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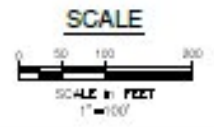






**GENERAL NOTES:**

1. WETLAND DELINEATION PERFORMED BY ALICE PINARD
2. TOPOGRAPHIC INFORMATION TAKEN FROM DSM
3. SITE IS COMPLETELY WOODED



REV	DATE	DESCRIPTION	BY/CHKD
1	10/16/20	FINAL SUBMISSION	
2	10/16/20	SUBMITTAL PRELIMINARY SUBMISSION	
3	10/16/20	PRELIMINARY SUBMISSION	
4	10/16/20	FINAL PLAN SUBMISSION	



**DEER CREEK CROSSING  
DURHAM, MAINE  
PROPOSED  
STORMWATER PLAN**

Jack Doughty  
221 Flying Point Road  
Pompano, Maine 04202

Grange Engineering LLC  
241 Rowe Station Road  
New Gloucester, ME 04260  
Tel: 207.712.6990

DRAWN: CB      DATE: October 16, 2020  
DESIGNED: CB      SCALE:  
CHECKED: CB      JOB NO. 1  
FILE NAME:  
SHEET: D-100



**Forested Buffer 1**

Impervious Area Captured 0.23 acres

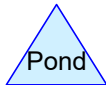
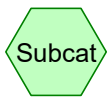
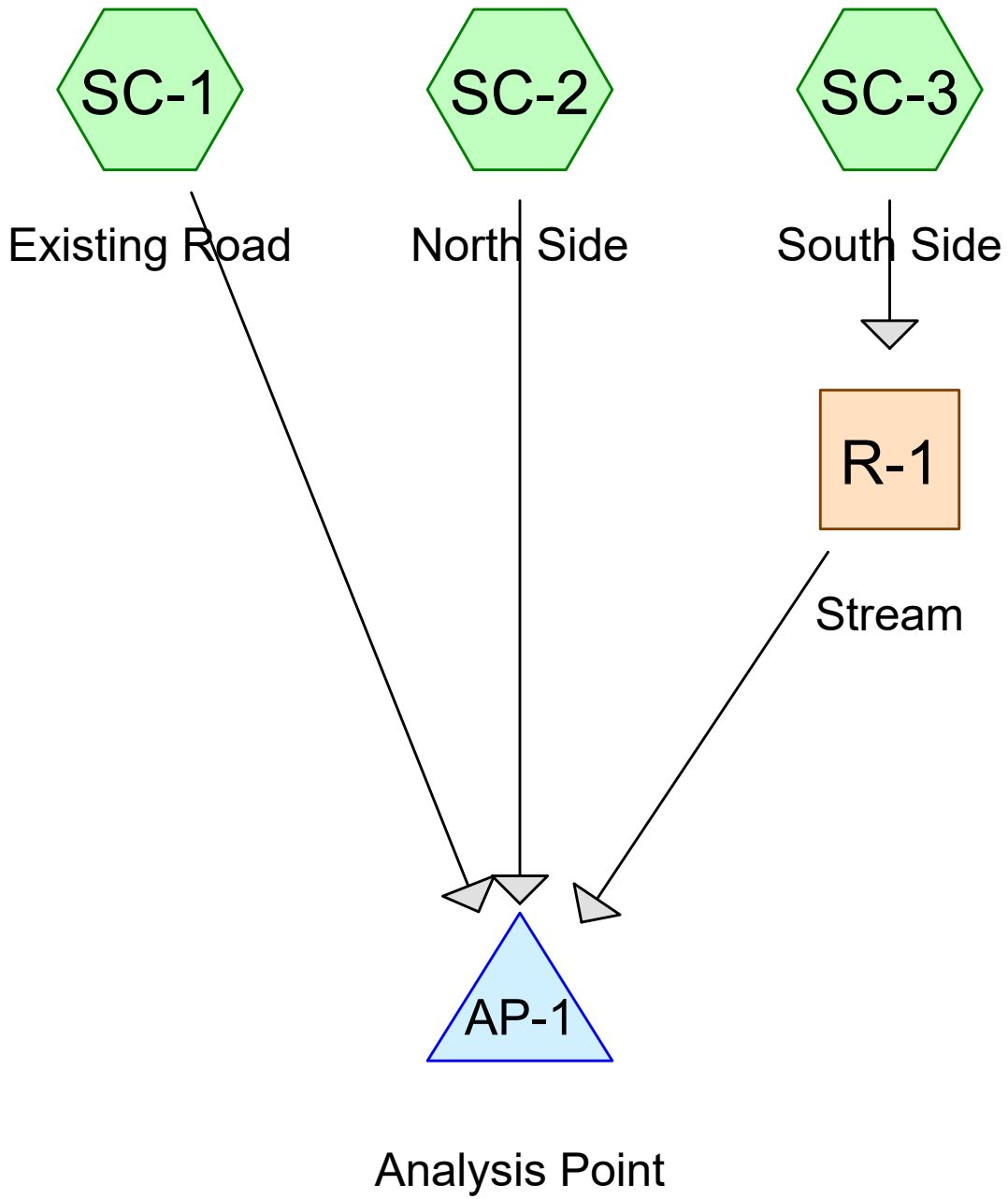
Flow Path Inside Buffer 75 feet

<b>Table 5.5</b> <b><i>Berm and Flow Path Length per Acre of Impervious area</i></b>									
Hydrologic Soil Group	Length of Flow Path in Buffer (feet)	Berm Length (feet)							
		0-8% Slope				9-15% Slope			
		Per Acre of Impervious Area		Per Acre of Lawn		Per Acre of Impervious Area		Per Acre of Lawn	
		FB	MB	FB	MB	FB	MB	FB	MB
A	75	75	125	25	35	90	150	30	42
	100	65	75	20	25	78	90	24	30
	150	50	60	15	20	60	72	18	24
B	75	100	150	30	45	120	180	36	54
	100	80	100	25	30	96	120	30	36
	150	65	75	20	25	78	90	24	30
C Loamy Sand or Sandy Loam	75	125	150	35	45	150	180	42	54
	100	100	125	30	35	120	150	36	42
	150	75	100	25	30	90	120	30	36
C Silty Loam, Clay Loam or Silty Clay Loam	100	150	200	45	60	180	240	54	72
	150	100	150	30	45	120	180	36	54
D Non-Wetland	150	150	200	45	60	180	240	54	72

**FB = Forest Buffer MB = Meadow Buffer**  
**NOTE: These tables were developed using a 1.25 inch, 24 hour storm of type III distribution, giving a maximum unit flow rate of less than 0.009 cfs per foot.**

Berm Length 17.0 feet

A 20-foot level spreader will be built upgradient of Forested Buffer 1.



