2022

Asset Management Plan

Township of Selwyn

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1.0 Municipal Information

The Township of Selwyn was created by virtue of two amalgamations and one name change: The Township of Smith and the Township of Ennismore amalgamated on January 1st, 1998 and the Township of Smith-Ennismore then amalgamated with the Village of Lakefield on January 1st, 2001. The Township then changed its name to the Township of Selwyn in 2013.

Centrally located in the County of Peterborough, one hour north of the Greater Toronto Area, the community is surrounded by water on three sides and borders the City of Peterborough and the City of Kawartha Lakes. The Township of Selwyn is the most populated municipality in the County of Peterborough, with an approximate population of 18,653 and has close to $^{1}/_{3}$ of all the households in the County of Peterborough and approximately 34% of the workforce. With a broad economic base that includes technology, information services, healthcare, education, retail, finance, and agriculture, its home to one of the County of Peterborough's most stable economies.

1.1 Municipal Area Characteristics

Statistics Canada Descriptions	2016	2021
Population	17,060	18,653
Population Change (2011-2016)	1.3%	9.3%
Total Private Dwellings	8,404	8,540
Private Dwellings Occupied by Usual Residents	6,857	7,483
Seasonal Households	1,547	1,057
Land Area (square kilometres)	315.69	316.12
Population Density per square kilometre	54.0	59.0

Budget 2022	Operations	Capital	Total
Taxation	$15,363,850	$1,996,606	$17,360,456
Police - Area Rates	$3,064,333	$6,000	$3,070,333
Water & Wastewater - Lakefield	$2,460,564	$1,249,649	$3,710,213
Water & Wastewater - Woodland Acres	$525,175	$81,265	$606,440
Total	**$21,413,922**	**$3,333,520**	**$24,747,442**

1.2 Purpose

Asset management plans formalize the Township's commitment to ensuring that assets are appropriately utilized and maximize the benefits of the Township's infrastructure.

In December 2013, Council adopted the Selwyn Township Asset Management Plan – Phase One as the starting point for a new long term asset management planning and budgeting process at Selwyn Township. Subsequently, Selwyn Council received a number of annual updates that prioritized key investments in core assets. This series of asset management plans was based on a guidebook established by the provincial government of the day.

The 2022 Asset Management Plan has been prepared in accordance with the requirements of Ontario Regulation (O. Reg) 588/17 – Asset Management Planning for Municipal Infrastructure, as amended.

The Selwyn Township 2022 Asset Management Plan is based upon the Council approved Strategic Asset Management Policy and seeks to establish a long-term asset management planning and budgeting process at Selwyn Township.

While the strategic plan for Selwyn is the overarching document that sets the tone and direction for all other plans, there are a number of specific other plans that will also affect AMP. These plans are interconnected and the various infrastructure investment plans come together under the AMP.

These plans and specific asset reviews, condition ratings and technical memos have been utilized to create this version of the AMP for Selwyn and are included in the References section of this report. As the AMP is updated annually and more detailed supporting data is compiled, the References section will be updated.

The ultimate goal is that all of these forward-looking documents will be updated in an appropriate sequence such that they can stand on their own but feed into other complementary plans. This represents our vision for AMP in Selwyn and how 'it all comes together".

1.3 Scope

The 2022 Township of Selwyn Asset Management Plan includes core municipal infrastructure assets; in accordance with O. Reg 588/17, **core municipal infrastructure assets** are:

I. Roads
II. Bridge or culvert
III. water asset that relates to the collection, production, treatment, storage, supply or distribution of water
IV. wastewater asset that relates to the collection, transmission, treatment or disposal of wastewater, including any wastewater asset that from time to time manages stormwater
V. stormwater management asset that relates to the collection, transmission, treatment, retention, infiltration, control or disposal of stormwater

The 2022 Selwyn AMP should be viewed as a 'living document' and an ongoing work-in-progress. From the initial plan approved in 2013, staff has stressed the importance of incorporating more fulsome information in the state of local infrastructure, the need for a more established process as it relates to levels of service and funding priorities, and a long-term financial strategy to fund the infrastructure deficit that exists. The adoption of the 2022 AMP is part of an ongoing process of continuous improvement in asset utilization and service provision.

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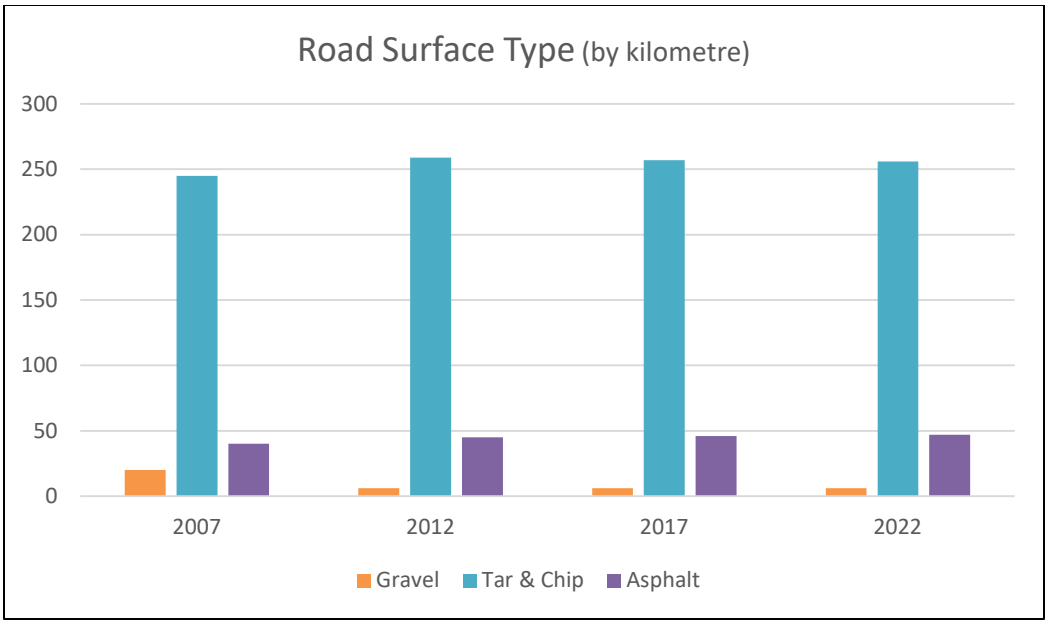
2.0 Roads

2.1 Summary of Assets

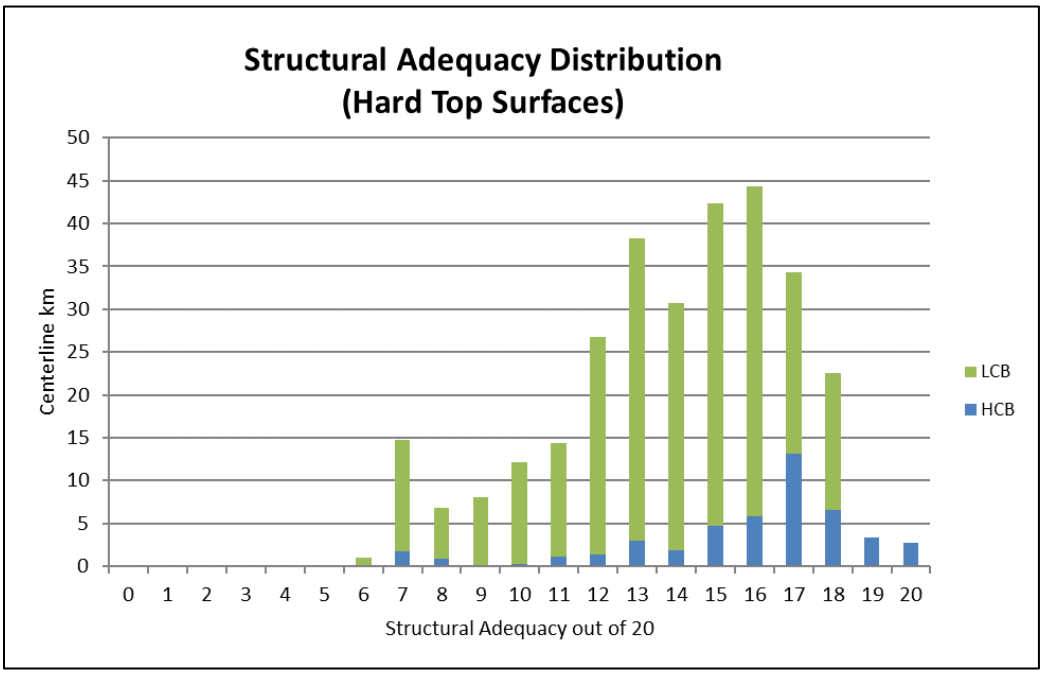
The Selwyn Public Works department is responsible for the maintenance and construction of the Township's Road network.

The information in this section is based on the 2022 Road Needs Study Report. The road infrastructure system spans a total of 309 km, primarily within a rural setting, with small areas of urban and semi-urban development. The road network includes surfaces ranging from gravel to hot mix paved (asphalt).

Township of Selwyn Road System in Kilometres (As of May 2022)		
A.	**Surface Type**	**Totals***
	Earth	0
	Gravel (Loose Top Gravel)	6
	Surface Treatment (LCB & ICB)	256
	Hot Mix Asphalt (HCB)	47
	Total A	**309 km**
B.	**Roadside Environment**	
(i)	**Rural**	
	Earth	0
	Gravel (loose Top Gravel)	6
	Surface Treatment (LCB & ICB)	186
	Hot Mix Asphalt (HCB)	4
	Total Rural	**196 km**
(ii)	**Semi-Urban**	
	Gravel (loose Top Gravel)	<1
	Surface Treatment (LCB)	70
	Hot Mix Asphalt (HCB)	30
	Total Semi-Urban	**101 km**
(iii)	**Urban**	
	Gravel (loose Top Gravel)	0
	Surface Treatment (LCB)	0
	Hot Mix Asphalt (HCB)	12
	Total Urban	**12 km**
	Total B	**309 km**
**Estimated to the nearest centreline kilometre.*		

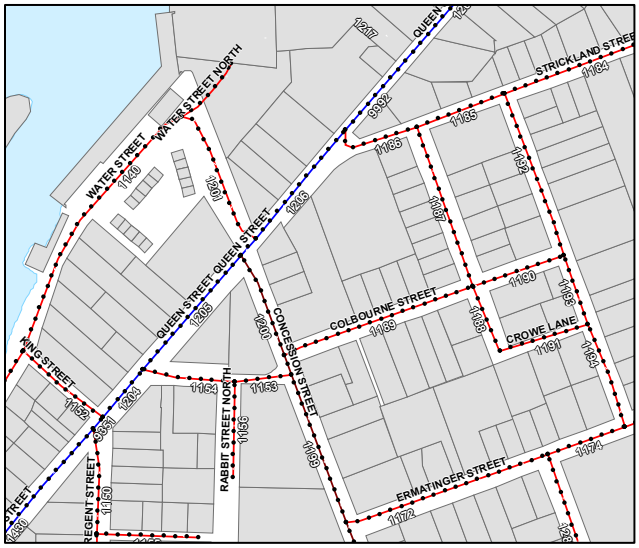


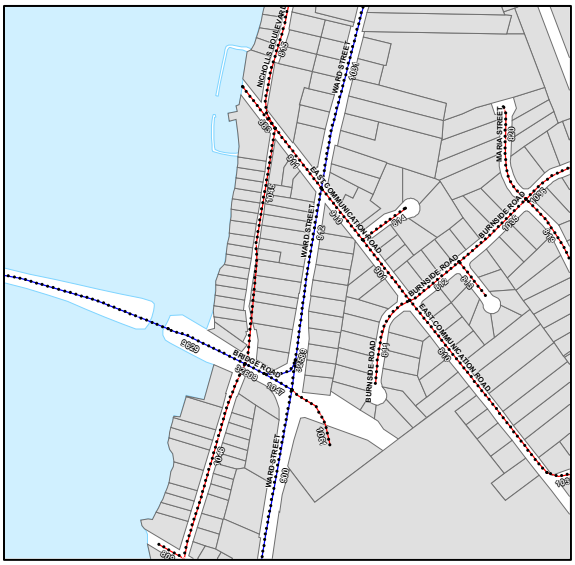
While Pavement Condition Index (PCI) is a key factor in the asset management plan, Road Adequacy is another measure that figures prominently in the RNS. The following graph outlines ongoing investments required over the next period of time.

