
Appendix A

Acronym Dictionary

ACRONYMS

BMP	Best Management Practice
BPA	Bisphenol A
BWSR	Board of Water and Soil Resources
CRWD	Capitol Region Watershed District
CSWMP	Comprehensive Surface Water Management Plan
CWA	Clean Water Act
DNR	Department of Natural Resources
EDC	Endocrine Disrupting Compound
EPA	Environmental Protection Agency
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
LGU	Local Government Unit
MDH	Minnesota Department of Health
MPCA	Minnesota Pollution Control Agency
MS4	Municipal Separate Storm Sewer System
MSL	Mean Sea Level
NFIP	National Flood Insurance Program
NPDES	National Pollution Discharge Elimination System
NURP	National Urban Runoff Program
NWI	National Wetland Inventory
NWS	National Weather Service
OHW	Ordinary High Water
PAH	Polycyclic Aromatic Hydrocarbons
PBB	Polybrominated Biphenyls
PCB	Polychlorinated Biphenyls
PFC	Perfluorochemicals
PFOA	Perfluorooctanoic Acid
PFOS	Perfluorooctane Sulfate
PWI	Public Water Inventory
RCD	Ramsey Conservation District
RCWD	Rice Creek Watershed District
RWMWD	Ramsey-Washington-Metro Watershed District
SDWA	Source Drinking Water Area
SPRWS	Saint Paul Regional Water Service
SWPPP	Storm Water Pollution Prevention Plan
TMDL	Total Maximum Daily Load
TP	Total Phosphorus
TSS	Total Suspended Solids
WCA	Wetland Conservation Act
WD	Watershed District
WIMN	What's In My Neighborhood
WMO	Watershed Management Organization

Appendix B

Development Standards

The City of Roseville has developed specific requirements that apply to development and redevelopment projects. These standards are intended to help achieve the water resource goals of the City's Surface Water Management Plan (SWMP) and help the City maintain compliance with the National Pollutant Discharge Elimination System (NPDES) municipal permit program. These standards highlight important aspects of the requirements for storm water quality, discharge rate and volume control, erosion control, and illicit discharge.

These standards do not replace or supersede City ordinances, watershed district regulations, state and federal rules or permits required for the project. For a more detailed listing of requirements see the specific policies of the City's SWMP and the applicable City ordinances, or consult with City staff on your specific project.

To accomplish the goals of the SWMP, it is important to the City to have consistent approaches to evaluating proposed development and redevelopment projects. Therefore, all hydrologic, hydraulic and water quality analysis must be prepared and submitted in a format that will allow for a timely and efficient review by City staff.

Project designers and/or developers are encouraged to schedule and complete a pre-design meeting with the City before any data will be accepted. The purpose of the meeting is to specifically address approvals and permits, pond requirements, trunk storm drain analysis, wetland impacts, water quality treatment, erosion control and discharge to lakes and sensitive wetland resources.

1) General

- a) Erosion control standards apply to all land disturbance activity unless specifically exempted by the definition of the term "land disturbance activity" in the City's Erosion and Sedimentation Control Ordinance (Roseville City Code Chapter 803.04).
- b) The City's water quality treatment and rate control requirements apply to projects which result in twenty-one thousand, seven hundred eighty (21,780) square feet or more of disturbed area or five thousand (5,000) square feet or more of new impervious surface, and
- c) Projects conducting mill and overlay or other surface pavement treatments, where aggregate base is left undisturbed, on existing impervious areas are exempt from the City's water quality treatment and rate control requirements. However, requirements must be met if the project impacts the base and/or sub-base materials for 21,780 square feet or more of disturbed area.
- d) Projects in a Shoreland, Wetland Protection or Storm Water Management Overlay District may have additional requirements which are defined in Roseville City Code Chapter 1017.
- e) Any work within a wetland, surface water, or Federal Emergency Management Agency (FEMA) designated floodplain may require permits to be obtained from, but not limited to the City, watershed district, Department of Natural Resources (DNR) and Army Corps of Engineers. All applicable permits for the specific project must be obtained prior to commencing land disturbance, construction, grading, clearing, or filling activities.
- f) The Applicant shall submit the information listed in Section 8 of these Standards to the City for review.