## Existing

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### Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
3.712	51	1 acre lots, 20% imp, HSG A (SC-1)
0.279	98	Impervious (SC-1)
54.528	30	Woods, Good, HSG A (SC-1, SC-2, SC-3)
<b>58.519</b>	<b>32</b>	<b>TOTAL AREA</b>

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Type II 24-hr 2-Year Rainfall=3.04"

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**Summary for Subcatchment SC-1: Existing Road**

Runoff = 0.00 cfs @ 24.00 hrs, Volume= 0.000 af, Depth&gt; 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs  
Type II 24-hr 2-Year Rainfall=3.04"

Area (sf)	CN	Description
161,691	51	1 acre lots, 20% imp, HSG A
270,129	30	Woods, Good, HSG A
* 12,162	98	Impervious
443,982	40	Weighted Average
399,482		89.98% Pervious Area
44,500		10.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
38.4	100	0.0050	0.04		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.04"
16.9	508	0.0100	0.50		<b>Shallow Concentrated Flow, B-C</b> Woodland Kv= 5.0 fps
0.6	552	0.0360	15.66	563.79	<b>Channel Flow, C-D</b> Area= 36.0 sf Perim= 22.0' r= 1.64' n= 0.025 Earth, clean & winding
55.9	1,160	Total			

**Summary for Subcatchment SC-2: North Side**

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs  
Type II 24-hr 2-Year Rainfall=3.04"

Area (sf)	CN	Description
1,073,376	30	Woods, Good, HSG A
1,073,376		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.2	100	0.0600	0.12		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.04"
15.7	761	0.0260	0.81		<b>Shallow Concentrated Flow, B-C</b> Woodland Kv= 5.0 fps
3.4	2,274	0.0180	11.07	398.66	<b>Channel Flow, C-D</b> Area= 36.0 sf Perim= 22.0' r= 1.64' n= 0.025 Earth, clean & winding
33.3	3,135	Total			

**Existing**

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Type II 24-hr 2-Year Rainfall=3.04"

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**Summary for Subcatchment SC-3: South Side**

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs  
Type II 24-hr 2-Year Rainfall=3.04"

Area (sf)	CN	Description
1,031,734	30	Woods, Good, HSG A
1,031,734		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.7	100	0.0400	0.10		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.04"
21.8	1,012	0.0240	0.77		<b>Shallow Concentrated Flow, B-C</b> Woodland Kv= 5.0 fps
0.7	700	0.0400	16.51	594.29	<b>Channel Flow, C-D</b> Area= 36.0 sf Perim= 22.0' r= 1.64' n= 0.025 Earth, clean & winding
39.2	1,812	Total			

**Summary for Reach R-1: Stream**

Inflow Area = 23.685 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-Year event  
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs  
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min  
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs  
Average Depth at Peak Storage= 0.00'  
Bank-Full Depth= 3.00' Flow Area= 36.0 sf, Capacity= 321.38 cfs

3.00' x 3.00' deep channel, n= 0.025 Earth, clean & winding  
Side Slope Z-value= 3.0 ' ' Top Width= 21.00'  
Length= 685.0' Slope= 0.0117 ' '  
Inlet Invert= 162.00', Outlet Invert= 154.00'





**Existing**

Type II 24-hr 2-Year Rainfall=3.04"

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**Summary for Pond AP-1: Analysis Point**

Inflow Area = 58.519 ac, 1.75% Impervious, Inflow Depth > 0.00" for 2-Year event  
Inflow = 0.00 cfs @ 24.00 hrs, Volume= 0.000 af  
Primary = 0.00 cfs @ 24.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs

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Type II 24-hr 10-Year Rainfall=4.55"

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**Summary for Subcatchment SC-1: Existing Road**

Runoff = 0.18 cfs @ 13.91 hrs, Volume= 0.117 af, Depth&gt; 0.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs  
Type II 24-hr 10-Year Rainfall=4.55"

Area (sf)	CN	Description
161,691	51	1 acre lots, 20% imp, HSG A
270,129	30	Woods, Good, HSG A
* 12,162	98	Impervious
443,982	40	Weighted Average
399,482		89.98% Pervious Area
44,500		10.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
38.4	100	0.0050	0.04		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.04"
16.9	508	0.0100	0.50		<b>Shallow Concentrated Flow, B-C</b> Woodland Kv= 5.0 fps
0.6	552	0.0360	15.66	563.79	<b>Channel Flow, C-D</b> Area= 36.0 sf Perim= 22.0' r= 1.64' n= 0.025 Earth, clean & winding
55.9	1,160	Total			

**Summary for Subcatchment SC-2: North Side**

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs  
Type II 24-hr 10-Year Rainfall=4.55"

Area (sf)	CN	Description
1,073,376	30	Woods, Good, HSG A
1,073,376		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.2	100	0.0600	0.12		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.04"
15.7	761	0.0260	0.81		<b>Shallow Concentrated Flow, B-C</b> Woodland Kv= 5.0 fps
3.4	2,274	0.0180	11.07	398.66	<b>Channel Flow, C-D</b> Area= 36.0 sf Perim= 22.0' r= 1.64' n= 0.025 Earth, clean & winding
33.3	3,135	Total			

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Type II 24-hr 10-Year Rainfall=4.55"

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**Summary for Subcatchment SC-3: South Side**

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs  
Type II 24-hr 10-Year Rainfall=4.55"

Area (sf)	CN	Description
1,031,734	30	Woods, Good, HSG A
1,031,734		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.7	100	0.0400	0.10		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.04"
21.8	1,012	0.0240	0.77		<b>Shallow Concentrated Flow, B-C</b> Woodland Kv= 5.0 fps
0.7	700	0.0400	16.51	594.29	<b>Channel Flow, C-D</b> Area= 36.0 sf Perim= 22.0' r= 1.64' n= 0.025 Earth, clean & winding
39.2	1,812	Total			

**Summary for Reach R-1: Stream**

Inflow Area = 23.685 ac, 0.00% Impervious, Inflow Depth = 0.00" for 10-Year event  
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs  
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min  
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs  
Average Depth at Peak Storage= 0.00'  
Bank-Full Depth= 3.00' Flow Area= 36.0 sf, Capacity= 321.38 cfs

3.00' x 3.00' deep channel, n= 0.025 Earth, clean & winding  
Side Slope Z-value= 3.0 ' ' Top Width= 21.00'  
Length= 685.0' Slope= 0.0117 ' '  
Inlet Invert= 162.00', Outlet Invert= 154.00'





**Existing**

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Type II 24-hr 10-Year Rainfall=4.55"

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**Summary for Pond AP-1: Analysis Point**

Inflow Area = 58.519 ac, 1.75% Impervious, Inflow Depth > 0.02" for 10-Year event  
Inflow = 0.18 cfs @ 13.91 hrs, Volume= 0.117 af  
Primary = 0.18 cfs @ 13.91 hrs, Volume= 0.117 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs

**Existing**

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Type II 24-hr 25-Year Rainfall=5.49"

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**Summary for Subcatchment SC-1: Existing Road**

Runoff = 0.74 cfs @ 12.93 hrs, Volume= 0.290 af, Depth&gt; 0.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs  
Type II 24-hr 25-Year Rainfall=5.49"

Area (sf)	CN	Description
161,691	51	1 acre lots, 20% imp, HSG A
270,129	30	Woods, Good, HSG A
* 12,162	98	Impervious
443,982	40	Weighted Average
399,482		89.98% Pervious Area
44,500		10.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
38.4	100	0.0050	0.04		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.04"
16.9	508	0.0100	0.50		<b>Shallow Concentrated Flow, B-C</b> Woodland Kv= 5.0 fps
0.6	552	0.0360	15.66	563.79	<b>Channel Flow, C-D</b> Area= 36.0 sf Perim= 22.0' r= 1.64' n= 0.025 Earth, clean & winding
55.9	1,160	Total			

