FINAL ENVIRONMENTAL IMPACT STATEMENT (FEIS) HIGHLAND CREEK PLANNED DEVELOPMENT DISTRICT TOWN OF BRUNSWICK, RENSSELAER COUNTY, NEW YORK

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DATE OF FEIS ACCEPTANCE:

April 13, 2006

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November 28, 2005
December 29, 2005

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APPENDIX D

PRELIMINARY STORMWATER MANAGEMENT ANALYSIS

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TOWN OF BRUNSWICK, RENSSELAER COUNTY, NY

MARCH 2006

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1. INTRODUCTION

The NYSDEC, as specified in their Stormwater Management Design Manual, dated August 2003, requires land development projects to provide mitigation measures for developed stormwater runoff. Aspects of the required stormwater mitigation measures include treatment of both the water quality volume (WQv) and channel protection volume (CPv) and providing overbank flood protection (Qp) and extreme storm protection (Qf).

With regard to Highland Creek Planned Development District, this report identifies NYSDEC's required stormwater treatment volumes and protections. Additionally, this report will provide a proposal for Highland Creek Planned Development District to complying with those requirements.

2. METHODOLOGY

Hydrologic models of existing and developed drainage conditions were developed utilizing the computer program, HydroCAD Stormwater Modeling System by Applied Microcomputer Systems. HydroCAD models the hydrology and hydraulics of stormwater runoff. HydroCAD is based largely on the hydrology techniques developed by the Soil Conservation Service (now the Natural Resources Conservation Service - NRCS) combined with other hydrology and hydraulic calculations. By using historic rainfall data compiled by the National Weather Service, curve numbers (CN) correlated to watershed surface characteristics and soil types identified by the NRCS, HydroCAD generates hydrographs throughout a watershed. Comparisons of existing verses developed peak stormwater runoff rates acquired from the model's hydrographs are made to analyze the effectiveness of the engineered components. These comparisons are made at points of equivalent comparison, the design points.

In the case of Highland Creek Planned Development District, the design point is the drainage culvert under McChesney Avenue Extension. Comparisons of the peak stormwater runoff rates the Highland Creek Planned Development District contributes to this culvert were made.

3. STORMWATER MANAGEMENT SYSTEM SUMMARY

The first step in management of stormwater runoff due to development is treatment of the water quality volume - WQv. The WQv represents 90% of additional stormwater runoff volume generated from creation of additional imperviousness within a tributary area due to land development. Storage of the WQv in a pocket pond is accomplished by providing storage of 50% of the volume in a permanent pool, while treatment of the remaining 50% of the WQv is accomplished via extended detention of the corresponding volume and releasing it over a 24-hour period.

Step two in the stormwater management process is storage of the runoff volume generated due to development of the 1-year, 24-hour storm event for a 24-hour period. This volume is identified as the channel protection volume - CPv. The CPv represents the depth of runoff during a 1-year, 24-hour storm event over the tributary area. The CPv and the WQv are stored cumulatively.

Detention of the developed 10-year peak runoff rates to pre-developed 10-year rates provides overbank flood protection (Qp), while detention of the developed 100-year peak runoff rates to pre-developed 100-year rates provide extreme flood protection (Qf). A detention basin provides overbank flood protection (Qp) and extreme flood protection (Qf) by providing storage capacity for the increased stormwater flows generated in conjunction with development of a project.

The objective of providing detention storage capacity is to be able to store the additional stormwater runoff generated from development and discharge it over a longer period of time at a reduced rate. With regard to Highland Creek Planned Development District, the effectiveness of the stormwater mitigation system to detain and release stormwater runoff is measured as the inflow to the culvert at McChesney Avenue Extenstion.

A system of thirteen (13) stormwater management basins throughout the Highland Creek Planned Development project site will provide both treatment and protection measures to mitigate developed stormwater runoff. A summary of the required treatment volumes: WQv and CPv and protection rates Qp and Qf and the total available stormwater storage volume for each of these basins is provided in Table 1, Stormwater Management Areas (SMA) Design Data Summary.

Table 1

Stormwater Management Areas (SMA) Design Data Summary

SMA	WQv-Ed (CFS)	CPv (CFS)	Qp (CFS)	Qf (CFS)	Vol (CF)
1A	1,436	8,508	4.9	6.3	13,483
1B	3,795	19,843	6.2	7.8	51,010
1CD	9,264	37,456	17.5	27.3	114,113
1F1	782	4,634	3.4	4.3	8,583
1F2	7,673	42,788	25.4	33.0	58,422
2E	5,229	21,142	10.2	13.4	35,767
2G	3,274	24,650	12.4	15.5	34,311
2H	991	8,194	4.1	5.3	17,100
2I	1,769	13,815	4.4	5.7	34,336
2J	1,437	11,217	7.8	9.8	19,849
2K	900	7,441	4.9	6.1	9,905
2L	1,186	9,802	5.5	6.8	14,132

WQv-Ed Water Quality Volume–Extended Detention – 50% of the volume of 90% of the average annual stormwater runoff volume captured and treated via 24-hour extended detention.

CPv Stream Channel Protection Volume – Volume generated from the 1-year, 24-hour storm event treated via 24-hour extended detention.

Qp Overbank Flood Control Criteria – Storage and attenuation of post development conditions 10-year, 24-hour peak discharge rate to existing conditions rate.

Qf Extreme Flood Control Criteria - Storage and attenuation of post development conditions 100-year, 24-hour peak discharge rate to existing conditions rate.

Vol Total available stormwater storage volume.

A comparison of the cumulative mitigating effect the thirteen stormwater management basins will have in providing overbank flood protection (Qp) and extreme storm protection (Qf) is provided in Table 2, Rates of Existing and Developed Flows at McChesney Ave Extension Culvert.

Table 2

Rates of Existing and Developed Flows at McChesney Ave Extension Culvert

DESIGN STORM EVENT	EXISTING FLOW * (CFS)	DEVELOPED FLOW * (CFS)
Qp - 10-Year, 24-Hour	77.4	55.4
Qf - 100-Year, 24-Hour	149.5	96.6

* Values represent the peak inflow rates the Highland Creek project area contributes to the McChesney Road Extension culvert from the drainage area as shown on Map D-1.

4. DRAINAGE ANALYSIS DOCUMENTATION

PART 1

WATER QUALITY VOLUME – WQv

CHANNEL PROTECTION VOLUME - CPv

WATER QUALITY VOLUMVE

$$WQv = \frac{P\ Rv\ A}{12}$$

Where: WQv = Water Quality Volume
P = 90% Precipitation (Fig 4.1 NYSDEC SMDM) = 0.95 IN
I = Impervious Cover (percent) (Table 4.2 NYSDEC SMDM)
= 25 1/3 Ac Residential Lot
= 28 1/4 Ac Residential Lot
Rv = Runoff Coefficent = 0.05 + 0.009 x I

Drainage Area	I	Rv	A	WQv
1A	28	0.302	120108	2872
1B	28	0.302	317480	7590
1CD	28	0.302	774947	18528
1F1	28	0.302	65418	1564
1F2	28	0.302	641820	15345
2E	28	0.302	437424	10458
2G	28	0.302	273894	6548
2H	25	0.275	91044	1982
2I	25	0.275	162524	3538
2J	25	0.275	131968	2873
2K	25	0.275	82682	1800
2L	25	0.275	108910	2371

CHANNEL PROTECTION VOLUME

$$\mathbf{CPv} = \frac{\mathbf{Q}\ \mathbf{A}\ \text{ft}}{\mathbf{12}\ \text{in}}$$

Where:
Cpv = Channel Protection Volume
Q = Runoff Depth, 1-Yr Storm (Obtained from HydroCAD report)
A = Tributary Area

Drainage Area	Q	A	CPv
1A	0.85	120108	8,508
1B	0.75	317480	19,843
1CD	0.58	774947	37,456
1F1	0.85	65418	4,634
1F2	0.80	641820	42,788
2E	0.58	437424	21,142
2G	1.08	273894	24,650
2H	1.08	91044	8,194
2I	1.02	162524	13,815
2J	1.02	131968	11,217
2K	1.08	82682	7,441
2L	1.08	108910	9,802

Subcatchment 1A:

Runoff = 3.68 cfs @ 12.02 hrs, Volume= 0.196 af, Depth= 0.85"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-Year Rainfall=2.30"

Area (sf)	CN	Description
6,038	39	>75% Grass cover, Good, HSG A
9,203	98	Paved roads w/curbs & sewers
27,161	92	Paved roads w/open ditches, HSG C
42,047	74	>75% Grass cover, Good, HSG C
16,133	80	>75% Grass cover, Good, HSG D
6,896	98	Paved roads w/curbs & sewers
10,062	93	Paved roads w/open ditches, HSG D
1,381	77	Woods, Good, HSG D
1,187	98	Roof
120,108	82	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.3	100	0.1300	0.2		**Sheet Flow, Slope Side** Grass: Dense n= 0.240 P2= 2.75"
0.8	70	0.0400	1.4		**Shallow Concentrated Flow, Slope Side** Short Grass Pasture Kv= 7.0 fps
0.9	270	0.0360	5.1	22.18	**Trap/Vee/Rect Channel Flow, Roadside** Bot.W=0.00' D=0.50' Z= 3.0 & 32.0 '/' Top.W=17.50' n= 0.022 Earth, clean & straight
0.4	105	0.0100	4.9	3.86	**Circular Channel (pipe), Storm Sewer** Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
9.4	545	Total			

Subcatchment 1B:

Runoff = 8.56 cfs @ 12.02 hrs, Volume= 0.458 af, Depth= 0.75"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-Year Rainfall=2.30"

Area (sf)	CN	Description
19,890	39	>75% Grass cover, Good, HSG A
3,267	98	Paved roads w/curbs & sewers
294,323	83	1/4 acre lots, 38% imp, HSG C
317,480	80	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.0	100	0.0400	0.2		**Sheet Flow, Lawn**
					Grass: Short n= 0.150 P2= 2.75"
0.1	25	0.0400	3.0		**Shallow Concentrated Flow, Lawn**
					Grassed Waterway Kv= 15.0 fps
0.7	370	0.0360	9.3	7.32	**Circular Channel (pipe), 12" Storm Sewer**
					Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
0.4	285	0.0350	10.7	13.09	**Circular Channel (pipe), 15" Storm Sewer**
					Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
9.2	780	Total			

Subcatchment 1CD: Combined C&D

Runoff = 10.15 cfs @ 12.15 hrs, Volume= 0.855 af, Depth= 0.58"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-Year Rainfall=2.30"

Area (sf)	CN	Description
44,471	39	>75% Grass cover, Good, HSG A
30,049	98	Paved roads w/curbs & sewers
240,672	61	1/4 acre lots, 38% imp, HSG A
8,181	92	Paved roads w/open ditches, HSG C
142,014	83	1/4 acre lots, 38% imp, HSG C
309,560	87	1/4 acre lots, 38% imp, HSG D
774,947	76	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.0					**Direct Entry,**

Subcatchment 1F1:

Runoff = 2.42 cfs @ 12.01 hrs, Volume= 0.128 af, Depth= 0.85"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-Year Rainfall=2.30"

Area (sf)	CN	Description
9,133	98	Paved roads w/curbs & sewers
39,269	87	1/4 acre lots, 38% imp, HSG D
29,740	71	Meadow, non-grazed, HSG C
78,142	82	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.2	50	0.1000	0.3		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.75"
4.2	50	0.0500	0.2		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.75"
0.4	50	0.0250	2.4		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
1.4	160	0.0100	1.9	2.91	**Trap/Vee/Rect Channel Flow, Road Side** Bot.W=0.00' D=0.30' Z= 4.0 & 30.0 '/' Top.W=10.20' n= 0.022 Earth, clean & straight
9.2	310	Total			

Subcatchment 1F2:

Runoff = 16.31 cfs @ 12.05 hrs, Volume= 0.985 af, Depth= 0.80"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-Year Rainfall=2.30"

Area (sf)	CN	Description
430,737	81	1/3 acre lots, 30% imp, HSG C
122,848	87	1/4 acre lots, 38% imp, HSG D
88,235	71	Meadow, non-grazed, HSG C
641,820	81	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.3	100	0.0500	0.2		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.75"
0.1	20	0.0500	3.4		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.4	290	0.0800	11.0	29.99	**Trap/Vee/Rect Channel Flow, Gutter** Bot.W=0.00' D=0.40' Z= 4.0 & 30.0 '/' Top.W=13.60' n= 0.013 Asphalt, smooth
1.9	550	0.0100	4.9	3.86	**Circular Channel (pipe), 12" Storm** Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
1.8	430	0.0050	4.0	4.95	**Circular Channel (pipe), 15" Storm** Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
1.0	360	0.0080	5.8	10.18	**Circular Channel (pipe), 18" Storm** Diam= 18.0" Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
12.5	1,750	Total			

Subcatchment 2E:

Runoff = 6.62 cfs @ 12.10 hrs, Volume= 0.483 af, Depth= 0.58"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-Year Rainfall=2.30"

Area (sf)	CN	Description
139,721	61	1/4 acre lots, 38% imp, HSG A
297,703	83	1/4 acre lots, 38% imp, HSG C
437,424	76	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	100	0.0200	0.2		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.75"
0.9	200	0.0300	3.5		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.5	230	0.0400	7.8	21.21	**Trap/Vee/Rect Channel Flow, Gutter** Bot.W=0.00' D=0.40' Z= 4.0 & 30.0 '/' Top.W=13.60' n= 0.013 Asphalt, smooth
2.1	590	0.0150	4.8	12.99	**Trap/Vee/Rect Channel Flow, Gutter** Bot.W=0.00' D=0.40' Z= 4.0 & 30.0 '/' Top.W=13.60' n= 0.013 Asphalt, smooth
1.0	420	0.0200	6.9	5.46	**Circular Channel (pipe), 12" Storm** Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
0.4	100	0.0050	4.0	4.95	**Circular Channel (pipe), 15" Storm** Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.3	80	0.0050	4.6	8.05	**Circular Channel (pipe), 18" Storm** Diam= 18.0" Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
15.8	1,720	Total			

Subcatchment 2G:

Runoff = 10.54 cfs @ 12.02 hrs, Volume= 0.567 af, Depth= 1.08"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-Year Rainfall=2.30"

Area (sf)	CN	Description
45,923	83	1/4 acre lots, 38% imp, HSG C
227,971	87	1/4 acre lots, 38% imp, HSG D
273,894	86	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	90	0.0900	0.2		**Sheet Flow, Lawn**
					Grass: Dense n= 0.240 P2= 2.75"
0.5	225	0.0350	7.9	65.15	**Trap/Vee/Rect Channel Flow, Swale**
					Bot.W=1.00' D=1.50' Z= 3.0 '/' Top.W=10.00'
					n= 0.030 Earth, grassed & winding
1.4	290	0.0050	3.5	2.73	**Circular Channel (pipe), 12" Storm**
					Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
0.2	210	0.1000	15.5	12.21	**Circular Channel (pipe), 12" Storm**
					Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
9.9	815	Total			

Subcatchment 2H:

Runoff = 3.35 cfs @ 12.03 hrs, Volume= 0.188 af, Depth= 1.08"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-Year Rainfall=2.30"

Area (sf)	CN	Description
91,044	86	1/3 acre lots, 30% imp, HSG D

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	100	0.1000	0.2		**Sheet Flow, Meadow** Grass: Dense n= 0.240 P2= 2.75"
1.9	200	0.0600	1.7		**Shallow Concentrated Flow, Lawn** Short Grass Pasture Kv= 7.0 fps
0.8	390	0.0500	7.7	14.20	**Trap/Vee/Rect Channel Flow, Gutter** Bot.W=0.00' D=0.33' Z= 4.0 & 30.0 '/' Top.W=11.22' n= 0.013 Asphalt, smooth
0.3	80	0.0100	4.9	3.86	**Circular Channel (pipe), 12" Storm** Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
11.1	770	Total			

Subcatchment 2I:

Runoff = 5.32 cfs @ 12.05 hrs, Volume= 0.318 af, Depth= 1.02"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-Year Rainfall=2.30"

