Lake Huron
Primary Water Supply System

Jacobs
Challenging today.
Reinventing tomorrow.

Lake Huron Water Treatment Plant Disinfection and Storage Upgrades Schedule B Environmental Assessment

Online Public Information Centre

May 27 to June 10, 2022

Welcome!

Welcome to the online Public Information Centre (PIC) for the Lake Huron Water Treatment Plant (WTP) Disinfection and Storage Upgrades Environmental Assessment (EA).

- Your feedback is an important part of the Class EA process. This PIC is being held to seek your feedback about this project, per provincial requirements for Schedule B Environmental Assessments.
- Please complete the survey questions and provide your comments after reviewing the PIC presentation at the end of this Microsoft Form.
- Any additional comments or questions that you have may be directed to the project team:

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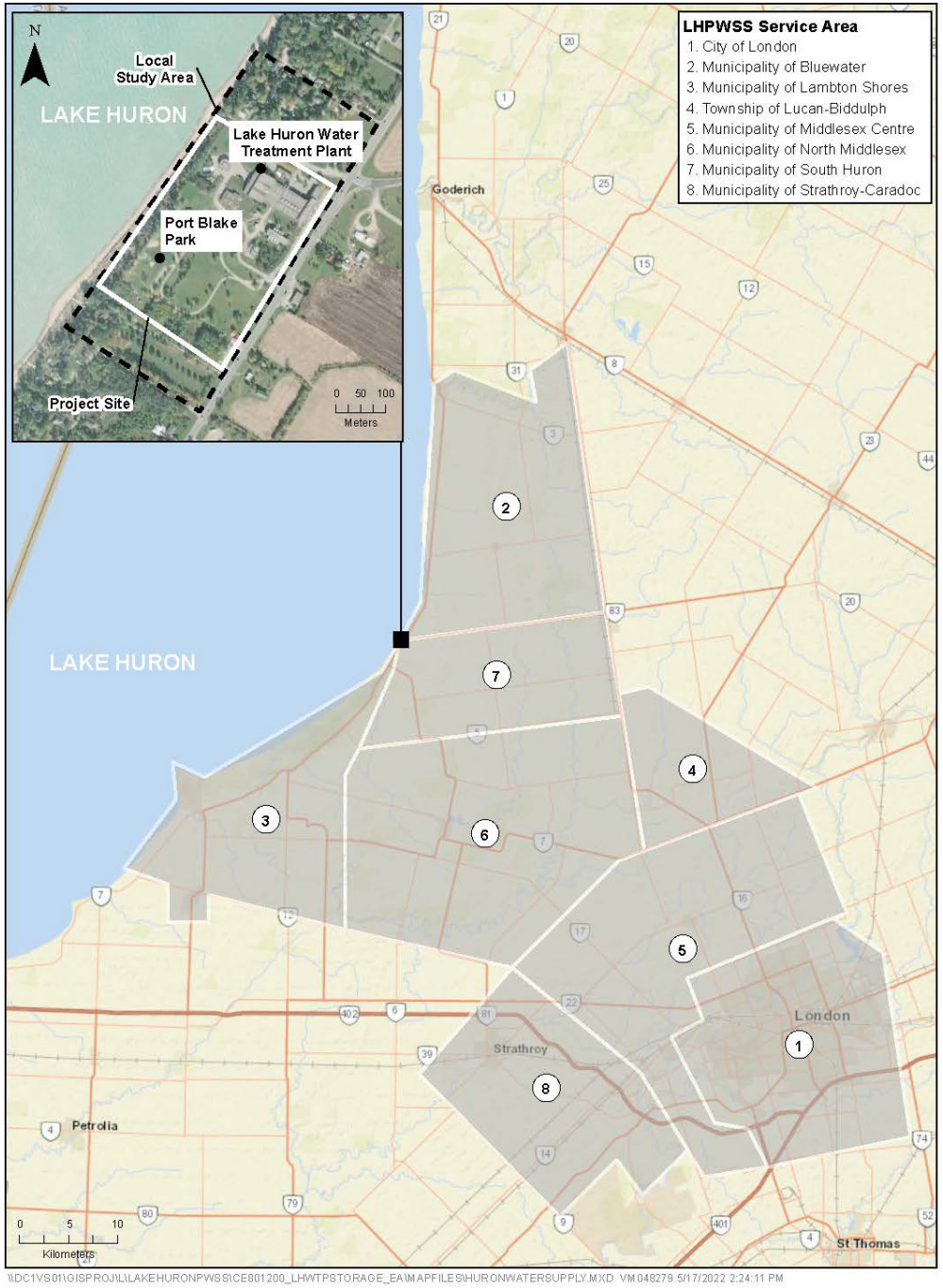
LHPWSS Land Acknowledgement

- It is acknowledged that the Lake Huron Primary Water Supply System (LHPWSS) serves communities and people within the traditional territories of the Anishinaabeg, the Haudenosaunee, and Métis peoples.
- It is acknowledged that members of the LHPWSS Board collectively meet from the areas covered by Treaty 2, Treaty 3, Treaty 6, Treaty 21, and Treaty 29. Accordingly, on behalf of the Project Team, we would like to pay respect to the First Nations who made it possible for others to settle and occupy these territories by signing the Treaties.
- The First Nations Communities closest in proximity to the LHPWSS service area are: Chippewas of the Thames First Nation (part of the Anishinabek); Oneida Nation of the Thames (part of the Haudenosaunee); Munsee-Delaware Nation (part of the Leni-Lunaape); and, Chippewas of the Kettle and Stoney Point First Nation (part of Anishinabek).

Background and Study Area

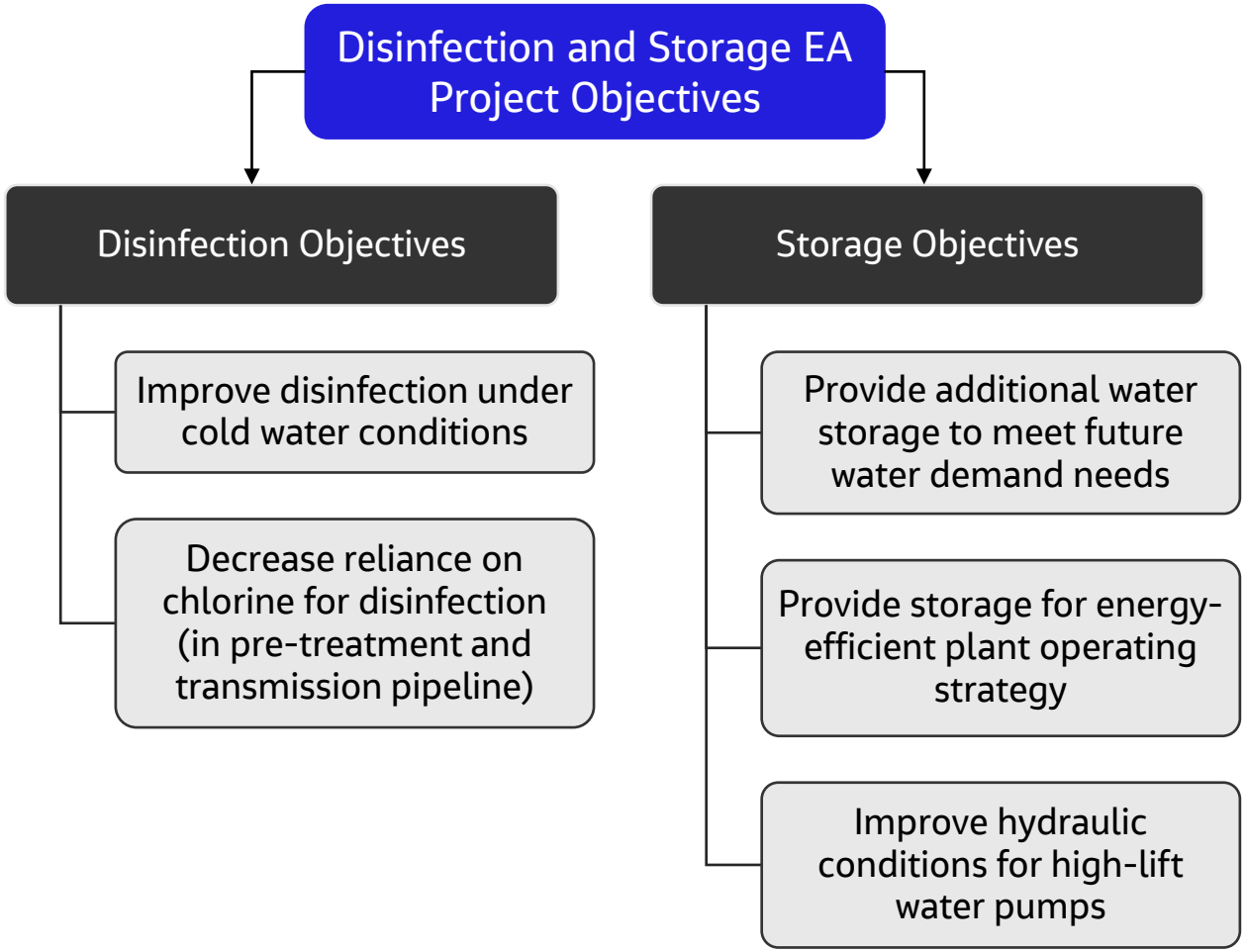
- The LHPWSS owns the 340 megalitre-per-day (ML/d) Lake Huron Water Treatment Plant (WTP), which supplies treated water to eight municipalities via a (partially twinned) 1.2-metre-diameter primary transmission main to reservoirs and secondary transmission systems that service the member municipalities.
- Study Area for the Class EA includes:
  - Project Site: Lake Huron WTP property, including Port Blake Park
  - Local Study Area: Project site extended to include Highlands Drive to the north and Gravelle Street to the south
  - LHPWSS Service Area: Area of municipalities serviced by the LHPWSS



