Haldimand County

2025 Asset Management Plan

This Asset Management Plan was prepared by:

Empowering your organization through advanced asset management, budgeting & GIS solutions

Table of Contents

List of Tables

List of Figures

Executive Summary

Municipal infrastructure provides the foundation for the economic, social, and environmental health and growth of a community through the delivery of services. The goal of asset management is to minimize the lifecycle costs of delivering infrastructure services, manage the associated risks, while maximizing the value and levels of service the community receives from the asset portfolio. This involves the development and implementation of asset management strategies and long-term financial planning.

The overall replacement cost of the asset categories owned by Haldimand County totals $3.89 billion. 82% of all assets analysed are in fair or better condition and assessed condition data was available for 51% of assets. For the remaining assets, assessed condition data was unavailable, and asset age was used to approximate condition – a data gap that persists in most municipalities. Generally, age misstates the true condition of assets, making condition assessments essential to accurate asset management planning, and a recurring recommendation.

The development of a long-term, sustainable financial plan requires an analysis of whole lifecycle costs. A sustainable financial plan was developed, using a combination of proactive lifecycle strategies (roads, bridges and culverts) and replacement only strategies (all other assets) to determine the lowest cost option to maintain the current level of service.

To meet capital replacement and rehabilitation needs for existing infrastructure, prevent infrastructure backlogs, and achieve long-term sustainability, Haldimand's proposed level of service is to maintain the current average condition. The average annual capital needed totals $46.3 million. Based on a historical analysis of sustainable capital funding sources, Haldimand County is committing approximately $28.9 million towards capital reserves per year. As a result, the Town is funding 62% of its annual capital requirements to maintain its proposed level of service. This creates a total annual funding deficit of $17.4 million. Addressing annual infrastructure funding shortfalls is a difficult and long-term endeavour for municipalities. Short phase-in periods to meet these funding targets may place too high a burden on taxpayers too quickly, whereas a phase-in period beyond 20 years may see a continued deterioration of infrastructure, leading to larger backlogs.

To close annual deficits for capital contributions from tax revenues for asset needs, it is recommended Haldimand County review the feasibility of implementing a 1.75% annual increase in revenues over a 10-year phase-in period.

Funding scenarios over longer time frames are also presented which reduce the annual increases.

Risk frameworks and levels of service (LOS) targets can then be used to prioritize projects and help select the right lifecycle intervention for the right asset at the right time—including replacement or full reconstruction. Haldimand County has developed preliminary risk models which are integrated with its asset register. These models can produce risk matrices that classify assets based on their risk profiles.

Most municipalities in Ontario, and across Canada, continue to struggle with meeting infrastructure demands. This challenge was created over many decades and will take many years to overcome. To this end, several recommendations should be considered, including:

- Continuous and dedicated improvement to Haldimand's infrastructure datasets, which form the foundation for all analysis, including financial projections and needs.
- Continuous refinements to the risk and lifecycle models as additional data becomes available. This will aid in prioritizing projects and creating more strategic long-term capital budgets.
- Continued monitoring of key performance indicators for all infrastructure programs to calibrate levels of service targets annually.

Haldimand County has taken important steps in building its asset management program, including developing a more complete and accurate asset register—a substantial initiative. Continuous improvement to this inventory will be essential in maintaining momentum, supporting long-term financial planning, and delivering the highest affordable service levels to the Haldimand community.

About this Document

The Haldimand County Asset Management Plan ("AM Plan") was developed in accordance with Ontario Regulation 588/17 ("O. Reg 588/17"). It contains a comprehensive analysis of Haldimand County's infrastructure portfolio. This is a living document that should be updated regularly as additional asset and financial data becomes available.

Ontario Regulation 588/17

As part of the *Infrastructure for Jobs and Prosperity Act, 2015*, the Ontario government introduced Regulation 588/17 - Asset Management Planning for Municipal Infrastructure. Along with creating better performing organizations, more livable and sustainable communities, the regulation is a key, mandated driver of asset management planning and reporting. It places substantial emphasis on current and proposed levels of service and the lifecycle costs incurred in delivering them.

Table 1: Ontario Regulation 588/17 Requirements and Reporting Deadlines

Requirement	2019	2022	2024	2025
1. Asset Management Policy	☑		☑	
2. Asset Management Plans		☑	☑	☑
State of infrastructure for core assets		☑		
State of infrastructure for all assets			☑	☑
Current levels of service for core assets		☑		
Current levels of service for all assets			☑	
Proposed levels of service for all assets				☑
Lifecycle costs associated with current levels of service		☑	☑	
Lifecycle costs associated with proposed levels of service				☑
Growth and risk impacts		☑	☑	☑
Financial strategy				☑

Scope

The scope of this document is to identify the current practices and strategies that are in place to manage public infrastructure and to make recommendations where they can be further refined. Through the implementation of sound asset management strategies, Haldimand County can ensure that public infrastructure is managed to support the sustainable delivery of municipal services.

The following asset categories are addressed in further sections:

Asset Category	Source of Funding
Road Network	Tax Levy
Bridges & Culverts	Tax Levy
Stormwater Network	Tax Levy
Buildings	Tax Levy
Land Improvements	Tax Levy
Vehicles	Tax Levy
Machinery & Equipment	Tax Levy
Sanitary Network	Utility Rates
Water Network	Utility Rates

Limitations and Constraints

The asset management program development requires substantial effort by staff, it is developed based on best-available data, and is subject to the following broad limitations, constraints, and assumptions:

- The analysis is highly sensitive to several critical data fields, including an asset's estimated useful life, replacement cost, quantity, and in-service date. Inaccuracies or imprecisions in any of these fields can have substantial and cascading impacts on all reporting and analytics.
- User-defined and unit cost estimates, based typically on staff judgment, recent projects, or established through completion of technical studies, offer the most precise approximations of current replacement costs. When this isn't possible, historical costs incurred at the time of asset acquisition or construction can be inflated to present day. This approach can produce highly inaccurate estimates.
- In the absence of condition assessment data, age was used to estimate asset condition ratings. This approach can result in an over- or understatement of asset needs. As a result, financial requirements generated through this approach can differ from those produced by staff.
- The risk models are designed to support objective project prioritization and selection. However, in addition to the inherent limitations that all models face, they also require availability of important asset attribute data to ensure that asset risk ratings are valid. Missing attribute data can misclassify assets.

These limitations have a direct impact on most of the analysis presented, including condition summaries, age profiles, long-term replacement and rehabilitation forecasts, and shorter term, 10-year forecasts that are generated from Citywide, Haldimand's primary asset management system.

These challenges are quite common among municipalities and require long-term commitment and sustained effort by staff. As Haldimand's asset management program evolves and advances, the quality of future AM Plans and other core documents that support asset management will continue to increase.

An Overview of Asset Management

Municipalities are responsible for managing and maintaining a broad portfolio of infrastructure assets to deliver services to the community. Lifecycle costs can span decades, requiring planning and foresight to ensure financial responsibility is spread equitably across generations. An AM Plan is critical to this planning, and an essential element of the broader asset management program. The industry-standard approach and sequence to developing a practical asset management program begins with a Strategic Plan, followed by an Asset Management Policy and an Asset Management Strategy, concluding with an Asset Management Plan.

This industry standard, defined by the Institute of Asset Management (IAM), emphasizes the alignment between the corporate strategic plan and various asset management documents. The strategic plan has a direct, and cascading impact on asset management planning and reporting.

Foundational Documents

In the municipal sector, 'asset management strategy' and 'asset management plan' are often used interchangeably. Other concepts such as 'asset management framework', 'asset management system', and 'strategic asset management plan' further add to the confusion; lack of consistency in the industry on the purpose and definition of these elements offers little clarity. To make a clear distinction between the policy, strategy, and the plan, see the following sections for detailed descriptions of the document types.

Strategic Plan

The strategic plan has a direct, and cascading impact on asset management planning and reporting, making it a foundational element. Developing alignment with corporate goals and objectives through service delivery and lifecycle management, ensures Haldimand County has line of sight to achieve their strategic objectives.

Strategic Asset Management Policy

An asset management policy represents a statement of the principles guiding the County's approach to asset management activities. It aligns with the organization and provides clear direction to municipal staff on their roles and responsibilities.

Haldimand County adopted their asset management policy by resolution #19-130 on June 24th, 2019 in accordance with Ontario Regulation 588/17. As per legislative requirements, municipalities shall review and if necessary, update their policy every 5 years.

Asset Management Strategy

An asset management strategy outlines the translation of organizational objectives into asset management objectives and provides a strategic overview of the

activities required to meet these objectives. It provides greater detail than the policy on how Haldimand County plans to achieve asset management objectives through planned activities and decision-making criteria.

Key Technical Concepts

Effective asset management integrates several key components, including data management, lifecycle management, risk management, and levels of service. These concepts are applied throughout this AM Plan and are described below in greater detail.

Asset Hierarchy and Data Classification

Asset hierarchy illustrates the relationship between individual assets and their components, and a wider, more expansive network and system. How assets are grouped in a hierarchy structure can impact how data is interpreted. Assets were structured to support meaningful, efficient reporting and analysis. Key category details are summarized at the asset segment level.

Replacement Costs

There are a range of methods to determine the replacement cost of an asset, and some are more accurate and reliable than others. The two methodologies are:

- **User-Defined Cost and Cost/Unit**: Based on costs provided by municipal staff which could include average costs from recent contracts; data from engineering reports and assessments; staff estimates based on knowledge and experience
- **Cost Inflation/CPI Tables**: Historical cost of the asset is inflated based on Consumer Price Index or Non-Residential Building Construction Price Index

User-defined costs based on reliable sources are a reasonably accurate and reliable way to determine asset replacement costs. Cost inflation is typically used in the absence of reliable replacement cost data. It is a reliable method for recently purchased and/or constructed assets where the total cost is reflective of the actual costs that Haldimand incurred. As assets age, and new products and technologies become available, cost inflation becomes a less reliable method.

Estimated Useful Life and Service Life Remaining

The estimated useful life (EUL) of an asset is the period over which Haldimand County expects the asset to be available for use and remain in service before requiring replacement or disposal. The EUL for each asset was assigned according to the knowledge and expertise of municipal staff and supplemented by existing industry standards when necessary.

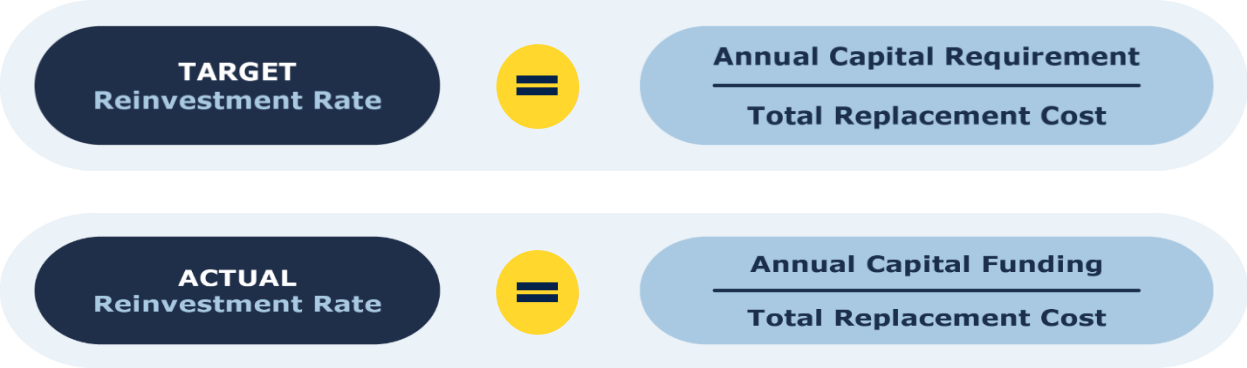
By using an asset's in-service date and its EUL, Haldimand County can determine the service life remaining (SLR) for each asset. Using condition data and the asset's SLR, Haldimand can more accurately forecast when it will require replacement. The SLR is calculated as follows:

Figure 1: Service Life Remaining Calculation

Reinvestment Rate

As assets age and deteriorate they require additional investment to maintain a state of good repair. The reinvestment of capital funds, through asset renewal or replacement, is necessary to sustain an adequate level of service. The reinvestment rate is a measurement of available or required funding relative to the total replacement cost. By comparing the actual vs. target reinvestment rate, Haldimand can determine the extent of any existing funding gap.

Figure 2: Reinvestment Rate Calculation

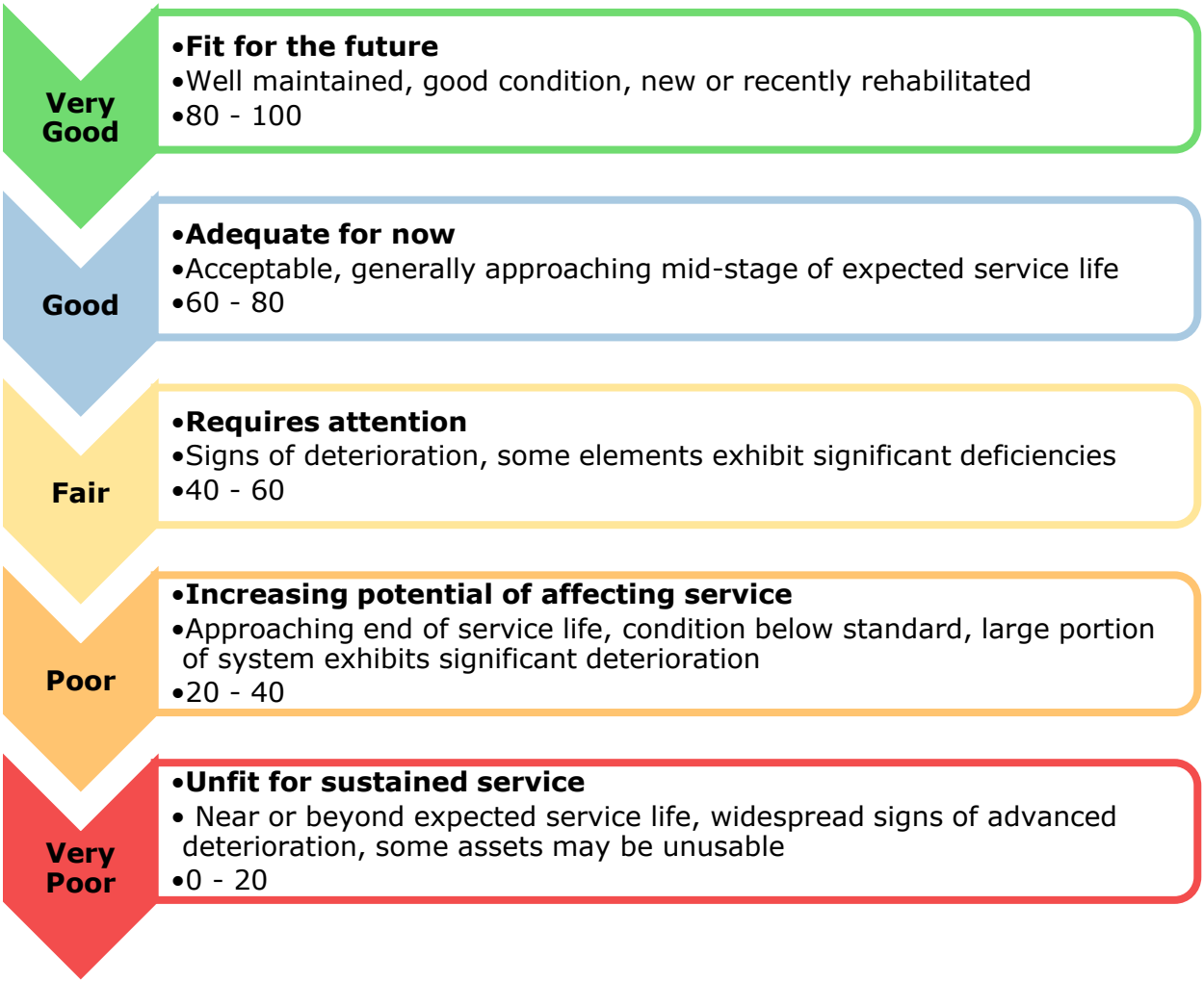


Asset Condition

An incomplete or limited understanding of asset condition can mislead long-term planning and decision-making. Accurate and reliable condition data helps to prevent premature and costly rehabilitation or replacement and ensures that lifecycle activities occur at the right time to maximize asset value and useful life.

A condition assessment rating system provides a standardized descriptive framework that allows comparative benchmarking across Haldimand County's asset portfolio. The table below outlines the condition rating system used to determine asset condition. This rating system is aligned with the Canadian Core Public Infrastructure Survey which is used to develop the Canadian Infrastructure Report Card.

Figure 3: Standard Condition Rating Scale



The analysis is based on assessed condition data, as available. In the absence of assessed condition data, asset age is used as a proxy to determine asset condition. Appendix L: Condition Assessment Guidelines includes additional information on the role of asset condition data and provides basic guidelines for the development of a condition assessment program.

Lifecycle Management Strategies

The condition or performance of most assets will deteriorate over time. This process is affected by a range of factors including an asset's characteristics, location, utilization, maintenance history and environment. Asset deterioration has a negative effect on the ability of an asset to fulfill its intended function, and may be characterized by increased cost, risk and even service disruption.

To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

There are several field intervention activities that are available to extend the life of an asset. These activities can be generally placed into one of three categories:

maintenance, rehabilitation, and replacement. The following table provides a description of each type of activity and the general difference in cost.

Depending on initial lifecycle management strategies, asset performance can be sustained through a combination of maintenance and rehabilitation, but at some point, replacement is required. Understanding what effect these activities will have on the lifecycle of an asset, and their cost, will enable staff to make better recommendations. Figure 4 provides a description of each type of activity, the general difference in cost, and typical risks associated with each.

Haldimand County's approach to lifecycle management is described within each asset category. Developing and implementing a proactive lifecycle strategy will help staff to determine which activities to perform on an asset and when they should be performed to maximize useful life at the lowest total cost of ownership.

Figure 4: Lifecyle Management Typical Interventions

Maintenance

- General level of cost is $
- All actions necessary for retaining an asset as near as practicable to its original condition,but excluding rehabilitation or renewal. Maintenance does not increase the service potential of the asset or keep it in its original condition;
- It slows down deterioration, and delays when rehabilitation or replacement is necessary.

Rehabilitation / Renewal

- General level of cost is $$$
- Works to rebuild or replace parts or components of an asset, to restore it to a required functional condition and extend its life, which may incorporate some modification;
- Generally involves repairing the asset to deliver its original level of service (i.e. milling and paving of roads) without resorting to significant upgrading or replacement, using available techniques and standards.

Replacement

- General level of cost is $$$$$
- The complete replacement of an asset that has reached the end of its life, so as to provide a similar, or agreed alternative, level of service;
- Existing asset disposal is generally included.

Risk Management Strategies

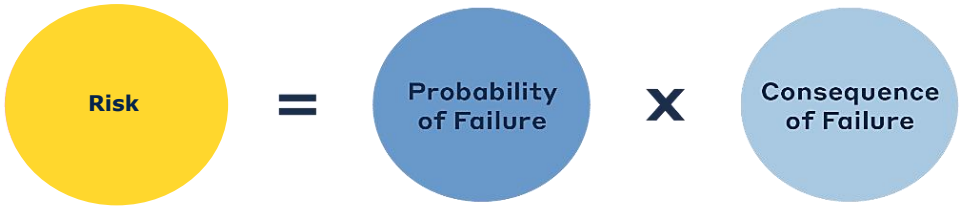
Municipalities generally take a 'worst-first' approach to infrastructure spending. Rather than prioritizing assets based on their importance to service delivery, assets in the worst condition are fixed first, regardless of their criticality. However, not all assets are created equal. Some are more important than others, and their failure or disrepair poses more risk to the community. For example, a road with a high volume of traffic that provides access to critical services poses a higher risk than a low volume rural road. These high-value assets should receive funding before others.

By identifying the various impacts of asset failure and the likelihood that it will fail, risk management strategies can identify critical assets, and determine where maintenance efforts, and spending, should be focused. This AM Plan includes a high-level evaluation of asset risk and criticality through quantitative and qualitative methodologies.

Quantitative Approach to Risk

Asset risk is defined using the following formula:

Figure 5: Risk Equation



The probability of failure relates to the likelihood that an asset will fail at a given time. The probability of failure focuses on two highly imperative impacts for risk assessment – structural and functional impacts. Structural impacts are related to the structural aspects of an asset such as load carrying capacity, condition, or breaks; whereas the functional impacts can include parameters, slope, traffic count, and other impacts that can affect the performance of an asset.

The consequence of failure describes the overall effect that an asset's failure will have on an organization's asset management goals. Consequences of failure can range from non-eventful to impactful.

Each asset has been assigned a probability of failure score and consequence of failure score based on available asset data. These risk scores can be used to prioritize maintenance, rehabilitation, and replacement strategies for critical assets.

Qualitative Approach to Risk

The qualitative risk assessment involves the documentation of risks to the delivery of services that the municipality faces given the current state of the infrastructure and asset management strategies. These risks can be understood as corporate level risks.

Climate Change

Climate change can cause severe impacts on human and natural systems around the world. The effects of climate change include increasing temperatures, higher levels of precipitation, droughts, and extreme weather events. In 2019, Canada's Changing Climate Report (CCCR 2019) was released by Environment and Climate Change Canada (ECCC).

The report revealed that between 1948 and 2016, the average temperature increase across Canada was 1.7°C; moreover, during this period, Northern Canada experienced a 2.3°C increase. The temperature increase in Canada has doubled that of the global average. If emissions are not significantly reduced, the temperature could increase by 6.3°C in Canada by the year 2100 compared to 2005 levels.

Observed precipitation changes in Canada include an increase of approximately 20% between 1948 and 2012. By the late 21st century, the projected increase could reach an additional 24%. During the summer months, some regions in Southern Canada are expected to experience periods of drought at a higher rate. Extreme weather events and climate conditions are more common across Canada. Recorded events include droughts, flooding, cold and warm extremes, wildfires, and record-low Arctic sea ice extent.

The changing climate poses a significant risk to the Canadian economy, society, environment, and infrastructure. The impacts on infrastructure are often a result of climate-related extremes such as droughts, floods, higher frequency of freeze-thaw cycles, extended periods of high temperatures, high winds, and wildfires. Physical infrastructure is vulnerable to damage and increased wear when exposed to these extreme events and climate variabilities. Canadian municipalities are faced with the responsibility to protect their local economy, citizens, environment, and physical assets.

Impacts of Growth

The demand for infrastructure and services will change over time based on a combination of internal and external factors. Understanding the key drivers of growth and demand will allow Haldimand County to plan for new infrastructure more effectively, and the upgrade or disposal of existing infrastructure. Increases or decreases in demand can affect what assets are needed and what level of service meets the needs of the community.

As growth-related assets are constructed or acquired, they are integrated into the asset management program. While the addition of residential units will add to the existing assessment base and offset some of the costs associated with growth, Haldimand County will need to review the lifecycle costs of growth-related infrastructure, and these costs should be considered in long-term funding strategies.

Levels of Service

A level of service is a measure of the services that Haldimand County is providing to the community and the nature and quality of that service. Within each asset category, technical metrics and qualitative descriptions that measure both technical and community levels of service have been established and measured as data is available.

These metrics include the technical and community level of service metrics that are required as part of Ontario Regulation 588/17, as well as additional performance measures that Haldimand County has selected in accordance with best practices.

Community Levels of Service

Community levels of service are a simple, plain language description or measure of the service that the community receives. For core asset categories (roads, bridges & culverts, water, wastewater, stormwater) the Province, through O. Reg. 588/17, has provided qualitative descriptions that are required. For non-core asset categories, Haldimand County has determined the qualitative descriptions that will be used to determine the community level of service provided. These descriptions can be found in the Levels of Service subsection within each asset category in the appendices.

Technical Levels of Service

Technical levels of service are a measure of key technical attributes of the service being provided to the community. These include mostly quantitative measures and tend to reflect the impact of the County's asset management strategies on the physical condition of assets or the quality/capacity of the services they provide.

For core asset categories (roads, bridges & culverts, water, wastewater, stormwater) the Province, through O. Reg. 588/17, has provided technical metrics. For non-core asset categories, Haldimand has determined the metrics that will be used to measure the services provided. These can be found in the Levels of Service subsection within each asset category in the appendices.

Current and Proposed Levels of Service

For Haldimand County to develop an effective AM Plan, it is imperative to establish clear levels of service across key service areas to ensure the efficient and sustainable delivery of municipal services. Haldimand County plans to establish their proposed LOS over a 10-year period, in accordance with O. Reg. 588/17.

Proposed levels of service should be realistic and achievable within the timeframe outlined by Haldimand County. They should also be determined with consideration of a variety of community expectations, fiscal capacity, regulatory requirements, corporate goals, and long-term sustainability. Haldimand must identify lifecycle management and financial strategies which allow these targets to be achieved.

Annual Review

The annual review must address Haldimand County's progress in implementing its AM Plan, any factors impeding the ability to implement, as well as a strategy to address any of the identified factors.

Portfolio Overview

Community Profile

Haldimand County is located on the Niagara Peninsula in southern Ontario. Haldimand is in the Golden Horseshoe and contains a rural landscape of 1,250 square kilometres with 83 kilometres of shoreline along Lake Erie. Haldimand County is adjacent to major cities like Hamilton, Toronto, and Buffalo.

Haldimand County was established as part of the Niagara District in 1798. Haldimand was opened for general settlement in 1832 and was first incorporated in 1850. In 1974 Haldimand County was amalgamated with Norfolk County to become the Regional Municipality of Haldimand-Norfolk.

In 2001, the regional municipality was abolished, and the local municipalities of Dunnville, Haldimand and part of Nanticoke were amalgamated into a single-tier authority. Although a city, it calls itself after its historic name Haldimand County.

Agriculture has long been the predominant land use in Haldimand County, and the municipality will continue to encourage the growth of a strong agricultural community. Haldimand recognizes the opportunities of commercial and industrial expansion with the attraction of its unique location, resources, and rich natural environment.

There are 25 designated hamlets within Haldimand that are developed as the residential, social, and commercial centres serving the surrounding agricultural community. The growth in Haldimand County is distributed to the six fully serviced urban areas which include Caledonia, Cayuga, Dunnville, Hagersville, Jarvis and Townsend.

Table 2: Haldimand County & Ontario Census Information

Census Characteristic	Haldimand County	Ontario
Population 2021	49,216	14,223,942
Population Change 2016-2021	7.9%	5.8%
Total Private Dwellings	20,710	5,929,250
Population Density	39.4 people/km^2	15.9 people/km^2
Land Area	1,250.45 km^2	892,411.76 km^2

Haldimand County Climate Profile

Haldimand County is a rural city-status, single-tier municipality on the Niagara Peninsula in southern Ontario. Haldimand is expected to experience notable effects of climate change which include higher average annual temperatures, an increase in total annual precipitation, and an increase in the frequency and severity of extreme events. According to Climatedata.ca – a collaboration supported by Environment and Climate Change Canada (ECCC), Haldimand County may experience the following trends:

1. Higher Average Annual Temperature
    - Between the years 1981 and 2010 the annual average temperature was 8.7ºC
    - Under a high emissions scenario, the annual average temperatures are projected to increase to 10.6ºC by the year 2050 and to 14ºC by the end of the century.
2. Increase in Total Annual Precipitation
    - Under a high emissions scenario, Haldimand County is projected to experience a 7% increase in precipitation by the year 2050 and a 14% increase by the end of the century.
3. Increase in Frequency of Extreme Weather Events
    - It is expected that the frequency and severity of extreme weather events will change.

Integrating Climate Change in Asset Management

Asset management practices aim to deliver sustainable service delivery - the delivery of services to residents today without compromising the services and well-being of future residents. Climate change threatens sustainable service delivery by reducing the useful life of an asset and increasing the risk of asset failure. Desired levels of service can be more difficult to achieve because of climate change impacts such as flooding, high heat, drought, and more frequent and intense storms.

To achieve the sustainable delivery of services, climate change considerations should be incorporated into asset management practices. The integration of asset management and climate change adaptation observes industry best practices and enables the development of a holistic approach to risk management.

Inventory & Valuation

Haldimand County's inventory follows an asset hierarchy of categories, indicated by the dark blue and white headings, and segments presented as bulleted lists, as outlined below.

Figure 6: Asset Hierarchy

Road Network
- Asphalt Roads
- Surface Treated Roads
- Sidewalks
- Lights

Bridges & Culverts
- OSIM Bridges
- Structural Culverts
- Non-OSIM Bridges

Stormwater Network
- Storm Structure
- Storm Pipe
- Municipal Drains
- Storm Ponds

Water Network
- Water Treatment Plant
- Booster Station
- Storage
- Water Depot
- Hydrants
- Valves
- Water Meter
- Water Pipe
- General Building
- General Equipment

Sanitary Network
- Sanitary Pumping Station
- Sanitary Manhole
- Sanitary Pipe
- Sanitary Treatment Plant
- Sanitary Lagoons
- Genral Building
- General Equipment

Buildings
- Administration
- Community Centres
- Recreation
- Public Works
- Fire / Ambulance
- Libraries
- Parks

Land Improvements
- Trees
- Parks
- Waste Management
- Recreation
- Public Works
- Cemeteries
- Administration
- Fire / Ambulance

Vehicles
- Parks
- Recreation
- Public Works
- Environmental
- Administration
- Fire / Ambulance
- Community Services

Machinery & Equipment
- Parks
- Waste Management
- Recreation
- Public Works
- Libraries
- Administration
- Fire / Ambulance
- Community Services

State of the Infrastructure

The table below outlines the current state of each asset category, as well as the current service trend. The service trend arrows indicate an overall downward trend, reflecting current funding levels and declining asset conditions.

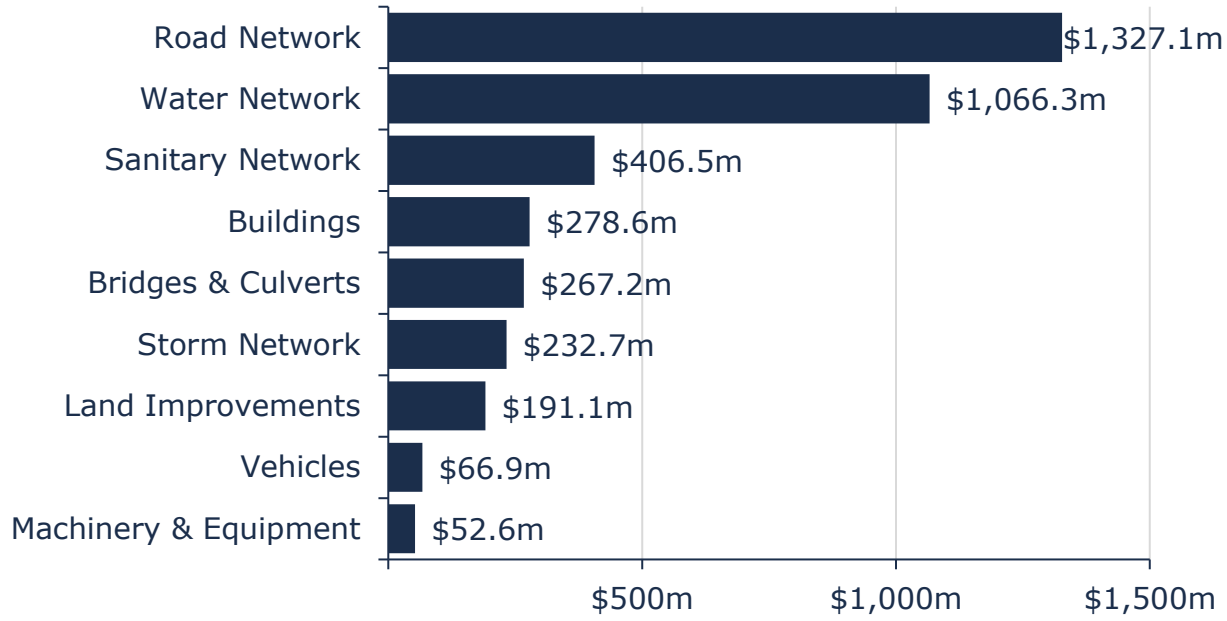
Table 3: State of the Infrastructure

Asset Category	Replacement Cost	Asset Condition	Service Trend
Road Network	$1,327,130,017	Good (64%)	↓
Bridges & Culverts	$267,189,811	Good (72%)	↓
Storm Network	$232,706,424	Good (61%)	↓
Water Network	$1,066,275,399	Very Good (80%)	↓
Sanitary Network	$406,472,340	Good (66%)	↓
Buildings	$278,582,526	Good (64%)	↓
Land Improvements	$191,141,181	Fair (52%)	↓
Vehicles	$66,910,595	Fair (53%)	↑
Machinery & Equipment	$52,573,221	Fair (48%)	↓
Overall	$3,888,981,512	Good (68%)	↓

Replacement Cost

The asset categories have a total replacement cost of $3.89 billion based on available inventory data. This total was determined based on a combination of user-defined costs and historical cost inflation. This estimate reflects replacement of historical assets with similar, but not necessarily identical, assets available for procurement today.

Figure 7: Asset Portfolio Replacement Value Breakdown



Condition of Asset Portfolio

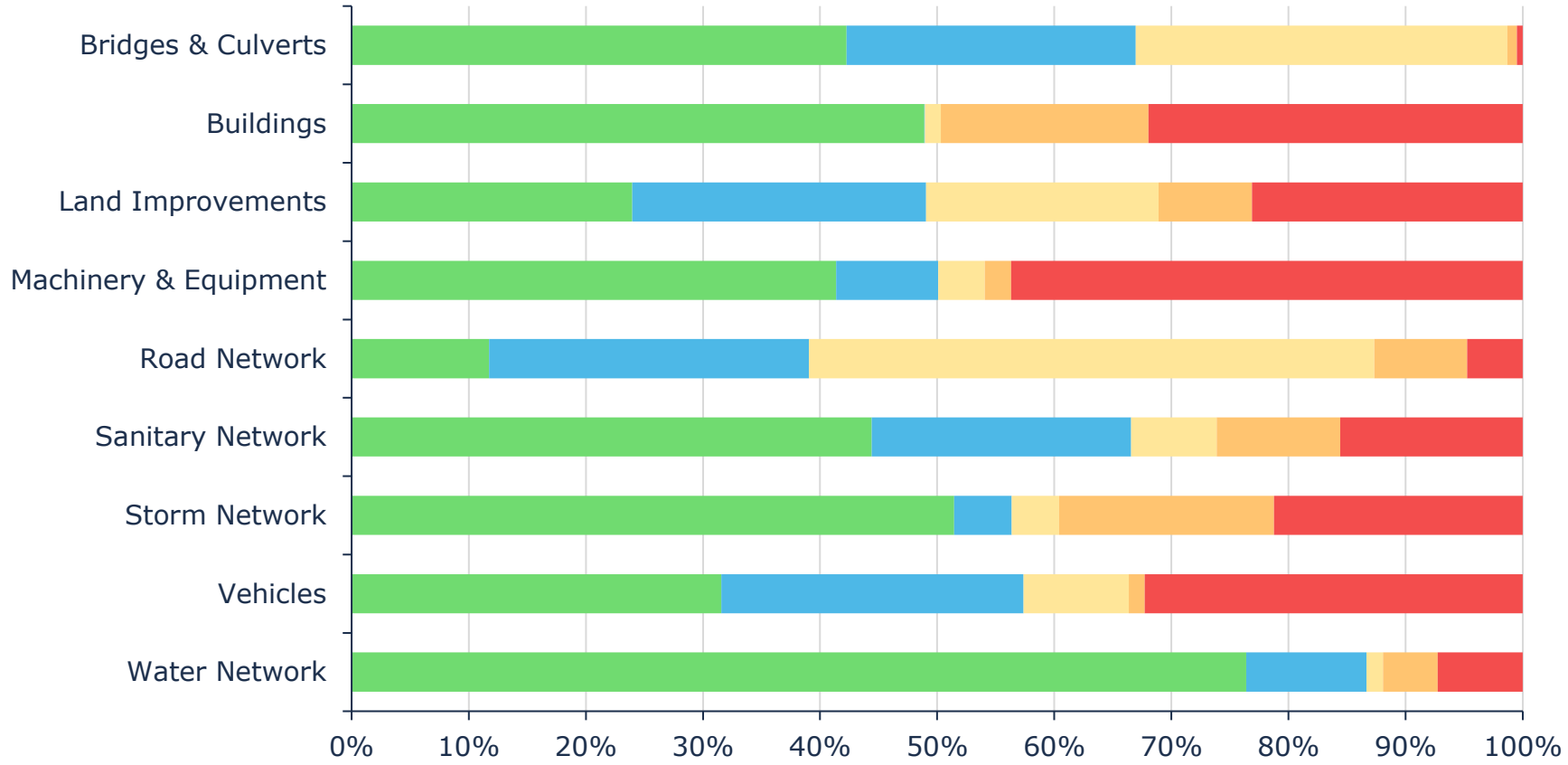
The current condition of the assets is central to all asset management planning. Collectively, 82% of assets in Haldimand County are in fair or better condition. This estimate relies on both age-based and field condition data.

Assessed condition data is available for 51% of assets; for the remaining portfolio, age is used as an approximation of condition. Assessed condition data is invaluable in asset management planning as it reflects the true condition of the asset and its ability to perform its functions. The table below identifies the source of condition data.

Table 4: Assessed Condition Data Sources

Asset Category	Assets with Assessed Condition	Source of Condition Data
Road Network	97%	Roads Needs Study - Stantec
Bridges & Culverts	100%	Ontario Structure Inspections (OSIM) – G. Douglas Vallee Limited
Buildings	43%	Consultant Assessments
Land Improvements	60%	Tree Staff Assessments Park Assessments
Vehicles	2%	Staff Assessments
Sanitary Network	7%	Staff Assessments
Water Network	16%	Engineering Assessments
All other Categories	0%	Age-based Estimates Only

Figure 8: Overall Condition Breakdown by Asset Category

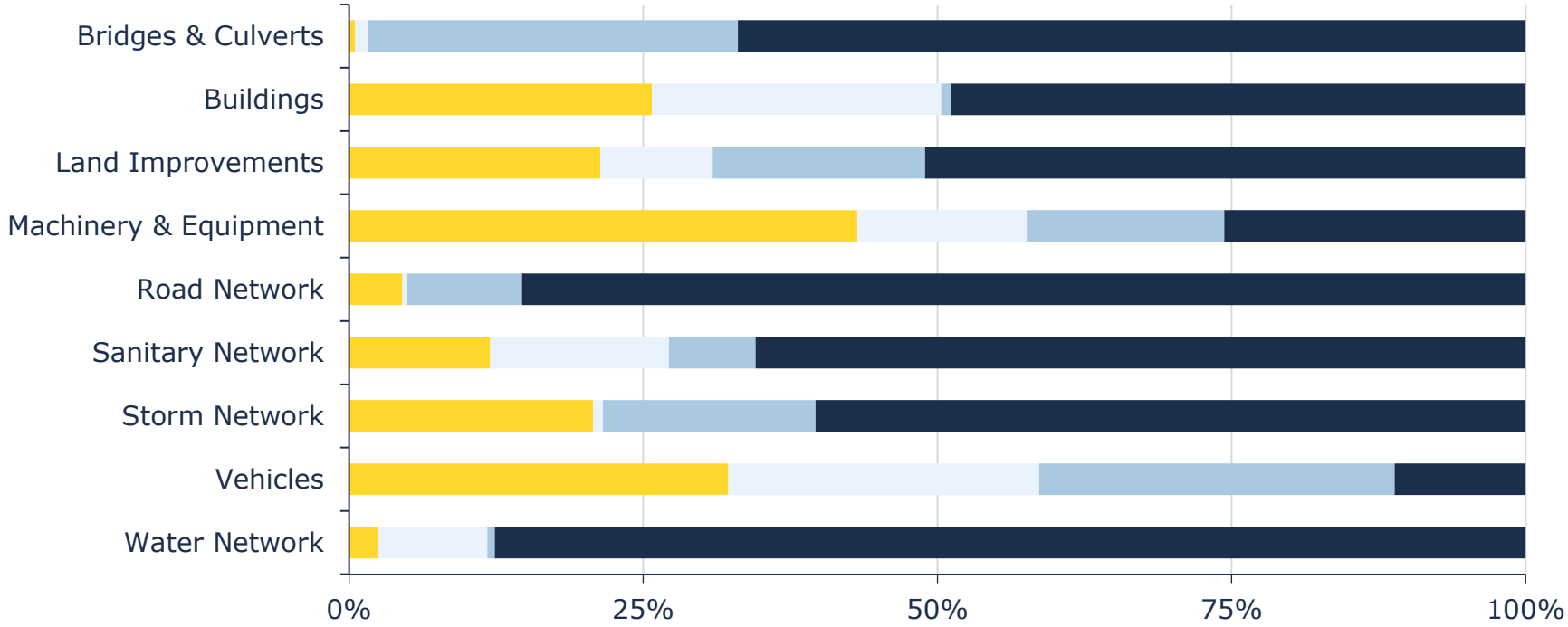


	Water Network	Vehicles	Storm Network	Sanitary Network	Road Network	Machinery & Equipment	Land Improvements	Buildings	Bridges & Culverts
Very Good	$814.5m	$21.1m	$119.7m	$180.5m	$155.6m	$21.7m	$45.8m	$109.4m	$112.9m
Good	$109.6m	$17.3m	$11.5m	$90.0m	$362.7m	$4.6m	$48.0m	$120k	$66.0m
Fair	$15.0m	$6.0m	$9.4m	$29.8m	$640.4m	$2.1m	$37.9m	$3.0m	$84.8m
Poor	$49.6m	$902k	$42.7m	$42.9m	$105.2m	$1.2m	$15.3m	$39.6m	$2.2m
Very Poor	$77.5m	$21.6m	$49.4m	$63.3m	$63.1m	$23.0m	$44.2m	$71.4m	$1.3m

Service Life Remaining

Based on asset age, available assessed condition data and estimated useful life, 32% of Haldimand County's assets will require rehabilitation / replacement within the next 10 years.

Figure 9: Overall Service Life Remaining by Asset Category



	Water Network	Vehicles	Storm Network	Sanitary Network	Road Network	Machinery & Equipment	Land Improvements	Buildings	Bridges & Culverts
Service Life Expired	$26.4m	$21.6m	$48.2m	$48.7m	$60.0m	$22.7m	$40.8m	$57.6m	$1.3m
0 - 5 Years Remaining	$98.9m	$17.7m	$2.0m	$61.8m	$5.5m	$7.6m	$18.3m	$55.0m	$2.9m
6 - 10 Years Remaining	$6.9m	$20.2m	$42.1m	$29.9m	$129.6m	$8.8m	$34.5m	$1.8m	$84.1m
Over 10 Years Remaining	$934.1m	$7.5m	$140.5m	$266.1m	$1,132.0m	$13.5m	$97.6m	$109.2m	$178.9m

Risk & Criticality

Qualitative Risk

Haldimand County has noted key trends, challenges, and risks to service delivery that they are currently facing:

Organizational Capacity
Staff resources have been focused primarily on accommodating infrastructure requirements. This leaves little time to dedicate towards asset management planning activities such as data refinement and lifecycle strategy development.

Technology
Haldimand County has many systems that are utilized for similar functions across the organization, without consistency. Haldimand also relies on external contractor's maintenance and data management systems without having access.

Asset Data & Information
There is a lack of confidence in the available inventory data for asset management purposes. Staff are in the process of improving the existing asset inventory including consolidating data sources. Staff plan to prioritize data refinement efforts to increase confidence in the accuracy and reliability of asset data and information.

Quantitative Risk

The overall risk breakdown for Haldimand County's asset inventory is portrayed in Figure 10. Each asset category has a breakdown of the attributes used to calculate the asset risk.

Figure 10: Overall Asset Risk Breakdown

1 - 4	5 - 7	8 - 9	10 - 14	15 - 25
Very Low	**Low**	**Moderate**	**High**	**Very High**
$1,481,270,670 (39%)	$769,646,500 (20%)	$526,127,083 (14%)	$588,177,813 (15%)	$468,759,447 (12%)

Based on replacement cost Haldimand County has 12% of their asset portfolio in very high risk. Reviewing the list of very high-risk assets to evaluate how best to mitigate the level of risk Haldimand is experiencing will help advance Haldimand County's asset management program.

Impacts of Growth

The demand for infrastructure and services will change over time based on a combination of internal and external factors. Understanding the key drivers of growth and demand will allow Haldimand County to plan for new infrastructure more effectively, and the upgrade or disposal of existing infrastructure. Increases or decreases in demand can affect what assets are needed and what level of service meets the needs of the community.

