



Managing Stormwater Onsite

Low Impact Development practices for landscape & building professionals

What’s the problem?

Rain falling on our roofs, roadways, and compacted soil runs off fast down ditches and pipes. This “storm water” can back up and flood homes, cause sewer overflows, and erode hillsides and stream banks. Stormwater also carries dirt, oil and metals from cars, landscape pesticides and fertilizers into Washington’s salmon spawning streams, lakes, estuaries, and swimming beaches.

Why manage storm water onsite?

Managing rain where it falls is much more cost-effective than giant pipes and tanks downstream. Simple onsite methods reduce the need for that concrete “gray” infrastructure, by slowing and cleaning rain runoff and soaking it into the soil.



reduce flooding



protect property



restore our waters
for people...



...and wildlife

What’s the solution?

Rain: **Slow it, spread it, filter it, soak it in** – restore the sponge. In the forest, rain gets slowed down by tree needles and leaves, then spread out over spongy soils and plants that filter out pollution, slowly letting the rain seep down into the groundwater that keeps our streams running cool all summer. We can help our towns and cities work more like the forest by taking some simple steps during our building and landscape construction, often called “Low Impact Development.”



How can we make this...



...work more like this?

What’s the role of builders and landscape professionals?

Low Impact Development or “Green Stormwater Infrastructure” practices are required or recommended by Washington State’s stormwater manuals, and increasingly by local codes. These regulations apply to new or re-development, but landscape designers, builders, and maintenance professionals can use these same methods cost-effectively on every site. We are all part of the solution.

rain: slow it, spread it, filter it, soak it in . . .



Low Impact Development toolbox

Protect existing soil and vegetation wherever possible

Planning the site to reduce construction impacts, and fencing off tree root zones and undisturbed soil areas, helps preserve the natural sponge.

Restore disturbed soils with compost and mulch

Breaking up construction-caused compaction to at least 12" deep, and amending with 15-20% compost, restores the soil life that creates structure (the sponge) and grows healthy landscapes that need less water and chemicals. Annual mulching with woodchips stops erosion, weeds, summer water loss, and slowly feeds the soil. Mulch-mowing lawns (leaving the clippings) also builds soil life and structure.



Plant trees

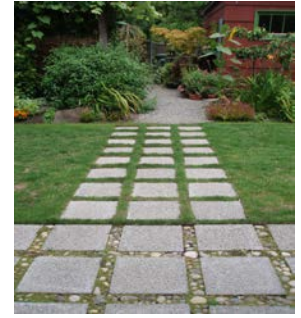
Trees, especially conifers, absorb and evaporate rainfall, slowing runoff. Choose trees that will fit your site when fully grown. Protect tree root zones during construction with fencing, or cover root zone with 4-6" of coarse woodchip, rock, plywood or metal plates.





Reduce paved area, and use porous paving

Consider removing unnecessary paving and restoring the soil. Plan narrower driveway pavement with grass strips at edges or middle. Porous pavers, flagstone, gravel, or reinforced grass-with-paver options all let rain soak through patios, walkways, or driveways into the soil. Permeable concrete and asphalt laid over coarse rock layers soak up rainfall too.



Safely direct pavement and roof runoff into soil and landscape, cisterns, or bioretention “rain gardens”

- ☑ **Make sure that big rain storms can still flow to the storm drain.** When installing a rain garden or cistern, make sure the overflow can drain safely downhill to the street or storm drain, without flooding sidewalks or neighboring properties.
- ☑ **Avoid infiltrating above steep slopes, slide areas, or near building foundations.** In those areas it’s better not to use concentrated infiltration methods like rain gardens, rock-filled trenches, or cisterns.
- ☑ **Follow sizing tables** and designs in the WA State Stormwater Manual or local codes to ensure adequate capacity.



Disperse runoff into soil and landscape

Direct roof and pavement runoff away from building foundations. Use a level gravel trench or other method to spread runoff into a large soil and landscape areas downslope, to slowly soak into the soil.



Install a stormwater cistern (detention tank)

Properly sized cisterns will fill during intense rainstorms. They have drain valves that are left open during winter to slowly drain and disperse runoff into the landscape or bioretention areas between storms, so that the cistern is empty when the next big rain comes. Drain valves can be shut in May to fill the cistern for summer irrigation use. Re-open drain valves in September.

