




**Cascade Township Planning Commission***August 19, 2014***7:00 PM****Cascade Town Hall****2025 75<sup>th</sup> St. NE****Agenda**

<b><u>Time</u></b>	<b><u>Topic</u></b>	<b><u>Presenters</u></b>	<b><u>Attachments</u></b>	<b><u>Purpose</u></b>
7:00 PM	<b>Call to Order</b>	Chair, Char Brown		
	<b>Roll Call</b>	Scribe, Ron Schaap		Establish a quorum
	<b>Pledge of Allegiance</b>	Chair, Char Brown		
	<b>Announcement of Agenda</b>	Chair, Char Brown		Adjust agenda, as necessary
	<b>Approval of Minutes</b>	Scribe, Ron Schaap	Not available	Establish a factual record
Limit 5 min per participant	<b>Call to the Audience</b>	Public Participants		Comments permitted on any topic not the subject of a public hearing
Time limits as announced	<b>Public Hearing CONTINUED</b> <b>-- Majestic Meadows Preliminary Plat</b>	All present will have an opportunity to speak	 Tointon re. EC Comm.pdf  Infiltration Info.pdf  staffreviewpreliminaryplat2014-tabledme	Obtain public testimony and comment
	<b>Update from the Town Board</b>	Town Board Rep, Arlen Heathman		Information exchange
	<b>Unfinished Business</b> <b>-- Discuss Plans to Revise Zoning Ordinance</b>	Commissioners		Decisions and actions
	<b>Round-the-table</b>	Commissioners		Open forum
Limit 5 min per participant	<b>Second Call to the Audience</b>	Public Participants		Comments permitted on any topic not the subject of a public hearing
	<b>Adjournment</b>	All		

**Note Items**

- 1.) Revise Zoning Ordinance to align with Olmsted County, incorporate definitions, add construction storm water requirements and add vacation rental regulations
- 2.) Revise Subdivision Ordinance to align with Olmsted County and capture open space requirement modification
- 3.) Post Construction Storm Water Ordinance (tentative)

**Voting Members:**

Char Brown		Daniel Frissora		Arlen Heathman		Ron Schaap	
Chuck Masog							

**Ex Officio Non-voting Members:**

Michael Brown		Roger Ihrke		David Meir			
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0 = absent

CASCADE TOWNSHIP  
OLMSTED COUNTY – MINNESOTA  
Planning Commission Meeting Minutes

July 16, 2014

Planning Commission Members present: Chair Person, Char Brown, Ron Schaap, Scribe, and Commissioners Arlen Heathman and Chuck Masog. Absent: Dan Frissora

Other Attendees: Cascade Township Clerk/Treas. Michael Brown, David Meir, (TCPA) These are advisory Ex-officio members.

1. Roll Call
2. Pledge of Allegiance
3. Announcement of Agenda
4. Approval of Minutes. Motion of Commissioner Arlan Heathman, seconded by Commissioner Masog. Motion Approved
5. Chairperson Char Brown read the Agenda. Point of order was explained.
6. Declared Pubic Hearing Open – Majestic Meadows (GDP) TCPA Spokesman Dave Meir began by handing out an updated PP Review with an attached Grading Plan Review. Updates were spelled out by Mr. Meir. Fred Daly parcel was corrected to A3 zoning. Also other changes and additions that were requested were made. Discussion continued.
7. August 20 has been scheduled to go before the Environmental Commission.
8. Access to a trail and private easement were discussed. During the discussion comments were made that a trail between lots 7 and 8 would not be a good location.
9. Slope easement was discussed.
10. Developers could make cash donations for a trail to the outer area. Developers feel it would not be a trail used by the homeowners.
11. Right turn lane off Co. Rd. #133 was approved.
  - New septic system will be put in for existing dwelling
  - Existing well will be closed and sealed on lot 3

