Incorporating an Integrated Management Systems' approach with utility business processes to achieve long-term sustainability and reliability

Lake Huron & Elgin Area Water Supply Systems

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LAKE HURON/ELGIN AREA WATER SYSTEMS

Today's presentation:

- ✓ Background and History
- ✓ Organization
- ✓ Principles and Practices
- ✓ Business Processes
- ✓ What's Next

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BACKGROUND & HISTORY

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BACKGROUND AND HISTORY

- Regional water systems were previously owned/operated by the Province of Ontario
  - Built and operated by the Ontario Water Resources Commission (forerunner to the MOE) in the mid-1960's
  - OWRC focused on regionalization of water and wastewater systems until 1970's when the Ministry of Environment was created and OWRC merged
- Ontario passed the *Municipal Water & Sewage Systems Transfer Act, 1997* to transfer provincially owned water and/or wastewater systems to the respective benefiting municipality.
  - Where a system benefitted more than one municipality, a Board of Management is established.

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BACKGROUND AND HISTORY

- Ownership of the Lake Huron Water Supply System and the Elgin Area Water Supply System (regional water systems) transferred to the respective benefiting municipalities in 2000 via Transfer Orders issued under the *Municipal Water & Sewage Systems Transfer Act, 1997*
  - Each municipality has an undivided interest in the respective system
  - No division of capacity. No division of ownership. No shareholdings.
- Transfer Orders created a Board of Management for each system, who has the complete authority to govern over the respective system

"You're a Board now. You're on your own.
Here's the assets (such as they are) and all the debt (as much as it is)…
but no cash and no reserve funds… and no policies… or staff…"

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BACKGROUND AND HISTORY

- Board of Management for the Lake Huron Water Supply System and the Board of Management for the Elgin Area Water Supply System were NOT created under the *Municipal Act, 2001*.
  - Boards meet the definition and likely considered a "local board" under the *Municipal Act*
  - Choose to behave as if it were a Joint Municipal Services Board (*Municipal Act*, section 195 to 202)

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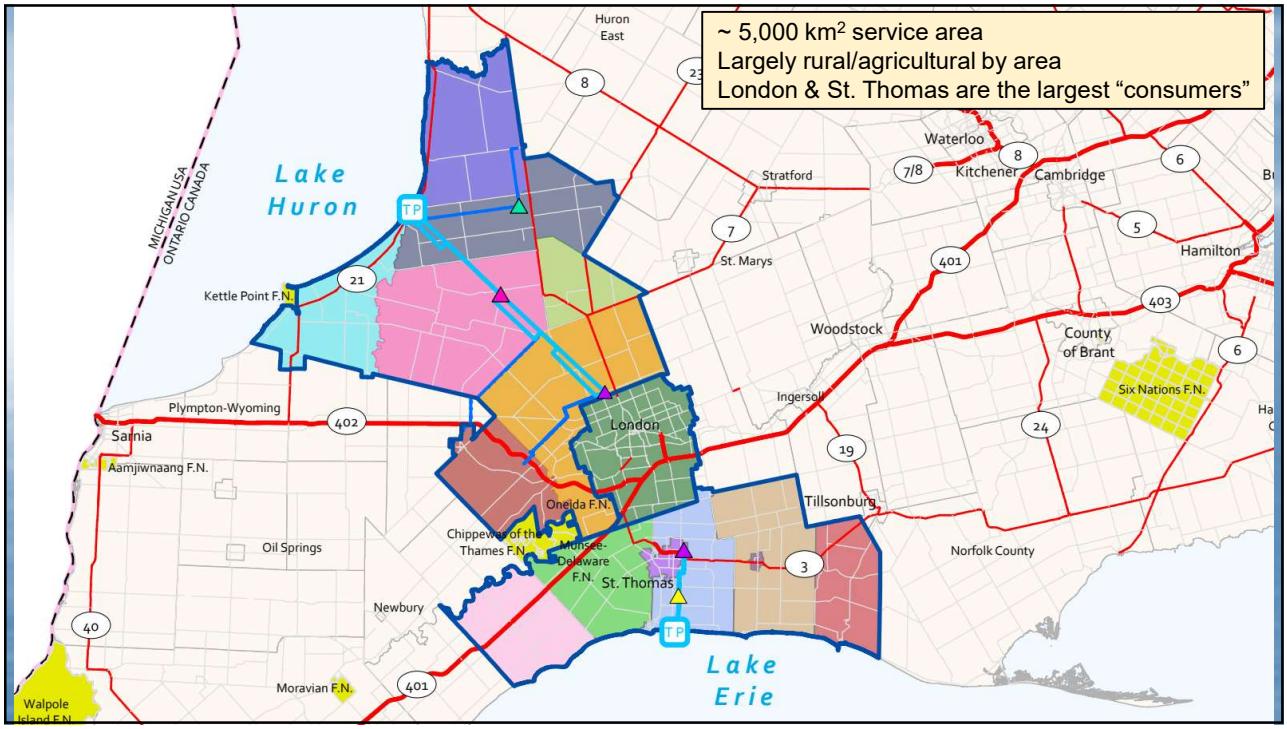

