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 lakes, streams, wetlands, and other surface waters. 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 first 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.

2006 Highlights and 2007 Work Plan

Storm Drain System Operational Management and Maintenance

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. Targeted pollutants include Nutrients and Floatable Trash.

A stormwater retention pond was constructed in 2006 for Flood Area 1, at 42nd Av N, from James to Morgan Av N, which is designed to also aid sediment control and nutrient removal. Maintenance and operation of the City's storm drain system is ongoing, with efforts in 2007 to add rainleader discharges and sump pump discharges, ultimately aimed at removing these inflow sources from the sanitary sewer system. Additionally in 2007, a final draft of an overall rehabilitation program will be completed for the 22 miles of deep storm drain tunnels in Minneapolis.

Structural Controls Operational Management and Maintenance

The NPDES 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. Within the system there are structural controls that affect system flow rates and water quality discharges. Structural controls include grit removal chambers, stormwater retention/detention ponds, outlet structures, inlet structures, pump stations, and level control weirs. Pollutants targeted include Sediment, Nutrients and Floatable Trash.

In 2006, inspection and maintenance activities were carried out for 25 pump stations, 114 grit chambers, 10 stormwater holding ponds, and about 20% of our 387 storm drain outfalls. The focus is on better condition assessment for maintenance pumps and ponds, and on long-term budgeting for pump station maintenance and operation.

Disposal of Removed Substances

The objective of the 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 of this objective is the collection and disposal of targeted pollutants in a manner that will prevent pollution and that will comply with applicable regulations. As above, the targeted pollutants of this program are Sediment, Nutrients and Floatable Trash.

In 2006, approximately 859 cubic yards of targeted pollutants were removed from the City's storm drain system, consisting primarily of sand and vegetative matter that were collected from grit removal chambers. Disposal of removed substances will continue, however because of budgetary constraints, there will be a reduced effort in removing substances from system piping and deep drainage tunnels.

Stormwater Management for New Developments and Construction

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 Mercury, Total Suspended Solids (TSS), Phosphorus, Biochemical Oxygen Demand (BOD5), Nitrate, Nitrite.

During 2006, Minneapolis Public Works took part in the preliminary review of over 250 site plans. Increased awareness of the Erosion & Sediment Control Ordinance, improvements in the plan submittal process, improved awareness of temporary erosion control Best Management Practices (BMPs), as well as our ongoing compliance-based inspection program, resulted in a continued rise in compliance.

In 2007, the City will study the option of requiring construction bonds to be posted from contractors to assure compliance and site completion, and also to facilitate the removal of temporary erosion controls at the completion of construction activities.

During 2006, over 100 permanent stormwater Best Management Practices (BMPs) were installed on 70 sites reviewed through the Minneapolis Development Review (MDR) process. BMP types included rain gardens, pervious pavement, infiltration areas, ponds and underground detention facilities. The redevelopment of existing sites continues to provide an opportunity to lessen the impacts of urbanization on the Mississippi River and other Minneapolis water resources.

The nearly 300 new residential rain gardens that were constructed in 2006 is testament to the success of a number of efforts including the stormwater utility credit program, Metro/Minneapolis Blooms rain garden workshops, and City of Minneapolis and MPRB stormwater education programs.

A new tracking process is in place to identify stormwater management opportunities. Public Works will continue to review all development plans from a Low Impact Design (LID) and sustainable water quality perspective.

Public Works is 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.

Roadways

The NPDES Permit objective of this 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), Biochemical Oxygen Demand (BOD5),

Chemical Oxygen Demand (COD), Phosphorus and Chlorides. Street sweeping, snow and ice control, and storage of de-icing material are the primary activities within this program.

Citywide sweeping operations occur every year in the spring and fall. Between these spring and fall sweep events, sweepers are assigned to maintenance districts for daily 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. Street sweeping techniques now utilize a combination of air regenerative and mechanical sweepers. Mechanical sweepers are best for sweeping where the debris is heavy, and then air regenerative street sweepers can be used to vacuum up some of the remaining, finer materials. Under the current program, each street in Minneapolis is swept a minimum of 4 to 5 times each year.

Street Maintenance 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 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 also harmful to groundwater, surface water, plants, and trees. Sand harms lakes and streams by disturbing the ecosystems, and in depositing pollutants that bind to sand particles in lake bottoms and streambeds. Maintenance supervisors are trained in winter maintenance techniques through sessions that are sponsored by the Local Road Research Board training partnership.

Material spreaders are calibrated before each winter season. Maintenance yard housekeeping practices are designed to minimize salt/sand runoff. The materials that are used are tallied daily.

The 2005-2006 winter season was a cold year with many small snow events, but major events occurred at the beginning and end of the season. The most snowfall was observed in December and March, while January and February were relatively dry. There were three snow emergencies, and 149 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. All salt stockpiles are stored under cover to minimize potential groundwater contamination and runoff.

Ongoing activities to fulfill permit requirements will continue. Additional education opportunities will be explored for management and maintenance workers. Management will keep abreast of new

technologies for street sweeping and for snow and ice control, as they become available. Any promising technologies will be tested on a pilot basis before implementation.

Flood Control

The objective of the 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 and Total Suspended Solids (TSS).

In 2006, pipe work and pond excavation were completed in the vicinity of 42nd Av N and Russell Av N for the Flood Area 1 project. Construction was completed to resolve a flood area in the vicinity of W 44th St and Aldrich Av S for Flood Area 24. Preliminary design was started for the Lake Hiawatha/Blue Water Partnership mitigation area. All underground sewer work is complete for the multi-phase Flood Area 27 project along 28th Av S from E 38th St to E 40th St.

In 2007, in addition to work associated with the above, City personnel are in the process of requesting funding for the 2007 – 2011 Capital Improvement Program for Sibley Field work.

Pesticides and Fertilizer Control

The objective is to minimize the discharge of pollutants by controlling the application of pesticides and fertilizers. Targeted pollutants include Pesticides and Nutrients.

The MPRB has 175 trained staff with applicator licenses, and the MPRB also trains appropriate City staff. The MPRB has ongoing programs for vegetation management, tracking chemical applications, training and (re)certifying employees, and maintaining Audubon Cooperative Sanctuary Program (ACSP) certification for environmental operations at the Meadowbrook and Wirth Golf Courses. The MPRB is expanding its documentation of pesticide and fertilizer use to properties managed by City of Minneapolis Department of Public Works, Minneapolis Public Housing Authority, and Minneapolis School Board properties.

Illicit Discharges and Improper Disposal to Storm Sewer System

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 a NPDES (or other such permit) be obtained for non-stormwater discharges. All pollutants are targeted by this program.

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
- 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
- The use of absorbents or other media to collect hazardous waste for disposal

Training for emergency spill procedures is coordinated amongst the Minneapolis Fire Department, the Regulatory Services Environmental Services unit and the Public Works Street Maintenance section.

In 2006, 178 calls for emergency response were successfully addressed, including:

- Spill containment
- Chemical dumping
- Illegal disposal or handling of regulated or hazardous materials

In 2007, GIS mapping will be implemented as a tool to support these activities. 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.

Storm Sewer Design for New Construction

There is a continuing effort to minimize the discharge of pollutants to public waters. The 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 storm water discharged. Targeted pollutants include Total Suspended Solids (TSS), Phosphorus, Chloride and Fertilizers.

Whenever storm sewer upgrades are required, installation of volume reduction systems are considered first. Pollutant load reducing facilities are considered next, and finally rate reduction Best Management Practices (BMPs) are incorporated in the work scope.

In the next five years, efforts will be concentrated on the removal of Inflow and Infiltration (I / I) from the sanitary sewer system, while also incorporating volume, pollutant load and rate reduction factors.

Public Education

The objective of this stormwater management program is to educate the public regarding point and non-point source (stormwater) pollution. Numerous educational activities conducted by the MPRB and the City of Minneapolis 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 non-point source pollution. Year 2007 highlights include ongoing programs by MPRB naturalists at recreation centers and along the Mississippi River, Earth Day activities, rain barrel distribution events, rain garden workshops, further development of multi-cultural and multi-lingual tools, and development of targeted education for developers and contractors.

Public Participation Process

The objective of the public participation process is to maximize the effectiveness of the City's NPDES program by seeking input about the Minneapolis stormwater management program and activities from the public. This outreach targets All Pollutants.

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 in April, the City of Minneapolis holds a public hearing to provide an opportunity for public testimony prior to report submittal to the MPCA. In 2007, a notice was sent to the City's 81 neighborhood organizations and 16 interested parties, environmental groups, and related governmental entities advising them of the opportunity to provide comments on the Draft Annual Report at the public hearing or in writing. A Public Hearing Notice was also posted in *Finance and Commerce*.

The draft, as well as the finalized Annual Report, is made available on the City's Storm and Surface Water Management website. The City Clerk's office also keeps a copy on hand for public examination. An electronic version of the Report can be obtained on compact disk (CD) from Minneapolis Public Works at 612-673-2522.

All testimony and written comments received are recorded and given consideration; these responses are then included in the Annual Report. Finally, the Annual Report is presented, with the responses to the public comments, to the Minneapolis City Council for approval and adoption. A copy of this resolution is then submitted to the MPCA by June 1.

The public hearing was held on April 17, 2007. No testimony or questions were presented. Written comments were accepted until Friday, April 27, 2007. Only one question was submitted, as follows:

> ***Question**: What are the City's plans to keep water from rising up out of the storm sewers and flooding the N E Minneapolis area near 27th Avenue NE and California Street NE? This seems to happen at least once a year during the all to common heavy rain events. The area of Columbia Avenue also floods or fills with standing water.*
>
> ***Response**: There are several stormwater-related projects that are scheduled for construction in the area in Year 2010. Public Works staff are contacting the individual that posed the question to communicate this, and also to request additional information to enter into the City's Flood Complaint database.*

In 2006, during development of the Local Surface Water Management Plan, three open houses were held to solicit public input on water resources management in Minneapolis. These open houses were held at Webber Park, at MPRB Headquarters, and at Nokomis Recreation Center. City staff will continue to update the Storm and Surface Water Management website: http://www.ci.minneapolis.mn.us/stormwater/

Coordination with Other Governmental Entities

Watershed Management Organizations

Coordination and partnerships of the City of Minneapolis and the Minneapolis Park & Recreation Board (MPRB) with other governmental entities include the four watershed management organizations (WMOs) in Minneapolis: Bassett Creek Water Management Commission (BCWMC), Mississippi Watershed Management Organization (MWMO), Minnehaha Creek Watershed District (MCWD), and Shingle Creek Watershed Management Commission (SCWMC).