Area (sf)	CN	Description
147,524	86	1/3 acre lots, 30% imp, HSG D
15,000	78	Meadow, non-grazed, HSG D
162,524	85	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	60	0.0500	0.2		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.75"
7.4	40	0.0200	0.1		**Sheet Flow, Lawn** Grass: Dense n= 0.240 P2= 2.75"
0.4	210	0.0200	8.1	67.16	**Trap/Vee/Rect Channel Flow, Swale** Bot.W=1.00' D=1.50' Z= 3.0 '/' Top.W=10.00' n= 0.022 Earth, clean & straight
12.7	310	Total			

Subcatchment 2J:

Runoff = 4.23 cfs @ 12.06 hrs, Volume= 0.258 af, Depth= 1.02"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-Year Rainfall=2.30"

Area (sf)	CN	Description
119,268	86	1/3 acre lots, 30% imp, HSG D
12,700	78	Meadow, non-grazed, HSG D
131,968	85	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.6	100	0.0650	0.2		**Sheet Flow, Meadow** Grass: Dense n= 0.240 P2= 2.75"
2.2	190	0.0420	1.4		**Shallow Concentrated Flow, Meadow** Short Grass Pasture Kv= 7.0 fps
1.5	310	0.0050	3.5	2.73	**Circular Channel (pipe), 12" Storm** Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
13.3	600	Total			

Subcatchment 2K:

Runoff = 3.31 cfs @ 12.01 hrs, Volume= 0.171 af, Depth= 1.08"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-Year Rainfall=2.30"

Area (sf)	CN	Description
82,682	86	1/3 acre lots, 30% imp, HSG D

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.5	40	0.3500	0.2		**Sheet Flow, Woods**
					Woods: Light underbrush n= 0.400 P2= 2.75"
4.2	60	0.1800	0.2		**Sheet Flow, Lawn**
					Grass: Dense n= 0.240 P2= 2.75"
1.1	290	0.0900	4.5		**Shallow Concentrated Flow, Lawn**
					Grassed Waterway Kv= 15.0 fps
8.8	390	Total			

Subcatchment 2L:

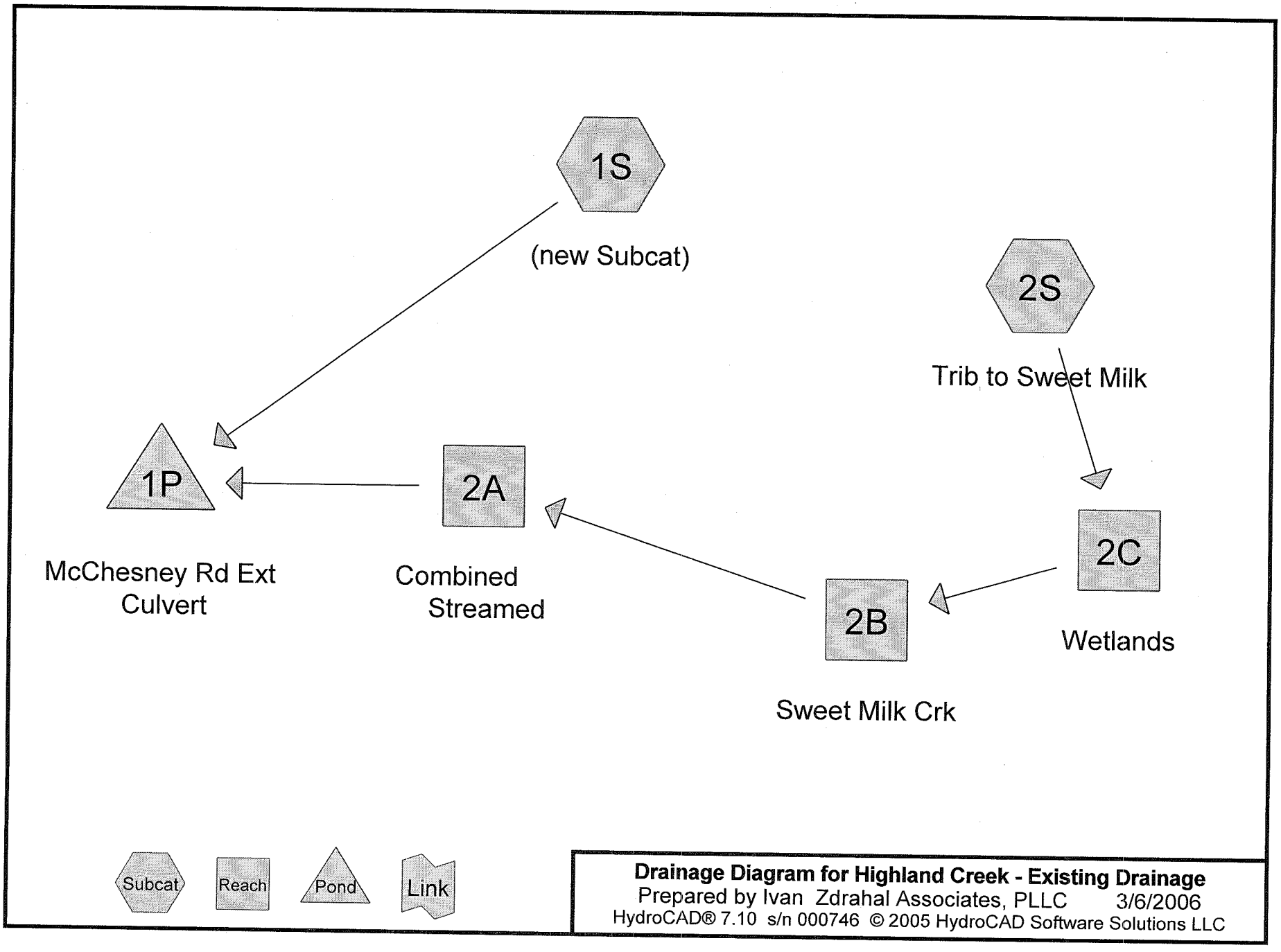
Runoff = 4.27 cfs @ 12.01 hrs, Volume= 0.225 af, Depth= 1.08"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-Year Rainfall=2.30"

Area (sf)	CN	Description
108,910	86	1/3 acre lots, 30% imp, HSG D

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.0	100	0.0400	0.2		**Sheet Flow, Lawn** Grass: Short n= 0.150 P2= 2.75"
0.9	250	0.0900	4.5		**Shallow Concentrated Flow, Lawn** Grassed Waterway Kv= 15.0 fps
0.5	280	0.0900	9.9	39.71	**Trap/Vee/Rect Channel Flow, Swale** Bot.W=1.00' D=1.00' Z= 3.0 '/' Top.W=7.00' n= 0.030 Earth, grassed & winding
9.4	630	Total			

PART 2 – EXISTING DRAINAGE CONDITIONS


1S
(new Subcat)
2S
Trib to Sweet Milk
1P
McChesney Rd Ext
Culvert
2A
Combined
Streamed
2C
Wetlands
2B
Sweet Milk Crk
Subcat
Reach
Pond
Link
Drainage Diagram for Highland Creek - Existing Drainage
Prepared by Ivan Zdrahal Associates, PLLC 3/6/2006
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EXISTING DRAINAGE CONDITIONS
10-YEAR STORM EVENT

Subcatchment 1S: (new Subcat)

Runoff = 77.26 cfs @ 12.28 hrs, Volume= 7.242 af, Depth> 1.51"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-Year Rainfall=4.00"

Area (sf)	CN	Description
187,094	65	Row crops, contoured, Good, HSG A
54,400	30	Brush, Good, HSG A
33,198	30	Woods, Good, HSG A
1,014,673	82	Row crops, contoured, Good, HSG C
359,025	71	Meadow, non-grazed, HSG C
174,732	65	Brush, Good, HSG C
114,494	70	Woods, Good, HSG C
145,927	82	Farmsteads, HSG C
215,076	86	Row crops, contoured, Good, HSG D
10,681	78	Meadow, non-grazed, HSG D
100,106	73	Brush, Good, HSG D
105,704	77	Woods, Good, HSG D
2,515,110	75	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.9	150	0.1600	0.2		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.75"
9.0	760	0.0800	1.4		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.7	290	0.0400	1.8		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
3.5	1,620	0.0150	7.7	61.44	**Trap/Vee/Rect Channel Flow, Ditch** Bot.W=0.00' D=2.00' Z= 2.0 '/' Top.W=8.00' n= 0.022 Earth, clean & straight
2.5	1,220	0.0130	8.0	144.62	**Trap/Vee/Rect Channel Flow, Stream** Bot.W=5.00' D=2.00' Z= 2.0 '/' Top.W=13.00' n= 0.025 Earth, clean & winding
0.6	280	0.0070	7.8	327.25	**Trap/Vee/Rect Channel Flow, Stream** Bot.W=8.00' D=3.00' Z= 2.0 '/' Top.W=20.00' n= 0.025 Earth, clean & winding
32.2	4,320	Total			

Subcatchment 2S: Trib to Sweet Milk

Runoff = 102.55 cfs @ 12.26 hrs, Volume= 9.187 af, Depth> 1.64"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-Year Rainfall=4.00"

Area (sf)	CN	Description
383,189	65	Row crops, contoured, Good, HSG A
9,805	30	Brush, Good, HSG A
42,238	30	Woods, Good, HSG A
507,837	82	Row crops, contoured, Good, HSG C
4,410	65	Brush, Good, HSG C
6,314	70	Woods, Good, HSG C
464,295	86	Row crops, contoured, Good, HSG D
2,459	73	Brush, Good, HSG D
1,499,567	77	Woods, Good, HSG D
2,920,114	77	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.6	150	0.0480	0.1		**Sheet Flow, Sheet** Woods: Light underbrush n= 0.400 P2= 2.75"
3.8	400	0.1250	1.8		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
4.1	1,515	0.0240	6.1	97.66	**Trap/Vee/Rect Channel Flow, Stream** Bot.W=2.00' D=2.00' Z= 3.0 '/' Top.W=14.00' n= 0.040 Mountain streams
30.5	2,065	Total			

Reach 2C: Wetlands

Inflow Area =	67.037 ac,	Inflow Depth >	1.64"	for	10-Year event
Inflow =	102.55 cfs @	12.26 hrs,	Volume=	9.187 af	
Outflow =	55.63 cfs @	13.17 hrs,	Volume=	8.476 af,	Atten= 46%, Lag= 54.8 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.0 fps, Min. Travel Time= 37.0 min
Avg. Velocity = 0.4 fps, Avg. Travel Time= 85.3 min

Peak Depth= 0.45' @ 12.56 hrs
Capacity at bank full= 2,180.01 cfs
Inlet Invert= 428.00', Outlet Invert= 413.00'
120.00' x 4.00' deep channel, n= 0.070 Medium-dense brush, winter
Side Slope Z-value= 3.5 '/' Top Width= 148.00'
Length= 2,250.0' Slope= 0.0067 '/'

Reach 2B: Sweet Milk Crk

Inflow Area = 67.037 ac, Inflow Depth > 1.52" for 10-Year event
Inflow = 55.63 cfs @ 13.17 hrs, Volume= 8.476 af
Outflow = 50.17 cfs @ 13.59 hrs, Volume= 8.249 af, Atten= 10%, Lag= 25.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.1 fps, Min. Travel Time= 13.0 min
Avg. Velocity = 1.5 fps, Avg. Travel Time= 26.3 min

Peak Depth= 1.73' @ 13.37 hrs
Capacity at bank full= 148.86 cfs
Inlet Invert= 413.00', Outlet Invert= 400.00'
6.00' x 3.00' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 2.0 '/' Top Width= 18.00'
Length= 2,390.0' Slope= 0.0054 '/'

Reach 2A: Combined Streamed

Inflow Area = 67.037 ac, Inflow Depth > 1.48" for 10-Year event
Inflow = 50.17 cfs @ 13.59 hrs, Volume= 8.249 af
Outflow = 50.05 cfs @ 13.63 hrs, Volume= 8.223 af, Atten= 0%, Lag= 2.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.3 fps, Min. Travel Time= 1.4 min
Avg. Velocity = 1.6 fps, Avg. Travel Time= 2.9 min

Peak Depth= 1.41' @ 13.61 hrs
Capacity at bank full= 206.61 cfs
Inlet Invert= 400.00', Outlet Invert= 398.00'
8.00' x 3.00' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 2.0 '/' Top Width= 20.00'
Length= 280.0' Slope= 0.0071 '/'

Pond 1P: McChesney Rd Ext Culvert

Inflow Area =	124.776 ac,	Inflow Depth >	1.49"	for	10-Year event
Inflow =	77.40 cfs @	12.28 hrs,	Volume=	15.464 af	
Outflow =	70.52 cfs @	12.39 hrs,	Volume=	15.425 af,	Atten= 9%, Lag= 6.3 min
Primary =	70.52 cfs @	12.39 hrs,	Volume=	15.425 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 400.29' @ 12.39 hrs Surf.Area= 20,153 sf Storage= 23,421 cf
Plug-Flow detention time= 4.8 min calculated for 15.374 af (99% of inflow)
Center-of-Mass det. time= 3.9 min (867.1 - 863.2)

Volume	Invert	Avail.Storage	Storage Description
#1	398.00'	490,235 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
398.00	1,667	0	0
400.00	16,374	18,041	18,041
402.00	42,034	58,408	76,449
404.00	57,068	99,102	175,551
406.00	68,459	125,527	301,078
408.00	120,698	189,157	490,235

Device	Routing	Invert	Outlet Devices
#1	Primary	398.00'	**8.00' W x 4.00' H x 60.0' long Culvert** Box, 30-75° wingwalls, square crown, Ke= 0.400 Outlet Invert= 397.50' S= 0.0083 '/' Cc= 0.900 n= 0.030 Stream, clean & straight

Primary OutFlow Max=70.31 cfs @ 12.39 hrs HW=400.29' (Free Discharge)
└**1=Culvert** (Barrel Controls 70.31 cfs @ 5.1 fps)

EXISTING DRAINAGE CONDITIONS
100-YEAR STORM EVENT

Subcatchment 1S: (new Subcat)

Runoff = 146.08 cfs @ 12.27 hrs, Volume= 13.510 af, Depth> 2.81"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-Year Rainfall=5.75"

Area (sf)	CN	Description
187,094	65	Row crops, contoured, Good, HSG A
54,400	30	Brush, Good, HSG A
33,198	30	Woods, Good, HSG A
1,014,673	82	Row crops, contoured, Good, HSG C
359,025	71	Meadow, non-grazed, HSG C
174,732	65	Brush, Good, HSG C
114,494	70	Woods, Good, HSG C
145,927	82	Farmsteads, HSG C
215,076	86	Row crops, contoured, Good, HSG D
10,681	78	Meadow, non-grazed, HSG D
100,106	73	Brush, Good, HSG D
105,704	77	Woods, Good, HSG D
2,515,110	75	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.9	150	0.1600	0.2		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.75"
9.0	760	0.0800	1.4		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.7	290	0.0400	1.8		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
3.5	1,620	0.0150	7.7	61.44	**Trap/Vee/Rect Channel Flow, Ditch** Bot.W=0.00' D=2.00' Z= 2.0 '/' Top.W=8.00' n= 0.022 Earth, clean & straight
2.5	1,220	0.0130	8.0	144.62	**Trap/Vee/Rect Channel Flow, Stream** Bot.W=5.00' D=2.00' Z= 2.0 '/' Top.W=13.00' n= 0.025 Earth, clean & winding
0.6	280	0.0070	7.8	327.25	**Trap/Vee/Rect Channel Flow, Stream** Bot.W=8.00' D=3.00' Z= 2.0 '/' Top.W=20.00' n= 0.025 Earth, clean & winding
32.2	4,320	Total			

Subcatchment 2S: Trib to Sweet Milk

Runoff = 187.38 cfs @ 12.25 hrs, Volume= 16.726 af, Depth> 2.99"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-Year Rainfall=5.75"

