

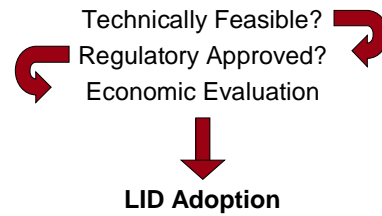
Assessing Low Impact Developments Using a Benefit-Cost Approach

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Adopting LID Stormwater Controls



The Economic Evaluation

Stormwater-management options:

Pipe Alternative vs. LID Alternative



Photo Credit: ISP



Photo Credit: Reach

Most economic evaluations of LIDs emphasize costs

A typical economic evaluation:

installation cost vs. **installation cost**
for the pipe option for the LID option

There's costs, and then there's costs

A better—but not best—economic evaluation:

installation cost + **operation & maintenance cost** vs. installation cost + **operation & maintenance cost**
for the pipe option for the LID option

What about economic benefits?

A cost comparison assumes away economic benefits.



Photo Credit: ISP

With LIDs, economic benefits matter

Reduced flooding costs
 Reduced CSO control costs
 Reduced filtration costs
 Reduced cooling costs
 Increased amenity values



Photo Credit: City of Seattle

7

We can better promote LID adoption by looking beyond costs

- » Installation costs give an incomplete economic evaluation.
- » Adding in operations and maintenance costs is an improvement.
- » But, if economic benefits matter, use a different approach...

8

The benefit-cost approach

A benefit-cost evaluation:

installation cost + O & M cost + <u>economic benefits</u> total benefits + costs for the pipe option	vs.	installation cost + O & M cost + <u>economic benefits</u> total benefits + costs for the LID option
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9

A more complete picture of the full range of costs

- » LIDs can help reduce system-wide operations and maintenance costs.
- » LIDs can help extend the useful life of pipe infrastructure as populations increase.

10

Economic benefits of LIDs

Reduced flooding costs
 Reduced CSO control costs
 Reduced filtration costs
 Reduced cooling costs
 Increased amenity values

Example

One study estimated that adopting LID practices throughout a watershed would reduce downstream flooding, resulting in \$54 - \$343 in benefits per developed acre. (Johnston et al., 2004)



Photo Credit: Sonoma State University

11

Economic benefits of LIDs

Reduced flooding costs
Reduced CSO control costs
 Reduced filtration costs
 Reduced cooling costs
 Increased amenity values

Example

Portland's downspout disconnection program eliminates an estimated 1.2 billion gallons of stormwater runoff each year from the city's combined sewer system. (City of Portland, 2007)



Photo Credit: Reich

12

Economic benefits of LIDs

Reduced flooding costs
Reduced CSO control costs
Reduced filtration costs
Reduced cooling costs
Increased amenity values

Instead of using sand filters and storm drain structures to treat stormwater along a seawall on the Anacostia River, a bioretention filter strip was installed, saving \$250,000. (Weinstein, 2002)

Example



Photo Credit: NOAA

13

Economic benefits of LIDs

Reduced flooding costs
Reduced CSO control costs
Reduced filtration costs
Reduced cooling costs
Increased amenity values

Reduced pavement area and natural vegetation in the Village Homes LID development in Davis, CA help reduce home energy bills by 33-50% compared to surrounding neighborhoods. (RMI, 2006)

Example



Photo Credit: Oregon State University

14

Economic benefits of LIDs

Reduced flooding costs
Reduced CSO control costs
Reduced filtration costs
Reduced cooling costs
Increased amenity values

Our preliminary analysis of properties on streets redeveloped by Seattle's Natural Drainage Systems Program indicate these modifications can add 6% to the value of the property.

Example



Photo Credit: City of Seattle

15

LIDs can benefit developers

Increased number of buildable lots
Grassy swales, no curbs or gutters
Green streets increase property values
Reduced permitting fees

By using LID techniques, a developer eliminated the need for stormwater retention ponds, which made room for six additional home sites. (WBDG 2007)

Example



Photo Credit: ISP

16

Impacts On Developers

Increased number of buildable lots
Grassy swales, no curbs or gutters
Green streets increase property values
Reduced permitting fees

Replacing curbs, gutters, and storm sewers with roadside swales in one residential subdivision saved the developer \$70,000 per mile, or \$800 per residence. (Dreher and Price 1997)

Example



Photo Credit: City of Seattle

17

Impacts On Developers

Increased number of buildable lots
Grassy swales, no curbs or gutters
Green streets increase property values
Reduced permitting fees

A developer that used LID techniques in a residential subdivision sold lots for \$3,000 more than lots in competing areas that did not use LID. (NRDC 1999)

Example



Photo Credit: Reich

18

Impacts On Developers

Increased number of buildable lots
Grassy swales, no curbs or gutters
Green streets increase property values

Reduced permitting fees

In Dane County, WI, permit fees for development are calculated based on the amount of impervious area in a site, providing an incentive to use LID.
(Dane County, 2007)

Example



18

A Los Angeles County Example

A USC study estimated that collecting and treating stormwater flows would cost \$44 billion.

A USC-UCLA study estimated that alternative stormwater controls, including LID, would be cheaper:

- » Costs estimated at \$2.8 to \$7.4 billion
- » Benefits estimated at \$5.6 to \$18 billion

20

Economic Evaluation of LIDs

- » Cost comparisons not always the best way to promote LID adoption.
- » A benefit-cost approach can give stakeholders and decision-makers more reasons to choose LIDs.

21

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22

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