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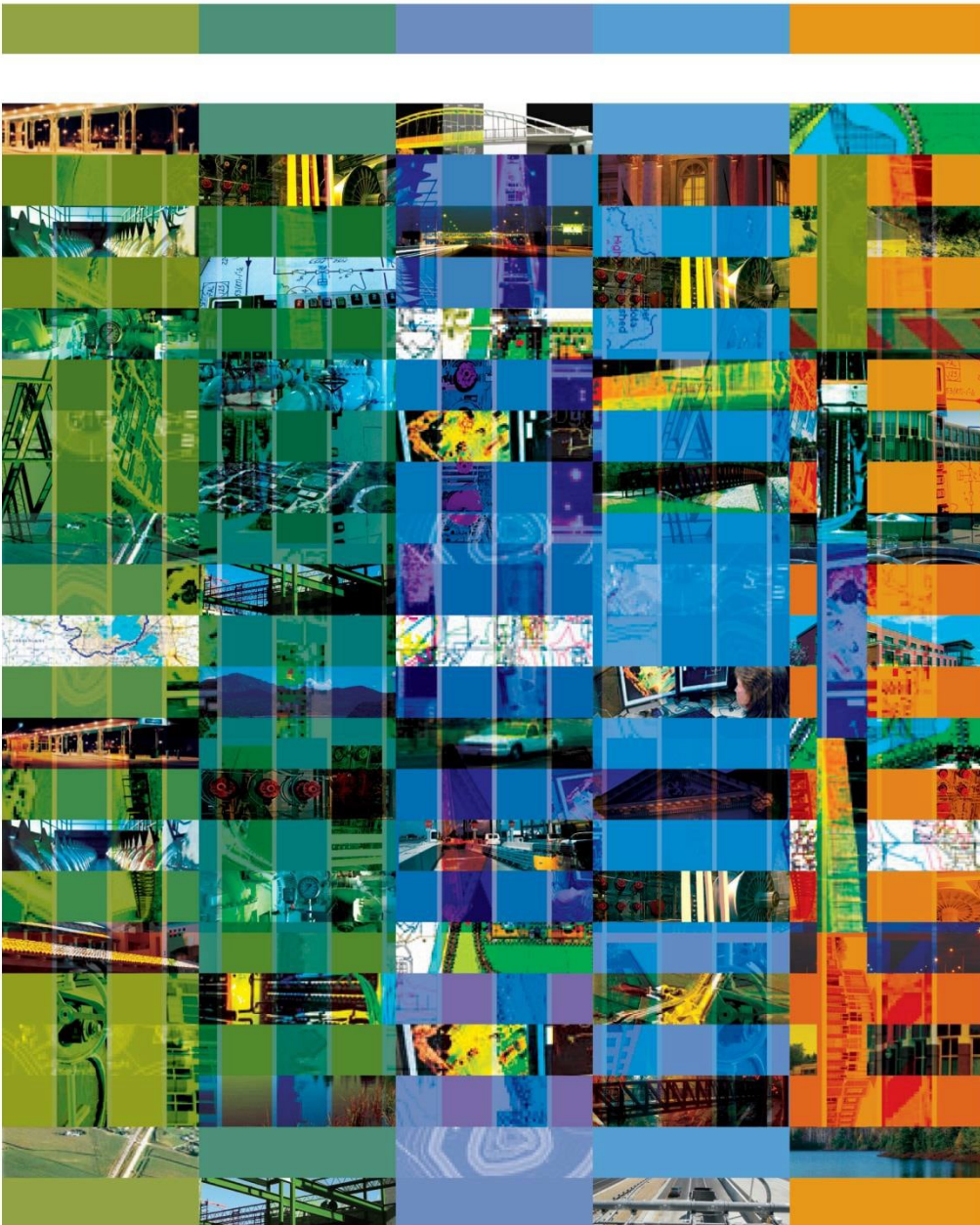
Stormwater
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Report

