Minute No. 499
Report - Executive Policy Committee - July 14, 2010

Item No. 4 Sustainable Water and Waste Directional Strategy
File PW 1/2010

COUNCIL DECISION:

Council concurred in the recommendation of the Executive Policy Committee and adopted the following:

1. That the Sustainable Water and Waste Infrastructure Direction Strategy as outlined in Attachment "A" to the report from the Winnipeg Public Service dated June 17, 2010, be endorsed in principle.

2. That the Proper Officers of the City be authorized to do all things necessary to implement the intent of the foregoing.

Report - Executive Policy Committee - July 14, 2010

DECISION MAKING HISTORY:

Moved by His Worship Mayor Katz,

That the recommendation of the Executive Policy Committee be adopted by consent.

Carried

EXECUTIVE POLICY COMMITTEE RECOMMENDATION:

On July 14, 2010, the Executive Policy Committee concurred in the recommendation of the Winnipeg Public Service and submitted the matter to Council.

Also on July 14, 2010, the Executive Policy Committee received from the Director of Planning, Property and Development a copy of his PowerPoint presentation on the OurWinnipeg Plan By-law No. 67/2010 and the Complete Communities Secondary Plan By-law No. 68/2010 which contained reference to the Sustainable Water and Waste Directional Strategy as well as a brochure titled Sustainable Water and Waste At-a-glance.

Further on July 14, 2010, the Executive Policy Committee received submissions with respect to the Sustainable Water and Waste Directional Strategy from the following:

- Genstar Development Company
- Peter Miller, Resource Conservation Manitoba
- Mike Moore, President, Manitoba Home Builders Association

ADMINISTRATIVE REPORT

Title: **Sustainable Water and Waste Infrastructure Direction Strategy**

ISSUE: **Seeking endorsement of the Sustainable Water and Waste Infrastructure Direction Strategy as Council Policy that will apply to the entire city**

Critical Path: Executive Policy Committee → Council

AUTHORIZATION

Author	Department Head	CFO	CAO
P. Regan	D. Joshi	N/A	Glen Laubenstein, CAO

RECOMMENDATIONS

1. That Council endorse in principle the '**Sustainable Water and Waste Infrastructure Direction Strategy**' as outlined in Attachment "A".

2. That the Proper Officers of the City be authorized to do all things necessary to implement the intent of the foregoing.

REASON FOR THE REPORT

OurWinnipeg integrates four Direction Strategies that provide detailed policies, directions and strategies necessary for implementation. The four direction strategies are: *Complete Communities* (submitted for adoption as by-law), *Sustainable Transportation, Sustainable Water and Waste Infrastructure*, and *A Sustainable Winnipeg*.

The *Sustainable Water and Waste Infrastructure* Direction Strategy outlines initiatives that deliver services in a sustainable manner and protect the health and safety of Winnipeg's citizens and the quality of our environment without sacrificing the economic well-being of the city.

The *Sustainable Water and Waste Infrastructure* Direction Strategy will be submitted for endorsement as Council Policy.

IMPLICATIONS OF THE RECOMMENDATIONS

- Each of the five (5) documents are being advanced under separate reports, which will describe the merits, content, and overview of each of the planning documents:
    - *OurWinnipeg* Plan submitted for adoption as a Plan Winnipeg by-law.
    - *Complete Communities Direction Strategy* submitted for adoption as a Secondary Plan by-law.
    - The remaining three Direction Strategies – *Sustainable Transportation, Sustainable Water and Waste Infrastructure* and *A Sustainable Winnipeg* – submitted for endorsement as Council Policy.

- Endorsement of the *Sustainable Water and Waste Infrastructure Direction Strategy* as Council Policy provides a set of guidelines for the City of Winnipeg Public Service to follow with respect to this subject matter. It will express Council's will and expectations and provide transparency to the public.

- The *Sustainable Water and Waste Infrastructure* Direction Strategy outlines directions intended to address how to protect and maintain the infrastructure advantages the City of Winnipeg already has and how to enhance the quality of our air, water and energy resources and our built and natural environment. These future directions will address environmental, economic and social sustainability and provide a path to guide the City's infrastructure needs into the future.

Background
On April 25, 2009 the Mayor's Symposium on a Sustainable Winnipeg marked the beginning of the City's comprehensive process to create a new Municipal Development Plan – the OurWinnipeg Initiative – based on principles of sustainability. During the year long engagement process following the symposium, more than 42,000 Winnipeggers provided input into the planning process through speakupwinnipeg.com, roundtables, open houses, major face to face events, and community outreach.

Plan Content
The *Sustainable Water and Waste Infrastructure Direction Strategy* is centred on three key themes:

- Protecting Public Health and Safety
- Preserving the Environment
- Ensuring Economic Stability

The Direction Strategy addresses the following five major areas of infrastructure:

- Water Supply, Treatment and Distribution
- Wastewater Collection and Treatment
- Stormwater Management and Flood Protection
- Solid Waste Management
- Service Sharing with the Capital Region

The *Sustainable Water and Waste Infrastructure Direction Strategy* builds on a number of initiatives of the Water and Waste Department currently in progress and provides policy directions that reinforce the City's approaches to water conservation, wastewater management,

stormwater management, solid waste minimization and sustainable asset management. These policies focus on:

- Water Conservation & Waste Reduction
- Providing cleaner, safer water to our citizens
- Protecting local water quality and reducing impacts on the natural environment
- Supporting long-term future growth and development
- Improving service reliability and reducing costs by aligning service rates with the actual costs of delivering services

There are several innovative initiatives in this Direction Strategy that will have long-term implications related to water and sewer infrastructure and solid waste management within the City and Capital Region. Some examples of these innovative initiatives include:

1. Water Sensitive Urban Design (WSUD) — Exploring the application of technologies such as greenroofs or vegetated bio-retention swales to our climate and geography.

2. Water Reuse/Recycling (Greywater or Rainwater Harvesting) — Exploring how the safe reuse of water can increase the number of people our water and waste infrastructure can serve while reducing our water consumption.

3. Source Separated Organics (SSO) — Exploring a SSO program where organic waste, recyclables and garbage are separated for curb-side collection.

4. Sustainable Asset Management (SAM) — Sustainable Asset Management allows the City to efficiently maintain its infrastructure and plan for future infrastructure needs while protecting public health and maintaining the quality of our environment.

Public Engagement

- The *Sustainable Water and Waste Infrastructure* Direction Strategy is based on the voices of Winnipeggers, commencing with the visions shared by participants at the Mayor's Symposium on Sustainability, held April 25, 2009, and augmented by the input received through the comprehensive speakupwinnipeg citizen involvement process. Over the course of approximately one year, more than 42,000 Winnipeggers provided input into the planning process through speakupwinnipeg.com, roundtables, open houses, major face to face events, and through community outreach.
- Public Involvement on *Our Winnipeg* and the companion documents was undertaken in three phases:
    - SpeakUpWinnipeg #1 (April 2009 – October 2009): Provided an opportunity for high-level / blue sky discussion regarding the future of our city. A wide range of online (blog, video, polls), social media tools, public events, roundtable meetings and a street team were used to engage more than 30,000 Winnipeggers.
    - SpeakUpWinnipeg #2 (November 2009 – January 2010): Provided an opportunity to check-in with key stakeholders and the general public. Website engagement was again used, along with open houses.
    - SpeakUpWinnipeg #3 (May/June 2010): Following the release of the draft *OurWinnipeg Plan* and accompanying Direction Strategies, this phase provided

an opportunity to check back with key stakeholders and to share information with the general public in advance of the formal review/approval process. Website engagement, roundtables and public information sessions were used. Through the course of SpeakUpWinnipeg 2 and 3 more than 12,000 additional people were engaged.

HISTORY

On March 21, 2007, Executive Policy Committee recommended to Council that the Province of Manitoba be advised that The City of Winnipeg has commenced the review of *Plan Winnipeg 2020 Vision* as required by The City of Winnipeg Charter.

On April 25, 2009 the Sustainability Symposium marked the beginning of the City's comprehensive process to create a new Municipal Development Plan – the OurWinnipeg Initiative – that will be based on principles of sustainability.

Between April 25, 2009 and May 2010 more than 42,000 Winnipeggers provided input into the planning process through speakupwinnipeg.com, roundtables, open houses, major face to face events, and through community outreach.

On May 26, 2010, a draft of the *Sustainable Water and Waste Infrastructure* Direction Strategy was released publicly.

FINANCIAL IMPACT

Financial Impact Statement Date: June 16, 2010

Project Name:

Sustainable Water and Waste Infrastructure Direction Strategy

COMMENTS:

The recommendation contained in this report is that Council endorse in principle the 'Sustainable Water and Waste Infrastructure Direction Strategy' as outlined in Attachment "A".

There are no financial implications associated with this recommendation.

"Original Signed By"
Mike McGinn, CA
Manager of Finance

CONSULTATION

In preparing this Report there was consultation with:

Internal Consultation: Public Works; Transit; Water and Waste; Community Services; Winnipeg Police Service; Winnipeg Parking Authority; Office of Sustainability; Legal Services.

External Consultation: A number of external stakeholders were consulted on this project.

SUBMITTED BY

Department	Planning, Property and Development
Division	Planning and Land Use
Prepared by	Brett Shenback, OurWinnipeg Team Member – Planner
Date	June 17, 2010
File	

Attachment "A": Sustainable Water and Waste Infrastructure Direction Strategy

Sustainable Water and Waste


SUSTAINABLE
WATER AND WASTE
Winnipeg
An OurWinnipeg™ Direction Strategy

PUBLIC SERVICE CONTRIBUTORS

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SUSTAINABLE WATER AND WASTE

THIS IS A DRAFT

SUSTAINABLE WATER AND WASTE IS STILL IN DRAFT FORM. IT WAS CREATED THROUGH SPEAKUPWINNIPEG AND CONVERSATIONS WITH MORE THAN 40,000 WINNIPEGGERS.

Sustainable Water and Waste is one of four Direction Strategies that support the OurWinnipeg Plan. Over the past decade the Water and Waste Department has developed a number of key initiatives that enhance the sustainability of the City's water, wastewater, stormwater management, and solid waste management systems. In developing this Direction Strategy, the Water and Waste Department retained the services of nationally and internationally renowned experts in the fields of municipal engineering and urban planning to build on these initiatives by providing new and innovative recommendations on sustainable infrastructure policies and best practices. These expert recommendations resulted from research of not only other North American cities, but also included investigation for innovative ideas from around the world. This resulted in a more holistic approach on water and waste infrastructure.

Directions for the future address how to protect and maintain the infrastructure advantages the City of Winnipeg already has and how to enhance the quality of our air, water and energy resources and our built and natural environment. These future directions address environmental, economic and social sustainability and provide a path to guide the City's infrastructure needs into the future.

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01 EXECUTIVE SUMMARY

A VISION FOR SUSTAINABLE WATER AND WASTE INFRASTRUCTURE

The City of Winnipeg Water and Waste Sustainable Infrastructure Strategy promotes actions required to protect public health and safety, ensure the purity and reliability of our water supply and maintain or enhance the quality of our built and natural environments.

The Vision addresses:

- The challenges involved in providing sustainable infrastructure that protects the health and safety of Winnipeg's citizens and the quality of our environment
- The initiatives required, including ongoing initiatives that will allow us to live safe, secure and fulfilling lives, with services delivered in a way that is sustainable and that protects the environment without sacrificing the City's economic well being.



MAJOR THEMES AND ELEMENTS OF THE SUSTAINABLE INFRASTRUCTURE DIRECTION STRATEGY

The Water and Waste Sustainable Infrastructure Strategy addresses five key elements of Winnipeg's infrastructure:

- Water Supply, Treatment and Distribution
- Wastewater Collection and Treatment
- Stormwater Management and Flood Protection
- Solid Waste Management
- Service Extensions to Winnipeg's Fringe Areas

This Direction Strategy provides a summary of the challenges and initiatives that comprise the Strategy and provides draft policies for inclusion in **OurWinnipeg**.



Source: AECOM

The major themes of the document are:

Sustainable Water and Waste Infrastructure Protects Public Health and Safety

- Watershed protection conserves Shoal Lake as a high quality water source for future generations
- Water treatment provides cleaner, safer water to our citizens
- Monitoring water quality addresses quality and regulatory compliance
- Training and certification of operating staff improves overall reliability and safety
- Evaluating residential fire protection sprinklers could save on future water related infrastructure costs while protecting our lives and property
- Upgrading wastewater treatment systems supports long-term future growth and development
- Flood protection protects citizens' lives and property
- Drainage safety helps prevent tragic accidents

Sustainable Water and Waste Infrastructure Preserves the Environment

- Water conservation–"Slow the Flow" reduces our impact on natural systems and protects future water sources while reducing energy inputs and green house gases
- Regulatory compliance reduces the amount of pollution in our rivers and streams
- Demand management has the potential to reduce water and energy use
- Evaluating water recycling/reuse technologies has the potential to reduce water and energy use
- Upgrades to pollution control centres protect water quality in local rivers and in Lake Winnipeg
- Reducing Combined Sewer Overflows also reduces pollution in local water bodies
- Waste reduction strategies reduce resource demands and green house gases
- Methane gas capture at landfills has the potential to reduce resource demands and green house gases
- Examining a source separated organics (SSO) program (curb-side pick-up of organics for composting) has the potential to save land that would otherwise need to be devoted to landfill construction. This type of program also has the potential to create a useful product from household organics
- Water sensitive urban design (WSUD) source control has the potential to create less runoff, improve water quality and reduce impacts on natural systems
- Promoting naturalized stormwater retention systems reduces nutrient loading and improves the quality of water discharging into local water bodies

Sustainable Water and Waste Infrastructure Ensures Economic Stability

- Sustainable Asset Management allows the City to spend the right amount of money in the right places at the right time
- Customer Information and Services System (CISS) improves customer service and billings
- Updated Supervisory Control and Data Acquisition improves service reliability and reduces costs
- Cost of Service Rates Study aligns service rates with the actual costs of delivering services to a class of customer

HOW IS THIS APPROACH DIFFERENT?

