Lake Huron

Primary Water Supply System

Asset Management Plan

2022

Executive Summary

The utility, the Lake Huron Primary Water Supply System (LHPWSS), undertakes an update to their Asset Management Plan (AM Plan) on a five (5) year cycle. The most recently completed AM Plan update was undertaken in 2016.

This project included the development of an Asset Management Policy (AM Policy), alignment of the existing level of service framework with ISO (International Organization for Standardization) 55000, assessment of risk ratings for asset components, addition of digital technology assets as a separate asset category and specific focus on lifecycle strategy for an aging transmission pipeline.

The goal of this project is to move Asset Management beyond the strategic level, such that assets may be assessed at a tactical level and asset management is further integrated into business practices.

The updated AM Plan provides the LHPWSS with a robust system wide approach that allows for operating, maintaining and renewing of physical assets in a cost effective manner to meet the target levels of service approved by the utility and delivered in alignment with the AM Policy.

Overview of the AM Plan

The Introduction (**Section 1**) includes the overall objectives of the project, an overview of asset management in alignment with the AM policy and organizational objectives, discusses the utility and the services delivered, and provides an overview of the asset management planning process.

In the State of the Infrastructure (**Section 2**) we present the asset inventory and replacement value, the asset age distribution and expected useful life. For each of the process areas, we present a description of the services, description of the assets, asset condition and performance, risk profile and annual capital investments for asset renewal and mid-life interventions. Each process area is summarized in an asset card.

The asset categories included in the AM Plan are:

- Treatment Assets (**Section 2.2**);
- Transmission Assets (**Section 2.3**); and
- Digital Technology Assets (**Section 2.4**).

In Level of Service (**Section 3**), the new endorsed level of service framework is presented along with target levels of service for the three key parameters: quality;

availability/reliability; and environmental acceptability. The key drivers for investment are defined and alignment is shown with the LOS parameters and the AM Policy. The current levels of service and asset performance is presented by process area as well as an overall aggregate summary, based on available information.

The asset management Strategy (**Section 4**) presents a risk strategy and lifecycle strategy for each asset category.

The Financial Strategy (**Section 5**) recommends the unconstrained capital investments required to meet the target levels of service.

The final chapter is Improvement and Monitoring (**Section 6**) which highlights the key recommendations from the AM Plan to: increase performance data collection; improve condition assessment information on a more regular basis; and to advance recommendations on strategy development and implementation.

Asset Management Policy and Alignment

Alignment with Organizational Objectives

The 2022 AM Plan has been developed in alignment with ISO 55000 and in alignment with the utility's organizational objectives, of which compliance is key. As stated in the AM Policy:

- **Alignment:** The asset management planning approach fosters integration with the Strategic Plan (currently under development), Master Water Plan, Operations Plan and Financial Plan. It is also in alignment with global best practice standards for Asset Management such as ISO 55000.
- **Compliance:** The asset management system, which includes the AM Policy, supporting strategies, and asset management plan satisfies compliance obligations including requirements and standards of ISO 14001, Drinking Water Quality Management Standard, the Environmental and Quality Policy, and any other contractually relevant obligations.

It is noted that although the utility is not subject to the requirements of **O. Reg. 588/17 Asset Management Planning for Municipal Infrastructure**, it has chosen to align with ISO 55000 which is a global best practice standard.

Asset Management Policy

The AM Policy was a key deliverable of the AM Plan update and was developed through a series of workshops with all service areas to establish guiding principles and outcomes for implementation across the utility.

The AM Policy demonstrates LHPWSS' commitment to asset management by setting out the principles by which the utility intends to apply asset management to achieve its organizational objectives.

This AM Plan update was developed in alignment with the AM Policy approved October 7, 2021 (Report No.: LH-2021-03-10). The following are excerpts from the policy to highlight the guiding principles and the key outcomes.

AM Policy – Guiding Principles

- **Service Delivery:** Decision-making should be focused on delivering defined levels of service that reflect customer expectations and balance risk and affordability.
- **Long-Term Sustainability and Resilience:** Achieving services from infrastructure assets over the long-term involves long-term planning that incorporates triple bottom line considerations, climate change awareness, and the development of resilience.
- **Fiscal Responsibility and Asset Management Decision-Making:** Robust asset management decision-making processes are required to make the best use of available funds to deliver services for the benefit of the utility's customers.
- **Whole-Life Perspective:** The utility shall consider the full financial impact of managing an asset from acquisition to disposal.
- **Environmentally Conscious:** The utility shall minimize the impact of infrastructure on the environment and address the vulnerabilities and risks caused by climate change through lifecycle management.
- **Transparency:** To make transparent infrastructure decisions, the utility shall be data-driven and evidence-based.

AM Policy – Key Outcomes

- Integrate findings from the asset management plan into the **annual budgeting process using a business case approach.**
- Develop a corporate asset information strategy to ensure accessibility to a fully integrated **asset data registry to support good governance and leverage operational efficiencies**.
- Develop and maintain an asset risk register capturing **climate change impacts on infrastructure assets** to inform prioritization of capital projects.
- Asset management facilitates **evidence-based dialogue with the utility and its customers** about investment recommendations.
- **Sustainable levels of service** and asset lifecycle activities are used by the utility as **drivers for investment** and are foundational to its decision making.
- The utility strives for **continuous improvement in asset management planning and asset management systems** by applying best management practices.

The Utility and the Services

The Lake Huron Primary Water Supply System strives to operate and to continually improve the sustainable, environmentally friendly utility that provides safe and reliable drinking water to current and future customers.

The utility delivers drinking water services which include water supply, treatment, and transmission services to benefiting municipalities. (Excerpt from AM Policy - Scope)