Problem and Opportunity Statement, and Project Objectives

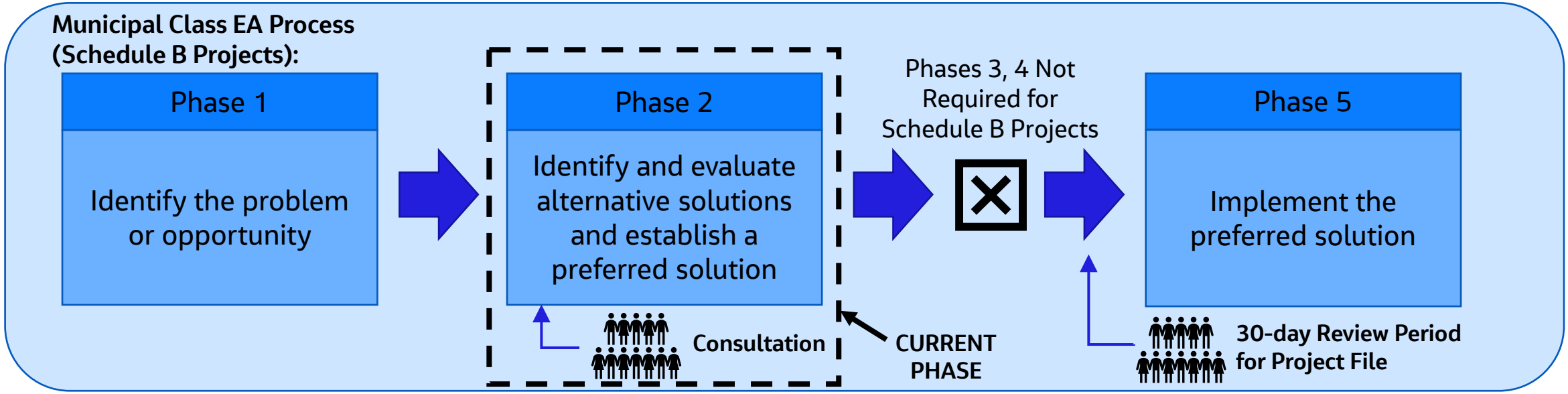
Problem and Opportunity Statement:

- A recently completed update to the LHPWSS Master Water Plan (Jacobs 2020) identified the need to **improve disinfection** and **increase water storage** at the Lake Huron WTP, to meet water demands to the year 2038.
- A Schedule B Municipal Class EA is being completed to **confirm the recommendation for additional storage** at the WTP site and **refine requirements for enhanced disinfection** to provide operational flexibility to implement energy management and other operating strategies.



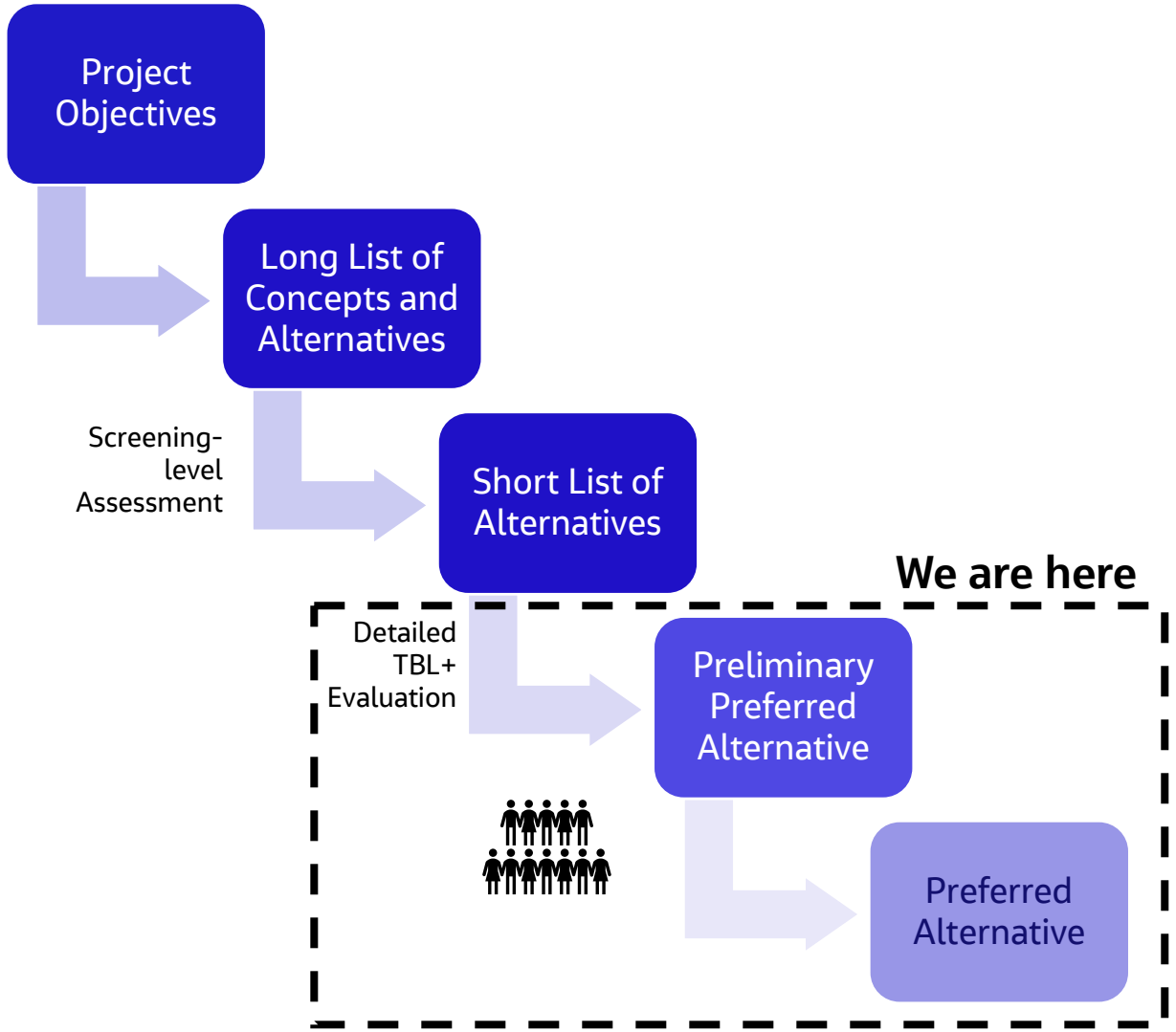
Class Environmental Assessments

- The Ontario Municipal Engineers Association's *Municipal Class Environmental Assessment* document (2000, as amended in 2007, 2011, and 2015) provides municipalities with a five-phase planning process approved under the *Environmental Assessment Act* to plan and undertake municipal projects.
- Projects are classified into different schedules (A, A+, B, or C), based on the anticipated environmental impact of the proposed development. Each classification requires a different level of review and public and stakeholder engagement to complete the Municipal Class EA.
- This project is classified as a Schedule B EA, as it will include upgrades to the existing municipal water infrastructure that have the potential for some adverse environmental impacts.
- The project is being carried out to satisfy the provincial requirements for the Municipal Class EA process.



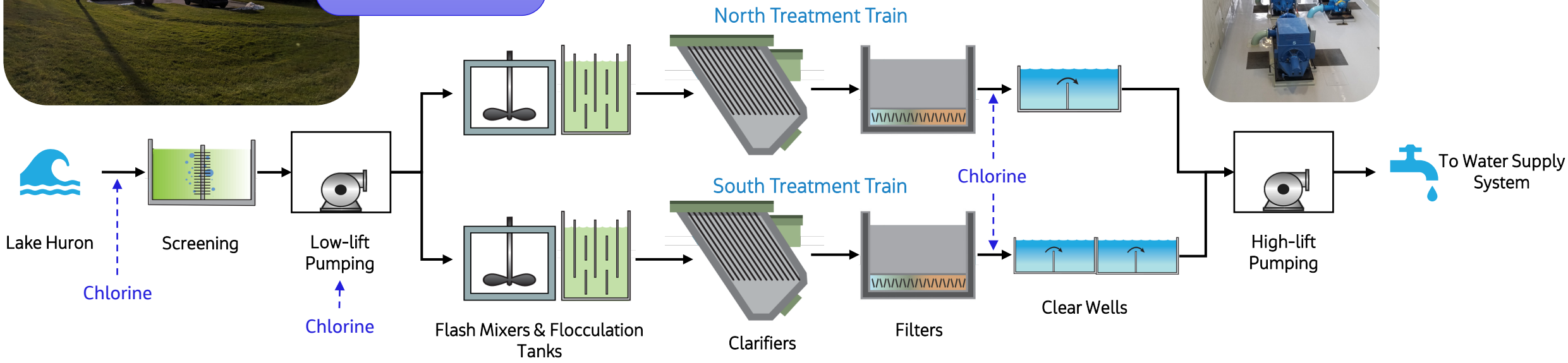
Phase 2: Alternative Development Process

- **Step 1:** Identify objectives for alternative solutions in alignment the with Problem and Opportunity Statement.
- **Step 2:** Identify and evaluate a long list of alternatives to meet project objectives, using a screening level assessment.
- **Step 3:** Develop a short list of alternatives and evaluate them using a detailed triple bottom line (TBL+) evaluation to identify a preliminary preferred alternative.
- **Step 4:** Consult and receive input to confirm the preferred alternative.



