

Checklist #3

Stormwater Management Plan Requirements

Under county ordinance, additional impervious surfaces in a proposed development may trigger the need for a stormwater management plan and permit. A stormwater management plan is designed to protect downstream water resources and property owners from water pollution, flooding and other damage caused by urban runoff after a development is complete. Stormwater management plans designed to meet the requirements of the county ordinance shall, to the maximum extent practicable, adhere to the following guiding principles:

- 1) Preserve natural watershed boundaries and drainage patterns;
- 2) Reserve adequately sized areas for stormwater infiltration, detention and treatment early in the planning process;
- 3) Locate stormwater BMPs upstream from where runoff leaves the site or enters waters of the state and outside of wetlands, floodplains, primary or secondary environmental corridors or isolated natural areas;
- 4) Minimize soil compaction and maintain pre-development groundwater recharge areas;
- 5) Minimize impervious surfaces and have them drain to vegetated areas for pollutant filtering and infiltration;
- 6) Emphasize vegetated swales, warm season and wetland plantings and low flow velocities for stormwater conveyance, treatment and infiltration, especially for transportation related projects;
- 7) Allow for different stormwater management strategies for cleaner runoff (i.e. roofs) versus more polluted runoff (i.e. streets and parking lots);
- 8) Provide for emergency overflow in all stormwater BMP designs (100-year flows);
- 9) Distribute stormwater bioretention and infiltration BMPs throughout the site plan for large developments.

Preliminary Stormwater Management Plans must include (for Preliminary Review Letter):

- ___ 1. A **site map** in accordance with Checklist #1. Digital submittal required.
- ___ 2. **Drafting date** and **contact information** for the project engineer with all other mapping elements and scale consistent with the site plan map.
- ___ 3. Delineation of existing and proposed **watersheds**, subwatersheds and major flow paths within the site and draining into the site from adjacent properties.
- ___ 4. Location, type and **preliminary design** of proposed stormwater BMPs needed to comply with the ordinance.
- ___ 5. Location and type of major stormwater **conveyance systems** proposed for the site.
- ___ 6. Existing and proposed stormwater **discharge points**.
- ___ 7. Locations and preliminary dimensions of proposed **drainage easements**.
- ___ 8. Location of soil borings and **soil profile evaluations** with surface elevations and unique references to supplemental data sheets, as needed to determine feasibility of any proposed stormwater BMP and to comply with applicable BMP technical standards.
- ___ 9. Preliminary location of **access lanes** for maintenance of stormwater BMPs.
- ___ 10. Support documentation including:
 - ___ a. Preliminary **plan narrative** describing site drainage, ultimate receiving water body for off-site discharges, major site restrictions, and how the preliminary stormwater management plan will meet the requirements of the ordinance and other project objectives;
 - ___ b. Summary of watershed, subwatershed and land use **data** in acres and the preliminary results of any hydrology calculations, following approved LRD format;
 - ___ c. **Soil profile evaluation data** submitted on SPS form SBD-10793 in accordance with BMP technical standards and county basement/groundwater separation requirements.
 - ___ d. Proposed ownership and **maintenance** responsibilities for all proposed stormwater BMPs

Final Stormwater Management Plans must include (for Permit):

- ___ 1. A **site map** in accordance with Checklist #1. Digital submittal required.
- ___ 2. **Drafting date** and **contact information** for the project engineer, with the engineer's stamp and date. All other mapping elements and scale consistent with the site plan map;
- ___ 3. Location of existing and proposed stormwater **discharge points**;

