STORMWATER MANAGEMENT REPORT ADDENDUM

5 ORCHARD LANE

TOPSFIELD, MASSACHUSETTS

March 30, 2018

Revised: April 18, 2018

SUBMITTED TO:

TOWN OF TOPSFIELD
TOPSFIELD PLANNING BOARD
461 BOSTON STREET, UNIT E-6
TOPSFIELD, MA 01983

APPLICANT:

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PREPARED BY:

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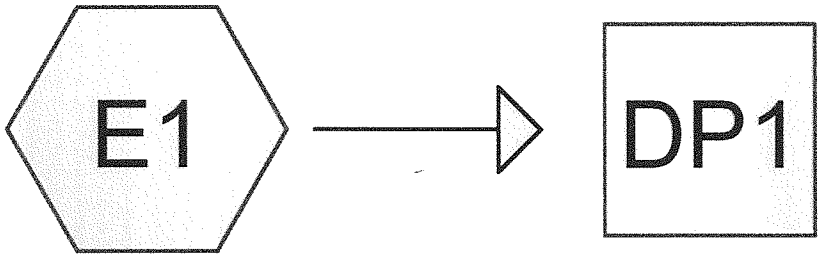
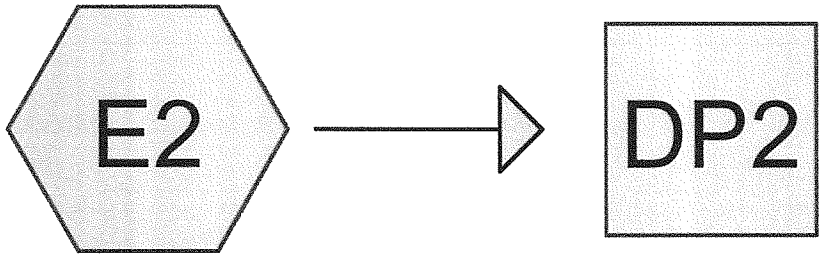
Comparison of Existing and Proposed Rates of Runoff

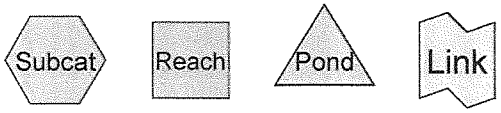
Event (Frequency in Years)	Existing Conditions (Peak CFS)	Proposed Conditions (Peak CFS)	Change in Peak (CFS)
DP1			
2	0.25	0.25	0.00
10	0.60	0.56	-0.04
100	1.18	1.14	-0.04
DP2			
2	0.45	0.34	-0.11
10	1.08	0.92	-0.16
100	2.12	1.65	-0.47



Drainage to Orchard Street



Drainage to Abutter



Routing Diagram for 3514_Existing Conditions Hydrologic Analysis
Prepared by The Morin-Cameron Group, Inc., Printed 4/18/2018

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
40,000	70	Woods, Good, HSG C (E1, E2)

Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment E1: Drainage to Orchard Runoff Area=14,106 sf 0.00% Impervious Runoff Depth=0.77"
Flow Length=265' Tc=6.8 min CN=70 Runoff=0.25 cfs 906 cf

Subcatchment E2: Drainage to Abutter Runoff Area=25,894 sf 0.00% Impervious Runoff Depth=0.77"
Flow Length=415' Tc=7.4 min CN=70 Runoff=0.45 cfs 1,663 cf

Reach DP1: Inflow=0.25 cfs 906 cf
Outflow=0.25 cfs 906 cf

Reach DP2: Inflow=0.45 cfs 1,663 cf
Outflow=0.45 cfs 1,663 cf

Summary for Subcatchment E1: Drainage to Orchard Street

Runoff = 0.25 cfs @ 12.11 hrs, Volume= 906 cf, Depth= 0.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.10"

Area (sf)	CN	Description
14,106	70	Woods, Good, HSG C
14,106		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	50	0.1200	0.14		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
0.4	120	0.1250	5.69		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.3	95	0.0737	5.51		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
6.8	265	Total			

Summary for Subcatchment E2: Drainage to Abutter

Runoff = 0.45 cfs @ 12.12 hrs, Volume= 1,663 cf, Depth= 0.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.10"

Area (sf)	CN	Description
25,894	70	Woods, Good, HSG C
25,894		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.8	50	0.1400	0.14		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
1.6	365	0.0575	3.86		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
7.4	415	Total			

Summary for Reach DP1:

Inflow Area = 14,106 sf, 0.00% Impervious, Inflow Depth = 0.77" for 2-Year event
Inflow = 0.25 cfs @ 12.11 hrs, Volume= 906 cf
Outflow = 0.25 cfs @ 12.11 hrs, Volume= 906 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Summary for Reach DP2:

Inflow Area = 25,894 sf, 0.00% Impervious, Inflow Depth = 0.77" for 2-Year event
Inflow = 0.45 cfs @ 12.12 hrs, Volume= 1,663 cf
Outflow = 0.45 cfs @ 12.12 hrs, Volume= 1,663 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment E1: Drainage to Orchard Runoff Area=14,106 sf 0.00% Impervious Runoff Depth=1.67"
Flow Length=265' Tc=6.8 min CN=70 Runoff=0.60 cfs 1,967 cf

Subcatchment E2: Drainage to Abutter Runoff Area=25,894 sf 0.00% Impervious Runoff Depth=1.67"
Flow Length=415' Tc=7.4 min CN=70 Runoff=1.08 cfs 3,612 cf

Reach DP1: Inflow=0.60 cfs 1,967 cf
Outflow=0.60 cfs 1,967 cf

Reach DP2: Inflow=1.08 cfs 3,612 cf
Outflow=1.08 cfs 3,612 cf

Summary for Subcatchment E1: Drainage to Orchard Street

Runoff = 0.60 cfs @ 12.10 hrs, Volume= 1,967 cf, Depth= 1.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
14,106	70	Woods, Good, HSG C
14,106		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	50	0.1200	0.14		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
0.4	120	0.1250	5.69		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.3	95	0.0737	5.51		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
6.8	265	Total			

Summary for Subcatchment E2: Drainage to Abutter

Runoff = 1.08 cfs @ 12.11 hrs, Volume= 3,612 cf, Depth= 1.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
25,894	70	Woods, Good, HSG C
25,894		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.8	50	0.1400	0.14		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
1.6	365	0.0575	3.86		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
7.4	415	Total			

Summary for Reach DP1:

Inflow Area = 14,106 sf, 0.00% Impervious, Inflow Depth = 1.67" for 10-Year event
Inflow = 0.60 cfs @ 12.10 hrs, Volume= 1,967 cf
Outflow = 0.60 cfs @ 12.10 hrs, Volume= 1,967 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Summary for Reach DP2:

Inflow Area = 25,894 sf, 0.00% Impervious, Inflow Depth = 1.67" for 10-Year event
Inflow = 1.08 cfs @ 12.11 hrs, Volume= 3,612 cf
Outflow = 1.08 cfs @ 12.11 hrs, Volume= 3,612 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment E1: Drainage to Orchard Runoff Area=14,106 sf 0.00% Impervious Runoff Depth=3.21"
Flow Length=265' Tc=6.8 min CN=70 Runoff=1.18 cfs 3,770 cf

Subcatchment E2: Drainage to Abutter Runoff Area=25,894 sf 0.00% Impervious Runoff Depth=3.21"
Flow Length=415' Tc=7.4 min CN=70 Runoff=2.12 cfs 6,920 cf

