

APPENDIX C

On-site Stormwater Management BMP Infeasibility Criteria

This appendix provides infeasibility criteria for use in evaluating BMPs for meeting the On-site Stormwater Management Requirement using the On-Site List approach (SMC, Section 22.805.070.D). GSI BMP lists are provided in Volume 1, Section 5.1.2. Step-by-step instructions are provided in Volume 3, Section 3.1.

When using the On-site List approach, if a GSI BMP cannot be installed within the existing project site, then the BMP is considered infeasible.

Table C.1. On-site Requirement Infeasibility Criteria Checklist: All Dispersion BMPs and All Infiltration BMPs.

BMP	Infeasibility Criteria	Additional Information from Applicant
All Dispersion BMPs	<ul style="list-style-type: none"> ▪ Where professional geotechnical evaluation recommends dispersion not be used anywhere within project site due to reasonable concerns of erosion, slope failure, or flooding (requires a signed and stamped written determination based on site-specific conditions from an appropriately licensed professional). ▪ Only available dispersion flowpath area is within a landslide hazard area defined by the Regulations for Environmental Critical Areas. ▪ Only available dispersion flowpath area is in or within 100 feet up-gradient of a known contaminated site or abandoned landfill. ▪ Only available dispersion flowpath area is in a Steep Slope Critical Area (SMC, Section 25.09.020) or within setback to Steep Slope Critical Area (calculated as 10 times the height of the Steep Slope to a 500 foot maximum setback). ▪ Only available dispersion flowpath area is up-gradient and within 10 feet of proposed or existing septic system or drainfield. 	
All Infiltration BMPs	<p>The following criteria each establish that the BMP is infeasible but only if based on an evaluation of site-specific conditions and a signed and stamped written determination from an appropriately licensed professional (e.g., engineer, geologist, hydrogeologist):</p> <ul style="list-style-type: none"> ▪ Where professional geotechnical evaluation recommends infiltration not be used due to reasonable concerns about erosion, slope failure, or flooding. ▪ Where the only area available for siting would threaten the safety or reliability of pre-existing underground utilities, pre-existing underground storage tanks, pre-existing structures, or pre-existing road or parking lot surfaces or subgrades. ▪ Where the only area available for siting does not allow for a safe overflow pathway. ▪ Where infiltrating water would threaten shoreline structures such as bulkheads. 	

BMP	Infeasibility Criteria	Additional Information from Applicant
	<p>The following criteria each establish that the BMP is infeasible, without further justification, though some criteria require professional services:</p> <ul style="list-style-type: none"> ▪ Within area designated as Landslide-Prone Critical Area, Steep Slope Critical Area or within setback from Steep Slope Critical Area (refer to <i>Volume 3, Section 5.4.1.3</i>). ▪ Within 5 foot setback from a structure without an underground basements or 10 feet from structure with a basement is not achievable. (Note: for projects infiltrating runoff from 5,000 square feet or more of impervious surface, see additional setback information in <i>Volume 3, Section 5.4.1.3</i>). ▪ Within 5 foot setback from property lines (excluding the property line abutting the right-of-way) if structure setbacks are met. ▪ Within 100 feet of a drinking water well, or a spring used for drinking water supply. ▪ Within drinking water protection area. ▪ Within 10 feet of an underground storage tank or connecting underground pipes when the capacity of the tank and pipe system is 1100 gallons or less. (Applicable to tanks used to store petroleum products, chemicals, or liquid hazardous wastes). ▪ Within 100 feet of an underground storage tank or connecting underground pipes when the capacity of the tank and pipe system is greater than 1100 gallons. ▪ Within 10 feet of a proposed or existing septic system or drain field for rain gardens, bioretention, permeable pavement facilities, infiltration trenches and drywells and within 100 feet of a proposed or existing septic system for other infiltration BMPs. ▪ Where the following minimum vertical separation to the seasonal high water table or hydraulically-restrictive layer would not be achieved below the infiltration BMP: <ul style="list-style-type: none"> – One foot separation for a BMP that would serve a drainage area that is: 1) less than 5,000 square feet of pollution-generating impervious surface (PGIS), and 2) less than 10,000 square feet of impervious surface; and, 3) less than three-quarter (3/4) acres of pervious surface. This clearance also applies to permeable pavement facilities regardless of size. Vertical separation requirements are larger if explorations are conducted during the dry season (refer to <i>Volume 3, Section 5.4.1.3</i>). – Three foot separation for a BMP that would serve a drainage area that meets or exceeds: 1) 5,000 square feet of PGIS, or 2) 10,000 square feet of impervious surface, or 3) three-quarter (3/4) acres of pervious surfaces. To use the 3 foot separation criterion, it must 	

