CITY OF HAMILTON

2013 STATE OF THE INFRASTRUCTURE UPDATE FOR THE WATER, WASTEWATER, AND STORM WATER SYSTEMS

FINAL

Prepared for:

City of Hamilton

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engineering · environment · infrastructure

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January 27, 2014

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City of Hamilton
Environmental & Sustainable Infrastructure Division
Public Works Department
77 James Street North, Suite 320
Hamilton, Ontario
L8P 4Y5

Attention: John Murray
Manager, Asset Management

Dear Sir:

Re: 2013 State of the Infrastructure Update for the Water, Wastewater and Storm Water Systems

We are pleased to submit the 2013 State of the Infrastructure Update for the Water, Wastewater and Storm Water Systems in the City.

The report documents the current state of the City's infrastructure and provides an indication of the perceived future outlook of each asset category. The report identifies the changes that have taken place in the ratings since the last report from 2009.

We appreciate the opportunity to assist the City of Hamilton with this strategically important study. We would like to acknowledge the significant input and support provided by the City's Public Works staff in completing the report.

Yours very truly,

R.V. ANDERSON ASSOCIATES LIMITED

Nick Larson, MEPP, P.Eng.
Project Manager

Executive Summary

This report represents the third review of the state of the City's water, wastewater and storm water systems. The first review was documented in 2 separate reports in 2005 and 2006 covering 11 business areas under the responsibility of the City's Public Works Department. The same business areas and their corresponding infrastructure areas were also reviewed in one consolidated document in 2009.

Since 2009, the City has transitioned to a process where the state of the infrastructure grades for particular asset groups can be updated as pressures and priorities change. For this reason, this report presents an update to only the state of the water, wastewater and storm water systems. The other information on the water, wastewater and storm water systems that is contained in the 2009 State of the Infrastructure Report will be updated as part of the City's 2013 Asset Management Plan that is being concurrently prepared.

Three (3) primary areas of infrastructure management were assessed in this report, including:

- The overall physical condition and performance of the infrastructure.
- The ability of the infrastructure to meet capacity needs.
- The adequacy of the current level of dedicated funding compared to the infrastructure needs.

The individual grades for each of the three areas of management described above were combined to produce a blended grade for each asset type in the systems. The blended grades for each asset type were then amalgamated to generate an overall grade for each system. The overall grades for the three systems are that are reviewed in this report are summarized in Table ES-1.

The scores in the Report Card were derived from available information by City staff members involved in the management of the specific infrastructure groups. The grades were assigned during facilitated workshop sessions to reach consensus scores for all of the assets in each system.

One of the important features of this report is the ability to compare the current information with the previous reports. The current and historical grades trends can be used to:

- Understand the impact of the City's previous investment decisions.
- Review the impact and effectiveness of the current infrastructure management practices/policies.
- Identify where grades have changed due to a higher quality of available information.

The 2013 Report Card indicates that the grades have declined for all three systems. The following provides some of the major factors that contributed to the lower grades:

- There is a concern over the long term funding of the systems. Declining water consumption is leading to falling revenues despite the increase in the water rate. In addition, many of the recent upgrades have been funded by external grants (i.e. stimulus funding) from higher levels of government. It should not be expected that external grants will be available to fund infrastructure renewal projects over the long term.
- There are concerns relating to the wet weather flow contribution to the sanitary sewer network. Climate change is resulting in more frequent high intensity storm flows infiltrating into the sanitary sewers. This effect, combined with ongoing deterioration of the condition of the sanitary sewers which also leads to additional infiltration, is impacting the available capacity in the wastewater system.
- The impacts of climate change are also affecting the capacity of the storm sewer network during extreme wet weather storm events. This impact is also negatively affecting other elements of the storm water system, such as increasing creek bank erosion.
- There is additional high quality information available on the physical condition of the systems. The information is being collected through assessment activities undertaken as part of the City's asset management programs. In general, the additional information is indicating that the physical condition of the large diameter buried water and wastewater infrastructure is worse than what was assumed in previous Report Cards.

2013 Report Card
for the Water, Wastewater and Storm Water Systems

	2005 Grade	2009 Grade	2013 Grade	Future Outlook/Trend
Water System	B	B+	B-	→
Wastewater System	B	B-	C	→
Storm Water System	C	C-	D	↓

The following recommendations should be considered by the City to address the results of this Report Card:

- Continue to collect high quality information on both the current physical condition and performance of the infrastructure in all three systems. This information helps the City to understand the current state of the infrastructure and to develop solutions to address the issues that are facing the three systems.
- Proceed with the storm water flooding drainage study that is currently being planned. This study will review opportunities to reduce the wet weather flow that enters the sanitary sewer network. Implementing the recommendations from this study may increase the available capacity in the wastewater system to be able to accommodate intensification or other forms of development in the City.
- Continue to advance the City's asset management practices. These practices provide the information that is used to make decisions with respect to the renewal of existing infrastructure or construction of new infrastructure in the three systems.

