ASSET MANAGEMENT PLAN

2014 to 2023

TOWNSHIP OF JOHNSON

PREPARED BY:

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1 EXECUTIVE SUMMARY

As with most Municipalities across Ontario, the Township of Johnson has undertaken the development of an Asset Management Plan in response to the Ontario Government's provincial capital funding requirements. The purpose of this Asset Management Plan is to assist with prioritizing needs over wants to ensure that infrastructure funding, whether generated through local or senior levels of government, be applied to projects with the greatest needs. This Asset Management Plan has been structured to adhere to the requirement described in the Ontario Ministry of Infrastructure's *Building Together, Guide for Municipal Asset Management Plans*.

As the following Asset Management Plan will outline, the Municipality's existing infrastructure is aging and deteriorating while demand grows for better infrastructure facilities. This demand is in response to higher standards of safety, accessibility, health, environmental protection, and government regulations. The solution to this issue is to examine the way the Municipality plans, designs and manages infrastructure to meet these changing demands. This Asset Management Plan is expected to assist:

- Council in making service level and asset investment decisions
- Staff with the planning and management of the assets
- Taxpayers by sustaining and improving the services they receive

The Municipality is not required to budget for the full replacement value of all assets simultaneously, as portions of assets only require an initial investment followed by further re-investment to maintain the acceptable levels of service.

This Asset Management Plan will address the replacement and any planned expansion priorities for the Municipality, however it is imperative that current maintenance activities be continued. The ability of the Municipality to utilize its knowledge of its infrastructure and apply the best asset management practices at the time will result in positive improvements in the infrastructure condition and level of service. A brief summary of the sections contained within this report is presented as follows.

Section two of the Municipality's Asset Management Plan provides an introduction to the assets included, describes how the plan was developed and outlines the goals of the Asset Management Plan. Section three will outline the asset inventory as well as their characteristics, conditions and values. Section four will outline the expected levels of service for each asset which will also provide an indication of the minimum acceptable standards for those assets. Service levels were developed through consideration of industry standards, generally accepted levels of operation and safety, as well

as evaluating the risk associated with achieving the targets levels established. Section five will outline the asset management strategy for each asset type. The strategy will identify a ten year plan for each group of assets with recommendations for updating the plan as needed. The asset management strategy and timing of implementation for the assets has been laid out by establishing planned actions through options analysis and risk assessment to maximize lifespan and minimize cost in a sustainable way.

Section six provides a financing strategy with potential procurement methods to finance the asset management strategies outlined in the previous section. The way capital assets are managed, capital investment is planned and the way infrastructure needs are communicated, must be a priority of the Township of Johnson's Council. The focus is to develop, implement and manage the long term asset management and financial means for the Corporation.

Small municipalities like the Township of Johnson will face increased financial uncertainty and more planning needs to be done to keep infrastructure in an acceptable condition. Long term asset management and financial plans will be an important and timely turning point for smaller municipalities in Ontario as they look towards the future.

Municipalities have traditionally focused on meeting infrastructure needs through investment in infrastructure pared with various levels of governments on a leveraged contribution basis, without planning for the long term lifecycle costs associated with the ongoing operation, maintenance and renewal of their tangible capital assets. Municipalities often wait until such funding of infrastructure programs are made available by provincial and federal governments before investing. This type of near term or "wait to see what is out there" focus with respect to municipal infrastructure has placed an overall burden on public finances.

Although this comprehensive Asset Management Plan has been developed to cover a period from 2014 to 2023, it is expected to be a living document that is updated regularly as asset conditions change and priority's shift. Improvements to the methodologies of data collection for developing more accurate inventory information and evaluation will only serve to bolster the content of the plan. An Asset Management Plan that is not adhered to or not updated will quickly become out-of-date and of little benefit to the Municipality.

2 INTRODUCTION

This Asset Management Plan (AMP) was prepared by Tulloch Engineering in cooperation with the Township of Johnson to meet the requirements of a Municipal Asset Management Plan. This AMP was developed in accordance with the guidance provided in the Ministry of Infrastructure's guideline *Building Together: Guide for Municipal Asset Management Plans*.

Asset management planning is meant to aid municipalities in making cost effective decisions with regards to operating, maintaining, replacing and disposing of their infrastructure assets. The decisions and directions laid out in the asset management planning process are intended to ensure that the municipality will be capable of providing the levels of service needed to meet their desired plans, goals and objectives.

The Township of Johnson's Official Plan outlines several reasons for its preparation including the following:

- Ongoing requirements for community improvement may be addressed through statements in the Official Plan for identifying and providing direction on improvements to deficiencies in infrastructure within the hamlet of Desbarats;
- Official Plan provides an opportunity for incorporating economic development initiatives to strengthen the economic base of the municipality;

The Official Plan further states that "The thrust of carrying out a balanced menu of capital works will continue. In this way, Council will be able to continue to maintain a high quality system of municipal roads and bridges, community facilities…particularly parks and recreation. The capital works program will focus primarily on continued improvement to the road system. Other foci include waterfront development along the Desbarats River and the development of landfill facilities. Inter-municipal cooperation in this regard can introduce the opportunity for a program for the reduction, reuse, recycling and recovery of waste materials in keeping with provincial objectives to encourage municipalities to recycle up to 25% of their waste by 1992 and 50% by the year 2000."

These statements outline the municipalities intentions to maintain a high quality system of infrastructure and to strengthen the economic base of the municipality. This asset management plan will assist the municipality in achieving these goals.

The AMP is not intended to change the municipalities existing processes and procedures with regards to their infrastructure assets but rather to help improve the decision making process by using long range

vision to dictate resource allocation and using performance based analyses to determine if desired objectives are being met.

This AMP is developed to cover a ten (10) year period and estimate future costs to maintain infrastructure at the expected levels of service. The AMP will provide guidance to the municipality and will be a dynamic plan that will be revised as infrastructure conditions change and municipal priorities are adjusted. A key aspect of the AMP is the ongoing evaluation of asset condition that will require tracking in future years. The intent of the AMP is not to constrain the municipality to a rigid plan with excessive reporting requirements but to provide a reasonable approach to asset management.

Prior to the advent of the Public Sector Accounting Board's requirements for municipalities to value and record their tangible capital assets, these assets simply passed through the budgets and financial records in the same manner as common expenditures. The practices used and policies applied to managing assets were broad, from nonexistent to highly detailed and complex.

The accounting for all tangible capital assets, including infrastructure and general assets facilitates better management of assets, development of appropriate maintenance and replacement policies, identification and timely disposal of surplus assets, and better management of risk. Decision makers are able to better understand the impact of using capital assets when the assets themselves have been identified and amortized.

The requirement to account for tangible capital assets is moving municipalities into a transparent position with senior levels of government and allowing for estimable forecasts. Documenting and reporting on their capital assets and ultimately their means of service delivery provides another starting point. Municipalities have completed stage one of the provincial agenda, what assets and values are delivering services to ratepayer/inhabitants in each municipality.

The fall out of recording, capitalization and amortization of historical data is that it provides the initial source of any financial forecast. Forecasts and projections are the tool for future planning. Nearly all financial forecasts begin with the historical results.

Preparation of the AMP followed the Ministry of Infrastructure guideline *Part 3 – The Elements of a Detailed Asset Management Plan* which outlines the following sections:

- Executive Summary
- Introduction

- State of Local Infrastructure
- Expected Levels of Service
- Asset Management Strategy
- Financing Strategy

The guideline outlines what infrastructure assets are to be included in the AMP. Best practice is for all of the assets to be included in the plan but at a minimum the asset management plans should cover roads, bridges, water and wastewater systems and social housing. The assets included within this Municipal AMP are the municipal roads, bridges, road maintenance vehicles & equipment, drinking water system, sanitary sewer system and storm sewer system. Each asset was separated into its respective category based on type and was assessed for current condition and replacement cost valuation. The condition of each of the assets was assessed using sound and accepted methods. Reference was made to assets valuated as part of the Public Sector Accounting Board requirements. Reference was also made to existing road management studies, sewer & water plans prepared by PUC Inc., Drinking Water System Financial Plan by Shelby Environmental Services and the Municipal Financial Information Returns.

In accordance with the guideline, an AMP must cover a minimum period of ten (10) years and be updated regularly. This AMP will cover a period from 2014 to 2023 and it is recommended that detailed capital expenditures plans for roads, bridges, equipment, water & sewer be updated every two years. The recommendation is that this biennial update of the AMP corresponds with the municipal elections so that the four year term of council will coincide with these regular updates. Therefore the council elected in 2014 would review and update two year segments of the AMP for 2015-16 and again for 2017-18 and subsequent two year periods.

The development of this AMP involved input from municipal staff and council, PUC Inc., Municipal Auditor Anthony Rossi of Calam Rossi Chartered Accountants LLP and Tulloch Engineering Inc. The policies and strategies presented are based upon discussions with municipal representatives and current accepted practices for the management of municipal infrastructure assets.

3 STATE OF LOCAL INFRASTRUCTURE

This section of the plan outlines the current age, condition and replacement cost valuation of the municipally owned capital assets included within the AMP. This evaluation is based on field investigations of roads and bridges, age condition assessment of sewer and water infrastructure and input from PUC on the water and sewer treatment plant facilities.

3.1 ROADS

A 10 Year Road Improvement Plan for roads is included in Appendix A. The municipality has approximately 85.4 kilometres (km) of public roads within its municipal boundaries of which 80.7 km are maintained year-round and 4.7 km are seasonal. A breakdown of the road lengths by surface type is shown in Table I following.

Table I – Summary of Road Types

Surface Type	Length	Percent
H.C.B. (Asphalt)	0.9 km	1.0%
L.C.B. (Surface Treatment)	24.7 km	29.0%
Gravel	59.8 km	70.0%
Total	**85.4 km**	**100.0%**

3.1.1 METHOD OF ROAD CONDITION EVALUATION

The determination of the state of the roads under the Municipality's jurisdiction was completed based upon practices outlined in the MTO Methods and Inventory Manual. This is the same method used by Tulloch Engineering for the preparation of the *Asset Management Roads & Structures PSAB 3150 Compliance* (2008) for the municipality. As per the previous study, the roads were divided into sections, defined by crossroads or physical landmarks, which exhibit uniform performance characteristics. Where applicable the identified sections from the 2008 plan were retained and only modified or updated to suit current conditions. The road condition appraisals were completed on May 14th & 15th, 2013 with the assistance of the Township Roads staff Randy McKinnon and Rick Barber. An overview map of the Township's Road system is appended to the 10 Year Roads Improvement Plan.

Each road section has been given a subjective rating from 1 to 10 based on current surface condition, surface type and drainage conditions. Condition ratings greater than 5 are considered acceptable and are expected to require only normal maintenance. A condition rating less than 5 is considered unacceptable and a road improvement is to be costed. Annual Average Daily Traffic counts were estimated from field observations and discussions with Township representatives.

The anticipated road condition for each section was then projected over ten years to allow for forecasting of required future work. This method of evaluating road surface deterioration relies on estimating the life cycle of various road surfaces. Based on the PSAB 3150 Compliance for Tangible Capital Assets, the deterioration of hard surfacing of roads was based on the following rate.

High Cost Bituminous (Asphalt) – 30 years

Low Cost Bituminous (Surface Treatment) - 8 years

Hot mix asphalt or High Class Bituminous (H.C.B) treated roads typically have a twenty five to forty year life cycle before their condition rating drops below 5. Again this is dependent on their use, structural condition and maintenance regime. Assuming a thirty year life cycle the condition rating for each section of asphalt road would typically drop 0.17 per year. This value was used to determine the year in which the condition rating will drop below 5 and will require resurfacing.

Surface treated or Low Cost Bituminous (L.C.B.) treated roads typically have a seven to ten year life cycle before their condition rating drops below 5. This is dependent on their use, the structural condition of the road and routine maintenance. Assuming an eight-year life cycle the condition rating for each section of surface treated road would typically drop 0.63 per year. This value was used to determine the year in which the condition rating will drop below 5 and will require resurfacing.

The Methods and Inventory Manual suggests that the condition rating for gravel roads will not change with continued routine loose top maintenance. The condition rating for the ten-year forecast will then be the same as the study year, although severe spring breakup may affect the condition rating and require localized repairs that cannot be anticipated.

The following is a measure of the condition of the existing road system proposed for this AMP.

Average Condition Rating	System Condition
8.5 to 10	excellent (very good) structural condition, no improvements required
6.5 to 8.4	good structural condition; some local improvement may be needed
5.0 to 6.4	average (fair) structural condition; continued improvement needed
Less than 5.0	poor structural condition; substantial improvement needed throughout total road system

3.1.2 ROAD CONDITION SUMMARY

A detail summary of the information collected during the investigation is presented in the Roads Plan. This details the condition of the road sections on the basis of a 1 to 10 rating scale. The average condition rating of the three types of road surfaces is as follows on Table II.

Table II – Average Road Condition Rating

Surface Type	Length	Average Rating
H.C.B. (Asphalt)	0.9 km	4.0
L.C.B. (Surface Treatment)	24.7 km	6.2
Gravel	59.8 km	5.3
Total	**85.4 km**	**5.5**

3.1.3 DATA VERIFICATION AND CONDITION ASSESSMENT POLICY

This data verification and condition assessment policy details how the municipality will fulfill the requirement to maintain up to date data information on the municipal road conditions. The road condition assessments would be best conducted by the Road Superintendent or other municipal representatives as they would have the most knowledge of the operation and condition of the roads on a regular basis. The road condition would be updated on an annual basis in the fall after any scheduled

hard surfacing and road maintenance was completed. This information would be entered into an existing spreadsheet that would then project the condition of the road over a period of several years. The condition would be compared to the projected condition based on the parameters outlined previously. Adjustments to the asset management strategy would be based on actual road conditions. This approach has the advantage of ensuring that the completion of road improvements are done on the basis of actual road condition and can address needs more accurately. This approach is especially advantageous when the road condition may be affected by abnormal external forces such as flooding, truck overloading etc.

3.2 MUNICIPAL STRUCTURES

Section 3 of the Public Transportation and Highway Improvement Act, Ontario Regulation 104/97 – Standards for Bridges, outlines that "the structural integrity, safety and condition of every bridge shall be determined through the performance of at least one inspection in every second calendar year under the direction of a professional engineer and in accordance with the Ontario Structure Inspection Manual".

The Ontario Structure Inspection Manual (OSIM) has been used for bridge inspections in Ontario since 1985 and describes the procedures for carrying out detailed visual inspections. The OSIM outlines that the following structures shall be inspected every two years.

- All bridges, culverts and tunnels with spans over 3 metres
- All retaining walls
- All movable bridges

This OSIM also indicates that for culverts with 3 to 6 metre spans and for retaining walls, the inspection interval can be increased to four years if the culvert or retaining wall is in good condition and the engineer believes that the culvert or retaining wall condition will not change significantly before the next inspection.

The Municipality currently has thirteen (13) structures within its jurisdiction that require inspection in accordance with the OSIM. These structures range in type and size and are summarized below in Table III.

Table III – Municipal Structures

Structure Name	Structure Location	Watercourse	Structure Type
BR1 Shewfelt Creek Bridge – Carter	Gordon Lake Road – 0.9 km N of Highway 17	Shewfelt Creek	Single Span Corrugated Steel Plate Arch on Concrete Footings
BR2 Shewfelt Creek Bridge - Grasley	Fisher Road – 3.3 km N of Highway 17	Shewfelt Creek	Single Span Cast in Place Concrete T-Beam Bridge with Concrete Deck
BR3 Stobie Creek – Portlock Corner	Government Road - 0.01 km W of Gordon Lake Road	Stobie Creek	Single Span Cast in Place Concrete T-Beam Bridge with Concrete Deck
BR4 Suddaby Bridge	Old Mill Road – 0.2km N of Gordon Lake Road	Stobie Creek	Three Span Concrete T-Beam Bridge & Concrete Deck
BR5 Suddaby Park Bridge	Gordon Lake Road - 0.5km N of Suddaby Park Road	Stobie Creek	Precast Concrete Box Culvert with Surface Treatment Surface
BR6 Black Creek Bridge	Gordon Lake Road – 0.1 km S of Suddaby Park Road	Black Creek	Single Span Cast in Place Concrete T-Beam Bridge with Concrete Deck
BR7 Sucker Creek Tributary Culvert	Puddingstone Road – 2.1 km N of Government Road	Sucker Creek Tributary	Single Span Corrugated Steel Plate Arch Culvert on Concrete Footings
BR8 Sucker Creek Culvert	MacDonald Drive - 0.04 km W of Highway 17	Sucker Creek	Single Span Corrugated Steel Plate Arch Culvert on Concrete Footings
CVT1 Desbarats River Culvert	Government Road – 2.0 km W of Gordon Lake Road	Desbarats River	Single Span Corrugated Structural Steel Plate Round Pipe Culvert
CVT2 Sucker Creek Culvert	Government Road – 1.9 km W of Lake Huron Drive	Sucker Creek	Single Span Corrugated Structural Steel Plate Round Pipe Culvert
CVT3 Sucker Creek @ CASS	Kensington Point Road – 0.4 km S of Highway 17	Sucker Creek	Single Span Corrugated Structural Steel Plate Pipe Arch Culvert
CVT4 Desbarats River Culvert	Boyer Drive – 0.03 km S of Highway 17	Desbarats River	Precast Concrete Box Culvert with Asphalt Road Surface
CVT5 Government Road Culvert	Government Road – 0.4 km E of Fisher Road	Shewfelt Creek Tributary	Single Span Corrugated Structural Steel Plate Round Pipe Culvert

3.2.1 METHOD OF STRUCTURE CONDITION EVALUATION

The current condition ratings of the municipal structures were established based on the most recent inspections of the structures. The 2012 Bridge and Culvert Inspections completed by AECOM were referenced in the 10 Year Road Improvement Plan. Section 2 of the Public Transportation and Highway Improvement Act, Ontario Regulation 472/10 – Standards for Bridges, allows for inspections methods other than OSIM such as the MTO Municipal Bridge Appraisal Manual and Municipal Culvert Appraisal Manual by stating "the inspection of a bridge may vary from the OSIM if, (a) the variation is not a marked departure from the Ontario Structure Inspection Manual; and (b) the variation does not adversely affect the safety and mobility of people and goods."

