Asset Management Plan
Contract No. ES-13-2

Prepared For:

Prepared By:

Robinson Consultants Inc.

In association with
BMA Management Inc.

Our Project No. 13030
November 2013

Robinson Consultants

October 29, 2013

Jason Covey, P.Eng
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Attention: **Mr. Jason Covey**

Reference: **Asset Management Plan**
Our File No. 13030

Dear Mr. Covey:

Please find enclosed three (3) hard copies and one (1) electronic copy of the Asset Management Plan for your use.

The objective of sustainability for all Public Works Assets is a noble one, one that is fiscally sound and beneficial not only for this generation but for future generations as well.

This project was undertaken to provide a reference that will facilitate regular tracking and guidance on the City's path towards infrastructure sustainability.

We thank you for the opportunity to work on this very important and challenging assignment and for the candid input and support of all City of Orillia's staff who contributed a great deal to the project.

Yours very truly,

ROBINSON CONSULTANTS INC.

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Acknowledgements

Robinson Consultants Inc. wishes to thank the City's Public Works team for its contribution to this Asset Management Plan. We apologize in advance for any inadvertent omissions. In particular, we note the following major contributors:

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The views exspressed in this report are those of the City of Orillia and do not nessarily reflect those of the Ontario Ministry of Agriculture, Food and Rural Affairs.

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EXECUTIVE SUMMARY

The City of Orillia is a single tier municipality located approximately 100km north of the City of Toronto at the northern tip of Lake Simcoe and has a population of 30,659 (source 2012 Financial Information Return) with 13,734 households (source 2012 Financial Information Return). The City owns and operates assets that provide a broad range of municipal services, including water, wastewater, roads and bridges.

The Province of Ontario has identified the need for municipalities to develop Asset Management Plans (AMP) for the core municipal service based assets of water, wastewater, roads, bridges and social housing. The City of Orillia has recognized the importance of the Asset Management Plan and is moving forward with it's own Asset Management Plan in accordance with the Provincial Guidelines. Orillia owns and operates four of the five identified core assets, but does not own any social housing. The purpose of this Asset Management Plan is to provide the City with both a short term (20 year) and long term life cycle (100 year) infrastructure vision to identify trends and issues that the community will face when dealing with infrastructure services, including but not limited to portfolio investment requirements, forecasted asset conditions and service levels for the identified asset classes.

This plan was developed by Robinson Consultants Inc. and BMA Management Consulting Inc. in co-ordination with three primary City Departments including Environmental Services, Public Works and Treasury and is in alignment with the "Building Together: Guide for Municipal Asset Management Plans" published by the Ministry of Infrastructure.

The Asset Management Plan (AMP) has identified key assumptions so future improvements can be made through the elimination or refinement of assumptions to improve the overall outcomes of the AMP. A list of specific recommendations (actions) for each asset class, along with recommended timelines to complete the recommendations have been identified within the appropriate sections and in the Asset Management Strategy.

State of the Infrastructure

The general approach taken was to collect and disseminate the City's asset data and derive each asset's rate of deterioration in order to establish the overall condition of each asset respective of its class. This approach is a reasonably accepted practice when establishing the basis for the initial Asset Management Plan using available information. It should also be noted that general overhead and administration costs have been considered with the estimated replacement values for all assets.

The development of the State of Infrastructure was fundamentally based on the Best Practice for Municipal Infrastructure Asset Management produced by the National Infrastructure Guide (InfraGuide). This best practice is based on seven principle questions that depict the life cycle of an asset.

1. What do we own?
2. What is it worth?
3. What condition is it in (expected remaining life)?
4. What do we need to do to it (expect service level)?
5. When do we need to do it (capital investment plans)?
6. How much will it cost (acceptable risk and service level)?
7. How do we pay for it (short and long term affordability)?

The approach also considered the asset component breakdown within the City`s PSAB registry and generally followed that breakdown, while making minor variations to suit other required information, such as condition data. See Section 3.0 for component breakdown used. A highlight of the current condition of each asset class is provided below.

Water: The estimated replacement value of the Water System Network is $200 million dollars with 60% of it linear assets in good condition.

Wastewater: The estimated replacement value of the Wastewater System Network is $236 million dollars with 76% of its linear assets in good condition.

Roads: The estimated replacement value of the Road Network is $194 million dollars with 48% of the roads in good condition.

Bridges: The estimated replacement value of the Bridge Network is $2.6 million dollars with 100% of the bridges in good condition.

Expected Levels of Service
There is an increased attention to service delivery with respect to infrastructure related services and this is consistent with increased financial pressure to address aging infrastructure. It has become necessary to engage the public when making financial decisions regarding infrastructure and its relation to the delivery of service to the public. Performance indicators, which are a qualitative or quantitative measure of service delivery, are the link between the public expectations, financial decisions and condition of infrastructure. The City has identified and are measuring several performance indicators and is committed to continue tracking and recording them. Moving forward the City must further develop their performance indicators in order to achieve two results; establishment of service levels (e.g. water outages linked to watermain breaks) to be met for each of the operationally measured performances and further define the performance indicators to establish a link with the service levels and the City's Strategic Plan.

Asset Management Strategy
The AMP Strategy has been structured as a global set of action plans identified to continue to move the City forward in the sustainable management of their infrastructure. The strategy is derived from the recommended actions for each of the asset groups (water, wastewater, roads and bridges) in addition to actions which should be taken to develop a corporate wide review of assets. The strategy has been broken down in to 6 specific groups including:

- Infrastructure Policy Strategies
- Inspection and Maintenance Activities
- Replacement and Rehabilitation Strategies
- Growth Strategies
- Corporate Review of Assets (Services)
- Risk Associated with Achieving AMP Objectives

Each section proposes specific recommendations with respect to technical reviews, program development, strategies and associated timing in order to assist in the implementation of this Asset Management Plan. A strategic asset management initiatives work plan has been outlined in table 5.7.1 in section 5 of this AMP. The timing of the strategic initiatives consider two primary factors; recommendations associated with an asset class which is currently underfunded and recommendations associated with an asset class which has weak information (e.g. condition data) from which to project future need.

Financial Strategy
The financial strategy has been prepared as follows:

- The State of Infrastructure (SoI) identified the future capital requirements for roads, bridges, water and wastewater from 2013 (including backlog) to 2113.
- The financial strategy has taken the SoI outcomes to develop a financial strategy, with a focus on the first 50 years to get an appreciation of the capital requirements during this time and then developing a financial strategy with proposed sources of financing over the initial 20 years.

Based on the Canadian Infrastructure Report Card issued by the Federation of Canadian Municipalities, the City of Orillia is in a generally better state than most municipalities with an average household combined infrastructure deficit of $2,035, which is below the national average of $13,813 in water, stormwater, wastewater, and road infrastructure. The financial strategy is summarized by the four asset classes, water, wastewater, roads and bridges, highlighted below:

Water Financial Summary

- Appendix A provides the 20 year Water Operating and Capital Budgets.
- Based on the analysis undertaken, it is estimated that the City will need to spend $150 million (2013 dollars) on water infrastructure investment over the next 50 years.
- The financial plan focuses on the first 20 years of the investment requirements. This plan reflects a need to gradually increase contributions to the Water Capital Reserves to address the existing infrastructure gap and future funding requirements.
- The existing water supported contributions of $1.7 million is below spending requirements which average approximately $3.4 million a year over the next 20 years. This can be addressed by gradually increasing the contribution over the next 20 years.
- The existing infrastructure gap of $5.5 million is addressed over the first 15 years of the plan.
- Due to the timing of capital needs, it is anticipated that internal and external financing will be required to address pipe replacement and treatment replacement costs over the next 20 years.
- Rate revenue requirements will need to be increased annually above inflation over the next 20 years (7% in 2014 and 2015 and 4% thereafter) *to address existing infrastructure only, addition funds would be required for any upgrades or additions to the water or wastewater systems.*

Wastewater Financial Summary

- Appendix B provides the 20 year Wastewater Operating and Capital Budgets.
- Based on the analysis undertaken, it is estimated that the City will need to spend $135 million on wastewater infrastructure investment over the next 50 years.
- The financial plan focuses on the first 20 years of the investment requirements. This plan reflects a need to gradually increase contributions to the Wastewater Capital Reserves to address the existing infrastructure gap and future funding requirements.
- The existing wastewater supported contributions of $3.3 million is below spending requirements which average approximately $3.6 million a year over the next 20 years.
- Due to the timing of capital needs, it is anticipated that internal financing will be required to address pipe investments over the next 20 years.
- Rate revenue requirements will need to be increased annually above inflation over the next 10 years (6% in 2014, 4% in 2015 and 3% from 2016-2023) to *address existing infrastructure only*

Roads and Bridges Financial Summary

- Appendix C provides the 20 year Roads and Bridges Operating and Capital Budgets.
- Based on the analysis undertaken, it is estimated that the City will need to spend $213 million on Road and Bridge infrastructure investment over the next 50 years.
- The financial plan focuses on the first 20 years of the investment requirements. This plan reflects an inflationary increase contribution to the Roads and Bridges Capital Reserves.
- The existing annual Roads and Bridges supported contributions of $4.3 million are at the 50 year average requirements.
- Due to the timing of capital needs, it is anticipated that internal financing will be required to address Roads costs from years 20-30.

The financial strategy outlined in this report represents a forecast of the financial capital requirements of the City's water, wastewater, roads and bridges over the next 20 years under a series of assumptions which have been outlined in the report. The financial plan does not represent a formal, multi-year budget for water, wastewater, roads and bridges. The approval of the operating and capital budgets is undertaken as part of the City's overall annual budget process.

1.0 INTRODUCTION

The Province of Ontario has identified the need for municipalities to develop Asset Management Plans (AMP) for all municipal owned assets, or at a minimum the core municipal service based assets of water, wastewater, roads, bridges and social housing. The City of Orillia owns and operates four of the five identified core assets, including water, wastewater, roads and bridges, but does not own any Social Housing. While the City has been managing and investing in all of their owned assets, a comprehensive Asset Management Plan had not been developed. Given the scale and scope of work involved in the development of a plan involving all owned assets, the City chose to establish the foundation for a corporate wide Asset Management Plan by developing an initial plan around the core assets under their ownership (Water, Wastewater, Roads and Bridges). This provided the City with the ability to create awareness and support for the need and value of an Asset Management Plan.

The core assets included in this plan provide essential services which form a significant part of the foundation for the City's quality of life including, health, economic and environmental expectations. The quality and reliability of these services relies on the assets providing the service. As a result the failure or deterioration of these assets affects the City's ability to provide an acceptable level of service.

The City's official plan has established a vision for the growth of the City, however this vision is also applicable to the ongoing management of it's infrastructure assets. The vision includes:

"Orillia will be a safe, healthy, attractive and livable community where people of all ages and abilities can live and have a sense of belonging" "The Plan promotes a City with: clean air, land and water; a vibrant downtown with strong connections to the waterfront; housing choices that meet the needs of all people throughout all stages of life; beautiful neighborhoods; green spaces, recreational facilities, trails and shoreline that promotes active, healthy living; a strong and competitive economy; cultural facilities and events that celebrate the community; and urban design that is inspiring".

The purpose of this Asset Management Plan is to provide the City with both a short term (20 year) and long term life cycle (100 year) infrastructure vision to identify trends and issues that the community will face when dealing with infrastructure services. This includes portfolio investment requirements, forecasted asset conditions and service levels for the identified asset classes. These metrics will help the community make informed and wise decisions with respect to providing the required levels of service needed to meet the goals of the City. It is expected that this plan be updated every five years or when significant changes are made through the completion of initiatives that provide valuable information which improve the asset forecasts. This could be done on an individual asset class or across all asset classes depending on the nature of the initiative completed.

The AMP is expected to be used as a significant resource in the development or future updating of Budgets, Official Plans, Master Plans and Growth Strategies. The plan will be able to integrate existing needs with respect to infrastructure investment within these processes in order to ensure future sustainability in the delivery of infrastructure services to the community.

1.1 Principles and Approach

This plan was developed by Robinson Consultants Inc. and BMA Management Consulting in co-ordination with three primary City Departments including Environmental Services, Public Works and Treasury. This co-ordination included three workshops with staff at various stages to ensure alignment with the City's objectives and understanding of their infrastructure. The Project Team and project participants are identified at the front of this report in the acknowledgements.

The capital investment plan was prepared based on our best knowledge and available information at the time of the AMP study. It is understood that some assumptions made in this AMP will need to be revisited in the future.

The principles used in completing this Asset Management Plan were primarily taken from the Province of Ontario's Building Together: Guide for Municipal Asset Management Plans and Industry Best Practice publications including:

- The National Guide for Sustainable Municipal Infrastructure (Canada) (InfraGuide)
- The International Infrastructure Management Manual (New Zealand) (IIMM)

1.1.1 Asset Deterioration Information

In order to establish an appropriate basis for the deterioration of the assets, two approaches were used relative to the availability of information and data from the City.

I. Where both condition information and asset age (or installation date) were available, the condition was plotted on a basic deterioration curve.

II. Where only condition information was available, the condition was plotted against the typical expected life of the asset.

1.1.2 Asset Deterioration Assumptions

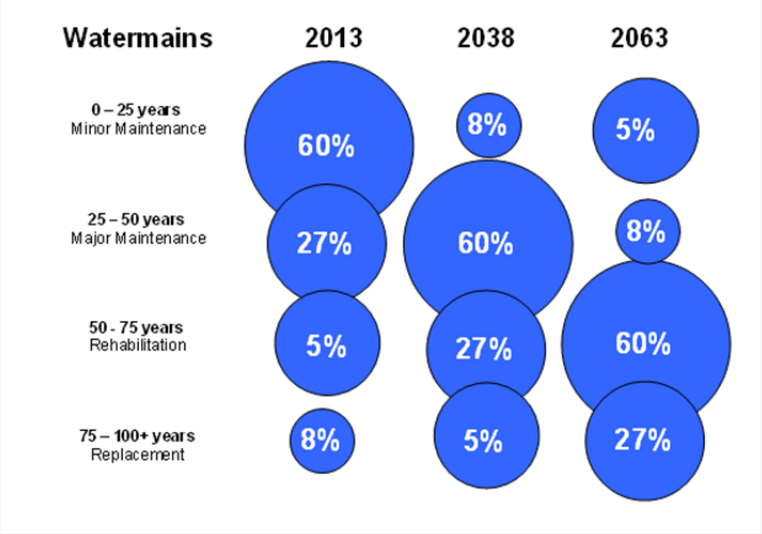
According to the New Zealand Infrastructure Asset Valuation and Depreciation Guide, failure of an asset is defined as "the point where assets fail to achieve required levels of service". Although an estimated useful life can be assigned to assets based on general industry knowledge, there are numerous factors which may affect the actual life of a specific asset. For example a typical industry life expectancy for a cast iron watermain is 80 years, however factors which affect the actual life of this asset could include design, material, quality of construction, operational demand, level of maintenance, etc. As a result assets installed in the same year will not all fail at the same time. In other words, in a network of cast iron watermain assets with an assigned useful life of 80 years, it would be normal to expect that a certain percentage of those watermains will fail prior to 80 years of age and a certain percentage will fail beyond 80 years of life.

Given a sufficient amount of data, a statistical model could be developed to represent the deterioration of an asset and make the investment schedule more accurate. However this was not possible at this time so assumptions were made for linear assets (water, wastewater and roads) to reflect the investment schedule as accurately as possible. It was assumed that for these assets 20% would fail at 75% of their expected life, 65% would fail at 125% of their expected life and remainder would fail at 100% of their expect life.

This approach is a reasonably accepted practice when establishing the basis for an initial Asset Management Plan using available information.

It is however important to understand that infrastructure asset deterioration is dynamic and will continue to change over time. As a result the condition of infrastructure today will not be the same in 5, 10, 25 or 50 years and the amount of required investment will vary significantly over time. Figure 1.1 shows an example of the dynamic change in infrastructure condition and thus level of investment. If these bubbles were all the same size moving from one condition state to the next, investment requirements would be balanced, however in reality these bubbles are not the same. The challenge therefore lies in the financial management for these large investment requirements which are on the horizon within the next 25 years.

Figure 1.1.1
Watermain Dynamic Asset Deterioration



1.1.3 Global Asset Management Plan Assumptions

This section describes the global assumptions made in the development of this Asset Management Plan.

1.1.3.1 Overhead and Administration

Design, inspection and other overhead and administration costs must be considered when setting capital budget plans. These costs have been considered in this AMP report within the estimated replacement values for each asset. In general the overhead and administration includes:

- Engineering services.
- Contingency.
- Administration.

1.1.3.2 Cost Allocations

Cost allocations (to other departments), for example allocations from water and wastewater funds (rates) to the road (levy) have been identified within the financial strategy.

1.2 General Approach

The development of the State of Infrastructure was fundamentally based on the Best Practice for Municipal Infrastructure Asset Management produced by the National Infrastructure Guide (InfraGuide). This best practice is based on seven principle questions that depict the life cycle of an asset.

1. What do we own?
2. What is it worth?
3. What condition is it in (expected remaining life)?
4. What do we need to do to it (expect service level)?
5. When do we need to do it (capital investment plans)?
6. How much will it cost (acceptable risk and service level)?
7. How do we pay for it (short and long term affordability)?

The approach also considered the asset component breakdown within the City`s PSAB registry and generally followed the component breakdown, while making minor variations to suite other required information, such as condition data. See Section 3.0 for component breakdown used.

1.3 Glossary of Terms

The following definitions are excerpts from various InfraGuide Best Practices that were developed or adopted as part of the National Guide to Sustainable Municipal Infrastructure. These definitions were used in this Asset Management Plan Report for City of Orillia assets.

Assessment — The process used to describe the condition and/or performance of a system component.

Asset — A physical component of a facility, which has value, enables services to be provided and has an economic life of greater than 12 months. Dynamic assets have some moving parts, while passive assets have none.

Asset Management — The combination of management, financial, economic, engineering, and operational and other practices applied to physical assets with the objective of providing the required level of service in the most cost-effective manner.

Asset Management Plan — A plan developed for the management of one or more infrastructure assets that combines multidisciplinary management techniques (including technical and financial) over the life cycle of the asset in the most cost effective manner to provide a specified level of service. A significant component of the plan is a long-term cash flow projection for the activities.

Asset Management Strategy — A strategy for asset management covering the development and implementation of plans and programs for asset creation, operation, maintenance, rehabilitation/replacement, disposal, and performance monitoring to ensure that the desired levels of service and other operational objectives are achieved at optimum cost.

Best Practices — State-of-the-art methodologies and technologies for municipal infrastructure planning, design, construction, management, assessment, maintenance and rehabilitation that consider local economic, environmental and social factors.

Collection System — The gravity flow linear piped sewer system.

Critical pipe — Those pipes of the system where the risk of failure is least acceptable.

Evaluation — The process used (following completion of the assessment) to determine the remedial measures necessary to improve the condition and/or performance of a system component at the best value for the community.

Infrastructure — The term as used in InfraGuide refers to roads and sidewalks, potable water, wastewater, storm water, and transit (incl. roads). *Note: For the purpose of this Asset Management Plan, only Roads, Bridges, Water and Wastewater infrastructure was considered, however other infrastructure could be considered for purposes of the Asset Management Plan in the future.*

Life Cycle Costing — A method of expressing cost, in which both capital costs and operations and maintenance costs are considered, to compare alternatives. "Present worth" is one way to express life cycle costs. The present worth represents the current investment that would have to be made at a specific discount (or interest) rate to pay for the initial and future cost of the works.

Rehabilitation — Works to rebuild or replace parts or components of an asset, to restore it to a required functional condition and extend its life, which may incorporate some modification. Generally involves repairing the asset to deliver its original level of service without resorting to significant upgrading or renewal, using available techniques and standards.

Replacement — The complete replacement of an asset that has reached the end of its service life, to provide an alternative that satisfies a targeted level of service.

2.0 BACKGROUND

The City of Orillia is located approximately 100km north of the City of Toronto at the northern tip of Lake Simcoe and has a population of 30,659 (source 2012 Financial Information Return) with 13,734 households (source 2012 Financial Information Return). The City is a single tier municipality and owns and operates assets which provide a broad range of municipal services, including water, wastewater, roads and bridges. The City does not own or operate any social housing Infrastructure.

3.0 STATE OF LOCAL INFRASTRUCTURE

The development of the City's State of Infrastructure was undertaken through a strategic review of existing information, data and reports on the attributes, condition and age of the assets. The information was used to create a condition profile for each of the identified asset classes. The component breakdown within each asset class primarily followed the City's PSAB registry, however some minor variations were made in some cases where further details were available. Upon completion of the preliminary profile for each asset class, a workshop was held with City Staff to review the approach, information used and outcomes, in order to ensure appropriate use of the information and agree on the approach taken.

The following asset classes and components were included in this plan:

1. Water
    a. Local and trunk watermains
    b. Water filtration plant
    c. Reservoirs
    d. Wells

2. Wastewater
    a. Local and trunk sanitary sewers
    b. Wastewater treatment plant
    c. Pumping stations

3. Roads
    a. Urban arterial roads
    b. Urban collector roads
    c. Urban local roads w/ditches
    d. Urban local roads w/curbs

4. Bridges
    a. Bridges located throughout the City

The following sections summarizes the state of infrastructure (estimated current condition) for each of the asset classes.

3.1 Water

3.1.1 What do we have?

The City's water distribution system dates back to 1872 and includes over 165 km of watermain made from Cast Iron in the early days to PVC more recently. The water network also consists of components comprised of the Water Filtration Plant (WFP), wells and reservoirs. For the purposes of this AMP report the various components have been broken down as shown in Table 3.1.1.

Table 3.1.1
Water System Inventory

Asset Type	Asset Component		Inventory
Linear	Local Watermains (< 350 mm)	Cast Iron	56,042 m
		Ductile Iron	42,768 m
		PVC	48,075 m
	Trunk Watermains (≥ 350 mm)	Cast Iron	3,832 m
		Concrete	2,109 m
		Ductile Iron	7,171 m
		PVC	5,223 m
Facilities	Water Filtration Plant		1
	Reservoirs		3
	Wells, incl. monitoring & test wells		3

The data for this study was primarily acquired from the City's 2012 PSAB registry and the City's water system database. Data from the PSAB registry was taken from the Specific Functional Asset Class categories of Water Treatment and Water Distribution/Transmission. These two asset classes were further broken down into three components, the WFP (200-202 Bay Street), Reservoirs located throughout the City, and Wells (consisting of wells and well buildings). It should be noted that the water filtration plant component breakdown was taken from the PSAB registry and revised by City staff for the purposes of the future investment analysis. In addition, linear assets were grouped by their diameter where local watermains were identified as being less than 350 mm in diameter and trunk watermains identified as 350 mm and larger in diameter.