Haldimand County Official Plan (2006)

The Haldimand County's Official Plan was originally adopted by Council in 2006 and approved by the Province in 2009. Haldimand County has undertaken a Municipal Comprehensive Review of the document and broken the project into two phases. Phase 1 was approved by the Province in November 2021 and focused on Haldimand's Growth Strategy, including overall Growth Plan Conformity and population forecasts. Phase 2 relates to a general update of Haldimand County policies and the major themes of the Official Plan. It was adopted by Council on August 29, 2022 and approved by the Province on May 13, 2024.

The Official Plan provides guidance for land use in Haldimand County and sets out the policies to guide and manage the maintenance, rehabilitation, growth and development of Haldimand to ensure a sustainable living environment that meets the needs of the community over the 30-year planning horizon to 2051. The document facilitates the vision of Haldimand County with consideration of the policies of the Provincial Policy Statement 2020, and the Growth Plan for the Greater Golden Horseshoe, 2020.

The vision statement in the Official Plan states that Haldimand County aims to build a caring, friendly community that is an exceptional place to live, work, play and nurture future generations. Haldimand County values its diversity and unique mix of urban and rural interests and is committed to preserving its rich natural environment and small-town character. The vision includes a strong agricultural foundation and a diverse range of economic opportunities based on its strategic location, resources and unique history and heritage.

The following table outlines population, private dwellings and employment changes in Haldimand between 2011-2021 from Statistics Canada, for which Haldimand provides services. Haldimand County focuses on maintaining and enhancing appropriate levels of service in both physical infrastructure and social services with respect to the growth opportunities.

Year	Population	Private Dwellings	Employment
2021	49,216	20,710	N/A
2016	45,608	19,472	24,305
2011	44,876	19,108	N/A

Other Related Documents

The Growth Strategy Report for Haldimand County was developed to address the requirements of Phase 1 of the Official Plan Update work program. The report is based on the growth policies of the Provincial Policy Statement 2020 (PPS 2020) and the Growth Plan for the Greater Golden Horseshoe including the recently approved Amendment No. 1 (Growth Plan 2020).

The Growth Strategy Report includes a detailed land needs assessment for residential, community employment and employment area lands with respect to the intensification targets, density targets and the recent population, household, and employment forecasts. The Growth Plan establishes the population and employment forecasts for Haldimand County as a total population of 77,000 and a total employment of 29,000 jobs in 2051.

Haldimand County will ensure to provide sufficient water and wastewater services to accommodate residential, commercial, institutional, and industrial development in a timely manner through monitoring residual water and sewage treatment reserves and the rate study will incorporate the future forecasted costs to sustainably fund the water and sanitary services.

The Development Charges Background Study is currently underway and is expected to be completed by the end of 2025. This study assesses the impact of growth on the municipality and estimates the costs associated with accommodating future development.

Impact of Growth on Lifecycle Activities

The Official Plan for Haldimand County indicated the vision statement as fostering healthy change and growth. Haldimand will ensure the sewage treatment, waste disposal services, water supply services, stormwater management, transport pathways, utilities and emergency services are planned and developed to provide for the growth targets outlined in the Official Plan. As growth-related assets are constructed or acquired, they are integrated into Haldimand County's asset management program.

Levels of Service

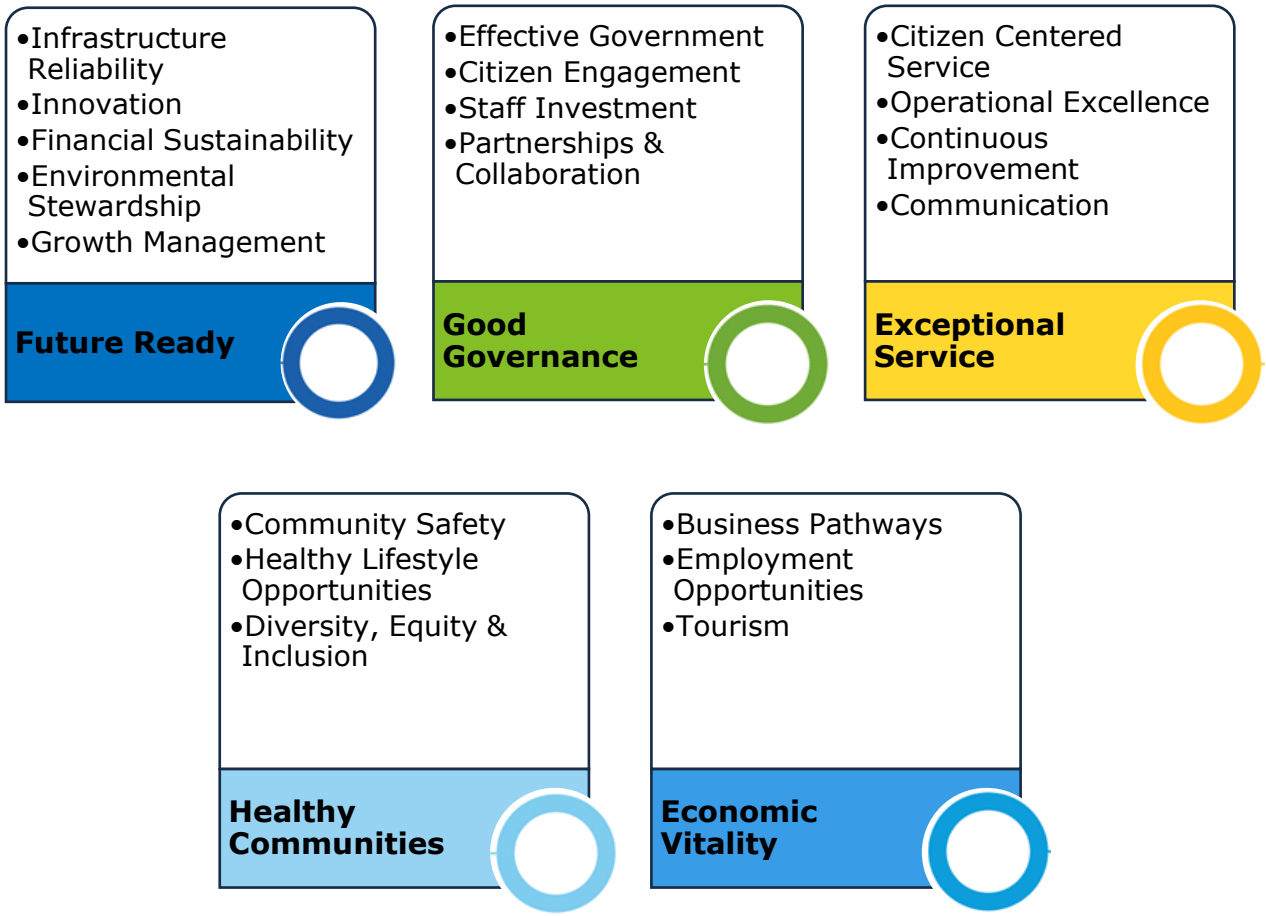
The Haldimand County Strategic Plan has a direct, and cascading impact on asset management planning and reporting, making it a foundational element. The long-term community vision statement for Haldimand County is:

Distinct, yet connected communities where growth and innovation harmonize with rural life, creating a vibrant and sustainable future for all.

The guiding values are the foundation of effective, ethical, and community centered municipal governance. The values that guide the work and interactions with stakeholders are respect, accountability, transparency, collaboration & teamwork, integrity, and professionalism.

The Strategic Plan is structured around five core themes, each containing priorities that will guide Council and staff in achieving Haldimand's vision. The themes and priorities within the plan will be the focus of our future planning and efforts, and the foundation of our organization's annual and multiyear work plans, budgets and policies.

Figure 11: Strategic Plan Themes and Priorities



Current Levels of Service

Haldimand County has defined their current levels of service for each infrastructure category by breaking it down into 3 service attributes - scope, quality / reliability and performance. Each of these attributes are defined as follows:

Scope – Is a description of the services being provided and the assets that are utilized to provide the services.

Quality / Reliability – Is a description of how condition is measured, as well as the current average condition of the assets utilized to provide the services. Also, for each asset category there are additional reliability measures included.

Performance – Is a description of how Haldimand will ensure long-term sustainability and is measured utilizing risk and financial parameters.

All community and technical levels of service are linked to the service attributes and can be found in the appendix for each asset category.

Proposed Levels of Service

Following an evaluation of current practices, community engagement efforts, and asset lifecycle activities, Haldimand County has determined that the current levels of service can be defined as an *average condition of good*. Maintaining this standard has been identified as the most appropriate LOS for the community.

A comprehensive assessment process was undertaken to establish proposed levels of service that ensure long-term sustainability and feasibility. The following key principles were integral to the development of the LOS methodology:

Stakeholder Engagement: Engage regularly with community stakeholders to gather feedback, communicate updates, and ensure transparency in decision-making.

Data-Driven Decision Making: Utilize analytics and performance data to guide strategic decisions and target areas for improvement.

Flexibility and Adaptability: Maintain a flexible approach to LOS, allowing for adjustments based on shifting community priorities and emerging needs.

Continuous Improvement: Implement an ongoing review process to refine and enhance the LOS methodology over time.

Scenarios

The scenarios used to analyze Haldimand County's asset inventory were modeled over a 100-year period to ensure all asset lifecycles were fully captured. These scenarios were developed using data from Haldimand County's asset management system, which includes estimated useful life, current condition, and replacement costs. All results are based on this data. The forecasted average condition for each scenario was assessed at the 30-year mark (2055) to provide a mid-term outlook.

Scenario 1: Current Capital Reinvestment Rate

Purpose: This scenario builds upon the current capital reinvestment rate, where the total amount of investment being made into capital improvements (like replacement or major repairs) remains the same. In this scenario, the focus is on the impact that current investment levels have on the condition of the infrastructure over time.

Key Focus: The annual investment stays constant, and the condition of the infrastructure is evaluated based on that level of reinvestment.

Outcome: This helps to see if the current capital reinvestment rate is enough to maintain the infrastructure in a sustainable way over the long term, or if it's falling short and leading to degradation in condition.

Scenario 2: Current Condition

Purpose: This scenario aims to achieve a specific, target condition level for the infrastructure, where the goal is to maintain the current average condition of the infrastructure in each asset category. By fixing the condition, the model determines what the required annual investment would be to maintain that target.

Key Focus: This scenario focuses on achieving a targeted condition level (current condition) and determining how much investment would be necessary to maintain that condition.

Outcome: This scenario gives insights into how much investment would be needed to keep the infrastructure at its current condition level.

Scenario 3: Current Lifecycle Activities

Purpose: This scenario examines the current state of the infrastructure based on existing lifecycle practices. It looks at how the infrastructure lifecycles are currently defined, the estimated useful lives and maintenance activities, and projects the amount of annual investment needed to be made in each asset category.

Key Focus: The condition of the infrastructure and the annual investment levels based on currently identified lifecycle activities.

Outcome: This scenario provides a baseline for how the infrastructure lifecycles are currently defined. It helps identify whether there are any gaps between current lifecycle definitions and long-term sustainability goals.

Analysis Results

The analysis was only performed on tax-funded asset categories, as a water and sanitary rate study and financial plan are currently under development to inform the financial strategy for the two systems.

Tax-Funded Analysis

Scenario 1: Current Capital Reinvestment Rate - this scenario utilizes the current capital reinvestment within each asset category. The current annual investment was held, and the condition was determined. The table below summarizes the results of each asset category and overall.

Table 5: Scenario 1 Current Capital Reinvestment Summary

Asset Category	Projected Average Condition in 2055	Current Average Annual Funding
Road Network	Fair (43%)	$13,159,137
Bridges & Culverts	Fair (52%)	$4,590,262
Storm Network	Fair (54%)	$659,070
Buildings	Fair (46%)	$2,536,847
Land Improvements	Fair (41%)	$1,833,908
Vehicles	Good (62%)	$4,071,960
Machinery & Equipment	Poor (30%)	$2,027,228
Overall	**Fair (45%)**	**$28,878,410**

Maintaining current funding levels will lead to a continued decline in average condition service levels. This increases the risk of asset failure and a rise in emergency repairs, which will in turn, drive up costs due to deferred lifecycle activities.

Scenario 2: Target Current Condition - this scenario utilizes a target of the average condition within each asset category. The condition value was held, and the annual investment was then determined. The table below summarizes the results of each asset category and overall.

Table 6: Scenario 2 Target Current Average Condition Summary

Asset Category	Current Average Condition	Projected Average Annual Funding
Road Network	Good (64%)	$25,865,982
Bridges & Culverts	Good (72%)	$5,157,799
Storm Network	Good (61%)	$1,737,110
Buildings	Good (64%)	$3,997,503
Land Improvements	Fair (52%)	$3,431,563
Vehicles	Fair (53%)	$3,198,376
Machinery & Equipment	Fair (48%)	$2,887,285
Overall	**Good (63%)**	**$46,275,618**

While maintaining the current average asset condition will support existing service levels, it will require the continued deferral of lifecycle activities to do so.

Scenario 3: Current Lifecycle Activities - this scenario utilizes the current lifecycle activities outlined as current practice within each asset category. The condition and annual investment were then determined.

The table below summarizes the results of each asset category and overall.

Table 7: Scenario 3 Current Lifecycle Activities Summary

Asset Category	Projected Average Condition in 2055	Projected Average Annual Funding
Road Network	Good (70%)	$33,038,123
Bridges & Culverts	Very Good (91%)	$5,359,062
Storm Network	Very Good(90%)	$2,407,405
Buildings	Good (68%)	$5,740,839
Land Improvements	Good (78%)	$6,678,139
Vehicles	Very Good (81%)	$5,223,105
Machinery & Equipment	Very Good (84%)	$5,216,547
Overall	**Good (75%)**	**$63,663,219**

Sustaining current lifecycle activities will lead to improvements in the average condition service levels across all asset categories.

Public Engagement

Haldimand County is committed to ensuring citizen satisfaction, with public engagement playing a key role in achieving its strategic goals. Resident feedback is regularly incorporated into planning and development processes, supported by initiatives such as the Strategic Plan development. Insights from the 2024 Resident Satisfaction Survey—building on the 2022 survey—as well as public engagement activities related to the Cayuga Master Servicing Plan (2025 and ongoing), the 2024 Community Recreation and Facilities Study, and the 2023–2026 Customer Service Strategy, among others, have been instrumental in identifying and addressing community priorities.

Summary

Haldimand County is adopting a strategic approach to ensure the long-term sustainability of its municipal services by focusing on the condition of the infrastructure that supports them. This strategy balances service quality with cost-efficiency, helping to avoid unsustainable over-investment while continuing to meet the needs of the community.

As part of this effort, Haldimand is enhancing the accuracy of its asset management system, which is critical for informed capital planning and sustainable long-term decision-making.

By targeting Scenario 2—which aims to maintain infrastructure in its current condition—Haldimand is setting a prudent financial goal that supports responsible stewardship of its assets. This approach reinforces Haldimand’s commitment to delivering sustainable, resilient municipal services while maintaining fiscal responsibility and accountability to residents.

Sustaining this standard ensures that critical assets continue to perform effectively and efficiently over time, reducing the risk of costly emergency repairs and minimizing service disruptions.

Financial Management

Financial Strategy

Each year, Haldimand County makes important investments in its infrastructure's maintenance, renewal, rehabilitation, and replacement to ensure assets remain in a state of good repair. However, spending needs specifically in recent years, have exceeded fiscal capacity. In fact, most municipalities continue to struggle with annual infrastructure deficits. Achieving full-funding for infrastructure programs will take many years and should be phased-in gradually to reduce burden on the community.

This financial strategy is designed for Haldimand County's existing asset portfolio and is premised on two key inputs: the average annual capital requirements and the average annual funding typically available for capital purposes. The annual requirements are based on the replacement cost of assets and their serviceable life, and where available, lifecycle modeling. This figure is calculated for each individual asset and aggregated to develop category-level values.

The annual funding typically available is determined by the budgeted allocations to reserves for capital purposes. For Haldimand, the approved 2025 values were used to project available funding.

Only reliable and predictable sources of funding are used to benchmark funds that may be available on any given year. The funding sources include:

- Revenue from taxation allocated to reserves for capital purposes
- Revenue from water and wastewater rates allocated to capital reserves
- The Canada Community Building Fund (CCBF), formerly the federal Gas Tax Fund
- The Ontario Community Infrastructure Fund (OCIF)
- Cost sharing with partners based on executed agreements

Although provincial and federal infrastructure programs can change with evolving policy, CCBF, and OCIF are considered permanent and predictable.

Through the development of proposed levels of service, Haldimand County has established a long-term target of maintaining its infrastructure in its current condition.

Annual Capital Requirements

The annual requirements represent the amount Haldimand should allocate annually to each asset category to meet replacement needs as they arise, prevent infrastructure backlogs, and achieve long-term sustainability.

As part of its proposed level of service analysis, Haldimand assessed the annual funding requirements needed to maintain the current condition of its existing infrastructure (excluding water and sanitary infrastructure). The analysis identified an estimated annual requirement of $46.3 million to sustain infrastructure assets over the long term.

Table 8 outlines the forecasted average annual requirements for existing assets in each asset category to maintain the proposed level of service.

Table 8: Average Annual Capital Requirements to Maintain Current Condition

Asset Category	Current Average Condtion	Annual Capital Requirements
Road Network	Good (64%)	$25,865,982
Bridges & Culverts	Good (72%)	$5,157,799
Storm Network	Good (61%)	$1,737,110
Buildings	Good (64%)	$3,997,503
Land Improvements	Fair (52%)	$3,431,563
Vehicles	Fair (53%)	$3,198,376
Machinery & Equipment	Fair (48%)	$2,887,285
Total	**Good (63%)**	**$46,275,618**

Current Funding Levels

Table 9 summarizes how current funding levels compare with funding required for each asset category. At existing levels, Haldimand is funding 62% of its annual capital requirements for all infrastructure analysed. This creates a total annual funding deficit of $17.4 million.

Table 9: Current Funding Position vs Required Funding to Maintain Current Condition

Asset Category	Annual Capital Requirements	Annual Funding Available	Annual Infrastructure Deficit
Road Network	$25,865,982	$13,159,137	$12,782,025
Bridges & Culverts	$5,157,799	$4,590,262	$567,537
Storm Network	$1,737,110	$659,070	$1,078,040
Buildings	$3,997,503	$2,536,847	$1,175,910
Land Improvements	$3,431,563	$1,833,908	$1,597,655
Vehicles	$3,198,376	$4,071,960	$(873,584)
Machinery & Equipment	$2,887,285	$2,027,228	$860,057
Total	**$46,275,618**	**$28,878,410**	**$17,397,208**

Closing the Gap

Eliminating annual infrastructure funding shortfalls is a difficult and long-term endeavour for municipalities. Considering Haldimand County's current funding position, it will require many years to reach full funding for current assets.

This section outlines how Haldimand County can close the annual funding deficits using own-source revenue streams, i.e., property taxation and utility rates, and without the use of additional debt for existing assets.

Full Funding Requirements

In 2025, Haldimand County's estimated annual tax levy is $92,200,590. Without consideration of any other sources of revenue or cost containment strategies, full funding would require a 18.9% tax change over time. Haldimand County currently has an approved 1.25% capital levy which if increased by 0.5% the County will reach full funding in approximately 10 years.

While shorter phase-in periods may place too high a burden on taxpayers, a phase-in period beyond 20 years may see a continued deterioration of infrastructure, leading to larger backlogs. Several scenarios have been developed using phase-in periods ranging from five to twenty years while also including the already approved 1.25%.

Funding 100% of annual capital requirements ensures that major capital events, including replacements, are completed as required. Under this scenario, projects are unlikely to be deferred to future years. This delivers the highest asset performance and customer levels of service.

Table 10: Phasing in an Increase to Tax Revenue

Phase In Period	5 Years	10 Years	15 Years
*% Increase in Annual Taxation	3.5%	1.75%	1.25%

*Note this is the increased amount inclusive of the already approved increase of 1.25%

Estimated Growth Financial Requirements

Haldimand County is committed to responsible long-term planning to ensure services remain affordable and sustainable as the community grows. To support this, Haldimand regularly reviews its operating and capital programs through detailed financial analysis.

As part of the ongoing Development Charges Background Study, new capital projects are being proposed to support future growth. These projects will increase Haldimand County's annual operating costs, but careful planning ensures these impacts are managed responsibly. Once the study is complete, all financial impacts will be integrated into Haldimand County's asset management program to support informed decision-making and long-term sustainability.

Ten-Year Financial Plan

This is the projection out of Haldimand County's asset management program based on the proposed level of service Scenario 2 – maintaining current average condition.

Asset Category /Fund	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Bridges & Culverts	**$4.3m**	**$5.9m**	**$3.4m**	**$6.3m**	**$4.4m**	**$5.1m**	**$5.5m**	**$3.7m**	**$5.0m**	**$3.2m**
Development Charges	-	-	-	$1.3m	-	-	-	-	-	-
Grants/Subsidies	$3.7m	$5.3m	$2.7m	$4.4m	$3.7m	$4.5m	$4.7m	$3.0m	$4.2m	$2.5m
Reserve Funds	$622.1k	$569.4k	$671.6k	$598.4k	$688.8k	$628.9k	$741.7k	$660.8k	$760.6k	$694.4k
Buildings	**$3.0m**	**$4.5m**	**$12.9m**	**$8.7m**	**$6.7m**	**$1.3m**	**$892k**	**$1.2m**	**$844k**	**$832k**
Community Vibrancy	$24.0k	-	-	-	-	-	-	-	-	-
Debentures	-	$910.2k	$9.5m	$6.6m	$6.0m	-	-	-	-	-
Development Charges	-	$178.7k	$1.6m	-	-	-	-	$30.3k	-	-
External Financing	-	-	-	-	-	-	-	-	$24.0k	-
Grants/Subsidies	$361.6k	$1.6m	$197.7k	$259.1k	-	-	-	-	-	-
Reserve Funds	$2.6m	$1.9m	$1.6m	$1.8m	$716.0k	$1.3m	$892.2k	$1.2m	$820.1k	$832.1k
Land Improvements	**$4.8m**	**$5.2m**	**$2.4m**	**$2.4m**	**$1.2m**	**$2.6m**	**$950k**	**$1.9m**	**$1.1m**	**$1.2m**
External Financing	$282.3k	$150.2k	$1.0m	$258.6k	$276.9k	$917.4k	$86.8k	$204.1k	$143.4k	$45.5k
Grants/Subsidies	$1.7m	$3.6m	$89.6k	$1.1m	$87.6k	$367.2k	$48.1k	$697.8k	$89.7k	$15.7k
Reserve Funds	$2.8m	$1.4m	$1.3m	$1.0m	$880.3k	$1.3m	$814.6k	$953.1k	$895.3k	$1.1m
Machinery & Equipment	**$6.1m**	**$4.8m**	**$5.2m**	**$3.4m**	**$3.4m**	**$4.0m**	**$3.1m**	**$3.2m**	**$3.4m**	**$3.0m**
Development Charges	$20.7k	$21.4k	$21.5k	$22.2k	$22.9k	$23.6k	$24.3k	$24.3k	$25.0k	$25.7k
External Financing	$167.6k	$68.9k	$53.3k	$52.7k	$92.9k	$53.9k	$79.2k	$56.6k	$55.8k	$56.5k
Grants/Subsidies	$473.9k	$1.3m	$689.5k	$84.5k	$85.6k	$134.2k	-	-	$44.0k	-
Reserve Funds	$5.4m	$3.4m	$4.4m	$3.2m	$3.2m	$3.8m	$3.0m	$3.1m	$3.3m	$2.9m
Road Network	**$14.1m**	**$13.7m**	**$14.0m**	**$11.9m**	**$12.1m**	**$11.5m**	**$13.3m**	**$13.0m**	**$12.9m**	**$13.4m**
Community Vibrancy	$74.0k	-	-	-	-	-	-	-	-	-
Development Charges	$211.5k	$160.0k	$275.0k	$316.0k	-	-	-	-	-	-
External Financing	-	-	-	-	-	$307.5k	-	-	-	-
Grants/Subsidies	$5.0m	$3.2m	$1.1m	$4.8m	$1.5m	$4.6m	$4.2m	$5.9m	$7.2m	$8.6m
Reserve Funds	$8.8m	$10.3m	$12.6m	$6.8m	$10.6m	$6.6m	$9.1m	$7.1m	$5.6m	$4.8m
Sanitary Network	**$3.1m**	**$10.0m**	**$34.3m**	**$3.5m**	**$7.3m**	**$4.9m**	**$2.3m**	**$2.8m**	**$28.9m**	**$1.5m**
Development Charges	$690.8k	$7.0m	$32.9m	$549.8k	$1.4m	$1.0m	$243.0k	$247.2k	$25.4m	$220.6k
Reserve Funds	$2.4m	$3.0m	$1.4m	$2.9m	$5.9m	$3.8m	$2.0m	$2.5m	$3.5m	$1.3m

Asset Category /Fund	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Stormwater Network	**$463k**	**$1.1m**	**$652k**	**$250k**	**$810k**	**$262k**	**$250k**	**$257k**	**$263k**	**$290k**
Development Charges	-	-	-	$17.4k	$35.7k	$18.3k	-	-	-	$20.2k
Reserve Funds	$463.1k	$1.1m	$652.1k	$232.1k	$774.1k	$244.0k	$250.2k	$256.5k	$263.1k	$269.6k
Vehicles	**$5.0m**	**$4.0m**	**$7.4m**	**$4.9m**	**$2.4m**	**$10.8m**	**$6.1m**	**$3.4m**	**$5.4m**	**$3.6m**
Development Charges	$860.0k	$1.4m	-	-	-	-	-	-	-	-
Reserve Funds	$4.1m	$2.6m	$7.4m	$4.9m	$2.4m	$10.8m	$6.1m	$3.4m	$5.4m	$3.6m
Water Network	**$7.8m**	**$13.1m**	**$4.3m**	**$4.5m**	**$3.3m**	**$9.9m**	**$2.7m**	**$2.2m**	**$10.5m**	**$4.8m**
Development Charges	$1.6m	$7.4m	$57.2k	$2.1m	$159.2k	$2.1m	$135.6k	$256.1k	$3.5m	$408.4k
External Financing	$2.3m	$1.2m	$598.6k	$374.2k	$217.8k	$995.2k	$97.5k	$100.0k	$151.4k	$105.4k
Grants/Subsidies	$993.5k	$1.8m	$2.1m	$1.1m	$1.0m	$627.8k	-	-	-	-
Reserve Funds	$2.9m	$2.7m	$1.5m	$928.9k	$1.9m	$6.2m	$2.5m	$1.8m	$6.8m	$4.3m
Water & Sanitary Rate Total	**$6.3m**	**$7.5m**	**$5.0m**	**$4.9m**	**$8.9m**	**$10.7m**	**$4.5m**	**$4.3m**	**$10.3m**	**$5.6m**
Tax Funded Total	**$27.8m**	**$31.0m**	**$18.7m**	**$19.4m**	**$19.8m**	**$12.7m**	**$17.6m**	**$19.5m**	**$17.8m**	**$18.2m**
Proposed Tax Capital Funding	$28.9m	$30.4m	$31.9m	$33.5m	$35.1m	$36.7m	$38.3m	$40.0m	$41.7m	$43.4m

The current 10-year capital program requires $203 million in tax funding, while the proposed available funding totals $359.8 million. This means Haldimand County is on track to meet its annual funding targets within the 10-year period. Not only will Haldimand be able to fully fund the identified projects, but it will also have additional capacity to support future capital needs.

Recommendations

Under O.Reg. 588/17, Haldimand County must annually review and report on its progress implementing the AM Plan, identifying any factors hindering implementation, and provide a strategy to address those factors.

Financial Strategies

To review the feasibility of adopting a full-funding scenario that achieves 100% of average annual requirements for the asset categories analysed. This involves:

- Implementing an additional 0.25% annual tax increase over a 10-year phase-in period and allocating the full increase in revenue toward capital expenditures
- Complete the water and sanitary rate study and long-term financial strategy and integrate the recommendations into the asset management program
- Continued allocation of OCIF and CCBF funding as previously outlined
- Using risk frameworks and staff judgement to prioritize projects, particularly to aid in elimination of existing infrastructure backlogs

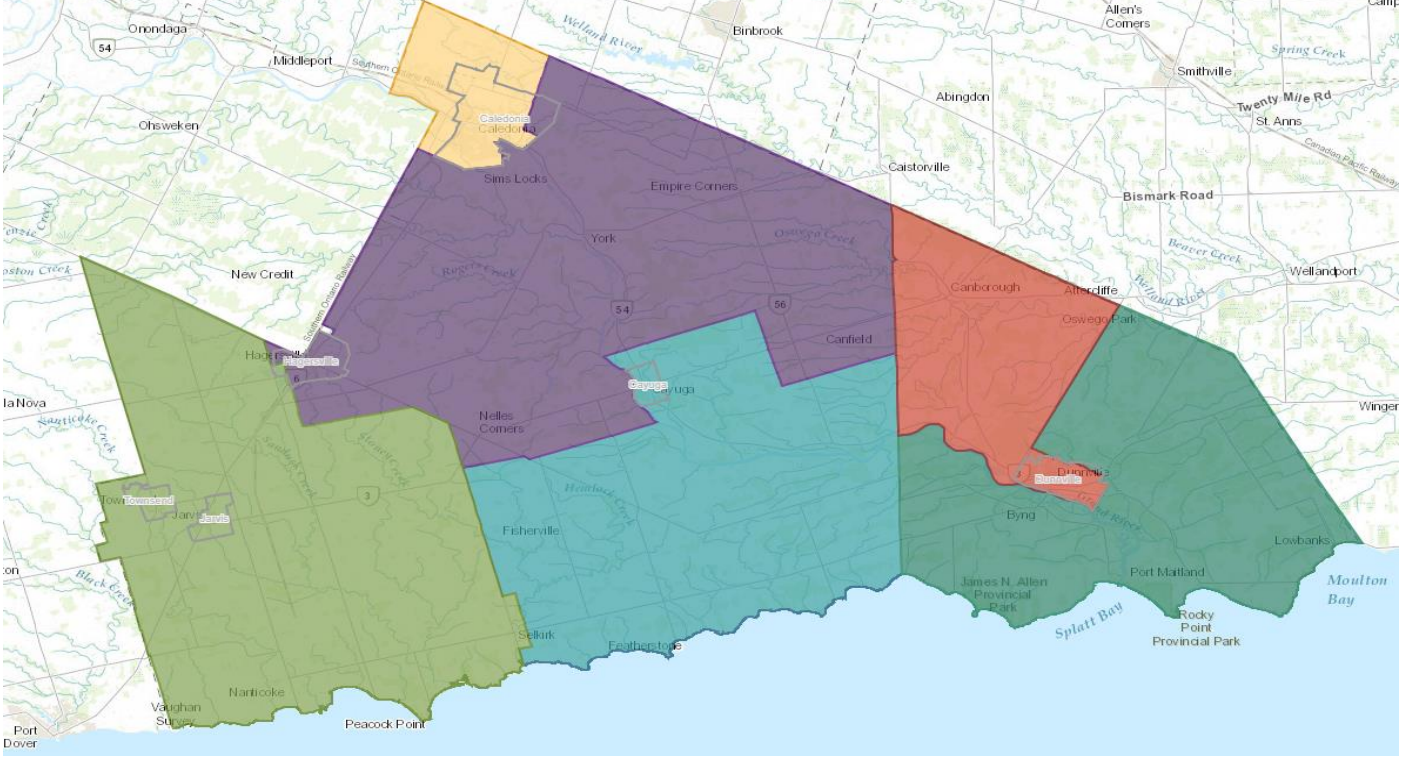
Although difficult to capture, inflation costs, supply chain issues, and fluctuations in commodity prices will also influence capital expenditures.

Asset Data

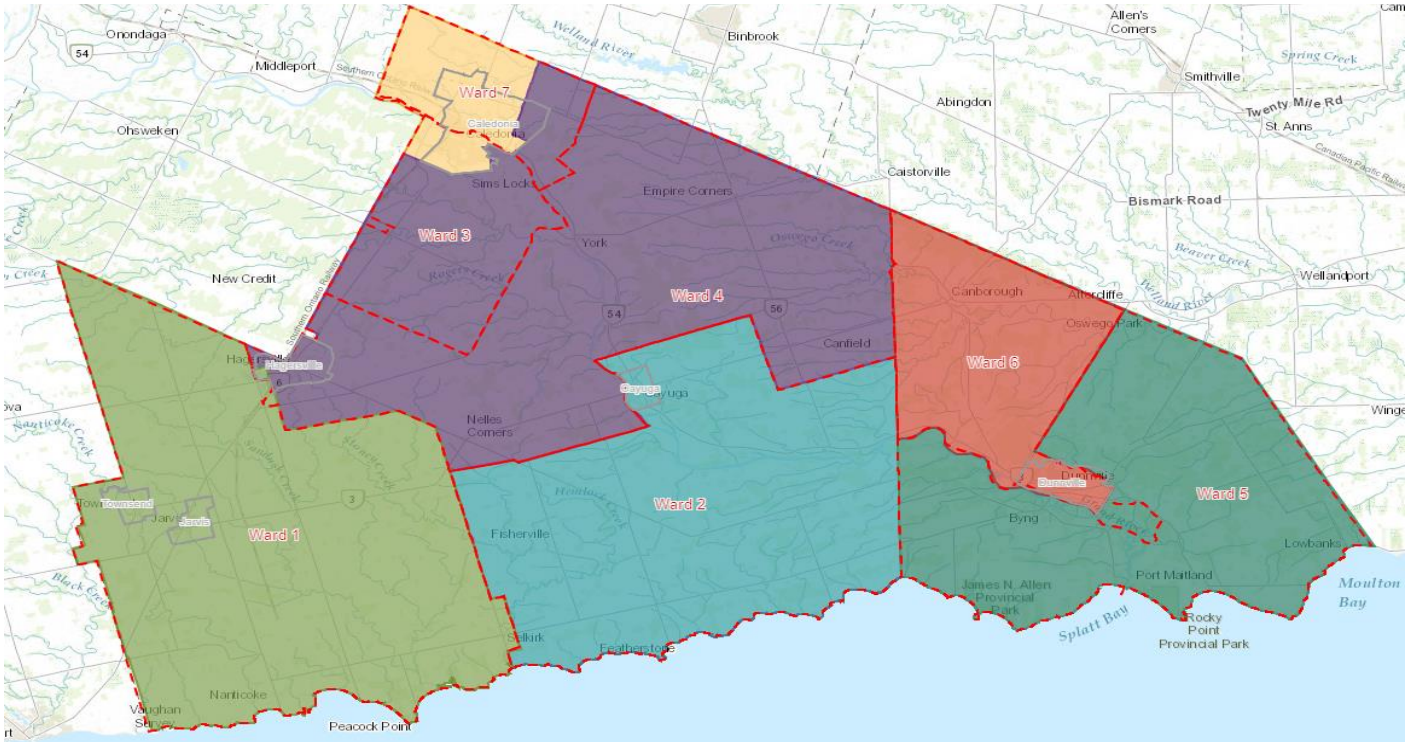
1. Ensure stormwater inventory is complete and includes appurtenances.
2. Componentize facilities data using Uniformat II Code standard for building classifications. This can be accomplished during building condition assessments. This will improve long-term replacement projections and better align system-generated forecasts with capital budgets.
3. Continuously review, refine, and calibrate lifecycle and risk profiles to better reflect actual practices and improve capital projections. In particular:
   - the timing of various lifecycle events, the triggers for treatment, anticipated impacts of each treatment, and costs
   - the various attributes used to estimate the likelihood and consequence of asset failures, and their respective weightings
4. Asset management planning is highly sensitive to replacement costs. Periodically update replacement costs based on recent projects, invoices, or estimates, as well as condition assessments, or any other technical reports and studies.
5. Like replacement costs, an asset's established serviceable life can have dramatic impacts on all projections and analyses, including condition, long-range forecasting, and financial recommendations. Periodically reviewing and updating these values to better reflect in-field performance and staff judgement is recommended.

Risk and Levels of Service

1. Risk models can play an important role in identifying high-value assets and in developing an action plan that may include repair, rehabilitation, replacement, or further evaluation through condition assessments. As a result, project selection and the development of multi-year capital plans can become more strategic and objective. Initial models have been built into Citywide for all asset groups. These models reflect current data, which was limited. As the data evolves and new attribute information is obtained, these models should also be refined and updated.
2. The estimates on the impact of growth should be incorporated into the asset management program once the DC background study is completed.

