2021

Asset Management Plan

Municipality of
Bluewater

www.municipalityofbluewater.ca

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1.0 Executive Summary

The Municipality of Bluewater is responsible for providing our communities of approximately 7,136 residents with essential services needed to realize our vision of a place for people to prosper. Our infrastructure assets with a replacement value of $405 million are the foundation for delivery of these vital services and we must therefore ensure appropriate investment is planned to renew our assets and enhance our portfolio as needed to maintain these services.

We have long recognized the benefits of adopting leading practice with respect to asset management. This includes working progressively to implement leading practice approaches that support sustainable service delivery efficiently while managing risks.

With the introduction of Ontario Regulation 588/17 for Asset Management, we have furthered our approaches to develop an updated asset management plan (AMP) that is fully compliant with requirements of the first regulation milestone in 2022 (updated) and presents advanced compliance with future milestones for specified asset areas. At the same time, we have undertaken an assessment to determine areas in need of additional development to achieve compliance.

As assets age, their condition degrades which can ultimately impact service delivery. We have adopted processes and technologies to assess asset conditions and to gain ongoing insight into the state of our infrastructure. This informs our monitoring and management of levels of service (LOS) and planning for investment in new and existing infrastructure. The application of these techniques on our assets indicates a decline in the overall condition of our assets, however maintaining a good condition rating overall.

The current condition of our infrastructure assets informs the analysis of the financial investment needed to renew our assets and sustain the current level of service over the 10-year planning period. The resulting analysis for this AMP indicates total new needs of $95 million for all service areas in this AMP for the period 2022-2031. Of this total, $27.6 million pertains to water and wastewater infrastructure which are self-funding in nature. The resulting difference, $67.4 million, is spread across all other asset classes shown in this AMP and reveals we are challenged to meet investment needs in key areas such as roads and bridges. It is important to note that these needs do not fully include the needs associated with facility infrastructure. Bluewater has scheduled building condition assessments for all facilities in 2022 and will incorporate facility needs into the AMP by July 2024.

We continuously assess opportunities for additional funding options and revenue streams to address our funding gaps. We have assessed a range of funding options to meet the funding gap identified

through this asset management plan, including options that have successfully been applied by other municipalities. Examples include stormwater management funding; special infrastructure levies or increased capital levies; user rates and fees; debt financing; sponsorship strategies and partnerships among others. We will continue to review financing strategies to better manage our infrastructure gap in future revisions of our AMP.

We are pleased to present an asset management plan to our communities and stakeholders that is compliant with all requirements of the initial regulation milestones for 2022 and many of those for future milestones. As we progress to the future milestones we will ensure a well governed plan that manages implementation risks to meet our outstanding requirements in advance of the upcoming milestones and support our efforts to close our financial gap, improve our LoS and enhance interaction with our communities about the services we deliver.

Glossary

Development Charges	The Municipality of Bluewater collects development charges in accordance with the Development Charges Act and its bylaws; these charges are used to offset capital costs required to support infrastructure associated with new growth
Financial Strategy	Requirement of O.Reg.588/17 to outline the cost to maintain the current levels of service
Funding Gap	Instances where an investment requirement does not have dedicated funding sources identified or assigned to execute the targeted activity associated with the investment
Levels of Service (Los)	Requirement of O.Reg.588/17 to outline both qualitative descriptions and technical metrics that describe our commitments, standards, and expectations that we have set for our infrastructure
Lifecycle Cost	Refers to the total costs required for an asset or service over all stages of its life, e.g., acquisition/creation, operation and maintenance, renewal, and disposal
Life Span	The expected length of time an asset can be operational and deliver the required level of service
Lifecycle Management	The processes we have in place to manage our infrastructure assets over the course of their useful lives including acquisition, creation, construction, maintenance, renewal, operations, disposal, and all engineering and design work associated with those activities
Net Own Source Revenues	Own source revenue is defined as revenue raised by a government from its own imposition of a tax, a license, a fee or any other charge
Non-Core Assets	Any infrastructure asset that does not fall under one of the Core Asset categories, but is still owned and operated by the municipality, such as fleet and equipment, parks, facilities etc.
O.Reg.588/17	An Ontario Regulation entitled, "Asset Management Planning for Municipal Infrastructure," made under the Infrastructure for Jobs and Prosperity Act and filed in December 2017, which prescribes the policies and requirements relating to the preparation of this asset management plan by applicable municipalities
Operating Costs	The aggregate of costs, including energy costs, of operating a municipal infrastructure asset over its service life
Replacement Cost	The replacement cost can be calculated or estimated based on asset parameters like asset size (diameter, depth and width) and material and can also depend on its location
State of Infrastructure	Requirement of O.Reg.588/17 to outline a summary of assets including their replacement costs, average ages, conditions etc.
Technical Levels of Service	Detailed metrics that can be used to evaluate and report whether the community and subsequently corporate LoS are being achieved

2.1 Background

The Municipality of Bluewater is updating its existing asset management plan, initially created in 2014, to meet the regulatory requirements of Ontario Regulation 588/17: Asset Management Planning for Municipal Infrastructure ("O. Reg. 588/17").

The Municipality of Bluewater ("Bluewater") provides essential services for our communities that enable its strategic vision. To deliver these services in a financially sustainable manner, Bluewater manages a wide range of assets that must be maintained in a good state of repair and replaced or upgraded to meet existing and future community needs and expectations. Faced with the limitations of aging infrastructure and a limited budget, Bluewater is updating its AMP to enhance the management and financing of infrastructure repair and replacement.

Bluewater developed its first AMP in 2014 with a separate stormwater asset management plan completed in 2017. Together, these plans covered only a portion of Bluewater's assets including roads, bridges, culverts, water systems, sanitary systems and stormwater infrastructure.

In addition to these asset classes, this updated 2021 AMP also incorporates fleet assets and facilities. Bluewater will continue incorporating other asset classes in the future as asset management data becomes available through condition assessments, inspections and other asset monitoring activities. For now, the current asset management plan considers asset needs and establishes priorities for managing lifecycle costs, not only for a single asset type, but in consideration with other infrastructure which the municipality owns, in particular:

Roads	Water System: Distribution & Supply	Stormwater System	Facilities

	Bridges and Culverts	Sanitary Sewer System: Collection & Treatment	Fleet Assets	Street Lights

Bluewater collected information for these asset classes from the previous AMP, inspection reports, needs studies, financial plans and asset inventory lists which the municipality maintains. Interviews and consultations were also held with staff and senior management to develop the AMP.

The goal of this AMP is to provide the municipality with a tool to be used in making decisions on infrastructure repair and replacement. This AMP establishes Bluewater's current state of infrastructure, levels of service for each asset class, lifecycle management strategies, the existing infrastructure gap and a corresponding financial strategy for Councillors and the municipality's administration.

2.2 Contents of the Plan

This Plan contains the basic elements outlined in "Building Together – Guide for Municipal Asset Management Plans" and follows the guidance provided in O. Reg. 588/17. The Plan is divided into the following sections:

I.	Introduction: Background and Context
II.	State of Infrastructure
III.	Levels of Service
IV.	Asset Lifecycle Management Strategy
V.	Financial Strategy
VI.	Recommendations for Continuous Improvement
VII.	Appendices

3.0 State of Infrastructure

3.1 Summary

The Municipality of Bluewater monitors the condition and state of its assets to varying degrees. Core assets are generally routinely monitored through a well-defined process to collect and manage asset information. Information gathered through these processes is reported in compliance with state of infrastructure reporting every two years. Moreover, the municipality will complete building condition assessments for all facilities in 2022.

The table below provides information about the condition, average age, and replacement value for each asset class.

Asset Class	Inventory	Average Age	Replacement Costs (millions)	Weighted Average Condition
Roads	362 road kms	Unknown	$196.0	Good
Bridges	16 bridges	69	$14.4	Fair
Culverts	62 culverts	52	$21.9	Fair
Water	122 pipe kms	28	$99.2	Good
Wastewater	50 pipe kms	26	$46.5	Good
Stormwater	27 pipe kms	31	$21.3	Poor
Fleet	62 assets	11	$10.2	Fair
Street Lights	668 lights	3	$0.5	Very Good
Facilities	24 facilities	Unknown	Unknown	Good
Total	-	-	$410	Good

Further information of the state of infrastructure for each asset class can be found in Appendix C.

Replacement Costs

The current replacement costs for each asset class are required to forecast future capital replacement costs and financial needs of the corporation to maintain existing service levels. Replacement costs are defined as costs required to fully replace an asset.

The replacement cost can be calculated or estimated based on asset parameters like asset size (diameter, depth and width) and material. The replacement cost can also be dependent on asset locations and proximity to environmentally sensitive features and/or major transportation features. This valuation is achieved by utilizing information from recent procurement contracts for similar works. The unit cost of replacement is used to estimate the current replacement cost of an asset. These unit costs are also useful for the estimation of future capital projects.

For roads, bridges, culverts, water, wastewater, stormwater and street light assets, replacement costs were calculated in-house or provided by third party consultants in inspection reports, financial plans and asset management plans.

Replacement costs are estimated at **$410 million** and broken down by asset class in the figure to the right. It is important to note this figure does not include replacement costs for facilities. The municipality has procured resources to complete the remaining analysis for facilities in 2022.

The graph shows that the largest replacement costs pertain to roads, drinking water, wastewater and bridges/culverts; however, it is important to note that drinking water and

Replacement Costs (millions, CAD)

wastewater are fully funded assets. Therefore, the assets with the highest replacement value are roads, bridges and culverts. Relative to other asset classes, these assets comprise the bulk of capital replacement costs in the financial forecast section of this asset management plan which are to be funded through reserves, the levy, debt or other sources of financing.
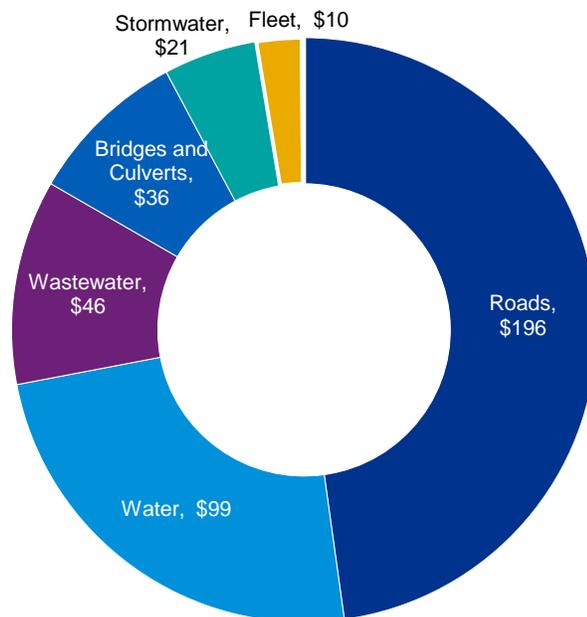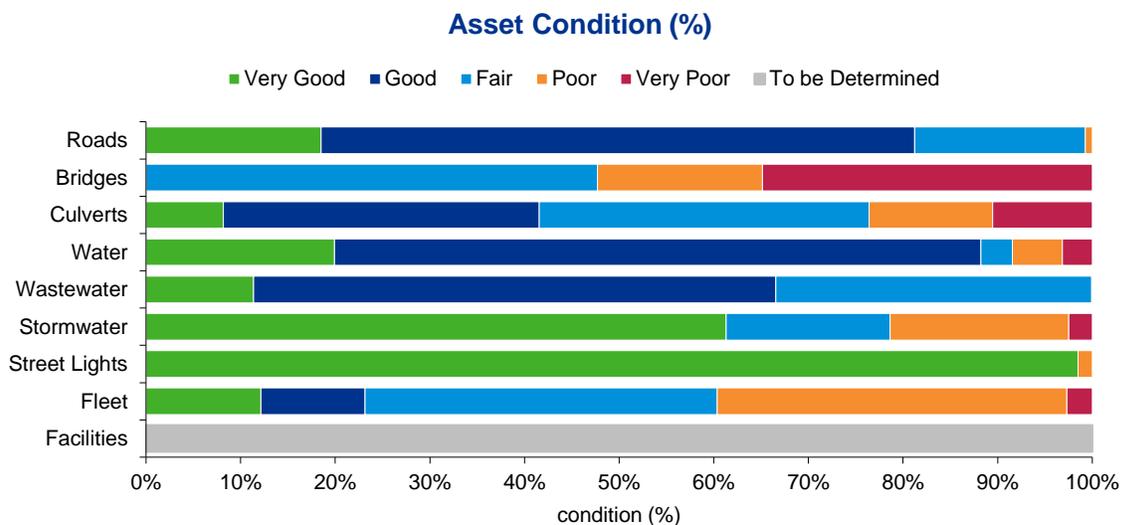
Condition Assessment

As assets age, their condition degrades which can ultimately impact service delivery. We have adopted leading processes for assessing the condition of assets to gain valuable ongoing insight into the state of our infrastructure that informs our monitoring and management of LoS and planning for investment in new and existing infrastructure. The application of these techniques on our assets indicates a decline in the overall condition of our assets. We routinely monitor the condition and state of our assets through well-defined processes to identify operational repairs, maintenance program planning, as well as capital renewal needs. The information is also used for reporting on the state of infrastructure.

Periodic inspections and condition assessment processes for all major assets are well defined and operationalized. All core infrastructure including roads, bridges, drinking water, wastewater and stormwater infrastructure have more robust processes while others follow a standard inspection approach and are in various stages of implementation. Asset-specific inspection and condition assessment approaches are described in the Asset Lifecycle Management Strategy section.

In the absence of formal condition assessment information, condition is derived from the age and lifespan of the asset. Once condition assessment information has been established for all assets, it is then used to support asset management decision-making at Bluewater.

The assets are at varying stages in their lifespans and have varying conditions. Based upon analysis of capital investment since the last AMP in 2014, asset conditions have been deteriorating, indicating the municipality is not keeping pace with investing in the rehabilitation of its assets.

Analysis undertaken for the current 2021 AMP indicates condition assessments as follows:

Asset Condition (%)

■ Very Good   ■ Good   ■ Fair   ■ Poor   ■ Very Poor   ▨ To be Determined

The Municipality of Bluewater has procured resources to perform building condition assessments for all facilities in 2022.

Risk Analysis

Bluewater has adopted a risk-based approach to analyzing its infrastructure portfolio as part of this AMP. In essence, this approach assigns a risk rating to all municipally owned assets. The approach recognizes that older assets pose greater financial, reputational, operational and service delivery risks compared to new assets. Accordingly, the risk-based approach allows decision-makers at the municipality to maintain, remediate and replace high risk assets first, thereby deriving greater value from tax dollars.