Lake Huron Water Treatment Plant – Existing Conditions and Previous Studies (1)

The Lake Huron WTP is a **chemically assisted, conventional filtration treatment plant**.



The water treatment process **begins with water being pumped from Lake Huron**. It then goes through the next treatment stages:

- Pretreatment: A chemical conditioning step to encourage clays, silts, organic material, and bacteria to stick together and settle out of the water.
- Filtration: A step to remove any remaining particles.
- Clear Wells: The stage where the water gets contact with chlorine.

The process **ends with treated water being sent out to customers** via the LHPWSS.

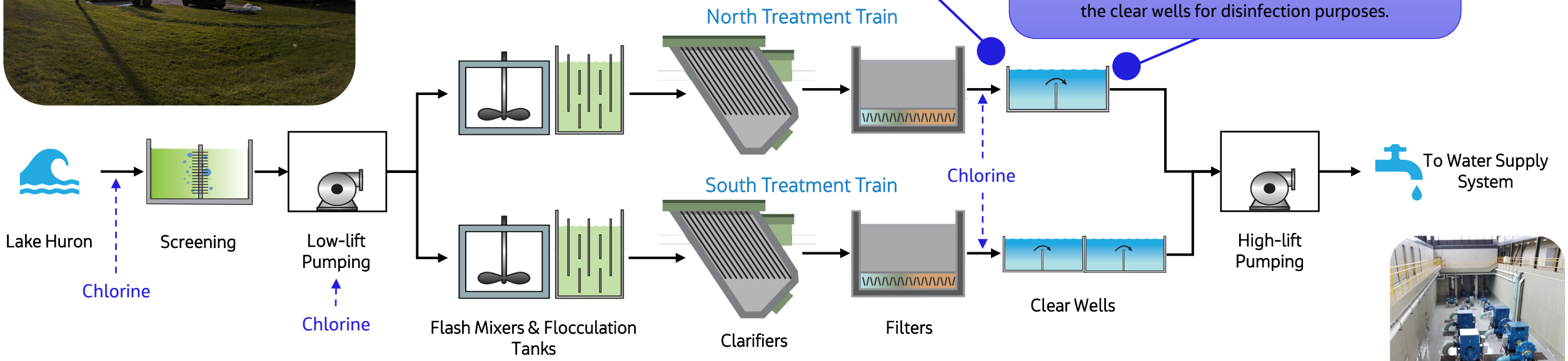
Lake Huron Water Treatment Plant – Existing Conditions and Previous Studies (2)

2018 – Disinfection Study Identified Primary Disinfection Deficiencies under Cold Water Conditions:

A study of the primary disinfection process determined that operational interventions would be required to meet the disinfection requirements under cold water conditions when operating at more than 200 ML/d (AECOM 2018). As the plant has a capacity of 340 ML/d, the need to mitigate the disinfection deficiencies was identified.

Limited Volume in North Clear Well:

The WTP's disinfection performance is limited by the north clear well, which is the smaller of the two clear wells at the plant. Access to the volume in the clear wells for water storage purposes is therefore constrained by the level that must be maintained in the clear wells for disinfection purposes.



Lake Huron Water Treatment Plant – Existing Conditions and Previous Studies (3)

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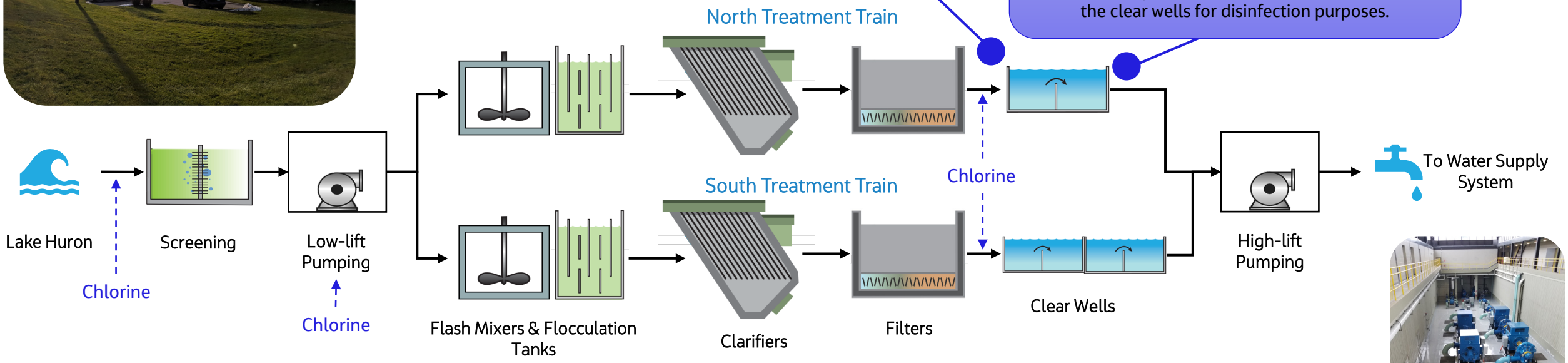

2018 – Master Plan Update Identified Storage Deficiencies:

A storage capacity assessment was completed as part of the 2018 LHPWSS Master Plan Update. The assessment identified the need for additional storage to meet the regional equalization and emergency storage needs to supply member municipalities (Jacobs 2020).

Lake Huron Water Treatment Plant – Existing Conditions and Previous Studies (4)

2018 – Disinfection Study Identified Primary Disinfection Deficiencies under Cold Water Conditions:

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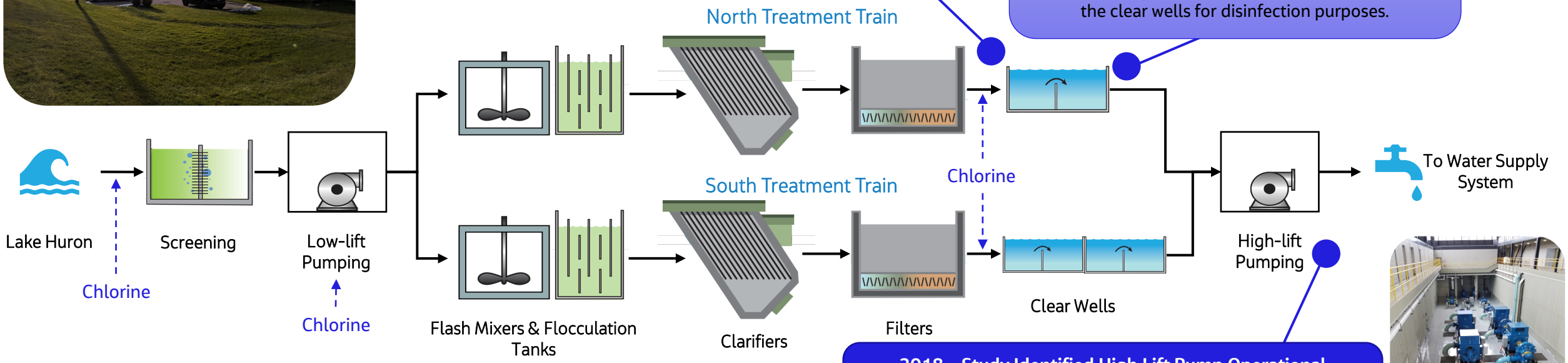

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2018 – Study Identified High Lift Pump Operational Restrictions and Deficiencies:

A study identified operational restrictions and deficiencies for the Lake Huron WTP relating to the operation of the existing high-lift pumps. It was identified that there is insufficient volume in the existing clearwells to offset the ramp-up requirements of the plant processes, to provide stable operations under certain high-lift pump operating conditions (AECOM 2018).

Long List of Alternative Solutions and Screening Process

- A long list of potential alternatives was identified, then screened to identify the viable short list of alternatives.