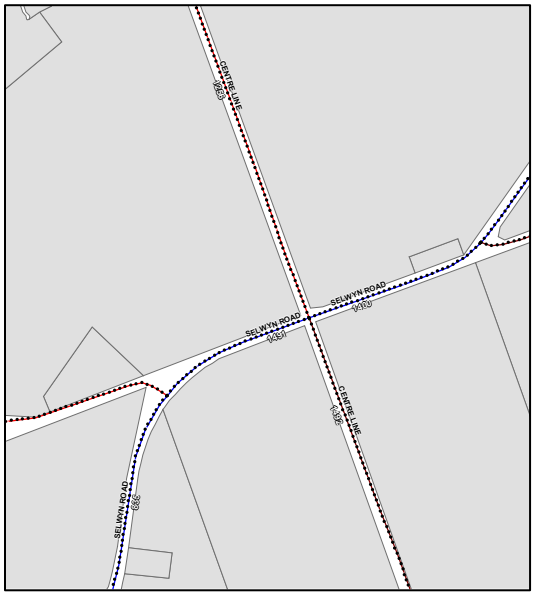


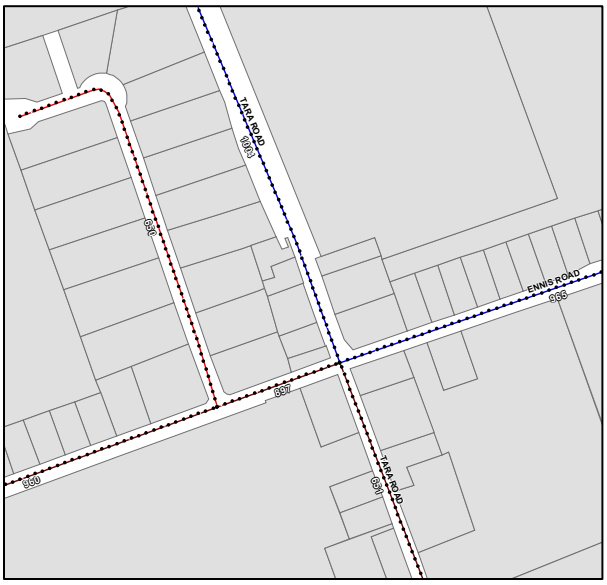
The Township uses a GIS based program to collect data and track asset attributes. Data stored and displayed on GIS allows the user to display a map of the subject area and then add or remove specific layers that display various data sets.

The following excerpts provide an example of the types of maps and data sets available. The different coloured roads depict road type.









Future iterations of the Selwyn AMP GIS will be included in budget presentations to provide Council with a visual representation of capital project areas and how they may affect adjacent areas or sections of the road network.

2.2 Replacement Cost/Average Age

All Road Classes	Replacement Cost	Average Age (based on PCI)
Total	$52,800,000	9.5 Years

2.3 Current Performance/Condition

Maintenance – specific to preservation management

Road Type	Total Kilometres in Length	Percentage of Total Road Network	Estimated Annual Maintenance Cost (Per 2022 RNS)
Gravel	6	1.94%	$15,600
Surface Treated Roads (LCB)	256	82.85%	$894,250
Hot Mixed Paved Roads (HCB)	47	15.21%	$432,400
Total	**309**	**100.00%**	**$1,342,250**

Construction

Hard Top Roads	Total Kilometres in Length	Percentage of Total Road Network	Estimated Annual Cost Now-Ten (Per 2022 RNS)
Total	**309**	**100.00%**	**$9,600,000**

Descriptions that illustrate the different levels of road class pavement condition are presented in the tables below. The tables below differ in qualitative description based on the surface type as noted in the heading of each table.

- HCB – Asphalt
- LCB – Tar & Chip
- Gravel – no hard top surface

Qualitative Descriptions of PCI for HCB Roads

Selwyn's HCB roads have PCI's ranging from 100 to 48.

Example Photos	PCI Range	Qualitative Description
	90 - 100	Pavement is in excellent condition with few cracks. The Ride Condition Rating is excellent with few areas of very slight to slight distortion.
	75 - 90	The pavement is in good condition with frequent very slight or slight cracking. The Ride Condition Rating is good with a few slightly rough and uneven sections.
	65 - 75	The pavement is in fairly good condition with slight cracking, slight or very slight distortion and a few areas of slight alligatoring. The Ride Condition Rating is fairly good with intermittent rough and uneven sections.
	50 - 65	The pavement is in fair condition with intermittent moderate and frequent slight cracking, and with intermittent slight or moderate alligatoring and distortion. The Ride Condition Rating is fair and the surface is slightly rough and uneven.

	40 - 50	The pavement is in poor to fair condition with frequent moderate cracking and distortion, and intermittent moderate alligatoring. The Ride Condition Rating is poor to fair and the surface is moderately rough and uneven.
N/A	30 - 40	The pavement is in poor to fair condition with frequent moderate alligatoring and extensive moderate cracking and distortion. The Ride Condition Rating is poor to fair and the surface is moderately rough and uneven.
N/A	20 - 30	The pavement is in poor condition with moderate alligatoring and extensive severe cracking and distortion. The Ride Condition Rating is poor and the surface is very rough and uneven.
N/A	0 - 20	The pavement is in poor to very poor condition with extensive severe cracking, alligatoring and distortion. The Ride Condition Rating is very poor and the surface is very rough and uneven.

Qualitative Descriptions of PCI for LCB Roads

Selwyn's LCB roads have PCI's ranging from 91 to 33.

Example Photos	PCI Range	Qualitative Description
	80 - 100	Pavement is in excellent condition with just a few bumps or depressions from slight surface deformation. No surface defects such as streaking, potholes or cracking distresses. The Ride Condition Rating is very good.
	60 - 79	Pavement is in good condition with just a few bumps or depressions from slight to moderate surface deformation. Intermittent slight to moderate surface defects and/or cracking distresses. The Ride Condition Rating is good.
	40 - 59	Pavement is in fair condition with intermittent to frequent bumps or depressions from slight to moderate surface deformation. Intermittent to frequent moderate surface defects and/or cracking distresses. The Ride Condition Rating is fair.
	20 - 39	Pavement is in poor condition with frequent bumps or depressions from moderate surface deformation. Frequent moderate to severe surface defects and/or cracking distresses. Localized slight to moderate alligatoring may be present indicating pavement structural failure. The Ride Condition Rating is poor.
N/A in Selwyn	0 - 19	Pavement is in very poor condition with extensive bumps. The Ride Condition Rating is very poor.

Qualitative Descriptions of Surface Condition for Gravel Roads

Selwyn contains no examples of very good or poor gravel roads, as assessed by surface condition. This is expected as it is rare for a loose-top surface to have a surface condition of 10/10, and gravel roads are always one grading operation away from looking perfect (i.e. if a gravel road had a surface condition less than 4/10, it would likely be repaired by grading).

Example Photos	Surface Condition	Qualitative Description
N/A	10	If the section affords a fully adequate standard of service, with no annoyance or discomfort. Gravel roads rarely score a “10” rating due to their inherent roughness.
	7 - 9	If it is possible to maintain the lesser of the Minimum Tolerable Average Operating Speed or the legal Speed Limit with only a noticeable amount of annoyance to the driver due to sway, vibration or steering effort, but with no noticeable feeling of hazard.
Photo not available	4 - 6	If maintaining even the lesser of the Minimum Tolerable Average Speed or the legal Speed Limit results in either a “tug-of-war” with a too-steep crown, or a feeling that the car is taking undue punishment.
N/A in Selwyn	1 - 3	If the surface irregularities are so severe that a driver will tend to reduce speed considerably, possibly even steering an irregular course, or if the crown is to steep as to be hazardous in winter.

2.4 Approach to Assessing Condition

The Township Road network is monitored through periodic road patrols with conditions documented through standardized record keeping in conjunction with Minimum Maintenance Standards.

In addition, it has been the Township's practice since 2002 to complete a comprehensive Road Needs Study (RNS) every five years. The purpose of the RNS is to assess the current condition of the network and update the road inventory to include new additions since the last study. The information derived from the study update provides assistance to the Township for developing and executing a planned road maintenance and improvement program.

Building upon these approaches, the Township can develop a more fulsome understanding of the state of the infrastructure by assessing risks and impacts of asset failures. The Township continues to refine lifecycle maintenance strategies and implement a more consistent risk-based approach.

2.5 Lifecycle Activities

For many road classes there are more maintenance techniques available, than are typically used in Selwyn.

For instance, our engineers typically outline all surface preservation techniques for the various types of roads in the RNS. However, Selwyn doesn’t typically use all of them. The following outlines the techniques used in Selwyn to maintain the current conditions.

In addition, when significant road maintenance activities are undertaken, a historical ‘rule of thumb’ used in Selwyn is that if the road preparation costs are greater than 50% of the overall project, then the project is treated as a Capital Construction project for funding purposes.

