How Low Can Impact Go?

An evolving strategic goal shifts again

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Low-impact development (LID) has captured the imagination of developers, watershed managers and environmental advocates. The LID acronym has been added to the storm water toolbox as a simple solution to the challenges of protecting properties and waterways downstream of development. At the same time, regulators struggle with ensuring performance and measuring compliance. Maybe the solution is not that simple.

The concept of "blue-green development," coined by Earl Jones in a 1967 American Society of Civil Engineers journal, utilizes the multifunctional natural drainage system for detention of urban storm water, aesthetics and overall enhancement of surrounding development. As growing urban centers have sprawled into the countryside, the ability of the natural drainage network to serve in a multifunctional capacity has been overwhelmed. In fact, impervious cover has grown at a rate five times greater than the population, according to a report from the U.S. Environmental Protection Agency Inspector General's Office.

The intuitive solution identified by those measuring the rapid decline of the aquatic ecosystem is to lower the impact of development by reducing the instantaneous, or flash, peak discharge. The well-intentioned strategy of "post"- back to "pre-" peak attenuation, however, has not adequately protected channels due to the inevitable increase in runoff volume and the associated frequency and duration of peak discharges. As a result, the strategy has shifted back to a site design focus: Minimize the impact of impervious cover by first minimizing its coverage, then minimize impacts to native vegetation and soil horizons.

These minimization strategies are readily measured and built into the traditional hydrologic modeling tools that have been available for years. Unfortunately, the strategy has not seen much success, possibly due to the inherent conflict with the development patterns of large commercial centers and subdivisions. And so with yet another shift in strategy, the LID acronym appears to have settled on the implementation of micro-scale integrated management practices (IMPs) within the vast expanse of impervious cover.

The IMP concept of treating runoff near the source is sound. The problem arises when we assume that: 1) because the IMPs have a vegetation component they can assimilate the annual pollutant load associated with an urban setting, and 2) IMPs can effectively sequester pollutants during a storm's first flush and detain or manage the higher flows associated with channel scour, as even the best water quality strategy will fail if downstream channels are being eroded. The inability to effectively measure compliance for both quality and quantity creates a substantial hurdle.

One solution that has proven effective is the use of a credit or point system, according to the Center for Watershed Protection. The use of minimization techniques, such as the disconnection of impervious cover and the creation and enhancement of functional buffers, can be assigned a weighted value or credit in the calculation of treatment volumes or in the curve number applied to peak discharge control. This method retains the integrity of appropriate IMPs selection, design and sizing as related to the unit processes of water quality and peak discharge or volume control. This system provides regulators and site designers a consistent tool for measuring implementation and compliance. **SWS**

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