Sustainability has always been a cornerstone for Water and Waste Infrastructure planning and operations. Whether it is water conservation, solid waste material recycling or state of the art wastewater treatment, the Water and Waste Department has always strived to incorporate best practices into all facets of our business. Since many of the current practices are sustainable in nature, proposed changes would be evolutionary rather than revolutionary. Of course, there is always room for improvement.

Four major initiatives stand out that will have long term implications related to water and sewer infrastructure and solid waste management within the City and Capital Region. The first three are new and can be broadly categorized as Water Sensitive Urban Design (WSUD), Water Reuse/Recycling (Greywater or Rainwater Harvesting) within the sewer and water framework and examining the potential for Source Separated Organics (SSO) within the solid waste management framework.

The fourth major initiative which is not new but will be enhanced and developed even further is Sustainable Asset Management (SAM). Sustainable Asset Management spans nearly every aspect of urban infrastructure and allows the City to properly allocate resources to efficiently maintain the current inventory and plan for future expansions while protecting public health and maintaining the quality of our environment. It is perhaps the most important and most strategic of the sustainable infrastructure strategies identified in this report.

02 INTRODUCTION

The initiatives summarized in this document specify key actions needed in our efforts to realize a more sustainable future for Winnipeg, including directives dedicated to protecting public health, ensuring the purity and reliability of our water supply and maintaining the quality of our environment.

The strategies proposed, in many cases, build on others already in place.

This Direction Strategy is organized into two major sections addressing the following major areas of infrastructure:

- Water Supply, Treatment and Distribution
- Wastewater Collection and Treatment
- Solid Waste Management
- Stormwater Management and Flood Protection and
- Service Extensions to our Fringe Areas

The first section describes the challenges and initiatives, both ongoing and proposed, which comprise a sustainable infrastructure strategy for the next 20 years for the City of Winnipeg. The second section provides draft policies for inclusion in OurWinnipeg; the new City of Winnipeg Sustainable Development Plan.

Sustainable Asset Management is a theme that spans nearly every aspect of urban infrastructure in the discussions that follow and is a vital component of a Sustainable Infrastructure Strategy. Properly allocating resources to efficiently maintain the current inventory provides economic sustainability in addition to its primary role in protecting public health.

Negotiating beneficial service extensions to areas that currently experience water quality and environmental protection issues, particularly those within the Perimeter Highway, affects the entire Winnipeg Capital Region by improving levels of water and wastewater servicing and providing access to more effective stormwater management and solid waste disposal strategies.

WHAT A SUSTAINABLE ASSET MANAGEMENT STRATEGY LOOKS LIKE

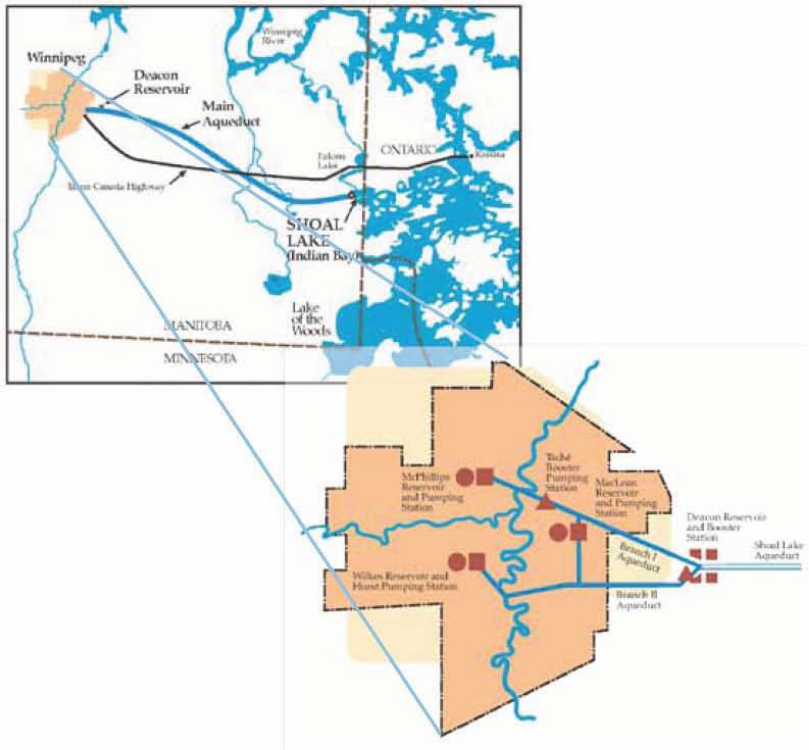


Source: AECOM

02-1 CHALLENGES

Winnipeg's access to fresh water, coupled with our sustainable and clean sources of energy are major advantages that distinguish us from many other urban centres. The quality of our air, water and soil are central to our well-being, and this value is reflected in how we choose to plan and manage our water, wastewater, solid waste, land drainage and flood protection infrastructure. The challenges we face today in Protecting Public Health, including our water supply and the natural environment around us are no less critical from those Winnipeggers faced in the past, even though they can be quite different. Our present challenges involve planning our future infrastructure investments to be sustainable in meeting needs associated with strong population growth, in improving the quality of both our natural and built environments and in establishing beneficial regional servicing partnerships.

By 2031, our City's population is projected to grow by nearly 27% to roughly 850,000 people. Realizing this level of growth while maintaining high standards for our natural, built and social environments will require significant planning and investment to upgrade the City's existing physical water and wastewater infrastructure. Much of that infrastructure is 75 to 100 years old, nearing the end of its physical design life. Responding to these challenges in a sustainable manner requires a comprehensive understanding of the City's existing infrastructure systems, as well as sensitivity to a range of local considerations, including the role of geography and climate in selecting viable infrastructure solutions, the dynamics of the local economy in achieving sustainable funding mechanisms for infrastructure and recognition of the geopolitical context within the Capital Planning Region in evaluating opportunities for shared servicing.



Prioritizing a high quality of life within Winnipeg and throughout the Capital Region necessitates improving our performance in a number of specific areas. The Sustainable Infrastructure Strategy outlined herein details initiatives that specify the actions required to protect public health, preserve and maintain our environment and ensure the purity and reliability of our water supply. Each strategy builds on another, whether strictly related to underground infrastructure, to surface infrastructure that is immediately connected to it, to adjacent developments that rely on this infrastructure or right to the people that depend on it to protect their health and to live safe, secure and fulfilling lives. This includes examining the barriers to improving our quality of life: our aging water, wastewater and stormwater systems, including combined sewer systems located in some of our oldest and most densely populated and developed neighbourhoods; flood protection systems, and solid waste management systems. All present challenges that, if left unaddressed will affect our environment, economy and standard of life. In addition, we examined the need for cooperation on a regional level with surrounding municipalities in the Winnipeg Capital Region to maximize overall servicing efficiencies and to reduce environmental impacts in the urban fringe.

The Challenges and Initiatives and Supporting Policies and Strategies sections that follow will discuss the following major areas of infrastructure:

- Water Supply
- Wastewater Collection and Treatment
- Solid Waste Management
- Stormwater Management and Flood Protection
- Service Extensions to Our Fringe Areas



Source: AECOM

Melbourne Ducklands



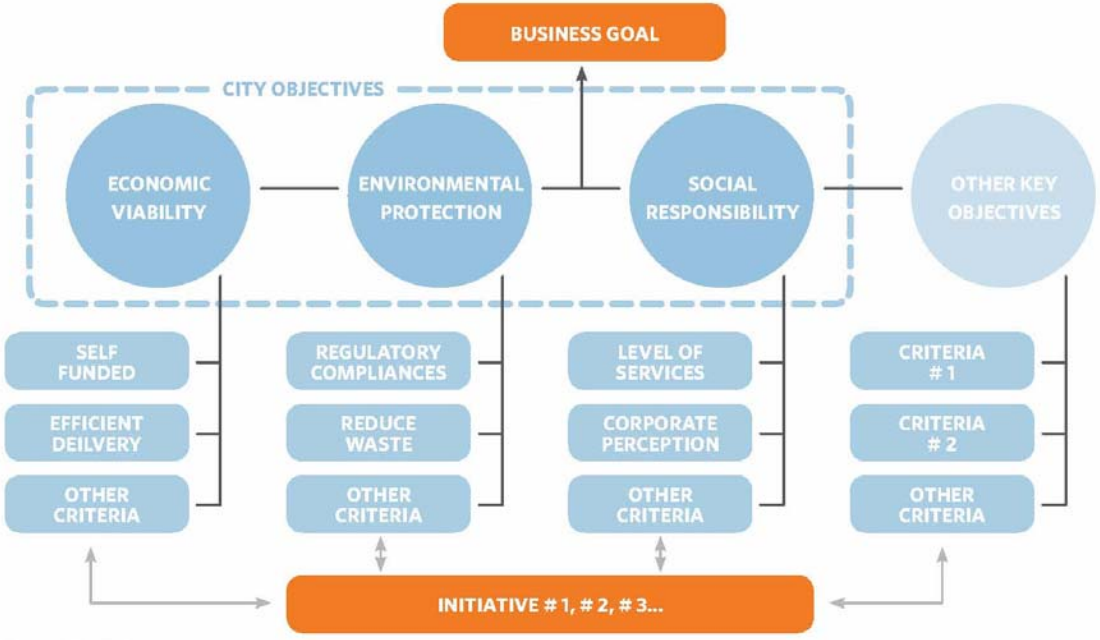
Source: Portland Green Streets



Source: Portland Green Streets

02-2 SUSTAINABLE INFRASTRUCTURE STRATEGY FOR OURWINNIPEG

In community planning terms, "Sustainability" addresses three pillars: economic, social, environmental. Cultural and governance considerations are sometimes added. The Sustainable Infrastructure Strategy for OurWinnipeg addresses key sustainability pillars, going beyond environmental issues to consider long-term economic viability and community wellness, innovative approaches to infrastructure delivery and regional service-sharing. The Strategy builds on a number of initiatives of the Water and Waste Department currently in progress and provides policy directions that reinforce the City's approaches to water conservation, wastewater management, stormwater management, solid waste minimization and sustainable asset management.



Source: AECOM

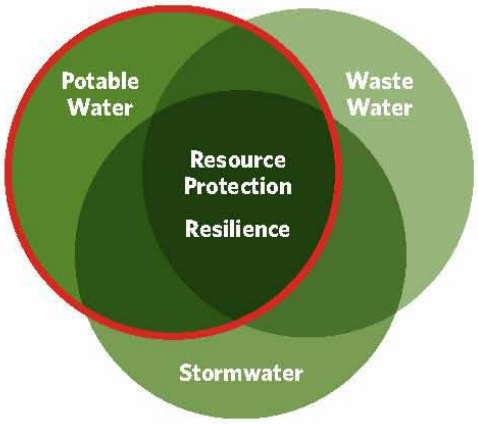
03 WATER

03-1 FUTURE OPPORTUNITIES

When our water system was first developed in the early 20th century it was an engineering marvel, but today, potential development around our primary water source and an aging infrastructure make it increasingly challenging to maintain the quality and reliability of our potable water supply.

This challenge–ensuring the water we drink is clean and available—will require ongoing investment. The City of Winnipeg will continue to secure our water supply and build critical upgrades to the Shoal Lake Aqueduct, water treatment plant, regional storage facilities, pumping and distribution piping systems and will continue to explore the potential for more sustainable solutions for operating and maintaining the system and preserving what we already have.

On an average day, Winnipeggers use roughly 225 million litres (50 million Imperial gallons) but we are still far from reaching the capacity of the Shoal Lake Aqueduct. In fact, in 1990, Winnipeg's Shoal Lake Aqueduct supplied as much as 300 million litres per day (66 million Imperial gallons per day). Current capacity of the Shoal Lake Aqueduct allows us to deliver approximately 385 million litres per day (85 million Imperial gallons per day). At current usage rates, and with successful citywide water conservation efforts, the Shoal Lake Aqueduct will have the capacity to provide water for the roughly 850,000 people expected by 2031.