Asphalt

- Maintain with cold patch – prefer HL2 or HL3 if available – and use edger whenever possible.
- If road is in overall good condition, micro coat to fill minor rutting and cracks to improve road cross fall
- If road is out of shape but overall, in good condition, apply a lift of HL2 – two (2) coats – first coat to fill rutting and minor low areas to provide cross fall and then finish top coat

Surface Treatment (Tar & Chip)

- Using the RNS as a guide and spring breakup observations, surface treatment with single lift
- Patch rough areas with edger and HL2 or HL3 hot mix
- If area is deemed to be of sufficient size, scarify, add gravel and grade and contract a double layer

- If area has soft spots, then the area is excavated and filled with pit run and gravel.
- Graded and double surfaced

Gravel

- Grade as needed based on observations (i.e., pot holes, washout)
- Apply calcium in late spring/early summer
- Add 25-50 mm of new aggregates annually, usually in fall

2.6 Current Levels of Service

2.6.1 Community Levels of Service

As noted in the County Official Plan Transportation Section, which covers the Township of Selwyn, the overall goal of the road network is *to provide a safe, convenient, efficient transportation system for all persons and goods … to ensure that roads continue to be effective corridors for the movement of people and goods in and throughout the County of Peterborough.*

As noted under Summary of Assets above, the CGIS system used by Selwyn provides maps of the entire road network, level of connectivity across the municipality and the different road classifications.

As more data is collected and more layers added, this platform will provide a one-stop location to house all relevant attributes of a road section. This information is provided in the Selwyn RNS.

2.6.2 Technical Levels of Service

The RNS provides the following reporting which meets the technical requirements under Table 4 of O. Reg. 588/17.

Road Class Density

Class	Lane-kilometres	Lane-kilometres / Municipal Area*	PCI
Arterial	0.00	0.00	0.00
Collector Roads	185.24	0.59	71.6
Local Roads	431.54	1.37	74.0
All	616.78	1.95	73.3

**Municipal area taken as 316.12 km^2*

The average PCI for hard top surfaces in the Township is 73.3. The average surface condition of unpaved roads is 8.0 as per the inventory Manual.

This would broadly translate into a road with “good” rating.

3.0 Bridges and Culverts

3.1 Summary of Assets

In the County of Peterborough, the majority of bridges and culverts that are deemed to be **structures** are the responsibility of the County.

Through the AMP process, and upon further investigation with County representatives, it has been determined that Selwyn is responsible for a limited number of structures within the Township's geographic boundaries.

In accordance with the Canadian Highway Bridge Design Code, a bridge is defined as "a **structure** that provides a roadway or walkway for the passage of vehicles, pedestrians, or cyclists across an obstruction, gap, or facility and is greater than 3m in span."

Culverts are defined as "a **structure** that forms an opening through soil", as per the Canadian Highway Bridge Design Code. Culverts included in the Ontario Structures Inventory Manual (OSIM) inspection have a span greater than or equal to 3 meters, and more than 600 mm of cover.

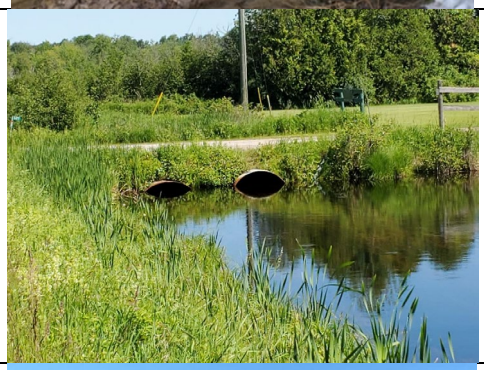
County of Peterborough By-law # 1336 approved on June 25, 1927 reverted all structures twenty feet or less (less than 6 metres) to the lower tier municipalities.

As a result, there are a group of structures greater than 3 metres but smaller than 6 metres which are the responsibility of Selwyn.

Selwyn Township does not have any bridges but does have 7 structures with varying spans and deck lengths. These structures are comprised of 3 rectangular concrete culverts, 2 twin arch culverts and 2 arch culverts.

Smaller culverts that fall outside of the parameters noted above are not assessed based the OSIM engineering methodology and are not included as part of this AM plan. So to be clear smaller cross culverts or entrance culverts are not included in this core asset section.

3.2 Replacement Cost/Average Age

Structure Type	Structure Photo	Count	Average Age	Replacement Cost
Rectangular		3	27	$1,153,700
Twin Arch		2	32	$570,500
Arch		2	40	$502,300
Total		**7**	**32**	**$2,456,370**

(Map from CGIS with Culvert Locations Marked is underway

- to be inserted)

3.3 Current Performance/Condition

With the detailed assessment of each structure, staff can develop an annual process for monitoring and self-assessment.

Initial improvements outlined in the inspection reports relate to the guiderails and hazard signage for two structures in rural areas. This work has been estimated to cost $60,000, however it is likely to be completed using internal resources, thereby resulting in a lower overall cost.

As noted below, bi-annual inspections will be maintained and completed under the County of Peterborough procurement for services to garner a competitive service rate.

3.3.1 Approach to Assessing Condition

In accordance with O./Reg. 104/97, Standards for Bridges, “The structural integrity, safety and condition of every bridge shall be determined through the performance of at least one inspection in every second calendar year under the direction of a professional engineer and in accordance with the *Ontario Structure Inspection Manual*. O. Reg. 472/10, s. 2.”

It is the Township’s intention to ‘piggyback” on the County of Peterborough’s engineering contract given the number of structures within the County. As outlined in the regulation, as long as the inspection is completed in every second calendar year, “the inspection referred to in subsection (3) may be performed at any time in the calendar year, regardless of when in a prior calendar year, the previous inspection was performed. O. Reg. 472/10, s. 2.”

The OSIM inspections visually evaluate each component of the structure. The condition of individual components is compiled into a summary, the Bridge Condition Index (BCI). The BCI ranges from 0 to 100, with 0 representing the worst possible condition and 100 representing the best possible condition.

3.3.2 Lifecycle Activities

During the bi-annual OSIM review, a list of recommended improvements is produced per structure, to outline the type of work that needs to be done.

Minor repairs are relatively inexpensive, but can defer or delay the need for major repairs or replacements in the future, thereby extending the useful life of the structures. Minor repairs include work such as:

- Crack sealing of wearing surface
- Regular re-coating of railing systems
- Preventative maintenance and cleaning of wearing items
- Regular clearance of debris around and within the structures

- Monitoring for minimum maintenance standards, including safety systems and signs

Current maintenance items noted in the recent inspection note two structures that require guiderail upgrades.

Moderate or major repairs would be evidence based on the BCI index and would typically involve the hiring of an engineer to coordinate approvals and specifications for a tender for repair or replacement.

3.4 Current Levels of Service

3.4.1 Community Levels of Service

GIS Map includes a layer that documents location of all structures. All structures transport all forms of vehicular and pedestrian traffic and are not currently restricted to any traffic type.

Of the seven structures, two structures would not have an alternate travel route or detour available. As a result, the consequence of failure for these two structures would rate high.

3.4.2 Technical Levels of Service

Selwyn engaged engineers, D.M. Wills Associates, to provide a Level of Service technical assessment as it relates to the structures. The assessment provides the following details which meets the technical requirements under Table 5 of O. Reg. 588/17.

Since Selwyn does not have any bridges, the assessment was concerned with structural culverts. The report notes that:

- there are no loading or dimensional restrictions
- all structures are in good condition; and
- the average bridge condition index is 72.74

4.0 Water - Distribution

4.1 Summary of Assets

The Township of Selwyn owns two municipal drinking water systems located in Lakefield and in the Woodland Acres water service area.

4.1.1 Lakefield

The majority of the Lakefield water system was installed in 1955. The water distribution system received significant upgrades to key water mains in the mid-1990s. The water treatment plant was upgraded at several junctures to add standby power and was expanded with new filter beds and related pumps and equipment in 2002.

The Lakefield Water System has been operated and managed under contract with Peterborough Utilities Services Inc. (PUS) since 2001 - PUS is an accredited Operating Authority.

The Lakefield water system provides municipal drinking water to approximately 1,275 households and a mixture of semi-urban commercial/industrial/institutional customers, which total approximately 3,600 customers.

The Lakefield water distribution system consists of approximately 24 kms of water main, 115 hydrants, booster station, a standpipe with an effective volume of 900 m^3 and an elevated storage tank (water tower) with capacity of 2,750 m^3.

The larger effective volume of the elevated tank, combined with the standpipe, allow the system to sustain greater system pressure and operate in one pressure zone. A separate zone can be easily created adjacent to the Standpipe to boost localized pressure if required. This zone can operate in parallel with assistance from the existing booster station, if ratepayer water pressure concerns are raised.

The water treatment plant is located at Water Street North and consists of a dual intake from the Otonabee River, a low lift pumping system located within the water treatment plant, and a treatment process using chemical coagulation, ballasted floc sedimentation (Actiflo), dual media filtration and disinfection. The plant has a two-celled baffled 900 m^3 clearwell and a high lift pumping facility discharging to the distribution system.

4.1.2 Woodland Acres

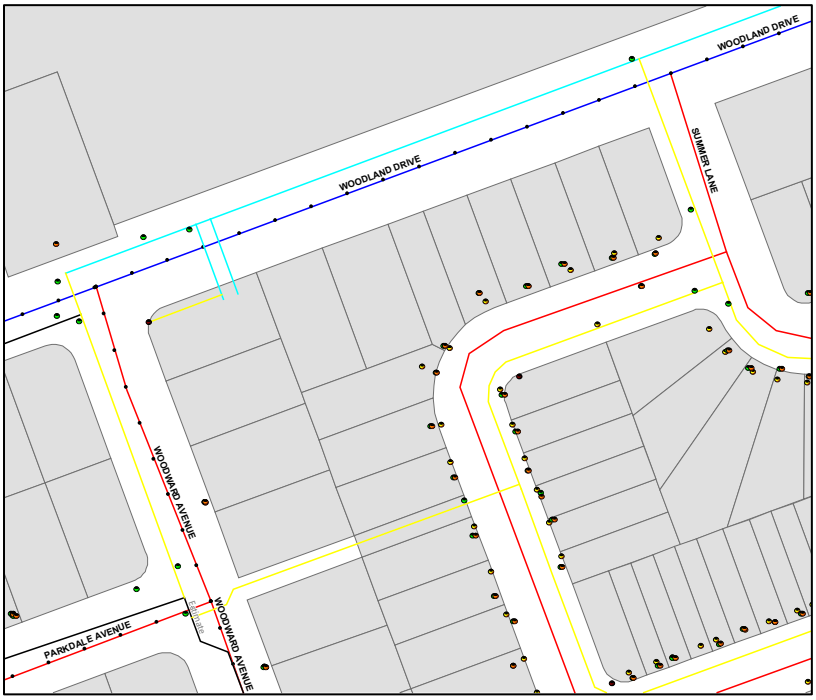
The Woodland Acres water distribution system obtains its water from the City of Peterborough's municipal water system. The Peterborough Utilities Commission owns and operates the Peterborough water system.

The Woodland Acres water distribution system has been operated and managed under contract with Peterborough Utilities Services Inc. (PUS) since 2001 - PUS is an accredited Operating Authority.