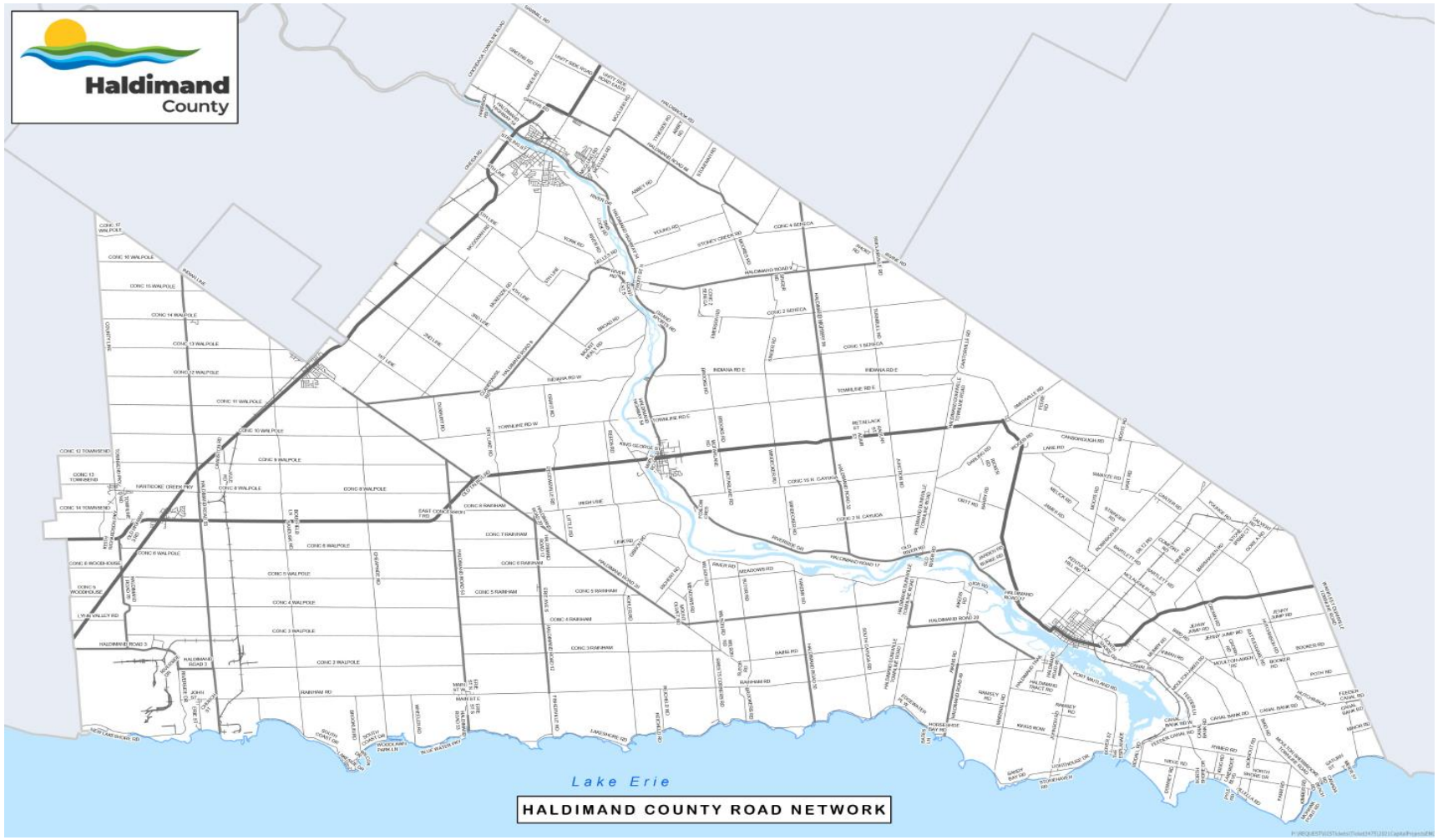


Appendix A: Level of Service Maps

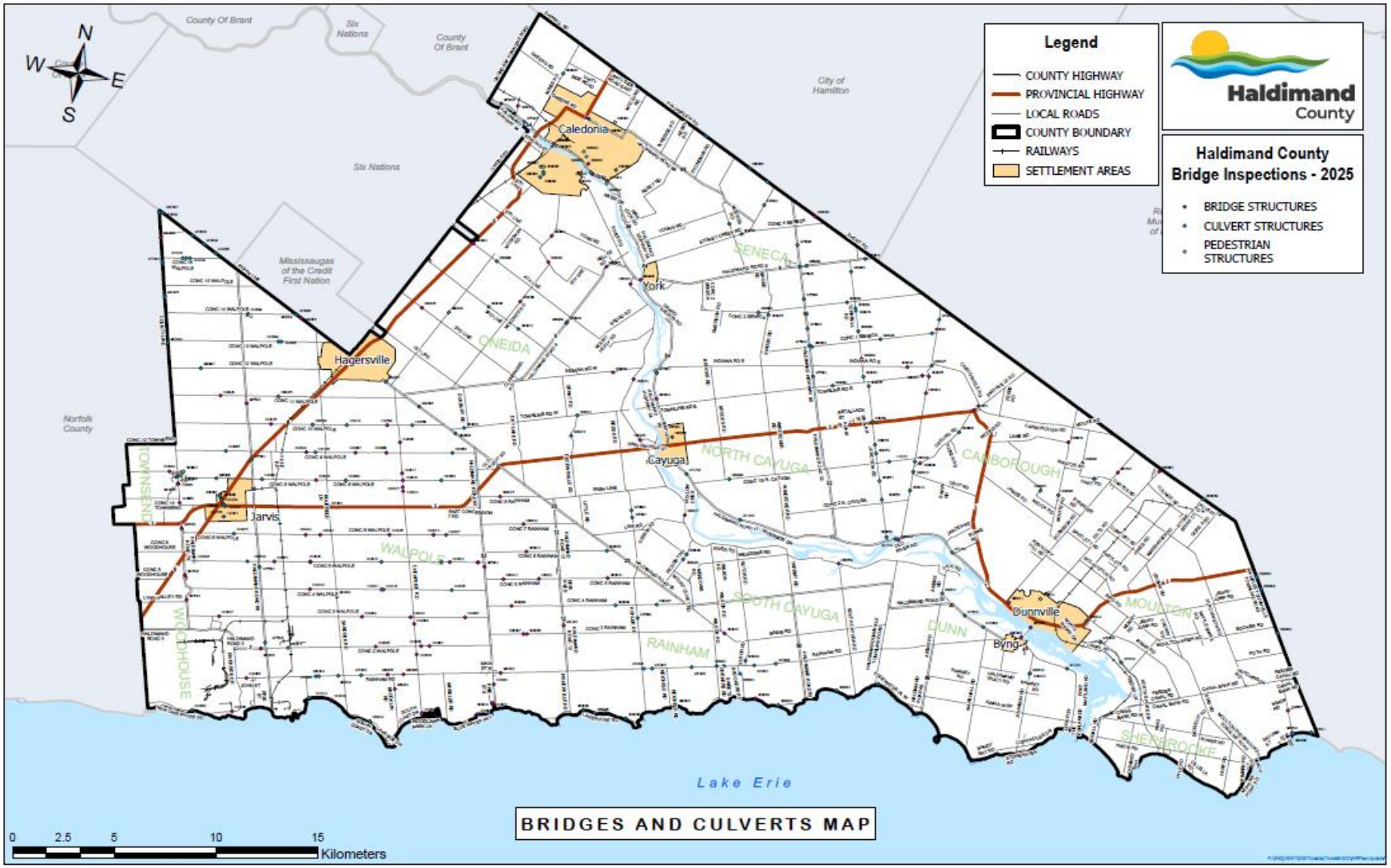


Appendix A: Level of Service Maps

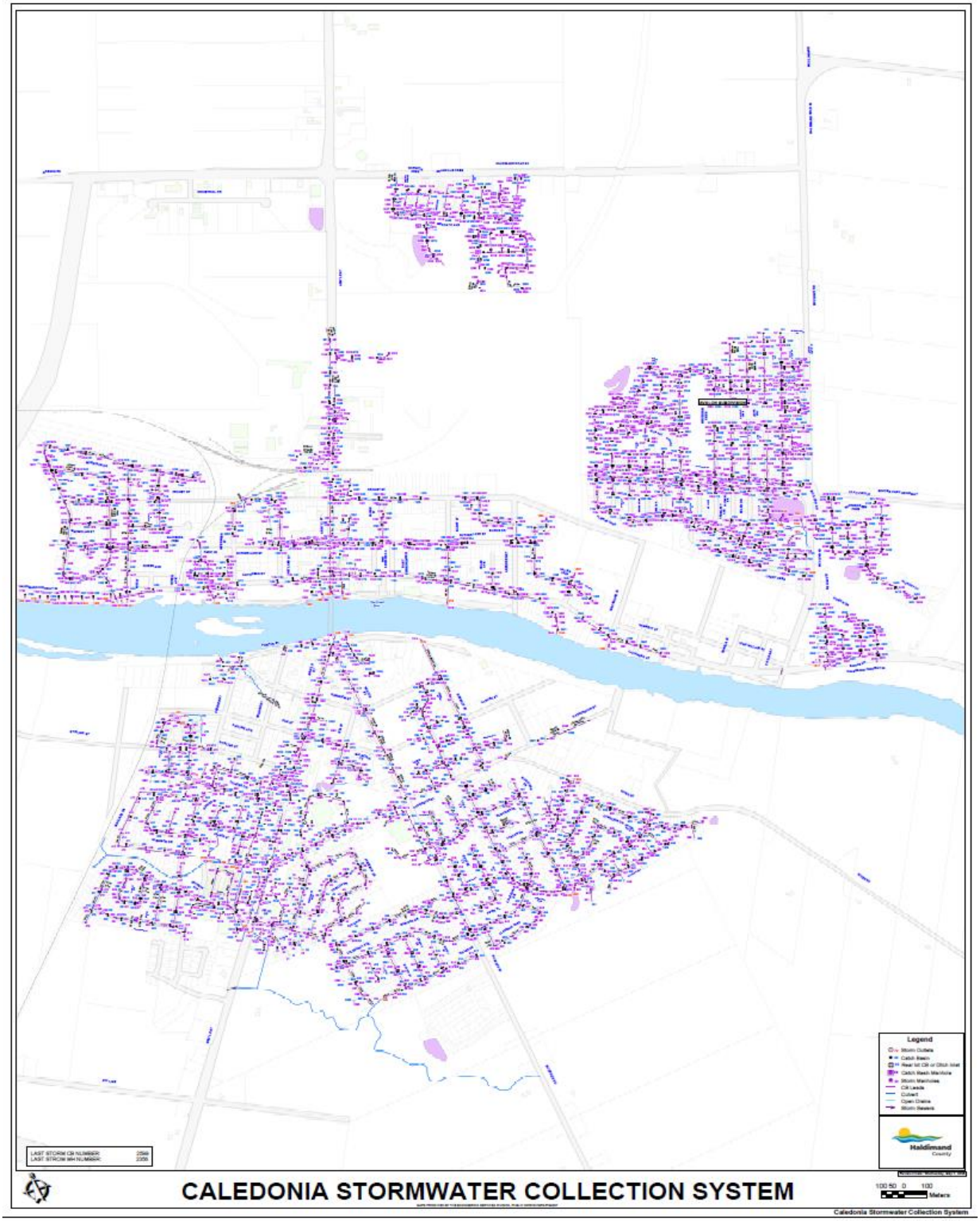
Road Network Maps

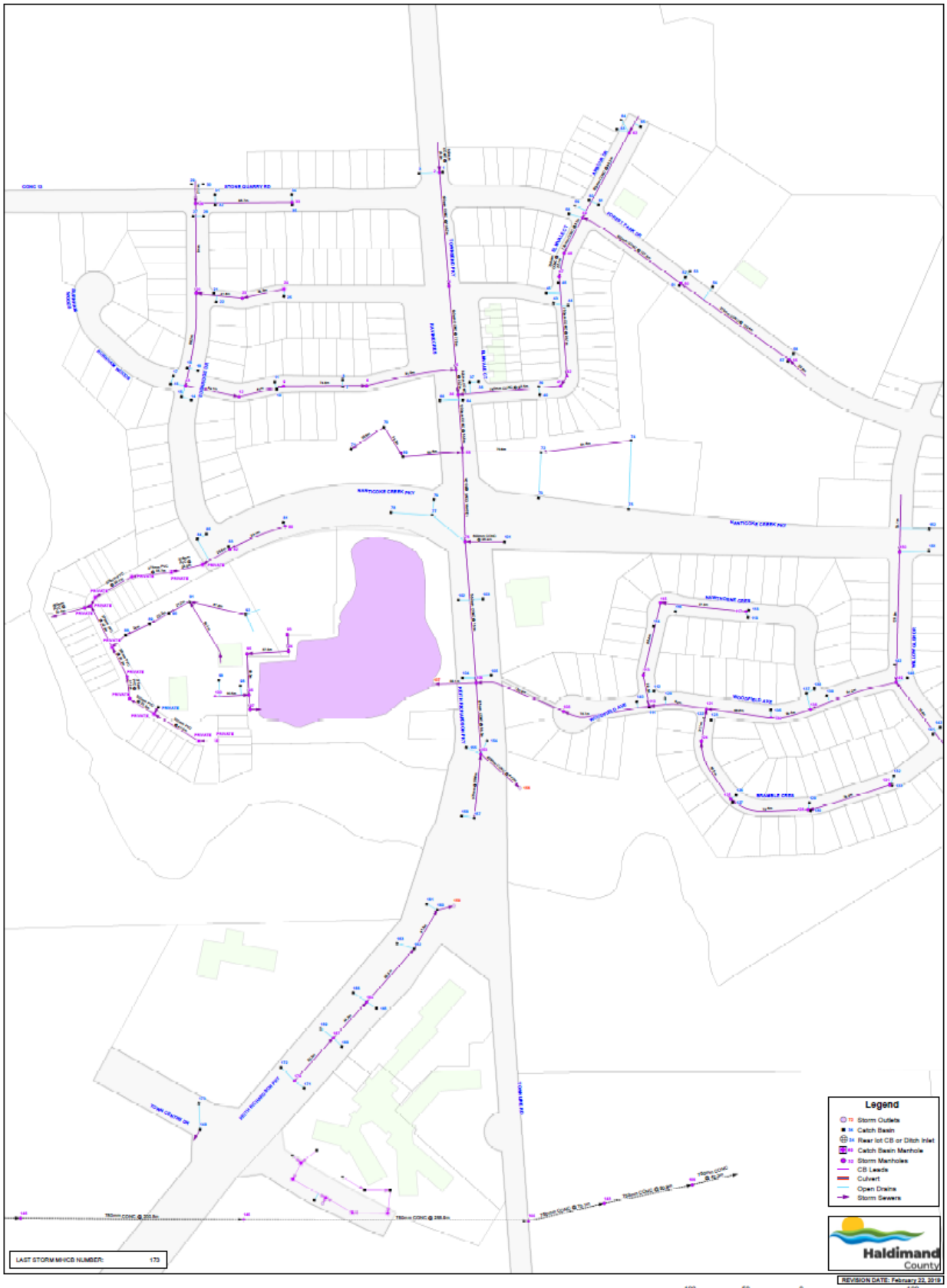


Bridges and Culverts Map



Storm Network Maps



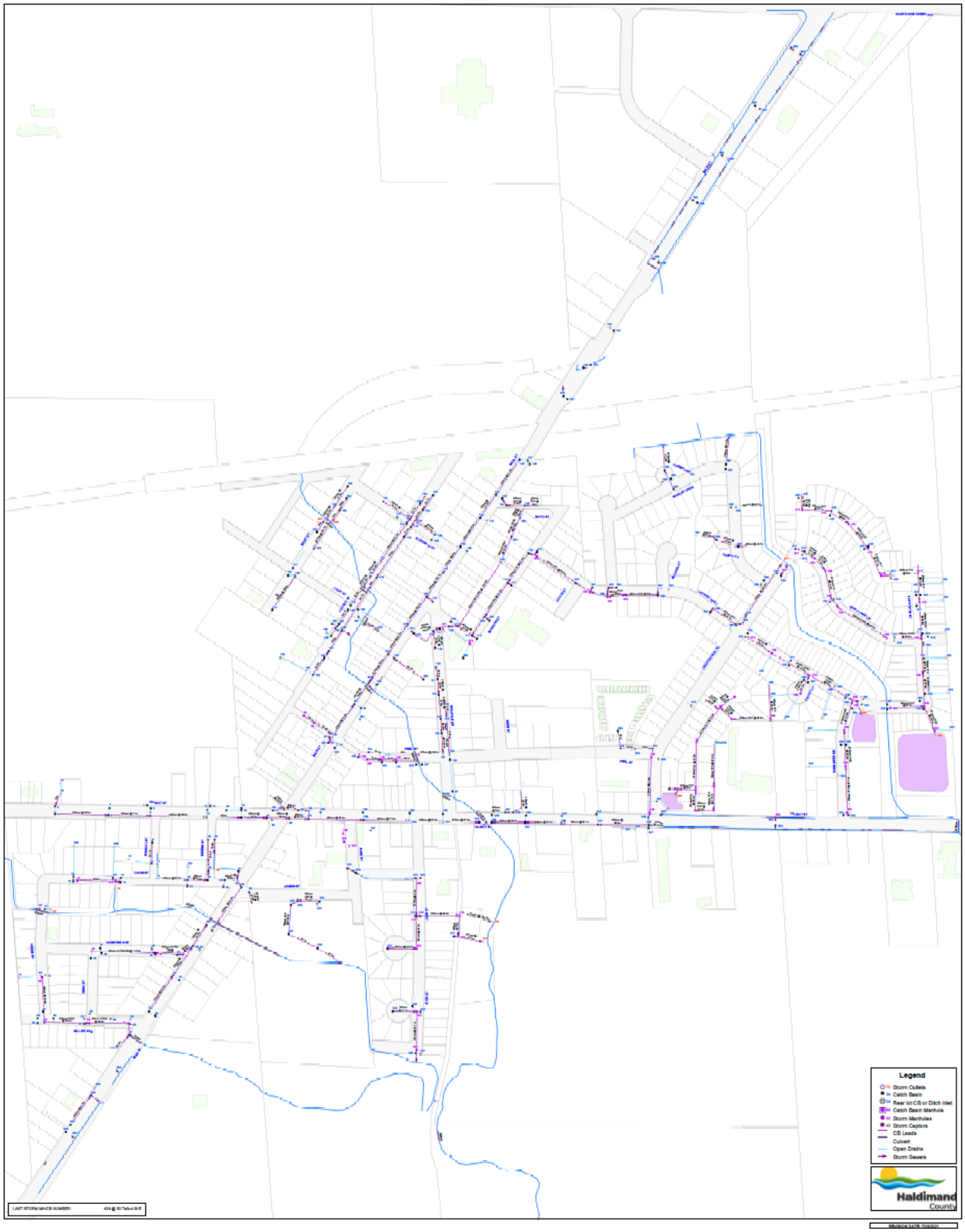


TOWNSEND STORM COLLECTION SYSTEM

MAPS PRODUCED BY THE ENGINEERING SERVICES DIVISION, PUBLIC WORKS DEPARTMENT.

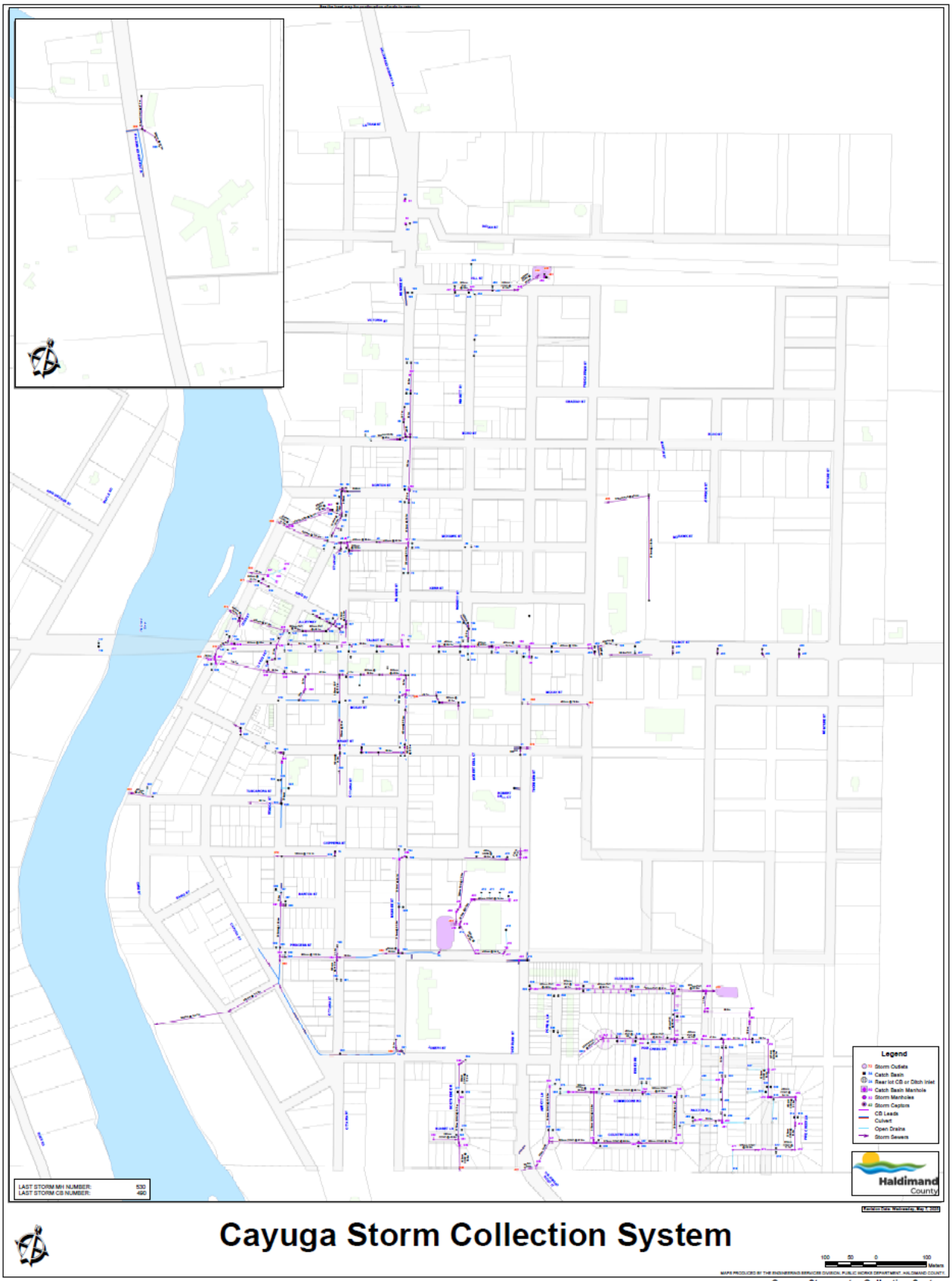
Townsend Stormwater Collection System


COPYRIGHT 2012, THE QUEEN'S PRINTER ONTARIO
LEGEND
Hydrant
Fireline
Diameter n/a
100mm Watermain
150mm Watermain
200mm Watermain
250mm Watermain
300mm Watermain
350mm and up
0 10 20 40 60 80 100 m
PRINT DATE: July 23, 2012
A GRAND EXPERIENCE
HALDIMAND COUNTY
Stormwater Collection Map
CANBOROUGH
147
MAP 147
MAPS PRODUCED BY THE ENGINEERING SERVICES DIVISION, PUBLIC WORKS DEPARTMENT.

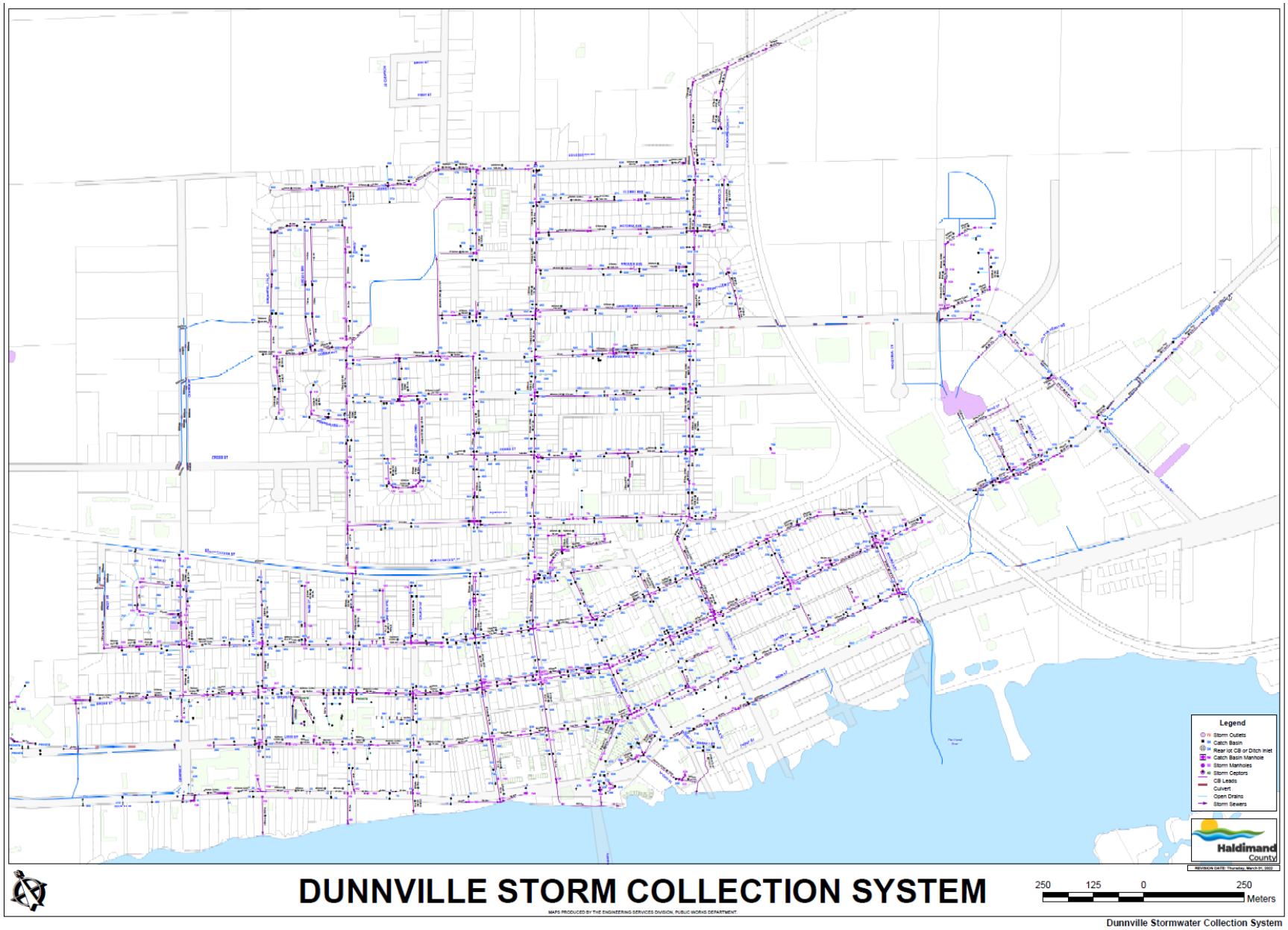


JARVIS STORM COLLECTION SYSTEM

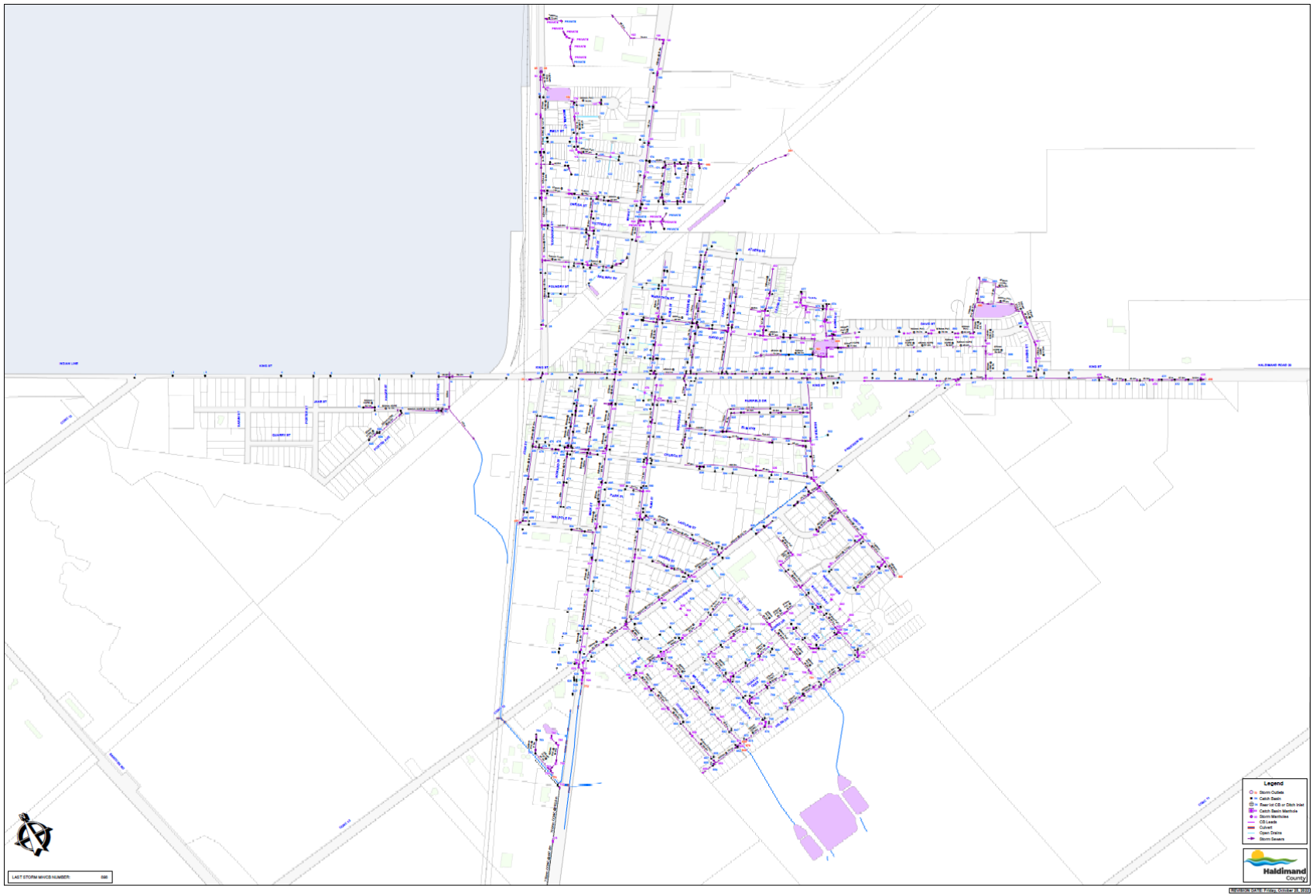
Jarvis Stormwater Collection System



Cayuga Stormwater Collection System



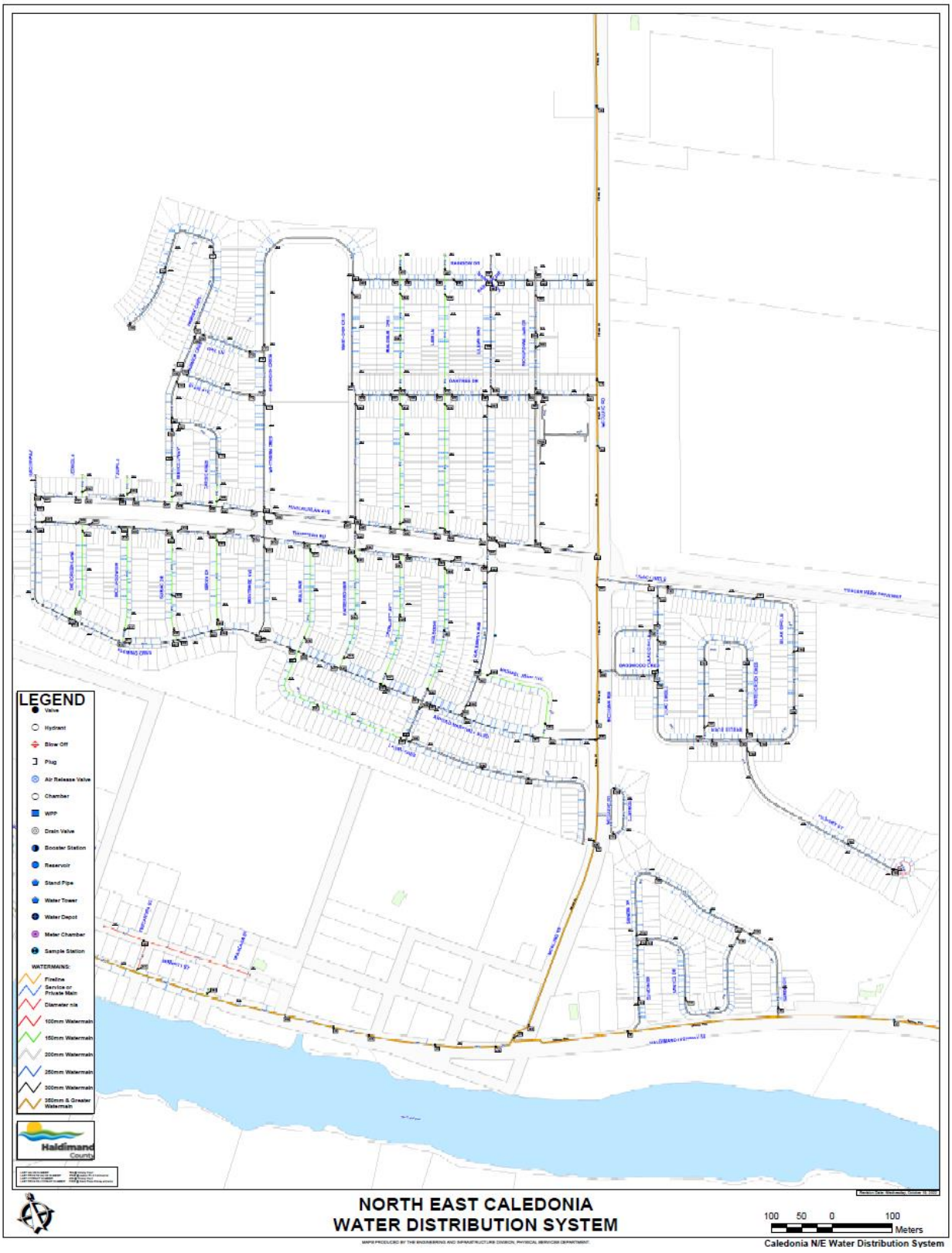
Dunnville Stormwater Collection System

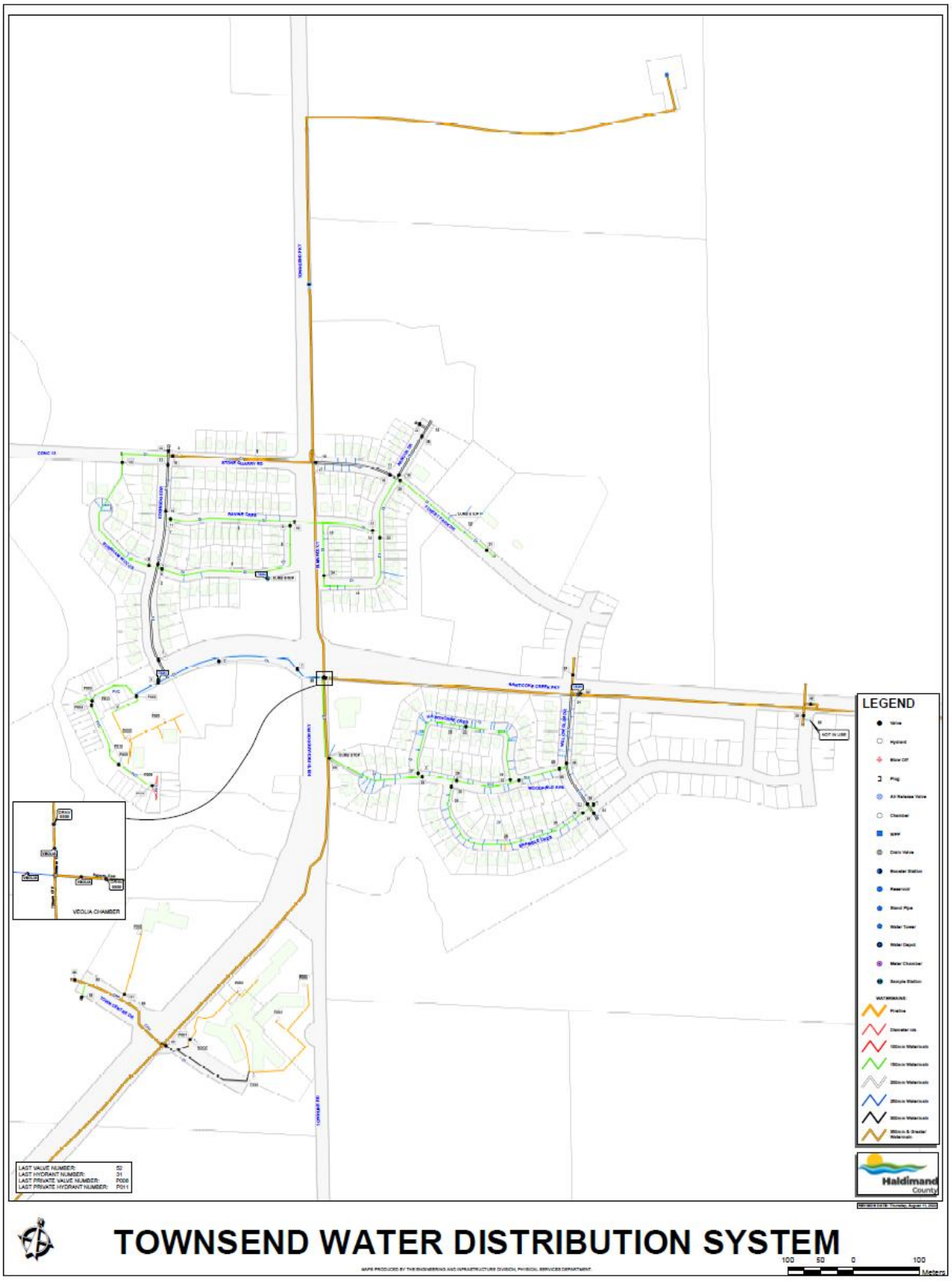


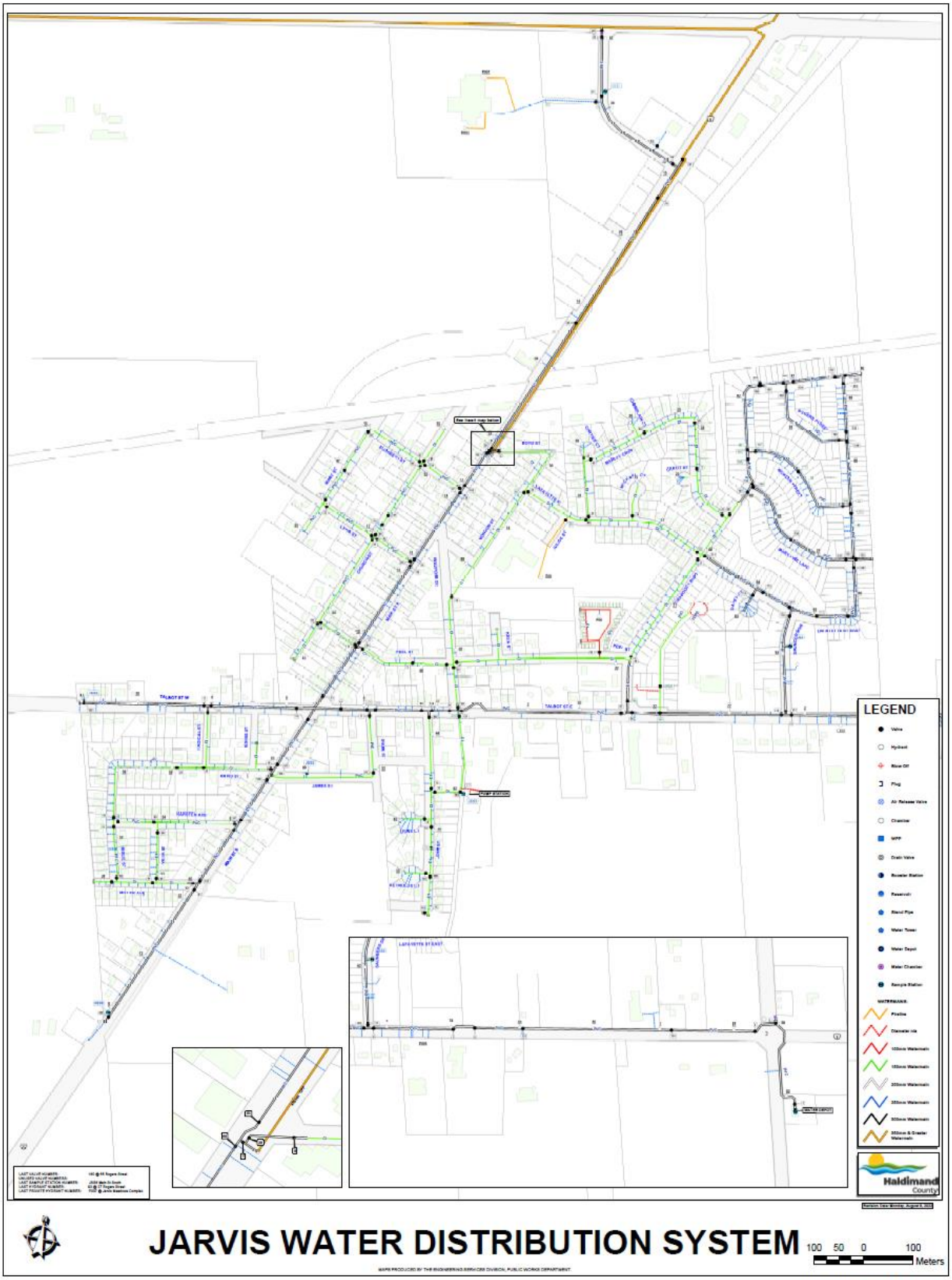
Hagersville Stormwater Collection System


CONC 3
HAWK ST
FIELD RD
HALDIMAND ROAD 3
HALDIMAND ROAD 3
Legend
Storm Outlets
Catch Basin
Rear lot CB or Ditch Inlet
Catch Basin Manhole
Storm Manholes
CB Leads
Culvert
Open Drains
Storm Sewers
Haldimand County
REVISION DATE: April 21, 2020
50 25 0 50
Meters
LAKE ERIE INDUSTRIAL PARK STORM COLLECTION SYSTEM
Lake Erie Industrial Park Stormwater Collection System

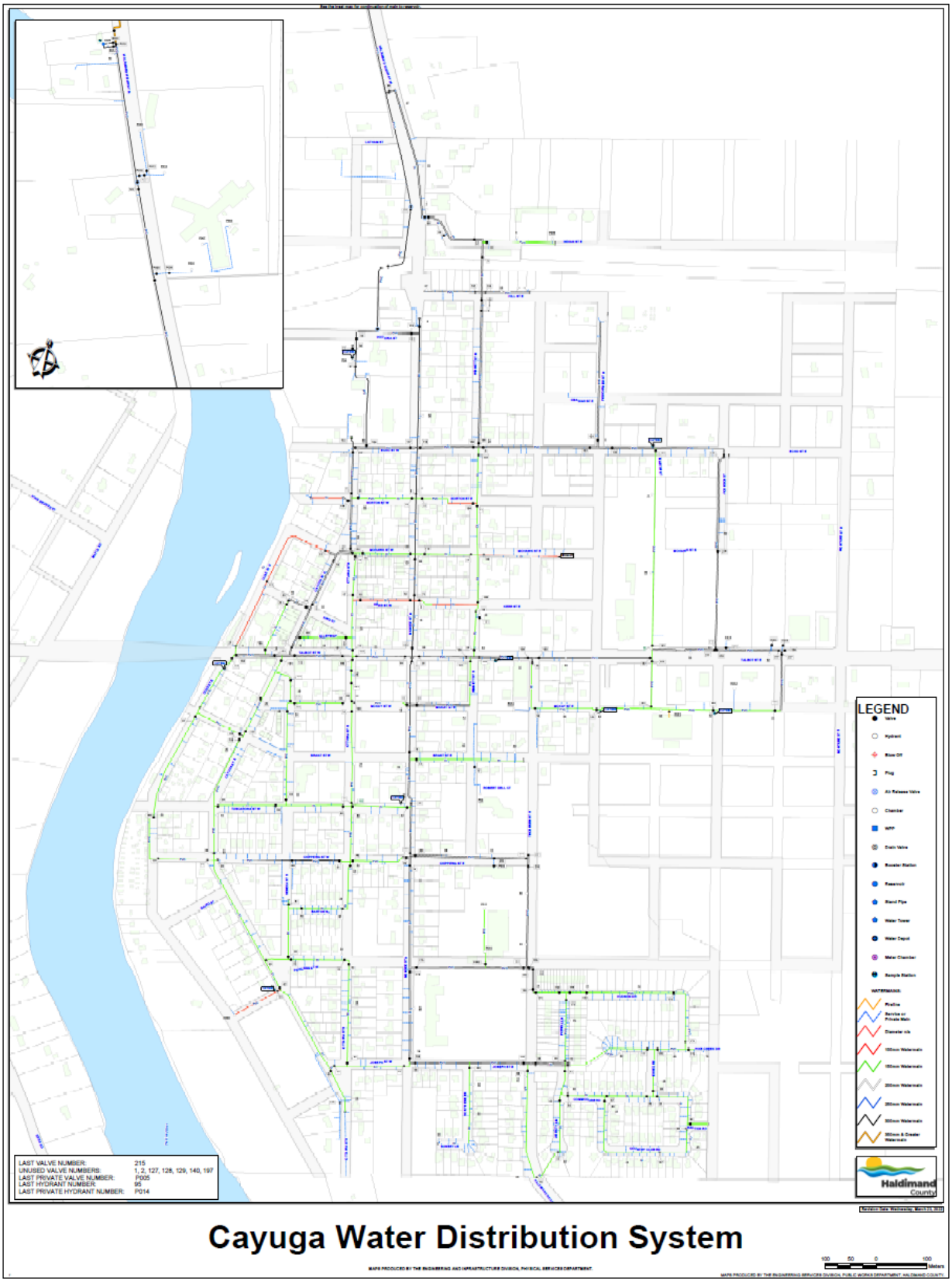
Water Network Maps



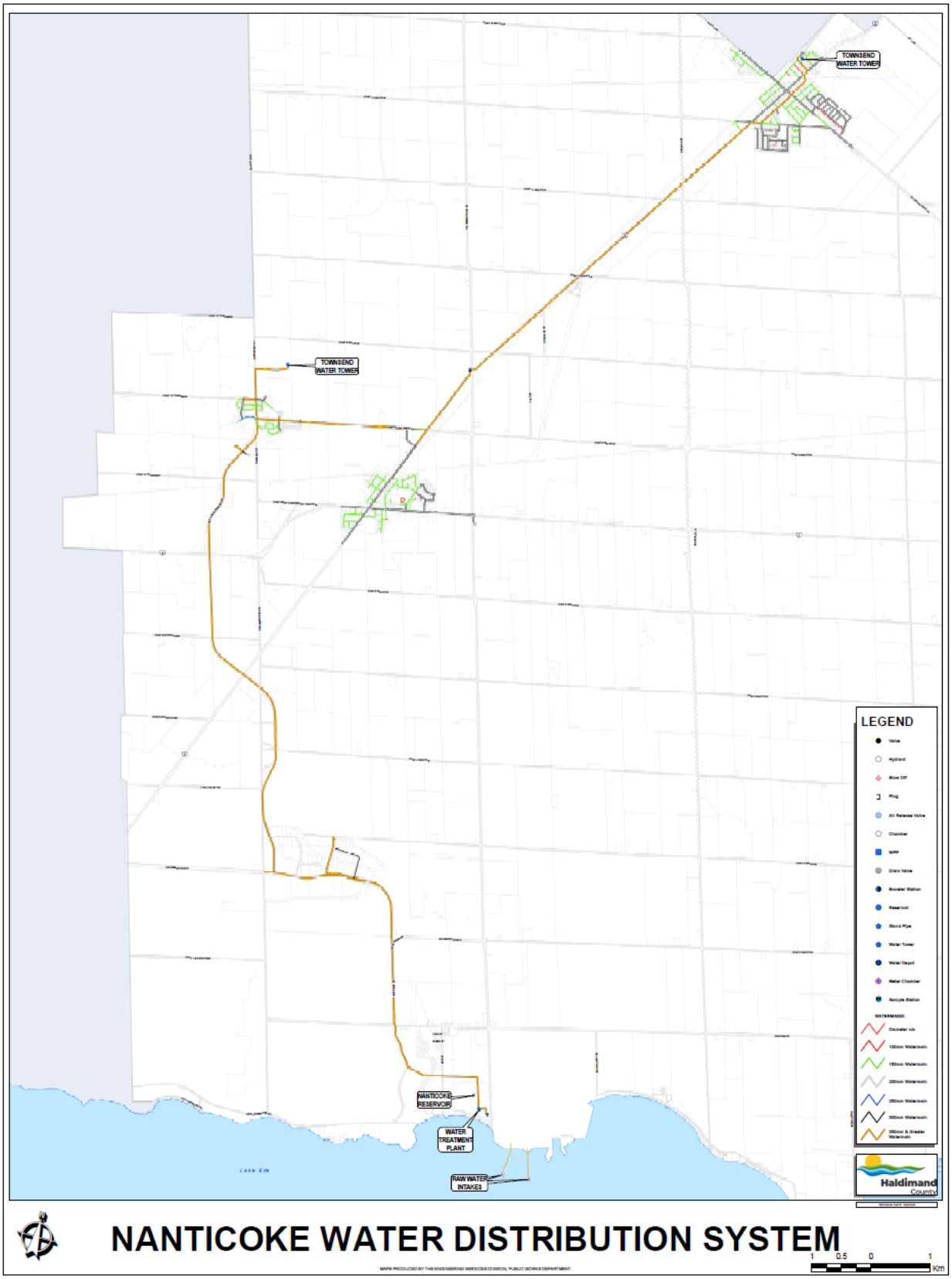

LEGEND
VEOLIA CHAMBER
Haldimand County
TOWNSEND WATER DISTRIBUTION SYSTEM
100 50 0 100
Meters

