

Polluted Runoff Learning Cohort - Thursday, Oct 18, 2012:

Topic: *Maintenance of Green Stormwater Solutions*

Summary Notes:

The objective of the cohort's third meeting was to tackle the challenges around maintaining green stormwater infrastructure, particularly rain gardens, swales and permeable pavement. The group had identified maintenance as one of the greatest emerging hurdles to achieving more low-impact development installations. The issues surrounding maintenance include: the uncertainties about costs; how to create maintenance programs; what types of maintenance are required and how frequently; institutional resistance to performing the specialized maintenance required for green infrastructure; questions about the burden of maintenance responsibility (private versus public as well as utilities versus transportation versus parks); and the need for training for municipal staff and private landscaping companies.

Four speakers were invited to share their research and solutions about maintenance:

James Houle, outreach coordinator and program manager for the University of New Hampshire Stormwater Center

Peg Staeheli, president and principal of Seattle's SvR Design Co.

Denis O'Brien, natural resources ecologist for Portland's Bureau of Environmental Services' Green Streets Program

Chris May, senior program director for Surface and Storm Water Management for Kitsap County Public Works Department

Here's a brief summary of some of the day's key messages:

RESEARCH AND DATA

Green stormwater infrastructure is being installed nationwide, and like all stormwater infrastructure, it will require regular maintenance. However, there is almost no scientific research available as to how much time and money needs to be allocated for that maintenance. In the absence of solid data, municipalities are making decisions for or against low-impact development projects based on anecdotal experiences.

James Houle and others at the University of New Hampshire Stormwater Center have taken one of the first stabs at trying to generate maintenance data and will have a paper published on the topic next month. Houle shared some of his results, based on conventional and green stormwater installations in Durham, New Hampshire that included a vegetated swale, a retention pond, a detention pond, a sand filter, a gravel wetland, bioretention and porous asphalt. Houle cautioned that his project was done using a very small sample size. The research revealed some surprising conclusions when comparing maintenance costs of the different installations, including the fact that the porous asphalt was least expensive to maintain and while initial maintenance of some of the green installations were initially more costly, costs decreased over time whereas gray infrastructure had cost spikes as time went on. Houle also calculated the cost of the stormwater installations against the amount of pollution removal.

ADVICE FOR MUNICIPALITIES

With numerous green stormwater installations around the Northwest, Peg Staeheli has spoken with a multitude of municipalities and staff at various levels about maintenance challenges. She shared her observations about the problems they're running up against and offered advice to clearing these hurdles.

Denis O'Brien has been working for a decade on urban restoration and green stormwater projects in Portland. He helps oversee the maintenance of the city's 1,000 swales, roadside planters and curb extensions that are part of the Green Streets program.

Over the past year, Chris May has been refining the stormwater maintenance program for Kitsap County to include specific maintenance protocols for green infrastructure. His program was strongly influenced by the maintenance program used in Portland.

Each of these experts had great tips and advice for municipalities. Here are some highlights:

DESIGN

- The design of GSI is key to successful maintenance. In Portland, that's meant redesigning inlets to make sure they're big enough for a standard shovel to fit into them to remove sediment. In Kitsap County, they use rounded rocks in swales rather than crushed, sharp-edged rocks so they can put down a screen over the rocks and clean out sediment without sucking up rocks.
- Another way to make sure design is done right is to include O&M folks in the design phase, and make sure that they're also part of the hand off of a project before it's completely finished.

DEFINING MAINTENANCE

- Maintenance of swales and rain gardens includes trash removal, weeding, pruning, irrigation, sediment removal, leaf litter removal if impeding function, mulching, and replacing dead/damaged plantings.
- Provide a maintenance guide to O&M, including images of what the maintained system should look like – what is the vision. Also instruct them as to how they can change and adapt the installation.
- Agencies need to be clear on who is doing the maintenance and what the maintenance looks like, including the level of maintenance that is expected. Seattle has created the region's definitive definitions of maintenance levels. Portland strives for Level B, while Kitsap is aiming for Level A given that their program is newer, smaller and the county is working to gain public support for the projects.
- Portland tries to visit GSI three to five times a year to monitor its condition; Kitsap aims for weekly inspections of GSI facilities.
- Be clear that crews need to survey GSI during and after storm events and give instructions as to how to respond to problems.
- Maintenance requirements for GSI change over time. Portland performs a more intensive level of maintenance during the first two years after installation as plants are getting established, then changes to a less intensive protocol. Installations are not irrigated past the first two years, except in the case of extreme droughts.

- Another big challenge is the unpredictability of the maintenance needs in terms of litter, vandalism and biohazards; neglect of neighboring properties resulting in extra weeds; damage from construction projects; difficulty in educating residents with GSI adjacent to their homes as to how the installation is meant to function.

LABOR AND EQUIPMENT

- There's no clear answer as to when and where to use contractors or municipal staff for various maintenance activities. One of the labor challenges is high turnover creating a need to regularly retrain workers as to how GSI maintenance is done. Kitsap successfully employs university students in the summer to do extra work. Portland has three year contracts with companies, with the potential for two year renewals. They encourage contractors to develop a sense of ownership for the GSI they work on.
- Portland is trying to supplement their paid labor with volunteers. They've hired an Americorps volunteer to go out into neighborhoods and talk directly to residents and businesses about ways they can do simple, basic maintenance of GSI such as trash removal.
- Make sure that all appropriate staff and contractors have maintenance tool kits in their vehicles at all times.
- Consider sharing expensive equipment such as sweeper trucks between departments (e.g. transportation and surface water) and between municipalities. In Kitsap the Public Works Department helped pay for new vacuum trucks that the Road Department uses. They are used most heavily on targeted routes that were selected to improve water quality.

BUILDING SUPPORT

- In-house cultural changes are a big challenge. Kitsap helped solve that by creating a "stormwater university" in which Chris May provided basic instruction over six months on stormwater starting with what it is and why it's a problem. Working on GSI became a plum position that was more autonomous and skilled. May made sure that the staff had sufficient training through WSU, Master Gardeners and with trips to Portland to see their program.
- Public outreach is crucial to protecting functional GSI, gaining support for new projects, and building teams of volunteers and stewards to maintain GSI. Portland has door hangers to let residents know that maintenance work has been performed, and also explaining what a rain garden is and why it's important.
- One problem is educating new property owners about the GSI on or adjacent to their homes. Portland is working with title companies and realtors to have them provide the information to homeowners.