3.1.2 Assumptions

- The City provided a typical replacement cost of $800/m for local watermains. Based on the local watermain costs, a replacement cost of $1,000/m for trunk watermains was assumed. This replacement cost is inclusive of the hydrants and valves which are associated with the watermains.
- Different pipe materials have varying useful lives, even given the same operational and environmental conditions. As such, the following useful lives were assigned based on watermain materials:

    - Cast Iron = 80 years
    - Ductile Iron = 60 years
    - PVC = 80 years
    - PCCP = 80 years

- Given the available information and data, watermain conditions (OCI) were predicted based on a generic deterioration curve, the age and material type and then used in conjunction with the expected life to project the timing of future investments.
- Several factors contribute to an asset's deterioration and subsequent failure and not all similar linear assets will fail at the end of their estimated useful life – some fail before whereas others fail much later. Considering this and taking into account that product useful lives provided by manufacturers are typically conservative, we incorporated the following schedule for linear assets only when assigning future investment dates:

- 20% fail at 75% of its useful life
- 15% fail at 100% of its useful life
- 65% fail at 125% of its useful life

- Linear assets that were beyond 75% of their useful life prior to 2013 have been scheduled for replacement at the end of their useful life based on their life expectancy.
- Watermains which were beyond their expected life at the time of this report were included in the backlog and scheduled for replacement/rehabilitation in 2013.
- Structural rehabilitation of watermains (not water facilities) is included in the projected needs.

3.1.3 What is it worth?

The replacement value of the water distribution network, based on current 2013 dollars is $200 million. Table 3.1.2 and Figure 3.1.1 provide a breakdown of the contribution of each of the network components to the overall system value.

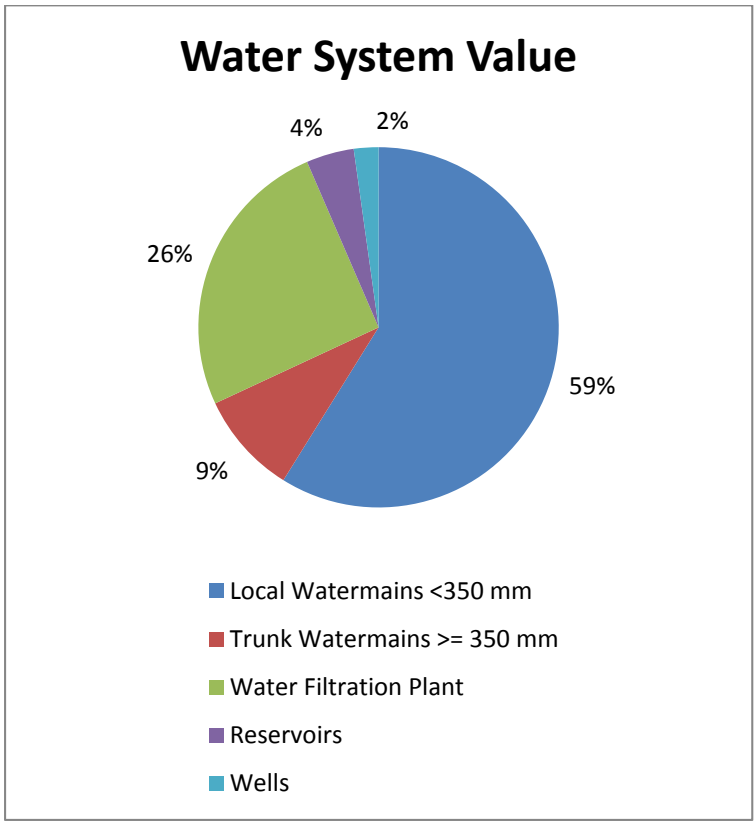
As previously discussed the linear water system value was determined by a distributed cost per linear meter, inclusive of valves and hydrants. The replacement values for the water facilities (treatment, reservoirs, wells) were determined from the PSAB registry and adjusted by City staff as follows:

- $33 million for the WFP building, unit processes and equipment at 202 Bay Street to bring total WFP replacement in line with Water and Sewer Rates and Fees Report PW-12-025 Future Capital Estimates,
- $3.5 million for Reservoirs based on Water and Sewer Rates and Fees Report PW-12-025 Future Capital Estimates, and Drinking Water Financial Plan, and
- Increased the replacement values for the Well buildings to bring them in line with Water and Sewer Rates and Fees Report PW-12-025 Future Capital Estimates.

Table 3.1.2
Water System Replacement Value

Asset Type	Asset Component		Inventory	Unit Replacement Cost	Overall Replacement Value ($M)
Linear	Local Watermain (< 350 mm)	Cast Iron	56,042 m	$800/m	$44.83
		Ductile Iron	42,768 m		$34.21
		PVC	48,075 m		$38.46
	Trunk Watermain (≥ 350 mm)	Cast Iron	3,832 m	$1,000/m	$3.85
		Concrete	2109 m		$2.11
		Ductile Iron	7171 m		$7.17
		PVC	5223 m		$5.22
Facilities	Water Filtration Plant		1		$50.80
	Reservoirs		3		$8.56
	Wells		3		$4.41
Total Replacement Cost:					$199.63

Figure 3.1.1
Breakdown of Water System Network Components



The linear portion of the Water System Network, Local and Trunk Watermains, makes up 68% of the water system's replacement value, whereas the WFP, Reservoirs and Wells make up the balance (Figure 3.1.1).

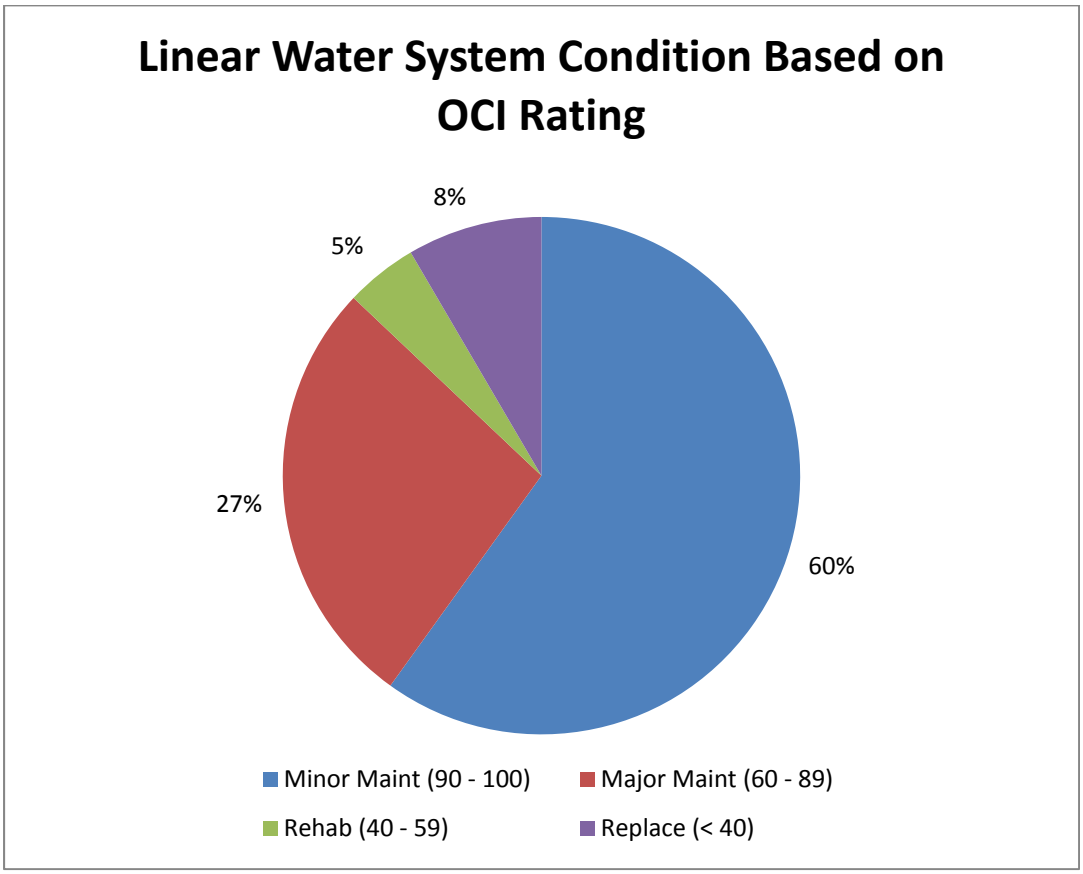
If this total asset replacement value of the water system is distributed across the number of water customer connections (10,460 – source 2012 FIR), it translates to approximately $19,085 in share value for each water customer connection.

3.1.4 What Condition is it in?

The overall condition of the Water System linear assets are shown in the following graphics. Figure 3.1.2 highlights the percentage breakdown of linear assets based on Overall Condition Index (OCI) rating in relationship to maintenance activities. The Water System linear assets are summarized in Table 3.1.3 based on their material, diameter and average OCI rating.

With respect to Water System facilities, no condition information was available during the development of the AMP. As a result expected lives were assigned to the facilities and future investments projected based on the age of the facility. This approach provides a proxy to estimate the condition state (i.e. life state) of assets with no condition information in order to forecast future investment requirements.

Figure 3.1.2
Water System Condition Based on OCI



Based on the approach taken to determine the condition of watermains for this AMP, 60% of the watermains are predicted to be in good condition. While this is a positive message for the immediate future, it is important to consider the 27% which is in a major maintenance state and will be moving into rehabilitation in the relatively near future.

Table 3.1.3
Watermain Average OCI Rating Summary

Material	Average OCI	
	< 350 mm	**≥ 350 mm**
Cast Iron	1	9
PCCP	N/A	83
Ductile Iron	16	15
PVC	57	59

3.1.5 What do we need to do with it?

There are four life states throughout the life cycle of an asset which is based on the asset's age, condition, or OCI. These states are listed below for the water and wastewater systems. For the purposes of this AMP the estimated OCI ranges within each life state have also been identified.

Activity	Description	Asset Condition (OCI)
Minor Maintenance	Planned, routine activities such as flushing, cleaning, visual inspection, etc.(2% of replacement cost annually)	90 - 100
Major Maintenance	Unplanned maintenance and repair activities such repairing watermain breaks, valve repair or replacement and individual watermain section replacement.	60 - 89
Rehabilitation	Rehabilitation using a fully structural CIPP design intended to extend the life of the watermain, allowing it to continue to provide service.	40 - 59
Replacement	Replacement is required when an asset reaches the end of its useful life. The useful life of an asset can vary greatly depending on a number of physical, environmental and operational factors.	< 40

The rehabilitation of a watermain prior to it reaching its expected life can extend its useful life and provide financial benefits based on an appropriate life cycle cost analysis. The use of rehabilitation methods to extend the useful life of a watermain has been included in the 100-year investment forecast based on the following:

- A watermain segment is scheduled for rehabilitation with a fully structural design at 75% of its useful life (as indicated above) at a cost of 75% of its replacement cost.
- The useful life of the watermain rehabilitation is 50 years, after which time the watermain is scheduled for replacement

3.1.6 When do we need to do it?

The range of typical useful lives for watermains (Table 3.1.4) were based on our literature review of typical product useful lives and the assumption that linear assets generally fail between 75% to 125% of that useful life.

Table 3.1.4
Water System Asset Useful Lives

Asset Type	Asset Component		Typical Useful Life (years)
Linear	Local Watermains (< 350 mm)	Cast Iron	60 - 100
		Ductile Iron	45 - 70
		PVC	60 - 100
	Trunk Watermains (≥ 350 mm)	Cast Iron	60 - 100
		Concrete	60 - 100
		Ductile Iron	45 - 70
		PVC	60 - 100
Facilities*	Water Filtration Plant		5 – 40, 75
	Reservoirs		40 - 60
	Wells		40 - 75

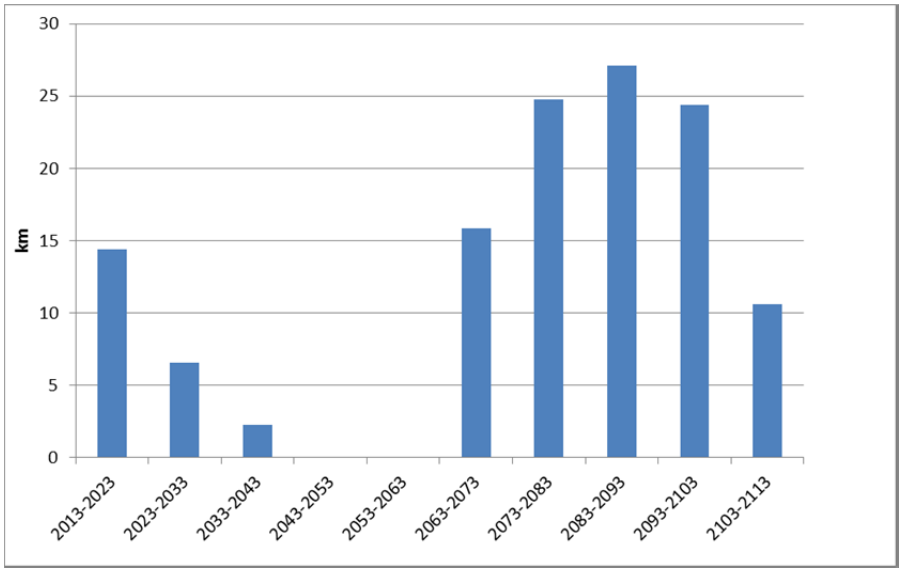
*Includes all componenets (i.e. building, mechanical, electrical, etc.)

The variation in the useful life for linear assets is in part due to the physical, environmental and operational factors that can have an impact on the life of the watermain. The internal components of the Water Filtration Plant have useful lives which range from 5 – 40 years and the building itself is expected to last 75 years before major investment is required. The wells are expected to provide service for up to 40 years whereas the well buildings are expected to remain in service up to 75 years.

The linear assets identified in Table 3.1.4 have been subdivided into two groups based on size, providing a better representation of the costs for replacement across the water system network.

The future linear replacement profile (annual km of pipe) for watermains is expressed in ten year increments in Figure 3.1.3. For example it is anticipated that approximately 14 km of watermain will be in need of replacement between 2013 and 2023.

Figure 3.1.3
Watermain Replacement Profile



It should be understood that the timing of future investments are very heavily reliant on the current condition rating and information related to the age of the watermain. The current method for the assessment of watermain condition is based on the age of the watermain only and much of the age data is estimated. As a result the refinement of watermain conditions will significantly help further define the required timing of investment. This refinement should include the development of a standard process for the assessment of watermains to improve the estimation of current age, along with service levels provided by the watermain.

3.1.7 How much money do we need?

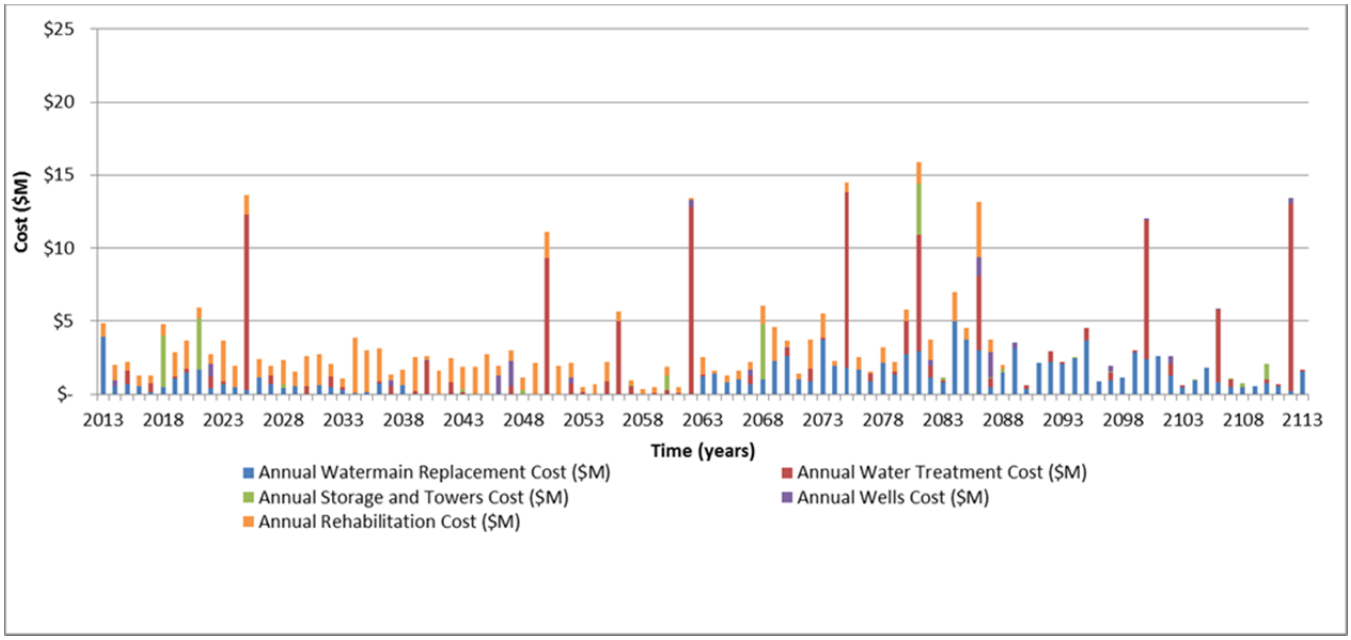
The required future investment into the City's water system has been projected over the next 100 years (expected life of the longest lived asset) in Figure 3.1.4. This projection identifies the annual investment required for each of the identified components within the system. The time of these investments is heavily reliant on the determination of age and current condition as described earlier in this section.

The analysis that was completed to identify capital investment requirements was based on the following assumptions:

1. Facility replacement and linear replacement costs are shown in Table 3.1.2.
2. The timing (year) of facilities replacement was derived from the City's 2012 PSAB registry and adjusted through discussions with the City.
3. The year of linear replacement and rehabilitation correspond to the previously discussed assumptions in this section.
4. Backlogged watermains (i.e. watermains which were beyond their expected life in 2013) have been scheduled for replacement in 2013.
5. The annual investment requirement for the replacement of non-linear assets and the replacement/rehabilitation of linear assets included in this study was defined as the total system replacement value distributed across a 100-year forecast period, based on the predicted timing of required component replacements. (See Figure 3.1.4).
6. All values are calculated in 2013 dollars.

Future investment dollars are based on 2013 replacement or rehabilitation costs and include 20% for Overhead and Administration.

Figure 3.1.4
Total Water System Investment Requirements



3.1.8 Recommendations:

1. Develop a condition assessment program in order to apply clear repeatable condition grades to both linear and facility system assets. (2014 – 2015)
2. Re-evaluate the system backlog upon completion of a refined condition assessment program. (2015 - 2016)
3. Develop a watermain management program, including a complete risk assessment process and decision process with consideration for life cycle analysis of options.(2015- 2016)
4. Review the use of available rehabilitation technologies which are suitable to the City's water distribution network and could provide better life cycle costs and help to reduce the back-log. (2014 – 2015)
5. Establish specific and measureable performance measures to support expected levels of service. (2018 -2020)
6. Develop the relationship between levels of service and cost of service along with appropriate supporting policies. (2018 – 2020)
7. Continue to populate asset registries to update and confirm the current information.
8. Provide updates to the State of the Infrastructure in co-ordination with the updates to the Asset Management Plan or changes to the Water System data (i.e. After development of condition assessment program). (2017-2018)
9. Incorporate the AMP into the next Water System Master Plan Update.

3.2 Wastewater

3.2.1 What do we have?

The wastewater network dates back to 1928 and consists of components comprised of the Wastewater Treatment Plant (WWTP) and Pumping Stations and over 146 km of sanitary sewer. For the purposes of this AMP report the various components have been break down as shown in Table 3.2.1:

Table 3.2.1
WasteWater System Inventory

Asset Type	Asset Component	Inventory
Linear	Local Sanitary Sewers (< 350 mm)	126,087 m
	Trunk Sanitary Sewers (≥ 350 mm)	20,358 m
Facilities	Wastewater Treatment Plant	1
	Pumping Stations	20

The data for this study was primarily acquired from the City's 2012 PSAB registry and the City's sanitary system database. Data from the PSAB registry was taken from the Specific Functional Asset Class categories Wastewater Treatment and Wastewater Collection and Conveyance. For the purposes of this AMP the treatment asset class was segmented in to the Wastewater Treatment Plant (40 Kitchener Street) and various Sanitary Pumping Stations and their associated buildings located throughout the City. In addition, the linear assets were grouped by their diameter where local sewers are less than 350 mm in diameter and trunk sewers are 350 mm and larger in diameter, which is consistent with the 2013 Wastewater Master Plan Update report.

The City has performed CCTV inspection on a large portion of their wastewater network and has assigned an Overall Condition Index (OCI) grading to each segment understood to be primarily based on the CCTV inspection. The current age of each segment was not readily available, so for the purposes of the AMP only the OCI condition of the wastewater segments was used to determine the investment requirements.

3.2.2 Assumptions

- The City has provided a replacement cost of $1,000/m for local sewers and $1,200/m for trunk sewers
- Due to the lack of sewer material information an estimated useful life for all sewers, regardless the actual pipe material is assumed to be 80 years.
- Due to the lack of sewer ages a generic deterioration curve was used to estimate the age of each segment based on the OCI assigned by the City and the expected life of 80 years. This estimated age was then used to forecast the future replacement and rehabilitation year. Where no OCI was available, the following assumptions were applied:
    - the replacement year is based on the recorded replacement date (REP_PIPE) year where available
    - Sanitary sewer segments with incomplete physical data and no OCI assigned were omitted from the AMP. Note: 200 sewer segments of the 2306 sewer segments entered in the sanitary database (8.7%) were not used for used for this AMP. The City notes that the majority of these sewer segments are proposed pipes in West Orillia, that are not yet constructed.
- Several factors contribute to an asset's deterioration and subsequent failure and not all similar linear assets fail at the end of their useful life – some fail before whereas others fail much later. Considering this and taking into account that product useful lives provided by manufacturers are typically conservative, we incorporated the following schedule for linear assets only when assigning replacement dates:

- 20% fail at 75% of its useful life
- 15% fail at 100% of its useful life
- 65% fail at 125% of its useful life

- Linear assets that were beyond 95% of their useful life prior to 2013 have been scheduled for replacement at the end of their useful lives with no applied rehabilitation.
- 75% of sanitary sewer sections (based on length in metres) deemed for replacement in 2013 and 2014 (i.e. backlog) are assumed to be rehabilitated at 50% of their respective installation cost.
- Structural rehabilitation of sewers (not wastewater facilities) is included in the projected needs

3.2.3 What is it worth?

The total replacement value of the Wastewater network, based on 2013 dollars is $236 million. Table 3.2.2 and Figure 3.2.1 provide a breakdown of the contribution of each of the network components to the overall system value.

