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**ANNUAL NPDES REPORT**  
**2009 MINNEAPOLIS STORMWATER MANAGEMENT PROGRAM & 2008 ACTIVITIES**

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*Executive Summary*

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## I. Executive Summary

### **Report Objective**

This report is prepared in compliance with the requirements of NPDES (National Pollutant Discharge Elimination System) Permit No. MN0061018.

### **Background**

The NPDES program was created in 1990 by the United States Environmental Protection Agency (EPA) to safeguard public waters through the regulation of the discharge of pollutants to surface waters including lakes, streams, wetlands, and rivers. The Minnesota Pollution Control Agency (MPCA) is the local authority responsible for administering this program. Under this program, specific permits are issued to regulate different types of municipal and industrial activities.

The MPCA issued the existing Municipal Separate Storm Sewer System (MS4) NPDES Permit to the City of Minneapolis on December 1, 2000. This Permit requires the implementation of approved stormwater management activities, referred to as Best Management Practices (BMPs). These efforts must be documented in the form of a Stormwater Management Program and Annual Report, which is due on June 1 of each year. The Permit also requires public input in the development of the priorities and programs, and adoption by City Resolution of the Annual Report as the City's Stormwater Management Plan. This Report presents the activities that will be implemented this year, and provides documentation and analysis of the activities conducted during the previous year.

The Minneapolis NPDES Stormwater Management program is developed and administered by the City departments/agencies that are responsible for permit activities. Included are the Minneapolis Park and Recreation Board (MPRB), and the City of Minneapolis Departments of Public Works and Regulatory Services. These stakeholders are jointly responsible for the completion of the required Permit submittals. Public Works provides program management and completes each Annual Report.

### **2008 Highlights and 2009 Work Plan**

#### ***Storm Drain System Operational Management and Maintenance Program***

The NPDES Permit objective for this program is to minimize the discharge of pollutants through the proper operational management and maintenance of the City's storm drain system. Routine maintenance in 2008 included 293 minor repairs and three major repairs to the storm drain system. In

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2009, the program will continue to perform its routine functions, respond to emergencies or random events, and aim for removing inflow sources from the sanitary sewer system.

***Structural Controls Operational Management and Maintenance Program***

Within the City's storm drain system are structural controls that affect system flow rates and water quality discharges. Structural controls include grit removal structures, stormwater retention and detention ponds, storm drain inlets and outfalls, level control weirs, and pump stations. These components are routinely inspected and maintained to ensure proper operation and reliability.

The required inspection schedule for storm drain outfalls is a five-year cycle, or approximately 20% each year. In 2008, 83 of 473 storm drain outfalls (about 17%) were inspected, and four were judged to be in need of maintenance. Of the outfalls needing maintenance, two had repairs completed in 2008 with the remaining scheduled for repairs in early 2009.

Ponds are regularly maintained for volume and in some instances also for park-like amenities. Based on current level of experience, the need for dredging of sediment buildup appears to be in a 5- to 20-year cycle. At present only a few of the City's holding ponds are at or near this age. In 2008 348 cubic yards of material was removed from the Kings Highway Holding Pond, constructed in the 1980s.

***Disposal of Removed Substances Program***

A key component of this program is to minimize the discharge of pollutants by proper collection and disposal. Targeted pollutants are collected from grit removal structures, inlet structures, system piping, detention ponds, and deep drainage tunnels. In 2008, the removed material consisted primarily of sand and vegetative matter collected from grit removal structures. Contaminated substances are disposed of at an MPCA-approved site. Non-contaminated removed materials are combined for disposal with similar materials from street sweeping operations (see 'Roadways', below). In 2008 the inorganic materials were sent to Becker MN for use as landfill daily cover, and the organic materials went to Carver County for conversion to retail mulch material that is then distributed by RW Farms, LLC, Organic Technologies.

***Stormwater Management for New Developments and Construction Program***

The objective of this stormwater management program is to minimize the discharge of pollutants through the regulation of construction projects and new developments. Proposed construction activities are reviewed through the City's Development Review process for compliance with the Erosion & Sediment Control Ordinance, Minneapolis Code of Ordinances [MCO] Chapter 52. Development projects

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are reviewed for long-term stormwater management strategies including ongoing operation and maintenance commitments, in compliance with the Stormwater Management Ordinance, MCO Chapter 54. Projects are also reviewed for any combined sewer issues (in part, MCO Chapter 56) and for any flooding and capacity issues.

Redevelopment of existing sites provides an opportunity to lessen the impacts of urbanization on the Mississippi River and other Minneapolis water resources. During 2008, over 120 site plans were reviewed in connection with stormwater management requirements (down from over 190 in 2007 and 250 in 2006, with the reduction apparently due to the economic downturn for housing and other development projects). During 2008, projects that had been reviewed during the Minneapolis Development Review process installed 71 Stormwater Best Management Practices (BMPs) on 29 sites that will provide rate control and water quality improvements for approximately 200 acres of land. BMP types included rain gardens, pervious pavement, infiltration areas, ponds, and underground detention facilities.

In 2009, a proposal is under consideration to require construction bonds to be posted from contractors to assure effective erosion and sediment control compliance and site completion, and also to facilitate the removal of temporary erosion controls at the completion of construction activities. Our 2009 workplan also includes improved data collection, tracking and analysis for improved understanding of water quality impacts and costs.

### ***Roadways Program***

The objective of this stormwater management program is to minimize the discharge of pollutants through the proper operation and maintenance of public streets, alleys, and municipal equipment yards.

#### ***Street Sweeping***

Minneapolis employs several street sweeping approaches in the City. Curb-to-curb sweeping operations occur citywide every year in the spring and fall. At those times, all City streets and alleys are swept systematically, and temporary parking bans are enforced to aid with sweeping operations. During the summer, between the spring and fall sweep events, sweepers are used for periodic sweeping of maintenance districts, downtown and other high traffic commercial areas, the Chain of Lakes drainage areas, and the Minneapolis Parkway System. In Fall 2008, over 6,700 tons of leaves were collected during the fall citywide sweeping and were sent to process as compost. During Spring and Summer 2008, over 21,000 tons of materials were collected. A portion of this volume is assumed to be reclamation of sand applied to roadways for snow and ice control.

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*Snow and Ice Control*

The Street Maintenance section applies salt and sand to City roadways every winter. Salt can cause damage to various types of infrastructures, as well as be harmful to groundwater, surface water, plants, and trees. In 2007, the EPA approved a Total Maximum Daily Load (TMDL) study that places limits on chlorides (salt) discharged to Shingle Creek, which had been assessed as impaired for chlorides. The improved snow and ice control practices that the City had developed for Shingle Creek are also being implemented citywide.

*Storage of De-icing Materials*

All salt stockpiles are stored under cover to minimize potential groundwater contamination and runoff. In 2008 13 foremen attended training on the use of salt at an annual salt symposium. The new maintenance facility at Hiawatha Avenue and E 26<sup>th</sup> St. is being designed to employ the most effective Best Management Practices (BMPs) available, including runoff collection systems that will be installed around salt and sand stockpiles, and truck washing areas.

***Flood Control Program***

The NPDES Permit objective of this program is to design flood control systems that manage stormwater quantities so that the runoff does not exceed the capacity of the existing facilities while minimizing the impacts on the water quality of the receiving water body.

The Flood Mitigation Program began in 1998 and was originally scheduled to run through 2009. However, due to the state of the City's available finances, this Program was temporarily suspended. Due to changes that the anticipated Total Maximum Daily Load (TMDL) standards will impose on new designs, current flood mitigation strategies are changing. The new type of project tries to achieve the three R's or the three *REDUCTIONS* of *VOLUME, LOAD and RATE*. This is a dramatic change in design development and a departure from past strategies of enlarging pipes to drain more stormwater faster. New techniques focus on green initiatives that treat stormwater where it falls and try to avoid the need for new or larger pipes.

The City's Flood Control Program is a companion to the Combined Sewer Overflow (CSO) Program and the Infiltration and Inflow (I & I) Program. Studies show that the City has a problem with inflow (stormwater that drains to the sanitary sewer system). Unfortunately, successful completion of CSO and I & I projects can be a burden for the Flood Control Program, because of additional stormwater volume, that formerly was discharged into the sanitary sewer system, being discharged into the

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stormwater management system. In 2008, the City removed 47-acre feet of inflow, thus the storm sewer system received 47 more acre-feet of runoff that had previously discharged to the sanitary sewer.

***Pesticides and Fertilizer Control Program***

The objective of this stormwater management program is to minimize the discharge of pollutants by controlling the application of pesticides and fertilizers.

The MPRB manages 6,400 acres of park land in the City of Minneapolis (approximately 18% of the City's 35,244 total land acres). In 2008, 182 MPRB employees held pesticide applicator licenses through the Minnesota Department of Agriculture.

***Illicit Discharges and Improper Disposal to Storm Sewer System Program***

The NPDES Permit objective of this program is to minimize the discharge of pollutants by implementing a program to detect and mitigate illicit discharges, and to encourage that an appropriate permit be obtained for non-stormwater discharges.

Environmental Services and the Minneapolis Fire Department personnel typically serve as the first responders to a spill event. The immediate goals of this response include spill containment, recovery of hazardous materials, and collection of data for use in assessment of site impacts. Recovery efforts can take several forms, but typically fall into two broad categories: recovery for re-use, or the use of absorbents or other media to collect hazardous waste for disposal.

In 2008, 84 calls for emergency response were successfully addressed, including containment of spills and response to chemical dumping, illegal disposal or handling of regulated or hazardous materials. GIS mapping is being implemented as a tool to support these activities. A total of 624 water and land pollution complaints were investigated. The complaints included illegal dumping, improper storage of material, and chemical storage.

***Storm Sewer Design for New Construction Program***

The City currently has a five-year focus on the reduction of inflow (stormwater directly connected to the sanitary sewer, streets, roof drains, foundation drains, etc.) and infiltration (groundwater leaks through sewer pipe joints and cracks, tree roots in the sanitary sewer system). The program focus is due to the Metropolitan Council Environmental Services (MCES) Inflow & Infiltration (I&I) Surcharge Program introduced in 2006 that established a mitigation fee (a "surcharge") of \$350,000 per million gallons per day (MGD) of excess flow in the sanitary sewer system to the MCES treatment plant. At that time MCES determined that the City had 112.7 million MGD of excess flow. To forgo the surcharge, the City needs to

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identify and eliminate the sources of inflow and infiltration. The surcharge program requires that the City make progress in removing 20 percent of the excess flow each year from 2007 to 2011.

Based on volume, roughly 60% of the sources of the inflow have been identified. The principal work is elimination of public and private stormwater inlets or rainleaders connected to the sanitary sewer. The work of identifying the remaining sources is continuing with a citywide sanitary sewer flow metering system. The City's success with the reducing I & I into the sanitary sewer system has increased the flow rates in the stormwater management system.

During the next five years, the removal of I & I from the sanitary sewer system, including Combined Sewer Overflow (CSO projects), will be the primary concentration. Mitigation begins with an effort to reduce the volume of runoff. Options that reduce volume must have space within the right-of-way or must have an off-site area, with suitable soils for volume reduction in either case. Next, load reduction options are investigated, using recognized Best Management Practices (BMPs) such as prefabricated swirl-type grit chambers, biofiltration or ponds. Space constraints in fully developed urban areas like Minneapolis limit the majority of projects to use of compact prefabricated BMPs for load reduction.

In 2009, Minneapolis is completing a project that incorporated pervious concrete and underground stormwater storage as a pilot project along a four-block segment of West 54<sup>th</sup> Street. This approach is designed to reduce stormwater volume discharging to Minnehaha Creek by increasing evapotranspiration and infiltration, to control rate of stormwater discharge, and also to remove pollutants from the stormwater prior to discharge to the creek.

### ***Public Education Program***

The City of Minneapolis and the MPRB's Public Education Program promotes, publicizes, and facilitates proper management of stormwater discharges to the storm sewer system. The program's main focus is to educate Minneapolis residents, business owners, employees and visitors about stormwater. The program's goals include showing how *everyone's* actions affect the quality of our lakes, wetlands, streams and the Mississippi River, and how to reduce the discharge of pollutants to our receiving waters. The desired result is to change behavior in ways that will improve water quality.

Ongoing activities address water quality education about erosion and sediment control, proper application of pesticides and fertilizers, proper use of the stormwater system to avoid illicit discharges and reduce pollutants, reducing overall imperviousness, yard care, on-site stormwater management, and other measures that impact pollution.

Year 2008 highlights included ongoing use of mobile, multi-language water education kiosks, a new round of rain garden workshops, development of a multi-language/multi-cultural watershed education

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video, Earth Day Watershed Clean-up, naturalist activities, a program working with teenagers to create audio public service announcements for use before public concerts at Lake Harriet and Minnehaha Park, and participation in a day-long water festival on Lake Street that highlighted water quality, water quantity and water ownership issues. Also in 2008 a cigarette litter study was conducted that culminated in an *Adopt-An-Ash Receptacle* program, and web site stormwater information and resources were expanded.

In 2009, most of these programs will continue. Use of the kiosks is expanding into the Minneapolis Public Schools. The Multi-Cultural Watershed Education Video is targeted for release late summer. The rain garden workshops are being expanded, and a state-funded pilot rain garden project will be launched for areas draining to Powderhorn Lake. Additionally, interpretive signage is being designed for installation at key public stormwater management sites, with project information and a self-guided tour of the sites that will appear on the City's web site.

***Public Participation Process Program***

The City of Minneapolis and the MPRB are the joint holders of the NPDES Permit, and the Annual Report is a coordinated effort by various City departments and the MPRB. The Permit requires an opportunity for public input in the development of the priorities and programs necessary for compliance. Information in the Annual Report covers the activities that will be implemented for the current year, and provides documentation and analysis of the activities conducted in the previous year.

Each year, the City holds a public hearing at a meeting of the Transportation & Public Works Committee of the City Council. The hearing provides an opportunity for public testimony regarding the Program and Annual Report prior to report submittal to the Minnesota Pollution Control Agency.

A notice of the availability of the draft Report for review and public comment was sent to all 81 Minneapolis neighborhood organizations, to the governmental entities that have jurisdiction over activities relating to stormwater management, and to other interested parties. The notice was sent by e-mail and included information for accessing or obtaining the draft Report, and for providing comments either in writing or in person at the public hearing. Once finalized, the Annual Report is also made available on the web site for viewing or downloading. The City Clerk's office also keeps copies of the Annual Report on hand for examination by the public, prior to the hearing date and for a period thereafter.

The public hearing was held on April 28, 2009. No testimony or questions were presented. Written comments were accepted until Friday, May 1, 2009. No questions or comments were submitted.

***Coordination with Other Governmental Entities Program***

The objective of this program is to maximize stormwater management efforts through coordination and partnerships with other governmental entities. Coordination and partnerships of the City

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and the MPRB with other governmental entities include the four watershed organizations in Minneapolis: Bassett Creek Water Management Commission, Mississippi Watershed Management Organization, Minnehaha Creek Watershed District, and Shingle Creek Watershed Management Commission.

