

City of Whitewater

Erosion Control and Stormwater Management Requirements

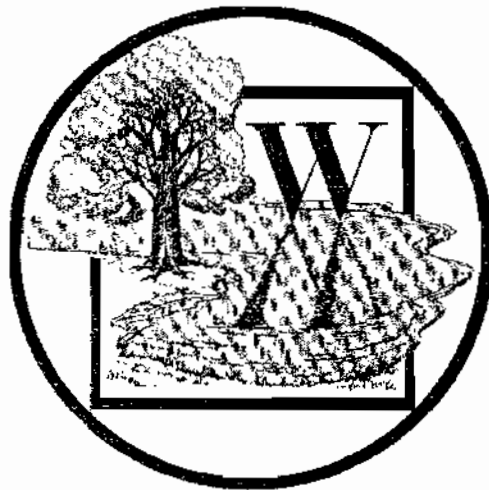


TABLE OF CONTENTS

Page No.
or Following

SECTION 1 – TECHNICAL STANDARDS

| | | |
|------|---|-----|
| 1.01 | Technical Standards and References | 1-1 |
| 1.02 | Precipitation Depth, Distribution and Average | 1-1 |
| 1.03 | Design Methods | 1-2 |
| 1.04 | Design Criteria | 1-3 |

SECTION 2 – PERFORMANCE STANDARDS

| | | |
|------|---------------------------------------|-----|
| 2.01 | Erosion Control Standards | 2-1 |
| 2.02 | Stormwater Management Standards | 2-3 |

SECTION 3 – GENERAL CONSIDERATIONS

| | | |
|------|--|-----|
| 3.01 | Stormwater Management Considerations | 3-1 |
|------|--|-----|

SECTION 4 – SUBMITTAL REQUIREMENTS

| | | |
|------|---|-----|
| 4.01 | Erosion and Sediment Control Plan | 4-1 |
| 4.02 | Stormwater Plan | 4-5 |

SECTION 5 – DEFINITIONS

SECTION 6 – FORMS

Stormwater Management Permit Application
Stormwater Management Permit
Construction Site Erosion Control Permit Application
Construction Site Erosion Control Permit
Sample Maintenance Agreement
Sample Financial Guarantee

APPENDICES

APPENDIX A - STORMWATER MANAGEMENT ORDINANCE
APPENDIX B - CONSTRUCTION SITE EROSION CONTROL ORDINANCE
APPENDIX C - WET DETENTION BASIN TECHNICAL STANDARD

1.01 TECHNICAL STANDARDS AND REFERENCES

A. Erosion Control and Stormwater Management Technical Standards

All drainage facilities and practices required to comply with the Erosion Control and Stormwater Management Ordinances shall incorporate technical standards and design methods specified in this document, maintained and periodically updated by the Director of Public Works. Where not superceded by stricter requirements in this document, the following standards are also incorporated by reference:

1. Applicable design criteria, standards, and specifications identified in the Wisconsin Construction Site Best Management Practice Handbook, Wisconsin Department of Natural Resources (DNR) Pub. WR-222, November 1993 Revision.
2. Other design guidance and technical standards identified or developed by the DNR under subchapter V of chapter NR 151, Wisconsin Administrative Code.
3. DNR is required by recent rule revisions to develop technical standards to provide guidance for measurement and evaluation of this performance standard. Measurement and evaluation of this performance standard shall be based on guidance published by the Department of Natural Resources. Until such guidance is published, total suspended solids removal shall be achieved to the maximum extent practical through implementation of approved BMP's.

1.02 PRECIPITATION DEPTH, DISTRIBUTION AND AVERAGES

A. Precipitation Depths

The following references may be used as a source for design rainfall depths:

1. *Rainfall Frequency Atlas of the United States*, US Department of Commerce, Weather Bureau Technical Paper No. 40, May 1961.
2. Huff, Floyd A., and Angel, James R., *Rainfall Frequency Atlas of the Midwest*, Midwestern Climate Center, Bulletin 71, 1992.

B. Precipitation Distribution

1. Where Technical Paper No. 40 rainfall depths are used, they shall be used in conjunction with the SCS Type II rainfall distribution for a 24-hour storm duration. Technical Paper No. 40 rainfall depths shall not be allowed with Huff rainfall distributions.
2. Where Bulletin 71 rainfall depths are used, they shall be used in conjunction with the appropriate quartile Huff rainfall distribution for the storm duration producing the highest peak discharge.

C. Average Annual Rainfall

1. For applications requiring use of average annual rainfall, recorded City of Madison depths for March 12 through December 2, 1981, shall be used.

1.03 DESIGN METHODS

A. Stormwater Runoff Calculations

1. For design of volume-dependent practices (detention basins, retention basins, infiltration systems, etc.), a hydrograph-producing method hydrologic model shall be developed. The following computer programs shall be allowed:
 - a. TR-55
 - b. TR-20
 - c. HEC-1
 - d. HEC-HMS
 - e. Other computer programs as allowed by the Director of Public Works
2. The Rational Method may be used to calculate peak discharges for tributary areas less than 20 acres for purposes of conveyance system design.
3. Estimation of Required Storage Volume
 - a. Final detention basin sizing shall be based on hydrograph routing through the basin with the proposed outlet structure.
 - b. The Soil Conservation Service TR-55 Approximate Method may be utilized to calculate the required storage volume. This may be used for developments with watershed areas of less than 25 acres which do

not involve significant off-site drainage that must be passed through the detention basin or routing of stormwater runoff through a series of detention basins. Soil Conservation Service Type II rainfall shall be utilized to estimate storage volume and peak inflow requirements.

4. Stormwater Conveyance System Design
 - a. Storm Sewers shall be designed in accordance with procedures described in Procedures 13-25-35 through 13-25-45 of the Wisconsin Department of Transportation (WisDOT) Facilities Design Manual (FDM).
 - b. Ditches shall be designed in accordance with procedures described in Procedures 13-30-5 through 13-30-10 of the WisDOT FDM.
 - c. Cross Culverts shall be designed in accordance with procedures described in Procedure 13-15-10 of the WisDOT FDM.

1.04 DESIGN CRITERIA

A. Wet Detention Basins

Design in accordance with the Wet Detention Basin Conservation Practice Standard (DNR), Section V.A.1, 2, 4-11 (Appendix A).

B. Dry Detention Basins

1. Minimum grades for the bottom of the basin shall be 2 percent unless underdrain is installed. If underdrains are installed, the minimum grade shall be 0.5 percent.
2. Basin side slopes shall not be steeper than 4:1 or flatter than 10:1.
3. Dry detention basins shall be designed to drain completely within 24 hours after the storm event.
4. Forebays shall be used to the maximum extent practical to prevent concentrated flow from entering the basin and allow sediment to settle prior to entering the basin.
 - a. Forebay area should be 10 to 25 percent of the basin's surface area.
 - b. Length to width ratio shall be at least 2:1.

- c. The forebay shall be located opposite of the basin's outlet to increase detention time.
5. The basin shall be designed with an emergency spillway designed to convey the 100-year peak discharge entering the basin.
6. The basin shall have a ponding depth of less than 10 feet, with at least 1 foot of freeboard above the 100-year flood elevation or emergency spillway elevation, whichever is higher.
7. The basin shape should be designed with a length to width ratio of 3:1 in either a long narrow shape or a teardrop shape, to the maximum extent practical.
8. The basin shall be seeded with vegetation that is tolerant of inundation.
9. The basin outlet structure shall discharge to a stable outlet.

C. Storm Sewers

1. Unless otherwise approved by the Director of Public Works, all storm sewer in the public right-of-way (R/W) shall be constructed of reinforced concrete pipe of appropriate class for the expected loading. Storm sewer materials outside of the R/W shall be subject to approval of the Director of Public Works.
2. The minimum allowable pipe diameter shall be 12 inches.
3. Sewer grades shall be designed so that, in general, a minimum of 2-foot cover is maintained over the top of the pipe. Pipe cover less than the minimum may be used upon site-specific approval by the Director of Public Works. Uniform slopes shall be maintained between inlets, manholes and inlet to manhole. Minimum and maximum allowable slopes shall be those capable of producing velocities between 2 and 12 feet per second, respectively, when the sewer is flowing full. Velocities lower than the minimum or higher than the maximum may be used upon site-specific approval by the Director of Public Works.
4. The maximum distance for overland flow of stormwater runoff to an underground storm sewer system shall be 600 feet unless a longer distance is approved by the Director of Public Works.

5. All inlets and catch basins shall be constructed with a 12-inch sump.

D. Ditches

1. Ditch side slopes shall be no steeper than 4:1.
2. Underdrains may be required for ditch grades of 0.75 percent or less.
3. Ditches and open channels shall be protected with erosion mat as necessary to prevent erosion. The erosion mat shall be of an approved type and application specified in the "Erosion Control Product Acceptability List", most current revision, by the Wisconsin Department of Transportation.

E. Culverts

1. Culverts and similar structures shall have a capacity that meets or exceeds the capacity of the surface drainageway and shall be a minimum of 12 inches in diameter. The flowline of a culvert shall match the flowline of the surface drainage way.
2. Culvert pipe materials and cover requirements shall be the same as pipe materials for storm sewers.
3. Culverts shall not create backwater that adversely impacts upstream properties. Design of new culverts shall consider impacts of future upstream development.
4. End sections shall be provided for all culverts. Grates shall be required on end sections for all culverts greater than 18 inches in diameter.

2.01 EROSION AND SEDIMENT CONTROL PERFORMANCE STANDARDS

A. Total Suspended Solids Removal Goals

1. The Erosion and Sediment Control Plan shall include best management practices (BMPs) that, by design, achieve to the maximum extent practicable, a reduction of 80 percent of the sediment load carried in runoff based on an average annual rainfall, as compared with no sediment or erosion controls until the construction site has undergone final stabilization. An 80 percent sediment reduction shall meet the requirement of this paragraph. Erosion and sediment control BMPs may be used alone or in combination to meet the requirements of this paragraph. Credit toward meeting the sediment reduction may be given for limiting the duration or area, or both, of land-disturbing construction activity.
2. If BMPs cannot be designed and implemented to reduce the sediment load by 80 percent, based on an average annual rainfall, the plan shall include a written and site-specific explanation as to why the 80 percent reduction goal is not attainable, and the sediment load shall be reduced to the maximum extent practicable.
3. DNR is required by recent rule revisions to develop technical standards to provide guidance for measurement and evaluation of this performance standard. Measurement and evaluation of this performance standard shall be based on guidance published by the Department of Natural Resources. Until such guidance is published, total suspended solids removal shall be achieved to the maximum extent practical through implementation of approved BMP's.

B. Required Best Management Practices

Where appropriate, the plan shall include sediment controls to do all of the following to the maximum extent practicable:

1. Each site shall provide an access drive and parking area of sufficient dimensions and design, surfaced with a material that will prevent erosion and minimize tracking or washing of soil onto public or private roadways. All nonpaved access drives shall be designed so that stormwater runoff from adjacent areas does not flow down the drive surface.
2. Any significant amount of runoff from upslope land area, rooftops, or other surfaces that drain across the proposed land disturbance shall be diverted

- around the disturbed area, if practical. Any diversion of upslope runoff shall be done in a manner that prevents erosion of the flow path and the outlet.
3. Any cuts and fills shall be planned and constructed to minimize the length and steepness of slope and stabilized in accordance with the approved erosion control plan timelines and standards of this document.
 4. Open channels shall be stabilized as required to prevent erosion.
 5. Inlets to storm drains, culverts, and other stormwater conveyance systems shall be protected from siltation until final site stabilization.
 6. Water pumped from the site shall be treated by temporary sedimentation basins or other appropriate controls designed for the highest dewatering pumping rate. Water may not be discharged in a manner that causes erosion of the site or receiving channels.
 7. All waste and unused building materials shall be properly disposed of and not allowed to be carried by runoff into a receiving channel or storm sewer system.
 8. All off-site sediment deposits occurring as a result of a storm event shall be cleaned up by the end of the next workday. All other off-site sediment deposits occurring as a result of land-disturbing activities shall be cleaned up by the end of the workday. Flushing may not be used unless the sediment will be controlled by a filter fabric barrier, sediment trap, sediment basin, or equivalent.
 9. All activities on the site shall be conducted in a logical sequence to minimize the area of bare soil exposed at one time. Existing vegetation shall be maintained as long as possible.
 10. Soil stockpiles shall be located no closer than 25 feet from lakes, streams, wetlands, ditches, drainageways, or roadway drainage systems. Stockpiles shall be stabilized by mulching, vegetative cover, tarps, or other means if remaining 20 days or more.
 11. For any disturbed area that remains inactive for greater than 7 working days, or where grading work extends beyond annual permanent seeding deadlines, the City of Whitewater may require the site to be treated with temporary stabilization measures.

12. When the disturbed area has been stabilized by permanent vegetation or other means, temporary BMPs such as silt fences, straw bales, and sediment traps shall be removed and these areas stabilized.

2.02 STORMWATER MANAGEMENT PERFORMANCE STANDARDS

A. Total Suspended Solids

1. BMPs shall be designed, installed, and maintained to control total suspended solids carried in runoff from the postconstruction site as follows:
 - a. For new development, by design, reduce to the maximum extent practicable, the total suspended solids load by 80 percent, based on the average annual rainfall, as compared to no runoff management controls. An 80 percent total suspended solids reduction shall meet the requirements of this subdivision.
 - b. For redevelopment sites one acre or larger, by design, reduce to the maximum extent practicable, the total suspended solids load by 40 percent, based on the average annual rainfall, as compared to no runoff management controls. A 40 percent total suspended solids reduction shall meet the requirements of this subdivision.
 - c. Notwithstanding items a. and b. if the design cannot achieve the applicable total suspended solids reduction specified, the stormwater management plan shall include a written and site-specific explanation why that level of reduction is not attained, and the total suspended solids load shall be reduced to the maximum extent practicable.
 - d. Measurement and evaluation of this standard shall be based on guidance published by the DNR. In the absence of such guidance, total suspended solids removal shall be achieved to the maximum extent practical through implementation of approved BMPs.

B. Peak Discharge

1. By design, BMPs shall be employed to maintain or reduce the peak runoff discharge rates, to the maximum extent practicable, as compared to pre-development conditions for the 2- through 100-year design storm applicable to the development site.

| | | | | |
|-----------------------|----|----|----|----|
| Hydrologic Soil Group | A | B | C | D |
| Runoff Curve Number | 56 | 70 | 79 | 83 |

Table 2.02-1 Maximum predevelopment Runoff Curve Numbers for Cropland Areas

2. Predevelopment conditions shall assume "good hydrologic conditions" for appropriate land covers as identified in TR-55 or an equivalent methodology. The meaning of "hydrologic soil group" and "runoff curve number" are as determined in TR-55. However, when predevelopment land cover is cropland, rather than using TR-55 values for cropland, the runoff curve numbers in Table 2.02-1 shall be used.

