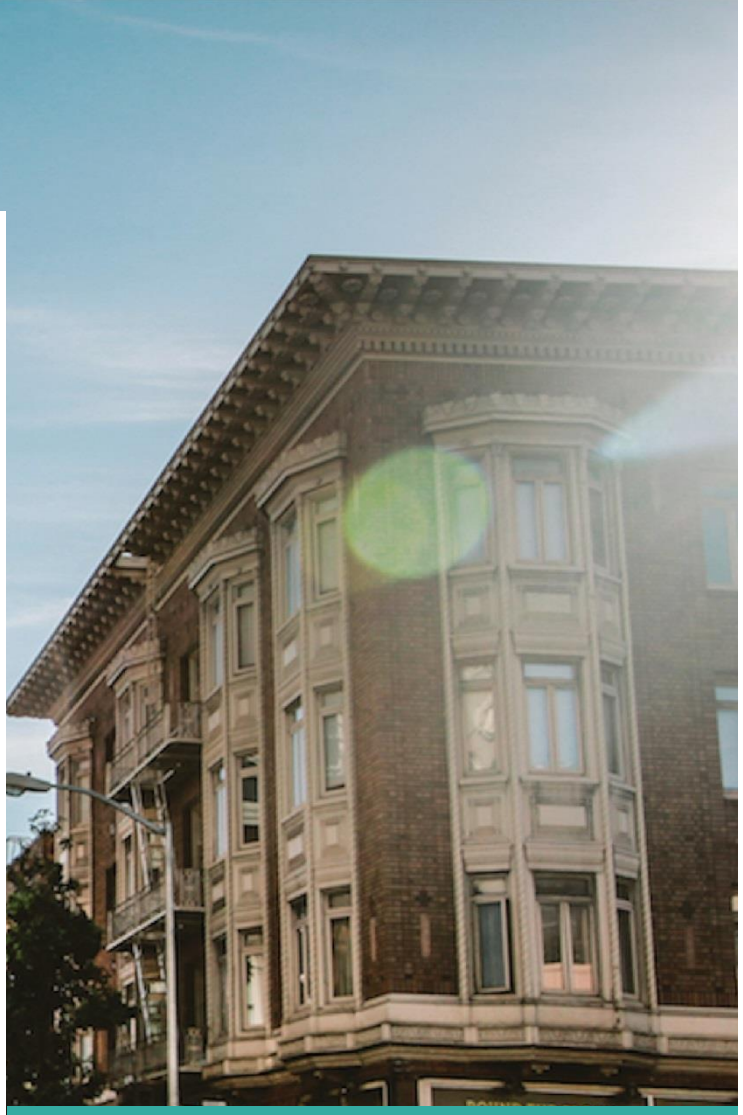
TOWNSHIP OF SOUTHGATE

ASSET MANAGEMENT PLAN 2022



TOWNSHIP OF SOUTHGATE

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1. INTRODUCTION and BACKGROUND

1.1 What is ASSET MANAGEMENT?

The Township of Southgate (referred to in this document as Southgate) owns and manages a diverse portfolio of assets, to provide stakeholders (residents, businesses, and visitors) with safe access to important services, such as transportation, recreation, waste management, economic development and much more. These assets include roads and bridges/ culverts, wastewater and storm sewer systems, and drinking water systems, known as Core Assets. Other asset groups include buildings, vehicle fleet, technology and machinery/ equipment. Asset management is the short title for an integrated business approach, within an organization, to strike a balance between managing the lifecycle costs of owning, operating and maintaining assets, managing an acceptable level of risk, and managing the continuous delivery of established levels of service for current and future customers, and doing all of these tasks in a manner designed to be environmentally and financially sustainable.

There are several key words, within this definition, that will be explained in more detail throughout this document. This document is designed, within Provincial format guidelines, to assist Southgate with the pursuit of asset management of its core assets. The Asset Management Plan will be ~~An~~ expanded to eventually include all ~~version of this report will come later, which will also include~~ non-core assets. ~~B, such as b~~uildings were added in 2022. A concise definition of Core Assets would be those assets that deliver the services that residents cannot do without. This 2021 AMP for Southgate deals with core assets.

As a subsidiary of Asset Management, Infrastructure asset management is the combination of management, financial, economic, engineering and other practices applied to physical assets, with the objective of providing the required Level of Service in the most cost-effective manner. It includes the management of the whole life cycle of physical and infrastructure assets:

- **Design**
- **Construction**
- **Commissioning**
- **Operating and maintaining**
- **Repairing and modifying**
- **Replacing and decommissioning/disposal**

1.2 What are the benefits of ASSET MANAGEMENT?

Asset management is an integrated process, which means it touches most of the divisions of Southgate's business activities. This can often lead to some significant overhauls of existing processes, practices and procedures. Organizational change can be valuable, and it can improve outcomes for all Southgate stakeholders. Key benefits of asset management are:

- **Data-driven decision making**
- **Enhanced sustainability of infrastructure assets**
- **Good governance and increased accountability**
- **Improved levels of service and quality of life**
- **Accurate forecasting of infrastructure replacement and enhancement needs**
- **Municipal compliance with Federal and Provincial regulations**

1.3 What is an ASSET MANAGEMENT PLAN?

A concise definition of an Asset Management Plan (shortened to AMP) is a strategic planning document, identifying key asset data, and the resources and funding required to meet organizational objectives.

Seven essential elements of an AMP are commonly presented as questions. These questions can be answered through the asset management process:

Seven Essential Elements of an AMP	Answers
What does the municipality own?	Asset Inventory
What is it worth?	Valuation of the Inventory
What is its condition?	Condition ratings, remaining life
What needs to be done?	Levels of Service, lifecycle actions
When do you need to do it?	Risk Assessment, Project Prioritization
How much will it cost?	Revenue Requirements, price forecasts
How will you pay for it?	Long Term Financial Plan

Provincial regulations require the AMP to be updated every five years (or less). The reason for this requirement for future updates is to allow Southgate to re-evaluate the state of its infrastructure assets, as well as to review how its financial strategies are progressing. Unexpected events can cause AMP targets to be missed (Covid), and strategies must be altered in response to events.

AMP content includes basics like an asset inventory, condition assessments, and replacement costs. Other required elements of an AMP, per the Provincial regulation, are:

- **Asset Management Strategies (risk assessment, lifecycle, prioritization)**
- **Levels of Service (performance measurement)**
- **Climate Change impacts**
- **Financial strategies**

1.4 Infrastructure Ownership and O. Reg. 588/17

In Ontario, municipalities own and manage more infrastructure assets than both the Provincial and Federal governments combined. Across Canada, the shares of infrastructure assets are:

- **Federal ownership 2%**
- **Provincial ownership 41%**
- **Municipal ownership 57%**

The Province of Ontario, in 2015, passed the Infrastructure for Jobs and Prosperity Act (IJPA) followed by consultations with municipalities during 2016, to collect feedback on its proposed Regulation. The IJPA update came into force on Jan. 1, 2017 as O. Reg. 588/17, with these selected timelines and requirements for all municipalities in this Province:

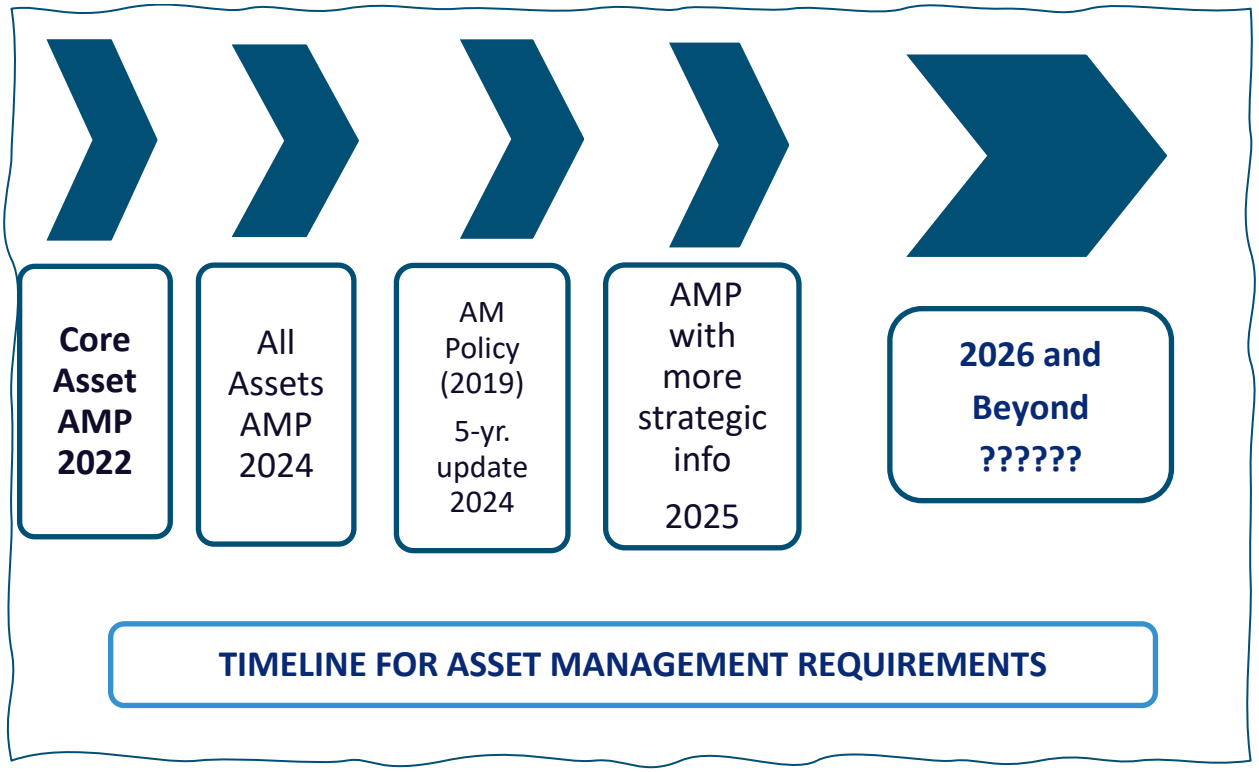
PHASE 1 Core Assets	**Due by July 1, 2021**	**1. Inventory analysis 2. Current levels of service 3. Costs and lifecycle activities required to maintain current levels of service 4. ONLY IF POP.> 25,000 : Population and Employment forecasts, and costs to service growth in next 10 yrs.**
PHASE 2 ALL Assets	**Due by July 1, 2023**	**Same requirements as Phase 1 above, but applied to ALL infrastructure assets**
PHASE 3	**Due by July 1, 2024**	**1. Proposed Levels of Service for next 10 years 2. Updated Inventory analysis 3. Lifecycle Management Strategy 4. Financial Strategy 5. Addressing Financial Shortfalls 6. ONLY IF POP.> 25,000 : how Growth Assumptions impact Lifecycle Mgmt. and Financial Strategy**

A concise definition of Core Assets would be those assets that deliver the services that residents cannot do without. This 2021 AMP for Southgate deals with core assets.

UPDATE

In March 2021, in response to municipal concerns over the impacts from COVID-19, the Province announced a one-year deferral for the three phases above. New required dates are:

1. **Core Assets version of the AMP due by July 1, 2022**
2. **Expanded AMP covering all assets due by July 1, 2024**
3. **Proposed Levels of Service due by July 1, 2025**



For the 2025 AMP, the additional "strategic information" includes:

- **Proposed Levels of Service for next 10 years**
- **Addressing Shortfalls within the Financial Strategy**
- **Lifecycle management strategy**
- **Explain how Growth will impact Lifecycle and Financial Strategies**

1.5 Integration with Other Plans

With respect to integrating the Township's budget process with asset management planning, both require a projection of capital and operating costs of a future period. Both the capital budget and the AMP should contain a ten-year forecast window for capital assets. Situations will change, assets will become damaged or worn-out earlier than expected. The annual budget process can respond to these circumstances because it is more frequent (annual) than the AMP process. The annual Southgate budget-setting process can be like an asset management plan update process.

Both asset management and PSAB 3150 (Public Sector Accounting Board) accounting rules require a complete and accurate asset inventory. The significant difference between the two lies in valuation approaches; PSAB 3150 requires historical cost valuation, while asset management requires future replacement cost valuation. Historical cost values can be misleading when an asset is very old, because the difference between its historical cost and its replacement cost will likely be large.

Further integration into other Township financial/planning documents would assist with

the ongoing accuracy of the AMP, as well as the accuracy of integrated financial/planning documents. This AMP has been developed to allow linkages to documents such as:

- **Development Charge Background Study;**
- **Official Plan;**
- **Water and Wastewater Rate Study;**
- **Road Needs Study;**
- **OSIM Structure studies (every structure updated in a two-year cycle); and**
- **Insurance valuations and records.**

References are made throughout this AMP to asset data that was obtained from these sources.

1.6 Annual Progress Review

The Regulation (section 9) requires "*every municipal Council shall conduct an annual review of its asset management progress on or before July 1 in each year*" and the review must address:

- **The progress in implementing the AMP**
- **Any factors impeding the ability to implement the AMP**
- **Strategy to address the factors described above**

The review may be done through a status update report to Council. A completely re-done AMP is not necessary for this annual review. The requirements for entirely re-done AMPs are spelled out in the table above (Phases Two and Three). After the Phase Three requirements are met, AMPs must be updated (re-done) at least every five years. See section on Next Steps.

2. STATE OF LOCAL INFRASTRUCTURE

In this section, Southgate core assets are itemized, along with information on condition assessments and estimated replacement costs. The annual Southgate audited financial statements are prepared using historical costs. Many assets in the inventory are decades old, so their historical cost bears little resemblance to current values. Historical values can be of little value in terms of asset management practices. Therefore, historical cost data is not referenced in this AMP, except for the first table below, just to show the differences between historical and replacement costs.

Asset data was based on the various sources listed in section 1.5, and not on historical cost financial accounting records. An exception to this is for recently acquired assets. Some of the data sources listed in section 1.5 are dated in 2018 or 2019, and so they are slightly outdated. Assets purchased after those reports were done have been picked up from the accounting records of recent years, for inclusion in this AMP, up to and including 2020 acquisitions.

2.1 Consolidated View of Core Assets

In this table, an overview is provided of all the core assets being reviewed in this AMP.

	Quantity measurement	Replacement Value Estimate	Net Book Value, Historical Cost, end of 2019
Roads – all types	517.812 km	$114,285,190	$ ~~22,137,579~~ 23,043,478
Structures – all types	118 structures	$ 77,182,770	$ ~~7,933,259~~ 8,656,469
Waterworks system, mains + other	as listed	$ 20,000,000	$ ~~8,034,616~~ 3,908,248
Storm sewer mains, catch basins	as listed	$ 6,500,000	$ ~~195,964~~ 525,744
Wastewater system, mains + other	as listed	$ 22,500,000	$ ~~2,777,447~~ 738,685
Facilities Covered in 2022 BCA	as listed	$ 19,466,836	$ 8,670,669
COMBINED		$~~240,467,960~~ 259,934,796	$ ~~41,078,865~~ 45,543,293

The following sections will take a closer look at each of these asset groups.

