



Low Impact Development

PROTECTING THE HYDROLOGIC CYCLE IN SITE-BASED DEVELOPMENT

New Developments

Low Impact Development, known as LID, is the process of developing land while minimizing impacts on water resources and infrastructure.

It is a site-based process, unlike Smart Growth and New Urbanism, which are community or regionally based and directed at minimizing sprawl and making developments more people-friendly. LID is geared toward protecting the hydrologic cycle that is normally badly damaged during development.

Redevelopment

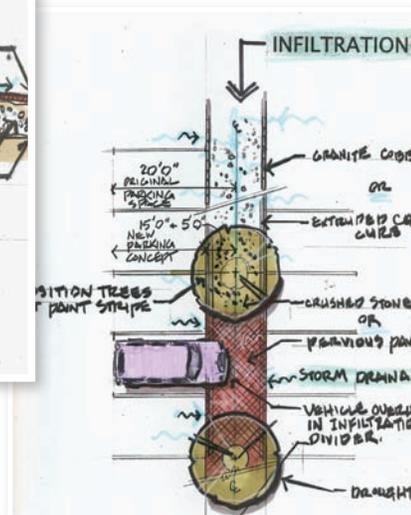
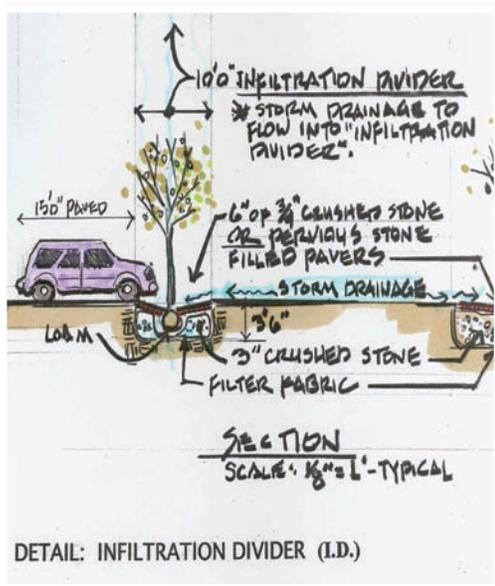
LID can also be applied to existing developments. How? By retrofitting existing paved or otherwise impervious sites with infiltration or storage units.

Dispersed units are better than single end-of-pipe treatment devices since they come closer to replicating the natural hydrology of the site.

Reestablishing the hydrologic connection has many benefits, but of course it's more expensive than doing it right in the first place. Still, the benefits outweigh the costs in many cases, particularly since the costs can include repeated flooding events and groundwater decline.

The Benefits Of LID

- Preserves the hydrologic cycle
- Protects streamflows
- Protects drinking water quantity
- Keeps drinking water pure
- Fish and wildlife benefits
- Promotes water conservation
- Reduces flooding and property damage from peak flows
- Saves communities money
- More attractive and diverse than traditional developments



A properly-executed Low Impact Development plan from CEI can re-establish the environmental quality and aesthetic beauty of your site.



What

Went Wrong?



Many people are surprised to find out that today's traditional developments are causing so much harm to the environment. It wasn't intentional, but somewhere along the line, it became cheaper and easier to clear cut large swaths of land for new developments.

Then topsoil began to be sold off, and just a little loam was left for the vast lawns with their massive sprinkler systems. Meanwhile, the runoff calculations designed to protect communities from increased runoff never got significantly updated to reflect the new, more impervious lawns and wider streets.

The Impact of Traditional Developments

- Farmland converted to suburbia or commercial and industrial development has many times as much runoff — some Walmarts, for example, have 20 acres or more of parking alone.
- Compacted lawns and playing fields have more runoff than the undisturbed woods, but you wouldn't know it from reviewing many of today's subdivision designs.
- Erosion during construction continues to be a major problem in many areas.
- Undersized stormwater treatment units demand high maintenance, and when it doesn't get done, they fail—leaving the site worse off than without them.

The resulting high impact developments of today mean:

- Lower low flows in streams
- Higher peak flows and flooding
- Less clean recharge and dropping water levels
- Pollution of drinking water
- Loss of wildlife habitat and damage to fisheries



Increased flooding is one of the most obvious problems caused by today's development practices. The water lost downstream should have recharged aquifers—a less obvious problem.



What can we do?

This CEI planting plan for a bioretention area includes many native species, and is durable as well as beautiful.



These children are learning to protect recharge of their aquifer by creating ice cream aquifers and eating the results.



One community built a "demonstration landscape" complete with all pervious surfaces, an information kiosk and plant listings.



What can communities do?

- Revise existing development controls through bylaws or subdivision and site plan review changes to promote retaining more total runoff on each site.
- Minimize site disturbance through clustering and other methods and stake out clearing limits and stockpiles.
- Review engineering calculations for overly optimistic pre and post runoff assumptions.
- Adopt guidance and design criteria.
- Set a good example on municipally owned properties.
- Create a public education program and demonstration projects like the ones shown at left.

