Summary of Stakeholder Meetings for

Minimal Impact Design Standards Project

October, 2009

Four stakeholder meetings were held in four regions of the state to gain input on Minnesota's Minimal Impact Designs Standards (MIDS) project. These meetings were designed to provide guidance for development of the MIDS workplan and information for RFP development. Ongoing stakeholder input will occur as the MIDS project is implemented.

The meetings were held on October 7 in Brainerd, October 13 in Duluth, October 19 in Rochester and on October 29 in Plymouth. Over 117 stakeholders attended the meetings. Attendees included: planners, developers, state agencies, watershed districts, builders, consultants, industry representatives, non-profits, academia, county, soil and water conservation districts,

A full list of attendees and notes from each meeting is attached.

Jay Riggs, Washington Conservation District (LID Workgroup Co-Chair); Julie Westerlund, Minnehaha Creek Watershed District (LID Workgroup Co-Chair); and Bruce Wilson, MN Pollution Control Agency (Project Manager) were the key presenters at all of the meetings. The presentation can be found on the MIDs web page: www.pca.state.mn.us/water/stormwater/mids.html

Attendees were asked about the challenges they face in stormwater management and design considerations for BMP selection. A list of best management practices was created at each meeting and attendees were asked to prioritize the list for the MIDs project. Stakeholder feedback is summarized below:

Challenges included: Regulatory issues/limited public understanding of stormwater/difficulty getting LID practices accepted/challenging site conditions and maintenance.

Design considerations included: operation and maintenance/engineering; ease of implementation; credits; land availability and consumption costs; type of property/soil conditions/regional differences; economics/cost of BMP's and political will. BMPs discussed ranged from traditional structural practices to innovative design and management approaches.

Voting Results: A full description of BMP's and number of votes is attached. The BMP's that scored the highest include:

- Vegetated filter systems (swales, filter strips, biofiltration, etc): 40 votes
- Infiltration practices (bioretention, infiltration trenches, detention basins w/infiltration design): 36 votes

- Vegetation-trees (canopy cover, planters/structural soils): 33 votes
- Soil restoration (soil amendments, soil decompaction): 31 votes
- Capture/reuse: 20 votes
- Operation and maintenance (street sweeping, turf management, pollution prevention): 33 votes
- Ordinances: (subdivision requirements, stormwater, zoning and land use, industrial and illicit discharge): 25 votes
- Information/education: citizen engagement, marketing, training and workshops: 23 votes

Stakeholders were informed that the information they provided will be used to help guide the RFP process. An RFP for services should be available in December/January. Work should begin on the project in February or March.

BMP VOTING RESULTS:

Non-structural LID tools: Planning/Design

Practice:	Brainerd (16 attendees)	Duluth (17 attendees)	Rochester (11 attendees)	Plymouth (73 attendees)	Grand Total 117 attendees
Cluster development/conservation design	3	1		4	8
Vertical development				1	1
Minimize total disturbed area	3	1		3	7
Protect natural flow pathways	2			2	4
Protect riparian buffer areas	2	2		1	5
Protect sensitive areas	1			2	3
Protect natural areas			2		2
Reduce impervious areas (street width)	0	2		5	7
Impervious disconnection		1	1	3	4
Shared parking				2	2
Structural parking (ramp or underground)				0	0
Ordinances: subdivision requirements/stormwater/zoning and land use/industrial and illicit discharge-connect the people in the process (reviewers, designers, installers)		4	7	14	25
Information/education: citizen engagement/marketing programs/training and workshops	3	6	4	10	23

O&M – street sweeping/ turf management/pollution prevention	5	2	4	22	33

Structural BMP's

Practice:	Brainerd	Duluth	Rochester	Plymouth	Total
Infiltration practices (general heading) • Bioretention (rain gardens, urban forestry) • Infiltration trenches • Detention basins w/infiltration design • Filtration shelf / re: ponds	 7 1	1 1 2	5	8 6 0 2 3	14 14 4 4 Total: 36
Combining BMP's w/ non BMP structures				2	2
Retrofit lawn irrigation systems to use detention ponds for source water. Incorporate water sensors in irrigation systems (avoid draining historical wetlands) • Underground infiltration practices • Tree boxes				3 1	3 1
Modifications to traditional practices (adding forebays to ponds, amending soils in dry detention basins)				5	5

Enhances pond treatment (Prior Lake style)				1	1
Sand Filters				1	1
Riparian buffers	2				2
Shoreline restoration-erosion controls for bank stabilitization	5				5
Vegetated Filter systems (general heading) • Vegetated swales • Filter strips • Biofiltration • Non-vegetated filters	4	8	1 5	7 8 0 7 0	7 20 1 7 5 Total: 40
Green Roofs	2	3		4	9
Manufactured settling chambers/pre-treatment				0	
Extended dry detention basins				0	
Underground storage/detention				7	7
Underground infiltration systems				3	3
Underground storage/reuse/attractive in landscape (fountain, etc.)				2	2
Roof top storage				0	
Evapotranspiration as a volume control and load reduction credit	6	4	1		11

More BMP's

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Practice	Brainerd	Duluth	Rochester	Plymouth	Total
Capture and reuse		2		18	20
Right of way management (disconnect driveways-drain to pervious area)				1	1
Permeable hard surfaces (porous pavement)	6	3	2	6	17
Non-vegetated filters (sandy iron filings, etc.)				2	2
Ditches				1	1
Underdrain Design		5			5
Soil Restoration (soil amendments, soil decompaction)	6	5	2	18	31
Active treatment to existing ponds/regional systems				2	2
Vegetation (native landscaping)	4	1	4	8	17
Vegetation – trees • Canopy cover • Planters/structural soils • Design for ample, uncompacted root zone volume that gets trees to 30 years and beyond		6	1	21 2 3	28 2 3 Total: 33
Evapotranspiration				3	3
Regional management				6	6
Chemical treatment – alum				5	5
Mobile water treatment plants				3	3