	Alternative	Screening Result
	Do Nothing	✗ Fail
	Control Flow to North Clearwell, and New Reservoir	✗ Fail
Modifications to Existing Clearwells + New Reservoir	Increase Existing Clearwell Baffle Factor, and New Reservoir	✓ Pass
	Overflow Weir at Clearwell Effluent, and New Reservoir	✓ Pass
	Operate North and South Clearwells in Series, and New Reservoir	✗ Fail
Additional Clearwell Volume + New Reservoir	Add Second Cell at North Clearwell, and New Reservoir	✗ Fail
	New Reservoir to Meet All Storage Needs	✓ Pass
Ultraviolet (UV) Disinfection + New Reservoir	Ultraviolet Disinfection at Settled Water Conduits, and New Reservoir	✓ Pass
	Ultraviolet Disinfection at Each Filter Effluent, and New Reservoir	✓ Pass
	Ultraviolet Disinfection at New Reservoir	✓ Pass
	Ultraviolet Disinfection at High-lift Pump Discharge, and New Reservoir	✗ Fail
Ozonation + New Reservoir	Ozonation Before Coagulation, and New Reservoir	✗ Fail
	Ozonation Before Filtration, and New Reservoir	✗ Fail

Resulting Short List of Alternatives

- The short list of alternatives was identified through the preliminary screening process:

Short List Alternative No.	Alternative Description
1	Do Nothing [a]
2	Clear Well Upgrades (Increase Baffle Factor and Install Overflow Weirs), and New Reservoir
3	New Reservoir to Meet Disinfection, Buffering, and Storage Needs
4.1	UV Disinfection at Settled Water Conduits, New Reservoir
4.2	UV Disinfection at Each Filter Effluent, and New Reservoir
4.3	UV Disinfection at New Reservoir

Table Notes:
[a] The 'Do Nothing' alternative is retained as a point against which the other alternatives can be compared, as part of the Class EA evaluation process.
No. = number

Alternative Solutions

Alternative 1 – Do Nothing

- Do Nothing is the baseline alternative considered as part of the Class EA process in which no physical infrastructure changes are made.
- Chlorine-based disinfection and storage needs would continue to be limited by the existing WTP arrangement and processes. However, to meet the Project Objectives, operational changes to the existing plant operations would need to be made and are assumed for the purposes of this EA.
- Overall, this alternative does not meet the Project's Problem and Opportunity Statement.

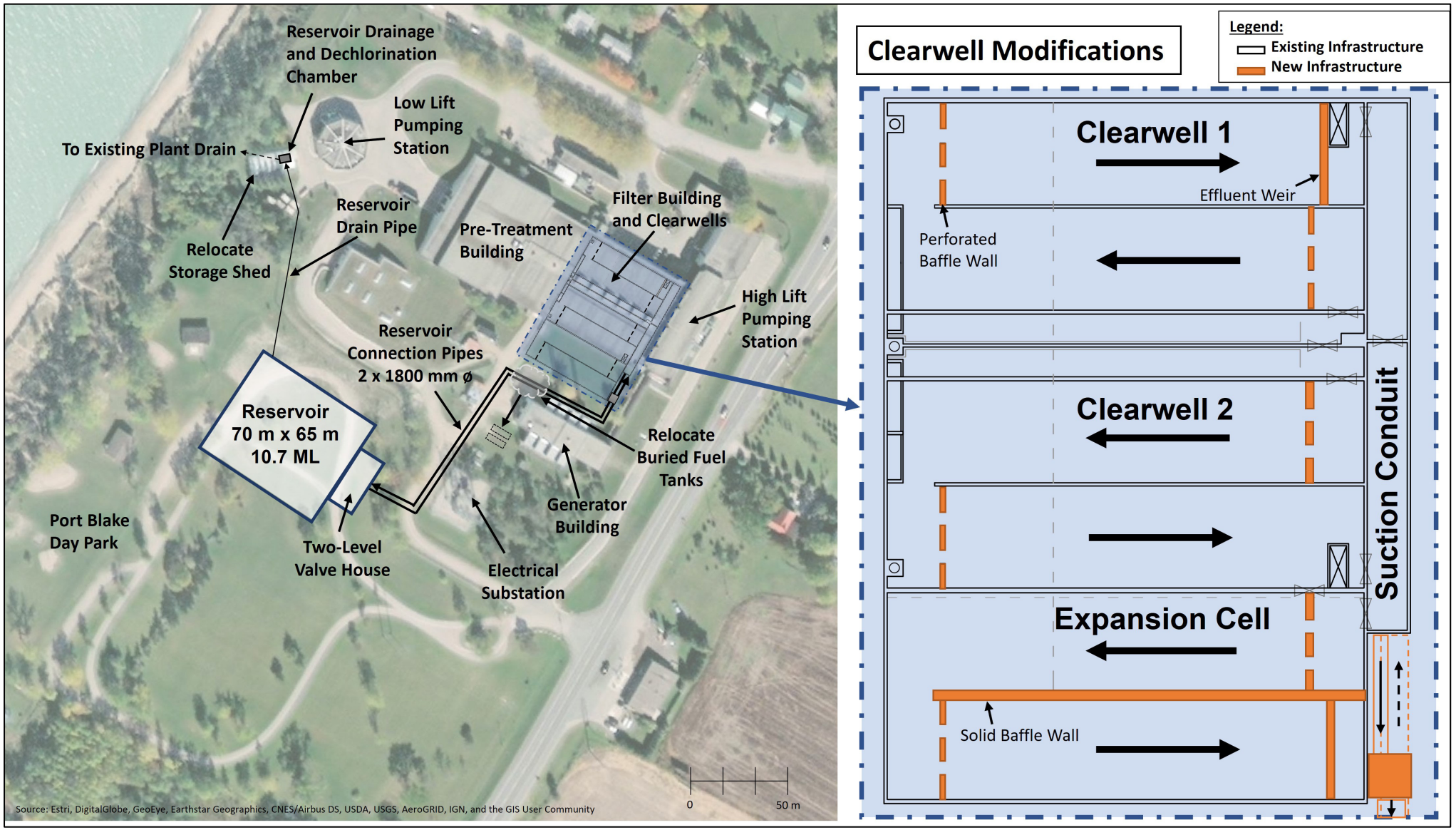
Alternative 1 Cost:

- Capital Investment = $0
- Operations and Maintenance (O&M) Costs, Over 20 Years (NPV)* = $844,000

Costs for Additional Disinfection Chemical (Chlorine) Usage

*Note: NPV = net present value. The O&M estimates were calculated using only additional costs resulting from new assets or processes resulting from the short-listed alternatives. Existing operational costs for the Lake Huron WTP are not included in the O&M cost estimates.

Alternative 2 – Clear Well Upgrades, and New Reservoir



Summary for Alternative 2 – Clear Well Upgrades, and New Reservoir

Alternative 2 consists of upgrading the existing clear wells to improve chlorine-based disinfection by:

- Installing baffle walls to improve water flow and disinfection time
- Installing overflow weirs at the outlets to maximize use of storage

Alternative 2 also includes adding a new belowgrade reservoir sized to meet additional storage requirements:

- Remaining disinfection volume needed to meet requirements under all conditions
- Water demand-based volume

Alternative 2 Cost:

- Capital Investment = $31.68 Million
- O&M Costs, Over 20 Years (NPV)* = $303,000

Alternative 2 New Reservoir Design Parameters	
Proposed Total Volume	10.7 ML
Number of Cells	2
Reservoir Total Length	70 m
Reservoir Total Width	65 m
Total Footprint	4,540 m^2

Volume for Disinfection = 3.8 ML

Volume for Water Demand = 6.9 ML

Table Notes:
ML = million litres
m = metres
m^2 = metres squared

*Note: NPV = net present value. The O&M estimates were calculated using only additional costs resulting from new assets or processes resulting from the short-listed alternatives. Existing operational costs for the Lake Huron WTP are not included in the O&M cost estimates.

Alternative 3 – New Reservoir

Summary for Alternative 3 – New Reservoir

Alternative 3 consists of adding a new belowgrade reservoir sized to meet additional chlorine-based disinfection and storage requirements:

- Disinfection volume needed to meet requirements under all conditions
- Water demand-based volume

Alternative 3 Cost:

- Capital Investment = $33.23 Million
- O&M Costs, Over 20 Years (NPV)* = $294,000

Alternative 3 New Reservoir Design Parameters	
Proposed Total Volume	13.0 ML
Number of Cells	2
Reservoir Total Length	70 m
Reservoir Total Width	65 m
Total Footprint	4,540 m^2

