

Practice Drainage Area Runoff CalculatorProject Name: **Low Density Residential**Discharge Point: **1**Disconnection Area # **1**

This tool may be used to calculate the required treatment volumes for the area draining to an individual practice where the practices drainage area is only a portion of the area draining to a discharge point. Where the practice receives runoff from the entire area to a discharge point, this calculator will give the same information as the Standards Compliance Workbook.

Precipitation Data* Precipitation values shall be obtained from [NOAA Atlas 14](#)

Storm	WQ Storm	1 yr, 24 hr	10 yr, 24 hr	100 yr, 24 hr
Precipitation (inches)	1.00	0.00	0.00	0.00

Drainage Area Information

Pre Development Land Use (acres)

Landuse	Hydrologic Soil Group				Total (acres)
	A	B	C	D	
Grass	0.000	0.000	0.000	0.000	0.000
Meadow	0.000	0.000	0.000	0.000	0.000
Woods	0.000	0.000	0.000	0.000	0.000
Pavement, roofs, and other impervious	0.000	0.000	0.000	0.000	0.000
Total	0.000	0.000	0.000	0.000	0.000

Post Development Land Use (acres)

Landuse	Hydrologic Soil Group				Total (acres)
	A	B	C	D	
Grass	0.000	0.000	0.000	0.000	0.000
Meadow	0.000	0.000	0.000	0.000	0.000
Woods	0.000	0.000	0.000	0.000	0.000
Pavement, roofs, and other impervious	0.000	0.000	0.000	0.000	0.000
Total	0.000	0.000	0.000	0.000	0.000

 T_v of upstream practices: 0.000 ac-ft T_v credit of this practice: 0.000 ac-ft

Treatment Standard	Required Treatment Volume	Post Development Runoff Volume	Pre-development Runoff Volume	Post Composite CN (to practice)	CN _{Adj} (with T_v practice credit)	Pre Composite CN
Channel Protection (Hydrologic Condition Method)	0.0000	0.0000	0.0000	0	0	0
Overbank Flood	0.0000	0.0000	0.0000	0	0	0
Extreme Flood	0.0000	0.0000	0.0000	0	0	0

Information for Calculating T_c by the Watershed Lag Method

Average Catchment

Hydraulic

Time of Concentration, T_c

	Slope, Y (%)	Length, l (ft)	1 yr	10 yr	100 yr
Pre Development	0%	0.00	0.0	0.0	0.0
Post Development, upstream of practice	0%	0.00	0.0	0.0	0.0
Post Development, with T _v credit from practice	0%	0.00	0.0	0.0	0.0

Project Name: **Low Density Residential**Discharge Point: **2**Dry Swale # **1****Dry Swale (4.3.2)**

Practice Drainage Area		For Permit Coverage	Not for Permit Coverage	Total to Practice
1	Total Area (acres)	0.380	0.000	0.380
2	New Impervious (acres)	0.080	0.000	0.080
3	Redeveloped Impervious	0.000	0.000	0.000
		WQ _V for credit	WQ _V not for credit	Total WQ _V
4	WQ _V to practice	0.0076	0.0000	0.0076

Modified CN for WQ (1.0") storm

88

5 Designed to Infiltrate? ☒ Yes ☐ No6* Design Volume for Infiltration (T_V) 0.0115← T_V value to enter on the Standards Compliance Workbook for this practice unless practice has under drain, then use answer to Question 367 Designed to Infiltrate >WQ_V? ☐ n/a ☐ No ☒ Yes

Note: If the practice is designed to infiltrate the WQ_V, then T_V = WQ_V. Designers may use the Practice Drainage Area Runoff Calculator (second tab) for calculation of practice-specific runoff volumes for other treatment standards. Sizing of the filter bed area/swale bottom need to consider the desired treatment volume (see treatment section). Some design requirements will change based on the size of storm the practice is designed to treat.

* Questions preceded by an asterisk (*) may change based on previously entered values

Feasibility (4.3.2.1)

		Response	Attachment location
8	Is the maximum longitudinal slope of the swale ≤5% without check dams or similar grade controls or ≤6% with grade controls?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet C-3
9*	Is the SHGWT separated one (1) foot or more from the bottom of the practice?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Test Pit Results
10*	Has the infiltration rate (fc) of the underlying soil been confirmed to be at least 0.2 inches per hour by the soil testing requirements in Section 4.3.3.2?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Infiltration Test Results

Conveyance (4.3.2.2)

		Response	Attachment location
11	Has an underdrain been provided? (required if the underlying soils have an infiltration rate of less than 0.2 inches per hour)	<input type="radio"/> Yes <input checked="" type="radio"/> No	
12*		<input type="radio"/> Yes <input type="radio"/> No	
13	Is the peak velocity for the 1-year storm non-erosive (3.5-5 fps)?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Modeling.

14	Does the swale have the capacity to convey the 10-year, 24-hour storm safely with 6 inches of freeboard?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Modeling.
15	Have the outfalls and the conveyance to the discharge point been designed/protected to avoid erosive velocities?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet C-3
16	Does the swale have a trapezoidal or parabolic cross section with side slopes \leq 2H:1V?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet C-3
17	Are check dams being used?	<input type="radio"/> Yes <input checked="" type="radio"/> No	
18*		<input type="radio"/> Yes <input type="radio"/> No	

Pre-Treatment (4.3.2.3)		Response	Attachment location
19	Has pretreatment been provided for non-rooftop runoff?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet C-3 and SW-1
20	What type of pretreatment is being used?	<input type="checkbox"/> Swale <input type="checkbox"/> Forebay (10% WQv) <input type="checkbox"/> Proprietary <input checked="" type="checkbox"/> Filter Strip <input type="checkbox"/> Deep Sump Catch Basins	

Treatment (4.3.2.4)		Response	Attachment location
21	What type filter media is being used?	<input type="radio"/> Bioretention Mix (Section 4.3.1.4) <input checked="" type="radio"/> Sand (ASTM C-33)	
22*		<input type="radio"/> Yes <input type="radio"/> No	
23	Is the swale bottom 2-8 feet wide, or have measures to prevent braiding and erosion been provided if the swale bottom is wider than 8 feet?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet C-3

Treatment Volume Calculation - Dry Swale without Underdrain		Response	Attachment location
24*	What is the Treatment Volume the Dry Swale filter bed will be sized to accommodate and treat? (Question 5)	0.0115	
25	What is the depth of the filter bed? (2-4 feet) d_f (ft)	2	
26	What is the coefficient of permeability of the filter media? k (ft/day)	3.5	
27	What is the average height of water above the filter bed? h_f (ft)	0.5	
28	What is the design filter bed drain time? (≤ 2 days) t_f (days)	2	
29*	Required minimum surface area of the filter bed A_f (ft ²)	57	
30	Design filter bed area A_f (ft ²)	80	
31	Is the dry swale storage volume, including the storage volume above the filter bed, volume in any upstream pre-treatment practice, as well as within the filter media, > 75% of the design WQv or Tv (as applicable)?	<input checked="" type="radio"/> Yes <input type="radio"/> No	

Treatment Volume Calculation- Dry Swale with Underdrain		Response	Attachment location
32*	A_f (ft ²)	80	
33*	Underdrain not used (Question 10). This section not required.	(ft)	0
34*	porosity	0	
35*		0	ft ³
36*		0.0000	ac-ft

Landscaping (4.3.2.5)		Response	Attachment location
37	Does the site plan specify a landscaping plan that ensures dense and vigorous vegetation over the contributing pervious drainage areas and the practice?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet C-3

Attachment location: Indicate the specific location (i.e. appendix, page, plan sheet) where the requisite support documentation has been provided within the application.

Practice Drainage Area Runoff CalculatorProject Name: **Low Density Residential**Discharge Point: **2**Dry Swale # **1**

This tool may be used to calculate the required treatment volumes for the area draining to an individual practice where the practices drainage area is only a portion of the area draining to a discharge point. Where the practice receives runoff from the entire area to a discharge point, this calculator will give the same information as the Standards Compliance Workbook.

Precipitation Data* Precipitation values shall be obtained from [NOAA Atlas 14](#)

Storm	WQ Storm	1 yr, 24 hr	10 yr, 24 hr	100 yr, 24 hr
Precipitation (inches)	1.00	2.05	3.43	5.08

Drainage Area Information

Pre Development Land Use (acres)

Landuse	Hydrologic Soil Group				Total (acres)
	A	B	C	D	
Grass	0.000	0.000	0.000	0.000	0.000
Meadow	0.000	0.000	0.000	0.000	0.000
Woods	0.000	0.380	0.000	0.000	0.380
Pavement, roofs, and other impervious	0.000	0.000	0.000	0.000	0.000
Total	0.000	0.380	0.000	0.000	0.380

Post Development Land Use (acres)

Landuse	Hydrologic Soil Group				Total (acres)
	A	B	C	D	
Grass	0.000	0.300	0.000	0.000	0.300
Meadow	0.000	0.000	0.000	0.000	0.000
Woods	0.000	0.000	0.000	0.000	0.000
Pavement, roofs, and other impervious	0.000	0.080	0.000	0.000	0.080
Total	0.000	0.380	0.000	0.000	0.380

 T_v of upstream practices: **0.002** ac-ft T_v credit of this practice: **0.012** ac-ft

Treatment Standard	Required Treatment Volume	Post Development Runoff Volume	Pre-development Runoff Volume	Post Composite CN (to practice)	CN _{Adj} (with T_v practice credit)	Pre Composite CN
Channel Protection (Hydrologic Condition Method)	0.0096	0.0122	0.0006	74	55	55
Overbank Flood	0.0206	0.0329	0.0102	71	64	55
Extreme Flood	0.0314	0.0657	0.0323	70	65	55

Information for Calculating T_c by the Watershed Lag Method

Average Catchment

Hydraulic

Time of Concentration, T_c

	Slope, Y (%)	Length, l (ft)	1 yr	10 yr	100 yr
Pre Development	0%	0.00	#DIV/0!	#DIV/0!	#DIV/0!
Post Development, upstream of practice	0%	0.00	#DIV/0!	#DIV/0!	#DIV/0!
Post Development, with T _v credit from practice	0%	0.00	#DIV/0!	#DIV/0!	#DIV/0!

