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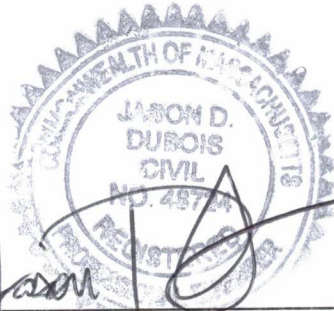
508-769-6659
508-341-2127

STORMWATER DRAINAGE ANALYSIS

**MDS LLC
#1570 Main Street
Leicester, MA
JOB NUMBER 2019-134**

**DATE : January 4, 2021
Revised: March 2, 2021**

**Developer:
MDS LLC
1570 Main Street
Leicester, MA 01524**



**JASON D. DUBOIS, P.E.
MA P.E. LICENSE NO. 48724**

SUMMARY

The proposed development will have a decrease in peak rate of runoff for the site. A comparison of the rates of runoff for storms of various return periods are tabulated and presented below.

Return Period	<u>Total Runoff to the Eastern Property Line</u>	
	Exist. (cfs)	Prop. (cfs)
2 yr	3.40	2.89
10 yr	6.04	5.83
25 yr	7.80	7.53
100 yr	10.75	10.18



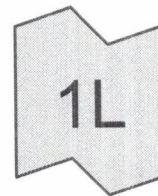
Existing Runoff To
Eastern Property Line



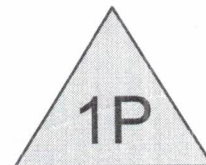
Proposed Runoff To
Eastern Property Line



Tributary to Detention
Basin



Total Runoff to Eastern
Property Line



Basin 1



Existing

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Type III 24-hr 2 -yr Rainfall=3.20"

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Page 2

Summary for Subcatchment 1S: Existing Runoff To Eastern Property Line

Runoff = 3.40 cfs @ 12.15 hrs, Volume= 0.260 af, Depth> 1.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 -yr Rainfall=3.20"

Area (sf)	CN	Description
36,317	74	>75% Grass cover, Good, HSG C
15,378	73	Woods, Fair, HSG C
* 10,911	98	Driveway & Roofs
32,945	89	Gravel, HSG C
95,551	82	Weighted Average
84,640		88.58% Pervious Area
10,911		11.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
2.6	134	0.0150	0.86		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.5	130	0.0080	1.44		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.3	17	0.0300	0.87		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
10.0	331	Total			

Summary for Subcatchment 2S: Proposed Runoff To Eastern Property Line

Runoff = 2.57 cfs @ 12.12 hrs, Volume= 0.188 af, Depth> 1.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 -yr Rainfall=3.20"

Area (sf)	CN	Description
4,923	74	>75% Grass cover, Good, HSG C
15,378	73	Woods, Fair, HSG C
* 1,711	98	Driveway & Roofs
* 40,748	89	Gravel, HSG C
62,760	84	Weighted Average
61,049		97.27% Pervious Area
1,711		2.73% Impervious Area

Existing

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Type III 24-hr 2 -yr Rainfall=3.20"

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Page 3

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
0.3	17	0.0150	0.86		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
2.3	221	0.0100	1.61		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.3	17	0.0300	0.87		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
8.5	305	Total			

Summary for Subcatchment 3S: Tributary to Detention Basin

Runoff = 1.43 cfs @ 12.13 hrs, Volume= 0.107 af, Depth> 1.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 -yr Rainfall=3.20"

	Area (sf)	CN	Description
*	7,930	98	Roof
*	8,614	98	Driveway
	16,217	74	>75% Grass cover, Good, HSG C
	32,761	86	Weighted Average
	16,217		49.50% Pervious Area
	16,544		50.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	50	0.0100	0.11		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
0.3	13	0.0100	0.70		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.5	72	0.0130	2.31		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.8	36	0.0130	0.80		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
9.0	171	Total			

Summary for Pond 1P: Basin 1

Inflow Area = 0.752 ac, 50.50% Impervious, Inflow Depth > 1.71" for 2-yr event
Inflow = 1.43 cfs @ 12.13 hrs, Volume= 0.107 af
Outflow = 0.78 cfs @ 12.32 hrs, Volume= 0.083 af, Atten= 45%, Lag= 11.5 min
Primary = 0.78 cfs @ 12.32 hrs, Volume= 0.083 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Existing

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Type III 24-hr 2 -yr Rainfall=3.20"

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Page 4

Peak Elev= 1,053.44' @ 12.32 hrs Surf.Area= 2,152 sf Storage= 1,767 cf

Plug-Flow detention time= 107.2 min calculated for 0.083 af (78% of inflow)

Center-of-Mass det. time= 50.8 min (840.8 - 790.0)

Volume	Invert	Avail.Storage	Storage Description		
#1	1,052.50'	3,069 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,052.50	1,616	182.0	0	0	1,616
1,053.00	1,897	192.0	877	877	1,928
1,054.00	2,500	210.0	2,192	3,069	2,538

