



Low Impact Development Techniques



What Is LID?

Low impact development (LID) is an approach to developing land by imitating the natural flow of water on the site. It is integrated with engineered, smallscale stormwater controls at the parcel and subdivision level to manage stormwater and maintain or restore pre-development watershed hydrologic functions. LID is particularly useful in urban environments, where rain and snowmelt are more likely to flow from impervious surfaces and create stormwater runoff. Stormwater runoff carries pollutants from developed land and impervious surfaces to nearby creeks, streams, and the Puget Sound.

Benefits of LID

LID can help communities more efficiently and effectively manage stormwater, and protect their water resources in the following ways:

- **Protects the environment.** Removes pollutants from stormwater, reduces the overall volume of stormwater, manages high storm flows, and replenishes streams and wetlands.
- **Reduces flooding and protects property.** Reduces impervious surfaces, increases vegetation, and disperses and infiltrates stormwater to create less runoff. This reduces the likelihood of flooding from stormwater runoff.
- **Protects human health.** Removes pollutants. Untreated stormwater can be unsafe for people to drink or to swim in.
- **Protects drinking water supplies.** Ensures that rain infiltrates the ground where it can recharge aquifers and is not treated as a waste and discharged to marine waters.
- **Benefits the economy.** Helps protect shellfish harvesting companies, water quality, and marine sediment quality. Taxpayers avoid paying for costly cleanup for polluted waters. LID projects are often less expensive to build.

Uses of LID

LID can be used for various projects, including:

- Individual sites
- Large-scale subdivision sites
- Residential, commercial, or industrial projects
- New developments
- Redevelopment sites
- Rural, suburban, and urban settings

- **Provides cost-effective alternatives to drainage system upgrades.** Often much less expensive to use than costly stormwater vaults or land-consuming stormwater ponds.
- **Improves the aesthetics of communities.** Maintains trees and plants and has fewer impervious surfaces.
- **Improves public safety.** Narrow streets can slow traffic speeds, which can decrease pedestrian accidents and fatalities.

What Are LID Strategies?

Key Strategies

LID strategies focus on evaporating, transpiring, and infiltrating stormwater through native soils, vegetation, and bioengineering applications, rather than conveying stormwater—at increased volumes—through large drainage systems—to streams and wetlands.

Conservation measures

- Maximize retention of native forests or revegetate if cleared.
- Protect native soils that drain well and restore the draining capacity of compacted soils.
- Protect topographic site features that slow, store, and infiltrate stormwater.
- Protect natural drainage patterns and features.

Site planning

- Use a multi-disciplinary approach that includes planners, engineers, architects, and landscape architects.
- Place buildings and roads away from critical areas and well-draining soils.
- Minimize impervious surfaces.
- Use pervious surfaces (for example, pervious pavement, pavers, and gravel) to promote stormwater infiltration.

Distributed management practices

- Manage stormwater as close to its origin as possible by using many, small-scale LID techniques.
- Create a site design that slows surface water flow and increases the amount of time that stormwater flows over a site.
- Increase the reliability of the stormwater drainage system by using multiple, redundant stormwater controls.
- Integrate stormwater controls into the design of a site and use the controls as aesthetic site amenities.
- Reduce the reliance on traditional collection and conveyance stormwater drainage systems.

Maintenance and education

- Develop reliable, long-term maintenance programs with clear and enforceable guidelines.
- Educate the public about proper operation and maintenance of low impact drainage practices and protection of surface waters.

Additional LID Strategies

While LID focuses largely on strategies to more effectively manage stormwater, it can and should address other issues such as:

- Road design that reduces traffic speed and promotes walking and biking as alternative transportation.
- Appropriate density development in accordance with the Growth Management Act and increase access to public transportation.
- Subdivision layout and building design that promote interaction between neighbors, connection to open space, and recreation.

Related Resources

For more information, see the following resources:

- **Free Technical Assistance from Local Conservation Districts** (<http://www.scc.wa.gov/districts/>)
- **Kitsap Homebuilders Foundation** (<http://www.kitsaphba.org/LID/index.php?action=viewpage&page=0>)
- **Lake Forest Park Municipal Code (LID)** (<http://www.cityofflp.com/city/municode.html>)
- **Low Impact Development Brochure** (http://www.psparchives.com/publications/our_work/stormwater/lid/lid_brochure/lid_brochure06_8.5x11.pdf)
- **Low Impact Development Technical Guidance Manual for Puget Sound** (http://www.psparchives.com/publications/our_work/stormwater/lid/LID_manual2005.pdf)
- **Puget Sound Partnership - Stormwater Management in the Puget Sound** (<http://www.psp.wa.gov/stormwater.php>)
- **Seattle Street Edge Alternatives (SEA) Project** (http://www.seattle.gov/util/About_SPU/Drainage_&_Sewer_System/Natural_Drainage_Systems/Street_Edge_Alternatives/index.asp)
- **Stratford Place Residential Project** (<http://www.concretenetwork.com/pervious/design-ideas/pervious-concrete-washington.html>)
- **University of Washington Professional Engineering Program** (<http://www.engr.washington.edu/epp/index.html>)
- **Washington State Department of Ecology Grants to Local Governments for LID Practices** (<http://www.ecy.wa.gov/programs/wq/funding/lidprojects.html>)
- **Incorporating LID into Stormwater Permits** (<http://www.ecy.wa.gov/programs/wq/stormwater/municipal/index.html>)
- **Washington State Department of Transportation Managing Stormwater Runoff on Highways** (<http://www.wsdot.wa.gov/Environment/WaterQuality/Runoff/HighwayRunoffManual.htm>)
- **Washington State Growth Management Act** (<http://www.gmhba.wa.gov/gma/index.html>)
- **Washington State University LID fact sheet** (<http://www.pierce.wsu.edu/WaterQuality/LID/LID-fact-sheet.pdf>)