2013 STATE OF THE INFRASTRUCTURE UPDATE FOR THE WATER, WASTEWATER, AND STORM WATER SYSTEMS

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1.0 INTRODUCTION

1.1 Background

This is the third formal review of the state of the City's water, wastewater and storm water infrastructure. The first review was completed in two separate reports in 2005/06 and was titled "Life-Cycle State of The Infrastructure Report on Public Works Assets". The second update was completed in 2009 and was titled "State of the Infrastructure Report on Public Works Assets". The two previous reviews included all of the assets managed by Hamilton's Public Works department. The assets were separated into eleven (11) different asset groups or systems.

Since 2009, the City has transitioned to a process where the state of the infrastructure grades for particular asset groups can be updated as pressures and priorities change. For this reason, this report presents an update to only the state of the water, wastewater and storm water systems. The other information on the water, wastewater and storm water systems that is contained in the 2009 State of the Infrastructure Report will be updated as part of the City's 2013 Asset Management Plan that is being concurrently prepared.

This report is part of an on-going process to improve the management of the City's infrastructure. It is intended to grade the current state of the water, wastewater and storm water systems and their ability to deliver services to citizens of Hamilton. The grades are based on input that was provided through facilitated workshops with City staff responsible for the infrastructure in each of the three systems. The input provided by staff is supported by empirical data that is maintained in various systems/databases and by other less formal data or hands-on knowledge of the infrastructure.

1.2 Goal of this Report

The goal of this report is to produce updated grades for the City's water, wastewater and storm water systems. The grades are used as a reporting mechanism to review and adjust the City's current infrastructure management policies. This report provides the opportunity to assess, on a comparative basis, the impact of the City's current management practices on the state of the infrastructure, including investment decisions, corporate policies and directives and external factors such as new operational regulations.

1.3 Project Overview

The objective of reviewing the state of the City's infrastructure is to measure and report the effectiveness of the City's management practices as they impact the physical condition of the infrastructure, the capacity of the infrastructure to service demands and the availability of funding to address infrastructure investment needs.

This project builds upon the results documented in the previous State of the Infrastructure reports. It is intended to report on similar processes in order to present comparative information on which to judge effective measures and recommend improvements.

The results that are documented in this report continue to be based on increasingly better knowledge supported by the infrastructure management systems that are used by Staff. This is attributed to improved institutional experience in completing the workshop processes to update the grades and the continued development of the asset management systems that collect, store and provide analysis on the current state of the infrastructure systems.

In undertaking a comparative analysis it will be important to document the potential factors that may have contributed to either an improvement or decline in the reported state of the infrastructure. This report will focus on these change factors in order to put a context to the reported state of each infrastructure group.

1.4 Approach and Methodology

This document has been structured to allow for a comparison form the two previous reviews of the state of the three systems. The majority of the grading was completed in a series of two workshops that were held with City staff. The reported results of each system have been prepared to emphasize and understand the differences that occurred since the last report. The text identifies any changes that have occurred in the City since the past report to further understand these differences.

The following simple alpha-rating system was used to assign the grades:

A = Excellent
B = Good
C = Fair
D = Poor
F = Fail

The approach to establishing grades was replicated from the approach used in the previous reviews, and is summarized as follows:

1. Assign detailed grades for each group of assets in the system for the three criteria listed below.
    - **Condition and Performance** – the current physical condition of the asset group and its ability to perform to the required level.
    - **Capacity versus Need** – the degree to which the asset group is meeting or will meet its capacity requirements.
    - **Funding versus Need** – the level of operational and capital funding dedicated to the asset group for both existing and future assets in comparison to the financial requirements.

2. Assign a blended grade for each asset group based on the detailed grades for each asset group. The blended grade may be more heavily weighted toward one of the three detailed ratings based on the specific circumstances.

3. Assign a Future Trend/Outlook direction arrow for the asset group. The trend arrow is an indicator that provides an outlook on where the grade of the system is perceived to be heading if the status-quo management practices, planned capital works or other activities are maintained. An “up” arrow indicates that the grade is expected to improve in the future if the planned activities are implemented. Similarly, a “down” arrow indicates that the grade is expected to decrease if the planned activities are implemented. A “neutral” arrow indicates that the situation is expected to remain relatively constant over the next few years if the planned actions are not changed.