In order to more easily express and understand the overall condition of each structure a straight forward condition rating system was developed using information presented within the Municipal Bridge Appraisal forms. The overall condition of the structures considered structure age, component Material Condition Ratings (MCR), component Performance Condition Ratings (PCR) and any recommended needs repairs or replacements.

- Excellent: Typically, these structures were constructed within the past 10 years and have no identified immediate or future needs.
- Good: These structures were constructed within the past 30 years and have no immediate needs and limited needs identified for the next 1 to 5 years. These structures typically have an assumed remaining service life of 20 years or more.
- Fair: These structures are generally greater than 30 years old and many may even be more than 40 years old but are assessed to be in reasonable condition with only minor, non-structural immediate needs, and moderate needs identified for the next 1 to 5 years. These structures may require replacement within approximately 15 to 20 years
- Poor: These structures are generally greater than 40 years old and appear to be in generally poor condition with numerous immediate structural and non-structural needs identified. These structures may require replacement within the next 10 years.

3.2.2 MUNICIPAL STRUCTURE INVENTORY

After detailed review of the 2012 inspection reports for the thirteen (13) municipal structures the condition ratings and recommended needs were determined and summarized in Table IV following.

Table IV – Structure Conditions & Needs

Structure Name	Year Constructed	Structure Condition	Structure Needs
BR1 Shewfelt Creek Culvert (Gordon Lake Road)	2006	Excellent	Guiderail End Treatment at NW Corner
BR2 Shewfelt Creek Bridge (Fisher Road)	1950's	Fair	Guiderail End Treatments, Patch Soffit, Girder & Wingwalls
BR3 Stobie Creek Bridge (Government Road)	1937	Fair	Repair Guiderails & Provide End Treatments
BR4 Suddaby Bridge (Old Mill Road)	1913	Poor	Consider Rehabilitation or Replacement
BR5 Suddaby Park Bridge (Gordon Lake Road)	2009	Excellent	None
BR6 Black Creek Bridge (Gordon Lake Road)	1930's	Fair	Guiderail End Treatments & Rehabilitate Deck Barrier, Soffit & T Beams
BR7 Sucker Creek Culvert (Puddingstone Road)	2002	Good	Repair Guiderail Cables
BR8 Sucker Creek Culvert (MacDonald Drive)	2000	Good	Install Guiderails
CVT1 Desbarats River Culvert (Government Road)	1980's	Poor	Install Guiderails, Replace Culvert
CVT2 Sucker Creek Culvert (Government Road)	1980's	Fair	Install Guiderails, Lining of Barrel
CVT3 Sucker Creek Culvert (Kensington Point)	1980's	Fair	Inspect below waterline for damage to pipe
CVT4 Desbarats River Culvert (Boyer Drive)	2008	Excellent	None
CVT5 Government Rd Culvert (Government Rd)	1980's	Good	Install Approach Guiderails

3.2.3 DATA VERIFICATION AND CONDITION ASSESSMENT POLICY

As mandated by Section 3 of the Public Transportation and Highway Improvement Act, Ontario Regulation 104/97 – Standards for Bridges, the structures under the municipality's jurisdiction should continue to undergo regular inspections every two years for bridges and every four years for culverts of acceptable condition. These inspections should be reviewed by municipal staff and recommendations should be implemented. The costs for these needs should be accounted for in an updated asset management plan for the bridges and culverts. It is recommended that the type of form used be the standard OSIM form as outlined in the MTO manual and not the alternative Municipal Structure Inspection Form as they are more difficult to determine condition of the structure to the uninformed user.

3.3 MUNICIPAL ROAD VEHICLES AND EQUIPMENT

The municipality maintains vehicles and equipment to support road maintenance and construction activities. The condition of the vehicles and equipment are critical to being available when needed especially as they relate to winter maintenance and addressing emergency needs.

3.3.1 METHOD OF CONDITION EVALUATION

The method of condition evaluation of vehicles and equipment is primarily based on equipment age. The depreciation for vehicles and equipment that are being utilized on a regular basis can be generally projected through the life of the asset. Some variation on depreciation of the asset is dependent on the quality of the original asset, the extent of use and the maintenance performed on the asset.

3.3.2 MUNICIPAL ROAD VEHICLES AND EQUIPMENT CONDITION SUMMARY

Useful life of the asset was determined during completion of the PSAB 3150 requirements and was used to project expected replacement date unless indicated otherwise by municipal staff. A summary of the municipal vehicles and equipment is included in the 10 Year Road Plans included in Appendix A.

3.3.3 DATA VERIFICATION AND CONDITION ASSESSMENT POLICY

The municipality would be required to keep records on all owned road vehicles and equipment. The key information to be recorded is as follows:

- Type
- Make
- Model
- Model Year

- Purchase Date
- Purchase Cost
- Maintenance Records
- Repair Records & Costs

Tracking of this information will allow the municipality to make an informed decision on replacement of the asset.

3.4 DRINKING WATER SYSTEMS

The municipality operates a water treatment plant and distribution system to provide potable water to the community of Desbarats. This municipal system currently supplies potable water to 110 users including businesses and the Johnson Tarbutt Public School and Central Algoma Secondary School. The plant is at 41.8% capacity according to the Desbarats Drinking Water System Waterworks #210001870 Annual & Summary Report 2012. This water treatment plant and distributions system was constructed in 1988 and bought online that year. The water system includes 170m of intake line and 3,280m of transmission pipe from the water treatment plant to Desbarats. The water distribution system also includes 4,842 metres of distribution watermain along with associated appurtenances but does not include fire hydrants.

3.4.1 METHOD OF CONDITION EVALUATION

The method of condition evaluation for the water treatment plant components was completed by PUC who are the operators of the plant. Evaluation of the in-ground watermain network was based on an age condition assessment given the difficulty and expense in determining the actual condition of underground plant. As the functional life of the watermain pipe is 75 years and the infrastructure was constructed in 1988 there is well beyond 10 years anticipated life left in the watermain components. It is recommended that the municipality record on “as built drawings” all watermain break repairs and other work as a means of determining those sections of watermain that will need to be prioritized for replacement in the future. These replacements would be coordinated with road improvements and other linear infrastructure (storm and sanitary sewers).

The water treatment plant has been broken down by components by the PUC and an estimated life of each water system component has been assigned by PUC. The PUC has a plan for completing the replacement of these assets as their life span has expired to ensure that the system is kept operational

at all times. Shelby Environmental Services Inc. completed a Drinking Water System Financial Plan #275-301 for the Township. This plan outlines projected expenses and revenue over the next ten years.

3.4.2 DRINKING WATER SYSTEM CONDITION SUMMARY

The PUC provided a summary of the drinking water treatment plant components and the estimated times for replacement. This information is included in the 10 Year Water, Sanitary & Storm Systems Improvement Plan. This summary provides a detailed accounting of the drinking water treatment plant components and the recommended replacement of the asset along with associated costs.

As the water distribution system is only 25 years into its expected life of 75 years it is determined that the entire system is in a functional condition. As the system was constructed all in the same year the need to replace any of the distribution assets is not expected within the next 10 years –the length of this AMP. As PVC watermain assets are known to exceed there estimated life it would not be recommended that replacement of the watermains be conducted at the end of the 75 years. However as indicated a record of repairs to watermains sections should be maintained so that poor performing sections can be identified for replacement first. In addition the replacement of gate valves may need to be conducted as a maintenance activity if they are found to be difficult to operate.

Table V – Summary of Drinking Water Distribution System

Pipe Size	Length (m)
114mm Ø Intake Pipe	170 m
160mm Ø Transmission Pipe	3,280 m
25mm Ø Watermain Pipe	47 m
50mm Ø Watermain Pipe	3,287 m
75mm Ø Watermain Pipe	1,020 m
100mm Ø Watermain Pipe	134 m
160mm Ø Watermain pipe	354 m

3.4.3 DATA VERIFICATION AND CONDITION ASSESSMENT POLICY

The following policy for data verification and condition assessment is recommended for the drinking water system. For the drinking water treatment plant, it is recommended that the operator of the plant continue to provide review and assessment of components and schedule regular maintenance and needed replacement of assets based on age and condition.

3.5 SANITARY SEWAGE SYSTEM

The municipality operates a sanitary sewage system within the community of Desbarats. This municipal system services similar users as the water system with the exception of Central Algoma Secondary School that has its own sanitary sewage system. The sanitary sewer system is a non-gravity system serviced by sanitary forcemains throughout the community. Each user has two concrete tanks including an effluent pump that will pump the sanitary sewage into the forcemain and then directed into the sewage lagoons located to the east of the Township offices. The Township is responsible for maintenance of the effluent pump and to clean out the solids in the septic tank which is typically done every three to five years.

As the functional life of the sanitary sewer pipe is 75 years and the infrastructure was constructed in 1988 there is well beyond 10 years anticipated life left in the sanitary sewer network. It is recommended that the municipality record on “as built drawings” all repair work as a means of determining those sections of sanitary sewer that will need to be prioritized for replacement in the future. These replacements would be coordinated with road improvements and other linear infrastructure (storm sewers and watermain).

3.5.1 METHOD OF SANITARY SEWER CONDITION EVALUATION

The Municipality’s sanitary sewer collection and treatment system was evaluated based on the as built drawings. The collection system was divided into sections based on pipe material, size and location. Each asset was assigned a number, and then its location, length, diameter, material and year of construction were noted.

3.5.2 SANITARY SEWER CONDITION SUMMARY

A summary of the Municipality’s sanitary sewer inventory is presented on the following Table VI. The inventory is based on the Municipality’s Tangible Capital Asset Summary and supplemented with PUC Equipment Inventory Summary. The complete inventory is presented in Appendix B, including all sewer components and assumptions used to arise at the given ratings and projected replacement costs.

Table VI – Summary of Sanitary Sewage System Components	
Component	**Length (m)**
50mm Ø Sanitary Sewer Forcemain	2,339 m
75mm Ø Sanitary Sewer Forcemain	1,198 m
100mm Ø Sanitary Sewer Forcemain	410 m

3.5.3 DATA VERIFICATION AND CONDITION ASSESSMENT POLICY

In accordance with the guide, it is recommended that a data verification policy and condition assessment policy be established to outline when and how the sanitary sewer infrastructure be updated. There is currently no up to date information available on the condition of the sanitary sewer collection assets. The current PUC programs should be continued to ensure ongoing compliance with regulatory agencies.

Inspection of the system by camera is not an option as it can only be used for a gravity system. The recommendation to monitor the condition of the sanitary system for leaks to determine when the system starts to deteriorate that it requires replacement. In addition as new users are added to the system the connection to the force mains will allow an observation of the condition of the pipe.

3.6 STORM SEWER SYSTEM

The municipality has a storm sewer system within the Community of Desbarats. This Storm Sewer System services Lake Huron Drive from Highway 17 northerly to Government Road. This storm sewer system services a curb and gutter street with some ditch inlets. The type of pipe was concrete and therefore a functional life of 75 years is anticipated.

3.6.1 METHOD OF STORM SEWER CONDITION EVALUATION

The municipality's storm sewer collection system is based on the as built drawings provided for the original installation. The storm sewer system was divided into sections based on pipe material size and location. Each asset was assigned a number and then its location, length, diameter, material and year of construction were noted.

3.6.2 STORM SEWER CONDITION SUMMARY

A summary of the municipality's storm sewer inventory is presented on the following Table VII. The inventory is based on the municipality's targetable capital asset summary.

Table VII Summary of Storm Sewer System Components

Components	Length (m)/Number
Structure – CB's/MH	27
300 mm Ø Concrete Pipe	608 m
400 mm Ø Concrete Pipe	32 m
530 mm Ø Concrete Pipe	93 m
750 mm Ø Concrete Pipe	86 m
850 mm Ø Concrete Pipe	84 m

3.6.3 DATA VERIFICATION AND CONDITION ASSESSMENT POLICY

It is recommended that a Data Verification Policy and Condition Assessment Policy be established to outline when and how the storm sewer infrastructure is updated. There is currently no up to date information available on the condition of the storm sewer with the exception of potential heaving issues at structures. It is recommended that prior to initiation of a reconstruction of Lake Huron Drive that camera inspection of the pipe be completed. This inspection would be done in conjunction with flushing of the system to allow a detailed inspection of the storm sewer pipe. The inspection would reveal whether sections of concrete pipe had become damaged and if there is heaving of the pipe causing infiltration. A decision on what repairs would be required would be determined at that time prior to proceeding with the Lake Huron Drive improvements.

4 DESIRED LEVELS OF SERVICE

Desired Levels of Service form a key component of the asset management process as they define the way in which the municipality wants their assets to perform. Levels of Service outline measureable targets and timeframes and can serve purposes such as:

- Act as a guide for management and operations staff
- Provide a means of assessing asset performance
- Provide a link between levels of service and costs

Determining the desired levels of service for each asset type was completed with consideration of a number of factors including costs, user expectations and government mandated minimum requirements. The target levels of service should be reviewed on a regular basis to determine if they are appropriate and achievable. Consideration should be given to risk and cost in the development of target levels of service.

All assets carry a level of risk for their users. Generally when conducting risk assessment, two key factors that come into consideration are frequency of use and cost of improvement. Acceptable levels of risk may vary depending on their frequency of use. For example, if a rarely used asset and a frequently used asset do not meet today's minimum standards, the risk is higher for the frequently used asset and therefore should be prioritized ahead of a rarely used substandard asset.

It is desirable to limit risk by replacing/improving the condition of all assets to meet today's minimum standards; however the cost of doing so may not be feasible. The Municipality attempts to achieve a manageable level of risk by completion of condition reviews and prioritizing of replacement/improvement projects.

To optimize an Asset Management Plan and ensure target levels of service are appropriate, performance measures or indicators are established and tracked. Performance measurement of the assets will provide an indication as to whether the rehabilitation and replacement strategies are effective or whether changes need to be made. Performance benchmarks for the various asset groups are described in the following sections. As much as possible these are tied to the performance measures outlined in the Financial Information Return which is a document on financial and statistical information of Municipalities. The Financial Information Return is a mandated document that municipalities submit on an annual basis to the Ministry of Municipal Affairs and Housing.

4.1 ROADS

The Municipality has established a target level of service for roads by classifying road segments based on their surface type and estimated traffic volume. The municipal road network has been evaluated through completion of the 10 Year Roads Improvement Plan. In this plan, all road segments have been rated using the MTO Road Appraisal forms. The rating system consists of a number 1 through 10 (where 10 represents a road in excellent condition, and a rating of 5 or less corresponding to poor condition).

The desired level of service for Municipal roads is to maintain an average weighted condition rating of 7.5 for the road network consisting of roads of 50 AADT (average annual daily traffic) and greater. Roads of less than 50 AADT are often seasonal or rarely used roads and holding them to a minimum standard can be costly. The goal of this level of service is to develop and maintain uniformity for users of the road network and to ensure that roads meet the minimum municipal standards.

The following strategies are recommended to achieve the target; however as a general rule when a roadway reaches a condition rating of 5 or less it is scheduled for improvement.

1. Improvements to poor condition roads (<5) with AADT of 50 vehicles per day or more;
2. Hard-top surfacing of loose-top rural high traffic volume arterial roads and of loose-top roads in urban and semi-urban environments;
3. Widening of critically substandard width roads;
4. Improvements to roads with other critical and safety needs (e.g. Grade raise of road in flood plain, sharp horizontal and vertical curves);
5. Remaining improvements generally prioritized on the basis of condition rating;

These improvements and repairs are incorporated into the road condition inventory spreadsheets which project the condition of road segments over the next 10 years. As was outlined in the 10 Year Roads Improvement Plan, a road's condition will degrade with time; the rate of degradation is a function of the adequacy of the roads design, the quality of construction, the traffic volume it serves, the maintenance effort it receives and its surface type.

For the purposes of this study, the following assumptions were made for road deterioration rates:

- Gravel Roads → Condition rating is maintained with regular maintenance
- Low Class Bituminous Roads → Condition rating reduced by 0.63 per year
- High Class Bituminous Roads → Condition rating reduced by 0.17 per year

Further detail on how the future ratings are achieved can be found in the 10 Year Road Plan completed as part of this planning exercise.

The performance of the road network should be evaluated by completing condition assessments on a biennial basis; the actual condition ratings collected should be compared to the projected ratings to determine whether or not the target level of service is being achieved. Adjustments to the plan should be made as necessary either by increasing the annual budget for road improvements, or by revising the target level of service.

