The Town of Tillsonburg

Comprehensive Asset Management Plan

November 2016

Version 2.2

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1 EXECUTIVE SUMMARY

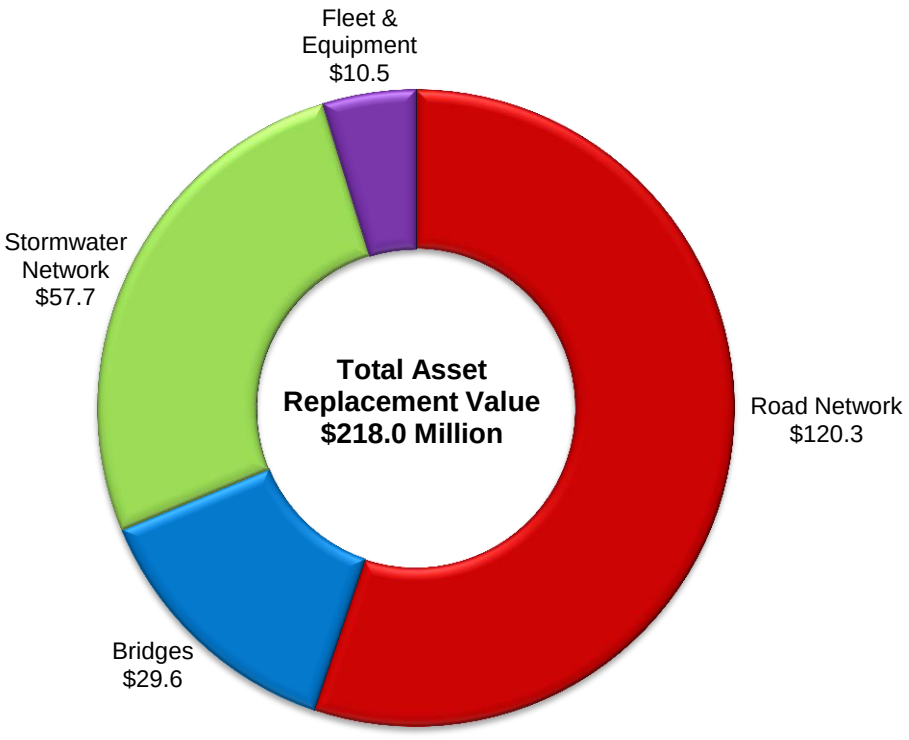
What we provide

The initial installation, maintenance and eventual replacement of infrastructure has always been one of the most important responsibilities of a municipality. The asset pool of local governments is quite different to that of most large businesses. It comprises of a diverse array of asset types, which perform a critical function for thousands of residents, workers and visitors. The total value of the assets is immense. In recent years, asset management has been linked to fiscal sustainability

The Town of Tillsonburg is responsible for a variety of capital assets including:

- Linear infrastructure such as roads, bridges, culverts, retaining walls, sidewalks, streetlights, signalized intersections, stormwater sewers and stormwater management ponds.
- Buildings including the community center, fire hall, operations and customer service center, museum and administrative offices.
- Land improvements such as sports fields, cemeteries, parking lots, parks and playgrounds.
- Vehicles and equipment including fire trucks, snowplow trucks, and specialized equipment.

There are currently four asset networks included in this Asset Management Plan being Roads (including sidewalks, streetlights, signalized intersections), Bridges (including culverts and retaining walls), Stormwater (including stormwater management ponds) and Fleet & Equipment (including light, medium and heavy duty trucks and various other types of off-road equipment). The scope of the plan will continue to grow in the upcoming years to include other assets such as parks, facilities and recreational amenities. The figure below illustrates the replacement cost breakdown of the Towns **$218.0 Million** asset inventory.



Asset Replacement Value ($ Millions)

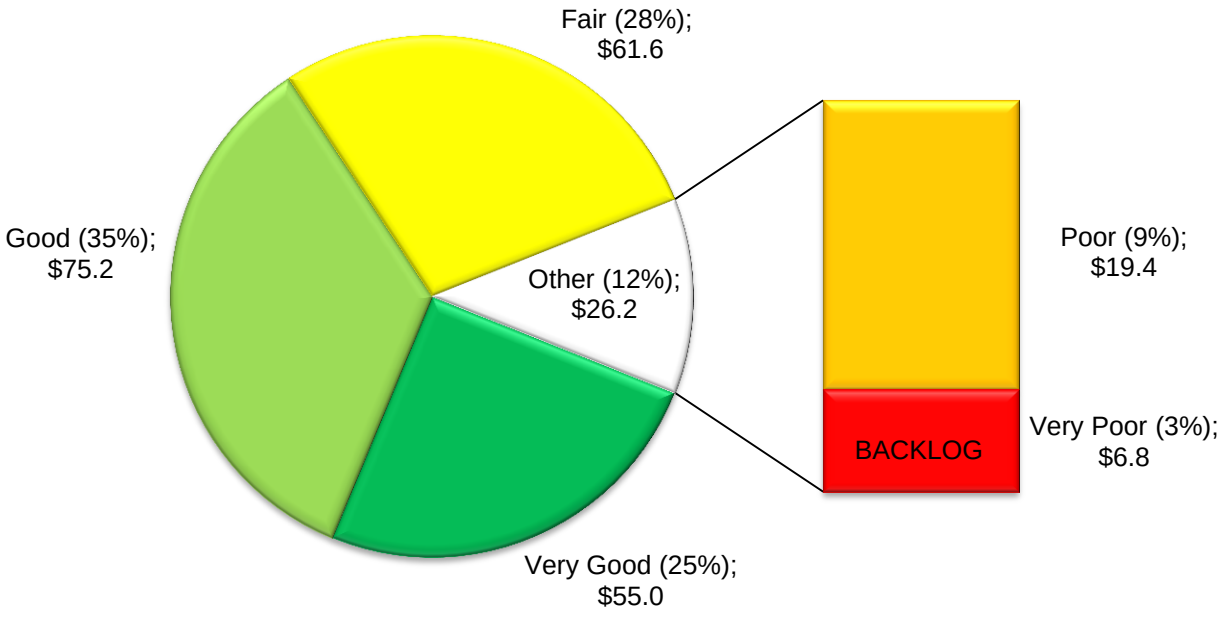
What we will do

The ability for the Town of Tillsonburg to provide services to the community relies on the existence of a network of assets and is restricted by the condition that those assets are in. The figure below illustrates the current condition of the Towns assets. Choosing a financially sustainable level of service and maintaining, rehabilitating and replacing assets in order to meet that level of service in the most efficient and effective manner is important for the fiscal health of the community

The Town of Tillsonburg will use this comprehensive Asset Management Plan (AMP) to help maintain its infrastructure and provide services to the community. The AMP will be instrumental in ensuring that the Town is able to meet the financing needs associated with keeping assets in the condition they need to be in now and in the future.

This Asset Management Plan:

- Fulfills the provincial requirements outlined in the Building Together Guide for Municipal Asset Management Plans published by the Ontario Ministry of Infrastructure.
- Is a living document that will be continuously updated as new information is obtained and refined as capital work is undertaken
- Facilitates efficiency and effectiveness for the capital program and related operating costs
- Includes consideration of risk management, service levels, and condition assessments to inform capital investments
- Will be a resource for staff and Council when making decisions that impact how funds are raised, allocated and ultimately how projects are prioritized as those funds are spent



Current Asset Condition Rating

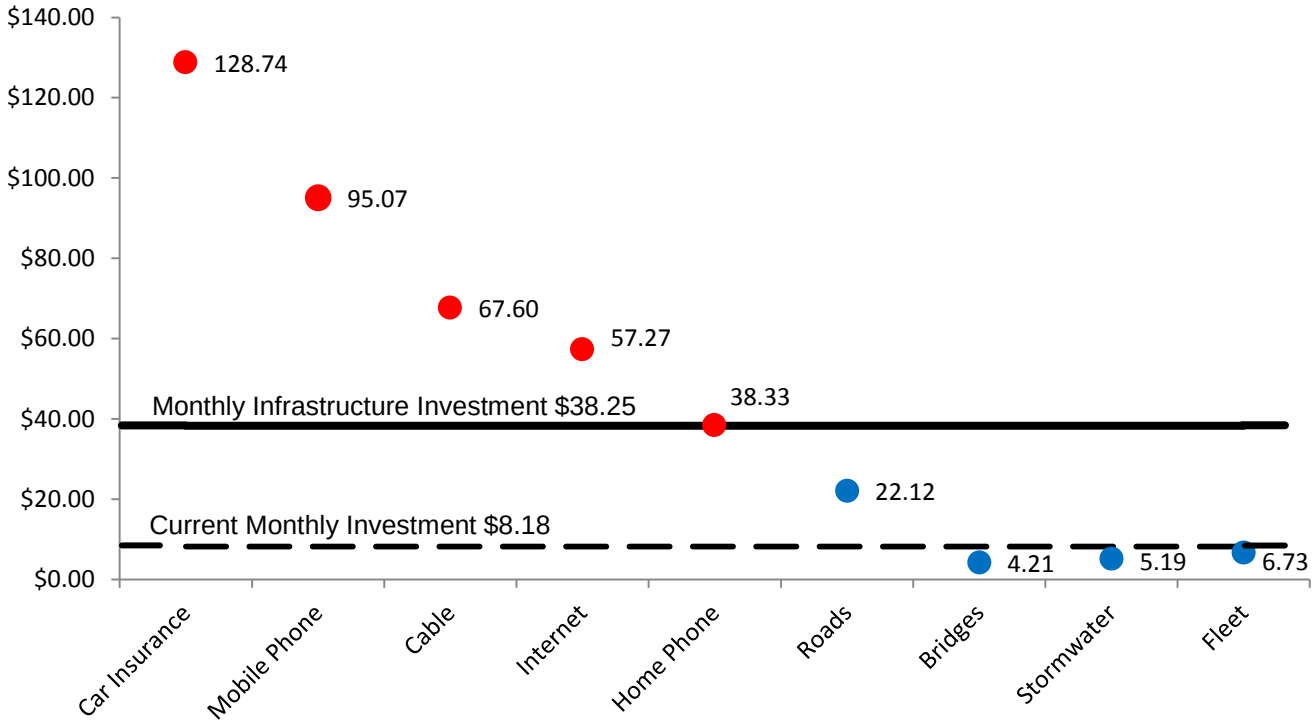
What will it cost

While the municipality is responsible for the strategic direction, it is the taxpayers of Tillsonburg who will ultimately bear the financial burden. Utilizing 2015 MPAC data a 'cost per household' (CPH) analysis was conducted for each of the asset classes, as summarized in the table below, to determine the financial obligation of each household in sharing the replacement cost of the municipality's assets.

Infrastructure Replacement Cost per Household

Network	2016 Replacement Value (Millions)	Cost per Household	Overall Rating	Current Annual Deficit
Roads	$120.3	$16,700	F	$2,050,000
Bridges	$29.6	$4,100	F	$520,000
Stormwater	$57.7	$8,000	F	$450,000
Fleet & Equipment	$10.5	$1,450	D	$270,000
Total	**$218.0**	**$30,250**		**$3,290,000**

The municipality's financial position to fund the asset's average annual requirement for sustainability (Funding vs. Need) was also examined. The Town received an 'F' on the Funding vs. Need dimension for three of the asset classes analyzed. Based on current investment levels the annual infrastructure deficit is **$3.29 Million**. The average monthly investment required per household to reach infrastructure sustainability compared to other various typical monthly household expenses is provided in the figure below.



Monthly Infrastructure Sustainability Investment Required per Household

How to Get There

Long-term infrastructure forecasts help provide insight into investment requirements and replacement trends that allow for the development of appropriate financing strategies. If the respective investment requirements are not addressed appropriately, levels of service could potentially decrease and operations and maintenance costs could increase.

In an effort to address the annual funding deficit for sustainability several funding scenarios of an infrastructure tax levy as summarized below were examined to evaluate both the impact to the taxpayer and the time in which sustainable funding could be reached in order to maintain current service levels.

Infrastructure Tax Levy Funding Scenario's

	Scenario 1	Scenario 2	Scenario 3
% of overall levy	1.0%	1.5%	2.0%
$ increase on Levy	$135,685	$203,528	$271,370
Year sustainability reached	2057	2039	2032
2017 Annual impact on average resident's tax bill	**$13.19**	**$19.78**	**$26.39**

Next Steps

As the Asset Management Plan continues to develop and expand it will become an integral part of the Towns Operations. The Asset Management Plan will feed long range financial plans and assist the Town in achieving its strategic goals. The following items have been identified to educate, engage and gain the support of the community, to improve and advance AMP development, and to support Council to continue to make informed decisions that meet community expectations and ensure the long-term sustainability of the Town.

- Communicate the Asset Management Plan to the community to help envision what the municipality will look like in the future and the infrastructure needed to support it.
- Continue transition from an aged-based to a condition-based Asset Management Plan through ongoing field measured condition assessment and inspection programs.
- Expand the Asset Management Plan to include other assets classes, beyond 10 years, and align more closely with operational and maintenance data.
- Schedule a re-examination of the Plan with each term of Council, preferably in the second year.
- Continue to manage debt through the creation of a Debt Policy.
- Investigate the implementation of a stormwater infrastructure user charge.

2 INTRODUCTION

Tillsonburg's Asset Management Plan (AMP) fulfills the provincial requirements outlined in the Building Together Guide for Municipal Asset Management Plans published by the Ontario Ministry of Infrastructure. The Plan contains the following six key sections:

1. Executive Summary
2. Introduction
3. State of the Local Infrastructure
4. Desired Levels of Service
5. Asset Management Strategy
6. Financing Strategy

The four asset classes addressed in this Plan include:

1. Roads
2. Bridges, Culverts and Retaining Walls
3. Stormwater
4. Fleet & Equipment

Additional asset classes will be included in future iterations of the AMP such as Facilities, Parks and Recreation as outlined in **Appendix A**. This Asset Management Plan will serve Tillsonburg as a strategic, planning, and financial management document to ensure that Tillsonburg is well-equipped to manage existing and future operational demands and desired levels of service. It will guide Tillsonburg's processes to reflect sound and accountable governance of its municipal infrastructure.

At the strategic level, Section 3: State of the Local Infrastructure of this document outlines current and future challenges to be addressed to sustainably maintain municipal infrastructure services for the long-term using a lifecycle approach. The Plan also identifies desired levels of service in Section 4 for each asset class through the use of key performance indicators.

At the practical level, Section 5: Asset Management Strategy identifies current and future strategies to manage the Town's asset base with the goal of maintaining the assets in an acceptable condition. Recognizing that asset management is evolving to a service based focus that optimizes asset lifecycle costs considering quantifiable risk and level of service, the Town will continue to develop corporate asset management programs and strategies.

At the financial level, Section 6: Financing Strategy depicts how the Town intends to implement a financial strategy which indicates how the Town will pay for the Plan and include details on expenditures, revenue sources and projections, and possible funding gap solutions.

2.1 Importance of Infrastructure

The Town is responsible for a diverse array of capital assets. The initial construction and/or commissioning of infrastructure, its maintenance, and eventual replacement has always been among the most important responsibilities of a municipality. The asset pool of local governments is quite different to that of most large, private sector businesses. It is comprised of asset types which perform critical functions for thousands of residents, workers and visitors, and forms part of a higher order of systems, such as roads providing a transportation network service. The total value of these assets is significant. Since governments have long held a role of administering assets, the formal concept of asset management is not new; however, the linkage of asset management to fiscal sustainability principles has become more prevalent in recent years.

The capital assets the Town of Tillsonburg is responsible for include, but are not limited to the following:

- Linear Infrastructure
    - Roads
    - Sidewalks
    - Streetlights
    - Signalized Intersections
    - Bridges, Culverts and Retaining Walls
    - Stormwater Sewers
    - Stormwater Management Ponds
- Buildings
    - Recreation Centre
    - Fire Hall
    - Operations and Customer Service Centre
    - Museum
    - Administrative Offices
- Fields and Parks
    - Sports Fields
    - Parks and Playgrounds
    - Equipment and furniture
    - Ice rinks and pools
    - Parking Lots
    - Cemeteries
- Fleet and Equipment
    - Automobiles, such as Building and Engineering vehicles
    - Trucks, such as fire trucks and snowplow trucks
    - Operational service trucks and specialized equipment

Although the long-range planning of replacement and growth related capital is not new, there are important factors that have recently contributed to the heightened need for a comprehensive, capital financing strategy as noted in the following sub-sections:

2.1.1 Recent Regulatory Changes

Over the last decade, important regulatory changes have occurred in Ontario that have increased the need for a municipality's emphasis on capital planning. Firstly, starting in 2007, the Public Sector Accounting Board (PSAB 3150) introduced new accounting standards for tangible capital assets owned by governments in Canada. Accrual accounting was required for government services and many capital assets needed to be depreciated for the purposes of financial reporting. Although acquisition and depreciation costs are not ideal for financial planning, PSAB 3150 helped municipalities to better understand the magnitude of asset funding gaps.

Secondly, municipalities need to prepare asset management plans (AMPs) as a requirement for certain grant applications, such as the Ontario Community Infrastructure Fund. In 2012, the Ontario Ministry of Infrastructure released the "Building Together: Guide for Municipal Asset Management Plans", a how-to guide to assist municipalities in preparing an AMP. Municipalities have been given discretion by the Ministry in terms of the precise form of their asset management plan. However, four key components must be included: an analysis of existing infrastructure, a description of the desired level of service, an asset management strategy, and a financing strategy. This Plan has all four components.

The Infrastructure for Jobs & Prosperity Act, 2015 was established to encourage evidence-based, strategic long-term infrastructure planning and requires municipalities to consider thirteen (13) statutory infrastructure planning principles when making infrastructure-related decisions. These include:

1. A long-term view as well as demographic and economic trends
2. Applicable budgets and fiscal plans
3. Clearly identified priorities
4. Continuation of the provision of core public services
5. Promotion of economic competitiveness, productivity, job creation and training
6. Ensuring health and safety of infrastructure workers
7. Opportunities to foster innovation
8. Evidence-based and transparent decisions
9. Existing plans and strategies such as policy statements and transportation plans
10. Promotion of accessibility for persons with disabilities
11. Designs that minimize environmental impact and are resilient to climate change
12. Use of acceptable recycled aggregates
13. Promotion of community benefits

2.1.1 Public Expectation of Municipal Services

The Town of Tillsonburg consistently delivers a high level of service to its residents and businesses. These services depend to a large degree on the Town's complex range of assets, which for many years it has managed without major failures, during a period when technology was less advanced and capital reserve funding activities were minimal. The challenge facing municipalities today is to convince taxpayers that despite the fact that services are still running well, more funding will be required than in the past. Due to the expectation of high performance levels and the greater awareness of health, safety and environmental issues, the public generally has a low tolerance for service disruptions. This expectation makes proactively addressing capital deficiencies essential on both technical and political grounds to avoid major service failures.

Tillsonburg's prosperity, economic development, competitiveness, image, and overall quality of life are inherently and explicitly tied to the performance of its infrastructure.

2.2 Relationship to Other Plans & Programs

The Town's Asset Management Plan (AMP) will be a key component of the municipality's strategic planning process, linking with multiple other corporate plans and documents such as:

- Official Plan – the AMP will influence land use policy directions for long-term growth and development as provided through coordination with the budgeting process.
- Community Strategic Plan – the AMP will support the *Economic Sustainability* and *Excellent in Local Government* in Tillsonburg's vision to become a regional hub for employment, recreation and culture.
- By-laws, Standards, and Policies – the AMP will influence policies and by-laws related to infrastructure management practices and standards.
- Regulations – the AMP must recognize and abide by industry and senior government regulations.
- Business Plans – the service levels, policies, processes, and budgets defined in the AMP will be incorporated into business plans as budgets, management strategies, and performance measures.

Updates to existing and future municipal plans and programs having a direct or indirect impact on municipal assets, including municipal properties and facilities should reference the Town's AMP and consider the impact on capital planning and future projections.

2.3 Purpose of Asset Management

Asset management is the coordinated activity in place to manage the way in which the Town realizes value from its assets in order to provide services effectively and in a financially sustainable manner.

An asset management plan is a strategic document that states how a group of assets is to be managed over a period of time. The plan describes the characteristics and condition of infrastructure assets, the level of service expected from them, planned actions to ensure the assets are providing the expected level of service, and financing strategies to implement the planned actions.

Asset management takes more of a long-term perspective which results in more informed strategic decisions that optimize investments to better manage risk of infrastructure while taking into consideration other important factors, such as official plans, strategic initiatives, and climate change. Good asset management does not only maximize the benefits provided by the infrastructure, but also affords the opportunity to achieve cost savings by spotting deterioration early on and taking action to rehabilitate or renew the asset.

Asset management represents a way of doing business that bases decisions on quality data. The goal of an asset management program is to build, maintain and operate infrastructure cost effectively, provide value to the customer, and improve the credibility and accountability of the municipality. Asset management is a move away from the current infrastructure management system to managing a network of interrelated assets with interdependent programs and services so that scarce resources ($) are properly allocated amongst competing asset needs.

Some of the benefits of asset management include:

- Providing the ability to show how, when, and why resources need to be committed by knowing the total investment required to maintain infrastructure assets at acceptable levels to support sound decision making;
- Decisions can be made between competing assets needs to ensure that the priorities of each asset type are being met, reducing the amount of unplanned or high priority maintenance/emergency activities that require response before the next budgeting cycle;
- Monitoring the performance of assets over the long term to ensure an adequate level of service is maintained and the ability to measure the progress made in achieving the performance targets;
- Lifecycle costing to identify the investment required to operate, maintain, renew, and replace an asset. Determining how much it will cost enhances financial planning and helps decision makers to select the most cost effective options; and
- Funding decisions can be made with a view of the total cost to be incurred over the useful life of an asset.

The purpose of the Town's Asset Management Plan is threefold:

1. To be a strategic work plan for corporate capital assets which reflects the municipality's need for planning, building, operating, maintaining and financing its infrastructure in a sustainable way.
2. To fulfill provincial requirements, enabling the Town to apply for capital funding grants such as the provincial Gas Tax allocation and Ontario Community Infrastructure Fund (OCIF).
3. To make recommendations for further work towards a more robust corporate asset management system.

2.4 Timeframe and Review Updates

This Asset Management Plan analysis was performed over a 100-year period to ensure that all assets went through at least one cycle of replacement. The asset lifecycle analysis was utilized to help develop a strategy that can be applied throughout the life of an asset to assist in the development of both short term capital plans (5 - 10 year) and long range sustainability plans to ensure the best overall health and performance of the Towns infrastructure.

In subsequent updates to this AMP, actual project implementation will be reviewed and measured through the established performance metrics to quantify whether the desired level of service is achieved or achievable for each infrastructure asset class. If shortfalls in performance are observed, these will be discussed and alternate financial models or service level target adjustments will be presented for consideration.

The Plan should also be updated on a regular basis to include additions to the asset inventory, to expand upon the scope of assets included in the Plan (i.e. Facilities, Parks and Recreation), to implement the Asset Management Municipal Action Plan outlined in **Appendix B**, to update projected replacement costs and expected revenues, procedural and policy changes, and to reflect other changes to the supporting data and assumptions that form the basis of this Plan.

A more thorough re-examination of the Plan is recommended to be undertaken with each new term of Council, perhaps in their second year.

3 STATE OF LOCAL INFRASTRUCTURE

3.1 Summary Report Card

Town of Tillsonburg Infrastructure Report Card				
Asset Network	Condition vs. Performance Rating	Funding vs. Need Rating	Overall Rating	Comments
Road Network	Good (63%)	Very Poor (25%)	**F**	Almost 70% of the road network is in good to fair condition with less than 15% in poor to very poor condition.
Bridge Network	Good (69%)	Very Poor (0%)	**F**	Over 50% of the bridge network is in good to fair condition with approximately 15% in poor to very poor condition.
Stormwater Network	Good (68%)	Very Poor (31%)	**F**	Nearly 60% of the stormwater network is in good to fair condition with 10% in poor to very poor condition.
Fleet & Equipment	Fair (45%)	Fair (68%)	**D**	While 60% of fleet & equipment is in good to fair condition nearly 35% is in poor to very poor condition.

1. Each asset network is rated on two key, equally weighted (50/50) dimensions: Condition vs. Performance, and Funding vs. Need.
2. The 'Overall Rating' is the average of the two dimensions converted to letter grades.

Based on the Summary Report Card results it can be expected that the future Condition vs. Performance rating of assets will significantly diminish without considerable improvement to the Funding vs. Need rating.

3.2 Base Data

In order to understand the full inventory of linear infrastructure assets Town staff reviewed and extracted asset information from various asset databases, inventory maps, and over 1,500 engineering drawings. Town staff also conducted a condition assessment of the entire sidewalk network as well as retaining the services of various consultants to perform pavement condition assessments, OSIM bridge inspections and limited CCTV inspection of stormwater infrastructure. This data forms the basis for analysis and the entire Asset Management Plan.

3.3 Asset Rating Criteria

Each asset network will ultimately be evaluated based on two key dimensions, Condition vs. Performance and Funding vs. Need.

3.3.1 Condition vs. Performance

A combination of the Estimated Service Life (ESL) and known asset condition (where available) was used to estimate the Percentage of Remaining Service life (%RSL) for each asset. The %RSL for each asset was then weighted (based on replacement value), and used to provide the weighted average %RSL for the asset. Assets are then placed into one of five rating categories ranging from Very Good to Very Poor as shown in **Table 1** below. Individual infrastructure asset scores were then aggregated up to the Component level and then to the Network level in order to provide an overall system Condition vs. Performance rating.

3.3.1.1 Asset Estimated Service Life

An asset's ESL is the period of time that it is expected to be of use and fully functional to the Town. Once an asset reaches the end of its service life, it will be deemed to have deteriorated to a point that necessitates replacement. The ESL for each asset component was established by using a combination of Town staff knowledge and experience, as well as industry standards. Individual ESL's was used in conjunction with the original installation dates to determine the theoretical Remaining Service Life (RSL) of each asset.

3.3.1.2 Asset Condition

The Town can undertake numerous investigative techniques in order to determine and track the physical condition of its infrastructure. For instance, the interior of stormwater pipes can be routinely inspected using CCTV (closed circuit television) inspection. These inspections are guided by standard principals of defect coding and condition rating that allow for a physical condition "score" for the infrastructure to be developed. For infrastructure without a standardized approach to condition assessment scoring, information such as visual inspections, bridge audits, annual pavement inspections and other maintenance related observations can be used in establishing the condition of the asset.

Table 1: Rating Categories based on Service Life and Condition

Rating Category	% of Remaining Service Life (RSL)	Definition
Very Good	81% - 100%	**Fit for the Future** - The infrastructure in the system or network is generally in very good condition, typically new or recently rehabilitated. A few elements show general signs of deterioration that require attention.
Good	61% - 80%	**Adequate for Now** - Some infrastructure elements show general signs of deterioration that require attention. A few elements exhibit significant deficiencies.
Fair	41% - 60%	**Requires Attention** - The infrastructure in the system or network shows general signs of deterioration and requires attention with some elements exhibiting significant deficiencies.
Poor	21% - 40%	**At Risk** - The infrastructure in the system or network is in poor condition and mostly below standard, with many elements approaching the end of their service life. A large portion of the system exhibits significant deterioration.
Very Poor	< 20%	**Unfit for Sustained Service** - The infrastructure in the system or network is in unacceptable condition with widespread signs of advanced deterioration. Many components in the system exhibit signs of imminent failure, which is affecting service or has effectively exceeded its theoretical service life.

3.3.1 Funding vs. Need

The second evaluation criterion reflects the status of funding dedicated to maintain, rehabilitate, replace, and improve the current condition of existing infrastructure. Infrastructure systems need funding that is dedicated, indexed, and long-term. The primary measure is the actual amount of funding provided versus the investment required to meet or maintain the desired levels of service. This ratio is then placed into one of five rating categories ranging from Very Good to Very Poor as shown in **Table 2** below.

To determine the current level of funding, the plan uses the most recent five year average of budgeted spending, funded by traditional sources of municipal funds and committed senior government grants. Traditional sources of municipal funds include taxation, reserves and debt. Development charges are not typically used for asset management as by definition, projects funded by these levies are new growth projects and do not include the rehabilitation and maintenance of pre-existing infrastructure. Committed senior government grants include programs such as the federal and provincial gas tax where an ongoing agreement has been executed. Funding received as part of a onetime grant program is not included as the Provincial requirements for asset management plan specifically excludes these types of grants. While the funding versus need ratio is expressed as a percentage of dollars it is important to recognize that dollars are not the only scarce resource that limits annual spending. Time is a major factor as well. Even if there were revenue sources available to completely fund annual needs requirements, consideration must be made for available staff time that is required to manage the projects undertaken.

When calculating need, replacement costs are entered onto a timeline over the next 100 years using both condition and age information for each asset. Maintenance and construction costs also need to be considered in the evaluation of need. Steady funding provides for maintenance that extends the life of infrastructure. Once the replacement profile is determined, the average annual spending requirement can be calculated. This is the measure of a steady annual investment that would be required to meet future needs completely. This measure is provided in current year dollars and does not take inflation into account.

Dedicated funds such as user fees and development charges need to be applied only to infrastructure systems for which they are raised. Indexing means that funds need to increase as the use of the system increases, or as the cost of providing the service increases. Maintenance and construction costs also need to be considered in the evaluation of funding. Steady funding provides for maintenance that extends the life of infrastructure. Long-term, multi-year funding plans should account for growth estimates so that projects can be designed and constructed in anticipation of needs, and not simply in reaction to inadequate capacity or problems caused by poor maintenance.

Table 2: Rating Categories based on Funding Levels

Rating Category	Description
Very Good	91% - 100% of the Funding need is supported.
Good	76% - 90% of the Funding need is supported.
Fair	61% - 75% of the Funding need is supported.
Poor	46% - 60% of the Funding need is supported.
Very Poor	< 45% of the Funding need is supported.

3.3.2 Blended Rating

The overall rating for each asset network should be based on the consolidation of the Condition vs. Performance rating and the Funding vs. Need rating. At some point the Town may want to consider Capacity vs. Need as an additional asset evaluation criterion that relates the demand on a system, such as volume or use, to its design capacity.

For the State of Local Infrastructure assessment each factor contributes equally to the overall rating as indicated in **Table 3** below.

Table 3: Overall Rating Contribution

Rating Category	Weighting Factor	Overall Rating
Condition vs. Performance	50%	A to F
Funding vs. Need	50%	

In the future the Town may want to adjust the contribution of each factor to better reflect their relative impact on sustainability. The Funding vs. Need criterion appears to be the most critical for most municipalities in terms of sustainability. For example, quite often new infrastructure assets are built through grants, development charges, or other external sources of funding with little or no consideration of its proper maintenance, rehabilitation, and ultimate replacement. In these cases, the newer asset may have received a very favourable Condition vs. Performance rating, but it will receive a low rating in the Funding vs. Need category due to the lack of financial investment and planning that compromise the long-term sustainability of the asset.

The overall rating ratio is then placed into one of five rating categories ranging from Very Good to Very Poor as shown in **Table 4** below to provide a letter grade for the asset network.

Table 4: Overall Letter Grade

Letter Grade	Rating Category	Description
A	Very Good	≥ 80%
B	Good	70% - 79%
C	Fair	60% - 69%
D	Poor	50% - 59%
F	Very Poor	< 50%

3.4 Road Network

3.4.1 Inventory

The road network that serves the Town of Tillsonburg consists of various types of arterial, collector, and local roadways as well as other associated asset components such as sidewalks, streetlights and signalized intersections. These components have been identified within **Table 5** below.

Table 5: Road Network Inventory

Asset Type	Asset Component	Quantity (km)	Lane (km)
Road Network	Arterial	19.1	42.8
	Collector	15.0	30.5
	Local	81.1	156.1
	Total Roads	**115.3**	**229.4**
	Sidewalks	92.4	
	Streetlights	2,788	
	Signalized Intersections	6.0	

The information used to compile the above inventory was determined by reviewing inventory maps and conducting in-field data collection.

3.4.2 Valuation

The replacement cost for the road network was estimated using current standards, historical tender pricing, and current market replacement values. The estimated replacement value of the road network and associated components, based upon current dollar value (2016) is **$115.9 Million**. The following table (**Table 6**) and associated pie-chart (**Figure 1**) provides a breakdown of the contribution of each of the network components to the overall system value.

Table 6: Road Network Replacement Value

Asset Type	Asset Component	Quantity (km)	Replacement Value (2016)
Road Network	Arterial	19.1	$ 23,691,502
	Collector	15.0	$ 12,859,560
	Local	81.1	$ 64,986,659
	Sidewalks	92.4	$ 10,606,377
	Streetlights	2,788	$ 6,909,616
	Signalized Intersections	6.0	$ 1,205,286
		TOTAL	**$ 120,259,000**

As can be seen from the pie chart of **Figure 1**, the Towns local roadways by themselves make up nearly 50% of the network based on replacement value.

If this total asset value is translated to an average value per household assuming 7,200 dwellings, then the average household would have an investment of approximately $16,700 in road network assets.