The Woodland Acres system receives water from a trunk watermain that delivers it to the water booster pumping station at Woodland Drive and Woodward Avenue. A recent extension of the watermain on Hetherington Avenue to Woodland Drive further supports, and creates redundancy, to this supply. The water distribution system consists of approximately 4 kms of water mains, 26 hydrants and 334 individual water services.

The Township uses a GIS based program to collect data and track asset attributes. Data stored and displayed on GIS allows the user to display a map of the subject area and then add or remove specific layers that display various data sets.

The following provides an example of how the various water distribution assets are displayed on the GIS map.



4.1.3 Replacement Cost/Average Age

Asset Class	Quantity	Units	Average Age (years)	Replacement Cost
Watermains	28	km	22	$13,987,479
Storage and Booster Stations	4	count	23	$6,442,148
Lakefield Water Treatment Plant	1	count	11	$11,125,264
Total				**$31,554,891**

4.2 Current Performance/Condition

4.2.1 Lakefield

Treatment

With respect to plant and treatment performance one can look to the MECP inspection history as an indicator of meeting these accepted minimum standards. Having regard for scheduled inspection reports and unscheduled focused inspections such activities as disinfection, flow rate, monitoring, sampling, record keeping, training and documentation were reviewed. All inspections have yielded good compliance and no “actions required” noted.

Selwyn has worked with the operating authority and engaged contractors on a proactive replacement of key components of the treatment and distribution process. In recent years, the Township has hired a project coordinator to provide more focus on the water utility and its significant annual projects.

Distribution

Selwyn has over 28 kms of watermain. Of that length, approximately 13.5 kms or 47% of the distribution system are PVC. This asset type has a 100-year useful life. With the first PVC mains installed in the early 90’s, less than half of the system has consumed less than $^{1}/_{3}$ of its useful life. As such, a robust annual maintenance program will keep the overall distribution system in very good condition.

Standpipe - Out of Service

The Lakefield Standpipe was constructed in 1987 and is a coated, welded steel standpipe. It was rehabilitated in 2011 and remained in operation for approximately 2 to 3 years. The Standpipe was drained to complete a 2-year anniversary inspection and during the inspection, it was discovered that brackets supporting the mixing system had sustained damage. Subsequent to this discovery, the Standpipe was not refilled and has remained offline.

Despite the standpipe currently being out of service, a recent study and related inspection recommended very few corrective actions. There were a number of health & safety related improvements that suggested and all interior coatings are in very good condition and the exterior coatings are in good condition.

It is the intention of the Township to complete required repairs and place the standpipe back in service once a sustainable repair solution has been developed for the mixing system.

Annual Funding Model

The Lakefield water system is supported through user charges. The majority of customers are charged a uniform flat rate with some metered charges for multi-residential, commercial and institutional customers. The total billing yields approximately $1.35 million dollars annually and additional reserve transfers offset annual capital expenditures.

Based on the extent of the capital program in each year there is some fluctuation in reserve contributions annually, but the current funding mix for water is typically one third for each of the following:

- Operations & Maintenance
- Capital investments
- Reserve contributions

Working within this mix, an annual rate increase of 1% allows the department to offset typical increases in operation agreement and inflationary factors. Additional annual rate increases would allow for specific annual maintenance programs or targeted capital investments.

4.3 Approach to Assessing Condition

4.3.1 Lakefield

The Township and operating authority hold bi-monthly operations meeting to consider system issues and determine approaches to resolve any issues. These are documented, updated on GIS as relevant, and taken into account when preparing annual budgets.

As noted below improvements related to SCADA allow the use of trending analysis as an indicator of changing conditions or impacts of a change.

The Township has contracted for leak detection and generally found that the system is in good condition, any suspected leaks were found to be actual water usage.

Prior to considering a comprehensive road construction project in a serviced area, staff review watermain break history, age and type of water main, and any condition notations in the project area.

4.3.2 Woodland Acres

In addition to the above noted condition assessment activities, in Woodland Acres the operating authority has integrated the bulk meter into their Advanced Metering Infrastructure (AMI) network. They now have the ability to read the meter remotely and start to trend and analyze this consumption data. This will ultimately aid operations in proactive system monitoring and performance.

4.4 Lifecycle Activities

4.4.1 Lakefield

Treatment Plant

The accredited operating authority has a set of standard operating guidelines in place to outline typical routine maintenance. These documents outline maintenance activities required throughout the useful life of the various assets in the water system, including supplier maintenance manuals, rebuild timelines, etc.

In addition, the operating authority, Township and Township's consultants develop annual investment plans which include:

- pump replacements
- process piping improvements
- instrumentation improvements
- SCADA system upgrades

Distribution System

Hydrant flushing – semi-annual unidirectional hydrant flushing is completed by the operating authority. A unidirectional approach, in conjunction with proper scouring velocities, is employed to help reduce build-up and tuberculation. Reducing this build-up decreases turbidity events and reduces friction loss (C factor), increases overall system efficiency. Chlorine residual readings and flushing duration at the flushing point provide indicators of the condition of the inside of the main, and if cast iron, should it be cement mortar lined. This data, coupled with service requests from customers, helps determine if a relining project should be considered.

Cement Mortar Lining on cast iron mains (CML) – dependent on break history and frequency, a section with no or few breaks would be a candidate for lining. If excessive breaks are noted on the segment, then replacement as part of a construction project would be recommended.

Capital investment

Approximately $500,000 annually on capital investments, funded through grants and specific water reserve.

4.4.2 Woodland Acres

Since water is provided by the City, Woodland Acres assets are all contained within distribution system sub class. Same processes as noted above in the Lakefield distribution system which results in capital investments as required.

Recent upgrades to the booster station include meter replacement, Program Logic Controller (PLC) upgrade, auto-dialer replacement and installation of a back-up generator.

4.5 Current Levels of Service

GIS maps outline Lakefield and Woodland Acres water service area with all relevant water assets noted. Users within the service areas have fire flow available and water hydrants are clearly shown on all relevant maps when the GIS water layer is activated.

There have been no boil water advisories in place in the last decade.

The distribution system experiences an average of 2-3 breaks per year, dependent on winter conditions. Almost all breaks are related to cast iron mains and are ‘ring’ breaks caused by site conditions and impacts of frost heave. This equates to approximately 0.0009 connection days/connection lost due to water main breaks.

Lakefield has only had one break on a PVC pipe and it was a longitudinal crack or split. The cause was likely the result of poor bedding material or an errant rock that wore on the pipe over time.

Lakefield services 3,100 users and Woodland Acres services 334 users, which is 18% of the Selwyn population. Lakefield and Woodland Acres water system connections are approximately 1,500 properties out of approximately 10,000 Selwyn properties or 15%.

5.0 Wastewater Collection and Treatment

5.1 Summary of Assets

Selwyn's sanitary collection system includes assets in urban areas of Lakefield and Woodland Acres.

This core infrastructure asset is fundamental in the collection and treatment of municipal wastewater. Water used in the communities is collected, treated and returned to the respective watershed, a key concept in wastewater management.

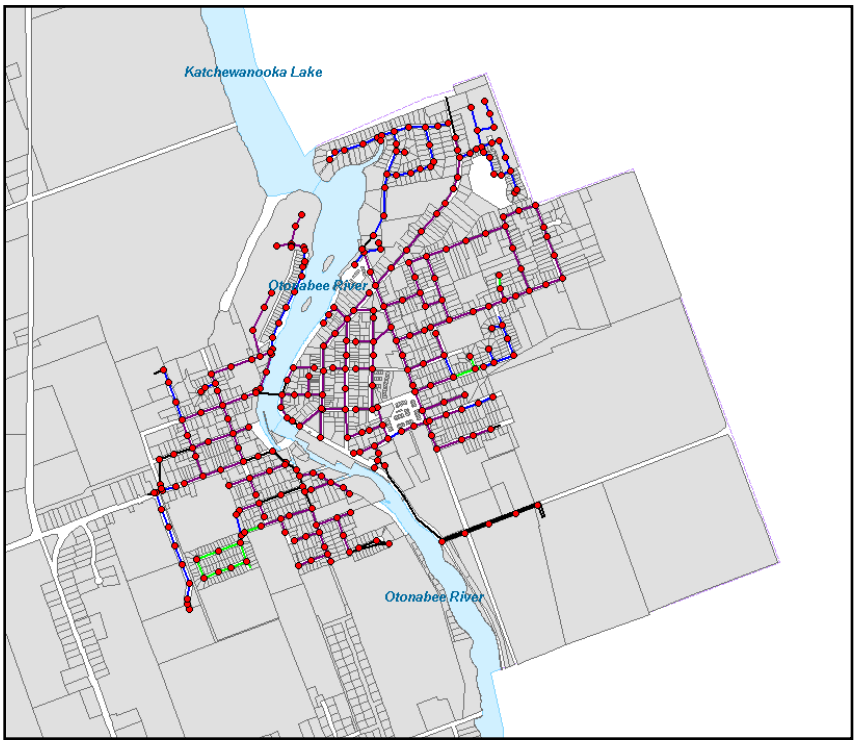
Selwyn has a number of engineer's reports on hand to document the extent of the network, condition of the **network** and maintenance activities.

5.1.1 Wastewater Collection Systems

Networks of varying sized pipes collect and convey residential, industrial, commercial and institutional wastewater to local treatment facilities. These networks consist of both gravity and forcemain transmission to navigate the elevation changes throughout the respective systems.

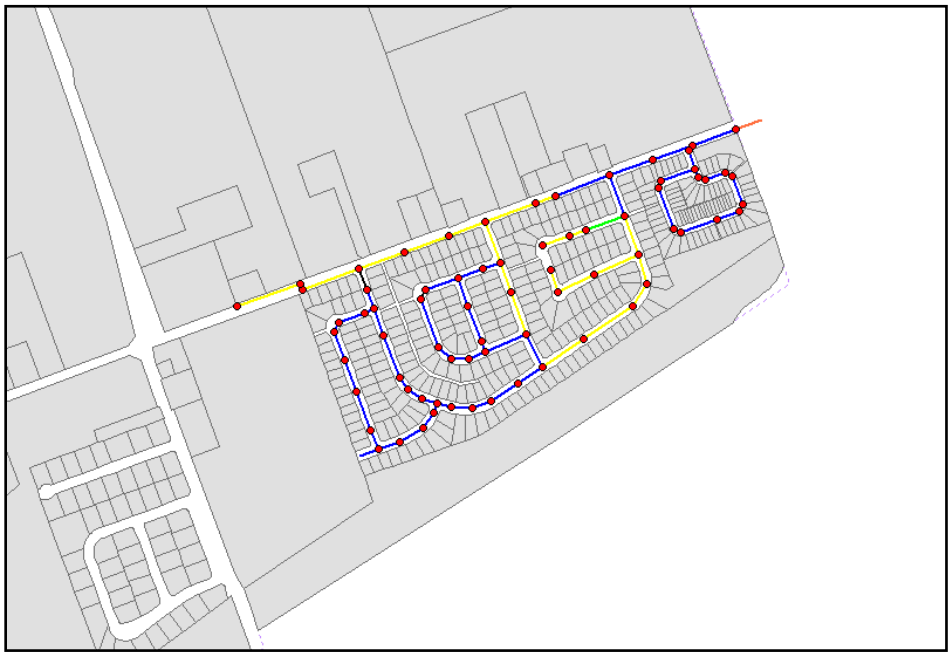
Lakefield

Through over twenty-five (25) kilometres of pipe and six (6) pumping stations, wastewater from Lakefield (including Lakefield College School in Douro-Dummer Township) is collected and transferred to the Lakefield Lagoon for treatment.



