RUNOFF REDUCTION VOLUME, WATER QUALITY VOLUME AND STREAM CHANNEL PROTECTION SIZING CALCULATIONS

Multi-Family Development Albany Post Road

3119 Albany Post Road

Village of Buchanan, NY

JMC Project: **22062**

Drawing Reference: **DA-1, DA-2**

Computed by: **MT**

Checked by: **XX**

Date Printed: 10/1/2025

WATER QUALITY VOLUME WORKSHEET

JMC Project:	**22062**
Design Point:	**SITE**

Multi-Family Development Albany Post Road	Drainage Area:	**SITE**

Initial Water Quality Treatment Volume

DESCRIPTION	Design Storm	Area	Impervious Area	Percent Impervious	Runoff Coefficient	Total Required WQ Volume
SYMBOL	P	A	I	%I	R_V	WQ_V
VALUE	1.5	3.87	2.53	65.48	0.639285587	**13,461**
UNITS	In	Ac	Ac	%	CF	CF
VALUE	Enhanced Phosphorus Removal (WQ_V = 1-yr Storm Runoff)					

Runoff Reduction Techniques (Area)

DESCRIPTION	Total Area	Impervious Area
SYMBOL	A	I
Conservation of Natural Areas		
Sheetflow to Riparian Buffers or Filter Strips		
Vegetated Swale		
Tree Planting / Tree Pit		
Disconnection of Rooftop Runoff		
Stream Daylighting		
TOTAL		
UNITS	Ac	Ac

Adjusted Water Quality Treatment Volume

DESCRIPTION	Design Storm	Area	Impervious Area	Percent Impervious	Runoff Coefficient	Total Required WQ Volume
SYMBOL	P	A	I	%I	R_V	WQ_V
VALUE	1.5	3.87	2.53	65.48	0.639285587	**13,461**
UNITS	In	Ac	Ac	%	CF	CF
VALUE	Enhanced Phosphorus Removal (WQ_V = 1-yr Storm Runoff)					

Net Water Quality Treatment Volume = Adjusted WQv - Provided RRv

Initial Water Quality Treatment Volume	13,461	CF
Adjusted Water Quality Treatment Volume	13,461	CF
Provided Runoff Reduction Volume	2,711	CF
Net Water Quality Treatment Volume	10,750	CF

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RUNOFF REDUCTION VOLUME WORKSHEET

JMC Project:	22062
Design Point:	X

Multi-Family Development Albany Post Road	Drainage Area:	XXX

Total Water Quality Treatment Volume

DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Initial Water Quality Volume	WQ_V	**13,461**	CF
Adjusted Water Quality Volume	WQ_V	**13,461**	CF

Minimum Runoff Reduction Volume

DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Design Storm [90% Rainfall Event Number] **or** [1-yr Storm Depth]	P	1.5	In
Total Area of *new* Impervious Cover	Aic	2.53	Ac
Hydrologic Soil Group (HSG) Specific Reduction Factor	S	0.20	
Runoff Coefficient [0.05 + 0.009 x %I]	R_V	0.95	CF
Impervious Cover targeted for Runoff Reduction [S x Aic]	Ai	0.51	Ac
TOTAL VOLUME Required [RR_V = (P x R_V x Ai) / 12]	RR_V	**2,619**	CF

Runoff Reduction Techniques (Volume)

GREEN INFRASTRUCTURE PRACTICE / SMP	*SYMBOL*	*VALUE*	*UNITS*
Stormwater Planter #1	RR_V	470	CF
Intensive Green Roof Areas (15 total)	RR_V	1,532	CF
Extensive Green Roof (LiveRoof)	RR_V	709	CF
	RR_V		CF
	RR_V		CF
	RR_V		CF
	RR_V		CF
	RR_V		CF
	RR_V		CF
TOTAL	RR_V	**2,711**	CF

Runoff Reduction

Is Total RR_V > Adjusted WQ_V?	**NO**
Is Total RR_V > Minimum RR_V?	**YES**

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STORMWATER PLANTER WORKSHEET

JMC Project: **22062**

Design Point: **2**

Stormwater Planter #1

Drainage Area: **PDA-2B**

Site Data for Drainage Area to be Treated by Practice			
DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Design Storm [90% Rainfall Event Number]	P	1.5	In
Impervious Area	I	0.30	Ac
Area	A	0.30	Ac
Percent Impervious	%I	100.00	%
Runoff Coefficient [0.05 + 0.009 x %I]	R_V	0.95	CF
TOTAL VOLUME Required [WQ_V = (P x R_V x A) / 12]	WQ_V	**1,566**	CF
Design Storm [1-yr Storm Depth]	P		In
TOTAL VOLUME Required *(TMDL)* [WQ_V = 1-yr Storm Runoff]	WQ_V		CF