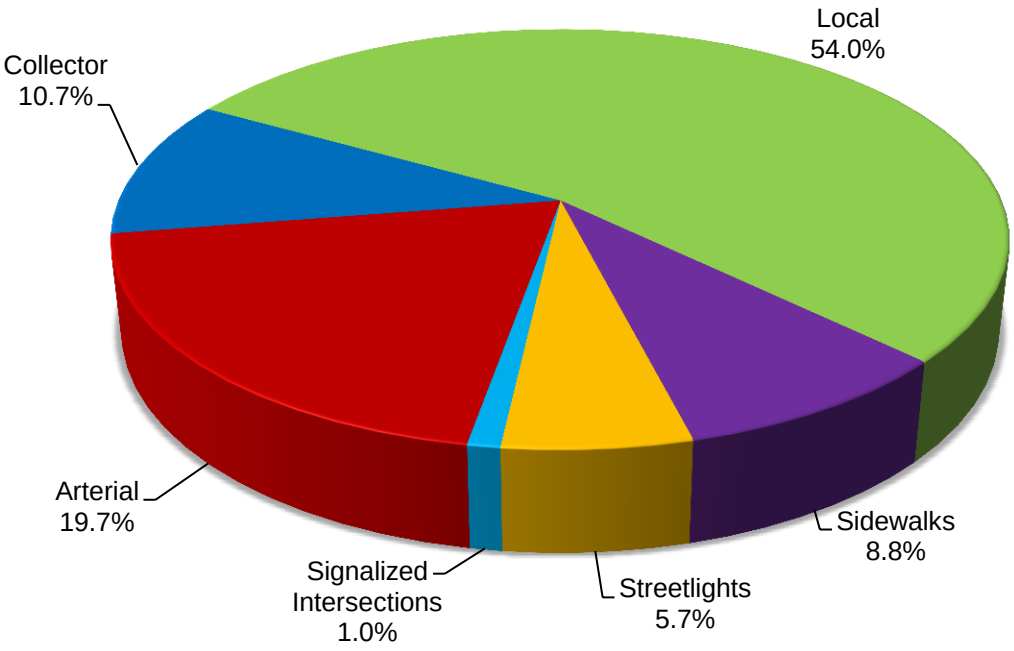


Figure 1: Breakdown of Road Network Components by Value

3.4.1 Useful Life

The generalized values used for typical expected useful life of road network assets are summarized in **Table 7** below. It should be recognized that the actual asset life is influenced by many variables such as installation, traffic patterns, local weather conditions, etc, and may be greater than the expected useful life in favourable conditions. Town staff will continue to refine the asset's expected useful life as more specific data becomes available.

Table 7: Road Network Useful Life

Asset Component	Expected Useful Life (years)
Arterial	35
Collector	42
Local	50
Sidewalks	40
Streetlights	40
Signalized Intersections	50

The individual expected useful life in conjunction with the respective original installation dates were used to determine the theoretical Remaining Service Life (RSL) of each asset. A distribution summary of theoretical RSL is provided in **Figure 2** below which indicates that approximately $16.0 Million (nearly 15%) of assets have exceeded their expected useful life. It is important to note that although some assets may have exceeded their expected useful life, they may be fully functional, have good condition, and provide high levels of service for many years. Consequently, age alone is not necessarily the best indication of an assets overall condition and performance.

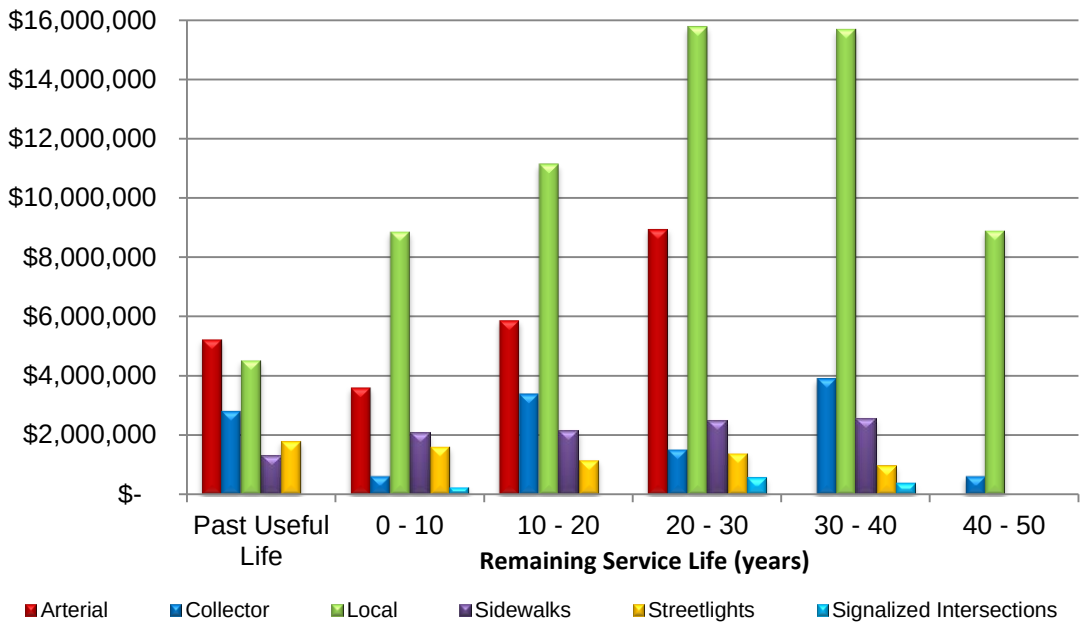


Figure 2: Road Network Remaining Service Life by Replacement Value

3.4.2 Condition vs. Performance

Figure 3 below demonstrates that about 70% of the road network is in good to fair condition, and that approximately 15% is in poor or very poor condition representing about $14.5 Million.

The overall Condition & Performance rating for the entire road network and associated assets is Good (63%), meaning that on average, the road network assets are 37% into their weighted average estimated service life of 45 years, and have 63% of their service life remaining (i.e. the weighted average estimated age of the road network is 17 years old).

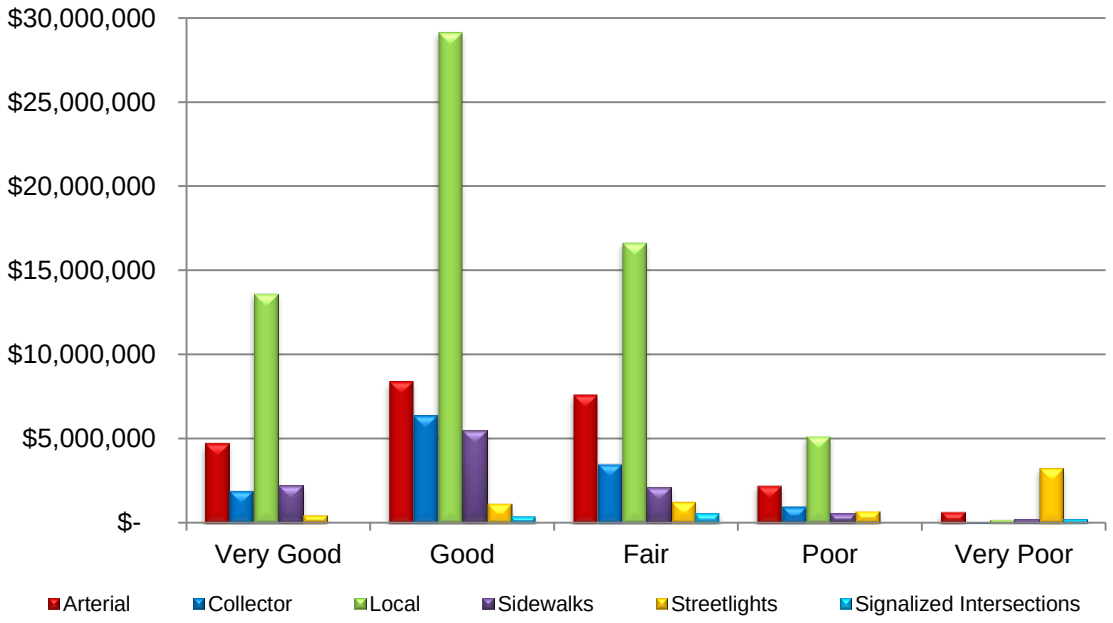


Figure 3: Road Network Condition by Replacement Value

3.4.3 Funding vs. Need

Figure 4 below outlines the projected capital investment in current year dollars for all road network assets including sidewalks, streetlights and signalized intersections. Each asset component replacement year is based on the current condition of the asset and the asset's expected remaining useful life given that condition. The analysis was run over a 100-year period to ensure that all assets went through at least one cycle of replacement in order to provide a sustainable projection. The average annual capital investment of $2.73 Million represents the amount required to meet all current and future financial obligations. The current funding level of $680,000 represents the historical five year budgeted average. As a result the roads network annual funding gap deficit is approximately **$2.05 Million** with a Funding vs. Need rating of Very Poor.

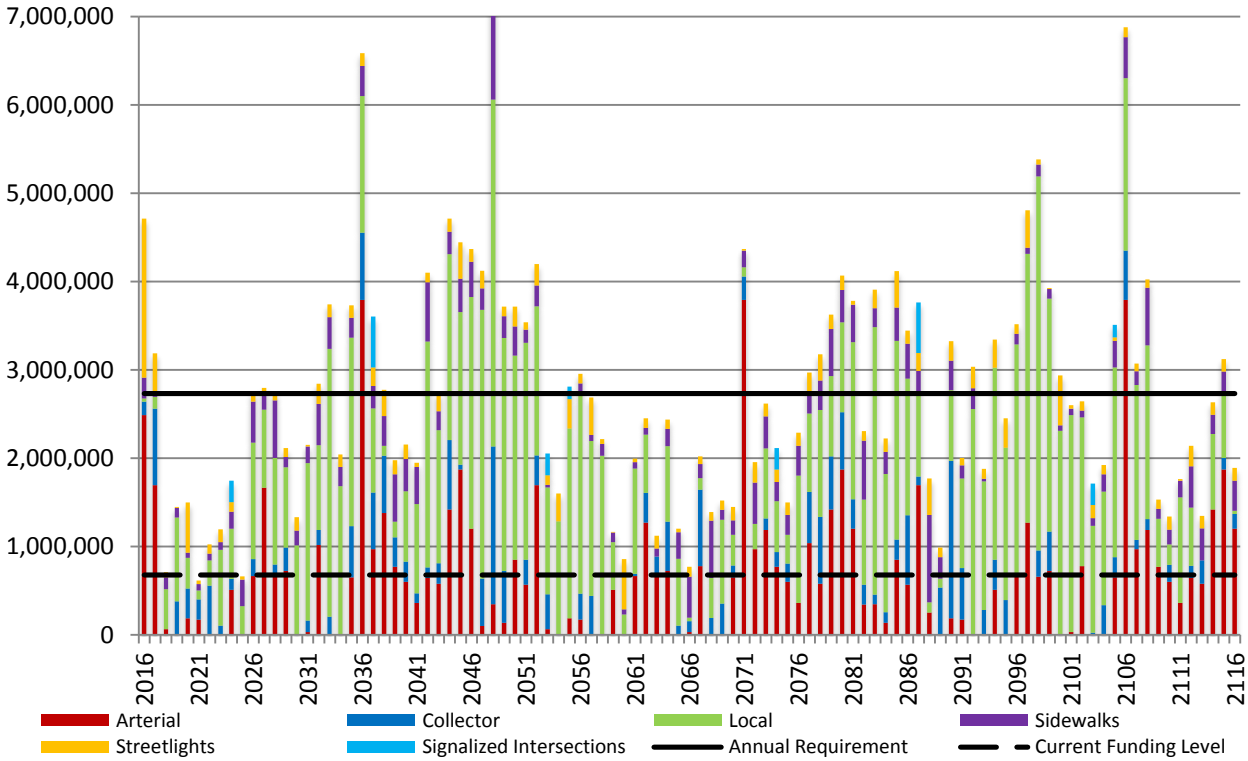


Figure 4: Road Network Replacement Profile

3.5 Bridge Network

3.5.1 Inventory

The bridge network that serves the Town of Tillsonburg consists of various types of bridge structures and culverts as well as other associated asset components such as retaining walls. These components have been identified within **Table 8** below.

Table 8: Bridge Network Inventory

Asset Type	Asset Component	Count (ea)	Quantity (m^2)
Bridge Network	Bridges > 3m span	9	1,954
	Culverts > 3m span	7	969
	Culverts < 3m span; > 40m length	12	1,791
	Culverts < 3m span; < 40m length	24	535
	Retaining Walls	7	2,086
	TOTAL	**59**	**7,336**

The information used to compile the above inventory was determined from the 2015 bi-annual OSIM bridge inspection reports.

3.5.2 Valuation

The replacement cost for the bridge network was estimated using current standards, historical tender pricing, and current market replacement values. The estimated replacement value of the bridge network and associated components, based upon current dollar value (2016) is **$29.6 Million**. The following table (**Table 9**) and associated pie-chart (**Figure 5**) provides a breakdown of the contribution of each of the network components to the overall system value.

Table 9: Bridge Network Replacement Value

Asset Type	Asset Component	Count (ea)	Replacement Value (2016)
Bridge Network	Bridges > 3m span	9	$ 10,978,196
	Culverts > 3m span	7	$ 3,704,400
	Culverts < 3m span; > 40m length	12	$ 10,216,041
	Culverts < 3m span; < 40m length	24	$ 2,691,478
	Retaining Walls	7	$ 1,973,751
	TOTAL	**59**	**$ 29,563,866**

As can be seen from the pie chart of **Figure 5**, the Towns bridges and culverts less than 3m span with a length greater than 40m make up over 80% of the network based on replacement value.

If this total asset value is translated to an average value per household assuming 7,200 dwellings, then the average household would have an investment of approximately $4,100 in bridge network assets.

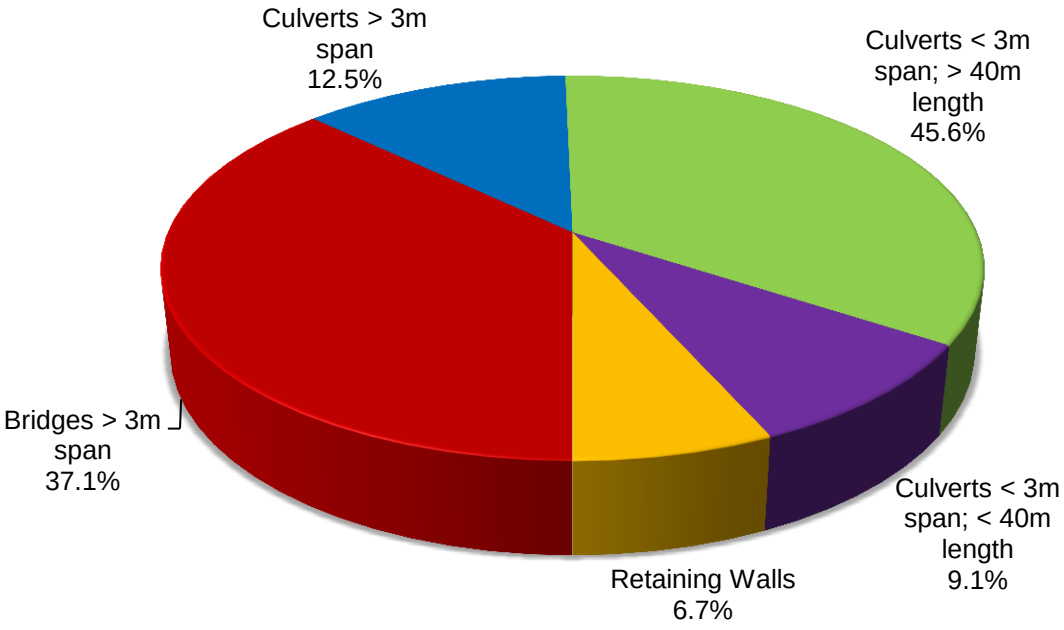


Figure 5: Breakdown of Bridge Network Components by Value

3.5.3 Useful Life

The generalized values used for typical expected useful life of the bridge network assets are summarized in **Table 10** below. It should be recognized that the actual asset life is influenced by many variables such as installation, traffic patterns, local weather conditions, etc, and may be greater than the expected useful life in favourable conditions. Town staff will continue to refine the asset's expected useful life as more specific data becomes available.

Table 10: Bridge Network Useful Life

Asset Component	Expected Useful Life (years)
Steel Structures	80
HDPE	80
CSP/MPPA	45
Concrete Structures	70
Gabion Baskets	50

The individual expected useful life in conjunction with the respective original installation dates were used to determine the theoretical Remaining Service Life (RSL) of each asset. A distribution summary of theoretical RSL is provided in **Figure 6** below which indicates that approximately $11.4 Million (nearly 40%) of assets have exceeded their expected useful life. It is important to note that although some assets may have exceeded their expected useful life, they may be fully functional, have good condition, and provide high levels of service for many years. Consequently, age alone is not necessarily the best indication of an assets overall condition and performance.

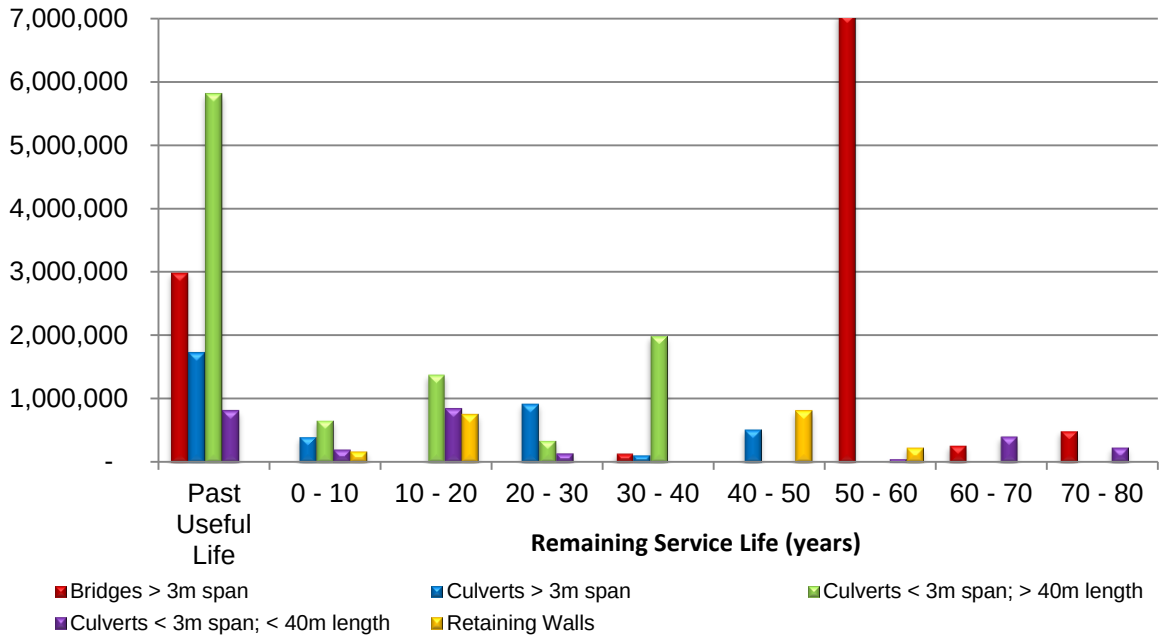


Figure 6: Bridge Network Remaining Service Life by Replacement Value

3.5.4 Condition vs. Performance

Figure 7 below demonstrates that about 50% of the bridge network is in good to fair condition and that about 10% is in poor or very poor condition representing approximately $3.2 Million.

The overall Condition & Performance rating for the entire bridge network and associated assets is Good (69%), meaning that on average, the bridge network assets are 31% into their weighted average estimated service life of 61 years, and have 69% of their service life remaining (i.e. the weighted average estimated age of the bridge network is 19 years old).

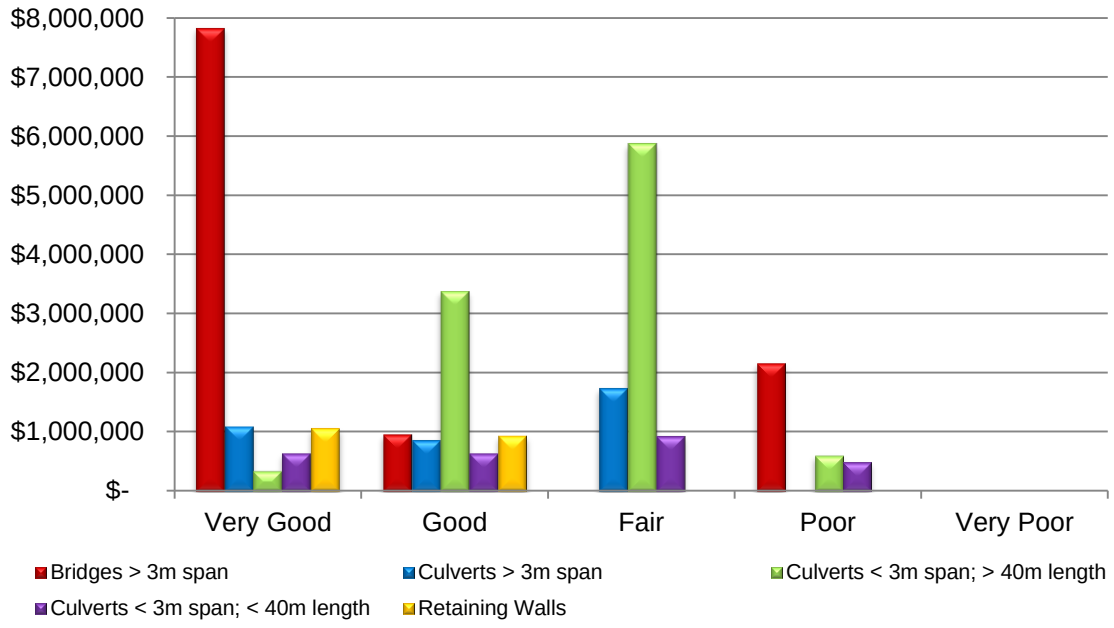


Figure 7: Bridge Network Condition by Replacement Value

3.5.5 Funding vs. Need

Figure 8 below outlines the projected capital investment in current year dollars for all bridge network assets including culverts and retaining walls. Each asset component replacement year is based on the current condition of the asset and the asset's expected remaining useful life given that condition. The analysis was run over a 100-year period to ensure that all assets went through at least one cycle of replacement in order to provide a sustainable projection. The average annual capital investment of $520,000 represents the amount required to meet all current and future financial obligations. The current funding level of $0 represents the historical five year budgeted average. As a result the bridge network annual funding gap deficit is approximately **$520,000** with a Funding vs. Need rating of Very Poor.

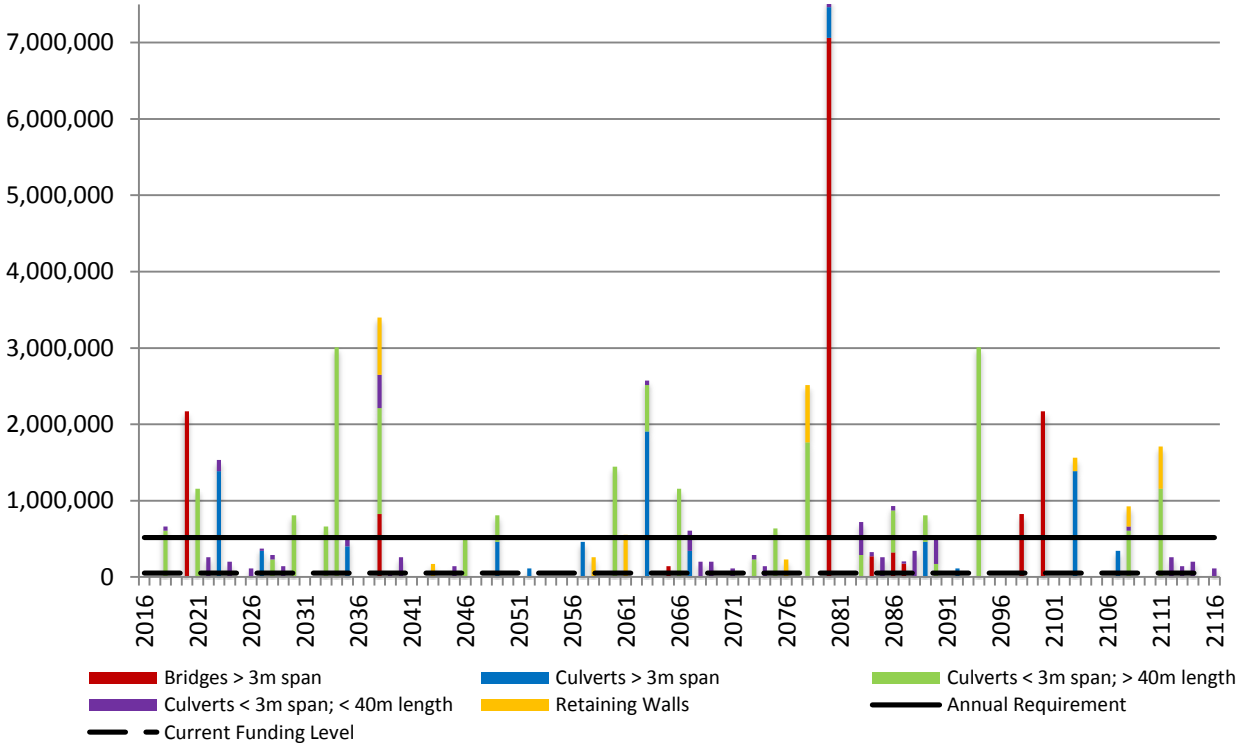


Figure 8: Bridge Network Replacement Profile

3.6 Stormwater Network

3.6.1 Inventory

The stormwater collection network that serves the Town of Tillsonburg consists of various types and diameter of stormwater collection pipes, manholes, leads, inlet structures such as catch basins and ditch inlets as well as other associated asset components such as stormwater management ponds. These components have been identified within **Table 11** below.

Table 11: Stormwater Network Inventory

Asset Type	Asset Component	Quantity
Stormwater Network	Collection Pipes	84.6 (km)
	Manholes	1,154 (ea)
	Structure Leads	23.8 (km)
	Inlet Structures	2,713 (ea)
	SWM Facilities	14 (ea)

The information used to compile the above inventory was determined from various incomplete databases, dated inventory maps, and as-built drawings. The document of assumptions for the stormwater collection network can be found in **Appendix F**.

3.6.2 Valuation

The replacement cost for the stormwater collection network was estimated using current standards, historical tender pricing, and current market replacement values. The estimated replacement value of the stormwater collection network and associated components, based upon current dollar value (2016) is **$57.7 Million**. The following table (**Table 12**) and associated pie-chart (**Figure 9**) provides a breakdown of the contribution of each of the network components to the overall system value.

Table 12: Stormwater Network Replacement Value

Asset Type	Asset Component	Quantity	Replacement Value (2016)
Stormwater Network	Collection Pipes	84.6 (km)	$ 34,606,136
	Manholes	1,154 (ea)	$ 6,645,990
	Structure Leads	23.8 (km)	$ 5,148,190
	Inlet Structures	2,713 (ea)	$ 6,684,795
	SWM Facilities	14 (ea)	$ 4,624,977
		TOTAL	**$ 57,710,088**

As can be seen from the pie chart of **Figure 9**, the Towns stormwater collection pipes make up 60% of the stormwater network based on replacement value.

If this total asset value is translated to an average value per household assuming 7,200 dwellings, then the average household would have an investment of approximately $8,000 in stormwater network assets.

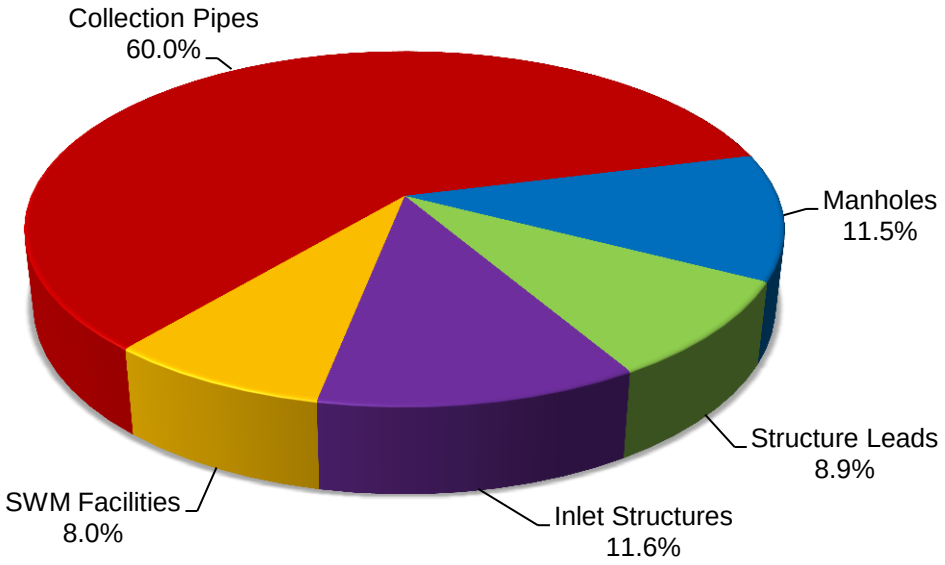


Figure 9: Breakdown of the Stormwater Network Components by Value

3.6.3 Useful Life

The generalized values used for typical expected useful life of the stormwater network assets are summarized in **Table 13** below. It should be recognized that the actual asset life is influenced by many variables such as installation practices, soil conditions, uneven manufacturing quality, local weather conditions, etc, and may be greater than the expected useful life in favourable conditions. Town staff will continue to refine the asset's expected useful life as more specific data becomes available.

Table 13: Stormwater Network Useful Life

Asset Component	Expected Useful Life (years)
Collection Pipes	80
Manholes	75
Inlet Structures	75
Leads	80
SWM Ponds	50

The individual expected useful life in conjunction with the respective original installation dates were used to determine the theoretical Remaining Service Life (RSL) of each asset. A distribution summary of theoretical RSL is provided in **Figure 10** below which indicates that approximately $6.7 Million (nearly 15%) of assets have exceeded their expected useful life. It is important to note that although some assets may have exceeded their expected useful life, they may be fully functional, have good condition, and provide high levels of service for many years. Consequently, age alone is not necessarily the best indication of an assets overall condition and performance.

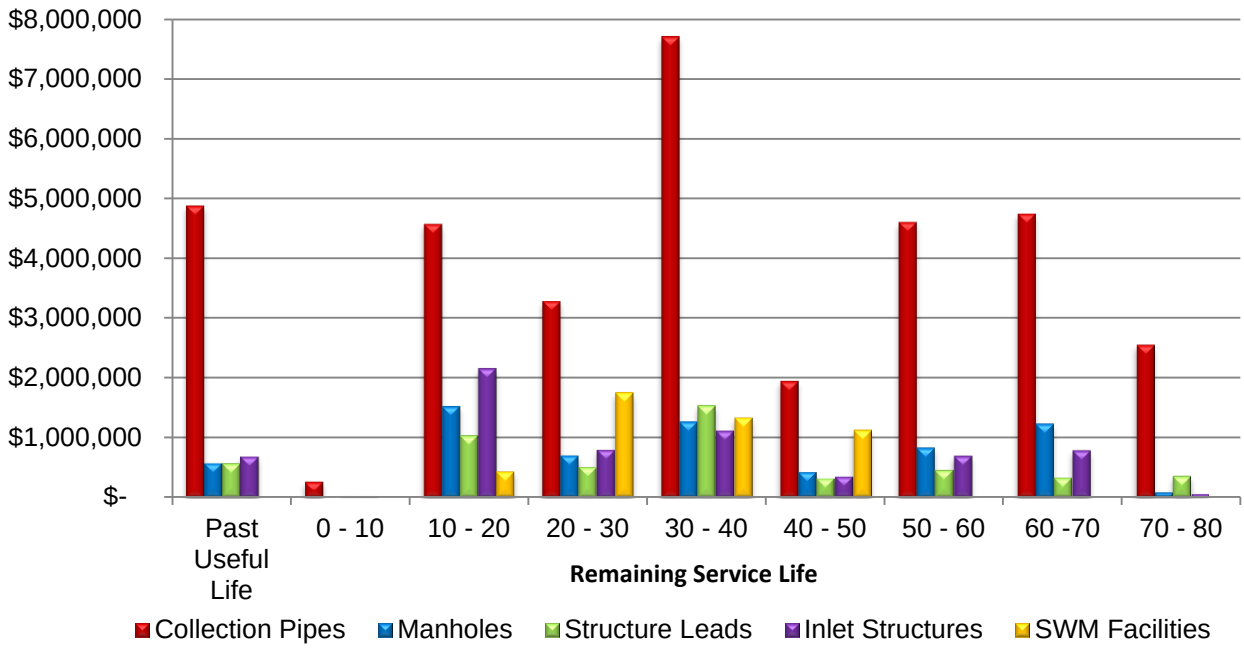


Figure 10: Stormwater Network Remaining Service Life by Replacement Value

3.6.4 Condition vs. Performance

Figure 11 below demonstrates that about 60% of the stormwater network is in good to fair condition and that approximately 10% is in poor or very poor condition representing about $4.8 Million.