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THE ORGANIZATION

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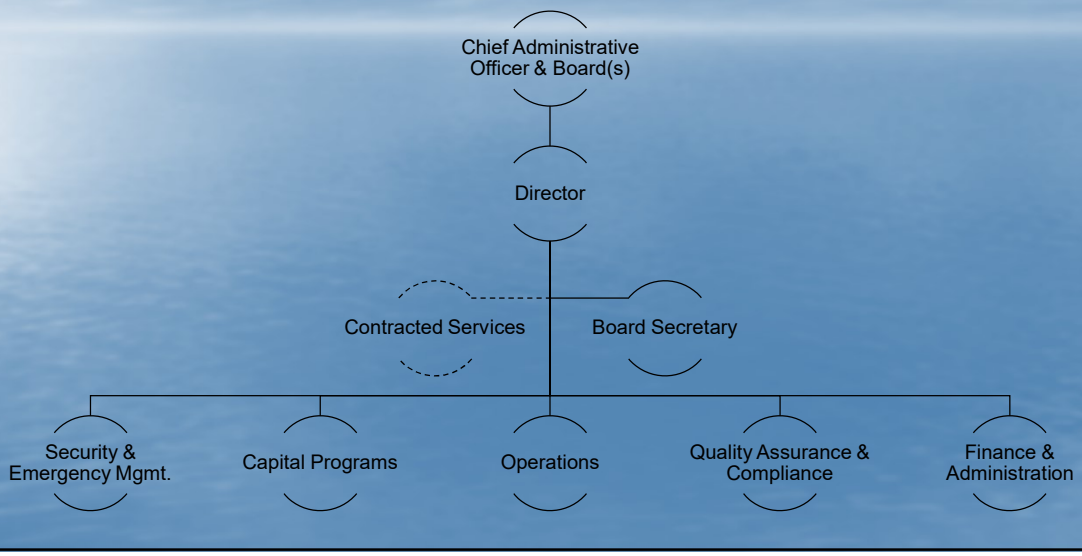
ORGANIZATION (BY FUNCTION)



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ORGANIZATION (BY FUNCTION)

Security & Emergency Management:

- Incident Management System
- Security Services (contracted)

Capital Programs:

- Planning & Studies
- Engineering & Construction
- Optimization & Efficiency

Finance & Administration:

- AP/AR & Finance Planning
- Procurement
- Legal Services (contracted)
- People Services & Safety

Operations:

- Information/Cyber Security
- Asset Management System
- Control Systems
- Operating Authority (contracted)
- Energy Management (contracted)

Quality Assurance & Compliance:

- Audit
- Lab Information System
- Quality Management System
- Environmental Management System

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PRINCIPLES AND PRACTICES

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SYSTEMIC APPROACH

Administration and oversight uses the management system approach:

- Quality management to minimize risks to the operation of the system and the quality of the drinking water (DWQMS)
- Environmental management to minimize risks related to the environment & legislation, optimization of resource utilization, and minimize waste (ISO 14001)
- Incident management to coordinate response to incidents and emergencies and mitigate associated risks (NIMS)
- Asset management to minimize risks to the assets, and coordinate the timely investment in the water system's assets accounting for condition, performance and risk (ISO 55001)

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SYSTEMIC APPROACH (CONTINUED)

- Document control systems to ensure information is up to date, protected, readily accessible and retrievable.
- Internal and external audits undertaken to identify areas of risk, non-conformance and opportunities for **continuous improvement**.
- Integration of future management systems (e.g., ISO 45001)

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FOUR PRIMARY PLANS (a.k.a. "THE FOUR PILLARS")

Master Water Plan:

- Growth management and planning
- Long-term projections of population and industries within municipalities
- Long-term projections of volumes supplied
- Infrastructure needed to support growth

➢ Water Quality Facility Plan (annex study)

- Effectiveness of treatment at higher rates of flow
- Identify treatment bottlenecks
- Identify emerging water quality issues (climate change, emerging contaminants, disinfection efficacy, etc.)

