Post Construction Stormwater Management Plan Requirements

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1.0 INTRODUCTION

1.1 Purpose

With new land development and urban redevelopment, stormwater management has become an issue of great importance. With increasing amounts of impervious cover, there is a corresponding increase in stormwater runoff volumes, and an increase in the quantity of pollutants carried by runoff. Therefore, post construction stormwater management is critical for protection of property and environmental quality. To mitigate stormwater issues related to land development, there are measures that can be taken to reduce the impacts of increased imperviousness.

The purpose of this document is to provide guidance and clarity for development of and submittal of a Post-Construction Stormwater Management Plan, in order to meet requirements, set forth in Section 122 of the City's Land Disturbance, Illicit Discharge & Erosion Control Ordinance. These requirements mandate the incorporation of Post Construction Stormwater Best Management Practices (PCBMPs) in new developments and redevelopments for water quality control of stormwater runoff.

1.2 Applicability

Stormwater requirements stated in Section 122 of the City's Land Disturbance, Illicit Discharge & Erosion Control Ordinance applies to new land development and significant redevelopment that discharge to the Municipal Separate Storm Sewer System (MS4). New land development includes areas not previously built to urban uses (including but not limited to farmland, pasture, woodland, and green space).

Significant redevelopment includes areas that are currently built to urban and suburban land uses, and are being revitalized with rehabilitation of existing structures, or demolition of existing structures and construction of new ones. Table 1 describes how the requirements are applied to different developments.

Table 1: Post-Construction Stormwater Management Plan (PCSMP) Applicability	
Development	**Requirement**
(1) For all developments with a preliminary plat approved by City Council on or after January 1, 2018. (2) For any re-plat in a preliminarily platted subdivision approved by City Council before January 1, 2018 that significantly increases the amount of impervious area.	PCSMP that includes BMPs, and where reasonably practical, provide water quality control of the first one-half inch of runoff from the site[2].
(3) For all developments with a Preliminary Plat approved by City Council before January 1, 2018, with a significant redevelopment that disturbs 1 acre or more and does not require preliminary platting.	PCSMP that includes BMPs, and where reasonably practical, provide water quality control of the first one-half inch of runoff from the site[2].
(4) Significant redevelopment that adds or replaces less than 1 acre but more than 5,000 SF of impervious surface area[1] Includes: (1) The expansion of a building footprint (2) Addition or replacement of a structure (3) Replacement of impervious surface that is not part of a routine maintenance activity	PCSMP that includes BMPs

1 Redevelopment does not include routine maintenance activities that are conducted to maintain original line and grade, hydraulic capacity, original purpose of facility or emergency redevelopment activity required to protect public health and safety. **2** In all cases where control of the first 0.5 inch of runoff cannot be achieved, the management plan should provide BMPs that maximize control and provide a calculation of amount of control that can be practicably attained.

2.0 POST-CONSTRUCTION STORMWATER MANAGEMENT PLAN SUBMITTAL REQUIREMENTS

Approval of a Post Construction Stormwater Management Plan (PCSMP) will be dependent on the type of development proposed. This criterion is defined in the following paragraphs along with more detailed information on the elements that make up a PCSMP submittal.

The PCSMP shall be prepared by or under the supervision of a licensed professional civil engineer registered in the State of Missouri. The responsible professional shall be listed as the Designer on the Application and will be required to provide a seal on PCSMP sheets and calculations.

2.1 Post Construction Stormwater Management Plan

A PCSMP will be required with the submittal of a (1) storm sewer construction plans for subdivisions that have an approved preliminary plat, (2) a Land Disturbance Permit Application for projects that do not require a preliminary plat and disturb 1 acre or more of the site or (3) submittal of a Building Permit Application for projects that add or replace less than 1 acre but more than 5,000 SF of impervious surface area and shall include the following elements:

a. Post-Construction Stormwater Management Plan Sheets

b. BMP Calculations

c. Drainage Study

d. BMP Maintenance Requirements

e. Maintenance Agreement (Maintenance Agreement will be required before Final Plat is approved)

2.2 Post-Construction Stormwater Management Plan Sheets

At a minimum, the PCSMP plan set must include:

1. A Site Resources Plan of the development site showing existing natural and aquatic resources along with a description of area or length including:

- Existing topography (5’ minimum contour interval)
- Open waterways or flood plains
- Ponds or lakes
- Green space corridors
- General types of vegetation on site, excluding crops (e.g. tree canopy, turf grass, native grasses or other buffer, wetlands, etc)
- Steep slopes

•Utility lines, easements, water supply wells, and sewage treatment systems

2. A Preliminary Drainage and Stormwater BMP Plan of the development site at scale showing:

•Existing topography (2’ minimum contour interval)

•Proposed topography (5’ minimum contour interval)

•Proposed drainage basins for each stormwater BMP labeled with

an identifier, runoff coefficient and drainage basin area (acres)

•Proposed land uses/zoning in each drainage basin

•Location of proposed stormwater conveyance systems such as storm sewer, storm drains, grass channels, vegetated swales, and flow paths