Bluewater assigned a risk rating to all assets using a systematic methodology whereby the risk rating was a function of two components: (1) likelihood of failure (LoF) and (2) consequence of failure (CoF). Based upon asset inventory data, each asset was assigned a rating of 1-5 for LoF and CoF respectively with a total risk score falling between 1 and 25. See Appendix E for more detail. Scores were then grouped as follows:

➢ Scores of 1-9 = low risk investment needs
➢ Scores of 10-19 = medium risk investment needs
➢ Scores of 20-25 = high risk investment needs

Bluewater was able to assign a risk rating for each asset using this methodology and to categorize future needs by risk. As mentioned in the Executive Summary, Bluewater's estimated needs between 2022 and 2031 are estimated to be $95.0 million. The figure below breaks down these needs by risk level:
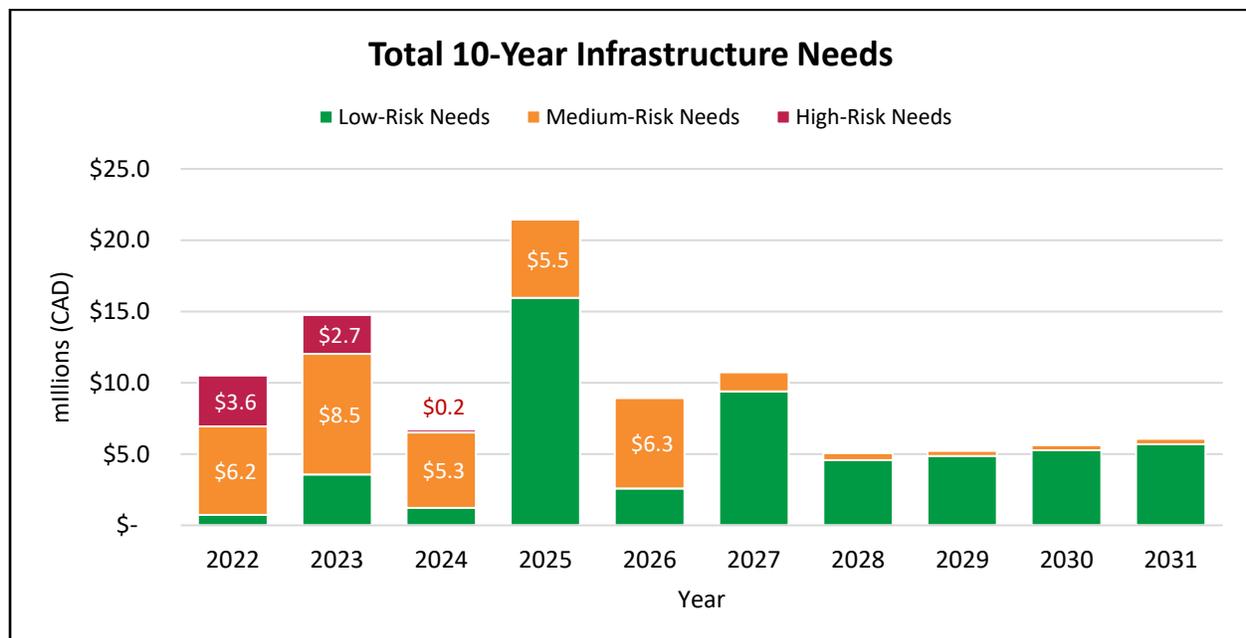
As can be seen, $6.5 million (7%) of future needs were categorized as high-risk needs requiring attention from 2022 to 2024. These needs pertain primarily to bridges and culverts ($3.8 million), roads ($2.6 million) and stormwater assets ($84,000). Decision-makers at Bluewater can derive more value from tax dollars by focusing on these needs in the next ten (10) years.
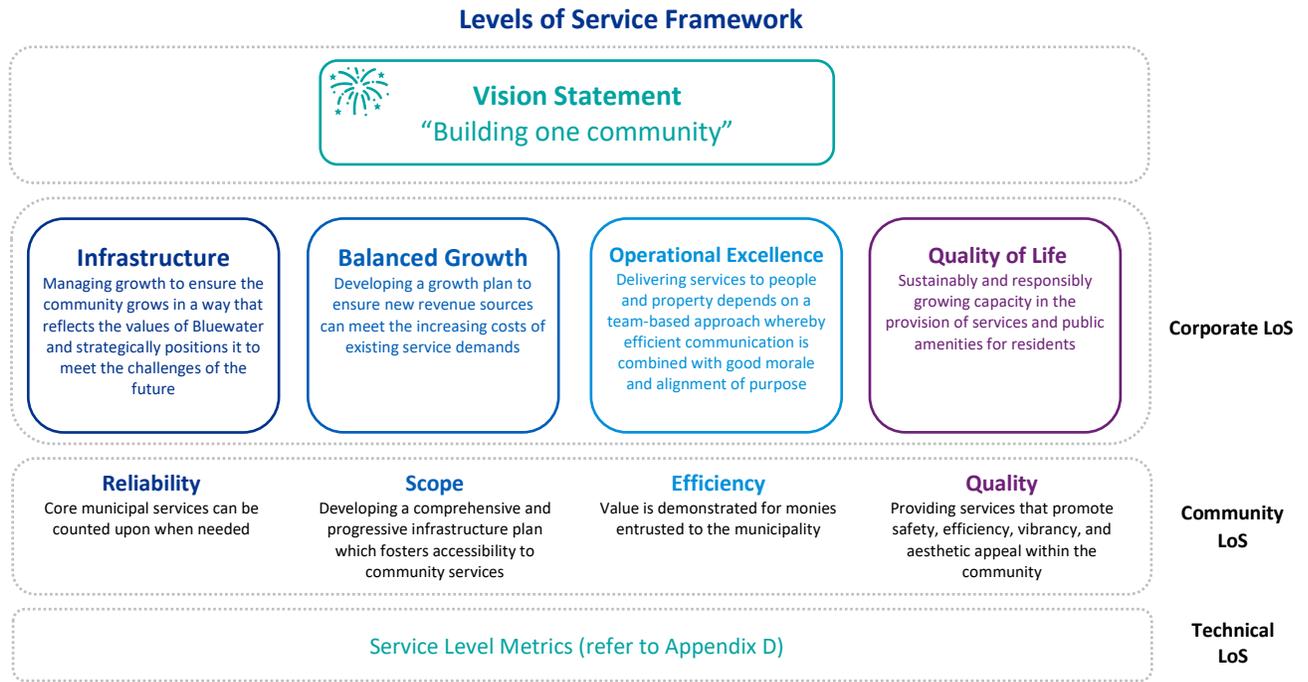
4.0 Levels of Service (LoS)

O. Reg. 588/17 requires that the AMP include the current LoS being provided and the LoS that the municipality proposes to provide for each of the ten (10) years following the publication of the AMP in 2024 for each asset class. The LoS must be determined in accordance with the qualitative descriptions and technical metrics documented in the regulation for core assets, as well as discretionary LoS and corresponding metrics which Bluewater has established for the community.

This section describes our approach to developing LoS for all service areas, both core and non-core assets. We have presented information and associated costs for the minimum LoS and associated costs as well as discretionary LoS. The financial strategy presented in this AMP is based on maintaining the current LoS presented in this section. Our continuous improvement plan for asset management will feature initiatives to target the desired LoS for our all our defined measures including the required investment in accordance with future milestone requirements of O. Reg. 588/17.

We aspire to advance our approach to LoS by exceeding regulatory requirements to develop measures that assess the extent to which we are meeting the needs and expectations of our communities. We have developed a levels of service framework to align our strategic plan with infrastructure services offered to our community. The LoS framework features the following components:

1. **Corporate LoS:** our core strategic outcomes as communicated in our vision from our Strategic Plan 2016-2021

2. **Community LoS**: reflects the categories or themes that are most valued by our communities and are aligned to the corporate LoS

3. **Technical LoS:** detailed metrics used to evaluate delivery of Community and Corporate LoS

Levels of Service Framework

Vision Statement
"Building one community"

Infrastructure	**Balanced Growth**	**Operational Excellence**	**Quality of Life**	
Managing growth to ensure the community grows in a way that reflects the values of Bluewater and strategically positions it to meet the challenges of the future	Developing a growth plan to ensure new revenue sources can meet the increasing costs of existing service demands	Delivering services to people and property depends on a team-based approach whereby efficient communication is combined with good morale and alignment of purpose	Sustainably and responsibly growing capacity in the provision of services and public amenities for residents	**Corporate LoS**
Reliability	**Scope**	**Efficiency**	**Quality**	
Core municipal services can be counted upon when needed	Developing a comprehensive and progressive infrastructure plan which fosters accessibility to community services	Value is demonstrated for monies entrusted to the municipality	Providing services that promote safety, efficiency, vibrancy, and aesthetic appeal within the community	**Community LoS**
Service Level Metrics (refer to Appendix D)				**Technical LoS**

4.1 Current Levels of Service

O. Reg. 588/17 states that municipalities shall prepare an AMP for core municipal infrastructure assets by July 1, 2022, and all other municipal infrastructure assets by July 1, 2024. The current LoS measures for core assets have been integrated within our LoS framework as the technical measures to evaluate performance of community LoS. As measures for non-core assets are not required until July 2024, we have developed initial measures for our non-core assets. These measures are not presented currently as they will be tested and reviewed in the period leading up to 2024.

In accordance with the regulation, we have reported the current LoS for the prescribed measures in core assets in the LoS for the last two years as required. In addition, we have presented the costs associated with delivery of these LoS based on the last two complete fiscal years as follows:

Operating Expenditures by Asset Class
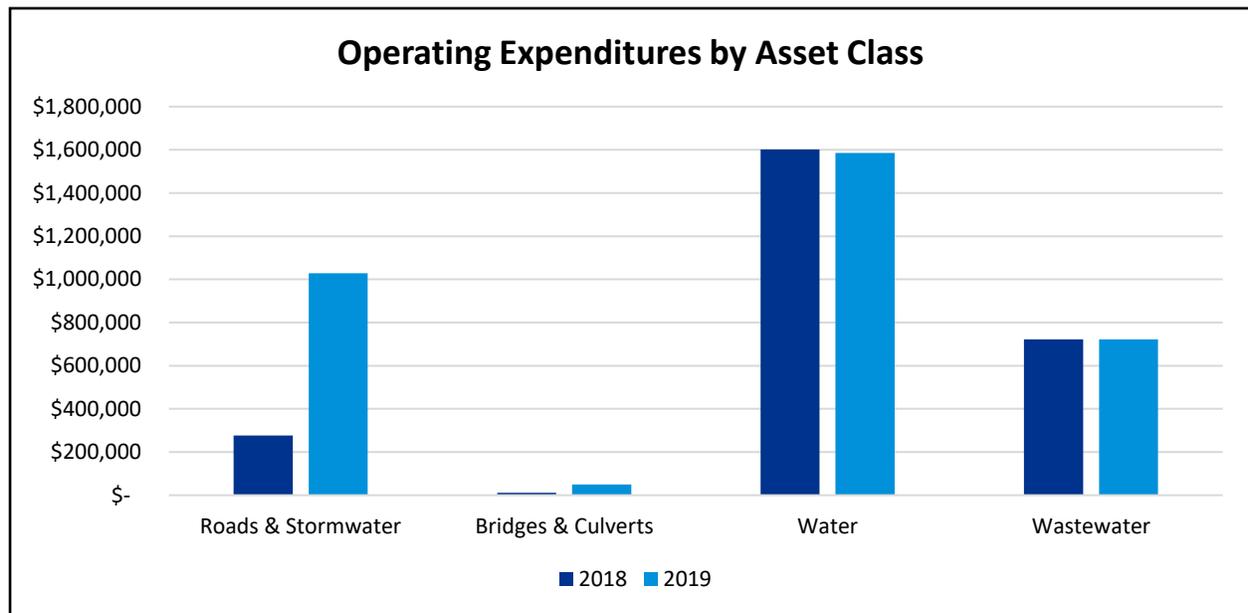
4.2 Desired Levels of Service

We have undertaken several LoS initiatives, including a service delivery review performed in 2020, to determine the baseline services provided by our assets within all service areas. In addition, Bluewater recently hired a corporate services coordinator to help with coordination activities for the asset management plan. These activities, including LoS workshops and coordinated discussions across Corporate Services, Public Works and Finance, have helped to develop a suite of technical measures for our asset classes which extend beyond the minimum LoS outlined within the regulation. These workshops have also served to identify data improvement efforts to track and report desired LoS.

As we implement our improvement plans ahead of the next regulatory milestone, we will continue to develop our suite of LoS for all assets and service areas along with performance targets as required for the following milestone of the Regulation in July 2025. This deadline includes LoS for core and non-core municipal infrastructure assets and the costs of maintaining these services levels, in addition to proposed levels of service, the activities required to meet them and a strategy to fund them.

5.0 Asset Lifecycle Management Strategy

5.1 Overview of Strategy

Provincial regulations require that the AMP include the lifecycle activities that are needed to maintain existing LoS for each asset category over the next ten (10) years. The regulations also require the estimated costs of these lifecycle activities. Our journey to implementing leading asset management approaches seeks to not only meet regulatory requirements but adopt leading practices, where feasible, to identify and manage lifecycle activities across the useful lives of our assets. Our strategy includes improving the data quality of our existing assets, particularly non-core assets like fleet and facilities, maintenance scheduling and operational expense forecasting. This strategy will help to automate the scheduling of maintenance and forecasting of operational expenses to maintain our service levels and infrastructure in a good state of repair. In addition, the Municipality of Bluewater procured RFAM software in 2021. This software is designed to store information for facility assets including condition, maintenance activities, etc. and is a significant milestone to manage facility assets in the future. The following section outlines the key activities for our lifecycle management activities.

5.2 Lifecycle Activities

Creation / Acquisition Plan
The creation and acquisition of new capital infrastructure at Bluewater typically originates with Council approval of master plans and other corporate plans, for example, the Bayfield Stormwater Master Plan. These plans have typically supported consistent service levels to existing residents given that population growth has been less than five hundred (500) residents over the past twenty (20) years or 0.2% growth per year. We expect slightly more growth in the decade to follow considering the planned expansion of the Bluewater wastewater treatment plant in Bayfield. These plans also create corporate objectives that align with community needs. Once approved, municipal staff operationalize these plans by performing needs assessments and business cases to identify specific assets for acquisition, anticipated costs, and other community impacts. Reports are sent to Council for approval, at which point tenders are submitted to acquire new infrastructure.

Condition Assessment and Inspection
At the Municipality of Bluewater, we follow the requirements outlined in the Ontario Structure Inspection Manual when performing condition assessments and inspections for bridges and large culverts, as well as the Ontario Minimum Maintenance Standards for Highways (O.Reg. 239/02) for our road assets.

We have developed a general condition assessment process whereby maintenance of transportation assets begins with routine inspection to identify defects that could result in risks or higher costs in the future. This practice of early identification through visual inspection and quantitative assessment allows for overall higher LoS and extended asset lifespans as the outputs from the condition assessments are used in planning.

Assets each have varying condition assessment and inspection procedures as shown in the table below.

Asset Class	Condition Assessment and Inspection Procedure
Roads	Roads undergo a robust condition assessment program every two years consisting of photographic inspections that inform calculation of the Pavement Quality Index. This exercise is performed by a third-party consultant to target renewal planning. Routine road patrol is also performed on an ongoing basis by Public Works.
Bridges & Culverts	Bridges and large culverts with a span of more than 3 metres undergo a formal inspection every two years as per provincial requirements. This data is used as input for maintenance activities, renewal/rehabilitation and capital planning.
Water	The Ontario Clean Water Agency (OCWA) operates all four (4) drinking water systems within Bluewater. Assessment and inspection procedures for the water systems include review of daily operating and maintenance activities, review of data collected through Water Information Systems by KISTERS, yearly permit to take water renewal applications, water taking reporting, reservoir inspections and servicing, hydrant maintenance and flushing, water sampling and testing, external audits and other O&M activities. All activities are tracked through work management system along with criticality and timelines.
Wastewater	The Ontario Clean Water Agency (OCWA) operates all three (3) wastewater collection and treatment systems within Bluewater. Inspection and condition assessment procedures include flow and effluent monitoring, third-party contracting for annual calibration, lifting device inspections, pump pulling and other O&M activities. All activities are tracked through work management system to identify and plan these activities along with criticality and timelines.
Stormwater	Bluewater cannot readily inspect stormwater infrastructure which is buried underground. As such, condition assessments and inspections are performed during road reconstructions and maintenance is performed at that time if required. Stormwater infrastructure is also assessed during bi-annual roads need studies and CCTV monitoring.
Fleet	Inspections are performed by various staff within the municipality depending on asset ownership. Maintenance and renewal needs are typically identified during the yearly budgeting process based upon staff knowledge and experience with the assets. An inventory of asset data is maintained including odometer readings which serve as a benchmark against the useful lives of fleet assets.
Street Lights	Public Works staff perform street light inspections within the municipality to identify maintenance needs. This information is maintained within a database of all street light assets containing pictures, light specifications, locations and other asset information which is used for capital planning.
Facilities	Inspections of municipal facilities is performed on a regular basis to identify maintenance and renewal needs. Third-party consultants are also engaged to perform

	these inspections with recommendations and reports sent to Council. In addition, the Municipality of Bluewater procured RFAM software in 2021. This software is designed to store information for facility assets including condition, maintenance activities, etc. and is a significant milestone to manage facility assets in the future.

Operations and Maintenance Plan

This stage of the asset lifecycle generates significant costs over time; therefore, we have implemented practices that enhance value through cost reduction and investment optimization. A successful operations and maintenance plan ensures that our assets also meet the level of service commitments and expectations from our community.

The operations and maintenance plan activities required to maintain current LoS over the next ten (10) year period are outlined in the table below.