C. Runoff Volume

At locations where site conditions permit and where technically feasible, infiltration of stormwater to reduce the volume of runoff may be required. If stormwater infiltration can be demonstrated, the reduced volume may be taken into account when designing practices to meet the peak flow control and pollution control requirements of this ordinance.

Where applicable, evaluation of the need for, appropriateness of, and required volume of infiltration shall be based on the most current DNR rules and technical standards. Infiltration shall not be permitted at locations specifically excluded in the DNR rules.

D. Oil and Grease

Fueling and vehicle maintenance areas shall have BMPs designed, installed, and maintained to reduce petroleum within runoff so that the runoff that leaves the site contains no visible petroleum sheen.

E. Protective Areas

1. A vegetated protective area with the width measured horizontally, specified in Table 2.02-2, shall be provided from the top of the channel (per definition in Section 5) of lakes, streams, and rivers or the delineated boundary of wetlands.
2. Impervious surfaces shall be kept out of the protective area unless impractical, with consideration of the planned use. The stormwater management plan shall contain a written site-specific explanation for any parts of the protective area that are disturbed during construction.

| Type of Resource | Protective Area |
|--|-----------------|
| Outstanding and Exceptional Resource Waters | 75 feet |
| Perennial/Intermittent Streams per USGS Map | 50 feet |
| Lakes and Wetlands | 50 feet |
| Other Waterways with Drainage Areas > 130 ac | 10 feet |

Table 2.02-2 Types of Resources and Protective areas

3. Where land-disturbing construction activity occurs within a protective area, and where no impervious surface is present, adequate sod or self-sustaining vegetative cover of 70 percent or greater shall be established and maintained. The adequate sod or self-sustaining vegetative cover shall be sufficient to provide for bank stability, maintenance of fish habitat, and filtering of pollutants from upslope overland flow areas under sheet flow conditions. Nonvegetative materials, such as rock riprap, may be employed on the bank as necessary to prevent erosion, such as on steep slopes or where high velocity flows occur.

In selecting the vegetative cover for the protective area, existing natural vegetative cover shall be left undisturbed, to the maximum extent practical. Where existing vegetative cover must be disturbed, consider revegetating the protective area with native plantings, where feasible.

4. Best management practices such as filter strips, swales, or wet detention basins that are designed to control pollutants from nonpoint sources may be located in the protective area.
5. The protective area requirement does not apply to:
 - a. Redevelopment sites.
 - b. In-fill development areas less than 5 acres.
 - c. Structures that cross or access surface waters such as boat landings, bridges, and culverts.
 - d. Structures constructed in accordance with s. 59.692(1v), Wis. Stats.
 - e. Postconstruction sites from which runoff does not enter the surface water, except to the extent that vegetative ground cover is necessary to maintain bank stability.

6. Stormwater Conveyance Systems
 - a. Storm Sewers shall be designed to convey the peak discharge for a 10-year frequency storm event.
 - b. Cross culverts shall be designed to convey the peak discharge for a 25-year frequency storm event.
 - c. Ditches shall be designed to convey the peak discharge for a 25-year frequency storm event.
 - d. All conveyance systems shall be designed to safely pass the 100-year storm flow without damage to adjacent structures. Unless waived by the City of Whitewater, all new structures shall be constructed at least 2 feet higher than the estimated 100-year overflow elevation.

3.01 GENERAL CONSIDERATIONS

- A. All concentrated stormwater discharges leaving a site must be conveyed into an existing channel, storm sewer, or overland flow path with adequate downstream stormwater capacity and shall not result in increased flood hazard, erosion, or other adverse impacts.
- B. Natural topography and land cover features such as natural swales, natural depressions, native soil infiltrating capacity, and natural groundwater recharge areas shall be preserved and used, to the extent possible, to meet the requirements of this section.
- C. Emergency overland flow for all stormwater facilities shall be provided to prevent exceeding the safe capacity of downstream drainage facilities and prevent endangerment of downstream property or public safety.

4.01 EROSION AND SEDIMENT CONTROL PLAN

Submittal requirements for Erosion and Sediment Control Plans are summarized below. The Director of Public Works may waive a portion of these submittal requirements where such information is not necessary to demonstrate compliance with the ordinance.

A. Responsible Party and Legal Description

1. Name, address, and telephone number for the following or their designees: landowner; developer; project engineer for practice design and certification; person(s) responsible for installation of stormwater management practices; and person(s) responsible for maintenance of stormwater management practices prior to the transfer, if any, of maintenance responsibility to another party.
2. A site location map and proper legal description of the property proposed to be developed, referenced to the US Public Land Survey system or to block and lot numbers within a recorded land subdivision plat.

B. Predevelopment Site Conditions Mapping

1. A USGS Quadrangle or other appropriate map showing the project location and nearby regional water resources potentially impacted by the project.
2. A copy of the applicable Soils Survey Map showing predominant soil types and hydrologic soil groups.
3. Mapping or description of existing cover type and condition.
4. A predeveloped conditions site map including the following information described below. Mapping shall include enough of the contiguous properties to show runoff patterns onto, through, and from the site.
 - a. Existing topographic contours of the site at a contour interval not to exceed 2 feet.
 - b. Property lines.
 - c. Existing flow paths and direction across the site.
 - d. Outlet locations identifying where stormwater drainage leaves the property.

- e. Drainage basin divides and subdivides to all outlet locations where stormwater drainage leaves the property.
- f. Existing drainage structures on and adjacent to the site.
- g. Watercourses that may affect or be affected by runoff from the site.
- h. Lakes, streams, wetlands, channels, ditches, and other watercourses on and immediately adjacent to the site.
- i. Limits of the 100-year floodplain.

C. Proposed Site Grading and Erosion Control Plan

A Site Grading and Erosion Control Plan shall be provided that includes the following items. The plan shall be at an appropriate scale for the size of the development.

- 1. Boundaries of the construction site.
- 2. Drainage patterns and approximate slopes anticipated after major grading activities.
- 3. Areas of soil disturbance.
- 4. Location of major structural and nonstructural controls identified in the plan.
 - a. Location of areas where stabilization practices will be employed.
 - b. Areas which will be vegetated following construction.
- 5. Extent of wetland acreage on the site and locations where stormwater is discharged to a surface water or wetland.

D. Calculations

Calculations shall be provided including computer modeling input and output files, as needed, to demonstrate compliance with ordinance performance standards. All major assumptions used in developing input parameters shall be clearly stated. The drainage basin areas used in making the calculations shall be clearly cross-referenced to the required map(s).

E. Narrative

A narrative description of the proposed Erosion and Sediment Control Plan shall be provided, including the following:

1. Name of the immediate named receiving water from the United States Geological Service 7.5 minute series topographic maps, as well as locations of all surface waters and wetlands within one mile of the construction site.
2. A description of the site and the nature of the construction activity.
3. A sequence of construction of the development site, including stripping and clearing; rough grading; construction of utilities, infrastructure, and buildings; and final grading and landscaping. Sequencing shall identify the expected date on which clearing will begin, the estimated duration of exposure of cleared areas, areas of clearing, installation of temporary erosion and sediment control measures, and establishment of permanent vegetation.
4. Estimates of the total area of the site and the total area of the site that is expected to be disturbed by construction activities.
5. Estimates, including calculations, if any, of the runoff coefficient of the site before and after construction activities are completed.
6. A description of appropriate controls and measures that will be performed at the site to prevent pollutants from reaching waters of the state. The plan shall clearly describe the appropriate control measures for each major activity and the timing during the construction process that the measures will be implemented. The description of erosion controls shall include, when appropriate, the following minimum requirements:
 - a. Description of interim and permanent stabilization practices, including a practice implementation schedule. Site plans shall ensure that existing vegetation is preserved where attainable and that disturbed portions of the site are stabilized.
 - b. Description of structural practices to divert flow away from exposed soils, store flows, or otherwise limit runoff and the discharge of pollutants from the site. Unless otherwise specifically approved in writing by the City of Whitewater, structural measures shall be installed on upland soils.

- c. Descriptions of any other practices proposed to meet requirements of the ordinance and prevent erosion from the site.

4.02 STORMWATER MANAGEMENT PLAN SUBMITTAL REQUIREMENTS

Submittal requirements for Stormwater Management Plans are summarized below. The Director of Public Works may waive a portion of these submittal requirements where such information is not necessary to demonstrate compliance with the ordinance.

A. Responsible Party and Legal Description

The stormwater management plan required under S.08 (1) should contain, at a minimum, the following information:

1. Name, address, and telephone number for the following or their designees: landowner; developer; project engineer for practice design and certification; person(s) responsible for installation of stormwater management practices; and person(s) responsible for maintenance of stormwater management practices prior to the transfer, if any, of maintenance responsibility to another party.
2. A proper legal description of the property proposed to be developed, referenced to the U.S. Public Land Survey system or to block and lot numbers within a recorded land subdivision plat.

B. Predevelopment Site Conditions Mapping

1. A USGS Quadrangle or other appropriate map showing the project location and nearby regional water resources potentially impacted by the project.
2. A copy of the applicable Soils Survey Map showing predominant soil types and hydrologic soil groups.
3. Mapping or description of existing cover type and condition.
4. A predeveloped conditions site map including the following information described below. Mapping shall include enough of the contiguous properties to show runoff patterns onto, through, and from the site:
 - a. Existing topographic contours of the site at a contour interval not to exceed 2 feet.
 - b. Property lines.

- c. Existing flow paths and direction across the site.
- d. Outlet locations identifying where stormwater drainage leaves the property.
- e. Drainage basin divides and subdivides to all outlet locations where stormwater drainage leaves the property.
- f. Existing drainage structures on and adjacent to the site.
- g. Watercourses that may affect or be affected by runoff from the site.
- h. Lakes, streams, wetlands, channels, ditches, and other watercourses on and immediately adjacent to the site.
- i. Limits of the 100-year floodplain.
- j. Location of wells and wellhead protection areas covering the project area and delineated pursuant to s. NR 811.16, Wis. Adm. Code.

C. Postdevelopment Site Conditions Mapping

- 1. Proposed pervious areas including vegetative cover type and condition.
- 2. Proposed impervious surfaces including all buildings, structures, and pavement.
- 3. Proposed topographic contours of the site at a scale not to exceed one foot.
- 4. Proposed drainage network including enough of the contiguous properties to show runoff patterns onto, through, and from the site; locations and dimensions of drainage easements.
- 5. Locations of maintenance easements specified in the maintenance agreement.
- 6. Flow path and direction for all stormwater conveyance sections.
- 7. Location and type of all stormwater management conveyance and treatment practices, including the on-site and off-site tributary drainage area.
- 8. Location and type of conveyance system that will carry runoff from the drainage and treatment practices to the nearest adequate outlet such as a curbed street, storm drain, or natural drainageway.

9. Proposed drainage divides and subdivides identified to each outlet location where stormwater will discharge from the proposed development site.

D. Detailed Drawings

Detailed drawings including cross sections and profiles of all permanent stormwater conveyance and treatment practices.

E. Calculations

Calculations, including computer modeling input and output files, as needed to demonstrate compliance with ordinance performance standards. All major assumptions used in developing input parameters shall be clearly stated. The drainage basin areas used in making the calculations shall be clearly cross-referenced to the required map(s).

F. Narrative

A narrative including, at a minimum, the following:

1. A description of methodologies and major assumptions used in developing hydrologic and hydraulic analyses.
2. A summary of analysis results and conclusions that shall include the following:
 - a. Tables summarizing predeveloped and postdeveloped hydrologic parameters for each drainage basin. Tables shall include subbasin areas, runoff curve numbers, impervious areas, and times of concentration for predeveloped and postdeveloped conditions.
 - b. Tables summarizing peak discharge rates for the 2-year, 5-year, 10-year, 25-year, and 100-year storm events for predeveloped, post-developed without practices, and postdeveloped with practices conditions.
3. Explanation of the provisions to preserve and use natural topography and land cover features to minimize changes in peak flow runoff rates and volumes to surface waters and wetlands.
4. Explanation of any restrictions on stormwater management measures in the development area imposed by wellhead protection plans and ordinances.

5. Results of investigations of soils and groundwater required for the placement and design of stormwater management measures.
6. A description and installation schedule for the stormwater management practices needed to meet the performance standards in S.07.
7. A maintenance plan developed for the life of each stormwater management practice including the required maintenance activities and maintenance activity schedule.
8. Cost estimates for the construction, operation, and maintenance of each stormwater management practice.
9. Other information requested in writing by the City of Whitewater to determine compliance of the proposed stormwater management measures with the provisions of this ordinance.

G. Certification of Site Investigations, Plans, Designs, Computations, and Drawings

All site investigations, plans, designs, computations, and drawings shall be certified by a Wisconsin-licensed professional engineer to be prepared in accordance with accepted engineering practice and requirements of the ordinance.

5.01 DEFINITIONS

- 1) "**Agricultural facilities and practices**" has the meaning given in s. 281.16, Wis. Stats.
- 2) "**Average annual rainfall**" means a calendar year of precipitation, excluding snow, which is considered typical.
- 3) "**Best management practice**" or "**BMP**" means structural or non-structural measures, practices, techniques or devices employed to avoid or minimize sediment or pollutants carried in runoff to waters of the state.
- 4) "**Business day**" means a day the office of the Director of Public Works is routinely and customarily open for business.
- 5) "**Cease and desist order**" means a court-issued order to halt land disturbing construction activity that is being conducted without the required permit.
- 6) "**Combined sewer system**" means a system for conveying both sanitary sewage and stormwater runoff.
- 7) "**Connected imperviousness**" means an impervious surface that is directly connected to a separate storm sewer or water of the state via an impervious flow path.
- 8) "**Construction Site**" means an area upon which one or more land disturbing construction activities occur, including areas that are part of a larger common plan of development or sale where multiple separate and distinct land disturbing construction activities may be taking place at different times on different schedules but under one plan.
- 9) "**Design storm**" means a hypothetical discrete rainstorm characterized by a specific duration, temporal distribution, rainfall intensity, return frequency, and total depth of rainfall.
- 10) "**Development**" means residential, commercial, industrial or institutional land uses and associated roads.
- 11) "**Director of Public Works**" means the City of Whitewater Director of Public Works or designee.
- 12) "**Division of land**" means either a major subdivision or minor subdivision, as defined by Chapter 18, Land Division and Subdivision.
- 13) "**Effective infiltration area**" means the area of the infiltration system that is used to infiltrate runoff and does not include the area used for site access, berms or pretreatment.
- 14) "**Erosion**" means the process by which the land's surface is worn away by the action of wind, water, ice or gravity.
- 15) "**Exceptional resource waters**" means waters listed in s. NR 102.11, Wis. Adm. Code.
- 16) "**Extraterritorial Jurisdiction**" means Extraterritorial Jurisdiction as defined by Section 18.04.020 of the City of Whitewater Subdivision Ordinance.
- 17) "**Final stabilization**" means that all land disturbing construction activities at the construction site have been completed and that a uniform, perennial, vegetative cover has been established, with a density of at least 70% of the cover, for the unpaved areas and areas not covered by permanent structures, or employment of equivalent permanent stabilization measures.
- 18) "**Financial guarantee**" means a performance bond, maintenance bond, surety bond, irrevocable letter of credit, or similar guarantees submitted to the Director of Public Works by the responsible party to assure that requirements of the ordinance are carried out in compliance with the stormwater management plan.
- 19) "**Governing body**" means town board of supervisors, county board of supervisors, city council, village board of trustees or village council.