- Bottom of page 8 change to U.S Highway 63 on new preliminary plat.
  - pp. 8- Change road name Majestic Circle NW to Majestic Drive NW.
12. Olmsted County Report was discussed.
- Stake where septic systems will be placed to eliminate driving over area.
  - Grading Plan was discussed.
  - All revised plans will be given to G.G.G.
  - Dave said adjustments must be made to drain entire area.
  - Chairperson Brown commented that soils are not suited for road beds to the entrance to subdivision. Soil 285A. Asked what risk mitigations are available. Soil type 340b is not suited for drainage fields on lots 7, 8 and 9.
  - Part b of question. Are there farm drainage tiles on these lots?
  - Commissioner Masog asked if you need DNR approval because of river. Dave said plat shows no construction near the river.
  - Commissioner Heathman had concern for out-lot having no access.
  - Also questioned how deed restriction worked. Dave said all homeowners would own a portion of the out-lot. Open space would be covered by homeowners association.
  - Clerk Brown questioned work from G.G.G. as to what data he used for calculating the drainage plan of the property.

Bill Tointon, Terry and Craig Johnson and Jeff Broberg – Geologist were given time to address commission.

- June 24 – They filed plan with TCPA
- Consideration of access down to the river and clean-up were discussed.
- Roger I. told Bill, grading plan does not need to be approved before plat approval.
- Bio infiltration basins will be used for MS4 plan.
- Adam Parker spoke about drainage plan.
- Jeff addressed soils for roadways (geotec fabric will be used) Common practice.

- Out lot was discussed. Sally Hills Plat was handed out and discussed.
13. Commissioner Heathman questioned the bio infiltration system.
- It was stated that this system is accepted by the MPCA.
  - They will be inspected to see if they are working - should stabilize in one year.
14. Jeff Broberg stated MS4 permits have priority on design and filtration during construction of final phase. Will put no water in the right of way.
- Jeff explained it is an on going study on design with this new system.
  - G.G.G. will fix the problems we had questions about.
  - Major inspection will happen after two years.
16. Clerk Brown will receive e-mail with more explanation of the B.I. Basins.
17. Discussion on soil types led to the conclusion that mound septic systems would be required on most lots.
18. Discussed Environmental Corridor.
- A public trail, in Jeff's opinion, would not work on property.
  - Cash donation by developer could be given for trail on other side of river. '
19. Clerk Brown asked if G.G.G. encountered a 1936 Fence Law. Right hand, Left hand law.
20. Meeting Open for Public Comment.
- In Favor – no speakers.
  - In Opposition – Fred Daley
  - Discussion of lot size and rolling average of lot size was explained.
  - After third call there were no more speakers.
  - Public comments were closed.
21. Bill Tointon asked for the floor
- In 1996, a 3 ½ acre lot in Olmsted County's general use plan was a rolling average.
  - Commission had a discussion.
22. Clerk Michael Brown asked for a 60 day extension for approval of plat. Variance requires will take time. August 20 will be the next Environmental Commission meeting.

23.. Chairperson Brown said she was uncomfortable passing this tonight.

- Commissioner Masog asked for an update on Zoning and Planning Ordinance.

24. Motion made and seconded to continue hearing until next meeting, Tuesday, August 19<sup>th</sup> at 7:00 pm. Approved and passed unanimously.

25. Send all questions to Dave at TCPA.

26. Will skip update from Township Board because of the late hour.

27. Will open it up to Public Hearing again. Approved..

- New definition for road use agreement.
- Instruction for storm water.
- Last item – Update on Vacation Rental property. (Serenity Home Network) Town Board not going to enforce the ordinance, neither is the County.

28. Round table discussion was held.

29. Motion to Adjourn at 10:10 pm. Motion by Meathman, Seconded by Mazog. Motion carried.

Respectfully Submitted,

Ronald D. Schaap, Scribe

Char Brown, Planning Commission Chair

**Brown, Charlene L. (Char)**

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**From:** Michael Brown <brownmk@charter.net>  
**Sent:** Tuesday, July 29, 2014 7:38 AM  
**To:** Brown, Charlene L. (Char)  
**Subject:** FW: Infiltration Basins

**From:** Michael Brown [<mailto:townclerk.cascadetownship@gmail.com>]  
**Sent:** Monday, July 28, 2014 9:28 PM  
**To:** Arlen Heathman; Chuck Masog; Dan Frissora; Ron Schaap; Char Brown  
**Subject:** Infiltration Basins

