

Low impact development: Tools to manage stormwater

A Report to the Legislature on the Minimal Impact Design
Standards Partnership



Executive summary

In 2009, the Legislature directed the Minnesota Pollution Control Agency (MPCA) to develop standards or other tools to enable and promote the implementation of low-impact development and other stormwater management techniques. The Builders Association of Minnesota, League of Minnesota Cities, and others had sought the legislation to help create the tools for local governments to shape development, protect or restore water quality, and meet federal and state regulatory requirements. These tools are needed to widely implement stormwater management practices that stakeholders reached broad consensus on in the 2005 *Minnesota Stormwater Manual*.

Over the last eight years, a diverse group of stakeholders from the public and private sectors and the Minnesota Stormwater Steering Committee have worked with the MPCA to better manage stormwater runoff. Many of these parties now comprise a work group that meets monthly to advise the MPCA through the development of the voluntary Minimal Impact Design Standards (MIDS) tool. The MIDS products will include 1) site runoff rate and volume control goals, 2) a method to determine credits for those goals, and 3) a user-friendly calculator to input site conditions and credits. In addition, the USEPA provided a grant to supplement the great work occurring in Minnesota for model ordinance development and pilots of the products.

The project is on track for meeting the legislative requirements. MPCA contracted with several consulting firms to conduct research and develop tools and that work will be completed in early 2011. MPCA staff work and on-going input from the stakeholder work group will continue until the summer of 2011 to finalize the work products.

Introduction and background

Urban runoff—called stormwater—is a major source of water pollution which needs to be addressed at many policy and regulatory levels as well as be considered a part of daily life for our cities, homes, and industries. Historically, the main goal of stormwater management has been to move the runoff off the landscape as quickly as possible to avoid flooding concerns. More recently we are focusing on keeping the raindrop where it falls and mimicking natural hydrology in order to minimize the amount of pollution reaching our lakes, streams, and rivers and to recharge ground waters. In order to accomplish this, new stormwater management guidance and methods need to be developed that can be applied across Minnesota's diverse landscapes and incorporated into development project designs. In response to a joint request by a diverse group of partners, the Minnesota Legislature allocated funds in 2009 to “develop performance standards, design standards or other tools to enable and promote the implementation of low impact development and other stormwater management techniques.”

Minimal Impact Design Standards (MIDS) Partnership

To accomplish the goals of this legislation, the MIDS partnership began during the fall of 2009, with four stakeholder meetings (Brainerd, Rochester, Duluth, and Plymouth). Input came from developers, builders (Builders Association of the Twin Cities, Builders Association of Minnesota), municipal public works, landscapers, professional engineers, watershed districts, Minnesota Cities Stormwater Coalition member cities, environmental groups (MN Center for Environmental Advocacy, Friends of the Mississippi River and 1000 Friends of Minnesota), and counties. While the MIDS scope of work and the Request For Proposal (RFP) for the contracting process was being completed, the MIDS Work Group was formed under the auspices of the Minnesota Stormwater Steering Committee with representatives from 24 organizations. Meetings are held every third Friday of the month at the MPCA's office, with Webex connections for up to 200 participants, especially for out-state participants. Members of the Work Group provide guidance and consensus recommendations to the MPCA and have been active participants in developing detailed work products with the MPCA and MIDS contractors.

MIDS funding was reduced by \$155,000 in 2010 due to state budget reductions. Some offsetting funding was obtained from the USEPA Section 319 grants to begin work with St. Croix Basin communities via the Washington County Conservation District and St. Croix Basin partners. As a result of budget reductions, there may be gaps in MIDS aspects relating to redevelopment and linear projects (highways), specifications and education products. Products from the state and federal funding sources will result in: 1) MIDS Performance runoff volume reduction goal(s), 2) MIDS volume and pollutant reduction credits for select designs; 3) MIDS pollutant load spreadsheet calculators, and 4) MIDS ordinance goals for municipalities. To date, the Work Group has contributed over 1,000 hours of review, comment, and technical assistance to the MIDS effort.

Outreach discussions have described MIDS products as voluntary tools, made available in the Minnesota Stormwater Manual, as spreadsheets and statewide standardized credits for volume and pollutant reductions. These tools will provide a clear understanding of the issues and water quality implications and thus help cities comply with regulatory requirements. MIDS will ultimately help cities sustain water quality in their lakes, streams, and rivers. Stakeholders have also identified areas where further work could enhance or expand the products and will work with the MPCA to consider future efforts.