Source: AECOM



Source: City of Winnipeg

Winnipeg Aqueduct

03-2 WATER SUPPLY DIRECTION DESCRIPTION

The City of Winnipeg faces three primary challenges:

- Protecting Public Health by ensuring that the water Winnipeggers drink is pure and reliable
- Maximizing efficient use of our existing water supply and ensuring the availability of future water supplies
- Investing in the in-city water delivery system in order to provide a clean, safe, reliable and sustainable water supply for our citizens, now and in the long-term future

03-3 ENSURE THE QUALITY AND SAFETY OF OUR EXISTING DRINKING WATER

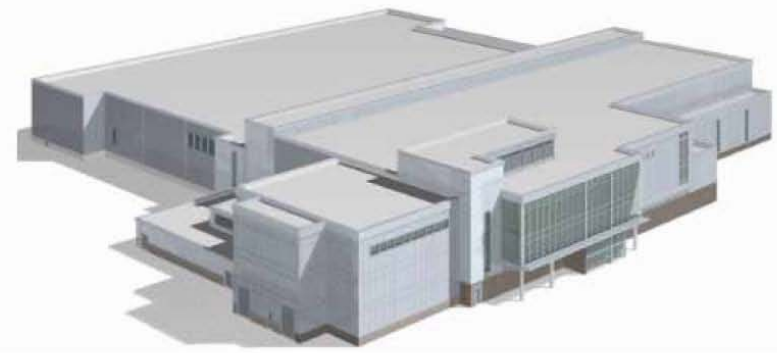
03-3a PROTECTING PUBLIC HEALTH-A MULTI-BARRIER APPROACH

01. Reliable clean water supply
- Watershed protection plan

02. Water Treatment Plant (WTP) – multiple disinfection treatment and removal processes

03. Water Distribution System Investment

04. Monitoring and Protecting
- Water quality sampling and reporting
- Regulatory reporting
- Regulatory compliance
- Certification of operating staff
- Cross connection control program



Source: City of Winnipeg New Water Treatment Plant

03-3b ENHANCE THE QUALITY OF WINNIPEG'S DRINKING WATER

Safe water is an absolute requirement for protecting Public Health within our community. Residents of Winnipeg expect the City to take all necessary and reasonable steps to provide a water supply that is both reliable and safe. At the end of 2009 the City brought their new water treatment plant online. The new water treatment plant, located at the Deacon Reservoir, is a frontline means of protecting citizens from potential waterborne disease outbreaks caused by pathogens and other micro-organisms that are chlorine resistant. The new water treatment plant will also reduce the levels of disinfection by-products and will help us to conform to the Guidelines for Canadian Drinking Water Quality. Additional benefits from the water treatment plant will be the improved taste, odour and appearance of our drinking water.

03-3c NEW WATER TREATMENT PLANT

The design maximum day capacity of the treatment plant is 400 million litres per day. Future expansion could increase this capacity to as much as 600 million litres per day. At current usage rates, and with successful citywide water conservation efforts, the water treatment plant will have more than enough capacity to provide water for the roughly 850,000 people expected by 2031.

03-4 SECURE AND PROTECT WATER SUPPLY AND WATERSHEDS

The City of Winnipeg will continue to be vigilant with its policy of requesting stakeholders and other jurisdictions to conform to the Watershed Management Plans to protect the Shoal Lake catchment area, including the provision for thorough environmental assessments for any developments that encroach on the watershed. In addition the City will implement water system security upgrades to protect the system against accidental or intentional damage or destruction.

03-4a REGULATORY COMPLIANCE

Ensure that the system conforms to various legislation and regulations such as the Drinking Water Safety Act, Public Health Act, Operator Certification Regulations, Workplace Safety and Health Act, and the Environment Act. The City will also perform a Drinking Water System Infrastructure Assessment Study as required under the Provincial Drinking Water Safety Act, to identify, analyze and mitigate any potential adverse health risks and environmental impacts associated with the water system applying a "source to tap" methodology. This study is required to be submitted to the Province in 2010, with subsequent updates every five years thereafter. The study's scope will also review projected water demands, treatment and pumping capacities and anticipated changes to water quality standards.

03-4b MONITOR WATER QUALITY

The City will continue to monitor its drinking water quality (at Shoal Lake, Deacon, the WTP, and within the water distribution system) and publish an annual report as required under the Manitoba Drinking Water Safety Act.

Other initiatives that have been identified within the current planning horizon include improvements to the Shoal Lake Aqueduct (SLA) intake structure, asset preservation of the aqueduct itself, as well as monitoring the Red River Basin watershed for Zebra Mussels, which have been found in Pelican Lake, Minnesota, USA.

Initiatives related to the SLA intake include condition assessments and potential improvements and modifications to components at the headworks, which have existed since the facilities were first constructed in 1919, including review and assessment of alternatives to using gas chlorine at the headworks for Zebra Mussel control, and preserving the aqueduct's hydraulic carrying capacity.

03-4c CONTINUE CROSS-CONNECTION CONTROL PROGRAM

The City will continue to protect our water system through a cross-connections control program, particularly in relation to other initiatives such as consideration of water reuse, recycling and rain water harvesting technologies. Cross-connections are potential connections between the potable water system and a non-potable water plumbing component.

03-5 MAXIMIZE OUR EXISTING WATER SUPPLY/ENSURE AVAILABILITY OF FUTURE WATER SUPPLIES

Although Winnipeg has an abundant water supply, that does not mean we can squander it. The City will continue in its efforts to maximize its existing water supply and protect future water sources that may add to our portfolio of safe, clean water for our citizens.

03-5a WATER CONSERVATION—"SLOW THE FLOW" PROGRAM

The City will continue with its successful "Slow the Flow" water conservation program. Water consumption for the entire city peaked in the early 1990s at roughly 300 million litres per day and has since reduced, despite an increased customer base, to an average consumption in 2009 of roughly 225 million litres per day. The program provides customer education on water efficient fixtures and appliances and also provides retrofit kits "at cost" that serve to reduce water demand for existing conventional toilets. The program has also recently been expanded to credit customers who install water-efficient dual flush toilets.



Source: City of Winnipeg Slow the Flow Program

03-5b COST OF SERVICE RATE STUDY

The City will conduct an updated Cost of Service study to ensure rates are aligned with the current cost of delivering services to customer groups. The cost of service strategy will investigate demand management techniques on the water side which will help to preserve our water supply capacity. The rate study will review alternative rate structures including declining block, inclining block, uniform, seasonal rates, and winter cost averaging.

The City will also continue its involvement in the National Water and Wastewater Benchmarking Initiative to inform public utilities managers on how well they are doing and how they compare to similar organizations. The benchmarking initiative helps to answer the most challenging question: "how can the utility get better at what it does?" including investing in current technology, training and upgrading the skills of staff and investing in practical research.

03-5c EVALUATE WATER RECYCLING/REUSE TECHNOLOGIES

The City will consider water recycling/reuse technologies such as grey-water and rainwater harvesting as an efficient way to maximize, supplement and protect its existing water supply.

03-5d REDUCE SYSTEM LEAKAGE

One of the most efficient and cost effective means of increasing the available water supply is to maintain the water distribution system, keeping it in good repair and not allowing valuable treated water to leak out of the system. The City will expand its current leak detection program to adopt best management practices that reduce non-revenue water losses, such as those currently being endorsed by organizations such as the American Waterworks Association (AWWA). The City will also take advantage of some of the new technologies that have been developed over the last few years to monitor and pinpoint leaks.

03-5e CONTINUE SUSTAINABLE ASSET MANAGEMENT (SAM) INITIATIVES

The nearly 2400 kilometres of watermains in Winnipeg require constant repair and continual upgrades. We simply cannot afford to replace watermains at a rate corresponding to a reasonable life span of 75 to 100 years. Therefore, we need to be strategic in identifying critical system components and ensuring they remain functioning— using complete total life-cycle costing analysis, pro-active monitoring and maintenance, and review of evolving technologies to extend useful asset life.

03-5f WATER SOURCES

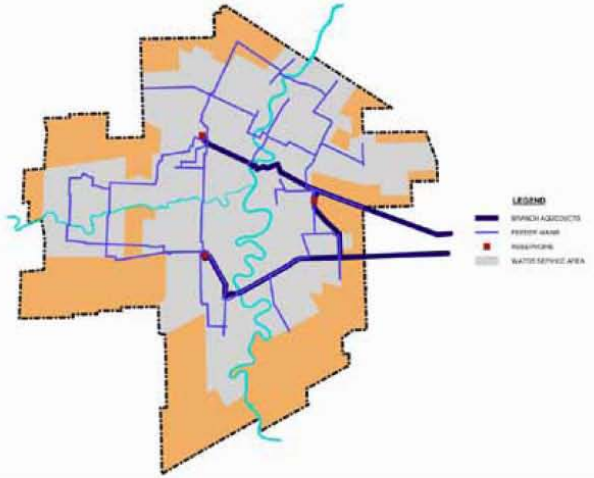
The City will continue to monitor issues related to potential water sources in order to preserve any potential water supply sources for future requirements.

03-6 WATER DISTRIBUTION SYSTEM INVESTMENT

03-6a CONTINUE WATERMAIN RENEWAL PROGRAM

The current watermain renewal program is an ongoing program to replace and/or rehabilitate Winnipeg's deteriorating watermain infrastructure, including watermain replacement, cathodic protection, valve and hydrant replacement or rehabilitation, correction of dead end watermains and hydraulic improvements for fire protection purposes. The program replaces roughly eight to nine kilometres of watermain annually. Keeping the distribution system in a state of good repair is important in order to protect Public Health, minimize service disruptions, eliminate leaky watermains that result in non-revenue water losses (including the energy losses associated with such water loss) and preserve the City's water supply.

REGIONAL WATER SUPPLY AND FEEDERMAIN SYSTEM



Source: AECOM

03-6b CUSTOMER INFORMATION AND SERVICES SYSTEM (CISS)

The Water and Waste Department will implement the remaining phases of the Customer Information and Services Project, which will enhance their customer care and billing system and allow for the introduction of cost-of-service rates. This system will include web self-service, meter management and inventory control and enhanced reporting. The Automatic Reading Technologies System upgrade should be reviewed to develop the full potential of the new Customer Information System.

03-6c SUPERVISORY CONTROL AND DATA ACQUISITION (SCADA) SYSTEM INVESTMENT

The Supervisory Control and Data Acquisition (SCADA) system controls and monitors the operation of the City of Winnipeg Drinking Water Treatment Plant and the Regional Water Supply and Distribution System. Components of the existing SCADA system are nearly two decades old and by the end of 2011 will no longer be serviced or supported by the manufacturer. Upgrading control and data acquisition components is required to optimize the operation of the system.

Related to this initiative, the City will also continue installation and replacement of valves and other watermain infrastructure required to improve service reliability and mitigate environmental risks. The program will include replacement of valve operators and SCADA control equipment at strategic pipe connections and valve chambers.

03-6d UPGRADE PUMP STATIONS AND CONTINUE STRENGTHENING OUR FEEDERMAIN SYSTEM

The City has completed the Water Pumping Station Power Reliability Study and is currently developing a program to implement the recommendations of this study which will increase the reliability of the regional pumping stations.

In addition, the City plans to continue strengthening the feedermain system to provide looped supplies for urban development occurring near the City's urban fringe.

03-6e EVALUATE THE FEASIBILITY AND COST EFFECTIVENESS OF RESIDENTIAL FIRE PROTECTION SPRINKLERS

The City will review potential savings available through requiring residential sprinkler systems for fire protection. Most watermains in residential subdivisions are sized based on fire flow demand requirements. Sprinkler systems can reduce required fire flows by a significant factor (roughly 50%), thereby potentially reducing the size and cost of domestic distribution systems within City jurisdiction.



04 WASTEWATER SYSTEM

Winnipeggers value and take pride in the abundant and natural surface water amenities both within and downstream of our city. The City of Winnipeg has actively protected these shared water resources and the public health of its citizens by implementing major capital projects and by providing for the operations and maintenance associated with our wastewater collection and treatment system. Ongoing improvements to our wastewater system will be required to maintain or upgrade the level of service our residents currently enjoy. Evolving regulatory requirements may place greater demand on the level of service and treatment required to protect the environment. It is imperative that upgrades and improvements to our wastewater system be based on long-term sustainable solutions that are cost-effective, practicable, environmentally sound and that comply with regulatory requirements.

A comprehensive review of our assets, operating practices, projected demands and regulatory trends is required to provide the most sustainable, long-term solutions related to our wastewater system. The goal is to develop a strategic framework that will effectively guide future actions and investments in our wastewater system that are publically acceptable, economically sound, foster the well-being of our community and protect the environment. Achieving this goal will require going beyond conventional approaches, identifying possible emerging and innovative/ naturalized solutions, such as Water Sensitive Urban Design technologies.

Future waste reduction programs should emphasize pollution prevention at source. This will help reduce both flows and pollutant loads, which in turn reduces the need for upgrades to our sewers and wastewater treatment plants.