BMP	Infeasibility Criteria	Additional Information from Applicant
	<p>be demonstrated that the drainage areas cannot reasonably be broken down into amounts smaller than the drainage thresholds listed above. Vertical separation requirements are larger if explorations are conducted during the dry season (refer to Volume 3, Section 5.4.1.3).</p> <ul style="list-style-type: none"> ▪ Within 100 feet up-gradient of a contaminated site or landfill (active or closed) for project sites where runoff from less than 5,000 square feet of impervious surface will be infiltrated on site, and within 500 feet up-gradient of contaminated sites or landfill (active or closed) for projects where runoff from 5,000 square feet or more of impervious area will be infiltrated on site. ▪ Note: For most infiltration BMPs, setbacks are measured from the vertical extent of maximum ponding before overflow. For bioretention and rain gardens, setback distances are as measured from the bottom edge of the bioretention or rain garden soil mix (i.e., bioretention cell bottom at the toe of the side slope). 	

Table C.2. On-site Requirement Infeasibility Criteria Checklist: Retain Existing Trees and Soil Amendment.

BMP	Infeasibility Criteria	Additional Information from Applicant
Retain Existing Trees	<ul style="list-style-type: none"> ▪ No existing trees with diameter equal to or greater than 4-inches on project site. ▪ New and/or replaced ground level impervious surface not proposed within 20 feet of existing tree. ▪ For tree(s) with a diameter greater than or equal to 6 inches, significant grading is unavoidable within the dripline or otherwise does not meet standards (per City Standard Plans and Specifications) required for retention. ▪ For tree(s) with a diameter of 4-6 inches significant grading is unavoidable within 5 feet of tree trunk or otherwise does not meet standards (per City Standard Plans and Specifications) required for retention. ▪ Trees are not considered healthy according to TIP 331B-Hazard Trees. 	
Soil Amendment	<ul style="list-style-type: none"> ▪ Portions of the site comprised of till soils with slopes greater than 33 percent need not meet this requirement. 	

Table C.3. On-site Requirement Infeasibility Checklist: Category 1 BMPs.

BMP	Infeasibility Criteria	Additional Information from Applicant
Full Dispersion	<ul style="list-style-type: none"> ▪ The infeasibility criteria for “All Dispersion BMPs” (Table C.1) apply. ▪ The Design Criteria for Full Dispersion (<i>Volume 3, Section 5.3.2</i>) cannot be met. ▪ A 65 to 10 ratio of the native vegetation area to the impervious area is unachievable. ▪ A minimum native vegetation flowpath length of 100 feet (25 feet for sheet flow from a non-native pervious surface) is unachievable. 	
Infiltration Trenches	<ul style="list-style-type: none"> ▪ The infeasibility criteria for “All Infiltration BMPs” (Table C.1) apply. ▪ The Design Criteria for Infiltration Trenches (<i>Volume 3, Section 5.4.2</i>) cannot be met. ▪ Field testing indicates potential infiltration trench site(s) have a measured (a.k.a., initial) native soil infiltration rate less than 0.5 inches per hour (<i>Volume 3, Section 5.4.1</i>). 	
Drywells	<ul style="list-style-type: none"> ▪ The infeasibility criteria for “All Infiltration BMPs” (Table C.1) apply. ▪ The Design Criteria for Dry Wells (<i>Volume 3, Section 5.4.3</i>) cannot be met. ▪ Field testing indicates potential infiltration trench site(s) have a measured (a.k.a., initial) native soil infiltration rate less than 5 inches per hour (<i>Volume 3, Section 5.4.1</i>). 	

Table C.4. On-site Requirement Infeasibility Criteria Checklist: Category 2 BMPs.