Hydrodynamic separators				1	1
Pervious pipes-distribution				2	2
Recycling stormwater-irrigation/gray water reuse			1	1	2
Curb design	1				1
Winter management techniques Color of pavement/vegetation type, salt/deicer		4	1		5
Techniques to ID: mimic natural conditions		5			5
Wetlands-constituted (?)				0	

October 7 2009 Brainerd Meeting MIDS

Attendees

Andy Bradshaw, City of Moorhead
Jesse Frushammer, City of Brainerd
Phil Hunsicker, 1000 Friends of MN
Jen Buckentine, Stearns County
T. VanderEyk, Bomart Pederson & Associates
Stan Hanson, Bonestroo,
Scott Lucas, MPCA
Lonnie Thomas, MDNR,
Paul Radomski, MDNR
Mike Mueller, MDNR
Jay Michels, EOR
Brian Hargrave, City of Cross Lake
Wayne Cymbawk, Stearns County SWCD
Bonnie Finnerty, MPCA
Rick Lestina, City of Maple Grove
Tim Ramerth, Westwood

General Thoughts from the Group:

Enforcement , one size fits all mentality doesn't apply, northern MN resource realities (lots of sensitive waters and shallow ground water).
Include soil types, high water table considerations
Lots of development around White Fish Chain, have to treat water fast. Typical of lake area developments.
Brainerd Shoreland issues, turf issues need to be considered and managed.
Need adequate details in SWPPPs, MIDS could help streamline. Refer to methods.
Need more flexibility for diversity of land, soil, groundwater issues
Growing number of LID examples in area. Rainwater gardens in redevel, LID Stonegate St.Cloud Monitoring, Sartell commercial devel win 1/2 mile of Mississippi River. Requires infiltration. People need to realize sw needs treatment as per wastewater!
Small cities up to speed on alternative means beyond pond and pipe.
SW Mgmt in rules, proposing to revise w/flexibility. Difficult to engage the public
Funding and public education biggest issues with local governments.
Design and community – nothing innovative coming along- need to get this education going. Great downtime to reconfigure processes.
Challenge – finding area (costs) for sw treatment and O & M expense uncertainty.
Everyone thinks is necessary but not my job. Disjointed in delivery of info SWCDs, poor implementation of sw regs.
How are we going to advance into new delivery system? Lots of opportunities.

Disjointed multi agency, multipermit process, complicated. Impacts from Nonpoint sources (small urban and agriculture) over broad areas.
Need to begin addressing small cumulative impacts.
Education needed!!
Biggest challenge will be related to saving open space, pervious space but land prices cause issues.
New available MS4 toolkit, get names and urban forestry Q and P reduction techniques.
Shoreland impacts, variances, manage runoff on property. Challenge – education for residents.
SW education Challenge – working with local officials including ordinances.
Present ordinances not oriented to LID, need incentives. Economic means as many lots as we can… incentivize ordinances.
Biggest group of priorities from board:
Life cycle costs
Education
– 100 year flood (rate control) is a conflict with the 2-5 year design storm.
MIDS: No set scale. Primary site level program.
Rain garden - ? volume credit with underground drains when we have tight soils
Pervious pavement:
Need more public sector leadership on how working?
Example : boat launches etc
Set up similar calculation program as to ponds …
Time and direction of flow, natural hydrology volume later.
Focus: P, not as much TSS concern up in Brainerd.
Pending markets: conservation design has not taken over due to lack of market desire.
Topography, life cycle costs, maintenance, soils, permittability (design flexibility getting credit)
LID standards – get through planning and city councils. Getting acceptance through the politics
Big homes, get credit for pervious pavements.
O& M concenerns: How long project will function? e.g. rain gardens and passing property to kids
Perceptions and asthetics (e.g. I & E)- lawn to water "beauty" aesthetics
Turf runoff, turf management issues substantial but under the radar.
Inspection (both construction and maintenance)
Inventory and asset management of sites
Local capacity to manage all aspects
Remote sensing, photo with greater resolution to define impervious and subtle details.
Complexity and vitality, health of the native plant community
Quality Control : construction of good designs by local vendors/contractors, then maintenance.
Capacity of installers, contractors
Effectiveness and how to determine in design, operation
Incorporation of precautionary approaches
Consideration that local units include understanding of all water resources.
Realtors need to be on board!
Who is designing?
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Requirements (e.g. engineering PE certification – all the way to the contractors building practices.)

List all possible bmps even though we may not have effectiveness info.
    Best guesses ok, develop a tiered approach.
Pervious pavement with and without infiltration designs
Soil augmentation : factor in climate, maintain winter porosity via organic materials.
Proprietary devices, with infiltration, filtration tree boxes,
Floodplain management: ditches, restoration.
    Geomorphological management.
Evapo-transpirational volume controls, changing climate
    e.g. cottonwood soak up 750 gpd
Native vegetation – could be better defined.
Silvacell – tree in a box, Auquatera
Planter box – surface planting in hardscape next to building
Green Roofs
Capture – reuse
Soil restoration
Vegetated filterstrip
Vegetated swale
Disconnect impervious surfaces.
Curb and gutter vs. rural design
Winter management: Techniques, color of pavement, vegetation types, deicing
Shoreline Restoration erosion control, or bank stabilization projects
Turf management: Compaction, soil augmentation, vegetation
Products needed: GIS coverages; municipal banking of credits for future development likely a big focus rather than trading between cities; Impervious cover MLCCS data for detailed parcel level; satellite vs. MLCCS
Credit: Points system
Designers – tools used, autocad, hydrocad for analysis, supplemental spreadsheets, P8, double ring infiltrometer infiltration tests (before design, verify infiltration rates by measure as to designs. Field verification
Doubt expressed on true utility of double ring infiltrometer, abused in field measurements. May not want in manual
Request to provide simple to complex.
    Simple numbers of volumes, hand calculations and spreadsheets
    Very difficult to use with volume control measure estimations
Some areas lack soil surveys – recent updated.
Review process: Hydrocad, compare numbers to accepted design practices and parameters. Accepted designs to mpca treatment levels,
Evapotranspiration example: inches per hour, leed criteria ecoregion, soils, stage of growth, precip, type of vegetation, maturity of community (plant community root system developed).
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Intensity of rainfall

Watershed area – bigger areas may have higher prob of intense events.