**Summary for Subcatchment SC-2: North Side**

Runoff = 0.10 cfs @ 24.00 hrs, Volume= 0.054 af, Depth&gt; 0.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs  
Type II 24-hr 25-Year Rainfall=5.49"

Area (sf)	CN	Description
1,073,376	30	Woods, Good, HSG A
1,073,376		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.2	100	0.0600	0.12		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.04"
15.7	761	0.0260	0.81		<b>Shallow Concentrated Flow, B-C</b> Woodland Kv= 5.0 fps
3.4	2,274	0.0180	11.07	398.66	<b>Channel Flow, C-D</b> Area= 36.0 sf Perim= 22.0' r= 1.64' n= 0.025 Earth, clean & winding
33.3	3,135	Total			

**Existing**

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Type II 24-hr 25-Year Rainfall=5.49"

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**Summary for Subcatchment SC-3: South Side**

Runoff = 0.09 cfs @ 24.00 hrs, Volume= 0.051 af, Depth> 0.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs  
Type II 24-hr 25-Year Rainfall=5.49"

Area (sf)	CN	Description
1,031,734	30	Woods, Good, HSG A
1,031,734		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.7	100	0.0400	0.10		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.04"
21.8	1,012	0.0240	0.77		<b>Shallow Concentrated Flow, B-C</b> Woodland Kv= 5.0 fps
0.7	700	0.0400	16.51	594.29	<b>Channel Flow, C-D</b> Area= 36.0 sf Perim= 22.0' r= 1.64' n= 0.025 Earth, clean & winding
39.2	1,812	Total			

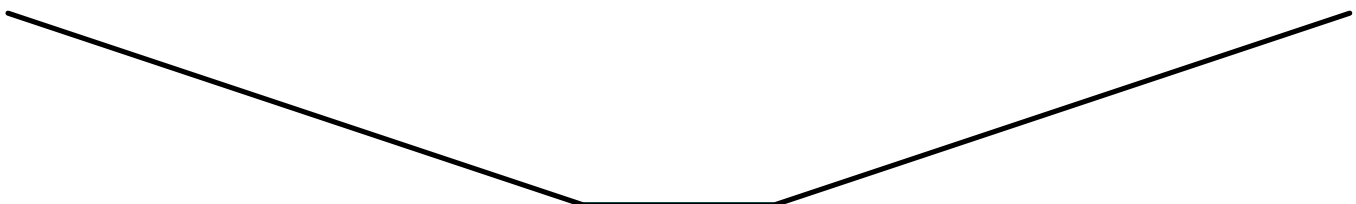
**Summary for Reach R-1: Stream**

Inflow Area = 23.685 ac, 0.00% Impervious, Inflow Depth > 0.03" for 25-Year event  
Inflow = 0.09 cfs @ 24.00 hrs, Volume= 0.051 af  
Outflow = 0.09 cfs @ 24.00 hrs, Volume= 0.049 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs  
Max. Velocity= 0.77 fps, Min. Travel Time= 14.8 min  
Avg. Velocity = 0.69 fps, Avg. Travel Time= 16.5 min

Peak Storage= 84 cf @ 24.00 hrs  
Average Depth at Peak Storage= 0.04'  
Bank-Full Depth= 3.00' Flow Area= 36.0 sf, Capacity= 321.38 cfs

3.00' x 3.00' deep channel, n= 0.025 Earth, clean & winding  
Side Slope Z-value= 3.0 ' Top Width= 21.00'  
Length= 685.0' Slope= 0.0117 '  
Inlet Invert= 162.00', Outlet Invert= 154.00'





**Existing**

Type II 24-hr 25-Year Rainfall=5.49"

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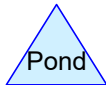
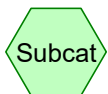
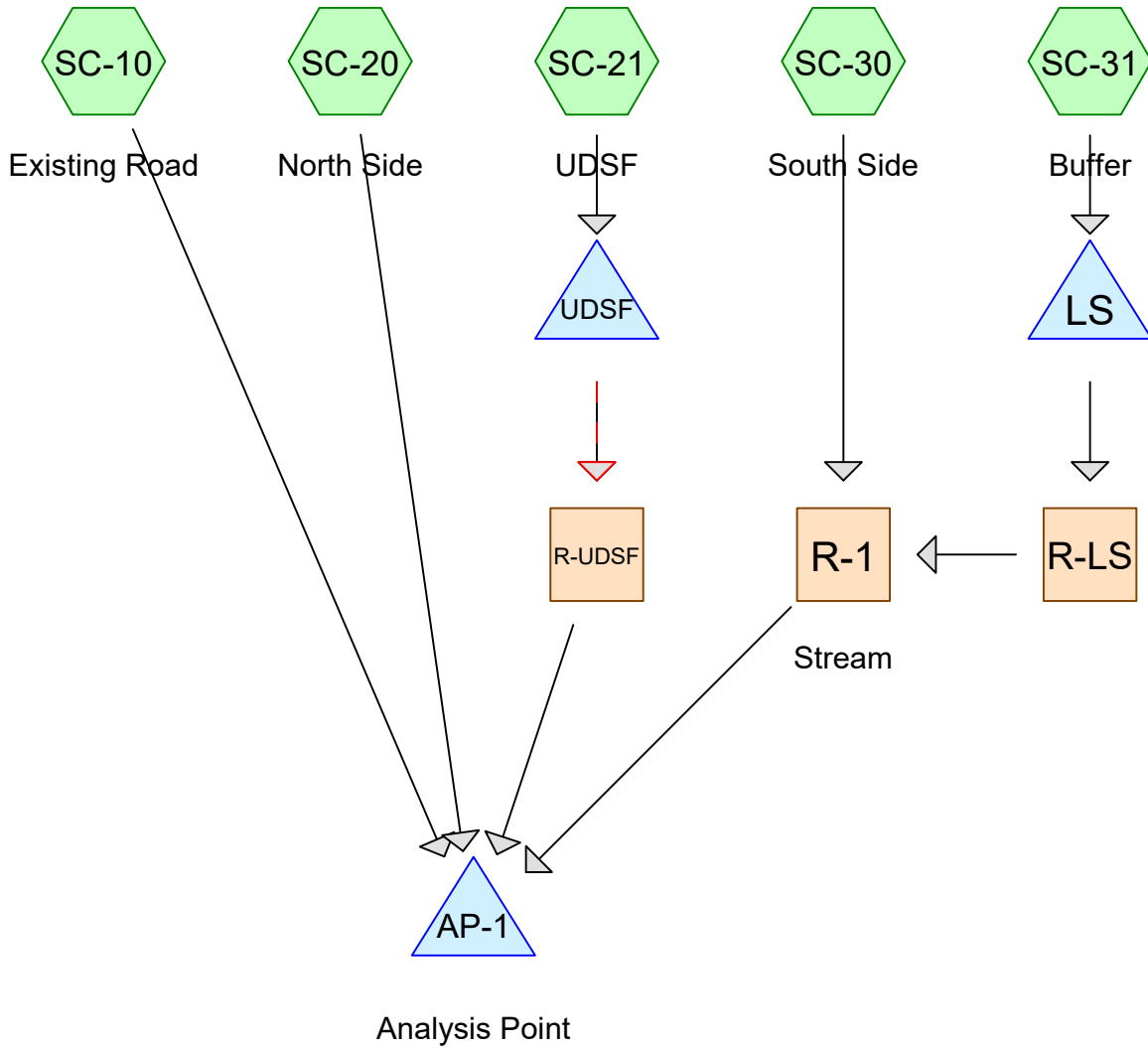
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**Summary for Pond AP-1: Analysis Point**