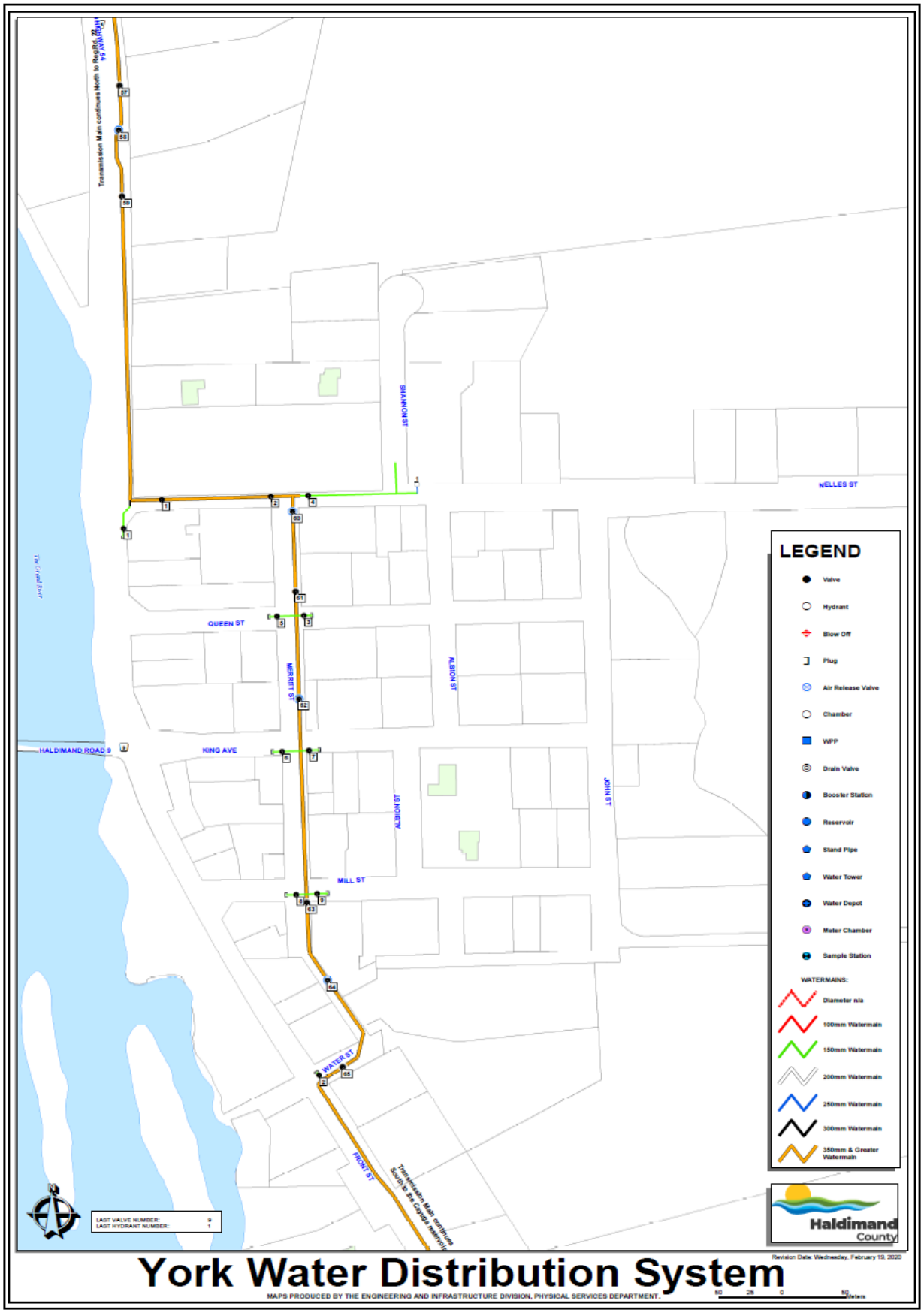


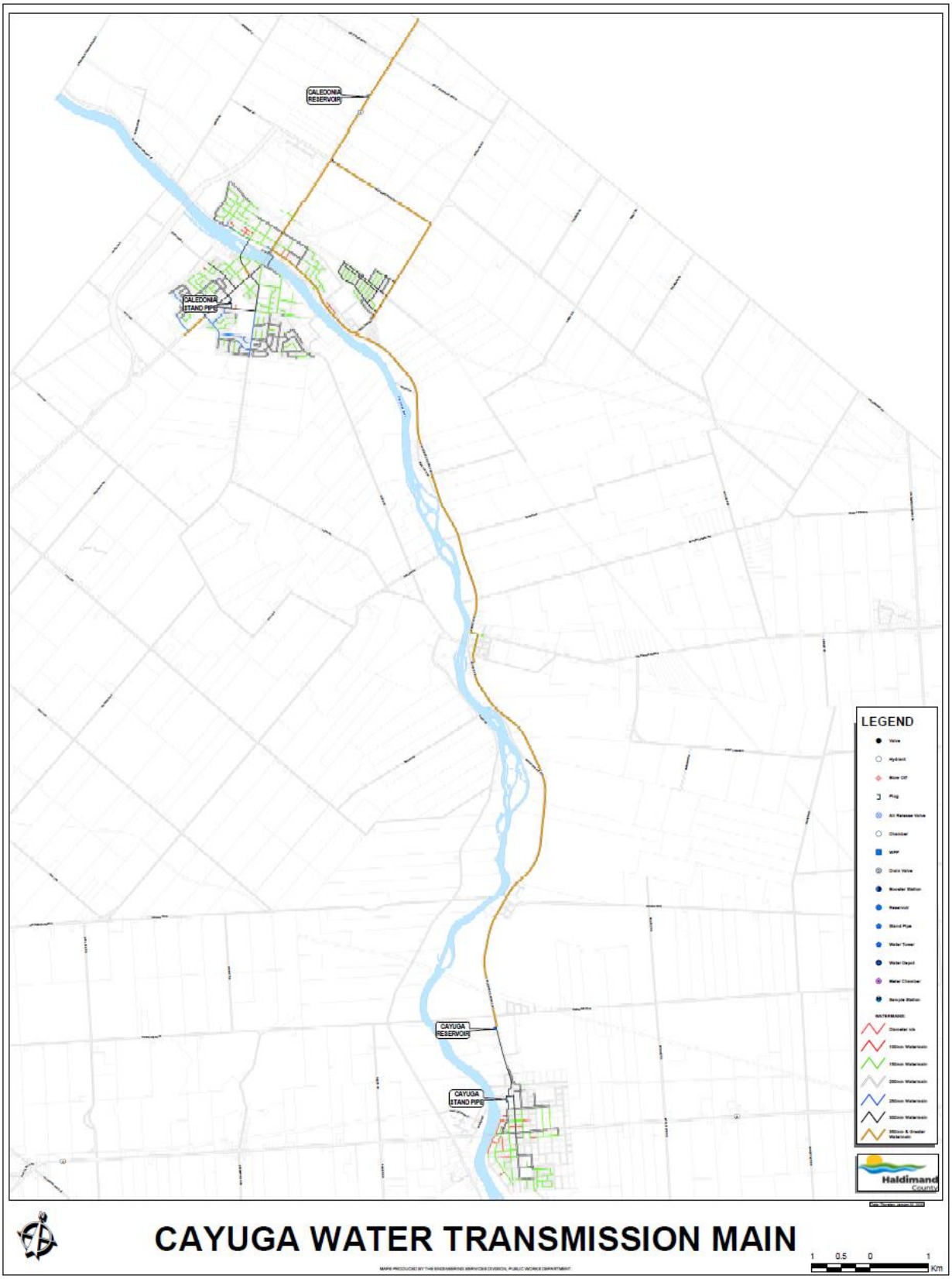
Jarvis Water Distribution System

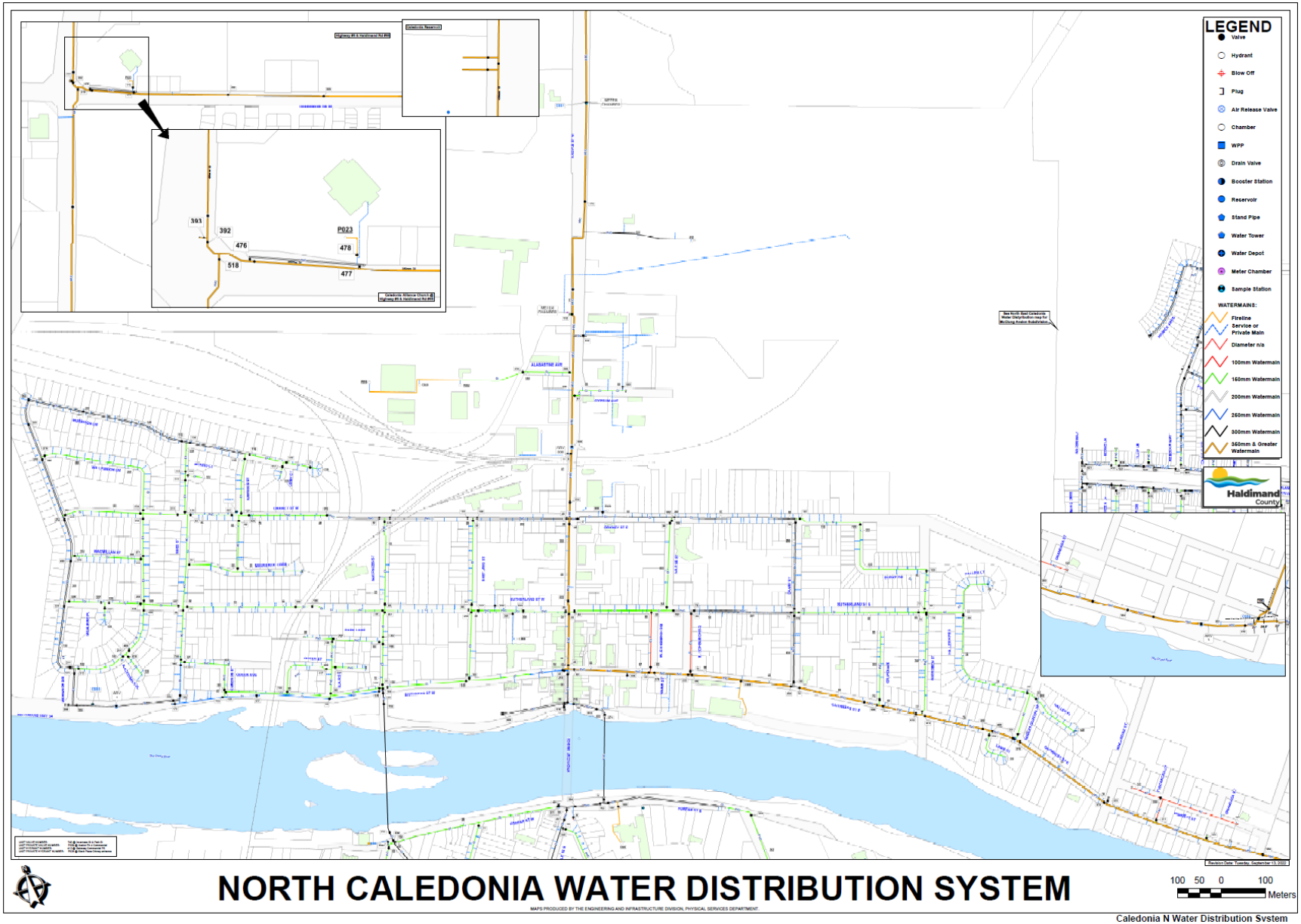


Cayuga Water Distribution System

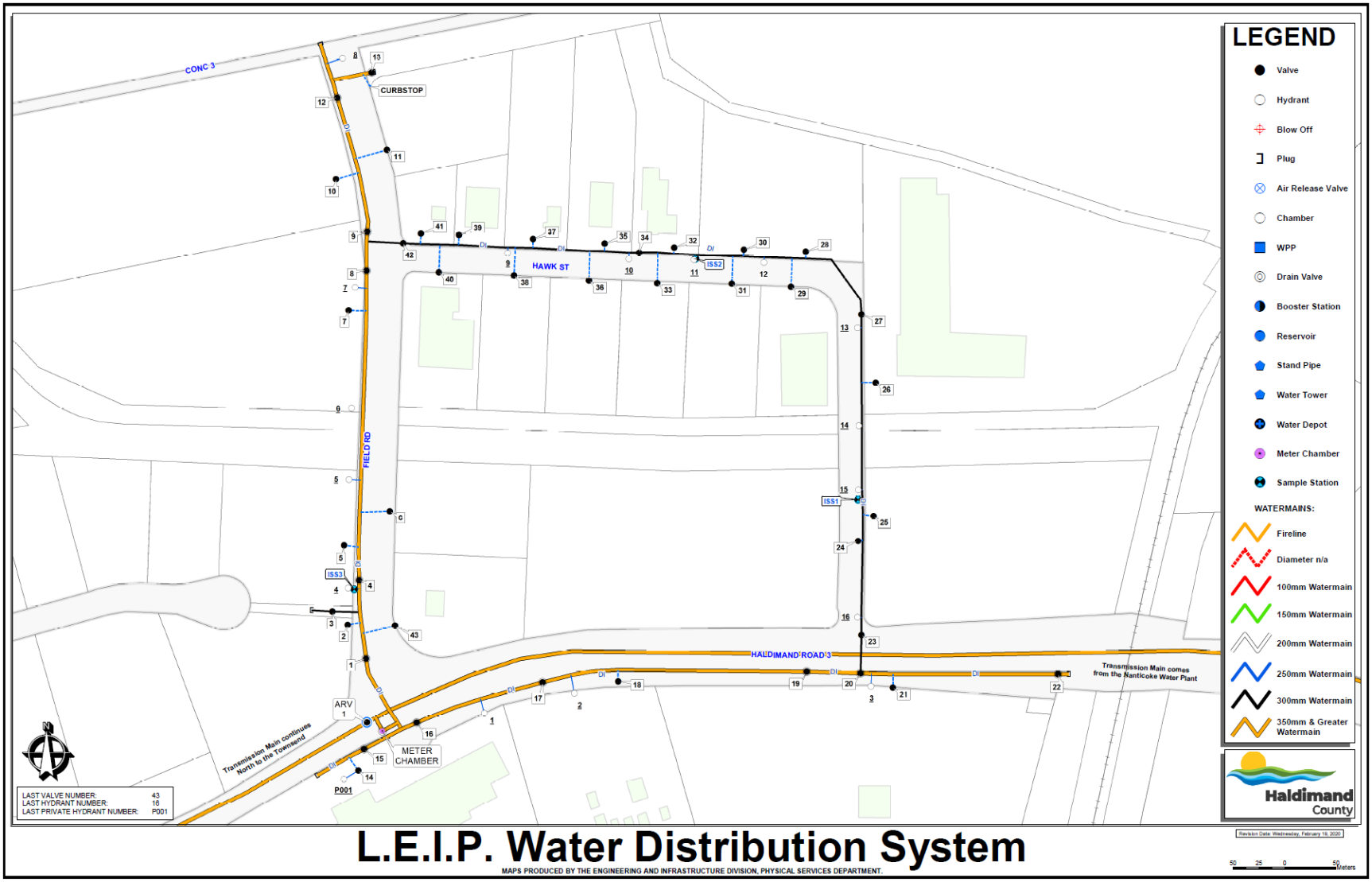

TOWNSEND WATER TOWER
TOWNSEND WATER TOWER
NANTICOKE RESERVOIR
WATER TREATMENT PLANT
RAW WATER INTAKES
LEGEND
Haldimand County
NANTICOKE WATER DISTRIBUTION SYSTEM
1 0.5 0 1
Km

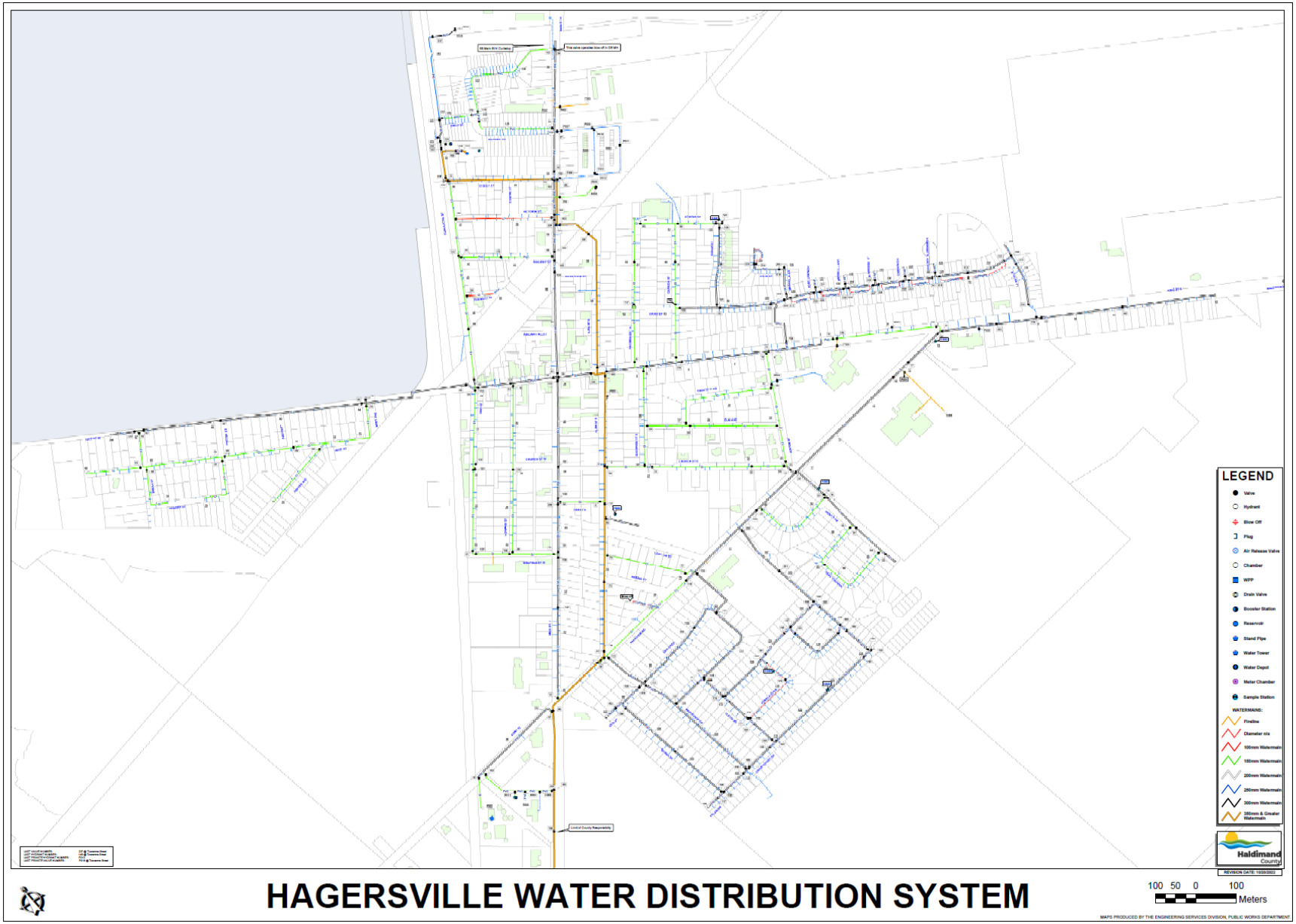

LEGEND
Valve
Hydrant
Blow Off
Plug
Air Release Valve
Chamber
WPP
Drain Valve
Booster Station
Reservoir
Stand Pipe
Water Tower
Water Depot
Meter Chamber
Sample Station
WATERMAINS:
Diameter n/a
100mm Watermain
150mm Watermain
200mm Watermain
250mm Watermain
300mm Watermain
350mm & Greater Watermain
SHANNON ST
NELLES ST
QUEEN ST
MERRITT ST
ALBION ST
KING AVE
HALDIMAND ROAD 9
MILL ST
WATER ST
FRONT ST
JOHN ST
Haldimand County
York Water Distribution System
MAPS PRODUCED BY THE ENGINEERING AND INFRASTRUCTURE DIVISION, PHYSICAL SERVICES DEPARTMENT.


CALEDONIA RESERVOIR
CALEDONIA STAND PIPE
CAYUGA RESERVOIR
CAYUGA STAND PIPE
LEGEND
CAYUGA WATER TRANSMISSION MAIN
Haldimand County
1 0.5 0 1
Km

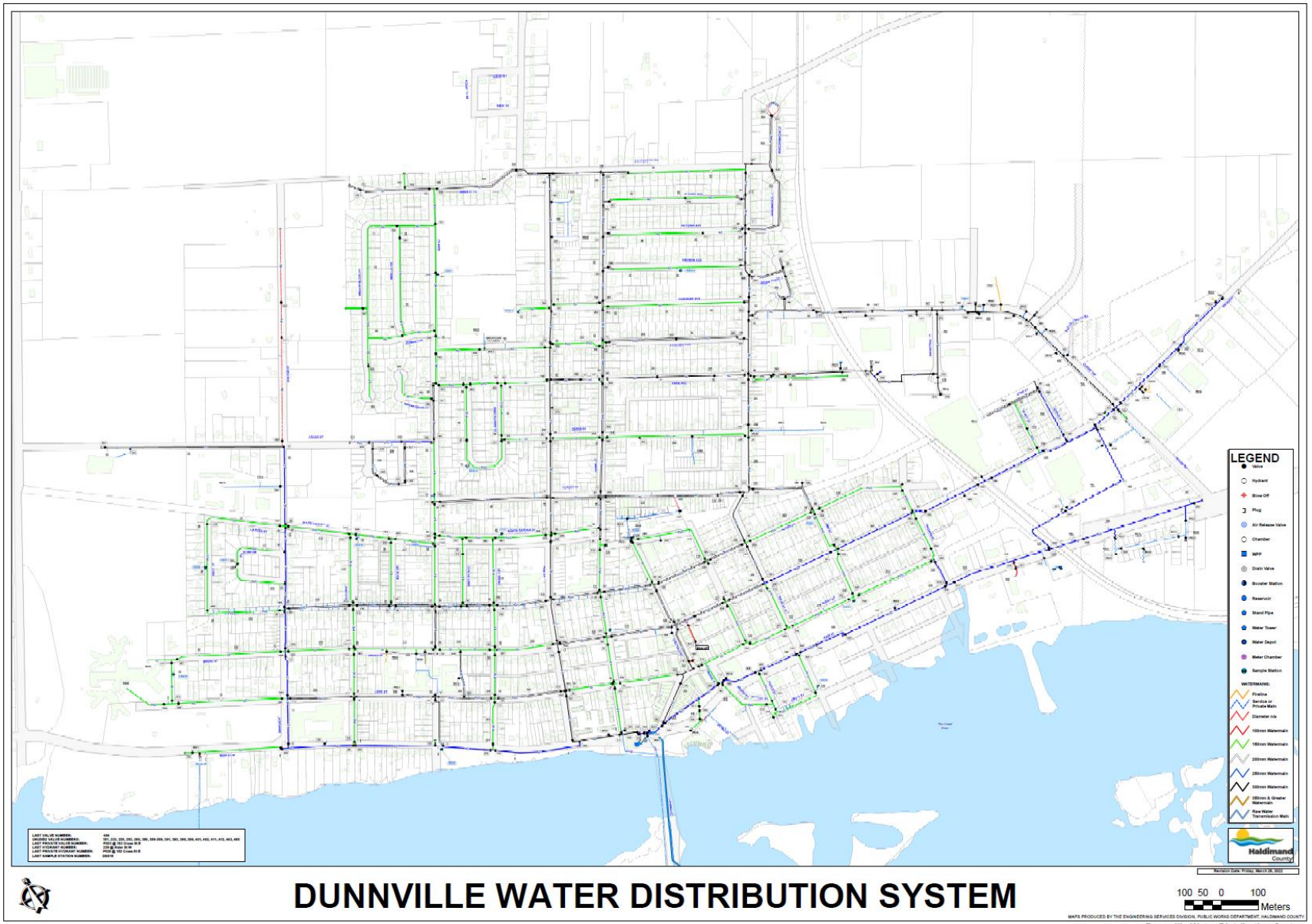


Caledonia N Water Distribution System

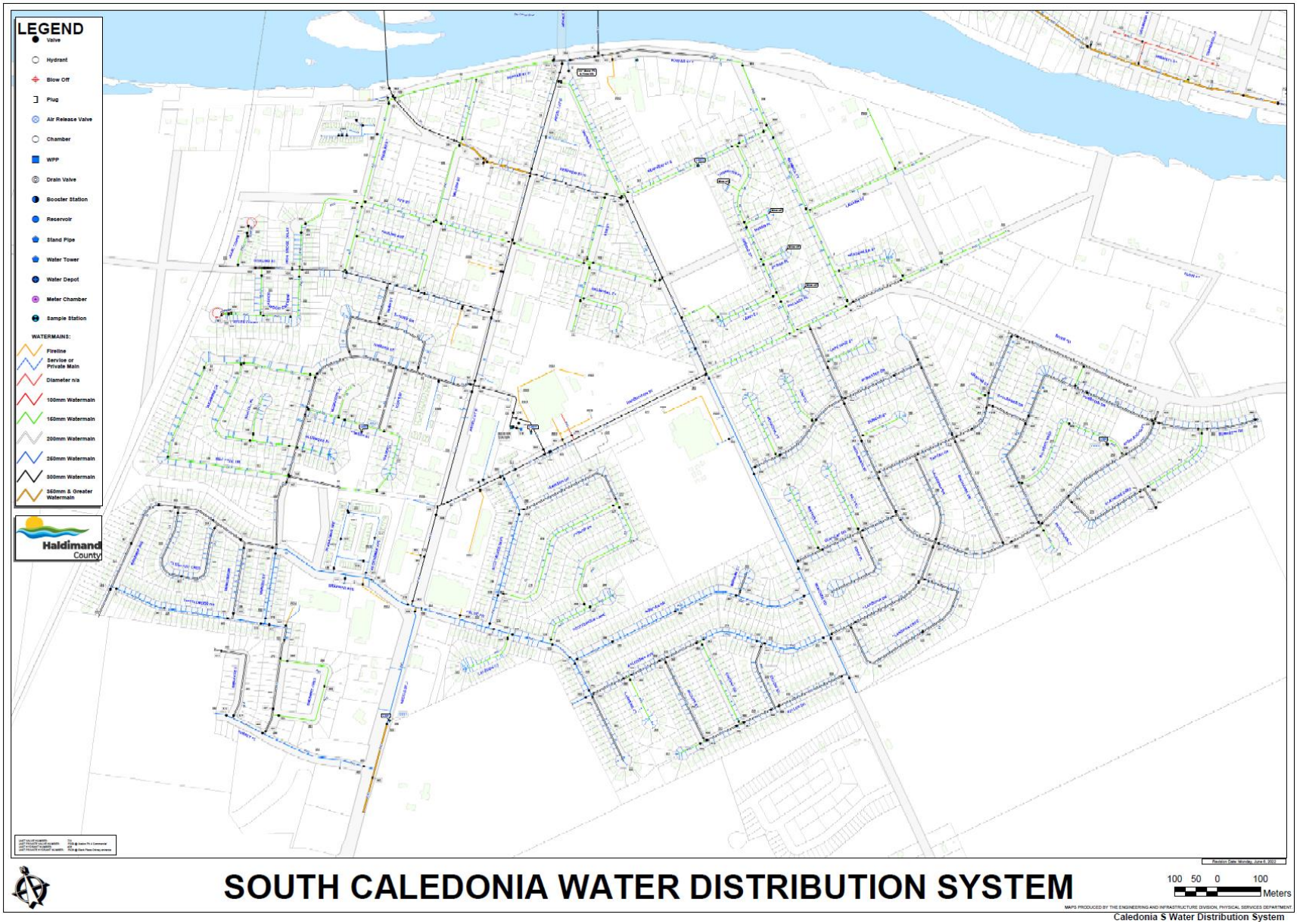

LEGEND
Valve
Hydrant
Blow Off
Plug
Air Release Valve
Chamber
WPP
Drain Valve
Booster Station
Reservoir
Stand Pipe
Water Tower
Water Depot
Meter Chamber
Sample Station
WATERMAINS:
Fireline
Diameter n/a
100mm Watermain
150mm Watermain
200mm Watermain
250mm Watermain
300mm Watermain
350mm & Greater Watermain
CONC 3
HAWK ST
FIELD RD
HALDIMAND ROAD 3
CURBSTOP
METER CHAMBER
ARV 1
P001
ISS1
ISS2
ISS3
Transmission Main continues North to the Townsend
Transmission Main comes from the Nanticoke Water Plant
LAST VALVE NUMBER: 43
LAST HYDRANT NUMBER: 16
LAST PRIVATE HYDRANT NUMBER: P001
Haldimand County
L.E.I.P. Water Distribution System
MAPS PRODUCED BY THE ENGINEERING AND INFRASTRUCTURE DIVISION, PHYSICAL SERVICES DEPARTMENT.



Hagersville Water Distribution System

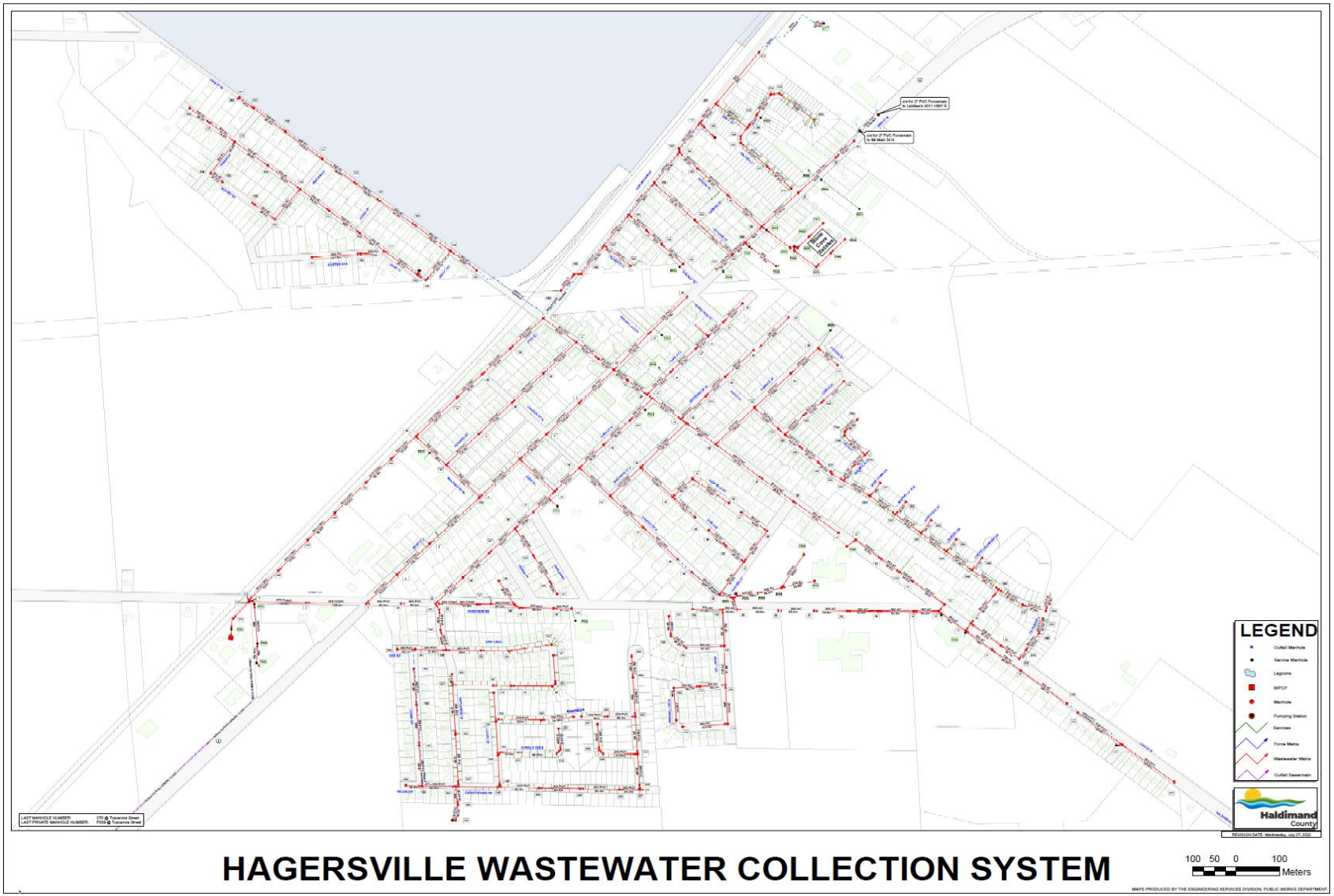


Dunnville Water Distribution System

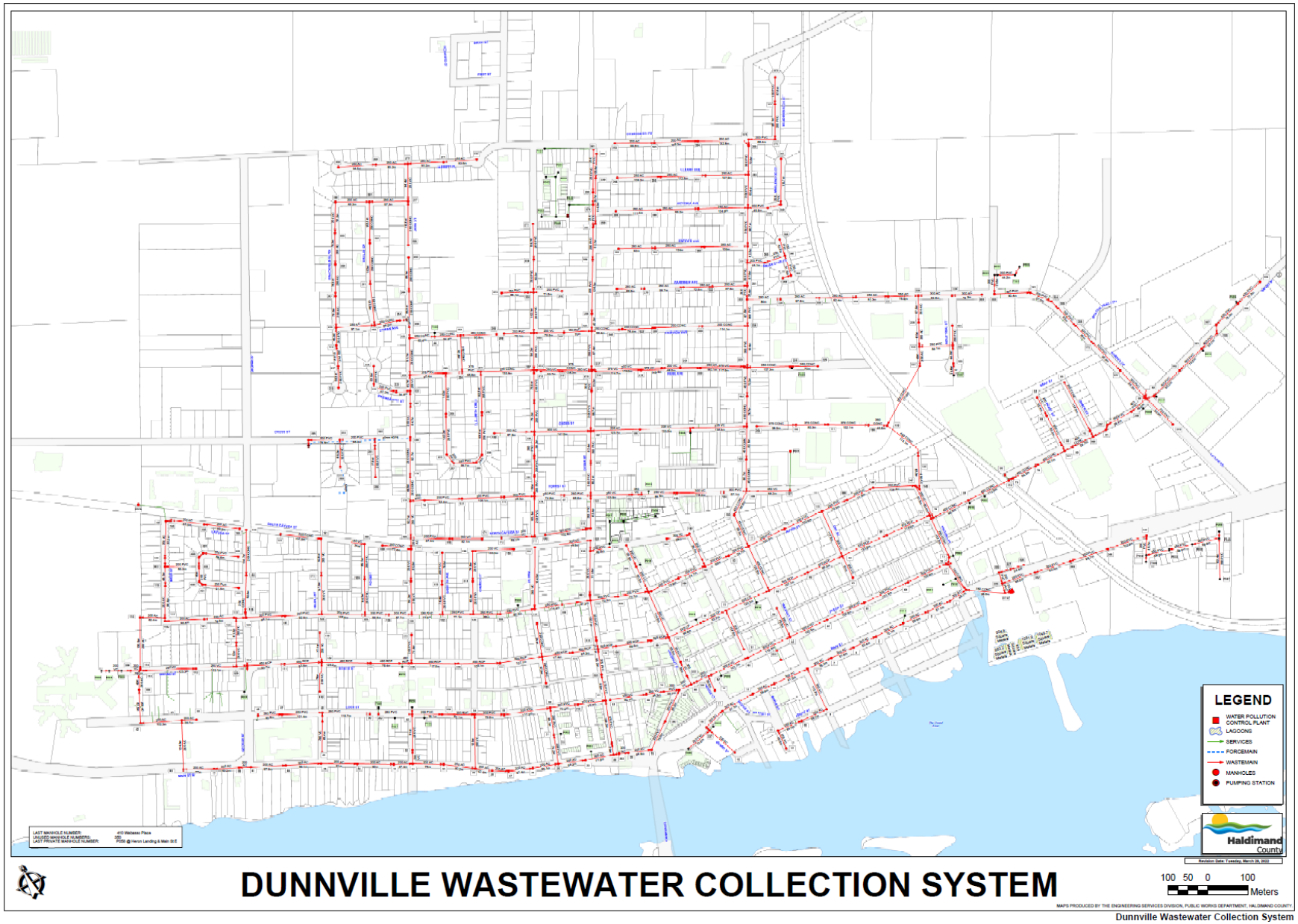


Caledonia S Water Distribution System

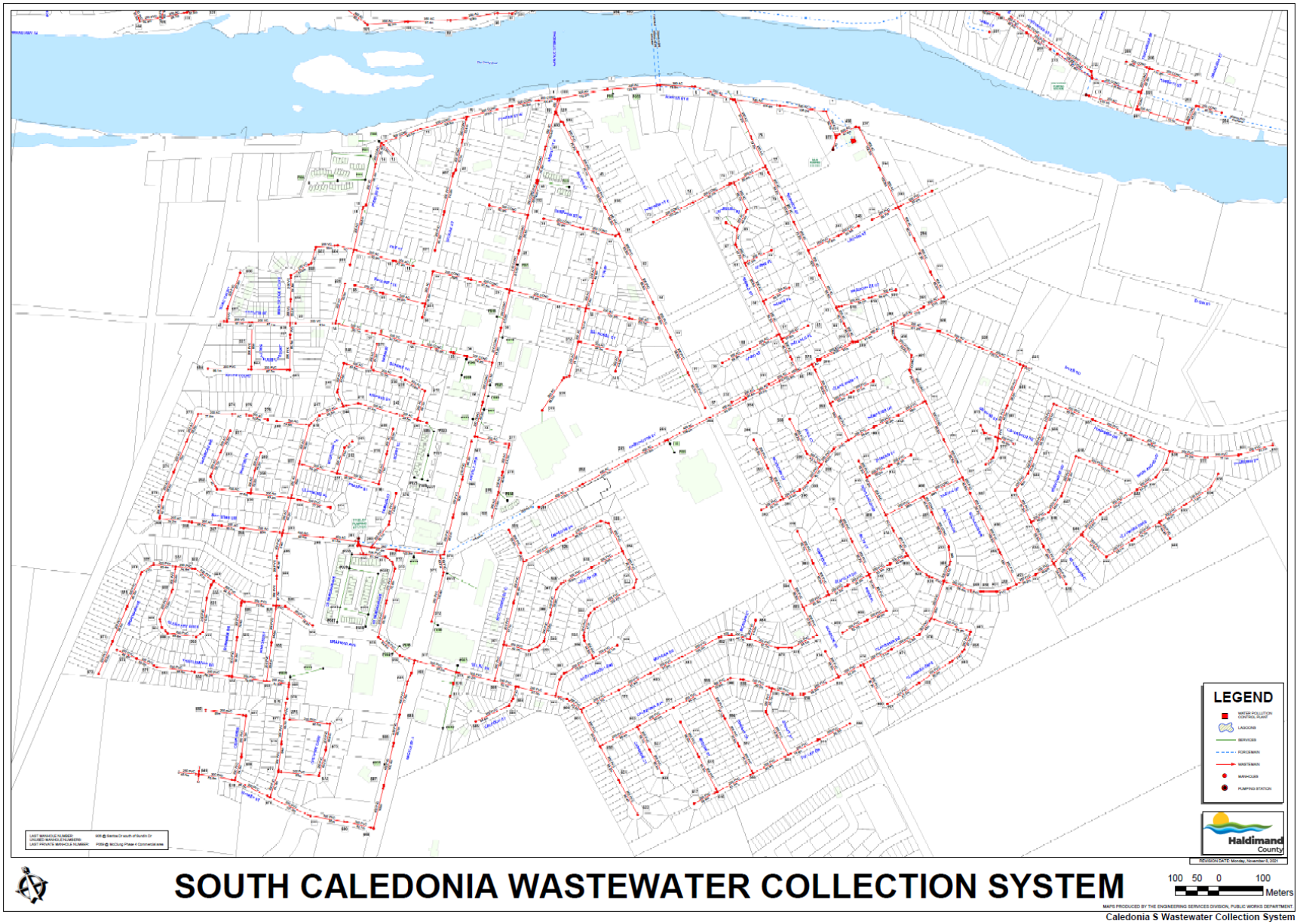
Sanitary Network Maps



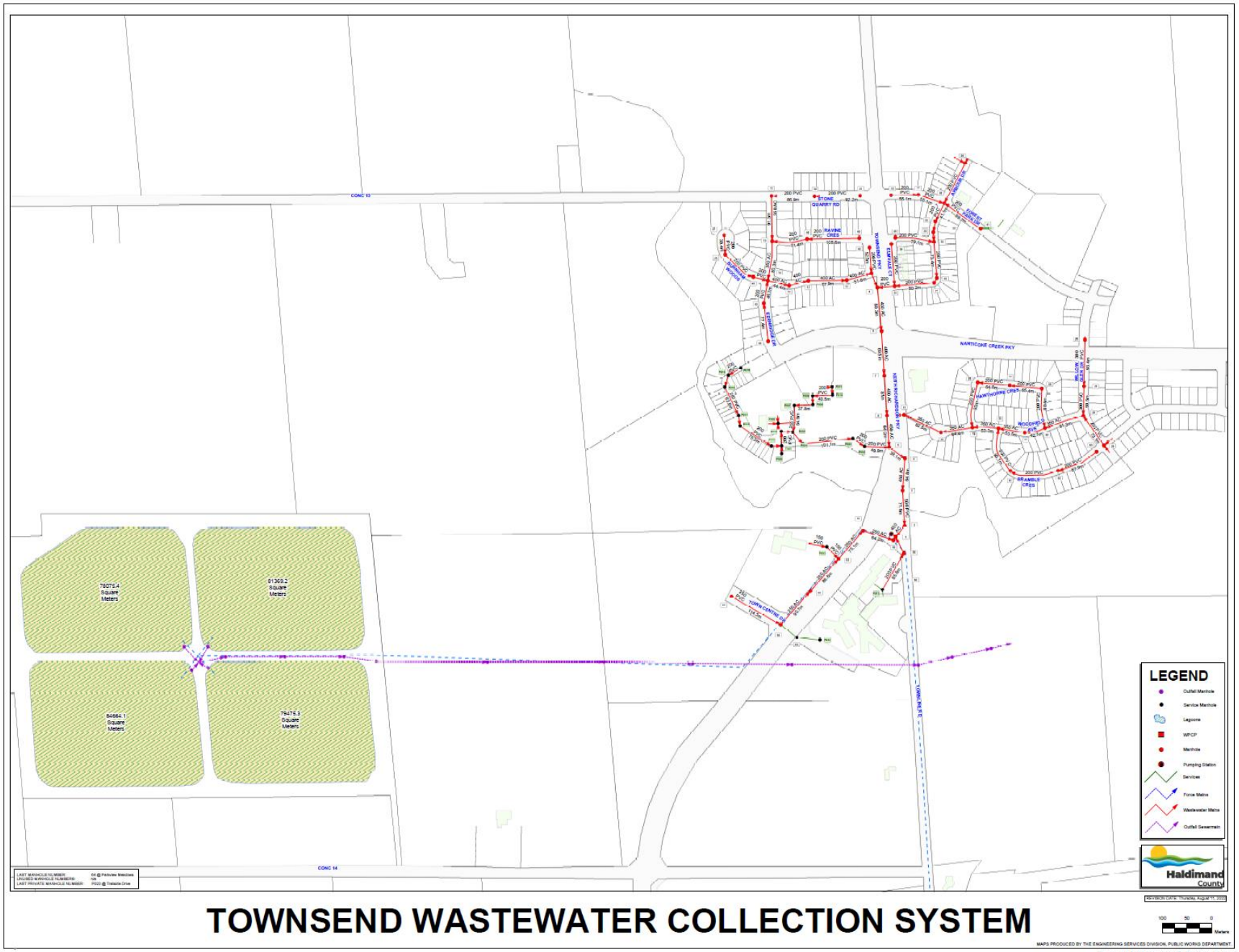
Hagersville Wastewater Collection System