Reach DP1: Inflow=1.18 cfs 3,770 cf
Outflow=1.18 cfs 3,770 cf

Reach DP2: Inflow=2.12 cfs 6,920 cf
Outflow=2.12 cfs 6,920 cf

Summary for Subcatchment E1: Drainage to Orchard Street

Runoff = 1.18 cfs @ 12.10 hrs, Volume= 3,770 cf, Depth= 3.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
14,106	70	Woods, Good, HSG C
14,106		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	50	0.1200	0.14		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
0.4	120	0.1250	5.69		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.3	95	0.0737	5.51		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
6.8	265	Total			

Summary for Subcatchment E2: Drainage to Abutter

Runoff = 2.12 cfs @ 12.11 hrs, Volume= 6,920 cf, Depth= 3.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
25,894	70	Woods, Good, HSG C
25,894		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.8	50	0.1400	0.14		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
1.6	365	0.0575	3.86		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
7.4	415	Total			

Summary for Reach DP1:

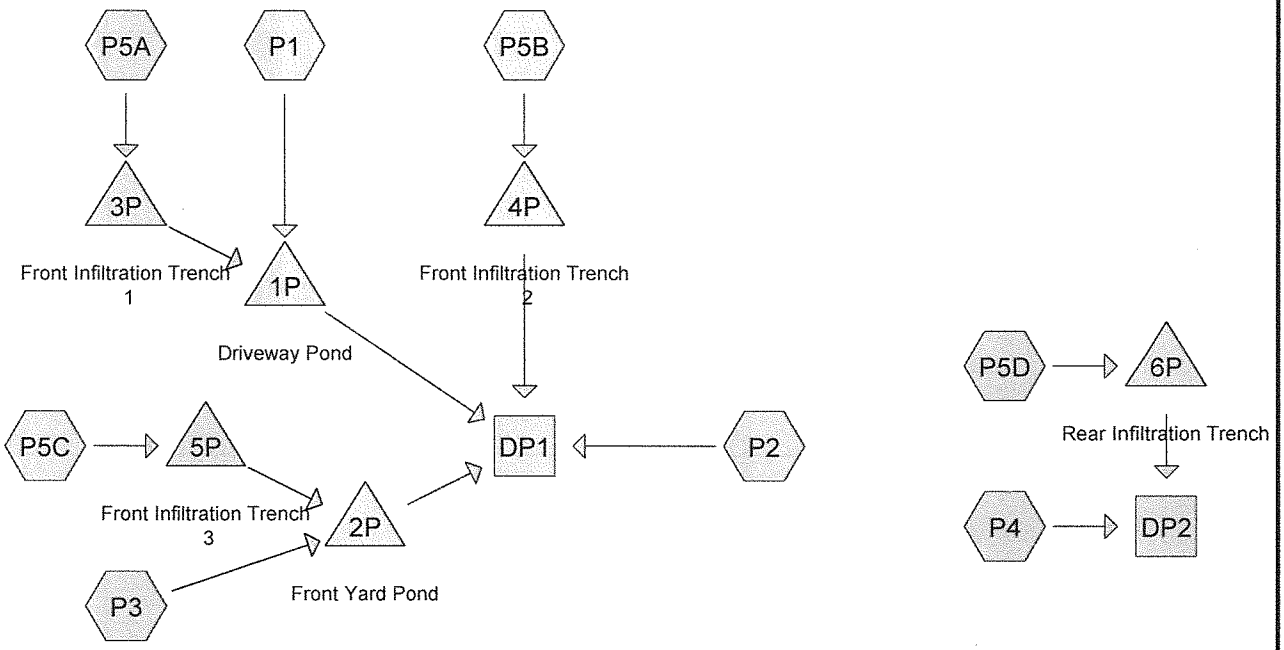
Inflow Area = 14,106 sf, 0.00% Impervious, Inflow Depth = 3.21" for 100-Year event
Inflow = 1.18 cfs @ 12.10 hrs, Volume= 3,770 cf
Outflow = 1.18 cfs @ 12.10 hrs, Volume= 3,770 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Summary for Reach DP2:

Inflow Area = 25,894 sf, 0.00% Impervious, Inflow Depth = 3.21" for 100-Year event
Inflow = 2.12 cfs @ 12.11 hrs, Volume= 6,920 cf
Outflow = 2.12 cfs @ 12.11 hrs, Volume= 6,920 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs



Subcat Reach Pond Link

Routing Diagram for 3514_Proposed Conditions Hydrologic Analysis
Prepared by The Morin-Cameron Group, Inc., Printed 4/18/2018

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
25,844	74	>75% Grass cover, Good, HSG C (P1, P2, P3, P4, P5A, P5B, P5C, P5D)
2,119	98	Paved parking, HSG C (P1, P2)
2,632	98	Roofs, HSG C (P5A, P5B, P5C, P5D)
319	98	Unconnected pavement, HSG C (P1, P2, P3)
9,086	70	Woods, Good, HSG C (P1, P4)

Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment P1: Runoff Area=13,573 sf 14.59% Impervious Runoff Depth=1.08"
Tc=6.0 min CN=76 Runoff=0.38 cfs 1,225 cf

Subcatchment P2: Runoff Area=4,668 sf 9.60% Impervious Runoff Depth=1.08"
Tc=6.0 min CN=76 Runoff=0.13 cfs 421 cf

Subcatchment P3: Runoff Area=3,065 sf 0.33% Impervious Runoff Depth=0.97"
Flow Length=165' Tc=6.2 min CN=74 Runoff=0.07 cfs 248 cf

Subcatchment P4: Runoff Area=15,634 sf 0.00% Impervious Runoff Depth=0.92"
Flow Length=230' Tc=7.3 min CN=73 Runoff=0.34 cfs 1,198 cf

Subcatchment P5A: Runoff Area=481 sf 85.65% Impervious Runoff Depth=2.55"
Tc=6.0 min CN=95 Runoff=0.03 cfs 102 cf

Subcatchment P5B: Runoff Area=312 sf 89.10% Impervious Runoff Depth=2.55"
Tc=6.0 min CN=95 Runoff=0.02 cfs 66 cf

Subcatchment P5C: Runoff Area=520 sf 85.00% Impervious Runoff Depth=2.45"
Tc=6.0 min CN=94 Runoff=0.03 cfs 106 cf

Subcatchment P5D: Runoff Area=1,747 sf 85.86% Impervious Runoff Depth=2.55"
Tc=6.0 min CN=95 Runoff=0.11 cfs 371 cf

Reach DP1: Inflow=0.25 cfs 1,923 cf
Outflow=0.25 cfs 1,923 cf

Reach DP2: Inflow=0.34 cfs 1,214 cf
Outflow=0.34 cfs 1,214 cf

Pond 1P: Driveway Pond Peak Elev=97.87' Storage=355 cf Inflow=0.38 cfs 1,226 cf
Outflow=0.09 cfs 1,225 cf

Pond 2P: Front Yard Pond Peak Elev=88.25' Storage=20 cf Inflow=0.08 cfs 267 cf
Outflow=0.06 cfs 267 cf

Pond 3P: Front Infiltration Trench 1 Peak Elev=103.50' Storage=45 cf Inflow=0.03 cfs 102 cf
Discarded=0.00 cfs 101 cf Primary=0.00 cfs 1 cf Outflow=0.00 cfs 102 cf

Pond 4P: Front Infiltration Trench 2 Peak Elev=103.51' Storage=23 cf Inflow=0.02 cfs 66 cf
Discarded=0.00 cfs 57 cf Primary=0.01 cfs 9 cf Outflow=0.01 cfs 66 cf

