TOWNSHIP OF PAPINEAU-CAMERON

Asset Management Plan

December 18, 2013

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Executive Summary

The Municipality of Papineau-Cameron (the Municipality) is a rural municipality with no urban/semi-urban centres that has and is anticipated to experience minimal growth. The Asset Management Plan (Plan) was prepared with the intent to maintain and improve the existing inventory of municipal infrastructure consisting of 88 km of roads, 5 bridges, 7 major culverts, 4 major buildings or building complexes, and several vehicles.

The estimated current (December 2012) Net Book Value of the Municipality's infrastructure is approximately $17.2 million. Roads and bridges, the primary assets, represent $ 15.6 million or 90.4 of the total value of the Township's capital assets.

The annual requirement to maintain current assets is $583,631 (2013 $s) excluding reserve transfers and long-term debt repayment, over the period of the Plan (2014-2023).

The Asset Management Plan provides a detailed inventory of the assets, the current book value, an evaluation of the state of infrastructure and recommended improvements and the associated costs for sustaining and improving the existing infrastructure.

The intent of the Plan is to support the Municipality in maintaining prescribed standards for maintenance and repair and provide guidance for initiating and budgeting capital improvement activities. The standards are set out in Appendix B as the Levels of Service.

The Municipality's capital assets will be maintained through a financial strategy that optimizes the application of local financial resources. The Plan targets to address current deficiencies with respect to roads, bridges and culverts based on priorities established through the roads management and OSIM studies. Other capital requirements will be funded on an as needed basis in order to meet the prescribed Levels of Service. The Municipality will consider debt financing to supplement municipal funds derived from property taxation but only to the limit of a low risk financial indicator category. The Municipality will also gradually increase the annual taxation level with a goal of not to exceed 1% per annum however it is recognized that extenuating circumstances may required more significant tax increases.

This Asset Management Plan is recognized as a dynamic plan for consideration and implementation with the annual budgeting practices. The Plan has been endorsed by Municipality of Papineau-Cameron Council as a starting point for a holistic approach to asset management within the municipality. As such, the plan will be subject to revision as the Municipality begins to work within the plan and identify specific challenges and/or opportunities for improvements. The plan will receive a comprehensive review every four years, with each new term of council, however, it is anticipated that in the first two years of application the plan may be subject to revision on an as required basis.

Further, updates to the Plan shall be undertaken to incorporate updated infrastructure condition assessments and expenditure requirements. In particular, the Plan should be updated to reflect the updated biennial OSIM inspections.

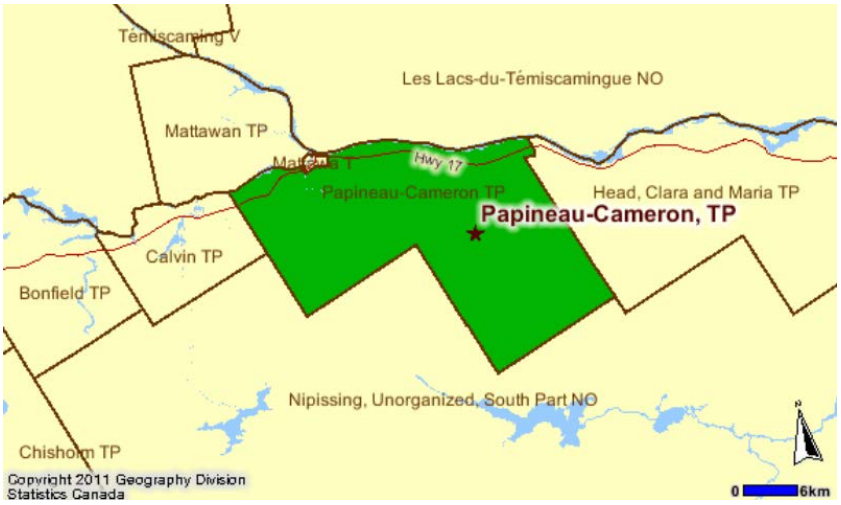
The Municipality of Papineau-Cameron wishes to acknowledge the support of the Ministry of Agriculture, Food and Rural Affairs (OMAFRA) in its financial support for development of the Asset Management Plan. The views expressed throughout the Asset Management Plan represent those of the Municipality of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

Introduction

1.1 Location of Papineau-Cameron

The Municipality of Papineau-Cameron is located 50 km east of the City of North Bay in the District of Nipissing. The Municipality is rural and there are no urban settlement areas within the Municipality. A map showing the location of Papineau-Cameron is located below.[1]

Figure 1: Location of Papineau-Cameron



1.2 Population

The population of Papineau-Cameron is relatively stable with no significant growth expected over the next census period (see Table 1.2). The population has decreased slightly (1.9%) in the last 10 year period.

Table 1.2 : Population Change[2]	
2011 Population	978
2006 Population	1,058
2001 Population	997
2006-2011 Population Change (%)	-7.6
2001-2006 Population Change (%)	6.1
2001-2011 Population Change (%)	-1.9

[1] Statistics Canada. 2012. GeoSearch. 2011 Census. Statistics Canada Catalogue no. 92-142-XWE. Ottawa, Ontario. Data updated October 24, 2012.
http://geodepot.statcan.gc.ca/GeoSearch2011-GeoRecherche2011/GeoSearch2011-GeoRecherche2011.jsp?lang=E&otherLang=F
(accessed 2013-10-28)

[2] Statistics Canada. 2007. Papineau-Cameron, Ontario (Code3548022) (table). 2006 Community Profiles. 2006 Census. Statistics Canada Catalogue no. 92-591-XWE. Ottawa. Released March 13, 2007.
http://www12.statcan.ca/census-recensement/2006/dp-pd/prof/92-591/index.cfm?Lang=E
(accessed October 28, 2013).

1.3 Purpose of an Asset Management Plan

The quality of life residents enjoy is directly related to the condition of municipal infrastructure. All taxpayers and residents are in fact, shareholders of the assets that make up municipal infrastructure and therefore have an interest in how they are maintained. Asset management planning allows municipalities to inventory and assess the condition of their assets and plan for their long-term maintenance and replacement. The Province has mandated the preparation of asset management plans as a prerequisite to seeking provincial capital funding. This Asset Management Plan (the Plan) will aid the municipality in making appropriate financial decisions and investments as part of their annual municipal budget decisions. Financial planning will require municipalities to examine a full range of financing and revenue generation tools including user fees.

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, development charges and other related revenue generators. This plan is not intended to replace normal budgeting procedures but rather to support budgeting decisions and assist in ensuring the long-term viability, financing of the municipality's largest, and most valuable (expensive) assets.

The Township of Papineau-Cameron uses the Official Plan for the East Nipissing Planning Area, which includes the Townships of Calvin, Mattawan, and Papineau-Cameron. The Planning Area, including the Township of Papineau-Cameron, is exclusively rural in character with no urban settlement areas. The policies of the Official Plan focus on the need to recognize and conserve natural resources for resource extraction uses. The 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.

It is also the intent of the Official Plan 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.

This Asset Management Plan appropriately focuses on those assets of the municipality that represent the greatest financial demand on the municipality and its residents. The following asset categories are included in this asset management plan for the Municipality of Calvin:

- Roads
- Bridges
- Buildings
- Vehicles

The asset management plan for the Municipality of Papineau-Cameron is intended to cover the period 2014-2023. The document will be used as a working tool for capital expenditure decisions on an ongoing basis, particularly in the preparation of the municipal capital budget using spreadsheets to update the pattern of capital expenditures. The Plan identifies key expenditures that are anticipated in each year of the 10-year period of the Plan.

1.4 Evaluation of the Asset Management Plan

As part of the Plan, Levels of Service have been developed for each of the asset groups identified in the plan. 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 for which the municipality can assess the relative success of their management practices, financial investment and overall the suitability and outcomes of the Asset Management 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, or other asset reviews as detailed in the Plan. The updated condition information will be used to both update the plan's financial forecasts relative to capital expenditure needs as well as assess the asset's condition against the specified Levels of Service.

