6.36)	**6.66** (5.93–7.39)	**7.45** (6.59–8.24)	**8.21** (7.24–9.06)	**9.02** (7.92–9.97)	**10.1** (8.81–11.2)	**11.1** (9.54–12.2)
10-min	**3.04** (2.74–3.40)	**3.82** (3.43–4.25)	**4.42** (3.95–4.91)	**5.10** (4.53–5.66)	**5.65** (5.00–6.24)	**6.18** (5.45–6.82)	**6.74** (5.91–7.45)	**7.46** (6.47–8.22)	**8.09** (6.95–8.92)
15-min	**2.48** (2.23–2.77)	**3.13** (2.80–3.48)	**3.62** (3.24–4.02)	**4.20** (3.73–4.66)	**4.66** (4.13–5.15)	**5.12** (4.51–5.65)	**5.59** (4.90–6.17)	**6.20** (5.38–6.84)	**6.74** (5.79–7.43)
30-min	**1.66** (1.49–1.85)	**2.14** (1.92–2.39)	**2.52** (2.25–2.80)	**2.97** (2.64–3.29)	**3.33** (2.95–3.68)	**3.70** (3.26–4.08)	**4.08** (3.57–4.50)	**4.60** (3.99–5.07)	**5.05** (4.34–5.57)
60-min	**1.02** (0.917–1.14)	**1.34** (1.21–1.50)	**1.60** (1.43–1.78)	**1.92** (1.71–2.13)	**2.20** (1.94–2.43)	**2.47** (2.18–2.73)	**2.77** (2.43–3.06)	**3.18** (2.76–3.50)	**3.55** (3.05–3.91)
2-hr	**0.601** (0.538–0.669)	**0.793** (0.710–0.882)	**0.956** (0.853–1.06)	**1.17** (1.04–1.29)	**1.35** (1.19–1.49)	**1.54** (1.35–1.70)	**1.75** (1.53–1.93)	**2.06** (1.77–2.26)	**2.33** (1.98–2.56)
3-hr	**0.432** (0.389–0.484)	**0.567** (0.510–0.633)	**0.681** (0.610–0.758)	**0.830** (0.739–0.920)	**0.963** (0.852–1.07)	**1.10** (0.969–1.22)	**1.26** (1.09–1.38)	**1.48** (1.27–1.62)	**1.68** (1.43–1.84)
6-hr	**0.268** (0.240–0.303)	**0.348** (0.310–0.393)	**0.416** (0.370–0.468)	**0.505** (0.446–0.566)	**0.583** (0.513–0.653)	**0.666** (0.582–0.745)	**0.759** (0.656–0.846)	**0.891** (0.761–0.992)	**1.01** (0.856–1.13)
12-hr	**0.165** (0.148–0.188)	**0.213** (0.191–0.243)	**0.255** (0.226–0.289)	**0.310** (0.274–0.350)	**0.359** (0.315–0.404)	**0.412** (0.358–0.463)	**0.471** (0.405–0.527)	**0.557** (0.472–0.622)	**0.638** (0.534–0.711)
24-hr	**0.101** (0.093–0.112)	**0.134** (0.123–0.148)	**0.160** (0.145–0.176)	**0.197** (0.178–0.217)	**0.229** (0.204–0.251)	**0.265** (0.234–0.291)	**0.306** (0.266–0.337)	**0.370** (0.315–0.408)	**0.426** (0.356–0.471)
2-day	**0.060** (0.055–0.066)	**0.079** (0.072–0.086)	**0.093** (0.085–0.101)	**0.113** (0.102–0.123)	**0.130** (0.117–0.142)	**0.149** (0.132–0.163)	**0.170** (0.149–0.186)	**0.202** (0.173–0.222)	**0.229** (0.194–0.254)
3-day	**0.043** (0.040–0.047)	**0.056** (0.052–0.061)	**0.066** (0.061–0.072)	**0.080** (0.073–0.086)	**0.091** (0.082–0.098)	**0.103** (0.092–0.112)	**0.116** (0.103–0.127)	**0.136** (0.119–0.150)	**0.154** (0.132–0.170)
4-day	**0.035** (0.033–0.038)	**0.045** (0.042–0.049)	**0.053** (0.049–0.057)	**0.063** (0.058–0.068)	**0.071** (0.065–0.077)	**0.080** (0.073–0.086)	**0.089** (0.080–0.097)	**0.104** (0.091–0.113)	**0.116** (0.101–0.128)
7-day	**0.023** (0.022–0.025)	**0.030** (0.028–0.032)	**0.034** (0.032–0.037)	**0.040** (0.037–0.043)	**0.045** (0.041–0.048)	**0.049** (0.045–0.053)	**0.054** (0.050–0.059)	**0.061** (0.055–0.067)	**0.068** (0.060–0.074)
10-day	**0.018** (0.017–0.020)	**0.023** (0.022–0.025)	**0.026** (0.025–0.028)	**0.030** (0.029–0.032)	**0.033** (0.031–0.035)	**0.036** (0.034–0.039)	**0.040** (0.037–0.042)	**0.044** (0.040–0.047)	**0.048** (0.043–0.052)
20-day	**0.013** (0.012–0.014)	**0.016** (0.015–0.017)	**0.018** (0.017–0.019)	**0.020** (0.019–0.021)	**0.022** (0.021–0.023)	**0.023** (0.022–0.025)	**0.025** (0.023–0.026)	**0.027** (0.025–0.029)	**0.028** (0.026–0.031)
30-day	**0.011** (0.010–0.011)	**0.013** (0.013–0.014)	**0.015** (0.014–0.015)	**0.016** (0.016–0.017)	**0.018** (0.017–0.018)	**0.019** (0.018–0.020)	**0.020** (0.019–0.021)	**0.021** (0.020–0.023)	**0.022** (0.021–0.024)
45-day	**0.009** (0.009–0.010)	**0.011** (0.011–0.012)	**0.012** (0.012–0.013)	**0.014** (0.013–0.014)	**0.015** (0.014–0.015)	**0.015** (0.015–0.016)	**0.016** (0.015–0.017)	**0.017** (0.016–0.018)	**0.018** (0.017–0.019)
60-day	**0.008** (0.008–0.009)	**0.010** (0.010–0.010)	**0.011** (0.010–0.011)	**0.012** (0.012–0.013)	**0.013** (0.012–0.013)	**0.013** (0.013–0.014)	**0.014** (0.013–0.015)	**0.015** (0.014–0.016)	**0.015** (0.015–0.016)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of annual maxima series (AMS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and annual exceedance probability) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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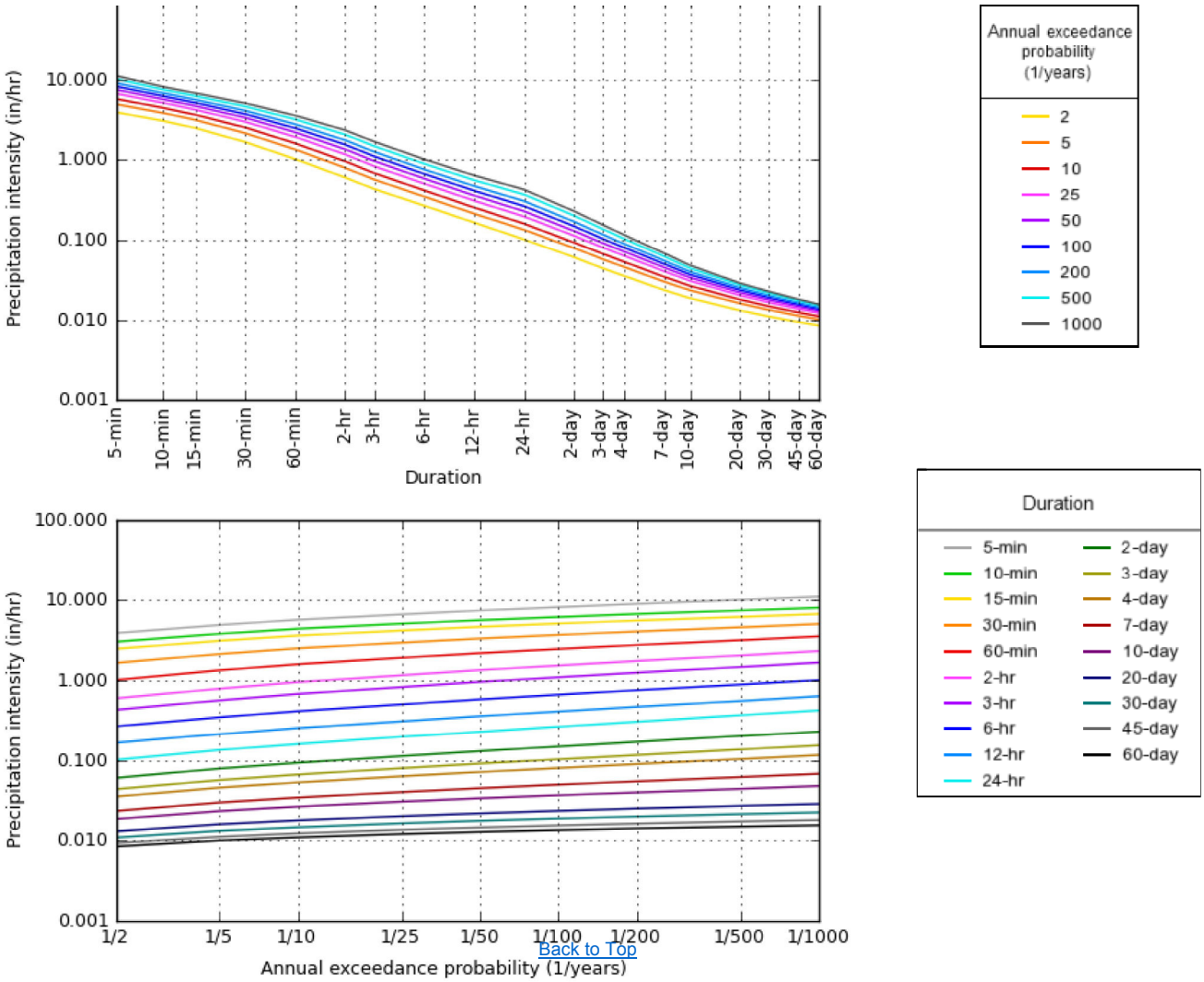
PF graphical



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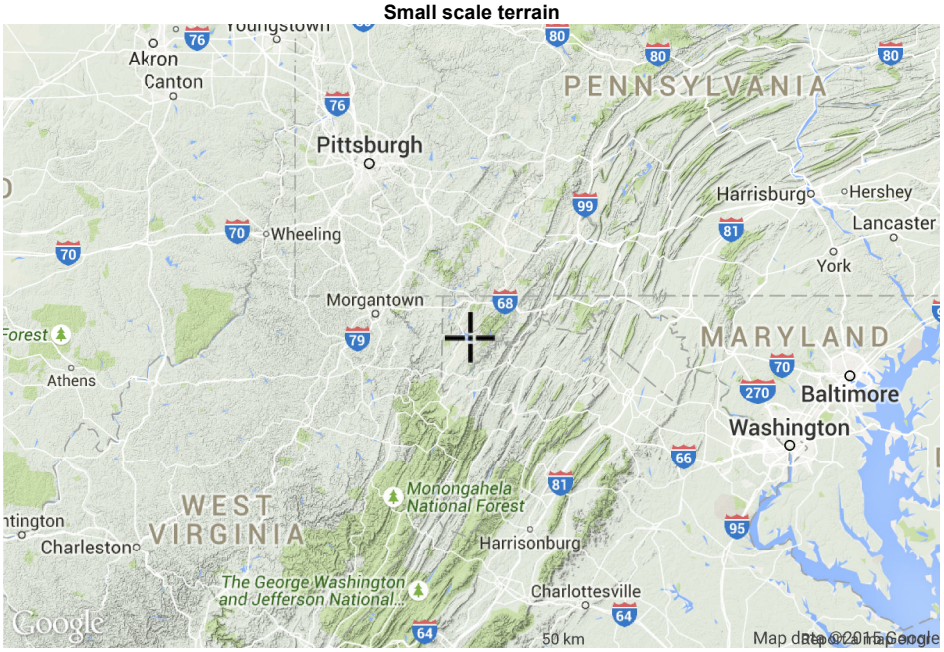
Maps & aerials

