

Prepared By:



City of Welland

Comprehensive Asset Management Plan

2016 Addendum to the 2015 Asset Management Plan

GMBP File: 614013

Revised: October 14, 2016

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COMPRHENSIVE ASSET MANAGEMEN PLAN – 2016 ADDENDUM

CITY OF WELLAND

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EXECUTIVE SUMMARY

In 2012 Ontario's Ministry of Infrastructure released a guide titled *Building Together: Guide for Municipal Asset Management Plans*. This guide forms part of a comprehensive strategy called the Municipal Infrastructure Investment Initiative (MIII) which aims to develop a strong and cooperative relationship between municipalities and the Province of Ontario to address the significant challenges that currently face our deteriorating infrastructure.

The Province is seeking to achieve standardization and consistency in the management of municipal infrastructure. To achieve this, they are requiring that any City seeking provincial capital funding for infrastructure projects be required to prepare an Asset Management Plan (AMP) to demonstrate the particular need of a project to the social, economic or environmental priorities of the community.

The City of Welland refines their AMP on a routine basis to:

- Reflect updates to asset data that provide a better understanding of the state of local infrastructure; -
- Better align the priority projects to achieve desired levels of service; -
- Consider the impact of alternative lifecycle management strategies of their infrastructure assets; and -
- Review the financing strategy of how the renewal of infrastructure assets will be funded. -

This report represents an addendum to the 2015 AMP. This update has been completed to incorporate new information on the City's bridge assets, reflect better estimates of the replacement cost of Welland's infrastructure assets and to more explicitly identify priority projects for which the City will be targeting for implementation over the next few years to achieve the desired levels of service.

This AMP is structured in the following sections:

- Section 1 introduces asset management and establishes goals for infrastructure management in the City. -
- Section 2 summarizes the state of local infrastructure in the City. -
- Section 3 documents desired levels of service in Welland that are used to establish priority infrastructure projects.
- Section 4 establishes the short term priority projects to achieve the City's desired levels of service. The section also quantifies the long term (50 year) expenditures needs to ensure that the City's infrastructure can provide the desired levels of service.
- Section 5 reviews the City's finances and provides a strategy to achieve a sustainable level of investment to renew the existing infrastructure in perpetuity.
- Section 6 recommends priority projects that the City should complete to achieve the desired levels of service.

This iteration of the AMP estimates the total value of the City's infrastructure at approximately \$1.15 billion. The analysis identifies an **annual infrastructure expenditure need** of \$35 million to achieve the desired levels of service. This expenditure need has been established based on a strategic review of the City's asset inventory. It should be

emphasized that value represents the capital investments that are required to sustain the City's existing infrastructure and does not include the resources that are required to operate or expand the infrastructure systems.

The current level of planned expenditures to renew existing infrastructure in Welland is approximately \$15 million per year. The analysis indicates that the funding gap is approximately \$20 million per year. The City is striving to reach a position where the infrastructure needs equal the available revenues. Over the coming years, the City will continually review the infrastructure needs as better information becomes available and as technological improvements reduce the cost of renewing infrastructure. The City will also consider approaches to increase the revenue that is available to fund the renewal of existing infrastructure, including pursuing Provincial or Federal infrastructure grants. This strategy positions the City on a path to ultimately reach a point where the infrastructure needs equal the available revenue.

To this end, the following priority projects are recommended in Welland:

- Combined sewer separation and cast iron watermain integrated right-of-way replacement

The elimination of combined sewers is a priority in Welland. This will significantly reduce the risk that these sewers will cause basement flooding or discharge untreated sewage into the natural environment. Furthermore, the elimination of the combined sewers will reduce the amount of wastewater that Welland has to pay the Region of Niagara to treat, which will free up future resources to fund the replacement of other assets in the City. At the same time, the replacement of cast iron watermains is also a priority because these pipes are associated with high break frequencies and discoloured water complaints. The high break frequency of this pipe cohort also results in an increase to the volume of water that is lost during the break events that the City has pay the Region to provide. Integrated right-of-way projects that separate combined sewers and replace cast iron watermains are recommended to be a high priority for the City.

Specific areas in the City that are in this priority category are as follows:

- River Road
- Edgar/Elgin area -
- Riverside Drive -
- PCD/West Main Area -

- Replacement of subsurface infrastructure in areas with high leakage watermains or high infiltration sanitary sewers

The replacement of watermains in areas that have high leakage rates, or the replacement of sewers that have high infiltration rates, are also recommended as a high priority in Welland. Watermains with high break frequencies increase the potential for the ingress of untreated water into the distribution system during watermain break events, and high infiltration sanitary sewers increase the likelihood of discharging untreated wastewater into the natural environment or the occurrence of basement flooding events. All of these consequences represent health and safety concerns for the local community.

The replacement of these assets will reduce the costs that the City has to pay to treat water/wastewater, freeing up funds to fund the replacement of other assets. An additional benefit to replacing watermains with high leakage rates is the restoration of the hydraulic capacity of the distribution system and an increase in available fire flows because these are typically older pipes that have a decreased hydraulic capacity due the degradation in the 'C' factor caused by internal corrosion.

Specific areas in the City that are in this priority category are as follows:

- McNaughton, Nelles, Bishop -
- David Street -
- Dain Avenue -
- East Wartime -
- West Wartime

- **Rehabilitation or Replacement of Bridges in Poor Condition**

Bridges represent a critical asset in Welland and therefore it is important to ensure that they are in a state of repair that does not impact their safe use. The City conducts biannual inspections of all bridges in accordance with Provincial regulations. The biannual bridge inspections provide recommendations for the rehabilitation or replacement need of each bridge in Welland to ensure that they are safe to use. The implementation of the recommendations from these biannual inspections are considered a high priority in Welland.

Specific bridges in the City that are in this priority category are as follows:

- The most recent inspections have identified the need to replace the Forks Road Bridge. Through the information obtained during the inspections and subsequent lifecycle cost analyses it has been determined that the Forks Road Bridge over the Recreational Canal should be replaced by no later than 2020. In the spring of 2016 the bridge inspections revealed greater deterioration than previously identified, and this structure was closed for approximately three weeks for emergency repairs. The replacement of the Forks Road Bridge is considered to be a high priority project for Welland.

1. INTRODUCTION

This report represents the comprehensive Asset Management Plan (AMP) for the City of Welland that includes all of the assets own by the municipality. It applies a framework that supports an informed decision making process that is used to explicitly identify priority projects in the City to achieve their target levels of service. This report represents an addendum to the 2015 AMP. This update has been completed to incorporate new information on the City's bridge assets, reflect better estimates of the replacement cost of Welland's infrastructure assets and to more explicitly identify priority projects for which the City will be targeting for implementation over the next few years to achieve the desired levels of service.