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FOUR PRIMARY PLANS (a.k.a. "THE FOUR PILLARS")

Asset Management Plan:

- Understanding asset condition, risks, and performance of existing infrastructure and systems (including IT and OT)
- Investment requirements to sustain appropriate levels of performance and condition, minimize/manage risks
- Identify interconnectedness of activities affecting condition and performance

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FOUR PRIMARY PLANS (a.k.a. "THE FOUR PILLARS")

Operational Plan:

- Activities and resources necessary to meet current and future (growth) volumes
- Activities and resources necessary to protect the quality of the product
- Activities and resources necessary to maintain current and future asset condition and performance
- Activities and resources necessary to meet Boards' strategic initiatives

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FOUR PRIMARY PLANS (a.k.a. "THE FOUR PILLARS")

Financial Plan:

- Identification of funding necessary to:
  - Manage, maintain, and repair existing assets and operate the system
  - Support growth, including capital investments, optimization and improvements
- Identification of policies necessary to:
  - Balance generational equity (current user rate(s), utilization of Reserve Funds, use of debentures, etc.)
  - Balance development growth versus existing consumers
  - Identification of special rates and charges for specific purposes
  - Balance system needs versus consequential impacts to municipalities

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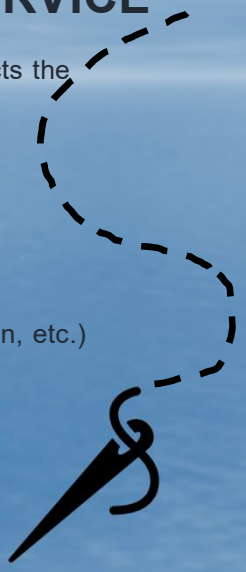
RISK MITIGATION AND LEVELS OF SERVICE

Customer Levels of Service and **Risk Mitigation** framework interconnects the management systems, policies, business processes and plans!

- ✓ Linked to business case and decision-making processes, etc.
- ✓ CLOS supported by technical, operational and performance LOS
- Focus on the concept of "customer":
  - Consumer (quality, volume, reliability, etc.)
  - Environment (sustainability, resource consumption, waste generation, etc.)
  - Staff (health & safety, workplace environment, etc.)
  - Regulatory and contractual obligations
  - Governance (including the benefiting municipalities)
  - Reputation



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BUSINESS PROCESSES

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ASSESSMENT PROCESS

Prioritization
- Identify risks and opportunities
- Assess against CLOS
- Identify interdependencies

Business Case
- Problem statement (objective)
- Assess options
- Identify CapEx & OpEx
- Identify operational impacts
- Identify residual risks

Approval
- Financial model
- Budget
- Regulatory & contractual obligations
- Operationalize: changes to O&M Manual, documentation, Permits/Licence, SOPs, programs, etc.

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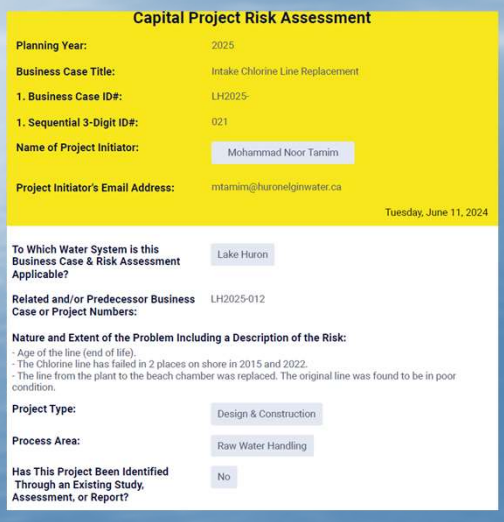
RISK/OPPORTUNITY PRIORITIZATION



Capital Project Risk Assessment

Planning Year:	2025
Business Case Title:	Intake Chlorine Line Replacement
1. Business Case ID#:	LH2025-
1. Sequential 3-Digit ID#:	021
Name of Project Initiator:	Mohammad Noor Tamim
Project Initiator's Email Address:	mtamim@huronelginwater.ca

Tuesday, June 11, 2024

To Which Water System is this Business Case & Risk Assessment Applicable?	Lake Huron
Related and/or Predecessor Business Case or Project Numbers:	LH2025-012

Nature and Extent of the Problem Including a Description of the Risk:

- Age of the line (end of life).
- The Chlorine line has failed in 2 places on shore in 2015 and 2022.
- The line from the plant to the beach chamber was replaced. The original line was found to be in poor condition.

