

Asset Management Plan Township of Stone Mills 2022



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Executive Summary

The development of an asset management plan has been identified as a pre-requisite for the receipt of funding from the Province of Ontario (the 'Province') under The *Infrastructure for Jobs and Prosperity Act, 2015* (the "Act"). *Ontario Regulation 588/17: Asset Management Planning for Municipal Infrastructure* (O.Reg. 588/17), establishes the requirement for Ontario municipalities to adopt asset management plans for core infrastructure (roads, bridges, water and wastewater management) by July 1, 2022.

The *Infrastructure for Jobs and Prosperity Act, 2015* (the "Act") was proclaimed by the Province of Ontario on May 1, 2016 and, along with *Ontario Regulation 588/17: Asset Management Planning for Municipal Infrastructure* (O.Reg. 588/17), establishes the requirement for Ontario municipalities to adopt asset management plans for core infrastructure (roads, bridges, water and wastewater management) by July 1, 2022.

The Corporation of the Township of Stone Mills (Township) operates and maintains core infrastructure (roads, bridges, water) with a historical cost of \$52.9 million and an estimated replacement cost of \$69.8 million.

While the Township's core infrastructure is considered to be in a good condition on average, specific components of its core infrastructure are approaching or are at the end of their useful lives. However, the Townships annual funding for maintenance and capital replacement of core infrastructure is not sufficient to meet its infrastructure requirements, with the Townships forecasted replacement and maintenance costs estimated at \$37.7 million over the next ten years. As a result, some maintenance and replacement requirements are necessarily deferred, resulting in an increasing infrastructure deficit, continued deterioration of its core infrastructure assets and the potential for reduced levels of service for residents and other users.

Asset management planning is an ongoing process that reflects the strategic asset management policy adopted by the Township and is coordinated with other activities undertaken by the Township, including but not limited to the development of annual service plans for core infrastructure, ongoing needs and conditions assessments undertaken by municipal departments and the Townships' operating and capital budgeting processes.

By providing an indication as to the condition, replacement cost, service levels and lifecycle requirements associated with the Township core infrastructure, this asset management plan informs other aspects of the Townships' operations by contributing towards a better understanding of the Township infrastructure and associated funding requirements so as to ensure the Township meets its service delivery expectations and commitments.

Back ground to Asset Management Plan

The Infrastructure for Jobs and Prosperity Act, 2015 (the "Act") was proclaimed by the Province of Ontario on May 1, 2016 and, along with Ontario Regulation 588/17: Asset Management Planning for Municipal Infrastructure (O.Reg. 588/17), establishes the requirement for Ontario municipalities to adopt asset management plans for core infrastructure (roads, bridges, water and wastewater management) by July 1, 2022, with asset management plans for remaining municipal assets adopted by July 1, 2024.

The Act and Regulation outline a variety of requirements intended to enhance asset management planning by municipalities, including the need for a strategic asset management policy, prescribed information required to be addressed in the asset management plans and future efforts to be undertaken by the Township with respect to updating and expanding the level of analysis and planning associated with asset management planning for the Township's assets and related levels of service.

In keeping with these requirements, the Township adopted a strategic asset management policy in 2019 that supports the establishment of consistent standards and guidelines for management of the Townships assets by applying sound technical, social, economic and environmental principles that consider present and future needs of users, and the service expected from the assets. This means leveraging the lowest total lifecycle cost of ownership with regard to the service levels that best meet the needs of the community while ensuring risks are appropriately managed.

The Township's asset management plan addresses the legislative requirements of the Act and provides support for future decision-making with respect to the Township's investment in its infrastructure and associated levels of service.

As required by the Act, the asset management plan includes the following components:

- A summary of the Township assets, including average age and estimated replacement cost;
- An assessment of asset condition;
- Community levels of service that provide a general description of the infrastructure in place and linkages to customers; and
- Technical levels of service, representing quantitative indicators that reflect asset condition or performance.

