Stormwater Performance Standards Recommendations

Prepared by:
PDSWRS Workgroup and AISWCD for submission to Illinois Environmental Protection Agency

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Post-Development Stormwater Runoff Standards (PDSWRS)

Workgroup Members:

American Council of Engineering Companies of Illinois
Center for Neighborhood Technology – Water Program
City of Aurora
City of Peoria – Public Works Department
Geosyntec
Illinois Department of Transportation
Lake County Stormwater Management Commission
Madison County Planning and Development
Metropolitan Planning Council
Openlands
Prairie Rivers Network
Sierra Club – Illinois Chapter
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Metropolitan Water Reclamation District of Greater Chicago

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Association of Illinois Soil and Water Conservation Districts
Illinois Environmental Protection Agency
U.S. Environmental Protection Agency

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Acronyms

AISWCD	Association of Illinois Soil and Water Conservation Districts
BDE	Bureau of Design and Environment
BMP	Best Management Practice
HUC	Hydrologic Unit Code
IDOT	Illinois Department of Transportation
IEPA	Illinois Environmental Protection Agency
MS4	Municipal Separate Storm Sewer System
NOI	Notice of Intent
NOT	Notice of Termination
NPDES	National Pollutant Discharge Elimination System
O&M	Operations and Maintenance
PDSWRS	Post-Development Stormwater Runoff Standards
PE	Professional Engineer
SSA	Special Services Area
TGM	Technical Guidance Manual

Definitions

Best Management Practices
Control measures taken to mitigate changes to the quantity and quality of urban runoff caused by changes in land use and the creation of impervious surfaces. BMPs are designed to reduce stormwater volumes, peak flows, and/or pollutant loads. BMPs may remove pollutants through biological or chemical actions or through filtration. BMPs may reduce stormwater discharge volumes though infiltration and evapotranspiration, or through capture and storage of water for re-use. There are a variety of BMPs available, with a range of pollutant removal capabilities. Green infrastructure practices are one of many types of BMPs.

Biologically Significant Streams
A list developed of high quality streams with noteworthy biological communities. The list is developed by the Illinois Department of Natural Resources.
See http://dnr.state.il.us/orc/biostrmratings/images/BiologicalStreamRatingReportSept2008.pdf, pp. 23-25.

Development
Changing the landscape from that of naturalized to non-naturalized.

Evapotranspiration
The loss of water from the soil both by evaporation and by transpiration from the plants growing within the soil.

Green Infrastructure
Stormwater management techniques or practices employed with the primary goal of preserving, restoring, or mimicking natural hydrology. Green infrastructure practices often help reduce stormwater discharge volumes and may help increase infiltration and groundwater re-charge. Green infrastructure includes, but is not limited to methods of using soil and vegetation to promote soil percolation, evapotranspiration, and infiltration. Green infrastructure includes the preservation and restoration of natural landscape features, such as forests, floodplains, headwaters, and wetlands. Green infrastructure practices include rain gardens, permeable pavements, green roofs, infiltration planters, trees and tree boxes, and rainwater harvesting for non-potable uses, such as toilet flushing and landscape irrigation.

HUC 12 Watershed
The United States Geological Survey has created a system for classifying hydrologic units or drainage areas. Each drainage area is assigned a unique Hydrologic Unit Code (HUC). There are six levels in the HUC hierarchy, represented by hydrologic unit codes from 2 to 12 digits. A 12-digit HUC watershed is often a 2nd or 3rd order stream drainage area. HUC 12 watersheds, on average, have an area of approximately 40 square miles.

Infiltration
The process of infiltrating precipitation or runoff into the ground. Water from the surface infiltrates down through soils toward groundwater. Infiltrate is to permeate a substance by passing through its interstices or pores.

Land Disturbance
An area where the land surface has been cleared, grubbed, compacted, constructed on, or otherwise modified. Sites where one or more acres of land is disturbed (including smaller sites/projects that are part of a larger common plan of development if the larger common plan will ultimately disturb one or more acres) are required to obtain NPDES permit coverage for stormwater discharges during construction and would be required to meet these post-construction performance standards. A demolition project where a site is not redeveloped would not be required to meet the post-construction performance standards. However, if demolition is followed by site redevelopment, the redevelopment project would be required to meet the performance standards.

Linear Project
A project that includes the construction, repair, or replacement of utility infrastructure, including but not limited to road projects, rail projects, trail projects, oil and gas pipelines, and/or levee construction, or projects of similar nature, where there is land disturbance of 1 or more acres of land.

Operation and Maintenance (O&M) Plan
A plan of action and requirement to monitor and keep BMPs functioning at ultimate designed capacity and effectiveness.

Proposed Impervious Surfaces
Areas of land that will be covered as part of a development project by materials that will not allow surface infiltration and will cause runoff of stormwater.

Introduction

In March 2012, AISWCD through an Urban BMP agreement from Illinois Environmental Protection Agency chartered a Workgroup comprised of representatives from diverse organizations to study the topic of post-development stormwater runoff performance standards, and to develop recommendations for goals and requirements to IEPA for incorporation into NPDES permits or other implementation mechanisms.

When development occurs, the new buildings and parking lots and other impervious features that are constructed change the stormwater runoff characteristics of the site and affect the watershed. In a predevelopment condition (for example, a greenfield area that has been a meadow), when it rains most of the rainwater soaks into the ground or goes back up into the air via evapotranspiration. During small storms there is often no runoff from the site. In larger storms there is runoff leaving the site, but the amount is moderated by capacity of the site to retain water.

When sites are developed and impervious surfaces are constructed, the ability of the site to retain runoff from precipitation is changed accordingly. Much larger volumes of water may run off the site if there is a significant amount of new impervious cover. These larger volumes of water can cause localized flooding, contribute to downstream flooding, and cause erosion in streams and rivers and along lakeshores. In addition, the runoff typically contains significant amounts of pollutants; the water picks up pollutants such as nutrients, metals, and oil and grease as it runs across impervious surfaces such as roads and parking lots. U.S. EPA has concluded that stormwater runoff from urban landscapes is a major cause of impairments of streams, rivers, and lakes across the country.

The purpose of implementing post-development stormwater runoff performance standards is to set up a process and standards so that at the time development occurs, and impervious surfaces are created or expanded, appropriate features are included in the design and installed at the same time to deal with the stormwater runoff from those surfaces. So, for example, if a new parking lot is constructed, the owner/operator could also install bioswales or other appropriate BMP to retain some of the new runoff on-site. If appropriate BMPs are planned and installed, a developed site can function (in a hydrologic sense) in a way that mimics the pre-development condition.

Putting in appropriate BMPs at the time development takes place makes good sense. It is almost always less expensive to install BMPs as a site is developed, versus trying to retrofit with BMPs at some later time. Also, if the owner/operator installs BMPs as the site is developed, this can help avoid stormwater expenses for others, such as city expenditures to construct larger sewers or detention facilities.

Since the Workgroup was chartered in 2012, the group conducted research on stormwater impacts, BMPs, and policies and standards being implemented in other States. Members of the Workgroup also reached out to other States and to counties implementing stormwater programs, to obtain information on ordinances and practices used in other jurisdictions. The Workgroup developed draft recommendations, and in the fall of 2012 solicited public comments on the draft standards. Two public meetings were held, and comments were also accepted by mail and e-mail. Over 80 commenters provided comments, input, and suggestions about the performance standards. The Workgroup carefully considered the comments, conducted further research, and

re-evaluated and revised the performance standard recommendations. The Workgroup prepared responses to comments, to summarize the comments received and how these points were considered by the Workgroup and in many cases are reflected in the final version of the recommendations.

