Town of The Blue Mountains

Bridge and Culvert Asset Management Plan

October 2020

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Executive Summary

Introduction

The Town owns and operates 31 bridge and culvert structures. To be considered a bridge or culvert, the structure must be at a minimum 3 meters. The 31 structures have a replacement cost of $56.9 Million. Not included in the 31 count is Structure #16, also known as Clendenan Bridge, which has been closed to vehicular traffic for a number of years. The 31 structures included in this plan range from large concrete box culverts to steel framed bridges. For the purposes of this Asset Management Plan the bi-annual Bridge Inspection Report has been used based on the 2019 Ontario Structural Inspection Manual (OSIM). Using these guidelines as well as staff knowledge this plan has been created in accordance with O.Reg 588/17.

Table 1 outlines the types of structures included in this plan, as well as the useful life estimates used for each of these assets.

Table 1
Useful Lives by Structure Type

Asset	Useful Life
Bridge	75 Years
Culvert - Concrete	75 Years
Culvert - Corrugated Steel	40 Years

The condition of the structures is completely based on the Bridge Condition Index (BCI) as determined through the Bridge Inspection Report. All of the various components of a bridge are assessed and given a rating which is then combined into an overall BCI. This index gives a quick snapshot of what the overall condition of the particular structure is.

As per the Ministry of Transportation guidelines a condition of 70 and above would result in no works needed in the next five years, 60 to 70 would have works in the next five years, and anything below 60 would have work within the next year. Table 2 below illustrates the BCI ratings from Good to Very Poor.

Table 2
Bridge Condition Index Ratings

Ratings	Metric
1 – Very Poor	39 and below
2 – Poor	40 to 69
3 – Fair	70 to 89
4 – Good	90 to 100

Plan Structure

The structure of this plan is in alignment with O.Reg 588/17. This was done so that the Town can include this piece in the final Asset Management Plan that will include all asset classes. This plan includes the following sections:

1. State of Infrastructure – Bridges;
2. Current Levels of Service and Performance;
3. Lifecycle Model; and
4. Population and Economic Activity.

State of the Infrastructure

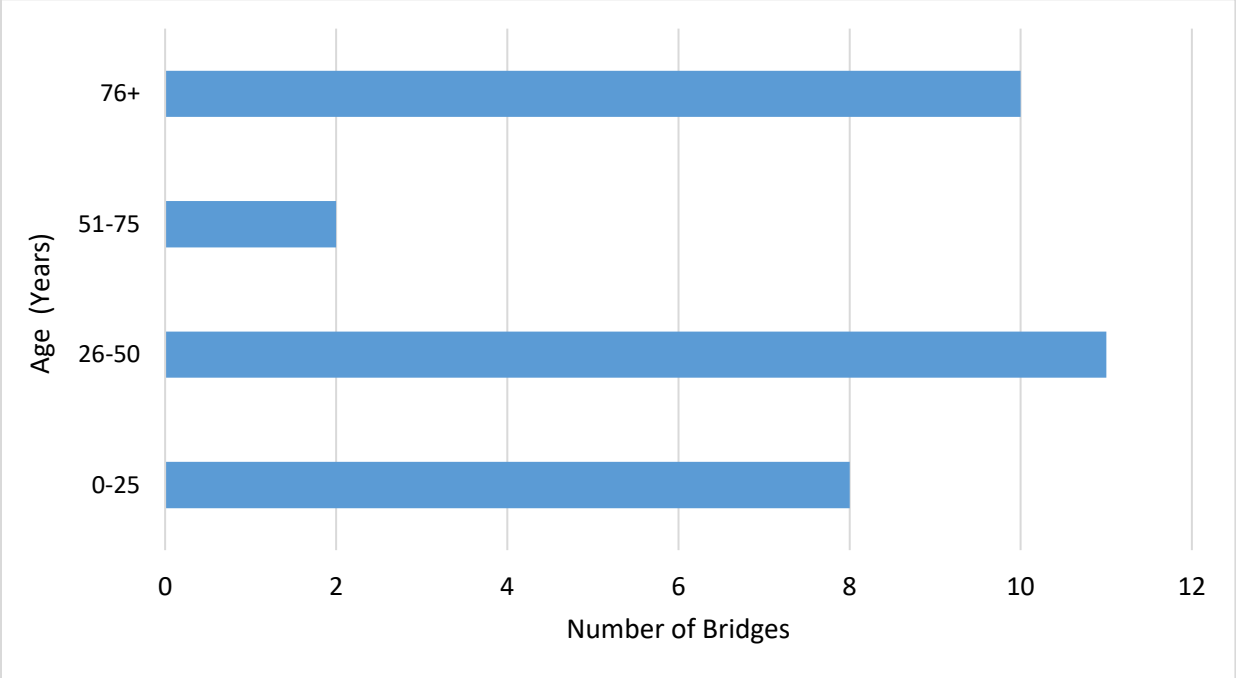
The following tables and charts look at each structure and outlines the basic information that is required through O.Reg 588/17;

