



WATER RESOURCES PLAN REVIEW CHECKLIST

Required Wetland Exhibits for Applications. A Wetland Conservation Act Decision for Boundary and Type issued within the past 5 years is required for existing wetlands, marshes, shoreland and/or floodplain areas onsite or to which any portion of the project parcel drains.

Plan Review

The purpose of the plan review is to examine a proposed project more closely for conformance with the City's Water Resource Regulations including the Design Standards, the Engineering Guidelines, Standard Detail Specifications for Storm Sewer Construction & Minnesota Pollution Control Agency Permits and guidelines. A determination, typically after several rounds of comments, on whether the proposal is consistent with the guidelines noted above. Conformance with the Water Resources rules does not imply the project is in compliance with other City Code and Zoning Ordinance regulations outside of the Water Resources Division.

General

- Proposed drainage plan and hydraulic calculations are dated and signed by a licensed professional engineer.
- Owner, engineer and architect name, address, phone and email listed.
- Plan is to scale with a legend. North arrow shown.
- Size of the project shown:
 - Existing impervious and pervious surface areas of the site.
 - Ultimate (fully developed) impervious and pervious surface of the site.
 - Development schedule: show phasing and calendar year each phase is planned for construction.
- Plan is drawn in 2-foot maximum contours. Existing and proposed contours shown differently. All contours are labeled and legible. Where applicable, extend existing contour lines a minimum beyond the site boundary to accurately depict the drainage patterns. Elevation tied to NGVD 88 (City benchmark).
- Describe and identify the location of existing vegetation.
- Areas not to be disturbed clearly defined.
- On-site soil characteristics: Boundaries of different soil types are described.
 - Groundwater elevations are shown.
- Existing public and private utilities shown.
- Property limits shown. Streets labeled. Lot and block information shown if platted. Street address shown if un-platted.
- A long-term inspection and maintenance plan for all permanent stormwater treatment practices is required to be submitted with the SWPPP.
- All receiving surface waters, including wetlands and ponds, within one mile from the project boundaries that will receive stormwater from the construction site. Identify if the surface water is a special or impaired water.

Easements

- Existing and proposed drainage easements shown and labeled on the plan.
- Easements must cover permanent stormwater management areas and hydrologic features such as floodplains, ponds, ditches, swales, wetlands, wetland buffers, and waterways.

Grading, Drainage & Erosion Control

- A stormwater report is required on all projects that meet the rate control threshold or greater
- Existing drainage: Show pre-developed drainage areas, land use and the direction of flow for each area and travel path used to determine the Time of Concentration.
- Final drainage: Show post-developed drainage areas, land use and the direction of flow for each area and travel path used to determine the Time of Concentration.
- Drainage arrows
- Identify off-site catchment areas draining to the site. Provide 2-foot contours. Show land use and direction of flow for each area and travel path
- All receiving surface waters, including wetlands and ponds, within one mile from the project boundaries that will receive stormwater from the construction site. Identify if the surface water is a special or impaired water.
- 100 year flood elevation on all basins
- NWL on all basins
- Emergency overflows noted and minimum of 1.5 feet below lowest opening
- Swales must have minimum grade of 2%. Less than 2% may be considered if there is draitile
- Driveway slopes between 2% and 10%. 5% at sidewalks
- Lowest floor minimum of 2 feet above HWL of pond or stormwater management facility
- Lowest floor minimum of 3 feet above the 100-year HWL of natural waters or the OHW of public waters
- Base flood elevation, flood zone shown and referenced
- Proposed building type (WO, LO, etc) for each lot
- Setbacks
- House pad elevation
- Basement floor elevation (3 feet minimum above sewer invert)
- Garage floor elevation
- Walkout elevation
- Driveway/garage location (left or right) and grade (%)
- Corner lot elevations
- Garage floor elevation 1 foot above highest corner /1.5 feet above curb
- Erosion control notes and details
- Rock entrances and silt fence
- Temporary sediment basins
- Inlet protection
- Concrete wash
- Indicate street sweeping required a minimum of 1x per week or more frequently as directed by the City Engineer.
- Decompaction of all disturbed soils and 6 inches of topsoil meeting current City of Plymouth Engineering Guidelines and Standard Detail Specifications.
- All Erosion, Sediment and Waste Control items must be in compliance with the MPCA CSW Permit (MN R100001)

