APPENDIX A: Design Guidelines and Standards

City of Minnetonka Water Resources Management Plan

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Attachments

1.0 Introduction

This document was prepared to assist developers, consultants and city staff in designing and managing water resource projects within the City of Minnetonka.

This document outlines the city contacts, water resource related ordinances, required permits and approvals from the city, watershed management organization (WMO), state and federal levels and city and watershed management organizations (WMO) design standards. In addition, there is detailed information related to the design of various water quality treatment devices. This document will be updated to reflect changes to reviews, requirements and weblinks etc., as needed.

2.0 City Contacts

2.1 Public Works

952.988.8400

- Streets (Maintenance)
- Water & Utilities
- Parks, Trails and Recycling
- Natural Resources
- Buildings
- Fleet

2.2 Development Services

Community Development

952.939.8200

- Inspections
- Environmental health
- Building permits
- Planning and zoning
- Licensing
- Housing and redevelopment

Planning

952.939.8290

- Planning & Zoning Administration

Engineering

952.939.8206

- Streets & Utilities (Design) – drainage, sanitary, water, street lighting, etc.
- Planning & Design
- Special Assessments

For all development and redevelopment projects, contact planning or engineering for your specific needs.

3.0 Ordinances

This section summarizes the ordinances established by the City of Minnetonka that outline specific standards and criteria related to new development, redevelopment and other improvements or modifications that could impact the water resources within the City of Minnetonka.

Below is a link to all of the City of Minnetonka Code of Ordinances:

http://www.amlegal.com/nxt/gateway.dll/Minnesota/minneton/cityofminnetonkaminnesotacodeofordinance?f=templates$fn=default.htm$3.0$vid=amlegal:minnetonka_mn$anc=

The following is a summary list of the key water resource-related ordinances currently enforced by the City of Minnetonka:

Chapter 3: ZONING REGULATIONS

Wetland Protection (300.23)
Key Items of Interest:
Setbacks, Buffers, Water Quality Treatment, Low Floor Elevation

Shoreland Ordinance (300.25)
Key Items of Interest:
Lot Requirements, Structure Height, Parcel Imperviousness, Setbacks, Low Floor Elevation

Floodplain Ordinance (300.24)
Key Items of Interest:
Setbacks, Low Floor Elevation

Performance Standards (300.28)

15. **Grading, Filling and Excavation**
16. **Application and Review of Grading Permits and Plans**
17. **Grading and Erosion Control Plans**
18. **Grading and Erosion Enforcement**
19. **Tree Protection**
20. **Performance Standards Regulating Steep Slopes**

Chapter 4: SUBDIVISION REGULATIONS

Key Items of Interest:
Easement Requirements

4.0 Permits, Approvals and Submittals

This section summarizes the permits required by the City of Minnetonka as well as the WMOs, the DNR, the MPCA and the Army Corps of Engineers. Each summary includes links to the actual permit application (if available). In addition, there is discussion of the "triggers" that establish when a permit is required. General submittal requirements are also outlined, although specific details of the required submittals are typically included on the application forms.

4.1 City of Minnetonka

There are several approvals and permits required for a variety of projects within the City of Minnetonka. This includes the following:

- Preliminary Plat Approval
- Final Plat Approval
- Rezoning Approval
- Comprehensive Plan Amendment
- Planned Unit Development (PUD) Permit
- Conditional Use Permit
- Building Permits
    - Residential
    - Commercial
- Grading, Filling, Excavation and/or Mining Permit
    - A Grading, Filling, Excavation and/or Mining Permit is required for the following projects:
        - Involving the movement of 50 cubic yards of material or land disturbance of areas greater than 5,000 square feet
        - Involving any land disturbance in designated wetlands, floodplains, or shorelands
        - Involving mining operations for gravel or other materials

  A grading and erosion control plan is a required submittal for a grading permit, preliminary plat, site plan review, lot division, wetland/floodplain alteration permit, or a building permit if at least 50 cubic yards of material is moved or material is moved from an area or areas encompassing at least 5,000 square feet.

- Wetland and Floodplain Alteration Permit

- This permit is required for projects involving any land disturbance in designated wetlands or floodplains.

- Wetland Conservation Act Approval (for all wetland alterations)
  - For all wetland alteration projects, the "Minnesota Local/State/Federal Application Forms for Water/Wetland Projects" must be completed. This form is available from the Board of Water and Soil Resource's (BWSR) website at: http://www.bwsr.state.mn.us

In an effort to create more efficient permitting, the City of Minnetonka has implemented an electronic application submission and plan review process. Included on the webpage (link below) are answers to common permit questions, requirements and common permits, a guide to learn more about the electronic permit and plan review system and a link to access the ePermits portal.

https://eminnetonka.com/community-development/permits

4.1.1 Requirements for a Review Submittal

All submittals for will be done electronically through the City's ePermits portal.

For projects triggering stormwater management standards, the following exhibits will be included in a submittal:

1. A set of **Project Plans**, including at least:
   a. A scale drawing of the site showing property lines and delineation of lands under ownership of the applicant.
   b. Proposed and existing stormwater facilities location, alignment and elevation.
   c. Existing and proposed site contour elevations related to NGVD, 1929 datum.
   d. Construction plans and specifications of all proposed stormwater management facilities.
2. A **Stormwater Management Plan**, signed by a professional engineer and meeting the minimum requirements listed below:
   a. Delineation of the subwatersheds contributing runoff from off-site and proposed and existing subwatersheds on-site.
   b. Delineation of existing on-site wetlands, marshes and/or floodplain areas.
   c. Existing and proposed post-development normal, 1-year, 2-year, 10-year and 100-year stormwater elevations for the site using Atlas 14 design storm events. For projects in the RPBCWD, existing and

proposed development stormwater elevations should also be evaluated for the 100-year, 10-day snowmelt event.

d. Stormwater runoff volume and rate analyses for existing and proposed conditions for Atlas 14 1-year, 2-year, 10-year, 100-year design storm events. For projects in the RPBCWD, existing and proposed runoff rates and volumes should also be evaluated for the 100-year, 10-day snowmelt event.

e. All hydrologic and hydraulic computations necessary to design the proposed stormwater quality management facilities, including models and model result summaries.

f. Documentation indicating conformance with the City's *Water Resource Management Plan*.

g. Submittal of a checklist of Best Management Practices (BMPs) demonstrating that, to the maximum extent practical, the plan has incorporated the structural and nonstructural BMPs as described in the following documents:

State of Minnesota Stormwater Manual (MPCA, 2005, as amended)

h. Additional items as may be required by the city engineer (e.g. soil boring logs, environmental investigations, infiltration testing, etc.)

3. A **Stormwater Pollution Prevention Plan (SWPPP)**, signed by a registered professional engineer and meeting the standards outlined in the Performance Standards Ordinance (300.28), Sections 15 through 18.

4.2 WMOs

The following section summarizes the permits and applications requiring WMO review and approval. Figures 3-3 and 3-4 show the location of the four WMOs within the City of Minnetonka, including both the hydrologic boundaries as well as the jurisdictional boundaries.

