RAYMOND A. BARKER WATER TREATMENT PLANT EXPANSION

SCHEDULE 'C' CLASS ENVIRONMENTAL ASSESSMENT

DRAFT ENVIRONMENTAL STUDY REPORT

PREPARED FOR:

TOWN OF COLLINGWOOD

JULY 2020

PROJECT NO. 119013

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Town of Collingwood

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The above noted individuals have reviewed and commented on this document and are satisfied that the authors have addressed concerns raised.

The Project Quality Management Plan (PQMP) requires that all documents prepared for the project be reviewed as required by the plan as confirmed by the Lead Reviewer and prime author of the document.

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ABBREVIATIONS

CEB	-	Chemically Enhanced Backwash
CIP	-	Clean-In-Place
CT	-	Chlorine Contact
EA	-	Environmental Assessment
EAA	-	Ontario Environmental Assessment Act
ESR	-	Environmental Study Report
HLP	-	High Lift Pump
HLWW	-	High Lift Wet Well
HMI	-	Human Machine Interface
HWM	-	High Water Mark
IPZ	-	Intake Protection Zones
kVA	-	Kilovolt-Amps
kW	-	Kilowatts
LID	-	Low Impact Development
m^3/d	-	Cubic metres per day
MCEA	-	Municipal Class Environmental Assessment
MECP	-	Ontario Ministry of Environment, Conservation and Parks
Mg/L	-	Milligrams per Litre
MNRF	-	Ontario Ministry of Natural Resources and Forestry
MOE	-	Ontario Ministry of Environment (now MECP)
MSP	-	Master Servicing Plan for Water and Sanitary Servicing
MTO	-	Ontario Ministry of Transportation
MTCS	-	Ontario Ministry of Tourism, Culture and Sport
NVCA	-	Nottawasaga Valley Conservation Authority
pH	-	Potential for Hydrogen (scale used to specify acidity/alkalinity)
PIC	-	Public Information Centre
PLC	-	Programmable Logic Controller
PPS	-	Provincial Policy Statement
PTTW	-	Permit To Take Water
SCADA	-	Supervisory Control And Data Acquisition
SPA	-	Source Protection Authority
SWM	-	Stormwater Management
TM	-	Alternatives Selection Technical Memorandum
UV	-	Ultraviolet
WTP	-	Water Treatment Plant

Executive Summary

The Town of Collingwood recently completed a Master Servicing Plan for Water and Sanitary Servicing which identified projects required to service future growth along with continuing to service existing residents. A key recommendation from the Master Servicing Plan was the need to expand the existing Raymond A. Barker Ultrafiltration Water Treatment Plant (WTP) to accommodate future water demands for the Town of Collingwood and its contractual commitments to supply treated water to other municipalities. In August 2019, the Town of Collingwood initiated the planning process to continue with an updated Municipal Class Environmental Assessment to identify and assess options to increase the Town's water treatment capacity. Based on the scope, this project constitutes a Schedule 'C' project in accordance with the Municipal Class Environmental Assessment document.

The expansion in the capacity of the plant will be undertaken in two phases (51,871 m^3/d for Phase 1 and 101,069 m^3/d for Ultimate).

Early in the process, various field studies were completed to determine existing environmental conditions which assisted in adequately identifying potential impacts from alternatives proposed. A Stage 1 Archaeological Assessment determined that the study area has been disturbed by previous construction and subsurface disturbance that would remove any potential for recovering archaeological material. Area land use is primarily a mix consisting of residential and parkland with the Collingwood Loop Trail along the waterfront. Vegetation consists primarily of manicured lawns throughout the Town property with scattered mature vegetation. A Natural Environment Assessment indicated that there are no designated natural environment features or areas or ecological communities within the study area. Potential impacts to noted Species at Risk or their habitat are considered low provided implementation of avoidance and mitigation measures are followed. The project area is subject to the South Georgian Bay Lake Simcoe Source Protection Plan and is within the Nottawasaga Valley Source Protection Area. No activities that are potential Significant Drinking Water Threats were identified for the Raymond A. Barker Ultrafiltration WTP expansion. The project site is within the flood plain of Nottawasaga Bay and as a result, consideration will be given during the design phase, to provide protection from flooding to all building and structure accesses, including constructing these above the 100-year Regional flood elevation (including wave uprush).