Inflow Area = 58.519 ac, 1.75% Impervious, Inflow Depth > 0.08" for 25-Year event  
Inflow = 0.74 cfs @ 12.93 hrs, Volume= 0.393 af  
Primary = 0.74 cfs @ 12.93 hrs, Volume= 0.393 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs



## Proposed

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Page 2

### Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
3.712	51	1 acre lots, 20% imp, HSG A (SC-10)
0.878	98	Impervious (SC-10, SC-21, SC-30, SC-31)
47.401	30	Woods, Good, HSG A (SC-10, SC-20, SC-30)
6.528	32	Woods/grass comb., Good, HSG A (SC-21, SC-31)
<b>58.519</b>	<b>33</b>	<b>TOTAL AREA</b>



**Proposed**

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Type II 24-hr 2-Year Rainfall=3.04"

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**Summary for Subcatchment SC-10: Existing Road**

Runoff = 0.00 cfs @ 24.00 hrs, Volume= 0.000 af, Depth&gt; 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs  
Type II 24-hr 2-Year Rainfall=3.04"

Area (sf)	CN	Description
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* 12,162	98	Impervious
443,982	40	Weighted Average
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44,500		10.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
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16.9	508	0.0100	0.50		<b>Shallow Concentrated Flow, B-C</b> Woodland Kv= 5.0 fps
0.6	552	0.0360	15.66	563.79	<b>Channel Flow, C-D</b> Area= 36.0 sf Perim= 22.0' r= 1.64' n= 0.025 Earth, clean & winding
55.9	1,160	Total			

**Summary for Subcatchment SC-20: North Side**

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs  
Type II 24-hr 2-Year Rainfall=3.04"

Area (sf)	CN	Description
966,622	30	Woods, Good, HSG A
966,622		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.2	100	0.0600	0.12		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.04"
15.7	761	0.0260	0.81		<b>Shallow Concentrated Flow, B-C</b> Woodland Kv= 5.0 fps
3.4	2,274	0.0180	11.07	398.66	<b>Channel Flow, C-D</b> Area= 36.0 sf Perim= 22.0' r= 1.64' n= 0.025 Earth, clean & winding
33.3	3,135	Total			

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Type II 24-hr 2-Year Rainfall=3.04"

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**Summary for Subcatchment SC-21: UDSF**

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs  
Type II 24-hr 2-Year Rainfall=3.04"

Area (sf)	CN	Description
194,450	32	Woods/grass comb., Good, HSG A
* 14,455	98	Impervious
208,905	37	Weighted Average
194,450		93.08% Pervious Area
14,455		6.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.0	100	0.0200	0.08		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.04"
2.8	129	0.0240	0.77		<b>Shallow Concentrated Flow, B-C</b> Woodland Kv= 5.0 fps
0.6	827	0.0700	24.82	893.38	<b>Channel Flow, C-D</b> Area= 36.0 sf Perim= 22.0' r= 1.64' n= 0.022 Earth, clean & straight
25.4	1,056	Total			

**Summary for Subcatchment SC-30: South Side**

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs  
Type II 24-hr 2-Year Rainfall=3.04"

Area (sf)	CN	Description
828,038	30	Woods, Good, HSG A
* 1,776	98	Impervious
829,814	30	Weighted Average
828,038		99.79% Pervious Area
1,776		0.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.7	100	0.0400	0.10		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.04"
21.8	1,012	0.0240	0.77		<b>Shallow Concentrated Flow, B-C</b> Woodland Kv= 5.0 fps
0.7	700	0.0400	16.51	594.29	<b>Channel Flow, C-D</b> Area= 36.0 sf Perim= 22.0' r= 1.64' n= 0.025 Earth, clean & winding
39.2	1,812	Total			

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Type II 24-hr 2-Year Rainfall=3.04"

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**Summary for Subcatchment SC-31: Buffer**

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs  
Type II 24-hr 2-Year Rainfall=3.04"

Area (sf)	CN	Description
89,906	32	Woods/grass comb., Good, HSG A
* 9,866	98	Impervious
99,772	39	Weighted Average
89,906		90.11% Pervious Area
9,866		9.89% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.0	100	0.0200	0.08		<b>Sheet Flow, A-B</b>
					Woods: Light underbrush n= 0.400 P2= 3.04"
1.3	232	0.0400	3.00		<b>Shallow Concentrated Flow, B-C</b>
					Grassed Waterway Kv= 15.0 fps
0.4	203	0.0100	8.25	297.14	<b>Channel Flow, C-D</b>
					Area= 36.0 sf Perim= 22.0' r= 1.64'
					n= 0.025 Earth, clean & winding
23.7	535	Total			

**Summary for Reach R-1: Stream**

Inflow Area = 21.340 ac, 1.25% Impervious, Inflow Depth = 0.00" for 2-Year event  
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs  
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min  
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs  
Average Depth at Peak Storage= 0.00'  
Bank-Full Depth= 3.00' Flow Area= 36.0 sf, Capacity= 321.38 cfs

3.00' x 3.00' deep channel, n= 0.025 Earth, clean & winding  
Side Slope Z-value= 3.0 ' ' Top Width= 21.00'  
Length= 685.0' Slope= 0.0117 ' '  
Inlet Invert= 162.00', Outlet Invert= 154.00'



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Type II 24-hr 2-Year Rainfall=3.04"

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**Summary for Reach R-LS:**

Inflow Area = 2.290 ac, 9.89% Impervious, Inflow Depth = 0.00" for 2-Year event  
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs  
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min  
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs  
Average Depth at Peak Storage= 0.00'  
Bank-Full Depth= 3.00' Flow Area= 36.0 sf, Capacity= 399.02 cfs

3.00' x 3.00' deep channel, n= 0.025 Earth, clean & winding  
Side Slope Z-value= 3.0 '/' Top Width= 21.00'  
Length= 1,042.0' Slope= 0.0180 '/'  
Inlet Invert= 186.00', Outlet Invert= 167.24'



**Summary for Reach R-UDSF:**

Inflow Area = 4.796 ac, 6.92% Impervious, Inflow Depth = 0.00" for 2-Year event  
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs  
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min  
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs  
Average Depth at Peak Storage= 0.00'  
Bank-Full Depth= 3.00' Flow Area= 36.0 sf, Capacity= 142.58 cfs