1.1 Provincial Guideline

In 2012 Ontario's Ministry of Infrastructure released a guide titled *Building Together: Guide for Municipal Asset Management Plans*. This guide forms part of a comprehensive strategy called the Municipal Infrastructure Investment Initiative (MIII) which aims to develop a strong and cooperative relationship between municipalities and the Province of Ontario to address the significant challenges that currently face our deteriorating infrastructure. Part of the Initiative from the Province includes making specific capital funds available to municipalities. To gain access to these specific funds a municipality must have completed an AMP to demonstrate the particular need of a project to the social, economic or environmental priorities of the community. Furthermore the AMP must demonstrate the coupling of capital investment to a customer expectation in terms of service provided by the infrastructure to which the capital investment is being made. This report and the accompanying analysis of the City's asset inventories will support the funding applications for this, and future, Provincial and Federal funding initiatives.

1.2 Goals of Asset Management

Asset management strives to continually improve the management of infrastructure. The following is a list of goals that asset management strategies and processes aim to achieve:

- Explicitly defining customer expectations with respect to the quantity, quality and availability of service provided by infrastructure assets.
- A repeatable, systematic, informed and transparent decision making process that provides elected officials with the knowledge that they need to make decisions regarding capital expenditures, operating costs and revenue requirements (i.e. rate and tax levels).
- Optimized life cycle cost (i.e. total operating, maintenance and capital resources) of providing services to residents.
- Reduced risk exposure to the City and its customers by ensuring that assets are managed in a manner that matches the risk that their failure represents to the delivery of services.
- A mechanism to ensure that the services that are delivered through infrastructure can be provided at a sustainable level at a cost that is affordable to residents.

1.3 Scope of the AMP

This AMP covers a period of 50 years and reports on the majority of the assets owned by the City, including:

- Water mains and water distribution system appurtenances -
- Sanitary sewers, combined sewers and collection system appurtenances -
- Stormwater management infrastructure -
- Roads and traffic appurtenances -
- Bridges and large culverts -
- Buildings -
- Parks -
- Cemeteries -

- Fleet
- Forestry

It should be noted that the assets required to support Fire and Emergency Services, Transit and the Welland Recreational Canal Corporation (WRCC) are included in the asset groups listed above (i.e. fleet, parks, buildings, forestry). It should also be noted that the city of Welland does not own or operate any social housing infrastructure.

1.4 Development of the AMP

This AMP was developed with a project team from the City and GM BluePlan. The following documents were reviewed and incorporated throughout the development of this AMP:

- 2016 Municipal Budget/Culvert Appraisal Rehabilitation and Replacement Needs (2016)
- Comprehensive Asset Management Plan (2015)
- Asset Management Plan Core Infrastructure Sustainability (2013)
- Official Plan (2011)
- Urban Design Guidelines (2014)
- Municipal Standards (2013 Update)
- Development Charges Background study (2014)
- Traffic Master Plan (2001)
- Brownfield Community Improvement Plan (2007)
- Strategic Plan 2011 – 2016 (2011)
- National Engineering Vulnerability Assessment of Public Infrastructure to Climate Change – City of Welland Stormwater and Wastewater Infrastructure Assessment Technical Report (2012)
- Taxpayer Affordability Strategy (2011)
- Transportation Planning Study (2001)
- Fire and Emergency Services - Facility Needs Study (2013)
- Welland Transit Master Plan 2013 – 2017 - Strategic Plan and Conventional Transit Working Paper (2014)
- O/Reg 239/02 for the Minimum Maintenance Standards for Municipal Highways
- TCA Documentation
- City Budgets and other Financial Documents
- Other Relevant City Correspondence

1.5 Refinement of the AMP

The City is realistic in recognizing that an AMP continually evolves within an organization as asset data, desired levels of service, and infrastructure priorities change. This AMP reflects the latest asset data, desired levels of service, lifecycle management strategies and infrastructure priorities in Welland.

2. STATE OF INFRASTRUCTURE

2.1 Sources of Asset Information

The City of Welland maintains several asset inventories at varying levels of detail, summarized as follows:

- **GIS / Database inventories**
The City maintains Geographic Information System (GIS) inventories of a number of asset types. The inventories are an excellent source of information to support asset management decision making processes. They contain condition information of some asset groups and other relevant information that can be used for infrastructure planning purposes.
- **Tangible Capital Asset (TCA) Register**
The asset register was developed to achieve the requirements of the Public Sector Accounting Board (PSAB) 3150 regarding full accrual accounting of assets in municipalities. While this Asset Register is comprehensive, there is not sufficient information on the assets to make informed investment decisions other than replacing an asset when it reaches the end of its amortization period (i.e. construction dates and theoretical useful lives).
- **Expert Systems**
The City currently owns and operates a number of specialized systems for the assessment and planning of capacity, capture of customer service requests and the documentation of the frequency, cost and extent of maintenance of infrastructure assets.
- **Stand-Alone Spreadsheets**
The City also maintains several stand-alone spreadsheets that are used to collect and store information on some assets. Some of these spreadsheets are useful for asset management decision making processes.

The City is striving to have all of their asset inventories in one location, referred to as asset centric data management, to allow asset management related information to be analyzed in a more timely and effective manner. GM BluePlan staff did observe that the City of Welland information holdings are more mature and better developed than client communities of an equivalent or similar population.

2.2 Asset Inventory

Table 1 summarizes the asset inventory that is included in the scope of this Comprehensive Asset Management Plan.

Table 1 – Asset Inventory

Asset Category	Includes items like...	Inventory
Watermains	Watermains, hydrants, valves and other water distribution system appurtenances	265 km
Sanitary and Combined Sewers	Sanitary and combined sewers, manholes and other related appurtenances	235 km
Storm Sewers	Stormwater management infrastructure, manholes and other related appurtenances	163 km
Roads	Road Network	293 km
Sidewalks	Sidewalks	333 km
Bridges/Culverts	Bridge decks and structures	13 Bridges
Facilities	All City buildings	52 Facilities
Parks	Playgrounds, ball diamonds, landscaping, paved surfaces	177 components
Cemeteries	Cemeteries	2 Cemeteries
Fleet	All City vehicles and motorized equipment	34 Transit, 13 Fire, 109 miscellaneous vehicles
Forestry	Trees	10,834 Street Trees
Traffic	Street Lights, Traffic Signs, Parking Meters, traffic signals	2320 Street Lights, 1878 Traffic Signs, 328 Parking Meters

2.3 Asset Value

Table 2 summarizes the replacement value of the assets that are included in the scope of this Comprehensive Asset Management Plan. It is apparent from Table 2 that the total value of the assets owned by the City is approximately \$1.15 billion.