The coordinated activities vary by watershed, but generally include some or all of the following:

- Joint review of projects
- Stormwater quality monitoring and outlet monitoring
- Water quality education and programs
- City staff attending watershed board meetings

- Technical Advisory Committee (TAC) participation
- Providing developers contact information (through site plan review) regarding watershed requirements
- Sharing information regarding watershed characteristics, flooding problems, public outreach opportunities, modeling data, etc.
- Input, review and comment of various planning efforts and documents
- In some cases, cost sharing for water quality projects

Other Stormwater Partners

The City and the MPRB also coordinate stormwater management efforts with Minnesota Department of Transportation (MnDOT), Metropolitan Council Environmental Services (MCES), the MPCA, the Minnesota Department of Natural Resources (DNR), surrounding municipalities, and Hennepin County.

Water Quality Monitoring Task Force

After three and a half years, the Water Quality Monitoring Task Force (WQMTF) was dissolved in January 2007, when the goals had been met. The WQMTF had included policymakers from the City, MPRB, and local WMOs. The goals were to determine whether there were overlaps in monitoring efforts carried out by the various organizations, and to determine whether it would be of benefit to standardize the organizations' monitoring parameters. It was determined that the monitoring efforts carried out by the various entities are not repetitive with one another, and that the various monitoring programs address different needs and therefore should not be standardized.

The Minneapolis Local Surface Water Management Plan

In 2006, the City of Minneapolis completed its Local Surface Water Management Plan (LSWMP), developed to meet the requirements of Minnesota Statute 103B, as well as to provide a resource for City staff. The LSWMP serves as a guidance manual for handling regulatory requirement issues, planning and managing surface water resources, stormwater and sanitary sewer infrastructure, as well as 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, and meeting agency review requirements. 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 content of the LSWMP is in large part determined by Minnesota Statue 103B and Rules 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. Contributors included various City departments, MPRB, MCES, and the four WMOs in Minneapolis. The Plan can be accessed at the City's Stormwater website: http://www.ci.minneapolis.mn.us/stormwater/local-surface.asp

Stormwater and Water Quality Monitoring - Results and Data Analysis

2006 Water Resources Report

The Minneapolis Park & Recreation Board's (MPRB) annual *2006 Water Resources Report* is a comprehensive technical reference of water quality information for the citizens of Minneapolis. Due to the length of the 2006 Water Resources Report, only its NPDES stormwater runoff monitoring and BMP monitoring sections are included in this *2007 Stormwater Management Program and Annual Report* (also known as the *Annual NPDES Report),* which is prepared by the City of Minneapolis in collaboration with the Minneapolis Park & Recreation Board. Electronic copies of the *2006 Water Resources Report* are available on the MPRB website at http://www.minneapolisparks.org/default.asp?PageID=791. The whole report can be found in the "*Caring for Our Parks - Lakes & Water Resources- Water Quality*" section of the website. 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.

Minneapolis Lake Trends

In 2006, 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.

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, Harriet and Wirth Lakes are mesotrophic with moderately clear water and some algae. Brownie, Isles, Hiawatha, Nokomis, Webber, Loring and Powderhorn Lakes are eutrophic with higher amounts of algae. Trends in lake water quality can be seen by using the annual average TSI score over the last 14 years.

Lakes showing water quality improvement

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

Lakes with stable water quality

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

Lakes showing water quality enrichment

- Webber Pond

Storm Drain System and Drainage Areas Inventory

Minneapolis contributes stormwater runoff to Minnehaha Creek, Bassett Creek, Shingle Creek, and Mississippi River watersheds. The Minneapolis storm drain system handles runoff from over 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 system includes main line storm drain piping, deep drainage storm tunnels, catch basin runs, outfall control structures, pump stations, grit chambers, and stormwater detention ponds. Not included in the City system are facilities owned and operated by MNDOT, Hennepin County, the University of Minnesota or other agencies.

From 1870 to 1922, all Minneapolis sewers were constructed as combined sewers, designed for conveying both sanitary sewage and stormwater. In 1922, Minneapolis began construction of a separate storm drain system for newly developing areas, however combined sewers remained the only drainage system for older areas until 1960, when the City began separating combined sewers.

Seasonal loads are reported in Appendix A and were calculated on the following basis:

Season	Inclusive dates	Precipitation, National Weather Service
Winter/snowmelt	01/01/06 – 03/31/06	3.03 inches (0.077 m)
Spring	04/01/06 – 05/31/06	7.63 inches (0.194 m)
Summer	06/01/06 – 08/31/06	11.00 inches (0.279 m)
Fall	09/01/06 – 12/31/06	5.90 inches (0.150 m)

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The LSWMP was prepared to guide the City in conserving, protecting, and managing its surface water resources, and meeting agency review requirements. 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 content of the LSWMP is in large part determined by Minnesota Statue 103B and Rules 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. Contributors included various City departments, MPRB, MCES, and the four watershed organizations in Minneapolis. The Plan can be accessed at the City's Stormwater website: http://www.ci.minneapolis.mn.us/stormwater

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 Field Services Division - Sewer and Storm Drain Section, of the Public Works Department. They are supported with their design engineering and regulatory compliance needs by Engineering Services Division – Water Resources Section.

The Sewer and Storm Drain Section is comprised of two functional work areas: construction & repair and operations & maintenance. The current total authorized staffing level of both areas is 96 full time employees. Of this, there are currently 50 permanent full time and 2 seasonal employees working directly within the operations and maintenance 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
- Operational management of stormwater detention ponds.

The table below shows the base operational functions along with the corresponding staffing:

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. Logs and condition assesses 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 pipe line 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 clean up 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 storm water pump stations. Operate and maintain storm water detention basins.
1	3	Shop	Perform general maintenance and repair to specialty use vehicles and emergency response equipment. Fabricates, as needed, custom metal and wood objects for sewer and storm drain operations. Provides field deliveries of materials, tools, and equipment. Maintains material inventory and fleet management data.

Previous Year Activities

The Sewer & Storm Drains Section actively engaged in the cleaning and repair of the City's storm drain system in 2006. Some of the more noteworthy accomplishments are summarized in the following list:

- Responded to 633 complaints of plugged or backed-up catch basins
- Responded to 36 complaints of cave-ins around catch basins and manholes
- Performed 339 minor repairs to storm drain lines, catch basins or manholes
- Completed 2 major repairs to the storm drain system

- Cleaned 7.11 miles of storm drain utilizing hydro jet washing and vacuum sediment removal
- Televised and assessed the condition of 2.31 miles of storm drain pipe line
- Inspected and condition assessed the City's 22 miles of deep storm drain tunnels
- Constructed a stormwater retention pond at 42nd Av. N, from James to Morgan Av N, designed to aid sediment control and nutrient removal

Work Plan

Maintenance & operation of the City's storm drain system in 2007 will continue, with efforts to add rainleader discharges and sump pump discharges, ultimately aimed at removing these inflow sources from the sanitary sewer system. Maintenance of the storm drain system will be reduced from the efforts of the previous year by $500,000. The budgetary reductions will be made through reduced cleaning of pipe line segments and postponing elective system repairs. Due to the inclusion of emergency response costs within the storm drain system budget and the randomness of natural events leading to realized costs, the effect of storm drain budget cuts can only be estimated at this point. In 2007, a final draft of an overall rehabilitation program will be completed for the City's 22 miles of deep storm drain tunnels.

Performance Measures

Miles of storm drain televised per year: 2.31 miles @ $1.19 / ft

Miles of storm drain cleaned per year: 7.11 miles @ $3,473 / mile

III. Structural Controls 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. Within the City's storm drain system are structural controls that affect system flow rates and water quality discharges. Structural controls include grit removal chambers, stormwater retention/detention ponds, outlet structures, inlet structures, pump stations, and level control weirs. Pollutants targeted include sediment, nutrients and floatable garbage.

Program Overview

Structural Controls, which are part of the City's overall storm drainage system, are operationally managed and maintained by the Public Works Field Services Division – Sewer and Storm Drains Section. In general, 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 categories as outlined below:

Grit Removal Structures – These are devices that have been installed for sediment, debris, and oil collection. The City continues its effort to increase the number installed. The devices are inspected annually in the spring and fall, 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 into a computerized tracking database.

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 five-year schedule, whereby 20% of the outfalls are inspected during any given year. Site inspections are aimed at evaluating the general condition of structure, determining if any significant erosion has occurred and observing for contaminant discharges. When any indications of illicit or otherwise contaminated discharges are observed, they are immediately reported to the Minnesota Pollution Control Agency Duty Officer and 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.

Pumps & Weirs – These are structural devices that mechanically affect the flow of stormwater runoff through the storm drain system. Pump stations are inspected monthly for routine operational checks and 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, as with outlet structures, are inspected and repaired as needed to facilitate their proper operational working order.

Ponds – These are structural devices which detain, and in some cases improve, the water quality of stormwater runoff entering the pond. Ponds are regularly maintained, given their park-like amenities including plantings, turf grass, pathways, benches, and lighting. Based on current experience, dredging of sediment buildup appears to be in a 15- to 20-year cycle. Currently, only a few of the City's holding ponds are at or near this age, and therefore sediment removal from them has not been a routine requirement.

Storm Drain Inlets – These are structural devices that provide entrance of stormwater runoff into the storm drainage system, and consist of catch basins located along the City's street system. While there is no formalized inspection schedule, both the Field Services – Sewer and Storm Drains Section and the Field Services – Street Maintenance Section make an effort to routinely look for plugged or damaged structures. Reported damages and/or plugs are given a priority for repair and/or cleaning within the Sewer and Storm Drains Section. Cleaning catch basins, while ensuring proper runoff conveyance from City streets, also removes accumulated sediments, trash, and debris. Augmenting this effort is the Street Maintenance Sections street sweeping program, which targets the pick-up of street sands, leaves, and debris prior to 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 25 pump stations
- Inspected 157 and cleaned 114 grit chambers, for a total of 859 cubic yards
- Maintained 10 stormwater holding ponds (Note: average cost listed below was based on only 9 stormwater holding ponds)

- Inspected 70 of 387 storm drain outfalls in 2006 inspection program. Of the 70 outfalls inspected, 18 were judged to be in need of maintenance.