City of

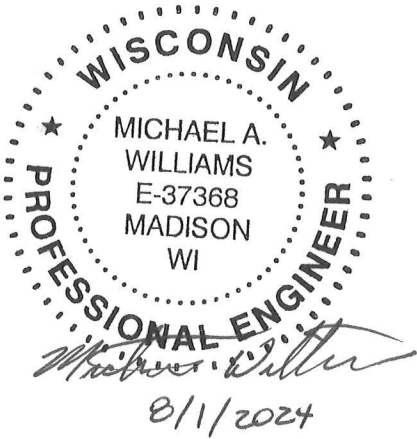
La Crosse, WI

August 2024



Report for
City of La Crosse, Wisconsin

Stormwater Quality Management Plan



Prepared by:

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August 2024



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EXECUTIVE SUMMARY

This report provides an overview of current stormwater management infrastructure in the City of La Crosse (City) and provides a plan for future stormwater management improvements. This project has been prompted by the City's need to update previous stormwater modeling efforts. In addition, the City is a United States Environmental Protection Agency (USEPA) Phase II National Pollutant Discharge Elimination System (NPDES)/Wisconsin Pollutant Discharge Elimination System (WPDES) permitted area. The City previously submitted a Notice of Intent to apply for coverage under Wisconsin Department of Natural Resources' (WDNR's) General Permit to Discharge Under the WPDES Permit No. WI-S050075-1. A condition of this permit was achieving 20 percent total suspended solids (TSS) reduction from stormwater runoff through the implementation of best management practices (BMP). The City has not provided modeling to show it has met this criterion, so this Stormwater Quality Management Plan (SQMP) evaluates the City's developed area as of 2004 conditions, excluding new development and BMPs serving new development that have occurred since 2004. This permit program is aimed at a reduction of pollutants associated with nonpoint source (NPS) stormwater runoff. This SQMP will identify measures to improve the quality of NPS stormwater runoff discharging to the La Crosse River, Lower Black River, Pammel Creek, Mississippi River, and other Waters of the State while being consistent with the requirements of the permit.

Plan objectives are consistent with goals of the USEPA and the WDNR in addressing NPS runoff sources. These objectives include the following:

1. Improve the quality of water in receiving waterways, which include the La Crosse River, Lower Black River, Mississippi River, and other Waters of the State.
2. Increase citizen awareness of issues associated with stormwater runoff.
3. Implement BMPs to comply with USEPA and WDNR requirements.

The City owns and maintains a drainage system consisting of storm sewers, wet detention basins, infiltration basins, and vegetated swales. The City drains through these systems to the waterbodies identified previously. Along with stormwater runoff, the stormwater drainage system carries sediment, oil, grease, and other pollutants that accumulate on pavement areas in the City. In addition, pet waste, fertilizer, and other nutrients from lawns and other open areas may discharge to local waterways.

Implementation of BMPs is an effective means of reducing the discharge of NPS pollutants to area waterways. A BMP can be described as any program, technology, process, siting criteria, operational method, measure, or device that controls, prevents, removes, or reduces pollution. BMPs may include nonstructural measures such as public information and education of homeowners to reduce their impacts on NPS pollution; "source controls" such as street sweeping and leaf collection; or structural BMPs such as construction of wet detention basins, bioretention basins, infiltration basins, vegetated swales, and similar measures.

This report proposes a series of structural BMPs to be implemented according to the permit-prescribed schedule to reduce discharge of NPS pollutants to area waterways. Proposed BMPs and associated recommendations are summarized within the report conforming to the following permit conditions. Each condition includes an individual plan and a measurable goal for the City to help assess the implementation of the SQMP as mandated by the WDNR. USEPA NPDES rules require implementation of the following measures and tracking of these measures through identification of measurable goals. While all of these measures apply, only item 7 is addressed as part of this SQMP.