Area (sf)	CN	Description
383,189	65	Row crops, contoured, Good, HSG A
9,805	30	Brush, Good, HSG A
42,238	30	Woods, Good, HSG A
507,837	82	Row crops, contoured, Good, HSG C
4,410	65	Brush, Good, HSG C
6,314	70	Woods, Good, HSG C
464,295	86	Row crops, contoured, Good, HSG D
2,459	73	Brush, Good, HSG D
1,499,567	77	Woods, Good, HSG D
2,920,114	77	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.6	150	0.0480	0.1		**Sheet Flow, Sheet** Woods: Light underbrush n= 0.400 P2= 2.75"
3.8	400	0.1250	1.8		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
4.1	1,515	0.0240	6.1	97.66	**Trap/Vee/Rect Channel Flow, Stream** Bot.W=2.00' D=2.00' Z= 3.0 '/' Top.W=14.00' n= 0.040 Mountain streams
30.5	2,065	Total			

Reach 2C: Wetlands

Inflow Area = 67.037 ac, Inflow Depth > 2.99" for 100-Year event
Inflow = 187.38 cfs @ 12.25 hrs, Volume= 16.726 af
Outflow = 121.57 cfs @ 12.94 hrs, Volume= 15.821 af, Atten= 35%, Lag= 41.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.4 fps, Min. Travel Time= 27.3 min
Avg. Velocity = 0.5 fps, Avg. Travel Time= 75.7 min

Peak Depth= 0.72' @ 12.48 hrs
Capacity at bank full= 2,180.01 cfs
Inlet Invert= 428.00', Outlet Invert= 413.00'
120.00' x 4.00' deep channel, n= 0.070 Medium-dense brush, winter
Side Slope Z-value= 3.5 '/' Top Width= 148.00'
Length= 2,250.0' Slope= 0.0067 '/'

Reach 2B: Sweet Milk Crk

Inflow Area = 67.037 ac, Inflow Depth > 2.83" for 100-Year event
Inflow = 121.57 cfs @ 12.94 hrs, Volume= 15.821 af
Outflow = 111.05 cfs @ 13.26 hrs, Volume= 15.529 af, Atten= 9%, Lag= 19.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.8 fps, Min. Travel Time= 10.4 min
Avg. Velocity = 1.7 fps, Avg. Travel Time= 24.1 min

Peak Depth= 2.60' @ 13.09 hrs
Capacity at bank full= 148.86 cfs
Inlet Invert= 413.00', Outlet Invert= 400.00'
6.00' x 3.00' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 2.0 '/' Top Width= 18.00'
Length= 2,390.0' Slope= 0.0054 '/'

Reach 2A: Combined Streamed

Inflow Area = 67.037 ac, Inflow Depth > 2.78" for 100-Year event
Inflow = 111.05 cfs @ 13.26 hrs, Volume= 15.529 af
Outflow = 110.70 cfs @ 13.30 hrs, Volume= 15.496 af, Atten= 0%, Lag= 2.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.1 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 1.7 fps, Avg. Travel Time= 2.7 min

Peak Depth= 2.17' @ 13.28 hrs
Capacity at bank full= 206.61 cfs
Inlet Invert= 400.00', Outlet Invert= 398.00'
8.00' x 3.00' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 2.0 '/' Top Width= 20.00'
Length= 280.0' Slope= 0.0071 '/'

Pond 1P: McChesney Rd Ext Culvert

Inflow Area =	124.776 ac,	Inflow Depth >	2.79"	for	100-Year event
Inflow =	149.50 cfs @	12.27 hrs,	Volume=	29.006 af	
Outflow =	129.29 cfs @	12.41 hrs,	Volume=	28.945 af,	Atten= 14%, Lag= 8.2 min
Primary =	129.29 cfs @	12.41 hrs,	Volume=	28.945 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 401.46' @ 12.41 hrs Surf.Area= 35,084 sf Storage= 55,561 cf
Plug-Flow detention time= 5.7 min calculated for 28.849 af (99% of inflow)
Center-of-Mass det. time= 5.0 min (846.7 - 841.7)

Volume	Invert	Avail.Storage	Storage Description
#1	398.00'	490,235 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
398.00	1,667	0	0
400.00	16,374	18,041	18,041
402.00	42,034	58,408	76,449
404.00	57,068	99,102	175,551
406.00	68,459	125,527	301,078
408.00	120,698	189,157	490,235

Device	Routing	Invert	Outlet Devices
#1	Primary	398.00'	**8.00' W x 4.00' H x 60.0' long Culvert** Box, 30-75° wingwalls, square crown, Ke= 0.400 Outlet Invert= 397.50' S= 0.0083 '/' Cc= 0.900 n= 0.030 Stream, clean & straight

Primary OutFlow Max=129.00 cfs @ 12.41 hrs HW=401.45' (Free Discharge)
└**1=Culvert** (Barrel Controls 129.00 cfs @ 6.2 fps)

PART 3 – DEVELOPED DRAINAGE CONDITIONS

DEVELOPED DRAINAGE CONDITIONS
10-YEAR STORM EVENT

Subcatchment 1A:

Runoff = 10.26 cfs @ 12.01 hrs, Volume= 0.546 af, Depth= 2.37"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-Year Rainfall=4.20"

Area (sf)	CN	Description
6,038	39	>75% Grass cover, Good, HSG A
9,203	98	Paved roads w/curbs & sewers
27,161	92	Paved roads w/open ditches, HSG C
42,047	74	>75% Grass cover, Good, HSG C
16,133	80	>75% Grass cover, Good, HSG D
6,896	98	Paved roads w/curbs & sewers
10,062	93	Paved roads w/open ditches, HSG D
1,381	77	Woods, Good, HSG D
1,187	98	Roof
120,108	82	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.3	100	0.1300	0.2		**Sheet Flow, Slope Side** Grass: Dense n= 0.240 P2= 2.75"
0.8	70	0.0400	1.4		**Shallow Concentrated Flow, Slope Side** Short Grass Pasture Kv= 7.0 fps
0.9	270	0.0360	5.1	22.18	**Trap/Vee/Rect Channel Flow, Roadside** Bot.W=0.00' D=0.50' Z= 3.0 & 32.0 '/' Top.W=17.50' n= 0.022 Earth, clean & straight
0.4	105	0.0100	4.9	3.86	**Circular Channel (pipe), Storm Sewer** Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
9.4	545	Total			

Pond A: SMA A

Inflow Area =	2.757 ac,	Inflow Depth =	2.37"	for	10-Year event
Inflow =	10.26 cfs @	12.01 hrs,	Volume=	0.546 af	
Outflow =	4.86 cfs @	12.13 hrs,	Volume=	0.545 af,	Atten= 53%, Lag= 7.1 min
Primary =	4.86 cfs @	12.13 hrs,	Volume=	0.545 af	

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 408.15' @ 12.13 hrs Surf.Area= 3,439 sf Storage= 5,509 cf
Plug-Flow detention time= 22.9 min calculated for 0.545 af (100% of inflow)
Center-of-Mass det. time= 22.5 min (846.2 - 823.8)

Volume	Invert	Avail.Storage	Storage Description
#1	406.00'	13,483 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
406.00	1,703	0	0
408.00	3,295	4,998	4,998
410.00	5,190	8,485	13,483

Device	Routing	Invert	Outlet Devices
#1	Primary	406.00'	**12.0" x 44.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 405.00' S= 0.0227 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=4.86 cfs @ 12.13 hrs HW=408.15' (Free Discharge)
└**1=Culvert** (Inlet Controls 4.86 cfs @ 6.2 fps)

Subcatchment 1B:

Runoff = 25.53 cfs @ 12.01 hrs, Volume= 1.341 af, Depth= 2.21"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-Year Rainfall=4.20"

Area (sf)	CN	Description
19,890	39	>75% Grass cover, Good, HSG A
3,267	98	Paved roads w/curbs & sewers
294,323	83	1/4 acre lots, 38% imp, HSG C
317,480	80	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.0	100	0.0400	0.2		**Sheet Flow, Lawn**
					Grass: Short n= 0.150 P2= 2.75"
0.1	25	0.0400	3.0		**Shallow Concentrated Flow, Lawn**
					Grassed Waterway Kv= 15.0 fps
0.7	370	0.0360	9.3	7.32	**Circular Channel (pipe), 12" Storm Sewer**
					Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
0.4	285	0.0350	10.7	13.09	**Circular Channel (pipe), 15" Storm Sewer**
					Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
9.2	780	Total			

Pond B: SMA B

Inflow Area =	7.288 ac,	Inflow Depth =	2.21"	for	10-Year event
Inflow =	25.53 cfs @	12.01 hrs,	Volume=	1.341 af	
Outflow =	6.22 cfs @	12.21 hrs,	Volume=	1.339 af,	Atten= 76%, Lag= 11.9 min
Primary =	6.22 cfs @	12.21 hrs,	Volume=	1.339 af	

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 409.21' @ 12.21 hrs Surf.Area= 8,646 sf Storage= 19,627 cf
Plug-Flow detention time= 43.5 min calculated for 1.339 af (100% of inflow)
Center-of-Mass det. time= 42.3 min (871.7 - 829.4)

Volume	Invert	Avail.Storage	Storage Description
#1	406.00'	51,010 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
406.00	3,756	0	0
408.00	6,639	10,395	10,395
410.00	9,962	16,601	26,996
412.00	14,052	24,014	51,010

Device	Routing	Invert	Outlet Devices
#1	Primary	406.00'	**12.0" x 40.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 405.00' S= 0.0250 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=6.22 cfs @ 12.21 hrs HW=409.21' (Free Discharge)
└**1=Culvert** (Inlet Controls 6.22 cfs @ 7.9 fps)

Subcatchment 11:

Runoff = 24.39 cfs @ 11.90 hrs, Volume= 0.927 af, Depth= 1.15"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-Year Rainfall=4.20"

Area (sf)	CN	Description
52,399	30	Meadow, non-grazed, HSG A
15,315	30	Brush, Good, HSG A
473	30	Woods, Good, HSG A
162,730	71	Meadow, non-grazed, HSG C
24,849	65	Brush, Good, HSG C
65,529	70	Woods, Good, HSG C
4,980	78	Meadow, non-grazed, HSG D
57,545	73	Brush, Good, HSG D
38,862	77	Woods, Good, HSG D
422,682	65	Weighted Average

Subcatchment 1CD: Combined C&D

Runoff = 37.14 cfs @ 12.13 hrs, Volume= 2.807 af, Depth= 1.89"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-Year Rainfall=4.20"

Area (sf)	CN	Description
44,471	39	>75% Grass cover, Good, HSG A
30,049	98	Paved roads w/curbs & sewers
240,672	61	1/4 acre lots, 38% imp, HSG A
8,181	92	Paved roads w/open ditches, HSG C
142,014	83	1/4 acre lots, 38% imp, HSG C
309,560	87	1/4 acre lots, 38% imp, HSG D
774,947	76	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.0					**Direct Entry,**

Pond D: SMA D

Inflow Area =	17.790 ac,	Inflow Depth =	1.89"	for	10-Year event	
Inflow =	37.14 cfs @	12.13 hrs,	Volume=		2.807 af	
Outflow =	27.96 cfs @	12.25 hrs,	Volume=		2.576 af,	Atten= 25%, Lag= 7.2 min
Primary =	27.96 cfs @	12.25 hrs,	Volume=		2.576 af	

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 434.03' @ 12.25 hrs Surf.Area= 11,434 sf Storage= 28,013 cf
Plug-Flow detention time= 80.3 min calculated for 2.576 af (92% of inflow)
Center-of-Mass det. time= 36.8 min (887.3 - 850.5)

Volume	Invert	Avail.Storage	Storage Description
#1	430.00'	40,193 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
430.00	3,370	0	0
432.00	6,488	9,858	9,858
434.00	11,379	17,867	27,725
435.00	13,556	12,468	40,193

Device	Routing	Invert	Outlet Devices
#1	Primary	432.00'	**42.0" x 160.0' long Culvert** CMP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 430.00' S= 0.0125 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=27.95 cfs @ 12.25 hrs HW=434.02' (Free Discharge)
└**1=Culvert** (Inlet Controls 27.95 cfs @ 4.8 fps)

Pond C: SMA C

Inflow Area =	17.790 ac,	Inflow Depth >	1.74"	for	10-Year event
Inflow =	27.96 cfs @	12.25 hrs,	Volume=	2.576 af	
Outflow =	17.47 cfs @	12.49 hrs,	Volume=	2.568 af,	Atten= 38%, Lag= 14.5 min
Primary =	17.47 cfs @	12.49 hrs,	Volume=	2.568 af	

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 428.33' @ 12.49 hrs Surf.Area= 10,930 sf Storage= 19,316 cf
Plug-Flow detention time= 27.6 min calculated for 2.567 af (100% of inflow)
Center-of-Mass det. time= 25.4 min (912.6 - 887.3)

Volume	Invert	Avail.Storage	Storage Description
#1	426.00'	75,835 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
426.00	5,616	0	0
428.00	10,182	15,798	15,798
430.00	14,672	24,854	40,652
432.00	20,511	35,183	75,835

Device	Routing	Invert	Outlet Devices
#1	Primary	426.00'	**24.0" x 90.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 425.00' S= 0.0111 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=17.47 cfs @ 12.49 hrs HW=428.33' (Free Discharge)
└**1=Culvert** (Inlet Controls 17.47 cfs @ 5.6 fps)

Subcatchment 1F1:

Runoff = 6.73 cfs @ 12.01 hrs, Volume= 0.355 af, Depth= 2.37"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-Year Rainfall=4.20"

Area (sf)	CN	Description
9,133	98	Paved roads w/curbs & sewers
39,269	87	1/4 acre lots, 38% imp, HSG D
29,740	71	Meadow, non-grazed, HSG C
78,142	82	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.2	50	0.1000	0.3		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.75"
4.2	50	0.0500	0.2		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.75"
0.4	50	0.0250	2.4		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
1.4	160	0.0100	1.9	2.91	**Trap/Vee/Rect Channel Flow, Road Side** Bot.W=0.00' D=0.30' Z= 4.0 & 30.0 '/' Top.W=10.20' n= 0.022 Earth, clean & straight
9.2	310	Total			

Pond F1: SMA F1

Inflow Area =	1.794 ac,	Inflow Depth =	2.37"	for	10-Year event
Inflow =	6.73 cfs @	12.01 hrs,	Volume=	0.355 af	
Outflow =	3.14 cfs @	12.13 hrs,	Volume=	0.354 af,	Atten= 53%, Lag= 7.0 min
Primary =	3.14 cfs @	12.13 hrs,	Volume=	0.354 af	

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 441.19' @ 12.13 hrs Surf.Area= 4,686 sf Storage= 4,116 cf
Plug-Flow detention time= 35.1 min calculated for 0.354 af (100% of inflow)
Center-of-Mass det. time= 33.3 min (856.9 - 823.6)

Volume	Invert	Avail.Storage	Storage Description
#1	440.00'	8,583 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
440.00	2,227	0	0
442.00	6,356	8,583	8,583

Device	Routing	Invert	Outlet Devices
#1	Primary	440.00'	**12.0" x 80.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 434.00' S= 0.0750 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=3.14 cfs @ 12.13 hrs HW=441.19' (Free Discharge)
└**1=Culvert** (Inlet Controls 3.14 cfs @ 4.0 fps)

Subcatchment 1F2:

Runoff = 47.60 cfs @ 12.04 hrs, Volume= 2.813 af, Depth= 2.29"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-Year Rainfall=4.20"

Area (sf)	CN	Description
430,737	81	1/3 acre lots, 30% imp, HSG C
122,848	87	1/4 acre lots, 38% imp, HSG D
88,235	71	Meadow, non-grazed, HSG C
641,820	81	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.3	100	0.0500	0.2		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.75"
0.1	20	0.0500	3.4		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.4	290	0.0800	11.0	29.99	**Trap/Vee/Rect Channel Flow, Gutter** Bot.W=0.00' D=0.40' Z= 4.0 & 30.0 '/' Top.W=13.60' n= 0.013 Asphalt, smooth
1.9	550	0.0100	4.9	3.86	**Circular Channel (pipe), 12" Storm** Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
1.8	430	0.0050	4.0	4.95	**Circular Channel (pipe), 15" Storm** Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
1.0	360	0.0080	5.8	10.18	**Circular Channel (pipe), 18" Storm** Diam= 18.0" Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
12.5	1,750	Total			