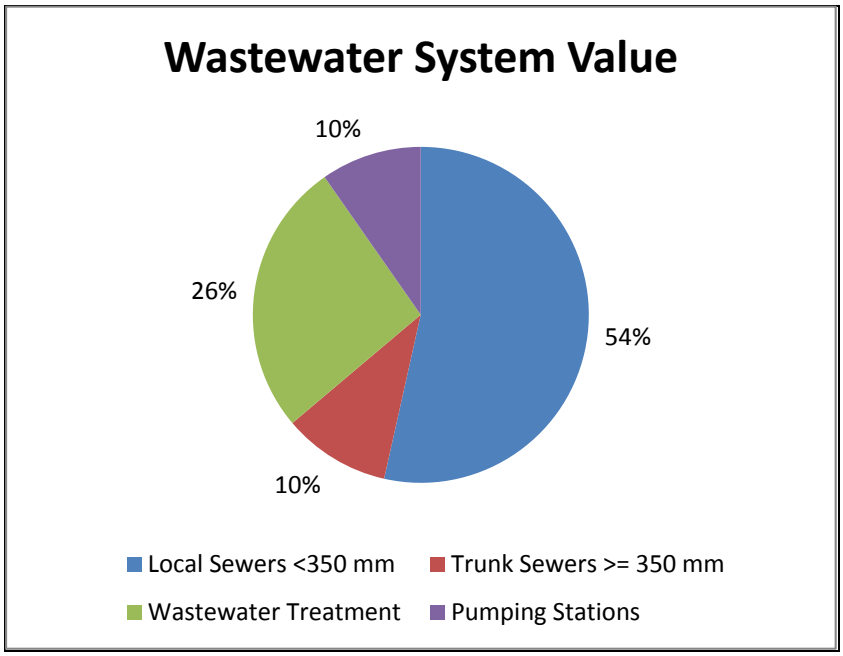
As previously discussed the linear wastewater system value was determined by a distributed cost per linear meter. The replacement values for wastewater facilities (treatment and pump stations) were determined from the City's PSAB registry and adjusted by City staff as follows:

- $41 million for the WWTC building, unit processes and equipment at 40 Kitchener Street to bring the total WWTC replacement in line with Water and Sewer Rates and Fees Report PW-12-025 Future Capital Estimates
- Revised replacement cost from what was recorded in the PSAB registry to reflect recent construction costs for similar sanitary pump stations.

Table 3.2.2
WasteWater System Replacement Value

Asset Type	Asset Component	Inventory	Unit Replacement Cost	Overall Replacement Value ($M)
Linear	Local Sanitary Sewers (< 350 mm)	126,087 m	$1,000.00	$126.40
	Trunk Sanitary Sewers (≥ 350 mm)	20,358 m	$1,200.00	$24.43
Facilities	WasteWater Treatment Plant	1		$62.45
	Pumping Stations	21		$22.93
Total System Replacement Value:				$236.20

Figure 3.2.1
Breakdown of WasteWater System Network Components



The linear portion (trunk and local sewers) make up 64% of the wastewater system replacement value, while the balance is made up from the treatment plant and pumping stations (Figure 3.2.1).

If this total asset replacement value of the wastewater system is distributed across the number of wastewater customer connections (10,460 – source 2012 FIR), it translates to approximately $22,580 in share value for each wastewater customer connection.

3.2.4 What Condition is it in?

Since 1995, CCTV has been used annually for the visual condition inspection of the City's sewers and to date approximately 95% of the network has been CCTV inspected. The video inspection of each section of sewer was reviewed by City staff and an Overall Condition Index (OCI) rating was applied to the sewer. The OCI is a summary of the total frequency of the deficiencies observed in the section of sewer (i.e. MH to MH) with a weighting factor applied on the specific deficiencies. These weighting factors are as follows:

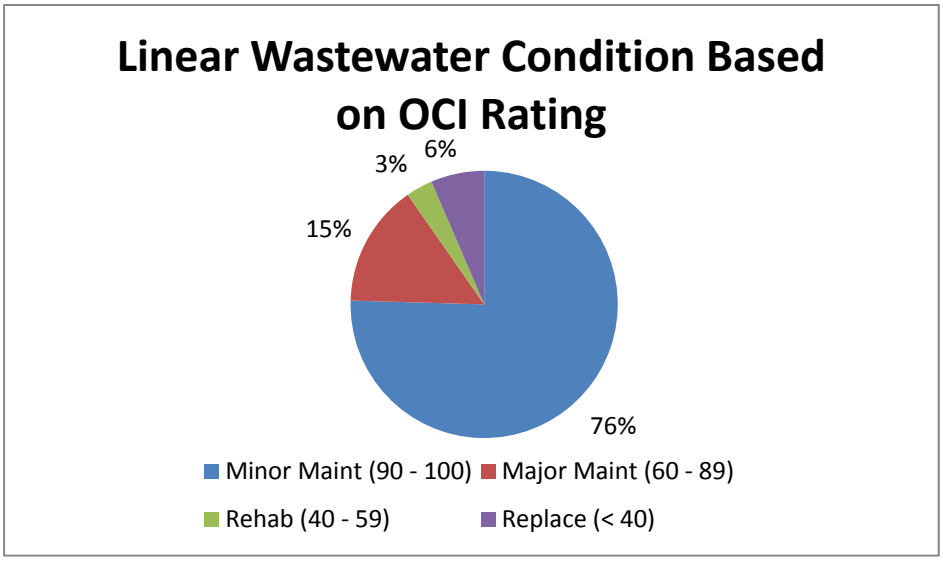
Collapse	Light (10)	Heavy (20)
Break	Light (10)	Heavy (20)
Crack	Light (1)	Heavy (2)
Infiltration	Light (2)	Heavy (4)
Roots	Light (2)	Heavy (4)
Ponding	Light (1)	Heavy (2)
Calcite	Light (1)	Heavy (2)

The overall condition of the Wastewater System linear assets are shown in the following graphics. Figure 3.2.2 highlights the percentage breakdown of linear assets based on OCI rating. The

Wastewater System linear assets are summarized in Table 3.2.3 based on their diameter and average OCI rating.

With respect to Wastewater System facilities, no condition information was available during the development of the AMP. As a result expected lives were assigned to the facilities and future investments were projected based on the age of the facility identified in the City's PSAB registry. This approach provides a proxy to estimate the condition state (i.e. life state) of assets with no condition information in order to forecast future investment requirements.

Figure 3.2.2
Wastewater System Condition Based on OCI



Based on the approach taken to determine the condition of sewers for this AMP, 76% of the sewers are predicted to be in good condition. While this is a positive message for the immediate future, it is important to consider the 15% which is in a major maintenance state and will be moving into Rehabilitation state in the relatively near future.

Table 3.2.3
Sanitary Sewer Average OCI Rating Summary

Functional Class	Average OCI
Local Sewer <350 mm	90
Trunk Sewer => 350 mm	91

3.2.5 What do we need to do with it?

There are four life states throughout the life cycle of an asset which are based on the asset's age, condition and Overall Condition Index (OCI). These states are listed below for the wastewater system along with the associated OCI range used for the purpose of this AMP.

Activity	Description	Asset Condition (OCI)
Minor Maintenance	Planned, routine activities such as visual inspection, etc.	90 - 100
Major Maintenance	Unplanned maintenance and repair activities such as repairing sewer breaks and individual sewer section replacement.	60 - 89
Rehabilitation	Rehabilitation using a fully structural CIPP design intended to extend the life of the sewer, allowing it to continue to provide service.	40 - 59
Replacement	Replacement is required when an asset reaches the end of its useful life. The useful life of an asset can vary greatly depending on a number of physical, environmental and operational factors.	< 40

The rehabilitation of a sewer prior to it reaching its expected life can extend its useful life and provide significant financial benefits based on an appropriate life cycle cost analysis. The use of rehabilitation methods to extend the useful life of sewers has been included in the 100-year investment forecast based on the following:

- A sewer segment is scheduled for rehabilitation with a fully structural design at 95% of its useful life (as indicated above) at a cost of 50% of its replacement cost.
- The useful life of the sewer rehabilitation is 50 years, after which the sewer is scheduled for replacement.

3.2.6 When do we need to do it?

The range of typical useful lives for sanitary sewers (Table 3.2.4) were based on our literature review of typical product useful lives and the assumption that sewers generally fail between 75% to 125% of that useful life as previously described.

Table 3.2.4
WasteWater System Asset Useful Lives

Asset Type	Asset Component	Typical Useful Life (years)
Linear	Local Sewers (< 350 mm)	75 - 120
	Trunk Sewers (≥ 350 mm)	75 - 120
Facilities	WasteWater Treatment Plant	5 – 40, 75
	Sanitary Pumping Stations	40

The variation in the useful life for sewers is in part due to the physical, environmental and operational factors that can have an impact on the life of the sewer. The internal components of the WWTP have useful lives ranging from 5 – 40 years and the building itself is expected to last 75 years before major maintenance is required. The Sanitary Pumping Stations and their respective buildings are expected to last up to 40 years before major maintenance is needed.

The linear assets (sewers) identified in Table 3.2.4 have been subdivided into two groups based on size, providing a better representation of the costs for replacement across the network.

It should be understood that the timing of future investments are very heavily reliant on the current condition rating and information related to the age of the sewers. As such the impact of inaccurate, missing or assumed information and data create a liability associated with the timing of future investments. While the City has a good program in place to CCTV inspect their sewers, the program should be converted to one of the available defect coding standards in the industry. This will allow for a process which is consistent and repeatable year over year, which is important in the future projection of needs. The City should also continue to update and improve the accuracy and completeness of their sewer database.

3.2.7 How much money do we need?

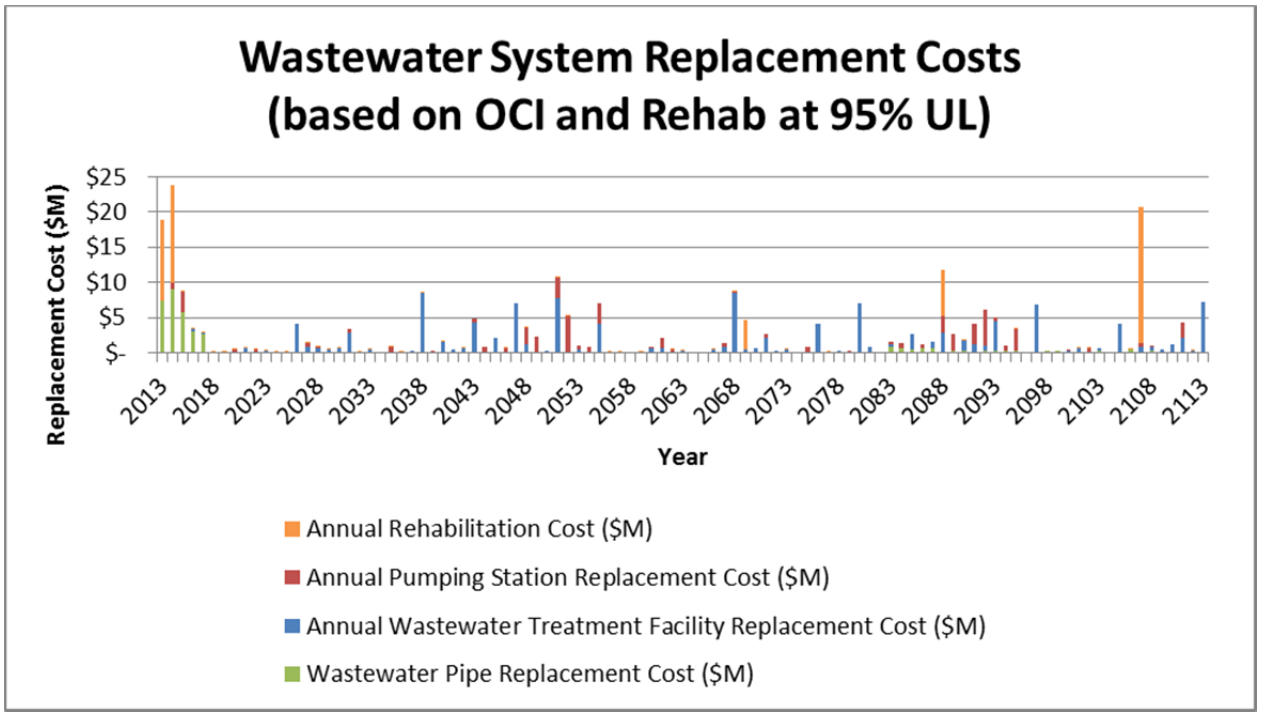
The required future investment into the City's wastewater system has been projected over the next 100 years (expected life of the longest lived asset) in Figure 3.2.3. This projection identifies the annual investment required for each of the identified components within the system. The time of these investments is heavily reliant on the determination of age and current condition as described earlier in this section.

The analysis which was completed to identify capital investment requirements was based on the following assumptions:

1. Facility replacement and linear replacement costs based on unit costs are shown in Table 3.2.2.
2. The timing (year) of facilities replacement derived from the 2012 PSAB registry and adjusted through discussions with the City.
3. The timing (year) of linear replacement and rehabilitation correspond to previously discussed assumptions in this section.
4. Backlogged sewers (i.e. sewers which were beyond their expected life in 2013) have been scheduled for replacement in 2013.
5. The annual investment requirement for the replacement of non-linear assets and the replacement/rehabilitation of linear assets included in this study was defined as the total system replacement value distributed across a 100-year forecast period, based on the predicted timing of required component replacements (see Figure 3.2.4).
6. All values are calculated in 2013 dollars.

Based on the assumptions, Figure 3.2.3 displays the annual investment profile from 2013 – 2113 resulting from the analysis.

Figure 3.2.3
Total WasteWater System Investment Requirements



3.2.8 Recommendations:

1. Continue with the City's CCTV Inspection of its sewer segments to update the known condition of the sewers. A program should be established with an appropriate inspection cycle based on the current condition and criticality of the sewer. (2015-2016)
2. Where available utilize industry recognized condition grading standards, e.g. WRc or CSA 4010 for sewer condition grading. Given the availability and recognition of well established condition grading systems in Canada, it is recommended that this be completed in 2014.
3. Re-evaluate the condition of the sewers using a standard format and reassess the backlog investment projection. (2016)
4. Develop condition assessment programs for wastewater facilities. The program should be established with an appropriate inspection cycle based on the current condition (or expected remaining life) and criticality of the facility component.
5. Develop a sewer management program, including a complete risk assessment process and decision process with consideration for life cycle analysis of options. (2014)
6. Review associated funding levels with the aim of ensuring that systems are maintained with the least cost over the life of the asset. (Annually).
7. Review the use of available rehabilitation technologies which are suitable to the City's sewer network and will provide a better life cycle solution. (2014 – 2015)
8. Establish specific and measureable performance measures to support expected strategic service levels. (2016-2017)
9. Develop the relationship between levels of service and cost of service along with appropriate supporting policies. (2016 – 2018)
10. Provide updates to the State of the Infrastructure in co-ordination with the Asset Management Plan updates or changes to the Sewer System data (i.e. after the review and update of the condition assessment program). (2016-2018)

3.3 Roads

3.3.1 What do we have?

The Road Network consists of components comprised of Urban Arterial, Urban Collector, Urban Local w/ditches and Urban Local w/curbs. A summary of the data is provided in Table 3.3.1:

Table 3.3.1
Road System Inventory

Asset Type	Asset Component	Inventory (centreline)
Roads	Urban Arterial	35,979 m
	Urban Collector	26,155 m
	Urban Local w/ditches	61,152 m
	Urban Local w/curbs	48,146 m

The data for this study was acquired from the City's Road Network Database. The provided data was segmented into the three road classes: urban arterial, urban collector and urban local roads. Transportation assets including traffic lights, signals and signs and sidewalks are not included in this survey. However it is noted that some sidewalks are included where applicable (e.g. on one side for urban local w/curb and on both sides for collector and arterial.) As such, road reconstruction costs do not include these assets.

The City has applied an OCI rating to all road segments within the network. The purpose of this review is to assess the road assets based their reported condition.

3.3.2 What assumptions have been made?

- Replacement costs as provided by the City, Table 3.3.2.
- Different road types have varying useful lives for the purposes of this AMP as follows:
    - Urban Arterial = 35 years
    - Urban Collector = 35 years
    - Urban Local w/ditches = 50 years
    - Urban Local w/curbs = 50 years
- The City has assigned an OCI to each segment within their road network. A generic deterioration curve was used to determine the age of each segment based on the OCI assigned by the City and the expected life. The estimated age was used for programing the replacement of that segment.
- Several factors contribute to an asset's deterioration and subsequent failure and not all similar assets fail at the end of their useful life – some fail before whereas others fail much later. Considering this, the following schedule was used when assigning replacement dates:
    - 20% fail at 75% of its useful life
    - 15% fail at 100% of its useful life
    - 65% fail at 125% of its useful life

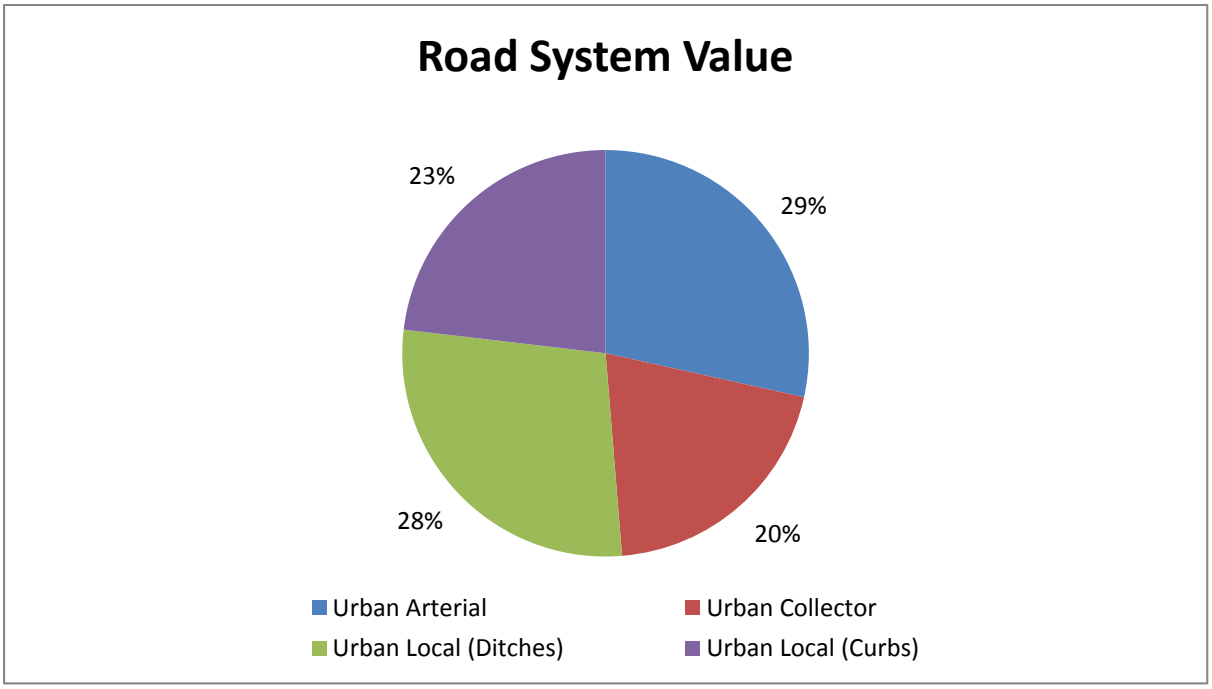
3.3.3 What is it worth?

The replacement value of the Road network, based on 2013 dollars is $193.6 million. Table 3.3.2 and Figure 3.3.1 provide a breakdown of the contribution of each road type to the overall system value:

Table 3.3.2
Road Network Replacement Value

Asset Type	Asset Component	Inventory (centreline)	Unit Replacement Cost	Overall Replacement Value ($M)
Roads	Urban Arterial	35,979 m	$541.00/m/lane	$55.11
	Urban Collector	26,155 m	$743.00/m lane	$39.18
	Urban Local w/ditches	61,152 m	$417.00/m/lane	$54.52
	Urban Local w/curbs	48,146 m	$546.50/m/lane	$44.79
Total Replacement Value:				$193.60

Figure 3.3.1
Breakdown of Road System Network Components



Urban Local roads (with ditches and curbs) make up 51% of the Road System value, followed by Urban Arterial at 29% and Urban Collector at 20% (see Figure 3.3.1). The total road system replacement value distributed across the number of private dwellings in Orillia (13,734 households - source 2012 Financial Information Return) translates to a value of approximately $18,720 of road assets per dwelling.

3.3.4 What Condition is it in?

The overall condition of the Road System is shown in Figure 3.3.2, which highlights the percentage breakdown of road segments based on OCI rating and maintenance activities. The Road System is also summarized in Table 3.3.3 based on their asset classification and average OCI rating.