To all,

I have not yet received any literature from McGhie & Betts to serve as a primer on Infiltration Basins as presented by McGhie & Betts as part of the Majestic Meadows preliminary plat. Though it may be a bit more technical than we need, I have listed below the links to the US EPA website information on infiltration basins and the MPCA stormwater manual section on infiltration basins. This is only for information and awareness of how the design is used and the advantages or disadvantages. If I receive any other informational literature on the topic per the request at the last Planning Commission meeting, I will forward that as well

US EPA website for Infiltration Basins. <http://water.epa.gov/polwaste/npdes/swbmp/Infiltration-Basin.cfm>

MPCA Storm Water Manual section on infiltration  
basins: [http://stormwater.pca.state.mn.us/index.php/Infiltration\\_basin](http://stormwater.pca.state.mn.us/index.php/Infiltration_basin)

If you click on the links on this page you will get the details for the various items such as design criteria, operation and maintenance etc.

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Michael Brown  
Clerk/Treasurer  
Cascade Township, Olmsted County, MN  
[www.cascadetownship.us](http://www.cascadetownship.us)

**Brown, Charlene L. (Char)**

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**From:** Michael Brown <townclerk.cascadetownship@gmail.com>  
**Sent:** Thursday, July 17, 2014 3:50 PM  
**To:** Bill Tointon  
**Cc:** David Meir; Dan Frissora; Chuck Masog; Char Brown; Arlen Heathman; Ron Schaap  
**Subject:** Re: FW: Preliminary plat at EC

Mr. Tointon,

Thank you for forwarding the note from TCPA. I have copied the Planning Commission members on this note for their future consideration.

On Thu, Jul 17, 2014 at 9:23 AM, Bill Tointon <[BTointon@mcghiebetts.com](mailto:BTointon@mcghiebetts.com)> wrote:

Mr. Brown. Here is the response from TCPA regarding the process for preliminary plat approval. As you will note the Townboard approves the preliminary plat contingent upon the Environmental Commission approval. This is the process that historically has been used in the townships and in fact the same one used for River Highlands.

**From:** David Meir [mailto:[david@tcpamn.org](mailto:david@tcpamn.org)]  
**Sent:** Wednesday, July 16, 2014 9:15 AM  
**To:** Bill Tointon  
**Subject:** Preliminary plat at EC

Mr. Tointon,

The preliminary plat *can* be approved by the Town Board *contingent* upon approval by the EC.

If you have other questions you can email me and I'll run it by Roger. Or feel free to email him yourself.

Respectfully,



***David H. Meir***

TCPA Zoning Administrator

4111 11th Avenue SW

Room 10

Rochester, MN 55902

ph: [507-529-0774](tel:507-529-0774)

fax: [507-281-6821](tel:507-281-6821)

[TCPA Website](#)

**Bill Tointon**

Principal

d: [507-218-3364](tel:507-218-3364)

McGhie & Betts, a Division of WSB & Associates, Inc. | 1648 Third Avenue SE | Rochester, MN 55904



*McGhie & Betts has joined WSB & Associates, Inc., a Minnesota-owned consulting firm serving a broad array of clients with civil engineering, planning, landscape architecture, environmental, and construction services.*

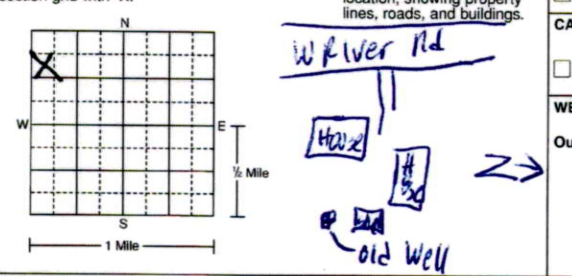

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Michael Brown  
Clerk/Treasurer  
Cascade Township, Olmsted County, MN  
[www.cascadetownship.us](http://www.cascadetownship.us)