4.2.1 BCWMC

The City of Minnetonka has permitting authority for projects requiring permits within the BCWMC, including all wetland activities. However, after the city has provided preliminary approval (indicating compliance with the city's local water management plan) and submitted a signed BCWMC application form to the BCWMC, the BCWMC provides review and approval before the city issues permits, or other approvals. The BCWMC has developed a document titled "Requirements for Improvements and Development Proposals" (August 2017, as updated) that outlines the review requirements and processes as well as the

required design guidelines. The following section summarizes some of the key information that is part of this document.

The types of improvements and development proposals that must be submitted to the BCWMC for review include:

- Alterations within the floodplain ,
- Proposals within the limits of the proposed floodplain storage sites as established in the BCWMC Plan (2015),
- Proposals that may affect water surface elevation, outlet storage capability, shoreline, streambank, or that are incompatible with existing/future land use around the lakes, streams and wetlands,
- Proposals that would alter water resources in the watershed, including the discharge of industrial or other waste to any watercourse or storm sewer, that would require extensive land alteration, are directly tributary to watercourses, or may otherwise affect existing water quality,
- Proposals for the application of chemicals or other treatments to lake or ponds,
- Proposals providing intra- and inter-watershed diversions that could affect flood levels, lake levels and minimum stream flows,
- Proposals for changes in land use and zoning that affect stormwater management,
- Proposals for temporary or permanent ground or surface water appropriations,
- Proposals for the construction of utilities through or paralleling the trunk system that will disturb the bed or banks,
- Proposals that will require diversion of the creek,
- Proposals requiring applications to the Minnesota Department of Natural Resources (DNR),
- Proposals requiring 200 cubic yards of cut/fill or more than 10,000 square feet of land disturbance will be submitted for erosion and sediment control review,
- Proposal of new, nonlinear development projects that create more than one acre of new impervious surface or redevelopment that creates one or more acres of new and/or fully reconstructed impervious surface for water quality review and
- Proposals for linear project disturbing one or more acres

The following items are required for review by the BCWMC for each project:

1. Completed Permit Application,
2. Project Review Fee,
3. Project Plans
4. Stormwater Management Plan and Computations (including hydrologic, hydraulic and water quality models, as required)
5. Final Erosion and Sediment Control Plan
6. Checklist of Best Management Practices incorporated into design

Additionally, more information can be found regarding the BCWMC review process and requirements for improvements and development proposals at the link below:

http://www.bassettcreekwmo.org/developer/review-process

4.2.2 MCWD

The City of Minnetonka has permitting authority for projects requiring permits under the MCWD erosion control, floodplain alteration and stormwater management rules.

Permits for all other MCWD rules (wetland protection, dredging, water body crossing and structures, appropriations and shoreline and streambank stabilization rules) must be obtained from the MCWD.

The following is a list of the types of projects that may require a permit from the MCWD:

- Single Family Home Construction/Remodel
- Residential Subdivision/Development/Redevelopment
- Commercial Construction/Institutional Construction/Reconstruction

Additionally, the following projects will require a permit from the MCWD:

- Dredging
    - All dredging in the beds, banks, or shores of any protected water or wetland
    - All dredging permit applications for Lake Minnetonka or Lake Minnetonka Tributaries must comply with the provisions of the Lake Minnetonka Dredging Joint Policy Statement

- Wetland Protection
    - All projects associated with the draining, filling, excavation, or alteration of a wetland
- Shoreline/Streambank Improvements
    - All shoreline and streambank improvements, including but not limited to rip rap, retaining walls, sheet piling and boat ramps
    - All sandblanket projects including family beaches
- Stream and Lake Crossings
- Placement of roads, highways, or utilities in the bed of a protected water or wetland
- Construction of a bridge or related crossing of a water, waterway or wetland.
- Placement of a culvert or similar structure in the bed or channel of a protected water or wetland

More information can be found regarding the MCWD requirements for permits, approvals and submittals at the link below:

http://minnehahacreek.org/permits/permit-information-and-applications/permit-applications

4.2.3 NMCWD

The City of Minnetonka does not have sole-permitting authority within the NMCWD. Both the City and the NMCWD each implement their individual permitting programs. The city will direct applicants to NMCWD for permitting during the preliminary plat review process when the city identifies which WMO a project is in and if it appears to be triggering the stormwater management rules. However, the NMCWD permitting review does not typically begin until the preliminary plan review has received city planning commission approval. The city does administer WCA.

The NMCWD has developed rules for: floodplain management and drainage alterations, wetlands management, stormwater management, erosion and sediment control, water body crossings and structures, shoreline and streambank stabilization, sediment removal and appropriation of public surface waters.

From a permitting standpoint, the NMCWD board will take action on a complete application within 60 days. A complete application has received at least preliminary required approval from the City of Minnetonka planning department. This review typically occurs in parallel with reviews by the City of Minnetonka.

Permits are required from the NMCWD for the following:

- Any project that proposes to alter or disturb more than 50 cubic yards of material or 5,000 square feet of area.
- Single family home construction or reconstruction
- Subdivision of a parcel into three (3) or more residential lots
- Linear projects creating more than 1 acre of new or additional impervious surface
- Redevelopment disturbing more than 50 percent of the existing impervious surface on the parcel or will increase the imperviousness of the entire parcel by more than 50 percent.
- Any construction, improvement, repair, removal of a crossing or structure in contact with or under the bed or bank of any water body.
- Any installation of a shoreline or streambank improvement, including but not limited to riprap, a bioengineered installation, or a retaining wall on a public water.
- Any alteration or filling of land and/or redirection of flow below the 100-year frequency floodplain of the creek system, lakes or detention basins.
- Any activity that results in draining, excavation, or filling of a wetland regulated through the Wetland Conservation Act (WCA).
- Any removal of sediment from the beds, banks, or shore of any public water.
- The appropriations from a public water basin, public water wetland, or a protected water course.

The NMCWD permitting program is independent of permits that may be required by other governmental agencies. If a permit is required by the Minnesota Department of Natural Resources (DNR) for a project, the NMCWD reviews and provides comments to the DNR regarding the project. General Permit 1997-6112 provides for state work-in-public waters permitting for property owners and project proponents who secure a permit from NMCWD for projects related to shore protection, docks, road crossings and maintenance at storm sewer intakes and outfalls.

More information can be found regarding the NMCWD requirements for permits, approvals and submittals at the link below:

https://www.ninemilecreek.org/permits/

4.2.4 RPBCWD

The City of Minnetonka does not have sole permitting authority within the RPBCWD. Both the City of Minnetonka and the RPBCWD administer their individual regulatory program for development and redevelopment projects within the RPBCWD. For projects where RPBCWD rules also apply, permits must be obtained from RPBCWD.

The RPBCWD has developed rules for: floodplain management and drainage alterations, erosion and sediment control, wetland, lake and creek buffers, dredging and sediment removal, shoreline and streambank stabilization, water body crossings and structures, appropriation of public surface waters, appropriation of groundwater and stormwater management.