- 20) **"Impervious surface"** means an area that releases as runoff all or a large portion of the precipitation that falls on it, except for frozen soil. Rooftops, sidewalks, driveways, parking lots and streets are examples of areas that typically are impervious.
- 21) **"In-fill area"** means an undeveloped area of land located within existing development.
- 22) **"Infiltration"** means the entry of precipitation or runoff into or through the soil.
- 23) **"Infiltration system"** means a device or practice such as a basin, trench, rain garden or swale designed specifically to encourage infiltration, but does not include natural infiltration in pervious surfaces such as lawns, redirecting of rooftop downspouts onto lawns or minimal infiltration from practices, such as swales or road side channels designed for conveyance and pollutant removal only.
- 24) **"Karst feature"** means an area or geologic feature subject to bedrock dissolution so that it is likely to provide a conduit to groundwater, and may include caves, enlarged fractures, mine features, exposed bedrock surfaces, sinkholes, springs, seeps or swallets.
- 25) **"Land Development Activity"** means any construction related activity that results in the addition or replacement of impervious surfaces such as rooftops, roads, parking lots, and other structures. Measurement of areas impacted by land development activity includes areas that are part of a larger common plan of development or sale where multiple separate and distinct land disturbing construction activities may be taking place at different times on different schedules but under one plan.
- 26) **"Land disturbing construction activity"** means any man-made alteration of the land surface resulting in a change in the topography or existing vegetative or non-vegetative soil cover, that may result in runoff and lead to an increase in soil erosion and movement of sediment into waters of the state. Land disturbing construction activity includes clearing and grubbing, demolition, excavating, pit trench dewatering, filling and grading activities.
- 27) **"Maintenance agreement"** means a legal document that provides for long-term maintenance of stormwater management practices.
- 28) **"MEP" or "maximum extent practicable"** means a level of implementing best management practices in order to achieve a performance standard specified in this ordinance which takes into account the best available technology, cost effectiveness and other competing issues such as human safety and welfare, endangered and threatened resources, historic properties and geographic features. MEP allows flexibility in the way to meet the performance standards and may vary based on the performance standard and site conditions.
- 29) **"New development"** means development resulting from the conversion of previously undeveloped land or agricultural land uses.
- 30) **"Off-site"** means located outside the property boundary described in the permit application.
- 31) **"On-site"** means located within the property boundary described in the permit application.
- 32) **"Ordinary high-water mark"** has the meaning given in s. NR 115.03(6), Wis. Adm. Code.
- 33) **"Outstanding resource waters"** means waters listed in s. NR 102.10, Wis. Adm. Code.
- 34) **"Percent fines"** means the percentage of a given sample of soil, which passes through a # 200 sieve.

- 35) **"Performance standard"** means a narrative or measurable number specifying the minimum acceptable outcome for a facility or practice.
- 36) **"Permit"** means a written authorization made by the Director of Public Works to the applicant to conduct land disturbing construction activity or to discharge post-construction runoff to waters of the state.
- 37) **"Permit administration fee"** means a sum of money paid to the [administering authority] by the permit applicant for the purpose of recouping the expenses incurred by the authority in administering the permit.
- 38) **"Pervious surface"** means an area that releases as runoff a small portion of the precipitation that falls on it. Lawns, gardens, parks, forests or other similar vegetated areas are examples of surfaces that typically are pervious.
- 39) **"Pollutant"** has the meaning given in s. 283.01(13), Wis. Stats.
- 40) **"Pollution"** has the meaning given in s. 281.01(10), Wis. Stats.
- 41) **"Post-construction site"** means a construction site following the completion of land disturbing construction activity and final site stabilization.
- 42) **"Pre-development condition"** means the extent and distribution of land cover types present before the initiation of land disturbing construction activity, assuming that all land uses prior to development activity are managed in an environmentally sound manner.
- 43) **"Preventive action limit"** has the meaning given in s. NR 140.05(17), Wis. Adm. Code.
- 44) **"Redevelopment"** means areas where development is replacing older development.
- 45) **"Responsible party"** means any entity holding fee title to the property.
- 46) **"Runoff"** means stormwater or precipitation including rain, snow or ice melt or similar water that moves on the land surface via sheet or channelized flow.
- 47) **"Sediment"** means settleable solid material that is transported by runoff, suspended within runoff or deposited by runoff away from its original location.
- 48) **"Separate storm sewer"** means a conveyance or system of conveyances including roads with drainage systems, streets, catch basins, curbs, gutters, ditches, constructed channels or storm drains, which meets all of the following criteria:
 - a. Is designed or used for collecting water or conveying runoff.
 - b. Is not part of a combined sewer system.
 - c. Is not draining to a stormwater treatment device or system.
 - d. Discharges directly or indirectly to waters of the state.
- 49) **"Site"** means the entire area included in the legal description of the land on which the land disturbing construction activity occurred.
- 50) **"Stop work order"** means an order issued by the Director of Public Works which requires that all construction activity on the site be stopped.
- 51) **"Stormwater management plan"** means a comprehensive plan designed to reduce the discharge of pollutants from stormwater after the site has undergone final stabilization following completion of the construction activity.
- 52) **"Stormwater management system plan"** is a comprehensive plan designed to reduce the discharge of runoff and pollutants from hydrologic units on a regional or municipal scale.
- 53) **"Technical standard"** means a document that specifies design, predicted performance and operation and maintenance specifications for a material, device or method.
- 54) **"Top of the channel"** means an edge, or point on the landscape, landward from the ordinary high water mark of a surface water of the state, where the slope of the land begins to be less than 12% continually for at least 50 feet. If the slope of the land is 12% or less continually for the initial 50 feet, landward from the ordinary high water mark, the top of the channel is the ordinary high water mark.

- 55) **“TR-55”** means the United States Department of Agriculture, Natural Resources Conservation Service (previously Soil Conservation Service), Urban Hydrology for Small Watersheds, Second Edition, Technical Release 55, June 1986.
- 56) **“Type II distribution”** means a rainfall type curve as established in the “United States Department of Agriculture, Soil Conservation Service, Technical Paper 149, published 1973”. The Type II curve is applicable to all of Wisconsin and represents the most intense storm pattern.
- 57) **“Waters of the state”** has the meaning given in s. 281.01 (18), Wis. Stats.

**CITY OF WHITEWATER
STORMWATER MANAGEMENT ORDINANCE**

TABLE OF CONTENTS

| | |
|------|---|
| S.01 | Authority |
| S.02 | Findings of Fact |
| S.03 | Purpose and Intent |
| | (1) Purpose |
| | (2) Intent |
| S.04 | Applicability and Jurisdiction |
| | (1) Applicability |
| | (2) Jurisdiction |
| | (3) Exclusions |
| S.05 | Technical Standards and Design Methods |
| S.06 | Performance Standards |
| | (1) Responsible Party |
| | (2) Plan |
| | (3) Stormwater Management Performance Standards |
| | (4) Location and Regional Treatment Option |
| | (5) Alternate Requirements |
| S.07 | Permitting Requirements, Procedures and Fees |
| | (1) Permit Required |
| | (2) Permit Application and Fees |
| | (3) Review and Approval of Permit Application |
| | (4) Permit Requirements |
| | (5) Permit Conditions |
| | (6) Permit Duration |
| S.08 | Stormwater Management Plan |
| | (1) Plan Requirements |
| | (2) Alternate Requirements |
| S.09 | Maintenance Agreement |
| | (1) Maintenance Agreement Required |
| | (2) Agreement Provisions |
| S.10 | Financial Guarantee |
| | (1) Establishment of the Guarantee |
| | (2) Conditions for Release |
| S.11 | Fee Schedule |
| S.12 | Exemptions and Waivers |
| | (1) General |
| | (2) Conditions |
| | (3) Procedures |
| S.13 | Enforcement |
| S.14 | Appeals |
| | (1) Board of Appeals or Adjustment |
| | (2) Who May Appeal |
| S.15 | Severability |
| S.16 | Definitions |

AN ORDINANCE TO CREATE CHAPTER [NUMBER] OF THE [CODE OR ORDINANCE] OF THE CITY OF WHITEWATER RELATING TO THE CONTROL OF POST-CONSTRUCTION RUNOFF

S.01 AUTHORITY.

This ordinance is adopted by the City of Whitewater under the authority granted by s 62.234, Wis. Stats. This ordinance supersedes all provisions of an ordinance previously enacted under s. 62.23, Wis. Stats., that relate to stormwater management regulations. Except as otherwise specified in s. 62.234, Wis. Stats., s. 62.23, Wis. Stats., applies to this ordinance and to any amendments to this ordinance.

The provisions of this ordinance are deemed not to limit any other lawful regulatory powers of the same governing body.

The City of Whitewater hereby designates the Director of Public Works to administer and enforce the provisions of this ordinance.

The requirements of this ordinance do not pre-empt more stringent stormwater management requirements that may be imposed by any of the following:

- (a) Wisconsin Department of Natural Resources administrative rules, permits or approvals including those authorized under ss. 281.16 and 283.33, Wis. Stats.
- (b) Targeted non-agricultural performance standards promulgated in rules by the Wisconsin Department of Natural Resources under s. NR 151.004, Wis. Adm. Code.

S.02 FINDINGS OF FACT.

The City of Whitewater finds that uncontrolled, post-construction runoff has a significant impact upon water resources and the health, safety and general welfare of the community and diminishes the public enjoyment and use of natural resources. Specifically, uncontrolled post-construction runoff can:

- (1) Degrade physical stream habitat by increasing stream bank erosion, increasing streambed scour, diminishing groundwater recharge, diminishing stream base flows and increasing stream temperature.
- (2) Diminish the capacity of lakes and streams to support fish, aquatic life, recreational and water supply uses by increasing pollutant loading of sediment, suspended solids, nutrients, heavy metals, bacteria, pathogens and other urban pollutants.
- (3) Alter wetland communities by changing wetland hydrology and by increasing pollutant loads.
- (4) Reduce the quality of groundwater by increasing pollutant loading.
- (5) Threaten public health, safety, property and general welfare by overtaxing storm sewers, drainage ways, and other minor drainage facilities.
- (6) Threaten public health, safety, property and general welfare by increasing major flood peaks and volumes.
- (7) Undermine floodplain management efforts by increasing the incidence and levels of flooding.

S.03 PURPOSE AND INTENT.

- (1) **PURPOSE.** The general purpose of this ordinance is to establish long-term, post-construction runoff management requirements that will diminish the threats to public health, safety, welfare and the aquatic environment. Specific purposes are to:

- (a) Further the maintenance of safe and healthful conditions.
- (b) Prevent and control the adverse effects of stormwater; prevent and control soil erosion; prevent and control water pollution; protect spawning grounds, fish and aquatic life; control building sites, placement of structures and land uses; preserve ground cover and scenic beauty; and promote sound economic growth.
- (c) Control exceedance of the safe capacity of existing drainage facilities and receiving water bodies; prevent undue channel erosion; control increases in the scouring and

transportation of particulate matter; and prevent conditions that endanger downstream property.

- (2) INTENT. It is the intent of the City of Whitewater that this ordinance regulates post-construction stormwater discharges to waters of the state. This ordinance may be applied on a site-by-site basis. The City of Whitewater recognizes, however, that the preferred method of achieving the stormwater performance standards set forth in this ordinance is through the preparation and implementation of comprehensive, systems-level stormwater management plans that cover hydrologic units, such as watersheds, on a municipal and regional scale. Such plans may prescribe regional stormwater devices, practices or systems, any of which may be designed to treat runoff from more than one site prior to discharge to waters of the state. Where such plans are in conformance with the performance standards developed under s. 281.16, Wis. Stats., for regional stormwater management measures and have been approved by the City of Whitewater, it is the intent of this ordinance that the approved plan be used to identify post-construction management measures acceptable for the community.

S.04 APPLICABILITY AND JURISDICTION.

(1) APPLICABILITY.

- (a) Where not otherwise limited by law, this ordinance applies to land development activity that results in one or more acres of land disturbing construction activity.
- (b) A site that meets any of the criteria in this paragraph is exempt from the requirements of this ordinance.
- A redevelopment site with no net increase in exposed parking lots, roads, rooftops, or other impervious areas.
 - A site with less than 10% connected imperviousness based on complete development of the post-construction site, provided the cumulative area of all parking lots and rooftops is less than one acre.
 - Nonpoint discharges from agricultural facilities and practices.
 - Nonpoint discharges from silviculture activities.
 - Routine maintenance for project sites under 5 acres of land disturbance if performed to maintain the original line and grade, hydraulic capacity or original purpose of the facility.
 - Underground utility construction such as water, sewer and fiberoptic lines. This exemption does not apply to the construction of any above ground structures associated with utility construction.
- (c) Notwithstanding the applicability requirements in paragraph (a), this ordinance applies to land development activity of any size that, in the opinion of the Director of Public Works, is likely to result in runoff that exceeds the safe capacity of the existing drainage facilities or receiving body of water, that causes undue channel erosion, that increases water pollution by scouring or the transportation of particulate matter or that endangers property or public safety.

(2) JURISDICTION

This ordinance applies to land development activities within the boundaries and jurisdiction of the City of Whitewater, as well as the division of land in the city's extraterritorial jurisdiction.

(3) EXCLUSIONS.

This ordinance is not applicable to activities conducted by a state agency, as defined under s. 227.01 (1), Wis. Stats., but also including the office of district attorney, which is subject to the

state plan promulgated or a memorandum of understanding entered into under s. 281.33 (2), Wis. Stats.

S.05 TECHNICAL STANDARDS AND DESIGN METHODS

DESIGN CRITERIA, STANDARDS AND SPECIFICATIONS. All drainage facilities and practices required to comply with this ordinance shall incorporate technical standards and design methods specified in the document City of Whitewater Erosion Control and Stormwater Management Requirements, maintained and periodically updated by the Director of Public Works. Where not superceded by stricter requirements in City of Whitewater Erosion Control and Stormwater Management Requirements, the following standards are also incorporated by reference:

- (a) Applicable design criteria, standards and specifications identified in the *Wisconsin Construction Site Best Management Practice Handbook*, WDNR Pub. WR-222 November 1993 Revision.
- (b) Other design guidance and technical standards identified or developed by the Wisconsin Department of Natural Resources under subchapter V of chapter NR 151, Wis. Adm. Code.
- (c) OTHER STANDARDS. Other technical standards not identified or developed in sub. (1), may be used provided that the methods have been approved by the Director of Public Works.