Asset management planning defined

Asset management planning is the process of making the best possible decisions regarding the acquisition, operating, maintaining, renewing, replacing and disposing of infrastructure assets. The objective of an asset management plan is to maximize benefits, manage risk and provide satisfactory levels of service to the public in a sustainable manner. In order to be effective, an asset management plan needs to be based on a thorough understanding of the characteristics and condition of infrastructure assets, as well as the service levels expected from them. Recognizing that funding for infrastructure acquisition and maintenance is often limited, a key element of an asset management plan is the setting of strategic priorities to optimize decision-making as to when and how to proceed with investments. The ultimate success or failure of an asset management plan is dependent on the associated financing strategy, which will identify and secure the funds necessary for asset management activities and allow the Township to move from planning to execution.

Scope of the asset management plan

Consistent with the requirements of the Act, this asset management plan encompasses those components of the Townships' infrastructure that are considered be core infrastructure assets, specifically:

- Roads
- Bridges
- Large Culverts

For the purposes of developing the asset management plan, a ten year planning horizon is considered.

Asset management planning objectives

In addition to meeting the legislative requirements under the Act, the Asset Management Plan is intended to enhance the Township's overall policy and planning framework for infrastructure management, while increasing its internal capacity (through people, information and processes) for effective asset management planning.

A summary of the Township's current state of asset management planning, as well as the intended future state of its capabilities following adoption of the asset management plan is provided below.

Capacity Element	Current State	Future State
Policy and Governance – The Township has developed a formal asset management planning policy and roadmap and measures its progress over time.	The Township has adopted a strategic asset management policy. The Township considers asset management implications as part of its budgeting and forecasting activities.	The Township will establish a “roadmap” that details required asset management planning action items over the next three to five years, with performance measures to monitor progress.
People and Leadership – The Township has cross-functional teams with clear accountabilities, resourcing and support to advance asset management planning.	The Township has functional departments considering asset management planning as part of annual budgeting and financial/capital forecasting activities.	The Township will have internal management capacity accountable for ongoing implementation, with each department having roles and responsibilities for managing their component of the overall plan.

Capacity Element	Current State	Future State
<p>Data and Information – The Township is collecting and using relevant data to support effective asset management planning and decision-making.</p>	<p>The Township has an asset inventory based on its tangible capital asset reporting and other available information (e.g. roads needs assessment studies), with formal approaches to assess asset condition and performance levels.</p>	<p>The Township will have formal asset inventory done on an ongoing basis that outlines condition assessments and service level standards for critical assets.</p>
<p>Planning and Decision-Making – The Township is documenting and standardizing the approach to establishing asset management planning priorities, capital and operations planning and related budget impacts.</p>	<p>Departments plan for infrastructure renewal based on their individual needs. Infrastructure planning decisions are typically made in response to user needs and regulatory requirements.</p>	<p>Asset management planning will be carried out in a more coordinated fashion across the Township, with consideration given to the current and expected levels of service for critical assets.</p>
<p>Contribution to Asset Management Practice – The Township supports asset management planning through internal and external knowledge sharing.</p>	<p>Asset management planning knowledge varies across the organization, with different approaches and formats used for data collection and analysis in support of asset management planning.</p>	<p>The Township will integrate asset management planning into its budgeting and financial reporting processes, as well as maintain a single database for asset management planning data. The Township will also provide ongoing training and support for staff on asset management planning concepts, and dedicate the necessary resources, support and training to facilitate successful asset management practices.</p>

Growth assumptions and implications

The 2016 population of the Township of Stone Mills is 7,702, increasing 1.9% from the 2011 population of 7,560. This represents the growth of 142 people within a 5-year period. As per the draft official plan, the Township is expected to experience relatively slow growth from 2016-2036 with a projected population of 8,832 by 2036 and approximately 400 new housing units.