The overall Condition & Performance rating for the entire stormwater network and associated assets is Good (68%), meaning that on average, the stormwater network assets are 32% into their weighted average estimated service life of 72 years, and have 68% of their service life remaining (i.e. the weighted average estimated age of the stormwater collection network is 23 years old).

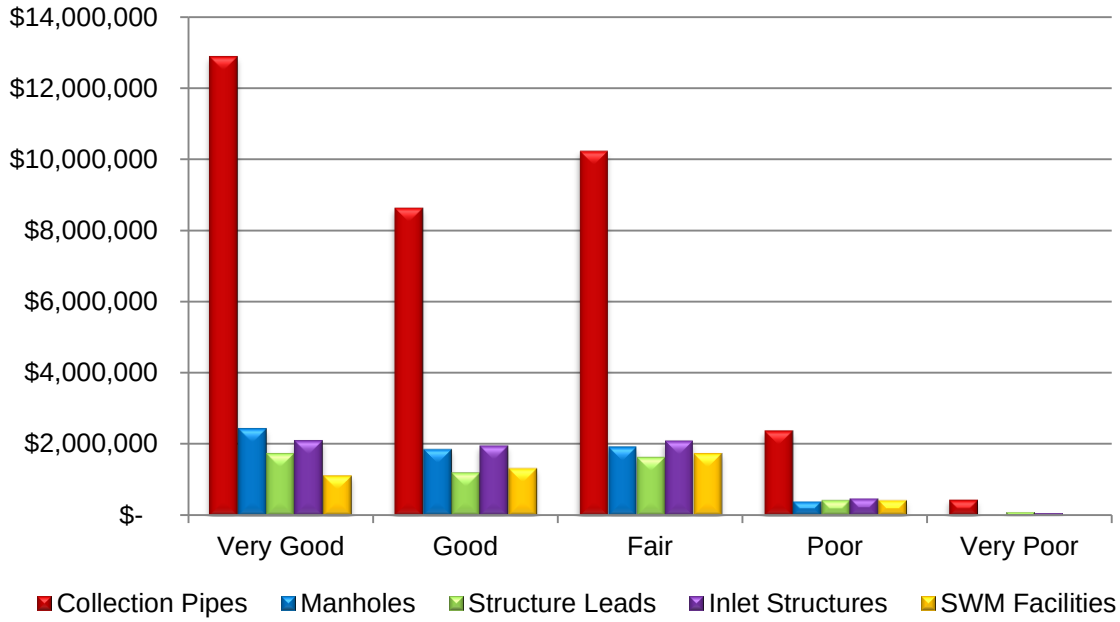


Figure 11: Stormwater Network Condition by Replacement Value

3.6.5 Funding vs. Need

Figure 12 below outlines the projected capital investment in current year dollars for all stormwater network assets including manholes, inlet structures and SWM facilities. Each asset component replacement year is based on the current condition of the asset and the asset's expected remaining useful life given that condition. The analysis was run over a 100-year period to ensure that all assets went through at least one cycle of replacement in order to provide a sustainable projection. The average annual capital investment of $640,000 represents the amount required to meet all current and future financial obligations. The current funding level of $190,000 represents the historical five year budgeted average. As a result the stormwater network annual funding gap deficit is approximately **$450,000** with a Funding vs. Need rating of Very Poor.

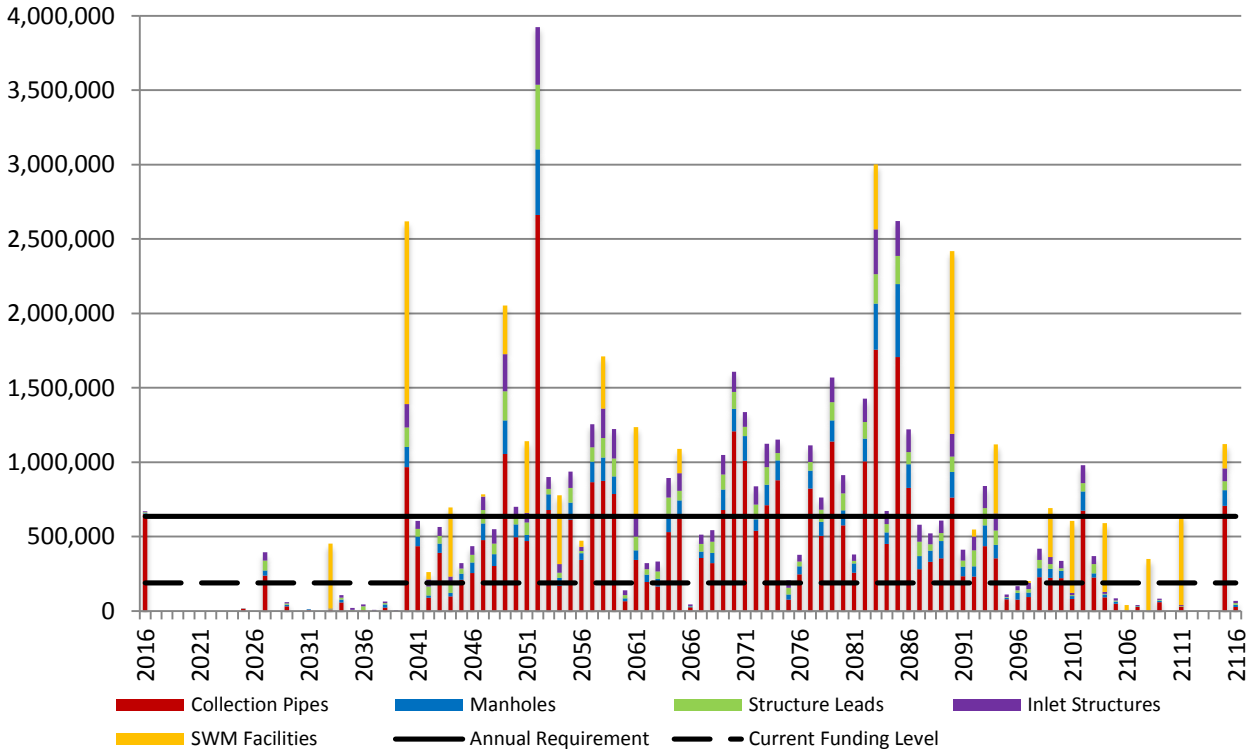


Figure 12: Stormwater Network Replacement Profile

3.7 Fleet & Equipment

3.7.1 Inventory

The fleet and equipment that serves the Town of Tillsonburg spans all departments and consists of a range of light, medium and heavy duty trucks, trailers, generators, and various types of off-road and small equipment. These components have been identified within **Table 14** below.

Table 14: Fleet & Equipment Inventory

Asset Type	Asset Component	Quantity (ea)
Fleet & Equipment	Light Duty Trucks	16
	Medium Duty Trucks	11
	Heavy Duty Trucks	14
	Off Road Equipment	20
	Attachments	41
	Trailers	8
	Generators	13
	Small Equipment	63
	Total	**186**

The information used to compile the above inventory was determined by conducting in-field data collection.

3.7.2 Valuation

The replacement cost for fleet and equipment was estimated using current standards, historical tender pricing, and current market replacement values. The estimated replacement value of fleet and equipment, based upon current dollar value (2016) is **$10.45 Million**. The following table (**Table 15**) and associated pie-chart (**Figure 13**) provides a breakdown of the contribution of each of the fleet and equipment assets to the overall system value.

Table 15: Fleet & Equipment Replacement Value

Asset Type	Asset Component	Quantity (ea)	Replacement Value (2016)
Fleet & Equipment	Light Duty Trucks	16	$ 527,000
	Medium Duty Trucks	11	$ 876,000
	Heavy Duty Trucks	14	$ 5,617,000
	Off Road Equipment	20	$ 2,085,000
	Attachments	41	$ 742,000
	Trailers	8	$ 155,000
	Generators	13	$ 319,000
	Small Equipment	63	$ 129,000
		TOTAL	**$ 10,450,000**

As can be seen from the pie chart of **Figure 13**, the Towns heavy duty trucks by themselves make up about 55% of the fleet and equipment assets based on replacement value.

If this total asset value is translated to an average value per household assuming 7,200 dwellings, then the average household would have an investment of approximately $1,450 in fleet and equipment assets.

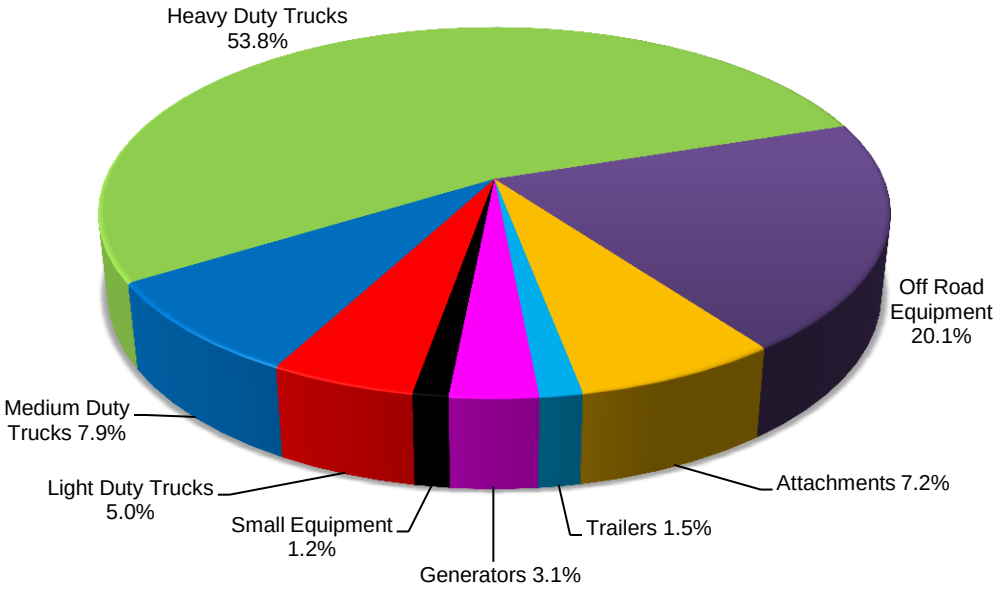


Figure 13: Breakdown of Fleet & Equipment Components by Value

3.7.3 Useful Life

The generalized values used for typical expected useful life of the bridge network assets are summarized in **Table 16** below. It should be recognized that the actual asset life is influenced by many variables such as installation, traffic patterns, local weather conditions, etc, and may be greater than the expected useful life in favourable conditions. Town staff will continue to refine the asset's expected useful life as more specific data becomes available.

Table 16: Fleet & Equipment Useful Life

Asset Component	Expected Useful Life (years)	Km / Hrs
Cars, Mini Vans, SUV's	8	200,000
1/2 Ton & 3/4 Ton Trucks	8	200,000
1 Ton Trucks	10	250,000
Single Axle Plow Trucks	10	300,000
Tandem Axle Plow Trucks	12	325,000
Street Sweeper	8	10,000
Loader	15	10,000
Grader	20	15,000
Backhoe	12	12,000
Tractors	15	5,000
Sidewalk Machine	10	5,000
Utility Trailers	15	-
Wood Chipper	15	2,000
Mowers	10	2,000

The individual expected useful life in conjunction with the respective original installation dates were used to determine the theoretical Remaining Service Life (RSL) of each asset. A distribution summary of theoretical RSL is provided in **Figure 14** below which indicates that approximately $3.7 Million (nearly 40%) of assets have exceeded their expected useful life.

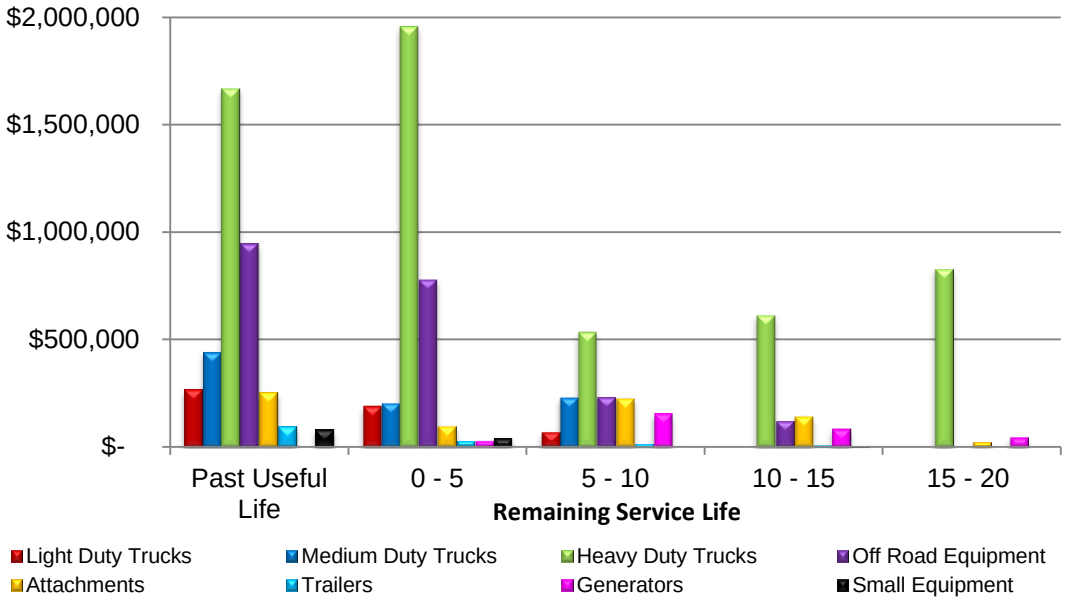


Figure 14: Fleet & Equipment Remaining Service Live by Replacement Value

3.7.4 Condition vs. Performance

Figure 15 below demonstrates that about 60% of fleet and equipment assets are in good to fair condition, but that approximately 35% are in poor or very poor condition representing about $3.7 Million.

The overall Condition & Performance rating of fleet and equipment assets is Fair (45%), meaning that on average, fleet and equipment assets are 55% into their weighted average estimated service life of 14 years, and have 45% of their service life remaining (i.e. the weighted average estimated age of fleet and equipment assets is 8 years old).

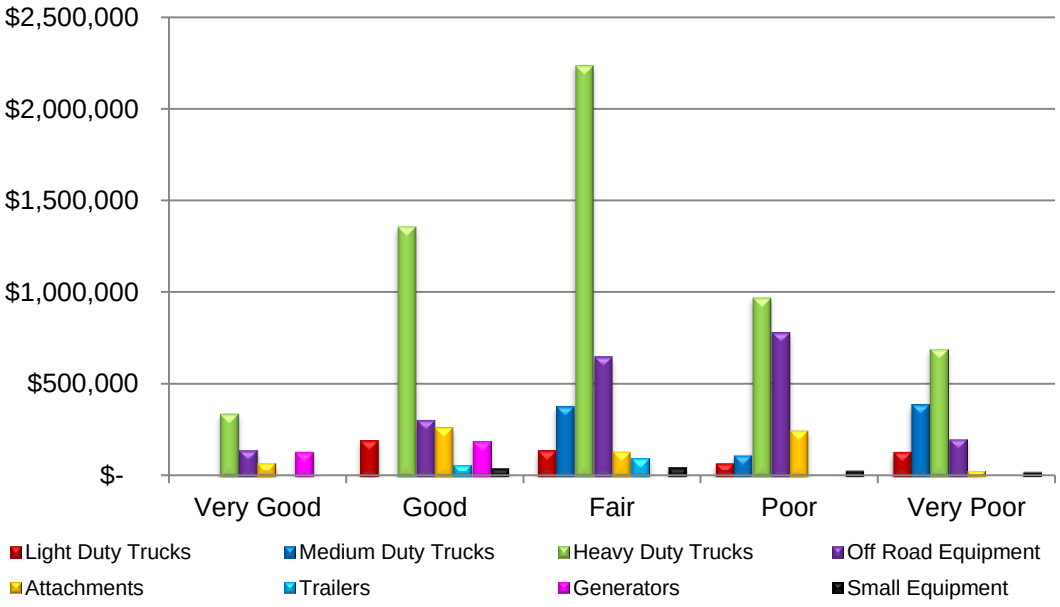


Figure 15: Fleet & Equipment Condition by Replacement Value

3.7.5 Funding vs. Need

Figure 16 below outlines the projected capital investment in current year dollars for all fleet and equipment assets including light, medium and heavy duty trucks, off-road equipment, attachments, trailers, generators and small equipment. Each asset component replacement year is based on the current condition of the asset and the asset's expected remaining useful life given that condition. The analysis was run over a 100-year period to ensure that all assets went through at least one cycle of replacement in order to provide a sustainable projection. The average annual capital investment of $830,000 represents the amount required to meet all current and future financial obligations. The current funding level of $560,000 represents the historical five year budgeted average. As a result the fleet and equipment annual funding gap deficit is approximately **$270,000** with a Funding vs. Need rating of Fair.

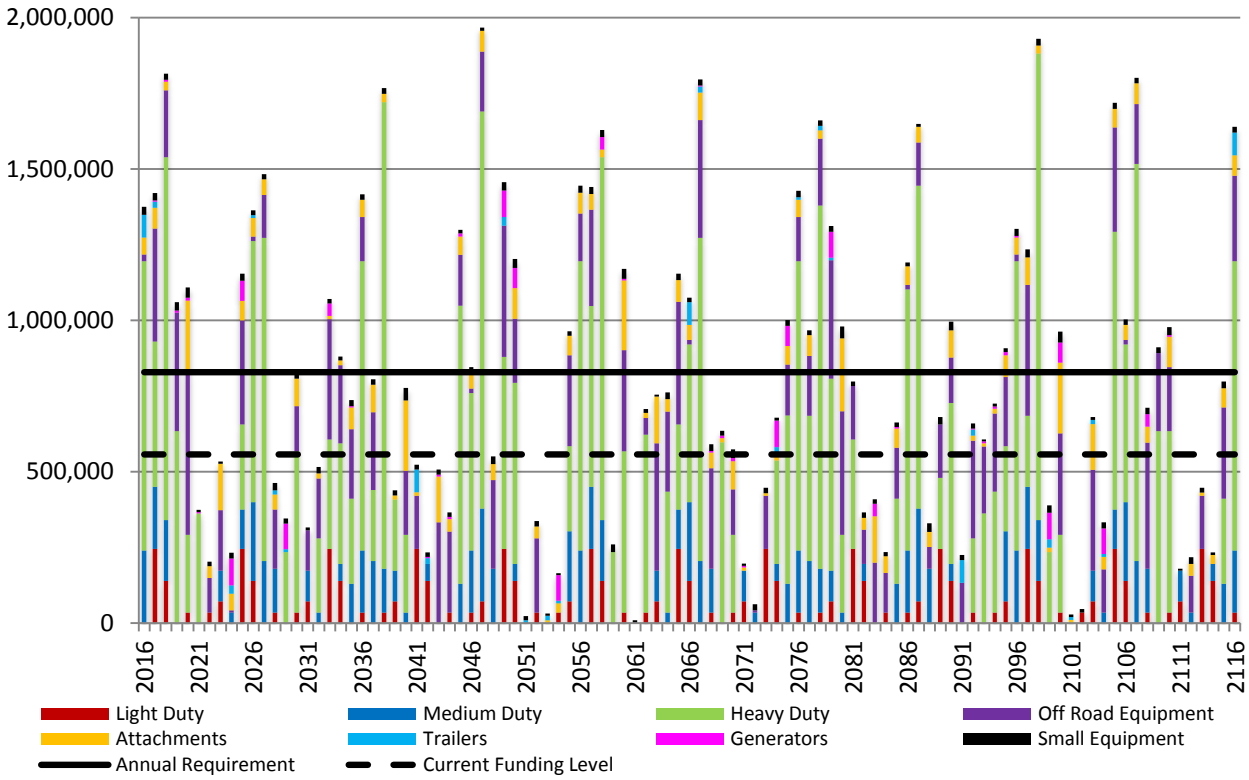


Figure 16: Fleet & Equipment Replacement Profile

4 DESIRED LEVELS OF SERVICE

4.1 Strategic and Corporate Goals

Asset management planning is a method of advancing Tillsonburg's long-term strategic goals of its infrastructure system. The Plan incorporates current management requirements while looking at how the Town can best serve the public now and in the future. Therefore, in order to achieve the overall corporate direction, the asset management plan needs to integrate the capital works plan, the Official Plan, and the Community Strategic Plan.

4.2 Legislative Requirements

The following five provincial legislative documents affect asset management planning:

- Ontario Regulation 239/02 made under the Municipal Act, 2001 sets the minimum maintenance standards for municipal highways.
- Ontario Regulation 104/97 made under the Public Transportation and Highway Improvement Act, 1990 sets the standards for detailed bridge inspections and provides a uniform approach for professional engineers and other inspectors to follow.
- Safe Drinking Water Act, 2002: Requires that municipalities plan for the long-term financial viability of their drinking water system.
- Water Opportunities Act, 2010: Sets the framework for a performance measurement regime and sustainability for water, wastewater, and stormwater over the lifetime of the infrastructure assets.
- Accessibility for Ontarians with Disabilities Act, 2005: Develops, implements and enforces accessibility standards in order to achieve accessibility for Ontarians with disabilities with respect to goods, services, facilities, accommodation, employment, buildings, structures and premises on or before January 1, 2025.

4.3 Service Level Indicators and Benchmarks

The goal of asset management is to move away from reactive and "worst first" planning to maintenance of assets in a "state of good repair". This is the most economical way to manage assets in order to continue to provide high levels of service. The path to get there requires a long-term strategy and customer buy-in to assure change. To aid in the evaluation of this change three types of indicators and associated performance measures have been developed.

Strategic Level

Strategic indicators are the highest and most abstract type of indicators. They are set and reviewed by the highest level of municipal decision makers. Examples would include the percentage of reinvestment compared to the value of the system, or assessing deficit needs versus budget.

Tactical Level

Tactical indicators result from analyzing different but related operational indicators to obtain an overview of an asset's condition. A tactical indicator provides managerial-level municipal decision makers with an overview of an asset's condition, state, or value. Tactical indicators would include the percentage amount for operations and maintenance compared to the value of the system or the overall asset condition such as the Pavement Condition Index (PCI) for roads or Bridge Sufficiency Index (BSI) for bridges.

Operational Level

An operational indicator is generally raw data collected about an asset by work crews while performing their duties or as part of an asset inventory process. Operational indicators can be expressed as a dollar value per length of asset or simply by the number or breaks or backup occurrences per year.

4.3.1 Road Network

4.3.1.1 Goal

To preserve the roadway network with the goal of protecting public safety, health, property, and the natural environment while meeting or exceeding all legislative requirements to move people, goods and services safely, efficiently, and effectively that will enable sustainable community growth and economic development.

4.3.1.2 Objective

- Maintain all arterial and collector roadways in a Fair to Good condition vs. performance rating with a minimum pavement condition index (PCI) of 50
- Within 10 years improve all local roadways to a minimum Fair condition vs. performance rating

4.3.1.3 Performance Indicators

Decision Level	Performance Indicator	Measure	
		Current (2016)	Desired (2026)
Strategic Level	Cost per household per month	$16.36 /hh	$26.25 /hh
	Percentage of capital reinvestment compared to total road network replacement value	0.57%	1.13%
	Backlog value of road network shortfall (accumulated asset network deficit)	$4,720,083	$2,360,041
Tactical Level	Overall Condition vs. Performance rating	63%	70%
	Percentage of road network replacement value spent on maintenance	0.22%	0.25%
	Percentage of road network replacement value spent on winter control	0.39%	0.43%
Operational Level	Roads maintenance cost per lane km	$1,140 /lane km	$1,310 /lane km
	Winter control cost per lane km	$2,060 /lane km	$2,590 /lane km
	Number of customer requests received annually	775	700

* Does not reflect amount required for sustainability, includes a 1.5% annual rate of inflation.

4.3.2 Bridge Network

4.3.2.1 Goal

To preserve the existing bridge network with the goal of protecting public safety, health, property, and the natural environment while meeting or exceeding all legislative requirements that will enable sustainable community growth and economic development.

4.3.2.2 Objective

- Maintain all bridges, culverts, and retaining structures in a Fair to Good condition vs. performance rating with a minimum bridge sufficiency index (BSI) of 60.
- Within 10 years improve all bridge, culvert, or retaining structure to a minimum Good condition vs performance rating.

4.3.2.3 Performance Indicators

Decision Level	Performance Indicator	Measure	
		Current (2016)	Desired (2026)
Strategic Level	Cost per household per month	$0.20 /hh	$2.40 /hh
	Percentage of capital reinvestment compared to total bridge network replacement value	0.00%	0.51%
	Backlog value of bridge network shortfall (accumulated asset network deficit)	$0	$0
Tactical Level	Overall Condition vs. Performance Rating	69%	75%
	Percentage of bridge network replacement value compared to total OSIM identified improvements	4.60%	1.76%
	Percentage of bridge network replacement value spent on operations and maintenance	0.06%	0.15%
Operational Level	Operating cost for bridges & culverts per sq.m.	$2.31 /sq.m.	$6.82 /sq.m.
	Number of structures with a posted load restriction	0	0
	Number of customer requests received annually	< 10	< 5

* Does not reflect amount required for sustainability, includes a 1.5% annual rate of inflation.

4.3.3 Stormwater Collection Network

4.3.3.1 Goal

To preserve the existing stormwater collection and land drainage system with the goal of protecting public safety, health, property, and the natural environment while meeting or exceeding all legislative requirements for stormwater quality and management that will enable sustainable community growth and economic development.

4.3.3.2 Objective

- Meet the Ministry of Environment quality requirements for stormwater management for new developments and reconstruction projects.
- Reduce the number of urgent stormwater projects

4.3.3.3 Performance Indicators

Decision Level	Performance Indicator	Measure	
		Current (2016)	Desired (2026)
Strategic Level	Cost per household per month	$3.64 /hh	$6.54 /hh
	Percentage of capital reinvestment compared to total stormwater network replacement value	0.33%	0.65%
	Backlog value of stormwater network shortfall (accumulated asset network deficit)	$642,581	$321,290
Tactical Level	Overall Condition vs. Performance rating	68%	75%
	Percentage of stormwater network replacement value spent on operations and maintenance	0.22%	0.27%
Operational Level	Stormwater maintenance cost per km	$1,500 /km	$2,130 /km
	Total number of Storm Facilities serviced annually	< 5	All
	Number of stormwater backup complaints received annually	< 25	< 15

* Does not reflect amount required for sustainability, includes a 1.5% annual rate of inflation.

4.3.4 Fleet & Equipment

4.3.4.1 Goal

To maintain, repair, and renew the Towns fleet and equipment assets with the goal of providing the necessary vehicles and equipment to enable the safe, reliable, and efficient operations of the various Town departments that deliver essential services to the public and residents of the Municipality.

4.3.4.2 Objective

- Maintain, repair, and replace vehicles and equipment efficiently
- Comply with Provincial standards and regulations
- Maintain the Towns Commercial Vehicle Operators Registration (CVOR) certificate and Carrier Safety Rating (CSR) as per the Highway Traffic Act and associated regulations

4.3.4.3 Performance Indicators

Decision Level	Performance Indicator	Measure	
		Current (2016)	Desired (2026)*
Strategic Level	Cost per household per month	$16.04 /hh	$17.15 /hh
	Percentage of capital reinvestment compared to total fleet & equipment replacement value	5.38%	6.85%
	Backlog value of fleet & equipment shortfall (accumulated asset network deficit)	$1,421,000	$0
Tactical Level	Overall Condition vs. Performance Rating	45%	65%
	Total Inventory of fleet vehicles and equipment	186	190
	Percentage of fleet & equipment replacement value spent on operations and maintenance	7.99%	7.61%
Operational Level	Number of repair requests received annually	300	250
	Percentage of repair requests serviced in 48 hours	67%	80%
	Average cost per repair serviced in 48 hours	$4,141 /ea	$3,944 /ea

* Does not reflect amount required for sustainability, includes a 1.5% annual rate of inflation.

4.4 Customer Engagement

Considering that Council has been approving annual budgets that reflect the community's needs, this plan assumes that the assets are currently providing the desired level of service. It may be advantageous to consult with the community to refine the desired levels of service. Future public engagement to refine targeted desired service levels could include:

- Engaging the public to help envision what the municipality will look like in the future and the infrastructure needed to support it.
- Assisting the engagement process by identifying priority projects and developing costing scenarios.
- Having conversations about prioritization and the difficult choices that sometimes need to be made to prioritize infrastructure investments

5 ASSET MANAGEMENT STRATEGY

5.1 Objective

An asset management strategy is a set of planned actions that will enable the asset to provide the desired levels of service outlined in Section 4 in a sustainable way, while managing risk, at the lowest lifecycle cost. The set of planned actions, when combined together form long-term operating and capital forecasts that include:

- Non-Infrastructure Solutions
- Maintenance Activities
- Rehabilitation and Replacement Planning
- Project Prioritization
- Demand and Growth Planning

5.2 Non-Infrastructure Solutions

Non-infrastructure solutions are actions that are taken to gain a better understanding of infrastructure needs, extend the asset useful life, or lower costs. These strategies are not directly related to individual assets, but affect the system as a whole, such as:

- Integrated Infrastructure Renewal
- Coordination with Municipalities
- Research Partnerships
- Procurement Methods

5.2.1 Integrated Infrastructure Renewal

Through determining road, water and sewer replacement schedules, actions can be taken to align replacement times. For example, if a road section was approaching its replacement year, but a sewer main located underneath the road was expected to be replaced in five years, the road could be flagged as a candidate for major maintenance activities to increase its service life. Through taking actions to increase the service life of the road to match the sewer replacement allows for the road to be replaced at the same time as the invasive excavation occurs to replace the sewer. Utilizing this approach saves costs, minimizes waste and maximizes the use of assets. The Town is currently in the process of implementing this approach as detailed in Section 5.4 – Rehabilitation and Replacement Planning.

5.2.2 Coordination with Municipalities

Municipalities working together can accomplish service levels that would be too expensive for a municipality to afford alone. This occurs between municipalities of all sizes, and presents significant opportunities for cost savings for both municipalities. For example the scheduling works on inter-related assets at the same time, sharing the cost and working together more efficiently. The Town, under agreement as the Operating Authority for the water distribution and wastewater collection systems with Oxford County works closely with the Oxford Public Works Water and Wastewater Divisions to ensure alignment of renewal activities within a street corridor.

Another example is cooperative purchasing, accomplished through partnering with other municipalities, in order to obtain the benefits of volume purchasing and the reduction in administrative efforts and costs. The Town is currently a member of the Oxford County Service Sharing Committee and undertakes cooperative purchasing with this group (i.e. Road Salt).

5.2.3 Research Partnerships

The Town of Tillsonburg has recently partnered with the private and academic sectors in the develop a pavement management optimization application to help mitigate the infrastructure deficit by providing a better road network capital and operational decision making tool that could potentially save thousands of dollars in capital expenses on the municipalities road network system.

5.2.4 Procurement Methods

The Town of Tillsonburg has a purchasing by-law that establishes policies for the procurement of goods and services by the Town. The objective of the policy is to ensure:

- Best value is achieved consistent with the required quality and service
- Integrity of the purchasing process
- Openness, accountability and transparency and fair treatment of all bidders
- Encourage competition among bidders

5.3 Maintenance Activities

Preservation of an asset is an important aspect in any asset management strategy, especially considering continuous fiscal constraints. The design life of an asset is often dependent on achieving a minimum level of maintenance to protect the capital investment of the asset. Early detection of potential issues is crucial to determine and evaluate maintenance and rehabilitation alternatives and is largely accomplished through ongoing condition assessments and inspections.

5.3.1 Condition Assessment and Inspection

The foundation of good asset management practice is based on having comprehensive reliable information on the current condition of infrastructure. Asset condition and performance information supports lifecycle decision making and is critical to the management of risks and performance in achieving levels of service. The Town actively undertakes condition assessment activities and utilizes the information gathered in the development of operating and capital plans. A list of the current condition assessment and inspection initiatives is shown in **Table 17**.

Table 17: Condition Assessment Projects by Asset Type

Asset Type	Project	Interval	Target % of Network
Road Network	• Visual Pavement Condition Assessment	Annual	25%
	• Detailed Roadway Surface Distress and Drivability Condition Assessment	5 Years	100%
	• MMS Road Patrols	Ongoing	100%
Sidewalks	• Detailed Sidewalk Condition Assessment	3 Years	100%
	• MMS Sidewalk Survey	Annual	100%
Bridges, Retaining Walls and Culverts	• Structural Condition Assessment (OSIM)	Bi-Annual	100%
	• Detailed Condition Investigation	As Required	
Stormwater Network	• Collection Pipe CCTV Condition Assessment	Annual	10%
	• Manhole Condition Assessment	Annual	10%
	• Stormwater Retention Pond and Oil Grit Separator Inspection	Annual	100%
Fleet & Equipment	• MTO Motor Carrier Safety Standards Schedule 1 and 2	Mileage	100%
Corporate Facilities	• Visual Building Condition Assessment	Annual	25%
	• Detailed Building Condition Investigation	5 Years	100%
	• Building Roof Condition Assessment	Annual	25%

Note: *The "Target % of Network" represents the percentage of the network assets that are covered in the specified interval*

5.3.2 Routine Maintenance

Routine maintenance activities can be conducted immediately in response to an identified localized issue or as a preventative measure to reduce the occurrence of future more severe issues. A list of routine maintenance activities generally accounted for within the Towns annual operating budget is provided in **Table 18**.