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 be contemplated 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. Roads Needs Study every five years, OSIM inspections every two years, building reviews every 2 years, etc. Comparisons to Levels of Service and resulting revisions to the Plan will therefore not necessarily be undertaken for all assets, on the same cycle.

1.5 Approach

The development of the Asset Management Plan builds on the policies and practices of the Municipality such as:

- PSAB 3150 Inventory
- Tangible Capital Asset Policy
- Roads Needs Study Update - 2013
- OSIM Bridge Inspection Report (2011)
- General financial policies of the municipality
- Current practices and technologies used in management and maintenance of capital assets

The steps used in developing this Asset Management Plan are summarized in **Figure 2** on the following page. The process was intended 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. Phase's 1a-1d are components of the State of Infrastructure Report; Phases 2a-2b comprises the Desired Level of Services; while 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.
- Classification of asset types (e.g. roads, bridges, etc.).
- Collection of asset information (from PSAB records, and various asset inventory reports) including:
    - Asset age,
    - Historical costs,
    - Replacement cost, and
    - Current condition.

Phase 2

Phase 2 of the work program focused 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. The overall planning period is10 years.
- Provisions for monitoring.
- Review of the current financial strategies for maintenance and replacement of capital assets.
- Comparisons or 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 that provided a financial strategy for Council to implement 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 the third phase was the preparation of an Asset Management Strategy replete with a corresponding financial strategy. The Strategy outlines the measures required to maintain, improve or add to the inventory (new assets) of infrastructure 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 planning that addresses maintenance, renewal or rehabilitation, replacement of assets as required, disposal, if required and the addition of new assets.
- Sources of financing.
- Alternative scenarios where appropriate and the correlation of funding (revenue) sources to capital expenditures.

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. The Asset Management Plan gives the Municipality an understanding of the current condition of the infrastructure assets; the current 'value' for accounting purposes and the rehabilitation requirements of these assets. In addition, an understanding of the period for rehabilitation with a priorities listing is provided.

The completed infrastructure assessments enables the Municipality to protect and prolong the useful life of its infrastructure, identify maintenance, repair and rehabilitation needs and provide a basis for a management system for the planning and funding of the necessary maintenance and rehabilitation of each system, in accordance with Ministry of Infrastructure (MOI) requirements.

State of Local Infrastructure

The following primary assets are included in this asset management plan:

- Roads
- Bridges
- Buildings
- Vehicles

A summary of the Municipality's primary assets are illustrated below.

Roads:
- **18 km Surface Treated**
- **70 km Gravel / Earth**

Structures
- **5 Bridges**
- **7 Culverts**

Buildings
- **Municipal Office**
- **Public Works Building**
- **Salt Dome**
- **Fire Station**

Equipment:
- **13 Rolling Stock**

1.6 Roads

The Municipality undertook a Road Needs Study Update in 2013 to inventory and assess the condition of road infrastructure.

The Township's complete road infrastructure system spans a total of approximately 88 km primarily within a rural setting. The road network includes surfaces ranging from gravel to low class bituminous (surface treatment). The Township has approximately 70 km of earth/gravel roads, 18 km of surface treated roads. The Township has 0 km of asphalt paved roads, as summarized in **Table 2.1** below.

Table 2.1: Road System Summary

Road Type	Length*	Current Replacement Value (2013)**	Net Book Value (as of Dec. 2012)***	Average Asset Age / Useful Service Life (Years) ***
Gravel (Loose Top Gravel) / Earth	70	$ 10.0 M	Not Available	/ 75 base / 10 surface
Low Class Bituminous (LCB)	18	$ 3.5 M	Not Available	/ 75 base / 8 surface
Total	**88**	**$ 13.5 M**		

* From 2013 Road Management Study
** Calculated based on MTO Road Design Standard for applicable road classification and represents new sub-base, base and surface.
*** Values from PSAB Reporting, as of December 2012

An overall road system adequacy, in accordance with the MTO Inventory Manual for Municipal Roads, has been calculated based on a number of road characteristics including:

- Capacity
- Geometrics
- Surface Condition
- Shoulder and Road Widths
- Structural Adequacy
- Drainage
- Maintenance Demand

The evaluation of the roads is set out in **Appendix C Road Needs Study Update.**

The overall system adequacy for the 2013 Road Needs Study is 79%. A substantial portion of the roads identified as deficient are such due to inadequate surface type considering the volume of traffic; their overall structural adequacy and surface condition generally being good.

1.7 Bridges

The Municipality's Bridge network was inspected in 2011 by K. Smart Associates Limited as part of a structure inventory and inspection study for the Municipality. The results of the study are summarized below in Table 2.2A below.

Table 2.2A: Bridge Inventory Summary

Structure No.	Structure Type	Year Built	Age	Age / Useful Service Life	Net Book Value (PSAB 2012)	Estimated Replacement Cost	Estimated Year of Replacement
Bridge 1	CSP Culvert	2013	0	0/20	N/A	$37,500	2033
Bridge 2	CSP Culvert	2013	0	0/20	N/A	$37,500	2033
Bridge 3	I Beam	-	-	-/60	N/A	$215,000	-
Bridge 4	Elliptical CSP Culvert	-	-	-/25	N/A	$19,600	-
Bridge 5	Rigid Frame	1996	17	17/60	N/A	$392,150	2056
Bridge 6	Circular CSP Culvert	-	-	-/25	N/A	$15,120	-
Bridge 7	Arch CSP Culvert on Footing	-	-	-/25	N/A	$29,120	-
Bridge 8	I Beam	c.1960	53	53/60	N/A	$64,600	2020
Bridge 9	Arch Culvert on Footing	2007	6	6/25	N/A	$40,600	2032
Bridge 10	Rectangular Culvert	-	-	-/60	N/A	$995,500	-
Bridge 11	Arch CSP Culvert on Footing	c.2005	8	8/25	N/A	$54,880	2030
Bridge 12	Circular CSP Culvert	-	-	-/20	N/A	$14,560	-

A biennial structure inspection will be completed in 2013, the results of which shall be utilized in updating the bridge inventory.

1.8 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 previously stated replacement values based on type of building and construction material.

A secondary goal of the visual inspection was to confirm any immediate (within the next 5-10 years) 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 Municipalities buildings inventory is provided in **Table 2.3** below.

Table 2.3A: Buildings Inventory/Needs Summary

Township of Papineau-Cameron - Buildings Inventory & Condition Assessment						
Asset	**Location**	**Year built**	**Sq. Ft.**	**Description**	**Useful Life**	**Estimated Replacement Cost**
Township Office	4861 Highway 17		1646	Council: Vinyl siding, new roof (EPDM), Aum. Soffit, Block Foundation with minor cracks, Parging in good condition Front Office: Vinyl Siding (same as Council), Concrete Block Foundation, Basement, Shingles, Aum. Soffit, Parging in poor condition	60	$164,600.00
Public Works Garage	4861 Highway 17		4200	Garage: Finished Steel Siding (insulated), 3 insulated garage doors, Flat Roof (timber rafters, pink insulation, space (gas) heat, membrane), Concrete Floor in good condition, Back Wall Exposed Block: oldest portion in the east ~2x10 rough, ~2x10 smooth, newest in the west TJI. Added lunchroom to garage in 2010. Furnace replaced 2012, Roof to be redone 2013, Bldg may need insulation upgrade, Automatic door openers added in garage 2009.	50	$168,000.00
Fire Hall	1288 Richards Road		3000	Fin. Siding - Damaged (East Wall/West), Soffit in good condition, SW corner damaged, 4 O/H doors are good, Vinyl siding, windows and doors on back are new, Steel Roof is in good condition	50	$120,000.00
Salt Dome	4861 Highway 17		5024	Floor Concrete in good condition. Shingle roof: No flashing over wall/roof interface	50	$301,440.00

The following generic building costs in Table 2.3B were assumed to confirm the appropriate replacement values for use in the Asset Management Plan:

Table 2.3B

Building Construction Costs (Estimated)	
Description	Cost per Square Ft.
Conventional Stud Frame (House Style)	$100
Metal Clad, Steel Frame (non-finished)	$20
Metal Clad, Steel Frame (finished, insulated)	$40
Sand/Salt Dome	$60

The condition of the Municipality's buildings shall be reviewed and documented at least once every two years (biennial) to identify the need for repairs or upgrades. An inspection of the structural integrity of the buildings shall be undertaken by a qualified person every 10 years or as otherwise deemed necessary based on biennial inspection. Results of the inspections shall be used to update the Plan as part of the regular plan review.