3.00' x 3.00' deep channel, n= 0.025 Earth, clean & winding  
Side Slope Z-value= 3.0 '/' Top Width= 21.00'  
Length= 435.0' Slope= 0.0023 '/'  
Inlet Invert= 165.00', Outlet Invert= 164.00'



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Type II 24-hr 2-Year Rainfall=3.04"

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**Summary for Pond AP-1: Analysis Point**

Inflow Area = 58.519 ac, 2.77% Impervious, Inflow Depth > 0.00" for 2-Year event  
Inflow = 0.00 cfs @ 24.00 hrs, Volume= 0.000 af  
Primary = 0.00 cfs @ 24.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs

**Summary for Pond LS:**

Inflow Area = 2.290 ac, 9.89% Impervious, Inflow Depth = 0.00" for 2-Year event  
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min  
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs  
Starting Elev= 193.00' Surf.Area= 17,006 sf Storage= 84,586 cf  
Peak Elev= 193.00' @ 0.00 hrs Surf.Area= 17,006 sf Storage= 84,586 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)  
Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	183.00'	103,599 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
183.00	3,365	0	0
184.00	4,176	3,771	3,771
186.00	5,945	10,121	13,892
188.00	8,011	13,956	27,848
190.00	10,369	18,380	46,228
192.00	12,991	23,360	69,588
194.00	21,020	34,011	103,599

Device	Routing	Invert	Outlet Devices
#1	Primary	193.00'	<b>20.0' long x 6.0' breadth Broad-Crested Rectangular Weir</b> 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 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=193.00' (Free Discharge)  
↑1=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)



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Type II 24-hr 2-Year Rainfall=3.04"

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**Summary for Pond UDSF:**

Inflow Area = 4.796 ac, 6.92% Impervious, Inflow Depth = 0.00" for 2-Year event  
 Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min  
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs  
 Peak Elev= 165.00' @ 0.00 hrs Surf.Area= 1,159 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)  
 Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	165.00'	8,485 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
165.00	1,159	0	0
167.00	1,159	2,318	2,318
170.00	2,952	6,167	8,485

Device	Routing	Invert	Outlet Devices
#1	Primary	165.50'	<b>0.7" Round Culvert</b> L= 82.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 165.50' / 164.00' S= 0.0183 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.00 sf
#2	Secondary	168.50'	<b>10.0' long x 5.0' breadth Broad-Crested Rectangular Weir</b> 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 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=165.00' (Free Discharge)

↑1=Culvert ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=165.00' (Free Discharge)

↑2=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

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Type II 24-hr 10-Year Rainfall=4.55"

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**Summary for Subcatchment SC-10: Existing Road**

Runoff = 0.18 cfs @ 13.91 hrs, Volume= 0.117 af, Depth> 0.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs  
Type II 24-hr 10-Year Rainfall=4.55"

Area (sf)	CN	Description
161,691	51	1 acre lots, 20% imp, HSG A
270,129	30	Woods, Good, HSG A
* 12,162	98	Impervious
443,982	40	Weighted Average
399,482		89.98% Pervious Area
44,500		10.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
38.4	100	0.0050	0.04		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.04"
16.9	508	0.0100	0.50		<b>Shallow Concentrated Flow, B-C</b> Woodland Kv= 5.0 fps
0.6	552	0.0360	15.66	563.79	<b>Channel Flow, C-D</b> Area= 36.0 sf Perim= 22.0' r= 1.64' n= 0.025 Earth, clean & winding
55.9	1,160	Total			

**Summary for Subcatchment SC-20: North Side**

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs  
Type II 24-hr 10-Year Rainfall=4.55"

Area (sf)	CN	Description
966,622	30	Woods, Good, HSG A
966,622		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.2	100	0.0600	0.12		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.04"
15.7	761	0.0260	0.81		<b>Shallow Concentrated Flow, B-C</b> Woodland Kv= 5.0 fps
3.4	2,274	0.0180	11.07	398.66	<b>Channel Flow, C-D</b> Area= 36.0 sf Perim= 22.0' r= 1.64' n= 0.025 Earth, clean & winding
33.3	3,135	Total			

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Type II 24-hr 10-Year Rainfall=4.55"

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**Summary for Subcatchment SC-21: UDSF**

Runoff = 0.04 cfs @ 15.61 hrs, Volume= 0.028 af, Depth&gt; 0.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs  
Type II 24-hr 10-Year Rainfall=4.55"

Area (sf)	CN	Description
194,450	32	Woods/grass comb., Good, HSG A
* 14,455	98	Impervious
208,905	37	Weighted Average
194,450		93.08% Pervious Area
14,455		6.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.0	100	0.0200	0.08		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.04"
2.8	129	0.0240	0.77		<b>Shallow Concentrated Flow, B-C</b> Woodland Kv= 5.0 fps
0.6	827	0.0700	24.82	893.38	<b>Channel Flow, C-D</b> Area= 36.0 sf Perim= 22.0' r= 1.64' n= 0.022 Earth, clean & straight
25.4	1,056	Total			

**Summary for Subcatchment SC-30: South Side**

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs  
Type II 24-hr 10-Year Rainfall=4.55"

Area (sf)	CN	Description
828,038	30	Woods, Good, HSG A
* 1,776	98	Impervious
829,814	30	Weighted Average
828,038		99.79% Pervious Area
1,776		0.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.7	100	0.0400	0.10		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.04"
21.8	1,012	0.0240	0.77		<b>Shallow Concentrated Flow, B-C</b> Woodland Kv= 5.0 fps
0.7	700	0.0400	16.51	594.29	<b>Channel Flow, C-D</b> Area= 36.0 sf Perim= 22.0' r= 1.64' n= 0.025 Earth, clean & winding
39.2	1,812	Total			

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Type II 24-hr 10-Year Rainfall=4.55"

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**Summary for Subcatchment SC-31: Buffer**

Runoff = 0.03 cfs @ 13.61 hrs, Volume= 0.022 af, Depth> 0.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs  
Type II 24-hr 10-Year Rainfall=4.55"

Area (sf)	CN	Description
89,906	32	Woods/grass comb., Good, HSG A
* 9,866	98	Impervious
99,772	39	Weighted Average
89,906		90.11% Pervious Area
9,866		9.89% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.0	100	0.0200	0.08		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.04"
1.3	232	0.0400	3.00		<b>Shallow Concentrated Flow, B-C</b> Grassed Waterway Kv= 15.0 fps
0.4	203	0.0100	8.25	297.14	<b>Channel Flow, C-D</b> Area= 36.0 sf Perim= 22.0' r= 1.64' n= 0.025 Earth, clean & winding
23.7	535	Total			

**Summary for Reach R-1: Stream**

Inflow Area = 21.340 ac, 1.25% Impervious, Inflow Depth > 0.01" for 10-Year event  
Inflow = 0.03 cfs @ 16.14 hrs, Volume= 0.020 af  
Outflow = 0.03 cfs @ 16.47 hrs, Volume= 0.019 af, Atten= 1%, Lag= 20.1 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs  
Max. Velocity= 0.61 fps, Min. Travel Time= 18.8 min  
Avg. Velocity = 0.61 fps, Avg. Travel Time= 18.8 min