Woodland Acres

Approximately 4 kilometres of pipe collect and convey wastewater from the Woodland Acres Subdivision to the City of Peterborough collection system. From here it travels through the City wastewater collection system for treatment at the City's Wastewater Treatment Plant.



5.1.2 Lakefield Wastewater Treatment Plant (Lagoon)

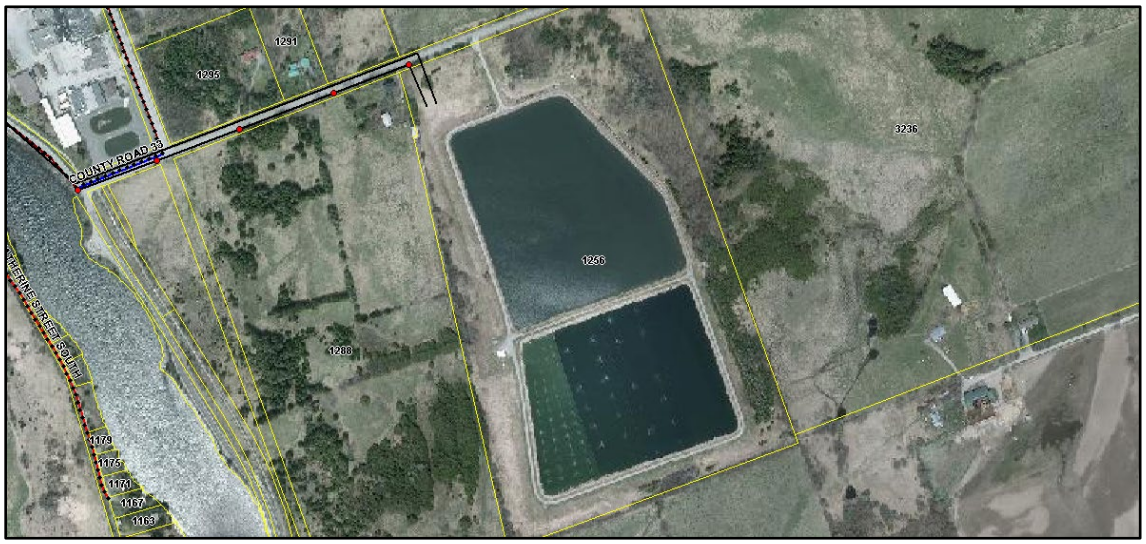
The sewage treatment plant has a rated capacity of 2,300 m^3 per day, and is comprised of an aerated and sedimentation lagoon system and discharging to the Otonabee River. It consists of an aerated lagoon cell (south cell), approximate 275 m long x 212 m wide x 3.1 m deep, complete with a minimum 200 mm depth of clay liner along the cell bottom and side slopes and equipped with the following:

- Three (3) membrane baffles (to form four compartments) anchored to the side slopes by anchor posts and steel cables, and weighted with concrete anchor blocks, to create a serpentine (plug) flow of the effluent through the four (4) compartments, the first three (3) compartments utilized as an aeration zone and the last compartment as a settling zone;
- A 350 mm diameter air header pipe located within the dividing berm between the Cell No. 1 and 2, providing air supply to the three aeration compartments as follows:
    - Four (4) flexible aeration chains (100 mm dia. air hose supported by stainless steel cables complete with bio-fuser assembly comprising of hoses, downcomer fittings, manifolds and appurtenances, and twelve (12)

submerged fine bubble diffusers per aeration chain) within the first aeration compartment;

- Two (2) flexible aeration chains (100 mm dia. air hose supported by stainless steel cables complete with bio-fuser assembly comprising of hoses, downcomer fittings, manifolds and appurtenances, and sixteen (16) submerged fine bubble diffusers per aeration chain) within each of the second and third aeration compartment;

- an inlet chamber into the first aeration compartment, and an outlet effluent chamber in the settling compartment to discharge effluent to Lagoon Cell No. 1 or to the disinfection facility.



5.1.3 Lakefield Wastewater Treatment Plant (Water Street SPS)

A wet well/dry well sewage pumping station as follows:

- Three vertical centrifugal sewage pumps (2 duty, 1 standby) each with a nominal capacity of 290 m^3 per hour at 31 m TDH, and equipped with 45 kW (60 hp) motors with electronic soft start starters.
- A 125-kW diesel engine standby generator, with an 1136 L capacity indoor fuel tank and capable of running 2 of the 3 pumps plus ancillary equipment.
- Twin 300 mm diameter forcemains from the Water Street Sewage Pumping Station to the sewage lagoons.
- An alum feed system (housed within the pumping station building) for phosphorus removal, consisting of two (2) bulk storage tanks, each having a nominal capacity of 13,600 L, a transfer pump, a 2,280 L capacity day tank, duplex metering pumps with nominal capacity of 65 L/hr. feeding into the forcemain, with continuous effluent discharge from lagoon cell no. 2 to existing 300 mm diameter outfall pipe to the Otonabee River.

5.1.4 Replacement Cost/ Average Age

Asset Class	Quantity	Units	Average Age (years)	Replacement cost
Wastewater Main	29	Km	20	$ 20,289,076.48
Pumping Stations	6	Count	26	$ 3,631,903.66
Wastewater Treatment Buildings	2	Count	31	$ 2,992,745.88
Total			**26**	**$ 26,913,726.02**

5.2 Current Performance/Condition

5.2.1 Wastewater Collection System (including pumping stations)

Wastewater pumping stations are inspected on a weekly basis, maintenance and repairs are performed as required. On an annual basis Township staff review recommendations from the operating authority, along with internal input, to select capital purchases and/or upgrades for the following budget year.

5.2.2 Wastewater Treatment Facilities

Wastewater from the Lakefield wastewater collection system is pumped from a central location to the Lakefield Lagoon for treatment before being discharged back to the watershed. Upgrades to the facility in 1999 included provisions to increase available aeration within each cell and an oversized UV system to accommodate future increases in plant rated capacity. The annual influent average of wastewater flow received at the Lakefield Lagoon was 1,473 m^3 per day in 2021. This is within the daily annual average rated capacity of 2,300 m^3 per day. The average lagoon effluent flow was 846 m^3 per day, well within the Lagoon effluent rated capacity based on UV disinfection rating of 6,800 m^3 per day. In 2021 the Lakefield Wastewater Treatment Plant operated at 64% of its design capacity.

As with any wastewater treatment facility the system relies on natural processes for the treatment of incoming wastewater. These processes are greatly affected by the quality of the influent and any contaminants that may be present in this stream. Enhanced sewer use by-law monitoring and enforcement will help extend the useful life and efficiency of this facility.

5.3 Approach to Assessing Condition

5.3.1 Sanitary Collection System (including pumping stations)

At 10-year intervals the Township coordinates a flushing and CCTV inspection program of the entire sanitary collection system in Selwyn. Based on the report generated from this inspection, using industry standard assessment criteria, staff are able to identify problem areas and prioritize capital spending.

2017 Sanitary Assessement Database

							Structural				O&M				Overall				Grade Count													
FROM	TO	PRIORITY	Street Location	Length	Size	Material	p rank (S)	efects (S1)	l Rank (S)	Defects (S2)	op rank (OM)	Defects (OM1)	nd Rank (OM)	Defects (OM2)	Top rank	efects (1)	nd Rank	efects (2)	5	4	3	2	1	0	Infill Dripper (IN)	Infill Gusher (IG)	Infill Runner (IR)	Column1	Broken (B)	Obstacle Other (OBZ)	Fracture (F)	Crack)
1	P.S.1	N/A	Nicholls St	17	450	AC	0	0	0	0	4	1	0	0	4	1	0	0	0	1	0	0	0	2	N	N	N	0	N	N	N	N
2	3	3	Nicholls St	67.7	450	AC	4	1	0	0	0	0	0	0	4	1	0	0	1	0	0	0	0	4	N	N	N	0	Y	N	N	N
3	4	3	Division St	66.2	450	AC	0	0	0	0	4	1	2	2	4	1	2	2	0	1	0	2	0	2	N	N	N	0	N	N	N	N
5	4	N/A	Division St	73.1	450	AC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	N	0	N	N	N	N
6	5	N/A	Rabbit St	19.6	450	AC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	N	N	N	0	N	N	N	N
7	6	3	Rabbit St	106.4	450	AC	3	4	0	0	3	2	2	1	3	6	2	1	0	0	6	1	0	6	Y	N	N	1	Y	N	N	N
8	7	3	Rabbit St	72.4	450	AC	4	1	3	2	2	1	0	0	4	1	3	2	1	0	2	1	0	1	N	N	N	0	Y	N	N	N
8	9	3	Rabbit St	62.3	450	AC	0	0	0	0	2	1	0	0	2	1	0	0	0	0	0	1	0	3	N	N	N	0	N	N	N	N
9	10	3	Rabbit St	26	450	AC	0	0	0	0	4	1	0	0	4	1	0	0	0	1	0	0	0	3	N	N	N	0	N	N	N	N
10	9	3	Rabbit St	28.3	450	AC	0	0	0	0	4	1	0	0	4	1	0	0	0	1	0	0	0	4	N	N	N	0	N	N	N	N
12	10	3	Concession St	103	450	AC	3	1	0	0	2	1	0	0	3	1	2	1	0	0	1	1	0	2	N	N	N	0	N	N	N	N
13	12	N/A	Concession St	94.5	450	AC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	N	N	N	0	N	N	N	N
13	14	N/A	Concession St	101.3	450	AC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	N	N	N	0	N	N	N	N
15	14	3	Queen St	102	200	AC	0	0	0	0	5	1	3	1	5	1	3	1	1	0	1	5	0	10	N	N	N	0	N	N	N	N
16	15	N/A	Queen St	107.2	200	AC	0	0	0	0	2	1	0	0	2	1	0	0	0	0	0	1	0	7	N	N	N	0	N	N	N	N
17	16	N/A	Queen St	106.6	200	AC	0	0	0	0	4	1	0	0	4	1	0	0	0	1	0	0	0	8	N	N	N	0	N	N	N	N
17	18	3	Queen St	107.3	200	AC	0	0	0	0	4	1	2	1	4	1	2	1	0	1	0	1	0	12	N	N	N	0	N	N	N	N
18	19	3	Queen St	57.5	200	AC	5	1	2	2	4	2	3	2	5	1	4	2	1	2	2	4	0	5	Y	N	N	1	Y	N	N	N
20	19	N/A	Queen St	73.3	200	AC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	N	0	N	N	N	N
20	21	N/A	Queen St	38.1	200	AC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	N	0	N	N	N	N
20	21	N/A	Queen St	27.4	200	AC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	N	0	N	N	N	N
22	21	N/A	Queen St	54.8	200	AC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	N	0	N	N	N	N
23	23A	3	Queen St	55	200	AC	0	0	0	0	2	F	0	0	2	F	0	0	0	0	0	3	0	6	N	N	N	0	N	N	N	N
23	22	3	Queen St	66.4	200	AC	5	2	4	1	5	1	4	1	5	3	4	2	3	2	1	8	0	4	N	N	N	0	Y	N	N	N
24	11	3	Nicholls St	24.8	200	AC	0	0	0	0	5	2	0	0	5	2	0	0	2	0	0	0	0	2	N	N	N	0	N	Y	N	N
24	2	N/A	Nicholls St	72.4	200	AC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	N	0	N	N	N	N
25	3	N/A	Nicholls St	67.9	250	PVC	0	0	0	0	4	2	0	0	4	2	0	0	0	2	0	0	0	4	N	N	N	0	N	N	N	N
26	25	N/A	Nicholls St	56.7	250	AC	2	1	0	0	4	1	0	0	4	1	2	1	0	1	0	1	0	4	N	N	N	0	N	N	N	N
26	27	N/A	Nicholls St	61.6	250	AC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	N	N	N	0	N	N	N	N
28	28A	3	Oxford St	76.3	200	AC	2	1	0	0	0	0	0	0	2	1	0	0	0	0	0	1	0	3	N	N	N	0	N	N	N	Y
29	28	N/A	Oxford St	77.3	200	AC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	N	0	N	N	N	N
29	29A	N/A	Oxford St	77.2	200	PVC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	N	N	N	0	N	N	N	N
30	27	3	Concession St	66.6	200	AC	5	1	0	0	0	0	0	0	5	1	0	0	1	0	0	0	0	7	N	N	N	0	N	N	N	N
31	32	3	Bishop St	119.1	200	AC	5	2	3	1	4	1	2	1	5	2	4	1	2	1	1	3	1	9	N	N	N	0	N	N	Y	N
31	30	3	Concession St	62.2	200	AC	0	0	0	0	2	1	0	0	2	1	0	0	0	0	0	1	0	3	N	N	N	0	N	N	N	N
33	32	3	Bishop St	54.9	200	AC	5	1	0	0	4	2	2	1	5	1	4	2	0	3	0	1	0	7	N	N	N	0	Y	N	N	N

