

**WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
DESIGN DIRECTIVE**

**DD-506
POST CONSTRUCTION STORM WATER MANAGEMENT
*June 1, 2017***

Attached for your use is the West Virginia Division of Highways policy for Post Construction Storm Water Management on new highway systems and improvement or renovation of existing highway systems. It shall be used on all applicable projects.

Attachment

10. INTRODUCTION

The Division of Highways (DOH) does not have the legal authority to regulate this issue beyond State Right-of-Way. The WVDEP already has regulations and NPDES Permits to address this issue. Also, a sub-government or political subdivision cannot regulate a higher level/division of government. The DOH will not be subject to city or county storm water regulations; however, the DOH will coordinate new project development and substantial improvement projects with the local authorities; and may provide an opportunity for public comment when appropriate through such mechanisms as the National Environmental Policy Act (NEPA). The DOH will make a good faith effort to address or incorporate comments submitted by the adjacent Municipal Separate Storm Sewer Systems (MS4).

State regulations prohibit encroachment onto DOH rights-of-way without authorization from the DOH. Since the regulatory agencies have made it clear that the owner of the discharge outlet will be held responsible for any and all pollutants discharged at that point, the DOH will prohibit all connections to the DOH storm water systems within Urbanized Areas, unless the discharger can ensure that only non-polluted storm water will enter the system. Any such connection to any Division Of Highways' drainage system shall be by permit only.

20. GUIDANCE

The drainage system for the project shall be designed in accordance with the current West Virginia Division of Highways Drainage Manual. In addition, pollution prevention and discharge reduction methods shall apply within MS4 boundaries.

MS4 boundaries can be found at this link <http://arcg.is/0quXKq>. ~~<https://www.census.gov/geo/maps-data/maps/2010ua.html>~~ The boundaries to be used are the WVDOT "MS4" "Urbanized Area" boundaries. ~~Note: there are boundaries shown on these maps as "Urbanized Cluster"; these areas are NOT to be used for MS4 determination. The designer is to exercise caution when identifying "Urbanized Area" boundaries.~~

Site design standards for all new development and redevelopment will require, in combination or alone, management measures that keep and manage on site the first one inch of rainfall from a 24-hour storm preceded by 48 hours of no measurable precipitation for the new impervious surface area. For design purposes, the West Virginia Division Of Highways has determined that it is nearly impossible to manage the first inch of rainfall from all storm events; therefore the first inch of rainfall management shall be designed for the 90th percentile rainfall event. Note: Redevelopment is defined as new construction requiring land disturbance that alters the footprint of an existing developed site, such as lane/roadway widening, two-way left turn lanes, intersection improvements that add turning lanes, sidewalks, etc.

Runoff volume reduction can be achieved by canopy interception, soil amendments, evaporation, rainfall harvesting, engineered infiltration, extended filtration and/or evapotranspiration and any combination of the aforementioned practices.

This first one inch of rainfall from the 90th percentile rainfall event must be 100% managed with no discharge to surface waters.

Pollution prevention and discharge reduction shall apply to new impervious surfaces and redevelopment that includes new or additional right-of-way. When there are projects that do not require additional pollution prevention and rainfall reduction beyond normal DOH practices, it is advisable to implement additional pollution prevention and discharge reduction methods on projects in urbanized areas in order to offset impacts for other projects where it may not be possible to achieve the sufficient pollution prevention and rainfall reduction requirements.

Exclusions: Milling, paving, and resurfacing, of existing roadways. Also, **increased impervious surface of 5000 square feet or less and** structures bridging waterways, roadways, railways, or impervious surfaces shall be excluded from the requirement to manage on site the first one inch of rainfall from the 90th percentile rainfall event preceded by 48 hours of no measurable precipitation; if, the finished structure includes measures that prevent erosion from any and all storm water discharges from the structure.

Water quality impacts shall be considered from the beginning stages of a project. New development and potentially redevelopment provide more opportunities for water quality protection. Pre-development discharge shall not exceed post-construction discharge. The design of the project shall minimize water quality impacts. A few very basic example calculations for simple situations are given at the end of this DD.

Project development shall give great consideration to protecting sensitive areas such as wetlands and riparian areas, maintain and/or increase open space, provide buffers along sensitive water bodies, minimize impervious surfaces, and minimize disturbance of soils and vegetation. Post-stormwater management BMP structures include: storage practices such as ponds, sumps, underdrains, and extended-detention inlet/outlet structures; filtration/infiltration practices such as grassed swales, stream restoration, and bio-retention structures.