Don't forget groundwater protection !! Infiltration practices have to be MDH approved too.

Curve numbers, affected by compaction , upped CN #

Compaction effects on soils, how do they affect Pre and Post curve numbers. Even with sands

Social – how well does voluntary program work? Shoreland

Developing an effective credit system with the technical and engineering aspects

Pilot the credits via the EPA system

Work with communities to make sure this is not mandatory.

Communicate legislation is an allocation to fund the project, not for mandatory new requirements.

Cost benefit numbers, longevity and effectiveness. Confidence factor

Demonstrations and financial incentives for communities and incentives.

Why would a community adopt this… TMDL and nondeg documentation, antideg no adverse impacts to downstream for volume, tp and tss.

Dirty thirty Antideg requirements to meet? TMDL requirements, ORVW requirements.

Improvement to water treatment, tourism, and other avoid metro marketing pitches.

Sales pitch based on science, and info for designs, will likely go into regulatory approaches in the future.

Evolution that is taking place.

Big Sandy TMDL - 20% reduction for NLF, area that can fixed , one Ws with 30% load in less than 5% of watershed. Practices are usually small area practices, not the big stuff.

Rural area has to have standards – they will have to do something. Practices will have to be implemented.

MIDS to rural communities - clean water goals for new development and redevelopment. Nothing about ag.

Creating a regulatory wormhole. Not a regulatory process but could be used as such by communities as they review the science.

Disengenuous to say not regulatory. Ramping this up will become regulatory.

GIS guru

Web blog is a good idea.

Get business cards

October 13, 2009
Duluth MIDS Meeting

Attendees:
Brad Scott, LHB
Patty Fowler, DNR
Kerry Thorne, City of New Brighton
Chris Morris, St. Louis County
Joel Peterson, MPCA
Chris Kleist, City of Duluth
Erik Larson, University of MN
Jesse Schomberg, University of MN
Amber Westerbur, State of MN
Keith Anderson, South St. Louis SWCD
Dave Stark, Stark, LLC.
Nathan Schroder, South St. Louis SWCD
Gary Mink, City of Duluth
Scott Weyandt, SEH, Inc.
Luke Sydow,
Tom Estabrooks, State of MN
Jim Dexter, , MPCA
Jay Riggs, Julie Westerlund, Bruce Wilson

Background information:
Stark: Preventing sw, reuse focus on capture water. Challenge is acceptance rainwater and municipal supply water. Regulatory constraints. Capture reuse regulations.
New Brighton – fully developed, into retrofit. SW and groundwater contamination at TCAPP. Conflict w/Superfund
Duluth. Public education, assess how effective the programs are. What is effective for our expenditures. Maximize resources.
Stormwater designs around state, overlapping regulations, different education with regulators and clients of acceptable. Regulatory framework is a daily challenge. Educating the regulators, expanding horizons, what is goal of regulation vs. semantics.
Duluth challenges: Unproven technologies, hoping for the best. Good things – updating of sw manual, one of best nationwide. Designer into the right mode and asking the right questions. Design life and maintenance, used to be 50 years. Ponds, can see, underground BMPS harder to inspect, contamination concerns. Fixing a much bigger deal. Maintenance a much bigger deal. Nondegradation. When it goes bad, what are we going to do. Duluth infrastructure in place for > 100 years. Bedrock shallow. Bigger infrastructure concerns. Hitting moving target with SW regs, whole new permit MS4, nondegradation rule making going forward. Appears to be separate groups. Amy Garcia, Bill Coles group. Uncertain regulation.
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Aesthetics and regulatory unknowns for sw designs to ponds.
SLC – rural in nature. SW treating sediments, P, how to measure. How do we measure and deal with. Rain gardens and pervious pavements. Site needs slopes, clays present severe constraints in design. Big box stores are a problem rather than big parking lots. Need alternate designs. Trout streams (16) in Duluth.
SW designs for retrofits for swcds. Challenges: Miller Creek area challenges – maintenance and operation of bmps. Installation, inspection & maintenance details needed. Not much in the way of process as is case in WWTF world. Built and forgotten and window dressing.
Making more stormwater than we need to due to local regulations. Requiring parking spaces, street widths, large lots requiring more streets etc.
UMD engineer $ and services. Example – U wants bike lanes, roads not wide enough Carbon footprint vs. street width. Conflicting interests. Contractors not knowledgeable of rules. Lack of consistency in inspection and compliance. Sediment is going to leave site: e.g.clays. Can't fix it, no NTUs.
Inconsistency – brown field requirements and stormwater requirements.
Too few inspectors in field. RE: remote sensing a need. Legal system is a frustrating: due process. Do not have adequate tools. Noncompliance cheaper even with risks. Business decision.
MIDS for urban or rural standards – applies to rural areas, growing cities.
Evapotranspiration aspects important!!! Need for crediting purposes!!Vs unproven technologies and time for maturity of techniques. Carbon concerns related -

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Suggestions for Full Range of Techniques

Design Considerations for BMP Sections
Impact on receiving waters
Biological conditions –
Source materials (compost, plants)
What's required by NPDES permit: construction permit
Space requirements constraints
    Upgradient issues: freeways, land use etc
Maintenance – lowest to no maintenance.
Costs: installation, life cycle costs. Design, installation, land costs.
Treatment effectiveness:
Quality of design: Site Design
What will be approved… local ordinances and local acceptance.
Ownership, responsibilities
Rightofway, home owners responsibilities
Access: easement, to entire device and for maintenance.
    Home owners associations, developer city agreements for when home owners association doesn't exist.