Project Name: **Low Density Residential**Discharge Point: **2****Simple Disconnection (4.2.2)**Disconnection Area # **2**

Disconnected Area		For Permit Coverage	Not for Permit Coverage	Total to Practice
1	Total Area (acres)	0.025	0.000	0.025
2	Impervious (acres)	0.025	0.000	0.025
		WQ _V for credit	WQ _V not for credit	Total WQ _V
4	WQ _V to practice	0.0020	0.0000	0.0020

Modified CN for WQ (1.0") storm

100

3 Disconnected Area Type

- ☒ Rooftop
☒ Paths/sidewalks/driveways

* Questions preceded by an asterisk (*) may change based on previously entered values

Feasibility (4.2.2.1)		Response	Attachment location
4	For areas conveyed by sheetflow, is the disconnection area at least as wide as the area being disconnected?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet SW-1
5	For rooftop areas conveyed by downspouts, is the disconnection area at least 12 feet wide?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet SW-1
6	For rooftop areas conveyed by downspouts, is the contributing area to any one discharge location no greater than 1,000 square feet?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet SW-1
7	Do the underlying soils of the disconnection area meet the Post-Construction Soil Depth and Quality Standard?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet C-5
8*	Is the maximum contributing impervious flow path length to any one discharge location no greater than 75 feet?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet SW-1
9*	Is the maximum flow path length from the path, sidewalk, or driveway 10 feet or less?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet SW-1
10	Are disconnection areas configured such that there is no overlap between adjacent disconnection areas?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet SW-1
11	Is the maximum slope of the disconnection area no steeper than 15%?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet SW-1
12	For sites with septic systems, is the disconnection flow path cross-gradient or down-gradient of the leachfield?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet SW-1

Conveyance (4.2.2.2)		Response	Attachment location
13	Is the runoff conveyed as sheet flow across the disconnection area for the applicable design storms and prevented from channelizing?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet SW-1
14	Is the disconnection surface directed away from buildings so as to protect foundations and basements?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet SW-1

15	Are downspouts at least 10 feet from the nearest downgradient impervious surface to prevent reconnection?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet SW-1
16	Has a stone diaphragm, level spreader, splash pad, or other acceptable flow spreading device been specified for each downspout outlet?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet SW-1
17	For runoff not conveyed by downspout, does the runoff drain either as sheet flow or drain to a subsurface drain field that is not directly connected to the drainage network?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet SW-1

Pretreatment (4.2.2.3)		Response	Attachment location
18	Is runoff from qualifying surfaces prevented from co-mingling with other runoff, such that pre-treatment is not required?	<input checked="" type="radio"/> Yes <input type="radio"/> No	

Treatment Volume Calculation		Response	Attachment location
19	Disconnected Impervious for permit coverage (from question 2) acres	0.025	
20*	ft	0.00	
21	Soil HSG $f_c \geq 1$ in/hr for $T_V = HC_V$ $f_c \geq 0.5$ in/hr for $T_V = WQ_V$ $f_c < 0.5$ in/hr for $T_V = WQ_V$	<input type="radio"/> A <input checked="" type="radio"/> A/B <input type="radio"/> C/D	
22	What is the slope of the disconnection area?	<input checked="" type="radio"/> <8% <input type="radio"/> 8-15%	
23	What is the required length of the disconnection area? ft	35	
24	What disconnection length is provided? ft	35	
25*	inches	0.0	
26	What is the treatment volume provided by the STP? T_V (cu-ft)	90.8	
27	What is the treatment volume provided by the STP? T_V (ac-ft)	0.002	

↑ Enter this value on the Standards Compliance Worksheet

Treatment (4.2.2.4)		Response	Attachment location
28*	Has infiltration rate documentation been provided for the use of shorter disconnection flow path lengths?	<input checked="" type="radio"/> Yes <input type="radio"/> No	n/a

Landscaping (4.3.2.5)		Response	Attachment location
29	Is a dense vegetative cover specified for the disconnection area on the plan sheet/detail sheet?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet C-5

Attachment location: Indicate the specific location (i.e. appendix, page, plan sheet) where the requisite support documentation has been provided within the application.

Practice Drainage Area Runoff CalculatorProject Name: **Low Density Residential**Discharge Point: **2**Disconnection Area #: **2**

This tool may be used to calculate the required treatment volumes for the area draining to an individual practice where the practices drainage area is only a portion of the area draining to a discharge point. Where the practice receives runoff from the entire area to a discharge point, this calculator will give the same information as the Standards Compliance Workbook.

Precipitation Data* Precipitation values shall be obtained from [NOAA Atlas 14](#)

Storm	WQ Storm	1 yr, 24 hr	10 yr, 24 hr	100 yr, 24 hr
Precipitation (inches)	1.00	0.00	0.00	0.00

Drainage Area Information

Pre Development Land Use (acres)

Landuse	Hydrologic Soil Group				Total (acres)
	A	B	C	D	
Grass	0.000	0.000	0.000	0.000	0.000
Meadow	0.000	0.000	0.000	0.000	0.000
Woods	0.000	0.000	0.000	0.000	0.000
Pavement, roofs, and other impervious	0.000	0.000	0.000	0.000	0.000
Total	0.000	0.000	0.000	0.000	0.000

Post Development Land Use (acres)

Landuse	Hydrologic Soil Group				Total (acres)
	A	B	C	D	
Grass	0.000	0.000	0.000	0.000	0.000
Meadow	0.000	0.000	0.000	0.000	0.000
Woods	0.000	0.000	0.000	0.000	0.000
Pavement, roofs, and other impervious	0.000	0.000	0.000	0.000	0.000
Total	0.000	0.000	0.000	0.000	0.000

 T_v of upstream practices: 0.000 ac-ft T_v credit of this practice: 0.000 ac-ft

Treatment Standard	Required Treatment Volume	Post Development Runoff Volume	Pre-development Runoff Volume	Post Composite CN (to practice)	CN _{Adj} (with T_v practice credit)	Pre Composite CN
Channel Protection (Hydrologic Condition Method)	0.0000	0.0000	0.0000	0	0	0
Overbank Flood	0.0000	0.0000	0.0000	0	0	0
Extreme Flood	0.0000	0.0000	0.0000	0	0	0

Information for Calculating T_c by the Watershed Lag Method

Average Catchment

Hydraulic

Time of Concentration, T_c

	Slope, Y (%)	Length, l (ft)	1 yr	10 yr	100 yr
Pre Development	0%	0.00	0.0	0.0	0.0
Post Development, upstream of practice	0%	0.00	0.0	0.0	0.0
Post Development, with T _v credit from practice	0%	0.00	0.0	0.0	0.0

BOREHOLE INFILTRATION TESTING

Project Name: Rock River Subdivision
Site: Someplace, Vermont
Date: 9/1/2015
Percolation Test By: Jimmy James, ST #0000
Calculation By: Jimmy James, ST #0000

Infiltration Test No.: I-1

Existing elevation:	60	
Proposed practice area elev.	60	
Thickness of filter bed	2	
Proposed bottom of practice =		58
Test/Bottom of borehole elev =		56 (2 ft below bottom of practice)

Borehole Characteristics: 6" diameter, 24-inch solid casing

Presoak Borehole for 24-hrs.	Presoak Start Time:	<u>9/1/2015</u>	<u>7:00 AM</u>
	Presoak End Time:	<u>9/2/2015</u>	<u>7:15 AM</u>

Cycle No.	Start Time	End Time	Rate
	H M S	H M S	(in/hr)
		Measured drop from top of casing (inches)	
1	8 30 0	9 31 0	8.50
2	9 35 5	10 40 55	9.00
3	10 45 2	11 46 22	8.50
4	11 50 48	12 55 45	8.75
		Average Infiltration Rate =	<u>8.24</u>
		Design Infiltration Rate =	4.12 (Factor of safety of 2)