Alternatives developed for achieving the necessary plant treatment capacity are presented under two categories; membranes and disinfection. Options were assessed relative to each other and evaluated against a set of pertinent criteria and factors. The results of all field studies and evaluation of alternatives were published in April 2020 as part of the consultation process. The Town conducted a virtual Public Information Centre through their Engage Collingwood online platform, which provided an opportunity for interested parties to review, pose questions and comment on the alternatives developed. Comments submitted during the Class Environmental Assessment process focused on the footprint of the plant expansion, active transportation, safety and impacts to area residents, and area drainage, including Low Impact Development (LID) features. Concluding the Public Information Centre period and

review of input received, the Preferred Design, to be implemented over two phases, was selected. The Preferred Design is comprised of the following works:

Phase 1

- Demolish the existing raw water station and industrial building and replace with a new raw water low-lift pumping station.
- Construct a new generator building and install larger generator in the location of the demolished industrial building.
- Construct a new membrane building on the site east of the existing industrial building to accommodate entire Phase 1 water demand.
- Integrate a new chemical building into the new membrane building.
- Integrate membrane backwash wastewater equalization tanks into the new membrane building.
- Construct a new 808 m^3 below-ground chlorine contact (CT) chamber on the site north of the existing membrane building.
- Construct a new UV building on top of the new CT chamber and install a minimum of two UV reactors.
- Abandon the existing membrane trains and repurpose the existing membrane building as the new administration building. Facilities within the new administration building will include men's and women's washroom/change room, lunch room, lab facilities and meeting/training room with AODA compliant washroom.
- Hydraulically connect the existing CT chamber to the existing high-lift wet well to provide additional equalization storage.
- Upgrade the Regional high-lift pumps.
- Install a sanitary sewage transfer system to collect sanitary waste from the new buildings and discharge it to the sanitary sewer.
- Extend existing chlorine building and install 1-ton chlorine gas scrubber.
- Replace the existing 2000kVA transformer with a larger transformer, along with associated electrical maintenance holes, duct banks and electrical rooms.
- Provide outdoor fuel storage in the location of the demolished ZW1000 membrane structure.
- Replace PLCs and control wiring and upgrade SCADA.
- Complete sitework as required.

Ultimate Buildout

- Install additional membranes in the new membrane building.
- Install an additional low-lift pump and micro-screen in the low-lift pumping station.
- Remove generator and tanks in existing generator building and replace with a larger generator and diesel day tanks.
- Provide additional outdoor fuel storage adjacent to the outdoor fuel storage provided in Phase 1.
- Construct a second new 808 m^3 below-ground CT chamber adjacent to the CT chamber constructed in Phase 1.
- Install additional UV reactor(s) in UV building constructed in Phase 1 (if necessary).
- Upgrade the Regional and Municipal high-lift pumps.

- Provide additional electrical maintenance holes, duct banks and electrical room if required.
- Carry out additional PLC, control wiring and SCADA replacements/upgrades as required.
- Complete sitework as required.

The opinion of cost of the Phase 1 expansion is $65,000,000 (2020 dollars). Funding will be provided through a combination of the Town's Allocated Water Reserve Fund (funded through water rates), Development Charges, and contributions from other Municipalities in accordance with Water Agreements.

It was also determined that the overall Preferred Design should include enhanced water conservation and efficiency measures.

Overall, this project will have a low potential to negatively impact the environment given that construction will be contained within the existing Water Treatment Plant property. It is not anticipated that the expansions will require any work within Nottawasaga Bay, nor is any disruption of the existing shoreline anticipated. During detailed design further analysis will be completed and any additional mitigation measures identified will be implemented.