1.9 Vehicles

The municipality owns a fleet of vehicles generally dedicated to public works and emergency services functions. A listing of the fleet is included below along with the reported 2012 PSAB values and amortization rates.

Table 2.4: Vehicles Inventory

Public Works	Proposed Year for Replacement	Estimated Replacement Cost
Ford Tandem Plow Truck	2015	$ 191,080
Volvo Tandem Plow	2020	$ 200,827
Ford 150 Pick-up	2018	$ 33,889
Champion Grader	2019	$ 231,581
Case Backhoe 580SN	2021	$ 76,470
Daewoo Excavator	2014	$ 53,104
Ford F250 Crew Cab	2028	$ 44,073
Fire		
Pumper # 3	2018	$ 24,806
1984 Ford - Tanker # 4		
Tanker # 1		
Service Vehicle		
Total		$ 855,830

The current estimated Net Book Value of the Municipality's vehicles is $939,610 (see **Table 1C**.

A detailed review of each vehicle was not undertaken as part of the state of local infrastructure review. For the purpose of this Asset Management Plan, generally accepted accounting principles, with respect to depreciation of equipment, will be applied in developing the fiscal plan for replacement of the Municipalities vehicle assets. Stated another way, the municipality shall endeavor to plan for replacement of its vehicles once their expected useful service lives have been realized.

Vehicles shall be evaluated annually to assess the residual lifespan of the vehicle and compare to the expected useful life. Results of the evaluation shall be used to update the Plan as part of the regular plan review. Those vehicles whose expected useful life will be realized during the Plan period, 2014 – 2023, have been highlighted in the preceding table.

Levels of Service

The Municipality of Papineau-Cameron has adopted Levels of Service standards as part of the development of the Asset Management Plan. The Levels of Service standards build from the Minimum Maintenance Standards for Municipal Highways, Ontario Reg. 239/02 and will guide the program for the maintenance of roads, bridges, buildings and vehicles (rolling stock) and related facilities in the Municipality. Appendix B sets out the Municipality's Levels of Service with the intent of addressing all of the infrastructure classes in this Plan.

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 level of service standards for each class of infrastructure (e.g. roads, bridges, safety devices, municipal equipment and buildings). An overall Level of Service Target has been assigned for each asset group. The Target will be used as the measure to assess how the Municipality is doing in meeting the Plan with respect to each of the primary asset groups.

Levels of service provide a measuring stick to ensure that municipal infrastructure is maintained to a standard that protects the municipal investment and sustains or prolongs the life of bridges, roads, buildings, equipment and other infrastructure. By establishing a level of service, the municipality will be able to identify the condition of all infrastructure on an ongoing basis and undertake measures to repair, upgrade or better all municipal assets over their lifespan. The intent of establishing levels of service is to also ensure that regulatory requirements are also met, notably, the minimum maintenance standards for municipal highways (Ontario Regulation 239/02).

The levels of service set out a written series of procedures that will guide Council in making financial decisions designed to maintain all of the municipality's capital assets to the level

appropriate for the municipality given its relative priorities and minimum legislated requirements. The service level standards will ensure the delivery of a quality level of services and an appropriate measure of accountability to municipal taxpayers.

The levels of service are organized by the type of asset or infrastructure and a series of objectives to be achieved through adherence to specific standards or levels of service. In a rural municipality, the most significant assets are roads and bridges as they are crucial to the conveyance of people and goods and services. Council has taken measures to improve the condition of the road network through better ditching, brushing, graveling and grading; however, careful capital programming will be required to sustain the road system over the coming years. Performance targets require the municipality to maintain capital assets by undertaking repairs immediately or on an as needed basis where required and by ditching, brushing and resurfacing roads on a regular cycle. Council intends to provide adequate funding of road and bridge improvements to maintain these facilities.

The Level of Service document is attached as Appendix B to this Asset Management Plan and has been prepared as a standalone supplement in a convenient booklet form that can be used by a department head.

The following summarizes the Target Levels of Service for each of the Municipality's primary Assets:

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 79%.

The Municipality's goal is to maintain the current overall system adequacy rating of 79%, 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 life. In other words, vehicles will last for the period of time over which they are intended (amortized). Fire vehicles have historically been replaced with used vehicles as a financial strategy. Careful maintenance of the vehicles has proved the effectiveness of this strategy since the cost of replacing a fire vehicle with a new vehicle is considered by the Municipality to be cost-prohibitive.

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 the building is realized, with the goal of using the building beyond is useful service life.

1.10 Issues and External Trends Affecting Levels of Service

Various potential and real external trends will put pressure on the Municipality in meeting their desired Levels of Service. The following external trends are noted as potentially influencing future decision making with regard to infrastructure investments and Levels of Service. These shall be considered as the Plan is further developed.

Existing Load Posted Structures: The Municipality currently has one structure recommended for load posting, Bridge No. 8, on McOrmond Road. A temporary bridge is currently installed overtop the original bridge and does not bear on the original structure. This bridge services a no exit road which is also a timber haul route.

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 makes it difficult to increase the tax base over time. The Township was required to make changes to its operations following th closure of the local forest products mill which redeuced the assessment base by $50,000.

Reduce Speed Limits (Reduced Maintenance Requirements): Some municipalities have considered a reduction in their posted speeds thereby influencing the maintenance requirements under Ont. Reg. 239/02, Minimum Maintenance Standards. The impact of such a change to the Plan is undetermined; while such a change would influence operation/maintenance activities, and related costs, its impact to capital asset expenditures would be less.

1.11 Current Performance

A summary of the Municipality's current performance against the previously noted Levels of Service Targets is included below:

Bridges – One Load Posted Structure.

The Municipality currently has one structure recommended for load posting, Bridge No. 8, on McOrmond Road. A temporary bridge is currently installed overtop the original bridge and does not bear on the original structure.

Roads – Minimum Overall System Adequacy Rating of 75%.

The Township currently has an overall system adequacy rating of 79%. Road Condition ratings are assigned in accordance with the MTO Inventory Condition Manual, 1991.

Recommendations for road improvements have been provided in the 2013 Roads Needs Study Update.

Vehicles – Utilization to Expected Service Life

The Municipality currently has an undetermined number of vehicles which have exceeded their expected useful life as the in-service year is unknown. Several of these are used for emergency services and therefore expected to have relatively infrequent use.

Assessment and revision of the expected service life, or modified use or maintenance activities are required to ensure the expected service life is realized and appropriately accounted for in the plan. This should be considered early in the life of this asset management plan.

The Township has recently replaced their Fire Rescue Truck.

Buildings – Building Use Exceeds Its Expected Service Life

The Municipality of Papineau-Cameron's building infrastructure is currently in good condition overall. Recent improvements have included the replacement of furnaces in the Township office and the fire hall and the replacement of the roof over the Township administrative building.

Asset Management Strategy (Best Management Practices)

The asset management strategy is a series of planned actions designed to sustain the prescribed levels of service of the municipality. The strategy takes into consideration the lifecycle costs of each asset with the intent to ensure that capital funds are available to replace the asset by the end of its lifespan. The strategy also provides measures to increase the lifespan of the asset and to maintain the value of the asset through its lifespan. Best management practices such as a "preservation management approach" for roads form part of the strategy.

