

LID: A lasting impression



Thomas L. Smith, P.E.,
BCEE, DWRE, LEED AP

Low impact development (LID) is a sustainable storm water management strategy utilizing land planning and engineering design to manage runoff. LID is an alternative to conventional storm water management practices and encompasses the use of structural devices (engineered systems) and non-structural devices (vegetated, natural systems). This implements engineered small-scale hydrologic controls to replicate the pre-development hydrologic regime through infiltrating, storing, evaporating and detaining runoff close to its source.

Integrated LID site layouts consist of management practices that provide water quality controls, runoff peak and volume controls in an attempt to match the pre-development runoff hydrograph for the site. LID integrated management practices (IMPs) are designed for on-lot use, integrating the lot with the natural environment and eliminating the need for large centralized parcels of land to control end-of-pipe runoff. The challenge of designing a low-impact site is that the IMPs and site design strategies must provide quantity and quality control and enhancement, including:

- Groundwater recharge through infiltration of runoff into the soil;
- Retention or detention of runoff for permanent storage or for later release;
- Pollutant settling and entrapment by conveying runoff slowly through vegetated swales and buffer strips. In addition, LID also provides an added aesthetic value to the property, which increases a sense of community lifestyle; and
- Multiple uses of landscaped areas—in some cases, the on-lot or commercial hydrologic control also can satisfy local government requirements for green or vegetated buffer space.

Placing controls in series provides for the maximum on-lot storm water runoff control. This type of design control is known as a “hybrid” and is effective in reducing volume and peak flow rate.

The goal of LID is to locate integration management practices at the source or lot, ideally on level ground within individual lots of the development. Some management practices that

are suited to low-impact development include bioretention facilities; dry wells, filter/buffer strips and other multifunctional landscape areas; grassed swales, bioretention swales and wet swales; rain barrels; cisterns; infiltration trenches and green roofs.

The green movement is sweeping across the U.S. and almost everyone recognizes the benefits associated with LID for new developments; however, LID measures can help reduce flooding in older, developed neighborhoods where the storm sewer watersheds can be significantly undersized.

Conventional approaches to storm water management like surface detention and underground tunneling are often expensive and space is prohibited. Other traditional approaches, like upsizing pipe, are both cost prohibitive and radically invasive to local communities.

One of the primary goals of LID is to reduce runoff volume by infiltrating rainwater into aquifers, evaporating rainwater back to the atmosphere and finding beneficial uses for the rainwater rather than distributing it as waste down storm sewers. LID approaches can be economical and often cost less than conventional storm water management systems to install and maintain. Generally, the most economical and simple storm water management strategies are achieved by controlling runoff at the source. Costs for storm water conveyance systems and storm water treatment structures often increase with distance from the source. Therefore, the cost benefits of LID can be substantial.

Even though the green movement acknowledges all of the benefits of low-impact development, LID is not suitable for all sites. Technical professionals must consider many factors like soil permeability, depth of water table and slope prior to implementation of LID measures. LID practices do not always replace the need for conventional storm water controls. ■

Thomas L. Smith, P.E., BCEE, DWRE, LEED AP, is chief technical officer of Green and Sustainable Services LLC. Smith can be reached at tsmith@grnserv.com or 940.597.3723.

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