Table 2 – Asset Value

Asset Category	Replacement Value (millions)
Sanitary and Combined Sewers	\$285
Watermains	\$214
Storm Sewers	\$201
Roads	\$193
Facilities	\$152
Bridges/Culverts	\$35
Sidewalks	\$27
Fleet	\$26
Parks	\$10
Forestry	\$3
Cemeteries	Included with Parks
Traffic	Included with Roads
Total	\$1,146

2.4 Asset Condition

Understanding the condition of the City's assets is an essential component to an AMP. Ideally the condition information is based on assessment activities that provide first-hand knowledge of the condition of the infrastructure. This information must, in all cases, be standardized and comparative to allow for the comparison of infrastructure needs and furthermore the analysis of trade-offs in capital investments. The City's current maturity of asset data with respect to actual condition information is summarized in Table 3.

Table 3 – Data Maturity Assessment

Asset Group	Maturity Assessment
Roads	99% of roads have a Pavement Condition Index (PCI) value
Sidewalks	65% of sidewalks have condition information based on visual observations
Sanitary and Combined Sewers	57% of sanitary/combined sewers have an industry-standard condition score
Storm Sewers	24% of storm sewers have an industry-standard condition score
Bridges/Culverts	100% of bridges are subjected to biannual inspections in accordance with Provincial regulations
Watermains	Break history and a full inventory of assets is available for asset management planning purposes
Facilities	Limited information is available for asset management planning purposes
Parks	Limited information is available for asset management planning purposes
Cemeteries	Limited information is available for asset management planning purposes
Fleet	A full inventory is available for asset management planning purposes
Forestry	A full inventory is available for asset management planning purposes
Traffic	A full inventory is available for asset management planning purposes

Table 4 summarizes how the condition information for the asset groups listed in Table 3 was used to establish a Condition State for the infrastructure.

Table 4 – Mapping Condition Information to a Condition State

Condition State	Roads	Sidewalks	Sanitary, Storm or Combined Sewers	Bridges
Very Good	Pavement Condition Index (PCI) \geq 85	Visual observations provide information that directly align with the 5 possible Condition States	PACP/WRC Score of 1	Bridge Condition Index (BCI) \geq 80
Good	PCI between 70 and 84		PACP/WRC Score of 2	BCI between 70 and 79
Fair	PCI between 50 and 69		PACP/WRC Score of 3	BCI between 60 and 69
Poor	PCI between 30 and 49		PACP/WRC Score of 4	BCI less than 60
Very Poor	PCI < 30		PACP/WRC Score of 5	The typical process used to assess bridges in Welland does not distinguish between poor or very poor condition

The asset groups that are not listed in Table 4 do not have standardized and comparative condition information that is readily available for asset management planning purposes. In these cases the condition of the assets had to be estimated based primarily on estimated service life. This is a common practice in municipalities in Ontario and across Canada where no reliable condition information exists. Caution must be used with this method in that it:

- Assumes replacement of the asset at its service life plus one day;
- Assumes a uniform deterioration rate irrespective of the applied load on that asset and the asset's physical make up
- Does not factor in substantial rehabilitation of an asset since it was put into service

The best practice to estimate the condition of an asset, where assessment activities have not been completed, is to evaluate the amount of its useful life that has been consumed. For example, an asset that has a useful life of 10 years would be considered to be in excellent condition if it is 1 year old and poor condition if it is 9 years old. Although this approach does not always provide an accurate condition of the asset, particularly in cases of buried linear infrastructure (i.e. water mains and sewers), it is a reasonable starting point where actual condition information is not easily accessible.

The City's inventories contain information on the asset age and the useful life that has been estimated based on industry norms, and therefore it is possible to estimate the condition of the assets using this approach. For the purposes of this report, the condition of the assets where condition information was not available was estimated based on Table 5.

Table 5 – Translating Estimated Service Life (ESL) to Asset Condition

Condition State	Percent of Estimated Service Life remaining on Asset
Very Good	75-100%
Good	50-74%
Fair	30-49%
Poor	10-29%
Very Poor	<10%

Table 6 provides a summary of the range of estimated service lives that are used for each asset group in the City. The specific estimated service life that is used for an individual asset will vary depending on the unique characteristics of the asset, such as material, frequency of use, location in the City, etc. City staff review the estimated service lives that are used for each asset or asset group on a continual basis to reflect real-world observations in Welland and industry trends.

Table 6 – Estimated Service Lives of Assets

Asset Group	Estimated Service Life (years)
Watermains and Sewers	80
Roads	20 to 50
Sidewalks	15 to 40
Bridges	75
Fleet	7 to 20
Facilities	25 to 100
Park Components	10 to 40

Table 7 summarizes the distribution of asset condition. It is apparent that \$202 million worth of assets are considered to be in poor or very poor condition.

Table 7 – Estimated Condition of Infrastructure by Value

Condition State	Water Distribution ¹	Sanitary & Combined Sewers ³	Storm Sewers ³	Roads ²	Sidewalks ³	Bridges ²	All other assets ¹	Total	% of Total
Very Good	\$54	\$152	\$61	\$52	\$8	\$3	\$63	\$393	34.3%
Good	\$49	\$79	\$66	\$50	\$13	\$19	\$32	\$307	26.8%
Fair	\$49	\$29	\$51	\$63	\$2	\$5	\$27	\$226	19.7%
Poor	\$32	\$11	\$19	\$22	\$1	\$8	\$7	\$100	8.7%
Very Poor	\$30	\$14	\$6	\$5	\$3		\$45	\$102	8.9%
Unknown	---	---	---	---	---	---	\$18	\$18	1.6%
Total	\$214	\$285	\$201	\$193	\$27	\$35	\$191	\$1,146	

1. Age/ESL information used to develop condition distribution.
2. Industry standard condition scores used to develop condition distribution.
3. Combination of both Age/ESL and industry standard condition scores used to develop condition distribution

2.5 Asset Capacity

The determination of asset capacity is an integral component of asset management planning. An asset can be well within its estimated service life and exhibit “like new” condition however may not meet the capacity requirements that are necessary to achieve the desired levels of service. In essence capacity can be described as the ability of an asset to meet the current demands put upon it both now and in the future by customers (i.e. sewer or water system capacity).

The asset group in Welland where asset capacity play a critical role is the combined sewers. The City has approximately 4.4 km of combined sewers that significantly impact the ability to meet the desired levels of service.

3. LEVEL OF SERVICE

A "level of service" is a term that is used to describe quality, quantity and availability of the service that is being provided. In the context of asset management plans, levels of service are established as a way to guide the management of infrastructure in a manner that aims to achieve the level of service goal. This develops a systematic process for:

- Coupling the customer level of service expectation, Customer Level of Service, with technical units of measure, Technical Levels of Service, used by technical staff in the analysis of infrastructure need.
- Tracking the current level of service through Key Performance Indicators (KPIs)
- Deciding the appropriate target level at which to provide each service.
- Preparing a strategy to achieve the level of service target if it is not currently being achieved.
- Establishing a clear linkage between the costs of higher service levels.
- Discussing the willingness to pay for higher service levels.