2.2 Roads

Roads are the single most significant asset type in the asset inventory. Roads are classified by surface type. At Dec. 31, 2019, the road inventory was:

Length in km. 2013		Length in km. 2019	Replacement Value Estimate
27.149	Paved roads, urban & semi-urban	26.248	14,436,400
127.319	Paved roads, rural areas	137.388	37,921,950
44.084	Surface-treated roads	53.417	9,615,060
304.127	Gravel roads	291.131	52,311,780
9.628	Earth roads	9.628	No plans to replace
512.307		517.812	$114,285,190

Replacement values used above are: Urban/Semi-Urban Paved Roads $550,000/km., Rural Paved $275,000/km., Rural Surface-Treated $180,000/km., and Rural Gravel $180,000/km. These are the estimated costs to fully reconstruct each type of road, including its base and surface.

Total km. in the system (now 517.8 km. or 1,035 lane-kms.) will increase slightly, as new roads are assumed by Southgate from new subdivisions. Here is some road data taken from AMP's of comparable (mostly rural) or nearby municipalities, to confirm the reasonableness of the road valuation above.

Comparator	Total km	Paved or ST	Gravel	Replac. Value	
Melancthon	248.5	81.2	167.3	$ 112,000,000	
Wellington North	424	230	194	$ 121,798,073	
Minto	286.3	224	62.3	$ 122,200,000	
West Grey	1,000.9	524	476.9	$ 284,170,354	
Springwater (Simcoe County)	440	189.2	250.8	$ 131,070,000	

Roads are classified by the Ministry of Transportation (O. Reg. 612/06) into Road Classes, based on a combination of Average Daily Traffic (ADT) volumes and Speed Limits. There are six classes, Class 1 being the highest volume and speeds over 80 km/hr. and daily traffic volumes 5,000 to 50,000+. An example of Class 1 would be four-lane or six-lane roads, like Dixie Road in Mississauga and Brampton. Southgate roads have low traffic volumes, are mostly two lanes, and are mostly 80 km/hr. in rural areas, with urban streets posted at 40 km/hr.

There are no Southgate roads in MTO Classes 1, 2 or 3. The 517.8 km network of roads in Southgate are analyzed as:

2013 Study		2019 Study	
411.7 km	MTO Class 4	411.4 km	Speeds 40-80km/hr. ADT 500-999
18.2 km	MTO Class 5	16.1 km	Speeds 40-80 km/hr. ADT 200-499

82.4 km	MTO Class 6	90.3 km	Speeds 40-80 km/hr. ADT 0 - 199
512.3 km		517.8 km	

Many Southgate Class 6 roads have an ADT of just 0-49 vehicles, which is the lowest ADT measure there is. The MTO Road Class has relevance for asset management because the lower traffic volumes, and lower speeds, indicate that Southgate roads might reasonably be expected to have longer useful life estimates, because they are subjected to lesser usage. Paved road surfaces are typically assigned lifespans of 15 to 25 years before planned resurfacing is required, whereas Southgate has been using a 50-year paved road lifespan.

Road Asset Condition

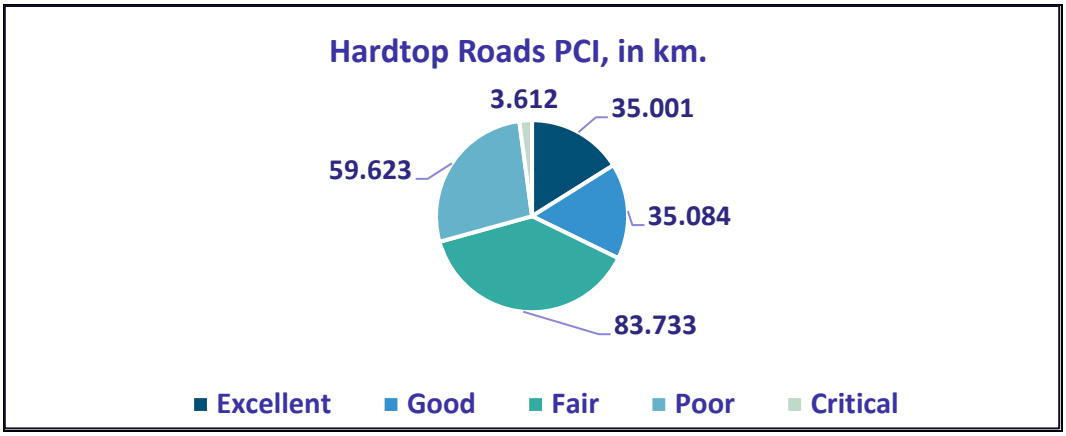
Asset condition is a critical factor in decision-making for capital asset management. The 2019 Triton study provides Pavement Condition Index ratings (PCI) for all paved and surface-treated roads. PCI is the standard measure for "hardtop" roads condition. PCI is a combination of Field Condition Rating (FCR) and Ride Comfort Index (RCI), on a scale from 0 to 100. A road that has just been resurfaced would rate a PCI of 100. Roads with a PCI of less than 50 are considered deficient and in need of rehabilitation.

Triton found, in 2019, nearly one-third of Southgate's hardtop roads were in need of rehabilitation. Triton noted that because many Southgate roads were hard-surfaced at the time of amalgamation with thin lift asphalt pavement, many of those roads have now reached the end of their service life.

Microsurfacing of paved roads binds the surface and keeps material in Place. It works best when the road base is still adequate, and the road's paved-surface distresses are mostly cracking, including alligator cracking. Microsurfacing is less costly than resurfacing. However, microsurfacing does not address rutting, or more deep-seated structural road distresses.

The other hardtop road type (after paved roads) is Surface-treated roads, also referred to as Low Class Bituminous (LCB), which are typically rural roads with moderate traffic volumes. The treatment maintains the surface, and provides dust control, but requires re-sealing roughly every seven years, per Triton.

Here is an analysis of PCI values for all hard top roads (both paved and LCB) from the 2019 Triton data, altered slightly for the roads that were paved in 2020 (sections of Road 22 and Wilder Lake Road) and were changed to an Excellent PCI value.



PCI value range	No. of Km.	Segments	
91-100 Excellent	35.001	43	
71-90 Good	35.084	55	
51-70 Fair	83.733	92	
31-50 Poor	59.623	36	
< 30 Critical	3.612	3	← on Rd. 4, Rd. 14
	217.053	229	229 of 428 segments have a PCI

Paved urban + Paved rural + Surface-treated rural = 217.053 km. of hardtop

Note that these are 2019 PCI ratings (with a couple of 2020 updates), and so there could be a small number of roads that have declined from one range to the next range (e.g. from Good to Fair) since 2019. It is noteworthy that there are 35 km. rated excellent, just as many as rated Good. This is an indication of an improvement in the amount of paving work accomplished in recent years. All 43 road segments in the Excellent list were either newly added/built, initially paved (formerly Gravel), or repaved, since 2014.

Gravel roads are appropriate in rural areas, and in low to very low traffic volumes. These roads represent over 50% of Southgate's road network. Triton's report says gravel surfaces are best for roads with poor subgrade conditions, such as topsoil present in the upper portions of the road base, and/or poor drainage conditions. These roads would not support a hard surface, as they would break up prematurely. Southgate maintains a regular gravel road program, along with brushing and ditching for improved drainage. Gravel roads of course do not have a PCI, but they do have an FCR. The Triton 2019 report says the weighted average FCR across the gravel road inventory was 5.7, considered to be good. The report states that "*while gravel roads should be maintained at an average FCR of 7.0, lower traffic-volume gravel roads can have FCR between 5.0 to 7.0 and provide satisfactory performance*".

2.3 Structures (bridges and culverts)

Southgate has a high number of structures, namely 118 structures. In Ontario, structures must undergo inspections every two years. Inspections are performed, on an element-by-element basis on each structure, by external engineers (R. J. Burnside "RJB"). Inspections are made in accordance with the Ministry of Transportation – Ontario Structure Inspection Manual (OSIM). See the section on Structures Asset Condition for details on the findings of the most recent OSIM inspections.

Structures by location:

Southgate Road	# structures	
Road 4	6	
Road 8	7	
Road 10	9	
Road 12	13	
Road 14	13	
Road 22	3	
Road 24	9	
Road 26	12	
Sideroad 7	4	
Sideroad 11	1	
Sideroad 13	3	
Sideroad 15	3	
Sideroad 19	1	
Sideroad 21	3	
Sideroad 41	3	
Sideroad 47	4	
Sideroad 49	9	
Sideroad 55	1	
Sideroad 57	4	
Sideroad 61	2	
Sideroad 71	2	
Sideroad 75 / Ida St.	3	
Eco Pkwy., Feairs Dr., Sligo Rd.	3 (1 each)	
	118	

Structures by most common type (types with under 3 structures are left out):

Cast-in-place concrete rigid frame	62
CSP multi-plate ellipse culvert(s) [might be single or double]	11
Steel I-girder, concrete deck	9
Cast-in-Place concrete box culvert	8

Precast concrete box culvert	6
CSP round culvert(s) [might be single or double]	4
Precast concrete I-girder	4
CSP Arch culvert(s) [might be single or double]	3
All Other	11

The structures Replacement Value of $77.18 million, shown in Section 2.1 above, comes from values found in the OSIM studies of 2019 and 2020, except that only the core asset value was used. RJB cost estimates for roadside protection features (like Guiderails and end treatments), engineering design, environmental assessments, and 10% cost contingencies were all excluded. This is because recent experience shows actual structure projects, completed by Southgate in recent years, have consistently come in well under the OSIM Study replacement cost estimate. Therefore, the OSIM core asset values, taken alone, are likely still on the high side for estimated replacement values.

Structure Asset Condition

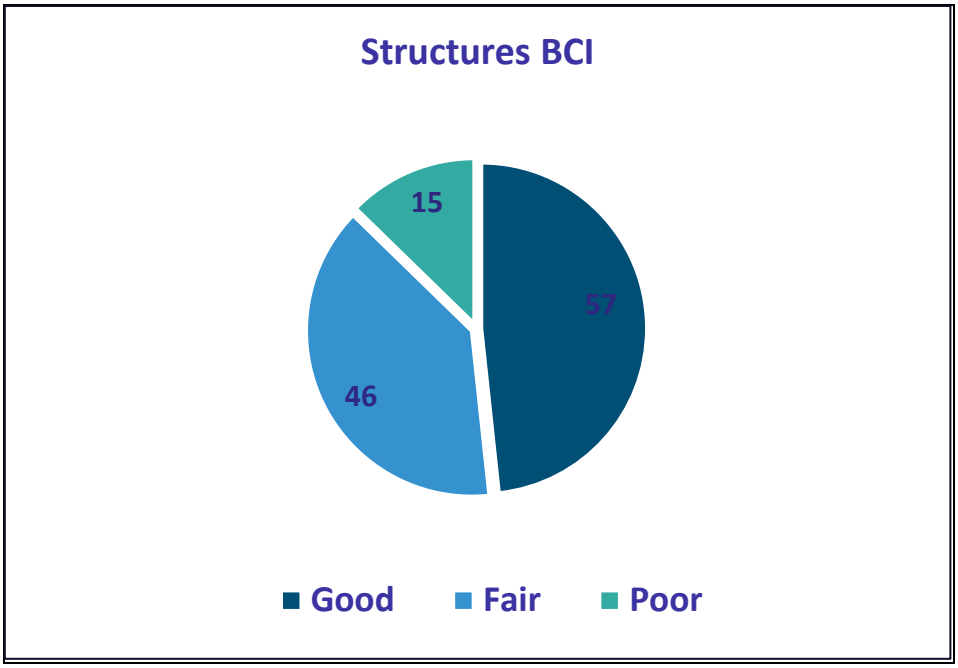
Asset condition is a critical factor in decision-making for capital asset management. Structure asset condition is measured by the Bridge Condition Index, the BCI for short. BCI value ranges are Good = 70 to 100, Fair = 50 to 70, and Poor = <50.

OSIM inspections are done on half of the Southgate structure inventory every year, so that every structure is inspected once in a two-year cycle. This cycle ensures that

- Inspection information is kept very recent (as compared to roads data)
- BCI measurement trends can be analyzed over time by comparing results over several recent cycles

The OSIM study every year includes a “five-year Capital Plan” from RJB, which is helpful to township staff in developing the township’s capital plan in the annual budget. In addition to capital cost plans, the annual operational budget provides funding for routine maintenance of structures. Routine maintenance is important, to extend the service life of structures. Routine bridge sweeping, washing of decks, drains, joints, bearing seat areas and girders will improve service life. Removal or trimming of vegetation, as well as addressing minor erosion concerns regularly, will pre-empt more serious issues.

In September 2020, RJB stated 48.3% of Southgate structures were Good (57 of 118), 39.0% were Fair (46 of 118) and 12.7% were Poor (15 of 118). MTO has established a goal for municipalities of keeping 85% of structures in “good” condition. At 48.3% Good, Southgate is underperforming when compared to that MTO 85% goal.



However, since the 2015/2016 inspections cycle, Southgate has accomplished enough maintenance and capital work on its structures to keep its overall average BCI, across all 118 structures, holding steady at 67.3 (see Level of Service table). Recently completed capital work was done on structures S043, S118 and S126 (all in 2019), and S031 in 2020.

Here is a table of all 118 BCI values, by specific ranges:

B C I value range	No. of structures		
75 to 100 Good	32		
70.1 to 74.9 Good	25	close to dropping to Fair	
56 to 70 Fair	41		
50 to 55.9 Fair	5	close to dropping to Poor	
20 to 49.9 Poor	15		
< 20 Critical	none		

This breakdown of BCI ranges was designed to show how many structures are nearing the point of BCI value that would drop them down one category. Finally, although BCI is a good measure of the overall condition of a structure, and its relative construction need, other factors beyond BCI are often considered when prioritizing bridge work. Other decision-making factors include:

- Traffic volume and # trucks that regularly use the road the Structure is on
- Load capacity restrictions
- Geometric restrictions (alignment or width is difficult to alter)
- Pedestrian or cycling requirements
- History of accidents or traffic conflicts

- History of flooding or ice problems
- Nearby area population growth and development

2.4 Waterworks, Sanitary Sewer and Storm Sewer Systems

There are three remaining core asset groups considered in the AMP: Waterworks system assets, Sanitary Sewer (Wastewater) system assets, and Storm Sewer (Stormwater) assets. These asset groups do not have external measurements like a PCI or a BCI, as roads and structures have. Instead, to measure asset condition in these groups, the AMP has used a five-part General Condition Grading System, per the Table below, and asked township staff who are most familiar with these assets to assign the condition rating they believe to be the most accurate.

