

Minimal Impact Design Standards

A Pathway to Compliance with Anti-deg

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Co-chair, MIDS Work Group

2013 MECA Conference

Minnesota Pollution Control Agency

What's It All About

Introduction to MIDS – The Why, What & How

MIDS Standards and BMPs

MIDS Community Assistance Package

MIDS Calculator

Resource and Regulation Driven

Federal and State Programs

- Maintain Antideg
- Minimize NPDES/MS4
- Improve TMDL

Watershed or County Goals and Programs

Local implementation to effectively manage on a watershed or county scale

Local Government Actions

- Implement Comp Plan Policies
- MS4 Permit Implementation
- Regulations

National Urban Runoff Program

Technical studies that compiled data about urban runoff

Resulted in treatment recommendations and easy to apply standards for design and review

Led to proliferation of ponds



REPORT IN BRIEF
Urban Stormwater Management in the United States

“Past practices...have been ineffective at protecting water quality in receiving waters and only partially effective in meeting flood control requirements”
 2008 National Academies of Science

REPORT IN BRIEF
Urban Stormwater Management in the United States

“Stormwater control measures that harvest, infiltrate, and evapotranspire stormwater are critical to reducing the volume and pollutant loading of small storms”

What does anti-degradation require?

Regulated communities must demonstrate what past, present, and future best management practices will be reasonably required to return stormwater runoff to 1988 levels.

How do you make this...
 ↓ 10%
 300-600 ppb TP

function like this?
 ↓ 50%
 20-50 ppb TP

Stormwater Management Paradigm Shift

Focus on water quality improvement through small event volume control

Rain events between .5 and 1.5 inches are responsible for about 75% of runoff pollutants

Rainfalls of approx. 1.1 inches represent 90% of rain events

The New Paradigm Challenge

“We need more flexibility in design to give credit for a wide variety of structural and non-structural BMPs.”
 Builders Association


Other Permits/Approvals – Locust Hills - Wayzata

Minnesota Department of Health <ul style="list-style-type: none"> Water Management Water Pollution Control Water Resources Water Quality Water Use Water Pollution Control Water Resources Water Quality Water Use 	Minnesota Pollution Control Agency <ul style="list-style-type: none"> Water Pollution Control Water Resources Water Quality Water Use Water Pollution Control Water Resources Water Quality Water Use
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23 Additional Approvals and/or Permits (in total)

The New Paradigm Challenge


We need consistent performance standards and matching calculation methods to enable practitioners and regulators to use innovative structural and non-structural BMPs in a manner similar to stormwater ponds.



MN Cities Stormwater Coalition

The New Paradigm Challenge


Water resources are continuing to degrade. We need a better system to protect and restore our urban and urbanizing systems.



Environment and Natural Resource Groups

The New Paradigm Challenge

Recognize the importance of cost-effectiveness and long term maintenance



How did MIDS come about?



Randy in the computer

MIDS Legislation


MPCA shall develop performance standards, design standards, or other tools to enable and promote the implementation of low-impact development and other stormwater management techniques.

“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.

Minnesota Statutes 2011, section 115.03, subdivision 5c

The Goals:

- “Promote...LID”
- An approach “that *mimic’s* a site’s natural hydrology”
- “stormwater is managed on-site ”
- “the rate and volume of predevelopment stormwater reaching receiving waters is unchanged”
- “based on native soil and vegetation”



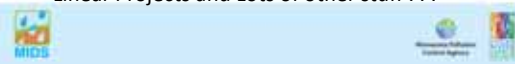
The MIDS Project

Phase I - Funding (\$480,000) through 2012 by Legislation and EPA

- New Residential Development & Redevelopment
- Administered by MPCA
- Stakeholder Input:
 - Final Workplan Development
 - Ongoing Throughout Process

Phase II+

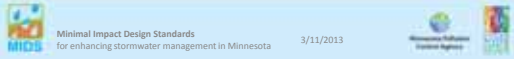
- Redevelopment
- Linear Projects and Lots of other stuff . . .



