2024 Asset Management Plan

Water Network

innservices

Version History

Version	Date	Description
1.0	May 9, 2024	InnServices' Board Approved
1.0	June 5, 2024	Council Approved

InnServices is committed to public transparency and open communication. In this spirit, and in compliance with Ontario Regulation 588/17: Asset Management Planning for Municipal Infrastructure (O. Reg 588/17), Asset Management Plans are accessible through the InnServices' website. If an alternate format is required, please contact communications@innisfil.ca

Table of Contents

Executive Summary

InnServices owns and manages a large range of water assets on the behalf of our community. These assets must be managed efficiently and effectively to ensure that they continue to meet the current and future needs of the community.

The **Water Network** Asset Management Plan (AMP) focuses on InnServices' water assets (core and non-core assets). Water core assets include watermains, water laterals, water treatment plants, pumping stations and well houses, water valves, reservoirs and standpipes, water meters, hydrants, valve chambers, and water fittings. Non-Core assets primarily include fleet and land improvements.

The water network supports the delivery of safe potable water services provided by InnServices across the Town of Innisfil.

AMPs will be updated periodically to meet legislative requirements as outlined in Figure 1 and to ensure the information remains current. The information and figures within this plan have been developed based on the best available data at the time of the plan's development. The AMPs will guide decision making for Levels of Service (LOS) and lifecycle management activities including the acquisition, operation, maintenance, renewal, and disposal of InnServices' assets.
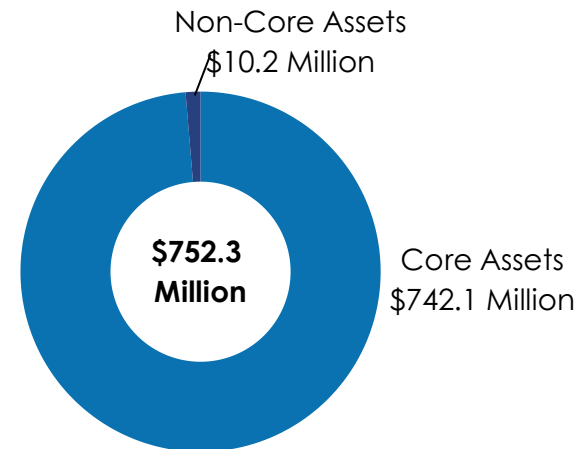
2024 State of Infrastructure

Asset Inventory:

- Core Assets
- Non-Core Assets

83% of Water Network assets are in good or better condition.

Total Replacement Value

Non-Core Assets
$10.2 Million

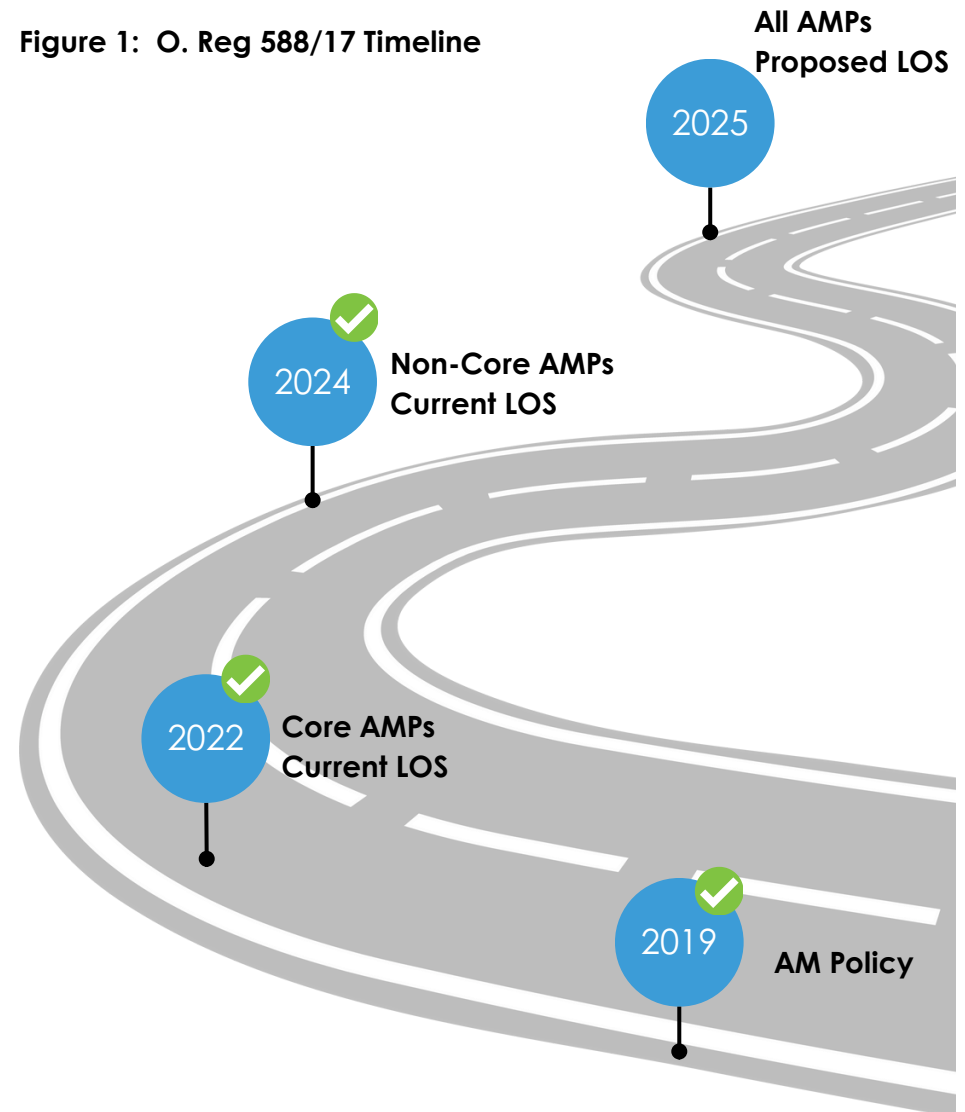$752.3 Million

Core Assets
$742.1 Million

Introduction

In 2015, the Ontario government, introduced the Infrastructure for Jobs and Prosperity Act. The purpose of this Act is to establish mechanisms to encourage principled, evidence-based and strategic long-term infrastructure planning that supports job creation and training opportunities, economic growth and protection of the environment, and incorporates design excellence into infrastructure planning.

Under this Act, the Ontario government also introduced O. Reg. 588/17 which requires that every municipality shall prepare an Asset Management Plan (AMP) in respect of its core and non-core municipal infrastructure assets. Although the regulation has not defined which non-core assets to include, InnServices has chosen Fleet and Land Improvement assets as the non core assets for the July 1, 2024 reporting year.

The AMP has, in part, been prepared to meet the 2024 regulatory requirements of O. Reg. 588/17. Any gaps or weaknesses in compliance are addressed in the Monitoring & Improvement section of the AMP.

InnServices owns and manages large range of core and non-core assets. These assets provide valuable services to the public, such as supporting safe drinking water distribution. Effective maintenance and renewal of these assets is critical to ensuring that they continue to deliver adequate levels of service and provide expected benefits.

Figure 1: O. Reg 588/17 Timeline

All AMPs Proposed LOS
2025

Non-Core AMPs Current LOS
2024

Core AMPs Current LOS
2022

AM Policy
2019

Strategic Plan 2030

InnServices was established on January 1, 2016 as municipal service corporation, wholly-owned by the Town of Innisfil, charged with the responsibility to operate, maintain and expand the water and wastewater services that service the Town of Innisfil. InnServices is closly tied to the Town of Innisfil's Strategic Plan. The Town of Innisfil's <u>Strategic Plan 2030</u> is organized around four pillars - Grow, Sustain, Connect, and Serve. These pillars guide the actions, priorities and outcomes the Town is working to achieve while balancing the needs of the community now and in the future. Asset management planning incorporates the long-term goals and objectives of the Town's Strategic Plan by documenting the current state of our assets and identifying the resources required to manage these through their lifecycles to achieve the current levels of service.

