

**Center for Environmental Excellence by AASHTO
Stormwater Management Community of Practice (CoP)**

**STATE-OF-THE-PRACTICE REPORT:
EPA Regulations**

October 2010

AMERICAN ASSOCIATION OF
STATE HIGHWAY AND
TRANSPORTATION OFFICIALS

AASHTO
THE VOICE OF TRANSPORTATION

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INTRODUCTION

The Center for Environmental Excellence by AASHTO has established a Stormwater Management Community of Practice (CoP). The purpose of the Stormwater Management CoP is to create a forum where State Department of Transportation (DOT) practitioners can engage in facilitated discussions on emerging issues, research data needs, and innovative stormwater quality compliance solutions. The CoP has two primary goals, the first of which is to extend each state DOT's network and contacts, enabling them to share experiences and engage in technology transfer. In this regard, the program is a continuation of efforts that were initiated June 23–25, 2008 at the First National AASHTO Stormwater conference that was held in San Diego, California. The second goal is to develop a State-of-the-Practice Report (this document) on a selected focus topic. The Stormwater Management CoP consists of representatives from 16 state DOTs, the Federal Highway Administration (FHWA), and the Federal Transit Administration (FTA). The Stormwater Management CoP members agreed that EPA Regulations should be the top priority for this phase of the CoP.

This State-of-the-Practice report discusses the proposed EPA rulemaking, implementation of low impact development, hydromodification mitigation, and retrofitting.

BACKGROUND

EPA Regulations

The new rulemaking will potentially require LID implementation, emphasize volume reduction, hydromodification mitigation, the ICR and retrofit. This CoP revolved around examples of BMPs that each state needs to repair to comply with EPA regulations. BMPs needed to comply with LID, alternatives to retrofitting, current research, reasonable alternatives to retrofitting, research needed, and to designate research champions to help develop research topics and input them into the TERI database to be funded. One particular stormwater idea was submitted over the summer to NCHRP 25-25 regarding how to prepare for the Effluent Limitations Guidelines.

Center for Environmental Excellence by AASHTO Workplan for this fiscal year is available for download on <http://environment.transportation.org/>.

This state-of-the-practice report summarizes the discussions of CoP members who spoke as individual members of the community and does not necessarily represent their agencies' views or positions. In addition, the contents of this report do not necessarily represent the views or positions of AASHTO or the Center for Environmental Excellence, FTA, or FHWA.

A key topic discussed was what BMPs are being used to comply with LID. There is a lot of good guidance available, such as on green streets, that is not very applicable to highway situations. Retrofitting comes with a high cost and is not sustainable in a DOT environment. The goal is to come up with LID for highway applications. BMPs can be categorized as follows:

Traditional	New	Unworkable
<ul style="list-style-type: none"> • Vegetated Swales • Vegetated Strips • Infiltration • Bioretention (potential) • Media Filter Drains 	<ul style="list-style-type: none"> • Permanent Friction Courses • Dispersion • Permeable Shoulders • Compost Amended Soils 	<ul style="list-style-type: none"> • Bioretention • Reduced Lane Widths

STATE-OF-THE PRACTICE: GENERAL PROGRAM INFORMATION FROM SELECTED STATES

The discussion below provides information on the state-of-the-practice for dealing with EPA regulations for selected states.

Alabama Department of Transportation (ALDOT)

- Behind in post-construction BMPs in general. Higher-level officials do not understand the need. Seen as “extreme environmental tree hugger issue.” Not much has been done to pursue in this state. While all about getting water off the roadways, the idea of holding water disturbs people, especially through allowing it to infiltrate slopes. Are behind but interested in solutions.
- A concern is that, for different states in the same EPA region, the rules are not enforced across the board. Not every state is held to the same standard. Need to look at this disparity under the new rulemaking.