4. Document any comments that are applicable to justify/explain the detailed grades or the Future Trend/Outlook direction.

5. Assign an overall grade for the system based on the blended grades for each asset group. For each system, the overall grade is more heavily weighted toward the blended grade of the larger asset groups.

2.0 WATER SYSTEM

2.1 Overview

System: Water 2013 Grade: B- Future Trend: ➔

2009 Grade: B+
2005/06 Grade: B

The overall grade for the water system in 2013 is a B**-**. This grade has decreased from a B+ in the 2009 Report Card and a B grade from the 2005/06 Report Card. The future outlook for the water system is neutral, indicating that the situation is expected to remain relatively constant over the next few years if the planned actions are not changed.

The results of the detailed grading process completed in the staff workshop sessions are summarized in Appendix A. The blended grade and Future Outlook direction of each asset group are also summarized in Table 1.

2.2 Discussion/Commentary

The following points summarize the workshop discussion related to the general water system:

- There is a concern over the long term funding of the system. Declining water consumption is leading to falling revenues despite the increase in the water rate. In addition, many of the recent upgrades to the water facilities have been funded by external grants (i.e. stimulus funding) from higher levels of government. It should not be expected that external grants will be available to fund infrastructure renewal projects over the long term.
- There is a concern that the water rate budget is being used to temporarily finance infrastructure that is required to service new developments. This is caused when money is borrowed from the rate budget to bridge shortfalls in development charge revenues. Although the capital value of the project is eventually returned from the development charge revenues to the water rate reserves, the interim financing costs are funded by the rate budget. This puts additional stress on the water budget.
- The new security plan to install new cameras, locks, and other equipment in water facilities is in progress and will continue to put additional pressure on the water system budget.

In addition to the points above related to the general water system, the following items summarize some of the workshop discussion related to specific asset groups in the water system:

- There are concerns regarding the physical condition of the trunk water mains inspected to date across the City. This increases the concern over the physical condition of the trunk water mains that have yet to be inspected.
- There are concerns over the lack of redundancy of water supply to some areas of the City.
- Much of the local water main renewals that have been completed in recent years have relied on the available funding for the renewal of local roads. The reduction in the tax levy budget for local road renewal will have a corresponding impact on the number of local water mains that are renewed.
- There have been many recent upgrades to the Woodward Water Treatment Plant. There is still a concern over the resources that will be available in the future to fund the renewal of the various process areas. The process upgrade study will be completed in 2014 and will provide a better indicator of the long term needs of the Plant.

Table 1 – Blended Grades for each Asset Group in the Water System

Asset Type	Asset Component		Grade 2005	Grade 2009	Grade 2013	Future Outlook/Trend
Linear	Mains - trunk (greater than 450 mm)		B	B	C+	↓
	Mains - Local (less than 450 mm)		B	B	C	↓
	Large Valves/Chambers		B	---	C+	↓
	Services		B	B-	B-	→
	Meters	Industrial	B	B	B	→
		Residential	B		B-	→
	Linear Consolidated Grade		B	B	C+	↓
Facilities	Woodward WTP		B/B+	B+	B+	→
		Mains to Low Lift	B	A	A	→
		Pre-Treatment	B	B	C+	→
		Filtration	B	B	B	→
		Chemical Systems	B	B	B+	→
		Clear Wells	B	B-	C	↓
		Surge Tower	B	B+	B+	→
		High Lift Pumping Station	---	---	A-	→
	Wells Systems		B	B+	B-	→
	Booster Stations		B	B	B-	→
	Storage Reservoirs/Towers		B	B	B-	→
	SCADA		---	B	B	↑
	Facilities Consolidated Grade		B	B+	B	→
Overall Water System Grade			B	B+	B-	→

3.0 WASTEWATER SYSTEM

3.1 Overview

System: Wastewater | 2013 Grade: C | Future Trend: ➔

2009 Grade: B-
2005/06 Grade: B

The overall grade for the wastewater system is a C. This grade has decreased from a B- in the 2009 Report Card and a B in the 2005/06 Report Card. The future outlook for the wastewater system is neutral, indicating that the situation is expected to remain relatively constant over the next few years if the planned actions are not changed.

The results of the detailed grading process completed in the staff workshop sessions are summarized in Appendix A. The blended grade and Future Outlook direction of each asset group are also summarized in Table 2.