This AMP demonstrates InnServices' systematic approach to asset management, compliance with regulatory requirements and commitment to fulfilling the following goals of the Town's Strategic Plan 2030:

- Proactively plan and manage growth
- Protect and preserve Innisfil's natural heritage and Lake Simcoe
- Advance climate change mitigation and adaption initiatives
- Ensure continued financial sustainability
- Focus on continuous improvement in service delivery

The reader will further benefit by consulting the following documentation:

- Approved Budgets
- Master Servicing Plan
- Water & Wastewater Rates Study
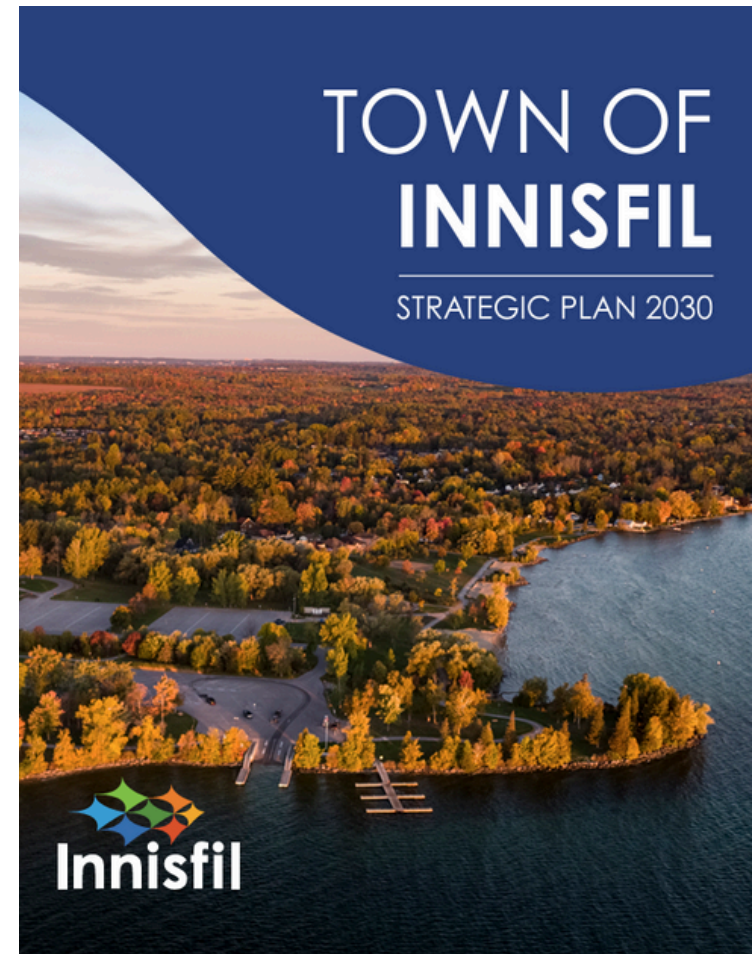
Frequently Asked Questions

What is an asset?
An asset is an item of property owned and maintained by InnServices that is deemed to have a value over a specified threshold. InnServices' assets include a variety of water network assets alongside most assets that are housed in facilities operated & maintained by InnServices.

What is an asset category?
An asset category refers to a set of assets that have similar characteristics or functionality. For example "water network" asset types include water mains, hydrants, hydrant leads, water valves, valve chambers, water laterals, facility assets and fleet.

What are the objectives of asset management?
The objectives of asset management are to intervene at strategic points in an asset's lifecycle to extend the expected service life, and thereby maintaining its performance. When maintenance activities are scheduled strategically it helps to decrease costs, rather than the increased costs of unplanned maintenance or excessive planned maintenance.

What is an Asset Management Plan?
An Asset Management Plan (AMP) is a strategic document that provides summary level information about the quantity, quality, average age, and replacement value for a particular asset category. It identifies the level of service delivered by the assets and the lifecycle activities required to maintain the assets in a condition that will adequately support this deliverable. Finally, the plan provides a summary of the required investment over the next 10 years.

Why does InnServices need an AMP?
Under the Infrastructure for Jobs and Prosperity Act, 2015, and Ontario Regulation 588/17: Asset Management Planning for Municipal Infrastructure, each municipality in Ontario has a legislative requirement to develop and maintain AMP's. In addition to the legislative requirement, InnServices benefits from maintaining an effective AMP to help ensure that limited resources are being invested effectively in the assets that need it the most to ensure the ongoing delivery of services.

How does InnServices include community feedback into the Plan?
InnServices would provide opportunities for community engagement in asset management planning. InnServices will provide information on the corporate website to facilitate transparency in asset management planning.

Definitions & Acronyms

Asset Performance: The manner in which or the efficiency with which an asset fulfills its intended purpose.

Average Asset Age: The age of the asset since the construction date. As each asset class has various components, the average asset age is used.

Connection-days: The number of properties connected to a municipal system that are affected by a service issue, multiplied by the number of days on which those properties are affected by the service issue.

Core Asset: As per O. Reg. 588/17, Water Assets, Wastewater Assets, Stormwater Management Assets, Roads and Bridges/ Culverts are considered as core assets.

Expected Useful Life: The length of time that assets are designed to provide safe, reliable, and useful service.

Lifecycle Activity: Activities undertaken with respect to a municipal infrastructure asset over its service life, including constructing, maintaining, renewing, operating and decommissioning, and all engineering and design work associated with those activities.

Lifecycle Cost: The cost of activities undertaken with respect to a municipal asset over its service life including reconstructing, maintaining, renewing, operating and decommissioning including associated design and engineering fees.

New Acquisitions: The planned construction of new assets that are not to replace the existing infrastructure.

Non-Core Assets: O. Reg 588/17 regulation has not defined which non-core assets to include. InnServices has chosen Fleet and Land Improvement assets for the July 1, 2024 reporting year.

Renewal: The asset to be replaced or restored to a excellent state as if had become new again.

Replacement Value: The cost in 2023 dollars to rebuild the entire asset regardless of maintenance/rehabilitation strategies. It is assumed as a complete new build of the asset, not including the land acquisition cost.

Water Network: Water assets that relate to the collection, production, treatment, storage, supply or distribution of water.

Acronyms:

AMP = Asset Management Plan
CI = Continuous Improvement
CPI = Construction Price Index
CVOR = Commercial Vehicle Operators Registration
ECA = Environmental Compliance Approval
LOS = Levels of Service
MCR = Municipal Comprehensive Review
MSP = Master Servicing Plan
NASSCO = National Association of Sewer Service Companies
O. Reg = Ontario Regulation
PACP = Pipeline Assessment Certification Program
PDCA = Plan-Do-Check-Act

Asset Hierarchy

InnServices has adopted an asset hierarchy approach to develop the framework for categorizing the asset portfolio into the appropriate linkages between the assets. The asset hierarchy in the AMP is illustrated as parent-child type relationship, with 4 levels:

- **Level 1:** Service
- **Level 2:** Major Group
- **Level 3:** Segment
- **Level 4:** Data

Below is the detailed asset hierarchy of Water Network assets:

Table 1: Water Network Asset Hierarchy

Level 1	Level 2	Level 3	Level 4
Water Network	Core Assets	Watermains	Type, Size, Material
		Water Laterals	Type, Size, Material
		Water Treatment Plant	Process Area, Component
		Pumping Stations & Well Houses	Process Area, Component
		Water Valves	Type, Size
		Reservoirs & Standpipes	Component
		Water Meters	Type, Size
		Hydrants	Purpose, Size
		Valve Chambers	Type, Size
		Water Fittings	Type, Size
	Non-Core Assets	Fleet	Type
		Land Improvements	Component

State of Infrastructure

The State of Infrastructure section provides summary level information about InnServices' water network assets. This information provides the foundation of InnServices' asset management plans, as having a complete and current understanding of InnServices' state of infrastructure is critical to efficient and effective lifecycle management and financial planning.

Background information and reports used in the preparation of the Asset Management Plans will also be made available publicly through InnServices' website or upon request.

In keeping with O. Reg 588/17 requirements, the following information is provided for each of the core and non-core asset types currently in scope of InnServices' asset management program:

Inventory (quantity)

Replacement value

Average age

Estimated useful life

Remaining useful life

Average condition

Water Network Inventory

Asset inventory was determined through the review of data in the 2023 Tangible Capital Assets (TCA) File and cross referenced through data within the County of Simcoe's Geographic Information System (GIS) database. InnServices' TCA and GIS database are updated frequently to ensure all assets are kept current and information is available to staff. Table 1 summarizes InnServices' Water Network asset hierarchy, with asset sub-types and data available.

Water Core assets are classified into ten (10) sub-types:

- **Water Mains** - Pipeline laid within the public right of way, used to transport potable water to the community & hydrants.

- **Water Laterals** - The water service line that provides water from the water main to a property.

- **Water Treatment Plant** - A compound facility designed to use physical and chemical processes to improve water quality to meet the regulatory requirements.

- **Pumping Stations & Well Houses** - Pumping station is defined as a facility of pumps housed in a building designed to boost water pressure from one place to another. Well house is a small building that collects raw well water and provides treatments before being distributed to the community.

- **Water Valves** - A fitting onto water mains and hydrant leads that allows to control the flow of water through the pipe.

- **Reservoir & Standpipes** - Reservoir is a structure designed to store water. Standpipe is a type of reservoir consisting of a vertical ground level storage tank to store water.

- **Water Meters** - Instruments that measure the volume of water used by residential and commercial building units that are supplied with water by a public water supply system

- **Hydrants** - An above ground fixture connected to the water main through a hydrant lead. Typically used for fighting fires and flushing.

- **Valve Chamber**s -A concrete chamber used to house pumps or valves, accessible through a surface maintenance hole.

- **Water Fittings** - A fitting is used in pipe systems to connect sections of pipe or tube, adapt to different sizes or shapes, and for other purposes such as regulating or measuring fluid flow.

▶ **How many water facilities are managed by InnServices?**

There are **16** pumping stations & well houses, and **1** water treatment plant managed by InnServices.

