Asset Management Plan

Pelham
NIAGARA

'Providing essential services that meet approved standards at minimum cost'

Executive Summary

The Town of Pelham's existing infrastructure is aging while demand grows for better infrastructure such as roads, bridges, sidewalk, lights, signals and sewer and water systems. This demand is in response to higher standards of safety, accessibility, health, environmental protections, regulations and population growth. Further, Municipal funding remains an ongoing challenge to overcome the accumulated backlog of capital renewals and maintenance deficits across Ontario.

A proven, effective method for long term infrastructure planning is known as "Asset Management". Through the implementation of asset management best practices, infrastructure assets that support core municipal services are monitored and maintained at levels that enable Pelham to provide these services at manageable risks and a high level of reliability and confidence, enhancing overall value to those receiving services in the community. The Town has reviewed long range infrastructure strategies, including current technical and financial practices, and consolidated them into two components, defined as an Asset Management Plan.

The Asset Management Plan, as presented in the report, is comprised of the following two components:

1. An overview of fundamentals of an Asset Management Plan based upon best management practices obtained from other Municipalities.
2. An Asset Management Strategy for each major asset class.

This format was selected to ensure that the asset management strategies, as attached, could be updated/amended as necessary according to changes in best management practices, advances in technology, financial constraints, and/or changes to condition assessments.

The Asset Management plan, as presented in this report, is a systematic process that allows for the maintenance, upgrading, and operating of the Town's physical assets in a cost effective and efficient manner.

The implementation of the Asset Management Plan will ensure that the Town of Pelham can meet new demands in a fiscally responsible and environmentally sustainable manner, while preserving the Town's quality of life.

Background

What is an Asset Management Plan?

An Asset Management Plan is a plan developed for the management of one or more infrastructure assets within the municipality that are used to provide municipal services. The purpose is to help preserve, protect, and enhance the quality of life in Pelham by systematically managing the Town's assets in an efficient, effective and sustainable manner. The plan combines multi-disciplinary management techniques, including technical and financial, over the life cycle of assets, to a specified level of service in the most cost-effective manner.

Integrated asset management plans are similar to the description provided above, however refers to the infrastructure that shares a common location within the utility corridor. His includes roads, curbs, gutters, streetlights, and sewer and water systems. Each asset has a different lifecycle which results in the need for the technical and financial experts to consult and determine. The condition of the asset will serve as the basis for replacement or rehabilitation. For example, a road that requires resurfacing drives the need to review the condition of the water and wastewater system.

Asset Management Plans enhance budgeting and planning processes by modeling future capital costs beyond the Town's current 5 year practice. This will aid in the Town's understanding of future budget pressures and assist in providing options on closing any infrastructure gaps. As well, a fully implemented plan will provide real life Town specific data on maintenance and operating costs allowing staff to generate tools to develop life cycle costing and long-term performance measures. Further, the plan will give direction on proactive preventative maintenance and rehabilitation which will ultimately lower costs and manage risks. This information is important to Council when deliberating on budget matters.

What are the benefits of Asset Management Plan?

Specific Benefits associated with Asset Management Planning are:

- Allows for better decision making regarding resource allocation
- Facilitates the establishment and subsequent implementation of policy objectives and the related measurement of performance
- Optimizes investment decisions resulting in cost savings
- Mitigates financial risk as greater preventative maintenance defers or eliminates need for costly reconstruction
- Provides more effective, transparent communication to all stakeholders
- Provides better and consistent levels of service to improve overall stakeholder value and confidence/trust

- Better risk management by identifying issues in timely manner allowing for early intervention
- Allows for more effective financial planning and accountability
- Reduces lifecycle costs
- Leads to more efficient data management
- Results in positive institutional change

Combined, these benefits will improve stakeholder value, confidence, and public trust, aiding in the achievement of the Town's mission/vision.

What are the key Principles of the Asset Management Plan?

Asset Management can be characterized by the following key principles:

- A strategic proactive approach and proactive approach that places a premium on data, information, collaboration and interdisciplinary management;
- A comprehensive long-term view of infrastructure performance and cost;
- An explicit, visible and transparent approach that requires effective communication among all stakeholders
- A business case involving investment choices that are policy driven with tradeoffs among competing priorities

What are the essential components to the Asset Management Plan?

