2014 TO 2023 ASSET MANAGEMENT PLAN

MUNICIPALITY OF CALVIN

DECEMBER 21, 2013

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Executive Summary

Tangible capital assets play a key role in the provision of municipal services both directly by providing municipal infrastructure and indirectly in the assets used to maintain the infrastructure. It is therefore a primary responsibility of municipal Council and management to manage these assets to ensure that the provision of municipal services is sustainable, and desired service levels are achieved at the minimum possible cost to ratepayers. To do this, proactive planning for the acquisition, maintenance and eventual replacement of capital assets is required.

The Municipality of Calvin's (the Municipality) Asset Management Plan (Plan) is an initial attempt to document information relevant to the management of the Municipality's capital assets. With the exception of land and landfill closure, all of the Municipality's assets are included. The historical cost (December 2012) of these assets is approximately $5.7 M. The estimated current replacement value of the assets is $19.9 M.

The Plan includes discussions of best management practices related to the primary asset classes as well as the "preservation management" approach to asset management that has been adopted by the Municipality. This approach has been shown to result in the lowest overall costs of asset ownership in the long-term.

In the Plan a Levels of Service Target has been chosen for each major asset class. The selected targets are loosely based on what the Municipality has been able to deliver in the past, with the assistance of senior-level government funding.

The chosen preservation management approach and service level targets directly impact the expenditures forecasted for the 10 years covered by the plan (2014-2023). In this period, the projected total requirement to maintain current assets is $3.2 M, and the total municipal expenditures related to financing past, current and future assets is $4.6 M.

To finance these expenditures, the Municipality will employ a strategy to use debt financing to supplement municipal funds derived from property taxation, but only to the limit of the "low risk level" as defined by the Ministry of Municipal Affairs and Housing. The level of debt will gradually increase over the 10-year period of the Plan within a limit not to exceed $900 K. The financial strategy also incorporates an annual tax levy increase in line with the inflation rate, and a capital tax levy of 1%.

The Municipality recognizes that even this financial strategy will not produce the funds necessary to finance all of the Municipality's assets over the 10-year term of the Plan. The anticipated Municipal funding shortfall with respect to overall required investments in capital assets is projected to be $.6 M for the 10 years. Further work is required to align the targeted service levels with the finances available to the Municipality.
This Plan is meant to be dynamic, for consideration and implementation with the annual budgets. It has been prepared by the Municipality, building on the "Asset Management Plan-Draft Report" (December 11, 2013) prepared by Tunnock Consulting Ltd. in partnership with D.M. Wills Associates Limited. The Plan has been endorsed by Municipal Council as a starting point for a holistic approach to asset management within the Municipality.

The Plan will be subject to revision as the Municipality begins to work within its guidelines, and identifies specific challenges and/or opportunities for improvements. The Plan will receive a comprehensive review every four years, with each new term of council. Further, we anticipate that in the first two years of application the Plan may be subject to revision on an as-required basis.

The Municipality of Calvin wishes to acknowledge the support of the Ministry of Agriculture, Food and Rural Affairs (OMAFRA) in its financial support for development of the Asset Management Plan. The views expressed throughout the Asset Management Plan represent those of the Municipality of Calvin and do not necessarily reflect those of OMAFRA.

1.0 Introduction

1.1 Location of Calvin

The Municipality of Calvin is located east of the City of North Bay in the District of Nipissing. The Municipality is rural and there are no urban settlement areas within it. A map showing the location of the Municipality is presented below.[1]

Figure 1: Location of the Municipality of Calvin

Table 1: Population Change[2]	
2011 Population	568
2006 Population	608
2001 Population	603
2006-2011 Population Change (%)	-6.6
2001-2006 Population Change (%)	-0.8
2001-2011 Population Change (%)	-5.8

1.2 Population

The population of the Municipality has slowly declined since 2011. No significant change in population is expected in the period covered by the Plan.

[1] Statistics Canada, *GeoSearch 2011 Census: Statistics Canada Catalogue no. 92-142-XWE* (Ottawa: Statistics Canada, 2012). Retrieved October 11, 2013 from **http://geodepot.statcan.gc.ca/GeoSearch2011-GeoRecherche2011/GeoSearch2011-GeoRecherche2011.jsp?lang=E&otherLang=F**

[2] Statistics Canada, *Calvin Ontario (Code 3548031) 2006 Community Profiles, 2006 Census – Catalogue no. 92-591-XWE* (Ottawa: Statistics Canada, March 13, 2007). Retrieved October 11, 2013 from **http://www12.statcan.gc.ca/census-recensement/2006/dp-pd/prof/92-591/index.cfm?Lang=E**

1.3 Purpose of an Asset Management Plan

The quality of life residents enjoy is directly related to the condition of municipal infrastructure and the condition of the assets used to deliver municipal services. Asset management planning allows municipalities to plan for the long-term maintenance and replacement of their assets, so that desired service levels can be met at the lowest overall cost in the long-run. The Province has mandated the preparation of asset management plans as a prerequisite to seeking provincial capital funding. This Plan will aid the Municipality in making appropriate financial decisions and investments as part of its annual municipal budget decisions.

This Plan is to serve as a guidance document for the Municipality's use in developing its annual budgets and long-range financing requirements as well as in the development of tax levy rates and other related revenue generators. This Plan is not meant to replace normal budgeting procedures but rather to support budgeting decisions and assist in ensuring the long-term viability and financing of the Municipality's most costly assets.

The Municipality of Calvin uses the Official Plan for the East Nipissing Planning Area, which includes the Municipality of Calvin, and the Townships of Mattawan, and Papineau-Cameron. The Planning Area is exclusively rural in character with no urban settlement areas. While much of the land is Crown, there are significant areas that are used for agriculture as well. The policies of the Official Plan focus on the need to recognize and conserve natural resources for resource extraction uses. The Official Plan sets out a vision that the Planning Area will experience slow but manageable growth which does not compromise the rural character of the area and which preserves the natural environment.

The Official Plan is also meant to encourage development that is compatible with the character, role and permitted uses of agricultural and rural areas, as well as to promote the continued functioning of natural systems. It is the intent that the rural pattern of large land holdings and rural landscapes be maintained.

Good roads and bridges facilitate the movement of goods, the provision of services, notably emergency services and the transportation of people to work, school, recreation and other facilities. Good roads are essential to attracting economic development in the transport of commodities to market or providing access to tourism and other amenities the Municipality has to offer.

The state of local infrastructure also reflects on the image of the Municipality to its residents and visitors. Poorly maintained infrastructure conjures a negative image and may detract from investment in the Municipality as people question the value for money they receive in the poor quality services.

Consequently, the development of a sustainable asset management plan will facilitate the achievement of the vision outlined in the Official Plan.

1.4 Evaluation of the Plan

As part of the Plan, Levels of Service have been developed for each of the primary asset groups. The Levels of Service are considered the 'expectation' or 'target' for management of the various assets. The Levels of Service also provide a measuring stick against which the Municipality can assess the relative success of their management practices, financial investment and overall the suitability and outcomes of the Plan.

A comprehensive review of the Plan shall be undertaken every four-years, as a minimum, or on an as-required basis. Review of the Plan will include an update to the existing state of infrastructure inventory and condition through such activities as the regular OSIM reporting and Road Needs Studies. The updated condition information will be used to update the Plan's financial forecasts relative to capital expenditure needs.

As an example, the average road network condition rating shall be calculated with each Road Needs Study. The calculated average condition rating will be compared against the Levels of Service expectations or 'target' value and an assessment made as to whether revisions to the Plan are required to meet the required Levels of Service. Alternatively, adjustments to the Levels of Service may need to be considered where insufficient funding or alternate priorities exist. The Plan must remain flexible for the Municipality to respond to the changing needs of its constituents and the infrastructure itself.

Asset condition updates will be completed on the frequency as detailed in the Plan, (e.g., OSIM inspections every two years, Road Needs studies every five years). Consequently, comparisons to Levels of Service and resulting revisions to the Plan will not necessarily be undertaken for all assets categories on the same cycle.

1.5 Approach

The Initial Plan development built on the policies and practices of the Municipality such as:

- PSAB 3150 Inventory
- Tangible Capital Asset Policy
- Roads Needs Study (2013)
- General financial policies of the Municipality
- Current practices and technologies used in management and maintenance of capital assets

The steps used in developing this Plan are summarized in **Figure 2** on page 7. The process was meant to be broad enough to capture the essential ingredients of asset management planning to ensure that the Municipality benefits from the experience of others, while developing a plan that is best suited to local needs.

Development of the Plan followed the framework provided by the Ministry of Infrastructure document, Building Together Guide for Municipal Asset Management Plans. Phases 1a -1d address the current state of the Municipality's infrastructure; Phases 2a -2b address the compromise between desired Level of Service and available finances; Phases 3a-3c are the components of the Asset Management Strategy/Financing Strategy.