Grade	Description of Asset Condition
VG Very Good	Typically new or recently rehabilitated asset. Only normal maintenance required
G Good	Minor deterioration only in some elements; some minor maintenance required
F Fair	Significant Maintenance required to return to Accepted Level of Service. General signs of deterioration.
P Poor	Mostly below standard, many elements nearing the end of their service life. Requires Renewal, or significant upgrade.
VP Very Poor	Asset is not serviceable. Widespread signs of advanced deterioration. Components exhibit signs of imminent failure.

2.4-1 Waterworks system

The drinking water system in Dundalk is a ground water source system, consisting of three production wells (D3, D4, D5), three water storage reservoirs, one monitoring well and a distribution system of approx. 19.8 km. of watermains of varying size, with 1067 service connections (per 2020 Annual Report).

The system is monitored by a new SCADA system installed in 2020, which communicates through RF towers and PLC's in the wells, to record data and monitor operations.
Below are tables listing key components of each well:

Well D3 280 Victoria St. W.		Condition Grade
Drilled ground water well, pumphouse structure, 86.9 m deep, 250 mm. diameter steel well casing to bedrock at 28 m. depth		G
Submersible pump that transfers water from wellhead into the reservoir, rated capacity 777 L/min. at 38.1 m TDH		G

One 100 mm. magnetic flow meter		G
Two vertical turbine high lift pumps to pump water from reservoir to distrib. system through 250 mm. diameter watermain		G
One 100 mm. magnetic flow meter on pump discharge header		G
Two fire flow pumps, rated cap. 5,678 L/min 1 Electric-driven		F
1 Diesel driven		F
One backflow preventer on the fire pump system		G
Secondary containment for chemicals and diesel fuel		G
Piping, valves, controls & equip within the pumphouse		G
1,364 cu. m. pre-stressed concrete Reservoir, circular, ground level, with baffle curtains and two mixers		F
Two UV light reactors for disinfection with one UVT monitor		G
Sodium hypochloride dosing pump, storage tank		G
Residual analyzer and downstream dosing pump		G
Turbidity analyzer on raw water piping		G
Metering pump flow switch with alarming and controls		G
Standby Power : 80kW diesel generator		VG

Well D4 550 Main St. E. (built 2004)		Condition Grade
Drilled ground water well, pumphouse structure, 100.6 m deep, 250 mm. diameter steel well casing to bedrock at 32 m. depth		G
Submersible pump that transfers water from wellhead into the reservoir, rated capacity 1,136.5 L/min. at 32.6 m TDH		G
One 100 mm. magnetic flow meter		G
Two vertical turbine high lift pumps to pump water from reservoir to distrib. system through 250 mm. diameter watermain		G
One 100 mm. magnetic flow meter on pump discharge header		G
179 m. of 250 mm. diameter PVC watermain connecting Well D4 to existing distrib. system		G
One turbidity analyzer		G
Piping, valves, controls & equip within the pumphouse		G
One baffled Reservoir approx. volume 187.7 cu. m.		G
Sodium hypochlorite metering pumps (2) with flow switch, auto switch-over, alarm and shutdown features		G
Sodium hypochlorite tank		G
One free chlorine residual analyzer		G
Standby Power : 100kW diesel generator with 284 L fuel tank		G

Well D5 250 Hagan St. (drilled 2017, installation 2019)		Condition Grade
Drilled ground water well, pumphouse structure, 96 m deep, 250 mm. diameter steel well casing to bedrock at 35.35 m. depth		VG
Submersible pump that transfers water from wellhead into the reservoir, rated capacity 1,363.5 L/min. at 35.2 m TDH		VG
One 100 mm. magnetic flow meter		VG
Two vertical turbine high lift pumps rated at 1,363.5 L/min with variable frequency drives		VG
One 100 mm. magnetic flow meter on pump discharge header		VG
179 m. of 250 mm. diameter PVC watermain connecting Well D5 to existing distribution system		VG
One turbidity analyzer		VG
Piping, valves, controls & equip within the pumphouse		VG
One baffled Reservoir, capacity 536 cu. m.		VG
Sodium hypochlorite dosing pumps (2) with flow switch, auto switch-over, alarm and shutdown features		VG
Sodium hypochlorite tank		VG
One free chlorine residual analyzer downstream		VG
Standby Power : 150kW diesel generator with double walled under base fuel tank for 24-hrs run time		VG

SCADA system (replaced in 2020)		Condition Grade
One level sensor in each Well		VG
One Well-pump operation sensor in each well		VG
One Well-pump flowmeter in each well, on raw water inlet to reservoir		VG
Six pump speed sensors, two at each well, with one on each highlight pump		VG
Three VFD failure monitors, one at each well		VG
Three ultra-sonic level sensors, one at each well		VG
Three float type level sensors, one at each well		VG
Eight Chlorine pump operation monitors, including failure alarms, two at Well D3, three at D4 and three at D5		VG
Three Chlorine and turbidity analyzers, one at each well		VG
Three Chlorine analyzers, located on treated water lines, one at each well		VG
Three treated-water flowmeters, located on treated water lines, one at each well		VG

Fuel Oil Systems, Diesel fuel		Condition Grade
One 550 L above ground double walled storage tank, outside the diesel generator, for pump house D3		VG
One 1,138 L above ground double walled storage tank, outside D3 fire system pump		F
One 680 L above ground double walled storage tank, outside the diesel generator, for pump house D4		G
One 1,137 L above ground double walled storage tank, outside the diesel generator, for pump house D5		VG

Watermains total 19,846 m.		Condition Grade
Main St E installation 2019/20 total 1,481 m. of 150, 200, and 250 mm dia. gasketed PVC main, including tracer wire, from Proton St. easterly to Sinclair St.		VG
Other recent installs: Elm St.		VG
Young St.		VG
Rowe's Lane		VG
Mains across remainder of system, 18,365 m. EXCEPT these		
Specific sections requiring attention :		F
Victoria St W		P
Proton St S		P
Gold St W		P
Ida St S		P

Water Meters:		Condition Grade
Approx. 1,200 units, both installed + inventory held		G
Hydrants		
Inventory count = 116 across the Town		G

2.4-2 Stormwater assets: storm sewers and catch-basins

Managing rain water (stormwater) is important for reducing the risk of flooding, and the risk of damage to other infrastructure assets. The stormwater system includes approx. 17.5 km. of stormwater drainage pipe, and approx. 160 catchbasins on various streets in Dundalk, including recent street additions (Doyle, Elm) and one Stormwater Holding Pond, located just south-east of the Sheffield Street cul-de-sac, with a holding capacity of 1,272 cu. m.,

covering 0.23 hectares. There is a partially-submerged inlet from the in-street collection system to the Pond.

2.4-3 Wastewater system

The Dundalk Sewage Treatment Works (STW), at 752051 Ida Street S. consists of a four cell waste stabilization pond facility, flowing into an aeration cell pond. Components of the system are a Pumping Station, Chemical Feed System, the Stabilization Ponds, a Post Aeration Cell, Blower Building, Tertiary Treatment Filter Building, and Discharge to the Foley Drain connected to the Grand River Watershed. In 2014, upgrades were completed on the pumping station, post-aeration cell, blower building, and the tertiary treatment filter building.

The system underwent inspection in May 2019 by the MECP (Ministry of Environment, Conservation and Parks). A sewage lagoons sludge assessment was conducted by Triton Engineering in 2020.

STW Component	Year	Condition Grade
Pumping station building	1972	G
Wet Well Pump #1	2019	VG
Wet Well Pump #2	2017	G
230 mm forcemain to stabiliz. ponds		G
Controls building, houses pump control equipment	2014	VG
50 kW diesel generator, auto transfer switch	2014	VG
2.2 sq. m. Chemical Metering building	2000	F
24.5 cu. m. capacity chemical storage tank (Alum)		G
Chemical metering pump w/ flow recorder+totalizer		VG
OTHER PUMPS:		
Influent Pump 1	2008	G
Influent Pump 2	2020	VG
Influent Pump 3	2016	G
Backwash Pump 4	2018	VG
Backwash Pump 5	2011	G
Backwash Pump 6	2020	VG
Stabiliz. Pond 1 depth 1.8 m. 6.5 hectares	1984	G
Stabiliz. Pond 2 depth 1.8 m. 6.5 hectares	1984	G

Stabiliz. Pond 3 depth 1.8 m. 4.1 hectares	1972	G
Stabiliz. Pond 4 depth 1.8 m. 4.1 hectares	1972	G
Post Aeration cell depth 2.1 m. 4,546 cu. m.	1984	G
Blower building	2014	G
Steel roof	2019	VG
Two Blowers, air main + diffusers	2014	VG
Tertiary Treatment Filter building	2000	G
Three variable frequency drives	2000	G
5,680L capacity chemical storage tank	2000	G
Flocculation tank with mixer+backwash filter	2000	G
50 cu. m. filter effluent tank	2000	G
50 cu. m. backwash waste tank	2000	G
Oxygen monitoring equipment, air piping, fine bubble air diffusers	2014	VG
Discharge system	2000	G
Sanitary sewer mains/pipes, approx. 17,500 m. or 17.5 km.		Condition Varies
Inventory of manholes		Condition Varies

The Sanitary Sewage Lagoons south of Eco Parkway, which treat the sewage from the community, are designed to treat 1,832 m3/day.

2.4-4 Facilities

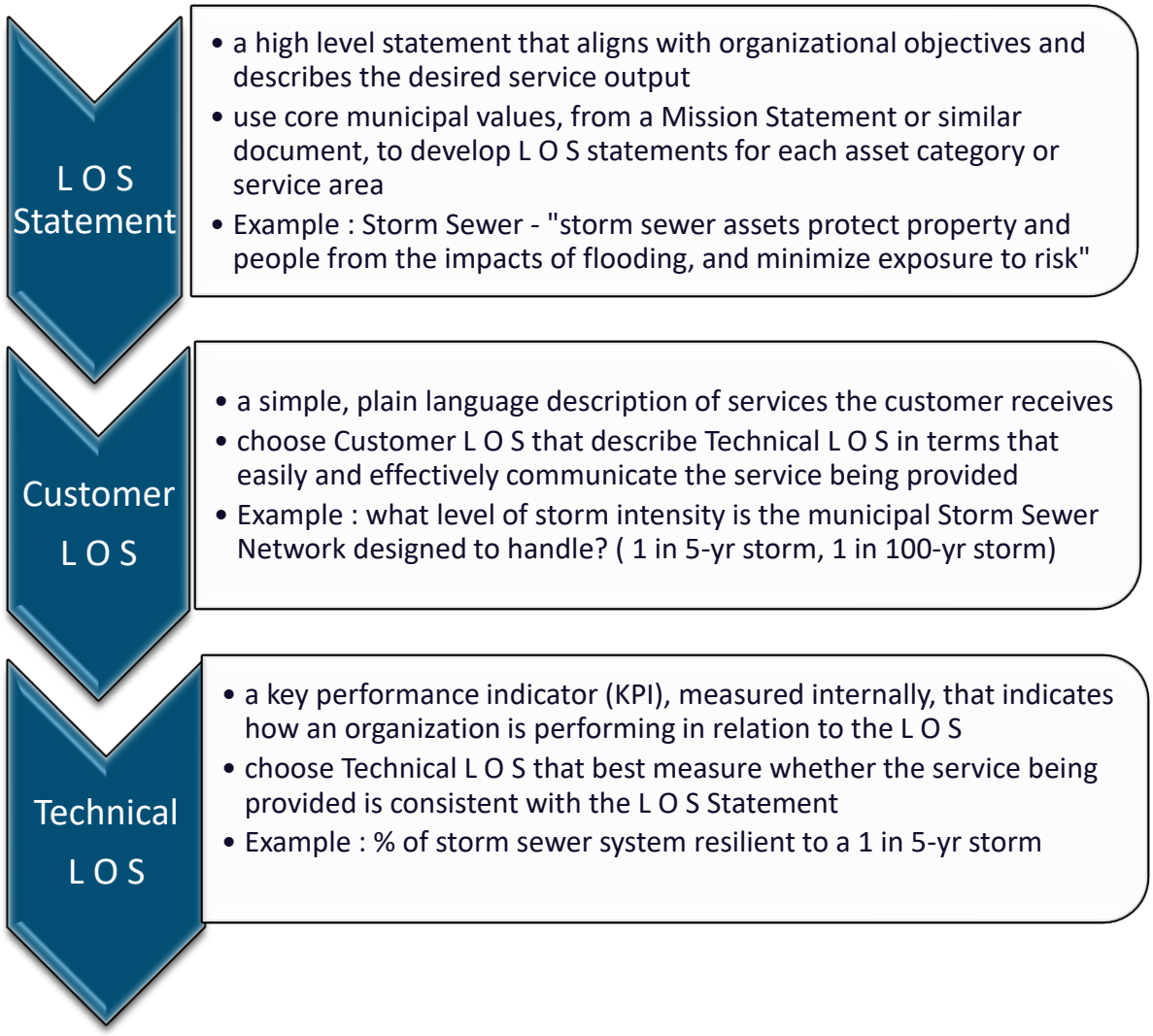
Southgate owns and operates several facilities to deliver various services to its residents. While facilities are not considered a core asset under *O.Reg588/17* the importance of facilities can not be understated. Facilities are used in almost every facet of Southgate's operations – including the provision of services through core assets.

Appendix 9 has a list of all the facilities that have been reviewed as part of the Building Condition Assessments along with their replacement cost.

3. LEVELS OF SERVICE

Every AMP needs to balance affordability of municipal services with customer needs and expectations. Levels of Service (LOS) is the standard used for this aspect of Asset Management. LOS are specific parameters that describe the extent and quality of services that the municipality provides to its users.

Here is a basic guide to establishing LOS:



Developing realistic LOS, using meaningful Key Performance Indicators (KPIs), is necessary for managing citizen expectations, identifying areas requiring additional investments, driving organizational performance, and securing the highest value-for-money from public assets. Municipalities face diminishing returns with their LOS and KPI frameworks; in other words, the more LOS and KPI measures are kept, the less and less incremental value they provide. The objective should be to track only LOS measures that are relevant and insightful to Southgate.

The O. Reg. 588/17 prescribes, in tables, a minimum number of LOS measures to be provided, at least initially, set out in section 6 of the regulation.

For core assets, per the diagram above, there are two types of LOS:

1. **Customer LOS, sometimes referred to as External Outcomes. A simple, plain language description of what customers expect to receive from Southgate**
2. **Technical LOS, key performance indicators (KPI's) used to measure performance of assets and performance of services to customers**

Reg. 588/17 section 5(2) sub-section (1)(i) sets out the need to include in the AMP some specific basic measures, for core assets, given in Reg. Tables 1 to 5. In future, Southgate should expand upon these basic LOS as more data on performance is collected.