BMP	Infeasibility Criteria	Additional Information from Applicant
Rain Gardens	<ul style="list-style-type: none"> ▪ Refer to feasibility criteria for Infiltrating Bioretention Facilities. 	
Infiltrating Bioretention Facilities	<ul style="list-style-type: none"> ▪ The feasibility criteria for “All Infiltration BMPs” (Table C.1) apply. ▪ The Design Criteria for Infiltrating Bioretention cannot be met (<i>Volume 3, Section 5.4.4</i>) ▪ Site cannot be reasonably designed to locate infiltrating bioretention facilities on slopes less than 8 percent. ▪ Where the facility is not compatible with surrounding drainage system (e.g., there is less than 2 percent fall from the contributing area to the facility and from the facility to the point of connection to the public drainage system, or requires non-standard connection). ▪ The minimum bottom width of the infiltrating bioretention facility cannot be met due to site constraints such as, but not limited to: encroachment within the critical root zone of an existing tree(s); minimum setbacks to structures/utilities cannot be met; or available area within the project site or planting strip too small. ▪ Minimum vertical and horizontal clearance from utilities as required by utility owner is unachievable. ▪ Where field testing indicates soils have a measured (a.k.a., initial) native soil infiltration rate less than 0.6 inches per hour infiltrating bioretention facilities without underdrains are not considered feasible. (Note: For soils with measured infiltration rates less than 0.6 inches per hour, but greater than or equal to 0.3 inches per hour, infiltrating bioretention with an underdrain is considered feasible, unless other feasibility restrictions apply.) ▪ Where facility without underdrain is within 1/4 mile of nutrient critical receiving waters and the underlying native soil does not meet the treatment soil requirements outlined in <i>Section 5.4.1</i>. ▪ Where facility with underdrain would route underdrained water to a nutrient-critical receiving water. 	
Rainwater Harvesting	<ul style="list-style-type: none"> ▪ The Design Criteria for Rainwater Harvesting (<i>Volume 3, Section 5.5.1</i>) cannot be met. ▪ Project lacks non-pollution-generating surface from which to harvest rainwater. ▪ Non-potable water demand is insufficient to use the harvested rainwater. ▪ Due to reasonable considerations of financial cost, rainwater harvesting is infeasible. 	

BMP	Infeasibility Criteria	Additional Information from Applicant
Permeable Pavement Facilities	<ul style="list-style-type: none"> ▪ The infeasibility criteria for “All Infiltration BMPs” (Table C.1) apply. ▪ The Design Criteria for Permeable Pavement Facilities (<i>Volume 3, Section 5.4.6</i>) cannot be met. <p>The following criteria each establish that the BMP is infeasible but only if based on an evaluation of site-specific conditions and a written recommendation from an appropriate licensed professional (e.g., engineer, geologist, hydrogeologist):</p> <ul style="list-style-type: none"> ▪ Where infiltrating and ponded water below permeable pavement area would compromise adjacent impervious pavements. ▪ Where fill soils are used that can become unstable when saturated. ▪ Where permeable pavements cannot provide sufficient strength to support heavy loads in areas with “industrial activity” as identified in 40 CFR 122.26(b)(14). <p>The following criteria each establish that the BMP is infeasible, without further justification, though some criteria require professional services:</p> <ul style="list-style-type: none"> ▪ Where subgrade slopes exceed 5 percent. ▪ At multi-level parking garages, and over culverts and bridges. ▪ Where the site design cannot avoid putting pavement in areas likely to have long-term excessive sediment deposition after construction (e.g., construction and landscaping material yards).* ▪ Where the site cannot reasonably be designed to have a porous asphalt surface at less than 5 percent slope, or a pervious concrete surface at less than 10 percent slope, or a permeable interlocking concrete pavement surface (where appropriate) at less than 12 percent slope. Note: grid systems upper slope limit can range from 6 to 12 percent; check with manufacturer and local supplier. ▪ Where the native soils below a pollution-generating permeable pavement (e.g., road or parking lot) do not meet the soil suitability criteria for providing treatment. Refer to <i>Volume 3, Section 5.4.1</i>. ▪ Where underlying soils are unsuitable for supporting traffic loads when saturated. Soils meeting a California Bearing Ratio of 5 percent are considered suitable for residential access roads. ▪ Where field testing indicates soils have a measured (a.k.a., initial) native soil infiltration rate less than 0.6 inches per hour, permeable pavement facilities without underdrains are not considered feasible. (Note: For soils with measured infiltration rates less than 0.6 inches per hour, but greater than or equal to 0.3 inches per hour, permeable pavement facilities with underdrains are considered feasible, unless other feasibility restrictions apply.) 	