Phase 1

Phase1 of the work program involved a review of the infrastructure and assets including but not limited to:

- A start-up meeting with representatives of the Municipality and its consultant.
- Classification of asset types (e.g., roads, bridges, etc).
- Collection of asset information (from PSAB accounting records, and various asset inventory reports) including:

- Asset Age;
- Historical Cost;
- Replacement Cost;
- Current Condition.

To ensure the consistent evaluation of assets, the inventory assessments were completed in accordance with the most current editions of the Inventory Manual for Municipal Roads and the Ontario Structure Inspection Manual, in the case of roads and bridges.

Phase 2

Phase 2 of the work program focussed on establishing the desired Levels of Service.

Specifically:

- A review of current performance standards and practices in the Municipality.
- Compliance or lack thereof with regulatory requirements.
- Establishing performance standards, targets and timeframes where they do not exist.
- Establishing the useful life in the context of a planning period.
- Provisions for monitoring.
- Review of the current financial strategies for maintenance and replacement of capital assets.
- Comparisons to take advantage of best practices used by other municipalities.
- Creating a desired Level of Service for each of the asset groups based on best management practices and comparative municipal practices in Ontario.

Phase 3

Phase 3 of the work program involved the design and establishment of a financial model for the Municipality for Council to consider as part of the municipal budgeting process. The model indicates the cost implications for the maintenance and ongoing upgrades, improvements and/or replacement of assets over the planning period.

The output of Phase 3 was the preparation of an Asset Management Strategy and a corresponding Financing Strategy. These strategies outline the measures required to maintain, improve or add to the asset inventory and where necessary, to examine options or trade-offs where municipal financial constraints may limit achieving the desired levels of service or performance targets. The associated financing strategy focuses on the following components:

- Yearly expenditure forecasts for capital that addresses maintenance, renewal or rehabilitation and replacement of assets.
- Sources of financing.
- The correlation of revenue sources to capital expenditures.

2.0 State of Local Infrastructure

All of the Municipality's tangible capital assets--with the exception of land and landfill closure—are included in this Plan. An overview of these assets follows.

Roads
- **12 km Surface Treated**
- **53 km Gravel**

Vehicles
- **3 Public Works Vehicles**
- **4 Fire Vehicles**

Equipment
- **Administration**
- **Public Works**
- **Fire**
- **Waste Disposal**
- **Cemetery**
- **Parks&Recreation**

Bridges
- **6 Bridges**

Buildings
- **Community Centre/ Municipal Office**
- **Fire Hall**
- **Public Works Building**
- **Quonset Building**
- **Salt Dome**
- **Band Shell**
- **Shelter at Landfill Site**
- **Change Room**

Other Assets
- **Boat Launch**
- **Bleachers**
- **Recreation Fencing**

2.1 Roads

The Municipality's complete road infrastructure system spans a total of approximately 65 km all within a rural setting. The road network includes surfaces ranging from gravel to low class bituminous (surface treatment). Information about the roads is presented in **Table 2.1** below.

Table 2.1 - Road System Summary

Road Type	Length	Historical Cost (Dec 2012)	Net Book Value (Dec 2012)	Estimated Replacement Cost (2013 Road Needs Study)	Average Asset Age / Useful Service Life (Years)
Gravel	53	$1,493,700	$36,600		45 / 45 base (surface improvements are not capitalized)
Low Class Bituminous (LCB)	12	$816,600	$274,700		35 / 45 base 8 / 15 surface
Total	**65**	$2,310,300	$311,300	$12,640,586	

Current road conditions were based on the Municipality's 2013 Road Needs Study, updated by D.M. Wills Associates as part of the preparation of this Plan.
The overall system adequacy from the 2013 Road Needs Study is 91%. Stated another way, 9% of the Municipality's roads have one or more elements identified as deficient.

2.2 Bridges

There are six bridges in the Municipality. These were most recently inspected in 2012 as part of the Municipality's regular biennial OSIM inspections. HP Engineering completed the OSIM inspection. Summary information is presented in **Table 2.2** below.

Table 2.2 - Bridge Inventory Summary

Structure No.	Structure Type	Year Built	Age 2013	Age / Useful Service Life	Historical Cost (PSAB 2012)	Net Book Value (PSAB 2012)	Estimated Replacement Cost (2012)
B1 – Hackenbrook Bridge	Concrete Rigid Frame	c. 1910-1920	93+	93/50	$36,000	$0	$159,500
B2 – Whalley Bridge	Concrete Slab on Steel I-Girders	-	-	-/75	$103,900	$47,800	$1,382,800
B3 – Carruthers Bridge	Concrete Slab on Concrete I-Girders	1988	25	25/50	$541,700	$372,000	$1,913,800
B4 - Stewart's Bridge	Timber Planks on Timber Girders	-	-	-/20	$32,000	$0	$90,900
B5 – Pautois Bridge	Concrete Slab on Steel I-Girders	2012	1	1/75	$893,000	$887,100	$893,000
B6 –Cross's Bridge	Concrete Rigid Frame	1983	30	30/50	$98,400	$59,700	$440,000
Total					**$1,705,000**	**$1,366,600**	**$4,880,000**

2.3 Buildings

A visual assessment of all municipal buildings was undertaken in support of development of the Plan. The primary purpose of the assessment was to confirm the reasonability of the estimated values of the buildings.

A secondary goal of the visual inspection was to confirm any immediate (major capital improvements necessary (e.g., new roof, foundation repairs, etc). Building equipment (i.e., HVAC) and interior finishes/fixtures were not considered as part of the review.

A summary of the Municipality's buildings inventory is provided in **Table 2.3** below.

Table 2.3 - Buildings Inventory Summary

Building Description	Comments on Condition	Year Built	Age (2013)	Age / Useful Service Life	Historical Cost (Dec 2012)	Net Book Value (Dec 2012)	Estimated Replacement Cost (2013)
Community Centre/Municipal Office 1355 Peddler's Drive	Overall condition good	1975	38	38/50	$32,600	$8,200	$156,200
Fire Hall 1238 Peddler's Drive	Component condition fair to good	1976	37	37/50	$27,200	$7,300	$124,800
Public Works Building 1331 Peddler's Drive	Overall condition fair	1975	38	38/50	$20,300	$5,100	$106,400
Quonset Building 1331 Peddler's Drive	Overall condition good	2008	5	5/20	$53,100	$41,200	$56,400
Salt Dome 1331 Peddler's Drive	-	2008	5	5/20	$298,100	$231,900	$301,400
Shelter at Landfill Site 111 Adams Road	Overall condition poor to fair	-	-	-/20	-	-	-
Band Shell 1331 Peddler's Drive	Overall condition good	2008	5	5/20	$16,300	$12,600	$17,900
Change Room/Washroom 1331 Peddler's Drive	Overall condition fair	1985	28	28/50	$6,600	$3,000	$12,200
Total					**$454,200**	**$309,300**	**$775,300**

2.4 Vehicles

The Municipality owns a fleet of vehicles generally dedicated to public works and emergency services functions. A listing of the fleet is included in **Table 2.4** below.

Table 2.4 - Vehicle Inventory Summary

Vehicle Description	Year of Acquisition	Age (2013)	Age / Useful Service Life	Historical Cost (Dec 2012)	Net Book Value (Dec 2012)	Estimated Year of Replacement	Estimated Replacement Cost (2013)
International 7600 Public Works	2005	8	8/15	$174,400	$87,200	2020	$194,800
Grader Public Works	1990	23	23/15	$144,500	-	2019	$320,000
Loader/Backhoe Public Works	2003	10	10/15	$102,000	$37,400	2018	$118,500
1989 Ford F800 Fire	2008	5	5/25	$15,000	$12,300	2018	$87,500
1985 GMC Brigadeer Fire	2005	8	8/25	$35,000	$24,500	2015/2016	$87,500
1975 GMC Fire	2004	9	9/25	$30,000	$19,800	2014	$198,000
1997 Ford F350 Fire	2002	11	11/20	$16,000	$7,600	N/A	$30,000
Total				**$516,900**	**$188,800**		**$1,036,300**

A detailed review of each vehicle was not undertaken as part of the state of local infrastructure review.

2.5 Equipment

Table 2.5 provides a summary, by functional area, of the equipment owned by the Municipality.

Table 2.5 - Equipment Inventory

Department	Average Age / Useful Service Life	Historical Cost (Dec 2012)	Net Book Value (Dec 2012)	Estimated Replacement Cost (2013)
Administration	4.7/5	$165,400	$9,300	$92,600*
Fire	5.7/10	$142,100	$61,000	$186,000
Public Works	8.9/10	$9,300	$1,100	$10,500
Landfill	7.5/10	$15,900	$4,000	$22,500
Cemetery	2/10	$2,800	$2,400	$2,700
Recreation	7.7/10	$118,200	$27,600	$138,400
Total		**$453,700**	**$105,400**	**$452,700**

*excludes GIS software and hardware with a historical cost of $81,500

Given the limited useful life, and relatively low value of the Municipality's equipment, an assessment was not undertaken of the current conditions of these assets.