Coordination activities and partnerships with other governmental entities also include MnDOT, MPCA, neighboring cities, the Metropolitan Council, and various other entities. The coordination can include the joint review of projects, joint studies, joint water quality projects, stormwater monitoring, water quality education, and investigation or enforcement activities. In 2008, participation with other governmental entities in Total Maximum Daily Load (TMDL) studies and implementation plans became a significant new Work Plan component, and this will continue into the foreseeable future.

In 2008, the City submitted its Minneapolis Local Surface Water Management Plan (LSWMP), adopted by the City in October 2006, to the Metropolitan Council as a component of the City's updated comprehensive plan, The Minneapolis Plan For Sustainable Growth. The LSWMP was developed to meet the requirements of Minnesota Statute 103B, as well as to provide a resource for City staff. The LSWMP plan serves as a guidance manual for handling regulatory requirement issues, planning for and managing surface water resources and stormwater and sanitary sewer infrastructure, and also for stormwater management for development and redevelopment. The intent of the LSWMP is to benefit stormwater management within Minneapolis, and to improve both the coordination and effectiveness of efforts by the City, the MPRB, and the WMOs.

The LSWMP was prepared to guide the City in conserving, protecting, and managing its surface water resources. Contributors included various City departments, MPRB, MCES, and the four watershed organizations in Minneapolis. The LSWMP brings together all water resources issues and activities, and identifies improvements, gaps or overlaps that will help to better manage the City's water resources and attain overall goals.

***Stormwater and Water Quality Monitoring - Results and Data Analysis Program***

The Minneapolis Park & Recreation Board's [2008 Water Resources Report](#), part of an annual series, is a comprehensive technical reference of water quality information for the citizens of Minneapolis. Due to the length of this document, only excerpts related to the NPDES stormwater runoff monitoring and BMP monitoring sections are included in the Annual NPDES Report. Electronic copies of the [2008 Water Resources Report](#) are available on the MPRB web page at [www.minneapolisparke.org](http://www.minneapolisparke.org). Reports are also available to be checked out from every public library in Minneapolis. A CD-ROM copy of the entire report can be obtained by contacting the MPRB Water Quality Section at (612) 230-6400.

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For required NPDES monitoring sites, storm event samples were collected May through November, and snowmelt grab samples were collected in January and March. The target frequency for sample collection was once a month. The total volume sampled for each site, and the total recorded volume, is given in Table 23B of Appendix A, along with the percentage sampled per season. For detailed information on sampling events see Table 23C of Appendix A. The parameters listed in the Limits and Monitoring Requirements section of the permit were monitored for each sample collected. Multiple bacteria grab samples were taken throughout the season, using standard protocols.

Best Management Practices (BMPs) include procedures and structures designed to help reduce water pollution. For monitoring of BMPs, in 2008 the MPRB monitored two of the City of Minneapolis' stormwater ponds located in north Minneapolis at Heritage Park. Monitoring will continue in 2009. This data will be used to assess and give an indication of the baseline efficacy of the Heritage Park and Heritage Common BMPs and will be compared to data collected in later years.

For lake monitoring, in 2008 the MPRB scientists monitored 13 of the city's most heavily used lakes. The data collected were used to estimate the fertility or Trophic State Index (TSI) of the lakes. Historical trends in TSI scores are used by lake managers to assess improvement or degradation in water quality. All the lakes in Minneapolis fall into either the mesotrophic or eutrophic category, which is as expected for lakes in a fully developed urban area. Calhoun, Cedar, and Harriet Lakes are mesotrophic with moderately clear water and some algae. Brownie, Isles, Hiawatha, Nokomis, Spring, Loring and Powderhorn Lakes are eutrophic with higher amounts of algae. Wirth Lake and Webber Pond fluctuate between these two categories. Trends in lake water quality can be seen by using the annual average TSI score over the last 18 years. Lakes showing water quality improvement included Calhoun, Cedar, Harriet, Powderhorn, Wirth and Webber Pond. Lakes with stable water quality included Brownie, Nokomis, Hiawatha, Isles and Spring.

***Storm Drain System and Drainage Areas Inventory Program***

The City of Minneapolis storm drain system handles runoff from approximately 50 square miles, and is the key element in ongoing efforts for flood protection and programs to improve and maintain water quality for the City's wetlands, lakes and streams. The City contributes stormwater runoff to Minnehaha Creek, Bassett Creek, Shingle Creek and Mississippi River watersheds.

The system includes main line storm drain piping, deep drainage storm tunnels, catch basin runs, outfall control structures, pump stations, and numerous Best Management Practices (BMPs) including ponds, wetlands, grit chambers and so on. The total replacement cost of the City's storm drain system

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exceeds \$860 million (based on year 2000 dollars). Not included in the City system are facilities owned and operated by MnDOT, Hennepin County, and the University of Minnesota.

Calculations of seasonal loads for 2008 were calculated on the following basis:

<u>Season</u>	<u>Inclusive dates</u>	<u>Precipitation, National Weather Service</u>
Winter/snowmelt	01/01/08 – 03/31/08	<b>2.52 inches (0.064 m)</b>
Spring	04/01/08 – 05/31/08	<b>5.65 inches (0.144 m)</b>
Summer	06/01/08 – 08/31/08	<b>8.18 inches (0.208 m)</b>
Fall	09/01/08 – 12/31/08	<b>6.03 inches ( 0.153 m)</b>

For a summary of activities and responsible departments for each Section of this Report, refer to Appendix A45.

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*Storm Drain System Operational Management and Maintenance*

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## II. Storm Drain System Operational Management and Maintenance

### **Program Objective**

The objective of the NPDES stormwater management program is to minimize the discharge of pollutants through the proper operational management and maintenance of the City's storm drain system. Targeted pollutants include:

- Sediment
- Nutrients
- Floatable Garbage

### **Program Overview**

The City's storm drain system is operationally managed and maintained by the Operations section of the Public Works Department Surface Water and Sewers Division. Design engineering and regulatory issues are managed by the division's Capital and Regulatory sections.

The current total authorized staffing level of the Operations section is approximately 68 full-time employees. Of this, there are currently 47 permanent, full-time and 1 seasonal employee working directly within the operations and maintenance area, and the remainder work within the construction area. General operations and maintenance efforts include pump station and pipeline inspections, pipeline cleaning, system repairs, rehabilitation or reconstruction, inspection and operation of control structures, operation of pump stations, cleaning of water quality structures, and operational management of stormwater detention ponds. The table below shows the base operational functions along with the corresponding staffing:

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*Storm Drain System Operational Management and Maintenance*

Crews	Staff/crew	Type	Tasks
4	2	Route Truck	Daily pipe line system inspections, complaint response, and resolution to minor system operational problems
6	2	Jet Truck	"As-requested" cleaning of storm system components, routine cleaning of sanitary system pipes, and "as-requested" cleaning of pump/lift stations. Hydro jet-wash technique.
2	2	TV Truck	Televise and inspect storm drain and sanitary sewer system components. Log and assess condition of televised lines to determine and prioritize rehabilitation and/or repair needs to storm drain and sanitary sewer system components.
2	2	Repair Truck	Perform medium-sized repairs, requiring minimum excavation, to storm drain and sanitary sewer system pipeline components. May assist in the repair or reconstruction of larger repair/ reconstruction jobs.
3	2	Vacuum Truck	Vacuum-cleaning of water quality structures, manholes, and catch basins within the storm drain system. Assist in sanitary sewer cleaning by vacuum removal of sludge and debris build-up. Assist in repair/ construction activities using vacuum excavation process. Assist in erosion control compliance using vacuum cleanup of eroded soils and/or cleaning of erosion control structures.
1	2	Rod Truck	Remove roots and foreign objects from sanitary sewer system. Remove large debris from storm drain pipes and free ice from frozen catch basin leads.
1	3	Pond & Pump	Operate, maintain, and repair sanitary lift station and stormwater pump stations. Operate and maintain stormwater detention basins.
1	3	Shop	Perform general maintenance and repair to specialty use vehicles and emergency response equipment. Fabricate, as needed, custom metal and wood objects for sewer and storm drain operations. Provide field deliveries of materials, tools, and equipment. Maintain material inventory and fleet management data.

**Previous Year Activities**

Some of the more noteworthy 2008 cleaning and repair statistics are summarized in the following list:

- Responded to 800 complaints of plugged or backed-up catch basins
- Responded to 44 complaints of cave-ins around catch basins and manholes
- Performed 293 minor repairs to storm drain lines, catch basins or manholes
- Completed 3 major repairs to the storm drain system
- Cleaned 4.73 miles of storm drain utilizing hydro-jet washing
- Televised and condition assessed 1.27 miles of storm drain pipe line

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*Storm Drain System Operational Management and Maintenance*

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**Work Plan**

The Program will continue to perform its routine functions, respond to emergencies or random events, and aim for removing inflow sources from the sanitary sewer system.

**Performance Measures**

- Miles of storm drain televised in 2008: **1.27 miles** @ \$0.99 / feet
- Miles of storm drain cleaned in 2008 utilizing hydro-jet washing: **4.73 miles** @ \$5,687/ mile

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*Structural Controls Operational Management and Maintenance*

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### III. Structural Controls Operational Management and Maintenance

#### **Program Objective**

The objective of this NPDES stormwater management program is to minimize the discharge of pollutants through the proper operational management and maintenance of the City's storm drain system. Within the City's storm drain system are structural controls which affect system flow rates and water quality discharges.

#### **Structural controls include:**

- Grit Removal Chambers
- Stormwater Retention/Detention Ponds
- Outlet Structures
- Inlet Structures
- Pump Stations
- Level Control Weirs

#### **Targeted pollutants include:**

- Sediment
- Nutrients
- Floatable Garbage

#### **Program Overview**

Structural controls that are part of the City's overall storm drainage system are operationally managed and maintained by the Operation & Maintenance section of the Public Works Surface Water & Sewers Division. These components are routinely inspected and maintained to ensure proper operation and reliability. Frequency of inspections and assigned maintenance efforts are based on both operational experience and incurred environmental events. Structural controls are separated into five separate categories:

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*Structural Controls Operational Management and Maintenance*

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**1. Grit Removal Structures**

These are devices that have been installed for sediment, debris, and oil collection. The City continues with its effort to increase the number of grit chambers installed. The devices are inspected in the spring and fall of each year, and then cleaned, if required. The amount of sediment removed, the presence of floatables, and the dates that devices were cleaned are recorded on log-sheets, and then added to a database. Appendix A35 contains a list of these devices, and maintenance dates.

**2. Storm Drain Outfalls**

These are the structural ends of system pipelines where conveyance of stormwater runoff is discharged into receiving water bodies. Outfalls are inspected on a 5-year schedule where 20% of the outfalls are inspected each year. Site inspections evaluate the general condition of structures, determine if any significant erosion has occurred and observe any contaminant discharges. When indications of illicit or otherwise contaminated discharges are observed, they are immediately reported to the Minnesota Duty Officer and the Minneapolis Regulatory Services – Environmental Section for further investigation and resolution. Any identified structural repairs or maintenance work is prioritized and scheduled within the constraints of available personnel, budget funding, and coordination with other essential operations. Appendix A36 contains maintenance information for these devices.

**3. Pumps & Weirs**

These are structural devices that mechanically affect the flow of stormwater runoff through the storm drain system. Pump stations are inspected on a monthly basis for routine operational checks and are inspected annually for detailed condition assessment. Maintenance and/or repairs are performed with routine items being completed as needed and larger items being coordinated into a budgeted pump station operation program. Weirs and outlet structures are inspected and repaired as needed to facilitate their proper operational working order.

**4. Ponds**

These are structural devices that detain stormwater runoff, and in some cases improve the water quality. Ponds are regularly maintained for volume and also for their park-like amenities including turf grass, pathways, benches, and lighting. Based on current level of experience, the need for dredging of sediment buildup appears to be in a 15- to 20-year cycle. At present, only a few of the City's holding ponds are at or near this age such that the need for sediment removal from them has been considerable.

**5. Storm Drain Inlets**

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*Structural Controls Operational Management and Maintenance*

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These are structural devices that provide entrance of stormwater runoff into the storm drainage system. They are catch basins located along the City's street system. There is no formalized inspection schedule, however Surface Water & Sewers crews and Street maintenance crews both routinely look for plugged or damaged structures. Reported damages and/ or plugs are given a priority for repair and/or cleaning. Cleaning catch basins, while ensuring proper runoff conveyance from City streets, also removes accumulated sediments, trash, and debris. Augmenting this effort is the street sweeping program carried out by the Street maintenance section that targets the pick-up of street sands, leaves, and debris prior to their reaching catch basins. Repair of damaged catch basins is also a priority, given their location in city streets and ultimate impact to the traveling public.

### **Previous Year Activities**

- Monitored and maintained pump stations.
- Inspected 270 and cleaned 128 grit chambers. A total of 554.76 cubic yards were removed from grit chambers. Another 320 cubic yards was removed from a storm drain tunnel and 348 cubic yards was removed from Kings Highway Holding Pond for a total of 1,222.76 cubic yards. The majority are both maintained and owned/operated by Public Works; however some are owned and operated by others, but cleaned by Public Works under contact.
- Maintained 11 stormwater holding ponds
- Inspected 81 of 387 storm drain outfalls in 2008 inspection program. Of the 81 outfalls inspected, 4 were judged to be in need of maintenance. Of the outfalls needing maintenance, 2 had repairs completed in 2008. There are also 2 outfalls carried over from 2007 that have not been repaired yet due to issues with accessibility.

### **Work Plan**

Operational management and maintenance of the City's structural control devices will continue as in prior years. In 2009, we are also concentrating on improving the consistency of maintenance of stormwater ponds and pumps, and on improving condition assessment of, and long-term budgeting for, pump station maintenance and operations.

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*Structural Controls Operational Management and Maintenance*

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**Performance Measures**

Structures operated and maintained annually:

- **25** pump stations @ average cost of \$4,767 / station
- **11** stormwater holding ponds @ average cost of \$25,347 / pond
- **138** grit chambers serviced @ average cost of \$533 / chamber

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*Disposal of Removed Substances*

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## IV. Disposal of Removed Substances

### **Program Objective**

The objective of this NPDES stormwater management program is to minimize the discharge of pollutants through the proper operational management and maintenance of the City's storm drain system. A key component is the collection and disposal of targeted pollutants in a manner that will prevent pollution and that will comply with applicable regulations. Targeted pollutants include:

- Sediment
- Nutrients
- Floatable Garbage

### **Program Overview**

Targeted pollutants are collected from grit removal structures, inlet structures, system piping, detention ponds, and deep drainage tunnels. Removed substances are screened for visual or olfactory indications of contamination. If contamination of the material is suspected, the Engineering Laboratory will select representative samples for an environmental analysis. Contaminated substances are disposed of in a landfill or another site that is approved by the Minnesota Pollution Control Agency (MPCA). Non-contaminated targeted pollutants are disposed of the same way as street sweepings, as reported in **Section VI. Roadways**. During cleaning and disposing operations, erosion control measures are applied when needed to prevent removed material from re-entering the storm drain system.