Figure 3.3.2
Road System Based on OCI Rating

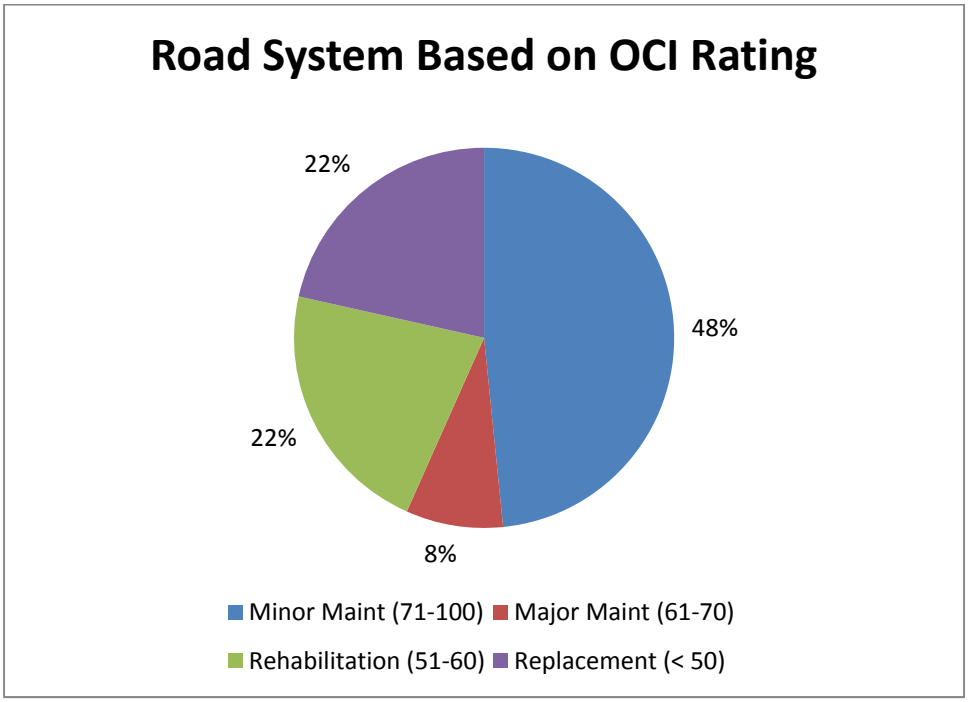


Table 3.3.3
Road System Average OCI Rating Summary

Asset Classification	Average OCI	Description
Urban Arterial	77	Above Average Condition
Urban Collector	70	Above Average Condition
Urban Local w/ditches	66	Average Condition
Urban Local w/curbs	69	Average Condition

3.3.5 What do we need to do with it?

There are four stages of activity throughout the life cycle of an asset which is based on the asset's condition, or Overall Condition Index (OCI). These activities are listed below for the road system:

Activity	Description	Asset Condition (OCI)
Minor Maintenance	Road is in above average to excellent condition. Planned, routine visual inspection is recommended.	(71-100)
Major Maintenance	Road is in upper portion of average condition. Unplanned maintenance and repair activities such sealing cracks, section resurfacing, etc. is recommended.	(61-70)
Rehabilitation	Road is in lower portion of average condition. Rehabilitation using road resurfacing methods are recommended to extend the life of the road.	(51-60)
Replace Replacement	Road is in below average to very poor condition. Replacement is recommended when an asset reaches the end of its useful life.	(< 50)

3.3.6 When do we need to do it?

The range of typical useful lives for roads were based on road assets typically failing between 75% to 125% of their useful life as stated in the assumptions section.

Table 3.3.4
Road Network Asset Useful Lives

Asset Type	Asset Component	Typical Useful Life (years)
Roads	Urban Arterial	26 - 44
	Urban Collector	26 - 44
	Urban Local w/ditches	38 - 62
	Urban Local w/curbs	38 - 62

The variation in the useful life for road assets (Table 3.3.4) is in part due to the physical, environmental and operational factors that can have an impact on the life of the road. Each road type has useful lives which range from 26 – 62 years before replacement is typically required.

It should be understood that the timing of future investments are very heavily reliant on the current condition rating and information related to the age of the roads. As such the impact of inaccurate, missing or assumed information and data create a liability associated with the timing of future investments. While the City has a good assessment program in place to review the visual condition of roads, the program should be linked to a Pavement Condition Index (PCI) standard which is available in the industry. This will allow for a process which is consistent and repeatable year over year, which is important in the future projection of needs. The City should also continue to update and improve the accuracy and completeness of their road network database.

3.3.7 How much money do we need?

The required future investment into the City's road network has been projected over the next 100 years (expected life of the longest lived asset) in Figure 3.3.3. This projection identifies the annual investment required for each of the identified components within the system. The timing of these

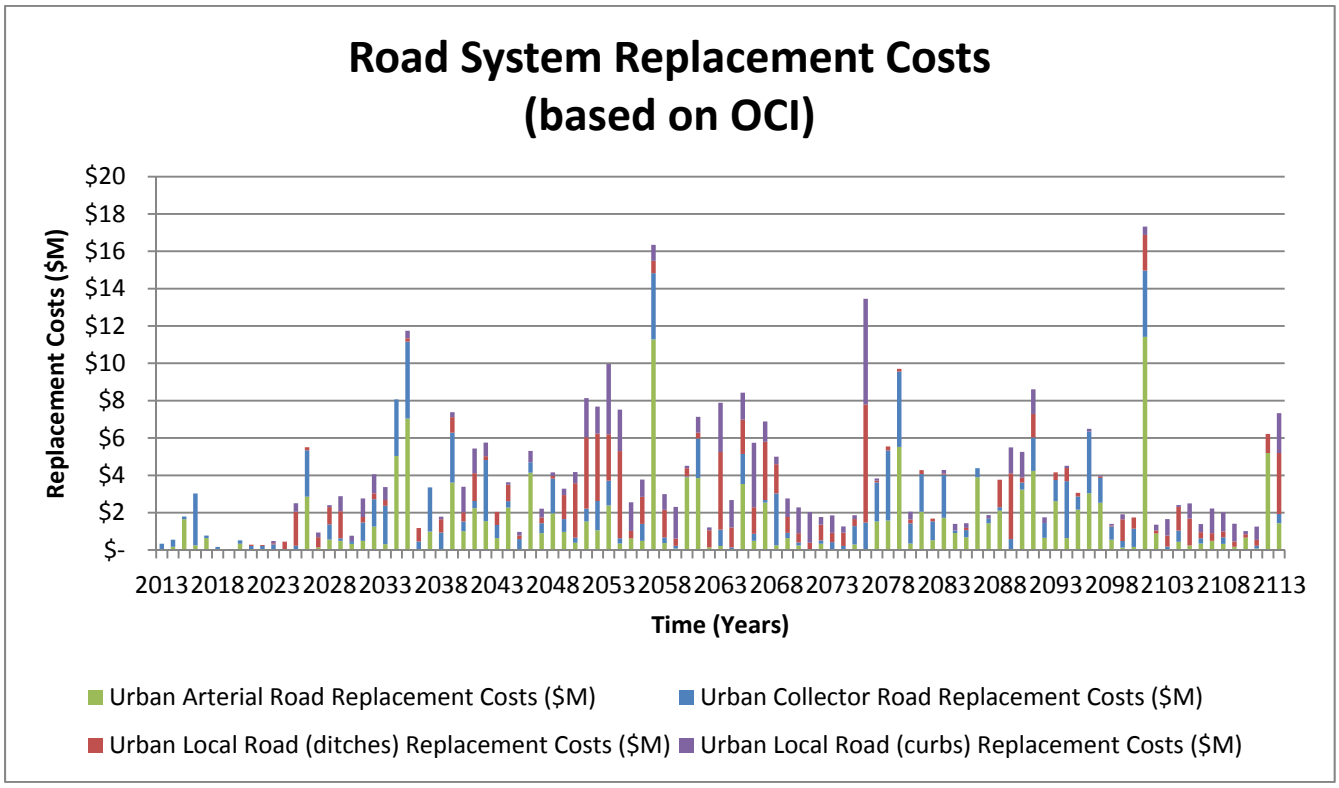
investments is heavily reliant on the determination of age and current condition as described earlier in this section.

The analysis that was completed to identify capital investment requirements was based on the following assumptions:

1. Replacement costs based on unit costs identified in Table 3.3.2.
2. The timing (year) of road segment replacement corresponds with the schedule applied in the assumptions section.
3. Backlogged roads (i.e. roads which are beyond their expected life in 2013) have been scheduled for 2013.
4. Investment in the replacement of road assets included in this study was defined as the total system replacement value distributed across a 100-year forecast period, based on the predicted timing of required replacement.
5. All values are calculated in 2013 current dollars.

Based on the assumptions, Figure 3.3.3 displays the annual investment profile from 2013 – 2113 resulting from the analysis.

Figure 3.3.3
Total Road System Investment Requirements



3.3.8 Recommendations:

1. Review existing industry recognized standard for the inspection of roads and adopt standard for future road inspections. (2016-2017)
2. Review operating and maintenance practices using industry Best Practices as well as other technical documents in order to develop a pavement management program, including decision matrix, life cycle cost analysis and risk assessment. (2015-2016)
3. Review associated funding levels with the aim of ensuring that systems are maintained with the least cost over the life of the asset. (2016 – 2018)
4. Develop a pavement preservation program, through the review and use of available pavement technologies/treatments which are suitable to extend pavement life. (2016- 2018)
5. Establish specific and measureable Levels of Service and Performance measures, and monitor. (2018 – 2020)
6. Develop the relationship between levels of service and cost, along with appropriate supporting policies. (>2020)

3.4 Bridges

3.4.1 What do we have?

The Bridge Network consists of 5 bridges. A summary of the data is provided in Table 3.4.1:

Table 3.4.1
Bridge System Inventory

Asset Type	Asset Component	Description	Inventory
Bridges	Brough Creek North Bridge	Cast In Place Concrete	1
	Brough Creek South Bridge	Cast In Place Concrete	1
	Kitchener St Bridge	Steel Girder	1
	Cedar Island Bridge	Concrete Bridge over Water	1
	Victoria Crescent Bridge	Cast In Place Concrete	1

The data for this study was acquired from the City's 2012 PSAB registry, available bridge inspection reports and through discussions with City staff. Data taken from the PSAB registry were from the Specific Functional Asset Class category: Bridges and Culverts. Two culverts, Memorial Ave Commercial Drive Culvert, East and West, are not included in this survey as they are privately owned and replacing them is the responsibility of the owner. The City does however inspect these culverts as a result of being located on a City road allowance.

Replacement dates for each bridge have been established based on comments from the City with respect to the bridge inspection reports or have been based on their installation date and a useful life of 75 years.

3.4.2 Assumptions

- Bridges are separate from the road system data.
- Estimated useful life for all bridges is 75 years, unless otherwise noted from the City.

3.4.3 What is it worth?

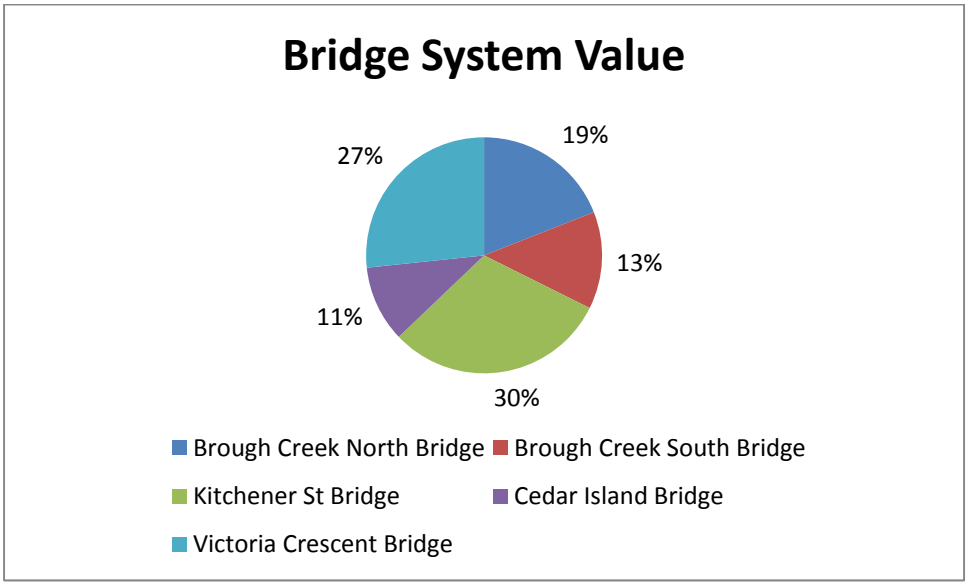
The replacement value of the Bridge network, based on 2013 dollars is $2.6 million. The

replacement costs for the Brough Creek bridges are for full replacement and do not consider cost sharing with the Township of Oro-Medonte. Table 3.4.2 and Figure 3.4.1 provide a breakdown of the contribution of each bridge type to the overall system value:

Table 3.4.2
Bridge System Replacement Value

Asset Type	Asset Component	Overall Replacement Value ($)
Bridges	Brough Creek North Bridge	$500,000.00
	Brough Creek South Bridge	$350,000.00
	Kitchener St Bridge	$800,000.00
	Cedar Island Bridge	$275,000.00
	Victoria Crescent Bridge	$700,000.00
Total Replacement Value:		**$2,625,000.00**

Figure 3.4.1
Breakdown of Bridge System Network Components



The total bridge system replacement value distributed across the number of private dwellings in Orillia (13,734 households - source 2012 Financial Information Return) translates to a value of approximately $165.00 of bridge assets per dwelling.

3.4.4 What Condition is it in?

While an OCI rating has not been applied to any of the bridges, based on the information provided from the City, including the bridge inspections conducted in late 2012 and per the 2011 Transportation Master Plan Update which stated, “The City’s bridges are structurally sound and will not require replacement due to condition in the foreseeable future” the City has determined all their bridges to be in good condition for the purpose of the AMP. Therefore the AMP has assessed the investment requirements over the next 100 years based on their current condition and expected life.

3.4.5 What do we need to do with it?

The deterioration of a bridge is not typically linear and as such a bridge's condition can still be good after numerous years, however is expected to drop quite rapidly in the second half of its projected life. Based on this observation, it is difficult to identify the level and extent of maintenance activities required at pre-determined intervals, but each bridge should be monitored through routine inspections.

3.4.6 When do we need to do it?

The useful life of a bridge structure for the purpose of this AMP has been established as 75 years and the rationale that assets typically fail between 75% to 125% of that useful life remains in effect for bridges as well. The Brough Creek bridges are approximately 80 years old and are beyond their extended lives; however the inspection report completed in 2012 did not identify any issues requiring investment and deemed the bridges in good condition. As a result, the City has estimated a remaining useful life of 15 years. The remaining bridges are currently in good condition. As mentioned above, it is difficult to identify the level and extent of maintenance activities. Therefore the City should address each bridge on an as required basis in accordance with the future inspection reports. The estimated replacement dates for the City's bridge assets are listed in Table 3.4.3:

Table 3.4.3
Bridge Network Asset Useful Lives

Asset Type	Asset Component	Installation Year	Age	Remaining Useful Life (years)	Replacement Date
Bridges	Brough Creek North Bridge*	N/A	N/A	15*	2028
	Brough Creek South Bridge*	1934	79	15*	2028
	Kitchener St Bridge	1994	19	56	2069
	Cedar Island Bridge	1977	36	39	2052
	Victoria Cres. Bridge	1976	37	38	2051

*The City has commented that these bridges have 15 years of life left or more.

3.4.7 How much money do we need?

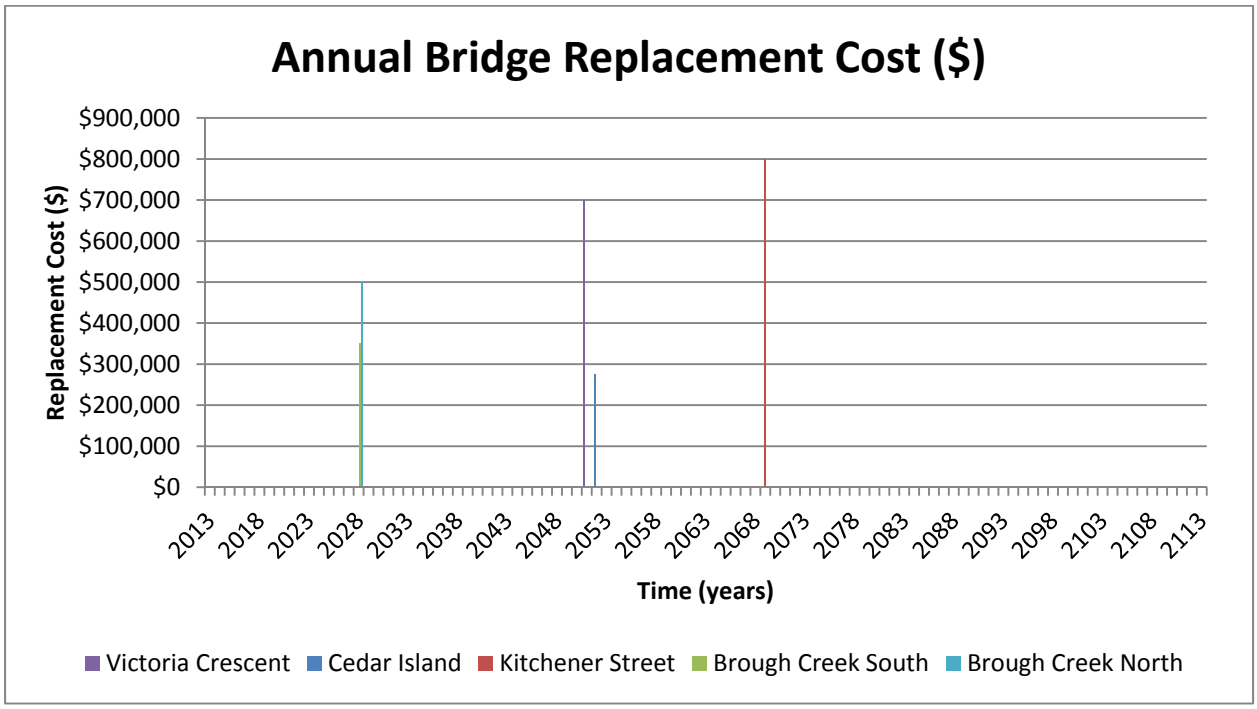
The required future investment into the City's bridge network has been projected over the next 100 years (expected life of the longest lived asset) in Figure 3.4.2. This projection identifies the annual investment required for each of the identified bridges within the system. The time of these investments is heavily reliant on the determination of age and current condition as described earlier in this section.

The analysis that was completed to identify capital investment requirements was based on the following assumptions:

1. Replacement costs based on unit costs identified in Table 3.4.2.
2. The timing (year) of bridge replacement corresponds with the schedule applied in the assumptions section.
3. Investment in the replacement of bridge assets included in this study was defined as the total network replacement value distributed across a 100-year forecast period, based on the predicted timing of required replacement of each bridge.
4. All values are calculated in 2013 dollars.

Based on the assumptions, Figure 3.4.2 displays the annual investment profile from 2013 – 2113 resulting from the analysis.

Figure 3.4.2
Total Bridge System Investment Requirements



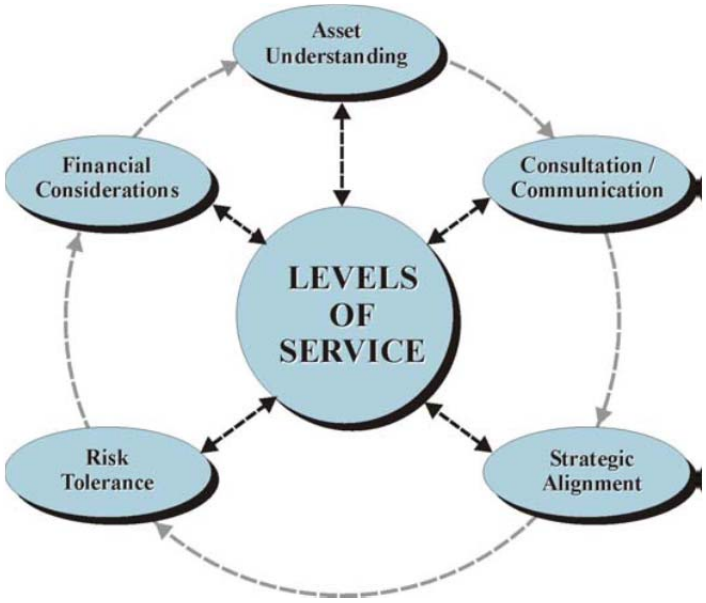
3.4.8 Recommendations:

1. Continue with the bridge condition inspection program. (2014)
2. Review operating and maintenance practices using industry Best Practices as well as other technical documents in order to develop a comprehensive Bridge Management Program, including life cycle cost analysis and risk identification. (>2020)
3. Establish specific and measureable Levels of Service and Performance measures, and monitor. (>2020)
4. Develop the relationship between levels of service and cost, along with appropriate supporting policies. (>2020)

4.0 EXPECTED LEVELS OF SERVICE

In recent years there has been an increase in the attention to service level delivery with respect to infrastructure services (i.e. potable water). The topic of levels of service is becoming increasingly popular at Asset Management conferences across the county as local governments wrestle with the challenges of aging infrastructure. As financial investment pressures increase into the future in order to address the aging infrastructure, it will become necessary to engage the public on these decisions since a critical consideration is the understanding of risk management. However engagement must be inclusive of education on the dynamics of infrastructure services, so that choices with respect to service levels and ability to pay (affordability) can be balanced. While public engagement is clearly a component of service level delivery it is only one component and is not necessarily required in the early development of levels of service. Figure 4.1.1 outlines the primary components of service level delivery.

Figure 4.1.1
Delivery of Service Levels



Ref: National Guide to Sustainable Municipal Infrastructure – Developing Levels of Service

As part of an Asset Management Plan (AMP) Levels of Service (LOS) (desired and affordable) need to be defined, along with performance indicators to measure the municipality's success with respect meeting the defined service levels. Levels of Service (LOS) is defined by InfraGuide as follows: *"Levels of service reflect social and economic goals of the community and may include any of the following parameters: safety, customer satisfaction, quality, quantity, capacity, reliability, responsiveness, environmental acceptability, cost, and availability. The defined levels of service are any combination of the above parameters deemed important by the municipality"*. While the City of Orillia has not undertaken any specific initiatives to define service levels, it has developed three of the components outlined in Figure 4.1, including Asset Understanding (State of the Infrastructure), Financial Considerations (Financial Strategy) and Strategic Alignment (Corporate Vision). For the purposes of this Asset Management Plan, the strategic vision in the City`s Official Plan (refer to the introduction section), Financial Strategy and asset understanding can be used for the identification of strategic levels of service from which high level performance indicators can be identified. For example the vision of ``clean water`` or a ``strong competitive economy' can be defined as a

desired service level for the City from which performance indicators can be defined to measure the success.

Performance Indicators (PI) are defined by InfraGuide as `` *A qualitative or quantitative measure of a service or activity used to compare actual performance against a standard or other target. Performance indicators commonly relate to statutory limits, safety, responsiveness, cost, comfort, asset performance, reliability, efficiency, environmental protection, and customer satisfaction*``. The intent of these performance indicators is to measure how the organisation is performing with respect to meeting the desired service level. InfraGuide cautions against developing and using too many indicators, or indicators which are onerous and do not achieve the desired results, resulting in data overload and frustration in the managing and reporting of the indicators. In order to avoid this, it is important that the indicators follow some basic rules of thumb, including being:

- Manageable
- Relevant
- Meaningful
- Measurable/Quantifiable
- Aligned with objectives

Using the City`s vision statement, financial strategy and state of infrastructure the following Investment Ratios can be used as key performance indicators to measure the City`s ability to meet the desired vision (Level of Service).

- Annualized revenues versus annualized expenditures
- Current network condition versus expected condition
- Total cost of borrowing versus total cost of service
- Cost of capital : life extension of asset (Life Cycle Cost Analysis)

Beyond these strategic service levels, there is a need to further define service levels at a tactical and operational level and appropriately link them to the strategic service levels identified in this report. InfraGuide has developed a best practice that addresses a great deal of these issues, titled “Developing Indicators and Benchmarks”. The following structure of these indicators is below.