2.6 Other Assets

The Municipality owns other recreational assets, such as boat launches, bleachers, and recreational fencing, which are estimated to last from 10 to 20 years. The historical cost of these assets is $39,000 ($44,200 estimated replacement cost) and they are on average at 50% of their estimated useful lives.

3.0 Levels of Service

The Municipality has adopted Levels of Service standards as part of the development of this Plan. This standard builds from the Minimum Maintenance Standards for Municipal Highways, Ontario Regulation 239/02, which the Municipality has historically adhered to. The Levels of Service standards will guide the program for the maintenance of roads, bridges, buildings, vehicles and related facilities in the Municipality. **Appendix B** sets out the Municipality's Levels of Service, which addresses all of the asset classes in this Plan.

The Levels of Service document has been prepared as a standalone supplement in a convenient booklet form that can be used by a department head.

The Levels of Service provides a comprehensive approach to the maintenance of municipal infrastructure by setting out the objectives (or expectations) to be achieved and service standards for each class of assets. An overall *Target* has been assigned for each class of assets. These targets will be used as a high-level measure to assess how the Municipality is doing in meeting its service level objectives for each of the primary classes of assets.

The following summarizes the Target Levels of Service for each of the Municipality's primary asset classes that have been selected:

Bridges – No Load Posted Structures.
Structures will be maintained to carry the loads for which they were originally designed.

Roads – Minimum Overall Road System Adequacy of 91%.
The Municipality's goal is to maintain the current overall system adequacy rating of 91%, as calculated using the MTO Inventory Condition Manual, 1991.

Vehicles – Utilization to Expected Service Life
Vehicles shall be maintained and operated to ensure they are available for use throughout their expected service lives. In other words, vehicles will last for the period of time over which they are intended (amortized).

Buildings – Building Use Exceeds Its Expected Service Life
Building maintenance and upgrades shall be undertaken to ensure, as a minimum, the expected useful service life of each building is realized, with the goal of using each building beyond its useful service life.

These target levels of service form the basis of the projected expenditures later in this Plan. Clearly, the higher the standard set by the target is, the more expensive it will be to maintain the assets to that level. The targets established for this Plan were based on the approximate historical service levels the Municipality has been able to achieve, with the assistance of senior-level government funding. As time passes, and the Plan is refined, it may be proven that these targets are too optimistic, and are not financially sustainable for the Municipality.

3.1 Issues and External Trends Affecting Levels of Service

Various potential and real external trends will put pressure on the Municipality's ability to meet its targets in the years to come. The following external trends could potentially bear on the Municipality's available finances, or on its priorities for capital asset investments in the future.

Accessibility Standards: Existing and future requirements with respect to accessibility standards may require upgrades to buildings and facilities which are not currently anticipated under the Plan.

Limited Population Growth: The limited growth in development and population of the Municipality will make it difficult to increase the tax base over time.

Forest Products Industry: the recent closure of the Columbia Forest Products mill in the Municipality has led to a reduction in the assessment base which has not been, and is not expected to be, recovered in the foreseeable future given the current state of the forest products industry.

Potential Highway Download: The Municipality foresees the downloading of portions of Provincial Highway 17 to the Municipality within the next 5 to 35 years. When/if the Municipality is expected to maintain these sections of the highway, there will be significant pressure put on the Municipality's finances and consequently, on its ability to finance this Asset Management Plan.

3.2 Current Performance

A summary of the Municipality's current performance against the previously-noted Levels of Service Targets follows:

Bridges – No Load Posted Structures

The Municipality currently has one load posted bridge

Roads – Minimum Overall Road System Adequacy of 91%.

As of the most recent (2013) Road Needs Study, the Municipality had an overall road system adequacy of 91%

Vehicles – Utilization to Expected Service Life

At the end of 2012, the Municipal grader had exceeded its expected useful life

Buildings – Building Use Exceeds Its Expected Service Life

All of the Municipality's buildings were constructed in the period 1975-2008 and have not yet reached their expected useful lives. Buildings arecurrently in fair to good condition overall, and ongoing capital investment in energy efficiency upgrades have enhanced their ability to achieve this target. The fire hall, which had an original life expectancy of 2026 is expected to require replacement within the 2024-2033 time period.

4.0 Asset Management Strategy

The asset management strategy is the series of planned actions designed to ensure that the Municipality can sustain its desired levels of service and achieve its stated targets. Best management practices such as a "preservation management approach" for roads have been included in this strategy, as such approaches are believed to minimize the lifecycle costs of the related assets. Following the preservation management approach should allow the Municipality to achieve a higher overall sustainable level of service in the long-run.

4.1 Roads

4.1.1 Roads Best Management Practices

The key to managing a pavement network is the timing of maintenance and rehabilitation activities. This idea evolves from the fact that a pavement's structural integrity does not fall constantly with time. A pavement generally provides a constant, acceptable condition for the first part of its service life and then begins to deteriorate very rapidly.

In many cases, maintenance and rehabilitation measures are not taken by municipalities until structural failure or noticeable changes in ride quality become apparent. This is the "fix it once it is already broken" approach. The unfortunate consequence of this decision is that maintenance and rehabilitation becomes exponentially more expensive over the life of the pavement and is often overlooked until the pavement condition reaches a severe state of distress. There is opportunity for substantial cost savings when intervention is made *before* the pavement becomes severely compromised; i.e. "fix it before it breaks". **Figure 4.1.1** illustrates the underlying principle in support of a preservation management approach to pavement infrastructure. The principle also has application to each of the classes of roads maintained by the Municipality. Significant cost savings will result from proactive intervention rather than simply waiting as long as possible before performing maintenance.

Examples of approaches to road maintenance with their associated cost implications over the lifecycle of a road are set out in **Appendix C** of this Plan and are provided to illustrate the potential benefit of a "preservation management approach".

Figure 4.1.1 - Typical Service Life of an Asphalt Pavement

4.1.2 Preservation Management Approach for Roads

The Municipality will gradually move towards the full application of the preservation management approach as a component of the management plan for each of its road classes. The details of this approach for each type of road follows.

The preservation management activities detailed in each of the following tables are guidelines only: they are not necessarily required treatments for each and every road. Road deterioration rates and the type of deterioration will dictate when action should be taken and what kind of treatment is most appropriate. The tables outline the series of techniques to be considered in an effort to realize and extend the useful service life of the road asset for the lowest overall lifecycle cost while maintaining the highest overall condition. This preservation management approach to roads is proven to yield the lowest overall life-cycle costs.

A. Gravel Roads

Gravel roads are the most significant and visible asset in the Municipality. A preservation management approach for this class of road, presented as a guideline only, is outlined in the following tables.

Table 4.1.2 A – Preservation Management Approach - Gravel Surface

Action	Frequency
Regrade surfaces to maintain smooth/safe driving surface and proper cross fall	As needed. Generally 2-3 times per year for higher volume roads; 1-2 for lower volume roads
Add calcium to tighten surface, retain aggregate and reduce dust	Each spring on all roads or higher volume and as needed during summer months
Ditch and brush right-of-ways to improve roadbed drainage and safety	Complete road network every 10 years

Table 4.1.2 B - Capital Activities – Gravel Roads

Action	Frequency
Add layer (75mm) of granular material to road surface	Every 5 years for gravel roads
Base and sub-base improvements	As needed or as dictated by traffic volumes
Reconstruct/convert to hard top	As dictated by traffic volumes

B. Surface Treated Roads

Surface treated roads have a hard wearing surface that must be preserved in order to be effective. Unlike gravel roads, a significant investment has been made in the surface and consequently these roads must be managed properly to obtain the longest possible service life from the surface. A guideline preservation management strategy for surface treated roads is presented in the following tables.

Table 4.1.2 C – Preservation Management Approach – Surface Treated Roads

Activity	Age (Years)	Condition Rating	Service Life Extension (years)
Slurry seal	3	8	4
Slurry seal	6	7	3
Double surface treatment	10	6	5
Pulverize and DST	14	<4	8

In addition to the above-noted preservation approach, the following best management practices will be employed to preserve the surface, extend the service life and reduce life cycle costs of surface treated roads:

1. Surface treatment will be applied to the entire road platform, from “grass to grass”, including any shoulders. This will eliminate grading on surface treated roads, which has a tendency to damage the edge of the surface treatment and cause premature failure of the surface.
2. Suitable new technologies will be utilized where they can be demonstrated to reduce life cycle costs, such as fibre-reinforced surface treatment. This technology can be used to mitigate reflective cracking when a single or

double surface treatment is applied over an aging surface. It can eliminate the need for pulverizing the underlying surface in certain situations and can reduce overall costs.

3. Drainage and culvert needs will be assessed prior to any significant renewal or rehabilitation strategy and any improvements will be completed concurrently. This will eliminate the need to cut/excavate a relatively new surface to replace a culvert.
4. Ditching and clearing (brushing) of the right-of-ways will take place to improve roadbed drainage and safety.