The following recommendations reflect the research and analysis of the Workgroup, and take into account comments received from other interested parties in the State. The recommendations begin with a description of quantified performance standards and associated implementation processes that the Workgroup believes are appropriate for implementation in the near-term. Near the end of this document the Workgroup also offers recommendations on ways the performance standards could potentially be refined, strengthened, and put into practice in a Phase 2 implementation component.

Applicability

The Workgroup recommends the performance standards for new development and redevelopment sites apply to all sites where there are 1 or more acres of land disturbance. The Workgroup recommends that the performance standards apply to all construction and development sites (including redevelopment sites) State-wide.[1] This recommendation for applicability aligns with the applicability requirements of the General NPDES Permit for Storm Water Discharges from Construction Sites Activities (ILR 10)[2] and the construction and post-construction provisions of the General NPDES Permit for Storm Water Discharges from Small Municipal Separate Storm Sewer Systems (MS4s) (ILR 40). This should facilitate use of these permit vehicles to implement post-development stormwater runoff performance standards. Site owners or operators should be required to modify their SWPP to reflect structural or functional changes to a BMP, and amend the corresponding O&M plan for that BMP.

Requirements for Development Sites

Site owner/operators should be required to meet a quantified post-development stormwater management performance standard by implementing an appropriate combination of BMPs, with highest preference given to green infrastructure techniques and practices (e.g., infiltration, evapotranspiration, and harvesting for reuse).

New Development Sites

The quantified stormwater runoff performance standards for new development sites can potentially be expressed in two ways, and site owner/operators can determine which expression of the performance standard they wish to use to achieve and document compliance.

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[1] The Workgroup is of the view that routine maintenance projects, such as repaving of a street, is not included within the definition of development or redevelopment when earth is not disturbed. The Workgroup is also of the view that the performance standards would likely not be applicable to a regional stormwater management or flood control project, a stream bank stabilization project, a natural area restoration, or a project to modify or perform maintenance on an existing stormwater management facility.

[2] ILR10 can also apply where IEPA finds a construction site has the potential to contribute to a violation of water quality standards or is a significant contribution of pollutants to waters of the State. In such cases where IEPA designates other sites for ILR10 coverage, the Workgroup recommends that these post-development stormwater runoff standards would also apply.

(a) No Net Increase. For new development projects, BMPs must be implemented such that there is no net increase in stormwater runoff volume from pre-project conditions[3] (on an annual average basis). Following is an example of how this requirement could be worded if incorporated into a permit vehicle such as ILR 10: *"The site owner must design, construct, and maintain stormwater management practices that preserve the pre-development runoff conditions following construction. The post-construction rate, volume, and duration of discharges must not exceed the pre-development rates, and the pre-development hydrograph for 1, 2, 10 and 25 year storms[4] must be replicated as a result of the BMPs implemented. Defensible and consistent hydrological assessments and modeling methods must be used and documented."*

(b) Retain the runoff from a 1-inch rainfall event. BMPs must be implemented such that the practices will retain a runoff volume equal to 1 inch of rainfall times the area of the proposed impervious surfaces on-site. Project owner/operators should be required to design, construct, and maintain stormwater management practices that manage rainfall on-site, and prevent the off-site discharge of the precipitation from the first 1 inch of rainfall from a 24-hour storm.[5] Discharge volume reduction can be achieved by canopy interception, soil amendments, rainfall harvesting, engineered infiltration, evaporation, evapotranspiration, or any combination of the aforementioned practices. This first 1 inch of rainfall running off the impervious surfaces on-site must be 100% managed on-site.

A 1-inch rain event is approximately equivalent to a 90th percentile storm in Illinois. Controlling the runoff from the impervious surfaces at a site that occurs with a 1-inch rain event will help prevent localized flooding in areas where sewer capacity is constrained, and will help protect water quality and prevent erosion in downstream water bodies.

Redevelopment Sites

The quantified stormwater runoff performance standards for redevelopment sites can also potentially be expressed in two ways, and site owner/operators can determine which expression of the performance standard they wish to use to achieve and document compliance.

1. No Net Increase. For redevelopment projects, BMPs must be implemented such that there is no net increase in stormwater runoff volume from pre-project conditions[6] (on an annual average basis). However, where the pre-project

[3] Pre-project conditions means the characteristics of the site and the associated rainfall runoff immediately prior to the site undergoing development. For example if an agricultural property is being converted to a more intensive land use, the pre-project conditions are the rainfall runoff amounts for that climate area and soil type and land use as calculated or modeled using an appropriate rainfall runoff method or model.

[4] Storm duration would be 24 hours for all listed storm events.

[5] In planning/modeling the BMPs to be implemented to meet this performance standard, model inputs on soil characteristics should reflect a condition where the rainfall event is preceded by at least 48 hours of no measurable precipitation.

[6] The term pre-project conditions mean the characteristics of the site and the associated rainfall runoff immediately prior to the site undergoing redevelopment. For example if the site was previously a building with a parking area

conditions were 80% or more impervious area (e.g., most or all of the site was covered by a building and an asphalt or concrete parking lot), BMPs must be implemented such that there is a net decrease in runoff.

2. Retain the runoff from a 0.8-inch rainfall event. BMPs must be implemented such that the practices will retain a runoff volume equal to 0.8 inches of rainfall times the area of the proposed impervious surfaces on-site. Project owner/operators should be required to design, construct, and maintain stormwater management practices that manage rainfall on-site, and prevent the off-site discharge of the precipitation from the first 0.8 inches of rainfall from a 24-hour storm preceded by 48 hours of no measurable precipitation. Discharge volume reduction can be achieved by canopy interception, soil amendments, rainfall harvesting, engineered infiltration, evaporation, evapotranspiration, or any combination of the aforementioned practices. This first 0.8 inches of rainfall running off the impervious surfaces on-site must be 100% managed on-site.

A 0.8-inch rain event is approximately equivalent to an 85th percentile storm in the northern counties in Illinois. A less stringent performance standard is appropriate for redevelopment sites because commonly there are conditions at redevelopment sites that can constrain the implementation of BMPs.

Definition of "Redevelopment"

The workgroup recommends keeping the applicability language contained in the current versions of the ILR10 and ILR40 general permits.

The Workgroup recommends the following definition of "redevelopment:" Any *human-induced activity* or change to an *existing developed property* where the volume, flow rate, infiltration, drainage pattern, or composition of the site stormwater runoff is affected.

Human-induced activity or change includes but is not limited to: construction, grading, paving, excavation, dredging, filling, or mining; alteration, change in land use or practice; building or permanent storage of equipment or materials. The term shall not be understood to include routine maintenance or agricultural practices.

An *existing developed property* is a parcel or property where there was previously a human-induced activity or change that affected the volume, flow rate, infiltration, drainage pattern, or composition of the site stormwater runoff. A parcel that was previously in commercial, industrial, institutional, governmental, or residential use is an existing developed property. A parcel that was previously in an agricultural use would not be considered to be an existing developed property.

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and a turf grass area prior to undergoing redevelopment, the pre-project conditions are the rainfall runoff amounts for that climate area and soil type and land use as calculated or modeled using an appropriate rainfall runoff method or model. For redevelopment sites, pre-project conditions does not mean the condition of the site prior to its initial development for a commercial, institutional, residential, or industrial use.