2) Water Quality Treatment

a) Infiltration/Volume Control Requirement

- 1) For all new impervious portions of a project, a runoff volume based on the requirements of the governing Capitol Region (CRWD) or Rice Creek Watershed District (RCWD) rules. Within all other Watershed jurisdictions, a runoff volume of one (1) inch must be treated through infiltration practices.
- 2) For all redevelopment impervious portions of a project, a runoff volume based on the requirements of the governing Capitol Region (CRWD) or Rice Creek Watershed District (RCWD) rules. Within all other Watershed jurisdictions, a runoff volume of one (1) inch must be treated through infiltration practices.
- 3) Filtration practices that are designed for partial recharge (e.g., bioretention basin with under drains) shall receive seventy percent (70%) credit for infiltration/volume control. Incorporation of trees and shrubs into filtration practices is encouraged.

b) Pollutant Removal Requirements. For projects that have met the infiltration/volume control requirements above, the pollutant removal requirements are considered to be met. For projects where infiltration or filtration is not feasible or is prohibited (see Item 5.a.), the following pollutant removal standards (based on a standard Nationwide Urban Runoff Program, NURP, particle size distribution) apply prior to reaching a downstream receiving water:

- 1) For new development and redevelopment portions of a site, provide treatment to remove ninety percent (90%) total suspended solids (TSS) and sixty percent (60%) total phosphorus (TP) modeled for an annual average rainfall.

3) Rate/Volume Control.

- a) Discharge rates leaving the site must not exceed the current rates for the 1, 2, 10 and 100-year, critical duration (24-hour) storm events, using a Type II storm distribution and antecedent moisture conditions 2 (AMC-2).
- b) The City of Roseville shall apply all City standards for developments and redevelopments outside of the City limits which discharge into waterbodies or storm drainage systems within the City limits. All plan submittals shall comply with City of Roseville storm water regulations.
- c) For development and redevelopment projects affecting storm water problem areas identified in the City's SWMP, the City requires the developer to incorporate such practices to resolve a proportionate share of the problem through a reduction based on existing runoff volumes.
 - 1) The "problem" as defined by the City is that excess volume of water that either causes a downstream storm sewer system to exceed a 10-year/24-hour design capacity or causes a downstream waterbody to exceed its designated 100-year flood elevation at a given point.
 - 2) The "proportionate share" of the problem is defined as a ratio of contributing runoff volume from a given parcel to the overall subwatershed contributing runoff volume upstream of the problem area.
 - 3) The procedure for computing the volume reduction for a development or redevelopment site is as follows:

- a) Find the ratio of existing runoff volumes from the parcel (V_{parcel}) to the total subwatershed (V_{total} , identified by the City):

$$\% \text{ contribution} = V_{parcel} / V_{total} \times 100$$

- b) Find the proportionate share of the problem (identified by the City).

$$V_{reduction} = \% \text{ contribution} \times V_{problem}$$

- c) Derive the % decrease in existing site runoff required on the development site to mitigate the proportionate share by the following formula:

$$\% \text{existing runoff volume reduction} = (V_{parcel} - V_{reduction}) / V_{parcel} \times 100$$

- d) Apply the above reduction to the 1-year, 2-year, 10-year and 100-year existing site runoff volumes. The proposed design runoff volumes cannot exceed these reduced runoff volumes.

4) Design Computations.

- a) *Hydrologic Data Format:* All hydrologic data shall be completed using NRCS methodology; i.e. HydroCAD or TR20/TR55, XP-SWMM or a comparable, City approved method. Hydraulic calculations will be accepted in the rational method format or in commonly used software packages such as FHWA HY-8, Eagle Point or XP-SWMM or a compatible, City approved method. These computations shall be submitted to the City upon request.
- b) *Rainfalls:* Rainfall amounts for hydrologic analysis shall be based on Hershfield, D.M., 1961, Rainfall Frequency Atlas of the United States for Duration of 30 Minutes to 24 Hours and Return Periods from 1 to 100 Years. Technical Publication No. 40 (TP-40). City of Roseville analyses shall use the values in the following table.