4.1.3 Capital Expenditures for Roads - Reconstruction

Prioritization and recommendations for planned capital improvements were developed based on condition rating and traffic demands on each road and documented in the 2013 Road Needs Study.

In the Road Needs Study, capital reconstruction requirements for gravel roads were estimated at a cost of $506 K. This cost estimate has been revised downward to $253 K (2013 $) to take into account reductions in the anticipated road upgrades and lower local gravel costs. These road improvement expenditures have been included in the Plan for the years 2014-2016. Additional reconstruction costs for the remaining years of the Plan have not been included, as these would exceed the financial resources of the Municipality. In lieu of reconstruction, the Municipality will focus on a preservation management approach as outlined below.

4.1.4 Preservation Management Approach – Road Resurfacing

In an ideal situation (i.e., financially unconstrained) an annual resurfacing strategy is recommended as follows based on typical degradation rates for roads:

I. Surface Treated Roads:

- 12 km in the existing inventory of surface treated roads (LCB)
- Degradation rate 0.625 km/year (rating drops from “10” to “5” over a 8 year period)
- Annual Resurfacing target of 1.5 km/year
- Annual Budget of $42,000 (1.5 km/yr. x $28,000/km **ST2***) for resurfacing

***ST2 – Double Surface Treatment**

Gravel roads require regular maintenance. Maintenance includes regular grading and reapplication of new gravel. Application of 75mm of new gravel is recommended every 3-5 years for all gravel roads.

II. Gravel Roads:

- 53 km in the existing inventory of earth/gravel roads
- 75mm gravel every 3 -5 years
- Annual Gravelling of 10 km/year
- Granular A ($12,500/ km)
- Annual Budget $125,000 (10 km/yr.** x $12,500/km **G***)*** for gravelling

***G – Gravel**

** Based on a 5-year gravel resurfacing cycle.

*** Cost reduced to ½ of the 2013 estimate provided by D.M. Wills Associates to account for local conditions

The total “ideal” resurfacing program, (surface treatment and gravel) for the entire municipal road network, per the calculations above, is estimated at $167 K per year (2013 $). Consideration could be given to removing all roads with less than a specified volume of traffic (e.g. 50 vehicles/day, as it is generally accepted that these roads may be maintained strictly through maintenance activities).

Gas tax funding of approximately $33 K annually is a potential source of funding for road resurfacing projects, but in the absence of additional senior level government grants, the recommended annual roads resurfacing expenditure represents an excessive burden on the Municipality financially. Recognizing the need to maintain its current overall average condition rating, the Municipality has adopted the above requirement as a longer-term goal for the Plan. Road expenditures will be increased by 2% per annum over the life of the Plan, starting from a

base of $83,500. This starting point approximates the historical level of taxation devoted to the annual gravel program plus additional work that could be funded by anticipated gas tax revenue.

For the purposes of the Plan, the above expenditures are deemed to include all non-maintenance related expenditures and therefore include actions such as routing and sealing, slurry sealing, resurfacing, reconstruction, etc. Ditching and brushing are considered strictly maintenance activities that may be completed by Municipality forces or otherwise subcontracted out. A separate suggested budget for ditching and brushing costs associated with the preservation approach is provided below.

4.1.5 Preservation Management Approach - Maintenance Expenditures for Roads

Regular maintenance in the form of grading, roadside ditch cleanout and clearing needs to be undertaken in order to extend the useful service life of the existing roads. A commitment of resources is necessary to ensure a viable annual ditching and clearing program. These activities are considered two of the least expensive and most beneficial preventative maintenance activities to facilitate realizing the full surface service life.

A ditching and brushing maintenance budget is calculated and recommended as follows:

- Ditch/Brush the entire road network on a 10-year cycle.
- 65 km of road – 6.5 km of ditching/brushing annually.
- Ditching Production Rate – 0.5km / day (2 sides of the road).
- Brushing Production Rate – 1 km /day (2 sides of the road).
- Approximately 20 person-days (or ~4 weeks) of Brushing/Ditching.
- Assume $6,000/week for contractor (incl. excavator w/ bucket/brush head).
- Assume Municipal forces will provide dump trucks and operators as required.

Estimated annual brushing/ditching requirement $24,000 ($6,000 * 4).

Alternatively, the Municipality could use its own forces and equipment and potentially realize cost savings in undertaking this work. Assuming the Municipality dedicated one public works person to this task, at an estimate rate of $60/hr. (including payroll benefits burden) the resulting cost would be $2,400/week or $9,600. The cost of the equipment and dump truck drivers has been omitted to permit direct comparison to the above Contractor costing. If the Municipality does not have the necessary ditching/brushing equipment to undertake the work, additional capital expenditure for equipment would have to be factored in.

Total Annual Brushing/Ditching Allowance:
External Forces $ 24,000
Internal Forces $ 9,600 + additional equipment if required

It has been assumed that road grading activities will be undertaken by Municipality forces and with existing Municipality equipment, as such, a separate road grading maintenance budget has not been prepared for the preservation management approach.

4.1.6 Preservation Management Approach – Future Road Needs Study Updates

Each of the preservation management activities for gravel and surface treatment roads identified above should be considered in any future updates of the Road Needs Study. Recommendations on the specific treatments required should be documented and prioritized in the Road Needs Study. A 10-year plan for road expenditures should be developed as part of the regular Road Needs Study updates. Prior to commencing a study, Municipal staff should review the per-unit cost estimates with the engineer contracted to prepare the study, to assure reasonable local-area rates are incorporated.

It has been recommended that an updated Road Needs Study be undertaken every five years to assess the structural adequacy and condition of the roads and update the prioritized plan for road reconstruction and resurfacing activities.

4.2 Bridges and Culverts

4.2.1 Best Management Practices for Bridges and Culverts

Once infrastructure is built, there is an immediate requirement to maintain, rehabilitate and eventually replace the infrastructure. Given the significant cost of rebuilding bridges and culverts, strategic asset management and preservation is extremely important.
Similar to a roads network, it is more economical to manage the structure network rather than simply maintain it. In the case of bridges and culverts, waiting for serious signs of structural failure can lead to substantial costs for maintenance and rehabilitation, which will ultimately cost the Municipality more money over the life of the structure network.
The key to managing both bridges and culverts is the timing and type of maintenance and rehabilitation activities. This idea evolves from the fact that a bridge's structural integrity does not fall constantly with time. A new bridge or culvert generally provides a constant, acceptable level of service and condition for the first part of its service life and then begins to deteriorate more rapidly as time progresses. In some cases, maintenance and rehabilitation measures are ignored until early signs of structural failure become noticeable.

4.2.2 Preservation Management Approach for Bridges and Culverts

The Municipality will use a preservation management strategy for managing its bridge assets. The approach will be based on more frequent, less costly treatments applied over the life span of a bridge. Careful timing of maintenance will extend the service life of the structure significantly versus a more traditional approach.

Bridges and culverts are different types of structures. Generally, bridges transmit live loads directly through their structure to a foundation whereas culverts transmit loads through fill to a foundation. Because these structures are different in construction and maintenance requirements, separate strategies have been identified for each type of infrastructure.

The preservation management activities outlined in each of the following tables are guidelines only: they are not necessarily requirements for each and every structure. Bridge deterioration rates and the type of deterioration will dictate when action should be taken and what kind of treatment is most appropriate. The tables outline the series of techniques to be considered in an effort to realize and extend the useful service life of the bridge and culvert assets for the lowest overall lifecycle cost while maintaining the highest overall condition and maintaining the structures in a non-load posted state. As detailed in the life cycle costs analysis presented in Appendix C, the preservation management approach to bridges is proven to yield the lowest overall life-cycle costs, similar to roads.

A. Bridge Management Strategy

Bridges are complex structures made up of several elements including the foundation, the substructure (abutments or ballast walls) and the superstructure (deck). Bridges are designed with a 75-year service life. However, in order to achieve this life span, intervention at periodic times is required. **Table 4.2.2A** summarizes the preservation management strategy that will be applied to bridges:

Table 4.2.2A - Bridge Preservation Management Strategy

Activity	Age (Years)	Condition Rating	Service Life Extension (years)
Minor Repairs	10-20	80-90	2-5
Minor Rehabilitation	30	65-70	20
Major Rehabilitation	50-60	50-60	40
Replacement	75	<40	75

B. Structural Culvert Management Strategy

Structural Culverts are typically designed with a 75-year service life similar to a bridge. However, in order to achieve this life span, careful selection of culvert material considering the site chemistry and culvert exposure is required. Intervention at periodic times is also required. **Table 4.2.2B** summarizes the preservation management strategy that will be applied to culverts:

Table 4.2.2B - Culvert Preservation Management Strategy

Activity	Age (Years)	Condition Rating	Service Life Extension (years)
Culvert material/ coating Selection	at Design		
Minor Repairs (patching, re-coating - partial or full, cleanout etc.)	10-20	80-90	2-5
Minor Rehabilitation (e.g. waterproofing, coating)	25	65-70	20
Major Rehabilitation (overlay, invert paving, lining etc.)	35 - 50	50-60	40
Replacement	75	<40	75

In addition to the above-noted preservation approaches, the following best management practices will be employed by the Municipality to extend the service life and reduce life cycle costs of bridges and culverts:

1. Implement an annual Minor Bridge Repair program into the Operations or Capital budget. Utilize specific recommendations from the OSIM Inspection report to select which repairs on which structures. Minor repairs are critical as they address problems while they are still small and cost effective to repair. Repairs may include, hand rail repair, pothole patching, concrete patches, repair to joint armouring, tightening steel bridge hardware, regrading of approaches or embankments, erosion prevention, crack sealing, etc.