Work Plan

Operational management and maintenance of the City's structural control devices will continue, as in prior years. In 2006, Minneapolis Field Services dedicated a staff member to monitor and track the maintenance pumps and ponds in Minneapolis. The efforts of this position will help to concentrate on a better condition assessment, as well as long-term budgeting for pump station maintenance and operation.

Performance Measures

Note: The unit costs shown below include overhead (from the labor, administrative & general funds), as well as equipment costs. Structures that are operated and maintained annually include:

- 25 pump stations, with an average cost of $4,945 per station
- 9 stormwater holding ponds, with an average cost of $18,344 per pond[1]
- 136 grit chambers serviced, with an average cost of $1,334 per chamber

[1] Ten holding ponds were service and maintained in 2006. However, due to the installation of the pond at 42nd Av. N, from James to Morgan Av N late in the year, no costs were incurred on this particular structure during 2006.

IV. Disposal of Removed Substances

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. A key component of this objective is the collection and disposal of targeted pollutants in a manner that will prevent pollution and that will comply with applicable regulations.

Targeted Pollutants: Sediment, Nutrients and 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 Field Services – Engineering Laboratory will select representative samples for 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 using the same process as with street sweepings. During cleaning and disposal operations, erosion control measures are applied when needed to prevent removed material from re-entering the storm drain system.

Previous Year Activities

In 2006, approximately 859 cubic yards of targeted pollutants were removed from the City's storm drain system. The removed material consisted primarily of sand and vegetative matter that were collected from grit removal chambers. See Section III for Maintenance and Operation details.

Work Plan

Disposal of removed substances will continue, with the exception that budget cuts will require reduced effort in removing substances from system piping and deep drainage tunnels.

Performance Measures

Quantity of materials removed: 859 cubic yards @ $88.62/cy (which includes labor costs for additional inspections). Sewer and Storm Drains Section responded to, and subsequently mitigated, 16 contaminated substance/ hazardous waste spills in 2006.

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: Mercury, TSS, BOD5, Phosphorus, Nitrate + Nitrite

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, multidisciplinary review of the submitted plans. This review provides comments which are integrated into a final plan submittal that is subsequently routed to the City's Licensing, Building Plan Review, Fire, Community Crime Prevention, and Public Works Department (Street, Traffic, Sidewalk, Water, Right of Way, and Water Resources Sections) for review of compliance issues. Water Resources reviews projects for compliance with the Erosion and 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.

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*". This ordinance was designed with the intent of regulating topsoil disturbances, thus limiting soil from entering the storm drain system.

Requirements

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

Enforcement

Ongoing site inspections are performed by Public Works and Regulatory Services inspectors. A violation of the ordinance is a misdemeanor (which holds a maximum penalty of $700 and/or ninety days in jail). 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 (Chapter 587, Article 9, Section 4). 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

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". Chapter 54 establishes requirements for land disturbance activities 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 process and approved by the Department of Public Works Water Resources section. 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. A 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 suspended solids for Mississippi River discharges
- 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 2006, Minneapolis Public Works took part in the preliminary review of over 250 site plans. Of those 250 sites, 160 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 2006 inspections is as follows:

- 3,061 site inspections completed
- Successfully responded to 53 public complaints
- 8 Enforcement actions issued to gain site compliance
- Coordinated inspections with Minnehaha Creek Watershed District

During 2006, Engineering Services 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 BMP's by City construction forces has allowed inspectors to focus on private sites improving compliance citywide.

Ongoing Stormwater Management

- During 2006, over 100 Stormwater Best Management Practices (BMPs) were installed on 70 sites reviewed through the Minneapolis Development Review process. BMP types that were proposed included rain gardens, pervious pavement, infiltration areas, ponds and underground detention facilities. When installed, these BMPs will provide rate control and water quality for over 100 acres of land. The increased redevelopment of existing sites continues to provide an opportunity to lessen the impacts of urbanization on the Mississippi River and other Minneapolis water resources.
- The nearly 300 new residential rain gardens that were constructed in 2006 is testament to the success of a number of efforts including:
- Stormwater utility credit program
- Minneapolis Blooms rain garden workshops
- City of Minneapolis and Minneapolis Park & Recreation Board stormwater education programs

Work Plan

Site Plan Review

Public Works staff will continue their detailed review of site plans, while utilizing a *Stormwater Project Review Application Form* 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.

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. Options under review for implementation are as follows:

- Requiring construction bonds to be posted from contractors to assure compliance and site completion, and also to facilitate the removal of temporary erosion controls at the completion of construction activities
- Education and outreach about erosion and sediment control and ongoing stormwater management to City staff, property owners, developers, consultants

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:

- Provide final inspections and register all stormwater devices installed under chapter 54 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 that could accelerate the goals of the permit.
- Sponsor amendments to Chapter 54 Stormwater Management to reduce the threshold for sites that are captured under the Ordinance, and to increase the buyout in lieu of site treatment fee.

Performance Measures

Current performance measures include [1]

1. Number of sites captured in 2006 under Stormwater Management Ordinance: 45
2. Number of erosion control inspections in 2006: 3,061
3. Number of large BMPs such as ponds or wetlands installed with public projects in 2006 as a result of current programs: 8 [2]
4. Number of small BMPs such as rain gardens installed with private projects in 2006 as a result of current programs: 426 [2]
5. Number of large area grit chambers installed with public projects in 2006: 14 [2]
6. Number of small area grit chambers installed with private projects in 2006: 34 [2]

[1] 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.
[2] City of Minneapolis Annual Sustainability Report

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: TSS, BOD5, COD, Phosphorus and Chlorides

Program Overview

Street Sweeping

Citywide sweeping operations occur every year in the spring and fall. All City streets and alleys are swept systematically; enforcement of temporary parking bans 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 daily 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. Street sweeping techniques now utilize a combination of air regenerative and mechanical sweepers. Mechanical sweepers are best for sweeping where the debris is heavy, and then air regenerative street sweepers can be used to vacuum up some of the remaining, finer materials. Under the current program, each street in Minneapolis is swept a minimum of 4 to 5 times each year.

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 2003 contract states that the organic materials, which are collected mostly in the fall of the year, go to

Hutchinson, Minnesota to be composted and converted to a retail mulch material that is then distributed by a company called 'Creekside Soils'.

Snow and Ice Control

Street Maintenance 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 also harmful to groundwater, surface water, plants, and trees. Sand harms lakes and streams by disturbing the ecosystems, and in depositing pollutants that bind to sand particles in lake bottoms and streambeds. Maintenance supervisors are trained in winter maintenance techniques through sessions that are sponsored by the Local Road Research Board (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 constructed in 1991 at maintenance yards located at 60th & Harriet Ave. S. and 1809 Washington Ave. N.E. These facilities were designed according to Mn/DOT specifications, to minimize runoff. Two other salt storage facilities exist that will be abandoned or replaced in the next few years. This will be done in coordination with plans to consolidate maintenance yards, and to build a new facility at 26th St. E. & Hiawatha Ave.. The storage shed at the 44th St. E. & Snelling Ave. maintenance yard is closed. The temporary storage shed at 198 Aldrich Ave. N. will be abandoned in 3-5 years, contingent upon the construction of new facility at 26th St. E. & Hiawatha Ave.. A temporary storage shed was added to 26th St. E. and Hiawatha Ave. Like the 198 Aldrich site, this will be abandoned when the new complex is built. The new maintenance yard will employ the most effective Best Management Practices (BMPs) available, including runoff collection systems that would be installed around salt and sand stockpiles, and truck washing areas.

Previous Year Activities

The 2005-2006 winter season was a cold year with many small snow events, but major events at the beginning and end of the season. The most snowfall was observed in December and March with dry January and February. There were three snow emergencies, and 149 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 weighing 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:

- 17,260 tons of salt was applied to roadways
- 14,975 tons of sand was applied to roadways
- 24,039 tons of material was reclaimed during spring and summer street sweeping operations
- 4,788 tons of leaves were collected (for composting) during the fall citywide sweeping
- Twenty staff members attended an eight-hour refresher for the 40-hour hazardous materials training class
- Eight Foremen attended training on the application of snow and ice control on parking lots and sidewalks sponsored by Shingle Creek Watershed Management Commission
- All divisional 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 material recovered as a percentage of material applied: 160.5%
- Amount of salt and sand applied relative to total snowfall: 655 tons/inch

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
- TSS (Total Suspended Solids)

Program Overview

In July of 1997, Minneapolis experienced torrential rainstorms that exceeded the capacity of the City's existing storm drain system and caused flooding throughout the City. The flooding caused physical damage to homes, businesses & automobiles. 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 state of the City's available finances, this Program has been 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 ongoing flood mitigation program uses strategies that include incentives for all properties to use on-site systems that reduce runoff rate, water volume and pollutants. Some of the strategies include the following:

- Construction of stormwater ponds
- Upgrading existing storm sewers to accommodate open channel flow during a 10-year, 24-hour design[1] and provide protection to homes from the 100-year storm event
- Replacing catch basin grates to provide for more inlet capacity

[1] City of Minneapolis 10-year design based on 4.2" of rainfall in a 24-hour event and-year design based on 5.9" of rainfall in a 24 hour event.

- Construction of additional catch basin inlets to reduce run-by into low areas
- 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
- Reducing sewer backups by removing cross-connections between storm and sanitary sewer systems, by continuing efforts to reduce I & I (Inflow and Infiltration), and by replacing standard manhole covers in low areas with watertight sealed covers
- Inclusion of various Best Management Practices (BMPs), including grit chambers, rain gardens, permeable pavers, etc.

Previous Activities

The following is a summary of flood mitigation project activity in 2006:

Flood Mitigation Area 1

- Pipe work is completed. Pond excavation is completed.