Pond F2: SMA F2

Inflow Area =	14.734 ac,	Inflow Depth =	2.29"	for	10-Year event
Inflow =	47.60 cfs @	12.04 hrs,	Volume=	2.813 af	
Outflow =	24.34 cfs @	12.18 hrs,	Volume=	2.810 af,	Atten= 49%, Lag= 8.2 min
Primary =	24.34 cfs @	12.18 hrs,	Volume=	2.810 af	

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 445.59' @ 12.18 hrs Surf.Area= 10,509 sf Storage= 27,014 cf
Plug-Flow detention time= 23.4 min calculated for 2.809 af (100% of inflow)
Center-of-Mass det. time= 22.9 min (852.4 - 829.6)

Volume	Invert	Avail.Storage	Storage Description
#1	442.00'	58,422 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
442.00	4,744	0	0
444.00	7,755	12,499	12,499
446.00	11,220	18,975	31,474
448.00	15,728	26,948	58,422

Device	Routing	Invert	Outlet Devices
#1	Primary	442.00'	**24.0" x 80.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 440.00' S= 0.0250 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=24.34 cfs @ 12.18 hrs HW=445.59' (Free Discharge)
└**1=Culvert** (Inlet Controls 24.34 cfs @ 7.7 fps)

Subcatchment 2H:

Runoff = 8.32 cfs @ 12.03 hrs, Volume= 0.475 af, Depth= 2.73"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-Year Rainfall=4.20"

Area (sf)	CN	Description
91,044	86	1/3 acre lots, 30% imp, HSG D

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	100	0.1000	0.2		**Sheet Flow, Meadow**
					Grass: Dense n= 0.240 P2= 2.75"
1.9	200	0.0600	1.7		**Shallow Concentrated Flow, Lawn**
					Short Grass Pasture Kv= 7.0 fps
0.8	390	0.0500	7.7	14.20	**Trap/Vee/Rect Channel Flow, Gutter**
					Bot.W=0.00' D=0.33' Z= 4.0 & 30.0 '/' Top.W=11.22'
					n= 0.013 Asphalt, smooth
0.3	80	0.0100	4.9	3.86	**Circular Channel (pipe), 12" Storm**
					Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
11.1	770	Total			

Pond H: SMA H

Inflow Area =	2.090 ac,	Inflow Depth =	2.73"	for	10-Year event
Inflow =	8.32 cfs @	12.03 hrs,	Volume=	0.475 af	
Outflow =	4.13 cfs @	12.15 hrs,	Volume=	0.474 af,	Atten= 50%, Lag= 7.6 min
Primary =	4.13 cfs @	12.15 hrs,	Volume=	0.474 af	

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 467.70' @ 12.15 hrs Surf.Area= 3,726 sf Storage= 5,000 cf
Plug-Flow detention time= 29.8 min calculated for 0.474 af (100% of inflow)
Center-of-Mass det. time= 28.8 min (841.7 - 812.9)

Volume	Invert	Avail.Storage	Storage Description
#1	466.00'	17,100 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
466.00	2,172	0	0
468.00	4,005	6,177	6,177
470.00	6,918	10,923	17,100

Device	Routing	Invert	Outlet Devices
#1	Primary	466.00'	**12.0" x 50.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 465.00' S= 0.0200 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=4.13 cfs @ 12.15 hrs HW=467.70' (Free Discharge)
└**1=Culvert** (Inlet Controls 4.13 cfs @ 5.3 fps)

Reach R14: Wetlands

Inflow Area = 2.090 ac, Inflow Depth > 2.72" for 10-Year event
Inflow = 4.13 cfs @ 12.15 hrs, Volume= 0.474 af
Outflow = 4.05 cfs @ 12.29 hrs, Volume= 0.474 af, Atten= 2%, Lag= 8.3 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.4 fps, Min. Travel Time= 4.6 min
Avg. Velocity = 0.4 fps, Avg. Travel Time= 16.4 min

Peak Depth= 0.13' @ 12.21 hrs
Capacity at bank full= 142.29 cfs
Inlet Invert= 465.00', Outlet Invert= 450.00'
20.00' x 1.00' deep channel, n= 0.050 Scattered brush, heavy weeds
Side Slope Z-value= 10.0 '/' Top Width= 40.00'
Length= 400.0' Slope= 0.0375 '/'

Pond 4P: Culvert 35+00

Inflow Area =	2.090 ac,	Inflow Depth >	2.72"	for	10-Year event
Inflow =	4.05 cfs @	12.29 hrs,	Volume=	0.474 af	
Outflow =	3.96 cfs @	12.36 hrs,	Volume=	0.474 af,	Atten= 2%, Lag= 3.9 min
Primary =	3.96 cfs @	12.36 hrs,	Volume=	0.474 af	

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 450.96' @ 12.36 hrs Surf.Area= 1,431 sf Storage= 709 cf
Plug-Flow detention time= 3.0 min calculated for 0.474 af (100% of inflow)
Center-of-Mass det. time= 3.0 min (858.8 - 855.9)

Volume	Invert	Avail.Storage	Storage Description
#1	450.00'	13,805 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
450.00	53	0	0
452.00	2,934	2,987	2,987
454.00	7,884	10,818	13,805

Device	Routing	Invert	Outlet Devices
#1	Primary	450.00'	**18.0" x 105.0' long Culvert** CMP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 446.00' S= 0.0381 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=3.96 cfs @ 12.36 hrs HW=450.96' (Free Discharge)
└**1=Culvert** (Inlet Controls 3.96 cfs @ 3.3 fps)

Reach R13: Wetlands

Inflow Area = 2.090 ac, Inflow Depth > 2.72" for 10-Year event
Inflow = 3.96 cfs @ 12.36 hrs, Volume= 0.474 af
Outflow = 3.88 cfs @ 12.50 hrs, Volume= 0.474 af, Atten= 2%, Lag= 8.6 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.0 fps, Min. Travel Time= 4.6 min
Avg. Velocity = 1.0 fps, Avg. Travel Time= 13.6 min

Peak Depth= 0.35' @ 12.42 hrs
Capacity at bank full= 194.42 cfs
Inlet Invert= 446.00', Outlet Invert= 426.00'
2.00' x 2.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 5.0 '/' Top Width= 22.00'
Length= 820.0' Slope= 0.0244 '/'

Subcatchment 12:

Runoff = 32.11 cfs @ 12.09 hrs, Volume= 2.168 af, Depth= 1.60"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-Year Rainfall=4.20"

Area (sf)	CN	Description
3,614	30	Meadow, non-grazed, HSG A
1,554	30	Brush, Good, HSG A
145,927	82	Farmsteads, HSG C
399,815	71	Meadow, non-grazed, HSG C
112,704	65	Brush, Good, HSG C
17,416	70	Woods, Good, HSG C
14,244	78	Meadow, non-grazed, HSG D
688	73	Brush, Good, HSG D
11,571	77	Woods, Good, HSG D
707,533	72	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	100	0.1100	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.75"
7.1	980	0.1080	2.3		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.0	300	0.0070	5.2	41.97	**Trap/Vee/Rect Channel Flow, Ditch** Bot.W=0.00' D=2.00' Z= 2.0 '/' Top.W=8.00' n= 0.022 Earth, clean & straight
15.9	1,380	Total			

Pond 3P: Culvert 25+00

Inflow Area =	34.861 ac,	Inflow Depth >	2.00"	for	10-Year event
Inflow =	59.22 cfs @	12.10 hrs,	Volume=	5.806 af	
Outflow =	21.96 cfs @	12.66 hrs,	Volume=	5.803 af,	Atten= 63%, Lag= 33.2 min
Primary =	21.96 cfs @	12.66 hrs,	Volume=	5.803 af	

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 429.44' @ 12.66 hrs Surf.Area= 45,780 sf Storage= 69,314 cf
Plug-Flow detention time= 35.6 min calculated for 5.801 af (100% of inflow)
Center-of-Mass det. time= 35.2 min (891.4 - 856.2)

Volume	Invert	Avail.Storage	Storage Description
#1	426.00'	248,754 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
426.00	1,826	0	0
428.00	20,000	21,826	21,826
430.00	55,711	75,711	97,537
432.00	95,506	151,217	248,754

Device	Routing	Invert	Outlet Devices
#1	Primary	426.00'	**24.0" x 100.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 425.50' S= 0.0050 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=21.96 cfs @ 12.66 hrs HW=429.44' (Free Discharge)
└**1=Culvert** (Barrel Controls 21.96 cfs @ 7.0 fps)

Reach R12:

Inflow Area = 34.861 ac, Inflow Depth > 2.00" for 10-Year event
Inflow = 21.96 cfs @ 12.66 hrs, Volume= 5.803 af
Outflow = 21.96 cfs @ 12.69 hrs, Volume= 5.802 af, Atten= 0%, Lag= 2.2 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.9 fps, Min. Travel Time= 1.3 min
Avg. Velocity = 1.7 fps, Avg. Travel Time= 3.0 min

Peak Depth= 1.25' @ 12.67 hrs
Capacity at bank full= 60.94 cfs
Inlet Invert= 425.50', Outlet Invert= 424.00'
2.00' x 2.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 2.0 '/' Top Width= 10.00'
Length= 300.0' Slope= 0.0050 '/'

Reach R11:

Inflow Area =	52.651 ac,	Inflow Depth >	1.91"	for	10-Year event
Inflow =	39.13 cfs @	12.54 hrs,	Volume=	8.384 af	
Outflow =	39.11 cfs @	12.58 hrs,	Volume=	8.384 af,	Atten= 0%, Lag= 2.3 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.8 fps, Min. Travel Time= 1.3 min
Avg. Velocity = 2.8 fps, Avg. Travel Time= 3.1 min

Peak Depth= 1.26' @ 12.56 hrs
Capacity at bank full= 105.89 cfs
Inlet Invert= 424.00', Outlet Invert= 416.00'
2.00' x 2.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 2.0 '/' Top Width= 10.00'
Length= 530.0' Slope= 0.0151 '/'

Reach R10:

Inflow Area = 52.651 ac, Inflow Depth > 1.91" for 10-Year event
Inflow = 39.11 cfs @ 12.58 hrs, Volume= 8.384 af
Outflow = 39.02 cfs @ 12.68 hrs, Volume= 8.381 af, Atten= 0%, Lag= 5.9 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.2 fps, Min. Travel Time= 3.3 min
Avg. Velocity = 2.0 fps, Avg. Travel Time= 8.9 min

Peak Depth= 1.05' @ 12.62 hrs
Capacity at bank full= 132.75 cfs
Inlet Invert= 416.00', Outlet Invert= 404.50'
5.00' x 2.00' deep channel, n= 0.025 Earth, clean & winding
Side Slope Z-value= 2.0 '/' Top Width= 13.00'
Length= 1,050.0' Slope= 0.0110 '/'

Pond 2P: Highland Culvert

Inflow Area =	72.400 ac,	Inflow Depth >	1.85"	for	10-Year event
Inflow =	48.47 cfs @	12.60 hrs,	Volume=	11.192 af	
Outflow =	43.42 cfs @	12.94 hrs,	Volume=	11.191 af,	Atten= 10%, Lag= 20.1 min
Primary =	43.42 cfs @	12.94 hrs,	Volume=	11.191 af	

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 408.93' @ 12.94 hrs Surf.Area= 15,101 sf Storage= 16,697 cf
Plug-Flow detention time= 2.4 min calculated for 11.188 af (100% of inflow)
Center-of-Mass det. time= 2.4 min (901.7 - 899.3)

Volume	Invert	Avail.Storage	Storage Description
#1	404.30'	38,889 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
404.30	0	0	0
406.00	868	738	738
408.00	5,540	6,408	7,146
410.00	26,203	31,743	38,889

Device	Routing	Invert	Outlet Devices
#1	Primary	404.30'	**30.0" x 80.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 403.40' S= 0.0113 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=43.42 cfs @ 12.94 hrs HW=408.93' (Free Discharge)
└**1=Culvert** (Inlet Controls 43.42 cfs @ 8.8 fps)

Subcatchment 20:

Runoff = 10.91 cfs @ 12.02 hrs, Volume= 0.606 af, Depth= 1.15"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-Year Rainfall=4.20"

Area (sf)	CN	Description
34,529	30	Meadow, non-grazed, HSG A
41,556	30	Woods, Good, HSG A
28,978	86	1/3 acre lots, 30% imp, HSG D
6,320	78	Meadow, non-grazed, HSG D
164,709	77	Woods, Good, HSG D
276,092	65	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	90	0.3000	0.2		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.75"
2.3	250	0.1300	1.8		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.5	340	Total			

Subcatchment 2E:

Runoff = 23.90 cfs @ 12.08 hrs, Volume= 1.584 af, Depth= 1.89"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-Year Rainfall=4.20"

Area (sf)	CN	Description
139,721	61	1/4 acre lots, 38% imp, HSG A
297,703	83	1/4 acre lots, 38% imp, HSG C
437,424	76	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	100	0.0200	0.2		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.75"
0.9	200	0.0300	3.5		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.5	230	0.0400	7.8	21.21	**Trap/Vee/Rect Channel Flow, Gutter** Bot.W=0.00' D=0.40' Z= 4.0 & 30.0 '/' Top.W=13.60' n= 0.013 Asphalt, smooth
2.1	590	0.0150	4.8	12.99	**Trap/Vee/Rect Channel Flow, Gutter** Bot.W=0.00' D=0.40' Z= 4.0 & 30.0 '/' Top.W=13.60' n= 0.013 Asphalt, smooth
1.0	420	0.0200	6.9	5.46	**Circular Channel (pipe), 12" Storm** Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
0.4	100	0.0050	4.0	4.95	**Circular Channel (pipe), 15" Storm** Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.3	80	0.0050	4.6	8.05	**Circular Channel (pipe), 18" Storm** Diam= 18.0" Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
15.8	1,720	Total			

Pond E: SMA E

Inflow Area =	10.042 ac,	Inflow Depth =	1.89"	for	10-Year event	
Inflow =	23.90 cfs @	12.08 hrs,	Volume=		1.584 af	
Outflow =	10.24 cfs @	12.28 hrs,	Volume=		1.583 af,	Atten= 57%, Lag= 11.9 min
Primary =	10.24 cfs @	12.28 hrs,	Volume=		1.583 af	

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 427.63' @ 12.28 hrs Surf.Area= 6,403 sf Storage= 16,686 cf
Plug-Flow detention time= 25.4 min calculated for 1.582 af (100% of inflow)
Center-of-Mass det. time= 25.1 min (871.7 - 846.6)

Volume	Invert	Avail.Storage	Storage Description
#1	424.00'	35,767 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
424.00	3,019	0	0
426.00	4,667	7,686	7,686
428.00	6,803	11,470	19,156
430.00	9,808	16,611	35,767

Device	Routing	Invert	Outlet Devices
#1	Primary	424.00'	**15.0" x 210.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 418.00' S= 0.0286 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=10.24 cfs @ 12.28 hrs HW=427.63' (Free Discharge)
└─**1=Culvert** (Inlet Controls 10.24 cfs @ 8.3 fps)

Subcatchment 2G:

Runoff = 26.05 cfs @ 12.01 hrs, Volume= 1.429 af, Depth= 2.73"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-Year Rainfall=4.20"

Area (sf)	CN	Description
45,923	83	1/4 acre lots, 38% imp, HSG C
227,971	87	1/4 acre lots, 38% imp, HSG D
273,894	86	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	90	0.0900	0.2		**Sheet Flow, Lawn**
					Grass: Dense n= 0.240 P2= 2.75"
0.5	225	0.0350	7.9	65.15	**Trap/Vee/Rect Channel Flow, Swale**
					Bot.W=1.00' D=1.50' Z= 3.0 '/' Top.W=10.00'
					n= 0.030 Earth, grassed & winding
1.4	290	0.0050	3.5	2.73	**Circular Channel (pipe), 12" Storm**
					Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
0.2	210	0.1000	15.5	12.21	**Circular Channel (pipe), 12" Storm**
					Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
9.9	815	Total			