Pond 5P: Front Infiltration Trench 3 Peak Elev=103.51' Storage=43 cf Inflow=0.03 cfs 106 cf
Discarded=0.00 cfs 86 cf Primary=0.02 cfs 19 cf Outflow=0.02 cfs 105 cf

Pond 6P: Rear Infiltration Trench Peak Elev=103.50' Storage=176 cf Inflow=0.11 cfs 371 cf
Discarded=0.01 cfs 355 cf Primary=0.03 cfs 16 cf Outflow=0.04 cfs 371 cf

Summary for Subcatchment P1:

Runoff = 0.38 cfs @ 12.09 hrs, Volume= 1,225 cf, Depth= 1.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.10"

Area (sf)	CN	Description
5,900	74	>75% Grass cover, Good, HSG C
167	98	Unconnected pavement, HSG C
1,813	98	Paved parking, HSG C
5,693	70	Woods, Good, HSG C
13,573	76	Weighted Average
11,593		85.41% Pervious Area
1,980		14.59% Impervious Area
167		8.43% Unconnected

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

Summary for Subcatchment P2:

Runoff = 0.13 cfs @ 12.09 hrs, Volume= 421 cf, Depth= 1.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.10"

Area (sf)	CN	Description
4,220	74	>75% Grass cover, Good, HSG C
142	98	Unconnected pavement, HSG C
306	98	Paved parking, HSG C
4,668	76	Weighted Average
4,220		90.40% Pervious Area
448		9.60% Impervious Area
142		31.70% Unconnected

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

Summary for Subcatchment P3:

Runoff = 0.07 cfs @ 12.10 hrs, Volume= 248 cf, Depth= 0.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.10"

Area (sf)	CN	Description
3,055	74	>75% Grass cover, Good, HSG C
10	98	Unconnected pavement, HSG C
3,065	74	Weighted Average
3,055		99.67% Pervious Area
10		0.33% Impervious Area
10		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.8	50	0.1400	0.14		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
0.3	85	0.1200	5.58		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.1	30	0.0500	4.54		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
6.2	165	Total			

Summary for Subcatchment P4:

Runoff = 0.34 cfs @ 12.11 hrs, Volume= 1,198 cf, Depth= 0.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.10"

Area (sf)	CN	Description
12,241	74	>75% Grass cover, Good, HSG C
3,393	70	Woods, Good, HSG C
15,634	73	Weighted Average
15,634		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.6	50	0.1000	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
0.7	180	0.0780	4.50		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
7.3	230	Total			

Summary for Subcatchment P5A:

Runoff = 0.03 cfs @ 12.08 hrs, Volume= 102 cf, Depth= 2.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.10"

Area (sf)	CN	Description
412	98	Roofs, HSG C
69	74	>75% Grass cover, Good, HSG C
481	95	Weighted Average
69		14.35% Pervious Area
412		85.65% Impervious Area

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

Summary for Subcatchment P5B:

Runoff = 0.02 cfs @ 12.08 hrs, Volume= 66 cf, Depth= 2.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.10"

Area (sf)	CN	Description
278	98	Roofs, HSG C
34	74	>75% Grass cover, Good, HSG C
312	95	Weighted Average
34		10.90% Pervious Area
278		89.10% Impervious Area

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

Summary for Subcatchment P5C:

Runoff = 0.03 cfs @ 12.08 hrs, Volume= 106 cf, Depth= 2.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.10"

Area (sf)	CN	Description
442	98	Roofs, HSG C
78	74	>75% Grass cover, Good, HSG C
520	94	Weighted Average
78		15.00% Pervious Area
442		85.00% Impervious Area

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

Summary for Subcatchment P5D:

Runoff = 0.11 cfs @ 12.08 hrs, Volume= 371 cf, Depth= 2.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.10"

Area (sf)	CN	Description
1,500	98	Roofs, HSG C
247	74	>75% Grass cover, Good, HSG C
1,747	95	Weighted Average
247		14.14% Pervious Area
1,500		85.86% Impervious Area

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

Summary for Reach DP1:

Inflow Area = 22,619 sf, 15.78% Impervious, Inflow Depth = 1.02" for 2-Year event
Inflow = 0.25 cfs @ 12.11 hrs, Volume= 1,923 cf
Outflow = 0.25 cfs @ 12.11 hrs, Volume= 1,923 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Summary for Reach DP2:

Inflow Area = 17,381 sf, 8.63% Impervious, Inflow Depth = 0.84" for 2-Year event
Inflow = 0.34 cfs @ 12.11 hrs, Volume= 1,214 cf
Outflow = 0.34 cfs @ 12.11 hrs, Volume= 1,214 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Summary for Pond 1P: Driveway Pond

Inflow Area = 14,054 sf, 17.02% Impervious, Inflow Depth = 1.05" for 2-Year event
Inflow = 0.38 cfs @ 12.09 hrs, Volume= 1,226 cf
Outflow = 0.09 cfs @ 12.53 hrs, Volume= 1,225 cf, Atten= 75%, Lag= 26.0 min
Primary = 0.09 cfs @ 12.53 hrs, Volume= 1,225 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 97.87' @ 12.53 hrs Surf.Area= 538 sf Storage= 355 cf

Plug-Flow detention time= 45.1 min calculated for 1,225 cf (100% of inflow)
Center-of-Mass det. time= 44.8 min (902.2 - 857.4)

Volume	Invert	Avail.Storage	Storage Description
#1	97.00'	1,231 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
97.00	278	0	0
98.00	577	428	428
99.00	1,029	803	1,231

Device	Routing	Invert	Outlet Devices
#1	Primary	97.00'	**6.0" Round Culvert** L= 50.0' Ke= 0.500 Inlet / Outlet Invert= 97.00' / 89.00' S= 0.1600 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf
#2	Device 1	97.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	98.00'	**4.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	98.90'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.09 cfs @ 12.53 hrs HW=97.87' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.09 cfs of 0.74 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.09 cfs @ 4.27 fps)
  ├─**3=Orifice/Grate** (Controls 0.00 cfs)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond 2P: Front Yard Pond

Inflow Area = 3,585 sf, 12.61% Impervious, Inflow Depth = 0.90" for 2-Year event
Inflow = 0.08 cfs @ 12.18 hrs, Volume= 267 cf
Outflow = 0.06 cfs @ 12.22 hrs, Volume= 267 cf, Atten= 18%, Lag= 2.4 min
Primary = 0.06 cfs @ 12.22 hrs, Volume= 267 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 88.25' @ 12.22 hrs Surf.Area= 104 sf Storage= 20 cf

Plug-Flow detention time= 9.3 min calculated for 267 cf (100% of inflow)
Center-of-Mass det. time= 9.3 min (865.4 - 856.0)

Volume	Invert	Avail.Storage	Storage Description
#1	88.00'	215 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
88.00	59	0	0
89.00	241	150	150
89.25	277	65	215

Device	Routing	Invert	Outlet Devices
#1	Primary	88.00'	**6.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 88.00' / 87.50' S= 0.0500 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf
#2	Device 1	88.00'	**2.5" Vert. Orifice/Grate** C= 0.600
#3	Device 1	88.75'	**3.0" Vert. Orifice/Grate** C= 0.600

#4 Device 1 89.10' **6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.06 cfs @ 12.22 hrs HW=88.25' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.06 cfs of 0.17 cfs potential flow)
├─**2=Orifice/Grate** (Orifice Controls 0.06 cfs @ 1.83 fps)
├─**3=Orifice/Grate** (Controls 0.00 cfs)
└─**4=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond 3P: Front Infiltration Trench 1