SOIL TEST PIT LOG

Project: East Street Commercial Plaza

Ground Surface Slope: 0-6%, varies Logged By: Jimmy James, Site Technician

Test Pit #	Depth (inches)	Texture	Consistence or Density	Color	Mottles	Comments
14-01	0-10	Fine sandy loam; little fine gravel.	Friable, subangular blocky	Medium brown		Topsoil, moist, roots
	10-48	Fine to medium sandy loam (with 1" thin layers of silt)	Loose, granular	Tan and Rust		Moist
	48-54	Fine to medium sandy loam.	Loose, granular	Rust	Many, prominent	Moist SHWT = 48"
	54-74	Medium to coarse sand; little fine gravel.	Loose, granular	Grey		Moist to wet GW = 64"
	74-84	Silty clay	Friable to firm	Grey		Wet
	>84	NLTD				

Note:

NLTD - No ledge to depth

NGWTD - No groundwater to depth

SHWT - Seasonal high water table

Infiltration (4.3.3)

Practice Drainage Area		For Permit Coverage	Not for Permit Coverage	Total to Practice
1	Total Area (acres)	3.120	0.000	3.120
2	New Impervious (acres)	0.360	0.000	0.360
3	Redeveloped Impervious	0.000	0.000	0.000
		WQ _V for credit	WQ _V not for credit	Total WQ _V
4	WQ _V to practice	0.0400	0.0000	0.0400

Modified CN for WQ (1.0") storm

84

5	Design Volume for Infiltration (T _V)	0.0455
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← T_v value to enter on the Standards Compliance Workbook for this practice

6	Practice Type	<input checked="" type="radio"/> Infiltration Basin <input type="radio"/> Infiltration Trench <input type="radio"/> Infiltration Chambers <input type="radio"/> Drywell(s)
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Note: If the practice is designed to infiltrate the WQ_V, then T_V = WQ_V. Designers may use the Practice Drainage Area Runoff Calculator (second tab) for calculation of practice-specific runoff volumes for other treatment standards. Sizing of the filter bed area/swale bottom need to consider the desired treatment volume (see treatment section). Some design requirements will change based on the size of storm the practice is designed to treat.

* Questions preceded by an asterisk (*) may change based on previously entered values

Feasibility (4.3.3.1)		Response	Attachment location
7	Has the infiltration rate (fc) of the underlying soil been confirmed to be at least 0.2 inches per hour by the soil testing requirements in Section 4.3.3.2?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Test Pit Results
8*	Is the seasonal high groundwater table (SHGWT) separated at least three (3) feet vertically from the bottom of the practice?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Infiltration Test Results
9	Has a groundwater mounding analysis been performed if the practice is designed to infiltrate >1 year storm and the SHGWT <4 feet?	<input type="radio"/> Yes <input checked="" type="radio"/> No	
10	Have the proper setback requirements for groundwater source protection been observed? (Section 4.3.3.1)	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet C-2 and C-3
11	Has the practice been placed so that it will not cause intrusion problems for down-gradient structures? (Section 4.3.3.1)	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet C-2 and C-3
12	Is the site free from subsurface contamination or prior approval obtained from the Agency? (If approval is required based on prior contamination, include	<input checked="" type="radio"/> Yes <input type="radio"/> No	n/a
13*	Is the basin designed with side slopes of 2:1 or flatter?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet C-2 and C-3

Conveyance (4.3.3.2)		Response	Attachment location
14	Have the outfalls and the conveyance to the discharge point been designed/protected to avoid erosive velocities?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet C-3
15	Is the practice designed to completely dewater the treatment volume (T_v) within 48 hours after the storm event?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Modeling.
16	If the practice is designed to infiltrate <1 year storm and runoff is delivered by the main conveyance system, has it been designed as an off-line practice?	<input type="radio"/> Yes <input checked="" type="radio"/> No	Designed to infiltrate HCv w/overflow

Pre-Treatment (4.3.3.3)		Response	Attachment location
17	Has pretreatment been provided for non-rooftop runoff?	<input checked="" type="radio"/> Yes <input type="radio"/> No	
18	What type of pretreatment is being used? <input type="checkbox"/> Swale <input checked="" type="checkbox"/> Forebay <input type="checkbox"/> Proprietary <input checked="" type="checkbox"/> Filter Strip <input type="checkbox"/> Deep Sump Catch Basins		Sheet C-3
19*	Is the infiltration rate (f_c) greater than or less than 2 inches per hour?	<input type="radio"/> ≤ 2 in/hr <input checked="" type="radio"/> > 2 in/hr	
20*	Is the forebay sized to hold at least 50% of the WQv?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet C-3
21*	Is the forebay separated at least three (3) feet from the SHGWT or located over impermeable soils?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Test Pit Results

Treatment (4.3.2.4)		Response	Attachment location
22	Has direct access been provided to the practice for maintenance and rehabilitation?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet C-2 and C-3
23*		<input type="radio"/> Yes <input type="radio"/> No	
24	What is the treatment volume provided by the STP? T_v (ac-ft)	0.0455	Modeling.

Treatment Volume (T_v) for infiltration practices may be calculated using the equations provided as design guidance in Section 4.3.3.5 OR by demonstrating infiltration of the T_v using TR-20 or an approved equivalent.

↑ Enter this value on the Standards

Landscaping (4.3.2.5)		Response	Attachment location
31	Does the site plan specify a landscaping plan that ensures dense and vigorous vegetation over the contributing pervious drainage areas and the practice?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet C-3

Attachment location: Indicate the specific location (i.e. appendix, page, plan sheet) where the requisite support documentation has been provided within the application.

Practice Drainage Area Runoff CalculatorProject Name: **Low Density Residential**Discharge Point: **3**Infiltration Practice # **1**

This tool may be used to calculate the required treatment volumes for the area draining to an individual practice where the practices drainage area is only a portion of of the area draining to a discharge point. Where the practice receives runoff from the entire area to a discharge point, this calculator will give the same information as the Standards Compliance Workbook.

Precipitation Data* Precipitation values shall be obtained from [NOAA Atlas 14](#)

Storm	WQ Storm	1 yr, 24 hr	10 yr, 24 hr	100 yr, 24 hr
Precipitation (inches)	1.00	2.05	3.43	5.08

Drainage Area Information

Pre Development Land Use (acres)

Landuse	Hydrologic Soil Group				Total (acres)
	A	B	C	D	
Grass	0.000	0.460	0.000	0.000	0.460
Meadow	0.000	0.000	0.000	0.000	0.000
Woods	0.000	2.660	0.000	0.000	2.660
Pavement, roofs, and other impervious	0.000	0.000	0.000	0.000	0.000
Total	0.000	3.120	0.000	0.000	3.120

Post Development Land Use (acres)

Landuse	Hydrologic Soil Group				Total (acres)
	A	B	C	D	
Grass	0.000	2.020	0.000	0.000	2.020
Meadow	0.000	0.000	0.000	0.000	0.000
Woods	0.000	0.740	0.000	0.000	0.740
Pavement, roofs, and other impervious	0.000	0.360	0.000	0.000	0.360
Total	0.000	3.120	0.000	0.000	3.120

T_v of upstream practices: **0.009** ac-ftT_v credit of this practice: **0.046** ac-ft

Treatment Standard	Required Treatment Volume	Post Development Runoff Volume	Pre-development Runoff Volume	Post Composite CN (to practice)	CN _{Adj} (with T _v practice credit)	Pre Composite CN
Channel Protection (Hydrologic Condition Method)	0.0443	0.0609	0.0076	69	59	56
Overbank Flood	0.0967	0.1980	0.0923	66	62	56
Extreme Flood	0.1483	0.4378	0.2804	65	62	56

Information for Calculating T_c by the Watershed Lag Method

	Average Catchment Slope, Y (%)	Hydraulic Length, l (ft)	Time of Concentration, T _c		
			1 yr	10 yr	100 yr
Pre Development	0%	0.00	#DIV/0!	#DIV/0!	#DIV/0!
Post Development, upstream of practice	0%	0.00	#DIV/0!	#DIV/0!	#DIV/0!
Post Development, with T _v credit from practice	0%	0.00	#DIV/0!	#DIV/0!	#DIV/0!