	LOS Statement /Customer LOS	Technical LOS and KPI's
WATER	Provide a safe and reliable supply of drinking water to residents connected to the municipal waterworks system	% of Dundalk properties connected to the water system - 99.0%
		% of Dundalk properties where Fire Flow is available - 100.0%
	Service requests are promptly responded to	Annual number of Boil-water Advisories - 2020 : 0 2019 : 0 2018 : 0
		Number of watermain breaks – 2020 – 2 2019 – 2 2018 – 3
WASTEWATER	Wastewater network is maintained and managed to enable continuous and reliable provision of sewage services Service requests are promptly responded to	Number of emergency sewer repairs per year - 2020 : 0 2019 : 1 2018 : 0
		Number of sanitary sewer backups per year - 2020 : 0 2019 : 0 2018 : 0
		Number of raw sewage bypass events 2020 : 0 2019 : 0 2018 : 0
STORM WATER SYSTEM	Stormwater network is maintained in good condition to enable continuous and reliable provision of services	% of properties resilient to a 100-year storm - 75%
		% of properties resilient to a 5-year storm - 100%
ROADS	Road network is convenient and available to the whole community.	Average Pavement Condition Index (PCI) value for paved roads : 2019 – 68.63

	There are minimal service disruptions. It is safe to use; traffic signs and markings are easy to see and understand. Service requests are promptly responded to. Example : potholes filled	
		Average Condition Rating for Surface Treated roads: 2019 - 5.7 2014 – 6.4
		Average Condition Rating for Paved Asphalt roads : 2019 - 6.1 2014 – 6.6
		Average Condition Rating for Gravel roads : 2019 - 5.7 2014 – 5.7
STRUCTURES	All Bridges and Culverts provide safe vehicular and pedestrian passage. All Structures are fully compliant with regulatory requirements. Traffic that is supported by Structure Network • Heavy trucks • Passenger vehicles • Emergency vehicles • Cyclists • Pedestrians	Average bridge condition index (BCI) : 2015/16 OSIM cycle : 67.2
		2017/18 OSIM cycle : 67.3
		2019/20 OSIM cycle : 67.3
		Do all Structures undergo OSIM inspections per MTO regulations? : YES
		Structures with Loading Restrictions: 9 of 118 = 7.6% They are S033, S070, S079, S080, S081, S085, S107, S113, S119

These LOS are basic and are a starting point for Southgate. The next version of the AMP will bring in more LOS for other types of assets, such as Buildings and Vehicles. Many other LOS measures for core assets could be added to this list, however they would require a commitment to gathering the data required. In some cases, historical data is not available because it was not kept. Therefore, some LOS measures will be kept only for 2021 and beyond.

Taking LOS to the next step will require some group discussion of Target values for Technical LOS. One example would be to say that an overall paved road PCI value of 70.0 is the target. Any targets that are beyond the current actual values in Southgate would, of course, require increased financial and human resources to achieve.

Target values appropriate for Southgate cannot be determined by this AMP. Average BCI through the past three OSIM cycles, per the table, has been kept constant, based on the spending level for structures, as previously approved. Council and staff would need to discuss how much more money

they are comfortable with spending, and whether the capacity even exists to accommodate the amount of work needed to get to a higher Target LOS. Capacity can be limited by not only budgets, but by available contractors and other service providers, and the amount of time that staff can afford to devote to projects, without impairing their existing, mandatory operational duties.

Risk

Another aspect of asset management that is directly linked to LOS is Risk. Risk represents the combination of the chance, or likelihood, of an event occurring, and its potential positive or negative consequences to customers/residents. In asset management, the event we are talking about is the failure of an asset to provide services; it could be caused by a weather-related event.

A Risk Matrix with sliding scales of values for Likelihood and Consequence is often used, such as this one:

CONSEQUENCE	Insignificant = 1	Minor Impact = 2	Moderate = 3	Major Impact = 4	Catastrophic = 5
LIKELIHOOD					
Rare = 1	1*1 = 1	2*1 = 2	3	4	5
Unlikely = 2	2*1 = 2	4	6	8	10
Possible = 3	3	6	9	12	15
Likely = 4	4	8	12	16	20
Almost Certain = 5	5	10	15	20	25

An example might be a severe winter storm event in Texas, an event with a likelihood = Unlikely, but Catastrophic consequences, for a value of 10 (2 times 5) in the matrix. Climate change is just one factor that can alter the likelihood of certain weather-related events, as the frequency of occurrence of weather-related events changes. (see Section 6 on Climate Change)

Assets can be assigned a likelihood of failure, and consequence of failure, such as a bridge closure, with consequences based on where the asset is located, available detour options, and traffic volume. A methodology is needed to identify where the most cost-effective risk reductions are, and what amount of risk can be mitigated, as risk cannot be fully eliminated (in other words, we cannot control the weather).

This will lead to a prioritization of asset needs. Prioritization is a necessary concept for Southgate, because the two Strategy sections of this AMP (Asset Strategy, Section 4 and Financial Strategy, Section 5) will make clear that there are not sufficient resources available to address all asset needs, and so choices must be made, priorities set, and postponements grudgingly accepted, when selecting assets for rehabilitation or replacement. It is unclear whether the assignment of Risk values, to core assets, would result in any significant changes to the timing of core asset projects from how the projects currently appear in the capital plan.

It is recommended that LOS measures, and Risk measures, should be factored-in during Southgate capital budget discussions for 2022 and beyond.

Past practice in Southgate for the selection and timing of capital projects, for the Capital Plan, has been influenced by a combination of:

1. **the results received from external consultants in the most recent OSIM inspection report and the Road Needs report (but not simply taking exactly the same timing, or exactly the same sequence, of projects as given by the consultants, at face value)**
2. **the advice and input of township staff, based on their hands-on knowledge and experience of the state of existing assets, that they use every day**

This past practice is very common among municipalities, as the additional work of devoting time and effort into an expansion of detailed LOS measures and Risk evaluation is just beginning to be developed, in 2021, especially in smaller municipalities. It is recommended that Southgate begins going down the road of keeping more specific LOS measures, and documenting how these measures influence the setting of its future budgets.

Selecting LOS

Asset Management Ontario (AMONT) is an organization providing help and advice on asset management to municipalities of all sizes. AMONT offers the following "tips" for developing LOS in the near term:

- **keep LOS simple, focus on asset objectives**
- **minimize the number of LOS, focus on "Why do we need this LOS?" and "What will this LOS tell us about the asset/service?"**
- **will the data needed for desired LOS be available?**
- **avoid using specific design criteria that is too detailed, too numerous, too prescriptive**

These tips have been followed for the purposes of LOS in this AMP. It is recommended that, as updated versions of AMPs from other comparable municipalities are adopted and publicly released, later in 2021, Southgate staff research these other Plans to discover LOS measures contained in them, that could be useful for Southgate to begin to measure and maintain, keeping in mind the AMONT Tips listed above.

Selecting KPIs

Selecting which KPIs to use, and to set targets for, when establishing Technical LOS is not a science, but there are a few important considerations. These are referred to as the SMART system, developed by the Institute of Public Works Engineering Australasia (IPWEA):

S Specific aspect of service
M be Measurable
A be Achievable (have a clear plan for reaching the KPI target)

R be Relevant to the LOS and to a strategic objective

T be Timebound, have a clear timeframe for achieving KPI target

Proposed Levels of Service (LOS), both Customer LOS and Technical LOS

Part 6 of the Regulation requires future versions of the AMP to include [now required by July 1, 2025] a discussion of Proposed LOS, including:

1. **the Proposed LOS measures**
2. **an explanation why the Proposed LOS are appropriate**
3. **proposed performance of each asset category, for each of the next ten years**
4. **a lifecycle management and financial strategy, in each asset category**

Although not required for the 2021 AMP, here are some initial considerations about developing Proposed LOS.

Future LOS for Southgate would most likely be built around maintaining the current LOS, at least in the near term. This expectation is based on the economic and practical limitations that a municipality like Southgate must operate within. Maintenance of just the "status quo", on its own, will be a challenge for Southgate, and will require more resources than those being used in 2021, because:

- **Southgate is experiencing substantial growth in population and households now, and growth is expected to continue, so to keep current LOS will demand more from existing core assets, even as they age**
- **Climate Change, and severe weather events, will have negative impacts on specific core assets, putting them under more stress, and likely shortening their service lives. In other words, assets are likely to need more frequent replacement in future.**

Climate change is an area of asset management that is taking on more and more significance. Section 6 of this AMP discusses climate change and its potential impacts on the assets that Southgate has in service.

Southgate must have chosen some Proposed LOS (by June 2025), and started to record and track those chosen. Here are some ideas for specific Technical LOS measures (KPIs) that could be tracked in the future:

ROADS and STRUCTURES

- **Percentage of Capital investment/spending to asset replacement value**
- **Historical cost depreciation compared to annual expenditures**
- **Costs per capita (Operations and Capital)**
- **Maintenance costs per square metre**

- **Achieved overall BCI (per OSIM inspections) compared to target overall BCI**
- **Achieved overall roads PCI compared to target overall PCI**
- **Percentage of road lane-km. rated as Poor and Critical**
- **Percentage of customer requests getting a response within 24 hours**

WATER AND SEWER

- **Cost of borrowing compared to total operating costs**
- **Percentage of mains where condition is rated Poor or Critical**
- **Number of wastewater main backups per 100 km. of main**
- **Number of customer requests received per year**
- **Percentage of customer requests with a response within 24 hours**
- **Percentage of network inspected**
- **Percentage of Replacement Value spent on operations and maintenance**

Other non-core asset classes, including buildings, vehicles and machinery, will be added to the next expanded AMP, and these asset classes will have KPIs of their own to add to this list.

But what are the right LOS/KPI's for Southgate? Factors that can influence which LOS and KPI will be selected for tracking in the future include:

1. **Strategic Objectives and Corporate Goals**
    - **Southgate's long-term direction outlined in its adopted corporate Plans**
    - **this direction will influence the types of services to be delivered, the quantity and quality**

2. **Community Expectations**
    - **General public will have insights on what they consider to be a "good Condition" for a road, or where they feel new roads are needed based on travel patterns**

3. **Economic Trends**
    - **Interest rates (example: a KPI that relates debt service cost to another metric)**
    - **Currency exchange rates**
    - **Fuel and utility prices (example: KPI that measures fuel efficiency, Km per litre)**

4. **Demographic Changes**
    - **If Skewing younger = more parks and recreation services**
    - **If Skewing older = more well-being centers**

5. **Environmental Change**
    - **more extreme storm events will require more KPIs related to asset resiliency**

Future Reviews

Reg. 588/17 part 9 requires annual reviews of progress of the Southgate AMP. This requirement has been added, by the Province, to encourage municipalities to treat asset management as an ongoing activity, make it part of annual budget preparations, and not something to be set aside for several years. This often has been the case for many municipalities, where their first AMP was completed in 2013 or 2014, but seldom looked at since.

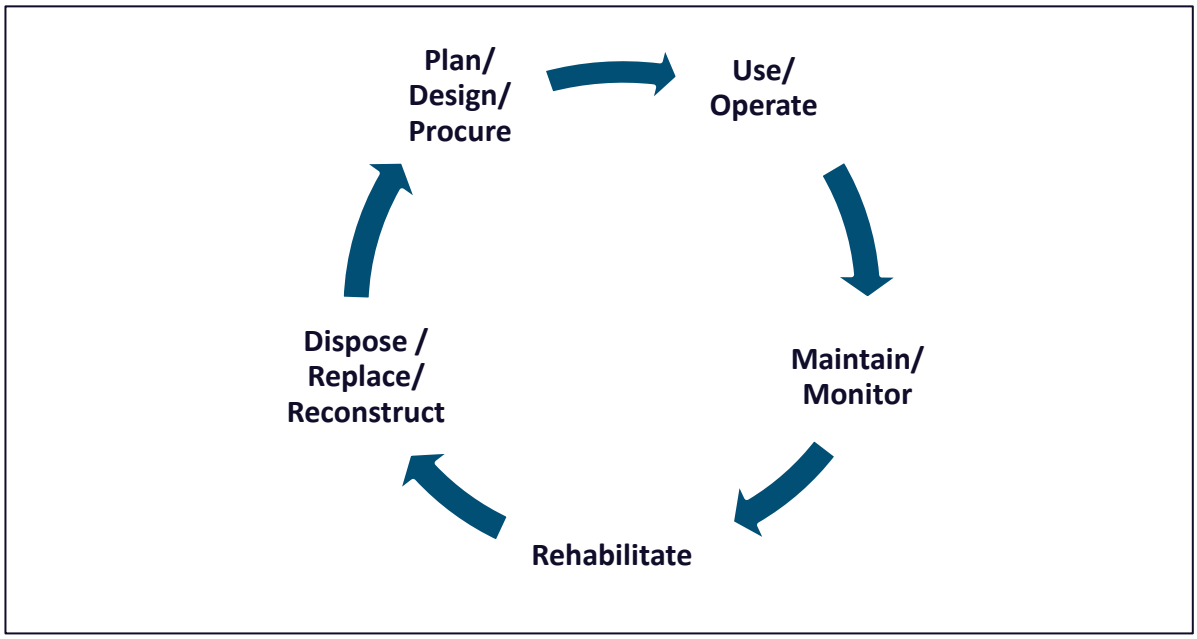
One mandatory piece of these annual reviews should be an historical tracking of Southgate LOS and KPI measures over time, to identify trends, and any new measures that have been added. The number of LOS and KPI measures kept by Southgate will certainly increase beyond this initial 2021 group.

4. ASSET STRATEGY

The purpose of Southgate's Asset Management Strategy (AM Strategy) is to evaluate current practices, and to establish future practices that will be sustainable and cost-effective. This AM Strategy considers asset/infrastructure solutions, and non-infrastructure solutions. There should be a focus on continuous improvement of asset management activities, towards the goal of improved service delivery from township assets.

Non-infrastructure solutions means using tools like external studies, master plans, and public consultations about LOS and asset condition assessment. In Southgate, these studies and plans are included in the budget as "special projects".

Steps needed in the AM Strategy are (a) data collection (including lifecycle data and risk data), (b) asset condition assessment, and (c) the analysis of the data collected.



Asset Lifecycle

(A) DATA COLLECTION

This diagram depicts a typical "cradle to grave" lifecycle of an asset. Township staff already follow this process for the assets they regularly work with, but it would be useful for proper asset management practice to, more formally, document best-estimate timetables of the various stages of key assets, including timing expected for rehabilitation and disposal. This is already in place to a certain degree; it has to be in place, to be able to prepare an annual capital budget and ten-year

capital plan. However, there is room for expansion of lifecycle record-keeping and for formalizing the processes followed. Introducing risk matrix calculations can be part of this expanded record-keeping. It is recommended that the Asset Co-ordinator (AC) work with front-line staff to develop a more uniform record-keeping process.

Gaps in asset data were encountered often during the preparation of this AMP. Confidence in the asset data presented in Section 2 State of the Infrastructure could be significantly improved through the work of a cross-functional team with the leadership of the AC. It is recommended that such an internal group, initially established by staff in 2021, become more active.