3.1 Types of Level of Service

Levels of service vary widely depending on the level of sophistication of an organization. They can be related to regulations, customer expectations, or corporate vision. In terms of municipal infrastructure, the services that they provide are generally related to either condition or capacity of the asset or infrastructure system. Level of service can also be based on managing the risk that the failure of the asset has on the service that it provides.

Condition Levels of Service

The most basic level of service for the City is established around maintaining infrastructure in an acceptable state of repair. This strategy is based on replacing an asset when it reaches a condition state that reduces its ability to provide the service for which it was constructed. The specific condition state when the renewal of the asset is required will change based on the importance of the service that the asset provides (i.e. local roads compared to collector roads).

Capacity Levels of Service

Capacity levels of service are related to the amount or size of infrastructure that is required to provide the objectives of the organization. Similar to most municipalities in Ontario, Welland does not have many specific levels of service that are used to address the renewal of existing infrastructure based on capacity issues.

3.2 Performance Metrics

Performance metrics, or Key Performance Indicators (KPIs), are used to assess how well the infrastructure is achieving the service levels. It is essential that each level of service have a corresponding performance metric that will be tracked on an ongoing basis because they will be used to make decisions about why and when to invest in the City's infrastructure systems.

3.3 Comprehensive Perspective on Levels of Service in Welland

As part of a previous AMP, a series of workshops were held with City Staff to develop the target level of service and performance metrics (KPIs) for each infrastructure system. The results of these workshops were a series of tables that documented:

1. - A customer service statement that describes what service the City is providing through the infrastructure system.
2. - Customer or Council focused levels of service and associated performance metrics that are used to convey how well the infrastructure system is providing its intended service to the general public.
3. - Technical focused levels of service and associated KPIs that are used by Staff to convey how well the infrastructure system is providing its intended service to technical experts in the infrastructure business.

3.4 Current Desired Levels of Service in Welland

The comprehensive suite of Levels of Service documented in the 2015 AMP are intended to serve as aspirational objectives that will help guide staff in the collection of additional asset data and to refine subsequent AMPs. Table 8 summarizes the current desired levels of service in Welland that are used to determine priority projects and determine the infrastructure needs in the subsequent portions of this AMP. The desired levels of service that are documented in Table 8 have been established to ensure that the infrastructure systems provide reliable services to residents in Welland.

Table 8 – Desired Levels of Service in Welland

Asset Group	Desired Level of Service
Sanitary Sewers	Replace or rehabilitate when condition state reaches poor or very poor
Combined Sewers	Replace and separate all combined sewers
Storm Sewers	Replace or rehabilitate when condition state reaches poor or very poor
Watermains	Replace when watermain exceeds its expected useful life, when number of breaks exceeds target threshold, or when desired fire flow cannot be achieved
Roads	Rehabilitate or reconstruct roads at the optimal time to maintain an acceptable condition state
Sidewalks	Replace when condition state reaches poor
Bridges	Maintain bridges in a safe state of repair through completing rehabilitation or replacement activities as recommended through biannual inspections
All other assets	Replace or rehabilitate as appropriate when asset reaches the end of its useful life

4. ASSET MANAGEMENT STRATEGY

4.1 Asset Management Strategy Overview

The asset management strategy component of the AMP represents the set of planned activities to ensure that the infrastructure is able to achieve the level of service goals. The strategy is generally related to optimizing decisions with respect to:

- The replacement or rehabilitation of assets
- The optimal level of maintenance investment required to optimize the long term costs of the assets (i.e. does more maintenance result in a longer useful life?)
- Disposing of assets that are not required to meet service levels
- Addressing policies that impact the strategy for how to renew the asset (i.e. does the asset size/design need to change to meet a certain policy?)

The items summarized above are the goals for an AMP (and the associated systems that support the plan) to achieve through an analysis of readily available information. In this iteration of the City's AMP, achieving a process that optimizes these goals is difficult due to a lack of readily available information and established processes to support the decisions. For example, the decision to rehabilitate a sanitary sewer is dependent on knowing if the size is sufficient or should be increased to provide adequate service to accommodate future growth. If the pipe is too small then rehabilitation is not an option. Therefore, the City needs to have the data in place (i.e. functioning hydraulic model of their sanitary sewer collection system with growth projections and spatial records of basement flooding complaints) in order to determine if the sanitary sewer is too small to support the decision making process of rehabilitation versus replacement.

4.2 Asset Management Strategies in Welland

The following points summarize the current asset management strategies that are practiced in Welland:

- Combined sewer separation
The separation of combined sewers are among the highest priority projects in Welland. In most cases, the separation of combined sewers is completed through the construction of a storm sewer along the same alignment, and the conversion of the combined sewer to function as a sanitary sewer.
- Cast iron watermain replacement
The replacement of old cast iron watermains is also among the highest priority projects in Welland. The cast iron watermains account for a significant portion of the City's expenditure needs in the water distribution system.
- Integrated right-of-way asset replacement
The City strives to optimize when and how assets in the same right-of-way are replaced. This approach provides better value for infrastructure renewal dollars because it is typically more cost effective to replace all of the infrastructure in the same right-of-way.

The highest priority projects in Welland are therefore integrated right-of-way projects in which combined sewer separation and cast iron watermain replacement are completed together.

- Bridge rehabilitation versus replacement/reconstruction
The City conducts biannual inspections of all bridges in accordance with Provincial regulations. The experts who conduct the inspections apply industry best practices with respect to decision making around the rehabilitation versus replacement/reconstruction of the structures. The bridge needs documented in this section reflect the recommendations from the latest inspections from 2016.

- Road rehabilitation versus replacement/reconstruction
The City applies industry best practices with respect to decision making around road rehabilitation versus road replacement/reconstruction. The understanding of current road condition and the subsurface infrastructure condition is also used to decide which roads will be reconstructed and which road will be resurfaced. The renewal needs identified in this section reflect the consideration that some roads will be resurfaced while others will be reconstructed.