Peak Storage= 30 cf @ 16.47 hrs  
Average Depth at Peak Storage= 0.01'  
Bank-Full Depth= 3.00' Flow Area= 36.0 sf, Capacity= 321.38 cfs

3.00' x 3.00' deep channel, n= 0.025 Earth, clean & winding  
Side Slope Z-value= 3.0 ' Top Width= 21.00'  
Length= 685.0' Slope= 0.0117 ' / '  
Inlet Invert= 162.00', Outlet Invert= 154.00'



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Type II 24-hr 10-Year Rainfall=4.55"

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**Summary for Reach R-LS:**

Inflow Area = 2.290 ac, 9.89% Impervious, Inflow Depth > 0.11" for 10-Year event  
Inflow = 0.03 cfs @ 15.75 hrs, Volume= 0.021 af  
Outflow = 0.03 cfs @ 16.14 hrs, Volume= 0.020 af, Atten= 1%, Lag= 23.4 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs  
Max. Velocity= 0.75 fps, Min. Travel Time= 23.0 min  
Avg. Velocity = 0.75 fps, Avg. Travel Time= 23.0 min

Peak Storage= 38 cf @ 16.14 hrs  
Average Depth at Peak Storage= 0.01'  
Bank-Full Depth= 3.00' Flow Area= 36.0 sf, Capacity= 399.02 cfs

3.00' x 3.00' deep channel, n= 0.025 Earth, clean & winding  
Side Slope Z-value= 3.0 '/' Top Width= 21.00'  
Length= 1,042.0' Slope= 0.0180 '/'  
Inlet Invert= 186.00', Outlet Invert= 167.24'



**Summary for Reach R-UDSF:**

Inflow Area = 4.796 ac, 6.92% Impervious, Inflow Depth > 0.00" for 10-Year event  
Inflow = 0.00 cfs @ 24.00 hrs, Volume= 0.001 af  
Outflow = 0.00 cfs @ 24.00 hrs, Volume= 0.001 af, Atten= 1%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs  
Max. Velocity= 0.27 fps, Min. Travel Time= 26.9 min  
Avg. Velocity = 0.27 fps, Avg. Travel Time= 26.9 min

Peak Storage= 6 cf @ 24.00 hrs  
Average Depth at Peak Storage= 0.00'  
Bank-Full Depth= 3.00' Flow Area= 36.0 sf, Capacity= 142.58 cfs

3.00' x 3.00' deep channel, n= 0.025 Earth, clean & winding  
Side Slope Z-value= 3.0 '/' Top Width= 21.00'  
Length= 435.0' Slope= 0.0023 '/'  
Inlet Invert= 165.00', Outlet Invert= 164.00'





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Type II 24-hr 10-Year Rainfall=4.55"

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**Summary for Pond AP-1: Analysis Point**

Inflow Area = 58.519 ac, 2.77% Impervious, Inflow Depth > 0.03" for 10-Year event  
Inflow = 0.19 cfs @ 14.10 hrs, Volume= 0.138 af  
Primary = 0.19 cfs @ 14.10 hrs, Volume= 0.138 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs

**Summary for Pond LS:**

Inflow Area = 2.290 ac, 9.89% Impervious, Inflow Depth > 0.12" for 10-Year event  
Inflow = 0.03 cfs @ 13.61 hrs, Volume= 0.022 af  
Outflow = 0.03 cfs @ 15.75 hrs, Volume= 0.021 af, Atten= 12%, Lag= 128.2 min  
Primary = 0.03 cfs @ 15.75 hrs, Volume= 0.021 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs

Starting Elev= 193.00' Surf.Area= 17,006 sf Storage= 84,586 cf  
Peak Elev= 193.01' @ 15.75 hrs Surf.Area= 17,029 sf Storage= 84,684 cf (98 cf above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)  
Center-of-Mass det. time= 31.5 min ( 1,097.1 - 1,065.6 )

Volume	Invert	Avail.Storage	Storage Description
#1	183.00'	103,599 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
183.00	3,365	0	0
184.00	4,176	3,771	3,771
186.00	5,945	10,121	13,892
188.00	8,011	13,956	27,848
190.00	10,369	18,380	46,228
192.00	12,991	23,360	69,588
194.00	21,020	34,011	103,599

Device	Routing	Invert	Outlet Devices
#1	Primary	193.00'	<b>20.0' long x 6.0' breadth Broad-Crested Rectangular Weir</b> 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 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

**Primary OutFlow** Max=0.02 cfs @ 15.75 hrs HW=193.01' (Free Discharge)  
←1=Broad-Crested Rectangular Weir (Weir Controls 0.02 cfs @ 0.18 fps)

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Type II 24-hr 10-Year Rainfall=4.55"

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**Summary for Pond UDSF:**

Inflow Area = 4.796 ac, 6.92% Impervious, Inflow Depth > 0.07" for 10-Year event  
 Inflow = 0.04 cfs @ 15.61 hrs, Volume= 0.028 af  
 Outflow = 0.00 cfs @ 24.00 hrs, Volume= 0.001 af, Atten= 90%, Lag= 503.3 min  
 Primary = 0.00 cfs @ 24.00 hrs, Volume= 0.001 af  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs  
 Peak Elev= 165.99' @ 24.00 hrs Surf.Area= 1,159 sf Storage= 1,150 cf

Plug-Flow detention time= 470.1 min calculated for 0.001 af (5% of inflow)  
 Center-of-Mass det. time= 172.7 min ( 1,287.9 - 1,115.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	165.00'	8,485 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
165.00	1,159	0	0
167.00	1,159	2,318	2,318
170.00	2,952	6,167	8,485

Device	Routing	Invert	Outlet Devices
#1	Primary	165.50'	<b>0.7" Round Culvert</b> L= 82.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 165.50' / 164.00' S= 0.0183 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.00 sf
#2	Secondary	168.50'	<b>10.0' long x 5.0' breadth Broad-Crested Rectangular Weir</b> 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 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

**Primary OutFlow** Max=0.00 cfs @ 24.00 hrs HW=165.99' (Free Discharge)

↑1=Culvert (Barrel Controls 0.00 cfs @ 1.34 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=165.00' (Free Discharge)

↑2=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

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Type II 24-hr 25-Year Rainfall=5.49"

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**Summary for Subcatchment SC-10: Existing Road**

Runoff = 0.74 cfs @ 12.93 hrs, Volume= 0.290 af, Depth> 0.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs  
Type II 24-hr 25-Year Rainfall=5.49"

Area (sf)	CN	Description
161,691	51	1 acre lots, 20% imp, HSG A
270,129	30	Woods, Good, HSG A
* 12,162	98	Impervious
443,982	40	Weighted Average
399,482		89.98% Pervious Area
44,500		10.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
38.4	100	0.0050	0.04		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.04"
16.9	508	0.0100	0.50		<b>Shallow Concentrated Flow, B-C</b> Woodland Kv= 5.0 fps
0.6	552	0.0360	15.66	563.79	<b>Channel Flow, C-D</b> Area= 36.0 sf Perim= 22.0' r= 1.64' n= 0.025 Earth, clean & winding
55.9	1,160	Total			

