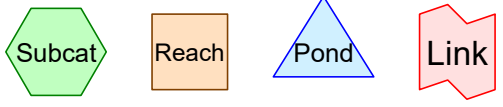
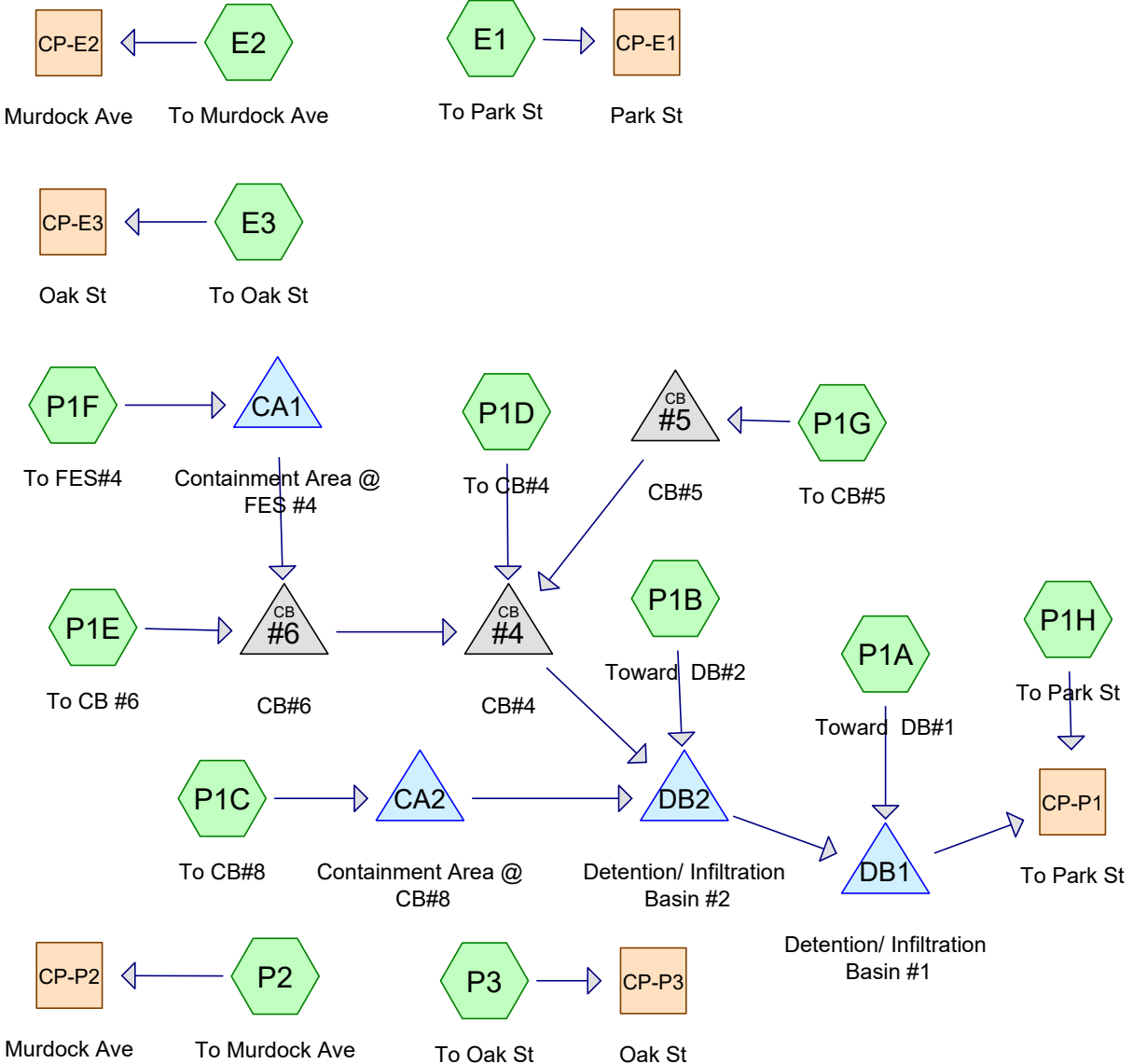


## **Appendix A – Pre- and Post Development Hydrologic Calculations**



**Routing Diagram for MVOC Winchendon 3.25.21**  
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MVOC - Winchendon  
 Type III 24-hr 2-Year Rainfall=3.00"  
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**Summary for Subcatchment E1: To Park St**

Runoff = 0.02 cfs @ 15.38 hrs, Volume= 0.010 af, Depth> 0.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
4,864	98	Paved parking, HSG A
97,188	39	>75% Grass cover, Good, HSG A
7,831	70	Woods, Good, HSG C
6,510	96	Gravel surface, HSG C
* 717	65	Landscape, HSG C
117,110	47	Weighted Average
112,246		95.85% Pervious Area
4,864		4.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	20	0.0350	1.21		<b>Sheet Flow, Paved</b> Smooth surfaces n= 0.011 P2= 3.00"
6.8	80	0.0350	0.20		<b>Sheet Flow, Grass</b> Grass: Short n= 0.150 P2= 3.00"
1.1	84	0.0360	1.33		<b>Shallow Concentrated Flow, Grass</b> Short Grass Pasture Kv= 7.0 fps
5.4	226	0.0100	0.70		<b>Shallow Concentrated Flow, Grass</b> Short Grass Pasture Kv= 7.0 fps
2.9	86	0.0100	0.50		<b>Shallow Concentrated Flow, Woods</b> Woodland Kv= 5.0 fps
16.5	496	Total			

**Summary for Subcatchment E2: To Murdock Ave**

Runoff = 0.53 cfs @ 12.09 hrs, Volume= 0.038 af, Depth> 1.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
4,534	98	Paved parking, HSG C
9,678	74	>75% Grass cover, Good, HSG C
* 75	65	Landscape, HSG C
14,287	82	Weighted Average
9,753		68.26% Pervious Area
4,534		31.74% Impervious Area

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Type III 24-hr 2-Year Rainfall=3.00"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	76	0.0428	0.21		<b>Sheet Flow, Grass</b> Grass: Short n= 0.150 P2= 3.00"

**Summary for Subcatchment E3: To Oak St**

Runoff = 1.61 cfs @ 12.11 hrs, Volume= 0.121 af, Depth&gt; 1.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
17,165	98	Paved parking, HSG C
2,723	96	Gravel surface, HSG C
16,600	74	>75% Grass cover, Good, HSG C
36,488	87	Weighted Average
19,323		52.96% Pervious Area
17,165		47.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.6	70	0.0290	0.18		<b>Sheet Flow, Grass</b> Grass: Short n= 0.150 P2= 3.00"
1.0	78	0.0064	1.29		<b>Shallow Concentrated Flow, Gravel</b> Unpaved Kv= 16.1 fps
7.6	148	Total			

**Summary for Subcatchment P1A: Toward DB#1**

Runoff = 0.68 cfs @ 12.13 hrs, Volume= 0.053 af, Depth&gt; 1.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
1,900	98	Unconnected pavement, HSG C
6,497	98	Water Surface, HSG C
7,740	74	>75% Grass cover, Good, HSG C
* 493	77	Stone Dust, HSG C
* 1,720	65	Landscape, HSG C
18,350	84	Weighted Average
9,953		54.24% Pervious Area
8,397		45.76% Impervious Area
1,900		22.63% Unconnected

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	73	0.0170	0.14		<b>Sheet Flow, Grass</b> Grass: Short n= 0.150 P2= 3.00"
0.3	13	0.0165	0.82		<b>Sheet Flow, Paved</b> Smooth surfaces n= 0.011 P2= 3.00"
0.1	40	0.1000	4.74		<b>Shallow Concentrated Flow, Grass</b> Grassed Waterway Kv= 15.0 fps
8.8	126	Total			

**Summary for Subcatchment P1B: Toward DB#2**

Runoff = 1.70 cfs @ 12.14 hrs, Volume= 0.139 af, Depth> 1.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
5,025	98	Unconnected pavement, HSG C
13,429	98	Roofs, HSG C
4,779	98	Water Surface, HSG C
15,611	74	>75% Grass cover, Good, HSG C
* 534	77	Stone Dust, HSG C
* 4,442	65	Landscape, HSG C
43,820	86	Weighted Average
20,587		46.98% Pervious Area
23,233		53.02% Impervious Area
5,025		21.63% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	100	0.0200	0.16		<b>Sheet Flow, Grass</b> Grass: Short n= 0.150 P2= 3.00"
0.2	40	0.0500	3.35		<b>Shallow Concentrated Flow, Grass</b> Grassed Waterway Kv= 15.0 fps
10.3	140	Total			

**Summary for Subcatchment P1C: To CB#8**

[45] Hint: Runoff=Zero

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= 0.01 hrs  
Type III 24-hr 2-Year Rainfall=3.00"