Rainfall Frequency	Rainfall (Inches)
1-Year 24-Hour	2.4
2-Year 24-Hour	2.8
10-Year 24-Hour	4.2
100-Year 24-Hour	6.0

- c) *Infiltration-Prohibitive Sites:* For projects not meeting the infiltration/volume control requirement as stated in Section 2(a), design engineers and developers shall determine the pollutant removal efficiency of the best management practices (BMPs) incorporated into the site plan using the available industry standard models, including P8 (using a standard NURP particle size distribution for the analysis), PondNET or a comparable model approved by the City.
- d) *Wet-Detention Pond Storm Water Treatment:* As an alternative to preparing a site-specific model, the development may provide a treatment volume (dead storage) of not less than two and one-half (2.5) inches multiplied by the runoff coefficient calculated over the contributing drainage area to the pond. For example, a one (1) acre impervious site with a runoff coefficient of 0.90 that drains to a common treatment pond would be required to provide a dead storage volume of 0.19 acre-feet or eight thousand two hundred (8,200) cubic feet. The Natural Resources Conservation Service Method may also be used upon City approval.

e) *Volume Reduction Calculation:* The volume reduction (in cubic feet) provided by surface infiltration practices shall be computed using the following:

1) For sites within CRWD jurisdiction, the Volume Control Worksheet (available online at www.capitolregionwd.org).

2) For sites within RCWD jurisdiction,

(a) Redevelopments: The Redevelopment Guidance Worksheet available at www.ricecreek.org.

(b) New Development: Provide calculations considering the same factors as RWCD Rule C(5)(b).

(c) Provide alternative computation method if approved by the City Engineer prior to the information being submitted to the City for review.

3) For all other sites, provide volume calculations based on the following formula:

$$V = Area \times 1 \text{ inch} \times 0.08333$$

Where V = Required Volume Reduction in cubic feet (cf)

A = New or Disturbed Impervious Area in square feet (sf)

f) *Storm Sewer Conveyance Design:* Local storm sewer systems shall be designed for the 10-year storm event within the crown of pipe. The Rational Method shall be the preferred methodology for the design of local systems. Culvert crossings or storm systems in County or State right-of-way may have a design frequency which differs from the City's 10-year design storm. The designer shall contact each agency/unit of government to determine the appropriate design frequency for hydrologically-connected systems.

g) *Outfall Energy Dissipation:* For culvert outlet velocities less than or equal to four (4) feet per second (fps), check shear stress to determine if vegetation or riprap will be adequate. If vegetation is used, temporary erosion control during and immediately following construction shall be used until vegetation becomes established. For velocities greater than four (4) fps, energy dissipaters shall be designed in accordance with Mn/DOT Design Criteria.

h) *Landlocked Basin HWL Determination:* High water elevations for landlocked areas (basins where no outlet exists) shall be established by first estimating the normal or initial water surface elevation at the beginning of a rainfall or runoff event using a documented water budget, evidence of mottled soil, and/or an established ordinary high water level. The high water level analysis shall be based on runoff volume resulting from a 100-year/10-day runoff (7.2 inches and saturated or frozen soil conditions [CN=100]) or the runoff resulting from a 100-year back-to-back event (6.0 inches followed by 6.0 inches). The high water elevation shall be the higher of these two conditions.

i) *Building Low Opening:* The lowest floor openings of all buildings shall be set:

1) At least two (2) feet above the 100-year high water elevation and at least one (1) foot above a designated emergency overflow.