Table 18: Routine Maintenance Activities by Asset Type

Asset Type	Asset Component	Activity
Road Network	Asphalt Surfaces	• Pothole repairs • Roadside maintenance • Drainage maintenance • Localized patching • Crack sealing
	Sidewalks	• Removal of trip ledges • Localized panel replacement

Bridges, Retaining Walls and Culverts	All Structures	• Wearing surface crack sealing
		• Painting
		• Washing & Cleaning of:
		  ○ Wearing surface & deck
		  ○ Sidewalk & railings
		  ○ Tops of abutments & piers
		  ○ Expansion joints
		  ○ Seats & bearings
		  ○ Lower chords of trusses
		  ○ Deck drains

	Concrete Structures	• Crack Repairs
		  ○ Bonding
		  ○ Routing and sealing
		  ○ Stitching

	Steel Structures	• Localized rust removal and painting • Sandblasting and repainting
Stormwater Network	Collection Pipes	• Localized repair of mains or leads • Cleaning and flushing • Calcite, roots and other debris removal
	Manholes & Inlet Structures	• Sediment removal • Frame and grate replacement • Manhole benching repairs
	SWM Facilities	• Vegetation maintenance • Access maintenance • Debris and litter control • Dredging and sediment removal
Fleet & Equipment	All Units	• Regular oil changes and tire rotation • Service order repair requests • Refurbish critical components/parts • Sandblast and repaint

5.4 Rehabilitation and Replacement Planning

5.4.1 Linear Assets

The linear asset rehabilitation and replacement planning process is comprised of two core steps as shown in **Table 19**. Developing and coordinating linear infrastructure renewal is a complex, data intensive process requiring several sources of input.

Table 19: Linear Asset Capital Planning Process

Identify and Select Project Candidates	• Roads • Sidewalks • Stormwater Sewers • *Watermains* • *Wastewater Sewers*
Corridor Coordination Process - Establish Project Type	• Spot Repair • Rehabilitation • Stand-alone Replacement • Full Corridor Reconstruction

Note: *Although Watermains and Wastewater Sewers are Upper Tier assets consideration of their renewal provides the opportunity for cost-effectiveness when considering the totality of the assets present within the street corridor.*

5.4.1.1 Project Identification

The workflow diagrams provided in **Figure 17** to **Figure 19** were developed to provide clear, transparent rationalization of the road, water, wastewater and stormwater rehabilitation and replacement candidate selection process as well as providing the opportunity to identify areas of improvement.

Figure 17: Road Candidate Selection Process Flow Chart

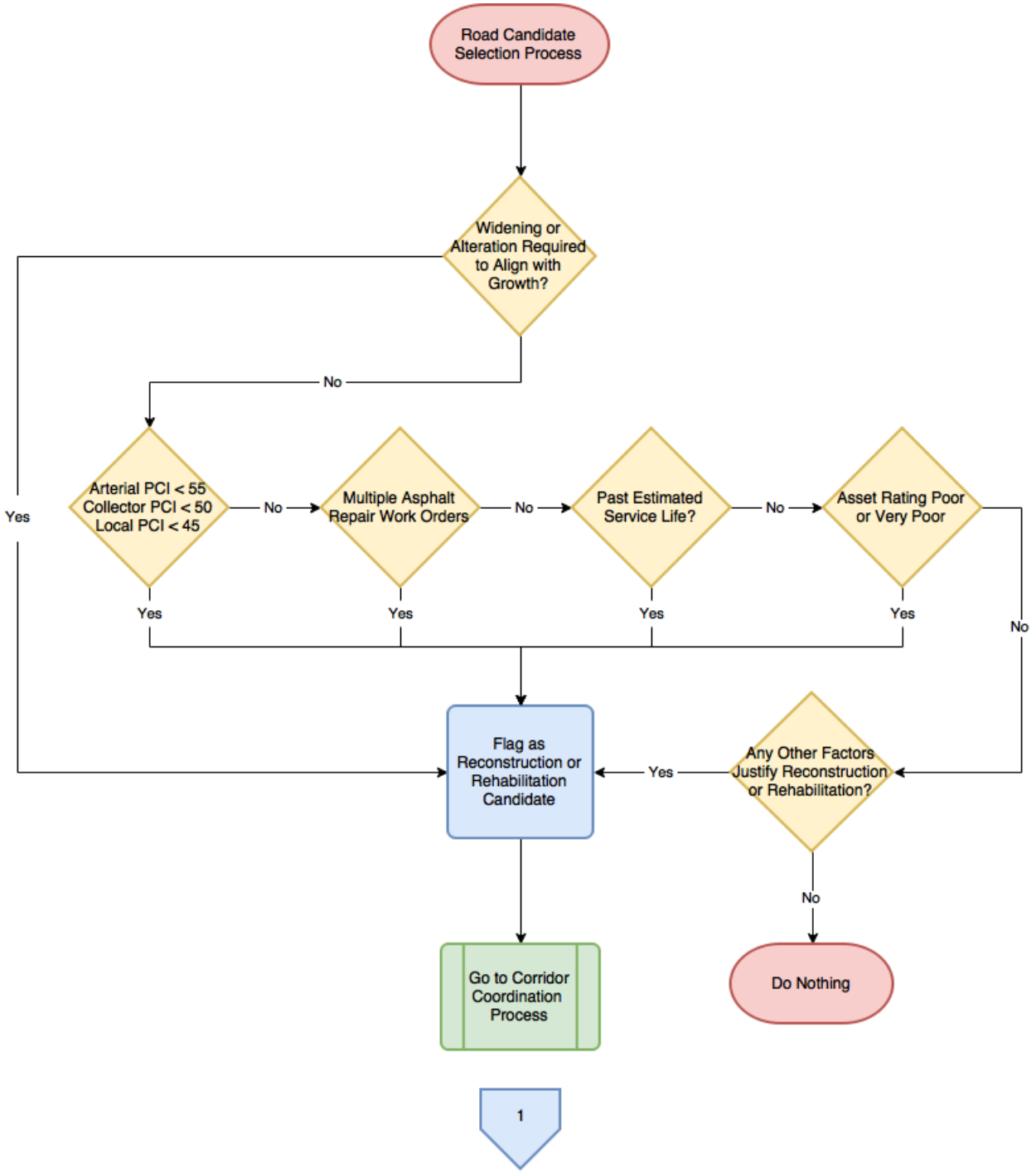


Figure 18: Watermain Candidate Selection Process Flow Chart

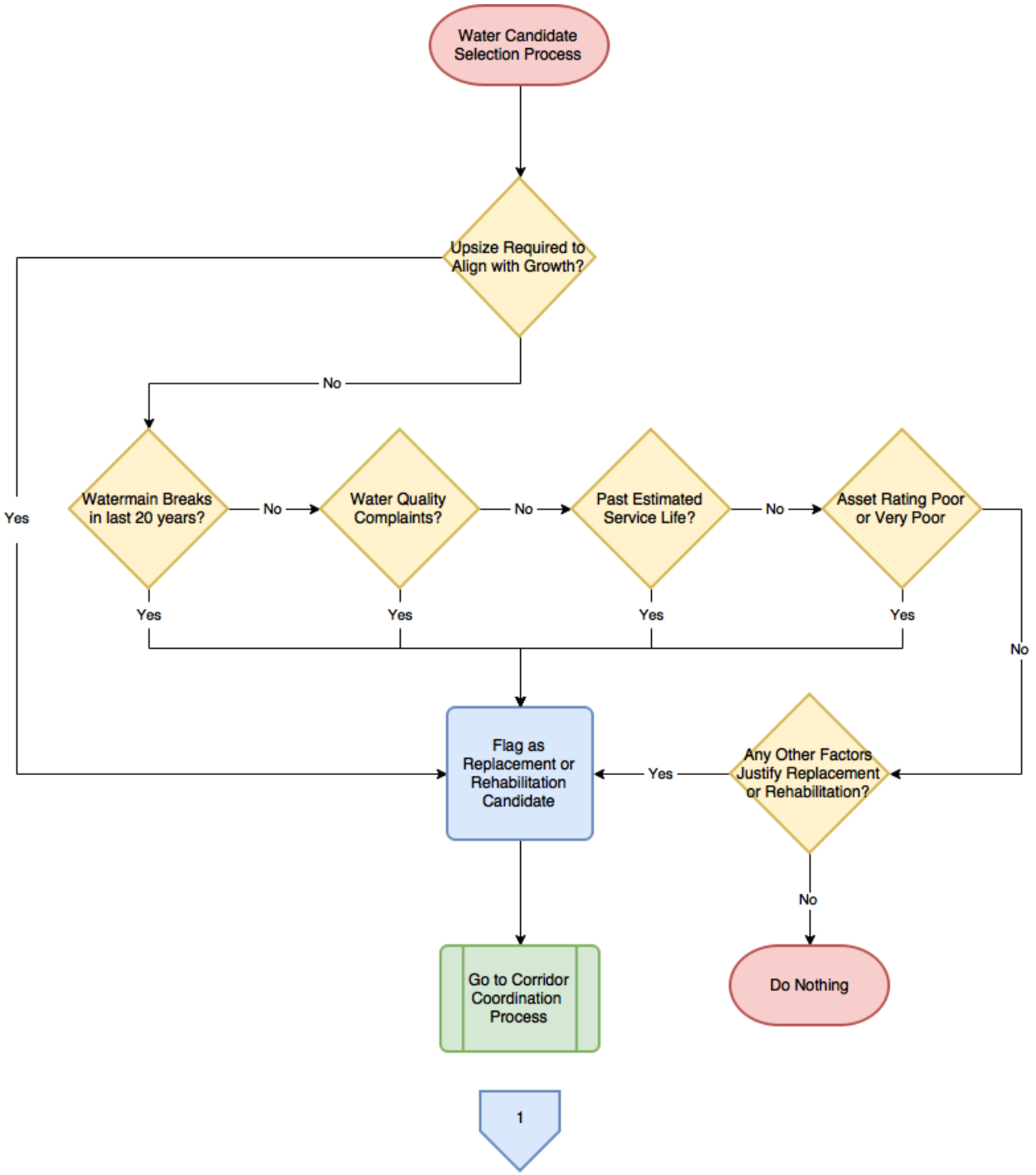
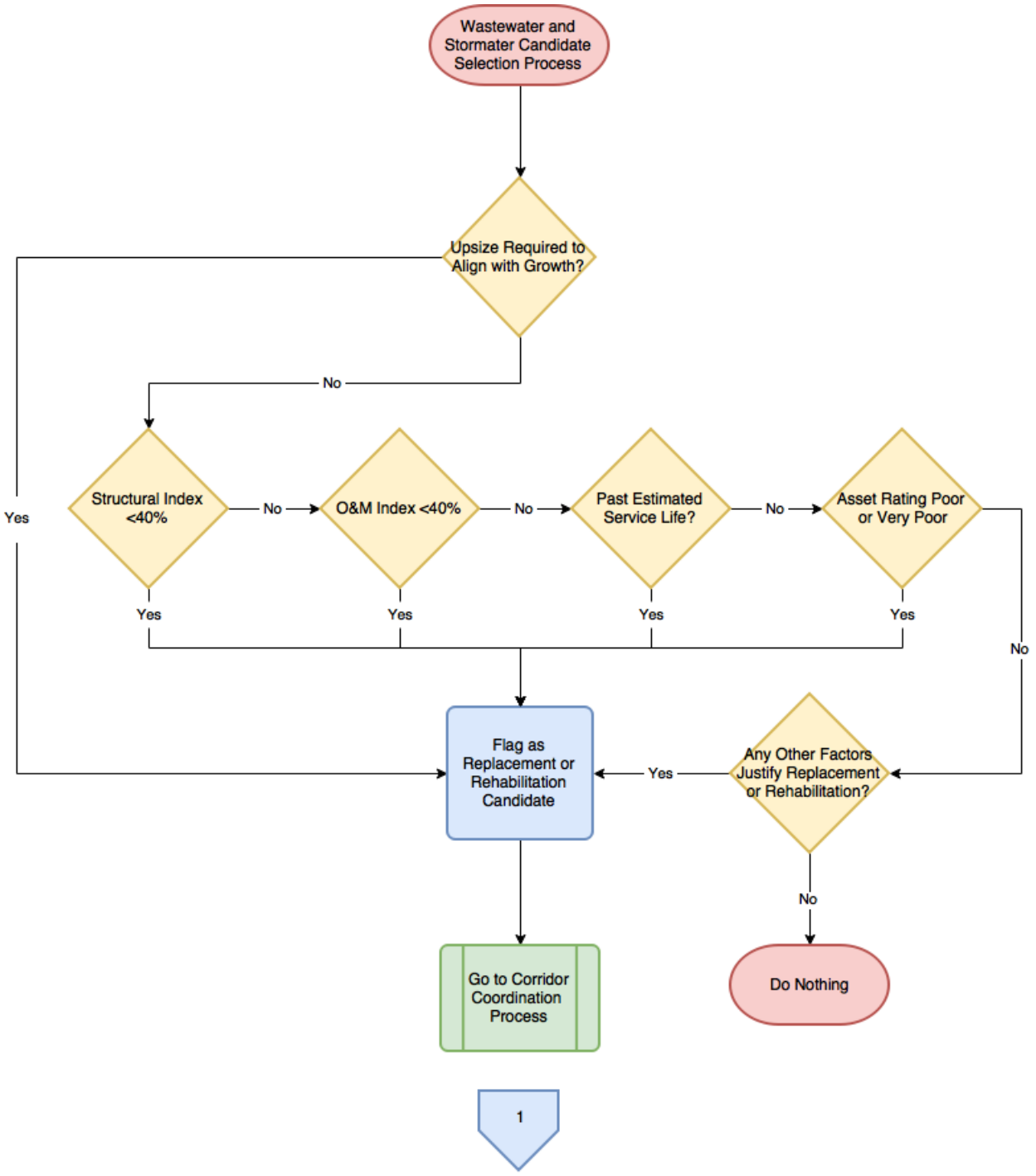


Figure 19: Wastewater and Stormwater Sewer Candidate Selection Process Flow Chart



5.4.1.2 Corridor Coordination

The candidate selection process identifies which individual assets require replacement or rehabilitation. In any given right-of-way, there may be multiple assets of varying asset type that have been identified as replacement or rehabilitation candidates. Moreover, there may be assets within the same right-of-way that have recently been repaired, are in good condition, and may last for a number of years. The process of corridor coordination allows the Town to identify and evaluate these scenarios, and develop the appropriate strategy that will extend the life of the corridor as long as possible, while maintaining the required levels of service and minimizing risk exposure.

In order to form the locational relationship between the different asset types all of the Town right-of-ways were divided into 'corridors'. Typically a corridor will range along a road from one intersection to the next. With assets grouped into corridors, each asset can be assessed alongside each other to diagnose the optimum treatment method.

A theoretical example of the lifecycle of infrastructure within a corridor is shown in **Figure 20** which illustrates the varying lifespan of asset types. For example, the road may require rehabilitation at approximately 40 years from the time it was constructed. At 60 years, the watermain may require replacement, requiring a trench to be cut in the road surface (which may still be in good condition); instead trenchless relining of the watermain could extend the service life of the pipe for an additional 40 years, with minimal impact to the road surface. This approach to integrated capital planning allows the corridor reconstruction to be harmonized at the end of each asset's lifecycle, providing greater return on infrastructure investments over the long-term as well as minimizing disruption to the public due to construction activities.

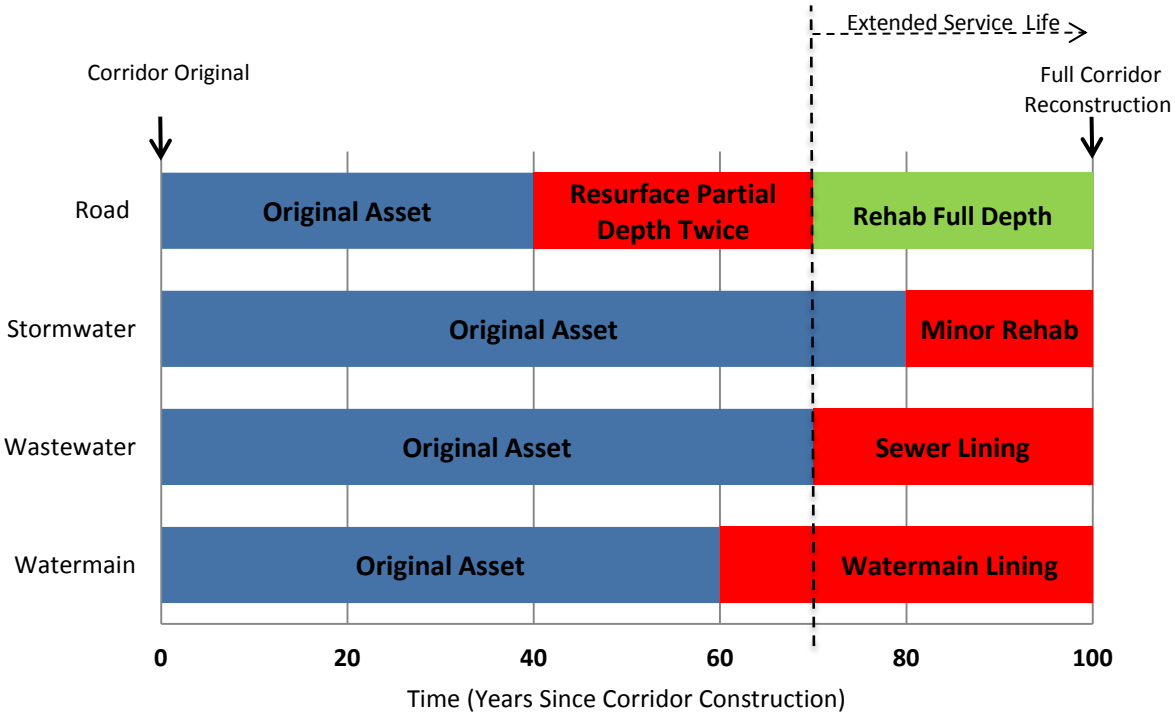


Figure 20: Theoretical Corridor Lifecycle

In order to ensure consistency across the entire infrastructure network, a formalized decision making process for selection of project type was developed. Outlining the process ensures a consistent, defensible and transparent approach to decision making. **Figure 21** illustrates the decision criteria used in the selection of project type for a corridor. Following the corridor coordination process, corridors are grouped together, when possible, with the goal of achieving efficiencies in economies of scale.

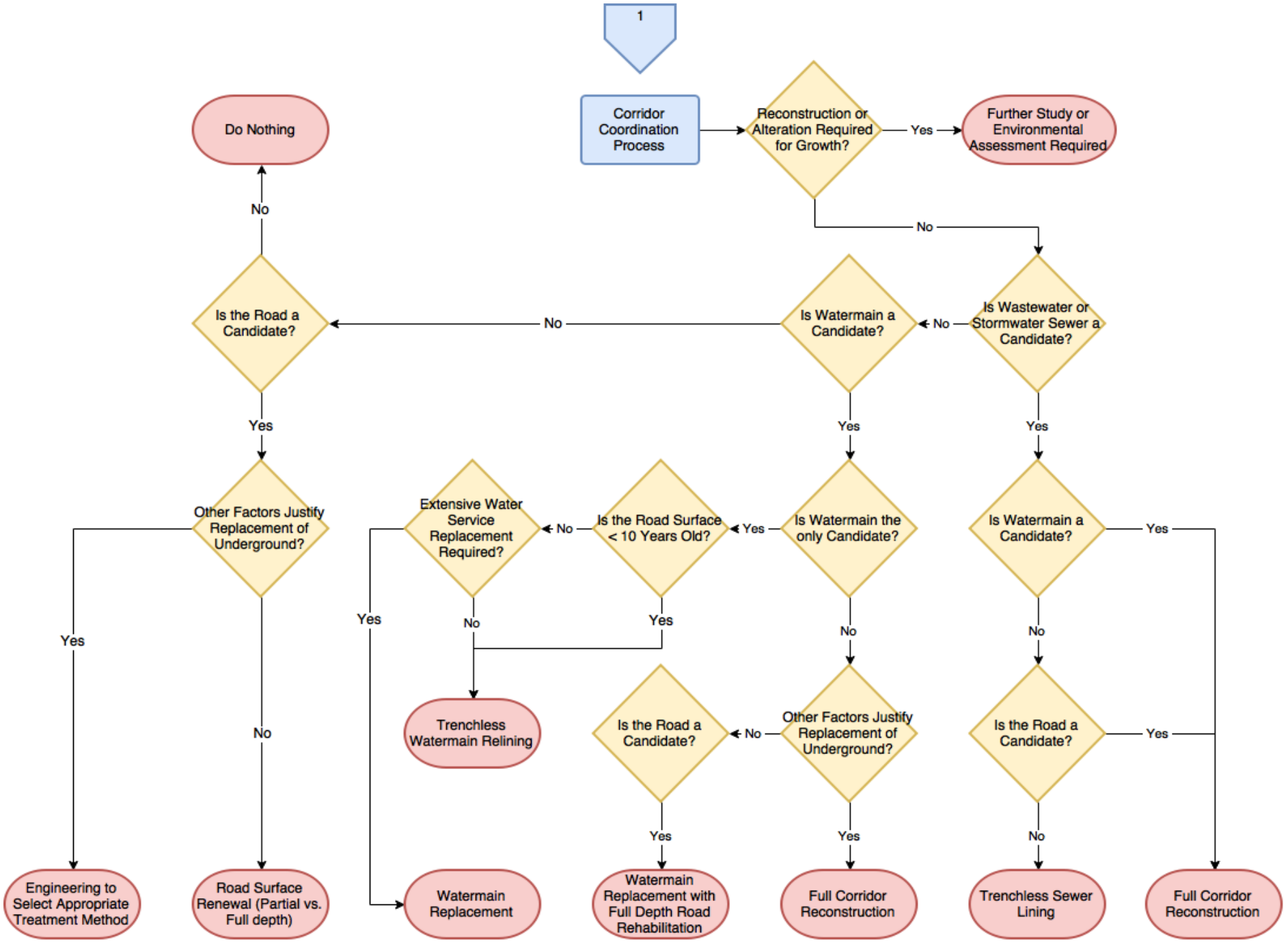


Figure 21: Corridor Coordination (Project Type) Process Flow Chart

5.4.2 Mobile Assets

In order to ensure that the appropriate vehicle or piece of equipment is identified for replacement during the period of time when the total cost of ownership is lowest a quantitative condition scoring system has been established based on industry standards and fleet management best practices. The quantitative condition scoring system provides additional information of fleet assets and is based on the average of four different factors including mileage (or hours), lifecycle operating and maintenance costs, reliability, and the mechanical/body assessment. A description of each factor and the associated scoring matrix used to estimate the %RSL for each individual fleet asset is provided below:

Mileage/Hours (5 pts)
The odometer or hour meter reading for the respective vehicle or piece of equipment is compared to the standard vehicle and equipment guidelines (**Table 16**) and assigned a score based on the extent of use as outlined in **Table 20**.

Table 20: Mileage/Hour Scoring Matrix

Km / Hours	Score
Km/Hrs are less than 20% of vehicle & equipment guideline	1
Km/Hrs are 21-40% of vehicle & equipment guideline	2
Km/Hrs are 41-60% of vehicle & equipment guideline	3
Km/Hrs are 61-80% of vehicle & equipment guideline	4
Km/Hrs are greater than 81% of vehicle & equipment guideline	5

Lifecycle Operation and Maintenance Cost (5 pts)
The total lifecycle maintenance and repair costs (not including repair from accident damage, lube, oil changes, filters, tire rotations, annual inspections etc.) is expressed as a percentage of the original purchase price for the respective vehicle or piece of equipment. This data is extracted for each vehicle or piece of equipment from the Town's financial software system with points assigned as outlined in **Table 21**.

Table 21: Lifecycle O & M Scoring Matrix

Lifecycle Operation & Maintenance Cost	Score
Lifecycle O&M costs are less than 20% of original purchase cost	1
Lifecycle O&M costs are 21-40% of original purchase cost	2
Lifecycle O&M costs are 41-60% of original purchase cost	3
Lifecycle O&M costs are 61-80% of original purchase cost	4
Lifecycle O&M costs are greater than 81% of original purchase cost	5

Reliability (5 pts)
Points are assigned depending on the frequency that a vehicle or piece of equipment is in the shop for repair as outlined in **Table 22**. The more frequent shop visits the higher the score. This data is extracted for each vehicle or piece of equipment from the service requests generated by fleet maintenance software.

Table 22: Reliability Scoring Matrix

Reliability	Score
less than 5 Service Requests per year	1
more than 5 but less than 10 Service Requests per year	2
more than 10 but less than 15 Service Requests per year	3
more than 15 but less than 20 Service Requests per year	4
more than 20 Service Requests per year	5

Mechanical / Body Assessment (5 pts)
An annual assessment of each vehicle or piece of equipment is performed that takes into consideration body condition, rust, interior condition, accident history, steering and suspension, engine and transmission, hydraulic and electrical systems, brakes, chassis, etc. based on the applicable MTO inspection standards. The mechanical/body score is based on the outcome of the assessment evaluation as outlined in **Table 23**.

Table 23: Mechanical / Body Assessment Scoring Matrix

Mechanical / Body Assessment	Score
No visual damage or rust, good drivetrain & engine	1
Minor imperfections in body/paint, interior fair (no rips, tears, burns), good drivetrain	2
Noticeable imperfections in body/paint, minor rust, minor damage to body, worn interior (one or more rips, tears, burns), weak or noisy drivetrain or engine	3
Previous accident damage, poor paint and body condition, rust and rusted through areas, bad interior (rips, tears, cracked dash), major damage to body, drivetrain or engine worn or bad	4
Previous accident damage, poor paint and body condition, rust and rusted through areas, bad interior (rips, tears, cracked dash), major damage to body, drivetrain or engine inoperative or unsafe	5

5.5 Project Prioritization

Implementation of the rehabilitation and replacement planning process outlined in Section 5.5 revealed a much larger list of needs than available resources. Therefore project prioritization parameters must be developed to ensure that the right assets come forward in the short-term and long range business plans. An important method of project prioritization is to rank each asset on the basis of how much risk it represents to the municipality. Prioritizing critical assets over lower risk assets ensures that the municipality is protected against the most severe risks. Asset risk is defined by applying the following formula to each asset.

Asset Risk = Probability of Failure X Consequence of Failure

The objective of this prioritization strategy is to reduce risk levels that are deemed to be high, as well as to ensure assets are maintained in a way that sustains risk at acceptable levels. It is recognized that the general approach outlined below will need to be reviewed and refined over the upcoming years and requires monitoring of asset risk scores to ensure in-house knowledge and experience is captured appropriately.

5.5.1 Probability of Failure

The probability of failure relates to the current condition state of each asset, whether they are in Very Good, Good, Fair, Poor, or Very Poor condition. The %RSL score is inversely proportional to the probability of failure and serves as a good indicator regarding the future risk of failure of an asset as described in **Table 24**.

Table 24 – Probability of Failure Score

%RSL Rating Category	Probability of Failure Description	Probability of Failure Score
Very Good	Improbable	1
Good	Unlikely	2
Fair	Possible	3
Poor	Likely	4
Very Poor	Highly Probable	5

5.5.1 Consequence of Failure

Failure can be defined as the condition at which an asset no longer meets its intended objective. Typically the most critical assets are those with the highest consequence of failure, and not necessarily a high probability of failure. For example, the failure of a watermain supplying a busy commercial location may cause substantial financial loss or a failure of a watermain servicing a hospital may have serious or life threatening consequences, however, failure of a watermain in a low density residential area during work hours may cause minimal disruptions.

The consequence of failure for linear assets can be characterized by examining the weighted balance of legal and regulatory, economic, social, environmental, and service delivery impacts as summarized in **Table 25** and for mobile assets can be characterized by the type of service the vehicle or piece equipment is used for as summarized in **Table 26**. For example failure of a Fire Services vehicle could have severe consequences, such as loss of life compared to the failure of a vehicle in Building or Engineering Services.

Table 25: Linear Asset Consequence of Failure Matrix

Consequence of Failure	Legal & Regulatory	Economic	Social	Environmental	Service Delivery
Slight	Low level legal issues; technical non-compliance; legal and/or regulatory actions unlikely; limited regulatory scrutiny	Repair costs; loss of income; damage to property; third party losses or fines <$25K	No injuries or health impacts; no media coverage or loss of image	No impact or lasting damage; reversible within 1 week; located significant distance from environmental feature	No or few disruptions in non-essential services; impacts to minimized residential zone
Minor	Regulatory non-compliance; increased direct regulatory scrutiny	Repair costs; loss of income; damage to property; third party losses or fines $25K - $50K	Minor injuries or health impacts; possible local media coverage and loss of image	Minor, short-term repairable damage; reversible within 3 months; located significant distance from environmental feature	Minor (isolated) disruption in non-essential services; no or few disruptions in essential services; impacts to minimized residential zone
Moderate	Regulatory non-compliance with expected regulatory prosecution; possible fines; possible civil action by minor party	Repair costs; loss of income; damage to property; third party losses or fines $50K - $100K	Multiple minor injuries or health impacts; some local media coverage and loss of image	Moderate; medium-term repairable damage; reversible within 1 year; located in proximity to environmental feature	Major disruption in non-essential services with minor (isolated) disruption in essential services; impacts to increasing residential zone
Major	Multi-jurisdictional regulatory non-compliance with prosecution and fines; civil action by major party	Repair costs; loss of income; damage to property; third party losses or fines $100K - $200K	Serious injuries or health impacts; possible regional media coverage and significant loss of image	Long-term damage with repairable consequences; reversible within 3 years; located within regulated environmental area	Major disruption in essential services with some non-essential services unavailable; impacts to increasing residential zone or industrial zone
Severe	Multi-jurisdictional regulatory non-compliance with prosecution and significant fines; class action law suit	Repair costs; loss of income; damage to property; third party losses or fines > $200K	Loss of life, serious injuries or health impacts; extensive media coverage and loss of image	Long term damage with permanent lasting consequences; non-reversible; located within regulated environmental area within significantly	Some essential services unavailable; impacts to increasing residential zone; industrial zone or institutional zone

Table 26: Mobile Asset Consequence of Failure Matrix

Type of Service	Consequence of Failure Score	Consequence of Failure Description
Any standard car, pickup, SUV, van, or equipment	1	Slight
Any vehicle or equipment with standard duties with attachments, service vehicle or dump body, with occasional off-road use	2	Minor
Any vehicle or equipment with multiple duties, that pulls trailers, hauls heavy loads, special purpose, or continued off-road use	3	Moderate
Hydro fleet & equipment, any vehicle or equipment involved in snow removal	4	Major
Emergency fleet & equipment	5	Severe

With both the probability of failure and consequence of failure documented, the total risk of asset failure can be determined. A graphical representation of the risk scoring matrix is illustrated in **Table 27**. Total risk can be classified under the following categories:

- **Extreme Risk:** risk well beyond acceptable levels;
- **High Risk:** risk beyond acceptable levels;
- **Medium Risk:** risk at acceptable levels, monitoring required to ensure risk does not become high;
- **Low Risk:** risk at or below acceptable levels.
- **Minimal Risk:** risk sufficiently below acceptable levels

Table 27: Asset Risk Scoring Matrix

Consequence	Probability				
	Improbable	Unlikely	Possible	Likely	Highly Probable
Severe	Medium	High	Extreme	Extreme	Extreme
Major	Low	Medium	High	Extreme	Extreme
Moderate	Low	Low	Medium	High	Extreme
Minor	Minimal	Low	Low	Medium	High
Slight	Minimal	Minimal	Low	Low	Medium

The following table (**Table 28**) and associated bar graph (**Figure 22**) provides a summary of asset risk scores by replacement value and indicate that approximately 10% or **$20.9 Million** of assets have an Extreme level of risk with another 20% or **$40.3 Million** of High level risk assets.

Extreme risk assets should be addressed in the near term to reduce risk exposure to the Town and High level risk assets should be addressed in the short-term. A list of priority projects is provided in **Appendix C**. It should be noted that some assets may require early upgrading if health and safety poses an increased risk. Similarly the Town may be able to delay the replacement of other assets if a higher level of risk can be accepted.