Simple Disconnection (4.2.2)

Disconnected Area		For Permit Coverage	Not for Permit Coverage	Total to Practice
1	Total Area (acres)	0.106	0.000	0.106
2	Impervious (acres)	0.106	0.000	0.106
		WQ _V for credit	WQ _V not for credit	Total WQ _V
4	WQ _V to practice	0.0084	0.0000	0.0084

Modified CN for WQ (1.0") storm: **100**

3 Disconnected Area Type: ☒ Rooftop ☒ Paths/sidewalks/driveways

* Questions preceded by an asterisk (*) may change based on previously entered values

Feasibility (4.2.2.1)		Response	Attachment location
4	For areas conveyed by sheetflow, is the disconnection area at least as wide as the area being disconnected?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet SW-1
5	For rooftop areas conveyed by downspouts, is the disconnection area at least 12 feet wide?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet SW-1
6	For rooftop areas conveyed by downspouts, is the contributing area to any one discharge location no greater than 1,000 square feet?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet SW-1
7	Do the underlying soils of the disconnection area meet the Post-Construction Soil Depth and Quality Standard?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet C-5
8*	Is the maximum contributing impervious flow path length to any one discharge location no greater than 75 feet?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet SW-1
9*	Is the maximum flow path length from the path, sidewalk, or driveway 10 feet or less?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet SW-1
10	Are disconnection areas configured such that there is no overlap between adjacent disconnection areas?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet SW-1
11	Is the maximum slope of the disconnection area no steeper than 15%?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet SW-1
12	For sites with septic systems, is the disconnection flow path cross-gradient or down-gradient of the leachfield?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet SW-1

Conveyance (4.2.2.2)		Response	Attachment location
13	Is the runoff conveyed as sheet flow across the disconnection area for the applicable design storms and prevented from channelizing?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet SW-1
14	Is the disconnection surface directed away from buildings so as to protect foundations and basements?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet SW-1

15	Are downspouts at least 10 feet from the nearest downgradient impervious surface to prevent reconnection?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet SW-1
16	Has a stone diaphragm, level spreader, splash pad, or other acceptable flow spreading device been specified for each downspout outlet?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet SW-1
17	For runoff not conveyed by downspout, does the runoff drain either as sheet flow or drain to a subsurface drain field that is not directly connected to the drainage network?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet SW-1

Pretreatment (4.2.2.3)		Response	Attachment location
18	Is runoff from qualifying surfaces prevented from co-mingling with other runoff, such that pre-treatment is not required?	<input checked="" type="radio"/> Yes <input type="radio"/> No	

Treatment Volume Calculation		Response	Attachment location
19	Disconnected Impervious for permit coverage (from question 2) acres	0.106	
20*	ft	0.00	
21	Soil HSG $f_c \geq 1$ in/hr for $T_v = HC_v$ $f_c \geq 0.5$ in/hr for $T_v = WQ_v$ $f_c < 0.5$ in/hr for $T_v = WQ_v$	<input type="radio"/> A <input checked="" type="radio"/> A/B <input type="radio"/> C/D	
22	What is the slope of the disconnection area?	<input checked="" type="radio"/> <8% <input type="radio"/> 8-15%	
23	What is the required length of the disconnection area? ft	35	
24	What disconnection length is provided? ft	35	
25*	inches	0.0	
26	What is the treatment volume provided by the STP? T_v (cu-ft)	384.8	
27	What is the treatment volume provided by the STP? T_v (ac-ft)	0.009	

↑ Enter this value on the Standards Compliance Worksheet

Treatment (4.2.2.4)		Response	Attachment location
28*	Has infiltration rate documentation been provided for the use of shorter disconnection flow path lengths?	<input checked="" type="radio"/> Yes <input type="radio"/> No	n/a

Landscaping (4.3.2.5)		Response	Attachment location
29	Is a dense vegetative cover specified for the disconnection area on the plan sheet/detail sheet?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet C-5

Attachment location: Indicate the specific location (i.e. appendix, page, plan sheet) where the requisite support documentation has been provided within the application.

Practice Drainage Area Runoff CalculatorProject Name: **Low Density Residential**Discharge Point: **3**Disconnection Area # **3**

This tool may be used to calculate the required treatment volumes for the area draining to an individual practice where the practices drainage area is only a portion of the area draining to a discharge point. Where the practice receives runoff from the entire area to a discharge point, this calculator will give the same information as the Standards Compliance Workbook.

Precipitation Data* Precipitation values shall be obtained from [NOAA Atlas 14](#)

Storm	WQ Storm	1 yr, 24 hr	10 yr, 24 hr	100 yr, 24 hr
Precipitation (inches)	1.00	0.00	0.00	0.00

Drainage Area Information

Pre Development Land Use (acres)

Landuse	Hydrologic Soil Group				Total (acres)
	A	B	C	D	
Grass	0.000	0.000	0.000	0.000	0.000
Meadow	0.000	0.000	0.000	0.000	0.000
Woods	0.000	0.000	0.000	0.000	0.000
Pavement, roofs, and other impervious	0.000	0.000	0.000	0.000	0.000
Total	0.000	0.000	0.000	0.000	0.000

Post Development Land Use (acres)

Landuse	Hydrologic Soil Group				Total (acres)
	A	B	C	D	
Grass	0.000	0.000	0.000	0.000	0.000
Meadow	0.000	0.000	0.000	0.000	0.000
Woods	0.000	0.000	0.000	0.000	0.000
Pavement, roofs, and other impervious	0.000	0.000	0.000	0.000	0.000
Total	0.000	0.000	0.000	0.000	0.000

 T_v of upstream practices: 0.000 ac-ft T_v credit of this practice: 0.000 ac-ft

Treatment Standard	Required Treatment Volume	Post Development Runoff Volume	Pre-development Runoff Volume	Post Composite CN (to practice)	CN _{Adj} (with T_v practice credit)	Pre Composite CN
Channel Protection (Hydrologic Condition Method)	0.0000	0.0000	0.0000	0	0	0
Overbank Flood	0.0000	0.0000	0.0000	0	0	0
Extreme Flood	0.0000	0.0000	0.0000	0	0	0

Information for Calculating T_c by the Watershed Lag Method

Average Catchment

Hydraulic

Time of Concentration, T_c

	Slope, Y (%)	Length, l (ft)	1 yr	10 yr	100 yr
Pre Development	0%	0.00	0.0	0.0	0.0
Post Development, upstream of practice	0%	0.00	0.0	0.0	0.0
Post Development, with T _v credit from practice	0%	0.00	0.0	0.0	0.0

BOREHOLE INFILTRATION TESTING

Project Name: Rock River Subdivision
Site: Someplace, Vermont
Date: 9/1/2015
Percolation Test By: Jimmy James, ST #0000
Calculation By: Jimmy James, ST #0000

Infiltration Test No.: I-2

Existing elevation:	57.5
Proposed practice area elev.	57
Thickness of filter bed	0
Proposed bottom of practice =	57
Test/Bottom of borehole elev =	53 (4 ft below bottom of practice)

Borehole Characteristics: 6" diameter, 24-inch solid casing

Presoak Borehole for 24-hrs.	Presoak Start Time:	<u>7/12/2017</u>	<u>7:00 AM</u>
	Presoak End Time:	<u>7/13/2017</u>	<u>7:15 AM</u>

Cycle No.	Start Time	End Time	Rate
	H M S	H M S	(in/hr)
		Measured drop from top of casing (inches)	
1	7 30 0	8 40 0	9.50
2	8 45 56	9 50 11	9.00
3	10 2 30	11 10 22	9.25
4	11 20 13	12 25 45	8.75
		Average Infiltration Rate =	<u>8.01</u>
		Design Infiltration Rate =	4.09 (Factor of safety of 2)

SOIL TEST PIT LOG

Project: Rock River Subdivision

Ground Surface Slope: 0-12%, varies Logged By: Jimmy James, Site Technician

Test Pit #	Depth (inches)	Texture	Consistence or Density	Color	Mottles	Comments
15-02	0-6"	Fine to medium sandy loam, little pebbles	Moist, loose, granular	Dark brown	No	Topsoil, many grass roots.
	6-42"	Gravelly, medium to coarse sand, trace silt	Dry, loose, granular	Rust-orange to 28", rust-brown below	No	50% fine to coarse gravel w/cobbles and boulders, roots to 28"
	42-72"	Fine to medium sand, trace pebbles	Moist, friable, subangular blocky	Tan	No	No bedrock, seeps or groundwater to depth. SHWT = >72"

Note:

NLTD - No ledge to depth

NGWTD - No groundwater to depth

SHWT - Seasonal high water table

Filters (4.3.4)

Practice Drainage Area		For Permit Coverage	Not for Permit Coverage	Total to Practice
1	Total Area (acres)	5.950	0.000	5.950
2	New Impervious (acres)	0.860	0.000	0.860
3	Redeveloped Impervious	0.000	0.000	0.000
		WQ _V for credit	WQ _V not for credit	Total WQ _V
4	WQ _V to practice	0.0893	0.0000	0.0893

Modified CN for WQ (1.0") storm

85

5 Designed to Infiltrate? ☒ Yes ☐ No6* Design Volume for Infiltration (T_V) 0.1237← T_V value to enter on the Standards Compliance Workbook for this practice unless practice has under drain, then use answer to Question 307 Designed to Infiltrate >WQ_V? ☐ n/a ☐ No ☒ Yes

Note: If the practice is designed to infiltrate the WQ_V, then T_V = WQ_V. Designers may use the Practice Drainage Area Runoff Calculator (second tab) for calculation of practice-specific runoff volumes for other treatment standards. Sizing of the filter bed area/swale bottom need to consider the desired treatment volume (see treatment section). Some design requirements will change based on the size of storm the practice is designed to treat.