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

1. <u>Asset Value:</u>

   All municipal infrastructure assets have a monetary value. Administration has determined the actual capital value for the majority of the assets, while providing an estimate for others.

2. <u>Life Cycle Management</u>

   All assets have a limited life expectancy. To some degree, the rate of deterioration can be estimated. A decision made at any point in time in the life cycle of an asset has an effect on the remaining life, and may have operational implications and related costs. The life cycle for each asset as presented in this report is contained in the attachments.

3. Sustainability

In the context of asset management, sustainable development has been defined as “meeting the needs of the present generation without compromising the ability of future generations to meet their own needs” (National Guide to Sustainable Municipal Infrastructure”). The Asset Management Plan needs to identify a financial strategy over the long term to ensure that sufficient monies are available. This function supports the capital and operating plans as they identify the timing for asset renewal, additions, and initial costs, along with maintenance of current service levels through performance indicators, respectively. As such, these monies provide the resources required to operate, rehabilitate, and ultimately replace the asset at the optimal time with the intention of achieving the lowest lifecycle cost. The plan also ensures, that correct 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. Integration of Technical and Financial Plans

The technical plan must minimize lifecycle costs for the infrastructure while maintaining an adequate 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 technical plan. Ideally, the two plans should be integrated so the relationship between the level of service and the cost can be quantified. The plans attached to this report integrate the financial investment level required to the level of service. The technical and financial relationship may change from time to time depending on the outcome of asset condition assessments

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 Town’s case, the probability of failure is taken into account while the condition of the asset is being analyzed. The condition survey leads to determining the rate of failure and the consequences of such failure, to some degree. 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 and adjustments made at appropriate stages in the asset life cycle to achieve an acceptable balance between cost and the service level performance. The Town can take advantage of tools provided by various organizations including OGRA, OWWA, and ORFA, as well as utilizing performance measurements established as part of the Ontario Municipal Benchmarking Initiative (OMBI). These benchmarks (for some assets) have been compiled into a comprehensive database that can be easily accessible and can be used to determine the performance of the asset.

Financial Implications

The financial implications (estimated cost per year for prescribed strategy) are presented in the attachments of this report. It is important to note that the amount of funds available through the Capital budget and Capital Forecast may not be sufficient to sustain current levels of service. Administration will continue to collectively work together to monitor and accommodate the financial and technical requirements of this plan, including taking advantage of any grant funding programs that may be available going forward.

Conclusion

The Asset Management Plan is a proven systematic process that allows for the maintenance, upgrading, and operating of our physical assets in a cost effective, efficient manner. The implementation of an Asset Management Plan enables the Town to utilize a decision making tool to meet new demands and deliver fiscally responsible options in an environmentally sustainable framework, ensuring the preservation of our quality of life.

Buildings

Asset:	**Buildings**
Inventory:	• 21 Facilities
Anticipated Asset Life Cycle:	Varies from 10-15 years. For example carpeting or a hot water tank would be in the 10-15 yr range, a roof membrane in the 20-25 year range, heating, ventilating and air conditioning in the 15-25 year range and a building super structure in the 25-50 year range. These life cycles assume adequate maintenance is provided throughout the course of the components life.
Integrated:	Individual asset components are reviewed; projects are lumped together per asset to take advantage of the "economies of scale" principle. Consideration is given to minimize the disruption of operations to a given asset over time.
Rehabilitation and Replacement Criteria:	Effective 2014, the Town will use a Facility Condition Index (FCI) Ratio of total deferred maintenance costs/current replacement value of the asset. FCI is a standard ratio recognized throughout North America. The FCI can be associated with individual assets or grouping of assets. A FCI of less than .05 is good, .05 to .10 is fair, > .10 is poor and .35 is total replacement.
Rehabilitation and Replacement Strategies:	An FCI will provide asset condition summaries and identify percentage used of individual components and prioritize replacement based on actual condition, and the point in time of its life cycle. Facility roof and HVAC system inventories are generally the most important components to manage and as such annual inspections should be completed. These assets will be replaced or upgraded to meet lifecycle, industry, technological, and safety standards. Upgrading of ingress/egress points may also be required for many facilities as new requirements under the Accessibility for Ontarians with Disabilities Act (AODA) have set minimum accessibility standards. Along with maintaining and protecting the Town's facility assets, any upgrade program will also include the implementation of energy efficient systems and equipment. Further, the Town is going beyond industry standards by utilizing Facility Accessibility Design Standards (FADS)
Life Cycle Consequences:	
Integrated Asset Priorities:	N/A
Corporate/Consulting Reports on Subject:	
Estimated Cost per year for Strategy described:	$24,000 +/- per year
Other Information or reference materials:	