Pond G: SMA G

Inflow Area =	6.288 ac,	Inflow Depth =	2.73"	for	10-Year event	
Inflow =	26.05 cfs @	12.01 hrs,	Volume=		1.429 af	
Outflow =	12.43 cfs @	12.13 hrs,	Volume=		1.427 af,	Atten= 52%, Lag= 7.2 min
Primary =	12.43 cfs @	12.13 hrs,	Volume=		1.427 af	

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 433.49' @ 12.13 hrs Surf.Area= 5,764 sf Storage= 15,181 cf
Plug-Flow detention time= 29.5 min calculated for 1.426 af (100% of inflow)
Center-of-Mass det. time= 28.5 min (840.2 - 811.8)

Volume	Invert	Avail.Storage	Storage Description
#1	430.00'	34,311 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
430.00	4,121	0	0
432.00	3,877	7,998	7,998
434.00	6,410	10,287	18,285
436.00	9,616	16,026	34,311

Device	Routing	Invert	Outlet Devices
#1	Primary	430.00'	**18.0" x 60.0' long Culvert** CMP, mitered to conform to fill, Ke= 0.700 Outlet Invert= 428.00' S= 0.0333 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=12.43 cfs @ 12.13 hrs HW=433.49' (Free Discharge)
└**1=Culvert** (Inlet Controls 12.43 cfs @ 7.0 fps)

Subcatchment 21:

Runoff = 25.82 cfs @ 12.06 hrs, Volume= 1.610 af, Depth= 1.89"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-Year Rainfall=4.20"

Area (sf)	CN	Description
75,904	73	Brush, Good, HSG D
368,679	77	Woods, Good, HSG D
444,583	76	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	100	0.1200	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.75"
3.3	620	0.0161	3.2	9.47	**Trap/Vee/Rect Channel Flow,** Bot.W=1.00' D=1.00' Z= 2.0 '/' Top.W=5.00' n= 0.040
3.2	1,180	0.0280	6.2	62.40	**Trap/Vee/Rect Channel Flow,** Bot.W=1.00' D=2.00' Z= 2.0 '/' Top.W=9.00' n= 0.040 Mountain streams
14.0	1,900	Total			

Subcatchment 2l:

Runoff = 13.66 cfs @ 12.04 hrs, Volume= 0.820 af, Depth= 2.64"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-Year Rainfall=4.20"

Area (sf)	CN	Description
147,524	86	1/3 acre lots, 30% imp, HSG D
15,000	78	Meadow, non-grazed, HSG D
162,524	85	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	60	0.0500	0.2		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.75"
7.4	40	0.0200	0.1		**Sheet Flow, Lawn** Grass: Dense n= 0.240 P2= 2.75"
0.4	210	0.0200	8.1	67.16	**Trap/Vee/Rect Channel Flow, Swale** Bot.W=1.00' D=1.50' Z= 3.0 '/' Top.W=10.00' n= 0.022 Earth, clean & straight
12.7	310	Total			

Pond I: SMA I

Inflow Area =	3.731 ac,	Inflow Depth =	2.64"	for	10-Year event
Inflow =	13.66 cfs @	12.04 hrs,	Volume=	0.820 af	
Outflow =	4.41 cfs @	12.25 hrs,	Volume=	0.815 af,	Atten= 68%, Lag= 12.4 min
Primary =	4.41 cfs @	12.25 hrs,	Volume=	0.815 af	

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 467.86' @ 12.25 hrs Surf.Area= 7,908 sf Storage= 12,018 cf
Plug-Flow detention time= 55.7 min calculated for 0.815 af (99% of inflow)
Center-of-Mass det. time= 52.1 min (869.8 - 817.6)

Volume	Invert	Avail.Storage	Storage Description
#1	466.00'	34,336 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
466.00	5,026	0	0
468.00	8,128	13,154	13,154
470.00	13,054	21,182	34,336

Device	Routing	Invert	Outlet Devices
#1	Primary	466.00'	**12.0" x 50.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 464.00' S= 0.0400 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=4.41 cfs @ 12.25 hrs HW=467.86' (Free Discharge)
└**1=Culvert** (Inlet Controls 4.41 cfs @ 5.6 fps)

Reach RF:

Inflow Area = 3.731 ac, Inflow Depth > 2.62" for 10-Year event
Inflow = 4.41 cfs @ 12.25 hrs, Volume= 0.815 af
Outflow = 4.40 cfs @ 12.31 hrs, Volume= 0.815 af, Atten= 0%, Lag= 3.4 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.0 fps, Min. Travel Time= 1.8 min
Avg. Velocity = 1.2 fps, Avg. Travel Time= 4.6 min

Peak Depth= 0.64' @ 12.28 hrs
Capacity at bank full= 58.06 cfs
Inlet Invert= 460.00', Outlet Invert= 452.00'
1.00' x 2.00' deep channel, n= 0.040 Mountain streams
Side Slope Z-value= 2.0 '/' Top Width= 9.00'
Length= 330.0' Slope= 0.0242 '/'

Subcatchment 2J:

Runoff = 10.87 cfs @ 12.05 hrs, Volume= 0.666 af, Depth= 2.64"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-Year Rainfall=4.20"

Area (sf)	CN	Description
119,268	86	1/3 acre lots, 30% imp, HSG D
12,700	78	Meadow, non-grazed, HSG D
131,968	85	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.6	100	0.0650	0.2		**Sheet Flow, Meadow** Grass: Dense n= 0.240 P2= 2.75"
2.2	190	0.0420	1.4		**Shallow Concentrated Flow, Meadow** Short Grass Pasture Kv= 7.0 fps
1.5	310	0.0050	3.5	2.73	**Circular Channel (pipe), 12" Storm** Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
13.3	600	Total			

Subcatchment 2K:

Runoff = 8.17 cfs @ 12.00 hrs, Volume= 0.432 af, Depth= 2.73"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-Year Rainfall=4.20"

Area (sf)	CN	Description
82,682	86	1/3 acre lots, 30% imp, HSG D

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.5	40	0.3500	0.2		**Sheet Flow, Woods** Woods: Light underbrush n= 0.400 P2= 2.75"
4.2	60	0.1800	0.2		**Sheet Flow, Lawn** Grass: Dense n= 0.240 P2= 2.75"
1.1	290	0.0900	4.5		**Shallow Concentrated Flow, Lawn** Grassed Waterway Kv= 15.0 fps
8.8	390	Total			

Pond K: SMA K

Inflow Area =	1.898 ac,	Inflow Depth =	2.73"	for	10-Year event
Inflow =	8.17 cfs @	12.00 hrs,	Volume=	0.432 af	
Outflow =	4.94 cfs @	12.09 hrs,	Volume=	0.432 af,	Atten= 40%, Lag= 5.4 min
Primary =	4.94 cfs @	12.09 hrs,	Volume=	0.432 af	

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 498.21' @ 12.09 hrs Surf.Area= 2,308 sf Storage= 2,943 cf
Plug-Flow detention time= 9.8 min calculated for 0.431 af (100% of inflow)
Center-of-Mass det. time= 9.8 min (820.6 - 810.7)

Volume	Invert	Avail.Storage	Storage Description
#1	496.00'	9,905 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
496.00	558	0	0
498.00	1,945	2,503	2,503
500.00	5,457	7,402	9,905

Device	Routing	Invert	Outlet Devices
#1	Primary	496.00'	**12.0" x 45.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 494.00' S= 0.0444 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=4.94 cfs @ 12.09 hrs HW=498.21' (Free Discharge)
└─**1=Culvert** (Inlet Controls 4.94 cfs @ 6.3 fps)

Reach RK:

Inflow Area =	1.898 ac,	Inflow Depth =	2.73"	for	10-Year event
Inflow =	4.94 cfs @	12.09 hrs,	Volume=	0.432 af	
Outflow =	4.71 cfs @	12.26 hrs,	Volume=	0.432 af,	Atten= 5%, Lag= 10.3 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.8 fps, Min. Travel Time= 6.1 min
Avg. Velocity = 0.2 fps, Avg. Travel Time= 23.4 min

Peak Depth= 0.27' @ 12.16 hrs
Capacity at bank full= 155.28 cfs
Inlet Invert= 491.50', Outlet Invert= 490.00'
20.00' x 2.00' deep channel, n= 0.050 Scattered brush, heavy weeds
Side Slope Z-value= 4.0 '/' Top Width= 36.00'
Length= 305.0' Slope= 0.0049 '/'

Pond J: SMA J

Inflow Area =	4.928 ac,	Inflow Depth =	2.67"	for	10-Year event
Inflow =	13.59 cfs @	12.07 hrs,	Volume=	1.097 af	
Outflow =	7.83 cfs @	12.29 hrs,	Volume=	1.096 af,	Atten= 42%, Lag= 13.1 min
Primary =	7.83 cfs @	12.29 hrs,	Volume=	1.096 af	

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 484.38' @ 12.29 hrs Surf.Area= 5,256 sf Storage= 8,402 cf
Plug-Flow detention time= 21.1 min calculated for 1.096 af (100% of inflow)
Center-of-Mass det. time= 20.6 min (847.6 - 827.0)

Volume	Invert	Avail.Storage	Storage Description
#1	482.00'	19,849 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
482.00	2,162	0	0
484.00	4,394	6,556	6,556
486.00	8,899	13,293	19,849

Device	Routing	Invert	Outlet Devices
#1	Primary	482.00'	**15.0" x 200.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 460.00' S= 0.1100 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=7.83 cfs @ 12.29 hrs HW=484.38' (Free Discharge)
└**1=Culvert** (Inlet Controls 7.83 cfs @ 6.4 fps)

Reach RJ:

Inflow Area = 4.928 ac, Inflow Depth > 2.67" for 10-Year event
Inflow = 7.83 cfs @ 12.29 hrs, Volume= 1.096 af
Outflow = 7.83 cfs @ 12.30 hrs, Volume= 1.096 af, Atten= 0%, Lag= 1.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.8 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 1.5 fps, Avg. Travel Time= 1.5 min

Peak Depth= 0.45' @ 12.29 hrs
Capacity at bank full= 412.05 cfs
Inlet Invert= 460.00', Outlet Invert= 452.00'
0.00' x 2.00' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 10.0 '/' Top Width= 40.00'
Length= 135.0' Slope= 0.0593 '/'

Reach RE:

Inflow Area =	8.659 ac,	Inflow Depth >	2.65"	for	10-Year event
Inflow =	12.23 cfs @	12.30 hrs,	Volume=	1.911 af	
Outflow =	12.23 cfs @	12.34 hrs,	Volume=	1.911 af,	Atten= 0%, Lag= 2.4 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.3 fps, Min. Travel Time= 1.3 min
Avg. Velocity = 1.7 fps, Avg. Travel Time= 3.5 min

Peak Depth= 0.97' @ 12.32 hrs
Capacity at bank full= 66.11 cfs
Inlet Invert= 452.00', Outlet Invert= 441.00'
1.00' x 2.00' deep channel, n= 0.040 Mountain streams
Side Slope Z-value= 2.0 '/' Top Width= 9.00'
Length= 350.0' Slope= 0.0314 '/'

Subcatchment 2L:

Runoff = 10.54 cfs @ 12.01 hrs, Volume= 0.568 af, Depth= 2.73"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-Year Rainfall=4.20"

Area (sf)	CN	Description
108,910	86	1/3 acre lots, 30% imp, HSG D

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.0	100	0.0400	0.2		**Sheet Flow, Lawn** Grass: Short n= 0.150 P2= 2.75"
0.9	250	0.0900	4.5		**Shallow Concentrated Flow, Lawn** Grassed Waterway Kv= 15.0 fps
0.5	280	0.0900	9.9	39.71	**Trap/Vee/Rect Channel Flow, Swale** Bot.W=1.00' D=1.00' Z= 3.0 '/' Top.W=7.00' n= 0.030 Earth, grassed & winding
9.4	630	Total			

Pond L: SMA L

Inflow Area =	2.500 ac,	Inflow Depth =	2.73"	for	10-Year event
Inflow =	10.54 cfs @	12.01 hrs,	Volume=	0.568 af	
Outflow =	4.94 cfs @	12.13 hrs,	Volume=	0.568 af,	Atten= 53%, Lag= 7.2 min
Primary =	4.94 cfs @	12.13 hrs,	Volume=	0.568 af	

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 466.21' @ 12.13 hrs Surf.Area= 3,626 sf Storage= 5,794 cf
Plug-Flow detention time= 23.0 min calculated for 0.568 af (100% of inflow)
Center-of-Mass det. time= 22.7 min (834.0 - 811.3)

Volume	Invert	Avail.Storage	Storage Description
#1	464.00'	14,132 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
464.00	1,676	0	0
466.00	3,387	5,063	5,063
468.00	5,682	9,069	14,132

Device	Routing	Invert	Outlet Devices
#1	Primary	464.00'	**12.0" x 40.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 463.00' S= 0.0250 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=4.94 cfs @ 12.13 hrs HW=466.21' (Free Discharge)
└**1=Culvert** (Inlet Controls 4.94 cfs @ 6.3 fps)

Reach RL:

Inflow Area =	2.500 ac,	Inflow Depth >	2.73"	for	10-Year event
Inflow =	4.94 cfs @	12.13 hrs,	Volume=	0.568 af	
Outflow =	4.91 cfs @	12.21 hrs,	Volume=	0.568 af,	Atten= 1%, Lag= 5.1 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.9 fps, Min. Travel Time= 3.0 min
Avg. Velocity = 0.7 fps, Avg. Travel Time= 8.8 min

Peak Depth= 0.12' @ 12.16 hrs
Capacity at bank full= 563.30 cfs
Inlet Invert= 467.00', Outlet Invert= 442.00'
20.00' x 2.00' deep channel, n= 0.050 Scattered brush, heavy weeds
Side Slope Z-value= 3.0 '/' Top Width= 32.00'
Length= 350.0' Slope= 0.0714 '/'

Reach RD:

Inflow Area = 11.159 ac, Inflow Depth > 2.67" for 10-Year event
Inflow = 16.90 cfs @ 12.29 hrs, Volume= 2.479 af
Outflow = 16.87 cfs @ 12.35 hrs, Volume= 2.479 af, Atten= 0%, Lag= 3.5 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.5 fps, Min. Travel Time= 1.9 min
Avg. Velocity = 1.7 fps, Avg. Travel Time= 4.9 min

Peak Depth= 1.14' @ 12.32 hrs
Capacity at bank full= 62.40 cfs
Inlet Invert= 442.00', Outlet Invert= 428.00'
1.00' x 2.00' deep channel, n= 0.040 Mountain streams
Side Slope Z-value= 2.0 '/' Top Width= 9.00'
Length= 500.0' Slope= 0.0280 '/'

Reach RC: Wetlands

Inflow Area = 27.653 ac, Inflow Depth > 2.39" for 10-Year event
Inflow = 47.68 cfs @ 12.09 hrs, Volume= 5.516 af
Outflow = 22.80 cfs @ 13.54 hrs, Volume= 5.437 af, Atten= 52%, Lag= 86.8 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.7 fps, Min. Travel Time= 52.6 min
Avg. Velocity = 0.3 fps, Avg. Travel Time= 133.0 min

Peak Depth= 0.26' @ 12.66 hrs
Capacity at bank full= 2,180.01 cfs
Inlet Invert= 428.00', Outlet Invert= 413.00'
120.00' x 4.00' deep channel, n= 0.070 Medium-dense brush, winter
Side Slope Z-value= 3.5 '/' Top Width= 148.00'
Length= 2,250.0' Slope= 0.0067 '/'