3.2 Discussion/Commentary

The following points summarize the workshop discussion related to the general wastewater system:

- There are concerns relating to the wet weather flow contribution to the sanitary sewer network. Climate change is resulting in more frequent high intensity storm flows infiltrating into the sanitary sewers. This effect, combined with ongoing deterioration of the condition of the sanitary sewers which also leads to additional infiltration, is impacting the available capacity in the wastewater system. A storm water flooding drainage study is being planned that will review opportunities to reduce the wet weather flow that enters the sanitary sewer network. Implementing the recommendations from this study may increase the available capacity in the wastewater system to be able to accommodate intensification or other forms of development in the City.
- New changes to the Fisheries Act will require additional water quality monitoring at the discharge locations of combined sewer overflows or other facilities that discharge directly into Lake Ontario or stream/creeks.

- Real time control in the operation of the regulating gates and combined sewer overflow tanks is improving the ability to control the flows that enter the Plant during wet weather events.
- New sewer use bylaws relating to fats/oils/greases have reduced the loadings experienced at the Plant.

In addition to the points above related to the general wastewater system, the following items summarize some of the workshop discussion related to specific asset groups in the wastewater system:

- The planned upgrades at the Woodward Wastewater Treatment Plant to improve the water quality are fully funded and in progress.
- Sewer laterals are still a concern – there continues to be a large amount of money spent on an annual basis on a sewer lateral renewal program and there is uncertainty about the effectiveness of the program.
- Upgrades to the primary clarifiers have resulted in the ability to treat the peak wet weather flow rate that enters the Plant, however this also results in increased operational requirements.
- There are concerns over the capacity of the interceptor/trunk sewer network and the lack of redundancy in the system.

Table 2 – Blended Grades for each Asset Group in the Wastewater System

Asset Type	Asset Component	Grade			Future Outlook /Trend
		2005	2009	2013	
Linear	Interceptors	B	B	C-	↓
	Trunk Sewers (greater than or equal to 450 mm)	B	B	C	↓
	Local Sewers & Manholes (less than 450 mm)	B	C	C	→
	Sewer Laterals	C-	C-	C-	→
	Linear Consolidated Ratings	B	C+	C-	↓
Facilities	Woodward WWTP	B	B-	C+	↑
	Pre-Treatment	B	B	B	→
	Primary Treatment	B	B+	A-	→
	Aeration	B	B	B	→
	Secondary Treatment	B	B	C	↑
	Headworks Pumping Station	---	---	C	↑
	Solids Handling	B	B-	B	↑
	Effluent Disinfection	B	B	B	↑
	Laboratory and Administration Building	B	B+	B-	↑
	Dundas (King St) WWTP	B	B+	B-	↑
	CSO Tanks	B	B	B	→
	Outstations (Lift Stations)	B	B	B-	→
	Regulator Gates (off-site)	C+	C+	C+	↑
	Facilities Consolidated Ratings	B	B	B-	→
Overall Wastewater System Grade		B	B-	C	→

4.0 STORM WATER SYSTEM

4.1 Overview

System: Storm Water 2013 Grade: D Future Trend: ↓

2009 Grade: C-
2005/06 Grade: C

The overall grade for the storm water system is a D. This grade has decreased from a C- in the 2009 Report Card and a C in the 2005/06 Report Card. The future outlook for the storm water system is downward, indicating that the situation is expected to worsen over the next few years if the planned actions are not changed.

The results of the detailed grading process completed in the staff workshop sessions are summarized in Appendix A. The blended grade and Future Outlook direction of each asset group are also summarized in Table 3.

4.2 Discussion/Commentary

The following points summarize the workshop discussion related to the general storm water system:

- The impacts of climate change are also affecting the capacity of the storm sewer network during extreme wet weather storm events. This impact is also negatively affecting other elements of the storm water system, such as increasing creek bank erosion.
- More detailed information is needed on the specific capacity deficiencies in the storm sewer system. Levels of service need to be better defined for the minor system (i.e. what return period should be conveyed in pipes versus overland flow routes?).
- The responsibilities for each asset type have now been defined. This will enable a process to improve the management of each asset group.

In addition to the points above related to the general storm water system, the following items summarize some of the workshop discussion related to specific asset groups in the storm water system:

- Creek erosion of natural channels is a concern. There is limited funding to address the impacts and there are issues associated with damage to private property.

