

Design Capture Volume		Worksheet B.2-1		
1	85 th percentile 24-hr storm depth from Figure B.1-1	d=		inches
2	Area tributary to BMP (s)	A=		acres
3	Area weighted runoff factor (estimate using Appendix B.1.1 and B.2.1)	C=		unitless
4	Trees Credit Volume Note: In the SWQMP list the number of trees, size of each tree, amount of soil volume installed for each tree, contributing area to each tree and the inlet opening dimension for each tree.	TCV=		cubic-feet
5	Rain barrels Credit Volume Note: In the SWQMP list the number of rain barrels, size of each rain barrel and the use of the captured storm water runoff.	RCV=		cubic-feet
6	Calculate DCV = $(3630 \times C \times d \times A) - TCV - RCV$	DCV=		cubic-feet

1. Is there a demand for harvested water (check all that apply) at the project site that is reliably present during the wet season?

Toilet and urinal flushing

Landscape irrigation

Other: _____

2. If there is a demand; estimate the anticipated average wet season demand over a period of 36 hours. Guidance for planning level demand calculations for toilet/urinal flushing and landscape irrigation is provided in Section B.3.2.
[Provide a summary of calculations here]

3. Calculate the DCV using worksheet B-2.1.
DCV = _____ (cubic feet)
[Provide a summary of calculations here]

<p>3a. Is the 36-hour demand greater than or equal to the DCV?</p> <p style="text-align: center;">Yes / No ⇒</p> <p style="text-align: center;">↓</p>	<p>3b. Is the 36-hour demand greater than 0.25DCV but less than the full DCV?</p> <p style="text-align: center;"><input type="checkbox"/> Yes / No ⇒</p> <p style="text-align: center;">↓</p>	<p>3c. Is the 36-hour demand less than 0.25DCV?</p> <p style="text-align: center;">Yes</p> <p style="text-align: center;">↓</p>
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<p>Harvest and use appears to be feasible. Conduct more detailed evaluation and sizing calculations to confirm that DCV can be used at an adequate rate to meet drawdown criteria.</p>	<p>Harvest and use may be feasible. Conduct more detailed evaluation and sizing calculations to determine feasibility. Harvest and use may only be able to be used for a portion of the site, or (optionally) the storage may need to be upsized to meet long term capture targets while draining in longer than 36 hours.</p>	<p>Harvest and use is considered to be infeasible.</p>
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Is harvest and use feasible based on further evaluation?
 Yes, refer to Appendix E to select and size harvest and use BMPs.
 No, select alternate BMPs.

Simple Sizing Method for Infiltration BMPs		Worksheet B.4-1		
1	DCV (Worksheet B-2.1)	DCV=		cubic-feet
2	Estimated design infiltration rate (Worksheet D.5-1)	$K_{\text{design}} =$		in/hr
3	Available BMP surface area	$A_{\text{BMP}} =$		sq-ft
4	Average effective depth in the BMP footprint (DCV/A_{BMP})	$D_{\text{avg}} =$		feet
5	Drawdown time, T ($D_{\text{avg}} * 12 / K_{\text{design}}$)	T=		hours
6	Provide alternative calculation of drawdown time, if needed.			
7	Provide calculations for effective depth provided in the BMP: Effective Depth = Surface ponding (below the overflow elevation) + gravel storage thickness x gravel porosity (0.4)			

Notes:

1. Drawdown time must be less than 36 hours. This criterion was set to achieve average annual capture of 80% to account for back to back storms (See rationale in Appendix B.4.3). In order to use a different drawdown time, BMPs should be sized using the percent capture method (Appendix B.4.2).
2. The average effective depth calculation should account for any aggregate/media in the BMP. For example, 4 feet of stone at a porosity of 0.4 would equate to 1.6 feet of effective depth.
3. This method may overestimate drawdown time for BMPs that drain through both the bottom and walls of the system. BMP specific calculations of drawdown time may be provided that account for BMP-specific geometry.