Minimum Planter Bed Area			
DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Water Quality Volume	WQ_V	1,566	CF
Coefficient of permeability of filter media (hydraulic conductivity)	k	4.00	Ft / Day
Planter bed Depth (soil media)	d_f	1.50	Ft
Average Height of water above planter bed	h_f	0.50	Ft
Design planter bed drain Time	t_f	4.00	Hours
Required Surface Area of Planter Bed [$A_f = (WQ_V \times d_f) / (k \times (h_f + d_f) \times t_f)$]	A_f	**1,761.43**	SF

Proposed Area			
DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Calculated planter bed area (Length x Width)			SF
Surface Area of Planter Bed Provided	A_f	**1,838.00**	SF
Actual Volume Provided		**919**	CF

Runoff Reduction		
DESCRIPTION	*VALUE*	*UNITS*
Is Proposed Af > Required Af ?	**YES**	
Type of Planter	**FLOW-THROUGH**	
RRv Provided for Infiltration Planter	1,566	CF
RRv Provided for Flow-Through Planter in HSG 'C' Soils	705	CF
RRv Provided for Flow-Through Planter in HSG 'D' Soils	470	CF

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GREEN ROOF WORKSHEET

JMC Project:	**22062**
Design Point:	**2**
Drainage Area:	**PDA-2C**

Intensive Green Roof Areas (15 total)

Site Data for Drainage Area to be Treated by Practice			
DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Design Storm [90% Rainfall Event Number]	P	1.5	In
Impervious Area	I_N	0.02	
Area	A	0.02	Ac
Percent Impervious	%I	100.00	%
Runoff Volume [0.05 + 0.009 x %I]	R_V	0.95	CF
TOTAL VOLUME Required [$WQ_V = (P \times R_V \times A) / 12$]	WQ_V	**102**	CF

Proposed Green Roof			
DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Green Roof surface AREA	A_{RG}	60.00	SF
DEPTH of the Soil Media	D_{SM}	2.42	Ft
DEPTH of the Drainage Layer	D_{DL}	0.50	Ft
DEPTH of Ponding above surface	D_P	0.33	Ft
Porosity of the Soil Media	n_{SM}	50%	%
Porosity of the Drainage Layer	n_{DL}	40%	%
VOLUME provided in Soil Media [$V_{SM} = A_{RG} \times D_{SM} \times n_{SM}$]	V_{SM}	72.50	CF
VOLUME provided in Drainage Layer [$V_{DL} = A_{RG} \times D_{SM} \times n_{SM}$]	V_{DL}	12.00	CF
VOLUME provided in Ponding Area [$D_P \times A_{RG}$]		20.00	CF
TOTAL VOLUME Provided [$WQv \leq V_{SM} + V_{DL} + (D_P \times A_{RG})$]	WQ_V	**105**	CF

Runoff Reduction			
DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Runoff Reduction volume provided	RR_V	**102**	CF

GREEN ROOF WORKSHEET

JMC Project:	**22062**
Design Point:	**2**
Drainage Area:	**PDA-2D**

Extensive Green Roof (LiveRoof)

Site Data for Drainage Area to be Treated by Practice			
DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Design Storm [90% Rainfall Event Number]	P	1.5	In
Impervious Area	I_N	0.14	
Area	A	0.14	Ac
Percent Impervious	%I	100.00	%
Runoff Volume [0.05 + 0.009 x %I]	R_V	0.95	CF
TOTAL VOLUME Required [$WQ_V = (P \times R_V \times A) / 12$]	WQ_V	**709**	CF

Proposed Green Roof			
DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Green Roof surface AREA	A_{RG}	5,423.68	SF
DEPTH of the Soil Media	D_{SM}	0.50	Ft
DEPTH of the Drainage Layer	D_{DL}	0.17	Ft
DEPTH of Ponding above surface	D_P	0.04	Ft
Porosity of the Soil Media	n_{SM}	50%	%
Porosity of the Drainage Layer	n_{DL}	25%	%
VOLUME provided in Soil Media [$V_{SM} = A_{RG} \times D_{SM} \times n_{SM}$]	V_{SM}	1,355.92	CF
VOLUME provided in Drainage Layer [$V_{DL} = A_{RG} \times D_{SM} \times n_{SM}$]	V_{DL}	225.99	CF
VOLUME provided in Ponding Area [$D_P \times A_{RG}$]		225.99	CF
TOTAL VOLUME Provided [$WQv \leq V_{SM} + V_{DL} + (D_P \times A_{RG})$]	WQ_V	**1,808**	CF

Runoff Reduction			
DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Runoff Reduction volume provided	RR_V	**709**	CF

PROPRIETARY PRACTICE WORKSHEET

JMC Project:	**22062**
Design Point:	**3**
Drainage Area:	**PDA-3**

Water Quality Structure - Jellyfish A

Rainfall Distribution Type: **III**

		A	B	C
Coefficients for the equation unit peak [$R = I_a / P$] [$C_i = A \times R^2 + B \times R + C$]	C_0	-1.774	0.3301	2.4577
	C_1	1.8622	-0.7397	-0.4627
	C_2	-0.0648	0.2276	-0.1932