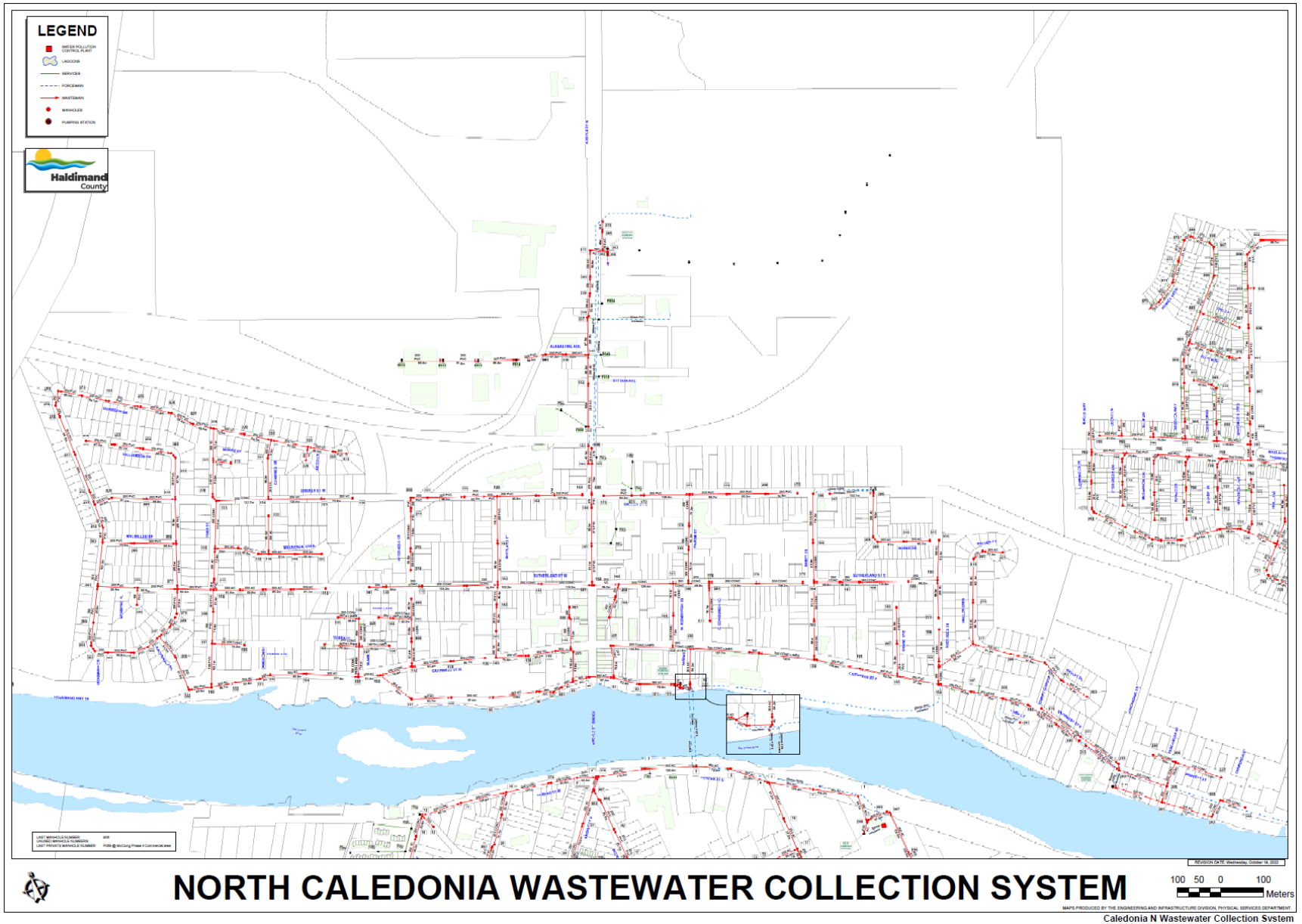
Dunnville Wastewater Collection System



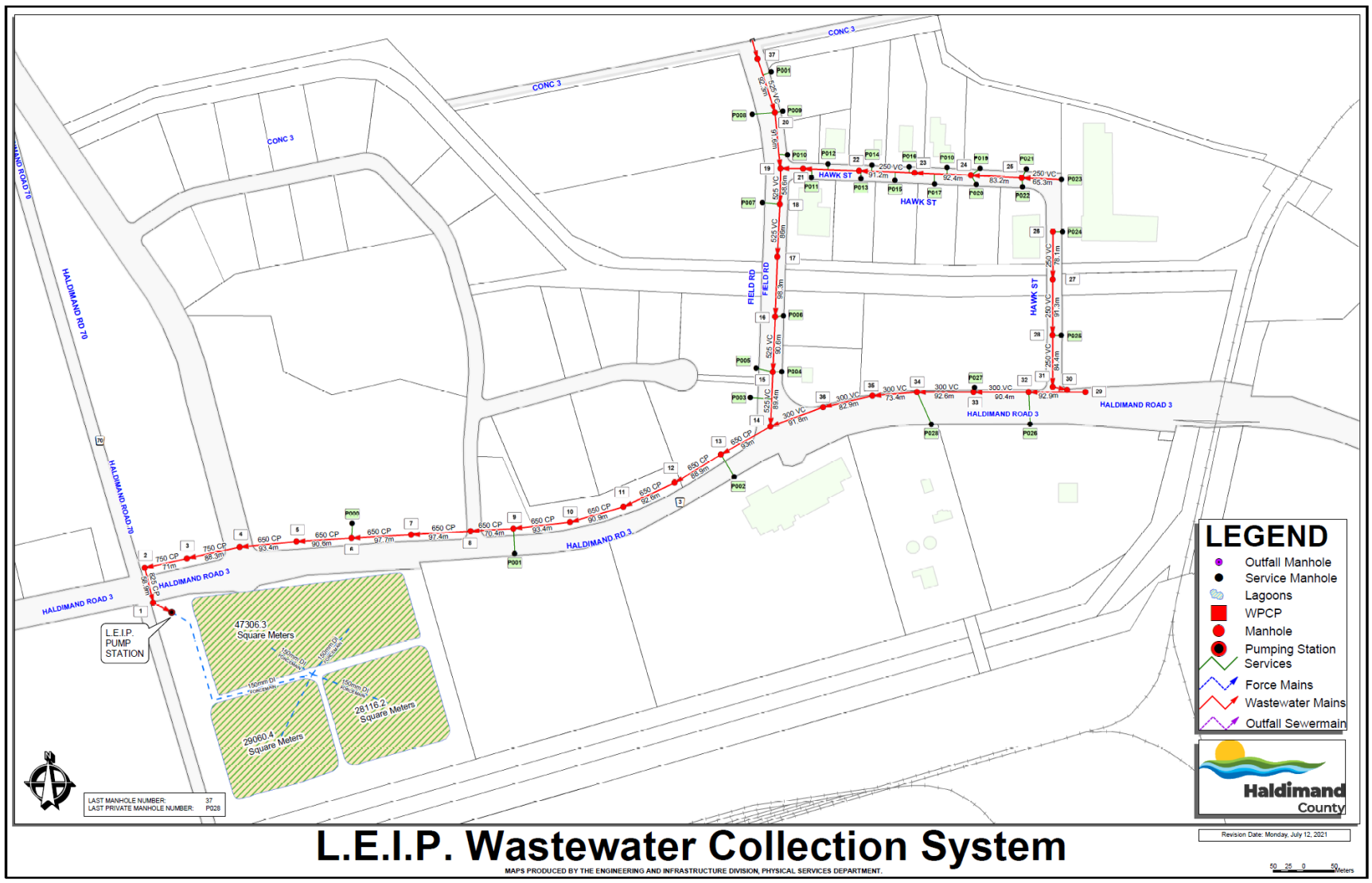
Caledonia S Wastewater Collection System

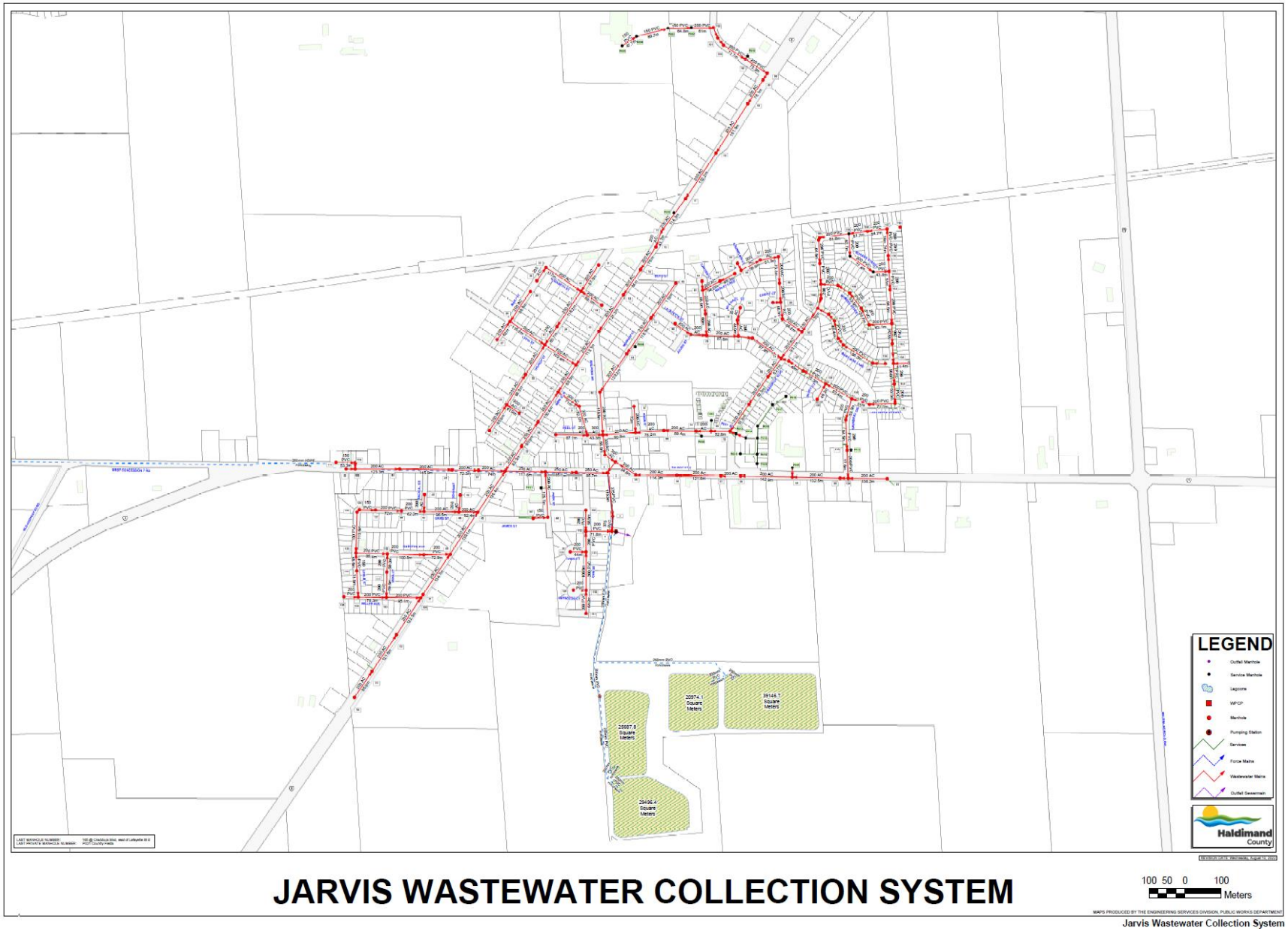


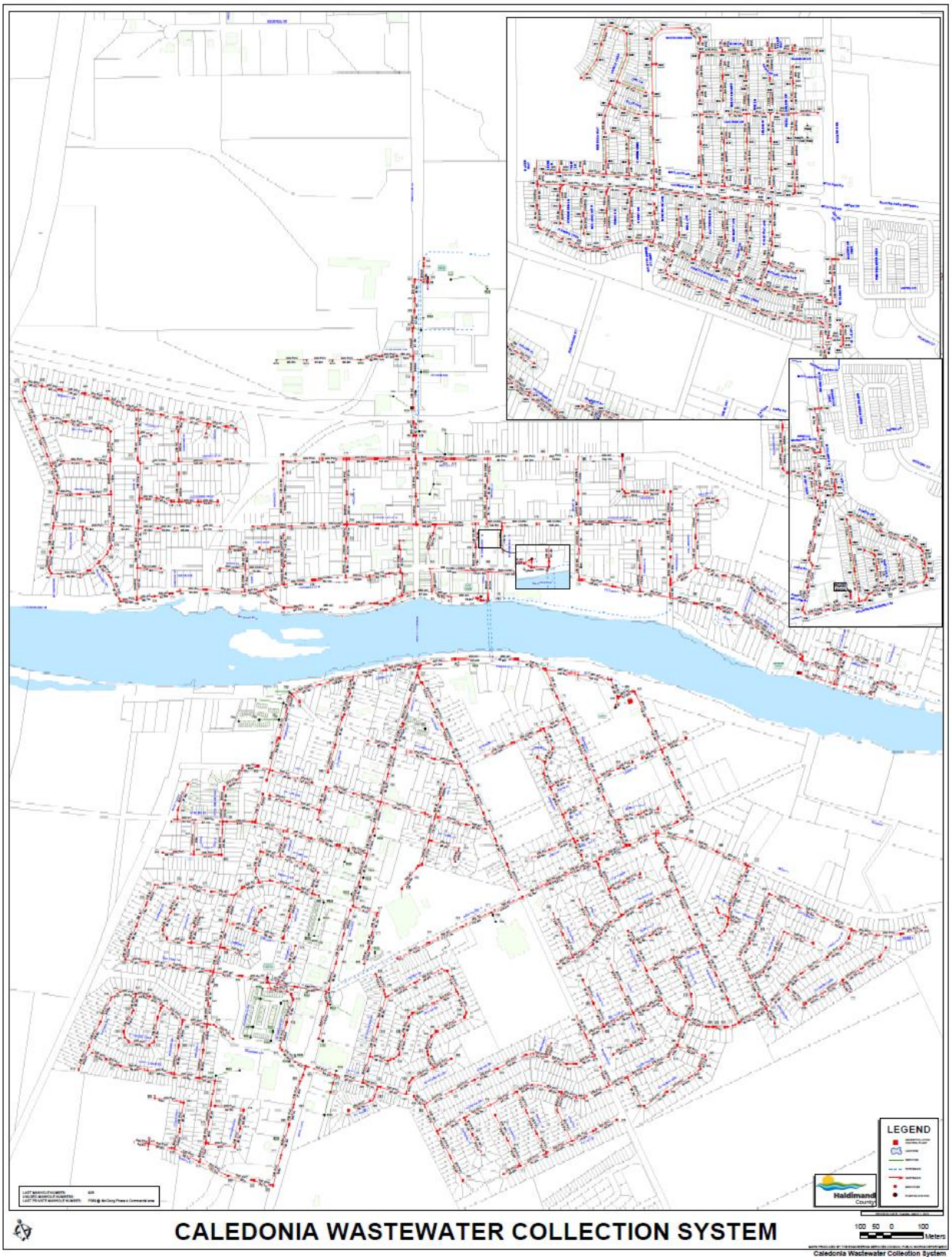
Townsend Wastewater Collection System

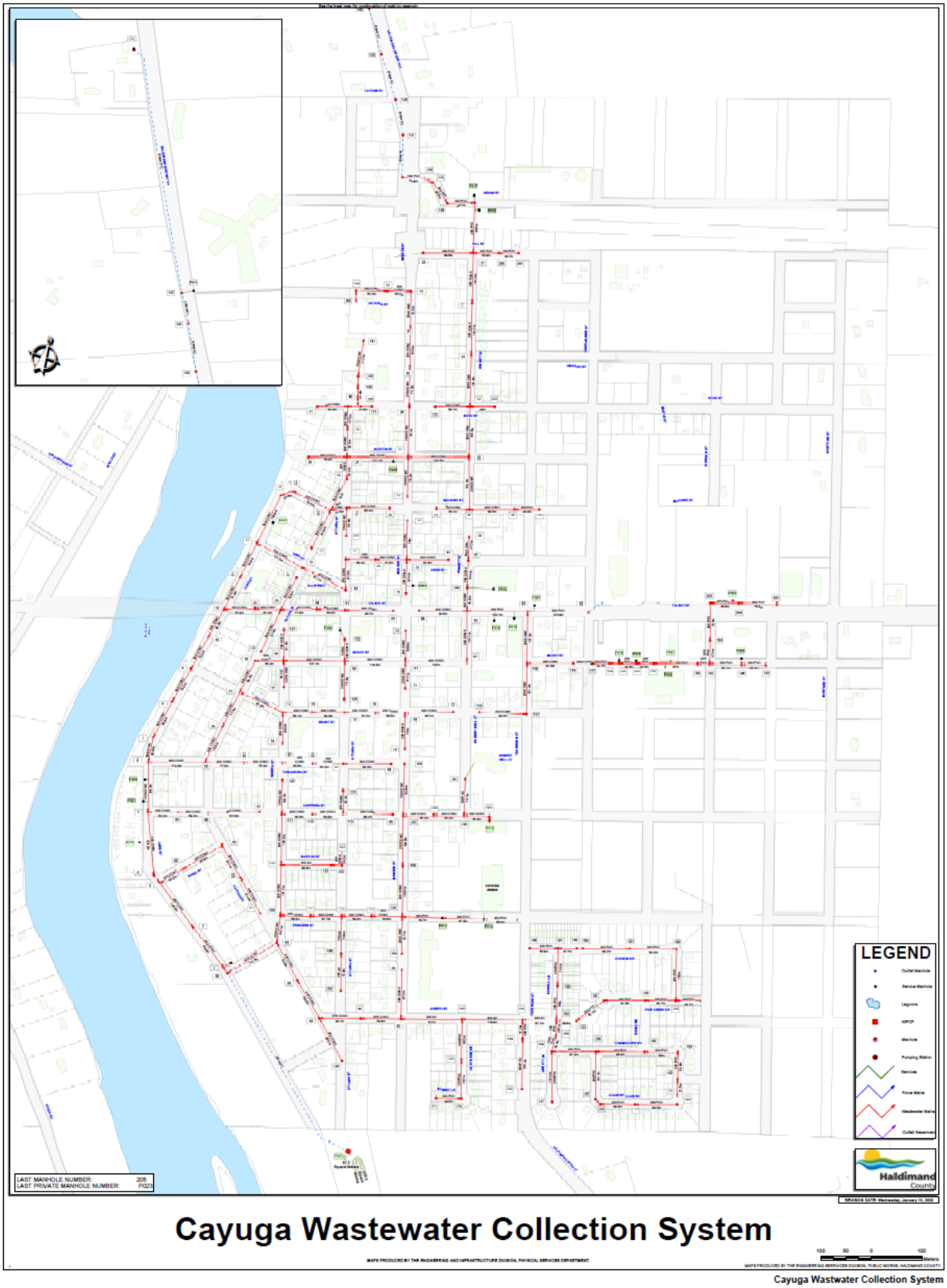


Caledonia N Wastewater Collection System

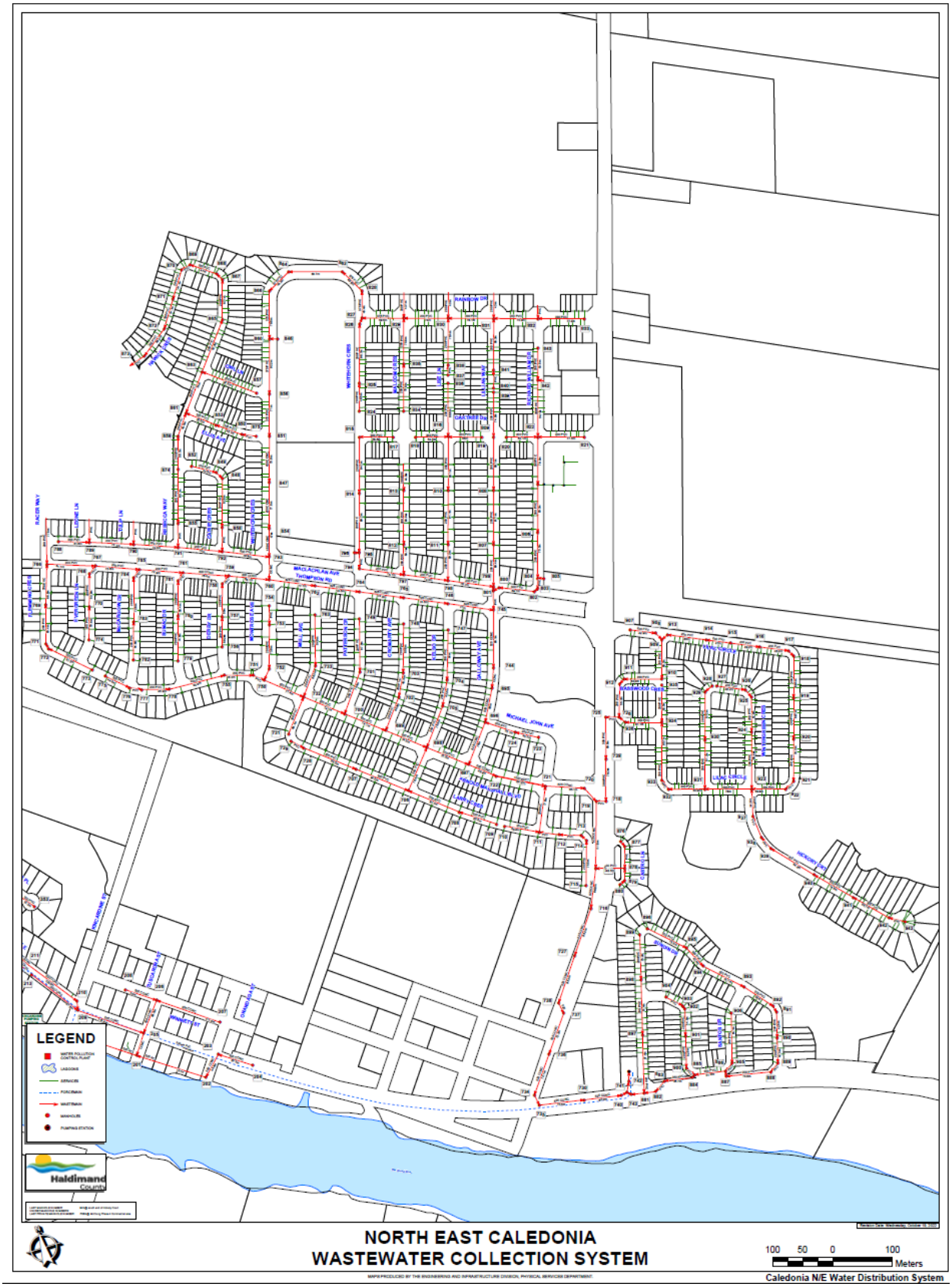

L.E.I.P. Wastewater Collection System
MAPS PRODUCED BY THE ENGINEERING AND INFRASTRUCTURE DIVISION, PHYSICAL SERVICES DEPARTMENT.
LEGEND
Outfall Manhole
Service Manhole
Lagoons
WPCP
Manhole
Pumping Station
Services
Force Mains
Wastewater Mains
Outfall Sewermain
Haldimand County
L.E.I.P. PUMP STATION
47306.3 Square Meters
28116.2 Square Meters
29060.4 Square Meters
HALDIMAND ROAD 3
HALDIMAND RD 70
CONC 3
HAWK ST
FIELD RD
LAST MANHOLE NUMBER: 37
LAST PRIVATE MANHOLE NUMBER: P028
Revision Date: Monday, July 12, 2021

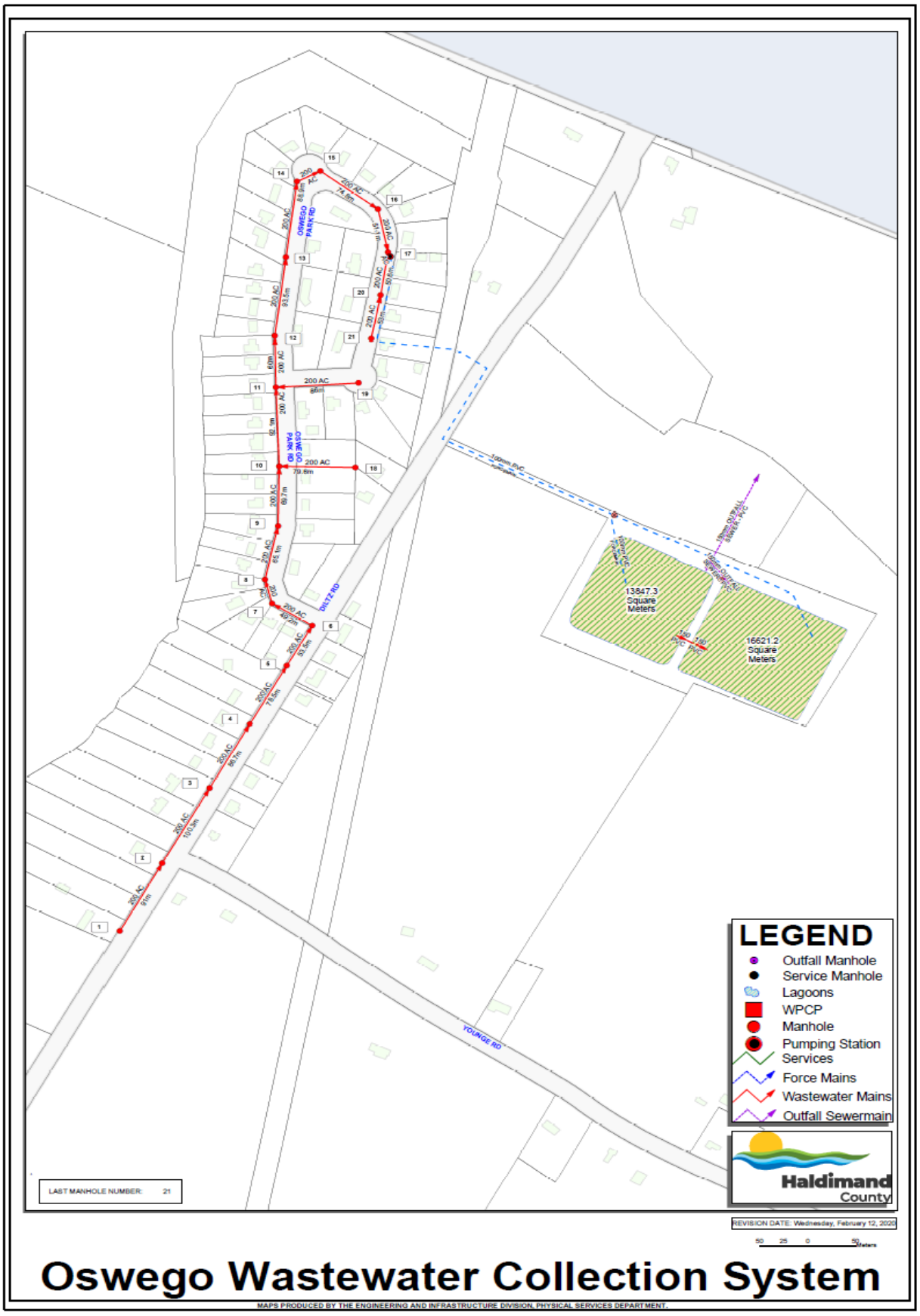

LEGEND
Outfall Manhole
Service Manhole
Lagoons
WPCP
Manhole
Pumping Station
Services
Force Mains
Wastewater Mains
Outfall Sewermain
Haldimand County
JARVIS WASTEWATER COLLECTION SYSTEM
100 50 0 100
Meters
MAPS PRODUCED BY THE ENGINEERING SERVICES DIVISION, PUBLIC WORKS DEPARTMENT
Jarvis Wastewater Collection System


LEGEND
Haldimand County
CALEDONIA WASTEWATER COLLECTION SYSTEM
100 50 0 100
Meters
Caledonia Wastewater Collection System



Cayuga Wastwater Collection System


LEGEND
Haldimand County
NORTH EAST CALEDONIA
WASTEWATER COLLECTION SYSTEM
100 50 0 100
Meters
Caledonia N/E Water Distribution System


LEGEND
Outfall Manhole
Service Manhole
Lagoons
WPCP
Manhole
Pumping Station
Services
Force Mains
Wastewater Mains
Outfall Sewermain
LAST MANHOLE NUMBER: 21
13847.3 Square Meters
16621.2 Square Meters
OSWEGO PARK RD
DILTZ RD
YOUNGE RD
Haldimand County
REVISION DATE: Wednesday, February 12, 2020
Oswego Wastewater Collection System
MAPS PRODUCED BY THE ENGINEERING AND INFRASTRUCTURE DIVISION, PHYSICAL SERVICES DEPARTMENT.

Appendix B: Road Network

Appendix B: Road Network

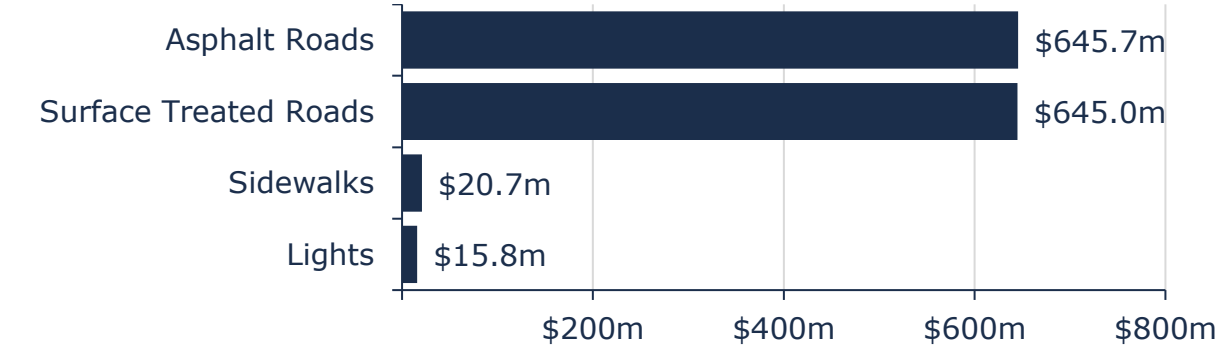
Haldimand County's road network comprises the largest share of its infrastructure portfolio, with a current replacement cost of more than $1.33 billion, distributed primarily between asphalt and surface treated roads.

Haldimand also owns and manages other supporting infrastructure and capital assets, including sidewalks and lights (streetlights, traffic lights and other lights).

Inventory & Valuation

The figure below displays the replacement cost of each asset segment in Haldimand's road inventory.

Figure 12: Road Network Replacement Value

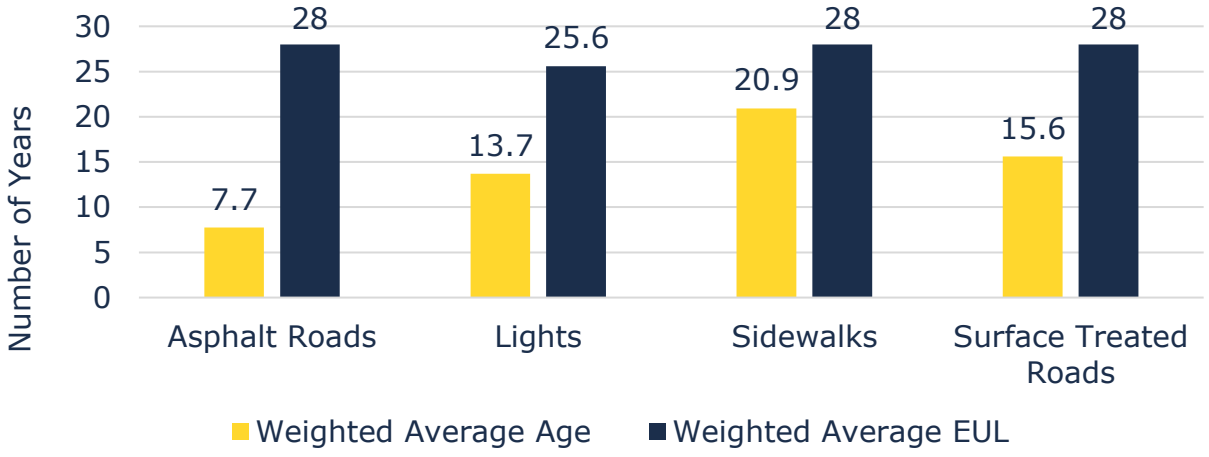


Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurately represent realistic capital requirements.

Asset Condition & Age

The graph below identifies the average age, and the estimated useful life for each asset segment. It is all weighted by replacement cost.

Figure 13: Road Network Average Age vs Average EUL

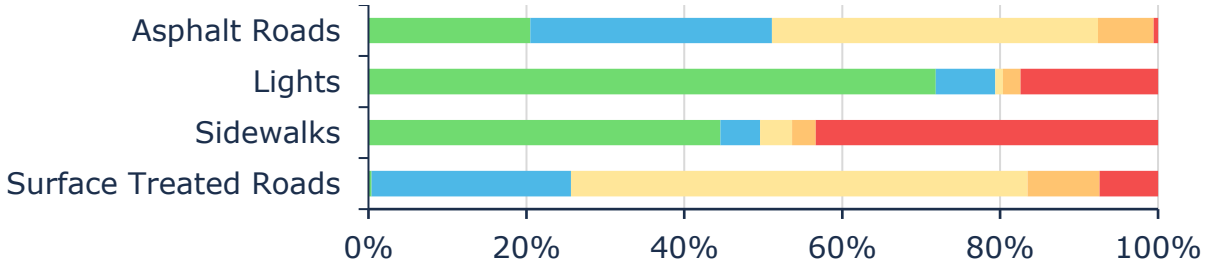


Each asset's EUL should also be reviewed periodically to determine whether adjustments need to be made to better align with the observed length of service life for each asset type.

The 2021 Roads Needs Study indicates that Haldimand's overall existing pavement condition index is 71%. However, as updates to asset information – such as gravel road conversions – are still underway in the asset management software, current condition values may not yet fully reflect actual conditions.

The graph below visually illustrates the average condition for each asset segment on a Very Good to Very Poor scale.

Figure 14: Road Network Condition Breakdown



	Surface Treated Roads	Sidewalks	Lights	Asphalt Roads
Very Good	$2.7m	$9.2m	$11.3m	$132.4m
Good	$162.9m	$1.0m	$1.2m	$197.6m
Fair	$372.9m	$839k	$157k	$266.6m
Poor	$58.7m	$621k	$349k	$45.6m
Very Poor	$47.9m	$9.0m	$2.8m	$3.5m

To ensure that Haldimand County's roads continue to provide an acceptable level of service, Haldimand should monitor the average condition of all assets. If the average condition declines, staff should re-evaluate their lifecycle management strategy to determine what combination of maintenance, rehabilitation, and replacement activities is required to increase the overall condition of the roads.

Current Approach to Condition Assessment

Accurate and reliable condition data allows staff to determine the remaining service life of assets and identify the most cost-effective approach to managing assets. Haldimand County's current approach is described below:

- Roadside safety audits completed every 10 years
- Roads needs studies completed every 4 years
- All roads are inspected/patrolled in accordance with O.Reg. 239/02 Minimum Maintenance Standards

The condition scale for roads utilized is from 0 to 100 from Very Poor to Very Good. See the following images as examples of a Very Good road and a road in Fair condition.

Figure 15: Townsend Parkway – LCB Rural (Very Good PCI=100)

Figure 16: Marshall Road – LCB Rural (Fair PCI=41)

Lifecycle Management Strategy

The condition or performance of most assets will deteriorate over time. This process is affected by a range of factors including an asset's characteristics, location, utilization, maintenance history and environment.

The following lifecycle strategies shown in Figure 17 have been developed as a proactive approach to managing the lifecycle of municipally owned roads. Instead

of allowing the roads to deteriorate until replacement is required, strategic rehabilitation is expected to extend the service life of roads at a lower total cost.

Figure 17: Road Network Current Lifecycle Strategy

Maintenance

- Deficiency repairs as required from patrols for minimum maintenance standards such as patching, shoulder grading, etc.

Rehabilitation / Renewal

- Crack sealing within 10 years of paving or as needed once in the lifecycle
- Resurfacing the roadway with a single or double depth surface overlay

Replacement

- Roads are identified as needing to be replaced if the PCI reaches a condition score less than 40

PCI scores, staff judgment, traffic loads, and opportunity to bundle projects with utility work help inform the optimal lifecycle intervention, ranging from pothole repairs to potential replacements. A surface treated road lifecycle model is shown in Figure 18 and an asphalt lifecycle model is show in Figure 19.

Figure 18: Surface Treated (LCB) Road Lifecycle Model

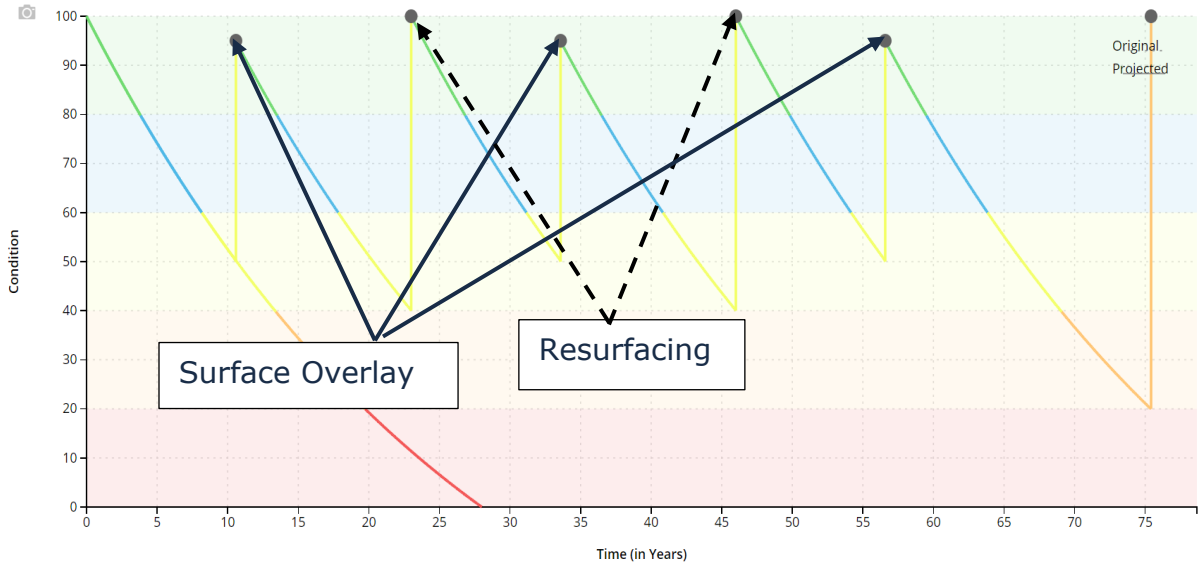
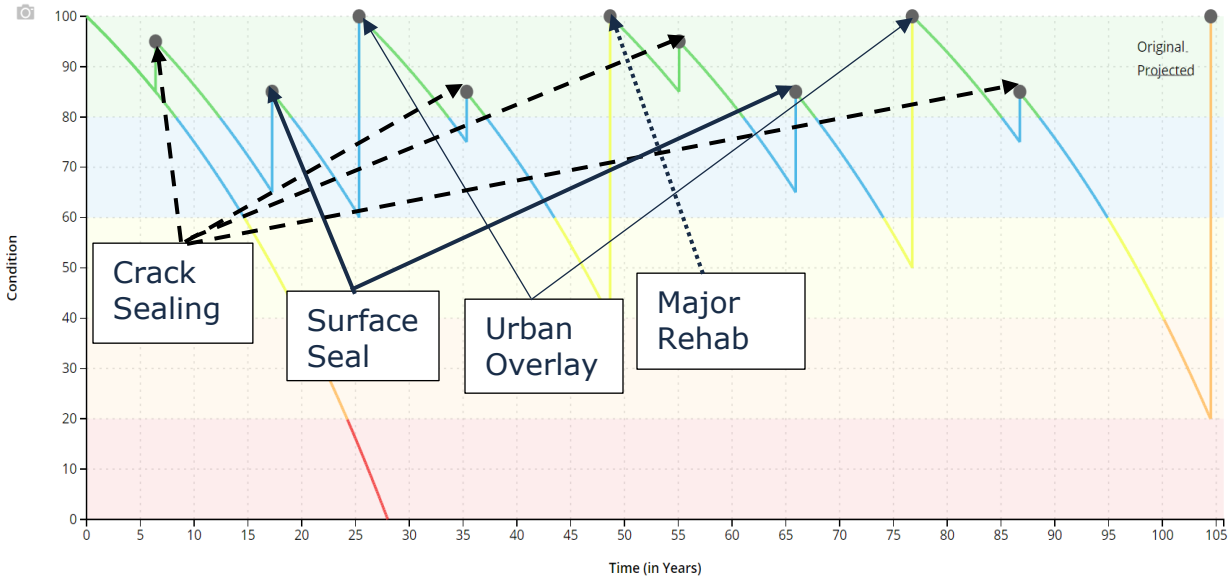


Figure 19: Asphalt (HCB) Road Lifecycle Model



Risk & Criticality

The following figure provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category based on available inventory data. See Appendix K: Risk Rating Criteria for the criteria used to determine the risk rating of each asset.

Figure 20: Road Network Risk Breakdown

1 - 4 **Very Low**	5 - 7 **Low**	8 - 9 **Moderate**	10 - 14 **High**	15 - 25 **Very High**
$169,660,834 (13%)	$440,106,969 (33%)	$415,457,284 (31%)	$266,844,185 (20%)	$35,060,744 (3%)

This is a high-level model developed by municipal staff and it should be reviewed and adjusted to reflect an evolving understanding of both the probability and consequences of asset failure.

The identification of critical assets allows Haldimand to determine appropriate risk mitigation strategies and treatment options. Risk mitigation may include asset-specific lifecycle strategies, condition assessment strategies, or simply the need to collect better asset data.

Levels of Service

The framework created by Haldimand County for levels of service is a valuable tool for assessing and managing the performance of their assets and the services provided by these assets. Proposed levels of service for Haldimand have been developed through engagement with staff.

Current Levels of Service

The following tables identify Haldimand County's current level of service for the road network. These metrics include the technical and community level of service metrics that are required as part of O. Reg. 588/17, as well as any additional performance measures that Haldimand County has selected.

Table 11: Road Network Current Levels of Service

Community LOS		Service Attribute	Technical LOS	
Description, which may include maps, of the road network in the municipality and its level of connectivity	See Appendix A: Level of Service Maps	Scope	Replacement Cost	$1,327,130,017
			Quantity (km of roads)	1,373
			Quantity (area of sidewalk m^2)	158,399
			Quantity (number of lights)	4,754
			Lane-km of arterial roads (MMS classes 1 and 2) per land area (km/km2)	0.60
			Lane-km of collector roads (MMS classes 3 and 4) per land area (km/km2)	0.0417
			Lane-km of local roads (MMS classes 5 and 6) per land area (km/km2)	1.6903
Description or images that illustrate the different levels of road class pavement condition	See Figure 15: Townsend Parkway – LCB Rural (Very Good PCI=100) and Figure 16: Marshall Road – LCB Rural (Fair PCI=41)	Quality / Reliability	Average pavement condition index for paved roads in the municipality	Good (75%)
			Average surface condition for unpaved roads in the municipality (e.g., excellent, good, fair, poor)	N/A
			Average Condition	Good (64%)
			% Condition > Fair	87%
			% Condition poor and very poor	13%
Services will be provided to ensure long-term sustainability for the Municipality		Performance	% Risk that is High and Very High	23%
			Annual reinvestment	$13,159,137
			Capital reinvestment rate	0.99%

Proposed Levels of Service

To ensure that all asset lifecycles were fully captured, the scenarios used to analyze Haldimand County's asset inventory were run over a 100-year period. These scenarios are based entirely on data from Haldimand County's asset management system, which includes information on EUL, current condition, and replacement costs. All results are derived from this data.

The table below presents the results for each scenario related to the road network. For consistency, the projected average condition for each scenario was measured in the year 2055.

Scenario 1: Current Capital Reinvestment Rate - this scenario utilizes the current capital reinvestment within each asset category. The current annual investment was held, and the condition was determined.

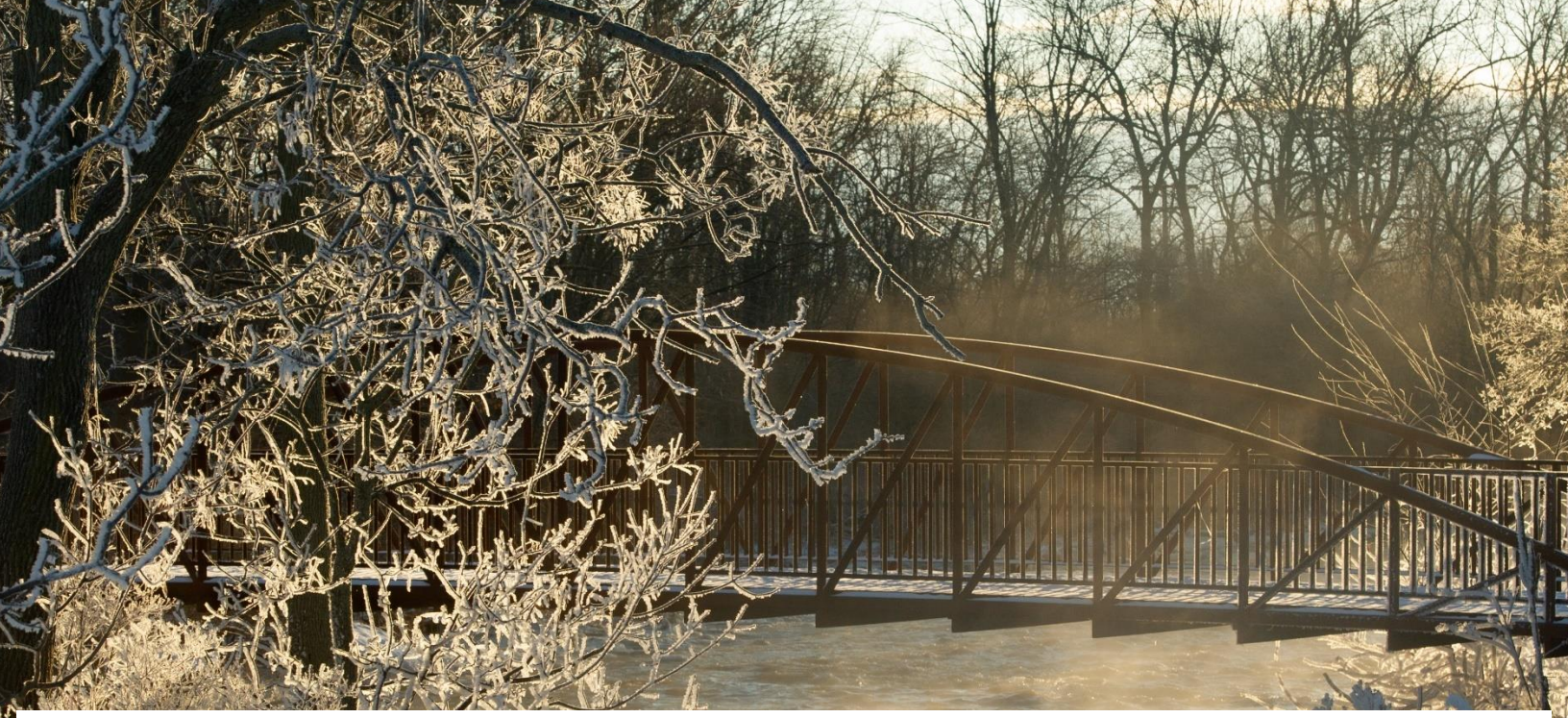
Scenario 2: Current Condition - this scenario utilizes a target of current average condition within each asset category. The condition value was held, and the annual investment was then determined.