1. Implementation of a public education and outreach program to increase community awareness of stormwater pollution impacts on Waters of the State to encourage changes in public behavior to reduce such impacts.
2. Public involvement and participation in efforts to reduce NPS pollutant discharges and inform the public of permit-required activities.
3. Development of an illicit discharge detection and elimination program with the primary goal of eliminating nonstormwater discharges to the storm sewer system. A primary component of this program is development of mapping to identify storm sewer outfalls to adjacent water bodies.
4. Development of a program to reduce pollutants in stormwater runoff from construction activities that result in a land disturbance of greater than or equal to one acre. This includes requesting authority to regulate erosion control at public buildings from the Wisconsin Department of Commerce pursuant to s. 101.1205(4), Wis. Stats.
5. Development of a program to control the quality of stormwater runoff from new development and redevelopment projects after construction is completed that disturb an area greater than or equal to 1 acre.
6. Development and implementation of an operation and maintenance program to prevent pollution and facilitate good housekeeping practices for municipal operations.
7. Storm Water Quality Management—Section 3 provides a stormwater quality analysis of baseline and existing stormwater pollutant loads to meet the 20 percent TSS reduction. It was found that existing City BMPs provide approximately 17.23 percent TSS reduction in the City, which does not meet the 20 percent reduction requirement.

Section 4 evaluates alternatives that will further increase the TSS reduction. Table ES-1 provides a summary of the cost and cost-effectiveness of each alternative. Alternative No. 3 is the most cost-effective method for reaching 20 percent TSS reduction; however, adopting Alternative Nos. 1 or 2 as an implementation plan may prove favorable to address a potential future Total Maximum Daily Load.

8. Development of a storm sewer system map of the municipal separate storm sewer system.
9. Submittal of an annual report to the WDNR documenting permit-related activities.

The implementation and funding of this SQMP is discussed in Section 5. Given the substantial costs of ongoing permit compliance and general ongoing capital costs, Strand Associates, Inc.® recommends the City leverage stormwater utility funds and supplement that with WDNR grants and Clean Water Fund principal forgiveness for design and construction of future improvements. According to State Fiscal Year 2025 data from the WDNR, the City is eligible for 55 percent principal forgiveness (similar to a grant).

Alternative No.	Alternative Description	2024 Alternative Cost	Citywide TSS Reduction	\$/lb TSS Removed 20-Year NPW	Excess over 20 Percent TSS Reduction (lb)
1	All six proposed structural BMPs	\$18,579,593	24.5%	\$4.84	125,877
2	Four most cost-effective structural BMPs	\$6,483,493	21.7%	\$2.78	47,035
3	Two most cost-effective structural BMPs	\$2,582,800	20.0%	\$1.80	611

Notes:
 \$/lb=cost per pound
 NPW=Net Present Worth
 lb=pounds

Table ES-1 Alternatives Summary

SECTION 1
INTRODUCTION

1.01 BACKGROUND

This project has been prompted by the designation of the City of La Crosse (City) as a United States Environmental Protection Agency (USEPA) Phase II National Pollutant Discharge Elimination System (NPDES) and Wisconsin Pollutant Discharge Elimination System (WPDES) permitted area. This permit program is aimed at the reduction of pollutants associated with nonpoint source stormwater runoff. The City previously submitted a Notice of Intent (NOI) to apply for coverage under Wisconsin Department of Natural Resources' (WDNR's) General Permit to Discharge Under the Wisconsin Pollutant Discharge Elimination System WPDES Permit No. WI-S050075-1 (current permit is WI-S050075-3). A condition of this permit was achieving 20 percent total suspended solids (TSS) reduction from stormwater runoff through the implementation of best management practices (BMPs). The WDNR issued a letter of audit in 2018 requiring updated modeling to verify that the City has achieved its 20 percent TSS requirement. The City has not provided modeling to show it has met this criteria, so this Stormwater Quality Management Plan (SQMP) evaluates the City's developed area as of 2004 conditions, excluding new development and BMPs serving new development that have occurred since 2004. This SQMP will identify measures to improve the quality of nonpoint source stormwater runoff discharging to the La Crosse River, the Lower Black River, Pammel Creek, the Mississippi River, and other Waters of the State while being consistent with the requirements of the permit.