1.12 Roads

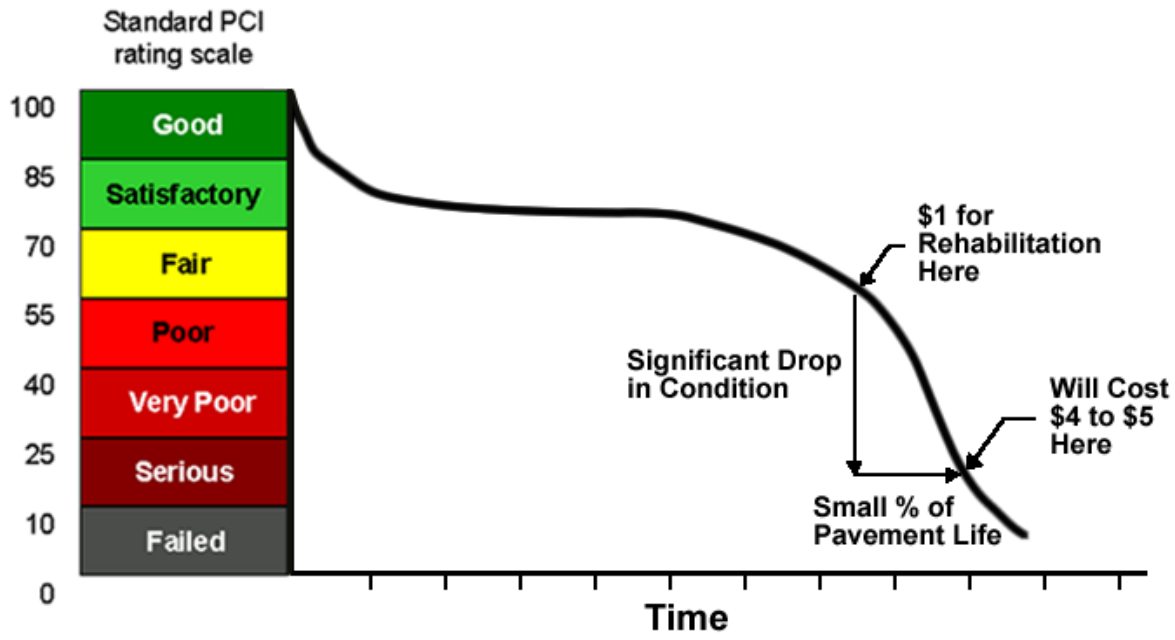
1.12.1 Roads Best Management Practices

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 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** 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. The Municipality of Papineau-Cameron, consequently will adopt a preservation management approach as a key component to the asset management plan for each class of road described as follows.

Examples of approaches to road maintenance with their associated cost implications over the lifecycle of a road are set out in Appendix C to this report and are provided as an illustration of the benefit of a "preservation management approach".

Figure 4. Typical Service Life of an Asphalt Pavement



1.12.2 **Preservation Management Approach**

A. Gravel Roads

Gravel roads are the most significant and visible asset in the Municipality. The proposed preservation management approach for this class of road 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 crossfall.	As needed. Generally 2-3 times per year for higher volume gravel; 1-2 for lower volume.
Add calcium to tighten surface, retain aggregate and reduce dust	Each spring on all roads or higher volume and as needed during summer months
Ditching and brushing of 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. The Municipality will employ the following preservation management strategy for surface treated roads.

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 shall 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. Assess drainage and culvert needs prior to any significant renewal or rehabilitation strategy and complete any improvements 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 to improve roadbed drainage and safety.

C. Asphalt Roads

Asphalt surfaces are the smoothest and most durable hard top surface used by the Municipality however; they are also the most expensive. Asphalt provides a constant, acceptable condition for the initial portion of its service life but then begins to deteriorate rapidly as it ages. Surface defects such as cracking and raveling are the first signs of the deterioration. If left untreated, the pavement will rapidly deteriorate to the point where reconstruction is the only option. A preservation management strategy can mitigate this by applying renewal treatments earlier in the pavements life before the conditions begin to deteriorate too far. **Table 4.1.2D** below summarizes preservation management activities to be considered for asphalt roads:

Table 4.1.2 D - Rural Asphalt Roads

Activity	Age (Years)	Condition Rating	Service Life Extension (years)
Crack seal	2-6	9	2
Slurry seal/ Microsurface*	4-8	8	4-6
Overlay	12-15	6-7	10
Pulverize and Pave	20-25	<5	20
Reconstruct	30	<4	30

*Slurry seal can be used on lower volume paved roads (less than 1000 vehicles per day). For roads with volumes in excess of 1000 vpd, microsurfacing should be used.

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

1. Review the condition of other infrastructure, particularly underground infrastructure prior to implementing any major renewal or rehabilitation of the pavement. Any repairs or capital upgrades to other infrastructure should be coordinated (refer to Section 4.6 for discussion on Integrated Capital Planning). This should reduce utility cuts in newer asphalt.
2. Repair potholes in the surface in a timely fashion to prevent saturation and weakening of road base.
3. Undertake regular shouldering program of rural paved roads to promote proper drainage. Poorly maintained shoulders allow surface water to pond and saturate the road base, which weakens the base and leads to cracking at the edge of pavements.
4. Undertake a ditching program to ensure there is adequate drainage for road base on rural roads. This will reduce the likelihood of structural distresses caused by softening of the road base due to poor drainage.
5. Specify the appropriate type of performance graded asphalt cement for the location.
6. Undertake a clearing program to reduce shading of the roadbed and remove roots/vegetation from the road base.

1.12.3 **Application of Preservation Management Approach - Roads**

The preservation management activities detailed in each of the tables above are not necessarily intended or required to be completed on 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 intention of the above is to 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. As detailed in the life cycle costs analysis presented in Appendix C, the preservation management approach to roads is proven to yield the lowest overall life-cycle costs.

Each of the preservation management activities for gravel, surface treatment and asphalt roads identified above, including route and seal, slurry seal, resurfacing etc. shall be considered as part of the regular Road Needs Study every 5 years. Recommendations on the specific treatments required shall be documented and prioritized in the Road Needs Study. A 10-year plan for road expenditures shall be developed as part of the regular Road Needs Study updates.

1.12.4 **Capital Expenditures for Roads**

Prioritization and recommendations for planned capital improvements were developed based on condition rating and traffic demands. Recommendations are summarized in

the 2013 Roads Needs Study Update. Road improvement expenditures over the next 10 years are estimated at $ 4.3 M and extend over 18 km of road or $437,500 per year

Expenditure of this nature over a 10-year plan represent a significant commitment of municipal resources, however, it is important to identify the overall need. The Municipality will endeavor to undertake those activities, which it can reasonably finance and will endeavor to partner with senior levels of government wherever possible to offset costs.

The focus of the Municipality will be to "keep the good roads good" by investing in those actions which result in the lowest life-cost and highest overall road network condition. Work has been prioritized within the Road Needs Study based on traffic volume and road condition.

A re-investment of approximately $437,500 K (2013) per year in capital resurfacing expenditures is recommended based on the 2013 Road Needs Study.

The projected level of expenditure does not provide for the longer-term replacement of roads as they reach the end of their useful life.

In the absence of alternative funding sources such as senior level government grants, the recommended annual roads expenditure represents and excessive burden on the Municipality financially. In recognizing the need to maintain its current overall average condition, rating the Town 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 with the goal of reaching the above noted contribution level in 2024, as adjusted for inflation.

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

1.12.5 **Maintenance Expenditures for Roads**

It is recommended that regular maintenance in the form of grading, roadside ditch cleanout and clearing 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. Both activities are considered two of the least expensive and most beneficial preventative maintenance activities to facilitate realizing the full pavement 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.

- 88 km of road – 8.8 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 26 person-days (or ~5 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.

Total Annual Brushing/Ditching Cost: $30,000

Alternatively, the Municipality may use its own forces and equipment and realize substantial 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 burden the resulting cost would be $2,400/week or $12,000. The cost of the equipment and dump truck drivers has been omitted to permit direct comparison to the above Contractor costing. It is understood that the Municipality already has the necessary ditching/brushing equipment to undertake the work and therefore capital expenditure for equipment has not been factored in.

Total Annual Brushing/Ditching Allowance: **External Forces $ 30,000**
Internal Forces $ 12,000

It is assumed that regular 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.