Table 2: Water Core Assets Summary

Asset Sub Type	Quantity	Replacement Value	Average Age	Condition
Watermains	236 km	$742.1 million	18.3 years	72%
Water Laterals	129 km			
Water Treatment Plant	1			
Pumping Stations & Well Houses	16			
Water Valves	16101			
Reservoirs & Standpipes*	14			
Water Meters	12522			
Hydrants	1489			
Valve Chambers	95			
Water Fittings**	2933			Good

Reservoirs & Standpipes include 3 standpipes, 1 water tower, 5 reservoirs and 2 fire protection cisterns.
The replacement value of the water fittings is accounted with the replacement value of watermains.

Water Non-Core assets are classified into two (2) sub-types:
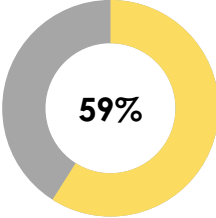
- **Fleet** - Assets used to transport people or goods related to manage water activities and operations.

- **Land Improvements** - Land Improvements Include assets such as fences, walkways, parking lots, and outdoor lighting.

▶ **How many water fleet assets are owned by InnServices?**

There are **15** water fleet units owned by InnServices.

Table 3: Water Non-Core Assets Summary

Asset Sub Type	Quantity	Replacement Value	Average Age	Condition
Fleet	15	$10.2 million	7.8 years	59% Fair
Land Improvements	158			

12

Replacement Value

Replacement value is the estimated total cost to replace an asset to the same/current functional standard and varies depending on current market costs. Asset replacement value is determined by estimating the total replacement value of the assets within each asset class.

All Water network assets analyzed in the AMP have a total replacement value of $752.3 million. The replacement value of the majority (75%) of the assets is estimated using "Cost/Unit" method. However, Construction Price Index (CPI) Method is used to estimate the replacement value of the remaining (25%) assets.

- **Cost/Unit:** Based on the current capital projects, the cost/unit is estimated for the infrastructure including the asset removal costs, site work, material costs, and engineering contingencies.

- **CPI (Construction Price Index) Method**: Replacement cost of the assets is estimated by inflating the historical costs using Non-Residential Building Construction Price Indices (NRBCPI) to reflect an assets replacement value in today's dollar (2023).

The Current Replacement Value (CRV) detailed in the AMP has become more important as a result of the Ministry of Infrastructure now using this data to determine Ontario Community Infrastructure Funding (OCIF).

Replacement Value Summary

Non-Core Assets
$10.2 M

$752.3 Million
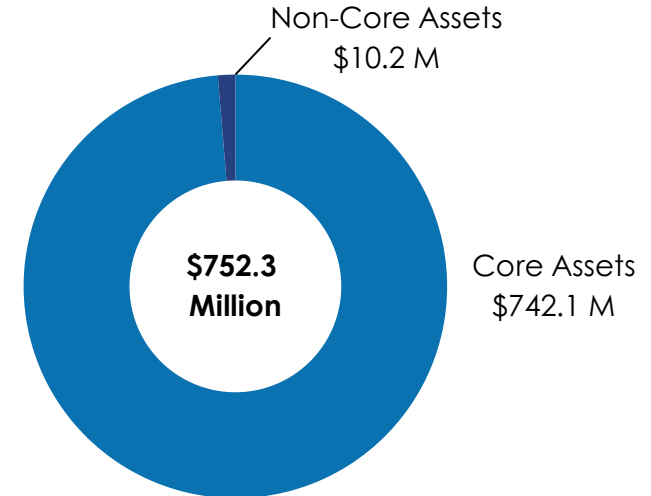
Core Assets
$742.1 M

▶ **When are assets replaced?**

Assets are replaced when they no longer add value or serve their initial/intended purpose.

Replacement Value - Water Core Assets

The distribution of the Water Core replacement value is predominantly in watermains. Total replacement value of Water Core Assets analyzed in the AMP is $742.1 million. As per the asset hierarchy approach, the Water Core assets are broken down to nine asset classes displaying replacement values in Table 4.

Replacement Value - Water Non-Core Assets

Water Non-Core Assets analyzed in the AMP have a total replacement value of $10.2 million. As per the asset hierarchy approach, the Water Non-Core assets are broken down to two asset classes displaying replacement values in Table 5.

Table 4: Replacement Value of Water Core Assets:

Asset Sub-Type	Replacement Value
Watermains	$437,905,396
Water Laterals	$79,461,279
Water Treatment Plant	$78,536,592
Pumping Stations & Well Houses	$68,405,875
Water Valves	$30,544,770
Reservoirs & Standpipes	$29,373,007
Water Meters	$11,044,404
Hydrants	$5,449,904
Valve Chambers	$1,403,842

Table 5: Replacement Value of Water Non-Core Assets:

Asset Sub-Type	Replacement Value
Fleet	$802,932
Land Improvements	$9,394,409

Average Age

The average age of InnServices assets is determined by analyzing the expected useful life and year built data detailed in the 2023 Tangible Capital Asset (TCA) file. Water Core and Non-Core assets are analyzed to inform and enable effective lifecycle management activities, such as rehabilitation or replacement.

Expected and Remaining Useful Life

The Expected Useful Life (EUL) is the length of time that assets are expected to provide safe, reliable, and useful service. This value is obtained from the TCA Policy and helps inform the timing of replacement activities. The Remaining Useful Life (RUL) represents the actual length of time an asset has left before requiring replacement. The Average Remaining Useful Life (ARUL) is obtained by subtracting the Average Age from the EUL for each asset sub-type.

In many cases, the service life of an asset can be extended well beyond the original expected life with proactive lifecycle management, however the cost of ownership generally increases as condition worsens and the frequency and cost of repairs increases. Figure 2 outlines average age, and ARUL of water network assets.

Age, EUL & ARUL Summary of Water Assets

Average Age: 16 Years

EUL: 4 - 100 years

ARUL: 42 Years

Figure 2: Average Age & ARUL - Water Assets

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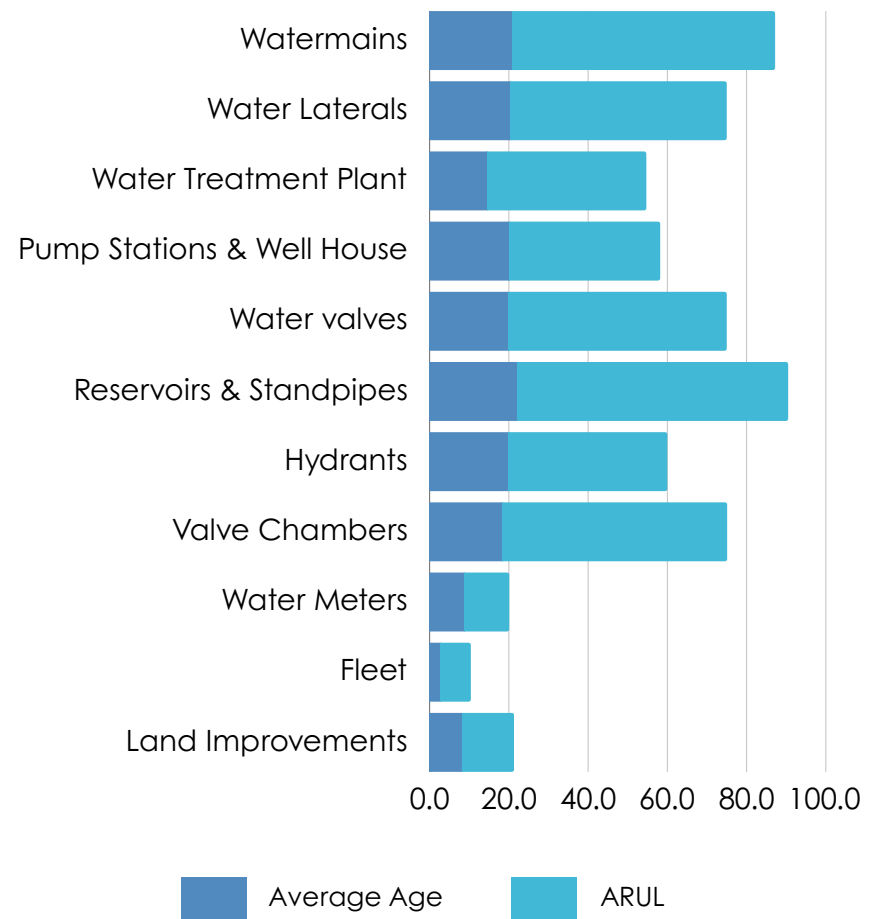
Condition

Asset condition can be determined through modeling or direct measurement. The modeling approach uses standardized deterioration curves and assigns condition based on the percentage of the expected life remaining. Direct measurement involves inspection of the assets against technical standards to directly determine the current condition.

InnServices is looking at the possibility of conducting condition assessments for watermains and as of now relied on the age-based condition estimates considering the pipe material as per industry standards.

InnServices conducts condition assessments as needed for critical assets. Due to the unavailability of the assessed condition of the infrastructure, age-based estimates are used to project the current condition of the remaining assets through lifecycle modeling. The modeling approach uses standardized deterioration curves and assigns a condition, based on the percentage of remaining life.

Assessed condition data is invaluable in asset management planning as it reflects the true condition of an asset. Due to the unavailability of assessed condition data for some asset types, age-based estimates are used to determine the condition. The average condition of the water network assets is 72.

Condition Summary

83% of Water Core assets are in good or better condition.