Scenario 3: Current Lifecycle Activities - this scenario utilizes the current lifecycle activities outlined as current practice within each asset category. The condition and annual investment were then determined.

Table 12: Scenario Results Summary

Scenarios	Replacement Cost	Projected Average Condition	Annual Capital Reinvestment
Scenario 1 - Current Capital Investment Rate	$1.32 billion	Fair (43%)	$13,159,137
Scenario 2 - Maintain Current Condition	$1.32 billion	Good (64%)	$25,865,982
Scenario 3 – Lifecycle	$1.32 billion	Good (70%)	$33,038,123

The proposed level of service recommended for the road network is Scenario 2, which maintains current condition of the road infrastructure.



Appendix C: Bridges & Culverts

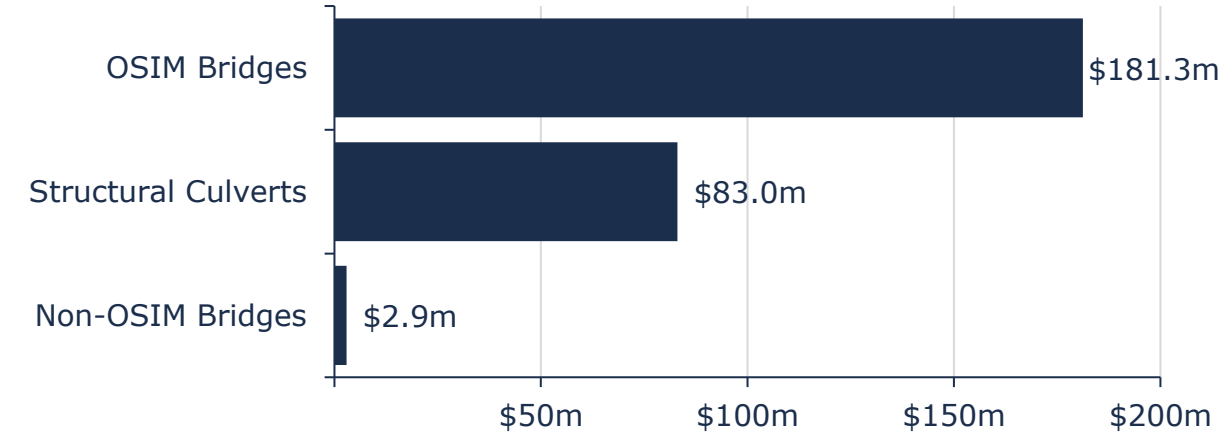
Appendix C: Bridges & Culverts

Bridges and culverts represent a critical portion of the transportation services provided to the community. The state of the infrastructure for bridges and structural culverts is summarized in the following table.

Inventory & Valuation

The replacement cost of each asset segment in Haldimand County's bridges and culverts inventory are shown below.

Figure 21: Bridges & Culverts Replacement Cost

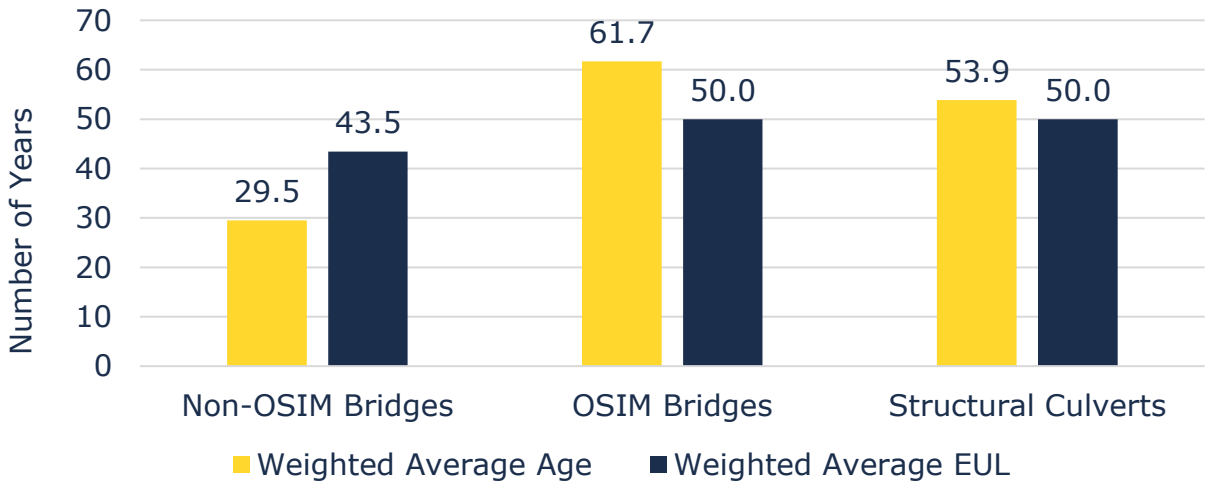


Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed.

Asset Condition & Age

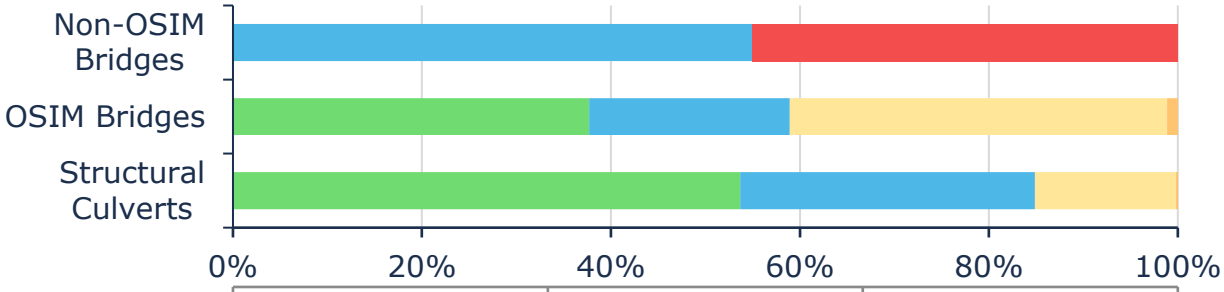
The graph below identifies the average age and the EUL for each asset segment. The values are weighted based on replacement cost.

Figure 22: Bridges & Culverts Average Age vs Average EUL



The graph below visually illustrates the average condition for each asset segment on a Very Good to Very Poor scale.

Figure 23: Bridges & Culverts Condition Breakdown



	Structural Culverts	OSIM Bridges	Non-OSIM Bridges
Very Good	$44.6m	$68.3m	
Good	$25.9m	$38.5m	$1.6m
Fair	$12.4m	$72.4m	
Poor	$156k	$2.0m	
Very Poor			$1.3m

To ensure that Haldimand County's bridges and culverts continue to provide an acceptable level of service, staff should monitor the average condition of all assets.

Each asset's EUL should also be reviewed periodically to determine whether adjustments need to be made to better align with the observed length of service life for each asset type.

Current Approach to Condition Assessment

Accurate and reliable condition data allows staff to determine the remaining service life of assets and identify the most cost-effective approach to managing them. Haldimand County's current approach is to assess the 104 bridges and 159 structural culverts every 2 years in accordance with the Ontario Structure Inspection Manual (OSIM). The most recent assessment was completed in 2023 by G. Douglas Vallee Limited - Consulting Engineers, Architects & Planners.

The condition scale utilized is from 0 to 100, from Very Poor to Very Good. See the following images as examples of a Very Good bridge and structural culvert, as well as a bridge and structural culvert in Fair condition.

Figure 24: Dennis Bridge (BCI=92 Very Good)

Figure 25: Balmoral Bridge (BCI=51 Fair)

Figure 26: Lakeshore Road Culvert (BCI=87 Very Good)

Figure 27: York Road Culvert (BCI=56 Fair)

Lifecycle Management Strategy

The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration. The following table outlines Haldimand County's current lifecycle management strategy.

Figure 28: Bridges & Culverts Current Lifecycle Strategy

Maintenance / Rehabilitation / Replacement
•All lifecycle activities are driven by the results of inspections completed according to the Ontario Structure Inspection Manual (OSIM)

Risk & Criticality

The figure below provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this category based on available inventory data. See Appendix K: Risk Rating Criteria for the criteria used to determine the risk rating of each asset.

This is a high-level model developed by municipal staff and should be reviewed and adjusted to reflect an evolving understanding of both the probability and consequences of asset failure.

Figure 29: Bridges & Culverts Risk Breakdown

1 - 4 Very Low	5 - 7 Low	8 - 9 Moderate	10 - 14 High	15 - 25 Very High
$33,065,406 (12%)	$29,057,430 (11%)	$25,668,569 (10%)	$139,595,201 (52%)	$39,803,205 (15%)

The asset-specific attributes that staff utilize to define and prioritize the criticality of bridges and culverts are documented in the following table. The identification of critical assets allows Haldimand to determine risk mitigation strategies and treatment options.

Risk mitigation may include asset-specific lifecycle strategies, condition assessment strategies, or simply the need to collect better asset data.

Levels of Service

The framework created by Haldimand County for levels of service is a valuable tool for assessing and managing the performance of their assets and the services provided by these assets. Proposed levels of service for Haldimand County have been developed through engagement with staff.

Current Levels of Service

The following tables identify Haldimand County's current level of service for bridges and culverts. These metrics include the technical and community level of service metrics that are required as part of O. Reg. 588/17, as well as any additional performance measures that Haldimand County has selected.

Table 13: Bridges & Culverts Current Levels of Service

Community LOS		Service Attribute	Technical LOS	
Description of the traffic that is supported by municipal bridges (e.g., heavy transport vehicles, motor vehicles, emergency vehicles, pedestrians, cyclists).	Bridges and culverts are a key component of the municipal transportation network.	Scope	Replacement Cost	$267,189,811
			Quantity (Bridges)	106
			Quantity (Structural Culverts)	168
			% of bridges in the Municipality with loading or dimensional restrictions	2%
Description or images of the condition of bridges & culverts and how this would affect use of the bridges & culverts	See Figure 23 Dennis Bridge (BCI=92 Very Good), Figure 24 Balmoral Bridge (BCI=51 Fair), Figure 25 Lakeshore Road Culvert (BCI=87 Very Good) and Figure 26 York Road Culvert (BCI=56 Fair)	Quality / Reliability	Average bridge condition index value for bridges in the Municipality	Good (70%)
			Average bridge condition index value for structural culverts in the Municipality	Good (77%)
			% Condition > Fair	99%
			% Condition poor and very poor	1%
Services will be provided to ensure long-term sustainability for the Municipality		Performance	% Risk that is High and Very High	67%
			Annual reinvestment	$4,590,262
			Capital reinvestment rate	1.72%

Proposed Levels of Service

To ensure that all asset lifecycles were fully captured, the scenarios used to analyze Haldimand County's asset inventory were run over a 100-year period. These scenarios are based entirely on data from Haldimand County's asset management system, which includes information on EUL, current condition, and replacement costs. All results are derived from this data.

The table below presents the results for each scenario related to bridges and culverts. For consistency, the projected average condition for each scenario was measured in the year 2055.

Scenario 1: Current Capital Reinvestment Rate - this scenario utilizes the current capital reinvestment within each asset category. The current annual investment was held, and the condition was determined.

Scenario 2: Current Condition - this scenario utilizes a target of current average condition within each asset category. The condition value was held, and the annual investment was then determined.

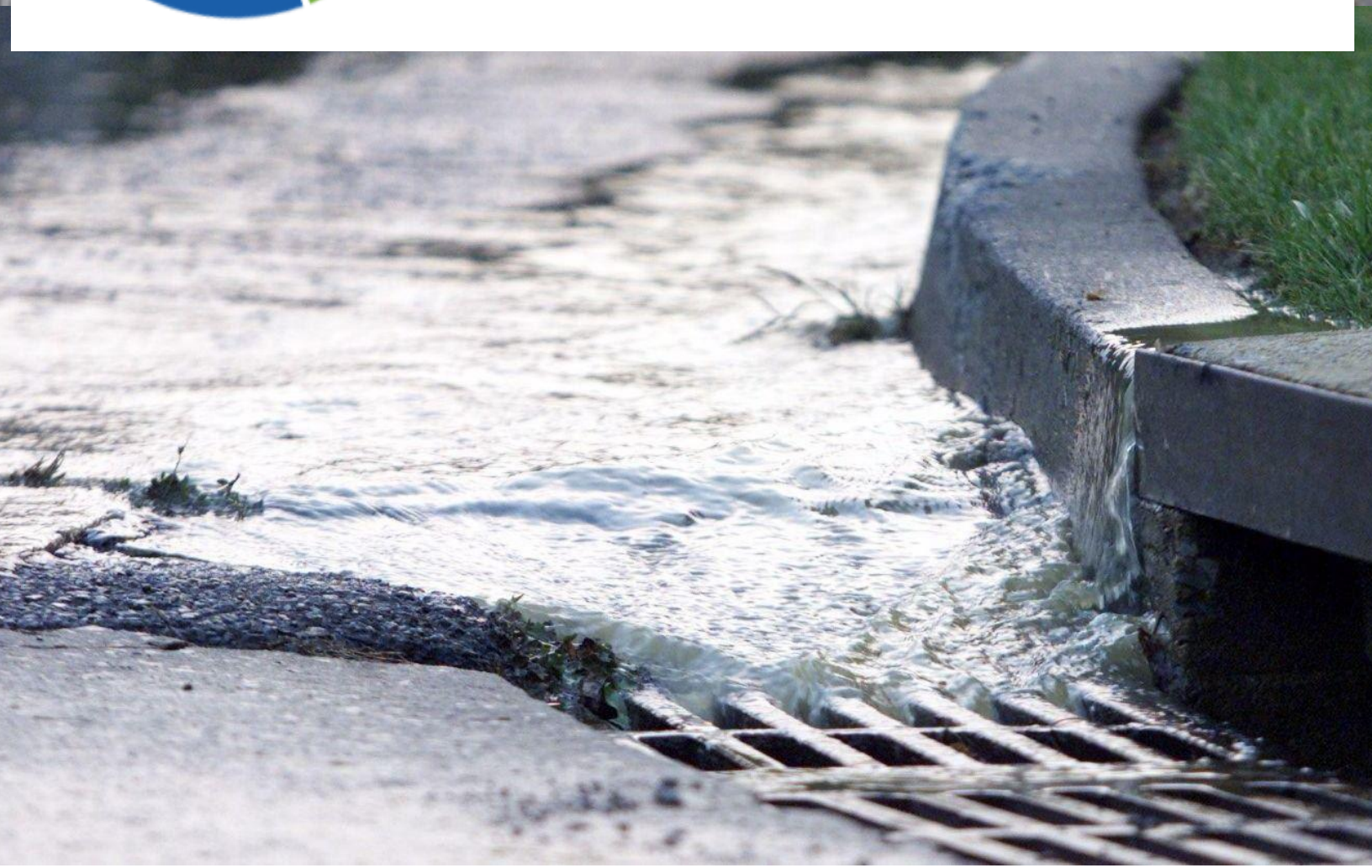
Scenario 3: Current Lifecycle Activities - this scenario utilizes the current lifecycle activities outlined as current practice within each asset category. The condition and annual investment were then determined.

Table 14: Scenario Results Summary

Scenarios	Replacement Cost	Projected Average Condition	Annual Capital Reinvestment
Scenario 1 - Current Capital Investment Rate	$267 million	Fair (52%)	$4,590,262
Scenario 2 - Maintain Current Condition	$267 million	Good (72%)	$5,157,799
Scenario 3 – Lifecycle	$267 million	Very Good (91%)	$5,359,062

The proposed level of service recommended for bridges and culverts is Scenario 2, which maintains current condition of the infrastructure.

Appendix D: Stormwater Network



Appendix D: Stormwater Network

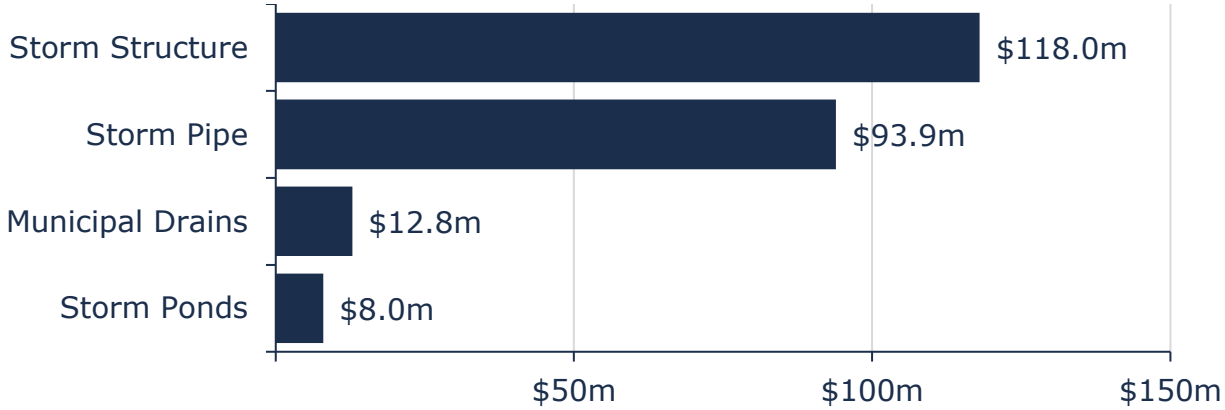
Haldimand County is responsible for owning and maintaining a storm system in the community which is generally made up of storm mains, catch basins, and manholes.

Staff are working towards improving the accuracy and reliability of their stormwater network inventory to assist with long-term asset management planning, as well as assessing the system for capacity and resiliency.

Asset Inventory & Costs

The figure below displays the replacement cost of each asset segment in Haldimand County's storm network inventory.

Figure 30: Storm Network Replacement Cost

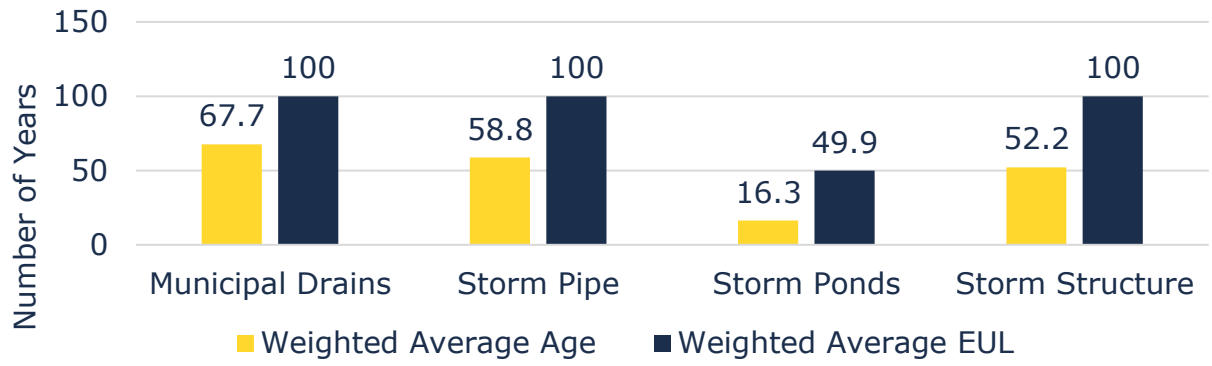


Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurately represent realistic capital requirements.

Asset Condition & Age

The graph below identifies the average age and the EUL for each asset segment. The values are weighted based on replacement cost.

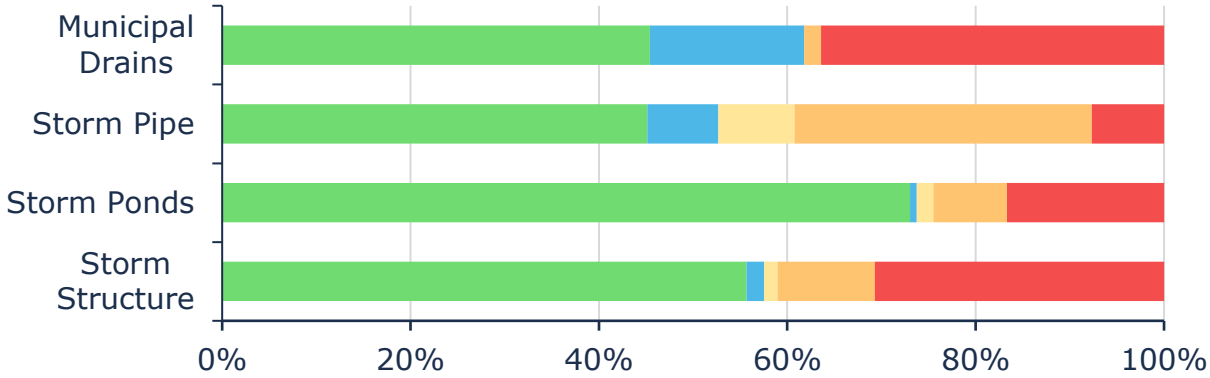
Figure 31: Storm Network Average Age vs Average EUL



Each asset's EUL should also be reviewed periodically to determine whether adjustments need to be made to better align with the observed length of service life for each asset type.

Figure 32 displays the average condition for each asset segment on a Very Good to Very Poor scale for the storm network in Haldimand County. All of the condition data for the storm network is age-based estimates.

Figure 32: Storm Network Condition Breakdown



	Storm Structure	Storm Ponds	Storm Pipe	Municipal Drains
Very Good	$65.7m	$5.8m	$42.4m	$5.8m
Good	$2.2m	$59k	$7.1m	$2.1m
Fair	$1.7m	$140k	$7.6m	
Poor	$12.2m	$621k	$29.6m	$231k
Very Poor	$36.2m	$1.3m	$7.2m	$4.7m

To ensure that Haldimand County's stormwater network continues to provide an acceptable level of service, Haldimand should monitor the average condition of all assets.

Current Approach to Condition Assessment

Accurate and reliable condition data allows staff to determine the remaining service life of assets and identify the most cost-effective approach to managing assets. The following describes Haldimand's current approach:

- All storm ponds were assessed in 2022
- CCTV inspections as part of preliminary inspections 1-3 years in advance of some planned reconstruction projects

Lifecycle Management Strategy

To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration. The following figures outline Haldimand County's current lifecycle management strategy.

Figure 33: Linear Storm Network Current Lifecycle Strategy

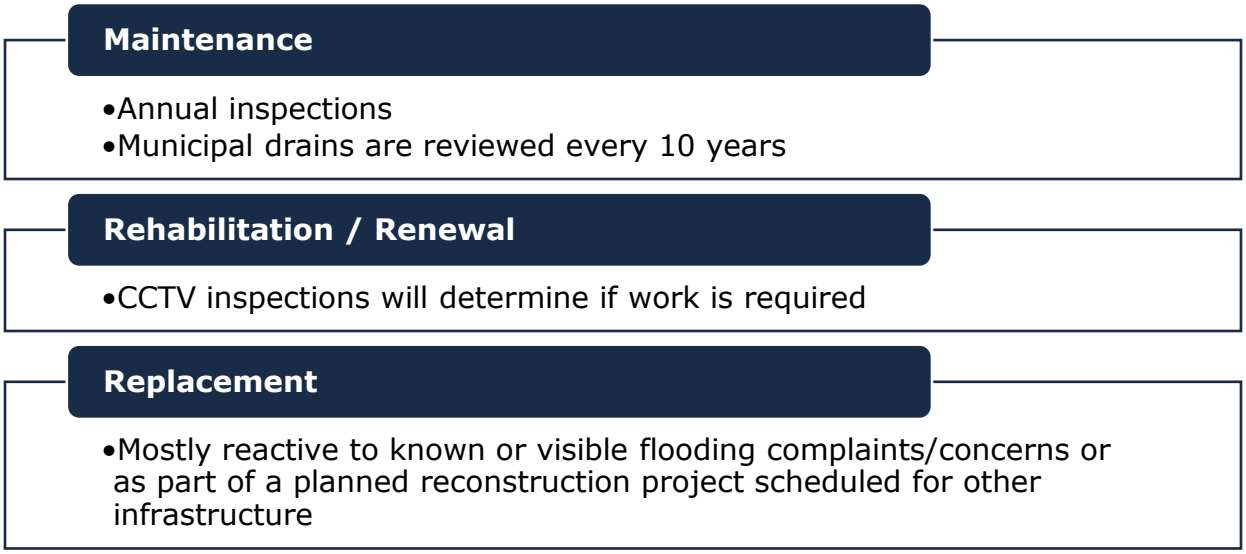


Figure 34: Storm Pond Current Lifecycle Strategy

Risk & Criticality

The following figure provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this category based on available inventory data. See Appendix K: Risk Rating Criteria for the criteria used to determine the risk rating of each asset.

Figure 35: Storm Network Risk Breakdown

1 - 4 Very Low	5 - 7 Low	8 - 9 Moderate	10 - 14 High	15 - 25 Very High
$118,799,654 (51%)	$9,550,172 (4%)	$5,026,685 (2%)	$31,710,548 (14%)	$67,619,364 (29%)

This is a high-level model developed by staff and should be reviewed and adjusted to reflect an evolving understanding of both the probability and consequences of asset failure. The identification of critical assets allows Haldimand to determine risk mitigation strategies and treatment options.

Levels of Service

The framework created by Haldimand County for levels of service is a valuable tool for assessing and managing the performance of their assets and the services provided by these assets. Proposed levels of service for Haldimand County have been developed through engagement with staff.

Current Levels of Service

The following tables identify Haldimand County's current level of service for the stormwater network. These metrics include the technical and community level of service metrics that are required as part of O. Reg. 588/17, as well as any additional performance measures that Haldimand has selected.

Table 15: Storm Network Current Levels of Service

Community LOS		Service Attribute	Technical LOS	
Description, which may include map, of the user groups or areas of the municipality that are protected from flooding, including the extent of protection provided by the municipal storm sewer system	See Appendix A: Level of Service Maps	Scope	Replacement Cost	$232,706,424
			Quantity (Metres of main)	111,423
			% of properties in municipality resilient to a 100-year storm	91%
			% of the municipal storm sewer management system resilient to a 5-year storm	TBD
Description of the condition of the storm network	Condition Description • Very Good - Fit for the future • Good - Adequate for now • Fair - Requires attention • Poor - Increased potential of affecting service • Very Poor - Unfit for sustained service	Quality / Reliability	Average Condition	Good (61%)
			% Condition > Fair	60%
			% Condition poor and very poor	40%
Services will be provided to ensure long-term sustainability for the Municipality		Performance	% Risk that is High and Very High	43%
			Annual reinvestment	$659,070
			Capital reinvestment rate	0.28%

Proposed Levels of Service

To ensure that all asset lifecycles were fully captured, the scenarios used to analyze Haldimand County's asset inventory were run over a 100-year period. These scenarios are based entirely on data from Haldimand County's asset management system, which includes information on EUL, current condition, and replacement costs. All results are derived from this data.

The table below presents the results for each scenario related to the stormwater network. For consistency, the projected average condition for each scenario was measured in the year 2055.

Scenario 1: Current Capital Reinvestment Rate - this scenario utilizes the current capital reinvestment within each asset category. The current annual investment was held, and the condition was determined.

Scenario 2: Current Condition - this scenario utilizes a target of current average condition within each asset category. The condition value was held, and the annual investment was then determined.

Scenario 3: Current Lifecycle Activities - this scenario utilizes the current lifecycle activities outlined as current practice within each asset category. The condition and annual investment were then determined.

Table 16: Scenario Results Summary

Scenarios	Replacement Cost	Projected Average Condition	Annual Capital Reinvestment
Scenario 1 - Current Capital Investment Rate	$233 million	Fair (54%)	$659,070
Scenario 2 - Maintain Current Condition	$233 million	Good (61%)	$1,737,110
Scenario 3 – Lifecycle	$233 million	Very Good (90%)	$2,407,405

The proposed level of service recommended for the stormwater network is Scenario 2, which maintains current condition of the infrastructure.

Appendix E: Water Network

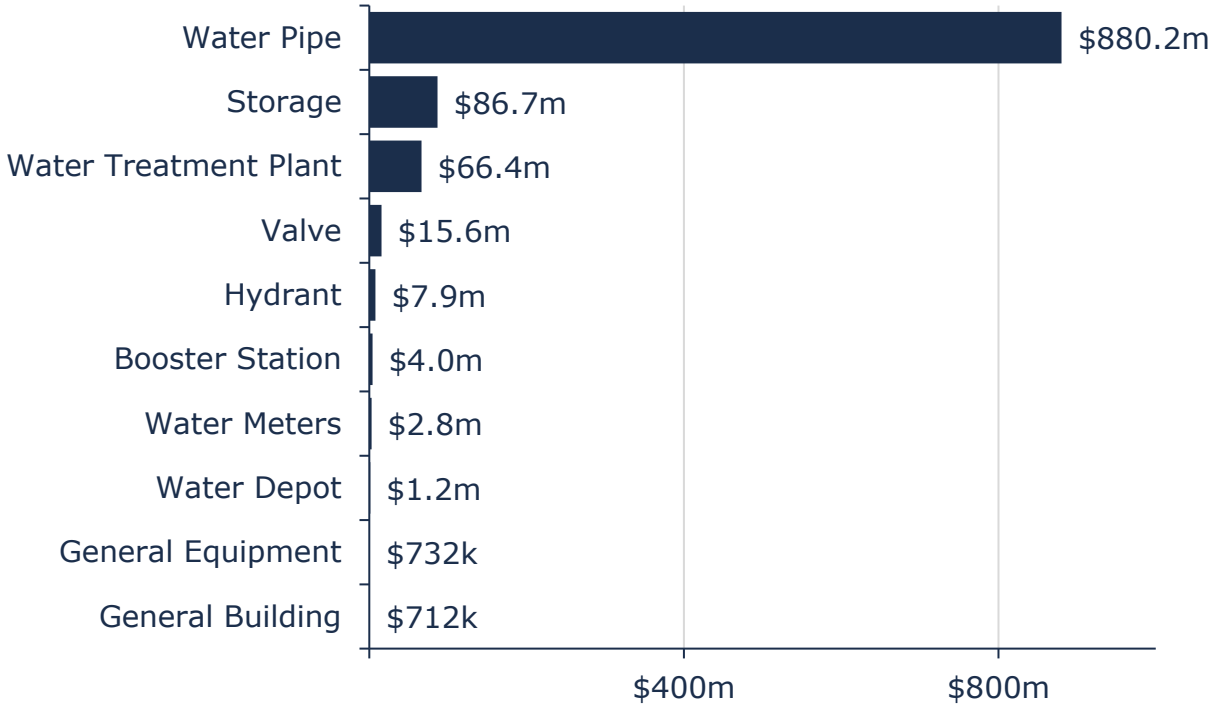
Appendix E: Water Network

Haldimand County's water network includes mains, hydrants, valves, treatment facilities, towers, and bulk water station (water depot), with a total current replacement cost of more than $1 billion.

Inventory & Valuation

The graph below displays the replacement cost of each asset segment in Haldimand County's water network inventory.

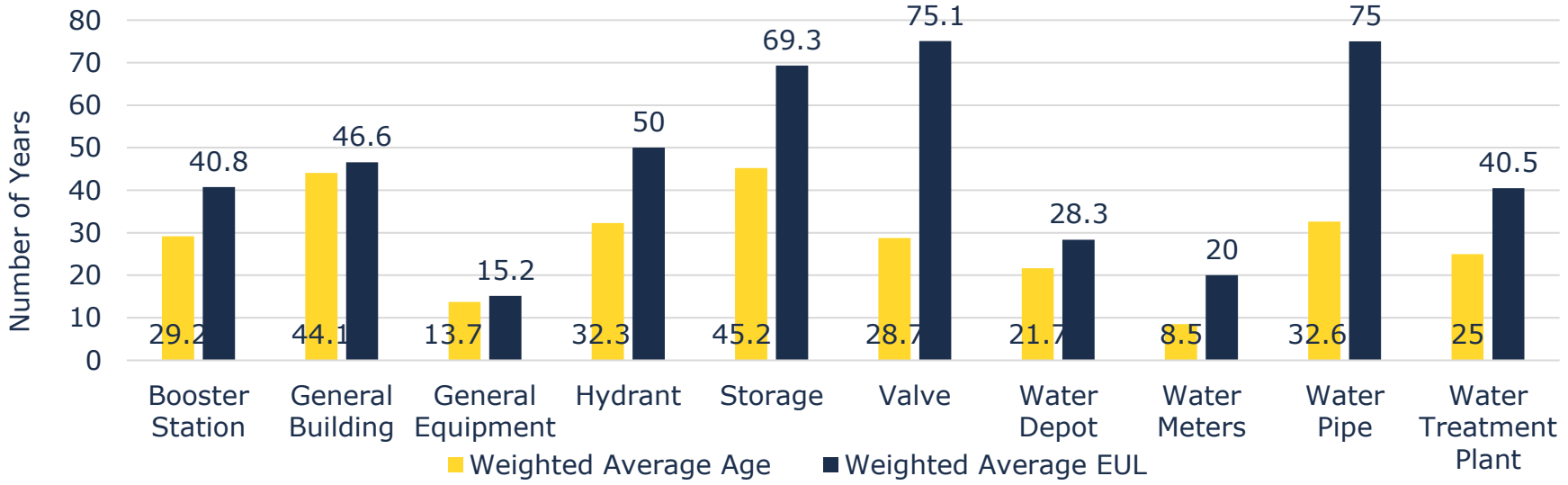
Figure 36: Water Network Replacement Cost



Asset Condition & Age

The graph below identifies the average age, and the EUL for each asset segment. The values are weighted based on replacement cost.

Figure 37: Water Network Average Age vs Average EUL

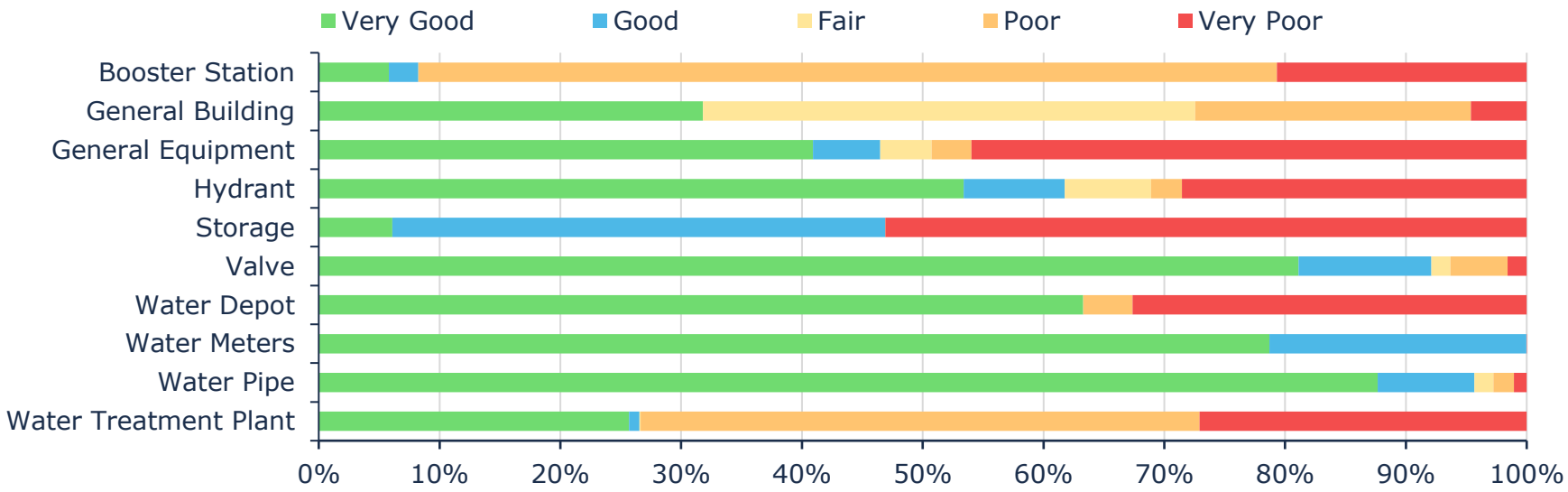


The graph below visually illustrates the average condition for each asset segment on a Very Good to Very Poor scale.

To ensure that Haldimand County's water network continues to provide an acceptable level of service, Haldimand should monitor the average condition of all assets. If the average condition declines, staff should re-evaluate the lifecycle management strategy to determine what combination of activities is required to increase the overall condition of the water network.

Each asset's EUL should also be reviewed periodically to determine whether adjustments need to be made to better align with the observed length of service life for each asset type.

Figure 38: Water Network Condition Breakdown



	Water Treatment Plant	Water Pipe	Water Meters	Water Depot	Valve	Storage	Hydrant	General Equipment	General Building	Booster Station
Very Good	$17.1m	$771.5m	$2.2m	$768k	$12.7m	$5.3m	$4.2m	$299k	$226k	$232k
Good	$563k	$70.5m	$604k		$1.7m	$35.4m	$660k	$41k		$98k
Fair	$66k	$13.8m			$248k		$562k	$31k	$290k	
Poor	$30.7m	$14.9m		$50k	$738k	$13k	$202k	$24k	$162k	$2.8m
Very Poor	$18.0m	$9.4m		$396k	$248k	$46.0m	$2.2m	$336k	$33k	$827k

Current Approach to Condition Assessment

Accurate and reliable condition data allows staff to determine the remaining service life of assets and identify the most cost-effective approach to managing assets. The following describes Haldimand County's current approach:

- Pipes assessed by pipe attributes & external leak detection assessments
- Hydrants & valves based on operations feedback
- Facility condition assessments and performance potential graph review with operations observations

Lifecycle Management Strategy

To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration. The following figures outline Haldimand County's current lifecycle management strategy.

Figure 39: Linear Water Network Current Lifecycle Strategy

Maintenance

- Flushing, fireflow testing, sampling and residual checks

Rehabilitation / Renewal

- Failure frequencies, leak detection assessments and water modelling

Replacement

- Determined using service life estimates, feedback from operations, rebuild vs. replace cost comparison
- Engineering uses a generalized matrix utilizing condition ratings, as well as input from operations staff to create a 10 year capital replacement plan

Figure 40: Water Network Facilities Current Lifecycle Strategy

Maintenance

- Operations assessments

Rehabilitation / Renewal

- Failure frequencies, service life estimates and determining if the equipment is obsolete or can no longer be serviced

Replacement

- Service life estimates, feedback from operations, rebuild vs. replace cost comparison

Risk & Criticality

The following risk breakdown provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category based on available inventory data. See Appendix K: Risk Rating Criteria for the criteria used to determine the risk rating of each asset.

Figure 41: Water Network Risk Breakdown

1 - 4 **Very Low**	5 - 7 **Low**	8 - 9 **Moderate**	10 - 14 **High**	15 - 25 **Very High**
$825,911,243 (77%)	$75,506,306 (7%)	$22,250,013 (2%)	$56,767,103 (5%)	$85,840,735 (8%)

This is a high-level model developed by municipal staff and should be reviewed and adjusted to reflect an evolving understanding of both the probability and consequences of asset failure. The identification of critical assets allows Haldimand County to determine appropriate risk mitigation strategies and treatment options.

Levels of Service

The framework created by Haldimand County for levels of service is a valuable tool for assessing and managing the performance of their assets and the services provided by these assets. Proposed levels of service for Haldimand have been developed through engagement with staff.

Current Levels of Service

The following tables identify Haldimand County's current level of service for the water network. These metrics include the technical and community level of service metrics that are required as part of O. Reg. 588/17, as well as any additional performance measures that Haldimand has selected.

Table 17: Water Network Current Levels of Service

Community LOS		Service Attribute	Technical LOS	
Description, which may include maps, of the user groups or areas of the municipality that are connected to the municipal water system	See Appendix A: Level of Service Maps	Scope	Replacement Cost	$1,066,275,399
			Quantity (Metres of main)	806,459
			Quantity (# of Plants)	2
Description, which may include maps, of the user groups or areas of the municipality that have fire flow	See Appendix A: Level of Service Maps		% of properties connected to the municipal water system	46%
			% of properties where fire flow is available	46%
Description of boil water advisories and service interruptions	There have been no boil water advisories in Haldimand County in 2024 and 11 main breaks	Quality / Reliability	# 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	0
			# of connection-days per year where water is not available to water main breaks compared to the total number of properties connected to the municipal water system	0.0016[1]

[1] The duration of water main breaks is not recorded therefore 1 day was used per break to create the metric. The duration and number of customers affected will be included in tracking going forward.

Community LOS		Service Attribute	Technical LOS	
Description of the condition of the water network	Condition Description • Very Good - Fit for the future • Good - Adequate for now • Fair - Requires attention • Poor - Increased potential of affecting service • Very Poor - Unfit for sustained service		Average Condition	Very Good (80%)
			% Condition > Fair	88%
			% Condition poor and very poor	12%
Services will be provided to ensure long-term sustainability for the Municipality		Performance	% Risk that is High and Very High	13%
			Annual reinvestment	$2,074,899
			Capital reinvestment rate	0.19%

Proposed Levels of Service

The proposed level of service recommended for the water network is based on the completion of the water and sanitary rate study and financial plan targeted at the end of 2026. Until then, the service will remain the same.

Appendix F: Sanitary Network

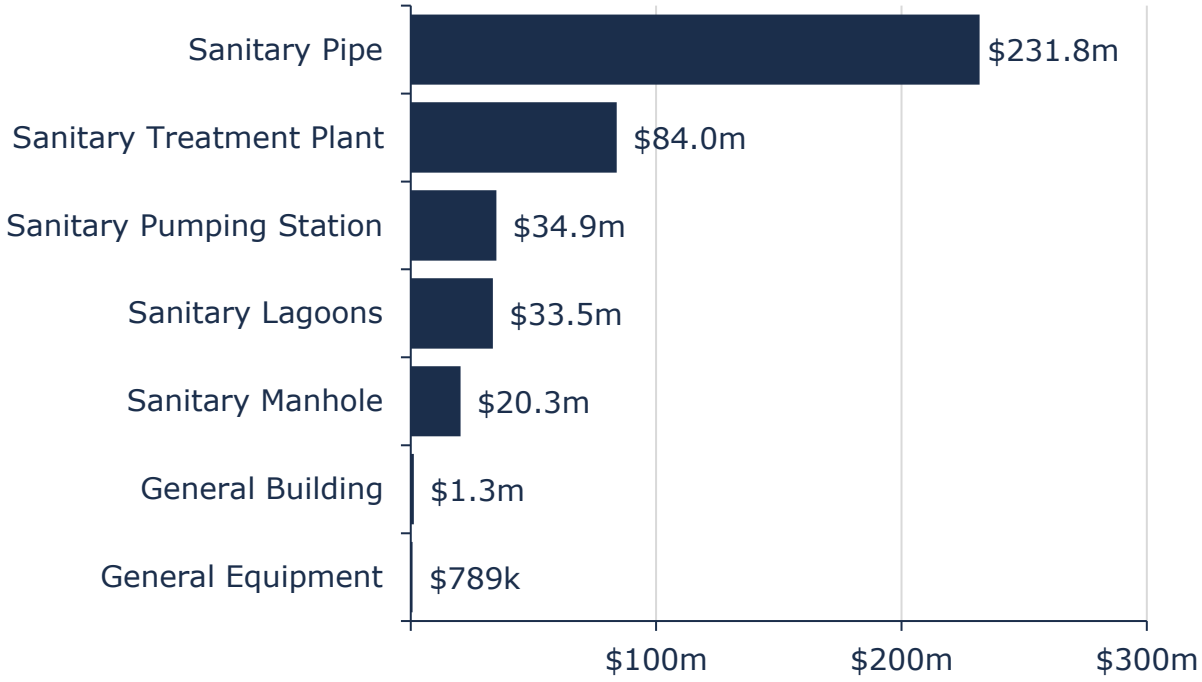
Appendix F: Sanitary Network

Haldimand County's sanitary network infrastructure includes sewer mains, treatment plants, lagoons, pumping stations and various appurtenances. The total current replacement of Haldimand's sanitary collection and treatment infrastructure is estimated at approximately $391 million.