Project Type:	Design & Construction
Process Area:	Raw Water Handling
Has This Project Been Identified Through an Existing Study, Assessment, or Report?	No

- Automated form to generate assessment
- Drop-down, pick-list and free-form text to capture information
- Questions assess pre- and post-risks, failure modes, outcomes, implications to EMS, QMS, IMS, operations, etc.
- Planning & review meeting with multi-disciplinary team to affirm risk/opportunity
- Output: Priority (rank)

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BUSINESS CASE

Capital Project Business Case

Planning Year: 2025

Business Case Title: Intake Chlorine Line Replacement

1. Business Case ID#: LH2025-

1. Sequential 3-Digit ID#: 021

Name of Project Initiator: Mohammad Noor Tamim

Project Initiator's Email Address: mtamim@huronelginwater.ca

Tuesday, June 11, 2024

To Which Water System is this Business Case & Risk Assessment Applicable? Lake Huron

Summary of the potential solution options considered to resolve the problem and the details of the recommended solution.

Is TAKING NO ACTION a Viable Option? Yes - At Present the Problem is Not Considered Critical and/or Anticipated to Jeopardize Our Ability to Treat and Transmit Potable Water

Benefits of Taking No Action:
No cost

Disadvantages of Taking No Action:
Inability to control mussels on intake leading to intake blockage and restricting plant operations

Financial Implications of Taking No Action:
Potential higher maintenance cost

- Automated form to generate assessment
- Drop-down, pick-list and free-form text to capture information
- Questions linked to EMS, QMS, Asset management, risk mitigation, CLOS and technical levels of service
- Initial assessment reviewed and validated (“challenge session”) by multi-disciplinary team
- Can identify other opportunities, interdependencies, etc.