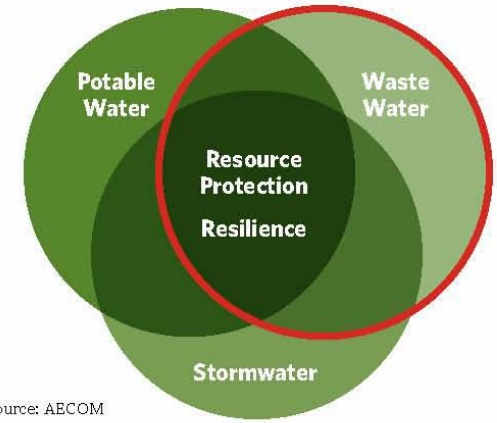


North End Water Pollution Control Centre

04-1 WASTEWATER DIRECTION

The foremost challenges facing Winnipeg's wastewater system relate to:

- Continuing to protect public health and well-being
- Continuing to protect water quality in our local rivers and Lake Winnipeg and complying with Federal and Provincial regulations
- Maintaining the safe and reliable operations of our existing wastewater system
- Improving existing wastewater systems capabilities and upgrading our wastewater systems to support future growth and development using long-term solutions that are founded on principles of sustainability
- Investigating and strategically investing in innovative wastewater technologies that are safe, reliable, cost effective and practicable



Source: AECOM



NEWPCC Raw Sewage Pumps

04-2 PUBLIC HEALTH AND WELL-BEING

04-2a BASEMENT FLOODING PROTECTION PROGRAM

Basement flooding is associated with the potential for health effects that result from contact with untreated wastewater. The City has an ongoing public education program to encourage owners of at-risk homes to install backwater valves and sump pumps. The City will continue its Basement Flooding Protection Program to provide a standard minimum level of protection against sewage backup caused by heavy rainstorms. This program focuses on implementing this level of protection throughout the older combined sewer and separate sewer areas of the city on a priority basis, as evaluated through cost-benefit analysis.

04-2b DISINFECTION OF EFFLUENTS

Effluent disinfection has been implemented at the SEWPCC and NEWPCC in 1999 and 2006, respectively. These facilities are operated according to their respective Manitoba Environment Act Licences, which require E. coli and Fecal coliform organisms to be limited to 200 organisms/100mL based on a monthly geometric mean. The addition of a disinfection facility at the WEWPCC has been postponed indefinitely. It has been found that the existing polishing ponds receive sufficient UV light from natural sunlight to reduce microbial levels to comply with the requirements of the Environmental Act Licence issued for the WEWPCC. The implementation of cost-effective options for reducing microbial levels will be necessary for the WEWPCC in the event that current disinfection methods do not consistently and fully comply with Environmental Act Licensing requirements.



Weir Overflow, King and Logan
Source: AECOM



Akkerman Jacking System
Source: AECOM



NEWPCC Ultraviolet Disinfection System

04-2c EMERGING HEALTH REGULATIONS

The City will also encourage the reduction of pollutants at the source where possible. Potential contaminants of concern are:

- Toxic substances under the Canadian Environmental Protection Act (CEPA)
- Endocrine disrupting compounds (EDCs)
- Personal care products
- Pharmaceuticals, etc.

The Sewer By-law is being updated to be more current and restrictive. A comprehensive review of by-laws from other jurisdictions was undertaken as part of the update. Additional substances were added to the restricted list, and the requirement to prepare a pollution prevention plan was included as deemed necessary.

Regulators may impose more stringent requirements on overflows and treated effluent in the future. The City will continue to keep abreast of these trends.

04-2d BIOSOLIDS MANAGEMENT

The City is reviewing its current biosolids management practices along with existing and emerging regulations associated with nutrient management. The existing Environment Act Licence for land application of biosolids under the WinGRO program will likely require an alteration to comply with requirements associated with the new Manitoba Nutrient Management Regulation. The key factors affecting future nutrient/biosolids management plans include:

- No winter spreading of biosolids
- Agronomic land application rates for Nitrogen (N) and Phosphorous (P)

The City will need to implement an alternative biosolids management program as a result of the Provincial Nutrient Management Regulation.

04-3 WATER QUALITY OF OUR RIVERS AND COMPLIANCE WITH FEDERAL AND PROVINCIAL REGULATIONS

04-3a REDUCING NUTRIENTS IN OUR WASTEWATER TREATMENT PLANT'S EFFLUENT

The City will continue its current nutrient reduction upgrade program for its three wastewater pollution control centres (WPCC), to comply with Provincial Environment Act Licences issued for each facility. The biggest factor affecting the cost of the upgrades is the need to remove Nitrogen to specified limits of 15 mg/L.

The purpose of these upgrades is to protect the health of our local rivers and Lake Winnipeg by controlling ammonia toxicity and nutrient loadings into these water bodies. Reduction of Phosphorous is known to be effective in reducing eutrophication which is associated with undesirable blooms of blue-green algae in Lake Winnipeg. It is the City's position that the reduction of Nitrogen will have no benefit to Lake Winnipeg. Scientific information indicates that Nitrogen removal may worsen the blooms of blue-green algae.

The upgrades required to comply with Environment Act Licences issued for each wastewater treatment plant were estimated to be at least $700M to remove both Nitrogen and Phosphorus to the specified limits of 15 mg/L and 1 mg/L respectively. The upgrades to the wastewater treatment plants will be reviewed in the context of sustainability to ensure that the environment, economics and public aspects are properly factored into the decision-making process and ultimately into design and operation of the plants.

04-3b RIVER CROSSING MONITORING AND REHABILITATION

Installation of leak detection equipment and rehabilitation and/or replacement of forcemain river crossings will be initiated as part of the plan to meet the Province of Manitoba Environmental Licence requirements for the city's wastewater collection system. These installations will reduce the risk of short-term and localized environmental stress resulting from a failure of these critical components of the collection system.



NEWPCC Centrate Nitrogen Treatment Facility

04-3c COMBINED SEWER OVERFLOW MANAGEMENT STRATEGY

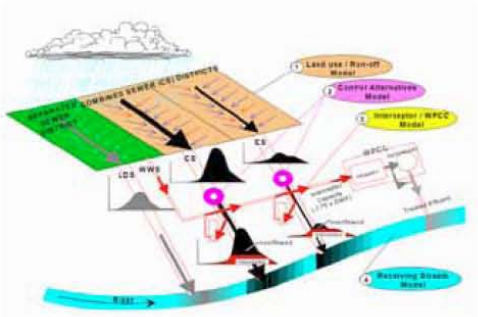
The City will continue to create a multi-year combined sewer overflow (CSO) Master Implementation Plan to improve the water quality in our rivers in terms of microbiological pollution and solids pollution control to meet both the 2003 Clean Environment Commission Hearings recommendations and Manitoba Conservation Guidance and Priorities requirements. The Clean Environment Commission (CEC) recommended that the City of Winnipeg shorten the time to complete the CSO mitigation program by no later than 2028, and take immediate steps to instrument outfalls, adjust weirs, accelerate combined sewer replacement, advance pilot projects, and other reasonable measures to reduce overflows.

Combined sewer overflows (CSOs) relate to both:

- microbiological water quality, i.e., E. Coli and Fecal coliforms, and
- aesthetics, i.e., visual, odour and objectionable matter related to sewage such as Fat, Oil and Grease (FOG)

The Canada-wide Strategy for the Management of Municipal Wastewater Effluent document recommends CSO's be reduced or eliminated depending on site specific conditions, but acknowledges that Provinces can set a higher and more stringent standard. Local CSOs are fundamentally a public policy issue in terms of the level of capture and treatment and should not be considered a significant public health issue. Combined sewer overflows represent roughly 1 to 2% of the city-wide wastewater that is lost on an annual basis. Combined sewer overflows occur at 79 overflow locations spread over a large area in the older parts of the city and represent less than 0.2% of the total Phosphorous and Nitrogen loadings into Lake Winnipeg. The City's current combined sewer overflow control plan is based on achieving a city-wide average of four overflows per year.

It is also anticipated that an Environment Act Licence will be issued in the future to limit the number and volume of wet weather induced overflows from wastewater sewers in separate or combined sewer districts. The mitigation options presented to the CEC in 2003 were estimated to cost between $ 450M to $1.5B. The Licence will dictate the timeframe, compliance requirements, and ultimately the overall program cost.



Source: TetrES Consultants Inc. Separate and Combined Sewer Schematic

04-3d OTHER WATER QUALITY REGULATORY REQUIREMENTS

The City will continue to operate the Wastewater Pollution Control Centres (WPCCs) to comply with Federal Wastewater Systems Effluent Regulations and Provincial Environment Act Licences issued for each WPCC to protect aquatic life by controlling the following pollutants:

- Carbonaceous Biological Oxygen Demand (cBOD)
- Total Suspended Solids (TSS)
- Ammonia (NH_3)

04-3e PROGRAM FUNDING

In August 2003, the Clean Environment Commission released their report on Winnipeg's wastewater collection and treatment systems and recommended that the City be directly assisted by the Province of Manitoba to secure financial support for required upgrades. Ideally, each level of government would fund one-third of the total program cost. These regulatory driven upgrades to the wastewater collection and treatment systems can incur a significant cost burden exceeding $2.0 B. To minimize rate impacts to customers and to maintain a competitive market to attract business to Winnipeg, it is essential that dialogue with the other levels of government be established to equitably share the burden of these costs.

04-4 MAXIMIZE OUR EXISTING WASTEWATER TREATMENT AND COLLECTION SYSTEM CAPACITY

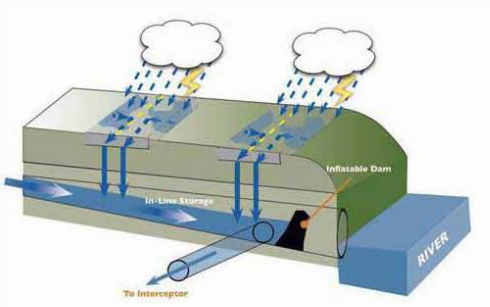
04-4a CAPACITY MANAGEMENT OPERATIONS AND MAINTENANCE (CMOM)

The City will continue to strategically invest in the regional wastewater interceptor and local wastewater systems to ensure that they are safe, reliable, robust, cost-effective, and practicable. These investments have the potential of:

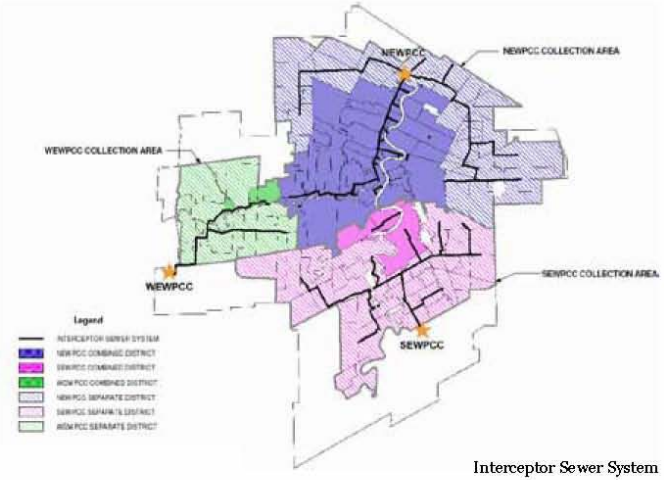
- Reducing demands on non-renewal resources, (e.g., more efficient gas engines, chemicals for wastewater treatment process, etc.)
- Reducing demands on electricity through the use of more energy efficient devices (e.g., pumps, lighting, temperature setbacks, gravity-based solutions for wastewater flows)
- Lowering the green house gas (GHG) footprint of these facilities

The upgrades will generally include:

- Reliability upgrades to our pumping stations
- Expansion of regional sewers to service new developments - promoting contiguous development
- Upgrades to existing infrastructure to support current and future developments, e.g., infill/densification of existing neighbourhoods.
- Synchronize pumping operations with downstream sewer hydraulics and wastewater treatment unit operations and processes to maximize system capacity, especially under wet weather flow conditions
- Investment in Supervisory Control and Data Acquisition (SCADA) technology to increase the efficiency of our operations



Source: TetrES/AECOM CSO Control



Interceptor Sewer System

04-4b CONTINUE OUR SEWER RENEWAL PROGRAM

It is important to keep the wastewater collection system in a "state of good repair" to minimize service disruptions and extraneous inflows which can take away capacity both in terms of hydraulic capacity within the collection system and treatment plant capacity. The current sewer renewal process is part of an ongoing program dedicated to the replacement and/or rehabilitation (i.e. relining and/or point repairs) of deteriorating sewer infrastructure.

The sewer renewal program will also continue to be integrated with the Basement Flooding Relief (BFR) and Combined Sewer Overflow (CSO) mitigation program to logically upsize system capacity where necessary in order to meet multiple needs, i.e., upgrades requirements to support growth and development, or remove bottlenecks.

04-4c INFLOW AND INFILTRATION (I&I) CROSS-CONNECTION INVESTIGATIONS

The City will continue with its Inflow and Infiltration program to improve the tightness of the wastewater sewer collection systems. The Water and Waste Department recently completed a study of the service area tributary to the SEWPCC and has identified a number of actions to reduce or eliminate extraneous inflows due to snowmelt and rainfall. The City will initiate studies in the catchment areas tributary to the NEWPCC and WEWPCC to identify practicable site-specific source control methods to cost-effectively limit or eliminate extraneous inflows. Inflow and infiltration (I&I) control has potential to be a cost-effective method of reducing the amount of wastewater that needs to be treated. I&I control will also preserve the existing capacities effectively delaying or eliminating the need for expensive future upgrades to either the collection system or wastewater treatment facilities. The following are some initiatives that will be part of the I&I investigations:

- Remove extraneous inflows where cost-effective and practicable:
- Promote sump pump installations in areas developed prior to 1990. Sump pump requirements for new developments on a city-wide basis came into effect following the issuance of the 1990 sewer bylaw.
- Enforce sump pump requirements in areas developed post 1990 to ensure that illicit discharges to wastewater sewers are curtailed
- Reduce inflow and infiltration through cross-connections with land drainage sewers, incorrect grates on manholes and informal road or ditch drainage
- Modify criteria for new developments relating to minimum lot size, placement of sump pump discharges, placement of manholes in pavement, ditches or grassed areas.