BMP	Infeasibility Criteria	Additional Information from Applicant
	<ul style="list-style-type: none"> ▪ Where the road type is classified as arterial or collector rather than access.* Refer to RCW 35.78.010, RCW 36.86.070, and RCW 47.05.021. Note: This infeasibility criterion does not extend to sidewalks and other non-traffic bearing surfaces associated with the collector or arterial. ▪ Where road has ADT exceeding XX [to be developed to represent “very low traffic volumes”] or ADTT exceeding XX [to be developed to represent “very low truck traffic”]. ▪ Where replacing existing impervious surfaces unless the existing surface is a non-pollution generating surface over an outwash soil with an infiltration rate of four inches per hour or greater. ▪ At sites defined as “high use sites” in SMC, Section 22.801.090*. ▪ In areas with “industrial activity” as identified in 40 CFR 122.26(b)(14)*. ▪ Where the risk of concentrated pollutant spills is more likely, including, but not limited to, gas stations, truck stops, and industrial chemical storage sites.* ▪ Where routine, heavy applications of sand occur in frequent snow zones to maintain traction during weeks of snow and ice accumulation.* ▪ Where it is infeasible to prevent stormwater run-on to the permeable pavement from unstabilized erodable areas without pre-settling. ▪ Areas contributing runoff to the permeable pavement facilities cannot be limited to the maximum run-on limits: <ul style="list-style-type: none"> – Pollution-generating impervious surfaces (e.g., roadways, parking lots): maximum run-on ratio of 2:1 – Non-pollution generating impervious surfaces (e.g., roofs, sidewalks) and stabilized pervious surfaces: maximum run-on ratio of 5:1 <p>*These criteria also apply to impervious pavements that would employ stormwater collection from the surface of impervious pavement with redistribution below the pavement.</p>	
Permeable Pavement Surfaces	<ul style="list-style-type: none"> ▪ The Design Criteria for Permeable Pavement Surfaces (Volume 3, Section 5.6.2) cannot be met. ▪ The infeasibility criteria provided for permeable pavement facilities cannot be met. (Note, however, that for permeable pavement surfaces, the infeasibility criteria for “All Infiltration BMPs” are not applicable and the minimum native soil infiltration rate differs, as described below). ▪ Where field testing indicates soils have a measured (a.k.a., initial) native soil infiltration rate less than 0.3 inches per hour permeable pavement surfaces are not considered feasible. (Note: field infiltration tests are not required, but may be used to demonstrate infeasibility) 	

BMP	Infeasibility Criteria	Additional Information from Applicant
	<ul style="list-style-type: none"> ▪ Where the site is a contaminated site or abandoned landfill. ▪ Within 10 feet of an underground storage tank or connecting underground pipes. (Applicable to tanks used to store petroleum products, chemicals, or liquid hazardous wastes). ▪ Run-on from an impervious area of 10 percent or less of the permeable pavement surface area is unavoidable. ▪ Where professional geotechnical evaluation recommends permeable pavement not be used anywhere within the project site due to reasonable concerns of erosion, slope failure, or flooding (requires a signed and stamped written determination based on site-specific conditions from an appropriately licensed professional). 	

Table C.5. On-site Requirement Infeasibility Criteria Checklist: Category 3 BMPs.