Storm Sewer System

- Storm Sewer Design is required to meet all guidelines in the City Engineering Guidelines
- Storm sewer configuration, length, grade, type (material) and size shown
- Elevations and design details for all storm sewer structures
- Includes sump structures and any underground structural best management practice
- Last six storm sewer pipe joints on inlet/outlets tied
- Rip Rap shown and size called out

- Drain tile location and size shown
- Storm sewer structure/casting schedule included
- Conflicts and crossings identified
- Castings approved
- Shallow storm sewer identified w/ reasoning
- Details shown for skimmer structures
- Correct size catch basins/manholes for pipe size being used
- Provide access to ponds for future maintenance as required by City Engineering Guidelines and the Minnesota Stormwater Manual.
- Private and Public (city owned) structural stormwater BMPs (e.g. ponds, infiltration/filtration systems) shall meet stormwater maintenance agreement requirements and the City Engineering Guidelines.

Permanent Stormwater Treatment Practices

- Refer to Minnesota Stormwater Manual for most current guidance on permanent stormwater treatment practice design**
 - stormwater.pca.state.mn.us/index.php
 - Applicant signing the stormwater report certifies that the permeant stormwater treatment practice(s) are in compliance with the Minnesota Stormwater Manual
- Rate**
 - For all projects that add or fully reconstruct more than a **half-acre (1/2 ac)** of impervious surface: no increase in peak runoff flow rates from existing conditions for the 2-, 10- and 100-year frequency storm events using a 24-hour rainfall distribution for all points where stormwater discharge leaves the site
- Volume**
 - For all projects that add or fully reconstruct **1 acre** or more of impervious surface: provide for the abstraction onsite of 1.1 inches of runoff from impervious surface of the parcel that meets MIDS. Where infiltration or filtration facilities, practices or systems are proposed, pretreatment of runoff must be provided.
 - Where infiltration facilities, practices or systems are proposed, data must be submitted showing:
 - No evidence of groundwater or redoximorphic soil conditions within 3 feet of the bottom of the facility, practice or system
 - Soil conditions within 5 feet of the bottom of any proposed stormwater treatment facility, practice or system
 - MPCA site screening assessment checklist for soil and groundwater contaminants
 - The measured infiltration capacity of soils at the bottom of the facility, practice or system. (For purposes of calculating volume-control capacity, measured infiltration rates must be divided by 2 to provide a margin of safety.)
 - Location of practice compared to the City of Plymouth Drinking Water Supply Management Area (DWSMA) and Emergency Response Area (ERA)
 - Location of any karst features (if applicable)
 - Drawdown of water levels in infiltration facilities must be within 48 hours
- Quality**

For all projects that add or fully reconstruct **1 acre** or more of impervious surface: Provide at least 60% annual removal efficiency for total phosphorus (TP) and at least 85% annual removal efficiency for total suspended solids (TSS) from site runoff, and no net increase in TSS or TP loading leaving the site from existing conditions. The onsite abstraction of runoff may be included in demonstrating compliance with the total suspended solids and total phosphorus removal requirements.

❑ Low-floor elevation

- All new and reconstructed buildings must be constructed such that the lowest floor is:
 - At least 3 feet above the Ordinary High Water of a Public Water.
 - At least 2 feet above the 100-year high water elevation of a stormwater-management facility or surface water.
- All new and reconstructed buildings must be constructed such that the lowest building opening is at least 1.5 feet above the emergency overflow of a stormwater-management facility or surface water.
- In addition, a stormwater-management facility must be constructed at an elevation that ensures that no adjacent habitable building will be brought into noncompliance with these requirements.

❑ Pretreatment

- A pretreatment device such as a vegetated filter strip, small sedimentation basin, or water quality inlet (e.g. grit chamber, sump, hydrodynamic separator) is required to remove solids, floating materials, and oil and grease from the runoff, to the maximum extent practicable before stormwater discharges into an infiltration or filtration system. Pretreatment devices shall be sized and designed based on Minnesota Stormwater Manual guidance and to prevent clogging of the system.
- Pretreatment practices must be designed for easy maintenance.
- It is recommended that pretreatment devices be certified through [Washington State's TAPE](#) or [NJDEP Manufactured Treatment Device](#) certification programs, be modeled using SHASM (Sizing Hydrodynamic Separators and Manholes) developed by Barr Engineering <https://shsam.barr.com/> or follow guidance in this manual for [vegetated filter strips](#) and [forebays](#).
- Pre-treatment sumps shall have a minimum 4-foot sump depth and be a manhole structure if possible.
- Pre-treatment sumps are required on the last storm manhole prior to discharging to a pond (City owned ponds only).
- Standard details of proprietary pre-treatment devices shall be provided.