04-4d COST OF SERVICE RATES STUDY

The City will conduct an updated Cost of Service study to ensure rates are aligned with the current cost of delivering services to customer groups. The cost of service strategy will investigate demand management techniques on the wastewater side which will help to preserve existing capacity and/or free up new capacity. The rate study will review alternative rate structures including declining block, inclining block, uniform, seasonal rates, and winter cost averaging.

The City will also continue its involvement in the National Water and Wastewater Benchmarking Initiative to inform managers of public utilities on how well they are doing and how they compare to similar organizations. The benchmarking initiative helps to answer the most challenging question which is: "How can the utility get better at what it does?" including investing in current technology, training and upgrading the skills of staff and investing in practical research.

04-4e MISCELLANEOUS UPGRADES TO OUR WATER POLLUTION CONTROL CENTRES

Continue upgrading various components within the Water Pollution Control Centres; including raw sewer pump replacement, surgewell, discharge chamber, grit removal, upgrading external power supply, septage/ leachate receiving system, etc. at the North End Water Pollution Control Centre (NEWPPC) and reliability upgrades at the SEWPCC and WEWPCC (South and West End Water Pollution Control Centres, respectively) in order to improve the environmental and economic performance of these facilities.



NEWPCC Main Plant Dry Wells

04-5 INVESTIGATE AND STRATEGICALLY INVEST IN INNOVATIVE WASTEWATER TECHNOLOGIES

04-5a ENHANCE OUR SUSTAINABLE ASSET MANAGEMENT (SAM) INITIATIVES

Various projects in the wastewater utility utilize Sustainable Asset Management (SAM) principles and GIS technologies. Development of a comprehensive SAM strategy is required to define the goals and objectives of an effective system in order to provide a more efficient and sustainable wastewater utility. Asset management systems typically include the following:

- System inventory - textual/numerical records, Geographical Information Systems (GIS), photos, and videos
- Condition assessments
- Deterioration curves
- GAP analyses
- Life cycles cost analyses

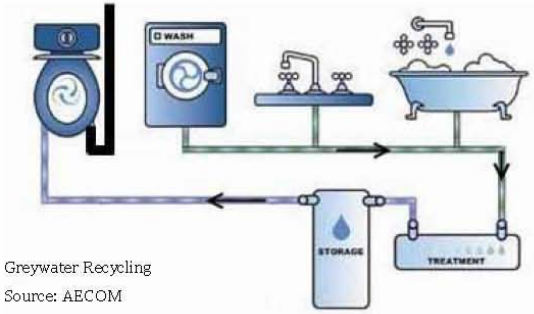
Restructuring of the Wastewater Utility's Geographic Information System (GIS) is required in order to more effectively take advantage of SAM technology.

04-5b WATER SENSITIVE URBAN DESIGN (WSUD)/GREEN TECHNOLOGIES

The Water and Waste Department will consider a number of naturalized solutions to supplement conventional strategies for limiting inflow into the collection system, including Water Sensitive Urban Design (WSUD)/ Green Technology stormwater management techniques as described in Section 06, Stormwater Management and Flood Protection System. These solutions must be consistent with the definition of Sustainability which is a function of economics, protection of the public well-being, and protection of the environment.

04-5c EVALUATE WATER RECYCLING/REUSE TECHNOLOGIES

The City will also consider grey water recycling/reuse technologies which are also part of the water supply initiatives described previously. Water use efficiency has the potential to reduce hydraulic loads on existing infrastructure by reducing flows. This does not result in a reduction to the pollutant loads delivered to the wastewater treatment plants. Rather, it concentrates the pollutants in the wastewater stream.



Greywater Recycling
Source: AECOM

The City will review the potential adaptation of home plumbing to support grey water recycling/reuse technologies with the following considerations:

- Must be safe for public health, particularly in regards to possible cross-connection with the potable water supply
- Comply with all building codes, regulations and by-laws
- Be subject to inspections and enforcement.

05 SOLID WASTE MANAGEMENT

05-1 BACKGROUND

The City of Winnipeg is currently served by three major landfills: the Brady Road Landfill and two private landfill facilities located in the Rural Municipalities of Rosser and Richot. The City operates and maintains the Brady Road Landfill, a 790 hectare Class 1 waste disposal facility that opened in 1973 and currently holds approximately 8 million metric tonnes of waste. The landfill has active dumping areas for most non-hazardous residential and commercial waste, as well as stockpile areas for materials that can be recycled or reused, including scrap metal, automotive batteries, used tires, used propane tanks and used appliances. It is the only active landfill within city limits and is located south of the Perimeter Highway (PTH 100) between Brady Road and Waverley Street.

In addition to operating the Brady Road facility, the City's Solid Waste Management responsibilities include the environmental monitoring of the 34 closed landfills. The management of hazardous waste is under the jurisdiction of the Province.

The City will continue to contract out the delivery of some solid waste services to the private sector, but is ultimately responsible for ensuring that these services are delivered in a manner that is consistent with Provincial regulations. Within the current regulatory framework for managing solid waste the Province of Manitoba sets broad targets and objectives for waste reduction and/or diversion, enacts and enforces regulations, and issues approvals and licenses for waste management facilities.



Source: City of Winnipeg



Source: City of Winnipeg

05-1a THE REVENUE CHALLENGE

Current work on managing solid waste tends to focus on two key areas; setting long-range targets for waste diversion from landfill, and identifying both viable and sustainable program alternatives to achieve these goals. In the 1980's, a combination of heightened environmental awareness and diminishing landfill capacity highlighted the need to re-examine the way in which communities across North America managed their solid waste. Consequently, the process of setting waste diversion goals has become a common practice for solid waste management programs. At current disposal rates the remaining service life of the Brady Road Landfill is approximately 100 years.

Notwithstanding the projected life-span for the Brady Landfill, the City is committed to waste reduction and will explore new waste management technologies in an effort to divert as much solid waste from landfill disposal as practical; however, under existing conditions, the City managed Solid Waste system is faced with the significant challenge of generating sufficient revenue to realistically implement alternative waste management technologies.

The net cost of the City's waste diversion programs are funded by the Solid Waste Disposal Utility. Operating revenue for the City's Solid Waste Management Program is generated from a combination of municipal taxes, tipping fees, sales of recyclables, and in some cases, Provincial funding support. Tipping fees in and around Winnipeg are among the lowest in Canada, largely due to the existing competitive market between the City's Brady Landfill and the two privately owned landfills in the Capital Region.

05-1b SUSTAINABLE WASTE MANAGEMENT PROGRAMS

As of July 1st, 2009, the Province of Manitoba has implemented a levy of $10 per tonne of disposed waste to encourage sustainable waste management practices and to improve diversion activities such as recycling and composting. Under the Waste Reduction and Recycling Support (WRARS) levy, 80% of revenue will be returned to municipalities that have environmentally sustainable waste management programs – based on their recycling tonnage as reported to the Manitoba Product Stewardship Corporation (MPSC). The remaining 20% of the levy revenue is dedicated to programs for managing household hazardous waste and electronic waste. Based on findings from the 2007 MPSC Annual Report, the WRARS program, at current City of Winnipeg disposal and recycling rates, has a potential net benefit of more than $2.0M to the City on an annual basis. The WRARS program is a key and timely financial incentive that may enable the City to explore alternative methods for reducing solid waste disposal to landfill.

05-2 COMPREHENSIVE WASTE MANAGEMENT STRATEGY

There is a need to integrate and optimize the service level and efficiency of all facets of the solid waste management system, while minimizing environmental impacts. Carrying out a comprehensive waste management strategy would address these objectives. The beneficial outcome of this process would include for example, reduced GHG emissions and less reliance on landfilling. The elements included in such a strategy would include but not be limited to the following programs/opportunities.



Source: AECOM City of Munster, Germany

05-2a RECYCLING

Consistent with Provincial regulations, the City of Winnipeg provides recycling services to residential locations with scheduled curb-side collection 50 times a year. Multi-family locations have the option of weekly cart or bin collection. City-owned public facilities such as swimming pools and community clubs are also eligible for this service. Collected recyclables are taken to a Material Recovery Facility (MRF) under contract to the City, where the recyclables are separated into the various material types and sold.

Currently, recycling at the residential level in Winnipeg has an 85% participation rate, which results in diverting approximately 45,000 tonnes of material from the waste landfill disposal stream. This tonnage is equivalent to approximately 17% of the waste stream. This rate of solid waste diversion falls short of many other Canadian municipalities who are now actively moving toward the ideal of Zero Waste by targeting 60+% diversion of solid waste, which necessarily includes the collection and processing of Source Separated Organics.

Recyclables collected by the City of Winnipeg include a standard list of 'blue box' material that includes:

- plastic containers with a recycling triangle on the bottom, including all bottles, pails, tubs, and jugs
- aluminum drink cans
- steel (tin) food cans
- milk and juice cartons
- juice boxes
- newspapers and inserts, flyers and junk mail
- magazines, phone books, household paper, shredded paper and envelopes
- cardboard egg cartons and paper tubes
- flattened cardboard, no more than 1 metre in any direction, e.g., cereal, cracker, tissue, laundry,
- shoe and packing boxes
- glass jars and bottles (clear and coloured).

Other related waste minimization services include the Leaf-It depots, Chip-In depots, a back yard composting program (including a subsidy and education program for backyard composting units) and seven general use recycling depots around the City. Programs related to household hazardous waste and used oil recycling are provided by the Province of Manitoba.

The net cost to the City for the current recycling program is dependent on markets for recycled materials and the level of funding support received under Provincial regulation. Over the past 15 years, more than 700 million kilograms of eligible materials have been recycled through the Manitoba Product Stewardship Corporation (MPSC), which pays 80% of the net cost of the recycling service. However, the MPSC is scheduled to be replaced under the new Packaging and Printed Paper Stewardship Regulation on April 1, 2010. The operating name of the company responsible for administering the new Regulation is "Multi-Material Stewardship Manitoba (MMSM).

The introduction of MMSM marks a shift from a single regulatory body (the MPSC) to a Regulated Steward Responsibility model. Under the new Regulation the first importers, or first sellers of packaging– any part of a package or container that is comprised of glass, metal, paper, or plastic– and printed paper in Manitoba are required to register as product "stewards" who are responsible for organizing and supporting programs to recover those materials, including 80% of the net operating costs.

05-2b SOURCE SEPARATED ORGANICS

There is interest in the City to consider a solid waste system that includes a program for Source Separated Organics (SSO) as a means of diverting more solid waste from landfill which is estimated to make up to one-third to one-half of the total residential waste stream. SSO's consist of organic material (i.e. kitchen & food scraps, leaves, grass, etc.) with undesirable material removed and set out for curb-side collection as a separate residual waste stream. Key considerations for implementing a residential SSO program include the quantity and quality of available material, as well as collection, haul and processing methods.



Source: AECOM

05-2c RESOURCE RECOVERY OPPORTUNITIES

The City of Winnipeg is open to considering options for recovering energy and/or material resource value from solid waste destined for landfill disposal, including technology and processes related to thermal oxidization, carbonizing, aerobic digestion, pelletizing, and organic waste management.

05-2d METHANE GAS CAPTURE

Landfills generate methane gas as organic waste decomposes. Methane is widely recognized as a harmful greenhouse gas that contributes to global warming. National statistics indicate that 4% of total greenhouse gas emissions are generated by landfills. The City of Winnipeg has completed a feasibility study on the capture of gas generated from decomposing organics at the Brady Landfill and is considering uses for the recovered gas, for example, as an energy source to displace natural gas use or to produce electricity.

05-2e ORGANIC MATERIAL PROCESSING AND ENERGY RECOVERY

One strategy for managing organic waste is anaerobic digestion. With appropriate technology and facilities, Source Separated Organics can provide feedstock for renewable energy production and be a source of quality compost material. Related processing options include anaerobic digestion and aerobic composting. While

development near landfills is already a general concern due to odour problems, the odour concern associated with composting SSO waste, when managed properly, is mostly related to handling and storage issues as opposed to the composting process. The ultimate feasibility of implementing energy recapture via anaerobic digestion methods will require information on the relative gas yields of various materials, the cost of the related technology and markets for related outputs.

05-2f MANAGE THE DISPOSAL OF CONSTRUCTION AND DEMOLITION WASTE

Waste management industries are becoming more sensitive to disposal practices for construction and demolition (C&D) waste. Public awareness of waste reduction and recycling in many other jurisdictions has increased to a level where public policy is mandating waste diversion for both public and private construction and demolition activities. Consequently, public agencies across North America have, or are in the process of developing regulations to facilitate waste diversion at the project proposal stage. Furthermore, the U.S. Green Building Council's LEED rating system's credit structure provides incentives to reduce waste in "green building" design and construction.

With a projected minimum 100-year land supply at the Brady Landfill (at current disposal rates), the City of Winnipeg is not anticipating a shortage of landfill space for solid waste disposal for the foreseeable future. However, the city's population is projected to increase by more than 180,000 people by 2031 and it is anticipated that more than 83,000 dwelling units will be required during this period in order to accommodate growth. Given the development requirements associated with these growth projections, there is potential for a substantial increase in C&D waste, which unless controlled will occupy more space in landfills and may result in increased emissions from haul vehicles.