An important life-cycle stage is the maintenance and monitoring of assets, after they have been procured and put into operational use. Proper maintenance is essential to maximize the useful life of an asset, and to minimize risk. Maintenance will avoid the need for earlier-than-anticipated replacement, thereby saving financial resources, and maintenance will ensure the performance of the asset is meeting LOS expectations. Monitoring asset condition with written or electronic log books is critical, to avoid duplication of maintenance activities and to find defects early on, before they develop into serious issues. Not only does asset performance benefit from this monitoring, there are health and safety benefits for employees who rely upon proper performance of assets.

Maintenance activities should consider factors such as cost-effectiveness (how long will this repair last? and Is just a "clean-up" enough, or should an entire part be replaced?), time delays (how long will the asset under maintenance be kept out of service?), and co-ordination with utilities (gas company, hydro company) and other municipalities (does a temporary detour need to go through part of a neighbouring municipality? If so, for how long?).

(B) ASSET CONDITION ASSESSMENT

In Section 2 of the AMP, asset condition was used to analyze the State of the Infrastructure. Accurate and comprehensive data on an asset's CURRENT condition are fundamental to a good AM Strategy. Such information mitigates premature asset replacement and/or failure of assets.

For some entire asset classes, Southgate has followed a more cost-effective, but cursory, approach to condition rating, using metrics like the five stages *Very Good, Good, Fair, Poor and Critical.* This approach enables an overview of the assets, and it does indicate which assets are most in need of attention. A better understanding of asset condition leads to more sound management practices and helps to minimize unnecessary expenditures. When combined with risk management frameworks, asset condition assessment will help to identify potential future asset failures, leading to the scheduling of repairs, preventative maintenance and rehabilitation programs that are financially accountable and transparent.

Gravel roads require frequent maintenance, especially after wet periods, and when accommodating heavier traffic. Deterioration involves wheel rutting and water run-off, and eventual road destruction if unchecked. Gravel roads require a cycle of perpetual maintenance, including general re-grading, reshaping of the crown and cross section, gravel spot and section replacement, dust abatement, ditching and brush removal.

For the entire road network, it is recommended that Southgate firmly maintain a regular schedule of comprehensive Road Needs Studies, at least every five years. There is no requirement for the timing of these studies, and so they could be less frequent. However, it is recommended that Southgate does not allow more than five years to elapse between external studies, because of the growth being experienced, leading to new roads being added to the network, and increased traffic volumes that have an impact on road asset condition. Roads can deteriorate quickly, if Southgate experiences one or two winter seasons that happen to involve unusually high numbers of freeze-thaw cycles, as opposed to a "Normal Winter" that gets cold and stays cold for the full season.

It is recommended that, based on factors such as substantial growth in population and vehicles on township roads, that the next Road Study be budgeted for 2023, four years after the most recent (2019) Study.

Structures fall under the Provincial rules of OSIM, and are thereby inspected every two years. There is a regular system of external inspections in place already in Southgate. This system fulfills the need, and does not need to be amended.

Also as required under legislation, water systems, sanitary sewer systems and the lagoon are reported on regularly, as to the water quality found in testing samples, effluent measurements, and so on. The reporting of test sample results is about the functioning of the systems, such as shut-downs or main breaks, but not focused on the condition of the assets in each system. As a result, the cursory approach to condition rating mentioned above (the five stages) was applied in this AMP. It is recommended that a more detailed, risk-based approach be made to gather more specific information on the condition of these assets.

A common method used for storm and sanitary mains is Closed Circuit Television Video (CCTV). The process involves a small robotic crawler vehicle, with a CCTV camera attached, that is lowered down a maintenance hole, into the main. The camera provides a live video feed to a truck on the road above. Deterioration problems that can be seen include open/displaced joints, presence of roots, infiltration and inflow, cracking, fracturing, collapse and deformation of pipe. CCTV is a costly process and it does take significant time to inspect large volumes of pipes.

It is recommended that Southgate establish a sewer condition assessment program and devote a portion of capital funding to this program.

(C) ANALYSIS OF DATA COLLECTED

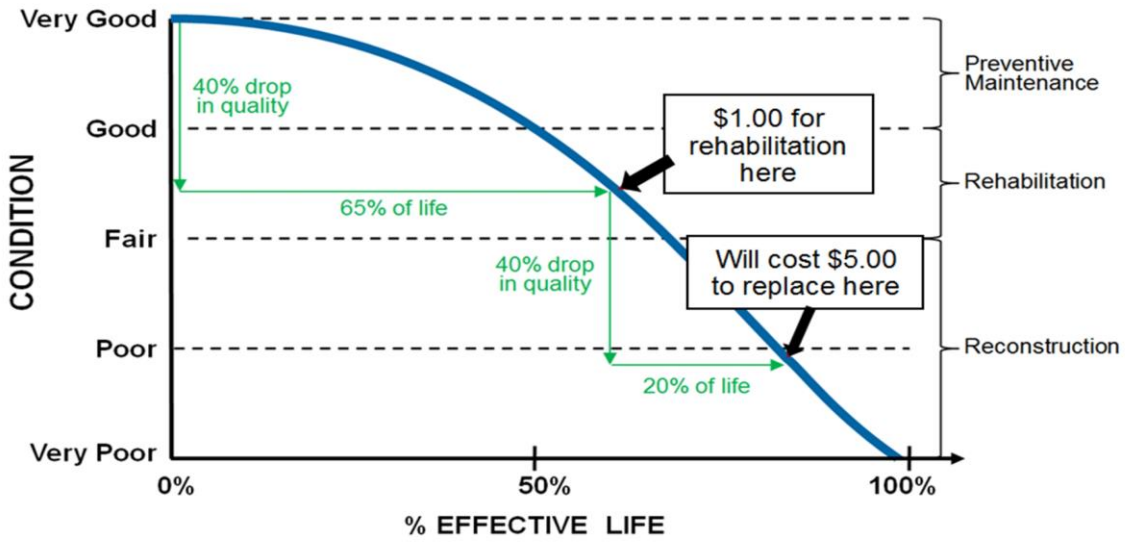
How data on assets is used is critical to asset management. An understanding of what the data tells us, and knowledge of what pitfalls to avoid from misinterpretation of data, is critical.

For road assets, PCI data taken alone could lead to a "worst-first" budget approach, where no lifecycle activities are done, other than simply performing reconstruction at the end of a road's service life. This is the most costly method of managing a road network. Road data collection needs to go beyond only PCI.

Section 4 of the Reg. 588/17 specifies the need for the 2021 AMP to discuss "lifecycle activities" for core assets. Asset useful lives can vary across a wide range of years, depending upon how well the assets are maintained. The lowest cost type of lifecycle activity is regular maintenance of core assets. Southgate has been doing core asset maintenance, as the main lifecycle activity, and will continue to do so. In addition to regular inspections, minor and major repairs are done every year, within budget limits.

Preventative maintenance activities can only be applied to a road at a relatively early point in its lifecycle. At a certain point, despite the efforts to maintain a road's condition, its life cycle stage will dictate more substantial rehabilitation. Activities such as routing and crack-sealing, or tar-and-chip on rural roads, have the lowest associated cost (per sq. m.) to obtain one year (or more) of added life.

Here is a commonly used graphic to illustrate lifecycle stages:



This graphic shows that regular preventive maintenance can see an asset through the first 60-65% of its normal life, at which time some major rehabilitation will keep the asset in service for an extended period. Skipping the major rehabilitation step will lead to an earlier than expected need for full asset reconstruction/replacement, typically when the asset is at about only 80-85% of its normal life. The rehabilitation will delay the need for full replacement until the normal end of the asset's life, or perhaps even a bit beyond that end-point, if the asset has been well maintained, rehabilitated, and not excessively used.

Below is a chart listing road lifecycle activity, making use of PCI (pavement condition) values:

Condition	PCI range	LIFECYCLE ACTIVITY
EXCELLENT	91-100	• Maintenance only
GOOD	71-90	• Crack sealing • Emulsions
FAIR	51-70	• Resurface – mill & pave • Resurface – asphalt overlay • Single & double surface treatment (rural roads)
POOR	31-50	• Reconstruct – pulverize & pave • Reconstruct – full surface & base reconstruction
CRITICAL	0-30	• Assets now beyond their useful life • Same activities as Poor above

A high proportion of gravel roads, as is the case with Southgate, can have a significant impact on the maintenance budget. It is recommended that Southgate study the traffic volumes on its gravel roads closely. Studies have found converting certain roadways to paved roads can be cost beneficial. Considerations for paving should include:

- **Functional importance of the road (location, landmarks nearby)**
- **Traffic volumes AND type of traffic (example near a landfill site or waste drop-off)**
- **Known safety issues (accident records)**
- **Frequency of maintenance, recent history of spending**

It is recognized that Southgate has been following this recommended practice; for example, in 2020 some gravel portions of Wilder Lake Road were paved.

Also, where it is appropriate, Southgate might decide to return a paved road back to gravel, based on multiple factors mentioned earlier. One recent example of this was the 0.510 km Orchardville Sideroad, at the west boundary near Highway 6 and Road 14.

When it comes to structures, again other factors beyond BCI should be considered. Operations staff perform routine visual inspections of structures. The best approach to minimize lifecycle costs is to perform smaller, low-cost repairs earlier in the lifecycle.

Routine maintenance of structures, like roads, is the lowest cost lifecycle activity for extending the lives of structures, enabling them to continue to meet existing levels of service.

Recurring items that should be completed every year include:

- **Cleaning winter sand and salt from bridge decks (sweeping)**
- **washing of decks, drains, joints, bearing seat areas and girders**
- **Vegetation removal or trimming**
- **Routing and sealing cracks, as needed**
- **Placing rip-rap in washouts on slopes adjacent to bridge wingwalls, with minor erosion concerns**

Funding for these tasks is provided in the annual Public Works operating budget. They are in fact performed annually by township staff now.

In the OSIM reports, consultants also recommend additional studies and investigations to evaluate the condition of certain elements beyond a visual inspection. Typical investigations that may be recommended include:

- **Deck condition surveys**
- **Structure evaluations (load capacity)**
- **Monitoring of deformations, settlements and movements**
- **Monitoring crack widths**

These actions are being done by Public Works staff, to the best of their available human resources. These actions recommended by RJB are for structures currently demonstrating severe material defects or performance deficiencies, which may need an inspector to require more detailed information. In the 2020 OSIM report, page 4, 31 structures had additional investigations recommended.

Sometimes these investigations may not be completed, due to budget constraints. There is provision made in the operations budget, however, for emergency repairs when needed. Structures S114 (2018) and S119 (2020) are examples where emergency repairs were performed.

Taking a step back to a broader look, not at just one asset class, but looking at AM Strategy in general, part of any data analysis should involve considering Future Demands; in particular, this is important for a growing municipality like Southgate. AM strategies must consider future growth, where it will take place, when it will happen (quickly or gradually) and what services are likely to be the most impacted. The Official Plan and other planning documents should be consulted to gather such information. AM Strategy applies to more than just existing asset infrastructure, it also applies to new assets yet to be constructed or acquired.

There are a series of Risks that have the impact of imposing limits on an AM Strategy:

- **One risk to AM Strategy, and decision-making, is resiliency to Climate Change. The Province has recognized this, and made it a requirement for AMP's of 2021 and beyond to include separate sections on Climate Change. Please refer to that section in this AMP.**
- **Affordability versus LOS. The LOS will certainly deteriorate if capital budgets remain "flat". Southgate capital budgets have increased in recent years, but the next section on Financial Strategy will show it is not enough. Like all municipalities of its size, Southgate will have to make a trade-off between capital asset management, LOS, and levels of taxation on its residents.**
- **Damage claims from accidents caused by substandard condition of assets like roads and structures are another risk to be factored into AM Strategy decisions.**
- **Adequate staff resources, in terms of manpower and skills training, is another risk factor. As affordability forces capital projects to be delayed in the ten-year plan, beyond the optimal time to do the work, trained staff resources devoted to inspections and regular maintenance become more essential.**
- **Knowledge retention is related to the staff resources risk. Human resource divisions can provide data on turnover rates and pending retirements. This data can be factored into succession plans, to minimize the loss of corporate knowledge about capital assets.**

Reg. 588/17 part 5, section 5, requires an AMP to provide "*A description of assumptions regarding future changes in population or economic activity*" and how these changes will impact asset management for Southgate. Here are population data for Southgate:

	2001 Census	2006 Census	2011 Census	2016 Census	2021 Forecast	2026 Forecast	2031 Forecast
TOTAL SG Population	6,907	7,167	7,190	7,355	8,530	9,810	11,280
% increase		3.76%	0.32%	2.28%	15.98%	15.00%	14.98%
Breakdown							
Male		3,677	3,705	3,815	*t b d*	*t b d*	*t b d*
Female		3,490	3,485	3,540	*t b d*	*t b d*	*t b d*
0 to 24		2,539	2,365	2,450	*t b d*	*t b d*	*t b d*
25 to 49		2,385	2,270	2,045	*t b d*	*t b d*	*t b d*
50 to 74		1,870	2,210	2,480	*t b d*	*t b d*	*t b d*
75 plus		373	345	380	*t b d*	*t b d*	*t b d*
Households		2,564	2,620	2,710	*t b d*	*t b d*	*t b d*
Avg. HH Size		2.79	2.74	2.71	*t b d*	*t b d*	*t b d*
Increase of 90 households or 3.4% over 5 yrs. 2011 to 2016							

Forecasts taken from the Southgate Recreation Master Plan 2021

The 2026 and 2031 forecasts above may be a bit on the high side. The most recent Southgate Development Charges Study (2017) provided population forecasts, based on 10-year and 20-year

time horizons, namely 9,350 by 2027 and 10,790 by 2037, per page 3-3 of the DC Study. The DC Study forecast for Households was 3,513 by mid-2027 and 4,133 by mid-2037, per page 3-5 of the DC Study.

