Minnesota Minimal Impact Design Standards

What is Minimal Impact Design Standards?

Minimal Impact Design Standards (MIDS) represent the next generation of stormwater management in Minnesota. The emphasis today is on keeping the raindrop where it falls in order to minimize stormwater runoff and pollution and preserve natural resources. Low Impact Development (LID) is an approach to stormwater management that mimics a site's natural hydrology as the landscape is developed and preserves and protects environmentally-sensitive site features such as riparian buffers, wetlands, steep slopes, valuable (mature) trees, floodplains, woodlands and highly permeable soils.

Tree trenches at Maplewood Mall

Minnesota's new MIDS offers guidelines, recommendations and tools that will help LID be implemented more uniformly across Minnesota's landscape and provides guidance to effectively implement the concepts and practices LID promotes and encourages.

MIDS contains four main elements to meet these needs:

- A stormwater volume performance goal for new development, redevelopment and linear that will provide enhanced protection for Minnesota's water resources.
- New credit calculations that will standardize the use of a range of innovative structural stormwater techniques.
- Design specifications for a variety of green infrastructure best management practices (BMPs).
- A model MIDS ordinance package that will help developers and communities implement MIDS.

What are the benefits?

Adapting and using LID approaches offers multiple benefits including minimizing and reducing the amount of pollution reaching our lakes, rivers and streams and helps to recharge groundwater resources. MIDS establishes unified LID standards, approaches and credits so we can consistently apply these principals across Minnesota communities. MIDS helps communities measure progress toward water and natural resource protection and restoration goals. MIDS will also be used as the highest standard for meeting the stormwater practice for Minnesota Green Step Cities.

Who will use MIDS?

The concepts behind MIDS can essentially be used by all Minnesotans – we can all do our part in minimizing stormwater runoff and pollution. MIDS was specifically developed for designers, engineers, planners, contractors, stormwater managers, landscape architects, public works staff, landscape industry, land use regulators and others involved in new development and redevelopment projects. MIDS methodologies will provide tools for these individuals to quantify reductions in post-development runoff and pollutant loading from a wide variety of LID practices.

Where did MIDS come from?

Recognizing the value of LID to Minnesota's high valued water and natural resources, the 2008 Legislature directed the MPCA to develop MIDS.

> Minn. Stat. § 115.03, subd. 5c reads:
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> "The agency shall develop performance standards, design standards, or other tools to enable and promote the implementation of low impact development and other storm water management techniques. For the purposes of this section, "low impact development" means an approach to storm water management that mimics a site's natural hydrology as the landscape is developed. Using the low impact development approach, storm water is managed on site and the rate and volume of predevelopment storm water reaching receiving waters is unchanged. The calculation of predevelopment hydrology is based on native soil and vegetation".

Upon passage of the legislation, a stakeholder group was created to guide the MPCA in the development of MIDS. This group met monthly for three years and was instrumental in creating the MIDS work products.

Performance goals(s)

A performance goal specifies what level of stormwater treatment must be achieved. The MIDS performance goals were developed to satisfy the legislation by determining how much precipitation must be retained on a particular site. It is expressed as a volume of water calculated by taking a depth of rainfall that falls on an impervious surface.

Minnesota's new MIDS performance goal

Performance Goal for New Development:

New, nonlinear developments that create more than one acres of new impervious surface on sites without restrictions, stormwater runoff volumes will be controlled and the post-construction runoff volume shall be retained on site for 1.1 inches of runoff from impervious surfaces statewide.

Performance Goal for Redevelopment:

Nonlinear redevelopment projects on site without restrictions that create one or more acres of new and/or fully reconstructed impervious surfaces shall capture and retain on site 1.1 inches of runoff from the new and/or fully reconstructed impervious surfaces.