Reach RB: Sweet Milk Crk

Inflow Area = 44.033 ac, Inflow Depth > 2.08" for 10-Year event
Inflow = 25.63 cfs @ 13.49 hrs, Volume= 7.625 af
Outflow = 24.53 cfs @ 13.96 hrs, Volume= 7.581 af, Atten= 4%, Lag= 27.9 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.5 fps, Min. Travel Time= 15.9 min
Avg. Velocity = 1.1 fps, Avg. Travel Time= 35.4 min

Peak Depth= 1.17' @ 13.69 hrs
Capacity at bank full= 148.86 cfs
Inlet Invert= 413.00', Outlet Invert= 400.00'
6.00' x 3.00' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 2.0 '/' Top Width= 18.00'
Length= 2,390.0' Slope= 0.0054 '/'

Reach RA:

Inflow Area = 116.433 ac, Inflow Depth > 1.93" for 10-Year event
Inflow = 55.28 cfs @ 12.85 hrs, Volume= 18.773 af
Outflow = 55.27 cfs @ 12.89 hrs, Volume= 18.767 af, Atten= 0%, Lag= 2.4 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.4 fps, Min. Travel Time= 1.4 min
Avg. Velocity = 1.5 fps, Avg. Travel Time= 3.1 min

Peak Depth= 1.49' @ 12.87 hrs
Capacity at bank full= 206.61 cfs
Inlet Invert= 400.00', Outlet Invert= 398.00'
8.00' x 3.00' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 2.0 '/' Top Width= 20.00'
Length= 280.0' Slope= 0.0071 '/'

Subcatchment 10:

Runoff = 0.37 cfs @ 12.30 hrs, Volume= 0.070 af, Depth= 0.40"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-Year Rainfall=4.20"

Area (sf)	CN	Description
7,866	83	Paved roads w/open ditches, HSG A
14,623	30	Meadow, non-grazed, HSG A
40,426	30	Woods, Good, HSG A
16,133	78	Meadow, non-grazed, HSG D
13,212	77	Woods, Good, HSG D
92,260	50	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.2	12	0.0312	1.0		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.75"
22.4	80	0.0050	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.75"
3.1	130	0.0200	0.7		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.3	190	0.0071	10.4	437.56	**Channel Flow, Stream** Area= 42.0 sf Perim= 14.0' r= 3.00' n= 0.025 Earth, clean & winding
26.0	412	Total			

Pond 1P: McChesney Rd Ext Culvert

Inflow Area =	118.551 ac,	Inflow Depth >	1.91"	for	10-Year event	
Inflow =	55.44 cfs @	12.89 hrs,	Volume=		18.837 af	
Primary =	55.44 cfs @	12.89 hrs,	Volume=		18.837 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs

DEVELOPED DRAINAGE CONDITIONS
100-YEAR STORM EVENT

Subcatchment 1A:

Runoff = 16.36 cfs @ 12.01 hrs, Volume= 0.884 af, Depth= 3.85"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=5.85"

Area (sf)	CN	Description
6,038	39	>75% Grass cover, Good, HSG A
9,203	98	Paved roads w/curbs & sewers
27,161	92	Paved roads w/open ditches, HSG C
42,047	74	>75% Grass cover, Good, HSG C
16,133	80	>75% Grass cover, Good, HSG D
6,896	98	Paved roads w/curbs & sewers
10,062	93	Paved roads w/open ditches, HSG D
1,381	77	Woods, Good, HSG D
1,187	98	Roof
120,108	82	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.3	100	0.1300	0.2		**Sheet Flow, Slope Side** Grass: Dense n= 0.240 P2= 2.75"
0.8	70	0.0400	1.4		**Shallow Concentrated Flow, Slope Side** Short Grass Pasture Kv= 7.0 fps
0.9	270	0.0360	5.1	22.18	**Trap/Vee/Rect Channel Flow, Roadside** Bot.W=0.00' D=0.50' Z= 3.0 & 32.0 '/' Top.W=17.50' n= 0.022 Earth, clean & straight
0.4	105	0.0100	4.9	3.86	**Circular Channel (pipe), Storm Sewer** Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
9.4	545	Total			

Pond A: SMA A

Inflow Area =	2.757 ac,	Inflow Depth =	3.85"	for	100-Year event
Inflow =	16.36 cfs @	12.01 hrs,	Volume=	0.884 af	
Outflow =	6.29 cfs @	12.15 hrs,	Volume=	0.884 af,	Atten= 62%, Lag= 8.4 min
Primary =	6.29 cfs @	12.15 hrs,	Volume=	0.884 af	

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 409.27' @ 12.15 hrs Surf.Area= 4,497 sf Storage= 9,942 cf
Plug-Flow detention time= 22.8 min calculated for 0.884 af (100% of inflow)
Center-of-Mass det. time= 22.5 min (832.5 - 810.0)

Volume	Invert	Avail.Storage	Storage Description
#1	406.00'	13,483 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
406.00	1,703	0	0
408.00	3,295	4,998	4,998
410.00	5,190	8,485	13,483

Device	Routing	Invert	Outlet Devices
#1	Primary	406.00'	**12.0" x 44.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 405.00' S= 0.0227 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=6.29 cfs @ 12.15 hrs HW=409.27' (Free Discharge)
└**1=Culvert** (Inlet Controls 6.29 cfs @ 8.0 fps)

Subcatchment 11:

Runoff = 48.32 cfs @ 11.90 hrs, Volume= 1.814 af, Depth= 2.24"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=5.85"

Area (sf)	CN	Description
52,399	30	Meadow, non-grazed, HSG A
15,315	30	Brush, Good, HSG A
473	30	Woods, Good, HSG A
162,730	71	Meadow, non-grazed, HSG C
24,849	65	Brush, Good, HSG C
65,529	70	Woods, Good, HSG C
4,980	78	Meadow, non-grazed, HSG D
57,545	73	Brush, Good, HSG D
38,862	77	Woods, Good, HSG D
422,682	65	Weighted Average

Subcatchment 1B:

Runoff = 41.60 cfs @ 12.01 hrs, Volume= 2.215 af, Depth= 3.65"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=5.85"

Area (sf)	CN	Description
19,890	39	>75% Grass cover, Good, HSG A
3,267	98	Paved roads w/curbs & sewers
294,323	83	1/4 acre lots, 38% imp, HSG C
317,480	80	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.0	100	0.0400	0.2		**Sheet Flow, Lawn** Grass: Short n= 0.150 P2= 2.75"
0.1	25	0.0400	3.0		**Shallow Concentrated Flow, Lawn** Grassed Waterway Kv= 15.0 fps
0.7	370	0.0360	9.3	7.32	**Circular Channel (pipe), 12" Storm Sewer** Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
0.4	285	0.0350	10.7	13.09	**Circular Channel (pipe), 15" Storm Sewer** Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
9.2	780	Total			

Pond B: SMA B

Inflow Area =	7.288 ac,	Inflow Depth =	3.65"	for	100-Year event
Inflow =	41.60 cfs @	12.01 hrs,	Volume=	2.215 af	
Outflow =	7.82 cfs @	12.25 hrs,	Volume=	2.212 af,	Atten= 81%, Lag= 14.7 min
Primary =	7.82 cfs @	12.25 hrs,	Volume=	2.212 af	

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 410.77' @ 12.25 hrs Surf.Area= 11,542 sf Storage= 35,306 cf
Plug-Flow detention time= 50.4 min calculated for 2.211 af (100% of inflow)
Center-of-Mass det. time= 49.7 min (864.8 - 815.1)

Volume	Invert	Avail.Storage	Storage Description
#1	406.00'	51,010 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
406.00	3,756	0	0
408.00	6,639	10,395	10,395
410.00	9,962	16,601	26,996
412.00	14,052	24,014	51,010

Device	Routing	Invert	Outlet Devices
#1	Primary	406.00'	**12.0" x 40.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 405.00' S= 0.0250 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=7.82 cfs @ 12.25 hrs HW=410.77' (Free Discharge)
└**1=Culvert** (Inlet Controls 7.82 cfs @ 10.0 fps)

Subcatchment 1CD: Combined C&D

Runoff = 64.35 cfs @ 12.13 hrs, Volume= 4.820 af, Depth= 3.25"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=5.85"

Area (sf)	CN	Description
44,471	39	>75% Grass cover, Good, HSG A
30,049	98	Paved roads w/curbs & sewers
240,672	61	1/4 acre lots, 38% imp, HSG A
8,181	92	Paved roads w/open ditches, HSG C
142,014	83	1/4 acre lots, 38% imp, HSG C
309,560	87	1/4 acre lots, 38% imp, HSG D
774,947	76	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.0					**Direct Entry,**

Pond D: SMA D

Inflow Area =	17.790 ac,	Inflow Depth =	3.25"	for	100-Year event
Inflow =	64.35 cfs @	12.13 hrs,	Volume=	4.820 af	
Outflow =	51.30 cfs @	12.23 hrs,	Volume=	4.589 af,	Atten= 20%, Lag= 6.4 min
Primary =	51.30 cfs @	12.23 hrs,	Volume=	4.589 af	

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 434.98' @ 12.23 hrs Surf.Area= 13,512 sf Storage= 39,920 cf
Plug-Flow detention time= 55.5 min calculated for 4.587 af (95% of inflow)
Center-of-Mass det. time= 28.4 min (863.4 - 835.0)

Volume	Invert	Avail.Storage	Storage Description
#1	430.00'	40,193 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
430.00	3,370	0	0
432.00	6,488	9,858	9,858
434.00	11,379	17,867	27,725
435.00	13,556	12,468	40,193

Device	Routing	Invert	Outlet Devices
#1	Primary	432.00'	**42.0" x 160.0' long Culvert** CMP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 430.00' S= 0.0125 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=51.29 cfs @ 12.23 hrs HW=434.98' (Free Discharge)
└**1=Culvert** (Inlet Controls 51.29 cfs @ 5.9 fps)

Pond C: SMA C

Inflow Area =	17.790 ac,	Inflow Depth >	3.10"	for	100-Year event
Inflow =	51.30 cfs @	12.23 hrs,	Volume=	4.589 af	
Outflow =	27.38 cfs @	12.53 hrs,	Volume=	4.580 af,	Atten= 47%, Lag= 17.6 min
Primary =	27.38 cfs @	12.53 hrs,	Volume=	4.580 af	

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 430.28' @ 12.53 hrs Surf.Area= 15,477 sf Storage= 44,807 cf
Plug-Flow detention time= 26.3 min calculated for 4.579 af (100% of inflow)
Center-of-Mass det. time= 25.0 min (888.4 - 863.4)

Volume	Invert	Avail.Storage	Storage Description
#1	426.00'	75,835 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
426.00	5,616	0	0
428.00	10,182	15,798	15,798
430.00	14,672	24,854	40,652
432.00	20,511	35,183	75,835

Device	Routing	Invert	Outlet Devices
#1	Primary	426.00'	**24.0" x 90.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 425.00' S= 0.0111 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=27.38 cfs @ 12.53 hrs HW=430.28' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 27.38 cfs @ 8.7 fps)

Subcatchment 1F1:

Runoff = 10.73 cfs @ 12.01 hrs, Volume= 0.575 af, Depth= 3.85"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=5.85"

Area (sf)	CN	Description
9,133	98	Paved roads w/curbs & sewers
39,269	87	1/4 acre lots, 38% imp, HSG D
29,740	71	Meadow, non-grazed, HSG C
78,142	82	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.2	50	0.1000	0.3		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.75"
4.2	50	0.0500	0.2		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.75"
0.4	50	0.0250	2.4		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
1.4	160	0.0100	1.9	2.91	**Trap/Vee/Rect Channel Flow, Road Side** Bot.W=0.00' D=0.30' Z= 4.0 & 30.0 '/' Top.W=10.20' n= 0.022 Earth, clean & straight
9.2	310	Total			

Pond F1: SMA F1

Inflow Area =	1.794 ac,	Inflow Depth =	3.85"	for	100-Year event
Inflow =	10.73 cfs @	12.01 hrs,	Volume=	0.575 af	
Outflow =	4.21 cfs @	12.14 hrs,	Volume=	0.574 af,	Atten= 61%, Lag= 8.1 min
Primary =	4.21 cfs @	12.14 hrs,	Volume=	0.574 af	

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 441.74' @ 12.14 hrs Surf.Area= 5,817 sf Storage= 6,994 cf
Plug-Flow detention time= 32.3 min calculated for 0.574 af (100% of inflow)
Center-of-Mass det. time= 31.2 min (841.0 - 809.8)

Volume	Invert	Avail.Storage	Storage Description
#1	440.00'	8,583 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
440.00	2,227	0	0
442.00	6,356	8,583	8,583

Device	Routing	Invert	Outlet Devices
#1	Primary	440.00'	**12.0" x 80.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 434.00' S= 0.0750 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=4.21 cfs @ 12.14 hrs HW=441.74' (Free Discharge)
└**1=Culvert** (Inlet Controls 4.21 cfs @ 5.4 fps)

Subcatchment 1F2:

Runoff = 77.02 cfs @ 12.04 hrs, Volume= 4.601 af, Depth= 3.75"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=5.85"

Area (sf)	CN	Description
430,737	81	1/3 acre lots, 30% imp, HSG C
122,848	87	1/4 acre lots, 38% imp, HSG D
88,235	71	Meadow, non-grazed, HSG C
641,820	81	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.3	100	0.0500	0.2		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.75"
0.1	20	0.0500	3.4		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.4	290	0.0800	11.0	29.99	**Trap/Vee/Rect Channel Flow, Gutter** Bot.W=0.00' D=0.40' Z= 4.0 & 30.0 '/' Top.W=13.60' n= 0.013 Asphalt, smooth
1.9	550	0.0100	4.9	3.86	**Circular Channel (pipe), 12" Storm** Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
1.8	430	0.0050	4.0	4.95	**Circular Channel (pipe), 15" Storm** Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
1.0	360	0.0080	5.8	10.18	**Circular Channel (pipe), 18" Storm** Diam= 18.0" Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
12.5	1,750	Total			

Pond F2: SMA F2

Inflow Area =	14.734 ac,	Inflow Depth =	3.75"	for	100-Year event	
Inflow =	77.02 cfs @	12.04 hrs,	Volume=		4.601 af	
Outflow =	31.84 cfs @	12.21 hrs,	Volume=		4.598 af,	Atten= 59%, Lag= 9.9 min
Primary =	31.84 cfs @	12.21 hrs,	Volume=		4.598 af	

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 447.43' @ 12.21 hrs Surf.Area= 14,442 sf Storage= 49,814 cf
Plug-Flow detention time= 23.2 min calculated for 4.597 af (100% of inflow)
Center-of-Mass det. time= 22.9 min (838.4 - 815.5)

Volume	Invert	Avail.Storage	Storage Description
#1	442.00'	58,422 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
442.00	4,744	0	0
444.00	7,755	12,499	12,499
446.00	11,220	18,975	31,474
448.00	15,728	26,948	58,422

Device	Routing	Invert	Outlet Devices
#1	Primary	442.00'	**24.0" x 80.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 440.00' S= 0.0250 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=31.83 cfs @ 12.21 hrs HW=447.43' (Free Discharge)
└**1=Culvert** (Inlet Controls 31.83 cfs @ 10.1 fps)

Subcatchment 2H:

Runoff = 12.75 cfs @ 12.02 hrs, Volume= 0.743 af, Depth= 4.27"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=5.85"

Area (sf)	CN	Description
91,044	86	1/3 acre lots, 30% imp, HSG D

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	100	0.1000	0.2		**Sheet Flow, Meadow** Grass: Dense n= 0.240 P2= 2.75"
1.9	200	0.0600	1.7		**Shallow Concentrated Flow, Lawn** Short Grass Pasture Kv= 7.0 fps
0.8	390	0.0500	7.7	14.20	**Trap/Vee/Rect Channel Flow, Gutter** Bot.W=0.00' D=0.33' Z= 4.0 & 30.0 '/' Top.W=11.22' n= 0.013 Asphalt, smooth
0.3	80	0.0100	4.9	3.86	**Circular Channel (pipe), 12" Storm** Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
11.1	770	Total			