From a permitting standpoint, the RPBCWD board will take action on a complete application within 60 days. A complete permit application includes all required information, exhibits and fees and must be signed by all property owners. This review typically occurs in parallel with reviews by the City of Minnetonka.

Permits are required from the RPBCWD for the following:

- Any project that proposes to alter or disturb more than 50 cubic yards of material or 5,000 square feet of area.
- Single family home construction or reconstruction within 300 feet within the centerline of Riley, Purgatory, or Bluff Creeks, within 500 feet of the OHWL of and draining to a public waters, or below the 100-year flood elevation adopted by the RPBCWD.
- Subdivision of a parcel into three (3) or more residential lots
- Linear projects creating more than 5000 SF of new or additional impervious surface
- Redevelopment disturbing more than 50 percent of the existing impervious surface on the parcel or will increase the imperviousness of the entire parcel by more than 50 percent.
- Any construction, improvement, repair, removal of a crossing or structure in contact with or under the bed or bank of any water body.
- Any installation of a shoreline or streambank improvement, including but not limited to riprap, a bioengineered installation, or a retaining wall on a public water.
- Any alteration or filling of land and/or redirection of flow below the 100-year frequency floodplain of the creek system, lakes or detention basins.

- Any activity that results in draining, excavation, or filling of a wetland regulated through the Wetland Conservation Act (WCA).
- Any removal of sediment from the beds, banks, or shore of any public water.
- The appropriations from a public water basin, public water wetland, a protected water course, or groundwater.

The RPBCWD permitting program is independent of permits that may be required by other governmental agencies.

More information can be found regarding the RPBCWD requirements for permits, approvals and submittals at the link below:

http://www.rpbcwd.org/permits/

4.3 State Agencies

4.3.1 Minnesota Department of Natural Resources (DNR)

The DNR requires a variety of permits related to work in or around public waters which are summarized in the section below. The following is a link to all of the water-related permits required by the DNR:

http://www.dnr.state.mn.us/permits/water/index.html

In some cases, the DNR has transferred permitting authority to local WMOs. Each WMO should be contacted to establish their permitting authority with regards to permits required by the DNR.

4.3.1.1 Public Waters Work Permits

The Public Water Work Permit is required for water development activities below the ordinary high water level (OHWL) in public waters and public waters wetlands, including:

- filling
- excavation
- shore protection
- bridges and culverts
- structures
- docks
- marinas
- water level controls

- dredging
- dams

There are two types of public waters work permits, general and individual. More discussion of the types of public waters permits can be found at the link below:

http://www.dnr.state.mn.us/waters/watermgmt_section/pwpermits/requirements.html

4.3.1.2 Water Appropriations Permit

A water use (appropriation) permit from DNR Waters is required for all users withdrawing more than 10,000 gallons of water per day or 1 million gallons per year. There are several exemptions to water appropriation permit requirements including:

- domestic uses serving less than 25 persons for general residential purposes,
- test pumping of a ground water source,
- reuse of water already authorized by a permit (e.g., water purchased from a municipal water system), or
- certain agricultural drainage systems (check with your area hydrologist for applicability).

For more information regarding DNR water appropriations and permits requirements, follow the link below:

http://www.dnr.state.mn.us/waters/watermgmt_section/appropriations/permits.html

4.3.1.3 Dam Safety Permit

A DNR Dam Safety Permit is required for the construction, alteration, repair, or removal of dams. For more information regarding the permit and application process as well as the DNR definition of a dam, follow the link below:

http://www.dnr.state.mn.us/permits/water/index.html

4.3.1.4 Aquatic Plant Management Control Permit

A DNR Aquatic Plant Management Control Permit may be required for removal of aquatic plants, algae, swimmer's itch or leeches. This includes both mechanical and chemical treatment methods. For more information about the DNR Aquatic Plant Management Permit Application, follow the link below:

http://www.dnr.state.mn.us/permits/water/index.html

4.3.1.5 Other Fishery Permits

There are several other DNR Fishery Permits required for rough fish removal, fish transport and stocking, as well as operation of lake aeration systems. For more information about these permits required by the DNR, follow the link below:

http://www.dnr.state.mn.us/permits/water/index.html

4.3.2 Minnesota Pollution Control Agency (MPCA)

4.3.2.1 National Pollution Discharge Elimination System (NPDES) Construction Stormwater General Permit

An NPDES/SDS permit is required if you are the owner or operator for any construction activity disturbing:

- One acre or more of soil.
- Less than one acre of soil if that activity is part of a "larger common plan of development or sale" that is greater than one acre.
- Less than one acre of soil, but the MPCA determines that the activity poses a risk to water resources.

For more information regarding the MPCA NPDES permit, follow the link below:

https://www.pca.state.mn.us/water/construction-stormwater

4.4 Federal Agencies

4.4.1 United States Army Corps of Engineers (COE)

This section describes several of the specific permits and approvals required from the COE for work in waters and wetlands of the United States. Below is a link that generally describes the COE regulatory program, while the second link provides information regarding the COE permit and application information:

http://www.usace.army.mil/Missions/Civil-Works/Regulatory-Program-and-Permits/

http://www.usace.army.mil/Missions/Civil-Works/Regulatory-Program-and-Permits/Obtain-a-Permit/

4.4.1.1 Section 10 of the Rivers and Harbors Act Permit

Section 10 of the Rivers and Harbors Act prohibits obstruction or alteration of designated navigable waters of the United States without a permit from the COE. Structure or work outside the limits defined for

navigable waters of the U.S. require a Section 10 permit if the structure or work affects the course, location, condition, or capacity of the water body. There are types of projects that do not require a Section 10 permit.

However, there are no navigable waters of the United States within the City of Minnetonka that will require a COE Section 10 Permit.

4.4.1.2 Section 404 Permit

Section 404 of the Clean Water Act regulates discharge of dredged or fill material into waters of the United States, including wetlands under the jurisdiction of the COE. Examples of activities that can require a Section 404 permit include: placement of riprap for erosion protection, placing fill in a wetland, construction of dams or dikes, stream channelization and stream diversion. However, there are activities exempt from Section 404 regulation, such as, but not limited to, maintenance activities to drainage ditches and structures such as dams, dikes and levees.

There are often questions and concerns about which water bodies fall under the jurisdiction of Section 404. A summary of Section 404 jurisdiction can be found in the June 5, 2007 EPA/Corps guidance, Clean Water Act Jurisdiction Following the U.S. Supreme Court's Decision in Rapanos v. United States & Carabell v. United States and subsequent documents that can be found at the following link:

https://www.epa.gov/cwa-404/2008-rapanos-guidance-and-related-documents

The following is a link to policy and technical guidance documents associated with Section 404:

https://www.epa.gov/cwa-404/cwa-policy-and-guidance

Further discussion of the Section 404 permit program can be found at the link below:

https://www.epa.gov/cwa-404/section-404-permit-program

5.0 Review Process

This section discusses the general permit review process for the City of Minnetonka as well as for the WMOs within the city, including a submittal and review timelines.