* Questions preceded by an asterisk (*) may change based on previously entered values

Feasibility (4.3.4.1)

	Response	Attachment location
8* Is the SHGWT separated one (1) foot or more from the bottom of the practice?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Test Pit Results
9* Has the infiltration rate (fc) of the underlying soil been confirmed to be at least 0.2 inches per hour by the soil testing requirements in Section 4.3.3.2?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Infiltration Test Results

Conveyance (4.3.4.2)

	Response	Attachment location
10 Has an underdrain been provided? (required if the underlying soils have an infiltration rate of less than 0.2 inches per hour)	<input type="radio"/> Yes <input checked="" type="radio"/> No	
11*	<input type="radio"/> Yes <input type="radio"/> No	
12 Have the outfalls and the conveyance to the discharge point been designed/protected to avoid erosive velocities?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet C-4
13 Is the practice unlined unless the presence of a stormwater hotspot or other site constraint has been discussed with ANR?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet C-4

Pre-Treatment (4.3.4.3)		Response	Attachment location
14	Has pretreatment been provided for non-rooftop runoff?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet C-4
15	What type of pretreatment is being used?	<input type="checkbox"/> Swale <input checked="" type="checkbox"/> Forebay (25% WQv) <input type="checkbox"/> Proprietary <input type="checkbox"/> Filter Strip <input type="checkbox"/> Deep Sump Catch Basins	

Treatment (4.3.4.4)		Response	Attachment location
16	Does the site plan specify a filter media consisting of medium sand (ASTM C-33 concrete sand) or an approved equivalent?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet C-4
17	Does the filter bed have a minimum depth of 18 inches or 12 inches for perimeter filters?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet C-4

Treatment Volume Calculation - Filter without Underdrain		Response	Attachment location
18*	What is the Treatment Volume the Filter bed will be sized to accommodate and treat? (Question 5)	0.1237	
19	What is the depth of the filter bed? (2-4 feet) d_f (ft)	1.5	
20	What is the coefficient of permeability of the filter media? k (ft/day)	3.5	
21	What is the average height of water above the filter bed? h_f (ft)	0.5	
22	What is the design filter bed drain time? (≤ 2 days) t_f (days)	2	
23*	Required minimum surface area of the filter bed A_f (ft ²)	577	
24	Design filter bed area A_f (ft ²)	580	
25	Is the Filter storage volume, including the storage volume above the filter bed, volume in any upstream pre-treatment practice, as well as within the filter media, > 75% of the design WQv or Tv (as applicable)?	<input checked="" type="radio"/> Yes <input type="radio"/> No	

Treatment Volume Calculation- Bioretention with Underdrain		Response	Attachment location
26*	A_f (ft ²)	580	
27*	Underdrain not used (Question 10). This section not required. (ft)	0	
28*	porosity	0	
29*		0	ft ³
30*		0.0000	ac-ft

Landscaping (4.3.1.5)		Response	Attachment location
31	Does the site plan specify a landscaping plan that ensures dense and vigorous vegetation over the contributing pervious drainage areas and the practice?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet C-4

Attachment location: Indicate the specific location (i.e. appendix, page, plan sheet) where the requisite support documentation has been provided within the application.

Practice Drainage Area Runoff CalculatorProject Name: **Low Density Residential**Discharge Point: **4**Filter # **1**

This tool may be used to calculate the required treatment volumes for the area draining to an individual practice where the practices drainage area is only a portion of the area draining to a discharge point. Where the practice receives runoff from the entire area to a discharge point, this calculator will give the same information as the Standards Compliance Workbook.

Precipitation Data* Precipitation values shall be obtained from [NOAA Atlas 14](#)

Storm	WQ Storm	1 yr, 24 hr	10 yr, 24 hr	100 yr, 24 hr
Precipitation (inches)	1.00	2.05	3.43	5.08

Drainage Area Information

Pre Development Land Use (acres)

Landuse	Hydrologic Soil Group				Total (acres)
	A	B	C	D	
Grass	0.000	0.360	0.000	0.000	0.360
Meadow	0.000	0.000	0.000	0.000	0.000
Woods	0.000	5.560	0.000	0.000	5.560
Pavement, roofs, and other impervious	0.000	0.030	0.000	0.000	0.030
Total	0.000	5.950	0.000	0.000	5.950

Post Development Land Use (acres)

Landuse	Hydrologic Soil Group				Total (acres)
	A	B	C	D	
Grass	0.000	4.310	0.000	0.000	4.310
Meadow	0.000	0.000	0.000	0.000	0.000
Woods	0.000	0.780	0.000	0.000	0.780
Pavement, roofs, and other impervious	0.000	0.860	0.000	0.000	0.860
Total	0.000	5.950	0.000	0.000	5.950

 T_v of upstream practices: **0.024** ac-ft T_v credit of this practice: **0.124** ac-ft

Treatment Standard	Required Treatment Volume	Post Development Runoff Volume	Pre-development Runoff Volume	Post Composite CN (to practice)	CN _{Adj} (with T_v practice credit)	Pre Composite CN
Channel Protection (Hydrologic Condition Method)	0.0976	0.1378	0.0163	71	56	57
Overbank Flood	0.2229	0.4206	0.1737	68	62	56
Extreme Flood	0.3472	0.8985	0.5273	66	63	56

Information for Calculating T_c by the Watershed Lag Method

Average Catchment	Hydraulic	Time of Concentration, T_c
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	Slope, Y (%)	Length, l (ft)	1 yr	10 yr	100 yr
Pre Development	0%	0.00	#DIV/0!	#DIV/0!	#DIV/0!
Post Development, upstream of practice	0%	0.00	#DIV/0!	#DIV/0!	#DIV/0!
Post Development, with T _v credit from practice	0%	0.00	#DIV/0!	#DIV/0!	#DIV/0!

Simple Disconnection (4.2.2)

Disconnected Area		For Permit Coverage	Not for Permit Coverage	Total to Practice
1	Total Area (acres)	0.284	0.000	0.284
2	Impervious (acres)	0.284	0.000	0.284
		WQ _V for credit	WQ _V not for credit	Total WQ _V
4	WQ _V to practice	0.0225	0.0000	0.0225

Modified CN for WQ (1.0") storm

100

3 Disconnected Area Type

- ☒ Rooftop
☒ Paths/sidewalks/driveways

* Questions preceded by an asterisk (*) may change based on previously entered values

Feasibility (4.2.2.1)		Response	Attachment location
4	For areas conveyed by sheetflow, is the disconnection area at least as wide as the area being disconnected?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet SW-1
5	For rooftop areas conveyed by downspouts, is the disconnection area at least 12 feet wide?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet SW-1
6	For rooftop areas conveyed by downspouts, is the contributing area to any one discharge location no greater than 1,000 square feet?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet SW-1
7	Do the underlying soils of the disconnection area meet the Post-Construction Soil Depth and Quality Standard?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet C-5
8*	Is the maximum contributing impervious flow path length to any one discharge location no greater than 75 feet?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet SW-1
9*	Is the maximum flow path length from the path, sidewalk, or driveway 10 feet or less?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet SW-1
10	Are disconnection areas configured such that there is no overlap between adjacent disconnection areas?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet SW-1
11	Is the maximum slope of the disconnection area no steeper than 15%?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet SW-1
12	For sites with septic systems, is the disconnection flow path cross-gradient or down-gradient of the leachfield?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet SW-1

Conveyance (4.2.2.2)		Response	Attachment location
13	Is the runoff conveyed as sheet flow across the disconnection area for the applicable design storms and prevented from channelizing?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet SW-1
14	Is the disconnection surface directed away from buildings so as to protect foundations and basements?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet SW-1

15	Are downspouts at least 10 feet from the nearest downgradient impervious surface to prevent reconnection?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet SW-1
16	Has a stone diaphragm, level spreader, splash pad, or other acceptable flow spreading device been specified for each downspout outlet?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet SW-1
17	For runoff not conveyed by downspout, does the runoff drain either as sheet flow or drain to a subsurface drain field that is not directly connected to the drainage network?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet SW-1

Pretreatment (4.2.2.3)		Response	Attachment location
18	Is runoff from qualifying surfaces prevented from co-mingling with other runoff, such that pre-treatment is not required?	<input checked="" type="radio"/> Yes <input type="radio"/> No	

Treatment Volume Calculation		Response	Attachment location
19	Disconnected Impervious for permit coverage (from question 2) acres	0.284	
20*	ft	0.00	
21	Soil HSG $f_c \geq 1$ in/hr for $T_v = HC_v$ $f_c \geq 0.5$ in/hr for $T_v = WQ_v$ $f_c < 0.5$ in/hr for $T_v = WQ_v$	<input type="radio"/> A <input checked="" type="radio"/> A/B <input type="radio"/> C/D	
22	What is the slope of the disconnection area?	<input checked="" type="radio"/> <8% <input type="radio"/> 8-15%	
23	What is the required length of the disconnection area? ft	35	
24	What disconnection length is provided? ft	35	
25*	inches	0.0	
26	What is the treatment volume provided by the STP? T_v (cu-ft)	1030.9	
27	What is the treatment volume provided by the STP? T_v (ac-ft)	0.024	

↑ Enter this value on the Standards Compliance Worksheet

Treatment (4.2.2.4)		Response	Attachment location
28*	Has infiltration rate documentation been provided for the use of shorter disconnection flow path lengths?	<input checked="" type="radio"/> Yes <input type="radio"/> No	n/a

Landscaping (4.3.2.5)		Response	Attachment location
29	Is a dense vegetative cover specified for the disconnection area on the plan sheet/detail sheet?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet C-5

Attachment location: Indicate the specific location (i.e. appendix, page, plan sheet) where the requisite support documentation has been provided within the application.

Practice Drainage Area Runoff CalculatorProject Name: **Low Density Residential**Discharge Point: **4**Disconnection Area # **4**

This tool may be used to calculate the required treatment volumes for the area draining to an individual practice where the practices drainage area is only a portion of the area draining to a discharge point. Where the practice receives runoff from the entire area to a discharge point, this calculator will give the same information as the Standards Compliance Workbook.