Life cycle : not 50 years much shorter life cycles
Duluth 150 large bmps now. Lots of smaller shorter life bmps

P8 and SLAMM : credit for practices – tracking system - how to make sure that BMPs (grass cut etc).
Do we need a databased for these practices.
Mosquitos – will these encourage? Unintended consequences
Minimum maintenance key, with native vegetation
Should be providing from contract:
Maintenance guidelines,
Education of long-term goals critical for longterm functioning of BMPs.
Menu of techniques
Everything up here needs to be underdrained. Agridrain – and drain for winter.
Will freeze up pervious pavements
Winter considerations: Salt and sand
Disconnection of impervious surfaces: how to get credit for curb cut outs,
Site designs
Downspouts
Street diversions and spreaders.
Geological limits to designs: shallow bedrock depth, clays, slopes
Define natural conditions to mimic. This is critical to define this. What is predevelopment. Go back to legislation. Presettlement. In Duluth, clay soil fully treed. CN on = clay 70 Initial abstraction. Volume controls vs. infiltration; We are not developing an infiltration standard.
Duluth – develop calculator for this area. Likely most difficult
Proprietary devices
Germany, Australia
Twin Cities : watershed volume control with a cap. Purchase credits. Keep flexibility.
Various exclusions discussed as with Wisconsin.

Hydrocad, Stormnet, P8, SLAMM,
Backwater effec

White Board Responses Duluth October 13, 2009
(// = Hatchmarks recorded)

Infiltration / Have to have underdrains in area, drained in fall or will freeze.
Biorention /
Infil. Trenches
Infil. Ponds //
Vegetated Swales ////////
Filter Strips
Biofiltration
Evapotranspiration methods ////

Native Landscaping /
Trees //////
Green Roofs ///
Capture and Reuse //
    Uber Deutchland
Permeable Pavements ///
Soil Restoration/Amendment /////
    Compaction Avoidance
Underdrain Design /////
Winter Considerations ////
Rural xsection vs. Curb & Gutter /
Techniques to ID
    Mimic natural conditions /////
Proprietary devices
Planning and Design
    Cons. Design /
    Disturbance minimization /
    Protect flowpaths
    Buffers //
    Reduce Impervious //
    Impervious Disconnection /
        Downspouts
        Street Diversions and spreaders
Ordinances ////
Education //////
    Public, local officials, contractors.
O & M //

Rochester Meeting
October 19, 2009

Atttendees:
Paul Drotros, City of Red Wing
Larry Frank, Arcon
Barb Huberty, City of Rochester
John Harford, Olmsted County
Andy Masterpole, Yaggy Construction
Matt Crawford, City of Rochester
Kyle Skov, City of Albert Lea
Randy Neprash, Bonestroo
Don Jakes, MPCA
Ray Schmitz, Concerned citizen
Matt Durand, City of Owatonna

Jay Riggs, Julie Westerlund, Bruce Wilson presenters, Milt Thomas Facilitator
Greatest challenge is to make people as entusisastic about stormwater as I am.
Approach all our projects with how do we grade a site. Not much concerned about how much dirt we move. Avoid chasing grades. Stormwater is the dominant issue when we do a development (when developments are occurring). Timeframe in midwest is a challenge – it's a rush because the snow will fly. The slow down in the economy gives us a chance to look at what works and what does not.
100 employees implementing the MS4 permit. Competing interests is a big stormwater challenge.
Zealots to economic interests – wide range of interests.
Challenge fitting wetlands and stormwater together. Our TEP is pragmatic – not idealists. This part of the state is not blessed with huge wetlands, but we do have many small ones scattered all over the place. Full sequencing is important, but many of the wetlands are relatively low value. City of Rochester stormwater standards sometimes do not fit well with wetland protection.
Tries to integrate stormwater into early design. Challenge is trying to convince owners that integrating stormwater into early phases of the design is the right thing to do. There are not policies and ordinances in place to encourage that. Up front design may be more expensive to take this approach. Challenge is getting development community to embrace some of these ideas. It's the last thing they think of – it's an afterthought.
High groundwater and others site issues are challenge.
Challenge is working toward making stormwater regulatory program meaningful and manageable.
Challenge is long term interest is how the MPCA appropriately credits various stormwater measures and load reductions for proposed activities.
Challenge is stormwater is an opportunity to bring back ecological function into developed landscape.
Challenge is taking that opportunity and making it happen.
Why are we focusing on ponds? We know it works and it's cost-effective. NURP.
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General comments: offer flexibility for designs
Concern over road and infrastructure - snow plows and winter conditions with narrow streets
P from agricultural sources as well as urban area
LID is great, small rain gardens offer a lot
Don't we have to consider the depth of soils as well as type of soils?
Antidegradation issues: have to be consistent with this effort
Scope of crediting system – site to city-wide. Tough to distinguish between what is needed.
Have to include O & M guidance with design standards. Otherwise we build and down the road we have a problem. Design, Installation and Maintenance
Include with RFP : potentially include UM – SAFL?
Have to define credits carefully
    Treatment credit vs. density credits vs.financial/fee credits, vs. P credits vs. Q credits
    Stand of great trees, developer preserves, gets credit for that with smaller pond.
Participant SW Mgmt Issues;
    Expediency for the developers, time is money through the review process
    Ordinance barriers to LID etc.
    City/Developers – what can we keep, keep vision of the site Pine, oaks.
    Get credit for preserving natural functions Vs. the clearcut development,
Detailed city planning needed on front end before developers (city planning about connecting natural areas)
    Concern that will lead to develop areas sensitive due to open credit.
Phased approach: As developer look at phases, construction phase vs. final product – time lags.
Complexity. Establishment of natural features (vegetation)
Acceptance of density dependence upon credits for other design/construction credits.
Development now – compaction of infiltration areas due to costs. Used for storage then impacts the compaction. Staging of areas - learning about compaction, LID etc. as we go.
Ownership responsibilities - Long term maintenance responsibilities\
Footprints of BMP – many small vs one big.
    Inspection of construction – low bidder without knowledge. Contractor training
    Local capacity is greater than MPCA's
Glean from literature potential list of unintended nuisances, mosquitos, frogs,
Need careful literature review of LID BMP effectiveness with caveats.
Regional issues
    High water table
    Clay soils, till soil that doesn't drain
    Karst/bedrock groundwater contamination
    Source water protection
    Calcareous fens – SE issue.

