Low-Impact Development

A Growing Trend in Stormwater Management

By ROBIA CHANG AND CAROLYN NELSON ROWAN

Increasingly, Western communities—particularly urban areas—are using an approach known as "low-impact development" (LID) to control stormwater pollution. Instead of making large investments in complex and costly engineering strategies for municipality-wide stormwater management, LID accomplishes this by various lot-level design strategies that are designed to mimic natural hydrology and processes, customized to each individual development and implemented by developers. LID addresses runoff close to the source by employing various features, including, for example, disconnecting roofs and paved areas from traditional drainage infrastructure and directing runoff to natural areas such as vegetated open spaces, which look like landscaped areas but are actually engineered systems that use plants and soil to trap and treat various contaminants. Other common LID practices include rooftop gardens, tree planter boxes, and the use of permeable pavement in low-traffic areas, parking areas and walking paths.

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For the most part, LID has been a voluntary approach, promoted but not required, in the Western states. Localities and developers have chosen to adopt such measures because of their benefits, not because they were mandatory. However, recent developments in Southern California signal significant changes that may indicate an increasing trend toward mandatory LID techniques throughout the state. In San Diego County, the California State Regional Water Quality Control Board, the regional branch of the state agency responsible for administering the state stormwater management program, recently approved a stormwater runoff permit that will require the county of San Diego, the Port District and the county's 18 cities to increase the testing and monitoring of runoff, street sweeping and sewer-line cleaning. Significantly, the renewal permit will also require the use of two types of LID at specified categories of development projects, as designated in local Standard Urban Storm Water Mitigation Plans. Both the routing of runoff from impervious to pervious areas, and the use of permeable surfaces for portions of low-traffic areas, are now required LID techniques, and within three years, all sites that are greater than one acre will be subject to the requirements.

Additional provisions require the inclusion of hydromodification measures that typically involve the use of large holding basins that detain the increased stormwater runoff resulting from development projects and release the runoff to the receiving storm drain in a pattern similar to the pre-project condition. Where the county and cities previously had discretion to require LID based on applicability and feasibility, under the new permit, this determination will not be made at the sole discretion of a co-permittee; rather, the regional board will have discretion to provide its input.

Similarly, the draft Municipal Separate Storm Sewer System (MS4) Permit issued to Ventura County by the Los Angeles Regional Board on Dec. 27, 2006, requires that all new development and redevelopment projects integrate LID principles into project design. The permittees, including the County Watershed Protection District, the County of Ventura and 10 cities within the county, are to develop a LID Technical Guidance Document for use by planners and developers within 18 months of the issuance of the permit. These regional precedents likely will result in the remaining seven regional boards following suit when their MS4 permits are renewed.

While these Southern California localities appear to be leading the way by making the use of LID mandatory, many Western states have been promoting LID for some time. For example, in the state of Washington, generally recognized as having some of the nation's most stringent stormwater management regulations, the use of LID techniques is strongly encouraged. The State Department of Ecology administers the state stormwater management program and this month issued separate permits for the eastern and western portions of the state. In response to comments relating to LID requirements, the department recognized that there are circumstances where LID approaches, such as infiltration-based strategies, may not be appropriate due to soils and site constraints. A Low-Impact Technical Guidance Manual for Puget Sound, targeted at engineers, planners, developers, builders and architects, provides LID goals and objectives and site assessment and design methods. Decisions on the use of LID techniques will be made on a site-specific basis, or may be locally mandated to meet zoning requirements. For example, in the city of Olympia, mandatory LID techniques have been adopted in a specific basin area known to contain aquatic habitat, and in Snohomish County, LID is already required for so-called Fully Contained Communities (i.e., communities located in rural areas at least one mile outside of current urban-growth areas, on at least 2,000 acres).

The use of LID techniques is also encouraged, but not required, by the Oregon State Department of Environmental Quality. The Willamette Basin Total Maximum Daily Load defines the amount of a pollutant that can be present in a water body without causing water quality criteria to be exceeded. One of the strategies suggested in the September 2006 Water Quality Management Plan (WQMP) to attain and maintain the water quality standards is LID. To prevent pollution in urban and rural areas, the WQMP suggests environmentally sound development, including LID standards. It also suggests the use of

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various management strategies characteristic of LID, such as minimizing the amount and disconnecting impervious areas and reducing the amount of new impervious surfaces associated with new development projects. Similarly, the March 2006 Tenmile Watershed Draft WQMP recommends LID as one of the Coastal Nonpoint Pollution Control Program strategies, and suggests that the "innovative" LID approaches can be used to meet a wide range of Wet Weather Flow control and community development goals while reducing the cost of stormwater treatment and management facilities construction and operation.

At the local level, municipalities in the state of Nevada have been encouraging the use of LID. The Truckee Meadows Regional Stormwater Quality Management Program—which is a collaborative effort between the city of Reno, city of Sparks and Washoe County—issued a Draft Low-Impact Development Handbook, providing guidance on LID practices for new development and redevelopment. The handbook, which is supposed to be the first guidance document referenced during the development planning process, was developed to assist planners, developers, architects, landscape professionals, city and county community development, and public works staff with the selection and design of features and practices that mimic natural hydrological functions. It suggests a variety of LID techniques, such as porous paving systems, roof rainwater collection systems, design considerations, and disconnection and reduction of impervious surfaces.

LID techniques are not required in the state of Idaho, where the EPA Region 10 issues general permits for MS4s. The Idaho Department of Environmental Quality issues a guidance manual that gives possible solutions to stormwater runoff. Counties generally have policies to require the construction of retention basins for new development or redevelopment to contain runoff and in some areas, post-construction stormwater runoff is allowed to drain to ditches or flood channels. The EPA recently issued renewal permits, proposing minimum components of the post-construction runoff control program, subject to the permittees' review. The permittees are also encouraged to consider requiring or promoting other LID practices. The state has developed a catalog of BMPs, including LID, to provide technical guidance for the selection and site design of stormwater BMPs.

Some Western states, such as New Mexico, have not yet made a strong (or at least statewide) push for the adoption of LID techniques, but it seems clear that the voluntary use of LID strategies has increased in the West as of late, likely because of the fact that they effectively control stormwater pollution, are affordable and may increase property values. But while everyone may agree that communities should strive for cleaner water, the question is whether developers should bear the costs. Now that San Diego and Los Angeles have answered that question by mandating more stringent LID requirements, other Western communities may well follow. Only time will tell. Regardless of whether other Western states and communities decide to mandate the use of LID, it is particularly likely that LID techniques are here to stay and will be adopted with increasing frequency in the near future.