Scope of Services

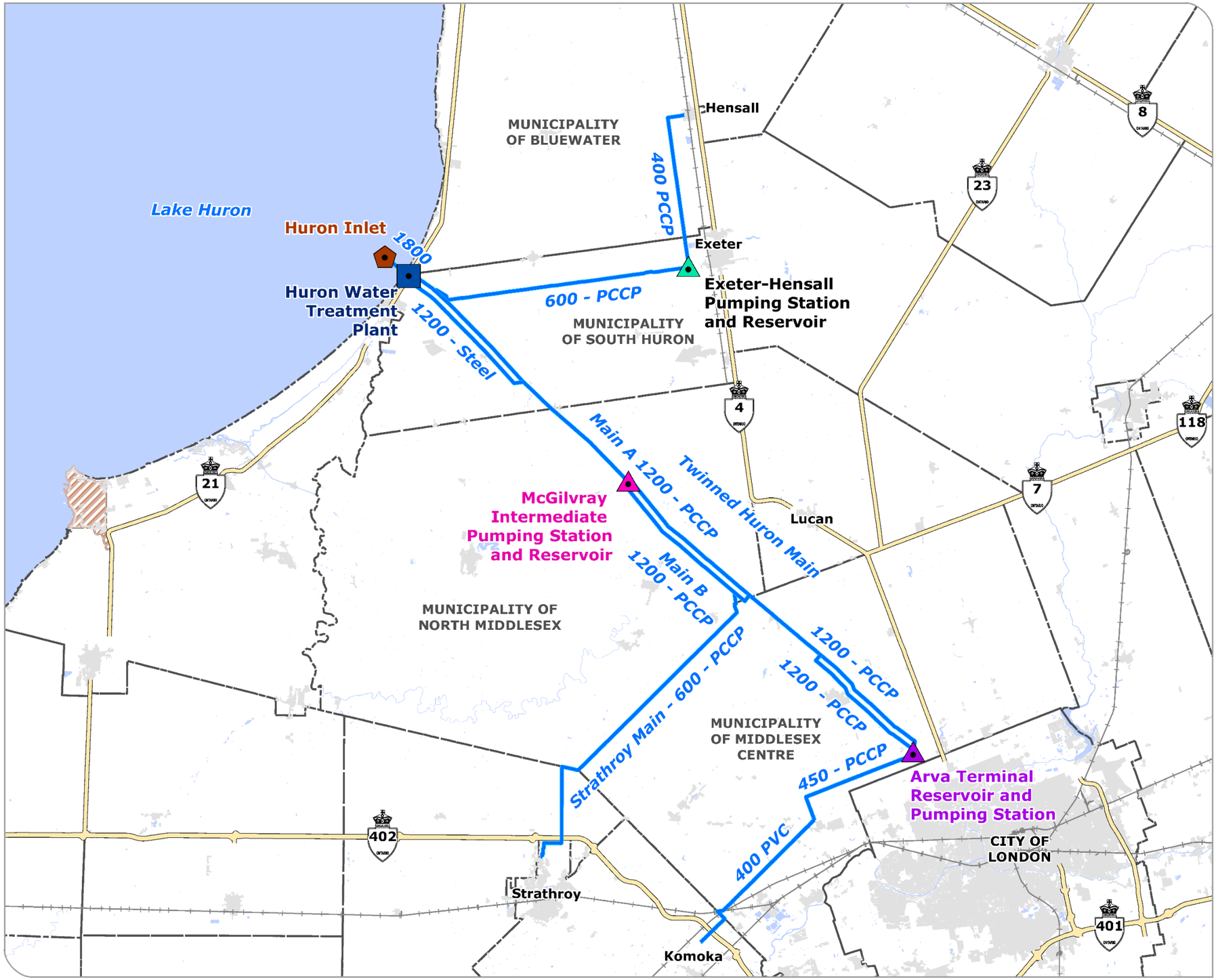
The LHPWSS delivers drinking water from Lake Huron, treated at the Lake Huron Water Treatment Plant located north of the Village of Grand Bend, to eight municipalities through partially twinned primary transmission mains and secondary transmission mains. The system is currently operated by the Ontario Clean Water Agency (OCWA) under an agreement that establishes contractual expectations for water quality and service delivery. The LHPWSS is governed by a Board of Management and administered using seconded staff from the City of London (Regional Water).

The assets that make up the regional water treatment and supply systems include:

- Water treatment plant located near Grand Bend;
- 47 km (combined 77 km) of partially twinned 1200 mm primary transmission mains;
- McGillivray Reservoir and Pumping Station;
- Arva Terminal reservoir;
- Secondary transmission mains for Exeter-Hensall (400mm and 600mm), Komoka/Mount Brydges (400mm and 450mm), and Strathroy/Caradoc (600mm);
- Exeter-Hensall Reservoir and Pumping Station; and
- Komoka/Mount Brydges Pumping Station.

See **Figure E-1** for map of LHPWSS infrastructure. (Note that the pipeline alignment is not to scale.)

Figure E-1: Map of LHPWSS Infrastructure (Appendix A)



Lake Huron
Primary Water Supply System

LAKE HURON PRIMARY WATER SUPPLY SYSTEM
ASSET MANAGEMENT PLAN

SYSTEM MAP
FIGURE E-1: Map of LHWSS Infrastructure

- Huron Water Treatment Plant
- Huron Inlet
- Arva Terminal Reservoir and Pumping Station
- McGilvray Intermediate Pumping Station and Reservoir
- Exeter-Hensall Pumping Station and Reservoir
- Water Supply Pipeline
- Highway
- Railway
- Built Up Area
- First Nation Settlement
- Municipal Boundary
- Water Body

Notes: Pipeline alignment not to scale.

SCALE 1:250,000

0 3 6 12 km

N W E S

MAP DRAWING INFORMATION:
DATA PROVIDED BY MNR

MAP CREATED BY: LMM/RB
MAP CHECKED BY: -
MAP PROJECTION: NAD 1983 UTM Zone 17N

DILLON CONSULTING

PROJECT: 21-1806
STATUS: DRAFT
DATE: 2022-09-12

FILE LOCATION: K:\2021\211806\Product\Client\Report\211806_LH_WaterSupplySystem.mxd

The system serves a population of approximately 390,000 (2021). The existing water production capacity at the Lake Huron WTP is 340 ML/d.

As reported in the Water Master Plan (2020), population served was 389,827 (2018) in the baseline year and is projected to grow to 408,174 (2023) and 468,476 (2038) in the medium scenario. In 2018 the system delivered 107 ML/d for the City of London and 20.2 ML/d for the non-London municipalities.

As reported in the Annual Compliance Report (2021), the system delivered an average daily flow of 124.7 ML/d (36.7% capacity). The maximum daily flow was 195.4 ML/day (57.5% capacity). Water production and transmission is fairly steady over the baseline year (2018) in the Water Master Plan, which reported 131 ML/d average day and 191 ML/d maximum day demand in 2018.

The infrastructure assets deliver water to the following member municipalities (associated percentage of treated drinking water from LHPWSS):

- City of London (82.74%);
- Municipality of Strathroy-Caradoc (4.44%);
- Municipality of Lambton Shores (3.17%);
- Municipality of South Huron (3.13%);
- Municipality of North Middlesex (3.04%);
- Municipality of Middlesex Centre (1.49%);
- Municipality of Bluewater (1.2%); and
- Township of Lucan Biddulph (0.78%).

Asset Hierarchy

The asset hierarchy is organized by Treatment, Transmission and Digital Technology assets at the system level (Level 1) and reports on the assets by process area (Level 2). See **Table E-1**.