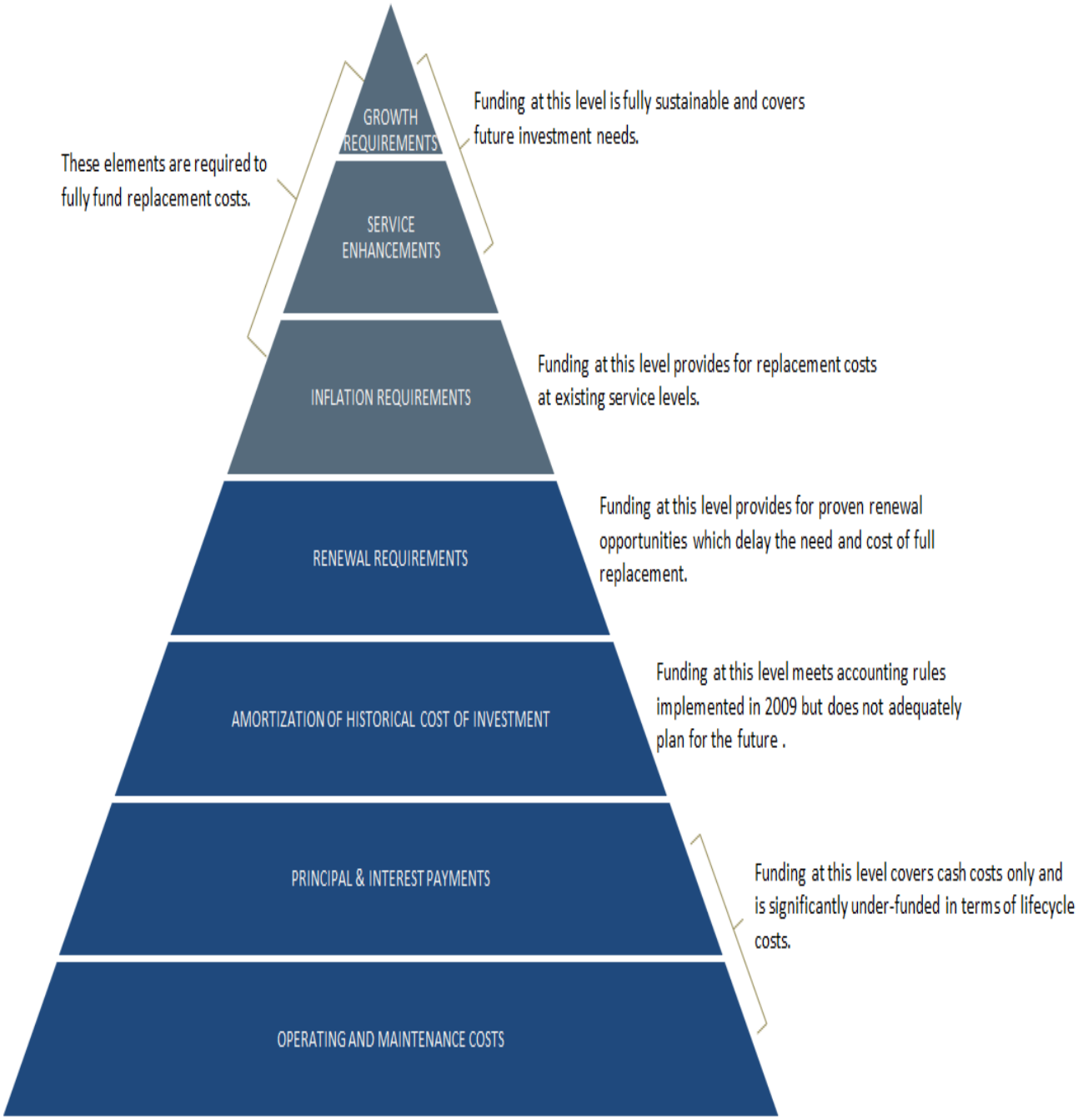
It should be acknowledged that a Grey County Growth Study is currently underway which will include the upper-tier's population forecasts.

What really counts, from the asset management viewpoint, is the impact of this pace of growth. The impact would be an increased demand for township services and in turn, increased demands on township assets needed to deliver those services, at LOS which are at or above 2021 LOS.

When assets are increased in their number, or existing assets get heavier use, there are impacts on the Operating Budget, and that should be considered as part of the Asset Strategy. For example, if the snowplow fleet is expanded by one unit, the Operating Budget for Winter Control should reflect increases in fuel, oil and repairs.

5. FINANCIAL STRATEGY

To make this AMP effective and meaningful, it must be integrated with financial planning and long-term budgeting. Here is a commonly referenced hierarchy of capital asset funding levels, presented in many AMPs, that measures the funding provided for capital needs, by seven levels:



Southgate currently is only slightly above Level Three. However, for many years Southgate was like many other municipalities, including others in Grey County, with its funding below Level Three. It was during those years that large backlogs developed in work to be done, backlogs commonly referred to as the Infrastructure Gap (the I-Gap).

At its current funding level, the I-Gap in Southgate is still growing. Every municipality has an I-Gap today, including the very largest municipalities, with the most human and financial resources at their disposal. The I-Gap is large enough now, in practically every municipality, that realistically it will never be fully resolved.

Stated simply, speaking realistically, there will always be an I-Gap, in every municipality.

What every municipality can do is, to the best of their ability based on resource restraints, firstly prevent their I-Gap from growing any larger, and secondly, do as much as is affordable to reduce their Gap gradually, year-by-year. It should be the AM Strategy of all municipalities to make consistent progress against their I-Gap in every single future year. There should be no "time-outs" taken, progress should be uninterrupted, barring catastrophic events that are unforeseen.

There will be bumps in the road. The economic damage from COVID may set back the progress against the I-Gap in the short term; many municipalities may find it more difficult to increase taxes to reduce their I-Gap while their local economy is suffering. There may also be unanticipated setbacks from weather-related events, that likewise could cause municipal finances to be temporarily re-directed away from the work to be done against the I-Gap. Even in those years, a reasonable compromise would be to make only a minor amount of progress against the I-Gap, less that what had been planned, but at least some improvement is made.

It will always require taxation increases to make any progress on an I-Gap. Taxation is the largest source of infrastructure funding, except when a very large borrowing is done in the year of a large project. Borrowing is appropriate for a major infrastructure project that results in an asset that will last many years, because borrowing spreads out the cost over future years, and over future taxpayers, who benefit from the services that asset will provide. However, borrowing adds to the cost of the asset by adding an interest expense. Borrowing also limits Council's control over its own budget, since debt servicing costs are a fixed cost that Council cannot cut from the budget.

In addition to raising more money, there are other actions to take, as mentioned earlier, such as better asset data gathering, proper asset maintenance and regular repairs, long term planning, and seeking out grant funding. Senior government levels recognized the I-Gap issue years ago, and so in recent times we have seen many actions they have taken:

- **Doubling the amount of Federal Gas Tax provided to municipalities, in specific years.**

- **Expanding the kinds of projects eligible for Gas Tax funding.**
- **Expanding the range of services eligible to use Development Charges.**
- **Increasing the frequency and amounts of competition-based, single project-based grant funding programs available.**
- **Increasing (albeit gradually) the funding for annual non-competitive, per-capita grant programs, such as OCIF**
- **Uploading of some services by the Province, the direct opposite of the downloading of both services and capital asset responsibilities (specific roads, social housing, for example) onto municipalities, that happened during the same years when the I-Gap was growing.**

Here is a review of how Southgate has recently stepped-up against its I-Gap:

Year	Taxes levied for Capital and Special Projects (e.g. studies)	Deprec. Expense on Audited Fin. Statements *(excludes W&S)*
	excludes Water Systems and Sewer Systems which are user-fee funded	
2011	$ 450,200	$ 1,334,243
2013	$ 831,000	$ 1,357,499
2015	$ 1,373,777	$ 1,399,672
2017	$ 1,447,896	$ 1,523,272
2019	$ 1,766,700	$ 1,647,668
2020	$ 2,055,854	$ 1,761,500
2021	$ 2,236,539	Estim. $ 2,000,000

Taxes levied annually, for tax-supported capital assets in Southgate, were inadequate until about 2015. Level Three, namely taxation matching the depreciation expense, is a bare minimum to reach, since depreciation is a flawed number that is based on often extremely outdated asset historical-cost values, and therefore Level Three funding will not come close to the cost of replacing an asset at current prices. This situation is particularly bad in low-growth municipalities, where many municipal assets are quite old, and there are not many newer assets because there has been no pressure coming, from municipal growth, to build new assets to service growth.

Southgate had not reached Level Three until 2015. Growth had picked up at about that time. Like most other municipalities, the I-Gap in Southgate was getting larger every year, until about 2015 when taxation-funding levels for capital assets began to approach what was necessary to stop things from continuously getting worse. However, since the I-Gap problem kept getting worse for roughly a twenty year stretch from 1995 to 2015, it will take many years of gradual progress, around enhanced financing, to resolve the problem.

Southgate's 10-year Capital Plan, as shown in its 2021 budget documents, recognizes the I-Gap problem and does strive to keep up with the need for increased attention to capital assets. Tax levy forecasts for Capital (and Special Projects):

Year	Forecasted TAX LEVY for Capital Budget (and Special Projects)	Increase in $$	Increase % over prior year	Gross Capital project costs for the year, forecasted
2020	$ 2,055,854 Adopted	$299,154	17.03%	
2021	$ 2,236,539 Adopted	$180,685	8.79%	$11,215,797
	Draft amounts from 10-year Capital Plan			
2022	$ 2,555,635	$319,096	14.27%	
2023	$ 2,828,163	$272,528	10.66%	
2024	$ 3,146,084	$317,921	11.24%	
2025	$ 3,508,870	$362,786	10.34%	
2026	$ 3,930,985	$422,115	12.03%	
2027	$ 4,410,125	$479,140	12.19%	
2028	$ 4,927,548	$517,423	11.73%	
2029	$ 5,519,127	$591,579	12.01%	
2030	$ 6,198,637	$679,510	12.31%	
	excludes Water Systems and Sewer (W&S) Systems which are user-fee funded			

Under this plan, taxation for capital projects would increase by 201.5% over 10 years, from 2020 to 2030; in other words, tax support would triple in ten years. This would be a major increase, going by the standards set by Southgate's budgets prior to 2020. On the other hand, for some perspective take note that:

- **Sept. 2020 OSIM report from RJB on Structures provides a five-year proposed Capital Plan (Table 8 in the report) costing $5,605,500 (no inflation adjustment)**
- **The same RJB report shows a forecasted cost for the next ten years of $28,322,400 for Structure "rehabilitation and replacement", NOT INCLUDING associated costs for roadside protection work and additional investigations (another $4.7 million). These costs are not adjusted for inflation (so 2020 costing is used throughout the ten-year period)**
- **The 2019 Triton Road Needs Study estimated a cost of $20.11 million over ten years for major rehabilitations and new pavements (again no inflation adjustment)**

Taking these numbers, at the lowest options, it works out to roughly $2 million per year for roads capital and $1.1 million per year for structures ($5.6 M/ 5 years) for a total of $3.1 million per year of gross capital spending recommended by external consultants, just for roads and structures.

The Southgate Tax Levy for 2021 capital projects, per the Table above, is $2.236 million for all its departments, and all its assets (not just roads and structures), including vehicle fleet, machinery and buildings, but excluding water and sewer (W&S) assets. The net levy for Public Works, for 2021 road and structure projects only, is $761,830 or about one-third of the full 2021 Levy, on gross project costs of $2.7095 million. This does not include fleet replacements, equipment, signs or debt servicing, it just includes road and structure projects. [*Funding of the $2.7095 million of work for 2021 comes from Grants $828K, from Reserves $294.4K, from borrowing $825.3K and from Taxation $761.8K.]* The $2.7 million amount of approved road and structure capital costs for 2021 is getting

reasonably close to the $3.1 million figure from the consultants. Southgate is making some progress against its I-Gap.

It is unusual to see borrowing as a funding source, especially when every infrastructure project in Public Works, across the entire ten-year Plan, are rehabilitations or replacements of existing assets. There are no new assets appearing in the Plan, just replacements or upgrades of assets already in place, but wearing out. In every year in the ten-year Plan, the projects listed are for an existing structure (as proof, the Structure ID # is given) or an existing section of road. In fact, borrowing appears as a financing source not just in 2021, but also in 2022, 2023 and 2024.

This use of debt for financing asset replacement is a signal of financial stress; in many municipalities, it is their adopted policy to only use debt for the construction of new assets, such as a building, where there is no asset currently. In Southgate, certain projects are placed within the capital plan, in specific years, because the work needs to get done, but there are not enough funds available to pay for them, so the shortfall is made up by borrowing some money every year. Late budget changes were made by Council to reduce the amount being borrowed in 2021, while keeping within Council's limits for the overall taxation increase. The debt service costs, created by this planned borrowing, become an annual expense in later years of the Plan, so that by year 2025 there are four infrastructure debt-servicing amounts (principal plus interest) appearing, under Public Works, taking up 2025 taxation revenue room, and leaving less room for new project costs.

The financial stress situation, shown by the need for borrowing for asset replacements, comes from prior years of under-funding capital assets, years when the I-Gap was expanding. It should also be noted that this stress is also reflected, but less noticeably, in the timing of capital projects throughout the ten-year Plan. You can point to multiple cases where Township staff would want to see specific projects scheduled earlier, but projects reluctantly get delayed to the year when they could be "fitted" within the Plan's annual financial limitations.

Another serious source of stress on asset management is capacity issues. It might be great to expand budget dollars, and to make plans to get more work completed each year. What must not be overlooked is the realistic capacity to accomplish the work. Consideration must be given to the human resources available to design, supervise and complete projects. Capital work projections, and capital budgets, that do not consider capacity limits will result in multiple unfinished projects, unspent funding, and high levels of work-in-progress.

One further point to be made about capacity issues is Covid-19's impact. Covid has put many 2020 projects of other municipalities into deferral, province-wide, (but not Southgate, however), leaving a work backlog to be filled by the same number of potential contractors, or perhaps even fewer contractors, when you consider that perhaps some were put out of business by Covid.

Looking at the final year in the Plan, 2030, the taxes levied are forecasted to be $4.920 million for the roads and structures segment of Public Works (79% of the forecasted 2030 capital tax-support Levy of $6.198 million). Within that amount, $450,000 is for debt payments, leaving $4.47 million [4.92 – 0.45] for 2030 project costs. This is about double the overall amount of adopted 2021 taxes levied for capital, in all departments combined, of $2.236 million, and is much improved over the $0.7618 million levied in 2021 tax support for road and structure projects.

Many other municipalities have adopted an "Infrastructure Levy" as part of their annual budget process. Typically, you will see others have approved 1% or 2% annual municipal tax levy increase commitments, for capital assets. Southgate's overall Tax Levy for 2020 was $7,584,704 (capital and operations) so the increase in 2021 taxes levied for capital purposes, namely $180,685 per the table above, was effectively a 2.38% increase over the 2020 levy, so Southgate is making a similar commitment to capital without naming it directly as an "infrastructure Levy". Notice that in the table above, draft tax increases for capital support, planned in 2022 and beyond, are all greater than the 2021 increase.

It is recommended that Southgate stay determined to meet those targets shown in the years 2022 to 2030 in its Capital Plan. Another recommendation is to pursue other revenue sources such as external grants and subsidies, to enable the Township to advance planned capital projects to earlier timeslots, without amending the targets for annual taxation support.

It is also recommended that as debt payments for past projects expire, the "savings" from the debt payments dropping off should be applied to new projects in the capital budget, and not be "returned to the taxpayer" by lowering the taxes levied for capital.

It is often asked "what is the appropriate level of taxes to raise for capital purposes?". There is no standard answer for this question; circumstances are different in every municipality. The size of the I-Gap, resulting from past actions (or lack thereof), is one factor, and municipal growth is another factor.

