

Clarification Sheet for SEATTLE STORMWATER MANUAL – VOLUME 3

This document contains clarifications for the Winter 2021 Public Review Draft of the City of Seattle Stormwater Manual that was originally posted on 1/11/21. The current public review draft documents are available on SDCI’s Updating Stormwater Regulations web page: <https://www.seattle.gov/sdci/codes/changes-to-code/updating-stormwater-regulations>

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6	1/27/21	3	5.43	<p>Contributing areas highlighted in yellow have been updated and orifice sizes highlighted in yellow were added.</p> <p>Table 5.43. Pre-Sized Sizing Factors and Equations for Aboveground Detention Cisterns.</p> <table border="1"> <thead> <tr> <th rowspan="2">Detention Depth^a</th> <th rowspan="2">Contributing Area (sf)</th> <th colspan="4">Sizing Factor/Equation for Cistern Area</th> </tr> <tr> <th>Pre-developed Pasture Standard</th> <th>Pre-Developed Pasture Standard Orifice Diameter for Construction</th> <th>Peak Control Standard</th> <th>Peak Flow Control Standard Orifice Diameter for Construction</th> </tr> </thead> <tbody> <tr> <td rowspan="5">3 feet</td> <td>≤ 2,000</td> <td rowspan="2">10.6%</td> <td rowspan="5">0.25</td> <td rowspan="5">[0.0552 x A] - 2.3435</td> <td rowspan="5">0.25</td> </tr> <tr> <td>2,001 – 3,500</td> </tr> <tr> <td>3,501 – 5,000</td> <td>408 sf</td> <td>0.375</td> </tr> <tr> <td>5,001 – 9,999</td> <td>0.00015 x [A ^ 1.74]</td> <td>0.5</td> </tr> <tr> <td>10,000</td> <td>0.625</td> </tr> <tr> <td rowspan="6">4 feet</td> <td>≤ 2,000</td> <td rowspan="2">6.4%</td> <td rowspan="6">0.25</td> <td rowspan="6">0.0141 x [A^{1.1289}]</td> <td rowspan="6">0.25</td> </tr> <tr> <td>2,001 – 3,500</td> </tr> <tr> <td>3,501 – 5,000</td> <td>322 sf</td> <td>0.375</td> </tr> <tr> <td>5,001 – 6,000</td> <td>0.0001 x [A ^ 1.73]</td> <td>0.5</td> </tr> <tr> <td>6,001 – 9,999</td> <td>0.625</td> </tr> <tr> <td>10,000</td> <td>0.625</td> </tr> </tbody> </table>	Detention Depth ^a	Contributing Area (sf)	Sizing Factor/Equation for Cistern Area				Pre-developed Pasture Standard	Pre-Developed Pasture Standard Orifice Diameter for Construction	Peak Control Standard	Peak Flow Control Standard Orifice Diameter for Construction	3 feet	≤ 2,000	10.6%	0.25	[0.0552 x A] - 2.3435	0.25	2,001 – 3,500	3,501 – 5,000	408 sf	0.375	5,001 – 9,999	0.00015 x [A ^ 1.74]	0.5	10,000	0.625	4 feet	≤ 2,000	6.4%	0.25	0.0141 x [A ^{1.1289}]	0.25	2,001 – 3,500	3,501 – 5,000	322 sf	0.375	5,001 – 6,000	0.0001 x [A ^ 1.73]	0.5	6,001 – 9,999	0.625	10,000	0.625
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7	1/27/21	3	NA	<p>The non-infiltrating bioretention applicability table was updated to remove Peak Flow Control as an option.</p> <table border="1"> <thead> <tr> <th rowspan="2">BMP</th> <th colspan="2">On-site</th> <th colspan="3">Flow Control</th> <th colspan="4">Water Quality</th> <th rowspan="2">Conveyance</th> </tr> <tr> <th>List</th> <th>Standard</th> <th>Forest</th> <th>Pasture</th> <th>Peak</th> <th>Basic</th> <th>Enhanced</th> <th>Oil Control</th> <th>Phosphorus</th> </tr> </thead> <tbody> <tr> <td>Non-Infiltrating Bioretention</td> <td>✓</td> <td>✓^a</td> <td>✓^a</td> <td>✓^a</td> <td></td> <td>✓</td> <td>✓</td> <td></td> <td></td> <td>✓^b</td> </tr> </tbody> </table>	BMP	On-site		Flow Control			Water Quality				Conveyance	List	Standard	Forest	Pasture	Peak	Basic	Enhanced	Oil Control	Phosphorus	Non-Infiltrating Bioretention	✓	✓ ^a	✓ ^a	✓ ^a		✓	✓			✓ ^b											