Table 28: Asset Risk by Replacement Value

Network	Minimal	Low	Medium	High	Extreme	Replacement Value (Millions)
Road Network	$6.1	$61.8	$23.2	$19.7	$9.4	$120.3
Bridge Network	$0.0	$3.6	$12.2	$7.5	$6.3	$29.6
Stormwater Network	$4.3	$27.4	$14.9	$6.7	$4.4	$57.7
Fleet & Equipment	$0.2	$1.5	$1.4	$6.6	$0.8	$10.5
Total	**$10.6**	**$94.3**	**$51.7**	**$40.5**	**$20.9**	**$218.0**

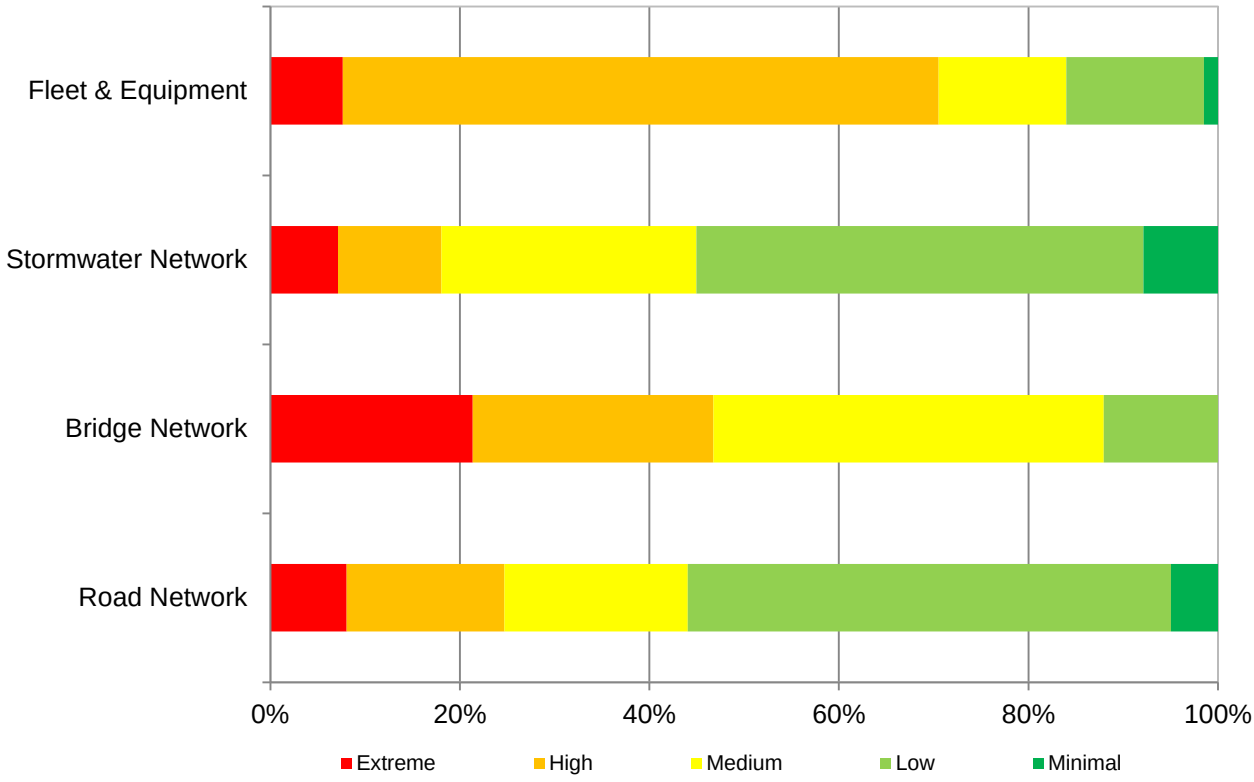


Figure 22: Asset Risk Distribution

5.6 Lifecycle Options Analysis

Asset lifecycle analysis is utilized to help develop a strategy that can be applied throughout the life of an asset to assist in the development of both short term capital plans and long range sustainability plans to ensure the best overall health and performance of the Towns infrastructure. **Figure 23** below illustrates the importance of timely investments and the effects on the overall cost of a typical asset.

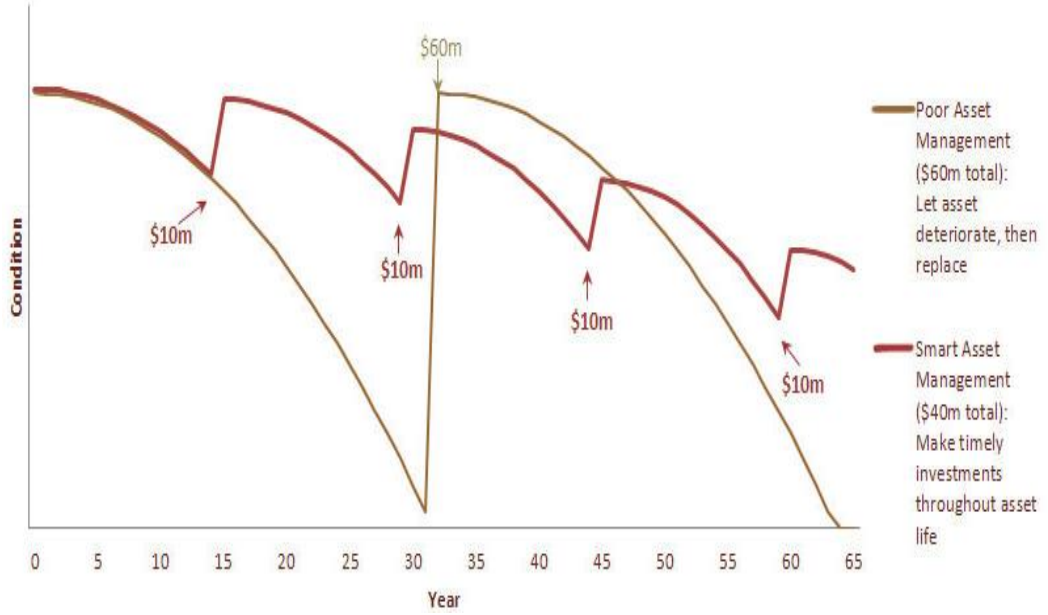


Figure 23: Timely Renewal Investments Save Money

Source: Building Together: Guide for Municipal Asset Management Plans, Ministry of Infrastructure, 2012)

5.6.1 Road Network

Pavement deterioration is non-linear such that initially in the first few years of service the rate of deterioration is slow. At mid service life the rate of deterioration increases and near the end of its service life the rate of deterioration is quite rapid. The following diagram (**Figure 24**) illustrates generalized pavement degradation profiles.

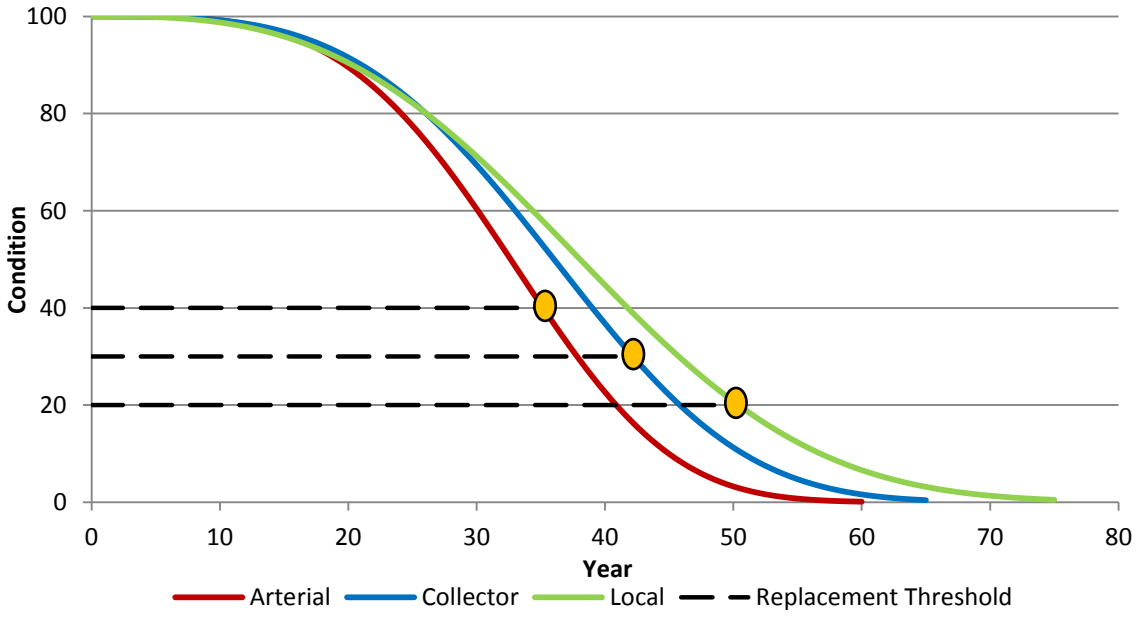


Figure 24: Pavement Degradation Profiles

During a road's lifecycle there are opportunities available for work activity to extend the life of the asset which generally coincides with the assets condition. Trigger thresholds used for identifying rehabilitation and reconstruction needs are provided in **Table 30**. Adjusting the asset condition trigger thresholds also adjusts the level of service and ultimately changes the required investment.

Table 30: Road Treatment Options

	Activity	Condition Trigger Threshold			Weighted Average Unit Price per Meter Length
		Arterial	Collector	Local	
Maintenance	1st Crack Seal	90 - 75	90 - 75	90 - 75	$4.15
	2nd Crack Seal	75 - 55	75 - 50	75 - 45	$8.65
Rehabilitation and Reconstruction Options	Partial Depth (Top Layer)	55 - 40	50 - 30	45 - 20	$182.31
	Full Depth (Top & Bottom Layers) with sport curb and gutter repairs	55 - 40	50 - 30	45 - 20	$371.81
	Reconstruction	< 40	< 30	< 20	$909.41

The maintenance options identified in **Table 30** are proposed to be performed on a regular basis moving forward. For rehabilitation and reconstruction activities, if one of the rehabilitation or reconstruction options is carried out on a road section, then the road service life will be extended corresponding to the treatment as summarized in **Table 31**. Therefore any one of the rehabilitation options may be implemented for individual road sections within the window of opportunity according to the current road condition.

Table 31: Roadway Extended Repair Life

Activity	Added Life (Years)		
	Arterial	Collector	Local
Partial Depth (Top Layer)	10	13	15
Full Depth (Top & Bottom Layers) with sport curb and gutter repairs	15	20	25
Reconstruction	35	42	50

The following strategies/scenarios for Local roadways have been developed for future rehabilitation activity based on the overall condition of the road:

I. Partial Depth resurfacing (top layer) three times.

II. Full Depth rehabilitation (top & bottom layers) with spot curb and gutter repairs two times, then Partial Depth resurfacing (top layer).

III. Partial Depth resurfacing (top layer) two times, then Full Depth rehabilitation (top & bottom layers) with spot curb and gutter repairs.

IV. Full Depth rehabilitation (top & bottom layers) with spot curb and gutter repairs once, then Partial Depth resurfacing (top layer) two times.

V. Full Depth rehabilitation (top & bottom layers) with spot curb and gutter repairs three times.

Graphical representations of each strategy illustrating the extended service life and associated cost per centerline length of roadway are provided in **Figure 25** to **Figure 29**.

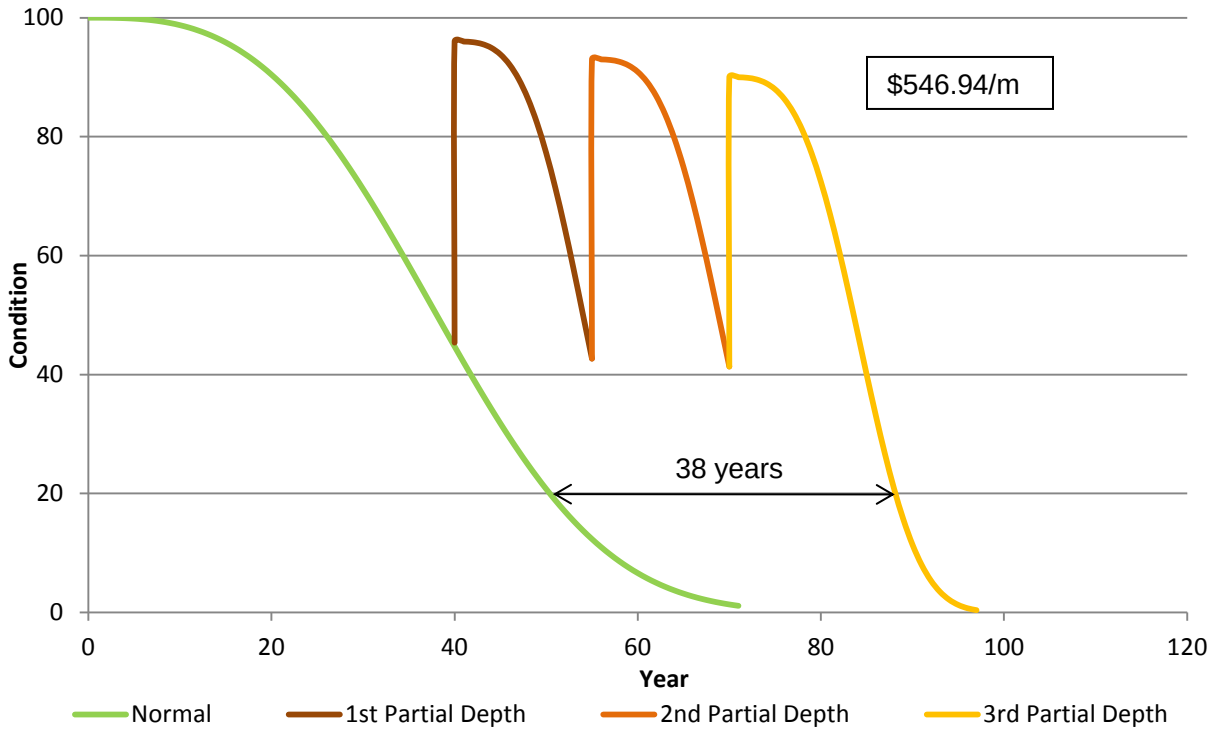


Figure 25: Road Rehabilitation Strategy I

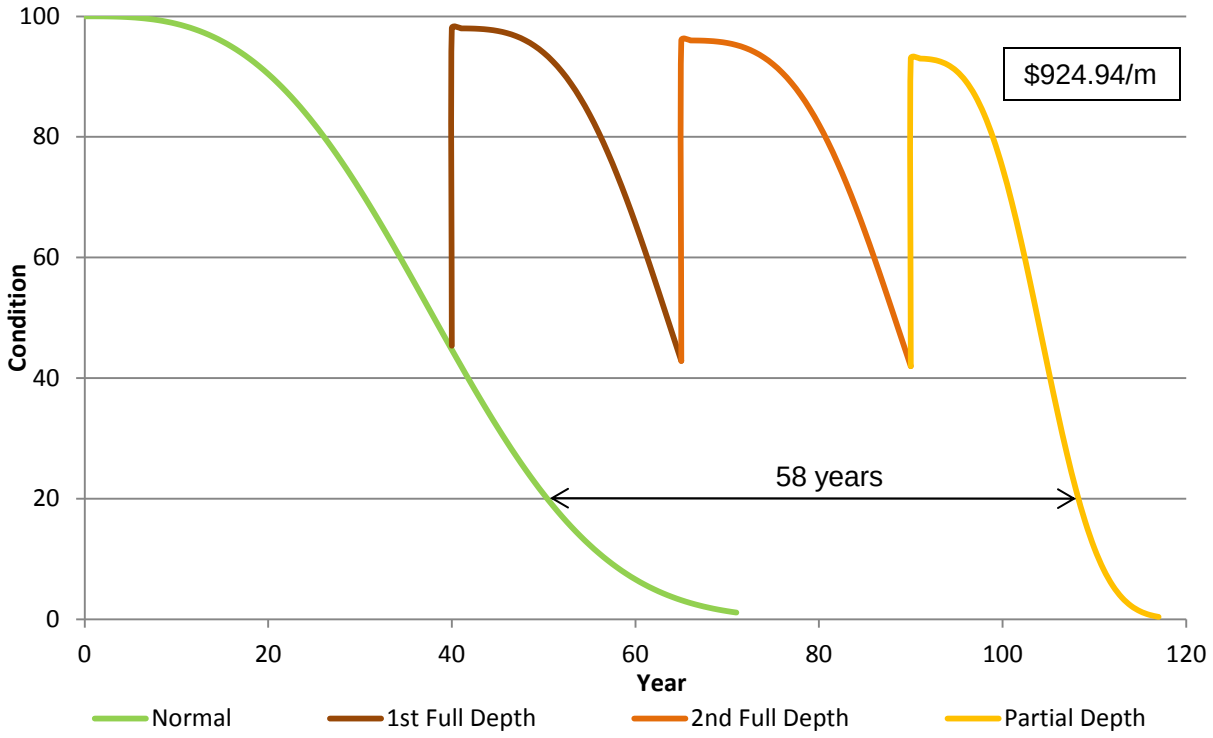


Figure 26: Road Rehabilitation Strategy II

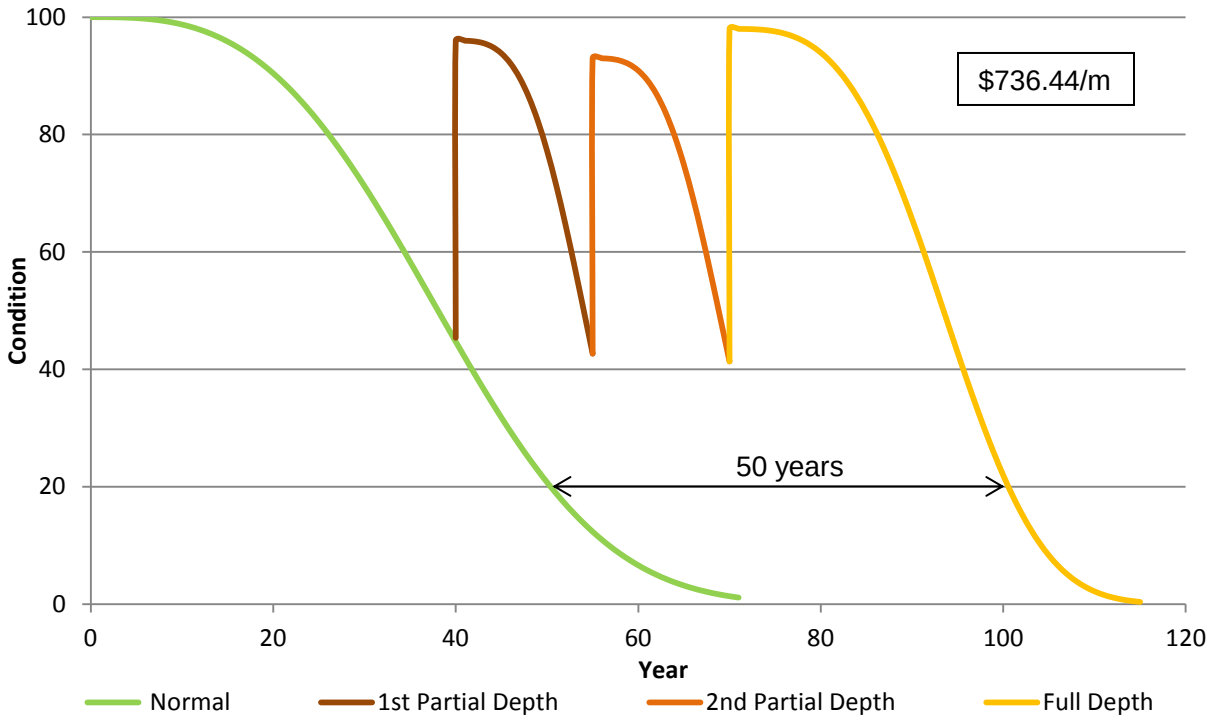


Figure 27: Road Rehabilitation Strategy III

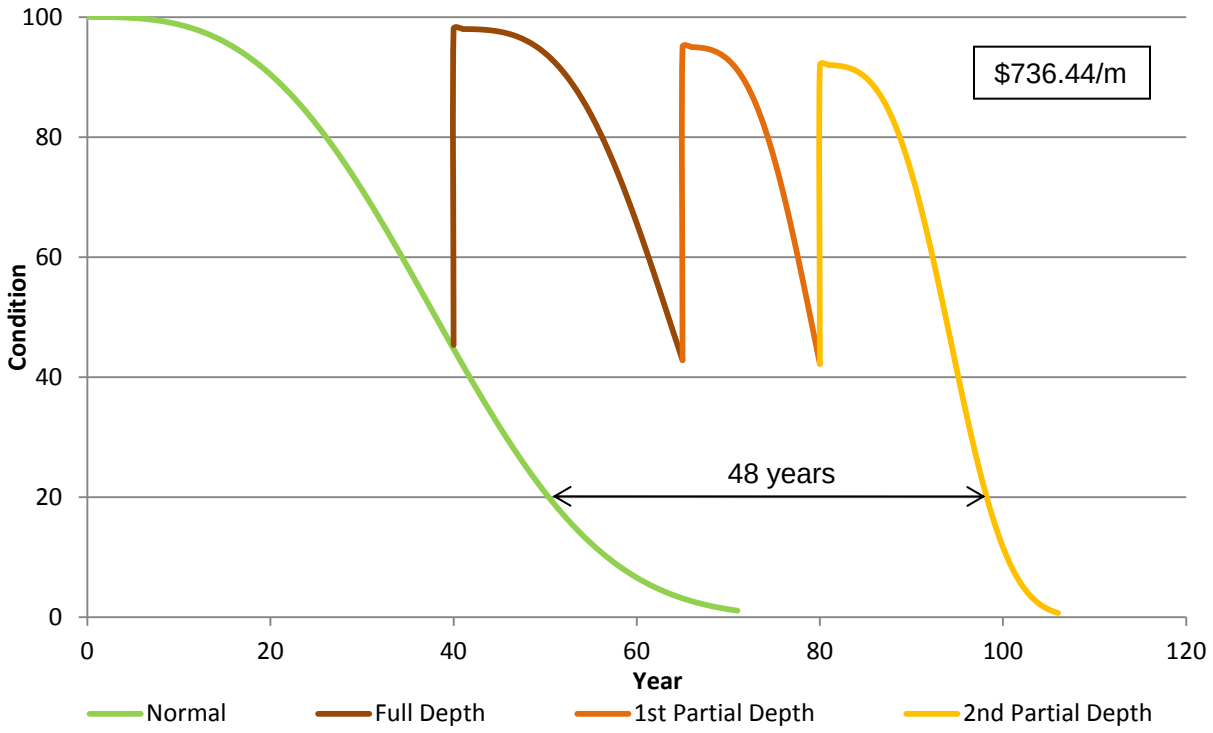


Figure 28: Road Rehabilitation Strategy IV

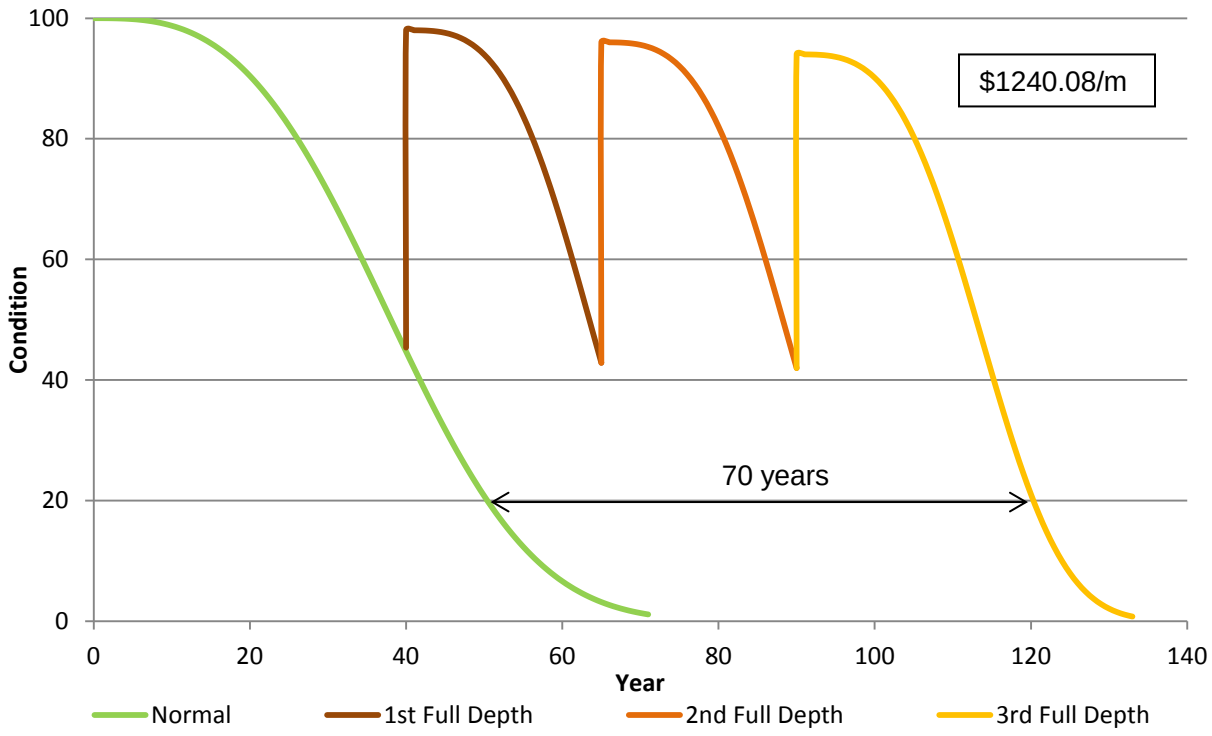


Figure 29: Road Rehabilitation Strategy V

Table 32: Road Rehabilitation Strategy Cost Summary

Strategies		Unit Cost per Meter	Extended Road Service Life (Years)	Unit Cost per Year of Added Life
I	Partial Depth resurfacing (top layer) three times	$546.94	38	$14.39
II	Full Depth rehabilitation (top & bottom layers) with spot curb and gutter repairs two times, then Partial Depth resurfacing (top layer)	$952.94	58	$15.96
III	Partial Depth resurfacing (top layer) two times, then Full Depth rehabilitation (top & bottom layers) with spot curb and gutter repairs	$736.44	50	$14.73
IV	Full Depth rehabilitation (top & bottom layers) with spot curb and gutter repairs once, then Partial Depth resurfacing (top layer) two times	$736.44	48	$15.34
V	Full Depth rehabilitation (top & bottom layers) with spot curb and gutter repairs three times	$1240.08	70	$17.72

Based on the road degradation figures and the strategy cost summary in **Table 32**, road rehabilitation strategy I appears to be the most economical alternative, however the application of rehabilitation strategy III will also be applied depending on individual road conditions.

5.6.2 Bridge Network

For some bridges in Poor condition, a small holding strategy of repairs can be done to extend the life of the bridge by 6 to 10 years. This will defer the major expense of structure replacement, while still maintaining the bridge in a serviceable condition. Some other bridges that are still in Good condition can have work done ahead of other Poor condition bridges to help preserve the bridges before they require extensive repair. The development of a bridge, culvert and retaining wall management strategy will be included in the next structural condition assessment (OSIM) inspection program scope of work.

5.6.3 Stormwater Network

The rate of deterioration of stormwater sewer collection pipes is also non-linear as shown in **Figure 30** which also illustrates the condition based rehabilitation and replacement trigger thresholds.

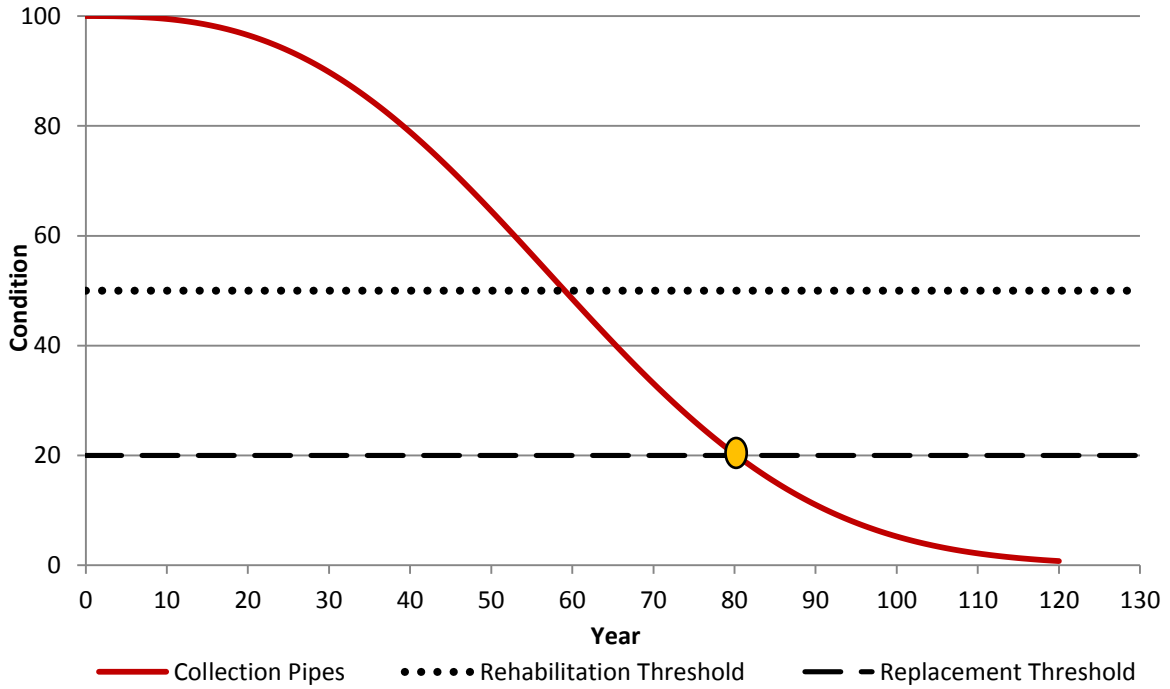


Figure 30: Stormwater Pipe Degradation Profile

There are two relining strategies the Town is currently exploring, non-structural and structural relining as an effective viable alternative solution for storm sewer rehabilitation. The following **Figure 31** to **Figure 33** compares the extended service life for non-structural and structural relining technologies with typical replacement of storm sewers.