Asset Class	Operations and Maintenance Plans
Roads	Maintenance activities include day-to-day tasks that keep the road system operational including road surface grading and re-surfacing of gravel roads, roadside maintenance, application of surface treatment, safety devices and overhead. Funds must be provided for these activities and winter snow removal activities prior to considering a construction program.
Bridges & Culverts	Maintenance activities include periodic maintenance, cleaning expansion joint seals and bearing seats, rip rap replacement, brush and log clearing and clearing debris jams caused by excess flooding.
Water	Bluewater's water service is contracted out and operated by the Ontario Clean Water Agency (OWCA) which performs maintenance activities to meet the requirements of the Ontario Drinking Water Quality Management Standard. Maintenance activities include water quality, residual maintenance, dead-end flushing, swabbing and flushing, water meter chamber inspections, responding to customer complaints, etc. In addition, municipal staff coordinate curb stop assessments/locates along with fire hydrant painting.
Wastewater	Bluewater's wastewater service is also contracted out and operated by the Ontario Clean Water Agency (OWCA). Maintenance activities including siphon valve turning and flushing, flow monitoring, inflow and infiltration (I&I) repairs, mainline cleaning, forcemain swabbing, pump station weekly maintenance, lateral blockages and relining, lagoon quality, monitoring and maintenance, responding to customer complaints etc.
Stormwater	Stormwater maintenance activities include grate inspections, storm pond inspections, oil and grit inspections/cleaning, manhole inspections and valve operations, catchbasin cleaning, storm flap gate inspections, responding to customer complaints, etc.

Fleet	Fleet maintenance activities include routine maintenance such as oil and filter replacements, tire changes, replacement of brake pads/shoes, timings belts, washing, etc.
Street Lights	Streetlight maintenance activities include replacement of bulbs and painting of light fixtures where relevant.
Facilities	Maintenance activities include cleaning, landscaping, painting, ice resurfacing, clearing gutters and drainage, crack sealing in parking lots, HVAC air filter replacement, servicing fire alarm and suppression systems, repairs to doors, etc.

Rehabilitation and Renewal Plan

For major rehabilitations and renewals across all asset classes, the process begins with a needs assessment followed by a review of the operational impacts of a potential investment. If the need for rehabilitation or renewal is significant, the item moves to a more detailed level of scope and budget definition, financial forecasting and then Council approval. In some cases, for very large assets that will affect a significant number of people, public consultation is necessary to make sure that our decisions align with the expectations and needs of residents. Most renewal projects require construction and project management, particularly as the projects increase in scale.

The rehabilitation and renewal process for our roads, culvert and bridge assets is integrated with the renewal needs of all underground infrastructure including drinking water, stormwater and wastewater. This integrated approach ensures our renewal projects for these service areas are delivered with optimal timing to increase value and minimize disruption to our communities.

Disposal Plan

Sometimes it is necessary to dispose of rather than replace an asset at the end of its useful life depending on its nature and condition. Municipal staff or third parties will inspect the asset to determine whether it ought to be renewed or replaced. They will also assess the LoS provided by the asset and whether the community requires the same LoS or is comfortable with reducing it.

In the event of disposal, municipal staff will ensure safe removal of the asset or hazardous materials, if any, in accordance with any applicable legislation and in coordination with third parties if necessary. Disposal costs for most assets are integrated into the capital costs of the project to replace the asset. In the event the asset will not be replaced, staff will calculate and communicate decommissioning costs, if any, during the capital planning process or reports to management.

6.0 Financial Strategy

6.1 Overview

The Municipality has undertaken a comprehensive analysis to determine the capital needs of its assets over a 10-year planning horizon to deliver the services expected by its communities and stakeholders. As part of its approach to asset management and compliance with the regulation, this analysis has been undertaken for core and non-core assets referenced earlier in this AMP. Investment needs identified below pertain to asset renewal, except for one capital project pertaining to infrastructure expansion.
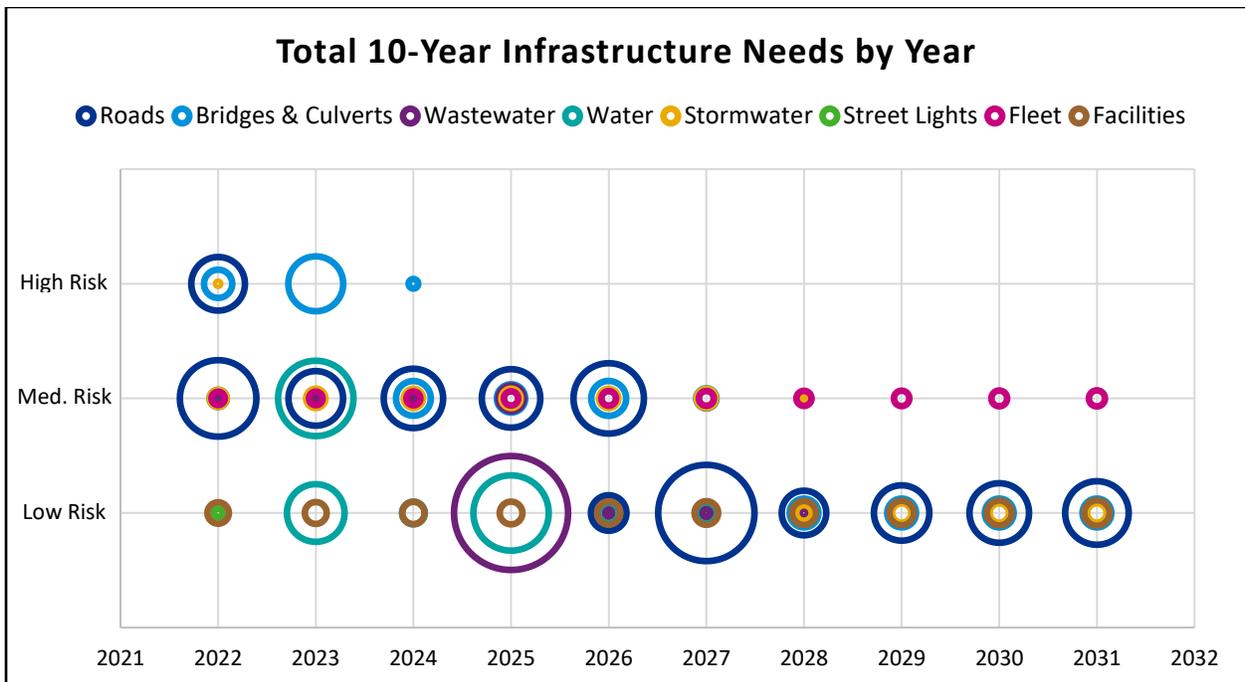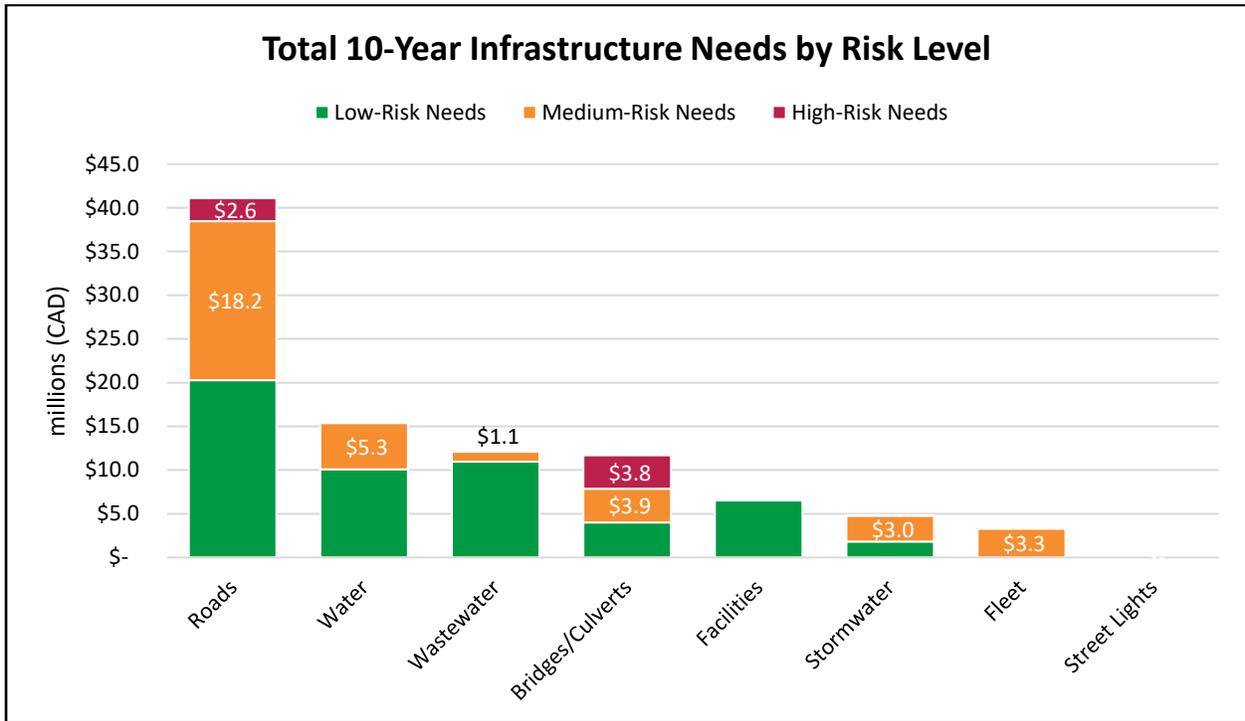
6.2 Funding Scenarios

The resulting analysis for our core and non-core assets, as described above, indicates that the total new infrastructure needs between 2022 and 2031 are **$95.0 million broken down as follows:**

1. High-Risk Needs: $6.5 million
2. Medium-Risk Needs: $34.7 million
3. Low-Risk Needs: $53.8 million

These needs represent a significant investment, and as part of this Asset Management Plan, Bluewater used a risk-based approach to categorize and prioritize them. The figure below breaks down the investment needs using three (3) risk levels (high-risk needs, medium-risk needs and low-risk needs). As can be seen, only $6.5 million (or 7%) of investment needs have a high-risk rating. Refer to Appendix E for Bluewater's risk definitions and to Appendix F for a detailed financial breakdown by all risk levels.
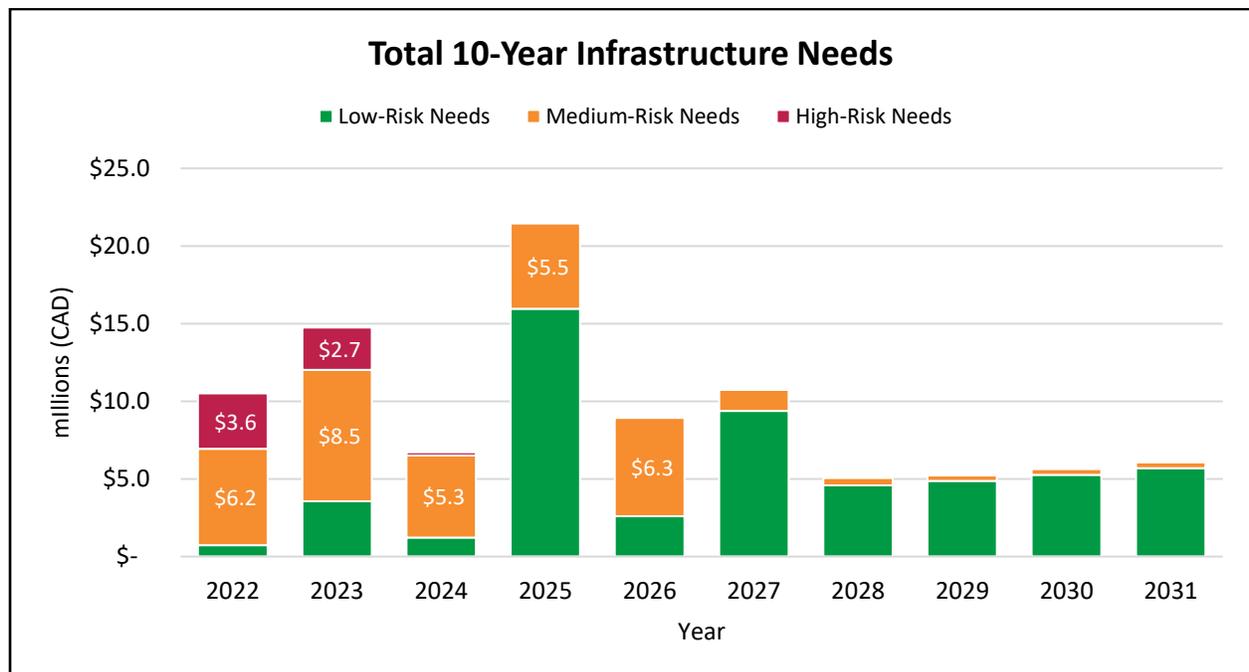
As seen below, Bluewater's high-risk and medium risk needs are concentrated between 2022 and 2026. The high-risk needs comprise bridges and culverts ($3.8 million) and roads ($2.6 million). It is important to note that the total needs are understated given that comprehensive condition asset assessments and future costs have yet to be determined for facilities and fleet assets (to be performed in 2022). Moreover, spending needs for water and wastewater assets is not available between 2028 and 2031 leading to an undervaluation of future needs during those years. Needs were retrieved from the 2021 Water Financial Plan and 2021 Wastewater Financial Plan, both of which only identify needs until 2027.

Total 10-Year Infrastructure Needs by Risk Level

Total 10-Year Infrastructure Needs by Year

To address these future needs, Bluewater considered three (3) different financing scenarios. It is important to note that these spending levels could be financed through a combination of reserves, tax levy, water/wastewater rates, debt and other sources. The important parts of the financing strategy include addressing high-risk needs; determining an appropriate funding level to address medium and low-risk needs over time; and managing the backlog of medium and low-risk needs. Most importantly, all three (3) scenarios address 100% of high-risk needs.

Scenario	Description	Total 10-Year Investment Needs	Total 10-Year Investment	Backlog in Year 10
#1	Maintain historical spending levels	$95.0 million	**$15.2 million**	$79.8 million as follows: • *High Risk: $0* • *Medium Risk: $26M* • *Low Risk: $53.8M*
#2	Address 100% of high-risk needs and 50% of medium-risk needs	$95.0 million	**$23.8 million**	$71.2 million as follows: • *High Risk: $0* • *Medium Risk: $17.3M* • *Low Risk: $53.8M*
#3	5% levy growth for five years and then maintain spending levels	$95.0 million	**$33.6 million**	$61.4 million as follows: • *High Risk: $0* • *Medium Risk: $13.8M* • *Low Risk: $47.6M*

Scenario 1: Maintain Historical Spending Levels and Match Needs Beginning in 2026

On average, Bluewater spent $1.5M per year on capital renewal and maintenance between 2017 and 2020, of which $570,000 was spent on self-funding assets (water and wastewater infrastructure). These levels represent actual spending as opposed to budgeted spending.

In Scenario 1, the average spending ($1.5M) is maintained over the 10-year horizon in relation to infrastructure needs of $95 million. This scenario approximates the status quo. Results from this analysis indicate a total investment of $15.2 million over 10 years.
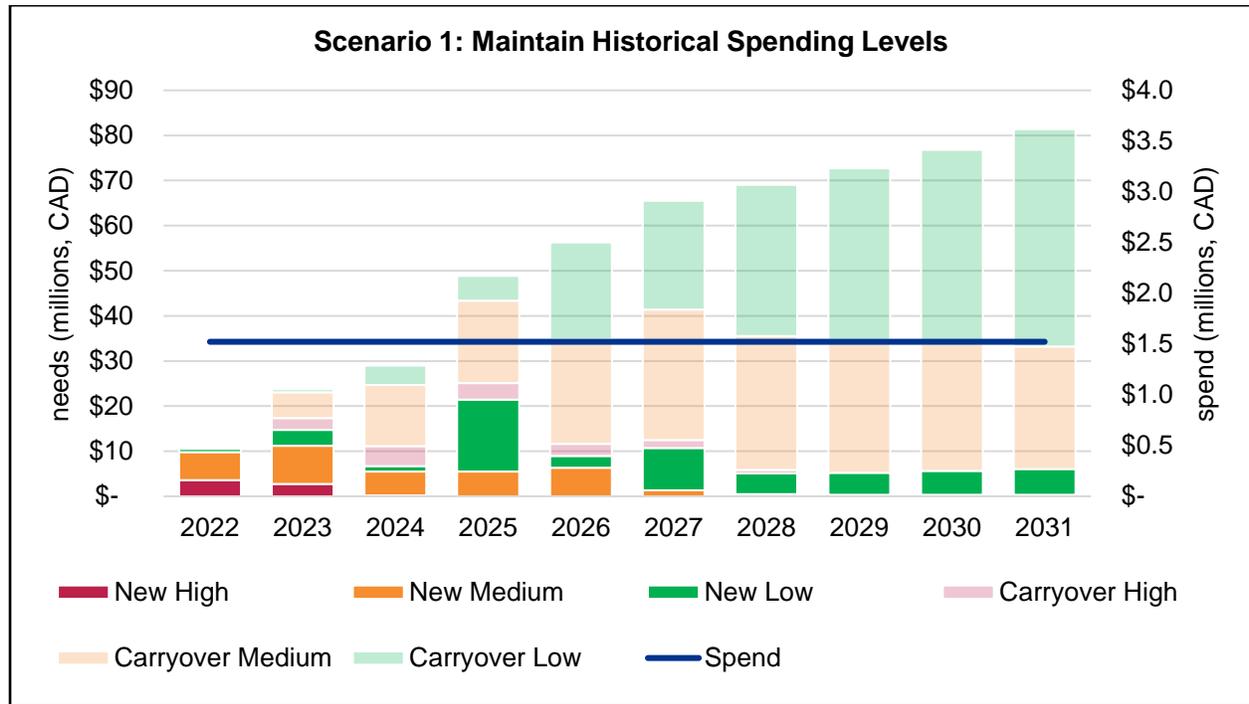
This scenario also leads to a backlog of $77.2 million at the end of year 10, of which $26 million pertain to medium-risk unaddressed needs and $53.8 million to low-risk unaddressed needs. The conclusion of scenario 1 is that historical spending levels cannot maintain a tolerable infrastructure gap as the backlog of unaddressed needs continues to rise every year. However, these spending levels do ensure that all high-risk needs are addressed during the 10-year horizon. A new financing approach is required to maintain existing service levels along Bluewater's long-term horizon; otherwise, the municipality will eventually see decreased service levels particularly along roads and bridges.