- ___ 4. Delineation and labeling of all proposed **impervious areas** and accompanying area computations.
- ___ 5. Final **design drawings** of all proposed stormwater BMPs with unique references to support documentation, prepared in accordance with minimum Land Resources Division standards and of sufficient clarity for those responsible for site grading, including:
 - ___ a. Plan views showing the **location of proposed BMPs** in combination with the site plan map at a scale of 1 inch equals no more than 100 feet;
 - ___ b. Additional **detail plan view** drawings at a scale of 1 inch equals no more than 40 lineal feet, showing proposed 2 foot contours and all critical design features and elevations;
 - ___ c. One detailed **cross-section** and one profile of each BMP, drawn to scale, with locations shown on the plan view, and showing all critical design features, side slopes, structures, soil profiles and elevations, including seasonal high water table and existing grade;
 - ___ d. Detailed drawings or **material specifications** for inlets or outlets.
- ___ 6. Type, size, location and cross-sections of all pipes, open channels, grade stabilization structures and other proposed stormwater **conveyance systems**, with unique references to support documentation.
- ___ 7. Location and dimensions of proposed **drainage easements**.
- ___ 8. Location, dimensions and surfacing materials or soils data of proposed **access lanes** and delineations of easements needed to allow future maintenance of stormwater BMPs. Minimum width of any access easement shall be 15 feet.
- ___ 9. Location of soil borings and **soil profile evaluations** with surface elevations and unique references to supplemental data sheets, as needed to determine feasibility of any proposed stormwater BMP and to comply with applicable technical standards such as basement/groundwater separation requirements.
- ___ 10. Detailed **construction notes** explaining all necessary procedures to be followed to properly implement the plan, including planting and landscaping specifications, timing and sequencing of construction and any temporary measures needed to protect BMPs during the construction phase.
- ___ 11. Detailed **construction inspection plan**, outlining the critical elements in the plan that need to be surveyed or inspected by a representative of the project engineer, the LRD or the municipality, and the timing and notification requirements involved (Identify who is responsible).
- ___ 12. A final **maintenance agreement** in accordance with ordinance requirements.
- ___ 13. Support documentation (submitted to the LRD only) summarized in accordance with LRD standards, must include at least the following:
 - ___ a. A **narrative** summary of the stormwater plan. (May combine with erosion control plan).
 - ___ b. **Maps** of existing and proposed **watersheds**, subwatersheds, Tc/Tt flow paths, soil types, hydrologic soil groups, land uses/cover type and runoff curve numbers within the site and draining into the site from adjacent properties, with unique references to hydrology data summaries and the ultimate receiving water body(s) for off-site discharges.
 - ___ c. Pre-development and post-development **hydrology** and pollutant loading (if applicable) **data** for each watershed, such as peak flows and runoff volumes, as needed to meet the requirements of the ordinance following approved LRD format. All major assumptions used in developing the input parameters shall be clearly stated and cross-referenced to the maps.
 - ___ d. **Impervious** surface maps and calculations of runoff volumes and effective infiltration areas.
 - ___ e. Hydraulic & **hydrologic data summaries** for all existing and proposed pipes, channels, grade stabilization structures and other runoff conveyance systems, and the necessary documentation to demonstrate compliance with the site drainage requirements (see pg. 4).
 - ___ f. **BMP design data** for each proposed BMP, showing how it complies with applicable technical standards and the requirements of the ordinance, following approved LRD format.
 - ___ g. **Soil evaluation reports** with matching references to map features, location and elevations.
 - ___ h. A cover sheet **stamped and signed by a professional engineer** registered in the State of Wisconsin indicating that all plans and supporting documentation have been reviewed and approved by the engineer and certifying that, to the best of their knowledge, the submitted plans comply with the requirements of the ordinance.
 - ___ i. For sites where changes are proposed in stormwater flow paths or where proposed stormwater discharges may otherwise have a significant negative impact on downstream property owner(s), the LRD may require the applicant to submit written authorization or complete other legal arrangements with the affected property owner(s).

Summary of Stormwater Management Plan Technical Requirements

Listed below is a brief summary of the specific stormwater management planning requirements and performance standards that must be met on all sites to the “maximum extent practicable”. All requirements apply to each subwatershed or stormwater discharge point independently and cannot be averaged for the site. Runoff draining to a stormwater BMP from off-site must be accounted for hydraulically in any BMP design. It is highly recommended that the applicant meet with the LRD prior to preparing a site plan to determine the applicability of these requirements early in the planning process. Please note that this is only a summary. It is intended to be a general guide for the project engineer. For details on any of the items listed, see the ordinance.

1. Peak Discharge. Maintain pre-development peak discharge rates for the 1-year, 2-year, 10-year, and 100-year, 24-hour design storms, following county standards.
2. Total Suspended Solids. By design, each stormwater management plan must meet the following post-development total suspended solids (TSS) reduction targets, based on average annual rainfalls, as compared to no runoff management controls:
 - A. For new land development and in-fill development, 80% TSS reduction;
 - B. For redevelopment, 40% TSS reduction of total suspended solids load from parking areas and roads;
3. Post-developed Infiltration Performance Standards.

Percent Connected Impervious Surface	Description/Example land uses	Post-development Infiltration Volume ^a	Maximum Effective Infiltration Area
Up to 40%	Description: Low imperviousness Example land uses: low density residential, parks, cemeteries	90% of pre-development ^b	1% of site
>40% up to 80%	Description: Medium imperviousness Example land uses: medium and high density residential, multi-family residential, industrial, institutional, office park	75% of pre-development	2% of site
>80%	Description: High imperviousness Example land uses: commercial strip malls, shopping centers, commercial downtowns	60% of pre-development	2% of site

^a All percentages are based on average annual rainfall.

^b To avoid downstream flooding and chronic wetness issues from stormwater discharges, the post-development infiltration volume for low density residential developments shall not be less than 25% of the 2-year, 24-hour storm.

Note: For details on definitions, pretreatment requirements, exclusions, exemptions, alternative uses of stormwater, well setbacks, soil filtering requirements, groundwater protection, etc. - see the county ordinance.