Device	Routing	Invert	Outlet Devices
#1	Primary	1,053.00'	10.0" Round Culvert L= 35.0' Ke= 0.500 Inlet / Outlet Invert= 1,053.00' / 1,052.65' S= 0.0100 '/' Cc= 0.900 n= 0.011, Flow Area= 0.55 sf
#2	Primary	1,053.25'	8.0" Round Culvert L= 32.0' Ke= 0.500 Inlet / Outlet Invert= 1,053.25' / 1,052.93' S= 0.0100 '/' Cc= 0.900 n= 0.010, Flow Area= 0.35 sf
#3	Secondary	1,053.95'	10.0' long x 10.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.77 cfs @ 12.32 hrs HW=1,053.44' (Free Discharge)↑ **1=Culvert** (Inlet Controls 0.66 cfs @ 2.25 fps)└ **2=Culvert** (Inlet Controls 0.12 cfs @ 1.48 fps)**Secondary OutFlow** Max=0.00 cfs @ 5.00 hrs HW=1,052.50' (Free Discharge)↑ **3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)**Summary for Link 1L: Total Runoff to Eastern Property Line**

Inflow Area = 2.193 ac, 19.11% Impervious, Inflow Depth > 1.48" for 2 -yr event
 Inflow = 2.89 cfs @ 12.15 hrs, Volume= 0.271 af
 Primary = 2.89 cfs @ 12.15 hrs, Volume= 0.271 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Existing

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Type III 24-hr 10-yr Rainfall=4.60"

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Page 5

Summary for Subcatchment 1S: Existing Runoff To Eastern Property Line

Runoff = 6.04 cfs @ 12.14 hrs, Volume= 0.465 af, Depth> 2.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Rainfall=4.60"

Area (sf)	CN	Description
36,317	74	>75% Grass cover, Good, HSG C
15,378	73	Woods, Fair, HSG C
* 10,911	98	Driveway & Roofs
32,945	89	Gravel, HSG C
95,551	82	Weighted Average
84,640		88.58% Pervious Area
10,911		11.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
2.6	134	0.0150	0.86		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.5	130	0.0080	1.44		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.3	17	0.0300	0.87		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
10.0	331	Total			

Summary for Subcatchment 2S: Proposed Runoff To Eastern Property Line

Runoff = 4.43 cfs @ 12.12 hrs, Volume= 0.327 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Rainfall=4.60"

Area (sf)	CN	Description
4,923	74	>75% Grass cover, Good, HSG C
15,378	73	Woods, Fair, HSG C
* 1,711	98	Driveway & Roofs
* 40,748	89	Gravel, HSG C
62,760	84	Weighted Average
61,049		97.27% Pervious Area
1,711		2.73% Impervious Area

Existing

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Type III 24-hr 10-yr Rainfall=4.60"

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Page 6

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
0.3	17	0.0150	0.86		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
2.3	221	0.0100	1.61		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.3	17	0.0300	0.87		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
8.5	305	Total			

Summary for Subcatchment 3S: Tributary to Detention Basin

Runoff = 2.39 cfs @ 12.13 hrs, Volume= 0.182 af, Depth> 2.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Rainfall=4.60"

	Area (sf)	CN	Description
*	7,930	98	Roof
*	8,614	98	Driveway
	16,217	74	>75% Grass cover, Good, HSG C
	32,761	86	Weighted Average
	16,217		49.50% Pervious Area
	16,544		50.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	50	0.0100	0.11		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
0.3	13	0.0100	0.70		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.5	72	0.0130	2.31		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.8	36	0.0130	0.80		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
9.0	171	Total			

Summary for Pond 1P: Basin 1

Inflow Area = 0.752 ac, 50.50% Impervious, Inflow Depth > 2.91" for 10-yr event
 Inflow = 2.39 cfs @ 12.13 hrs, Volume= 0.182 af
 Outflow = 1.77 cfs @ 12.23 hrs, Volume= 0.157 af, Atten= 26%, Lag= 6.0 min
 Primary = 1.77 cfs @ 12.23 hrs, Volume= 0.157 af
 Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

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Type III 24-hr 10-yr Rainfall=4.60"

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Page 7

Peak Elev= 1,053.66' @ 12.23 hrs Surf.Area= 2,288 sf Storage= 2,265 cf

Plug-Flow detention time= 79.5 min calculated for 0.157 af (86% of inflow)

Center-of-Mass det. time= 39.6 min (817.2 - 777.6)

Volume	Invert	Avail.Storage	Storage Description		
#1	1,052.50'	3,069 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,052.50	1,616	182.0	0	0	1,616
1,053.00	1,897	192.0	877	877	1,928
1,054.00	2,500	210.0	2,192	3,069	2,538