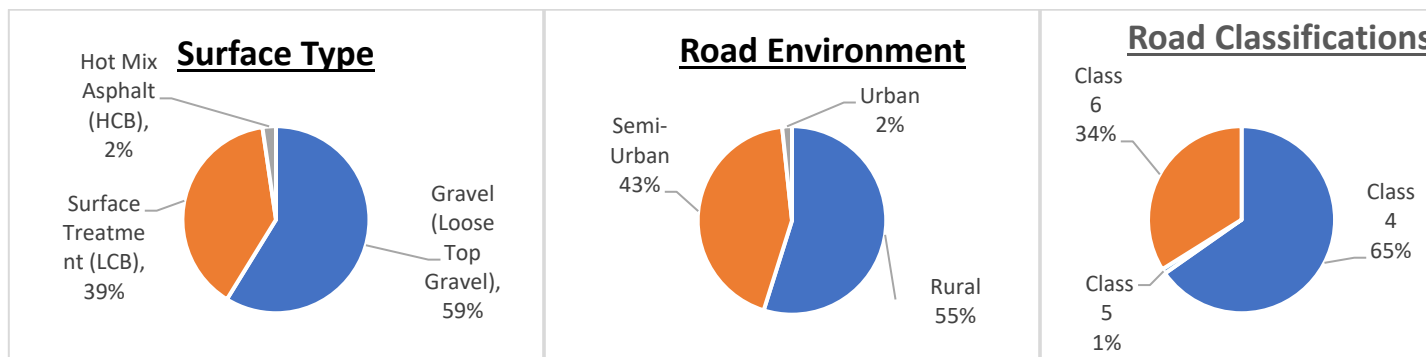
While the absence of significant levels of growth, combined with the large geographic footprint of the Township of Stone Mills, indicates that significant demand for infrastructure expansion (i.e., investments in new infrastructure components) are not expected over the duration of the asset management plan. The Township will need to continue to invest in the requirements associated with the replacement of existing infrastructure. In addition, the potential also exists for the Township to incur significant capital expenditures relating to service level improvements.

Asset Management for the Roads Network

Overview of the Townships Road Network

The Township’s municipal road network is comprised of 373 kilometers of roads or 746 lane kilometers that connect properties within the municipality to other municipalities through connections with the Lennox and Addington Roads network and the Provincial Highway system. As identified by the most recent roads need study completed in December 2020 (“The Township of Stone Mills Roads Needs Study”), the majority of the Township’s Road network is classified as Class 4 roads under Ontario Regulation 239/02: Minimum Maintenance Standards for Municipal Highways (“O. Reg. 239/20”). Data Collection and Road Ratings were done in accordance with the Ministry of Transportation (MTO) Inventory Manual for Municipal Roads (“the Manual”).

A summary of the Townships’ Road network is provided below.



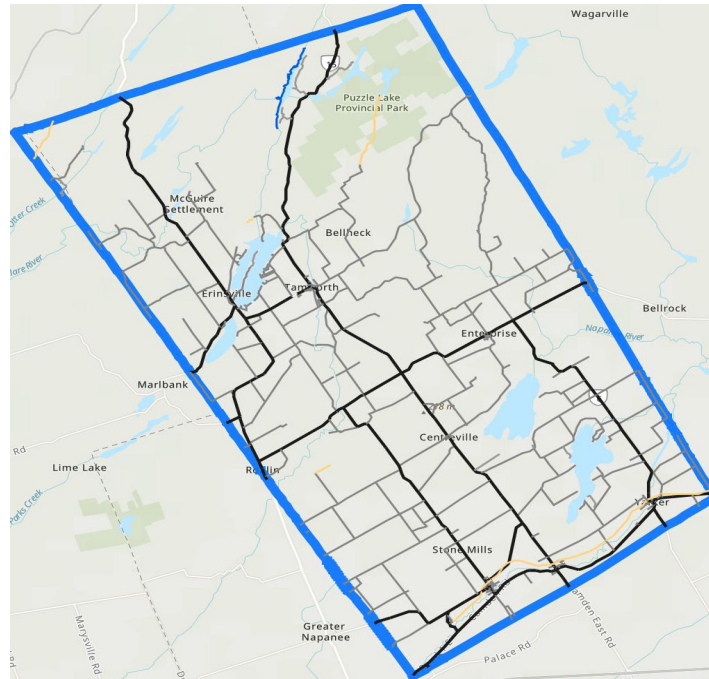
Overview

Road Environment Breakdown					
Rural	KM	Semi-Urban	KM	Urban	KM
Gravel (Loose Top Gravel)	132.5	Gravel (Loose Top Gravel)	0	Gravel (Loose Top Gravel)	0
Surface Treatment (LCB)	72.5	Surface Treatment (LCB)	137.32	Surface Treatment (LCB)	0
Hot Mix Asphalt (HCB)	0.59	Hot Mix Asphalt (HCB)	24.96	Hot Mix Asphalt (HCB)	6.18
Total Rural	204.59	Total Semi-Urban	162.28	Total Urban	6.18

Continued

Map of the Township's Road Network

The Township of Stone Mills Roads network covers a large geographic area,. Most of the Township roads are connected by the Lennox And Addington County network which provides the highest class of roads within the Township.