Note: this image is not intended to be reviewed and is for informational purposes only.

5.3.2 Wastewater Treatment Facility

Township staff meets with the contracted operating authority on a quarterly basis to review maintenance and operations of these systems. Annually the operating authority submits capital recommendations for the consideration in the following budget year based on their assessment.

5.4 Lifecycle Activities

On an annual basis Township staff review recommendations by the operating authority, along with internal input, to select capital purchases and/or upgrades for the following budget year. Continual effluent quality monitoring and process performance are key tools used to aid in planning.

5.4.1 Sanitary Collection System

With the availability of advanced CCTV inspections and trenchless sanitary repair technology, the Township invests approximately $15,000 annually on investigating and repairing sanitary lateral blockages. This reduces customer service disruption and can eliminate the need for expensive restoration costs that can be incurred by traditional excavation repairs.

The Township also implements an annual “dead end” flushing program to help reduce build-up in the system which can lead to potential blockages.

5.4.2 Wastewater Treatment Facility

Approximately $9,500 is invested annually on maintaining and repairing aeration diffusers and equipment at this facility. Residue management at the Lagoon requires the periodic removal of accumulated sludge build-up; this was last completed in 2019 at a

cost of $441,352. Although largely dependent on growth within the Village of Lakefield this activity is not expected to be required for another 10-15 years. Excess sludge accumulation can lead to incomplete biological breakdown of organics and decreased aeriation and ammonia removal. Staff will continue to monitor and trend levels to aid in forecasting this work proactively.

5.5 Current Levels of Service

The levels of service currently provided by the Township's wastewater systems are, in part, a result of the state of local infrastructure identified above. A level of service analysis defines the current levels of service that will be tracked over time. In future iterations of the asset management plan, targets will be set for the technical levels of service.

Wastewater assets have prescribed levels of service reporting requirements under O. Reg. 588/17. These requirements include levels of service reporting at two different levels, i.e., community levels of service and technical levels of service. Community levels of service objectives describe service levels in terms that customers understand and reflect customers' expectations with respect to the scope, reliability, affordability, and efficiency of the wastewater systems. Technical levels of service describe these aspects of the Township's wastewater systems through performance measures that can be quantified and evaluated. These performance measures can be used to assess how effectively a municipality is achieving its established targets.

5.5.1 Community Levels of Service

The wastewater collections system serves the communities of Lakefield and Woodland Acres. The wastewater system is separated, meaning that sanitary and stormwater flows are carried in different mains with different destinations. Despite this, stormwater can enter the wastewater system through numerous sources. The Township has worked to reduce the amount of stormwater entering the wastewater system. The Township completed a flushing and CCTV inspection of the entire network in 2017 and has implemented and completed a sump pump inspection program.

Staff are working to revise the current Sewer Use By-Law to help enforce requirements related to sump pump connections to the sanitary. The priority list generated from the CCTV inspection and assessment is used for capital planning and replacement.

5.5.2 Technical Levels of Service

There are approximately 3,434 residents within the respective sewer sheds with only approximately 17 residents not connected to the Municipal sanitary collection system, representing a 99.5% connection rate. There have been no connection-days lost per year due to wastewater backups compared to the total number of properties connected to the municipal wastewater collection systems.

The Township completed a flushing and CCTV inspection of all known sanitary mains within the Township in 2017.

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6.0 Stormwater

6.1 Summary of Assets

Selwyn's storm water management system includes a number of stormwater collection systems and several stormwater collection ponds.

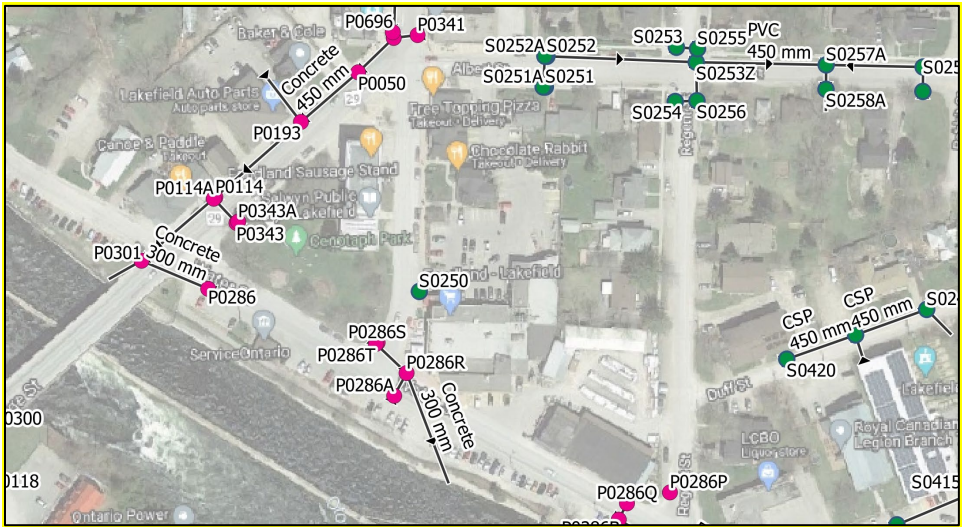
This core infrastructure asset protects the health of streams and lakes as well as mitigating the impacts of urban development. This is achieved by collecting stormwater in order to protect properties and road networks from flooding, managing the flow rate into the environment, and allowing for removal of contaminants.

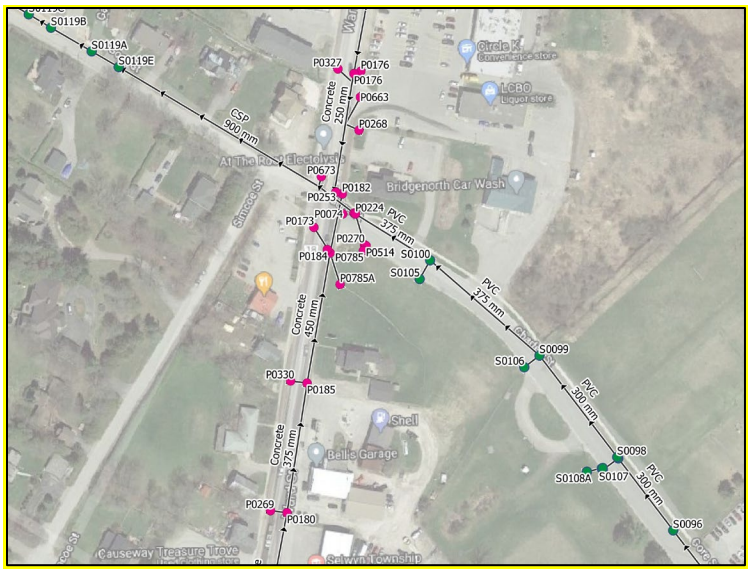
Selwyn has a number of engineer's reports on hand to document the extent of the network, condition of the network and ponds and proposed maintenance activities.

6.1.1 Stormwater Collection System

While typically associated with an urban road network, stormwater collection systems of varying sizes and composition are located throughout the rural and semi urban areas of the Township as well.

Given the function of this infrastructure, the Selwyn system is often linked with the County of Peterborough system, with each impacting the other.





Selwyn has over 17 kms. of storm sewers, 667 structures and 1 oil/grit separator structures.

6.1.2 Stormwater Collection Ponds

Selwyn has eight (8) Stormwater Management (SWM) facilities that fall within core asset responsibilities. The three (3) types of SWM facilities include extended detention wet ponds, dry ponds and an infiltration basin.

No.	Name/Location	Facility Type
1.	Twin Oaks Subdivision	Extended Detention, Wet Pond
2.	Pine Valley Estates	Dry Pond
3.	Bridgenorth Public Library	Extended Detention, Wet Pond
4.	Selwyn Public Works Yard	Infiltration Basin
5.	Albert Street	Dry Pond
6.	Woodland Acres	Extended Detention, Wet Pond
7.	Chemong Bluffs Subdivision	Extended Detention, Wet Pond
8.	Summerlane Subdivision	Extended Detention, Wet Pond

All SWM Facilities are geo-referenced and plotted on the Township's GIS platform.