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 Type III 24-hr 2-Year Rainfall=3.00"  
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Area (sf)	CN	Description
126	98	Unconnected pavement, HSG C
5,038	39	>75% Grass cover, Good, HSG A
5,164	40	Weighted Average
5,038		97.56% Pervious Area
126		2.44% Impervious Area
126		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	94	0.0175	0.15		<b>Sheet Flow, Grass</b> Grass: Short n= 0.150 P2= 3.00"
0.8	45	0.0175	0.93		<b>Shallow Concentrated Flow, Grass</b> Short Grass Pasture Kv= 7.0 fps
11.0	139	Total			

**Summary for Subcatchment P1D: To CB#4**

Runoff = 0.55 cfs @ 12.07 hrs, Volume= 0.041 af, Depth> 2.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
7,805	98	Paved parking, HSG C
302	74	>75% Grass cover, Good, HSG C
8,107	97	Weighted Average
302		3.73% Pervious Area
7,805		96.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry, Min Tc</b>

**Summary for Subcatchment P1E: To CB #6**

Runoff = 0.10 cfs @ 12.07 hrs, Volume= 0.008 af, Depth> 2.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
1,436	98	Paved parking, HSG C
1,436		100.00% Impervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry, Min Tc</b>

**Summary for Subcatchment P1F: To FES#4**

[45] Hint: Runoff=Zero

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= 0.01 hrs  
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Adj	Description
525	98		Unconnected pavement, HSG A
10,141	39		>75% Grass cover, Good, HSG A
10,666	42	40	Weighted Average, UI Adjusted
10,141			95.08% Pervious Area
525			4.92% Impervious Area
525			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	114	0.0200	0.17		<b>Sheet Flow, Grass</b> Grass: Short n= 0.150 P2= 3.00"

**Summary for Subcatchment P1G: To CB#5**

Runoff = 0.16 cfs @ 12.07 hrs, Volume= 0.011 af, Depth> 2.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
2,082	98	Paved parking, HSG C
310	74	>75% Grass cover, Good, HSG C
2,392	95	Weighted Average
310		12.96% Pervious Area
2,082		87.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry, Min Tc</b>

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**Summary for Subcatchment P1H: To Park St**

Runoff = 0.00 cfs @ 22.34 hrs, Volume= 0.001 af, Depth> 0.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
853	98	Paved parking, HSG A
56,917	39	>75% Grass cover, Good, HSG A
6,352	70	Woods, Good, HSG C
64,122	43	Weighted Average
63,269		98.67% Pervious Area
853		1.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	100	0.0350	0.21		<b>Sheet Flow, Grass</b> Grass: Short n= 0.150 P2= 3.00"
1.1	84	0.0360	1.33		<b>Shallow Concentrated Flow, Grass</b> Short Grass Pasture Kv= 7.0 fps
5.8	245	0.0100	0.70		<b>Shallow Concentrated Flow, Grass</b> Short Grass Pasture Kv= 7.0 fps
2.9	86	0.0100	0.50		<b>Shallow Concentrated Flow, Woods</b> Woodland Kv= 5.0 fps
17.9	515	Total			

**Summary for Subcatchment P2: To Murdock Ave**

Runoff = 0.23 cfs @ 12.07 hrs, Volume= 0.016 af, Depth> 2.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
3,356	98	Paved parking, HSG A
223	39	>75% Grass cover, Good, HSG A
3,579	94	Weighted Average
223		6.23% Pervious Area
3,356		93.77% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry, Min Tc</b>



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### Summary for Subcatchment P3: To Oak St

Runoff = 0.39 cfs @ 12.08 hrs, Volume= 0.027 af, Depth> 1.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
3,655	98	Paved parking, HSG C
161	96	Gravel surface, HSG C
* 956	65	Landscape, HSG C
4,826	74	>75% Grass cover, Good, HSG C
9,598	83	Weighted Average
5,943		61.92% Pervious Area
3,655		38.08% Impervious Area

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

### Summary for Reach CP-E1: Park St

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.688 ac, 4.15% Impervious, Inflow Depth > 0.05" for 2-Year event  
Inflow = 0.02 cfs @ 15.38 hrs, Volume= 0.010 af  
Outflow = 0.02 cfs @ 15.38 hrs, Volume= 0.010 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3

### Summary for Reach CP-E2: Murdock Ave

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.328 ac, 31.74% Impervious, Inflow Depth > 1.38" for 2-Year event  
Inflow = 0.53 cfs @ 12.09 hrs, Volume= 0.038 af  
Outflow = 0.53 cfs @ 12.09 hrs, Volume= 0.038 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3

### Summary for Reach CP-E3: Oak St

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.838 ac, 47.04% Impervious, Inflow Depth > 1.74" for 2-Year event  
Inflow = 1.61 cfs @ 12.11 hrs, Volume= 0.121 af  
Outflow = 1.61 cfs @ 12.11 hrs, Volume= 0.121 af, Atten= 0%, Lag= 0.0 min

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Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3

**Summary for Reach CP-P1: To Park St**

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 3.537 ac, 28.86% Impervious, Inflow Depth > 0.00" for 2-Year event  
Inflow = 0.00 cfs @ 22.34 hrs, Volume= 0.001 af  
Outflow = 0.00 cfs @ 22.34 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3

**Summary for Reach CP-P2: Murdock Ave**

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.082 ac, 93.77% Impervious, Inflow Depth > 2.35" for 2-Year event  
Inflow = 0.23 cfs @ 12.07 hrs, Volume= 0.016 af  
Outflow = 0.23 cfs @ 12.07 hrs, Volume= 0.016 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3

**Summary for Reach CP-P3: Oak St**

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.220 ac, 38.08% Impervious, Inflow Depth > 1.45" for 2-Year event  
Inflow = 0.39 cfs @ 12.08 hrs, Volume= 0.027 af  
Outflow = 0.39 cfs @ 12.08 hrs, Volume= 0.027 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3

**Summary for Pond #4: CB#4**

[57] Hint: Peaked at 998.40' (Flood elevation advised)

Inflow Area = 0.519 ac, 52.42% Impervious, Inflow Depth > 1.39" for 2-Year event  
Inflow = 0.81 cfs @ 12.07 hrs, Volume= 0.060 af  
Outflow = 0.81 cfs @ 12.07 hrs, Volume= 0.060 af, Atten= 0%, Lag= 0.0 min  
Primary = 0.81 cfs @ 12.07 hrs, Volume= 0.060 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3  
Peak Elev= 998.40' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	997.90'	<b>12.0" Round Culvert</b> L= 186.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 997.90' / 996.50' S= 0.0075 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

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**Primary OutFlow** Max=0.81 cfs @ 12.07 hrs HW=998.40' TW=997.25' (Dynamic Tailwater)

↑1=Culvert (Outlet Controls 0.81 cfs @ 3.03 fps)

## Summary for Pond #5: CB#5

[57] Hint: Peaked at 998.66' (Flood elevation advised)

Inflow Area = 0.055 ac, 87.04% Impervious, Inflow Depth > 2.45" for 2-Year event  
Inflow = 0.16 cfs @ 12.07 hrs, Volume= 0.011 af  
Outflow = 0.16 cfs @ 12.07 hrs, Volume= 0.011 af, Atten= 0%, Lag= 0.0 min  
Primary = 0.16 cfs @ 12.07 hrs, Volume= 0.011 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 998.66' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	998.43'	<b>12.0" Round Culvert</b> L= 57.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 998.43' / 998.00' S= 0.0075 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

**Primary OutFlow** Max=0.16 cfs @ 12.07 hrs HW=998.66' TW=998.40' (Dynamic Tailwater)

↑1=Culvert (Outlet Controls 0.16 cfs @ 1.67 fps)

## Summary for Pond #6: CB#6

[57] Hint: Peaked at 999.34' (Flood elevation advised)

Inflow Area = 0.278 ac, 16.20% Impervious, Inflow Depth > 0.33" for 2-Year event  
Inflow = 0.10 cfs @ 12.07 hrs, Volume= 0.008 af  
Outflow = 0.10 cfs @ 12.07 hrs, Volume= 0.008 af, Atten= 0%, Lag= 0.0 min  
Primary = 0.10 cfs @ 12.07 hrs, Volume= 0.008 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 999.34' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	999.17'	<b>12.0" Round Culvert</b> L= 142.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 999.17' / 998.00' S= 0.0082 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

**Primary OutFlow** Max=0.10 cfs @ 12.07 hrs HW=999.34' TW=998.40' (Dynamic Tailwater)

↑1=Culvert (Outlet Controls 0.10 cfs @ 1.76 fps)

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### Summary for Pond CA1: Containment Area @ FES #4

Inflow Area = 0.245 ac, 4.92% 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

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3  
 Peak Elev= 1,000.00' @ 0.00 hrs Surf.Area= 20 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	1,000.00'	845 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,000.00	20	16.0	0	0	20
1,001.00	709	156.0	283	283	1,938
1,001.50	1,601	266.0	563	845	5,634