❑ Pond Design Parameters

- Pond intended to provide water quality shall be designed to NURP standards.
- Ponds shall not be in a wetland unless mitigated for.
- The following is required to be submitted with pond design submittals:
 - Pond drainage/service area shown (in the stormwater report).
 - Grading plan with pond cross section. All apron elevations (inlet and outlet) shown.
 - Hydraulic calculations for ponding provided. 100-year high water level and normal water level shown.
 - Where possible, locate inlet and outlet at opposite ends of pond; and provide length to width ratio 3:1.
 - Permanent pool volume minimum of 1,800 cubic feet of storage below the outlet pipe per acre drained to the basin.
 - Pond design shall provide live storage for a water quality volume (calculated as an instantaneous volume) based on the new and/or redevelopment volume requirement not treated by another on-site system.
 - Outlet sized to discharge water quality volume at no more than 5.66 cfs/acre of pond surface area
 - Outlet designed to prevent discharge of floating debris and short circuiting.
 - Energy dissipation on outlet piping should follow City Engineering Guidelines.
 - Emergency overflow spillway is located to protect adjacent property.

- Stabilized emergency overflow spillway provided to accommodate storms greater than the 100-year event. High point elevation and direction of overflow marked on plans.
- Emergency overflow should utilize cable concrete or rip rap designed for the flow velocities.
- Pre-treatment sumps are required on the last storm manhole prior to discharging to the pond.
 - - City owned ponds (required), strongly recommended for all ponds
- Pond liners shall be considered, following Minnesota Stormwater Manual design specifications, in circumstances where a permanent pool is needed but difficult to maintain due to site conditions, or where seepage from the pond into the groundwater would otherwise occur but must be avoided. This includes:
 - Areas with Hydrologic Group A soils, gravel, or fractured bedrock
 - Potential stormwater hotspots or contaminated soils or groundwater
- As part of the drawing set submittal, provide in table form the following information:
 - a) Elevation of normal water level (NWL).
 - b) Elevation of 100-year high water level (HWL), with respective discharge rate.
- The permanent volume must reach a minimum depth of at least 4 feet with no depth greater than 10 feet, and be configured to minimize scour or resuspension of solids.
- A 10:1 bench is provided for first 1 foot of depth below normal water elevation.
- Vegetation and slope stabilization methods are subject to City's approval.
- Per Minnesota Department of Health Rule 4725.4350, a minimum of 35 feet horizontal distance is required between a water supply well and the OHW of the pond.
- Minimum 10-foot width at top of berm.
- Maximum 7% vertical grade and 3% horizontal grade for pond access route

☐ Infiltration/Filtration Parameters

- ☐ Refer to the Minnesota Stormwater Manual for specific design criteria and guidance. City owned systems shall be designed in partnership with City staff.
- ☐ Infiltration systems must not be excavated to final grade, or within three (3) feet of final grade, and filter media cannot be installed until the contributing drainage area has been constructed and fully stabilized unless rigorous erosion prevention and sediment controls (e.g. diversion berms) are provided to keep sediment and runoff completely away from the infiltration/filtration area. Notes, temporary BMPs, and details provided on plans.
- ☐ Area to be infiltrated or filtered shall be shown in the stormwater report.
- ☐ Calculations and/or computer model results that demonstrate the design adequacy of the infiltration or filtration system must be included as part of the SWPPP.
- ☐ The water quality volume shall discharge through the soil surface or filter media in 48 hours or less. Additional flows that cannot be infiltrated or filtered in 48 hours should be routed to bypass the system through a stabilized discharge point. A way to visually verify that the system is functioning as designed must be provided.
- ☐ At least one soil boring is required in the location of each infiltration treatment system to verify soil types, ensure a minimum of 3 feet of separation from the seasonally saturated soils (or from bedrock) and the bottom of the proposed infiltration system, and to help determine and confirm infiltration rates.
- ☐ In addition to the soil boring required above, At least one double-ring infiltrometer test (or approved equal) is required to be completed in all infiltration treatment systems per the chart and below. Field measured infiltration rates must be divided by a safety factor of 2. Onsite testing must be consistent with the recommendations in the Minnesota Stormwater Manual