83%

66% of Water Non-Core assets are in good or better condition.

66%
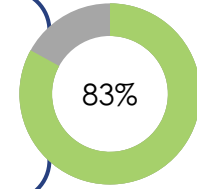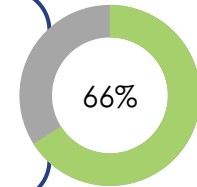
Figure 3: Water Network Assets Condition

Poor 2%
Very Poor 2%
Fair 12%
Excellent 38%
Good 46%
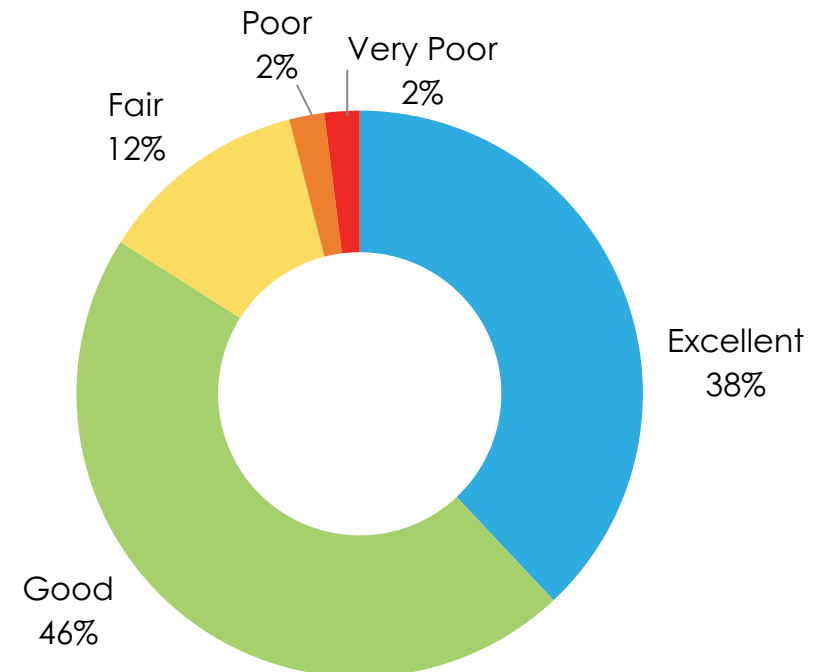
Building Condition Assessment

Condition data of Facilities Assets was obtained from the 2021 Building Condition Assessment (BCA) Report completed by a third-party consultant. BCA's are completed in accordance with the American Society for Testing and Materials (ASTM) Standards for Property Condition Assessments: Baseline Property Condition Assessment Process (E2018-15).

The BCA's inspect facility assets for physical deficiencies through a visual review of building components/systems based on the Uniformat II building nomenclature system including substructure, shell, interiors, services, and building sitework. A condition rating is provided for each asset component from Excellent (1), Good (2), Fair (3) Poor (4) or Very Poor (5). These values roll-up to provide an overall condition rating. A Condition Index was established by the third-party consultant and to evaluate and prioritize maintenance and renewal activities identified within BCA.

In addition to the BCA's, Facilities staff complete regular inspections of facility assets to ensure staff and community spaces are maintained, safe, and accessible.

Innservices has 22 water facilities including treatment plant, booster stations and metering stations. Out of the 22 facilities, 11 facilities were inspected in 2021. Innisfil Heights Reservoir, Lefroy Reservoir, Gilford Transfer Monitoring Station and the Fennels Monitoring Station are in good condition. However, the Stroud Pump Station, Stroud Backwash Building, Innisfil Heights Wellhouse, Goldcrest Pump Station, Chruchill Old Building and Alcona Zone 2 Pumping Station are in fair condition. The BCA for water treatment plant and lowlift pump station is scheduled to be completed by the end of 2024. Figure 4 & 5 below, outlines the condition summary of core and non-core assets based on the current condition of assets within each asset type.

Condition Summary

75% of Facilities are in good or better condition.

75%
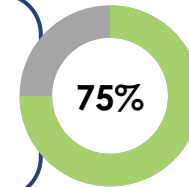
Table 6: Condition Index

Condition	BCA Rating	Age-Based Rating	Definition
Excellent	1	80-100	Functioning as intended. No repairs anticipated within 10 years.
Good	2	60-79	Functioning as intended. No repairs anticipated within 5 years.
Fair	3	40-59	Functioning as intended with some deterioration consistent with age of asset. Repairs and/or replacements required within 2 to 5 years.
Poor	4	20-39	Not functioning as intended. Significant repair or replacement required within 0 to 1 years.
Very poor	5	0-19	It is near or beyond its expected service life and shows widespread signs of advanced deterioration.

Water Core Assets Condition

Figure 4 shows the asset class condition ratings determined through the building condition assessments and age-based estimates of each asset type. Overall, 83% of water core assets are in good or excellent condition, whereas, 5% of assets are in poor or very poor condition. The percentage of assets in a particular condition are weighted with respect to their replacement value.

Figure 4: Water Core Assets - Condition Summary

Water Non-Core Assets Condition

Figure 5 shows the asset class condition ratings determined through the age-based estimates as well as building condition assessments. Overall, 66% of water non-core assets are in good or excellent condition, whereas 9% of assets are in poor or very poor condition. The percentage of assets in a particular condition are weighted with respect to their replacement value.

Figure 5: Water Non-Core Assets - Condition Summary
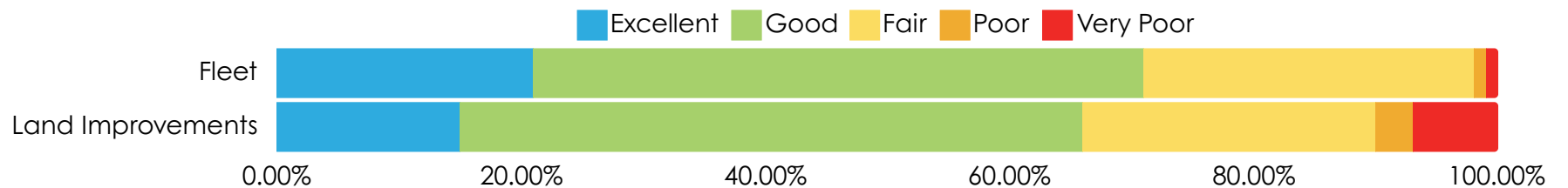
Water Network Assets Condition Summary

Table 7 shows the asset class condition ratings determined through age-based as well as building condition assessments (BCA) of each asset type.

Table 7: Water Assets - Condition

Asset Sub-Type	Average Condition	Average Condition Rating	Condition Assessment Method
Watermains	75	Good	100% Age-Based
Water Laterals	74	Good	100% Age-Based
Water Treatment Plant	72	Good	100% Age-Based
Pumping Stations & Well Houses	45	Fair	67% Age-Based and 33% BCA
Water Valves	73	Good	100% Age-Based
Reservoirs & Standpipes	75	Good	100% Age-Based
Water Meters	60	Good	100% Age-Based
Hydrants	67	Good	100% Age-Based
Valve Chambers	76	Good	100% Age-Based
Fleet	74	Good	100% Age-Based
Land Improvements	54	Fair	90% Age-Based & 10% BCA

Levels of Service

Levels of Service (LOS) describe the quantity and performance of services that assets should support during their service life. They provide a direct link between InnServices' strategic objectives, the public's service expectations and the measured performance of the delivered service.

LOS also facilitate a greater understanding of the cost-benefit implications of adjusting the services provided. To be effective, LOS must be documented in ways that are meaningful to both the customers using the service and to the municipal staff that are delivering the services and managing the infrastructure that underlies the service.

To ensure effectiveness, two types of LOS have been defined below:

Community - simple qualitative descriptions, in non-technical terms, or images, that describe the public's perception or understanding of a service.

Technical - quantitative metrics that enable staff to measure, track and report on various service attributes such as scope, quality and reliability.

Community and Technical LOS defined by InnServices are summarized in the following tables. These will be used to:

- Identify LOS that service recipients can expect to receive and InnServices' current performance in meeting these.
- Identify assets that require attention to ensure that LOS can be delivered and maintained.
- Enable Staff, the Board and Council to discuss and assess the suitability, affordability and equality of the existing service levels and to determine the effect of increasing or decreasing these levels over time.

It should be noted that LOS listed here exceed the current LOS requirements of O. Reg. 588/17.

▶ **How often are Levels of Service (LOS) updated?**

LOS are updated **yearly** and documented every 5 years in revisions to asset management plans.

Community Levels of Service

Community Levels of Service (LOS) are performance measures designed to help the community better understand the services they are receiving and how varying LOS will impact their service experience. Where possible, images are used to further enhance this understanding.