Precipitation Data* Precipitation values shall be obtained from [NOAA Atlas 14](#)

Storm	WQ Storm	1 yr, 24 hr	10 yr, 24 hr	100 yr, 24 hr
Precipitation (inches)	1.00	0.00	0.00	0.00

Drainage Area Information

Pre Development Land Use (acres)

Landuse	Hydrologic Soil Group				Total (acres)
	A	B	C	D	
Grass	0.000	0.000	0.000	0.000	0.000
Meadow	0.000	0.000	0.000	0.000	0.000
Woods	0.000	0.000	0.000	0.000	0.000
Pavement, roofs, and other impervious	0.000	0.000	0.000	0.000	0.000
Total	0.000	0.000	0.000	0.000	0.000

Post Development Land Use (acres)

Landuse	Hydrologic Soil Group				Total (acres)
	A	B	C	D	
Grass	0.000	0.000	0.000	0.000	0.000
Meadow	0.000	0.000	0.000	0.000	0.000
Woods	0.000	0.000	0.000	0.000	0.000
Pavement, roofs, and other impervious	0.000	0.000	0.000	0.000	0.000
Total	0.000	0.000	0.000	0.000	0.000

 T_v of upstream practices: **0.000** ac-ft T_v credit of this practice: **0.000** ac-ft

Treatment Standard	Required Treatment Volume	Post Development Runoff Volume	Pre-development Runoff Volume	Post Composite CN (to practice)	CN _{Adj} (with T_v practice credit)	Pre Composite CN
Channel Protection (Hydrologic Condition Method)	0.0000	0.0000	0.0000	0	0	0
Overbank Flood	0.0000	0.0000	0.0000	0	0	0
Extreme Flood	0.0000	0.0000	0.0000	0	0	0

Information for Calculating T_c by the Watershed Lag Method

Average Catchment

Hydraulic

Time of Concentration, T_c

	Slope, Y (%)	Length, l (ft)	1 yr	10 yr	100 yr
Pre Development	0%	0.00	0.0	0.0	0.0
Post Development, upstream of practice	0%	0.00	0.0	0.0	0.0
Post Development, with T _v credit from practice	0%	0.00	0.0	0.0	0.0

BOREHOLE INFILTRATION TESTING

Project Name: Rock River Subdivision
Site: Someplace, Vermont
Date: 8/23/2015
Percolation Test By: Jimmy James, ST #0000
Calculation By: Jimmy James, ST #0000

Infiltration Test No.: I-3

Existing elevation:	53.5
Proposed practice area elev.	52
Thickness of filter bed	1.5
Proposed bottom of practice =	50.5
Test/Bottom of borehole elev =	48.5 (2 ft below bottom of practice)

Borehole Characteristics: 6" diameter, 24-inch solid casing

Presoak Borehole for 24-hrs.	Presoak Start Time:	<u>8/23/2015</u>	<u>8:00 AM</u>
	Presoak End Time:	<u>8/24/2015</u>	<u>8:15 AM</u>

Cycle No.	Start Time	End Time	Rate
	H M S	H M S	(in/hr)
		Measured drop from top of casing (inches)	
1	8 30 0	9 35 3	8.50
2	9 45 56	10 47 0	8.00
3	10 50 30	11 52 0	8.00
4	11 55 23	12 57 45	7.80
		Average Infiltration Rate =	<u>7.75</u>
		Design Infiltration Rate =	3.88 (Factor of safety of 2)

SOIL TEST PIT LOG

Project: Rock River Subdivision

Ground Surface Slope: 0-12%, varies Logged By: Jimmy James, Site Technician

Test Pit #	Depth (inches)	Texture	Consistence or Density	Color	Mottles	Comments
15-02	0-10	Fine sandy loam; little fine gravel.	Friable, subangular blocky	Medium brown		Topsoil, moist, roots
	10-64	Fine to medium sandy loam	Loose, granular	Tan brown		Moist
	64-72	Fine to medium sandy loam.	Loose, granular	Grey and Rust	Many, prominent	Moist to wet SHWT = 64"
	72-86	Medium to coarse sandy loam; little fine gravel	Loose, granular	Grey		Wet GW = 80"
	>86	NLTD				

Note:

NLTD - No ledge to depth

NGWTD - No groundwater to depth

SHWT - Seasonal high water table

Project Name: **Low Density Residential**Discharge Point: **5****Infiltration (4.3.3)**Infiltration Practice # **2**

Practice Drainage Area		For Permit Coverage	Not for Permit Coverage	Total to Practice
1	Total Area (acres)	7.000	0.000	7.000
2	New Impervious (acres)	0.890	0.000	0.890
3	Redeveloped Impervious	0.000	0.000	0.000

		WQ _V for credit	WQ _V not for credit	Total WQ _V
4	WQ _V to practice	0.0959	0.0000	0.0959

Modified CN for WQ
(1.0") storm

85

5	Design Volume for Infiltration (T _V)	0.1217	← T _V value to enter on the Standards Compliance Workbook for this practice
6	Practice Type	<input checked="" type="radio"/> Infiltration Basin <input type="radio"/> Infiltration Trench <input type="radio"/> Infiltration Chambers <input type="radio"/> Drywell(s)	

Note: If the practice is designed to infiltrate the WQ_V, then T_V = WQ_V. Designers may use the Practice Drainage Area Runoff Calculator (second tab) for calculation of practice-specific runoff volumes for other treatment standards. Sizing of the filter bed area/swale bottom need to consider the desired treatment volume (see treatment section). Some design requirements will change based on the size of storm the practice is designed to treat.

* Questions preceded by an asterisk (*) may change based on previously entered values

Feasibility (4.3.3.1)		Response	Attachment location
7	Has the infiltration rate (fc) of the underlying soil been confirmed to be at least 0.2 inches per hour by the soil testing requirements in Section 4.3.3.2?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Infiltration Test results
8*	Is the seasonal high groundwater table (SHGWT) separated at least three (3) feet vertically from the bottom of the practice?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Test Pit results
9	Has a groundwater mounding analysis been performed if the practice is designed to infiltrate >1 year storm and the SHGWT <4 feet?	<input type="radio"/> Yes <input checked="" type="radio"/> No	Not designed to infiltrate > 1-yr.
10	Have the proper setback requirements for groundwater source protection been observed? (Section 4.3.3.1)	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet C-4
11	Has the practice been placed so that it will not cause intrusion problems for down-gradient structures? (Section 4.3.3.1)	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet C-4
12	Is the site free from subsurface contamination or prior approval obtained from the Agency? (If approval is required based on prior contamination, include	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet C-4
13*	Is the basin designed with side slopes of 2:1 or flatter?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet C-4

Conveyance (4.3.3.2)		Response	Attachment location
14	Have the outfalls and the conveyance to the discharge point been designed/protected to avoid erosive velocities?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet C-4
15	Is the practice designed to completely dewater the treatment volume (T_v) within 48 hours after the storm event?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Modeling.
16	If the practice is designed to infiltrate <1 year storm and runoff is delivered by the main conveyance system, has it been designed as an off-line practice?	<input type="radio"/> Yes <input checked="" type="radio"/> No	n/a, overflow provided

Pre-Treatment (4.3.3.3)		Response	Attachment location
17	Has pretreatment been provided for non-rooftop runoff?	<input checked="" type="radio"/> Yes <input type="radio"/> No	
18	What type of pretreatment is being used? <input type="checkbox"/> Swale <input checked="" type="checkbox"/> Forebay <input type="checkbox"/> Proprietary <input type="checkbox"/> Filter Strip <input type="checkbox"/> Deep Sump Catch Basins		Sheet C-4
19*	Is the infiltration rate (f_c) greater than or less than 2 inches per hour?	<input type="radio"/> ≤ 2 in/hr <input type="radio"/> > 2 in/hr	
20*	Is the forebay sized to hold at least 50% of the WQ_v ?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet C-4
21*	Is the forebay separated at least three (3) feet from the SHGWT or located over impermeable soils?	<input checked="" type="radio"/> Yes <input type="radio"/> No	

Treatment (4.3.2.4)		Response	Attachment location
22	Has direct access been provided to the practice for maintenance and rehabilitation?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet C-2 and C-4
23*		<input type="radio"/> Yes <input checked="" type="radio"/> No	
24	What is the treatment volume provided by the STP? T_v (ac-ft)	0.1217	

Treatment Volume (T_v) for infiltration practices may be calculated using the equations provided as design guidance in Section 4.3.3.5 OR by demonstrating infiltration of the T_v using TR-20 or an approved equivalent.

↑ Enter this value on the Standards

Landscaping (4.3.2.5)		Response	Attachment location
31	Does the site plan specify a landscaping plan that ensures dense and vigorous vegetation over the contributing pervious drainage areas and the practice?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet C-4

Attachment location: Indicate the specific location (i.e. appendix, page, plan sheet) where the requisite support documentation has been provided within the application.