Licensed Vehicles

Asset:	**Licensed Vehicles**
Inventory:	• 23 Heavy Duty vehicles • 22 Light Duty Vehicles • 4 Equipment accessory add-ons • 4 Trailers • 1 Four Wheeler
Anticipated Asset Life Cycle:	Varies depending on service area and vehicle/equipment type
Integrated:	With technical advances and financial plans, environmental regulations, operational changes, service increases or decreases.
Rehabilitation and Replacement Criteria:	Lifecycle cost analysis considering depreciation, fuel, repair and downtime costs identify optimal replacement year for vehicle classes.
Rehabilitation and Replacement Strategies:	Review usage to warrant replacement, repair costs should not exceed 40-50% of replacement costs, depending on the vehicle and other factors. Review lease, seasonal rental opportunities and refurbishing strategies.
Life Cycle Consequences:	Cost per km increases, increased downtime requiring more spare units or work schedules to be lengthened increasing manpower costs, loss of production
Integrated Asset Priorities:	
Corporate/Consulting Reports on Subject:	
Estimated Cost per year for Strategy described:	$52,000 +/- per year
Other Information or reference materials:	

Street Lights & Traffic Signals

Asset:	**Traffic Signals & Street Lights**
Inventory: -Street Lights -Traffic Signals	• 1147 Cobra Streetlights • 216 Circular Lanterns Streetlights • 13 Solera Colonial Streetlights • 5 Holophane RSL-350 Streetlights • 4 sets of Traffic Signals • 2 sets of school zone warning lights
Anticipated Asset Life Cycle:	Expected life cycle for street lights are 30 years, whereas traffic signals have an expected life of 25 years.
Integrated:	This asset is integrated above and below ground with Hydro 1 and Niagara Peninsula Energy
Rehabilitation and Replacement Criteria:	Based on Hydro 1 pole line rebuilds, updated component technologies, life cycle requirements and roadway infrastructure reconstruction in order to maintain recommended illumination levels as per The Towns standards. Traffic signals improvements made based on required levels of service due to changing vehicular and/or pedestrian volumes,on roadway infrastructure reconstruction programs, Hydro 1 pole removals, updated component technologies and life cycle requirements as outlined above.
Rehabilitation and Replacement Strategies:	Reconstruction of roadways will determine required rehabilitation of existing streetlight infrastructure in order to ensure proper illumination. As well, streetlights and traffic signals will be replaced when necessary due to changing technologies.
Life Cycle Consequences:	Existing ***street lighting*** systems removed as part of road reconstruction projects and/or Hydro 1 pole line reconstruction projects would not be replaced resulting in no illumination. The existing street lighting system would continue to deteriorate resulting in increased outages, unsafe poled, public concern for safety and increased maintenance costs. Outdated ***traffic signals*** will not provide the recommended level of service based on changing traffic volumes and vehicular/pedestrian movements, resulting in traffic congestion, delays, public concerns for traffic safety and increased maintenance costs.
Integrated Asset Priorities:	***Streetlights*** are based on roadway reconstruction and Hydro 1 pole line rebuilds in order to maintain recommended illumination levels as per Towns standards. ***Traffic Signal*** priorities are based on maintaining acceptable levels of service due to changing traffic volumes and pedestrian

	movements
Corporate/Consulting Reports on Subject:	
Estimated Cost per year for Strategy described:	$36,400 +/- per yr
Other Information or reference materials:	

