



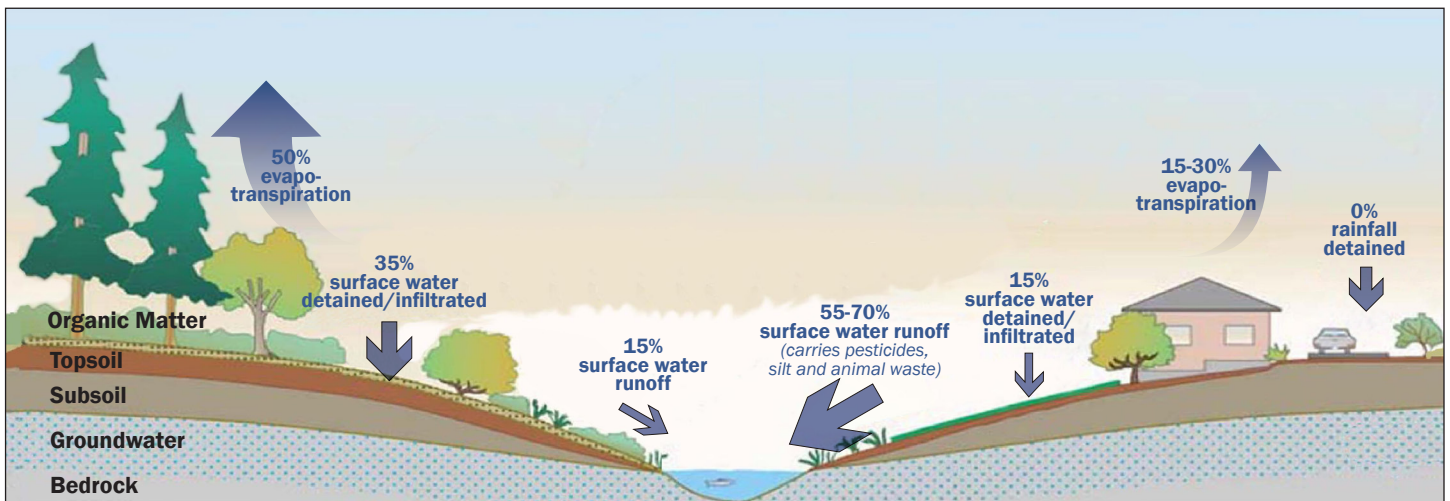
LOW IMPACT DEVELOPMENT ELEMENTS FOR RESIDENTIAL STORMWATER MANAGEMENT

The Puget Sound is growing rapidly. By 2040, the population is expected to increase by over 2 million people. Kirkland’s population is expected to increase by 29%.

This population growth will lead to an increase in residential & commercial development. Environmentally sensitive approaches to development and stormwater management are needed to help make this growth sustainable.

What Is Low Impact Development?

LOW IMPACT DEVELOPMENT (LID) elements mimic natural and historical hydrologic processes that occurred prior to development in Kirkland. LID protects aquatic resources, water quality, and the natural hydrology of a watershed as development takes place. The image below compares conditions within a watershed or creek basin prior to development and post development.



Forests, Meadows & Other Natural Areas

Soil and plants absorb most rainfall and minimize stormwater runoff. 50% of rainfall returns to the sky as “evapo-transpiration” (as tree roots pull water from the soil and it evaporates from leaves and needles). Almost all the rest filters slowly into and through the soil, to feed streams year-round.

Developed Areas

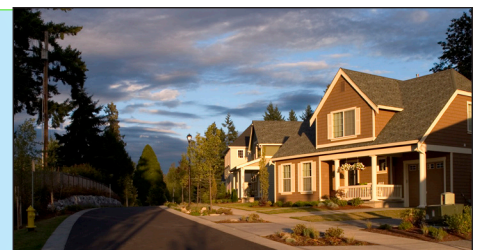
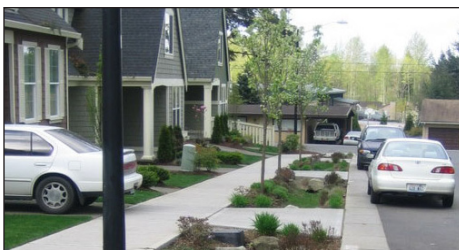
Vegetation and topsoil are removed, degrading the land’s ability to hold and recycle rainwater. After typical development, only 15-30% of rain evaporates, while most rushes swiftly off roofs, roads, and compacted soil (known as “impervious surfaces”). This erodes streams, causes flooding, and carries pollution and sediment, damaging essential habitat for salmon and other aquatic life.