•Proposed areas of fill placement and limits of construction

•Proposed BMPs with an identifier that matches their drainage basin (if more than one)

•Proposed utility lines, easements, water supply wells, and sewage treatment systems

3. Final Construction Plans:

a. Vicinity map

b. Existing utilities and infrastructure

c. Proposed stormwater BMPs including structural components

d. Proposed storm sewer and stormwater conveyance systems

e. Other proposed infrastructure as it relates to the construction of the stormwater BMPs

f. Construction notes

g. Design water surface elevations

h. Structural details of outlet structures, embankments, spillways, stilling basins, grade control structures, conveyance channels, etc.

i. Plan and profile sheets (if applicable)

j. Reference to the project geotechnical report

2.3 Post Construction Best Management Practice(s) Maintenance **Requirements**

The owners of lands on which Post Construction Best Management Practices (PCBMPs) have been installed to meet the requirements of this section, shall ensure the maintenance of these PCBMPs and shall themselves maintain the PCBMPs if other persons or entities who are also obliged to maintained the PCBMPs (by contract or covenant, or pursuant to this section) fail to do so. PCBMPs shall be inspected at least once annually, and a written record of inspection results and any maintenance work shall be maintained. Furthermore, a copy of this inspection record shall be sent to the City.

Annual review and inspection of PCBMPs shall be done by a person adequately trained or certified in stormwater BMP function and maintenance. Information on the Inspector should be provide, annual review and inspection of PCBMPs and the holder of the annual inspection report shall be provided in the Post Construction Management Agreement.

To assure compliance with this section, maintenance requirements for PCBMPs must be documented as part of, or an addendum to, the Post Construction Maintenance Agreement to ensure that the system will function properly. The following elements are required:

> Site information, BMP information, description and schedule of maintenance and repair tasks for each PCBMP type.

2.4 Maintenance Agreement and Easement

The applicant or owner is required to execute a Post Construction Maintenance Agreement (PCMA), to be filed on record, binding on all subsequent owners of land served by a private stormwater management facility. Such agreements shall provide for access to the facility, at reasonable times, for inspections by the City or its authorized representative to ensure that the facility is maintained in proper working condition to meet design standards.

Such agreements shall document the responsibilities of the owner, the Home Owner's Association or other responsible party. The PCMA shall be approved by the City as part of the PCSMP and recorded with the County Recorder's Office. A sample copy of the Maintenance Agreement can be downloaded at www.nixa.com/stormwater.

Maintenance Agreement exhibits shall include the following:

> Exhibit A – Real Property Depiction – Provide lot certificate or platted subdivision with legal description, or PCSMP plan sheet if that information is contained on a sheet already (11"x17")
>
> Exhibit B – PCBMP Maintenance Requirements as described in Section 2.5 of this document.

2.5 BMP Final Inspection

Upon construction completion, all stormwater BMPs that are part of the PCSMP shall be subject to a final inspection to insure they are correctly installed and are in an effective working condition prior to release of an approved final inspection and the recordation of the final plat.

3.0 Development of a Post-Construction Stormwater Management Plan

3.1 Site Evaluation

The development of the PCSMP must be initiated in the early stages of site planning and design. However, before a PCSMP can be developed, defining site conditions must be completed by conducting a site assessment. The data collected during the site assessment will be used for describing site conditions, including vegetation, soils and drainage patterns. When this information is obtained, appropriate stormwater BMPs can be selected, located, sized, and designed.

The following data should be collected, to the maximum extent practicable, during the development of the PCSMP:

Natural Resources: The development site's natural resources, including vegetative communities, soils and geology, and aquatic resources need to be determined to assist in stormwater management plan development and is part of the permit application. Important data includes wetlands, riparian (stream) corridors, native prairie and/or woodland, receiving stream(s), floodplain (if applicable). Natural resources should be assessed by trained professionals.

Site topography: Topography dictates how and where water will drain from a site. On steeper sites, stormwater will runoff more rapidly, with less infiltration and greater volume. Stormwater management requirements are substantially different than for more gently rolling or flat sites.

Soils: Soil information is important for development of the PCSMP, and for optimal planning of the new community. Soil depth, texture (sand, silt, and clay content), and structure are important factors that will provide understanding of infiltration capacity (permeability), ability to support vegetation, and erodibility.

Engineering qualities and limitations of the soil are important for determining where structures can be placed, how stormwater runoff can be managed, and possible limitations for underground utilities. If hydric soils are present, it is important to understand limitations of building in these areas. Much of the information can be obtained from a USDA County Soil Survey, but an on-site soil assessment is recommended.

Aquatic Resources: The identification of streams, ponds, and lakes as receiving waters and as an integral part of the PCSMP plan is critical. Understanding the function of these water bodies, their current condition, and potential impacts from proposed development may influence your choice of stormwater BMPs. The identification of these resources may also be necessary to comply with local, State and Federal regulations.

NOTE: Some or all of this information may already be part of the SWPPP, if that is the case, the PCSMP may simple reference the SWPPP (section and or page number to satisfy the above section requirements).