Device	Routing	Invert	Outlet Devices
#1	Primary	999.95'	<b>12.0" Round Culvert</b> L= 90.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 999.95' / 999.27' S= 0.0076 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=1,000.00' TW=999.17' (Dynamic Tailwater)  
 ↑1=Culvert (Passes 0.00 cfs of 0.01 cfs potential flow)

### Summary for Pond CA2: Containment Area @ CB#8

Inflow Area = 0.119 ac, 2.44% 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  
 Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3  
 Peak Elev= 999.25' @ 0.00 hrs Surf.Area= 16 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	999.25'	1,384 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		

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Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
999.25	16	16.0	0	0	16
1,000.00	603	139.0	179	179	1,534
1,001.00	1,931	290.0	1,204	1,384	6,694

Device	Routing	Invert	Outlet Devices
#1	Primary	997.70'	<b>8.0" Round Culvert</b> L= 162.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 997.70' / 996.50' S= 0.0074 '/' Cc= 0.900 n= 0.012, Flow Area= 0.35 sf
#2	Discarded	999.25'	<b>8.270 in/hr Exfiltration over Surface area</b> Conductivity to Groundwater Elevation = 0.00'

**Discarded OutFlow** Max=0.00 cfs @ 0.00 hrs HW=999.25' (Free Discharge)

↑**2=Exfiltration** (Passes 0.00 cfs of 0.00 cfs potential flow)

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=999.25' TW=996.50' (Dynamic Tailwater)

↑**1=Culvert** (Passes 0.00 cfs of 1.35 cfs potential flow)

**Summary for Pond DB1: Detention/ Infiltration Basin #1**

Inflow Area = 2.065 ac, 48.48% Impervious, Inflow Depth > 1.13" for 2-Year event  
 Inflow = 2.58 cfs @ 12.16 hrs, Volume= 0.195 af  
 Outflow = 0.27 cfs @ 13.06 hrs, Volume= 0.195 af, Atten= 89%, Lag= 53.9 min  
 Discarded = 0.27 cfs @ 13.06 hrs, Volume= 0.195 af  
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 997.35' @ 13.06 hrs Surf.Area= 4,856 sf Storage= 3,669 cf

Plug-Flow detention time= 129.7 min calculated for 0.195 af (100% of inflow)

Center-of-Mass det. time= 129.5 min ( 940.6 - 811.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	996.50'	13,617 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
996.50	3,796	263.0	0	0	3,796
997.00	4,404	283.0	2,048	2,048	4,676
998.00	5,755	324.0	5,064	7,113	6,679
998.50	6,497	344.0	3,061	10,174	7,755
999.00	7,285	364.0	3,444	13,617	8,896

Device	Routing	Invert	Outlet Devices
#1	Primary	998.50'	<b>20.0' 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

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#2 Discarded 996.50' 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88  
**2.410 in/hr Exfiltration over Surface area**  
 Conductivity to Groundwater Elevation = 0.00' Phase-In= 0.01'

**Discarded OutFlow** Max=0.27 cfs @ 13.06 hrs HW=997.35' (Free Discharge)

↑**2=Exfiltration** ( Controls 0.27 cfs)

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=996.50' TW=0.00' (Dynamic Tailwater)

↑**1=Broad-Crested Rectangular Weir**( Controls 0.00 cfs)

**Summary for Pond DB2: Detention/ Infiltration Basin #2**

Inflow Area = 1.643 ac, 49.18% Impervious, Inflow Depth > 1.45" for 2-Year event  
 Inflow = 2.32 cfs @ 12.12 hrs, Volume= 0.199 af  
 Outflow = 2.03 cfs @ 12.18 hrs, Volume= 0.198 af, Atten= 13%, Lag= 4.0 min  
 Discarded = 0.07 cfs @ 12.18 hrs, Volume= 0.056 af  
 Primary = 1.96 cfs @ 12.18 hrs, Volume= 0.142 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 997.40' @ 12.18 hrs Surf.Area= 1,177 sf Storage= 732 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 24.1 min ( 834.1 - 809.9 )

Volume	Invert	Avail.Storage	Storage Description		
#1	996.50'	5,448 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
996.50	471	90.0	0	0	471
997.00	865	130.0	329	329	1,173
998.00	1,744	208.0	1,279	1,608	3,278
998.50	3,142	246.0	1,204	2,813	4,656
999.00	7,738	408.0	2,635	5,448	13,088

Device	Routing	Invert	Outlet Devices
#1	Primary	996.50'	<b>18.0" Round Culvert</b> L= 30.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 996.50' / 996.50' S= 0.0000 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf
#2	Discarded	996.50'	<b>2.410 in/hr Exfiltration over Surface area</b> Conductivity to Groundwater Elevation = 0.00'

**Discarded OutFlow** Max=0.07 cfs @ 12.18 hrs HW=997.40' (Free Discharge)

↑**2=Exfiltration** ( Controls 0.07 cfs)

**Primary OutFlow** Max=1.96 cfs @ 12.18 hrs HW=997.40' TW=996.94' (Dynamic Tailwater)

↑**1=Culvert** (Barrel Controls 1.96 cfs @ 2.55 fps)

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Type III 24-hr 10-Year Rainfall=4.50"

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## Summary for Subcatchment E1: To Park St

Runoff = 0.38 cfs @ 12.48 hrs, Volume= 0.083 af, Depth> 0.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
4,864	98	Paved parking, HSG A
97,188	39	>75% Grass cover, Good, HSG A
7,831	70	Woods, Good, HSG C
6,510	96	Gravel surface, HSG C
* 717	65	Landscape, HSG C
117,110	47	Weighted Average
112,246		95.85% Pervious Area
4,864		4.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	20	0.0350	1.21		<b>Sheet Flow, Paved</b> Smooth surfaces n= 0.011 P2= 3.00"
6.8	80	0.0350	0.20		<b>Sheet Flow, Grass</b> Grass: Short n= 0.150 P2= 3.00"
1.1	84	0.0360	1.33		<b>Shallow Concentrated Flow, Grass</b> Short Grass Pasture Kv= 7.0 fps
5.4	226	0.0100	0.70		<b>Shallow Concentrated Flow, Grass</b> Short Grass Pasture Kv= 7.0 fps
2.9	86	0.0100	0.50		<b>Shallow Concentrated Flow, Woods</b> Woodland Kv= 5.0 fps
16.5	496	Total			

## Summary for Subcatchment E2: To Murdock Ave

Runoff = 1.01 cfs @ 12.09 hrs, Volume= 0.072 af, Depth> 2.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
4,534	98	Paved parking, HSG C
9,678	74	>75% Grass cover, Good, HSG C
* 75	65	Landscape, HSG C
14,287	82	Weighted Average
9,753		68.26% Pervious Area
4,534		31.74% Impervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	76	0.0428	0.21		<b>Sheet Flow, Grass</b> Grass: Short n= 0.150 P2= 3.00"

**Summary for Subcatchment E3: To Oak St**

Runoff = 2.84 cfs @ 12.11 hrs, Volume= 0.216 af, Depth&gt; 3.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
17,165	98	Paved parking, HSG C
2,723	96	Gravel surface, HSG C
16,600	74	>75% Grass cover, Good, HSG C
36,488	87	Weighted Average
19,323		52.96% Pervious Area
17,165		47.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.6	70	0.0290	0.18		<b>Sheet Flow, Grass</b> Grass: Short n= 0.150 P2= 3.00"
1.0	78	0.0064	1.29		<b>Shallow Concentrated Flow, Gravel</b> Unpaved Kv= 16.1 fps
7.6	148	Total			

**Summary for Subcatchment P1A: Toward DB#1**

Runoff = 1.26 cfs @ 12.12 hrs, Volume= 0.099 af, Depth&gt; 2.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
1,900	98	Unconnected pavement, HSG C
6,497	98	Water Surface, HSG C
7,740	74	>75% Grass cover, Good, HSG C
* 493	77	Stone Dust, HSG C
* 1,720	65	Landscape, HSG C
18,350	84	Weighted Average
9,953		54.24% Pervious Area
8,397		45.76% Impervious Area
1,900		22.63% Unconnected



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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	73	0.0170	0.14		<b>Sheet Flow, Grass</b> Grass: Short n= 0.150 P2= 3.00"
0.3	13	0.0165	0.82		<b>Sheet Flow, Paved</b> Smooth surfaces n= 0.011 P2= 3.00"
0.1	40	0.1000	4.74		<b>Shallow Concentrated Flow, Grass</b> Grassed Waterway Kv= 15.0 fps
8.8	126	Total			