Inflow Area = 481 sf, 85.65% Impervious, Inflow Depth = 2.55" for 2-Year event
Inflow = 0.03 cfs @ 12.08 hrs, Volume= 102 cf
Outflow = 0.00 cfs @ 12.60 hrs, Volume= 102 cf, Atten= 86%, Lag= 30.8 min
Discarded = 0.00 cfs @ 12.60 hrs, Volume= 101 cf
Primary = 0.00 cfs @ 12.60 hrs, Volume= 1 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 103.50' @ 12.60 hrs Surf.Area= 112 sf Storage= 45 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 281.7 min (1,063.6 - 782.0)

Volume	Invert	Avail.Storage	Storage Description
#1	101.50'	45 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 112 cf Overall x 40.0% Voids
#2	103.50'	3 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
		48 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
101.50	56	0	0
103.50	56	112	112

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
103.50	56	0	0
103.55	56	3	3

Device	Routing	Invert	Outlet Devices
#1	Primary	103.50'	**26.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#2	Discarded	101.50'	**1.020 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.00 cfs @ 12.60 hrs HW=103.50' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 12.60 hrs HW=103.50' TW=97.86' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 0.00 cfs @ 0.08 fps)

Summary for Pond 4P: Front Infiltration Trench 2

Inflow Area = 312 sf, 89.10% Impervious, Inflow Depth = 2.55" for 2-Year event
Inflow = 0.02 cfs @ 12.08 hrs, Volume= 66 cf
Outflow = 0.01 cfs @ 12.20 hrs, Volume= 66 cf, Atten= 32%, Lag= 7.1 min
Discarded = 0.00 cfs @ 12.20 hrs, Volume= 57 cf
Primary = 0.01 cfs @ 12.20 hrs, Volume= 9 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 103.51' @ 12.20 hrs Surf.Area= 56 sf Storage= 23 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 243.0 min (1,024.9 - 782.0)

Volume	Invert	Avail.Storage	Storage Description
#1	101.50'	22 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 56 cf Overall x 40.0% Voids
#2	103.50'	1 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
		24 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
101.50	28	0	0
103.50	28	56	56

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
103.50	28	0	0
103.55	28	1	1

Device	Routing	Invert	Outlet Devices
#1	Primary	103.50'	**12.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#2	Discarded	101.50'	**1.020 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.00 cfs @ 12.20 hrs HW=103.51' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=0.01 cfs @ 12.20 hrs HW=103.51' TW=0.00' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 0.01 cfs @ 0.19 fps)

Summary for Pond 5P: Front Infiltration Trench 3

Inflow Area = 520 sf, 85.00% Impervious, Inflow Depth = 2.45" for 2-Year event
Inflow = 0.03 cfs @ 12.08 hrs, Volume= 106 cf
Outflow = 0.02 cfs @ 12.18 hrs, Volume= 105 cf, Atten= 31%, Lag= 5.7 min
Discarded = 0.00 cfs @ 12.18 hrs, Volume= 86 cf
Primary = 0.02 cfs @ 12.18 hrs, Volume= 19 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 103.51' @ 12.18 hrs Surf.Area= 74 sf Storage= 43 cf

Plug-Flow detention time= 297.4 min calculated for 105 cf (99% of inflow)
Center-of-Mass det. time= 293.4 min (1,081.5 - 788.2)

Volume	Invert	Avail.Storage	Storage Description
#1	98.00'	40 cf	**24.0" W x 24.0" H Box Pipe Storage** L= 25.0' S= 0.2200 '/' 100 cf Overall x 40.0% Voids
#2	101.50'	10 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 24 cf Overall x 40.0% Voids
#3	103.50'	1 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
		50 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
101.50	12	0	0
103.50	12	24	24

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
103.50	12	0	0
103.55	12	1	1

Device	Routing	Invert	Outlet Devices
#1	Primary	103.50'	**6.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#2	Discarded	98.00'	**1.020 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.00 cfs @ 12.18 hrs HW=103.51' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=0.02 cfs @ 12.18 hrs HW=103.51' TW=88.24' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 0.02 cfs @ 0.29 fps)

Summary for Pond 6P: Rear Infiltration Trench

Inflow Area = 1,747 sf, 85.86% Impervious, Inflow Depth = 2.55" for 2-Year event
Inflow = 0.11 cfs @ 12.08 hrs, Volume= 371 cf
Outflow = 0.04 cfs @ 12.40 hrs, Volume= 371 cf, Atten= 67%, Lag= 19.1 min
Discarded = 0.01 cfs @ 12.40 hrs, Volume= 355 cf
Primary = 0.03 cfs @ 12.40 hrs, Volume= 16 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 103.50' @ 12.40 hrs Surf.Area= 399 sf Storage= 176 cf

Plug-Flow detention time= 328.2 min calculated for 371 cf (100% of inflow)
Center-of-Mass det. time= 327.9 min (1,109.8 - 782.0)

Volume	Invert	Avail.Storage	Storage Description
#1	98.00'	33 cf	**24.0" W x 24.0" H Box Pipe Storage** L= 20.5' S= 0.0268 '/' 82 cf Overall x 40.0% Voids
#2	101.50'	143 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 358 cf Overall x 40.0% Voids
#3	103.50'	9 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
		185 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
101.50	179	0	0
103.50	179	358	358

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
103.50	179	0	0
103.55	179	9	9

Device	Routing	Invert	Outlet Devices
#1	Primary	103.50'	**80.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#2	Discarded	98.00'	**1.020 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.01 cfs @ 12.40 hrs HW=103.50' (Free Discharge)
↑**2=Exfiltration** (Controls 0.01 cfs)

Primary OutFlow Max=0.03 cfs @ 12.40 hrs HW=103.50' TW=0.00' (Dynamic Tailwater)
↑**1=Broad-Crested Rectangular Weir** (Weir Controls 0.03 cfs @ 0.13 fps)

Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment P1: Runoff Area=13,573 sf 14.59% Impervious Runoff Depth=2.13"
Tc=6.0 min CN=76 Runoff=0.77 cfs 2,409 cf

Subcatchment P2: Runoff Area=4,668 sf 9.60% Impervious Runoff Depth=2.13"
Tc=6.0 min CN=76 Runoff=0.27 cfs 828 cf

Subcatchment P3: Runoff Area=3,065 sf 0.33% Impervious Runoff Depth=1.97"
Flow Length=165' Tc=6.2 min CN=74 Runoff=0.16 cfs 504 cf

Subcatchment P4: Runoff Area=15,634 sf 0.00% Impervious Runoff Depth=1.90"
Flow Length=230' Tc=7.3 min CN=73 Runoff=0.75 cfs 2,470 cf

Subcatchment P5A: Runoff Area=481 sf 85.65% Impervious Runoff Depth=3.92"
Tc=6.0 min CN=95 Runoff=0.05 cfs 157 cf

Subcatchment P5B: Runoff Area=312 sf 89.10% Impervious Runoff Depth=3.92"
Tc=6.0 min CN=95 Runoff=0.03 cfs 102 cf

Subcatchment P5C: Runoff Area=520 sf 85.00% Impervious Runoff Depth=3.82"
Tc=6.0 min CN=94 Runoff=0.05 cfs 165 cf

Subcatchment P5D: Runoff Area=1,747 sf 85.86% Impervious Runoff Depth=3.92"
Tc=6.0 min CN=95 Runoff=0.17 cfs 571 cf