For example, the County of Grey tax levy for 2021 is 26.75% for capital costs and 73.25% for operations. For comparison, in 2020 Grey County's tax levy was 24.74% for capital costs and 75.26% for operations. Further, in 2015, the Grey County tax levy was 20.77% for capital costs and 79.23% for operations. For Southgate, its tax levy for capital in 2021 was 28% of the total levy; in 2018 it was 27% of the total levy; in 2013 it was 20.57% of the total levy.

A 25% / 75% target ratio is quite typical in larger municipalities. Grey County has 887 km of County roads and 192 structures. This does not mean 75/25 is the right target for Southgate. The taxation

ratio split depends on the kind of services being delivered. Upper-tier municipalities, like the County of Grey, perform many "soft services" such as Child Care, Elder Care and Social Assistance, where the costs are weighted towards personnel and are more operational, as opposed to Public Works where there are a high number of capital assets to maintain. Notice the County levy-share going to capital costs has been increasing; this is what should ideally be happening in municipalities that are actively trying to address their I-Gap. This has also been happening in Southgate.

AMP's often will illustrate the I-Gap on a line-graph, as part of a Financial Strategy designed to close their I-Gap over time, using increased property taxes and other actions. These graphs will often show the tax increases that would be necessary to get the I-Gap all the way down to zero in the future. Where the I-Gap is large, this analysis can result in calculations that give required annual tax increases, needed to "eliminate" the I-Gap in the specified timeframe, that are not reasonable or realistic, and very unlikely to ever be approved by Council.

This approach is not recommended.

In the case of Southgate, it is more realistic to state honestly that the I-Gap will never be zero; instead, we recommend that the municipal leaders be disciplined in their efforts to raise property taxes, for capital project purposes, at a manageable but steady pace, and consistently accomplish as much capital work each year as the municipality has the capacity to complete. Avoid the "over-promise and under-deliver" scenario. The targets for tax support already in the Southgate Capital Plan are a good start.

The evidence of future advances accomplished by Southgate, against the I-Gap, will be clearly measurable, by using the future PCI and BCI results in external consultants' reviews of the state of Southgate's core infrastructure (Roads and Structures), when these reports are completed in future years. Results achieved (or not achieved) will also be reflected through comments and opinions received, from local ratepayers, about the state of township core infrastructure.

User-rate Supported Assets (Water and Sewer system)

Water and sewer systems are required by Ontario legislation to be self-sustaining financially. User Rates must be set at levels needed to fund all operational costs, capital costs and debt-servicing costs. Capital costs can be more than what is needed to finance current-year capital projects, to build capital-project reserves, in anticipation of major capital project costs upcoming.

Even when reserves for water and sewer projects are built in advance of major capital projects, the reserves may not be built up to the full project cost by the time of project construction. This could happen because there was not enough time available to build reserves before a project was

started, or some unusual events happened from an operational standpoint, that resulted in higher operating costs, leaving smaller amounts to go into the reserves than what was planned for.

For very large capital projects, it may be necessary to plan long-term borrowing for those projects. Then user rates would be set such that annual debt-servicing costs can be fully carried from the rate revenues collected. This is like securing a mortgage loan on the purchase of a home. Borrowing is appropriate for the purchase (or major rehabilitation) of a long-lived asset, such as a new sewage treatment plant, so long as the debt payments can be carried by rate revenues.

Southgate operates utilities in Dundalk only. The User Rate system ensures that only the residents in Dundalk are paying for the costs and the debt of the utilities, and not the residents in the remainder of the township. Southgate does in fact have several large capital purchases scheduled in the medium-term for both its water and sewage systems (projects of $1.0 million or more). Capital project data obtained from the 2021-2030 Plan:

YEAR	SANITARY SEWAGE SYSTEM CAPITAL BUDGET	FORECASTED NEW DEBT	DEBT TERM		WATERWORKS SYSTEM CAPITAL BUDGET
2021	60,000	0			233,000
2022	16,316,200	10,993,185	20 yrs.	SWR	
2022		3,225,000	20 yrs.	WTR	3,337,000
2023	0	0			172,000
2024	0	0			47,000
2025	1,500,000 (but no debt)	0			352,000
2026	0	1,684,000	10 yrs.	WTR	1,736,000
2027	1,000,000 (but no debt)	0			242,000
2028	0	4,250,000	20 yrs.	WTR	4,202,000
2029	0	0			2,000
2030	1,000,000 (but no debt)	0			2,000
		20,152,185			
	SANITARY SEWAGE SYSTEM CAPITAL BUDGET	FORECASTED NEW DEBT			WATERWORKS SYSTEM CAPITAL BUDGET

Southgate borrowed $3,731,925 in 2019 in respect of Well D5 waterworks capital project. Plans are in place, per this table, to take on a further $20 million of debt over the next ten years for utilities projects. Future user rates must take the future debt-servicing costs into consideration. Interest rates for municipal borrowing are very favorable at the current time, and they are expected to remain that way for many years ahead.

Major projects in the Capital Plan, reflected in the table above, are:

- 2022 sewage treatment facility upgrade
- 2022 construct new water tower

- **2025 Ida St. S. & Eco Parkway sewage pumping station**
- **2026 Main St. W. watermain (oversizing) [Main St. E. mains were done in 2019/20]**
- **2027 Glenelg St. sewer**
- **2028 construct new Well D6**
- **2030 Ida St. N. & Glenelg St. sewer**

The Plan expects to have adequate funds in reserve for the pumping station (2025) and the two sewer projects (2027 and 2030) to fully fund those projects from the sewer system reserve, without issuing any new debt. From the seven projects above, four are expected to require incurring new debt.

Debt-servicing costs can also be funded from Development Charges (DC), so long as the projects were DC eligible (in other words, they were growth-related projects, in full or in part, and they were in the current DC Bylaw). At the time of project construction, it is likely there will not be enough DC funds collected to date, to pay the DC-eligible share of project costs in full. Instead, over subsequent years, as more DC are collected each year, they may be applied annually towards debt-servicing costs.

Additional Financial Considerations

One further point to make about financing is for information only, as Southgate is a long way from being in the following position. [This point also appeared in the 2013 Southgate AMP.]

Municipalities with strong levels of financial resources available to them, due to large populations and high property values, may follow the "Sinking Fund Method (SFM)" for financing capital assets. The SFM takes asset management planning to another level. SFM builds large reserve balances for the future replacement of assets. These reserves get started soon after an asset is replaced, contributions are made to the reserves consistently every year, and the outcome is many subsidiary reserves, covering nearly every asset class. These large reserves are invested, to earn investment income that gets added to the reserves, to build the reserves more quickly, and to be put towards the future project costs. The practice of SFM is part of formal Long-Term Financial Plans (LTFP), found more commonly in larger municipalities with "deeper pockets".

For one example, there could be subsidiary reserves in place for the replacement of the HVAC systems and the parking lots of every single building owned by the municipality. The need to replace any one HVAC system or parking lot could be five to ten years away, but some funds are being raised and placed into reserve now, and in every future year, so that when the asset replacement time arrives, the full funding is in place. These capital reserves are often pooled by asset component. For example, a single "HVAC reserve" and a "parking lot" reserve, are recorded, and used for the next HVAC or parking lot project (but not a separate reserve for every lot).

The problem with this approach comes from those who may object to taxing current residents today, for part of the cost of a project that will not be undertaken for at least five years. This approach results in very large reserve balances and very large cash balances in the municipality, which can create the appearance that the municipality is "over-taxing" its residents today, and simply accumulating large sums of money, even though the municipality can always explain specifically what its plans are, for its reserve funds, if asked to do so. This financial position, of large cash balances and large reserve balances, can be found in the financial statements of many larger municipalities.

Rather than being able to implement SFM, the capital project taxation raised by Southgate in any given year is directly applied to projects to be undertaken in that same year. Funds raised in 2021 are not being set aside for future years (see one exception noted below). This is the result of Southgate having a substantial I-Gap, being in the position of playing "catch-up" with its capital asset work. There are more assets in need of attention now than there is funding available to rehabilitate them. Instead of using SFM, Southgate finds itself having to defer capital projects to one or two years further on, within the capital plan, than it would otherwise prefer, because of limited funding. Capital Reserves are not large.

One exception to this situation in Southgate arises if, in any given year, the projects completed for that year, or the assets bought (like vehicles for example), turn out to cost less than the taxes raised (being under-budget). Annual tax contributions beyond the actual capital costs would be transferred to a "capital replacement reserve fund" for future needs. Unspent funds placed into Capital Reserves also protect against the possibility of the opposite situation happening, in another year (project costs turn out to be greater than the taxes raised, or over-budget). This practice for handling variances from budget helps ensure that Southgate does not need to deviate from its (recommended) commitment to gradually, but consistently, increase its tax support for capital work.

Other strategies for financing capital projects include:

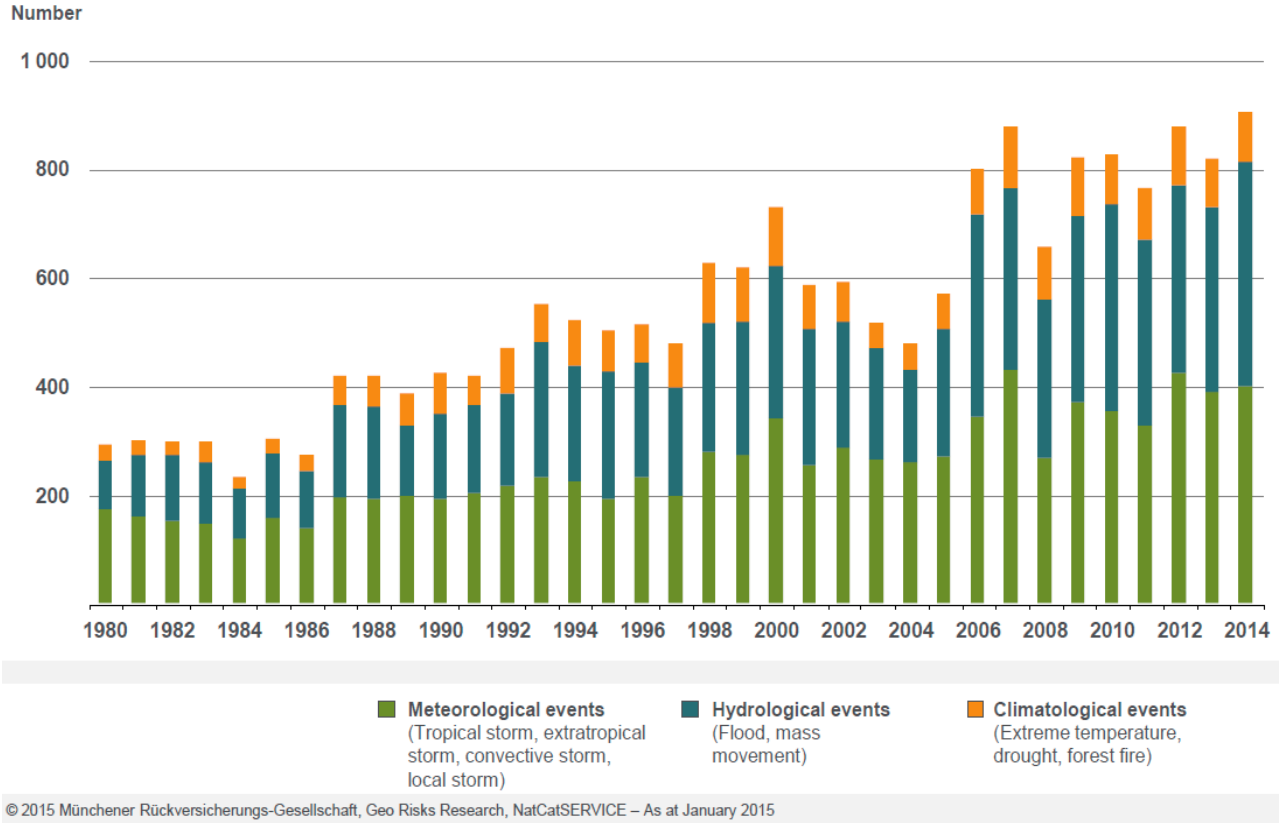
- **Actively seeking out and applying for grants and subsidies**
- **Implementing operating efficiencies, reducing operating costs, to permit directing more funds to capital projects**
- **Decreasing expected levels of service, to reduce operational costs and make more capital funding available**
- **Updating the Development Charges Bylaw, to more closely match with the capital plan project list, normally resulting in higher DC rates**
- **Approaching the development community for funding assistance with respect to growth/expansion related project**

6. CLIMATE CHANGE

The impacts of climate change present an increasingly serious challenge to municipal infrastructure. As temperatures and sea levels rise, and extreme weather events occur with greater frequency, it is critical that municipalities attempt to understand the emerging threat of climate change and develop strategies to ensure that vital services and critical infrastructure continue to operate as expected.

This will require consideration of four key factors of climate change (exposure, vulnerability, resiliency and adaptation, see comments below) at every stage of an asset's lifecycle.

Globally, there has been a serious increase in weather-related loss events, resulting in property damage and/or bodily injury (see chart below). Municipal infrastructure is at particular risk to meteorological, hydrological and climatological events, potentially leading to an increasing rate of asset deterioration, failure and service disruption. Here is a graphic depiction of the global increase in frequency of "climate events" from about 300 in 1980 to 900 in 2014.



Moving from a global perspective to just Canada, Canada is warming up twice as fast as the rest of the world, and municipalities across the country are facing the biggest impacts (see Exposure

section). Historical trends can no longer be used to predict future scenarios, and what used to be infrequent extreme weather occurrences are now common.

1. **EXPOSURE**

Exposure refers to the state of being in a place, or situation, where there is no protection from something harmful or unpleasant. Exposure is a combination of the probable range of a climate stressor and the physical characteristics of a geographic location, for example sea-level concerns for a coastal region.

In 2018, the Intergovernmental Panel on Climate Change (IPCC, an international body responsible for assessing the science related to climate change) reported that the world has already warmed by 1 degree C above pre-industrial levels (1850-1900) due to human activities, and is projected to reach 1.5 degrees C by 2030-2052, at the current rate of warming.

Canada is warming at a faster rate with overland temperatures increasing an average of 1.7 degrees C between 1948 and 2016, and about 2.3 degrees C for northern Canada, with the majority of the warming due to human activities. Ontario's Ministry of the Environment and Climate Change (MOECC) reports that the average annual temperature in Ontario has increased by 1.4°C over the last 60 years, and models suggest that by 2050 the average annual temperature in Ontario could increase by another 2.5°C to 3.7°C. Along with this, comes the increased likelihood of extreme weather events such as prolonged heatwaves, wind storms, and flooding.

1. **VULNERABILITY**

Vulnerability refers to a weakness in the ability of a person, structure, or natural system to respond to a negative force, such as a hazard. A municipality's vulnerability to a hazard can be addressed, by developing adaptation strategies that strengthen infrastructure, support local eco-systems, and build community awareness and preparedness.