2) For landlocked basins, at least two (2) feet above the higher of the elevations determined in Part 4h.

j) *No Net Loss of Storage Capacity*: If encroachments within storm water retention basins are approved by the City Engineer, then calculations indicating the volume of encroachment and plans for volume mitigation must be submitted.

5) Volume Control/Infiltration Practices Design Criteria.

a) Infiltration systems are prohibited:

- 1) Where the bottom of the infiltration basin is less than three (3) feet to bedrock or the seasonally high water table;
- 2) Low permeability soils (i.e., Hydrologic Soil Group D soils) or where a confining layer exists below the proposed basin;
- 3) Within fifty (50) feet of a public or private water supply well (Minn. Rules, Chapter 4725);
- 4) Potential storm water hot spots or contaminated soils;
- 5) Within ten (10) feet of a property line or building foundation; and
- 6) Within thirty-five (35) feet of a septic system tank or drain field.

b) Infiltration practices must be designed to draw down to the bottom elevation of the practice within forty-eight (48) hours. The pond depth shall be based on the soil infiltration rate determined from site-specific soils investigation data taken from the location of proposed infiltration practices on the site (e.g., double ring infiltrometer test). The maximum pond depth, regardless of infiltration rate shall be two (2) feet unless otherwise approved by the City Engineer. The soils investigation requirement may be waived for residential property practices where the maximum pond depth is one (1) foot or less. The following infiltration rates shall be used for the most restrictive underlying soil unless otherwise supported by an *in-situ* infiltration test:

Soil Group	Rate	Soil Textures	ASTM Unified Soil Class Symbols
A	1.63 in/hr	Gravel, sand, sandy gravel, silty gravel, loamy sand, sandy loam	GW, GP
	0.80 in/hr		GM, SW, SP
B	0.60 in/hr	Loam, silt loam	SM
	0.30 in/hr		ML, OL
C	0.20 in/hr	Sandy clay loam	GC, SC
D	0.00 in/hr	Clay loam, silty clay loam, sandy clay, silty clay, or clay	CL, CH, OH, MH

Source: *Minnesota Storm water Manual, November 2005.*

c) Infiltration practices shall have provisions for pretreatment of the runoff. Examples of pretreatment include: a mowed grass strip between a curb-cut and a small rain garden, a sump

manhole or manufactured sediment trap prior to an infiltration basin, and a sediment forebay as the first cell of a two-cell treatment system. Where the infiltration system captures only clean runoff (e.g., from a rooftop) pretreatment may not be required.

- d) The design shall incorporate a diversion or other method to keep construction site sediment from entering the infiltration system prior to final stabilization of the entire contributing drainage area.
 - e) The design shall incorporate provisions, where infiltration practices are proposed, that will prohibit the compaction of soils by construction equipment.
 - f) A plan for maintenance of the system must be submitted that identifies the maintenance activities and frequency of activities for each infiltration practice on the site. A signed maintenance agreement will be required by the City.
- 6) Pond and Additional Infiltration System Design Criteria. Newly constructed or expanded/modified ponds and basins shall be designed and constructed to meet the following:
- a) All ponds or basins shall:
 - 1) Have a 4:1 maximum slope (above the normal water level [NWL] and below the 10:1 bench, if a wet pond);
 - 2) Maximize the separation between inlet and outlet points to prevent short-circuiting of storm flows;
 - 3) Have an emergency overflow spillway identified and designed to convey storm flows from events greater than the 100-year event; and
 - 4) Be made accessible for maintenance and not be entirely surrounded by steep slopes or retaining walls which limit the type of equipment that can be used for maintenance. Vehicle access lane(s) of at least ten (10) feet shall be provided, at a slope less than fifteen percent (15%) from the access point on the street or parking area to the pond, to accommodate maintenance vehicles. Maintenance agreements will be required when the pond is not located on City property.
 - b) All wet ponds shall:
 - 1) Have an aquatic bench having a 10:1 (H:V) slope for the first ten (10) feet from the NWL into the basin;
 - 2) Have inlets be placed at or below the NWL;
 - 3) Have a skimming device designed to remove oils and floatable materials up to a five (5) year frequency event. The skimmer shall be set a minimum of twelve (12) inches below the normal surface water elevation and shall control the discharge velocity to 0.5 feet per second.
 - 4) Have an average four (4) feet of permanent pool depth (dead storage depth). This constraint may not be feasible for small ponds (less than about three [3] acre-feet in volume or less). In such cases, depths of three to four (3-4) feet may be used. To prevent development of thermal stratification, loss of oxygen, and nutrient recycling from bottom sediments, the maximum depth of the permanent pool should be less than or equal to ten (10) feet.
- 7) Erosion and Sediment Control (Roseville City Code Chapter 803.04)
- a) The City's Erosion Control Ordinance shall be followed for all projects, including those not regulated under the NPDES construction permit.