Device	Routing	Invert	Outlet Devices
#1	Primary	1,053.00'	10.0" Round Culvert L= 35.0' Ke= 0.500 Inlet / Outlet Invert= 1,053.00' / 1,052.65' S= 0.0100 '/' Cc= 0.900 n= 0.011, Flow Area= 0.55 sf
#2	Primary	1,053.25'	8.0" Round Culvert L= 32.0' Ke= 0.500 Inlet / Outlet Invert= 1,053.25' / 1,052.93' S= 0.0100 '/' Cc= 0.900 n= 0.010, Flow Area= 0.35 sf
#3	Secondary	1,053.95'	10.0' long x 10.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=1.76 cfs @ 12.23 hrs HW=1,053.66' (Free Discharge)↑ **1=Culvert** (Barrel Controls 1.26 cfs @ 3.74 fps)↑ **2=Culvert** (Inlet Controls 0.49 cfs @ 2.18 fps)**Secondary OutFlow** Max=0.00 cfs @ 5.00 hrs HW=1,052.50' (Free Discharge)↑ **3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)**Summary for Link 1L: Total Runoff to Eastern Property Line**

Inflow Area = 2.193 ac, 19.11% Impervious, Inflow Depth > 2.65" for 10-yr event
 Inflow = 5.83 cfs @ 12.14 hrs, Volume= 0.484 af
 Primary = 5.83 cfs @ 12.14 hrs, Volume= 0.484 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Existing

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Type III 24-hr 25-yr Rainfall=5.50"

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Page 8

Summary for Subcatchment 1S: Existing Runoff To Eastern Property Line

Runoff = 7.80 cfs @ 12.14 hrs, Volume= 0.605 af, Depth> 3.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Rainfall=5.50"

Area (sf)	CN	Description
36,317	74	>75% Grass cover, Good, HSG C
15,378	73	Woods, Fair, HSG C
* 10,911	98	Driveway & Roofs
32,945	89	Gravel, HSG C
95,551	82	Weighted Average
84,640		88.58% Pervious Area
10,911		11.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
2.6	134	0.0150	0.86		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.5	130	0.0080	1.44		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.3	17	0.0300	0.87		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
10.0	331	Total			

Summary for Subcatchment 2S: Proposed Runoff To Eastern Property Line

Runoff = 5.65 cfs @ 12.12 hrs, Volume= 0.421 af, Depth> 3.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Rainfall=5.50"

Area (sf)	CN	Description
4,923	74	>75% Grass cover, Good, HSG C
15,378	73	Woods, Fair, HSG C
* 1,711	98	Driveway & Roofs
* 40,748	89	Gravel, HSG C
62,760	84	Weighted Average
61,049		97.27% Pervious Area
1,711		2.73% Impervious Area

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Type III 24-hr 25-yr Rainfall=5.50"

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Page 9

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
0.3	17	0.0150	0.86		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
2.3	221	0.0100	1.61		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.3	17	0.0300	0.87		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
8.5	305	Total			

Summary for Subcatchment 3S: Tributary to Detention Basin

Runoff = 3.02 cfs @ 12.13 hrs, Volume= 0.232 af, Depth> 3.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Rainfall=5.50"

	Area (sf)	CN	Description
*	7,930	98	Roof
*	8,614	98	Driveway
	16,217	74	>75% Grass cover, Good, HSG C
	32,761	86	Weighted Average
	16,217		49.50% Pervious Area
	16,544		50.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	50	0.0100	0.11		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
0.3	13	0.0100	0.70		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.5	72	0.0130	2.31		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.8	36	0.0130	0.80		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
9.0	171	Total			

Summary for Pond 1P: Basin 1

Inflow Area = 0.752 ac, 50.50% Impervious, Inflow Depth > 3.71" for 25-yr event
 Inflow = 3.02 cfs @ 12.13 hrs, Volume= 0.232 af
 Outflow = 2.30 cfs @ 12.22 hrs, Volume= 0.207 af, Atten= 24%, Lag= 5.7 min
 Primary = 2.30 cfs @ 12.22 hrs, Volume= 0.207 af
 Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

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Type III 24-hr 25-yr Rainfall=5.50"

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Page 10

Peak Elev= 1,053.77' @ 12.22 hrs Surf.Area= 2,356 sf Storage= 2,518 cf

Plug-Flow detention time= 71.2 min calculated for 0.207 af (89% of inflow)
 Center-of-Mass det. time= 36.7 min (808.5 - 771.8)

Volume	Invert	Avail.Storage	Storage Description		
#1	1,052.50'	3,069 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,052.50	1,616	182.0	0	0	1,616
1,053.00	1,897	192.0	877	877	1,928
1,054.00	2,500	210.0	2,192	3,069	2,538

Device	Routing	Invert	Outlet Devices
#1	Primary	1,053.00'	10.0" Round Culvert L= 35.0' Ke= 0.500 Inlet / Outlet Invert= 1,053.00' / 1,052.65' S= 0.0100 '/' Cc= 0.900 n= 0.011, Flow Area= 0.55 sf
#2	Primary	1,053.25'	8.0" Round Culvert L= 32.0' Ke= 0.500 Inlet / Outlet Invert= 1,053.25' / 1,052.93' S= 0.0100 '/' Cc= 0.900 n= 0.010, Flow Area= 0.35 sf
#3	Secondary	1,053.95'	10.0' long x 10.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=2.28 cfs @ 12.22 hrs HW=1,053.77' (Free Discharge)

1=Culvert (Barrel Controls 1.56 cfs @ 3.89 fps)

2=Culvert (Inlet Controls 0.71 cfs @ 2.45 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,052.50' (Free Discharge)