### **Previous Year Activities**

Approximately 1,223 cubic yards of targeted pollutants were removed from storm drain system facilities by Minneapolis Public Works crews in 2008. Minneapolis Public Works maintains the city's system and also facilities for other agencies, such as Hennepin County and the Minnesota Department of Transportation. The removed material consisted primarily of sand and vegetative matter collected from grit removal chambers. See **Section III. Structural Control Operational Management and Maintenance** for operation and maintenance details.

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*Disposal of Removed Substances*

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**Work Plan**

Disposal of removed substances will continue as in years past.

**Performance Measures**

- Quantity of materials removed: **1,223** cubic yards @ \$100/cubic yard (includes labor costs for additional inspections)
- Surface Water & Sewers Operations responded to, and subsequently mitigated, **9** contaminated substance/ hazardous waste spills in 2008.

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*Stormwater Management for New Developments and Construction*

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## V. Stormwater Management for New Developments and Construction

### **Program Objective**

The objective of this stormwater management program is to minimize the discharge of pollutants, through the regulation of construction projects and new developments. Regulation includes erosion and sediment control, and approval of stormwater management including ongoing operation and maintenance commitments. Targeted pollutants include:

- BOD5<sup>1</sup>
- Nitrate + Nitrite
- Mercury
- Phosphorus
- Total Suspended Solids (TSS)

### **Program Overview**

Minneapolis Code of Ordinances, Title 3, Air Pollution and Environmental Protection, contains erosion and sediment control requirements, and stormwater management instructions for new developments and other land-disturbing construction activities.

### **Site Plan Review**

Construction activities and new development projects are reviewed through the City's site plan review process. The Minneapolis Development Review (MDR) facilitates this process where a Development Coordinator directs a preliminary, multi-disciplinary review of the submitted plans. This review provides comments that are integrated into a final plan submittal that is subsequently routed to the City's Licensing, Building Plan Review, Fire, and Community Crime Prevention units, and to the Public Works Department (Street, Traffic, Sidewalk, Water, Right of Way, and Surface Water & Sewers sections), for review of compliance issues. The Surface Water & Sewers Division reviews projects for compliance with the Erosion & Sediment Control Ordinance (Minneapolis Code of Ordinances (MCO) Chapter 52), Stormwater Management Ordinance (MCO Chapter 54), combined sewer issues (in part, MCO Chapter 56) and flooding and capacity issues.

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<sup>1</sup> Biochemical Oxygen Demand of wastewater during decomposition occurring over a 5-day period

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***Erosion Control***

**Ordinance**

On May 16, 1996 the Minneapolis City Council amended Title 3 of the Minneapolis Code of Ordinances relating to Air Pollution and Environmental Protection by adding Chapter 52, entitled *Erosion and Sediment Control for Land Disturbance Activities*. The ordinance was designed with the intent of regulating topsoil disturbances, thus limiting soil from entering the storm drain system.

**Requirements**

The ordinance addresses development sites, utility excavations, demolition projects, and all other land disturbing activities. Sites disturbing more than five cubic yards, or 500 square feet, need an erosion control permit. Erosion & Sedimentation Control (ESC) Permits must be acquired prior to commencement of work, and must be obtained before a building permit will be issued for the site. If there will be a disturbance of greater than 5,000 square feet, demolition and construction sites also require an approved erosion control plan before the ESC Permit can be issued.

**Enforcement**

Ongoing site inspections are performed by Public Works and Regulatory Services inspectors. A violation of the ordinance holds a maximum penalty of \$ 700. Inspectors may issue a warning notice citation or a "Stop Work Order". Failure of the permittee to comply with the ordinance will constitute a violation (pursuant to Section 52.300), and will be considered a nuisance pursuant to the laws of the State of Minnesota. If there is a demonstrated failure to comply, the City reserves the right to terminate an ESC permit at any time. The City then has the option of proceeding with the necessary restoration of the site. This restoration would be done at the expense of the owner/permittee.

***Ongoing Stormwater Management (following completion of construction projects)***

**Ordinance**

On November 24, 1999, the Minneapolis City Council amended Title 3 of the Minneapolis Code of Ordinances (relating to Air Pollution and Environmental Protection) by adding Chapter 54, which is entitled *Stormwater Management*. The ordinance establishes requirements for permanent stormwater management for projects on sites that are greater than one acre.

**Plan Review**

Stormwater management plans are required for all construction projects greater than 1 acre in size. These plans are reviewed through the Minneapolis Development Review (MDR) process and

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approved by the Minneapolis Public Works, Surface Water & Sewers Division. Sites less than 1 acre are also encouraged to incorporate stormwater BMPs in their design as a means of satisfying other city codes such as green space requirements.

**Registration**

Stormwater devices are registered with the City of Minneapolis Department of Regulatory Services, with an annual permit required for each stormwater device registered. An annual maintenance and inspection program is included in the permitting process.

**Goals**

The Minneapolis Stormwater Ordinance specifies that stormwater management standards be set according to the receiving water body. These standards include but are not limited to:

- Reductions of Total Suspended Solids (TSS) for discharges to the Mississippi River
- Controlled rate of runoff for discharges to streams, areas prone to flooding, and areas with infrastructure limitations
- A reduction in nutrients for stormwater that discharges to lakes and wetlands
- Provision of on-site, off-site, or regional stormwater facilities
- Maximizing infiltration by minimizing the amount of impervious surface
- Employing natural drainage and vegetation

**Previous Year Activities**

***Site Plan Review***

During 2008, Minneapolis Public Works took part in the preliminary review of 120 site plans. Of those 120 sites, 90 site plans received final approval with the appropriate permits issued. Continued attention to erosion control plan submittals along with increased awareness in the industry provided for better compliance during site inspections.

***Erosion Control***

Increased awareness of the ordinance, improving plan submittals and a continued compliance-based inspection program resulted in a continued rise in compliance. A summary of the 2008 inspections is as follows:

- 1,447 site inspections completed

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- Successfully responded to 47 public complaints
- 5 enforcement actions issued to gain site compliance
- Coordinated inspections with Minnehaha Creek Watershed District (MCWD)

During 2008, Public Works Surface Water & Sewers inspectors continued to work with internal forces on erosion compliance providing site inspections for Street, Bridge, Traffic, Sewer and Water construction forces improving overall compliance. Improved understanding of erosion control BMPs by City construction forces has allowed inspectors to focus on private sites improving compliance citywide.

***Ongoing Stormwater Management***

Redevelopment of existing sites provides an opportunity to lessen the impacts of urbanization on the Mississippi River and other Minneapolis water resources. During 2008, **71** Stormwater Best Management Practices (BMPs) were installed on sites reviewed through the Minneapolis Development Review process. BMP types that were proposed included:

- Rain gardens
- Pervious pavement
- Infiltration areas
- Ponds
- Underground detention facilities

When installed, these BMPs will provide rate control and water quality for approximately 200 acres of land.

**Work Plan**

***Site Plan Review***

Public Works staff will continue their detailed review of site plans and a tracking process to identify stormwater management opportunities. Despite limited resources, Public Works has been tracking the type, location, and number of constructed stormwater BMPs. Public Works will continue to review all development plans from a Low Impact Design (LID) and sustainable water quality perspective.

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***Erosion Control***

- New developments and other projects that disturb soil will see a continued presence by Public Works inspectors. This effort should lead to a continued awareness of the problems associated with construction site sediment. This presence will also result in a continuing increase in the overall rate of compliance citywide. Public Works will continue to study other options to increase compliance, and to help limit the amount of erosion and sediment loss associated with new construction.

***Data Collection and Analysis***

- Creating new performance measures and improving data collection, tracking and analysis. Means of measuring and understanding water quality impacts that are under study include total acres providing on-site water quality treatment, total pervious area in the City, regulatory costs per site, and cost vs. compliance benefits.

***Ongoing Stormwater Management***

Current activities will assure the continuation of the progressive nature of our program. In addition to current activities Public Works will:

- Continue to finalize inspections and registration of all stormwater devices installed under Minneapolis Code of Ordinances Chapter 54, Stormwater Management, to-date.
- Continue to promote water quality incentives through the Stormwater Utility Credit Program; while incentives may provide some improvement in water quality, they will not by themselves dramatically reverse the negative impacts of urbanization on water quality.
- Explore potential for new regulations or amendments to existing ordinances that could accelerate the goals of the permit.
- Propose amendments to the Stormwater Management ordinance to reduce the threshold for sites that are captured, and to increase the buyout in lieu of site treatment fee.

**Performance Measures**

Current performance measures include: <sup>2</sup>

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<sup>2</sup> Unit costs are not available because functions exist in more than one department, and because expended labor and resources are not tracked separately from other site review and permitting functions.

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1. Number of sites captured in 2008 under Stormwater Management Ordinance: **29**
2. Number of erosion control inspections in 2008: **1,447**
3. Number of large BMPs such as ponds or wetlands installed with public projects in 2008 as a result of current programs: **1**
4. Number of small BMPs such as rain gardens installed with private projects in 2008 as a result of current programs: **56**
5. Number of large area grit chambers installed with public projects in 2008: **2**
6. Number of small area grit chambers installed with private projects in 2008: **15**

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*Roadways*

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## VI. Roadways

### **Program Objective**

The objective of this stormwater management program is to minimize the discharge of pollutants through the proper operation and maintenance of public streets, alleys, and municipal equipment yards. Targeted pollutants include:

- Total Suspended Solids (TSS)
- BOD<sub>5</sub><sup>3</sup>
- COD
- Phosphorus
- Chlorides

### **Program Overview**

#### ***Street Sweeping***

Minneapolis employs several street sweeping approaches in Minneapolis. Some are citywide, and some vary by area or land use. Curb-to-curb sweeping operations occur citywide every year in the spring and fall. At those times, all City streets and alleys are swept systematically, and temporary parking bans are enforced to aid with sweeping operations. Operational routines and special methods are employed to address seasonal conditions, and to optimize cleaning. Flusher trucks apply pressurized water to the streets in an effort to push sediment and debris to the gutters. Street sweepers follow behind the flusher trucks and clean the gutters. During the fall, leaves are first bunched into piles, and then the leaves are picked up before flushing and sweeping occurs. During the summer, between the spring and fall sweep events, sweepers are assigned to maintenance districts for periodic area sweeping. Downtown and other high traffic commercial areas are swept at night on a weekly basis. In addition, summer sweeping in the Chain of Lakes drainage areas has occurred since 1995 as part of the Clean Water Partnership project. Two sweepers are dedicated to cleaning drainage areas around the Chain of Lakes, and one sweeper is devoted to the Minneapolis Parkway System.

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*Roadways*

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The materials collected from Street Sweeping are received at two different locations, based on time of the year and nature of the material. The inorganic materials go to a construction demolition landfill site in Becker, Minnesota, to be used as daily cover. A five-year 2008 contract states that the organic materials, which are collected mostly in the fall of the year, go to Carver County Minnesota to be composted and converted to a retail mulch material that is then distributed by a company called RW Farms, LLC, Organic Technologies.

**Snow and Ice Control**

The Street Maintenance section applies salt and sand to City roadways every winter for snow and ice control. Efficient application of de-icing materials is sought to reduce costs, required maintenance, and environmental impact. The most obvious cost savings is realized in a reduction of the overall amount of materials used; catch basins and grit chambers require more frequent cleaning due to the accumulation of the additional sand. Salt causes corrosive damage to bridges, reinforcement rods in concrete streets, metal structures and pipes in the street, and vehicles. Salt is harmful to groundwater and to most plant and tree species. Sand harms lakes and streams by disturbing the ecosystems, and in depositing pollutants that bind to sand particles in lake bottoms and streambeds. In 2008, the EPA approved a Total Maximum Daily Load (TMDL) study that places limits on chlorides (salt) discharged to Shingle Creek which had been assessed as impaired for chlorides. Consequently, the City developed improved snow and ice control practices, and they are being implemented not only in the Shingle Creek drainage area but also citywide. Maintenance supervisors are trained in winter maintenance techniques through sessions that are sponsored by the Local Road Research Board (LRRB), a training partnership of Mn/DOT and the University of Minnesota. Specific topics covered include guidelines for sand and salt application rates that are based on weather conditions, application techniques, and spreader calibration. Plans for future training sessions will include those actual equipment operators. Material spreaders are calibrated annually before the winter season. Maintenance yard housekeeping practices are designed to minimize salt/sand runoff. The materials that are used are tallied on a daily basis.

**Storage of De-icing Materials**

All salt stockpiles are stored under cover to minimize potential groundwater contamination and runoff. After evaluating existing storage facilities, new storage sheds were

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<sup>3</sup> Biochemical Oxygen Demand of wastewater during decomposition occurring over a 5-day period

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constructed in 1991 at maintenance yards located at 60<sup>th</sup> and Harriet Ave. S. and at 1809 Washington Ave. N.E. These facilities were designed according to Mn/DOT specifications, to minimize runoff. A new maintenance facility is being constructed at Hiawatha Avenue and E. 26<sup>th</sup> St. that will consolidate several maintenance yards. The new maintenance yard will employ the most effective Best Management Practices (BMPs) available, including runoff collection systems that will be installed around salt and sand stockpiles, and truck washing areas. Once the complex is built, the temporary storage sheds at 198 Aldrich Avenue N. and at Hiawatha Avenue and E. 26<sup>th</sup> St. will be eliminated. The storage shed at the 44<sup>th</sup> St. E. & Snelling Ave. maintenance yard is closed.

### **Previous Year Activities**

The 2007-2008 winter season was colder than the year before with a number of large snow events along with fewer minor events. The most snowfall was observed in December and March which was later than the year before, but significant snowfalls were seen in February and April in single or two-day events. There were two declared snow emergencies, and 167 days of snow and/or temperatures below freezing. The quantities of salt and sand used in snow and ice control are tracked by recording amounts that are delivered by suppliers, and also by estimating the quantities that are on-hand on a daily basis. Street sweepings are counted by volume (truckload). These counts are converted to material weight by taking an average of a random weighting of trucks, and by then multiplying that number by the number of truckloads hauled. Leaves picked up are weighed at certified scales that are located at City facilities or in Hutchinson. The statistics for last year's program are as follows:

- 16,500 tons of salt was applied to roadways
- 13,000 tons of sand was applied to roadways
- 21,640 tons of materials was reclaimed during spring and summer street sweeping operations
- 6,738 tons of leaves were collected (for composting) during the fall City-wide sweeping
- 25 staff members attended an eight-hour refresher for the 40-hour hazardous materials training class
- 13 Foremen attended training on the use of salt at the annual salt symposium

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- All division shift–staff attended the annual review of procedures. The review covers the recognition and response to hazardous materials or situations.

