Urban Stormwater Pollution

Urban stormwater pollution has been considered a major cause of water quality impairment since the 1970s. When rain falls on hard "impervious" surfaces in urban areas (e.g., streets, rooftops, parking lots, etc.), the water cannot be absorbed into the ground, so it flows untreated into nearby creeks and ponds via storm sewer collection systems. This transport of rainfall runoff also carries with it an abundance of pollutants, such as:

- ***Sediments***
- ***Bacteria / pathogens***
- ***Excess nutrients***
- ***Fertilizers and pesticides***
- ***Organic chemicals***
- ***Oils, solvents and grease***
- ***Automobile fluids***
- ***Heavy metals***
- ***Trash and litter***

Stormwater discharges occur throughout an urban area, introducing pollutants from thousands of individual points of discharge into local waterbodies. The accumulated effect is that many of these receiving streams cannot assimilate the pollutant loads. This results in water quality degradation which triggers the need for pollution control permits and programs to improve water quality.

What Is LID ?

Because stormwater pollution discharges are dispersed throughout an urban area, it is not possible to have "end of pipe" pollution treatment systems. ***Low Impact Development (LID)*** is a relatively new approach to employ smaller and innovative pollution treatment systems and runoff management strategies close to pollution sources.

LID is most often thought of as physical structures and devices that infiltrate rainwater and absorb pollutants into plants and soils. However, communities can also incorporate holistic non-structural LID strategies into urban planning, often called ***"Green Infrastructure (GI)"*** implementation. Examples of GI are adopting development codes that include use of LID features and creating open natural spaces.

Types of LID

LID systems are designed to infiltrate water to reduce flow volume and rate and to absorb pollutants into plants and soils. Typical structural LID features include rain gardens, bioswales, bioretention ponds, roof gardens, artificial wetlands, rain barrels, vegetative buffers, and permeable pavement. Many cities and developers are finding that using LID features is cost-effective.

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Green Country Stormwater Alliance
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LID Pollution Controls

Cost-Effective Source Treatment

For More Information on LID or GCSA

Contact INCOG at (918) 584-7526 or email at stormwater@incog.org

A Closer Look at

LID Pollution Controls

LID Benefits and Costs

Certain costs of LID are easily quantifiable, such as costs of materials, manpower and contract expenditures. Likewise, certain benefit costs can be quantified, such as the cost savings for curbs and gutters that were not used in lieu of bioswales, or the reduction of asphalt costs because street widths were reduced to increase infiltration.

However, there are many benefit and cost aspects of using LID that are more difficult to quantify. These include calculating the benefit of improved water quality or the reduction in stream bank erosion and downstream flooding due to reduced peak runoff.

Developers who want bottom lines may not find a direct positive benefit to cost ratio for implementing LID in their projects. Municipalities need to encourage LID adoption in local development projects based not only on quantifiable monetary gains, but also the benefits of environmental protection, enhanced desirability of projects, and increased property values. LID clearly benefits these bottom lines as well.

Treating At The Source

LID systems control stormwater at the source by using small-scale LID pollution controls distributed around the site. These systems, such as infiltration ponds, rain gardens and bioswales, are much less expensive to construct and maintain than placing large-scale treatment systems at stormwater discharge outlets. In addition, many LID features are designed to be attractive amenities to the property, and they provide habitat for beneficial insects and wildlife.

How LID Reduces Pollution

Rainfall runoff picks up pollution from many small sources throughout the watershed. By placing LID features near those small sources, the smaller volumes of water and pollutants can be absorbed into the soils and plants within the LID feature, such as a rain garden. Pollutant removal efficiencies are impressive. In addition, by absorbing and slowing the velocity of runoff, stream bank erosion and sediment transport downstream is greatly reduced. This helps reduce flooding and property damage.

LID Maintenance

Probably the biggest issue facing widespread use of LID is maintenance. Often there is uncertainty of responsibility, especially when properties are sold. It is important that the new owner fully understand the purpose of the LID feature and their role in maintaining its integrity.

Many LID systems require about the same level and type of maintenance as any flower garden. Weeding, trash removal, keeping plants healthy, and ensuring good drainage. Some LID features, such as grass bioswales along streets, simply need mowing and kept free from obstructions. It is the responsibility of the property owner or tenant to maintain LID features.

This brochure is not intended to provide complete guidance on LID materials, design, costs or construction. It is intended for general information purposes only.