Objectives

Using the legislation the MPCA and the Minimal Impact Design Standards Work Group identified four objectives to the project:

1. **No net increase** — Development project stormwater controls will result in the same pre-development stormwater discharge volumes and rates for all new development and redevelopment to the best extent possible. It is understood that flexibility will need to be built into MIDS to accommodate unique circumstances or special considerations relating to density of development, linear projects, and geographic-based constraints.
2. **Effective** — Prevent stormwater erosive impacts to stream channels (i.e. widening or down-cutting) by reducing stormwater runoff volumes from small to moderate storms. MIDS techniques will be effective on a site-by-site basis, as well as on a broader watershed-wide scale.
3. **Flexible** — The tools will accommodate diversity among Minnesota’s municipalities. The diversity in aquatic ecoregions and geology also presents major challenges and requires flexibility in how to achieve stormwater management outcomes across the state.
4. **Technically sound and scientifically based** – MIDS methodologies must be technically sound, peer reviewed, and defensible.

Expenditures and timeline

The appropriation that was allocated to MIDS will result in four work products.

Work product	Expenditure	Timeline
1. Performance goal(s)	\$131,000	January, 2011
2. Credits	\$126,000	March, 2011
3. Calculators	\$90,000	April, 2011
4. Ordinance goals for cities	\$125,000 (Federal EPA funds)	August, 2013

Products: All draft and final work products, digitized presentations, and associated background materials are on the website: <http://www.pca.state.mn.us/water/stormwater/mids>

Conclusion

The development of tools to enable and promote the implementation of low impact development and other stormwater management techniques will ultimately result in cleaner lakes, rivers, and streams in Minnesota. The Minnesota Pollution Control Agency is developing these tools in partnership with the stakeholders who will be using these tools, such as builders, landscapers, developers, cities, watershed districts and others. The tools from this project will provide simplified approaches to reduce pollutant loading to impaired waters and to prevent degradation of high quality lakes, rivers and streams and enable all local governmental units (LGUs) to better protect water quality. Those LGUs regulated by federal permits will be better able to address their pollutant contributions to impaired waters or degradation of un-impaired waters.

Appendices:

Appendix 1: Minimal Impact Design Fact Sheet

Appendix 2: Minimal Impact Design Work Group Membership

Legislative Charge

M.L. 2009, Chapt. 367, Sec 2, Subd. 5(c)

\$500,000 the first year is to develop minimal impact design standards for urban stormwater runoff. This is a onetime appropriation and is available until June 30, 2011. The commissioner shall report to the chairs and ranking minority members of the legislative committees and divisions having primary jurisdiction over environment and natural resources policy and finance no later than January 12, 2011.

Notwithstanding Minnesota Statutes, section 16A.28, the appropriations encumbered on or before June 30, 2011, as grants or contracts for clean water partnership, SSTs, surface water and groundwater assessments, total maximum daily loads, stormwater, and local basin wide water quality protection in this subdivision are available until June 30, 2013.

Section 37. Minnesota Statutes 2008, section 115.03, subdivision 5c, is amended to read:

Subd5c. Regulation of storm water discharges..

(c.) The agency shall develop performance standards, design standards, or other tools to enable and promote the implementation of low-impact development and other stormwater 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 low-impact development approach, storm water is managed on-site and the rate and volume of predevelopment stormwater reaching receiving waters is unchanged. The calculation of predevelopment hydrology is based on native soil and vegetation.

Authors

Bruce Wilson
Anne Gelbmann

Contributors / acknowledgements

Don Jakes
Brian Livingston
Dale Thompson

Editing and graphics Paul Andre

Paul Andre
Theresa Gaffey
Peggy Hicks

Cover photos: Rain gardens in Stillwater, courtesy of Rusty Schmidt, Washington Conservation District
Green roof in Minneapolis, courtesy of Sara Brown, Minnesota Pollution Control Agency
Porous alley in Owatonna, courtesy of Anne Gelbmann, Minnesota Pollution Control Agency

Minnesota Pollution Control Agency

520 Lafayette Road North | Saint Paul, MN 55155-4194 | www.pca.state.mn.us | 651-296-6300
Toll free 800-657-3864 | TTY 651-282-5332