This SQMP provides an overview of current stormwater management infrastructure, policies, and programs in the City and provides a plan for future improvements. The primary goal of this SQMP is to provide a means of addressing existing stormwater quality issues consistent with permit requirements. Figure 1.01-1 shows the City boundary and drainage features.

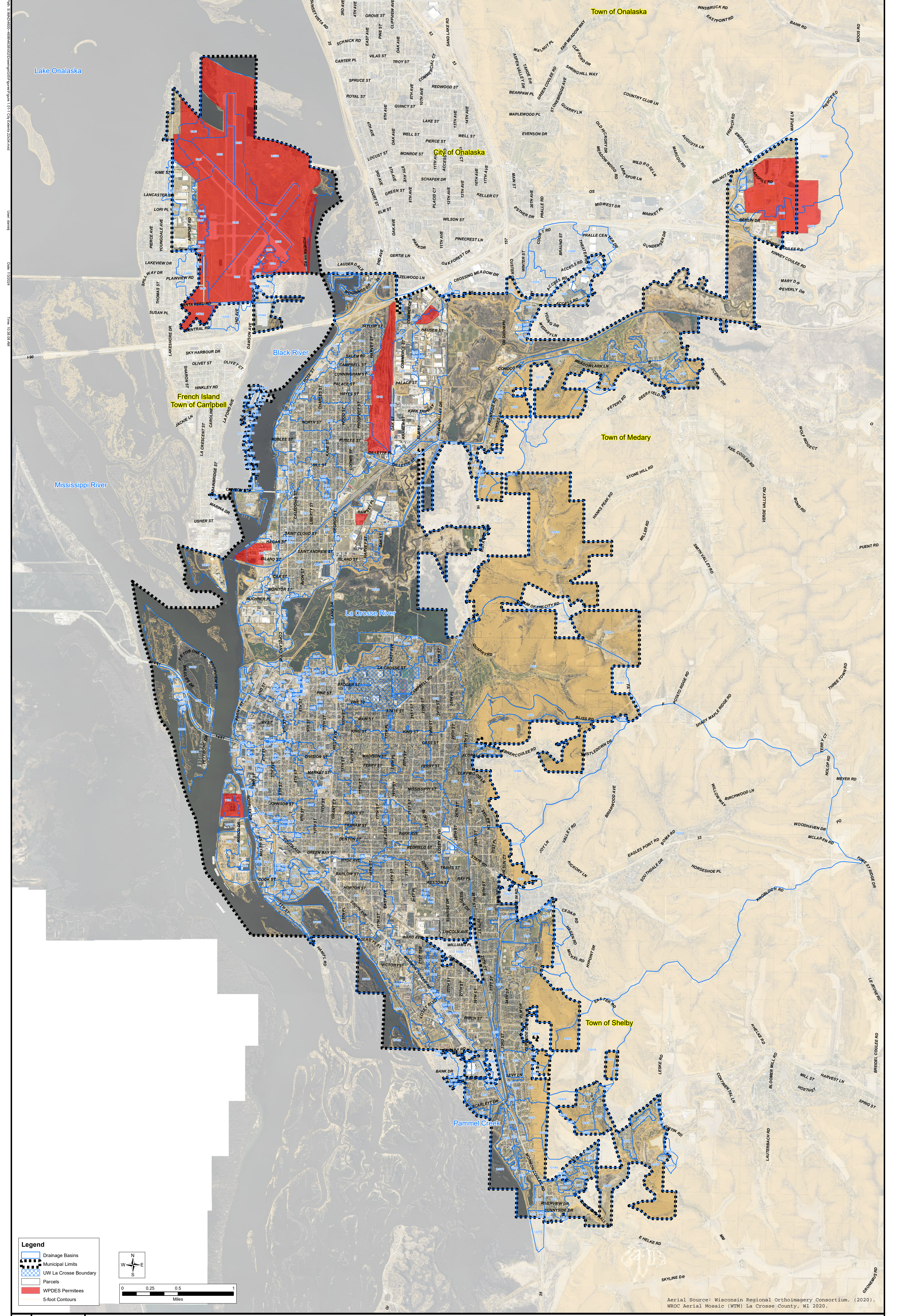
There are five sections in this SQMP. Sections 1 and 2 provide introductory and general information regarding stormwater management practices (SMP) and methodologies used in the study. Section 3 summarizes water quality modeling for baseline and current conditions in the City and defines the TSS reduction gap between current conditions and the permit-required 20 percent TSS reduction. Section 4 discusses stormwater management alternatives investigated and potential BMPs to achieve the reduction in nonpoint source pollution necessary to close the TSS reduction gap and meet regulatory requirements. Section 5 summarizes overall recommendations and provides a possible funding and implementation plan.