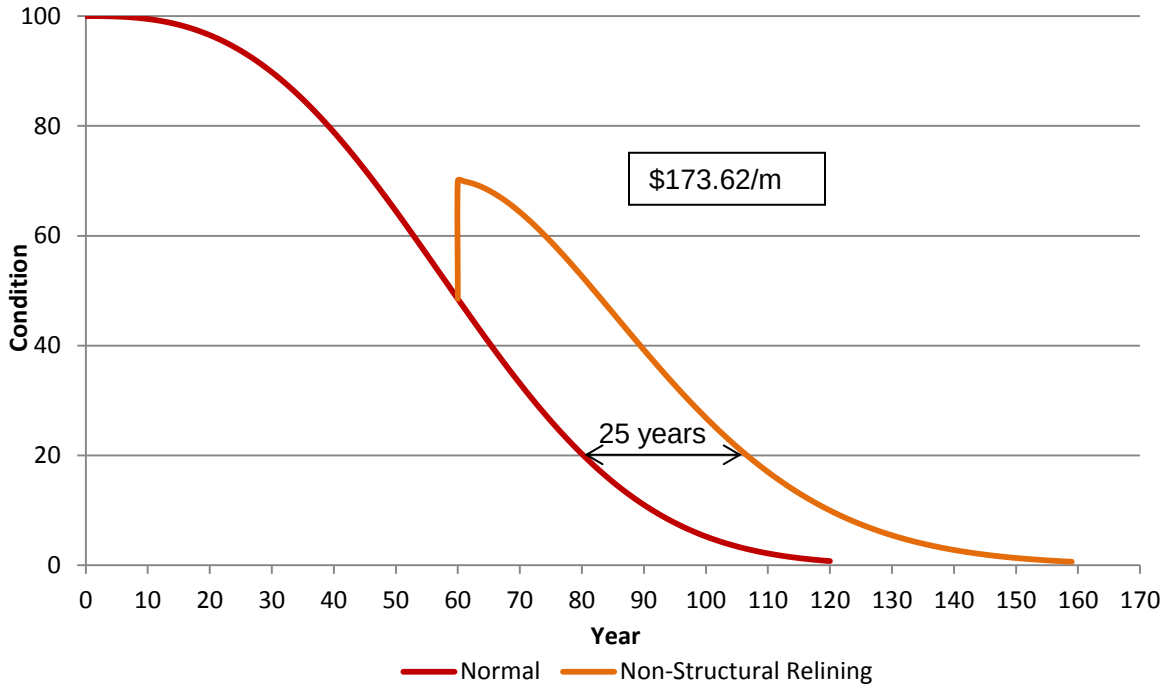


Figure 31: Normal vs. Non-Structural Relining

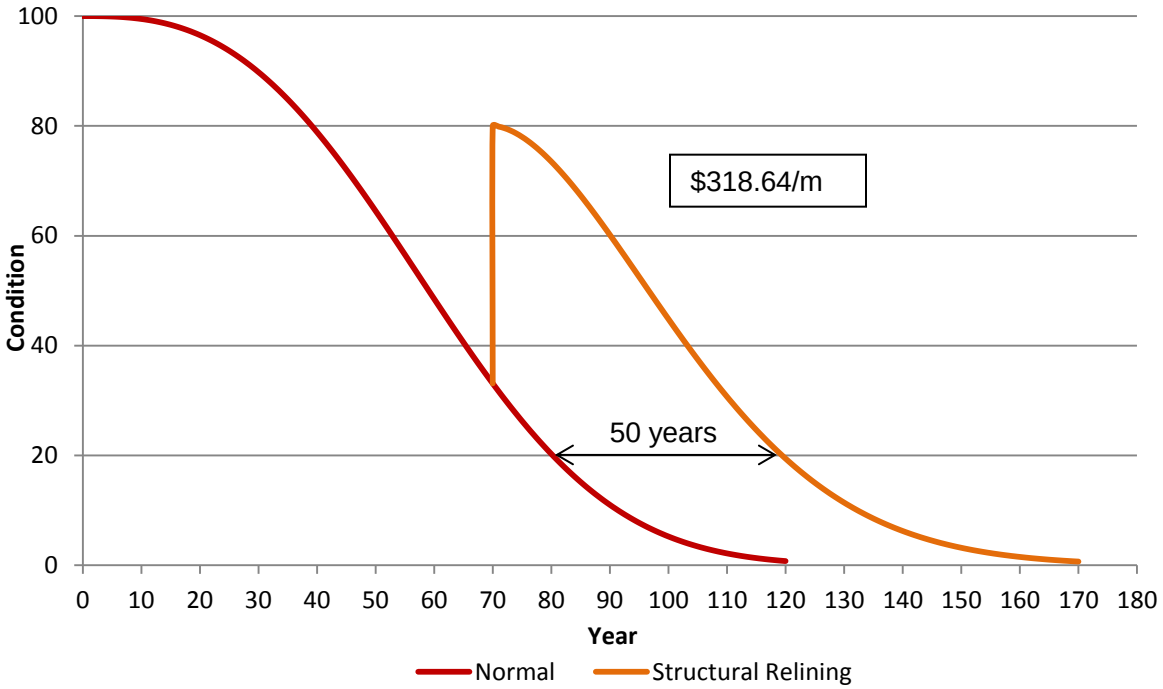


Figure 32: Normal vs. Structural Relining

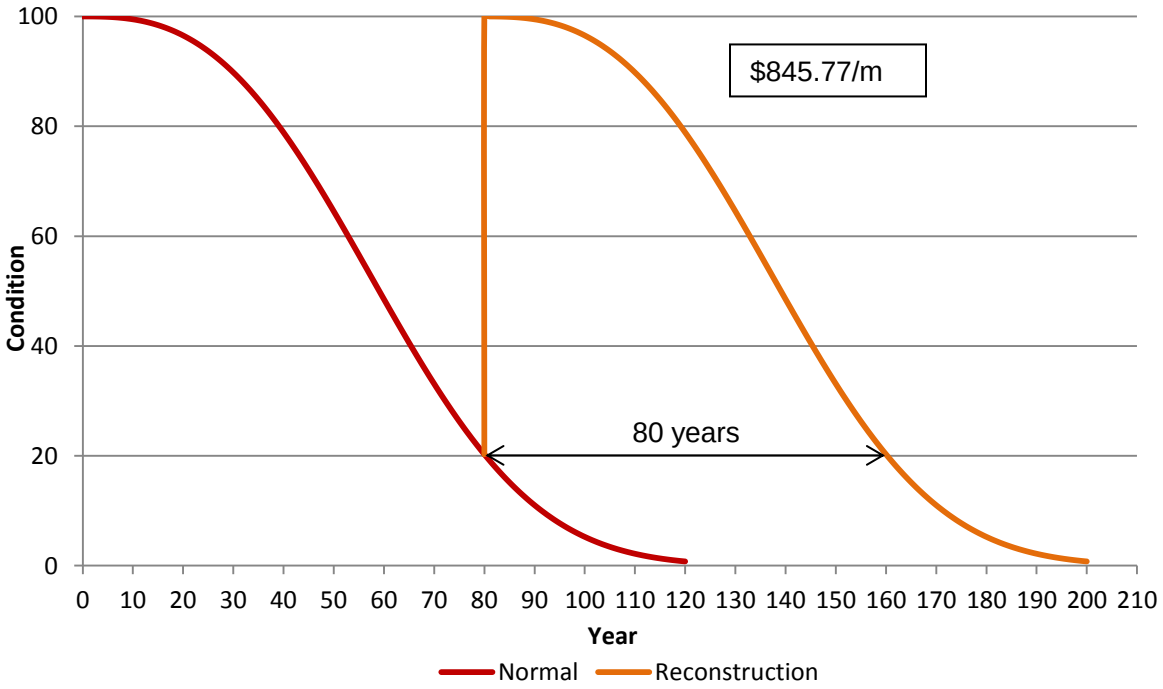


Figure 33: Normal vs. Reconstruction

Table 33: Stormwater Pipe Rehabilitation Strategy Cost Summary

Strategy	Unit Cost per Meter	Extended Service Life (Years)	Unit Cost per Year of Added Life
Non-Structural Relining	$183.62	25	$7.34
Structural Relining	$338.64	50	$6.77
Reconstruction	$845.77	80	$10.57

Based on the sewer pipe degradation figures and the strategy cost summary in **Table 33**, structural relining appears to be the most economical alternative. However the application of non-structural relining may also be applied depending on the condition of other street corridor assets in order to facilitate a coordinated full asset reconstruction of the street corridor.

5.6.4 Fleet & Equipment

The economic theory of vehicle replacement, as illustrated in **Figure 34** indicates that from an economic perspective the optimal point to replace fleet assets is when the total cost of ownership is at its lowest. As a vehicle ages, its capital cost diminishes and its operating costs increase (i.e. maintenance, repair, etc.). The combination of these two costs produces a U-shaped total cost curve that reflects the total cost of ownership. Ideally a vehicle or piece of equipment should be replaced when the capital and operating cost curves intersect and the total cost of ownership begins to increase. However, given that the bottom of the total cost curve is relatively flat suggests that there is not a single best time to replace a unit, but rather that a period of time exists for replacement as illustrated in **Figure 35**.

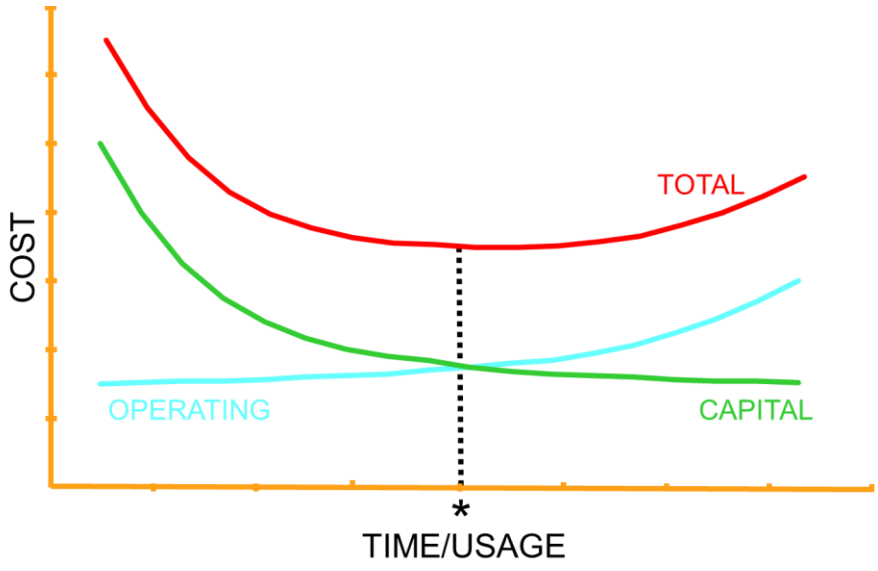


Figure 34: Economic Theory of Vehicle Replacement

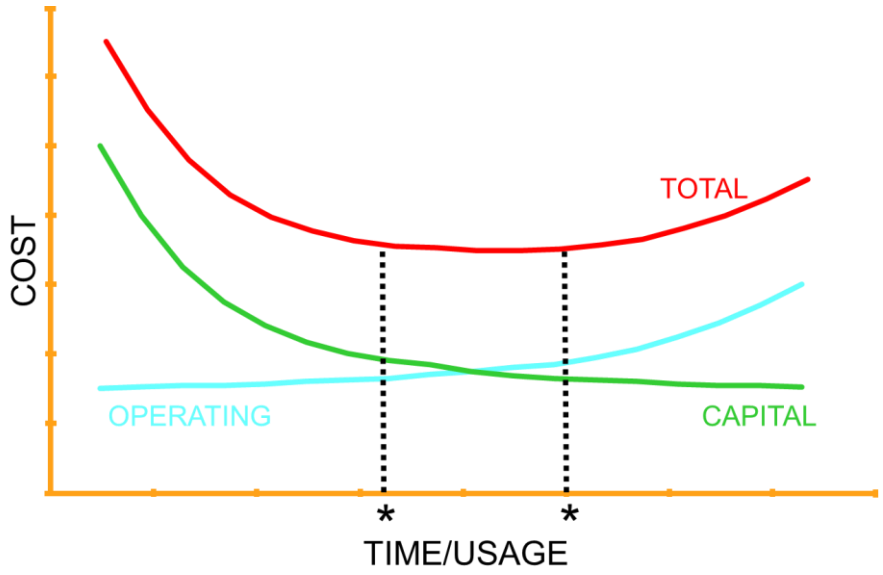


Figure 35: Economic Reality of Vehicle Replacement

Based on the economic reality of vehicle replacement timely replacement of fleet assets is important for controlling the total cost of ownership and overall fleet performance (i.e. vehicle suitability, availability, safety, reliability, and efficiency).

5.7 Disposal Activities

Disposal activities are those associated with disposing of an asset once it has reached the end of its useful life, or is otherwise no longer needed by the municipality. In most cases, once an asset has reached the end of its useful life it needs to be replaced to continue to provide service. When an asset has been identified for rehabilitation or replacement, the associated cost for proper disposal has been incorporated in the estimate (i.e. waste asphalt material in conformance with current MOECC policies)

5.8 Growth and Demand

The Town of Tillsonburg had a population of 15,301 according to the 2011 federal census. This represents a percentage increase of 3.2% from 2006 which is approximately half of the national average of 5.9%. Continuing at this rate, the forecasted population of Tillsonburg in 2031 is estimated at 17,700. This anticipated 16% population growth over the next 15 years is expected to have a significant impact on the Towns infrastructure requirements.

5.9 Risk Evaluation of Asset Management Strategy

The Town of Tillsonburg Asset Management Strategy is founded on available data, anticipated service levels, and other assumptions. Assumptions in these items introduce some unavoidable risk that the overall strategy may change over time as the Town evolves and develops more complete data and processes. Recognizing these uncertainties, Tillsonburg is developing strategies to address each source of risk so that the Asset Management Strategy can evolve over time. Risk mitigation strategies for each of the following are discussed below:

5.9.1 Data Quality

As with any date-intensive quantitative analysis, the results are only as good as the data that it is based on. The Town recognizes that there are some gaps in the datasets used for the development of the asset management plan that may impact the validity of the results.

Strategy to Address:
It is suggested that in-field data collection and assessments be completed concurrently to ensure the inventory of assets is complete along with their current physical condition. With updated information the asset management strategies should be reviewed to determine if any significant changes are required.

5.9.2 Levels of Service

The levels of service present a risk, since no previous levels of service were establish for the Town. The level of service performance indicators have never been measured before and the expectations of each level of service has not been established. Adjustment is expected in the early years of levels of service to better reflect the level of commitment from the municipality, but risk exists if a level of service is set at higher expectations than what is possible at the current levels of funding.

Strategy to Address:
It is suggested that to address this source of risk, the targets established in the first year of utilizing the Levels of Service should be reviewed along with the cost to provide the levels of service. If the cost of the level of service is too high to maintain the target should be adjusted or alternative strategies to accomplish the level of service should be investigated.

5.9.3 Lifecycle Consequences

Lifecycle consequences represent the anticipated outcomes in the event that the municipality does not undertake the recommended asset management activities during the recommended timeframes. Lifecycle consequences can included but are not limited to deterioration of the physical condition of the asset, a reduction in the outputs and service potential of the assets, increased operating costs, higher costs for subsequent asset management activities than would otherwise have been incurred had the Town undertaken the recommended asset management activities and/or a reduction in the estimated useful life of the asset.

Strategy to Address:
It is suggested that future budgets be tied directly to the asset management strategy highlighting the impact that spending decisions have on the condition, useful life, maintenance costs, and future rehabilitation funding needs as well as the potential impact to levels of service and associated degrees of risk and liability.

5.9.4 Assumptions

As with any assumption, risk exists if that assumption does not account for a large enough percentage of the assets that could potentially result in unexpected costs if not corrected (i.e. year of installation assumed, when the asset is past its expected useful life, and due to the degradation of the asset, affects surrounding assets.)

Strategy to Address:
It is suggested that through the asset inspection programs the largest assumptions be mitigated and asset management strategy revised, if required.

6 FINANCING STRATEGY

6.1 Overview

Several financing strategies are available for the funding of capital projects which are utilized on a project by project basis. The typical financing strategies include:

- *Pay as you go:* Saving all funds in advance of building or acquiring an asset. This strategy is long range in nature and sometimes requires foregoing needs in the short term until enough capital has been saved to carry out the required project.
- *Reserve Accounts:* Contributing revenues to a reserve account, and drawing funds from the account. This strategy allows a reserve 'threshold' to be set to provide a buffer for unexpected expenditures. It also allows lifecycle contributions to be made on an annual basis which can be drawn upon when needed.
- *Debenture Financing:* A loan issued to the organization for building or acquiring an asset, which involves repayment annually with interest. The Province has limits on the total amount of debt which is based on an Annual Payment Limit or 25% of the municipality's source revenue.
- *Third-Party Contributions:* Contributions from parties external to the organization. This typically comes from contributions, subsidies and recoveries from development or grants from senior levels of government. This funding strategy impacts rates (except in the case of grants and subsidies).

In reality the Town utilizes a combination of the above funding strategies depending on the specific project situation. Tillsonburg, like many other municipalities has historically seen increases in taxes at rates lower than inflation and lower than the true cost of delivering the service. Underground infrastructure, which can be fully functional for over 70 years and is often out of sight and out of mind, has historically received investments below the lifecycle requirements resulting in a steadily increasing backlog of deferred maintenance and capital expenditures.

Tillsonburg will use both short-term and long-term analyses with the goal of developing sustainable infrastructure capital plans and financing strategies. These analyses include a 100 year sustainability forecast and a 10 year capital budget plan.

6.2 100 Year Sustainable Forecasts

Long-term infrastructure investment forecasts provide insight into prospective investment requirements which may fall outside of the 10 year planning horizon typically utilized for capital budgeting processes. Large amounts of infrastructure or building construction during a short time span will require equally as heavy investment once those assets reach the end of their service lives. If those investment requirements are not addressed appropriately, levels of service could potentially decrease and operations and maintenance costs could increase. The 100-year forecast aims to cover the entire lifecycle of the assets, therefore allowing identification of such trends.

Funding and re-investment requirements were developed for each network area based on the analysis to establish an average annual capital reinvestment. The reinvestment forecast takes into consideration statistical parameters that utilize the condition, estimated service lives, replacement costs and lifecycle probability distributions to provide trends of replacement costs in any given year. The replacement trends can then be used to develop short-term and long-term replacement requirements and average annual costs.

Figure 36 depicts the average annual capital investment requirements across all asset groups covered in this analysis. The figure shows various spikes in the replacement forecasts, which is typically due to large assets with high replacement value, or groups of assets being required to be replaced in a given year. An example of this can been seen in areas of post-war growth where communities were built and developed in mass with significant investments in new infrastructure made over a relatively short time period.

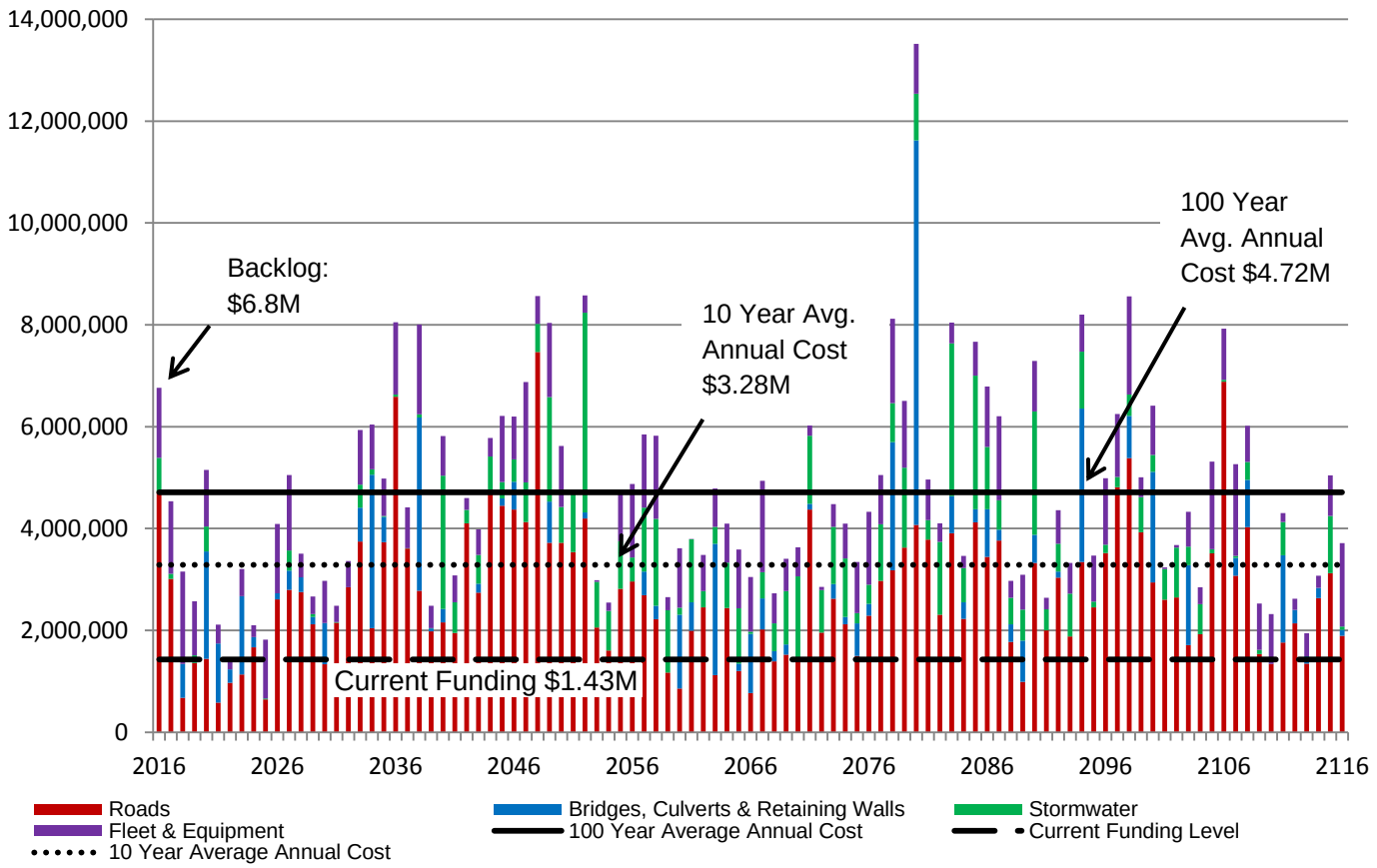


Figure 36: 100-Year Investment Requirement Forecast for all Asset Categories

6.3 10 Year Capital Budget

It is recommended that the Town pursue the implementation of a corporation-wide 10 year capital budget. Historically, the Town has compiled five (5) year capital budgets along with an unfunded list of projects which was updated by staff on an annual basis. A 10 year budget provides a broader planning horizon, which provides perspective and awareness of future projects outside of traditional short-term plans.

The asset management strategy outlined in Section 5.0 developed a list of needs in addition to providing project type coordination and a project priority ranking. The 10 year forecast is a living document that utilizes the Project Priority Listing contained in **Appendix C**, and while the first year is what is recommended for approval during the budget cycle, years 2 through 10 are forecasted and may be subject to change as new information becomes available and needs change.

The Town of Tillsonburg will need to implement a comprehensive financial plan that will allow it to fund the repair, rehabilitation and reconstruction of its asset base as it deteriorates and breaks down. It should be noted that the values outlined in this Section only relate to the existing asset base and serviced population. Future growth and expansion projects will need to be financed on their own schedule with additional sources of funding in addition to those put into place for long term replacement.

6.4 Actuals vs. Forecast Expenditures

Actual expenditures over the past five (5) years and the forecasted expenditures for the next 10 years of non-infrastructure and maintenance activities identified in section 5.2 and 5.3 as well as rehabilitation and replacement activities identified in section 5.4 are provided in **Table 34**.

Table 34: Actual vs. Forecast Expenditures

Activity	5 year Actuals Average	10 year Forecast Average
Non-Infrastructure Solutions		
• Road Studies/Assessments	15,000	19,010
• Bridge Studies/Assessments	11,800	17,050
• Stormwater Studies/Assessments	35,210	44,500
Maintenance Activities		
• Road Maintenance	260,930	290,149
• Bridge Maintenance	16,959	37,384
• Stormwater Maintenance	126,357	159,998
• Fleet Maintenance	828,200	805,763
Total	**1,232,445**	**1,293,295**
Rehabilitation & Replacement		
• Roads	680,039	1,621,530
• Bridges	-	593,071
• Stormwater	188,074	142,572
• Fleet	557,260	927,600
Total	**1,425,372**	**3,284,773**
Grand Total	**2,657,817**	**4,578,067**

6.5 Funding Sources

The key to infrastructure funding is sustainability and predictability – sustainable in that it can be reasonably expected that funding will continue into the future and predictable in that the amount can be reasonably projected. These factors are necessary for future planning and budgeting purposes. The following sub-sections provide funding source details, recent five year amounts and projected amounts.

6.5.1 Grants

The most significant grant that the Town has access to is the allocation of the Federal Gas Tax. It is significant because it is sustainable and predictable – the federal government has made a commitment to maintain these funds and has provided projections of future funding.

The Town's practice has been to apply Federal Gas Tax funding primarily to road projects. Over the years, the provincial and federal governments have provided other application based grant opportunities. These application based grant opportunities peaked a few years ago with stimulus funding and continues now with the Ontario Community Infrastructure Funding (OCIF). Most of these grant opportunities require a project specific application which is neither sustainable nor predictable. The recent introduction of the formula-based component of OCIF is an exception.

Table 35 illustrates the anticipated Grant funding levels over the next three years, and is assumed similar funding levels will continue in the future.

Table 35: Sustainable Grant Funding Levels

Source	2017	2017	2018
Gas Tax	465,000	487,000	487,000*
OCIF	100,429	142,637	222,386
Total	**565,429**	**629,637**	**709,386**

* Anticipated given that 2019 Federal Gas Tax funding levels have not been released.

6.5.2 Property Taxes and Reserve Funds

By default, any funding requirements not met by grant funding, requires the use of general revenues – property taxes. This is also known as “pay-as-you-go” financing.

The aim with this funding mechanism is to raise all funds in-year or save funds in advance (through the use of reserves) of building or acquiring an asset. This strategy is long range in nature and sometimes requires foregoing needs in the short term until enough capital has been saved to carry out the required project.

The reserves and reserve funds stabilize the Town’s funding requirements preventing spikes in rates when significant expenditures are needed for infrastructure renewal at given points in time. Reserves are also available should unanticipated emergencies arise.

Reserves are typically generated through unspent levy dollars, or implementing special tax levies for a specific purpose. The Town would draw on these funds, if needed, in conjunction with the current year’s general levy for capital projects.

Reserves and reserve funds are the lowest overall cost because the money being saved earns interest.

6.5.3 Development Charges (DC’s)

Development charges are fees collected from developers at the time a building permit is issued.

The fees help pay for the cost of infrastructure required to provide municipal services to new development, such as roads, transit, water and sewer infrastructure, community centers and fire and police facilities.

Most municipalities in Ontario use development charges to ensure that the cost of providing infrastructure to service new development is not borne by existing residents and businesses in the form of higher property taxes.

As a result, DC charges are **not** considered as a funding source for the purposes of this Asset Management Plan, since these funds are only to be used to fund **growth-related and expansion** projects of roads, bridges and culverts.

6.5.4 Debt Financing

Principle and Interest payments are required to be funded from the annual tax levy; therefore debt financing is **not** included as a sustainable funding option in this Asset Management Plan. Debt represents a build now; pay later scenario, which has the lowest impact on short-term tax rates, however has the highest overall cost and long-term impact on tax rate. The Town currently uses debt financing to fund approximately 25% of the annual capital expenditure.

It would be in the Town's best interest to move from a "build now; pay later" debt funding scenario to a "build now, pay now" taxation strategy. However, this transition will take a significant amount of time, therefore in the short term, debt can be used as a management tool to advance the list of necessary capital projects while taxation levels and reserves are built up to sustain future capital spends.

Given that a one-time taxation increase of approximately 30% to address the current funding gap of $3.29M is not feasible it is recommended that the Town continue to incur debt, at the same or higher levels as a management tool in order to facilitate projects required to be completed within the desired timeframe to maintain current levels of service.

A municipality may only issue new debentures provided that the projected financial charges related to the outstanding debt will be within the annual debt repayment limit prescribed by the Ministry of Municipal Affairs and Housing (MMAH). This limit is set at 25% of a municipality's own source revenues less debt charges and financial commitments. The Town, as of November 2016, has a debt level of 21% of the limit.

6.5.5 User Fees

User fees consist of dedicated asset charges that are utilized for the same asset capital projects. The Town currently does not collect user fees on its stormwater sewer infrastructure, however, is aware of this potential funding source and plans to investigate its feasibility in the future.

6.6 Funding Options

Each year, capital spending will vary depending on which projects are identified for rehabilitation and replacement. As outlined within this AMP, should the current funding level through taxation continue, the Town will have an annual capital funding deficit of $3.29M. As a one-time tax increase to fund this deficit is not financially feasible, a strategy that applies a gradual phase-in is generally more realistic and acceptable.

In an effort to address the deficit, many municipalities have implemented an Infrastructure levy. This special levy is to be in addition to the current level of capital spending earmarked in the budget and its purpose will be to have sufficient funds available to finance the replacement of capital assets at the end of their expected useful life.

In order to address the current funding deficit of $3.29M the implementation of an ongoing infrastructure tax levy between 1.0% and 2.0% of the overall tax levy is recommended. The impact of these scenarios is outlined below.

The scenarios were determined using the following assumptions:

- *Annual Requirement for Sustainability:*
    - Assumed to increase only by inflation, which is assumed to be 1.5%
    - Assets are maintained at the 2016 level; no growth, no service level changes

- *Annual average funding*
    - 2016 figure used is $1,010,000 representing the average of Gas Tax and Taxation contributions. Debt and Other funding sources are excluded as they are not true/guaranteed funding sources.

- Grant funding capped at $710,000 from 2019 onwards to remain conservative
- Inflation is assumed at 1.5%
- Percentage increases are based on 2016 budgeted Town levy of $13.6M – county, school board, parking and BIA portions have been excluded
  - The levy has only been increased by inflation; growth factors or changes in assessment values are not taken into consideration

- Interest earned on funds deposited into the dedicated infrastructure reserve have not been taken into consideration.

It is also important to note that the figures below contain only the Town's Road Network, Bridge Network, Storm water infrastructure and Fleet/Equipment. As other asset categories are added to this Plan, the scenarios and corresponding figures will be adjusted.

6.6.1 Current Funding Position

Current funding levels are summarized in **Table 36** and illustrated in **Figure 37** which demonstrates that the Town is currently funding Linear and mobile assets at 30.3% of the annual requirement for sustainability. This includes uses of Debenture and "Other" funds which are not guaranteed and/or sustainable. Removing these funding sources lowers the Town's annual investment to 1,010,000 or 21.3% of the annual requirement for sustainability. For the purposes of the scenarios below, this lower funding level and higher annual deficit has been used in the calculations.

Table 36: Current Funding Levels

Network	2016 Replacement Value (Millions)	Annual Requirement for Sustainability	Current Funding Levels				Annual Funding Deficit for Sustainability
			Gas Tax	Tax/ Reserves	Debt	Other	
Roads	$120.3	$2,730,000	$415,000	$170,000	$80,000	$15,000	$2,050,000
Bridges	$29.6	$520,000	-	-	-	-	$520,000
Stormwater	$57.7	$640,000	$115,000	$55,000	$20,000	-	$450,000
Fleet & Equipment	$10.4	$830,000	-	$255,000	$260,000	$45,000	$270,000
Total	**$217.9**	**$4,720,000**	**$530,000**	**$480,000**	**$360,000**	**$60,000**	**$3,290,000**
			1,430,000				

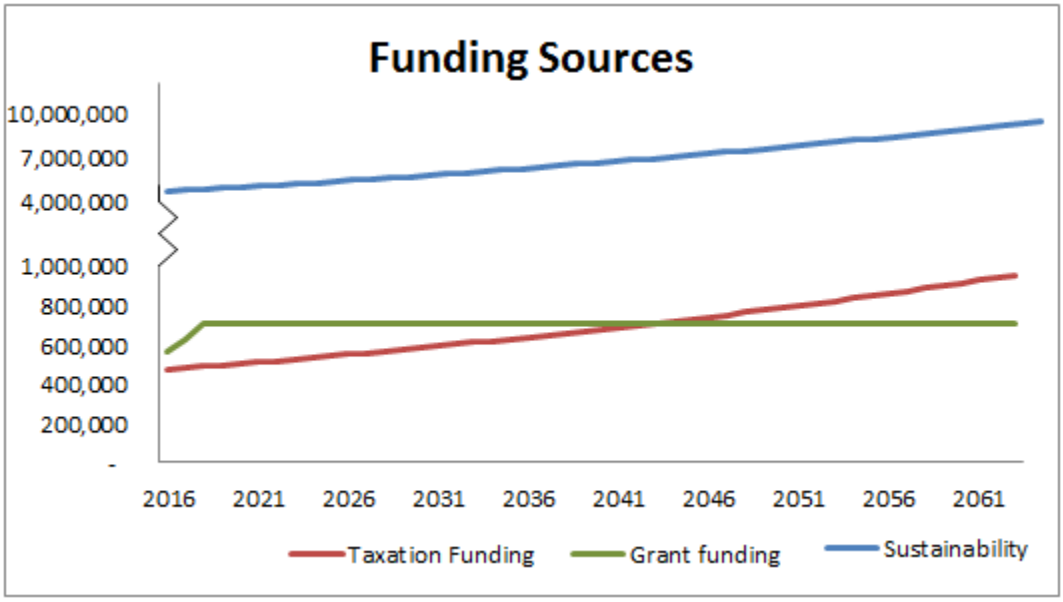


Figure 37: Current Sustainable Funding Sources vs. Sustainable Investment Level

As illustrated in the **Figure 37** sustainability will not be achieved continuing at the current funding levels. Total taxation funding and the sustainability levels will forever be increasing at the same rate of inflation.

If the Town was to fully fund the deficit in 2017, it would require a one-time 27.3% taxation increase, which for the average residential household taxpayer would be about $360 towards capital funding in 2017, equivalent to approximately $30.07 per month.

6.6.2 Scenario 1 – 1.0% Levy increase

% of overall levy	1.0%
$ increase on Levy	$135,685
Year sustainability reached	2057
2017 Annual impact on average resident's tax bill	**$13.19**

An additional 1% levy over the current funding level of $1,010,000, will result in the average household contributing a total of $59.86 in 2017. The total contribution per household over this 41 year plan is equivalent to approximately $15,000.