Sharon Haack

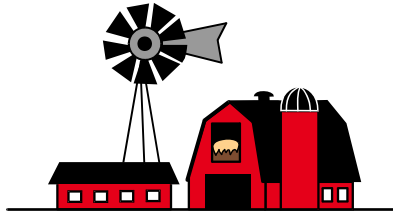
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WELL OR BORING LOCATION					<b>MINNESOTA DEPARTMENT OF HEALTH WELL AND BORING SEALING RECORD</b> <small>Minnesota Statutes, Chapter 1031</small>		Minnesota Well and Boring Sealing No. Minnesota Unique Well No. or W-series No. <small>(Leave blank if not known)</small>	
County Name <u>Olmsted</u>					<b>H 319163</b>			
Township Name <u>Cascade</u>	Township No. <u>107</u>	Range No. <u>14</u>	Section No. <u>1</u>	Fraction (sm. → lg.) <u>SW NW NW</u>				
Date Sealed <u>5-28-14</u>					Date Well or Boring Constructed <u>UNK</u>			
GPS LOCATION – decimal degrees (to four decimal places) Latitude _____ Longitude _____					Depth Before Sealing <u>24</u> ft.		Original Depth <u>24</u> ft.	
Numerical Street Address or Fire Number and City of Well or Boring Location <u>1358 W. River Rd NW, Rochester</u>					<b>AQUIFER(S)</b> <input checked="" type="checkbox"/> Single Aquifer <input type="checkbox"/> Multiaquifer <b>WELL/BORING</b> <input checked="" type="checkbox"/> Water-Supply Well <input type="checkbox"/> Monit. Well <input type="checkbox"/> Env. Bore Hole <input type="checkbox"/> Other _____		<b>STATIC WATER LEVEL</b> <input checked="" type="checkbox"/> Measured <input type="checkbox"/> Estimated   Date Measured <u>5-28-14</u> <u>23</u> ft. <input checked="" type="checkbox"/> below <input type="checkbox"/> above land surface	
Show exact location of well or boring in section grid with "X." 					<b>CASING TYPE(S)</b> <input type="checkbox"/> Steel <input type="checkbox"/> Plastic <input type="checkbox"/> Tile <input checked="" type="checkbox"/> Other <u>Stove Pipe</u>			
<b>PROPERTY OWNER'S NAME/COMPANY NAME</b> <u>Sharon Haack</u> Property owner's mailing address if different than well location address indicated above <u>810 2nd Ave NW # 103</u> <u>Plainview, MN 55964</u>					<b>WELLHEAD COMPLETION</b> <b>Outside:</b> <input type="checkbox"/> Well House <input checked="" type="checkbox"/> At Grade <input type="checkbox"/> Pitless Adapter/Unit <input type="checkbox"/> Buried <input type="checkbox"/> Well Pit <input type="checkbox"/> Other _____ <b>Inside:</b> <input type="checkbox"/> Basement Offset <input type="checkbox"/> Well Pit <input type="checkbox"/> Buried <input type="checkbox"/> Other _____			
<b>WELL OWNER'S NAME/COMPANY NAME</b> <u>Same</u> Well owner's mailing address if different than property owner's address indicated above					<b>CASING(S)</b> Diameter <u>6</u> in. from <u>0</u> to <u>21</u> ft.   Set in oversize hole? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No   Annular space initially grouted? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown _____ in. from _____ to _____ ft. <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown _____ in. from _____ to _____ ft. <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown			
<b>SCREEN/OPEN HOLE</b> Screen from _____ to _____ ft.   Open Hole from <u>21</u> to <u>24</u> ft.					<b>OBSTRUCTIONS</b> <input type="checkbox"/> Rods/Drop Pipe <input type="checkbox"/> Check Valve(s) <input type="checkbox"/> Debris <input checked="" type="checkbox"/> Fill <input type="checkbox"/> No Obstruction Type of Obstructions (Describe) <u>Dirt + Gravel</u> Obstructions removed? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No   Describe <u>Bailed + Blew out</u>			
<b>GEOLOGICAL MATERIAL</b> <b>COLOR</b> <b>HARDNESS OR FORMATION</b> <b>FROM</b> <b>TO</b> If not known, indicate estimated formation log from nearby well or boring. <u>Drift</u> _____   _____ <u>0</u> <u>21</u> <u>Limestone</u> _____   _____ <u>21</u> <u>24</u>					<b>PUMP</b> Type _____ <input type="checkbox"/> Removed <input checked="" type="checkbox"/> Not Present <input type="checkbox"/> Other _____			
<b>METHOD USED TO SEAL ANNULAR SPACE BETWEEN 2 CASINGS, OR CASING AND BORE HOLE:</b> <input checked="" type="checkbox"/> No Annular Space Exists <input type="checkbox"/> Annular Space Grouted with Tremie Pipe <input type="checkbox"/> Casing Perforation/Removal _____ in. from _____ to _____ ft. <input type="checkbox"/> Perforated <input type="checkbox"/> Removed _____ in. from _____ to _____ ft. <input type="checkbox"/> Perforated <input type="checkbox"/> Removed Type of Perforator _____					<b>VARIANCE</b> Was a variance granted from the MDH for this well? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No   TN# _____			
<b>GROUTING MATERIAL(S)</b> <small>(One bag of cement = 94 lbs., one bag of bentonite = 50 lbs.)</small> Grouting Material <u>Next Cement</u> from <u>0</u> to <u>24</u> ft. _____ yards <u>5 1/2</u> bags _____ from _____ to _____ ft. _____ yards _____ bags _____ from _____ to _____ ft. _____ yards _____ bags					<b>OTHER WELLS AND BORINGS</b> Other unsealed and unused well or boring on property? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No   How many? _____			
<b>REMARKS, SOURCE OF DATA, DIFFICULTIES IN SEALING</b>           					<b>LICENSED OR REGISTERED CONTRACTOR CERTIFICATION</b> This well or boring was sealed in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.			
					The In Well Rochester, Inc. <u>2641</u> <small>Licensee Business Name</small> <small>License of Registration No.</small>  <u>1187</u> <u>5-28-14</u> <small>Certified Representative Signature</small> <small>Certified Rep. No.</small> <small>Date</small> <u>Tim Postler</u> <small>Name of Person Sealing Well or Boring</small>			
<b>MINN. DEPT OF HEALTH COPY</b> <b>H 319163</b>								