**Summary for Subcatchment P1B: Toward DB#2**

Runoff = 3.04 cfs @ 12.14 hrs, Volume= 0.251 af, Depth> 3.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
5,025	98	Unconnected pavement, HSG C
13,429	98	Roofs, HSG C
4,779	98	Water Surface, HSG C
15,611	74	>75% Grass cover, Good, HSG C
* 534	77	Stone Dust, HSG C
* 4,442	65	Landscape, HSG C
43,820	86	Weighted Average
20,587		46.98% Pervious Area
23,233		53.02% Impervious Area
5,025		21.63% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	100	0.0200	0.16		<b>Sheet Flow, Grass</b> Grass: Short n= 0.150 P2= 3.00"
0.2	40	0.0500	3.35		<b>Shallow Concentrated Flow, Grass</b> Grassed Waterway Kv= 15.0 fps
10.3	140	Total			

**Summary for Subcatchment P1C: To CB#8**

Runoff = 0.00 cfs @ 13.85 hrs, Volume= 0.001 af, Depth> 0.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-Year Rainfall=4.50"

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Area (sf)	CN	Description
126	98	Unconnected pavement, HSG C
5,038	39	>75% Grass cover, Good, HSG A
5,164	40	Weighted Average
5,038		97.56% Pervious Area
126		2.44% Impervious Area
126		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	94	0.0175	0.15		<b>Sheet Flow, Grass</b> Grass: Short n= 0.150 P2= 3.00"
0.8	45	0.0175	0.93		<b>Shallow Concentrated Flow, Grass</b> Short Grass Pasture Kv= 7.0 fps
11.0	139	Total			

**Summary for Subcatchment P1D: To CB#4**

Runoff = 0.84 cfs @ 12.07 hrs, Volume= 0.064 af, Depth> 4.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
7,805	98	Paved parking, HSG C
302	74	>75% Grass cover, Good, HSG C
8,107	97	Weighted Average
302		3.73% Pervious Area
7,805		96.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry, Min Tc</b>

**Summary for Subcatchment P1E: To CB #6**

Runoff = 0.15 cfs @ 12.07 hrs, Volume= 0.012 af, Depth> 4.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
1,436	98	Paved parking, HSG C
1,436		100.00% Impervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry, Min Tc</b>

**Summary for Subcatchment P1F: To FES#4**

Runoff = 0.00 cfs @ 13.85 hrs, Volume= 0.003 af, Depth&gt; 0.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Adj	Description
525	98		Unconnected pavement, HSG A
10,141	39		>75% Grass cover, Good, HSG A
10,666	42	40	Weighted Average, UI Adjusted
10,141			95.08% Pervious Area
525			4.92% Impervious Area
525			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	114	0.0200	0.17		<b>Sheet Flow, Grass</b> Grass: Short n= 0.150 P2= 3.00"

**Summary for Subcatchment P1G: To CB#5**

Runoff = 0.24 cfs @ 12.07 hrs, Volume= 0.018 af, Depth&gt; 3.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
2,082	98	Paved parking, HSG C
310	74	>75% Grass cover, Good, HSG C
2,392	95	Weighted Average
310		12.96% Pervious Area
2,082		87.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry, Min Tc</b>

**Summary for Subcatchment P1H: To Park St**

Runoff = 0.07 cfs @ 12.61 hrs, Volume= 0.027 af, Depth&gt; 0.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-Year Rainfall=4.50"

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Area (sf)	CN	Description
853	98	Paved parking, HSG A
56,917	39	>75% Grass cover, Good, HSG A
6,352	70	Woods, Good, HSG C
64,122	43	Weighted Average
63,269		98.67% Pervious Area
853		1.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	100	0.0350	0.21		<b>Sheet Flow, Grass</b> Grass: Short n= 0.150 P2= 3.00"
1.1	84	0.0360	1.33		<b>Shallow Concentrated Flow, Grass</b> Short Grass Pasture Kv= 7.0 fps
5.8	245	0.0100	0.70		<b>Shallow Concentrated Flow, Grass</b> Short Grass Pasture Kv= 7.0 fps
2.9	86	0.0100	0.50		<b>Shallow Concentrated Flow, Woods</b> Woodland Kv= 5.0 fps
17.9	515	Total			

**Summary for Subcatchment P2: To Murdock Ave**

Runoff = 0.36 cfs @ 12.07 hrs, Volume= 0.026 af, Depth> 3.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
3,356	98	Paved parking, HSG A
223	39	>75% Grass cover, Good, HSG A
3,579	94	Weighted Average
223		6.23% Pervious Area
3,356		93.77% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry, Min Tc</b>

**Summary for Subcatchment P3: To Oak St**

Runoff = 0.73 cfs @ 12.07 hrs, Volume= 0.050 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-Year Rainfall=4.50"

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Type III 24-hr 10-Year Rainfall=4.50"

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Area (sf)	CN	Description
3,655	98	Paved parking, HSG C
161	96	Gravel surface, HSG C
* 956	65	Landscape, HSG C
4,826	74	>75% Grass cover, Good, HSG C
9,598	83	Weighted Average
5,943		61.92% Pervious Area
3,655		38.08% Impervious Area

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

## Summary for Reach CP-E1: Park St

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.688 ac, 4.15% Impervious, Inflow Depth > 0.37" for 10-Year event  
Inflow = 0.38 cfs @ 12.48 hrs, Volume= 0.083 af  
Outflow = 0.38 cfs @ 12.48 hrs, Volume= 0.083 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3

## Summary for Reach CP-E2: Murdock Ave

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.328 ac, 31.74% Impervious, Inflow Depth > 2.63" for 10-Year event  
Inflow = 1.01 cfs @ 12.09 hrs, Volume= 0.072 af  
Outflow = 1.01 cfs @ 12.09 hrs, Volume= 0.072 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3

## Summary for Reach CP-E3: Oak St

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.838 ac, 47.04% Impervious, Inflow Depth > 3.09" for 10-Year event  
Inflow = 2.84 cfs @ 12.11 hrs, Volume= 0.216 af  
Outflow = 2.84 cfs @ 12.11 hrs, Volume= 0.216 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3

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### Summary for Reach CP-P1: To Park St

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 3.537 ac, 28.86% Impervious, Inflow Depth > 0.09" for 10-Year event  
Inflow = 0.07 cfs @ 12.61 hrs, Volume= 0.027 af  
Outflow = 0.07 cfs @ 12.61 hrs, Volume= 0.027 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3

### Summary for Reach CP-P2: Murdock Ave

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.082 ac, 93.77% Impervious, Inflow Depth > 3.81" for 10-Year event  
Inflow = 0.36 cfs @ 12.07 hrs, Volume= 0.026 af  
Outflow = 0.36 cfs @ 12.07 hrs, Volume= 0.026 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3

### Summary for Reach CP-P3: Oak St

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.220 ac, 38.08% Impervious, Inflow Depth > 2.72" for 10-Year event  
Inflow = 0.73 cfs @ 12.07 hrs, Volume= 0.050 af  
Outflow = 0.73 cfs @ 12.07 hrs, Volume= 0.050 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3

### Summary for Pond #4: CB#4

[57] Hint: Peaked at 998.56' (Flood elevation advised)

Inflow Area = 0.519 ac, 52.42% Impervious, Inflow Depth > 2.24" for 10-Year event  
Inflow = 1.23 cfs @ 12.07 hrs, Volume= 0.097 af  
Outflow = 1.23 cfs @ 12.07 hrs, Volume= 0.097 af, Atten= 0%, Lag= 0.0 min  
Primary = 1.23 cfs @ 12.07 hrs, Volume= 0.097 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3  
Peak Elev= 998.56' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	997.90'	<b>12.0" Round Culvert</b> L= 186.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 997.90' / 996.50' S= 0.0075' /' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

**Primary OutFlow** Max=1.23 cfs @ 12.07 hrs HW=998.56' TW=997.51' (Dynamic Tailwater)  
↑**1=Culvert** (Outlet Controls 1.23 cfs @ 3.21 fps)

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### Summary for Pond #5: CB#5

[57] Hint: Peaked at 998.75' (Flood elevation advised)

Inflow Area = 0.055 ac, 87.04% Impervious, Inflow Depth > 3.92" for 10-Year event  
Inflow = 0.24 cfs @ 12.07 hrs, Volume= 0.018 af  
Outflow = 0.24 cfs @ 12.07 hrs, Volume= 0.018 af, Atten= 0%, Lag= 0.0 min  
Primary = 0.24 cfs @ 12.07 hrs, Volume= 0.018 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3  
Peak Elev= 998.75' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	998.43'	<b>12.0" Round Culvert</b> L= 57.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 998.43' / 998.00' S= 0.0075' / Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

**Primary OutFlow** Max=0.24 cfs @ 12.07 hrs HW=998.75' TW=998.56' (Dynamic Tailwater)  
↑1=Culvert (Outlet Controls 0.24 cfs @ 1.64 fps)

### Summary for Pond #6: CB#6

[57] Hint: Peaked at 999.38' (Flood elevation advised)