Table 3 – Blended Grades for each Asset Group in the Storm Water System

Asset Type	Asset Component	Grade			Future Outlook/ Trend
		2005	2009	2013	
Linear Assets and Ancillary Works	Storm sewers & manholes	C+	C	C	↓
	Engineered Channels	---	---	D+	↓
	Natural Channels	---	---	D-	↓
	Rear Yard Catchbasins	C-/D	D	D-	↓
	Culverts	C-	-	C	→
	Ditches	C	-	C	→
	Linear Consolidated Ratings	C+	C	D	↓
Storm Water Structures	Storm Ponds	C	D	D	↑
	Inlet / Outfall Structures	C	D	D	↓
	Structures Consolidated Ratings	C	D	D	→
Overall Storm Water System Grade		C	C-	D	↓

Appendix A

Detailed Grades for the Water, Wastewater and Storm Water Systems

Table A.1 – Detailed Water System Grades

Asset	Individual Ratings				Overall Rating			2013 Future Outlook/ Trend	2013 Comments
	Criteria	2005	2009	2013	2005	2009	2013		
Mains – Trunk (>450mm)	Condition & Performance	B	B	**C**	B	B	**C+**	🡻	- Concern over concrete pressure pipe - have had more failures over the past few years. - Condition assessment program will give better information. Recent inspections show more deterioration than expected. - There are critical mains to districts that do not have redundancy (Waterdown, up the escarpment, Woodward/Greenhill main), however a plan is in place to address these concerns. - Operations and Maintenance is currently adequate - Need to redefine target sustainable funding level to guide rate increases. - Intensification not expected to put stress on the capacity.
	Capacity vs. Need	B-	B+	**B+**					
	Funding vs. Need	B+	B-	**C**					
Main – Local (<450mm)	Condition & Performance	B	B+	**B+**	B	B	**C**	🡻	- Proactive in replacing older water mains through joint road projects. - Number of breaks/year is not a concern. - Intensification not expected to put stress on the capacity. - There are many mains that still have inadequate capacity resulting in significant areas that are undersized. - Coordinated plan that ties growth and renewal together should be implemented. - Funding for local mains is impacted by the reduction in the tax levy budget for local road renewal. This will impact the amount of infrastructure that is renewed.
	Capacity vs. Need	B-	B-	**B-**					
	Funding vs. Need	B+	B	**C-**					
Large Valves and Chambers	Condition & Performance	Not separately assessed in previous Report Cards		**C+**	Not separately assessed in previous Report Cards		**C+**	🡻	- Visited all large valve chambers within the last 3 years. - Large backlog of replacements required. - Sufficient coverage of valves in the system.
	Capacity vs. Need			**B**					
	Funding vs. Need			**C**					

Asset	Individual Ratings				Overall Rating			2013 Future Outlook/ Trend	2013 Comments
	Criteria	2005	2009	2013	2005	2009	2013		
Services	Condition & Performance	B	B-	**B-**	B	B-	**B-**	➔	- There are still lead services on the public side. The City is collecting better information on the number and location of these services. - Current program replaces 600-700 services per year. - Corrosion control program is an interim solution.
	Capacity vs. Need	B-	B-	**B-**					
	Funding vs. Need	B+	B+	**B+**					
Meters - Industrial	Condition & Performance	B	---	**B+**	B	B	**B**	➔	- ICI meter replacement program started in the past 2 years.
	Capacity vs. Need	B-	---	**B-**					
	Funding vs. Need	B+	---	**B**					
Meters - Residential	Condition & Performance	B	---	**C**	B	B	**B-**	➔	- Residential meter replacement is in the planning process. There are a large number that have reached the end of their useful life and need to be replaced.
	Capacity vs. Need	B-	---	**B-**					
	Funding vs. Need	B+	---	**B**					
Overall Woodward WTP	Condition & Performance	B / B+	B	**B+**	B/B+	B+	**B+**	➔	- There have been several recent upgrades to the WTP, however in general there are still concerns over the future funding.
	Capacity vs. Need	A	B+	**B+**					
	Funding vs. Need	B+	B+	**B-**					
Mains Low Lift to Plant & LLPS	Condition & Performance	B	A	**A**	B	A	**A**	➔	- Recent upgrades completed to the process area. - Long term funding is a concern. - O&M funding is sufficient. - Localized condition being assessed in the LLPS discharge piping.
	Capacity vs. Need	B-	A	**A**					
	Funding vs. Need	B+	A	**A**					
Pre-Treatment	Condition & Performance	B	B	**B-**	B	B	**C+**	➔	- Process upgrade study in progress to gain better capacity and performance information. - Limited capacity in pre-treatment process area.
	Capacity vs. Need	B-	B-	**B-**					
	Funding vs. Need	B+	B+	**C**					