**Summary for Subcatchment SC-20: North Side**

Runoff = 0.09 cfs @ 24.00 hrs, Volume= 0.048 af, Depth> 0.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs  
Type II 24-hr 25-Year Rainfall=5.49"

Area (sf)	CN	Description
966,622	30	Woods, Good, HSG A
966,622		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.2	100	0.0600	0.12		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.04"
15.7	761	0.0260	0.81		<b>Shallow Concentrated Flow, B-C</b> Woodland Kv= 5.0 fps
3.4	2,274	0.0180	11.07	398.66	<b>Channel Flow, C-D</b> Area= 36.0 sf Perim= 22.0' r= 1.64' n= 0.025 Earth, clean & winding
33.3	3,135	Total			

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Type II 24-hr 25-Year Rainfall=5.49"

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**Summary for Subcatchment SC-21: UDSF**

Runoff = 0.18 cfs @ 12.68 hrs, Volume= 0.089 af, Depth&gt; 0.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs  
Type II 24-hr 25-Year Rainfall=5.49"

Area (sf)	CN	Description
194,450	32	Woods/grass comb., Good, HSG A
* 14,455	98	Impervious
208,905	37	Weighted Average
194,450		93.08% Pervious Area
14,455		6.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.0	100	0.0200	0.08		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.04"
2.8	129	0.0240	0.77		<b>Shallow Concentrated Flow, B-C</b> Woodland Kv= 5.0 fps
0.6	827	0.0700	24.82	893.38	<b>Channel Flow, C-D</b> Area= 36.0 sf Perim= 22.0' r= 1.64' n= 0.022 Earth, clean & straight
25.4	1,056	Total			

**Summary for Subcatchment SC-30: South Side**

Runoff = 0.08 cfs @ 24.00 hrs, Volume= 0.041 af, Depth&gt; 0.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs  
Type II 24-hr 25-Year Rainfall=5.49"

Area (sf)	CN	Description
828,038	30	Woods, Good, HSG A
* 1,776	98	Impervious
829,814	30	Weighted Average
828,038		99.79% Pervious Area
1,776		0.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.7	100	0.0400	0.10		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.04"
21.8	1,012	0.0240	0.77		<b>Shallow Concentrated Flow, B-C</b> Woodland Kv= 5.0 fps
0.7	700	0.0400	16.51	594.29	<b>Channel Flow, C-D</b> Area= 36.0 sf Perim= 22.0' r= 1.64' n= 0.025 Earth, clean & winding
39.2	1,812	Total			

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Type II 24-hr 25-Year Rainfall=5.49"

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**Summary for Subcatchment SC-31: Buffer**

Runoff = 0.17 cfs @ 12.41 hrs, Volume= 0.058 af, Depth> 0.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs  
Type II 24-hr 25-Year Rainfall=5.49"

Area (sf)	CN	Description
89,906	32	Woods/grass comb., Good, HSG A
* 9,866	98	Impervious
99,772	39	Weighted Average
89,906		90.11% Pervious Area
9,866		9.89% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.0	100	0.0200	0.08		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.04"
1.3	232	0.0400	3.00		<b>Shallow Concentrated Flow, B-C</b> Grassed Waterway Kv= 15.0 fps
0.4	203	0.0100	8.25	297.14	<b>Channel Flow, C-D</b> Area= 36.0 sf Perim= 22.0' r= 1.64' n= 0.025 Earth, clean & winding
23.7	535	Total			

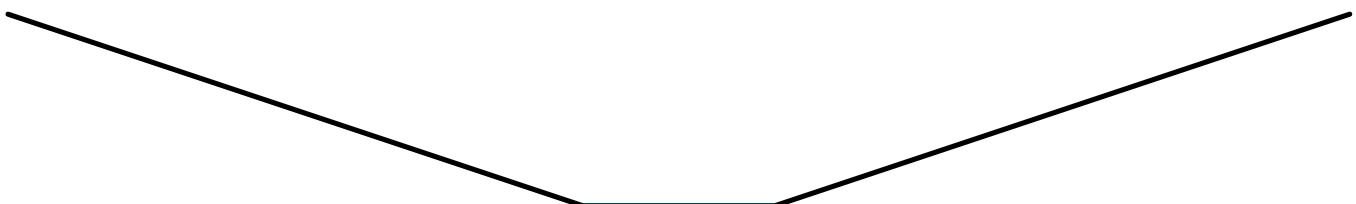
**Summary for Reach R-1: Stream**

Inflow Area = 21.340 ac, 1.25% Impervious, Inflow Depth > 0.05" for 25-Year event  
Inflow = 0.11 cfs @ 13.32 hrs, Volume= 0.095 af  
Outflow = 0.11 cfs @ 24.00 hrs, Volume= 0.093 af, Atten= 1%, Lag= 640.6 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs  
Max. Velocity= 0.82 fps, Min. Travel Time= 13.9 min  
Avg. Velocity = 0.77 fps, Avg. Travel Time= 14.8 min

Peak Storage= 94 cf @ 24.00 hrs  
Average Depth at Peak Storage= 0.04'  
Bank-Full Depth= 3.00' Flow Area= 36.0 sf, Capacity= 321.38 cfs

3.00' x 3.00' deep channel, n= 0.025 Earth, clean & winding  
Side Slope Z-value= 3.0 ' ' Top Width= 21.00'  
Length= 685.0' Slope= 0.0117 ' '  
Inlet Invert= 162.00', Outlet Invert= 154.00'





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Type II 24-hr 25-Year Rainfall=5.49"

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**Summary for Reach R-LS:**

Inflow Area = 2.290 ac, 9.89% Impervious, Inflow Depth > 0.29" for 25-Year event  
Inflow = 0.12 cfs @ 12.97 hrs, Volume= 0.055 af  
Outflow = 0.11 cfs @ 13.32 hrs, Volume= 0.054 af, Atten= 7%, Lag= 21.3 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs  
Max. Velocity= 0.94 fps, Min. Travel Time= 18.5 min  
Avg. Velocity = 0.77 fps, Avg. Travel Time= 22.4 min

Peak Storage= 125 cf @ 13.32 hrs  
Average Depth at Peak Storage= 0.04'  
Bank-Full Depth= 3.00' Flow Area= 36.0 sf, Capacity= 399.02 cfs

3.00' x 3.00' deep channel, n= 0.025 Earth, clean & winding  
Side Slope Z-value= 3.0 '/' Top Width= 21.00'  
Length= 1,042.0' Slope= 0.0180 '/'  
Inlet Invert= 186.00', Outlet Invert= 167.24'



**Summary for Reach R-UDSF:**

Inflow Area = 4.796 ac, 6.92% Impervious, Inflow Depth > 0.01" for 25-Year event  
Inflow = 0.01 cfs @ 24.00 hrs, Volume= 0.004 af  
Outflow = 0.01 cfs @ 24.00 hrs, Volume= 0.004 af, Atten= 1%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs  
Max. Velocity= 0.27 fps, Min. Travel Time= 26.9 min  
Avg. Velocity = 0.27 fps, Avg. Travel Time= 26.9 min