Pond H: SMA H

Inflow Area =	2.090 ac,	Inflow Depth =	4.27"	for	100-Year event
Inflow =	12.75 cfs @	12.02 hrs,	Volume=	0.743 af	
Outflow =	5.34 cfs @	12.17 hrs,	Volume=	0.742 af,	Atten= 58%, Lag= 8.9 min
Primary =	5.34 cfs @	12.17 hrs,	Volume=	0.742 af	

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 468.49' @ 12.17 hrs Surf.Area= 4,723 sf Storage= 8,328 cf
Plug-Flow detention time= 28.1 min calculated for 0.742 af (100% of inflow)
Center-of-Mass det. time= 27.4 min (827.6 - 800.2)

Volume	Invert	Avail.Storage	Storage Description
#1	466.00'	17,100 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
466.00	2,172	0	0
468.00	4,005	6,177	6,177
470.00	6,918	10,923	17,100

Device	Routing	Invert	Outlet Devices
#1	Primary	466.00'	**12.0" x 50.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 465.00' S= 0.0200 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=5.34 cfs @ 12.17 hrs HW=468.49' (Free Discharge)
└**1=Culvert** (Inlet Controls 5.34 cfs @ 6.8 fps)

Reach R14: Wetlands

Inflow Area = 2.090 ac, Inflow Depth > 4.26" for 100-Year event
Inflow = 5.34 cfs @ 12.17 hrs, Volume= 0.742 af
Outflow = 5.28 cfs @ 12.30 hrs, Volume= 0.742 af, Atten= 1%, Lag= 7.6 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.6 fps, Min. Travel Time= 4.2 min
Avg. Velocity = 0.5 fps, Avg. Travel Time= 14.6 min

Peak Depth= 0.15' @ 12.23 hrs
Capacity at bank full= 142.29 cfs
Inlet Invert= 465.00', Outlet Invert= 450.00'
20.00' x 1.00' deep channel, n= 0.050 Scattered brush, heavy weeds
Side Slope Z-value= 10.0 '/' Top Width= 40.00'
Length= 400.0' Slope= 0.0375 '/'

Pond 4P: Culvert 35+00

Inflow Area =	2.090 ac,	Inflow Depth >	4.26"	for	100-Year event
Inflow =	5.28 cfs @	12.30 hrs,	Volume=	0.742 af	
Outflow =	5.18 cfs @	12.38 hrs,	Volume=	0.742 af,	Atten= 2%, Lag= 4.8 min
Primary =	5.18 cfs @	12.38 hrs,	Volume=	0.742 af	

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 451.13' @ 12.38 hrs Surf.Area= 1,683 sf Storage= 983 cf
Plug-Flow detention time= 3.0 min calculated for 0.742 af (100% of inflow)
Center-of-Mass det. time= 3.0 min (843.2 - 840.2)

Volume	Invert	Avail.Storage	Storage Description
#1	450.00'	13,805 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
450.00	53	0	0
452.00	2,934	2,987	2,987
454.00	7,884	10,818	13,805

Device	Routing	Invert	Outlet Devices
#1	Primary	450.00'	**18.0" x 105.0' long Culvert** CMP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 446.00' S= 0.0381 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=5.18 cfs @ 12.38 hrs HW=451.13' (Free Discharge)
└**1=Culvert** (Inlet Controls 5.18 cfs @ 3.6 fps)

Reach R13: Wetlands

Inflow Area =	2.090 ac,	Inflow Depth >	4.26"	for	100-Year event
Inflow =	5.18 cfs @	12.38 hrs,	Volume=	0.742 af	
Outflow =	5.12 cfs @	12.51 hrs,	Volume=	0.742 af,	Atten= 1%, Lag= 8.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.2 fps, Min. Travel Time= 4.3 min
Avg. Velocity = 1.1 fps, Avg. Travel Time= 12.1 min

Peak Depth= 0.40' @ 12.44 hrs
Capacity at bank full= 194.42 cfs
Inlet Invert= 446.00', Outlet Invert= 426.00'
2.00' x 2.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 5.0 '/' Top Width= 22.00'
Length= 820.0' Slope= 0.0244 '/'

Subcatchment 12:

Runoff = 58.62 cfs @ 12.08 hrs, Volume= 3.886 af, Depth= 2.87"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=5.85"

Area (sf)	CN	Description
3,614	30	Meadow, non-grazed, HSG A
1,554	30	Brush, Good, HSG A
145,927	82	Farmsteads, HSG C
399,815	71	Meadow, non-grazed, HSG C
112,704	65	Brush, Good, HSG C
17,416	70	Woods, Good, HSG C
14,244	78	Meadow, non-grazed, HSG D
688	73	Brush, Good, HSG D
11,571	77	Woods, Good, HSG D
707,533	72	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	100	0.1100	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.75"
7.1	980	0.1080	2.3		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.0	300	0.0070	5.2	41.97	**Trap/Vee/Rect Channel Flow, Ditch** Bot.W=0.00' D=2.00' Z= 2.0 '/' Top.W=8.00' n= 0.022 Earth, clean & straight
15.9	1,380	Total			

Pond 3P: Culvert 25+00

Inflow Area =	34.861 ac,	Inflow Depth >	3.37"	for	100-Year event
Inflow =	94.31 cfs @	12.10 hrs,	Volume=	9.801 af	
Outflow =	27.77 cfs @	12.89 hrs,	Volume=	9.797 af,	Atten= 71%, Lag= 47.8 min
Primary =	27.77 cfs @	12.89 hrs,	Volume=	9.797 af	

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 430.61' @ 12.89 hrs Surf.Area= 67,831 sf Storage= 135,165 cf
Plug-Flow detention time= 49.6 min calculated for 9.797 af (100% of inflow)
Center-of-Mass det. time= 49.3 min (890.0 - 840.7)

Volume	Invert	Avail.Storage	Storage Description
#1	426.00'	248,754 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
426.00	1,826	0	0
428.00	20,000	21,826	21,826
430.00	55,711	75,711	97,537
432.00	95,506	151,217	248,754

Device	Routing	Invert	Outlet Devices
#1	Primary	426.00'	**24.0" x 100.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 425.50' S= 0.0050 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=27.77 cfs @ 12.89 hrs HW=430.61' (Free Discharge)
└─**1=Culvert** (Barrel Controls 27.77 cfs @ 8.8 fps)

Reach R12:

Inflow Area = 34.861 ac, Inflow Depth > 3.37" for 100-Year event
Inflow = 27.77 cfs @ 12.89 hrs, Volume= 9.797 af
Outflow = 27.77 cfs @ 12.93 hrs, Volume= 9.797 af, Atten= 0%, Lag= 2.1 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.2 fps, Min. Travel Time= 1.2 min
Avg. Velocity = 1.9 fps, Avg. Travel Time= 2.6 min

Peak Depth= 1.40' @ 12.91 hrs
Capacity at bank full= 60.94 cfs
Inlet Invert= 425.50', Outlet Invert= 424.00'
2.00' x 2.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 2.0 '/' Top Width= 10.00'
Length= 300.0' Slope= 0.0050 '/'

Reach R11:

Inflow Area = 52.651 ac, Inflow Depth > 3.28" for 100-Year event
Inflow = 54.30 cfs @ 12.61 hrs, Volume= 14.410 af
Outflow = 54.29 cfs @ 12.64 hrs, Volume= 14.409 af, Atten= 0%, Lag= 2.1 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 7.4 fps, Min. Travel Time= 1.2 min
Avg. Velocity = 3.2 fps, Avg. Travel Time= 2.8 min

Peak Depth= 1.47' @ 12.62 hrs
Capacity at bank full= 105.89 cfs
Inlet Invert= 424.00', Outlet Invert= 416.00'
2.00' x 2.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 2.0 '/' Top Width= 10.00'
Length= 530.0' Slope= 0.0151 '/'

Reach R10:

Inflow Area =	52.651 ac,	Inflow Depth >	3.28"	for	100-Year event
Inflow =	54.29 cfs @	12.64 hrs,	Volume=		14.409 af
Outflow =	54.23 cfs @	12.73 hrs,	Volume=		14.406 af, Atten= 0%, Lag= 5.3 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.7 fps, Min. Travel Time= 3.0 min
Avg. Velocity = 2.3 fps, Avg. Travel Time= 7.7 min

Peak Depth= 1.26' @ 12.68 hrs
Capacity at bank full= 132.75 cfs
Inlet Invert= 416.00', Outlet Invert= 404.50'
5.00' x 2.00' deep channel, n= 0.025 Earth, clean & winding
Side Slope Z-value= 2.0 '/' Top Width= 13.00'
Length= 1,050.0' Slope= 0.0110 '/'

Pond 2P: Highland Culvert

Inflow Area =	72.400 ac,	Inflow Depth >	3.20"	for	100-Year event
Inflow =	68.58 cfs @	12.64 hrs,	Volume=	19.315 af	
Outflow =	71.56 cfs @	12.65 hrs,	Volume=	19.315 af,	Atten= 0%, Lag= 0.9 min
Primary =	71.56 cfs @	12.65 hrs,	Volume=	19.315 af	

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 414.72' @ 12.65 hrs Surf.Area= 26,203 sf Storage= 38,889 cf
Plug-Flow detention time= 5.7 min calculated for 19.309 af (100% of inflow)
Center-of-Mass det. time= 5.7 min (894.1 - 888.4)

Volume	Invert	Avail.Storage	Storage Description
#1	404.30'	38,889 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
404.30	0	0	0
406.00	868	738	738
408.00	5,540	6,408	7,146
410.00	26,203	31,743	38,889

Device	Routing	Invert	Outlet Devices
#1	Primary	404.30'	**30.0" x 80.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 403.40' S= 0.0113 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=71.56 cfs @ 12.65 hrs HW=414.72' (Free Discharge)
└─**1=Culvert** (Inlet Controls 71.56 cfs @ 14.6 fps)

Subcatchment 20:

Runoff = 22.21 cfs @ 12.02 hrs, Volume= 1.185 af, Depth= 2.24"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=5.85"

Area (sf)	CN	Description
34,529	30	Meadow, non-grazed, HSG A
41,556	30	Woods, Good, HSG A
28,978	86	1/3 acre lots, 30% imp, HSG D
6,320	78	Meadow, non-grazed, HSG D
164,709	77	Woods, Good, HSG D
276,092	65	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	90	0.3000	0.2		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.75"
2.3	250	0.1300	1.8		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.5	340	Total			

Subcatchment 2E:

Runoff = 41.21 cfs @ 12.08 hrs, Volume= 2.721 af, Depth= 3.25"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=5.85"

Area (sf)	CN	Description
139,721	61	1/4 acre lots, 38% imp, HSG A
297,703	83	1/4 acre lots, 38% imp, HSG C
437,424	76	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	100	0.0200	0.2		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.75"
0.9	200	0.0300	3.5		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.5	230	0.0400	7.8	21.21	**Trap/Vee/Rect Channel Flow, Gutter** Bot.W=0.00' D=0.40' Z= 4.0 & 30.0 '/' Top.W=13.60' n= 0.013 Asphalt, smooth
2.1	590	0.0150	4.8	12.99	**Trap/Vee/Rect Channel Flow, Gutter** Bot.W=0.00' D=0.40' Z= 4.0 & 30.0 '/' Top.W=13.60' n= 0.013 Asphalt, smooth
1.0	420	0.0200	6.9	5.46	**Circular Channel (pipe), 12" Storm** Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
0.4	100	0.0050	4.0	4.95	**Circular Channel (pipe), 15" Storm** Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.3	80	0.0050	4.6	8.05	**Circular Channel (pipe), 18" Storm** Diam= 18.0" Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
15.8	1,720	Total			

Pond E: SMA E

Inflow Area =	10.042 ac,	Inflow Depth =	3.25"	for	100-Year event
Inflow =	41.21 cfs @	12.08 hrs,	Volume=	2.721 af	
Outflow =	13.43 cfs @	12.33 hrs,	Volume=	2.719 af,	Atten= 67%, Lag= 15.2 min
Primary =	13.43 cfs @	12.33 hrs,	Volume=	2.719 af	

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 429.80' @ 12.33 hrs Surf.Area= 9,512 sf Storage= 33,862 cf
Plug-Flow detention time= 28.8 min calculated for 2.718 af (100% of inflow)
Center-of-Mass det. time= 28.6 min (859.7 - 831.1)

Volume	Invert	Avail.Storage	Storage Description
#1	424.00'	35,767 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
424.00	3,019	0	0
426.00	4,667	7,686	7,686
428.00	6,803	11,470	19,156
430.00	9,808	16,611	35,767

Device	Routing	Invert	Outlet Devices
#1	Primary	424.00'	**15.0" x 210.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 418.00' S= 0.0286 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=13.43 cfs @ 12.33 hrs HW=429.80' (Free Discharge)
└─**1=Culvert** (Barrel Controls 13.43 cfs @ 10.9 fps)

Subcatchment 2G:

Runoff = 39.88 cfs @ 12.01 hrs, Volume= 2.236 af, Depth= 4.27"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=5.85"

Area (sf)	CN	Description
45,923	83	1/4 acre lots, 38% imp, HSG C
227,971	87	1/4 acre lots, 38% imp, HSG D
273,894	86	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	90	0.0900	0.2		**Sheet Flow, Lawn** Grass: Dense n= 0.240 P2= 2.75"
0.5	225	0.0350	7.9	65.15	**Trap/Vee/Rect Channel Flow, Swale** Bot.W=1.00' D=1.50' Z= 3.0 '/' Top.W=10.00' n= 0.030 Earth, grassed & winding
1.4	290	0.0050	3.5	2.73	**Circular Channel (pipe), 12" Storm** Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
0.2	210	0.1000	15.5	12.21	**Circular Channel (pipe), 12" Storm** Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
9.9	815	Total			

Pond G: SMA G

Inflow Area =	6.288 ac,	Inflow Depth =	4.27"	for	100-Year event
Inflow =	39.88 cfs @	12.01 hrs,	Volume=	2.236 af	
Outflow =	15.51 cfs @	12.16 hrs,	Volume=	2.233 af,	Atten= 61%, Lag= 8.6 min
Primary =	15.51 cfs @	12.16 hrs,	Volume=	2.233 af	

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 435.02' @ 12.16 hrs Surf.Area= 8,038 sf Storage= 25,624 cf
Plug-Flow detention time= 28.1 min calculated for 2.232 af (100% of inflow)
Center-of-Mass det. time= 27.4 min (826.5 - 799.1)

Volume	Invert	Avail.Storage	Storage Description
#1	430.00'	34,311 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
430.00	4,121	0	0
432.00	3,877	7,998	7,998
434.00	6,410	10,287	18,285
436.00	9,616	16,026	34,311

Device	Routing	Invert	Outlet Devices
#1	Primary	430.00'	**18.0" x 60.0' long Culvert** CMP, mitered to conform to fill, Ke= 0.700 Outlet Invert= 428.00' S= 0.0333 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=15.51 cfs @ 12.16 hrs HW=435.02' (Free Discharge)
└─**1=Culvert** (Inlet Controls 15.51 cfs @ 8.8 fps)

Subcatchment 21:

Runoff = 44.45 cfs @ 12.06 hrs, Volume= 2.765 af, Depth= 3.25"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=5.85"

Area (sf)	CN	Description
75,904	73	Brush, Good, HSG D
368,679	77	Woods, Good, HSG D
444,583	76	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	100	0.1200	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.75"
3.3	620	0.0161	3.2	9.47	**Trap/Vee/Rect Channel Flow,** Bot.W=1.00' D=1.00' Z= 2.0 '/' Top.W=5.00' n= 0.040
3.2	1,180	0.0280	6.2	62.40	**Trap/Vee/Rect Channel Flow,** Bot.W=1.00' D=2.00' Z= 2.0 '/' Top.W=9.00' n= 0.040 Mountain streams
14.0	1,900	Total			

Subcatchment 2I:

Runoff = 21.18 cfs @ 12.04 hrs, Volume= 1.294 af, Depth= 4.16"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=5.85"