Tactical Indicators (example):

1. Less than X% water losses in the distribution system.
2. Number of customer complaints for discolour water

Operational Indicators (example): Current

1. Less than X breaks per km per year (linked to tactical indicator 3 above).
2. Respond to 90% of customer inquiries within X hours.

The City has identified and is measuring several performance indicators through several initiatives, including the Financial Information Return (FIR) Schedule 92, Drinking Water Quality Management System (DWQMS), Annual Inflow and Infiltration Analysis and Non Revenue Water Reports. Other City documents such as the Development Control Program and the 2011 Transportation Master Plan have identified some other indicators, such as Intersection Collision History. Of these reports, the Financial Information Return is currently the most applicable tracking document with respect to performance measures which could be linked to Levels of Service (LOS) and the corporate vision.

The City has committed to continuing the tracking and recording of these existing performance indicators, including maintaining the current level of performance being met in these indicators. Table 4.1.1 below identifies the Performance Measures currently being tracked.

Table 4.1.1
Performance Measures

Asset Type	Performance Measure	Measure	*Current Performance	Tracking Document
Water	Watermain Break Rate	# of breaks / (Total Km of pipe/100)	1.2270	2012 Financial Information Return
	Boil Water Advisories	(# of advisory days x total connections) / total connections	0.00	2012 Financial Information Return
	Customer Complaints	Complaints are tracked through DWQMS, incl. nature, root cause and resolution status.	Not identified	DWQMS Management Review Summary Report
	Regulatory Non Compliance	All non compliances are recorded, including resolution status and action taken	Not identified	DWQMS Management Review Summary Report
Wastewater	Sewer Back ups	# of backups /(total Km of mains/100)	6.6667	2012 Financial Information Return
	Over all condition index (OCI)	% of sewers below OCI 50	36%	2013 Sanitary Sewer Database
	Treatment by-pass	Est. Megaliters of untreated wastewater / (Total megaliters treated + Est. untreated)	0.038%	2012 Financial Information Return
Roads	Intersection Collision History	Total of Collisions, identified by intersection	Not identified	2011 Transportation Master Plan
	Over all condition index (OCI)	# of paved lane km where condition is good to very good / Total paved lane km	37.6%	Road Inventory Management System
Bridges	Condition index	** # of bridges & Culverts rated as good to very good	8	2012 Financial Information Return

* Current performance is taken from the identified tracking document
** Considers only primary components

Moving forward the City must further develop their performance indicators in order to achieve two results: establishment of service levels (e.g. water outages linked to watermain breaks) to be met for each of the operationally measured performances and further define the performance indicators to establish a link with the service levels and the City's Strategic Plan as described previously.

Recommendations:

1. Further develop tactical and operational performance indicators, beyond those already identified.
2. Align the currently tracked performance measures with the measures used in this AMP.
3. Develop specific levels of service (i.e. targets) which are expected to be met for each performance measure.
4. Link the operational and tactical performance measure and levels of service with the strategic performance targets and corporate vision.
5. Develop tools to communicate to customers (tax and rate payers) the service levels and costs associated with the services being provided.

5.0 ASSET MANAGEMENT STRATEGY

The AMP Strategy has been structured as a global set of action plans identified to continue to move the City forward in the sustainable management of their infrastructure. The strategy is derived from the recommended actions for each of the asset groups (water, wastewater, roads and bridges) in addition to actions which should be taken to develop a corporate wide review of assets.

The strategy has been broken down in to 5 specific groups discussed in the following sections.

5.1 Infrastructure Policy Strategies

The development of appropriate infrastructure policies and practices will help the City make informed and sustainable decisions. These policies and practices should allow for innovative thinking from City staff, consultants, contractors and suppliers in the delivery of infrastructure services and consider at a minimum financial, social, technical and environmental implications. For example, the review of procurement policies to allow for best life cycle solutions through best value analysis versus low bid helps to further improve the overall sustainable management of infrastructure. The following policies are recommended for the City's review and consideration.

- Review of procurement methods, including the use of Best Value Award policies, which consider the quality and overall value of service with the cost of the services being provided by contractors, consultants, suppliers, etc.
- Complete technical reviews of potential technological services which could provide better life cycle cost. For example structural rehabilitation technologies for sewers and watermains which can extend the life of these assets at a significantly lower cost than replacement.
- Review of financial policies to continually improve financing strategies to allow for the most optimum funding of programs.
- Develop rehabilitation and replacement programs on a system wide basis versus annual project by project basis. This will allow for improved prioritization and co-ordination of required works within similar geographic areas. For example the co-ordination of all required infrastructure improvements within small geographic areas (e.g. road right of way). This approach will also help to ensure that appropriate prioritization of work can be optimized with respect to the timing of co-ordinated work (i.e. the advancement or delay of one asset replacement/rehabilitation to co-ordinate with another).
- Improve current data management practices through the use of a centralized asset repository, which can be linked to existing software in use for the various assets.

5.2 Inspection and Maintenance Activities

Infrastructure condition assessment (i.e. Inspections) are at the core of an Asset Management Plan. The assessment of the useful remaining life of an asset forms the basis for the predicted timing of rehabilitation and replacement. These condition assessment programs should be established based on industry standards to ensure a reasonable condition grade can be assigned to an asset and further it is consistent and repeatable so that subsequent assessments can be completed in the same manner year over year. This allows for the development of asset deterioration and depreciation curves to better define when assets will require rehabilitation and replacement, which will improve the deterioration assumptions made in this AMP. The following recommendations with respect to the development or refinement of all the City's condition assessment programs are presented for the City's consideration:

- Develop a watermain inspection and assessment program, including methodology and practices.

- Refine current sewer inspection program to adopt industry defect coding standards (e.g. WRc, CSA 4012, PAPC).
- Develop alignment with condition ratings across road, water and sewer, to improve comparability when making investment priorities in the City's road right of ways.
- Further refine decision making process to include asset risk, probability of failure and consequence of failure.

5.3 Replacement and Rehabilitation Strategies

Rehabilitation investments for linear assets has been incorporated into the investment forecasts. The forecasted rehabilitation is based on a structural rehabilitation which provides extended life and does not account for any rehabilitation which only provides service enhancements without extended life (e.g. cement mortar coating of watermains). The forecasted costs and estimated life extensions have been identified within the sections of this report pertaining to linear assets. The following recommendations are presented for the City's consideration:

- Development of annual structural rehabilitation programs for water and wastewater pipes.
- Development of annual pavement preservation programs to provide the City with the ability to extend the life of their paved roads.

5.4 Growth Strategies

As the City grows and new developments (e.g. subdivisions) are added, it increases the City's overall inventory of infrastructure assets which must be operated, maintained, rehabilitated and eventually replaced. In order to ensure these new assets are funded adequately, additional revenues must be acquired, which will come from the new rate and levy payers. However in some cases this does not fully cover the required future investments (maintenance, rehabilitation, replacement and enhancements). It is understood that the City has completed a financial strategy for future growth and required enhancements which will compliment this AMP in providing a completed financial forecast. The following recommendations with respect to growth are presented for the City's consideration:

- A review of the City's growth plan should be completed to ensure a sustainable balance between the cost of infrastructure and new revenues is achieved.
- Integrate the financial plan presented in the AMP with the City's financial plan for major capital, which is understood to have been undertaken simultaneously with the development of the AMP. This will help to establish a complete financial projection over the next 20 to 30 years, incorporating both investments for current infrastructure plus infrastructure enhancements, including growth related enhancements.

5.5 Corporate review of assets (services)

While the development of this AMP is a significant step towards infrastructure sustainability, the assets included in the plan cover only a portion of the City's total asset portfolio. In order to ensure the City is allocating its infrastructure funds in a manner which provides the most benefit to the community, the inclusion of all owned assets is required. The following recommendations are presented for the City's consideration:

- Expand the AMP to include additional assets, such as storm water, facilities, transportation, fleet, etc. This could be done in a phased approach over the next few years prior to updating the water, wastewater, roads and bridges portion of the AMP.
- Update the City's PSAB registry with the information from this AMP and continue to align the AMP with the PSAB registry.

5.6 Risk associated with achieving AMP objectives.

While this AMP is projecting future investment requirements, it is impossible to anticipate future impacts which could negatively impact the City in sustaining its infrastructure. These impacts can be economic, social, environmental, regulatory, etc. As such, consideration in the financial strategy must account for these impacts in order to manage the extent to which affordability and level of service are affected. Some of these impacts may include:

- Local, national or global economic changes, such as oil prices affecting the cost of asphalt, which occurred in 2008/2009 and significantly impacted the cost of road reconstruction (replacement).
- Environmental regulation, such as the potential for storm water treatment.

In order to mitigate the impact of future risks associated with infrastructure funding, the following recommendations are presented for the City's consideration:

- Allow for flexibility in the financing of infrastructure, including managing debt levels to allow for room for these unanticipated impacts.
- Development of an asset reinvestment plan (i.e. sustainability plan for new assets)
- Develop programs aimed at extending the life of assets, such as rehabilitation programs for watermains and preservation programs for paved roads.

5.7 Summary of Recommendations and Timelines.

Recommendations for each asset class (Water, Wastewater, Roads and Bridges) have been provided within the appropriate sections of this report (see section 3). The report recommendations have been summarized with the estimated timing of the initiative (Table 5.7.1). The timing of the recommended initiatives considers two primary factors: recommendations associated with an asset class which is currently underfunded and recommendations associated with an asset class which has weak information (e.g. condition data) from which to project future need.

Table 5.7.1
Table of Recommendations

Priority	Asset Class – Description	2014	2015	2016	2017	2018	2019	2020	>2020
	Water								
1	Develop a condition assessment program in order to apply clear repeatable condition grades to both linear and facility system assets. (2014 – 2015)								
2	Review the use of available rehabilitation technologies which are suitable to the City's water distribution network and could provide better life cycle costs and help to reduce the back-log. (2014 – 2015)								
3	Develop a watermain management program, including a complete risk assessment process and decision process with consideration for life cycle analysis of options.(2015- 2016)								
4	Re-evaluate the system backlog upon completion of a refined condition assessment program. (2015 - 2016)								
5	Provide updates to the State of the Infrastructure in co-ordination with the Asset Management Plan update after any significant update or change to the Water System data (i.e. After development of condition assessment program). (2017-2018)								

Priority	Asset Class – Description	2014	2015	2016	2017	2018	2019	2020	>2020
6	Establish specific and measureable performance measures to support expected Levels of Service. (2018 -2020)								
7	Develop the relationship between levels of service and cost, along with appropriate supporting policies. (2018 – 2020)								
8	Continue to annually populate asset registries to update and confirm the current information.	●	●	●	●	●	●	●	●
9	Incorporate the AMP into the next Water System Master Plan Update								
	Wastewater								
1	Where available utilize industry recognized condition grading standards, e.g. WRc or CSA 4010 for sewer condition grading. Given the availability and recognition of well established condition grading systems in Canada, it is recommended that this be completed in 2014.								
2	Review the use of available rehabilitation technologies which are suitable to the City's sewer network and will provide a better life cycle solution.(2014 – 2015)								
3	Develop a sewer management program, including a complete risk assessment process and decision process with consideration for life cycle analysis of options. (2014).								
4	Develop condition assessment programs for wastewater facilities. The program should be established with an appropriate inspection cycle based on the current condition (or expected remaining life) and criticality of the facility component								
5	Continue with the City's CCTV Inspection of its sewer segments to update the known condition of the sewers. A program should be established with an appropriate inspection cycle based on the current condition and criticality of the sewer. (2015- 2016)								
6	Re-Evaluate the condition of the sewers using a standard format and reassess the backlog investment projection. (2016)								
7	Establish specific and measureable performance measures to support expected strategic service levels. (2016-2017)								
8	Develop the relationship between levels of service and cost, then develop a policy regarding levels of service and cost.(2016 – 2018)								
9	Review associated funding levels with the aim of ensuring that systems are maintained with the least cost over the life of the asset. (Annually).	●	●	●	●	●	●	●	●
10	Provide updates to the State of the Infrastructure in co-ordination with the Asset Management Plan update after any significant update or change to the Sewer System data (i.e. After the review and update of the condition assessment program). (2016-2018)								
	Roads								
1	Review operating and maintenance practices using the Best Practices as well as other technical documents in order to develop a pavement management program, including decision matrix, life cycle cost analysis and risk assessment.(2015 -2016)								
2	Develop a Pavement preservation program, through the review and use of available pavement technologies/treatments which are suitable to extend pavement life. (2016- 2018)								
3	Review existing industry recognized standard for the inspection of roads and adopt standard for future road inspections.(2016-2017)								
4	Review associated funding levels with the aim of ensuring that systems are maintained with the least cost over the life of the asset.(2016 – 2018)								
5	Establish specific and measureable Levels of Service and Performance measures, and monitor.(2018 – 2020)								
6	Develop the relationship between levels of service and cost, and then develop a policy regarding levels of service and cost.(>2020)								

	Bridges								
1	Continue with the Bridge condition inspection program (2014)								
2	Review operating and maintenance practices using industry Best Practices as well as other technical documents in order to develop a comprehensive Bridge Management Program, including life cycle cost analysis and risk identification.(>2020)								
3	Establish specific and measureable Levels of Service and Performance measures, and monitor.(>2020)								
4	Develop the relationship between levels of service and cost and develop policy regarding levels of service and cost.(>2020)								

Additional Global Recommendations:

- Continue with the City's current level of funding within each asset class, until such time as the AMP is updated subsequent to the completion of recommended initiatives which address the level of detailed condition information.
- Review and update the AMP every 5 years
- Alignment of condition grading systems for clear communication of asset conditions across asset classes e.g. alignment of ascending and descending condition grades to ensure all assets are aligned to depict good to bad condition in the same order (descending or ascending).

6.0 FINANCING STRATEGY

6.1 Introduction

Investments made too early are a financial detriment while investments made too late increase exposure to risk and additional costs.

For the purposes of this report, it was assumed that timing of capital projects can be adjusted to accommodate financial smoothing. In reality this may not be cost effective since it does not consider doing the right thing to the right asset at the right time. Refined systems are required in order to take this approach.

As the City continues to develop its asset management programs and infrastructure reinvestment strategies it will be in a better position to optimize infrastructure expenditures. This will require the development of refined processes and tools to more accurately define the need and current timing of infrastructure investments (i.e. technical smoothing). These may include:

- Integrated Right of way investment optimization.
- Risk Management (consequence and probability).
- Improved assessment of asset condition, moving from observation based assessment to fact based assessment.
- Infrastructure reinvestment policies.
- Improved asset registries.
- City specific deterioration curves.
- Clear expected levels of service.
- Improved ability to measure and report performance.

These processes and tools have been identified in the Asset Management Strategy. Once implemented, the strategy will allow concurrent technical and financial smoothing.

The financial strategy has been prepared using the future capital requirements for roads, bridges, water and wastewater from 2013 (including backlog) to 2113 as presented in the State of Infrastructure section of this report. These future capital requirements were taken to develop a financial strategy, with a focus on the first 50 years to get an appreciation of the capital requirements during this time and then developing a financial strategy with proposed sources of financing over the next 20 years

6.2 Financial Strategy Approach

Ensuring adequate funding recognizes the challenges facing the City of Orillia and virtually all Canadian municipalities due to the need to fund infrastructure renewal needs. As such, the development of a financial strategy to support asset management principles is based on financial sustainability. Financial sustainability is supported by the following:

- **Flexibility** - Able to respond to changing circumstances, which may relate to economic, environmental or political conditions.
- **Efficiency** - Using public funds in ways that are cost effective to provide services within the amount of funding available.
- **Sufficiency** - Having sufficient resources to support the delivery of services for which the City of Orillia bears responsibility.
- **Integration** - Ensuring the financial constraints under which the City operates are fully considered when engaging in policy-making and decision-making.

- **Credibility** - Achieving financial performance in a way that maintains and enhances public confidence in the City.

In September 2012, the Federation of Canadian Municipalities (FCM) released Canada's first report on the state of our Nation's infrastructure. The Canadian Infrastructure Report Card estimated that the average household in Canada has a combined infrastructure deficit of $13,813 in water, stormwater, wastewater, and road infrastructure. In comparison, Orillia is generally in better state than most municipalities. For example, the City's infrastructure deficit per household is estimated to be $2,035 for water, wastewater, roads and bridges however, the deficit will continue to grow without the implementation of appropriate sustainable management. While this AMP does not include storm (which was outside the scope of this study), Orillia's infrastructure deficit is well below the average across other Canadian municipalities. There are however a number of challenges facing Orillia in the future to fund the investment needs of assets on a timely basis while continuing to provide affordable programs and services.

The financial strategy recognizes that the magnitude of the roads, bridges, water and wastewater requirements and the existing infrastructure deficit cannot be addressed in a short timeframe. The financial strategy is built on a desire to eliminate all backlog within a period of 10-15 years and meet future requirements on a go forward basis.

6.3 Financial Strategy Assumptions

The following summarizes the key assumptions used in the preparation of the financial strategy for water, wastewater, roads and bridges:

- 2% annual operating expenditure increase
- 3% interest earning on reserve balances
- 3% annual increase in capital replacement costs
- Existing funding sources, as identified in the 2013 budget are used as the base for the forecast with annual percentage increases to address infrastructure funding requirements over the next 20 years
- Internal financing will be permitted from the roads, water and wastewater reserves to address requirements across the three asset classes but will be repaid to the respective reserve over time.
- External financing will be used as required. Debt will be issued for 15 years at the most current Infrastructure Ontario rate of 3.69%
- Existing Gas Tax Revenue of $1.85 million annually (not inflated)
- No growth related capital has been included in analysis as the financial strategy relates to the investment needs of existing assets.
- Bridges capital requirements are jointly funded from external sources and only the City's share has been included in the analysis.

It is important to keep in mind that assumptions may significantly change over time. In addition, capital cost estimates may vary from current projections. As such, there is a need to monitor the financial strategy over time.

6.4 Water

6.4.1 Water Capital Investment Requirements

Capital investments have been projected to 2113 in the state of infrastructure section of this report and funding needs have been included in the financial strategy for 2014-2033. The intent of the financial strategy is to ensure that funding will be available when needed for capital investment.

Capital investment funds beyond 2033 should be considered in the next update of the financial strategy.

An analysis was undertaken of investment requirements over the next 50 years, with a focus on the estimated requirements over 10 year increments to get an appreciation of the short term, medium and long term requirements. The following table reflects the estimated requirements, over each of the next 10 years (in 2013 dollars):

Table 6.4.1
Estimated Water Requirements

Water Replacement Requirements (millions)		% of Total
Years 1-10	$ 35.97	24%
Years 11-20	$ 32.36	22%
Years 21-30	$ 24.09	16%
Years 31-40	$ 28.54	19%
Years 41-50	$ 28.76	19%
Total	$ 149.73	100%

As shown in table 6.4.1, there is an estimated water investment requirement of $36 million over the next 10 years which includes $5.5 million in backlog. The backlog is primarily related to pipe replacement and rehabilitation. It should be noted that 46% of the capital investment requirements over the next 50 years occur in the first 20 years of the plan.

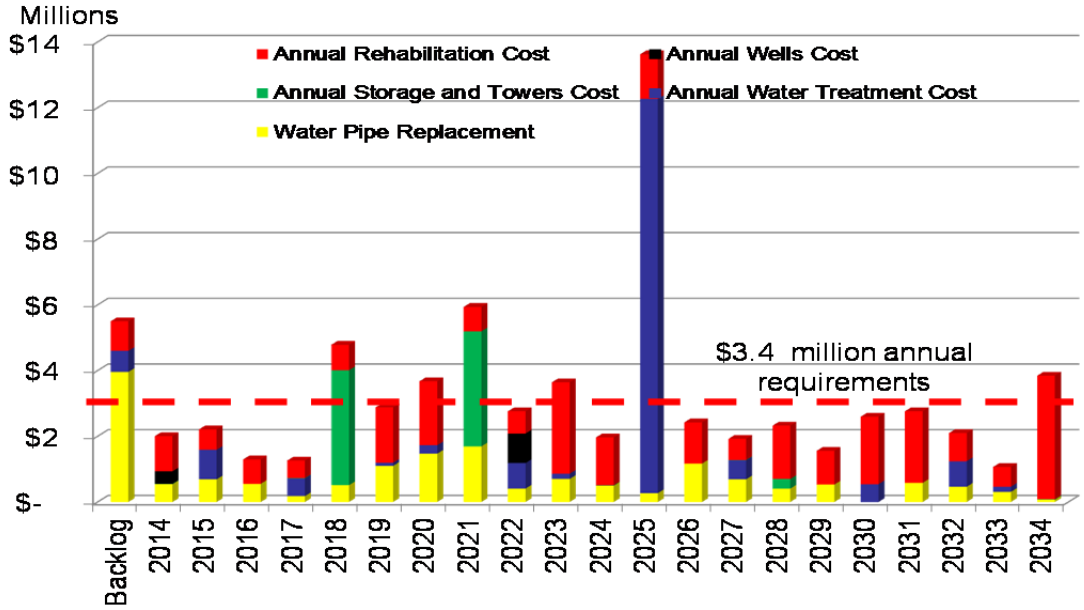
Table 6.4.2 provides a summary of the investment requirements for each type of water infrastructure.

Table 6.4.2
Water Investment Requirements by Asset Class

Water 2013 dollars	20 Years + Backlog Millions	50 Years + Backlog Millions
Water Pipe Replacement	$ 16.73	$ 19.54
Water Treatment Cost	$ 17.42	$ 52.19
Storage and Towers Cost	$ 7.34	$ 8.94
Wells Cost	$ 1.28	$ 5.71
Rehabilitation Cost	$ 25.56	$ 63.34
Total Water	$ 68.34	$ 149.73

Figure 6.4.1 reflects the annual requirements over the next 20 years to provide an understanding of the timing of the investment requirements. Over the next 20 years, the average annual investment requirement is $3.4 million (in 2013 dollars) however the requirements vary on an annual basis.

Figure 6.4.1
Annual Water Requirements Over 20 Years



As illustrated in Figure 6.4.1, there are significant capital investment needs in 2025 related to the filtration plant.

6.4.2 Existing Water Funding Requirements and Identification of Funding Gaps

A comparison was made of the existing funding sources used by the City of Orillia to support water investment in relation to the funding requirements anticipated over time (in 2013 dollars). See Table 6.4.3.