2. Sweep and clean bridge decks and deck drains each spring. This will allow for inspection of the bridge surface and will promote positive drainage on the deck. This will eliminate standing water that has the potential to penetrate the wearing surface and cause premature deterioration of the deck.

3. Replace expansion joints AS SOON AS THEY ARE DAMAGED or worn. Expansion joints are flexible joints between the bridge deck and the approach slabs on a large bridge. Once they are damaged, they allow water to penetrate down to the abutments and bearing seats, which causes premature deterioration of these areas. Expansion joints are (relatively) inexpensive and their timely replacement can delay very costly rehabilitation work on the sub-structure.

4. Ensure OSIM inspections are completed on a biennial basis; not only because they are a legislative requirement, but also because they form the basis of the bridge inventory in the Plan and contain recommendations for required improvements.

5. Complete deck condition assessments (DCA) on any larger structures as outlined in the OSIM reports. DCA's involve exploratory work to properly assess the extent of deterioration of the deck. They will help define the extent of rehabilitation required on a bridge deck.

6. Undertake localized or complete painting of steel girders, truss members or other steel members as recommended by OSIM inspections.

7. Cleanout culverts as need to prevent standing water or sediment collection in the culvert.

8. Stabilize embankments and inlet/outlet to prevent erosion and "piping" around the culvert. Ensure appropriate headwall/cutoff walls or clay seals are in place.

4.2.3 Capital Expenditures for Bridges

Reinvestments in bridge maintenance for the current bridge assets were estimated at $358,500 (2012 $) in the OSIM inspection for the next 5-year period with priorities as identified in **Table 4.2.3**. An equivalent dollar value of additional bridge capital requirements is estimated for the remaining five years of the Plan.

The 10-year plan should be revisited after each biennial structure inspection and updated every two years. In some cases, through preventative maintenance or rehabilitation activities, structures have outlived their expected useful service lives. Given the limited available funding, extending the use of the Municipalities structures beyond their useful services lives is required.

Table 4.2.3 - Bridge 5-Year Needs Summary

Structure No.	Structure Type	Year Built	OSIM Inspection Recommended Works (1-5 years)	Estimated Cost (2012 OSIM Inspection)
B1 – Hackenbrook Bridge	Concrete Rigid Frame	c. 1910-1920	Replace wingwall, spot concrete repair for deck and upgrade traffic barriers	$137,500
B2 – Whalley Bridge	Concrete Slab on Steel I-Girders	-	Replace barriers Replace elastometric bearings (6-10 years)	$165,000 $44,000
B3 – Carruthers Bridge	Concrete Slab on Concrete I-Girders	1988	Install approved end treatments	$12,000
B4 - Stewart's Bridge	Timber Planks on Timber Girders	-	-	-
B5 – Pautois Bridge	Concrete Slab on Steel I-Girders	2012	-	-
B6 –Cross's Bridge	Concrete Rigid Frame	1983	Install approved end treatments	$9,000
Total				**$358,500**

4.2.4 Preservation Management Approach – Future OSIM Inspections

Each of the preservation management activities identified above should be considered as part of the biennial structure inspections. Recommendations on the specific treatments required should be documented and prioritized in the OSIM Inspection. A 10-year plan for bridge expenditures should be developed as part of the regular OSIM updates.

4.3 Buildings

4.3.1 Building Best Management Practices

The Municipality will employ the following best management practices in maintaining their buildings in an effort to ensure that the full service life of these assets is actually exceeded:

1. Program the inspection of buildings on a regular basis, preferably no less than once every two years by a qualified professional.
2. Maintain exterior sealants and flashing to ensure no water penetration.
3. Ensure grading is such that surface water (drainage) is directed away from the building or into soak away pits.
4. Repair damaged exterior elements, e.g. steel sheathing, roofing, cladding as soon as the damage occurs to prevent further deterioration.
5. Annually inspect and remove debris from roof drains, gutters, downspouts.
6. Enact or maintain service contracts for building systems such as HVAC as per manufacturer recommendations or as otherwise deemed necessary.
7. Retrofit buildings to enhance energy conservation.
8. Pump-out septic tanks on a regular basis.
9. Maintain heating and HVAC systems through annual cleaning of furnaces and replacement of filters. Provide for humidity and moisture controls to prevent mould.

4.3.2 Alternative Approaches to Building Management

Potential alternatives for management of the Municipality's buildings include:

- Disposal of current building assets and renting of space.
- Upgrades to reduce operating costs.

For the purposes of this Plan the Municipality has adopted the above best management practices and intends to manage their buildings assets as they have in the past, with consideration for the alternative strategies presented above, as required in the future.

4.3.3 Building Capital Expenditures

In general, the Municipality's buildings are in fair to good condition with limited capital requirements envisioned over the next 10 years. The replacement of the Fire Hall is expected in the subsequent 10-year period.

The Municipality has undertaken a number of repairs to the building stock with the objective of increasing the useable life of the buildings. Re-insulating the exterior wall of the municipal office complex, for example, had reduced the energy costs for heating of the building substantially. Repairs have also been made to the roof.

Where possible, the Municipality shall strive to allocate funds to a building reserve for future capital improvements or ultimate replacement of its building assets.

4.4 Vehicles

4.4.1 Vehicles Best Management Practices

The Municipality has historically benefited from a rigorous and ongoing maintenance program that has extended the useful lives of its vehicles. In the future, the Municipality shall continue to employ the following best management practices to maintaining their vehicles:

1. Vehicles to be serviced on a regular basis, as per manufacturer recommendations or as otherwise deemed necessary by the manager of the fleet.
2. Vehicle failures shall be repaired at the earliest opportunity to prevent undue wear and tear related to faulty vehicles in disrepair.
3. Vehicles shall be used with care.
4. Vehicles will be stored indoors whenever possible
5. Winter sanding/salting vehicles will be washed after use to remove salt/sand residue.
6. Operators shall be properly trained on the use and care of the vehicles.
7. Vehicles shall be locked and parked in a safe location, when not parked at their home facility, to prevent the potential for vandalism and theft.
8. Vehicles shall be replaced on or near the end of their respective service lives.

4.4.2 Alternative Approaches to Vehicle Management

Potential alternatives for management of the Municipality's vehicles include:

- Disposal of current vehicle assets and entering into operating lease agreement.
- Contract select maintenance tasks to eliminate need for specialized vehicles.
- Joint use of infrequently-used vehicles with neighboring municipalities.

Risks associated with the above alternative approaches include concern over response time for maintenance given the Municipality's location.

For the purposes of this Plan, the Municipality has adopted the above best management practices and intends to manage their vehicle assets as they have in the past, with consideration for the alternative strategies presented above, as required in the future.

4.4.3 Vehicle Capital Expenditures

During the period covered by this Plan, all of the Municipality's vehicles will have reached, or exceeded, their expected service lives, and all are scheduled to be replaced in this time frame. In addition, the purchase of an additional plow/sander at a cost of $200,000 has been included in the Plan for 2014, as this is being considered in the 2014 annual budget procedures. A new fire truck is also included in 2014 at an estimated cost of $200,000. The grader replacement has been included in the Plan for 2019, as this will give the Municipality time to assess the effectiveness of the new plow truck in undertaking winter maintenance activities.

Fire vehicles have historically been replaced with used vehicles , since the cost of purchasing new fire vehicles is seen to be cost-prohibitive. However, Municipal staff are in the process of reassessing their fire vehicle needs, and the Plan includes replacing two existing vehicles with one new vehicle.

4.4.4 Tangible Capital Asset Policy - Revisions

The Municipality's Level of Service target for its vehicles is that each vehicle realizes its full expected service life. In order to realistically assess whether this target is being achieved, the Municipality should revisit its Tangible Capital Asset Policy (the Policy), which outlines the expected lives and amortization rates for all of the Municipality's assets. Since it is common for the Municipality to purchase used vehicles, the amortization periods set out in the Policy for that type of vehicle, which doesn't differentiate between new and used vehicles, might not be realistic. Consideration will be given to amending the Policy in 2014 to include a category of assets "Used vehicles, machinery and equipment", with an expected lifespan and amortization period of "to be determined by manager at time of purchase".

