

Under county ordinance, additional impervious surfaces in a proposed development may trigger the need for a storm water management plan and permit. A storm water 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. Storm water 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 storm water infiltration, detention, and treatment early in the planning process;
- 3) Locate storm water 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 storm water conveyance, treatment and infiltration, especially for transportation related projects;
- 7) Allow for different storm water management strategies for clean runoff (i.e. roofs) versus more polluted runoff (i.e. streets and parking lots);
- 8) Provide for emergency overflow in all storm water BMP designs (100-year flows);
- 9) Distribute storm water bioretention and infiltration BMPs throughout the site plan for large developments.

Preliminary Storm Water Management Plans must include (for Preliminary Review Letter):

1. A **site map** in accordance with Checklist #1.
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 storm water BMPs needed to comply with the ordinance.
5. Location and type of major storm water **conveyance systems** proposed for the site.
6. Existing and proposed storm water **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 storm water BMP and to comply with applicable BMP technical standards.
- ___ 9. Preliminary location of **access lanes** for maintenance of storm water 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 storm water 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;
 - c. **Soil profile evaluation data** in accordance with BMP technical standards and county basement/groundwater separation requirements.
 - d. Proposed ownership and **maintenance** responsibilities for all proposed storm water BMPs

Final Storm Water Management Plans must include (for Final Permit):

- ___ 1. A **site map** in accordance with Checklist #1.
- ___ 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 storm water **discharge points**;
- ___ 4. Delineation and labeling of all proposed **impervious areas** and accompanying area computations.
- ___ 5. Final **design drawings** of all proposed storm water BMPs with unique references to support documentation, prepared in accordance with minimum Land Conservation 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. Detailed **cross-section** and profiles 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 and depth to bedrock if within 5 feet of the proposed BMP;
 - ___ 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 storm water **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 storm water 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 storm water 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.

PLANNING & DEVELOPMENT DEPARTMENT • LAND CONSERVATION DIVISION

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- ___ 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 LCD 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 LCD only) summarized in accordance with LCD standards, must include at least the following:
 - ___ a. A **narrative** summary of the storm water 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. 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 LCD 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. Cost estimate for the installation of proposed storm water BMPs, which shall serve as a basis for financial assurance. The applicant may use average costs for the BMP installations in the County rather than specific estimates, upon approval by the LCD.
 - ___ j. For sites where changes are proposed in storm water flow paths or where proposed storm water discharges may otherwise have a significant negative impact on downstream property owner(s), the LCD may require the applicant to submit written authorization or complete other legal arrangements with the affected property owner(s).
- ___ 14. Any and all environmental monitoring data collected by applicant in relation to the proposed site and associated activity, including well monitoring data as outlined in the plan required under 17.05.100 D.3., as collected for compilation of the application as well as continued monitoring for the life of the permit.
- ___ 15. Plan for abandonment of storm water structures and intended site reclamation at the end of life of the proposed activity, where applicable. Such activity shall be reflected in the maintenance agreement as required under 17.06.150.

- ____ 16. Emergency action plan for use in rain events that exceed the design storm, failure of BMPs, equipment malfunctions, and for other unforeseen circumstances that could have significant adverse impacts.

Summary of Storm Water Management Plan Technical Requirements

Listed below is a brief summary of the specific storm water management planning requirements and performance standards that must be met on all sites to the “maximum extent practicable”. It is highly recommended that the applicant meets with the LCD 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 2-year, 10-year, 25-year, and 100-year, 24-hour design storms, following county standards.
2. **Total Suspended Solids.** By design, each storm water 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, 80% TSS reduction;
 - B. For redevelopment, 40% TSS reduction;
 - C. For in-fill development prior to October 1, 2012, 40 % TSS reduction;
 - D. For in-fill development after October 1, 2012, 80% TSS reduction.

3. **Infiltration.**

Land Use	Minimum Infiltration Volumes (%)		Maximum Required “Effective Infiltration Area”
	Option #1 Percent of Annual Predevelopment Runoff	Option #2 Percent of 2-Year, 24- hr. Storm Runoff	
Residential	90%	25%	1% of Site
Nonresidential	60%	10%	2% of Site

Note: For details on definitions, pretreatment requirements, exclusions, exemptions, alternative uses of storm water, 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”. Minimum widths of protective areas are shown in the table below:

Site Description	Protective Area Min. Width
All lakes and streams	50 lineal feet
“Outstanding” and “Exceptional resource waters” (Per Ch.17.05.110 D-7)	75 lineal feet
Wetlands: <ul style="list-style-type: none"> • In area of special natural resource interest (determined by WiDNR) • Highly susceptible (determined by the LCD) • Less susceptible (determined by the LCD) 	75 lineal feet 50 lineal feet 10% of average wetland width
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 storm water 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. **Basement floor** surfaces must be built at least 1 foot above the seasonal high water table elevation and avoid all hydric soils.
 - F. **Open channels** must carry flows from a 25-year, 24-hour design storm using planned land use for the entire watershed area. Side slopes shall be no steeper than 3h:1v unless LCD approves for unique site conditions.
 - G. **Storm sewers** shall be designed in accordance with all applicable community technical standards and specifications.
 - H. **Buildings** must be protected from 100-year, 24-hour design flows for all drainage systems. For homes and businesses (human occupancy), the following additional requirements shall apply (by deed restriction):
 - The lowest elevation of the structure that is exposed to the ground surface must be at least 2 feet above the 100-year flow elevation.
 - Must be setback at least 50 feet from the 100-year flow line.

Note: The LCD 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 LCD 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.