Flood Mitigation Area 19 – Phase II Tunnel Construction

- Project was completed on September 20, 2005

Flood Mitigation Area 19 – Phase III Construction by City Crews

- The grit chamber near Upper Harriet Parkway was completed
- The connection and inlets at Aldrich Av S & 44th St W, were constructed in December of 2006 to coordinate with the Flood Area 24/CSO 26 project

Flood Mitigation Area 21/22 - Lake Hiawatha/Blue Water Partnership – Zone 1

- City personnel started preliminary design of the Blue Water Partnership project in 2006

Flood Mitigation Area 24/CSO Area 26

- The Flood Area 24 storm drains were designed to discharge to the new storm tunnel constructed along W 44th St, from Aldrich Av S to Lake Harriet.
- The new storm tunnel was constructed to resolve Flood Area 19 (W 44th St & Aldrich Av S). Construction started in June of 2006, and was completed in December 2006.

Flood Mitigation Area 27

- Box culvert construction was completed in 2006. All Flood Area 27 underground sewer work is complete. 28th Av S road reconstruction was completed in 2006.

Work Plan

The following a summary of scheduled flood mitigation project activities in 2007:

Flood Mitigation Area 1

- Light fixtures, vegetation, alley guard rail, fence to the west of the pond to be completed in 2007

Flood Mitigation Area 19 – Phase III Construction by City Crews

- Final restoration for the connection and inlets at Aldrich & 44th will be completed in the Spring of 2007

Flood Mitigation Area 21/22

- Flood Area 21/22, Lake Hiawatha/Blue Water Partnership – Zone 1
  - Funding was approved for 2006 and is approved for 2007. City personnel are working with MPRB to gain permission to the project site and complete the preliminary design.
- Flood Area 21/22, Bloomington Ave. – Zone 2
  - City personnel are in the process of requesting funding for the 2007 – 2011 CIP
- Flood Area 21/22, Sibley Field – Zone 3
  - City personnel are in the process of requesting funding for the 2007 – 2011 CIP

Flood Mitigation Area 24/CSO 26

- Final restoration will be completed in the Spring of 2007.

Flood Mitigation Area 27

- Although Flood Area 27 sewer work was completed in 2006, the sealcoat work for 28th Av S is to be completed in the summer of 2007.

Performance Measures

The performance will be realized in reduced neighborhood flooding, and increased water quality of lakes, river and streams in Minneapolis. The Flood Mitigation Program Projects provides removal of TSS, nutrients, litter, and other pollutants, as well as providing some rate control.

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 the Park Maintenance and Environmental Services staff to decide the best approach to dealing with pest issues. The main focus areas are 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, bio-controls, etc.

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 and coordinated by the University of Minnesota (UMN). 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 UMN researchers to develop a 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 UMN's bio-control program efforts. Purple loosestrife is the only plant where a bio-control agent has been successful at controlling the spread of the invasive species. In years where beetle populations are low, and bio-control methods are not as effective, spot-spraying or hand-pulling of purple loosestrife is done by park maintenance staff. Eurasion watermilfoil and purple loosestrife control are permitted through Minnesota Department of Natural Resources - Division of Ecological Services. Coordination of control programs for purple loosestrife and Eurasian watermilfoil are determined, and supervised, by the MPRB 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 5 years, in accordance with Minnesota Department of Agriculture regulations.

Since the 1980's, 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 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. This ordinance regulates the rate of application of turf and phosphorus-containing fertilizers. The ordinance prohibits the application of phosphorus-containing and turf fertilizers, with the following exceptions:

- If the fertilizer is organic
- If the fertilizer is being applied to newly established turf
- If a soil test has been taken that indicates that the turf needs phosphorus

Fertilization of turf on Minneapolis Park Board property is applied to 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 5 years, as per state law.

Previous Year Activities

Staff Pesticide Applicator Licensing and Continuing Education

In 2006, 160 MPRB employees held 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.

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. A wide range of fertilizers was offered to allow park maintenance and golf course foremen to pick

the highest performing fertilizer, based on soil test results. In 2006, many suppliers are offering a wider range of zero-phosphorus turf fertilizers, considerably expanding bid alternatives.

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. Important components of this program are the implementation of IPM procedures, and 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 Theodore Wirth and Meadowbrook Golf Course foremen, received the ACSP certification for both courses. MPRB staff conducts yearly water quality and aquatic vegetation monitoring at the courses.

Work Plan

- Maintain vegetation database: Environmental Operations staff tracks maintenance activities on the MPRB's Environmental Operations' vegetation database
- Investigate creation of a MPRB Pesticide and Fertilizer Application Database to improve tracking and reporting of chemical applications to MPRB lands
- Continue to recertify employees as Pesticide applicators
- Continue 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 Department of Public Works – Property Services Division, the Minneapolis Community Development Agency, 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: 175

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 (or other such permit) be obtained for non-stormwater discharges.

Targeted pollutants include: all pollutants.

Program Overview

Hazardous Spills

Public Works Street Maintenance department, the Minneapolis Fire Department, and the Regulatory Services Environmental Services unit 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 department for handling spills is documented in the City's *Standard Operating Procedure for Vehicle Related Spills,* which is included in Appendix A32.

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 of additional resources being 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, and outside agencies and private emergency response contractors are also incorporated as needed. Spills that fall within the minimum reporting requirements are reported to the Public Safety Duty Officer from the Minnesota Pollution Control Agency (MPCA). 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.

Emergency Response Program

In 2004, the Department of Regulatory Services purchased a boat, for use by Environmental Services unit, on the Mississippi River and other water bodies in Minneapolis. This boat is necessary for responding to spills that have the potential to impact our valuable water resources. In the past when such impacts have occurred, the City efforts were restricted to mitigation efforts that could be advanced from land. The presence of a properly equipped boat facilitates addressing these events on the Mississippi River and City lakes, and provides a valuable service to the citizens. The boat is an asset in that it allows City personnel to address these events, and to coordinate this work with other City efforts and the MPCA's Spill Response Program. 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.

In addition, the boat would also be used in 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 primarily through educational efforts, inspections, and coordinated community outreach events. These activities may include enforcement, pursuant to Chapter 48[1] 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 inspectors 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, 311 in Minneapolis. Outside of Minneapolis, 612-673-3000
- Reports from sewer maintenance crews, plumbing inspectors, and other City personnel
- Direct contact to Environmental Services staff (612-673-5843)

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:

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

[1] Minneapolis Code of Ordinances, Chapter 48 Minneapolis Watershed Management Authority.

		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, 52 & 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.
g.	Foundation and footing drains	Contribute to I/I problems, and ultimately to Combined Sewer Overflows.
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 and Sewer Maintenance departments 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.

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 ongoing 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. In 2005, the Environmental Services unit entered into 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 178 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 285 water and land pollution complaints (illegal dumping, improper storage of material, and chemical storage)
- Notices sent to 6 of 497 residential erosion control permit holders (for residential, multi-family and commercial projects, construction and demolition)
- Inspected 5 contaminated soil complaints
- Approved installation of 7 contaminated soil and ground water remediation systems

The Sewer Maintenance Department also responded to 7 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: 433 of 469
- Erosion control permit non-compliance that were addressed: 4 of 6

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 storm water discharged.

Targeted pollutants include: Total Suspended Solids, Phosphorus, Chloride and Fertilizers

Program Overview

City of Minneapolis has scaled back its stormwater management program with a five-year focus on the reduction of Infiltration and Inflow (I/I) in the sanitary sewer system. The principal work is elimination of public and private stormwater inlets or rainleaders connected to the sanitary sewer. As each connection is eliminated, there is a resulting incremental increase in runoff.

The shift in focus is the result of a Metropolitan Council penalty surcharge of $36.6 million divided over a five-year period because the City has 103.3 million gallons per day of inflow during a large storms. Based on volume, half of the sources of the inflow have been identified. The work of identifying the remaining sources is continuing. As the City has success with the reduction if I/I in the sanitary sewer system, that translates to increased flow rates in the storm water management system. The management techniques focus first on volume reduction, and vary with each project. Most of the projects involve a one lot roof area or a 1-acre drainage area. By themselves these inflow areas are not a serious problem, but many are grouped together. As a result, 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 offsite area, both with suitable soils for volume reduction. Next, load reduction options are investigated. Except under conditions that have inadequate elevation, load reduction can be included. Normally load reduction consists of using prefabricated BMPs (swirl type grit chambers) which are preferred by designers. Other systems include the use of biofiltration or the use of ponding. Space constraints normally result in the use of a swirl type grit chamber BMPs because of space constraints in fully developed urban areas like Minneapolis. Limited space makes the compact prefabricated BMPs the feasible alternative for the majority of projects.

Other popular BMPs include the use of pervious pavements. Minneapolis has constructed pilot projects that include pervious concrete pavements in several locations as an alternative to

grit chambers. This approach is designed to reduce stormwater volume. These projects are pilot projects because the City must know if there are other impacts resulting from volume reduction BMPs, such as increased infiltration.

Previous Year Activities

During 2006, the flood area work carried over from the 2005 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 sewer upgrades are required, installation of volume reduction systems are considered first. Load reducing facilities are considered next and finally rate reduction BMPs are incorporated in the work scope. The Lake Street reconstruction project is an example where stormwater treatment BMPs were installed on project outfalls that discharged to systems that were in turn connected to public water. The storm drain project areas, and associated water quality impacts, for 2006 are referenced in the following table:

PROJECT AREA	PROJECT DESCRIPTION	STORMWATER RUNOFF BENEFITS
Folwell Middle School Green Initiative.	This project highlights the focus of stormwater projects. First it included the removal of over 2.5 acres of asphalt to facilitate the construction of an infiltration/basin rain garden. This basin will provide retention for the entire site as well as the adjacent 5+ acre watershed for the 100-year storm event.	Volume Reduction by providing opportunity for infiltration in the detention basin. Load Reduction by reducing inflow to the sanitary sewer eliminating water quality degradation of a CSO event and reduction in TSS and pollutants by utilizing the newly constructed regional ponding facility. Education by providing a positive water quality teaching opportunity in an outdoor classrooms close to the school
Pervious pavement at E Lake Street and 10th Avenue S	A traffic diverter was constructed and the new pavement was pervious concrete pavement.	Volume Reduction is achieved by providing a large area for infiltration
Flood Area 1, 42nd and Russell Avenues North	The project includes storm sewer pipe in 42nd, 43rd, Russell and Queen Avenues North in Phase I, then a flood mitigation pond on land acquired from Crystal Lake Cemetery	Rate Reduction by creating a detention pond Load Reduction in TSS through sedimentation occurs because of the detention time in the pond, not by design
Village in Phillips Alley rain garden at 2412 16th Avenue S	This project included the relocation of an alley and in consideration of vacating the existing alignment, the	Load Reduction in TSS, nutrients and other pollutants in the Mississippi Watershed Management Organization Volume Reduction as a result of