Reach DP1: Inflow=0.56 cfs 3,872 cf
Outflow=0.56 cfs 3,872 cf

Reach DP2: Inflow=0.92 cfs 2,609 cf
Outflow=0.92 cfs 2,609 cf

Pond 1P: Driveway Pond Peak Elev=98.37' Storage=672 cf Inflow=0.81 cfs 2,443 cf
Outflow=0.31 cfs 2,442 cf

Pond 2P: Front Yard Pond Peak Elev=88.62' Storage=72 cf Inflow=0.21 cfs 567 cf
Outflow=0.12 cfs 567 cf

Pond 3P: Front Infiltration Trench 1 Peak Elev=103.51' Storage=45 cf Inflow=0.05 cfs 157 cf
Discarded=0.00 cfs 123 cf Primary=0.06 cfs 34 cf Outflow=0.06 cfs 157 cf

Pond 4P: Front Infiltration Trench 2 Peak Elev=103.51' Storage=23 cf Inflow=0.03 cfs 102 cf
Discarded=0.00 cfs 68 cf Primary=0.03 cfs 34 cf Outflow=0.03 cfs 102 cf

Pond 5P: Front Infiltration Trench 3 Peak Elev=103.52' Storage=43 cf Inflow=0.05 cfs 165 cf
Discarded=0.00 cfs 100 cf Primary=0.05 cfs 63 cf Outflow=0.05 cfs 164 cf

Pond 6P: Rear Infiltration Trench Peak Elev=103.51' Storage=178 cf Inflow=0.17 cfs 571 cf
Discarded=0.01 cfs 430 cf Primary=0.19 cfs 139 cf Outflow=0.20 cfs 568 cf

Summary for Subcatchment P1:

Runoff = 0.77 cfs @ 12.09 hrs, Volume= 2,409 cf, Depth= 2.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
5,900	74	>75% Grass cover, Good, HSG C
167	98	Unconnected pavement, HSG C
1,813	98	Paved parking, HSG C
5,693	70	Woods, Good, HSG C
13,573	76	Weighted Average
11,593		85.41% Pervious Area
1,980		14.59% Impervious Area
167		8.43% Unconnected

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

Summary for Subcatchment P2:

Runoff = 0.27 cfs @ 12.09 hrs, Volume= 828 cf, Depth= 2.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
4,220	74	>75% Grass cover, Good, HSG C
142	98	Unconnected pavement, HSG C
306	98	Paved parking, HSG C
4,668	76	Weighted Average
4,220		90.40% Pervious Area
448		9.60% Impervious Area
142		31.70% Unconnected

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

Summary for Subcatchment P3:

Runoff = 0.16 cfs @ 12.09 hrs, Volume= 504 cf, Depth= 1.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
3,055	74	>75% Grass cover, Good, HSG C
10	98	Unconnected pavement, HSG C
3,065	74	Weighted Average
3,055		99.67% Pervious Area
10		0.33% Impervious Area
10		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.8	50	0.1400	0.14		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
0.3	85	0.1200	5.58		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.1	30	0.0500	4.54		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
6.2	165	Total			

Summary for Subcatchment P4:

Runoff = 0.75 cfs @ 12.11 hrs, Volume= 2,470 cf, Depth= 1.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
12,241	74	>75% Grass cover, Good, HSG C
3,393	70	Woods, Good, HSG C
15,634	73	Weighted Average
15,634		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.6	50	0.1000	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
0.7	180	0.0780	4.50		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
7.3	230	Total			

Summary for Subcatchment P5A:

Runoff = 0.05 cfs @ 12.08 hrs, Volume= 157 cf, Depth= 3.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
412	98	Roofs, HSG C
69	74	>75% Grass cover, Good, HSG C
481	95	Weighted Average
69		14.35% Pervious Area
412		85.65% Impervious Area

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

Summary for Subcatchment P5B:

Runoff = 0.03 cfs @ 12.08 hrs, Volume= 102 cf, Depth= 3.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
278	98	Roofs, HSG C
34	74	>75% Grass cover, Good, HSG C
312	95	Weighted Average
34		10.90% Pervious Area
278		89.10% Impervious Area

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

Summary for Subcatchment P5C:

Runoff = 0.05 cfs @ 12.08 hrs, Volume= 165 cf, Depth= 3.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
442	98	Roofs, HSG C
78	74	>75% Grass cover, Good, HSG C
520	94	Weighted Average
78		15.00% Pervious Area
442		85.00% Impervious Area

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

Summary for Subcatchment P5D:

Runoff = 0.17 cfs @ 12.08 hrs, Volume= 571 cf, Depth= 3.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
1,500	98	Roofs, HSG C
247	74	>75% Grass cover, Good, HSG C
1,747	95	Weighted Average
247		14.14% Pervious Area
1,500		85.86% Impervious Area

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

Summary for Reach DP1:

Inflow Area = 22,619 sf, 15.78% Impervious, Inflow Depth = 2.05" for 10-Year event
Inflow = 0.56 cfs @ 12.21 hrs, Volume= 3,872 cf
Outflow = 0.56 cfs @ 12.21 hrs, Volume= 3,872 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Summary for Reach DP2:

Inflow Area = 17,381 sf, 8.63% Impervious, Inflow Depth = 1.80" for 10-Year event
Inflow = 0.92 cfs @ 12.09 hrs, Volume= 2,609 cf
Outflow = 0.92 cfs @ 12.09 hrs, Volume= 2,609 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Summary for Pond 1P: Driveway Pond

Inflow Area = 14,054 sf, 17.02% Impervious, Inflow Depth = 2.09" for 10-Year event
Inflow = 0.81 cfs @ 12.11 hrs, Volume= 2,443 cf
Outflow = 0.31 cfs @ 12.37 hrs, Volume= 2,442 cf, Atten= 62%, Lag= 15.7 min
Primary = 0.31 cfs @ 12.37 hrs, Volume= 2,442 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 98.37' @ 12.37 hrs Surf.Area= 744 sf Storage= 672 cf

Plug-Flow detention time= 45.6 min calculated for 2,442 cf (100% of inflow)
Center-of-Mass det. time= 45.5 min (881.5 - 836.0)

Volume	Invert	Avail.Storage	Storage Description
#1	97.00'	1,231 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
97.00	278	0	0
98.00	577	428	428
99.00	1,029	803	1,231

Device	Routing	Invert	Outlet Devices
#1	Primary	97.00'	**6.0" Round Culvert** L= 50.0' Ke= 0.500 Inlet / Outlet Invert= 97.00' / 89.00' S= 0.1600 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf
#2	Device 1	97.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	98.00'	**4.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	98.90'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.31 cfs @ 12.37 hrs HW=98.37' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.31 cfs of 1.00 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.12 cfs @ 5.46 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 0.19 cfs @ 2.17 fps)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond 2P: Front Yard Pond

Inflow Area = 3,585 sf, 12.61% Impervious, Inflow Depth = 1.90" for 10-Year event
Inflow = 0.21 cfs @ 12.09 hrs, Volume= 567 cf
Outflow = 0.12 cfs @ 12.22 hrs, Volume= 567 cf, Atten= 43%, Lag= 7.5 min
Primary = 0.12 cfs @ 12.22 hrs, Volume= 567 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 88.62' @ 12.22 hrs Surf.Area= 173 sf Storage= 72 cf

Plug-Flow detention time= 8.9 min calculated for 567 cf (100% of inflow)
Center-of-Mass det. time= 8.8 min (840.9 - 832.1)