**Work Plan**

Ongoing activities to fulfill permit requirements will continue. Currently, the method for tracking the quantities of materials gathered through street sweeping operations is to use data on how much material is hauled away. Additional education opportunities will be explored for management and maintenance workers. Management will keep abreast of new technologies for snow and ice control, and street sweeping, as they become available. Any promising technologies will be tested on a pilot basis before implementation.

**Performance Measures**

- Unit costs are not available
- Amount of materials recovered as a percentage of materials applied: **73%**
- Amount of salt and sand applied relative to total snowfall: **488** tons/inch

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*Flood Control*

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## VII. Flood Control

### **Program Objective**

The objective of the Minneapolis stormwater management program is to design flood control systems that manage stormwater quantities so that the runoff does not exceed the capacity of the existing facilities while minimizing the impacts on the water quality of the receiving water body. Targeted pollutants include:

- Phosphorus
- Total Suspended Solids (TSS)

### **Program Overview**

In July 1997, Minneapolis experienced torrential rainstorms that exceeded the capacity of the City's existing storm drain system and caused flooding throughout the City, causing physical damage to homes, businesses & vehicles. In response, Minneapolis Public Works established the Flood Mitigation Program to develop potential solutions and a plan for implementation for each of 39 areas that experienced flooding and/or property damage as a result of the 1997 storms.

The Flood Mitigation Program began in 1998 and was originally scheduled to run through 2009. However, due to the state of the City's available finances, this Program was temporarily suspended. New flooding areas continue to be identified by residents, or through continued analysis of the system. These additional project areas will be considered for future implementation. The design storm is unchanged. Storm drains are still designed to accommodate open channel flow during a 10-year, 24-hour design<sup>4</sup> and provide protection to homes from the 100-year, 24-hour design event. However due to changes that anticipated Total Maximum Daily Load (TMDL) standards will impose on new designs, current flood mitigation strategies are changing. The mitigation techniques have a much different priority now. Anticipated TMDL standards require a new type of flood management project. The new type of project tries to achieve the three R's or the three **REDUCTIONS** of **VOLUME**, **LOAD** and **RATE**.

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<sup>4</sup> City of Minneapolis 10-year design based on 4.2" of rainfall in a 24-hour event and 100-year design based on 5.9" of rainfall in a 24-hour event.

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With this current strategy, the designer first looks for **VOLUME REDUCTION**. This is a successful approach to TMDL reduction, because these volume reducing techniques do not concentrate the phosphorus or suspended solids, so there is a corresponding **LOAD REDUCTION**. Next the designer looks for **RATE REDUCTION**. This too is a successful approach to TMDL reduction because the techniques slow the water down at its source, thereby reducing the initial amount of sediment that reaches the stormwater system. This is a dramatic change in design development and a departure from past strategies of enlarging pipes to drain more stormwater faster. New techniques focus on green initiatives that treat stormwater where it falls and this approach develops options that eliminate or at least minimize the need for new or larger pipes. Examples of the new **Three “R”** techniques include:

- A proposal to use street right-of-way for infiltration is a **Three “R”** project because phosphorus-laden suspended solids would be filtered by porous media and then infiltrate into the soil
- Another proposal to use street right-of-way in areas with heavy soil is a **Three “R”** project because, once again, phosphorus-laden suspended solids would be filtered by porous media to an underground reservoir that feeds tree roots for evapotranspiration
- When volume-reducing strategies are precluded by soil conditions, rate control systems such as underground storage are used

In many cases, adding catch basins or augmenting inlet capacity has the negative effect of increasing the runoff rate. New strategies would look for volume-reducing techniques upstream so the existing system would then have capacity for existing flows. Here are other strategies to help control flooding:

- Installation of backup generators for existing pump stations
- Increased inspection and maintenance of catch basin inlets and storm drains that are located within flood-sensitive areas
- Inclusion of various Best Management Practices (BMPs), including grit chambers, rain gardens, permeable pavers, etc.

The City’s Flood Control Program is a companion to the Combined Sewer Overflow (CSO) Program and the Infiltration and Inflow (I & I) Program. Studies show that the City has a problem with inflow (stormwater that drains to the sanitary sewer system). Citywide, the estimated inflow in spring 2008 was 68.184 million gallons per day, or 209.25 acre-feet of runoff. Unfortunately, successful completion of CSO and I & I projects can be a burden for the Flood Control Program, because of

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additional volume. In 2008 the City removed 47-acre feet of inflow, thus the storm sewer system received 47 more acre-feet of runoff that had previously discharged to the sanitary sewer.

### **Previous Year Activities**

There was no flood mitigation project activity in 2008.

### **Work Plan**

- Flood mitigation projects planned for 2009 have been postponed due to uncertainty of funding. The projects will be rescheduled if funding becomes available.

### **Performance Measures**

While most citizens will measure success by whether there is reduced neighborhood flooding, the Flood Control work proposed in the future will also target water quality. Many of the projects are intended to determine and demonstrate technology that works specifically for this City. Continuing the objectives of previous years, the goal is increased water quality of lakes, river and streams in Minneapolis. The Flood Mitigation Program Projects now focus more on treating stormwater where it falls and making **VOLUME REDUCTION** the common element of systems, because volume-reducing systems provide for reduction of TSS, nutrients, litter, and other pollutants, as well as providing some **RATE CONTROL**.

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*Pesticides and Fertilizer Control*

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## VIII. Pesticides and Fertilizer Control

### **Program Objective**

The objective of this stormwater management program is to minimize the discharge of pollutants by controlling the application of pesticides and fertilizers. Targeted pollutants include:

- Pesticides
- Nutrients

### **Program Overview**

#### ***Integrated Pest Management (IPM) Policy and Procedures***

The Minneapolis Park and Recreation Board's (MPRB) IPM policy for golf courses and general park areas is included in the MPRB's General Operating Procedures.

The Coordinator of Horticulture Programs works with both Park Maintenance and Environmental Services staff to decide the best approach to dealing with pest issues. The main focus is the Cowles Conservatory, the Minneapolis Sculpture Garden, and the major display gardens at Lyndale Park, Loring Park, and Minnehaha Falls Park. *Plant Health Care/Integrated Pest Management Action Forms* are filed when there are specific plant health problems for these garden areas. These forms document the specific problems and the recommended course of corrective action.

The Coordinator of Horticulture Programs frequently assists golf course and maintenance staff who have concerns regarding turf and ornamental pests, and also provides recommendations regarding natural resource vegetation management. The Coordinator regularly sends IPM updates; each golf course foreman is responsible for the IPM decisions at his/her course. The golf course foremen, along with other staff, attend the annual Minnesota Green Expo in January. There they receive updated information on the newest turf and other related research as it applies to fertilizers, pesticides, biocontrols, and so on.

#### ***Staff Pesticide Applicator Licensing and Continuing Education***

All recent park keeper and Mobile Equipment Operator (MEO) hires are required to obtain their Minnesota Non-Commercial Pesticide Applicator license within one year of their hiring. Every two years, as mandated by the Minnesota Department of Agriculture, staff attends re-certification training, offered

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and coordinated by the University of Minnesota. This effort is in conjunction with the Agronomy Services Division of the Minnesota Department of Agriculture.

***Use of Pesticides and Fertilizers on Park Lands***

The MPRB manages 6,400 acres of park land in the City of Minneapolis (approximately 18% of the City's 35,244 total land acres).

**Pesticide Use**

Use of pesticides to control turf weeds is not a regular practice of park maintenance. Weed control pesticides may be used when a park is being renovated, or when athletic fields and surrounding areas are being sodded/seeded. It may also be used when weeds exceed 50% of the ground "turf" cover. These procedures for general grounds and athletic fields are included in the MPRB's General Operating Procedures.

The MPRB actively manages Eurasian watermilfoil and purple loosestrife, which are two non-native invasive plant species. Eurasian watermilfoil, an aquatic weed, is harvested mechanically on Lakes Harriet, Cedar, Calhoun, and Isles throughout the summer months. The MPRB has established in its General Operating Procedures that no chemical application will be used to control aquatic weeds. The MPRB collaborated with University of Minnesota (U of M) researchers to develop a biological control (biocontrol) program using a weevil predator for Eurasian watermilfoil. Purple loosestrife, an invasive emergent plant, is controlled using a leaf-feeding beetle as part of the U of M's biocontrol program efforts. Purple loosestrife is the only plant where a biocontrol agent has been successful at controlling the spread of the invasive species. In years where beetle populations are low, and biocontrol methods are not as effective, spot-spraying or hand-pulling of purple loosestrife is done by park maintenance staff. Eurasian watermilfoil and purple loosestrife control are permitted through Minnesota Department of Natural Resources (DNR), Division of Ecological Services. Coordination of control programs for purple loosestrife and Eurasian watermilfoil are determined and supervised by the Environmental Operations Section. Park Maintenance and Environmental Operations staff document chemical application for purple loosestrife control when this is used as a control method.

The Coordinator of Horticulture Programs maintains chemical application records for a period of five years, in accordance with Minnesota Department of Agriculture regulations.

Since the 1980s, golf course foremen and park maintenance staff have documented the type, amount, and locations of the chemicals that are stored at park storage facilities. These chemical inventories provide detailed information to the fire department as to how to deal with a possible fire at

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these sites. The plans identify how the fires are best extinguished, and how to protect surface water in the surrounding area. The plans were put into place in the early 1980s following a chemical company fire in north Minneapolis that resulted in the contamination of Shingle Creek.

**Fertilizer Use**

In September 2001, the Minneapolis City Council amended Title 3 of the Minneapolis Code of Ordinances (relating to Air Pollution and Environmental Protection) by adding *Chapter 55, Lawn Fertilizer*. Under the ordinance, since January 1, 2002 the retail sale of fertilizer containing any amount of phosphorus or other compound containing phosphorus, such as phosphates, is prohibited in Minneapolis, except as allowed by Minnesota Statute 18C.60 Phosphorus Turf Fertilizer Use Restrictions. The Minnesota Statute allows the use of phosphorus turf fertilizer if:

- An approved and recent test indicates that the level of available phosphorus in the soil is insufficient
- The fertilizer is being applied to newly established turf, and only during the first growing season
- The fertilizer is for use on a golf course under certain conditions specified in the Statute

Fertilization of turf on Minneapolis Park & Recreation Board Property is performed for golf courses, around athletic fields, and in areas of heavy traffic. Golf course managers and maintenance foremen are instructed that no phosphorus can be used for turf fertilization unless a current soil test has demonstrated the need for this nutrient. MPRB staff is required to complete a report for every turf fertilizer application. These records are maintained for a period of five years, per state law.

**Previous Year Activities**

***Staff Pesticide Applicator Licensing and Continuing Education***

Currently 182 MPRB employees hold pesticide applicator licenses, through the Minnesota Department of Agriculture (MDA).

***Use of Pesticides and Fertilizers on Park Lands***

**Pesticide Use**

MPRB maintenance and environmental staff continue to maintain the purple loosestrife control program. Populations of released beetles in Minneapolis parks continue to maintain themselves at most sites, thereby reducing the need for chemical spraying.

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**Fertilizer Use**

The MPRB included zero phosphorus turf fertilizers beginning with the 2002 fertilizer bid. This was done in response to the City/state regulation changes regarding phosphorus turf fertilizers. Many suppliers now offer a wide range of zero-phosphorus turf fertilizers.

***Public Education***

Minneapolis Environmental Services has developed a lawn fertilizer brochure by partnering with local communities and the University Extension Program. The brochures were sent out to hardware stores, nurseries, and other stores selling lawn fertilizer.

***Audubon Cooperative Sanctuary Program (ACSP) for Golf Courses***

Audubon International provides comprehensive conservation and environmental education assistance to golf course superintendents and industry professionals, through collaborative efforts with the United States Golf Association (USGA). The ACSP seeks to address environmental concerns while maximizing golf course opportunities thereby providing open space benefits. An important component of this program is the implementation of IPM procedures along with the reduction of chemical and fertilizer use, to protect water quality and provide a healthier habitat for wildlife.

Participation in the program requires that golf course staff address environmental concerns related to the potential impacts of water consumption and chemical use on local water sources, wildlife species, and native habitats. Additionally, the program provides assistance in comprehensive environmental management, enhancement and protection of existing wildlife habitats, and recognition for those who are engaged in environmentally responsible projects. Audubon International provides information to help golf courses with:

- Environmental Planning
- Wildlife and Habitat Management
- Water Conservation
- Water Quality Management
- Outreach and Education

By completing projects in each of the above, the golf course receives national recognition as a Certified Audubon Cooperative Sanctuary. MPRB Operations staff, working with foremen from Theodore Wirth and Meadowbrook Golf Courses, received the ACSP certification for both courses. MPRB staff conducts yearly water quality and aquatic vegetation monitoring at the courses.

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**Work Plan**

- Maintain vegetation database: Environmental Operations staff tracks maintenance activities on the MPRB's Environmental Operations vegetation database.
- Implement an MPRB-created Pesticide and Fertilizer Application Database to improve tracking and reporting of chemical applications to MPRB lands.
- Continue to recertify employees as pesticide applicators.
- Continuing to certify and train more MPRB staff through the Pesticide Applicator Licensing program at the MDA.
- Continue Audubon Cooperative Sanctuary Program efforts: Environmental Operations staff is working with Meadowbrook and Wirth Golf Courses to maintain ACSP certification.
- Continue to institute IPM practices for fertilizers and pesticides across all City land management departments, and include training of MPW and other City staff as part of the MPRB training program. MPRB horticulture staff will work with MPW staff to develop and incorporate IPM into their daily work
- Document the use of pesticides and fertilizers on all City facilities. This information exists for MPRB facilities. This same information will be collected for other facilities within the City, including those managed by the Minneapolis Community Planning & Economic Development Department (CPED) and Property Services Division of Public Works, the Minneapolis Public Housing Authority, and the Minneapolis School Board.

**Performance Measures**

- No unit costs are available for this program.
- Number of MPRB staff with pesticide applicator licenses: **182**

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## IX. Illicit Discharges and Improper Disposal to Storm Sewer System

### **Program Objective**

The objective of this stormwater management program is to minimize the discharge of pollutants by implementing a program to detect and mitigate illicit discharges, and to encourage that an NPDES General Industrial Stormwater Permit or other such permit be obtained for non-stormwater discharges. Targeted pollutants include:

- All pollutants

### **Program Overview**

#### ***Hazardous Spills***

The Street Maintenance section of the Public Works Transportation Maintenance & Repair Division, the Minneapolis Fire Department, and the Environmental Services section of the Regulatory Services Department all coordinate training for emergency spill procedures.