Table E-1: Asset Hierarchy

Level 1 (System)	Treatment	Transmission	Digital Technology
Level 2 (Process Area)	• Raw Water Handling • Pre-Treatment • Filtration, Disinfection, and High Lift Pumping • Residuals Management • General Site, Building Services, Fleet and Security • Primary Power	• Primary – Reservoir and Pumping Station • Primary – Pipelines and Chambers • Secondary – Reservoir and Pumping Station • Secondary – Pipelines and Chambers	• SCADA • Various Process Area • Corporate

Overall Condition and Replacement Cost

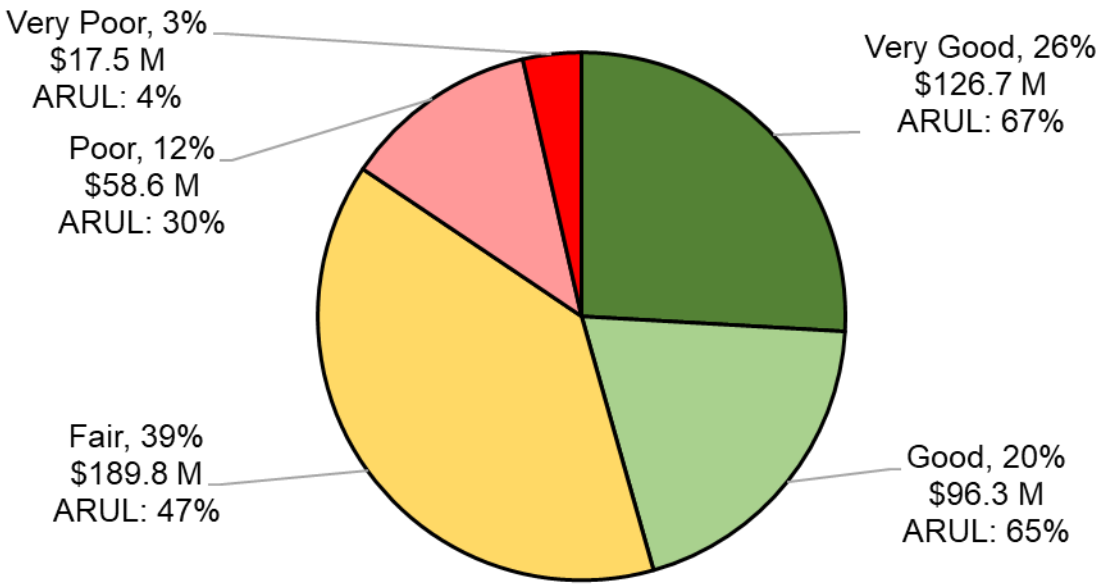
The total replacement cost of all LHPWSS assets, in 2022 dollars, is estimated at **$489 million**. The treatment assets make up approximately **36%** of the LHPWSS's assets by value, with the transmission assets making up **61%** and digital technology assets **3%**.

The overall condition of the LHPWSS by replacement value is shown in **Figure E-2.**

The age-based condition presented below indicates that **15%** of the assets are considered Poor or Very Poor; however, this is based on the assets nearing the end of their useful life with the average remaining useful life (ARUL) of **30%** for Poor and **4%** for Very Poor. The estimated replacement value for Poor and Very Poor assets is **$76.1 million**.

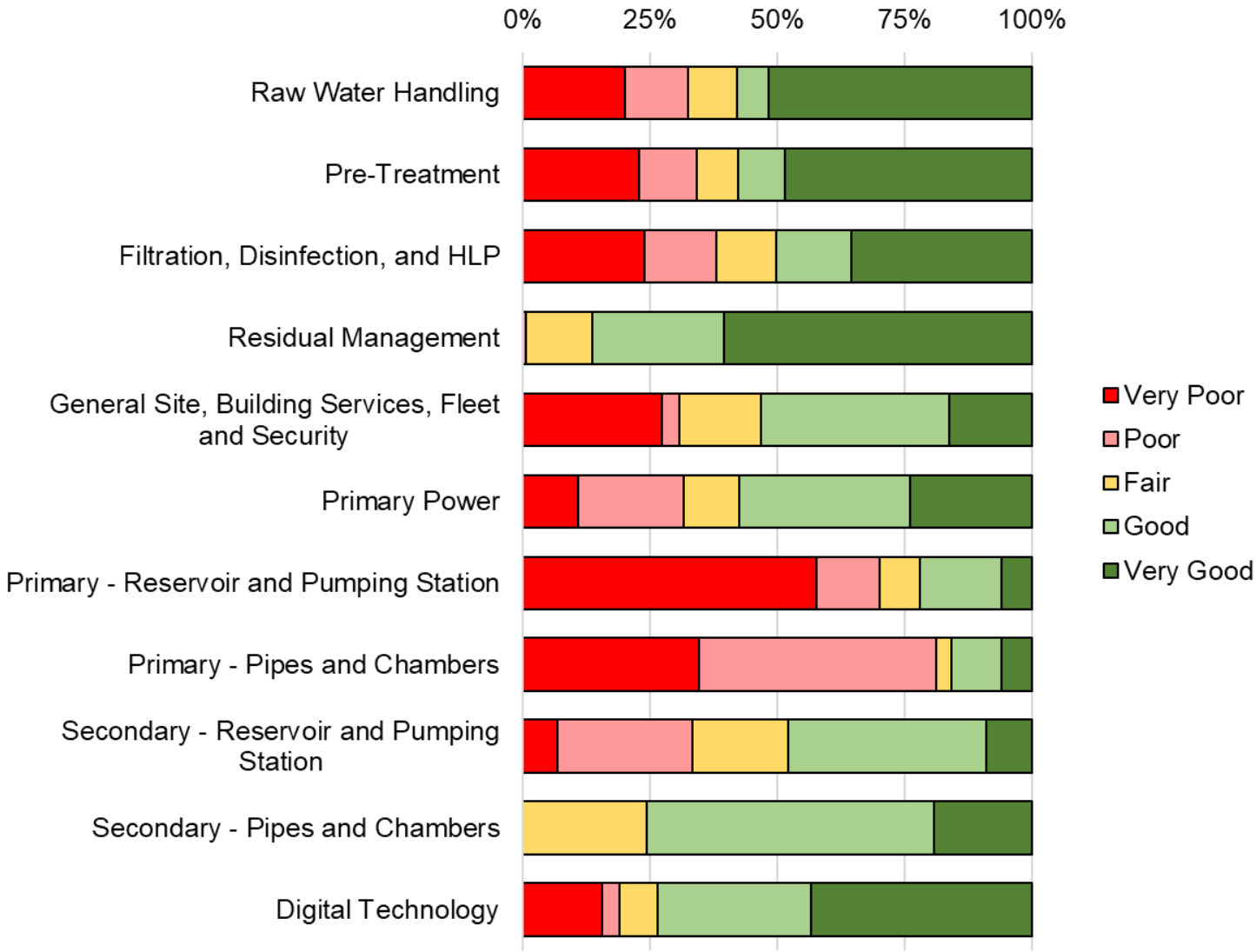
The overall data confidence (condition data) is estimated as Moderate.