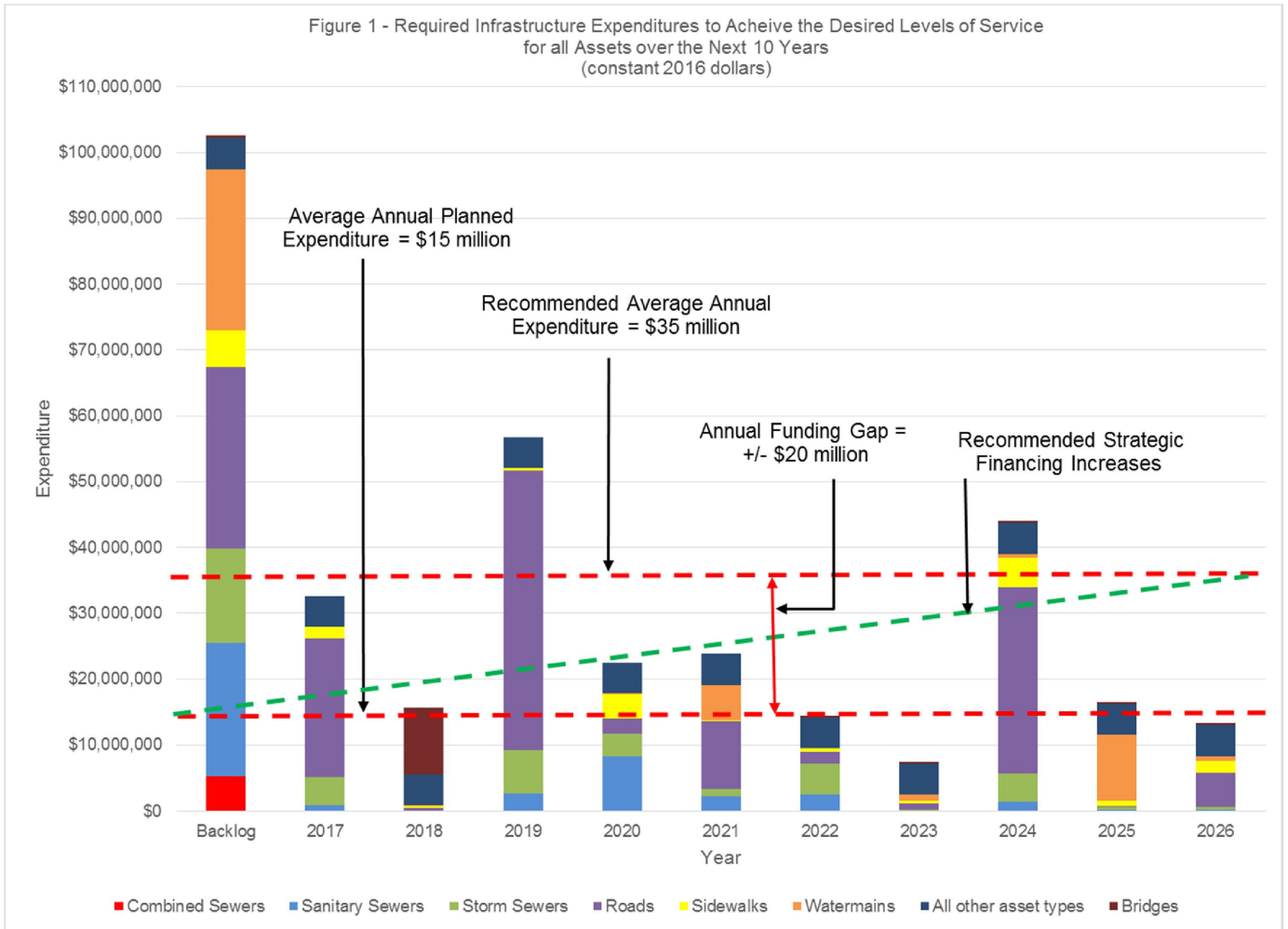
4.3 Infrastructure Expenditure Needs to Provide the Desired Levels of Service

Figure 1 illustrates the expenditure needs that are required to provide the desired levels of service over the next 10 years. It is apparent from Figure 1 that over the next decade the average expenditure needs to provide the desired levels of service are approximately \$35 million per year. The average expenditure need for tax-supported assets is approximately \$26 million per year, while the average expenditure need for rate-supported assets is approximately \$9 million per year (refer to Figures 2 and 3, respectively).

It is also apparent from Figure 1 that the backlog of investment needs to renew assets that are currently below the desired levels of service is over \$100 million. In practice, the backlog is distributed over the following 10 years in a prioritized manner to smooth out the fluctuations in annual expenditure needs.

Figure 1 also shows the current level of planned expenditures and illustrates the impact of the strategic financing increases that are recommended in Section 5 of this report. This additional information on Figure 1 helps to convey the overall strategy to address the annual funding gap of approximately \$20 million over the next 10 years. The impact of not increasing annual expenditures to address the funding gap are:

1. - A continued decline in the ability for the infrastructure in Welland to provide the desired levels of service; and
2. - The risk that the future expenditure needs will be greater than the current estimates as the infrastructure deteriorates to a condition state where less costly rehabilitation interventions are no longer appropriate and more costly replacement interventions will need to be completed.