Bridges & Culverts

Asset:	**Bridges & Culverts**
Inventory: -Bridges -Culverts	• 16 Bridges • 10 Culverts
Anticipated Asset Life Cycle:	Bridges have various components, with varying construction practices and materials creating a need for various assumed lives. Further, the life cycle can be affected by things such as traffic volumes and loads, climate and salt exposure.
Integrated:	May be integrated with road resurfacing or road widening projects, however, generally not integrated with other infrastructure
Rehabilitation and Replacement Criteria:	Criteria for prioritizing include level of service and traffic volumes, safety and to preserve infrastructure. Bi-annual visual inspections of bridges are completed and detailed bridge constructions surveys are completed as required. Bridge components are evaluated and tested providing severity and extent of deterioration and overall condition. An overall Bridge Condition Index is provided for each bridge. A value of 100 indicates the bridge is in excellent condition whereas a value of 0 indicates the bridge is in extremely poor condition.
Rehabilitation and Replacement Strategies:	Bridge Rehabilitation or replacement is based on bridge age and assumed life spans and result of condition surveys
Life Cycle Consequences:	Bridge and culvert life cycles will be reduced, level of service is lowered and safety is compromised
Integrated Asset Priorities:	N/A
Corporate/Consulting Reports on Subject:	
Estimated Cost per year for Strategy described:	$18,000/yr +
Other Information or reference materials:	

Sanitary Sewer & Storm Sewer Networks

Asset:	**Sanitary Sewer & Storm Sewer Networks**
Inventory: -Sanitary Sewer Main -Manhole -Catch Basin -Storm Sewer Main	• 909 Sanitary Sewer Main • 911 Manholes • 469 Storm Sewer Mains • 531 Storm Manholes • 1192 Catch Basins
Anticipated Asset Life Cycle:	70-100 years
Integrated:	May be integrated with road resurfacing, road construction work and other utilities such as hydro, telephone, natural gas and cable. It may also be a standalone replacement with a trench cut and repair.
Rehabilitation and Replacement Criteria:	The criteria for prioritizing the replacement schedule for sanitary sewers is based upon an assessment through a closed circuit television (CCTV) inspection. The camera work and associated rating system known as WRc Coding, rates the condition of sewers and allows engineers to gather relevant information. Other factors affecting the criteria will include localized collapses, infiltration/exfiltration, material type, upsizing requirements as well as coordination with the roads replacement program
Rehabilitation and Replacement Strategies:	Sanitary & Storm Sewer rehabilitation will be based on the condition rating of the infrastructure. In most cases, once the pipe has been inspected and given a condition rating, Town staff can determine the best replacement or rehabilitation method. Replacement will be the most common method for collapsed or heavily deteriorating pipe. Other methods include Cured In Place Pipe (CIPP), spot repairs and joint sealing.
Life Cycle Consequences:	Sanitary and Storm sewers deteriorate in much the same manner, however the consequences of failure for sanitary sewers are usually much more significant. The structural deterioration can result in infiltration of groundwater into the sewer that results in an accumulation of debris and sediment therefore lessening the amount of waste water that can flow. Another big consequence of groundwater infiltration is the added volume of sewage to be treated at the wastewater treatment plants which results in added costs. As with any buried infrastructure, maintenance and rehabilitation is key to the longevity of the system.
Integrated Asset Priorities:	A deteriorating Sanitary or Storm sewer is replaced or rehabilitated depending on the condition. Should replacement be the method used, then other assets such as sidewalks, curb/gutter, road trench cuts or full pavement may become part of the project. Other utilities such as hydro, telephone, natural gas and cable may be integrated into the work as well. Often road rehabilitation projects help to

	dictate the project priority.
Corporate/Consulting Reports on Subject:	
Estimated Cost per year for Strategy described:	$151,000 +/- per year
Other Information or reference materials:	