S.06 PERFORMANCE STANDARDS

- (1) RESPONSIBLE PARTY. The entity holding fee title to the property shall be responsible for either developing and implementing a stormwater management plan, or causing such plan to be developed and implemented through contract or other agreement. This plan shall be developed in accordance with S. 08, which incorporates the requirements of this section.
- (2) PLAN. A written plan shall be developed in accordance with S. 08 and implemented for applicable land development activities.
- (3) STORMWATER MANAGEMENT PERFORMANCE STANDARDS. All drainage facilities and practices required to comply with this ordinance shall meet performance standards specified in the document City of Whitewater Erosion Control and Stormwater Management Requirements, maintained and periodically updated by the Director of Public Works.
- (4) LOCATION AND REGIONAL TREATMENT OPTION.
 - (a) Stormwater Management Facilities required to meet this ordinance may be located on-site or off-site as part of a regional stormwater device, practice or system.
 - (b) The Director of Public Works may approve off-site management measures provided that all of the following conditions are met:
 - 1. The Director of Public Works determines that the post-construction runoff is covered by a stormwater management system plan that is approved by the City of Whitewater and that contains management requirements consistent with the purpose and intent of this ordinance.
 - 2. The off-site facility meets all of the following conditions:
 - a. The facility will be in place before the need for the facility arises as a result of on-site construction activities.
 - b. The facility is designed and adequately sized to provide a level of stormwater control equal to or greater than that which would be afforded by on-site practices meeting the performance standards of this ordinance.
 - c. The facility has a legally obligated entity responsible for its long-term operation and maintenance.
 - d. Where a regional treatment option exists such that the Director of Public Works may exempt the applicant from all or part of the minimum on-site stormwater management requirements, the applicant shall be required to pay a fee in an amount determined in negotiation with the Director of

Public Works. In determining the fee for post-construction runoff, the Director of Public Works shall consider an equitable distribution of the cost for land, engineering design, construction, and maintenance of the regional treatment option.

- (5) **ALTERNATE REQUIREMENTS.** The Director of Public Works may establish alternative stormwater management requirements to those set forth in City of Whitewater Erosion Control and Stormwater Management Requirements, if the Director of Public Works determines that an added level of protection is needed for to address downstream stormwater management issues; or that extraordinary hardships or practical difficulties may result from strict compliance with these regulations. Exceptions or waivers to stormwater management requirements set forth in this ordinance and City of Whitewater Erosion Control and Stormwater Management Requirements shall be considered in accordance with S. 12.

S.07 PERMITTING REQUIREMENTS, PROCEDURES, AND FEES

- (1) **PERMIT REQUIRED.** No responsible party may undertake a land disturbing construction activity without receiving a post-construction runoff permit from the Director of Public Works prior to commencing the proposed activity.
- (2) **PERMIT APPLICATION AND FEES.** Unless specifically excluded by this ordinance, any responsible party desiring a permit shall submit to the Director of Public Works a permit application made on a form provided by the Director of Public Works for that purpose.
- (a) Unless otherwise excepted by this ordinance, a permit application must be accompanied by a stormwater management plan, a maintenance agreement (where required) and, where not otherwise covered by a developer's agreement, a non-refundable permit administration fee. The permit administration fee, where applicable, shall be consistent with a fee schedule maintained by the Director of Public Works.
- (b) The stormwater management plan shall be prepared to meet the requirements of S.06 and 08, the maintenance agreement shall be prepared to meet the requirements of S.09, the financial guarantee shall meet the requirements of S.10, and fees shall be those established by the City of Whitewater as set forth in S.11.
- (3) **REVIEW AND APPROVAL OF PERMIT APPLICATION.** The Director of Public Works shall review any permit application that is submitted with a stormwater management plan, maintenance agreement, and the required fee. The following approval procedure shall be used:
- (a) The Director of Public Works may request additional information if required for a complete application within 15 business days of receipt of any permit application. Within 30 business days of the receipt of a complete permit application, including all items as required by sub. (2), the Director of Public Works shall inform the applicant whether the application, plan and maintenance agreement are approved or disapproved based on the requirements of this ordinance.
- (b) If the stormwater permit application, plan and maintenance agreement are approved, or if an agreed upon payment of fees in lieu of stormwater management practices is made, the Director of Public Works shall issue the permit.
- (c) If the stormwater permit application, plan or maintenance agreement is disapproved, the Director of Public Works shall detail in writing the reasons for disapproval.
- (d) The Director of Public Works may request additional information from the applicant. If additional information is submitted, the Director of Public Works shall have 10 business days from the date the additional information is received to inform the applicant that the plan and maintenance agreement are either approved or disapproved.
- (e) Prior to commencing the land development activity, the project may be subject to additional approvals under Chapter 18, Chapter 19, or both, of the City's municipal code.
- (4) **PERMIT REQUIREMENTS.** All permits issued under this ordinance shall be subject to the following conditions, and holders of permits issued under this ordinance shall be deemed to have accepted these conditions. The Director of Public Works may suspend or revoke a permit for

violation of a permit condition, following written notification of the responsible party. An action by the Director of Public Works to suspend or revoke this permit may be appealed in accordance with S.14.

- (a) Compliance with this permit does not relieve the responsible party of the responsibility to comply with other applicable federal, state, and local laws and regulations.
 - (b) The responsible party shall design and install all structural and non-structural stormwater management measures in accordance with the approved stormwater management plan and this permit.
 - (c) The responsible party shall notify the Director of Public Works at least 2 business days before commencing any work in conjunction with the stormwater management plan, and within 3 business days upon completion of the stormwater management practices. If required as a special condition under sub. (5), the responsible party shall make additional notification according to a schedule set forth by the Director of Public Works so that practice installations can be inspected during construction.
 - (d) Practice installations required as part of this ordinance shall be certified "as built" by a licensed professional engineer. Completed stormwater management practices must pass a final inspection by the Director of Public Works or its designee to determine if they are in accordance with the approved stormwater management plan and ordinance. The Director of Public Works or its designee shall notify the responsible party in writing of any changes required in such practices to bring them into compliance with the conditions of this permit.
 - (e) The responsible party shall notify the Director of Public Works of any significant proposed modifications to an approved stormwater management plan. The Director of Public Works may require that the proposed modifications be submitted to it for approval prior to incorporation into the stormwater management plan and execution by the responsible party.
 - (f) The responsible party shall maintain all stormwater management practices in accordance with the stormwater management plan until the practices either become the responsibility of the City of Whitewater, or are transferred to subsequent private owners as specified in the approved maintenance agreement.
 - (g) The responsible party authorizes the Director of Public Works to perform any work or operations necessary to bring stormwater management measures into conformance with the approved stormwater management plan, and consents to a special assessment or charge against the property as authorized under subch. VII of ch. 66, Wis. Stats., or to charging such costs against the financial guarantee posted under S.10.
 - (h) If so directed by the Director of Public Works, the responsible party shall repair at the responsible party's own expense all damage to adjoining facilities and drainage ways caused by runoff, where such damage is caused by activities that are not in compliance with the approved stormwater management plan.
 - (i) The responsible party shall permit property access to the Director of Public Works or its designee for the purpose of inspecting the property for compliance with the approved stormwater management plan and this permit.
 - (j) Where site development or redevelopment involves changes in direction, increases in peak rate and/or total volume of runoff from a site, the Director of Public Works may require the responsible party to make appropriate legal arrangements with affected property owners.
 - (k) The responsible party is subject to the enforcement actions and penalties detailed in S.13, if the responsible party fails to comply with the terms of this permit.
- (5) PERMIT CONDITIONS. Permits issued under this subsection may include conditions established by Director of Public Works related to the requirements needed to meet the performance standards in S.06 or a financial guarantee as provided for in S.10.
- (6) PERMIT DURATION. Permits issued under this section shall be valid from the date of issuance through the date the Director of Public Works notifies the responsible party that all stormwater management practices have passed the final inspection required under sub. (4)(d). The permit shall be invalid if work is not commenced within 1 year of permit issuance.

S.08 STORMWATER MANAGEMENT PLAN

- (1) **PLAN REQUIREMENTS.** A Stormwater Management Plan shall be prepared and submitted to the Director of Public Works. The Stormwater Management Plan shall include, at a minimum, information required in the City of Whitewater Erosion Control and Stormwater Management Requirements, maintained and periodically updated by the Director of Public Works. The Director of Public Works may waive certain submittal requirements if determined by the Director of Public Works to be unnecessary to demonstrate compliance with ordinance standards.
- (2) **ALTERNATE REQUIREMENTS.** The Director of Public Works may prescribe alternative submittal requirements for applicants seeking an exemption to on-site stormwater management performance standards under S.06 (5) or S.12.

S.09 MAINTENANCE AGREEMENT

- (1) **MAINTENANCE AGREEMENT REQUIRED.** The maintenance agreement required under S.07 (2) for stormwater management practices shall be an agreement between the Director of Public Works and the responsible party to provide for maintenance of stormwater practices beyond the duration period of this permit. The maintenance agreement shall be filed with the County Register of Deeds as a property deed restriction so that it is binding upon all subsequent owners of the land served by the stormwater management practices.
- (2) **AGREEMENT PROVISIONS.** The maintenance agreement shall contain the following information and provisions and be consistent with the maintenance plan required by S.07(2).
 - (a) Identification of the stormwater facilities and designation of the drainage area served by the facilities.
 - (b) A schedule for regular maintenance of each aspect of the stormwater management system consistent with the stormwater management plan required under S.06(2).
 - (c) Identification of the property or easement owner, organization or city, county, town or village responsible for long term maintenance of the stormwater management practices identified in the stormwater management plan required under S.06 (2).
 - (d) Requirement that the responsible party(s), organization, or city, county, town or village shall maintain stormwater management practices in accordance with the schedule included in par. (b).
 - (e) Authorization for the Director of Public Works to access the property to conduct inspections of stormwater management practices as necessary to ascertain that the practices are being maintained and operated in accordance with the agreement.
 - (f) A requirement on the Director of Public Works to maintain public records of the results of the site inspections, to inform the responsible party responsible for maintenance of the inspection results, and to specifically indicate any corrective actions required to bring the stormwater management practice into proper working condition.
 - (g) Agreement that the party designated under par. (c), as responsible for long term maintenance of the stormwater management practices, shall be notified by the Director of Public Works of maintenance problems which require correction. The specified corrective actions shall be undertaken within a reasonable time frame as set by the Director of Public Works.
 - (h) Authorization of the Director of Public Works to perform the corrected actions identified in the inspection report if the responsible party designated under par. (c) does not make the required corrections in the specified time period. The Director of Public Works shall enter the amount due on the tax rolls and collect the money as a special charge against the property pursuant to subch. VII of ch. 66, Wis. Stats.

S.10 FINANCIAL GUARANTEE

- (1) **ESTABLISHMENT OF THE GUARANTEE.** The Director of Public Works may require the submittal of a financial guarantee, the form and type of which shall be acceptable to the Director

of Public Works. The financial guarantee shall be in an amount determined by the Director of Public Works to be the estimated cost of construction and the estimated cost of maintenance of the stormwater management practices during the period that the designated party in the maintenance agreement has maintenance responsibility. The financial guarantee shall give the Director of Public Works the authorization to use the funds to complete the stormwater management practices if the responsible party defaults or does not properly implement the approved stormwater management plan, upon written notice to the responsible party by the administering authority that the requirements of this ordinance have not been met.

- (2) **CONDITIONS FOR RELEASE.** Conditions for the release of the financial guarantee are as follows:
- (a) The Director of Public Works shall release the portion of the financial guarantee established under this section, less any costs incurred by the Director of Public Works to complete installation of practices, upon submission of "as built plans" by a licensed professional engineer. The Director of Public Works may make provisions for a partial pro-rata release of the financial guarantee based on the completion of various development stages.
 - (b) The Director of Public Works shall release the portion of the financial guarantee established under this section to assure maintenance of stormwater practices and facilities, less any costs incurred by the Director of Public Works, at such time that the responsibility for practice or facility maintenance is passed on to another entity via an approved maintenance agreement.

S.11 FEE SCHEDULE

The fees referred to in other sections of this ordinance shall be established by the City of Whitewater and may from time to time be modified by resolution. A schedule of the fees established by the Director of Public Works shall be available for review in Department of Public Works.

S.12 EXCEPTIONS AND WAIVERS

- (1) **GENERAL.** Where the Director of Public Works finds that extraordinary hardships or practical difficulties may result from strict compliance with these regulations and/or the purposes of these regulations may be served to a greater extent by an alternative proposal, it may approve exceptions and waivers to these regulations so that substantial justice may be done and the public interest secured, provided the exception or waiver shall not have the effect of nullifying the intent and purpose of these regulations; and further provided the Director of Public Works shall not approve exceptions and waivers unless it shall make findings based upon the evidence presented to it that all of the following conditions are met by the petitioner.
- (a) The granting of the exception or waiver will not be detrimental to the public safety, health, or welfare or injurious to other property;
 - (b) The conditions upon which the request is based are unique to the property for which the relief is sought and are not applicable generally to other property;
 - (c) Because of the location or conditions affecting the specific property involved, a particular hardship to the owner would result, as distinguished from a mere inconvenience, if the strict letter of these regulations is carried out;
 - (d) The relief sought will not materially alter the provisions of any existing regional stormwater management plan except that this document may be amended in the manner prescribed by law.
 - (e) The granting of the exception or waiver will not result in a violation of State or Federal laws or permits.

06/04/04

- (2) **CONDITIONS.** In approving exceptions or waivers, the Director of Public Works may require such conditions as will in his judgement secure substantially the purposes described in this ordinance and accompanying written stormwater management and erosion control requirements.
- (3) **PROCEDURES.** A petition for an exception or waiver shall be submitted in writing by the responsible party at the time when the development is filed for the consideration of the Director of Public Works. The petition shall state fully the grounds for the application and all of the facts relied upon by the petitioner.