1.13 Bridge and Culvert Best Management Practices

1.13.1 Preservation Management Approach for Bridges and Culverts

When infrastructure is built, there becomes a need for maintenance, rehabilitation and eventually replacement. Given the significant cost to rebuilding bridges and culverts, strategic asset management and preservation becomes increasingly important to operating the asset network at a prescribed level of service over its full service life.

Similar to the 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, and ultimately cost the municipality and the end users more money.

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.

1.13.2 **Best Management Practices for Bridges and Culverts**

The Municipality of Papineau-Cameron will use a preservation management strategy for managing its bridge assets (including culverts larger than 3 m). The approach will be based on more frequent, less costly treatments applied over the life span of a bridge or culvert. 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.

Examples of approaches to bridge maintenance with their associated cost implications over the lifecycle of a bridge are set out in Appendix C to this report and are provided as an illustration of the benefit of a "preservation management approach".

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 the 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

Structural Culvert Management Strategy

Structural Culverts are typically designed with a 75-year service life similar to a bridge; however, in order to achieve the 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 of 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 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 the problem while it is 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 because they form the basis of the bridge inventory 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.

1.13.3 **Application of Preservation Management Approach – Bridges**

The preservation management activities detailed in each of the tables above are not necessarily intended or required to be completed on 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 intention of the above is to outline the series of techniques to be considered in an effort to realize and extend the useful service life of the bridge asset for the lowest overall lifecycle cost while maintaining the highest overall condition and **maintaining the bridge 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.

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

1.13.4 **Capital Expenditures for Bridges**

Based on the condition assessment of each structure, a ten-year structures work plan was developed for the Municipality with the goal of maintaining their current bridge network asset. A summary of the work activities and estimated reinvestment costs are provided in the table below.

A total reinvestment cost to maintain the current bridge asset is estimated at $41,000 over a 6-10 year period as identified in the table below. The Municipality has realized significant cost savings in undertaking repairs using its own staff resources. Most of the bridge structures have been repaired to the standards recommended in the recent OSIM Report.

The OSIM plan will 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 life. Given the limited available funding, extending the use of the Municipalities structures beyond their useful services lives is required.

The reinvestment costs are intended to maintain the bridge network asset in its current state and represent near term expenditures while the replacement costs and estimated replacement year are included to facilitate long-range financing plans.

Table 4.2.4: Bridge Inventory/Needs Summary

Municipality of Papineau-Cameron - Inspection Summary Report - Bridge Needs									
Structure No.	Structure Type	Span (m)	2011 OSIM Inspection Comments	Recommended Works (1-5 Years)	Estimated Cost	Year Built	Deck Area (m^2)	Culvert Size (m)	
								Dia	Length
Bridge 1	CSP Culvert	-	No guiderail over structure. Timber cribs are failing.	Replaced in 2013	$0	2013	30		
Bridge 2	CSP Culvert	-	Some poor areas in the deck. Girders are in poor condition. Needs guiderail	Replaced in 2013	$0	2013	30		
Bridge 6	Circular CSP Culvert	2.7	Severe rust and loss of material at waterline	Replace culvert (6-10 years)	$35,000	-		2.7	18.6
Bridge 8*	I Beam	2.6	Some rotten deck wood. Girders are rusted and show some thinning of webs and flanges. No Guiderail or hazard signs	Install railings on bridge and hazard signs on approaches	$2,500	c.1960	13.6		
Bridge 9	Arch Culvert on Footing	7.25	In excellent condition, some minor items	Reinstate rock protection downstream and reset sub drain outlets	$3,500	2007		7.25	7.61
Bridge 10	Rectangular Culvert	7.3	In good condition			-	181		
Bridge 11	Arch CSP Culvert on Footing	9.8	In excellent condition, some erosion of banks	Reinstate eroded area	-	c.2005		9.8	19.4
Bridge 12	Circular CSP Culvert	2.6	Culvert in fair condition, rusting at the bottom half	Install hazard signs	-	-		2.6	15.4

*Bridge No. 8, on McOrmand Road, is currently load posted.

1.13.5 **Maintenance Expenditures for Bridges**

Maintenance requirements for the bridge and culvert network are detailed in the OSIM Inspection Report, 2013. As bridge maintenance is anticipated to be completed by Municipality forces, a stand-alone bridge maintenance budget has not been assigned for the purposes of this Plan.

1.14 Building Best Management Practices

The Municipality will employ the following best management practices in maintaining their buildings with a view to ensuring and extending the full service life (or more):

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

Alternative Approaches to Building Management

Discussion of alternatives for management of the Municipality's building assets included:

- Disposal of current building assets and renting of space.
- Renting additional space as opposed to building new space.

Risks to the above alternative approaches included the availability of sufficient and appropriate rental space.

For the purposes of the initial Asset Management Plan (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.

It is recognized by the Municipality that given the high costs associated with replacement of their building assets, it is imperative that the Municipality realize building lives in excess of their expected useful service lives. As such, this is reflected in the Municipality's Levels of Service Document.

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

1.15 Vehicles Best Management Practices

The Municipality shall employ the following best management practices in maintaining their vehicles with a view to ensuring the full service life (or more) from their vehicle assets):

- Vehicles to be serviced on a regular basis, as per manufacturer recommendations or as otherwise deemed necessary by the manager of the fleet.

- Vehicles failures shall be repaired at the earliest opportunity to prevent undue wear and tear related to faulty equipment in disrepair.
- Vehicles shall be used with care.
- Vehicles will be stored indoors whenever possible
- Winter sanding/salting equipment will be washed after use to remove salt/sand residue.
- Operators shall be properly trained on the use and care of the equipment.
- Vehicles shall be locked and parked in a safe location, when not parked at its home facility, to prevent the potential for vandalism and theft.
- Vehicles shall be replaced on or near the end of its respective service life.

Alternative Approaches to Vehicle Management

Discussion of alternatives for management of the Municipality's vehicle assets included:

- Disposal of current vehicle assets and leasing.
- Contract select maintenance tasks to eliminate need for specialized equipment.
- Joint use of infrequently-used equipment with neighboring municipalities.

Risks associated with the above alternative approaches included concern over response time for maintenance given Papineau-Cameron's location.

For the purposes of the initial Asset Management Plan (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.

As stated previously in the Plan, the Township's Level of Service for their vehicle assets is for utilization beyond the expected service lives. It is important that the Township assess the historic service lives of their vehicles and either revise the expected service life, or modify the use or vehicle maintenance activities to ensure the expected service life documented in the Plan is realized. This should be considered early in the life of this Plan.

No specific vehicle allocations have been included in the Plan.

1.16 Prioritization of Projects

The Municipality has developed Levels of Service (LOS) for each of the respective classes of assets included within this asset management plan. The respective LOS sets the benchmark or expectations of the municipality and its constituents/ratepayers. The prioritization of projects within each class of asset and across the various classes of assets may still be required where financing limitations or emergency activities are required. In general, project prioritization shall be undertaken using the following criteria:

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

1.17 Integrated Capital Planning

While it is important to manage each asset group as a system, e.g. road network, 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 ensure the full service life is realized from 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 on 5 years later. The scheduling and prioritizing of projects should be an integrated approach across related assets.

The municipality in scheduling work priorities shall adopt the following integrated capital planning practices:

- Replacement of underground services beneath a road surface shall be coordinated with renewal of the road base and/or surface, wherever feasible, and vice versa.

- 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.

- Culvert replacements shall be done in conjunction with road rehabilitations wherever possible.

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

1.18 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 opportunities for such arise including:

Joint 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. The Municipality shall abide by the By-law.

Shared Services – pooled services with other municipalities.

1.19 Risks to the Asset Management Plan

As with the development of any plan there are inherent risks that may jeopardize the partial or full execution of the plan or may challenge the ability of the plan to meets its respective targets. The following summarizes those risks, associated with the Asset Management Plan, known to exist today.

- Inadequate levels of funding.
- Non-commitment by Municipality Council or Staff to the Plan.
- Emergency activities which direct funds away from the Plan.
- Change to 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.