5.1 City of Minnetonka Procedure for Review

5.1.1 Procedural Steps

1. All applications related to development or redevelopment must be submitted to the City of Minnetonka Planning Department, with the required attachments. The required submittals are outlined on the application forms.
2. The Planning and Engineering Departments will review the submitted application, plans and design computations within 10 days of receiving the complete submittal packet.
3. The city has 60 days to make a final decision on a development or redevelopment review.
4. The planning commission is a seven-member volunteer body appointed by the city council to make recommendations to the city council. All of the meetings are open to the public and the public is invited to speak during public hearings. Meetings are held generally twice a month on Thursday at 6:30 p.m.
5. The city council is a seven-member elected body. As elected representatives, the council is responsible for implementing the Zoning Ordinance and Comprehensive Guide Plan. The council generally meets twice a month on Monday at 6:30 p.m.

5.1.2 Variances

A variance is needed for any project that is non-compliant with any of the zoning codes, including the water resource related code. For more information related to variances, see the following:

https://eminnetonka.com/planning/brochures/

5.2 WMOs

Each of the WMOs have their own permitting, review and approval processes and timelines. The following sections provide links to the permitting processes outlined on each of the WMOs respective websites.

5.2.1 BCWMC

More information can be found regarding the BCWMC review process and requirements for improvements and development proposals at the link below:

http://bassettcreekwmo.org/developer/review-process

5.2.2 MCWD

More information can be found regarding the MCWD permit requirements and review process can be found at the link below:

http://www.minnehahacreek.org/permits/permit-information-and-applications

5.2.3 NMCWD

More information can be found regarding the NMCWD permit requirements and review process can be found at the link below:

https://www.ninemilecreek.org/permits/

5.2.4 RPBCWD

More information can be found regarding the RPBCWD permit requirements and review process can be found at the link below:

http://www.rpbcwd.org/permits/

6.0 City of Minnetonka Guidelines and Design Standards

The City of Minnetonka has established specific guidelines and design standards that meet, or exceed, those standards outlined by the respective WMO. Because these standards are based on the requirements of the various WMOs and vary by location in the city.

6.1 Stormwater Treatment Standards

6.1.1 General Guidelines

The City of Minnetonka has established policies within the WRMP that state that the city will meet or exceed the stormwater management rules established by all the WMOs within the city. The City had generally adopted the current WMO stormwater management standards within each respective portion of the City, although in some cases, the City's application of the rules is more restrictive than for some of the WMOs (e.g. the city has established a smaller threshold triggering a permit or treatment). The City's stormwater management requirements includes criteria for:

- Runoff Rate Control
- Runoff Volume Control
- Water Quality Treatment

The Stormwater Management Requirement Guidelines attachment includes a flow chart for each WMO to assist developers in determining the required level of treatment for a specific project. Additionally, this also includes a discussion of the Volume Retention Compliance Sequencing Approach, which is the recommended approach to achieving the volume retention standard and also discusses the process if meeting the city's volume retention standard cannot be met.

6.1.2 Specific Standards and Criteria for Stormwater BMPs

There are a number of best management practices (BMPs) that can be implemented to help achieve the stormwater treatment standards required by the city. These BMPs include, but are not limited to, infiltration, filtration and detention systems. **Table AppA-1**, as updated, includes a list of BMPs that are typically used to help achieve the city's runoff volume control criteria. The applicant should contact the city for the most recent version of **Table AppA-1**.

To ensure that the stormwater management BMPs function as designed, they must be properly maintained in perpetuity. The city requires that applicants

provide a maintenance plan that identifies and protects the design, capacity and functionality of both onsite and offsite stormwater management facilities; specifies the methods, schedule and responsible parties for maintenance; and provides for the maintenance in perpetuity of the facility. The plan will be recorded on the deed in a form acceptable to the city. For single family homes, maintenance agreements are not required.

Along with proper maintenance of the BMPs, the city requires that BMPs include pretreatment of runoff to remove solids before discharging to infiltration and filtration systems, helping to maintain the designed function.

A performance surety for the construction of stormwater BMPs, as well as other permitted activities, may be required for various projects.

6.1.2.1 Volume Retention Compliance Sequencing Approach

Although infiltration is the preferred approach to managing stormwater runoff, the city recognizes that there are site conditions that may not allow an applicant to achieve the runoff volume control such as poorly infiltrating soils (e.g. HSG D), contaminated soils, high groundwater elevations, or it is located within an groundwater quality protection area such as a wellhead protection area or a DWSMA.

In these cases, the applicant can pursue the following alternative compliance sequencing approach. Details related to this approach are included in the Stormwater Management Requirement Guidelines attachment.

The city may require an applicant to submit the following information to demonstrate the need for alternative compliance sequencing:

- Soil borings highlighting soil type, conditions and depth to/presence of groundwater,
- Infiltration testing (in-situ) for soils identified as HSG D, and
- Environmental investigations.

6.1.2.2 BMP Design Guidelines

There are a number of different types of BMPs that can be used to help meet the stormwater treatment standards, including a variety of infiltration, filtration and wet retention pond practices.

These BMPs include:

- Bioretention basins/Rain gardens
- Infiltration basins/Subsurface infiltration systems
- Infiltration trenches
- Permeable/pervious pavement

- Tree trenches
- Swales
- Sand filters
- Enhanced sand filters
- Stormwater ponds
- Green roofs
- Stormwater harvesting and reuse

The City supports the reduction in runoff volumes through the implementation of low impact development techniques. If site condition allow for infiltration, the city would prefer the implementation of surface infiltration practices which are easier to inspect and maintain. However, the City recognizes that some sites may achieve the stormwater management standards through the use of subsurface infiltration/filtration practices. It is critical that the design of these subsurface systems are designed to handle loads rated to 10,800 lbs/SF (for emergency vehicles) if located within drive lanes and that they are designed to allow for inspection and long-term maintenance.

The City encourages project proposers and land owners to restore creek and streambank areas affected by bank erosion, lack of vegetation/buffer, or other conditions that compromise the ecological function of the creek.

Developers can also consider better site design practices which reduce runoff volume and mitigate site impacts when decisions are being made about proposed layout of a development site. Examples of these types of practices include preserving/creating natural areas, amending soils, establishing buffers, disconnecting rooftops and other impervious surfaces and reducing impervious cover through the narrowing of streets and creating smaller parking lots.

Table AppA-1, as updated, lists a variety of BMPs that can be implemented to help achieve the city's runoff volume control criteria.

The City of Minnetonka relies on the design standards outlines in the *State of Minnesota Stormwater Manual* (MPCA, 2005, as updated):

https://stormwater.pca.state.mn.us/index.php?title=Main_Page

6.1.2.1 BMP Maintenance

The city requires all developments requiring stormwater management practices to enter into a long-term maintenance agreement with the city. These maintenance agreements is recorded against the property to

ensure the property owner actively inspects and maintains these stormwater management practices in perpetuity.