Colorado Department of Transportation (CDOT)

- Urban Drainage Flood Control District has just released a rewrite of what they call their Volume 3, which are water quality features they have incorporated LID into the revision ... thin on linear construction projects. Focused on infiltration. Infiltration will only work in select areas of the state. Still constrained by rock.
- Practices have to be capture and treat ... sediment basins
- Based on drainage areas, having challenges with ...
- Rewriting Development/Redevelopment manual, which is part of permit ...
- Looking at how going to integrate LID into Development/Redevelopment program
- No research going on right now
- Did not focus on ...

Florida Department of Transportation (FDOT)

- With regulatory agency, have been putting forward nutrient removal requirements. It has not been passed yet but for a number of years have been researching some different BMPs.
- The basic problem with the way EPA has been approaching this is that they are looking at volume rather than annual loading of nutrients. There are things that can be done to reduce the concentration of nutrients, even though they put out more volume of water. Lacks a logical component. EPA is going after volume as a surrogate to reduce pollutant loading, rather than going directly after pollutant loading. If they went after pollutant loading, there would be all kinds of opportunities to address that, even though volume might increase on the roadway. Misses the bottom line.
- Just targeting volume, have been researching permeable pavements, asphalt, concrete, different types of pavers that use glass, rubber, etc. Permeable concrete is promising but have to be careful of shear stresses. As long as shoulder or parking lot and constructed properly, and maintenance and maintenance performance is managed, it can be done. Is more expensive, more finicky to construct.
- Reuse is great but it is very expensive to buy the right of way to reuse or harvest the water. Pavement people are very concerned with saturating sub grades because of pavement performance. Where land exists, pumping the water for infiltration, even pumping it repeatedly, we have a research project going on where looking at model for recycling water around the area near a pond. End up with recycling groundwater mound so some of the water gets back but it is cleaner.
- Regarding the disparity of enforcement across the board for different states in the same EPA region, this may have started the state regulatory focus for construction permitting.

Illinois Department of Transportation (IDOT)

- EPA not going to do anything until 2012
- Use of compost to manage the first flush and to hold and clean some portion of the stormwater
- Public health surrounding compost use in ditch bottoms -- Water in ditch bottoms should permanently stand deep enough for fish to thrive to eat the larvae or to get out of there quickly, since mosquitoes take only four days of soggy ground to reproduce. Compost will hold water, but could also add to the already too numerous mosquito hatcheries. This issue is included in the design for retention ponds. Is it being considered for compost amended ditch bottoms.
- Permeable pavement with decreased lane width -- this is not an answer that the traffic safety people want to hear.
- Projected maintenance requirements or costs of various BMPs (other than the reason PP was not considered in a couple of states) -- Maintenance is the biggest issue. Need data for maintenance needs and costs of various low impact development BMPs.
- USEPA MS4 audits -- MN had one, and they called IDOT, because Region 5 said that IL was audited (but no one from either the USEPA or IL EPA talked with anyone in IDOT). Want to know the status and results of ongoing audits around the country.

Michigan Department of Transportation (MDOT)

- Not as advanced in BMP program. Do very little with respect to infiltration, very limited experience with it. Will be a challenge to implement. Have a wide range of soils, so difficult in some areas of the state to get infiltration. Majority of storage is for flow rate control as opposed to volume reduction.

New Hampshire Department of Transportation (NHDOT)

- Using horizontal gravel wetlands from UNH stormwater center. Consists of a bed of 0.75 inches of gravel or wash stone and running water vertically through it. It has good removal efficiencies and good peak flow control because it has so much volume.
- Regarding infiltration, working BMPs where store for peak flow control. Need to store water on the downhill side on native soils and let it try to soak in. This is tricky on fills, e.g., when excavating when get down to native soils ... generally there is not a lot of infiltration because [the soil] is packed very hard.