# TOWNSHIP COOPERATIVE PLANNING ASSOCIATION

4111 11<sup>th</sup> Avenue SW  
Room 10  
Rochester, MN 55902

PH: (507) 529-0774  
FX: (507) 281-6821



*Roger Ihrke, Administrator  
David Meir, Administrator  
Barbara Literski, Adm. Asst.*

*roger@tcpamn.org  
david@tcpamn.org*

-- TCPA --

**Date:** 8/11/14

**To:** Cascade Township Planning Commission  
Cascade Town Board  
McGhie & Betts, Inc.  
GGG, Inc.  
(all of the above via e-mail)

**RE:** Preliminary Plat Review Majestic Meadows (Section 1, Cascade Township) from tabled meeting on July 15 2014

The Cascade Township Planning Commission tabled any decision on the preliminary plat for Majestic Meadows until their next scheduled meeting on August 19, 2014. The Commission tabled a decision on the preliminary plat in order to allow the applicant to provide additional information on the stormwater treatment systems along with allowing the Township engineers report to be provided to the Commission prior to approval. The applicant has since met with the Township Board to get some direction on the open space questions, trail easements and variance requests.

The applicant has since resubmitted much of the materials with several corrections. Those documents were made available to Commission members via a separate email last week. If any of the Commission members would like hard copies of the information, please let us know via email and we will send them to you.

The applicant has requested a special meeting of the Cascade Township Board and the Cascade Township Board of Adjustment to be held on August 21, 2014 after 6:00 PM. This meeting has been scheduled and the variance requests advertised for the Board of Adjustment. If the Commission acts upon the Preliminary Plat and the open space variance is approved, the Commission's recommendation will be taken before the Town Board the same evening.

The Commission may or may not choose to voice its' concerns over the building variance. If the building variance is denied by the Board of Adjustment, the plat may still move forward understanding that the applicant will be required to remove the building prior to final plat approval.

The Township Engineers report will be provided under separate cover.