3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Link 1L: Total Runoff to Eastern Property Line

Inflow Area = 2.193 ac, 19.11% Impervious, Inflow Depth > 3.44" for 25-yr event
 Inflow = 7.53 cfs @ 12.14 hrs, Volume= 0.628 af
 Primary = 7.53 cfs @ 12.14 hrs, Volume= 0.628 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Existing

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Type III 24-hr 100-yr Rainfall=7.00"

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Page 11

Summary for Subcatchment 1S: Existing Runoff To Eastern Property Line

Runoff = 10.75 cfs @ 12.14 hrs, Volume= 0.845 af, Depth> 4.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-yr Rainfall=7.00"

Area (sf)	CN	Description
36,317	74	>75% Grass cover, Good, HSG C
15,378	73	Woods, Fair, HSG C
* 10,911	98	Driveway & Roofs
32,945	89	Gravel, HSG C
95,551	82	Weighted Average
84,640		88.58% Pervious Area
10,911		11.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
2.6	134	0.0150	0.86		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.5	130	0.0080	1.44		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.3	17	0.0300	0.87		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
10.0	331	Total			

Summary for Subcatchment 2S: Proposed Runoff To Eastern Property Line

Runoff = 7.69 cfs @ 12.12 hrs, Volume= 0.582 af, Depth> 4.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-yr Rainfall=7.00"

Area (sf)	CN	Description
4,923	74	>75% Grass cover, Good, HSG C
15,378	73	Woods, Fair, HSG C
* 1,711	98	Driveway & Roofs
* 40,748	89	Gravel, HSG C
62,760	84	Weighted Average
61,049		97.27% Pervious Area
1,711		2.73% Impervious Area

Existing

Prepared by Microsoft

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Type III 24-hr 100-yr Rainfall=7.00"

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Page 12

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
0.3	17	0.0150	0.86		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
2.3	221	0.0100	1.61		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.3	17	0.0300	0.87		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
8.5	305	Total			

Summary for Subcatchment 3S: Tributary to Detention Basin

Runoff = 4.08 cfs @ 12.12 hrs, Volume= 0.317 af, Depth> 5.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-yr Rainfall=7.00"

	Area (sf)	CN	Description
*	7,930	98	Roof
*	8,614	98	Driveway
	16,217	74	>75% Grass cover, Good, HSG C
	32,761	86	Weighted Average
	16,217		49.50% Pervious Area
	16,544		50.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	50	0.0100	0.11		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
0.3	13	0.0100	0.70		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.5	72	0.0130	2.31		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.8	36	0.0130	0.80		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
9.0	171	Total			

Summary for Pond 1P: Basin 1

Inflow Area = 0.752 ac, 50.50% Impervious, Inflow Depth > 5.06" for 100-yr event
 Inflow = 4.08 cfs @ 12.12 hrs, Volume= 0.317 af
 Outflow = 2.95 cfs @ 12.23 hrs, Volume= 0.291 af, Atten= 28%, Lag= 6.2 min
 Primary = 2.95 cfs @ 12.23 hrs, Volume= 0.291 af
 Secondary = 0.00 cfs @ 12.25 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Existing

Type III 24-hr 100-yr Rainfall=7.00"

Prepared by Microsoft

Printed 3/3/2021

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Page 13

Peak Elev= 1,053.95' @ 12.23 hrs Surf.Area= 2,471 sf Storage= 2,956 cf

Plug-Flow detention time= 61.7 min calculated for 0.291 af (92% of inflow)

Center-of-Mass det. time= 33.2 min (797.7 - 764.5)

Volume	Invert	Avail.Storage	Storage Description		
#1	1,052.50'	3,069 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,052.50	1,616	182.0	0	0	1,616
1,053.00	1,897	192.0	877	877	1,928
1,054.00	2,500	210.0	2,192	3,069	2,538

Device	Routing	Invert	Outlet Devices
#1	Primary	1,053.00'	10.0" Round Culvert L= 35.0' Ke= 0.500 Inlet / Outlet Invert= 1,053.00' / 1,052.65' S= 0.0100 ' / Cc= 0.900 n= 0.011, Flow Area= 0.55 sf
#2	Primary	1,053.25'	8.0" Round Culvert L= 32.0' Ke= 0.500 Inlet / Outlet Invert= 1,053.25' / 1,052.93' S= 0.0100 ' / Cc= 0.900 n= 0.010, Flow Area= 0.35 sf
#3	Secondary	1,053.95'	10.0' long x 10.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=2.94 cfs @ 12.23 hrs HW=1,053.95' (Free Discharge)↑ **1=Culvert** (Inlet Controls 1.92 cfs @ 3.52 fps)↑ **2=Culvert** (Inlet Controls 1.02 cfs @ 2.92 fps)**Secondary OutFlow** Max=0.00 cfs @ 12.25 hrs HW=1,053.95' (Free Discharge)↑ **3=Broad-Crested Rectangular Weir** (Weir Controls 0.00 cfs @ 0.07 fps)**Summary for Link 1L: Total Runoff to Eastern Property Line**

Inflow Area = 2.193 ac, 19.11% Impervious, Inflow Depth > 4.78" for 100-yr event

Inflow = 10.18 cfs @ 12.13 hrs, Volume= 0.873 af

Primary = 10.18 cfs @ 12.13 hrs, Volume= 0.873 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

STORMWATER MANAGEMENT CALCULATIONS

Standard #1, No New Untreated Discharges:

No new untreated discharges are proposed to existing wetland resources. The proposed site development will follow the same drainage patterns as the existing.