Break Down of the Townships Road Network

The road network for the Township is comprised of two components:

- Road subsurface, comprised of the granular base that provides drainage and structural support;
- Road surface, which consists of a top layer of either gravel or asphalt (i.e. high class bituminous) that transfers the weight of vehicles to the granular subsurface and underlying ground.

The historical cost of the Township’s road network was reported to be \$52.9 million, with an estimated replacement cost (2021) in the order of \$69.8 million².

<u>Surface Type</u>	<u>Number of Lane KM</u>	<u>Average Age (in Years)</u>		
		<u>Estimates Useful Life</u>	<u>Average Age</u>	<u>Average Remaining Useful Life</u>
Gravel Roads	219.27	40	36	4
Asphalt/Hot mix	8.61	40	15	25
Surface treated	145.17	15	3	12
TOTAL	373.05			

² Based on 2020 reconstruction cost estimates outlined in the Roads Need Study, which quantify costs for different components of road reconstruction (e.g. excavation, ditching, granular materials, surface application).

Condition assessment

Condition assessments for the Township's Road network were determined as part of the Roads Needs Study based on authoritative guidance that reflect engineering best practices and standards, including but not limited to:

- Pavement Condition Index (PCI) for Flexible Pavement, Ministry of Transportation
- SP-021 Manual for Condition Rating of Surface-Treated Pavements, Distress Manifestations, Ministry of Transportation ("The Manual")
- SP-022 Flexible Pavement Condition Rating Guidelines for Municipalities, Ministry of Transportation
- SP-024 Manual for Condition Rating of Flexible Pavements, Distress Manifestations, Ministry of Transportation
- SP-025 Manual for Condition Rating of Gravel Surface Roads, Ministry of Transportation
- Measuring the Condition of Municipal Roads, Ontario Good Roads Association, Ministry of Transportation

As outlined in the Roads Needs Study, condition assessments involved visual inspections of the Township's Road network in order to assess the severity and density of distresses in road segments (surface defects, surface deformations and cracking).

The results of the visual inspections were used to determine the status of each road based on the six (6) categories listed in the Manual. The 6 categories are Geometrics, Structural Adequacy, Surface Type, Surface Width, Capacity, and Drainage. Considered in conjunction with the field assessment and traffic volumes, these critical components assist in determining when and what strategy is to be implemented for each road section. The table listed below shows what the needs are based on either rehabilitation or reconstruction timing strategies.

Condition Assessment Continued

Breakdown of Lane km Replacement and Rehabilitation Over Next Ten Years			
	# of lane Km		
Timing	Rehabilitation	Reconstruction	Total
Now		51.47	51.47
1-5 Year needs	10.628	1.84	12.468
6-10 Year needs	22.098	1.406	23.504
			87.442

Breakdown by Surface Type of Needs Over Next Ten Years			
	Now	1-5 Years	6-10 years
Type of Road	# of Lane Km		
Gravel	49.623		
Surface treatment	0.98	11.469	18.898
Asphalt	0.867	0.999	4.606
TOTAL	51.47	12.468	23.504

The Township’s Road system adequacy according to the roads need study is 86.2%. According to the Roads need study the Township’s road system is considered to be “generally in good condition”.

Current Service Levels

The majority of the Township road network is considered to be rural or semi-urban roads, accounting for 54.84% and 43.49% of the road network, respectively. The remaining road network is comprised of urban roads. Traffic counts conducted as part of the Roads Needs Study indicated that the majority of roads (100%) are used by less than 500 vehicles per day. Based on the draft Stone Mills Official Plan, the population growth of the Township is anticipated to be 1.9% over the next ten years, or 0.19% per annum. The associated impact on usage of the municipal roads is predicted to be the same rate as the population.

The current and projected traffic volumes for the Township Road network are provided below.