Table 8: Community LOS

Service Attribute	Community LOS (Qualitative Descriptions)	Current LOS
Scope	Description, which may include maps, of the user groups or areas of the municipality that are connected to the municipal water system.	Appendix A - Levels of Service; Servicing Map
	Description, which may include maps, of the user groups or areas of the municipality that have fire flow.	Appendix A - Levels of Service; Fire Flow Map
Reliability	Description of boil-water advisories and service interruptions.	InnServices does not have any boil water advisories.
Performance	Description of Inspection, maintenance and rehabilitation activities performed to provide the existing LOS.	InnServices actively performing the regular operational inspections, both scheduled and un-scheduled maintenance, and rehabilitation, and renewal strategies based on the asst type.
Quality	Description or images of the condition of water facilities and watermains and how this would affect their use.	Water facilities are evaluated through the Building Condition Assessments, and through regular inspections by InnServices' staff. The BCA analyzes the condition of elements within each facility, providing recommendations for replacement or repair. Majority of the facilities are in good condition require no planned repair or replacement activities within the life of the BCA, whereas Fair or Poor condition will require repairs or replacements within 0 to 10 years. For underground infrastructure such as watermains, InnServices is relying on the watermain break history and age-based condition estimates due to limited access but looking at the possibility of developing a condition assessment program in future.

Technical Levels of Service

Technical Levels of Service (LOS) are designed to translate Community LOS into quantitative performance measures, and results that can assist staff responsible for delivering the services and supporting the assets that fulfill the Community LOS. For this version of the Water Network Asset Management Plan, performance and quality measures were obtained through Key Performance Indicators and metrics data obtained from staff.

Table 9: Technical LOS

Service Attribute	Performance Measure	Current Performance
Scope	Percentage of properties connected to the municipal water system.	62%
	Percentage of properties where fire flow is available.	100%
Reliability	The number of connection-days per year where a boil water advisory notice is in place compared to the total number of properties connected to the municipal water system.	Not Applicable*
	The number of connection-days per year due to water main breaks compared to the total number of properties connected to the municipal water system.	0.014
Performance	Actual Reinvestment Rate.	0.53%
	% of Core assets in good & excellent condition	83%
	% of Core assets in poor & very poor condition	5%
	Average condition of facilities inspected through BCA only	1.97 (Good)
	% of Non-Core assets in good & excellent condition	66%
	% of Non-Core assets in poor & very poor condition	9%
	% of water loss as compared to total water distributed	17%
Quality	% of watermains flushed/swabbed (annually)	31%
	% of facilities inspected or planned for inspections as per Building Condition Assessments	59%
	Number of complaints received related to water quality annually	21

InnServices does not have any boil water advisories.

Risk Management

In the context of municipal asset management, a **Risk** is an event that, if it occurred, would have an undesirable effect on the delivery of service. Understanding what risks exist for InnServices' each asset category is critical in determining how best to treat them.

Risk is managed through a four-step iterative process of identification, assessment, treatment, and monitoring to ensure that InnServices is adequately prepared for what events may happen and have plans in place to react to events appropriately. This process is outlined in Figure 6, with each step described in further detail.

Figure 6: Risk Management Process
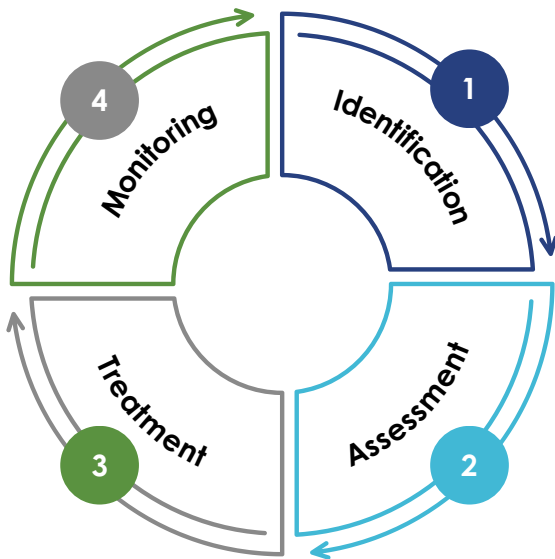
1 **Identification** - Write down all the threats and risks you can think of and ask for ones from other stakeholders. Risks are identified through a number of data sources, including:

- Routine inspections
- Reports and complaints from the public
- Information obtained from past incidents
- Advice from professional bodies
- Past experience of InnServices staff

2 **Assessment -** Evaluate each risk by determining the likelihood and severity of it happening and the level of impact it would have. Each controllable event is evaluated and provided a risk rating (1-5) for each of the following categories:

- **Likelihood (A)**: if the possibility of an identified event is remote, the score will be low (closer to 1)
- **Severity (B):** greater the implication of the occurrence of an identified event causing harm to persons or property, higher the score will be (closer to 5)
- **Detectability (C):** If an identified event is highly detectable, the score will be low (close to 1)

⚠️ **Risk = Likelihood + Severity + Detectability**

Likelihood and Severity are scored based on lower the value, lower the risk. Detectability scores, however, are based on, more detectable an event, lower the score will be. Appendix D includes three tables in reference to likelihood, severity and detectability and these tables provide context and guidance on the rating of risk.

▶ **What is InnServices risk management procedure?**

InnServices has a risk management procedure for identifying potential hazards, conducting hazard analysis, and identifying critical control points within InnServices Utilities water treatment and supply activities, in a manner consistent with the requirements of the DWQMS.

Based on a review of the Total Risk Values and the associated events, a threshold number is chosen such that all events associated with Total Risk Values which are equivalent to or greater than the threshold number are considered critical.

- Total Risk Values less than or equal to 6 are considered low risk.
- Total Risk Values between 7 and 10, inclusive, are considered as moderate risk
- Total Risk Values equal or greater than or equal to 11 are considered high risk

3 **Treatment** - Implement process changes to reduce the impact of each risk and a response plan for if it happens. The choice of treatment depends on the level of risk that can be reasonably managed and accepted by InnServices(i.e. the risk tolerance).

Risk tolerance is informed not just by the likelihood, detectability and impact of the risk event, but also the cost of treatment and the urgency of the risk in comparison to other priorities. Depending on the nature of the risk event and the level of risk tolerance, treatment can include:

- **Elimination** - process of removing the risk event entirely.
- **Mitigation** - process of reducing the likelihood and/or impact of the risk event
- **Acceptance** - process of retaining the risk as controlling or monitoring it

4 **Monitoring** - InnServices review the progress of the plan and ensure assessment and treatments are adequately addressing the identified risks on annual basis. Continuous monitoring enables InnServices to stay ahead of any potential hazards and ensures that the risk management process and techniques used are current and effective.

InnServices have identified some potential risks mentioned in Appendix D along with outcome strategies to reduce the likelihood and impact.

Future Demand

InnServices is the municipal service corporation of the Town of Innisfil and rely on Town's Official Plan for growth within the Community. As we look towards the future, it is important that we align asset management planning with local land-use planning and provincial policies. Ontario's Place to Grow Plan sets minimum targets for growth and the Municipal Comprehensive Review (MCR) currently underway by the County of Simcoe will establish the minimum growth (residents and jobs) for Innisfil. Innisfil is expecting its current population to double over the next 30 years. Innisfil's Official Plan "Our Place" guides where Innisfil will direct growth to achieve complete and sustainable communities and will be updated to align with the outcome of the County MCR process.

Growth generates both challenges and opportunities as we navigate and balance the ongoing needs of existing residents while addressing the pressures associated with growth and the incremental increases in costs for operational needs. As we look to the future in addressing the longer term financial requirements related to asset renewal and replacement, careful and prudent planning is necessary to ensure the community remains stable, sustainable and affordable.

InnServices Master Servicing Plan is a comprehensive, long-term master plan that outlines recommendations for building the new infrastructure and expanding the existing infrastructure to meet the future demand. This plan takes into consideration the anticipated growth of the Town and identifies the future locations of water facilities and linear infrastructure. It also provides projections for when these assets will be required based on population forecasts.

Demand Forecast

Current Population: 43,326 (2021 Census)
Projected Population: 54,971 (by 2031)

Housing: 6300 new homes by 2031

▶ *How many customers connected to Water System?*

InnServices is responsible for providing safe and reliable water services to approximately **12,500** customers.

Climate Demand

IInnServices is working with the Town of Innisfil to develop an Integrated Sustainability Master Plan which will identify the vulnerabilities of its infrastructure towards policy formulation and program implementation for projected future climate change impact. Changes to our climate can create challenges for municipalities to maintain the levels of service and can decrease the service life and functionality of these assets. To ensure InnServices' water assets are safe and reliable, climate change and the consideration of sustainable materials must be incorporated into the decisions and long-term planning.

We are committed to delivering services in a way that are sustainable and that protect the existing natural environment. InnServices' water infrastructure is designed and constructed to resist the impacts of such extreme climate events. Based on past experience, InnServices has implemented corporate processes such as additional staff on call, more training, inclusion of an emergency contingency plan and program, better communication, and adding capacity to the systems to help manage extreme climate events. InnServices inspects and monitors its water assets to ensure the safety of the public and staff.

During the acquisition or renewal lifecycle stages, InnServices' staff will prioritize sustainable practices where possible. Staff will explore energy efficiency options to reduce emissions, such as retrofitting existing facilities to reduce emissions, such as retrofitting existing facilities.

Conserving & Enhancing Natural Assets

Planting trees in our community helps by absorbing carbon dioxide and providing shade for cooling.

Decrease watering and grass cutting activities during periods of extreme heat.