Even in the absence of efforts aimed at monitoring and controlling C&D waste, other factors such as increases in tipping fees, declines in the number of available C&D landfills, and more rigorous standards for new landfill design, all suggest landfill disposal of C&D waste will be subject to more regulation in the future. Given these considerations, the City plans to encourage all local contractors to meet Green Building standards related to construction and demolition waste minimization, which includes both reusing construction materials and recycling of C&D waste.

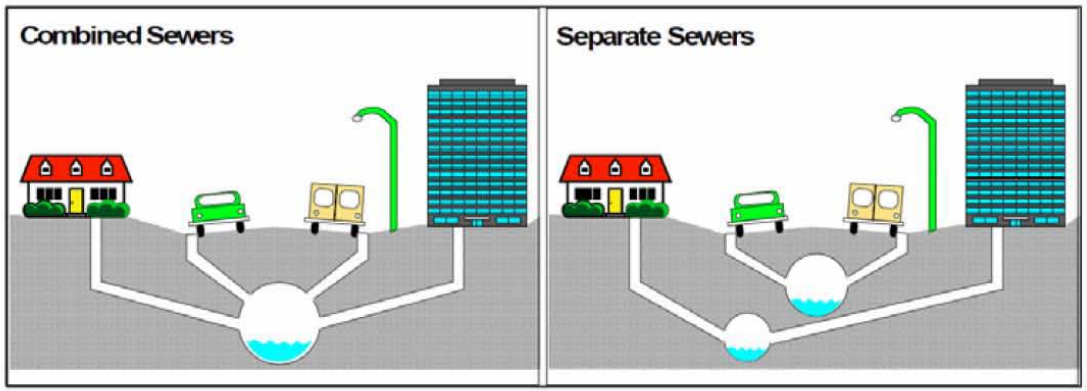
06 STORMWATER MANAGEMENT AND FLOOD PROTECTION SYSTEM

On average approximately half of rainfall that falls to the ground produces runoff within an urban setting. The remaining half is retained on or below pervious surfaces such as grass or other natural ground cover or detained on impervious surfaces such as concrete that has no connection to a drainage outlet. Runoff is typically collected and conveyed in street gutters or ditches and enters the collection system through street inlets (catchbasins), ditch inlets or manholes.

The City of Winnipeg's urban land drainage system consists of two main types:

- Combined Sewer and
- Separate Land Drainage Sewer.

Approximately 30% of the developed land mass is served by combined sewer systems where runoff and domestic wastewater are collected in the same underground pipe. Separate land drainage sewers, as the name implies, convey stormwater in a sewer that is separate from the wastewater sewer system, which is also located within the street right-of-way. A wastewater interceptor system in our combined sewer system conveys domestic sewage to the City's wastewater pollution control centres during dry weather periods.



Source: City of Winnipeg

06-1 BACKGROUND

The City's flood protection system consists of a primary dike system that parallels our major rivers. During floods our flood pumping stations are used to dewater our combined sewer system following rainstorm events, while the City's separate land drainage system is isolated from the river by outfall gate structures. Major upstream flood control works such as the Red River Floodway and the Portage Diversion redirect a portion of floodwaters around or away from the City.

We have three primary challenges related to stormwater and flood protection systems:

- Enhance our urban drainage systems to adequately protect people and property
- Continue to improve and enhance our flood protection system to protect people and property in periods of high river levels
- Promote strategies that reduce urban runoff in combined sewer areas to reduce the potential of basement flooding and to increase the capacity available in the pipes.



Source: AECOM



Source: PLAN NYC Rainbarrell Rainwater Harvesting



Source: Brac Systems Rainwater Harvesting



Source: Manitoba Hydro Greenroof

06-2 ENHANCE AND MAINTAIN THE URBAN DRAINAGE AND FLOOD PROTECTION SYSTEM

06-2a MINIMIZING BASEMENT FLOODING

The City will continue to improve and enhance our flood protection system to better respond to increased frequency of high river levels.

The City will continue with its basement flooding relief program which is intended to enhance the sewer capacity in our existing combined sewer areas and our older separate sewer areas to protect homes and businesses from damage resulting from sewer backups.

There are 42 Combined Sewer Districts in the city. Approximately 28 of them have been relieved in some form or another to a five-year storm level. The City has initiated a study that will determine the next areas of priority. This initiative will also coordinate with the Combined Sewer Overflow Mitigation Strategy to reduce the number of overflows to the river.

06-2b IMPROVING REGIONAL FLOOD PROTECTION

The "Flood of the Century" in 1997 has resulted in a number of improvements in the City's overall flood protection system. The Red River Floodway has since been expanded and bridges raised to allow the system to safely pass larger floods.

The 1997 flood, while an infrequent flood, demonstrated the need to develop an improved Flood Manual that defines what needs to be done for a wide range of floods and hydraulic conditions. In 2004, the City's new interactive, GIS-based Flood Manual went operational. The Flood Manual is a 'living' document that is continually updated as our flood protection system is changed and knowledge gained from recent floods, i.e. 2005, 2006, and 2009 is incorporated into the document.

The City continues to improve the functionality of its outfall gate structures by adding flap gates to these structures. As of 2009, all outfall structures below 23.5ft James Avenue have been retrofitted.

The City continues to retrofit its flood pumping stations that were constructed following the 1950 flood. Significant improvements were made after 1993 in terms of power supply, ventilation for summer use and flood gate orientation. Additional retrofits are being made to mechanical and electrical systems.

06-2c IMPROVING FLOOD PROTECTION OUTSIDE OF PRIMARY DIKE SYSTEM

Since 1980, legislation was enacted to control development in the flood plain; however a lot of housing stock along the river predates this and the devastating 1950 flood. Historically, flood level has been 18ft James Avenue, and is the level where some homes begin to require sandbags. The recent floods have shown a need to raise our level of flood protection. City is actively assisting homeowners where economically feasible to raise their level of flood protection.

06-2d DRAINAGE SAFETY

In 1997, a young teenager was swept into an unprotected drainage inlet leading to one of the city's underground pipes and was drowned. As a result of that incident the City of Winnipeg has installed barriers on all its inlets to closed systems and monitors these inlet grates to ensure that they are functioning on an annual basis.

06-3 PROMOTE STRATEGIES TO REDUCE RUNOFF USING NATURAL AMENITIES

Stormwater Retention Basins and other retention/detention strategies such as street and parking lot storage have been used in the city over the last 40 plus years with good results. There is now a range of emerging "source control" strategies that have begun to be tested and installed across North America that reduce runoff with potential to enhance the ecological environment by reducing nutrient runoff to waterways.

06-3a WATER SENSITIVE URBAN DESIGN (WSUD)

Cities such as Toronto, Minneapolis, New York, Chicago, Seattle and Vancouver have begun integrating more natural, softer solutions on a broad scale into their planning and development, with encouraging results. A list of technologies adopted in other jurisdictions that may be applicable to Winnipeg include the following:

- Greenroofs/Blueroofs
- Vegetated Retention Cells
- Vegetated Bio-retention/Infiltration Swales or Trenches
- Modified Tree Pits with Stormwater Storage Capacity
- Bio-retention Rain Gardens
- Permeable Pavements

Within Winnipeg, there are a number of barriers that hinder our ability to adopt these "source control" technologies which are referred to in various forms as Water Sensitive Urban Design (WSUD)/Green Technologies, Low Impact Development (LID), or Best Management Practices (BMPs). The barriers include but are not limited to issues resulting from our extreme winter climate, our clay soil conditions which inhibit natural infiltration into the soil, flat topography which can result in large areas being affected if these technologies fail and operational/traffic safety requirements such as the application of sand, salt and de-icing chemicals which can affect the long-term operation of these facilities.

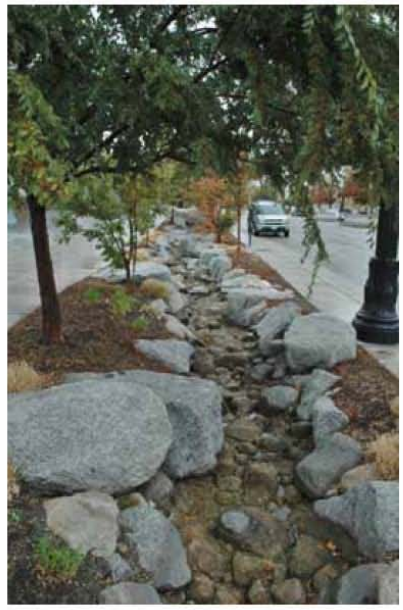
Given these potential difficulties, the City will begin investigating opportunities used in other cold weather cities and adopt or adapt these technologies into our stormwater management framework where deemed to be cost effective and efficient. This may be done through a series of specific initiatives, which may include the establishment of a City task force charged with finding opportunities to pilot test these installations or through other means.



Source: Portland Green Streets



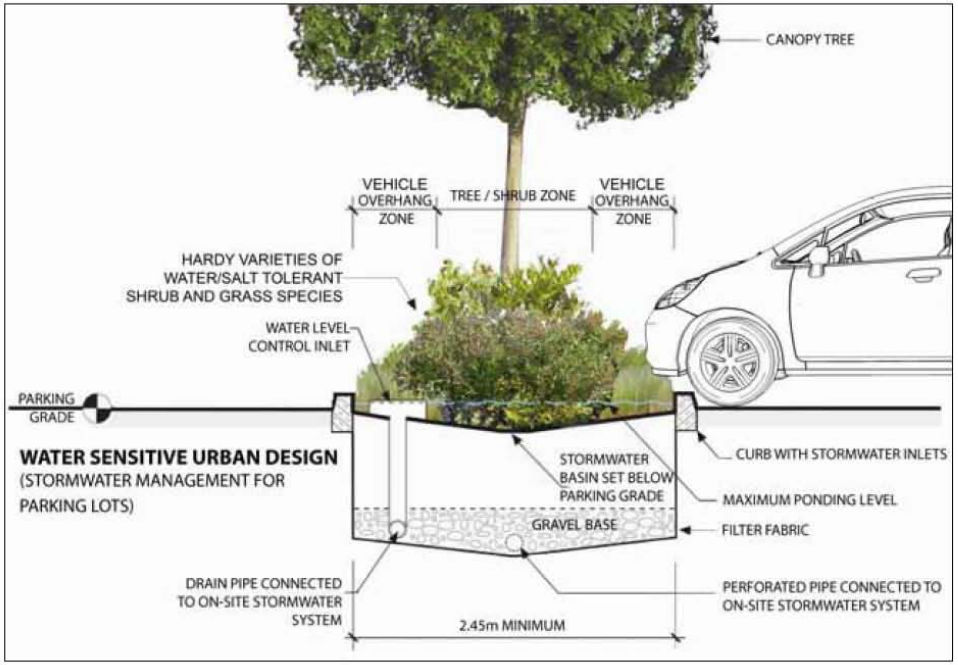
Source: Portland Green Streets



Source: AECOM



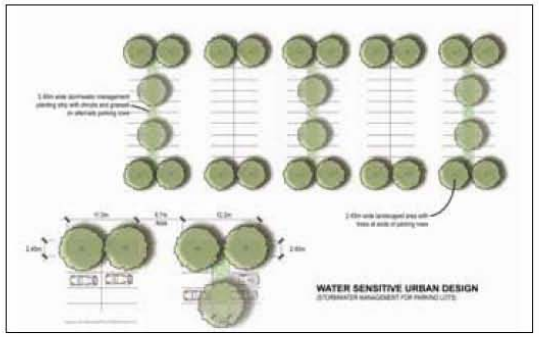
Source: PLAN NYC



Source: AECOM (adapted from PLAN NYC)



Source: AECOM (adapted from PLAN NYC)



Source: AECOM (adapted from PLAN NYC)



Source: PLAN NYC

06-3b STORMWATER RETENTION FACILITIES

The City will continue to promote the use of stormwater retention facilities as a cost effective alternative to pipe-only drainage systems. The city will also continue to consider alternative stormwater retention options such as multi-use storage elements that are incorporated into recreational facilities such as soccer fields or baseball diamonds.

06-4 WATER QUALITY AND SUSTAINABILITY

06-4a PRESERVING NATURAL STREAMS AND CONSTRUCTED DRAINAGE SYSTEMS

The City will continue to preserve its close to 200 km of primary waterways such as the Red, Assiniboine, Seine and La Salle Rivers as well as its close to 50 km of secondary waterways such as Bunn's Creek, Omand's Creek, Sturgeon Creek and Truro Creek.

06-4b ENCOURAGE THE USE OF CONSTRUCTED WETLANDS

The City will continue to support the use of more naturalized facilities. These constructed wetlands have shown to improve the water quality, reduce maintenance costs while at the same time increasing bio-diversity around these facilities. In the past five years nearly half of all stormwater basins have been built with a wetland type of shoreline environment. These naturalized basins have been shown to be less attractive to geese.