Average Annual Daily Traffic Volumes	Current
Less than 50 vehicles per day	40.6%
50 to 199 vehicles per day	45.1%
200 to 499 vehicles per day	14.30%
500 to 999 vehicles per day	0%
1,000 to 1,999 vehicles per day	0%
2,000 or more vehicles per day	0%

Based on the estimated capacity of the Township Road network and the projected growth, it's not anticipated that the Township will require additional lanes to accommodate the anticipated growth in traffic volumes.

Current service levels (continued)

In addition to requiring a general description of the road network, O.Reg. 588/17 also outlines the qualitative descriptions and technical metrics to be use for describing the current service levels relating to the Township's Road network and includes:

- The number of lane kilometers of each category of road (Arterial, Collector, Local) as a proportion of square kilometers of land area of the Township;
- For paved roads, the average PCI value; and
- For unpaved roads, the average surface condition (e.g. excellent, good, fair, poor).

As summary of these service level indicators are provided below.

	Arterial	Collector	Local	Total
Number of lane kilometers	6.18	162.27	204.60	373.05
Township geographic area (in square kilometers)	740	740	740	740
Lane kilometers of roads per square kilometer	0.0083	0.2192	0.2764	11.4

	Gravel	Surface Treated	Asphalt	Total
Average PCI value	59.03	75.76	74.51	69.76
Average condition rating	Good	Good	Good	Good

Required lifecycle activities

As defined in O.Reg.588/17, lifecycle activities include “*activities undertaken with respect to a municipal infrastructure asset over its service life, including constructing, maintaining, renewing, operating and decommissioning, and all engineering and design work associated with those activities*”. For the purposes of the asset management plan, the estimated cost of lifecycle activities includes:

- The replacement/rehabilitation/reconstruction of roads at the end of their useful lives; and
- The cost of annual maintenance activities required on a periodic basis to maintain the Township’s roads at the current state.

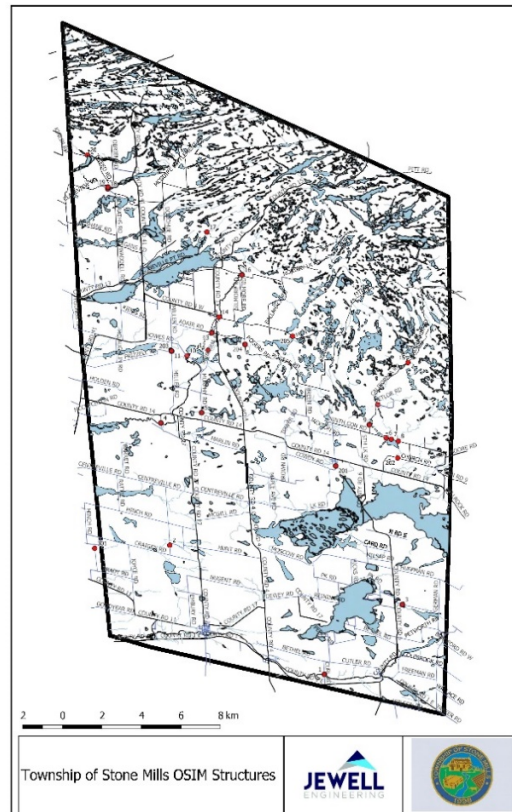
As summarized below, the estimated cost of required lifecycle activities is estimated to be in the order of \$37.7 million over the next ten years.

Year	Lifecycle Maintenance Activities	Capital Works	Total
2021	\$823,000.00	\$20,794,317.37	\$21,617,317
2022	\$839,460.00	\$949,315.81	\$1,788,776
2023	\$856,249.20	\$821,890.96	\$1,678,140
2024	\$873,374.18	\$1,042,445.50	\$1,915,820
2025	\$890,841.67	\$685,674.95	\$1,576,517
2026	\$908,658.50	\$1,107,407.59	\$2,016,066
2027	\$926,831.67	\$848,084.13	\$1,774,916
2028	\$945,368.30	\$815,229.81	\$1,760,598
2029	\$964,275.67	\$853,782.92	\$1,818,059
2030	\$983,561.18	\$755,662.24	\$1,739,223
Total	\$9,011,620.38	\$28,673811.28	\$37,685,432

Asset Management for the Bridges and Culvert

Overview of the Townships Bridges and Culverts

The Township's municipal road network includes a total of 20 Bridges and 7 large culverts. Structures vary between concrete, I and T beams and Girders and round and box culverts.