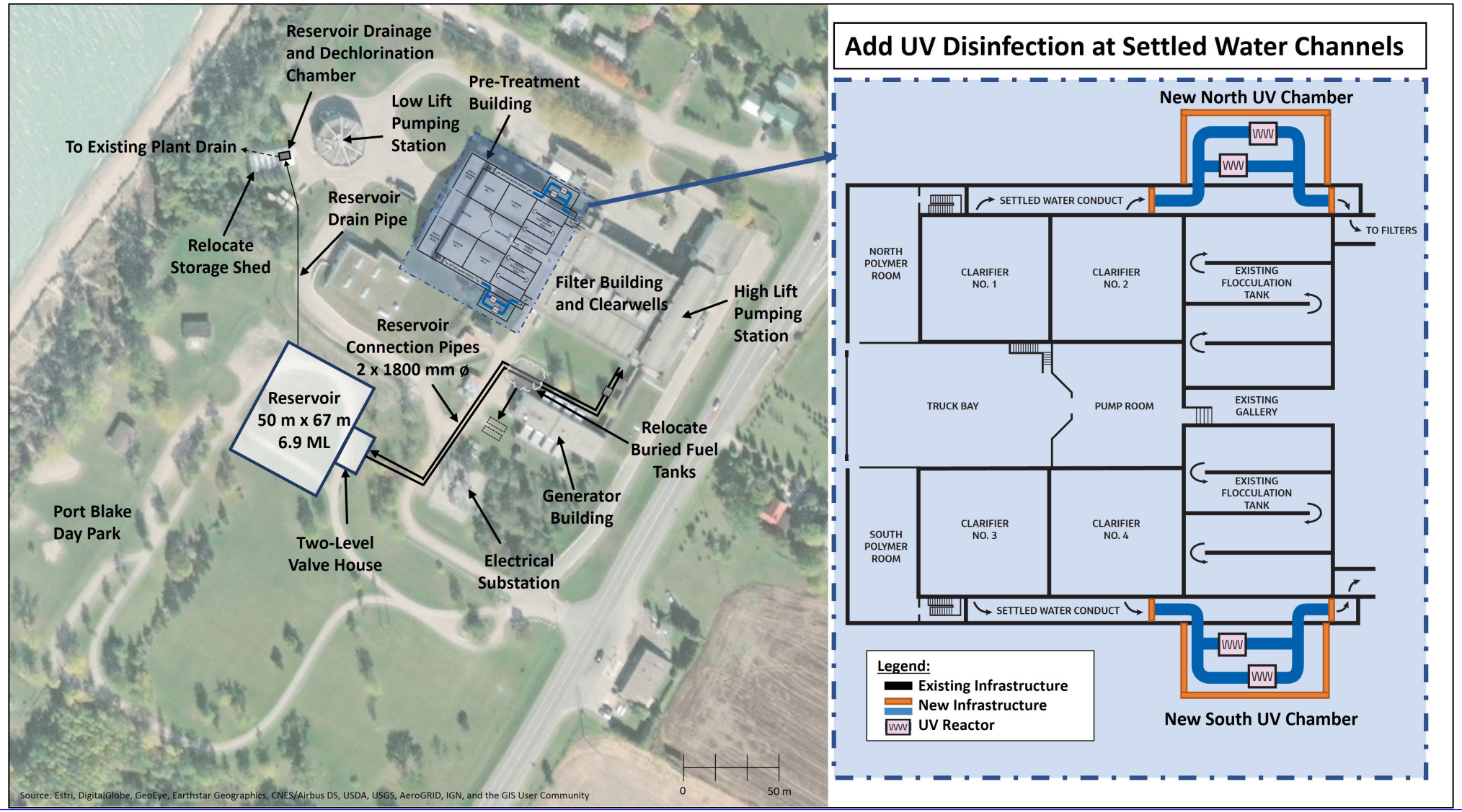
Volume for Disinfection =6.1 ML

Volume for Water Demand = 6.9 ML

Table Notes:
ML = million litres
m = metres
m^2 = metres squared

*Note: NPV = net present value. The O&M estimates were calculated using only additional costs resulting from new assets or processes resulting from the short-listed alternatives. Existing operational costs for the Lake Huron WTP are not included in the O&M cost estimates.

Alternative 4.1 - UV Disinfection at Settled Water Conduits, and New Reservoir for Additional Storage Needs



Summary for Alternative 4.1 – UV Disinfection at Settled Water Conduits, and New Reservoir for Additional Storage Needs

Alternative 4.1 consists of implementing UV disinfection to improve disinfection at the WTP and reduce reliance on chlorine-based disinfection. The concept includes:

- Annexing two new buildings to the pretreatment building, one at each the north and south settled water conduits
- Installing a total of 4 (2 duty, 2 redundant) UV reactors to treat the water

The alternative also includes adding a new belowgrade reservoir sized to meet additional storage requirements:

- Water demand-based volume

Alternative 4.1 Cost:

- Capital Investment = $37.03 Million
- O&M Costs, Over 20 Years (NPV)* = $346,000

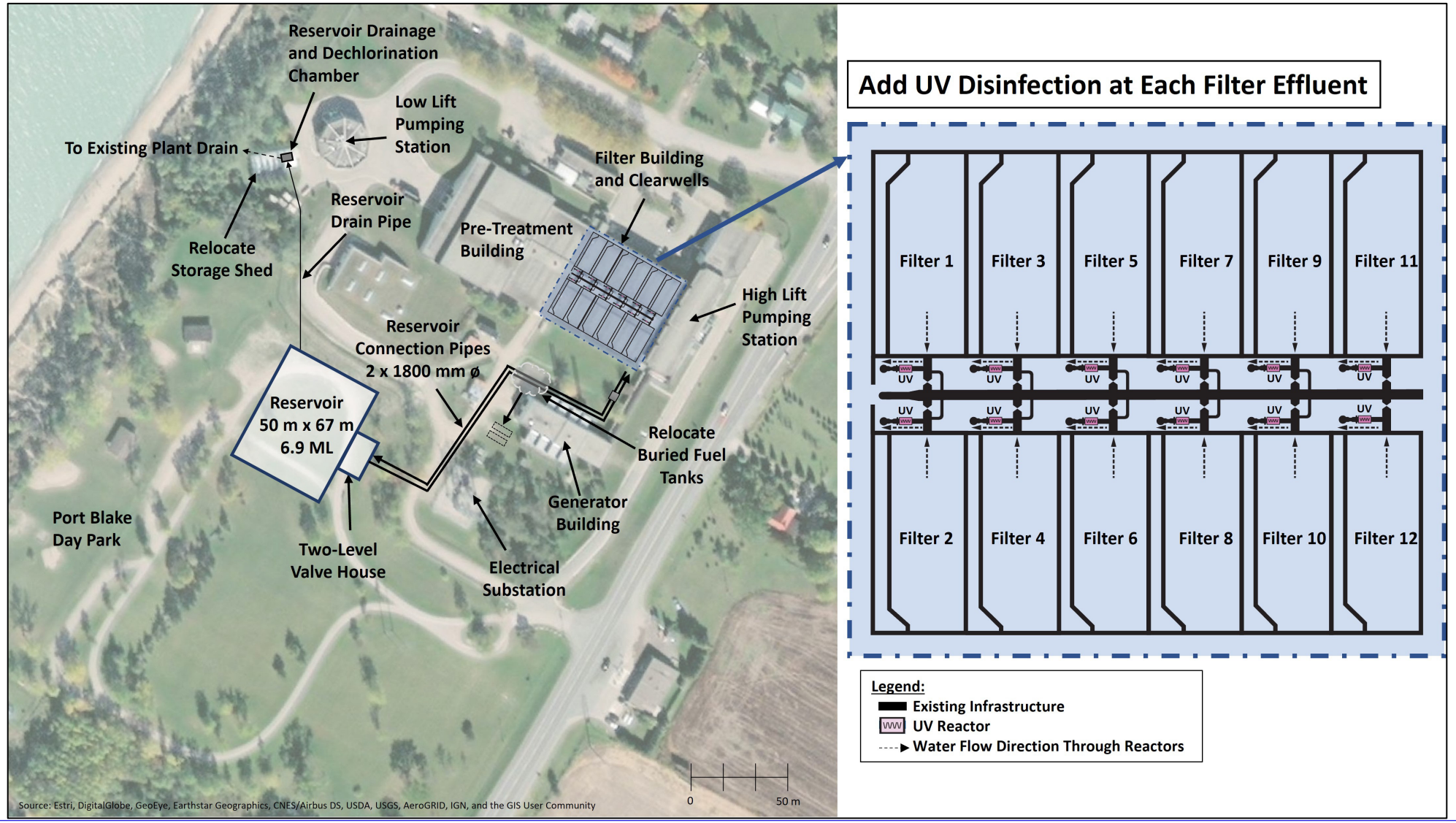
Alternative 4.1 New Reservoir Design Parameters	
Proposed Total Volume	6.9 ML
Number of Cells	2
Reservoir Total Length	50 m
Reservoir Total Width	67 m
Total Footprint	3,320 m^2

Volume for Water Demand = 6.9 ML

Table Notes:
ML = million litres
m = metres
m^2 = metres squared

*Note: NPV = net present value. The O&M estimates were calculated using only additional costs resulting from new assets or processes resulting from the short-listed alternatives. Existing operational costs for the Lake Huron WTP are not included in the O&M cost estimates.

Alternative 4.2 – UV Disinfection at Each Filter Effluent, and New Reservoir for Additional Storage Needs



Summary for Alternative 4.2 – UV Disinfection at Each Filter Effluent, and New Reservoir for Additional Storage Needs

Alternative 4.2 consists of implementing UV disinfection to improve disinfection at the WTP and reduce reliance on chlorine-based disinfection. The concept includes:

- Retrofitting a UV reactor onto each of the 12 filter effluent pipes within the filter piping gallery
- Installing a total of 12 medium-pressure UV reactors (all duty) to treat the water

The alternative also includes adding a new belowgrade reservoir sized to meet additional storage requirements:

- Water demand-based volume

Alternative 4.2 Cost:

- Capital Investment = $26.91 Million
- O&M Costs, Over 20 Years (NPV)* = $420,000