Table 6.4.3
Water Infrastructure Deficit

Water	In Millions
Water Contribution to Reserve	$ 1.7
10 Year Annual Funding Requirements	$ 3.6
20 Year Annual Funding Requirements	$ 3.4
30 Year Annual Funding Requirements	$ 3.1
40 Year Annual Funding Requirements	$ 3.0
50 Year Annual Funding Requirements	$ 3.0
Annual Gap with 10 year forecast	$ (1.9)
Annual Gap with 20 year forecast	$ (1.7)
Annual Gap with 30 year forecast	$ (1.4)
Annual Gap with 40 year forecast	$ (1.3)
Annual Gap with 50 year forecast	$ (1.3)

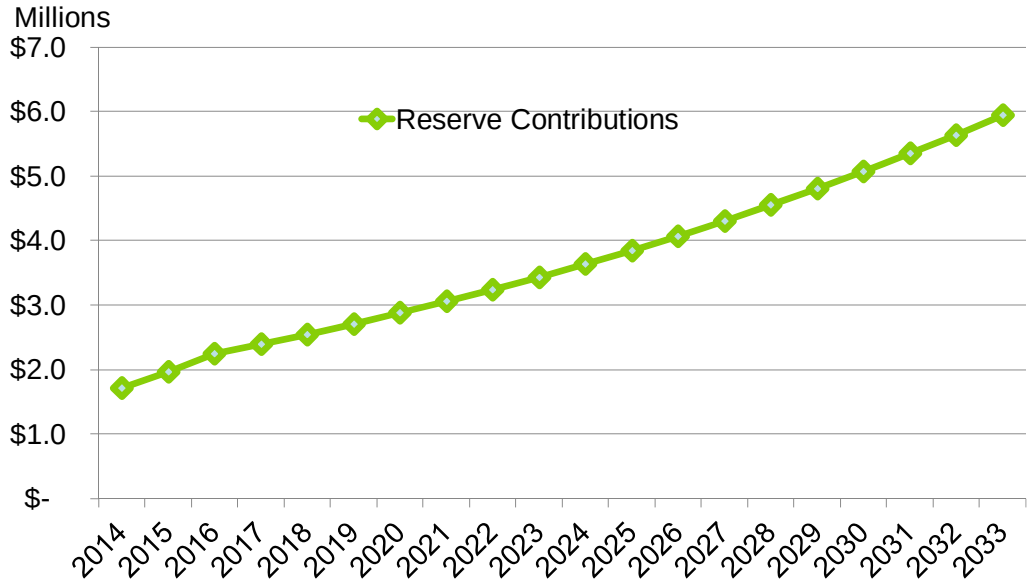
As shown in Table 6.4.3, the existing sources of financing are insufficient to support the water capital program. On average, over the next 20 years there is an average annual requirement of $3.4 million (in 2013 dollars) in comparison to the existing contribution of $1.7 million, resulting in an annual infrastructure deficit of $1.7 million. As a result, phase in strategies are required to address this issue over time.

6.4.3 Recommended Financial Strategies - Water

The following strategies are recommended over the next 20 years to address water infrastructure requirements:

- **Backlog -** A phase in strategy is recommended to address the water infrastructure backlog over a period of 15 years to balance affordability and future asset investment requirements.
- **Increase Reserve Contributions –** The recommended strategy is to ensure that funding is increased, over time, to plan for the future requirements. This will require increases in contributions to the capital investment reserve. Figure 6.4.2 reflects the annual contributions to the Water Capital Reserve (inflated dollars).

Figure 6.4.2
Annual Water Contributions



- **Rate Revenue Requirements -** In order to fully fund the water capital requirements (*for existing assets only*) over the next 20 years, the following provides the forecast annual increase in rate revenue requirements:
    - 7% rate revenue requirement increase in 2014 and 2015
    - 4% rate revenue requirement increase from 2016-2033
- **Internal and External Financing:** From a cash flow perspective, the forecast assumes that internal financing from within the Roads, Water and Wastewater Reserves will be permitted to address short term requirements across the three asset classes and repaid with interest. However, based on the water filtration plant replacement requirements in 2025 and limited reserve balances, it is recommended that the City issue external debt as there is insufficient time to build the reserve and still maintain ratepayer affordability. The forecast assumes that $18 million would be issued in debt in 2025. There are years where the Water Reserve will

be in a negative position and will require temporary internal financing from other reserves (e.g. Roads). Based on the analysis of the Roads, Water and Wastewater Reserve position, sufficient funds appear to be available to internally finance these requirements over the next 20 years.

- **Gradual Investment -** To avoid significant peaks and valleys in capital spending, the pipe replacement and rehabilitation has been spread more evenly over the next 20 years.

As shown in figure 6.4.3, the modified water capital plan gradually increases the water capital replacement and rehabilitation program for pipes (note the graph excludes filtration plant, storage and wells which cannot be smoothed) which avoids the peaks and valleys in the projected investment schedule.

Figure 6.4.3
Modified Water Capital Plan

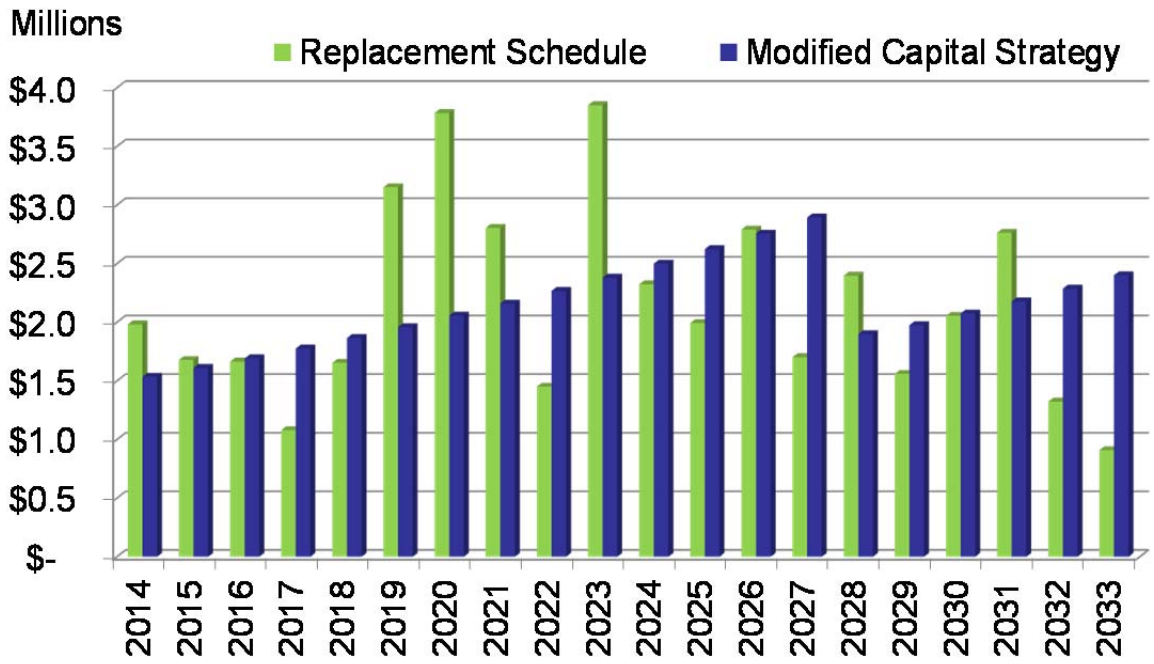
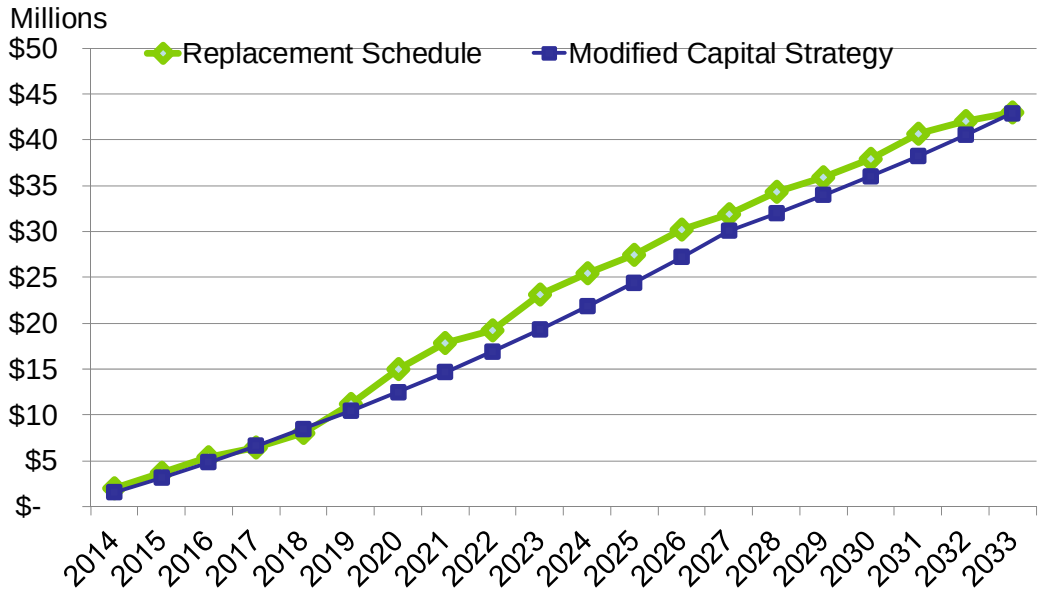


Figure 6.4.4
Modified Water Capital Strategy



6.4.4 Water Financial Summary

- Appendix A provides the 20 year Water Operating and Capital Budgets.
- Based on the analysis undertaken, it is estimated that the City will need to spend $150 million (2013 dollars) on water infrastructure investment over the next 50 years.
- The financial plan focuses on the first 20 years of the investment requirements which reflects a need to gradually increase contributions to the Water Capital Reserves to address the existing infrastructure gap and future funding requirements.
- The existing water supported contributions of $1.7 million is below spending requirements which average approximately $3.4 million a year over the next 20 years. This has been addressed by gradually increasing the contribution over the next 20 years.
- The existing infrastructure gap of $5.5 million is addressed over the first 15 years of the plan.
- Due to the timing of capital needs, it is anticipated that internal and external financing will be required to address pipe replacement/rehabilitation and treatment replacement costs over the next 20 years.
- Rate revenue requirements will need to be increased annually above inflation over the next 20 years (7% in 2014 and 2015 and 4% thereafter) to *address existing infrastructure only*.

6.5 Wastewater

6.5.1 Wastewater Capital Investment Requirements

Capital investments have been projected to 2113 in the state of infrastructure section of this AMP and funding needs have been included in the financial strategy for 2014-2033. The intent is to ensure that funding will be available when needed for capital investment. Capital investments beyond 2033 should be considered in the next update of the financial strategy.

An analysis was undertaken of investment requirements over the next 50 years, with a focus on the estimated requirements over 10 year increments to get an appreciation of the short term, medium and long term requirements. Table 6.5.1 reflects the estimated requirements, over each of the next 10 year increments:

Table 6.5.1
Estimated WasteWater Requirements

Wastewater Replacement Requirements (millions)		% of Total
Years 1-10	$ 54.07	40%
Years 11-20	$ 17.99	13%
Years 21-30	$ 17.31	13%
Years 31-40	$ 33.38	25%
Years 41-50	$ 11.88	9%
Total	$ 134.64	100%

As shown in table 6.5.1, there is an estimated wastewater investment requirement of $54 million over the next 10 years which includes $18.9 million in backlog. The backlog is primarily related to pipe replacement and rehabilitation. It should be noted that 53% of the capital investment requirements over the next 50 years occur in the first 20 years of the plan.

Table 6.5.2 provides a summary of the investment requirements for each type of wastewater infrastructure.

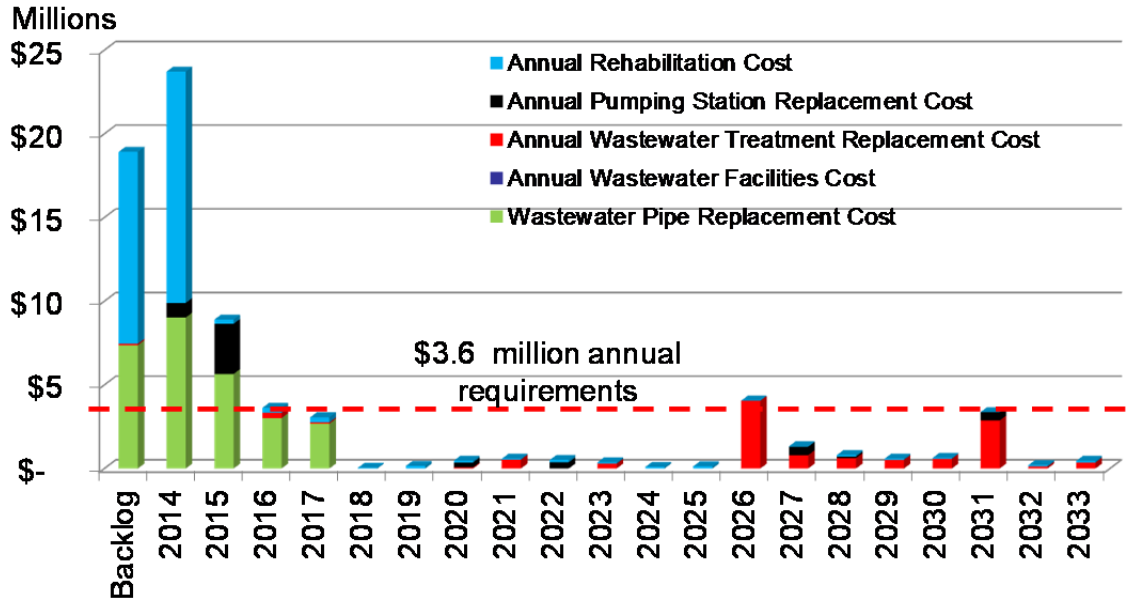
Table 6.5.2
WasteWater Investment Requirements by Asset Class

WW 2013 dollars	20 Years + Backlog Millions	50 Years + Backlog Millions
Wastewater Pipe Replacement Cost	$ 27.73	$ 27.73
Wastewater Facilities Cost	$ -	$ -
WW Treatment Replacement Cost	$ 26.82	$ 51.16
Pumping Station Replacement Cost	$ 7.01	$ 27.58
Rehabilitation Cost	$ 27.82	$ 28.17
Total WW	$ 89.38	$ 134.64

As shown in table 6.5.2, within the next 50 years, all pipe replacement is scheduled to take place within the next 20 years. This is largely the case for pipe rehabilitation/replacement which is also a driver in the first 20 years of the capital plan.

Figure 6.5.1 reflects the annual requirements over the next 20 years to provide an understanding of the timing of the investment requirements. Over the next 20 years, the average annual investment requirement is $3.6 million (2013 dollars) however the requirements vary on an annual basis.

Figure 6.5.1
Annual WasteWater Requirements Over 20 Years



6.5.2 Existing Wastewater Funding Requirements and Identification of Funding Gaps

A comparison was made of the existing funding sources used by the City of Orillia to support wastewater investment in relation to the funding requirements anticipated over time. (See table 6.5.3)

Table 6.5.3
WasteWater Infrastructure Deficit

WW	In Millions	
WW Contribution to Reserve	$	3.3
10 Year Annual Funding Requirements	$	6.0
20 Year Annual Funding Requirements	$	3.6
30 Year Annual Funding Requirements	$	3.0
40 Year Annual Funding Requirements	$	3.1
50 Year Annual Funding Requirements	$	2.7
Gap with 10 year forecast	$	(2.7)
Gap with 20 year forecast	$	(0.3)
Gap with 30 year forecast	$	0.3
Gap with 40 year forecast	$	0.3
Gap with 50 year forecast	$	0.6

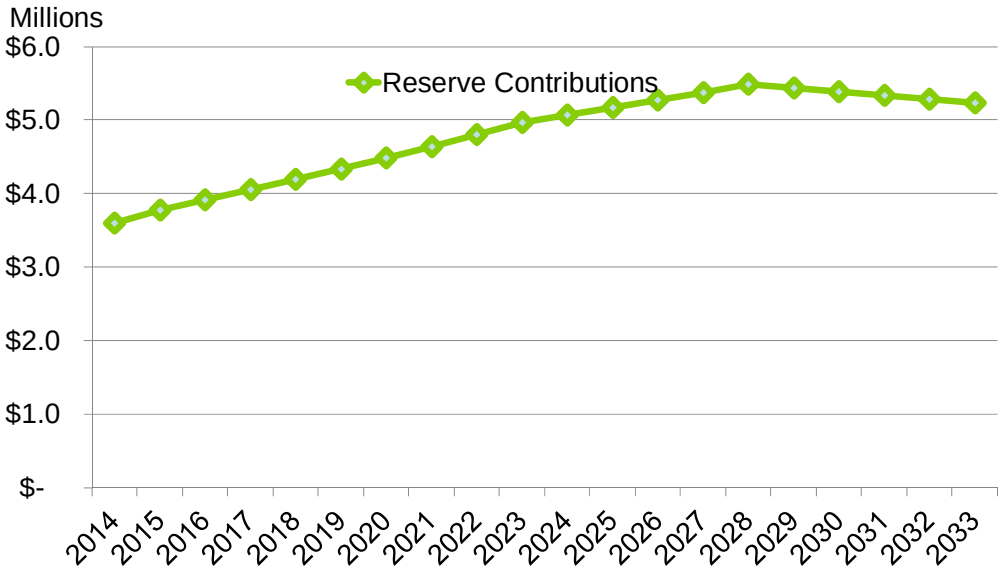
Over the next 10 years, there is a need to contribute $6.0 million annually compared with the existing $3.3 million contribution. Over the next 20 years there is an average annual requirement of $3.6 million, slightly higher than the existing contribution of $3.3 million. Phase in strategies will be required to address the needs over the next 10 years where the capital requirement is highest. Also, as shown in table 6.5.3, the annual funding gap in wastewater over the next 20 years is lower than in water, despite having a higher backlog.

6.5.3 Recommended Financial Strategies - Wastewater

The following strategies are recommended over the next 20 years to address wastewater infrastructure requirements:

- **Backlog -** A phase in strategy is recommended to address the wastewater infrastructure backlog of $18.9 million over a period of 15 years to balance affordability and asset investment requirements.
- **Increase Reserve Contributions –** The recommended strategy is to ensure that funding is increased, over time, to plan for the future requirements. This will require increases in contributions to the capital investment reserve from 2014-2028 which can then be reduced slightly from 2029-2033.

Figure 6.5.2
Annual WasteWater Contributions



- **Rate Revenue Requirements –** The recommended strategy is to ensure that funding is increased, over time, to plan for the future capital and operating requirements. Initially, this will require increases in capital contributions to reserves. In order to fully fund the wastewater capital requirements (*for existing assets only*) over the next 20 years, the following provides the forecast annual increase in rate revenue requirements:
  - 6% rate revenue requirement increase in 2014
  - 4% rate revenue requirement increase in 2015
  - 3% rate revenue requirement increase from 2016-2023
  - 2% rate revenue requirement increase from 2024-2028
  - 0% rate revenue requirement increase from 2028-2033

- **Internal and External Financing:** From a cash flow perspective, the forecast assumes that internal financing from within the Roads, Water and Wastewater Reserves will be permitted to address requirements across the three asset classes and repaid with interest. The forecast assumes no external debt, relying on the ability to utilize internal financing resources.
- **Gradual Investment -** To avoid significant peaks and valleys, the pipe replacement and rehabilitation has been smoothed in relation to the projected investment schedule. The smoothing strategy is to replace wastewater assets on time or with a planned deferral program. This is necessary given the funding gap that will gradually be addressed.

As shown in figure 6.5.3, the modified wastewater capital plan gradually increases the wastewater capital replacement and rehabilitation program for pipes only (i.e. the graph excludes treatment plant and pumping stations which cannot be smoothed) which avoids the peaks and valleys in the projected investment schedule.

Figure 6.5.3
Modified WasteWater Capital Plan

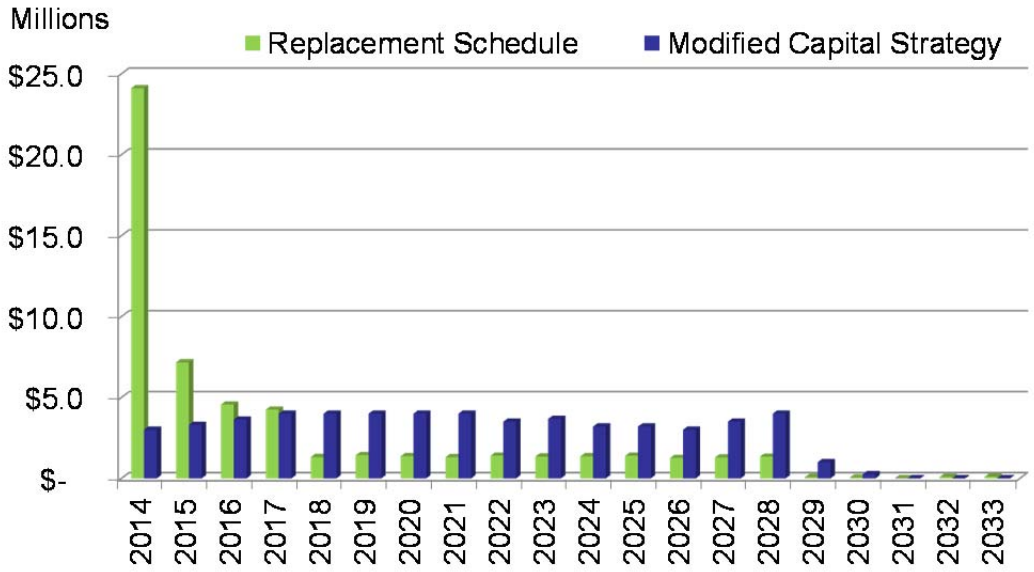
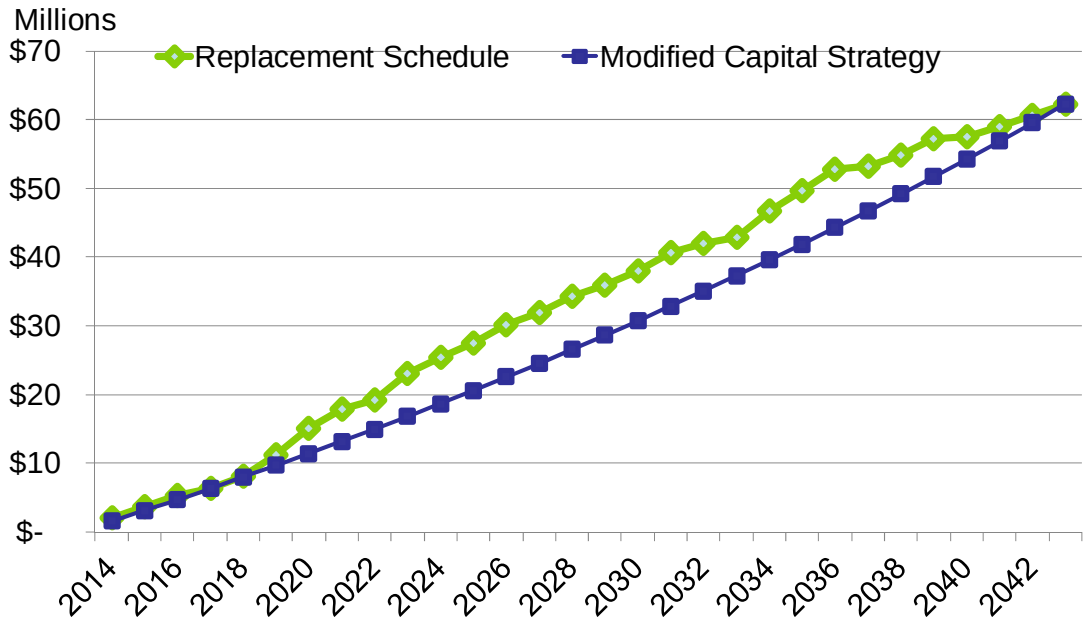


Figure 6.5.4
Modified WasteWater Capital Strategy



6.5.4 Wastewater Financial Summary

- Appendix B provides the 20 year Wastewater Operating and Capital Budgets.
- Based on the analysis undertaken, it is estimated that the City will need to spend $135 million on wastewater infrastructure investments over the next 50 years.
- The financial plan focuses on the first 20 years of the investment requirements which reflects a need to gradually increase contributions to the Wastewater Capital Reserves to address the existing infrastructure gap and future funding requirements.
- The existing wastewater supported contributions of $3.3 million is below spending requirements which average approximately $3.6 million a year over the next 20 years.
- Due to the timing of capital needs, it is anticipated that internal financing will be required to address pipe investments over the next 20 years.
- Rate revenue requirements will need to be increased annually above inflation over the next 10 years (6% in 2014, 4% in 2015 and 3% from 2016-2023) to address existing infrastructure only.