If we alter native soils with development: how are we to implement MIDS (runoff to native soils and vegetation)?

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Loss of native soils (e.g. developer selling topsoils) ~ minimum of 1 foot left in place.
Stripping topsoil and respread.
Compacted soils – many more acres of hard surfaces.
Mining of sand & gravel at sites can be extensive.
Mass grading. 6 inches of soil can disappear in 2 years at site if not covered.
Constructing the pad, impacts the topsoils. Ripping a great idea.
Social costs – overall measuring impacts of site holistically.

Full Measure of BMPs w/votes

Ordinances /
Subd Req./////
Stormwater
Zoning //
Have to have land use plans
Challenges of retrofitting vs. new development
Inf and education
City engagement //
Marketing
Training //
O & M ///
Street sweeping /
Turf Management
Pollution Prev.
Planning/Design Site specific /
Cons Des
Dist. Minimization
Protect Nat. Areas //
Reduce Imp
Imper. Disconnection /
Infiltration Practices /////
Biorention
Infil. Trenches
Detention w/Inf
Vegetation ///
Native Landscpaing /
Trees /
Evapotranspiration /
Biofiltration /////
Vegetated swales /
Green Roofs
Capture/Reuse
Permeable Hardscapes //
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Soil Protection/Restoration //
Proprietary Devices /
    Filterra
    Biobasins
Cold Climate Considerations /
Water Conservation /
    Outdoors, lawn irrigation
    Municipal water rates (cost)
"Proprietary"
- Devices swirl conc.
- Filterra
- Silva cell

Stuctural soils
O & M – permeable pavements at Walmart etc – who is doing the maintenance?
NURP – we know life cycle costs, don't have the long term costs need all considerations
Developers – looking at costs – need entire costs. Include I & E,
Need to include total costs for design life for maintenance and who shoulders the burdens
Reality = if count on maintenance – have a problem. Maintenance cut at times of economic uncertainty by county boards etc. Find as low maintenance items as possible.
Redevelopment – higher standards will be needed.
Regional system – meeting requirements (Barb) Infil development is very different in Rochester vs. Twin Cities.
Administration of credits, record keeping and tracking, reporting
And relation to stormwater utility fees, credits.
Confidence levels
Zero maintenance BMPs – such a thing exist? Native vegetation type areas?
Low Maintenance items: Native vegetation, protection of natural areas. No
SW Management – drought to floods, floodplain issues.
    Water conservation – no irrigation
    Green Roofs
Mulitiple benefits of various BMPs. Integrating multiple benefits
    Energy
    Carbon
    Biodiversity
    Irrigation
    Harvesting for $
Specs and design calc's
Demonstration cities: monitoring and assessment.
    Core Science
    Demonstration output

Products and Services:
Requests
Visioning software -
Nondeg – analyses for big cities
Hydrocad, rational spreadsheet
New infiltration not handled by these models , have to manipulate the existing models.
Recarda – Wisconsin Model (Matt Crawford, Rochester)
Curve number changes –
Inputs critical as model used.
Stormulator Tim Laurence
Rochester – limited nondeg items they could claim
Highways not in same planning effort. Integration with highways and other planning efforts to be encouraged. Basin management
Red Wing ordinances not preventing MIDS, not encouraging either.
Package has to say these not restricting and how are they going to incentivize these practices.
TMDL Load reductions will drive this effort.
Concern about aquifers and contamination potential.
Cultural shift – people think we have clean water – how does this stack up against other social issues (unemployed, impaired, crime, schools, education etc.)
Community sizes – small (growing) to large and established.

Plymouth Meeting:

October 29, 2009

Attendees:

1. Shawn Tracy: Anoka SWCD
2. Wes Saunders-Pearce: MnDot
3. Doug Thomas: Rice Creek Watershed district
4. Jean Coleman: CR Planning
5. Peder Otterson: DNR
6. Jill Crafton:
7. Ken Beck:
8. Don Asleson: Target Corp.
9. Marty Asleson: City of Lino Lakes
10. Steve Juetten: City of Plymouth
11. Jim Hafner: City of Blaine
12. Ron Leaf: SHE, Inc.
13. Phillip Elkin: Frostline Eng.
14. Shane Missaghi: U of M
15. Tom Kaldunski: City of Inver Grove Heights
16. Angie Tomovic: City of St. Cloud
17. John
18. Bob Swanson: Meadowood, Inc.
19. Mark Jaster: Stanley Group
20. Allan Larson: City of Cottage Grove
21. Scott Anderson: City of Bloomington
22. Kristin Asher: City of Richfield
23. Mary Davy: No Stress Gardening
24. Donna Herman: No Stress Gardening
25. Liz Stout: City of Minnetonka
26. Jo Colleran: City of Minnetonka
27. Paul Dudalla: WSB
28. Tim Kelly: Coon Creek Watershed District
29. Derek Asche: City of Plymouth
30. Dave Poggi: Bolton-Menk
31. John Bilotta: U of M (NEMO)
32. Dave Fritzke:
33. Karen Jensen: Met Council
34. James Landini: City of Shorewood
35. Dave Bauer: Rice Creek Watershed District
36. Tom Mathieson: City of Crystal
37. Andrew Judd: Stanley Group