Figure E-2: Overall Condition by Replacement Value



The asset condition by process area is presented in **Figure E-3**, highlighting Residual Management as the best condition overall.

Figure E-3: Asset Condition by Process Area (by Count)

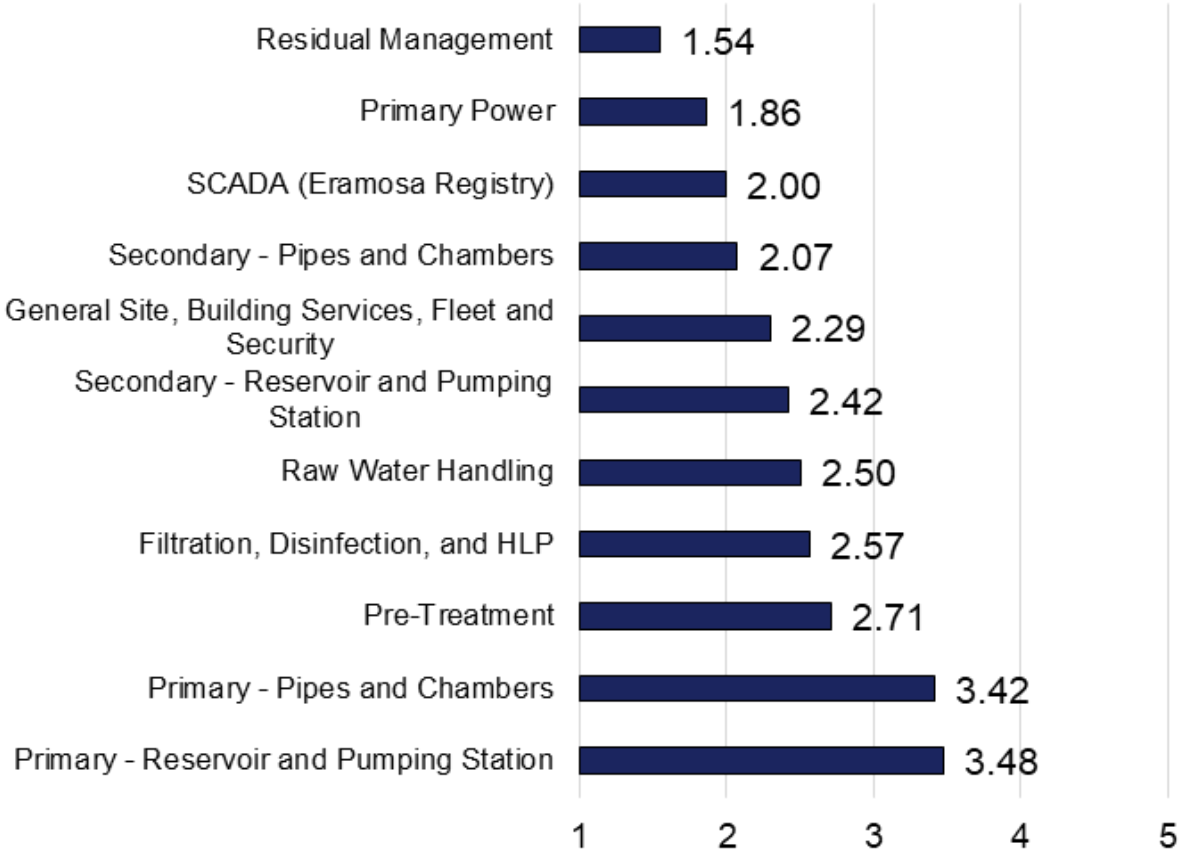


Overall Performance

Asset performance is a measure of how well an asset is performing as part of its operational function, and this is assessed independently of other factors, such as age or condition. Performance can be observed through the operating and maintenance activities (qualitative); and measured with meters, sensors, testing, etc. (quantitative). Overall the assets are performing in the Fair (3.48) to Very Good (1.54) range, as presented in **Figure E-4** by process area.

It is recommended that a formal performance rating methodology be employed for all assets, in parallel to the condition rating scale using ratings from 1 (Very Good) to 5 (Very Poor).

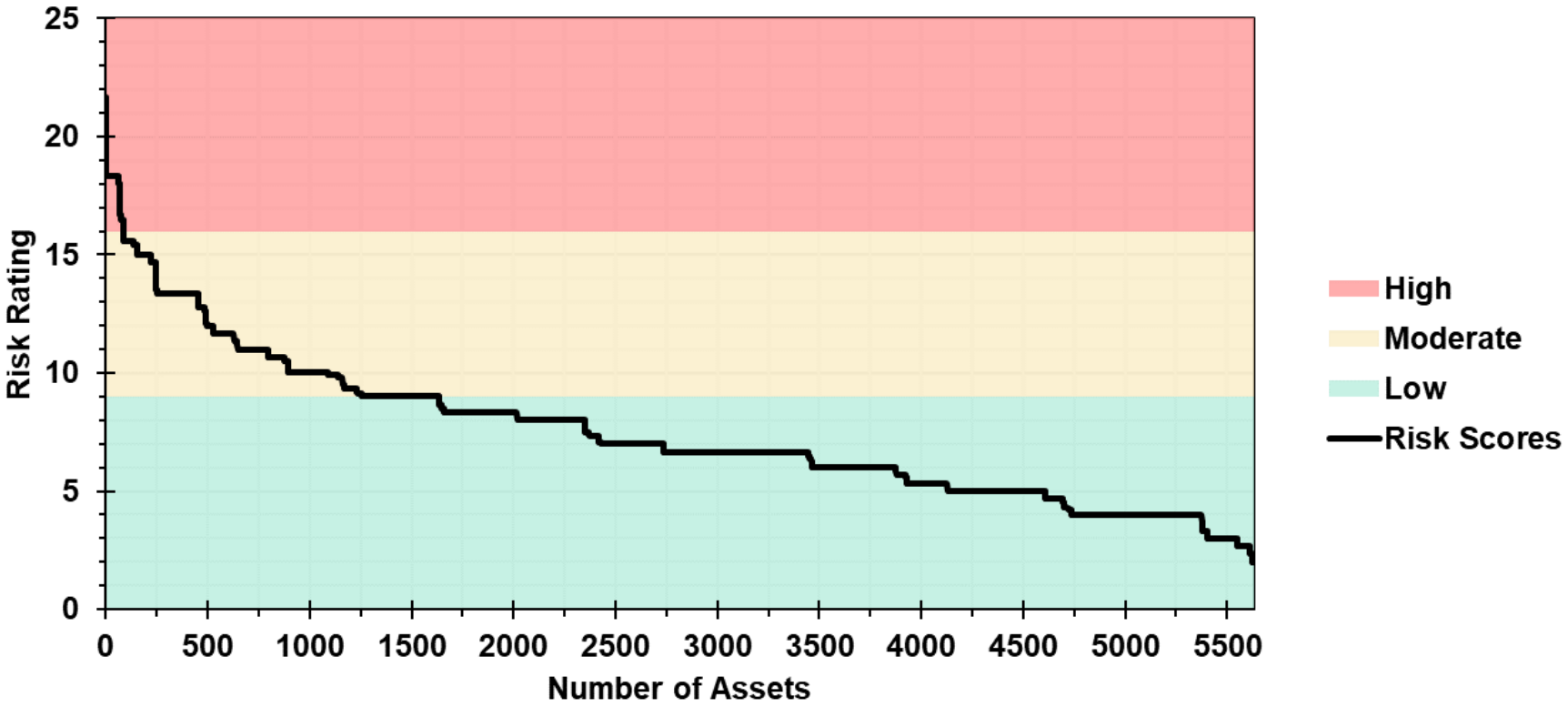
Figure E-4: Overall Average Performance Score



