



Post-Construction Storm Water Questions and Answers Water Quality Volume

What is the water quality volume (WQv) and how did Ohio EPA determine how to calculate it?

The term water quality volume is generally used to define the amount of storm water runoff from any given storm that should be captured and treated in order to remove a majority of storm water pollutants on an average annual basis. Analysis of long-term, historic Ohio rainfall data indicates that designing post-construction best management practices (BMPs) to store storm water runoff from a rainfall of 0.90 inches or less results in an estimated 80 percent reduction in total suspended solids (TSS) on an average annual basis (Dorsey and Winston, 2018). Ohio EPA felt that this was a sufficient precipitation depth to control pollutants in runoff and minimize channel and stream bank erosion due to runoff from developed areas.

Are there any alternatives to using the WQv formula, runoff coefficient formula or drawdown times listed in the NPDES permit?

No. The formulas detailed in the NPDES construction general permit (CGP) for calculating the WQv or, in the case of flow-through BMPs such as grass swales, the water quality flow (WQf) must be used. Drawdown times provided in the CGP cannot be altered. These times are required to allow the practice enough time to settle pollutants out of runoff. Decreasing the drawdown times will make the practice less effective.

What surfaces should be considered impervious in determining a runoff coefficient?

The fraction of impervious surface used to determine the volumetric runoff coefficient (R_v) should be the fraction of drainage area that will be unvegetated (WEF/ASCE, 1998) such as rooftops, paved or gravel roads and parking lots, sidewalks detention basins and open water.

Is treatment of the WQv required for areas of the development that will not drain into the permanent drainage system of the site?

Yes. Treatment of the WQv is required for all portions of the site being developed. Thus, runoff from the entire site should be routed through a structural BMP before being discharged. Ohio EPA understands there may be situations where it will not be possible to establish a standard post-construction BMP for perimeter areas or for small, isolated drainage areas of the site.

The runoff reduction practices listed in the CGP can be used in place of structural BMPs to address runoff along perimeter areas or for small, isolated drainage areas that cannot be routed to storm sewers. Rear-yard lawns may be designed as vegetated filter strips so as to capture and treat the WQv. However, easements and deed restrictions may be necessary to ensure access when maintenance must be performed and to ensure that homeowners do not install structures which could impede the function of the filter strip.

Stream setbacks or riparian protection areas may also be used for perimeter areas. However, the size of stream setbacks or riparian protection areas should be justified based on the size of the stream and must meet local riparian setback requirements at a minimum. The SWP3 must include documentation that setbacks will remain in perpetuity.

Where runoff reduction practices, stream setbacks or riparian areas are not feasible, please consult with Ohio EPA for further guidance. Ohio EPA will require you to demonstrate that a site design to provide the required BMPs for these perimeter or small, isolated areas cannot be achieved.

Can areas not draining to a structural BMP be compensated for by overtreating other areas?

No. Untreated areas cannot be compensated for by overdesigning or oversizing BMPs treating the remainder of the site. When shown to be necessary, compensation could occur by constructing a BMP using the offsite mitigation procedures established in the CGP.

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Am I required to include runoff generated from off-site areas or undeveloped portions of the site when determining the WQv?

Yes. The area used in calculating the WQv is the total contributing drainage area to the BMP. Ohio EPA does not require off-site areas and undeveloped portions of the site to be routed through structural post-construction BMPs and, where no adverse upstream or downstream impact would occur, Ohio EPA encourages diverting such areas away from the BMP(s). However, local government may have other requirements or may ask the developer to provide detention of off-site areas or undeveloped portions of the site for flood control reasons. If this occurs, whenever possible, structural post-construction BMPs for water quality should be located at the point just prior to where runoff from developed portions commingles with these other sources of runoff. This will allow the post-construction BMP to be sized only for developed portions of the site. Where this is not possible or where these areas must be routed through the post-construction practice, the SWP3 designer must account for off-site acreage and/or the acreage of undeveloped areas when calculating the WQv.

If the local government requires a detention or retention basin to manage the flood control volume and the peak rate of storm water discharge from the site, can the requirements for post-construction control for water quality be incorporated into the basin?

Yes. In fact, this appears to be the method of choice for meeting the post-construction BMP requirement. If the basin will serve the multiple functions of water quality and water quantity management, a staged outlet structure with multiple orifices or weirs will be needed. Ohio EPA does not require the WQv and any quantity control volumes be stacked within the basin, but please consult the local storm water regulations for their preference regarding this matter.

References

Dorsey, J. and R. Winston. 2018. WQv Analysis. Technical Memorandum prepared for Ohio EPA.

WEF/ASCE. 1998. Urban Runoff Quality Management. WEF Manual of Practice No. 23 and ASCE Manual and Report on Engineering Practice No. 87. Alexandria, VA and Reston, VA: WEF and ASCE.

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