Performance Standards for Specific Pollutants

The Workgroup is of the view that volume control can be used as a surrogate for stormwater-related pollutants, e.g., phosphorous and total suspended solids. In other words if stormwater discharge volumes are controlled, loadings of stormwater-related pollutants will be controlled. Reflecting this view, the Workgroup is not recommending separate performance standards for specific pollutants. The reduction of phosphorus and other pollutants by source reduction can be included in the general permits as "evaluate only" items.

Site Conditions that May Limit Infiltration

Stormwater infiltration practices reduce stormwater runoff and increase groundwater recharge by facilitating processes for stormwater to soak into the ground. Care must be taken in siting and designing infiltration practices to ensure that they do not adversely affect groundwater quality or increase the likelihood of basement flooding. In order to protect groundwater and local property, the Workgroup recommends that infiltration practices should not be implemented in the following circumstances:

1. Areas/sites where vehicle fueling and maintenance occur.
2. Areas/sites with less than three (3) feet of separation distance from the bottom of the infiltration system to the elevation of the seasonally saturated soils or the top of bedrock.
3. Areas where contaminants in soil or groundwater could be mobilized by infiltrating stormwater.[7]
4. Areas within 1,000 feet up-gradient, or 100 feet down-gradient of active karst features.
5. Areas within a delineated source water protection area for a public drinking water supply where the potential for introducing pollutants into the groundwater exists.[8] The Workgroup also recommends that infiltration practices should be restricted in areas within 400 feet of a community water supply well if there is not a wellhead protection delineation area, and should also be restricted in areas within 200 feet of private water supply well(s).[9]
6. Areas where the shallow aquifer drains to/recharges a sensitive ecosystem such as a fen.
7. Areas where soil infiltration rates are more than 8.3 inches per hour.[10]

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[7] An area of a brownfield site where there are contaminants present in the soil would be an example of an area where infiltration may not be advisable. In such situations site owner/operators should consult with IEPA Bureau of Land or another appropriate agency to evaluate soil characteristics to determine if there would be risks to groundwater from infiltrating stormwater. In some areas institutional controls are used to reduce health risks. For example, there may be a prohibition on use of groundwater in the area as a source of drinking water. This may affect decision-making regarding infiltration practices at Brownfield sites. Railroad yards and railroad right-of-ways may also be areas where there are contaminants in the ground that could be mobilized by infiltration practices.

[8] It may be appropriate to apply this criterion to both within the delineated source water protection area and a buffer area around the delineated source water protection area.

[9] Private water supply wells are often drilled to a shallower depth as compared to public water supply wells, and thus may be more susceptible to contamination from stormwater infiltration practices.

[10] Infiltration rates above 8.27 inches per hour will infiltrate too quickly to provide the necessary time for filtration, absorption, and biological degradation necessary to properly treat stormwater contaminants. See Virginia Department of Conservation and Recreation, Stormwater Management Handbook, 1999. In some cases it may be possible to use engineered soils at the surface to slow the movement of water to the native soils and provide for filtration. Site owner/operators should consult with a qualified professional engineer or the local soil and water conservation district before considering infiltration practices over soils with high infiltration rates.

The suitability of infiltration practices will also be affected by site topography and site soils. Infiltration rates may be slower where there are Category D (clayey) soils. In cases where infiltration rates are less than 0.5 inches per hour, mitigation should be permissible, but on-site infiltration practices should be implemented to the maximum extent practicable.

Infiltration practices should be located and designed such that they will not present risks to buildings, basements, or embankments. Appropriate geotechnical investigations should be conducted to ensure infiltration practices are properly located and designed. In some cases BMPs may be considered for areas that are above buried/underground linear utilities, e.g., cable lines. This may occur, for example, on a road project where there are buried utilities in the right-of-way. Care should be taken in such cases to ensure the BMPs will not damage the underground utilities, and that the utility lines will not result in the lateral movement of water, vs. infiltration down into the subsoils. Provisions should be made in easements or other agreements that if the BMPs need to be temporarily taken out in order to do maintenance work on underground utilities, that the BMPs will be replaced as part of the maintenance project.

Mitigation

The Workgroup recognizes there may be sites where it is not feasible to meet the runoff volume reduction requirements and recommends alternative approaches and standards for such sites.

Where it is not feasible for the owner/operator of a new development or redevelopment project to fully meet the retention performance standards, due to site constraints, some type of mitigation strategy should be required. Justification for mitigation should be provided with stormwater performance standard compliance documentation. Off-site mitigation should be permitted only in situations where:

1. The owner/operator of the construction site/project is precluded from retaining enough stormwater on the site to fully meet the applicable standard due to infiltration-related or other site or project constraints; and
2. The owner/operator of the construction site/project proposes to implement BMPs that will retain runoff on site to the maximum extent practicable.

Mitigation allows site owner/operators to address with off-site practices the stormwater runoff volume not retained on-site so as to fully meet the performance standards. The workgroup recommends that owner/operators be allowed to work with the local government staff or owners of other nearby sites either to install off-site features or take other action to make up for the runoff volume not retained on-site. The owner/operator may elect one or a combination of the following alternative actions for this purpose:

1. Off-Site Mitigation

    a. Off-site mitigation practices should retain at least 1.5 times the volume of stormwater not retained on-site.[11] However, if mitigation is done on a contiguous property, a mitigation ratio of 1:1 should be allowed.
    b. Mitigation should be implemented at a location as close as possible to the development site. The mitigation should be within the same HUC 12 watershed. In the limited situations where mitigation is not feasible within the same HUC 12 watershed, the owner/operator should be required to address the remaining runoff volume through a fee-in-lieu or water treatment technology or both, as set forth below. The highest preference for mitigation projects should be given to locations that yield benefits to the same receiving water that receives runoff from the original construction activity. Priority should be given to locations identified in watershed plans or by local stormwater officials. MS4s are encouraged to create and provide developers with an inventory of appropriate off-site mitigation project locations.[12]
    c. Mitigation projects must involve the creation of new stormwater runoff volume reduction practices or the retrofit (improvement) of existing, man-made stormwater BMPs on developed properties.
    d. Mitigation projects cannot be used to satisfy the infiltration requirements of future development projects. In order to keep track of the locations of mitigation projects, IEPA and MS4s should maintain a GIS database.
    e. Mitigation the practices should be selected from those described in the Illinois Urban Manual, the IDOT BDE Manual, the applicable county TGM or other IEPA recognized guidance, and constructed according to the specifications therein. In the instance a site owner/operator wishes to use an innovative stormwater practice not included in any of the above references, documentation of practice effectiveness must be provided to the permitting agency.
    f. Mitigation projects will be completed and in operation by the time the Notice of Termination is filed for the construction activity.
    g. The site owner/operator must make provisions and document what entity will be responsible for long-term maintenance of the mitigation site/project.
    h. Mitigation installations must be accessible to government inspectors.
    i. Mitigation installations must be addressed in O&M plans, and their locations clearly described in the land records.