Standard #2, Post-development peak Discharge Rates:

Post-development peak discharge rates are demonstrated on the Summary page of this report. Post-development peak discharge rates do not exceed pre-development rates on the site at the points of discharge.

Standard #3, Recharge to groundwater

There will be an additional 7,374 s.f. of impervious surfaces.

Hydrologic Soil Group "C" = 0.25 in/hr
 $7,374 \text{ s.f.} \times 0.25 \text{ in/hr} / 12 = 153 \text{ c.f. required}$

Due to various site constraints such as the lot being relatively flat, being mapped at Hydrologic Group C soils and groundwater close to the surface, the maximum extent practicable recharge requirement is met. Test pits were done and ground water elevations are within 30 inches to the surface. In order to meet the required recharge offsets to groundwater, the site would be required to be raised with structural fill approximately 24" throughout the driveway, parking areas, and proposed building. This would incur costs that would make the project economically unfeasible.

Standard #4, 80% TSS Removal

Water quality treatment of 0.5 inches of runoff is done through the bio-retention area with sediment forebay. See TSS removal work sheet for total TSS removal rates.

Standard #5, Land Uses With Higher Potential Pollutant Loads (LUHPPLs)

The proposed Land Use is not a listed Higher Potential Pollutant Load.

Standard #6, Critical Areas

The site is not located within a critical area.

Standard #7, Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable

The site is not a redevelopment project

Standard #8, Construction Period Pollution Prevention and Erosion and Sedimentation Control

A Site Plan that shows stormwater controls has been provided under the title of "Proposed Site Plan for MDS LLC."

Standard #9, Operation/maintenance plan

See Attached Operation/maintenance plan



Checklist for Stormwater Report

A. Introduction

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



A Stormwater Report must be submitted with the Notice of Intent permit application to document compliance with the Stormwater Management Standards. The following checklist is NOT a substitute for the Stormwater Report (which should provide more substantive and detailed information) but is offered here as a tool to help the applicant organize their Stormwater Management documentation for their Report and for the reviewer to assess this information in a consistent format. As noted in the Checklist, the Stormwater Report must contain the engineering computations and supporting information set forth in Volume 3 of the Massachusetts Stormwater Handbook. The Stormwater Report must be prepared and certified by a Registered Professional Engineer (RPE) licensed in the Commonwealth.

The Stormwater Report must include:

- The Stormwater Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Stormwater Report contains all required submittals.¹ This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 8²
- Operation and Maintenance Plan required by Standard 9

In addition to all plans and supporting information, the Stormwater Report must include a brief narrative describing stormwater management practices, including environmentally sensitive site design and LID techniques, along with a diagram depicting runoff through the proposed BMP treatment train. Plans are required to show existing and proposed conditions, identify all wetland resource areas, NRCS soil types, critical areas, Land Uses with Higher Potential Pollutant Loads (LUHPPL), and any areas on the site where infiltration rate is greater than 2.4 inches per hour. The Plans shall identify the drainage areas for both existing and proposed conditions at a scale that enables verification of supporting calculations.

As noted in the Checklist, the Stormwater Management Report shall document compliance with each of the Stormwater Management Standards as provided in the Massachusetts Stormwater Handbook. The soils evaluation and calculations shall be done using the methodologies set forth in Volume 3 of the Massachusetts Stormwater Handbook.

To ensure that the Stormwater Report is complete, applicants are required to fill in the Stormwater Report Checklist by checking the box to indicate that the specified information has been included in the Stormwater Report. If any of the information specified in the checklist has not been submitted, the applicant must provide an explanation. The completed Stormwater Report Checklist and Certification must be submitted with the Stormwater Report.

¹ The Stormwater Report may also include the Illicit Discharge Compliance Statement required by Standard 10. If not included in the Stormwater Report, the Illicit Discharge Compliance Statement must be submitted prior to the discharge of stormwater runoff to the post-construction best management practices.

² For some complex projects, it may not be possible to include the Construction Period Erosion and Sedimentation Control Plan in the Stormwater Report. In that event, the issuing authority has the discretion to issue an Order of Conditions that approves the project and includes a condition requiring the proponent to submit the Construction Period Erosion and Sedimentation Control Plan before commencing any land disturbance activity on the site.



Checklist for Stormwater Report

B. Stormwater Checklist and Certification

The following checklist is intended to serve as a guide for applicants as to the elements that ordinarily need to be addressed in a complete Stormwater Report. The checklist is also intended to provide conservation commissions and other reviewing authorities with a summary of the components necessary for a comprehensive Stormwater Report that addresses the ten Stormwater Standards.

Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the item is not applicable (N.A.) and provide the reasons for that determination.