- b) Prior to the start of any excavation or land disturbing activity for the site, the Applicant or contractor must have in place a functional and approved method of erosion and sediment control. The contractor must have received authorization from the City prior to commencing construction activities.
 - c) Development projects subject to the NPDES Construction Permit shall meet the requirements of the NPDES permit program, including the requirement to prepare and follow a storm water pollution prevention plan (SWPPP). The Applicant shall submit proof of receipt and approval by Minnesota Pollution Control Agency and/or watershed district of the permit application prior to commencing construction if required. A copy of the SWPPP prepared in accordance with the NPDES permit requirements, shall be submitted to the City if requested by the City Engineer.
- 8) Storm Water Plan Submittals.
- a) Property lines and delineation of lands included in the project application.
 - b) Delineation of the subwatersheds contributing runoff from off-site, and proposed and existing subwatersheds on-site.
 - c) Location, alignment and elevation of proposed and existing storm water facilities.
 - d) Delineation of existing on-site wetlands, shoreland and/or floodplain areas. Removal or disturbance of stream bank and shoreland vegetation should be avoided. The plan shall address how unavoidable disturbances to this vegetation will be mitigated per the City's ordinances.
 - e) Existing and proposed inlet and outlet elevations
 - f) The 10-year and 100-year high water elevations on-site. For landlocked basins, the higher of the elevations determined in Part 4h. of these standards shall also be identified.
 - g) The lowest opening elevation of all buildings and structures.
 - h) Existing and proposed site contour elevations related to NGVD, 1929 datum.
 - i) Construction plans and specifications of all proposed storm water management facilities.
 - j) Storm water runoff volume and rate analyses for existing and proposed conditions.
 - k) All hydrologic and hydraulic computations completed to design the proposed storm water quality management facilities. Computations shall include a summary of existing and proposed impervious areas.
 - l) All pollutant removal computations for practices not meeting the volume control/infiltration requirement.
 - m) Provision of outlots or easements for maintenance access to detention basins, retention basins, constructed wetlands, and/or other storm water management facilities.
 - n) Maintenance agreement between developer and City which addresses sweeping, pond inspection, sediment removal and disposal, etc.
 - o) Inlets to detention basins, wetlands, etc., shown at or below the outlet elevation.
 - p) Identification of receiving water bodies (lakes, streams, wetlands, etc).

- q) Identification of existing and abandoned wells and septic tanks on the development site.
 - r) Documentation indicating conformance with these standards.
- 9) Prohibition of Illicit Discharges (Roseville City Code Chapter 803.03). No person shall throw, drain, or otherwise discharge, cause, or allow others under its control to throw, drain, or otherwise discharge into the municipal separate storm sewer system any pollutants or waters containing any pollutants other than storm water, i.e., swimming pool water which contains pollutants not found in storm water. The following discharges are exempt from the prohibition provision above:
- a) Non-storm water that is authorized by an NPDES point source permit obtained from the MPCA, provided that the discharger is in full compliance with all requirements of the permit, waiver, or order and other applicable laws and regulations, and provided that written approval has been granted for any discharge to the (municipal/county) separate storm sewer system.
 - b) Water line flushing or other potable water sources, landscape irrigation or lawn watering, diverted stream flows, rising ground water, ground water infiltration to storm drains, uncontaminated pumped ground water, foundation or footing drains (not including active groundwater dewatering systems), crawl space pumps, air conditioning condensation, springs, non-commercial washing of vehicles, natural riparian habitat or wetland flows, dechlorinated swimming pools and any other water source not containing pollutants;
 - c) Discharges or flows from fire fighting, and other discharges as necessary to protect public health and safety;
 - d) Dye testing discharge, as long as the Public Works Director is provided verbal notification prior to the time of the test.