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#	Date Added	Volume/Appendix	Table	Clarification																										
8	1/27/21	3	5.45	<p>Contributing areas highlighted in yellow have been added and sizing factors highlighted in yellow were updated for consistency with the water quality treatment sizing.</p> <p style="text-align: center;">Table 5.45. On-site List Sizing for Non-infiltrating Bioretention.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th rowspan="2">Bioretention Configuration</th> <th rowspan="2">Average Ponding Depth</th> <th rowspan="2">Contributing Area (sf)</th> <th>Sizing Factor for Facility Bottom Area</th> </tr> <tr> <th>On-site List</th> </tr> </thead> <tbody> <tr> <td rowspan="4">Sloped sides</td> <td>2 inches</td> <td>0 – 10,000</td> <td>1.3%</td> </tr> <tr> <td rowspan="2">6 inches</td> <td>≤2,000</td> <td>[0.0059 x A] - 3.215</td> </tr> <tr> <td>2,001 – 10,000</td> <td>[0.0097 x A] – 11.297</td> </tr> <tr> <td rowspan="2">12 inches</td> <td>≤2,700</td> <td>0.4%</td> </tr> <tr> <td>2,701 – 10,000</td> <td>[0.0052 x A] - 12.1092</td> </tr> <tr> <td rowspan="2">Vertical sides</td> <td>6 inches</td> <td>0 – 10,000</td> <td>1.2%</td> </tr> <tr> <td>12 inches</td> <td>0 – 10,000</td> <td>1.0%</td> </tr> </tbody> </table> <p><i>The text preceding the table was also updated as follows:</i></p> <p>Non-infiltrating bioretention may be selected to meet the On-site List Requirement (refer to Section 3.3.1 and Appendix C for infeasibility criteria). To meet the requirement, the facility shall be sized according to the sizing factors provided in Table 5.45.</p> <p>Factors are organized by cell ponding depth, contributing area, and side slope. To select the appropriate sizing factor the design ponding depth shall be rounded down to the nearest depth in the sizing table, or sizing factors may be linearly interpolated for intermediate ponding depths (e.g., between 4 and 6 inches ponding).</p>	Bioretention Configuration	Average Ponding Depth	Contributing Area (sf)	Sizing Factor for Facility Bottom Area	On-site List	Sloped sides	2 inches	0 – 10,000	1.3%	6 inches	≤2,000	[0.0059 x A] - 3.215	2,001 – 10,000	[0.0097 x A] – 11.297	12 inches	≤2,700	0.4%	2,701 – 10,000	[0.0052 x A] - 12.1092	Vertical sides	6 inches	0 – 10,000	1.2%	12 inches	0 – 10,000	1.0%
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9A	1/27/21	3	5.46	<p>Sizing factors highlighted in yellow were updated since non-infiltration bioretention with 12 inches of ponding does not meet the Peak Control Standard</p> <p>Table 5.46. Pre-Sized Sizing Factors and Equations for Non-Infiltrating Bioretention.</p> <table border="1"> <thead> <tr> <th rowspan="2">Bioretention Configuration</th> <th rowspan="2">Average Ponding Depth</th> <th rowspan="2">Contributing Area (sf)</th> <th colspan="3">Sizing Factor/Equation for Facility Bottom Area</th> </tr> <tr> <th>Pre-developed Pasture Standard</th> <th>Peak Control Standard</th> <th>Water Quality Treatment</th> </tr> </thead> <tbody> <tr> <td rowspan="4">Sloped sides</td> <td>2 inches</td> <td>0 – 10,000</td> <td>NA^a</td> <td>NA^a</td> <td>1.3%</td> </tr> <tr> <td