

Appendix B

MWMO Standards

3.1.3 THE MWMO'S STANDARDS LANGUAGE

1. Stormwater Management Standards

- a. Any project creating greater than one acre of land disturbance is subject to the standards below.
- b. The MWMO's Standards, or higher, must be adopted by local units of government and incorporated into their stormwater ordinance or other regulatory control.
- c. In order to reduce regulatory complexity, a member may request the MWMO to allow stormwater rules set forth by adjacent watershed management organizations to govern development so long as they can be shown to be substantially equal to or greater than the level of protection afforded by the MWMO Standards.
- d. Road mill and overlay project activities need only to comply with MWMO erosion and sediment control standards.
- e. See the land disturbance definition for activities that shall not be considered land disturbance for the purposes of determining permanent stormwater management requirements.

2. Rate Control

Runoff rates for the proposed activity shall meet the member cities and MS4's runoff rate control requirements, using the member cities' and MS4's required critical storm events (as defined by Atlas 14 Volume 8 and/or subsequent revisions). Runoff rates for the proposed activity and pre-development shall be determined using an Atlas 14-based (nested, regional, state) rainfall distribution using NRCS-approved methodology.

All area contributing to the practice shall be accounted for in the design of the rate control practice. This includes areas off site and beyond the public right-of-way that will be contributing to the practice.

3. Water Quality / Volume Control

- a. For nonlinear projects, without limitations, that disturb one or more acre of land, 1.1 inches of runoff from the new and fully reconstructed impervious surfaces shall be captured and retained on site.
- b. For linear projects on sites, without limitations, that disturb one or more acre of land, the larger of the following shall be captured and retained on site:
 - i. 0.55 inches of runoff from the new and fully reconstructed impervious surfaces
 - ii. 1.1 inches of runoff from the net increase in impervious area
- c. For projects on sites with limitations, the MWMO Design Sequence Flow Chart (Appendix I) or a MWMO-approved alternative shall be used to identify a path to compliance through Flexible Treatment Options.
 - i. The MWMO will develop a MOU with individual member cities and MS4's to address flexible treatment option #3 off site mitigation conditions.

4. Volume Control Guidance (recommended procedures for volume control projects)

- a. Infiltration volumes and facility sizes shall be calculated using the appropriate hydrologic soil group classification, ASTM Unified Soil Class Symbol, and design infiltration rate from Table B. Select the design infiltration rate from Table B based on the least permeable soil horizon within the first five feet below the bottom elevation of the proposed infiltration management practice. The information provided in Table B is intended to be used in the following manner:

- i. For preliminary design purposes, refer to the NRCS soil survey to identify the hydrologic soil groups found on site. This information provides a preliminary indication of the infiltration capacity of the underlying soils.
 - ii. After volume control/infiltration practices have been located on the grading plans, perform soil borings in the exact location of the proposed practices and in the quantity as described in the Minnesota Stormwater Manual Wiki (Minnesota Pollution Control Agency, 2014) as amended. Soil borings should be logged using the USDA Soil Textural Classification System and the ASTM Unified Soil Class Symbol.
 - iii. The combination of all the aforementioned information will allow the designer to identify the appropriate design infiltration rate. As the Minnesota Stormwater Manual States, “these infiltration rates represent the long-term infiltration capacity of a constructed infiltration practice and are not meant to exhibit the capacity of the soils in the natural state”. A permit applicant can submit field measurements and revised rates (using the correction factors provided in the Minnesota Stormwater Manual) if there is reason to believe the long-term infiltration rates will be other than the design infiltration rates provided in Table B.
- b. A geotechnical investigation shall be performed in the location of the proposed volume control practices to confirm or determine underlying soil types, the depth to the seasonally high groundwater table, and the depth to bedrock or other impermeable layer.
 - c. Infiltration BMPs shall drawdown in the time specified in the Minnesota Stormwater Manual Wiki for that BMP, or less if required by another entity with jurisdiction. Drawdown time and maximum ponding depths are defined in the Minnesota Stormwater Manual Wiki.
 - d. Infiltration stormwater management practices must be designed to include adequate pretreatment measures before discharge of runoff to the primary infiltration area, consistent with the Minnesota Stormwater Manual Wiki.
 - e. Design and placement of infiltration stormwater management practices shall be done in accordance with the Minnesota Department of Health guidance called “Evaluating Proposed Stormwater Infiltration Projects in Vulnerable Wellhead Protection Areas.” (Final version to govern)
 - f. Specific site conditions may make infiltration difficult, undesirable, or impossible. Some of these conditions are listed in Table A. A more comprehensive list is provided in the MWMO Design Sequence Flow Chart in Appendix I.