NOAA Atlas 14, Volume 2, Version 3

Created (GMT): Wed Sep 2 19:12:21 2015

Small scale terrain



Large scale terrain

Large scale aerial

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National Weather Service
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Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

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NOAA Atlas 14, Volume 2, Version 3
Location name: Swanton, Maryland, US*
Latitude: 39.4999°, Longitude: -79.2811°
Elevation: 2600 ft*
* source: Google Maps

POINT PRECIPITATION FREQUENCY ESTIMATES

G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M.Yekta, and D. Riley

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

AMS-based point precipitation frequency estimates with 90% confidence intervals (in inches)
[1]

Duration	Annual exceedance probability (1/years)								
	1/2	1/5	1/10	1/25	1/50	1/100	1/200	1/500	1/1000
5-min	**0.325** (0.292–0.362)	**0.409** (0.367–0.456)	**0.477** (0.426–0.530)	**0.555** (0.494–0.616)	**0.621** (0.549–0.687)	**0.684** (0.603–0.755)	**0.752** (0.660–0.831)	**0.845** (0.734–0.932)	**0.926** (0.795–1.02)
10-min	**0.507** (0.456–0.567)	**0.636** (0.571–0.709)	**0.736** (0.658–0.818)	**0.850** (0.755–0.943)	**0.942** (0.833–1.04)	**1.03** (0.908–1.14)	**1.12** (0.985–1.24)	**1.24** (1.08–1.37)	**1.35** (1.16–1.49)
15-min	**0.620** (0.558–0.693)	**0.782** (0.701–0.871)	**0.906** (0.809–1.01)	**1.05** (0.933–1.17)	**1.17** (1.03–1.29)	**1.28** (1.13–1.41)	**1.40** (1.23–1.54)	**1.55** (1.35–1.71)	**1.69** (1.45–1.86)
30-min	**0.830** (0.747–0.927)	**1.07** (0.960–1.19)	**1.26** (1.13–1.40)	**1.48** (1.32–1.64)	**1.67** (1.48–1.84)	**1.85** (1.63–2.04)	**2.04** (1.79–2.25)	**2.30** (1.99–2.53)	**2.53** (2.17–2.79)
60-min	**1.02** (0.917–1.14)	**1.34** (1.21–1.50)	**1.60** (1.43–1.78)	**1.92** (1.71–2.13)	**2.20** (1.94–2.43)	**2.47** (2.18–2.73)	**2.77** (2.43–3.06)	**3.18** (2.76–3.50)	**3.55** (3.05–3.91)
2-hr	**1.20** (1.08–1.34)	**1.59** (1.42–1.76)	**1.91** (1.71–2.12)	**2.33** (2.07–2.58)	**2.70** (2.38–2.98)	**3.09** (2.70–3.40)	**3.51** (3.05–3.86)	**4.11** (3.54–4.52)	**4.67** (3.97–5.12)
3-hr	**1.30** (1.17–1.45)	**1.70** (1.53–1.90)	**2.05** (1.83–2.28)	**2.49** (2.22–2.76)	**2.89** (2.56–3.20)	**3.31** (2.91–3.65)	**3.77** (3.29–4.15)	**4.44** (3.81–4.87)	**5.05** (4.29–5.54)
6-hr	**1.61** (1.44–1.82)	**2.08** (1.86–2.35)	**2.49** (2.21–2.80)	**3.02** (2.67–3.39)	**3.49** (3.07–3.91)	**3.99** (3.48–4.46)	**4.55** (3.93–5.07)	**5.34** (4.56–5.94)	**6.07** (5.12–6.75)
12-hr	**1.99** (1.78–2.27)	**2.57** (2.30–2.92)	**3.07** (2.73–3.48)	**3.73** (3.30–4.21)	**4.33** (3.80–4.87)	**4.96** (4.31–5.57)	**5.67** (4.88–6.35)	**6.72** (5.69–7.50)	**7.69** (6.43–8.56)
24-hr	**2.44** (2.23–2.69)	**3.22** (2.95–3.56)	**3.83** (3.49–4.22)	**4.72** (4.26–5.20)	**5.49** (4.91–6.04)	**6.36** (5.61–6.99)	**7.35** (6.40–8.09)	**8.87** (7.55–9.79)	**10.2** (8.54–11.3)
2-day	**2.88** (2.66–3.15)	**3.78** (3.48–4.13)	**4.45** (4.08–4.86)	**5.42** (4.92–5.92)	**6.23** (5.61–6.81)	**7.14** (6.35–7.81)	**8.15** (7.15–8.93)	**9.68** (8.32–10.7)	**11.0** (9.30–12.2)
3-day	**3.13** (2.90–3.39)	**4.07** (3.77–4.40)	**4.76** (4.40–5.15)	**5.73** (5.25–6.20)	**6.53** (5.93–7.08)	**7.41** (6.66–8.05)	**8.37** (7.43–9.12)	**9.82** (8.55–10.8)	**11.1** (9.48–12.2)
4-day	**3.37** (3.15–3.63)	**4.36** (4.06–4.68)	**5.07** (4.71–5.44)	**6.04** (5.58–6.49)	**6.83** (6.25–7.36)	**7.67** (6.96–8.29)	**8.59** (7.71–9.31)	**9.95** (8.77–10.9)	**11.1** (9.66–12.3)
7-day	**3.91** (3.67–4.19)	**4.98** (4.67–5.33)	**5.73** (5.36–6.14)	**6.73** (6.26–7.21)	**7.50** (6.94–8.05)	**8.31** (7.63–8.94)	**9.15** (8.33–9.88)	**10.3** (9.28–11.2)	**11.4** (10.1–12.4)
10-day	**4.44** (4.20–4.71)	**5.56** (5.26–5.90)	**6.33** (5.97–6.70)	**7.30** (6.85–7.73)	**8.03** (7.50–8.52)	**8.76** (8.15–9.32)	**9.51** (8.79–10.2)	**10.5** (9.62–11.3)	**11.4** (10.4–12.6)
20-day	**6.25** (5.96–6.58)	**7.64** (7.28–8.04)	**8.53** (8.12–8.98)	**9.63** (9.15–10.2)	**10.4** (9.87–11.0)	**11.2** (10.6–11.9)	**12.0** (11.2–12.7)	**12.9** (12.1–13.8)	**13.7** (12.6–14.7)
30-day	**7.85** (7.51–8.23)	**9.50** (9.08–9.95)	**10.5** (10.1–11.0)	**11.8** (11.2–12.3)	**12.7** (12.0–13.3)	**13.5** (12.8–14.2)	**14.3** (13.5–15.1)	**15.3** (14.4–16.3)	**16.1** (15.0–17.1)
45-day	**10.1** (9.67–10.5)	**12.0** (11.6–12.6)	**13.3** (12.7–13.9)	**14.7** (14.0–15.4)	**15.7** (15.0–16.4)	**16.6** (15.8–17.4)	**17.5** (16.6–18.4)	**18.6** (17.5–19.6)	**19.4** (18.2–20.5)
60-day	**12.1** (11.6–12.7)	**14.4** (13.8–15.0)	**15.8** (15.1–16.5)	**17.3** (16.6–18.1)	**18.4** (17.6–19.3)	**19.4** (18.5–20.3)	**20.3** (19.3–21.3)	**21.5** (20.3–22.6)	**22.2** (21.0–23.5)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of annual maxima series (AMS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and annual exceedance probability) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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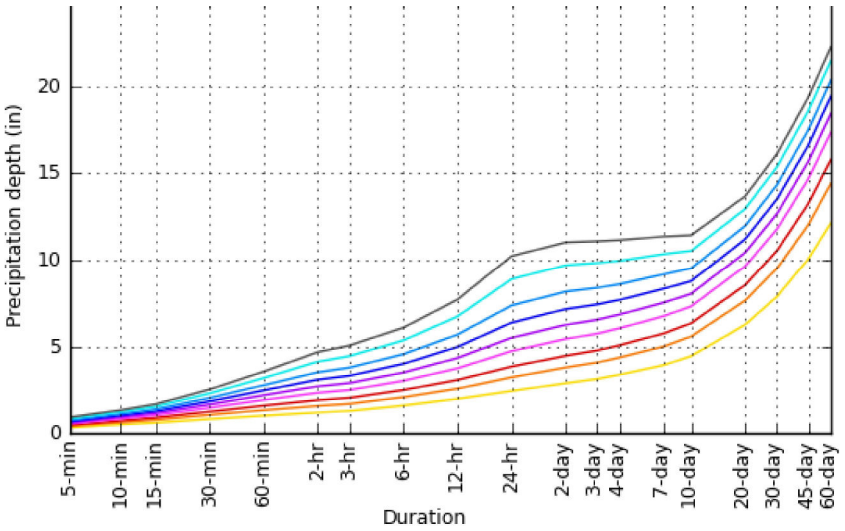
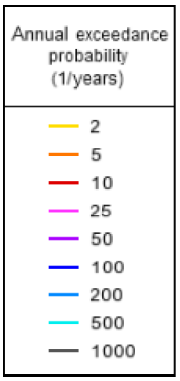
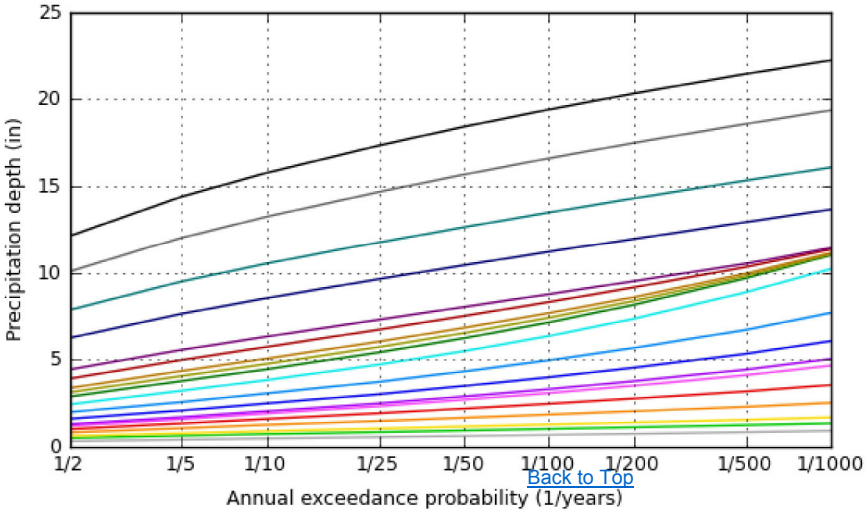
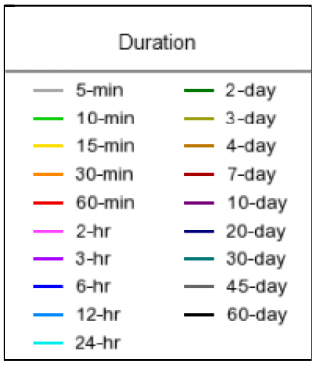
PF graphical