#### ***Typical Spill Response***

Environmental Services and the Minneapolis Fire Department personnel typically serve as the first responders to a spill event. The immediate goals of this response are containment of the spill, recovery of hazardous materials, and collection of data for use in assessment of site impacts. Recovery efforts can take several forms, but typically fall into two broad categories:

- 1) Recovery for re-use
- 2) The use of absorbents or other media to collect hazardous waste for disposal

The life cycle of an event requires City personnel to work as a team, utilizing all available resources to protect residents, the environment and property. Each event is followed by a post-action debriefing to determine the cause of the event, to identify measures to improve the City's response, and to determine the means to limit future occurrences.

The protocol used by the Street Maintenance section for handling spills is documented in **Appendix 32: City of Minneapolis Standard Operating Procedure for Vehicle Related Spills.**

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***Small Spills***

Street Maintenance will dispatch personnel with appropriate equipment to apply sand. Once the sand has absorbed the spill, it is removed by a street sweeper. The contaminated sand is removed from the street sweeper, and then deposited in a leak-proof container.

***Large or Hazardous Spills***

For large or extremely hazardous spills, the small spill process is followed with the exception that additional resources are expended. The Fire Department's Hazardous Materials Response Team is mobilized in lieu of the local fire station. As the assessment of the event occurs, other City departments become involved; additionally, outside agencies and private emergency response contractors are incorporated as needed. Spills that fall within the minimum reporting requirements are reported to the Minnesota Pollution Control Agency (MPCA) Public Safety Duty Officer. For these spills, an ***Oil and Hazardous Materials Spill Data*** form must be completed within 24 hours, or by the next business day. The completed forms are used to document the type of spill, as well as the response to the spill. Environmental Services is responsible for coordinating long-term recovery efforts with other regulatory agencies. Qualifying spills are also reported to the National Duty Officer as required by law.

***Emergency Response Program***

The Department of Regulatory Services operates a boat for use on the Mississippi River and other Minneapolis water bodies, to be able to respond to spills that could impact our valuable water resources. The presence of a properly equipped boat facilitates addressing these events on the Mississippi River as well as on City lakes. Environmental Services staff are trained in the river deployment of booms, have field experience in placement of both containment and absorbent types of booms, and have years of experience on the water. These skills, coupled with an extensive level of knowledge of the Mississippi River, City lakes, landings and outfalls, provide a high level of protection for our precious natural resources.

Additionally, the boat is available for the placement of monitoring and sampling equipment used for tracking water quality, identifying points of illegal discharges, illegal sewer connections, infiltration from a sanitary sewers or water mains, assessment of outfalls, and investigation of complaints that are inaccessible from shore.

***Unauthorized Discharges***

Environmental Services is responsible for pollution prevention and control. Results are achieved through educational efforts, inspections, and coordinated community outreach events. These activities

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may include enforcement, pursuant to Chapter 48<sup>5</sup> and other applicable City codes, and coordination with other regulatory agencies at the county, state and federal levels. Enforcement yields identification of the responsible party, documentation of clean-up activities, and also endeavors to reduce the flow of pollutants from illegal dumping and disposal. Four full-time and one half-time Environmental Services employees are employed to enforce anti-pollution laws and to coordinate various anti-pollution efforts. Environmental Services responds to reports of unauthorized discharges and illicit connections. Complaints are received from the public, City and private contractors, City staff and other government agencies, by the following means:

- [Environmental Management Complaint Form](#)
- Confidential calls to Minneapolis Information & Services. Within Minneapolis, the phone number is 311. Outside of Minneapolis, the phone number is 612-673-3000.
- Reports from sewer maintenance crews, plumbing inspectors, and other City personnel
- Direct contact to Environmental Services staff at 612-673-3867

***Non-Stormwater Discharges***

Environmental Services reviews non-stormwater permits and renewals while working with the MPCA permitting authority to address local concerns. Environmental Services also reviews alleged violations to a permit or code. If permits are violated, or if conditions indicate that the permit should be revised, Environmental Services staff will assist MPCA permitting staff in updating or revoking the permit.

Additional control measures are implemented within the City of Minneapolis to minimize impacts on receiving waters due to the non-stormwater discharges listed below:

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<sup>5</sup> Minneapolis Code of Ordinances, Chapter 48 Minneapolis Watershed Management Authority.

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a.	NPDES permitted non-stormwater discharges	Permits are reviewed and registration is required. Ordinances: Title 3 Chap. 50.
b.	Water line flushing and other discharges from a potable water distribution system	Minneapolis Dept. of Public Works Water Distribution & Treatment Division implements procedures for de-chlorination prior to discharge to the storm drain system.
c.	Landscape irrigation and lawn watering	Pollutants are controlled through City ordinances: Title 11 Chap. 230 and Title 3 Chaps. 48 and 55.
d.	Irrigation water	Same as above.
e.	Diverted stream flows	Regulated by state statute and adopted in the City Charter. Diversions require approval by the City and other regulatory agencies.
f.	Rising ground water	The Minneapolis Brownfield Program addresses relevant contamination issues through requirements in City Ordinance Title 3 Chapter 48.
g.	Foundation and footing drains	Contribute to I/I problems, and ultimately to Combined Sewer Overflows. Clear water connection requirements enforced by state plumbing code and through City ordinance Title 3 Chapter 56.
h.	Water from basement sump pumps	Not a significant source of pollution. Contribute to I/I problems, and ultimately to Combined Sewer Overflows.
i.	Air conditioning condensation	Not a significant source of pollution.
j.	Springs	Not a significant source of pollution.
k.	Individual residential and fund-raising car washings	Not a significant source of pollution.
l.	Flows from riparian habitats and wetlands	Not a significant source of pollution.
m.	Swimming pool discharges	Regulated by City ordinances: Title 5 Chap. 111 and Title 11 Chap. 231.
n.	Flows from fire-fighting	Minneapolis Fire Department and Public Works Sewer Maintenance section cooperate to control fire-fighting flows. Environmental Services gets involved if there are chemicals on site.
o.	Lawn Fertilizer use, application and sale	Minneapolis Environmental Services provides education and enforcement of MCO 55 Lawn Fertilizer.

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***Detection and Removal Screening Program***

The field screening program to detect and investigate contaminated flows in the storm drain system is an integral part of Sewer Maintenance and Environmental Services daily operations. Sewer Maintenance crews routinely inspect and clean storm drain structures throughout the City. In addition, inspections of flows that generate unusual odors, stains, and deposits are included in the annual outfall inspection and grit chamber cleaning programs. Any suspect flows are then reported to Environmental Services inspectors for further investigation. Environmental Services also receives reports of alleged illicit discharges to the storm drain system from the public, other City departments, and various agencies. These combined efforts result in an annual screening of more than 20% of City drainage areas. The City has an agreement with the Mississippi Watershed Management Organization to conduct a joint sampling program of the storm drainage system that drains to the Mississippi River. The intent of this partnership is to detect illegal discharges, and to establish a baseline of chemical, physical, and biological parameters. The best avenue for a continued effective screening program in the City of Minneapolis, without duplication of services, is to continue to use current practices, and to explore the development of certain aspects of the program to improve enforcement results.

***Facility Inspection Program***

Environmental Services and Fire inspectors perform site visits of facilities that store large quantities of regulated and hazardous materials. In addition, site plan inspections yield the following information:

- Drainage patterns from the site to the nearest drain or water body
- Watershed destination and outlet location
- Handling, storage, and transfer procedures as they relate to the site

**Previous Year Activities**

- Successfully addressed 84 calls for emergency response (containment of spills, chemical dumping, illegal disposal or handling of regulated or hazardous materials)
- 41 direct connections (registrations) to the storm drain (NPDES Permits)
- Investigated 624 water and land pollution complaints (illegal dumping, improper storage of material, and chemical storage)

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- Inspected 19 contaminated soil complaints
- Approved installation of 7 contaminated soil and ground water remediation systems
- Approved 12 limited duration sanitary sewer and storm drain discharge permits
- Approved 110 underground and above ground chemical storage tank installations and removal

The Sewer Maintenance Department also responded to **9** incidents of alleged illicit discharges to the storm drain system.

### **Work Plan**

Environmental Services will continue existing programs as outlined in the program overview, and will continue to develop and improve documentation of program activities. GIS mapping will be implemented as a tool to support various activities. Information that is gained through the Facilities Inspection Program will be used to compile data on non-stormwater discharges, storage of hazardous materials, and activities or operations that may be potential water pollution point sources.

### **Performance Measures**

Unit costs are not available because of the integrated nature of these activities with other operations.

- Resolution of all reported or discovered non-compliant activities in previous year: **616** of **727**
- Erosion control permit non-compliance that were addressed: **184** of **269** permits

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## X. Storm Sewer Design for New Construction

### **Program Objective**

There is a continuing effort to minimize the discharge of pollutants to public waters. This section describes the current focus and outlines the design measures used to control the discharge of pollutants by controlling the volume, loading or rate of stormwater discharged.

Targeted pollutants include:

- Total Suspended Solids (TSS)
- Phosphorus
- Chloride
- Fertilizers

### **Program Overview**

The City of Minneapolis has completed the second year of a five-year program to reduce sanitary sewer inflow (surface water and clear water sources connected directly to the sanitary sewer) and infiltration (groundwater that enters the sanitary sewer usually through pipe and system defects). The program is a continuing focus the city has had since the 1960's when the city began a 40-year residential paving program. The focus sharpened when the Metropolitan Council Environmental Services (MCES) introduced an Inflow & Infiltration (I & I) Surcharge Program in 2006 (Surcharge Program). The Surcharge Program established a mitigation fee (a "surcharge") of \$350,000 per Million Gallons per Day (MGD) of excess flow in the sanitary sewer system to the MCES treatment plant. MCES determined that the City had 112.7 MGD of excess flow. The Surcharge Program allows the City to perform I & I work in lieu of paying the surcharge. The surcharge amount is reduced as the City removes excess flow. As a result of reducing the excess flow the City's surcharge has been reduced from \$7,899,110 to \$4,772,600 per year.

Based on volume, 60 percent of the sources of the inflow have been identified. The principal work is elimination of public and private stormwater inlets or rainleaders connected to the sanitary sewer. The work of identifying the remaining sources is continuing with a citywide 36-month sanitary sewer flow metering program. The flow metering program includes follow-up smoke testing where a smoke-like vapor is blown into the sanitary sewer in order to expose openings where inflow is entering the sanitary sewer.

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The City's success with reducing I & I is transferring a problem from the sanitary sewer system to the stormwater management system, because there is rarely storm sewer capacity for the inflow removed from the sanitary sewer. Management techniques are required for volume reduction or rate reduction, and the techniques vary with each project. Most projects range from the equivalent area of one lot to a 2.5-acre drainage area. By themselves, these inflow areas may not be serious problems but cumulatively, the runoff becomes significant.

At this time, mitigation begins with an effort to reduce the volume of runoff. Options that reduce volume must have space within the right-of-way or must have an off-site area, with suitable soils for volume reduction in either case. Next, load reduction options are investigated, using recognized Best Management Practices (BMPs) such as prefabricated swirl-type grit chambers, bio-filtration or ponds. Space constraints in fully developed urban areas like Minneapolis limit the majority of projects to use of compact prefabricated BMPs for load reduction.

**Previous Year Activities**

During 2008, the flood area work carried over from the 2007 was completed. No other storm drain system upgrades associated with the street paving program were needed. The focus is unchanged for paving projects. Whenever storm drain upgrades are required, installations of volume reduction systems are first considered. Load-reducing facilities are considered next and finally rate reduction BMPs are incorporated into the work scope. The storm drain project areas for 2008, and associated water quality impacts, are referenced in the following table:

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PROJECT AREA	PROJECT DESCRIPTION	STORMWATER RUNOFF BENEFITS
CSO Area 001 <i>(22nd Av N &amp; 2nd St N)</i>	Street drain was disconnected from the sanitary sewer and connected to a nearby storm drain, which also included construction of a grit chamber for water quality.	Eliminated CSO area and achieved load reduction
CSO Area 100 <i>(37th Av NE, Van Buren to Central Av NE)</i>	Street drain was disconnected from the sanitary sewer and connected to an existing storm drain that discharges to water quality ponds in a golf course	Eliminated CSO area and achieved load reduction
W 54th St Paving Project <i>(Xerxes Ave S to Upton Ave S)</i>	Volume and load reduction using street trees, rock cells and infiltration. Work also included swirl type grit chamber.	Water quality improvement and ground water recharge for a direct flow tributary to the Minnehaha Creek.
CSO Area #043 <i>(Blaisdell Ave &amp; West Lake Street)</i>	Re-direct catch basin from the sanitary sewer to the storm sewer.	Eliminated CSO area of 0.87 acres
CSO Area #010 <i>(W 43rd St, Harriet to Garfield Ave S)</i>	Re-direct catch basin from the sanitary sewer to the storm sewer.	Eliminated CSO area of 1.80 acres
CSO Area #046 <i>(E 34th St, 20th to 21st Ave S)</i>	Re-direct catch basin from the sanitary sewer to the storm sewer.	Eliminated CSO area of 2.00 acres
CSO Area #124 <i>(Main St NE and 3rd Ave NE)</i>	Re-direct catch basin from the sanitary sewer to the storm sewer.	Eliminated CSO area of 0.33 acres
CSO Area #110 <i>(Pleasant St, W 59th to 59th and ½ St)</i>	Re-direct catch basin from the sanitary sewer to the storm sewer.	Eliminated CSO area of 0.90 acres
CSO Area #047 <i>(E 28th to 29th St, 33rd to 34th Ave S)</i>	Re-direct catch basin from the sanitary sewer to the storm sewer.	Eliminated CSO area of 2.75 acres

**Work Plan**

Minneapolis Public Works Department Surface Water & Sewers Division design teams will continue to look for opportunities include BMPs to improve water quality in all new projects that require

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the modification of the stormwater management system. These BMPs will be selected so that they advance program objectives on the basis of their feasibility. The selection will be made giving priority to the following objectives, in this order:

- 1) Reducing the volume
- 2) Reducing the load
- 3) Reducing the rate of runoff
- 4) Increasing pipe conveyance as a localized flood control measure

One BMP gaining popularity is pervious pavement, however most existing demonstration projects are limited to parking lots. To determine whether it is appropriate for street use, experience is needed regarding pervious pavement constructability and durability issues, appearance and acceptability over time, how to properly maintain to maintain porosity, expected life of the product, overall long-term costs, performance for stormwater management maintenance, and other characteristics. In 2008, Minneapolis incorporated pervious concrete parking bays as a pilot project along a four-block segment of West 54<sup>th</sup> Street. This approach is designed to reduce stormwater volume discharging to Minnehaha Creek by increasing evapotranspiration and infiltration, to control rate of stormwater discharge, and also to remove pollutants from the stormwater prior to discharge to the creek.

During the next five years, the removal of I & I from the sanitary sewer system, including Combined Sewer Overflow (CSO projects), will be the primary concentration. That does not mean the primary focus for volume, load and rate reduction is ignored. Future flood mitigation projects, and their impacts on stormwater runoff, are discussed in **Section VII. Flood Control**.