6.6 Roads and Bridges

6.6.1 Roads and Bridges Capital Investment Requirements

Capital investments have been projected to 2113 in the state of infrastructure and funding needs have been included in the financial strategy for 2014-2033. The intent is to ensure that funding will be available when needed for capital investments. Capital investments beyond 2033 should be considered in the next update of the financial strategy.

An analysis was undertaken of investment requirements over the next 50 years, with a focus on the estimated requirements over 10 year increments to get an appreciation of the short term, medium and long term requirements. Table 6.6.1 reflects the estimated requirements, over each of the next 10 years (2013 dollars):

Table 6.6.1
Estimated Roads and Bridges Requirements

Roads Replacement Requirements (millions)		% of Total
Years 1-10	$ 19.07	9%
Years 11-20	$ 25.56	12%
Years 21-30	$ 68.10	32%
Years 31-40	$ 46.83	22%
Years 41-50	$ 53.57	25%
Total	$ 213.14	100%

As shown in table 6.6.1, there is an estimated roads and bridges investment requirement of $19 million over the next 10 years which includes $3.5 million in backlog. The backlog is primarily related to urban local roads. It should be noted that only 21% of the capital investment requirements over the next 50 years occur in the first 20 years of the plan which differs from the water and wastewater capital requirements which have larger proportional capital requirements in the first 20 years. As such, while the focus of the financial strategy is on the first 20 years of the plan, it is important to consider the capital requirements beyond this time as the costs are expected to increase dramatically.

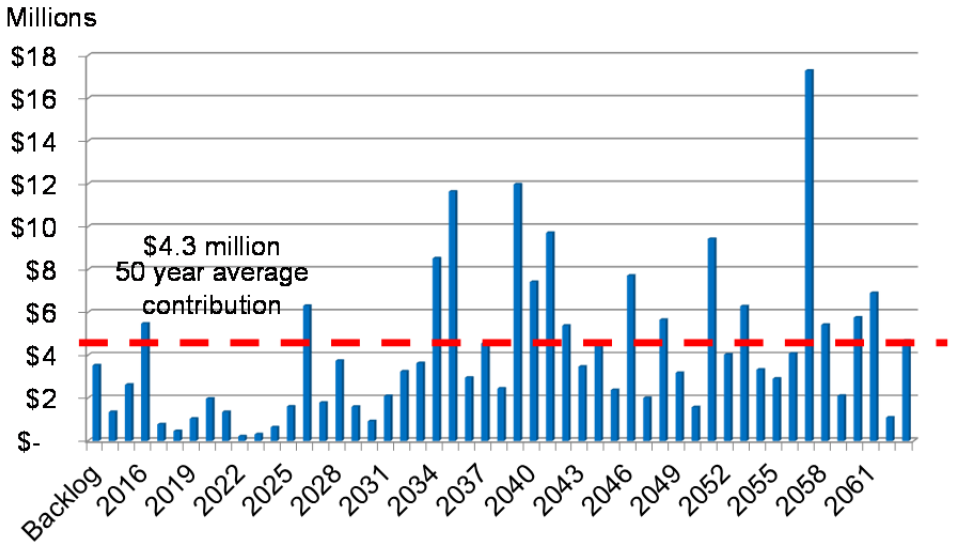
Table 6.6.2 provides a summary of the investment requirements for each type of roads and bridges infrastructure.

Table 6.6.2
Roads and Bridges Investment Requirements by Asset Class

Roads and Bridges 2013 dollars	20 Years + Backlog Millions	50 Years + Backlog Millions
Roads and Bridges		
Urban Arterial	$ 9.48	$ 68.49
Urban Collector	$ 13.17	$ 48.29
Urban Local	$ 21.56	$ 95.45
Bridges	$ 0.43	$ 0.91
Total Roads & Bridges	$ 44.64	$ 213.14

Figure 6.6.1 reflects the annual requirements over the next 50 years to provide an understanding of the timing of the investment requirements. Over the next 20 years, the average annual investment requirement is $2.2 million however, as illustrated below, the majority of the infrastructure investment requirements occur after the first 20 years. Over the next 50 years, the average annual contribution is $4.3 million. This must be taken into consideration in the development of the financial strategy.

Figure 6.6.1
Annual Roads and Bridges Requirements



6.6.2 Existing Roads and Bridges Funding Requirements and Identification of Funding Gaps

A comparison was made of the existing funding sources used by the City of Orillia to support roads and bridge investments in relation to the funding requirements anticipated over time (2013 dollars).

Table 6.6.3
Roads and Bridges Infrastructure Deficit

Roads and Bridges	In Millions
Existing Roads and Bridges Funding	$ 4.3
10 Year Annual Funding Requirements	$ 1.9
20 Year Annual Funding Requirements	$ 2.2
30 Year Annual Funding Requirements	$ 3.8
40 Year Annual Funding Requirements	$ 4.0
50 Year Annual Funding Requirements	$ 4.3
Annual Gap with 10 year forecast	$ 2.3
Annual Gap with 20 year forecast	$ 2.0
Annual Gap with 30 year forecast	$ 0.5
Annual Gap with 40 year forecast	$ 0.3
Annual Gap with 50 year forecast	$ (0.0)

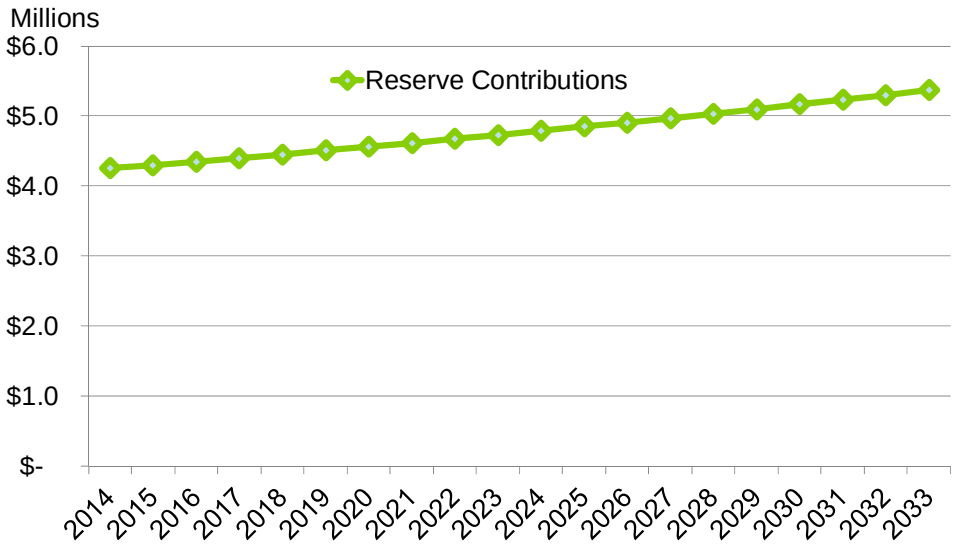
As shown in table 6.6.3, the existing sources of financing are sufficient to support the roads and bridges capital program over the next 50 years with the existing funding sources. As previously discussed, there is a need to maintain the existing sources of financing to ensure that there are sufficient funds available for future investment beyond the 20 year financial strategy. Any additional funds can be used corporately as an internal source of financing. This approach would also help reduce the amount of external borrowing requirements. It is also worth noting that maintaining the existing funding levels also provides the opportunity to advance some work or implement pavement preservation programs (rehabilitation) to extend the life of the road beyond the peak investment periods. This helps to reduce the future investment peaks, but also the socioeconomic impacts associated with completing a large volume of capital work in a short period of time. This would need to be managed through an appririated risk based decision making framework, supported by a robust condition assessment program to obtain the most benefit.

6.6.3 Recommended Financial Strategies – Roads and Bridges

The following strategies are recommended over the next 20 years to address roads and bridges infrastructure requirements:

- **Backlog -** A phase in strategy is recommended to address the roads and bridges $3.5 million infrastructure backlog. A phase-in period of 10 years is recommended to balance affordability and asset investment requirements.
- **Increase Reserve Contributions –** The recommended strategy is to ensure that funding is increased, over time, to plan for the future requirements. This will require an inflationary increase in contributions to the capital investment reserve. Figure 6.6.2 reflects the annual contributions to the Roads Capital Reserve.

Figure 6.6.2
Annual Roads and Bridges Contribution



- **Internal and External Financing:** From a cash flow perspective, the forecast assumes that internal financing from within the Roads, Water and Wastewater (WW) Reserves will be permitted to address requirements across the three asset classes and repaid with interest. The forecast assumes no external debt, relying on the ability to utilize internal financing

resources. Over the first 20 years of the plan, it is anticipated that the Roads Reserve will be used as a source of internal financing for Water/WW but in future years (20-30 year time frame) Roads will also be able to benefit from internal borrowing from the Water and Wastewater Reserves.

- **Gradual Investment -** To avoid significant peaks and valleys, the road replacement and rehabilitation has been smoothed in relation to the projected investment schedule. While bridges have been included in the overall investment requirements, they cannot be smoothed and are represented as peak expenditures. The smoothing strategy is to replace roads and bridges assets on time or with a planned deferral program. This is necessary given the funding gap that will gradually be addressed. As shown in figure 6.6.3, the modified roads and bridges capital plan gradually increases the roads capital investment program which avoids the peaks and valleys in the projected investment schedule.

Figure 6.6.3
Modified Roads and Bridges Capital Plan

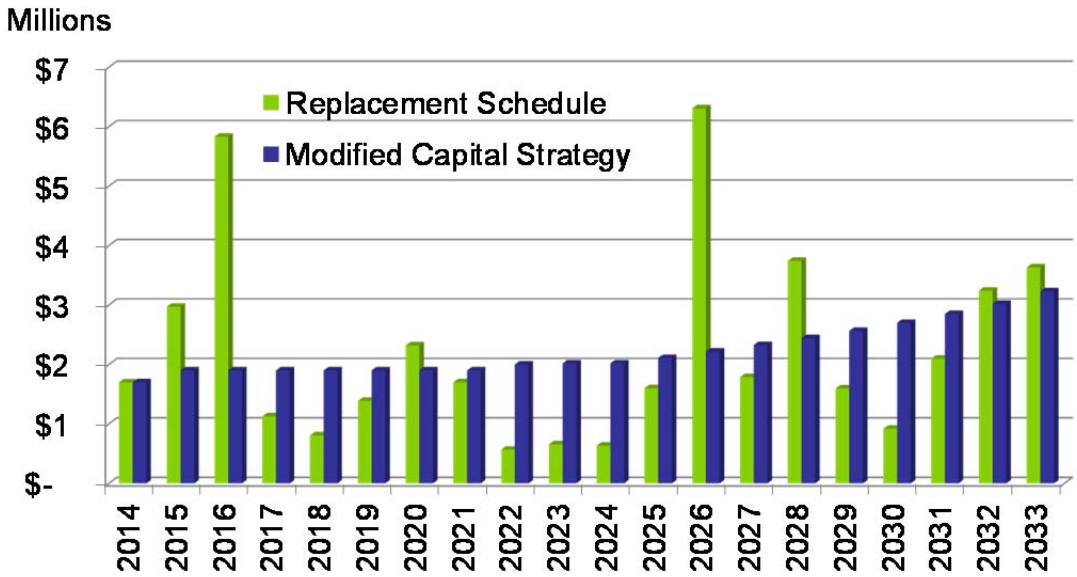
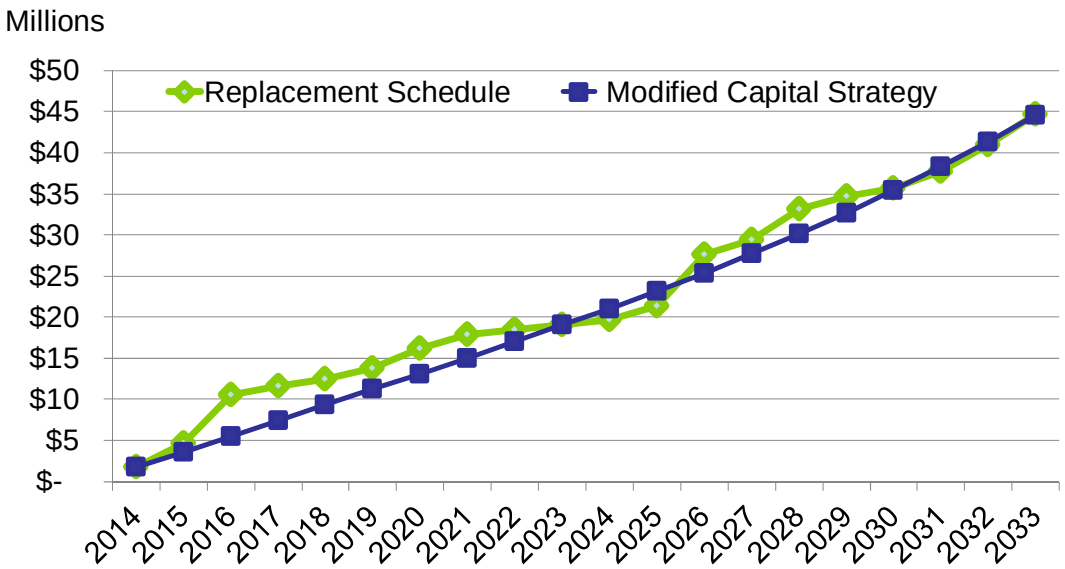


Figure 6.6.4
Modified Roads and Bridges Capital Strategy



6.6.4 Roads and Bridges Financial Summary

- Appendix C provides the 20 year Roads and Bridges Operating and Capital Budgets.
- Based on the analysis undertaken, it is estimated that the City will need to spend $213 million on road and bridge investments infrastructure over the next 50 years.
- The financial plan focuses on the first 20 years of the investment requirements which reflects an inflationary increase contribution to the Roads and Bridges Capital Reserves.
- The existing annual Roads and Bridges supported contributions of $4.3 million are at the 50 year average requirements.
- Due to the timing of capital needs, it is anticipated that internal financing will be required to address Roads costs from years 20-30.

6.7 Financial Strategy Summary

The proposed financial strategy is based on the following key objectives:

- ***Operating on a Financially Sustainable Basis*** – the 20 year Financial Strategy fully funds the identified infrastructure backlog and investment requirements over this timeframe
- ***Effectively Utilizing Internal and External Sources of Financing*** – the Financial Strategy utilizes internal financing available from the Roads, Water and Wastewater Reserves due to timing differences in investment requirements. The Financial Strategy also utilizes external debt for the investment of some of the Water Treatment Plant in 2028, with $18 million of debt amortized over a period of 15 years.
- ***Effectively Utilizing External Sources of Revenues*** – The future tax increases related to roads operating and capital are forecast at approximately inflation, supplemented by ongoing Gas Tax Revenue ($1.85 million) for roads capital investment requirements.
- ***Providing Sufficient Financial Flexibility*** – The combined Roads, Water and Wastewater Reserve balances, on an annual basis, provides sufficient flexibility to address unforeseen events.
- ***Affordability*** - The financial strategy (20 year horizon) is forecasting water and wastewater rate revenue requirement increases to support the replacement/rehabilitation of assets on a

timely basis and to address the infrastructure backlog while at the same time supporting affordability considerations. The blended rate revenue requirement increase for water and wastewater is estimated to be 6% in 2014, 5% in 2015 and 2-3% thereafter ***(to address existing infrastructure only, addition funds would be required for any upgrades or additions to the water or wastewater systems)***. Roads capital is supported by inflationary increases in existing capital reserve contributions.

It is well recognized that a Financial Strategy to support the asset management plan is a dynamic document that should be updated and re-evaluated, on an ongoing basis to:

- Amend the assumptions, projections and strategies based on changes in the municipal environment;
- Continue building awareness of the results of projections of current operating and capital spending and funding levels;
- Assist the City in determining the extent of its financial challenges;
- Reconfirm the key financial goals and strategies that should guide future planning; and
- Spur the development of actions in future business plans that would respond to the long-term strategies.

The financial strategy outlined in this report represents a forecast of the financial capital requirements of the City's roads, bridges, water and wastewater over the next 20 years under a series of assumptions which have been outlined in the report. The financial plan does not represent a formal, multi-year budget for roads, bridges, water and wastewater. The approval of the operating and capital budgets is undertaken as part of the City's overall annual budget process.

7.0 REFERENCES

2009 Water Master Plan, City of Orillia

2013 Wastewater Master Plan, City of Orillia

2011 Transportation Master Plan, City of Orillia

Drinking Water Quality Management System – Management Review Summary Report, City of Orillia

InfraGuide, Federation of Canadian Municipalities

International Infrastructure Management Manual, Institute of Public Works Engineering Australia

Building Together – Guide for Municipal Asset Management Plans, Province of Ontario