i. Structure
ii. 2020 Replacement Cost
iii. Age of the Structure (years)
iv. 2019 Bridge Condition Index

Table 3
State of the Infrastructure

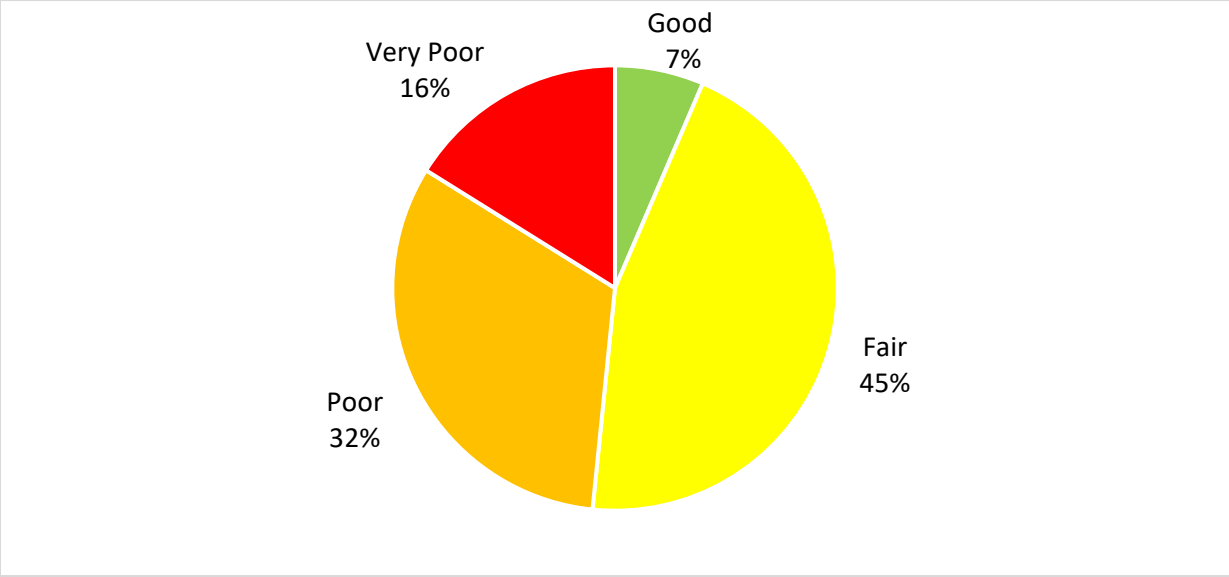
Structure	Replacement Cost	Age	BCI
Structure # B-1 - 10th Line	$1,698,000	40	74
Structure # B-2 - 6th Sideroad	$1,100,000	90	24
Structure # B-3 - 6th Sideroad	$1,100,000	90	20
Structure # B-4 - 9th Sideroad	$2,020,000	39	63
Structure # B-5 - 12th Sideroad	$805,000	90	24
Structure # B-6 - 10th Line	$1,316,000	90	43
Structure # B-7 - 12th Sideroad	$1,336,000	90	59
Structure # B-8 - 6th Line	$550,000	80	63
Structure # B-9 - 12th Sideroad	$727,000	90	19
Structure # B-11 - 21st Sideroad	$1,558,000	47	74
Structure # B-12 - 21st Sideroad	$1,609,000	25	75
Structure # B-13 - Main St. Heathcote	$122,000	70	70
Structure # B-14 - 24th Sideroad	$2,469,000	43	75
Structure # B-15 - Slabtown Bridge	$2,842,000	8	84
Structure # B-17 - Clark Street (Black Bridge)	$3,210,000	97	48
Structure # B-18 - 10th Line	$1,036,000	90	57
Structure # B-19 - 11th Line	$558,000	90	30
Structure # B-21 - Beaver River Bridge	$15,800,000	12	63
Structure # C-201 - 18th Sideroad	$1,188,000	50	70
Structure # C-202 - 10th Line	$1,081,000	24	70
Structure # C-203 - 21st Sideroad	$2,251,000	15	66
Structure # C-204 - 6th Line	$1,406,000	30	75
Structure # C-205 - Grand Cypress Lane	$891,000	30	72
Structure # C-206 - Arrowhead Rd	$3,248,000	50	74
Structure # C-207 - Indian Circle	$1,376,000	31	75
Structure # C-208 - Sunset Blvd	$548,000	50	63
Structure # C-209 - Alice St W	$1,072,000	32	80
Structure # C-210 - Arthur St W	$1,591,000	70	54
Structure # C-212 - 7th Line	$511,000	13	95
Structure #C-211 - 11th Line	$571,000	19	75
Structure #C-213 - Pretty River Road	$1,300,000	0	100
Total Replacement Cost	**$56,890,000**		

