

# Supplemental Retention Guidance for Non-Standard Biofiltration BMPs

In May 2016, the San Diego Regional Water Quality Control Board (RWQCB) provided written clarification on the 2013 MS4 Permit requirement for the Best Management Practice Design Manual (BMPDM) to “provide guidance for hydraulic loading rates and other biofiltration design criteria necessary to maximize the storm water retention and pollutant removal of treatment control best management practices (BMPs).” Per this direction, biofiltration design criteria applied by the County of San Diego must explicitly require volume retention. Because the February 2016 County BMPDM does not currently contain such requirements, applicants should use these updated instructions to supplement the requirements of BMPDM Sections 5.5.2 and 5.5.3, and Appendices B and F with respect to the retention of runoff for Non-Standard biofiltration BMPs.

## A. APPLICABILITY OF BMP REQUIREMENTS

**Table 1** below illustrates the BMP feasibility evaluation process set forth in BMPDM Section 5.4. As shown, Biofiltration BMPs may only be considered upon demonstration that providing full retention is infeasible. In this situation, applicants may propose **Standard Biofiltration BMPs** or **Non-Standard Biofiltration BMPs**, or both. The updated retention criteria described in this document apply only to Non-Standard Biofiltration BMPs, which may consist of either **reduced size biofiltration BMPs** or **specialized biofiltration BMPs**. Standard Biofiltration BMPs are not affected by this supplemental guidance.

**Table 1: Overview of BMP Feasibility Screening Process (BMPDM Section 5.4)**

Full Retention →	Biofiltration →	Flow-Thru
<p>Evaluate the feasibility of <b>Retention BMPs</b> (i.e., that capture, use, and/or infiltrate the entire design capture volume (DCV)).</p> <p>If infeasible, proceed to Biofiltration BMPs.</p>	<p>Evaluate the feasibility of BMPs that manage the entire DCV through a combination of biofiltration and partial retention. Biofiltration BMPs must be unlined unless supporting geotechnical recommendations are provided to the satisfaction of the County.</p> <p><b><u>Standard Biofiltration</u></b></p> <ul style="list-style-type: none"> <li>• Uses default biofiltration parameters and is sized at 3% of effective tributary area.</li> </ul> <p><b><u>Non-Standard Biofiltration</u></b></p> <ul style="list-style-type: none"> <li>• <b>Reduced Size Biofiltration:</b> Non-proprietary biofiltration BMPs which utilize standard biofiltration elements but are sized at <u>less than 3%</u> of the effective tributary impervious area.</li> <li>• <b>Specialized Biofiltration:</b> Proprietary or non-proprietary biofiltration BMPs which utilize specialized biofiltration elements (such as specialized media) that vary from standard biofiltration elements.</li> </ul>	<p>In lieu of providing full retention or biofiltration, applicants may provide <b><u>Flow-thru Treatment</u></b> AND offsite mitigation through one or more alternative compliance projects</p>

## B. AVAILABLE APPROACHES FOR SATISFYING RETENTION CRITERIA FOR NON-STANDARD BIOFILTRATION BMPs

Applicants proposing Non-Standard biofiltration BMPs must demonstrate that implementation of these BMPs, in combination with other site design elements in the drainage management area (DMA), will retain a percentage of the average annual runoff that is equivalent to the amount that would have been retained by a standard biofiltration BMP. This may be accomplished using either of the following approaches:

- **Automated Approach:** Use the updated “County of San Diego Automated Stormwater Pollutant Control Worksheets (Version 1.2)” available on the County website.<sup>1</sup>
- **Manual Approach:** Use the values presented in **Figure 1** to determine minimum retention requirements; then provide manual calculations demonstrating that applicable BMP elements satisfy the requirements.

**Automated Approach:** Version 1.2 of the County of San Diego automated pollutant control worksheets (dated 8/10/2016) incorporates these updated retention criteria. This includes automated calculations to determine 1) the percentage of annual retention that is required based on user input for rainfall depths and design infiltration rates, 2) the percentage of annual retention that is provided by a project through incorporation of site design (e.g., dispersion areas, rain barrels, or tree wells) and biofiltration elements, and 3) that the project satisfies minimum retention criteria.

**Manual Approach:** Applicants electing not to use the automated stormwater pollutant control worksheets may perform their own calculations by following the 3-step process outlined below.

**Step 1. Required Retention:** Determine the percentage of annual runoff retention that is required.

1a) Using **Figure 1** below, locate the applicable Design Infiltration Rate along the x-axis. This value represents the infiltration rate recommended by the geotechnical engineer and is determined per manual completion of BMPDM Worksheets C.4-1 and D.5-1.

1b) Trace vertically from the x-axis result to the intersect with the plot representing the project’s 85<sup>th</sup> Percentile Rainfall Depth. As shown, data presented in this figure represent ranges of rainfall depth. Users should choose the range that includes their specific rainfall depth rather than interpolating or extrapolating discrete values between the lines.

1c) Trace horizontally from the intersect result to identify the annual retention requirement on the y-axis. This is the required annual retention expressed as a percentage of the DCV for the drainage area.

