Low Impact Development and Storm-EZ

March 26-27, 2014

DENR joins engineering consultants, NC State University, the University of North Carolina, local governments, and the NC Coastal Federation in promoting the voluntary use of Low Impact Development (LID). LID can benefit both the economy and the environment by reducing infrastructure costs, increasing lot yields and enhancing water quality protection.

When it rains there are only a few places for the water to go. It can soak into the ground, be used by plants, evaporate, or run off the ground surface. Before a site is developed, only a small percentage of rain runs off the site. When development replaces vegetation with hard surfaces, most rainfall becomes surface runoff.

The New Definition of LID

For the first time in North Carolina, there is a quantifiable definition of LID. *A development is considered LID when the volume of runoff leaving the site after development matches the volume of runoff before development*. In addition, an LID project should maintain adequate flows to the streams and wetlands on the site rather than piping stormwater to a single low point.

What is Storm-EZ?

Storm-EZ is a spreadsheet based on the SCS Discrete Curve Number Method and current research findings on best management practices, or BMPs. Designers enter data about the site development plan and the BMPs that will be used. Then, Storm-EZ reports how closely the project matches the pre-development runoff volumes. Storm-EZ can also be used to judge compliance with conventional "pipe and treat" approach to stormwater (or a hybrid approach of some LID practices used with some end-of-pipe stormwater treatment).

LID versus Conventional Sites: What is the Difference?

LID sites, like the one above, look different from conventional sites like the one shown on the right. An LID site typically has more vegetated areas interspersed with roads, parking lots and buildings. These vegetated areas provide landscaping for the site while also treating stormwater. The rain garden shown above ponds immediately after a storm and then the water soaks into the bioretention soils in less than one day. Other LID stormwater practices include permeable pavement, infiltration systems, rainwater harvesting (cisterns), and green roofs.

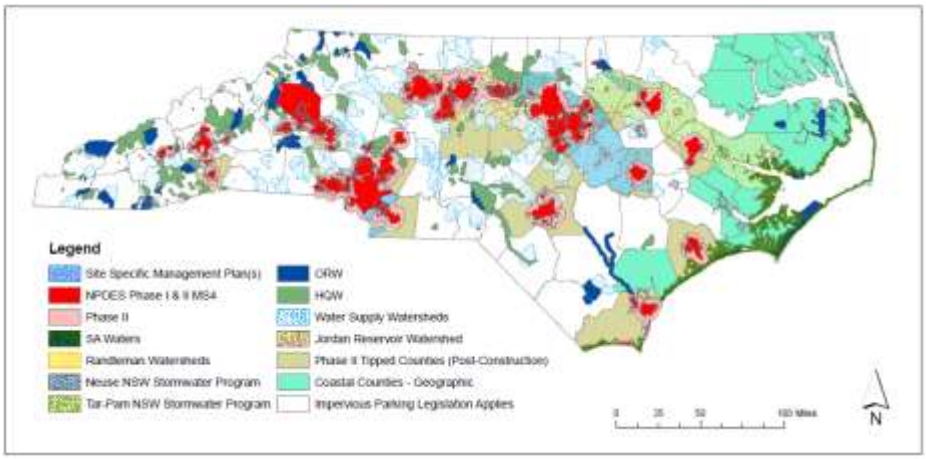
Conventional sites pipe stormwater to devices such as wet detention ponds (shown lower right) for treatment.

Photos: NCSU Stormwater Group (top), Blooming Rock (middle), DENR (bottom)

The Advantages of Using Storm-EZ

The use of Storm-EZ is **voluntary**. Designers may continue to use the old forms and methods for meeting stormwater requirements. However, there are a number of advantages to using Storm-EZ, including:

- Storm-EZ can be used for both LID and conventional projects.
- Storm-EZ streamlines the state stormwater permit application form, the BMP Supplement Forms, and the Operation and Maintenance Agreements into one all-inclusive tool.
- Storm-EZ estimates the impact of small-scale LID techniques on peak discharge rates from a development for flood control events, including the 5-, 10-, 25-, 50- and 100-year storms.
- Developments that fulfill LID goals per Storm-EZ will meet any state-implemented stormwater program, including Coastal Counties, ORW, HQW and SA Waters. See the stormwater programs map below.
- Local governments with state stormwater programs such as Water Supply Watershed and Phase II programs are allowed and encouraged to accept LID projects as meeting the requirements of their programs.



What are the Next Steps?

- **April 1, 2014** – DENR public notices the draft of Storm-EZ and three draft chapters of the BMP Manual. Designers may use Storm-EZ and the new chapters after they discuss with state or local stormwater review staff. Sign up on DEMLR's BMP Manual page to receive public notices.
- **May – August 2014** – The NCSU Stormwater Group, Withers & Ravenel, and DENR offers two-day LID & Storm-EZ technical workshops. During the workshops, DEMLR will solicit feedback on Storm-EZ to improve it prior to releasing the final version. So far, the workshop offerings are: May 7-8 in Boone, May 14-15 in Raleigh, and May 21-22 in Wilmington. For more information about the LID & Storm-EZ workshops visit the NCSU Stormwater Group's training website.
- **Fall 2014** – Anticipated release date for the final version of Storm-EZ. Beyond fall 2014, Storm-EZ will continue to be updated as the need arises.

Suitable BMPs for LIDs

Practices that convert runoff from built-upon areas to infiltration, evapotranspiration and post-filtration discharge are the cornerstone of LID. These practices include infiltration devices and permeable pavement designed for infiltration, Chapters 16 and 18 in the BMP Manual respectively. Another excellent BMP for LIDs is bioretention (Chapter 12).

In addition to unveiling Storm-EZ, DENR is publishing a draft of a new BMP Manual chapter called "Disconnected Impervious Surfaces" (DIS). The new DIS standards provide runoff reduction credit for simply sending runoff from built-upon areas to vegetated areas as shown below.

DENR is also updating two existing chapters of the BMP Manual – Rainwater Harvesting Systems and Green Roofs – based on recent research. These updated chapters provide more detailed design standards and more credit for reducing runoff. This will provide more BMP options for LID projects.

Questions or comments? Contact Mike Randall at (919) 807-6374 or mike.randall@ncdenr.gov or Annette Lucas at (919) 807-6381 or annette.lucas@ncdenr.gov.