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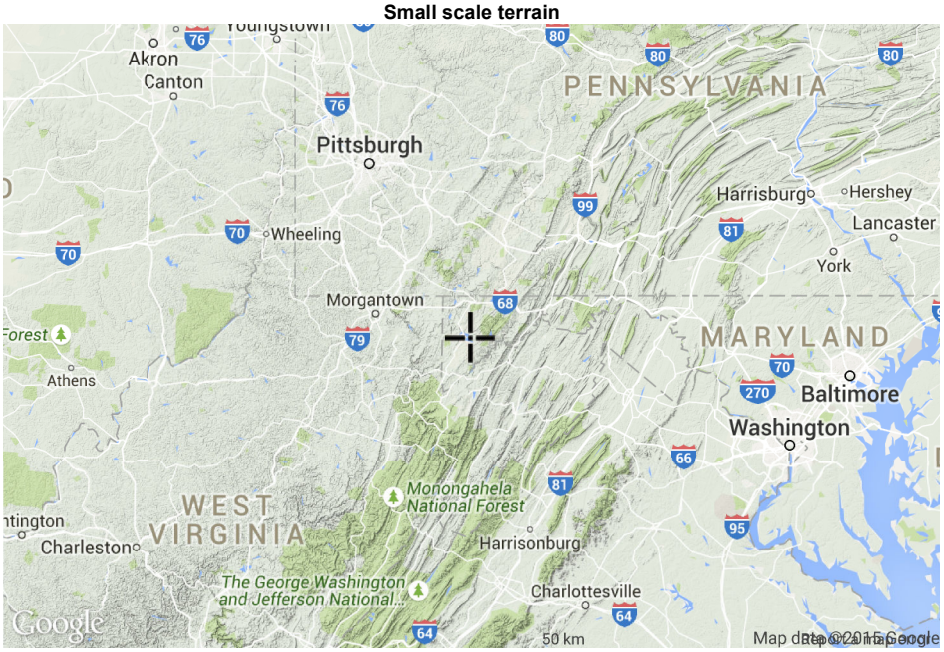
Maps & aerials

NOAA Atlas 14, Volume 2, Version 3

Created (GMT): Wed Sep 2 19:39:43 2015

Small scale terrain



Large scale terrain

Large scale aerial

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National Weather Service
Office of Hydrologic Development
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

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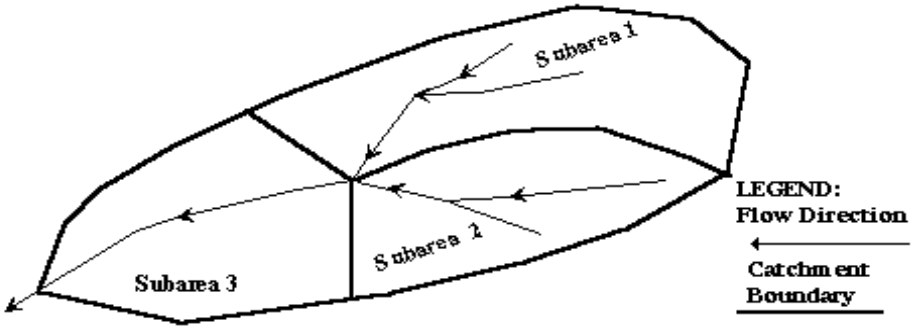
Area-Weighting for Runoff Coefficient Calculation

Project Title:	**North Glade Run Watershed**
Catchment ID:	**Subcatchment ID 121**

Illustration



Instructions: For each catchment subarea, enter values for A and C.

Subarea ID	Area acres A	Runoff Coeff. C*	Product CA
input	input	input	output
121a	1.34	0.89	1.19
121b	1.73	0.17	0.29
Sum:	**3.07**	**Sum:**	**1.49**

Area-Weighted Runoff Coefficient (sum CA/sum A) = **0.48**

***See sheet "Design Info" for inperviousness-based runoff coefficient values.**

CALCULATION OF A PEAK RUNOFF USING RATIONAL METHOD

Project Title: North Glade Run Watershed
Catchment ID: Subcatchment ID 121

I. Catchment Hydrologic Data

Catchment ID = 121
Area = 3.07 Acres
Percent Imperviousness = 21.50 %
NRCS Soil Type = B A, B, C, or D

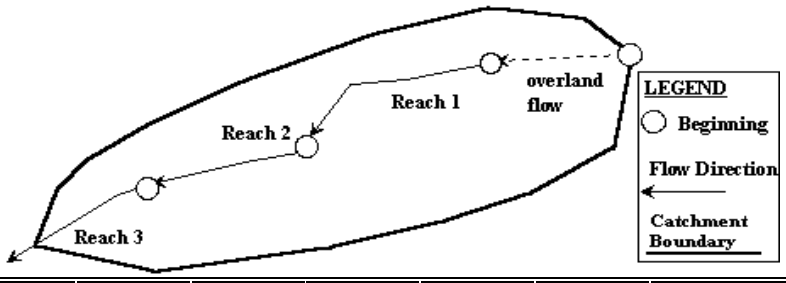
II. Rainfall Information I (inch/hr) = C1 * P1 /(C2 + Td)^C3

Design Storm Return Period, Tr = 10 years (input return period for design storm)
P1= 1.60 inches (input one-hr precipitation--see Sheet "Design Info")

III. Analysis of Flow Time (Time of Concentration) for a Catchment

Overide Runoff Coefficient, C = 0.48 (enter an overide C value if desired, or leave blank to accept calculated C.)

Illustration



NRCS Land Type	Heavy Meadow	Tillage/ Field	Short Pasture/ Lawns	Nearly Bare Ground	Grassed Swales/ Waterways	Paved Areas & Shallow Paved Swales (Sheet Flow)
Conveyance	2.5	5	7	10	15	20

Calculations:

Reach ID	Slope S ft/ft input	Length L ft input	5-yr Runoff Coeff C-5 output	NRCS Convey-ance input	Flow Velocity V fps output	Flow Time Tf minutes output
Overland	0.0220	85	0.48	N/A	0.18	7.96
1	0.3534	523		10.00	5.94	1.47
2	0.0010	342		20.00	0.63	9.00
3						
4						
5						
	Sum	950			Computed Tc =	18.43

IV. Peak Runoff Prediction

Rainfall Intensity at Computed Tc, I = 3.33 inch/hr
Peak Flowrate, Qp = 4.90 cfs

CALCULATION OF A PEAK RUNOFF USING RATIONAL METHOD

Project Title: North Glade Run Watershed
Catchment ID: Subcatchment ID 123

I. Catchment Hydrologic Data

Catchment ID = 123
Area = 5.58 Acres
Percent Imperviousness = 12.10 %
NRCS Soil Type = B A, B, C, or D

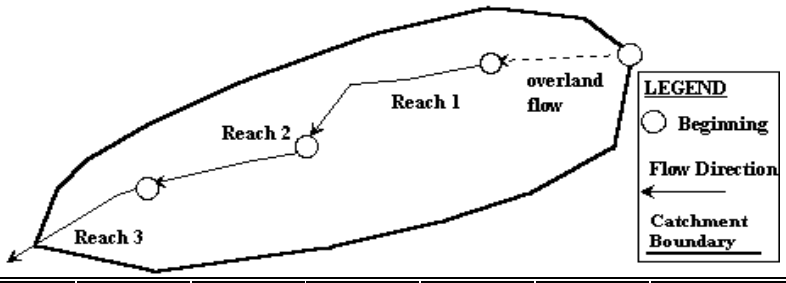
II. Rainfall Information I (inch/hr) = C1 * P1 /(C2 + Td)^C3

Design Storm Return Period, Tr = 10 years (input return period for design storm)
P1= 1.60 inches (input one-hr precipitation--see Sheet "Design Info")

III. Analysis of Flow Time (Time of Concentration) for a Catchment

Overide Runoff Coefficient, C = 0.26 (enter an overide C value if desired, or leave blank to accept calculated C.)

Illustration



NRCS Land Type	Heavy Meadow	Tillage/ Field	Short Pasture/ Lawns	Nearly Bare Ground	Grassed Swales/ Waterways	Paved Areas & Shallow Paved Swales (Sheet Flow)
Conveyance	2.5	5	7	10	15	20

Calculations:

Reach ID	Slope S ft/ft input	Length L ft input	5-yr Runoff Coeff C-5 output	NRCS Convey-ance input	Flow Velocity V fps output	Flow Time Tf minutes output
Overland	0.0455	87	0.26	N/A	0.17	8.60
1	0.0854	804		10.00	2.92	4.58
2						
3						
4						
5						
		Sum			Computed Tc =	13.18

IV. Peak Runoff Prediction

Rainfall Intensity at Computed Tc, I = 3.90 inch/hr
Peak Flowrate, Qp = 5.66 cfs

CALCULATION OF A PEAK RUNOFF USING RATIONAL METHOD

Project Title: North Glade Run Watershed
Catchment ID: Subcatchment ID 141A1

I. Catchment Hydrologic Data

Catchment ID = 141A1
Area = 6.58 Acres
Percent Imperviousness = 22.30 %
NRCS Soil Type = B A, B, C, or D

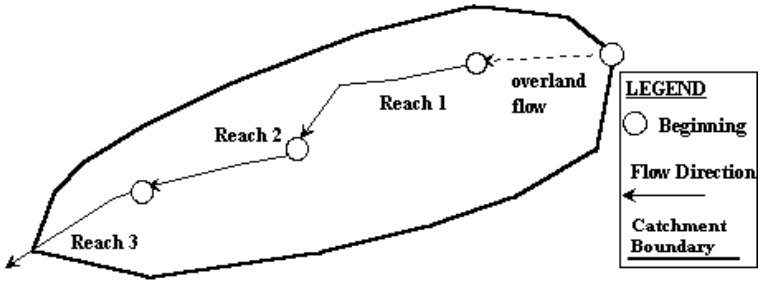
II. Rainfall Information I (inch/hr) = C1 * P1 /(C2 + Td)^C3

Design Storm Return Period, Tr = 10 years (input return period for design storm)
P1= 1.60 inches (input one-hr precipitation--see Sheet "Design Info")

III. Analysis of Flow Time (Time of Concentration) for a Catchment

Overide Runoff Coefficient, C = 0.28 (enter an overide C value if desired, or leave blank to accept calculated C.)

Illustration



NRCS Land Type	Heavy Meadow	Tillage/ Field	Short Pasture/ Lawns	Nearly Bare Ground	Grassed Swales/ Waterways	Paved Areas & Shallow Paved Swales (Sheet Flow)
Conveyance	2.5	5	7	10	15	20

Calculations:

Reach ID	Slope S ft/ft input	Length L ft input	5-yr Runoff Coeff C-5 output	NRCS Convey-ance input	Flow Velocity V fps output	Flow Time Tf minutes output
Overland	0.0693	129	0.28	N/A	0.24	8.86
1	0.1141	1,118		20.00	6.75	2.76
2						
3						
4						
5						
	Sum	1,246			Computed Tc =	11.62

IV. Peak Runoff Prediction

Rainfall Intensity at Computed Tc, I = 4.12 inch/hr
Peak Flowrate, Qp = 7.59 cfs

CALCULATION OF A PEAK RUNOFF USING RATIONAL METHOD

Project Title: North Glade Run Watershed
Catchment ID: Subcatchment ID 141A2

I. Catchment Hydrologic Data

Catchment ID = 141A2
Area = 5.78 Acres
Percent Imperviousness = 23.00 %
NRCS Soil Type = B A, B, C, or D

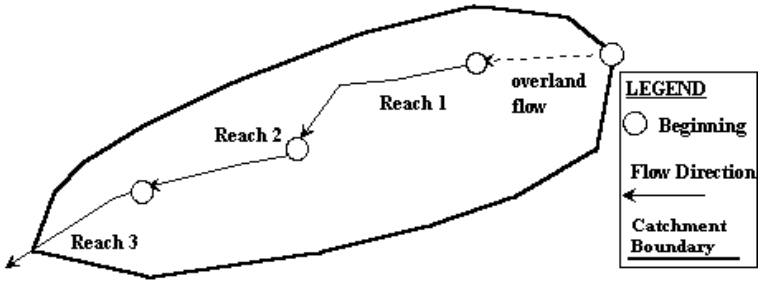
II. Rainfall Information I (inch/hr) = C1 * P1 /(C2 + Td)^C3

Design Storm Return Period, Tr = 10 years (input return period for design storm)
P1= 1.60 inches (input one-hr precipitation--see Sheet "Design Info")

III. Analysis of Flow Time (Time of Concentration) for a Catchment

Overide Runoff Coefficient, C = 0.28 (enter an overide C value if desired, or leave blank to accept calculated C.)