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APPROVAL

Number	Name	Process Area	Risk/ Opportunity Score	Residual Risk	Status	BC-ID#	2021	2022	2023	2024	2025
LH1285	Pressure Reducing Valve Replacements	Primary - Pipes and Chambers			Approved			$425,000			
H1316-22	2022 Annual Maintenance Allowance	ALL	N/A		Approved	N/A		$125,000			
H1316-23	2023 Annual Maintenance Allowance	ALL	N/A		Approved	LH2022-016			$125,000		
H1316-24	2024 Annual Maintenance Allowance	ALL	10		Approved	LH2022-016				$125,000	
LH1317	Distressed Pipe Replacement Program	Primary - Pipes and Chambers	20		Budget	LH2016-013a	$350,000	$350,000	$400,000	$350,000	$350,000
LH1352	Ana Reservoir Structural Repairs	Primary - Reservoirs and Pumping Stations	10		Approved	LH2017-017			$50,000	$2,000,000	
LH1353	WTP - Administration Building Extension and Site Redevelo	General Site, Building Services, Fleet, and Security	12.32		Budget	LH2024-014			$500,000	$1,500,000	$15,900,000
LH1380	Clarifier Upgrades	Pre-Treatment	6		Approved	LH2022-015		$115,000	$115,000	$115,000	
LH1388	Coagulation Optimization Study	Pre-Treatment	N/A		Approved	N/A					
LH1408	Oneida Transmission Pipeline	Secondary - Pipes and Chambers	N/A		Approved	N/A		$200,000	$25,000,000		
LH1426	WTP Storage Reservoir & UV	Filtration, Disinfection, and High Lift Pumping	20		Approved	LH2018-004			$500,000	$3,000,000	
LH1560	Record Drawings and Documents	ALL	5		Approved	LH2017-007a					
LH1561	Water Quality Facility Plan	ALL	14		Approved	LH2019-002		$290,000			
LH2036	Roof Drain Replacement	General Site, Building Services, Fleet, and Security	5		Budget	LH2022-002		$50,000	$25,000	$25,000	$25,000
LH2038	Chamber Flood Prevention/Rehab	Primary - Pipes and Chambers	15		Budget	LH2022-005		$100,000	$75,000	$75,000	$100,000
LH2042	Pipeline-A Double Isolation Valve	Primary - Pipes and Chambers	115		Approved	LH2021-005		$1,247,000			
LH2043	Construction Site Trailer Pad & Electrical Pedestal	General Site, Building Services, Fleet, and Security	20		Approved	LH2022-002		$75,000			
LH2044	Sub-basement Drain Study	Filtration, Disinfection, and High Lift Pumping	20		Approved	LH2023-001			$25,000		
LH2045	Monitoring Station Controls Upgrades	Primary - Pipes and Chambers	27		Approved	LH2023-002			$275,000		
LH2046	Asset Condition Field Assessment	ALL	6		Approved	LH2023-003			$110,000	$100,000	
LH2047	Electric Vehicle Charging Stations	General Site, Building Services, Fleet, and Security	7		Approved	LH2023-004			$10,000		
LH2048	De-chlorination at Remote Stations	Primary - Reservoirs and Pumping Stations	150		Approved	LH2023-009			$125,000		
LH2049	Office Expansion		10		Approved	N/A			$100,000		
LH2050	Master Water Plan Update	ALL	9		Approved	LH2018-001				$235,000	
LH2051	Service Water Study	Filtration, Disinfection, and High Lift Pumping	5		Approved	LH2024-004				$120,000	
LH2052	McGillivray Building Renovations	Primary - Reservoirs and Pumping Stations	3		Budget	LH2024-004				$25,000	$25,000
LH2053	Climate Change Resiliency Assessment	ALL	18		Budget	LH2024-005				$120,000	$120,000
LH2054	Treatment Plant Surge System Rehabilitation	Filtration, Disinfection, and High Lift Pumping	20		Approved	LH2024-012				$175,000	
LH2055	Beach Chamber Valve Replacement	Raw Water Handling	5		Approved	LH2024-007				$400,000	
LH2056	Clarifier Ramp Replacement	Pre-Treatment	15		Approved	LH2024-008				$280,000	
LH2057	High Lift Discharge Flow Meter Replacements	Filtration, Disinfection, and High Lift Pumping	15		Approved	LH2024-009				$400,000	
LH2058	Low Lift Check & Butterfly Valve Replacements	Raw Water Handling	3		Approved	LH2024-010				$370,000	
LH2059	Raw Water Valve & Actuator Replacement	Raw Water Handling	15		Approved	LH2024-011				$350,000	

Incorporate into Capital Plan (if applicable:

- Assess implications to Reserve Funds, Debentures, operating/capital budgets
- Timing can be shifted based on interdependencies and prioritization assessment

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APPROVAL

- Budgets approved annually:
  - Operating budget (zero-base budget) incorporates related initiatives and impacts / outcomes of capital programs, needed contributions to reserve funds, etc.
  - Capital budget include projects (if appliable) based on prioritization, scheduled, and interdependencies
- Financial model updated based on recommended / approved initiatives and programs
  - Assess impacts to reserve funds, debentures, debt capacity, etc.

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OPERATIONALIZATION

- Document, document, document!
  - Operations & Maintenance Manuals
  - Permits & Licenses
  - OHS-PSHRs
  - SOPs
  - Security & Emergency Response
  - Training, certification, permitting
- Assess EMS/QMS/IMS/AMS risks due to construction/implementation
- Assess changes in EMS/QMS/IMS/AMS risks post- operational assumption
- Opportunities for Improvement

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WHAT'S NEXT?

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WHAT'S NEXT?

- "Employee-led" Strategic Plan, linked to LOS, risk mitigation framework, and four primary plans
- Improved feed-back assessment of implementation (continuous improvement)
- Continue to leverage continuous improvement and process optimization to gain system capacity, efficacy and efficiency
- (Re)Balance of affordability, sustainability, long-term growth, and generational equity
  - Next iteration of the four primary plans (5-year cycle)
  - Integrate Health & Safety Management (ISO 45001 / CSA Z45001)
  - Integrate with Business Continuity Planning (CSA Z1600)

✓ Understand how each of these may impact management systems and business process integration, and require further evolution

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