Asset	Individual Ratings				Overall Rating			2013 Future Outlook/ Trend	2013 Comments
	Criteria	2005	2009	2013	2005	2009	2013		
Filtration	Condition & Performance	B	B-	**B-**	B	B	**B**	➔	- Process upgrade study in progress to gain better capacity and performance information. - Recent upgrades to the filter building but the condition of the process equipment and structure still a concern.
	Capacity vs. Need	B-	B-	**A**					
	Funding vs. Need	B+	B+	**C**					
Chemical Systems	Condition & Performance	B	B	**B+**	B	B	**B+**	➔	- Recent fluoride, ammonia and chlorine systems.
	Capacity vs. Need	B-	B	**B+**					
	Funding vs. Need	B+	B+	**B**					
Clear Wells	Condition & Performance	B	B-	**C**	B	B-	**C**	➔	- The current condition is unknown as there is no access. - Cannot isolate the clear wells. - No funding allocated to address these issues. - No redundancy in clear wells, capacity is a concern. - Process upgrade study in progress to gain better capacity and performance information.
	Capacity vs. Need	B-	B-	**C**					
	Funding vs. Need	B+	C	**C**					
Surge Tower	Condition & Performance	B	B+	**B+**	B	B+	**B+**	➔	
	Capacity vs. Need	B-	B	**B+**					
	Funding vs. Need	B+	B+	**B+**					
High Lift PS	Condition & Performance	Not separately assessed in previous Report Cards		**A-**	Not separately assessed in previous Report Cards		**A-**	➔	- Overall in good condition, minor localized condition issues in one chamber and other small areas.
	Capacity vs. Need			**A**					
	Funding vs. Need			**B+**					
Well Systems	Condition & Performance	B	B	**B**	B	B+	**B-**	➔	- Recent upgrades to Carlisle & Freelton systems - Linden & Greensville still have condition problems and require renewal of some components. - Below ground inspection of wells every 15 years.
	Capacity vs. Need	B-	B	**B**					
	Funding vs. Need	B+	B+	**C**					

Asset	Individual Ratings				Overall Rating			2013 Future Outlook/ Trend	2013 Comments
	Criteria	2005	2009	2013	2005	2009	2013		
Booster Stations	Condition & Performance	B	B-	**B-**	B	B	**B-**	➔	- Master plan will require upgrades to some facilities in the future. - Condition assessments have been recently completed and more are to be completed in the near future. This information leads to capital improvements. - Renewal needs of some larger stations have been addressed using external grants (stimulus funding). - Some smaller stations still require renewal.
	Capacity vs. Need	B-	B	**B**					
	Funding vs. Need	B+	B+	**C**					
Reservoirs	Condition & Performance	B	B-	**B-**	B	B	**B-**	➔	- Condition assessments of all reservoirs are in the process of being or have been completed.
	Capacity vs. Need	B-	B-	**B**					
	Funding vs. Need	B+	B+	**B-**					
SCADA	Condition & Performance	---	B	**B**	B	B	**B**	➔	- SCADA master plan is currently being implemented. A number of upgrades have already been completed and more are committed to in the near future.
	Capacity vs. Need	---	B	**B**					
	Funding vs. Need	---	B	**B**					