Volume	Invert	Avail.Storage	Storage Description
#1	88.00'	215 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
88.00	59	0	0
89.00	241	150	150
89.25	277	65	215

Device	Routing	Invert	Outlet Devices
#1	Primary	88.00'	**6.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 88.00' / 87.50' S= 0.0500 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf
#2	Device 1	88.00'	**2.5" Vert. Orifice/Grate** C= 0.600
#3	Device 1	88.75'	**3.0" Vert. Orifice/Grate** C= 0.600

#4 Device 1 89.10' **6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.12 cfs @ 12.22 hrs HW=88.62' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.12 cfs of 0.58 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.12 cfs @ 3.47 fps)
  ├─**3=Orifice/Grate** (Controls 0.00 cfs)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond 3P: Front Infiltration Trench 1

Inflow Area = 481 sf, 85.65% Impervious, Inflow Depth = 3.92" for 10-Year event
Inflow = 0.05 cfs @ 12.08 hrs, Volume= 157 cf
Outflow = 0.06 cfs @ 12.11 hrs, Volume= 157 cf, Atten= 0%, Lag= 1.7 min
Discarded = 0.00 cfs @ 12.11 hrs, Volume= 123 cf
Primary = 0.06 cfs @ 12.11 hrs, Volume= 34 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 103.51' @ 12.11 hrs Surf.Area= 112 sf Storage= 45 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 217.4 min (988.5 - 771.1)

Volume	Invert	Avail.Storage	Storage Description
#1	101.50'	45 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 112 cf Overall x 40.0% Voids
#2	103.50'	3 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
		48 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
101.50	56	0	0
103.50	56	112	112

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
103.50	56	0	0
103.55	56	3	3

Device	Routing	Invert	Outlet Devices
#1	Primary	103.50'	**26.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#2	Discarded	101.50'	**1.020 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.00 cfs @ 12.11 hrs HW=103.51' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=0.05 cfs @ 12.11 hrs HW=103.51' TW=98.09' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 0.05 cfs @ 0.25 fps)

Summary for Pond 4P: Front Infiltration Trench 2

Inflow Area = 312 sf, 89.10% Impervious, Inflow Depth = 3.92" for 10-Year event
Inflow = 0.03 cfs @ 12.08 hrs, Volume= 102 cf
Outflow = 0.03 cfs @ 12.09 hrs, Volume= 102 cf, Atten= 0%, Lag= 0.1 min
Discarded = 0.00 cfs @ 12.09 hrs, Volume= 68 cf
Primary = 0.03 cfs @ 12.09 hrs, Volume= 34 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 103.51' @ 12.09 hrs Surf.Area= 56 sf Storage= 23 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 188.3 min (959.4 - 771.1)

Volume	Invert	Avail.Storage	Storage Description
#1	101.50'	22 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 56 cf Overall x 40.0% Voids
#2	103.50'	1 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
		24 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
101.50	28	0	0
103.50	28	56	56

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
103.50	28	0	0
103.55	28	1	1

Device	Routing	Invert	Outlet Devices
#1	Primary	103.50'	**12.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#2	Discarded	101.50'	**1.020 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.00 cfs @ 12.09 hrs HW=103.51' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=0.03 cfs @ 12.09 hrs HW=103.51' TW=0.00' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 0.03 cfs @ 0.26 fps)

Summary for Pond 5P: Front Infiltration Trench 3

Inflow Area = 520 sf, 85.00% Impervious, Inflow Depth = 3.82" for 10-Year event
Inflow = 0.05 cfs @ 12.08 hrs, Volume= 165 cf
Outflow = 0.05 cfs @ 12.09 hrs, Volume= 164 cf, Atten= 0%, Lag= 0.1 min
Discarded = 0.00 cfs @ 12.09 hrs, Volume= 100 cf
Primary = 0.05 cfs @ 12.09 hrs, Volume= 63 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 103.52' @ 12.09 hrs Surf.Area= 74 sf Storage= 43 cf

Plug-Flow detention time= 223.3 min calculated for 164 cf (99% of inflow)
Center-of-Mass det. time= 217.2 min (993.7 - 776.5)

Volume	Invert	Avail.Storage	Storage Description
#1	98.00'	40 cf	**24.0" W x 24.0" H Box Pipe Storage** L= 25.0' S= 0.2200 '/' 100 cf Overall x 40.0% Voids
#2	101.50'	10 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 24 cf Overall x 40.0% Voids
#3	103.50'	1 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
		50 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
101.50	12	0	0
103.50	12	24	24

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
103.50	12	0	0
103.55	12	1	1

Device	Routing	Invert	Outlet Devices
#1	Primary	103.50'	**6.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#2	Discarded	98.00'	**1.020 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.00 cfs @ 12.09 hrs HW=103.52' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=0.05 cfs @ 12.09 hrs HW=103.52' TW=88.46' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 0.05 cfs @ 0.39 fps)

Summary for Pond 6P: Rear Infiltration Trench

Inflow Area = 1,747 sf, 85.86% Impervious, Inflow Depth = 3.92" for 10-Year event
Inflow = 0.17 cfs @ 12.08 hrs, Volume= 571 cf
Outflow = 0.20 cfs @ 12.09 hrs, Volume= 568 cf, Atten= 0%, Lag= 0.5 min
Discarded = 0.01 cfs @ 12.09 hrs, Volume= 430 cf
Primary = 0.19 cfs @ 12.09 hrs, Volume= 139 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 103.51' @ 12.09 hrs Surf.Area= 399 sf Storage= 178 cf

Plug-Flow detention time= 250.5 min calculated for 568 cf (99% of inflow)
Center-of-Mass det. time= 247.2 min (1,018.2 - 771.1)

Volume	Invert	Avail.Storage	Storage Description
#1	98.00'	33 cf	**24.0" W x 24.0" H Box Pipe Storage** L= 20.5' S= 0.0268 '/' 82 cf Overall x 40.0% Voids
#2	101.50'	143 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 358 cf Overall x 40.0% Voids
#3	103.50'	9 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
		185 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
101.50	179	0	0
103.50	179	358	358

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
103.50	179	0	0
103.55	179	9	9

Device	Routing	Invert	Outlet Devices
#1	Primary	103.50'	**80.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#2	Discarded	98.00'	**1.020 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.01 cfs @ 12.09 hrs HW=103.51' (Free Discharge)
↑**2=Exfiltration** (Controls 0.01 cfs)

Primary OutFlow Max=0.18 cfs @ 12.09 hrs HW=103.51' TW=0.00' (Dynamic Tailwater)
↑**1=Broad-Crested Rectangular Weir** (Weir Controls 0.18 cfs @ 0.25 fps)

Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment P1: Runoff Area=13,573 sf 14.59% Impervious Runoff Depth=3.82"
Tc=6.0 min CN=76 Runoff=1.39 cfs 4,315 cf

Subcatchment P2: Runoff Area=4,668 sf 9.60% Impervious Runoff Depth=3.82"
Tc=6.0 min CN=76 Runoff=0.48 cfs 1,484 cf

Subcatchment P3: Runoff Area=3,065 sf 0.33% Impervious Runoff Depth=3.61"
Flow Length=165' Tc=6.2 min CN=74 Runoff=0.30 cfs 922 cf

Subcatchment P4: Runoff Area=15,634 sf 0.00% Impervious Runoff Depth=3.51"
Flow Length=230' Tc=7.3 min CN=73 Runoff=1.41 cfs 4,570 cf