For new development, the city requires stormwater BMPs or wetland buffers to be platted on outlots. However, since the city is fully-developed and the majority of the development the city experiences is redevelopment, many projects to not require modifications to the existing plat. As a result, there is little opportunity to create outlots and are considered on a case-by-case basis. More commonly, the city currently requires that all stormwater management facilities be covered by drainage and utility easements and maintenance agreements that establish the applicant's responsibility to maintain the feature, while reserving the right for the city to access the facility should maintenance be neglected. Wetland buffers are required to be placed in conservation easement.

6.2 Flooding and Water Quantity

6.2.1 General Guidelines

The City of Minnetonka requires the control of peak runoff flow rates and volume for:

- Land-altering activities disturbing more than 50 cubic yards
- Land-altering activities disturbing more than 5,000 square feet
- Subdivision of a parcel into 3 or more lots
- Single Family Homes meeting specific criteria
- New and redevelopment activities
- Linear projects

The Stormwater Management Requirement Guidelines attachment outlines the rate and volume control requirements for the city.

6.2.2 Specific Standards and Criteria

Additional details on the City of Minnetonka flooding and water quantity standards can be found in the Wetland Protection (300.23), Floodplain District (300.24) and Shoreland Protection (300.25) Ordinances.

6.2.2.1 Low Floor Elevations

The City of Minnetonka has established the low-floor elevation for all principal structures as 2 feet above the Atlas 14 (if available) 100-year flood elevation for wetlands, floodplains, stormwater ponds and

shorelands. In landlocked basins, the low-floor elevation is set at 2 feet above the elevations based on two back-to-back Atlas 14 (if available) 100-year storm events (first event assuming AMC-II, the second event assuming AMC-III).

Complete details on the City of Minnetonka low-floor elevation standards can be found in the Wetland Protection (300.23), Floodplain District (300.24) and Shoreland Protection (300.25) Ordinances.

6.2.2.2 Storm Water Conveyance System Sizing

The City of Minnetonka has established the following requirements for the design of all trunk storm drainage systems, evaluated using a hydrograph method and ultimate land use conditions:

- In areas where flood damage is likely to occur, the storm sewer system will be designed to convey the critical duration (1/2 hour to 30 day) Atlas 14 1-percent chance flood (100-year)
- In areas where no significant flood damage is likely to occur, the storm sewer system will be designed to convey the critical duration (1/2 hour to 30 day) Atlas 14 10-percent chance flood (10-year).

6.2.2.3 Catch Basin Spacing and Sag Points

The City of Minnetonka restricts the maximum length of pipe between storm structures (manholes and catch basins) to 300 feet. For all State-Aid roadways, the catch basin spacing should follow Mn/DOT's MSA Standards for catch basin spacing and sag (low) points. These standards follow those outlined by the Federal Highway Administration (FHWA) HY-22.

- For catch basin spacing, the critical Atlas 14 10 percent chance storm event is used (10-year) to estimate the spacing.
- For sag points, the critical Atlas 14 2 percent chance storm event is used (50-year) to locate the low areas along the roadway.

6.2.2.4 Peak Runoff Rates

The Stormwater Management Requirement Guidelines attachment outlines the rate control standards as required by the City of Minnetonka.

6.2.2.5 On-site Volume Retention

The Stormwater Management Requirement Guidelines attachment outlines the volume retention standards as required by the City of Minnetonka.

6.3 Erosion and Sediment Control

6.3.1 General Guidelines

The City of Minnetonka has established guidelines for the preparation and implementation of grading and erosion control plans for land disturbing activity in order to prevent sediment deposition on public roads, prevent disruption or damage to water resources and public stormwater systems, prevent adverse impacts to neighboring property; prevent damage to natural resources, such as trees, that are intended to be preserved and to maintain stable slopes.

Grading and erosion control plans are required for the following projects:

- Involving the movement of 50 cubic yards of material or land disturbance of areas greater than 5,000 square feet.
- Involving any land disturbance in designated wetlands, floodplains, or shorelands
- Involving mining operations for gravel or other materials

6.3.2 Specific Standards and Criteria

The specific grading and erosion control standards and criteria for the City of Minnetonka are outlined as part of the Performance Standards Ordinance (300.28), Sections 15 through 18. The city uses the Mn/DOT standard plan sheets for drainage and erosion control. Below is a link to the Mn/DOT Standard Plans website:

https://standardplans.dot.state.mn.us/

6.4 Wetlands

6.4.1 General Guidelines

The City of Minnetonka has established wetland regulations to recognize, preserve and protect the environmental, aesthetic and hydrologic functions of the city's wetlands by regulating the use of wetlands and their adjacent properties. The intent is to protect wetlands to the maximum extent possible, resulting in no net loss of wetland functions and values, while allowing a reasonable use of the property.

The city has established standards related to the setback of structures and low floor elevations and the establishment of vegetative buffers. Additionally, all new discharges to wetlands will be required to incorporate water quality treatment, regardless of the wetland management classification. For projects

subject to WMO review and permits, applicants will need to meet the WMOs' buffer rules and requirements related to wetlands (all WMOs) and streams (if project is located in the BCWMC or the RPBCWD).

For projects requiring wetland delineations and assessment of functions and values, a methodology authorized under the Wetland Conservation Act should be used. The wetland assessment methodology required by the WMOs within the City of Minnetonka typically refers to the most current version of the Minnesota Routine Assessment Method for Evaluating Wetland Functions (MnRAM). Applicants should contact the WMOs regarding any potential changes to their wetland assessment methodology requirements. For the most current version of MnRAM, contact the Minnesota Board of Water and Soil Resources (BWSR).

6.4.2 Specific Standards and Criteria

The specific wetland protection standards and criteria for the city are outlined in the Wetland Protection Ordinance (300.23). Additional information regarding the city's wetlands can be found in Chapter 3.

6.5 Floodplains

6.5.1 General Guidelines

The City of Minnetonka has established floodplain regulations to recognize, preserve and protect recreational and hydrological resources and functions of the city's creeks and associated lakes and drainage ways by regulating the use of the creeks, associated lakes and adjacent properties in order to minimize loss of life and property damage due to flooding.

The city has established standards related to the setback of structures and establishment of low floor elevations. Additionally, the city restricts land uses within the established floodplains. However, there are some specific land uses permitted within the floodplain (outside the floodway) if they do not result in the net fill of the floodplain or does not involve the excavation or fill of

- more than 20 cubic yards
- more than 1,000 square feet

6.5.2 Specific Standards and Criteria

The specific floodplain district standards and criteria for the City of Minnetonka are outlined in the Floodplain District Ordinance (300.24).

6.6 Shorelands

6.6.1 General Guidelines

The City of Minnetonka has established shoreland regulations to recognize, preserve and protect the environmental, recreational and hydrologic resources and functions of the city's lakes and streams by regulating the use of both the public waters and adjacent land in order to protect their viability and minimize loss from flooding. In order to promote the general health, safety and welfare, certain DNR public waters in the city have been given a shoreland management classification by the DNR.

