

Appendix B

Unit Basin Storage Volume Sizing Curves

Design Storm Volume Calculation

Hydrologic calculations for design of volumetric-based stormwater quality BMPs in Ventura County shall be in accordance with the procedures set forth herein. This procedure complies with Regional Board Order No. 00-108, NPDES Permit No. CAS004002, Attachment A – Ventura Countywide Stormwater Quality Urban Impact Mitigation Plan, issued July 27, 2000.

Calculation Procedure

1. Review the area draining to the proposed BMP. Determine the percentage of the drainage area that is considered impervious. Impervious area includes paved areas, roofs, and other developed, non-vegetated areas. Non-vegetated, compacted soil areas shall be considered and impervious area.
2. Use Table B-1 to determine the Runoff Coefficient “C” for the drainage area. The runoff coefficients from this table are intended only for use in this procedure for design of volumetric-based stormwater quality BMPs.

Table B-1
C Values based on Impervious/Pervious Area Ratios

Impervious	Pervious	C
0	100	0.15
5	95	0.19
10	90	0.23
15	85	0.26
20	80	0.30
25	75	0.34
30	70	0.38
35	65	0.41
40	60	0.45
45	55	0.49
50	50	0.53
55	45	0.56
60	40	0.60
65	35	0.64
70	30	0.68
75	25	0.71
80	20	0.75
85	15	0.79
90	10	0.83
95	5	0.86
100	0	0.90



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3. Enter Figure B-1 on the vertical axis at 80% Annual Capture. Move horizontally to the right across Figure B-1 until the curve corresponding to the drainage area's runoff coefficient ("C") determined in Step 2 is intercepted. Interpolation between curves may be necessary. Move vertically down Figure B-1 for this point until the horizontal axis is intercepted. Read the Unit Basin Storage Volume along the horizontal axis.

Figure B-2 provides a direct reading of Unit Basin Storage Volumes required for 80% annual capture of runoff for values of "C" determined in Step 2. Enter the vertical axis of Figure B-2 with the "C" value from Step 2. Move horizontally across Figure B-2 until the line is intercepted. Move vertically down Figure B-2 from this point until the horizontal axis is intercepted. Read the Unit Basin Storage Volume along the horizontal axis.

Figure B-1 and Figure B-2 are based on Precipitation Gage 168, Oxnard Airport. This gage has a data record of approximately 40 years of hourly readings and is maintained by Ventura County Flood Control District. Figure B-1 and Figure B-2 are for use only in the permit area specified in Regional Board Order No. 00-108, NPDES Permit No. CAS004002.

4. The basin volume or basic volume of the BMP is then calculated by multiplying the Unit Basin Storage Volume by the BMP's drainage area. Due to the mixed units that result (e.g., acre-inches, acre-feet) it is recommended that the resulting volume be converted to cubic feet for use during design.

Example Use of Unit Basin Storage Volume Curves Sizing a Dry Detention Basin

- # Determine the drainage area for the BMP, A_t . Example: 10 acres.
- # Determine the area of impervious surfaces in the drainage area, A_i . Example: 6 acres.
- # Calculate the percentage of impervious, Percent Impervious = $(A_i / A_t) * 100$
Example: Percent Impervious = $(A_i / A_t) * 100 = (6 \text{ acres} / 10 \text{ acres}) * 100 = 60\%$
- # Determine the runoff coefficient ("C") for the drainage area using Table B-1. Example: For 60% impervious drainage area, $C = 0.60$.
- # Determine the Unit Basin Storage Volume for 80% Annual Capture, V_u using Figure B-1 or Figure B-2. Interpolate between curves, if necessary. Example: For $C = 0.60$ and 80% Annual Capture, the Unit Basin Storage Volume, $V_u = 0.64$ in.
- # Calculate the volume of the basin, V_b , where $V_b = V_u * A_t$.
Example: $V_b = (0.64 \text{ in})(10 \text{ ac})(\text{ft}/12 \text{ in})(43,560 \text{ ft}^2 / \text{ac}) = 23,232 \text{ ft}^3$.
- # Solution: Size the dry detention basin for 23,232 ft^3 and 40-hour drawdown.



Figure B-1
Volumetric BMP Sizing Curves for
Ventura Countywide Stormwater Quality Management Program

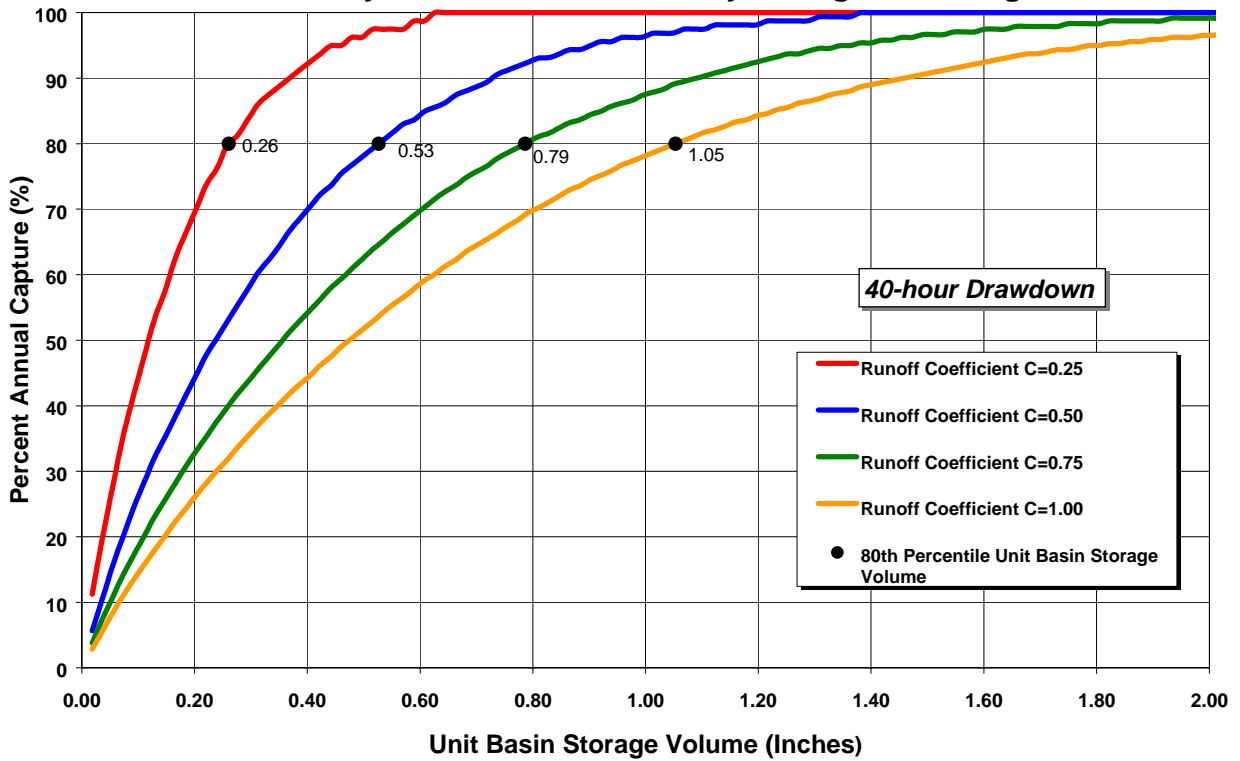


Figure B-2
Volumetric BMP Sizing Curves for
Ventura Countywide Stormwater Quality Management Program