Risk Profile

The Risk profile for all assets can be found in **Figure E-5**.

Figure E-5: Risk Profile



The relationship shown is fairly linear, with a sharp drop initially, indicating the LHPWSS has a broad range of risk across their assets and few High risk assets.

This is a good position to be in as it allows the management of risk and replacement of assets to move forward at a steady rate.

Of the 5,631 assets tracked within the LHPWSS's asset management data, 88 are classified as High risk and 29% as Moderate or High risk. These assets are considered high and moderate priorities for the implementation of lifecycle activities, possible replacement and enhanced monitoring. The remaining assets are considered Low risk.

Levels of Service

As part of the AM Plan update, the 2014 Levels of Service (LOS) Framework was reviewed and revisions identified to update the LOS framework to be in alignment with global best practice standards for Asset Management such as ISO 55000. The revised LOS framework with target LOS was endorsed on March 3, 2022 (Report No. LH-2022-01-07).

The guiding principles from the AM Policy that relate to the LOS Framework include:

- **Service Delivery**: Service delivery is the key purpose of infrastructure assets. Decision-making should be focused on delivering defined levels of service that reflect customer expectations and balance risk and affordability.
- **Environmentally Conscious**: The utility shall minimize the impact of infrastructure on the environment and address the vulnerabilities and risks caused by climate change through lifecycle management. This includes energy and resource optimization, meeting environmental standards such as ISO 14001 in our operation, considering end of product life disposal or reuse options, and whole lifecycle considerations at the time of repair, replacement or new build.

In the review of the current framework in light of ISO55000 guidance and in alignment with the new AM Policy, three Level of Service parameters and associated objectives were identified that reflects the outcomes that the utility delivers and the Customer Level of Service metrics. See **Table E-2**.

Table E-2: Levels of Service

Parameter	Objective	Customer Level of Service
Quality	Provide drinking water quality that meets or is superior to regulatory requirements	• Meet target of no adverse water quality incidents • Satisfy MECP regulatory compliance requirements • Satisfy Superior Water Performance Criteria • Meet Plant Maintenance/ Performance Requirements
Availability /Reliability	Deliver water to customers when demanded	• Measurable flow when customer connection is open
Availability /Reliability	Provide resilient water production	• Chemical working volume greater than demand • Power supply greater than peak demand • Assets operate with % reserve capacity
Availability /Reliability	Provide safe and secure operations	• Physical Security • Computational Security (IT, IAS)
Environmental Acceptability	Minimize water system impacts on the environment	• Environmental sustainability best practices • Meet other regulatory compliance requirements
Environmental Acceptability	Detect changes in source water quality and environmental impacts that affect the water system	• Operations and services are continuous

Level of Service Targets

The purpose of setting targets for LOS is to define the objectives of the utility. Levels of Service are the service performance targets for the utility and used in the utility's decision-making process for operational activities and asset investments. These targets will be measured on a regular basis and any gaps in being able to meet LOS become a priority for action.

See questions for decision making in **Table E-3**.

Table E-3: Levels of Service (LOS) Priority for Action

Question	Response for Decision Making
1. Meet LOS now?	• If No: Priority for action • If Yes: Look at Question 2
2. Meet LOS in future?	• If No: Priority for action • If Yes: Look at Question 3
3. Is LOS staying the same?	• If No: Priority for action • If Yes: No change in action

Risk is the "effect of uncertainty on objectives". Asset risk is any issue preventing the utility in achieving the target LOS. Establishing clearly defined objectives in the LOS for the utility is a foundational practice in asset management. Not only does it help to communicate expectations to the utility's customers, it provides clarity in risk management for the utility to prioritize actions, including financial investments in infrastructure. Priorities are quantified by the size of the gaps between target LOS and current and future risks.

The targets for LOS are presented in **Sections 3.2 to 3.4** of the AM Plan. The alignment of digital technology assets to provide monitoring and reporting data to support reporting on LOS achieved is presented in **Section 3.5**.

Asset Management Strategy

The strategic direction statements have been updated to align with the LOS Framework. In describing the key drivers for meeting target LOS, these statements provide a definition as applicable for treatment services and transmission services and include an example of an activity for each. Clarity in each of these key drivers is important as funding for activities and projects comes from reserve funds for these purposes. In the development of business cases for new investments, the source(s) of funding is determined based on the key driver(s) for the project.

The key drivers for investment are defined as follows:

- **Address Legislative Changes**: investment required for compliance with new legally enforceable obligations;
- **Maintain LOS***:* investment required to maintain the current LOS to the existing member municipalities;
- **Support Growth and Demand***:* investment required to provide service for new customers with no net deterioration from the current level of service provided to existing member municipalities;

- **Increase Efficiency***:* investment required to enable a demonstrable savings in operating expenses arising from the project;
- **Enhance LOS***:* investment required to provide an identifiable, measurable and permanent change in the overall level of service to existing member municipalities above the standard previously provided.