Inflow Area = 0.278 ac, 16.20% Impervious, Inflow Depth > 0.62" for 10-Year event  
Inflow = 0.15 cfs @ 12.07 hrs, Volume= 0.014 af  
Outflow = 0.15 cfs @ 12.07 hrs, Volume= 0.014 af, Atten= 0%, Lag= 0.0 min  
Primary = 0.15 cfs @ 12.07 hrs, Volume= 0.014 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3  
Peak Elev= 999.38' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	999.17'	<b>12.0" Round Culvert</b> L= 142.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 999.17' / 998.00' S= 0.0082' / Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

**Primary OutFlow** Max=0.15 cfs @ 12.07 hrs HW=999.38' TW=998.56' (Dynamic Tailwater)  
↑1=Culvert (Outlet Controls 0.15 cfs @ 1.89 fps)

### Summary for Pond CA1: Containment Area @ FES #4

Inflow Area = 0.245 ac, 4.92% Impervious, Inflow Depth > 0.14" for 10-Year event  
Inflow = 0.00 cfs @ 13.85 hrs, Volume= 0.003 af  
Outflow = 0.00 cfs @ 13.85 hrs, Volume= 0.003 af, Atten= 0%, Lag= 0.0 min  
Primary = 0.00 cfs @ 13.85 hrs, Volume= 0.003 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3

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Peak Elev= 1,000.00' @ 13.85 hrs Surf.Area= 20 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 0.0 min ( 1,036.3 - 1,036.3 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,000.00'	845 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,000.00	20	16.0	0	0	20
1,001.00	709	156.0	283	283	1,938
1,001.50	1,601	266.0	563	845	5,634

Device	Routing	Invert	Outlet Devices
#1	Primary	999.95'	<b>12.0" Round Culvert</b> L= 90.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 999.95' / 999.27' S= 0.0076 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

**Primary OutFlow** Max=0.01 cfs @ 13.85 hrs HW=1,000.00' TW=999.23' (Dynamic Tailwater)  
 ↑**1=Culvert** (Barrel Controls 0.01 cfs @ 0.90 fps)

**Summary for Pond CA2: Containment Area @ CB#8**

Inflow Area = 0.119 ac, 2.44% Impervious, Inflow Depth > 0.14" for 10-Year event  
 Inflow = 0.00 cfs @ 13.85 hrs, Volume= 0.001 af  
 Outflow = 0.00 cfs @ 13.85 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.0 min  
 Discarded = 0.00 cfs @ 13.85 hrs, Volume= 0.000 af  
 Primary = 0.00 cfs @ 13.85 hrs, Volume= 0.001 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3  
 Peak Elev= 999.25' @ 0.00 hrs Surf.Area= 16 sf Storage= 0 cf

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

Volume	Invert	Avail.Storage	Storage Description
#1	999.25'	1,384 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
999.25	16	16.0	0	0	16
1,000.00	603	139.0	179	179	1,534
1,001.00	1,931	290.0	1,204	1,384	6,694

Device	Routing	Invert	Outlet Devices
#1	Primary	997.70'	<b>8.0" Round Culvert</b> L= 162.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 997.70' / 996.50' S= 0.0074 '/' Cc= 0.900



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#2 Discarded 999.25' n= 0.012, Flow Area= 0.35 sf  
**8.270 in/hr Exfiltration over Surface area**  
 Conductivity to Groundwater Elevation = 0.00'

**Discarded OutFlow** Max=0.00 cfs @ 13.85 hrs HW=999.25' (Free Discharge)  
 ↑**2=Exfiltration** (Passes 0.00 cfs of 0.00 cfs potential flow)

**Primary OutFlow** Max=0.00 cfs @ 13.85 hrs HW=999.25' TW=998.02' (Dynamic Tailwater)  
 ↑**1=Culvert** (Passes 0.00 cfs of 1.04 cfs potential flow)

**Summary for Pond DB1: Detention/ Infiltration Basin #1**

Inflow Area = 2.065 ac, 48.48% Impervious, Inflow Depth > 2.05" for 10-Year event  
 Inflow = 4.55 cfs @ 12.16 hrs, Volume= 0.352 af  
 Outflow = 0.32 cfs @ 13.67 hrs, Volume= 0.327 af, Atten= 93%, Lag= 90.9 min  
 Discarded = 0.32 cfs @ 13.67 hrs, Volume= 0.327 af  
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3  
 Peak Elev= 998.02' @ 13.67 hrs Surf.Area= 5,785 sf Storage= 7,233 cf

Plug-Flow detention time= 231.3 min calculated for 0.326 af (93% of inflow)  
 Center-of-Mass det. time= 193.8 min ( 1,006.4 - 812.7 )

Volume	Invert	Avail.Storage	Storage Description			
#1	996.50'	13,617 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
996.50	3,796	263.0	0	0	3,796	
997.00	4,404	283.0	2,048	2,048	4,676	
998.00	5,755	324.0	5,064	7,113	6,679	
998.50	6,497	344.0	3,061	10,174	7,755	
999.00	7,285	364.0	3,444	13,617	8,896	

Device	Routing	Invert	Outlet Devices																		
#1	Primary	998.50'	<b>20.0' 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	2.65	2.67	2.66	2.68	2.70	2.74	2.79	2.88
#2	Discarded	996.50'	<b>2.410 in/hr Exfiltration over Surface area</b>																		
			Conductivity to Groundwater Elevation = 0.00' Phase-In= 0.01'																		

**Discarded OutFlow** Max=0.32 cfs @ 13.67 hrs HW=998.02' (Free Discharge)  
 ↑**2=Exfiltration** ( Controls 0.32 cfs)

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=996.50' TW=0.00' (Dynamic Tailwater)  
 ↑**1=Broad-Crested Rectangular Weir**( Controls 0.00 cfs)

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**Summary for Pond DB2: Detention/ Infiltration Basin #2**

Inflow Area = 1.643 ac, 49.18% Impervious, Inflow Depth > 2.55" for 10-Year event  
 Inflow = 4.01 cfs @ 12.12 hrs, Volume= 0.349 af  
 Outflow = 3.51 cfs @ 12.18 hrs, Volume= 0.346 af, Atten= 12%, Lag= 3.5 min  
 Discarded = 0.10 cfs @ 13.66 hrs, Volume= 0.093 af  
 Primary = 3.43 cfs @ 12.18 hrs, Volume= 0.253 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3  
 Peak Elev= 998.02' @ 13.66 hrs Surf.Area= 1,796 sf Storage= 1,647 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 43.2 min ( 842.8 - 799.6 )

Volume	Invert	Avail.Storage	Storage Description		
#1	996.50'	5,448 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
996.50	471	90.0	0	0	471
997.00	865	130.0	329	329	1,173
998.00	1,744	208.0	1,279	1,608	3,278
998.50	3,142	246.0	1,204	2,813	4,656
999.00	7,738	408.0	2,635	5,448	13,088

Device	Routing	Invert	Outlet Devices
#1	Primary	996.50'	<b>18.0" Round Culvert</b> L= 30.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 996.50' / 996.50' S= 0.0000 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf
#2	Discarded	996.50'	<b>2.410 in/hr Exfiltration over Surface area</b> Conductivity to Groundwater Elevation = 0.00'

**Discarded OutFlow** Max=0.10 cfs @ 13.66 hrs HW=998.02' (Free Discharge)  
 ↑**2=Exfiltration** ( Controls 0.10 cfs)

**Primary OutFlow** Max=3.41 cfs @ 12.18 hrs HW=997.71' TW=997.40' (Dynamic Tailwater)  
 ↑**1=Culvert** (Barrel Controls 3.41 cfs @ 3.05 fps)

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## Summary for Subcatchment E1: To Park St

Runoff = 1.90 cfs @ 12.29 hrs, Volume= 0.248 af, Depth> 1.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-Year Rainfall=6.40"

Area (sf)	CN	Description
4,864	98	Paved parking, HSG A
97,188	39	>75% Grass cover, Good, HSG A
7,831	70	Woods, Good, HSG C
6,510	96	Gravel surface, HSG C
* 717	65	Landscape, HSG C
117,110	47	Weighted Average
112,246		95.85% Pervious Area
4,864		4.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	20	0.0350	1.21		<b>Sheet Flow, Paved</b> Smooth surfaces n= 0.011 P2= 3.00"
6.8	80	0.0350	0.20		<b>Sheet Flow, Grass</b> Grass: Short n= 0.150 P2= 3.00"
1.1	84	0.0360	1.33		<b>Shallow Concentrated Flow, Grass</b> Short Grass Pasture Kv= 7.0 fps
5.4	226	0.0100	0.70		<b>Shallow Concentrated Flow, Grass</b> Short Grass Pasture Kv= 7.0 fps
2.9	86	0.0100	0.50		<b>Shallow Concentrated Flow, Woods</b> Woodland Kv= 5.0 fps
16.5	496	Total			

## Summary for Subcatchment E2: To Murdock Ave

Runoff = 1.66 cfs @ 12.09 hrs, Volume= 0.119 af, Depth> 4.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-Year Rainfall=6.40"

