Checklist for Reviewing Compliance with the Watershed Protection Standard

This checklist is intended to guide technical reviewers in evaluating application materials for compliance the Watershed Protection Standard (WPS). The checklist pairs with the Performance Standard (i.e. the WPS) outlined in the WPS Toolkit's "Regulatory Language for Adopting the Watershed Protection Standard." Designers can also use this checklist to understand how their design will be evaluated.

Checklist to Evaluate Low Impact Development Design Approach

Designers are expected to employ a Low Impact Development (LID) approach to site development. The checklist below assists reviewers in verifying the implementation of LID strategies and is adapted from Part 2 of the Rhode Island Stormwater Design and Installation Standards Manual Appendix A: Stormwater Management Plan Checklist.[1] *If certain practices cannot be incorporated into site design, a written explanation should be provided.*

Preservation and Enhancement of Natural Areas

- ☐ As much of the existing natural vegetation as possible has been maintained as part of proposed site design
- ☐ Site clearing has been restricted to minimum area needed for building footprints, development activities, construction access, and safety
- ☐ Low-maintenance landscaping has been proposed using native species
- ☐ Plantings of native trees and shrubs in proposed vegetated areas previously cleared of native vegetation are shown on site plan
- ☐ Lawn areas have been limited/minimized, and yards have been kept undisturbed to the maximum extent practicable on residential lots

Preservation and Restoration of Natural Hydrology and Soils

- ☐ Development site features and buildings have been appropriately distanced from wetlands and waterbodies
- ☐ Stormwater controls have been located in areas with greatest infiltration capacity (i.e. Hydrologic Soil Groups A and B if available)
- ☐ Impervious surfaces have been located in areas with the poorest infiltration capacity (i.e. Hydrologic Soil Groups C and D if present)
- ☐ Stormwater controls have been designed to infiltrate if possible, including in poorly-draining soils (i.e. Hydrologic Soil Groups C and D)

1 Rhode Island Stormwater Design and Installation Standards Manual: Appendix A Checklist. dem.ri.gov/environmental-protection-bureau/water-resources/permitting/stormwater-permitting/stormwater-rules

- ☐ Site has been designed to position buildings, roadways, and parking areas in a manner that minimizes grading (cut and fill quantities) and changes to pre-development topography and maintains natural drainage depressions
- ☐ Proposed drainage catchments and discharge points are as close to pre-development conditions as possible, with stormwater control distributed to manage runoff as close to its source as possible
- ☐ Development sites and building envelopes have been located to minimize impacts to steep slopes (≥15%)
- ☐ Soil restoration work is proposed to improve compacted/degraded soils
- ☐ (*Redevelopment only*) Historic drainage patterns have been restored by removing closed drainage systems, daylighting buried streams, and/or restoring degraded stream channels and/or wetlands to the maximum extent possible

Reduction of Impervious Cover[2]

- ☐ Reduced roadway widths. (If reduced roadway widths are not permitted under other local regulations, consider requesting a variance.)
- ☐ Reduced driveway areas (e.g., length minimized via reduced right of way width and/or reduced front yard setback; width minimized; shared driveways; pervious surface)
- ☐ Reduced building footprint
- ☐ Reduced sidewalk impervious area (e.g., reduced width, sidewalk on only one side of the street, unpaved path, pervious surface)
- ☐ Reduced cul-de-sacs (e.g., use alternative turn-arounds; if using cul-de-sac, radius < 45 ft and vegetated center island)
- ☐ Reduced parking lot impervious area (e.g., minimize provided spaces based on projected parking demand or minimum zoning requirements, minimize stall dimensions, provide compact car stalls, use pervious surface) Note: if it is not permitted under other local regulations to reduce parking lot impervious area to the extent desired, consider requesting a variance.

Disconnection of Impervious Cover

- ☐ Impervious surfaces have been disconnected, and runoff has been diverted to pervious areas to the maximum extent possible (e.g., rooftop downspouts directed to pervious areas; pavement/curbing designed such that runoff sheet flows to pervious areas and not to closed drainage system to the maximum extend practicable)
- ☐ Plans show measures to prevent soil compaction in areas designated as Pervious Area for Impervious Cover Disconnection
- ☐ Residential street edges direct roadway drainage into vegetated open swales
- ☐ Parking lot landscaping breaks up impervious expanse and accepts runoff

2 For design guidance on reasonable dimensions, setbacks, etc., refer to resources such as the Mass Audubon's Bylaw Review Tool and the Center for Watershed Protection's Better Site Design: A Handbook for Changing Development Rules in Your Community.

Checklist to Evaluate Stormwater Control Measure (SCM) Design and Runoff Reduction Volume Compliance

Application Materials

Check that the application materials include the following:

☐ Schematic showing proposed catchments (including any untreated areas), design points, and stormwater controls associated with each catchment.

☐ Complete and coherent treatment calculations demonstrating compliance with the WPS. This can include populated versions of the University of New Hampshire's Watershed Protection Standard Calculator[3] and Performance Curve Calculator.[4] This can also include Table 1, which is included at the end of this document, and which municipalities can encourage applicants to populate to help set clear expectations.