Subcatchment P5A: Runoff Area=481 sf 85.65% Impervious Runoff Depth=5.91"
Tc=6.0 min CN=95 Runoff=0.07 cfs 237 cf

Subcatchment P5B: Runoff Area=312 sf 89.10% Impervious Runoff Depth=5.91"
Tc=6.0 min CN=95 Runoff=0.04 cfs 154 cf

Subcatchment P5C: Runoff Area=520 sf 85.00% Impervious Runoff Depth=5.79"
Tc=6.0 min CN=94 Runoff=0.07 cfs 251 cf

Subcatchment P5D: Runoff Area=1,747 sf 85.86% Impervious Runoff Depth=5.91"
Tc=6.0 min CN=95 Runoff=0.25 cfs 860 cf

Reach DP1: Inflow=1.14 cfs 7,018 cf
Outflow=1.14 cfs 7,018 cf

Reach DP2: Inflow=1.65 cfs 4,917 cf
Outflow=1.65 cfs 4,917 cf

Pond 1P: Driveway Pond Peak Elev=98.97' Storage=1,195 cf Inflow=1.46 cfs 4,407 cf
Outflow=0.61 cfs 4,406 cf

Pond 2P: Front Yard Pond Peak Elev=88.99' Storage=148 cf Inflow=0.37 cfs 1,054 cf
Outflow=0.24 cfs 1,054 cf

Pond 3P: Front Infiltration Trench 1 Peak Elev=103.51' Storage=45 cf Inflow=0.07 cfs 237 cf
Discarded=0.00 cfs 145 cf Primary=0.07 cfs 92 cf Outflow=0.07 cfs 237 cf

Pond 4P: Front Infiltration Trench 2 Peak Elev=103.51' Storage=23 cf Inflow=0.04 cfs 154 cf
Discarded=0.00 cfs 80 cf Primary=0.04 cfs 74 cf Outflow=0.04 cfs 154 cf

Pond 5P: Front Infiltration Trench 3 Peak Elev=103.53' Storage=43 cf Inflow=0.07 cfs 251 cf
Discarded=0.00 cfs 116 cf Primary=0.07 cfs 132 cf Outflow=0.07 cfs 248 cf

Pond 6P: Rear Infiltration Trench Peak Elev=103.51' Storage=178 cf Inflow=0.25 cfs 860 cf
Discarded=0.01 cfs 505 cf Primary=0.24 cfs 347 cf Outflow=0.25 cfs 852 cf

Summary for Subcatchment P1:

Runoff = 1.39 cfs @ 12.09 hrs, Volume= 4,315 cf, Depth= 3.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
5,900	74	>75% Grass cover, Good, HSG C
167	98	Unconnected pavement, HSG C
1,813	98	Paved parking, HSG C
5,693	70	Woods, Good, HSG C
13,573	76	Weighted Average
11,593		85.41% Pervious Area
1,980		14.59% Impervious Area
167		8.43% Unconnected

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

Summary for Subcatchment P2:

Runoff = 0.48 cfs @ 12.09 hrs, Volume= 1,484 cf, Depth= 3.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
4,220	74	>75% Grass cover, Good, HSG C
142	98	Unconnected pavement, HSG C
306	98	Paved parking, HSG C
4,668	76	Weighted Average
4,220		90.40% Pervious Area
448		9.60% Impervious Area
142		31.70% Unconnected

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

Summary for Subcatchment P3:

Runoff = 0.30 cfs @ 12.09 hrs, Volume= 922 cf, Depth= 3.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
3,055	74	>75% Grass cover, Good, HSG C
10	98	Unconnected pavement, HSG C
3,065	74	Weighted Average
3,055		99.67% Pervious Area
10		0.33% Impervious Area
10		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.8	50	0.1400	0.14		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
0.3	85	0.1200	5.58		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.1	30	0.0500	4.54		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
6.2	165	Total			

Summary for Subcatchment P4:

Runoff = 1.41 cfs @ 12.11 hrs, Volume= 4,570 cf, Depth= 3.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
12,241	74	>75% Grass cover, Good, HSG C
3,393	70	Woods, Good, HSG C
15,634	73	Weighted Average
15,634		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.6	50	0.1000	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
0.7	180	0.0780	4.50		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
7.3	230	Total			

Summary for Subcatchment P5A:

Runoff = 0.07 cfs @ 12.08 hrs, Volume= 237 cf, Depth= 5.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
412	98	Roofs, HSG C
69	74	>75% Grass cover, Good, HSG C
481	95	Weighted Average
69		14.35% Pervious Area
412		85.65% Impervious Area

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

Summary for Subcatchment P5B:

Runoff = 0.04 cfs @ 12.08 hrs, Volume= 154 cf, Depth= 5.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
278	98	Roofs, HSG C
34	74	>75% Grass cover, Good, HSG C
312	95	Weighted Average
34		10.90% Pervious Area
278		89.10% Impervious Area

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

Summary for Subcatchment P5C:

Runoff = 0.07 cfs @ 12.08 hrs, Volume= 251 cf, Depth= 5.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
442	98	Roofs, HSG C
78	74	>75% Grass cover, Good, HSG C
520	94	Weighted Average
78		15.00% Pervious Area
442		85.00% Impervious Area

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

Summary for Subcatchment P5D:

Runoff = 0.25 cfs @ 12.08 hrs, Volume= 860 cf, Depth= 5.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
1,500	98	Roofs, HSG C
247	74	>75% Grass cover, Good, HSG C
1,747	95	Weighted Average
247		14.14% Pervious Area
1,500		85.86% Impervious Area

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

Summary for Reach DP1:

Inflow Area = 22,619 sf, 15.78% Impervious, Inflow Depth = 3.72" for 100-Year event
Inflow = 1.14 cfs @ 12.12 hrs, Volume= 7,018 cf
Outflow = 1.14 cfs @ 12.12 hrs, Volume= 7,018 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Summary for Reach DP2:

Inflow Area = 17,381 sf, 8.63% Impervious, Inflow Depth = 3.39" for 100-Year event
Inflow = 1.65 cfs @ 12.10 hrs, Volume= 4,917 cf
Outflow = 1.65 cfs @ 12.10 hrs, Volume= 4,917 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Summary for Pond 1P: Driveway Pond

Inflow Area = 14,054 sf, 17.02% Impervious, Inflow Depth = 3.76" for 100-Year event
Inflow = 1.46 cfs @ 12.09 hrs, Volume= 4,407 cf
Outflow = 0.61 cfs @ 12.31 hrs, Volume= 4,406 cf, Atten= 58%, Lag= 13.5 min
Primary = 0.61 cfs @ 12.31 hrs, Volume= 4,406 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 98.97' @ 12.31 hrs Surf.Area= 1,014 sf Storage= 1,195 cf

Plug-Flow detention time= 42.7 min calculated for 4,406 cf (100% of inflow)
Center-of-Mass det. time= 42.6 min (861.5 - 818.9)

Volume	Invert	Avail.Storage	Storage Description
#1	97.00'	1,231 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
97.00	278	0	0
98.00	577	428	428
99.00	1,029	803	1,231

Device	Routing	Invert	Outlet Devices
#1	Primary	97.00'	**6.0" Round Culvert** L= 50.0' Ke= 0.500 Inlet / Outlet Invert= 97.00' / 89.00' S= 0.1600 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf
#2	Device 1	97.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	98.00'	**4.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	98.90'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.61 cfs @ 12.31 hrs HW=98.97' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Passes 0.61 cfs of 1.24 cfs potential flow)
↑—**2=Orifice/Grate** (Orifice Controls 0.14 cfs @ 6.61 fps)
—**3=Orifice/Grate** (Orifice Controls 0.38 cfs @ 4.30 fps)
—**4=Orifice/Grate** (Weir Controls 0.09 cfs @ 0.84 fps)