S.13 ENFORCEMENT

- (1) Any land disturbing construction activity or post-construction runoff initiated after the effective date of this ordinance by any person, firm, association, or corporation subject to the ordinance provisions shall be deemed a violation unless conducted in accordance with the requirements of this ordinance.
- (2) The Director of Public Works shall notify the responsible party by certified mail of any non-complying land disturbing construction activity or post-construction runoff. The notice shall describe the nature of the violation, remedial actions needed, a schedule for remedial action, and additional enforcement action which may be taken.
- (3) Upon receipt of written notification from the Director of Public Works under sub. (2), the responsible party shall correct work that does not comply with the stormwater management plan or other provisions of this permit. The responsible party shall make corrections as necessary to meet the specifications and schedule set forth by the Director of Public Works in the notice.
- (4) If the violations to a permit issued pursuant to this ordinance are likely to result in damage to properties, public facilities, or waters of the state, the Director of Public Works may enter the land and take emergency actions necessary to prevent such damage. The costs incurred by the Director of Public Works plus interest and legal costs shall be billed to the responsible party.
- (5) The Director of Public Works is authorized to post a stop work order on all land disturbing construction activity that is in violation of this ordinance, or to request the City Attorney to obtain a cease and desist order in any court with jurisdiction.
- (6) The Director of Public Works may revoke a permit issued under this ordinance for non-compliance with ordinance provisions.
- (7) Any permit revocation, stop work order, or cease and desist order shall remain in effect unless retracted by the Director of Public Works, City Attorney, or by a court with jurisdiction.
- (8) The Director of Public Works is authorized to refer any violation of this ordinance, or of a stop work order, or of a cease and desist order issued pursuant to this ordinance, to the city attorney for the commencement of further legal proceedings in any court with jurisdiction.
- (9) Any person, firm, association, or corporation who does not comply with the provisions of this ordinance shall be subject to a forfeiture of not less than 100 dollars or more than 500 dollars per offense, together with the costs of prosecution. Each day that the violation exists shall constitute a separate offense.
- (10) Compliance with the provisions of this ordinance may also be enforced by injunction in any court with jurisdiction. It shall not be necessary to prosecute for forfeiture or a cease and desist order before resorting to injunctive proceedings.
- (11) When the Director of Public Works determines that the holder of a permit issued pursuant to this ordinance has failed to follow practices set forth in the stormwater management plan, or has failed to comply with schedules set forth in said stormwater management plan, the Director of

Public Works or a party designated by the Director of Public Works may enter upon the land and perform the work or other operations necessary to bring the condition of said lands into conformance with requirements of the approved plan. The Director of Public Works shall keep a detailed accounting of the costs and expenses of performing this work. These costs and expenses shall be deducted from any financial security posted pursuant to S.10 of this ordinance. Where such a security has not been established, or where such a security is insufficient to cover these costs, the costs and expenses shall be entered on the tax roll as a special charge against the property and collected with any other taxes levied thereon for the year in which the work is completed.

S.14 APPEALS

- (1) **BOARD OF ZONING APPEALS.** The board of zoning appeals, created pursuant to Section 19.72 of the City of Whitewater ordinances pursuant to s. 62.23(7)e Wis. Stats, shall hear and decide appeals where it is alleged that there is error in any order, decision or determination made by the Director of Public Works in administering this ordinance. The Board shall also use the rules, procedures, duties, and powers authorized by statute in hearing and deciding appeals. Upon appeal, the Board may authorize variances from the provisions of this ordinance that are not contrary to the public interest, and where owing to special conditions a literal enforcement of the ordinance will result in unnecessary hardship.
- (2) **WHO MAY APPEAL.** Appeals to the board of appeals may be taken by any aggrieved person or by an officer, department, board, or bureau of the City of Whitewater affected by any decision of the Director of Public Works.

S.15 SEVERABILITY

If any section, clause, provision or portion of this ordinance is judged unconstitutional or invalid by a court of competent jurisdiction, the remainder of the ordinance shall remain in force and not be affected by such judgment.

S.16 DEFINITIONS

- (1) **"Agricultural facilities and practices "** has the meaning given in s. 281.16, Wis. Stats.
- (2) **"Average annual rainfall"** means a calendar year of precipitation, excluding snow, which is considered typical.
- (3) **"Best management practice" or "BMP"** means structural or non-structural measures, practices, techniques or devices employed to avoid or minimize sediment or pollutants carried in runoff to waters of the state.
- (4) **"Business day"** means a day the office of the Director of Public Works is routinely and customarily open for business.
- (5) **"Cease and desist order"** means a court-issued order to halt land disturbing construction activity that is being conducted without the required permit.
- (6) **"Combined sewer system"** means a system for conveying both sanitary sewage and stormwater runoff.
- (7) **"Connected imperviousness"** means an impervious surface that is directly connected to a separate storm sewer or water of the state via an impervious flow path.
- (8) **"Design storm"** means a hypothetical discrete rainstorm characterized by a specific duration, temporal distribution, rainfall intensity, return frequency, and total depth of rainfall.
- (9) **"Development"** means residential, commercial, industrial or institutional land uses and associated roads.
- (10) **"Director of Public Works"** means the City of Whitewater Director of Public Works or designee.
- (11) **"Division of land"** means either a major subdivision or minor subdivision, as defined by Chapter 18, Land Division and Subdivision.
- (12) **"Effective infiltration area"** means the area of the infiltration system that is used to infiltrate runoff and does not include the area used for site access, berms or pretreatment.

- (13) **"Erosion"** means the process by which the land's surface is worn away by the action of wind, water, ice or gravity.
- (14) **"Exceptional resource waters"** means waters listed in s. NR 102.11, Wis. Adm. Code.
- (15) **"Extraterritorial Jurisdiction"** means Extraterritorial Jurisdiction as defined by Section 18.04.020 of the City of Whitewater Subdivision Ordinance.
- (16) **"Final stabilization"** means that all land disturbing construction activities at the construction site have been completed and that a uniform, perennial, vegetative cover has been established, with a density of at least 70% of the cover, for the unpaved areas and areas not covered by permanent structures, or employment of equivalent permanent stabilization measures.
- (17) **"Financial guarantee"** means a performance bond, maintenance bond, surety bond, irrevocable letter of credit, or similar guarantees submitted to the Director of Public Works by the responsible party to assure that requirements of the ordinance are carried out in compliance with the stormwater management plan.
- (18) **"Governing body"** means town board of supervisors, county board of supervisors, city council, village board of trustees or village council.
- (19) **"Impervious surface"** means an area that releases as runoff all or a large portion of the precipitation that falls on it, except for frozen soil. Rooftops, sidewalks, driveways, parking lots and streets are examples of areas that typically are impervious.
- (20) **"In-fill area"** means an undeveloped area of land located within existing development.
- (21) **"Infiltration"** means the entry of precipitation or runoff into or through the soil.
- (22) **"Infiltration system"** means a device or practice such as a basin, trench, rain garden or swale designed specifically to encourage infiltration, but does not include natural infiltration in pervious surfaces such as lawns, redirecting of rooftop downspouts onto lawns or minimal infiltration from practices, such as swales or road side channels designed for conveyance and pollutant removal only.
- (23) **"Karst feature"** means an area or geologic feature subject to bedrock dissolution so that it is likely to provide a conduit to groundwater, and may include caves, enlarged fractures, mine features, exposed bedrock surfaces, sinkholes, springs, seeps or swallets.
- (24) **"Land Development Activity"** means any construction related activity that results in the addition or replacement of impervious surfaces such as rooftops, roads, parking lots, and other structures. Measurement of areas impacted by land development activity includes areas that are part of a larger common plan of development or sale where multiple separate and distinct land disturbing construction activities may be taking place at different times on different schedules but under one plan.
- (25) **"Land disturbing construction activity"** means any man-made alteration of the land surface resulting in a change in the topography or existing vegetative or non-vegetative soil cover, that may result in runoff and lead to an increase in soil erosion and movement of sediment into waters of the state. Land disturbing construction activity includes clearing and grubbing, demolition, excavating, pit trench dewatering, filling and grading activities.
- (26) **"Maintenance agreement"** means a legal document that provides for long-term maintenance of stormwater management practices.
- (27) **"MEP" or "maximum extent practicable"** means a level of implementing best management practices in order to achieve a performance standard specified in this ordinance which takes into account the best available technology, cost effectiveness and other competing issues such as human safety and welfare, endangered and threatened resources, historic properties and geographic features. MEP allows flexibility in the way to meet the performance standards and may vary based on the performance standard and site conditions.
- (28) **"New development"** means development resulting from the conversion of previously undeveloped land or agricultural land uses.
- (29) **"Off-site"** means located outside the property boundary described in the permit application.
- (30) **"On-site"** means located within the property boundary described in the permit application.
- (31) **"Ordinary high-water mark"** has the meaning given in s. NR 115.03(6), Wis. Adm. Code.
- (32) **"Outstanding resource waters"** means waters listed in s. NR 102.10, Wis. Adm. Code.
- (33) **"Percent fines"** means the percentage of a given sample of soil, which passes through a # 200 sieve.
- (34) **"Performance standard"** means a narrative or measurable number specifying the minimum acceptable outcome for a facility or practice.

- (35) **"Permit"** means a written authorization made by the Director of Public Works to the applicant to conduct land disturbing construction activity or to discharge post-construction runoff to waters of the state.
- (36) **"Permit administration fee"** means a sum of money paid to the [administering authority] by the permit applicant for the purpose of recouping the expenses incurred by the authority in administering the permit.
- (37) **"Pervious surface"** means an area that releases as runoff a small portion of the precipitation that falls on it. Lawns, gardens, parks, forests or other similar vegetated areas are examples of surfaces that typically are pervious.
- (38) **"Pollutant"** has the meaning given in s. 283.01(13), Wis. Stats.
- (39) **"Pollution"** has the meaning given in s. 281.01(10), Wis. Stats.
- (40) **"Post-construction site"** means a construction site following the completion of land disturbing construction activity and final site stabilization.
- (41) **"Pre-development condition"** means the extent and distribution of land cover types present before the initiation of land disturbing construction activity, assuming that all land uses prior to development activity are managed in an environmentally sound manner.
- (42) **"Preventive action limit"** has the meaning given in s. NR 140.05(17), Wis. Adm. Code.
- (43) **"Redevelopment"** means areas where development is replacing older development.
- (44) **"Responsible party"** means any entity holding fee title to the property.
- (45) **"Runoff"** means stormwater or precipitation including rain, snow or ice melt or similar water that moves on the land surface via sheet or channelized flow.
- (46) **"Separate storm sewer"** means a conveyance or system of conveyances including roads with drainage systems, streets, catch basins, curbs, gutters, ditches, constructed channels or storm drains, which meets all of the following criteria:
 - (a) Is designed or used for collecting water or conveying runoff.
 - (b) Is not part of a combined sewer system.
 - (c) Is not draining to a stormwater treatment device or system.
 - (d) Discharges directly or indirectly to waters of the state.
- (47) **"Site"** means the entire area included in the legal description of the land on which the land disturbing construction activity occurred.
- (48) **"Stop work order"** means an order issued by the Director of Public Works which requires that all construction activity on the site be stopped.
- (49) **"Stormwater management plan"** means a comprehensive plan designed to reduce the discharge of pollutants from stormwater after the site has undergone final stabilization following completion of the construction activity.
- (50) **"Stormwater management system plan"** is a comprehensive plan designed to reduce the discharge of runoff and pollutants from hydrologic units on a regional or municipal scale.
- (51) **"Technical standard"** means a document that specifies design, predicted performance and operation and maintenance specifications for a material, device or method.
- (52) **"Top of the channel"** means an edge, or point on the landscape, landward from the ordinary high water mark of a surface water of the state, where the slope of the land begins to be less than 12% continually for at least 50 feet. If the slope of the land is 12% or less continually for the initial 50 feet, landward from the ordinary high water mark, the top of the channel is the ordinary high water mark.
- (53) **"TR-55"** means the United States Department of Agriculture, Natural Resources Conservation Service (previously Soil Conservation Service), Urban Hydrology for Small Watersheds, Second Edition, Technical Release 55, June 1986.
- (54) **"Type II distribution"** means a rainfall type curve as established in the "United States Department of Agriculture, Soil Conservation Service, Technical Paper 149, published 1973". The Type II curve is applicable to all of Wisconsin and represents the most intense storm pattern.
- (55) **"Waters of the state"** has the meaning given in s. 281.01 (18), Wis. Stats.

S.17 EFFECTIVE DATE.

This ordinance shall be in force and effect from and after its adoption and publication. The above and foregoing ordinance was duly adopted by the City of Whitewater of the City of Whitewater on the [number] day of [month], [year].

**CITY OF WHITEWATER
CONSTRUCTION SITE EROSION CONTROL ORDINANCE**

TABLE OF CONTENTS

| | |
|------|--|
| | Foreword |
| S.01 | Authority |
| S.02 | Findings of Fact |
| S.03 | Purpose |
| S.04 | Applicability and Jurisdiction |
| | (1) Applicability |
| | (2) Jurisdiction |
| | (3) Exclusions |
| S.05 | Technical Standards |
| | (1) Design Criteria, Standards and Specifications |
| | (2) Other Standards |
| S.06 | Performance Standards |
| | (1) Responsible Party |
| | (2) Plan |
| | (3) Erosion and Other Pollutant Control Requirements |
| | (4) Location |
| | (5) Alternate Requirements |
| S.07 | Permitting Requirements, Procedures and Fees |
| | (1) Permit Required |
| | (2) Permit Application and Fees |
| | (3) Review and Approval of Permit Application |
| | (4) Financial Guarantee |
| | (5) Permit Requirements |
| | (6) Permit Conditions |
| | (7) Permit Duration |
| | (8) Maintenance |
| S.08 | Erosion and Sediment Control Plan and Amendments |
| | (1) Plan Requirements |
| | (2) Amendments |
| S.09 | Fee Schedule |
| S.10 | Inspection |
| S.11 | Exemptions and Waivers |
| | (1) General |
| | (2) Conditions |
| | (3) Procedures |
| S.12 | Enforcement |
| S.13 | Appeals |
| | (1) Board of Zoning Appeals |
| | (2) Who May Appeal |
| S.14 | Severability |
| S.15 | Definitions |
| S.16 | Effective Date |

**CITY OF WHITEWATER
CONSTRUCTION SITE EROSION CONTROL ZONING ORDINANCE**

**[CHAPTER]
CONSTRUCTION SITE EROSION**

S.01 AUTHORITY

- (1) This ordinance is adopted under the authority granted by s. 62.234, Wis. Stats. This ordinance supersedes all provisions of any ordinance previously enacted Wis. Stats. that relate to construction site erosion control. Except as otherwise specified in s. 62.23 Wis. Stats. s. 62.234, Wis. Stats., applies to this ordinance and to any amendments to this ordinance.
- (2) The provisions of this ordinance are deemed not to limit any other lawful regulatory powers of the same governing body.
- (3) The City of Whitewater hereby designates the Director of Public Works to administer and enforce the provisions of this ordinance.
- (4) The requirements of this ordinance do not pre-empt more stringent erosion and sediment control requirements that may be imposed by any of the following:
 - (a) Wisconsin Department of Natural Resources administrative rules, permits or approvals including those authorized under ss. 281.16 and 283.33, Wis. Stats.
 - (b) Targeted non-agricultural performance standards promulgated in rules by the Wisconsin Department of Natural Resources under s. NR 151.004, Wis. Adm. Code.

S.02 FINDINGS OF FACT

The City of Whitewater finds that runoff from land disturbing construction activity carries a significant amount of sediment and other pollutants to the waters of the state in City of Whitewater.

S.03 PURPOSE.

It is the purpose of this ordinance to further the maintenance of safe and healthful conditions; prevent and control water pollution; prevent and control soil erosion; protect spawning grounds, fish and aquatic life; control building sites, placement of structures and land uses; preserve ground cover and scenic beauty; and promote sound economic growth, by minimizing the amount of sediment and other pollutants carried by runoff or discharged from land disturbing construction activity to waters of the state in the City of Whitewater.

S.04 APPLICABILITY AND JURISDICTION.

(1) APPLICABILITY.