Scenario 2: Match Spending with Investment Needs

In scenario 2, Bluewater would address 100% of high-risk needs and 50% of medium-risk needs over the 10-year period. This scenario would yield a total investment of $23.8 million from 2022 to 2031 representing a 61% increase in spending compared to historical spending levels. Note: the investment of $23.8 million has been averaged over the ten-year period for year-to-year consistency.
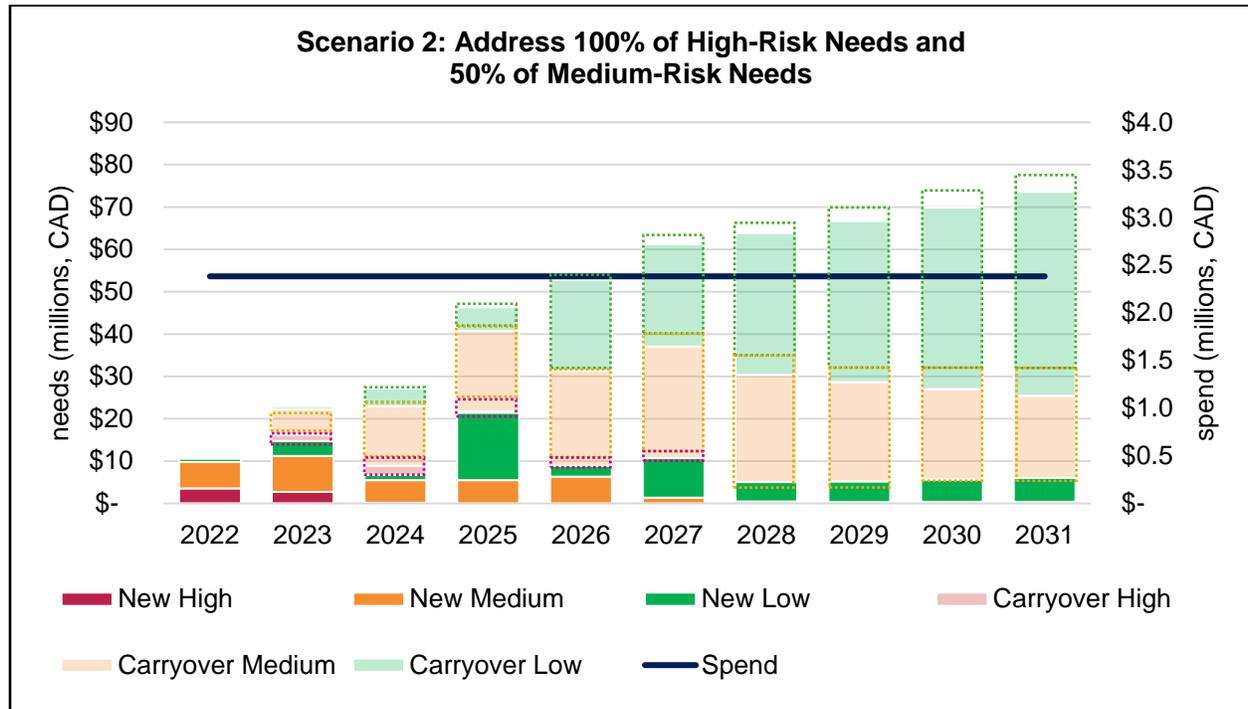
Scenario 2: Address 100% of High-Risk Needs and 50% of Medium-Risk Needs

Note: the dotted lines represent the carryover backlogs in Scenario 1 for comparison purposes

The scenario addresses all high-risk needs by 2024 compared to 2027 in the scenario 1. This scenario also leads to a backlog of $71.2 million at the end of year 10, of which $17.3 million pertains to medium-risk unaddressed needs and 53.8 million pertain to low-risk unaddressed needs. The medium-risk backlog also diminishes at the end of the 10-year horizon as can be seen in the bar chart above; however, the low-risk backlog continues to grow year-over-year leading up to 2031. This poses a risk for the municipality as a portion of these low-risk needs will eventually convert to medium-risk needs and the total backlog is projected to grow past the forecast period as can be seen above.

Scenario 3: 5% Levy Growth for Five Years and then Maintain Spending Levels

In 2021, the Municipality budgeted a total levy of $8.4 million. In scenario 3, infrastructure needs are funded by increasing the levy by 5% compounded annually for five (5) years – and then maintaining these new spending levels from 2027 to 2031. Results from this analysis indicate a total investment of $33.6 million over 10 years.
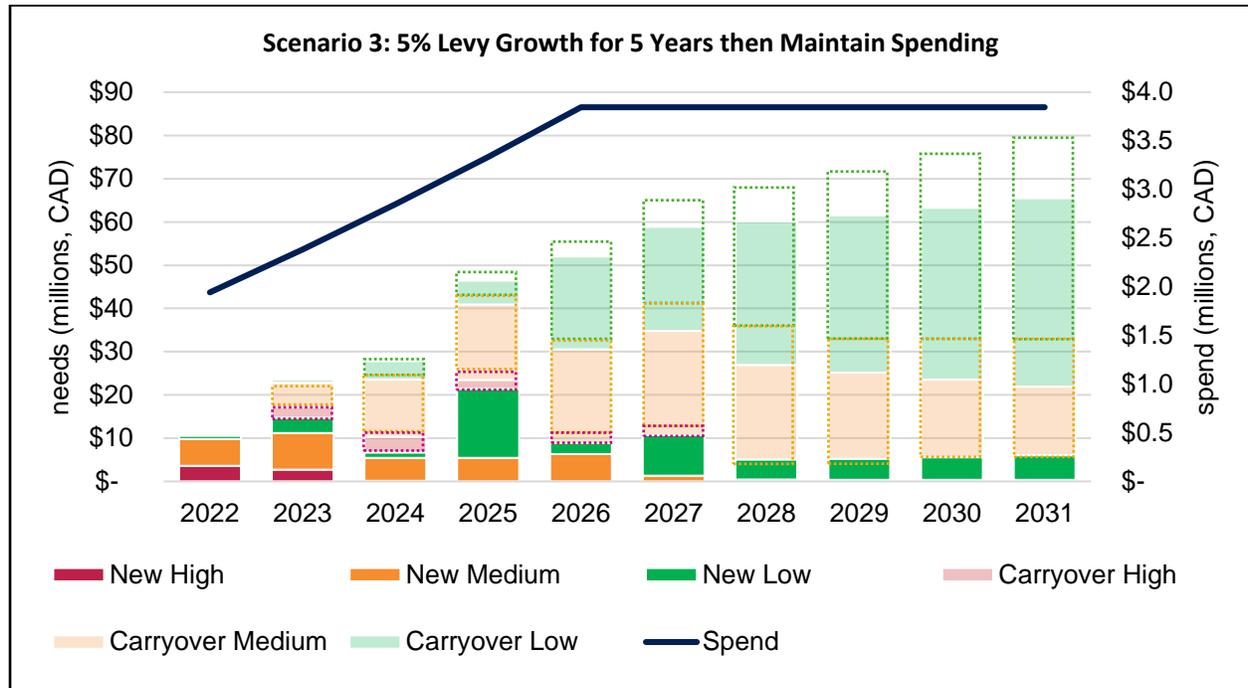

Note: the dotted lines represent the carryover backlogs in Scenario 1 for comparison purposes

The scenario addresses all high-risk needs by 2024 compared to 2027 in the scenario 1. This scenario also leads to a backlog of $58.8 million at the end of year 10, of which $13.8 million pertain to medium-risk unaddressed needs and $47.6 million pertain to unaddressed low-risk needs. The main benefit of this scenario is the eventual elimination of medium-risk needs after the 10-year horizon. As can be seen, the backlog of medium-risk needs is gradually reduced from 2026 onwards. Compared to scenario 1, this scenario leads to a backlog of medium-risk needs that is $8.7 million lower at the end of year 10. The main disadvantage of this scenario is tax affordability as it requires a 5% levy growth from 2022 to 2026.

6.3 Funding Strategies

Overview

The financial strategy presented in the preceding section forecasts the municipality's new infrastructure needs over the immediate 10-year period. The municipality will need to develop a comprehensive financial plan that will allow it to fund the repair, rehabilitation and renewal of its asset base as it ages and breaks down.

The asset classes being examined are funded from different revenue sources with respect to capital funding. Structures, roads, buildings, fleet assets and stormwater infrastructure are tax-supported assets. The municipal share of capital costs for these assets is derived from the general tax base. Water and wastewater capital is financed through the collection of charges assessed to only those properties that receive service. Other sources of funding for capital projects could include senior government grant contributions, development charge contributions, reserves, and financing project costs through debt. For purposes of discussion, it is assumed that the municipality will be responsible for providing all capital funding towards future asset replacement/rehabilitation needs.

The table below provides a summary of the three funding strategies considered in this AMP.

Asset Class	Assets	Total 10-Year New Needs	Scenario 1	Scenario 2	Scenario 3
Tax Supported Assets	Roads Stormwater Bridges Facilities Fleet	$67.6M	$9.5M invested with a backlog of $58.1M broken down as follows: *-High-Risk: $0* *-Medium-Risk: $25.3M* *-Low Risk: $32.8M*	$20.6M invested with a backlog of $46.9M broken down as follows: *-High-Risk: $0* *-Medium-Risk: $14.1M* *-Low Risk: $32.8M*	$21.0M invested with a backlog of $46.6M broken down as follows: *-High-Risk: $0* *-Medium-Risk: $13.8M* *-Low Risk: $32.8M*
Self-Funding Assets	Water Wastewater Street Lights	$27.4M	$5.7M invested with a backlog of $21.7M broken down as follows: *-High-Risk: $0* *-Medium-Risk: $0.7M* *-Low Risk: $21M*	$3.2M invested with a backlog of $24.3M broken down as follows: *-High-Risk: $0* *-Medium-Risk: $3.2M* *-Low Risk: $21.1M*	$12.6M invested with a backlog of $14.8M broken down as follows: *-High-Risk: $0* *-Medium-Risk: $0* *-Low Risk: $14.8M*

In addition to generating funding from the levy and reserves, this AMP considers the following alternative revenue sources to manage the municipality's infrastructure needs.

Future Funding Strategies

We continuously assess opportunities for additional funding options and revenue streams to address our funding gaps. The following are options that have been used by other municipalities towards addressing their infrastructure gaps and we continue to review for implementation at the Municipality of Bluewater.

Stormwater Management Funding

The assets that support stormwater management in Bluewater have a total estimated replacement value of $21.1 million. Historically, funding for the stormwater management program has come through property taxes, which puts it in competition with other essential municipal services for limited resources of tax levy funding. Many municipalities in Ontario and Canada have adopted a designated stormwater user rate to help address the funding challenge, including the cities of Kitchener, Waterloo and Guelph.

As a user fee, the stormwater rate works to charge the property owner based on the approximate amount of stormwater runoff generated by the property. It could also lead to incentives for property owners to reduce the amount runoff and pollutants that they create, potentially minimizing future infrastructure needs. Additionally, by having a separate fee, the program would have a designated funding source allowing it to build towards a sustainable funding level based on its actual needs.

Special Infrastructure Levy/Increased Capital Levy

To address infrastructure gaps and ensure sufficient funding will be provided to maintain service levels, some municipalities have implemented special capital levies or special infrastructure levies. These special levies area used yearly to improve asset sustainability.

The 2021 capital budget stipulated $2.4 million in levy funding for capital needs. These needs are brought before Council on a yearly basis for approval and vary from year to year. Together with the levy required for operations, these two components make up the total yearly levy. However, Bluewater currently does not have a capital/infrastructure levy for asset sustainability.

An alternative or additional approach to the special infrastructure levy is to dedicate a certain percentage of assessment growth revenues as a contribution to capital reserves. This would ensure we are saving for future rehabilitation and replacement of assets acquired through new construction. Currently assessment growth is used in Bluewater's base budget. Under this alternative model, a portion would directly support capital funding instead.

Debt Financing

The Ministry of Municipal Affairs and Housing regulates the amount of debt that municipalities may carry by setting an annual repayment limit of 25% of a municipality's net own source revenues. To ensure financial sustainability and minimize risk, the municipality has also adopted a financial principle which limits annual debt repayments to 10% of net own source revenues.

Staff will monitor these debt limits, along with a recently updated debt management policy, to ensure prudent use of debt as Bluewater aims to reduce its infrastructure gap over the next 10 years and beyond.

Public-Private Partnerships

A public-private partnership is a cooperative arrangement between the public and private sector. Under this model, we could work with a third party to have them expand privately-owned infrastructure that would supply certain municipal services which Bluewater would not otherwise provide. Such a partnership could reduce the municipality's capital needs as has already been demonstrated with Bluewater's partnership with BFIT to operate the Bayfield Community Centre from 2020 to 2025.

Community Benefits Charge

Part of the provincial government's More Homes, More Choice Act, 2019, allows municipalities to charge for community benefits in order to fund a range of capital infrastructure for community services that would benefit new development. Certain services formerly part of the Development Charges Act, as well as parkland dedication and benefits derived from "density bonusing" under the Planning Act, would effectively be replaced by the community benefits charge under this legislation. Based on information provided by the Province, it is anticipated that the changes would be revenue neutral for municipalities. As such it is unlikely that the Act would reduce the municipality's infrastructure deficit. Further study is required to determine whether these charges could in fact reduce Bluewater's infrastructure gap.

Other Funding Strategies

Finally, while outside of Bluewater's control, additional funding opportunities are periodically provided by the provincial and federal governments towards certain infrastructure projects. These funding sources typically outline specific conditions and requirements that must be demonstrated in order to secure and maintain the funding. In many cases, these conditions require applicants to demonstrate capabilities in effective planning and financial management. The AMP provides a critical means to demonstrate our understanding of our assets, services, community priorities and abilities to assess these needs.

In our efforts to determine the most effective funding strategies to meet our future needs, we will consider how our asset management planning approaches can be used to demonstrate compliance with the requirements.

Any impacts to these funding studies as a result of the analysis in investment needs undertaken within the Asset Management Plan in compliance with O.Reg.588/17 will be communicated in future revisions of the AMP in advance of the 2024 requirement.

7.0 Recommendations for Continuous Improvement

The Municipality of Bluewater has made significant progress in its asset management practices since O. reg. 588/17 came into force in early 2018. Bluewater has committed to a process of continuous improvement which entails meeting upcoming regulatory deadlines, leading up to 2025, and adopting leading practices where feasible. The following recommendations have been identified to further this process of continuous improvement:

1. Adoption of Funding Strategy
Bluewater will need to adopt a funding strategy to address the most important infrastructure needs presented in this AMP. Three financial scenarios have been presented for consideration although the municipality may choose another strategy that suits its needs. Ideally, the municipality should set target dates to address all high-risk needs and a portion of medium-risk needs which require attention. The funding strategy should also consider financial principles and policies adopted by Council.