Lifecycle Management

All municipal infrastructure assets progress through a series of stages referred to as the asset lifecycle. Management of this lifecycle is critical for delivering consistent and reliable service and achieving the lowest possible cost over the expected life of the assets. A fundamental principle of lifecycle management is that maintaining an asset in good condition costs significantly less than reconstructing an asset in poor condition. For Municipal Water Network assets, the overall goal is to extend the expected life of the assets while managing risks and minimizing the total lifecycle costs.

As shown in Figure 7, municipal assets follow an iterative 3-step cycle including acquisition, operations, maintenance, renewal and disposal. As assets progress through each lifecycle stage, different activities or tasks are required to ensure assets are delivering the expected levels of service.

1 Acquisition - Municipal infrastructure assets are acquired primarily through assumption of ownership from developers but can also be constructed directly by InnServices through approved capital projects.

2 Operations and Maintenance (O&M) - Planned and unplanned routine activities such as inspection, assessment, cleaning, and servicing to fulfill level of service commitments and detect defects before failures occur. Operations and Maintenance activities help resolve minor defects and delay future defects.

3 Renewal and Disposal - Capital activities that are beyond the scope of routine maintenance including reconstruction and rehabilitation of assets to enhance their condition and extend the expected life of an asset. Asset disposal occurs when the asset has reached the end of their effective service life.

Figure 7: Asset Lifecycle
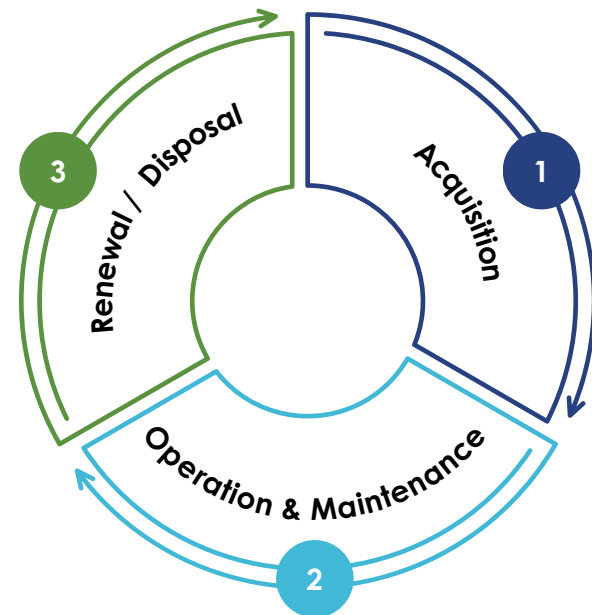
Lifecycle Activities

Building on the state of infrastructure and levels of service content, lifecycle activities are the actions utilized by InnServices to operate, maintain, and renew water network assets in the manner most appropriate to ensure the long-term performance of the assets. Determination of the specific action to be taken in the Maintenance and Renewal stages is based on careful consideration of the asset condition, remaining life, and available budget. The timing of the activity also considers competing priorities and related project activities to minimize the risk of having to redo work that is disturbed by a related project. All this helps to ensure that InnServices is performing the most appropriate and cost-effective activity to optimize the lifecycle for each asset.

Table 10: Lifecycle Activities - Water Network

Activity	Description of Activities Performed by InnServices
Assessment	• There is no formal condition assessment program in place. However, InnServices keeps a record of water main break history and asset age which helps to determine the condition. • New or larger assets are identified through technical analysis as part of Master Servicing Plans completed every 5 years to service new development. • Reservoirs are inspected every 5 years. • Vehicles are inspected on an annual basis and follow CVOR (Commercial Vehicle Operators Registration) Regulations. • Health & Safety inspections are conducted every 6 months. • Pumps & motors are inspected, externally as well as internally as specified in the operations manual to identify the asset performance and remedial measures. • Generators are inspected on monthly basis as per the operational schedules.
Operations & Maintenance	• Hydrants and valves are inspected to see if they are operable, approximately 20% annually. • InnServices conducts regular inspections to ensure all pumping stations operate in a manner that is free from failure and meets the accepted operational standards and efficiencies. • InnServices performs the ongoing maintenance activities as necessary, such as emergency repairs, hydrant repairs, and exercising valves. • A detailed breakdown of applicable maintenance activities is provided in Appendix B.
Renewal	• Vehicles and facility assets are rehabilitated and upgraded based on the condition, breakage, growth, and compliance as per Ministry Standards. • Alcona Reservoir, Innisfil Heights Reservoir, Lakeshore Treatment Plant, Zone 2 Booster Station, Cookstown Standpipes are scheduled to be upgraded in the next 10 years (2024-2033). • Water assets are either removed during renewal or disconnected and abandoned in place depending on the construction circumstances. Abandoned assets are capped and/or grouted to protect other infrastructure. • Water mains in poor or very poor condition are replaced around their end of its useful life. • Undersized water mains that don't meet capacity requirements are being replaced with larger mains. • Valves, valve chambers, and water laterals are replaced at the same time as water mains and on as need basis.

Financial Summary

InnServices' financial summary includes the full consideration of the lifecycle cycle costs of the existing and new water infrastructure assets. This summary along with financial policies provide guidance to InnServices while building operating and capital budgets. This financial summary guides InnServices when and where the financial resources will be needed, recognizing the immediate and future needs for the asset renewal, maintenance and growth to meet the infrastructure demands.

The Budget Process
InnServices prepares a budget on an annual basis. The budget is informed by development charges background study, various master plans, water and sewer rate studies, and infrastructure needs studies, and asset lifecycle requirements.

Operating Budget
InnServices' operating budgets quantify the expenditures needed to provide services, governance and administration, maintain financial funding for the current & future projects, and to perform the operational and maintenance activities required to maintain current service levels.

Funding for operating expenditures is provided from water and sewer rates and various non-rates revenue sources including:
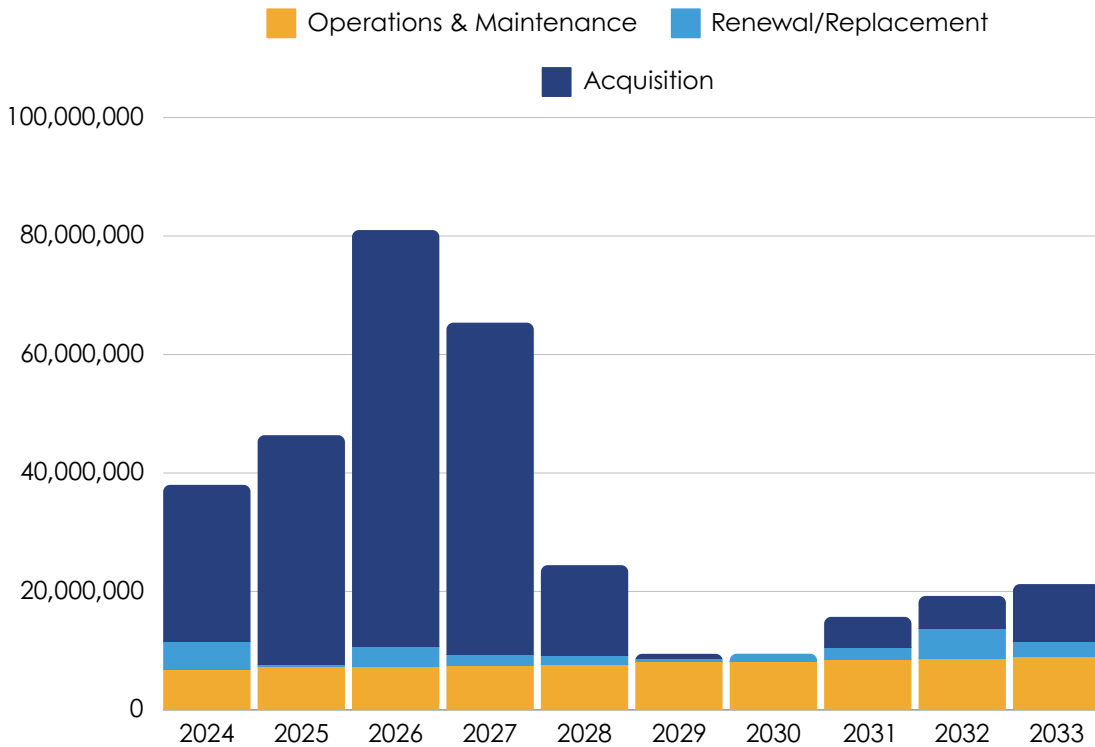
- Development charges
- Other user fees
- Interest

10-Year Lifecycle Activities Forecast

O. Reg. 588/17 requires municipalities to provide a 10-year forecast that estimates the annual costs of lifecycle activities that will need to be undertaken to maintain the current LOS and accommodate expected growth.

Figure 8: 10-Year Lifecycle Activities Forecast

Asset renewal/replacement includes the capital costs of the existing water infrastructure to be replaced /rehabilitated in the next 10 years.

Acquisition costs includes the new infrastructure scheduled to be built as per master servicing plan over the period of next 10 years. For the Operations & Maintenance costs, the 2023 operational & maintenance budget costs are extrapolated to 2033 with an annual of increase of 3%.

Figure 8 and table 11 below identifies 10 year lifecycle activities forecast scheduled to be completed by 2033.