Potential Benefits of Low Impact Development

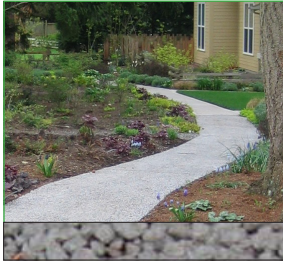
HOMEOWNERS can reduce water use for irrigation by installing LID elements. These systems often cost less to maintain.

WATER BODIES will receive less pollutants and cooler water as more LID elements are used. This improves habitat and water quality for recreational uses.

DEVELOPERS can incorporate LID elements to reduce the size of stormwater management facilities and also meet the City’s landscape requirements.



Many low impact development elements can improve the look of a home and help the environment. They are easy to incorporate into residential development and can be installed in new developments, redevelopments, or on existing properties.



Permeable Pavements

Permeable pavement can be used for walkways, parking areas, driveways, and patios. These surface treatments reduce the amount of rainwater runoff from your property by allowing the water to infiltrate into the ground. In addition, parking areas that are created with permeable pavement reduce pollutants from driveways and roads that enter the City stormwater system.



Bioswales

Bioswales can be installed on your property or along roadways and driveways to collect stormwater. Bioswales are planted with vegetation that can survive in wet soils and will help filter out the pollutants from dirty stormwater runoff coming from driveways and roadways. They can be designed on gradual slopes to convey, control, and treat water.



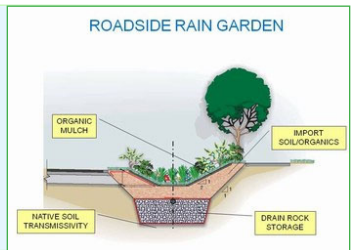
Green Roofs

Green roofs capture and slow roof runoff. Residential green roofs often include a thin layer of soil planted with drought tolerant and self-sustaining plants to reduce stormwater runoff. These can be installed on existing flat and sloped roofs with proper structural review.



Rain Gardens

Rain gardens can collect stormwater from rooftops, driveways and patios. Instead of water flowing out (like a swale or bioswale) water is retained in a rain garden. It can hold several inches of rainwater and allow stormwater to slowly seep into the ground. Plants that tolerate both saturated and drought conditions are used.



Disconnect Downspouts

Disconnect downspouts from footing drains or storm drains to direct the water to your garden or LID element such as a rain garden. Splash blocks can also be placed under roof drains to direct flow.