Mitigation will address standard construction related impacts such as erosion control, noise, air quality, and methodology to respond to accidental spillage if one were to occur. It is anticipated impacts will not be significant and any potential for impact can be reduced through the implementation of appropriate mitigation during design and construction.

Pubic and Review Agency consultation was undertaken throughout the planning process. During Phase 3 of the Class EA process, input was received from the Ministry of Environment, Conservation and Parks (MECP), the Nottawasaga Valley Conservation Authority (NVCA) and the Saugeen Ojibway Nation in particular. The final design will need to address all of these comments.

1 Introduction

Following the completion of the Master Servicing Plan (MSP) for Water and Sanitary Servicing (filed December 2019), the Town of Collingwood has continued with the Class Environmental Assessment planning process to identify and assess options to increase the Town's potable water treatment capacity. The MSP satisfied Phases 1 and 2 of the Municipal Engineer's Association Class EA planning process for Projects of this nature.

The MSP identified the need to expand the existing Raymond A. Barker Ultrafiltration WTP to accommodate future water demands for the Town of Collingwood and its contractual commitments to supply treated water to other municipalities (Town of New Tecumseth, Township of Clearview, and Town of the Blue Mountains). The Town retained the services of Ainley Group (in partnership with AECOM) to complete Phases 3 and 4 of the Class EA in accordance with the Municipal Class EA Document (Oct. 2000, as amended 2007, 2011 & 2015).

The Raymond A. Barker WTP is located on Raglan Street as illustrated in Figure 1. The service area being considered under the Class EA includes the Town of Collingwood, and supply requests from the Town of the Blue Mountains, the Town of New Tecumseth and the Township of Clearview.

Figure 1: Raymond A. Barker WTP Location

2 Project History

2.1 1999 to 2019

In March 1999, the Raymond A. Barker Ultrafiltration WTP was constructed to replace the existing water treatment plant which was constructed in the 1950s. The initial construction included the raw water intake structure and intake pipe with an instantaneous hydraulic capacity of approximately 125,000 m^3/d. The new WTP incorporated low pressure membrane filtration technology containing Zenon ZeeWeed® 500 membranes. The WTP was constructed with the following facilities:

- Raw Water Intake Facilities
- Industrial (unfiltered) Water Supply Plant
- Municipal (filtered) Water Treatment Plant

Prior to March 2001, the plant's rated capacity was 27,355 m^3/d. In April 2001, a demonstration mobile package unit containing Zenon ZeeWeed® 1000 membranes rated at 3,785 m^3/d was installed in a temporary timber structure outside the plant and the unit was integrated into the plant operation. However, since it was a demonstration pilot unit, the extra capacity was not formally incorporated into the plant capacity until 2005 following negotiations with the (then) Ministry of the Environment (MOE). Once that extra capacity was approved by the Ministry, the total rated capacity of the WTP was increased to 31,140 m^3/d.

The Town retained R. G. Robinson and Associates to complete a Class Environmental Assessment (EA) to determine alternatives to increase the plant capacity as the demands had increased to 99% of the plant's rated capacity in 2001. The Class EA was completed in 2004 and identified preferred solutions to provide 50,250 m^3/d and 74,550 m^3/d capacity for Phase 1 and Ultimate flows respectively (Table 1).

