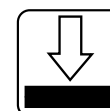




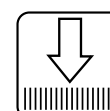
buildings



parking areas  
& impermeable  
landscape



impermeable  
soils



permeable  
soils

*Tanner Springs Park, Portland. Stormwater from surrounding impermeable surfaces is conveyed and recirculated through a constructed wetland and filter strip to be cleansed and aerated. The filter strip and wetland edge is planted with a variety of native plants based on their suitability to the different planting conditions.*

## Description

A habitat is a space that provides food, water and shelter for the survival and reproduction of an organism. Low Impact Development Approaches (LIDA) facilities mimic the natural habitats, processes and hydrology of a particular site. The environmental benefits of LIDA facilities include:

- Less disturbance to sites than conventional stormwater management methods
- Reduced and delayed peak stormwater flows
- Reduced discharge of pollutants
- Increased planted space and habitat
- Creation of a multifunctional landscape that enhances visual and functional amenities

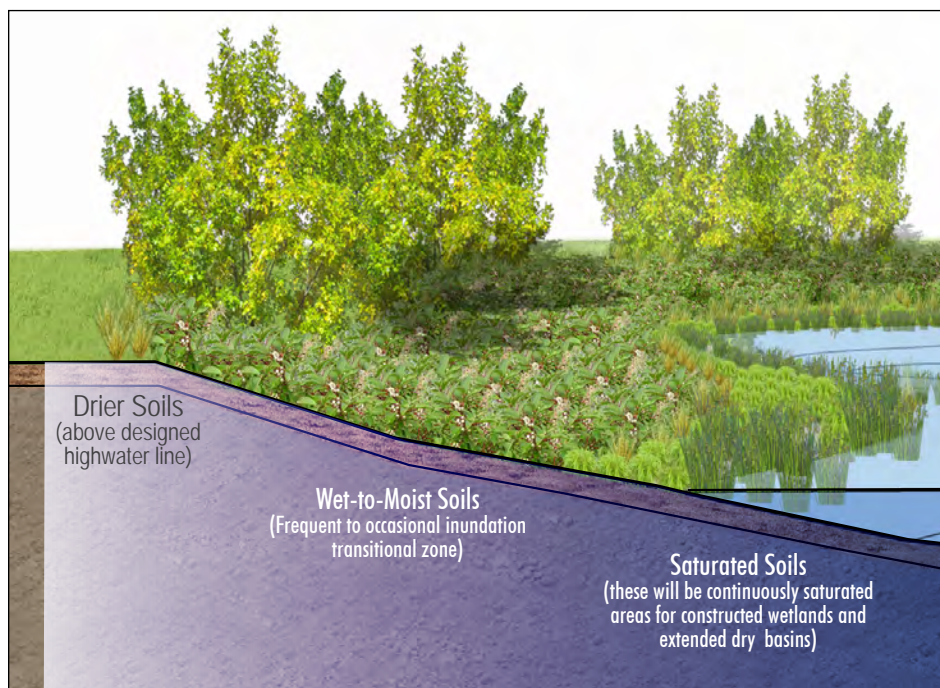
All of these on-site benefits generate a variety of off-site benefits that preserve and enhance riparian and wetland habitats “downstream” from the facility by reducing the negative environmental affects associated with urban development.

## Application & Limitations

Nearly all LIDA facilities have the potential to create and improve habitat on and near the site. Water is one of the most important factors in the creation of habitat; because most LIDA facilities receive large amounts of stormwater, they offer a great opportunity to create habitat. Planting vegetation is one of the most practical ways to create habitat within a LIDA facility.

Each LIDA facility has planting design guidelines such as required plant spacing and plant types, but there is flexibility to maximize habitat for a variety of organisms such as invertebrates, amphibians, small mammals and birds.





*Planting conditions and habitats are varied for LIDA facilities with side slopes, such as vegetated swales, LIDA swales, extended dry basins and water quality wetlands.*

## Design Factors

### Relationship of Form and Hydrology

Careful consideration of the planting conditions within a LIDA facility will help to ensure the success of a planting design.

Planting conditions for sloped, basin-like stormwater facilities such as swales, extended dry basins, constructed water quality wetlands and infiltration basins have a variety of moisture levels. Soil conditions at and near the bottom of the facility are wet due to frequent or constant inundation, and side slopes vary from wet at the bottom to relatively dry near the top. The moisture gradient varies with the designed maximum water depth, the time it takes for a facility to drain after a storm event and the steepness of the side slopes. The zone from the bottom of the facility to the designed high-water line or top of freeboard should be planted with plants that tolerate occasional standing water and wet-to-moist conditions. Above the designed high-water line vegetation is not affected by stormwater entering the facility and should be planted with species well suited to the local climate and context.

Planting conditions are more uniform for flow-through and Structural Infiltration planters because of the relatively flat surface



*Planting conditions for LIDA facilities without sloped edges (such as concrete flow-through planters and infiltration planters) are largely uniform.*



*Beaumont Village, Portland*





*Oregon Convention Center Rain Garden, Portland*



*Mt. Tabor Middle School, Southeast Portland*

## Design Factors (continued)

### Climate and Microclimate

All stormwater facility vegetation should be well adapted to both the Northwest regional climate and the facility's microclimate.

Although regional climate dictates average seasonal temperatures, amount of rainfall and available daylight, site-specific microclimates can vary considerably and should be factored into the planting design, particularly in an urbanized environment. For example, sword fern is a plant native to woodlands of the Pacific Northwest that likely would not survive if placed in a south-facing flow-through planter with direct sun exposure most of the day and heat radiating off the building. However, sword fern placed in a flow-through planter on the north side of the building likely would thrive.

### Native and Adapted Plants

The use of native plants is strongly recommended. They are well adapted to the local climate and offer more habitat value for native organisms. Non-native or adapted plants may be used in stormwater facilities for added color and habitat value as long as they are noninvasive and appropriate for the facility. Local nurseries offer a wealth of information about native and adapted plants.

### Habitat Diversity and Layering of Plants

Natural environments in the Pacific Northwest are characterized by diverse, layered plant habitats. A forest typically has three broad habitats vertically arranged one on top of the other; low-growing groundcovers, topped by shrubs, topped by arborescent shrubs (shrubs that look like small trees) and trees. These layers vary in composition and form from one habitat type to another, such as the Northwest habitats of forest, wetland and riparian. Different organisms occupy different niches within these habitats, creating greater biodiversity. A range of habitats can be created in LIDA facilities by selecting a variety of complementary vegetation to plant together, such as groundcovers, perennials, shrubs, and trees. The structural variety of a diversified planting design can also be very pleasing to the eye.

### Irrigation

Water-efficient irrigation should be applied for at least the first two years after construction of the facility, particularly during the dry summer months, while plantings become established.





*Oleson Woods Apartments, Tigard*



*Rock Creek Greenway*

## Maintenance

- Check regularly for weeds. Remove weeds or invasive plants such as blackberries and ivy, and implement a weed control program as needed.
- Check mulch regularly to maintain uniform coverage. Most LIDA facilities specify a mulch cover such as river rock to prevent erosion and moisture loss during dry periods.
- Replant bare patches as necessary to comply with the facility's coverage requirements and maintenance plan.

## References

- Clean Water Services Design and Construction Standards
- Gardening with Native Plants poster; Clean Water Services



*Ronler Acres, Hillsboro*