PROJECT AREA	PROJECT DESCRIPTION	STORMWATER RUNOFF BENEFITS
	developer constructed the rain garden BMP to treat runoff from the alley	infiltration
CSO 26, Flood Area 24, Aldrich Ave S, 44th to 45th Sts W, 45th St W Aldrich to Lyndale Ave S	The project is a combination of CSO and Flood Mitigation of runoff that drained to the sanitary sewer system	Load reduction as a result of eliminating a CSO so that combined sewers do not overflow to the Minnesota River
Heritage Park, bordered by Humboldt Av N, Plymouth Av N, Glenwood Av N, and Lyndale Av N	This project is ongoing (2001-2008) and is using a treatment train approach consisting of grit chambers, sediment basins/ sediment forebays, level spreaders, filtration and infiltration galleries with native plant communities, and water quality ponds.	Load reduction in TSS, nutrients and other pollutants in the Mississippi Watershed Management Organization watershed

Work Plan

The next five years we will concentrate on the removal of I/I from the sanitary sewer system. That does not mean that our overall focus for volume, load and rate reduction is ignored. Listed below are some of the I/I projects that include elements that achieve the program objectives. At the same time, we are incorporating BMPs when we upgrade debilitated infrastructure Future flood mitigation projects, and their impacts on stormwater runoff, are discussed in the Flood Control section of this document. The table below lists the storm drain construction projects and planned benefits of the each project scheduled for 2007:

PROJECT AREA	PROJECT DESCRIPTION	STORMWATER RUNOFF BENEFITS
CSO Area 102 in 5th Ave between Newton and Morgan Ave N	Disconnect an alley drain from the sanitary sewer and connect the drain to the nearest storm sewer which is undersized so install detention	Rate Reduction as a result of constructing a box culvert to store the peak flow from the alley until there is capacity at 5th and Morgan Avenues N
Diamond Lake east of I-35W	Replace the existing storm sewer and install a grit chamber on the outfall to Diamond Lake	Load Reduction in TSS through sedimentation that occurs in the grit chamber then further treatment of nutrients in Diamond Lake
Completion of Heritage Park stormwater management amenities	(see table above for additional information)	(see table above for additional information)

Engineering Services design teams will continue to include BMPs in all new projects that require the modification of the stormwater management system. The 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 objections, in this order: 1) reducing the volume, 2) reducing the load, and 3) reducing the rate of runoff. Design teams will include additional BMPs on new storm drain construction projects, wherever feasible, to improve overall water quality. Design staff will be instructed to take advantage of training opportunities that become available on stormwater management and water quality topics, and will be responsible for staying informed about new technologies as they advance.

Performance Measures

Total BMPs and existing infrastructure:

- 16 water quality pond systems or constructed wetlands, and 142 grit chambers (unit costs are not available)
- An increase in the percentage of City watershed acres receiving treatment prior to discharge into the receiving waters

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.

Program Overview

One of the requirements of the City's NPDES permit is that the City implements a city-wide 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. This program includes providing City Ordinance literature to local 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.

Another NPDES requirement is that the City's education program requires education regarding illicit discharges. One element of this education includes the required notification of the Department of Public Safety Duty Officer (as required in Chapter 3, Section 8) for reportable spills. 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. The City reports to the MPCA Duty Officer (800) 422-0798 or (651) 649-5451 all pertinent information regarding illicit discharges. The City of Minneapolis has developed a program to inform residents not to discharge non-stormwater substances to drains that discharge to a lake or stream. Interested parties can visit the City's website to become better educated regarding the ordinances to prevent illicit discharge into the City's water bodies. The City of Minneapolis – Environmental Services has a program in place to encourage compliance in prohibiting discharges. The Minneapolis Environmental Report – Towards Sustainability fosters the prohibited discharge.

The Department of Regulatory Services maintains the following website for additional information about the above initiatives and other programs:
http://www.ci.minneapolis.mn.us/environment

The City of Minneapolis provides information regarding pesticides, fertilizers, illicit discharges, and improper disposal via the following City Regulatory control and enforcement website:http://www.ci.minneapolis.mn.us/stormwater/what-we-do/water-quality-control.asp#TopOfPage

The City's website and ordinances provide education regarding the City's authorization to discharge stormwater via its NPDES MS4 Permit.

The City of Minneapolis - Department of Public Works administers a public education program to promote, publicize, and facilitate the proper management of stormwater discharges to the storm sewer system by all the residents under their jurisdiction so as to reduce the discharge of pollutants.

The City of Minneapolis meets the Stormwater Management Requirements by providing the following City website and ordinance: http://www.ci.minneapolis.mn.us/stormwater/

The City of Minneapolis provides education regarding structural controls via the following City website and ordinance: http://www.ci.minneapolis.mn.us/stormwater/

The City of Minneapolis – Department of Field services provides internal training to City personnel as part of its Facilities Operation and Quality Control, Removed Substances, and Roadways plan.

The City of Minneapolis began to redevelop Heritage Park in the fall of 2000. The redevelopment is expected to be complete in December of 2009, and includes a stormwater educational component. Refer to the following website: http://www.ci.minneapolis.mn.us/cped/docs/heritage_park_stormwater.pdf

The City of Minneapolis website provides educational information regarding flood control. For information on flooding and safety precautions the following website can be viewed by interested parties: http://www.ci.minneapolis.mn.us/stormwater/flood-information/TopOfPage

The City of Minneapolis – Engineering Services provides internal mentoring and training to City engineering personnel regarding the construction of storm sewers and the importance of infiltration, and proper erosion and sediment control techniques.

The City of Minneapolis Public Education program educates interested parties regarding how the City advances its stormwater education. This information can be viewed at the following website: http://www.ci.minneapolis.mn.us/stormwater/outreach.asp

Each year the City communicates to/with interested parties that the City must make available the Stormwater Management Program for Public Participation and Input.

As a component of the City's new Stormwater Utility Fee, the City website encourages the implementation of various BMPs (Pilot Programs) that would serve to reduce the overall amount of impervious surface area throughout the City. The City also maintains a link to the following Metropolitan Council and Minneapolis Pollution Control Agency BMP websites, 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

The City maintains the following website to educate Minneapolis residents and others about the City's program to eliminate Combined Sewer Overflows: http://www.ci.minneapolis.mn.us/cso/

The City works with local watershed organizations, internal agencies, and other government agencies, to partner with these organizations as a requirement of the City's NPDES MS4 Permit. The City of Minneapolis provides the following website to educate interested parties regarding the Stormwater Management Annual Report: http://www.ci.minneapolis.mn.us/stormwater/NPDESAnnualReportDocuments.asp

The Minneapolis Park and Recreation Board provides the following website to educate interested parties regarding the Stormwater Monitoring Program: http://www.minneapolisparks.org/default.asp?PageID=833

Previous Year Activities

Friends of CUE/Minneapolis Blooms Workshop Program

In 2006, the City and others sponsored a multi-part stormwater education workshop program conducted by the Friends of CUE/Minneapolis Blooms program (CUE is the Minneapolis Committee on Urban Environment). A series of workshops was developed and held to inform, coach and offer consultation to Minneapolis residents protecting the Upper Mississippi Watershed by installing properly designed bioinfiltration areas (rain gardens), redirecting downspouts and using native plants. The workshops were in two parts. Over 40 of the Part A 2-hour workshops were held, with 40+ participants at each, and a waiting list of over 800 people was held over for the next year (2007). The Part B workshops offered practical, hands-on design sessions for the participants' sites. An estimated 400+ rain gardens were created in 2006 by Minneapolis homeowners, and the majority are attributed to this workshop series. A rain garden database is under development. The goals of the workshop program are to protect the watershed by reducing stormwater runoff, to prevent polluted water runoff that damages our watersheds, and to improve the environmental and visual quality of the urban landscape.

Minneapolis Park & Recreation Board Events and Naturalist Program

In 2006, the Minneapolis Park & Recreation Board (MPRB) continued to provide water quality education programs throughout the City. With stormwater education models and printed materials in hand, Environmental Operations Naturalist staff participated in 25 Minneapolis

community festivals, events, and concert series at local water bodies. 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, temporary tattoos, stickers, and water bottles with educational messages were also distributed at these events.

The summer pilot program MPRB Naturalist staff created and led last year for children ages 6 to 12 was re-titled and upgraded based on staff and participant evaluations. Formerly known as Water Works, for 2006 this program was titled Sewer Rats which had an immediate appeal to boys. Thirty recreation centers[1] (twice as many as 2005) from across the city participated in this four part, four hour program series. By providing information in a series of programs, Naturalist staff helped children achieve a better understanding of stormwater and learn how their actions or inactions affect local water bodies (that is, the lake or creek children like to wade, swim or fish in). Sewer Rats incorporated hands-on learning activities that focus on watersheds, storm drains, pollution patrol, water quality testing, macro invertebrates, wetlands, and more. The MPRB will continue to improve and update the program series based on evaluations. Some of the participating parks also had children who created art work as part of the Earth Day poster contest. The winner's art was featured on the 2006 Earth Day poster.

Water Quality Education Programs at Mill Ruins Park

The MPRB continued to provide hands-on water quality education programs at Mill Ruins Park, which is located adjacent to St. Anthony Falls on the west bank of the Mississippi River. Programs targeted schools and other groups as well as the general public with specific programs for families and adults. Participants learned about the importance of the Mississippi River to the City of Minneapolis as power source, transportation corridor, recreation resource, wildlife habitat and our main source of drinking water. Based on evaluations from the 2006 programming season, content was adjusted to answer questions about the odors emanating from storm water outlets in the park and also the geese management program. As per last year's suggestions,

[1] Participating recreation centers included: Armatage, Beltrami, Bethune, Bottineau, Brackett, Burroughs School, Corcoran, Creekview, Farview , Folwell, Fuller, Harrison, Hiawatha Park School, Keeywadin, Kenwood, King, Lake Hiawatha, Linden Hills, Logan, Lynnhurst, Luxton, Matthews, McRae, Morris, Northeast, Pershing, Powderhorn, Sibley, Stewart, Windom South

water quality information was also incorporated into themed river programs as appropriate, such as like lumbering and flour milling programs.