2. Fee-in-lieu or Public Stormwater Project

    a. The fee charged should be based on 1.5 times the cost of installing on-site retention features[13] if site constraints did not exist and be the lesser of:
        i. the fee for each cubic foot of retention required, with fees computed by the MS4 or county;[14] or

[11] Permitting Green Infrastructure: A Guide to Improving Municipal Stormwater Permits and Protecting Water Quality. American Rivers. January 2013. P. 13 and elsewhere.
[12] Permitting Green Infrastructure: A Guide to Improving Municipal Stormwater Permits and Protecting Water Quality. American Rivers. January 2013. P. 9 and elsewhere.
[13] Permitting Green Infrastructure: A Guide to Improving Municipal Stormwater Permits and Protecting Water Quality. American Rivers. January 2013. P. 13 and elsewhere.

ii. the verifiable cost of providing the required retention on-site, including the value of the land required and all construction costs. The land required shall be valued according to the use to which it will be put if not used to provide the required storage.[15]

b. Fees would then be used to fund public stormwater projects that improve water quality in the same receiving stream, watershed or sewershed as the development site.

3. Stormwater Treatment Technologies

In certain situations it may be appropriate for owner/operators to provide treatment for flows that cannot be retained due to site constraints. The Workgroup recommends in such situations that the following requirements should apply:

a. Stormwater treatment technology should remove pollutants before stormwater leaves the developed property.
b. The potential pollutants of concern include but are not limited to total suspended solids, metals, oils, nitrogen, and phosphorus. The acceptable discharge concentrations of pollutants in treated runoff should be determined by IEPA.
c. Treatment devices should be selected, installed, and operated in accordance with technical criteria in the Illinois Urban Manual or other appropriate technical resources (e.g., ASTM) and accepted engineering practices. The selection and design of treatment BMPs should be reviewed by a qualified professional engineer, the local soil and water conservation district, or an IEPA District Office.

Provisions should be made to ensure treatment devices are properly maintained, in accordance with manufacturers' recommendations, the Illinois Urban Manual, or other appropriate technical resources.

Linear Projects

Linear projects, such as construction of a new roadway, which disturb 1 or more acres of land, must obtain NPDES permit coverage for stormwater discharges associated with construction activities. The Workgroup recommends that linear projects be treated the same as other projects and be required to implement retention practices to meet the post-construction stormwater performance standards outlined above. The Workgroup recommends that technical specifications for practices meeting the standards be incorporated in IDOT Manuals such as the Bureau of Design & Environment (BDE) Manual, for use by IDOT and other agencies for linear projects in the State. Project owner/operators should be required to make a reasonable attempt to obtain adequate rights-of-way to incorporate green infrastructure stormwater practices during the project planning process. Where the lack of right-of-way precludes the installation of volume control practices next to the roadway that meet the conditions for post-construction stormwater management enumerated above, project owner/operators should explore other potential runoff retention measures, such as using a rock sub-base for stormwater storage and infiltration under

[14] During Workgroup call with Wisconsin, officials stated the state does not set fee-in-lieu standards but cities can.
[15] Kane County Stormwater Ordinance has a similar performance standard, Article 13, "Fee-in-lieu of site runoff storage".

the roadway. There also may be situations where permeable pavements can be used in shoulder areas or at rest stops.

Where site or project constraints make it impracticable to fully meet the stormwater performance standard, project owner/operators should be allowed to implement practices in accordance with the following hierarchy, along or in combination with the project mitigation options provided above:

1. Retain the greatest amount of runoff practicable given site/project constraints.
2. Implement measures to filter and slow down the movement of stormwater, such as using bioswales as part of drainage ditches.
3. Implement measures to detain water to the maximum extent practicable, so that stormwater is released slowly during and after storms to help prevent localized flooding and erosion of downstream water bodies.
4. Utilize catch basins with sumps or other inlet controls to trap sediment, debris, and pollutants.
5. Incorporate runoff design practices for bridge deck runoff crossing waters to minimize stormwater impacts considering alternatives such as:
   - Conveying the storm water runoff over the surface of the bridge to one or both ends for BMP treatment or discharge.
   - Conveying the storm water runoff via piping or open troughs over to one or both ends of the bridge for BMP treatment or discharge.
   - Detaining and treating the storm water under the bridge deck.
   - Street sweeping.
6. Create hazardous spill basins to protect surface water quality by detaining hazardous materials accidentally released on roadways near sensitive waters and concentrated truck usage areas.
7. Use treatment devices such as oil/water separators and vortex separators to reduce concentrations of sediment and other pollutants in stormwater discharges.

It will be important that BMPs implemented for linear projects be maintained so that they continue to control flow volumes and reduce pollutant loads as originally designed and installed. Transportation agencies constructing and reconstructing roads should incorporate BMP inventories and maintenance provisions into the organization's stormwater management program and should include funds for maintenance work in budgets. Entities that are MS4 permittees should report on BMP maintenance in their annual reports.

Where linear projects are being designed for sewered neighborhoods, owner/operators should evaluate local sewer capacity and anticipated runoff volumes from the new impervious surfaces to be constructed, and design the new project to ensure that it does not usurp sewer capacity needed for the existing discharges.

Compliance Certifications and Enforcement

The workgroup recommends that implementation of the performance standards for new development and redevelopment sites be through provisions in the ILR10 and ILR40 permits.

Both of these permits include requirements for post-construction stormwater management. Post-development performance standards can be readily integrated into these permits.

Under ILR10, owner/operators of construction sites submit a NOI form to the State prior to the start of construction, and file a NOT when the construction project is completed and the site is stabilized. The Workgroup recommends that a post-development performance standard compliance self-certification be required of site owner/operators, as further discussed below. The self-certification potentially would be submitted with the NOT form.

ILR40 could require MS4 communities to update their ordinances so they include the stormwater performance standards for stormwater runoff from development and redevelopment sites (or more stringent performance standards if a community determines additional protection is warranted). In the alternative, ILR40 could contain all the performance standards that MS4 communities are required to enforce. In approving development projects and reviewing site plans, MS4 communities would ensure that these performance standards are being met. Communities should strategically audit/inspect sites after construction is completed and sites are in operation to ensure the BMPs planned to meet the performance standards are in place and are being maintained to the functional level prescribed by the applicable BMP designs for that site.

Inspections of BMPs implemented to meet the post-development performance standards will be important to ensure the BMPs are in place, are being maintained, and are working as planned. The Workgroup believes that ideally a regulatory agency such as IEPA, and in urban areas the MS4s, should develop compliance assurance programs as necessary to ensure that sites meet the performance standards. The Workgroup recommends that IEPA allow regulated governing bodies to develop their own compliance assurance programs as opposed to developing a standard inspection and enforcement program for each MS4 community across the entire State. IEPA would provide minimum elements or criteria for such programs.

Self-certification

After the project is constructed and prior to the full release of the financial security that is typically required by the local permitting authority, the owner/operator will be required to prepare as-built drawings for the site improvements, including the stormwater BMPs. The as-built drawings should clearly indicate that the BMPs were constructed in accordance with the approved design. The as-built drawings should be signed/certified as being complete and accurate. The as-built drawings, along with pertinent design calculations, will be made a part of the Operation and Maintenance Plan (as discussed further below). The as-built drawings will be retained as part of the site records and be available to State or local inspectors. The owner/operator of the development site will be required to include a certification with the NOT affirming that the BMPs were put in place to meet the performance standard, and that as-built drawings were prepared. Any design changes in the stormwater BMP must be reflected in the as-built plans. All as-built drawings should be retained through the life of the BMPs to document what was installed and as a resource/reference for use when maintenance or repairs are needed.

Self-inspections

The workgroup recommends that the owner/operator of each site be required to maintain all BMPs so that they function as designed. The development of site-specific Operation and Maintenance (O&M) Plans should be required. Further details on the Workgroup's recommendations for O&M Plans are provided later in this document. One element of the O&M Plans which is closely related to compliance assurance is a self-inspection program. The O&M Plans should include a self-inspection program, with regularly scheduled inspections to be carried out and documented. The frequency and specific inspection activities for each site should take into account the sensitivity of the surrounding ecosystem as well as potential impacts to upstream and downstream improvements.