The linkages between the key drivers and the LOS parameters are presented in **Table E-4**.

Table E-4: Key Drivers linked to Level of Service

Level of Service Parameters	Address Legislative Changes	Maintain LOS	Support Growth and Demand	Increase Efficiency	Enhance LOS
Quality	yes	yes		yes	yes
Availability & Reliability		yes	yes	yes	yes
Environmental Acceptability	yes	yes			yes

The linkages between the key drivers and the AM Policy (guiding principles and the key outcomes) are presented in **Table E-5** and **Table E-6**.

Asset management strategies presented in the AM Plan include the following:

- Strategy to Maintain LOS
- Risk Strategy
- Climate Change
- Lifecycle Strategy – Transmission
- Lifecycle Strategy – Treatment
- Lifecycle Strategy – Digital Assets

Table E-5: Key Drivers linked to AM Policy (Guiding Principles)

AM Policy (Guiding Principles)	Address Legislative Changes	Maintain LOS	Support Growth and Demand	Increase Efficiency	Enhance LOS
Service Delivery		yes			yes
Long-Term Sustainability and Resilience			yes		yes
Fiscal and Asset Management Decision-Making	yes			yes	
Whole-Life Perspective		yes			yes
Environmentally Conscious	yes	yes	yes		
Transparency	yes			yes	

Table E-6: Key Drivers linked to AM Policy (Key Outcomes)

AM Policy (Key Outcomes)	Address Legislative Changes	Maintain LOS	Support Growth and Demand	Increase Efficiency	Enhance LOS
Annual Budgeting Process, Business Case Approach		yes	yes	yes	yes
Asset Data Registry, Good Governance & operational efficiencies					yes
Climate Change, Risk Management Approach	yes	yes			
Evidence Based Dialogue					yes
Sustainable LOS, Investment Drivers		yes			yes
Continuous Improvement				yes	yes

Financial Strategy

The capital funding projections provide a window into spending over the next 25 years, presented in 2022 dollars.

Included in the capital funding projections are the projects identified in the 2023 capital plan, new projects proposed in various planning documents confirmed with input from the utility, the asset replacement schedule and the mid-life intervention costs.

The projections will inform the Financial Plan update being completed by Watson and Associates Ltd. (Watson) as a separate project. The Financial Plan update should be referenced for a more complete financial analysis and strategy.

Capital Funding Projections (25 Years)

The capital funding projections are presented in **Table E-7** with the corresponding estimated cost in 2022 dollars and year(s) that the investment will take place. The estimated cost of each project includes the remaining budget for projects that are underway with multi-year funding. For more detailed funding projections, year by year investment projections are presented in **Section 5**.

Table E-7: Capital Funding Projections (25 Years)

Project Name	Remaining Project Cost ($2022)	Investment Year(s)
Concrete Crack Injection (LH1207)	$150,000	2022 to 2024
Security Upgrades (LH1229)	$653,000	2022 to 2026
Hydraulic/Transient Model Update & Transient Monitoring (LH1242)	$210,000	2022 to 2023
McGillivray Electrical Upgrades (LH1243)	$7,077,436	2022
Interior LED Lighting Upgrades (LH1270)	$50,000	2022
(PS3) Exeter-Hensall Pump Control Upgrades (LH1273)	$50,000	2022
Arva Reservoir Expansion (LH1280)	$35,000,000	2028 to 2029
Distressed Pipe Replacement Program (LH1317)	$5,750,000	2022 to 2037
Arva Reservoir Structural Repairs (LH1352)	$2,050,000	2023 to 2024
Plant Expansion & Renovation (LH1353)	$5,000,000	2024 to 2026

Project Name	Remaining Project Cost ($2022)	Investment Year(s)
Clarifier Upgrades (LH1380)	$345,000	2022 to 2024
Oneida Transmission Pipeline (LH1408)	$25,200,000	2022 to 2023
WTP Storage Schedule B Environmental Assessment (LH1426)	$35,000,000	2023 to 2025
Water Quality Facility Plan (LH1901)	$290,000	2024
Chamber Flood Prevention/Rehab (LH2038)	$475,000	2022 to 2027
Pipeline-A Double Isolation Valve (LH2042)	$1,247,000	2022
Construction Site Trailer Pad & Electrical Pedestal (LH2043)	$75,000	2022
Asset Management Plan	$750,000	2026, every 5 years
Financial Plan	$250,000	2026, every 5 years
Master Water Plan Update	$750,000	2024, every 5 years
Asset Condition Field Assessment	$366,000	2023 to 2025
Control Systems Upgrades for the Strathroy Monitoring Stations	$275,000	2023
De-chlorination of Water Discharge at Remote Stations	$125,000	2023
Electric Vehicle Charging Stations	$60,000	2023 to 2024
Sub-basement Drain Study	$25,000	2023
Climate Change Risk Assessment Recommendation #5	$50,000	2024
Optimization Opportunities (1-5 year)	$653,777	2025 to 2029
Optimization Opportunities (6-10 years)	$18,264,157	2030 to 2034
Mid-Life Intervention Costs	$6,518,021	2022 to 2046
Lifecycle Replacement Costs	$112,483,050	2022 to 2046
Total	**$259,192,441**	

The total capital funding projection is **$259.2 million**, which includes: confirmed capital projects; projects in the planning stage (reports, proposed projects, optimization opportunities); and costs for mid-life interventions and lifecycle replacement over a 25-year period.

Lifecycle Replacement Costs and Mid-Life Interventions

The projected lifecycle replacement costs and mid-life interventions for all assets (Treatment, Transmission and Digital Technology) is **$119 million** in current dollars over the 25-year period. See **Table E-8.** A summary of the overall condition, performance, risk profile and investment projections for the lifecycle replacement costs and mid-life interventions for all assets is presented in **Figure E-6: Asset Card – Lake Huron Primary Water Supply System**.