Area (sf)	CN	Description
4,534	98	Paved parking, HSG C
9,678	74	>75% Grass cover, Good, HSG C
* 75	65	Landscape, HSG C
14,287	82	Weighted Average
9,753		68.26% Pervious Area
4,534		31.74% Impervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	76	0.0428	0.21		<b>Sheet Flow, Grass</b> Grass: Short n= 0.150 P2= 3.00"

**Summary for Subcatchment E3: To Oak St**

Runoff = 4.41 cfs @ 12.10 hrs, Volume= 0.342 af, Depth&gt; 4.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-Year Rainfall=6.40"

Area (sf)	CN	Description
17,165	98	Paved parking, HSG C
2,723	96	Gravel surface, HSG C
16,600	74	>75% Grass cover, Good, HSG C
36,488	87	Weighted Average
19,323		52.96% Pervious Area
17,165		47.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.6	70	0.0290	0.18		<b>Sheet Flow, Grass</b> Grass: Short n= 0.150 P2= 3.00"
1.0	78	0.0064	1.29		<b>Shallow Concentrated Flow, Gravel</b> Unpaved Kv= 16.1 fps
7.6	148	Total			

**Summary for Subcatchment P1A: Toward DB#1**

Runoff = 2.02 cfs @ 12.12 hrs, Volume= 0.160 af, Depth&gt; 4.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-Year Rainfall=6.40"

Area (sf)	CN	Description
1,900	98	Unconnected pavement, HSG C
6,497	98	Water Surface, HSG C
7,740	74	>75% Grass cover, Good, HSG C
* 493	77	Stone Dust, HSG C
* 1,720	65	Landscape, HSG C
18,350	84	Weighted Average
9,953		54.24% Pervious Area
8,397		45.76% Impervious Area
1,900		22.63% Unconnected

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	73	0.0170	0.14		<b>Sheet Flow, Grass</b> Grass: Short n= 0.150 P2= 3.00"
0.3	13	0.0165	0.82		<b>Sheet Flow, Paved</b> Smooth surfaces n= 0.011 P2= 3.00"
0.1	40	0.1000	4.74		<b>Shallow Concentrated Flow, Grass</b> Grassed Waterway Kv= 15.0 fps
8.8	126	Total			

**Summary for Subcatchment P1B: Toward DB#2**

Runoff = 4.77 cfs @ 12.14 hrs, Volume= 0.401 af, Depth> 4.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-Year Rainfall=6.40"

Area (sf)	CN	Description
5,025	98	Unconnected pavement, HSG C
13,429	98	Roofs, HSG C
4,779	98	Water Surface, HSG C
15,611	74	>75% Grass cover, Good, HSG C
* 534	77	Stone Dust, HSG C
* 4,442	65	Landscape, HSG C
43,820	86	Weighted Average
20,587		46.98% Pervious Area
23,233		53.02% Impervious Area
5,025		21.63% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	100	0.0200	0.16		<b>Sheet Flow, Grass</b> Grass: Short n= 0.150 P2= 3.00"
0.2	40	0.0500	3.35		<b>Shallow Concentrated Flow, Grass</b> Grassed Waterway Kv= 15.0 fps
10.3	140	Total			

**Summary for Subcatchment P1C: To CB#8**

Runoff = 0.03 cfs @ 12.36 hrs, Volume= 0.006 af, Depth> 0.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-Year Rainfall=6.40"

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Area (sf)	CN	Description
126	98	Unconnected pavement, HSG C
5,038	39	>75% Grass cover, Good, HSG A
5,164	40	Weighted Average
5,038		97.56% Pervious Area
126		2.44% Impervious Area
126		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	94	0.0175	0.15		<b>Sheet Flow, Grass</b> Grass: Short n= 0.150 P2= 3.00"
0.8	45	0.0175	0.93		<b>Shallow Concentrated Flow, Grass</b> Short Grass Pasture Kv= 7.0 fps
11.0	139	Total			

**Summary for Subcatchment P1D: To CB#4**

Runoff = 1.20 cfs @ 12.07 hrs, Volume= 0.094 af, Depth> 6.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 100-Year Rainfall=6.40"

Area (sf)	CN	Description
7,805	98	Paved parking, HSG C
302	74	>75% Grass cover, Good, HSG C
8,107	97	Weighted Average
302		3.73% Pervious Area
7,805		96.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry, Min Tc</b>

**Summary for Subcatchment P1E: To CB #6**

Runoff = 0.21 cfs @ 12.07 hrs, Volume= 0.017 af, Depth> 6.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 100-Year Rainfall=6.40"

Area (sf)	CN	Description
1,436	98	Paved parking, HSG C
1,436		100.00% Impervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry, Min Tc</b>

**Summary for Subcatchment P1F: To FES#4**

Runoff = 0.07 cfs @ 12.36 hrs, Volume= 0.013 af, Depth&gt; 0.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-Year Rainfall=6.40"

Area (sf)	CN	Adj	Description
525	98		Unconnected pavement, HSG A
10,141	39		>75% Grass cover, Good, HSG A
10,666	42	40	Weighted Average, UI Adjusted
10,141			95.08% Pervious Area
525			4.92% Impervious Area
525			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	114	0.0200	0.17		<b>Sheet Flow, Grass</b> Grass: Short n= 0.150 P2= 3.00"

**Summary for Subcatchment P1G: To CB#5**

Runoff = 0.35 cfs @ 12.07 hrs, Volume= 0.027 af, Depth&gt; 5.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-Year Rainfall=6.40"

Area (sf)	CN	Description
2,082	98	Paved parking, HSG C
310	74	>75% Grass cover, Good, HSG C
2,392	95	Weighted Average
310		12.96% Pervious Area
2,082		87.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry, Min Tc</b>

**Summary for Subcatchment P1H: To Park St**

Runoff = 0.62 cfs @ 12.39 hrs, Volume= 0.101 af, Depth&gt; 0.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-Year Rainfall=6.40"

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Area (sf)	CN	Description
853	98	Paved parking, HSG A
56,917	39	>75% Grass cover, Good, HSG A
6,352	70	Woods, Good, HSG C
64,122	43	Weighted Average
63,269		98.67% Pervious Area
853		1.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	100	0.0350	0.21		<b>Sheet Flow, Grass</b> Grass: Short n= 0.150 P2= 3.00"
1.1	84	0.0360	1.33		<b>Shallow Concentrated Flow, Grass</b> Short Grass Pasture Kv= 7.0 fps
5.8	245	0.0100	0.70		<b>Shallow Concentrated Flow, Grass</b> Short Grass Pasture Kv= 7.0 fps
2.9	86	0.0100	0.50		<b>Shallow Concentrated Flow, Woods</b> Woodland Kv= 5.0 fps
17.9	515	Total			

## Summary for Subcatchment P2: To Murdock Ave

Runoff = 0.52 cfs @ 12.07 hrs, Volume= 0.039 af, Depth> 5.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-Year Rainfall=6.40"

Area (sf)	CN	Description
3,356	98	Paved parking, HSG A
223	39	>75% Grass cover, Good, HSG A
3,579	94	Weighted Average
223		6.23% Pervious Area
3,356		93.77% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry, Min Tc</b>

## Summary for Subcatchment P3: To Oak St

Runoff = 1.18 cfs @ 12.07 hrs, Volume= 0.082 af, Depth> 4.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-Year Rainfall=6.40"



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Area (sf)	CN	Description
3,655	98	Paved parking, HSG C
161	96	Gravel surface, HSG C
*	956	Landscape, HSG C
4,826	74	>75% Grass cover, Good, HSG C
9,598	83	Weighted Average
5,943		61.92% Pervious Area
3,655		38.08% Impervious Area

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

**Summary for Reach CP-E1: Park St**

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.688 ac, 4.15% Impervious, Inflow Depth > 1.11" for 100-Year event  
 Inflow = 1.90 cfs @ 12.29 hrs, Volume= 0.248 af  
 Outflow = 1.90 cfs @ 12.29 hrs, Volume= 0.248 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3

**Summary for Reach CP-E2: Murdock Ave**

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.328 ac, 31.74% Impervious, Inflow Depth > 4.35" for 100-Year event  
 Inflow = 1.66 cfs @ 12.09 hrs, Volume= 0.119 af  
 Outflow = 1.66 cfs @ 12.09 hrs, Volume= 0.119 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3

**Summary for Reach CP-E3: Oak St**

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.838 ac, 47.04% Impervious, Inflow Depth > 4.89" for 100-Year event  
 Inflow = 4.41 cfs @ 12.10 hrs, Volume= 0.342 af  
 Outflow = 4.41 cfs @ 12.10 hrs, Volume= 0.342 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3

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### Summary for Reach CP-P1: To Park St

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 3.537 ac, 28.86% Impervious, Inflow Depth > 0.54" for 100-Year event  
Inflow = 1.50 cfs @ 12.61 hrs, Volume= 0.159 af  
Outflow = 1.50 cfs @ 12.61 hrs, Volume= 0.159 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3