2. Regulatory Requirements – Next Steps
Bluewater's asset management journey is well underway. Within the next 4 years, the AMP will need to be revised to incorporate the following regulatory elements:

O. Reg. 588/17 Deadline	Regulatory Requirement	Recommendation
July 1, 2024	Date for municipalities to have an approved asset management plan for all municipal infrastructure assets that identifies current levels of service and the cost of maintaining those levels of service.	Include additional asset classes not identified in this AMP within the next iteration including LoS and the cost of maintaining those LoS.
July 1, 2025	Date for municipalities to have an approved asset management plan for all municipal infrastructure assets that builds upon the requirements set out in 2024. This includes an identification of proposed levels of service, what activities will be required to meet proposed levels of service, and a strategy to fund these activities.	Identify proposed levels of service for all asset classes (core and non-core) and update the funding strategy to fund these activities.

2. Asset Management Processes
(a) Technical LoS Reporting
Bluewater will create a process to centralize the collection and performance of LoS technical measures across all asset classes. The process will need to identify the following elements: (1) process owner, (2) owners of technical LoS measures and (3) metric reporting deadlines.

It is recommended to collect all LoS technical measure data leading up to the budgeting season. This timeline will enable Bluewater staff to evaluate community LoS and make budget recommendations to maintain LoS or increase LoS where service disruptions or decreases have been observed in the year.

(b) Corporate and Community Levels of Service

Bluewater will need to define a process whereby new master plans and corporate plans are used to update corporate and community LoS within the AMP. As noted above, process owners will need to be identified along with reporting deadlines. After collecting new master plans, the process owner will need to discern whether additional technical LoS are required to measure new LoS or whether the existing technical measures are sufficient.

3. Risk-Based Approach

Bluewater has created its first risk-based approach spanning all asset classes with the publication of this AMP. Bluewater commits to enhancing this risk-based approach to improve the accuracy of its risk definitions and the inherent risk of its asset profile throughout its asset management journey.

4. Data Collection and Quality

The analysis and results of this AMP are dependent upon the nature and quality of data available for all asset classes. Overall, the type and quality of data to assess the current state of infrastructure is good. There are, however, areas for improvement as noted in the chart below, particularly for facilities and fleet assets. Bluewater will aim to enhance condition assessments to accurately calculate future maintenance and replacement costs for these asset classes.

Asset Category		Age	Condition	Replacement Costs	Material & Components
Roads	🛣️	🟡 Medium	🟢 High	🟢 High	🟢 High
Bridges & Culverts	🌉	🟢 High	🟢 High	🟢 High	🟢 High
Water	🚿	🟢 High	🟡 Medium	🟢 High	🟢 High
Wastewater	💧	🟡 Medium	🟡 Medium	🟢 High	🟢 High
Stormwater	🌧️	🟢 High	🟢 High	🟢 High	🟢 High
Facilities	🏫	🟢 High	🟡 Medium	🟡 Medium to be completed in 2022	🟡 Medium
Fleet	🚚	🟢 High	🟡 Medium	🟡 Medium	🟡 Medium
Street Lights	💡	🟢 High	🟡 Medium	🟢 High	🟢 High

Data Quality Legend: 🟢 High 🟡 Medium ✖️ Low/Missing

Appendices

Appendix A: Guiding Documents Used in the Asset Management Plan

Appendix B: Asset Planning Documents Used in the Asset Management Plan

Appendix C: State of Infrastructure - Asset Conditions, Replacement Values and Ages

Appendix D: Levels of Service Profiles

Appendix E: Risk Definitions

Appendix F: Investments Needs by Asset Class and Risk Level

Appendix G: Needs Assumptions and Limitations

Appendix H: Condition Assessment Rating Criteria

Appendix A: Guiding Documents Used in the Asset Management Plan

Bluewater used the following guiding documents in creating this AMP.

Element	Key Guiding Documents
All elements of the current AMP	— 2016-2021 Strategic Plan — Strategic Asset Management Policy — 2014 Asset Management Plan — 2017 Stormwater Asset Management Plan — 2018 Official Plan

Appendix B: Asset Planning Documents Used in the Asset Management Plan

The following documents were used for each asset class.

Asset Class	Key Asset Planning Documents
Roads	— 2019 Roads Needs Study including roads inventory, condition assessment, replacement values and maps
Bridges & Culverts	— 2019 Bridge Inspection including bridges/culverts inventory, condition assessment, replacement values and maps
Water	— 2021 Water Financial Plan including water infrastructure inventory, condition assessment, replacement values and maps
Wastewater	— 2021 Wastewater Financial Plan including wastewater infrastructure inventory, condition assessment, replacement values and maps
Stormwater	— 2017 Stormwater Asset Management Plan including stormwater infrastructure inventory, condition assessment, replacement values and maps
Fleet	— Fleet Inventory Database including inventory and pictures
Street Lights	— Street light Inventory Database including inventory and pictures
Facilities	— Financial schedules including facilities inventory, historical costs etc.

Appendix C: State of Infrastructure - Asset Conditions, Replacement Values and Ages
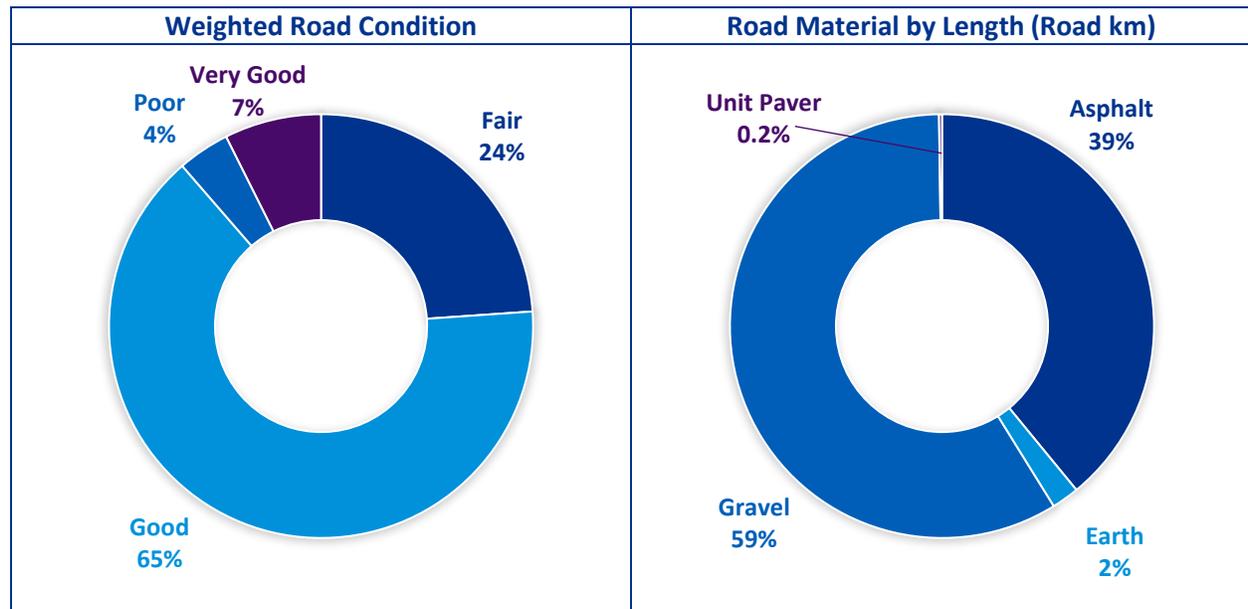
Roads

Road assets are those that enable citizens to get to where they need to go throughout the municipality. These assets are some of Bluewater's most used and visible assets and include paved and unpaved roads. We recognize that the efficiency and value of our transportation assets extends into many other asset categories like stormwater, bridges and culverts which makes them particularly important.
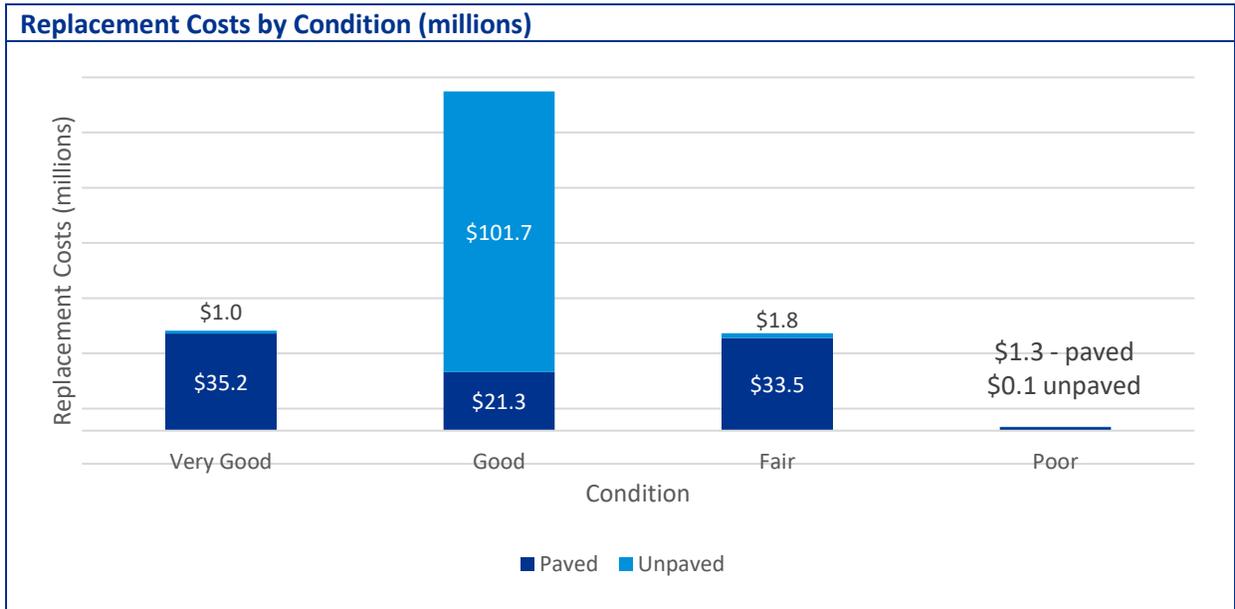
The Municipality of Bluewater is responsible for 362 road kilometers of roadway, mostly serving local traffic. The municipality inspects all roads every two years which has created a strong foundation of data for the asset management plan. For this AMP, the condition assessment methodology for roads involved performing a roads needs study using a third-party consulting engineer.

Replacement Value (M)	**Condition**	**Average Age**
$196.0	**Good**	**Unknown**
Total replacement value of all road assets	Weighted average condition rating of all road assets	Average age of roads within the municipality

For transportation assets, 4% of road assets are in poor or very poor condition while 72% of road assets are in good or very good condition. The average of Canadian roads in poor or very poor condition is 17% according to the 2019 State of Infrastructure Report Card.

Weighted Road Condition

- Very Good 7%
- Poor 4%
- Fair 24%
- Good 65%

Road Material by Length (Road km)

- Unit Paver 0.2%
- Asphalt 39%
- Gravel 59%
- Earth 2%

The estimated replacement costs for roads in poor or very poor condition is approximately $1.4 million. These roads have an average surface rating of 4.3 on a 10-point scale.

Replacement Costs by Condition (millions)

Bridges

Bridge assets are those that enable citizens to get to where they need to go throughout the municipality. These assets are frequently used and visible to the public.

The Municipality of Bluewater is responsible for 16 bridges. The municipality inspects all bridges every two years which has created a strong foundation of data for the asset management plan. For this AMP, the condition assessment methodology for bridges involved performing a bridge inspection using a third-party consulting engineer.

Replacement Value (M)	Condition	Average Age
$14.4	**Fair**	**69**
Total replacement value of all bridge assets	Weighted average condition rating of all bridge assets	Average age of bridges within the municipality

For transportation assets, 47% of bridges are in poor or very poor condition. The remaining 53% of bridges are in fair condition. The average of Canadian bridges in poor or very poor condition is 12% according to the 2019 State of Infrastructure Report Card.

Weighted Bridge Condition	Bridge Surface Type
Very Poor 33% · Fair 53% · Poor 14%	Unpaved 10% · Paved 90%
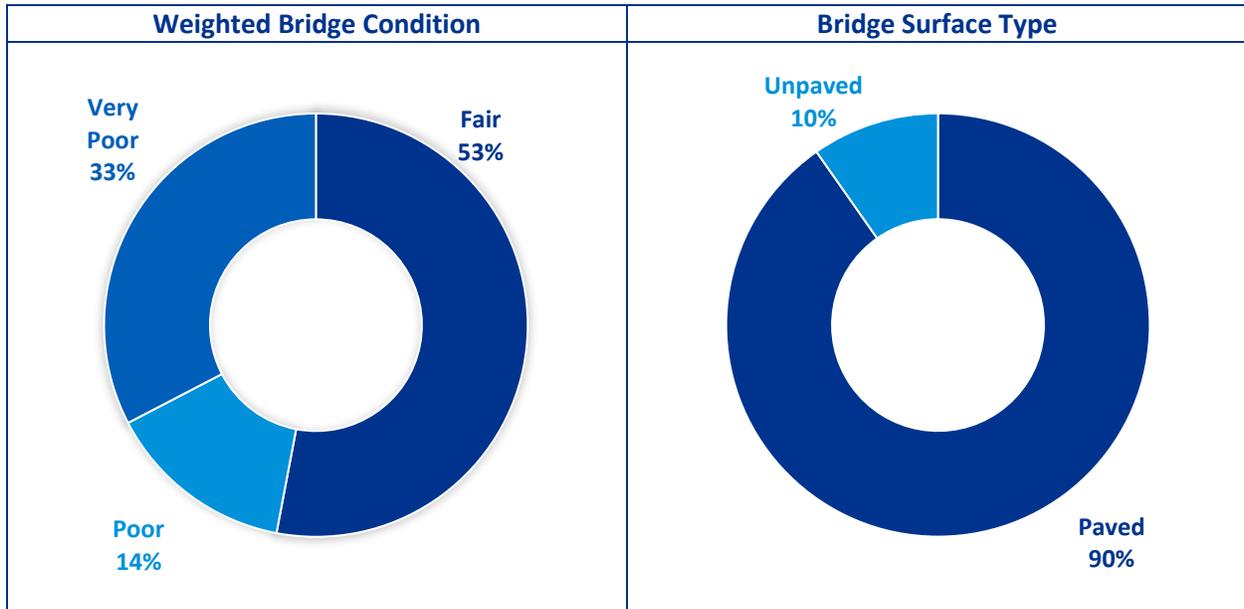
The estimated replacement costs for bridges in poor or very poor condition is approximately $7.5 million. These bridges have an average bridge condition index (BCI) rating of 28.