Table 11: 10-Year Lifecycle Costs

Lifecycle Phase	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Operations & Maintenance	$6.9M	$7.1M	$7.3M	$7.5M	$7.7M	$8M	$8.2M	$8.5M	$8.7M	$9M
Renewal/Replacement	$4.7M	$0.6M	$3.4M	$1.8M	$1.4M	$0.8M	$1.3M	$2.1M	$5.1M	$2.6M
Acquisition*	$26.4M	$38.6M	$70.3M	$56M	$15.3M	$0.7M	$0	$5.1M	$5.4M	$9.7M
Total	**$38M**	**$46.3M**	**$81M**	**$65.3M**	**$24.4M**	**$9.5M**	**$9.5M**	**$15.7M**	**$19.2M**	**$21.3M**

Acquisition and Renewal costs are estimated w.r.t 2023 costs

Monitoring and Improvement

In this final section, opportunities for improvement of InnServices asset management program, including AMP content, are identified along with planned activities to strengthen both. These planned activities will ensure that InnServices continues to comply with O. Reg. 588/17 and that the utility of the AMP and the level of data confidence continuously improves over the short to medium term.

Continuous Improvement

The overall approach to monitoring and improving the asset management program and AMP will be consistent with the Plan-Do-Check-Act (PDCA) model. Following this model, staff will monitor the performance of the asset management program and continue to plan and implement corrective actions to ensure that the program and AMP continue to improve and mature over time.

Improvement Plan

Table 12 on the following page, summarizes the improvement opportunities currently identified for the Water Network AMP and the corrective actions planned for the next three years. A term of three years has been selected to align with the AMP deliverables detailed in O. Reg. 588/17 and summarized in Figure 1 of the AMP.

▶ *What is the Plan-Do-Check-Act (PDCA)?*

The PDCA model is a four step continuous improvement cycle that helps InnServices' staff monitor performance and make incremental changes to improve the Asset Management Program.

Table 12: Improvement Plan

Opportunity	Actions	Priority
Improve completeness and accuracy of state of infrastructure data for core and non-core assets.	Complete and consolidate water facility assets inventory.	High
	Complete condition assessments of all assets.	High
	Implement a Computerized Maintenance Management system	High
Improve asset management processes for creation, maintenance, and disposal of asset records throughout the asset lifecycle.	Complete mapping of processes.	High
	Prepare standard operating procedure documentation for assets and integrate with year end.	Medium
Improve maturity of level of service reporting for core and non-core assets.	Expand LOS definitions for core and non-core assets.	Medium
	Establish level of service targets.	High
	Formalize data gathering and reporting procedures for each LOS	Medium
Expand asset management program to include non-core assets.	Identify costs associated with target levels of service and scenarios to achieve same.	High
	Develop long-term financial plan for the water network assets.	High
	Complete water rates study for the infrastructure needs.	High
Enhance strategic asset management policy.	Complete review and release of the updated policy.	Low
Enhance public reporting of asset management information.	Enhance asset management content on InnServices' website.	Low
Enhance asset management links to climate change planning.	Expand climate change coverage in future updates on AMPs.	Medium

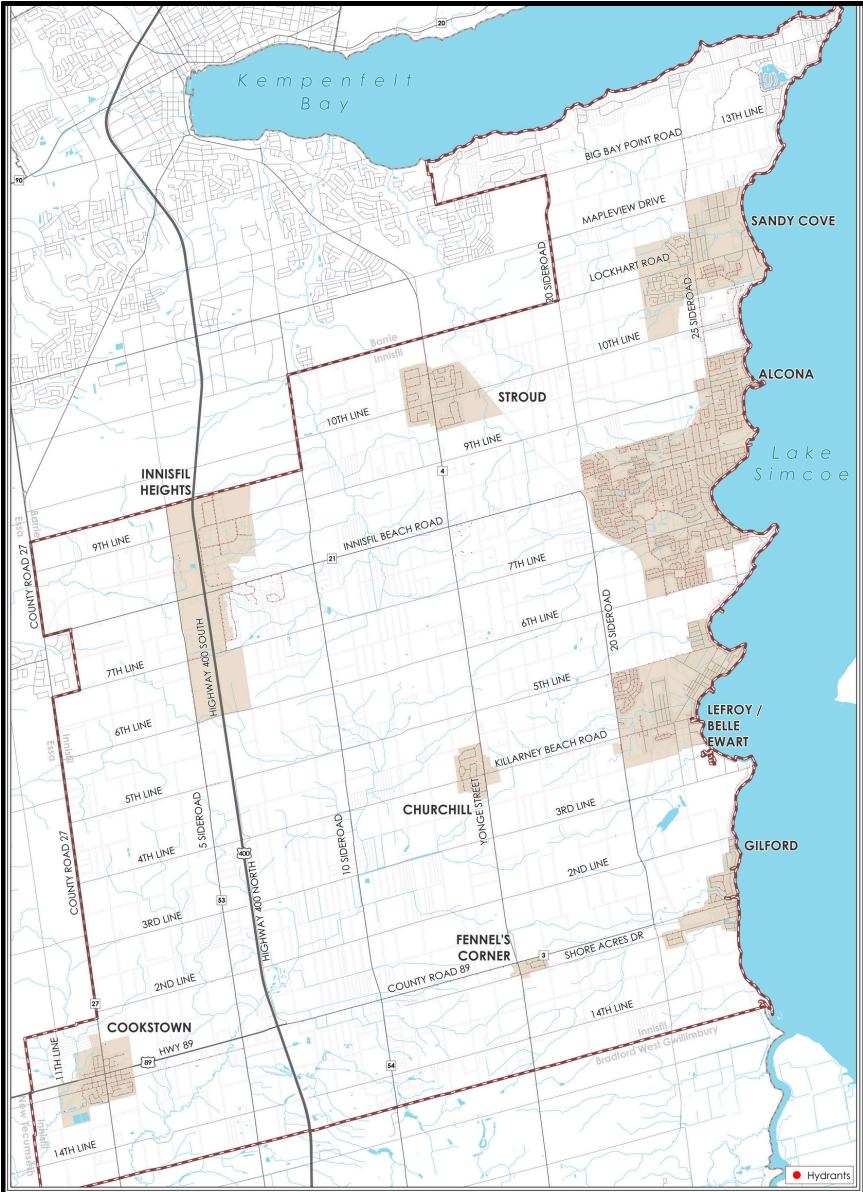# Appendix A - Levels of Service Maps

Levels of Service - Servicing Map

Legend:
- Sewer Serviced Only (green)
- Sewer Serviced Only (blue)
- Sewer & Water Serviced (pink)
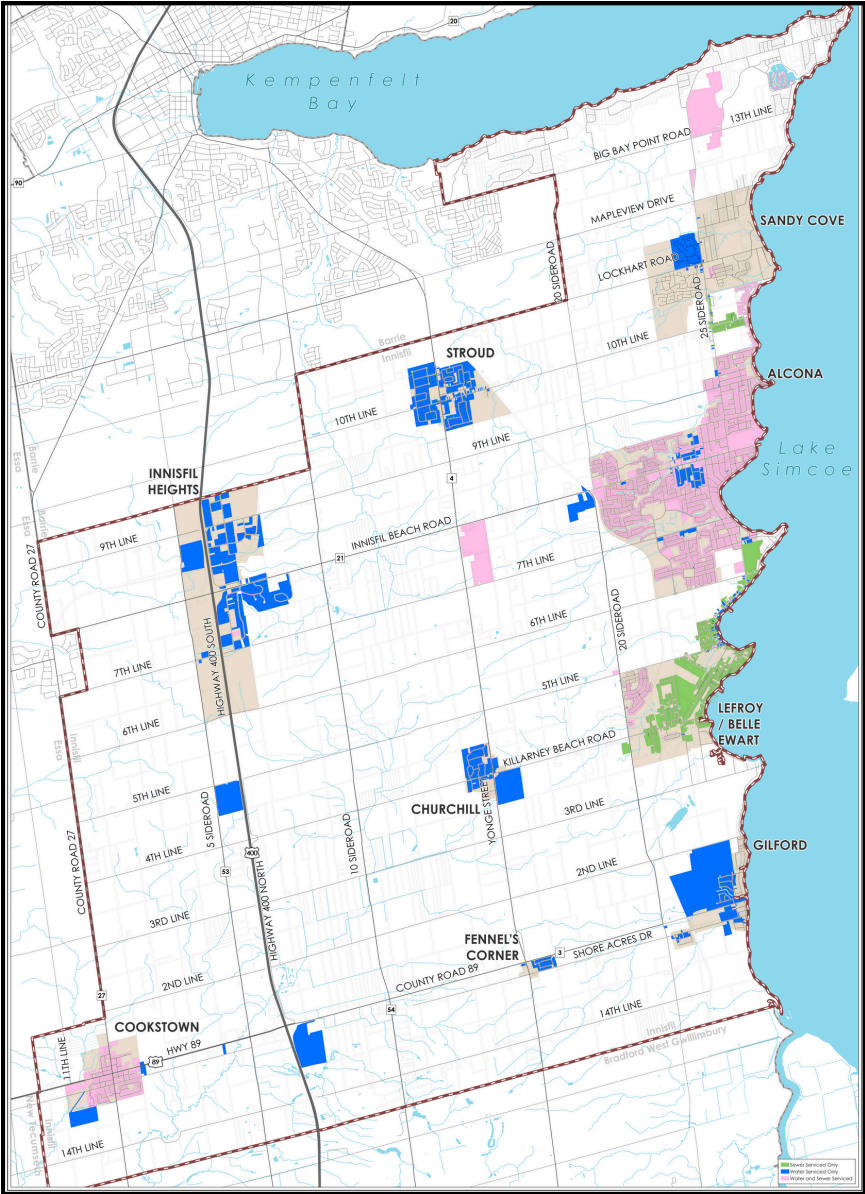
Appendix A - Levels of Service Maps