### **Performance Measures**

Total BMPs and existing infrastructure:

- **16** water quality pond systems or constructed wetlands, and **150** grit chambers
- An increase in the percentage of City watershed acres receiving treatment prior to discharge into the receiving waters. New data management in 2009 will allow calculations of watershed acres receiving treatment.

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## XI. Public Education

### **Program Objective**

The objective of this stormwater management program is to educate the public regarding point and non-point source stormwater pollution. Targeted pollutants include:

- All pollutants

### **Program Overview**

The City of Minneapolis and the Minneapolis Park & Recreation Board (MPRB) implement their Public Education Program to promote, publicize, and facilitate the proper management of stormwater discharges to the storm sewer system. The program's focus is to educate Minneapolis residents, business owners, employees and visitors about stormwater. The program's goals include showing how *everyone's* actions affect the quality of our lakes, wetlands, streams and the Mississippi River, and how to control pollutants at the sources to reduce the discharge of pollutants to our receiving waters. The desired result is to change behavior in ways that will improve water quality. Many of the components of the program can be found on the City of Minneapolis Stormwater web site: <http://www.ci.minneapolis.mn.us/stormwater/>.

### **Previous Year Activities**

#### **Mobile Water Education Kiosks**

In 2008, three mobile, multimedia kiosks that feature interactive water education components were used at neighborhood recreation centers in Minneapolis. The kiosks have stand-alone computers that house six interactive water education modules. Each year, the average use per kiosk has been just over 3,000. The educational messages focus on urban runoff:

- Impacts of impervious surfaces
- Problems caused by non-point source pollution
- Solutions that can be implemented

These kiosks are owned and managed through a partnership of the MPRB, Minneapolis Public Works, the Mississippi Watershed Management Organization (MWMO) and the Minnehaha Creek

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Watershed District (MCWD). Kiosks were moved approximately every four weeks. Use of these kiosks varied greatly by site, from more than 830 uses at King Park to fewer than 65 at Kenny Park.

From 12/12/2007 through 1/15/2009, the three kiosks were at 32 *different* sites and received a total of 9,972 hits among the three kiosks:

	<b>MCWD Kiosk</b>	<b>MWMO Kiosk</b>	<b>MPRB/MPLS Kiosk</b>	<b>TOTAL</b>
<b>Total Hits</b>	3,377	3,362	3,233	9,972
<b># Sites</b>	11	10	11	32

The kiosks were featured mainly at recreation centers, but were also at St. Anthony Park Library and two community type centers, the Association for the Advancement of Hmong Women and the Park Elder Center. In addition to community centers, the kiosks will be featured at various Minneapolis public schools in 2009.

All of the kiosks were programmed to operate in the English, Hmong and Spanish languages. Additional languages or new programs may be added at a later date. Listed here are the six different modules:

- **Journey of a Raindrop:** This module follows the journey of a raindrop from the roof of an urban residence through the storm sewer system to the river. Users learn about eight common sources of non-point source pollution as well as ways to clean up these sources.
- **Rappin' with Alex:** In this module, Alex the Frog performs in a rap video about water and water pollution.
- **The Water Cycle:** Graphics visualization along with a quiz teaches users about the water cycle and its various parts.
- **Streets to Streams - Impervious Surfaces:** An urban planner simulation lets users explore the impacts of impervious surfaces on surface waters and river water quality.
- **The Water Watchers:** This module profiles people who have positively impacted the quality of their local waters, showing how individuals can make a difference by working to promote clean waters.

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- **What's Your Watershed Address?:** In this module, users learn what a watershed is as well as the fact that everyone lives in a watershed.

**Earth Day/Watershed Clean-Up Event**

The 2008 Earth Day Watershed Clean-Up took place on Saturday, April 19, from 9:30 am to Noon. More than 2,800 volunteers, from 36 different sites in Minneapolis, collected and removed more than 22,500 pounds of garbage in just over three hours. This event involved cleaning major watersheds and waterbodies in the City of Minneapolis including: the Chain of Lakes, Lake Nokomis, Lake Hiawatha, Powderhorn Lake, Diamond Lake, Shingle Creek, Minnehaha Creek, Bassett Creek and the Mississippi River. The goals of the Minneapolis Earth Day Watershed Clean Up include providing both a volunteer experience and environmental information to Minneapolis residents and park users who participate in the event.

**Metro Blooms Rain Garden Workshop Program**

In 2008, the City and others again sponsored a multi-part stormwater education workshop program conducted by the Metro Blooms, a non-profit organization that grew out of the City's Committee on the Urban Environment (CUE). The goals of the workshop program are to reduce stormwater runoff, prevent stormwater pollution that damages our watersheds and improve the environmental and visual quality of the urban landscape. The two-part workshops serve to inform, coach and offer consultation to Minneapolis residents protecting the Upper Mississippi Watershed by installing properly designed bio-infiltration areas (rain gardens), redirecting downspouts and using native plants. The **Part A** workshop focuses on watershed education, various types of rain garden design, and native plant choices. Attendees can then attend a **Part B** workshop, which offers practical, hands-on design sessions where participants bring pictures, measurements and sketches of the sites and receive plant and one-on-one design advice. One of the means of publicizing the workshops is a utility bill insert that reaches most of the approximately 100,000 households in Minneapolis. In 2008, five **Part A** and four **Part B** workshops were held within Minneapolis, attended by a total of 578 Minneapolis residents. (The Metro Blooms program has expanded to include additional workshops in other communities.) A database of residential rain gardens in Minneapolis is under development.

**Multi-Cultural Watershed Education Video**

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Minneapolis Public Works is partnering with the Mississippi Watershed Management Organization (MWMO) to create an educational water quality Digital Video (DVD) called ***The Nature of Water***. The DVD uses a spoken language approach, educating people about watersheds and water quality, and includes bonus features about drinking water and raingardens. It will include five languages, with subtitles in English and Hmong, and audio tracks in Hmong, Vietnamese, Lao, Khmer (Cambodian) and English. The DVD is being created in a way that allows the content to be modified for use in other cultural communities such the Latino or African immigrant communities at a later date. The production for this DVD is scheduled for completion by March 31, 2009, with duplication and distribution to follow.

**Minneapolis Park & Recreation Board Events and Naturalist Program**

In 2008, MPRB staff continued to provide water quality education programs throughout the City. Armed with stormwater education models and printed materials, Environmental Operations Naturalist staff participated in 66 Minneapolis community festivals, neighborhood events<sup>6</sup>, as well as concerts at Lake Harriet, Father Hennepin Park (along the Mississippi River) and Minnehaha Park. Hands-on water quality educational displays focused on neighborhood watersheds and how human activities impact local water bodies. Adults and children participated in ***Watershed Jeopardy*** and other educational games. Printed materials, bookmarks, and water bottles with educational messages were also distributed at these events.

MPRB staff also worked with teenagers at the Powderhorn Park Sound Studio, where they learned about watersheds, water quality and how their actions (and inactions) impact local lakes and ponds. Based on this new knowledge, these teens created audio public service announcements, or PSAs, (in English) about water quality. These PSAs were played before free public concerts at Lake Harriet and Minnehaha Park during the last six weeks of the 2008 summer concert season. In 2009, MPRB staff plans to broadcast the audio PSAs for the entire summer concert season, beginning Memorial Day weekend and continuing through Labor Day. MPRB staff also hopes to expand the program in the future to include audio PSAs in other non-English languages.

**Minneapolis Park & Recreation Board Water Everywhere Program**

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<sup>6</sup> Neighborhood event sites (some sites had multiple events): Armatage, Beltrami, Bottineau, Bryant Square, Cleveland, Elliot, Fuller, Harrison, King, Lake Hiawatha, Longfellow, Loring, Luxton, Lynnhurst, Matthews, McRae, North Commons, Painter, Pershing, Phelps, Sibley, Victory, Webber, Whittier, and also Fort Snelling.

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Seven recreation centers<sup>7</sup> participated in ***Water Everywhere***, a new four-part, four-hour program series. By providing information in a series of programs, Naturalist staff helped children to achieve a better understanding of stormwater and learn how their actions or inactions affect the local lakes and creeks in which children like to wade, swim or fish. ***Water Everywhere*** incorporates hands-on learning activities to explore water, storm drains, water quality, wetlands and more. Water quality education components were also incorporated into spring and summer program series for youth such as ***Earth Watch*** and ***Backyard Science***. MPRB Naturalists also led a series of programs for 40 adults (with a 20+ person waiting list!) through the Osher Lifelong Learning Institute (OLLI) titled ***Ecology of Minneapolis Parks***. In 2008, four of the six educational field trips focused on the Mississippi River and included visits to North Mississippi Regional Park, St. Anthony Falls, the River Gorge and Minnehaha Park. In addition to learning about geology, restoration efforts and various habitats, adult participants also learned about watersheds, storm water and water quality.

To give people of all ages a better understanding of how stormwater negatively impacts local waterbodies, MPRB staff led guided canoe trips on lakes and ponds. The MPRB provided canoes, paddles, and lifejackets, and paddling instruction. Participants paddled by stormwater outlets and observed alluvial fans, floating debris, and adjacent erosion. Participants were also able to use secchi disks to determine lake and pond clarity. In some locations, like Lakes Calhoun and Nokomis, participants were able to view and learn about adjacent stormwater ponds. Evaluations indicated that participants enjoyed being on the water and observing and learning about lakes and ponds. The combination of recreation and education was well-received by those who were just learning to canoe. MPRB staff are confident that by providing opportunities on the water, participants will place a greater value on the resource and change their behaviors to help protect lakes and ponds. Providing paddling experiences at neighborhood parks with smaller water bodies such as Powderhorn Lake and Webber Pond attracted a high percentage of minority participants. More than 800 people participated in this program.

***In the Heart of the Beast 'Water Awareness' Performances***

In 2008, the City and the MPRB continued their collaboration by investing funding and staff time to the ***In the Heart of the Beast Puppet and Mask Theatre***. The mission was to develop a series of programs that addressed water quality, water quantity and water ownership issues. These were titled ***Invigorate the Common Well***, ***Beneath the Surface*** and ***Decorate the Well in Gratitude***, for showing

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<sup>7</sup> Participating MPRB recreation centers included: Corcoran, King, Lyndale Farmstead, Powderhorn, Sibley, Waite and Windom NE

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in 2007, 2008 and 2009. The program focuses on water stewardship, water quantity, quality and ownership, the Mississippi River watershed, the drinking water distribution system in Minneapolis, and the bottled water industry. MPRB Naturalist staff was on hand after performances for school and public audiences to provide additional hands-on activities and information about watersheds and water quality.

On July 26th, 2008, East Lake Street was closed from Bloomington to 15th Avenue S for a day-long Water Festival. Over 1,000 residents were on hand to participate in the event, including some old-fashioned carnival games:

- Disappearing aquifers games
- Brain teasers about water issues
- A fortune teller who inspires water stewardship
- Water “taste testing”

Minneapolis Public Works staff was on hand for the duration of the Water Festival, educating and interacting with participants. Additionally, there were both public and private advocacy groups with interactive, kid-friendly demonstrations about storm water runoff, sewage treatment and rapidly filling landfills. All activities were bi-lingual, in Spanish and English. Inside the HOB Theater, people participated in:

- Hands-on water themed art making activities
- Watching short videos on water issues
- Viewing small puppet shows
- Viewing of a gallery of paintings about water

The emphasis was educating people about the local and global issues surrounding WATER and how their individual actions can make a difference by being more mindful about what is put down the City’s storm drains, by reducing fertilizer use, and by cleaning up after pets.

**Keep Minneapolis Beautiful Campaign**

In 2008, under the **Adopt-An-Ash Receptacle** program, the City of Minneapolis conducted a cigarette litter study in a targeted area of Minneapolis. “Before” counts were made at the beginning of the study, when the area had one ash receptacle. Five additional ash receptacles were placed in the area. At the conclusion of the study the “after” counts were made. The study showed a 74 percent reduction in

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cigarette butts in the gutters and a 33 percent reduction in cigarette butts on the sidewalk. Under the program, 28 ash receptacles were placed throughout Minneapolis during 2008.

**Pesticides and Fertilizers**

The City's NPDES permit requires that the City implement a Citywide education program regarding the proper application of pesticides and fertilizers. To this end, the City's Department of Regulatory Services - Environmental Services has implemented a fertilizer and pesticide education program, including providing City Ordinance literature to suppliers of fertilizers. The information pertains to fertilizer application in general, phosphorus containing fertilizer, and retail requirements. The program also offers education materials to Minneapolis homeowners on local requirements. For additional information, see **Section VIII. Pesticides and Fertilizer Control** in this report.

**Illicit Discharges**

Another NPDES requirement is City education regarding illicit discharges. The City maintains a plan that is designed to adequately notify the public of potential health threats due to discharge of untreated or partially treated wastewater. A program was developed to inform residents not to discharge non-stormwater substances to storm drains that discharge to a lake or stream. The City's Environmental Services Division of its Regulatory Services Department has a program in place to encourage compliance with restrictions on certain kinds of discharges.

**Web sites**

**STORM & SURFACE WATER MANAGEMENT** – The City provides the following primary web site for information about Storm and Surface Water Management:

<http://www.ci.minneapolis.mn.us/stormwater/>

**ENVIRONMENTAL MANAGEMENT** – The Department of Regulatory Services maintains the following web site for additional information about the above initiatives and other programs:

<http://www.ci.minneapolis.mn.us/environment>

**ANNUAL NPDES REPORT** – The City and MPRB work with local watershed organizations, internal agencies, and other government agencies to partner with these organizations as a requirement of the City's National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit. The current and prior annual reports that can be reviewed at the following web site provide education to interested parties about the City's authorization to discharge stormwater via its NPDES MS4 Permit: <http://www.ci.minneapolis.mn.us/stormwater/NPDESAnnualReportDocuments.asp>

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**LOCAL SURFACE WATER MANAGEMENT PLAN** – The City’s comprehensive approach can be reviewed at the following web site: <http://www.ci.minneapolis.mn.us/stormwater/local-surface.asp>

**REGULATORY CONTROL OF SURFACE WATER MANAGEMENT** – The City of Minneapolis provides information regarding pesticides, fertilizers, illicit discharges, improper disposal and other water quality issues via the following City web site: <http://www.ci.minneapolis.mn.us/stormwater/water-quality-control.asp>

**STORMWATER MONITORING PROGRAM** – The MPRB provides the following web site to educate interested parties regarding their Stormwater Monitoring Program:  
<http://www.minneapolisparcs.org/default.asp?PageID=833>

**FLOOD CONTROL INFORMATION** – The City web site provides educational information regarding flood control. For information on flooding and safety precautions, the following web site can be viewed by interested parties: <http://www.ci.minneapolis.mn.us/stormwater/flood-information/index.asp>

**COMBINED SEWER OVERFLOW (CSO) PROGRAM** – The City maintains a web site to educate Minneapolis residents and property owners about the City’s CSO program to eliminate Combined Sewer Overflows: <http://www.ci.minneapolis.mn.us/cso/>

**STORMWATER UTILITY FEE** and **BEST MANAGEMENT PRACTICES (BMPs)** – As a component of the City’s Stormwater Utility Fee, the City web site encourages the implementation of various Best Management Practices (BMPs) that would reduce the overall amount of impervious surface area throughout the City, as well as filter and cleanse stormwater. The City also maintains a link to the following Metropolitan Council and MPCA BMP web sites, where numerous BMP suggestions are available for small scale implementation:

<http://www.metrocouncil.org/environment/watershed/bmp/manual.htm>

<http://www.pca.state.mn.us/water/stormwater/stormwater-manual.html>

**PUBLIC EDUCATION & OUTREACH** – Additional information about how the City and MPRB advance stormwater education activities can be found at the following web sites:

City of Minneapolis – <http://www.ci.minneapolis.mn.us/stormwater/outreach.asp>

Minneapolis Park & Recreation Board – <http://www.minneapolisparcs.org/home.asp>

**Erosion and Sediment Control Education for Contractors and Developers**

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During Minneapolis Development Review and the Site Plan Review processes, and during on-site inspections, Public Works personnel provided Erosion and Sediment Control (ESC) education and guidance to contractors and developers. This education included information regarding the City's ordinances, and local, state and federal regulations.