Site Data for Drainage Area to be Treated by Practice			
DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Design Storm [90% Rainfall Event Number]	P	1.5	In
Impervious Area	I	1.59	Ac
Area	A	2.38	Ac
Percent Impervious	%I	66.75	%
Runoff Coefficient [0.05 + 0.009 x %I]	R_V	0.65	CF
TOTAL VOLUME Required [$WQ_V = (P \times R_V \times A) / 12$]	WQ_V	**8,449**	CF
Design Storm [1-yr Storm Depth]	P		In
TOTAL VOLUME Required *(TMDL)* [WQ_V = 1-yr Storm Runoff]	WQ_V		CF

Water Quality Peak Flow Calculation			
DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Water Quality Volume	WQ_V	8,449	CF
Design Storm [90% Rainfall Event Number] **or** [1-yr Storm Depth]	P	1.5	In
Time of Concentration	t_c	0.1000	Hr
Runoff Volume [$Q = WQ_V / (A \times 3630)$]	Q	0.98	In
Curve Number [$CN = 1000 / (10 + 5P + 10Q - 10 \times (Q^2 + 1.25\ QP)^{½}$]	CN	94.53	
Curve Number	CN	95	
Initial Abstraction [$I_a = 200 / CN - 2$]	I_a	0.12	In
Ratio [$R = I_a / P$]	R	0.08	
$C_0 = A \times R^2 + B \times R + C$	C_0	2.47	
$C_1 = A \times R2 + B \times R + C$	C_1	-0.51	
$C_2 = A \times R2 + B \times R + C$	C_2	-0.18	
Unit Peak Discharge	q_u	638.67	$cfs/mi^2/in$
Peak Discharge [$Q_p = q_u \times A \times Q / 640$]	Q_p	**2.32**	cfs

Proposed Device			
DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Water Quality Peak Flow Provided	Q_p	**2.9**	cfs
Water Quality Volume Provided [$WQ_V = 640 \times 3600 \times Q_P / q_u$]	WQ_V	**10,606**	CF
Model Designation		JFPD0808	
Quantity		1	

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PROPRIETARY PRACTICE WORKSHEET

JMC Project:	**22062**
Design Point:	**3**
Drainage Area:	**PDA-2E**

Water Quality Structure B-6

Rainfall Distribution Type: **III**

		A	B	C
Coefficients for the equation unit peak [$R = I_a / P$] [$C_i = A \times R^2 + B \times R + C$]	C_0	-1.774	0.3301	2.4577
	C_1	1.8622	-0.7397	-0.4627
	C_2	-0.0648	0.2276	-0.1932

Site Data for Drainage Area to be Treated by Practice			
DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Design Storm [90% Rainfall Event Number]	P	1.5	In
Impervious Area	I	0.21	Ac
Area	A	0.21	Ac
Percent Impervious	%I	100.00	%
Runoff Coefficient [$0.05 + 0.009 \times \%I$]	R_V	0.95	CF
TOTAL VOLUME Required [$WQ_V = (P \times R_V \times A) / 12$]	WQ_V	**1,072**	CF
Design Storm [1-yr Storm Depth]	P		In
TOTAL VOLUME Required *(TMDL)* [WQ_V = 1-yr Storm Runoff]	WQ_V		CF

Water Quality Peak Flow Calculation			
DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Water Quality Volume	WQ_V	1,072	CF
Design Storm [90% Rainfall Event Number] **or** [1-yr Storm Depth]	P	1.5	In
Time of Concentration	t_c	0.1000	Hr
Runoff Volume [$Q = WQ_V / (A \times 3630)$]	Q	1.43	In
Curve Number [$CN = 1000 / (10 + 5P + 10Q - 10 \times (Q^2 + 1.25\ QP)^{½}$]	CN	99.36	
Curve Number	CN	98	
Initial Abstraction [$I_a = 200 / CN - 2$]	I_a	0.04	In
Ratio [$R = I_a / P$]	R	0.03	
$C_0 = A \times R^2 + B \times R + C$	C_0	2.47	
$C_1 = A \times R2 + B \times R + C$	C_1	-0.48	
$C_2 = A \times R2 + B \times R + C$	C_2	-0.19	
Unit Peak Discharge	q_u	575.13	$cfs/mi^2/in$
Peak Discharge [$Q_p = q_u \times A \times Q / 640$]	Q_p	**0.27**	cfs

Proposed Device			
DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Water Quality Peak Flow Provided	Q_p	**0.3**	cfs
Water Quality Volume Provided [$WQ_V = 640 \times 3600 \times Q_P / q_u$]	WQ_V	**1,082**	CF
Model Designation		JFP-1-1	
Quantity		1	

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