APPENDIX A –
20-YEAR WATER OPERATING AND CAPITAL BUDGETS

Appendix A

Water Operating Budget

WATER OPERATING BUDGET	2010 Actual	2011 Actual	2012 Actual	2013 Budget	2014 Forecast	2015 Forecast	2016 Forecast	2017 Forecast	2018 Forecast	2019 Forecast	2020 Forecast	2021 Forecast	2022 Forecast	2023 Forecast	2024 Forecast	2025 Forecast	2026 Forecast	2027 Forecast	2028 Forecast	2029 Forecast	2030 Forecast	2031 Forecast	2032 Forecast	2033 Forecast
Filtration Plant	$ 1,247,037	$ 1,144,900	$ 1,197,330	$ 1,142,295	$ 1,165,141	$ 1,188,444	$ 1,212,213	$ 1,236,457	$ 1,261,186	$ 1,286,410	$ 1,312,138	$1,338,381	$ 1,365,148	$ 1,392,451	$ 1,420,300	$ 1,448,706	$ 1,477,680	$ 1,507,234	$ 1,537,379	$ 1,568,126	$ 1,599,489	$ 1,631,479	$ 1,664,108	$ 1,697,390
Storage	$ 21,776	$ 21,866	$ 22,260	$ 21,700	$ 22,134	$ 22,577	$ 23,028	$ 23,489	$ 23,959	$ 24,438	$ 24,926	$ 25,425	$ 25,934	$ 26,452	$ 26,981	$ 27,521	$ 28,071	$ 28,633	$ 29,205	$ 29,789	$ 30,385	$ 30,993	$ 31,613	$ 32,245
Distribution & Transmission System	$ 518,962	$ 537,854	$ 523,715	$ 562,667	$ 573,920	$ 585,399	$ 597,107	$ 609,049	$ 621,230	$ 633,654	$ 646,328	$ 659,254	$ 672,439	$ 685,888	$ 699,606	$ 713,598	$ 727,870	$ 742,427	$ 757,276	$ 772,421	$ 787,870	$ 803,627	$ 819,700	$ 836,094
General Administration	$ 548,358	$ 575,972	$ 594,710	$ 615,507	$ 627,817	$ 640,373	$ 653,181	$ 666,245	$ 679,569	$ 693,161	$ 707,024	$ 721,165	$ 735,588	$ 750,300	$ 765,306	$ 780,612	$ 796,224	$ 812,148	$ 828,391	$ 844,959	$ 861,858	$ 879,096	$ 896,677	$ 914,611
Water Efficiency Program	$ 8,626	$ 6,825	$ 5,742	$ 9,700	$ 9,894	$ 10,092	$ 10,294	$ 10,500	$ 10,710	$ 10,924	$ 11,142	$ 11,365	$ 11,592	$ 11,824	$ 12,061	$ 12,302	$ 12,548	$ 12,799	$ 13,055	$ 13,316	$ 13,582	$ 13,854	$ 14,131	$ 14,414
Engineering Services	$ 112,809	$ 85,655	$ 107,114	$ 136,600	$ 139,332	$ 142,119	$ 144,961	$ 147,860	$ 150,817	$ 153,834	$ 156,910	$ 160,049	$ 163,250	$ 166,515	$ 169,845	$ 173,242	$ 176,707	$ 180,241	$ 183,846	$ 187,523	$ 191,273	$ 195,098	$ 199,000	$ 202,980
Billing & Collecting	$ 397,576	$ 381,350	$ 402,256	$ 438,608	$ 447,380	$ 456,328	$ 465,454	$ 474,763	$ 484,259	$ 493,944	$ 503,823	$ 513,899	$ 524,177	$ 534,661	$ 545,354	$ 556,261	$ 567,386	$ 578,734	$ 590,309	$ 602,115	$ 614,157	$ 626,440	$ 638,969	$ 651,748
Municipal Taxes	$ 53,012	$ 50,049	$ 48,247	$ 48,247	$ 49,212	$ 50,196	$ 51,200	$ 52,224	$ 53,269	$ 54,334	$ 55,421	$ 56,529	$ 57,660	$ 58,813	$ 59,989	$ 61,189	$ 62,413	$ 63,661	$ 64,934	$ 66,233	$ 67,557	$ 68,909	$ 70,287	$ 71,693
Transfer to Reserves	$ 1,423,265	$ 1,468,570	$ 1,608,303	$ 1,708,616	$ 1,966,445	$ 2,245,137	$ 2,392,074	$ 2,546,059	$ 2,707,399	$ 2,876,412	$ 3,053,428	$3,238,793	$ 3,432,867	$ 3,636,022	$ 3,848,649	$ 4,071,154	$ 4,303,960	$ 4,547,506	$ 4,802,250	$ 5,068,670	$ 5,347,262	$ 5,638,543	$ 5,943,053	$ 6,261,351
Debt Charges - Principal																	$ 919,845	$ 953,784	$ 988,983	$ 1,025,487	$ 1,063,314	$ 1,102,554	$ 1,143,234	$ 1,185,417
Debt Charges - Interest																	$ 664,200	$ 630,261	$ 595,062	$ 558,558	$ 520,731	$ 481,491	$ 440,811	$ 398,628
TOTAL OPERATING EXPENDITURES	$4,331,421	$4,273,041	$4,509,677	$4,683,940	$5,001,275	$5,340,664	$5,549,511	$5,766,646	$5,992,398	$ 6,227,110	$ 6,471,140	$6,724,860	$ 6,988,654	$ 7,262,925	$ 7,548,091	$ 7,844,585	$ 9,736,904	$10,057,427	$10,390,689	$10,737,197	$11,097,479	$11,472,084	$11,861,583	$12,266,571
Water Rates Revenue Requirements	$4,155,782	$4,094,438	$4,306,083	$4,487,592	$4,801,723	$5,137,844	$5,343,358	$5,557,092	$5,779,376	$ 6,010,551	$ 6,250,973	$6,501,012	$ 6,761,052	$ 7,031,494	$ 7,312,754	$ 7,605,264	$ 7,909,475	$ 8,225,854	$ 8,554,888	$ 8,897,084	$ 9,252,967	$ 9,623,086	$10,008,009	$10,408,329
Fire Protection	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 102,000	$ 104,040	$ 106,121	$ 108,243	$ 110,408	$ 112,616	$ 114,869	$ 117,166	$ 119,509	$ 121,899	$ 124,337	$ 126,824	$ 129,361	$ 131,948	$ 134,587	$ 137,279	$ 140,024	$ 142,825	$ 145,681	$ 148,595
Local Improvement - Ratepayers' Sh	$ 38,148	$ 36,148	$ 63,349	$ 36,148	$ 36,148	$ 36,148	$ 36,148	$ 36,148	$ 36,148	$ 36,148	$ 36,148	$ 36,148	$ 36,148	$ 36,148	$ 36,148	$ 36,148	$ 36,148	$ 36,148	$ 36,148	$ 36,148	$ 36,148	$ 36,148	$ 36,148	$ 36,148
Recoveries from Capital Projects	$ 33,060	$ 23,103	$ 26,084	$ 52,000	$ 53,040	$ 54,101	$ 55,183	$ 56,286	$ 57,412	$ 58,560	$ 59,732	$ 60,926	$ 62,145	$ 63,388	$ 64,655	$ 65,949	$ 67,268	$ 68,613	$ 69,985	$ 71,385	$ 72,813	$ 74,269	$ 75,754	$ 77,269
Other Revenue	$ 6,431	$ 19,352	$ 14,161	$ 8,200	$ 8,364	$ 8,531	$ 8,702	$ 8,876	$ 9,053	$ 9,235	$ 9,419	$ 9,608	$ 9,800	$ 9,996	$ 10,196	$ 10,400	$ 10,608	$ 10,820	$ 11,036	$ 11,257	$ 11,482	$ 11,712	$ 11,946	$ 12,185
TOTAL REVENUES	$4,333,421	$4,273,041	$4,509,677	$4,683,940	$5,001,275	$5,340,664	$5,549,511	$5,766,646	$5,992,398	$ 6,227,110	$ 6,471,140	$6,724,860	$ 6,988,654	$ 7,262,925	$ 7,548,091	$ 7,844,585	$ 8,152,859	$ 8,473,382	$ 8,806,644	$ 9,153,152	$ 9,513,434	$ 9,888,039	$10,277,538	$10,682,526
Total Expenditures		-1.3%	4.4%	3.9%	6.8%	6.8%	3.9%	3.9%	3.9%	3.9%	3.9%	3.9%	3.9%	3.9%	3.9%	3.9%	24.1%	3.3%	3.3%	3.3%	3.4%	3.4%	3.4%	3.4%
Water Rate Revenue Requirements		-1.5%	4.3%	4.2%	7.0%	7.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%

Appendix A

Water Inflated Capital Budget																					
Millions (Inflated)	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Water Treatment Cost	$ -	$ 0.95	$ -	$ 0.60	$ -	$ 0.11	$ 0.32	$ -	$ 1.01	$ 0.22	$ -	$ 17.11	$ -	$ 0.87	$ -	$ -	$ 0.90	$ -	$ 1.36	$ 0.29
Storage and Towers Cost	$ 0.01	$ -	$ -	$ 0.01	$ 4.06	$ -	$ -	$ 4.43	$ -	$ -	$ 0.02	$ -	$ -	$ 0.02	$ 0.46	$ -	$ -	$ -	$ -	$ -
Wells Cost	$ 0.38	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1.17	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water Pipe, Backlog and Reh	$ 1.54	$ 1.71	$ 1.85	$ 2.00	$ 2.16	$ 2.34	$ 2.53	$ 2.74	$ 2.96	$ 3.20	$ 3.46	$ 3.74	$ 4.05	$ 4.38	$ 2.96	$ 3.17	$ 3.43	$ 3.71	$ 4.01	$ 4.34
Total Capital Requirements	$ 1.93	$ 2.66	$ 1.85	$ 2.62	$ 6.22	$ 2.45	$ 2.85	$ 7.17	$ 5.15	$ 3.42	$ 3.48	$ 20.85	$ 4.05	$ 5.27	$ 3.42	$ 3.17	$ 4.33	$ 3.71	$ 5.37	$ 4.63
Financing																				
Reserves/Internal Financing	$ 1.93	$ 2.66	$ 1.85	$ 2.62	$ 6.22	$ 2.45	$ 2.85	$ 7.17	$ 5.15	$ 3.42	$ 3.48	$ 20.85	$ 4.05	$ 5.27	$ 3.42	$ 3.17	$ 4.33	$ 3.71	$ 5.37	$ 4.63
Gas Tax																				
Debt												$ 18.00								
Total Financing Sources	$ 1.93	$ 2.66	$ 1.85	$ 2.62	$ 6.22	$ 2.45	$ 2.85	$ 7.17	$ 5.15	$ 3.42	$ 3.48	$ 38.85	$ 4.05	$ 5.27	$ 3.42	$ 3.17	$ 4.33	$ 3.71	$ 5.37	$ 4.63

APPENDIX B – 20-YEAR WASTEWATER OPERATING AND CAPITAL BUDGETS

Appendix B

Wastewater Operating Budget																									
	2010 ACTUAL	2011 ACTUAL	2012 BUDGET	2012 ACTUAL	2013 BUDGET	2014 Forecast	2015 Forecast	2016 Forecast	2017 Forecast	2018 Forecast	2019 Forecast	2020 Forecast	2021 Forecast	2022 Forecast	2023 Forecast	2024 Forecast	2025 Forecast	2026 Forecast	2027 Forecast	2028 Forecast	2029 Forecast	2030 Forecast	2031 Forecast	2032 Forecast	2033 Forecast
Waste Water Treatment Plant	$ 1,008,199	$ 1,006,552	$ 1,067,100	$ 1,000,153	$ 1,025,069	$ 1,045,570	$ 1,066,482	$ 1,087,811	$ 1,109,568	$ 1,131,759	$ 1,154,394	$ 1,177,482	$ 1,201,032	$ 1,225,052	$ 1,249,553	$ 1,274,544	$ 1,300,035	$ 1,326,036	$ 1,352,557	$ 1,379,608	$ 1,407,200	$ 1,435,344	$ 1,464,051	$ 1,493,332	$ 1,523,199
Sludge Management	$ 244,451	$ 214,227	$ 255,000	$ 265,234	$ 255,000	$ 260,100	$ 265,302	$ 270,608	$ 276,020	$ 281,541	$ 287,171	$ 292,915	$ 298,773	$ 304,749	$ 310,844	$ 317,060	$ 323,402	$ 329,870	$ 336,467	$ 343,196	$ 350,060	$ 357,062	$ 364,203	$ 371,487	$ 378,917
Sanitary Sewer Pumping Stations	$ 375,263	$ 431,392	$ 400,900	$ 390,883	$ 408,300	$ 416,466	$ 424,795	$ 433,291	$ 441,957	$ 450,796	$ 459,812	$ 469,008	$ 478,389	$ 487,956	$ 497,715	$ 507,670	$ 517,823	$ 528,180	$ 538,743	$ 549,518	$ 560,508	$ 571,719	$ 583,153	$ 594,816	$ 606,712
Envirosave Program	$ 38,206	$ 36,356	$ 26,100	$ 11,256	$ 27,486	$ 28,036	$ 28,596	$ 29,168	$ 29,752	$ 30,347	$ 30,954	$ 31,573	$ 32,204	$ 32,848	$ 33,505	$ 34,175	$ 34,859	$ 35,556	$ 36,267	$ 36,993	$ 37,732	$ 38,487	$ 39,257	$ 40,042	$ 40,843
Engineering Services	$ 111,901	$ 85,654	$ 133,300	$ 105,965	$ 134,300	$ 136,986	$ 139,726	$ 142,520	$ 145,371	$ 148,278	$ 151,244	$ 154,268	$ 157,354	$ 160,501	$ 163,711	$ 166,985	$ 170,325	$ 173,731	$ 177,206	$ 180,750	$ 184,365	$ 188,052	$ 191,813	$ 195,650	$ 199,563
Collection System	$ 144,287	$ 167,388	$ 172,200	$ 171,277	$ 173,945	$ 177,424	$ 180,972	$ 184,592	$ 188,284	$ 192,049	$ 195,890	$ 199,808	$ 203,804	$ 207,880	$ 212,038	$ 216,279	$ 220,604	$ 225,016	$ 229,517	$ 234,107	$ 238,789	$ 243,565	$ 248,436	$ 253,405	$ 258,473
Municipal Taxes & Insurance	$ 123,155	$ 117,325	$ 117,324	$ 114,190	$ 117,545	$ 119,896	$ 122,294	$ 124,740	$ 127,234	$ 129,779	$ 132,375	$ 135,022	$ 137,723	$ 140,477	$ 143,287	$ 146,152	$ 149,075	$ 152,057	$ 155,098	$ 158,200	$ 161,364	$ 164,591	$ 167,883	$ 171,241	$ 174,666
Pollution Inspection & Control	$ 146,465	$ 154,485	$ 159,900	$ 157,738	$ 163,569	$ 166,840	$ 170,177	$ 173,581	$ 177,052	$ 180,593	$ 184,205	$ 187,889	$ 191,647	$ 195,480	$ 199,390	$ 203,377	$ 207,445	$ 211,594	$ 215,826	$ 220,142	$ 224,545	$ 229,036	$ 233,617	$ 238,289	$ 243,055
Transfer to Reserves - WW	$2,987,736	$2,953,838	$2,732,912	$3,089,271	$3,327,357	$3,600,073	$3,781,287	$3,913,646	$4,050,358	$4,191,560	$4,337,397	$4,488,013	$4,643,562	$4,804,199	$4,970,085	$5,069,367	$5,170,634	$5,273,927	$5,379,285	$5,486,751	$5,437,334	$5,386,930	$5,335,517	$5,283,076	$5,229,586
TOTAL OPERATING EXPENDITURE	$5,179,663	$5,167,217	$5,064,736	$5,305,967	$5,632,571	$5,951,391	$6,179,632	$6,359,958	$6,545,596	$6,736,703	$6,933,442	$7,135,980	$7,344,488	$7,559,143	$7,780,128	$7,935,611	$8,094,203	$8,255,967	$8,420,966	$8,589,265	$8,601,899	$8,614,786	$8,627,930	$8,641,337	$8,655,012
Sewer Rates	$ 4,669,181	$ 4,513,739	$ 4,545,211	$ 4,787,412	$ 5,105,216	$ 5,411,529	$ 5,627,990	$ 5,796,830	$ 5,970,735	$ 6,149,857	$ 6,334,352	$ 6,524,383	$ 6,720,115	$ 6,921,718	$ 7,129,370	$ 7,271,957	$ 7,417,396	$ 7,565,744	$ 7,717,059	$ 7,871,400	$ 7,871,400	$ 7,871,400	$ 7,871,400	$ 7,871,400	$ 7,871,400
Hauled Sewage	$ 412,004	$ 549,026	$ 420,000	$ 425,011	$ 424,450	$ 432,939	$ 441,598	$ 450,430	$ 459,438	$ 468,627	$ 478,000	$ 487,560	$ 497,311	$ 507,257	$ 517,402	$ 527,750	$ 538,305	$ 549,071	$ 560,053	$ 571,254	$ 582,679	$ 594,332	$ 606,219	$ 618,344	$ 630,710
Recoveries - Capital Projects	$ 33,060	$ 23,103	$ 49,000	$ 26,084	$ 52,000	$ 55,120	$ 57,325	$ 59,045	$ 60,816	$ 62,640	$ 64,520	$ 66,455	$ 68,449	$ 70,502	$ 72,617	$ 74,070	$ 75,551	$ 77,062	$ 78,603	$ 80,175	$ 80,175	$ 80,175	$ 80,175	$ 80,175	$ 80,175
Envirosave Inspection Fees	$ 8,337	$ 8,323	$ 6,000	$ 8,045	$ 6,000	$ 6,000	$ 6,000	$ 6,000	$ 6,000	$ 6,000	$ 6,000	$ 6,000	$ 6,000	$ 6,000	$ 6,000	$ 6,000	$ 6,000	$ 6,000	$ 6,000	$ 6,000	$ 6,000	$ 6,000	$ 6,000	$ 6,000	$ 6,000
Municipal Act 391 Recovery / Local Improvement Ratepayer Share / Leacock Service	$ 57,081	$ 73,026	$ 44,525	$ 59,415	$ 44,905	$ 45,803	$ 46,719	$ 47,654	$ 48,607	$ 49,579	$ 50,570	$ 51,582	$ 52,613	$ 53,666	$ 54,739	$ 55,834	$ 56,950	$ 58,089	$ 59,251	$ 60,436	$ 61,645	$ 62,878	$ 64,135	$ 65,418	$ 66,726
TOTAL OPERATING REVENUES	$ 5,179,663	$ 5,167,217	$ 5,064,736	$ 5,305,967	$ 5,632,571	$ 5,951,391	$ 6,179,632	$ 6,359,958	$ 6,545,596	$ 6,736,703	$ 6,933,442	$ 7,135,980	$ 7,344,488	$ 7,559,143	$ 7,780,128	$ 7,935,611	$ 8,094,203	$ 8,255,967	$ 8,420,966	$ 8,589,265	$ 8,601,899	$ 8,614,786	$ 8,627,930	$ 8,641,337	$ 8,655,012

Appendix B

Wastewater Inflated Capital Budget																							
Millions (Inflated)	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Wastewater Facilities Cost	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
WW Treatment Replacement Cost	$ -	$ -	$ 0.36	$ 0.09	$ -	$ -	$ 0.08	$ 0.68	$ -	$ 0.40	$ -	$ -	$ 5.95	$ 1.21	$ 0.97	$ 0.83	$ 0.97	$ 4.89	$ 0.21	$ 0.66
Pumping Station Replacement Cost	$ 0.88	$ 3.18	$ -	$ -	$ -	$ -	$ 0.37	$ -	$ 0.49	$ -	$ -	$ -	$ -	$ 0.76	$ 0.16	$ -	$ -	$ 0.85	$ -	$ -
WW Pipe, Backlog and Rehab	$ 3.00	$ 3.50	$ 3.97	$ 4.49	$ 4.63	$ 4.77	$ 4.91	$ 5.06	$ 4.57	$ 4.94	$ 4.43	$ 4.56	$ 4.41	$ 5.29	$ 6.23	$ 1.60	$ 0.41	$ -	$ -	$ -
Total	$ 3.88	$ 6.68	$ 4.32	$ 4.58	$ 4.63	$ 4.77	$ 5.36	$ 5.73	$ 5.06	$ 5.33	$ 4.43	$ 4.56	$ 10.36	$ 7.26	$ 7.36	$ 2.44	$ 1.38	$ 5.74	$ 0.21	$ 0.66
Financing																				
Reserves/Internal Financing	$ 3.88	$ 6.68	$ 4.32	$ 4.58	$ 4.63	$ 4.77	$ 5.36	$ 5.73	$ 5.06	$ 5.33	$ 4.43	$ 4.56	$ 10.36	$ 7.26	$ 7.36	$ 2.44	$ 1.38	$ 5.74	$ 0.21	$ 0.66
Gas Tax																				
Debt																				
Total Financing Sources	$ 3.88	$ 6.68	$ 4.32	$ 4.58	$ 4.63	$ 4.77	$ 5.36	$ 5.73	$ 5.06	$ 5.33	$ 4.43	$ 4.56	$ 10.36	$ 7.26	$ 7.36	$ 2.44	$ 1.38	$ 5.74	$ 0.21	$ 0.66

APPENDIX C – 20-YEAR ROADS AND BRIDGES OPERATING AND CAPITAL BUDGETS

Appendix C

Roads Operating Budget

	2010 Actual	2011 Actual	2012 Actual	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
	Actual	Actual	Actual	Budget	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast
Shoreline Maintenance	18,085	13,643	5,495	12,500	12,750	13,005	13,265	13,530	13,801	14,077	14,359	14,646	14,939	15,237	15,542	15,853	16,170	16,493	16,823	17,160	17,503	17,853	18,210	18,574
Bridges & Culverts	38,967	43,660	38,442	42,585	43,437	44,305	45,192	46,095	47,017	47,958	48,917	49,895	50,893	51,911	52,949	54,008	55,088	56,190	57,314	58,460	59,629	60,822	62,038	63,279
Roadside Maintenance	470,362	500,920	521,159	469,294	478,680	488,253	498,019	507,979	518,138	528,501	539,071	549,853	560,850	572,067	583,508	595,178	607,082	619,223	631,608	644,240	657,125	670,267	683,673	697,346
Hardtop Maintenance	246,462	222,604	298,500	250,531	255,542	260,652	265,866	271,183	276,606	282,139	287,781	293,537	299,408	305,396	311,504	317,734	324,089	330,570	337,182	343,925	350,804	357,820	364,976	372,276
Storm Sewer System	77,409	77,139	94,759	85,884	87,602	89,354	91,141	92,964	94,823	96,719	98,654	100,627	102,639	104,692	106,786	108,922	111,100	113,322	115,589	117,900	120,258	122,664	125,117	127,619
Supplemental Downtown Maintenance	45,950	44,695	45,248	47,986	48,946	49,925	50,923	51,942	52,980	54,040	55,121	56,223	57,348	58,495	59,665	60,858	62,075	63,317	64,583	65,874	67,192	68,536	69,907	71,305
Winter Control	1,069,718	1,117,527	998,926	1,340,275	1,367,081	1,394,422	1,422,311	1,450,757	1,479,772	1,509,367	1,539,555	1,570,346	1,601,753	1,633,788	1,666,464	1,699,793	1,733,789	1,768,464	1,803,834	1,839,910	1,876,709	1,914,243	1,952,528	1,991,578
Roads Reserve	687,000	704,000	704,000	704,000	718,080	732,442	747,090	762,032	777,273	792,818	808,675	824,848	841,345	858,172	875,336	892,842	910,699	928,913	947,491	966,441	985,770	1,005,485	1,025,595	1,046,107
Capital Tax Levy	1,353,000	1,683,000	1,800,000	1,700,000	1,734,000	1,768,680	1,804,054	1,840,135	1,876,937	1,914,476	1,952,766	1,991,821	2,031,657	2,072,291	2,113,736	2,156,011	2,199,131	2,243,114	2,287,976	2,333,736	2,380,410	2,428,019	2,476,579	2,526,111
TOTAL ROADWAYS EXPENDITURES	$ 4,006,953	$ 4,407,188	$ 4,506,529	$ 4,653,055	$ 4,746,116	$ 4,841,038	$ 4,937,859	$ 5,036,616	$ 5,137,349	$ 5,240,096	$ 5,344,898	$ 5,451,796	$ 5,560,831	$ 5,672,048	$ 5,785,489	$ 5,901,199	$ 6,019,223	$ 6,139,607	$ 6,262,399	$ 6,387,647	$ 6,515,400	$ 6,645,708	$ 6,778,623	$ 6,914,195

Appendix C

Roads & Bridges Inflated Capital Budget																					
Millions (Inflated)	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Roads Replacement	$ 1.70	$ 2.02	$ 2.08	$ 2.14	$ 2.20	$ 2.27	$ 2.34	$ 2.41	$ 2.61	$ 2.71	$ 2.80	$ 3.01	$ 3.25	$ 3.52	$ 3.14	$ 4.12	$ 4.46	$ 4.85	$ 5.30	$ 5.84
Bridges															$ 0.66					
Total	$ 1.70	$ 2.02	$ 2.08	$ 2.14	$ 2.20	$ 2.27	$ 2.34	$ 2.41	$ 2.61	$ 2.71	$ 2.80	$ 3.01	$ 3.25	$ 3.52	$ 3.81	$ 4.12	$ 4.46	$ 4.85	$ 5.30	$ 5.84

Financing

Reserves/Internal Financing	$ -	$ 0.17	$ 0.23	$ 0.29	$ 0.35	$ 0.42	$ 0.49	$ 0.56	$ 0.76	$ 0.86	$ 0.95	$ 1.16	$ 1.40	$ 1.67	$ 1.96	$ 2.27	$ 2.61	$ 3.00	$ 3.45	$ 3.99
Gas Tax	$ 1.70	$ 1.85	$ 1.85	$ 1.85	$ 1.85	$ 1.85	$ 1.85	$ 1.85	$ 1.85	$ 1.85	$ 1.85	$ 1.85	$ 1.85	$ 1.85	$ 1.85	$ 1.85	$ 1.85	$ 1.85	$ 1.85	$ 1.85
Debt	$ -																			
Total Financing Sources	$ 1.70	$ 2.02	$ 2.08	$ 2.14	$ 2.20	$ 2.27	$ 2.34	$ 2.41	$ 2.61	$ 2.71	$ 2.80	$ 3.01	$ 3.25	$ 3.52	$ 3.81	$ 4.12	$ 4.46	$ 4.85	$ 5.30	$ 5.84