The Performance Measures: Effectiveness for paved roads is outlined on line 2152 of Schedule 92 of the Financial Information Return for Roadways. This performance measure takes the number of paved lane kilometres where the condition is rated as good to very good and divides by the total number of lane kilometres. The determination of the definition of good and very good in relation to the numbered condition rating system is important. Given that the municipality will knowingly let the road system for paved roads drop to a rating of 5 before scheduling a repair/replacement then it can be expected that the entire road system will not receive a good to very good rating. The following condition rating standard as it relates to the FIR reporting is proposed with the expectation that 70% of the paved roads within the municipality achieve a good to very good (excellent) rating at the end of the reporting year which will be after any surface improvements are completed. If the percentage falls below this rating then the municipality is falling behind on their restoration of paved roads.

Condition Rating	System Condition
8.5 to 10	very good (excellent)
6.5 to 8.4	good
5.0 to 6.4	fair
Less than 5.0	poor

The following Table VIII outlines the existing rating of roads and the goal for that class of roads.

Table VIII – Existing & Target Road Condition Rating		
Surface Type	**Existing Rating**	**Target Rating**
H.C.B. (Asphalt)	4.0	7.5
L.C.B. (Surface Treatment)	6.2	7.5
Gravel >50 AADT	5.8	7.5

The following is recommended for desired levels of service for roads:

- Complete Road Maintenance as mandated by Ontario Regulation 239/02 Minimum Maintenance Standards for Municipal Highways.
- Review & track all accident reports to determine if road condition or alignment contributed to the accident
- Endeavour to achieve an average rating of 7.5 for hard surfaced roads and gravel roads of greater than 50 AADT.

4.2 MUNICIPAL STRUCTURES

Bridges and structural culverts of greater than 3 metre spans consist of many different components with varying life expectancies, generally ranging from 50 to 75 years. The condition of a bridge is evaluated by completing mandatory biennial (every 2 years) OSIM inspections (every 4 years for culverts in good condition) which provide detailed condition ratings of all the components of each structure. The condition of the various components is described by one of four ratings, being Excellent, Good, Fair or Poor.

In general, components of a bridge are recommended for rehabilitation once a large percentage reaches a condition of 'Poor'. If a number of components are rated poor, the structure is typically recommended for a major rehabilitation or replacement within a specified timeframe.

The desired level of service for municipal bridges has been established through review of the current OSIM inspection data. The target level of service for Municipal bridges and culverts is for structures to achieve the following features with some exceptions for low volume roads as allowed by the *MTO Structural Manual.*

- Hydraulically adequate opening to 1:100 year storm event

- No Load Posting of Structure
- Two lane crossing
- Guiderail protected with proper end treatments
- Good sight lines on the approaches to the water crossing

The ideal scenario is for all structures to meet these requirements. However, bridges on low volume roads of less than 50 vehicles per day would not necessarily require a two lane crossing given the low number of times a conflict for crossing would be expected to occur. This is especially true if the site lines from both directions are good allowing approaching vehicles to stop if needed. If a structure is load posted but is still functional and able to meet the needs of the municipality it would make economic sense not to replace it until such time as its condition has deteriorated to a level that replacement was necessary to ensure public safety. Finally the need for proper guiderails and end treatments should be considered typically if the structure will not be up for replacement within ten years.

The following is recommended to meet desired levels of service for structures:

- Complete OSIM inspections as mandated by Ontario Regulation 104/97 Standards for Bridges
- Implement studies and repairs as outlined in OSIM reports
- Evaluate Rehabilitation and Replacement Studies for Structures when they are within five years of the end of their design service life or when the overall condition is poor
- New structures to meet the target requirements with the exceptions of “low volume roads”
- New structures to have a minimum of 75 year design service life
- Use conservative calculations when sizing structures for hydrology and hydraulics given the occurrence of several extreme rain events in the past 5 years

The following Table IX outlines the municipal structures with an evaluation of the parameters present and comments on the future need of replacement.

Table IX – Summary of Bridges Conditions

Bridge Name	Overall Condition	Hydraulics Adequate	Load Posted	Access	No of Lanes	Guiderail Protection
BR1 Shewfelt Creek (Gordon Lake Road)	Excellent	Okay	None	Alternate	2	End Treatment Required
BR2 Shewfelt Creek (Fisher Road)	Fair	Okay	None	Alternate	1	Inadequate
BR3 Stobie Creek (Government Road)	Fair	Okay[1]	None	Alternate	1	Inadequate
BR4 Suddaby Bridge (Old Mill Road)	Poor	Okay	10 Tonnes	Alternate	1	Inadequate
BR5 Suddaby Park Bridge (Gordon Lake Rd)	Excellent	Okay[1]	None	Alternate	2	Okay
BR6 Black Creek Bridge (Gordon Lake Road)	Fair	Okay[1]	None	Alternate	1	Inadequate
BR7 Sucker Creek Trib. (Puddingstone Road)	Good	Okay[1]	None	Only	2	Okay
BR8 Sucker Creek (MacDonald Drive)	Good	Okay	None	Only	1 ½	Inadequate
CVT1 Desbarats River (Government Road)	Poor	Okay[1]	None	Alternate	1	Inadequate
CVT2 Sucker Creek (Government Road)	Fair	Okay[1]	None	Alternate	2	Inadequate
CVT3 Sucker Creek (Kensington Point)	Fair	Okay	None	Alternate	2	Inadequate
CVT4 Desbarats River (Boyer Drive)	Excellent	Okay	None	Alternate	2	Okay
CVT5 Government Rd (Government Rd)	Good	Okay	None	Alternate	2	Inadequate

[1] A number of structures were overtopped with the flooding of September 10, 2013. This storm event is considered to be a rare event greatly exceeding a 1:100 year design storm.

The Performance Measures: Effectiveness for structures is outlined on line 2165 of Schedule 92 of the Financial Information Return for Bridges & Culverts. This performance measure takes the number of structures where the condition of primary components is rated as good to very good, requiring only repair. The determination of definition of good and very good relating to the OSIM evaluation of bridges and culverts is important. The following summary outlines the comparison of the two rating system as well as the length of time a structure would be anticipated to be at each level. The following condition rating standard as it relates to the FIR reporting is proposed with the expectation that not all bridges and culverts within the municipality will achieve a good to very good rating at the end of the reporting year.

There will be a time when a bridge as it nears the end of its design service life will drop into fair or even a poor overall condition. Although the structure is still functional for its purpose, planning for replacement will be undertaken. Therefore a reasonable approach would have a target that 70% of the structures are considered good to very good. If this level is greater than 70% then the overall condition of the municipal structures is above average. If this level is between 50% and 70% then some improvement is necessary. If the performance measure drops below 50% then overall condition of municipal structures is a real concern and should be addressed immediately.

Table X – Comparison of Structure Condition and System Condition

Overall Condition Rating (OSIM)	Design Life Expectancy Length (Percent)	System Condition (FIR)
Excellent	20%	Very Good
Good	50%	Good
Fair	20%	Fair
Poor	10%	Poor

4.3 MUNICIPAL ROAD MAINTENANCE VEHICLES AND EQUIPMENT

The target level of service for municipal road maintenance vehicles and equipment is to maintain all vehicles such that they are in good repair with minimal breakdowns. To track any equipment failures the municipality should implement a vehicle and equipment log for each municipal asset. This log would record any vehicle or equipment failures, repair documentation including costs and regular maintenance activities. This log book would be reviewed on an annual basis for each asset to determine those assets that may be considered unreliable for their intended purposes. This is especially relevant for vehicles and equipment that are used in winter maintenance as their unavailability would have a direct impact on public safety. Given the range of assets in type and use it is difficult to assign a minimum reliability standard that would apply to all vehicles and equipment. However a 99% availability rate, defined as the percentage of days an asset is available for use would provide a level of service that would be expected for the assets. Ideally an asset will be available 100% of the time but achieving this level may be cost prohibitive. It is recommended that records be kept of the availability of assets and when the level drops below 99% then an evaluation for the major repair of the asset be undertaken. For availability rates of less than 95% the asset should be replaced.

Availability Rate	Action
99% to 100%	Asset Okay
95% to 99%	Asset Repaired
<95%	Asset Replaced

Confirming achievement of this level of service will require the Municipality to keep records and review them on an annual basis at a minimum. Actions resulting from this review would then be implemented in the asset management plan for that asset.

4.4 DRINKING WATER SYSTEM

Levels of service for the water supply system within the community are defined through the use of performance measures that have been established as part of this comprehensive asset management plan. The primary focus of the Municipality is to maintain an adequate level of service for the existing water supply system. This will be accomplished by continually monitoring the performance of the system using measures that can be tracked to identify issues. Confirming achievement of the identified levels of service will require the Municipality to keep regular records and review them on an annual basis.

4.4.1 WATER TREATMENT PLANT

Performance Measures: Effectiveness for Boil Water Advisories is outlined on line 3355 of Schedule 92 of the Financial Information Return. This performance measure calculates the sum of the number of boil water days times the number of connections affected, divided by the total connections within the service area. The target for this performance measure is 0 days as a boil water advisory is an inconvenience to residents. It should be noted that under certain conditions such as watermain extensions, boil water advisories are unavoidable due to the need to connect into the system. These types of occurrences should be considered when reviewing the effectiveness measure. A recording of these events in the FIR can allow tracking of the system to determine if it is inadequately meeting the needs of the community.

4.4.2 WATER DISTRIBUTION SYSTEM

Performance Measures: Effectiveness for Watermain Breaks is outlined on line 3256 of Schedule 92 of the Financial Information Return. This performance measure calculates the number of watermain breaks in a year per 100 km of watermains within the system. The ideal target for this performance

measure is 0 breaks as they are obviously an undesirable event. However as the system ages it can be expected that the likelihood of breaks will increase. The performance measure is more suited to a city where significantly longer lengths of watermain would give the expectation there will be some breaks in a year. As the municipality is quite small a desired target of 0 breaks will be used. As performance of the watermain system directly impacts the public, the establishment of levels of service with a performance target provides the public with assurances that their concerns are being addressed. The following performance measures are proposed for the watermain distribution system.

- Water Treatment & Distribution will meet all regulatory requirements
- Customer complaints are responded to within 24 hours
- Watermain repairs will be completed within 48 hours 90% of the time.

4.5 SANITARY SEWAGE SYSTEMS

Levels of service for the sanitary sewage system within the community are defined through the use of performance measures that have been established as part of this comprehensive asset management plan. The primary focus of the Municipality is to maintain an adequate level of service for the existing sanitary sewage system. This will be accomplished by continually monitoring the performance of the system using measures that can be tracked to identify issues with the sanitary sewer system. Confirming achievement of the identified level of service will require the Municipality to keep and review regular records on an annual basis.

4.5.1 SEWAGE TREATMENT PLANT

Performance Measures: Effectiveness for Wastewater Bypasses Treatment is outlined on line 3155 of Schedule 92 of the Financial Information Return. This performance measure calculates the estimated megalitres of untreated wastewater divided by the estimated megalitres of untreated and treated wastewater for the year. The target for this performance measure is 0% as untreated wastewater is a very undesirable event. Occurrences of untreated wastewater should result in immediate action to correct the problem. The possibility of untreated sewage is directly related to the size of the sewage lagoons. New development or infiltration into the sanitary system will need to be monitored.

4.5.2 SEWAGE COLLECTION SYSTEM

Performance Measures: Effectiveness for Wastewater Main Backups is outlined on line 3154 of Schedule 92 of the Financial Information Return. This performance measure calculates the number of wastewater backups divided by the 100 km's of wastewater main in year. The target for this performance measure is 0 as sewage backups are an undesirable event. Should backups occur the cause of the problem should be identified and corrected as soon as possible. As performance of the sanitary collection system directly impacts the public, the establishment of levels of service with a performance target provides the public with assurances that their concerns are being addressed. The following performance measures are proposed for the sewage collection system.

- Sewage Treatment & Collection will meet all regulatory requirements
- Customer complaints are responded to within 24 hours
- Sewage System Repairs/Pump Replacements will be completed within 48 hours 90% of the time.

5 ASSET MANAGEMENT STRATEGY

As referenced in the guide, "*the asset management strategy is the set of planned actions that will enable the assets to provide the desired level of services in a sustainable way."* All assets have a limited life expectancy and to some degree the rate of deterioration can be estimated. A decision made at any point in time in the lifecycle of an asset has an impact on the remaining life and may have operational implications and related costs.

5.1 PLANNED ACTIONS

This section of the asset management plan is intended to provide planned actions towards an asset management strategy as follows:

- Management Solutions (actions or policies that can lower cost and extend asset life)
- Maintenance Activities (regular maintenance and responding to unexpected events)
- Renewal/Rehabilitation Activities (significant repairs to extend the life of an asset)
- Replacement Activities (response to when an asset has reached the end of its useful life)
- Disposal Activities (disposing of an asset when it has reached the end of its useful life)
- Expansion Activities (extending service to unserviced areas or to meet growth demands)

5.1.1 ROADS

A summary of planned actions for roads is included following. It is split up into gravel roads in Table XI, surface treated roads in Table XII and asphalt roads in Table XIII. They are dealt with separately as their asset management strategies will vary.

Table XI – Strategy for Gravel Roads (Rural)	
Asset Life Cycle	With regular maintenance asset is expected to not have an end life
Minimum Municipal Road Standard	Design Speed = 80 km/h (Exceptions to 50 km/h to 70 km/h for Low Volume or Semi Urban Areas based on site conditions and cost) Minimum Right of Way Width– 20m, New Development to have 30 m to provide for clearing requirements for Utilities Road Width = 8.0 metres, Surface Crossfall = 3% Road Subbase = 300mm Granular "B", Subbase Crossfall = 3% (Subject to geotechnical investigations to determine depth & need for geotextile) Road Base = 150mm Granular "A" Minimum Horizontal Radius – 250m (Exceptions to 90m to 190m) Minimum Vertical "k" Factors – Crest = 35m, Sag=30m (Exceptions to as low as Crest = 8m, Sag = 8m for Low Volume or Semi Urban based on site conditions and cost)
Management Solutions	Load Limits of 5 Tonnes/Axle implemented at critical times & strictly enforced. Preventing Heavy Traffic during adjacent highway closures Utilize Amalgamated Tenders for the supply of culverts, gravel and contracted services – e.g. Brushing, Rock ditch blasting etc.
Maintenance Activities	Maintenance at regular intervals – Brushing, Ditch Cleanouts, shoulder stripping Application of 50mm Granular "A" to road surface every 5 to 10 years Road Grading to maintain the crown of road to encourage runoff Application of Calcium Chloride for Dust Control & Reduction in Grading Needs
Renewal/ Rehabilitation	Replacement of Culverts with 75 year Design Service Life (HDPE – 320 kPa) Treatment of Frost Heaves with excavation, nonwoven geotextile & new granulars Complete New ditching in areas to provide proper drainage of the road base
Replacement Activities	Not expected to require replacement if continued as gravel road. Reconstruction of the road base (excavation, new granulars, ditching) may be necessary to ensure proper performance of hard surfacing. Realignment to correct horizontal and vertical deficiencies to bring road to municipal standard of 8m platform width
Disposal Activities	Not expected to be disposed unless realignment creates an abandoned road section. If this is the case utilize granulars from existing road base in project. Dispose of property to adjacent landowner if utilities are relocated onto new right of way
Expansion Activities	Extending road service to be completed to minimum municipal road standard of 8m top width. Provide proper connection with other roads or turnaround sufficient for municipal maintenance equipment

Table XII– Strategy for Surface Treated Roads (Rural)	
Asset Life Cycle	Surface Treatment – 8 years
Minimum Municipal Road Standard	Design Speed = 80 km/h (Exceptions to 50 km/h for Semi Urban Areas and 60 km/h for Rural Areas based on site conditions and cost) Minimum Right of Way Width– 20m, New Development to have 30 m to provide for clearing requirements for Utilities Road Width = 8.0 metres, Shoulder Crossfall = 2% Paved Width = 7.3 metres, Lane Crossfall = 2% Road Subbase = 450mm Granular "B", Subbase Crossfall = 3% (Subject to geotechnical investigations to determine depth & need for geotextile) Road Base = 150mm Granular "A" Surface Treated Roads – Initial Application - Double Course, Follow-up – Single Course Minimum Horizontal Radius – 250m (Exceptions from to 90m to 190m) Minimum Vertical "k" Factors – Crest = 35m, Sag=30m (Exceptions to as low as Crest = 12m, Sag = 12m for difficult areas based on site conditions and cost)
Management Solutions	Load Limits of 5 Tonnes/Axle implemented at critical times & strictly enforced. Preventing Heavy Traffic during adjacent highway closures. Participate in Amalgamated Tendering process for reduced unit costs
Maintenance Activities	Maintenance at regular intervals – Brushing, Ditch Cleanouts, shoulder stripping Patching of potholes/cracks with cold mix to prevent further breakup of road surface Repair of surface treatment breakup along edge using Dynapatch application.
Renewal/ Rehabilitation	Replacement of Culverts with 75 year Design Service Life (HDPE – 320 kPa) Treatment of Frost Heaves with excavation, nonwoven geotextile & new granulars Complete New ditching in areas to provide proper drainage of the road base Application of Single Course S.T. to surface treated roads 8 to 10 years based on when road reaches a condition rating of 5.
Replacement Activities	Consider rehabilitation of surface treated surface after initial double course application and three applications of single course if road cross section has become sufficiently distorted. Road surface would be in place processed, drainage improvements completed and new double course surface treatment applied. For upgrade to hard surfacing, reconstruction of the road base may be necessary to ensure proper performance Realignment to correct horizontal and vertical deficiencies to create road to municipal standard of 8m platform width
Disposal Activities	Not expected to be disposed unless realignment creates an abandoned road section. If this is the case utilize granulars from existing road base in project. Dispose of property to adjacent landowner if utilities are relocated onto new right of way
Expansion Activities	Extending road service to be completed to minimum municipal road standard of 8m top width. Provide proper connection with other roads or turnaround sufficient for municipal maintenance equipment. Subdivision Developments costs for new road to be 100% borne by the Developer.