Table E-8: Mid-Life and Lifecycle Replacement Projections (25 Years) Rounded

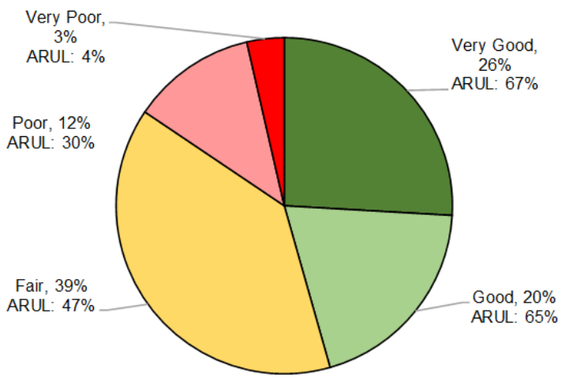
Year	Mid-Life Cost	Replacement Cost	Total Cost
2022	$4,000	$13,081,500	$13,085,600
2023	$1,000	$910,000	$911,000
2024	$1,285,800	$182,800	$1,468,600
2025	$625,800	$5,030,900	$5,656,700
2026	$154,100	$129,600	$283,800
2027	$80,500	$571,000	$651,500
2028	$147,500	$3,403,300	$3,550,800
2029	$699,700	$4,075,900	$4,775,600
2030	$236,900	$2,682,700	$2,919,600
2031	$17,100	$2,577,800	$2,595,000
2032	$290,100	$1,429,000	$1,719,100
2033	$366,500	$4,254,900	$4,621,400
2034	$106,400	$1,927,400	$2,033,800
2035	$564,900	$968,900	$1,533,800
2036	$260,400	$1,071,500	$1,332,000
2037	$557,800	$15,472,500	$16,030,300
2038	$435,500	$3,211,600	$3,647,100
2039	$108,000	$1,040,700	$1,148,700
2040	$215,000	$4,362,800	$4,577,900
2041	$47,300	$1,234,300	$1,281,700
2042	$0.00	$2,427,100	$2,427,100
2043	$113,900	$9,090,500	$9,204,400
2044	$81,600	$1,233,400	$1,315,000
2045	$104,300	$19,628,600	$19,732,900
2046	$13,600	$12,484,300	$12,498,000
Total	**$6,518,000**	**$112,483,000**	**$119,001,000**

Figure E-6: Asset Card – Lake Huron Primary Water Supply System

System	Total Assets	Replacement Cost
Lake Huron Primary Water Supply System	5631	$489 M

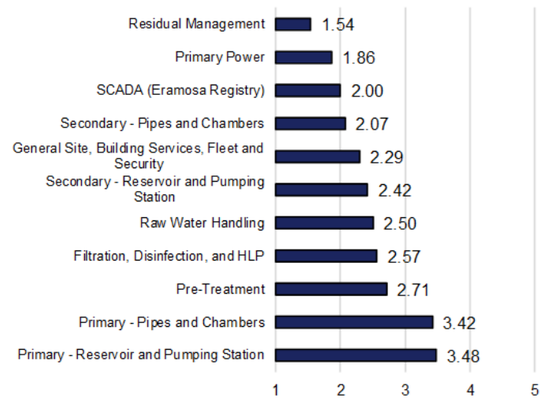
Condition by Replacement Value

Condition Range: Very Good to Very Poor

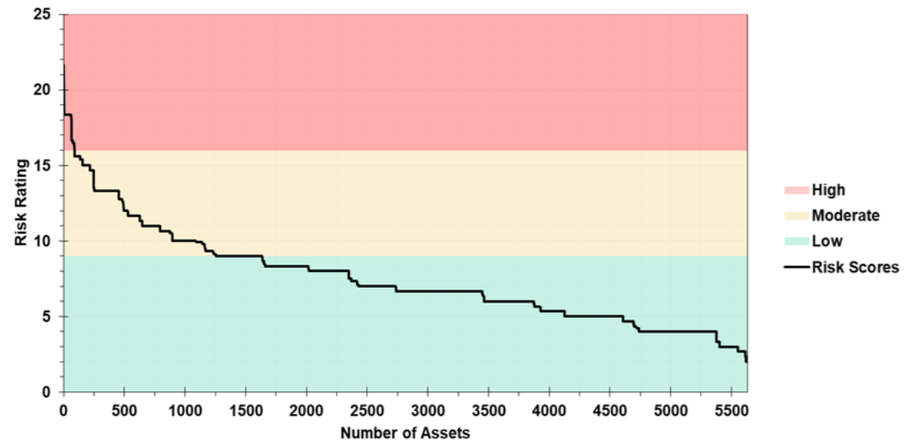


Performance by Process Area

Performance Range: 1.54 (Good) to 3.48 (Fair)

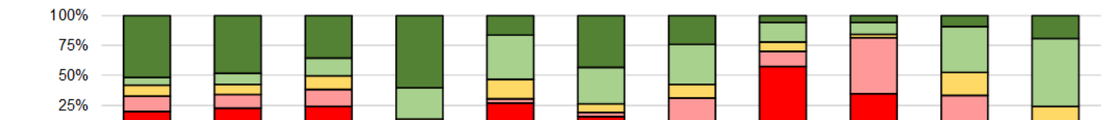


Risk Profile



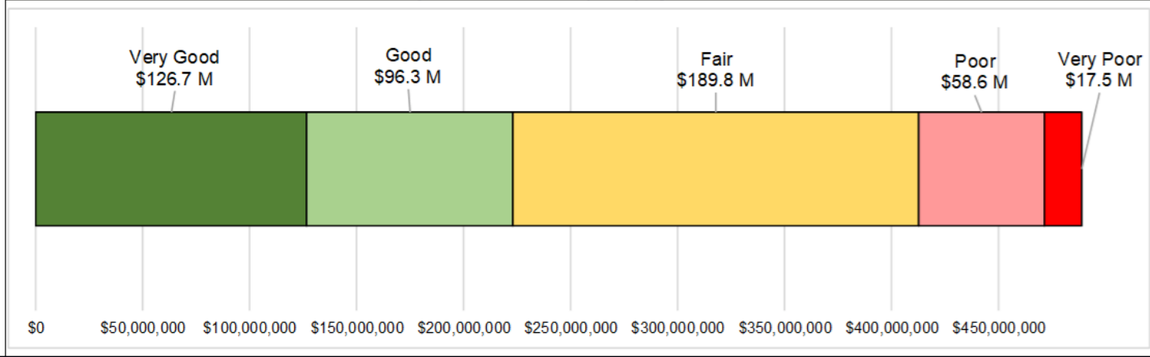
88	High Risk Assets	1548	Moderate Risk	3995	Low Risk Assets	29%	Moderate or High Risk

Condition by Process Area (Count of Assets)