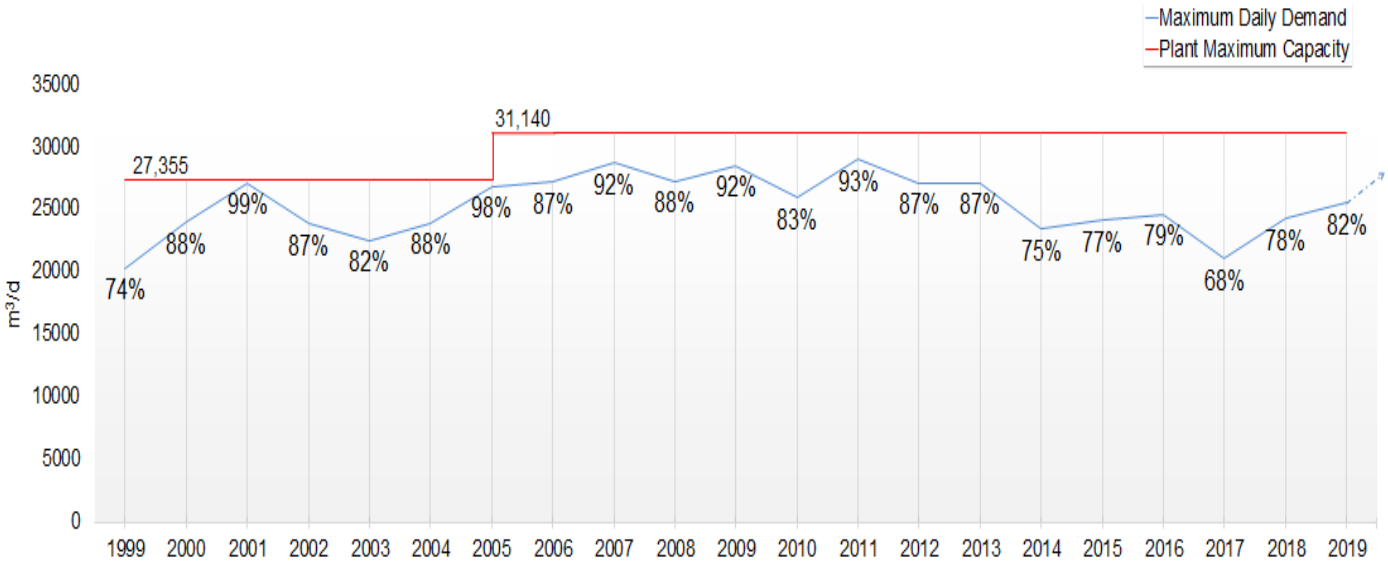
Table 1: Summary of Preferred Design November 2004

Component	Preferred Design Description
Membranes	• Retrofit two existing ZW500a membrane trains with ZW500d "long" membrane trains and relocate nine of the removed ZW500a modules into the three other basins to increase the number of modules in each of those trains from twelve to fifteen (Phase 1) • Retrofit the remaining three ZW500a membrane trains with ZW500d "long" membranes (Ultimate)
Disinfection	• New UV system
Storage	• Convert existing chlorine contact chamber into high-lift equalization storage • Provide new 2,600 m^3 in-ground reservoir
High Lift Pumping (Municipal)	• Replace existing Municipal jockey pump with 145 L/s pump; retain remaining three 145 L/s pumps (Phase 1) • Replace two existing Municipal 145 L/s pumps with 225 L/s pumps (Ultimate)

Other	• Expand gas chlorination system to match Phase 1 and Ultimate flows • Expand/replace air blowers, permeate pumps, concentrate pumps to match Phase 1 and Ultimate flows • Incorporate ultrafiltration mobile package unit into the plant's rated capacity • No upgrade/expansion necessary for intake, raw water building, Regional high-lift pumps, non-potable (industrial) water supply station, residue management system, standby generator

Due to financial considerations and reduced water demands the expansion was delayed. The graph presented in Figure 2 compares the historical water demands and the plant capacity since construction to present day. Typically, the expansion process is initiated when plants reach 80% of their capacity.

Figure 2: Historical Water Demands vs. Plant Capacity



The proposed expansion was put on hold until 2019 when increasing water demands reached 82% of the 31,140 m^3/d plant capacity. The Town identified the need to update the 2004 Class EA and to subsequently proceed with design and construction of a preferred design alternative to increase the capacity of the plant, taking into account new demand projections and technological advances since the completion of the 2004 Class EA.