**Step 2. Provided Retention:** Determine the percentage of annual retention that is provided.

2a) Calculate the volume of stormwater that is retained through incorporation of site design elements such as dispersion areas, tree wells, and rain barrels. This may be calculated using Appendices B.1 and B.2 of the BMPDM. These processes are also represented in Worksheet B.1-1 (version 1.2).

2b) Calculate the volume of stormwater that is retained through incorporation of structural BMP elements. This volume represents reductions associated with infiltration, capture and use, and evapotranspiration within each structural BMP. Note that retention volumes provided by structural BMPs must be normalized to a 36-hour drawdown time. This may be calculated using Worksheets B.4-1, B.5-1, and B.5-2 (version 1.2).

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<sup>1</sup> Automated worksheets link:

[http://www.sandiegocounty.gov/content/sdc/dpw/watersheds/DevelopmentandConstruction/BMP\\_Design\\_Manual.html?cg\\_ck=1459196613380](http://www.sandiegocounty.gov/content/sdc/dpw/watersheds/DevelopmentandConstruction/BMP_Design_Manual.html?cg_ck=1459196613380)

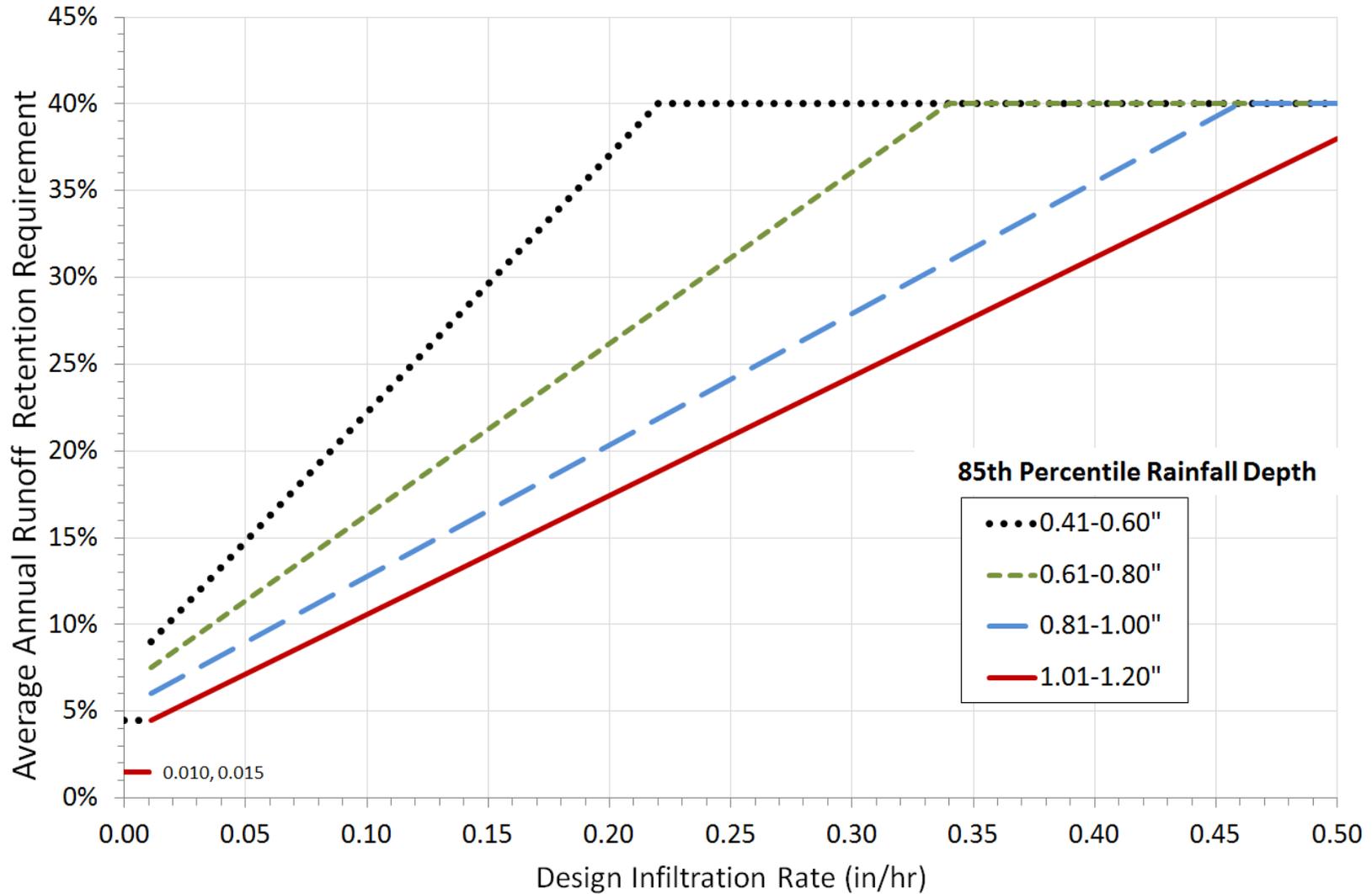


Figure 1: Average Annual Runoff Retention Requirement<sup>2</sup>

<sup>2</sup> Plots have been developed through use of Version 1.2 automated pollutant control worksheets assuming various rainfall depths (0.60 to 1.20 inches) and design infiltration rates (0.000 to 0.500 in/hr) that are representative of the region. All plots were developed assuming BMPs were sized at 3% of the effective impervious tributary area, provided 18" soil media depth, 3" of gravel above the underdrain, no hydromodification orifices, 3" of gravel beneath the underdrain, and varied surface ponding depths as needed to fully satisfy pollutant removal standards. DMAs with Design Infiltration Rates of 0.010 or less fall into the "No Infiltration" category and are only required to retain 1.5% the average annual runoff; however, if the 85<sup>th</sup> percentile rainfall depth is 0.60" or less, the DMA must retain 4.5% as indicated in the above plot. DMAs with Design Infiltration Rates of >0.50 in/hr fall into the "Full Infiltration" category and must retain the full DCV.

2c) Calculate the fraction of the DCV that is retained through incorporation of site design elements and structural BMPs by summing the volumes from Step 2a and 2b then dividing by the initial DCV.

2d) Calculate the percent annual retention provided through incorporation of site design elements and structural BMPs by referencing the Percent Capture Nomographs presented in Appendix B of the BMPDM, identifying the result of Step 2c on the x-axis, intersecting with the 36-hour plot, then intersecting with the annual percent capture value on the y-axis.