### Summary for Reach CP-P2: Murdock Ave

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.082 ac, 93.77% Impervious, Inflow Depth > 5.69" for 100-Year event  
Inflow = 0.52 cfs @ 12.07 hrs, Volume= 0.039 af  
Outflow = 0.52 cfs @ 12.07 hrs, Volume= 0.039 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3

### Summary for Reach CP-P3: Oak St

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.220 ac, 38.08% Impervious, Inflow Depth > 4.46" for 100-Year event  
Inflow = 1.18 cfs @ 12.07 hrs, Volume= 0.082 af  
Outflow = 1.18 cfs @ 12.07 hrs, Volume= 0.082 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3

### Summary for Pond #4: CB#4

[57] Hint: Peaked at 998.78' (Flood elevation advised)

Inflow Area = 0.519 ac, 52.42% Impervious, Inflow Depth > 3.47" for 100-Year event  
Inflow = 1.78 cfs @ 12.07 hrs, Volume= 0.150 af  
Outflow = 1.78 cfs @ 12.07 hrs, Volume= 0.150 af, Atten= 0%, Lag= 0.0 min  
Primary = 1.78 cfs @ 12.07 hrs, Volume= 0.150 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 998.78' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	997.90'	<b>12.0" Round Culvert</b> L= 186.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 997.90' / 996.50' S= 0.0075 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

**Primary OutFlow** Max=1.77 cfs @ 12.07 hrs HW=998.77' TW=997.86' (Dynamic Tailwater)

↑**1=Culvert** (Outlet Controls 1.77 cfs @ 3.25 fps)

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## Summary for Pond #5: CB#5

[57] Hint: Peaked at 998.90' (Flood elevation advised)

Inflow Area = 0.055 ac, 87.04% Impervious, Inflow Depth > 5.81" for 100-Year event  
 Inflow = 0.35 cfs @ 12.07 hrs, Volume= 0.027 af  
 Outflow = 0.35 cfs @ 12.07 hrs, Volume= 0.027 af, Atten= 0%, Lag= 0.0 min  
 Primary = 0.35 cfs @ 12.07 hrs, Volume= 0.027 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3  
 Peak Elev= 998.90' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	998.43'	<b>12.0" Round Culvert</b> L= 57.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 998.43' / 998.00' S= 0.0075' / Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

**Primary OutFlow** Max=0.35 cfs @ 12.07 hrs HW=998.89' TW=998.77' (Dynamic Tailwater)  
 ↑1=Culvert (Outlet Controls 0.35 cfs @ 1.44 fps)

## Summary for Pond #6: CB#6

[57] Hint: Peaked at 999.44' (Flood elevation advised)

Inflow Area = 0.278 ac, 16.20% Impervious, Inflow Depth > 1.28" for 100-Year event  
 Inflow = 0.22 cfs @ 12.08 hrs, Volume= 0.030 af  
 Outflow = 0.22 cfs @ 12.08 hrs, Volume= 0.030 af, Atten= 0%, Lag= 0.0 min  
 Primary = 0.22 cfs @ 12.08 hrs, Volume= 0.030 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3  
 Peak Elev= 999.44' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	999.17'	<b>12.0" Round Culvert</b> L= 142.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 999.17' / 998.00' S= 0.0082' / Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

**Primary OutFlow** Max=0.22 cfs @ 12.08 hrs HW=999.44' TW=998.78' (Dynamic Tailwater)  
 ↑1=Culvert (Outlet Controls 0.22 cfs @ 1.93 fps)

## Summary for Pond CA1: Containment Area @ FES #4

Inflow Area = 0.245 ac, 4.92% Impervious, Inflow Depth > 0.63" for 100-Year event  
 Inflow = 0.07 cfs @ 12.36 hrs, Volume= 0.013 af  
 Outflow = 0.07 cfs @ 12.37 hrs, Volume= 0.013 af, Atten= 0%, Lag= 0.7 min  
 Primary = 0.07 cfs @ 12.37 hrs, Volume= 0.013 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3

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Peak Elev= 1,000.09' @ 12.36 hrs Surf.Area= 41 sf Storage= 3 cf

Plug-Flow detention time= 0.3 min calculated for 0.013 af (100% of inflow)  
 Center-of-Mass det. time= 0.3 min ( 941.4 - 941.0 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,000.00'	845 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,000.00	20	16.0	0	0	20
1,001.00	709	156.0	283	283	1,938
1,001.50	1,601	266.0	563	845	5,634

Device	Routing	Invert	Outlet Devices
#1	Primary	999.95'	<b>12.0" Round Culvert</b> L= 90.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 999.95' / 999.27' S= 0.0076 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

**Primary OutFlow** Max=0.07 cfs @ 12.37 hrs HW=1,000.09' TW=999.38' (Dynamic Tailwater)  
 ↑**1=Culvert** (Outlet Controls 0.07 cfs @ 1.68 fps)

**Summary for Pond CA2: Containment Area @ CB#8**

Inflow Area = 0.119 ac, 2.44% Impervious, Inflow Depth > 0.63" for 100-Year event  
 Inflow = 0.03 cfs @ 12.36 hrs, Volume= 0.006 af  
 Outflow = 0.03 cfs @ 12.36 hrs, Volume= 0.006 af, Atten= 0%, Lag= 0.0 min  
 Discarded = 0.00 cfs @ 12.40 hrs, Volume= 0.000 af  
 Primary = 0.03 cfs @ 12.36 hrs, Volume= 0.006 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3  
 Peak Elev= 999.25' @ 0.00 hrs Surf.Area= 16 sf Storage= 0 cf

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

Volume	Invert	Avail.Storage	Storage Description
#1	999.25'	1,384 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
999.25	16	16.0	0	0	16
1,000.00	603	139.0	179	179	1,534
1,001.00	1,931	290.0	1,204	1,384	6,694

Device	Routing	Invert	Outlet Devices
#1	Primary	997.70'	<b>8.0" Round Culvert</b> L= 162.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 997.70' / 996.50' S= 0.0074 '/' Cc= 0.900

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#2 Discarded 999.25' n= 0.012, Flow Area= 0.35 sf  
**8.270 in/hr Exfiltration over Surface area**  
 Conductivity to Groundwater Elevation = 0.00'

**Discarded OutFlow** Max=0.00 cfs @ 12.40 hrs HW=999.25' (Free Discharge)  
 ↑**2=Exfiltration** (Passes 0.00 cfs of 0.00 cfs potential flow)

**Primary OutFlow** Max=0.00 cfs @ 12.36 hrs HW=999.25' TW=998.48' (Dynamic Tailwater)  
 ↑**1=Culvert** (Passes 0.00 cfs of 0.82 cfs potential flow)

**Summary for Pond DB1: Detention/ Infiltration Basin #1**

Inflow Area = 2.065 ac, 48.48% Impervious, Inflow Depth > 3.18" for 100-Year event  
 Inflow = 6.03 cfs @ 12.12 hrs, Volume= 0.547 af  
 Outflow = 1.39 cfs @ 12.63 hrs, Volume= 0.455 af, Atten= 77%, Lag= 30.6 min  
 Discarded = 0.37 cfs @ 12.63 hrs, Volume= 0.396 af  
 Primary = 1.02 cfs @ 12.63 hrs, Volume= 0.058 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3  
 Peak Elev= 998.58' @ 12.63 hrs Surf.Area= 6,617 sf Storage= 10,687 cf

Plug-Flow detention time= 231.9 min calculated for 0.455 af (83% of inflow)  
 Center-of-Mass det. time= 163.0 min ( 960.2 - 797.2 )

Volume	Invert	Avail.Storage	Storage Description			
#1	996.50'	13,617 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
996.50	3,796	263.0	0	0	3,796	
997.00	4,404	283.0	2,048	2,048	4,676	
998.00	5,755	324.0	5,064	7,113	6,679	
998.50	6,497	344.0	3,061	10,174	7,755	
999.00	7,285	364.0	3,444	13,617	8,896	

Device	Routing	Invert	Outlet Devices													
#1	Primary	998.50'	<b>20.0' 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													
#2	Discarded	996.50'	<b>2.410 in/hr Exfiltration over Surface area</b>													
			Conductivity to Groundwater Elevation = 0.00' Phase-In= 0.01'													

**Discarded OutFlow** Max=0.37 cfs @ 12.63 hrs HW=998.58' (Free Discharge)  
 ↑**2=Exfiltration** ( Controls 0.37 cfs)

**Primary OutFlow** Max=1.02 cfs @ 12.63 hrs HW=998.58' TW=0.00' (Dynamic Tailwater)  
 ↑**1=Broad-Crested Rectangular Weir**(Weir Controls 1.02 cfs @ 0.65 fps)

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**Summary for Pond DB2: Detention/ Infiltration Basin #2**