Illustration



NRCS Land Type	Heavy Meadow	Tillage/ Field	Short Pasture/ Lawns	Nearly Bare Ground	Grassed Swales/ Waterways	Paved Areas & Shallow Paved Swales (Sheet Flow)
Conveyance	2.5	5	7	10	15	20

Calculations:

Reach ID	Slope S ft/ft input	Length L ft input	5-yr Runoff Coeff C-5 output	NRCS Convey-ance input	Flow Velocity V fps output	Flow Time Tf minutes output
Overland	0.0784	138	0.28	N/A	0.26	8.82
1	0.0987	1,293		20.00	6.28	3.43
2						
3						
4						
5						
	Sum	1,431			Computed Tc =	12.25

IV. Peak Runoff Prediction

Rainfall Intensity at Computed Tc, I = 4.03 inch/hr
Peak Flowrate, Qp = 6.52 cfs

CALCULATION OF A PEAK RUNOFF USING RATIONAL METHOD

Project Title: North Glade Run Watershed
Catchment ID: Subcatchment ID 141B

I. Catchment Hydrologic Data

Catchment ID = 141B
Area = 111.96 Acres
Percent Imperviousness = 6.50 %
NRCS Soil Type = B A, B, C, or D

For catchments larger than 90 acres, CUHP hydrograph and routing are recommended.

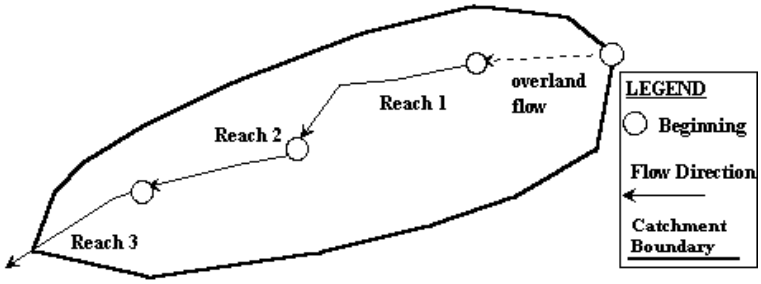
II. Rainfall Information I (inch/hr) = C1 * P1 /(C2 + Td)^C3

Design Storm Return Period, Tr = 10 years (input return period for design storm)
P1= 1.60 inches (input one-hr precipitation--see Sheet "Design Info")

III. Analysis of Flow Time (Time of Concentration) for a Catchment

Overide Runoff Coefficient, C = 0.18 (enter an overide C value if desired, or leave blank to accept calculated C.)

Illustration



NRCS Land Type	Heavy Meadow	Tillage/ Field	Short Pasture/ Lawns	Nearly Bare Ground	Grassed Swales/ Waterways	Paved Areas & Shallow Paved Swales (Sheet Flow)
Conveyance	2.5	5	7	10	15	20

Calculations:

Reach ID	Slope S ft/ft input	Length L ft input	5-yr Runoff Coeff C-5 output	NRCS Convey-ance input	Flow Velocity V fps output	Flow Time Tf minutes output
Overland	0.0809	207	0.18	N/A	0.29	12.00
1	0.1177	3,140		10.00	3.43	15.25
2						
3						
4						
5						
	Sum	3,347			Computed Tc =	27.25

IV. Peak Runoff Prediction

Rainfall Intensity at Computed Tc, I = 2.69 inch/hr
Peak Flowrate, Qp = 54.28 cfs

CALCULATION OF A PEAK RUNOFF USING RATIONAL METHOD

Project Title: North Glade Run Watershed
Catchment ID: Subcatchment ID 160A

I. Catchment Hydrologic Data

Catchment ID = 160A
Area = 3.35 Acres
Percent Imperviousness = 22.80 %
NRCS Soil Type = B A, B, C, or D

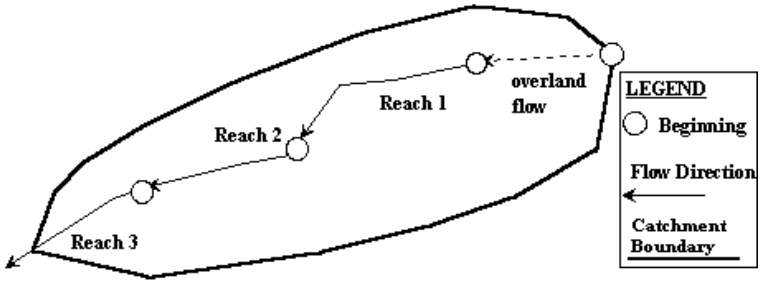
II. Rainfall Information I (inch/hr) = C1 * P1 /(C2 + Td)^C3

Design Storm Return Period, Tr = 10 years (input return period for design storm)
P1= 1.60 inches (input one-hr precipitation--see Sheet "Design Info")

III. Analysis of Flow Time (Time of Concentration) for a Catchment

Overide Runoff Coefficient, C = 0.30 (enter an overide C value if desired, or leave blank to accept calculated C.)

Illustration



NRCS Land Type	Heavy Meadow	Tillage/ Field	Short Pasture/ Lawns	Nearly Bare Ground	Grassed Swales/ Waterways	Paved Areas & Shallow Paved Swales (Sheet Flow)
Conveyance	2.5	5	7	10	15	20

Calculations:

Reach ID	Slope S ft/ft input	Length L ft input	5-yr Runoff Coeff C-5 output	NRCS Convey-ance input	Flow Velocity V fps output	Flow Time Tf minutes output
Overland	0.0310	75	0.30	N/A	0.14	8.58
1	0.0937	293		7.00	2.14	2.28
2	0.0260	264		15.00	2.42	1.82
3						
4						
5						
		Sum 632			Computed Tc =	12.68

IV. Peak Runoff Prediction

Rainfall Intensity at Computed Tc, I = 3.97 inch/hr
Peak Flowrate, Qp = 3.99 cfs

CALCULATION OF A PEAK RUNOFF USING RATIONAL METHOD

Project Title: North Glade Run Watershed
Catchment ID: Subcatchment ID 160B

I. Catchment Hydrologic Data

Catchment ID = 160B
Area = 6.48 Acres
Percent Imperviousness = 24.10 %
NRCS Soil Type = A A, B, C, or D

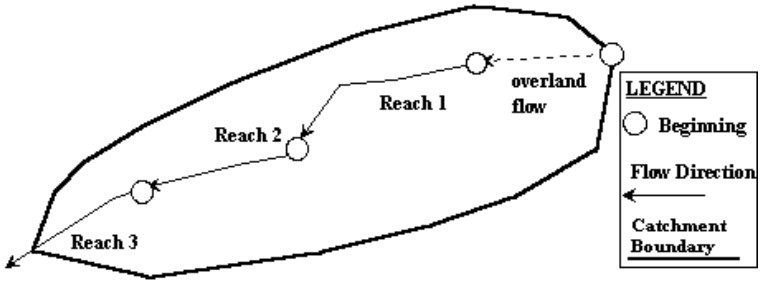
II. Rainfall Information I (inch/hr) = C1 * P1 /(C2 + Td)^C3

Design Storm Return Period, Tr = 10 years (input return period for design storm)
P1= 1.60 inches (input one-hr precipitation--see Sheet "Design Info")

III. Analysis of Flow Time (Time of Concentration) for a Catchment

Overide Runoff Coefficient, C = 0.26 (enter an overide C value if desired, or leave blank to accept calculated C.)

Illustration



NRCS Land Type	Heavy Meadow	Tillage/ Field	Short Pasture/ Lawns	Nearly Bare Ground	Grassed Swales/ Waterways	Paved Areas & Shallow Paved Swales (Sheet Flow)
Conveyance	2.5	5	7	10	15	20

Calculations:

Reach ID	Slope S ft/ft input	Length L ft input	5-yr Runoff Coeff C-5 output	NRCS Convey-ance input	Flow Velocity V fps output	Flow Time Tf minutes output
Overland	0.0598	96	0.26	N/A	0.19	8.24
1	0.0508	303		15.00	3.38	1.49
2	0.0276	357		15.00	2.49	2.39
3	0.0175	352		15.00	1.99	2.95
4						
5						
		Sum 1,108			Computed Tc =	15.07

IV. Peak Runoff Prediction

Rainfall Intensity at Computed Tc, I = 3.67 inch/hr
Peak Flowrate, Qp = 6.19 cfs

CALCULATION OF A PEAK RUNOFF USING RATIONAL METHOD

Project Title: North Glade Run Watershed
Catchment ID: Subcatchment ID 160B1

I. Catchment Hydrologic Data

Catchment ID = 160B1
Area = 0.96 Acres
Percent Imperviousness = 30.20 %
NRCS Soil Type = A A, B, C, or D

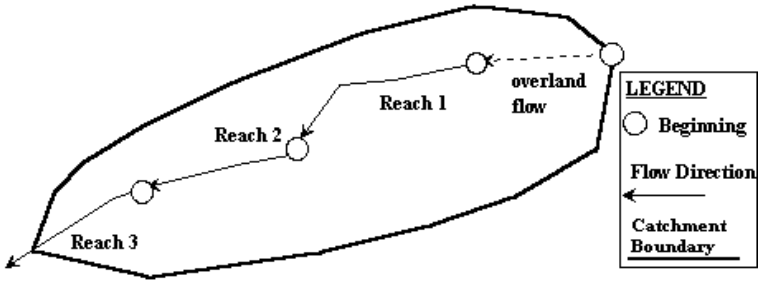
II. Rainfall Information I (inch/hr) = C1 * P1 /(C2 + Td)^C3

Design Storm Return Period, Tr = 10 years (input return period for design storm)
P1= 1.60 inches (input one-hr precipitation--see Sheet "Design Info")

III. Analysis of Flow Time (Time of Concentration) for a Catchment

Overide Runoff Coefficient, C = 0.26 (enter an overide C value if desired, or leave blank to accept calculated C.)

Illustration



NRCS Land Type	Heavy Meadow	Tillage/ Field	Short Pasture/ Lawns	Nearly Bare Ground	Grassed Swales/ Waterways	Paved Areas & Shallow Paved Swales (Sheet Flow)
Conveyance	2.5	5	7	10	15	20

Calculations:

Reach ID	Slope S ft/ft input	Length L ft input	5-yr Runoff Coeff C-5 output	NRCS Convey-ance input	Flow Velocity V fps output	Flow Time Tf minutes output
Overland	0.0598	96	0.26	N/A	0.19	8.24
1	0.0508	303		15.00	3.38	1.49
2						
3						
4						
5						
	Sum	399			Computed Tc =	9.73

IV. Peak Runoff Prediction

Rainfall Intensity at Computed Tc, I = 4.43 inch/hr
Peak Flowrate, Qp = 1.11 cfs

CALCULATION OF A PEAK RUNOFF USING RATIONAL METHOD

Project Title: North Glade Run Watershed
Catchment ID: Subcatchment ID 160B2

I. Catchment Hydrologic Data

Catchment ID = 160B2
Area = 2.30 Acres
Percent Imperviousness = 21.60 %
NRCS Soil Type = A A, B, C, or D

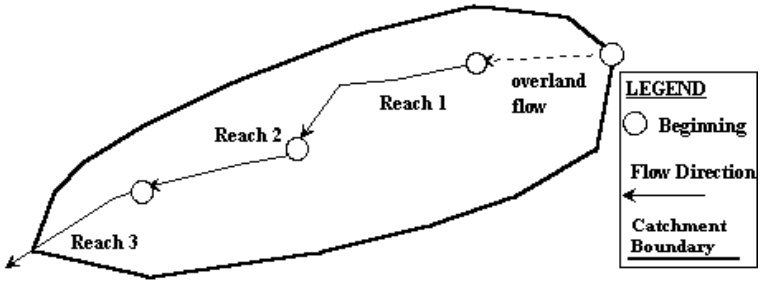
II. Rainfall Information I (inch/hr) = C1 * P1 /(C2 + Td)^C3

Design Storm Return Period, Tr = 10 years (input return period for design storm)
P1= 1.60 inches (input one-hr precipitation--see Sheet "Design Info")

III. Analysis of Flow Time (Time of Concentration) for a Catchment

Overide Runoff Coefficient, C = 0.26 (enter an overide C value if desired, or leave blank to accept calculated C.)