- (a) This ordinance applies to construction sites that have one or more acres of land disturbing construction activity except as provided under sub. (b):
- (b) This ordinance does not apply to the following:
 1. Land disturbing construction activity that includes the construction of a building and is otherwise regulated by the Wisconsin Department of Commerce under s. Comm 21.125 or 50.115, Wis. Adm. Code.
 2. A construction project that is exempted by federal statutes or regulations from the requirement to have a national pollutant discharge elimination system permit

issued under Chapter 40, Code of Federal Regulations, part 122, for land disturbing construction activity.

3. Nonpoint discharges from agricultural facilities and practices.
 4. Nonpoint discharges from silviculture activities.
 5. Routine maintenance for project sites under 5 acres of land disturbance if performed to maintain the original line and grade, hydraulic capacity or original purpose of the facility.
- (c) Notwithstanding the applicability requirements in paragraph (a), this ordinance applies to construction sites of any size that, in the opinion of the Director of Public Works, are likely to result in runoff that exceeds the safe capacity of the existing drainage facilities or receiving body of water, that causes undue channel erosion, that increases water pollution by scouring or the transportation of particulate matter or that endangers property or public safety.

(2) JURISDICTION

This ordinance applies to land disturbing construction activities on lands within the boundaries and jurisdiction of the City of Whitewater, as well as the extraterritorial division of land subject to an ordinance enacted pursuant to s. 236.45(2) and (3) Wis.

(3) EXCLUSIONS

This ordinance is not applicable to activities conducted by a state agency, as defined under s. 227.01 (1), Wis. Stats., but also including the office of district attorney, which is subject to the state plan promulgated or a memorandum of understanding entered into under s. 281.33 (2), Wis. Stats.

S.05 TECHNICAL STANDARDS

(1) DESIGN CRITERIA, STANDARDS AND SPECIFICATIONS

All drainage facilities and practices required to comply with this ordinance shall incorporate technical standards and design methods specified in the document City of Whitewater Erosion Control and Stormwater Management Requirements, maintained and periodically updated by the Director of Public Works. Where not superceded by stricter requirements in City of Whitewater Erosion Control and Stormwater Management Requirements, the following standards are also incorporated by reference:

- (a) Applicable design criteria, standards and specifications identified in the *Wisconsin Construction Site Best Management Practice Handbook*, WDNR Pub. WR-222 November 1993 Revision.
- (b) Other design guidance and technical standards identified or developed by the Wisconsin Department of Natural Resources under subchapter V of chapter NR 151, Wis. Adm. Code.

(2) OTHER STANDARDS

Other technical standards not identified or developed in sub. (1), may be used provided that the methods have been approved by the Director of Public Works.

S.06 PERFORMANCE STANDARDS

- (1) RESPONSIBLE PARTY. The entity holding fee title to the property shall be responsible for either developing and implementing an erosion and sediment control plan, or causing such plan to be developed and implemented through contract or other agreement. This plan shall be developed in accordance with S. 09, that incorporates the requirements of this section.

06/04/04

- (2) PLAN. A written plan shall be developed in accordance with S.08 and implemented for applicable land development activities.
- (3) EROSION AND SEDIMENT CONTROL PERFORMANCE STANDARDS. All drainage facilities and practices required to comply with this ordinance shall meet performance standards specified in the document City of Whitewater Erosion Control and Stormwater Management Requirements, maintained and periodically updated by the Director of Public Works.
- (4) LOCATION. The BMPs used to comply with this section shall be located prior to runoff entering waters of the state.
- (5) ALTERNATE REQUIREMENTS. The Director of Public Works may establish alternative erosion and sediment control requirements to those set forth in City of Whitewater Erosion Control and Stormwater Management Requirements, if the Director of Public Works determines that an added level of protection is needed or that extraordinary hardships or practical difficulties may result from strict compliance with these regulations. Exceptions or waivers to requirements set forth in this ordinance and City of Whitewater Erosion Control and Stormwater Management Requirements shall be considered in accordance with S. 12.

S.07 PERMITTING REQUIREMENTS, PROCEDURES AND FEES.

- (1) PERMIT REQUIRED. No responsible party may commence a land disturbing construction activity subject to this ordinance without receiving prior approval of an erosion and sediment control plan for the site and a permit from the Director of Public Works.
- (2) PERMIT APPLICATION AND FEES. The responsible party desiring to undertake a land disturbing construction activity subject to this ordinance shall submit an application for a permit and an erosion and sediment control plan that meets the requirements of S.08. The applicant shall pay an application fee consistent with the fee schedule maintained by the Director of Public Works. By submitting an application, the applicant is authorizing the Director of Public Works to enter the site to obtain information required for the review of the erosion and sediment control plan.
- (3) REVIEW AND APPROVAL OF PERMIT APPLICATION. The Director of Public Works shall review any permit application that is submitted with an erosion and sediment control plan, and the required fee. The following approval procedure shall be used:
 - (a) The Director of Public Works may request additional information if required for a complete application within 15 business days of receipt of any permit application. Within 30 business days of the receipt of a complete permit application, including all items as required by sub. (2), the Director of Public Works shall inform the applicant whether the application, plan and maintenance agreement are approved or disapproved based on the requirements of this ordinance.
 - (b) If the permit application and plan are approved, the Director of Public Works shall issue the permit.
 - (c) If the permit application or plan is disapproved, the Director of Public Works shall state in writing the reasons for disapproval.
 - (d) The Director of Public Works may request additional information from the applicant. If additional information is submitted, the Director of Public Works shall have 10 business days from the date the additional information is received to inform the applicant that the plan is either approved or disapproved.
- (4) FINANCIAL GUARANTEE. As a condition of approval and issuance of the permit, the Director of Public Works may require the applicant to deposit a surety bond or irrevocable letter of credit to guarantee a good faith execution of the approved erosion control plan and any permit conditions.
- (5) PERMIT REQUIREMENTS. All permits shall require the responsible party to:

- (a) Notify the Director of Public Works 2 full business days prior to commencing any land disturbing construction activity.
 - (b) Notify the Director of Public Works of completion of any BMPs within 3 full business days after their installation.
 - (c) Obtain permission in writing from the Director of Public Works prior to any modification pursuant to S.08(2) of the erosion and sediment control plan.
 - (d) Install all BMPs as identified in the approved erosion and sediment control plan.
 - (e) Maintain all road drainage systems, stormwater drainage systems, BMPs and other facilities identified in the erosion and sediment control plan.
 - (f) Repair any siltation or erosion damage to adjoining surfaces and drainage ways resulting from land disturbing construction activities and document repairs in a site erosion control log. Remove accumulated sediment from downstream culverts, storm sewers, and other drainage facilities.
 - (g) Inspect the BMPs within 24 hours after each rain of 0.5 inches or more which results in runoff during active construction periods, and at least once each week, make needed repairs and document the findings of the inspections in a site erosion control log with the date of inspection, the name of the person conducting the inspection, and a description of the present phase of the construction at the site.
 - (h) Allow the Director of Public Works to enter the site for the purpose of inspecting compliance with the erosion and sediment control plan or for performing any work necessary to bring the site into compliance with the control plan. Keep a copy of the erosion and sediment control plan at the construction site.
- (6) **PERMIT CONDITIONS.** Permits issued under this section may include conditions established by Director of Public Works in addition to the requirements set forth in sub. (5), where needed to assure compliance with the performance standards in S.06.
- (7) **PERMIT DURATION.** Permits issued under this section shall be valid for a period of 180 days, or the length of the building permit or other construction authorizations, whichever is longer, from the date of issuance. The Director of Public Works may extend the period one or more times for up to an additional 180 days. The Director of Public Works may require additional BMPs as a condition of the extension if they are necessary to meet the requirements of this ordinance.
- (8) **MAINTENANCE.** The responsible party throughout the duration of the construction activities shall maintain all BMPs necessary to meet the requirements of this ordinance until the site has undergone final stabilization.

S.08 EROSION AND SEDIMENT CONTROL PLAN AND AMENDMENTS.

- (1) **PLAN REQUIREMENTS.** An Erosion and Sediment Control Plan shall be prepared and submitted to the Director of Public Works. The Erosion and Sediment Control Plan shall include, at a minimum, information required in the City of Whitewater Erosion Control and Stormwater Management Requirements, maintained and periodically updated by the Director of Public Works.
- (2) **AMENDMENTS.** The applicant shall amend the plan if any of the following occur:
- (a) There is a change in design, construction, operation or maintenance at the site which has the reasonable potential for the discharge of pollutants to waters of the state and which has not otherwise been addressed in the plan.
 - (b) The actions required by the plan fail to reduce the impacts of pollutants carried by construction site runoff.
 - (c) The Director of Public Works notifies the applicant of changes needed in the plan to comply with this ordinance or the City of Whitewater Erosion Control and Stormwater Management Requirements.

S.09 FEE SCHEDULE.

The fees referred to in other sections of this ordinance shall be established by the Director of Public Works and may from time to time be modified by resolution. A schedule of the fees established by the Director of Public Works shall be available at the Department of Public Works.

S.10 INSPECTION.

If land disturbing construction activities are being carried out without a permit required by this ordinance, the Director of Public Works may enter the land pursuant to the provisions of ss. 66.0119(1), (2), and (3), Wis. Stats.

S.11 EXCEPTIONS AND WAIVERS

- (1) **GENERAL.** Where the Director of Public Works finds that extraordinary hardships or practical difficulties may result from strict compliance with these regulations and/or the purposes of these regulations may be served to a greater extent by an alternative proposal, it may approve exceptions and waivers to these regulations so that substantial justice may be done and the public interest secured, provided the exception or waiver shall not have the effect of nullifying the intent and purpose of these regulations; and further provided the Director of Public Works shall not approve exceptions and waivers unless it shall make findings based upon the evidence presented to it that all of the following conditions are met by the petitioner.
 - (a) The granting of the exception or waiver will not be detrimental to the public safety, health, or welfare or injurious to other property;
 - (b) The conditions upon which the request is based are unique to the property for which the relief is sought and are not applicable generally to other property;
 - (c) Because of the location or conditions affecting the specific property involved, a particular hardship to the owner would result, as distinguished from a mere inconvenience, if the strict letter of these regulations is carried out;
 - (d) The relief sought will not materially alter the provisions of any existing regional stormwater management plan except that this document may be amended in the manner prescribed by law.
 - (e) The granting of the exception or waiver will not result in a violation of State or Federal laws or permits.
- (2) **CONDITIONS.** In approving exceptions or waivers, the Director of Public Works may require such conditions as will in his judgement secure substantially the purposes described in this ordinance and accompanying written stormwater management and erosion control requirements.
- (3) **PROCEDURES.** A petition for an exception or waiver shall be submitted in writing by the responsible party at the time when the development is filed for the consideration of the Director of Public Works. The petition shall state fully the grounds for the application and all of the facts relied upon by the petitioner.

S.12 ENFORCEMENT.

- (1) The Director of Public Works may post a stop-work order if any of the following occurs:

06/04/04

- (a) Any land disturbing construction activity regulated under this ordinance is being undertaken without a permit.
 - (b) The erosion and sediment control plan is not being implemented in a good faith manner.
 - (c) The conditions of the permit are not being met.
- (2) If the responsible party does not cease activity as required in a stop-work order posted under this section or fails to comply with the erosion and sediment control plan or permit conditions, the Director of Public Works may revoke the permit.
 - (3) If the responsible party, where no permit has been issued, does not cease the activity after being notified by the Director of Public Works, or if a responsible party violates a stop-work order posted under sub. (1), the Director of Public Works may request the city attorney to obtain a cease and desist order in any court with jurisdiction.
 - (4) The board of zoning appeals may retract the stop-work order issued under sub. (1) or the permit revocation under sub. (2).
 - (5) After posting a stop-work order under sub. (1), the Director of Public Works may issue a notice of intent to the responsible party of its intent to perform work necessary to comply with this ordinance. The Director of Public Works may go on the land and commence the work after issuing the notice of intent. The costs of the work performed under this subsection by the Director of Public Works, plus interest at the rate authorized by the Director of Public Works shall be billed to the responsible party. In the event a responsible party fails to pay the amount due, the clerk shall enter the amount due on the tax rolls and collect as a special assessment against the property pursuant to subch. VII of ch. 66, Wis. Stats.
 - (6) Any person violating any of the provisions of this ordinance shall be subject to a forfeiture of not less than \$100 nor more than \$500 and the costs of prosecution for each violation. Each day a violation exists shall constitute a separate offense.
 - (7) Compliance with the provisions of this ordinance may also be enforced by injunction in any court with jurisdiction. It shall not be necessary to prosecute for forfeiture or a cease and desist order before resorting to injunctive proceedings.

S.13 APPEALS.

- (1) **BOARD OF ZONING APPEALS.** The board of zoning appeals created pursuant to Title 19 of the city's ordinance pursuant to 62.23(7)(e), Wis. Stats.:
 - (a) Shall hear and decide appeals where it is alleged that there is error in any order, decision or determination made by the Director of Public Works in administering this ordinance except for cease and desist orders obtained under S.12 (3).
 - (a) Upon appeal, may authorize variances from the provisions of this ordinance which are not contrary to the public interest and where owing to special conditions a literal enforcement of the provisions of the ordinance will result in unnecessary hardship; and
 - (b) Shall use the rules, procedures, duties and powers authorized by statute in hearing and deciding appeals and authorizing variances.
- (2) **WHO MAY APPEAL.** Appeals to the board of appeals may be taken by any aggrieved person or by any office, department, board, or bureau of the City of Whitewater affected by any decision of the Director of Public Works.

S.14 SEVERABILITY.

If a court of competent jurisdiction judges any section, clause, provision or portion of this ordinance unconstitutional or invalid, the remainder of the ordinance shall remain in force and not be affected by such judgment.

S.15 DEFINITIONS.