6.1.3 Replacement Cost/ Average Age

Asset Class	Quantity	Average Age (Years)	Replacement Cost
Stormwater Mains	17 kms.	18	$12,229,636
Stormwater Structures	667	17	$2,267,800
Stormwater Management Facilities	8	13	$1,260,000
Total			**$15,757,437**

6.2 Current Performance/Condition

6.2.1 Stormwater Collection System

Traditionally the Township has coordinated an outside contractor attending annually to clean and vac all municipal catch basins. While thorough, this annual clean-out program has not included the completion of any additional paperwork related to condition, accumulation of debris, type, etc. This data needs to be captured moving forward.

In an associated maintenance operation, the Township completes spring road sweeping to remove winter sand/salt and road debris. While a maintenance operation within roads, this activity directly benefits the storm water collection system by reducing the amount of sedimentation that flows to the catch basin structures.

6.2.2 Stormwater Collection Ponds

Typical maintenance expenditures include work completed by our public works staff and/or contractors to clean out stormwater management ponds as required and in accordance with the engineer's inspection report.

In general, the facilities are in reasonable condition. The primary observation was the accumulation of silt in the facilities, which indicates that the facilities are providing the desired sediment removal function.

An engineer's inspection did note a number of deficiencies which were divided into the following categories for the purpose of compiling the inspection data:

- Safety Items
- Maintenance Items
- Housekeeping Items

These deficiencies are further addressed in the lifecycle activities section.

6.3 Approach to Assessing Condition

6.3.1 Stormwater Collection System

Selwyn engaged an engineer to coordinate a joint CCTV inspection project with the County of Peterborough. This joint project was undertaken given the impact on and linkages with each other's storm water systems.

The project included Inspection, Reporting and Mapping Services for the storm sewer infrastructure network throughout the Township of Selwyn including Lakefield, Woodland Acres, and other locations where buried storm sewer infrastructure is present.

The objective of the condition assessment was to determine an overall rating of the structures that can be compared to other evaluated structures to prioritize system improvements. Wills has assumed that the storm structures will be located in Lakefield, Woodland, and throughout the Township.

System maps were provided to the Township for uploading to the Township's GIS database.

Now that the Township has a robust storm water asset inventory and initial condition assessment in place, the process of updating the inventory and revising the condition will take considerably less effort in future.

6.3.2 Stormwater Collection Ponds

The Township retained D.M. Wills Associates Limited to complete an inspection of the Township's Stormwater Management (SWM) facilities in 2015.

The purpose of the inspection program was to understand the general state and performance of each facility by means of a comprehensive visual inspection program.

The data summarized in the Stormwater Management Facility Inspection Report include basic operational principles of the facilities, photographs, deficiencies and any recommendations for maintenance of the facilities, including further analysis if required.

For the purposes of the pond inspection program, deficiencies were categorized as relating to safety, maintenance or housekeeping measures. Safety measures related to fencing and inlet grates; maintenance related primarily to sediment removal, pipe flushing or grading corrections; and housekeeping related to replacing missing or broken components and addressing areas requiring stabilization.

6.4 Lifecycle Activities

6.4.1 Stormwater Collection System

Annual expenditures are approximately $18,000, with the largest component being engagement of an outside contractor.

More detailed record keeping associated with this maintenance activity would allow staff to begin to analyze the records to develop appropriate maintenance and capital plans.

For instance, could annual catch basin cleaning be switched to bi-annual? Would areas and/or structures with high degree of accumulation be an indicator of more serious structural issue? Should isolated CCTV inspections become part of annual maintenance activities?

With improved in-field inspection record keeping and related GIS referencing, life cycle activities could be improved.

6.4.2 Stormwater Collection Ponds

Annual expenditures are less than $1,000.
The pond inspections and resulting maintenance considered:

- inlet and outlet structures
- overflow spillways
- receiving drainage course
- vegetation
- storage volumes
- human or animal use
- erosion
- debris

Public Works staff has worked through the corrective actions and the deficiencies have been cleared.

In addition, the Project Coordinator - Water & Sewer completed an in-house update of the SWM facilities in November 2021 and produced a supplementary report noting all corrective actions taken.

With the engineer's report on file, the supplementary report on file and a greater awareness of the functioning of the SWM facilities, life cycle activities could be improved.

6.5 Current Levels of Service

6.5.1 Community Levels of Service

GIS Map includes a Stormwater layer that documents all ponds and network locations.

As subdivisions come on stream, a certain number will have SWM facilities and collection systems. These are provided to the Township as contributed assets and are added to the asset management plan.

6.5.2 Technical Levels of Service

The technical criteria look more holistically at the larger picture of flood resiliency and at the capacities of the various collection systems and SWM facilities

Selwyn engaged Wills Associates to provide a Level of Service technical assessment as it relates to storm water resiliency. That assessment provides the following details which meets the technical requirements under Table 3 of O. Reg. 588/17.

6.5.3 Five (5) Year Resiliency

While the term ‘resilient’ is not clearly defined in the O. Reg, Wills interpreted its meaning to be consistent with typical engineering practices which would, in their experience, include the development of a ‘Storm Sewer Design Sheet’. This tool typically demonstrates free-flowing conveyance of the 5-year storm runoff based on local rainfall, soil, and development characteristics and engineering standards.

Wills selected 27 representative locations, towards the outlets of ‘branches’ of storm sewers, and completed an analysis of lumped sub-sewer sheds. The results in each location were extrapolated to the upstream network, subject to some adjustments, and the impact to the percentage-resiliency was weighted by the area of each sub-sewer shed.

Wills considered the slope of the pipe relative to the surrounding average slope, and strove to ensure that each sub-sewer shed was of a similar vintage. Wills also noted that some pipes at the upstream headwaters of each sewer shed were likely sized appropriately for the 5-year storm, even if the lower end of the system demonstrated a lesser design standard, on the merit of the minimum pipe size requirements.

Ultimately, Wills estimates that 44% of the storm sewer system is currently resilient to the 5-year storm. The results generally indicate that newer systems, such as Summer Lane, Woodland Acres (newer development) and select locations in Lakefield provide a higher level of performance.

This assessment includes numerous assumptions that could be refined based on further study, pertaining to land use, site-specific SWM features, site grading, etc.

No provisions have been included at this time for impacts due to climate change. Given the asset management policy direction, this is a gap that needs to be worked through with the engineer.

6.5.4 One-Hundred (100) Year Resiliency

Once again, the term ‘resilient’ is not clearly defined in the O. Reg, Wills interpreted its meaning to consider instances where constructed features would be impacted by 100-year flood levels.

In order to estimate the number of properties that were not resilient to the 100-year flood, Wills conducted the following tasks:

- Wills counted all properties with structures or pavement within the Regulatory Floodplain, as developed by Otonabee Conservation and shown on the County of Peterborough web-based GIS system

- Wills reviewed the LiDAR orthophotography throughout the Township to identify any urban streets which do not provide continuous overland drainage (i.e., a ‘pocket’)
- Wills invited the Township to provide any additional locations of known historical surface flooding.

Based on our estimate of 10,000 properties within the Township, the resulting percentage of properties that are resilient to the 100-year storm is approximately 95%.

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7.0 Financial Information

The Township has historically dealt with the tax supported budget and the water & sewer user charge budgets at different meetings to support public optics related to funding sources for projects. However, capital projects that are interrelated do receive appropriate planning/review and are tendered as complete projects.

The Township's average annual level of capital investment across the core infrastructure is approximately $3,340,000.

The goal of the AMP is to establish an annual lifecycle funding target that would be required to fully support a lifecycle management strategy over the long-term.

The following information provides a general overview of the funding mechanisms used to fund capital in Selwyn.

7.1 Debt

The Township does not currently carry any debt related to core infrastructure. Historically, debt has not been an active part of Township financing since amalgamation in 2001.

In the 1990s and prior, the former Village of Lakefield was required to take on debt related to improvements of the water and sewer system. However, with the retirement of that debt and a restructuring of the water and sewer budget process which included mores significant reserve contributions, no additional need to issue debt,

The most recent annual debt repayment limit under O. Reg 403/02 is $3,943,786. This calculated amount is 25% of net revenues less any existing debt charges. There are no recommended changes at this time to explore debt financing as an active means of funding Selwyn infrastructure.

7.2 Reserves

The Township has established a good reserve allocation with respect to several core infrastructure assets. By maintaining level funding for reserves over the long-term, the periods of relatively low capital needs allow for the building up of reserves that could be drawn upon in times of relatively high capital needs.

The water reserve stands at approximately $4.7 million with typical annual allocations of $400,000-$500,000.

The sewer reserve stands at $925,000 with typical annual allocations of $350,000-$400,000. The sewer reserve is currently depleted following the recent expenditures on the George Street pumping station and LSDA sewer main connection. Lakefield South Development Charges will be repaying a portion of these expenditures and typical annual reserve allocations will also help to replenish the sewer reserve.

Likewise in the Woodland Acres Water & Sewer Service Area, a good annual reserve contribution has been established for both water and sewer. The reserve balances for water & sewer are $850,000 and $710,000 respectively with annual allocations of $80,000 and $70,000 respectively.

The Selwyn Roads Construction capital reserve has been established and the current reserve balance is $740,000. Annual contributions are not fully planned over the long term and tend to be increased through projects that did not get completed. More strategy work needs to be completed in this area and the AMP will be a key document in setting a reserve level goal and an acceptable annual reserve contribution.

A Stormwater reserve has been established, but to date any allocation has been utilized in the following year. Given the significant network of storm water collection systems, this core infrastructure should receive attention as to increasing annual allocations. As a positive, the recent system condition ratings seem to show that for the most part the system is in good shape.

With respect to Bridges and Culverts, no dedicated annual reserve allocation exists. Indeed, only through the AMP process, and in clarification with our County partners, was it determined that Selwyn was responsible for any structures within its jurisdiction.

Given the significant asset base of the Roads network and the risk involved with Bridge and Culvert structures, the lack of dedicated reserve allocations is an obvious area that needs to be addressed.

In summary, while the overall approach to reserves in Selwyn has been good, only three (3) core infrastructure assets have established reserves and only two (2) have a well-planned annual allocation process in place.

7.3 Community Capacity Building Fund (Formerly the AMO/Federal Gas Tax grant)

The Association of Municipalities of Ontario (AMO) administers this program in Ontario. The Federal Gas Tax Fund became enshrined in legislation as a permanent annual source of infrastructure funding for Canada’s municipalities at $2 billion per year. The fund is allocated on a per capita basis across Canada.

In 2022, the Township received $541,060 and in 2023 is expected to receive $564,585 under the existing transfer payment agreement.

Since its inception the fund has been used exclusively for roads and storm water works. There are a number of other eligible program areas, but at this time it is proposed that the fund will continue to provide stable funding for roads network and storm water related investments.