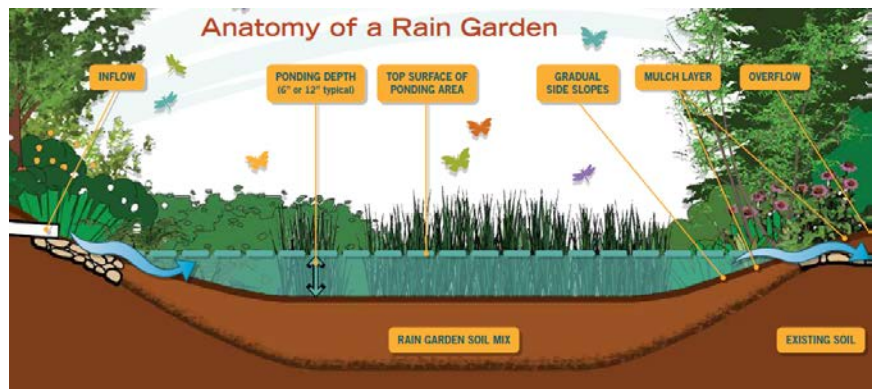
Build bioretention swales or cells (“rain gardens”)

Bioretention swales and cells are shallow depressions that can pond runoff from roofs and roadways until it soaks in (usually within 48 hours). They have deep compost-amended soils and are landscaped with plants that fit the site’s landscape and are adapted to the sun, soil, and moisture conditions: wet-lovers at bottom, drought-tolerant plants at top. Bioretention swales soak up and filter runoff flowing through them. Bioretention cells (aka rain gardens) are designed to infiltrate all the runoff that reaches them, but still have an overflow for big storms.



Use a rock-filled trench

In areas too small for a rain garden, a rock-filled trench can help infiltrate roof and driveway runoff into the soil.



Keep it clean – prevent pollution

Besides slowing the flow of storm runoff, it's also important to keep it clean, to protect our streams, lakes, and marine waters. Here's how you can help:

- ☑ **Avoid using pesticides** like “weed & feed” or other weed and bug killers.
- ☑ **Fertilize moderately** – more is not better, and fertilizers can pollute our waterways. Base fertilizer use on soil tests and observed plant need. Look for the words “natural organic” or “slow-release” to find less-polluting fertilizers, for healthier landscapes and waterways.
- ☑ **Prevent concrete wash-off and sediment** from running off-site during construction. Use compost blankets and socks for temporary erosion control, and then till the compost into the soil at end – a 2 for 1 value!
- ☑ **Keep soap, cleaners, paints, etc. out of storm drains.** Direct soapy water into lawns or landscape beds to break down in the soil. Wash vehicles at a car wash. Use the least-toxic cleaning products available.
- ☑ **Fix oil and fluid leaks in vehicles and equipment** – even a little oil can do a lot of harm if it gets into our streams.

Maintain onsite stormwater systems

Whether it's a simple mulch layer, a cistern, or rain garden, your annual maintenance practices will help reduce storm runoff and keep it clean. Renew mulch layers, weed rain gardens, sweep off porous paving, open cistern drain valves in September, and make sure inlets and gutters aren't clogged with dirt or fall leaves. Go out in the first big rain storm of fall, to make sure that everything is flowing where it should. Educate property owners and other professionals. Help keep our storm water drainage system flowing, and our landscapes soaking up the rain!

Resources – learn more about stormwater best practices

- Soil protection and restoration best practices for design, development, and construction, including erosion control www.SoilsforSalmon.org
- Factsheets on each of these LID methods, and training resources www.seattle.gov/util/GreenInfrastructure These pages also include Seattle's Green Stormwater Infrastructure resources for professionals.
- *Rain Garden Handbook* for homeowners and landscapers <https://fortress.wa.gov/ecy/publications/publications/1310027.pdf>
- *Low Impact Development Technical Guidance Manual for Puget Sound* – the State-approved guidance for code-required LID (implementing the State stormwater manuals), with details on design, sizing, and technical specs www.psp.wa.gov/downloads/LID/20121221_LIDmanual_FINAL_secure.pdf *Eastern WA LID Manual* www.wastormwatercenter.org/ew-lid-guidance-manual
- WA Department of Ecology's *Stormwater Management Manual for Western Washington* (and link to Eastern WA manual too) – State requirements that local governments must follow in building LID into local codes www.ecy.wa.gov/programs/wq/stormwater/manual.html
- Low Impact Development (LID) Resources on the WA Dept. of Ecology's website, with many useful local, state, and design resources www.ecy.wa.gov/programs/wq/stormwater/municipal/LID/Resources.html



Even if your jobsite or property isn't right next to a river, lake, or Puget Sound, that's where runoff from all our towns and yards goes. So let's keep it clean!



Plants in compost-rich bioretention swales (rain gardens) grow fast! Plan to water, weed and mulch until they fill in – typically 2-3 years. Below is same site after 2 years growth.