Illustration



NRCS Land Type	Heavy Meadow	Tillage/ Field	Short Pasture/ Lawns	Nearly Bare Ground	Grassed Swales/ Waterways	Paved Areas & Shallow Paved Swales (Sheet Flow)
Conveyance	2.5	5	7	10	15	20

Calculations:

Reach ID	Slope S ft/ft input	Length L ft input	5-yr Runoff Coeff C-5 output	NRCS Convey-ance input	Flow Velocity V fps output	Flow Time Tf minutes output
Overland	0.0394	56	0.26	N/A	0.13	7.20
1	0.1273	154		7.00	2.50	1.03
2	0.0276	357		15.00	2.49	2.39
3						
4						
5						
		Sum 567			Computed Tc =	10.62

IV. Peak Runoff Prediction

Rainfall Intensity at Computed Tc, I = 4.28 inch/hr
Peak Flowrate, Qp = 2.56 cfs

CALCULATION OF A PEAK RUNOFF USING RATIONAL METHOD

Project Title: North Glade Run Watershed
Catchment ID: Subcatchment ID 160B3

I. Catchment Hydrologic Data

Catchment ID = 160B3
Area = 3.23 Acres
Percent Imperviousness = 24.10 %
NRCS Soil Type = A A, B, C, or D

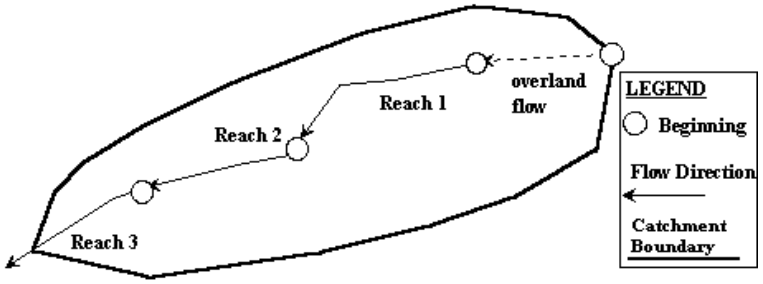
II. Rainfall Information I (inch/hr) = C1 * P1 /(C2 + Td)^C3

Design Storm Return Period, Tr = 10 years (input return period for design storm)
P1= 1.60 inches (input one-hr precipitation--see Sheet "Design Info")

III. Analysis of Flow Time (Time of Concentration) for a Catchment

Overide Runoff Coefficient, C = 0.26 (enter an overide C value if desired, or leave blank to accept calculated C.)

Illustration



NRCS Land Type	Heavy Meadow	Tillage/ Field	Short Pasture/ Lawns	Nearly Bare Ground	Grassed Swales/ Waterways	Paved Areas & Shallow Paved Swales (Sheet Flow)
Conveyance	2.5	5	7	10	15	20

Calculations:

Reach ID	Slope S ft/ft input	Length L ft input	5-yr Runoff Coeff C-5 output	NRCS Convey-ance input	Flow Velocity V fps output	Flow Time Tf minutes output
Overland	0.0102	72	0.26	N/A	0.09	12.79
1	0.1000	289		7.00	2.21	2.18
2	0.0175	352		15.00	1.99	2.95
3						
4						
5						
		Sum 713			Computed Tc =	17.92

IV. Peak Runoff Prediction

Rainfall Intensity at Computed Tc, I = 3.37 inch/hr
Peak Flowrate, Qp = 2.83 cfs

CALCULATION OF A PEAK RUNOFF USING RATIONAL METHOD

Project Title: North Glade Run Watershed
Catchment ID: Subcatchment ID 193A

I. Catchment Hydrologic Data

Catchment ID = 193A
Area = 4.95 Acres
Percent Imperviousness = 14.10 %
NRCS Soil Type = B A, B, C, or D

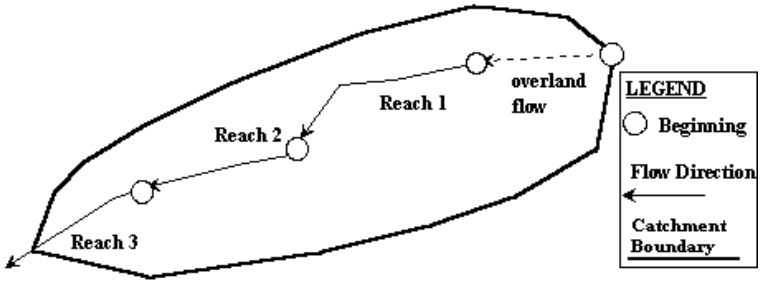
II. Rainfall Information I (inch/hr) = C1 * P1 /(C2 + Td)^C3

Design Storm Return Period, Tr = 10 years (input return period for design storm)
P1= 1.60 inches (input one-hr precipitation--see Sheet "Design Info")

III. Analysis of Flow Time (Time of Concentration) for a Catchment

Overide Runoff Coefficient, C = 0.28 (enter an overide C value if desired, or leave blank to accept calculated C.)

Illustration



NRCS Land Type	Heavy Meadow	Tillage/ Field	Short Pasture/ Lawns	Nearly Bare Ground	Grassed Swales/ Waterways	Paved Areas & Shallow Paved Swales (Sheet Flow)
Conveyance	2.5	5	7	10	15	20

Calculations:

Reach ID	Slope S ft/ft input	Length L ft input	5-yr Runoff Coeff C-5 output	NRCS Convey-ance input	Flow Velocity V fps output	Flow Time Tf minutes output
Overland	0.0384	61	0.28	N/A	0.14	7.42
1	0.1020	219		7.00	2.24	1.63
2	0.0188	435		20.00	2.74	2.64
3	0.0235	290		20.00	3.07	1.57
4						
5						
	Sum	1,003			Computed Tc =	13.27

IV. Peak Runoff Prediction

Rainfall Intensity at Computed Tc, I = 3.89 inch/hr
Peak Flowrate, Qp = 5.39 cfs

CALCULATION OF A PEAK RUNOFF USING RATIONAL METHOD

Project Title: North Glade Run Watershed
Catchment ID: Subcatchment ID 193A1

I. Catchment Hydrologic Data

Catchment ID = 193A1
Area = 2.50 Acres
Percent Imperviousness = 13.50 %
NRCS Soil Type = B A, B, C, or D

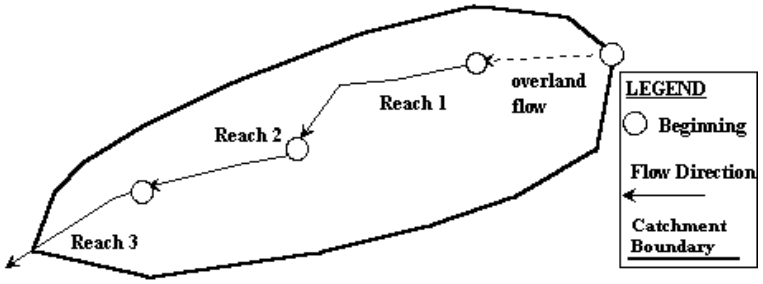
II. Rainfall Information I (inch/hr) = C1 * P1 /(C2 + Td)^C3

Design Storm Return Period, Tr = 10 years (input return period for design storm)
P1= 1.60 inches (input one-hr precipitation--see Sheet "Design Info")

III. Analysis of Flow Time (Time of Concentration) for a Catchment

Overide Runoff Coefficient, C = 0.28 (enter an overide C value if desired, or leave blank to accept calculated C.)

Illustration



NRCS Land Type	Heavy Meadow	Tillage/ Field	Short Pasture/ Lawns	Nearly Bare Ground	Grassed Swales/ Waterways	Paved Areas & Shallow Paved Swales (Sheet Flow)
Conveyance	2.5	5	7	10	15	20

Calculations:

Reach ID	Slope S ft/ft input	Length L ft input	5-yr Runoff Coeff C-5 output	NRCS Convey-ance input	Flow Velocity V fps output	Flow Time Tf minutes output
Overland	0.0384	61	0.28	N/A	0.14	7.42
1	0.1020	219		7.00	2.24	1.63
2	0.0188	435		20.00	2.74	2.64
3						
4						
5						
		Sum 714			Computed Tc =	11.69

IV. Peak Runoff Prediction

Rainfall Intensity at Computed Tc, I = 4.11 inch/hr
Peak Flowrate, Qp = 2.88 cfs

CALCULATION OF A PEAK RUNOFF USING RATIONAL METHOD

Project Title: North Glade Run Watershed
Catchment ID: Subcatchment ID 193A2

I. Catchment Hydrologic Data

Catchment ID = 193A2
Area = 2.45 Acres
Percent Imperviousness = 14.70 %
NRCS Soil Type = B A, B, C, or D

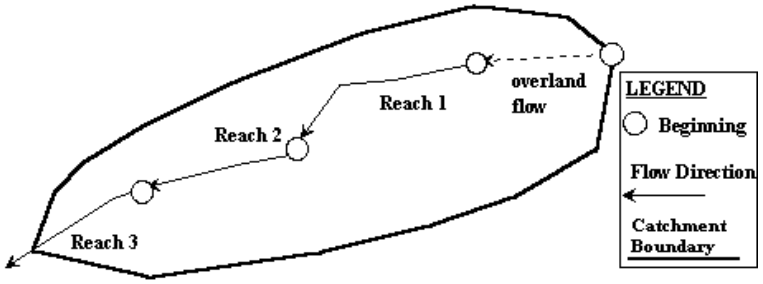
II. Rainfall Information I (inch/hr) = C1 * P1 /(C2 + Td)^C3

Design Storm Return Period, Tr = 10 years (input return period for design storm)
P1= 1.60 inches (input one-hr precipitation--see Sheet "Design Info")

III. Analysis of Flow Time (Time of Concentration) for a Catchment

Overide Runoff Coefficient, C = 0.28 (enter an overide C value if desired, or leave blank to accept calculated C.)

Illustration



NRCS Land Type	Heavy Meadow	Tillage/ Field	Short Pasture/ Lawns	Nearly Bare Ground	Grassed Swales/ Waterways	Paved Areas & Shallow Paved Swales (Sheet Flow)
Conveyance	2.5	5	7	10	15	20

Calculations:

Reach ID	Slope S ft/ft input	Length L ft input	5-yr Runoff Coeff C-5 output	NRCS Convey-ance input	Flow Velocity V fps output	Flow Time Tf minutes output
Overland	0.0749	82	0.28	N/A	0.20	6.90
1	0.1470	168		20.00	7.67	0.36
2						
3						
4						
5						
	Sum	250			Computed Tc =	7.27

IV. Peak Runoff Prediction

Rainfall Intensity at Computed Tc, I = 4.91 inch/hr
Peak Flowrate, Qp = 3.37 cfs

CALCULATION OF A PEAK RUNOFF USING RATIONAL METHOD

Project Title: North Glade Run Watershed
Catchment ID: Subcatchment ID 193B

I. Catchment Hydrologic Data

Catchment ID = 193B
Area = 4.13 Acres
Percent Imperviousness = 15.90 %
NRCS Soil Type = B A, B, C, or D

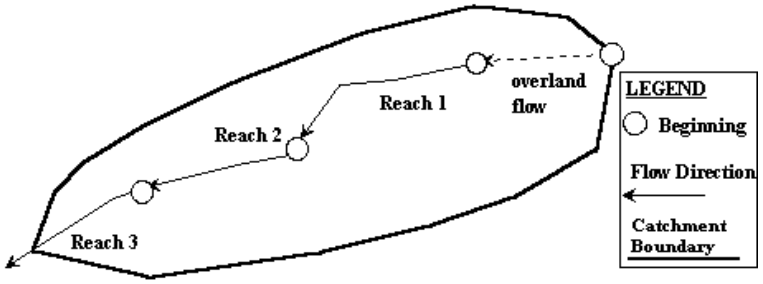
II. Rainfall Information I (inch/hr) = C1 * P1 /(C2 + Td)^C3

Design Storm Return Period, Tr = 10 years (input return period for design storm)
P1= 1.60 inches (input one-hr precipitation--see Sheet "Design Info")

III. Analysis of Flow Time (Time of Concentration) for a Catchment

Overide Runoff Coefficient, C = 0.26 (enter an overide C value if desired, or leave blank to accept calculated C.)