Levels of Service - Fire Flow Map

Appendix B - Maintenance Activities

Maintenance	Summary of Activity
Backflow Prevention Program	InnServices staff identify all possible sources that may be a point of potential cross connection contamination and inspections to ensure there is no backflow and there is safe drinking water.
Cleanouts	Carried out regularly to keep machinery, equipment, and work areas clear of dirt, materials, and foreign objects. The preventative measures ensure the asset is running at ideal performance and is easy to access, inspect, and repair when required.
Water Meters	Water meters are replaced at the end of the useful life as well as on need basis.
Facility Assets	Facility equipment such as overhead cranes, straps, harnesses, chain falls, hoisting equipment, forklifts, turbidimeters, flow meters, and genie lifts are inspected externally, every year.
	Equipment is tested and calibrated to their original standard every three months, internally and externally on annual basis. If the asset is determined to be outside of the allowable tolerance even after recalibration will then be repaired or replaced with a back-up.
	Lubricating involves the periodic application of a lubricant (oil, grease, solid) to contact and wear surfaces to prevent wear, corrosion, and friction. Lubrication schedules typically follow manufacturer's recommendations.
Repairs - Watermain breaks and water meters	InnServices Investigates and confirms watermain break, notifies and creates the required work orders and repair instantly.
	Repairs of leaking water meters will be initiated by a complaint from a property owner. Goals are to eliminate leaking water meter, reduce water loss and ensure safety of drinking water.
Spills & Clean Up	Identify the nature and source of spill, containment, and clean-up by InnServices' operation and maintenance staff, if a spill occurred then absorbent materials and sand would be used to aid in clean up, collection of which would be in hazardous waste bins.
Unidirectional Flushing	Unidirectional watermain flushing to address water quality issues related to the accumulated sediment, biofilm, increased chlorine demand, discoloured water, and customer complaints.

Appendix B - Maintenance Activities

Valves, Hydrants, Valve Chamber	Expose the underground asset to replace, relocate and repair the hydrant, hydrant lead, valve box and chamber to ensure proper operation and continuous supply of safe drinking water to the residents.
	Hydrant pump-out is done every year before the winter for all the hydrants to ensure that hydrant barrels are drained and are free of water over the winter to avoid freezing.
	All frozen hydrants are returned to service in a timely manner during winter conditions. Utilizing a steamer, hydrant is thawed, and barrel is pumped out.
	Hydrant flow testing is part of annual summer maintenance program.
Fleet	Vehicle oil changes between 5000 - 7000 km as per the owner's manual.
	Tire changes every winter and summer season and breakdown maintenance on an as needed basis.
Water Service Lateral Repair & Hard Surface Restoration	InnServices repairs the portion of a water lateral, from the main to the property line as on need basis. InnServices also restores the hard surfaces within the road allowance for the repairs as on need basis.
	Thawing of frozen water services on InnServices' property using an approved thawing machine. Heat is applied to the water service line and as it travels throughout the pipe it thaws the frozen water.

Appendix C - Risk Rating Description Table

Risk Rating Description Table - Likelihood (A)

Risk Rating	Descriptor	Example description
1	Unlikely	May occur only in exceptional circumstances
2	Rare	Could occur at some point
3	Possible	Might occur at some time/the event should occur at some time
4	Likely	Will probably occur in most circumstances
5	Almost Certain	Is expected to occur in most circumstances

Risk Rating Description Table - Severity (B)

Risk Rating	Descriptor	Example description
1	Insignificant	Insignificant impact, little disruption to normal operation, low increase in normal operations costs
2	Minor	Minor impact for small geographical area, some manageable operation disruption, some increase in operating costs
3	Moderate	Minor impact for large geographical area, significant modification to normal operation but manageable, operation costs increased, increased monitoring
4	Major	Major impact for small geographical area, systems significantly compromised and abnormal operation if at all, high level of monitoring required
5	Catastrophic	Major impact for large geographical area, complete failure of all systems

Appendix C - Risk Rating Description Table

Risk Rating Description Table - Detectability (C)

Risk Rating	Descriptor	Example description
1	High Detectability	SCADA alarms with auto-dialer programmed alarm
2	Moderate Detectability	Monitored but not alarmed, may require operator to walk by and notice alarm; A problem is indicated by lab test results
3	Detectable	Visually detectable on operator's rounds; Regular maintenance would discover the problem
4	Poor Detectability	Visually detectable, but not inspected on a regular basis; Would not be detected before a problem was evident; Lab tests that are not done on a regular basis (eg. quarterly)
5	Undetectable	Cannot detect

Appendix D - Risk Management

Risk Management Area: Pumping Stations

Description of Hazard	Risk	Control/Monitoring In Place	Outcome (Strategy to reduce likelihood or impact of risk)
Low Lift pump fails to operate	L	Redundancy: raw water flow continuously monitored	Preventive Maintenance
Redundant raw mains not isolated	H	UV Reactor alarms	Isolation and check valves for both mains, connected to SCADA
Back up Power Failure	L	Monitoring/monthly testing generator	Preventive Maintenance
Loss of control (fibre optic cable, power)	L	Breakers in sub-station	Continuous power monitoring- network switch (comms)
VFD or drive failure	L	RW flow is continuously monitored, redundancy	Preventive Maintenance
Surge Anticipator Valve failure	M	SCADA Monitoring	Preventive Maintenance

Risk Management Area: Water Towers

Description of Hazard	Risk	Control/Monitoring In Place	Outcome (Strategy to reduce likelihood or impact of risk)
Sustained deep freeze-ice build up/extreme weather event	M	Check for visual defects	Install circulation system (Cookstown only) Friday Harbour & Goldcrest: maintain circulation system

Appendix D - Risk Management

Risk Management Area: Treated Water

Description of Hazardous Materials	Risk	Control/Monitoring In Place	Outcome (Strategy to reduce likelihood or impact of risk)
Highlift fail to operate	M	Redundant equipment/alarms	Preventive Maintenance
Clogged flow control valve plumbing	M	Programmed interlocks / Redundant equipment	Preventive Maintenance
VFD or drive failure	L	Failure alarms / Redundant equipment	Preventive Maintenance
Supply discharge Piping failure (inside plant)	L	SCADA, daily visual inspection	Preventive Maintenance; perform desktop exercise
Loss of water source for chlorinators	L	Alarmed	SCADA (low vacuum alarm)
Treatment Plant Structure Collapse	M	Engineering Standards	Preventive Maintenance
Low Chlorine Residual	M	Flushing, monitoring	Maintain flushing program
Water Level Indicator Failure	L	SCADA, milltronics level sensors, daily checks	Develop redundancies, PM program
Booster pump failures	L	SCADA alarms, redundancy, public notification	Preventive Maintenance
Clogged flow control valve Plumbing	L	Pump fail alarm	Daily Operator checks
Contamination of contact chambers from leaking membranes or other sources	H	Raised hatches with watertight gasket and seals	Procedure for contamination of contact chambers/ clear wells
Structure Collapse	M	Check for visual defects when reservoir is being inspected	Physical inspection/evaluation by structural engineer.
Main Valve Failure	M	Valve & hydrant maintenance program	Repair/replace damaged valves or hydrants. Redundant discharge

Appendix D - Risk Management

Risk Management Area: Linear & Facility Assets

Description of Hazardous Materials	Risk	Control/Monitoring In Place	Outcome (Strategy to reduce likelihood or impact of risk)
Sustained pressure loss	L	Public notification	Hydraulic modelling (additional services); flushing program
Risk of water lateral disruption	L	Accept and resolve as reported	Repair/replace as on needed basis
Premature failure of facility equipment assets	L	Accept and resolve as reported	Regular/preventative maintenance
Risk of hydrant freezing	M	Mitigate through frequent inspection and maintenance	Winterization of Hydrants

Risk Management Area: Wells

Description of Hazard	Risk	Control/Monitoring In Place	Outcome (Strategy to reduce likelihood or impact of risk)
Drought - Well dry	M	Monitor levels, redundancy	Source Water Protection Plan, Water Restriction Bylaw
Well Casing Failure	M	Redundancy	Annual Well Inspection program
Sudden change to raw water characteristics	M	Raw water monitoring	Source Water Protection Plan
Well screen failure	M	Monitor Pressure and Flow; lower flow rate	Preventive Maintenance
Back up Power Failure (Long Term Outage)	M	SCADA alarm, Operational checks & testing of generator	Portable generator; primary & essential fuel suppliers