Asset Inventory & Valuation

The graph below displays the replacement cost of each asset segment in Haldimand County's sanitary network inventory.

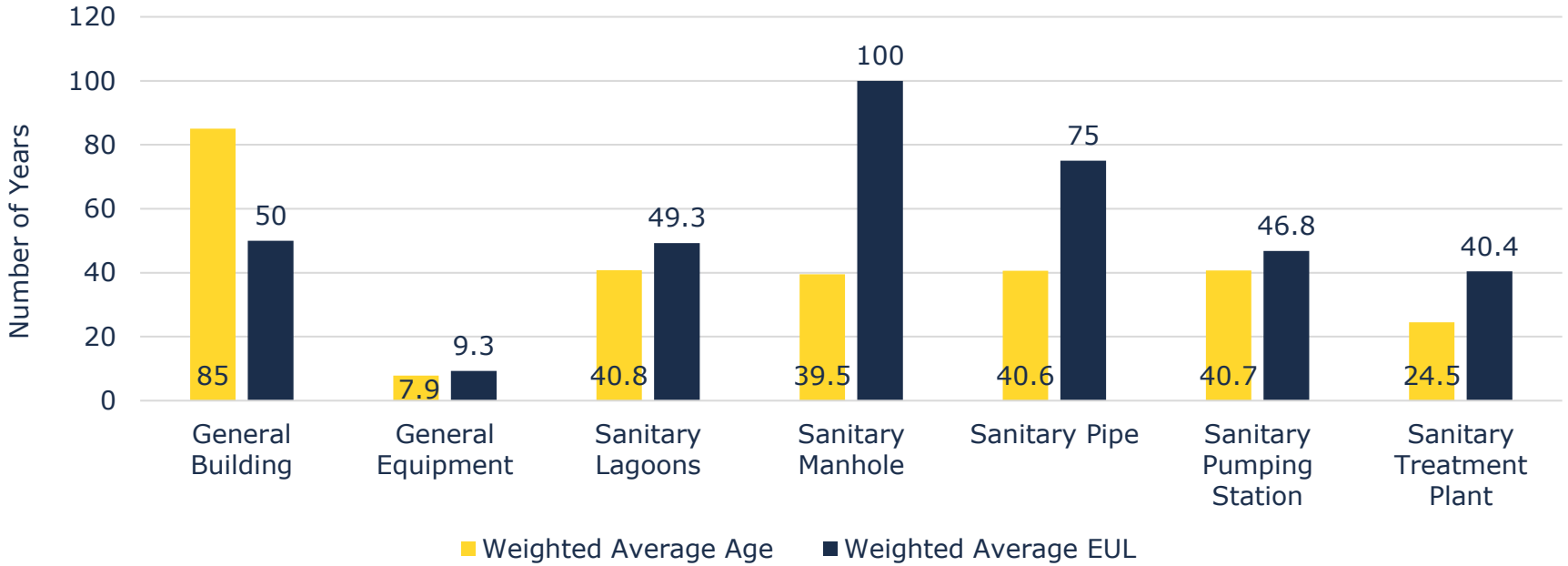
Figure 42: Sanitary Network Replacement Cost



Asset Condition & Age

The graph below identifies the average age, and the EUL for each asset segment. The values are weighted based on replacement cost.

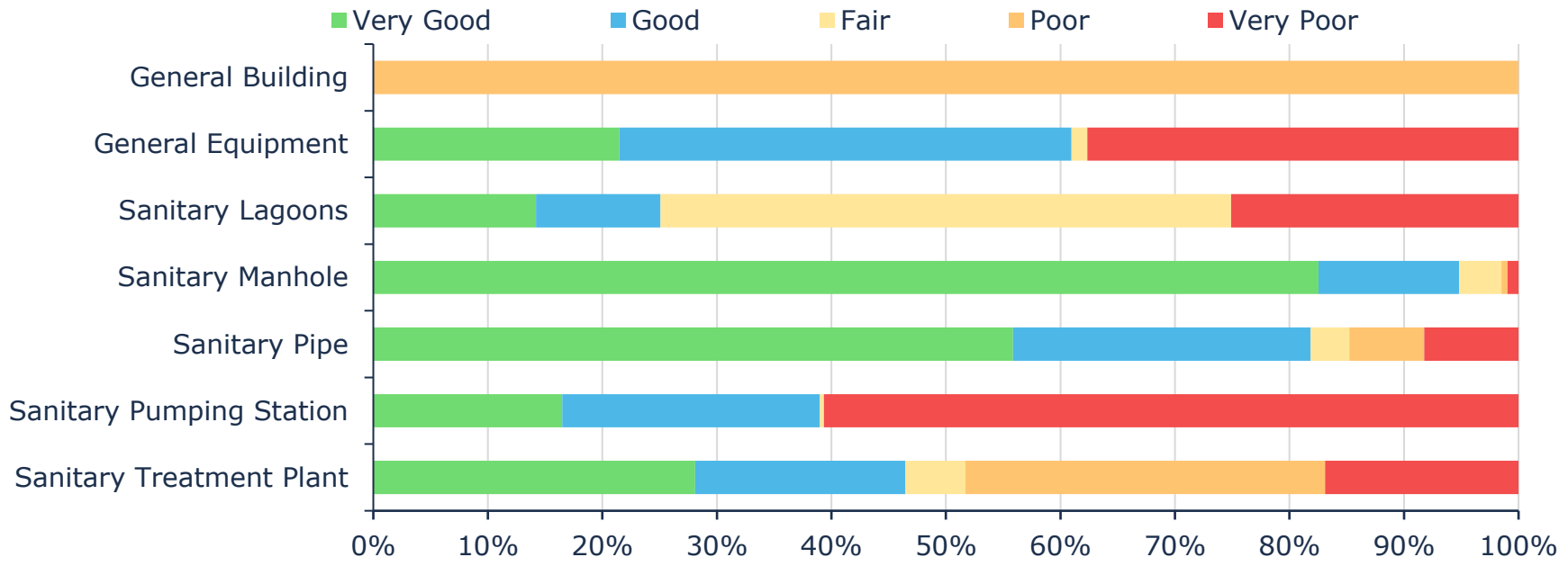
Figure 43: Sanitary Network Average Age vs Average EUL



The graph below visually illustrates the average condition for each asset segment on a Very Good to Very Poor scale.

To ensure that Haldimand County's sanitary network continues to provide an acceptable level of service, Haldimand should monitor the average condition of all assets. If the average condition declines, staff should re-evaluate their lifecycle management strategy to determine what combination of activities is required to increase the overall condition of the sanitary network.

Figure 44: Sanitary Network Condition Breakdown



	Sanitary Treatment Plant	Sanitary Pumping Station	Sanitary Pipe	Sanitary Manhole	Sanitary Lagoons	General Equipment	General Building
Very Good	$23.6m	$5.7m	$129.5m	$16.7m	$4.8m	$169k	
Good	$15.4m	$7.8m	$60.3m	$2.5m	$3.6m	$311k	
Fair	$4.4m	$123k	$7.8m	$752k	$16.7m	$11k	
Poor	$26.4m		$15.2m	$107k	$7k		$1.3m
Very Poor	$14.2m	$21.1m	$19.1m	$195k	$8.4m	$297k	

Current Approach to Condition Assessment

Accurate and reliable condition data allows staff to determine the remaining service life of assets and identify the most cost-effective approach to managing assets. The following describes Haldimand County's current approach:

- Equipment is assessed based on capacity and service life
- Sanitary facilities are assessed against design
- Zoom camera inspections based on criticality
- CCTV Inflow & Infiltration Program

Lifecycle Management Strategy

To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration. The following figures outline Haldimand County's current lifecycle management strategy.

Figure 45: Linear Sanitary Network Current Lifecycle Strategy

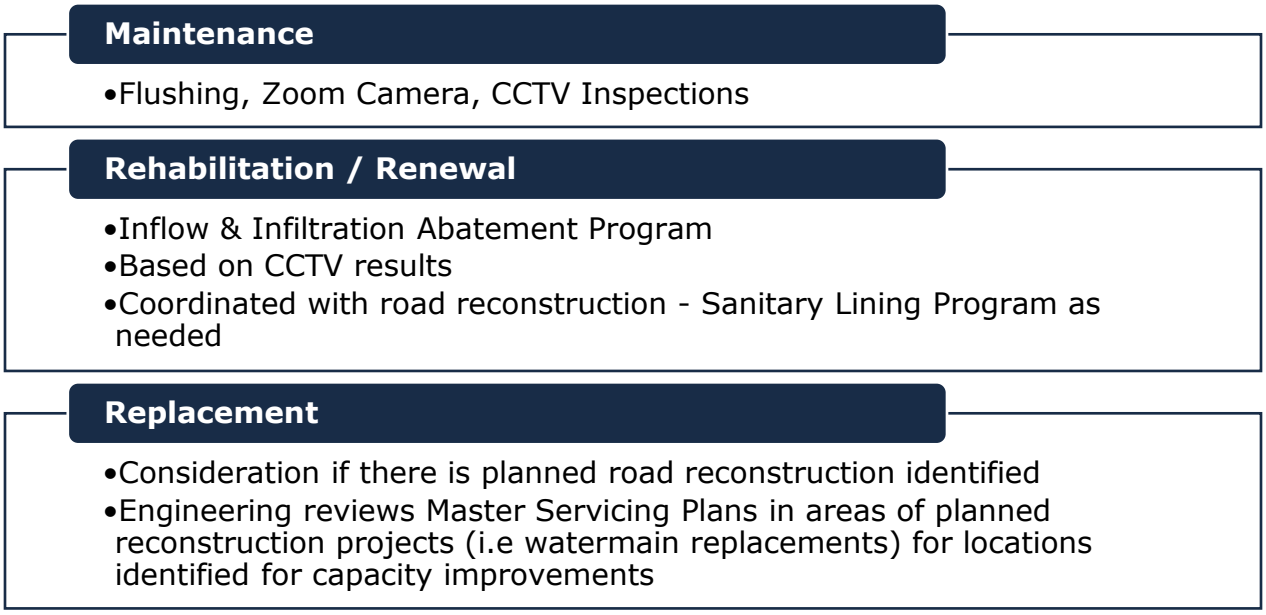
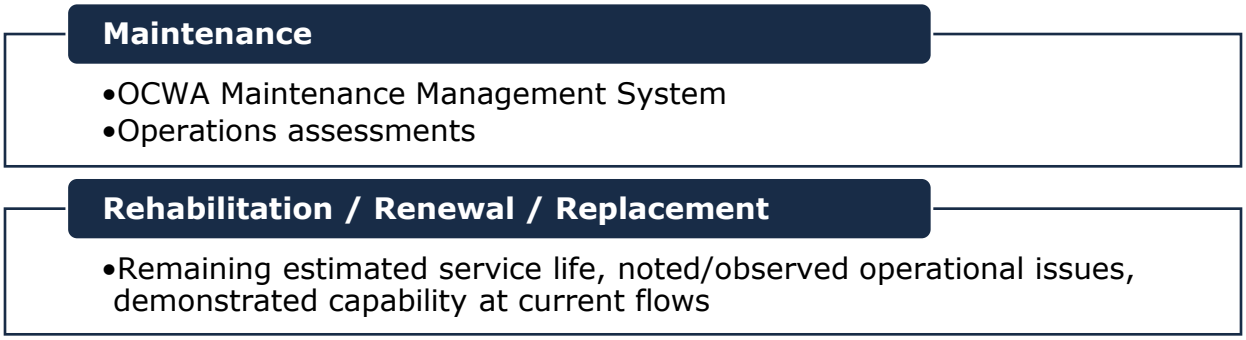


Figure 46: Sanitary Network Facilities Current Lifecycle Strategy



Risk & Criticality

The following figure provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this category based on available inventory data. See Appendix K: Risk Rating Criteria for the criteria used to determine the risk rating of each asset.

Figure 47: Sanitary Network Risk Breakdown

1 - 4 Very Low	5 - 7 Low	8 - 9 Moderate	10 - 14 High	15 - 25 Very High
$223,204,426 (55%)	$45,266,653 (11%)	$25,033,158 (6%)	$48,349,787 (12%)	$64,618,316 (16%)

This is a high-level model developed by municipal staff and should be reviewed and adjusted to reflect an evolving understanding of both the probability and consequences of asset failure. The identification of critical assets allows Haldimand County to determine appropriate risk mitigation strategies and treatment options.

Levels of Service

The framework created by Haldimand County for levels of service is a valuable tool for assessing and managing the performance of their assets and the services provided by these assets. Proposed levels of service for Haldimand have been developed through engagement with staff.

Current Levels of Service

The following tables identify Haldimand County's current level of service for the sanitary network. These metrics include the technical and community level of service metrics that are required as part of O. Reg. 588/17, as well as any additional performance measures that Haldimand has selected.

Table 18: Sanitary Network Current Levels of Service

Community LOS		Service Attribute	Technical LOS	
Description, which may include maps, of the user groups or areas of the municipality that are connected to the municipal wastewater system	See Appendix A: Level of Service Maps	Scope	Replacement Cost	$406,472,340
			Quantity (Metres of main)	160,013
			Quantity (# of Plants)	8
			% of properties connected to the municipal wastewater system	45%
Description of how stormwater can get into sanitary sewers in the municipal wastewater system, causing sewage to overflow into streets or backup into homes	Stormwater can enter into sanitary sewers due to cracks in sanitary mains or through indirect connections (e.g. weeping tiles). In the case of heavy rainfall events, sanitary sewers may experience a volume of water and sewage that exceeds its designed capacity.	Quality / Reliability	# of events per year where combined sewer flow in the municipal wastewater system exceeds system capacity compared to the total number of properties connected to the municipal wastewater system	n/a
Description of how sanitary sewers in the municipal wastewater system are designed to be resilient to stormwater infiltration	The County follows a series of design standards that integrate servicing requirements and land use considerations when constructing or replacing sanitary sewers.		# of connection-days per year having wastewater backups compared to the total number of properties connected to the municipal wastewater system	6 instances where the sanitary main was surcharged and backed up
Description of the effluent that is discharged from sewage treatment plants in the municipal wastewater system	Effluent refers to water that is discharged from a sanitary treatment plant, and may include suspended solids, total phosphorous and biological oxygen demand. The Environmental Compliance Approval (ECA) identifies the effluent criteria for municipal wastewater treatment plants.		# of effluent violations per year due to wastewater discharge compared to the total number of properties connected to the municipal wastewater system	Jarvis Lagoon - 1 day past discharge time window Townsend Lagoons - E.Coli ECA Effluent Violations All other facilities - No ECA Effluent Violations

Community LOS		Service Attribute	Technical LOS	
Description of the condition of the sanitary network	Condition Description • Very Good - Fit for the future • Good - Adequate for now • Fair - Requires attention • Poor - Increased potential of affecting service • Very Poor - Unfit for sustained service		Average Condition	Good (66%)
			% Condition > Fair	74%
			% Condition poor and very poor	26%
Services will be provided to ensure long-term sustainability for the Municipality		Performance	% Risk that is High and Very High	28%
			Annual reinvestment	$2,150,399
			Capital reinvestment rate	0.53%

Proposed Levels of Service

The proposed level of service recommended for the sanitary network is based on the completion of the water and sanitary rate study and financial plan targeted at the end of 2026. Until then, the service will remain the same.

Appendix G: Buildings

Appendix G: Buildings

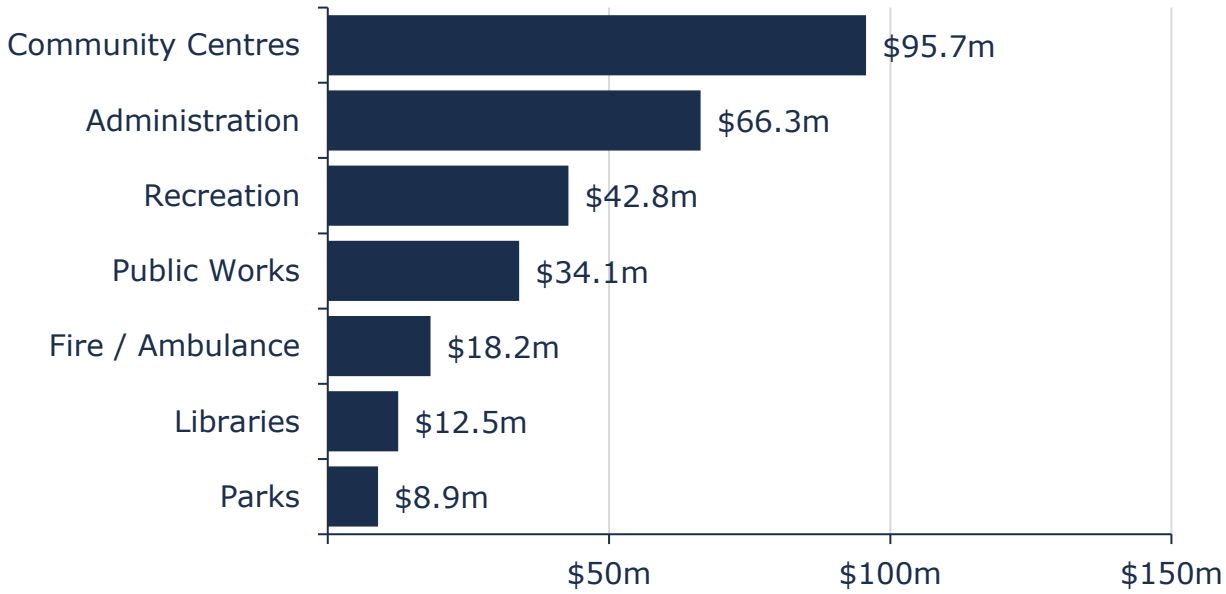
Haldimand County owns and maintains several facilities that provide key services to the community. These include:

- administrative offices
- fire / ambulance stations
- recreation
- public works garages and storage sheds
- community centres
- parks
- libraries

Inventory & Valuation

The graph below displays the total replacement cost of each asset segment in Haldimand County's buildings inventory. As Haldimand is in the process of developing their building inventory structure for asset management, buildings such as museums and long-term care facilities are contained within other categories shown below.

Figure 48: Buildings Replacement Cost

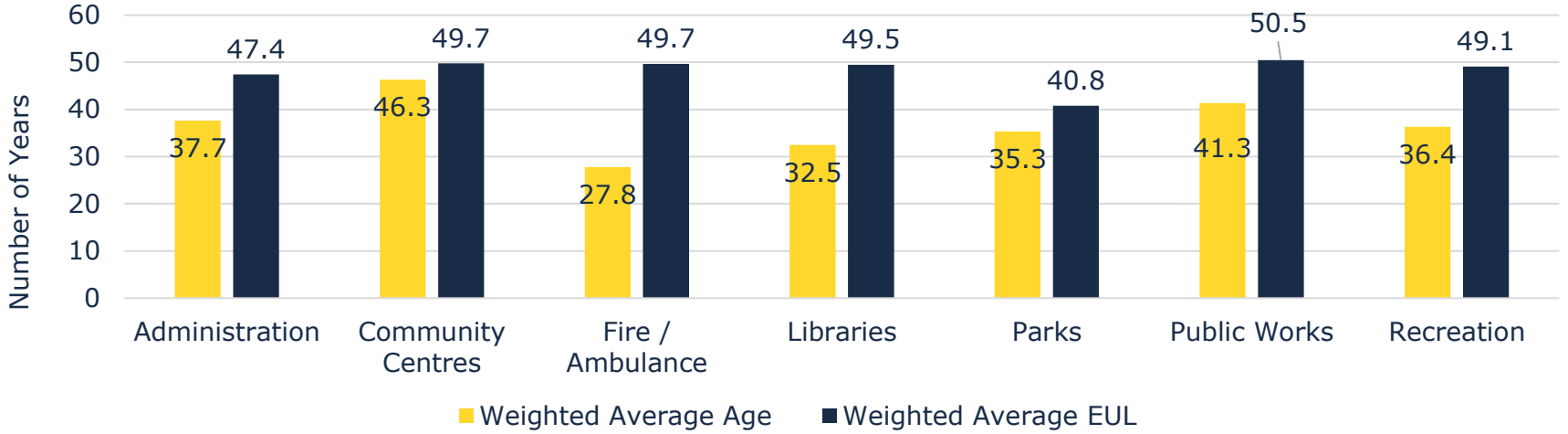


Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to represent capital requirements more accurately.

Asset Condition & Age

The graph below identifies the average age, and the EUL for each asset segment. The values are weighted based on replacement cost.

Figure 49: Buildings Average Age vs Average EUL

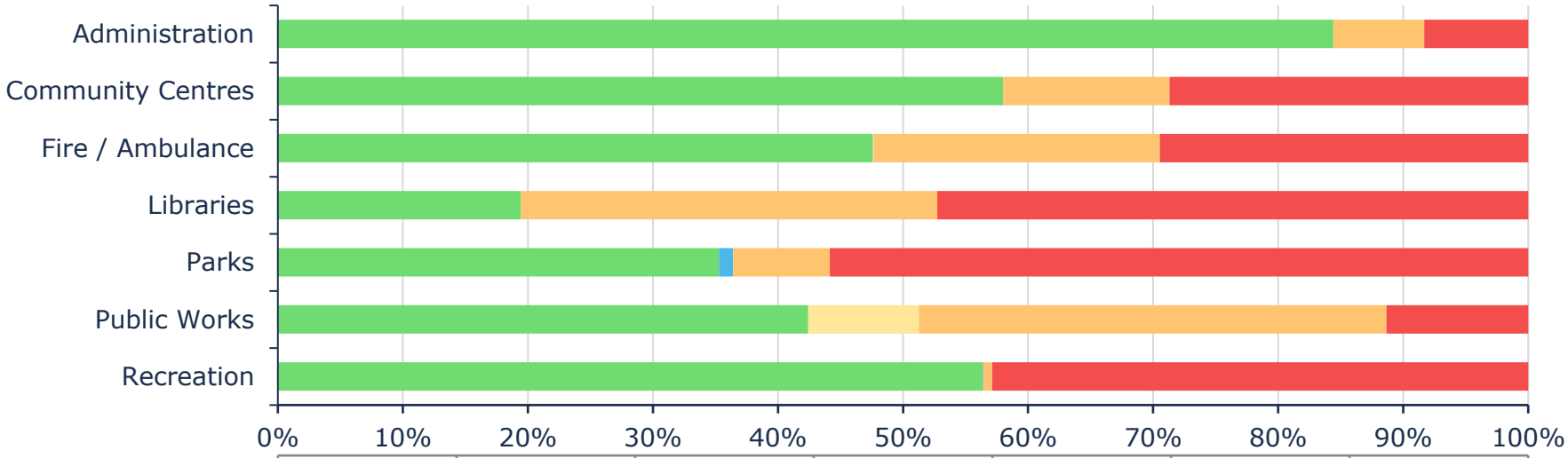


These assets are not componentized in detail which limits the accuracy of projections. The graph below visually illustrates the average condition for each asset segment on a Very Good to Very Poor scale.

To ensure that municipal buildings continue to provide an acceptable level of service, Haldimand should monitor the average condition of all assets. If the average condition declines, staff should re-evaluate their lifecycle management strategy to determine what combination of maintenance, rehabilitation and replacement activities is required to increase the overall condition of the buildings.

Each asset's EUL should also be reviewed to determine whether adjustments need to be made to better align with the observed service life.

Figure 50: Buildings Condition Breakdown



	Recreation	Public Works	Parks	Libraries	Fire / Ambulance	Community Centres	Administration
Very Good	$24.1m	$14.4m	$3.1m	$2.4m	$8.7m	$55.5m	$56.0m
Good	$20k		$101k				
Fair		$3.0m			$7k		
Poor	$300k	$12.7m	$690k	$4.2m	$4.2m	$12.7m	$4.8m
Very Poor	$18.4m	$3.9m	$5.0m	$5.9m	$5.4m	$27.5m	$5.5m

Current Approach to Condition Assessment

Accurate and reliable condition data allows staff to determine the remaining service life of assets and identify the most cost-effective approach to managing assets. Buildings are condition assessed every 5 years.

Lifecycle Management Strategy

To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration. The following figure outlines Haldimand County's current lifecycle management strategy.

Figure 51: Buildings Current Lifecycle Strategy

Maintenance / Rehabilitation

- Maintenance of buildings is dealt with on a case-by-case basis
- Contractors complete regulatory inspections and maintenance

Replacement

- Currently undergoing a complete building condition assessment which will provide lifecycle recommendations going forward.

Risk & Criticality

The figure below provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this category based on available inventory data. See Appendix K: Risk Rating Criteria for the criteria used to determine the risk rating of each asset.

Figure 52: Buildings Risk Breakdown

1 - 4	5 - 7	8 - 9	10 - 14	15 - 25
Very Low	Low	Moderate	High	Very High
$76,759,807	$87,747,388	$427,923	$15,660,475	$97,986,933
(28%)	(31%)	(<1%)	(6%)	(35%)

This is a high-level model that has been developed based on information currently available and should be reviewed and adjusted to reflect an evolving understanding of both the probability and consequences of asset failure.

The identification of critical assets allows Haldimand County to determine risk mitigation strategies and treatment options. Risk mitigation may include asset-specific lifecycle strategies, condition assessment strategies, or simply the need to collect better asset data.

Levels of Service

The framework created by Haldimand County for levels of service is a valuable tool for assessing and managing the performance of their assets and the services provided by these assets. Proposed levels of service for Haldimand have been developed through engagement with staff.

Current Levels of Service

The following tables identify Haldimand County's current level of service for municipal buildings. These metrics include the technical and community level of service metrics that Haldimand County has selected.

Table 19: Buildings Current Level of Service

Community LOS		Service Attribute	Technical LOS	
Description of the services provided by municipal buildings	Services provided by municipal facilities are based on the types of facilities outlined below: • administrative offices • library and community centre • fire halls and associated offices and facilities • public works garages and storage sheds • recreation buildings • parks	Scope	Replacement Cost	$278,582,526
			Quantity (square feet)	729,352
Description of the condition of municipal buildings	Condition Description • Very Good - Fit for the future • Good - Adequate for now • Fair - Requires attention • Poor - Increased potential of affecting service • Very Poor - Unfit for sustained service	Quality / Reliability	Average Condition	Good (64%)
			% Condition > Fair	50%
			% Condition poor and very poor	50%
Services will be provided to ensure long-term sustainability for the Municipality		Performance	% Risk that is High and Very High	51%
			Annual reinvestment	$2,536,847
			Capital reinvestment rate	0.91%

Proposed Levels of Service

To ensure that all asset lifecycles were fully captured, the scenarios used to analyze Haldimand County's asset inventory were run over a 100-year period. These scenarios are based entirely on data from Haldimand County's asset management system, which includes information on EUL, current condition, and replacement costs. All results are derived from this data.

The table below presents the results for each scenario related to buildings. For consistency, the projected average condition for each scenario was measured in the year 2055.

Scenario 1: Current Capital Reinvestment Rate - this scenario utilizes the current capital reinvestment within each asset category. The current annual investment was held, and the condition was determined.

Scenario 2: Current Condition - this scenario utilizes a target of current average condition within each asset category. The condition value was held, and the annual investment was then determined.

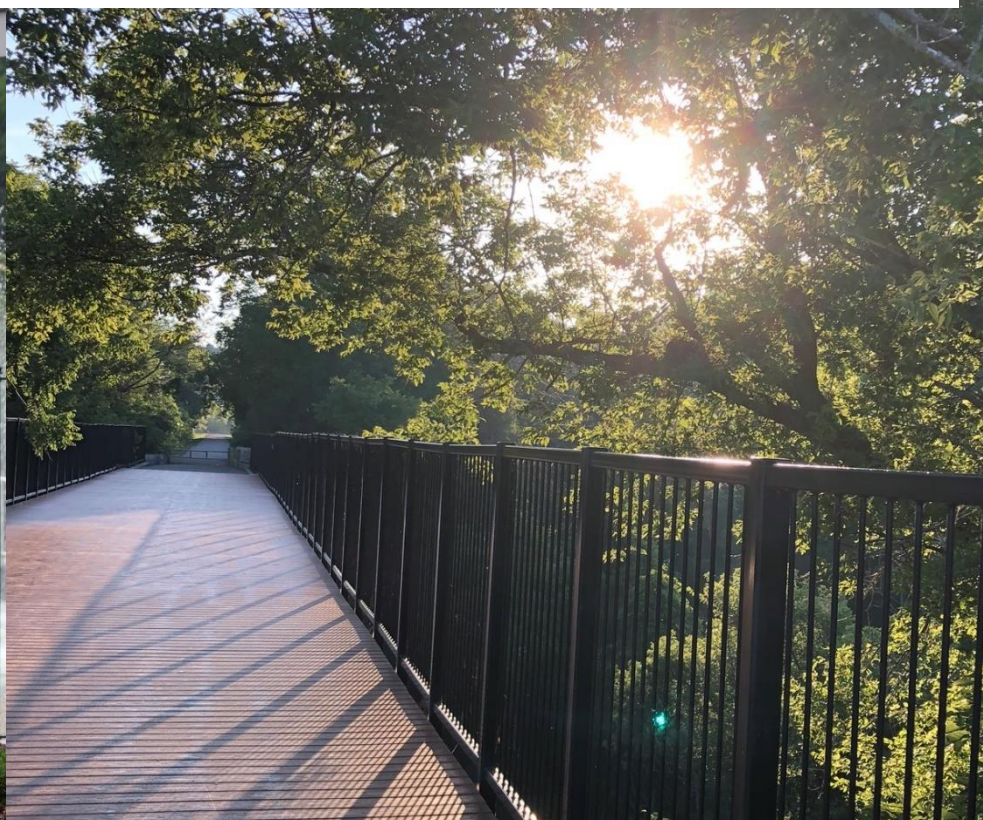
Scenario 3: Current Lifecycle Activities - this scenario utilizes the current lifecycle activities outlined as current practice within each asset category. The condition and annual investment were then determined.

Table 20: Scenario Results Summary

Scenarios	Replacement Cost	Projected Average Condition	Annual Capital Reinvestment
Scenario 1 - Current Capital Investment Rate	$279 million	Fair (46%)	$2,536,847
Scenario 2 - Maintain Current Condition	$279 million	Good (64%)	$3,997,503
Scenario 3 – Lifecycle	$279 million	Good (68%)	$5,740,839

The proposed level of service recommended for buildings is Scenario 2, which maintains current condition of the infrastructure.

Appendix H: Land Improvements



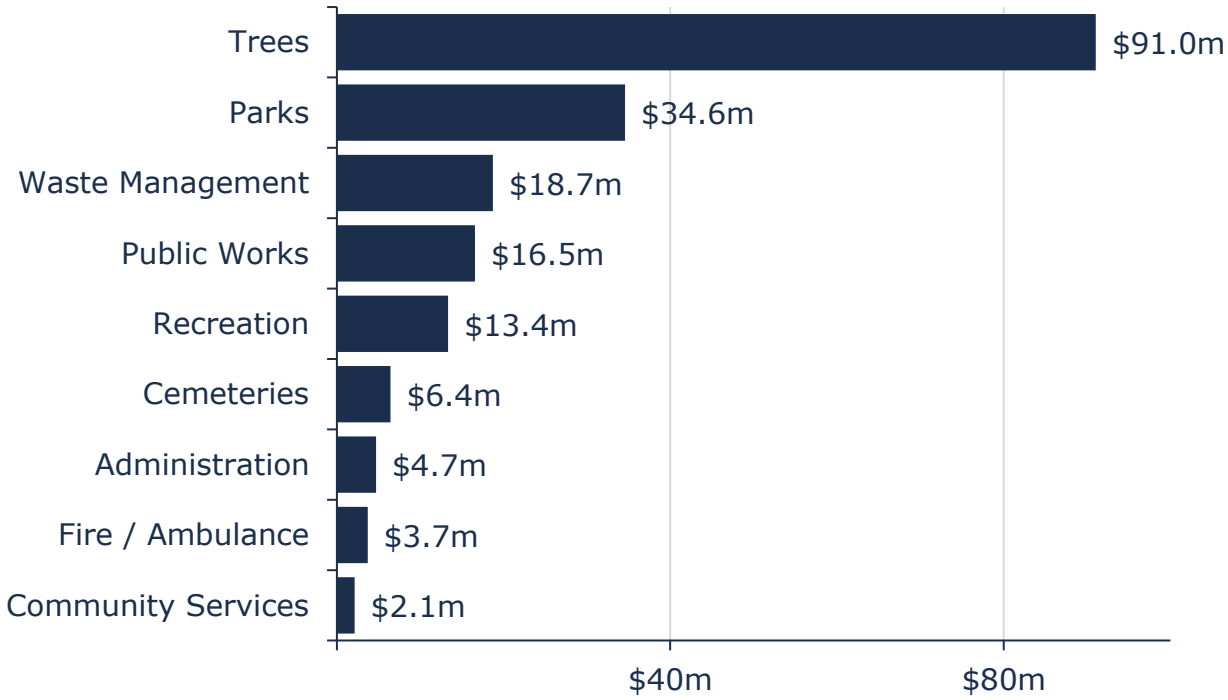
Appendix H: Land Improvements

Haldimand County owns several assets that are considered land improvements. This category includes park and sports field assets like ball diamonds, soccer fields, outdoor rinks, pathways and waste management areas. It also includes exterior facility assets such as parking lots and fencing. Street, park and cemetery trees are included in this category as well.

Inventory & Valuation

The graph below displays the total replacement cost of each asset segment in Haldimand County's land improvement inventory.

Figure 53: Land Improvements Replacement Cost

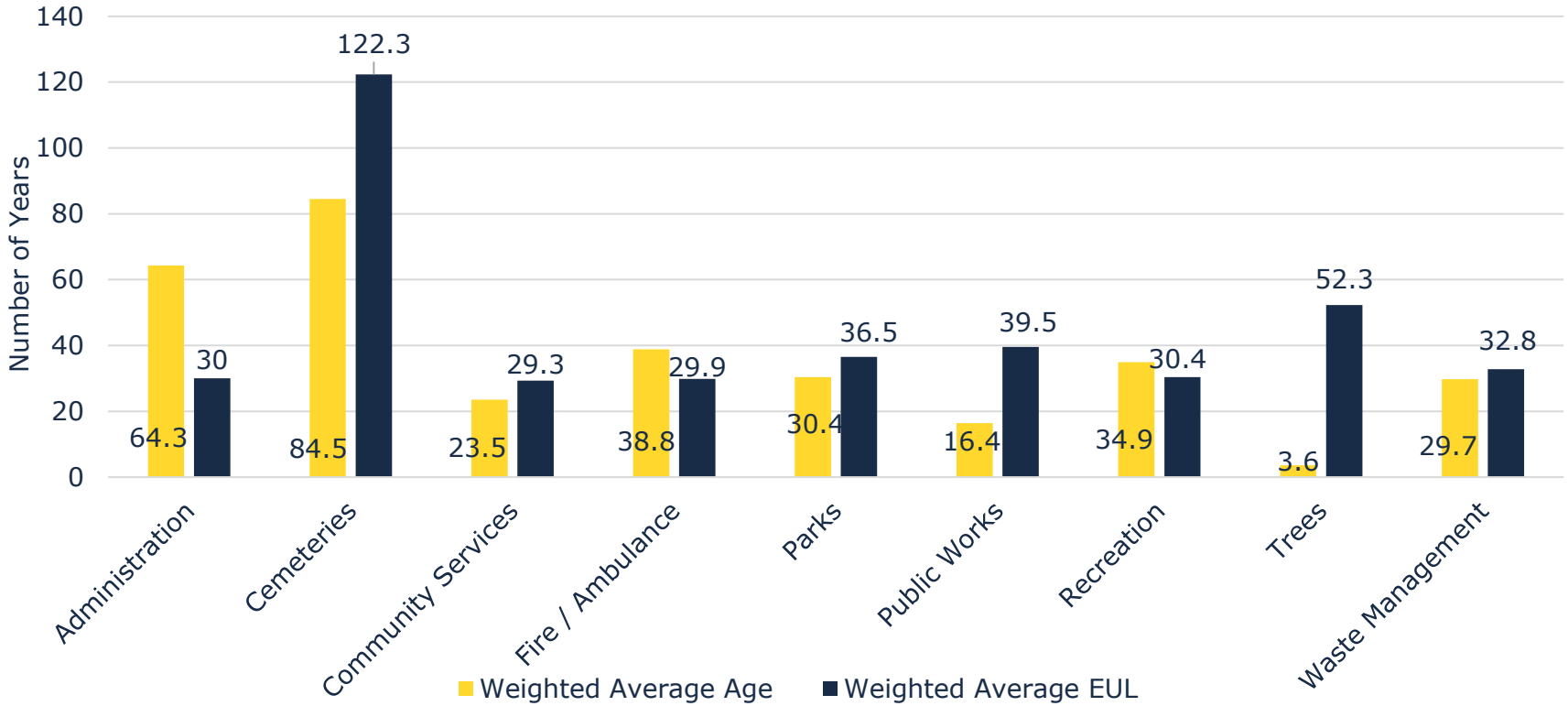


Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to represent capital requirements more accurately.

Asset Condition & Age

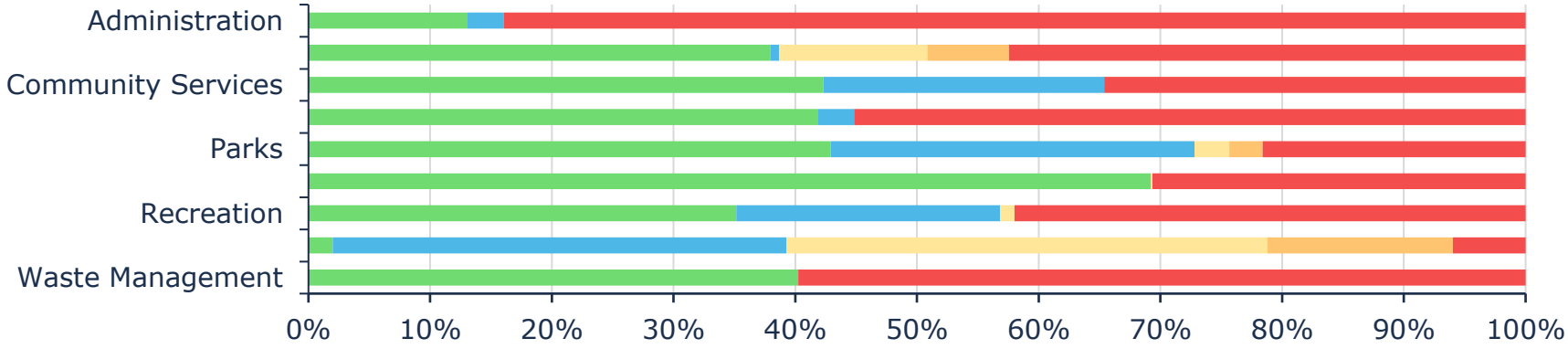
The graph below identifies the average age, and the EUL for each asset segment. The values are weighted based on replacement cost.

Figure 54: Land Improvements Average Age vs Average EUL



The graph below visually illustrates the average condition for each asset segment on a Very Good to Very Poor scale.

Figure 55: Land Improvements Condition Breakdown



	Waste Management	Trees	Recreation	Public Works	Parks	Fire / Ambulance	Community Services	Cemeteries	Administration
Very Good	$7.5m	$1.8m	$4.7m	$11.5m	$14.8m	$1.5m	$895k	$2.4m	$610k
Good		$33.9m	$2.9m		$10.3m	$111k	$488k	$45k	$143k
Fair		$36.0m	$157k	$18k	$989k			$786k	
Poor		$13.9m			$946k			$430k	
Very Poor	$11.2m	$5.4m	$5.6m	$5.1m	$7.5m	$2.0m	$733k	$2.7m	$3.9m

To ensure that Haldimand County's land improvements continue to provide an acceptable level of service, Haldimand should monitor the average condition of all assets. If the average condition declines, staff should re-evaluate their lifecycle management strategy to determine what combination of maintenance, rehabilitation and replacement activities is required to increase the overall condition.

Each asset's EUL should also be reviewed periodically to determine whether adjustments need to be made to better align with the observed length of service life for each asset type.

Current Approach to Condition Assessment

Accurate and reliable condition data allows staff to determine the remaining service life of assets and identify the most cost-effective approach to managing assets. The current approach varies significantly due to the varied assets included in this category.

- Parks are inspected monthly and in accordance with CSA best practices
- Trees are on a 7-year inspection cycle

Lifecycle Management Strategy

To ensure that municipal assets are performing as expected and meeting the needs of residents, it is important to establish a lifecycle management strategy to proactively manage asset deterioration. The following figure outlines the current lifecycle management strategy.

Figure 56: Land Improvement Current Lifecycle Strategy

Maintenance

- As needed and identified through inspections

Rehabilitation / Replacement

- As identified through deficiency inspections or failures

Risk & Criticality

The figure below provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this category based on available inventory data. See Appendix K: Risk Rating Criteria for the criteria used to determine the risk rating of each asset.

Figure 57: Land Improvements Risk Breakdown

1 - 4 Very Low	5 - 7 Low	8 - 9 Moderate	10 - 14 High	15 - 25 Very High
$51,620,678 (27%)	$71,293,478 (37%)	$19,272,290 (10%)	$11,127,451 (6%)	$37,827,284 (20%)

This is a high-level model that has been developed based on information currently available and should be reviewed and adjusted to reflect an evolving understanding of both the probability and consequences of asset failure.

The identification of critical assets allows the County to determine risk mitigation strategies and treatment options. Risk mitigation may include asset-specific lifecycle strategies, condition assessment strategies, or simply the need to collect better asset data.

Levels of Service

The framework created by Haldimand County for levels of service is a valuable tool for assessing and managing the performance of their assets and the services provided by these assets. Proposed levels of service for Haldimand have been developed through engagement with staff.

Current Levels of Service

The following tables identify Haldimand County's current level of service for land improvements. These metrics include the technical and community level of service metrics that Haldimand has selected.

Table 21: Land Improvements Current Level of Service

Community LOS		Service Attribute	Technical LOS	
Description of the services provided by municipal land improvements	Services provided by municipal land improvements are based on the assets outlined below: • administration • waste management • community services • fire / ambulance • public works • recreation • parks • cemeteries	Scope	Replacement Cost	$191,141,181
			Quantity (trees)	26,359
Description of the condition of land improvements	Condition Description • Very Good - Fit for the future • Good - Adequate for now • Fair - Requires attention • Poor - Increased potential of affecting service • Very Poor - Unfit for sustained service	Quality / Reliability	Average Condition	Fair (52%)
			% Condition > Fair	69%
			% Condition poor and very poor	31%
Services will be provided to ensure long-term sustainability for the Municipality		Performance	% Risk that is High and Very High	26%
			Annual reinvestment	$1,833,908
			Capital reinvestment rate	0.96%

Proposed Levels of Service

To ensure that all asset lifecycles were fully captured, the scenarios used to analyze Haldimand County's asset inventory were run over a 100-year period. These scenarios are based entirely on data from Haldimand County's asset management system, which includes information on EUL, current condition, and replacement costs. All results are derived from this data.

The table below presents the results for each scenario related to land improvements. For consistency, the projected average condition for each scenario was measured in the year 2055.

Scenario 1: Current Capital Reinvestment Rate - this scenario utilizes the current capital reinvestment within each asset category. The current annual investment was held, and the condition was determined.

Scenario 2: Current Condition - this scenario utilizes a target of current average condition within each asset category. The condition value was held, and the annual investment was then determined.

Scenario 3: Current Lifecycle Activities - this scenario utilizes the current lifecycle activities outlined as current practice within each asset category. The condition and annual investment were then determined.

Table 22: Scenario Results Summary

Scenarios	Replacement Cost	Projected Average Condition	Annual Capital Reinvestment
Scenario 1 - Current Capital Investment Rate	$191 million	Fair (41%)	$1,833,908
Scenario 2 - Maintain Current Condition	$191 million	Fair (52%)	$3,431,563
Scenario 3 – Lifecycle	$191 million	Good (78%)	$6,678,139

The proposed level of service recommended for land improvements is Scenario 2, which maintains current condition of the infrastructure.