Identification of the above potential risks is an important step in moving forward with the Asset Management Plan. 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 asset management 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.

Financing Strategy

1.20 Overview

In 2011 the province adopted its long-term infrastructure plan for Ontario, "Building Together". One of the guiding principles of this plan is 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 Papineau-Cameron, 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, the Township calculated a commonly cited sustainability measure— the annual amortization of the current replacement cost of assets--, and contributions to reserves of an equivalent amount were considered as a proposed long-term municipal target. The resulting calculation far exceeded any reasonable potential funding level for the Township, from increased taxation, debt financing, and all other known funding sources/strategies, that this target was felt not to be feasible. In the case of the Town of Papineau-Cameron this "funding of amortization" approach would cost in the neighborhood of $583,631 annually. The municipality's current taxation level is approximately $1.2 million with a 1% increase in the tax rate correlating to approximately $12,000.

Instead, as a more practical and feasible long-term objective, the Municipality has focussed on funding its needs, as dictated by its desired Levels of Service, in the period covered by this plan. An outline of how these revenues and expenditures were estimated, and a discussion of the estimates and other considerations factored into these estimates, is presented in the sections that follow.

It should be noted that this section of the Plan is not intended to replace the Township's standard budgeting practices, and with minor exceptions only, does not prescribe specific work to be undertaken to achieve the Township's desired Levels of Service. Rather, the focus of the revenue and expenditure estimates is to provide a snapshot of the funding required to achieve the desired Levels of Service and the prescribed approach to tax rate increases, and debt and other sources of financing are followed.

The summary results of this strategy are presented in **Appendix A- Table 1D**. A brief summary follows.

In the period covered by the plan, investment in capital asset refurbishment and replacement, net of reserve transfers and long-term debt repayments, is expected to range between $100,000 and $300,000 as the Municipality replaces or improves the capital asset inventory.

The approach taken in the Plan anticipates that Council will use a combination of funding sources including an increase the municipal tax rate at approximately 1% per

year, debt financing and senior level government funding where available. The municipality's annual debt repayment limit established by the Ministry of Municipal Affairs and housing (2012) is prescribed at $294,386. The additional long-term borrowing based on the above limit would provide $2.2 million in additional funds at an Interest rate of 5% over a period of 10 years. The current level of debt repayment is less than $20,000/year. Assuming a conservative approach of 50% of the permitted rate, this would enable the municipality to borrow $1.1 million.

The Municipality has successfully maintained the capital value of assets through targeted expenditures while keeping the annual rate of tax growth to approximately1% over the last decade. Reserves have been maintained at approximately $0.5 million and have been used prudently to fund major expenditures sch as the acquisition of fire vehicles. The Municipality has also benefited from the use of its own staff resources as a means to reduce capital costs. For example, the road system has been maintained with an annual capital expenditures in the order of $100,000. The intent of the municipality is to continue to use this approach, but recognizes that debt financing will be required to offset some of the more significant expenditures, notably the replacement of vehicles.

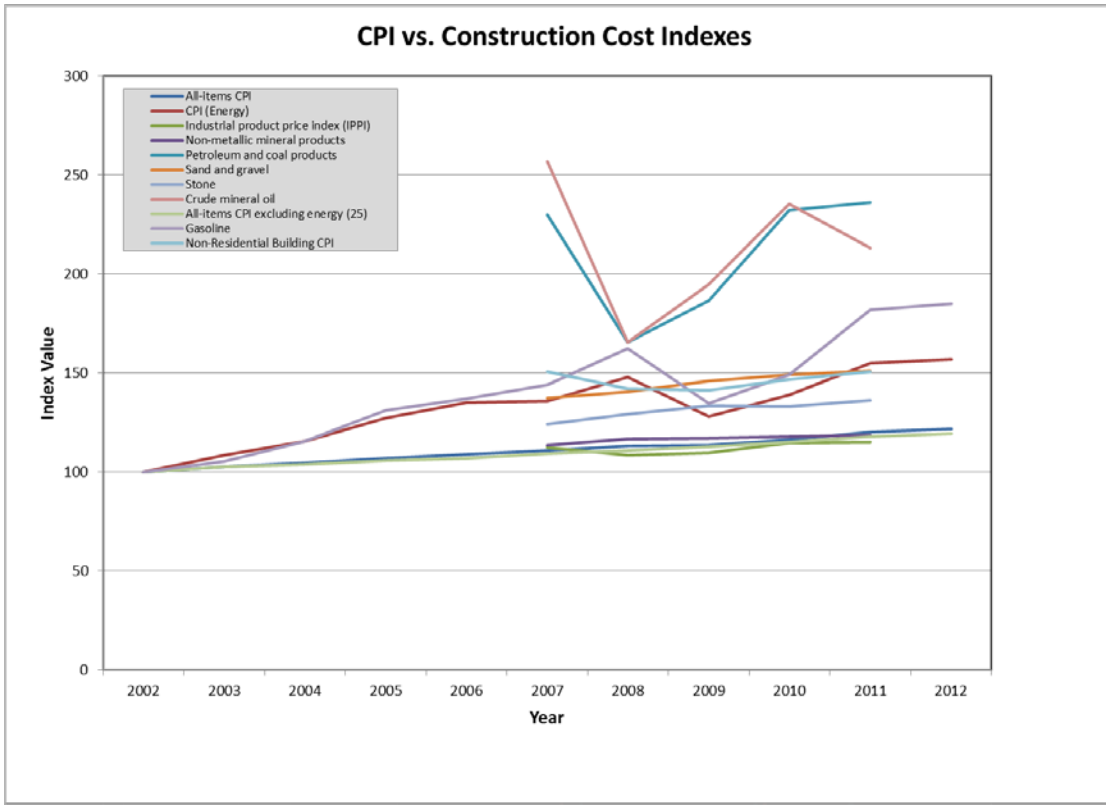
1.21 Assumptions

The following summarizes the assumptions that have been incorporated into the expenditure and revenue forecast:

1. The focus of the Municipality will be on maintaining its current inventory of capital assets rather than expanding its current asset base.
2. The Levels of Service set out in Appendix 'B' for sustaining the quality of assets at their current state, and the level of expenditures dictated by the resulting asset preservation strategy, will be incorporated into the plan as a reasonable level of expenditures by the final year of the Plan.
3. The useful life as set out in the Municipality's Tangible Capital Asset By-Law can be used to reasonably estimate the timing of the replacement of vehicles only. The timing for replacement of roads, bridges and buildings shall be determined based on independent reporting (e.g., OSIM inspections, building reviews, and road needs assessments).
4. Limited growth will lead to only modest growth in the assessment base over the planning period (2014-2023). Consequently, the Municipality will continue to use the current approach of increasing the tax rate at no more than 1% annually.
5. The valuation of the replacement cost for all assets will increase by a rate of inflation forecasted to be 1% annually (see Section 5.3).
6. The Township will assume debt for capital financing only where required and at a maximum of 50% of the rate prescribed as the maximum rate permitted under legislation.

1.22 Consumer Price Index versus Construction Cost Indexes

In assessing the future replacement costs of the various assets within the Asset Management Plan, it is important to consider the appropriate rates of inflation to ensure forecasting is as accurate as possible. 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 rate of 1% has been adopted.**

1.23 Financial Strategy and Capital Expenditure Notes

1. The useful lifespan of the asset, in particular vehicles, was based on the Municipality's Tangible Capital Asset By-Law**.**

2. Capital funding will be drawn from property taxes, transfers from reserves, and through debt financing. The Municipality will utilize the MMAH financial indicators in determining a reasonable debt ceiling not to exceed 50% of the prescribed legislative limit (based on the 2012 limit. The Township has calculated that incurring annual additional debt of $1.1 million (assuming a 5% interest rate), with a ten-year repayment period, would be the maximum amount to be borrowed. The intent would be to retire debt on a revolving 10-year basis. The estimated debt required to address forecasted expenditures over the next 10 years is $610,000.