Practice Drainage Area Runoff CalculatorProject Name: **Low Density Residential**Discharge Point: **5**Infiltration Practice # **2**

This tool may be used to calculate the required treatment volumes for the area draining to an individual practice where the practices drainage area is only a portion of the area draining to a discharge point. Where the practice receives runoff from the entire area to a discharge point, this calculator will give the same information as the Standards Compliance Workbook.

Precipitation Data* Precipitation values shall be obtained from [NOAA Atlas 14](#)

Storm	WQ Storm	1 yr, 24 hr	10 yr, 24 hr	100 yr, 24 hr
Precipitation (inches)	1.00	2.05	3.43	5.08

Drainage Area Information

Pre Development Land Use (acres)

Landuse	Hydrologic Soil Group				Total (acres)
	A	B	C	D	
Grass	0.000	0.000	0.000	0.000	0.000
Meadow	0.000	0.000	0.000	0.000	0.000
Woods	0.000	7.000	0.000	0.000	7.000
Pavement, roofs, and other impervious	0.000	0.000	0.000	0.000	0.000
Total	0.000	7.000	0.000	0.000	7.000

Post Development Land Use (acres)

Landuse	Hydrologic Soil Group				Total (acres)
	A	B	C	D	
Grass	0.000	3.120	0.000	0.000	3.120
Meadow	0.000	0.000	0.000	0.000	0.000
Woods	0.000	2.990	0.000	0.000	2.990
Pavement, roofs, and other impervious	0.000	0.890	0.027	0.000	0.917
Total	0.000	7.000	0.027	0.000	7.027

T_v of upstream practices: **0.000** ac-ftT_v credit of this practice: **0.122** ac-ft

Treatment Standard	Required Treatment Volume	Post Development Runoff Volume	Pre-development Runoff Volume	Post Composite CN (to practice)	CN _{Adj} (with T _v practice credit)	Pre Composite CN
Channel Protection (Hydrologic Condition Method)	0.1543	0.1659	0.0116	71	60	55
Overbank Flood	0.2773	0.4655	0.1881	67	62	55
Extreme Flood	0.3977	0.9928	0.5950	65	62	55

Information for Calculating T_c by the Watershed Lag Method

	Average Catchment Slope, Y (%)	Hydraulic Length, l (ft)	Time of Concentration, T _c		
			1 yr	10 yr	100 yr
Pre Development	0%	0.00	#DIV/0!	#DIV/0!	#DIV/0!
Post Development, upstream of practice	0%	0.00	#DIV/0!	#DIV/0!	#DIV/0!
Post Development, with T _v credit from practice	0%	0.00	#DIV/0!	#DIV/0!	#DIV/0!

Simple Disconnection (4.2.2)

Disconnected Area		For Permit Coverage	Not for Permit Coverage	Total to Practice
1	Total Area (acres)	0.328	0.000	0.328
2	Impervious (acres)	0.328	0.000	0.328
		WQ _V for credit	WQ _V not for credit	Total WQ _V
4	WQ _V to practice	0.0260	0.0000	0.0260

Modified CN for WQ (1.0") storm

100

3 Disconnected Area Type

- ☒ Rooftop
☒ Paths/sidewalks/driveways

* Questions preceded by an asterisk (*) may change based on previously entered values

Feasibility (4.2.2.1)		Response	Attachment location
4	For areas conveyed by sheetflow, is the disconnection area at least as wide as the area being disconnected?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet SW-1
5	For rooftop areas conveyed by downspouts, is the disconnection area at least 12 feet wide?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet SW-1
6	For rooftop areas conveyed by downspouts, is the contributing area to any one discharge location no greater than 1,000 square feet?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet SW-1
7	Do the underlying soils of the disconnection area meet the Post-Construction Soil Depth and Quality Standard?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet C-5
8*	Is the maximum contributing impervious flow path length to any one discharge location no greater than 75 feet?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet SW-1
9*	Is the maximum flow path length from the path, sidewalk, or driveway 10 feet or less?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet SW-1
10	Are disconnection areas configured such that there is no overlap between adjacent disconnection areas?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet SW-1
11	Is the maximum slope of the disconnection area no steeper than 15%?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet SW-1
12	For sites with septic systems, is the disconnection flow path cross-gradient or down-gradient of the leachfield?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet SW-1

Conveyance (4.2.2.2)		Response	Attachment location
13	Is the runoff conveyed as sheet flow across the disconnection area for the applicable design storms and prevented from channelizing?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet SW-1
14	Is the disconnection surface directed away from buildings so as to protect foundations and basements?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet SW-1

15	Are downspouts at least 10 feet from the nearest downgradient impervious surface to prevent reconnection?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet SW-1
16	Has a stone diaphragm, level spreader, splash pad, or other acceptable flow spreading device been specified for each downspout outlet?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet SW-1
17	For runoff not conveyed by downspout, does the runoff drain either as sheet flow or drain to a subsurface drain field that is not directly connected to the drainage network?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet SW-1

Pretreatment (4.2.2.3)		Response	Attachment location
18	Is runoff from qualifying surfaces prevented from co-mingling with other runoff, such that pre-treatment is not required?	<input checked="" type="radio"/> Yes <input type="radio"/> No	

Treatment Volume Calculation		Response	Attachment location
19	Disconnected Impervious for permit coverage (from question 2) acres	0.328	
20*	ft	0.00	
21	Soil HSG $f_c \geq 1$ in/hr for $T_v = HC_v$ $f_c \geq 0.5$ in/hr for $T_v = WQ_v$ $f_c < 0.5$ in/hr for $T_v = WQ_v$	<input type="radio"/> A <input checked="" type="radio"/> A/B <input type="radio"/> C/D	
22	What is the slope of the disconnection area?	<input checked="" type="radio"/> <8% <input type="radio"/> 8-15%	
23	What is the required length of the disconnection area? ft	35	
24	What disconnection length is provided? ft	35	
25*	inches	0.0	
26	What is the treatment volume provided by the STP? T_v (cu-ft)	1190.6	
27	What is the treatment volume provided by the STP? T_v (ac-ft)	0.027	

↑ Enter this value on the Standards Compliance Worksheet

Treatment (4.2.2.4)		Response	Attachment location
28*	Has infiltration rate documentation been provided for the use of shorter disconnection flow path lengths?	<input checked="" type="radio"/> Yes <input type="radio"/> No	n/a

Landscaping (4.3.2.5)		Response	Attachment location
29	Is a dense vegetative cover specified for the disconnection area on the plan sheet/detail sheet?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet C-5

Attachment location: Indicate the specific location (i.e. appendix, page, plan sheet) where the requisite support documentation has been provided within the application.

Practice Drainage Area Runoff CalculatorProject Name: **Low Density Residential**Discharge Point: **5**Disconnection Area # **5**

This tool may be used to calculate the required treatment volumes for the area draining to an individual practice where the practices drainage area is only a portion of the area draining to a discharge point. Where the practice receives runoff from the entire area to a discharge point, this calculator will give the same information as the Standards Compliance Workbook.

Precipitation Data* Precipitation values shall be obtained from [NOAA Atlas 14](#)

Storm	WQ Storm	1 yr, 24 hr	10 yr, 24 hr	100 yr, 24 hr
Precipitation (inches)	1.00	0.00	0.00	0.00

Drainage Area Information

Pre Development Land Use (acres)

Landuse	Hydrologic Soil Group				Total (acres)
	A	B	C	D	
Grass	0.000	0.000	0.000	0.000	0.000
Meadow	0.000	0.000	0.000	0.000	0.000
Woods	0.000	0.000	0.000	0.000	0.000
Pavement, roofs, and other impervious	0.000	0.000	0.000	0.000	0.000
Total	0.000	0.000	0.000	0.000	0.000

Post Development Land Use (acres)

Landuse	Hydrologic Soil Group				Total (acres)
	A	B	C	D	
Grass	0.000	0.000	0.000	0.000	0.000
Meadow	0.000	0.000	0.000	0.000	0.000
Woods	0.000	0.000	0.000	0.000	0.000
Pavement, roofs, and other impervious	0.000	0.000	0.000	0.000	0.000
Total	0.000	0.000	0.000	0.000	0.000

 T_v of upstream practices: 0.000 ac-ft T_v credit of this practice: 0.000 ac-ft

Treatment Standard	Required Treatment Volume	Post Development Runoff Volume	Pre-development Runoff Volume	Post Composite CN (to practice)	CN _{Adj} (with T_v practice credit)	Pre Composite CN
Channel Protection (Hydrologic Condition Method)	0.0000	0.0000	0.0000	0	0	0
Overbank Flood	0.0000	0.0000	0.0000	0	0	0
Extreme Flood	0.0000	0.0000	0.0000	0	0	0

Information for Calculating T_c by the Watershed Lag Method

Average Catchment

Hydraulic

Time of Concentration, T_c

	Slope, Y (%)	Length, l (ft)	1 yr	10 yr	100 yr
Pre Development	0%	0.00	0.0	0.0	0.0
Post Development, upstream of practice	0%	0.00	0.0	0.0	0.0
Post Development, with T _v credit from practice	0%	0.00	0.0	0.0	0.0

BOREHOLE INFILTRATION TESTING

Project Name: Rock River Subdivision
Site: Someplace, Vermont
Date: 7/1/2017
Percolation Test By: Jimmy James, ST #0000
Calculation By: Jimmy James, ST #0000