Staff recommendation is still being withheld until we have had a chance to review the engineers report. All of the information requested in our report has been submitted, reviewed and meets the criteria as outlined in the subdivision ordinance with the exception of the open space. The Commission may only provide positive conditional recommendation of the plat, if it recommends the open space variance. If the preliminary plat is

approved by the Town Board; work on the project may commence once the township engineer has reviewed the engineers estimate and the applicant has provide a bond in the amount of 125 percent of the estimated costs.

# **Stormwater Management Based On The New NPDES Permit and Site Applicability**

*By Adam Parker, PE, CPESC*

**McGhie and Betts/WSB and Associates**



# Storm Management and Site Applicability

- ❑ New MPCA CSW (Construction Stormwater) Permit Overview and Stormwater Treatment (Permit and Local)
- ❑ What is MIDS?
- ❑ WSB/MB Past Experience Providing Filtration and Biofiltration
- ❑ Current Site Characteristics and how WSB/MB Will Provide Stormwater Treatment and Protection for this Site – **Haack Property**

# Permit Overview and Treatment

With the new MPCA permit, if over 1 acre of new impervious surface is added, treatment is required.

Before 2013, Owner of a New Construction Project Had Option of Infiltrate/Filtrate/Biofiltrate or Wet Pond to Treat

Now, Viewed as “Infiltrate/Filtrate/Biofiltrate or Else”

Summary Provided by MPCA Fact Sheet (provided as a separate document).



# Permit Overview and Treatment

## Basic definitions (paraphrased):

**Infiltration** – water infiltrates entirely throughout the soil horizon and travels to the defined water table with no additional piping or collection system added.

**Filtration** – water travels through a medium and can be collected by daintile or some other collection assist method. May or may not have plant or grass on the upper layer

**Biofiltration** – basically the same concept as filtration but there is some form of plant material or grass in the upper horizon.

MPCA CSW makes no distinction, you can meet requirements by routing stormwater by either method. Wet Ponds are a secondary option unless allowed by MS4.

# Permit Overview and Treatment

Based On MPCA CSW Permit, The Treatment Requirement is “Prohibited” If Karst Or High Groundwater Tables Are Present.

Per The Permit Language, Mottled Soil Found On This Site Would be Considered “Saturated” because of Mottling Presence within 3 Feet of Most Borings/readings

Refer To Current MPCA CSW Permit with Highlighted Text (Pgs. 9 And 12) – attached in a separate document

*Note Pg. 14 Regarding Discussion About Karst Features.*

# Permit Overview and Treatment

Site is shown to have mottled soil within 3' of most borings, and Karst is found within proximity, now what?

1. Proposed Bio-filtration system with underdrain
2. Meets MIDS standards, which has been adopted by the MPCA as satisfying permit requirements.
3. Underdrain helps maintain groundwater level and reduces peak flow rates for smaller storm events.
4. For higher events, the resultant CN is lower due to previous agriculture use, however additional rate control is done by upstream ditches. Additional BMPs including erosion control and ditch checks help satisfy pretreatment requirements.



# What is MIDS?

## MIDS – Minimal Impact Design Standards

1. Focus group initiated by MPCA
2. States actual stormwater performance goals for new construction as well as linear (i.e. highway) and re-development sites. MPCA as satisfying permit requirements
3. Also provides sample ordinances for MS4s
4. The NPDES Permit allows MIDS as an acceptable alternative to standard 1 inch rule
5. Because of current site characteristics, i.e. mottled soil and karst features, the Design Sequence Flowchart was used.

## Further Discussion (Minnesota Stormwater Manual)

[http://stormwater.pca.state.mn.us/index.php/Design\\_Sequence\\_Flowchart-Flexible\\_treatment\\_options](http://stormwater.pca.state.mn.us/index.php/Design_Sequence_Flowchart-Flexible_treatment_options)

# What is MIDS?

## MIDS – Minimal Impact Design Standards (continued)

6. For this site, site meets Flexible Treatment Option (FTO) #2 or FTO#3 (shallow groundwater and karst)
7. Proposed Stormwater Management Plan will provide 0.55 inch of biofiltration volume over new impervious (exceeds FTO#2/3)
8. Additional treatment to be provided by vegetated swales, ditch checks, level spreaders.
9. Based on P8, the amount of treatment will provide 60% removal based on average annual events in terms of lbs/year of total phosphorus.
10. Because of current site characteristics, i.e. mottled soil and karst features, the Design Sequence Flowchart was used to select FTO.