38. John Barter: Three Rivers Park District
39. Doran Cote
40. Len Linton: City of Ramsey
41. Steve Foss: City of St. Cloud
42. Mike Isensee – Dakota SWCD
43. Rick Person:
44. Rod Rue: City of Eden Prairie
45. Jack Gleason: DNR
46. Ed Mattthiesen: Wenck
47. Mark Zabel: Dakota Co.
48. David Filipiak: SRF Consulting
49. Brian Miller: BDM Cons. Energ
50. Tina Plant: Hedberg Aggregates
51. Jill Thomas: MN APA
52. Todd Hubmer: WSB
53. Paul Moline: Carver County
54. Ryan Peterson:
55. Klayton Eckles: City of Woodbury
56. Lois Eberhart: City of Minneapolis
57. Paul Chellsen: City of Minneapolis
58. Bob Moberg: City of Plymouth
59. Peter Coyle: Larkin Hoffman (?)
60. Andrea Hendrickson: MnDot
61. Sharon Doucette: City of Woodbury
62. Brian Nerbonne: DNR
63. Marcey Westrick: BWSR
64. Douglas Carter: Bolton-Menk
65. Kristine Giga: City of Roseville
66. Eric Macbeth: City of Eagan
67. Ann Messerschmidt: City of Lakeville
68. Beth Neuendorf: DNR
69. Dan Marckel: 1000 Friends of Minnesota
70. Pat Byrns: City of Minneapolis
71. Michele Hanson: DNR
72. Steve Klein: Barr Engineering

LID Co-chairs: Julie Westerlund and Jay Riggs
MPCA Staff: Anne Gelbmann, Anna Kerr, Mike Findorff, Bruce Wilson, Mike Trojan

<u>What are some challenges you face with stormwater management?</u>

- There are many competing issues for stormwater management, such as water quality, CSOs, erosion control, and flood control
- There are too many regulators; multiple layers of regulation. There needs to be better coordination of regulations
- Coordination of regulatory programs-multiple layers

- Erosion
- Cities have to respond
- Non urban rural landowners have unique challenges
- Education of public-it's not the city's water-it's "your" water
- Economic development between stormwater and redevelopment in build environments-redevelop to pre-development conditions is difficult
- Certain BMP's are more experienced
- Regulations that are ahead of technology – need to know they are effective
- Use nature-practices that have multiple benefits
- New development must address stormwater issues vs. the past where stormwater was not an issue (I think this pertains specifically to water quality concerns)
- Getting the public to understand stormwater and stormwater management; education needs
- Finding an economic balance between development and stormwater
- Pre-development target is not achievable for some situations
- Changing to new approaches may be costly
- Maintaining BMPs and ensuring that BMPs are kept as designed (not modified with time)
- Using the landscape/natural environment in development
- Treating stormwater as a resource

<u>Questions that came up during the presentations:</u>

- MIDS seems to focus on residential but linear projects and commercial areas can be significant contributors because of the high imperviousness. Similarly there are concerns from areas that are largely built out and primarily undergo redevelopment rather than new development. There were concerns about MIDS being done in two phases.
- There were some concerns around anti-degradation as the driver for MIDS. One concern is that anti-degradation is not achievable in some situations. Another concern is getting the MPCA to buy into the concept of using MIDS to meet anti-degradation requirements. MPCA cannot commit to this but acknowledges that conceptually this is the intent. It was stated there will be an oversight team consisting of manager types from MPCA, MCEA, and MCSC to ensure that MIDS fulfills requirements for anti-degradation.
- Will infiltration cause unforeseen problems? One example was the impact on local and possibly regional water levels by forcing infiltration onto a landscape that is largely a function of stormwater hydrology. Another example is the potential impact of infiltration on groundwater quality. This is partly addressed by MIDS being subject to local conditions and qualifiers. For example, infiltration may not be feasible in karst settings.
- Will work by other organizations, specifically the U of M and LRRB, be incorporated into MIDS. Bruce replied yes.
- Will traditional BMPs be included in MIDS? The answer was yes, although it was stated that we already have pretty good data for these BMPs.

- Will there be a hierarchy of water bodies addressed through MIDS? Will lakes, rivers, wetlands be treated equally? A concern was expressed that managing for all of them equally may not be practical. No specific answer was provided to these questions.
- Will watershed organizations buy off on MIDS? If MIDS is acceptable to MPCA it may not be acceptable to some WDs. How do we ensure this does not happen? One way is to involve WDs in the process, but it was acknowledged that this may be a concern. There needs to be a commitment from the more aggressive WDs that may be a concern.
- MnDOT stated linear projects do not fit in well with watershed plans and rules as they currently exist, and it may be more difficult to make this fit if linear projects are overlooked during MIDS development.
- There were concerns about the applicability of MIDS to local projects. The objective of MIDS is consistency and not a one-size-fits-all approach. There needs to be flexibility in MIDS.
- Concerns exist over different approaches in Metro and outstate areas. One example is design methods, with 90 percent of Metro folks using CADD and 50 percent in rural areas using spreadsheets.
- Extra credit should be provided for BMPs that achieve multiple benefits. For example, what credit should be given to a BMP that helps decrease stormwater volume, improves stormwater quality, and reduces the carbon footprint?
- Some concerns about non-traditional discharges to the stormwater system, such as industrial or geothermal discharges
- Will the credits be defendable? Bruce talked about the role of monitoring in determining the appropriate credits
- The BMP list is not static. The list will grow with time. Some concern that the credits could change over time, which presents a moving target. Having a credit council should help with this.
- Everyone needs to be involved, including watershed districts.