Overview of the Townships bridges and culverts (continued)

As at December 31, 2020, the historical cost of the Township's bridges and Culverts was reported to be \$2.8 million. Based on the most recent engineering assessments and estimates, the replacement cost of the Township's structures was estimated to be \$17.2 million.

For TCA reporting purposes, the Township has adopted a 50-year useful life for bridges and 40 year for culverts and the average age of the Township's bridges was 64 years.

Structure Type	Estimated Useful Life				Replacement Cost (Per OSIM Inspection Report) ⁵	Replacement Cost (Inflation Adjusted) ⁶
	Estimated Useful Life	Maximum Age	Average Age	Average Remaining Useful Life		
Bridges	50	110	82	-32%	\$14,300,000	\$15,286,700
Culvert	40	92	55	-15%	\$2,900,000	\$3,100,000
Total					\$17,200,000	\$18,386,700

⁵ Based on reconstruction and rehabilitation cost estimates provided in the OSIM Inspection Report, which include provisions for associated work, staging, environmental assessments, engineering design and contingencies.

⁶ The replacement cost has been increased by 6.9% to reflect the rate of inflation in non-residential construction costs from 2020 to 2021.

Condition assessment

Under Ontario Regulation 104/97: Standards for Bridges (amended by Ontario Regulation 472/10), all municipalities are required to undertake detailed visual inspections in accordance with the Ontario Structure Inspection Manual ('OSIM') of all:

- Bridges, culverts and tunnels with spans of three metres or greater; and
- All movable bridges.

Under Ontario Regulation 104/97, inspections are required every second calendar year.

In addition to establishing the requirements for bi-annual visual inspections, the OSIM defines the guidelines for bridge inspections. Specifically, the OSIM includes Condition State Tables that are used to assess the condition of various bridge components, based on the following ratings:

Condition Rating	Description	Examples
Excellent	<ul style="list-style-type: none">• New (as constructed) condition• No visible deterioration-type defects noted, with minor construction defects excluded• No remedial action required	
Good	<ul style="list-style-type: none">• First signs of minor defects noted• Defects would not normally require remedial action as overall performance is not affected	<ul style="list-style-type: none">• Light corrosion• Narrow cracks in concrete
Fair	<ul style="list-style-type: none">• Medium defects are visible• May require preventative maintenance where it is economic to do so	<ul style="list-style-type: none">• Medium corrosion (up to 10% section loss)• Medium cracks in concrete
Poor	<ul style="list-style-type: none">• Severe and very severe defects are noted• Rehabilitation or replacement required if overall performance is affected	<ul style="list-style-type: none">• Severe corrosion• Spalling

Condition assessment Continued

The results of the inspection of individual elements is then weighted to provide an overall Bridge Condition Index ('BCI'), which determines the timing of required maintenance activities for the structure under inspection.

BCI	Condition	Maintenance Schedule
70 to 100	Good	No maintenance requirements are identified within the next five years
60 to 69	Fair	Maintenance requirements are identified within the next five years
<60	Poor	Maintenance requirements are identified within one year

Based on this approach, 80% of the Township's bridges are classified as being in Poor condition, with the remaining 15% being Good and 5% being in fair condition.

The Townships Culverts are classified as 57% being in good condition 29% being in poor condition with the remaining 14% being in fair condition.

BRIDGES

BCI	Condition	Number	Percentage
70 to 100	Good	3	15%
60 to 69	Fair	1	5%
<60	Poor	16	80%

CULVERTS

BCI	Condition	Number	Percentage
70 to 100	Good	4	57%
60 to 69	Fair	1	14%
<60	Poor	2	29%

Current service levels

O.Reg. 588/17 outlines the qualitative descriptions and technical metrics to be use for describing the current service levels relating to the Town’s bridges, as summarized below.