ROSEVILLE
RESIDENTIAL STORM WATER PERMIT POLICY
Public Works Department

1. Statement of Policy

The City of Roseville Public Works Department will administer a Residential Storm Water Permitting Program in accordance with City Code. The City believes that controlling the quantity and quality of storm water runoff from single-family residential lots that increase impervious surface addresses water quality concerns and future costs of infrastructure upgrades and maintenance.

2. Purposes

- a. Limit the volume of storm water runoff from new impervious surfaces.
- b. Require homeowners to be accountable for the ongoing maintenance and operation of installed Best Management Practices (BMPs) and to ensure that the BMPs remain with the property for the life of the improvement.

3. Application

This permit applies to owners of developed home lots with single-family use and/or zoning who propose projects creating new impervious surfaces. Impervious surfaces include, but are not limited to, home additions, accessory building installations, new patios or patio expansions, new walks or walkway additions, driveway expansions, and other hard surfaces that otherwise impede infiltration of storm water runoff. To apply under this policy a project must:

- a. Increase the overall impervious area of the lot to greater than 25% of the overall lot area if the lot is within a Shoreland or Wetland Management District,
- b. Increase the overall impervious area of the lot to greater than 30% of the overall lot area for all other lots.

4. Exclusions

This policy excludes the following:

- a. All other zoning and land uses, except for single-family residential home lots.
- b. New residential subdivision developments implementing regional or common-lot stormwater BMP's maintained by the City or a homeowner's association.

5. Provisions, Requirements and Basis of Permit

An applicant must provide storm water BMP's that capture the difference in runoff volume between the existing and proposed impervious surfaces based on 1 inch storm event. The volume of runoff (typically expressed in units cubic feet) from any impervious surface ($V_{IMP.RUNOFF}$) based on the 1 inch storm event is computed by taking product of the

impervious surface area ($A_{\text{IMPERVIOUS}}$, typically in square feet) times the depth of the 1 inch rainfall event (0.083, converted to feet) or,

$$V_{\text{IMP.RUNOFF}}(\text{cf}) = A_{\text{IMPERVIOUS}}(\text{sf}) \times 0.083(\text{ft})$$

The volume control required (V_{REQ}) is equal to the difference between the volume of runoff from all impervious surfaces on the property after the completed project (V_{PROPOSED}) and the runoff volume from prescribed limits for impervious surfaces as follows:

- a. For lots within a Shoreland or Wetland Management District, the runoff volume from an impervious surface limit of 25% ($V_{25\%}$) or,

$$V_{\text{REQ}} = V_{\text{PROPOSED}} - V_{25\%}$$

- b. For all other single-family residential lots, the runoff volume from an impervious surface limit of 30% ($V_{30\%}$) or,

$$V_{\text{REQ}} = V_{\text{PROPOSED}} - V_{30\%}$$

6. Other Design Provisions and Requirements

- a. Installed BMPs must draw down in 72 hours or less.
- b. The homeowner shall conduct inspections and maintenance of installed BMPs and submit an annual report to the City ensuring that the BMPs are performing their intended function.
- c. Every 5 years, the homeowner shall have a third party certified in storm water BMP design inspect the garden and provide a documented inspection report. The homeowner shall submit the reporting form with the report to the City.

7. Help

Permit Questions?

Contact the City of Roseville Public Works Department at (651) 792-7003

8. References

- a. Roseville City Code Chapter 1004.08 Section C