Please note that this report and modeling herein does not incorporate University of Wisconsin–La Crosse lands.

1.02 PLAN OBJECTIVES AND CRITERIA

A. Regulatory Issues

A primary concern in land development has historically been quickly draining stormwater runoff. Typically, curbs, gutters, and storm sewer systems have been constructed to provide for efficient stormwater drainage. Unfortunately, along with efficiently transporting stormwater runoff, storm sewers are also efficient at conveying accumulated pollutants from parking lots, streets, rooftops, lawns, and other areas to adjacent waterways. Sediment, heavy metals, pesticides, nutrients, bacteria,



Legend

- Drainage Basins
- Municipal Limits
- UW La Crosse Boundary
- Parcels
- WPDES Permitees
- 5-foot Contours

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Miles

Aerial Source: Wisconsin Regional Orthoimagery Consortium. (2020).
WROC Aerial Mosaic (WTM) La Crosse County, WI 2020.

**CITY OF LA CROSSE MUNICIPAL LIMITS
AND DRAINAGE AREAS**

STORMWATER MANAGEMENT PLAN UPDATE

CITY OF LA CROSSE

LA CROSSE COUNTY, WISCONSIN

and oxygen-demanding organic waste from pollutant “source areas” have been recognized as a cause of water quality degradation in streams, lakes, ponds, and other water resources. Drainage of developed lands employing a “rural” road cross section with grassed swales somewhat mitigates the effect of development but in and of itself may not be able to meet WDNR stormwater quality goals.

In recognition of the potential harmful impacts of stormwater runoff, new regulations have been implemented at the federal and state level. In October 1999, the USEPA adopted Phase II NPDES stormwater runoff requirements, applicable to municipalities located in urbanized areas (UA), as defined by the United States (U.S.) Census Bureau. A UA is a land area comprising one or more places and the adjacent densely settled surrounding area that together have a residential population of at least 50,000 and an overall population density of at least 500 people per square mile. According to the 2000 U.S. Census, the City is one of several municipalities located within the La Crosse urbanized area. Consequently, the City was required to obtain a permit to discharge stormwater runoff to Waters of the State.

USEPA NPDES rules require implementation of the following measures and tracking of these measures through identification of measurable goals. While all of these measures apply, only item 7 is addressed as part of this study.