**Step 3. Compliance Determination:** Demonstrate that minimum retention criteria are satisfied.

There are two options for satisfying this requirement. Normally the County will require that it be satisfied individually for each DMA on the site; however, at the County's discretion, it may also be satisfied at the site level (i.e., across all DMAs). If the retention requirements have been satisfied for each DMA (i.e., the 2d result is greater than or equal to the 1c result), no further action is required. This is the County's preferred approach.

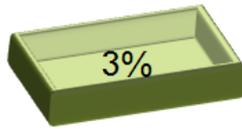
However, if these requirements cannot be satisfied for one or more DMA, staff may allow the annual retention requirements to be satisfied at the project level by determining required and provided retention values as area-weighted averages representative of all DMAs in the project. Any such project level retention analysis must be performed manually by applicants and submitted as a supplement to the automated stormwater pollutant control worksheets. In all instances, staff will require that all reasonable options for satisfying the requirement at the DMA level have been exhausted before allowing applicants to proceed with a site-level approach.

### **C. SUMMARY OF AVAILABLE BIOFILTRATION OPTIONS**

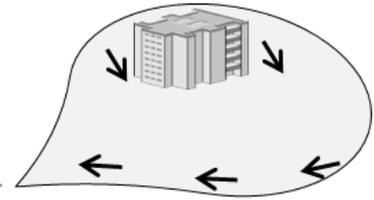
Applicants may use any combination of available Biofiltration BMPs to demonstrate that all applicable criteria set forth and this Supplemental Retention Guidance and the BMPDM are satisfied. Because Non-Standard Biofiltration BMPs typically offer reduced retention capacity, allowance of such BMPs is almost always dependent on successful incorporation of site design elements such as tree wells, rain barrels, and/or dispersion areas. **Figure 2** below summarizes all available biofiltration BMP options and identifies the automated pollutant control worksheets applicable to each option. Use of these worksheets assists users in ensuring that BMPs are properly sized, satisfy annual retention requirements, are not subject to increased clogging, and qualify as "biofiltration".

**If Site Design Elements Are NOT Incorporated:**

**Standard Unlined Biofiltration**  
*Must complete Worksheets B.1-1 and B.5-1*

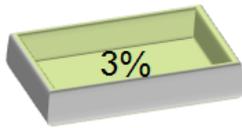


**Flow-Thru BMP + Alternative Compliance**  
*Must complete Worksheets B.1-1, B.6-1, and participate in Alternative Compliance Program*



**If Site Design Elements ARE Incorporated:**

**Standard Lined Biofiltration**  
*Must complete Worksheets B.1-1 and B.5-1*



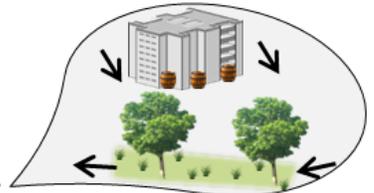
**Reduced Footprint Biofiltration**  
*Must complete Worksheets B.1-1, B.5-1, and B.5-3*



**Specialized Biofiltration**  
*Must complete Worksheets B.1-1, B.5-2, and comply with all Appendix F criteria*



**Flow-Thru BMP + Alternative Compliance**  
*Must complete Worksheets B.1-1, B.6-1, and participate in Alternative Compliance Program*



*Site Design Elements include:*

- Tree Wells, and/or
- Rain Barrels, and/or
- Dispersion Areas

**Figure 2: Summary of Available Biofiltration Options**