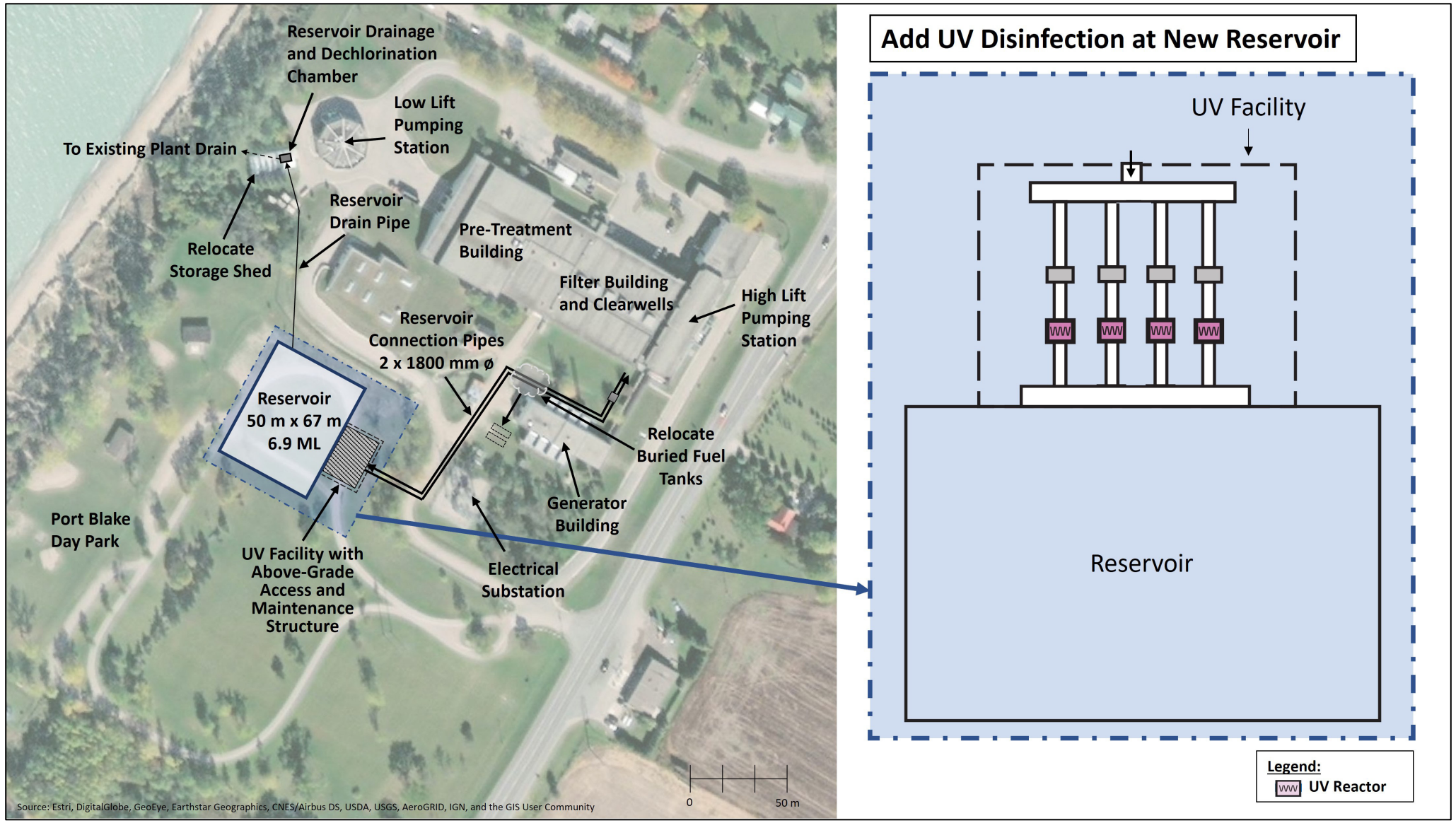
Alternative 4.2 New Reservoir Design Parameters	
Proposed Total Volume	6.9 ML
Number of Cells	2
Reservoir Total Length	50 m
Reservoir Total Width	67 m
Total Footprint	3,320 m^2

Volume for Water Demand = 6.9 ML

Table Notes:
ML = million litres
m = metres
m^2 = metres squared

*Note: NPV = net present value. The O&M estimates were calculated using only additional costs resulting from new assets or processes resulting from the short-listed alternatives. Existing operational costs for the Lake Huron WTP are not included in the O&M cost estimates.

Alternative 4.3 – UV Disinfection at New Reservoir



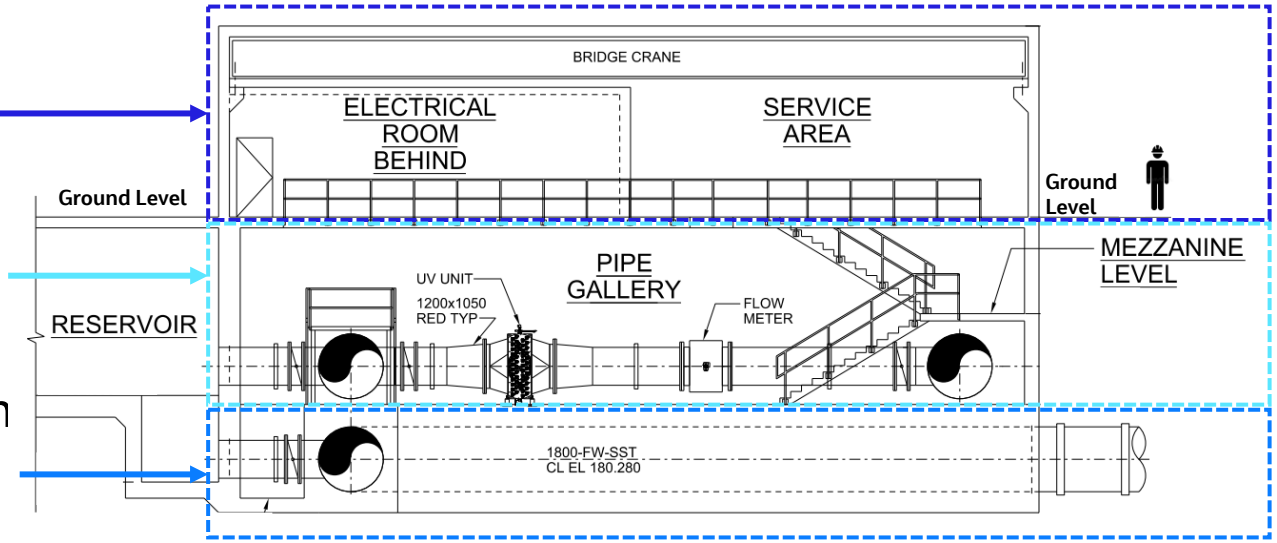
Summary for Alternative 4.3 – UV Disinfection at New Reservoir

Alternative 4.3 includes:

- A new reservoir sized to meet the water-demand based storage needs
- A new UV building as part of the new belowgrade reservoir valve house attached to the new reservoir
- Installing a total of 4 (3 duty, 1 redundant) low-pressure, high-output UV reactors to treat the water

The new UV and reservoir valving building will be partially abovegrade and partially belowgrade, and will consist of the following levels:

- Upper Level (Abovegrade): Building that acts as an access point and service area to the facility
- Middle Level (Belowgrade): Pipe gallery and will house the reservoir influent piping and valving with the UV reactors
- Lower Level (Belowgrade): Effluent piping and valvin for the treated water exiting the reservoir



Summary for Alternative 4.3 – UV Disinfection at New Reservoir (Continued)

Alternative 4.3 Cost:

- Capital Investment = $35.56 M
- Operations and Maintenance Costs, Over 20 Years (NPV)* = $182 k

Alternative 4.3 reservoir design concept:

Alternative 4.3 New Reservoir Design Parameters	
Proposed Total Volume	6.9 ML
Number of Cells	2
Reservoir Total Length	50 m
Reservoir Total Width	67 m
Total Footprint	3,320 m^2

Volume for Water Demand = 6.9 ML

Table Notes:
ML = million litres
m = metres
m^2 = metres squared

*Note: NPV = net present value. The Operations and Maintenance (O&M) estimates were calculated using only additional costs resulting from new assets or processes resulting from the short-listed alternatives. Existing operational costs for the Lake Huron WTP are not included in the O&M cost estimates.

Additional Background and Supplemental Studies

Ecological Assessment (Jacobs)

Description

A desktop ecological assessment was completed to identify natural heritage features which may occur within the limits of the proposed project site, to assess potential ecological impacts, and identify required field studies.

Key Findings

- Each proposed alternative slightly encroaches the Ausable Bayfield Conservation Authority (ABCA) Regulated at the proposed alignment of the piping to the new reservoir.
- A list of Species-at-Risk (SAR) has been identified as potentially occurring within the site. A SAR assessment including field surveys is recommended for the detailed design stage.
- No changes to the current discharge effluent quantity or quality from the plant are anticipated, therefore no impacts to fish and fish habitat are predicted at this stage.
- Wildlife may be impacted from the proposed vegetation and potential tree removals, particularly from the proposed reservoir and associated alignment. A restoration plan is to be considered during detailed design.

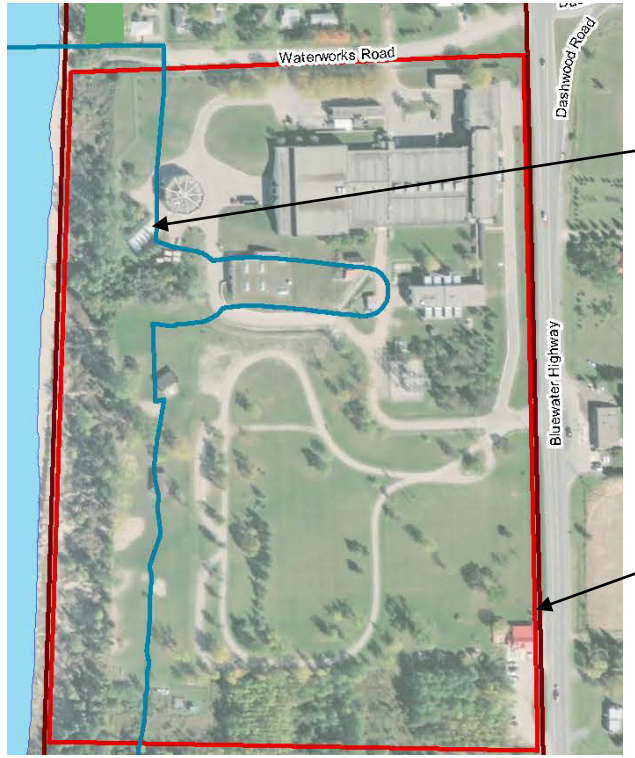


Figure: Desktop Natural Features (Jacobs, 2022)

Next Steps

A baseline field survey and impact assessment will be conducted during the preliminary design of the preferred alternative solution to confirm the baseline desktop assessment.

