



Basic Principles

Treat water as a resource, not a waste product

Often people consider stormwater to be a waste product that must be disposed of as quickly as possible. Communities need to shift their understanding to treat water as a resource, opening up a range of design possibilities that take advantage of the benefits of water for beautification, irrigation, groundwater recharge, wildlife habitat, and other uses.

Design to mimic or replicate the natural hydrology of a given site

One of the easiest ways to treat water as a resource is to work with the natural hydrology of the site. Taking into account the site's natural drainage features and balance of infiltration, evaporation, transpiration, and surface flow will allow you to minimize harmful off-site impacts and protect water resources. Ideally you can maintain or restore your site to function as it did under predevelopment conditions. In areas where impacts from existing development are severe, your site's capacity to absorb hydrologic impacts can be enhanced to have a net-positive (rather than net-zero) effect on the hydrology of the larger drainage area or watershed.

Infiltrate, detain, or retain stormwater within the limits of a development project whenever possible

Many stormwater best management practices aim to reduce site runoff by evaporation, infiltration, detention, and retention. This approach can reduce infrastructure costs (pipes and sewers, for example) and help maintain onsite water balance. Infiltration systems recharge groundwater, filter pollutants out of stormwater, and irrigate plants. Detention and retention systems slow or eliminate the release of stormwater from a site, protecting downstream water bodies from erosive flows, and they can provide an aesthetic and recreational amenity, as well.

Start small and build from there

If you have little experience working with innovative stormwater best management practices or if your municipality is unfamiliar with this new approach, it may be best to begin with small projects. This will provide you and all regulatory agencies with an opportunity to see the benefits of these practices with a relatively small investment and low risk. Small changes to traditional site and project design might also be more readily approved through established regulatory and permitting processes and are easier to remove if proven unsuccessful. Be aware that small projects require advance planning and collaboration just like large projects. It is important to give even the smallest best management practices an appropriate level of attention and to consult with technical experts and stakeholders. This will improve your chances of success and help pave the way for larger projects.

Keep it simple

Integrating stormwater features into your project site does not have to be complicated or involve prefabricated structural elements. Projects at all scales can be designed using just a handful of principles and techniques. Look for sites or locations within your site where simple solutions will suffice. For example, a parking area can be designed to drain to an adjacent landscape area without any complicated engineering, which is a very low-cost solution. If you can move water from one place to

another using gravity, do it – there is no reason to add a pump system that will require maintenance and upkeep. Simplifying infrastructure may reduce installation and maintenance costs and can increase the likelihood of success.

Design to the standards and expectations of the local community

Every community is unique and has its own particular design aesthetic. People who live in that community have certain expectations for how their area should look. Communities in the Midwest might favor landscapes featuring prairie wildflowers and grasses, whereas communities in the desert Southwest might prefer succulents and rock gardens. As designers and engineers, it is your job to accommodate those expectations if you desire public acceptance. Talking to the public and engaging their interest and input is a good way to ensure that your design fits with their preferences and expectations. You can introduce ideas that push the boundaries of a preferred aesthetic, but your design should always be informed by the local context and from stakeholder input.

Design to address issues of water quality, quantity and amenity

Stormwater permits often include specific requirements for the quality and quantity of stormwater that leaves a developed site. While it is important to address these minimum requirements, a “lowest common denominator” approach does not allow for a full exploration of how stormwater can best be used onsite. It is important to recognize that these spaces can be designed for people to use and enjoy while still meeting water quality and quantity requirements.

Stormwater BMPs can be integrated into almost any project

Stormwater management is a factor in all construction projects. As specific stormwater management requirements are addressed, look to sustainable stormwater management practices to see if they can provide all or part of the solution. Including an ecoroof or rain garden, for example, reduces the total volume of runoff to be managed and can reduce or eliminate drainage infrastructure. Creating a green space that also provides stormwater management adds an aesthetic amenity that the community values, which can increase public support for a project or bolster property values.

Sustainable stormwater management practices can be incorporated into projects with entirely different goals. For example, a new park can be equipped with an underground storage or treatment facility and topped with a basketball court, which saves space and construction costs. A soccer field can double as an infiltration using a little ingenuity and engineering.

Projects should be collaborative and encourage active participation from many stakeholders

Stormwater management planning decisions should include input from a variety of stakeholders to ensure that all technical, aesthetic, design, and maintenance needs are addressed. Collaborative planning can increase stakeholder buy-in and pave the way for future projects. Involving additional groups, such as homeowners and environmental organizations, can build support for more projects and may open the door to new funding opportunities.

Stormwater BMPs may only provide part of your solution

Sustainable stormwater management practices may not meet all of a site’s drainage needs, but they can be used in combination with other more traditional practices to provide a comprehensive stormwater solution. Always remember that this is a learning process and, while it is important to do your homework, it is OK to make mistakes. Encountering obstacles does not mean that sustainable stormwater management is an unworthy goal.