Small group discussions:

Design considerations

Group A

- Maintenance and engineering considerations
- Cost per removal
- In choosing between infiltration and filtration, what credits will be given
- Credits for a variety of constituents; for example one practice may work well for phosphorus but not volume – how will the BMP be credited

- What is the specific pollutant; the example cited was temperature in the Vermillion River watershed.
- Ease of implementation
- Public acceptance
- Public willingness to maintain the BMP (e.g. rain gardens); will they enter into a maintenance agreement.
- For street sweeping, there are a variety of design considerations, such as type of sweeper, frequency, targeting areas, type of surface, etc.
- For education, what kind of a credit will be given, or can a credit even be given (difficult to quantify effects)

Group B

- Manual (credits) hard to implement; difficult to calculate/verify
  e.g. prairie reforestation-difficult to achieve; not practical; disconnection of impervious surfaces-impractical; costs – still need to see profit for developers
- Credits need to be realistic, apply to standard practices
- Different levels of requirements (state, city, watershed district)
- Tie in costs to O&M-maintenance is key; e.g. certification programs for BMP's – Rice Creek watershed district's raingardens, annual inspections.
- Funding – who pays? Costs upfront – annual fees; lifecycle costs
- New Niche: private maintenance of raingardents, etc.
- Problem areas: frost heave-greater base slab base, drain tiles, etc.
- Need product acceptability lists: certification process-certain standards criteria; list of products & practices; "time is money"

Group C

- Land availability/costs
- Creep of impervious percentage-in developed areas-is there an impact?
- Maintenance requirements
- Percolation tests
- Conversation/replacement of failed BMP's
- Thermal impacts-how to addresss?
- Public acceptance
- Ease of implementation
- Public education-how to quantify?
- Access to facilities

Group D:

- Soils
- BMP footprint-size, available space
- Goal/requirements to be met
- Pollutant removal goal
- Cost and cost benefit
- BMP efficiency-reasonable range
- Confidence in BMP's/proven track record
- Life span-how long will it last?
- Expertise & knowledge – for newer BMPs
- What maintenance is necessary?
- Aesthetics
- Maintenance access
- Community benefits
- Education, health-community goals
- Community vision
- Regulations, comp plans

Group E:

- Type of property varies by physical character
- Clear understanding of goals (e.g. load reduction, volume)
- Design features of the site (e.e. space constraints)
- Cost
- Is the site good relative to location within watershed-what is best location for maximizing cost investment
- Looking across developments/sites-not just within site-regional approach/neighborshed or subwatershed – using the natural network.
- Balance between regional ponding and micro site focus
- Operation and maintenance costs/responsibilities
- Don't make BMP's cookie cutter

Group F:

- Maintenance-equipment, manpower, access, costs, life cycle, responsible party, credit
- Public understanding – how raingardens function, managing expectations
- Measure returns – cost/benefit, pollution reduction, credits, footprint considerations, volume reduction
- Political impacts – city council directives

- Education – function of BMP's (many audiences) Who? Public, city officials, designers, implementers-everyone!
- Conservation/Preservation/Renovation: quantify value of existing resources (trees), conversion to healthy ecosystems.
- Economic – what it costs to manage site, purchase property (easements)
- Demonstrate value up front – life cycle costs – not just up front or installation costs – how do we communication these long term costs?
- Satisfy multiple goals….quality, volume, rate "Resemble natural conditions"
- Meeting regulations & goals – anti deg; infiltration, permits

Group G:

- Rules
- Soil type-infiltration rates
- Cost
- Maintenance
- Space available
- Training for city staff
- Water table
- Size of drainage area
- Existing problems
- Quality of receiving waters
- Contamination – point source, first flush, soils
- Planning/zoning issues
- Effect on existing infrastructure/compatibility

Group H:

- Function for water quality goal of project-does it provide the needed protection for receiving water
- Determine effectiveness
- Cost/Upfront/long term (i.e. life cycle)
- O&M – qualified staff? (consultant vs. public works staff); admin/agreements; private systems/ensure function and maintenance
- Aesthestics
- Land consumption
- Accepted BMP's – native buffer vs. turf – political/ public (can feed long term political value)
- Upland benefits vs. designed BMP-minimizing impact vs. rate control
- Better math for BMP's in a series (ex: 3 ponds in a row) quantify preservation of open space-stacked benefits

- Quantify soil amendments and mediation work-stacked benefits-irrigation-reduced infrastructure-pesticide/herbicide-open space-root development
- Developer receives stormwater credit for open space
- Green roof-stormwater slanted roof
- Credits for proactive BMP maintenance programs
- Credits for modifications/enhancements to traditional systems
- Retrofit irrigation systems – with rain sensors; use pond water (not drain wetlands)
- Side note: geothermal – must be closed looped systems

Group I: (Ultra-Urban)

- Underground utilities
- Capacity and location of system to discharge to
- Receiving waters
- Compacted or unknown soils
- Contaminated soils
- Contaminated or questionable runoff
- Types of soils
- Aesthestics
- O&M (including equipment needs)
- Life cycle costs
- Access to BMP site
- Project density-lack of space – neighborhood density
- Adjacent structures (water in basements, etc)
- Who is responsible for O&M?
- Multiple regulatory authorities (conflicting goals & standards/regulations)
- Distance to water table or bedrock
- High land value and cost
- Drinking water to wellhead protection
- Utility fees
- Right of way – C/B – cost per unit of pollutant removal
- Redeveloping older neighborhoods
- Are old right of ways included?
- Use opportunities that are off-site?
- O&M – long term accountability and ability
- Constructability
- Lots of existing roads
- Integrating into existing water regime – protect existing flows and water table level (quantify and quality)