Performance Goal for Linear:

Linear projects on sites without restrictions that create one acre or greater of new and/or fully reconstructed impervious surfaces, shall capture and retain the larger of the following:

- 0.55 inches of runoff from the new and fully reconstructed impervious surfaces
- 1.1 inches of runoff from the net increase in impervious area

Mill and overlay and other resurfacing activities are not considered fully reconstructed.

Why 1.1 inches? What is the significance?

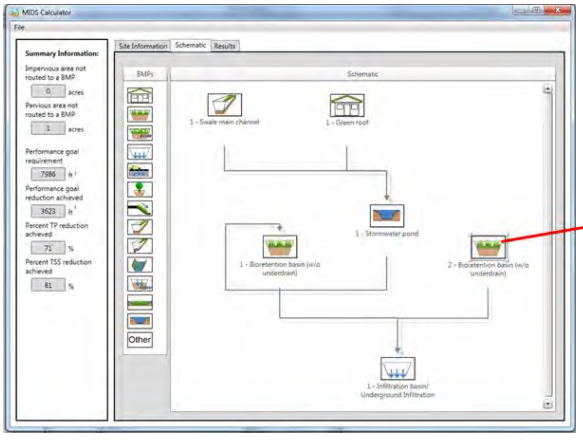
In studying rainfall data for Minnesota, 1.1 inches represents approximately 90 percent of all rain events in Minnesota. Rainfall events between 0.5 and 1.5 inches are responsible for about 75 percent of runoff pollutants. This is sometimes referred to as the "first flush" of pollutants. Therefore, by more carefully managing rainfall events of this size using LID approaches, we can prevent or minimize stormwater volume and pollution during many of the runoff events in Minnesota.

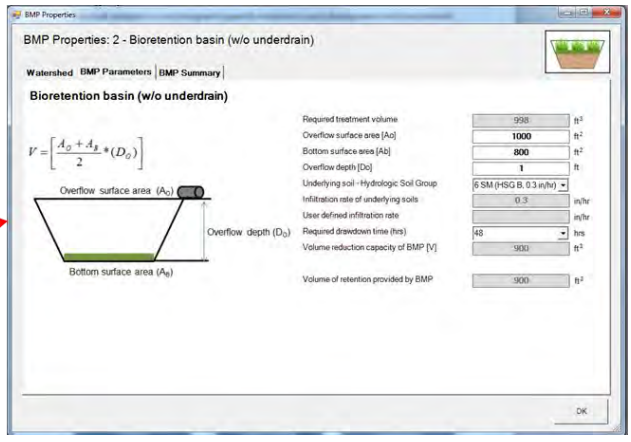
Flexible treatment option – not all sites can retain 1.1 inches

While reducing the volume of runoff leaving a developed site is the only way to mimic native hydrology, there are situations where it is simply not feasible. Infiltration is the most common practice to reduce runoff volumes, but soil conditions may not always allow water to soak into the ground. Much of Minnesota has tight clay soils, shallow bedrock, or karst topography that are not conducive to infiltration as a stormwater management approach. Additionally, some sites may have contamination, existing building or utility conflicts, or other site constraints such as zoning requirements that create difficulties in providing volume reduction. In order to accommodate alternative forms of water quality treatment on sites with restrictions, a Flexible Treatment Options Sequence and accompanying Design Guidance Flow-Chart was developed. Project proposers are taken through a step by step approach to document site restrictions and how they have attempted to meet the full 1.1 inches performance goal. If the 1.1 inch performance goal is shown to be infeasible, a 0.55 inch performance goal is explored, followed by a 60 percent annual Total Phosphorus removal goal, and then a final option to meet the 1.1 inches volume reduction goal at an off-site location.