3. **Roads (Table 1A):** The roads needs management study established a list of priority projects to be addressed in a 1-10 year time horizon. This would require a capital expenditure of $4,375,000. The engineering estimates are considered a guideline; however local experience is that the repairs can be undertaken at a lesser capital expenditure. The Municipality will allocate $100,000 annually for the purposes of capital reconstruction ans resurfacing. The capital expenditure would be supplemented by operational expenditures for ditching and brushing of approximately $42,000 annually. The roads management study will be updated every five years as a measure to reassess road conditions and to determine deficiencies. The report will be used as a monitoring tool in assessing past expenditure patterns in the maintenance of the road network.

4. **Bridges and Culverts (Table 1A):** Capital expenditures for bridges and culverts will be undertaken based on the OSIM reports, which the Municipality will update every two years. The projected sequence of expenditures for bridges and culverts based on the most current OSIM report is detailed previously in the report in Table 4.2.4. To address current deficiencies, expenditures of $41,000 will be required in gthe last year of the Plan.

5. **Buildings (Table 1B):** No major capital expenditures on buildings are proposed within the life of this Plan; however, the Municipality will continue to maintain existing buildings in a good state of repair.

6. **Vehicles (Table 1C):** The ongoing replacement of vehicles is anticipated as they reach the end of their useful life. Through ongoing maintenance, the Municipality will endeavor to extend the lifecycle. Expenditures adjusted to the rate of inflation of approximately $855,000 will be required to replace rolling stock over the life of the Plan. Capital funding will include transfers from reserves and loans.

7. **Table 1D – Yearly Revenue and Expenditure Summary:** This Table provides the historical and projected financial information for capital projects. The municipality maintains reserves of approximately $500,000 of which $175,000 are dedicated to roads and bridges. The intent of the plan is to continue to maintain the reserves at this level. The Plan assumes that $100,000 is available for capital works an annual basis. The Municipality will draw on reserves where required to fund capital projects, notable roads and bridges.

   The summary chart indicates that no funding shortfalls will be incurred using this strategy; however, significant expenditures over and above the proposed 10-year capital program would pose a significant financial constraint to the municipality.

8. Capital expenditures will be monitored on an annual basis. The Asset Management Plan will be subject to a comprehensive review every four years and shall be updated as updated asset condition/needs information is available.

   In summary, the Township will increase the level of capital expenditures targeted to meeting deficiencies on a prioritized basis but neither beyond a prescribed debt ceiling nor an untenable tax increase.

Appendix A - Summary of Asset Expenditures and Funding - Tables 1A – 1D

See attached spread sheets.

Appendix B - Level of Service

Appendix C - Example Life Cycle Cost Analysis

Example Life Cycle Cost Analysis

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.

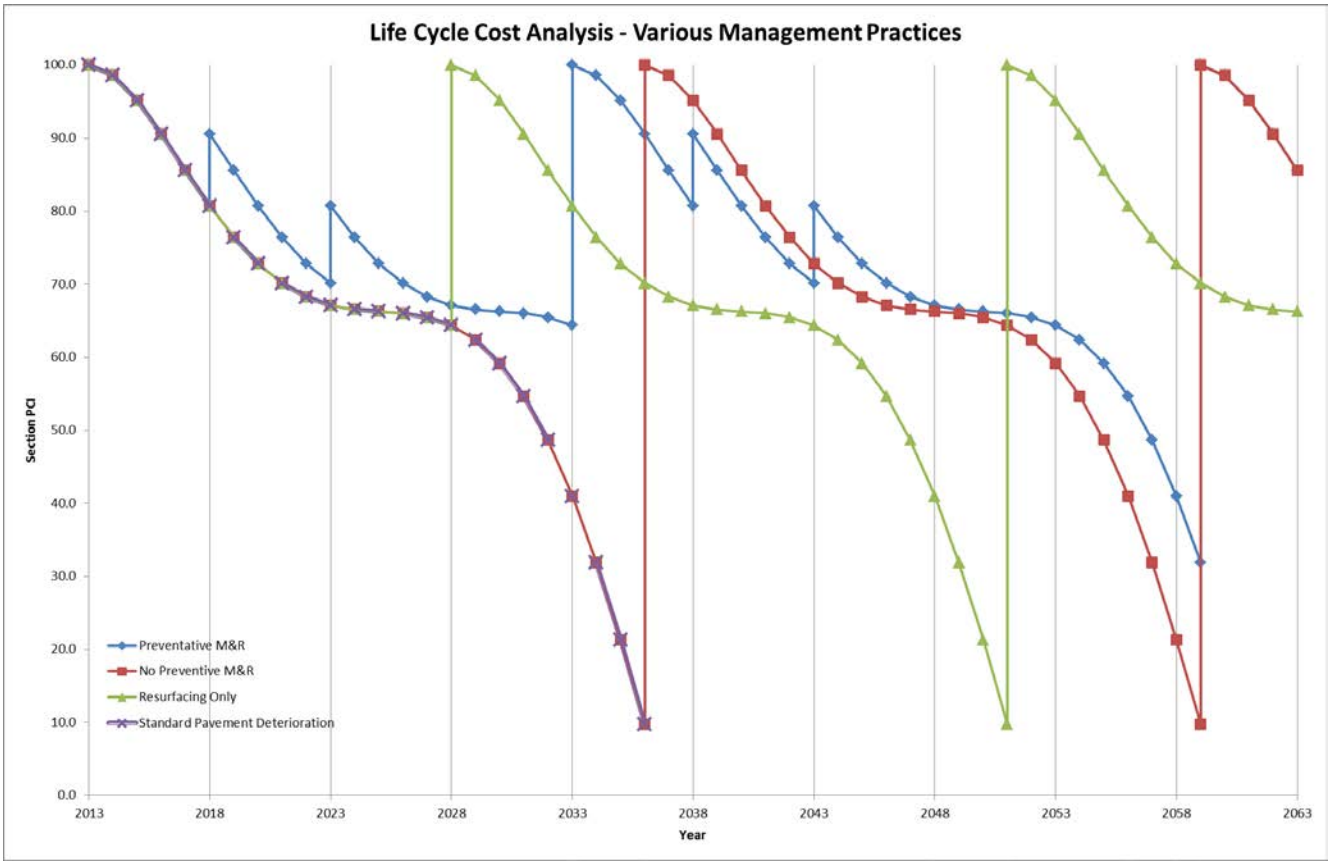


Figure 8.2. Time-Condition Plot for 3 Municipalities

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

Preventive M&R									
Year	**Age**	**Treatment**	**Δ PCI**	**PCI_q**	**Quantity**	**Unit**	**Unit Cost**	**Total Cost**	**Present Worth**
		-- Annual Ditching/Clearing --							
2018	**5**	**Localized Preventive - Rout and Seal**	81-90	Satisfactory-Good	1000	m	$1.50	$1,500.00	**$1,325.78**
2023	**10**	**Global Preventive - Slurry Seal**	70-81	Satisfactory-Good	7000	m^2	$6.50	$45,500.00	**$35,544.53**
2033	**20**	**Surface Course**	64-100	Poor-Good					
		Mill and Dispose of Surface Course			7000	m^2	$12.00	$84,000.00	
		50mm Surface Course			892.5	t	$135.00	$120,487.50	
								$204,487.50	**$124,792.78**
2038	**25**	**Localized Preventive - Rout and Seal**	81-88	Satisfactory-Good	4500	m	$1.50	$6,750.00	**$3,640.89**
2043	**30**	**Global Preventive - Slurry Seal**	68-78	Satisfactory-Good	7000	m^2	$6.50	$45,500.00	**$21,691.79**
2048	**35**	**Safety/Stopgap Maintenance - AC Patching/Leveling**	N/A	N/A	5%	m^2	$30.00	$10,500.00	**$4,424.40**
2053	**40**	**Safety/Stopgap Maintenance - AC Patching/Leveling**	N/A	N/A	10%	m^2	$30.00	$21,000.00	**$7,821.04**
2058	**45**	**Full Reconstruction**	32-100	Serious-Good					
		Remove Asphalt Full Depth			7000	m^2	$15.00	$105,000.00	
		Add and Compact Corrective Aggregate/Correct Crossfall (25mm avg.)			420	t	$35.00	$14,700.00	
		40mm Base Course			686	t	$125.00	$85,750.00	
		50mm Surface Course			892.5	t	$135.00	$120,487.50	
								$325,937.50	**$107,290.28**
2063	**5**	**Localized Preventive - Rout and Seal**	81-90	Satisfactory-Good	1000	m	$1.50	$1,500.00	**$436.41**
		Final PCI in 2063:	**90**	**Good**				**Net:**	**$306,967.90**
								Residual Value:	**$85,346.08**
								Total Cost:	**$221,621.82**

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.