Illustration



NRCS Land Type	Heavy Meadow	Tillage/ Field	Short Pasture/ Lawns	Nearly Bare Ground	Grassed Swales/ Waterways	Paved Areas & Shallow Paved Swales (Sheet Flow)
Conveyance	2.5	5	7	10	15	20

Calculations:

Reach ID	Slope S ft/ft input	Length L ft input	5-yr Runoff Coeff C-5 output	NRCS Convey-ance input	Flow Velocity V fps output	Flow Time Tf minutes output
Overland	0.0452	59	0.26	N/A	0.14	7.05
1	0.1020	203		7.00	2.24	1.51
2	0.0173	510		15.00	1.98	4.30
3						
4						
5						
		Sum 771			Computed Tc =	12.87

IV. Peak Runoff Prediction

Rainfall Intensity at Computed Tc, I = 3.94 inch/hr
Peak Flowrate, Qp = 4.24 cfs

CALCULATION OF A PEAK RUNOFF USING RATIONAL METHOD

Project Title: North Glade Run Watershed
Catchment ID: Subcatchment ID 207A1

I. Catchment Hydrologic Data

Catchment ID = 207A1
Area = 1.11 Acres
Percent Imperviousness = 8.40 %
NRCS Soil Type = B A, B, C, or D

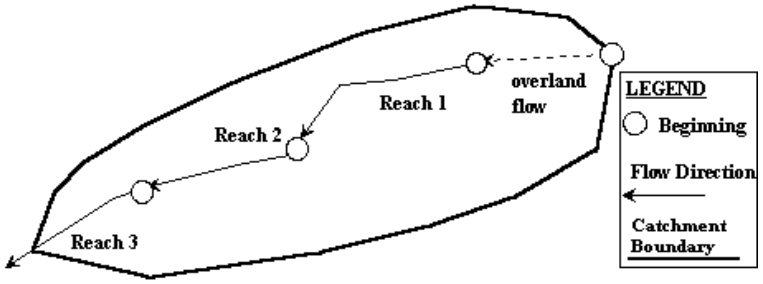
II. Rainfall Information I (inch/hr) = C1 * P1 /(C2 + Td)^C3

Design Storm Return Period, Tr = 10 years (input return period for design storm)
P1= 1.60 inches (input one-hr precipitation--see Sheet "Design Info")

III. Analysis of Flow Time (Time of Concentration) for a Catchment

Overide Runoff Coefficient, C = 0.26 (enter an overide C value if desired, or leave blank to accept calculated C.)

Illustration



NRCS Land Type	Heavy Meadow	Tillage/ Field	Short Pasture/ Lawns	Nearly Bare Ground	Grassed Swales/ Waterways	Paved Areas & Shallow Paved Swales (Sheet Flow)
Conveyance	2.5	5	7	10	15	20

Calculations:

Reach ID	Slope S ft/ft input	Length L ft input	5-yr Runoff Coeff C-5 output	NRCS Convey-ance input	Flow Velocity V fps output	Flow Time Tf minutes output
Overland	0.0382	81	0.26	N/A	0.15	8.77
1	0.0490	334		7.00	1.55	3.59
2	0.0523	152		15.00	3.43	0.74
3						
4						
5						
		Sum 567			Computed Tc =	13.11

IV. Peak Runoff Prediction

Rainfall Intensity at Computed Tc, I = 3.91 inch/hr
Peak Flowrate, Qp = 1.13 cfs

CALCULATION OF A PEAK RUNOFF USING RATIONAL METHOD

Project Title: North Glade Run Watershed
Catchment ID: Subcatchment ID 207A2

I. Catchment Hydrologic Data

Catchment ID = 207A2
Area = 2.21 Acres
Percent Imperviousness = 31.20 %
NRCS Soil Type = B A, B, C, or D

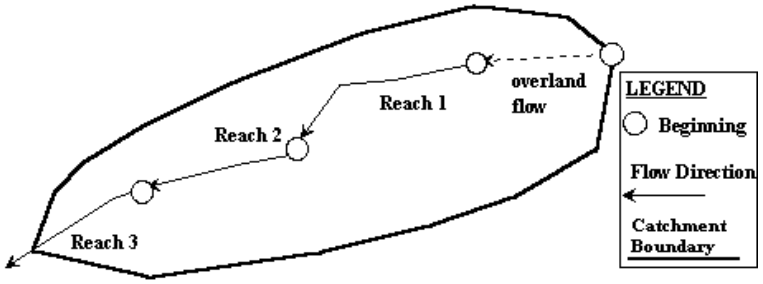
II. Rainfall Information I (inch/hr) = C1 * P1 /(C2 + Td)^C3

Design Storm Return Period, Tr = 10 years (input return period for design storm)
P1= 1.60 inches (input one-hr precipitation--see Sheet "Design Info")

III. Analysis of Flow Time (Time of Concentration) for a Catchment

Overide Runoff Coefficient, C = 0.72 (enter an overide C value if desired, or leave blank to accept calculated C.)

Illustration



NRCS Land Type	Heavy Meadow	Tillage/ Field	Short Pasture/ Lawns	Nearly Bare Ground	Grassed Swales/ Waterways	Paved Areas & Shallow Paved Swales (Sheet Flow)
Conveyance	2.5	5	7	10	15	20

Calculations:

Reach ID	Slope S ft/ft input	Length L ft input	5-yr Runoff Coeff C-5 output	NRCS Convey-ance input	Flow Velocity V fps output	Flow Time Tf minutes output
Overland	0.0395	63	0.72	N/A	0.30	3.47
1	0.0340	152		7.00	1.29	1.97
2	0.0645	340		15.00	3.81	1.49
3						
4						
5						
		Sum 555			Computed Tc =	6.93

IV. Peak Runoff Prediction

Rainfall Intensity at Computed Tc, I = 4.99 inch/hr
Peak Flowrate, Qp = 7.94 cfs

CALCULATION OF A PEAK RUNOFF USING RATIONAL METHOD

Project Title: North Glade Run Watershed
Catchment ID: Subcatchment ID 207B

I. Catchment Hydrologic Data

Catchment ID = 207B
Area = 2.46 Acres
Percent Imperviousness = 51.10 %
NRCS Soil Type = B A, B, C, or D

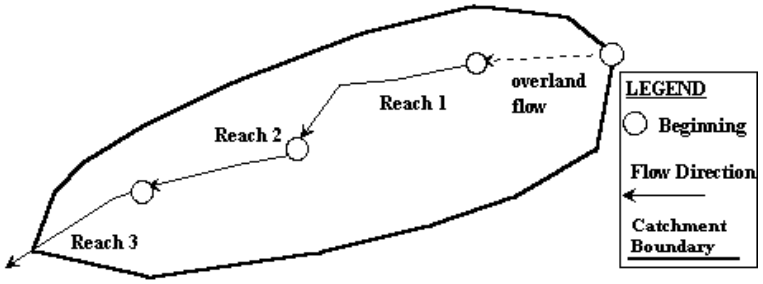
II. Rainfall Information I (inch/hr) = C1 * P1 /(C2 + Td)^C3

Design Storm Return Period, Tr = 10 years (input return period for design storm)
P1= 1.60 inches (input one-hr precipitation--see Sheet "Design Info")

III. Analysis of Flow Time (Time of Concentration) for a Catchment

Overide Runoff Coefficient, C = 0.72 (enter an overide C value if desired, or leave blank to accept calculated C.)

Illustration



NRCS Land Type	Heavy Meadow	Tillage/ Field	Short Pasture/ Lawns	Nearly Bare Ground	Grassed Swales/ Waterways	Paved Areas & Shallow Paved Swales (Sheet Flow)
Conveyance	2.5	5	7	10	15	20

Calculations:

Reach ID	Slope S ft/ft input	Length L ft input	5-yr Runoff Coeff C-5 output	NRCS Convey-ance input	Flow Velocity V fps output	Flow Time Tf minutes output
Overland	0.0753	78	0.72	N/A	0.42	3.11
1	0.1417	379		7.00	2.64	2.40
2						
3						
4						
5						
	Sum	457			Computed Tc =	5.51

IV. Peak Runoff Prediction

Rainfall Intensity at Computed Tc, I = 5.34 inch/hr
Peak Flowrate, Qp = 9.47 cfs

CALCULATION OF A PEAK RUNOFF USING RATIONAL METHOD

Project Title: North Glade Run Watershed
Catchment ID: Subcatchment ID 213

I. Catchment Hydrologic Data

Catchment ID = 213
Area = 6.04 Acres
Percent Imperviousness = 58.80 %
NRCS Soil Type = B A, B, C, or D

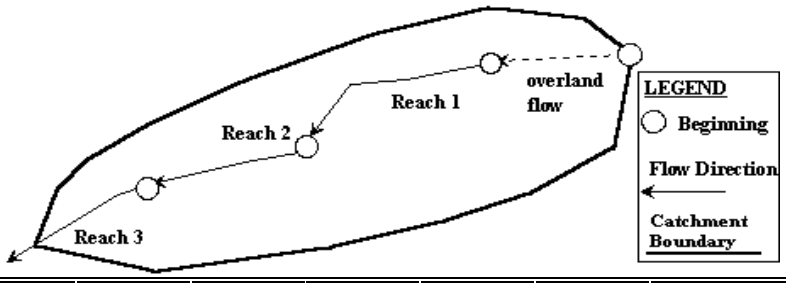
II. Rainfall Information I (inch/hr) = C1 * P1 /(C2 + Td)^C3

Design Storm Return Period, Tr = 10 years (input return period for design storm)
P1= 1.60 inches (input one-hr precipitation--see Sheet "Design Info")

III. Analysis of Flow Time (Time of Concentration) for a Catchment

Overide Runoff Coefficient, C = 0.72 (enter an overide C value if desired, or leave blank to accept calculated C.)

Illustration



NRCS Land Type	Heavy Meadow	Tillage/ Field	Short Pasture/ Lawns	Nearly Bare Ground	Grassed Swales/ Waterways	Paved Areas & Shallow Paved Swales (Sheet Flow)
Conveyance	2.5	5	7	10	15	20

Calculations:

Reach ID	Slope S ft/ft input	Length L ft input	5-yr Runoff Coeff C-5 output	NRCS Convey-ance input	Flow Velocity V fps output	Flow Time Tf minutes output
Overland	0.0160	98	0.72	N/A	0.28	5.81
1	0.0415	619		20.00	4.08	2.53
2	0.0487	221		20.00	4.41	0.83
3						
4						
5						
		Sum 938			Computed Tc =	9.17

IV. Peak Runoff Prediction

Rainfall Intensity at Computed Tc, I = 4.53 inch/hr
Peak Flowrate, Qp = 19.69 cfs

StreamStats Version 3 Beta

Flow Statistics Ungaged Site Report

Date: Tues Nov 17, 2015 10:58:02 AM GMT-5
Site Location: Maryland
NAD 1983 Latitude: 39.508 (39 30 29)
NAD 1983 Longitude: -79.2508 (-79 15 03)
Drainage Area: 1.64 mi2

Peak Flows Region Grid Basin Characteristics			
100% Peak Appalachian Plateau 2010 AHMMD (1.64 mi2)			
Parameter	**Value**	**Regression Equation Valid Range**	
		Min	**Max**
Drainage Area (square miles)	1.64	0.52	293.7
Mean Basin Slope from 10m DEM ft per ft (feet per foot)	0.0882	0.06632	0.22653

Urban Flows Region Grid Basin Characteristics
100% Undefined Region (1.64 mi2)

The selected watershed is entirely in an area for which flow equations were not defined.

Low Flows Region Grid Basin Characteristics
100% Undefined Region (1.64 mi2)

The selected watershed is entirely in an area for which flow equations were not defined.