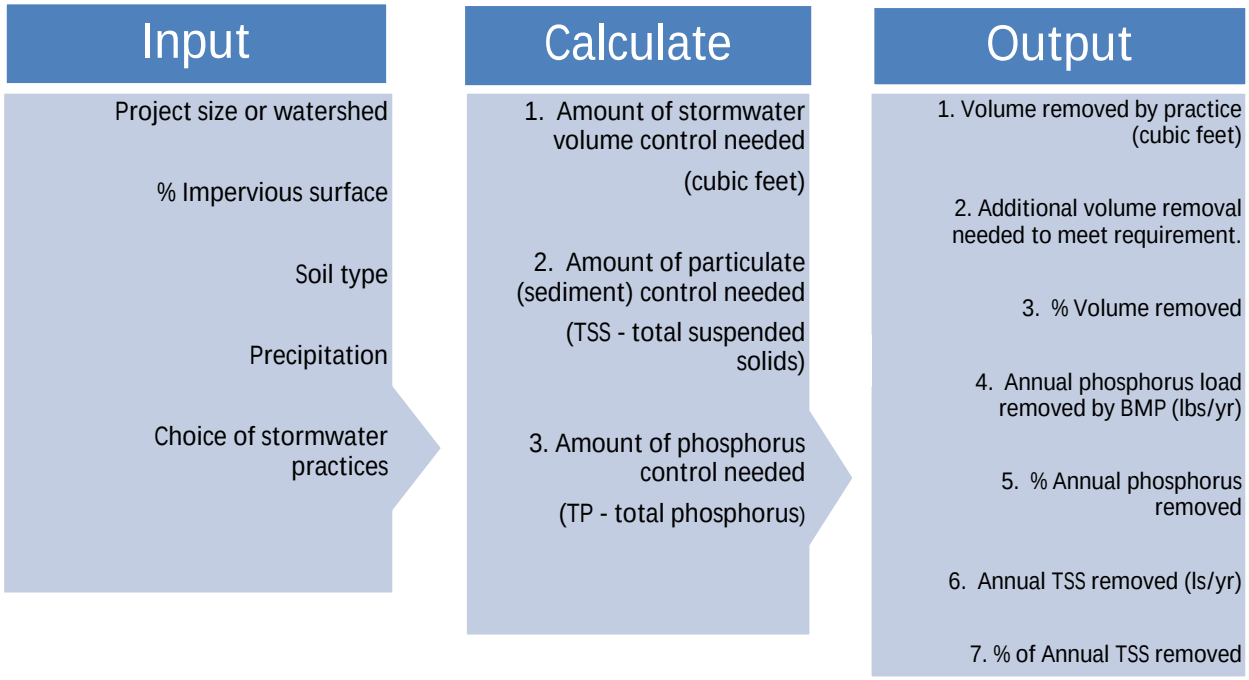
Design specifications and a credit calculator

The credit calculator is a tool designed to quantify reductions in post-development runoff and pollutant loading using a variety of LID practices. This graphic user interactive tool allows individuals to enter a project's site conditions and determine the amount of stormwater volume retention needed and the pollution loading (sediment and phosphorus). The calculator then provides a method to enter their stormwater practices of choice and determine (calculate) the amount of stormwater volume and pollution reduction (credit) they can achieve. Currently, the credit calculator includes LID practices for green roofs, bioretention basins, infiltration basins, permeable pavement, infiltration trench/tree box, swales, filter strips and sand filters. Other practices will be added in the future. The calculator includes convenient links to specific design specifications for LID practices that are found within the **Minnesota Stormwater Manual**.





How does the calculator work?



The credit calculator and design specifications will be located within the **Minnesota Stormwater Manual**. [See Resource Links below]

Model ordinances for communities that support clean water goals

A Community Assistance Package (CAP) is being developed to provide ordinances and tools that help integrate LID principles, including the MIDS performance goals and calculator, into a package that can be used by local units of government. These tools can be used by communities to help them achieve MIDS performance goals for stormwater volume. The CAP will include instructions about how to use the checklists, and various training materials and approaches used during implementation in several test or pilot communities.

Resources

MIDS webpage: http://www.pca.state.mn.us/veiza8e.

Minnesota Stormwater Manual (which includes MIDS work products): http://stormwater.pca.state.mn.us/index.php/Main_Page.