

Sightline Daily: Get Your Mind Out of the Gutter

SPECIAL SERIES: [STORMWATER SOLUTIONS: CURBING TOXIC RUNOFF](#)

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In a Series

Get Your Mind Out of the Gutter

POSTED BY LISA STIFFLER

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Curbing stormwater while trimming the bottom line.

For years, environmentalists have touted "low-impact development" -- letting soil and vegetation soak up heavy rains, rather than channeling storm runoff into gutters and sewers -- as the best solution for stormwater. But as it turns out, LID has picked up a whole host of new fans: smart economists, developers, builders, and government regulators are now singing LID's praises as well.



Green roof photo from [Rob Harrison](#) under the Creative Commons license.

The fundamental principle of low-impact development is that it's better -- both for people's pocketbooks and for streams

-- to *prevent* storm runoff than it is to treat it. That means building green roofs and rain gardens, installing rain barrels and cisterns, and using porous concrete and pavers. The conventional alternative is building an elaborate and expensive system of concrete storm sewers that funnel stormwater, as well as the trash and toxics it picks up, into streams, lakes, and bays.

And recent studies from around North America show that the principle has promise: real-world evidence shows that LID is, in fact, a cheaper way to handle stormwater, and it does so without the flooding risk or the damage to marine life, that the conventional approach to stormwater often carries with it.

Take, for example, [this 2005 study](#) by researchers from the University of Southern California and the University of California, Los Angeles. They point to a previous study, which had estimated that it would cost a whopping *\$284 billion*, and require building 65 drinking-water treatment plants, to clean the filthy torrents streaming off of LA's highways and rooftops. But the researchers concluded that LID, coupled with related strategies, could deal with stormwater in the sprawling metropolis at a cost of [\\$3 billion to \\$7 billion](#) -- treating stormwater at pennies on the dollar, compared with the conventional approach.

Seattle Public Utilities has done some number crunching of its own. The utility found that using LID, or what they call "natural drainage systems," to retrofit streets in need of

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stormwater treatment that the [city spent \\$325,000 per block](#), compared to \$425,000 if they had built traditional storm-drain-and-pipes infrastructure.

A good chunk of that savings likely came from the fact that the LID street has only one sidewalk (this is in a neighborhood that previously had no sidewalks) rather than two. But the comparison doesn't count the many other benefits of LID, including improved property values (thanks to the improved aesthetics of the natural systems) plus the near elimination of runoff. That means no flooding and less dependence on combined-sewer overflows that can [dump raw sewage](#) along with stormwater into the sea and rivers ([this talk](#) outlines these additional benefits).

If you're looking for good examples of smart LID projects, this [EPA document](#) is a stormwater solutions throw down. It concludes that, in 11 of the 12 projects studied, LID is the economic winner over conventional strategies. The savings ranged from 15 to 80 percent. Let's take a look:

SEA Street Seattle: If you're an LID fan, you already know about [SEA Street](#), or 2nd Avenue Street Edge Alternative. This 2001 literally groundbreaking project was a rebuild of a residential street in which the road was narrowed, some sidewalks removed, and wide ditches called swales built along the pavement to catch runoff. The amount of impervious surfaces were reduced by 18 percent, and the redesign captures nearly all of the runoff according to studies tracking its performance. Plus, it's really pretty with native plants and trees lining the street. It's been [replicated](#) in neighborhoods around the city.

PROJECT COSTS

- For a conventional retrofit: \$868,803
- LID retrofit: \$651,548
- Difference: \$217,255 in savings

Parking lot retrofits, Bellingham: The city opted for rain gardens instead of underground vaults to capture and treat runoff from parking lots at city hall and Bloedel Donovan Park. Three of the city hall's 60 parking spaces were converted into the rain garden. At the park, a 550 square-foot area was converted.

Rain gardens typically look like traditional landscaping, but can include planted depressions that are lined with layers of gravel and porous soil. Sometimes the depression can contain a drain that leads into traditional stormwater infrastructure to accommodate unusually heavy rains.

PROJECT COSTS

- For vaults: \$80,400
- For rain gardens: \$18,400
- Difference: \$62,400 in savings

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Crown Street, Vancouver, BC: This 2005 retrofit of a [Vancouver street](#) was based on the SEA Street model. The project is expected to reduce runoff by 90 percent. The city opted for the LID design because the street reportedly drains into the last two salmon-bearing streams in Vancouver.

PROJECT COSTS

- For a conventional retrofit: \$364,000
- LID retrofit: \$707,000 (this includes \$311,000 in consulting fees that would not be required for additional projects, making the cost \$396,000)
- Difference: \$32,000, discounting consulting fees; however, according to the EPA report, the city estimates that the LID approach would be less expensive than a traditional stormwater system in areas of new development

Downspout disconnection program, Portland: Combined Sewer Overflows (CSOs) are a scourge of urban sewer-stormwater systems. In these systems, stormwater and sewage are mixed and treated in sewage facilities. In heavy storms, the treatment plants are overwhelmed by the extra runoff, and the combined waste gets dumped untreated into rivers and bays. And they're really expensive to fix by separating the systems or increasing capacity.

So Portland is opting for a program that pays homeowners \$53 for each [downspout it disconnects](#) from the stormwater system. Instead, the water flows into rain barrels or the home's yard. More than 50,000 downspouts have been disconnected, channeling more than 1.2 billion gallons of water out of the CSO system.

PROJECT COSTS (based on numbers provided for the EPA's December 2007 study by which time there had been 44,000 downspouts disconnected)

- For added capacity to CSO: \$250 million
- For disconnection program: \$8.5 million

If you want some more examples, the Puget Sound Action Team (now the Partnership for Puget Sound) published "[Natural Approaches to Stormwater Management](#)" a few years back. It's a great document providing dozens of case studies showing LID in action from around BC and Washington.

I could go on, but you get the idea. LID is smart for the pocketbook, and the only answer for the built environment.