Table XIII – Strategy for Asphalt Streets (Semi Urban Area)	
Asset Life Cycle	Asphalt – 30 to 40 years
Minimum Municipal Road Standard	Design Speed = 50 km/h Minimum Right of Way Width– 20m Road Width = 8.0 metres, Shoulder Crossfall = 2% Paved Width = 7.0 metres, Lane Crossfall = 2% Road Subbase = 450mm Granular "B", Subbase Crossfall = 3% (Subject to geotechnical investigations to determine depth & need for geotextile) Road Base = 150mm Granular "A" Asphalt Surface High Volume – 90 mm HL4 Asphalt Surface Low Volume – 50 mm HL4 Minimum Horizontal Radius – 90m Minimum Vertical "k" Factors – Crest = 12m, Sag=12m
Management Solutions	Load Limits of 5 Tonnes/Axle implemented at critical times & strictly enforced. Utilize Amalgamated Tenders for the supply of culverts and contracted services Road work to be coordinated with other work on drainage, sanitary sewer & water supply infrastructure
Maintenance Activities	Maintenance at regular intervals – Brushing, Ditch Cleanouts, shoulder stripping Patching of potholes/cracks with cold mix to prevent further breakup of road surface
Renewal/ Rehabilitation	Culverts/Storm Sewers with 75 year Design Service Life (HDPE & PVC – 320 kPa) Treatment of Frost Heaves with excavation, nonwoven geotextile & new granulars Complete New ditching in areas to provide proper drainage of the road base Repair of Cracks with Rout & Seal 2 to 3 years after asphalt placement Milling of existing asphalt and resurfacing of spot locations of deteriorated asphalt
Replacement Activities	In place processing of the existing asphalt and underlying granular. Restoration of asphalt surface with new asphalt. Coordinate other work related to drainage, sanitary and water supply
Disposal Activities	Not expected to be disposed unless realignment creates an abandoned road section. If this is the case utilize removed asphalt as RAP material. Reuse granulars from road base as fill. Dispose of property to adjacent landowner if utilities are relocated onto new right of way
Expansion Activities	Extending road service to be completed to minimum municipal road standard of 8m top width. Provide proper connection with other roads or turnaround sufficient for municipal maintenance equipment. Subdivision Developments costs for new streets to be 100% borne by the Developer.

5.1.2 STRUCTURES

A summary of planned actions for structures including bridges and culverts are included following in Table XIV.

Table XIV – Strategy for Structures (Bridges & Culverts)	
Asset Life Cycle	Bridges – 75 years Culverts – 75 years
Municipal Structures Standard	New Bridges & Culverts No of Lanes – Two Lanes, Low Volume Roads – One Lane Load Rating – No Load Limit Hydrology & Hydraulic Design – 100 year Return Storm Design Guidelines – Canadian Highway Bridge Design Code, Guiderail Exception for Low Volume Roads based on MTO Structural Manual Bridge Width – As per CHBDC Culvert Crossing Width (guiderail face to guiderail face – 9 metres) Guiderail End Treatments on all Four Quadrants
Management Solutions	Monitor Bridges with Load Restricted Limits for unauthorized use. OSIM inspections as per legislation – Bridges every 2 years, Culverts every 4 years. (Utilize same Engineering Consultant on follow-up inspections to insure continuity and monitoring of deficiencies)
Maintenance Activities	**Bridges** Complete annual cleanout of expansion joints. Complete removal of sand from surface of deck structure. Replacement of deficient components Remove Debris from inlet to structure **Culverts** Complete removal of granular berm & repair washouts along guide rail posts Remove Debris from inlet to structure
Renewal/ Rehabilitation	**Bridges** Structural Steel Coating Structural Rehabilitation of Concrete Deck / Barrier / Abutments Rehabilitation of “Heritage” Structures if feasible **Culverts** Lining of culvert invert to repair corrosion of invert.
Replacement Activities	Consider realignment of road if reasonable to maintain use of existing structure until new structure is installed. Replacement of single lane crossing with two lane if Road AADT >50
Disposal Activities	Recycling of materials from structure replacement (i.e. steel) Salvaging of components for reuse in other projects (i.e. timbers, concrete fill) Dispose of hazardous materials (creosote wood) in an environmentally safe manner
Expansion Activities	New Water Crossing Structures to be designed in accordance with CHBDC. Cost of Structures required as part of Subdivision Development to be borne by Developer.

5.1.3 ROAD MAINTENANCE VEHICLES & EQUIPMENT

A summary of planned actions for structures including bridges and culverts are included following in Table XV.

Table XV – Strategy for Road Maintenance Vehicles & Equipment	
Asset Life Cycle	Pickup Trucks – 10 years Dump/Plow Truck – 15 years Grader – 20 years Excavator/Backhoe – 20 years Miscellaneous Equipment – 20 years
Minimum Standards	Pickup Trucks – 4 Wheel Drive Dump Trucks – Utilized as Snow Plow Trucks for Winter Maintenance Graders – Utilized as Snow Plows for Winter Maintenance Excavator/Backhoe – Wheel mounted to provide accessibility benefits
Management Solutions	Consider Leasing of Equipment to lower high capital outlay.
Maintenance Activities	Regular Maintenance activities according to Manufacturer Guidelines.
Renewal/ Rehabilitation	Replacement of Brakes Rebuild of Motor if Remainder of Asset is in Good Condition
Replacement Activities	Purchase of New Vehicles & Equipment through Request for Quotation (RFQ) process
Disposal Activities	Sale of Asset to Highest Bidder through Closed Tender Process Consider sale of Asset partway through life expectancy to maximize sale value
Expansion Activities	Consideration purchase of additional equipment to meet expected levels of service or to provide cost benefits to eliminating contracted services requirements

5.1.4 DRINKING WATER SYSTEM

A summary of planned actions for the Drinking Water System including the water treatment plant and distribution system is included following in Table XVI.

Table XVI – Strategy for Drinking Water System	
Asset Life Cycle	Water Treatment Plant – 75 years Water Treatment Components – As specified in PUC Documents Watermains & Components – 75 years
Municipal Minimum Standards	Design in Accordance with *Design Guidelines for Drinking-Water Systems 2008 MOE* Watermain Size – 50 mmØ
Management Solutions	Record on System Drawing location of all incidents of watermain breaks. Monitor Flow Rates to determine potential leakage from system
Maintenance Activities	Complete Flushing of Watermain every 5 years to reduce sediment in system. Perform Checks on Gate Vales Annually
Renewal/ Rehabilitation	Replace Water Treatment Plant Components in accordance with PUC schedule Replace Gate Valves and Fire Hydrants that are inoperative Consider new technological advances for nonintrusive repairs of watermain pipe
Replacement Activities	Replacement to be completed with other infrastructure & rebuild of street/road Prepare a long term plan for replacement of water system in an orderly manner
Disposal Activities	Dispose of components in accordance with Environmental Requirements
Expansion Activities	Complete Looping of Watermain System to eliminate dead ends of water system New Subdivision Development Costs to be borne by the Developer

5.1.5 SANITARY SEWER SYSTEM

A summary of planned actions for the Sanitary Sewer System including the water treatment plant and distribution system is included following in Table XVII.

Table XVII – Strategy for Sanitary Sewer System	
Asset Life Cycle	Sewage Treatment Plant – 75 years Sewage Treatment Components – As specified in PUC documentation Sanitary Sewers & Maintenance Holes – 50 years
Municipal Minimum Standards	Design in Accordance with *Design Guidelines for Sewage Works 2008 MOE* Pipe Size – 50mm Ø
Management Solutions	Record on System Drawing location of all incidents of sanitary system backups. Monitor Flow Rates to determine leakage into system from watermain breaks or infiltration
Maintenance Activities	Inspect Pipe condition during tie in of new services.
Renewal/ Rehabilitation	Replace Sewage Treatment Plant Components in accordance with PUC schedule Consider new technological advances for nonintrusive repairs of sewage pipe joints
Replacement Activities	Replacement to be completed with other infrastructure & rebuild of street/road Prepare a long term plan for replacement of sewage system in an orderly manner
Disposal Activities	Dispose of components in accordance with Environmental Requirements
Expansion Activities	New Subdivision Development Costs to be borne by the Developer

5.1.6 STORM SEWER SYSTEM

A summary of planned actions for the Sanitary Sewer System including the water treatment plant and distribution system is included following in Table XVIII.

Table XVIII – Strategy for Storm Sewer System	
Asset Life Cycle	Storm Sewers – 75 years Maintenance Holes & Catch Basins– 75 years
Municipal Minimum Standards	Design in Accordance with *Design Guidelines for Sewage Works 2008 MOE* Minimum Storm Sewer Pipe Size – 250mm Ø Maintenance Holes – Maximum Spacing of 120 metres
Management Solutions	Record on System Drawing location of all incidents of storm system backups Monitor Flow Rates to determine leakage into system from watermain breaks or infiltration
Maintenance Activities	Complete Flushing & Camera Inspection of Sanitary pipes every 20 years to reduce solids in system and identify potential pipe damage Complete Sediment Removal from Maintenance Holes & Catch Basins every year
Renewal/ Rehabilitation	Repair or Replace Maintenance Holes & Catch Basins with excessive heaving Consider new technological advances for nonintrusive repairs of sewage pipe joints
Replacement Activities	Replacement to be completed with other infrastructure & rebuild of street/road Prepare a long term plan for replacement of sewage system in an orderly manner
Disposal Activities	Dispose of components in accordance with Environmental Requirements
Expansion Activities	Ensure sufficient gradients in pipe especially at ends of low flow areas New Subdivision Development Costs to be borne by the Developer

5.2 RISK ASSESSMENT

All assets carry a level of risk in terms of cost for the Municipality. Due to the uncertainty in assigning a reasonable estimate of probability and cost associated with a risk event, a qualitative approach was applied to the asset management plan.

For the integrated assets, such as the sanitary sewer, storm sewer and road surface, assets would not be expected to reach the end of their service life at the same point in time. Therefore a qualitative approach should be applied to reasonably accept the increased risk of letting the road deteriorate beyond the desired level of service to offset the cost of replacing the road asset a second time in conjunction with the sewer and water assets.

In addition, the management of the asset improvement scheduling took into consideration the risk associated with volume of use that the assets received. Acceptable levels of risk will vary depending on the frequency and type of use. If a rarely used asset and a frequently used asset do not meet the

minimum standards, the risk is higher for the frequently used asset and therefore should be prioritized ahead of a rarely used substandard asset.

It is desirable to limit risk by replacing/improving the condition of all assets to meet today's minimum standards however the cost of doing so is not necessarily financially feasible. The Municipality attempts to achieve a manageable level of risk by completion of condition reviews and prioritizing of replacement and improvement projects.

5.3 PROCUREMENT METHODS

The Municipality currently has procurement by-laws in place for use when completing various projects. Consulting Engineers of Ontario recommend that procurement of design engineers should not only be based on design cost but also the qualifications and expertise of the design firm. Best value for the project does not always mean lowest cost. Similarly the tendering of capital projects should make use of an invited tender list of those contractors that are known to have sufficient resources and personnel to complete the project in a timely and quality manner.

The use of amalgamated tenders could allow for a higher volume of service by a supplier or contractor, which would reduce the overall cost for each municipality. This approach is currently being done for the supply of common equipment and construction materials as well as for road resurfacing projects which are short duration and easily divisible by municipality. The use of amalgamated tendering for road reconstructions and for sewer and water projects is unlikely given the construction length of these projects limit work on multiple fronts and site condition differences could lead to unfair sharing of costs. The exception would be related to specialty work that a contractor or supplier from outside of the Algoma Region would provide. This could be a service such as flushing of sanitary sewers, ditch rock drilling and blasting or Dyna-Patching of surface treatment.

5.4 SCHEDULE OF PRIORITIES

This Asset Management Plan provides a schedule of projects based on each asset type for the next ten years. Options were considered for each type of asset as outlined above, with the options being evaluated for risk and lifecycle costs. It is not intended that this 10 year plan be a rigid plan without flexibility. It is anticipated that it be reviewed and adjusted as conditions and priorities change. The recommendation is that it be updated every two years and would coincide with the municipal council elections that happen every four years. Therefore the plan would be revisited in the late autumn of 2014 and again every two years after that. This schedule will also take advantage of having the most

recent OSIM reports on structures available provided they are completed in a time frame that will make them available when reviewing the AMP.

5.4.1 ROADS

The plan for roads is included in the ***10 Year Roads Improvement Plan*** as Appendix A. It is combined with Structures and Road Maintenance Vehicles and Equipment as those are included in the Municipal Roads budget.

5.4.2 STRUCTURES

The plan for structures is included in the ***10 Year Roads Improvement Plan*** as Appendix A. It is combined with Roads and Road Maintenance Vehicles and Equipment as those are included in the Municipal Roads budget.

5.4.3 ROAD MAINTENANCE VEHICLES AND EQUIPMENT

The plan for road maintenance vehicles and equipment is included in the ***10 Year Roads Improvement Plan*** as Appendix A. It is combined with Roads and Structures as those are included in the Municipal Roads budget.

5.4.4 DRINKING WATER SYSTEM

The 10 year asset management for drinking water systems is included in the ***10 Year Water, Sanitary & Storm Systems Improvement Plan*** in Appendix B.

5.4.5 SANITARY SEWER SYSTEM

The 10 year asset management for sanitary sewage system is included in the ***10 Year Water, Sanitary & Storm Systems Improvement Plan*** in Appendix B.

5.4.6 STORM SEWER SYSTEM

The 10 year asset management for storm sewer is included in the ***10 Year Water, Sanitary & Storm Systems Improvement Plan*** in Appendix B.

6 FINANCING STRATEGY

6.1 ASSET MANAGEMENT PLAN COMPONENTS

In order for an Asset Management Plan to fulfill the principles of asset management, the following essential components must be contained in the overall plan:

1. Asset Value

All municipal infrastructure assets have a monetary value. Under PSAB 3150 in fiscal 2009 this was completed through the Tangible Capital Asset processes using PSAB 3150 Guidelines.

2. Lifecycle Management

All assets have a life expectancy. The life cycle is dependent on a number of factors: nature of the asset, utilization (frequency), treatment costs and maintenance, technology (obsolesces). A change made at any point in time in the lifecycle of an asset has an effect on the remaining life and may have operational related costs.

3. Sustainability

This definition has been extracted from the “National Guide to Sustainable Municipal Infrastructure”. The Asset Management Plan needs to identify a financial plan over the long term to ensure that sufficient monies are available. These monies provide the resources required to operate, rehabilitate, dispose and ultimately replace the asset at the optimal time with the intention of achieving the lowest lifecycle cost. The plan helps make sure that current users pay a fair share for the service they receive and that future users pay a similar cost for the same level of service which ensures multigenerational equity and fairness.

4. The Goal (Technical) VS. Financial Plans

The goal is to minimize lifecycle costs for the infrastructure while maintaining an adequate and acceptable level of service at the lowest possible level of risk. The financial plan must identify the financial investment required per year for each asset over the long term, including any larger than normal expenditures to meet the requirements of the plan. Ideally, the two plans should be integrated so the relationship between the level of service and the cost can be quantified.

5. Risk Assessment

Risk should be managed in any decision making process. The owner of the assets should analyze and document acceptable risk tolerance. In the Township's case, the probability of failure is taken into account while the condition of the asset is being analyzed. Risk factors can include financial, environmental, regulatory/legal and public health and safety.

6. Performance Measurement

To optimize an Asset Management Plan, performance of the assets and rehabilitation strategies should be monitored regularly. This can achieve an acceptable balance between cost and the level of service. Benchmarks (for some of the assets) have to be determined in order to determine the performance of the asset.

7. Role of Treatment Costs and Tangible Capital Assets

Treatment costs are costs associated with adequately treating a capital asset, whether it gets replaced or rehabilitated. From a public sector perspective, many municipal decision makers have indicated that using historical cost is meaningless, particularly given the long-lived nature of infrastructure assets. There are three arguments against using historic cost: First, conventional historical cost accounting does not produce meaningful performance measurements in times of changing prices and money values. Over the last five years there has been escalation in contract pricing in housing and non-residential building construction. Second, because infrastructure needs to be replaced on an ongoing basis, the cost of using infrastructure should reflect its current cost, rather than an allocation based on historic cost. Therefore, historic cost may not be the initial source and may not provide the most relevant information for decision makers. Third, is that engineers would argue that what is meaningful is replacement cost as this is what should be budgeted to replace assets. If replacement cost is the metric and not historical costs than municipalities will need to estimate the applicable replacement costs of assets.