Area (sf)	CN	Description
147,524	86	1/3 acre lots, 30% imp, HSG D
15,000	78	Meadow, non-grazed, HSG D
162,524	85	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	60	0.0500	0.2		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.75"
7.4	40	0.0200	0.1		**Sheet Flow, Lawn** Grass: Dense n= 0.240 P2= 2.75"
0.4	210	0.0200	8.1	67.16	**Trap/Vee/Rect Channel Flow, Swale** Bot.W=1.00' D=1.50' Z= 3.0 '/' Top.W=10.00' n= 0.022 Earth, clean & straight
12.7	310	Total			

Pond I: SMA I

Inflow Area =	3.731 ac,	Inflow Depth =	4.16"	for	100-Year event
Inflow =	21.18 cfs @	12.04 hrs,	Volume=	1.294 af	
Outflow =	5.65 cfs @	12.28 hrs,	Volume=	1.289 af,	Atten= 73%, Lag= 14.4 min
Primary =	5.65 cfs @	12.28 hrs,	Volume=	1.289 af	

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 468.73' @ 12.28 hrs Surf.Area= 9,931 sf Storage= 19,766 cf
Plug-Flow detention time= 55.0 min calculated for 1.289 af (100% of inflow)
Center-of-Mass det. time= 52.5 min (857.1 - 804.7)

Volume	Invert	Avail.Storage	Storage Description
#1	466.00'	34,336 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
466.00	5,026	0	0
468.00	8,128	13,154	13,154
470.00	13,054	21,182	34,336

Device	Routing	Invert	Outlet Devices
#1	Primary	466.00'	**12.0" x 50.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 464.00' S= 0.0400 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=5.65 cfs @ 12.28 hrs HW=468.73' (Free Discharge)
└─**1=Culvert** (Inlet Controls 5.65 cfs @ 7.2 fps)

Reach RF:

Inflow Area = 3.731 ac, Inflow Depth > 4.14" for 100-Year event
Inflow = 5.65 cfs @ 12.28 hrs, Volume= 1.289 af
Outflow = 5.65 cfs @ 12.33 hrs, Volume= 1.289 af, Atten= 0%, Lag= 3.2 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.2 fps, Min. Travel Time= 1.7 min
Avg. Velocity = 1.3 fps, Avg. Travel Time= 4.1 min

Peak Depth= 0.72' @ 12.31 hrs
Capacity at bank full= 58.06 cfs
Inlet Invert= 460.00', Outlet Invert= 452.00'
1.00' x 2.00' deep channel, n= 0.040 Mountain streams
Side Slope Z-value= 2.0 '/' Top Width= 9.00'
Length= 330.0' Slope= 0.0242 '/'

Subcatchment 2J:

Runoff = 16.86 cfs @ 12.05 hrs, Volume= 1.051 af, Depth= 4.16"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=5.85"

Area (sf)	CN	Description
119,268	86	1/3 acre lots, 30% imp, HSG D
12,700	78	Meadow, non-grazed, HSG D
131,968	85	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.6	100	0.0650	0.2		**Sheet Flow, Meadow** Grass: Dense n= 0.240 P2= 2.75"
2.2	190	0.0420	1.4		**Shallow Concentrated Flow, Meadow** Short Grass Pasture Kv= 7.0 fps
1.5	310	0.0050	3.5	2.73	**Circular Channel (pipe), 12" Storm** Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
13.3	600	Total			

Subcatchment 2K:

Runoff = 12.50 cfs @ 12.00 hrs, Volume= 0.675 af, Depth= 4.27"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=5.85"

Area (sf)	CN	Description
82,682	86	1/3 acre lots, 30% imp, HSG D

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.5	40	0.3500	0.2		**Sheet Flow, Woods** Woods: Light underbrush n= 0.400 P2= 2.75"
4.2	60	0.1800	0.2		**Sheet Flow, Lawn** Grass: Dense n= 0.240 P2= 2.75"
1.1	290	0.0900	4.5		**Shallow Concentrated Flow, Lawn** Grassed Waterway Kv= 15.0 fps
8.8	390	Total			

Pond K: SMA K

Inflow Area =	1.898 ac,	Inflow Depth =	4.27"	for	100-Year event
Inflow =	12.50 cfs @	12.00 hrs,	Volume=	0.675 af	
Outflow =	6.06 cfs @	12.11 hrs,	Volume=	0.675 af,	Atten= 52%, Lag= 6.7 min
Primary =	6.06 cfs @	12.11 hrs,	Volume=	0.675 af	

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 499.07' @ 12.11 hrs Surf.Area= 3,823 sf Storage= 5,587 cf
Plug-Flow detention time= 10.4 min calculated for 0.675 af (100% of inflow)
Center-of-Mass det. time= 10.5 min (808.6 - 798.1)

Volume	Invert	Avail.Storage	Storage Description
#1	496.00'	9,905 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
496.00	558	0	0
498.00	1,945	2,503	2,503
500.00	5,457	7,402	9,905

Device	Routing	Invert	Outlet Devices
#1	Primary	496.00'	**12.0" x 45.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 494.00' S= 0.0444 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=6.06 cfs @ 12.11 hrs HW=499.07' (Free Discharge)
└─**1=Culvert** (Inlet Controls 6.06 cfs @ 7.7 fps)

Reach RK:

Inflow Area = 1.898 ac, Inflow Depth = 4.27" for 100-Year event
Inflow = 6.06 cfs @ 12.11 hrs, Volume= 0.675 af
Outflow = 5.92 cfs @ 12.28 hrs, Volume= 0.675 af, Atten= 2%, Lag= 10.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.9 fps, Min. Travel Time= 5.6 min
Avg. Velocity = 0.2 fps, Avg. Travel Time= 20.9 min

Peak Depth= 0.31' @ 12.18 hrs
Capacity at bank full= 155.28 cfs
Inlet Invert= 491.50', Outlet Invert= 490.00'
20.00' x 2.00' deep channel, n= 0.050 Scattered brush, heavy weeds
Side Slope Z-value= 4.0 '/' Top Width= 36.00'
Length= 305.0' Slope= 0.0049 '/'

Pond J: SMA J

Inflow Area =	4.928 ac,	Inflow Depth =	4.20"	for	100-Year event
Inflow =	20.77 cfs @	12.06 hrs,	Volume=	1.725 af	
Outflow =	9.79 cfs @	12.33 hrs,	Volume=	1.725 af,	Atten= 53%, Lag= 16.1 min
Primary =	9.79 cfs @	12.33 hrs,	Volume=	1.725 af	

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 485.37' @ 12.33 hrs Surf.Area= 7,482 sf Storage= 14,697 cf
Plug-Flow detention time= 21.7 min calculated for 1.724 af (100% of inflow)
Center-of-Mass det. time= 21.4 min (834.8 - 813.5)

Volume	Invert	Avail.Storage	Storage Description
#1	482.00'	19,849 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
482.00	2,162	0	0
484.00	4,394	6,556	6,556
486.00	8,899	13,293	19,849

Device	Routing	Invert	Outlet Devices
#1	Primary	482.00'	**15.0" x 200.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 460.00' S= 0.1100 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=9.79 cfs @ 12.33 hrs HW=485.37' (Free Discharge)
└**1=Culvert** (Inlet Controls 9.79 cfs @ 8.0 fps)

Reach RJ:

Inflow Area =	4.928 ac,	Inflow Depth >	4.20"	for	100-Year event
Inflow =	9.79 cfs @	12.33 hrs,	Volume=	1.725 af	
Outflow =	9.79 cfs @	12.34 hrs,	Volume=	1.724 af,	Atten= 0%, Lag= 1.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.0 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 1.7 fps, Avg. Travel Time= 1.3 min

Peak Depth= 0.49' @ 12.34 hrs
Capacity at bank full= 412.05 cfs
Inlet Invert= 460.00', Outlet Invert= 452.00'
0.00' x 2.00' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 10.0 '/' Top Width= 40.00'
Length= 135.0' Slope= 0.0593 '/'

Reach RE:

Inflow Area = 8.659 ac, Inflow Depth > 4.18" for 100-Year event
Inflow = 15.44 cfs @ 12.34 hrs, Volume= 3.013 af
Outflow = 15.43 cfs @ 12.38 hrs, Volume= 3.013 af, Atten= 0%, Lag= 2.3 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.6 fps, Min. Travel Time= 1.3 min
Avg. Velocity = 1.9 fps, Avg. Travel Time= 3.1 min

Peak Depth= 1.07' @ 12.36 hrs
Capacity at bank full= 66.11 cfs
Inlet Invert= 452.00', Outlet Invert= 441.00'
1.00' x 2.00' deep channel, n= 0.040 Mountain streams
Side Slope Z-value= 2.0 '/' Top Width= 9.00'
Length= 350.0' Slope= 0.0314 '/'

Subcatchment 2L:

Runoff = 16.13 cfs @ 12.01 hrs, Volume= 0.889 af, Depth= 4.27"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=5.85"

Area (sf)	CN	Description
108,910	86	1/3 acre lots, 30% imp, HSG D

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.0	100	0.0400	0.2		**Sheet Flow, Lawn** Grass: Short n= 0.150 P2= 2.75"
0.9	250	0.0900	4.5		**Shallow Concentrated Flow, Lawn** Grassed Waterway Kv= 15.0 fps
0.5	280	0.0900	9.9	39.71	**Trap/Vee/Rect Channel Flow, Swale** Bot.W=1.00' D=1.00' Z= 3.0 '/' Top.W=7.00' n= 0.030 Earth, grassed & winding
9.4	630	Total			

Pond L: SMA L

Inflow Area =	2.500 ac,	Inflow Depth =	4.27"	for	100-Year event
Inflow =	16.13 cfs @	12.01 hrs,	Volume=	0.889 af	
Outflow =	6.21 cfs @	12.15 hrs,	Volume=	0.889 af,	Atten= 61%, Lag= 8.4 min
Primary =	6.21 cfs @	12.15 hrs,	Volume=	0.889 af	

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 467.20' @ 12.15 hrs Surf.Area= 4,762 sf Storage= 9,945 cf
Plug-Flow detention time= 22.9 min calculated for 0.888 af (100% of inflow)
Center-of-Mass det. time= 22.7 min (821.3 - 798.6)

Volume	Invert	Avail.Storage	Storage Description
#1	464.00'	14,132 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
464.00	1,676	0	0
466.00	3,387	5,063	5,063
468.00	5,682	9,069	14,132

Device	Routing	Invert	Outlet Devices
#1	Primary	464.00'	**12.0" x 40.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 463.00' S= 0.0250 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=6.21 cfs @ 12.15 hrs HW=467.20' (Free Discharge)
└**1=Culvert** (Inlet Controls 6.21 cfs @ 7.9 fps)

Reach RL:

Inflow Area = 2.500 ac, Inflow Depth > 4.27" for 100-Year event
Inflow = 6.21 cfs @ 12.15 hrs, Volume= 0.889 af
Outflow = 6.19 cfs @ 12.23 hrs, Volume= 0.889 af, Atten= 0%, Lag= 4.8 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.1 fps, Min. Travel Time= 2.7 min
Avg. Velocity = 0.7 fps, Avg. Travel Time= 8.3 min

Peak Depth= 0.14' @ 12.18 hrs
Capacity at bank full= 563.30 cfs
Inlet Invert= 467.00', Outlet Invert= 442.00'
20.00' x 2.00' deep channel, n= 0.050 Scattered brush, heavy weeds
Side Slope Z-value= 3.0 '/' Top Width= 32.00'
Length= 350.0' Slope= 0.0714 '/'

Reach RD:

Inflow Area = 11.159 ac, Inflow Depth > 4.20" for 100-Year event
Inflow = 21.41 cfs @ 12.31 hrs, Volume= 3.901 af
Outflow = 21.39 cfs @ 12.37 hrs, Volume= 3.901 af, Atten= 0%, Lag= 3.3 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.8 fps, Min. Travel Time= 1.7 min
Avg. Velocity = 1.9 fps, Avg. Travel Time= 4.4 min

Peak Depth= 1.27' @ 12.34 hrs
Capacity at bank full= 62.40 cfs
Inlet Invert= 442.00', Outlet Invert= 428.00'
1.00' x 2.00' deep channel, n= 0.040 Mountain streams
Side Slope Z-value= 2.0 '/' Top Width= 9.00'
Length= 500.0' Slope= 0.0280 '/'

Reach RC: Wetlands

Inflow Area = 27.653 ac, Inflow Depth > 3.86" for 100-Year event
Inflow = 73.10 cfs @ 12.08 hrs, Volume= 8.899 af
Outflow = 37.95 cfs @ 13.31 hrs, Volume= 8.811 af, Atten= 48%, Lag= 73.6 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.9 fps, Min. Travel Time= 43.1 min
Avg. Velocity = 0.3 fps, Avg. Travel Time= 119.4 min

Peak Depth= 0.36' @ 12.59 hrs
Capacity at bank full= 2,180.01 cfs
Inlet Invert= 428.00', Outlet Invert= 413.00'
120.00' x 4.00' deep channel, n= 0.070 Medium-dense brush, winter
Side Slope Z-value= 3.5 '/' Top Width= 148.00'
Length= 2,250.0' Slope= 0.0067 '/'

Reach RB: Sweet Milk Crk

Inflow Area = 44.033 ac, Inflow Depth > 3.47" for 100-Year event
Inflow = 48.33 cfs @ 13.21 hrs, Volume= 12.715 af
Outflow = 46.73 cfs @ 13.63 hrs, Volume= 12.670 af, Atten= 3%, Lag= 24.9 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.0 fps, Min. Travel Time= 13.2 min
Avg. Velocity = 1.3 fps, Avg. Travel Time= 31.7 min

Peak Depth= 1.66' @ 13.41 hrs
Capacity at bank full= 148.86 cfs
Inlet Invert= 413.00', Outlet Invert= 400.00'
6.00' x 3.00' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 2.0 '/' Top Width= 18.00'
Length= 2,390.0' Slope= 0.0054 '/'

Reach RA:

Inflow Area = 116.433 ac, Inflow Depth > 3.30" for 100-Year event
Inflow = 99.08 cfs @ 13.39 hrs, Volume= 31.985 af
Outflow = 96.36 cfs @ 13.63 hrs, Volume= 31.979 af, Atten= 3%, Lag= 14.5 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.0 fps, Min. Travel Time= 1.2 min
Avg. Velocity = 1.7 fps, Avg. Travel Time= 2.7 min

Peak Depth= 2.01' @ 13.61 hrs
Capacity at bank full= 206.61 cfs
Inlet Invert= 400.00', Outlet Invert= 398.00'
8.00' x 3.00' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 2.0 '/' Top Width= 20.00'
Length= 280.0' Slope= 0.0071 '/'

Subcatchment 10:

Runoff = 1.63 cfs @ 12.25 hrs, Volume= 0.189 af, Depth= 1.07"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=5.85"

Area (sf)	CN	Description
7,866	83	Paved roads w/open ditches, HSG A
14,623	30	Meadow, non-grazed, HSG A
40,426	30	Woods, Good, HSG A
16,133	78	Meadow, non-grazed, HSG D
13,212	77	Woods, Good, HSG D
92,260	50	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.2	12	0.0312	1.0		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.75"
22.4	80	0.0050	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.75"
3.1	130	0.0200	0.7		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.3	190	0.0071	10.4	437.56	**Channel Flow, Stream** Area= 42.0 sf Perim= 14.0' r= 3.00' n= 0.025 Earth, clean & winding
26.0	412	Total			

Pond 1P: McChesney Rd Ext Culvert

Inflow Area =	118.551 ac,	Inflow Depth >	3.26"	for	100-Year event
Inflow =	96.61 cfs @	13.63 hrs,	Volume=		32.168 af
Primary =	96.61 cfs @	13.63 hrs,	Volume=		32.168 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs

5. DRAINAGE MAPS

D-1 EXISTING DRAINAGE CONDITIONS

D-2 DEVELOPED DRAINAGE CONDITIONS

D-3 thru D-7 PROPOSED GRADING & DRAINAGE