There has been a great deal of work done on the topic of climate change, and this work can be referred to as climate science, for short. There are many resources available to learn more about the subject, from a municipal perspective. FCM (Federation of Canadian Municipalities) is a primary source of material. Part of the climate science work has been the development of complicated climate forecast models, which can be found on the internet. For Canadian modelling, there is

- **climateatlas.ca**
- **climatedata.ca**

These websites contain models based on 30-year timeframes, and on different assumptions of climate adaptation scenarios. The scenarios are based on how much effort will be made to make

changes to address climate change. These scenarios are based on RCP levels (Representative Concentration Pathways) for future greenhouse gas (GHG) emissions:

- RCP 2.5, low emissions scenario, presumes much work gets done to limit GHG
- RCP 4.5 and RCP 6.0, moderate emissions scenario, some efforts made
- RCP 8.5, high emissions scenario, no changes made from way things are today

The models then give forecasts, for each scenario, of multiple measures based on different data sets (temperature, precipitation, agriculture data sets). Time periods for measurement are the recent past (1976 to 2005), the near-term (2021 to 2050), and longer term (2051 to 2080). Here is a small sample, taken from climateatlas.ca, for Southgate:

Data Set	Measurement Description	1976 to 2005	2021 to 2050	2051 to 2080	
TEMPERATURE					
	Days where temp goes above 30 C				
	RCP 2.5	4.7 days	15.4 days	24.2 days	
	RCP 8.5	4.7 days	17.0 days	38.6 days	
	Mean temperature for the year				
	RCP 2.5	5.8 C	7.8 C	8.8 C	
	RCP 8.5	5.8 C	8.0 C	10.1 C	
	Nights when temp does not go below 20				
	RCP 2.5	1.4	5.8	10.4	
	RCP 8.5	1.4	7.0	20.1	
	Longest stretch of 30C+ days				
	RCP 2.5	1.3	3.8	5.9	
	RCP 8.5	1.3	4.4	10.5	
PRECIPITATION					
	Wet days, at least some precip.				
	RCP 2.5	178.9	178.8	178.7	
	RCP 8.5	178.9	179.7	178.1	
	Days of heavy precip. At least 10 mm.				
	RCP 2.5	24.4	26.3	27.6	
	RCP 8.5	24.4	27.1	28.2	
AGRICULTURE					
	Frost-free season, in days				
	RCP 2.5	140.9	162.9	172.6	
	RCP 8.5	140.9	167.3	188.7	
	Date of first frost				
	RCP 2.5	Oct 4	Oct 16	Oct 22	
	RCP 8.5	Oct 4	Oct 19	Oct 30	

Three words which best summarize the Climate Projections report are “warmer,” “wetter” and “wilder.” This is just a small sample of climate forecast measures to be found on these sites. When

going through the modelling online, there are also line graphs provided on-screen, spanning 1976 to 2080, so the models let you drag across the graph, and stop on any single year to see the values for that specific year.

Remember that "all models are wrong, but some are useful!"

3. **RESILIENCY**

Resiliency is the capacity to recover quickly from difficulties. A resilient municipality has the capacity to survive, and adapt, to chronic stresses and acute shocks, such as population growth (or decline), aging populations, influxes of new immigrants, economic swings, or climate change impacts like severe storms, or flooding. Resiliency is the ability to continue to operate, for example, despite the loss of a single road or bridge. It also refers to the physical restraints on repair or replacement of an asset (how quickly can it be returned to service?).

Municipal resiliency can be improved by reducing short-term and long-term risks resulting from climate change. FCM has created a guide on Building Sustainable and Resilient Communities with Asset Management.

Some municipalities are creating Reserves for Climate Impact Recoveries. A portion of net operating surplus, that would normally just go into a Tax Rate Stabilization Reserve, is earmarked instead for use when the municipality needs to perform recovery actions, following a weather event, that caused damage to its corporate assets.

4. **ADAPTATION**

Climate change adaptation refers to taking actions to help communities and their eco-systems cope with changing climate conditions.

FCM states that about 44% of Canada's GHG emissions, that cause climate change, are under the direct or indirect control of municipalities. Although private sector industry, and residential homes, also contribute to GHG emissions, the substantial impact from municipal assets explains why so many municipalities are devoting time and resources to this subject.

Many municipalities have recently been working on Climate Change Action Plans (CCAP), as endorsed by their Councils (County of Grey), identifying some actions that can be taken locally, and setting targets for future local levels of GHG emissions. Others have completed their CCAP (Burlington, Guelph, Clarington) and their CCAPs are available online, and can be reviewed for ideas useful to Southgate. The GHG targets are set based on local actions they have committed to taking in coming years. Like their AMPs, these CCAPs will be monitored and updated every few years.

It is recommended that Southgate staff monitor the CCAPs of other municipalities in the near term, and compile a checklist of specific actions, as listed by those municipalities in their CCAPs, that could also be done locally, and bring forward this checklist to Council for endorsement, and to request funding if needed, for specific actions.

Applying adaptation to Southgate, what steps could Southgate take?

- **It is free to join FCM's Partners for Climate Protection (PCP) program. This program allows access to a network of over 350 municipalities currently acting on climate change, along with access to additional support from Regional Climate Advisors.**
- **Participate with the County of Grey project to complete its CCAP (now underway, an update was provided in Feb. 2021 to local CAO's) and then pursue specific actions recommended by the CCAP**
- **Research materials currently available from the Municipalities for Climate Innovation (MCIP), including case studies and information on potential funding sources**

It is recommended that all these steps be pursued by Southgate.

GREEN INFRASTRUCTURE

Another growing aspect of climate change work, within asset management, involves Green Infrastructure, also referred to as Natural Assets. Municipalities often have not collected very much data on these assets, and they have not assigned values to them. Natural assets do not fall under the core assets required for this AMP, but should be accounted for, moving forward. Natural assets can serve as mitigation tools against many of the hazards of climate change, such as excessive heat waves and soil erosion. Natural assets can be grouped into three categories:

1. **Naturally occurring assets**
2. **Enhanced natural assets**
3. **Engineered natural assets**

Some examples of each category are:

Naturally occurring assets

- **Forests, parks and open space, wetlands, fields, lakes, creeks, rivers, soil**

Enhanced natural assets

- **urban street trees, urban parks/parkettes, rain gardens, stormwater ponds, community gardens on municipal land**

Engineered natural assets

- **green roofs, green walls, cisterns, permeable pavement, rain barrels**

IMPACT ON INSURANCE COSTS

Weather-related insurance claims in Canada averaged $400 million between 1983 and 2008, and they averaged $1.8 billion between 2009 and 2017. The Insurance Bureau of Canada's (IBC) top 10 highest payout years on record include every year since 2016. In 2020, the IBC reported that severe weather caused $2.4 billion in insured damage, while global losses from natural disasters hit $270 billion. In addition to insured losses, there are also uninsured losses incurred by government, business, and individuals. It has been reported that for every $1 of insured losses, there are $3 to $4 of uninsured losses.

Rather than wait for a weather disaster to strike and then respond, a better plan is to reduce the risk before it happens. It has been estimated that the benefits of investing in community adaptation and resilience outweigh the costs by a ratio of 6 to 1.

The insurance cost impact of climate change is already being experienced by municipalities, so many of them are moving forward with concrete actions. Southgate could conduct some research into the actions that others have made so far, and then implement those that make sense for this municipality.

FCM has been mentioned as a good source of climate information, and another is the Local Governments for Sustainability (ICLEI) group. For example, ICLEI and FCM jointly developed a PCP (Partners for Climate Protection) Milestone Tool that helps municipalities quantify, monitor and manage GHG emissions at the local level. The latest upgrades to the Tool include a Scenario Builder, to help model various emission reduction scenarios, as well as alignment with global protocol and reporting standards. The Tool is a web-based resource, with a user-friendly framework, to work through five milestones. Municipalities can create a new account on the pcptool.ca website and follow the process. This would be a good place for Southgate to get started on its GHG reduction journey.

ICLEI is focused on Adaptation and Resilience. Their flagship program is BARC (Building Adaptive and Resilient Communities), a comprehensive way to respond to the impacts of climate change. ICLEI is currently consulting with Grey County on its CCAP, and with the City of Barrie, the District of Muskoka, and the Township of Huron-Kinloss on similar projects. ICLEI completed a CCAP with the City of Peterborough, available on the internet.

ICLEI offers multiple resources for municipal use such as:

- **local government strategies on having the climate conversation**
- **handbook for local elected officials on climate change**
- **the PCP Milestone Tool**
- **guidebook for quantifying GHG reductions at the local level**
- **discussion guide for local government staff on climate adaptation**

- **local government case studies**
- **Dec. 2019 webinar on district energy policies and governance models (90 min.)**
- **introduction and link to the "Get Ready Game"**

RECOMMENDATIONS

In future, Southgate should consider the impact of climate change on the estimated useful life of all its assets, and then build these considerations into future editions of its AMP.

• Adjust lifecycle activity strategies for assets that are particularly exposed or vulnerable to the impacts of climate change (adjust maintenance frequency or intensity)

• Develop policies that outline a commitment to consider the impact of climate change on existing infrastructure and future development (*example:* some municipalities are making commitments to installing electric vehicle charging stations, and then phasing-in electric vehicles for their fleet)

• Include climate change considerations into the design and planning phase of future asset additions (*example:* choice of energy systems going into new or renovated township buildings)

• Integrate impacts of climate change into risk management frameworks (see Risk comments in the LOS chapter; one example could be the impact of extreme heat on municipal staff working outdoors, and the action would be setting internal limits on time spent in hot conditions)

• Develop disaster mitigation plans, in the event of infrastructure failure

7. NEXT STEPS

7.1 PLAN REVIEW and ADOPTION

The AMP is intended to be a "living document" that is relevant and integral to Southgate's daily asset management activities. The AMP will need continuous updates and improvements. Maintaining and updating the various tools, plans, policies, and strategies of an AMP is a major part of the ongoing work required to keep an asset management process operational. Implementing improvements to the asset management process, usually as the result of innovation, technological and process advancements, are necessary to ensure optimal planning over time.

To make that happen, the following process of ongoing AMP activities should be undertaken:

1. **Review of draft AMP with Council on May 12, make revisions as needed**
2. **Council to formally adopt the core assets AMP in 2021 (deadline is July 1, 2022)**
3. **Expand the AMP data to include other asset classes**
4. **Research and study other municipal AMPs, as they are released in 2021**
5. **Summer 2022 bring expanded AMP, in draft, to Council for review**
6. **Council to formally adopt expanded AMP in mid-2022 (deadline July 1, 2023)**
7. **Revise and re-issue the AMP every 4 to 5 years, to include changes to work programs, new knowledge gained, new assets acquired, new Levels of Service (LOS) being measured.**

7.2 FORMALIZE the ASSET MANAGEMENT PROCESS

Many municipalities update the asset management planning process when external pressures necessitate it (such as applying for a capital grant). Further, there is typically no documentation available, to outline the process to follow, when updating the asset management planning process (including the AM plan). As such, updates to the asset management planning process are typically carried out on a reactionary basis.

As part of step 4 above, as research is undertaken, Southgate should develop a more formalized asset management process to follow. The process for Southgate will include

- **Standard Asset Register documents, in a database (MDW or other), to be kept up to date throughout the year**
- **Potentially changing the technology being used for asset management (better software may come along)**

- **Maintain communication through meetings of the Asset Mgmt. Group to keep all departments informed about what is happening (being on the same page)**

7.3 ONGOING MONITORING of ASSET DATA

The following actions will become the regular process for asset management in future, after adoption of the 2021 core assets AMP:

1. **Report to Council with annual reviews, starting mid-2023, with content including:**
    - **Results from capital projects of the previous calendar year, including variances from budget, schedules, or outputs**
    - **Updated asset listings, including additions and disposals in the past year**
    - **Identifying new LOS, and reporting historical results of established LOS**
    - **Report any measures taken to address climate impacts, including any actions related to County Climate Action Plan commitments**

2. **Maintain staff knowledge and skill-set development, through ongoing training opportunities from FCM, MFOA, CNAM, AMONT**

3. **Include asset management concepts and data into annual township budget process, including asset risk assessments, condition and lifecycle information**

4. **Build upon the MDW Asset Register, a comprehensive source of data on township assets, and gather improved asset data, that is accurate and current**

5. **Consider benchmarking with comparable municipalities, for example on condition data, or financial support of capital costs**

SUMMARY OF RECOMMENDATIONS

- **Sect 3 LOS measures, and Risk measures, should be factored-in to annual Southgate capital budget discussions starting with the 2022 budget.**
- **Sect 3 Southgate begins keeping more specific LOS measures, and document how these measures influence the setting of future budgets.**
- **Sect 3 Southgate staff research AMP of other municipalities, that are released publicly after July 2021, to discover LOS measures that could be useful for Southgate to measure and maintain.**

- **Sect 4 the Asset Co-ordinator work with front-line staff to develop a more uniform process for keeping records of asset repair and maintenance.**
- **Sect 4 the cross-functional Asset Mgmt. Team become more active, with regular meetings and discussions of ways to improve asset data in Southgate.**
- **Sect 4 Southgate advance the date of the next Roads Needs Study to 2023 (four years after the last one, in 2019).**
- **Sect 4 a more detailed, risk-based approach be developed to gather more specific data on condition of waterworks, sanitary sewer and storm sewer assets**
- **Sect 4 Southgate establish a sewer asset condition assessment program and devote a portion of capital funding to this program**
- **Sect 4 Southgate continue to monitor traffic volumes, and other factors listed, on its gravel roads, to determine if paving would be beneficial**

- **Sect 5 Southgate stay determined to hold to the draft tax-support for capital projects in its 10-year Capital Plan for the years 2022 to 2030**
- **Sect 5 continue to pursue external sources of revenue for capital assets, such as grants and subsidies**
- **Sect 5 as long-term debts are retired, re-direct the funds previously spent on servicing that debt to the capital budget tax-support**

- **Sect 6 consider ear-marking a portion of any net, year-end Operations Surplus to a Reserve for Climate Impact Recoveries, instead of going into the Tax Rate Stabilization Reserve**
- **Sect 6 see the series of Recommendations listed on last page of Sect 6**

TOWNSHIP OF SOUTHGATE
ASSET MANAGEMENT PLAN 2022~~1~~

LIST OF APPENDICES

1. **Ontario Regulation 588/17**
2. **Southgate Asset Management Policy 2019**
3. **ROADS LISTING, alphabetical with 2019 PCI values**
4. **ROADS LISTING, alphabetical with Historical Condition Ratings**
5. **STRUCTURES LISTING, with Historical BCI values, by road location**
6. **STRUCTURES LISTING, by I.D. number**
7. **WATERMAIN LISTING (2013)**
8. **STORM SEWER LISTING (2013)**
9. **BUILDING REPLACEMENT COST ANALYSIS (2022)**