1. Implementation of a public education and outreach program to increase community awareness of stormwater pollution impacts on Waters of the State to encourage changes in public behavior to reduce such impacts.
2. Public involvement and participation in efforts to reduce nonpoint source pollutant discharges and inform the public of permit-required activities.
3. Development of an illicit discharge detection and elimination (IDDE) program with the primary goal of eliminating nonstormwater discharges to the storm sewer system. A primary component of this program is development of mapping to identify storm sewer outfalls to adjacent water bodies.
4. Development of a program to reduce pollutants in stormwater runoff from construction activities that result in a land disturbance of greater than or equal to 1 acre. This includes requesting authority to regulate erosion control at public buildings from the Wisconsin Department of Commerce pursuant to s. 101.1205(4), Wis. Stats.
5. Development of a program to control the quality of stormwater runoff from new development and redevelopment projects after construction is completed that disturb an area greater than or equal to 1 acre.
6. Development and implementation of an operation and maintenance program to prevent pollution and facilitate good housekeeping practices for municipal operations.

7. Development and implementation of a municipal stormwater management program that to the maximum extent practicable as documented by stormwater quality modeling achieves a reduction in TSS in the Phase II-designated area of 20 percent by March 10, 2008.
8. Development of a storm sewer system map of the municipal separate storm sewer system (MS4).
9. Submittal of an annual report to the WDNR documenting permit-related activities.

In Wisconsin, the WDNR is responsible for administering the USEPA Stormwater Permit Program. The WDNR administers this program through Wisconsin Administrative Code (WAC) NR 216, which requires affected municipalities to implement the minimum control measures listed above to the “maximum extent practicable.” To better define maximum extent practicable, the WDNR has adopted specific stormwater management performance standards as defined in the WAC NR 151 administrative rules.

B. Plan Objectives

The objectives of this SQMP are consistent with goals of the USEPA and the WDNR in addressing nonpoint source runoff sources. These objectives include the following:

1. Improve the quality of water in receiving waterways, which include the La Crosse River, Lower Black River, Mississippi River, and groundwater recharged by infiltrated stormwater.
2. Implement BMPs to comply with USEPA and WDNR requirements.

C. BMPs

The WDNR defines BMPs as structural or nonstructural measures, practices, techniques, or devices employed to avoid or minimize soil, sediment, or pollutants carried in runoff to Waters of the State. A BMP may include any program, technology, process, siting criteria, operational method, measure, or device that controls, prevents, removes, or reduces pollution. Nonstructural measures may include public information and education of homeowners to reduce their impacts on nonpoint source pollution and “source controls,” such as street sweeping and leaf collection. Structural BMPs may include construction of wet detention basins, infiltration basins, vegetated swales, and similar measures.

An effective stormwater management program will include a mixture of structural and nonstructural BMPs as well as effective source controls to reduce nonpoint source runoff to receiving waterways. This SQMP will discuss or recommend a series of citywide and basin-specific BMPs to reduce nonpoint source runoff to the La Crosse River, the Lower Black River, the Mississippi River, and other Waters of the State.

1.03 SCOPE OF STUDY

This SQMP was completed to meet requirements of the NPDES and WPDES stormwater permitting program. Primary tasks included development of a SQMP for the City, which are summarized as follows.

A. Identification of Project Goals and Objectives

1. List of water quality issues to be addressed.
2. List of project goals and objectives, including the identification of stormwater management system design criteria incorporating state runoff performance standards and additional City stormwater management requirements.

B. Description of Planning Area Including Mapping of the Following Features:

1. Size, type, and location of storm sewer outfalls to Waters of the State.
2. Drainage basin delineations and areas draining to identified storm sewer outfalls.
3. Locations of existing BMPs including detention basins, ditches, catch basins, and inlets with sumps, if any.
4. City Phase II-designated planning area and municipal limits. In this case, the planning area is the City's municipal limits.
5. Location of existing WPDES permit holders, if any.
6. Existing land use of areas tributary to mapped outfalls.
7. Soil types and characteristics of tributary drainage area.
8. Wetland locations as depicted on La Crosse County mapping, previous field delineations, or other available information provided by the City.