Mobile Water Education Electronic Kiosks

This year a new mobile water education kiosk developed and licensed by the Center for Global Environmental Education of Hamline University was piloted at MPRB neighborhood recreation centers. The kiosk is a stand alone computer that houses six interactive water education modules available in English, Spanish and Hmong. The six modules are:

- **Journey of a Raindrop:** This module follows the journey of a raindrop from the roof of an urban residence through the storm drain 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:** A visualization along with a quiz teach users about the water cycle and its various parts.
- **Streets to Streams: Impervious Surfaces:** An urban planning 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.
- **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.

The number of times each kiosk is accessed is kept track of by the computer program in the kiosk. The program keeps track of the statistics for both the "lifetime" of the program, as well as for individual "sessions." The individual session can be erased if the administrator part of the program is accessed.

Linden Hills Park

The first water education kiosk was installed in Linden Hills Park on June 11, 2006 where it remained until the end of August. Statistics were originally kept using the "session" numbers. Unfortunately, these numbers were erased during the week of 8/2/06 to 8/9/06, and the count was restarted from zero. Because original "lifetime" numbers were not recorded, kiosk numbers for the entire period at Linden Hills Park are not available. The protocol for recording numbers has now changed to using the "lifetime" numbers to avoid any issues with sessions being erased.

The following table shows the number of times modules were accessed from 6/11/06 to 8/2/06 at Linden Hills Park recreation center.

Linden Hills Park - Modules Accessed 6/11/06 to 8/2/06

Module	English Version	Spanish Version	Total
Journey of a Raindrop	192	15	270
Rappin' With Alex	176	19	195
The Water Cycle	97	3	100
Streets to Streams	63	3	66
Water Watchers	80	6	86
Watershed Address	47	8	55
Total	655	54	709

Lynnhurst Park

The water education kiosk was installed in the Lynnhurst Park recreation center on the 9/12/06, where it remained until 12/22/06. The following table shows the number of times modules were accessed during this time period.

Lynnhurst Park - Modules Accessed 9/12/06 to 12/22/06

Module	English Version	Spanish Version	Total
Journey of a Raindrop	249	35	284
Rappin' With Alex	253	38	291
The Water Cycle	91	12	103
Streets to Streams	118	23	141
Water Watchers	84	16	100
Watershed Address	90	19	109
Total	885	143	1028

Observation at these two test sites has also shown that the kiosk needs to be moved every three to four weeks to prevent users from trying to add their own games to the computer. Based on this information, that is the timeline that will be followed in 2007.

Earth Day Activities

The annual Earth Day Watershed Clean-Up was held on Saturday, April 23, 2006. This event provided an opportunity for the MPRB and City of Minneapolis to provide information to residents regarding water quality issues and subsequently how to limit pollution from entering local lakes and streams. Over 900 Earth Day participants removed waste materials from shorelines and open space areas throughout Minneapolis' parklands. These parklands included

the Chain of Lakes, Shingle Creek, Bassett's Creek, the Minnehaha Creek corridor, the Mississippi River corridor, Grass Lake, Lake Nokomis, Lake Hiawatha, and Powderhorn Lake.

A Citywide Earth Day Education Fair sponsored by MPRB was held at Nokomis Community Center. This event included informational stations on low input lawn care, landscaping with native plants, designing a rain garden, and building a birdfeed for kids.

Latino Family Resource Fair

In August, the Department of Public Works participated in the 12th Annual Latino Family Resource Fair ("La Feria"). The Department of Public Works provided the message that storm sewers drain directly into local water bodies. Latino families and other citizens attended the event. An interactive display (created by the University of Minnesota - Water Resources Center) was set-up next to the Public Works table. The display attracted mostly children, but a few adults asked questions and talked about the display with their children. The displays are available at various agencies and organizations; this particular display was borrowed from the Mississippi River Watershed Management Organization. Formal success measures were not collected to determine the success of this outreach activity, but one indicator of the success could have been measured by popularity of the display. Many children used the display and, upon observation, most were able to grasp the basic concept that the pollutants were flowing directly into local water bodies unfiltered.

Hmong Multicultural Pilot Study for Watershed Education

In 2006, the City of Minneapolis and the Mississippi Watershed Management Organization (MWMO) conducted a Pilot Study for Multicultural Watershed Education. Minneapolis, and especially the portion lying within the MWMO watershed, is highly diverse, and the Pilot Study was an effort to customize an education and outreach effort that would intersect with the worldview of various cultural groups, has context in people's lives, and targets key behaviors that contribute to non-point source pollution. The cultural group selected for the pilot study was the Hmong community. The MWMO's doorhangers for drain stenciling were also modified to include explanations in Hmong, Spanish and Somali languages.

Storm Drain Stenciling Program and Urban Runoff Pollution Education Sessions

In 2006, Friends of the Mississippi River coordinated the stenciling of 1,588 storm drains and the distribution of 5,500 door hangers in partnership with 723 volunteers from school groups, community groups, and residents of the City of Minneapolis. FMR staff maintained and stored 25

stenciling equipment kits including paint, stencils, and traffic safety cones. FMR purchased 350 stencils, 480 cans of paint, and miscellaneous kit supplies for the project. FMR staff also redesigned the door hanger to include translated messages, and produced 5,000 doorhangers for use in Minneapolis.

Translation. Effort was made to translate the stenciling messages in a way that was appropriate in a public works context, and meaningful to community members in the various language groups. FMR staff sought help from the Minnesota DNR and MN Department of Public Health to locate an appropriate translator. The City of Minneapolis Department of Civil Rights then reviewed the translated messages for both doorhangers and stencils.

FMR staff provided an educational program/orientation on urban runoff pollution to each of the Minneapolis stenciling groups. Following these presentations students have background to describe the difference between wastewater and stormwater, define non-point source pollution, list the effects of various non-point source pollutants, and cite ways to keep NPS pollutants off our pavement. Staff also made 9 additional education presentations to 1,200 students in 18 student groups from seven schools in order to provide lessons designed to enhance the educational impact of the stenciling activity. Additionally, FMR's 2006 watershed education workshops in Minneapolis were conducted at locations in the Longfellow, Seward, Kenwood, Como and Bryn Mawr neighborhoods, and FMR focused efforts to build an outreach program to residents in north Minneapolis.

Erosion and Sediment Control Education for Contractors and Developers

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. This information is provided at various stages, including during the Site Plan Review process, via Minneapolis Development Review, and during onsite inspections.

Minneapolis Stormwater Utility Fee Water Quality Education

In 2006 Public Works staff continued to present overviews of the City's Stormwater Utility Fee, ordinances related to non-point source pollution, and Best Management Practices to a variety of community and business groups, as well as individuals contacting the department with specific questions.

Development of On-Site Stormwater Management Outreach for Business Properties

While most stormwater education has historically targeted the residential property audience (with the exception of erosion and sediment control training for contractors and developers), in 2006 the City contracted with the Green Institute to develop an outreach strategy about on-site stormwater management BMPs for Minneapolis business properties.

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.

Work Plan for 2007 Activities

The Department of Public Works has advanced several education programs for 2006, and dedicated a significant amount of time to the research and identification of Stormwater Education and Outreach partners, topics, media, and regulatory requirements, for its 2007 Stormwater Education Program. This information/research was then used to establish potential partnerships with multiple agencies; including, the Minneapolis Blooms Program, the Mississippi Watershed Management Organization, the Minnehaha Creek Watershed District, Friends of the Mississippi River, the Green Institute, the Department of Regulatory Services – Environmental Management, Hennepin County, the Metro WaterShed Partners, Shingle Creek Watershed Management Commission (SCWMC) Education and Public Outreach Committee (EPOC), Minneapolis Park and Recreation Board, the EPA, and private Citizens. The following proposals/partnerships are either being implemented, or are still under consideration, in 2007:

- Blooms Program – Rainwater Garden workshops
- EPA grant-funded Rain Barrel Partnership
- MPRB Public Outreach Activities
- Stormwater interpretive signs at public water quality demonstration sites
- Earth Day watershed clean-up activities
- Implementation of Multicultural Educational Needs
- Storm Drain Stenciling/Education
- Electronic kiosks

In 2007, there are now a total of four electronic kiosks in full-time or part-time use in Minneapolis, with City cost participation for three of them. They are on a rotation schedule at public buildings such as libraries, government centers, community centers and park buildings.

Over 10,000 individuals can be reached per year with a non-point source pollution by each kiosk. The message is all about urban runoff: impacts of impervious surfaces, problems caused by non-point source pollution, and solutions that can be implemented. The organizations that manage the kiosks are the MPRB as described above, the Mississippi Watershed Management Organization, the Minnehaha Creek Watershed District, and Hamline University. All of the Kiosks are programmed to operate in the English, Hmong and Spanish languages. The Somali language may be added later.

- In 2007, the City will partner with the Mississippi Watershed Management Organization to build on their 2006 research on multi-lingual and multi-cultural outreach. A series of DVDs will be developed for use with non-traditional and non-English speaking audiences, using a spoken language approach. Initially the approach will focus on Vietnamese, Hmong, Cambodian, and other Southeast Asian populations. In the future the approach may be adapted to add options for Somali and Latino audiences.
- In 2007, additional training of Public Works staff and by Public Works staff regarding erosion and sediment control measures, and proper handling of salt for snow and ice control for streets, sidewalks, and parking lots.
- In 2007, developing GIS tools to communicate to the public exactly what is going on in their watershed and what they can be doing about it.
- In 2007, the City will be collaborating with the MPRB and the Heart of the Beast Theatre to apply for federal funding for a unique program dealing with water quantity, water quality, and control/ownership of water.
- In 2007, additional website development and enhancement

Performance Measures

Water quality education unit cost:

Not available at this time.