The city has established standards for the restriction of minimum lot sizes, water frontage, structure heights and imperviousness, based on the DNR shoreland management classification. The city also established standards for the setback of structures from the OHWL and the top of bluffs as well as low floor elevations of structures on shoreland parcels.

6.6.2 Specific Standards and Criteria

The specific shoreland district standards and criteria for the City of Minnetonka are outlined in the Shoreland Protection Ordinance (300.25).

6.7 Wellhead Protection Areas

6.7.1 General Guidelines

The city has a Minnesota Department of Health (MDH) approved Wellhead Protection Plan. The MDH is responsible for the protection of groundwater supplies and aims to prevent contaminants from entering the recharge zones of public water supply wells. Chapter 3 includes a figure showing the location of water supply wells as well as the delineated wellhead protection areas within the City of Minnetonka, including wellhead protection areas from surrounding cities. Additionally, the 1-year zone of recharge is shown for each of the city's wells.

To protect groundwater resources, the City requires that infiltration practices be implemented with consideration of guidance provided by the MPCA in its NPDES General Construction Stormwater permit (2013, as amended), MIDS guidance (2013, as amended) and the Minnesota Department of Health's (MDH), Evaluating Prop (2016).

Table AppA-1. Best Management Practices for Stormwater Volume Control Criteria Sep-19

Category	Method	Storage Volume Credit Formulas[1]	Nomenclature
Preferred Volume Retention Practices			
Rain Gardens/Surface Infiltration (no underdrain)	Storage & Infiltration	If $D_o \leq (I \times 4)$, $V = D_o \times ((A_O+A_M) / 2)$ If $D_o \geq (I \times 4)$, $V = (I \times 4) \times ((A_O+A_M) / 2)$	V = Volume Credit (ft3) D_o = Overflow Depth (ft) A_o = BMP overflow area (ft2) A_M = Area at Media (ft2) I = infiltration rate (in/hr) 4 = conversion for 48 hr drawdown
Subsurface Infiltration (no underdrain)	Storage & Infiltration	If $D_o \leq (I \times 4)$, V = (pipe volume + rock/subgrade void volume), to overflow elevation Pipe Vol. = Pipe [A x L], to overflow elevation Rock/Subgrade Void Vol. = ([W x H x L] - Pipe[A x L]) x n, to overflow elevation If $D_o \geq (I \times 4)$, V = (pipe volume + rock/subgrade void volume), to bottom elevation + (I x 4) Pipe Vol. = Pipe [A x L], to bottom elevation + (I x 4) Rock/Subgrade Void Vol. = ([W x H x L] - Pipe[A x L]) x n, to bottom elevation + (I x 4)	V = Volume Credit (ft3) D_o = Overflow Depth (ft) n = porosity (ft3/ft3) of rock/subgrade media W = width of trench (ft) H = height of trench (ft) L = length of trench or pipe (ft) A = area of pipe (ft2) I = infiltration rate (in/hr) 4 = conversion for 48 hr drawdown
Permeable Pavers (no underdrain)	Storage & Infiltration	If $D_o \leq (I \times 4)$, V = [W x Do x L] x n, to overflow elevation If Do ≥ (I x 4), V = [W x (I x 4) x L] x n, to overflow elevation	V = Volume Credit (ft3) Do = Overflow Depth of rock/subgrade media (ft) n = porosity (ft3/ft3) of rock/subgrade media W = width of trench (ft) L = length of trench (ft) I = infiltration rate (in/hr) 4 = conversion for 48 hr drawdown
Rain Barrel/Cistern (Irrigation Reuse)	Storage & Slow Release, Evaporation	MIDS Calculator or demonstrated equivalent method - see city staff	
Alternative Volume Reduction Practices			
Better Site Design Credits			
Rooftop/Non-rooftop Disconnection Credit	Moisture Retention, Infiltration, & ET	See Minnesota Stormwater Manual https://stormwater.pca.state.mn.us/index.php?title=Turf	
Grass Channel Credit	Moisture Retention, Infiltration, & ET	See MIDS calculator	
Soil Amendment Credit	Infiltration	See Minnesota Stormwater Manual https://stormwater.pca.state.mn.us/index.php?title=Turf	
Natural Area Conservation Credit	Moisture Retention & ET	TBD - see city staff	
Filtration Techniques* (for use on sites where conditions preclude infiltration practices)			
* Bioretention Systems (with underdrain)	Storage, Moisture Retention & ET	See MIDS calculator	
* Standard Surface Sand Filter (with underdrain)	Moisture Retention & Slow Release, Evaporation	See MIDS calculator	
* Iron-Enhanced Sand Filter (with underdrain)	Moisture Retention & Slow Release, Evaporation	See MIDS calculator	