New York State Department of Transportation (NYSDOT)

- The State regulatory agency recently modified its Stormwater Management Design Manual in August 2010. It included requirements for what they call green infrastructure, which is LID. Requires looking at a different suite of practices. Also requires that permittees go about the stormwater management analysis differently. Instead of just looking at a water quality volume based on 90-percentile storm event, now look at runoff reduction requirements and investigate/document ways of conserving natural areas and reducing impervious areas.
- Regarding list of different practices, not too progressive. Mastering bioretention and dry swales. When it comes to things like pervious pavements, NYSDOT is still leery of getting it to pervious pavements, asphalts, concretes, etc.
- Working with state regulatory agency on using media filter drains with mix recipe to improve its structural stability while maintaining its pollutant removal capability. Had problems with vehicles going off the road and tires sinking into the media filter drain before it gets a chance to stabilize, i.e., shortly after construction.
- Using compost amended filter strips, which improves infiltration into the soil and promotes water retention in the filter strip.
- Natural dispersion areas would be those areas in the right of way that can naturally absorb water and protect water quality if there is enough soil depth before the highest water table. Engineered dispersion areas would be those areas that are similar to natural dispersion areas but require some soil amendments in order to get them to perform as desired.
- All of these BMPs are in the Highway Runoff Manual, which can be accessed online.
- Proposing research on the use of permeable shoulders. State planning and research money funding cycle starting. Are concerned, like other DOTs, with how permeable shoulders might promote breakup at the pavement edge, as well as erosion of the subsurface.

- Pervious pavements for traffic lanes are not feasible, because they do not hold up as long as conventional pavements, due in part to the fact that Washington State still allows the use of studded tires between November and April. Therefore, they are not being pursued.

North Carolina Department of Transportation (NCDOT)

- EPA Region 4 and North Carolina Division of Water Quality issued DOT a TS4 transportation-specific stormwater sewer system permit.
- Have implemented media filters ... mix ... looking at trying to infiltrate a lot of the water quickly, which will not help as much on the volumetric controls. Trying to modify some typical sections on the roadway. Environment will help with volumetric control. In process of getting groups together on that.
- Looking at soil amendments.
- Looking at environmental site design (pioneered in Maryland, used in Washington), where natural topography is used to retain and infiltrate flows in areas where possible. Have had success in small areas like bridge decks using environmental site design-type process.
- Interested in regenerative stormwater systems (also used in Maryland), which entails using more natural design. An example might be on an inside creek or ephemeral ditch where there is excessive erosion going in and check dams and back flowing with soil amendments so can minimize the amount of pipes put in the ground; better for habitat.
- Working with open graded friction courses following Dr. Barrett's research.
- Looking into permeable pavers (but not permeable concrete or permeable asphalt, based on difficulties cleaning those systems over time) for use mainly in rest areas.
- Partnering with North Carolina Coastal Federation and Larry Kaufman LID on workshop in highway environments to bring design engineers together to brainstorm ways to try LID in linear environment.
- Regarding the disparity of enforcement across the board for different states in the same EPA region, this may have started within the state regulatory structure, with respect to requirements.

Oregon Department of Transportation (ODOT)

- Have started installing media filter drains.
- Research projects scheduled, mandated by NRDC lawsuit include looking at: 1) general effectiveness of pollutant removal using standard media filter drain; and 2) effectiveness of putting fishbone meal in the mix for enhanced metals removal.
- Regarding permeable pavement, looking at it again more from shoulders and parking lots but not on the driving surface. Does not hold up to studded tires.
- Doing soil amendments in just about all BMPs, especially in the more urbanized areas, where enhancing just the filter strip/vegetated shoulders away from the roads and the bottoms of swales and the bottom of detention basins. An issue that has come up is having amended soils close up to the gravel shoulder such that vehicles drive over them and material sinks in.
- In rural areas, have used blankets of compost to satisfy the regulators.