A complete checklist must include the Certification set forth below signed by the Registered Professional Engineer who prepared the Stormwater Report.

Registered Professional Engineer's Certification

I have reviewed the Stormwater Report, including the soil evaluation, computations, Long-term Pollution Prevention Plan, the Construction Period Erosion and Sedimentation Control Plan (if included), the Long-term Post-Construction Operation and Maintenance Plan, the Illicit Discharge Compliance Statement (if included) and the plans showing the stormwater management system, and have determined that they have been prepared in accordance with the requirements of the Stormwater Management Standards as further elaborated by the Massachusetts Stormwater Handbook. I have also determined that the information presented in the Stormwater Checklist is accurate and that the information presented in the Stormwater Report accurately reflects conditions at the site as of the date of this permit application.

Registered Professional Engineer Block and Signature



Jason D. Dubois 1-4-2021
Signature and Date

Checklist

Project Type: Is the application for new development, redevelopment, or a mix of new and redevelopment?

- ☒ New development
☐ Redevelopment
☐ Mix of New Development and Redevelopment



Checklist for Stormwater Report

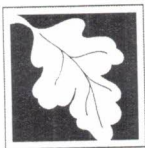
Checklist (continued)

LID Measures: Stormwater Standards require LID measures to be considered. Document what environmentally sensitive design and LID Techniques were considered during the planning and design of the project:

- ☒ No disturbance to any Wetland Resource Areas
- ☐ Site Design Practices (e.g. clustered development, reduced frontage setbacks)
- ☐ Reduced Impervious Area (Redevelopment Only)
- ☐ Minimizing disturbance to existing trees and shrubs
- ☐ LID Site Design Credit Requested:
 - ☐ Credit 1
 - ☐ Credit 2
 - ☐ Credit 3
- ☒ Use of "country drainage" versus curb and gutter conveyance and pipe
- ☒ Bioretention Cells (includes Rain Gardens)
- ☐ Constructed Stormwater Wetlands (includes Gravel Wetlands designs)
- ☐ Treebox Filter
- ☐ Water Quality Swale
- ☒ Grass Channel
- ☐ Green Roof
- ☐ Other (describe): _____

Standard 1: No New Untreated Discharges

- ☒ No new untreated discharges
- ☒ Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth
- ☒ Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.



Checklist for Stormwater Report

Checklist (continued)

Standard 2: Peak Rate Attenuation

- ☐ Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.
- ☒ Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.
- ☒ Calculations provided to show that post-development peak discharge rates do not exceed pre-development rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24-hour storm.

Standard 3: Recharge

- ☐ Soil Analysis provided.
- ☒ Required Recharge Volume calculation provided.
- ☐ Required Recharge volume reduced through use of the LID site Design Credits.
- ☐ Sizing the infiltration, BMPs is based on the following method: Check the method used.
 - ☐ Static
 - ☐ Simple Dynamic
 - ☐ Dynamic Field¹
- ☐ Runoff from all impervious areas at the site discharging to the infiltration BMP.
- ☐ Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.
- ☐ Recharge BMPs have been sized to infiltrate the Required Recharge Volume.
- ☒ Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:
 - ☒ Site is comprised solely of C and D soils and/or bedrock at the land surface
 - ☐ M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
 - ☐ Solid Waste Landfill pursuant to 310 CMR 19.000
 - ☐ Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.
- ☐ Calculations showing that the infiltration BMPs will drain in 72 hours are provided.
- ☐ Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

¹ 80% TSS removal is required prior to discharge to infiltration BMP if Dynamic Field method is used.



Checklist for Stormwater Report

Checklist (continued)

Standard 3: Recharge (continued)

- ☐ The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.
- ☐ Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

Standard 4: Water Quality

The Long-Term Pollution Prevention Plan typically includes the following:

- Good housekeeping practices;
 - Provisions for storing materials and waste products inside or under cover;
 - Vehicle washing controls;
 - Requirements for routine inspections and maintenance of stormwater BMPs;
 - Spill prevention and response plans;
 - Provisions for maintenance of lawns, gardens, and other landscaped areas;
 - Requirements for storage and use of fertilizers, herbicides, and pesticides;
 - Pet waste management provisions;
 - Provisions for operation and management of septic systems;
 - Provisions for solid waste management;
 - Snow disposal and plowing plans relative to Wetland Resource Areas;
 - Winter Road Salt and/or Sand Use and Storage restrictions;
 - Street sweeping schedules;
 - Provisions for prevention of illicit discharges to the stormwater management system;
 - Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
 - Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
 - List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.
- ☒ A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.
 - ☒ Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:
 - ☒ is within the Zone II or Interim Wellhead Protection Area
 - ☐ is near or to other critical areas
 - ☐ is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)
 - ☐ involves runoff from land uses with higher potential pollutant loads.
 - ☐ The Required Water Quality Volume is reduced through use of the LID site Design Credits.
 - ☒ Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.



Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

- ☒ The BMP is sized (and calculations provided) based on:
 - ☒ The ½" or 1" Water Quality Volume or
 - ☐ The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.
- ☐ The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the propriety BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.
- ☐ A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

Standard 5: Land Uses With Higher Potential Pollutant Loads (LUHPPLs)

- ☐ The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.
- ☐ The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted **prior** to the discharge of stormwater to the post-construction stormwater BMPs.
- ☐ The NPDES Multi-Sector General Permit does **not** cover the land use.
- ☐ LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.
- ☐ All exposure has been eliminated.
- ☐ All exposure has **not** been eliminated and all BMPs selected are on MassDEP LUHPPL list.
- ☐ The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

Standard 6: Critical Areas

- ☐ The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.
- ☐ Critical areas and BMPs are identified in the Stormwater Report.



Checklist for Stormwater Report

Checklist (continued)

Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable

- ☐ The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:
- ☐ Limited Project
 - ☐ Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.
 - ☐ Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area
 - ☐ Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
 - ☐ Bike Path and/or Foot Path
 - ☐ Redevelopment Project
 - ☐ Redevelopment portion of mix of new and redevelopment.
- ☐ Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.
- ☐ The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan must include the following information:

- Narrative;
 - Construction Period Operation and Maintenance Plan;
 - Names of Persons or Entity Responsible for Plan Compliance;
 - Construction Period Pollution Prevention Measures;
 - Erosion and Sedimentation Control Plan Drawings;
 - Detail drawings and specifications for erosion control BMPs, including sizing calculations;
 - Vegetation Planning;
 - Site Development Plan;
 - Construction Sequencing Plan;
 - Sequencing of Erosion and Sedimentation Controls;
 - Operation and Maintenance of Erosion and Sedimentation Controls;
 - Inspection Schedule;
 - Maintenance Schedule;
 - Inspection and Maintenance Log Form.
- ☒ A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.



Checklist for Stormwater Report

Checklist (continued)

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control (continued)

- ☐ The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has **not** been included in the Stormwater Report but will be submitted **before** land disturbance begins.
- ☒ The project is **not** covered by a NPDES Construction General Permit.
- ☐ The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.
- ☐ The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins.

Standard 9: Operation and Maintenance Plan

- ☒ The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:
 - ☒ Name of the stormwater management system owners;
 - ☒ Party responsible for operation and maintenance;
 - ☒ Schedule for implementation of routine and non-routine maintenance tasks;
 - ☒ Plan showing the location of all stormwater BMPs maintenance access areas;
 - ☒ Description and delineation of public safety features;
 - ☒ Estimated operation and maintenance budget; and
 - ☒ Operation and Maintenance Log Form.
- ☐ The responsible party is **not** the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:
 - ☐ A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
 - ☐ A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

Standard 10: Prohibition of Illicit Discharges

- ☒ The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;
- ☒ An Illicit Discharge Compliance Statement is attached;
- ☐ NO Illicit Discharge Compliance Statement is attached but will be submitted **prior to** the discharge of any stormwater to post-construction BMPs.

Illicit Discharge Compliance Statement
January 4, 2021

This statement is to document that there are no and will be no Illicit Discharges for the Proposed Site Plan located at 1570 Main Street, Leicester, MA operated by MDS LLC


MDS LLC

1-4-2021
Date

Location:

MDS LLC
1570 Main Street, Leicester

B

BMP

TSS Removal Calculation Worksheet

	C TSS Removal 0	D Starting TSS Load	E Amount Removed (C*D)	F Remaining Load (D-E)
Bio-Retention Area	0.80	1.00	0.80	0.20
	0.00	0.20	0.00	0.20
	0.00	0.20	0.00	0.20
	0.00	0.20	0.00	0.20
	0.00	0.20	0.00	0.20

Separate Form
Needs to be
Completed for
Each Outlet or
BMP Train

80%

Total TSS Removal =

Project No.

2019-134
J. Dubois
1/4/2021
Rev. 3/3/2021

*Equals remaining load from previous BMP (E)
which enters the BMP

**Stormwater Operation and Maintenance Plan
& Long-term Pollution Prevention Plan
for**

MDS LLC
1570 Main Street
Leicester, MA
Job #2019-134

January 4, 2021
Revised March 3, 2021

Prepared by

DC Engineering & Survey, Inc.
32 Cranberry Meadow Road
Charlton, MA 01507

Stormwater Operation and Maintenance Plan
for
MDS LLC
1570 Main Street
Leicester, MA

This is an Operation and Maintenance Plan for the Definitive Site plan.

Current Operator:

MDS LLC
1570 Main Street
Leicester, MA 01524

Long term Operator of Stormwater System:

Owner of the site

Stormwater Management Systems

The stormwater management system for the site is as follows:

- Bio-Retention Area

Inspection Schedule

The inspection log shall be completed after every inspection of each component listed below. (See attached Inspection Log sheet)

Bio-Retention Area

Check vegetation until fully established and seasonal landscaping thereafter. Check sediment forebay for accumulation after construction is complete and quarterly thereafter.

Maintenance Procedures

Maintenance log shall be completed after any maintenance is performed on any component listed. (See attached Maintenance Log sheet)

Bio-Retention Area

Inspect soil and repair eroded areas as needed. Remulch void areas as needed. Remove litter and debris. Remove and replace dead vegetation twice per year (spring and fall). Mow the buffer area and side slopes as needed during the growing season.

