nerej
CELEBRATING 55 YEARS

Developers are using LID to reduce environmental impact on new development

July 16, 2008 - Connecticut

Today public entities and private developers are focusing a greater emphasis on constructing "green" developments and building projects. It is generally understood and accepted that green projects are better for the environment and our future. Low Impact Development (LID) is one approach to site planning and development that has quickly gained acceptance and become a requirement for many projects. LID is a relatively new stormwater management approach that strives to reduce the amount of stormwater generated from new development and manage the remaining stormwater on-site through techniques such as evapotranspiration, infiltration, and reuse. LID attempts to conserve or replicate natural ecosystems and existing hydrologic functions on a site to promote groundwater recharge and reduce the amount of stormwater and associated pollutants that must be controlled and treated.

Many municipalities are beginning to require LID through their local zoning regulations, ordinances, and by-laws. In addition, state agencies, such as the Massachusetts Department of Environmental Protection (MADEP), are beginning to require that LID techniques be utilized to manage stormwater from new development subject to the Wetlands Protection Act. Recent revisions to MADEP's Stormwater guidelines require a designer to use LID techniques such as infiltration to meet new regulatory requirements. Many buildings and development projects are also now being designed and constructed to obtain LEED certification through the U.S Green Building Council (USGBC). One important part of LEED certification is sustainable site development, which includes open space preservation and stormwater management aspects, both of which are related to LID.

Someone not familiar with LID requirements and techniques, such as open space preservation and bioretention, may assume they will increase the cost of their project. However, designing a project that incorporates LID techniques can typically save money and provide added value and benefits to a development.

A major component of LID is open space preservation. Leaving as much of the site as possible in an undisturbed natural state reduces the amount of runoff that is generated and leaves natural ecosystems in place to mitigate and treat the resulting stormwater. While preserved areas can negatively impact target density, there are benefits associated with open space preservation, including lower site preparation and infrastructure costs, and a more desirable and marketable development.

Another focus of LID is the reduction of the amount of impervious area on a site to minimize the amount of stormwater runoff that is generated. Reducing road and sidewalk widths, eliminating on street parking, reducing the size of parking facilities, and promoting shared driveways are all measures that can be used to limit the impervious surfaces associated with a new development. Reducing the amount of runoff that has to be treated can result in lower capital and operations and

maintenance costs for stormwater control and treatment infrastructure. Given the current high prices of asphalt and other building materials, reducing the amount of pavement and concrete can also result in substantial capital savings.

Utilizing vegetated buffer strips and grassed swales to filter and collect runoff from roads and parking areas can reduce or eliminate the need for more costly drainage infrastructure such as curbing, catchbasins, and drainage piping. Grass buffer strips and vegetated swales slow stormwater runoff and provide treatment through filtration, sedimentation, and infiltration. In some applications, permeable paver systems can be used to provide the benefits of a grassed buffer strip while allowing for emergency vehicle access or infrequent overflow parking.

Bioretention structures, commonly called "rain gardens", are a very popular and effective LID tool often used today. Bioretention areas are typically shallow depressions located between or adjacent to parking lots or other impervious areas. These depressions are filled with permeable soil and covered with mulch and plantings. Stormwater runoff is directed to the rain gardens where it percolates down through the mulch and soil receiving treatment before entering groundwater or being removed by an underdrain system. One of the main benefits of bioretention is a size reduction, or altogether elimination, of downstream detention ponds and other more costly stormwater infrastructure. Capturing and treating the runoff in multiple small decentralized retention areas allows for a reduction in runoff quantity through infiltration, evaporation, and evapotranspiration by the dense vegetation in the rain garden.

With the right design, LID can be good for the environment and good for the bottom line.

Jay Viamari, P.E., is a senior project engineer at Tighe & Bond, headquartered in Westfield, Mass.