- (1) **"Administering authority"** means a governmental employee, or a regional planning commission empowered under s. 62.234 Wis. Stats., that is designated by the City of Whitewater to administer this ordinance.
- (2) **"Agricultural facilities and practices "** has the meaning in s. 281.16(1), Wis. Stats.
- (3) **"Average annual rainfall"** means a calendar year of precipitation, excluding snow, which is considered typical.
- (4) **"Best management practice" or "BMP"** means structural or non-structural measures, practices, techniques or devices employed to avoid or minimize soil, sediment or pollutants carried in runoff to waters of the state.
- (5) **"Business day"** means a day the office of the Director of Public Works is routinely and customarily open for business.
- (6) **"Cease and desist order"** means a court-issued order to halt land disturbing construction activity that is being conducted without the required permit.
- (7) **"Construction site"** means an area upon which one or more land disturbing construction activities occur, including areas that are part of a larger common plan of development or sale where multiple separate and distinct land disturbing construction activities may be taking place at different times on different schedules but under one plan.
- (8) **"Division of land"** means the creation from one parcel of [number] or more parcels or building sites of [number] or fewer acres each in area where such creation occurs at one time or through the successive partition within a 5 year period.
- (9) **"Director of Public Works"** means the City of Whitewater Director of Public Works or designee.
- (10) **"Erosion"** means the process by which the land's surface is worn away by the action of wind, water, ice or gravity.
- (11) **"Erosion and sediment control plan"** means a comprehensive plan developed to address pollution caused by erosion and sedimentation of soil particles or rock fragments during construction.
- (12) **"Extraterritorial Jurisdiction"** means Extraterritorial Jurisdiction as defined by Section 18.04.020 of the City of Whitewater Subdivision Ordinance.
- (13) **"Final stabilization"** means that all land disturbing construction activities at the construction site have been completed and that a uniform perennial vegetative cover has been established, with a density of at least 70 percent of the cover, for the unpaved areas and areas not covered by permanent structures, or that employ equivalent permanent stabilization measures.
- (14) **"Governing body"** means town board of supervisors, county board of supervisors, city council, village board of trustees or village council.
- (15) **"Land disturbing construction activity"** means any man-made alteration of the land surface resulting in a change in the topography or existing vegetative or non-vegetative soil cover, that may result in runoff and lead to an increase in soil erosion and movement of sediment into waters of the state. Land disturbing construction activity includes clearing and grubbing, demolition, excavating, pit trench dewatering, filling and grading activities.
- (16) **"MEP" or "maximum extent practicable"** means a level of implementing best management practices in order to achieve a performance standard specified in this chapter which takes into account the best available technology, cost effectiveness and other competing issues such as human safety and welfare, endangered and threatened resources, historic properties and geographic features. MEP allows flexibility in the way to meet the performance standards and may vary based on the performance standard and site conditions.
- (17) **"Performance standard"** means a narrative or measurable number specifying the minimum acceptable outcome for a facility or practice.
- (17) **"Permit"** means a written authorization made by the Director of Public Works to the applicant to conduct land disturbing construction activity or to discharge post-construction runoff to waters of the state.

06/04/04

- (18) **"Pollutant"** has the meaning given in s. 283.01 (13), Wis. Stats.
- (19) **"Pollution"** has the meaning given in s. 281.01 (10), Wis. Stats.
- (20) **"Responsible party"** means the entity holding fee title to the property.
- (21) **"Runoff"** means stormwater or precipitation including rain, snow or ice melt or similar water that moves on the land surface via sheet or channelized flow.
- (22) **"Sediment"** means settleable solid material that is transported by runoff, suspended within runoff or deposited by runoff away from its original location.
- (23) **"Separate storm sewer"** means a conveyance or system of conveyances including roads with drainage systems, streets, catch basins, curbs, gutters, ditches, constructed channels or storm drains, which is designed or used for collecting and conveying stormwater runoff and is not part of a combined sewer system:
- (24) **"Site"** means the entire area included in the legal description of the land on which the land disturbing construction activity is proposed in the permit application.
- (25) **"Stop work order"** means an order issued by the Director of Public Works which requires that all construction activity on the site be stopped.
- (26) **"Technical standard"** means a document that specifies design, predicted performance and operation and maintenance specifications for a material, device or method.
- (27) **"Waters of the state"** has the meaning given in s. 281.01 (18), Wis. Stats.

S.16 EFFECTIVE DATE.

This ordinance shall be in force and effect from and after its adoption and publication. The above and foregoing ordinance was duly adopted by the City of Whitewater of the City of Whitewater on the [number] day of [month], [year].

Approved: _____
Attested _____
Published on [day, month, and year].

Wet Detention Basin (No.) Code 1001

Wisconsin Department of Natural Resources
Conservation Practice Standard

I. Definition

A permanent pool of water with designed dimensions, inlets, outlets and storage capacity, constructed to collect, detain, treat and release stormwater runoff.

II. Purposes - Primary reasons for which the practice is applied. Each purpose identifies a resource problem the practice can be specifically designed to treat.

The primary purposes of this practice are to control water pollution and peak flow.

III. Conditions Where Practice Applies - Land uses and site conditions that affect the suitability or function of the practice.

This practice applies to urban, construction, and agricultural sites where runoff pollution due to suspended solids loading and attached pollutants is a concern. It also applies where increased runoff from urbanization or land use change is a concern. Site conditions must allow for runoff to be directed into the basin and a permanent pool of water to be maintained.

This practice does not apply to wetland restorations, animal lot runoff control, infiltration basins, or dry detention basins. It also does not apply to sites with high concentrations of toxic materials, or other regulated materials contained in the runoff.

This practice may not apply to all flood control, floodplain management and other flooding issues. Modifications to the peak flow criteria or additional analysis of the potential flooding issues may be needed.

IV. Federal, State and Local Laws

The design, construction, and maintenance of wet detention basins shall comply with all federal, state and local laws, rules or regulations. The owner/operator is responsible for securing required permits. This standard

does not contain the text of any federal, state or local laws governing wet detention basins.

The location and use of wet detention basins may be limited by regulations relating to navigable waters (Ch. 30, Stats.), floodplains, wetlands, buildings, wells and other structures, or land uses, such as waste disposal sites and airports. The basin embankment may also be regulated as a dam under Ch. 31 Stats. and further restricted under NR 333, Wis. Adm. Code which includes regulations for embankment heights and storage capacities.

V. Criteria - Allowable limits for design parameters, acceptable installation processes, or performance requirements to accomplish one or more identified purposes

A. General The following minimum criteria shall apply to all wet detention basin designs used for the purposes stated in section II of this standard. Use more restrictive criteria as needed to fit the conditions found in the site assessment.

1. **Site Assessment** - A site assessment shall be conducted and documented to determine the physical site characteristics that will affect the placement, design, construction, and maintenance of the basin. The site assessment shall identify characteristics such as ground slopes, soil types, soil conditions, *bedrock*¹, sinkholes, drainage patterns, runoff constituents, proximity to regulated structures, natural resources, and specific land uses. The site assessment shall include the following:
 - a. A 2 foot contour map drawn to scale showing location and elevations for the basin area, soil borings and test pits, buildings and other structures, property lines, wells, wetlands, 100 yr.

Conservation Practice Standards are reviewed periodically and updated if needed. To obtain the current version of this standard, contact your local DNR office or the Standards Oversight Council office in Madison, WI at (608) 833-1833.

DNR, WI
(06/99)

¹ Words in the standard that are shown in italics are described in IX. Definitions. The words are italicized the first time they are used in the text

- floodplains, surface drains, navigable streams, known drain tile, roads and overhead or buried utilities.
- b. Soil logging of the site shall be to a depth at least 3 ft. below the proposed design bottom of the basin and include information on the texture, color, odor, structure, water table indicators, and distance to and type of bedrock, if encountered.
2. **Water Pollution Control** - A minimum of 80% of the total suspended solids load shall be removed from the runoff volume generated by the drainage area on an average annual basis. The following criteria meet this requirement:
 - a. **Permanent Pool** - All basins shall be designed to include a permanent pool of water consisting of a sediment forebay and main pool. (See fig. 1 and fig. 2)
 - (1) The minimum surface area of the permanent pool shall be based on the total drainage area to the basin or it shall be 10,000 sq. ft., whichever is greater. Table 1 or an *approved model* shall be used. Values shall be prorated for mixed land uses.
 - (2) A sediment forebay shall be located at the inlet to trap large particles such as road sand. The storage volume of the sediment forebay shall be consistent with the maintenance plan, with a goal of 5-15% of the permanent pool surface area. The sediment forebay shall be a minimum depth of 3 ft. plus the depth for sediment storage.
 - (3) The length to width ratio of the flow path shall be maximized with a goal of 3:1 or greater. The flow path is considered the general direction of water flow within the basin including the permanent pool and forebay.
 - (4) A safety shelf shall extend a minimum of 8 ft. from the edge of the permanent pool, with a slope of 10h:1v or flatter. The maximum depth of water over the shelf shall be 1.5 ft.
 - (5) Excluding the safety shelf and sediment storage, the average water depth of the permanent pool shall be a minimum of 3 ft.
 - (6) A minimum of 2 ft. shall be added for sediment storage.
 - (7) For basins greater than 20,000 sq. ft., 50% of the total surface area of the permanent pool shall be a minimum of 5 ft. deep. For basins less than 20,000 sq. ft., maximize the area of 5 ft. depth.
 - (8) All side slopes below the safety shelf shall be 2h:1v or flatter as required to maintain soil stability.

Table 1 - Calculation of Minimum Permanent Pool Surface Area.¹

| Land Use/Description/Management ² | Total Impervious (%) ³ | Minimum Surface Area of the Permanent Pool (% of Watershed Area) | |
|--|-----------------------------------|--|--|
| Residential • < 2.0 units/acre (>1/2 acre lots) • 2.0 - 6.0 units/acre • > 6.0 units/acre (high density) | 8 - 28 >28 - 41 >41 - 68 | 0.7 0.8 1.0 | |
| Office Park/Institutional/Warehouse⁴ (Non-retail related business, multi-storied buildings, usually more lawn/landscaping not heavily traveled, no outdoor storage/manufacturing) | <60 60-80 >80 | 1.6 1.8 2.0 | |
| Commercial/Manufacturing/Storage⁵ (Large heavily used outdoor parking areas, material storage or manufacturing operations) | <60 60-80 >80 | 1.8 2.1 2.4 | |
| Parks/Open Space/Woodland/Cemeteries | 0-12 | 0.6 | |
| Highways/Freeways (Includes right-of-way area) • Typically grass banks/conveyance • Mixture of grass and curb/gutter • Typically curb/gutter conveyance | <60 60-90 >90 | 1.4 2.1 2.8 | |
| Cropland (Cropland that is draining to the basin) | | | |
| Dominant Surface Soil Texture ⁶ - S, LS - SC, SCL, SL, L, SiL, Si - C, CL, SiCL, SiC | | Erosion < Tolerable 0.6 1.6 2.0 | Erosion > Tolerable 0.9 2.4 3.0 |

¹ Multiply the value listed by the watershed area within the category to determine the minimum pond surface area. Prorate for drainage areas with multiple categories due to different land use, management, percent impervious, soil texture, or erosion rates. For example, a 50 acre (residential, 50% imperviousness) x 0.01 (1% of watershed from table) = 0.5 acre + 50 acres (office park, 85% imperviousness) x 0.02 (2% of watershed) = 1.0 acre. Therefore 0.5 acre + 1.0 acre = 1.5 acres for the minimum surface area of the permanent pool.

² For offsite areas draining to the proposed land use, refer to local municipalities for planned land use and possible institutional arrangements as a regional stormwater plan.

³ Impervious surfaces include rooftops, parking lots, roads, and similar hard surfaces, including gravel driveways/parking areas. Roofs are assumed to be pitched and half connected (or draining directly) to the storm sewer system. The other half is assumed to drain onto a vegetated area. Paved parking and storage areas are assumed to be all connected. Sidewalks and driveways are only half connected.

⁴ Category includes insurance offices, government buildings, company headquarters, schools, hospitals, and churches.

⁵ Category includes shopping centers, strip malls, power plants, steel mills, cement plants, lumber yards, auto salvage yards, grain elevators, oil tank farms, coal and salt storage areas, slaughter houses, and other outdoor storage or parking areas

⁶ S=Sand, Si=Silt, C=Clay, L=Loam (USDA Textural Soil Classification System)

- b. **Extended Detention Volume** - Volume above permanent pool that is released slowly. (see fig. 1 and 2)
- (1) Extended detention volume shall be the runoff volume produced by a 1-yr., 24-hr. design storm or as computed by an approved model. The 1-yr., 24-hr rainfall data for Wisconsin is shown in Table 4. The relationship of runoff to precipitation is shown in Table 5. For curve number determination see Chapter 2, Natural Resources Conservation Service, Technical Release 55 (TR-55). Use the post development curve number.
 - (2) Outlet design shall allow for the release of the extended detention volume over a period of 24 hr. or greater.
3. **Peak Flow Control** - Peak flow control shall be designed to maintain stable downstream conveyance systems and comply with local ordinances or conform with regional stormwater plans where they are more restrictive than this standard. At a minimum:
- a. Outflow shall not exceed pre-development peak flows for both the 2-yr. and 10-yr., 24-hr design storms.
 - b. All runoff and flow calculations required for peak flow design of this practice shall use a hydrograph-producing method such as TR-55.
 - c. When pre-development land cover is cropland, use the runoff curve numbers in Table 2. For all other pre-development land covers, use runoff curve numbers from TR - 55 assuming "good hydrologic conditions." For post-development calculations use runoff curve numbers based on actual conditions.
4. **Inflow Points** - All inlets shall be designed to prevent erosion during peak flows produced by the 10-yr., 24-hr. design storm. Any rock rip-rap or other channel liners shall extend a minimum of 1.5 vertical ft. below the permanent pool elevation.
5. **Outlets** - All outlet designs shall incorporate preventive measures for ice damage, trash accumulation, and erosion at the outfall.
 6. **Emergency Spillway** - All basins shall have an emergency spillway. The spillway shall be designed to safely pass peak flows produced by a 100-yr., 24-hour design storm routed through the basin without damage to the structure. The flow routing calculations shall start at the permanent pool elevation.
 7. **Freeboard** - The basin design shall ensure the top of embankment, after settling, is a minimum of 1 vertical foot above the flow depth in the emergency spillway required to safely pass the routed 100-yr., 24-hr. storm.
 8. **Side Slopes** - All interior side slopes above the safety shelf shall be 4h:1v or flatter.
 9. **Bedrock** - If bedrock is encountered within 2 ft. of the bottom of the pond, special precautions shall be taken, as needed, to minimize movement of pollutants to groundwater.
 10. **Earthen Embankments** - Earthen embankments (see fig. 2) shall be designed to address potential risk and structural integrity issues such as seepage and saturation. All constructed earthen embankments shall meet the following criteria.
 - a. The base of the embankment shall be stripped of all vegetation, stumps, topsoil and other matter. Stripping shall be a minimum of 6 in.
 - b. For embankments where the permanent pool is ponded 3 ft. or more against the embankment, there shall be a core trench or key-way along the centerline of the embankment up to the permanent pool elevation. The core trench or key-way shall be a minimum of 2 ft. deep and 8 ft. wide with a side slope of 1:1 or flatter.
 - c. All embankments shall be constructed with non-organic soils and compacted to 90% standard proctor according to the procedures outlined in ASTM D-698 or by using compaction requirements of USDA Natural Resource Conservation Service, Wisconsin Construction Specification 3. No tree stumps, or other organic material shall be buried in the embankment. The constructed embankment height shall be increased by a minimum of 5% to account for settling.