BMP	Infeasibility Criteria	Additional Information from Applicant
Sheet Flow Dispersion	<ul style="list-style-type: none"> ▪ The infeasibility criteria for “All Dispersion BMPs” (Table C.1) apply. ▪ The Design Criteria for Sheet Flow Dispersion (<i>Volume 3, Section 5.3.5</i>) cannot be met. ▪ Positive drainage for sheet flow runoff is unachievable. ▪ Area to be dispersed (e.g., driveway, patio) cannot be graded to have less than a 15 percent slope. ▪ At least a 10-foot wide vegetation buffer for dispersion of the adjacent 20 feet of impervious surface is unachievable. ▪ The flowpath setbacks to property lines, structures and other flowpaths (refer to <i>Volume 3, Section 5.3.5</i>) cannot be achieved. 	
Concentrated Flow Dispersion	<ul style="list-style-type: none"> ▪ The infeasibility criteria for “All Dispersion BMPs” (Table C.1) apply. ▪ The Design Criteria for Concentrated Flow Dispersion (<i>Volume 3, Section 5.3.6</i>) cannot be met. ▪ The dispersion device and flowpath requirements are unachievable: <ul style="list-style-type: none"> – A minimum 10 feet length of dispersion trench followed by a 25-foot minimum flowpath or a rock pad with a 50-foot minimum flowpath. – A maximum of 700 square feet of drainage area to any dispersion device. ▪ The flowpath setbacks to property lines, structures and other flowpaths (refer to <i>Volume 3, Section 5.3.6</i>) cannot be achieved. 	
Splashblock Downspout Dispersion	<ul style="list-style-type: none"> ▪ The infeasibility criteria for “All Dispersion BMPs” (Table C.1) apply. ▪ The Design Criteria for Splashblock Downspout Dispersion (<i>Volume 3, Section 5.3.3</i>) cannot be met. ▪ There are no downspouts. ▪ A 50-foot minimum flowpath for the dispersion area or a maximum of 700 square feet of drainage area to any splashblock is unachievable. ▪ The flowpath setbacks to property lines, structures and other flowpaths (refer to <i>Volume 3, Section 5.3.3</i>) cannot be achieved. 	

BMP	Infeasibility Criteria	Additional Information from Applicant
Trench Downspout Dispersion	<ul style="list-style-type: none"> ▪ The infeasibility criteria for “All Dispersion BMPs” (Table C.1) apply. ▪ The Design Criteria for Splashblock Downspout Dispersion (<i>Volume 3, Section 5.3.4</i>) cannot be met. ▪ There are no downspouts. ▪ A minimum 10 feet length of dispersion trench for every 700 square feet of drainage area followed by 25-foot minimum flowpath is unachievable. ▪ The flowpath setbacks to property lines, structures and other flowpaths (refer to <i>Volume 3, Section 5.3.4</i>) cannot be achieved. 	
Non-Infiltrating Bioretention	<ul style="list-style-type: none"> ▪ The Design Criteria for Non-Infiltrating Bioretention (<i>Volume 3, Section 5.8.2</i>) cannot be met. ▪ Site cannot be reasonably designed to locate non-infiltrating bioretention facilities on slopes less than 8 percent. ▪ Where the facility is not compatible with surrounding drainage system (e.g., there is less than 2 percent fall from the contributing area to the facility and from the facility to the point of connection to the public system, or requires non-standard connection). ▪ The minimum bottom width of the non-infiltrating bioretention facility cannot be met due to site constraints such as encroachment within the critical root zone of an existing tree(s); minimum setbacks to structures/utilities cannot be met; project limits/planting strip too small. ▪ Minimum vertical and horizontal clearance from utilities is unachievable as required by utility owner ▪ The underdrained water would be routed to a nutrient-critical receiving water. 	
Vegetated Roofs	<ul style="list-style-type: none"> ▪ The Design Criteria for Vegetated Roofs (<i>Volume 3, Section 5.6.1</i>) cannot be met. ▪ Project does not include a roof. ▪ Roof design has a slope less than 1 degree (0.2:12) or greater than 10 degrees (2:12). ▪ Due to reasonable considerations of financial cost, building cannot be designed to accommodate structural load of vegetated roof. 	
SFR Cisterns	<ul style="list-style-type: none"> ▪ The Design Criteria for SFR Cisterns (see <i>Volume 3, Section 5.5.2</i>) cannot be met. ▪ Project site cannot accommodate above ground detention cisterns. (Note: Belowground detention cisterns are not considered GSI.) 	

Table C.6. On-site Requirement Infeasibility Criteria Checklist: Category 4 BMPs.

BMP	Infeasibility Criteria	Additional Information from Applicant
Perforated Stub-out Connections	<ul style="list-style-type: none"> ▪ The infeasibility criteria for “All Infiltration BMPs” (Table C.1) apply. ▪ The Design Criteria for Perforated Stub-Out Connections (<i>Volume 3, Section 5.4.7</i>) cannot be met. ▪ The only location for the perforated pipe portion of the system is under impervious or heavily compacted (e.g., driveways and parking areas) surfaces. ▪ A minimum of 10 feet of perforated pipe per 5,000 square feet of contributing roof area is unachievable. 	
New Trees	<ul style="list-style-type: none"> ▪ Space necessary for the mature height, size, and/or rooting depth for tree planting per the current City Approved Tree List is unachievable. 	