2.2 Master Servicing Plan for Water and Sanitary Servicing (December 2019)

2.1.1 General

The MSP for the Town of Collingwood identified projects required to service future growth along with continuing to service existing residents. The study defined existing problems and

opportunities, considered and evaluated solutions, and recommended preferred water and sanitary servicing strategies. The alternatives for the water treatment system are presented as follows:

- 'Do Nothing' – This alternative proposes no changes. The existing WTP would remain 'as is' with no improvements or modifications. The 'Do Nothing' alternative was given consideration as part of the Class EA process and was used as a benchmark to gauge the potential for environmental impact of the other options.
- Limit Growth – Proposing to limit growth would mean that the current infrastructure is sufficient to meet current water supply demands. However, it was determined that limiting growth would have large implications as it would contravene the *Places to Grow Act* (2005) and would have compounding negative impacts.
- Enhanced Water Efficiency and Conservation – This alternative involves creating programs to reduce daily water use, public education on water conservation, and implementing repairs to Town infrastructure where water may be wasted.
- Water Treatment Plant Expansion and Improvements – Consideration was made for the expansion of the capacity of the existing Raymond A. Barker Ultrafiltration WTP.

The Town held a Public Information Centre (PIC) to provide an opportunity to gain public input and feedback on the water and sanitary alternatives and to recommend preferred alternatives. During the evaluation of alternatives, preferred recommended solutions were identified. Following the Master Servicing Plan PIC in March 2019, and assessment of the input received from interested parties, the recommended preferred solutions for the water supply are:

- Enhanced Water Efficiency and Conservation – This solution is considered as part of the preferred solution as it lessens the impact on water resources. Through public education, in the long term, this solution can provide positive effects on water resources. The Town of Collingwood has undertaken a program which includes maintaining and making repairs to infrastructure, public education and the encouragement of water conservation opportunities for many years. The Town will continue with this program and will enhance its efforts towards water efficiency and conservation. There would be limited implementation costs associated with this solution, depending on the enhancements put in place by the Town. It is noted that this solution only partially meets the future water supply requirements for growth. Therefore, an expansion of the capacity of the existing WTP is also part of the preferred solution.
- Water Treatment Plant Expansion and Improvements – An expansion of the existing WTP will support future water supply requirements. This solution will incur construction related impacts that are temporary in nature and mitigatable. The expansion would require large capital costs, but it would reduce any increases in lifecycle costs due to the upgraded plant infrastructure. It is also noted that the capital and operating costs of the expanded WTP will be shared with other municipalities and developers that are serviced by the Raymond A. Barker Ultrafiltration WTP.

2.1.2 Projected Demands

As part of the MSP, an analysis was conducted that calculated demands on water supply for existing water taking rates, future phases of development in the Town of Collingwood, and requests from nearby municipalities. The MSP analysis determined that it would be necessary

to increase the ultimate plant capacity to 101,069 m^3/d for current full build boundary projections and maximum future supply requests by other municipalities. A copy of the full MSP document can be found on the Town's Website and can be accessed through the following links:

https://www.collingwood.ca/sites/default/files/uploads/documents/master_servicing_study_-_water_and_sanitary_system_-_december_2019_0.pdf

https://www.collingwood.ca/sites/default/files/uploads/documents/2017-1013_final_collingwood_water_and_sanitary_appendices_a_to_d2_dec_19-2019.pdf

https://www.collingwood.ca/sites/default/files/uploads/documents/2017-1013_final_collingwood_water_and_sanitary_appendices_d3_to_g_dec_19-2019.pdf

A copy of the main body of the MSP (excluding Appendices) is included in **Appendix A** of this report.

In this ESR it is suggested that the expansion in the capacity of the WTP be undertaken in phases (Phase 1 and Ultimate) to meet the future anticipated water supply requirements. The proposed Phase 1 expansion will increase the WTP capacity to 51,871 m^3/d which will take the plant to the limit of its current PTTW (including in-plant usage and non-potable water distribution to industries), with the next expansion taking the plant to its full buildout capacity of 101,069 m^3/d.

2.3 Steering Committee Meetings

At the commencement of the planning process, a Steering Committee was formed for the purpose of sharing input between Town staff and the consulting team. The Committee prepared notices, reviewed public information material, organized the Virtual PIC and drafted the ESR for public review and comment.

Minutes of Steering Committee meetings were recorded. Copies of the minutes are included in **Appendix B**.