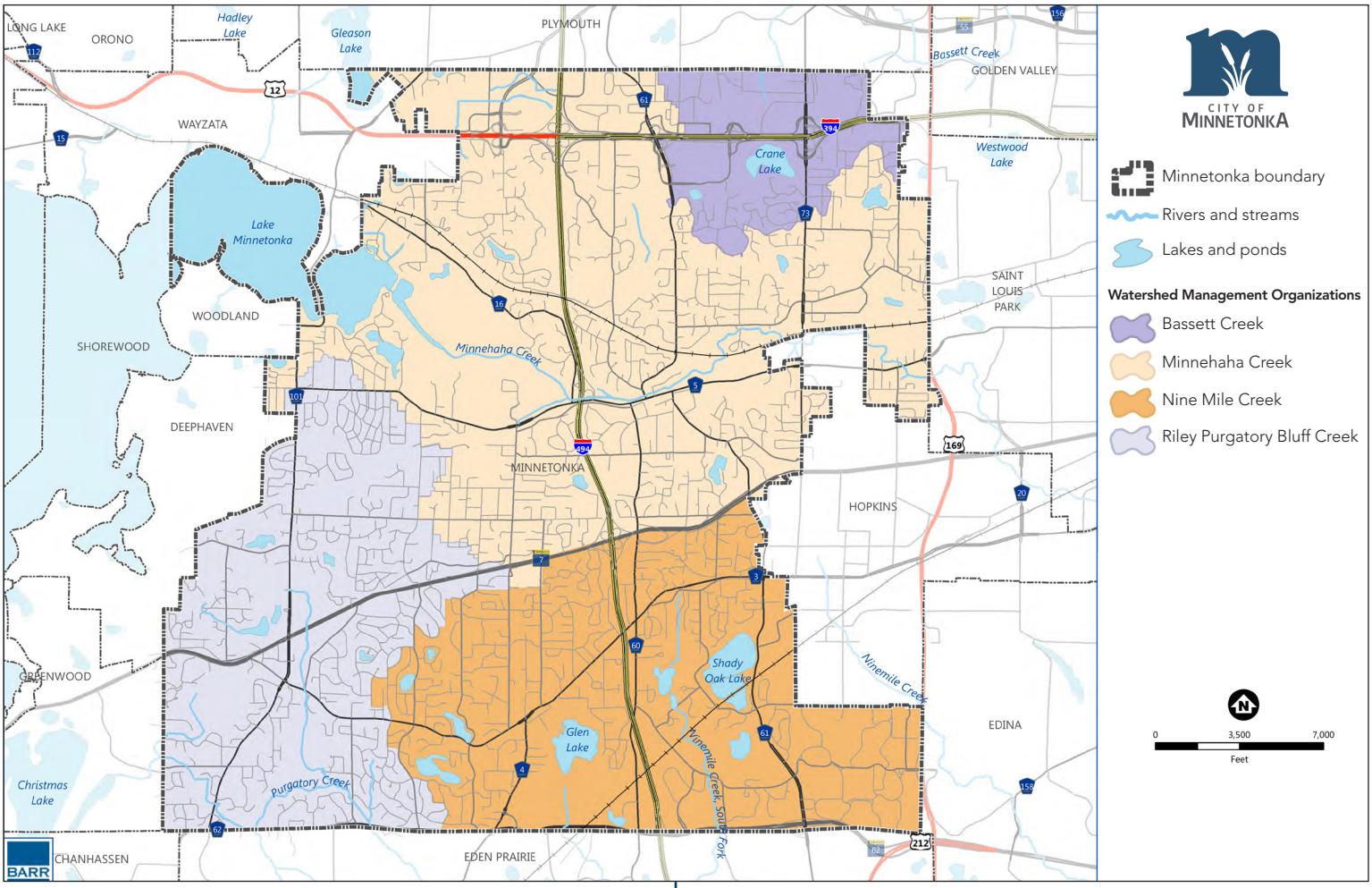
ET = Evapotranspiration

1 - Crediting approach to Stormwater BMPs based on methods outlined in the Minnesota Stormwater Manual

Stormwater Management Requirements Guidance

September 2019

The stormwater management requirements differ depending on the watershed where your project is located. Use the map below to determine which watershed management organization stormwater management rules apply.



Bassett Creek Watershed Management Commission (BCWMC), see page AppA-2

Minnehaha Creek Watershed District (MCWD), see page AppA-3

Nine Mile Creek Watershed District (NMCWD), see page AppA-4

Riley Purgatory Bluff Creek Watershed District (RPBCWD), see page AppA-5

If you are unable to determine which watershed management organization your project is in after viewing this map, contact the water resources coordinator at the City of Minnetonka engineering department (952-939-8206).

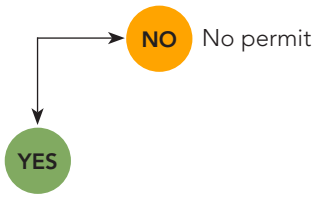
Bassett Creek Watershed Management Commission

Stormwater Management Requirements Guidance

September 2019

Does my project:

- Disturb 50 cubic yards or more of earth?
- Disturb 5,000 square feet of surface area?
- Subdivide a property into three or more residential lots?

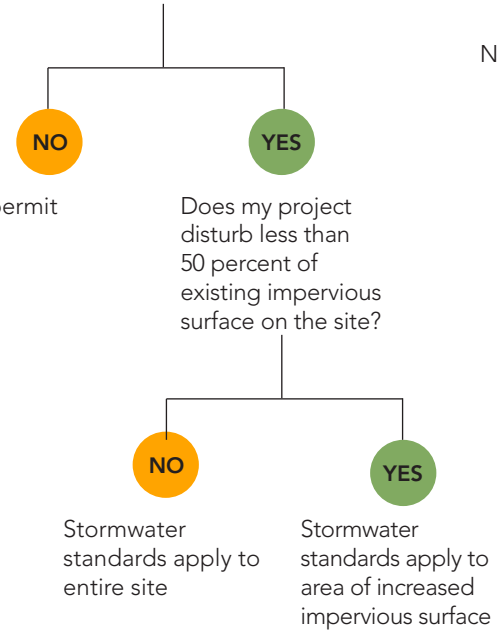


What type of project do I have?

Development/redevelopment of a single-family home

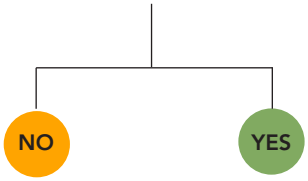
Is my parcel:

- Within 300 feet of the centerline and draining to Bassett Creek?
- Within 500 feet of an OHWL and draining to a public water/wetland?
- Below the 100-year flood elevation adopted by BCWMC?



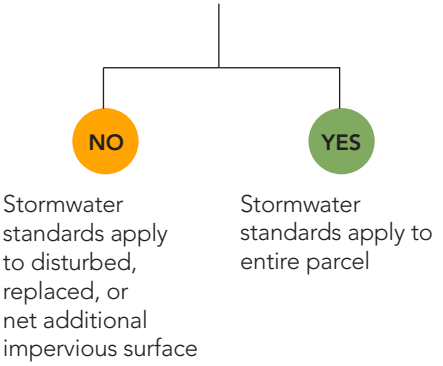
Linear project

Does my project increase the total impervious surface area by at least one acre?



Other development/ redevelopment activity

Does my project disturb more than 50 percent of the existing impervious surface or increase the imperviousness of the site by 50 percent?



Stormwater management standards

Volume retention

Capture and retain 1.1 inches of runoff on-site from applicable impervious surface

- Provide pretreatment of runoff for infiltration or filtration systems
- Draw down water levels in infiltration or filtration systems within 48 hours
- If site conditions limit or prohibit infiltration, see the volume retention compliance sequencing approach (see AppA-6)

Rate control

- Limit peak runoff flow rates to existing conditions for two-, 10-, and 100-year frequency storms (nested 24-hour rainfall distribution)

For more information, including exempt projects and other details, see the complete BCWMC rules at: http://www.bassettcreekwmo.org/developer/review-process

Minnehaha Creek Watershed District

Stormwater Management Requirements Guidance

September 2019

Does my project:

- Disturb 50 cubic yards or more of earth?
- Disturb 5,000 square feet of surface area?
- Subdivide a property into three or more residential lots?

NO → No permit

YES

What type of project do I have?

Development/redevelopment of a single-family home site

Is my parcel:

- Within 300 feet of the centerline of Minnehaha Creek?
- Within 500 feet of the OHWL of any other public water/protected wetland?
- Below the 100-year flood elevation?

NO → No permit

YES → Does my project disturb less than 50 percent of existing impervious surface on site?

NO → Stormwater standards apply to entire site

YES → Stormwater standards apply to area of increased impervious surface

Linear project

Does my project create more than 10,000 square feet of new impervious surface?

NO → No permit

YES → Is my project a new linear project?

NO → Does my project increase impervious surface between >10,000 square feet and < one acre

YES → Stormwater standards apply to new impervious surface

NO → Stormwater standards apply to additional impervious surface

YES → Rate control and water quality standards apply to additional impervious surface

Other development/ redevelopment activity

Is my project new development?

NO → Does my project disturb more than 40 percent of the site?

YES → Stormwater standards apply to entire parcel

NO → Does my project increase the impervious area by less than 50 percent?