IEPA should develop recommended inspection form templates that could be utilized, with site-specific modifications as appropriate, for each post-construction site. These templates could potentially be included in the Technical Guidance Manual (see below). Project owner/operators should maintain inspection and maintenance documentation for a minimum of five years. The permitting authority should be allowed to review all documentation.

Enforcement

MS4 Non-compliance

The Workgroup recommends that the new retention standards be incorporated in ILR40 and that all mechanisms for enforcing such standards remain unchanged. Fines and penalties collected should be returned to IEPA to help fund its stormwater management program.

Construction Project Non-compliance

When IEPA determines that a construction project subject to ILR10 does not comply with the performance standards, then up until the NOT is issued, IEPA has enforcement authority to address violations. Once the NOT is issued, IEPA either would maintain authority to regulate maintenance and monitoring through the Phase II MS4 permits, as amended to include these new requirements, or IEPA could seek new legislative authority to extend its authority provide for BMP oversight in the post-construction period. This would provide IEPA with authority to ensure that the sites meet the post-development performance standards and BMPs are properly maintained after the submittal of NOTs. If IEPA decides to pursue legislation provide for oversight authorities subsequent to NOT issuance, the Workgroup recommends that the legislation clearly state the penalties for violations, such as failure to perform necessary maintenance work to ensure that the sites continue to meet the performance standards.

Based upon the increased attention that MS4 inspections and enforcement will require, we recommend that IEPA and the Soil and Water Conservation Districts be given additional resources or flexibility to appropriately staff this important program. For example, any fines and penalties collected should be returned to IEPA to help fund the program.

Technical Guidance Manual

In order to promote a consistent approach to the installation, operation and maintenance of retention BMPs, the Workgroup recommends that IEPA develop separate technical guidance or a TGM prior to the effective date of post-construction performance standards be required via permits or new State regulations. The TGM should, among other things provide technical information, best practices, and templates for plans and forms. The TGM would help project owner/operators to better understand applicable requirements and provide tools and examples to help owner/operators to cost-effectively meet the performance standards. One to the topics that should be covered in the TGM is self-certification and self-inspection programs. It is recommended that the TGM include templates or documents for the following:

1. Example stormwater and drainage easement language
2. Operation and Maintenance templates for various BMPs or reference to existing acceptable manuals that detail O&M for particular BMPs
3. Recommended inspection and maintenance schedules
4. Example forms for documenting inspection and maintenance activities
5. Sample language for dormant (back-up) Special Service Areas
6. O&M Plan template
7. Self-certification form

Best Management Practices Design Options

The Workgroup recommends that the language for implementation of the performance standard accommodate flexible approaches to meet the final volumetric requirement. Approaches may include green roofs, naturalized detention facilities[16], trees and tree boxes, rain gardens, vegetated swales, wetlands, infiltration planters, porous and permeable pavements, porous piping systems, dry wells, vegetated median strips, reforestation/revegetation, open space preservation, rain barrels and cisterns, and protection and enhancement of riparian buffers and floodplains. It will be critical to quantify the volume reductions that the practices used on-site will achieve, and to document the volume reductions in the design plans, as-built drawings, or other documentation.

The Workgroup identified various sources of design information that are currently used for development within Illinois. The Illinois Urban Manual is used extensively throughout Illinois but is not always the "go-to-guide." IDOT uses Chapter 41 of the BDE Manual for construction of stormwater BMPs, among other manuals. However, BDE does not currently address post-development stormwater performance standards. New technologies and innovation in the design of green infrastructure should be allowed to think outside of the box and evolve from traditional sources of design information. The Illinois Urban Manual should be expanded to include technical guidance for post-construction BMP design standards (TGM). Existing BMP design

[16] It may be appropriate to include in the TGM information distinguishing retention from detention. The recommended performance standard is based on retaining rainfall running off impervious surfaces, with no discharge of this volume of stormwater to local sewer systems or receiving waters. In general detention practices store water to help prevent localized flooding but the water is later released to the sewer system or receiving waters. Stormwater volume reduction credit should only be given for detention practices to the extent naturalized detention designs are used which allow for infiltration and evapotranspiration to take place, thereby reducing stormwater discharge volumes.

resources from established Illinois county programs and other State programs should be utilized to create the TGM, e.g., Wisconsin, Minnesota, Orange County, California, etc.

Another factor that may affect BMP selection is proximity to airports. Communities and developments near airports should review the U.S. Department of Transportation Federal Aviation Administration Advisory Circular 150/5200-33B (soon to be superseded by 150/5200-33C).

Both simple and complex methods should be options to meet the requirement. Simple calculation methods are encouraged whenever possible. A simple calculation should be used to clearly establish the standard for compliance and provide a quick and easy option for typical applicants. However, complex methods, calculations, or modeling should be allowed as an option for complicated sites or in instances where the applicant decides to put additional time and money to "prove out" that a smaller system is compliant with the requirement.

Green Infrastructure BMPs include stormwater management techniques or practices that reduce runoff through preserving, restoring, utilizing, or enhancing the process of infiltration, evapotranspiration, and/or water harvesting and reuse.

BMP designs should achieve a full drawdown of ponded stormwater within 72 to 96 hours, except for permanent open water basins. The use of drain tiles may be used to achieve the full drawdown in areas with Type C/D clayey type soils. This upper limit prevents mosquito growth and also provides storage capacity for subsequent storm events. The Workgroup recommends establishing a minimum drawdown time of 48 hours (when drain tiles are used) to be included in the technical guidance documents. The location of the practice and depth of ponding should not create hazards in recreational or other areas where children may be present.

Systems designed to meet the retention standards are generally expected to be sized for small, frequent storms and not to have capacity to manage infrequent larger rain events that can result in significant flooding. Therefore, green infrastructure designs should incorporate adequate overflow and overland flow routes when larger storm events occur and exceed the capacity of the system. Where large amounts of stormwater flow through a green infrastructure feature at a fairly high velocity, there can be erosion of the practice and/or damage to plants. The Workgroup recommends that the TGM include maximum stormwater volumes and velocities to ensure continued effectiveness of the designed BMPs e.g., erosion control, stabilization, etc.

The use of native vegetation is the preferred choice of vegetative cover for the above practices and provides the following benefits:

- Lower intensity of long-term maintenance and cost
- Deep root structure to enhance natural infiltration and minimize erosion
- Increased evapotranspiration to reduce runoff
- Filter pollutants and minimize water quality impairment

The group recognizes that initial maintenance costs, establishment time, and lacking aesthetic appeal may lead to a negative acceptance factor for current and future property owners. Zoning restrictions may also preclude their use in some instances. A hierarchy should be developed to

prioritize, yet remain flexible, in the selection of site-specific strategies to meet the performance standards.

Incentives for reduced project requirements should be offered to the Applicant to encourage and promote the use of native vegetation, where applicable. Appropriate plant selection should consider on-site and off-site hydrology, inundation frequency, and duration. However, alternative plant list designs should be considered. Careful consideration should be given to the type of native vegetation within roadway right-of-ways and other areas where heavy salt loading may occur. Low profile plants should be specified in areas where drivers' sight lines could be obstructed.