A change in the accounting Policy will impact the anticipated timing of vehicle purchases in the current and future versions of this Plan, as some vehicle replacements in the Plan have been triggered solely by the asset reaching the end of its useful life, as defined for accounting purposes.

4.5 Other Asset Classes – Equipment and Park Facilities

Included in this Plan are costs associated with the replacement of the Municipality's machinery/equipment and park facilities (e.g., boat launches). The necessity of these asset replacements have, for the most part, been triggered by assets reaching the end of their service lives. The forecasted costs for the replacement of these other asset classes are estimated to be approximately $289K over the 10-year period.

4.6 Prioritization of Projects

The need to prioritize competing projects within this Plan so that expenditures don't exceed available finances, or that may result because of unforeseen or emergency events is inevitable. In general, project prioritization shall be undertaken using the following criteria:

- User safety
- Life-cycle cost and remaining service life
- Risk management
- Size of User Group (e.g. Volume of traffic for roads, number of bridge users)
- Economic Development
- Recreation
- Aesthetics

4.7 Integrated Capital Planning

While it is important to manage each asset group as a system (e.g., the road network, the bridge network, etc), it is also important to understand and implement an integrated capital planning approach to realize maximum value for money and economies of scale, and to ensure the full service life is realized for each capital asset investment. As an example, it is not economical or feasible to replace a road in Year 1, only to go back and replace services beneath the road, and have to replace the road again 5 years later. The scheduling and prioritizing of projects should be an integrated approach across related assets.

The following integrated capital planning practices shall be adopted by the Municipality in developing work priorities.

A. Road rehabilitation work adjacent to structures planned for replacement shall be considered for tender with the structure replacement work or after structure, work is complete.

B. Culvert replacement will be carried out in conjunction with road rehabilitation wherever possible.

C. Road and bridge priorities shall give due consideration to short and long-term development plans (e.g. turning lane requirements, utility cuts etc.).

4.8 Procurement Methods

The Municipality has in place and shall adhere to its current Purchasing By-Law in retaining services to manage, maintain and improve its infrastructure assets under this Plan.

Alternative procurement methods shall be explored as the opportunities for such arise including:

Tendering - (e.g. line painting, gravel/salt bulk purchase to realize potential economies of scale)

Retainer Services - (e.g. engineering, consultant retainers to minimize procurement costs)

Shared Services – pooled services with other municipalities.

4.9 Risks to the Asset Management Plan

As with any plan, there are inherent risks that may jeopardize the partial or full execution of the Plan or may prevent the achievement of its expected outcomes. The following is a summary of the risks that are known to exist today.

- Inadequate levels of funding.
- Non-commitment by Municipal Council or Staff to the Plan.
- Emergencies, which direct funds away from the Plan.
- Change in legislative requirements, which may influence Levels of Service.
- Premature failure of an asset.
- Unforeseen development pressures.
- Risk to Public Health and Safety (relating to asset failure due to inadequate funding).
- The Plan is “Brand New” and as such will require refinement.

As is the case in many small rural municipalities, particularly in Northern Ontario, the simple reality is that there is a limited availability of funds, and a related limited ability to grow funding, in order to manage the Municipality’s infrastructure. While this Plan sets out to manage the competing infrastructure priorities at the lowest combined lifecycle costs, the plan will be subject to revision and refinement as new approaches/technologies are developed, new funding strategies are found, and the expectations of the Municipality (council, staff, and ratepayers) evolve.

5.0 Financing Strategy

5.1 Overview

When the Province adopted its long-term infrastructure plan for Ontario ("Building Together") in 2011, one of its guiding principles was that *those who benefit directly from municipal infrastructure should pay for the service, whenever feasible*. While the Province appears to be continuing to recognize its obligation to assist municipalities with their infrastructure challenges, it is clear that every municipality is expected to move towards the sustainable management of its own capital assets: to ensure that, as assets need to be repaired and replaced, each municipality will be able to finance its own requirements.

The Municipality of Calvin, as with many rural and small urban municipalities, is faced with sustaining a substantial inventory of capital assets. As part of the development of this Plan, a commonly cited sustainability measure—the annual amortization of the current replacement cost of assets--was calculated for the Municipality, and contributions to reserves of an equivalent amount was considered as a proposed long-term municipal target. The resulting calculation vastly exceeded any reasonable potential funding level for the Municipality.

Instead, as a more practical and feasible long-term objective, the Municipality has focused on funding its needs, as dictated by its desired Levels of Service, in the 10-year period covered by this Plan. For the purposes of this analysis, the Municipality has assumed that senior-government funding will be limited to Federal Gas Tax funding over the Plan period, since the Municipality is not aware of any other grant entitlement at this point in time.

It should be noted that this section of the Plan is not intended to replace the Municipality's standard budgeting practices, and does not necessarily reflect the precise timing of revenue and expenditures currently being contemplated by Council. Rather, the focus of the revenue and expenditure estimates is to provide an approximation of the of the funding shortages that are currently expected to result if the work required to achieve the desired Levels of Service is undertaken, and the prescribed approach to tax rate increases, and debt and other sources of financing are followed.

5.2 Expenditures

A summary of the anticipated expenditures (as discussed in **Section 4** of this Plan) and related sources of funding is presented in **Appendix A**. The expenditures summarized in this appendix are supported by detailed asset replacement schedules for each class of assets. The supporting calculations are not included in this Plan.

For the purposes of forecasting future expenditures, an **annual inflation factor of 1% has been used**. See **Appendix D** for a background discussion on the selected inflation rate.

Highlights of the expenditures follow:

A. Road Reconstruction

The 2013 roads needs study established a list of critical deficiencies which should be addressed. The estimated cost of addressing existing deficiencies over the next three years was originally estimated to be $506,000. This has been revised to $253,000 to reflect cost efficiencies in obtaining local aggregate material and reductions in the level of work contemplated.

The cost of this work ($253,000 in 2013$) is included in years 1-3 of the Plan.

B. Road Resurfacing – Preservation Management Costs

Road resurfacing requirements for both paved and unpaved roads resulting from the adoption of the preservation management approach are introduced in Year 4 of the Plan, after the critical road deficiencies have been addressed. The recommended annual investment of $187,000 (2013$) will be phased in slowly, starting with $83,500 in Year 4 of the Plan, and increasing by 2% plus a 1% inflationary factor in subsequent years.

Note that the preservation management approach also calls for annual ditching, brushing and grading. These costs have been excluded from the expenditures as they are considered in the annual operating budget.

C. Bridges

Capital expenditures for bridges and culverts for years 1-5 of the Plan are based on completing the $358,500 (2012$) recommended works in the 2012 OSIM report. An equivalent dollar value of unspecified bridge work is included for the remaining 5 years of the Plan.

D. Buildings

There are no forecasted expenditures for buildings for the 2014-2023 planning period. Since the replacement of the fire hall is projected in the subsequent 10-year period (estimated current replacement cost of $125,000), if financially feasible, Council should consider establishing a reserve for the eventual replacement of the building, and making contributions to it annually in their annual budget deliberations.

E. Vehicles and Expansion Activities

2014 forecasted expenditures include $200,000 related to the purchase of a new fire pumper/tanker, and $200,000 related to the purchase of an additional plow/sander. The plow purchase has been recorded as an "expansion activity" as it represents an increase in the existing fleet. Other vehicles have been scheduled for replacement based on the likely timing as determined from discussions with staff, or at the end of their expected useful lives (as determined by the Municipality's current amortization policy). The grader replacement has been included for 2019.

F. **Equipment and Other Assets**

The Plan includes an annual allowance $27,667 (2014$) for the replacement of equipment and other assets. This is an estimate of the average annual cost that is required to replace these assets as they reach the end of their service life, as defined by the Municipality's amortization policy.

In total, the total forecasted investments in capital asset refurbishment and replacement is expected to be $3.2 M in the 10-year period. The 1-year requirements range from a low of $124 K (2017) to a high of $653 (2014). Total expenditures (capital assets, debt repayments and net transfers to reserves) are forecasted to be $4.6 M.

5.3 Revenue (Sources of Funding)

Revenue and other funding sources (i.e., transfers from reserves and debt financing) available for financing the above-noted expenditures is also presented in **Appendix A**. Each identified source is discussed below:

A. Taxation

In the 2013 budget, an estimated **$145,573 of the general taxation levy** (2012 $135,165; $2011 $118,196)) **is estimated to have been available for financing past, current and future capital asset expenditures**. These are represented respectively by: *debt repayments* re fire breathing apparatus (past capital asset requirements); *capital expenditures plus regular gravel resurfacing program expenditures* (current capital asset requirements); *net transfers to reserves* (future capital asset requirements). (Annual gravel resurfacing maintenance costs have been included so that historical expenditures are comparable to forecasted capital expenditures, since gravel resurfacing has not been capitalized historically per the Municipality's Tangible Capital Asset Policy.)