- Have looked at and installed some rain garden type features when in an urban area for city streets, but these are not appropriate for high-speed zones, only for low-speed roads. Narrowing lane widths is not an option.
- Regarding flow modification and volume reduction, focus has mostly been on controlling flows to the most geomorphically effective range of flows
- Infiltration is desired where appropriate

Virginia Department of Transportation (VDOT)

- Regulatory authority working for a number of years on redoing state stormwater regulations. After about four years, was passed by regulatory board. In spring, EPA proposed Chesapeake Bay regulation and TMDL, so all put on hold.
- Quantity control/volume control is part of regulation. Regulatory authority developed a list of BMPs that would give credit for nutrient removal for both actual removal of nutrients and for reduction of the volumes (and treating the remaining volume, which typically is for phosphorus).
- Developing a web page with BMPs listed with given efficiencies, etc.
- Goal is controlling volume and nutrient runoff.
- Waiting for EPA to come out with final draft Chesapeake Bay TMDL. In public comment stage right now. Hard constraints for anyone to meet.
- Have one project in northern county (Fairfax) where trying to put some LID practices in right of way to see if will fit and how will perform; has been redesigned a couple of times; not sure where going.

Washington Department of Transportation (WSDOT)

- Regarding LID and the EPA's Rulemaking, a big dose of feasibility goes along with the ability to do LID and many of the BMPs that have been discussed (e.g., filter strips, dispersion areas, and infiltration basins). They require some amount of right away adjacent to the highways, and the necessary soil and geologic characteristics. If in an ultra-urban area, you do not have the kind of right of way needed to do LID, and we need to help EPA understand that.

Wisconsin Department of Transportation (WisDOT)

- Using vegetated swales and filter strips in rural areas. Research project starting with USGS and regulatory agency on effectiveness of filter strips removing metals and TSS. Looking at it from getting perspective from regulatory agency on what the TSS removal will be, then can use that on projects across the board.
- Staying away from PFC and all types of permeable pavement, primarily because of freeze/thaw issues at this point.
- A bigger initiative going on is reuse of fly ash in concrete pavements. Have found that it binds and solidifies the concrete, making it less permeable, which is going in the opposite direction.
- Have an agreement with regulatory agency that have not pursued enhanced infiltration due to potential for hazardous spill along highway corridors. This has been a big barrier against doing infiltration.
- Still in infancy stages of urban LID BMPs. Just doing some research, seeing what is out there, what is working well in other states, but have not taken on too much of it, due to costs and right of way issues.

SUGGESTED RESEARCH AND FUTURE TOPICS

Following are research and data needs and topic focus areas suggested during the CoP conference call for future discussion as a part of the CoP. Additional topics and research ideas related to XXXXX are listed in no particular order of priority.

XXXXX

- XXXXX

ACRONYMS AND ABBREVIATIONS

The following acronyms and abbreviations are used in this report:

AASHTO	American Association of Highway and Transportation Officials
BAT	Best Available Technology Economically Achievable
BCT	Best Conventional Pollutant Control Technology
BMP	Best Management Practice
C&D	Construction and Development
Caltrans	California Department of Transportation
CGP	Construction General Permit
CoP	Community of Practice
CWA	Clean Water Act
DelDOT	Delaware Department of Transportation
DNREC	Department of Natural Resources and Environmental Control
DOT	Department of Transportation
ECS	Erosion Control Supervisor
ELGs	Effluent Limitations Guidelines
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
NCDOT	North Carolina Department of Transportation
NCSU	North Carolina State University
NEL	Numeric Effluent Limitation
NPDES	National Pollutant Discharge Elimination System
NSPS	New Source Performance Standards
NTU	Nephelometric Turbidity Units
NYSDOT	New York State Department of Transportation
ODOT	Oregon Department of Transportation
SHA	State Highway Administration
SWPPP	Stormwater Pollution Prevention Plan
WSDOT	Washington State Department of Transportation

RESOURCES

- Center for Environmental Excellence by AASHTO:
<http://environment.transportation.org>

- Developing and Implementing a Stormwater Management Program in a Transportation Agency Practitioner Handbook and Webinar: http://environment.transportation.org/center/products_programs/webinar_handbook_13.aspx
- EPA Effluent Limitations Guidelines and New Source Performance Standards (NSPS) to control the discharge of pollutants from construction sites and supporting documents and fact sheets: <http://www.epa.gov/guide/construction>
- NCSU Soil Sciences: <http://www.soil.ncsu.edu>
- Stormwater and Erosion Control: <http://www.soil.ncsu.edu/programs/stormwater>

Appendix B
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