Chart 1
Bridges by Age



The average age of Town owned bridges is 51 years.

Chart 2
Bridges by Condition Rating



The average BCI of Town owned bridges is 62 or a condition rating of Poor.

Map 1
Bridge and Culverts by Condition Rating

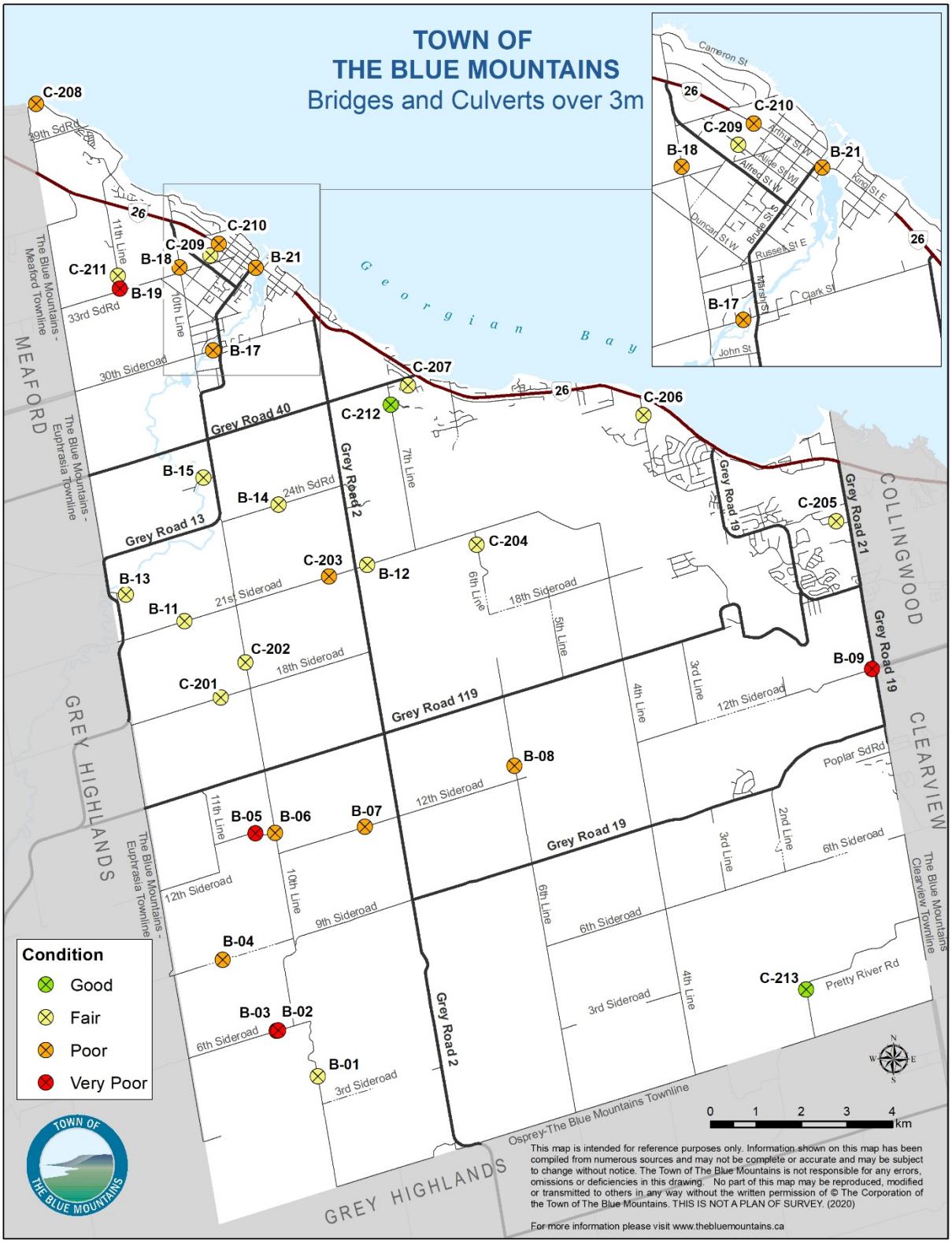
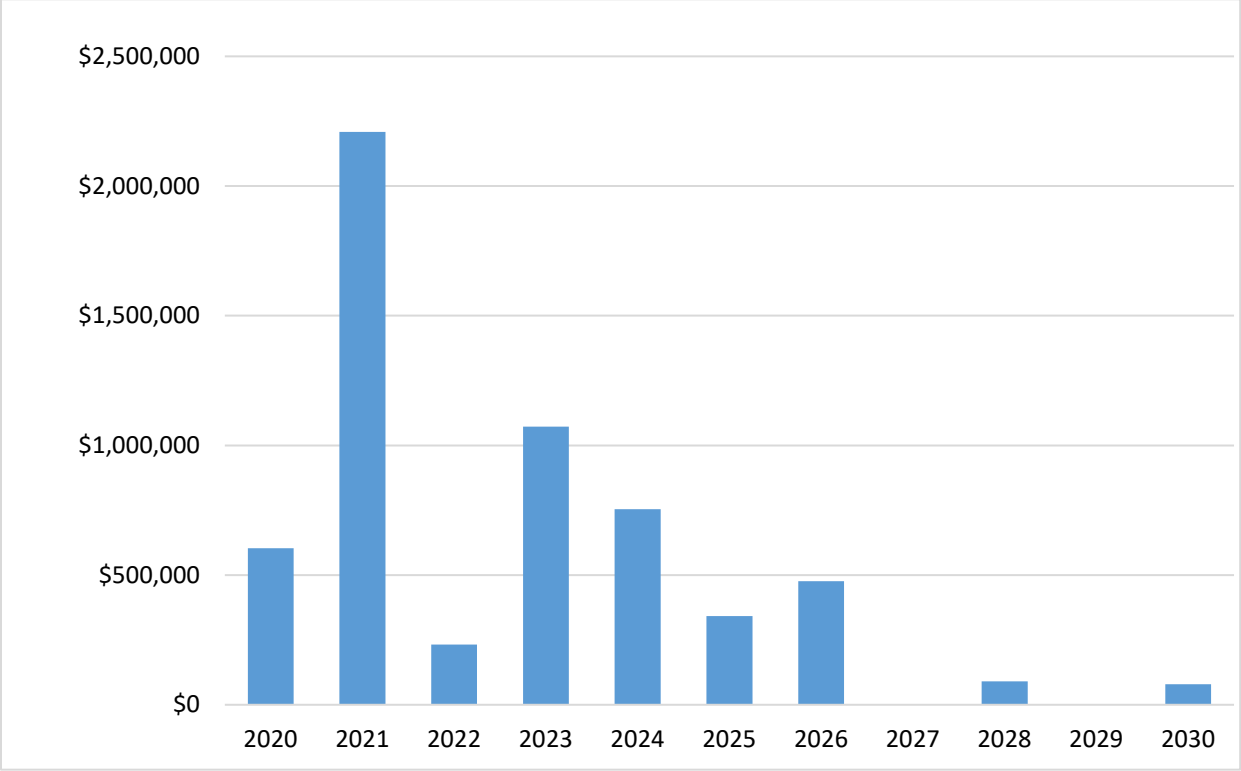