4. Protective Areas. A “protective area” is a vegetative buffer that must be maintained between a proposed impervious surface and the nearest water resource, measured from the “top of channel”. Stormwater BMP’s may be located in the area, but cannot encroach on wetlands, floodplains or environmental corridors. Minimum widths of protective areas are shown in the table below:

Site Description	Protective Area Min. Width
All lakes and streams (see county GIS system)	50 lineal feet
“Outstanding” and “Exceptional resource waters”	75 lineal feet
Wetlands	50 lineal feet
• Highly susceptible (determined by the LRD)	75 lineal feet
• Less susceptible (determined by the LRD)	10% of average width (min. 10’, max. 30’)
Concentrated flow channels (>130 acre drainage)	10 lineal feet

5. Fueling and Vehicle Maintenance Areas. Must have BMPs designed, installed and maintained to reduce petroleum within runoff, such that the runoff that enters waters of the state contains no visible petroleum sheen.
6. Site Drainage.
 - A. *Drainage easements* must be recorded to preserve major stormwater flow paths, specify maintenance responsibilities, restrict buildings/structures and prevent any grading, filling or other activities that obstruct flows.
 - B. *Site grading* must ensure positive flows away from all buildings, roads, driveways/septic systems, coordinate with general drainage patterns for the area, and minimize adverse impacts on adjacent properties.

- C. *Street drainage* must prevent concentrated flows from crossing the traffic lanes. Design flow depths at the road centerline must not exceed 6 inches during the 100-year, 24-hour design storm (planned land use).
- D. *Bridges and cross-culverts* must facilitate fish passage and prevent increased flooding or channel erosion upstream or downstream from the structure. Preserve runoff storage areas within the flow paths. Compensatory storage may be allowed. As-builts are required to maintain floodplain studies.
- E. *Subsurface drainage*. To avoid property and other damages from groundwater, all buildings planned for human occupation on a regular basis shall meet all of the following:
 - i. Basement floor surfaces shall be built one (1) foot above the highest groundwater table elevation, as documented in the submitted soil evaluations in accordance with LRD standards. On sloped sites, basements may be allowed partially below the highest groundwater table only on the upslope side if they meet LRD drainage system standards for design, discharge, engineering oversight, and long-term maintenance. For these sites, the 1-foot groundwater separation will be enforced at the further downslope point of the basement.
 - ii. Avoid hydric soils as much as possible.
 - iii. The LRD shall be notified of any drain tiles that are uncovered during construction, which the LRD may require to be restored or connected to other drainage systems.
 - iv. No discharge of groundwater from tile lines, sump pumps or other means shall be allowed onto another person's land or any public space without the written approval of the owner or unit of government.

Note: The LRD has published technical standards to implement the above noted basement/groundwater separation requirements. Refer to a separate document titled "Basement Wetness and Flooding Prevention Standards" on the Waukesha County web site (www.waukeshacounty.gov).

- F. *Open channels*. All open channel drainage systems shall at a minimum be designed to carry the peak flows from a 10-year, 24-hour design storm using planned land use for the entire contributing watershed area. Side slopes shall be no steeper than 3h:1v unless otherwise approved by the LRD for unique site conditions. Open channels that carry runoff from more than 130 acres shall at a minimum be designed to carry the peak flows from a 25-year, 24-hour design storm.
- G. *Storm sewers*. All storm sewers shall be designed in accordance with applicable community technical standards and specifications.
- H. *Changes to stormwater discharges*. For sites where the LRD determines the post-development stormwater discharge flow paths will be significantly different than pre-development conditions, or where proposed stormwater discharges may otherwise have a significant negative impact on downstream property owner(s), the LRD may require the applicant to submit written authorization, record a drainage easement, or complete other legal arrangements with the affected property owner(s) prior to permit issuance.
- I. *Structure protection and safety*. Flows generated by the 100-year, 24-hour design storm under planned land use conditions may exceed the design capacity of conveyance systems, but shall not come in contact with any buildings. For buildings designed for human occupation on a regular basis, the following additional requirements shall apply:
 - i. The lowest elevation of the structure that is exposed to the ground surface shall be a minimum of two (2) feet above the maximum water surface elevation produced by the 100-year, 24 hour design storm, including flows through any stormwater BMP that may temporarily or permanently store water at a depth of greater than one (1) foot; and
 - ii. The structure shall be setback at least 50 feet from any stormwater BMP that may temporarily or permanently store water at a depth of greater than one (1) foot, including any internally drained area with a significant contributing watershed and/or limited runoff storage capacity, as determined by the LRD. Setback distance shall be measured from the closest edge of water at the elevation produced by the 100-year, 24-hour design storm. The LRD may exempt existing structures and structures with no basement from this requirement if the LRD determines other site risks are minimal based on soil and site conditions.

Note: The LRD has published technical standards to implement the above noted vertical and horizontal separation requirements for internally drained areas. Refer to a separate document titled "Basement Wetness and Flooding Prevention Standards" on the Waukesha County web site (www.waukeshacounty.gov).

Note: The LRD may establish more stringent requirements than those listed based on unique site conditions, such as sensitive water resources or downstream landowner impacts. The applicant may apply for a technical exemption for any item in accordance with ordinance procedures.

The LRD requires map items listed above to be submitted in digital form, if available, including georeferencing map data to the public land survey system in accordance with county mapping standards.