Green infrastructure practices are more likely to be well-received in communities if they are aesthetically pleasing and well-maintained. Proper maintenance also ensures the practices will continue to function as designed and constructed. Conversely, if green infrastructure practices look unkempt, there will likely be neighbors who advocate that the practices be removed. Regulation of aesthetics is challenging. Therefore, detailed O&M Plans (see following section) should be required. The O&M Plans will help ensure perpetual maintenance and good aesthetic upkeep.

Maintenance of Stormwater BMPs

The Workgroup recognizes that effective operation and maintenance of stormwater BMPs is critical in order to ensure the practices will perform as designed. The Workgroup recommends that an O&M Plan be developed for the stormwater management measures incorporated into the site plan to meet the performance standards. The O&M Plans should be developed in conjunction with the self-certification and submitted with the NOT. The self-certification language should include an affirmation that an O&M Plan has been developed. The Workgroup recommends that IEPA require the O&M Plans to address maintenance activities that are needed to ensure that the BMP continues to operate as designed. The O&M Plans should address the following requirements:

1. The BMPs must perform as designed throughout the useful life of the development that is being treated by the BMPs.
2. A recorded covenant must be attached to the property, which includes the self-certification, and a requirement that the owner/operator must operate and maintain the BMPs to ensure that they will provide the level of treatment necessary to meet the performance standards.
3. The parties responsible for the O&M must be identified in the plan. For instance, the property owner in the case of a single lot development, or a home owners association in the case of a multi lot residential development.
4. The O&M requirements apply to BMPs constructed off-site as part of an approved mitigation plan, as well as all onsite BMPs.
5. The O&M Plan must address long term maintenance activities including replacement of BMPs at the end of their useful life.
6. The O&M Plan must include guidance on how stormwater BMPs are not to be used for snow storage to prevent BMPs from becoming overwhelmed and contaminated from the additional runoff.

7. The property owners have the right to make changes to the BMP(s) as long as the proposed changes will meet the performance standards applicable to that development. O&M plans should be revised to reflect any necessary changes to how the BMP should be maintained. Changes must be recorded in the O&M Plan as they occur.
8. The O&M Plan must include a maintenance and inspection schedule.

The following are maintenance-related suggestions:

1. MS4s should be encouraged to voluntarily track O&M costs and submit to IEPA on an annual basis with their annual ILR40 permit report. IEPA could maintain this information in a public database or otherwise make the data available to the public.
2. The permitting authority should consider requiring stormwater BMPs to be placed within easements or separate parcels where appropriate.
3. A dedicated source of revenue such as a fee specifically for the operation, maintenance, and ultimate replacement of the stormwater management practices should be encouraged for multi parcel developments.
4. Municipalities should be encouraged to consider the establishment of financial safeguards such as dormant (back-up) Special Service Areas for larger-sized projects (five or more acres of land disturbance) to ensure that O&M activities can continue in the event that the responsible entity becomes insolvent.
5. IEPA should recommend that the O&M plan include a budget for performing the ongoing maintenance work. The O&M Plan should identify funding and backup funding sources for maintenance.
6. IEPA should recommend that the O&M Plan take into account short-term maintenance requirements such as frequent weeding and irrigation of native planted areas during the establishment period.
7. IEPA should recommend that maintenance should be conducted in accordance with acceptable manuals such as the Illinois Urban Manual, the IDOT BDE Manual, and County Stormwater Management TGMs. Operation and maintenance should ultimately reflect the nature of the specific BMPs and take into account the unique characteristics of each site.

Creating Incentives and Promoting Understanding

The language laying out the performance standards in the permits and the TGM will need to be written with a focus on clarity that most people can understand. The standards should include objective criteria that can be clearly interpreted by the owner/operators, engineers, designers, and regulatory permit/enforcement entities. The exceptions (such as where infiltration practices are not recommended due to site conditions) should be clear and have good scientific basis. Minimizing the subjectivity and uncertainty helps ensure a consistent and efficient process. Examples should be provided in the TGM. The TGM should also include scientific and technically sound criteria to explain the rationale and support the final standards. Understandable scientific-based standards and exceptions can strengthen funding source eligibility, incentives (e.g., stormwater utility fee reductions) and opportunities among various Federal, State, and local programs.

Existing regulatory provisions and BMP practices that inherently meet the goals and objectives of the standard should be allowed as “credits” toward meeting the requirement. For example,

buffer requirements around riparian and natural resource areas which specify the use of native vegetation should be an available credit. The use of open channels with native vegetation in-lieu of storm sewers should also be an available credit. Guidance will need to be developed on how to calculate applicable credits.

Incentives to reduce detention volumes (as a result of BMPs implemented to meet the volume control requirement) should be allowed at the discretion of the governing stormwater authority e.g., municipality, county, etc. Providing detention credit for volume control stormwater management practices provides an incentive for implementing such practices and may in some situations avoid a degree of redundancy. It is also important that local construction design specifications not require the use of conventional stormwater management systems that duplicate green infrastructure practices and increase the cost to developers of these systems. Such specifications should be reviewed and modified to provide the maximum levels of flexibility, coordination and efficiency in the choices by developers of their stormwater management system elements.

County Stormwater Management Ordinances

To allow for greater efficiencies and to avoid duplication of program efforts, the Workgroup recommends that when a county has adopted and is implementing a county ordinance (which is implemented in municipalities and unincorporated parts of the county) that is at least as stringent as the State-wide stormwater runoff performance standards, in terms of controlling stormwater runoff volume/protecting water quality, the State program can accept the county program as being equivalent to the State program. Where a county program is determined by the State to be equivalent to (or more stringent than) the State program, provisions could be established so that administrative/procedural aspects of program implementation are handled by the county. This would potentially help to avoid duplication between the county and the State, and streamline administrative/documentation steps required of site owner/operators.

Counties will still be required to adhere to the State standards that are not adopted at that level. However, counties would be the lead entity in enforcement of the performance standards, without removing State enforcement authority. Counties would maintain administrative and enforcement authority unless in violation of their obligations.

Costs and Economic Impacts

When the Workgroup prepared draft recommendations and sought stakeholder comments, numerous commenters asked questions and raised concerns about the costs of implementing BMPs to meet the draft performance standards. Questions and comments also were submitted on the economic impacts of the performance standards – would they have the effect of stifling development?

Comments were also submitted about the engineering feasibility of meeting the draft performance standard which called for retention of 1.35 inches of runoff from impervious surfaces. Several commenters noted that at many sites it would be problematic to locate and construct BMPs sufficient to meet the draft performance standard, and that this would be particularly true for redevelopment sites, where there may be space constraints, in-place utilities, and other factors that could limit placement of BMPs.

The Workgroup conducted further research and analysis taking into account the comments on costs, economic impacts, and engineering feasibility in developing the final recommendations presented in this document. The recommendations continue to focus on matching the pre-development stormwater profile with the post-development stormwater profile. However, the rainfall retention targets enumerated in the performance standards were modified in the final recommendations. For new development sites the retention value was reduced from 1.35 inches of rainfall runoff from impervious surfaces to 1 inch of runoff. The 1 inch retention standard is currently in use in other States and site developers are finding generally they are able to implement BMPs to meet this retention value. The final performance standard recommendations also create a greater distinction between new development sites and redevelopment sites. This is in recognition of the fact that there is typically more space and there are more opportunities for implementation of BMPs at new development sites as compared to redevelopment sites. The target retention value for redevelopment sites is to retain the runoff from a 0.8 inch precipitation event.