Water Distribution Network

Asset:	**Water Distribution Network**
Inventory: -Fire Hydrants -Gate Valves -Water Mains	• 306 Water Mains • 546 Gate Valves • 489 Fire Hydrants
Anticipated Asset Life Cycle:	Lifecycles can vary from 25 years to 100 years as follows: • Water mains- between 50-100 years • Valve replacements- vary from 30 to 50 years • Fire Hydrants- estimated at 40 years
Integrated:	May be integrated with road resurfacing, road reconstruction work and other utilities such as wastewater, hydro, telephone, natural gas and cable. It may also be a standalone replacement with a trench cut and repair if the watermain is required to be replaced but there are no plans to repair the related road.
Rehabilitation and Replacement Criteria:	The criteria for prioritizing the replacement schedule for watermains is the break history of the pipe, age of the pipe, material type of pipe, size of pipe, soil conditions surrounding the pipe, pressure related issues and hydrant spacing. The road rehab program may bump up the replacement of a pipe segment if the replacement is scheduled in the near future. The replacement criteria is difficult to define but studying break histories and failure trends can determine when maintenance costs are increasing at a high enough rate that economically it makes sense to simply replace or rehab the pipe
Rehabilitation and Replacement Strategies:	Watermain rehabilitation is based on the current condition of the pipe. It is difficult to determine the condition since it is buried. For this reason, the replacement strategy relies entirely on the break history, age/size and material type of pipe plus keeping up with current road projects. There are numerous methods of rehabilitation for watermains such as complete replacement, cleaning and cement mortar lining, slip lining and pipe bursting. Cathodic Protection also helps prolong the life expectancy of the pipe.
Life Cycle Consequences:	The results will be catastrophic failures at undetermined and unexpected times. Some pipe materials with 100 year life expectancies are in need of replacement after 30 years, whereas some 100 year old pipe can be simply maintained or rehabilitated to gain 50 years plus of additional service life.
Integrated Asset Priorities:	A deteriorated watermain is replaced because of the level of risk that can be absorbed. Some problem areas are less of a priority and disruption to service and repairing the mains is tolerable. Replacement is a high priority where fire protection, water quality

	and disrupted service can result in water loss and collateral damage. Other utilities such as Telephone, Hydro and Cable may be integrated into the work as well. Often road rehab projects help accelerate the project priority.
Corporate/Consulting Reports on Subject:	
Estimated Cost per year for Strategy described:	$140,000 +/- per year
Other Information or reference materials:	

Roads

Asset:	**Roads**
Inventory: - Road Base - Road Surface - Curbs and Gutters - Sidewalk	• 245.29 km of Granular A&B gravel Road Base • 236.92 km of Asphalt Road Surface • 66.02 km of Curbs & Gutters • 48.03 km of Sidewalks
Anticipated Asset Life Cycle:	Pavement life of a newly constructed road is affected by design, traffic volumes and loads, construction quality and climate but generally the end of its useful life is: •
Integrated:	With other buried assets located in the utility corridor such as water, sewer, storm sewers, hydro, telephone, natural gas and cable. May also affect street lightning, traffic signals and sidewalks.
Rehabilitation and Replacement Criteria:	Towns condition assessment standards, such as the percentage of road cracking and the type of cracking, identifying the need for rehabilitation or replacement.
Rehabilitation and Replacement Strategies:	Based on the Towns condition assessment standards, road classification, rural or urban, curbed or non-curbed/ditched, surface type (asphalt or surface treated) or benefit/cost ratio, the following rehabilitation strategies are selected: • Total reconstruction of pavement • Mille and resurface pavement • Strip and resurface pavement • Pulverization and remixing Overlay • Mill and resurface patched of pavement • Base Repair
Life Cycle Consequences:	Under funding pavement rehabilitation results in more pavements and results in escalating construction costs. Pavement falling below the Towns standards negatively affects levels of service, and increases risks and liabilities
Integrated Asset Priorities:	Pavement rehabilitation forecast is compared to underground Utility forecast. The integration of projects occurs internally within the Engineering and Public Works department and externally with hydro, natural gas and telephone utilities. In general a pavement rehabilitation project drives the replacement of underground water & sewer infrastructure if the infrastructure is near the end of its life cycle.
Corporate/Consulting Reports on Subject:	

Estimated Cost per year for Strategy described:	$432,000 +/- per year
Other Information or reference materials:	