3 Class Environmental Assessment Process

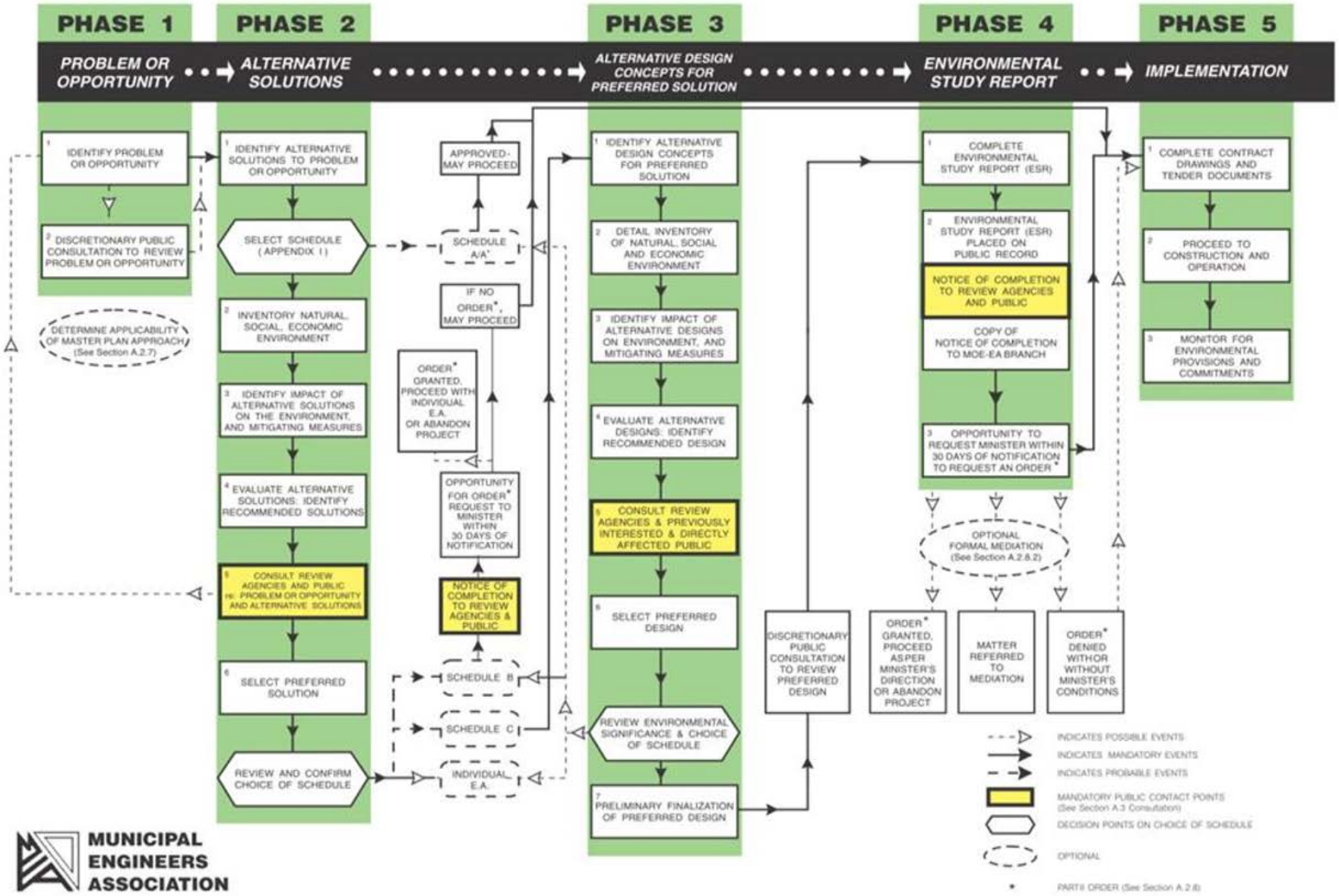
3.1 General

The Class EA is a planning process that has been approved under the *Ontario Environmental Assessment Act* (EAA) for a class or group of undertakings including water treatment plant expansions. A Class EA follows an approved process designed to protect the environment and ensure compliance with the EAA. The purpose of the EAA is to provide for *"…the betterment of the people of the whole or any part of Ontario by providing for the protection, conservation and wise management in Ontario of the environment."* The term "environment" is broadly defined and includes the built, natural, socio-economic and cultural environments. Projects that are

identified in the Class EA can proceed to implementation without further approval under the EAA provided that the approved Class EA planning process is followed.