This can be completed by using the following two approaches.

Approach 1: Utilize an accumulated Consumer Price Index (CPI) calculation to obtain an estimated today cost of each asset.

Approach 2: Utilize the Non-residential Building Construction Price Index (NRBCPI) to obtain an estimated today cost of each asset. The NRBCPI is a quarterly series measuring the changes in contractors' selling prices of non-residential building construction (i.e. commercial, industrial

and institutional). The indexes relate to both general and trade contractors' work and exclude the cost of land, land assembly, design, and development and real estate fees.

6.2 INVESTMENT STRATEGIES

Understanding and making the right decisions about infrastructure investment is challenging and for smaller municipalities involves balancing two questions.

(1) What quantity and quality of infrastructure can the municipality afford and maintain? As affordability depends mainly on the current and future revenue base of the community; and

(2) What quantity and quality of infrastructure is needed? As need is driven by regulation and public expectations, as well as current and future population and consumption patterns.

Municipalities are presently facing an affordability problem as there is an increased demand on capital spending to pay for infrastructure needs. Smaller municipalities with limited growth cannot rely on development charges to pay for infrastructure needs. Presently, there is limited ratepayer affordability in smaller communities as ratepayers become sensitive to property tax increases. As the financial uncertainty in Ontario increases, municipalities are in a position where they will need to potentially increase their borrowing patterns to replace or rehabilitate infrastructure in a timely manner. In most cases this will mean smaller municipalities will need to increase their debt loads to finance capital expenditures. Municipalities will need to be conscious of their debt capacity limits should this be the case. A key indicator of acceptable debt loan on an annual repayment limit is Schedule 81 of the annual Financial Information Return.

Plans must contain an element of financing to be viable plans for municipality's to consider. Historically, asset management plans have been the responsibility of engineers and the public works department, while the financing of asset management plans have been the responsibility of Council. On many occasions, municipal decision makers have questioned who should pay for the cost of building municipal infrastructure. This touches on the important issue of intergenerational equity. Given that infrastructure has the potential to last for generations, today's users and ratepayers argue that they should only pay their share and not the entire amount. To achieve this, municipalities must borrow money upfront indirectly accumulating a debt load that would be paid off gradually over the life of the assets.

Achievable investment models are critical to success. Proper projections enable Council and staff to make more prudent infrastructure decisions. The following strategies have been derived based on the premise that municipal decision makers in smaller municipalities have articulated the challenges of

funding capital to address infrastructure needs on an annual basis. The strategies listed below are recommendations based on discussions with practitioners in the sector:

Debenture Strategy

Independent Capital Reserve Account Strategy

Bucket Allocation Strategy

Capital Reserves or Cash to Capital Strategy

Cash in Lieu of Future Needs

Capital-Debt Strategy

Debt Strategy

User Fees

Leasing

Government Funding

Other Tactics

1. Debenture Strategy

A debenture is a type of debt instrument that is available to municipalities. It is used to secure capital and is supported by the general credit worthiness and reputation of the issuer. Many municipalities use debentures to finance large capital projects for general and infrastructure assets. This strategy looks at funding capital though continuing a committed debenture payment upon completion. This strategy rolls funds over that were previously committed to debenture funding straight to support capital program spending, which mitigates the risk of increasing property taxes to fund capital.

This strategy would require the appropriate approvals from Council and MMAH to allocate the debenture payments amounts to capital program funding for the preceding year. Municipal decision makers must ensure the proper mechanisms are in place to achieve the debenture amount into the future as directed by Council.

2. Independent Capital Reserve Account Strategy

This proactive strategy looks at creating independent capital reserve accounts to manage future capital needs for a municipality. Public works vehicles, for example typically do not have a long useful life, which means vehicles for the departments fleet are being purchased regularly. This can place significant

pressure on a municipality's capital program, for example, when multiple vehicles are due to be replaced in a single year, and the purchases are not adequately planned.

This strategy helps mitigate those types of risks by allocating capital to such specific reserve accounts on an annual basis. In this circumstance a fleet or vehicle replacement reserve account would actively be receiving funds in order to smooth the impact to the tax rate and maintain existing service levels. This strategy can be utilized for many assets. However, proper forecasting methods are encouraged to ensure proper amounts are contained within the specific capital reserve accounts. Capital reserve accounts vary depending on the municipality and the services it is responsible for providing.

3. Bucket Allocation Strategy

This strategy works closely with the municipality's asset management plan in terms of yearly capital requirements by department. The yearly cost by department would represent the assets that appear above the priority threshold meaning that they need to be properly treated to maintain existing service levels and mitigate any risks. In an ideal world, all of these identified assets would be properly treated. Unfortunately, this is not the case for smaller municipalities. This strategy now takes the allocated capital budget for the corporation and allocates the money based on the percentage of the total asset estimated treatment cost by department. Once the capital has been allocated by using the bucket allocation strategy, the individual departments would use their capital to optimize treatments of assets.

4. Capital Reserves or Cash to Capital Strategy

In an effort to smooth out the impacts of variable tax rate funding of capital on a year by year basis, select municipalities have strategically adopted a program of allocating a certain amount each year from the operating fund into a capital reserve account. The annual contribution may be set as a percentage of something such as expected tax levy, or it may be a fixed amount. Fixed amounts should also be indexed to maintain its effectiveness over time. That is to say a price index (inflationary factor) is applied. Adopting such a strategy evens out the fluctuating impacts that capital funding can have on property tax rates.

5. Cash in Lieu of Future Road Needs

This strategy considers charging a fee to developers that purchase land that an existing or future road network attaches to. The fee ideally would be charged on a per metre basis and accounts for the roads

future needs; however this would be at the discretion of the municipality. The fee would be a component of the developer's project costs associated with developing in the municipality and would be in addition to any calculated development charges.

The construction of the fee formula would require meticulous consideration from the municipality's engineering department; taking into specific cost considerations and how they are allocated for road treatments. Several alternatives would need to be classified to ensure an accurate fee is being charged based on the present conditions of the road network where a new development borders and the projected costs to maintain and repair that specific road network into the future.

This strategy increases the revenue collected by the municipality and specifically allocates the money to fund future road network maintenance and rehabilitation. It also helps to strengthen the capital program budget allocated to road network projects. For municipalities with a large network of roads infrastructure this can prove to be a valuable proactive revenue tool.

6. Capital-Debt Strategy

This strategy funds an asset management model through a combination of capital and debt. Finding the suitable funding levels for asset management plans is an emerging challenge, especially for smaller municipalities that have minimal capacity. A debt payback plan would accompany this strategy.

7. Debt Strategy

This strategy provides the municipality with the cash necessary to expand and thrive. A debt outline helps a municipality review all factors affecting the creditworthiness, from how much it owes and how it intends to repay outstanding loans to how much it will need to borrow in the future. Finding the appropriate solutions to these types of questions allows the government to progress towards financial sustainability. It is important to note that select municipal Councils take the position of anti-debt, which means this strategy would not apply. This is common for smaller municipalities with limited growth projections.

8. User Fees

The Municipality needs to review user fees related to its tangible capital assets and their lifecycles. Specifically, the Township of Johnson need to focus on user fees which have a direct impact on the utilization of the assets and the service delivery. The Township needs to consider long term debt

associated with the water treatment plant and infrastructure as it applies to debt recovery and future capital expenditures incorporated into the water and sewer rates.

9. Leasing

The alternative of utilizing leasing for municipal vehicles and equipment is a consideration. This option would avoid a high capital outlay in a single year. In addition depending on the length of the lease the Township would have a vehicle/equipment during the time that it is most reliable with no need to dispose of the asset at the completion of the lease as it is turned back to the leaser.

10. Government Funding

The use of government funding continues to be a potential source of revenue to leverage the municipal monies for specific projects of need. Two examples of projects that are well suited to government funding are bridge replacements and road realignment projects. Typically funding applications require the municipality proving need of the project related to an objective of the program such as public safety and these types of projects can be easily justified.

11. Other Tactics

The sale of underutilized or surplus assets is an option available to municipalities when an asset is not being used within the municipality's service delivery model. In most cases these underutilized assets generate a financial burden to the ratepayer while delivering minimal value. For example, municipal owned halls can in some cases be classified as an underutilized asset. Redundant rolling stock adds to the municipal operating budget and ties-up capital resources.

6.3 FINANCING PLAN

It is important to recognize that the capital investment (financing strategies) can be and should be based on one or a combination of those outlined above. One must consider the trade-off under the current ten year capital budget process and the current level of service. Can the capital budget process yield a lower cost once we realign the maintainable service level? Staff will need to continually take advantage of any grant funding programs that may be available today or in the future. It is likely that these programs will be necessary in some format from senior levels of government. (i.e. Federal Gas Tax, specifically targeted to infrastructure)Finally, we have not yet integrated alternative sources of revenue. For example, Water & Sewer rates with a capital component as part of the asset management plan for these assets.

The accompanying spreadsheet template has been tailored to the Township of Johnson budget process and is an integral tool of this asset management plan. The template has been setup up as a continuing forecasting document for the next ten years. The template will allow the user to investigate alternative funding strategies that will then generate the corresponding taxation rate required. It is anticipated that municipal staff and council will utilize the template as they create a viable financial plan for the municipality's capital assets.

7 CLOSURE

This asset management plan presented is to fulfill the core requirements as outlined in the Ontario Ministry of Infrastructure's *Building Together, Guide for Municipal Asset Management Plans*. This AMP is intended to be a document that can be built on that eventually all of the municipal tangible capital assets can be included within the AMP. Tulloch Engineering would like to acknowledge the assistance of municipal staff Randy McKinnon, Road Superintendent and Rick Barber; Ruth Kelso, Clerk/CAO and Paula Spurway, Treasurer in the preparation of this Asset Management Plan. The contribution of municipal auditor Anthony Rossi of Calam Rossi Chartered Accountants LLP towards completion of the Financing Strategy section of the AMP and preparation of the planning template was invaluable.

This Asset Management Plan was completed with financial funding from The Province of Ontario through the Municipal Infrastructure Investment Initiative Program administered by the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA). The views expressed in this document do not necessarily reflect those of OMAFRA.

Respectfully Submitted:

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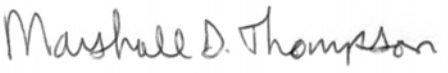

Marshall D. Thompson, P.Eng.
M.F. TULLOCH INC.

10 YEAR ROADS IMPROVEMENT PLAN

TOWNSHIP OF JOHNSON

PROJECT NO. 13-2020

PREPARED BY:

TULLOCH ENGINEERING

January 2014

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1 INTRODUCTION

The following document was prepared by Tulloch Engineering (Tulloch) in conjunction with the Township of Johnson to act as a 10 Year Roads Improvement Plan. This plan addresses the following components:

- Inventory of the 85.4 kilometres of road system including 13 municipal bridges and culverts.
- Identification of road sections and bridges in need of improvement and estimated costs associated with those improvements.
- Inventory of existing major equipment within the roads department and identification of recommended replacements and costs.
- Preparation of a 10 year recommended improvement program.

These components will aid in the long range financial planning of the Township and outline needs for special project funding. This plan is intended to serve as a guide only. Decisions regarding the timing and completion of actual improvements are to be made by the Municipality with consideration of its financial capacity, desired levels of service and remaining commitments to its taxpayers.

2 ROAD SYSTEM

2.1 ROAD CONDITION EVALUATION

Determination of the existing condition of the roads under the Township's jurisdiction was completed based on practices outlined in the, *MTO Methods and Inventory Manual*. The road condition appraisals were completed on May 14th and 15th 2013 with assistance provided by the Township's Roads Department.

The Township's road network includes road surface types of; gravel, surface treatment or Low Class Bituminous (L.C.B.) and hot mix asphalt or High Class Bituminous (H.C.B). The roads were divided into sections, defined by crossroads or physical landmarks, which exhibit uniform performance characteristics. Each road section has been given a subjective evaluation from 1 to 10 based on current drainage and surface conditions. Condition ratings greater than 5 are considered acceptable and are expected to require only normal maintenance. A condition rating less than 5 is considered unacceptable and a road improvement was costed. Annual Average Daily Traffic counts, measure in vehicles per day (V.P.D.) were estimated from field observations and discussions with Township representatives.

A summary of information collected during the road appraisals can be found in Appendix A along with a Road Section Location and Condition Rating Map. For comparison purposes average condition ratings, based on weighted road section lengths, were calculated for each of the surface types and estimated daily traffic volumes. This information is presented in Tables 1 and 2 following.

Table 1 - Road Lengths and Condition Rating by Surface Type

Surface Type	Length	Condition Rating
GRAVEL	59.8 km	5.3
L.C.B.	24.7 km	6.2
H.C.B.	0.9 km	4.0
Total	**85.4 km**	

Table 2 - Road Lengths and Condition Rating by Traffic Volume

Traffic Volume	Length	Condition Rating
0-49 V.P.D.	29.6 km	5.0
50-199 V.P.D.	24.9 km	5.4
200-399 V.P.D.	30.9 km	6.2
Total	**85.4 km**	

The MTO Methods and Inventory Manual suggests that rural roads with estimated traffic counts less than 50 V.P.D. are considered adequate for their use and should be assigned a minimum condition rating of 5. Using this minimum rating for the low volume roads produces an overall condition rating of 5.6 for the Township's road network. The MTO Methods and Inventory Manual defines road systems with average condition ratings between 5 and 7 as, "average structural condition; continued improvement needed". It is the intention of this plan to outline these continued improvements and increase the overall condition of the road network.

Once the existing condition ratings were established, the anticipated road condition for each section was then projected over the 10 year study period considering deterioration and allowing for the forecasting of required improvements. This method of evaluating road surface deterioration relies on estimating the life cycle of the various surfaces.

Surface treated or L.C.B. treated roads typically have a 6 to 10 year life cycle before their condition rating drops below 5. This is dependent on their use, the structural condition of the road and routine maintenance. After discussions with Township staff and through review of existing surface treatment performance an 8 year life cycle was assumed. Based on this assumption the condition rating for each section of surface treated road would typically drop 0.63 per year. This value was used to determine the year in which the condition rating will drop below 5 and require resurfacing.

As presented by Table 1, the Township supports a limited length of asphalt or H.C.B. surfaced road which is made up of an approximately 900m section of Lake Huron Drive in the hamlet of Desbarats. Asphalt surfaced rural and urban roads with low traffic volumes typically have a life cycle of twenty years or more. After review of the performance of the existing road section a life cycle of 30 years was assumed. This would result in a typical condition rating drop of 0.17 per year. This section of Lake Huron Drive has deteriorated below a 5 condition rating, suggesting that it requires resurfacing in the very near future.

The Methods and Inventory Manual suggests that the condition rating for gravel roads will not change with continued routine loose top maintenance. Therefore, the forecasted future condition ratings will be the same as the study year, although severe spring breakup may affect the condition rating and require localized base repairs that cannot be anticipated. Using the assumed surface life cycles and accounting for anticipated surface improvements, the condition ratings for the Township's hard surfaced roads were projected over the next 10 years and are summarized in Appendix B.

2.2 ROAD IMPROVEMENTS AND COSTING

Required road improvements were assessed based on existing and projected condition ratings and input from Township representatives. Forecasting minor improvements such as light granular resurfacing, ditch cleanout, brushing and etc. over an extended 10 year study period is difficult and often inaccurate. The costing of these minor improvements were typically not identified as much of this work would be completed as part of the Township's continued maintenance programs. As per the MTO Methods and Inventory Manual, improvements were generally not costed for roads with estimated traffic counts less than 50 V.P.D. as they are considered adequate for their use and require only continued maintenance.

Improvements costs were estimated using bench mark costs established from industry knowledge and review of recent construction projects. Bench mark costs used for improvements noted within this plan are shown in Appendix C. For road resurfacing projects requiring in-place processing or pulverizing, a 50mm depth of Granular "A" 'sweetener' was costed to account for assumed base improvements. The asphalt resurfacing of Lake Huron Drive included the required adjustment of all catchbasins and maintenance holes and the assumed replacement of 10% of the storm sewers. It is suggested that a detailed storm system rehabilitation and replacement study and geotechnical investigation be completed prior to this resurfacing project to determine the extent of work required.

3 ROADS EQUIPMENT

3.1 ROADS EQUIPMENT INVENTORY AND REPLACEMENTS

An inventory of the major roads equipment was obtained through correspondence with Township representatives. Anticipated equipment replacements were based on the respective useful life of the equipment as indicated by the Township's Capital Asset By-law and on input from Township representatives. Where useful life of equipment was not indicated in the Tangible Capital Asset Policy, it was assumed. Anticipated replacement of equipment currently operating beyond its estimated useful life was determined from discussions with the Township. An inventory of the major roads equipment with anticipated replacement years is presented in Table 3 following.