The Stakeholders

<ul style="list-style-type: none"> ➢ MPCA ➢ Cities – Phase I ➢ Cities – Phase II ➢ Public Works Assoc. ➢ SWCD ➢ Watershed Districts ➢ Met Council ➢ MN DNR ➢ MnDot ➢ BWSR 	<ul style="list-style-type: none"> ➢ Builders Association ➢ Developers ➢ Landscape architects ➢ County Plan & Zoning ➢ Non-profit environmental ➢ University of Minnesota ➢ NEMO ➢ Consultants ➢ League of MN Cities ➢ MCEA
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MIDS Components

Performance Standards Designed to Meet CWA Antidegradation Requirements

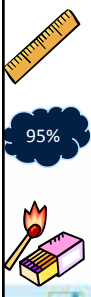

Credit Calculator

Community Assistance Package





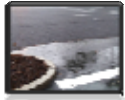
3 Modeled Approaches to a Volume Control Performance Standard

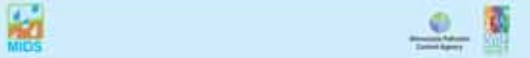
1. Retain a runoff volume equal to one inch times the proposed impervious surfaces
2. Retain the post-construction runoff volume on site for the 95th percentile storm
3. Match the native runoff volume for the
 - a. 1-year 24-hour design storm
 - b. 2-year 24-hour design storm


Three Common Volume Control Approaches

 Retain runoff volume on-site equal to one inch of runoff from proposed impervious surface



1 inch X  = Retention Volume

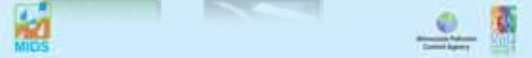
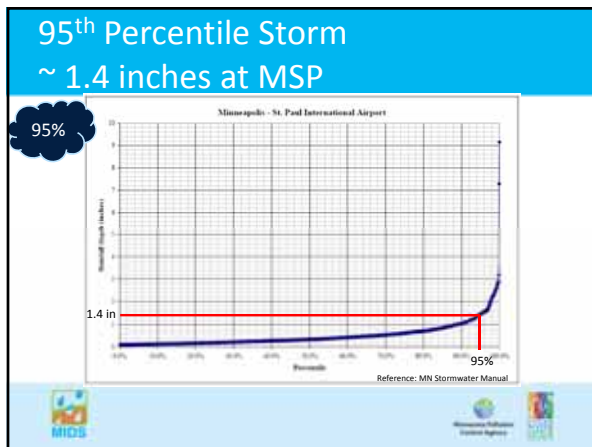


Three Common Volume Control Approaches


 Retain the post-construction runoff volume on site for the 95th percentile storm (1.4 inches in Minneapolis)

95% Storm Amount

 +  = Retention Volume

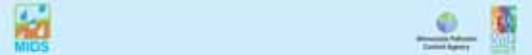
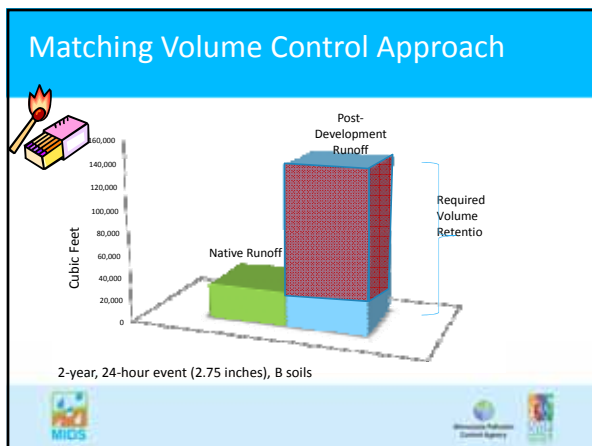



Three Common Volume Control Approaches

 Limit post-construction runoff from a 1- and 2-year 24-hour design storm to a volume equal to or less than the native condition