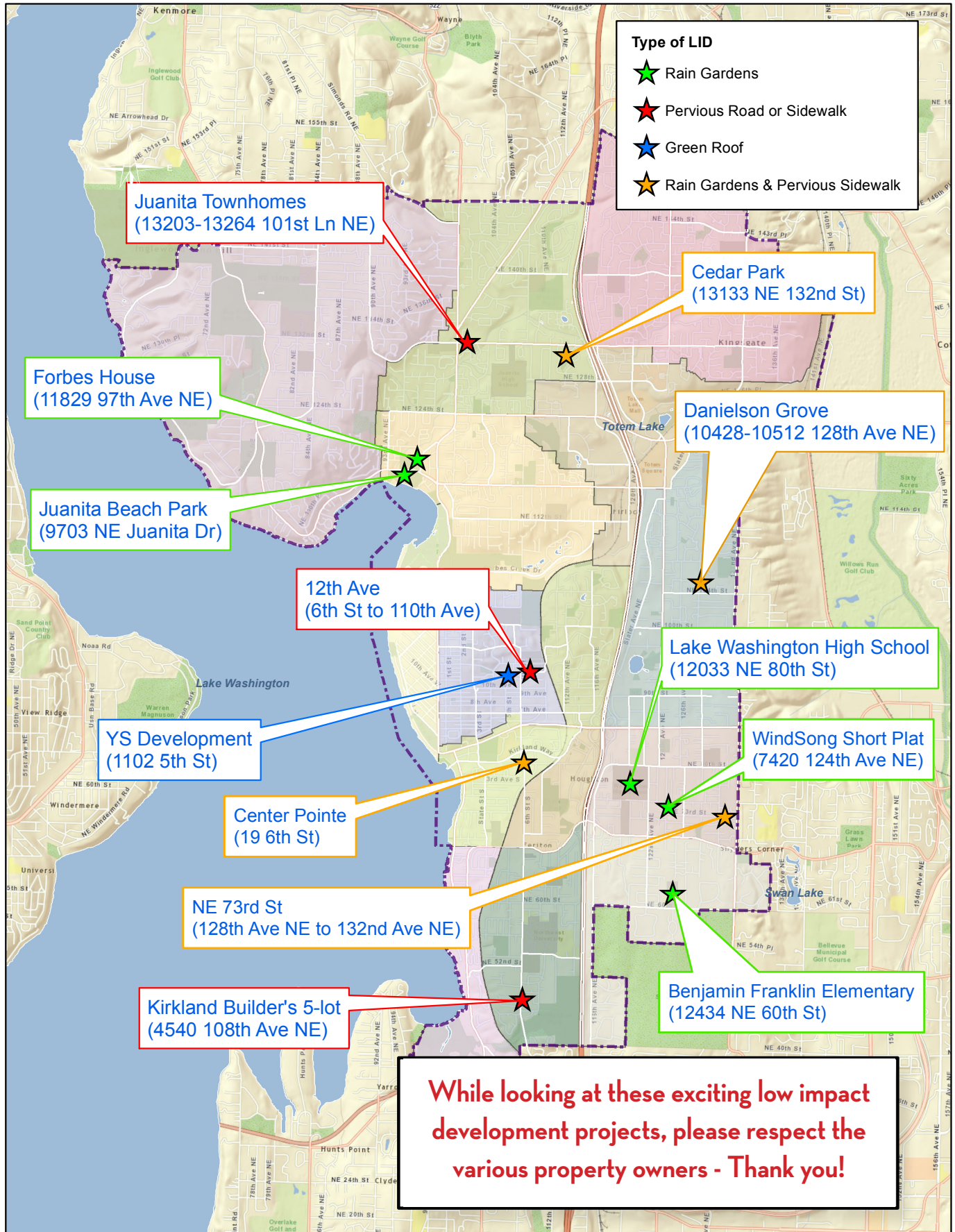


Amended Soils

Amending soils with compost will increase infiltration and absorption. Chemical, biological and physical properties of plants, microbes and soils improve the health of plants and remove pollutants from stormwater runoff. Amended soils can be used in all of these LID elements.



FOR RESIDENTIAL STORMWATER MANAGEMENT





LOW IMPACT DEVELOPMENT ELEMENTS FOR RESIDENTIAL STORMWATER MANAGEMENT

Resources, Contacts and Important Links

Kirkland Municipal Codes

Current laws and regulations for development in Kirkland.
www.kirklandcode.ecitygov.net/CK_KMC_Search.html

Pre-Approved Standard Plans and Policies

Answers and directions for common residential development.
www.kirklandwa.gov (search 'Pre-approved Plans')

Building and Construction Permits

Permit forms and contact information help to outline what information is needed for project approval.
www.kirklandwa.gov (search 'Permits')

Puget Sound Partnership (PSP)

A partnership of representatives, citizens, governments, tribes, scientists & businesses working together to restore and protect Puget Sound.
www.psp.wa.gov

Built Green Washington

Provides information for developers, contractors, and homeowners about how to reduce the environmental impacts of residential construction.
www.builtgreenwashington.org

Northwest Ecobuilding Guild

An association of designers, developers, homeowners, and others concerned with ecological building.
www.ecobuilding.org

Washington State Department of Ecology

Administers federal stormwater regulations to cities and counties in Washington State. Information about the timeline for the regulatory changes is available at their website.
www.ecy.wa.gov/programs/wq/stormwater

Puget Sound Concrete Specification Council

Provides information on porous concrete suppliers and contractors that are trained for various installations.
www.theconcretecouncil.org

Puget Sound Shoreline Stewardship Guidebook

Provides information to homeowners to stream side or shoreline residents.
www.kingcounty.gov/puget-sound-guidebook.htm (search 'Shoreline Stewardship')

Puget Sound Low Impact Development Manual

Contains technical information for designing LID facilities.
www.psp.wa.gov/downloads/LID/LID_manual2005.pdf

2009 King County Surface Water Design Manual (KCSWDM)

Development projects in Kirkland are reviewed based on the 2009 King County Surface Water Design Manual and the Kirkland Addendum.
www.kingcounty.gov (search 'Design Manual')

Addendum to the 2009 King County Surface Water Design Manual

The Addendum includes minor revisions to the KCSWDM to address the differences between King County's and the City's organization and processes
www.kirklandwa.gov (search '2009 Addendum Surface Water')

CITY OF KIRKLAND CONTACTS

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