Table 2 - Maximum Pre-Development Runoff Curve Numbers for Cropland Areas

| Hydrologic Soil Group | A | B | C | D |
|-----------------------|----|----|----|----|
| Runoff Curve Number | 55 | 68 | 77 | 80 |

- d. Any pipes extending through the embankment shall be bedded and backfilled with embankment or equivalent soils. The bedding and backfill shall be compacted in lifts and to the same standard as the original embankment. Excavation through a completed embankment shall have a minimum side slope of 1:1 or flatter.
 - e. Measures shall be taken to minimize seepage along any conduit buried in the embankment. Measures such as anti-seep collars or sand diaphragms are acceptable.
 - f. Downstream side slopes shall be 3h:1v or flatter.
 - g. Minimum embankment top width shall be 10 ft.
11. **Topsoil and Seeding** - Topsoil shall be spread on all disturbed areas, except for elevations below the safety shelf, as areas are completed. Minimum depth of topsoil spread shall be 4 in. Seed all areas above safety shelf.
12. **Operation and Maintenance** - An operation and maintenance plan shall be developed that is consistent with the purposes of this practice, its intended life, safety requirements and the criteria for its design.

The plan shall address the responsible party for operation, maintenance, and documentation of the plan. At a minimum, the plan shall also include details on inspecting sediment depths, frequency of sediment removal, disposal locations for sediment, inlet and outlet maintenance, keeping embankments clear of woody vegetation, and providing access to perform the operation and maintenance activities.

- B. Construction Site.** A wet detention basin, designed to meet the minimum criteria in section V. A. will also meet the criteria for construction sites if the following criteria are followed.
- 1. The minimum permanent pool area shall be the larger of 1.5% of the disturbed area, or the permanent pool size as specified in Table 1.
 - 2. If a minimum of 2 vertical feet of sediment storage is not available after construction and site stabilization, all excess sediment must be removed and disposed in accordance with the operation and maintenance plan. After the site is stabilized, the minimum permanent pool depth must meet the requirements of V. A. 2. a.

C. Agricultural. A wet detention basin, designed to meet the minimum criteria in V. A. will also meet the criteria for the control of pollution from agricultural watersheds if the following additional criteria and exceptions are followed.

- 1. A permanently vegetated buffer extending a minimum of 75 ft. beyond the designed permanent pool elevation is required around the entire basin.
- 2. The peak outflow for the 10-yr., 24-hr. design storm shall not exceed the peak inflow for the 2-yr., 24-hr. design storm.
- 3. If the permanent pool is ponded 3 ft. or more against the basin embankment, the embankment and spillway design shall meet the criteria in Engineering Standard 378 - Pond, NRCS Field Office Technical Guide (FOTG) Section IV.
- 4. The sediment forebay (V. A. 2. a. (2)) is not required.
- 5. Livestock shall be excluded from the pool, embankment, outlet, and buffer areas.

VI. Considerations. Additional recommendations relating to design which may enhance the use of, or avoid problems with, this practice.

- A. General.** Consider the following items for all applications of this standard:
- 1. Additional conservation practices should be considered if the receiving water body is sensitive to temperature fluctuations, oxygen depletion, excess toxins or nutrients.
 - 2. Consider providing additional length to the safety shelf, above or below the wet pool elevation, to enhance safety.
 - 3. The use of liners should be evaluated for maintaining permanent pool levels and reducing potential groundwater contamination.
 - 4. To prevent damage or failure due to ice, all risers extending above the pond surface should be incorporated into the basin embankment.
 - 5. The use of underwater outlets should be considered to minimize ice damage, accumulation of floating trash or vortex control.

6. When designing basins in series (along same flow path), consider the impacts on sediment removal efficiency, flow routing, and safety.
 7. Minimum watershed size and land cover should be considered to ensure adequate runoff volumes to maintain a permanent pool. For supplementing low runoff periods, consider the installation of a well to maintain the permanent pool level.
 8. Aesthetics of the pond should be considered in designing the shape and specifying landscape practices.
 9. If downstream flood management or bank erosion is a concern, a watershed study should be conducted to determine the most appropriate location and design of stormwater management structures.
 10. For elongated pools in the direction of prevailing winds, consider reinforcing banks, extending the safety shelf, or other measures to prevent erosion of embankment due to wave action.
 11. Consider the potential impacts on downstream channels, farming practices, or other land uses if the wet detention basin may create or alter base flows.
 12. To prevent failure, earthen emergency spillways should not be constructed over fill material.
 13. All flow channels draining to the basin should be stable to minimize sediment delivery to the basin.
 14. The use of baffles may be used to artificially lengthen the flow path in the basin.
 15. Consider aerators to maintain aerobic conditions.
- B. Urban Applications.** Consider the following items when applying this standard to urban areas:
1. Consider including volume reduction practices in the design to reduce the potential downstream impacts of larger runoff volumes with increased development.
 2. Consider using flow splitters before the basin inlet to provide treatment of the first flush from urban areas.
3. Consider safety issues such as signage, flotation devices and special landscaping to deter entry by people.
 4. Consider the effects of construction site compaction and the use of deep tilling to increase soil infiltration. Consider raising the hydrologic soil group used in calculating post-development runoff to calculate a more representative runoff volume due to compaction.
 5. Consider vegetative buffer strips along drainage ways leading to the detention basin to help filter pollutants in urban runoff.
- C. Construction Site Applications.** Consider the following items when applying this standard to construction sites:
1. Consider providing extra sediment storage depth for structures that will serve as permanent stormwater management practices. This could eliminate the need for sediment removal after site stabilization.
 2. The entire drainage area, and all of the basin side slopes, should be thoroughly stabilized with a vegetative cover prior to conversion to a permanent pond.
 3. Consider construction sequencing to minimize the amount of land opening during construction.
- D. Agricultural Applications.** Consider the following items when applying this standard to an agricultural setting:
1. Consider installing a sediment forebay to minimize maintenance needs for the entire basin, especially if coarse surface soils are present in the watershed.
 2. Consider vegetative buffer strips between cropland and drainage ways leading to the detention basin to help filter agricultural pollutants. See Standard 393 - Riparian Vegetative Buffer, NRCS FOTG Section IV.
 3. To enhance use by wildlife, consider enlarging the pond surface area, flattening slopes below the water surface, creating irregular edges and planting native species in and around the pond. See Chapter 11 - Ponds and Reservoirs, NRCS Engineering Field Manual.

4. Consider using the basin as an outfall for subsurface drains from upstream agricultural lands.
5. All concentrated flow channels entering the basin from drainage areas as large or larger than those listed in the middle column of Table 3 should be vegetated adequately to carry the 10 yr. storm. See Standard 412 - Grassed Waterway, NRCS FOTG Section IV and to Chapter 7 - Grassed Waterways, USDA-NRCS Engineering Field Manual.
6. All concentrated flow channels entering the basin from drainage areas in the range shown in the right hand column of Table 3 should be vegetated 200 ft. up the channel from the permanent pool. Vegetation should be adequate to carry the 10 yr. storm.
7. Consider measures to minimize sheet and rill erosion in the entire drainage area.

| Hydrologic Soil Group | Drainage Area for vegetated channels, ac | Drainage Area for 200 ft. of vegetation up the channels, ac |
|-----------------------|--|---|
| A | 100 | 20 to 99 |
| A/B | 40 | 15 to 39 |
| B | 25 | 10 to 24 |
| B/C | 15 | 7 to 14 |
| C, D | 10 | 5 to 9 |

- E. **Operation and Maintenance Considerations for All Applications** -The maintenance plan should address weed or algae growth and removal, insect and wildlife control and any landscaping practices. Outlet designs should consider having the ability to dewater the pond to ease future maintenance. To prevent nuisance from geese, consider not mowing around the pond perimeter. To maximize safety and pollutant removal, allow plant growth along the safety shelf.

VII. Plans and Specifications

Plans and specifications shall be prepared in accordance with the criteria of this standard and shall describe the requirements for applying the practice to achieve its intended use. Plans shall specify the materials, construction processes, location, size and elevations of

all components of the practice to allow for certification of construction upon completion.

VIII. References

- Center for Watershed Protection, *Stormwater BMP Design Supplement for Cold Climates*, Draft Review Document, August 1997.
- United States Department of Agriculture, Natural Resources Conservation Service, *Ponds - planning, Design, Construction*, Agriculture Handbook 590, Revised September 1997.
- United States Department of Agriculture - Natural Resources Conservation Service, *Wisconsin Field Office Technical Guide, Section IV*.
- United States Department of Agriculture - Natural Resources Conservation Service, *Engineering Field Handbook*.
- United States Department of Agriculture - Natural Resources Conservation Service, *Technical Release 55*.
- United States Department of Commerce - Weather Bureau, *Rainfall Frequency Atlas of the United States, Technical Paper 40*.
- Wisconsin Department of Natural Resources - Bureau of Water Resources Management, *Wisconsin Construction Site Best Management Practice Handbook*, Publication WP-222 93 REV, April 1994.
- Wisconsin Department of Natural Resources - Bureau of Water Resources Management, *The Wisconsin Stormwater Manual Part One: Overview*, Publication WR-349-94.

IX. Definitions

Approved Model (V. A. 2. b. (1), V. A. 2. c. (1)) - A computer model that is used to predict pollutant loads from urban lands and has been approved by the applicable regulatory authorities. SLAMM and P8 are examples of models which may be used to verify that a detention pond design meets the minimum criterion of 80% reduction of suspended solids.

Bedrock (V. A. 1., V. A. 1. b., V. A. 2. a.) - Consolidated rock material and weathered in-place material with > 50%, by volume, larger than 2 mm in size.

Tolerable (Table 1) - The tolerable level ("T") of erosion that could occur without losing long term productivity as farmland. T values are assigned for each soil type and are found in Section 1 of the NRCS FOTG. Erosion

rates are estimated using industry standard formulas such as the Revised Universal Soil Loss Equation.

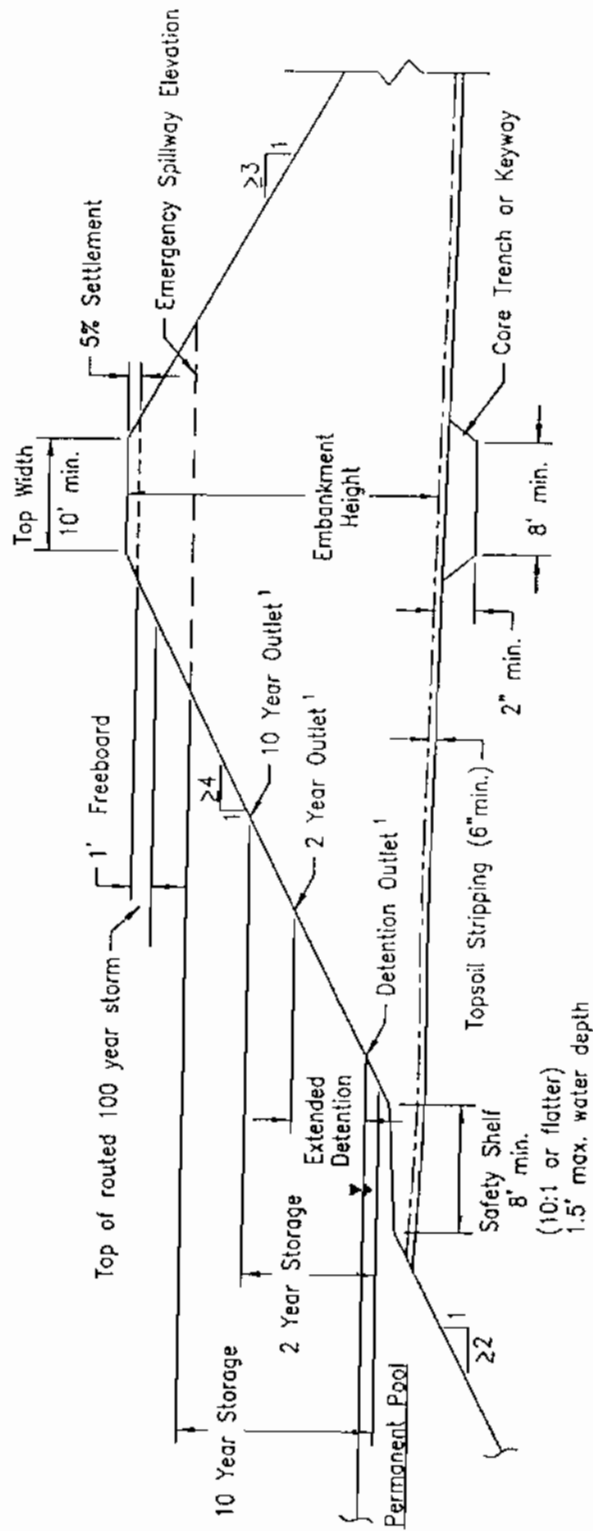
| Inches of Rainfall | County |
|--------------------|--|
| 2.1 in. | Door, Florence, Forest, Kewaunee, Marinette, Oconto, Vilas |
| 2.2 in. | Ashland, Bayfield, Brown, Calumet, Douglas, Iron, Langlade, Lincoln, Manitowoc, Menominee, Oneida, Outagamie, Price, Shawano, Sheboygan |
| 2.3 in. | Barron, Burnett, Dodge, Fond du Lac, Green Lake, Marathon, Milwaukee, Ozaukee, Portage, Racine, Rusk, Sawyer, Taylor, Washburn, Washington, Waukesha, Waupaca, Waushara, Winnebago, Wood |
| 2.4 in. | Adams, Chippewa, Clark, Columbia, Dane, Dunn, Eau Claire, Jackson, Jefferson, Juneau, Kenosha, Marquette, Pepin, Pierce, Polk, Rock, St. Croix, Walworth |
| 2.5 in. | Buffalo, Green, Iowa, La Crosse, Monroe, Richland, Sauk, Trempealeau, Vernon |
| 2.6 in. | Crawford, Grant, Lafayette |

¹TP - 40 - Rainfall Frequency Atlas of the United States, U.S. Department of Commerce Weather Bureau.

| Rainfall (inches) | Runoff Depth in Inches for Curve Number of: | | | | | | | | | | |
|-------------------|---|-----|-----|-----|-----|-----|-----|------|------|------|------|
| | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 98 |
| 2.1 in. | .00 | .02 | .08 | .17 | .28 | .43 | .63 | .88 | 1.18 | 1.58 | 1.87 |
| 2.2 in. | .01 | .04 | .10 | .20 | .33 | .49 | .69 | .95 | 1.27 | 1.67 | 1.97 |
| 2.3 in. | .01 | .06 | .13 | .24 | .37 | .54 | .76 | 1.03 | 1.35 | 1.77 | 2.07 |
| 2.4 in. | .02 | .07 | .15 | .27 | .42 | .60 | .82 | 1.10 | 1.44 | 1.86 | 2.17 |
| 2.5 in. | .02 | .08 | .17 | .30 | .46 | .65 | .89 | 1.18 | 1.53 | 1.96 | 2.27 |
| 2.6 in. | .03 | .10 | .20 | .34 | .51 | .71 | .96 | 1.26 | 1.62 | 2.06 | 2.37 |

¹NRCS TR-55

Figure 2: Typical Embankment Cross Section for Wet Detention Basin
(Not to Scale)



1. These are conceptual outlet locations to indicate the need to have different outlets for different purposes. Numerous outlet designs will meet the criteria of the standard.

Figure 1: Conceptual Wet Detention Basin
(Not to Scale)