Catchment-Level Checks

Check the following for *each catchment*:

☐ Is an infiltration SCM proposed? If a non-infiltrating SCM is proposed, is there a valid explanation for why infiltration is not feasible? Note: Soils in Hydrologic Groups C and D do not constitute a valid explanation. Check the appropriate explanation:

- ☐ Depth to bedrock
- ☐ Depth to groundwater
- ☐ Contaminated soils or groundwater
- ☐ Presence of resources areas (e.g. wetlands)
- ☐ Excessively steep slopes
- ☐ Other based on engineering discretion

☐ Is the WPS target met for the catchment/SCM?

- ☐ For conventional surface and subsurface infiltration SCMs, the SCM meets the required Runoff Depth from Impervious Area.
- ☐ For impervious cover disconnection, the SCM meets the required Pervious to Impervious Area Ratio.
- ☐ For non-infiltrating SCMs in new development, the SCM removes 90% of Total Suspended Solids and 60% of Total Phosphorus on an average annual basis.
- ☐ For non-infiltrating SCMs in redevelopment, the SCM removes 80% of Total Suspended Solids and 50% of Total Phosphorus on an average annual basis.
- ☐ The WPS target cannot be met in the catchment, but there is a valid explanation.

3 UNHSC Watershed Protection Standard Calculator. https://scholars.unh.edu/stormwater/130/
4 UNHSC Performance Curve Calculator. https://scholars.unh.edu/stormwater/120/

Design Point-Level Checks

If an individual catchment is not able to meet the WPS (i.e. catchment is treated but SCM is undersized OR the catchment is entirely untreated), check that the WPS target is met for each design point:

- ☐ For design points where infiltration is possible in all catchments, the design point meets the required Runoff Volume Removal Efficiency. (If the design point's drainage area contains soils of more than one infiltration rate, the required Runoff Volume Removal Efficiency should be a weighted average based on the areas and infiltration rates of the different catchments draining to the design point.)
- ☐ For new development design points where non-infiltrating SCMs are utilized due to site constraints, the design point achieves removal of 90% of Total Suspended Solids and 60% of Total Phosphorus on an average annual basis.
- ☐ For redevelopment design points where non-infiltrating SCMs are utilized due to site constraints, the design point achieves removal of 80% of Total Suspended Solids and 50% of Total Phosphorus on an average annual basis.
- ☐ For mixed new development-redevelopment design points where non-infiltrating SCMs are utilized due to site constraints, the design point achieves removal of 90% of Total Suspended Solids and 60% of Total Phosphorus on an average annual basis.

Site-Level Checks

Check the following at the site level:

- ☐ All proposed impervious cover is treated by a stormwater control measure, or there is a valid explanation for why untreated impervious cover cannot be treated.
- ☐ If a designer submitted the optional Table 1 provided below, review to make sure each design point meets the WPS.

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Table 1. Summary of Treatment and Recharge for Design Point 1.

This table is intended to be used as an optional resource by designers and reviewers alongside the above checklist to determine compliance with the WPS. Reviewers should ensure that the appropriate WPS Target is filled in for each catchment and for the overall Design Point based on the Impervious Drainage Area and SCM Soil Infiltration Rate of each catchment. To determine compliance with the WPS, reviewers should compare the WPS Target and Achieved values provided for each catchment and the overall Design Point to ensure that the targets are met.

					SCM Design			Runoff Volume Reduction			Total Phosphorus Reduction		
Catchment ID	SCM Type[1]	Impervious Drainage Area (ac)	SCM Soil Infiltration Rate (in/hr)	Land Use		Runoff Depth from Impervious Area (in)[2]	Design Storage Volume (cf)[3]	Runoff Volume to SCM (MG/yr)	Runoff Volume Reduction (MG/yr)	Runoff Volume Removal Efficiency[4]	Total Phosphorus Load (lb/yr)	Total Phosphorus Reduction (lb/yr)	Total Phosphorus Removal Efficiency[5]
					WPS Target:			-	-		-	-	
					Achieved:								
					WPS Target:			-	-		-	-	
					Achieved:								
					WPS Target:			-	-		-	-	
					Achieved:								
					WPS Target:			-	-		-	-	
					Achieved:								
					WPS Target:			-	-		-	-	
					Achieved:								
					WPS Target:			-	-		-	-	
					Achieved:								
Total for Design Point				-	WPS Target:	-	-	-	-		-	-	
					Achieved:	-	-						

[1] If no SCM is implemented in a catchment, write “Untreated” in this column.

[2] For the “Runoff Depth from Impervious Area (in)” field, if the SCM is impervious cover disconnection, the WPS Target and Achieved values can instead be “Pervious Area for Disconnection (acres).” For non-infiltrating SCMs, the WPS Target can be left blank.

[3] For the “Design Storage Volume (cf)” field, if the SCM is impervious cover disconnection or a non-infiltrating SCM, the WPS Target can be left blank. For impervious cover disconnection, the Achieved field can also be left blank.

[4] Runoff Volume Removal Efficiency is the WPS target at the SCM and design point-level for infiltrating SCMs. If a drainage area contains soils of more than one infiltration rate, Runoff Volume Removal Efficiency should be a weighted average based on the areas and soil infiltration rates of the drainage area. If the SCM is impervious cover disconnection or a non-infiltrating SCM, the WPS Target can be left blank.

[5] Total Phosphorus Removal Efficiency is the WPS target at the SCM level for non-infiltrating SCMs and at the design point level for design points with drainage areas containing a non-infiltrating SCM. For conventional infiltrating SCMs and impervious cover disconnection, the WPS Target can be left blank.