Replacement Costs by Condition (millions)

Condition	Concrete	Steel
Fair	$6.9	
Poor	$0.8	$1.7
Very Poor	$5.0	

Culverts

Culvert assets are those that enable citizens to get to where they need to go throughout the municipality and allow for proper water flow throughout the municipality. These assets are frequently used and somewhat visible to the public.
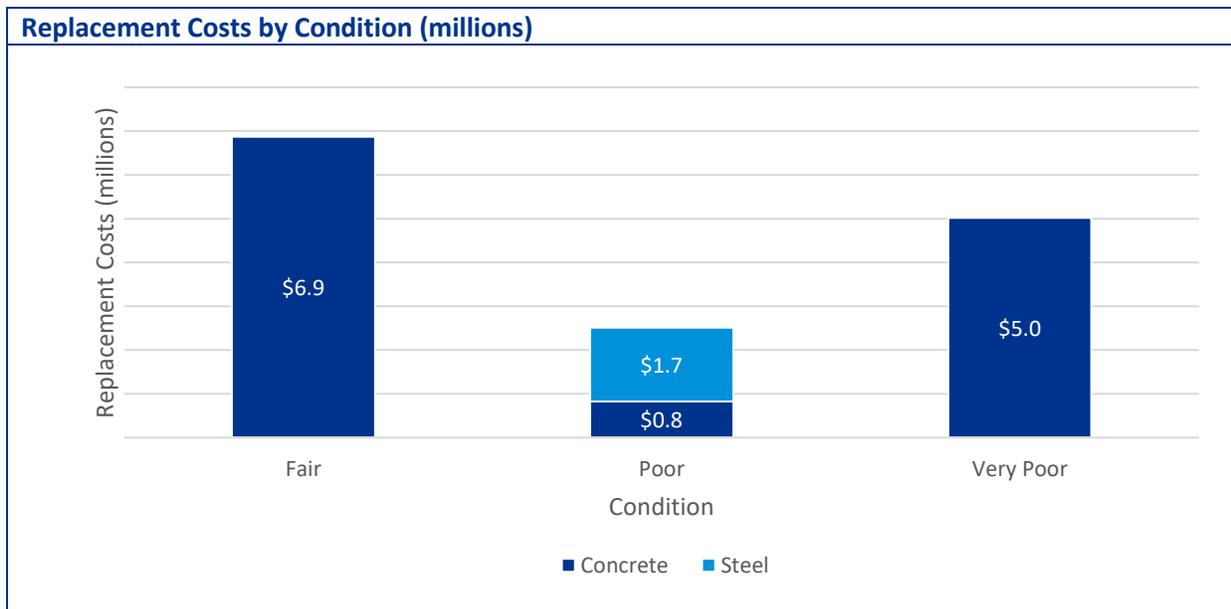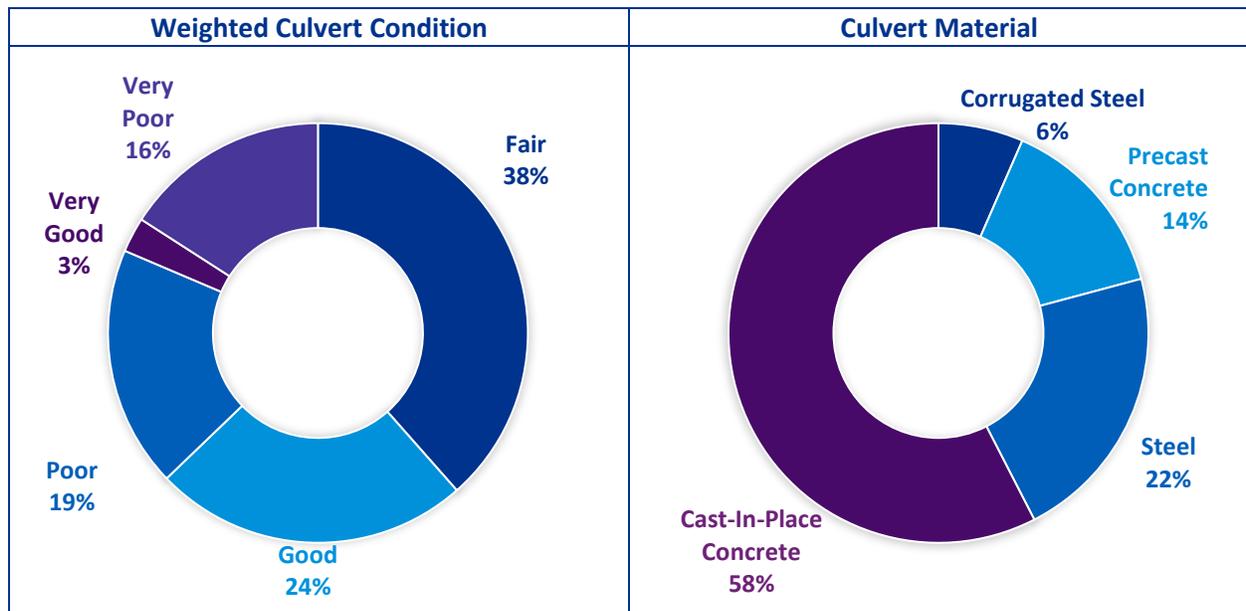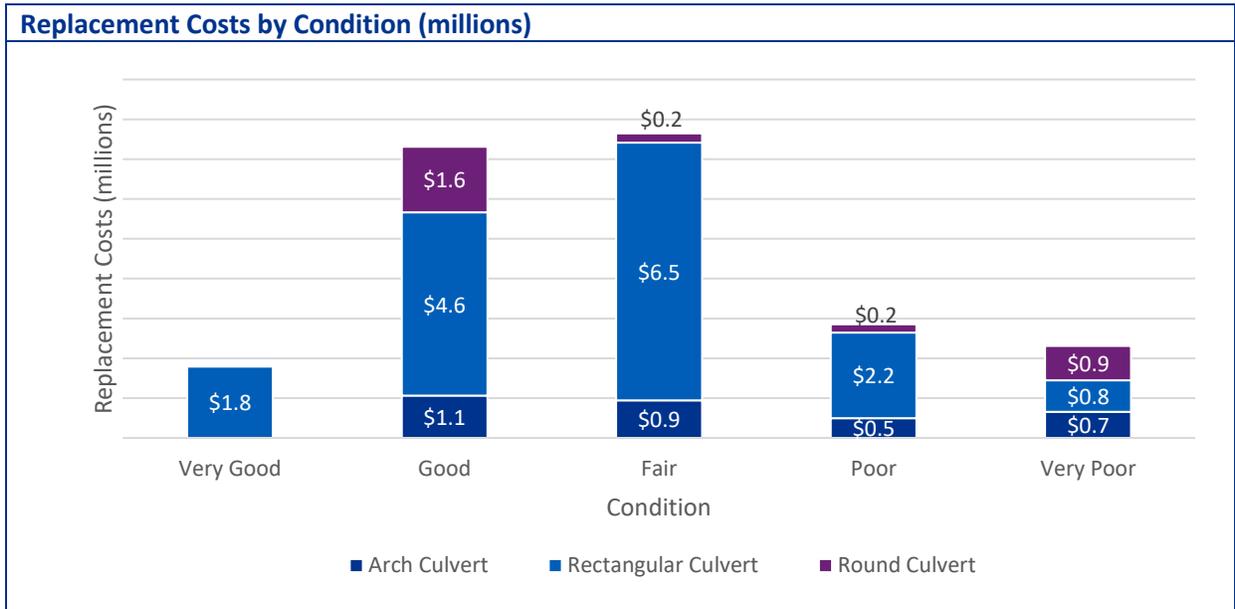
The Municipality of Bluewater is responsible for 62 culverts. The municipality inspects all culverts every two years which has created a strong foundation of data for the asset management plan. For this AMP, the condition assessment methodology for culverts involved performing a bridge inspection using a third-party consulting engineer.

Replacement Value (M)	Condition	Average Age
$21.9	**Fair**	**52**
Total replacement value of all culvert assets	Weighted average condition rating of all culvert assets	Average age of culverts within the municipality

According to the bridge inspection, 35% of culvert assets are in poor or very poor condition while 27% are in good or very good condition. The remaining 38% are in fair condition. The average of Canadian culverts in poor or very poor condition is 17% according to the 2019 State of Infrastructure Report Card.

Weighted Culvert Condition

Very Poor 16%
Very Good 3%
Fair 38%
Poor 19%
Good 24%

Culvert Material

Corrugated Steel 6%
Precast Concrete 14%
Steel 22%
Cast-In-Place Concrete 58%

The estimated replacement costs for culverts in poor or very poor condition is approximately $5.3 million. These culverts have an average bridge condition index (BCI) rating of 29.

Replacement Costs by Condition (millions)

Water

Water assets are those that enable citizens to live in a healthy, clean and safe environment. The Municipality of Bluewater is responsible for four drinking water systems servicing local communities. All four of these systems are currently operated by the Ontario Clean Water Agency (OCWA). Underground watermain assets are not visible to the public unlike water treatment facilities, reservoirs and pumping stations which are somewhat visible. The condition assessment methodology for water assets involved performing a financial plan for water facilities and the collection system using a third-party consulting engineer.

Replacement Value (M)	Condition	Average Age
$99.2	**Good**	**28**
Total replacement value of all water assets	Weighted average condition rating of all water assets	Average age of water assets within the municipality

For watermain assets, 18% of all assets are in poor or very poor condition while 77% are in good or very good condition. The average of Canadian water assets in poor or very poor condition is 9% according to the 2019 State of Infrastructure Report Card.

Weighted Watermain Condition	Watermain by Service Location

The estimated replacement costs for watermain assets in poor or very poor condition is approximately $7.6 million.

Replacement Costs by Condition, Watermain Only (millions)

Wastewater
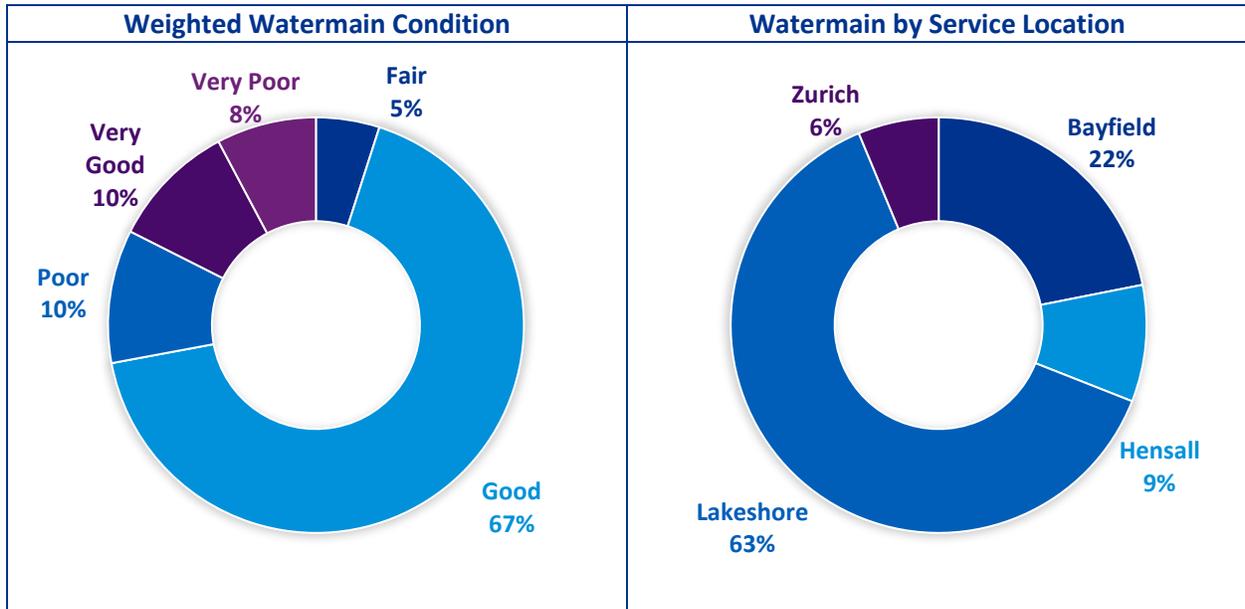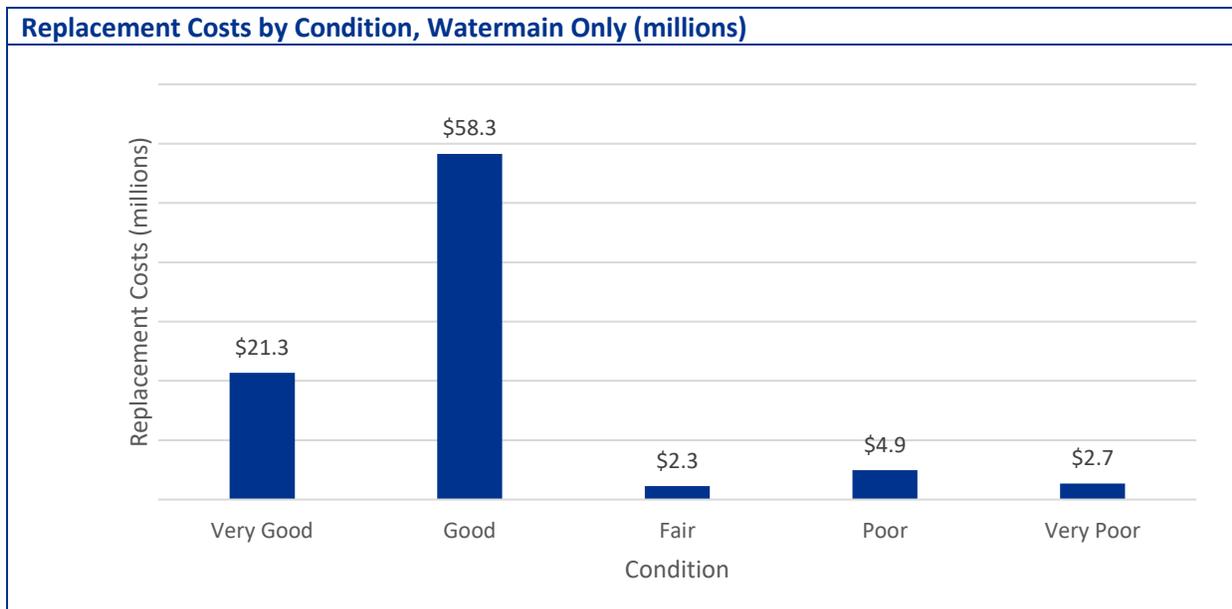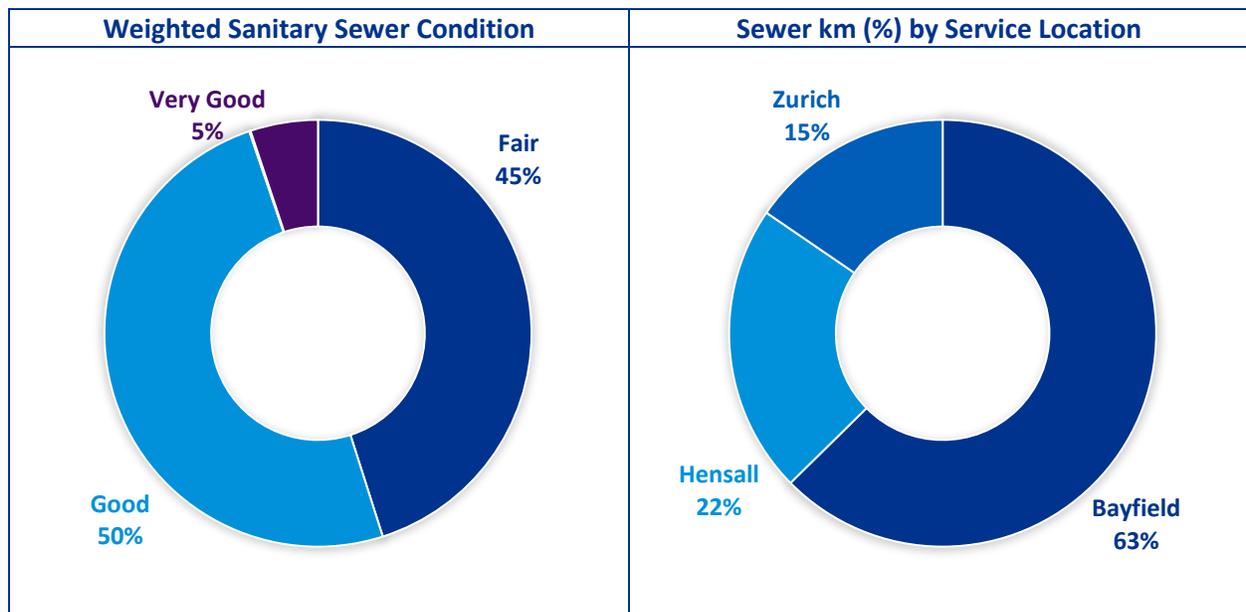
Wastewater assets are those that enable citizens to live in a healthy, clean and safe environment. The Municipality of Bluewater is responsible for three wastewater collection and treatment systems servicing local communities. All three of these systems are currently operated by the Ontario Clean Water Agency (OCWA). Underground forcemain and sewer assets are not visible to the public unlike wastewater lagoons and pumping stations which are somewhat visible.

The condition assessment methodology for wastewater assets involved performing a financial plan for wastewater facilities and the collection system using a third-party consulting engineer.

Replacement Value (M)	Condition	Average Age
$46.5	**Good**	**26**
Total replacement value of all wastewater assets	Weighted average condition rating of all wastewater assets	Average age of wastewater assets within the municipality

For wastewater watermain assets, less than 1% of all assets are in poor or very poor condition while 55% are in good or very good condition. The average of Canadian wastewater assets in poor or very poor condition is 11% according to the 2019 State of Infrastructure Report Card.

Weighted Sanitary Sewer Condition	Sewer km (%) by Service Location

Weighted Sanitary Sewer Condition:
- Very Good 5%
- Fair 45%
- Good 50%

Sewer km (%) by Service Location:
- Zurich 15%
- Hensall 22%
- Bayfield 63%

The estimated replacement costs for sewer assets in poor or very poor condition is approximately $11,000.