YES → Stormwater standards apply to entire parcel

NO → Stormwater standards apply to entire parcel

YES → Stormwater standards apply to additional impervious surface

Stormwater management standards

Volume retention

Retain 1.1 inches of runoff on-site from applicable impervious surfaces

- Provide pretreatment of runoff for infiltration or filtration systems
- Draw down water levels of infiltration or filtration systems within 48 hours
- If site conditions limit or prohibit infiltration, see the volume retention compliance sequencing approach (see AppA-6)

Rate control

- Limit peak runoff flow rates to existing conditions for one-, 10-, and 100-year frequency storms (nested 24-hour distribution)

Water quality

- New development/linear projects—no net increase in phosphorus loading from existing conditions

For more information, including exempt projects and other details, see the complete MCWD rules at http://minnehahacreek.org/permits/permit-information-and-applications/permit-applications

Does my project:

- Disturb 50 cubic yards or more of earth?
- Disturb 5,000 square feet of surface area or vegetation?
- Subdivide a property into three or more residential lots?

NO → No permit

YES

What type of project do I have?

Development/redevelopment of a single-family home site

Does my project increase the total impervious surface by at least 25 percent?

- NO → No permit
- YES → Does my project disturb less than 50 percent of existing impervious surface on site?
  - NO → Stormwater standards apply to entire site
  - YES → Stormwater standards apply to area of increased impervious surface

Linear project

Does my project increase the total impervious surface area by at least one acre?

- NO → No permit
- YES → Stormwater standards apply only to the net new or additional impervious surface

Other development/ redevelopment activity

Does my project disturb more than 50 percent of the existing impervious surface or increase the imperviousness of the entire site by more than 50 percent?

- NO → Stormwater standards apply to disturbed, replaced, and net additional impervious surface
- YES → Stormwater standards apply to entire parcel

Stormwater management standards

Volume retention

Retain 1.1 inches of runoff on-site from applicable impervious surface

- Provide pretreatment of runoff for infiltration or filtration systems
- Draw down water levels in infiltration or filtration systems within 48 hours
- If site conditions limit or prohibit infiltration, see the volume retention compliance sequencing approach (see AppA-6)

Rate control

- Limit peak runoff flow rates to existing conditions for two-, 10-, and 100-year frequency storms (nested 24-hour rainfall distribution)

Water quality

- Remove at least 60 percent of total phosphorus and 90 percent of total suspended solids annually from site runoff

For more information, including exempt projects and other details, see the complete NMCWD rules at https://www.ninemilecreek.org/permits/

Riley Purgatory Bluff Creek Watershed District

Stormwater Management Requirements Guidance

September 2019

Does my project:

- Place, alter, or remove 50 cubic yards or more of earth?
- Alter or remove 5,000 square feet of surface area or vegetation?
- Subdivide a property into three or more residential lots?

NO → No permit

YES

What type of project do I have?

Development/redevelopment of a single-family home site

Is my parcel:

- Within 300 feet of centerline and draining to Purgatory Creek?
- Within 500 feet of an OHWL and draining to a public water/wetland?
- Below the 100-year flood elevation of a water body?

NO → No permit

YES → Does my project disturb less than 50 percent of existing impervious surface on site?

NO → Stormwater standards apply to entire site

YES → Stormwater standards apply to area of increased impervious surface

Linear project

Does my project create 5,000 square feet or more of new and/or fully reconstructed impervious surface?

NO → No permit

YES → For projects creating between 5,000 square feet and one acre of new and/or fully reconstructed impervious surface, the volume retention standard applies to the net increase in impervious surface. Other standards apply to the entire site.

For projects creating more than one acre of new and/or fully reconstructed impervious surface, the volume retention standards apply to the entire site.

Other development/ redevelopment activity

Does my project disturb more than 50 percent of the existing impervious surface or increase the imperviousness of the entire site by more than 50 percent?

NO → Stormwater standards apply to disturbed area and additional impervious surface

YES → Stormwater standards apply to entire site

Stormwater management standards

Volume retention

Abstract 1.1 inches of runoff on-site from applicable impervious surface

- Provide pretreatment of runoff in filtration or filtration systems
- Draw down water levels in infiltration or filtration systems within 48 hours
- If site conditions limit or prohibit infiltration, see the volume retention compliance sequencing approach (see AppA-6)

Rate control

- Limit peak runoff flow rates to existing conditions for two-, 10-, and 100-year frequency storms (nested 24-hour rainfall distribution), and 100-year, 10-day snowmelt event

Water quality

- Remove at least 60 percent of total phosphorus (TP) and 90 percent of total suspended solids (TSS) annually from site runoff, or
- Nondegradation (no net increase in TP or TSS loading from existing conditions)

For more information, including exempt projects and other details, see the complete RPBCWD rules at http://www.rpbcwd.org/permits/

Volume Retention Compliance Sequencing Approach

The runoff volume retention standards require applicants to provide for on-site retention of 1.1 inches of runoff from impervious surfaces as outlined in the stormwater management flowcharts. It is the City of Minnetonka's preference that the 1.1 inches of runoff be retained through implementation of infiltration practices.

However, if site conditions limit or preclude on-site infiltration (see Table 1), the following compliance alternatives shall be pursued in order of preference for compliance with the volume retention standards.

1. Capture and retain at least 0.55 inches of runoff from impervious surfaces and achieve:
   (a) 75 percent annual total phosphorus removal (in BCWMC watershed)
   (b) 60 percent annual total phosphorus removal and 90 percent annual total suspended solids removal (in MCWD, NMCWD, and RPBCWD districts), and
   (c) No net increase in total phosphorus or total suspended solids annually from site runoff (in RPBCWD)

2. Capture and retain to the maximum extent practicable and achieve:
   (a) 60 percent annual total phosphorus removal and 90 percent annual total suspended solids removal, whichever is more stringent
   (b) No net increase in total phosphorus or total suspended solids annually from site runoff (in RPBCWD)

3. If unique, site-specific constraints preclude compliance with 1. or 2. (above), alternative methods such as offsite retention of the required runoff volume may be considered at the discretion of the City Engineer.

Table 1: Site Conditions that Preclude Infiltration or Other Preferred Volume Retention Methods

Types	Site-Specific Conditions	Submittal Requirements
Potential contamination	Potential stormwater hot spots (PSHs)	PSH locations and flow paths
	Contaminated soils/groundwater	State-permitted brownfield documentation; soil borings
Physical limitations	Low permeability (Type D soils)	Soil borings/infiltration testing
	Bedrock within three vertical feet of the bottom on the infiltration area	Soil borings
	Seasonal high groundwater within three vertical feet of the bottom of the infiltration area	Soil borings, monitoring well data
	Karst areas	Soil borings
Land-use limitations	Utility locations	Site map
	Adjacent wells	Well locations

For stormwater discharged to a wetland

Stormwater must be treated before discharge to a wetland.

High-value wetlands cannot be used for stormwater management unless no other alternative is feasible (when permitted); any discharge to a high-value wetland must be treated to at least 60 percent annual removal efficiency for phosphorus and at least 90 percent annual removal efficiency for total suspended solids prior to discharge to the wetland.