Peak Flows Region Grid Statistics						
Statistic	**Value**	**Unit**	**Prediction Error (percent)**	**Equivalent years of record**	**90-Percent Prediction Interval**	
					Min	**Max**
PK1 25	48	ft3/s	24	5.7		
PK1 5	60.7	ft3/s	22	5.9		
PK2	73.9	ft3/s	21	7.1		
PK5	126	ft3/s	22	12		
PK10	168	ft3/s	24	14		
PK25	233	ft3/s	29	15		
PK50	290	ft3/s	33	16		
PK100	356	ft3/s	37	15		
PK200	433	ft3/s	42	15		
PK500	552	ft3/s	48	15		

http://www.gishydro.umd.edu/HydroPanel/hydrology_panel_report_3rd_edition_final.pdf
(http://www.gishydro.umd.edu/HydroPanel/hydrology_panel_report_3rd_edition_final.pdf)
Thomas_ Jr._ W.O. and Moglen_ G.E._ 2010_ An Update of Regional Regression Equations for Maryland_ Appendix 3 in Application of Hydrologic Methods in Maryland_ Third Edition_ September 2010: Maryland State Highway Administration and Maryland Department of the Environment_ 38 p.

StreamStats Version 3 Beta

Flow Statistics Ungaged Site Report

Date: Thurs Nov 19, 2015 3:26:43 PM GMT-5
Site Location: Maryland
NAD 1983 Latitude: 39.507 (39 30 25)
NAD 1983 Longitude: -79.2532 (-79 15 12)
Drainage Area: 3.54 mi2

Peak Flows Region Grid Basin Characteristics			
100% Peak Appalachian Plateau 2010 AHMMD (3.54 mi2)			
Parameter	**Value**	**Regression Equation Valid Range**	
		Min	**Max**
Drainage Area (square miles)	3.54	0.52	293.7
Mean Basin Slope from 10m DEM ft per ft (feet per foot)	0.0822	0.06632	0.22653

Urban Flows Region Grid Basin Characteristics
100% Undefined Region (3.54 mi2)

The selected watershed is entirely in an area for which flow equations were not defined.

Low Flows Region Grid Basin Characteristics
100% Undefined Region (3.54 mi2)

The selected watershed is entirely in an area for which flow equations were not defined.

Peak Flows Region Grid Statistics						
Statistic	**Value**	**Unit**	**Prediction Error (percent)**	**Equivalent years of record**	**90-Percent Prediction Interval**	
					Min	**Max**
PK1 25	89.4	ft3/s	24	5.7		
PK1 5	113	ft3/s	22	5.9		
PK2	138	ft3/s	21	7.1		
PK5	232	ft3/s	22	12		
PK10	309	ft3/s	24	14		
PK25	423	ft3/s	29	15		
PK50	523	ft3/s	33	16		
PK100	637	ft3/s	37	15		
PK200	768	ft3/s	42	15		
PK500	968	ft3/s	48	15		

http://www.gishydro.umd.edu/HydroPanel/hydrology_panel_report_3rd_edition_final.pdf
(http://www.gishydro.umd.edu/HydroPanel/hydrology_panel_report_3rd_edition_final.pdf)
Thomas_ Jr._ W.O. and Moglen_ G.E._ 2010_ An Update of Regional Regression Equations for Maryland_ Appendix 3 in Application of Hydrologic Methods in Maryland_ Third Edition_ September 2010: Maryland State Highway Administration and Maryland Department of the Environment_ 38 p.

HY-8 Existing Culvert Analysis Report

Site Data - Culvert 48"

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 999.25 ft

Outlet Station: 34.00 ft

Outlet Elevation: 998.00 ft

Number of Barrels: 1

Culvert Data Summary - Culvert 48"

Barrel Shape: Circular

Barrel Diameter: 4.00 ft

Barrel Material: Corrugated Steel

Embedment: 8.00 in

Barrel Manning's n: 0.0240 (top and sides)

Manning's n: 0.0350 (bottom)

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: NONE

Tailwater Channel Data - Crossing 1

Tailwater Channel Option: Rectangular Channel

Bottom Width: 18.00 ft

Channel Slope: 0.0200

Channel Manning's n: 0.0350

Channel Invert Elevation: 998.65 ft

Roadway Data for Crossing: Crossing 1

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 30.00 ft

Crest Elevation: 1005.00 ft

Roadway Surface: Paved

Roadway Top Width: 30.00 ft

Table 1 - Culvert Summary Table: Culvert 48"

Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
PK2	73.90	73.90	1002.74	2.828	0.0*	1-S2n	1.928	2.251	1.939	0.824	10.187	4.980
PK10	168.00	113.23	1005.71	4.063	6.902	7-M2c	2.817	2.817	2.817	1.379	11.104	6.766
PK100	356.00	121.10	1006.88	4.371	6.965	7-M2c	3.333	2.898	2.898	2.234	11.637	8.852

Table 2 - Downstream Channel Rating Curve (Crossing: Crossing 1)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
73.90	999.47	0.82	4.98	1.03	0.97
168.00	1000.03	1.38	6.77	1.72	1.02
356.00	1000.88	2.23	8.85	2.79	1.04

Table 3 - Summary of Culvert Flows at Crossing: Crossing 1

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	Culvert 48" Discharge (cfs)	Roadway Discharge (cfs)	Iterations
1002.74	PK2	73.90	73.90	0.00	1
1005.71	PK10	168.00	113.23	54.73	5
1006.88	PK100	356.00	121.10	234.93	5
1005.00	Overtopping	113.23	113.23	0.00	Overtopping

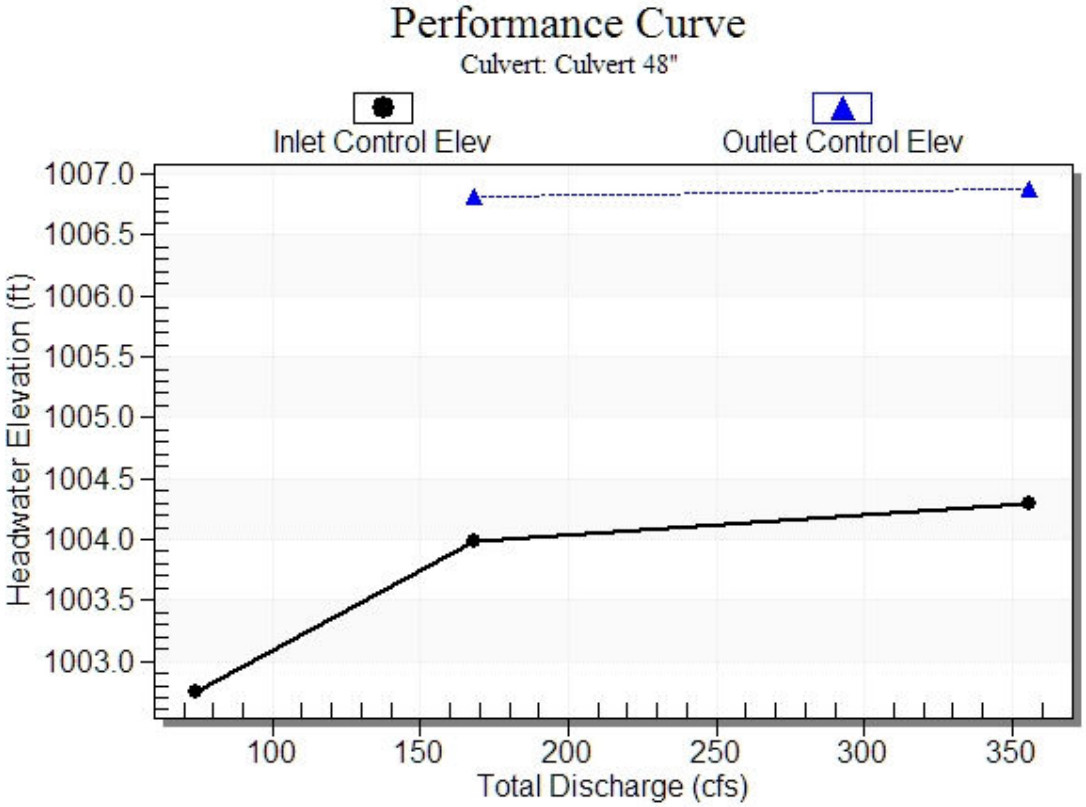


Figure 1 - Culvert Performance Curve Plot: Culvert 48"

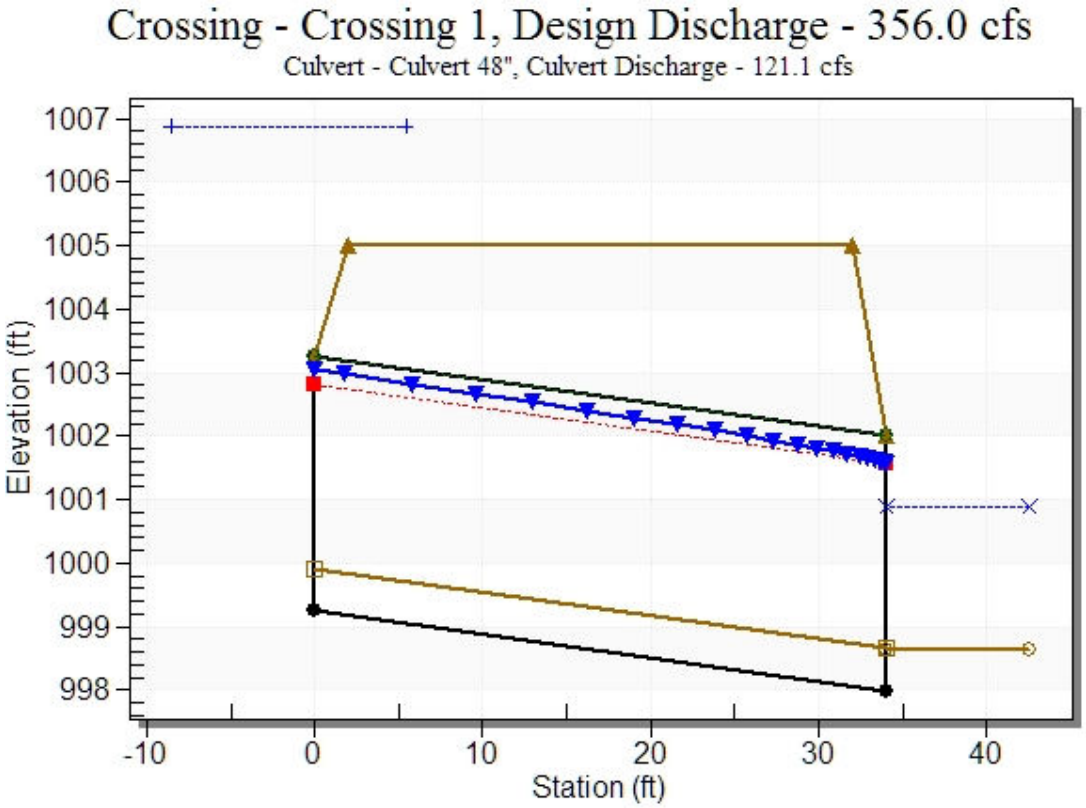


Figure 2 - - Water Surface Profile Plot for Culvert: Culvert 48"