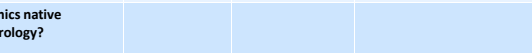
2-Year 24-Hour Storm

Native Condition Runoff = Developed Condition Runoff

Evaluation Criteria of Three Common Volume Control

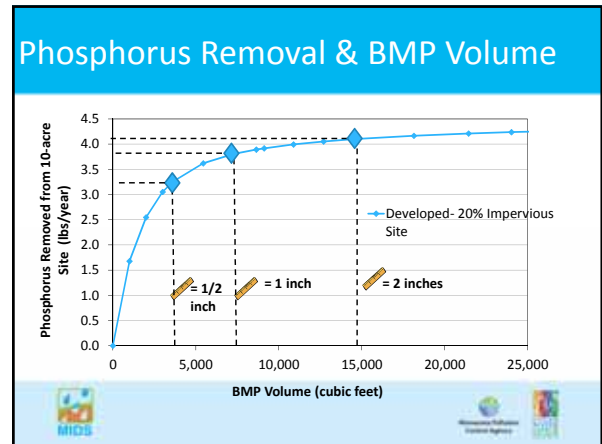
Issue	Approach 1: 1 Inch off Impervious Surface	Approach 2: Retain 95% Storm	Approach 3A: Match 1-Year 24-Hour Volume	Approach 3B: Match 2-Year 24-Hour Volume
Simple to calculate?	Very Simple	Simple	Moderately simple	
Open to subjectivity?	No	Some, but values can be defined to reduce	More, but values can be defined to reduce	
Provides incentive to reduce impervious surfaces?	Yes, the most of the 3	Yes, less incentive for sites on non-porous soils	Yes, less incentive for sites on non-porous soils	
Takes into account different MN regions?	No, but could by varying 1"	Yes	Yes	
Mimics native hydrology?				



Mimicry Evaluation Summary

What about pollutant removal?


Parameter	Approach 1: 1 Inch off Impervious Surface	Approach 2: Retain 95% Storm	Approach 3A: Match 1-Year 24-Hour Volume	Approach 3B: Match 2-Year 24-Hour Volume
Is the 35-year average annual runoff volume equal to or less than the native annual runoff?	<ul style="list-style-type: none"> You Betcha! Improved match with higher treatment (1.1") 	<ul style="list-style-type: none"> Almost always Closely matches for low impervious Provides more than needed volume reduction for high impervious 	<ul style="list-style-type: none"> Yes Closely matches for low impervious Provides more than needed volume reduction for high impervious 	<ul style="list-style-type: none"> Yes Closely matches for low impervious Provides more than needed volume reduction for high impervious



The New Development Performance Standard


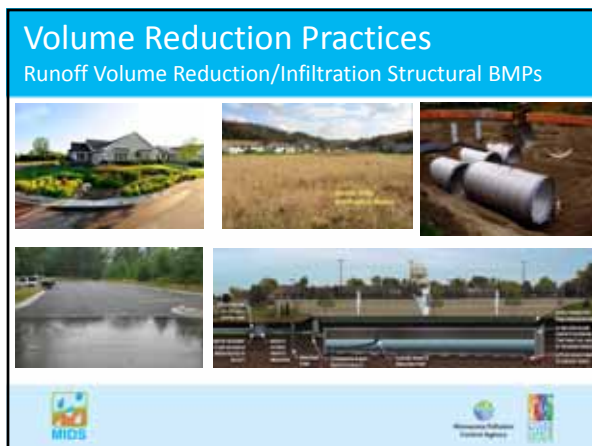
MIDS Performance Standard


“For new, nonlinear developments that create more than one acre 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.”



Flexible Treatment Options

If, due to site constraints, an applicant is unable to achieve the New Development Performance Goal of a 1.1” volume reduction, as attested by the local authority, then a sequencing approach will be followed

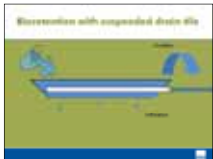



- ### Volume Reduction Practices
- Runoff Volume Reduction/Infiltration Structural BMPs
- Bioretention without drain tile
 - Infiltration Basin
 - Pervious pavement without drain tile
 - Underground Infiltration
 - Green roof
 - Harvesting and Re-use
- 