7.4 Ontario Community Investment Fund (OCIF)

OCIF is a provincial formula-based grant program under which eligible recipients:

- receive annual allocation notices specifying OCIF funding for the calendar year
- may accumulate annual formula-based grants for up to five years to address larger infrastructure projects

To date, this fund has supported asset management work, data collection and condition assessments. Funding will continue to support asset management plan creation until 2025.

Capital expenditures on core infrastructure projects (such as roads, bridges, water and wastewater, including sanitary and stormwater facilities) that are part of an asset management plan are eligible, including:

- capital construction of new core infrastructure to be owned by the recipient that addresses an existing health or safety issue
- capital maintenance for the renewal, rehabilitation and replacement of core infrastructure owned by the recipient

The OCIF program has recently been revised and under the new calculation model the annual allocation has increased from $178,490 to $421,320.

The new calculation is expected to use current replacement value of core infrastructure as a key factor. As such, moving forward a portion of OCIF should also be considered for allocation to joint water and sewer projects, since the formula uses the CRV of these assets to determine the annual grant level.

7.5 Ontario Municipal Partnership Fund (OMPF)

OMPF is the largest unconditional grant received by Selwyn and the only one that the local Council truly controls.

The Ontario Municipal Partnership Fund – Grant (OMPF) for 2022 has been confirmed and will be $1,054,500 (decrease of $100 over 2021).

As part of the annual budget process, Selwyn Council reviews recommended projects and approves OMPF use and inclusion in the annual budget. OMPF is typically used to cover ongoing arena deficits, unforeseen departmental deficits, capital programs or one-time expenditures.

This fund has allowed Council is complete numerous facility repairs and renovations over the last few decades. This grant is used as a core funding source for infrastructure investments.

7.6 Specific Conditional Grant Programs

There are still a number of conditional grant programs available for local government.

The most significant program that currently exists to support core infrastructure is (ICIP). This is a three-party grant program with federal, provincial and municipal. Currently funded Selwyn's share of the causeway project and the COVID resiliency stream has funded office improvements at the main municipal office

Other conditional grants that support capital investments include:

- Provincial modernization and efficiency grants
- Ontario trillium Foundation grants

Many of these grants will be instrumental as the Township continues to invest in facility improvements and enhanced service level opportunities.

7.7 Development Charges

The Township of Selwyn Development Charges by-law was adopted effective September 2018. A component of the existing DC capital needs includes various road improvements identified in the Township's Roads Needs Study that would benefit future development.

In the Selwyn DC model, a component of Roads is used to offset increases in road capacities as capital projects improve the roads network overall to ensure a safe passage of vehicular traffic, improved rideability characteristics and increased road surface widths.

The annual amount typically flowing from DC deferred revenues for Roads is $60,000-$70,000.

In future iterations of the AMP which will consider future growth planning, DC's will play a larger role in addressing future service level considerations.

7.8 Financing Strategy - Next Steps

Once a comprehensive capital needs forecast, including all of the Township's assets, has been developed through future expansions of this asset management plan, a full financing strategy can be developed. It is noted that the Township will be required to include a comprehensive financing strategy will in the asset management plan by July 1, 2025.

Working within approved Council policy and general Council expectations, staff will spend some effort in consideration of methodologies to implement a separate annual capital levy.

This exercise would first consider the impact on the municipal levy and municipal tax rate, impact that this new source of funding could have on the infrastructure investment decisions and impact on risk mitigation through increased capital funding.

By phasing in the capital levy over a number of years and combining it with other funding sources, it is expected that an additional $1 million dollars of annual capital investments could result.

This would allow for a Selwyn controlled capital program to be put in place and would remove some of the vulnerability associated with reliance on outside grant programs.

Should those grant programs remain in place, a dedicated capital levy would ultimately free up funding from unconditional grant programs to support other one-time investments in projects of importance to the community and in accordance with Council's strategic plan.

Analysis of Existing Investment Gap						
Core Assets	Estimated 10 year annual maintenance required	Estimated 10 year annual investment required	10 year average maintenance	10 year average capital	Average as % of Estimated Investment	Additional Comments
Roads	13,422,500	9,600,000	5,923,676	7,229,734	57.13%	despite this under investment, the roads network adequacy remains high at 89%.
Structures	91,250	288,987	26,250	0	6.90%	this under investment is a result of previously unknown structures prior to the AMP process.
Water	817,314	6,310,978	421,767	3,256,722	51.60%	this under investment may be affected by the CRV for plant equipment - low confidence rating.
Wastewater	603,975	5,718,305	311,675	5,345,079	89.47%	may be overstated given recent significant investments in many SPS, Lagoon and LSDA link
Stormwater	353,228	1,575,744	182,280	618,588	41.52%	this under investment may be a result of new stormwater department previously included in roads

8.0 Next Steps

The annual budget process has typically included capital projects and planning for these projects over the short to mid- term. The Selwyn Township Asset Management Plan represents the next step in capital project planning.

Over time this plan will be used to provide the Township with the information it needs to make informed decisions on managing capital assets in a sustainable manner over the long term.

The following recommendations are put forward in response to information gaps, best practices that should be in place, the need to maximize each asset based on its own set criteria, and in the spirit of continuous improvement.

8.1 Ensure Asset Inventories are Updated Regularly

- In order to make sound asset management decisions, the information in the asset database needs to be detailed, supportable and accurate.
- The Township should regularly update the asset database as part of ongoing operations.
- Regular updates should have regard for not only the cost of asset purchases but also have regard for the rationale for the asset upgrades, consider asset condition ratings, and include information about remaining useful life.

8.2 Filling Information Gaps

- A work plan should be developed to address the level of completeness and confidence in the data included on the chart included herein.
- Decision making should rely on data that is as accurate and up to date
- Data gaps or confidence levels with a Low rating should be a high priority for updating to create a more robust inventory.
- Once the data gap is adequately addressed and the reliability for Current Replacement Value is determined to be of higher quality, a more detailed costing of life cycle activities should be presented. This should ideally be incorporated in the annual AMP update presented as part of the annual budget cycle.

8.3 Maximize Use of GIS Capabilities

- With the progress made thus far on implementing GIS layers for core assets, resourcing needs to be put in place to maximize the use of reliable GIS data within the CGIS module.

8.4 All Assets Classes

- Repair and replacement of capital works should be prioritized more formally and include asset condition ratings as a key prioritization factor.

- Risk analysis should be incorporated into annual updates as data is improved and long-term financial planning is entrenched. Levels of Service should be affected by a detailed risk assessment related to each asset class.
- The process for urban area infrastructure improvements should continue to have regard for all components of road sections including road, water, sewer and storm sewer
- The Township should, where possible, coordinate the construction of new infrastructure with infrastructure repairs and replacement to achieve cost efficiencies.

8.5 Best Practices

- As asset management plans in Ontario are developed under the new O./Reg 588/17 protocols, staff should actively seek out sector best practices and incorporate these best practices in annual updates of the Selwyn Asset Management Plan
- Engineering studies and assessments should be planned in advance of key AMP update cycles and in conjunction with other key municipal plans such as the Climate Change Action Plan, Development Charges Study and system wide master plans

Selwyn Asset Management - Data Summary

Asset Class	Asset Sub-Class	Data Sources	Data Set Completeness	Data Condition Confidence Level	CVR Cost & Age Confidence Level	Comments and Next Steps
Roads	road network	Roads Needs Study 2022 Roads Needs Study - historical Tangible Capital Asset Documentation	High	High	Moderate	engineer's training session on use update annually and new study every 5 years consider road count supplemental contracts
Bridges & Culverts	structures > 3m. & < 6m.	Engineer's Bridge Condition Assessment Internal GPS report County of Peterborough records	Moderate	High	Moderate	further ground proofing of Internal GPS Report establish bi-annual inspection schedule
Water	distribution system	Tangible Capital Asset Documentation Historical Engineer reports/plans Hydrant Flushing field reports	Moderate	Moderate	Moderate	track costs from present day tender results review main break history use chlorine residual data to consider relining candidates
	treatment facilities	Tangible Capital Asset Documentation Insurance files Historical Engineer reports/plans	Moderate	Moderate	Low	consider engineers study determine op. agrmt. maintenance components amounts
Wastewater	collection system	CCTV Reports and Engineers Assessment Tangible Capital Asset Documentation Historical Engineer reports/plans Operating Authority service reports	Moderate	Moderate	Moderate	plan for next CCTV project track costs from present day tender results
	treatment facilities	Tangible Capital Asset Documentation Insurance files Historical Engineer reports/plans	Moderate	Moderate	Low	consider engineers study determine op. agrmt. maintenance components amounts
Stormwater	collection system	Engineers Cost Report Engineers Representative Pipe Report CCTV Reports and Engineers Assessment Tangible Capital Asset Documentation	Moderate	High	Moderate	contracts to capture missing data track costs from present day tender results improve data mgmt. on annual structure cleaning
	ponds	Engineers Report on Maintenance Tangible Capital Asset Documentation	Moderate	High	Low	annual in house updates & additions

General Comments and Next Steps:

Financial Information Considerations
- develop process to gather and update consistent use of engineering based construction indices
- consider comprehensive CRV costs and average age study on all core assets (except Roads given RNS 2022)
- ensure updates of CRV costs to current day dollars on a go-forward basis
- consider all aspects of maintenance and confirm what components should be included in average annual maintenance activities

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9.0 References

The compilation of the 2022 AMP relied upon a variety of source documents. Since this is the first iteration of the AMP under the new regulation, no one definitive source provided all aspects of the requirements for each of the core assets save and except perhaps the relative completeness of the Roads Needs Study 2022.

The following provides a good general overview of the source documents used in creating the 2022 AMP.

- Selwyn Township TCA documentation and audit working papers
- Budgets, narratives and financial statements as approved by Council
- In-house expertise and notes on lifecycle activities
- Roads Needs Study (draft) 2022 and earlier editions dating back to 2002.
- Water system reports – historical studies
- Water Tower and Standpipe inspection and engineering reports
- Stormwater Management Facility Inspection Report and Update
- Stormwater CCTV analysis and condition rating
- Stormwater – Flood Resiliency technical memo with catchment areas
- Structures Inspection Report and Technical Memo
- Sanitary Sewer CCTV and condition rating
- Tender documents on Selwyn projects
- CGIS – GIS - tables and mapping
- County Official Plan
- Stats Can – Selwyn dataset
- Construction price indices from:
    - Peterborough Utilities
    - City of Peterborough
    - DM Wills
    - Watson & Associates

And finally, the overall municipal sector and its various partners have shared training tips, plan designs and documentation. Selwyn benefited greatly from other municipalities generosity and the strength of larger municipal centers with in-house expertise. As a result, certain report formats and presentation tables have been used to convey information.

There is no doubt that as the sector becomes stronger in asset management, even more sharing and best practice work will be incorporated into future updates.

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selwyntownship.ca/assetmanagementplan

Township of Selwyn