Rhode Island Stormwater Design and Installations Standards Manual

Public Workshop
Overview of Manual Content and Why the Manual was Updated
January 13, 2011
Legislative Mandate

Rhode Island General Law, Section 45, Chapter 61.2, entitled “The Smart Development for a Cleaner Bay Act of 2007” states that “stormwater, when not properly controlled and treated, causes pollution of the waters of the state...” and “development often results in increased stormwater runoff by increasing the size and number of paved and other impervious surfaces...” The Bay Act of 2007 requires DEM and CRMC to amend the 1993 Stormwater Design and Installation Standards Manual to:

a) Maintain groundwater recharge to predevelopment levels;
b) Maintain post-development peak discharge rates to not exceed pre-development rates; and
c) Use LID techniques as the primary method of stormwater control to the maximum extent practicable.
1993 Manual

- Peak rate attenuation (2 & 25 year storms, often 100 yr as well);
- Proper conveyance of 10 yr storm;
- 80% TSS Removal Rate with 1” / impervious area;
- Additional controls for impaired waters, drinking supply reservoirs, ONRWs, etc.
- Acceptable Water Quality BMPs
  - Wet Ponds;
  - Extended Detention Ponds;
  - Infiltration Practices;
  - Pretreatment Devices;
  - Grassed Swales with higher infiltration soils;
  - Vegetative Filter Strips as last resort.
Where did 80% TSS Removal Originate?

- The 80% standard was a product of the Coastal Zone Act Reauthorization Amendments of 1990 (CZARA) requiring EPA to develop NPS guidance based on being:
  - economically achievable
  - reflect the greatest degree of pollutant reduction achievable through the application of the best available non-point pollution control practices.

Recommends by design or performance:

1. Either
   a. Post construction reduce average annual TSS loadings by 80% ...or
   b. Reduce post-development loadings of TSS so that average annual TSS load = pre-development conditions

2. To the MEP maintain post-development peak runoff rate AND average rainfall volume at levels similar to pre-development conditions
Why is the manual being updated?

- Several technical/scientific advances since 1993 (both in assessment and controls);
- Methods and techniques seem to have fallen short in adequately protecting water resource quality;
- We now know a lot more about the important of volume control (aka “runoff reduction”)
- Hydrologic alteration of new development was not addressed in the 1993 manual (recharge and volume controls);
- 80% TSS removal requirement does not appear to have prevented resources from degrading; and
- Widely recognized that a more holistic management approach is necessary.
RIDEM combined similar imperviousness datasets for MA & RI into a seamless grid clipped to the watershed extent. The data represent man-made 100% impervious areas such as pavement, rooftops and other structure.
Stormwater Impacts

At < 10% impervious we begin to see:

• Water quality issues
• Impacts to biological communities
• Increased flooding
• Stream erosion
• Loss of recreational uses
• Shellfish bed closures
• Reduced baseflow and recharge
The Effects of Urbanization
The Effects of Urbanization
The Impervious Cover Model

Stream Quality

Good
Fair
Poor

Watershed Impervious Cover

Sensitive
Impacted
Urban Drainage
Non-Supporting

10%
25%
60%
100%

Watershed Impervious Cover
Horsley Witten Group, Inc.
Rooftop and Driveway Runoff

Turf Runoff

Detention Pond (2-cell)

Road Runoff

To wetland

Westmoreland Ln
Rooftop and Driveway Runoff
Detention Pond
Turf Runoff
Road Runoff
“LID Cluster” subdivision

- 12 lots clustered on 6.9 acres
- Designed to minimize site runoff

Low-mow areas
Bioretention cul-de-sac
Rain gardens
Grassed swales
Pervious & shared driveways
Pervious & narrow road
Jordan Cove Results

Flow Rate vs Time

Conventional

LID

Adapted from J. Clausen, UConn
Most significant changes since the 1993 manual?

- Low impact development (LID) required to the MEP;
- Recharge criteria to infiltrate runoff from up to 0.6″/Imp acre;
- Revised design precipitation rates based on latest rainfall data;
- Expanded water quality pollutant removal targets (85% TSS, 60% Pathogen, 30% TP, 30% TN);
- Changed the type of practices acceptable for water quality treatment (extended detention, wet basins, and filter strips no longer acceptable as stand-alone practices), flow splitters now required for some practices;
Continued

• Changes to **infiltration practice** application - must fully pre-treat for direct discharge at a high rate, limitations on fill applications, significant dewatering requires water budget analysis;

• Special design requirements for discharges in **cold-water fisheries**;

• Extended detention of the **1-year storm** required;

• Changed how **sediment load** is addressed;

• Pollutant loading approach and analysis updated (when req’d); and

• New approach and criteria for **re-development** and **infill** projects.