Sizing Method for Pollutant Removal Criteria		Worksheet B.5-1	
1	Area draining to the BMP		sq. ft.
2	Adjusted runoff factor for drainage area (Refer to Appendix B.1 and B.2)		
3	85 th percentile 24-hour rainfall depth		inches
4	Design capture volume [Line 1 x Line 2 x (Line 3/12)]		cu. ft.
BMP Parameters			
5	Surface ponding [6 inch minimum, 12 inch maximum]		inches
6	Media thickness [18 inches minimum], also add mulch layer and washed ASTM 33 fine aggregate sand thickness to this line for sizing calculations		inches
7	Aggregate storage (also add ASTM No 8 stone) above underdrain invert (12 inches typical) – use 0 inches if the aggregate is not over the entire bottom surface area		inches
8	Aggregate storage below underdrain invert (3 inches minimum) – use 0 inches if the aggregate is not over the entire bottom surface area		inches
9	Freely drained pore storage of the media	0.2	in/in
10	Porosity of aggregate storage	0.4	in/in
11	Media filtration rate to be used for sizing (maximum filtration rate of 5 in/hr. with no outlet control; if the filtration rate is controlled by the outlet use the outlet controlled rate (includes infiltration into the soil and flow rate through the outlet structure) which will be less than 5 in/hr.)		in/hr.
Baseline Calculations			
12	Allowable routing time for sizing	6	hours
13	Depth filtered during storm [Line 11 x Line 12]		inches
14	Depth of Detention Storage [Line 5 + (Line 6 x Line 9) + (Line 7 x Line 10) + (Line 8 x Line 10)]		inches
15	Total Depth Treated [Line 13 + Line 14]		inches
Option 1 – Biofilter 1.5 times the DCV			
16	Required biofiltered volume [1.5 x Line 4]		cu. ft.
17	Required Footprint [Line 16/ Line 15] x 12		sq. ft.
Option 2 – Store 0.75 of remaining DCV in pores and ponding			
18	Required Storage (surface + pores) Volume [0.75 x Line 4]		cu. ft.
19	Required Footprint [Line 18/ Line 14] x 12		sq. ft.
Footprint of the BMP			
20	BMP Footprint Sizing Factor (Default 0.03 or an alternative minimum footprint sizing factor from Line 11 in Worksheet B.5-4)		
21	Minimum BMP Footprint [Line 1 x Line 2 x Line 20]		sq. ft.
22	Footprint of the BMP = Maximum (Minimum (Line 17, Line 19), Line 21)		sq. ft.
23	Provided BMP Footprint		sq. ft.
24	Is Line 23 ≥ Line 22? If Yes, then footprint criterion is met. If No, increase the footprint of the BMP.	<input type="checkbox"/> Yes <input type="checkbox"/> No	

Sizing Method for Volume Retention Criteria		Worksheet B.5-2	
1	Area draining to the BMP		sq. ft.
2	Adjusted runoff factor for drainage area (Refer to Appendix B.1 and B.2)		
3	85 th percentile 24-hour rainfall depth		inches
4	Design capture volume [Line 1 x Line 2 x (Line 3/12)]		cu. ft.
Volume Retention Requirement			
5	<p>Measured infiltration rate in the DMA</p> <p>Note:</p> <p>When mapped hydrologic soil groups are used enter 0.10 for NRCS Type D soils and for NRCS Type C soils enter 0.30</p> <p>When in no infiltration condition and the actual measured infiltration rate is unknown enter 0.0 if there are geotechnical and/or groundwater hazards identified in Appendix C or enter 0.05</p>		in/hr.
6	Factor of safety	2	
7	Reliable infiltration rate, for biofiltration BMP sizing [Line 5/ Line 6]		in/hr.
8	<p>Average annual volume reduction target (Figure B.5-2)</p> <p>When Line 7 > 0.01 in/hr. = Minimum (40, 166.9 x Line 7 + 6.62)</p> <p>When Line 7 ≤ 0.01 in/hr. = 3.5%</p>		%
9	<p>Fraction of DCV to be retained (Figure B.5-3)</p> <p>When Line 8 > 8% = $0.0000013 \times \text{Line } 8^3 - 0.000057 \times \text{Line } 8^2 + 0.0086 \times \text{Line } 8 - 0.014$</p> <p>When Line 8 ≤ 8% = 0.023</p>		
10	Target volume retention [Line 9 x Line 4]		cu. ft.