Alternatives to Curbs and Gutters

How Do Curbs and Gutters Affect Stormwater Pollution?

Curbs and gutters, along with their system of underground storm sewer pipes, have been used for decades to quickly and efficiently move rainfall runoff away from areas where standing water can cause damage to structures, destroy property, interfere with traffic and emergency services, and cause injury to people. While this engineering solution to move excess water out of urban areas has solved many flood-related problems, the displaced water often causes increased flooding and environmental damage downstream.

Most cities now require flow-reduction structures, such as detention basins, at the outlets of curb and gutter collection systems to reduce the erosion in receiving streams. Unfortunately, ***flow-reduction structures are not designed to remove pollutants*** transported in runoff water flowing through curb and gutter conveyance systems. In fact, curbs and gutters increase the amounts of pollutants entering receiving streams because they collect many types of pollutants, and they do not have pervious surfaces that can absorb water and pollutants.

Curb and gutter systems are quite effective at delivering pollutants to receiving streams. Most developed urban centers around the country now have ***stormwater pollution control permits*** that require them to implement strategies to reduce pollutant discharges to receiving streams. Curb and gutter system alternatives are now being implemented to reduce downstream flow volume and pollution transport.

What Are Alternatives to Curbs and Gutters?

Alternatives to curbs and gutters allow for on-site absorption of runoff water and pollutants. For streets, the alternative is usually ***grassy swales (bioswales)***. Once considered to be just open drainage ditches, the modern alternatives to street curbs and gutters are designed to maximize flow, allow for significant infiltration of water, ease of maintenance, and often have added plants and features that beautify and enhance appearance. Another street curb and gutter alternative is to use a series of ***rain gardens*** with the same design benefits.

Parking lots can likewise be enhanced by use of ***porous pavers*** and bioswales for infiltrating rainfall in place of curb and gutter systems that otherwise discharge pollutants directly to adjacent streams. When properly designed and maintained, these "***green spaces***" can be an important amenity to residential and commercial properties.

Retrofitting existing curb and gutter systems to the use of green spaces may not be cost-effective in some cases, and there may not be sufficient open land for constructing bioswales or rain gardens. Curb and gutter alternatives often work best for new development at time of initial design.

What Are the Benefits of Green Space Alternatives?

Green spaces provide for infiltration of stormwater runoff into the soil. They reduce the velocity and volume of runoff, and they reduce the amounts of pollutants and sediment that get discharged to receiving streams by providing pathways for infiltration and adsorption into the soil. Some pollutants, such as nutrients and certain metals, will be absorbed by the green space plants.

A good design of a green space, such as a bioswale or rain garden, will include ***optimizing the selection of soils and plants for enhanced pollutant removal efficiency***. Selection factors will include using hardy native species, designing the system for effective flow and infiltration within the green system, and making maintenance easy and inexpensive. Green spaces reduce erosion, enhance runoff water quality, and increase groundwater recharge.

How Local Codes Affect the Use of Green Space:

Municipal use of green space alternatives to curbs and gutters is of growing interest. Many cities have not yet updated their local building, zoning, landscaping and development codes to allow curb and gutter alternatives. Some green space projects have application limits: they are not suitable for certain climate conditions, soil types or flow patterns. Homeowners Associations may restrict installation of green spaces such as rain gardens. Local planning officials should be consulted prior to plan and design.

Green Space Care and Maintenance:

There are often uncertainties expressed by developers, municipal officials and land owners over green space projects. Having natural vegetated areas by homes and businesses triggers concerns from some that the green spaces attract rodents, snakes and other undesirable wildlife, or that mosquitoes and other unhealthful insects might breed in standing water and plants. However, a properly designed and maintained green space amenity will not have these problems. Proper design and maintenance ensures an attractive, healthy green space project.

There often is confusion about ***who is responsible for care and maintenance*** of the green space system. In general, the landowner is responsible for care and maintenance. The swales along residential streets are on the homeowners' properties, and they should maintain the vegetated areas that they own. Rain gardens on commercial properties should be maintained by the property owner or tenant. Green spaces on city properties should be cared for by the city.

Sometimes property owners do not have all the knowledge or resources that they need to adequately maintain their green spaces. This is where ***partnerships*** between local public officials and their citizens is crucial. Cities should expect to spend a lot of time on educating their citizens about the benefits of and care for the green spaces within their community. Cities can host neighborhood cleanup days and provide information about local resources that property owners can access. And the internet has abundant information about care and maintenances of all types of green space systems.