Green Infrastructure Pays:
the what, why, and how-to of green stormwater strategies for commercial properties

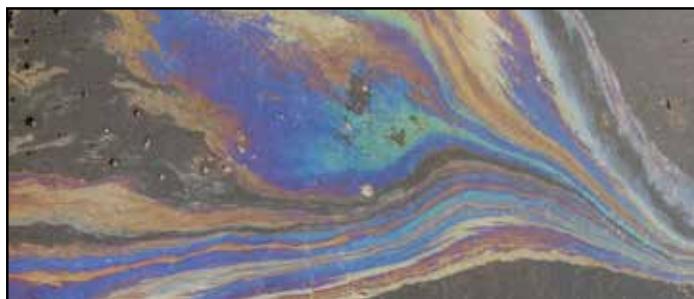| clean water	healthy people	the bottom line
• Reduce flooding • Reduce sewer overflows • Reduce chemical and nutrient runoff • Reduce heated runoff into streams	• Improve air quality • Improve physical health • Improve mental health • Increase physical activity	• Increase property values • Increase sales • Reduce energy costs • Reduce infrastructure and l andscape maintenance costs • Improve worker productivity

What is green infrastructure?

Green Infrastructure uses nature and natural features, such as trees, plants, or pervious surfaces to absorb, retain, and filter stormwater on site. It is used to replace or augment "grey" or built infrastructure such as pavement or pipes that send stormwater offsite.

Why GI?

Large areas of impervious parking lots, driveways, walks, roofs, and even extensive areas of lawn, create big problems for clean water. They keep rain from percolating through the soil. They send so much stormwater rushing across the surface into storm drains so quickly that sewer systems can't always handle them. In some areas, older combined sewer systems have to relieve the overload by releasing untreated sewage into streams.

Grey infrastructure that uses hard surfaces and pipes is bad for fish and other aquatic organisms that are the bases of a major part of the Great Lakes economy. Paving and pipes send runoff into streams with such speed and force that banks erode, and aquatic life is put at risk from pollutants – automotive fluids, road salt, fertilizers and pesticides – that contribute to the degradation of the Great Lakes.

What happens on your property doesn't stay on your property. It's important to find new ways to manage rain and snow where it falls, and not to send pollution into storm drains or waterways without first slowing it down, filtering it through soil, or allowing it to be absorbed by plants and tree roots.

Adding green infrastructure to your property will reduce stress on, and lengthen the life of, more costly grey infrastructure. Replacing grey with green does even more, providing additional benefits that pipes, concrete, and asphalt do not, usually at less expense than replacing old grey with new grey infrastructure.

GI Q&A

Do I have to replace my whole parking lot or walkway?

Not necessarily, though the more the better. You can put strips of permeable paving just along the center straightaway, or around drains to capture water before it gets into the drain, or just under the front half of parking spaces to capture car juice drips. You can put narrow filter strips across walkways, or replace some of a walkway's concrete blocks, to interrupt flow.

Isn't green infrastructure expensive?

Not in the long run. Permeable and pervious paving is more expensive to install, but less expensive to maintain. It doesn't need frequent sealing or replacing. You don't use as much de-icer, so you save money on road salt and your landscaping stays healthier and lives longer.

What happens if the reservoir or bioswale overflows?

Excess water goes into the storm sewer or surrounding greenspace, but before that happens you've cleaned, filtered, and kept a lot of water from overloading the sewer system and streams.

Does my city building code allow this?

Check with city hall. Green infrastructure is now a preferred stormwater management best practice.

If it's not allowed now, be an advocate for change.