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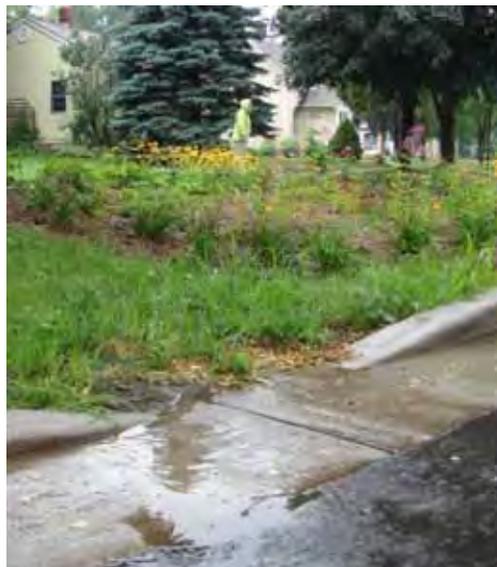
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Minimal Impact Design Standards (MIDS) represent the next generation of stormwater management and contain three main elements that address current challenges.

1. A higher clean water performance goal for new development and redevelopment that will provide enhanced protection for Minnesota's water resources.
2. New modeling methods and credit calculations that will standardize the use of a range of innovative structural and nonstructural stormwater techniques.
3. A credits system and ordinance package that will allow for increased flexibility and a streamlined approach to regulatory programs for developers and communities.

The development of MIDS is based on **low impact development (LID)**—an approach to stormwater management that:

1. Mimics a site's natural hydrology as the landscape is developed.
2. Preserves and protects environmentally-sensitive site features such as riparian buffers, wetlands, steep slopes, valuable (mature) trees, floodplains, woodlands and highly permeable soils.



Using the LID approach, stormwater is managed on-site, and the rate and volume of predevelopment stormwater reaching receiving waters is unchanged. The calculation of predevelopment hydrology is based on native soil and vegetation (Minn. Stat. 2009 § 115.03, subd. 5c).

Background

Historically, urban runoff was managed to move water off the landscape quickly and reduce flooding. Now, the focus has shifted to keeping the raindrop where it falls by mimicking natural hydrology in order to minimize the amount of pollution reaching our lakes, rivers and streams, and to recharge our groundwaters.

Accordingly, there is a greater emphasis on increasing infiltration, biofiltration, abstraction and reuse, as well as implementing a variety of planning, engineering and operating methods such as LID. With this emphasis and change in how stormwater management will be designed and implemented on new development and redevelopment sites, it has become clear that compiling the latest information and guidance is needed to offer consistency in design and performance, as well as flexibility in meeting regulatory requirements.

In response to this need, a diverse group of partners successfully worked with the Legislature to allocate funds to “develop performance standards, design standards or other tools to enable and promote the implementation of LID and other stormwater management techniques.”

Vision and Goals

Who will use MIDS?

Designers of new development and redevelopment projects will use the first MIDS products for state-of-the-art designs and calculation methodologies in everyday zoning, comprehensive planning and ordinance development. In the future, MIDS may also be used for measuring compliance and progress toward protection and restoration goals via a crediting system for pollutant removal.

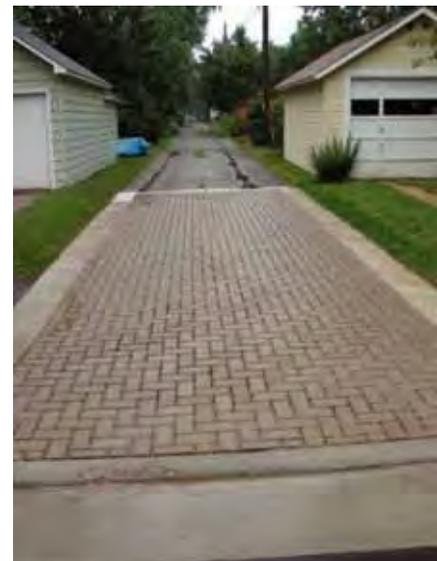
MIDS methodologies will provide tools for developers and local program managers to quantify reductions in post-development runoff and pollutant loading from a wide variety of structural and nonstructural LID practices for new developments and redevelopments. These practices will enable stormwater management to mimic a site’s natural hydrology. Using MIDS, stormwater will be managed on-site, and the rate and volume will match predevelopment hydrology based on native soil, vegetation and ecoregion for up to medium-sized storm events.