Table 3 - Roads Equipment Inventory

Municipal ID	Make & Model	In-Service Year	Depreciable Life	Anticipated Replacement Year
EQ 11.0	Case Grader 885	2009	20	2029
EQ 12.0	Case CS130 Excavator	2007	20	2027
EQ 15.0	Husqvarna Sitting lawn mower	2005	10	2015
V 30.0	Chevrolet ½ ton Pick-up	2001	10	2015
Unknown	Freightliner Plow Truck	2001	15	2014

3.2 EQUIPMENT REPLACEMENTS AND COSTING

Replacement costs for the major equipment were estimated based on historical purchase price and current equivalent equipment values where information was available. The indicated replacements of any of the equipment are to act as a planning tool only and will need to be reassessed and modified based on actual deterioration.

4 MUNICIPAL STRUCTURES

4.1 MUNICIPAL STRUCTURE APPRAISALS

The Ontario Structure Inspection Manual (OSIM) has been used for bridge inspections in Ontario since 1985 and describes the procedures for carrying out detailed visual inspections. The OSIM outlines that the following structures shall be inspected every 2 years.

- All bridges, culverts and tunnels with spans over 3 metres
- All retaining walls
- All movable bridges

The OSIM also indicates that for culverts with 3 to 6 metre spans and retaining walls, the inspection interval can be increased to 4 years if the culvert or retaining wall is in good condition and the engineer believes that the culvert or retaining wall condition will not change significantly before the next inspection.

The Township of Johnson currently has 13 structures within its jurisdiction that require inspection in accordance with the OSIM requirements. AECOM completed inspections of the municipal structures in the fall of 2012. A municipal bridge or culvert appraisal form was completed for each structure and submitted to the Township.

Required replacements, repairs and/or improvements were determined after review of the information presented within the appraisal forms and following discussions with Township representatives regarding desired improvements. A summary of the bridges and culverts with fixed asset identifications taken from the Township's PSAB data are shown in Table 4 along with their suggested improvements.

Table 4 - Summary of Bridges and Culverts

Structure Name	Structure Location	In-Service Year	Recommendations
BR1-Shewfelt Creek Culvert	Gordon Lake Road	2006	Guide Rail End Treatment at NW Corner
BR2-Shewfelt Creek Bridge	Fisher Road	1950's	Guide Rail End Treatments, Patch Soffit, Girder & Wingwalls
BR3-Stobie Creek Bridge	Government Road	1937	Repair Guide Rails & Provide End Treatments
BR4-Suddaby Bridge	Old Mill Road	1913	Consider Rehabilitation or Replacement
BR5-Suddaby Park Bridge	Gordon Lake Road	2009	None
BR6-Black Creek Bridge	Gordon Lake Road	1930's	Numerous Repairs. Replace in 3-5 years
BR7-Sucker Creek Culvert	Puddingstone Road	2002	Repair Guide Rail Cables
BR8-Sucker Creek Culvert	MacDonald Drive	2000	None
CVT1-Desbarats River Culvert	Government Road	1980's	Install Guide Rails, Replace Culvert
CVT2-Sucker Creek Culvert	Government Road	1980's	Install Guide Rails, Lining of Barrel
CVT3-Sucker Creek Culvert	Kensington Point	1980's	Inspect below waterline
CVT4-Desbarats River Culvert	Boyer Drive	2008	None
CVT5-Government Rd Culvert	Government Rd	1980's	Install Approach Guide Rails

4.2 STRUCTURE REPLACEMENTS AND IMPROVEMENTS

Costs relating to improvements were taken directly from the appraisal forms, where applicable, and generated through estimates based on industry knowledge of similar projects. Provisions for the costs associated with the required OSIM inspections were also included within this plan based on the inspection of bridges every second year and culverts every fourth. An estimated inspection cost of $1,000 per structure was assumed. Costs associated with future inspections and improvements of Sucker Creek Culvert on Puddingstone Road were assessed at 50% as it is a shared asset with the Township of Tarbutt & Tarbutt Additional.

It should be noted that the appraisal forms for some of the older structures recommended immediate installation of approach guide rails. Installation of these guide rails were not included within the recommended work for structures planned for replacement in the near future as it is assumed they would be installed as part of the replacement operations.

5 10 YEAR RECOMMENDED IMPROVEMENT PLAN

The overall roads improvement plan was based on the recommended improvements, the year of improvements and their associated costs. This information was derived from the outlined improvements and replacements of bridges and culverts, roads, and major roads equipment. Where possible the timing of improvements were positioned in an attempt to better balance yearly expenditures. Expenditures were also broken down by capital and maintenance costs as per interpretation of the Township's Tangible Capital Asset Polices. In order to account for increased future costs of proposed improvements, an assumed inflation rate of 2 percent was used to project costs from the 2013 bench mark dollar figures. Dollar amounts were rounded to the nearest $100 for simplicity. The following table summarizes the proposed activities by year.

Table 5 - 10 Year Improvement Plan

Year 2014

Capital Expenditures

Bridges & Culverts

Municipal ID	Location	Type	Costs
CVT1	Desbarats River Culvert	Replace Culvert*	$35,100.00
		Subtotal	**$35,100.00**

Equipment

Municipal ID	Type	Costs
Freightliner Plow Truck		$168,300.00
	Subtotal	**$168,300.00**

Roads

Sect No.	Road Name	Type	Costs
370	Government Rd	Pulverize & Surface Treatment - DBL Course 1 km, Surface Treatment - SGL Course 1 km	$80,600.00
480	Kensington Pnt Rd	Pulverize 900m & Surface Treatment - DBL Course 1.5km	$58,700.00
		Subtotal	**$139,300.00**

Capital Expenditures Total	**$342,700.00**

Maintenance Expenditures

Bridges & Culverts

Municipal ID	Location	Type	Costs
Various Bridges		OSIM Inspections	$11,700.00
		Subtotal	**$11,700.00**

Equipment
As Required

Roads
As Required

Maintenance Expenditures Total	**$11,700.00**

* Township has been approved for funding of 90% of total cost through the Municipal Infrastructure Investment Initiative - Capital Program. Costs shown represent Township's component.

Year 2015

Capital Expenditures

Bridges & Culverts
None

Equipment

Municipal ID	Type	Costs
Chevrolet ½ ton Pick-up	Replace 1/2 ton Pick-up	$26,000.00
Husqvarna Sitting Lawn Mower	Replace	$10,400.00
	Subtotal	**$36,400.00**

Roads

Sect No.	Road Name	Type	Costs
120	Gordon Lake Rd	Surface Treatment - SGL Course	$29,600.00
150	Gordon Lake Rd	Surface Treatment - SGL Course	$30,100.00
160	Gordon Lake Rd	900mm dia. Culvert & Surface Treatment - SGL Course	$19,800.00
205	Gordon Lake Rd	Surface Treatment - SGL Course	$5,500.00
220	Gordon Lake Rd	Surface Treatment - SGL Course	$22,300.00
375	Government Rd	Surface Treatment - SGL Course	$24,300.00
405	Queen Victoria St	Localized Patching and Surface Treatment - SGL Course	$5,600.00
410	Bolton St	Surface Treatment - SGL Course	$1,300.00
415	Cameron Dr	Surface Treatment - SGL Course	$1,600.00
430	Gillespie St	Surface Treatment - SGL Course	$3,400.00
		Subtotal	**$143,400.00**
		Capital Expenditures Total	**$179,800.00**

Maintenance Expenditures

Bridges & Culverts
As Required

Equipment
As Required

Roads

Sect No.	Road Name	Type	Costs
115	Diamond Lake Rd	Replace 1200mm dia.	$7,500.00
475	Boyer Dr	Replace Cable Guide Rail	$3,100.00
		Subtotal	**$10,600.00**
		Maintenance Expenditures Total	**$10,600.00**

* Shared with Township of Tarbutt & Tarbutt Additional

Year 2016

Capital Expenditures

Bridges & Culverts

Municipal ID	Location	Type	Costs
CVT3	Sucker Creek Culvert	Install Cable Guide Rails	$21,200.00
CVT5	Government Rd Culvert	Install Cable Guide Rails	$21,200.00
		Subtotal	**$42,400.00**

Equipment

None

Roads

Sect No.	Road Name	Type	Costs
460	Lake Huron Dr	In-Place Processing & Asphalt Paving - DBL Lift, Storm Sewer Rehab/Replacement	$367,000.00
		Subtotal	**$367,000.00**
		Capital Expenditures Total	**$409,400.00**

Maintenance Expenditures

Bridges & Culverts

Municipal ID	Location	Type	Costs
Various Bridges		OSIM Inspections	$7,400.00
		Subtotal	**$7,400.00**

Equipment

As Required

Roads

Sect No.	Road Name	Type	Costs
105	Diamond Lake Rd	Replace 1200mm dia.	$7,600.00
		Subtotal	**$7,600.00**
		Maintenance Expenditures Total	**$15,100.00**

Year 2017

Capital Expenditures

Bridges & Culverts
None

Equipment
None

Roads

Sect No.	Road Name	Type	Costs
245	Gordon Lake Rd	Surface Treatment - SGL Course	$29,200.00
250	Gordon Lake Rd	Surface Treatment - SGL Course	$23,400.00
291	Deplonty Rd	Surface Treatment - SGL Course	$20,400.00
350	Government Rd	Surface Treatment - SGL Course	$37,000.00
360	Government Rd	Surface Treatment - SGL Course	$26,400.00
400	Margaret St	Pulverize & Surface Treatment - DBL Course	$26,600.00
		Subtotal	**$163,000.00**

Capital Expenditures Total	**$163,000.00**

Maintenance Expenditures

Bridges & Culverts
As Required

Equipment
As Required

Roads
As Required

Year 2018

Capital Expenditures

Bridges & Culverts

Municipal ID	Location	Type	Costs
BR3	Stobie Creek Bridge	Repair Guide Rails & Install End Treatments	$151,300.00
		Subtotal	**$151,300.00**

Equipment

None

Roads

Sect No.	Road Name	Type	Costs
125	Gordon Lake Rd	Surface Treatment - SGL Course	$5,600.00
135	Gordon Lake Rd	Surface Treatment - SGL Course	$24,400.00
170	Gordon Lake Rd	Surface Treatment - SGL Course	$17,600.00
195	Gordon Lake Rd	Surface Treatment - SGL Course	$24,800.00
215	Fisher Rd	Ditching & Granular Resurfacing	$39,300.00
325	Mink Pt Rd	Surface Treatment - SGL Course	$5,000.00
425	Main St	Surface Treatment - SGL Course	$18,800.00
		Subtotal	**$135,600.00**

Capital Expenditures Total	**$286,900.00**

Maintenance Expenditures

Bridges & Culverts

Municipal ID	Location	Type	Costs
Various	Bridges	OSIM Inspections	$13,800.00
		Subtotal	**$13,800.00**

Equipment

As Required

Roads

As Required

Maintenance Expenditures Total	**$13,800.00**

Year 2019

Capital Expenditures

Bridges & Culverts
None

Equipment
None

Roads

Sect No.	Road Name	Type	Costs
100	Diamond Lake Rd	Ditching & Granular Resurfacing	$34,600.00
480	Kensington Pnt Rd	Surface Treatment - SGL Course	$36,600.00
		Subtotal	**$71,200.00**
		Capital Expenditures Total	**$71,200.00**

Maintenance Expenditures

Bridges & Culverts
As Required

Equipment
As Required

Roads

Sect No.	Road Name	Type	Costs
105	Diamond Lake Rd	Granular Resurfacing	$15,200.00
185	Round Lake Rd	Minor Grade Raise Through Swamp Area	$6,100.00
190	Carter Side Rd	Minor Grade Raise Through Swamp Area	$6,900.00
		Subtotal	**$28,200.00**
		Maintenance Expenditures Total	**$28,200.00**

Year 2020

Capital Expenditures

Bridges & Culverts

Municipal ID	Location	Type	Costs
BR6	Black Creek Bridge	Replace with Culvert	$344,600.00
		Subtotal	**$ 344,600.00**

Equipment

None

Roads

Sect No.	Road Name	Type	Costs
270	Fisher Rd	Grade Raise North of Hwy 17 & Ditching	$37,000.00
		Subtotal	**$37,000.00**

Capital Expenditures Total **$381,600.00**

Maintenance Expenditures

Bridges & Culverts

Municipal ID	Location	Type	Costs
Various Bridges		OSIM Inspections	$6,900.00
		Subtotal	**$6,900.00**

Equipment

As Required

Roads

Sect No.	Road Name	Type	Costs
115	Diamond Lake Rd	Ditching & Grade Raise Through Swamp Area	$17,900.00
180	Carter Side Rd E	Ditching	$9,200.00
		Subtotal	**$27,100.00**

Maintenance Expenditures Total **$34,000.00**

Year 2021

Capital Expenditures

Bridges & Culverts

Municipal ID	Location	Type	Costs
BR4	Suddaby Bridge	Major Rehabilitation	$392,500.00
		Subtotal	**$392,500.00**

Equipment
None

Roads
None

Capital Expenditures Total	**$392,500.00**

Maintenance Expenditures

Bridges & Culverts
As Required

Equipment
As Required

Roads
As Required

Year 2022

Capital Expenditures

Bridges & Culverts

Municipal ID	Location	Type	Costs
BR2	Shewfelt Creek Bridge	Rehab Structure	$126,700.00
		Subtotal	**$126,700.00**

Equipment

None

Roads

Sect No.	Road Name	Type	Costs
400	Margaret St	Surface Treatment - SGL Course	$11,300.00
		Subtotal	**$11,300.00**

Capital Expenditures Total	**$138,000.00**

Maintenance Expenditures

Bridges & Culverts

Municipal ID	Location	Type	Costs
Various Bridges		OSIM Inspections	$12,500.00
		Subtotal	**$12,500.00**

Equipment

As Required

Roads

As Required

Maintenance Expenditures Total	**$12,500.00**

Year 2023

Capital Expenditures

Bridges & Culverts

Municipal ID	Location	Type	Costs
CVT2	Sucker Creek Culvert	Reline Culvert & Install Guide Rails	$293,800.00
		Subtotal	**$293,800.00**

Equipment

None

Roads

Sect No.	Road Name	Type	Costs
160	Gordon Lake Rd	Surface Treatment - SGL Course	$16,600.00
370	Government Rd	Surface Treatment - SGL Course	$42,700.00
405	Queen Victoria St	Surface Treatment - SGL Course	$6,100.00
		Subtotal	**$65,300.00**

Capital Expenditures Total	**$359,100.00**

Maintenance Expenditures

Bridges & Culverts

As Required

Equipment

As Required

Roads

As Required

6 SUMMARY

The Township of Johnson's road system provides a difficult task of maintaining and improving. This is due to several factors including the length of the road system relative to the population, the number of structures and the limited funding available. As identified in this report the overall condition rating of the road system is defined as, 'average with continued improvement needed'. By following the outlined plan and continuing the same level of maintenance the Township will be able to improve the overall condition of the road network. It is evident that there are considerable culvert and bridge upgrades/rehabilitations required. Ideally the Township would pursue funding opportunities to assist them in the completion of these projects.

This plan is intended to serve as a guide only. Decisions regarding the timing and completion of actual improvement projects are to be made by the Township with consideration of its financial capacity, desired levels of service and remaining commitments to its taxpayers. This plan shall be updated and adjusted regularly based on observed depreciations to ensure the accuracy of recommended improvement timing.

Respectively Submitted,

Drew MacDonald, E.I.T.
Tulloch Engineering Inc.