Table A: Site Conditions Considered Undesirable for Infiltration Stormwater Management Practices

Type	Specific Site Conditions	Submittal Requirements
Potential Contamination	Potential Stormwater Hotspots (PSHs)	PSH locations and flow paths, Remediation Alternatives Considered
	Contaminated Soils	State Permitted Brownfield Documentation, Soil Borings, Remediation Alternatives Considered, Site design alternatives considered
Physical Limitations	Low Permeability (Type D Soils)	Soil Borings
	High Permeability (soils infiltrating greater than	Soil Borings

	8.3 inches/hour)	
	Bedrock within 5 vertical feet of bottom of infiltration area	Soil Borings
	Potential Adverse Hydrologic Impacts (e.g., impacting perched wetland)	Documentation of Potential Adverse Hydrologic Impacts
	Seasonal High Groundwater within 5 vertical feet of bottom of infiltration area	Soil Borings
	Karst Areas	Soil Borings
	Steep Slopes	Steep Slope Determination
Land Use Limitations	Utility Locations	Site Map, Alternatives considered
	Zoning or Land Use Limitations (Parking, Density, Setbacks, etc.)	Alternatives considered, Documentation of Infeasibility
	Adjacent Wells within 200 feet or inside Wellhead Protection Area or Drinking Water Supply Management Areas (DWSMA)	Well Locations or DWSMA
	Building Foundation	Ten (10) feet

Source: Modified from Minnesota Pollution Control Agency Minimal Impact Design Standards Design Sequence Flow Chart, December 5, 2013

Note: the most recent version of the Minnesota Stormwater Manual should be used; Table A is provided as optional guidance to the cities

Table B. Design Infiltration Rates

Hydrologic Soil Group	Soil Textures ¹	ASTM Unified Soil Class Symbols	Rate
A	Gravel, sandy gravel, silty gravel	GW, GP, GM, SW	1.63 in/hr
	Sand, loamy sand, sandy loam	SP	0.80 in/hr
B	Loam, silt loam	SM	0.45 in/hr
		MH	0.30 in/hr
C	Sandy clay loam	ML	0.20 in/hr
D	Clay, clay loam, silty clay loam, sandy clay, silty clay	CL, CH, OH, OL, GC, SC	0.06 in/hr

Source: Minnesota Stormwater Manual Wiki, October 2014

Note: Design infiltration rates from the most recent version of the Minnesota Stormwater Manual should be used
¹ Adapted from the U.S. Department of Agriculture, Natural Resources Conservation Services, 2005. National Soil Survey Handbook, title 430-VI.

5. Maintenance

- a. Practices must continue to perform as approved. Owners must follow an inspection and maintenance schedule that has been approved by the permitting entity and correct any post-construction performance issues that arise.
- b. All stormwater management structures and facilities, including volume reduction stormwater management practices, shall be maintained to assure that the structures and facilities function as originally designed. The maintenance responsibilities must be assumed by either the municipality's acceptance of the required easements dedicated to stormwater management purposes, or by the applicant executing and recording a maintenance agreement, or by another enforceable means acceptable to the LGU. If used, the recordable executed agreement must be submitted to the municipality prior to issuance of the project approval from the city." Public developments will require a maintenance agreement in the form of a Memorandum of Agreement or an approved Local Water Management Plan or in compliance with an MS4 Permit that details the methods, schedule, and responsible parties for maintenance of stormwater management facilities for permitted development. A single Memorandum of Agreement for each local government unit may be used to cover all stormwater management structures and facilities required herein, including volume reductions management practices, within the LGU's jurisdiction. This maintenance plan shall address snow management.

6. Drainage Alterations

No person shall alter stormwater flows (resulting in an increase in stormwater flows or a change in existing flow route) at a property boundary by changing land contours, diverting or obstructing surface or channel flow, or creating a basin outlet, without first obtaining any necessary permits from the city..

7. Bounce and Duration Control

- a. The project must meet hydroperiod standards adapted from "Stormwater and Wetlands Planning and Evaluation Guidelines for Addressing Potential Impacts of Urban Stormwater and Snowmelt Runoff on Wetlands," (Minnesota Stormwater Advisory Group, June 1997), as follows:
 - i. Wetland Susceptibility Class = Highly Susceptible; Permit Storm Bounce = Existing; Inundation Period for 2-Year event = Existing; Inundation Period for 10-year or Greater Event = Existing
 - ii. Wetland Susceptibility Class = Moderately Susceptible; Permit Storm Bounce = Existing plus 0.5 feet; Inundation Period for 2-Year event = Existing plus 1 days; Inundation Period for 10-year or Greater Event = Existing plus 7 days
 - iii. Wetland Susceptibility Class = Slightly Susceptible; Permit Storm Bounce = Existing plus 1.0 feet; Inundation Period for 2-Year event = Existing plus 2 days; Inundation Period for 10-year or Greater Event = Existing plus 14 days
 - iv. Wetland Susceptibility Class = Least Susceptible; Permit Storm Bounce = No Limit; Inundation Period for 2-Year event = Existing plus 7 days; Inundation Period for 10-year or Greater Event = Existing plus 21 days

8. Flood Control

Flood control for the proposed activity shall meet the member cities or MS4's flood control requirements. Member cities and MS4's flood control requirements should minimize property damage due to excess water.

9. Erosion and Sediment Control

- a. Erosion and sediment control measures shall meet the standards for the General Permit Authorization to Discharge Stormwater Associated with Construction Activity Under the National Pollutant Discharge Elimination System/State Disposal System Permit Program, Permit MN R100001 (NPDES General Construction Permit), issued by the Minnesota Pollution Control Agency, except where more specific requirements are required.
- b. Activity shall be phased to minimize disturbed areas subject to erosion at any one time.
- c. All construction site waste—such as discarded building materials, concrete truck washout, chemicals, litter, and sanitary waste at the construction site—shall be properly managed and disposed of so they will not have an adverse impact on water quality.
- d. If silt fence is installed it shall conform to sections 3886.1 and 3886.2, Standard Specifications for Construction, Minnesota Department of Transportation (2005 ed.), as it may be amended.