Table A.2 – Detailed Wastewater System Grades

Asset	Individual Ratings				Overall Rating			2013 Future Outlook/ Trend	2013 Comments
	Criteria	2005	2009	2013	2005	2009	2013		
Interceptor Sewers	Condition & Performance	B	B	**C**	B	B	**C-**	↓	- 403 interceptor is funded for twinning. - Uncertain of the condition of most interceptors. - Lack of capacity/redundancy in interceptors. - Difficult access to determine condition. - A sanitary sewer master plan is required to better assess capacity needs.
	Capacity vs. Need	B-	B	**C**					
	Funding vs. Need	B+	B+	**C-**					
Trunk Sewers	Condition & Performance	B	B	**B**	B	B	**C**	↓	- Most trunk sewers are at full capacity. - More rehabilitation work has been completed in trunk sewers, but still some condition concerns. - Lack of capacity/redundancy in many trunk sewers. - A sanitary sewer master plan is required to better assess capacity needs.
	Capacity vs. Need	B-	B	**C**					
	Funding vs. Need	B+	B+	**C**					
CSO Tanks	Condition & Performance	B	B	**B**	B	B	**B**	→	- Most tanks are in fair to good condition, only one tank is in poor condition. - RTC phase #1 completed and currently being monitored. - Climate change impacts are making capacity issues more of a concern in interceptor/trunk and CSO system. - Lack of monitoring at discharge locations is still a concern.
	Capacity vs. Need	B+	B+	**B**					
	Funding vs. Need	B+	B+	**B**					
Local Sewers	Condition & Performance	C	B	**B**	B	C	**C**	→	- All-pipe model is completed and is ready for use to assess system deficiencies. - Reduced pressure to address system deficiencies because of the installation of some backflow prevention valves. - Downspout disconnection program may be alleviating pressure in some local areas, still needs to be confirmed. - Some localized flooding is still a concern.
	Capacity vs. Need	C+	C-	**C-**					
	Funding vs. Need	B+	C+	**C+**					
Manholes	Condition & Performance	Not Rated Separately							- Program in place for resetting of manhole frames and grates. - Do not have the staffing to do condition assessments on manholes. - Minor rehabilitations for I&I reduction. - Manhole patching may be an area to pursue in the future.
	Capacity vs. Need								
	Funding vs. Need								
Sewer Laterals	Condition & Performance	---	D	**D**	---	C-	**C-**	→	- Complete approximately 1000 inspections per year. - 2/3 of the laterals inspected require work. - Condition of laterals is largely unknown, but based on limited view they are expected to be in poor condition. - Current program spends $10 million per year on sewer lateral replacement in coordination with road reconstruction projects. - Other replacements done on a reactive basis responding to customer complaints. - Need to review approach to lateral replacement – no proactive management strategy.
	Capacity vs. Need	---	C	**B**					
	Funding vs. Need	---	C	**C**					

Asset	Individual Ratings				Overall Rating			2013 Future Outlook/ Trend	2013 Comments
	Criteria	2005	2009	2013	2005	2009	2013		
Outstations (Lift Stations)	Condition & Performance	B-	B	**B-**	B	B	**B-**	➔	- Overall audit is from 2003 and needs to be updated. - Better information required to determine needs. - Some locations require a gravity overflow – impact to performance.
	Capacity vs. Need	C+	B-	**B-**					
	Funding vs. Need	B+	B+	**B**					
Regulator Gates (Outside Plant)	Condition & Performance	C	C	**B-**	C+	C+	**C+**	➔	- Recent upgrades on 50% of gates and more may be addressed in the medium term.
	Capacity vs. Need	C+	C+	**C+**					
	Funding vs. Need	B+	C+	**C+**					
Woodward WWTP	Condition & Performance	B	B	**C+**	B	B-	**C+**	➔	- Funding secured for water quality expansion, however funding is from external sources. - Plant cannot currently meet nitrification requirements.
	Capacity vs. Need	B-	B-	**C+**					
	Funding vs. Need	B+	C+	**B-**					
Woodward Pre-Treatment	Condition & Performance	B	B	**B**	B	B	**B**	➔	- Processes are in good condition, some issues with the operation of the separators.
	Capacity vs. Need	B-	B	**B**					
	Funding vs. Need	B+	B+	**B+**					
Woodward Primary	Condition & Performance	B	B+	**A-**	B	B+	**A-**	➔	- Recently refurbished and is in good condition.
	Capacity vs. Need	B	B+	**A-**					
	Funding vs. Need	B+	B+	**B+**					
Woodward Aeration	Condition & Performance	B	B	**B**	B	B	**B**	➔	- External grants have been confirmed for upgrades. - Limitations on implementing nitrification due to capacity of process.
	Capacity vs. Need	B-	B	**C**					
	Funding vs. Need	B+	B+	**B+**					

Asset	Individual Ratings				Overall Rating			2013 Future Outlook/ Trend	2013 Comments
	Criteria	2005	2009	2013	2005	2009	2013		
Woodward Secondary	Condition & Performance	B	B	**C+**	B	B	**C**	↑	- Current design limits performance and capacity. - Funding in place for upgrades.
	Capacity vs. Need	B-	B-	**C+**					
	Funding vs. Need	B+	B+	**B+**					
Woodward Headworks Pumping Station	Condition & Performance	Not separately assessed in previous Report Cards		**C**	Not separately assessed in previous Report Cards		**C**	↑	- Pumping capacity is adequate, but small wet well is a limitation. - Cannot take PS offline for inspection or maintenance. - Plan is in place to deal with concerns of pumps.
	Capacity vs. Need			**C**					
	Funding vs. Need			**B+**					
Woodward Solids Handling	Condition & Performance	B	B	**B+**	B	B-	**B**	↑	- Recent upgrades to handle solids, sufficient capacity in process areas.
	Capacity vs. Need	B-	B-	**B+**					
	Funding vs. Need	B+	B-	**B**					
Woodward Disinfection /Effluent	Condition & Performance	B	B	**B**	B	B	**B**	↑	- New processes will be part of planned upgrades.
	Capacity vs. Need	B-	B	**B**					
	Funding vs. Need	B+	B+	**B+**					
Woodward Lab and Admin	Condition & Performance	B	B+	**B+**	B	B+	**B-**	↑	- Plan in place to upgrade/expand the facility. - HVAC issues in the building.
	Capacity vs. Need	B-	B+	**C-**					
	Funding vs. Need	B+	B+	**B+**					
King St. & WWTP (Dundas)	Condition & Performance	B	B	**C+**	B	B+	**B-**	↑	- Portion of the plant (the “A” plant) is at the end of its useful life. - Under normal weather conditions the plant functions well. - Peak flows during wet weather events exceed the capacity of the plant. - Tertiary filters were recently replaced. - $18 million has been budgeted for upgrades, however more money is expected to be required to complete all required activities. Study underway to assess upgrade requirements.
	Capacity vs. Need	B-	B	**B-**					
	Funding vs. Need	B+	B+	**B-**					