C. Performance of Water Quality Analysis

The Source Loading and Management Model (WinSLAMM) computer model was used to determine the TSS loading under baseline (no-control) and existing conditions to determine compliance with the 20 percent TSS reduction requirement. Existing BMPs such as street sweeping, detention basins, and grassed swale drainage are incorporated in the existing conditions model.

D. Identification and Evaluation of Potential Stormwater Management Alternatives to Meet The 20 Percent TSS Reduction Requirement

Evaluation of alternatives to achieve additional TSS reduction was completed.

- E. Development of Recommendations and Implementation Plan, Specifically the Following:
1. Recommendations of BMPs to be employed by the City to achieve stormwater management goals and objectives.
 2. Opinion of probable construction cost (OPCC) and potential sources of funding are included.
- F. Preparation of SQMP

This SQMP was completed for submission to the City and the WDNR in draft and final formats. This SQMP includes a narrative discussion of study issues, criteria and goals, analytical methods, results, and recommendations.

1.04 DEFINITIONS AND ABBREVIATIONS

The following definitions and abbreviations are presented as an aid to the reader.

- A. Definitions
- Average sediment depth–The average depth of deposited sediment measured over the entire pond area.
 - Average current normal pool depth–The average depth of water measured over the entire pond area. This is the difference between the water surface and the top of sediment.
 - Average current total pond depth–The average depth of the pond if all deposited sediment were removed. This is the difference between the water surface and the existing bottom of the pond.
 - Best management practices–Also known as BMPs, structural or nonstructural measures, practices, techniques, or devices that are employed to avoid or minimize soil, sediment or pollutants carried in runoff to Waters of the State.
 - Catch basins–An inlet to a storm sewer equipped with a sediment sump, and sometimes a hood on its outlet pipe to the downstream storm sewer.
 - Control structure–The manmade structure that controls the water released from a stormwater facility to the outfall.
 - Curve number–The Soil Conservation Service has devised a method of computing the runoff from an area based on a system of curve numbers. The curve number for an area of land is obtained by examining the land use and soil type of the land area.
 - Design storm–A hypothetical discrete rainstorm characterized by a specific duration, temporal distribution, rainfall intensity, return frequency, and total depth of rainfall.

- Detention basin—A stormwater management structure that temporarily detains runoff and discharges it through a hydraulic structure to a stream or receiving waterway.
- Drainage basin—A geographical area that contributes surface water runoff to a particular point.
- Erosion—The process by which soil, rocks, and other land forms are worn away by repetitive wind, water, or ice activity.
- Final stabilization—When all land disturbing construction activities at the construction site have been completed and 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.
- Flume—The structure or channel upstream of the stormwater facility used to convey stormwater to the facility.
- Forebay—The area of the pond near the inlet where heavy sediments are encouraged to settle out of the stormwater that enters a facility.
- Illicit discharge—Any discharge to a municipal separate storm sewer (MS4) system that is not composed entirely of runoff, except discharges authorized by a WPDES permit or any other discharge not requiring a WPDES permit such as water line flushing, landscape irrigation, individual residential car washing, firefighting, and similar discharges.
- Impervious surface—A ground cover such as concrete, rooftops, asphalt, gravel or other surface which inhibits precipitation or runoff from infiltrating or penetrating the surface. A surface which releases as runoff all or most of the precipitation that falls on it.
- In-fill development—Development that occurs in an undeveloped area which is located within or is surrounded by a developed area.
- Infiltration—The entry of precipitation or runoff into or through the soil.
- Inlet—An entryway to the storm sewer system usually located at street corners and low points.
- Karst feature—An area or surficial geological 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.
- Maximum extent practicable (MEP)—Abbreviated as MEP, a level of implementing BMPs to achieve a performance standard 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.
- New development—Development resulting from the conversion of previously undeveloped land or agricultural land uses.