Source: LADCO

07 CAPITAL REGION SERVICE SHARING STRATEGY

07-1 INTER-JURISDICTIONAL COOPERATION

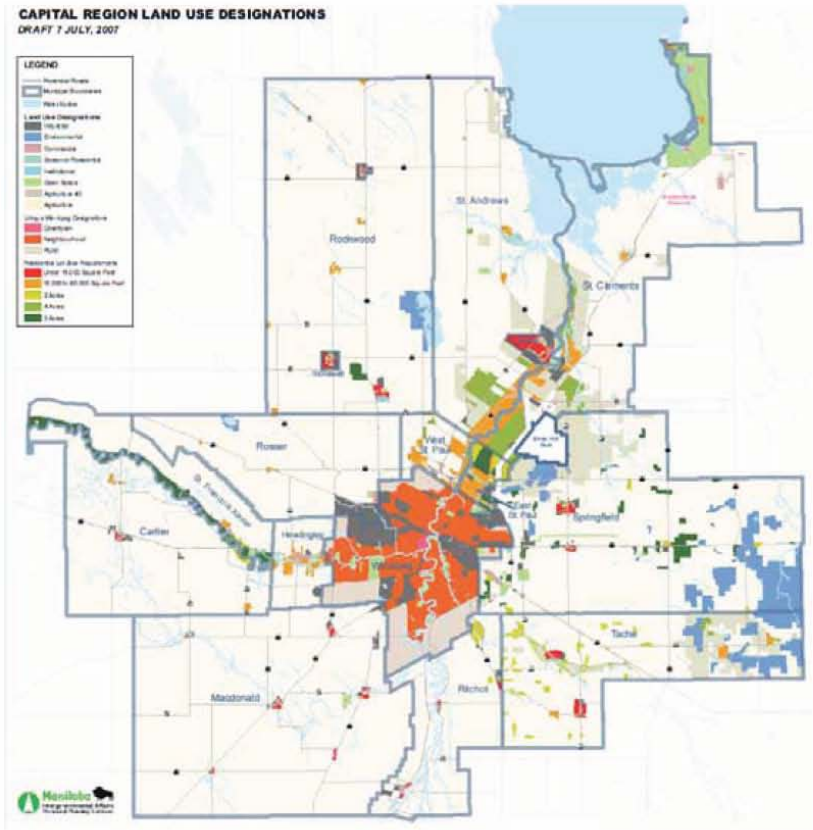
The City will collaborate with the Province, Capital Region Rural Municipalities, Towns and Cities interested in service sharing. The purpose will be to determine realistic approaches to joint planning, service sharing and tax sharing, in the context of the application of higher level servicing standards and "Green Technologies" related to water, wastewater and stormwater infrastructure, and solid waste management. In this context, any service sharing agreements would have to be in accordance with policies adopted by City Council.

The current City policy includes the following guiding principles for service sharing agreements:

- Are government to government.
- Are consistent with the City's existing and future capacity to provide the service.
- Are founded on a strong business case to ensure the efficient delivery of the service in the region.
- Incorporate a joint planning agreement to manage development and related environmental concerns.
- Include a provision for revenue sharing so that both the City and the partnering municipality share the costs and benefits associated with the delivery of the service.

07-2 CAPITAL REGION SERVICE SHARING DIRECTION

Service sharing agreements to maximize the existing and future capacities of water and wastewater, and land drainage infrastructure, as well as solid waste management systems should be made consistent with new Provincial Land Use Policies and any current or future direction established by City Council.



Source: Province of Manitoba

08 SUPPORTING POLICIES AND STRATEGIES

The implementation of this plan will require action or cooperation by many people including elected officials, public authorities that serve the City, Provincial authorities that serve the Province as a whole, business leaders, and ordinary citizens. Below we have outlined the critical policies that should form part of the OurWinnipeg Plan in order to bridge the gap between realizing the long-term benefits of the proposed plan and the need for immediate progress or perceived progress by the citizenry.

08-1 WATER SUPPLY SUPPORTING POLICIES

POLICY 1
ENHANCE PUBLIC HEALTH BY PROTECTING AND MANAGING POTABLE WATER SUPPLY AND SOURCE

- Monitoring and protecting the quality of water to ensure it meets or exceeds the Canadian Drinking Water Quality Guidelines including but not limited to, maintaining and upgrading if necessary the water treatment works
- Maintaining and investing in the infrastructure necessary to sustain water supply, storage, pumping, and distribution with funding generated through the distribution costs to users in the rate structure
- Requesting stakeholders and other jurisdictions to comply with the watershed management plan to protect the Shoal Lake catchment area including the provision of a thorough environmental assessment
- Taking appropriate measures to protect desirable alternative drinking water sources including potential water and water recycling/reuse sources to add to the water supply portfolio
- Adopting demand management and efficiency measures such as water conservation, to keep the consumption levels within the capacity of the aqueduct and to allow adequate revenue to allow ongoing maintenance and upgrading of water infrastructure
- Collaborate with stakeholders to support the adoption and enforcement of regulations and guidelines that reduce the consumption of Winnipeg's water resources
- Conduct ongoing energy efficiency audits consistent with the City's energy management plan in relation to energy inputs required for treating, pumping and distributing potable water

POLICY 2
GUIDE THE DEVELOPMENT OF NEW AND EXISTING RESIDENTIAL AREAS

- Incorporate sustainable neighbourhood design principles promoting water efficiency and innovative wastewater recycling technologies such as rainwater harvesting and grey water recycling/reuse systems.

08-2 WASTEWATER SYSTEM SUPPORTING POLICES

POLICY 1
PROVIDE WASTEWATER MANAGEMENT

- Maintaining the wastewater collection system and adding to it as necessary using funding generated through distribution of costs to users in the rate structure
- Providing wastewater treatment to maintain river water quality at the highest practical and cost-effective level consistent with the natural characteristics of our rivers and in accordance with the water quality objective established for the Red and Assiniboine Rivers and Lake Winnipeg
- Controlling water pollution through the implementation of a combined sewer overflow management plan, the implementation of effluent disinfection, and the provision of a cost-effective and environmentally-acceptable method of sludge handling and disposal; and
- Studying, in cooperation with the other levels of government and academic institutions, the effects of its treated effluent discharges on the aquatic life of the rivers.

08-3 SOLID WASTE MANAGEMENT SUPPORTING POLICIES

POLICY 1

ENSURE ENVIRONMENTALLY SOUND, EFFICIENT, COST EFFECTIVE AND SUSTAINABLE SOLID WASTE COLLECTION, DISPOSAL AND RESOURCE RECOVERY.

- Prepare a comprehensive Waste Management Strategy
- Evaluate alternatives for sustainable system financing

POLICY 2

INVESTIGATE PROMISING, COST EFFECTIVE, EFFICIENT ALTERNATIVE WASTE DIVERSION TECHNOLOGIES, FOLLOWED BY PILOTING AND OPTIMIZING PROGRAMS THAT HAVE BEEN SELECTED FOR IMPLEMENTATION.

- The City will continue the residential recycling program and will examine efficiencies and improvements to service levels, collection and processing technologies.
- The City will examine options for a Source Separated Organics collection and processing program at the residential level to increase waste diversion and reduce the amount of waste requiring landfilling at the Brady Landfill.
- The City will support work by stakeholders (food establishments, food processors, retailers and residents) to promote and educate the public on Source Separated Organics.
- The City will work with stakeholders to set objectives and targets for the diversion of organics from the residential solid waste stream.
- The City requires Source Separated Organics processing facilities as part of this strategy. The desired result is to divert organic material from the solid waste stream and to enable the processing of organic waste material for resource recovery.

POLICY 3

THE CITY WILL SEEK TO EVALUATE PROGRAMS FOR CAPTURING AND/OR PRODUCING ENERGY FROM ORGANIC WASTE.

> The City will take steps toward evaluating one or more alternative waste technologies to reuse and/or capture energy from organic waste to maximize the safe, cost-effective extraction of useful energy from its organic waste streams and minimize the methane and carbon dioxide emissions associated with organic waste. The evaluation process will consider the financial, social and environmental impacts for organics transportation and processing.

POLICY 4

WORK IN PARTNERSHIP WITH INDUSTRY STAKEHOLDERS TO CONSTRUCTION AND DEMOLITION WASTE IN A MANNER THAT WILL HELP TO PROTECT OUR ENVIRONMENT BY REDUCING OUR DEPENDENCY ON LAND BURIAL.

POLICY 5

SUPPORT WORK BY THE PROVINCE IN DEVELOPING AND IMPLEMENTING STRATEGIES TO DEAL WITH HAZARDOUS AND SPECIAL WASTES

POLICY 6:

CONTINUE MONITORING AND RESTORATION OF LANDFILL SITES

> Monitor active and closed landfills and undertake measures necessary to mitigate harmful by-products of waste decomposition

> Restore completed landfills for recreational or other appropriate uses

08-4 STORMWATER MANAGEMENT AND FLOOD PROTECTION SUPPORTING POLICIES

POLICY 1
URBAN DENSIFICATION

> Prepare urban design/streetscape standards for Downtown addressing street furnishings, sustainable landscaping and other urban design elements, particularly related to Water Sensitive Urban Design (WSUD)/Green Technology Source Control stormwater management using elements such as green roofs, pocket parks, vegetated bio-retention ditches or swales, bio-retention cells, modified tree pits, rain gardens, permeable paving etc.

POLICY 2
MANAGE NEIGHBOURHOOD TRAFFIC/TRAFFIC CALMING

> Undertake streetscape improvements to create high quality public spaces through inclusion of tree planting and landscaping, pedestrian scale lighting, good quality street furnishings and decorative paving and through design approaches that reduce the impacts of parking and public utilities on the quality of the pedestrian environment while also providing opportunities for Water Sensitive Urban Design (WSUD)/Green Technology Source Control stormwater management.

POLICY 3
GREEN STREETS/STREET DESIGN GUIDELINES REVIEW

> Support opportunities to retrofit streets for Water Sensitive Urban Design (WSUD)/Green Technology Source Control stormwater management such as vegetated/bio-retention swales, bio-retention cells, modified tree pits, rain gardens, etc.

POLICY 4
GREENING OF PARKING LOTS

> Support opportunities to reduce parking requirements and convert existing at-grade parking to green space that incorporates a number of Water Sensitive Urban Design (WSUD)/Green Technology Source Control stormwater management technologies. The addition of trees and landscaping in parking lots offers a feasible and perhaps cost-effective means for the private sector to work with the City in reducing stormwater runoff and decreasing combined sewer overflow (CSO) events in combined sewer areas. Stormwater retention or detention could slow down the rate at which water enters the sewer system; enabling the combined sewers or land drainage sewers to function at a much higher level of service with respect to protecting the adjacent buildings from basement or overland flooding. This also allows the City to treat more of the combined sewer flows entering the underground system by not allowing it to overflow into our rivers.

POLICY 5

GUIDE THE DEVELOPMENT OF NEW AND EXISTING RESIDENTIAL AREAS

- Encourage the incorporation of sustainable neighbourhood design principles such as Water Sensitive Urban Design (WSUD) approaches when planning and building new neighbourhoods and redeveloping older neighbourhoods.

POLICY 6

PROVIDE LAND DRAINAGE/STORMWATER MANAGEMENT AND FLOOD PROTECTION

- Ensure that building codes and development practices take into full account protection against major storms and regional flooding
- Preserve natural streams and constructed drainage systems in urban areas
- Require development of stormwater retention basin facilities such as constructed wetlands within residential communities as cost-effective alternatives to pipe-only systems with an emphasis on aesthetics and public accessibility
- Minimize basement flooding at the one in five-year level or better if economically feasible through continued construction of relief sewers; and
- Maximize regional flood protection for Winnipeg by cooperating and actively pursuing with other levels of government, agreements for technical, administrative and financial assistance.
- Encourage new development to incorporate Water Sensitive Urban Design (WSUD) best-practices into the siting and design of neighbourhoods and buildings to reduce stormwater run-off and enhance water conservation
- Design, arrange and locate new infrastructure and buildings to mitigate impacts upon the civic water system
- Manage and integrate natural wetlands into new and existing developments as key assets in Winnipeg's ecological network
- Redevelop and adjust maintenance regimes for existing stormwater retention basins to incorporate native wetland vegetation

08-5 SUSTAINABLE ASSET MANAGEMENT STRATEGIES

POLICY 1
PROVIDE SOUND MUNICIPAL MANAGEMENT FOR INFRASTRUCTURE WORKS

- Implement life-cycle full-cost-of-service funding of capital projects
- Manage investments in physical assets including infrastructure, fleet, and facilities to ensure sustainable and effective procurement, maintenance, replacement and disposal
- Introduce a common framework for sustainable asset management (SAM) across all City-owned infrastructure

POLICY 2
COMMIT TO THE PROACTIVE MAINTENANCE AND RENEWAL OF EXISTING INFRASTRUCTURE

- Implement a proactive program of assessment and renewal of infrastructure in order to maintain the capacity of existing infrastructure systems
- Minimize deferred maintenance by taking into account the impact on the infrastructure life expectancy and life cycle when making maintenance decisions
- Apply advanced techniques, new technology, best practices, better materials, and innovative products in all infrastructure renewal, rehabilitation, construction, and preventive maintenance programs to maximize return on investment

POLICY 3
INVEST STRATEGICALLY IN NEW INFRASTRUCTURE

- Weigh the lifecycle implications of any proposed investment in new infrastructure, recognizing the economic, environmental, and social benefits and costs to the community associated with its development, operation and disposal
- Understand the impacts of traditional and non-traditional financing and procurement options on the long-term viability of new infrastructure

POLICY 4
BENCHMARK PERFORMANCE TO SUPPORT CONTINUOUS IMPROVEMENT

- Introduce metrics capable of monitoring the economic, environmental and social performance of infrastructure over time
- Ensure consistency in measurement and reporting so that performance be benchmarked across assets and over time
- Establish operating thresholds reflecting acceptable levels of service relative to each metric
- Develop improvement strategies targeted at resolving noted underperformance in a cost-effective sustainable manner

GLOSSARY

ANAEROBIC DIGESTION
A biological decomposition of organic material by micro-organisms in the absence of oxygen resulting in the production of gas principally composed of methane and carbon dioxide.