- Recognize regional approaches and BMPs
- Public acceptance (also O&M)
- Short lived projects – land uses
- Political will
- Conflicts with other planning or land use regulations or goals
- Coordination within city
- Conflicts with other site issues and goals (bldg locations vs. BMPs)
- Developer acceptance – developer powers
- Developer pressure – take it somewhere else
- Special tax districts – inadequate funding sources
- Design rain storms
- Agreed upon pollutant removal rates (credits)
- Include non-structural BMP's
- Some BMP's just won't work
- Alternate mitigation paths needed
- Include in-lake (?) BMPs
- Too much trouble – cost, design, building, etc.
- Recognize local constraints and circumstances

BMPs

Group A:

- Pond retrofits
- Street sweeping
- Ditches – can we incorporate practices into ditches that make them suitable as BMPs
- Underground storage
- Inventories and mapping of BMPs – this should be treated as a BMP
- Stuff that is already in the permit, such as the education BMPs, should be given credits
- Other training and education BMPs, including certification

Group B:

- Residential cisterns (attractive in the landscape; fit into green city designation

Group C:

- Vegetative Swales

- Rain Gardens
- Filtration vs. infiltration
- Pond retrofits
- Mfce agreements (?)
- Street sweeping
- Ditches
- Underground storage
- Public education
- Inventory of facilities

Group D:

- Proprietary treatment units
- Reduce impervious surfaces (reduce street width, parking area hard surface)
- Regional treatment facilities
- Swales & ditches
- Filtration shelf-ponds
- Water conservation techniques
- Soil amendments
- Capture & reuse
- Porous pavement
- Soil decompaction
- Planning/policy decisions early in design process – link green corridors with open space
- Right of way management
- Lawn/turf management
- Disconnect driveways with drains to pervious area
- Non-vegetated filters-san, iron filing, etc.

Group E:

- Combining BMP's with non BMP structure (e.g. infiltration with other structures – retaining walls, roads)- Don't focus just on the BMP-look at it in context of other structures-recognize soils and geology
- Educating reviewers, installers and designers on installation, review, etc. – disconnect between the pieces of the process –
- Connect the people in the process (staff , designers, etc.)
- Manufactured settling chambers – pre-treatment.

Group F:

None

Group G:

- Exfitration

Group H: None

Group I: None

Design Tools/Products in Use:

- Hyrdocad (TR20 Inputs)
- StormCAD
- StormNET
- AutoCAD design software
- P8 (if sediment reduction is needed)
- Site visit/soil conditions
- Infiltration test tools rather than published values (should be used to design infiltration practices)
- Subdivision and permit application forms
- XP-SWMM
- Pond NET
- Rational Method
- GIS/ARC GIS
- ARC Hydro
- Shelf Design credit system
- HEC RAS
- Design worksheet/spreadsheets
- SWAT
- WIN SLAM
- Community VIS

Additional comments:

- BMP's may help satisfy up to 5 year storm, but what do I do when I need to consider flood control for the 100 year storm?
- Associate value to BMP's – specifically trees-both newly planted and existing.
- Planting practices – get more landscape designers to use fewer mounded beds-use bowl plantings.

BMP VOTING RESULTS:

Non-structural LID tools: Planning/Design

# of votes	Practice:
4	Cluster development/conservation design
1	Vertical development
3	Minimize total disturbed area
2	Protect natural flow pathways
1	Protect riparian buffer areas
2	Protect sensitive areas
5	Reduce impervious areas (street width)
3	Impervious disconnection
2	Shared parking
0	Structural parking (ramp or underground)
14	Ordinances: subdivision requirements/stormwater/zoning and land use/industrial and illicit discharge-connect the people in the process (reviewers, designers, installers)
10	Information/education: citizen engagement/marketing programs/training and workshops
22	O&M – street sweeping/ turf management/pollution prevention

Structural BMP's

# of votes	Practice:
8	Infiltration practices (general heading)
6	• Bioretention (rain gardens, urban forestry)
0	• Infiltration trenches

2 3 Total: 19	• Detention basins w/infiltration design • Filtration shelf / re: ponds
2	Combining BMP's w/ non BMP structures
3 1 0 Total: 4	Retrofit lawn irrigation systems to use detention ponds for source water. Incorporate water sensors in irrigation systems (avoid draining historical wetlands) • Underground infiltration practices • Tree boxes
5	Modifications to traditional practices (adding forebays to ponds, amending soils in dry detention basins)
1	Enhances pond treatment (Prior Lake style)
1	Sand Filters
7 8 0 7 0 Total: 22	Vegetated Filter systems (general heading) • Vegetated swales • Filter strips • Biofiltration • Non-vegetated filters
4	Green Roofs
0	Manufactured settling chambers/pre-treatment
0	Extended dry detention basins
7	Underground storage/detention
3	Underground infiltration systems
2	Underground storage/reuse/attractive in landscape (fountain, etc.)
0	Roof top storage

More BMP's

# of votes	practice
18	Capture and reuse
1	Right of way management (disconnect driveways-drain to pervious area)
6	Permeable hard surfaces
2	Non-vegetated filters (sandy iron filings, etc.)
1	Ditches
18	Soil Restoration (soil amendments, soil decompaction)
2	Active treatment to existing ponds/regional systems
8	Vegetation (native landscaping)
21 2 3 0 Total: 26	Vegetation – trees • Canopy cover • Planters/structural soils • Design for ample, uncompacted root zone volume that gets trees to 30 years and beyond
3	Evapotranspiration
6	Regional management
5	Chemical treatment – alum
3	Mobile water treatment plants
1	Hydrodynamic separators
2	Pervious pipes-distribution
1	Recycling stormwater-irrigation/gray water reuse
0	Wetlands-constituted (?)