Will MIDS be mandatory?

No. MIDS will offer a package of options for local governments and developers to consider in design, based on local needs and community preferences. This will be similar to the way the Minnesota Stormwater Manual serves as a general reference for stormwater management. The standards will not be mandatory; however, future components will offer tangible measures of community management that could demonstrate compliance with Total Maximum Daily Loads, nondegradation and water quality/management goals. A particular design, methodology or pollution reduction goal could become mandatory only if state or local governments took action (outside the scope of this project) to put it into a permit, rule, ordinance or similar requirement.



Green roofs reduce the volume of stormwater runoff from buildings, and also help reduce cooling costs and urban heat island effects.



Pavers at the drain end of this alley provide significant infiltration. Alleys can be excellent low-traffic test plots for cities that want to improve stormwater practices.

What will MIDS include?

MIDS will include a suite of practices that can be used on new and redevelopment sites to manage stormwater so that the rate and volume of runoff matches that of predevelopment levels (based on native soils and vegetation).

MIDS will include the following:

- ✓ research to determine up to what size storm events can realistically be managed using LID techniques in Minnesota’s eco-regions and seasons
- ✓ design details, figures and options; products for end users (perhaps spreadsheets, Hydrocad, P8 and/or GIS formats)
- ✓ runoff and pollutant removal credits
- ✓ translation of designs and credits into easy-to-use calculation methodologies

How Will MIDS Help Guide Local Decisions?

Currently, a pilot project is being conducted in the St. Croix Basin for education, outreach, ordinance and planning for communities in the basin. This project is paid for by federal 319 grant funds and is administered by the Washington Conservation District. Upon completion of the ordinance work, sample ordinances will be made available to other Minnesota communities.

MIDS will be...

- ✓ a flexible approach to stormwater management that differs by ecoregion, based on specifics of native soils, vegetation, etc.
- ✓ the development of specific performance goals to be achieved through ordinances
- ✓ a package of options for achieving compliance with water quality goals and requirements for runoff volume, total phosphorus and total suspended solids
- ✓ practices to help communities meet water quality protection and restoration requirements

MIDS will not be...

- ✓ a single stormwater management method applicable across the entire state
- ✓ a set of required ordinances that must be adopted
- ✓ a prescriptive planning approach
- ✓ a one-size-fits-all approach to compliance with water quality standards and regulations

Next Steps

In January 2010, a workgroup was formed under the auspices of the Minnesota Stormwater Steering Committee, with 24 organizations represented. Members of the MIDS workgroup provide guidance and recommendations to the Minnesota Pollution Control Agency (MPCA). Meetings are held every third Friday of the month from 9:00 a.m. to noon at the MPCA's St. Paul office. Co-chairs of the workgroup are Mr. Jay Riggs, Washington Conservation District; and Mr. Mark Doneux, Capitol Region Watershed District. Meeting notes and a list of workgroup members can be found on the MIDS Web page: www.pca.state.mn.us/water/stormwater/stormwater-mids.html.

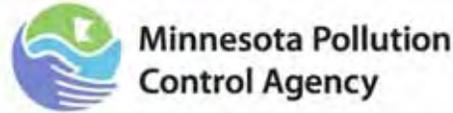
In September 2010, consultants were selected to begin the technical details of MIDS. Consultants include Barr Engineering, Bonestroo, and Wenck and Associates. It is anticipated that the MIDS project will be developed in two phases through 2012, and will rely upon additional partner support at the local, state and federal levels in order to accomplish the overall intent of the legislation. As resources allow, assessment of LID stormwater practices, and outreach and training for designers and communities with help for implementing MIDS, will be developed. MIDS may also lead to updates to the Minnesota Stormwater Manual, which will include more design information specific to LID.

For More Information

www.pca.state.mn.us/water/stormwater/stormwater-mids.html



The intersection of impervious (left) and pervious (right) asphalt shows the efficient infiltration ability of using pervious pavements.



