ENVIRONMENTAL
Fact Sheet

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

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Low Impact Development and Stormwater Management

What is Stormwater Runoff?
Stormwater is water from precipitation events, like rain or melting snow. In a forest, meadow or other natural environment, most stormwater soaks into the ground. A small portion flows over land to create brooks, streams and rivers. When natural areas are developed into places like residential neighborhoods, commercial areas and shopping centers, impervious surfaces such as rooftops, roads, parking lots and compacted grass areas are created. During precipitation events, impervious surfaces act to prevent stormwater from soaking into the ground, thereby increasing overland flow and creating stormwater runoff.

Stormwater runoff often picks up pollutants such as trash, leaking or spilled vehicle fluids, pesticides, fertilizers, pet waste, sediment and road salt when it flows over impervious surfaces. This polluted runoff eventually flows untreated into nearby lakes, streams and other waterbodies. Stormwater runoff also creates problems when stream channels have to accommodate more flow than nature intended, resulting in more frequent flooding and stream bank erosion. Further, impervious surfaces block infiltration into the soil which reduces groundwater table recharge.

Stormwater runoff has been identified as a major source of water pollution in the United States. In New Hampshire, stormwater runoff contributes to over 90% of the surface water quality impairments. All across the state, communities, businesses and property owners are experiencing the challenge of managing stormwater to maintain transportation and storm drainage infrastructures, protect water quality, and keep their driveways and landscaping from washing out each year.

Low impact development can be used to reduce runoff from impervious surfaces and protect nearby surface waters from stormwater pollution.

What is Low Impact Development?
Low impact development (LID) is a stormwater management approach. Unlike conventional stormwater management (which pipes untreated runoff away from a site to a nearby surface water body or to large centralized treatment areas), LID uses small, decentralized methods to treat stormwater close to the source. The primary goals of LID are accomplished through site planning and treatment practices including:

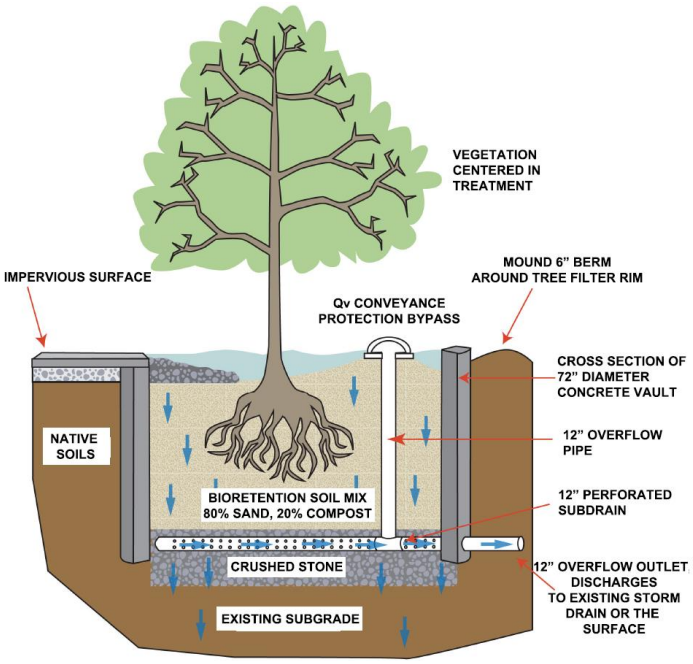
- Lessening the impact of development, and the impact of runoff resulting from that development, on the natural environment
- Using the land more efficiently
- Lowering capital and operating costs associated with development

Low Impact Development Site Planning

LID site planning reduces the amount of runoff generated on a site through source control and protection of the site's existing hydrologic features, such as topography, vegetated buffers, wetlands, floodplains and highly permeable soils. More information on LID site planning can be found in Chapter 6 of the *New Hampshire Stormwater Manual: Volume 1 Stormwater and Antidegradation*.

Objectives of LID site planning include:

- Minimizing areas of disturbance
- Maintaining / restoring natural buffers
- Minimizing impervious surfaces
- Collecting runoff from impervious surfaces
- Minimizing soil compaction



Example tree box filter design (UNH Stormwater Center 2007a) and installation in the Hodgson Brook Watershed in Portsmouth, NH.

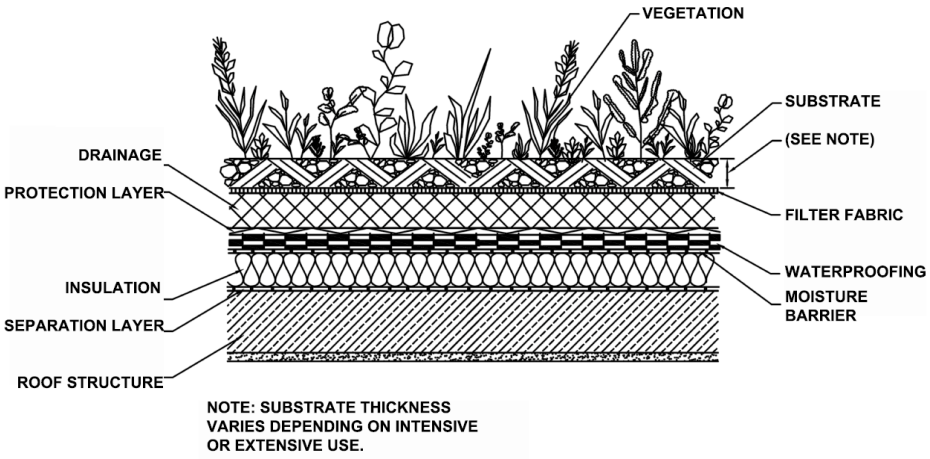
Low Impact Development Practices

Once LID site planning has been used to minimize the amount of runoff generated, site-level, decentralized LID treatment practices are used to treat any remaining runoff. LID treatment practices are typically designed as open, vegetated systems that rely on plants and their root systems as well as permeable soils to slow the flow of water and encourage infiltration and filtration. This reduces the rate and amount of runoff and provides treatment of pollutants.