Working from the 2013 base, taxation available for financing net capital asset expenditures has been increased by 2% annually. This is a reasonable approximation of what would generally happen in the combined annual operating and capital budget (i.e., small increases in the tax levy annually to compensate for rising prices due to inflation).

B. **Additional Capital Tax Levy**

In 2013, the total general and school board tax base was approximately $1.3 M. If the Municipality were to incorporate a 1% capital-specific tax levy increase into their annual budget, $13,000 additional funds would be raised in year 1 of the Plan; this would increase to $13,130 in year 2 of the Plan. By the end of the 10-year Plan period, an additional $136,000 would be raised to finance capital purchases. This calculation is illustrated in the spreadsheets that support, but are not included, in this Plan. The spreadsheet can be used to calculate the impact of varying the chosen % of the additional capital levy.

C. Senior Government Grants

Future federal gas tax funding has been estimated at $32,900 annually for each Plan year. 2014 grant revenue also includes $20,420 related to the approved Small Rural and Northern Municipal Infrastructure Fund – Capacity funding grant. No other senior-level funding has been incorporated into the plan, since the Municipality is not aware of any other grant entitlement at this point in time.

D. Transfers to and from Reserves

The anticipated total 2013 year-end reserve balance carried forward to Year 1 of the Plan is expected to be $559,482. Of this, approximately $40K is earmarked for the purchase of fire equipment/vehicles and another $295K is earmarked for the replacement of public works vehicles (total of $335K). Normally we would think of these as being available to fund capital purchases.

However, it worth noting that just because a reserve is earmarked for a specific purpose doesn't mean that it would be prudent to use the reserve for that purpose when the occasion arose. Since there is a requirement to set a balanced budget every year, any Municipality that wishes to avoid cash flow problems in its day-to-day operations needs to maintain reserves at a level sufficient to compensate for the cash that is "tied up" in such things as: tax arrears balances/other accounts receivable; inventories of gravel and other supplies, etc. Additional available cash is likely necessary to mitigate the impact of swings in the cash used for these items over the course of every year. The Municipality only has approximately $80K in non-designated reserves (an additional $117K is earmarked for landfill: landfill closure expenses have been excluded from the scope of this Plan). As a very crude estimate, **the Municipality needs to maintain reserves of at least $300K to finance its day-to-day operations. Consequently, for all intents, the maximum value of reserves currently available to finance capital purchases is in the neighborhood of $260K, and less if significant draws on the landfill reserve are anticipated in the 10-year period covered by the Plan.**

It is also worth noting that the calculations underlying the available long-term debt (E below) are based on the existing level of reserves. If the Municipality were to reduce its overall reserve balance below the existing $560K level, the total outstanding debt target would need to be revised downward by the same amount.

The reserve transfers currently contemplated to finance proposed vehicle purchases in the 2014 annual budget ($120K public works sander/plow and net transfer of $10K for fire pumper/tanker) are recorded as a source of funding in year 1 of the Plan. However, for the remainder of the Plan years, **net transfers to reserves** are recorded, at an annual amount sufficient to bring the reserves up to their (inflated) 2013 value by the end of the 10-year period. When the more refined annual budgets are established, additional draws on reserves to finance specific vehicle replacements may be possible and appropriate.

E. Long-term Debt Financing

A discussion of an approach to long-term debt financing is presented in **Appendix E**. Briefly, the Plan incorporates the incurrence of annual debt of $183,600—and the corresponding required debt repayments—based on strategy of phasing in overall "Low Risk level of debt" in the neighbourhood of $900,000.

Although debt financing has been included in the Plan at an equivalent annual amount, it is more likely that new long-term debt will be linked to the purchase of specific vehicle/equipment replacements, and will only be agreed to after careful consideration of other available alternatives (such as deferring/reducing planned capital expenditures). Since the actual decision to incur debt for specific items will occur as a result of the annual budgeting procedures, a more refined approach to incorporating debt financing in this Plan was not deemed necessary.

In total, the forecasted sources of funding for capital-related expenditures is expected to be $3.9 M, approximately $400 K in each year of the Plan.

5.4 Funding Shortfall Relative to Financial Requirements

The resulting annual funding shortfalls for each year of the Plan are also presented in **Appendix A**. In total, the forecasted shortfall for the 10 years is projected to be $627 K, approximately $63,000 annually. Because long-term debt financing has not been tailored to the years it is actually required, some years show excess funding while other years show significant shortages.

Further reconciliation is required to align the desired Levels of Service with the actual available funding. As a first step, Council should consider the feasibility of higher tax rate increases or capital tax levy as it begins its 2014 budget deliberations.

Appendix A

Yearly Revenue and Expenditure Summary

The yearly revenue and expenditure summary is prepared in a separate Excel spreadsheet. It is an integral component of the Plan

Appendix B

Levels of Service

The Levels of Service has been prepared as a stand-alone document and is not included in the main body of this Plan

Appendix C
Life Cycle Cost Analysis

Pavement Management

The following life cycle costs analysis compares three different municipalities Municipality 1, Municipality 2 and Municipality 3, each with three distinct approaches to pavement management. For this analysis we will assume each of the three municipalities have 7000 m^2 of pavement i.e. 1km of asphalt paved road that is 7m wide. In each scenario, the road is assumed to have been constructed in 2013 and will operate under normal traffic loading.
The Life Cycle Cost Analysis (LCCA) assumes no user costs. The LCCA uses a discount rate of 2.5% / year.
The LCCA shows the three different municipalities and tracks their pavement management decisions and related condition over the specified time period. Municipality 1 represents decisions made based on strategic preventive maintenance and rehabilitation (M&R), Municipality 2 represents decisions based on no preventive M&R and Municipality 3 represents decisions based on resurfacing only.
The figure below illustrates a time- pavement condition plot for each municipality.
Figure 8.2. Time-Condition Plot for 3 Municipalities

The costs associated with the corresponding maintenance and rehabilitation decisions are outlined in the following tables:

The policy of Municipality 1 is to strategically intervene with preventative maintenance measures over the course of the pavement's service life. Two significant maintenance measures are performed on the pavement at various times and ultimately extend the service life of the pavement, prorating the total cost of the pavement over a longer period of time. Eventually, a full reconstruction is required and this cycle repeats. The total life cycle costs are substantially less when compared to Municipality 2 and 3, at a total of $221,622 over 50 years.

The policy of Municipality 2 is to simply construct the pavement and wait until serious deficiencies begin to appear before acting. This approach unfortunately remains common still today. Over the last period of the pavement's life, maintenance is required to ensure safety and operation until the pavement becomes completely destroyed. Once the pavement has failed, a complete reconstruction is carried out restoring the pavement to new condition. This cycle repeats again until a second reconstruction is required. The total costs are substantial and total $287,630 over 50 years.

The policy of Municipality 3 is periodic resurfacing. The pavement is constructed and time passes until early signs of serious distress are observed. This occurs after the time when preventive maintenance is neither appropriate nor possible, but before the pavement becomes completely destroyed. Resurfacing is performed and restores the pavement to almost new condition. The pavement then deteriorates for the remainder of its life, requiring significant maintenance in the last years before it becomes completely destroyed. A full reconstruction is then carried out and the cycle continues. The total costs are in between that of Municipality 1 and 2 at $260,038 over 50 years.

It may be easy to see upfront cost savings by understanding that as long as any costs associated with maintaining the pavement are deferred as long as possible, money will be saved. The reality is that extending a pavements service life prorates the total cost of the pavement over a longer period of time and ultimately becomes more economical in the long run. If preventive maintenance measures are strategically planned and carried out then the service life of the pavement can be maximized and substantial reconstruction costs can be deferred for longer periods of time. In a time when economy and efficiency are becoming more and more important, this type of proactive management is essential in the management of infrastructure.

Structures

The following life cycle costs analysis compares two different management practices for municipalities managing their structure inventory. For the analysis we will assume each of the municipalities have an identical bridge as a part of their inventory. The bridges both have the same initial construction cost, and are identical in terms of structure type and construction.

For the analysis, each municipality has in their inventory a two-lane, single span bridge with concrete barrier walls and deck supported by prestressed concrete girders on concrete abutments. The bridge has expansion joints at either end and a paved deck. The road maintenance policy of each municipality is to use salt as a winter roadway de-icer. The Life Cycle Cost Analysis (LCCA) assumes no user costs.

The LCCA shows the municipalities and tracks their structure management decisions over a 90-year time period. Municipality 1 represents decisions made based on strategic preventive M&R and Municipality 2 represents decisions based on no preventive M&R. Refer to the figure below for a time-condition plot for each municipality.