Summary for Pond 2P: Front Yard Pond

Inflow Area = 3,585 sf, 12.61% Impervious, Inflow Depth = 3.53" for 100-Year event
Inflow = 0.37 cfs @ 12.09 hrs, Volume= 1,054 cf
Outflow = 0.24 cfs @ 12.19 hrs, Volume= 1,054 cf, Atten= 36%, Lag= 5.8 min
Primary = 0.24 cfs @ 12.19 hrs, Volume= 1,054 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 88.99' @ 12.19 hrs Surf.Area= 240 sf Storage= 148 cf

Plug-Flow detention time= 9.1 min calculated for 1,054 cf (100% of inflow)
Center-of-Mass det. time= 9.0 min (824.6 - 815.6)

Volume	Invert	Avail.Storage	Storage Description
#1	88.00'	215 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
88.00	59	0	0
89.00	241	150	150
89.25	277	65	215

Device	Routing	Invert	Outlet Devices
#1	Primary	88.00'	**6.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 88.00' / 87.50' S= 0.0500 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf
#2	Device 1	88.00'	**2.5" Vert. Orifice/Grate** C= 0.600
#3	Device 1	88.75'	**3.0" Vert. Orifice/Grate** C= 0.600

#4 Device 1 89.10' **6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.24 cfs @ 12.19 hrs HW=88.99' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.24 cfs of 0.82 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.15 cfs @ 4.54 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 0.08 cfs @ 1.68 fps)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond 3P: Front Infiltration Trench 1

Inflow Area = 481 sf, 85.65% Impervious, Inflow Depth = 5.91" for 100-Year event
Inflow = 0.07 cfs @ 12.08 hrs, Volume= 237 cf
Outflow = 0.07 cfs @ 12.08 hrs, Volume= 237 cf, Atten= 0%, Lag= 0.1 min
Discarded = 0.00 cfs @ 12.08 hrs, Volume= 145 cf
Primary = 0.07 cfs @ 12.08 hrs, Volume= 92 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 103.51' @ 12.08 hrs Surf.Area= 112 sf Storage= 45 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 172.2 min (933.9 - 761.7)

Volume	Invert	Avail.Storage	Storage Description
#1	101.50'	45 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 112 cf Overall x 40.0% Voids
#2	103.50'	3 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
		48 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
101.50	56	0	0
103.50	56	112	112

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
103.50	56	0	0
103.55	56	3	3

Device	Routing	Invert	Outlet Devices
#1	Primary	103.50'	**26.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#2	Discarded	101.50'	**1.020 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.00 cfs @ 12.08 hrs HW=103.51' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=0.07 cfs @ 12.08 hrs HW=103.51' TW=98.58' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 0.07 cfs @ 0.26 fps)

Summary for Pond 4P: Front Infiltration Trench 2

Inflow Area = 312 sf, 89.10% Impervious, Inflow Depth = 5.91" for 100-Year event
Inflow = 0.04 cfs @ 12.08 hrs, Volume= 154 cf
Outflow = 0.04 cfs @ 12.08 hrs, Volume= 154 cf, Atten= 0%, Lag= 0.1 min
Discarded = 0.00 cfs @ 12.08 hrs, Volume= 80 cf
Primary = 0.04 cfs @ 12.08 hrs, Volume= 74 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 103.51' @ 12.08 hrs Surf.Area= 56 sf Storage= 23 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 149.2 min (910.9 - 761.7)

Volume	Invert	Avail.Storage	Storage Description
#1	101.50'	22 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 56 cf Overall x 40.0% Voids
#2	103.50'	1 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
		24 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
101.50	28	0	0
103.50	28	56	56

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
103.50	28	0	0
103.55	28	1	1

Device	Routing	Invert	Outlet Devices
#1	Primary	103.50'	**12.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#2	Discarded	101.50'	**1.020 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.00 cfs @ 12.08 hrs HW=103.51' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=0.04 cfs @ 12.08 hrs HW=103.51' TW=0.00' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 0.04 cfs @ 0.30 fps)

Summary for Pond 5P: Front Infiltration Trench 3

Inflow Area = 520 sf, 85.00% Impervious, Inflow Depth = 5.79" for 100-Year event
Inflow = 0.07 cfs @ 12.08 hrs, Volume= 251 cf
Outflow = 0.07 cfs @ 12.08 hrs, Volume= 248 cf, Atten= 0%, Lag= 0.1 min
Discarded = 0.00 cfs @ 12.08 hrs, Volume= 116 cf
Primary = 0.07 cfs @ 12.08 hrs, Volume= 132 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 103.53' @ 12.08 hrs Surf.Area= 74 sf Storage= 43 cf

Plug-Flow detention time= 171.9 min calculated for 248 cf (99% of inflow)
Center-of-Mass det. time= 164.5 min (931.0 - 766.4)

Volume	Invert	Avail.Storage	Storage Description
#1	98.00'	40 cf	**24.0" W x 24.0" H Box Pipe Storage** L= 25.0' S= 0.2200 '/' 100 cf Overall x 40.0% Voids
#2	101.50'	10 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 24 cf Overall x 40.0% Voids
#3	103.50'	1 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
		50 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
101.50	12	0	0
103.50	12	24	24

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
103.50	12	0	0
103.55	12	1	1

Device	Routing	Invert	Outlet Devices
#1	Primary	103.50'	**6.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#2	Discarded	98.00'	**1.020 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.00 cfs @ 12.08 hrs HW=103.53' (Free Discharge)
↑**2=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=0.07 cfs @ 12.08 hrs HW=103.53' TW=88.82' (Dynamic Tailwater)
↑**1=Broad-Crested Rectangular Weir** (Weir Controls 0.07 cfs @ 0.44 fps)

Summary for Pond 6P: Rear Infiltration Trench

Inflow Area = 1,747 sf, 85.86% Impervious, Inflow Depth = 5.91" for 100-Year event
Inflow = 0.25 cfs @ 12.08 hrs, Volume= 860 cf
Outflow = 0.25 cfs @ 12.08 hrs, Volume= 852 cf, Atten= 0%, Lag= 0.1 min
Discarded = 0.01 cfs @ 12.08 hrs, Volume= 505 cf
Primary = 0.24 cfs @ 12.08 hrs, Volume= 347 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 103.51' @ 12.08 hrs Surf.Area= 399 sf Storage= 178 cf

Plug-Flow detention time= 194.2 min calculated for 852 cf (99% of inflow)
Center-of-Mass det. time= 188.0 min (949.7 - 761.7)

Volume	Invert	Avail.Storage	Storage Description
#1	98.00'	33 cf	**24.0" W x 24.0" H Box Pipe Storage** L= 20.5' S= 0.0268 '/' 82 cf Overall x 40.0% Voids
#2	101.50'	143 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 358 cf Overall x 40.0% Voids
#3	103.50'	9 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
		185 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
101.50	179	0	0
103.50	179	358	358

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
103.50	179	0	0
103.55	179	9	9

Device	Routing	Invert	Outlet Devices
#1	Primary	103.50'	**80.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#2	Discarded	98.00'	**1.020 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.01 cfs @ 12.08 hrs HW=103.51' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.01 cfs)

Primary OutFlow Max=0.24 cfs @ 12.08 hrs HW=103.51' TW=0.00' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 0.24 cfs @ 0.28 fps)