Storm water technologies are constantly being improved, and the evaluation and implementation of new technologies should be considered. It is essential that that all permanent BMPs are accessible and maintainable by DOH Maintenance Forces. This may require that access roadways be built to access remote features, locked gates be provided in fences surrounding such items, guardrail may need to be made easily removable without compromising the guardrail's strength and redirecting capabilities, etc. Access to these stormwater management features must be considered early in the design process, so extra rights-of-way if needed can be acquired in a timely manner.

Utilization of practices for pollution prevention and discharge reduction may include dry swales, bio-retention, rain tanks and cisterns (outside of the travelled surfaces), soil amendments, roof-top disconnections, permeable pavement (parking lots and sidewalks only), porous concrete (parking lots and sidewalks only), permeable pavers (parking lots and sidewalks only), reforestation, grass channels, green roofs and other practices that alone or combined will capture the first one inch of rainfall runoff volume. Extended filtration practices that are designed to capture and retain up to one inch of rainfall may discharge volume in excess of the first inch through an underdrain system. An Underground Injection Control permit may be required when certain conditions are met.

The above guidance for post-construction pollution prevention and discharge reduction applies to all increases in impervious area with the WVDOH MS4 areas defined as urbanized areas by the US Census and the USEPA or the current MS4 area mandated by the USEPA. To reiterate, the following link showing MS4 boundaries is <http://acrg.is/0quXKq.https://www.census.gov/geo/maps-data/maps/2010ua.html>

The designer shall insert the Special Provision 107.21.4 Increasing Impervious Areas and MS4 Requirements into the project's proposal or PS&E package. This special provision can be obtained from Contract Administration Division.

Pay in lieu

Develop a payment matrix based on the percentage of rainfall not managed, the proportional cost of all items of constructed rainfall management, and/or the volume of discharge. The DOH may also fund a storm water improvement project for the local MS4. If you have managed 0.75 inches of rainfall discharge at an estimated cost of \$75,000, the in-lieu fee would be \$25,000 multiplied by 2 or \$50,000.

In order to utilize the in-lieu fee method to offset unmanaged pollution prevention and discharge reduction, the local MS4 must be willing to accept the funds and apply the funds to pollution prevention and discharge reduction within their MS4 area.

Mitigation

Reduction of post-construction storm water runoff within the same watershed (prior to or at the same time that the construction impacts occur) shall receive 100% credit towards the management of the first one inch of rainfall from the 90th percentile rainfall event preceded by 48 hours of no measurable precipitation. A ratio of 1.5 shall apply to mitigation outside the project watershed area.

30. Best Management Practices

For more information concerning stormwater pollution prevention Best Management Practices (BMP's) the National Menu of Stormwater BMPs: Post-Construction Stormwater Management in New Development and Redevelopment is available through

the EPA at: <http://water.epa.gov/polwaste/npdes/swbmp/PostConstruction-Stormwater-Management-in-New-Development-and-Redevelopment.cfm>

Topics on this website include:

Structural BMPs

Ponds

Dry extended detention ponds

Wet ponds

Infiltration practices

Infiltration basin

Infiltration trench

Filtration practices

Bioretention

Sand and organic filters

Vegetative practices

Storm water wetland

Grassed swales

Grassed filter strip

Runoff pretreatment practices

Catch basins/Catch basin insert

In-line storage

Manufactured products for storm water inlets

Nonstructural BMPs

Experimental practices

Alum injection

On-lot Treatment

On-Lot treatment

Better site design

Buffer zones

Open space design

Urban forestry

Conservation easements

Infrastructure planning

Narrower residential streets

Eliminating curbs and gutters

Green parking

Alternative turnarounds

Alternative pavers

BMP inspection and maintenance

Ordinances for postconstruction runoff

Zoning

Sample Calculations

Example #1	<p>1 mile of 24' wide roadway with 4 foot stone shoulders</p> <p>5280 x 24' x 1/12 = 10,560 cubic feet for the roadway</p> <p>5280 x 8 x 1/12 x 90%= 3,168 cubic feet for the shoulder (assuming 90% impermeable)</p>
Example #2	<p>If you have a 4" diameter underdrain pipe on one side of the road, you handle</p> <p>460.5333 cubic feet (You may be able to claim more management depending on the material used to backfill the underdrain)</p>
Example #3	<p>2 ponds that are 40' long x 40' wide x 4' deep handle</p> <p>12800 cubic feet</p>
Example #4	<p>A grass swale 4' wide x 1000' long x .5' deep (less than 4% slope) will handle</p> <p>1400 cubic feet Assuming 70% infiltration - may vary depending on a number of factors</p>