Time-Condition Plot for 2 Municipalities

The costs associated with the corresponding maintenance and rehabilitation decisions are outlined in the following tables:

Preventive M&R

Year	Treatment	Δ BCI	Quantity	Unit	Unit Cost	Total Cost	Present Worth
2021	**Rout and Seal Cracks**	93-96	250	m	$2.50	$625.00	**$512.97**
2033	**First Rehabilitation**	70-95					
	Patch, Waterproof and Pave Deck		480	m2	$600.00	$288,000.00	
	Misc Concrete Patching		50	m2	$2,000.00	$100,000.00	
						$388,000.00	**$236,785.13**
2038	**Rout and Seal Cracks**	89-93	250	m	$2.50	$625.00	**$337.12**
2050	**Barrier Wall Replacement**	69-80	39	m3	$2,500.00	$97,500.00	**$39,104.04**
2056	**Rout and Seal Cracks**	70-75	200	m	$2.50	$500.00	**$172.92**
2066	**Second Rehabilitation**	50-80					
	Patch, Waterproof and Pave Deck		480	m2	$600.00	$288,000.00	
	Misc. Concrete Patching		100	m2	$2,000.00	$200,000.00	
	Bearing Replacement		10	ea.	$5,000.00	$50,000.00	
	New Barrier Walls		39	m3	$1,450.00	$56,550.00	
						$594,550.00	**$160,628.84**
2072	**Rout and Seal Cracks**	72-76	350	m	$2.50	$875.00	**$203.84**
2091	**Structure Replacement**	21-100					
	Piles		1500	m	$350.00	$525,000.00	
	Abutments and Wingwalls		300	m3	$1,100.00	$330,000.00	
	Girders		450	m	$1,000.00	$450,000.00	
	New Concrete Deck		300	m3	$1,250.00	$375,000.00	
	New Barrier Walls		39	m3	$1,450.00	$56,550.00	
	Approach Slabs		56	m3	$575.00	$32,200.00	
						$1,768,750.00	**$257,753.73**
	Final BCI in 2093:	**98**				**Net:**	**$695,498.58**
						Residual Value:	**$240,427.03**
						Total Cost:	**$455,071.54**

No Preventive M&R

Year	Treatment	Δ BCI	Quantity	Unit	Unit Cost	Total Cost	Present Worth
2048	**Structure Replacement**	21-100					
	Piles		1500	m	$350.00	$525,000.00	
	Abutments and Wingwalls		300	m3	$1,100.00	$330,000.00	
	Girders		450	m	$1,000.00	$450,000.00	
	New Concrete Deck		300	m3	$1,250.00	$375,000.00	
	New Barrier Walls		39	m3	$1,450.00	$56,550.00	
	Approach Slabs		56	m3	$575.00	$32,200.00	
						$1,768,750.00	**$745,300.07**
2083	**Structure Replacement**	21-100					
	Piles		1500	m	$350.00	$525,000.00	
	Abutments and Wingwalls		300	m3	$1,100.00	$330,000.00	
	Girders		450	m	$1,000.00	$450,000.00	
	New Concrete Deck		300	m3	$1,250.00	$375,000.00	
	New Barrier Walls		39	m3	$1,450.00	$56,550.00	
	Approach Slabs		56	m3	$575.00	$32,200.00	
						$1,768,750.00	**$314,047.89**
	Final BCI in 2093:	**64**				**Net:**	**$1,059,347.96**
						Residual Value:	**$157,013.57**
						Total Cost:	**$902,334.39**

*Costs are for materials only and do not include construction costs

The policy of Municipality 1 is to strategically intervene with maintenance measures over the course of the structure's service life. Maintenance measures are performed on the structures at various times and ultimately extend the service life of the structure, prorating the total cost of the structure over a longer period of time. Eventually, a full reconstruction is required and this cycle repeats. The total costs are fractional compared to those of Municipality 1. This difference in decision making introduces significant savings throughout the cycle.

The policy of Municipality 2 is to simply build the structure and wait until serious deficiencies become evident. At the last possible minute, a complete reconstruction is carried out restoring the structure to perfect condition. This cycle repeats again until a second reconstruction is required. The total costs are substantial. Unfortunately this approach still remains common today as municipalities are faced with an aged structure network and limited funds for maintenance.

It may be easy to see upfront cost savings by understanding that as long as any costs associated with maintaining the structure are deferred as long as possible, money will be saved. The reality is that extending a bridge or culvert's service life prorates the total cost of the structure over a longer period of time and ultimately becomes more economical in the long run. If preventive maintenance measures are strategically planned and carried out then the service life can be maximized and substantial reconstruction costs can be deferred for longer periods of time. In a time when economy and efficiency are becoming more and more important, this type of proactive management is essential in the management of our resources.

The difficulty faced by most municipalities is related to "breaking the cycle." With an aged infrastructure and many structures with condition beyond the point of preservation management techniques, substantial funds are required to address those most significantly deteriorated structures leaving little funds for keeping the good bridges good.

Appendix D

Annual Inflation Factor

Consumer Price Index versus Construction Cost Indexes

When determining what the future required capital expenditures will be, it is necessary to inflate the costs over time based on an appropriate inflation factor. The figure below illustrates the Ontario Consumer Price Index (2003-2012) against various recent (5 years) construction and material price indexes.

In general, the rates of inflation for various material and construction indexes have remained comparable to the overall rate of inflation in Ontario. While gasoline, oil and overall energy rates have fluctuated more significantly over the 10-year period (2002-2012), the overall impact in the Non-Residential Building CPI (NRBCPI) has been buffered. The Overall Rate of Inflation (Ontario) grew from 113.3 in 2007 to 121.8 in 2012, an increase of 8.5 points. The NRBCPI fell from 150.8 to 141.4 and back to 150.7 over the period 2008 -2012; remaining generally unchanged over the period. While material indexes generally grew at similar rates to the overall CPI, gas/energy rates fell substantially in 2008, potentially resulting in the generally unchanged NRBCPI.

For the purpose of this Asset Management Plan, given the potential for relative short-term instability in energy and fuel rate indexes, and resulting potential influence on NRBCPI, **an inflation factor of 1% has been applied.**

Appendix E
Low Risk Long-term Debt Level

In the Building Together guide, the Province suggested that as part of a long-term capital asset financing strategy "*there may be a need for some municipalities to revisit their "zero debt" policies. Debt financing, such as debentures, loans, and construction financing agreements, helps to spread the cost of expensive capital projects over time so that both current and future users of services share the burden*."

When viewed in conjunction with another of the Province's guiding principles—"*those who benefit directly from municipal infrastructure should pay for the service"*—it seems clear that, rather than having to borrow money itself to pay for grants to individual municipalities, the Province is expecting individual municipalities, the beneficiaries of the related municipal infrastructure, to take on long-term debt themselves.

Most small northern municipalities are loath to take on debt. However, in light of the Province's philosophy, the Municipality will consider increasing its use of long-term debt to finance capital projects to a "reasonable level".

The Ministry of Municipal Affairs and Housing (MMAH) prepares a "Financial Indicator Review" (Review) annually for each municipality, based on the Financial Information Return (FIR) submitted by each municipality. The Review classifies the municipality as "Low", "Moderate" or "High" Risk for each of the reported measures. There are three debt-related measures on the "Financial Indicator Review":

1. Debt servicing cost as a % of total operating revenue: low risk = < 5%
2. Net financial assets or net debt as a % of total operating revenue: low risk > -20%
3. Net financial assets as a % of own purpose taxation plus user fees : low risk > -50%

Based on its 2012 FIR, the Municipality calculated what its Low Risk level of debt threshold would be using a combination of the above three measures and has determined that this is in the neighbourhood of $900,000 based on a 10-year repayment term and 5% interest rate. In other words, at any point in time the total outstanding debt of the Municipality could be $900,000 and the Municipality would still be classified as "Low Risk" based on the measures in the Review.
Note that the **maximum** allowable outstanding debt of the Municipality (estimated from the commonly-cited "Annual Debt Repayment Limit" of the Municipality, using a 10-year repayment and 6% interest) is approximately double this amount
(estimated at approximately $1.8 M).

The following outlines the approach that has been used to incorporate a gradual move to this threshold by the Municipality:

a) in each year of the Plan, an equivalent amount of new debt will be incurred to finance capital expenditures. The annual amount of $183,600 new debt was calculated assuming that the borrowing rate will be 5%, and all debt will be repaid over 10 years.
b) By the 10th year, by incurring approximately $183,600 new debt each year, the Municipality will have reached its threshold level of outstanding debt of $900,000, and will be repaying $234,000 of debt principal ($183,600) and interest (approximately $50,100) annually.
c) This pattern of borrowing and repaying is sustainable indefinitely. However, **by the 10th year this strategy will not produce any additional capital asset financing**, since the debt repayments (principal and interest) will exceed the new debt incurred by the interest portion of the repayments.

It is worth noting that although debt financing has been included in the Plan at an equivalent annual amount, it is more likely that new long-term debt will be linked to the purchase of specific vehicle/equipment replacements, and will only be agreed to after careful consideration of other available alternatives (such as deferring/reducing planned capital expenditures). Since the actual decision to incur debt for specific items will occur as a result of the annual budgeting procedures, a more refined approach to incorporating debt financing in this Plan was not deemed necessary.