# Past Experience with Examples

## WSB/MB Experience

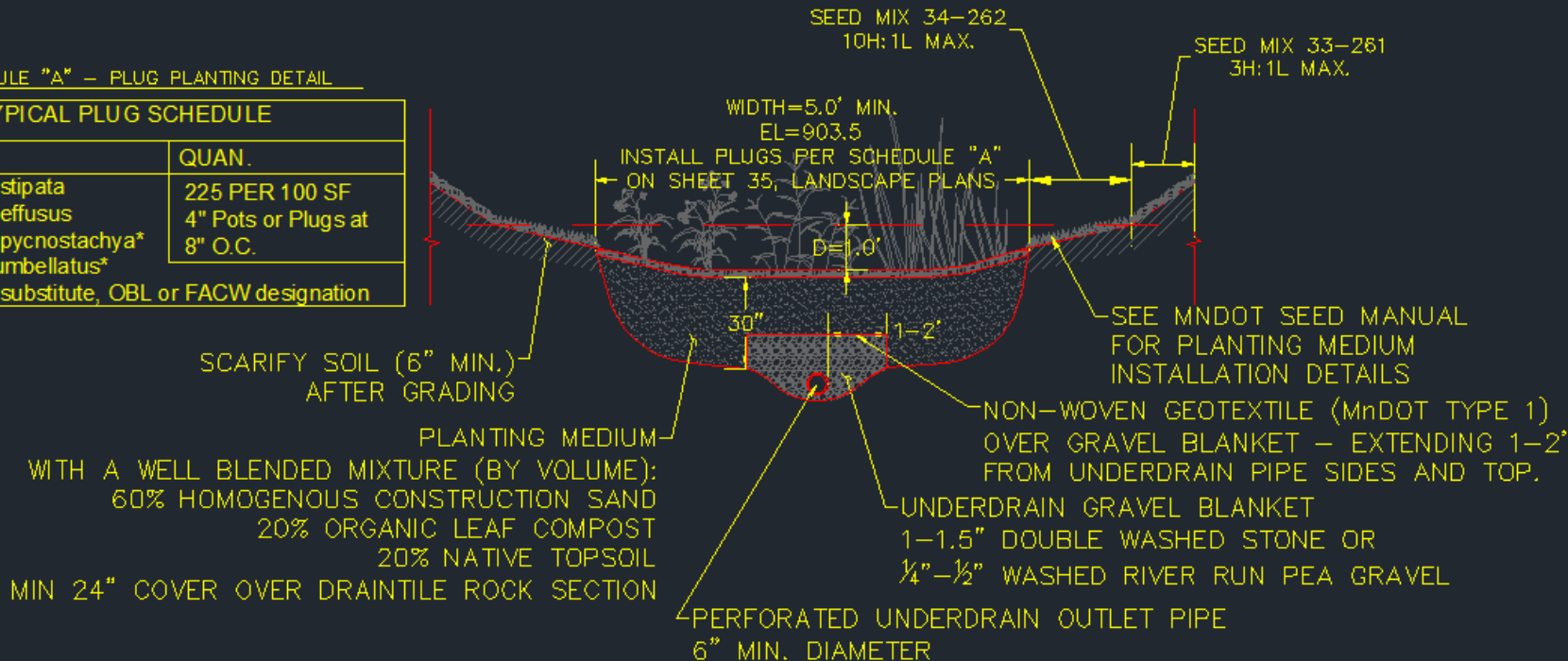
1. Designed and oversaw installation of filtration practices dating back to 2000.
2. In metro area, infiltration or filtration has been standard practice and required as primary treatment option for most new construction within the last 10 years.
3. Design involves anticipation of expected runoff rates and peak flows
4. Additional upstream settling and velocity reduction is required where standard pond design is not critical.
5. Filtration/Biofiltration provides lower impact of runoff volumes and downstream erosion when compared to standard pond designs.