The modifications to the originally recommended performance standards relax those standards slightly, to respond to concerns registered in comments received on costs and engineering feasibility. Nevertheless, the new recommendations still provide significant protections for Illinois water resources. For example, if a site has 50% impervious area and is located in an area with Category B soils, capturing the runoff from a 1 inch rain event will typically keep 95% of the phosphorus pollutant loadings out of the downstream waters, and will keep 98% of the total suspended solids out of the discharges.[17]

Modifying the retention targets for new development and redevelopment sites will result in reduced costs for implementing BMPs for many sites. Fewer BMPs or smaller-sized BMPs will need to be implemented in order to retain runoff from site impervious surfaces. The cost impacts for implementing BMPs to meet the recommended performance standards are expected to be moderate, especially for new development sites. For new development sites, such as a residential subdivision or an office complex, there will often be numerous design options available for sizing and locating buildings, streets, parking areas, and other development components. These decisions can be made with an eye toward minimizing stormwater runoff and the standards can often be met with little or no additional costs as compared to a more conventional design. The design ideas which foster sustainable stormwater management are often referred to as Low Impact Development, conservation design, or better site design (a naming convention used by the Center for Watershed Protection).

In late 2007 U.S. EPA released a report entitled, “Reducing Stormwater Costs through Low Impact Development (LID) Strategies and Practices.” This report provided information on 17 case studies of developments that factored in LID practices and found that applying LID techniques can reduce project costs while at the same time improving environmental performance. In the vast majority of cases studies evaluated the LID designs resulted in significant savings. Cost savings were realized due to reduced costs for site grading and site preparation, stormwater infrastructure, site paving, and landscaping. Total capital cost savings ranged from 15 to 80 percent when LID methods were used.

[17] Source: Minnesota Pollution Control Agency and Minimal Impact Design Standards technical analyses. See Exhibit 1.

As it considered changes to its stormwater ordinance, the Lake County (IL) Stormwater Management Commission evaluated costs for implementing a retention standard. The Lake County study found that with the site and design features already being incorporated to manage stormwater and prevent flooding, the incremental cost of meeting the retention standard would be minimal.

In a recent article entitled, "The Costs of LID - Low Impact Development BMP installation and operation and maintenance costs in Orange County, CA"[18] the authors reported that LID BMP installation costs range from a low of $1 per square foot up to nearly $70 per square foot, except for green roofs. Infiltration and biofiltration BMPs are the least expensive BMPs to install and are reported to cost as little as $1 per square foot. Infiltration BMPs including concrete pavers are somewhat more costly to install than biofiltration units, with trenches, curb-contained planters, and paver systems generally the most costly infiltration BMPs. Expressed per gallon of runoff managed, infiltration and biofiltration BMPs are the least expensive LID BMPs to install, with per-gallon costs in the $1 to $5 range.

The Workgroup also looked into the comment/question posed as to whether requirements for developers to implement BMPs to meet performance standards would stifle development activity in the State. The economics consulting firm ECONorthwest released a report in 2011 entitled, "Managing Stormwater in Redevelopment and Greenfield Development Projects Using Green Infrastructure - Economic Factors that Influence Developers' Decisions." Among the findings in this report were the following:

> **Complying with stormwater regulations is one factor among many that influences a project's costs. It is rarely the driving factor -** Stronger stormwater standards can affect the costs of both greenfield and redevelopment projects. These costs are folded into a *pro forma* analysis that developers and lenders use to assess the viability of a project. Developers we interviewed revealed that their decision-making process incorporates a wide range of economic factors, including various construction costs, current and future market conditions, regulatory incentives and disincentives, and uncertainty and risk. While some developers we interviewed indicated that the costs associated with meeting stronger stormwater standards may change the types of projects they will pursue in the future, many developers described the cost of implementing stormwater controls as minor compared to the other economic factors they considered in deciding whether or not to pursue a project. This is especially true in the context of highly-complex redevelopment projects and green-building infill projects. In general, stronger stormwater standards increase the costs of implementing stormwater controls, a trend that many of the developers we interviewed have experienced since at least the 1980s. Some developers pointed out, however, that using LID controls has helped offset some of the increased cost, compared to using conventional controls.[19]

[18] Stormwater – The Journal for Surface Water Quality Professionals. March-April 2013. Mark Grey, Dave Sorem, Caitlin Alexander, and Richard Boon. http://www.stormh2o.com/SW/articles/20426.aspx?page=1

[19] Report posted on-line at http://www.smartgrowthamerica.org/smartgrowthusa/wp-content/uploads/2011/08/managing-stormwater-in-redevelopment.pdf

Given that the recommended performance standards have been modified to reflect comments received on engineering feasibility as well as implementation costs, and the fact that available literature indicates the costs of implementing BMPs to meet performance standards are very moderate, especially for new development sites, and that stormwater requirements are not likely to suppress development activity, the Workgroup is of the view that the recommended performance standards are justifiable in terms of costs and economic impacts. In some situations the implementation of green infrastructure BMPs may in fact help to enhance property values and/or add to the marketability of developments. Green infrastructure practices may also in some situations contribute to economic revitalization and/or neighborhood stabilization.

State Performance Standards and the Federal Stormwater Rulemaking

Comments were received by the Workgroups posing the question is it advisable for the State to put in place post-development stormwater runoff performance standards when it is known that U.S. EPA has initiated a stormwater rulemaking that is expected to include minimum national standards. The Workgroup is of the view it is advisable to move forward with post-development stormwater runoff performance standards. Through the Workgroup's research and the public comment process, and further work IEPA will do to propose requirements and facilitate public participation, IEPA can adopt performance standards tailored to the State of Illinois -- its climate, topography, land uses, and water resources. Beginning the process of adopting standards and phasing in the implementation of the standards allows the State to have a jump-start on implementation of the Federal program.

It is expected that the Federal stormwater rule will include a provision whereby if a State has a equivalent post-development performance standards State program, the State program can continue to be implemented in lieu of the Federal program. It is likely that an "equivalent" State program would include a program of any design that provides for a level of watershed protection equal to or greater than the Federal program. Thus there is little risk, and there are several advantages to working toward adoption of post-development performance standards even in light of the pending Federal stormwater rulemaking. Implementing post-development standards as soon as is practicable will substantively help protect Illinois water resources.

Recommendations for Further Analysis and Possible Refinement of the Performance Standards – Phase 2

Applicability

The Workgroup recommends that in a future Phase 2 implementation of the performance standards that IEPA consider lowering the project size threshold for the applicability of the post-development requirements. Many development projects are on sites that are smaller than 1 acre, particularly those in already developed areas. Cumulatively, increased impervious surfaces on these small sites can have significant impacts on receiving waters.

Some MS4 communities already have construction and post-construction requirements that apply to sites where there is less than 1 acre of land disturbance. The Workgroup encourages MS4 communities during the Phase 1 time period to exercise their ordinance authorities to establish an applicability threshold of less than 1 acre of land disturbance where appropriate for protecting

community character and local water resources. The Workgroup recommends that during the implementation of Phase 1 of the performance standards, IEPA commission a study/report that would focus on the number and locations of sites where less than 1 acre is disturbed, the expected environmental impacts of the smaller development projects, the State and local resources needed to oversee the increased numbers of regulated sites, and the estimated costs for implementing volume control BMPs at the smaller sites. The Workgroup then recommends that in a second phase of implementation of the standards, applicability be extended to encompass smaller development sites. The study/report can provide information regarding what the appropriate size threshold should be.