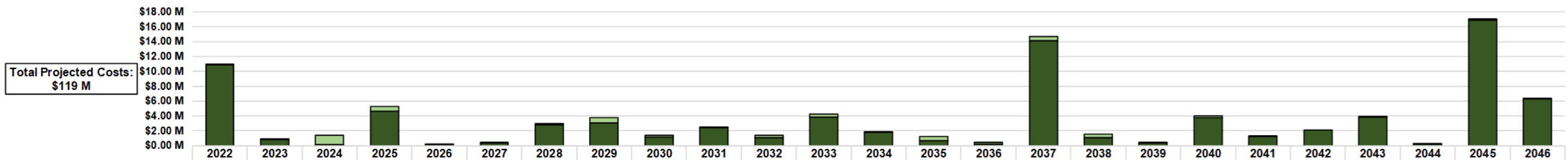


	Raw Water Handling	Pre-Treatment	Filtration, Disinfection, and HLP	Residual Management	General Site, Building Services, Fleet and Security	Digital Technology	Primary Power	Primary - Reservoir and Pumping Station	Primary - Pipes and Chambers	Secondary - Reservoir and Pumping Station	Secondary - Pipes and Chambers
Very Good	52%	49%	35%	60%	16%	44%	24%	6%	6%	9%	19%
Good	6%	9%	15%	26%	37%	30%	34%	16%	10%	39%	56%
Fair	10%	8%	12%	13%	16%	8%	11%	8%	3%	19%	24%
Poor	13%	11%	14%	1%	4%	3%	21%	13%	47%	27%	0%
Very Poor	20%	23%	24%	0%	27%	16%	11%	58%	35%	7%	0%

Replacement Value (2022) by Condition



25-Year Asset Lifecycle Replacement and Mid-Life Intervention Costs (2022 Dollars)



	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046
Mid-Life Interventions	$0.00 M	$0.00 M	$1.29 M	$0.63 M	$0.15 M	$0.08 M	$0.15 M	$0.70 M	$0.24 M	$0.02 M	$0.29 M	$0.37 M	$0.11 M	$0.56 M	$0.26 M	$0.56 M	$0.44 M	$0.11 M	$0.22 M	$0.05 M	$0.00 M	$0.11 M	$0.08 M	$0.10 M	$0.01 M
Lifecycle Replacements	$10.89 M	$0.87 M	$0.14 M	$4.62 M	$0.09 M	$0.39 M	$2.85 M	$3.08 M	$1.17 M	$2.42 M	$1.09 M	$3.88 M	$1.78 M	$0.67 M	$0.22 M	$14.10 M	$1.12 M	$0.38 M	$3.77 M	$1.23 M	$2.08 M	$3.82 M	$0.24 M	$16.91 M	$6.31 M

Improvement and Monitoring

2022 Improvements Completed

Asset management is a journey of continuous improvement. Improvements incorporated in the 2022 Update included:

- Development of an AM Policy and alignment of the AM Plan with the policy;
- Update of LOS framework to align with ISO55000 and setting targets for LOS;
- Alignment of asset registry hierarchy by process area;
- Assessment of risk ratings for asset components in the asset registry to develop risk profile for each process area and overall risk profile;
- Addition of Digital Technology as a separate asset category to highlight value of IT/OT and data and analytics in sustaining reliable operations and achieving target LOS;
- Addition of security assets and fleet asset as part of the process area: General Site, Building Services, Fleet and Security;
- Focus on lifecycle strategy for ageing transmission systems including identification of activities aligned with lifecycle management strategic outcomes as an example for other asset categories; and
- Alignment of key drivers for funding capital projects with LOS parameters and AM Policy (e.g., guiding principles and key outcomes).

This project addresses many of the initiatives in the AM Assessment and Roadmap (2020) report (Roadmap). See **Table E-9**.

Table E-9: Roadmap Initiatives Addressed

Description of Initiative	How it was addressed
[S2] Implement AM Policy	• AM Policy developed and adopted by the utility • AM Plan developed in alignment with the policy
[S3] Develop AM Plans by major asset classes	• AM Plan developed which includes treatment, transmission and digital technology assets
[P3] LOS Framework Development	• Updated LOS Framework, set LOS targets • Align digital technology assets to monitoring and measuring LOS metrics

Recommendations

This section focuses on recommendations that were identified through the AM Plan update project, based on experience with limited or outdated data; gaps or barriers to reporting on levels of service and performance; or seeking to apply global best practices to advance asset management at the utility. In moving forward, also refer to the Roadmap for activities and projects to advance asset management practices.

The key recommendations from the AM Plan focus on:

- Increasing performance data collection in support of monitoring level of service metrics, risks, and asset condition/performance;
- Updating condition assessment information on a more regular basis tied to decision making windows for accurate line-of-sight; and
- Advancing recommendations on strategy development and implementation.

The “next steps” for operationalizing asset management at the utility are presented in the following categories.

Data Collection and Monitoring

Data collection and monitoring is an essential part of asset management. Two of the key recommendations can be addressed by improvements to data collection and monitoring, i.e. increasing performance data collection; and updating condition assessment information on a more regular basis.

- [R1] Increase Performance Data Collection
- [R2] Update Condition Assessment Information
- [R3] Increase Level of Service Data Collection
- [R4] Improve Asset Data Collection in CMMS
- [R5] Enhance Tracking of Digital Technology Assets

Level of Service Tracking

The LOS framework and targets presented to the Board of Management for the LHPWSS in March 2022 require regular monitoring, tracking and reporting.

- [R6] Operationalize the LOS Framework

Risk Mitigation

The delivery of service from the infrastructure that make up the systems in each process area is a balancing act of cost (investment) and risk (of under-performance). As risk is the effect of uncertainty on objectives, risk mitigation is creating more certainty in

meeting levels of service through performance of the assets. See **Section 4.3 – Risk Strategy** for more details.

- [R7] Reduce Uncertainty in Data Confidence (Asset Condition)
- [R8] Reduce Uncertainty in Climate Change Impacts
- [R9] Operationalize the Risk Strategy

Strategy Implementation

As stated in **Section 6.3 – Risk Mitigation**, the implementation of AM strategies is a key recommendation for risk mitigation as well as achieving the LOS targets.

- [R10] Develop AM Strategies (Transmission Strategy, Treatment Strategy, Digital Technology Strategy)

Financial Considerations

As the budgeting cycle at the utility incorporates longer-term decision-making, there is a greater onus to be forward thinking and to refer regularly to the long-term projections for capital renewal and mid-life improvements in the AM Plan.

The projections are based on replacement at end of useful life, and as such, are estimates. Good maintenance practices can improve condition and extend the useful life, but not indefinitely.

- [R11] Establish Process for Budgeting Renewal and Mid-Life Capital Investments
- [R12] Update Business Case to align with AM Policy and LOS Framework

Next AM Plan Update

With a recommended 5-year renewal cycle, the next AM Plan update in 2027 would be based on available asset data as of December 31, 2026.

- [R13] Preparing for 2027 Update
- [R14] Recommended Improvements
- [R15] Recommended Schedule

Acknowledgements

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About This Report

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