Appendix I: Vehicles

Appendix I: Vehicles

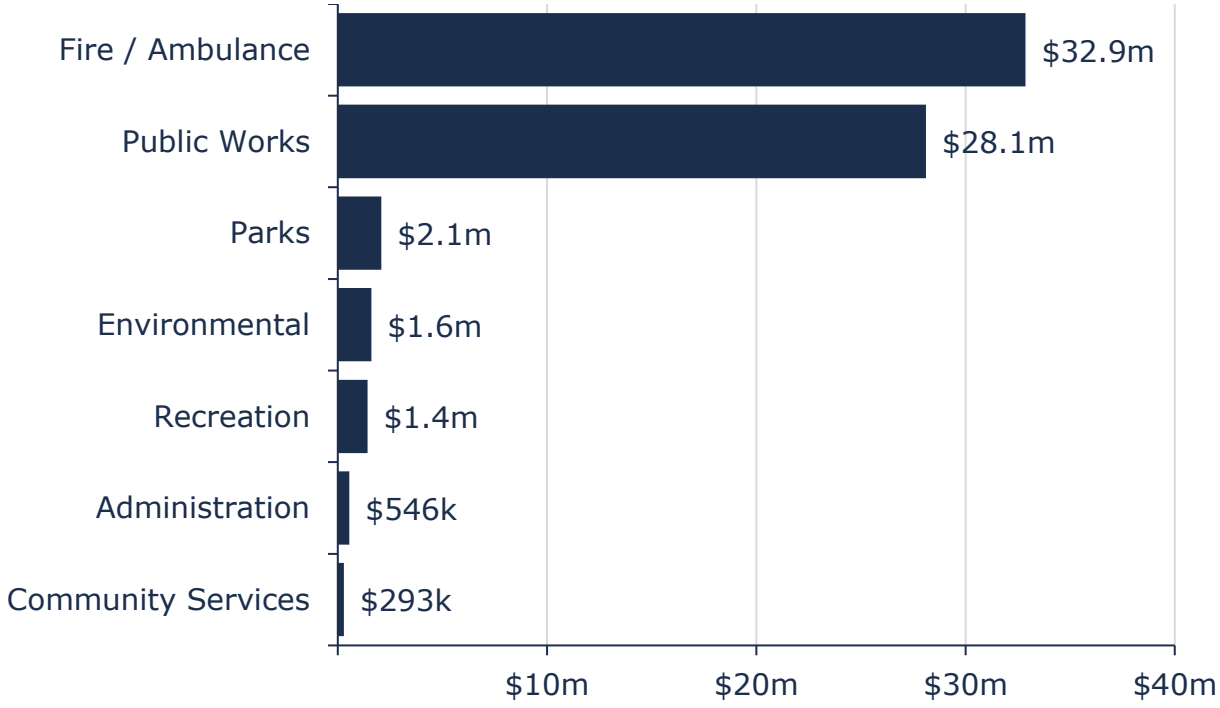
Vehicles allow staff to efficiently deliver municipal services and personnel. Municipal vehicles are used to support several service areas, including:

- tandem axle trucks for winter control activities
- fire rescue vehicles and ambulances to provide protection services
- mowers to provide park maintenance services

Inventory & Valuation

The graph below displays the total replacement cost of each asset segment in the vehicle inventory.

Figure 58: Vehicles Replacement Costs

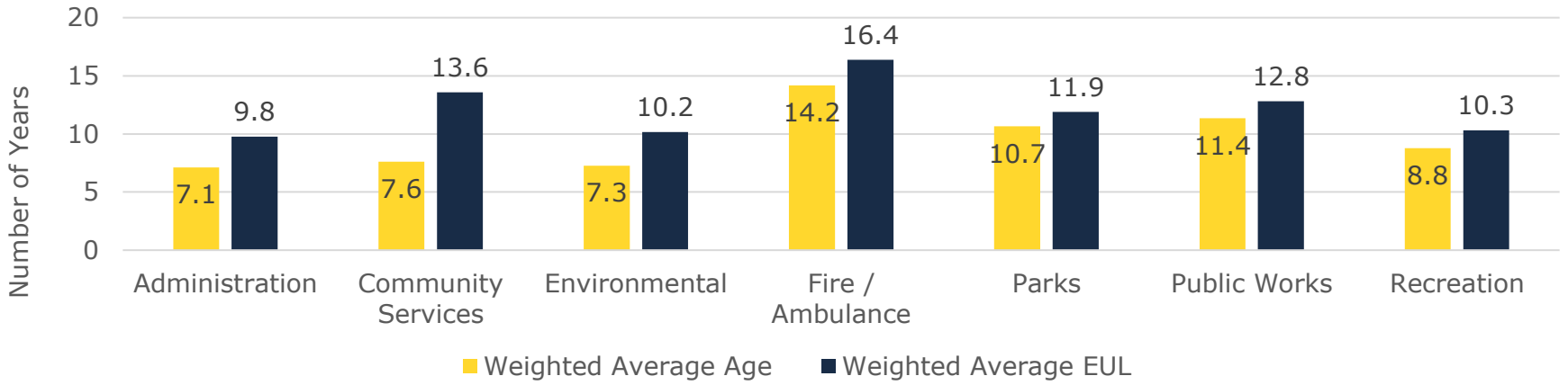


Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to represent capital requirements more accurately.

Asset Condition & Age

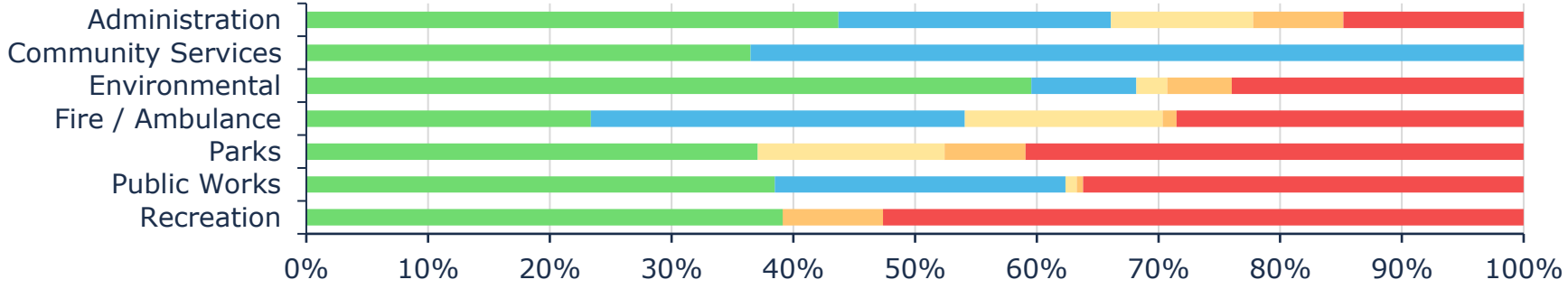
The graph below identifies the average age and the EUL for each asset segment. The values are weighted based on replacement cost.

Figure 59: Vehicles Average Age vs Average EUL



The graph below visually illustrates the average condition for each asset segment on a Very Good to Very Poor scale.

Figure 60: Vehicles Condition Breakdown



	Recreation	Public Works	Parks	Fire / Ambulance	Environmental	Community Services	Administration
Very Good	$556k	$10.8m	$771k	$7.7m	$954k	$107k	$239k
Good		$6.7m		$10.1m	$138k	$186k	$122k
Fair		$255k	$319k	$5.3m	$40k		$64k
Poor	$117k	$149k	$138k	$372k	$85k		$40k
Very Poor	$748k	$10.2m	$851k	$9.4m	$384k		$81k

To ensure that Haldimand County's vehicles continue to provide an acceptable level of service, Haldimand should monitor the average condition of all assets. If the average condition declines, staff should re-evaluate their lifecycle management strategy to determine what combination of maintenance, rehabilitation and replacement activities is required to increase the overall condition of the vehicles.

Each asset's EUL should also be reviewed periodically to determine whether adjustments need to be made to better align with the observed length of service life for each asset type.

Current Approach to Condition Assessment

Accurate and reliable condition data allows staff to determine the remaining service life of assets and identify the most cost-effective approach to managing assets.

The Fleet division continually monitors the condition of vehicles through their preventative maintenance program which includes annual safety inspections (commercial vehicles) and maintenance/ repair activities. Fleet technicians complete thorough in-depth inspections in addition to operator visual inspections. Condition assessments are performed on every asset before replacement is recommended and replacement timelines can be brought forward or delayed depending on these condition assessment activities.

Lifecycle Management Strategy

The condition or performance of assets will deteriorate over time. To ensure vehicles are performing as expected, it is important to establish a lifecycle management strategy to proactively manage asset deterioration. Lifecycles are determined by a combination of:

- Anticipated use
- Job function (Ambulance vs. Bylaw vehicle)
- Original Equipment Manufacture (OEM) recommendations
- American Public Works Association (APWA) standards
- Networking with other municipalities with similar vehicles/equipment
- Haldimand County history with similar vehicles/equipment

To assist Haldimand departments in meeting their service levels, the Fleet division manages a fleet pool. The fleet pool consists of surplus vehicles that have met their life cycle and been replaced through the capital budget process but are reliable/safe to provide to divisions on a short-term basis. The intent is to provide spare vehicles as "loaners" when division assigned equipment is due for preventative maintenance or "out of service" due to breakdowns, warranty work or unscheduled maintenance on a short-term basis.

Figure 61: Vehicles Current Lifecycle Strategy

Maintenance

- All vehicles under the control of the Fleet division are assigned a Preventative Maintenance (PM) program to ensure manufacture warranty remains valid, meets the intended lifecycle, ensures legislative requirements are met and to ensure safe and reliable vehicles/equipment

Rehabilitation / Replacement

- The following criteria will be used to determine if replacement is required:
  - **Age**: Chronological age based on in-service date.
  - **Kilometres/Hours**: Total operating distance or time based on in-service date.
  - **Type of Service**: Demand of duty, e.g. ambulance versus a by-law enforcement vehicle.
  - **Reliability**: Average amount of maintenance performed to meet functional requirements of the vehicle.
  - **M&R Costs**: Life to date maintenance and repair costs and any anticipated repairs.
  - **Condition**: Body condition, i.e. rust, interior, accident history.
  - **Operational Requirements**: Changes in service levels, vehicle/equipment technology, condition of units in fleet pool

Risk & Criticality

The risk breakdown provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category based on available inventory data. See Appendix K: Risk Rating Criteria for the criteria used to determine the risk rating of each asset.

This is a high-level model that has been developed based on information currently available and should be reviewed and adjusted to reflect an evolving understanding of both the probability and consequences of asset failure.

Figure 62: Vehicles Risk Breakdown

1 - 4 Very Low	5 - 7 Low	8 - 9 Moderate	10 - 14 High	15 - 25 Very High
$18,056,573 (27%)	$4,349,035 (6%)	$11,529,377 (17%)	$11,129,591 (17%)	$21,846,019 (33%)

The identification of critical assets allows Haldimand to determine appropriate risk mitigation strategies and treatment options. Risk mitigation may include asset-specific lifecycle strategies, condition assessment strategies, or simply the need to collect better asset data.

Levels of Service

The framework created by Haldimand County for levels of service is a valuable tool for assessing and managing the performance of their assets and the services provided by these assets. Proposed levels of service for Haldimand have been developed through engagement with staff.

Current Levels of Service

The following tables identify Haldimand County's current level of service for vehicles. These metrics include the technical and community level of service metrics that Haldimand has selected.

Table 23: Vehicles Current Level of Service

Community LOS		Service Attribute	Technical LOS	
Description of the services provided by municipal vehicles	Service provided by municipal vehicles are based on the assets outlined below: • administration • environmental • community services • fire / ambulance • public works • recreation • parks	Scope	Replacement Cost	$66,910,595
			Quantity (assets)	287
Description of the condition of vehicles	Condition Description • Very Good - Fit for the future • Good - Adequate for now • Fair - Requires attention • Poor - Increased potential of affecting service • Very Poor - Unfit for sustained service	Quality / Reliability	Average Condition	Fair (53%)
			% Condition > Fair	66%
			% Condition poor and very poor	34%
Services will be provided to ensure long-term sustainability for the Municipality		Performance	% Risk that is High and Very High	50%
			Annual reinvestment	$4,071,960
			Capital reinvestment rate	6.09%

Proposed Levels of Service

To ensure that all asset lifecycles were fully captured, the scenarios used to analyze Haldimand County's asset inventory were run over a 100-year period. These scenarios are based entirely on data from Haldimand County's asset management system, which includes information on EUL, current condition, and replacement costs. All results are derived from this data.

The table below presents the results for each scenario related to vehicles. For consistency, the projected average condition for each scenario was measured in the year 2055.

Scenario 1: Current Capital Reinvestment Rate - this scenario utilizes the current capital reinvestment within each asset category. The current annual investment was held, and the condition was determined.

Scenario 2: Current Condition - this scenario utilizes a target of current average condition within each asset category. The condition value was held, and the annual investment was then determined.

Scenario 3: Current Lifecycle Activities - this scenario utilizes the current lifecycle activities outlined as current practice within each asset category. The condition and annual investment were then determined.

Table 24: Scenario Results Summary

Scenarios	Replacement Cost	Projected Average Condition	Annual Capital Reinvestment
Scenario 1 - Current Capital Investment Rate	$66.9 million	Good (62%)	$4,071,960
Scenario 2 - Maintain Current Condition	$66.9 million	Fair (53%)	$3,198,376
Scenario 3 – Lifecycle	$66.9 million	Very Good (81%)	$5,223,105

The proposed level of service recommended for vehicles is Scenario 2, which maintains current condition of the infrastructure.

Appendix J: Machinery & Equipment

Appendix J: Machinery & Equipment

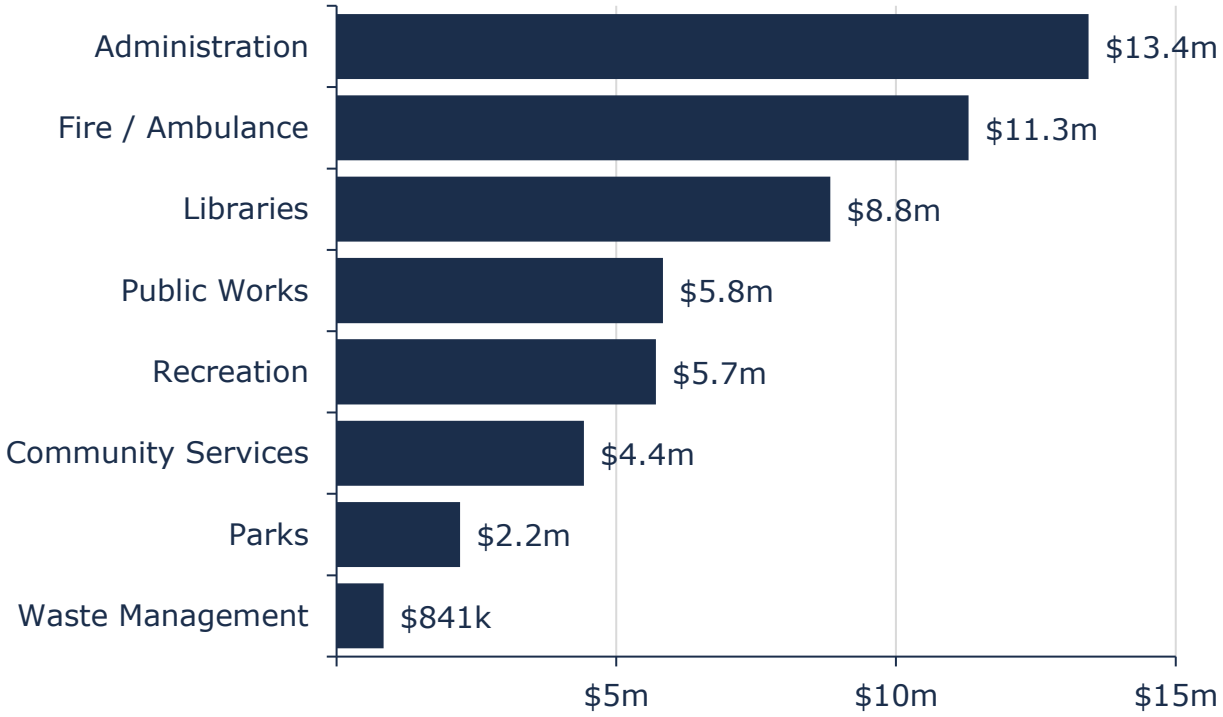
To maintain the quality stewardship of Haldimand County's infrastructure and support the delivery of services, municipal staff own and employ various types of equipment. This includes:

- Computer hardware, software, and phone systems to support all municipal services
- Safety equipment to support the delivery of protection services
- Books and equipment for library services
- Playground equipment and bleachers to enable the provision of recreational and parks services

Inventory & Valuation

The graph below displays the total replacement cost of each asset segment in Haldimand County's equipment inventory.

Figure 63: Machinery & Equipment Replacement Costs

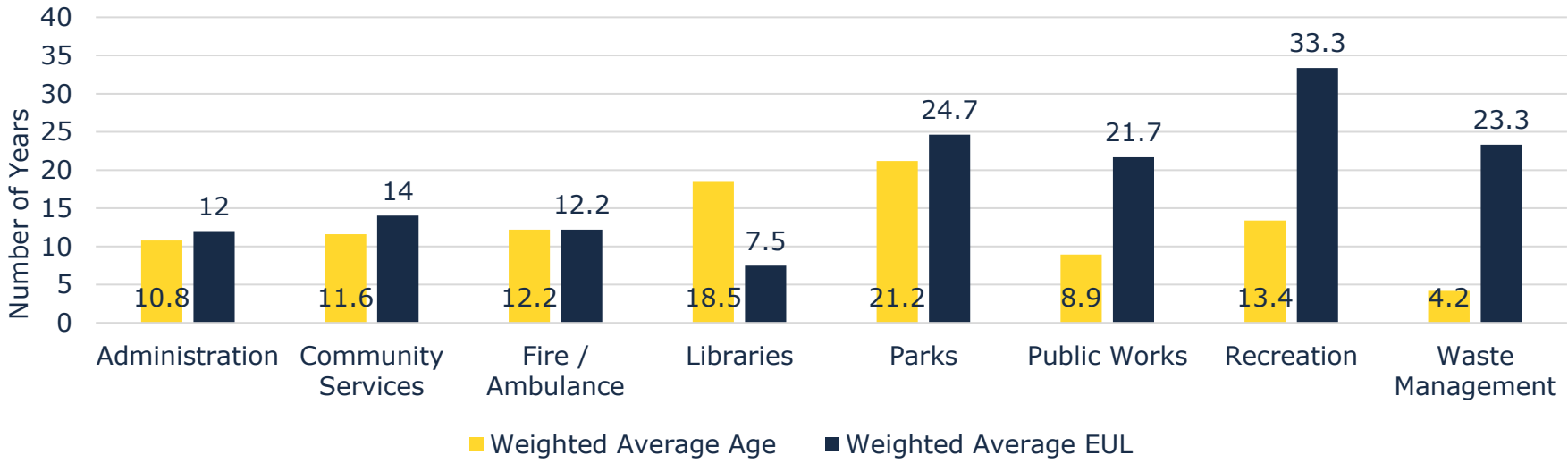


Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurate represent capital requirements.

Asset Condition & Age

The graph below identifies the average age and the EUL for each asset segment. The values are weighted based on replacement cost.

Figure 64: Machinery & Equipment Average Age vs Average EUL

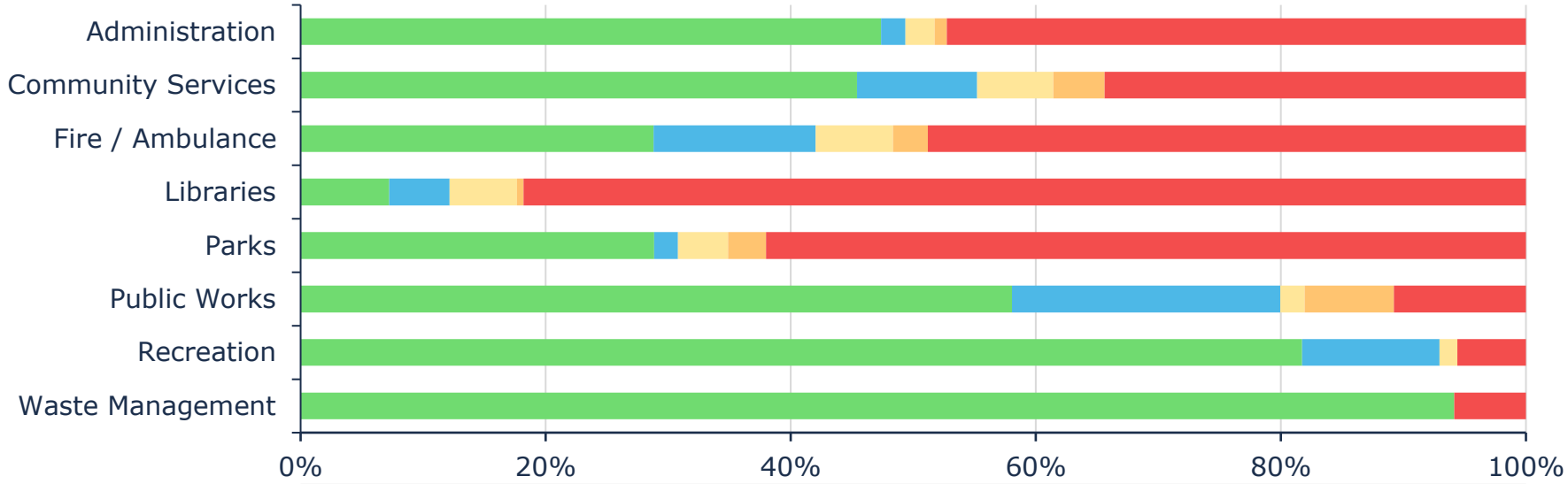


The graph below visually illustrates the average condition for each asset segment on a Very Good to Very Poor scale.

To ensure that Haldimand County's equipment continues to provide an acceptable level of service, Haldimand should continue to monitor the average condition. If the average condition declines, staff should re-evaluate their lifecycle management strategy to determine what combination of maintenance, rehabilitation and replacement activities is required to increase the overall condition.

Each asset's EUL should also be reviewed periodically to determine whether adjustments need to be made to better align with the observed length of service life for each asset type.

Figure 65: Machinery & Equipment Condition Breakdown



	Waste Management	Recreation	Public Works	Parks	Libraries	Fire / Ambulance	Community Services	Administration
Very Good	$792k	$4.7m	$3.4m	$637k	$639k	$3.3m	$2.0m	$6.4m
Good		$641k	$1.3m	$43k	$435k	$1.5m	$433k	$268k
Fair		$83k	$115k	$90k	$484k	$714k	$275k	$321k
Poor			$425k	$68k	$48k	$321k	$186k	$132k
Very Poor	$49k	$319k	$629k	$1.4m	$7.2m	$5.5m	$1.5m	$6.4m

Current Approach to Condition Assessment

Accurate and reliable condition data allows staff to determine the remaining service life of assets and identify the most cost-effective approach to managing assets. The current approach is varied because of the broad range of types of equipment included in this category. There are some types with very established assessments (i.e. Fire Equipment), but also many don't have any assessment procedures.

Lifecycle Management Strategy

The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meet the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration. All equipment will be assigned to a class with an appropriate lifecycle and replacement cost.

Figure 66: Machinery & Equipment Current Lifecycle Strategy

Maintenance

- All equipment is assigned a Preventative Maintenance (PM) program to ensure manufacture warranty remains valid, meets the intended lifecycle, ensure legislative requirements are met and to ensure safe reliable vehicles/equipment

Rehabilitation / Replacement

- The following criteria will be used to determine if replacement is required (depending on the size/value of the equipment):
  - **Age**: Chronological age based on in-service date.
  - **Hours**: Total operating distance or time based on in-service date.
  - **Type of Service**: Demand of duty, e.g. ambulance versus a by-law enforcement vehicle.

Risk & Criticality

The risk breakdown provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this category based on available inventory data. See Appendix K: Risk Rating Criteria for the criteria used to determine the risk rating of each asset.

Figure 67: Machinery & Equipment Risk Breakdown

1 - 4	5 - 7	8 - 9	10 - 14	15 - 25
Very Low	**Low**	**Moderate**	**High**	**Very High**
$19,192,049	$6,769,069	$1,461,784	$6,993,472	$18,156,847
(37%)	(13%)	(3%)	(13%)	(35%)

This is a high-level model that has been developed based on information currently available and should be reviewed and adjusted to reflect an evolving understanding of both the probability and consequences of asset failure.

The identification of critical assets allows Haldimand to determine appropriate risk mitigation strategies and treatment options. Risk mitigation may include asset-specific lifecycle strategies, condition assessment strategies, or simply the need to collect better asset data.

Levels of Service

The framework created by Haldimand County for levels of service is a valuable tool for assessing and managing the performance of their assets and the services provided by these assets. Proposed levels of service for Haldimand have been developed through engagement with staff.

Current Levels of Service

The following tables identify Haldimand County's current level of service for machinery and equipment. These metrics include the technical and community level of service metrics that Haldimand has selected.

Table 25: Machinery & Equipment Current Level of Service

Community LOS		Service Attribute	Technical LOS	
Description of the services provided by municipal machinery and equipment	Service provided by municipal machinery & equipment are based on the assets outlined below: • administration • waste management • community services • fire / ambulance • public works • recreation • parks • libraries	Scope	Replacement Cost	$52,573,221
			Quantity (assets)	163,554
Description of the condition of machinery and equipment	Condition Description • Very Good - Fit for the future • Good - Adequate for now • Fair - Requires attention • Poor - Increased potential of affecting service • Very Poor - Unfit for sustained service	Quality / Reliability	Average Condition	Fair (48%)
			% Condition > Fair	54%
			% Condition poor and very poor	46%
Services will be provided to ensure long-term sustainability for the Municipality		Performance	% Risk that is High and Very High	48%
			Annual reinvestment	$2,027,228
			Capital reinvestment rate	3.86%

Proposed Levels of Service

To ensure that all asset lifecycles were fully captured, the scenarios used to analyze Haldimand County's asset inventory were run over a 100-year period. These scenarios are based entirely on data from Haldimand County's asset management system, which includes information on EUL, current condition, and replacement costs. All results are derived from this data.

The table below presents the results for each scenario related to machinery and equipment. For consistency, the projected average condition for each scenario was measured in the year 2055.

Scenario 1: Current Capital Reinvestment Rate - this scenario utilizes the current capital reinvestment within each asset category. The current annual investment was held, and the condition was determined.

Scenario 2: Current Condition - this scenario utilizes a target of current average condition within each asset category. The condition value was held, and the annual investment was then determined.

Scenario 3: Current Lifecycle Activities - this scenario utilizes the current lifecycle activities outlined as current practice within each asset category. The condition and annual investment were then determined.

Table 26: Scenario Results Summary

Scenarios	Replacement Cost	Projected Average Condition	Annual Capital Reinvestment
Scenario 1 - Current Capital Investment Rate	$52.6 million	Poor (30%)	$2,027,228
Scenario 2 - Maintain Current Condition	$52.6 million	Fair (48%)	$2,887,285
Scenario 3 – Lifecycle	$52.6 million	Very Good (84%)	$5,216,547

The proposed level of service recommended for machinery and equipment is Scenario 2, which maintains current condition of the infrastructure.

Appendix K: Risk Rating Criteria

Appendix K: Risk Rating Criteria

Risk Definitions

Risk	Integrating a risk management framework into the asset management program requires the translation of risk potential into a quantifiable format. This will allow for the comparison and analysis of individual assets across the entire asset portfolio. Asset risk is typically defined using the following formula: **Risk = Probability of Failure (POF) x Consequence of Failure (COF)**
Probability of Failure (POF)	The probability of failure relates to the likelihood that an asset will fail at a given time. The current physical condition and service life remaining are two commonly used risk parameters in determining this likelihood.
POF - Structural	The likelihood of asset failure due to aspects of an asset such as load carrying capacity, condition or breaks
POF - Functional	The likelihood of asset failure due to its performance
POF - Range	1 - Rare 2 - Unlikely 3 - Possible 4 - Likely 5 - Almost Certain
Consequences of Failure (COF)	The consequence of failure describes the overall effect that an asset's failure will have on an organization's asset management goals. Consequences of failure can range from non-eventful to impactful: a small diameter water main break in a subdivision may cause several rate payers to be without water service for a short time. However, a larger trunk water main break outside of a hospital, can lead to significantly higher consequences.
COF - Economic	The monetary consequences of asset failure for the organization and its customers
COF - Social	The consequences of asset failure on the social dimensions of the community
COF - Environmental	The consequence of asset failure on an asset's surrounding environment
COF - Operational	The consequence of asset failure on Haldimand County's day-to-day operations
COF - Health & safety	The consequence of asset failure on the health and well-being of the community
COF - Strategic	The consequence of asset failure on strategic planning
COF - Range	1 - Insignificant 2 - Minor 3 - Moderate 4 - Major 5 - Severe

Risk Frameworks

Asset Category	Asset Segment	Risk Criteria	Criteria	Weighting (%)	Sub-Criteria	Weighting (%)	Value/Range	Score
General / Corporate		COF	Economic	100%	Replacement Cost	100%	0 - 2,000 2,000 - 20,000 20,000 - 200,000 200,000 – 2,000,000 >2,000,000	1 - Insignificant 2 - Minor 3 - Moderate 4 - Major 5 - Severe
		POF	Structural	60%	Age Based Condition	100%	80 - 100 60 - 79 40 - 59 20 - 39 0 - 19	1 - Rare 2 - Unlikely 3 - Possible 4 - Likely 5 - Almost Certain
			Functional	40%	Service Life Remaining	100%	> 40 30 - 40 20 - 30 10 - 20 < 10	1 - Rare 2 - Unlikely 3 - Possible 4 - Likely 5 - Almost Certain

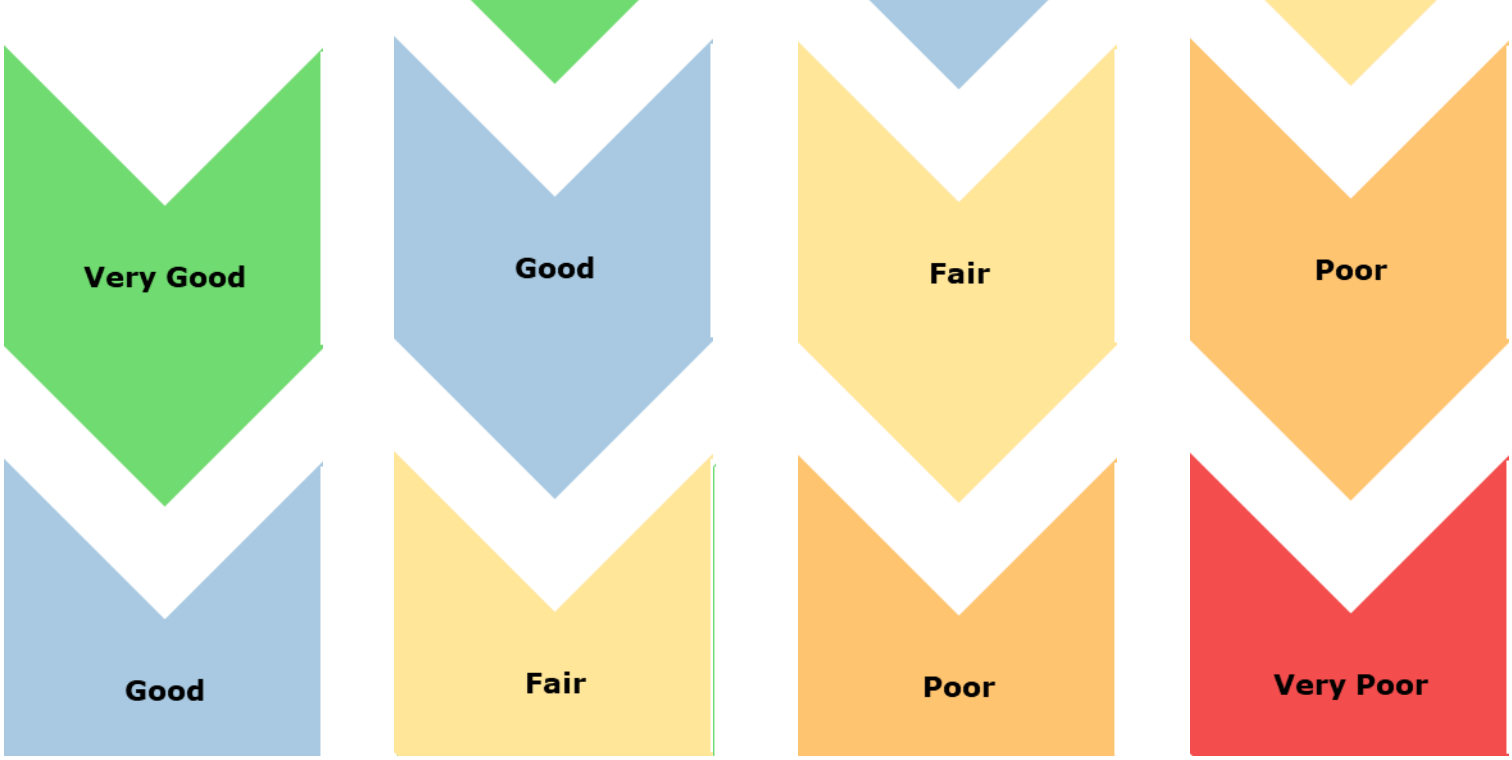
Asset Category	Risk Criteria	Criteria	Weighting (%)	Sub-Criteria	Weighting (%)	Value/Range	Score
Bridges & Culverts	COF	Economic	50%	Replacement Cost	70%	0 - 2,000 2,000 - 20,000 20,000 - 200,000 200,000 - 2,000,000 >2,000,000	1 - Insignificant 2 - Minor 3 - Moderate 4 - Major 5 - Severe
				Structure Type (AM Segment)	30%	Non-OSIM Bridges Structural Culverts OSIM Bridges	2 - Minor 3 - Moderate 4 - Major
		Social	50%	MMS Class	25%	6 5 4 3 2	1 - Insignificant 2 - Minor 3 - Moderate 4 - Major 5 - Severe
				Speed	25%	=<40km/h =<50km/h =<60km/h =<70km/h =<80km/h	1 - Insignificant 2 - Minor 3 - Moderate 4 - Major 5 - Severe
				Structure Width	25%	<5 5m - 10m 10m - 15m 15m - 20m >20m	1 - Insignificant 2 - Minor 3 - Moderate 4 - Major 5 - Severe
				School Route	25%	Yes No	4 - Major 2 - Minor
	POF	Structural	60%	Assessed Condition	100%	80 - 100 60 - 79 40 - 59 20 - 39 0 - 19	1 - Rare 2 - Unlikely 3 - Possible 4 - Likely 5 - Almost Certain
		Functional	40%	Service Life Remaining	100%	> 40 20 - 30 10 - 20 1 - 10 < 1	1 - Rare 2 - Unlikely 3 - Possible 4 - Likely 5 - Almost Certain

Asset Category	Risk Criteria	Criteria	Weighting (%)	Sub-Criteria	Weighting (%)	Value/Range	Score
Road Network	COF	Economic	50%	Surface Type (AM Segment)	100%	Earth Gravel Surface Treated Asphalt	1 - Insignificant 2 - Minor 3 - Moderate 4 - Major
		Social	50%	MMS Class	100%	5 & 6 4 3 2	1 - Insignificant 2 - Minor 3 - Moderate 4 - Major
	POF	Structural	60%	Assessed Condition (PCI)	100%	80 - 100 60 - 79 40 - 59 20 - 39 0 - 19	1 - Rare 2 - Unlikely 3 - Possible 4 - Likely 5 - Almost Certain
		Functional	40%	Service Life Remaining	100%	> 40 20 - 30 10 - 20 1 - 10 < 1	1 - Rare 2 - Unlikely 3 - Possible 4 - Likely 5 - Almost Certain

Asset Category	Asset Segment	Risk Criteria	Criteria	Weighting (%)	Sub-Criteria	Weighting (%)	Value/Range	Score
Storm System	Rest of System	COF	Economic	70%	Replacement Cost	100%	0 - 2,000 2,000 - 20,000 20,000 - 200,000 200,000 - 2,000,000 >2,000,000	1 - Insignificant 2 - Minor 3 - Moderate 4 - Major 5 - Severe
			Social	30%	System Segments	100%	Municipal Drains Storm Structures Storm Ponds	2 - Minor 3 - Moderate 4 - Major
		POF	Structural	60%	Assessed Condition	100%	80 - 100 60 - 79 40 - 59 20 - 39 0 - 19	1 - Rare 2 - Unlikely 3 - Possible 4 - Likely 5 - Almost Certain
			Functional	40%	Service Life Remaining	100%	> 40 30 - 40 20 - 30 10 - 20 < 10	1 - Rare 2 - Unlikely 3 - Possible 4 - Likely 5 - Almost Certain
	Storm Mains	COF	Economic	70%	Diameter	100%	200 250 375 & 400 >450 & < 700 >700	1 - Insignificant 2 - Minor 3 - Moderate 4 - Major 5 - Severe
			Social	30%	Surface Type (Attribute)	100%	UNK River Surface Treated Asphalt	2 - Minor 5 - Severe 3 - Moderate 4 - Major
		POF	Structural	60%	Assessed Condition	100%	80 - 100 60 - 79 40 - 59 20 - 39 0 - 19	1 - Rare 2 - Unlikely 3 - Possible 4 - Likely 5 - Almost Certain
			Functional	40%	Service Life Remaining	100%	> 40 30 - 40 20 - 30 10 - 20 < 10	1 - Rare 2 - Unlikely 3 - Possible 4 - Likely 5 - Almost Certain

Asset Category	Asset Segment	Risk Criteria	Criteria	Weighting (%)	Sub-Criteria	Weighting (%)	Value/Range	Score
Water System	Water mains	COF	Economic	70%	Diameter	100%	> 100 100 - 150 150 - 300 300 - 400 > 400	1 - Insignificant 2 - Minor 3 - Moderate 4 - Major 5 - Severe
			Social	30%	Surface Type (Attribute)	100%	Unknown River Surface Treated Asphalt	2 - Minor 5 - Severe 3 - Moderate 4 - Major
		POF	Structural	60%	Assessed Condition	100%	80 - 100 60 - 79 40 - 59 20 - 39 0 - 19	1 - Rare 2 - Unlikely 3 - Possible 4 - Likely 5 - Almost Certain
			Functional	40%	Service Life Remaining	100%	> 40 30 - 40 20 - 30 10 - 20 < 10	1 - Rare 2 - Unlikely 3 - Possible 4 - Likely 5 - Almost Certain
	Rest of System	COF	Economic	70%	Replacement Cost	100%	0 - 2,000 2,000 - 20,000 20,000 - 200,000 200,000 - 2,000,000 >2,000,000	1 - Insignificant 2 - Minor 3 - Moderate 4 - Major 5 - Severe
			Social	30%	System Segments	100%	Hydrant & General Equipment & Meters Valves General Buildings Storage & Water Depot Booster Station Treatment Plant	1 - Insignificant 2 - Minor 3 - Moderate 4 - Major 4 - Major 4 - Major 5 - Severe
		POF	Structural	60%	Assessed Condition	100%	80 - 100 60 - 79 40 - 59 20 - 39 0 - 19	1 - Rare 2 - Unlikely 3 - Possible 4 - Likely 5 - Almost Certain
			Functional	40%	Service Life Remaining	100%	> 40 30 - 40 20 - 30 10 - 20 < 10	1 - Rare 2 - Unlikely 3 - Possible 4 - Likely 5 - Almost Certain

Asset Category	Asset Segment	Risk Criteria	Criteria	Weighting (%)	Sub-Criteria	Weighting (%)	Value/Range	Score
Sanitary System	Sanitary Mains	COF	Economic	70%	Diameter	100%	200 250 375 & 400 >450 & < 700 >700	1 - Insignificant 2 - Minor 3 - Moderate 4 - Major 5 - Severe
			Social	30%	Surface Type (Attribute)	100%	Unknown River Surface Treated Asphalt	2 - Minor 5 - Severe 3 - Moderate 4 - Major
		POF	Structural	60%	Assessed Condition	100%	80 - 100 60 - 79 40 - 59 20 - 39 0 - 19	1 - Rare 2 - Unlikely 3 - Possible 4 - Likely 5 - Almost Certain
			Functional	40%	Service Life Remaining	100%	> 40 30 - 40 20 - 30 10 - 20 < 10	1 - Rare 2 - Unlikely 3 - Possible 4 - Likely 5 - Almost Certain
	Rest of System	COF	Economic	70%	Replacement Cost	100%	0 - 2,000 2,000 - 20,000 20,000 - 200,000 200,000 - 2,000,000 >2,000,000	1 - Insignificant 2 - Minor 3 - Moderate 4 - Major 5 - Severe
			Social	30%	System Segments	100%	General Equipment Manholes General Building Lagoon & Pump Stn Treatment Plant	1 - Insignificant 2 - Minor 3 - Moderate 4 - Major 5 - Severe
		POF	Structural	60%	Assessed Condition	100%	80 - 100 60 - 79 40 - 59 20 - 39 0 - 19	1 - Rare 2 - Unlikely 3 - Possible 4 - Likely 5 - Almost Certain
			Functional	40%	Service Life Remaining	100%	> 40 30 - 40 20 - 30 10 - 20 < 10	1 - Rare 2 - Unlikely 3 - Possible 4 - Likely 5 - Almost Certain



Appendix L: Condition Assessment Guidelines

Appendix L: Condition Assessment Guidelines

The foundation of good asset management practices is accurate and reliable data on the current condition of infrastructure. Assessing the condition of an asset at a single point in time allows staff to have a better understanding of the probability of asset failure due to deteriorating condition.

Condition data is vital to the development of data-driven asset management strategies. Without accurate and reliable asset data, there may be little confidence in asset management decision-making which can lead to premature asset failure, service disruption and suboptimal investment strategies. To prevent these outcomes, Haldimand County's condition assessment strategy should outline several key considerations, including:

- The role of asset condition data in decision-making
- Guidelines for the collection of asset condition data
- A schedule for how regularly asset condition data should be collected

Role of Asset Condition Data

The goal of collecting asset condition data is to ensure that data is available to inform maintenance and renewal programs required to meet the desired level of service. Accurate and reliable condition data allows municipal staff to determine the remaining service life of assets, and identify the most cost-effective approach to deterioration, whether it involves extending the life of the asset through remedial efforts or determining when replacement is required to avoid asset failure.

In addition to the optimization of lifecycle management strategies, asset condition data also impacts Haldimand County's risk management and financial strategies. Assessed condition is a key variable in the determination of an asset's probability of failure. With a strong understanding of the probability of failure across the entire asset portfolio, Haldimand can develop strategies to mitigate both the probability and consequences of asset failure and service disruption. Furthermore, with condition-based determinations of future capital expenditures, Haldimand can develop long-term financial strategies with higher accuracy and reliability.

Guidelines for Condition Assessment

Whether completed by external consultants or internal staff, condition assessments should be completed in a structured and repeatable fashion, according to consistent and objective assessment criteria. Without proper guidelines for the completion of condition assessments there can be little confidence in the validity of condition data and asset management strategies based on this data.

Condition assessments must include a quantitative or qualitative assessment of the current condition of the asset, collected according to specified condition rating criteria, in a format that can be used for asset management decision-making. As a

result, it is important that staff adequately define the condition rating criteria that should be used and the assets that require a discrete condition rating. When engaging with external consultants to complete condition assessments, it is critical that these details are communicated as part of the contractual terms of the project.

There are many options available to Haldimand to complete condition assessments. In some cases, external consultants may need to be engaged to complete detailed technical assessments of infrastructure. In other cases, internal staff may have sufficient expertise or training to complete condition assessments.

Developing a Condition Assessment Schedule

Condition assessments and general data collection can be both time-consuming and resource intensive. It is not necessarily an effective strategy to collect assessed condition data across the entire asset inventory. Instead, Haldimand should prioritize the collection of assessed condition data based on the anticipated value of this data in decision-making. The International Infrastructure Management Manual (IIMM) identifies four key criteria to consider when making this determination:

- **Relevance**: every data item must have a direct influence on the output that is required
- **Appropriateness**: the volume of data and the frequency of updating should align with the stage in the assets life and the service being provided
- **Reliability**: the data should be sufficiently accurate, have sufficient spatial coverage and be appropriately complete and current
- **Affordability**: the data should be affordable to collect and maintain