# Past Experience with Examples

## Typical details used on past projects:

SCHEDULE "A" – PLUG PLANTING DETAIL

TYPICAL PLUG SCHEDULE	
NAME	QUAN.
25% <i>Carex stipata</i>	225 PER 100 SF
25% <i>Juncu effusus</i>	4" Pots or Plugs at
25% <i>Liatris pycnostachya</i> *	8" O.C.
25% <i>Aster umbellatus</i> *	
*=or Native substitute, OBL or FACW designation	



- SEE LANDSCAPE AND RESTORATION PLANS FOR ADDITIONAL PLANTING INFORMATION
- SEE STORM AND GRADING PLANS FOR PLACEMENT OF DRAINTILE AND PLANTING BOUNDARIES

2

25

**BIOFILTRATION AREA w/UNDERDRAIN TYP. CROSS SECTION**

SCHEMATIC - NOT TO SCALE



# Past Experience with Examples

## Typical Items To Be Placed On Construction Plans:

1. Basin Protection: (typically leave 1' from bottom unexcavated, then remove once final stabilization has occurred. Then basin is scarified and seeded or planted as to loosen soil and allow filtration. Alternative is to provide a Temporary Basin upstream from Basin.
2. Seeding and Plant Establishment Notes
3. Draintile and Collection Information (inverts, size, details)
4. Outlet Structure and Overflow Information



# Past Experience with Examples

all from WSB/MB Current Project Staff

Prior projects : U of M Student Housing Complex, Minneapolis, MN



## Site Characteristics:

Ultra-urban, compact site, no outfall other than filtration, daintile helps maintain structure, storm pipe directly enters structure from parking lot, “medium wet to wet”



# Past Experience with Examples

Prior projects : Townhome Site, Plymouth, MN



Site Characteristics:

Drain tile helps maintain structure, Storm pipe directly enters structure from parking lot, “medium-wet”



# Past Experience with Examples

Prior projects : Commercial Site, Plymouth, MN



## Site Characteristics:

Compact site, curbcut from parking lot direct to basin, adjacent to wetland with permanent saturated soil, "wet".

# Past Experience with Examples

Prior projects : Way Park, Northfield, MN



Site Characteristics:

Park setting, generally sheet flow, “medium dry to medium wet”



# Past Experience with Examples

Prior projects : Met Council Service Center, Fridley, MN



## Site Characteristics:

Entire site drains to basins, generally sheet flow with curbcuts, “medium dry to medium wet”

# Past Experience with Examples

Additional project experience includes large and small commercial and residential sites.

## Other bio/filtration projects underway (select examples):

1. New 30+ Acre Army Training and Firehall Complex – Stillwater, MN (requires 100% filtration of all runoff)
2. I-35E Park and Ride – Lino Lakes, MN
3. 30+ Acre Residential Sites in Andover and Medina, MN
4. Riverview Park - Coon Rapids, MN
5. CSAH101 Highway Expansion – Minnetonka, MN



# Site Characteristics and Likely Outcomes

1. This site has benefit of using sheet flow and non-concentrated (i.e. non piped) incoming flows
2. Amount of impervious surface not considered “intense”
3. Anticipated runoff will be “dry” to “medium dry” and proposed vegetation plan will reflect upstream flow
4. Draintile will help maintain system and prevent standing water or groundwater creep
5. Maintenance should be manageable given the presence of low intensity sheet flow to basin and low intensity runoff.

# Site Characteristics and Likely Outcomes

6. Area draining to landlocked portion will be maintained low velocity sheet flow
7. Additional rate control will be provided by the ditch sections
8. Ditch sections designed to be dry under normal circumstances with drintile aided at lowpoints for long-term maintenance.
9. Overall runoff rates to Zumbro will be maintained mimicking existing drainage patterns
10. Amount of sediment likely to decrease with addition of ditches and biofiltration basin compared to existing uncontrolled agricultural runoff.
11. Our belief that this project can be used as a demonstration tool for future applications.