



Low-Impact Development Techniques

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Low-Impact Development (LID) techniques mimic natural processes to manage stormwater, and are frequently cheaper and more attractive than traditional stormwater management techniques.

Stormwater runoff is generated when precipitation from rain and snowmelt flows over land or paved surfaces and does not absorb into the ground. As the runoff flows over impervious surfaces such as paved streets, parking lots, and building rooftops, it accumulates debris, chemicals, sediment, or other pollutants that contributes to water quality problems when runoff flows directly into surface waterways and is left untreated.

When is LID required?

LID is the **preferred approach** to stormwater management countywide. Inside the NPDES Permit Area and the Special Flood Hazard Area, LID techniques are **required** unless not feasible.

When required, applicants must use the techniques in the Low Impact Development Technical Guidance Manual for Puget Sound (Puget Sound Partnership and WSU Extension, 2012) unless the Administrative Official determines the techniques as not feasible.

LID Basics

Generally, LID is about:

- managing your stormwater **onsite**, rather than sending it into a stormwater conveyance system;
- controlling the **quantity** and flow of stormwater to prevent impacts on neighboring properties;
- protecting the **quality** of stormwater to prevent it from picking up pollutants, including sediment.

Multiple Benefits

LID provides a multitude of benefits that go beyond traditional stormwater infrastructure. Some benefits include:

Water quality improved by reducing erosion that sends sediment and other pollutants into natural waterways.

Cost effectiveness through lower operations and maintenance costs as well as reduced infrastructure costs because LID reduces water flow into stormwater systems.

Aesthetic benefits—LID features can be part of attractive landscaping throughout communities and streetscapes.

Ecological benefits including preserved fish and wildlife habitat, improved air quality from retaining vegetation, reduced building water or energy use (where rainwater is collected or vegetated roofs provide insulation), and carbon sequestration by retaining or planting vegetation.

How it Works

LID has been widely demonstrated as an effective approach for managing stormwater. Here's how it works:

Slows it down

LID reduces the quantity and speed of stormwater flowing into water bodies. Seattle's SEA Streets LID project reduced the volume of water flowing to municipal drainage infrastructure by 98% and the Meadow on the Hylebos LID project in Tacoma was able to retain 99% of precipitation falling on that area.

Spreads it out

Because LID approaches, such as permeable pavements, can be installed over larger areas than traditional stormwater drywells or retention ponds, their effectiveness amplifies when implemented at the landscape-level. LID facilities are often small and more dispersed across the development than the traditional facilities.

Soaks it in

LID filters pollutants picked up by stormwater runoff, such as oil, bacteria, sediments, and metals, before the pollutants enter surface water bodies. A six-year study by University of Washington found that permeable pavements were much more effective than traditional pavements at reducing zinc, copper, and motor oil concentrations to in stormwater runoff.

What to Do

LID doesn't have to be complicated or daunting. For most single-family dwelling construction, following the techniques in this handout will satisfy the LID requirement. See www.skagitcounty.net/stormwaterpermitting for a host of online resources, including links to full descriptions of these BMPs.

TECHNIQUES

Reduce Impervious Surface

Limiting your impervious surface will limit the amount of work you need to do to manage stormwater. Keep your driveway width, parking area, patios, lawn area, and land disturbing activity to a minimum.

Amend disturbed soils

Un-amended soils can act like an impervious surface. Even lawn areas that get compacted from equipment or materials will produce more stormwater runoff and dispersion techniques do not work right. Scarify or till these areas at least eight inches deep and provide the organic content, such as compost, needed to restore the topsoil to native conditions.

Minimal excavation foundations

LIDTGM § 6.6



Instead of a traditional foundation, use a pin foundation or other technique that does not disturb, or disturbs very little of, the natural soil profile within the footprint of the building. That allows the existing ground to still handle and treat stormwater runoff and shallow subsurface flow paths under the structure.

TECHNIQUES

Manage Rainwater from the Roof

Downspout dispersion

SWMMWW BMP T5.30

Use splash blocks or gravel-filled trenches to disperse (spread) roof runoff over vegetated pervious areas like your lawn. Dispersion weakens peak flows by slowing the runoff, allows for some infiltration, and provides some water quality benefits.

Downspout infiltration

SWMMWW BMP T5.10A

Use below grade trenches or drywells to infiltrate runoff from your roof downspout drains. These techniques should not be used to directly infiltrate runoff from pollutant-generating hard surfaces like driveways, just rainwater from your roof.

Rainwater catchment

LIDTGM § 6.7

Catch clean rainwater from your roof to use it later by connecting your downspouts to a storage tank or cistern. Rainwater catchment should be used for vegetable gardens only from metal roofs. Use for drinking water or greywater only with approval of the Health Department.

TECHNIQUES

Manage Rainwater from Driveway or Patio

Sheet flow dispersion

SWMMWW BMP T5.12

Instead of channeling runoff, allow runoff from flat surfaces like your driveway or patio where water is already spread out continue to sheet flow or “disperse” over areas like your lawn that allow infiltration and promote water quality. These dispersion areas must meet soil amendment criteria to qualify for sheet flow dispersion.

Reverse slope sidewalks

In neighborhoods with sidewalks, slope the sidewalk toward the yard or landscaped areas where rainwater can infiltrate onsite, rather than directing stormwater into a ditch or onto the road. Infiltration helps reduce pollutants and reduces the need to water.

Rain gardens or bioretention swales

LIDTGM § 6.5



A shallow landscaped depression with a specified soil mix and appropriate plants can receive runoff from your roof, driveway, or other cleared areas. Raingardens promote infiltration, storage, water quality, and slow release of stormwater flows. Larger raingardens must be engineered.

Permeable pavement

LIDTGM § 6.3



Pavers are one type of permeable pavement. Other types like special design mixes of concrete or asphalt that allows stormwater to drain through are also ways to allow stormwater to infiltrate through a hard surface. Even grids that hold drain rock or grass that you can drive on may be used. All need a proper base to ensure infiltration without clogging.

Vegetated roofs

LIDTGM § 6.5

Although uncommon, roofs can be specially designed and built to maintain a plant habitat, improving energy efficiency and air quality, reducing temperatures and noise in urban areas, and substantially reducing stormwater flows.