LIST OF APPENDICIES

APPENDIX A

SUMMARY OF ROAD APPRAISALS &
ROAD SECTION LOCATION AND CONDITION RATING MAP

Summary of Road Appraisals

SECTION NO.	ROAD NAME	FROM	TO	SURFACE TYPE	TRAFFIC RANGE (V.P.D.)	LENGTH (km)	CONDITION
100	Diamond Lake Rd	MMA Twp Line	Creek 1.3 km W Of Teal Dr	GRAVEL	50-199	1.5	4
105	Diamond Lake Rd	Creek 1.3 km W Of Teal Dr	Teal Dr	GRAVEL	50-199	1.3	4
110	Teal Dr	Diamond Lake Rd	End	GRAVEL	50-199	0.1	7
115	Diamond Lake Rd	Teal Dr	Gordon Lake Rd	GRAVEL	50-199	2.5	6
120	Gordon Lake Rd	Twp Line	Diamond Lake Rd	L.C.B.	200-399	1.7	6
125	Gordon Lake Rd	Diamond Lake Rd	Old Soo Rd	L.C.B.	200-399	0.3	7
130	Old Soo Rd	Gordon Lake Rd	Twp Line	GRAVEL	200-399	3.1	6
135	Gordon Lake Rd	Old Soo Rd	McClelland Side Rd	L.C.B.	200-399	1.3	7
140	McClelland Side Rd	Gordon Lake Rd	End	GRAVEL	0-49	0.6	5
145	McClelland Side Rd W	Gordon Lake Rd	End	GRAVEL	0-49	1.4	5
150	Gordon Lake Rd	McClelland Side Rd	McKinnon Side Rd	L.C.B.	200-399	1.7	6
155	McKinnon Side Rd	Gordon Lake Rd	200 m Past Old Soo Rd	GRAVEL	50-199	1.8	6
160	Gordon Lake Rd	McKinnon Side Rd	Colonization Rd	L.C.B.	200-399	0.8	5
165	Colonization Rd	Gordon Lake Rd	End	GRAVEL	0-49	0.4	6
170	Gordon Lake Rd	Colonization Rd	Carter Side Rd	L.C.B.	200-399	0.9	7
175	Carter Side Rd	Gordon Lake Rd	West End	GRAVEL	0-49	0.8	5
180	Carter Side Rd E	Gordon Lake Rd	Round Lake Rd	GRAVEL	50-199	1.8	6
185	Round Lake Rd	Carter Side Rd	North To End	GRAVEL	50-199	2.2	4
190	Carter Side Rd	Round Lake Rd	Twp Line	GRAVEL	50-199	0.4	6
195	Gordon Lake Rd	Carter Side Rd	Suddaby Park Rd	L.C.B.	200-399	1.2	7
200	Suddaby Park Rd	Gordon Lake Rd	End	GRAVEL	0-49	1.7	5
205	Gordon Lake Rd	Suddaby Park Rd	Fisher Rd	L.C.B.	200-399	0.3	6
210	Fisher Rd	Gordon Lake Rd	Fire Entrance No. 1088	GRAVEL	50-199	0.6	5
215	Fisher Rd	Fire Entrance No. 1088	Government Rd	GRAVEL	50-199	2.1	4
220	Gordon Lake Rd	Fisher Rd	Old Mill Rd	L.C.B.	200-399	1.3	6
225	Old Mill Rd	McKinnon Rd	Planned Realignment	GRAVEL	0-49	1.2	6
230	Old Mill Rd	Planned Realignment	Phillips Side Rd	GRAVEL	0-49	2.4	6
235	Phillips Side Rd	Old Mill Rd	End	GRAVEL	0-49	0.4	5
240	Old Mill Rd	Phillips Side Rd	Gordon Lake Rd	GRAVEL	0-49	0.5	5
245	Gordon Lake Rd	Old Mill Rd	Government Rd	L.C.B.	200-399	1.5	7
250	Gordon Lake Rd	Government Rd	Hwy 17	L.C.B.	200-399	1.2	7
255	Government Rd	Gordon Lake Rd	Fisher Rd	GRAVEL	50-199	2.5	7
260	Government Rd	Fisher Rd	End	GRAVEL	50-199	1.6	6
265	Fisher Rd	Government Rd	Deplonty Rd	GRAVEL	50-199	1.6	6
270	Fisher Rd	Deplonty Rd	Hwy 17	GRAVEL	50-199	2.2	5
275	Boundary Rd	Fifth Concession	Deplonty Rd	GRAVEL	200-399	1.1	6
280	Boundary Rd	Deplonty Rd	East To End At Farm Drive Way	GRAVEL	0-49	0.1	5
285	Deplonty Rd	Boundary Rd	Fisher Rd	GRAVEL	200-399	1.6	7
290	Deplonty Rd	Fisher Rd	400m W of Fisher Rd	GRAVEL	200-399	0.4	7
291	Deplonty Rd	400m W of Fisher Rd	Hwy 17	L.C.B.	200-399	1.3	7
295	Springwater Dr	Deplonty Rd	End	GRAVEL	50-199	0.2	5
300	Cora Dr	Hwy 17	End	GRAVEL	0-49	0.4	5
305	Archibald Rd	Hwy 17	Oak Dr	GRAVEL	50-199	0.6	6
310	Spurway Dr	Archibald Rd	End	GRAVEL	0-49	0.4	5
315	Oak Dr	Archibald Rd	100m Past Lantern Lane	GRAVEL	50-199	1	5
320	Lantern Lane	Oak Dr	End (600m Private)	GRAVEL	0-49	1.4	5
325	Mink Pt Rd	Hwy 17	Algoma Vet Clinic	L.C.B.	200-399	0.3	7
330	Mink Pt Rd	Algoma Vet Clinic	Foster Dr	GRAVEL	0-49	1.2	5
335	Foster Dr	West End	East End	GRAVEL	0-49	0.4	5
340	Bear Rd	Hwy 17	End	GRAVEL	0-49	0.4	5
345	Whirlpool Park Rd	Hwy 17	End	GRAVEL	0-49	0.5	5
350	Government Rd	Gordon Lake Rd	Desbarats Lake Rd	L.C.B.	200-399	1.8	7
355	Desbarats Lake Rd	Government Rd	End	GRAVEL	0-49	4.6	4
360	Government Rd	Desbarats Lake Rd	Barber Side Rd	L.C.B.	200-399	1.3	7
365	Barber Side Rd	Government Rd	End	GRAVEL	0-49	1.4	6
370	Government Rd	Barber Side Rd	Railroad Tracks	L.C.B.	200-399	2	5
375	Government Rd	Railroad Tracks	Puddingstone Rd	L.C.B.	200-399	1.3	6
380	Puddingstone Rd	Government Rd	Mckluskie Rd	GRAVEL	0-49	1.9	5
385	Puddingstone Rd	Mckluskie Rd	Cave Rd	GRAVEL	0-49	2.9	5
390	Puddingstone Rd	Cave Rd	End	GRAVEL	0-49	1.1	5
395	Cave Rd	Private Lane	End	GRAVEL	0-49	1.1	3
400	Margaret St	Government Rd	Queen Victoria St	L.C.B.	50-199	0.6	6
405	Queen Victoria St	Lake Huron Dr	Main St	L.C.B.	200-399	0.4	5
410	Bolton St	Queen Victoria St	End	L.C.B.	50-199	0.1	6
415	Cameron Dr	Main St	End	L.C.B.	200-399	0.1	6
420	Amory St	Main St	End	GRAVEL	0-49	0.2	6
425	Main St	Hwy 17	Lake Huron Dr	L.C.B.	200-399	1.1	7
430	Gillespie St	Margaret St	End	L.C.B.	0-49	0.2	6
435	McGill St	Lake Huron Dr	End	GRAVEL	0-49	0.1	5
440	Doucet St	Lake Huron Dr	Canadian Pacific Ave	GRAVEL	0-49	0.1	6
445	Canadian Pacific Ave	Doucet St	Armstrong St	GRAVEL	0-49	0.2	6
450	Armstrong St	Canadian Pacific Ave	Lake Huron Dr	GRAVEL	0-49	0.1	6

SECTION NO.	ROAD NAME	FROM	TO	SURFACE TYPE	TRAFFIC RANGE (V.P.D.)	LENGTH (km)	CONDITION
455	D'Odet St	Lake Huron Dr	Canadian Pacific Ave	GRAVEL	0-49	0.1	6
460	Lake Huron Dr	Government Rd	Hwy 17	H.C.B.	200-399	0.9	4
465	Johnson Dr	Lake Huron Dr	End	GRAVEL	50-199	0.2	7
470	Queen Victoria St	Lake Huron Dr	East End	GRAVEL	0-49	0.05	5
475	Boyer Dr	Hwy 17	Hwy 17	GRAVEL	0-49	0.9	5
480	Kensington Pnt Rd	Hwy 17	End	L.C.B.	200-399	2	4
485	Macdonald Dr	Hwy 17	End	GRAVEL	0-49	0.4	6

APPENDIX B

PROJECTED CONDITION RATINGS

Projected Condition Ratings													
SECTION NO.	ROAD NAME	FROM	TO	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
120	Gordon Lake Rd	Twp Line	Diamond Lake Rd	5.4	10.0*	9.4	8.8	8.1	7.5	6.9	6.3	5.7	5.0
125	Gordon Lake Rd	Diamond Lake Rd	Old Soo Rd	6.4	5.8	5.1	4.5	10.0*	9.4	8.8	8.1	7.5	6.9
135	Gordon Lake Rd	Old Soo Rd	McClelland Side Rd	6.4	5.8	5.1	4.5	10.0*	9.4	8.8	8.1	7.5	6.9
150	Gordon Lake Rd	McClelland Side Rd	McKinnon Side Rd	5.4	10.0*	9.4	8.8	8.1	7.5	6.9	6.3	5.7	5.0
160	Gordon Lake Rd	McKinnon Side Rd	Colonization Rd	4.4	10.0*	9.4	8.8	8.1	7.5	6.9	6.3	5.7	10.0*
170	Gordon Lake Rd	Colonization Rd	Carter Side Rd	6.4	5.8	5.1	4.5	10.0*	9.4	8.8	8.1	7.5	6.9
195	Gordon Lake Rd	Carter Side Rd	Suddaby Park Rd	6.4	5.8	5.1	4.5	10.0*	9.4	8.8	8.1	7.5	6.9
205	Gordon Lake Rd	Suddaby Park Rd	Fisher Rd	5.4	10.0*	9.4	8.8	8.1	7.5	6.9	6.3	5.7	5.0
220	Gordon Lake Rd	Fisher Rd	Old Mill Rd	5.4	10.0*	9.4	8.8	8.1	7.5	6.9	6.3	5.7	5.0
245	Gordon Lake Rd	Old Mill Rd	Government Rd	6.4	5.8	5.1	10.0*	9.4	8.8	8.1	7.5	6.9	6.3
250	Gordon Lake Rd	Government Rd	Hwy 17	6.4	5.8	5.1	10.0*	9.4	8.8	8.1	7.5	6.9	6.3
291	Deplonty Rd	400m W of Fisher Rd	Hwy 17	6.4	5.8	5.1	10.0*	9.4	8.8	8.1	7.5	6.9	6.3
325	Mink Pt Rd	Hwy 17	Algoma Vet Clinic	6.4	5.8	5.1	4.5	10.0*	9.4	8.8	8.1	7.5	6.9
350	Government Rd	Gordon Lake Rd	Desbarats Lake Rd	6.4	5.8	5.1	10.0*	9.4	8.8	8.1	7.5	6.9	6.3
360	Government Rd	Desbarats Lake Rd	Barber Side Rd	6.4	5.8	5.1	10.0*	9.4	8.8	8.1	7.5	6.9	6.3
370	Government Rd	Barber Side Rd	Railroad Tracks	10.0**	9.4	8.8	8.1	7.5	6.9	6.3	5.7	5.0	10.0*
375	Government Rd	Railroad Tracks	Puddingstone Rd	5.4	10.0*	9.4	8.8	8.1	7.5	6.9	6.3	5.7	5.0
400	Margaret St	Government Rd	Queen Victoria St	5.4	4.8	4.1	10.0**	9.4	8.8	8.1	7.5	10.0*	9.4
405	Queen Victoria St	Lake Huron Dr	Main St	4.4	10.0*	9.4	8.8	8.1	7.5	6.9	6.3	5.7	10.0*
410	Bolton St	Queen Victoria St	End	5.4	10.0*	9.4	8.8	8.1	7.5	6.9	6.3	5.7	5.0
415	Cameron Dr	Main St	End	5.4	10.0*	9.4	8.8	8.1	7.5	6.9	6.3	5.7	5.0
425	Main St	Hwy 17	Lake Huron Dr	6.4	5.8	5.1	4.5	10.0*	9.4	8.8	8.1	7.5	6.9
430	Gillespie St	Margaret St	End	5.4	10.0*	9.4	8.8	8.1	7.5	6.9	6.3	5.7	5.0
460	Lake Huron Dr	Government Rd	Hwy 17	3.8	3.7	10.0**	9.8	9.7	9.5	9.3	9.2	9.0	8.8
480	Kensington Pnt Rd	Hwy 17	End	10.0**	9.4	8.8	8.1	7.5	10.0*	9.4	8.8	8.1	7.5

Notes:

* Denotes Single Course Surface Treatment

** Denotes Double Course Surface Treatment or Double Lift of Asphalt

APPENDIX C

BENCH MARK COSTS

APPENDIX C

ROAD IMPROVEMENTS BENCH MARK COSTS

#	ITEM	UNIT	UNIT COST
1	Asphalt		
	a) Double Lift	sq. m.	$30.00
	b) Single Lift	sq. m.	$15.00
2	Surface Treatment (Includes Aggregates)		
	a) Single Course	sq. m.	$2.50
	b) Double Course	sq. m.	$5.00
3	Full Depth in-Place Reclamation	sq. m.	$1.00
4	Earth Excavation	.	$10.00
5	Rock Excavation		
	a) <500 cu.m	cu. m.	$120.00
	b) >500 cu.m	cu. m.	$60.00
6	Granular "B" (in place)	cu. m.	$20.00
7	Granular "A" (in place)	cu. m.	$30.00
8	Guide Rails		
	a) Cable	m.	$50.00
	b) Steel Beam	m.	$250.00
9	Ditching		
	a) New Ditch	m.	$20.00
	b) Reditching	m.	$10.00
10	Culverts – HDPE (Installed)		
	a) 450 mm	m.	$200.00
	b) 600 mm	m.	$250.00
	c) 750 mm	m.	$300.00
	d) 900 mm	m.	$350.00

10 YEAR WATER, SANITARY & STORM SYSTEMS IMPROVEMENT PLAN

TOWNSHIP OF JOHNSON

PROJECT NO. 13-2020

PREPARED BY:

TULLOCH ENGINEERING

January 2014

1 INTRODUCTION

The following document was prepared by Tulloch Engineering in conjunction with the Township of Johnson and is supplemented with information provided by PUC Inc. (PUC) and Shelby Environmental services Ltd. (Shelby). It is intended to act as a 10 Year Water, Sanitary and Storm Systems Improvement Plan and identifies water, sanitary and storm sewer system components in need of repair or replacement. The anticipated improvements outlined herein are based on installation date, material type and knowledge of system provided by the Township and their agents.

Municipal services including drinking water supply and wastewater collection are provided to approximately 93 homes and 15 commercial and institutional buildings in the hamlet of Desbarats. The Township also owns and maintains a storm sewer system along Lake Huron Drive made up of approximately 900m of storm sewer pipe and 27 storm structures. Detailed inspections of in ground infrastructure were not completed as part of this study. Condition assessments were based on infrastructure age and materials alone. This plan is intended to serve as a guide only. Decisions regarding the timing and completion of actual improvements are to be made by the Municipality with consideration of its financial capacity, desired levels of service and remaining commitments to its taxpayers.

2 DRINKING WATER SYSTEM

Desbarats' water supply is drawn from the St. Joseph Channel on Lake Huron and treated and stored at the Township's Water Treatment Plant on Kensington Point. Treated and disinfected drinking water is delivered to the hamlet via a submarine 160mm diameter (dia.) transmission main. Drinking water is distributed throughout the hamlet via a network of municipal watermains. The Township currently has an agreement in place with PUC for the management, operation and maintenance of the water supply system.

Shelby Environmental Services has prepared the, *Desbarats Drinking Water System Financial Plan # 275-301* for the Township as required by the Safe Drinking Water Act under the Financial Plans Regulation (O. Reg. 453/07). This financial plan is attached in Appendix A and is intended to act as a guide for future expenses and revenues relating to the Township's Drinking water system. PUC has also provided a capital operating plan outlining equipment age, forecasted replacement cost and timing of expected replacements over the next 10 years. The,

Desbarats WTP Capital Expenditures spreadsheet completed by PUC is Attached in Appendix B and summarizes projected expenditures. It is assumed that the existing conditions and timing of expected replacements of the water treatment facility components is assessed during the development of this document as PUC staff have the greatest understanding of the systems and their capacities.

Condition assessments and timing of expected replacement of the distribution network is not included within the PUC capital projections. Projected watermain replacements were estimated based on installation date and material type. A detailed inventory of the water distribution network was compiled by Tulloch Engineering as part of the preparation of this plan. The system is comprised of varying diameter Polyethylene (PE) watermains which began service in 1988. A breakdown of the watermain infrastructure is shown in Table 1. Also included in the table is the approximately 3280m length of 160mm dia. PE submarine transmission main which delivers drinking water from the treatment plant to the distribution network. A spreadsheet containing the detailed inventory and estimated replacement costs can be found on the CD-ROM disc attached in Appendix C.

Table 1 - Watermain Inventory Summary

Pipe Diameter (mm)	Pipe Material	Length (m)
25	PE Series 80 Pipe	47
50	PE Series 80 Pipe	3287
75	PE Series 80 Pipe	1020
100	PE Series 80 Pipe	134
160	PE Series 80 Pipe	354
160 Transmission	PE Series 80 Pipe	3280

Review of the Township's Public Sector Accounting Board (PSAB) databases showed that a useful life of 50 years was assumed for PE watermain. In reality, observation of similar systems has proven that actual expected lifespans of these types of installations, when completed properly and regularly maintained is closer to 75 years. Assuming the conservative 50 year lifespan would suggest that the early installations would be nearing the end of their useful lives in the late 2030's. Although major replacements are not anticipated at that time, it is recommended that detailed inspections and studies be conducted when the infrastructure nears 50 years in age to determine if another 20 to 25 years of service life is feasible.

It is our understanding that there have been two prior watermain breaks at the railway crossing. This is of great concern given that these breaks cut-off the water supply to the entire community of Desbarats. The heavy loading at the railway crossing has most likely impacted the piping in this area. We would recommend that a review of this crossing be conducted to determine if measures can be taken to alleviate the potential for future problems.

A total 2013 valuation of the watermain distribution network was estimated at approximately $1.2 million. Valuation of the transmission main was estimated at approximately $600,000. It is not anticipated that any significant capital expenditures will be required for the replacement of the Township's watermains within this plan's 10 year study period.