Table A.3 – Detailed Storm Water System Grades

Asset	Individual Ratings				Overall Rating			2013 Future Outlook/ Trend	2013 Comments
	Criteria	2005	2009	**2013**	2005	2009	**2013**		
Sewers	Condition & Performance	B	B	**B**	C+	C	**C**	🡻	- Climate change impacting ability for minor system to convey routine storm flows. - Design standards are not consistent throughout the City. - There is currently limited dedicated funding for the storm sewer system.
	Capacity vs. Need	B	B	**C**					
	Funding vs. Need	C+	D	**D**					
Manholes	Condition & Performance	Not Rated Separately							- Program in place for resetting of manhole frames and grates. - Do not have the staffing to do condition assessments on manholes. - Minor rehabilitations for I&I reduction. - Manhole patching may be an area to pursue in the future.
	Capacity vs. Need								
	Funding vs. Need								
Ponds	Condition & Performance	C	D	**D**	C	D	**D**	🡹	- Inventory has been completed. - Condition assessments are being completed and renewal work is being prioritized. - Funding is inadequate based on needs. - Proactive maintenance is being completed. - Better information is leading to better decisions.
	Capacity vs. Need	C	D	**C+**					
	Funding vs. Need	F	F	**D**					
Outfall Structures (storm only)	Condition & Performance	C	D	**D**	C	D	**D**	🡻	- Maintenance responsibility is a concern. - Lack of funding for these assets. - More information is becoming available, leading to larger investment requirements. - Additional information still required.
	Capacity vs. Need	C	C	**C**					
	Funding vs. Need	D	F	**F**					
Ditches (roadside)	Condition & Performance	C+	Not assessed separately in 2009	**C-**	C	Not assessed separately in 2009	**C**	🡺	- Rural road program for cleaning of ditches prior to a road reconstruction. - Reactionary inspection based on need. - No proactive program for maintenance/renewal.
	Capacity vs. Need	C		**C**					
	Funding vs. Need	D		**C-**					

Asset	Individual Ratings				Overall Rating			2013 Future Outlook/ Trend	2013 Comments
	Criteria	2005	2009	2013	2005	2009	2013		
Engineered Channels	Condition & Performance	Not separately assessed in previous Report Cards		C+	Not separately assessed in previous Report Cards		D+	↓	- Lack of clarity on ownership/responsibility of some assets. - Washout is a problem in areas along some engineered channels. - No dedicated funding for these assets.
	Capacity vs. Need			D+					
	Funding vs. Need			F					
Natural Watercourse	Condition & Performance	Not separately assessed in previous Report Cards		D	Not separately assessed in previous Report Cards.		D-	↓	- Lack of information. - New pressure from the City to manage these assets. - Limited dedicated funding for these assets. - Have an inventory and in the process of determining which are owned by city
	Capacity vs. Need			D					
	Funding vs. Need			F					
Rear Yard Catchbasin	Condition & Performance	C	Not assessed separately in 2009	D	C-/D	D	D-	↓	- No inventory. - No access to RYCB on private property.
	Capacity vs. Need	C		D					
	Funding vs. Need	F		F					
Culverts	Condition & Performance	C	Not assessed separately in 2009	C	C-	Not assessed separately in 2009	C	→	- Currently developing cross road culvert inventory. - Condition assessments have been completed on some culverts. - Have the ability to assess culvert capacity, but no level of service has been defined.
	Capacity vs. Need	C		C					
	Funding vs. Need	F		C-					