Storm and Surface Water Management website:

2006 website statistics:

Total visits:	**33,201**	(up from 27,500 in 2005)
Average visits per day:	**90**	(up from 75 in 2005)
Average visits per visitor:	**2.34**	(up from 2.0 in 2005)
Visitors who visited more than once:	**2,314**	

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

Each year, the City of Minneapolis holds a public hearing in April 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. April 17, 2007 is the date of this year's public hearing, at 9:30 AM in Council Chambers, Room 317 City Hall, 350 S 5th Street, Minneapolis, MN. The hearing is officially noticed in Finance and Commerce, and also publicized through public service announcements on the City cable television channel.

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 6, 2007, announcing the website link to the draft Report, and informing that written comments will be accepted until 4:30 PM on Friday April 27, 2007, or in person at the public hearing on April 17. The website link is:
http://www.ci.minneapolis.mn.us/stormwater/NPDESAnnualReportDocuments.asp

The contact information for written comments is:

City of Minneapolis, Department of Public Works
Engineering Services c/o Mr. Lane Christianson
NPDES REPORT COMMENTS
300 City of Lakes Building, 309 2nd Avenue S, Room 300
Minneapolis MN 55401-2268
Fax: 612-673-2048
E-mail: 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 website prior to finalization, and once finalized, the Annual Report is also made available on the website 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 a CD from Minneapolis Public Works at 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. The conclusion of this process is the presentation of the Annual Report, and the responses to the public comments, to the Minneapolis City Council for approval and adoption. A copy of the council resolution adopting the Stormwater Management Program and Annual Report Activities is submitted to the Minnesota Pollution Control Agency (MPCA) by June 1 of each permit year.

Previous Year Activities

Also in 2006, during the development of the Local Surface Water Management Plan, three Open Houses were held in the community in July to solicit public input on management of the water resources in the City of Minneapolis. These open houses were held at Webber Park, 4400 Dupont Avenue N, on Monday evening July 10; at the Minneapolis Park & Recreation Board Headquarters, 2117 West River Road, on Tuesday evening July 11; and at Nokomis Recreation Center, 2401 E Minnehaha Parkway, on Thursday evening July 13. This flyer is included as Appendix A46.

Work Plan

City staff will continue to update the Storm and Surface Water Management website: http://www.ci.minneapolis.mn.us/stormwater/

Performance Measures

Unit costs are not available.

Number of interested parties that were directly notified of public hearing and Annual Report availability: 98 (which includes 81 neighborhood organizations)

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

The City of Minneapolis coordinates its stormwater management efforts with local Watershed Management Organizations (WMOs), MnDOT, neighboring cities, the Metropolitan Council, and various other entities. This coordination includes the joint review of projects, and sharing of costs for water quality projects, stormwater monitoring, and water quality education.

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.

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. The MWMO is planning to commence work on its next generation plan in 2007.

Coordination with the Minnehaha Creek Watershed District (MCWD)

The MCWD adopted its Second Generation Water Resources Management Plan in January 1997, and the Board approved the Third Generation Plan in late 2006, for submission to the Minnesota Board of Water & Soil Resources in 2007 for review and acceptance. 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.

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.

Coordination with Highway Department

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 Neighboring Cities

Richfield

A residential area in southwest Minneapolis contributes stormwater runoff to Grass Lake, which in turn flows to Richfield Lake. A cooperative agreement was established that sets minimum practices that Minneapolis must maintain in order to ensure that the water quality of Grass Lake is maintained in a manner such that the water quality of Richfield Lake is not degraded. This cooperative agreement will remain in place unless otherwise terminated by the mutual agreement of the two cities.

Coordination with the Metropolitan Council Environmental Services (MCES)

The City of Minneapolis coordinates with MCES in the following ways:

- Review of non-stormwater permit applications
- Inspection of existing infrastructure and regulators
- Review and comment on local government's water resource management plan

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.

Minneapolis Regulatory Services - Environmental Services also sends staff to WMO meetings. Environmental Services coordinates with the MPCA and the MCES regarding investigations and enforcement efforts for incidences 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 coordinates/partners 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.

Water Quality Monitoring Task Force (WQMTF)

The Water Quality Monitoring Task Force was created by City Council resolution on July 15th, 2003. The purpose of this task force was to:

- Oversee existing water quality monitoring data in Minneapolis
- Improve the coordination of water quality monitoring data and protocols

- Establish public health standards
- Develop strategies to reduce water quality problems identified through monitoring efforts

MPW and the MPRB were responsible for direction and coordination for the WQMTF. Voting members included policymakers from the City, the MPRB, and the local WMOs, and attendance included invited guests from other governmental agencies and environmental groups. In 2006, it was determined that the goals of the task force had been met, and the Task Force was dissolved in January 2007.

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. The MPRB, the City and the BCWMC will jointly implement the recommended improvement projects.

Shingle Creek Watershed Management Commission

SCWMC is currently developing a proposed Capital Improvement Program. This CIP would include CIP recommendations for the remainder of the period encompassed by the Second Generation Watershed Management Plan (through 2012). Adopting a CIP will require a major management plan amendment.

Mississippi Watershed Management Organization

The water quality components of these capital projects are included in MWMO's capital program:

- Heritage Park - Near Northside Wetlands: The City's Near North Redevelopment project includes a "treatment train" approach, with installation of pre-treatment grit chambers, sediment forebays, filtration and infiltration galleries with native plant communities ("wet meadows"), and wet ponds. The stormwater components of this project are scheduled for completion in 2008.

- University Industrial Park (formerly known as SEMI): Redevelopment of the University Industrial Park Area will include the construction of several wet ponds, and may include the installation of a variety of stormwater Best Management Practices (BMPs) such as biofilters, swales, filter strips, rain gardens, and linear urban wetlands. This is a partnership with Minneapolis Community Planning and Economic Development Department (CPED), and MPW. This project is currently being redesigned.
- MPRB Mississippi River Corridor Restoration Projects: A series of restoration projects along the shoreline of the Mississippi River. Partners for one or more of these projects include the MPRB, Minneapolis Environmental Services, Minneapolis Community Planning and Economic Development, MPW, the Minnesota DNR, and the Army Corps of Engineers (USACE). Individual projects are scheduled for completion over 10 years.

Minnehaha Creek Watershed District

- The Blue Water Partnership, comprised of the City of Minneapolis, the Minneapolis Park and Recreation Board, and the Minnehaha Creek Watershed District, is implementing the recommendations of the Blue Water Commission's 1998 report. The non-profit organization was established in 2002 to focus on monitoring and improving the water quality in Lakes Hiawatha and Nokomis in Minneapolis. Board Members include residents of NENA, SENA and HPDL neighborhoods, as well as residents of other nearby neighborhoods and the MCWD, MPRB 5th District Commissioner Carol Kummer, and the City of Minneapolis 12th Ward Council Member Sandy Colvin Roy. The Blue Water Partnership hopes to include all impacted residents and agencies as partners in the water quality improvement process, step by step, with neighborhood funding that can be used to leverage additional dollars necessary to accomplish its goals.
- The City and the MPRB provided input and testimony for the MCWD's new Third Generation Plan. This Plan will include funding for a series of capital projects in Minneapolis.

Minnesota Department of Transportation

In 2006, the City of Minneapolis and MnDOT completed a joint study of flooding issues along the I-35W corridor and relevant Minneapolis neighborhoods. The project included a detailed hydrologic and hydraulic modeling of the I-35W storm tunnel and its contributing drainage area. The modeling effort involved existing conditions, proposed development conditions, alternative solutions to solve the current under-capacity problem.

The Minneapolis Local Surface Water Management Plan (LSWMP)

In 2006, the City of Minneapolis completed its Local Surface Water Management Plan, adopted by the City in October 2006. It was developed to meet the requirements of Minnesota Statute 103B, as well as to provide a resource for City staff. The LSWMP plan will serve as a guidance manual for handling regulatory requirement issues, planning and managing surface water resources, stormwater and sanitary sewer infrastructure, as well as 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 will serve to meet agency review requirements, and was prepared to guide the City in conserving, protecting, and managing its surface water resources. 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 content of the LSWMP is in large part determined by Minnesota Statue 103B and Rules 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. Contributors included various City departments, MPRB, MCES, and the four watershed organizations in Minneapolis. The Plan can be accessed at City's Stormwater website: http://www.ci.minneapolis.mn.us/stormwater

Work Plan

Coordination and partnerships on capital projects, water quality programs, and studies will continue. Coordinated activities, and the status of cooperative efforts, shall be provided in each Annual Report.

Performance Measures

Unit costs that would reflect the expenditures of all departments are not available at this time.

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

Stormwater Runoff Monitoring Results[1]

Storm event samples were collected May through December 2006, and one snowmelt grab sample was collected in February. 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 2006 were fairly comparable 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 comparable or less than reported Nationwide Urban Runoff Program (NURP) values. Most MPRB land use category values were comparable to NURP values. All metals were well below NURP values, with the exception of the 2006 mixed land use Cu (copper) data.

While most parameters were comparable to MRPB 2001-2005 data, residential land use Pb (lead) values were higher in 2006, as well as TP (Total Phosphorus), TKN (Total Kjeldahl Nitrogen), NO3NO2 (Nitrate Nitrite) and Cu (copper) values for all land use categories. It is important to note that the new site monitored in 2006, 8a Pershing Park, has the same land use designation as parkland, but is within a different watershed. Most MPRB mean concentrations were comparable to other studies as listed in Table 23I. TP values are most closely related to those monitored by local agencies. Data from MPRB Sites 1-5a (2001-2004) and 6-9 (2005) collective median concentrations were similar to the Sites 6-9 in 2006. Cl (Chloride), TDS (Total Dissolved Solids) and Zn (zinc) increased while Nitrogen, TSS (Total Suspended Solids) and Pb (Lead) decreased.

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1 For tables referenced in this section, see Appendix A4 (NPDES Summary & Monitoring Results and Data Analysis) of this report. This section, as well as Appendix A4, are adapted from the *2006 Water Resources Report*, which is produced by the Minneapolis Park & Recreation Board. These annual reports can be found at this Minneapolis Park & Recreation website.

Best Management Practices Monitoring Results[2]

Best management practices (BMPs) include procedures and structures designed to help reduce water pollution. In 2006, the MPRB monitored one of the City of Minneapolis' stormwater ponds located in north Minneapolis. The pond was designed for flood mitigation purposes and to help reduce pollutants. The stormwater pond is referred to as Logan Pond, which is located at 29th Ave. N. and Logan Ave. N. The MPRB monitored Logan Pond from May to November 2006. Samples were collected at the inlet, outlet, and two inlet pipes located in the alleys on the east and west sides of the pond.