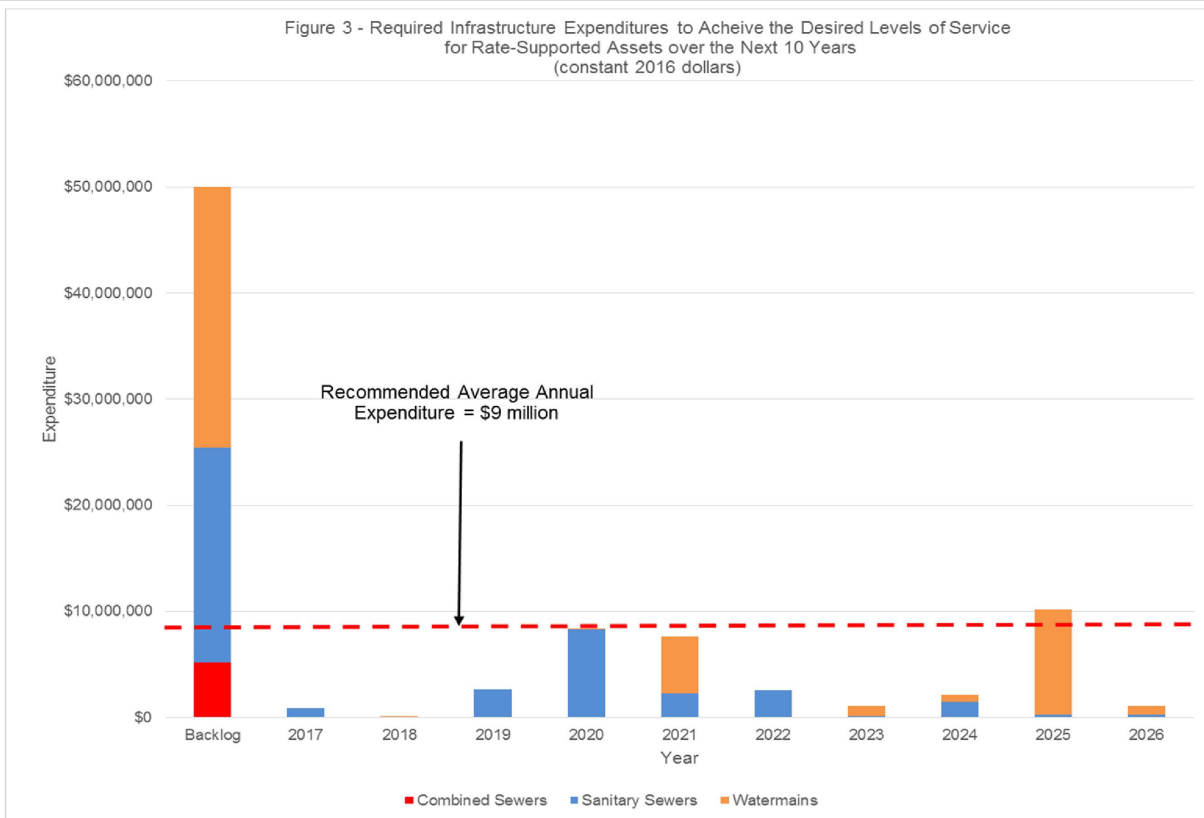
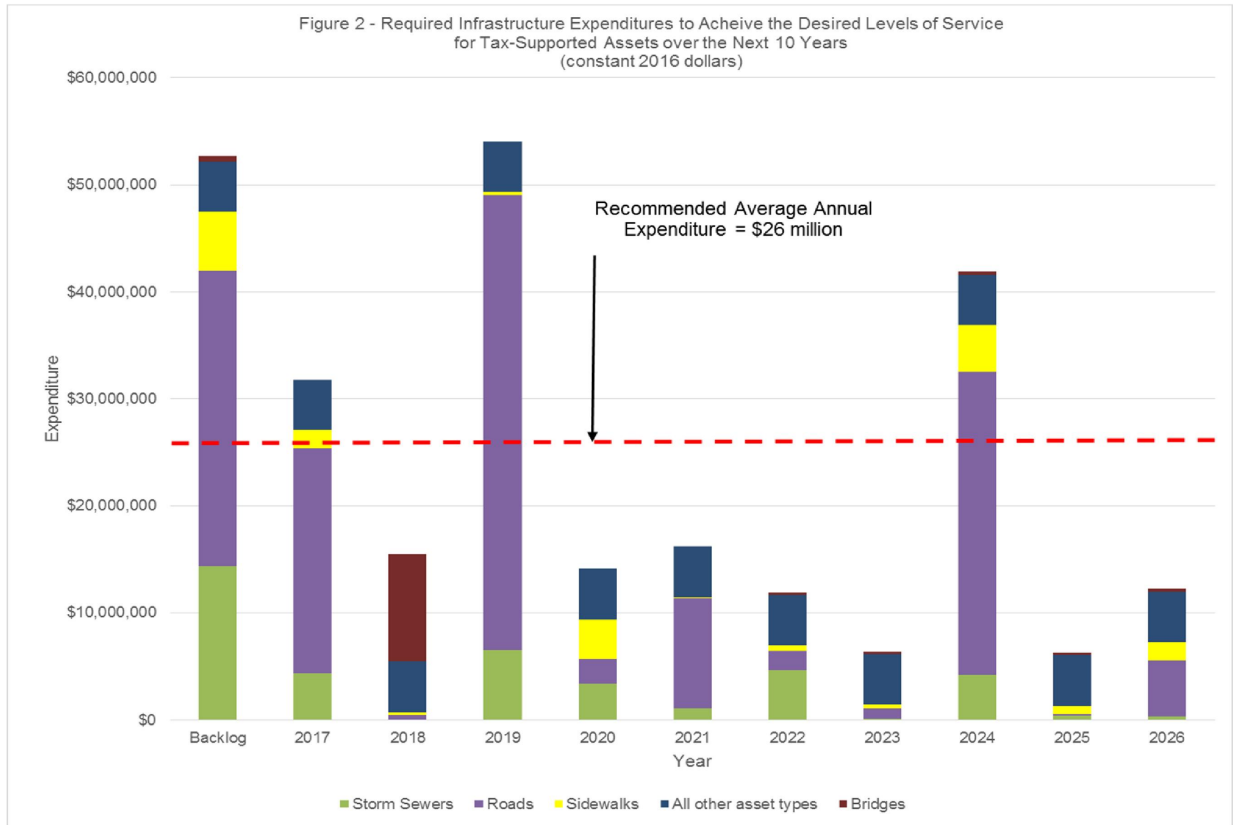
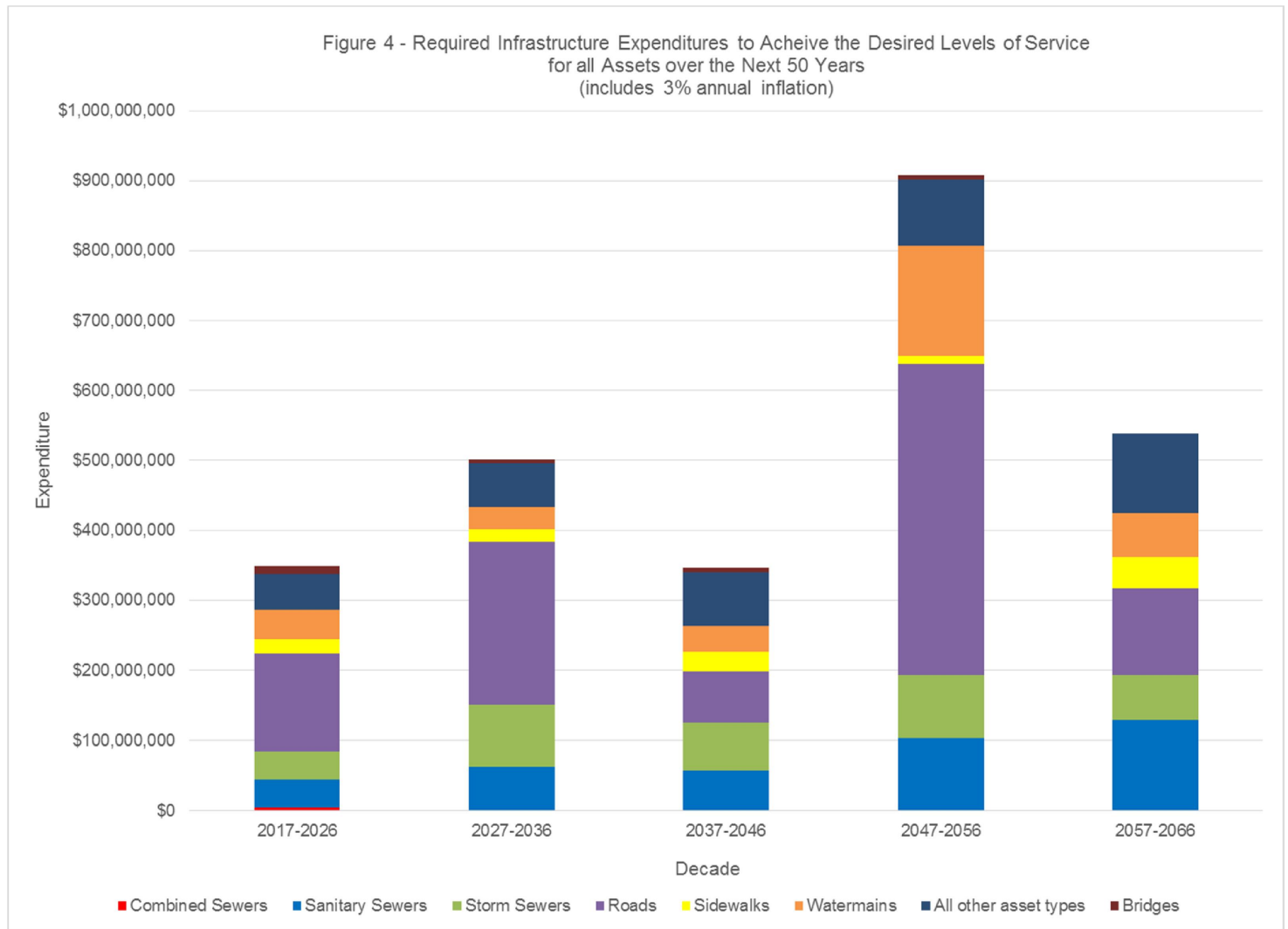