BENCHMARKING
The search for industry best practices which lead to superior performance.

BIO-RETENTION
A storm water control and water quality practice that utilizes landscaping and soils to treat urban stormwater runoff by collecting it in shallow depressions, before filtering through a fabricated planting soil media.

BIO-RETENTION SWALES
Also known as Vegetated Swales, these are landscape elements, frequently on roadsides, designed to remove silt and pollution from surface runoff water. They consist of a swaled drainage course with gently sloping sides (less than six percent) and filled with vegetation, compost and/or riprap. The water's flow path, along the wide and shallow ditch, is designed to maximize the time that water spends in the swale. This aids in trapping pollutants and silt. Bio-retention swales may have meandering or straight-line channel alignment depending on site. Biological factors also contribute to the breakdown of certain pollutants.

BIOSOLIDS
Also referred to as treated sludge, biosolids are a by-product of domestic and commercial sewage and wastewater treatment. During treatment, bacteria and other microorganisms break down components in wastewater to simpler and more stable forms of organic matter. Non-organic matter also settles into sludge. This sludge is treated to reduce pathogens and vectors which can then be safely recycled and applied as fertilizer to sustainably improve and maintain productive soils and stimulate plant growth.

BLUEROOFS
Also known as rooftop detention, a blue roof allows temporary ponding and gradual release of stormwater falling directly onto flat roof surfaces by incorporating controlled-flow roof drains into building design.

CARBONIZING
The conversion of an organic substance into carbon or a carbon-containing residue through pyrolysis. The resulting product is used for fuel.

CATHODIC PROTECTION
A technique used with watermains to control the corrosion of metal surfaces and their corresponding metal fittings by making it work as a cathode in an electrochemical cell. This is usually achieved by placing in contact with the metal to be protected another more easily corroding metal to act as the anode. A significant percentage of Winnipeg's watermains consist of cast iron and ductile iron waterlines. Soil conditions in Winnipeg also create some of the most corrosive conditions in the world. Cathodic protection helps to extend the service life of these waterlines.

COLLECTION
The process of loading solid wastes from residences, businesses or other collection points into a vehicle and transporting them to a processing, transfer or disposal site.

COMPOST
The result of composting, it is a combination of decomposed plant and animal materials and other organic materials that are being decomposed largely through aerobic decomposition into a rich black soil. Compost, also called humus, is a soil conditioner and in some instances is used as a fertilizer.

COMPOSTING
Biological decomposition of organic materials by bacteria, fungi, and other organisms into a soil-like product.

CONDITION ASSESSMENTS
Used to determine the physical condition of the asset or plant on buried linear underground infrastructure such as sewers and watermains. Condition assessments seek to locate and characterize specific defects or inadequacies in the pipe system or structure and sets the basis for selecting and implementing specific rehabilitation measures to reduce infiltration and inflow (I&I) or system leakage.

CONSTRUCTED WETLANDS
Intentionally developed in non-wetland areas to replicate the shoreline of natural wetlands. A by-product of a constructed wetland is it nutrient uptake and improved water quality.

CSO'S - COMBINED SEWER OVERFLOWS
The discharge of wastewater and stormwater from a combined sewer system directly into a river, stream, or lake. Overflow frequency and duration varies both from system to system, and from outfall to outfall, within a single combined sewer system. Some CSO outfalls discharge infrequently, while others activate nearly every time it rains. During heavy rainfall when the stormwater exceeds the sanitary flow, the CSO is diluted.

DEMAND MANAGEMENT
The management of current and future demands for water, including reclaimed water by altering the net consumption or timing or place of use. Demand management deploys various techniques for conserving water and improving the efficient use of water by end users. Demand management or strategic load management complements supply management by reducing peak demand that affect the total capacity requirements of the treatment and distribution system.

DIVERSION
Changing the destination of waste material from landfills or incineration to recycling, composting or reuse.

DUALFLUSH TOILETS
Toilets that provide two buttons for flushing, giving you the option to use 6 litres or less per flush. These high efficiency toilets will help to conserve water.

GIS (GEOGRAPHIC INFORMATION SYSTEM)
A computerized mapping system that captures, stores, analyzes, manages and presents data.

GREENROOF
Sometimes called an eco-roof, a rooftop that is covered with vegetation. Greenroof systems can either be Extensive Gardens or Intensive Gardens. Extensive Gardens have thinner soil depths and require less management and less structural support than intensive gardens. They do not require artificial irrigation. Plants chosen for these gardens are low-maintenance, hardy species that do not have demanding habitat requirements. The goal of an extensive planting design is to have a self-sustaining plant community. Not generally appropriate for Winnipeg's climate. Intensive Gardens have thicker soil depths and generally require more management and artificial irrigation systems. The plants chosen for these gardens must thrive in the specific roof environment they inhabit. Intensive gardens are heavier than extensive gardens, requiring more structural support.

GREYWATER
Wastewater from bathing and washing facilities that does not contain concentrated human waste (i.e., flush water from toilets) or food waste (i.e., kitchen sink, food waste grinders). Examples include bath and shower water, hand wash water and laundry washwater. Greywater typically contains high concentrations of salts and minerals from detergents and soaps. If powdered laundry detergents and brine type water softeners are used, increased concentrations of sodium can be expected in the greywater.

LEED - LEADERSHIP IN ENERGY AND ENVIRONMENTAL DESIGN GREEN BUILDING RATING SYSTEM

Developed by the U.S. Green Building Council (USGBC) and introduced in 1998, the LEED Green Building Rating System is a set of standards used to measure the extent of green building and development practices in environmentally sustainable construction. Certification is based on a total point score attained, which corresponds with four different levels: LEED certified, silver, gold, and platinum. Since its inception in 1998, LEED has grown to encompass more than 14,000 projects in the United States and 30 countries.

For more info see Canada Green Building Council website at: www.cagbc.org/leed/what/index.php

LIFE-CYCLE COST ANALYSIS

A method for assessing the total cost of facility/ infrastructure ownership. It takes into account all costs of acquiring, owning and disposing of the system initial capital cost and long-term operating costs.

LOW-IMPACT DESIGN (LID)

A comprehensive stormwater management and site-design technique. Within the LID framework, the goal of any construction project is to design a hydrologically functional site that mimics predevelopment conditions. This is achieved by using design techniques that infiltrate, filter, evaporate, and store runoff close to its source. Rather than rely on costly large-scale conveyance and treatment systems, LID addresses stormwater through a variety of small, cost-effective landscape features located on-site. LID is a versatile approach that can be applied to new development, urban retrofits, and revitalization projects. This design approach incorporates strategic planning with micro-management techniques to achieve environmental protection goals while still allowing for development or infrastructure rehabilitation to occur.

MATERIALS RECOVERY FACILITY (MRF)

A facility for sorting recyclables by manual or mechanical means. Some MRFs are designed to separate recyclables from mixed municipal solid waste. MRFs then bale and ship the recovered materials to markets.

NATIONAL WATER AND WASTEWATER BENCHMARKING INITIATIVE

Developed in response to a need for Canadian municipal water and wastewater utilities to measure, track and report on their utility performance. While fundamentally a high level metric benchmarking process, it has developed into a network and information base for Canada's most progressive municipal utilities.

NON-REVENUE WATER LOSS

Water that has been produced and is "lost" before it reaches the user. Losses can be real losses through leaks through the pipe walls or joints/gaskets, usually referred to as physical losses. There can also be apparent losses, such as through theft or metering inaccuracies. High levels of non-revenue water loss are detrimental to the financial viability of water utilities. It is typically measured on a percentage basis, as the volume of water lost relative to the net water produced. This is the primary driver in ensuring that the distribution system is kept in a state-of-good-repair.

NUTRIENTS

The principal nutrients are nitrogen and phosphorus in various forms. Other inorganic constituents are also nutrients. When discharged to water bodies, nutrients can stimulate the growth of undesirable aquatic plant life. Reduction of phosphorous is known to be effective in reducing eutrophication which is associated with blooms of blue-green algae in Lake Winnipeg. It is the City's position that the reduction of nitrogen will have no benefit to Lake Winnipeg.

Nutrients when applied to land in excessive amounts can lead to surface runoff into adjacent water bodies or groundwater contamination. The City's bio-solids management program will be modified to comply with Manitoba's new Nutrient Management Regulation which will require agronomic land application rates of nitrogen and phosphorous and will also preclude winter spreading of bio-solids.

PELLETIZING

The process of compressing or moulding of a product into the shape of a pellet. If used for organics, the result is a fuel product.

PERMEABLE (OR POROUS) PAVEMENT
Pavements comprised of materials which facilitate infiltration of rainwater and transfer to the underlying subsoil. Use of these pavements must use appropriate precautions in design and maintenance in cold weather climates such as Winnipeg. Winnipeg's clay subsoil conditions also require engineered subgrade and underdrain systems for these pavements to remain viable over the long-term.

RAIN GARDEN (VEGETATED INFILTRATION BASIN)
A planted depression that allows rainwater runoff from impervious urban surfaces, such as roofs, driveways, walkways and compacted lawn areas, the opportunity to be absorbed. A rain garden simply requires an area where water can collect and infiltrate, plants to maintain infiltration rates, diverse microbial communities and water holding capacity. Evapotranspiration by growing plants accelerates soil drying between storms. Rain gardens reduce runoff by allowing rainwater to soak into the ground as opposed to flowing to storm drains and surface waters. Rain gardens can reduce erosion, water pollution and flooding as well as serving to recharge groundwater, depending on the infiltration rates of the underlying subsoil.

RAINWATER HARVESTING
The collection of rainwater from building downspouts into above or below ground vessels which can be used for irrigation.

RECLAIMED (RECYCLED) WATER
Municipal wastewater that has been through various treatment processes to meet specific water quality criteria with the intent of being used in a beneficial manner (e.g., irrigation). The term recycled water is used synonymously with reclaimed water.

RECYCLABLES
Items that can be reprocessed into feedstock for new products. Common examples are paper, glass, aluminum, steel, corrugated cardboard and plastic containers.

RECYCLING
The process of transforming waste materials into raw materials for manufacturing new products, which may or may not be similar to the original product.

RESIDENTIAL FIRE PROTECTION SPRINKLERS

Automatic sprinkler systems that activate independently based on a temperature setting of approximately 74 degrees Celsius (165 degrees Fahrenheit). Usually only one sprinkler is activated to extinguish or limit a fire within a room. They release between 30-90 litres of water per minute. Residential sprinkler systems may reduce the needed fire flow capacity in a residential area by as much as 50% which may reduce the overall cost of the distribution system since much of the watermain flow capacity is governed by the needed fire flow capacity.

SHOAL LAKE WATERSHED MANAGEMENT PLAN (SLWMP)

A plan developed to help guide management of the Shoal Lake Watershed in achieving a sustainable balance among ecological, social and economic needs. It contains information that assesses the state of water and related resources, evaluates human impacts and influences and considers the needs and interests of watershed residents and resource users. It includes multiple jurisdictions including First Nation communities located on Shoal Lake, the Federal Government, the provinces of Ontario and Manitoba and the City of Winnipeg.

SOURCE SEPARATED ORGANICS

The separation of organic waste (fruit and vegetables scraps, yard waste, paper towels, coffee grinds, etc.) from the waste stream at the point of generation. The goal in many cases is to turn it into compost.

SOURCE SEPARATION

The segregation of specific materials at the point of generation for separate collection. Residents source separate recyclables from the waste stream as part of a curbside recycling program.

STORMWATER RETENTION BASIN (SRB)

A pond or man-made lake that retains stormwater after a rainfall event and then slowly releases the flow to downstream piping that eventually flows into streams, rivers and lakes.

SUMP PUMP AND SUMP PIT DRAINAGE SYSTEM

Includes a sump pit, sump pump and discharge hose. The sump pit, set into the basement floor, collects water from the weeping tiles around the basement. The pump pushes the water outside the house through the hose. The discharge from a sump pump could be a free source of water for garden plants.

THERMAL OXIDATION
Rapid oxidation or burning of combustible waste materials.

TIPPING FEE
A fee for unloading or dumping waste at a landfill, transfer station, incinerator or recycling, composting or other waste processing facility.

VEGETATED SWALES
See: Bio-retention Swales

WATER CONSERVATION
A strategy used by water utilities to optimize water supply capacity. Water conservation has been viewed historically as a standby or temporary measure that is utilized during times of drought or other emergency water shortages. This limited view is changing; utilities that have pioneered the use of water conservation have shown that it is a viable long-term supply option. Water conservation can also yield a number of benefits including reduced energy and chemical inputs for water treatment, downsized or postponed expansions of water facilities, and reduced costs and impacts on wastewater management. Common water conservation measures include customer education about water use, water efficient fixtures, water-efficient landscaping, metering, economic incentives, and water-use restriction programs.

WATER SENSITIVE URBAN DESIGN (WSUD)
A comprehensive strategy for conservation of water resources through reduction of water use, retention and treatment of wastewater and storm water.

WETLANDS
Areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands include swamps, marshes, bogs and similar areas.