Peak Storage= 8 cf @ 24.00 hrs  
Average Depth at Peak Storage= 0.01'  
Bank-Full Depth= 3.00' Flow Area= 36.0 sf, Capacity= 142.58 cfs

3.00' x 3.00' deep channel, n= 0.025 Earth, clean & winding  
Side Slope Z-value= 3.0 '/' Top Width= 21.00'  
Length= 435.0' Slope= 0.0023 '/'  
Inlet Invert= 165.00', Outlet Invert= 164.00'



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Type II 24-hr 25-Year Rainfall=5.49"

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**Summary for Pond AP-1: Analysis Point**

Inflow Area = 58.519 ac, 2.77% Impervious, Inflow Depth > 0.09" for 25-Year event  
Inflow = 0.79 cfs @ 13.03 hrs, Volume= 0.435 af  
Primary = 0.79 cfs @ 13.03 hrs, Volume= 0.435 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs

**Summary for Pond LS:**

Inflow Area = 2.290 ac, 9.89% Impervious, Inflow Depth > 0.31" for 25-Year event  
Inflow = 0.17 cfs @ 12.41 hrs, Volume= 0.058 af  
Outflow = 0.12 cfs @ 12.97 hrs, Volume= 0.055 af, Atten= 29%, Lag= 33.5 min  
Primary = 0.12 cfs @ 12.97 hrs, Volume= 0.055 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs

Starting Elev= 193.00' Surf.Area= 17,006 sf Storage= 84,586 cf

Peak Elev= 193.01' @ 12.97 hrs Surf.Area= 17,063 sf Storage= 84,828 cf (242 cf above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)

Center-of-Mass det. time= 26.3 min ( 1,020.2 - 993.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	183.00'	103,599 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
183.00	3,365	0	0
184.00	4,176	3,771	3,771
186.00	5,945	10,121	13,892
188.00	8,011	13,956	27,848
190.00	10,369	18,380	46,228
192.00	12,991	23,360	69,588
194.00	21,020	34,011	103,599

Device	Routing	Invert	Outlet Devices
#1	Primary	193.00'	<b>20.0' long x 6.0' breadth Broad-Crested Rectangular Weir</b> 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 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

**Primary OutFlow** Max=0.08 cfs @ 12.97 hrs HW=193.01' (Free Discharge)

←1=**Broad-Crested Rectangular Weir** (Weir Controls 0.08 cfs @ 0.28 fps)

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Type II 24-hr 25-Year Rainfall=5.49"

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**Summary for Pond UDSF:**

Inflow Area = 4.796 ac, 6.92% Impervious, Inflow Depth > 0.22" for 25-Year event  
 Inflow = 0.18 cfs @ 12.68 hrs, Volume= 0.089 af  
 Outflow = 0.01 cfs @ 24.00 hrs, Volume= 0.004 af, Atten= 97%, Lag= 679.5 min  
 Primary = 0.01 cfs @ 24.00 hrs, Volume= 0.004 af  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs  
 Peak Elev= 167.96' @ 24.00 hrs Surf.Area= 1,732 sf Storage= 3,703 cf

Plug-Flow detention time= 400.4 min calculated for 0.004 af (4% of inflow)  
 Center-of-Mass det. time= 121.0 min ( 1,143.5 - 1,022.5 )

Volume	Invert	Avail.Storage	Storage Description
#1	165.00'	8,485 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
165.00	1,159	0	0
167.00	1,159	2,318	2,318
170.00	2,952	6,167	8,485

Device	Routing	Invert	Outlet Devices
#1	Primary	165.50'	<b>0.7" Round Culvert</b> L= 82.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 165.50' / 164.00' S= 0.0183 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.00 sf
#2	Secondary	168.50'	<b>10.0' long x 5.0' breadth Broad-Crested Rectangular Weir</b> 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 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

**Primary OutFlow** Max=0.01 cfs @ 24.00 hrs HW=167.96' (Free Discharge)  
 ↑1=Culvert (Barrel Controls 0.01 cfs @ 1.91 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=165.00' (Free Discharge)  
 ↑2=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

**STORMWATER MANAGEMENT PLAN**  
**DEER CREEK CROSSING SUBDIVISION**  
**DEER CREEK CROSSING, DURHAM**

**PROJECT NARRATIVE**

This Report is prepared to address the General Standards submission requirements of the Maine Department of Environmental Protection (MEDEP) Stormwater Law. The Site was designed to meet the MEDEP Chapter 500 Stormwater Management Rules.

The site is located along the west side of Route 9 (Hallowell Road) in the Town of Durham. The property is in a rural area among single-family residences. Access to the proposed subdivision will be via an existing road that will be improved as part of the project. The name of the access road is Deer Creek Crossing.

**CALCULATIONS**

**Modeling Methodology**

The stormwater calculations for this Stormwater Management Report are based on the NRCS soils mapping and their respective Hydrologic Soil Group designation. The various Hydrologic Soil Groups were entered into the HydroCAD stormwater model developed for this report. The ground cover in the pre-development model was “Forest”, while the post development model accounted for new impervious surfaces (road, driveways, and houses) and anticipated clearings for lawns. The HydroCAD output for the pre-developed and developed models are provided in Attachment B and C, respectively.

**EXISTING SITE CONDITIONS**

The site is in the upper reaches of the Dyer Creek watershed which is a tributary to the Androscoggin River Watershed. The runoff from the site was analyzed at a point located in the southeast corner of the site. The site is primarily wooded. The first 600 feet of the proposed road are existing as a gravel road. The entire site drains to the northeast corner where two branches of the stream converge. The existing site has been divided into three subcatchments. One for each of the branches and another for the existing road into the site.

## **PROPOSED SITE CONDITIONS**

The site will continue to drain similarly to the existing conditions. The road will drain to one of two treatment systems, an underdrained soil filter and a forested buffer (via a level spreader). The treatment systems are contained entirely within one of the two large existing subcatchments.

## **TREATMENT SUMMARY**

Runoff from and draining to the road will be captured by vegetated swales. Each swale will run to either a culvert, underdrained soil filter, or level spreader. A Treatment Summary Table and calculations are included at the end of this Section. The Forested buffer is in open space to ensure it is not accidentally cleared.

**Forested Buffer-** A 20-foot-wide level spreader captures the western end of the road and feeds a 75 foot-deep forested buffer

**Underdrained Soil Filter-** An underdrained soil filter at the northeastern corner of the road captures and treats a large portion of the road and some of the lots.

## **DETAILS, DESIGNS, AND SPECIFICATIONS**

The Forest Buffer and Underdrained Soil Filter were sized in accordance with Chapter 5 and 7 of Maine Department of Environmental Protection Stormwater Best Management Practices Manual.

## **MAINTENANCE PLAN, INSPECTIONS, AND REQUIREMENTS**

Maintenance of the stormwater control measures will be performed by the Owners' designee in conjunction with the Owner.

During construction, the site work contractor (StoneX) will be responsible for all site maintenance.

## **CONCLUSION**

The stormwater management for the Deer Creek Crossing Subdivision was designed in accordance with the MEDEP Chapter 500 requirements. The water quality treatment is provided mainly by a rain garden and series of forested buffers. There will be no adverse impact on adjacent properties as a result of this project.