Inflow Area = 1.643 ac, 49.18% Impervious, Inflow Depth > 4.07" for 100-Year event  
 Inflow = 6.19 cfs @ 12.12 hrs, Volume= 0.557 af  
 Outflow = 4.12 cfs @ 12.13 hrs, Volume= 0.539 af, Atten= 33%, Lag= 0.6 min  
 Discarded = 0.22 cfs @ 12.60 hrs, Volume= 0.152 af  
 Primary = 4.01 cfs @ 12.13 hrs, Volume= 0.387 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3  
 Peak Elev= 998.60' @ 12.60 hrs Surf.Area= 3,894 sf Storage= 3,162 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 42.5 min ( 834.0 - 791.5 )

Volume	Invert	Avail.Storage	Storage Description		
#1	996.50'	5,448 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
996.50	471	90.0	0	0	471
997.00	865	130.0	329	329	1,173
998.00	1,744	208.0	1,279	1,608	3,278
998.50	3,142	246.0	1,204	2,813	4,656
999.00	7,738	408.0	2,635	5,448	13,088

Device	Routing	Invert	Outlet Devices
#1	Primary	996.50'	<b>18.0" Round Culvert</b> L= 30.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 996.50' / 996.50' S= 0.0000 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf
#2	Discarded	996.50'	<b>2.410 in/hr Exfiltration over Surface area</b> Conductivity to Groundwater Elevation = 0.00'

**Discarded OutFlow** Max=0.22 cfs @ 12.60 hrs HW=998.60' (Free Discharge)

↑**2=Exfiltration** ( Controls 0.22 cfs)

**Primary OutFlow** Max=4.01 cfs @ 12.13 hrs HW=998.09' TW=997.80' (Dynamic Tailwater)

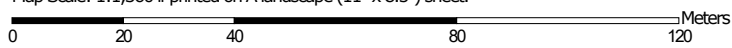
↑**1=Culvert** (Inlet Controls 4.01 cfs @ 2.27 fps)

## **Appendix B – Soils Information**

Hydrologic Soil Group—Worcester County, Massachusetts, Northwestern Part  
(MVOC Winchendon)



Map Scale: 1:1,360 if printed on A landscape (11" x 8.5") sheet.


































Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84





## MAP LEGEND

<b>Area of Interest (AOI)</b>		 C
Area of Interest (AOI)		 C/D
		 D
		 Not rated or not available
<b>Soils</b>		
<b>Soil Rating Polygons</b>		
 A		
 A/D		
 B		
 B/D		
 C		
 C/D		
 D		
 Not rated or not available		
<b>Soil Rating Lines</b>		
 A		
 A/D		
 B		
 B/D		
 C		
 C/D		
 D		
 Not rated or not available		
<b>Soil Rating Points</b>		
 A		
 A/D		
 B		
 B/D		
<b>Water Features</b>		
 Streams and Canals		
<b>Transportation</b>		
 Rails		
 Interstate Highways		
 US Routes		
 Major Roads		
 Local Roads		
<b>Background</b>		
 Aerial Photography		

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:25,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service  
Web Soil Survey URL:  
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Worcester County, Massachusetts,  
Northwestern Part  
Survey Area Data: Version 14, Jun 10, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 18, 2019—Jul 9, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
365B	Skerry fine sandy loam, 3 to 8 percent slopes	C/D	7.5	100.0%
<b>Totals for Area of Interest</b>			<b>7.5</b>	<b>100.0%</b>

### Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

### Rating Options

*Aggregation Method: Dominant Condition*

*Component Percent Cutoff: None Specified*

**SHALLOW BORING TO 30' OR REFUSAL**

**SB#1**

**DEEP HOLE TEST PIT FOR STORMWATER (WITH BACKHOE):**  
To allow soil investigation of soil characteristics, infiltration capacity, stormwater classification of soil estimated seasonal high water mark.

**TP#1**

**TP#2**

**DEEP BORING TO 60' OR REFUSAL**

**DB#1**

**SB#2**

**TP#6 (OPTIONAL)**

**TP#5**

**TP#4**

**TP#3**

**TP #4 HAD TO BE RELOCATED TO THE NORTH OF THIS LOCATION**













## **Appendix C – Proposed Stormwater Management System Operation & Maintenance Plan**

**Proposed  
Operation & Maintenance Plan  
*Stormwater Management***

**During Construction**

The Contractor shall be responsible for inspection and maintenance during construction.

At all times, siltation fabric fencing, stakes and hay bales sufficient to construct a sedimentation control barrier a minimum of 50 feet long will be stockpiled on the site in order to repair established barriers which may have been damaged or breached.

An inspection of all erosion control and stormwater management systems shall be conducted by the Contractor at least once a week and during all rain storms until the completion of construction. In case of any noted breach or failure, the Contractor shall immediately make appropriate repairs to any erosion control system and notify the engineer of any problems involving stormwater management systems.

A rain storm shall be defined as all or one of the following:

- Any storm in which rain is predicted to last for twelve consecutive hours or more.
- Any storm for which a flash flood watch or warning is issued.
- Any single storm predicted to have a cumulative rainfall of greater than 1/2 inch.
- Any storm not meeting the previous three thresholds but which would mark a third consecutive day of measurable rainfall.

The Contractor shall also inspect the erosion control and stormwater management systems at times of significant increase in surface water runoff due to rapid thawing when the risk of failure of erosion control measures is significant.

In such instances as remedial action is necessary, the Contractor shall repair any and all significant deficiencies in erosion control systems within two days.

The Winchendon Conservation Commission shall be notified of any significant failure of stormwater management systems & erosion and sediment control measures and shall be notified of any release of pollutants to a water body (stream, brook, pond, etc.).

The Contractor shall remove the sediment from behind the face of the sedimentation control barrier when the accumulated sediment has reached one-half of the original installed height of the barrier.

This project requires a NPDES General Permit for Stormwater Discharges from Constriction Activities. Contractor and Owner are responsible for finalizing a Stormwater Pollution Prevention Plan (SWPPP) and filing for the NDPEs permit prior to the start of construction. All clearing, grading, drainage, construction, and development shall be conducted in strict accordance with the SWPPP.

**Post-Construction**

***Stormwater Management System Owner:***

Montachusett Veterans Outreach Center  
268 Central Street  
Gardner, Massachusetts 01440  
(978) 632-9601

***Party Responsible for Operation & Maintenance:***

Montachusett Veterans Outreach Center  
268 Central Street  
Gardner, Massachusetts 01440  
(978) 632-9601

***Inspection & Maintenance Schedule:***

1) **Detention Ponds**

*(The following recommendations follow the MADEP Stormwater Policy guidelines.)*

*Inspections*

- a. Initial six months of use:  
Inspect infiltration basins after every major storm event. Examine for stabilization and function, including determination of the duration of water standing in the basin, any sediment erosion, excessive compaction of soils, or low spots.
- b. Twice per year:  
Examine basin for the following: differential settlement, cracking, erosion, leakage, or tree growth on embankments, condition of riprap, sediment accumulation, and health of turf.

Any adverse conditions noted during any inspections shall be addressed by repair or reconsideration of design components.

*Mowing and General Maintenance*

Occasional mowing (1-2 times per year min.) shall be performed on the side slopes and basin bottom. Accumulated grass clippings and/or organic matter and trash and debris shall be removed. Any clogged surface areas can be loosened by deep tilling; tilled areas must be immediately re-vegetated. Tilling may be used in this manner for no more than two consecutive maintenance periods. Thereafter, sediment in the clogged areas shall be removed, liner material replaced, and vegetation re-established.

### *Dredging/Sediment Removal*

Accumulated sediment shall be removed from the basin at five (5) year intervals, or as required to maintain the function of the stormwater management system as designed. During this process and until the disturbed sediment has settled, the outlet pipe shall be sealed so as to minimize the risk of conveying sediment beyond the basin

## **2) Stormwater Treatment Chamber**

The Stormwater Treatment Chamber, shall be inspected and maintained according the manufacturer's specifications. Maintenance be completed on the structures at least once per year, but the units should be checked once every three months during the first year to determine the rate of sediment and oil accumulation and to establish an appropriate maintenance schedule. The rate at which the system collects pollutants will depend on site activities. Maintenance or cleaning shall be performed when the stored volume reaches 15% of the capacity, when oil (hydrocarbon) has accumulated to 1 inch or greater depth, or immediately in the event of a fuel or oil spill according the manufacturer's specifications. All material removed from the chamber shall be disposed in accordance with applicable local, state, and federal guidelines and regulations

## **3) Hooded Catch Basin with Sump**

Oil and water separators should be inspected at least four times per year and cleaned annually or more often if required. Oil and sediments should be removed and disposed of when sediment deposits are greater than or equal to one half the depth from the bottom of the invert of the lowest pipe in the basin, and should be disposed of in accordance with local, state and federal guidelines and regulations. In the case of an oil or bulk pollutant release, the system must be cleaned immediately following the spill and the proper authorities notified. Remove oils if any visible sheen observed.