

## LOW IMPACT DEVELOPMENT (LID) GUIDELINES

The City of Southfield has always been a progressive, ecologically-friendly city that strives to protect the environment with its policies and programs.

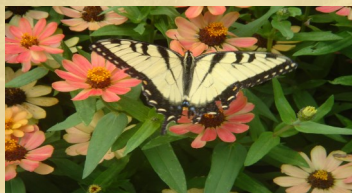
Green cities experience a higher quality of life through clean air and water, beautiful parks and green spaces, clean and efficient energy use, local and organic food and green jobs. The City of Southfield hopes to promote building policies designed to improve the health of both the residents and the environment to ensure long term economic vitality. In keeping with this philosophy, the City has developed the following Low Impact Development (LID) Guidelines to encourage environmental stewardship.

### GOALS OF LID

- > **Protect Water Quality**
- > **Reduce Runoff**
- > **Reduce Impervious Surfaces**
- > **Encourage Open Spaces**
- > **Protect Significant Vegetation**
- > **Reduce Land Disturbance**
- > **Decrease Infrastructure Costs**

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### LID BENEFITS

LID uses a basic principle modeled after nature to:

- Manage rainfall by using design techniques that infiltrate, filter, store, evaporate, and detain runoff close to its source;
- Provide storm water benefits, such as groundwater recharge and cleaner streams;
- Increase the urban forest and reduce the urban heat islands;
- Improve air quality;
- Reduce thermal stream pollution; and
- Enhance communities by making water resources a focal point that residents value.



### LID SITE PLANNING & DESIGN CONCEPTS

LID site planning & design concepts:

- Preserve open space & minimize land disturbance;
- Protect & incorporate natural systems (wetlands, streams, wildlife corridors, mature forests) as design elements;
- Utilize neo-traditional street & lot layouts and design; and,
- Decentralize & micro-manage storm water at its source using LID Storm Water Management Practices.

Source: Builders Guide to Low Impact Development

### LID AND URBAN FOREST RESEARCH

Protection of trees and woodlands are important because:

- Trees work in combination with other storm water controls to produce a comprehensive solution to rainfall interception, runoff and landscape water use;
- Trees store more water during a one inch rainfall event that lasts two days versus one that lasts only two hours; and
- A healthy urban forest can reduce the amount of runoff and pollutant loading by receiving waters in four primary ways: 1) Evapotranspiration, drawing moisture from the soil; 2) Interception, through leaves, branch surfaces, and trunk bark; 3) root growth, increasing capacity and soil infiltration; and 4) tree canopy, reducing the impact of raindrops on barren surfaces.

Source: Center for Urban Forest Research

**Bioretention:** A practice using landscaped areas on parking lots to hold and infiltrate storm water.

Source: Prince George's County, LID Design Strategies, Maryland



*Bioswale summer 2011*

*City Hall*



*Bioswale summer 2011*

*City Hall*

**Native Plants:** Native plants are plants that were historically growing in southeast Michigan. They need little or no fertilization or pesticides when grown in fertile soil with proper moisture. Native plants attract native wildlife species such as songbirds and butterflies. They help maintain our natural heritage and local community identity. Many help enrich the soil. Their root systems help rainfall percolate into the soil, reducing erosion and runoff.

**Rain Gardens:** Landscaped gardens that soak up rain water from your driveway, lawn and roof. Planted with native vegetation, a rain garden soaks up about 30% more water than a conventional lawn.

**Vegetated Swale:** A vegetated swale or **rain garden** is an attractive landscape filter planted with plants. Rain gardens are designed to absorb storm water run-off from impervious surfaces such as roofs and parking lots. Government studies have shown that up to 70% of the pollution in our streams, rivers, and lakes is carried there by untreated storm water. Keeping rain where it falls, by putting it into a beautiful rain garden, or swale is a natural solution.

Source [www.raingardens.org](http://www.raingardens.org)

## Vegetated roofs

**Green roofs** essentially convert roofs from impervious to pervious surfaces. Green roofs provide a 50%-90% annual runoff reduction; reduce heat island affect; provide reduction of conventional storm water infrastructure and detention basins and reduce energy for heating and cooling.

Source [www.cdfinc.com](http://www.cdfinc.com)



*Rain Garden  
Lathrup Village*



*Green Roof Rescue Boat Shed  
Carpenter Lake Nature Center*

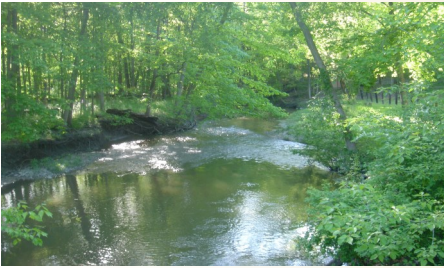
### Rooftop Greening

Improves air quality (up to 85% of dust particles can be filtered out of the air).



*Green Roof  
Lawrence Technological University*

## Stormwater



Stormwater is water resulting from rain or snowmelt that runs off surfaces such as rooftops, streets, and parking lots. The water may pick up and transport contaminants including motor oils, gasoline, antifreeze, dust, fertilizers and pesticides. The water eventually flows into our local streams, rivers or lakes, or into the City's storm drain until it is released untreated into a local water-body.

### How much rain are we talking about?

One inch of rain over one acre is about 27,000 gallons.

Source: Urban Forest Research

## Pervious Pavement



*Pervious Pavers at Carpenter Lake*



*Pervious Asphalt at City Hall Lake*



*Precast concrete paver on Terra-Adjust Pedestal System at City Hall*

Porous paving systems (e.g. pervious asphalt, concrete, gravel, or pavers) reduce surface run off and increase groundwater recharge. These flexible paving systems also increase infiltration and detention capacity. There may be limitations to porous pavement. Consult the City's Engineering Department for more information. At (248) 796-4810.

Source [www.cdfinc.com](http://www.cdfinc.com)



*Pervious Brick Paving at Carpenter Lake*

## Natural Features Setbacks for Woodlands & Wetlands

As naturalistic landscaping becomes more familiar and gains acceptance, it will be viewed as an asset rather than a liability. Furthermore, as development and redevelopment continues to consume our open space and natural settings, those rare elements of nature that remain in a landscape will increase its value.

Source: Copyright 2002, Wild Ones Natural Landscape, Ltd.



*Word of Faith Southfield*



Bioswale



Lear Corporation



Bioswale

Botsford Hospital  
Farmington HillsBioswale & Pervious Brick Paving at  
Carpenter Lake Nature Center

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### In conclusion:

✓ Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

Source: World Commission on Environment and Development

## GREEN LINKS

[www.rrrasoc.org](http://www.rrrasoc.org)  
[www.getenergyactive.org](http://www.getenergyactive.org)  
[www.energystar.gov](http://www.energystar.gov)  
[www.rougeriver.com](http://www.rougeriver.com)  
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[www.earth911.com](http://www.earth911.com)  
[www.southfieldfarmersmarket.net](http://www.southfieldfarmersmarket.net)  
[www.co.oakland.mi.us](http://www.co.oakland.mi.us)  
[www.lowimpactdevelopment.org](http://www.lowimpactdevelopment.org)  
[www.toolbase.org](http://www.toolbase.org)  
[www.epa.gov](http://www.epa.gov)  
[www.greenroofs.com](http://www.greenroofs.com)