Eleven storm events were sampled at the inlet, thirteen at the outlet, and three at each of the alleys. The dates and lab results are presented in Table 24B of Appendix A5. Statistics were calculated and are presented in Table 24D of Appendix A5. Lab values reported below detection were divided in half for statistical calculations. Mean outlet values in Table 24D show water quality improvements for most parameters except Cl (chloride), TDS (Total Dissolved Solids) and Pb (lead). Winter salt use may be adding chloride that flushes out during the year. This may explain why the outlet has higher values than the inlet.

When comparing the average values of the east and west alleys, it seems most of the parameters were comparable except for fecal coliform and lead. Fecal coliform and lead were more than double for the west alley. It is unknown why the west alley fecal coliform and lead were higher in the west alley. Trash cans are located in the alleys which could contribute to pollutant concentrations. Trash cans were seen overflowing into east alley with garbage on the ground.

Total volumes recorded at each monitored location are given in Table 24G of Appendix A5. The total inlet volume recorded for the sampling period 5/5/06 – 11/29/06 was 1,506,490 cubic feet (cf). The total outlet volume recorded was 1,510,996 cf. Since a small percentage of the data were negative flows at the alleys due to the pond backing up into the pipe during storm events, the recorded volumes give an approximation of total pollutants removed in Table 24J of Appendix A5. In 2006 many parameters showed some water quality improvements, TDP (Total Dissolved Phosphorus), NO3NO2 (Nitrate Nitrite), NH3 (ammonia), cBOD (carbonaceous

2 For tables referenced in this section, see Appendices A5 & A6. This section and these tables are portions of the *2006 Water Resources Report*, which is produced by the Minneapolis Park & Recreation Board. These annual reports can be found at this MPRB website.

Biochemical Oxygen Demand), TSS (Total Suspended Solids), Cu (copper) and Zn (zinc). NO3NO2 (Nitrate Nitrite) showed the highest improvement, with 55% removal, while NH3 (ammonia) and TSS (Total Suspended Solids) showed the least amount captured, with 7% removal for each. The lack of rainfall in 2006 may have left additional time for settling. With fewer storms, more opportunity exists for stagnant water to become anaerobic. If this occurs it may lead to anaerobic digestion of organic materials such as leaves.

Permeable pavers are a BMP designed to increase infiltration. In 2006, the MPRB monitored the permeable paver lot located at the City of Minneapolis' Animal Shelter in north Minneapolis.

Storm data are presented in Table 24G of Appendix A6, including the dates of storm events, rainfall, intensity, peak levels, flow volumes, and percent infiltrated. In 2006 a total of 26 storm events were recorded. A storm event is defined as having 0.10 inches of rainfall or greater separated by eight hours. If events occurred with no record of rainfall they are not included in Table 24G. This may be due to the washing of trucks at the shelter, which may result in an overflow to the drain pipe.

Several large rain events occurred in 2006 resulting in pipe surcharges. Five total events surcharged resulting in inaccurate flow recordings, Table 24G. Recorded peak levels for these events were greater than 18 inches. Overflow problems generally occurred during high flow, high intensity events.

In 2006, all events showed positive treatment percentages. For the 26 storms monitored, roughly 62% of the runoff infiltrated. Several factors may be influencing the results, such as the drainage area could be larger than originally estimated. The known contributing drainage area was measured by MPRB staff, but there is an adjacent building west of the paver lot which has rain leaders pointed toward the lot. The leaders are approximately 25 feet west with a buffer of tall vegetation. It is currently unknown if these leaders contribute significantly to the paver lot. Also, the pipe may be backing up from downstream. Trash has been found within the pipe which may influence level readings. An area/velocity meter was used in 2006 to more accurately determine flow in all conditions. Careful monitoring of the adjacent building's drainage is necessary to determine if it is contributing to the total flow of the pipe. Further monitoring is necessary to investigate these possibilities. From a qualitative perspective, the permeable pavers appear to be functioning well with little or no ponding visible during rain events.

Minneapolis Lake Trends

In 2006, 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.

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, Harriet and Wirth Lakes are mesotrophic with moderately clear water and some algae. Brownie, Isles, Hiawatha, Nokomis, Webber, Loring and Powderhorn Lakes are eutrophic with higher amounts of algae. Trends in lake water quality can be seen by using the annual average TSI score over the last 14 years.

Lakes showing water quality improvement

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

Lakes with stable water quality

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

Lakes showing water quality enrichment

- Webber Pond

2006 Water Resources Report

The Minneapolis Park & Recreation Board's annual *2006 Water Resources Report* is a comprehensive technical reference of water quality information for the citizens of Minneapolis. Due to the length of the 2006 Water Resources Report, only its NPDES stormwater runoff

monitoring and BMP monitoring sections are included in this *2007 Stormwater Management Program and Annual Report* (also known as the *Annual NPDES Report),* which is prepared by the City of Minneapolis in collaboration with the Minneapolis Park & Recreation Board. Electronic copies of the *2006 Water Resources Report* are available on the MPRB website at http://www.minneapolisparks.org/default.asp?PageID=791. The whole report can be found in the "Caring for Our Parks - Lakes & Water Resources- Water Quality" section of the website. 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.

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 through the inception of a formalized Combined Sewer Separation program, called CSO Program, Phase I. There are currently 556 miles of main line storm drain piping and 22 miles of deep drainage storm tunnels within the City of Minneapolis. This total does not include MNDOT, 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, 136 sedimentation (grit removal) structures, 387 outlets (exclusive of the added MPRB outlets noted above), and 10 stormwater detention ponds/ filtration 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 as well as 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 also listed in the appendix.

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 A. The following formula was used to calculate the total annual pollutant load:

L = [(**P**) (**Pj**) (**Rv**) (**C**/1000) (**A***4046.9)], where:

L = seasonal pollutant load, kilograms/season

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

Pj = correction factor for storms which do not produce runoff = 0.85

Rv = 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:

- 4046.9 for acres → square meters
- 1000 for liters → cubic meters

The Flow Weighted Mean Concentration (FWMC) is expressed as a mean of all sites, and 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 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 differences in calculation methods.

Seasonal loads were calculated on the following basis:

Season	Inclusive dates	Precipitation, National Weather Service
Winter/snowmelt	01/01/06 – 03/31/06	3.03 inches (0.077 m)
Spring	04/01/06 – 05/31/06	7.63 inches (0.194 m)
Summer	06/01/06 – 08/31/06	11.00 inches (0.279 m)
Fall	09/01/06 – 12/31/06	5.90 inches (0.150 m)

XVI. Minneapolis Stormwater Utility Program

Introduction

In November 2004, the Minneapolis City Council adopted an ordinance that authorized the creation of a Stormwater Utility. The new utility fee was imposed on most classes of developed and undeveloped land within the City of Minneapolis. The following goals and outcomes were the primary considerations in the design of the Minneapolis Stormwater Utility program:

- To implement a stormwater utility to pay for 100 percent of the City's annual stormwater management program (including all activities related to NPDES permit requirements)
- To implement the utility fee in such a manner as to reflect the impacts of different types of land use
- To aid in the development of stormwater management programs
- To distribute stormwater management program costs in a equitable fashion (The previous method was based on metered water usage, and did not take into account the amount of a property's amount of impervious surface)
- The new Stormwater Utility fee was designed to be "revenue neutral"; the new fee is offset by a reduction in the sanitary sewer fee. The sanitary sewer fee formerly included an amount for stormwater management. With separate fees for storm & sanitary management, by being revenue neutral, the citywide total revenue would remain approximately the same
- To implement a program of quantity and quality credits (against stormwater utility fees) to encourage the adoption of best management practices (BMPs) for reduction and treatment of surface water runoff

Funding

See Appendix A44.

Billing

Billing for more than 100,000 stormwater utility accounts commenced in March 2005. While the first several months of billing generated a large volume of requests for information, billing rates were disputed for only 1.1 percent (0.011%) of all accounts. The vast majority of these disputes were easily resolved. While most stormwater utility programs offer credits only to larger developments and commercial properties, the City of Minneapolis Stormwater Utility is innovative in making the stormwater credits program available to all property owners, including single family homes. This not only encourages wider use of stormwater BMPs (such as rain gardens on residential properties or stormwater ponds on commercial properties), but also gives Minneapolis property owners a greater stake in stormwater management issues, and provides increased opportunities for public education.

Annual Review

A review of this year's operations shows that the City of Minneapolis Stormwater Utility Program is meeting the goal of providing a dedicated revenue source for stormwater management on a fair and equitable basis. In addition, the program is also a valuable tool for encouraging the use of stormwater BMPs, and for increasing public awareness of the issues surrounding the management and protection of surface water resources. The complete text of the stormwater ordinance can be found on Appendix A28, along with additional information on the stormwater utility fee program on Appendices A27, A29 and A31. As stated above, refer to A44 for a table of funding requirements.

The following table shows the percentage of revenues in 2006 per land use category.

Unknown	0.02%		Misc. Commercial	3.69%
Vehicle Related Use	2.11%		Common Area	0.05%
Bar, Rest., Entertainment	0.89%		Single Family Attached	0.47%
Mixed Comm., Res, Apt	1.15%		Single Family Detached	29.93%
Office	5.16%		Sport or Rec. Facility	2.93%
Retail	4.95%		Vacant Land Use - Comm.	0.01%
Institution, Sch., Church	6.25%		Vacant Land Use - Ind.	0.05%
Utility	1.19%		Vacant Land Use - Res.	0.02%
Garage or Misc. Res.	0.85%		Industrial Railway	0.52%
Group Residence	1.41%		Car Sales Lot	0.10%
Public Accommodations	0.26%		Cemetery w/Monuments	0.63%
Ind. Warehouse, Factory	20.22%		Vacant Misc. Landscape	0.21%
Multi-Family Apartment	10.13%		Parks & Playgrounds	0.12%
Multi-Family Residential	4.01%		Downtown District	2.67%

	100.00%

XVII. Local Surface Water Management Plan (LSWMP)

The Minneapolis Local Surface Water Management Plan (LSWMP)

Please see narrative on the LSWMP in **Section XIII. Coordination with Other Governmental Entities.**