Replacement Costs by Condition, Sewer Only (millions)
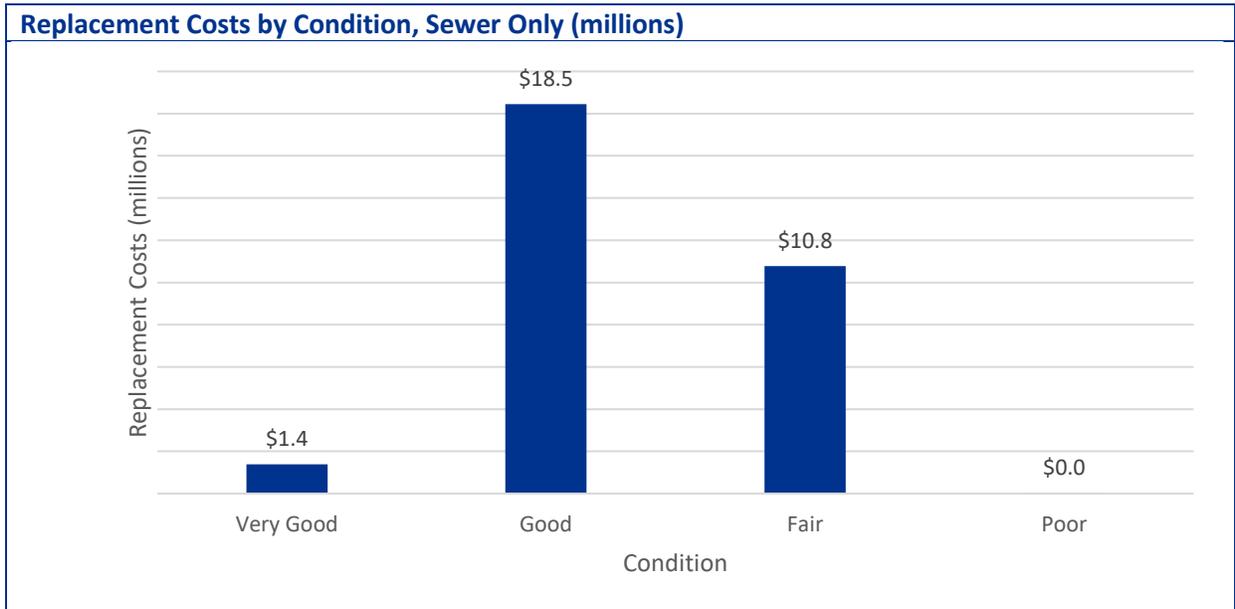
Stormwater

Stormwater assets are those that enable citizens to live in a safe environment. The Municipality of Bluewater is responsible for three separate stormwater networks located in Bayfield, Hensall and Zurich. There are other stormwater networks in Varna, Brucefield, and Dashwood which are municipal drains. These drains are excluded from the scope of this AMP since the Municipality of Bluewater is not responsible for their maintenance and replacement. Underground storm sewer main assets are not visible to the public.
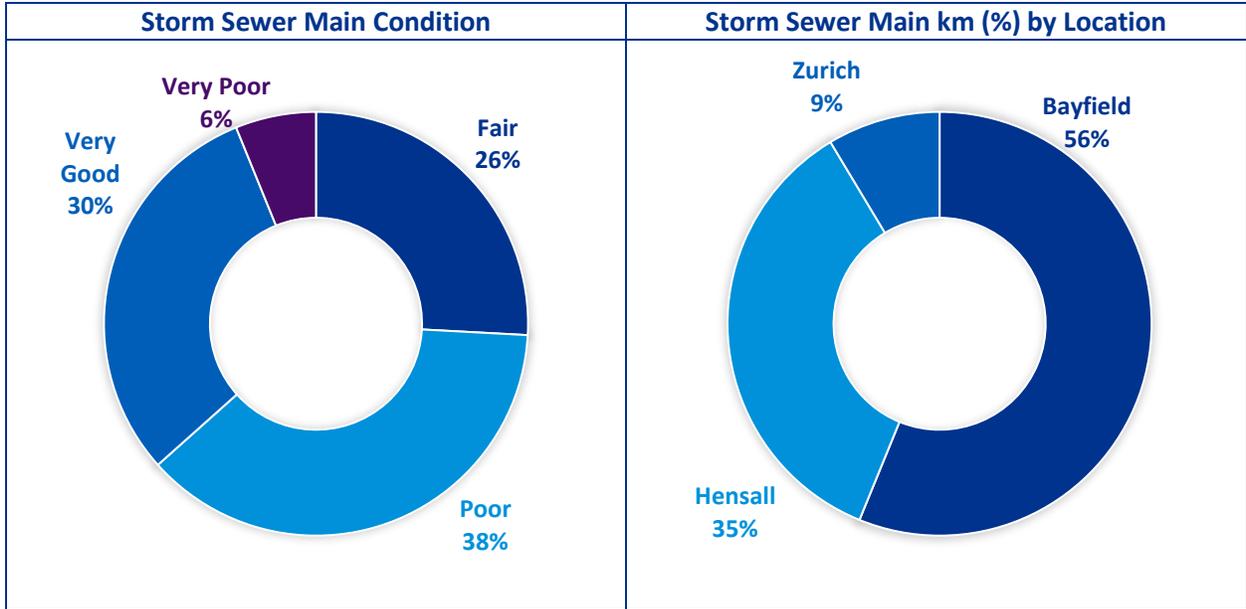
The condition assessment methodology for stormwater assets involved performing an asset management plan using a third-party consulting engineer.

Replacement Value (M)	Condition	Average Age
$21.3	**Poor**	**31**
Total replacement value of all stormwater assets	Weighted average condition rating of all stormwater assets	Average age of stormwater assets within the municipality

For stormwater assets, 44% of all assets are in poor or very poor condition while 30% are in good or very good condition. The average of Canadian stormwater assets in poor or very poor condition is 11% according to the 2019 State of Infrastructure Report Card.

Storm Sewer Main Condition

Very Poor
6%

Very Good
30%

Fair
26%

Poor
38%

Storm Sewer Main km (%) by Location

Zurich
9%

Bayfield
56%

Hensall
35%

The estimated replacement costs for stormwater assets in poor or very poor condition is approximately $4.1 million.

Replacement Costs by Condition (millions)

Replacement Costs (millions)

$11.8 — Very Good

$5.3 — Fair

$3.6 — Poor

$0.5 — Very Poor

Condition
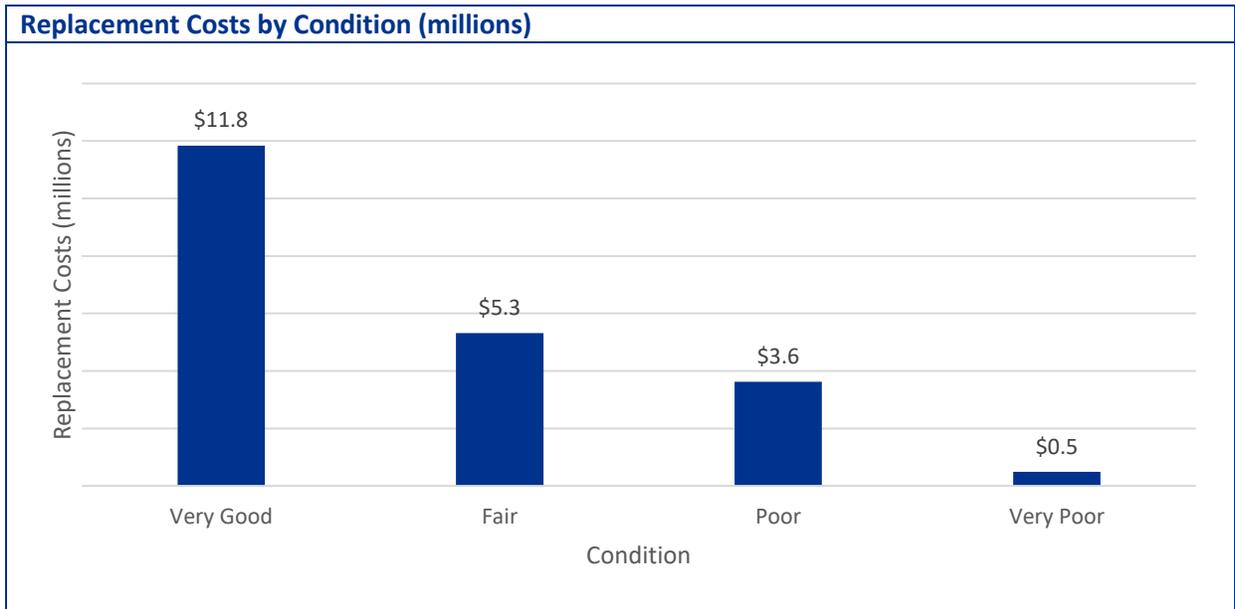
Fleet

Fleet assets are those that enable municipal staff to provide a wide range of services externally to the public and internally to municipal staff. These assets are used daily and are highly visible to the public.

The Municipality of Bluewater is responsible for 62 fleet assets. The fleet's condition was assessed by analyzing the age of all assets relative to their useful lives.

Replacement Value (M)	Condition	Average Age
$10.2	**Fair**	**11**
Total replacement value of all fleet assets	Average condition rating of all fleet assets	Average age of fleet assets within the municipality

For fleet assets, 40% of them are in poor or very poor condition while 23% are in good or very good condition. Conditions were assigned by comparing the assets' net book values with their original costs.

Fleet Condition: Very Good 16%, Good 16%, Fair 27%, Poor 23%, Very Poor 18%

Type of Assets: Pickup, 11; Snow Plow, 6; Tanker, 4; Rescue Van, 4; Flatbed, 4; Grader, 3; Other, 6; Pumper, 4; Ice resurfacer, 3; Tractor, 2
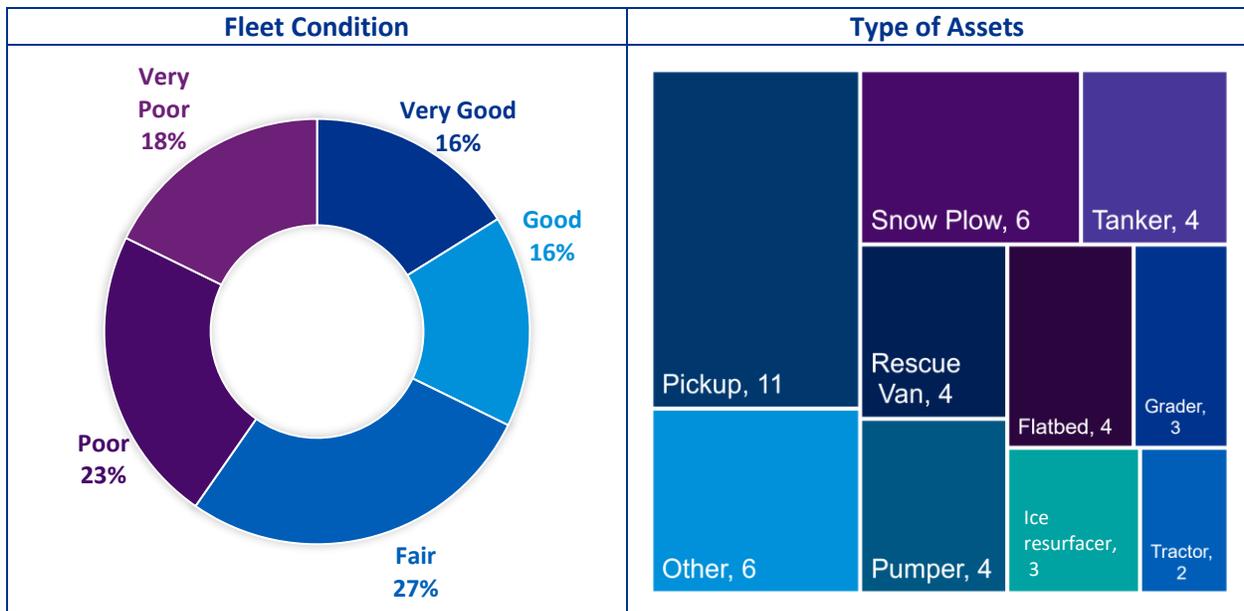
There are 25 fleet assets in poor or very poor condition. The replacement value of all fleet assets is approximately $10.2 million.

Replacement Costs by Condition
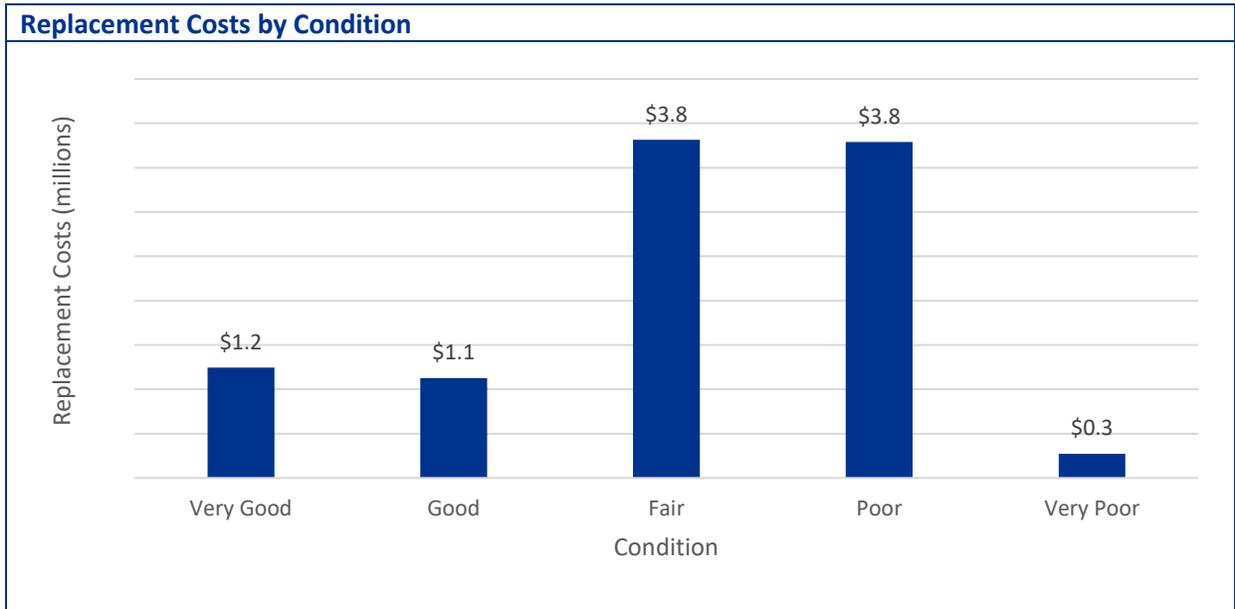
Facilities

Facility assets are those that benefit the wider Bluewater community by providing dedicated space for learning, recreation and sport through arts, programming and leisure areas. Facility assets also provide space for municipal administration and operations including public works yards, washrooms, fire halls, council chambers and other spaces. These assets are used daily and are highly visible to the public depending on the nature of the facility.

The Municipality of Bluewater is responsible for 24 facilities. As of publication, condition assessments have not been performed for all facilities. Condition assessments are planned to be completed in 2022 and will provide accurate condition assessments at that time for all facility components. For the purposes of this AMP, Bluewater estimated facility conditions by analyzing historical operating and capital expenditures on facilities relative to their historic construction costs.

Replacement Value (M)	**Condition**	**Average Age**
Unknown	**Good**	**Unknown**
Total replacement value of all facilities	Average condition rating of all facilities	Average age of facilities within the municipality

Street Lights

Street light assets are those that enable citizens to use and enjoy public and private spaces within the community. These assets operate continually and are highly visible to the public.

The Municipality of Bluewater is responsible for 668 street lights, 26 of which are owned by the Municipality of South Huron but for which Bluewater incurs partial operating costs. For this AMP, the condition assessment methodology for street light assets involved performing site inspections.

Replacement Value	Condition	Average Age
$499,000	**Very Good**	**3**
Total replacement value of all street light assets	Average condition rating of all fleet assets	Average age of street light assets within the municipality

For street lights, 1% of all assets are in poor condition while 99% are in good condition.