Figure 4 illustrates the long term renewal needs of the City’s infrastructure over the next 50 years. It is apparent from Figure 4 that the investment needs escalate to approximately \$900 million over a ten-year period (or \$90 million per year) when 3% annual inflation is factored into the analysis.



5. FINANCING STRATEGY

5.1 Scope and Process

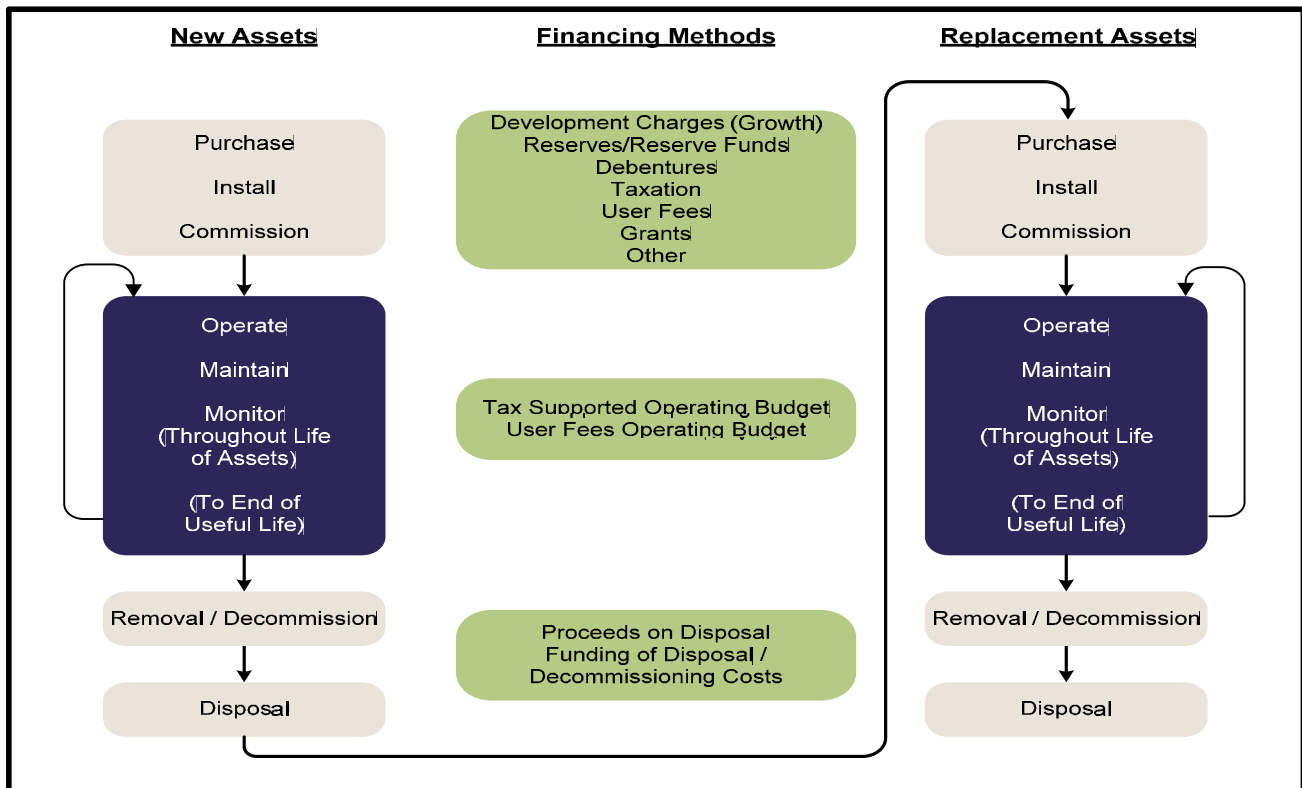
The City completed a detailed financing strategy as part of their 2015 AMP. The content in this section is summarized from the analysis completed in the previous report as it was deemed to be sufficiently accurate to support this update of the AMP. The City of Welland’s financing strategy is continually reviewed and adjusted to reflect changing pressures and priorities across the community. **Please refer to the latest budget documents to understand how the financing strategy described in this Section will be implemented over the coming years.**

The financing strategy from the 2015 AMP included:

- Annual expenditure forecasts broken down by category; -
- Actual expenditures in the above named categories for 2013 and budget expenditures for 2014 and draft 2015; -
- A breakdown of annual funding/revenue by source; and -
- Identification of the funding shortfall. -

The long-term financing strategy forecast (including both expenditure and revenue sources) was prepared, consistent with the City’s departmental budget structure, so that it can be used in conjunction with the annual budget process. Various financing options, including taxation, reserves, reserve funds, debt, user fees (i.e. water and wastewater rates) and grants were considered and discussed with City staff during the process. Figure 3 below provides a visual representation of how various financing methods can be used for both initial asset purchases, as well as asset replacements.

Figure 3 - Financing Methods of Lifecycle Costs



5.2 Financing Strategy

The analysis from the 2015 AMP concluded that a key component of the financing strategy in Welland to fund the required infrastructure expenditures is increases to taxation rates or water/wastewater rates.

The analysis completed in 2015 demonstrated that annual taxation increases of approximately 4.6% per year would be required to fund an average renewal need for tax-supported assets of \$11 million per year. The average renewal need for tax-supported assets that is identified in this AMP is approximately \$26 million per year. Therefore, the annual taxation increases will need to be approximately 11% to fund the improved perspective of expenditure needs identified in this AMP (refer to Table 9).