- Outfall–The piping, channel, or other equipment downstream of the control structure used to transfer water out of the control structure to the surrounding environment.
- Performance standard–A narrative or measurable number specifying the minimum acceptable outcome for a facility or practice.
- Recurrence interval–The probability that a given rainfall event will occur in a given year. For example, a 100-year rainfall event has a 1 percent chance of occurring in a given year ($1/100=0.01=1$ percent), a 5-year rainfall event has a 20 percent chance of occurring in a given year ($1/5=0.20=20$ percent).
- Redevelopment–Areas where development is replacing older development.
- Retention basin–A stormwater management structure that captures stormwater runoff and does not discharge to a surface water body. The water is discharged by infiltration or evaporation.
- Separate storm sewer–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:
 - Is designed or used for collecting water or conveying runoff
 - Is not part of a combined sewer system
 - Is not draining to a stormwater treatment device or system
 - Discharges directly or indirectly to Waters of the State
- Sheet flow runoff–Water, usually storm runoff, flowing in a thin layer over the ground; also called overland flow.
- Subbasin–The parts of a drainage basin that, when combined, create the entire drainage basin for a facility.
- Time of concentration (Tc)–“... the time for runoff to travel from the hydraulically most distant point of the watershed to a point of interest within the watershed,” SCS, 1986.
- Time distribution of rainfall–The amount of rainfall that has fallen during a storm event versus the amount of time that has elapsed during a storm event.
- Total maximum daily load (TMDL)–The amount of a pollutant a stream, river, or lake can receive before exceeding water quality standards.
- Weir–A wall spanning the control structure. When the water level of the pond reaches the top of the weir, water flows over the weir and out of the pond.

B. Abbreviations

\$/lb	cost per pound
ac	acres
ADS	Advanced Drainage System
APWA	American Public Works Association
BMPs	Best Management Practices
City	City of La Crosse, Wisconsin
Contech	Contech Engineered Solutions LLC
CWF	Clean Water Fund
EIF	Environmental Improvement Fund
FAA	Federal Aviation Administration
FAL	Fish and Aquatic Life
ft	feet
GIS	Geographic Information System
GIS	Geographical Information System
HC	Halfway Creek
HSG	Hydrologic Soils Groups
IDDE	Illicit Discharge Detection And Elimination
IDDE	Illicit Discharge Detection and Elimination
in	inches
in/hr	inches per hour
ITA	Intent to Apply
lb	pound
lb/ac	pounds per acre
mg/L	milligram per liter
MS4	Municipal Separate Storm Sewer System
NA	not applicable
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NPS	nonpoint source
NPW	net present worth
NRCS	National Resource Conservation Service
NSBB	Nutrient Separating Baffle Box
OPCC	opinion of probable construction cost
PCB	polychlorinated biphenyls
PERF	Priority Evaluation Review Form
PFAS	per- and polyfluoroalkyl substances
RCP	reinforced concrete pipe
RES	Resource Environmental Solutions
ROW	right-of-way
RR	Remediation and Redevelopment
SCS	Soil Conservation Service
sf	square feet
SMP	stormwater management practices

SOC	synthetic organic compounds
SQMP	Stormwater Quality Management Plan
STH	State Trunk Highway
Strand	Strand Associates, Inc.®
SWPPP	Stormwater Pollution Prevention Plan
Tc	Time of Concentration
TMDL	total maximum daily load
TP	Total Phosphorus
TSS	total suspended solids
U.S.	United States
UA	urbanized areas
UNPS	Urban Nonpoint Source
USEPA	United States Environmental Protection Agency
VOC	volatile organic compounds
WAC	Wisconsin Administrative Code
WAM	watershed adaptive management
WDOA	Wisconsin Department of Administration
WDNR	Wisconsin Department of Natural Resources
WinSLAMM	Source Loading and Management Model
WisDOT	Wisconsin Department of Transportation
WPDES	Wisconsin Pollutant Discharge Elimination System
WQBEL	water quality-based effluent limitations
WQT	water quality trading
WSEL	Water Surface Elevation
WWSF	Warm Water Sport Fishery