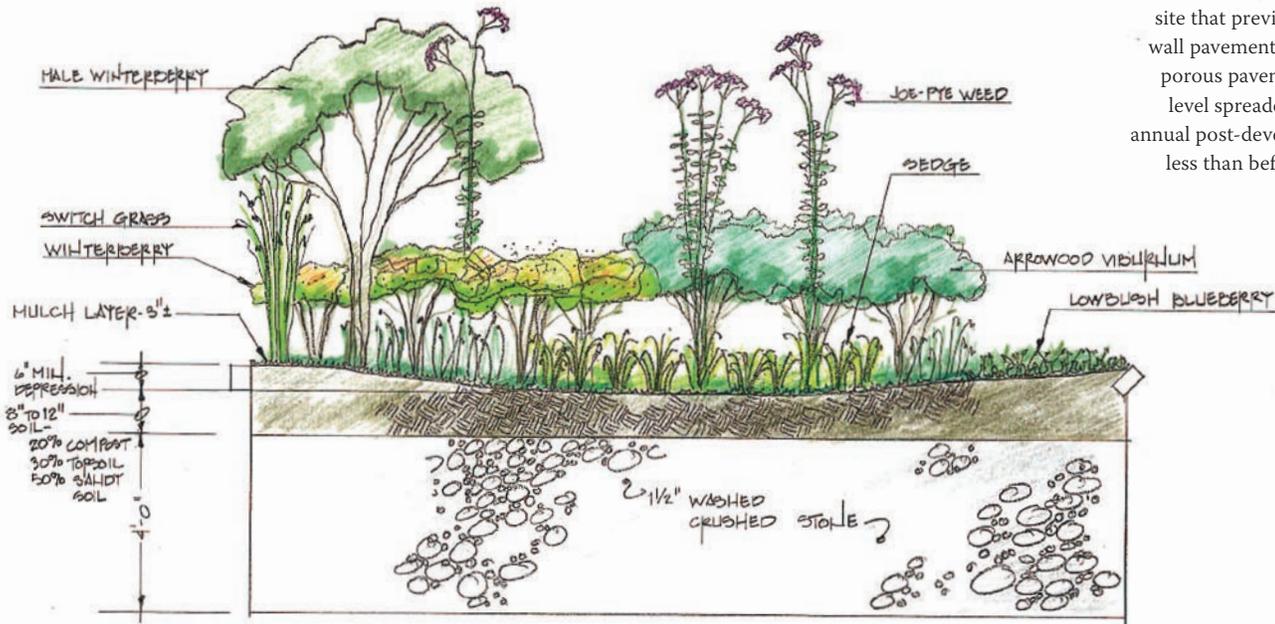
What can individuals do?

- Review your own property's drainage and find out where it goes during large rainstorms.
- Disconnect roof leaders and direct connections to the street and reroute these to drywells or other infiltration.
- Build your own raingarden using one of the many guides available.
- Add organic matter to your soil, even if just a topdressing of compost, and compost for soil health.
- Cut down on your lawn size and plant shrubs and trees instead—look for hardy, low maintenance varieties that don't need a lot of water or pampering once established.
- Keep a raingauge and see if you can keep all the rain that falls on your property!



How CEI Can Help You Implement **LID**

This is a cross-section of a bioisland at a CEI-designed LID redevelopment site that previously featured wall-to-wall pavement. The new site includes porous pavement in different styles, level spreaders and biofilters. Total annual post-development runoff is 88% less than before the improvements.



Getting it right.

LID is a great concept, that like many other good environmental ideas, has moved northward to New England from the Maryland area. That's not a bad thing, but New England is different from Maryland, where the County style government can mandate widespread changes.

Here in our locally controlled communities where no two towns are quite the same, it's a different story. Many communities have wondered where to start, while developers have feared added costs.

CEI can help in several ways, starting with the unique structure of each community or development, tailoring LID designs to the sites' conditions—often with little or no cost impact on the development.

Comprehensive Environmental Inc.
Milford, MA • Merrimack NH • N. Kingstown, RI

FOR MORE INFORMATION:

800-725-2550 or www.ceiengineers.com

CEI's Services:

- **Design of LID measures, including:**
 - Raingardens and other techniques for residential and commercial development
 - Water conservation and LID methods such as limited clearing, high organic content of soils, native plantings and low water use landscape designs
 - Runoff prevention methods such as dry wells and infiltration galleries
 - Wetlands treatment and other techniques for areas with high groundwater
 - Many other innovative designs
- **Construction inspection**
- **Regulatory review and markup of needed changes**
- **Suggested additions to local regulations**
- **New development guidelines for the local developers**
- **Redevelopment guidelines**
- **Landscape design guidelines for new and redevelopment projects**
- **Plan review and peer review of proposed designs**
- **Structural and non-structural best management practices (BMPs)**