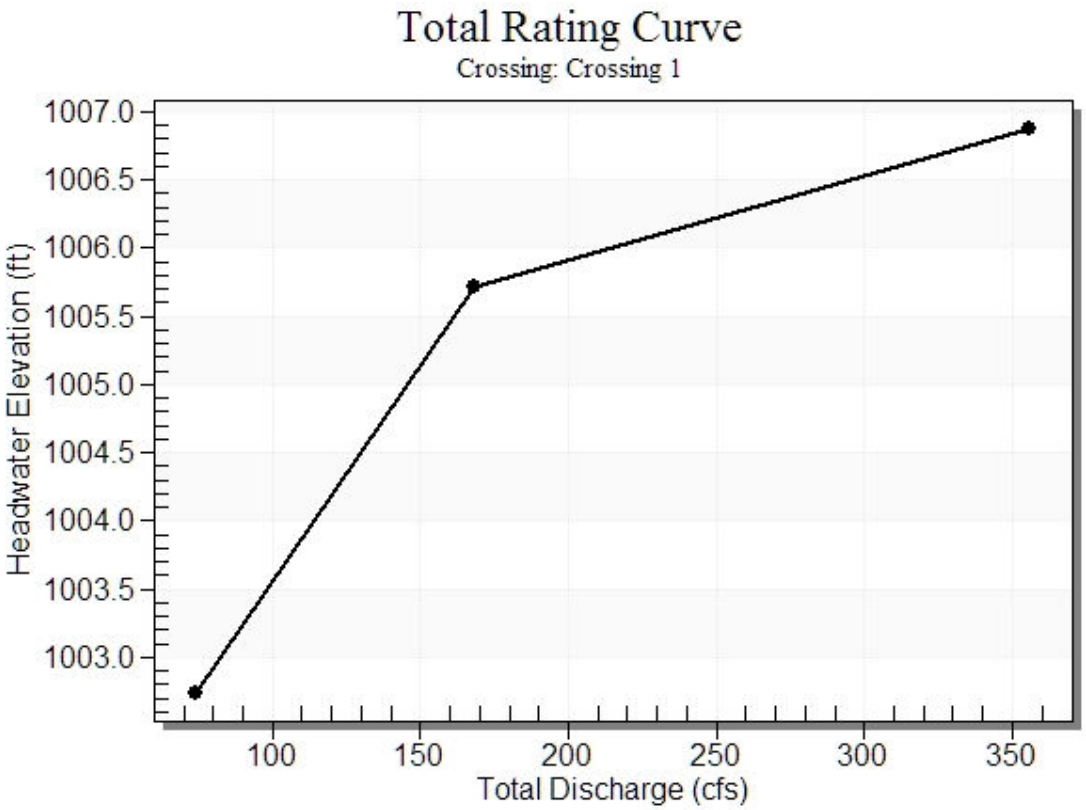


Figure 3 - Rating Curve Plot for Crossing: Crossing 1

HY-8 Proposed Culvert Analysis Report

Site Data - Culvert 36" Double

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 999.25 ft

Outlet Station: 34.00 ft

Outlet Elevation: 998.00 ft

Number of Barrels: 2

Culvert Data Summary - Culvert 36" Double

Barrel Shape: Circular

Barrel Diameter: 3.00 ft

Barrel Material: Concrete

Embedment: 4.00 in

Barrel Manning's n: 0.0120 (top and sides)

Manning's n: 0.0350 (bottom)

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall

Inlet Depression: NONE

Tailwater Channel Data - Crossing Recommended

Tailwater Channel Option: Rectangular Channel

Bottom Width: 18.00 ft

Channel Slope: 0.0200

Channel Manning's n: 0.0350

Channel Invert Elevation: 998.30 ft

Roadway Data for Crossing: Crossing Recommended

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 30.00 ft

Crest Elevation: 1005.00 ft

Roadway Surface: Paved

Roadway Top Width: 30.00 ft

Table 1 - Culvert Summary Table: Culvert 36" Double

Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
PK2	73.90	73.90	1001.60	2.020	1.551	1-S2n	1.254	1.776	1.311	0.824	10.491	4.980
PK10	168.00	168.00	1003.56	3.982	0.096	5-S2n	2.213	2.528	2.270	1.379	13.903	6.766
PK100	356.00	179.77	1006.55	4.296	0.951	5-S2n	2.450	2.450	2.450	2.234	14.372	8.852

Table 2 - Downstream Channel Rating Curve (Crossing: Crossing Recommended)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
73.90	999.12	0.82	4.98	1.03	0.97
168.00	999.68	1.38	6.77	1.72	1.02
356.00	1000.53	2.23	8.85	2.79	1.04

Table 3 - Summary of Culvert Flows at Crossing: Crossing Recommended

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	Culvert 36" Double Discharge (cfs)	Roadway Discharge (cfs)	Iterations
1001.60	PK2	73.90	73.90	0.00	1
1003.56	PK10	168.00	168.00	0.00	1
1006.55	PK100	356.00	179.77	176.22	5
1005.00	Overtopping	189.33	189.33	0.00	Overtopping

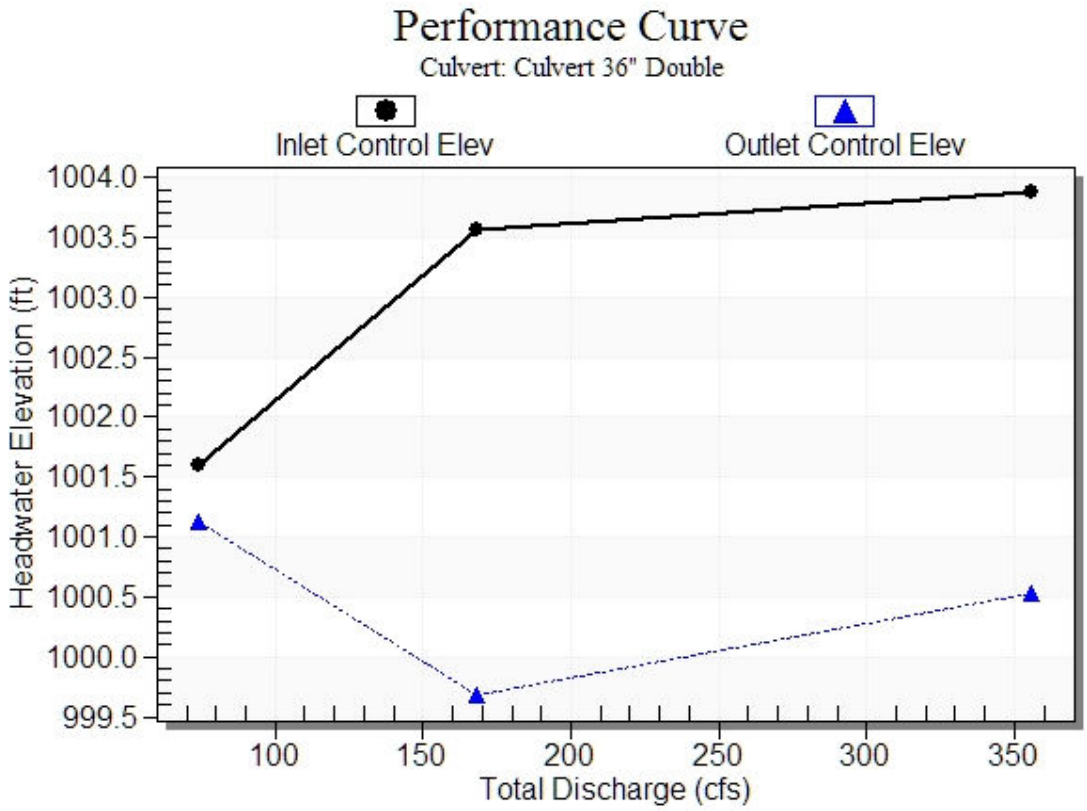


Figure 1 - Culvert Performance Curve Plot: Culvert 36" Double

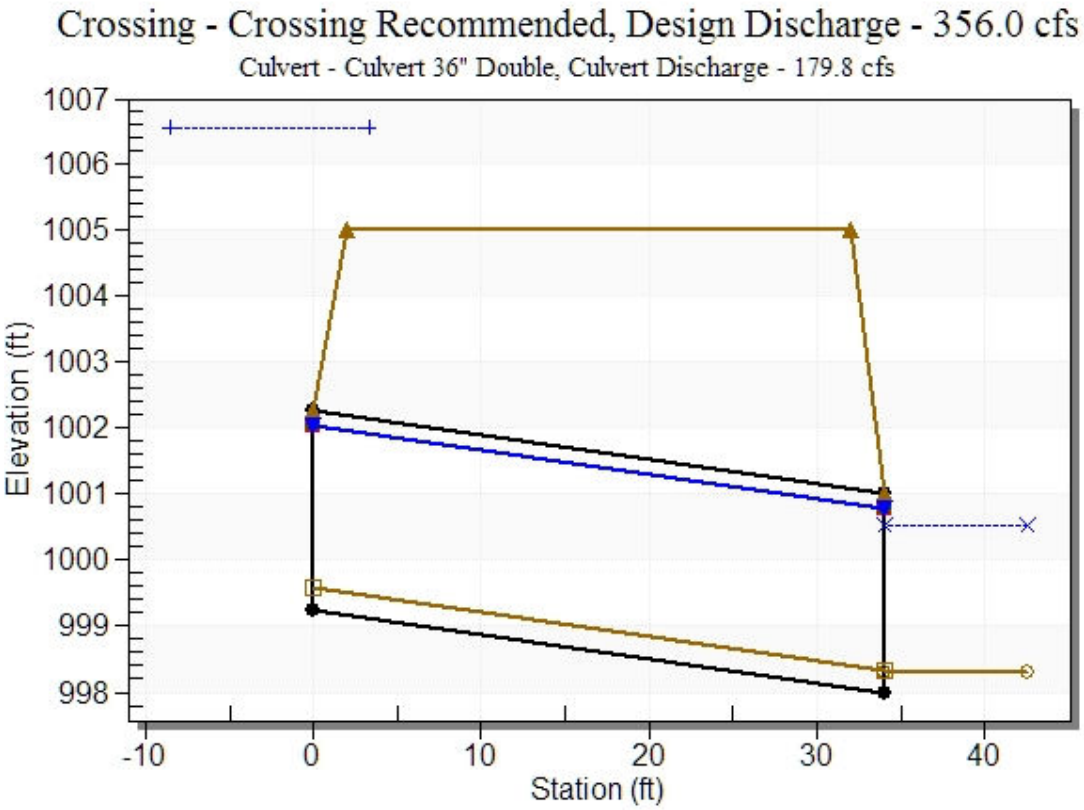


Figure 2 - Water Surface Profile Plot for Culvert: Culvert 36" Double

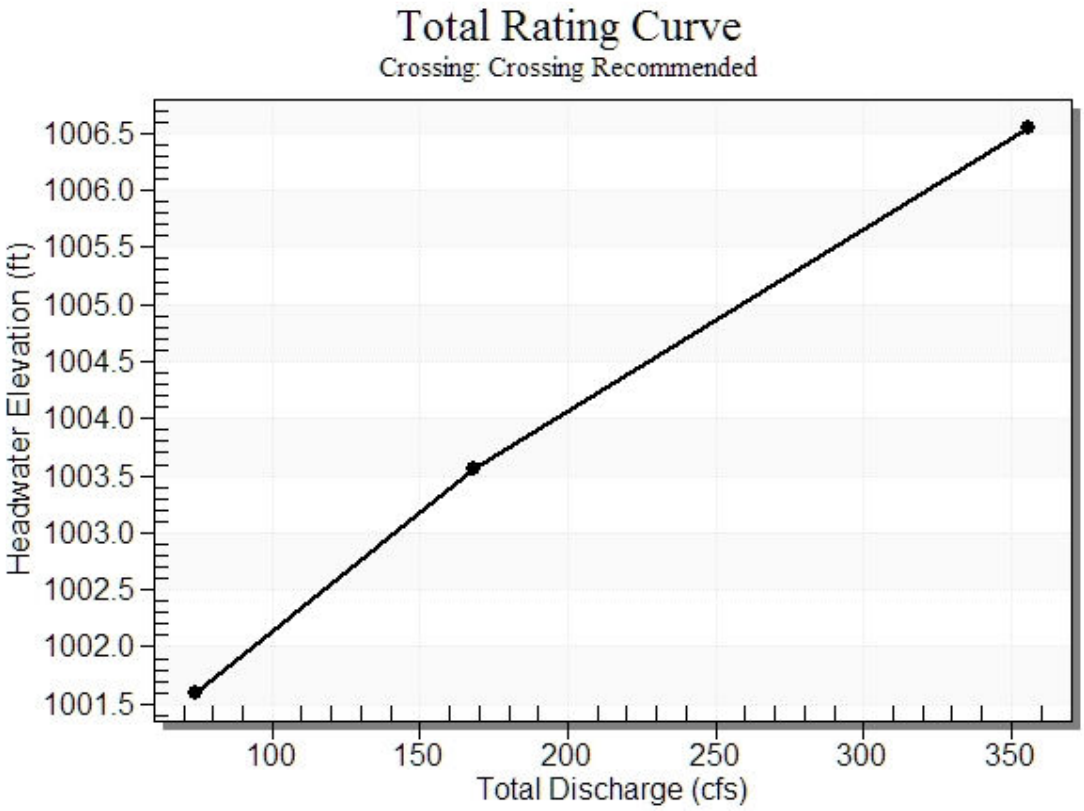


Figure 3 - Rating Curve Plot for Crossing: Crossing Recommended