Minimal Impact Design Standards Work Group Members

Organization	Primary	E-mail	Alternate	E-mail
City-metro Phase 1 MS4	Lois Eberhart	Lois.Eberhart@ci.minneapolis.mn.us	Anne Weber	anne.weber@ci.stpaul.mn.us
Minnesota Pollution Control Agency	Mike Findorff	michael.findorff@state.mn.us	Anne Gelbmann	anne.gelbmann@state.mn.us
City-metro Phase II/MS4 (MCSC)	James Hafner	JamesH@ci.blaine.mn.us	Scott Anderson	smanderson@ci.bloomington.mn.us
Soil and Water Conservation District (Metro)	Jay Riggs	jriggs@mnwcd.org	Mike Isensee	Mike.Isensee@co.dakota.mn.us
Soil and Water Conservation District (Greater Minnesota)	Wayne Cymbaluk	Wayne.Cymbaluk@mn.nacdn.net	Mark Zabel	Mark.Zabel@CO.DAKOTA.MN.US
Builders Association	James Vagle	james@batc.org	Lisa Frenette	Frenettela@gmail.com
Metropolitan Council	Karen Jensen	karen.jensen@metc.state.mn.us	Jack Frost	jack.frost@metc.state.mn.us
Non Point Education for Municipal Officials	Jesse Schomberg	jschombe@d.umn.edu		
American Public Works Assn/Mn Chapter Developer	Klayton Eckles Larry Frank	keckles@ci.woodbury.mn.us lfrank@arcondvelopment.com	Kerry Thorne Ian Peterson	kerry.thorne@newbrightonmn.gov ian.peterson@pultegroup.com
Metro Watershed District	Mark Doneux	mark@capitolregionwd.org	Tina Carstens	tina@rwmwd.org
Watershed Districts-Greater Minnesota	Chad Anderson	chad@mfcrow.org	Mike Kinney	mkinney@plslwd.org
Minnesota Nursery and Landscape Assn.	Mike Kelly	mgekelly100@yahoo.com	Craig Otto	craigo@watermotion.com
Watershed Mgmt Organizations	Paul Moline	PMoline@co.carver.mn.us		
Minnesota Department of Natural Resources	Julie Westerlund	julie.westerlund@state.mn.us	Paul Radomski	Paul.radomski@state.mn.us
Minnesota Department of Transportation	Wesley Saunders-Pearce	Wesley.Saunders-Pearce@state.mn.us	Beth Neuendorf	beth.neuendorf@state.mn.us
Academic Researcher	Shane Missaghi	miss0035@umn.edu		
Non-profit	Trevor Russell	trussell@fmr.org	Liz Boyer	lboyer@1000fom.org
Board of Soil and Water Resources	Steve Woods	Steve.Woods@state.mn.us	Melissa Lewis	Melissa.K.Lewis@state.mn.us
City-greater MN-MS4	Anita Rasmussen	anita@sartellmn.com	Matt Durand	Matt.durand@ci.owatonna.mn.us
Engineering Consultant	Michele Caron	michele.caron@westwoodps.com	Randy Hedlund	randyh@hedlundeng.com



Organization	Primary	E-mail	Alternate	E-mail
Minnesota County Planning and Zoning Administrators	Garry Johanson	garry.johanson@co.todd.mn.us		
MN Utilities Contractors Association	Deann Stish	deans@muca.org	Mary Davy	mdavy@nostressgardening.com
Association of Landscape Architects (MN Chapter)	Joni Giese	jgiese@srfconsulting.com		

Other members:

Representing	Name	E-mail	Role
Minnesota Department of Natural Resources	Ken Holman	Ken.holman@state.mn.us	Alternate
Minnesota Department of Natural Resources Developer	Sharon Pfeifer	Sharon.Pfeifer@state.mn.us	Alternate
Minnesota Chapter of APWA	Dave Newman	Dave@bancorgroup.com	Alternate
Minnesota Pollution Control Agency	Rick Person	2persons@comcast.net	Alternate
Engineering Consultant	Anna Kerr	anna.kerr@state.mn.us	Alternate
Minnesota Chapter of APWA	Roger Anderson		Alternate
U.S. Environmental Protection Agency	Sherri Buss		Advisory
Builders Association	Bob Newport	Newport.Bob@epamail.epa.gov	Advisory
Minnesota Center for Environmental Advocacy	Lisa Frenette	Frenettela@gmail.com	High level Review
League of Minnesota Cities	Kris Sigford	ksigford@mncenter.org	High Level Review
Minnesota Pollution Control Agency	Craig Johnson		High Level Review
	Rebecca Flood	rebecca.flood@state.mn.us	High Level Review