- For new development projects of raw land, the infiltration rate test is required prior to plan submittal.
 - For redevelopment projects with existing infrastructure over the proposed infiltration area, the infiltration rate test must be completed prior to installation of the infiltration system. Results must be approved by the City's Engineering Department prior to installation.
 - Number of test locations can be found [here](#) based on BMP size.
- ❑ Provide scaled drawing with typical detail and cross section and associated pretreatment BMPs. Show runoff area directed to the BMP. Show design details such as planting/engineered soils, landscape/final stabilization plan, soil & subgrade preparation details.
- ❑ Infiltration is prohibited when the infiltration systems will be constructed in:
 - Areas that receive stormwater runoff from these types of entities regulated under NPDES for industrial stormwater: automobile salvage yards; scrap recycling and waste recycling facilities; hazardous waste treatment, storage, or disposal facilities; or air transportation facilities that conduct deicing activities.
 - Areas that receive discharge from vehicle fueling and maintenance areas, regardless of the amount of new and fully reconstructed impervious area.
 - Areas with less than three (3) feet of separation distance from the bottom of the infiltration system to the elevation of the seasonally saturated soils or the top of bedrock.
 - Areas where soil infiltration rates are more than 8.3 inches per hour unless soils are amended to slow the infiltration rate below 8.3 inches per hour per MN Stormwater Manual Guidance.
 - Areas of predominately Hydrologic Soil Group D (clay) soils.
 - Areas within 1,000 feet up-gradient, or 100 feet down-gradient of active karst features
 - Areas within a Drinking Water Supply Management Area (DWSMA) as defined in Minn. R. 4720.5100, subp. 13 and per NPDES CSW Permit requirements.
 - Areas where infiltrating stormwater may mobilize high levels of contaminants in soil or groundwater. It is required to complete the MPCA's contamination screening checklist or conduct your own assessment to determine the suitability for infiltration. Permittees must retain the checklist or assessment with the site plan.
- ❑ Filtration systems shall be designed to remove at least 80% TSS.
- ❑ Filtration systems shall meet City standard plate/detail requirements for filtration basin and drain tile connection and cleanout.
- ❑ Filtration systems must be constructed with an impermeable liner with less than three (3) feet of separation between seasonally saturated soils or from bedrock, and in areas where infiltrating water may mobilize contaminants in soil or groundwater.
- ❑ **Other Best Management Practices (ex: underground chamber systems, propriety devices etc..)**
 - Refer to the Minnesota Stormwater Manual and supplier design and installation specifications. All documentation is required to be submitted to the City.
- ❑ **Wetland Design Parameters**
 - Designed outlet and emergency spillway are required.
 - Follow the Board of Soil and Water Resources (BWSR) recommended wetland management standards and hydrologic guidelines for bounce, inundation, and runoff control.
 - All existing wetland sediment will be completely removed from the wetland buffer and mitigated area. No wetland sediment/soil shall be used as backfill in the wetland mitigation areas.

- Prior to planting and seeding all newly constructed wetland and buffer areas shall be treated to control weed growth with herbicide that breaks down sufficiently within 14 days to allow planting.
- For new wetland buffer areas adjacent to existing wetlands, two rows of perimeter control shall be installed along the edge of the wetland prior to any grading. After the buffer area has been graded, prepared, seeded, planted, and buffer monuments installed, a line of perimeter control shall be installed along the edge of the buffer area. All perimeter control shall be maintained in accordance with the City Erosion Control Ordinance.
- Lowest floor elevation shall be two (2) feet above the 100yr flood elevation, or three (3) feet above the Ordinary High Water (OHW) of the public waters.

□ Maintenance

- All stormwater-management structures and facilities must be designed for maintenance access and properly maintained in perpetuity to assure that they continue to function as designed. Applicants must provide a maintenance, inspection and, if required, monitoring plan that identifies and protects the design, capacity and functionality of onsite and offsite stormwater-management facilities; specifies the methods, schedule and responsible parties for inspection, maintenance and monitoring; provides for the inspection and maintenance in perpetuity. This plan must be recorded against the property.