Service Level Consideration	Assessment
Description of the traffic that is supported by municipal bridges	While the Township’s bridges provide access for commercial and passenger vehicles, cyclists and pedestrians, the majority of structures serve residential passenger vehicle movements and pedestrians.
Description of the condition of bridges and how this would affect use of the bridges	While the current condition of the Township’s bridges and culverts does have a significant impact on usage at the present time, the requirement for weight restrictions and other aspects of deferred maintenance is and has impact the ability of certain vehicles to use bridges. In addition, the condition of certain bridges presents a potential a risk of failure which will have an impact on level of service through either closure of the bridges/road or the imposition of further weight limitations. The prospect of a bridge failure would also be accompanied by the need for the Township to incur significant expenses with respect to the repair or replacement of the structure in question.
Percentage of bridges with loading or dimensional restrictions	There are currently several bridges (6) with loading or dimensional restrictions.
Average bridge condition index for bridges and large culverts	57.102

Required lifecycle activities

As defined in O.Reg.588/17, lifecycle activities include “*activities undertaken with respect to a municipal infrastructure asset over its service life, including constructing, maintaining, renewing, operating and decommissioning, and all engineering and design work associated with those activities*”. The determination of required lifecycle activities, including the related cost and timing, is identified in the OSIM Inspection Report and includes the following:

- Routine maintenance, which includes erosion control, handrail maintenance, replacing missing and damaged signs and other minor repairs. The OSIM Inspection Report identifies 10 bridges/culverts that are currently in need of maintenance.
- Additional studies, investigations and monitoring programs for structures with significant deficiencies, the purpose of which is to provide more a more detailed assessment of capital requirements.
- Capital works (repairs, rehabilitation or replacement) that would extend the service life of the structure or increase its BCI. The OSIM Inspection Report identifies 12 bridges that are currently in need of rehabilitation. 11 of the 12 bridges have been identified as requiring rehabilitation within the next five years.

Leveraging the information identified in the 2020 OSIM Inspection Report, the estimated level of lifecycle investments over the next ten years as identified in the OSIM Inspection Report is \$8,591,500. Based on the 2020 to 2021 rate of inflation (6.9%), the required level of lifecycle investment has been calculated to be \$9,184,313.50.

Required lifecycle activities (continued)

Year	Rehabilitation	Additional Studies	Capital Works	Total
2021	\$872,500	\$80,000	\$2,410,000	\$3,362,500
2022			–	–
2023			–	–
2024			-	-
2025			–	–
2026	\$449,000		\$3,750,000	\$4,199,000
2027			-	-
2028			–	–
2029				-
2030			\$1,030,000	\$1,030,000
Total	\$1,321,500	\$80,000	\$7,190,000	\$8,591,500

In arriving at the recommended lifecycle requirements, the OSIM Inspection Report identifies capital requirements necessary to address potential health and safety risks to users and/or replace or rehabilitate bridges. As a result, the required lifecycle activities accommodate a gradual reduction in the overall BCI of the Town’s structures while still maintaining BCI’s in the good to fair range, which allows for minimal impact on service levels.

Required lifecycle activities (continued)

The current level of funding for both the maintenance of bridges and their eventual replacement at the end of useful life is not sufficient to meet the identified needs for the Township's bridges. While deferral of maintenance and replacement can be considered, this is expected to increase the potential risk of failure for a structure. Additionally, while the abandonment of structures can be considered, this is not expected to be a viable strategy as most structures are located on local roads and cannot be abandoned as they are required to provide road access to residents, emergency vehicles and other users.

Next Steps

As required by the Act, the Township will undertake the following ongoing activities related to asset management planning:

- Updating the strategic asset management policy every five years, with the next update expected in 2024;
- Updating the asset management plan for core infrastructure every five years, with the next update expected in 2026;
- Completing a similar asset management plan for other assets on or before July 1, 2024;
- Updating the asset management plan for proposed levels of service (which may differ from current levels of service) on or before July 1, 2025; and
- Providing Council with an annual update as to the Township's progress against the asset management plan.

In addition to these requirements, the Township will be providing ongoing training for asset management planning to municipal personnel and will also be integrating asset management planning into its new information management system, providing a better linkage between asset management planning and the Town's financial reporting systems.

Information sources

Data Collection and Information for this report has been compiled utilizing the following documents;

- The Townships asset registry
- 2020 Roads needs Study,
- 2020 OSIMS reports
- 2021 Updated Township's official plan

The layout and legislation requirements have come from O.Reg. 588/17 and various municipal samples to ensure compliance with the current legislation.