

# Integrating Green Infrastructure into Public Streets, Roads, Buildings, and Parking Lots

In natural landscapes, rain that falls on the ground mostly soaks, or infiltrates, into the soil. However, in urban areas, impervious surfaces such as roofs, pavement, and streets, prevent infiltration. This results in an increase in stormwater runoff and pollutants flowing into storm drains, local creeks, and the Bay.



To reduce the impact of urban development on waterways, local municipalities are now required to develop and implement Green Infrastructure (GI) Plans for incorporating Low Impact Development (LID) designs into new and existing drainage infrastructure on public properties and rights-of-way, including streets, storm drains, parking lots, and building roofs. LID designs reduce stormwater runoff and mimic a site's predevelopment hydrology by minimizing impervious cover, and infiltrating, storing, and/or biotreating stormwater runoff. This reduces the quantity of runoff and pollutants flowing into storm drains and local creeks.

Image: Street runoff flowing into vegetated areas that capture and infiltrate stormwater (Image courtesy of Callander Associates and the City of Campbell)

## Regulatory Requirements

The Federal Clean Water Act and State regulations require municipalities to obtain permits to discharge stormwater from municipal storm drain systems. The Municipal Regional Stormwater Permit (MRP) covers 76 agencies in the Bay Area. In Santa Clara Valley, 15 local agencies (Co-permittees) collaborate through the Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP) to implement MRP requirements.

Since 2011, Provision C.3 of the MRP has required public and private development projects that create and/or replace 10,000 square feet or more of impervious surface (5,000 sq. ft. for highly polluting land uses) to provide LID site design and stormwater treatment measures. Beginning in 2016, each Co-permittee is also required to:

- Evaluate all public projects, regardless of size, to identify opportunities for integrating LID measures.
- Prepare and maintain a list of public projects that may have the opportunity to integrate GI elements.
- Develop and implement a GI Plan describing how local impervious surface areas will be built or retrofitted over time to disperse, capture, infiltrate, and/or treat runoff on-site, or before it enters the storm drain system.
- Develop a framework (work plan) for developing a GI Plan, and have it approved by a local governing body by June 30, 2017.
- Complete a GI Plan and submit it to the Regional Water Quality Control Board by September 30, 2019.
- Amend policies, ordinances, and planning documents to support the implementation of the GI Plan.
- Conduct outreach to the public, municipal staff, and elected officials.

## Opportunities for Green Infrastructure

Some projects that offer opportunities to integrate GI include:

- Roadway narrowing for traffic calming and safety ("road diets")
- Improvement of bicycle and pedestrian facilities
- Replacing or adding pavement or drainage structures (including gutters, inlets, or pipes)
- Reconstruction of parking facilities
- Landscaping and street beautification, including tree planting
- Streetscape and intersection improvements
- Modifications or improvements to public building areas

### Potential Green Infrastructure Benefits

- Improved water quality
- Improved wildlife habitat
- Reduced flooding
- Increased water supply
- More pleasant urban environment
- Traffic calming
- Safer pedestrian and bicycle facilities
- Increased property values
- Improved air quality and climate resiliency



## Green Infrastructure Measures

The following low impact development measures can be integrated into public infrastructure projects:



### Dispersion of Stormwater Runoff into Landscaping

Landscaped areas can be designed to collect stormwater runoff from building roofs and paved areas. Stormwater infiltrates into these areas, and pollutants are filtered out or broken down by the soil and plants.

*Landscaped drainage areas along a walkway*



### Bioretention Areas or Rain Gardens

These landscaped areas collect, treat, and infiltrate runoff using plants and a specified soil mix. Biotreatment areas can be incorporated into parking lots, curb extensions, park strips, traffic circles, and street edges and medians. Planter boxes next to buildings, tree wells, and tree trenches can also be designed as biotreatment areas.

*Biotreatment area in a curb bulb-out in the Southgate Neighborhood, Palo Alto*



### Rainwater Harvesting and Use

Rainwater harvesting systems collect and store rainwater for later use. They slow and reduce stormwater runoff, and that stored water can be used for landscape irrigation or toilet flushing.

*A large rainwater collection cistern at the Environmental Innovation Center, San Jose*



### Green Roofs

Building roofs covered in soil and vegetation enable rain water infiltration, storage, and evapotranspiration. In addition to stormwater benefits, Green roofs can also mitigate urban heat island effects while improving air quality and building energy efficiency.

*Green roof at 1460 North 4<sup>th</sup> Street Apartments, San Jose*



### Pervious Concrete, Porous Asphalt, and Pervious Pavers

Pervious surfaces let rain percolate through them and into the soil. They are generally used in crosswalks, sidewalks, plazas, driveways, parking spaces, street edges, and emergency vehicle access lanes. Pervious surfaces include the following:

- Pervious concrete or porous asphalt
- Interlocking pavers made of pervious material
- Grid pavers with gaps filled with gravel or turf
- Solid interlocking pavers that have gaps between

*Pervious pavers at Rosita Park, Los Altos*



### Infiltration Trenches

Infiltration trenches are excavated trenches backfilled with gravel. They capture, store and infiltrate stormwater runoff into the soil. They can be used along street edges and in alleys and parking lots.

*Pervious pavers over an infiltration trench in the Martha Gardens neighborhood, San Jose*