Volume Reduction Credits

Runoff Quality Treatment Practices/ Some Volume Reduction

- Bioretention Basin with suspended drain tile
- Pervious Pavements with suspended drain tile
- Grass channel
- Dry swale with suspended drain tile
- Filter strips

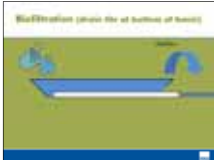


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Water Quality Credits

Runoff Quality Treatment Practices/ No Volume Reduction

- Biofiltration
- Sand filters
- Enhanced sand filters
- Underground storage/detention
- Pretreatment
- Stormwater Wet Ponds



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Non-Structural Volume Reductions Practices

- Landscape management
 - Cluster development/conservation design
 - Urban forestry
 - Soil protection and amendments
- Impervious surface design/management
 - Linear projects
 - Parking lot design
 - Impervious surface disconnection
- Operations and maintenance

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Tech Teams and Work Orders

Tech teams identified data gaps
 Project Manager assigned work orders
 MPCA reviewed deliverables
 Tech teams gave final review
 Work group review and consensus moment
 Will be completed in 2013 and incorporated into the MN Stormwater Manual

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Community Assistance Package

A package of tools designed to help communities adopt local ordinances and implement best management practices (BMPs) as a step toward antidegradation, ORVW, and TMDL compliance

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Community Assistance Package Components

- Background on MIDS
- How to use the package
- Planning process checklist
- Long and short form stormwater and erosion control ordinance
- Conservation subdivision ordinance
- Development checklist
- Sample ordinance adoption resolution

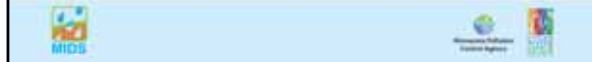
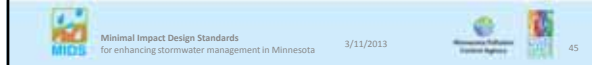
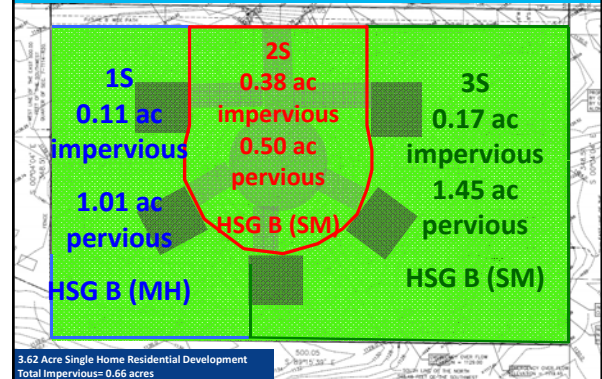


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Residential New Development

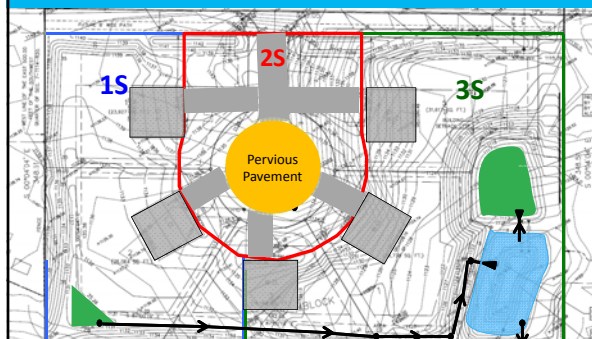


Residential New Development



3.62 Acre Single Home Residential Development
Total Impervious= 0.66 acres

Residential New Development



Summary of MIDS Package

- Voluntary approach to meeting Anti-deg
 - TMDLs & other water quality/management goals
- Provides updated BMP knowledge
- Assist in update of Stormwater Manual
- Calculator to guide better use of BMPs
- Potential of leveling the playing field
 - Consistent standards with FTO in all areas
 - Smarter approach to stormwater management



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for enhancing stormwater management in Minnesota

3/11/2013



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Thank You!

Additional MIDS Information can be found at
<http://www.pca.state.mn.us/veiza8e>



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