**Education and Training of City Personnel**

Public Works sent professional and technical staff to various Stormwater and Erosion/Sediment Control educational conferences, seminars, and presentations, and provided internal mentoring and training to City personnel regarding the construction of storm sewers and the importance of infiltration, and proper erosion and sediment control techniques.

The Transportation Maintenance & Repair Division provided internal training to City personnel as part of its Facilities Operation and Quality Control, Removed Substances, and Roadways plan.

**Work Plan for 2009 Activities**

Identifying additional opportunities and better methods for education and outreach will continue. The City and MPRB will maintain and strengthen partnerships with multiple agencies, including the Metro Blooms Program, MWMO, MCWD, Friends of the Mississippi River, Hennepin County, WaterShed Partners, Shingle Creek Watershed Management Commission, Bassett Creek Water Management Commission, the Minnesota Pollution Control Agency (MPCA), the Minnesota Department of Natural Resources (DNR), neighborhood groups, private citizens and business owners. The following initiatives are targeted for implementation in 2009:

- Metro Blooms Program – continued funding of rain garden workshops and education of Minneapolis residents about the benefits of rain gardens. In addition, it is anticipated that in April the legislature will approve a 2009 grant from the Legislative-Citizen Commission on Minnesota Resources (LCCMR) for a new pilot rain garden citizen-based outreach program for residents in one of the Powderhorn Lake sub-watershed area.
- Expansion of the Mobile Water Education Kiosk program into the Minneapolis Public Schools
- Combined Sewer Overflow (CSO) Program
- Completion and Distribution of Watershed Multi-Cultural Educational DVD
- MPRB Public outreach activities
- Installation of stormwater interpretive signs at public water quality demonstration sites and development of web site with project information and self-guided tour map

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- Implementation of multicultural educational needs
- Continued training of and by Public Works staff regarding erosion and sediment control measures, and proper handling of salt for snow and ice control on streets, sidewalks, and parking lots
- Utilizing Minneapolis GIS tools for better communication with the public about what is occurring in their watersheds and what they can do to help
- Additional web site development and enhancements
- Earth Day Watershed Clean-Up activities
- A continued broad-based approach that targets Minneapolis residents, workers and visitors in a coordinated effort to change behavior, that will be reflected in an overall increase of environment knowledge and watershed awareness

**Performance Measures**

*Storm and Surface Water Management Web Site statistics:*

Total visits:	<b>40,000</b> (up 9.9% from 36,394 in 2007)
Average visits per day:	<b>110</b> (up 14.5% from 96 in 2007)

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*Public Participation Process*

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## XII. Public Participation Process

### **Program Objective**

The objective of this stormwater management program is to maximize the effectiveness of the City's NPDES program by seeking input from the public. Targeted pollutants include:

- All pollutants

### **Program Overview**

The City of Minneapolis and the MPRB are the joint holders of the NPDES-MS4 Permit, and the Annual Report is a coordinated effort by various City departments and the MPRB. The Permit requires an opportunity for public input in the development of the priorities and programs necessary for compliance. Information in the Annual Report covers the activities that will be implemented for the current year, and provides documentation and analysis of the activities conducted in the previous year.

Each year, the City holds a public hearing at a meeting of the Transportation & Public Works Committee of the City Council. The hearing provides an opportunity for public testimony regarding the Program and Annual Report prior to report submittal to the Minnesota Pollution Control Agency on June 1. The hearing is officially noticed in [Finance and Commerce](#), and also publicized through public service announcements on the City cable television channel. This year's public hearing date was April 28, 2009, at 9:30 AM in Council Chambers, Room 317 City Hall, 350 S 5<sup>th</sup> Street, Minneapolis, MN.

A notice of the availability of the draft Report for review and public comment was sent to all Minneapolis neighborhood organizations, to the governmental entities that have jurisdiction over activities relating to stormwater management, and to other interested parties. The notice was sent by e-mail on April 1, 2009, announcing the web site link to the draft Report, and informing that written comments would be accepted until 4:30 PM on Friday May 1, 2009, or in person at the public hearing on April 28.

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The notice explained that emails or faxes were the preferred methods for submitting written comments, rather than conventional mail due to the additional time involved. The contact information for written comments was listed as:

City of Minneapolis, Department of Public Works  
Surface Water & Sewers Division c/o Mr. Lane Christianson  
NPDES REPORT COMMENTS  
300 City of Lakes Building, 309 2nd Avenue S, Room 300  
Minneapolis MN 55401-2268  
Phone: 612-673-2522                      Fax: 612-673-2048  
E-mail: [lane.christianson@ci.minneapolis.mn.us](mailto:lane.christianson@ci.minneapolis.mn.us)

The draft Annual Report is made available in April and May for viewing or downloading from the City's [Storm and Surface Water Management web site](#) prior to finalization. Once finalized, the Annual Report is also made available on the web site for viewing or downloading. The City Clerk's office also keeps copies of the Annual Report on hand for examination by the public, prior to the hearing date and for a period thereafter. An electronic version of the entire report can also be obtained on CD by contacting Lane Christianson of Minneapolis Public Works at [lane.christianson@ci.minneapolis.mn.us](mailto:lane.christianson@ci.minneapolis.mn.us) or 612-673-2522.

All testimony presented at the public hearing, and all written comments received, are recorded and given due consideration. A response to those public comments is then included with the Annual Report as Appendix C. A copy of the council resolution adopting the Stormwater Management Program and Annual Report Activities is included with the submission to the Minnesota Pollution Control Agency (MPCA) by June 1 of each permit year.

**Work Plan**

City staff will continue to maintain and update the Storm and Surface Water Management web site: <http://www.ci.minneapolis.mn.us/stormwater/>

**Performance Measures**

- Number of interested parties that were directly notified of public hearing and Annual Report availability: **97** (includes 81 neighborhood organizations)

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*Coordination with Other Governmental Entities*

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### XIII. Coordination with Other Governmental Entities

#### **Program Objective**

The objective of this Stormwater Management Program is to maximize stormwater management efforts through coordination and partnerships with other governmental entities.

#### **Program Overview**

Coordination and partnerships of the City and the MPRB with other governmental entities include the four watershed organizations in Minneapolis: Bassett Creek Water Management Commission, Mississippi Watershed Management Organization, Minnehaha Creek Watershed District, and Shingle Creek Watershed Management Commission. Coordination activities and partnerships with other governmental entities also include MnDOT, MPCA, neighboring cities, the Metropolitan Council and various other entities.

The coordination and partnership activities can include the joint review of projects, joint studies, joint water quality projects, stormwater monitoring, water quality education, and investigation or enforcement activities.

#### **Coordination with the Bassett Creek Water Management Commission (BCWMC)**

The BCWMC approved its Second Generation Watershed Management Plan in September 2004. Under the current plan, they require stormwater management, erosion control practices and floodplain management for redevelopment projects that are greater than 5 acres. Minneapolis provides yearly financial contributions to the BCWMC annual operations budget. The City and the MPRB are also stakeholders with other BCWMC joint power cities in development of several Total Maximum Daily Load (TMDL) studies and implementation plans.

#### **Coordination with the Mississippi Watershed Management Organization (MWMO)**

The MWMO adopted its Second Generation Watershed Management Plan in June 2000. This plan focuses on the creation of water quality capital improvement projects and public education. The MWMO delegates stormwater management requirements for new developments to its member cities and does not provide separate project review and approval. The MWMO receives revenue through direct taxation against properties within its jurisdiction. In 2007, it commenced work on its next generation plan. The City and MPRB participate in its planning committees.

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**Coordination with the Minnehaha Creek Watershed District (MCWD)**

The MCWD adopted its Third Generation Plan in late 2006. The District administers state mandated wetland protection rules and Department of Natural Resources regulations, as well as District rules relating to erosion control (land disturbance of 5,000 square feet or greater), floodplain alteration, wetland protection, dredging, shoreline & stream bank improvements, stream & lake crossings and stormwater management. The MCWD receives revenue through direct taxation against properties within its jurisdiction. The City of Minneapolis and the MPRB are stakeholders in development of TMDL studies and implementation plans, in collaboration with the MCWD and other stakeholders.

**Coordination with the Shingle Creek Watershed Management Commission (SCWMC)**

The SCWMC adopted its Second Generation Watershed Management Plan in August 2004. SCWMC reviews plans of any land development adjacent to or within a lake, wetland, or a natural waterway, within the 100-year floodplain, 15 acres or larger (for single-family detached housing use) and 5 acres or larger for all other land uses. SCWMC requires these developments to provide erosion protection during construction, in addition to on-site detention and treatment. Developments also have the option of demonstrating that adequate detention and treatment is available via a regional facility. Minneapolis provides yearly financial contributions to the SCWMC annual operations budget. The City of Minneapolis and the MPRB are stakeholders with other SCWMC joint power cities in development of TMDL studies and implementation plans.

**Coordination with the Minnesota Department of Transportation**

The City of Minneapolis coordinates with the Minnesota Department of Transportation (MnDOT) in the following ways:

- Erosion control review, inspections, and enforcement
- Plan review of storm and water quality improvements associated with road projects
- Roadway and storm drain maintenance agreements

**Coordination with the Metropolitan Council Environmental Services)**

The City of Minneapolis coordinates with Metropolitan Council Environmental Services (MCES) in the following ways:

- Review of non-stormwater permit applications
- Inspection of existing infrastructure and regulators

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- Joint permittees for Combined Sewer Overflow (CSO)

**Previous Year Activities**

**Ongoing Coordination Efforts**

The Minneapolis Park and Recreation Board (MPRB) and the City of Minneapolis coordinate stormwater management efforts, and coordinate with WMOs and other governmental agencies on a number of water quality projects. Minneapolis Public Works (MPW) maintains communications with all WMOs within the City boundaries. Interactions with WMOs take several forms to facilitate communication and provide support:

- Attend local WMO board and special issues meetings with individual WMO staff
- Attend Education and Public Outreach Committee (EPOC) meetings
- Take part in Technical Advisory Committee (TAC) meetings
- Inform individual WMOs of upcoming City capital projects in an effort to identify projects that may benefit from partnerships
- Provide developers (who submit projects for site plan review) with information and contacts to meet watershed requirements
- Share information and data regarding storm drainage system infrastructure, watershed characteristics, flooding problems, modeling data, etc.

The Environmental Services Division of the Minneapolis Regulatory Services Department coordinates with the MPCA and the MCES regarding investigations and enforcement for incidents of illegal dumping or illicit discharges to the storm drain system.

The MPRB coordinates with individual WMOs, as well as the MCES, on watershed outlet monitoring. The MPRB and the City coordinate and partner with WMOs on capital projects and water quality programs. The MPRB also works with the DNR and surrounding suburbs on various capital projects and programs. The City and the MPRB coordinate with the MPCA, the watershed organizations and stakeholders for Total Maximum Daily Load (TMDL) studies and implementation plans.

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***Current Capital Project and Program Partnerships***

***Bassett Creek Water Management Commission***

In 1996, BCWMC developed Wirth Lake Watershed and Lake Management Plan (Lake Plan). Wirth Lake is located in the City of Golden Valley, but owned by the MPRB. The water quality in the lake has typically fallen below the BCWMC's water quality goal. Within the Lake Plan, there are identified Improvement Projects complete with recommendations for implementation. The improvement projects were included in the 10-year capital improvement program for the Second Generation Watershed Management Plan. The Capital Improvement Program (CIP) is funded through an *ad valorem* tax. Wirth Lake is impaired for phosphorus and a TMDL Study is underway. Stakeholders include the MPRB, the Cities of Golden Valley and Minneapolis, MnDOT and Hennepin County. The TMDL study includes a public outreach component.

***Shingle Creek Watershed Management Commission***

TMDL studies for chloride impairment of Shingle Creek and nutrient impairment of Ryan Lake have been completed and approved by the MPCA and the EPA. A second TMDL study for Shingle Creek, for biota and dissolved oxygen, is underway. Additionally, a TMDL study is underway for Crystal Lake, for nutrients. Minneapolis is partnering with the WMO and the other joint powers cities on these watershed-based initiatives.

***Mississippi Watershed Management Organization***

A TMDL study is underway for bacteria impairment of a portion of the Mississippi River. Additionally, a TMDL study is underway for nutrient impairment of Lake Pepin, which is a portion of the Mississippi River. The geographic area for both of these studies is considerably larger than either the City of Minneapolis or the Mississippi Watershed Management Organization. The City and the MPRB are engaged with the MWMO as well as numerous other stakeholders on both of these TMDL studies.

***Minnehaha Creek Watershed District***

The City and the MPRB are engaged with the MCWD and other stakeholders for two TMDL studies currently underway. One of the studies includes three Minneapolis lakes: Lake Nokomis, Powderhorn Lake, and Brownie Lake. The other study includes Minnehaha Creek and one lake in Minneapolis: Lake Hiawatha.

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**The Minneapolis Local Surface Water Management Plan (LSWMP)**

In 2008, the City submitted its Minneapolis Local Surface Water Management Plan (LSWMP), adopted by the City in October 2006, to the Metropolitan Council as a component of the City's updated comprehensive plan, The Minneapolis Plan For Sustainable Growth. The LSWMP was developed to meet the requirements of Minnesota Statute 103B, as well as to provide a resource for City staff. The LSWMP plan serves as a guidance manual for handling regulatory requirement issues, planning for and managing surface water resources and stormwater and sanitary sewer infrastructure, and also for stormwater management for development and redevelopment. The intent of the LSWMP is to benefit stormwater management within Minneapolis, and to improve both the coordination and effectiveness of efforts by the City, the MPRB, and the WMOs.