rowspan="2">6 inches</td> <td>≤2,000</td> <td rowspan="2">NA^a</td> <td rowspan="2">NA^a</td> <td>[0.0059 x A] - 3.215</td> </tr> <tr> <td>2,001 – 10,000</td> <td>[0.0097 x A] – 11.297</td> </tr> <tr> <td rowspan="2">12 inches</td> <td>≤ 2,700</td> <td rowspan="2">NA^a</td> <td rowspan="2">NA^a</td> <td>0.4%</td> </tr> <tr> <td>2,701 – 10,000</td> <td>[0.0052 x A] - 12.1092</td> </tr> <tr> <td rowspan="2">Vertical sides</td> <td>6 inches</td> <td>0 – 10,000</td> <td>NA^a</td> <td>NA^a</td> <td>1.2%</td> </tr> <tr> <td>12 inches</td> <td>0 – 10,000</td> <td>NA^a</td> <td>NA^a</td> <td>1.0%</td> </tr> </tbody> </table> <p>NA – not applicable For Sizing Factors: Bioretention Facility Bottom Area = Contributing Hard Surface Area x Factor (%) / 100 Hard Surface Area Managed = Bioretention Facility Bottom Area + Factor (%) / 100 For Sizing Equations: Bioretention Facility Bottom Area (sf) = [Factor x A (sf)] + Integer. Hard Surface Area Managed (sf) = [Bioretention Bottom Area (sf) - Integer] + Factor.</p> <p>^a Bioretention facilities with underdrains are not capable of achieving the standard unless orifice controls are used.</p> <p><i>The text preceding the table was also updated as follows:</i></p> <p>Pre-sized Approach for Flow Control and Water Quality Treatment</p> <p>The Pre-sized Approach may be used for projects with new and replaced hard surface areas up to 10,000 square feet. Under the Pre-sized Approach (refer to <i>Section 4.1.2</i>), pre-sized non-infiltrating bioretention facilities may be used to achieve Water Quality Treatment Standards.</p>	Bioretention Configuration	Average Ponding Depth	Contributing Area (sf)	Sizing Factor/Equation for Facility Bottom Area			Pre-developed Pasture Standard	Peak Control Standard	Water Quality Treatment	Sloped sides	2 inches	0 – 10,000	NA ^a	NA ^a	1.3%	6 inches	≤2,000	NA ^a	NA ^a	[0.0059 x A] - 3.215	2,001 – 10,000	[0.0097 x A] – 11.297	12 inches	≤ 2,700	NA ^a	NA^a	0.4%	2,701 – 10,000	[0.0052 x A] - 12.1092	Vertical sides	6 inches	0 – 10,000	NA ^a	NA ^a	1.2%	12 inches	0 – 10,000	NA ^a	NA^a	1.0%
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#	Date Added	Volume/Appendix	Table	Clarification
9B	1/27/21	3	NA	<p><i>The text preceding the table was also updated as follows:</i></p> <p>To use these pre-sized facilities to meet performance standards, the bioretention facility shall meet the general requirements outlined in this section plus the following specific requirements:</p> <ul style="list-style-type: none"> ● The bottom area shall be sized using the applicable sizing factor or equation. <p><i>The text following the table was also updated as follows:</i></p> <p>Modeling Approach for On-site Performance Standard, Flow Control, and Water Quality Treatment</p> <p>When using continuous simulation hydrologic modeling to size non-infiltrating bioretention, the assumptions listed for infiltrating bioretention in Table 5.24 shall be applied, with the exception that the facility is modeled with no infiltration to underlying soil. [Note: MGSFlood is not currently approved (as of December 2020) by Ecology for modeling bioretention.] When using currently available modeling methods, non-infiltrating bioretention is not capable of meeting the Pre-developed Forested or Pre-developed Pasture Standard.</p>