No Preventive M&R									
Year	**Age**	**Treatment**	**Δ PCI**	**PCI_q**	**Quantity**	**Unit**	**Unit Cost**	**Total Cost**	**Present Worth**
2023	**10**	**Safety/Stopgap Maintenance - AC Patching/Leveling**	N/A	N/A	5%	m^2	$30.00	$10,500.00	**$8,202.58**
2028	**15**	**Safety/Stopgap Maintenance - AC Patching/Leveling**	N/A	N/A	10%	m^2	$30.00	$21,000.00	**$14,499.78**
2030	**17**	**Safety/Stopgap Maintenance - AC Patching/Leveling**	N/A	N/A	20%	m^2	$30.00	$42,000.00	**$27,602.19**
2036	**23**	**Full Reconstruction**	10-100	Poor-Good					
		Remove Asphalt Full Depth			7000	m^2	$15.00	$105,000.00	
		Add and Compact Corrective Aggregate/Correct Crossfall (25mm avg.)			420	t	$35.00	$14,700.00	
		40mm Base Course			686	t	$125.00	$85,750.00	
		50mm Surface Course			892.5	t	$135.00	$120,487.50	
								$325,937.50	**$184,707.88**
2043	**7**	**Safety/Stopgap Maintenance - AC Patching/Leveling**	N/A	N/A	5%	m^2	$30.00	$10,500.00	**$5,005.80**
2048	**12**	**Safety/Stopgap Maintenance - AC Patching/Leveling**	N/A	N/A	10%	m^2	$30.00	$21,000.00	**$8,848.79**
2053	**17**	**Safety/Stopgap Maintenance - AC Patching/Leveling**	N/A	N/A	20%	m^2	$30.00	$42,000.00	**$15,642.09**
2059	**23**	**Full Reconstruction**	10-100	Poor-Good					
		Remove Asphalt Full Depth			7000	m^2	$15.00	$105,000.00	
		Add and Compact Corrective Aggregate/Correct Crossfall (25mm avg.)			420	t	$35.00	$14,700.00	
		40mm Base Course			686	t	$125.00	$85,750.00	
		50mm Surface Course			892.5	t	$135.00	$120,487.50	
								$325,937.50	**$104,673.45**
		Final PCI in 2063:	**86**	**Good**				**Net:**	**$369,182.56**
								Residiual Value:	**$81,552.92**
								Total Cost:	**$287,629.64**

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 is 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.

Resurfacing Only									
Year	**Age**	**Treatment**	**Δ PCI**	**PCI_q**	**Quantity**	**Unit**	**Unit Cost**	**Total Cost**	**Present Worth**
2028	**15**	**Surface Course**	64-100	Poor-Good					
		Mill and Dispose of Surface Course			7000	m^2	$12.00	$84,000.00	
		50mm Surface Course			892.5	t	$135.00	$120,487.50	
								$204,487.50	**$141,191.58**
2051	**23**	**Full Reconstruction**	10-100	Serious-Good					
		Remove Asphalt Full Depth			7000	m^2	$15.00	$105,000.00	
		Add and Compact Corrective Aggregate/Correct Crossfall (25mm avg.)			420	t	$35.00	$14,700.00	
		40mm Base Course			686	t	$125.00	$85,750.00	
		50mm Surface Course			892.5	t	$135.00	$120,487.50	
								$325,937.50	**$127,534.43**
2067	**15**	**Surface Course**	64-100	Poor-Good					
		Mill and Dispose of Surface Course			7000	m^2	$12.00	$84,000.00	
		50mm Surface Course			892.5	t	$135.00	$120,487.50	
								$204,487.50	**$53,898.67**
		Final PCI in 2063:	**66**	**Good**				**Net:**	**$322,624.67**
								Residiual Value:	**$62,587.12**
								Total Cost:	**$260,037.55**

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 is 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 is 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.

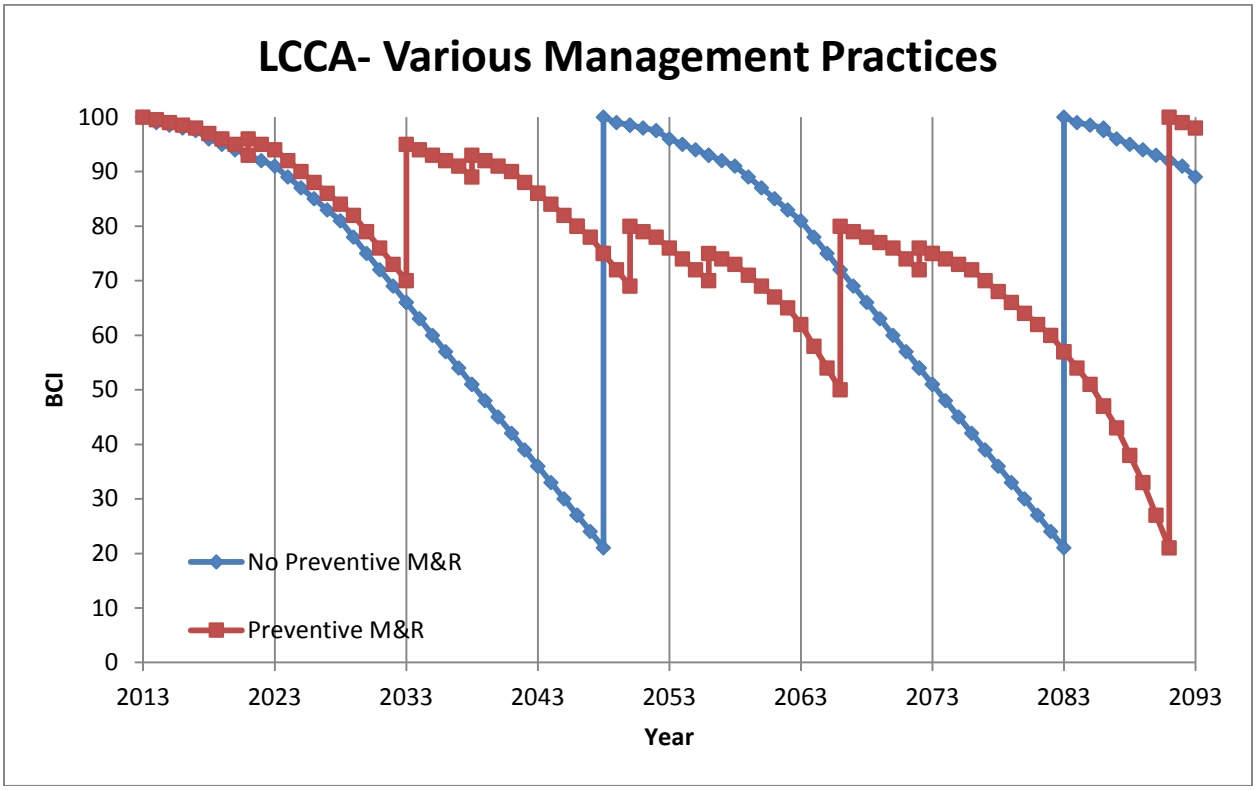
It may be easy to see upfront cost savings by understanding that as long as any costs associated with maintaining the pavement are deferred as long as possible, money will be saved. The reality is that extending a pavements service life prorates the total cost of the pavement over a longer period of 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.

Life Cycle Cost Analysis

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 table:

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. Once the structure condition has deteriorated, 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.