The LSWMP was prepared to guide the City in conserving, protecting, and managing its surface water resources. Contributors included various City departments, MPRB, MCES, and the four watershed organizations in Minneapolis. The LSWMP brings together all water resources issues and activities, and identifies improvements, gaps or overlaps that will help to better manage the City's water resources and attain overall goals.

The LSWMP brings together all water resources issues and activities, and identifies improvements, gaps or overlaps that will help to better manage the City's water resources and attain overall goals. The content of the LSWMP is in large part determined by Minnesota Statutes Chapter 103B and Minnesota Rules Part 8410. Web links are provided throughout the document to allow the user to access the wealth of local water resources information available on the Internet. The Plan can be accessed at City's Stormwater website: <http://www.ci.minneapolis.mn.us/stormwater/local-surface.asp>

**Work Plan**

Coordination and partnerships on capital projects, water quality programs, and studies will continue. Participation with other governmental entities in TMDL studies and implementation plans has become a significant Work Plan component, and this will continue into the foreseeable future. Coordinated activities, and the status of cooperative efforts, shall be provided in each Annual Report.

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*Stormwater and Water Quality Monitoring – Results and Data Analysis*

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## XIV. Stormwater and Water Quality Monitoring - Results and Data Analysis

### **Stormwater Runoff Monitoring Results<sup>8</sup>**

Storm event samples were collected May through November, and one snowmelt grab sample was collected from each site, three sites in January and one site in March. The target frequency for sample collection was once a month. If a sample was not taken one month, more than one sample was taken the next month. The required number of samples was met or exceeded for the year. The total volume sampled for each site, and the total recorded volume, is given in Table 23B of Appendix A4, along with the percentage sampled per season. For detailed information on sampling events see Table 23C of Appendix A4. The parameters listed in the Limits and Monitoring Requirements section of the permit were monitored for each sample collected. Multiple bacteria grab samples were taken throughout the season, using standard protocols.

Sampled data for 2008 were similar to typical urban stormwater data (Tables 23H and 23I of Appendix A4, respectively). Table 23H shows median values for residential sampled sites; the results were similar or less than reported Nationwide Urban Runoff Program (NURP) values with the exception of TKN (total Kjeldahl nitrogen) and TSS (total suspended solids). Most MPRB land use category values were similar to NURP values with the exception of TP (total phosphorus), TKN (total Kjeldahl nitrogen) and TSS (total suspended solids) values. All metals were well below NURP values.

While most parameters were similar to MPRB 2001-2007 data, residential land use TSS (total suspended solids) and TKN (total Kjeldahl nitrogen) values were higher in 2008 as well as TP (total phosphorus) values for all land use categories. Mixed land use 2008 data were comparably higher for TP (total phosphorus) and TSS (total suspended solids). When comparing MPRB 2001-2007 data to NURP all of the sites for 2008 were comparably lower for metals but higher for TSS (total suspended solids). It is important to note that the new sites monitored in 2005 - 2008 are different watersheds and have similar, but not identical, land uses as previously monitored sites in 2001-2004. Most MPRB mean concentrations were similar to other studies as listed in Table 23I of Appendix A4. TP (total phosphorus) values are most closely related to those monitored by local agencies. Median concentrations from NPDES Sites 1-5a (2001-2004) and 6-9 (2005-2006) were similar to Sites 6-9 in 2008. TP (total phosphorus), TKN (total Kjeldahl nitrogen), NO<sub>2</sub>NO<sub>3</sub> (nitrite, nitrate), Cl (chloride), TDS (total dissolved

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<sup>8</sup>For tables referenced in this section, see Appendix A4 of this report. This section and Appendix A4 are adapted from the 2008 Water Resources Report, which is produced by the Minneapolis Park & Recreation Board. These annual reports can be found at this [Minneapolis Park & Recreation web site](#).

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*Stormwater and Water Quality Monitoring – Results and Data Analysis*

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solids) and TSS (total suspended solids) median concentrations were higher in 2008 while only the  $\text{BOD}$  (carbonaceous biochemical oxygen demand) concentration was lower in 2008.

**Best Management Practices Monitoring Results<sup>9</sup>**

Best Management Practices (BMPs) include procedures and structures designed to help reduce water pollution. In 2008, the MPRB monitored two of the City of Minneapolis' stormwater ponds located in north Minneapolis at Heritage Park. Heritage Park is a large redevelopment project of 140 acres which was formerly public housing and a public park. It is now a mix of public and private housing, two public parks and an innovative collection of stormwater treatment systems. The treatment train approach using grit chambers, trench forebays or sedimentation ponds, infiltration or filtration galleries, and stormwater ponds was designed for hydraulic mitigation purposes, to help reduce pollutants discharged to the Mississippi River and to create high quality amenities in an amenity-poor area of the City. Level spreaders and flow splitters are also engaged to distribute flows. The stormwater ponds located north of the intersection of Olson Memorial Highway and Van White Memorial Boulevard are referred to as Heritage Park Pond and to the south as Heritage Commons Pond. Following construction, Heritage Park Pond outlet auto-monitoring dates were 7/30/07 – 11/7/07 and 5/8/08 – 9/1/08. Heritage Park Pond outlet samples were collected by flow weighted auto-monitoring. In 2008 grab samples were collected at the Heritage Commons Pond's three inlets and the North outlet. Heritage Commons outlet auto-monitoring was performed from 6/3/08 – 8/5/08, 9/7/08 – 9/27/08. The brief break was caused by equipment failure.

In 2007-2008, 21 storm flow weighted events were auto-sampled at the Heritage Park Pond outlet.

In 2008 grab samples were collected at the Heritage Commons Pond, 11 at the north outlet, six at inlet A, three at inlet B and two at inlet C. In 2008 at Heritage Commons Pond, 9 storm events were auto-sampled at the north outlet, 8 at inlet A, 7 at inlet C. Inlet B could not be installed for auto-monitoring. Also in 2008 at Heritage Commons Pond additional grab samples were collected, 3 at inlet A, 2 at inlet B, 2 at inlet C and 1 at the north outlet.

These data will be used to assess and give an indication of the baseline efficacy of the Heritage Park and Heritage Common BMPs and will be compared to data collected in later years. At Heritage Park Pond it should be noted that on 9/3/08 an internal weir was removed from the outlet. The dates and lab

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<sup>9</sup> For tables referenced in this section, see Appendix A5. This section and Appendix A5 are adapted from the 2008 Water Resources Report, which is produced by the Minneapolis Park & Recreation Board. These annual reports can be found at this [Minneapolis Park & Recreation website](#).

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*Stormwater and Water Quality Monitoring – Results and Data Analysis*

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results are presented in Table 24A of Appendix A5. Statistics were calculated and are presented in Table 24B of Appendix A5. Lab values reported below detection were divided in half for statistical calculations. Mean outlet values in Table 24B show the results for many water quality parameters. The fact that these data were collected with construction ongoing should be interpreted as a baseline of these “disturbed” systems and not as how these systems will ultimately work. At Heritage Commons the mean inlet versus the mean outlet data show a decrease in all parameters except TDP and NH<sub>3</sub> (Table 24B of Appendix A5). A large resident Canada goose population was observed in the outlet pond which likely contributed significant animal waste products. It appears that Heritage Commons is effective in removing significant amounts of Nitrate/Nitrite, TSS and metals from stormwater.

Total volume recorded at the monitored location and total pollutant load calculations for the Heritage Commons outlet and Heritage Park outlet are given in Table 24C of Appendix A5. The Heritage Commons total outlet volume recorded for the sampling period 6/3/08 – 8/5/08, 9/7/08 – 9/27/08 was 1,236,155 cubic feet. The Heritage Park Pond total outlet volume recorded for the sampling period 7/30/07–11/7/07 was 578,360 cubic feet and 5/8/08 – 9/1/08 was 1,738,815 cubic feet.

It is noted that the Heritage Park complex includes an automatic in-ground sprinkler system at Sumner Field Park. It has on occasion been observed producing runoff into the system during non-precipitation events which may affect the measurement.

Both Heritage Commons and Heritage Park systems had CDS units, or grit chambers, that appeared to be backing up and malfunctioning with standing water in the upstream pipes. Some of the infiltration basins/trench forebays at Heritage Park appear to be silting in. The engineering design consultant is investigating. Sediment also appears to be circumventing upstream treatment where silt is being deposited in front of the level spreaders.

It is difficult to draw solid conclusions from this limited data set which included grab samples, limited inlet data and a dynamic system under construction. Further comprehensive study will be needed to explore and answer some of the questions raised.

### **Minneapolis Lake Trends**

In 2008, MPRB scientists monitored 13 of the city’s most heavily used lakes. The data collected were used to estimate the fertility or Trophic State Index (TSI) of the lakes. Changes in lake water quality can be tracked by looking for trends in TSI scores over time. These values are especially important for monitoring long-term trends (5 - 10 years). Historical trends in TSI scores are used by lake managers to assess improvement or degradation in water quality.

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All the lakes in Minneapolis fall into either the mesotrophic or eutrophic category, for lakes in a fully developed urban area. Calhoun, Cedar, and Harriet Lakes are mesotrophic with moderately clear water and some algae. Brownie, Isles, Hiawatha, Nokomis, Spring, Loring and Powderhorn Lakes are eutrophic with higher amounts of algae. Wirth Lake and Webber Pond fluctuate between these two categories. Trends in lake water quality can be seen by using the annual average TSI score over the last 18 years.

**Lakes showing water quality improvement**

- Lake Calhoun
- Cedar Lake
- Lake Harriet
- Powderhorn Lake
- Wirth Lake
- Webber Pond

**Lakes with stable water quality**

- Brownie Lake
- Lake Nokomis
- Lake Hiawatha
- Lake of the Isles
- Spring Lake

**2008 Water Resources Report**

The Minneapolis Park & Recreation Board's annual **2008 Water Resources Report** is a comprehensive technical reference of water quality information for the citizens of Minneapolis. Due to the length of this document, only the NPDES stormwater runoff monitoring and BMP monitoring sections are included in Appendices A4 and A5 of this Annual Report. When ready, electronic copies of the [2008 Water Quality Report](http://www.minneapolisparcs.org/default.asp?PageID=791) <http://www.minneapolisparcs.org/default.asp?PageID=791> will be available on the MPRB web page at [www.minneapolisparcs.org](http://www.minneapolisparcs.org). Previous years' reports can be found in the "**Caring for**

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***Our Parks - Lakes & Water Resources- Water Quality***’ section of the website. Reports are also available for check out at Minneapolis public libraries.

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*Storm Drain System and Drainage Areas Inventory*

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## XV. Storm Drain System and Drainage Areas Inventory

### **Storm Drain System Infrastructure**

The City of Minneapolis storm drain system handles runoff from approximately 50 square miles, and is the key element in ongoing efforts for flood protection and programs to improve and maintain water quality for the City's wetlands, lakes and streams.

#### **History**

From 1870 to 1922, all sewers built in Minneapolis were combined sewers intended to convey both sanitary sewage and stormwater runoff. In 1922, the City began construction of a separate storm drain system in newly developing areas of the City. In older previously developed areas, combined sewers continued as the only drainage system until 1960, when the City began actively separating combined sewers. From 1961 to 1984, construction of new storm drain piping proceeded in conjunction with the City of Minneapolis Residential Paving Program. In 1984, storm drain construction for sewer separation was accelerated because of development of a formalized Combined Sewer Separation program, called CSO Program, Phase I. There are currently approximately 600 miles of main line storm drain piping and 17 miles of deep drainage storm tunnels within the City of Minneapolis. This total does not include the State of Minnesota Department of Transportation, Hennepin County, the University of Minnesota or other agency systems. Approximately 91% of the City's storm drain system is constructed of reinforced concrete pipe (RCP). Service connections to catch basin inlets and private drains are mainly constructed of Polyvinyl Chloride (PVC). In 2003, the Minneapolis Public Works Department (MPW) was assigned to take over the storm drain system of the Minneapolis Park and Recreation Board (MPRB). This added roughly 17.16 miles of mainline piping and approximately 100 outfall control structures to the Minneapolis system (the exact number and delineation of areas drained is to be determined by a field survey). The total replacement cost of the City's storm drain system exceeds \$860 million (based on year 2000 dollars). In addition to the main line piping, MPW also maintains approximately 151 miles of catch basin runs.

### **Structural Controls**

The City of Minneapolis owns and operates 25 stormwater pump stations, 150 sedimentation (grit removal) structures, 387 outlets (exclusive of the added MPRB outlets noted above), and 28 stormwater

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ponds and wetlands. Grit removal structures, detention ponds, and outfall locations are displayed in Appendix B.

### **Drainage Areas and Discharges**

**Drainage Areas Inventory:** The City of Minneapolis contributes stormwater runoff to Minnehaha Creek, Bassett Creek, Shingle Creek and Mississippi River watersheds. A map of the drainage areas that have been delineated according to topographic contours and the storm drain system is included in Appendix B. The population, size of drainage area, land uses, distribution, and runoff coefficients by body of receiving water are listed in Appendix A1.

**Stormwater Hot Spots:** The City of Minneapolis currently has no known stormwater hotspots.

### **Event Mean Concentration and Annual Pollutant Loadings**

Calculated event mean concentrations and annual pollutant loading are included in Appendix A7. The following formula was used to calculate the total annual pollutant load:

$L = [(P) (P_j) (R_v) (C/1000) (A*4046.9)]$ , where:

**L** = seasonal pollutant load, kilograms/season

**P** = seasonal precipitation, inches/season (meters/season)

**P<sub>j</sub>** = correction factor for storms which do not produce runoff = 0.85

**R<sub>v</sub>** = runoff coefficient

**C** = median event mean concentration of pollutants, mg/L

**A** = area, in acres

Conversion factors were used to convert acres to square meters, and to adjust the concentration data units. Conversion factors are as follows:

- 4,046.9 for acres → square meters
- 1,000 for liters → cubic meters

The Flow Weighted Mean Concentration (FWMC), expressed as a mean of all sites, was used for the annual load estimation calculations. The FWMC most accurately reflects stormwater loading on an annual basis. The seasonal loads were calculated from the pooled data using the median event mean

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concentration, as there were too few data points from each watershed. The median of the data set is a better representation of the runoff data than the mean values (Bannerman, et al, 1992). The annual load, and a summation of the seasonal loads, will not be equal due to this difference in calculation methods.

Seasonal loads were calculated on the following basis:

Season	Inclusive dates	Precipitation, National Weather Service
Winter/snowmelt	01/01/08 - 03/31/08	2.52 inches (0.064 m)
Spring	04/01/08 - 05/31/08	5.65 inches (0.144 m)
Summer	06/01/08 - 08/31/08	8.18 inches (0.208 m)
Fall	09/01/08 - 12/31/08	6.03 inches (0.153 m)