Chart 3
Capital Costs by Year



O.Reg 588/17 calls for a 10-year capital forecast, but for the purposes of Bridges and Culverts 11 years are being shown as the Town is working on a culvert replacement in 2020. Included in the 11-year forecast is 7 full structure replacements.

Table 4
10 Year Capital Plan

Structure	Replacement Cost	Year
Structure #213 - Pretty River Road	$604,000	2020
Structure # 2 - 6th Sideroad	$1,100,000	2021
Structure # 3 - 6th Sideroad	$1,100,000	2021
Structure # 13 - Main St. Heathcote	$122,000	2022
Structure # 5 - 12th Sideroad	$805,000	2023
Structure # 9 - 12th Sideroad	$727,000	2024
Structure # 19 - 11th Line	$558,000	2026
Total Replacement Cost	**$5,016,000**	

Unlike some of the other asset management plans a chart by funding type has not been included as all structures in this plan are funded through taxation. Whether the funding flows through a reserve fund or from long-term debt, the initial source is taxation.

Current Level of Service

As per O.Reg 588/17 this asset management plan is built using the current level of service that the Town is offering for this asset class. The regulation does have mandatory metrics for bridge and culvert structures, and staff have also included extra metrics for these assets.

- Percentage of bridges in the municipality with loading or dimensional restrictions **(mandatory)**
- For bridges in the municipality, the average bridge condition index value **(mandatory)**
- For structural culverts in the municipality, the average bridge condition index value **(mandatory)**
- Percentage of structures with a Bridge Condition Index of <40 **(optional)**
- Number of full structure replacements over the next 10-year period **(optional)**
- Number of structures with no forecasted capital spending over the next 10 years **(optional)**

Currently the Town has two structures (or 6% of structures) with loading or dimensional restrictions.

The average Bridge Condition Index for the 18 bridges owed by the Town is 54, or Poor. The average Bridge Condition Index for the 13 culverts owed by the Town is 67, or Poor. These two metrics are mandatory as per O.Reg 588/17.

The Town currently has six (or 19% of structures) with a Bridge Condition Index of lower than 40. This will be decreased to five (or 16% of structures) once the replacement of the Pretty River Road Culvert (Structure #213) is completed in 2020. This is a good metric as it gives an indication of which structures are going to be due for replacement in the near future (within five years). Like most infrastructure, once an asset reaches a certain point of degradation minor capital or rehabilitation are no longer options and full replacement is then required.

The Town has seven full structure replacements (or 23% of structures) recommended to be done over the next 10 years. One of the structures is underway (Structure #213) and will be completed in 2020 and two structures are side by side and will be completed as one project (Structures #2 and #3). Staff have included this as a metric because of the immense amount of work that goes into a structure replacement. The average replacement takes three to five years to complete given the number of pre-planning studies that must be completed including a Cultural/Historic Study, and an Environmental Assessment. For the Town this means that over the next 10-year period there will be at least one project in each of the phases (Study, Environmental Assessment, Preliminary Engineering or Construction).

The Town has 14 (or 45% of structures) with no capital works recommended over the next 10-year period. The average Bridge Condition Index of these structures is 71 or Fair. Staff have included this metric to illustrate that although the Town is facing a significant capital investment in some of these structures over the next 10-year period, almost half of the assets do not require any of this funding.