3.2 BMP Selection

Quality and properly installed BMPs emulate natural systems by integrating a variety of dispersed treatments at multiple scales, from backyard rain gardens to district-level bio-retention basins. They are widely applicable in both urban and rural environments. These treatments can be designed into new developments or retrofit into existing community open spaces, parks, road rights-of-way, side and rear areas of homes and commercial buildings, rooftops of structurally adequate buildings, below parking lots and in many other settings. All aspects of stormwater management can be integrated to contribute to positive community aesthetics and economics.

Stormwater BMPs include a variety of methods that are simple and practical in design, yet provide effective stormwater management as well as aesthetic enhancements for urban, suburban, and rural landscapes. These methods can be cost effective to build while providing long-term sustainability for City infrastructure and conservation of Nixa's water resources.

BMP MAINTENANCE REQUIREMENTS

The project designer shall include the following information as Exhibit B as part of the Maintenance Agreement.

Name & Location

Project Name: _____

Address: _____

Site Data

Total Site Area: _____

Total Disturbed Area: _____

Total Undisturbed Area: _____

Impervious Area Before Construction: _____

Impervious Area After Construction: _____

BMP Information

The designer shall provide, on the PCSMP plan set, the following information on post-construction stormwater BMPs:

BMP ID	TYPE OF BMP	LOCATION OF BMP

4.0 Routine Maintenance and Tasks Schedule

The following tables outline recommended maintenance tasks and **suggested** frequencies for example BMPs. Delete the lists and tables that are not needed according to the types of BMPs within the development and edit the table according to your site specific conditions. BMPs may be added as well. Inspection Reports should be completed and kept on file with the Inspector, Owner or otherwise responsible person. At least one copy of each completed inspection report shall be given to the City for record retention.

BIORETENTION MAINTENANCE	
TASK	**SCHEDULE**
Remove trash and debris	Monthly
Check and repair any eroded areas	Monthly
Re-mulch any void areas	Monthly
Check vegetation and replace any damaged plant materials	Monthly
Inspect for ponding, washed out areas, soil conditions	Monthly
Perimeter mowing	Monthly
Inspect collection system for proper function	Quarterly
Reseed grass swales	As needed
Repair broken pipes	As needed
Replace filtration rip rap that is chocked with sediment	As needed
Removed any accumulated sediment	As needed

Wet Detention Basin/Pond Maintenance	
TASK	**SCHEDULE**
Remove trash and debris from side slopes	Monthly
Outlet/inlet inspection and cleanout	Monthly
Check pond side slopes and repair eroded areas	Monthly
Basin inspection and cleanout	Inspect once Annually Remove sediment when 25% of permanent pool volume has been lost
Inspect for structural damage and leaks	Annually
Replace filtration rip rap that is choked with sediment	As needed
Repair broken pipes	As needed
Removed any accumulated sediment	As needed or as directed above

Dry Detention Basin/Pond Maintenance	
TASK	**SCHEDULE**
Remove trash and debris from side slopes	Monthly
Outlet/Inlet inspection and cleanout	Inspect Monthly Clean out as needed
Check pond side slopes and repair eroded areas	Inspect Quarterly Repair as needed
Basin inspection and cleanout	Inspect once annually Remove sediment when 25% of permanent pool volume has been lost
Inspect for structural damage and leaks	Annually
Replace filtration rip rap that is choked with sediment	As needed
Repair broken pipes	As needed
Removed any accumulated sediment	As needed

Wetlands MAINTENANCE	
TASK	**SCHEDULE**
Remove any invasive plants	Monthly
Remove trash and debris from Outlet/inlet areas	Inspect Monthly Clean out as needed
Check wetlands side slopes and repair eroded areas where vegetation has been lost	Inspect Quarterly Repair as needed
Inspect for structural damage and leaks	Annually
Replace filtration rip rap that is chocked with sediment	As needed
Repair broken pipes or risers	As needed
Removed any accumulated sediment	As needed

GRASSED SWALE/CHANNEL MAINTENANCE	
TASK	**SCHEDULE**
Remove trash and debris	Monthly
Stabilization of eroded areas	Monthly
Mowing	Monthly or as needed
Check outlet pipes (if present) for clogging	Monthly
Check flow dispersion device for accumulated sediment that can cause formation of sub-channels.	Monthly
Re-seed	As needed
Removed any accumulated sediment	As needed

Flow Level Spreader/Dissipater Blocks Maintenance Task and Schedule	
TASK	**SCHEDULE**
Remove trash and debris	Monthly
Inspect for undercutting	Monthly
Inspect for settlement	Monthly
Inspect and replace degraded or eroded rip rap or stone	Monthly Repair-replace as needed
Check flow dispersion/dissipater device for accumulated sediment that can cause formation of sub-channels.	Monthly

Permeable Pavers or Pavement Maintenance Task and Schedule	
TASK	**SCHEDULE**
Inspect and remove accumulated sediment from pavement surface	Monthly As needed
Inspect and clean pavement of accumulated oil or grease	Monthly As needed
Spray vegetation and moss with herbicide	Monthly As needed during growing season
Vacuum/sweep surface	Annually
Inspect for deterioration	Annually
Verify surface infiltration after storms	Annually