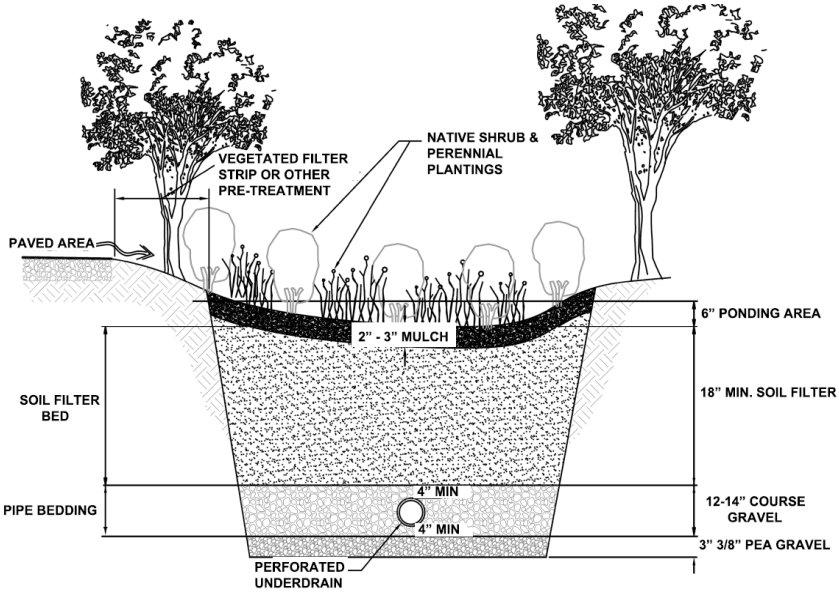
LID treatment practices can be used in existing development and can also be used in redevelopment projects to improve existing stormwater management. In redevelopment situations, LID focuses on minimizing and collecting runoff from existing impervious surfaces. More information on LID treatment practices can be found in [Chapter 4 of the *New Hampshire Stormwater Manual: Volume 2 Post-Construction Best Management Practices Selection & Design*].

Examples of LID treatment practices include:

- Bioretention, e.g. Rain Gardens
- Dry Wells
- Rooftop Gardens and Green Roofs
- Vegetated Swales, Buffers, and Strips
- Soil Amendments
- Permeable Pavement
- Tree Box Filters
- Rain Barrels and Cisterns



Example of green roof design (Maine DEP 2006, EPA 2006a) and installation at the Mount Washington Hotel, Bretton Woods, NH.



Rain garden and pervious pavement installation in downtown Peterborough, NH.

Barriers to Low Impact Development

Although LID is not new, it is still considered innovative. Because of this, there are several potential perceived barriers to implementing LID. For example:

- *Cost Concerns* – Many people are deterred from using LID practices because they believe they are more costly than conventional stormwater management practices. In reality, LID practices can cost less than conventional stormwater management due to a reduced need for catch basins and piping. Also, with less infrastructure involved, LID can reduce the long-term cost of operation and maintenance.
- *Conflicting Local Ordinances* – Municipal ordinances and bylaws, such as minimum roadway widths, minimum parking requirements, and curb and gutter conveyance designs, can conflict with LID principles. Local regulations can be modified or waivers or variances can be granted to allow for LID, or municipalities can adopt stormwater ordinances that require LID. More information on New Hampshire local ordinances can be found in the NHDES Innovative Land Use Planning Techniques Handbook.
- *Lack of Confidence* – Many people lack confidence in the performance of LID practices. LID has been used successfully in New England and across the country. Specifically, the University of New Hampshire Stormwater Center (UNHSC) has tested several LID practices and has data showing their efficiency in New Hampshire's climate.
- *Site Constraints* – There are concerns that LID practices do not work in cold climates, or on sites that have poorly draining soils, are close to groundwater, or have other site constraints. The UNHSC has shown that properly designed and installed LID practices perform well in New Hampshire even given these site constraints.
- *Maintenance Concerns* – All stormwater management practices need maintenance. The type of maintenance required for LID practices is often different than conventional systems. Because most LID practices are vegetated, maintenance focuses on maintaining healthy vegetation as well as removing sediment and other debris as necessary. LID practices tend to be smaller and usually do not require the use of heavy equipment to conduct maintenance.

For More Information

Additional information on Low Impact Development can be found in the following resources:

- Search the NHDES website for the:
  - New Hampshire Stormwater Manual
  - Innovative Land Use Planning Techniques Handbook
  - Homeowner's Guide to Stormwater Management
- The University of New Hampshire Stormwater Center
- EPA's National Low Impact Development website
- EPA's Stormwater Planning website
- Center for Watershed Protection website
- Low Impact Development Center website