Cultural Heritage Screening Assessment (Golder Associates)

Description

A desktop assessment of the local study area was completed to assess whether there are properties or buildings with cultural heritage significance as defined by Ontario Regulation 9/06's Criteria for Determining Cultural Heritage Value or Interest.

Key Findings

- Two properties with cultural heritage potential were identified within the local study area; however, neither are located within the Project Site:
  - 71106 Bluewater Highway
  - 71176 Bluewater Highway

Next Steps

No further cultural heritage studies are required.

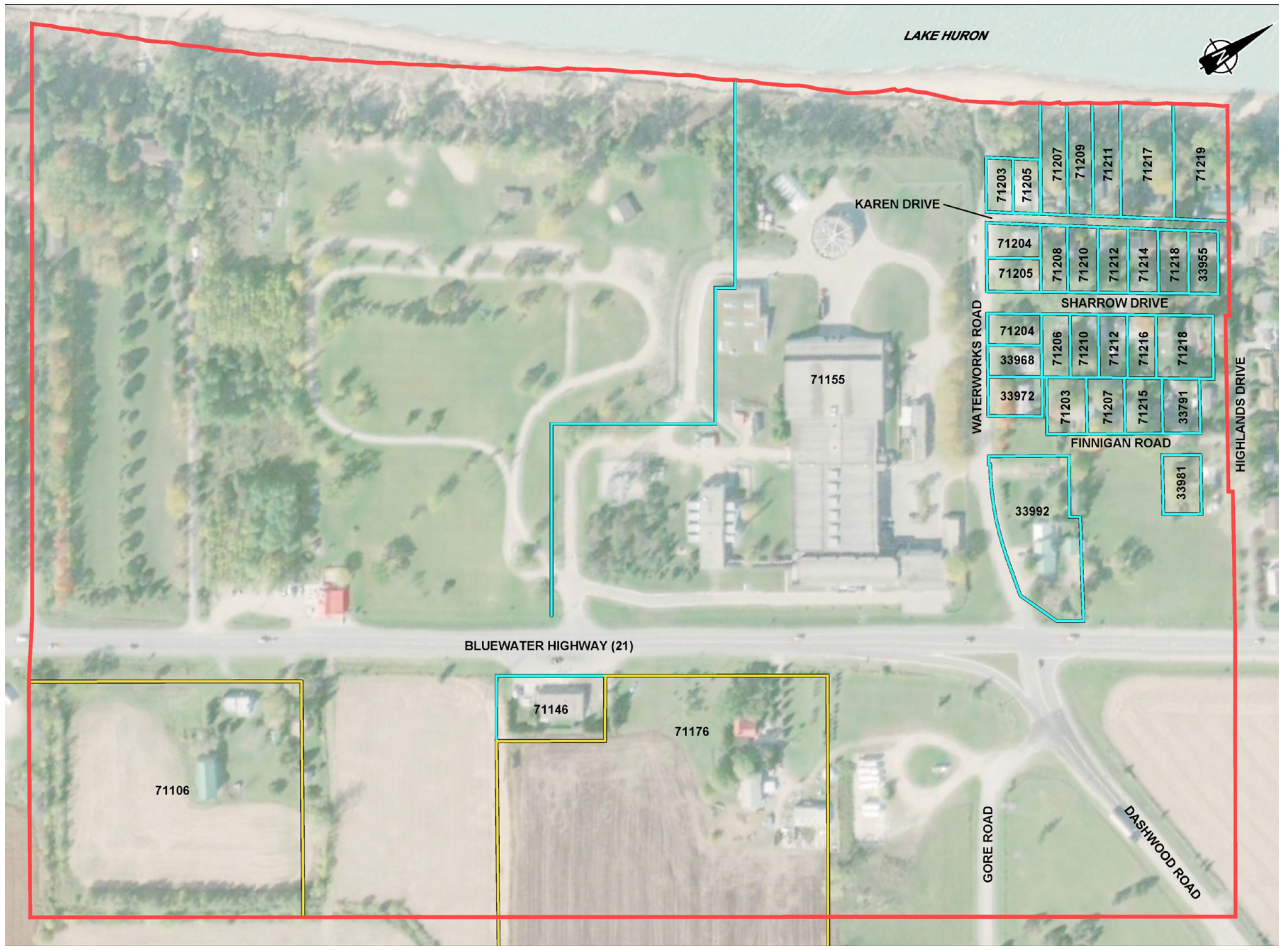


Figure: Map of Properties of Potential CHVI Within and Adjacent to the Study Area (Golder 2021)

Stage 1 Archeological Assessment (Golder Associates)

Description

A Stage 1 Archeological Assessment was undertaken to assess the potential for archaeological features within the local study area, as defined by the Ministry of Heritage, Sport, Tourism, and Culture Industries' Standards and Guidelines for Consultant Archaeologists (2011).

Key Findings

- Some areas within the local study area have archeological potential for both pre-contact Indigenous and historical period sites. These consist of areas —like the manicured lawn and forested areas within Port Blake Day Park south-west of the Lake Huron WTP—that are undisturbed by previous construction or development activities.
- Development in these areas resulting from any of the alternatives will require a Stage 2 Archaeological Assessment ahead of implementation

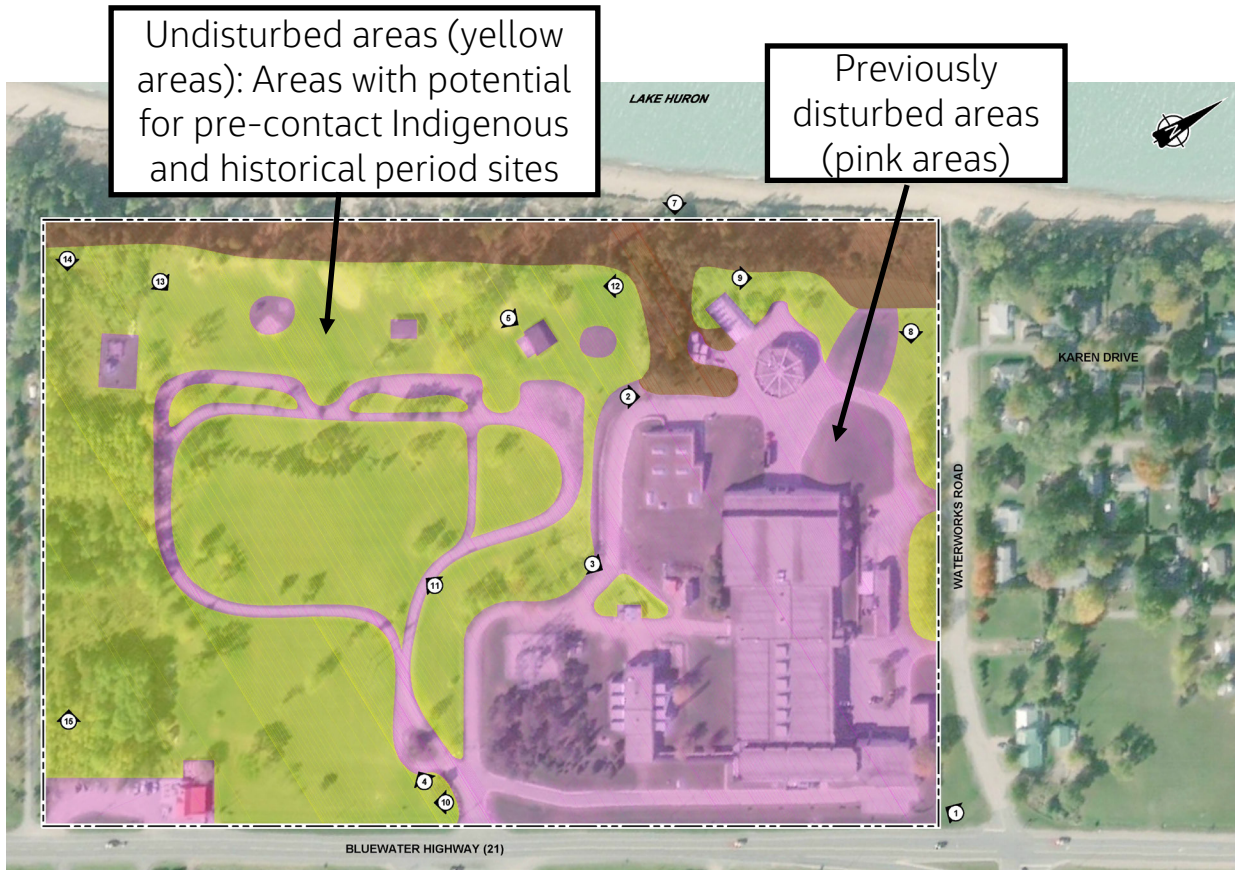


Figure: Map of Stage 1 Archeological Assessment Results (Golder, 2021)

Next Steps

Complete Stage 2 Archaeological Assessment using Test Pit Survey Method during detailed design of preferred solution

Evaluation Framework and Identification of Preliminary Preferred Solution

Evaluation Framework and Criteria

- An evaluation framework was developed based on the Municipal Class EA process.
- Evaluation criteria within four categories were developed, each with their own scoring descriptors to determine whether an alternative gets a low, medium, or high score for each criterion.