Street Light Condition

Very Good 99%
Poor 1%

Number of Street Lights (%) by Service Location

Zurich 22%
Bayfield 37%
Hensall 23%
Dashwood 7%
Other 11%
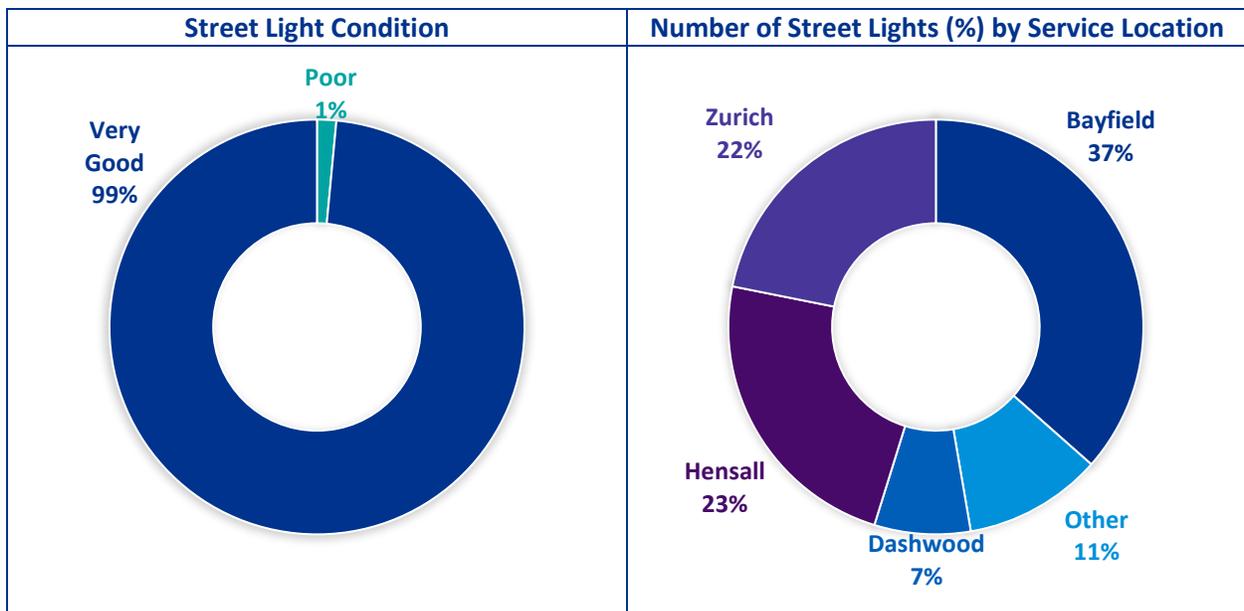
The estimated replacement costs for street light assets in poor or very poor condition is approximately $170,000. These assets are 94 years old and are located in downtown Bayfield. The municipality plans to replace them in 2022.

Replacement Costs (millions) by Condition
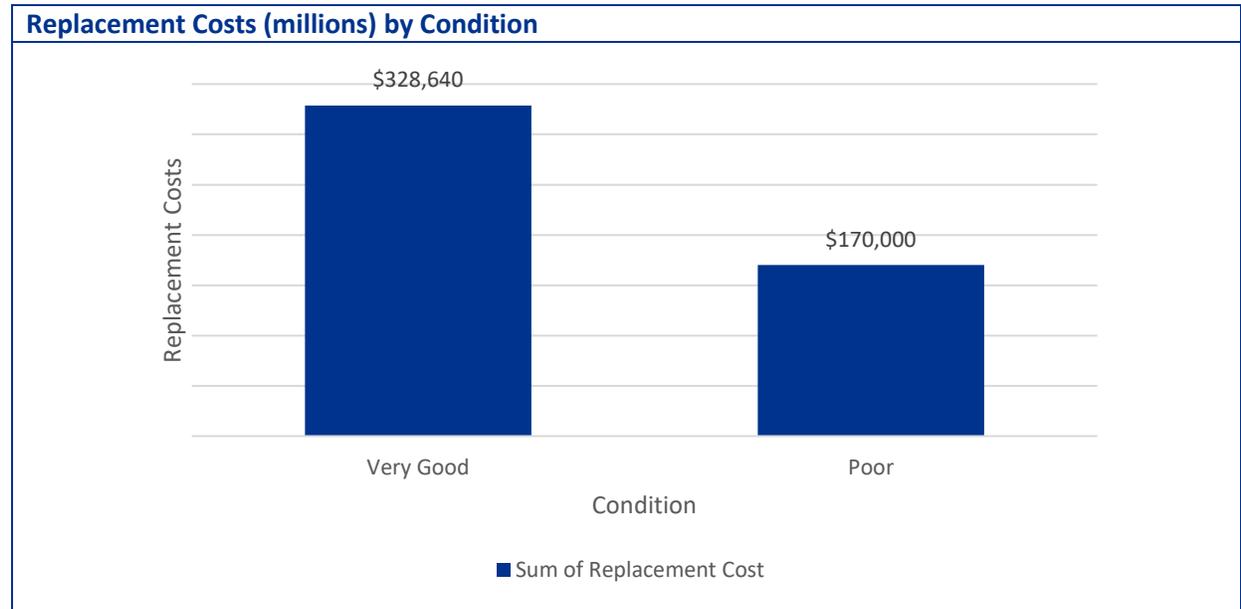
Appendix D: Levels of Service Profiles

Asset Class	Service Attribute	Levels of Service	
Water	Scope	**Community levels of service** The municipal drinking water system supports community fire protection for each ward in Bluewater. There are five (5) water supply and distribution systems serving 3,410 customers in Bayfield, Hensall, Zurich, Varna and surrounding areas.	
Technical measures of service		**2020**	**2021**
Percentage of properties connected to the municipal water system		3,400	3,460
Percentage of properties where fire flow is available		Measurement in progress	24%

Asset Class	Service Attribute	Levels of Service	
Water	Reliability	**Community levels of service** The municipal drinking water system provides safe water with minimal interruptions to the community, for example, boil water advisories and service interruptions.	
Technical measures of service		**2020**	**2021**
The number of connection-days per year where a boil water advisory notice is in place compared to the total number of properties connected to the municipal water system		1 day to 3,400 properties	Measurement in progress
The number of connection-days per year due to water main breaks compared to the total number of properties connected to the municipal water system		1 day to 3,400 properties	Measurement in progress

Asset Class	Service Attribute	Levels of Service	
Wastewater	Scope	**Community levels of service** The wastewater network connects our community to sanitary services. There are three (3) sanitary systems servicing 1,762 customers in Bayfield, Hensall, Zurich and surrounding areas.	
Technical measures of service		**2020**	**2021**
Percentage of properties connected to the municipal wastewater system		32.2%	32.2%

Asset Class	Service Attribute	Levels of Service	
Wastewater	Reliability	**Community levels of service** Bluewater provides sanitary services with minimal interruptions. The number of overflow or sanitary home backup events due to the absence of overflow structures in the municipal wastewater system is low. Home backups and overflows can occur due to heavy rainfall, inflow and infiltration (I&I), cracked and collapsed pipes, and excess organic waste among others, although Bluewater outsources the operation of all three (3) sanitary systems to OCWA and has no combined sewers. Effluent is discharged from the sewage treatment plants through lagoons and municipal drains leading to Lake Huron.	
Technical measures of service		**2020**	**2021**
The number of events per year where combined sewer flow in the municipal wastewater system exceeds system capacity compared to the total number of properties connected to the municipal wastewater system		0 events to 1,762 properties	Measurement in progress
The number of connection-days per year due to wastewater backups compared to the total number of properties connected to the municipal wastewater system		0 connection-days to 1,762 properties	Measurement in progress
The number of effluent violations per year due to wastewater discharge compared to the total number of properties connected to the municipal wastewater system		3 effluent violations to 1,762 properties	Measurement in progress

Asset Class	Service Attribute	Levels of Service	
Stormwater	Scope	**Community levels of service** Bluewater provides stormwater services that protect the community and our assets. Stormwater collection services are provided through three (3) separate systems servicing Bayfield, Hensall and Zurich. Compared to Hensall and Zurich, the majority of the existing stormwater system in Bayfield has been evaluated as undersized and inadequate to achieve expected levels of service.	
Technical measures of service		**2020**	**2021**
Percentage of properties in municipality resilient to a 100-year storm		Measurement in progress	Measurement in progress
Percentage of the municipal stormwater management system resilient to a 5-year storm		Measurement in progress	Measurement in progress
Percent of roads with stormwater drainage (sewer, ditch or other)		66%	66%

Asset Class	Service Attribute	Levels of Service	
Roads	Scope	**Community levels of service** The network of roads, comprised predominantly of rural roads, is in relatively good condition and well maintained. It includes major roads including highways 21, 83 and 4 forming the western, southern and eastern perimeters and a major arterial travelling east-west connecting Zurich and Hensall. Highways 3 and 31, travelling north-south, connect the southern part of the municipality with Bayfield, a popular tourism destination, in the north. Overall, Bluewater provides the majority of road structures with no load restrictions.	
Technical measures of service		**2020**	**2021**
Number of lane-kilometres of each of arterial roads, collector roads and local roads as a proportion of square kilometres of land area of the municipality		1.7 lane kms per square km of land area	1.7 lane kms per square km of land area

Asset Class	Service Attribute	Levels of Service
Roads	Reliability	**Community levels of service** The Municipality of Bluewater meets current and anticipated provincial road maintenance standards. Eighty-one percent (81%) of our roads are in very good or good condition while less than 3% of our roads are in poor condition. Bluewater is happy to report that its residents travel across reliable roads on a daily basis.
Technical measures of service	**2020**	**2021**
The average pavement condition index value for paved roads in the municipality	6.9	6.8
The average surface condition for unpaved roads in the municipality	7.7	7.6
Average structure condition for paved roads	7.2	7.1
Average structure condition for unpaved roads	6.9	6.8

Asset Class	Service Attribute	Levels of Service
Bridges & Culverts	Scope	**Community levels of service** We endeavor to develop a comprehensive and progressive infrastructure plan. A rural community with a highway connecting Southwestern Ontario with northern communities and cottages near Lake Huron and the Georgian Bay, our structures primarily support heavy transport vehicles, heavy farm equipment, motor vehicles and emergency vehicles.
Technical measures of service	**2020**	**2021**
Percentage of bridges in the municipality with loading or dimensional restrictions	31.2%	31.2%
Percent of bridges and large culverts with a certain width with no load restrictions	5.1%	5.1%

Asset Class	Service Attribute	Levels of Service	
Bridges & Culverts	Reliability	Community levels of service Bluewater commits to meet current and anticipated provincial standards. The most recent bridge inspection report recommends weight posting limits for two (2) bridges. Moreover, two (2) bridges are currently closed within the municipality.	
Technical measures of service		**2020**	**2021**
The average bridge condition index value for bridges in the municipality		Fair	Fair
the average bridge condition for structural culverts in the municipality		Fair	Fair

Appendix E: Risk Definitions

Currently, Bluewater's approach to managing its infrastructure is largely driven by the tacit knowledge of Public Works staff. Assets are slated for renewal based on immediate needs, and projects are grouped together to leverage available municipal funding. This process is loosely tied to asset condition reporting which provides staff with insight into needs and priorities. However, the approach is unstructured, making investment decisions difficult to justify and defend should plans come into question. The absence of structure and documentation makes Bluewater reliant on the knowledge and efforts of individual team members and susceptible to changes in staff and direction. However, since 2020 the Municipality has completed its AMP with KPMG and will have condition assessments on all facilities completed in 2022. These tools will provide a comprehensive and structured approach for Bluewater Council and staff going forward.

For the purposes of the analysis provided in this AMP, infrastructure risk was calculated as follows:

Infrastructure Risk = LoF x CoF

Where:
- LoF = Likelihood of Failure, as derived from third party condition reports or other indicators of urgency or time-horizon.
- CoF = Consequences of Failure, as derived from the severity and extent of stakeholder impacts

And where:
- Scores of 1-9 = low risk investment needs
- Scores of 10-19 = medium risk investment needs
- Scores of 20-25 = high risk investment needs

The risk matrix below shows how risk scores are calculated when multiplying the LoF by the CoF.

		Consequence of Failure				
		1	2	3	4	5
Likelihood of Failure	5	Med	Med	Med	High	High
	4	Low	Low	Med	Med	High
	3	Low	Low	Low	Med	Med
	2	Low	Low	Low	Low	Low
	1	Low	Low	Low	Low	Low

Bluewater assigned scores to each asset using a standard set of criteria for each asset class listed below:

Likelihood of Failure (LoF)		1	2	3	4	5
Roads	Raw Score (0-10) * (0-10)	100 - 81	80 - 61	60 - 41	40 - 21	20 - 0
Bridges	Bridge Condition Index (0-100)	100 - 81	80 - 61	60 - 41	40 - 21	20 - 0
Water	Condition	Very Good	Good	Fair	Poor	Very Poor
Wastewater	Condition	Very Good	Good	Fair	Poor	Very Poor
Fleet	Condition	Very Good	Good	Fair	Poor	Very Poor
Stormwater	Probability of Failure (1-5)	0, 1	2	3	4	5
Street Lighting	Condition	Very Good	Good	Fair	Poor	Very Poor
Facilities	Condition	Very Good	Good	Fair	Poor	Very Poor

Consequence of Failure (CoF)		1	2	3	4	5
Roads	Vehicle Per Day (Tiered)	0-49	50-199	200-499	500-999	1000-1999
Bridges	Annual Average Daily Traffic (Tiered)	0-49	50-199	200-499	500-999	>1000
Watermain	Pipe Diameter (mm)	0-50	51-100	101-200	201-300	301+
Wastewater	Pipe Diameter (mm)	0-150	151-250	251-350	351-450	451+
Stormwater	Consequence of Failure (1-5) (BM Ross)	0, 1	2	3	4	5

In addition, all fleet vehicles were assigned a consequence of '2' except for rescue vans which were assigned a consequence of '4'. Likewise all street light and facilities were assigned a consequence of '1' and '3' respectively.

Appendix F: Investments Needs by Asset Class and Risk Level

Total investment needs spanning 2022-2031 are broken down below by asset class and risk level.

Asset Class	High	Medium	Low	Total
Bridges/Culverts	$3.8	$4.0	$3.9	**$11.7**
Facilities	$0.0	$6.5	$0.0	**$6.5**
Fleet	$0.0	$0.0	$3.3	**$3.3**
Roads	$2.6	$20.3	$18.2	**$41.1**
Stormwater	$0.1	$1.8	$3.0	**$4.9**
Street Lights	$0.0	$0.2	$0.0	**$0.2**
Wastewater	$0.0	$11.0	$1.1	**$12.1**
Water	$0.0	$10.1	$5.3	**$15.4**
Grand Total	**$6.5**	**$53.8**	**$34.7**	**$95.0**

Appendix G: Needs Assumptions and Limitations

The following assumptions and limitations apply to this Asset Management Plan.

Item	Description
Inflation	Inflation was assumed to be 3% during the 10-year forecasts present in the Financing Section of the AMP based upon rising construction costs, particularly in the post-pandemic economy.
10-Year Needs Forecast	Future needs over the 10-year forecast period are understated since comprehensive needs assessments have not yet been performed for facility and fleet assets. Bluewater has planned to complete building condition assessments for all facilities in 2020. Moreover, the water and wastewater needs spanning 2027-2031 have yet to be identified.
10-Year Needs	New infrastructure needs spanning the 10-year forecasts include needs derived from the following plans and documents: 1. 2021 Water Financial Plan 2. 2021 Wastewater Financial Plan 3. 2017 Stormwater Asset Management Plan 4. 2019 Roads Needs Study 5. 2019 Bridges Assessment 6. Fleet Inventory Database 7. Street Light Inventory Database 8. Financial Data showing Net Book Values and Useful Lives

Appendix H: Condition Assessment Rating Criteria

Condition ratings were assigned to each asset class using the following ratings. Condition assessment criteria ratings were provided through independent third-party reviews for roads, bridges, culverts and stormwater assets.

Assets	Condition Assessment Criteria	Very Good	Good	Fair	Poor	Very Poor
Roads	Surface Rating	9-10	7-8	5-6	3-4	1-2
Bridges & Culverts	Bridge Condition Index (BCI)	90-100	75-89	40-74	30-39	0-29
Water & Sanitary Main	Percent of Useful Life Consumed	0-20%	21-40%	41-60%	61-80%	81-100%
Fleet	Percent of Useful Life Consumed	86-100%	41-85%	31-40%	11-30%	<10%
Linear Stormwater Assets	Probability of Failure	0-1	2	3	4	5
Facilities	Age	0-20	21-30	31-40	41-50	51+

Finally, all street lights that were replaced within the last 1-5 years were categorized as 'very good' while the remainder were categorized as 'poor'. These assets are located in downtown Bayfield and the Municipality of Bluewater has procured resources to replace them in 2022.