Similarly, the analysis completed in 2015 demonstrated that annual water and wastewater increases of approximately 2.8% and 3.4%, respectively, would be required to fund an average renewal need for water and wastewater assets of \$1.5 million and \$2.4 million per year, respectively. The average renewal need for water and wastewater assets that is identified in this AMP is approximately \$4.2 million and \$4.4 million per year, respectively. Therefore, the annual water and wastewater rate increases will need to be 7.8% and 6.2%, respectively, to fund the improved perspective of expenditure needs identified in this AMP (refer to Table 9).

Table 9 – Summary of Annual Tax/Rate Increases Required to Fund Infrastructure Expenditure Needs

Asset Group	2015 AMP		2016 AMP	
	Average Annual Expenditure Need	Annual Tax/Rate Increase	Average Annual Expenditure Need	Annual Tax/Rate Increase
Tax Supported	\$11 Million	4.6% per year for 10 years	\$26 Million	11.0% per year for 10 years
Water	\$1.5 Million	2.8% per year for 10 years	\$4.2 Million	7.8% per year for 10 years
Wastewater	\$2.4 Million	3.4% per year for 10 years	\$4.4 Million	8.2% per year for 10 years

The following excerpt from the financing strategy of the 2015 AMP is relevant to the analysis documented above:

“While the annual funding requirement may fluctuate, it is important for the City to implement a consistent, yet increasing annual investment in capital so that the excess annual funds can accrue in capital reserve funds. As the financing strategy under each scenario is based on the City funding the plan with own funds, if other funding sources become available (i.e. grant funding or third party contributions) or if maintenance and rehabilitation practices allow for the deferral of capital works, then the impact on the City’s water revenue would decrease.”

5.3 Mitigating the Funding Shortfall

The financing strategy documented in the 2015 AMP provided the following considerations to mitigate the funding shortfall that currently exists in Welland:

- Applying rehabilitation techniques to extend the lifespan of assets;
- Rate increases, where needed (i.e. taxation, user fees, parking);
- Actively seeking out and applying for grants;
- Decreasing expected levels of service;
- Divestment of facilities, parks, or other non-critical infrastructure where it is practical and appropriate to do so;
- Issuing debt for significant and/or unforeseen capital projects, in addition to the debt recommended within this report, while staying within the City’s debt capacity limits (this would have the impact of spreading out the capital repayment over a defined term); or
- Implementing operating efficiencies (i.e. reduced operating costs to allow more capital investment).

6. CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

The analysis documented in this iteration of Welland's AMP identifies infrastructure expenditure needs that are in excess of the available revenue. The analysis indicates that the funding gap is approximately \$20 million per year. The City has committed to advancing asset management practices in the organization. These strategies will help Welland refine their infrastructure needs by providing an improved understanding of the condition and capacity/performance concerns of the infrastructure systems based on detailed assessments and provide an understanding of the impact of advanced rehabilitation techniques on the lifecycle renewal costs of assets.

6.2 Recommended Priority Projects

The following priority projects are recommended for implementation in the City based on the analysis completed in this AMP:

- Combined sewer separation and cast iron watermain integrated right-of-way replacement
The elimination of combined sewers is a priority in Welland. This will significantly reduce the risk that these sewers will cause basement flooding or discharge untreated sewage into the natural environment. Furthermore, the elimination of the combined sewers will reduce the amount of wastewater that Welland has to pay the Region of Niagara to treat, which will free up future resources to fund the replacement of other assets in the City. At the same time, the replacement of cast iron watermains is also a priority because these pipes are associated with high break frequencies and discoloured water complaints. The high break frequency of this pipe cohort also results in an increase to the volume of water that is lost during the break events that the City has pay the Region to provide. Integrated right-of-way projects that separate combined sewers and replace cast iron watermains are recommended to be a high priority for the City.

Specific areas in the City that are in this priority category are as follows:

- River Road
 - Edgar/Elgin area -
 - Riverside Drive -
 - PCD/West Main Area -
- Replacement of subsurface infrastructure in areas with high leakage watermains or high infiltration sanitary sewers
The replacement of watermains in areas that have high leakage rates, or the replacement of sewers that have high infiltration rates, are also recommended as a high priority in Welland. Watermains with high break frequencies increase the potential for the ingress of untreated water into the distribution system during watermain break events, and high infiltration sanitary sewers increase the likelihood of discharging untreated wastewater into the natural environment or the occurrence of basement flooding events. All of these consequences represent health and safety concerns for the local community.

The replacement of these assets will reduce the costs that the City has to pay to treat water/wastewater, freeing up funds to fund the replacement of other assets. An additional benefit to replacing watermains with high leakage rates is the restoration of the hydraulic capacity of the distribution system and an increase in available fire flows because these are typically older pipes that have a decreased hydraulic capacity due the degradation in the 'C' factor caused by internal corrosion.

Specific areas in the City that are in this priority category are as follows:

- McNaughton, Nelles, Bishop -
 - David Street -
 - Dain Avenue -
 - East Wartime -
 - West Wartime
- Rehabilitation or Replacement of Bridges in Poor Condition
Bridges represent a critical asset in Welland and therefore it is important to ensure that they are in a state of repair that does not impact their safe use. The City conducts biannual inspections of all bridges in accordance with Provincial regulations. The biannual bridge inspections provide recommendations for the rehabilitation or replacement need of each bridge in Welland to ensure that they are safe to use. The implementation of the recommendations from these biannual inspections are considered a high priority in Welland.

Specific bridges in the City that are in this priority category are as follows:

- The most recent inspections have identified the need to replace the Forks Road Bridge. Through the information obtained during the inspections and subsequent lifecycle cost analyses it has been determined that the Forks Road Bridge over the Recreational Canal should be replaced by no later than 2020. In the spring of 2016 the bridge inspections revealed greater deterioration than previously identified, and this structure was closed for approximately three weeks for emergency repairs. The replacement of the Forks Road Bridge is considered to be a high priority project for Welland.

6.3 Next Steps

This infrastructure investment needs have been established based on a strategic review of the City's asset inventory. It is important to recognize that the City is striving to reach a position where the infrastructure needs equal the available revenues (i.e. a full cost recovery approach). Over the coming years, the City will continually review the infrastructure needs as better information becomes available and as technological improvements reduce the cost of renewing infrastructure. This will include the adoptions of infrastructure rehabilitation techniques such as trenchless technologies in order to provide the desired level of service in a more cost effective manner.

The City will also consider approaches to increase the revenue that is available to fund the renewal of existing infrastructure, including pursuing Provincial or Federal infrastructure grants. This strategy positions the City on a path to ultimately reach a point where the infrastructure needs equal the available revenues.