Natural Environment

- Aquatic Vegetation and Wildlife
- Terrestrial Vegetation and Wildlife
- Surface Water
- Groundwater
- Greenhouse Gas from Energy Usage
- Chemical Usage
- Soil and Geology

Socio-cultural Environment

- Archaeological Sites
- Cultural and Heritage Features
- Recreational Land Uses and Visual Landscape
- Impacts During Construction
- Long-term Community Impact
- Reduction in Service Interruptions
- Planning Policy Compliance

Technical Environment

- Improvements to Primary Disinfection
- Impact on Disinfection Byproduct Formation
- Ease of Implementation
- Future Proofing
- Potential for System Expandability for Redundancy
- Compatibility with WTP Hydraulic Grade Line
- Operational Flexibility
- Maintenance
- Permits and Approvals

Economic Environment

- Capital Costs
- Lifecycle Costs (including O&M Costs)

Alternatives Evaluation Results

- For each criterion, the alternatives were given a **high (10), medium (5), or low (0) score**, with a high score meaning more benefits and fewer impacts, and a low score meaning fewer benefits and more impacts. The total score for each alternative was then calculated, by taking the sum of the scores from all 25 criteria.
- ***Alternative 4.3 had the highest score*** of all the short-listed alternatives as it provides the most benefits with the fewest impacts. This finding was also supported for three of the five scoring scenarios completed as part of a sensitivity analysis.

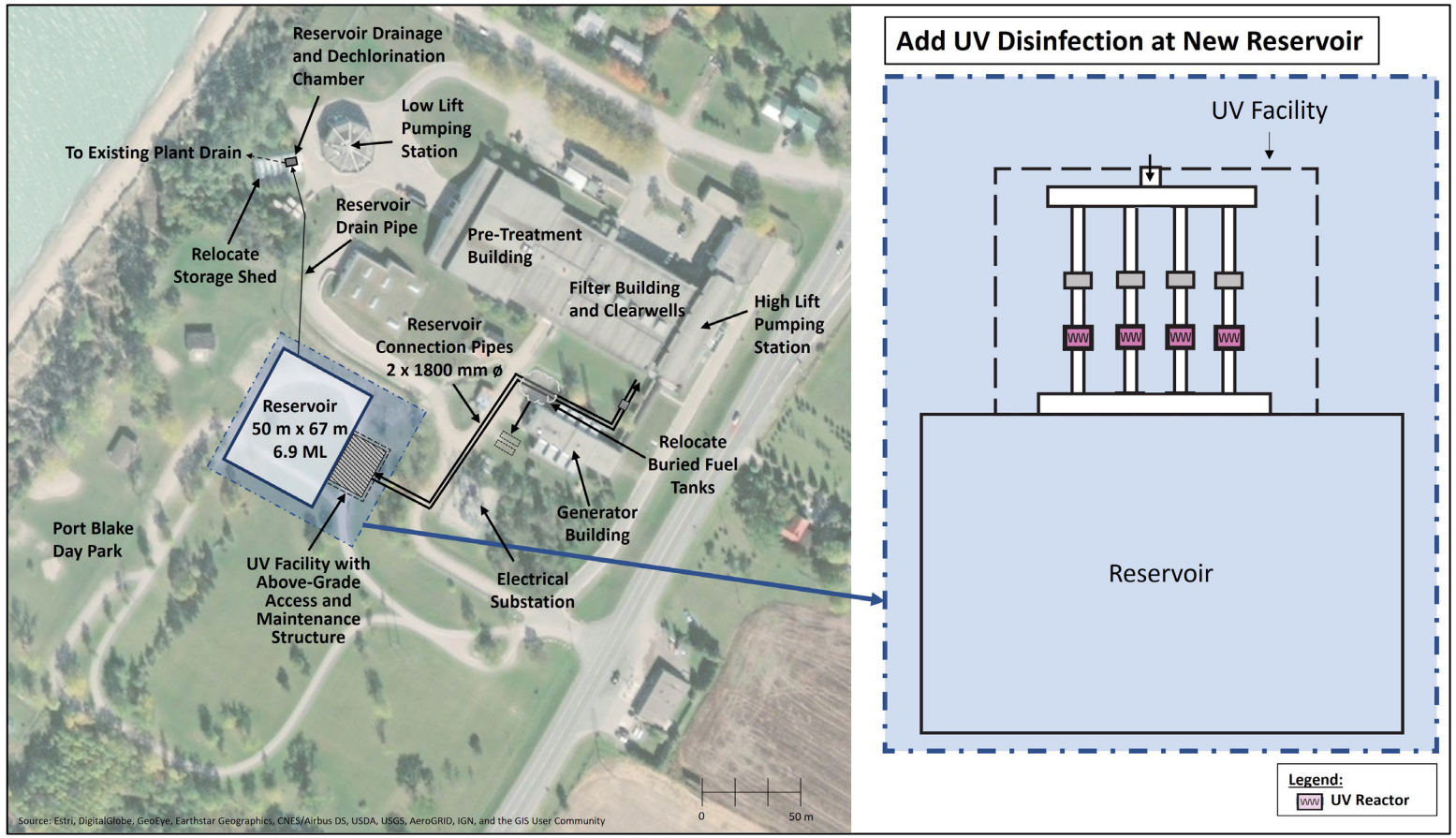
Alternative No.	Alternative Description	Natural Environment	Socio-Cultural	Technical	Economic	Overall Evaluation Score
1	Do Nothing	60	65	25	20	**170**
2	Clear Well Upgrades, and New Reservoir (10.7 ML)	55	60	55	10	**180**
3	New Reservoir (13.0 ML)	55	60	60	10	**185**
4.1	UV Disinfection at Settled Water Conduits, and New Reservoir (6.9 ML)	60	55	70	10	**195**
4.2	UV Disinfection at Each Filter Effluent, and New Reservoir (6.9 ML)	55	60	50	10	**175**
4.3	UV Disinfection at New Reservoir (6.9 ML)	60	55	80	10	**205**
	Maximum Possible Score	*70*	*70*	*90*	*20*	***250***

☑ **Preferred Alternative**

Preferred Solution

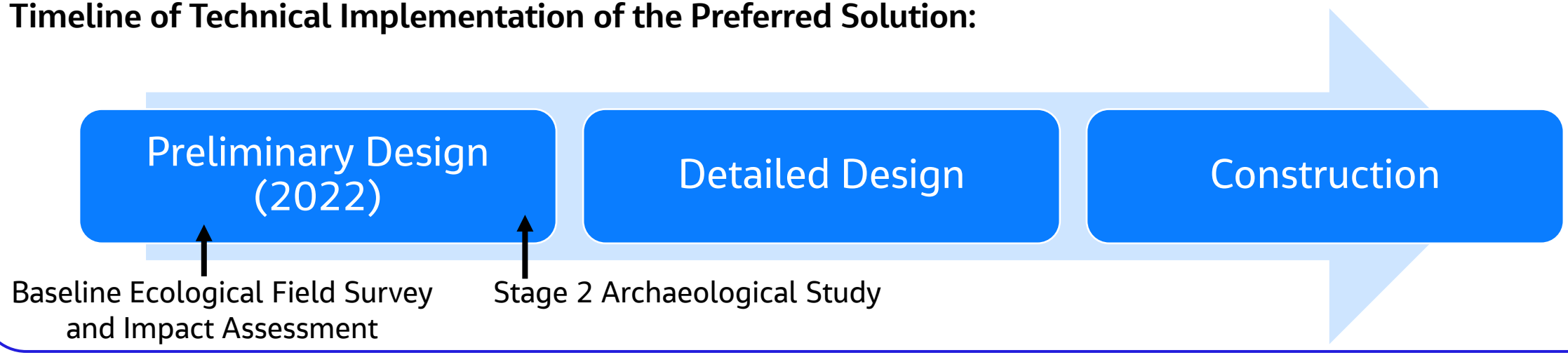
In addition to meeting the Project Objectives, Alternative 4.3 will provide the following benefits:

- Provides the Lake Huron WTP with enhanced primary disinfection capabilities through a multi-barrier disinfection process
- Provides the WTP with more storage to reduce the potential for the number of planned or unplanned service interruptions to LHPWSS customers in case of water production interruptions
- Limits the construction to one area, reducing shutdowns and interference with plant operations when compared to other short-listed alternatives (not including Alternatives 1 or 3)



Implementation of Preferred Solution

Timeline of Technical Implementation of the Preferred Solution:



Next Steps

Thank you for your interest in the Lake Huron WTP Disinfection and Storage Upgrades Class EA. The next steps of the Project include confirming the preferred alternative solution and developing the Project File Report to summarize the Class EA.

Your feedback is an important part of the Class EA process.

- Please complete the survey questions and provide your comments at the end of this Microsoft Form.
- The Project File Report is anticipated to be posted online in October 2022, and will be available for 30 days on the Lake Huron and Elgin Area Primary Water Supply Systems Website (Link : www.huronelginwater.ca)
- Any additional comments or questions that you have may be directed to the project team:

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