Let it grow

One of the quickest, easiest, and least expensive ways to slow the flow is to let green grow. That is, stop mowing the grass a round the perimeter of your property and replace large areas of manicured lawn with wildflowers. Higher grass and perennial wildflowers have deeper roots, slow runoff, and absorb more stormwater than lawn. The less grass you cut, the more you can cut your landscaping expenses.
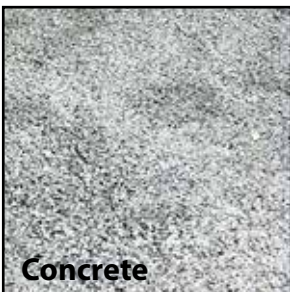
Pavers & Paving

There are many ways to provide a stable surface strong enough to support any size and number of vehicles or uses while allowing stormwater to percolate into the ground. Some use pavers, others are poured like traditional concrete or asphalt, and still others use a grid support in turf grass. All types sit atop a 1.5'-2.5'-deep reservoir of stone layers where water is held until it filters down into the soil.

Permeable Pavers let water seep *around* the paver.

Pervious (or Porous) Pavers let water seep *through* the paver itself.

Pervious Concrete or Asphalt both let water seep through the surface.

Permeable

Pervious

Concrete

Asphalt

Narrow, deep, filter strips with grass, gravel, or grillwork can be installed along regular paving to interrupt flow.

For more information, go to
water.epa.gov/infrastructure/greeninfrastructure/index.cfm

or contact your local Soil & Water Conservation District.

Trees & Plants

Plant trees. Big ones. Lots of them. Everywhere.

Trees are the only infrastructure features that increase in value over time. They absorb stormwater, limit runoff, interrupt rainfall to limit flooding and erosion, and hold snow in their canopy to let it melt slowly to the ground. They shade and cool surfaces and buildings, and reduce deterioration of pavement. They clean the air. They increase property values. And the bigger they get, the more benefits they provide. They do their best work when rainwater can get to their roots.

Bioswales and raingardens

Bioswales are linear landscape features that hold and slowly infiltrate stormwater and let it evaporate on the surface. They are used in parking lots or beside road-ways, below grade so that water can flow into them. They often have a drain with an inlet just below the level of the adjacent hard surface, so that if the bioswale fills up any excess water will drain out, or a perforated drain deep below the soil to take away water after it has filtered down.

Raingardens are vegetated retention areas without drains, usually sited at low points in greenspaces, planted with native species that hold, absorb, and infiltrate stormwater.

The grey way	The green way
Road salt washes off into storm drains or gets plowed into snow piles, which melt and run off into drains and streams.	Pervious paving requires little or no salting. Snow melts down through the surface. Less salt is tracked into your building, meaning you cut cleaning costs, reduce damage, and replace flooring less often. Less salt = less $.
Snow is plowed into big piles at the corners or between rows of parking lots. When it melts it runs into drains.	Snow is piled onto pervious-paved areas in corners or onto bioswales between rows, where it melts down and is filtered by soils.
Small trees planted in small raised areas in parking lots don't absorb rainwater draining from surfaces and don't provide shade.	Large trees are planted around parking lots and in bioswales between rows, *not in raised beds* but with curb cuts that let them receive and filter runoff. They provide shade that extends the life of paving. Cars parked in the shade use less fuel and create less air pollution cool down the A/C on hot days. In winter, branches interrupt and hold snow. Less sweeping and scraping = happier people.
Dark asphalt roofs absorb heat in summer, requiring more energy used to cool buildings, and UV rays degrade asphalt, requiring costly and frequent repair and replacement.	Green roofs intercept sunlight, and keep buildings cooler in summer and insulated in winter, reducing energy costs, protecting asphalt roofs, extending their useful lives, and reducing repair and replacement costs.
Large expanses of lawn require frequent mowing, use of chemical weed killers, pesticides, and fertilizer, and costly watering.	Converting lawn to raingardens, letting grasses grow high along area perimeters, planting groves of trees, native grasses, or wildflower meadows, reduces use of chemicals, and absorbs stormwater.
Lots of hard grey surfaces don't provide healthy, inviting, shady, or aesthetically pleasing spaces.	Trees, grasses, and naturally landscaped areas improve mental and physical health, and increase employee productivity.

Green is good for business