Infiltration Test No.: I-7

Existing elevation:	52	
Proposed practice area elev.	50	
Thickness of filter bed	0	
Proposed bottom of practice =	50	
Test/Bottom of borehole elev =	48	(2 ft below bottom of practice)

Borehole Characteristics: 6" diameter, 24-inch solid casing

Presoak Borehole for 24-hrs.	Presoak Start Time:	<u>7/1/2017</u>	<u>8:30 AM</u>
	Presoak End Time:	<u>7/2/2017</u>	<u>8:45 AM</u>

Cycle No.	Start Time	End Time		Rate
	H M S	H M S	Measured drop from top of casing (inches)	(in/hr)
1	8 50 0	9 55 0	9.50	8.77
2	10 56 56	12 0 11	9.00	8.54
3	12 2 30	13 10 22	9.25	8.18
4	14 20 13	15 25 45	8.75	8.01
		Average Infiltration Rate =		8.37
		Design Infiltration Rate =	4.19	(Factor of safety of 2)

SOIL TEST PIT LOG

Project: Rock River Subdivision

Ground Surface Slope: 0-8%, varies Logged By: Jimmy James, Site Technician

Test Pit #	Depth (inches)	Texture	Consistence or Density	Color	Mottles	Comments
17-01	0-6	Fine sandy loam; little fine gravel.	Friable, subangular blocky	Medium brown		Topsoil, moist, roots
	6-24	Fine to medium sandy loam	Loose, granular	Tan and Rust		Moist
	24-52	Medium to coarse sandy loam; little fine gravel	Loose, granular	Grey		Moist
	52-110	Coarse sand; little fine to medium gravel.	Loose, granular	Grey and Rust	Common, distinct	Moist SHWT = 90"
	>110	NLTD, NGWTD				

Note:

NLTD - No ledge to depth

NGWTD - No groundwater to depth

SHWT - Seasonal high water table

Post-Construction Soil Depth and Quality Standard

Feasibility (3.1)		Response	Attachment location
1	Have all areas of disturbance within the site that are subject to the Post-Construction Soil Depth and Quality Standard been identified on a plan sheet? This includes all disturbed areas on slopes $\leq 33\%$ which are not covered by an impervious surface, part of a structural stormwater treatment practice, or engineered as structural fill once development is complete.	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet C-5
2	Have all areas that will not be disturbed and areas exempt from the Standard, including the reason for the exemption, been identified on a plan sheet?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet C-5

Treatment (3.2)		Attachment Location
3	Is the minimum topsoil depth specified as: <input checked="" type="checkbox"/> 4 inches <input type="checkbox"/> The depth of the O and A horizons on the NRCS Official Soil Series Description of the native mapped soils (provide documentation)	Sheet C-5
4	Which of the following methods are utilized to meet soil quality requirements for this site? <input checked="" type="checkbox"/> Option 1: Leave undisturbed native vegetation and soil, and protect from compaction during construction. <input checked="" type="checkbox"/> Option 2: Amend existing site topsoil or subsoil in place. <input checked="" type="checkbox"/> Option 3: Remove and stockpile existing topsoil during grading. <input checked="" type="checkbox"/> Option 4: Import topsoil mix, or other materials for mixing, including compost, of sufficient organic content and depth.	Sheet C-5 Sheet C-5 Sheet C-5 Sheet C-5

		Response	Attachment location
5	Does the site layout retain the duff layer and native topsoil in an undisturbed state to the maximum extent practicable?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet C-5
6	Is the organic matter content of the topsoil layer specified to be at least 4%?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet C-5
7	Is compost or other materials used to amend soils specified to have a C:N ratio below 25:1?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet C-5
8	Is it specified that compost shall meet the definition of "compost" or meet the contaminant standards in the Vermont Solid Waste Management Rules?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet C-5
9	If Exceptional Quality (EQ) biosolids are used as a soil amendment, do they comprise no more than 35% of the total volume of soil, and is it specified that they be well mixed before or during application?	<input type="radio"/> Yes <input checked="" type="radio"/> No	n/a

Vegetation and Landscaping (3.3)		Response	Attachment location
	Does the application include a site-specific plan for soil management that:		
10	Identifies all areas on the site subject to the standard?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet C-6
11	Includes construction details and notes on the various methods the contractor may use to meet the Standard?	<input type="radio"/> Yes <input type="radio"/> No	Sheet C-6
12	Includes a statement that soil depth and quality shall be established towards the end of construction, and once established, be protection from compaction?	<input type="radio"/> Yes <input type="radio"/> No	Sheet C-6
13	Includes instructions for contractor verification of the Standard, including a sampling scheme that includes nine 8-inch deep test holes per acre of area subject to the Standard?	<input type="radio"/> Yes <input type="radio"/> No	Sheet C-6
14	Instructions that test holes shall be excavated using only a shovel driven solely by the inspector's weight and shall be at least 50 feet apart from each other?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet C-6
15	Instructions to establish dense and vigorous vegetative cover over turf areas?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sheet C-6

Attachment location: Indicate the specific location (i.e. appendix, page, plan sheet) where the requisite support documentation has been provided within the application.

Extreme Flood Protection Standard Waiver Worksheet

Fill out this worksheet for each discharge point in which use of this waiver is sought.

Extreme Flood Protection Standard (Q_{P100}) Waiver (*check only one*):

- ☐ 1. A site that has a direct discharge to waters with a drainage area equal to or greater than or equal to 10 square miles and that is less than 5% of the watershed area at the site's upstream boundary.

Name of Waters at Discharge Point:

Drainage Area of Waters at Discharge Point (square miles):

- ☒ 2. The impervious on site or otherwise associated within a common plan of development, constructed after 2002, is less than 10 acres.

☒ Yes ☐ No

- ☐ 3. A downstream analysis was completed, pursuant to Section 2.5 of the 2017 VSMM, that indicated extreme flood control is not necessary for the site.

Has adequate conveyance from the site to the discharge point been verified?

☐ Yes ☐ No

Has supporting information (e.g. narrative description, calculations, modeling) for the completed downstream analysis been included with the application?

☐ Yes ☐ No

For a project that has more than one discharge point and that discharges to different receiving waters, waiver eligibility shall be determined on a "per receiving water" basis. Receiving waters are considered separate if the drainage area at their downstream point of confluence is greater than 10 square miles.

For example, if discharge point S/N 001 drains directly to the Winooski River (greater than 10 square miles), but discharge point S/N 002 drains to a small tributary of the Winooski River, then S/N 001 could be waived from the Extreme Flood Protection Treatment Standard using Waiver 2, but S/N 002 could not. However, S/N002 may be still eligible for Waiver 1.

Practice Drainage Area Runoff CalculatorProject Name: **Low Density Residential**Discharge Point: **1**Disconnection Area #: **1**

This tool may be used to calculate the required treatment volumes for the area draining to an individual practice where the practices drainage area is only a portion of the area draining to a discharge point. Where the practice receives runoff from the entire area to a discharge point, this calculator will give the same information as the Standards Compliance Workbook.

Precipitation Data* Precipitation values shall be obtained from [NOAA Atlas 14](#)

Storm	WQ Storm	1 yr, 24 hr	10 yr, 24 hr	100 yr, 24 hr
Precipitation (inches)	1.00	0.00	0.00	0.00

Drainage Area Information

Pre Development Land Use (acres)

Landuse	Hydrologic Soil Group				Total (acres)
	A	B	C	D	
Grass	0.000	0.000	0.000	0.000	0.000
Meadow	0.000	0.000	0.000	0.000	0.000
Woods	0.000	0.000	0.000	0.000	0.000
Pavement, roofs, and other impervious	0.000	0.000	0.000	0.000	0.000
Total	0.000	0.000	0.000	0.000	0.000

Post Development Land Use (acres)

Landuse	Hydrologic Soil Group				Total (acres)
	A	B	C	D	
Grass	0.000	0.000	0.000	0.000	0.000
Meadow	0.000	0.000	0.000	0.000	0.000
Woods	0.000	0.000	0.000	0.000	0.000
Pavement, roofs, and other impervious	0.000	0.000	0.000	0.000	0.000
Total	0.000	0.000	0.000	0.000	0.000

 T_v of upstream practices: 0.000 ac-ft T_v credit of this practice: 0.000 ac-ft

Treatment Standard	Required Treatment Volume	Post Development Runoff Volume	Pre-development Runoff Volume	Post Composite CN (to practice)	CN _{Adj} (with T_v practice credit)	Pre Composite CN
Channel Protection (Hydrologic Condition Method)	0.0000	0.0000	0.0000	0	0	0
Overbank Flood	0.0000	0.0000	0.0000	0	0	0
Extreme Flood	0.0000	0.0000	0.0000	0	0	0

Information for Calculating T_c by the Watershed Lag Method

Average Catchment

Hydraulic

Time of Concentration, T_c

	Slope, Y (%)	Length, l (ft)	1 yr	10 yr	100 yr
Pre Development	0%	0.00	0.0	0.0	0.0
Post Development, upstream of practice	0%	0.00	0.0	0.0	0.0
Post Development, with T _v credit from practice	0%	0.00	0.0	0.0	0.0