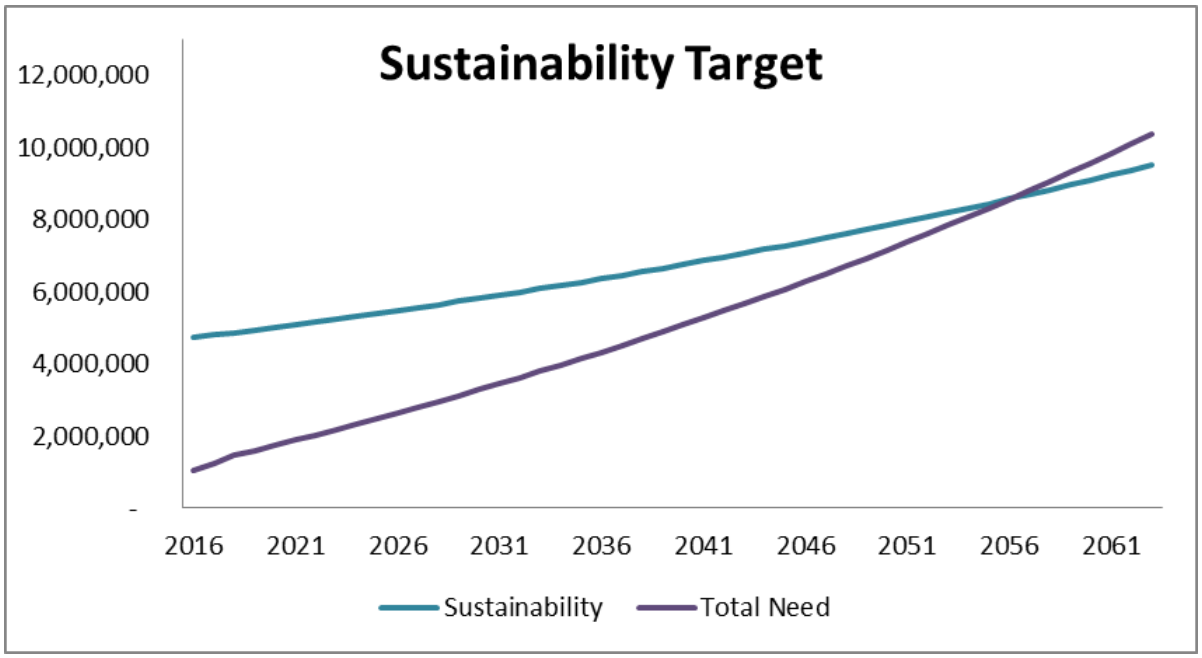


Figure 38: Projected Impact of a 1.0% Tax Levy Increase

6.6.3 Scenario 2 – 1.5% Levy increase

% of overall levy	1.5%
$ increase on Levy	$203,528
Year sustainability reached	2039
2017 Annual impact on average resident's tax bill	**$19.78**

An additional 1.5% levy over the current funding level of $1,010,000, will result in the average household contributing a total of $66.45 in 2017. The total contribution per household over this 23 year plan is approximately $8,000.

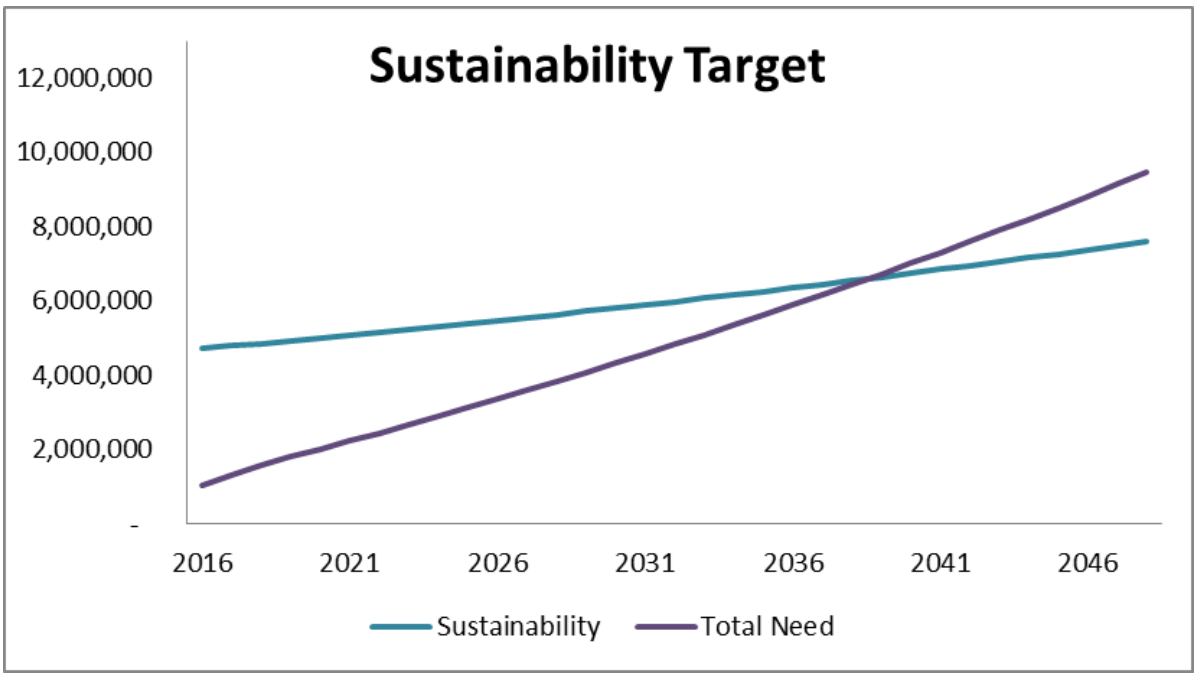


Figure 39: Projected Impact of a 1.5% Tax Levy Increase

6.6.4 Scenario 3 – 2.0% Levy increase

% of overall levy	2.0%
$ increase on Levy	$271,370
Year sustainability reached	2032
2017 Annual impact on average resident's tax bill	**$26.39**

An additional 2% levy over the current funding level of $1,010,000, will result in the average household contributing a total of $73.05 in 2017. The total contribution per household over this 16 year plan is equivalent to approximately $5,000.

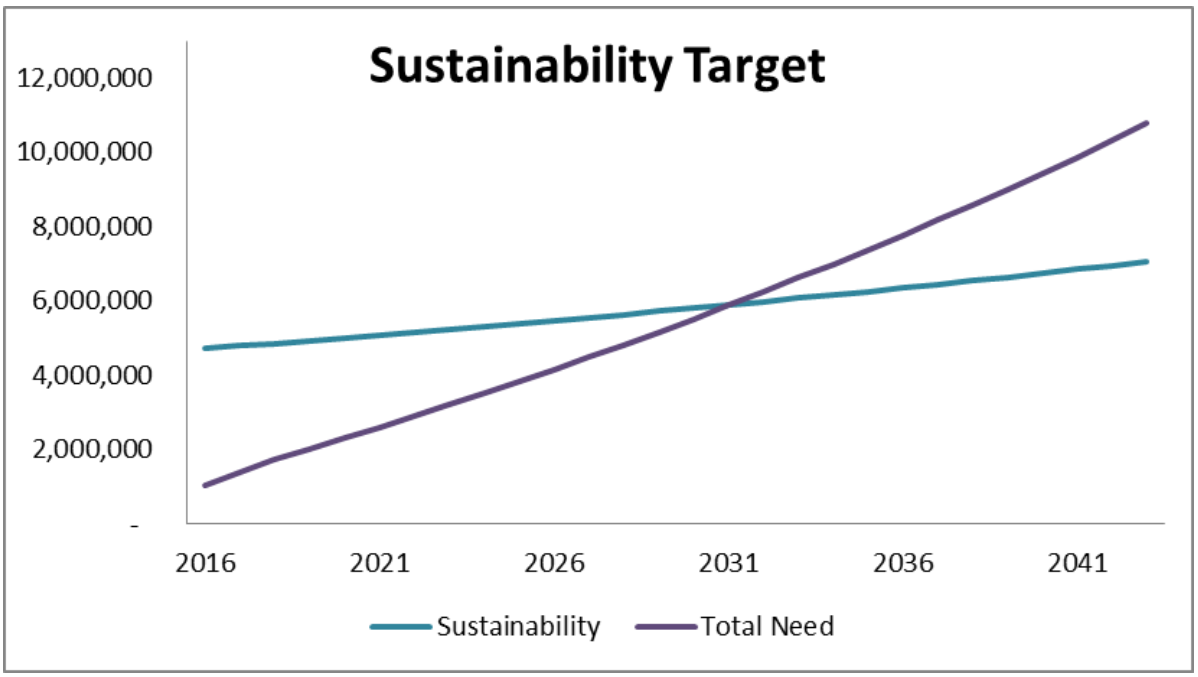


Figure 40: Projected Impact of a 2.0% Tax Levy Increase

6.7 Recommendation

To manage the funding gap it is recommended that a gradual increase be implemented to reach sustainability. This gradual increase would be funded through a dedicated infrastructure tax levy of 1.5% of the overall levy. It is also recommended that debt levels be maintained or increased up to the annual repayment limit as a way to manage cash flows and the Towns current infrastructure needs.

APPENDIX A

Asset Inventory Classification

Assets that are ultimately to be included in the Town Asset Management Plan are listed below. Assets with a priority ranking of 1, as identified in the Ministry of Infrastructure Building Together Guide for Municipal Asset Management Plans, were completed in 2013 for future funding eligibility. This update has addressed all items with a priority ranking of 2. Future updates of the Plan will include all assets with a priority ranking of 3.

Asset Inventory Classification

Asset Class	Priority Ranking (1-3)	Asset Type
Road Network	1 1 1 2 2 2	Arterial Collector Local Sidewalks Streetlights Signalized Intersections
Bridge Network	1 1 2	Bridges (Pedestrian & Vehicular) Culverts (>3m span) Retaining Walls
Stormwater Network	1 1 1 1 2 2	Collection Pipes Manholes Structure Leads Inlet Structures Stormwater Management Pods Oil Grit Interceptors (OGI)
Facilities (major levels i.e. structural, electrical, mechanical, etc.)	3 3 3 3 3 3 3 3 3 3 3 3	Airport Terminal Building Annandale House/Museum Cemetery Operations Building Community Centre Customer Service Centre Elliot Fairburn Training Facility Tillsonburg Fire Hall Gibson House Highway 3 Barn Lake Lisgar Waterpark OPP Headquarters Public Works Building Summer Place
Parks & Open Space	3 3 3 3 3	Sports Fields Parks and Playgrounds Equipment and Outdoor Furniture Outdoor Pools Cemeteries
Fleet & Equipment	2 2 2 2 2 2	Public Works Engineering, Building & By-Law Water & Wastewater Hydro Operations Parks & Facilities Fire Services
Municipal Parking Lots	3	
Information Technology	3	

APPENDIX B

Asset Management Municipal Action Plan

ASSET MANAGEMENT
MUNICIPAL ACTION PLAN

HEMSON Consulting Ltd.
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Toronto, ON, M5T 3A3

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MUNICIPAL ACTION PLAN EXECUTIVE SUMMARY

A. MFOA AMP IT UP PROGRAM: BACKGROUND

The MFOA Amp It Up program provides expert Asset Management Plan consulting services to municipalities in Ontario with populations under 20,000. To date, over 90 municipalities across Ontario have participated, with the goal of having all municipalities in the province participate in the future. This pilot project has been funded in co-operation with the Province of Ontario.

The Municipal Action Plan (MAP), provides the Town with guidance on how to update the existing asset management plan and how to move forward with asset management strategies to optimize the Town's asset management framework. The MAP is based on Hemson's analysis, consultation with Town staff and MFOA's Asset Management Self Assessment Tool.

B. KEY OBJECTIVES AND RECOMMENDATIONS

- Incorporate all assets into the corporate asset management plan. The federal gas tax requirements set out all eligible categories which must be included in a plan by December 31st, 2016. This is a "soft" deadline and the Town must show progression towards completion.

- Monitor the progress and implementation of the Asset Management Plan. Continue to use a "funding report card" for all asset categories and report funding levels for all asset categories to Council on a regular basis.

- Implement a 5-tier condition rating system and work towards documenting condition ratings based on engineering and staff inspections. The goal is to move away from condition assessments based on useful life assumptions.

- Define levels of service and define service level targets. Service level targets should be defined in consultation with staff, the public and Council. Levels of service should be documented in a level of service registry and be updated regularly.

- Take a risk based approach to asset management. Incorporate a risk matrix analysis by defining the risk of assets and the consequence of asset failure. This ensures that corporate risk is minimized.

- Ensure that the Town creates and implements a long-term financing strategy for all assets. The financing strategy should address future challenges and consider all funding options the Town has. The financing strategy should address the Town's commitment to eliminate the infrastructure deficit over the long-term.

I INTRODUCTION: ASSET MANAGEMENT POLICY & PROCEDURE

A. WHAT IS ASSET MANAGEMENT?

In its most simplistic form, Asset Management is a process of managing assets in the most cost effective way. The key objective is to maximize benefits and manage risks while providing services to the public in the most sustainable way. It is important that your plan clearly define asset management and the benefits of asset management to your organization. Some benefits of asset management:

- Informed and traceable decisions;
- Risks are managed where necessary and in advance so the Town has the opportunity to coordinate accordingly;
- Higher customer satisfaction;
- Documents funding plan and strategy to manage infrastructure; and
- Demonstrated compliance with regulation and legislation.

Action Item 1:

- *Town does a good job defining the objective and scope of the asset management plan.*
    - *Continue to refine goals and objectives of asset management planning in the Town.*

B. LINKAGE TO OTHER DOCUMENTS AND STRATEGIES

It is important to identify how this document incorporates municipal responsibility and strategies. For example: Council is committed to ensuring that infrastructure is provided in a sustainable, orderly and coordinated fashion. Some examples could include:

- Optimal use of existing infrastructure;
- An accessible, affordable and available transportation system;
- An environment in which all modes of transportation can play a balanced role;
- The provision of infrastructure in a coordinated, efficient and cost effective manner; and
- Integration of planning for infrastructure with the planning for growth.

Action Item 2:

- *Current asset management plan does a good job linking strategic priorities.*
- *Strategies/polices should be a focus – perhaps bring a report to Council which identifies the strategic use of assets and infrastructure.*

C. TIMEFRAMES FOR REVIEW AND UPDATES

The asset management plan should outline key timelines for updates and review. A snapshot table outlining when such updates and review should take place can help guide future plans.

Asset Management Framework	Timeframe
Asset Management Policy	5 Years
Asset Management Plan	5 Years
Capital Budget	Annually
Asset Register and Data	Semi-Annually or Annually
Condition Assessment Reviews and Revisions	Two times per year

Example timeline for updates and reviews.

Action Item 3:

- *Identify when you should be reviewing and updating policies and practices, this strengthens the monitoring section of the plan and will help keep you moving forward.*

D. WHAT ASSETS ARE COVERED BY THIS PLAN

Communities are able to use the Federal Gas Tax funds towards a wide range of projects that are related to: **public transit, wastewater infrastructure, drinking water, solid waste management, community energy systems, local roads and bridges, capacity building, highways, local and regional airports, short-line rail, short-sea shipping, disaster mitigation, broadband and connectivity, brownfield redevelopment, culture, tourism, sport and recreation**. A municipality needs to include all applicable assets into their asset management plan to satisfy future grant funding applications.

Action Item 4:

- *The most immediate task is to incorporate all assets into the corporate asset management plan. The federal gas tax requirements set out all eligible categories which must be included in a plan by December 31st, 2016. This is a "soft" deadline and the Town must show progression towards completion.*

E. DATA ALIGNMENT AND POLICY

Asset management is a data driven process. It is important to recognize that without reliable data on municipal assets and their associated services, management of these assets will be difficult. As part of the overall asset management strategy, there should be a complementary data management strategy.

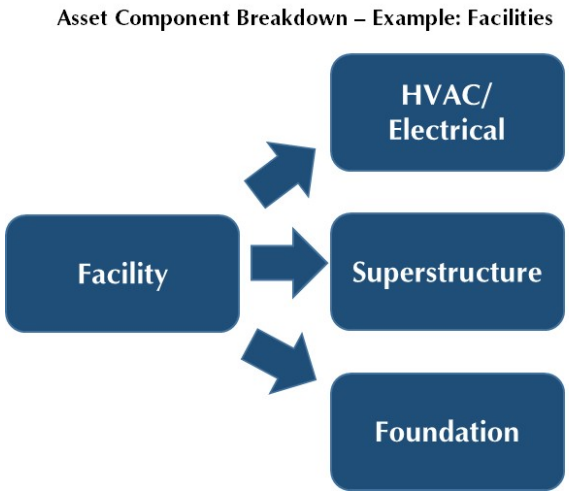
The data management strategy relates to the methods for the acquisition, storage and analysis of asset data. Knowledge and decision making on asset management is a function of the reliability of the data. The asset management strategy should include policies related to:

- Maintaining a central asset register;
- Well defined asset attributes required in the asset register;
    - Whenever a new asset is entered into the database a replacement cost, year of service and service life must be entered;
- Frequency of asset register updates;
- Who is responsible for updates and management of the data or "data champion;" and
- The roles of other departments in collecting and managing data.

It is important that a central asset register be maintained and should contain all assets the Town owns and manages. The asset register can help facilitate updating the asset management plan, working towards meeting the gas tax funding requirements and analysis of the municipal funding gap. At a minimum, an asset register should contain the following pieces of information:

- Asset unique ID;
- Name and description of asset;
- Useful life in years;
- Replacement cost of asset;
- Condition Assessment; and
- Detailed asset attributes (diameter, material type, width, make/model, etc.).

In addition to these data attributes, each asset should be broken down into smaller components wherever possible. This ensures that asset condition is tracked for components that may require more frequent repairs or replacements. For example, in the case of facilities, a building can be broken down into its superstructure, foundation, roof and other components such as HVAC and electric systems. The repair and maintenance of all these components vary widely and cost efficiencies are possible by tracking these repairs separately.



Example asset component breakdown.

The asset register is an integral part of the asset management strategy and should also play a complementary role informing other data bases the Town maintains. It is advantageous that the asset register be spatially mapped using a GIS software solution. The unique asset ID should be used to create a connection between the asset register and any spatially mapped assets for database consistency.

The frequency of updates of the asset register is extremely important. As assets age and more are added over time, the reliability of the data depends on how frequently the asset register is updated. The asset register should be updated whenever there are new asset purchases, upgrades and replacements, as well as asset condition ratings and information on useful life. These types of updates may be required several times per year, however the reliability of the data will become apparent as updates occur.

To facilitate updating the asset register, it is recommended that a data "champion" be designated. The data champion is intended to be the person who maintains and regulates the quality of the asset register. Identifying a champion may be challenging however there are some characteristics that may help in identifying one including:

- Knowledgeable about asset management and the Town's current practices;
- Well-connected within the Town;
- Interested in contributing to the process; and
- Strong communication skills.

Tips to identify a data champion include:

- First opportunity to identify a data champion may occur during initial AMP concept meetings – staff members that relate most strongly to the objectives/process may emerge at this time.

- Can also assign "leadership groups" to distribute responsibilities – staff members or small groups of staff may be assigned specific responsibilities (e.g. project management, data collection, data integrity, etc.).

A data champion does not and should not be alone in the data management process. It is important that all other departments contribute to the process to ensure that reliable data is available. For example, as new assets are acquired for recreation services, it is required that recreation staff provide the information to the data champion to update the asset register. This ensures that the register is up to date and that there is no data loss.

To ensure buy-in and co-operation from all departments, department representatives and the data champion should meet frequently to identify and address any gaps or challenges that may arise throughout the process. This creates an internal network which facilitates communication between departments. As challenges are addressed, the data register may be adapted to incorporate changes that will facilitate buy-in from all departments. Communication between municipal departments is key to the success of the data management strategy.

Action Item 5:

- *Identify data champion.*
- *Review frequency of asset register update.*
- *Incorporate all assets into asset register.*

F. DOCUMENTING KEY MAJOR ASSUMPTIONS AND DEFINITIONS

A good plan should have major assumptions and definitions documented that are clear and transparent as to the process and use of information. It may also be good to include a section on the level of confidence or reliability of the information used to inform the

development of the plan. Some examples include:

- Include a definitions section – outline all terminology used throughout the plan.
- Condition assessments – How were they completed?
- Document key financial drivers: Inflation and Investment rates for example.
- Data reliability and confidence – this will also set the tone for future updates and items for review.

Action Item 6:

- *Expand and define key assumptions where necessary.*
- *Incorporate definitions section.*

G. PLAN MONITORING

The following indicators should be monitored to measure the effectiveness of the plan. The Town should look to review these six compliance mechanisms to ensure the plan is being utilized to the full extent.

1. Compliance with legislative requirements – Are we meeting all legislated mandates?

2. Services Delivery –100% compliance with service targets or targets exceeded.

3. Capital project delivery outputs delivered to schedule (or better) and on budget (or better).

4. Operational and maintenance budgets met (or better).

5. Risk Management—No events occurring outside the risk profile. How have projects with high risk been handled?

6. Benchmarking with comparable jurisdiction — Maintain performance.

Action Item 7:

- *Monitoring the results is the only way your plan's success can be rated and should be reported on an annual basis at minimum.*
- *Even if you are not able to accurately account for all six measurements – start with what you can report on immediately.*
- *Continue to provide a "funding report card" to Council based on funding levels for each asset category and provide funding level reports to Council on a regular basis.*

II STATE OF LOCAL INFRASTRUCTURE

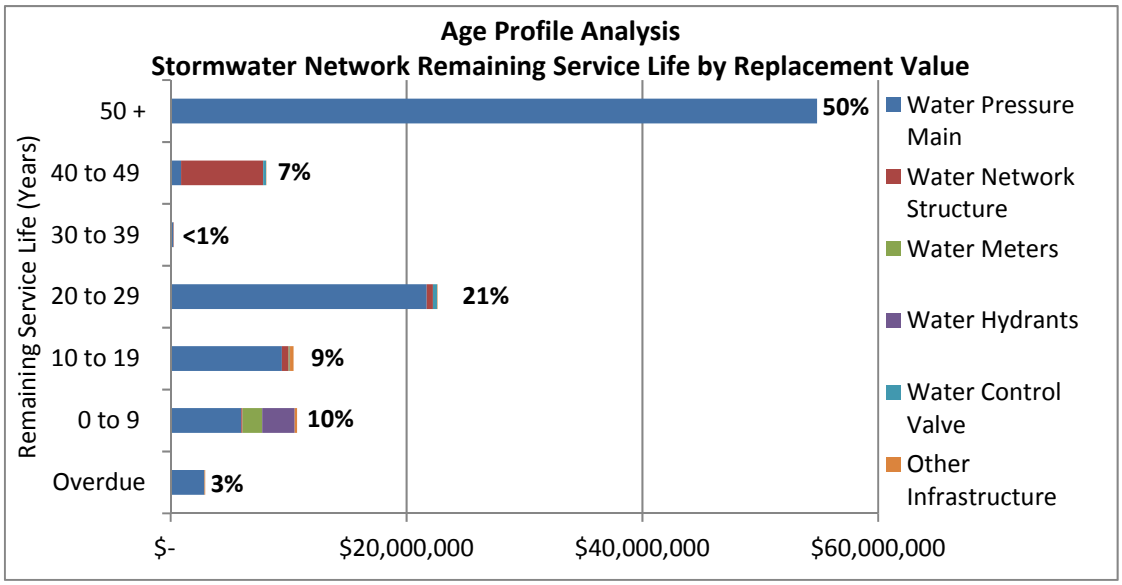
A. ASSET DESCRIPTIONS: WHAT INFORMATION SHOULD BE INCLUDED

The State of the Local Infrastructure section of the plan is about documenting what the Town owns; both in a quantitative and qualitative aspect. Below is a snapshot of how to illustrate the inventory of your assets in an easy to read format. A municipality should be striving to ensure each asset is valued and accounted for separately and by asset component for building and structures as this will improve the accuracy of your plan.

Asset Type	Asset	Inventory	Unit	Total Replacement Value ($000)
Fleet	Light Duty Trucks	16	Each	$ 527
	Medium Duty Trucks	11	Each	$ 814
	Heavy Duty Trucks	14	Each	$ 5,592
	Off Road Equipment	20	Each	$ 2,085
	Attachments	41	Each	$ 742
	Trailers	8	Each	$ 155
	Generators	13	Each	$ 319
	Small Equipment	63	Each	$ 129
	Total	**186**		**$ 10,363**

Example illustration of asset inventory.

An age profile analysis which details asset age to useful life across all different asset classes is a helpful way to illustrate the remaining useful life of your assets by category or holistically. The graph on the following page provides an example of an age profile analysis which can be included as part of the plan or communicated to Council.



Example of an age profile analysis by remaining useful life.

Action Item 8:

- *Document inventory of all assets – by asset type and by component where applicable.*
- *Include age profile analysis for all assets. See example above.*

B. REPLACEMENT COSTS

A comprehensive asset management plan's key outputs and capital replacement requirements can only be as good as the inputs into the plan. In order for a municipality to properly plan for future capital requirements, having reliable replacement costs identified is a key to success. There can be several methodologies to calculate the replacement cost of infrastructure assets, they include:

- Recent tenders in the Town and surrounding areas – Cost to construct certain buildings, the acquisition cost of a new fire truck, vehicle or heavy equipment, cost to rehabilitate/replace roads and bridges.

- If applicable, your Development Charges Background Study contains information related to the estimated replacement value of all DC eligible assets.

- Insurance values, although often low, is a good benchmark or reasonability test.

- Historical cost inflated to current dollars. This approach is best used for assets recently acquired or for low value assets which represent a small share of the Town's total replacement value. The Town should look to move away from

this approach and generate replacement cost based on the other three more credible methodologies.

The Town should develop and implement a policy to update and refine costs. The policy should address the following:

- When a municipality issues a new tender for the construction and/or acquisition of an asset – important time to look at revising costs.
- Close contact with surrounding municipalities on upcoming work – policy to interact every six months.

Action Item 9:

- *Continue to review existing replacement cost methodology and update costs as required with new information as it becomes available.*
- *Implement a policy to continually update replacement costs on a regular basis. Policy should be documented in Asset Management Plan so it is endorsed by Council with report.*

C. CONDITION ASSESSMENTS

To ensure repeatable and consistent approach of condition ratings, a general 5-tier condition rating system which is backed by other major organizations and associations should be used. The *Building Together Guide* specifies assets to be conditioned, at minimum, as "Good", "Fair" or "Poor". The 5-Tier rating approach noted above adds additional details to these categories. The ideal method to identify asset conditions:

1) Condition rating systems based on engineered metrics and standards: Pavement Quality Index, Facility Condition Index, Bridge Condition Index, Ride Comfort Rating and CCTV inspections, etc. These metrics can then be translated into a 5 tier rating system.
2) Estimate based on age and the remaining useful life of the asset.
3) Estimate based on expert staff opinion. This approach is important where there is low confidence that age and useful life properly represents a particular asset.

The table below provides some general parameters using the 5-tier rating system, although it should be noted that the parameters of what constitutes asset condition may change from place to place. It is important to note that your existing plan already

includes condition ratings on a 5-tier rating system.

Rating	Condition	Definition	Parameter	Probability of Failure
1	Very Good	Well maintained, good condition, new or recently rehabilitated.	Greater than 80% of Asset Useful life remaining	Improbable
2	Good	Good condition, few elements exhibit existing deficiencies.	60% - 79.9% of Asset Useful life remaining	Not likely
3	Fair	Some elements exhibit significant deficiencies. Asset requires attention.	40% - 59.9% of Asset Useful life remaining	Possible
4	Poor	A large portion of the system exhibits significant deficiencies. Asset mostly below standard and approaching end of service life.	20% - 39.9% of Asset Useful life remaining	Likely
5	Very Poor	Widespread signs of deterioration, some assets may be unusable. Service is affected.	Less than 20% of Asset Useful life remaining	Very Probable

Action Item 10:

- *Town to verify existing asset conditions regularly – use actual engineered or staff expertise vs. mathematical remaining useful life approach.*
- *Integrate condition assessment into maintenance activities and future capital budget exercises.*
- *Map out all "Very Poor" to "Poor" assets. Assets also identified in "Fair" condition are extremely important to recognize as this category of assets will continue to deteriorate and transition into the "Poor" category in the near term. These assets are likely to pose the greatest risk to the organization.*
- *Document all major assumptions associated with carrying out the condition assessments – staff visual inspection level. This will ensure the process in place is repeatable and consistent.*
    - *What did they look for?*
    - *Key items which characterized condition..*

III LEVELS OF SERVICE

A. IDENTIFYING CORPORATE GOALS

A municipality should start by identifying corporate goals for each asset category. Corporate goals are general and provide a high level expectation as to what should be achieved by the service. For example, corporate service goals may focus on safety, reliability and accessibility. Some corporate goals may be directly defined by legislation, such as goals for local water services, which are governed by strict safety and reliability regulations. Other corporate goals may be less restricted such as those for recreation which depend on the types of recreation programs offered and demand for those programs. It is important that corporate goals for each service category are well defined, easy to understand and realistic. The table in the following section provides some examples of services and their associated corporate service goals.

B. IDENTIFYING CUSTOMER LEVELS OF SERVICES AND HOW THEY CAN BE MEASURED

For each corporate goal, there should also be key customer level of service descriptions which define what the municipal service performance will be measured on and be specific to the type of service. For example, road related corporate goals may be measured on safety while fire related corporate goals may focus on quick response times to emergencies.

To measure the performance of each service category and whether the associated corporate goals are being met, we must establish performance indicators or level of service measures. Level of service measures vary widely across services and municipalities. Where information to establish level of service measures is available for one service, it may be difficult to obtain for another. However, there are many sources of information that are readily available and these are discussed in the following section. The following table shows examples of corporate levels of service and their associated level of service measures.

Example Levels of Service and Associated Level of Service Performance Indicator			
Service Area	**Corporate Goal**	**Level of Service**	**Level of Service Performance Indicator**
Roads	To maintain safe roadways and roadsides enabling safe and efficient travel in a cost effective way.	Maintain road infrastructure in state of good repair.	Number of paved land kilometres where the condition is rated as good to very good.
Fire	Protect municipal health and safety efforts through fire preventions and protection services.	Fire services that meet fire master plan priorities.	Number of locations that do not meet fire master plan strategic priorities.
Outdoor Recreation	Provide safe, clean parks and open space systems through proactive property management in a cost effective way.	Provide sufficient park, trails and open spaces for residents.	Square metres of outdoor recreation facility space per 1,000 persons (municipally owned).
Indoor Recreation	Provide accessible and enjoyable indoor community space to all residents.	Infrastructure should comply with the *Accessibility for Ontarians with Disabilities Act.*	Number of facilities in the Town that do not comply with the Act.

Action Item 11:

- *Town has done a good job identifying level of service performance indicators. Town should define levels of service to be able to associate corporate goals to each performance indicator.*

C. DATA ACCESSIBILITY

Most municipalities track levels of service and the performance of assets, but there is often a disconnect in documenting progress over time for many reasons. Data limitations, data understanding and limited resources are common challenges faced by municipalities in documenting their levels of service. Fortunately, there is a wealth of resources that can be used to obtain level of service data and track it over time. Municipalities can look to some of the following sources to get input:

- Municipal FIR statements;
- Engineering documents and master plans; and
- Industry standards, common practices, regulatory requirements and your staff.

Appendix A identifies a range of level of service metrics which can be gathered from municipal staff and budgets.

D. TARGET LEVELS OF SERVICE

Target levels of service are the main benchmark to measure whether a municipality has met a particular corporate goal. Target levels of service are mainly a function of the demand for services from the public.

Public perception and opinion can be established in several ways including through common municipal practices such as:

- Local public surveys;
- Local committees and stakeholder consultation; and
- Council meetings.

Local perception of current services and actual public demand for services are complementary to Council engagement. It is important that Council understands what realistic and reasonable targets are for local services. Establishment of any service level target should be done through consultation with Council.

Finally, level of service targets should be well defined and realistic. Some level of service targets will be mandated through legislation such as those for drinking water services. Targets for engineering services such as roads for example, can be defined by using industry standards and municipal benchmarks (such as those provided in the FIR). Target levels of service may not be achievable immediately and it is advantageous for short and long term goals to be distinguished.

Action Item 12:

- *Define target levels of service in consultation with public and Council.*

E. TRACKING OVER SEVERAL YEARS VS. TARGET

Levels of service should be tracked over time. Level of service performance measures should be tracked and illustrated over a 5-year time frame. This will help illustrate if the necessary progressions have been made and helps gauge whether corporate goals have been met. For example, if there has been a corporate decision to increase funding for road repairs and rehabilitation, the % of roads in good condition should be shown

to increase from year-to-year.

To complement the data management process, a level of service registry should be established. This registry should include historical levels of service for all services the Town provides for at least a 5-year time frame. The registry can be used to complement asset management discussions and budget deliberations with Council and the public. It also has the advantage of being a central database that staff can reference when needed.

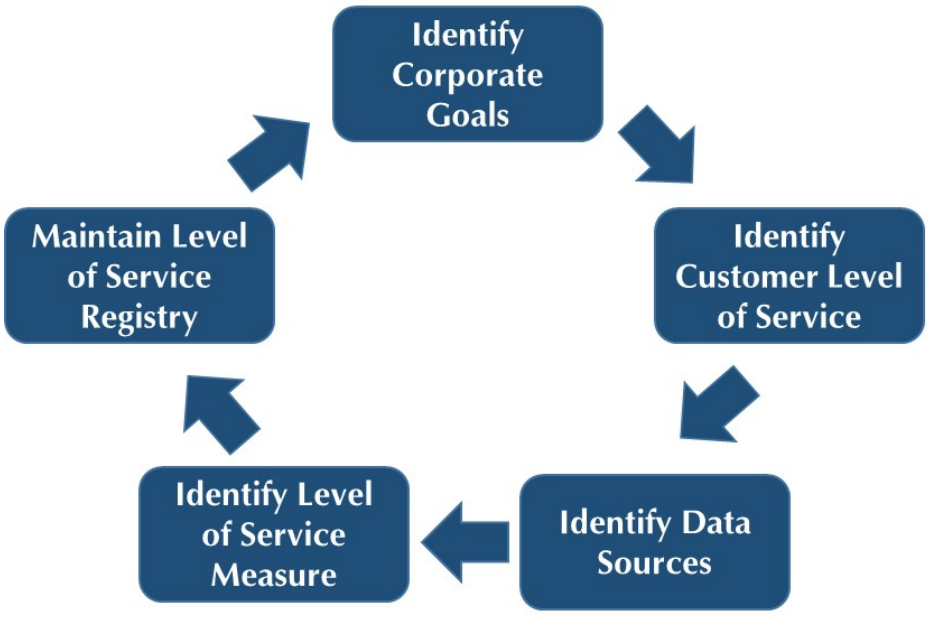
A sample template that can be used to track level of service measures over time is provided in the table below.