A Master Servicing Plan as defined by the EAA is a "long range plan which integrates infrastructure requirements for existing and future land use with environmental assessment principles". The Town's MSP has followed Approach No.1 under the Municipal Class Environmental Assessment (MCEA) process and involved the preparation of a Master Plan document upon completion of Phase 1 and 2 of the process. The Master Plan document was made available for public comment in December 2019 and subsequently endorsed by Town of Collingwood Council in January 2020. Following Approach No.1 the Master Plan is used as the basis for, and in support of, future investigation for specific Schedule B and C projects identified within it. Based on the scope (increased water treatment capacity), this project constitutes a Schedule 'C' project in accordance with the MCEA document. Schedule 'C' projects require completion of Phases 1 to 4 with implementation during Phase 5. The MSP will be used in support of Phases 3 and 4 as it addresses Phases 1 and 2 of the Class EA process. An overview of the MCEA process is provided in Figure 3.

Figure 3: Municipal Class Environmental Assessment Process



3.2 Regulatory Requirements

A Master Plan is to comply with and meet regulatory requirements. These include various acts, regulations, guidelines and policies that guide land use planning and the development of area infrastructure. The key provincial and municipal regulatory requirements impacting the Master Plan, and correspondingly this Class EA, are listed below and further discussed within the MSP document.

- *Safe Drinking Water Act, 2002*

  The Safe Drinking Water Act provides the legislative framework for municipal drinking water systems. It establishes a set of province-wide standards, rules and regulations to ensure the population has access to safe and reliable drinking water. The Act specifies requirements for drinking water systems, testing services and the certification of system operators and water quality analysts and includes regulatory water quality standards and mechanisms for compliance.

- *Provincial Policy Statement, 2014*

  The Provincial Policy Statement (PPS) provides policy direction on matters relating to land use planning and development and applies to any land use planning decisions made under the Planning Act by municipal councils, planning boards, provincial government, and agency officials. The PPS includes policies relevant to water and wastewater infrastructure planning including the requirement that infrastructure be provided in a coordinated, efficient and cost-effective manner.

- *Places to Grow Act, 2005*

  Under the Places to Grow Act (2005), regional Growth Plans have been developed to manage long-term growth and infrastructure renewal throughout the province. A Place to Grow – Growth Plan for the Greater Golden Horseshoe (2019), is the document that provides direction for the Town of Collingwood in this regard. It is the Ontario government's initiative to plan for growth and development in a way that supports economic prosperity, protects the environment, and helps communities achieve a high quality of life. The Growth Plan establishes that municipal water and wastewater systems will be planned, designed, constructed or expanded through a comprehensive water or wastewater master plan, informed by watershed planning.

- *Town of Collingwood Official Plan*, 2018

  The Town of Collingwood Official Plan provides direction for managing growth and change within the Town. This includes the consideration of land use change, the provision of public works, and the responsibilities of local boards, the municipality, and the actions of private enterprises. Official Plan policies have been developed to be in accordance with Provincial Long-Range Land Use interests, PPS principles, the Growth Plan for the Greater Golden Horseshoe policies and the goals of the County of Simcoe Official Plan. Municipal servicing policies are identified based on the goal of providing adequate and sufficient systems of water supply, sanitary sewerage disposal and storm drainage to all areas of development in the municipality in accordance with the staging program established by the Official Plan and sound financial planning.