It may be appropriate to focus performance standards for smaller sites within regulated MS4 communities. MS4 communities are in urbanized areas and are largely developed, and thus there is relatively more runoff, potentially causing localized flooding and/or water quality concerns in these developed areas. We also note that the U.S. Environmental Protection Agency is developing new stormwater rules with retention requirements similar to those recommended here, and that these rules may include applying the performance standard to other developing communities both upstream and downstream of existing MS4 communities. Thus, it will be in the interest of all MS4s to become familiar with the broad application of these performance standards to many different sized sites.

Percentile Storms

The Workgroup recognizes that while a 1-inch rain event is a 90th percentile storm in Lake County and some other northern parts of the State (and a 0.8-inch rain event is an 85th percentile storm), a 90th percentile storm in other parts of the State is greater than 1 inch. Protecting watersheds in the central and southern portions of the State may be enhanced by basing the performance standards on control of the local 90th or 85th percentile storm, vs. a flat performance standard of 1 inch or 0.8 inches. The Workgroup recommends that Illinois EPA consider moving toward the use of percentile storms as the basis for the performance standards as part of Phase 2 implementation. In addition to tailoring the performance standards to regional climatic conditions, using percentile storms as the basis for the performance standards would better take into account the effects of climate change in the Midwest. Downscaled climate models predict that rainfall amounts will increase in the spring and early summer in Illinois, and it can be expected that tables of storm sizes and frequencies will change as climate change effects are seen. Using percentile storms as the basis for the performance standard will result in the storm sizes to be managed increasing gradually over time, reflecting the larger and/or more frequent storms.

Sensitive Watersheds

The Workgroup recommends that as part of Phase 2 implementation, the State consider developing somewhat more protective stormwater performance standards for development and redevelopment projects that drain to Biologically Significant Streams.[20]

[20] See http://dnr.state.il.us/orc/biostrmratings/images/BiologicalStreamRatingReportSept2008.pdf, pp. 23-25, for information on Biologically Significant Streams in Illinois.

Refining Standards for Redevelopment Sites

The Workgroup recommends that in planning for a future Phase 2 implementation of the performance standards that IEPA further evaluate program incentives for redevelopment sites. Where a project is implemented at a redevelopment (infill) site, versus a greenfield development which may be on the urban fringe, there are significantly less environmental impacts. For example, there is typically less vehicle use associated with traveling to and from infill sites versus greenfield sites, and where infill sites are in a relatively dense area there may be opportunities for walkability and transit-oriented development. To the extent feasible, incentives should be considered to encourage infill development. For example, in West Virginia the way the stormwater performance standard is set up, a site owner/operator can have a slightly less stringent stormwater runoff performance standard if the development takes place on a Brownfield site or if it creates a mixed-use development. In the Phase 2 post-development performance standards program it may be beneficial to build in further incentives for redevelopment sites.

Mitigation

The Workgroup recommends that in planning for a future Phase 2 implementation that IEPA further evaluate mitigation ratios for projects/sites where it is not feasible to meet the performance standards. In particular IEPA should assess whether the 1.5:1 ratio for mitigation and fee-in-lieu payments is creating a disincentive for redevelopment and infill projects. If this ratio is found to be significant in terms of development decisions, the State may want to consider lowering the mitigation ratios.

Retrofits

The performance standards described above address development and redevelopment sites, and are intended to ensure appropriate stormwater control measures are put in place as sites are developed and new or additional impervious surfaces are created. With regard to communities and neighborhoods that are already developed, and have extensive amounts of impervious surfaces and relatively high volumes of stormwater runoff, the General Stormwater Permit for MS4s already contains requirements for implementing plans to reduce stormwater volume and pollutants. The Workgroup recommends that IEPA convene a separate Workgroup to evaluate and make recommendations for amending the performance standard as appropriate to clarify them and ensure that they lead to cost effective retrofit programs for developed urban communities in Illinois.

Conclusion

The workgroup's research and investigations revealed that stormwater runoff from impervious surfaces is a major contributor to the water quality impairment of surface waters in Illinois, both in terms of delivery of pollutants and in terms of the physical effects of excessive stormwater volumes, which erode stream channels and lakeshores. Additionally, excessive stormwater volumes can contribute to localized flooding.

Establishing stormwater runoff performance standards for development and redevelopment projects is a prudent way to begin to address the challenge of excessive amounts of, and pollutant

loadings in, stormwater runoff. New expanses of impervious surfaces are created as development occurs, and it makes good sense to minimize the effects of these changes by putting in place BMPs at the same time to retain runoff and mimic the predevelopment hydrology. It is almost always less expensive to implement BMPs as part of a development plan/project, vs. trying to retrofit in BMPs at a later time. Also, incorporating BMPs as part of development projects can help avoid costs for a community or nearby property owners associated with enlarging stormwater infrastructure or responding to localized flooding.

The performance standards being recommended by the workgroup offer flexibility to developers in deciding what BMPs are best suited for their sites/projects, and also in selecting the method best suited for demonstrating compliance (modeling pre- and post-development stormwater, or using the established retention standards). The recommended performance standards also acknowledge that implementing BMPs at redevelopment sites may in many cases be more challenging than implementing BMPs at new development sites by providing for a moderately less stringent retention target for redevelopment sites.

The Workgroup is of the view that the performance standards are feasible to implement at most sites. The performance standard for new development sites of managing runoff from 1 inch of precipitation is in place in other States. For example, this performance standard was established in the recently issued permit for MS4 communities in Minnesota. The Workgroup recommendations include provisions for mitigation for development projects where there are site conditions that make it infeasible to meet the performance standards.

The Workgroup appreciates the opportunity presented by IEPA to research the topic of post-development stormwater runoff standards and to offer recommendations for implementation of performance standards in the State. Implementing stormwater runoff performance standards will provide significant benefits in terms of helping to protect the water resources of Illinois.

Exhibit 1

Summary of total phoshorus and total suspended sediment removal efficiencies from volume control and rate control BMPs for four performance goal alternatives

Performance Goal used to Size Bioretention BMP	Pollutant Removal Efficiency from Volume Control BMPs[1]				Cumulative Pollutant Removal Efficiency (Volume Control BMPs[1]+ Rate Control BMPs[2])			
	B Soils		C Soils		B Soils		C Soils	
	TP Removal[3] (%)	TSS Removal[3] (%)	TP Removal[3] (%)	TSS Removal[3] (%)	TP Removal[3] (%)	TSS Removal[3] (%)	TP Removal[3] (%)	TSS Removal[3] (%)
1-inch Off Impervious Surfaces								
20% Impervious Site	89	95	81	91	90	97	83	93
50% Impervious Site	95	98	92	97	96	99	93	98
80% Impervious Site	96	99	95	99	97	99	95	99
95th Percentile Storm								
20% Impervious Site	91	96	88	94	92	97	88	95
50% Impervious Site	97	99	95	98	97	99	95	98
80% Impervious Site	97	99	97	99	98	99	97	99
Match One Year Storm								
20% Impervious Site	91	96	86	93	92	97	86	94
50% Impervious Site	97	99	94	98	97	99	94	98
80% Impervious Site	97	99	96	99	98	99	96	99
Match Two Year Storm								
20% Impervious Site	93	96	87	93	93	97	87	94
50% Impervious Site	97	99	95	98	97	99	95	98
80% Impervious Site	98	99	97	99	98	100	97	99

[1] Volume control BMPs modeled as bioretention basins

Source: Minnesota Pollution Control Agency and Minimal Impact Design Standards technical analyses