Key Indicators	2009	2010	2011	2012	2013	5 Year Average	Qualitative Measure	Regulated LOS	Target LOS
Number of paved lane kilometres where the condition is rated good to very good.	42.0%	43.0%	43.3%	43.7%	56.7%	46%	→	xx	xx
Number of watermain breaks per 100km of water distribution/transmission pipe in a year.	2.0	2.5	2.5	1.7	5.0	2.7	→	xx	xx
Unaccounted for water (water loss after distribution).	31.0%	29.1%	29.9%	30.3%	31.4%	30.3%	–	xx	xx
Percentage of wastewater estimated to have by-passed treatment.	0.005%	0.006%	0.007%	0.007%	0.008%	0.007%	↓	xx	xx

Example of an asset register.

Tracking the performance of corporate goals over time is a cycle. The previous sections provided an overview of the process which can be summarized in the figure below. It is important to recognize that level of service tracking and management is a fluid process and should be refined over time as lessons are learned and the Town changes.

Identifying and Measuring Performance of Corporate Goals



Defining and measuring performance of corporate goals is an ongoing process.

Action Item 13:

- *Start tracking your service levels over a number of years (minimum 5-years).*
- *Establish a level of service centralized registry that includes all current services.*

F. SERVICE CAPACITY

Well-documented set of service levels are used to drive asset management activities as they relate to the capacity of infrastructure. One of the most common initiatives is to encourage growth and development in already built-up areas as a means of utilizing existing capacity within infrastructure as opposed to creating additional capacity in various neighbourhoods.

- The Town should promote intensification and infill where sufficient capacity is available or can be made available, to support the resulting growth.

- The Town should identify specific levels of service for collector drainage areas serving properties within the Town.

Action Item 14:

- Update your plan to include policies surrounding service capacity.

IV ASSET MANAGEMENT STRATEGY

A. SET OF PLANNED ACTIONS TO PROVIDE DESIRED LEVEL OF SERVICE

The Town's existing plan already identifies several examples of asset management strategies, specifically related to roads, which will help the Town deliver the services in a sustainable way. The following tables provide some further examples of the planned actions which should be documented for core services as well as for other municipal services such as parks, buildings, etc.

Areas	Planned Actions Example:
Non-Infrastructure Solutions	• Work is not carried out on roads which are planned to have either sewer work in the next 5 years or are part of a larger project in the 5-year Capital Program. • Public consultation and communication to conserve water. • Service level adjustments.
Maintenance Activities	• Bridge washing program. • Perform regular bridge inspections as mandated by the province. • Maintenance activity/programs spearheaded by public through general use/observation. • Street sweeping occurs in spring after the snow melts.
Renewal/ rehabilitation	• Sidewalk spot repair program. • Catch basin inspection and repair annually. • Gravel road resurfacing to have 100 + mm of new gravel applied on an as needed basis.
Replacement	• Asset replacement is common for heavily deteriorated linear infrastructure. • Facilities components are replaced based on inspection reports.
Disposal	• Asset disposal is carried out to avoid cost recovery. • Land is reused or sold.
Expansion	• Identify needs through traffic counts and environmental assessment reports. • Assumption of capital assets through development agreements. • Service improvements made where possible (traffic calming equipment, etc.).
Building and Facilities	• Buildings and Facilities are inspected monthly. • HVAC and heating system are inspected annually. • Fire extinguishers, emergency exits and lights inspected monthly. • Constructing a new facility or major rehabilitation usually involves a complete business plan and involvement of key staff, council and sometimes stakeholders.

Areas	Planned Actions Example:
Parks	• Playground equipment is inspected monthly. • Dragging of the baseball diamonds is completed three times per week. • Land improvement equipment (soccer nets, courts, etc.) are inspected once/twice per season. • Splash pads are visually inspected monthly – thorough inspection twice a season. • Trails are walked and audited regularly for hazards.
Fire Services	• Vehicle log books outlining defects and repair and maintenance is undertaken. • Immediate service needs are addressed by outside contractors. • Follow preventative maintenance program – 5,000 km for all non MTO certification vehicles.
Public works Fleet	• Performs annual MTO inspections on all applicable equipment. • Servicing undertaken in accordance with frequency of use and manufacturers recommendations.
Corporate IT	• Computers managed on a lifecycle basis and disposed of at the end of term.

Action Item 15:

- *Build on existing asset management strategies for all services by the required categories.*
- *Incorporate non-core infrastructure strategies into plan.*
- *Identify planned or targeted strategies to be initiated into regular practices in the short-to-medium term.*

B. RISK ASSESSMENTS ASSOCIATED WITH PLAN AND STRATEGY

A good asset management plan should recognize the risk associated with a municipality's ability to deliver the plan. It should recognize that any deviation may affect the overall ability to deliver service. An Asset Management Plan should look to identify possible risks and the mitigating actions.

Identified Risk	Potential Impact	Mitigating Action
Failed Infrastructure	• Delivery of service • Asset and equipment damage	• Repair and rehabilitate as necessary • Increase investment • Non-infrastructure solutions.

Identified Risk	Potential Impact	Mitigating Action
Inadequate funding	• Delivery of service • Increased risk of failure • Shorten asset life • Defer funding to future generations	• Reductions of service • Find additional revenue sources
Regulatory requirements	• Non-compliance • Mandatory investments • Increased costs	• Find additional revenue sources • Lobby actions
Plan is not followed	• Shorten asset life • Inefficient investments • Prioritization process failure • Failure to deliver service	• Monitor and review • Create asset management network • Implement processes

Action Item 16:

- *Incorporate a risk assessment table associated with the strategy which outlines any actions that will be taken in response to the potential impacts.*

C. RISK MATRIX – ASSESSED BY ASSET

It is important to try and assess the risk associated with each asset and the likelihood of failure. Certain assets have a greater consequence of failure than others. Asset failure can occur as the asset reaches its limits and can jeopardize public/environmental safety. The risk matrix can help you prioritize which assets should be repaired/replaced, even those which the Town has already identified to be in "Very Poor" or "Poor" condition. The evaluation rating is then linked to the condition assessment parameter discussed in the previous sections.

Consequence	Probability				
	Improbable	Unlikely	Possible	Likely	Highly Probable
Severe	Medium	High	Extreme	Extreme	Extreme
Major	Low	Medium	High	Extreme	Extreme
Moderate	Low	Low	Medium	High	Extreme
Minor	Minimal	Low	Low	Medium	High
Slight	Minimal	Minimal	Low	Low	Medium

Example of a risk matrix.

Example: Probability of Failure: Highly Probable (Very Poor Asset) and Consequence of Failure: Severe = Extreme Risk Category. This would illustrate that the particular

asset assessed should be prioritized for replacement immediately as it would have the highest risk.

Contingency Plan to Reduce Consequence of Failure: A more advanced model would consider redundancy factors which essentially reduces the consequence of failure and overall asset risk if the Town has a plan in place to manage asset failure. This would result in a reduced consequence of failure as the widespread impact would be minimal if the Town can react quickly and efficiently.

Action Item 17:

- *Town should try and apply the risk matrix approach to remaining non-core assets. The probability of failure and associated consequence should be applied to each asset and asset component.*
- *Consider the use of redundancy factors to reduce the consequence of failure – explore back-up alternatives.*

D. FUTURE DEMAND

This component of the plan analyzes how future demand can impact the delivery of services in the community.

This component assesses the type of growth which is anticipated in the community. Even if growth is limited this does not directly translate into a reduction or sustained capital investment. The Town has to be responsive to new capital investments and operating and maintenance required to address changing demographics and demands. The assets requiring attention to service demands will be different based on how the change takes places (existing area vs. greenfield areas).

Action Item 18:

- *Create a population and household growth graph to illustrate what the future looks like in Tillsonburg.*

E. COST REDUCTION STRATEGIES

The *Guide for Municipal Asset Management Plans (Guide)* states that 'to ensure the most efficient allocation of resources, best practice is for a number of delivery

mechanisms to be considered — such as working with other municipalities to pool projects and resources, or considering an AFP model.' The design-build-finance-maintain AFP (Alternate Financing and Procurement) model takes a lifecycle perspective and builds effective asset management directly into the contract. The *Guide* also states that municipalities should have procurement by-laws in place to serve as the basis for considering various delivery mechanisms.

Procurement – a procurement policy that addresses the acquisition of an asset in great detail including consideration of socioeconomic factors and health and safety.

Alternative Service Delivery (Shared Services) – A municipality's ability to explore the shared services concept to deliver services.

Action Item 19:

- *Include procurement policy in the Asset Management Plan.*
- *Explore opportunity to utilize alternative service delivery options.*

V FINANCING STRATEGY

A. IDENTIFY AVAILABLE FUNDING TOOLS

A broad range of funding tools are available to a municipality in order to fund infrastructure repair and replacement activities, although, recognizing that property taxes and utility rates are the most common own source revenues. As part of the Asset Management Plan, the Town should look to list each funding tool and discuss to what extent each funding tool is used. This will demonstrate that the Town is exercising all available funding options.

Funding Tools Available	
• Grants – Federal and Provincial	• Public Private partnerships
• Development Charges	• Local Improvement Charges
• Utility Rates	• Developer Contributions
• Property Taxes	• Debt (as a financing tool)
• User Fees	• Reserve and Reserve Funds

Action Item 20:

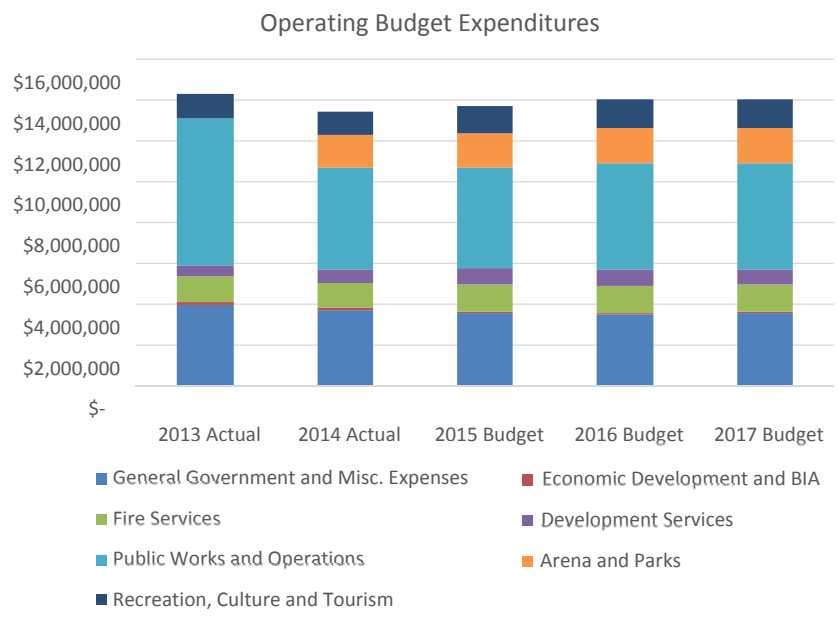
- *Identify funding tools and applicability in the Town. Also good to provide financial information in each description. Answer questions like: How much revenue was generated from the funding source in the latest year? What % of total revenues did that represent? What is the current % of the annual repayment limit?*

B. LONG-TERM OUTLOOK

The Town's long term budgetary outlook should be observed from two perspectives:

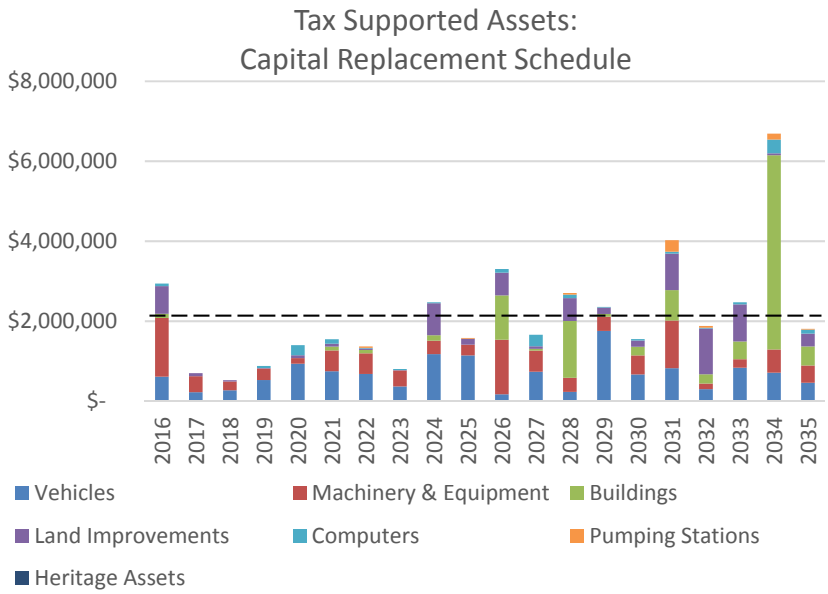
a) Operating Costs – A municipality should look at operating costs holistically, a significant component of costs is related to maintaining infrastructure in a state of good repair. This is also true as often times the general maintenance and repair costs are undertaken by municipal staff, or contracted services, which is all captured in the operating budget. These maintenance expenses ensure that the assets deliver services at existing levels.

b) Capital Requirements – Future capital requirements should be calculated to reflect in-year requirements and the replacement of assets outside of the AMP planning period. It is important to show the capital requirements delineated by maintenance, growth and non-infrastructure.



- How are operating and maintenance costs going to change in the next few years?
- Are there increased costs associated with enhanced repair programs?
- Future operating needs to be considered within the AMP.

Example historical operating budget expenditures graph.



- This simply looks at capital replacement (maintenance of existing system).
- Identify annual in-year capital requirements by department.
- Replacement schedule should be based on condition assessment and risk matrix.

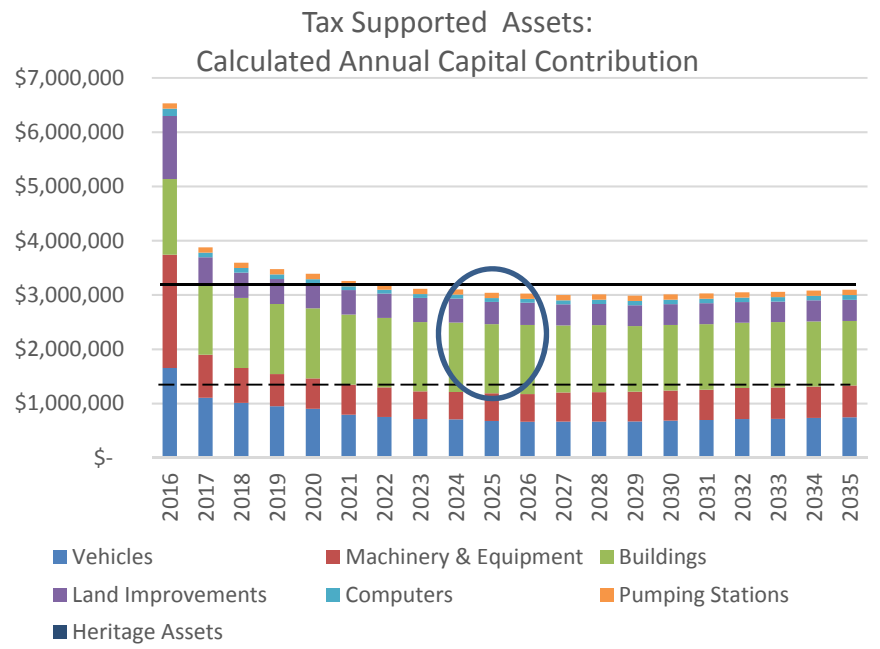
Example capital replacement schedule graph.

Action Item 21:

- *Incorporate future operating budget implications into your asset management plan.*
- *Look to break-down capital costs by non-infrastructure, maintenance and growth expenditures.*
- *Replacement schedule should reflect prioritized asset list (based on condition and risk).*

C. IDENTIFY INFRASTRUCTURE GAP

It is important to recognize what current capital expenditures are versus calculated requirements. The difference between the two is considered to be the funding shortfall (i.e. infrastructure gap/deficit).



- The difference between current expenditures and required capital contributions is the funding shortfall.
- Analysis takes into account how much is required to fund in-year capital requirements *plus* savings for long-term replacements.

Example calculated annual capital contribution graph.

Action Item 22:

- *Identify infrastructure funding shortfall to consider all tax supported assets vs. utility rate supported assets.*
- *Annual capital contributions need to consider asset replacement over the long-term (outside of the planning period).*

D. IMPLEMENTING A STRATEGY TO TACKLE THE FUNDING SHORTFALL

In order for an asset management plan to be effective a municipality must identify how to manage the funding shortfall. One of the most important questions the financing strategy means to address is how much does your capital spending need to increase to close the infrastructure gap. It is important to recognize that once the in-year gap is closed, the cumulative infrastructure deficit will need to be addressed. The Town has to recognize the relationship between the increased capital contribution requirements and the impact on the tax levy. Therefore, a good plan will likely have to take a long-term perspective and outline the key revenue sources which will be used to sustain infrastructure investments.

The table below provides an example of how to look at achieving financial sustainability over the long-term.

Legend	A	B	C	D	E	F	G
	Projected Annual Capital Provision [1]	Annual Capital Contributions (Tax Supported)	% Annual Increase in Capital Contributions	Other Sources of Funding (Gas Tax)	Total Capital Funding = (B+D)	Annual Funding Gap = (A-E)	Cumulative Infrastructure Deficit = (sum of F)
2013	-	$ 1,250,000		$ 350,000	$ 1,600,000		
2014	-	$ 1,270,000		$ 350,000	$ 1,620,000		
2015	-	$ 1,310,000		$ 350,000	$ 1,660,000		
2016	$ 6,500,000	$ 1,366,903	4.3%	$ 357,000	$ 1,723,903	$ 4,776,097	$ 4,776,097
2017	$ 3,800,000	$ 1,426,278	4.3%	$ 364,140	$ 1,790,418	$ 2,009,582	$ 6,785,679
2018	$ 3,200,000	$ 1,488,231	4.3%	$ 371,423	$ 1,859,654	$ 1,340,346	$ 8,126,025
2019	$ 3,100,000	$ 1,552,876	4.3%	$ 378,851	$ 1,931,727	$ 1,168,273	$ 9,294,298
2020	$ 3,100,000	$ 1,620,329	4.3%	$ 386,428	$ 2,006,757	$ 1,093,243	$ 10,387,540
2021	$ 3,000,000	$ 1,690,712	4.3%	$ 394,157	$ 2,084,869	$ 915,131	$ 11,302,672
2022	$ 3,000,000	$ 1,764,152	4.3%	$ 402,040	$ 2,166,192	$ 833,808	$ 12,136,480
2023	$ 3,000,000	$ 1,840,782	4.3%	$ 410,081	$ 2,250,863	$ 749,137	$ 12,885,617
2024	$ 2,950,000	$ 1,920,741	4.3%	$ 418,282	$ 2,339,023	$ 610,977	$ 13,496,594
2025	$ 2,950,000	$ 2,004,173	4.3%	$ 426,648	$ 2,430,821	$ 519,179	$ 14,015,773
2026	$ 2,950,000	$ 2,091,229	4.3%	$ 435,181	$ 2,526,410	$ 423,590	$ 14,439,363
2027	$ 2,950,000	$ 2,182,066	4.3%	$ 443,885	$ 2,625,951	$ 324,049	$ 14,763,412
2028	$ 2,950,000	$ 2,276,849	4.3%	$ 452,762	$ 2,729,612	$ 220,388	$ 14,983,801
2029	$ 2,950,000	$ 2,375,750	4.3%	$ 461,818	$ 2,837,567	$ 112,433	$ 15,096,233
2030	$ 2,950,000	$ 2,478,946	4.3%	$ 471,054	$ 2,950,000	$ (0)	$ 15,096,233
2031	$ 2,950,000	$ 2,586,625	4.3%	$ 480,475	$ 3,067,100	$ (117,100)	$ 14,979,133
2032	$ 2,950,000	$ 2,698,981	4.3%	$ 490,084	$ 3,189,066	$ (239,066)	$ 14,740,068
2033	$ 2,950,000	$ 2,816,218	4.3%	$ 499,886	$ 3,316,104	$ (366,104)	$ 14,373,964
2034	$ 2,950,000	$ 2,938,547	4.3%	$ 509,884	$ 3,448,431	$ (498,431)	$ 13,875,533
2035	$ 2,950,000	$ 3,066,190	4.3%	$ 520,082	$ 3,586,271	$ (636,271)	$ 13,239,262
Total Infrastructure Deficit						**$ 13,239,262**	

Example of a funding strategy and the cumulative infrastructure deficit.

Column	Explanation
A	The required in-year annual contribution for capital repair/replacement.
B	The planned tax supported annual capital contribution required to close the in year funding gap by 2030 (see column F).
C	The calculated annual contribution % increase required to close the in year funding gap by 2030. This percentage increase is used in column B.
D	Other sources of funding, such as the gas tax funding as shown in the example above.
E	Total planned capital funding to close the in year funding gap by 2030. The sum of B+D.
F	The in year funding gap. The difference between the required in year capital contribution, and the planned capital contribution. Column A-E.
G	The cumulative infrastructure deficit. Notice that we begin to fund the backlog by 2030, however the infrastructure deficit is not eliminated.

Certainly the above example looks solely at increased capital spending to close the infrastructure gap. Additional tests and variations should be explored which consider the use of debt to fund infrastructure or perhaps increased alternative revenue solutions.

A municipality also has the ability to manage the funding shortfall through the creation of additional policy:

- Review under utilized infrastructure which may not warrant repair/replacement;
- Coordinate assets into specific hubs to create operating and capital repair/maintenance efficiencies where possible. Example: Sport fields into centralized areas;
- Leverage growth related works with asset repair and replacement activities. Example: watermain upsizing in conjunction with road resurfacing projects; and
- Explore major building rehabilitation vs. complete replacement.

Action Item 23:

- *Illustrate when the infrastructure gap will be closed.*
- *Identify what the rate (tax and utility) implications would be in order to carry out the required capital contributions – test various funding options.*
- *Look to break-down capital costs by non-infrastructure, maintenance and growth expenditures.*
- *Contributed assets – identify how much (in $) is contributed each year. The Town assumes responsibility for future repair and replacement.*
- *Identify policy to manage funding shortfall.*

VI MAKING ASSET MANAGEMENT OPERATIONAL

A. CREATING ASSET MANAGEMENT INTERNAL NETWORK

In order to operationalize a plan, it really starts with involving the necessary staff in your organization. The internal network needs to be created and each member has to be informed about asset management and the effects of good practice on your organization.

B. LINKAGE TO CAPITAL

1) The Town should adopt multi-year capital budgets and forecasts for all services based on a minimum 10 year forecast horizon. The long-term capital forecast should incorporate the prioritized capital projects as a result of risk assessment and condition analysis undertaken.

2) Capital budgets and forecasts should identify and evaluate each capital project in terms of the following, including but not limited to:

   - gross and net project costs;
   - timing and phasing;
   - funding sources;
   - growth-related components;
   - potential financing and debt servicing costs;
   - long-term costs, including operations, maintenance, and asset rehabilitation costs;
   - capacity to deliver; and
   - alternative service delivery and procurement options.

3) Utilize capital prioritization matrix to assist in capital budget decision making.

C. RELATE TO PLAN

1) Endorse Financing Strategy: In order to operationalize a plan, a financing strategy needs to be adopted. The financial plan is the most critical step in putting the plan into action and ultimately the only avenue to ensure your assets continue to meet service levels.

2) Plan Monitoring – monitor progress: success and failures.

3) Keep it a living document – ongoing updates and refinements are encouraged.

APPENDIX A

LEVEL OF SERVICE PERFORMANCE INDICATORS

Suggested Service Level Descriptions and Associated Level of Service Performance Indicators
Town of Tillsonburg

Asset Category	Level of Service	Level of Service Performance Indicator
Roads	• All new roads in the municipality are paved • Concrete curb, gutter & stormwater on all urban roads • Provide maintenance in accordance with minimum regulatory requirements • Paved roads should be maintained in a state of good repair	• Number of roads that are currently unpaved that should be paved • Number of roads that do not meet curb, gutter & stormwater requirements • Number of times road maintenance is not in accordance with minimum regulatory requirements • Percentage of roads in good to very good condition
Bridges & Culverts	• All bridges should be maintained to be safe for use • All bridges should be maintained in state of good repair	• Percentage of recommended repairs completed in accordance with timing identified in the bi-annual bridge (OSIM) inspections • Percentage of bridges in good to very good condition
Stormwater	• All stormwater infrastructure assets should be maintained in state of good repair	• Percentage of stormwater infrastructure assets in good to very good condition
Solid Waste	• Provide residential solid waste services including garbage and recycling • Minimize the number of complaints from residents about the solid waste collection service • Maximize the rate of solid waste that is diverted from landfills	• Number of locations where solid waste collection services are not available • Number of complaints received • Solid waste landfill diversion rate

Suggested Service Level Descriptions and Associated Level of Service Performance Indicators
Town of Tillsonburg

Asset Category	Level of Service	Level of Service Performance Indicator
Facilities	• Facilities should comply with the Accessibility for Ontarians with Disabilities Act • All facilities should be maintained in state of good repair	• Number of facilities that do not comply with the Act • Percentage of facilities in good to very good condition • Number of outstanding repair/rehabilitation activities for all facilities.
Vehicles & Equipment	• All vehicles & equipment should be maintained in state of good repair • Maintain minimum fleet availability • Perform preventative maintenance and repairs to meet industry standards of safety and operation	• Percentage of vehicles & equipment in good to very good condition • Percentage of vehicles available for duty • Number of equipment units inspected (weekly, monthly, etc) • Percentage of preventative maintenance inspections completed per year
Improvement to Land	• All land improvements should be maintained in state of good repair	• Percentage of land improvement assets in good to very good condition
Outdoor Recreation	• Provide a variety of parks and open spaces residents • Provide sufficient parks and open spaces for residents • Provide an extensive trail network • Provide sufficient trails for residents	• Number of parks of each size/type • Square metres of park space per 1,000 persons • Total kilometres of trails. • Total kilometres of trails per 1,000 persons
Indoor Recreation	• Provide a variety of indoor recreation facility space for residents • Provide sufficient recreation facility space for residents • Facilities should comply with the Accessibility for Ontarians with Disabilities Act • All indoor recreation facilities should be maintained in state of good repair	• Square metres of indoor recreation facilities • Square metres of indoor recreation facilities per 1,000 persons • Number of facilities that do not comply with the Act • Number of days program space is closed due to mechanical issues or facility repairs

APPENDIX B

MUNICIPAL ACTION PLAN TIMELINE

Municipal Action Plan Timeline
Town of Tillsonburg

Action Items	Timeframe
Action Item 1: • *Town does a good job defining the objective and scope of the asset management plan.* o *Continue to refine goals and objectives of asset management planning in the Town.*	Short Term
Action Item 2: • *Current asset management plan does a good job linking strategic priorities.* • *Strategies/polices should be a focus – perhaps bring a report to Council which identifies the strategic use of assets and infrastructure.*	Medium Term
Action Item 3: • *Identify when you should be reviewing and updating policies and practices, this strengthens the monitoring section of the plan and will help keep you moving forward.*	Short Term

Municipal Action Plan Timeline
Town of Tillsonburg

Action Items	Timeframe
Action Item 4: • *The most immediate task is to incorporate all assets into the corporate asset management plan. The federal gas tax requirements set out all eligible categories which must be included in a plan by December 31st, 2016. This is a "soft" deadline and the Town must show progression towards completion.*	Short Term
Action Item 5: • *Identify data champion.* • *Review frequency of asset register update.* • *Incorporate all assets into asset register.*	Short Term
Action Item 6: • *Expand and define key assumptions where necessary.* • *Incorporate definitions section.*	Short Term

Municipal Action Plan Timeline
Town of Tillsonburg

Action Items	Timeframe
Action Item 7: • *Monitoring the results is the only way your plan's success can be rated and should be reported on an annual basis at minimum.* • *Even if you are not able to accurately account for all six measurements – start with what you can report on immediately.* • *Continue to provide a "funding report card" to Council based on funding levels for each asset category and provide funding level reports to Council on a regular basis.*	Medium to Long Term
Action Item 8: • *Document inventory of all assets – by asset type and by component where applicable.* • *Include age profile analysis for all assets. See example above.*	Medium Term

Municipal Action Plan Timeline
Town of Tillsonburg

Action Items	Timeframe
Action Item 9: • *Continue to review existing replacement cost methodology and update costs as required with new information as it becomes available.* • *Implement a policy to continually update replacement costs on a regular basis. Policy should be documented in Asset Management Plan so it is endorsed by Council with report.*	Long Term

Municipal Action Plan Timeline
Town of Tillsonburg

Action Items	Timeframe
Action Item 10: • *Town to verify existing asset conditions regularly – use actual engineered or staff expertise vs. mathematical remaining useful life approach.* • *Integrate condition assessment into maintenance activities and future capital budget exercises.* • *Map out all "Very Poor" to "Poor" assets. Assets also identified in "Fair" condition are extremely important to recognize as this category of assets will continue to deteriorate and transition into the "Poor" category in the near term. These assets are likely to pose the greatest risk to the organization.* • *Document all major assumptions associated with carrying out the condition assessments – staff visual inspection level. This will ensure the process in place is repeatable and consistent.* ▪ *What did they look for?* ▪ *Key items which characterized condition..*	Medium to Long Term

Municipal Action Plan Timeline
Town of Tillsonburg

Action Items	Timeframe
Action Item 11: • *Town has done a good job identifying level of service performance indicators. Town should define levels of service to be able to associate corporate goals to each performance indicator.*	Short to Medium Term
Action Item 12: • *Define target levels of service in consultation with public and Council.*	Medium to Long Term
Action Item 13: • *Start tracking your service levels over a number of years (minimum 5-years).* • *Establish a level of service centralized registry that includes all current services.*	Medium to Long Term
Action Item 14: • Update your plan to include policies surrounding service capacity.	Medium to Long Term

Municipal Action Plan Timeline
Town of Tillsonburg

Action Items	Timeframe
Action Item 15: • *Build on existing asset management strategies for all services by the required categories.* • *Incorporate non-core infrastructure strategies into plan.* • *Identify planned or targeted strategies to be initiated into regular practices in the short-to-medium term.*	Short to Medium Term
Action Item 16: • *Incorporate a risk assessment table associated with the strategy which outlines any actions that will be taken in response to the potential impacts.*	Medium to Long Term

Municipal Action Plan Timeline
Town of Tillsonburg

Action Items	Timeframe
Action Item 17: • *Town should try and apply the risk matrix approach to remaining non-core assets. The probability of failure and associated consequence should be applied to each asset and asset component.* • *Consider the use of redundancy factors to reduce the consequence of failure – explore back-up alternatives.*	Short to Medium Term
Action Item 18: • *Create a population and household growth graph to illustrate what the future looks like in Tillsonburg.*	Short Term
Action Item 19: • *Include procurement policy in the Asset Management Plan.* • *Explore opportunity to utilize alternative service delivery options.*	Short Term

Municipal Action Plan Timeline
Town of Tillsonburg

Action Items	Timeframe
Action Item 20: • *Identify funding tools and applicability in the Town. Also good to provide financial information in each description. Answer questions like: How much revenue was generated from the funding source in the latest year? What % of total revenues did that represent? What is the current % of the annual repayment limit?*	Short to Medium Term
Action Item 21: • *Incorporate future operating budget implications into your asset management plan.* • *Look to break-down capital costs by non-infrastructure, maintenance and growth expenditures.* • *Replacement schedule should reflect prioritized asset list (based on condition and risk).*	Medium to Long Term

Municipal Action Plan Timeline
Town of Tillsonburg

Action Items	Timeframe
Action Item 22: • *Identify infrastructure funding shortfall to consider all tax supported assets vs. utility rate supported assets.* • *Annual capital contributions need to consider asset replacement over the long-term (outside of the planning period).*	Short to Medium Term
Action Item 23: • *Illustrate when the infrastructure gap will be closed.* • *Identify what the rate (tax and utility) implications would be in order to carry out the required capital contributions – test various funding options.* • *Look to break-down capital costs by non-infrastructure, maintenance and growth expenditures.* • *Contributed assets – identify how much (in $) is contributed each year. The Town assumes responsibility for future repair and replacement.* • *Identify policy to manage funding shortfall.*	Short to Medium Term

APPENDIX C

Priority Project Listing