Plans:

Plans indicating the location and features of the stormwater management system can be found on the site plan for MDS LLC.

Description of Public Safety Features:

All features associated with the stormwater controls are located above ground and are designed with a maximum of 3:1 slopes so should not pose any danger to the public.

Operation and Maintenance Budget:

The owner will have to pay for a service to perform the operation and maintenance described above; therefore the budget is mainly for labor and disposal of sediment collected.

The estimated yearly cost is approximately \$1,000.00

Plans:

Plans indicating the location and features of the stormwater management system can be found on the site plan for MDS LLC.

Description of Public Safety Features:

All features associated with the stormwater controls are located above ground and are designed with a maximum of 3:1 slopes so should not pose any danger to the public.

Operation and Maintenance Budget:

The owner will have to pay for a service to perform the operation and maintenance described above; therefore the budget is mainly for labor and disposal of sediment collected.

The estimated yearly cost is approximately \$500.00

ation and Maintenance Plan for MDS LLC

Log of Operation and Maintenance Activities

INSPECTION LOG

[illegible]

Long-term Pollution Prevention Plan
for
MDS LLC
1570 Main Street
Leicester, MA

This is a Long-term Pollution Prevention Plan for the above-mentioned site.

Current Operator:

MDS LLC
1570 Main Street
Leicester, MA 01524

Long term Operator of Plan:

Owner of the Site

Good Housekeeping:

Good housekeeping practices, outlined below, will be used on site:

An effort will be made to store only enough products that will be needed.

All materials stored on site will be stored neatly, in their appropriate containers, and, if possible, under a roof or other enclosure.

Products will be kept in their original containers with the original manufacturer's label.

Substances will not be mixed with one another unless recommended by the manufacturer.

Whenever possible, all of a product will be used up before disposing of the container.

Manufacturer's recommendations for proper use and disposal will be followed.

Routine Inspections:

Routine inspections and procedures are outlined in the Stormwater Operation & Maintenance Plan.

Waste Materials:

All waste materials will be collected and stored in a metal dumpster. All trash and debris from the site will be deposited in the dumpsters. Dumpsters will be emptied weekly or more often if necessary, and the trash will be hauled off-site to an approved waste facility. No construction waste materials will be buried on site. All personnel will be instructed regarding the correct procedures for waste disposal. Individual(s) managing day-to-day operations will be responsible for seeing that these procedures are followed.

Hazardous Waste:

All hazardous waste materials will be disposed of in the manner specified by local or state regulation or by the manufacturer. Site personnel will be instructed in these practices and the individual managing day-to-day operations will be responsible for implementing these practices.

Hazardous Materials:

These practices will be used to reduce the risks associated with hazardous materials.

Products will be kept in original containers unless they are not re-sealable. Original labels and material safety data sheets (MSDS) will be retained; they contain important product information.

Manufacturers' and local and/or state recommended methods for proper disposal of excess materials will be followed.

Spill Control Practices:

In addition to the good housekeeping and material management practices discussed in the previous sections of this plan, the following practices will be used for spill prevention and cleanup:

Manufacturers' recommended methods for spill cleanup will be clearly posted and site personnel will be familiar with the procedures and location of the information and cleanup supplies.

Materials and equipment necessary for spill cleanup will be kept in the material storage area on site. Equipment and materials will include, but not be limited to, brooms, dust pans, mops, rags, gloves, goggles, kitty litter, sand, sawdust, and plastic and metal trash containers specifically for this purpose.

All spills will be cleaned up immediately upon discovery.

Spill areas will be kept well ventilated, and personnel will wear appropriate protective clothing to prevent injury from contact with a hazardous substance.

Spills of toxic or hazardous material will be reported to the appropriate state or local government agency, regardless of the size of the spill.

The spill prevention plan will be adjusted to include measures to prevent this type of spill from re-occurring and how to clean up the spill if there is another one. A description of the spill, what caused it, and the cleanup measures will also be included.

Snow and Ice Management:

Any deicing materials will be stored indoors and used per manufacturer's recommendations. Site personnel will be instructed in these practices and the individual managing day-to-day operations will be responsible for implementing these practices.

Grass Cutting:

The grass shall be cut to a depth of no less than 3 inches and should be cut as needed during the growing season.

Supporting Plans & Analyses:

Proposed Site Plan and Detail Drawings

Stormwater Operation and Maintenance Plan, Stormwater Drainage Analysis

Hydrologic Soil Group—Worcester County, Massachusetts, Southern Part



Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
305B	Paxton fine sandy loam, 3 to 8 percent slopes	C	7.5	7.3%
305C	Paxton fine sandy loam, 8 to 15 percent slopes	C	0.1	0.1%
307B	Paxton fine sandy loam, 0 to 8 percent slopes, extremely stony	C	53.5	52.4%
310B	Woodbridge fine sandy loam, 3 to 8 percent slopes	C/D	35.8	35.0%
312B	Woodbridge fine sandy loam, 0 to 8 percent slopes, extremely stony	C/D	5.2	5.1%
Totals for Area of Interest			102.1	100.0%