3 SANITARY SYSTEM

The Township's sanitary collection system is a non-gravity system serviced by sanitary force mains throughout the community. Each user has two concrete tanks including an effluent pump that pumps sanitary sewage into the network of forcemains and directs it to the Township's sewage lagoons located to the east of the Township offices. The Township is responsible for maintenance of the effluent pumps and removal of solids from the tanks, which is typically done every three to five years. A detailed projection of capital expenditures similar to the spreadsheet created for the drinking water system has not been prepared by the municipality or its agents. It is the suggestion of this plan that a detailed study be completed to assess the condition of the sanitary system with regards to the existing effluent pumps, tanks and lagoon capacity. Review of past maintenance issues, failures and replacements should be completed to assess component conditions and estimate longevity.

A detailed inventory of the sanitary sewer pipes was compiled by Tulloch Engineering as part of the preparation of this plan. The Township's system is comprised of varying diameter PE forcemains which were installed in 1988. A brief summary of the forcemains is shown in Table 2. A spreadsheet containing the detailed inventory and estimated replacement costs can be found on the CD-ROM disc attached in Appendix C.

Table 2 - Sanitary Forcemain Inventory Summary

Pipe Diameter (mm)	Pipe Material	Length (m)
50	PE Series 80 Pipe	2339
75	PE Series 80 Pipe	1198
100	PE Series 80 Pipe	410

Similar to the water distribution system, a recommended lifespan of 50 years was used for the preparation of the PSAB amortization period. Similar systems have proven that the expected lifespan of these installations can be as much as 75 years. A conservative 50 year lifespan assumption would suggest that the installations would be nearing the end of their useful lives in the late 2030's. Detailed inspections of representative sanitary sewer sections throughout the network should be conducted when the infrastructure nears 50 years in age to determine if another 20 to 25 years of service life is feasible. A total 2013 valuation of all the sanitary sewers was estimated at approximately $1.8 million. It is not anticipated that any significant capital expenditures will be required for the replacement sanitary sewers within the 10 year study period of this plan.

4 STORM SYSTEM

The Township currently supports a storm sewer network running primarily along Lake Huron Drive in the hamlet of Desbarats that was installed in the 1970's. As with the Township's sanitary and water networks, a detailed inventory of the storm sewer was compiled using the, Desbarats Water and Sewer Project 'As-Built' drawings. Discussions regarding the storm sewer pipe material with the Township representatives indicated it to be precast concrete pipe but this assumption should be verified. A brief summary of the storm sewer network is shown in Table 3.

Table 3 – Storm Sewer Inventory Summary

Pipe Diameter (mm)	Pipe Material (Assumed)	Length (m)
300	Precast Concrete	608
400	Precast Concrete	32
530	Precast Concrete	93
750	Precast Concrete	86
850	Precast Concrete	84

During compilation of the PSAB information an assumed lifespan of 50 years was used for the storm sewers. Similar to the PE watermain and sanitary sewers, a more realistic life expectancy for these types of installations can be as much as 70 to 75 years. Assuming the conservative 50 year lifespan would suggest that the early installations would be nearing the end of their useful lives in the 2020's.

A detailed rehabilitation and replacement study of the storm sewer system has been recommended in the, *10 Year Roads Improvement Plan – Township of Johnson* completed by Tulloch Engineering in 2013. The study was recommended prior to an identified asphalt resurfacing project on Lake Huron Drive to determine the extent of the storm system that is feasibly capable of providing another 20 to 30 years of service life. Current heaving and distortions along Lake Huron Drive suggests that some storm sewer infrastructure replacements should be expected as part of the resurfacing project. An estimated rehabilitation and replacement cost of 10% of the storm sewers, approximately $50,000, was used in the *10 Year Roads Improvement Plan* but should be confirmed by the proposed study.

5 10 YEAR RECOMMENDED IMPROVEMENT PLAN

The improvements outlined by the *Desbarats Drinking Water System Financial Plan (Shelby)* and the *Desbarats WTP Capital Expenditures* spreadsheet (PUC) found in Appendices A and B should act as an outline for projected expenditures relating to the Municipality's drinking water system.

This 10 Year Water, Sanitary and Storm Systems Improvement Plan shall be amended to include anticipated expenditures with regards to the sanitary system once a detailed condition study has been completed that encompasses the effluent pumps, tanks and lagoon. Major replacements of existing water distribution lines and sanitary collection sewers are not anticipated within the next 10 years but installations will begin reaching the end of their anticipated useful lives (PSAB) in the late 2030's.

As the sewer and water infrastructure were installed in the same time period and will assumedly reach the end of their service lives at the same time, their expected replacement will result in the need for substantial capital expenditures over a short timeframe. This situation should be considered and budgeted for in future water and sanitary improvement plans. A possible

scenario for the replacement of the aging sewer and water infrastructure could involve the phased assessment and replacement of watermains and sanitary sewers over an extended period, completing the work in small sections over a 5-10 year period. Other options such as replacing the majority of the aging infrastructure once it is deemed to have reached the end of its useful life over a shorter period such as 3 years could be considered. The latter option would likely require substantial amounts of outside funding should adequate reserves not be in place. In any case, planning for the replacement of these systems should be a key consideration in future financial and infrastructure plans.

The storm sewers along Lake Huron Drive will begin reaching the end of their anticipated useful lives (PSAB) in the early 2020's and have already begun to show possible signs of deterioration by road surface heaving and distortion. A detailed rehabilitation and replacement study of the storm sewer infrastructure should be completed prior to the asphalt resurfacing project as recommended in the *10 Year Roads Improvement Plan– Township of Johnson*.

Respectively Submitted,

Drew MacDonald, E.I.T.
Tulloch Engineering Inc.

APPENDIX B

DESBARATS WTP CAPITAL EXPENDITURES

PUC Inc.

Desbarats WTP Expenditures

	Capitol Expenditures	Units	Current Age (yr.)	Life Cycle	Replacement Value (est.)	2013 Budget	2014 Budget	2015 Budget	2016 Budget	2017 Budget	2018 Budget	2019 Budget	2020 Budget	2021 Budget	2022 Budget	Grand Total
1	Highlifts	1 pump	9	10	$ 3,000.00	$ 500.00	$ 507.50	$ 515.11	$ 522.84	$ 530.68	$ 538.64	$ 546.72	$ 554.92	$ 563.25	$ 571.69	$ 5,351.36
2		2 pump	9	10	$ 3,000.00	$ 400.00	$ 406.00	$ 412.09	$ 418.27	$ 424.55	$ 430.91	$ 437.38	$ 443.94	$ 450.60	$ 457.36	$ 4,281.09
3		3 pump	9	10	$ 3,000.00	$ 300.00	$ 304.50	$ 309.07	$ 313.70	$ 318.41	$ 323.19	$ 328.03	$ 332.95	$ 337.95	$ 343.02	$ 3,210.82
4	Raw Water Pumps	1 pump	5	10	$ 3,000.00	$ 300.00	$ 304.50	$ 309.07	$ 313.70	$ 318.41	$ 323.19	$ 328.03	$ 332.95	$ 337.95	$ 343.02	$ 3,210.82
5		2 pump	8	10	$ 3,000.00	$ 400.00	$ 406.00	$ 412.09	$ 418.27	$ 424.55	$ 430.91	$ 437.38	$ 443.94	$ 450.60	$ 457.36	$ 4,281.09
6	Pressure tanks	6 tanks	15	15	$ 5,000.00	$ 500.00	$ 507.50	$ 515.11	$ 522.84	$ 530.68	$ 538.64	$ 546.72	$ 554.92	$ 563.25	$ 571.69	$ 5,351.36
7	Chemical feed equipment	8 pumps	10	10	$ 20,000.00	$ 2,000.00	$ 2,030.00	$ 2,060.45	$ 2,091.36	$ 2,122.73	$ 2,154.57	$ 2,186.89	$ 2,219.69	$ 2,252.99	$ 2,286.78	$ 21,405.44
8	Storage tank	4 tanks	23	25	$ 3,000.00	$ 300.00	$ 304.50	$ 309.07	$ 313.70	$ 318.41	$ 323.19	$ 328.03	$ 332.95	$ 337.95	$ 343.02	$ 3,210.82
9	Auto switch over unit	4 panels	9	15	$ 16,000.00	$ 1,600.00	$ 1,624.00	$ 1,648.36	$ 1,673.09	$ 1,698.18	$ 1,723.65	$ 1,749.51	$ 1,775.75	$ 1,802.39	$ 1,829.42	$ 17,124.35
10	Mixers	3 units	23	20	$ 4,500.00	$ 450.00	$ 456.75	$ 463.60	$ 470.56	$ 477.61	$ 484.78	$ 492.05	$ 499.43	$ 506.92	$ 514.53	$ 4,816.22
11	Maintenance Costs - parts/tubing		9	5	$ 2,000.00	$ 200.00	$ 203.00	$ 206.05	$ 209.14	$ 212.27	$ 215.46	$ 218.69	$ 221.97	$ 225.30	$ 228.68	$ 2,140.54
12	Filter media (anthracite)	25 cu.ft.	23	10	$ 5,000.00	$ 400.00	$ 406.00	$ 412.09	$ 418.27	$ 424.55	$ 430.91	$ 437.38	$ 443.94	$ 450.60	$ 457.36	$ 4,281.09
13	Filter media (sand)	25 cu.ft.	23	20	$ 500.00	$ 50.00	$ 50.75	$ 51.51	$ 52.28	$ 53.07	$ 53.86	$ 54.67	$ 55.49	$ 56.32	$ 57.17	$ 535.14
14	Ecodyne Package Plant	1 plant	23	50	$ 100,000.00	$ 10,000.00	$ 10,150.00	$ 10,302.25	$ 10,456.78	$ 10,613.64	$ 10,772.84	$ 10,934.43	$ 11,098.45	$ 11,264.93	$ 11,433.90	$ 107,027.22
	Instrumentation						$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
15	Turbidity meter	1	12	10	$ 3,000.00	$ 300.00	$ 304.50	$ 309.07	$ 313.70	$ 318.41	$ 323.19	$ 328.03	$ 332.95	$ 337.95	$ 343.02	$ 3,210.82
16	Turbidity meter	1	1	10	$ 3,000.00	$ 300.00	$ 304.50	$ 309.07	$ 313.70	$ 318.41	$ 323.19	$ 328.03	$ 332.95	$ 337.95	$ 343.02	$ 3,210.82
17	Turbidity meter	1	6	10	$ 3,000.00	$ 300.00	$ 304.50	$ 309.07	$ 313.70	$ 318.41	$ 323.19	$ 328.03	$ 332.95	$ 337.95	$ 343.02	$ 3,210.82
18	Flow Meter	1	23	15	$ 2,000.00	$ 200.00	$ 203.00	$ 206.05	$ 209.14	$ 212.27	$ 215.46	$ 218.69	$ 221.97	$ 225.30	$ 228.68	$ 2,140.54
19	Flow Meter	1	10	15	$ 3,500.00	$ 350.00	$ 355.25	$ 360.58	$ 365.99	$ 371.48	$ 377.05	$ 382.71	$ 388.45	$ 394.27	$ 400.19	$ 3,745.95
20	Chlorine Analyser	1	6	10	$ 3,500.00	$ 350.00	$ 355.25	$ 360.58	$ 365.99	$ 371.48	$ 377.05	$ 382.71	$ 388.45	$ 394.27	$ 400.19	$ 3,745.95
21	pH Meter	1	23	10	$ 1,500.00	$ 150.00	$ 152.25	$ 154.53	$ 156.85	$ 159.20	$ 161.59	$ 164.02	$ 166.48	$ 168.97	$ 171.51	$ 1,605.41
22	RTU plant controller	1	23	10	$ 5,000.00	$ 500.00	$ 507.50	$ 515.11	$ 522.84	$ 530.68	$ 538.64	$ 546.72	$ 554.92	$ 563.25	$ 571.69	$ 5,351.36
23	Bristol Controller/modem	1	12	10	$ 10,000.00	$ 1,000.00	$ 1,015.00	$ 1,030.23	$ 1,045.68	$ 1,061.36	$ 1,077.28	$ 1,093.44	$ 1,109.84	$ 1,126.49	$ 1,143.39	$ 10,702.72
24	Level Meter	1	1	10	$ 2,000.00	$ 200.00	$ 203.00	$ 206.05	$ 209.14	$ 212.27	$ 215.46	$ 218.69	$ 221.97	$ 225.30	$ 228.68	$ 2,140.54
25	Pressure transmitters	2	23	10	$ 2,000.00	$ 200.00	$ 203.00	$ 206.05	$ 209.14	$ 212.27	$ 215.46	$ 218.69	$ 221.97	$ 225.30	$ 228.68	$ 2,140.54
26	Compressor	1	2	5	$ 2,000.00	$ 200.00	$ 203.00	$ 206.05	$ 209.14	$ 212.27	$ 215.46	$ 218.69	$ 221.97	$ 225.30	$ 228.68	$ 2,140.54
27	Automated valves (pnuematic)	6	6	15	$ 12,000.00	$ 1,200.00	$ 1,218.00	$ 1,236.27	$ 1,254.81	$ 1,273.64	$ 1,292.74	$ 1,312.13	$ 1,331.81	$ 1,351.79	$ 1,372.07	$ 12,843.27
28	Automated valves (electronic - ftw)	1	9	15	$ 5,000.00	$ 500.00	$ 507.50	$ 515.11	$ 522.84	$ 530.68	$ 538.64	$ 546.72	$ 554.92	$ 563.25	$ 571.69	$ 5,351.36
29	Process Valves	15	23	25	$ 5,000.00	$ 500.00	$ 507.50	$ 515.11	$ 522.84	$ 530.68	$ 538.64	$ 546.72	$ 554.92	$ 563.25	$ 571.69	$ 5,351.36
30	Propane generator	1	9	25	$ 15,000.00	$ 1,500.00	$ 1,522.50	$ 1,545.34	$ 1,568.52	$ 1,592.05	$ 1,615.93	$ 1,640.16	$ 1,664.77	$ 1,689.74	$ 1,715.08	$ 16,054.08
31	Propane storage tanks	4	9	15	$ 2,000.00	$ 200.00	$ 203.00	$ 206.05	$ 209.14	$ 212.27	$ 215.46	$ 218.69	$ 221.97	$ 225.30	$ 228.68	$ 2,140.54
32	Annual mtce.	-	-	-	-	$ 500.00	$ 507.50	$ 515.11	$ 522.84	$ 530.68	$ 538.64	$ 546.72	$ 554.92	$ 563.25	$ 571.69	$ 5,351.36
33	Intake inspection	1	23	50	$ 25,000.00	$ 2,500.00	$ 2,537.50	$ 2,575.56	$ 2,614.20	$ 2,653.41	$ 2,693.21	$ 2,733.61	$ 2,774.61	$ 2,816.23	$ 2,858.47	$ 26,756.80
34	Licenses & Audits DWQMS				$ 10,000.00	$ 1,000.00	$ 1,000.00	$ 1,015.00	$ 1,030.23	$ 1,045.68	$ 1,061.36	$ 1,077.28	$ 1,093.44	$ 1,109.84	$ 1,126.49	$ 10,559.33
35	Clearwell Inspection						$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
36	Watermain Leak detection				$ 2,500.00	$ 250.00	$ 253.75	$ 257.56	$ 261.42	$ 265.34	$ 269.32	$ 273.36	$ 277.46	$ 281.62	$ 285.85	$ 2,675.68
37	Hydrant replacement/repairs						$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
38	Valve replacement/repair	20	23	40	$ 100,000.00	$ 10,000.00	$ 10,150.00	$ 10,302.25	$ 10,456.78	$ 10,613.64	$ 10,772.84	$ 10,934.43	$ 11,098.45	$ 11,264.93	$ 11,433.90	$ 107,027.22
39	Watermain replacement/repairs	6 km.	23	40												
40	Health & Safety Equipment/Issues	-	-		$ 500.00	$ 50.00	$ 50.75	$ 51.51	$ 52.28	$ 53.07	$ 53.86	$ 54.67	$ 55.49	$ 56.32	$ 57.17	$ 535.14
41	Lab Equipment						$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
42	Lab Costs															
43	Chemical Costs															
44	Corrosion Control Equipment															
45	Misc.				$ 1,000.00	$ 100.00	$ 101.50	$ 103.02	$ 104.57	$ 106.14	$ 107.73	$ 109.34	$ 110.98	$ 112.65	$ 114.34	$ 1,070.27
46	Building Maintenance/Upkeep/roof				$ 5,000.00	$ 500.00	$ 507.50	$ 515.11	$ 522.84	$ 530.68	$ 538.64	$ 546.72	$ 554.92	$ 563.25	$ 571.69	$ 5,351.36
47	Operational Contract				$ 65,842.00	$ 67,817.26	$ 69,851.78	$ 71,947.33	$ 74,105.75	$ 76,328.92	$ 78,618.79	$ 80,977.36	$ 83,406.68	$ 85,908.88	$ 88,486.14	$ 777,448.88
	Total				**$ 460,342.00**	**$108,067.26**	**$110,690.53**	**$113,398.66**	**$116,178.85**	**$119,033.12**	**$121,963.55**	**$124,972.29**	**$128,061.53**	**$131,233.55**	**$134,490.69**	**$1,208,090.04**

APPENDIX C

ASSET MANAGEMENT PLAN – PDF

10 YEAR ROADS IMPROVEMENT PLAN SPREADSHEETS

10 YEAR WATER, SANITARY & STORM SYSTEMS SPREADSHEETS

FINANCIAL PLANNING TEMPLATE

CD-ROM

CD-ROM Delivered to the Municipality.