Lifecycle Costs

As per O.Reg 588/17 a ten-year lifecycle cost must be calculated for the asset category to maintain the current level of service that has already been established. Similar to previous asset management plans the costs have been split between Annual Costs and Annual Transfer for Capital Costs. The current Annual Costs only consist of the required bi-annual Bridge Inspection Report. The Town has been reactive to Bridge work and undertaking it only when necessary.

The current Annual Transfer for Capital Costs started in 2015 at $45,000 and has been increased by $10,000 per year and now sits at $95,000. Without making a change to this annual transfer, besides the $10,000 increase each year, the Town will need to take out $4.8 million in long-term debt by the end of the 10-year cycle, which has a $275,000 annual repayment. This debt will cost the Town $2.1 million in interest over the 25-year term.

Table 5 illustrates the 10-year lifecycle costs as they currently are in the Town's annual budget. The amounts represent the totals over ten years. As shown in this table, the Town will have only set aside a total of $1.5 million in Annual Transfers for Capital Costs by the end of the ten years.

Table 5
Current 10 Year Lifecycle Costs

Asset Class	Annual Costs	Annual Transfer	Total
Bridge and Culvert Structures	$100,000	$1,500,000	$1,600,000

Although this asset management plan is regulated to be compiled using the Town's current level of service, staff believe this is an appropriate time to change the way these structures are funded both annually and long-term. Included in the 2019 Bridge Inspection Report is a list of more routine operating costs for a total of $55,000 each year. In addition, the guiderails that lead up to these structures also require annual work for a total of $50,000 each year. Table 6 below looks at the proposed Annual Costs and Annual Transfer that staff will be including in the 2021 Proposed Budget for Council consideration.

If the Town continued on the same track of increasing the Annual Transfer by just $10,000 a year, the majority of the seven replacement budgets would require long-term debt. Structure #213 and Structures #2 and #3 are to be completed in the very near future and at this time will likely need long-term debt. However, the Annual Transfer proposed in Table 4 will allow the Town to fully fund future replacements with reserve fund funding rather than relying on additional long-term debt.

Table 6
Proposed 10 Year Lifecycle Costs

Asset Class	Annual Costs	Annual Transfer	Total
Bridge and Culvert Structures	$1,150,000	$6,353,000	$7,503,000

Although the proposed increases to the Town's operating budget totals almost $6 million over 10 years, this will allow the Town to fully fund bridge and culvert capital replacements which will avoid $2.1 million in interest costs on long-term debt.

For the Annual Cost an increase of $105,000 will be included in the 2021 Proposed Operating Budget for Council's consideration. This is for the annual routine operating costs and annual guiderail work that was noted above and represents a 0.63% increase on the Town's tax levy from 2020. This annual maintenance will cost the Town an additional $1 million over the next ten years.

On the Annual Transfer side staff are proposing a dedicated Bridge and Culvert Replacement Levy be added to the Town's annual tax levy. The proposed amount for 2021 will be $271,000 which is a 1% increase over the 2020 Tax Levy ($105,000 was included in the 2021 base budget). This amount will increase by 1% of the previous year's tax levy until 2024. At that time the annual transfer will be $716,000 or 4% of the levy. Staff are proposing that this annual Bridge and Culvert Replacement Levy be included on the Town tax levy indefinitely.

Although this represents an increase to the 2021 tax levy of 1.63% (for both the Annual Cost and Transfer) this will save interest on long-term debt and allow the Town to properly maintain the bridge and culvert network.

O.Reg 588/17 requires a description of the municipality's approach to assessing the condition of the asset class, based on recognized and generally accepted good engineering practices. This asset management plan has been built using the Town's bi-annual Bridge Inspection Report which is done in accordance with the Ontario Structural Inspection Manual.

Population and Economic Activity

Using the Town's Development Charges Background Study as the guiding document for infrastructure needs due to long-term growth there are no required additional Bridges or Culverts.