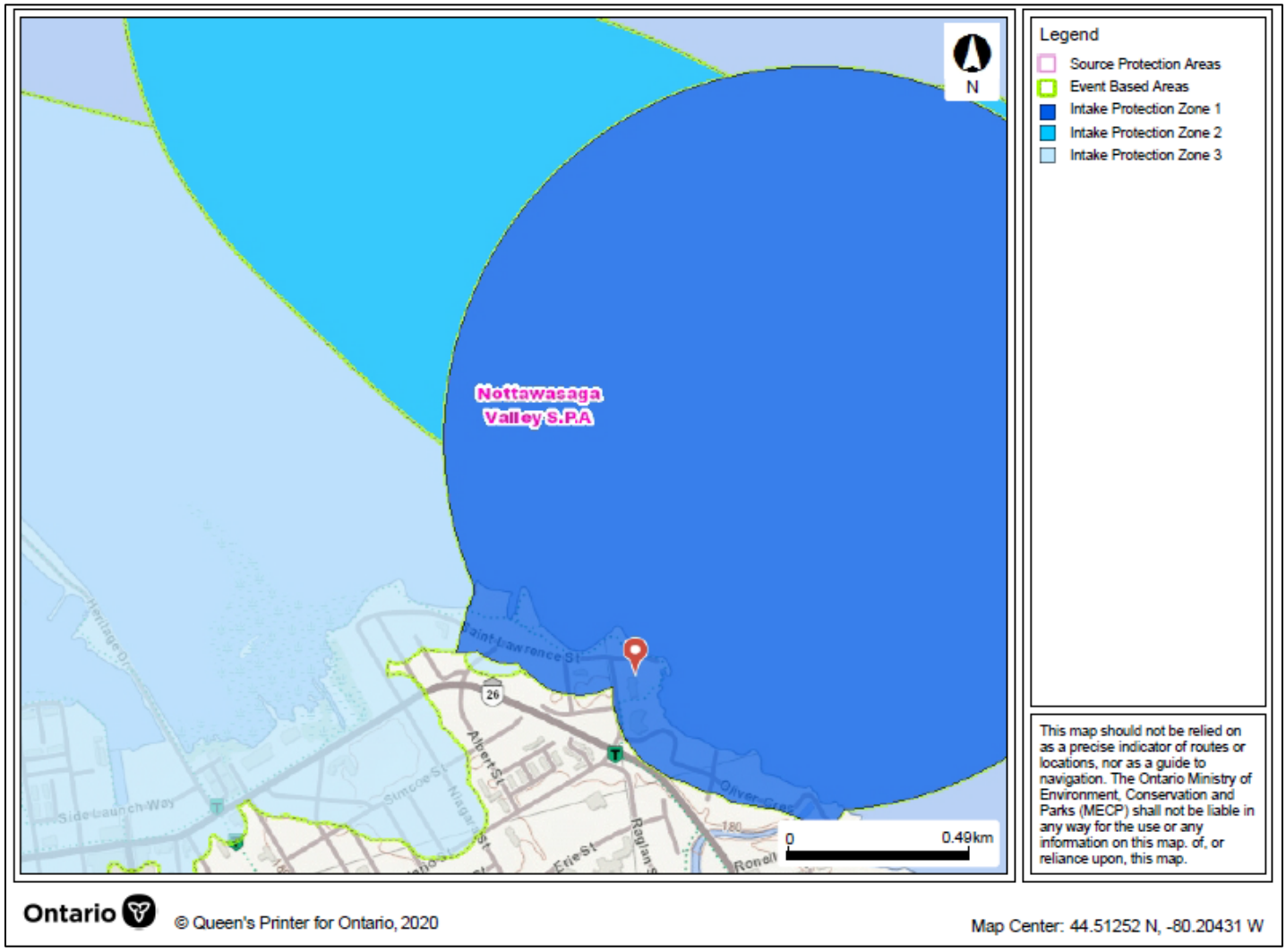
This Municipal Class EA is consistent with additional policies as described in the following sections.

- *Clean Water Act, 2006*

  The purpose of the Clean Water Act is to protect drinking water at the source and to safeguard human health and the environment. It ensures that municipal drinking water supplies are protected through prevention by the development of a watershed-based source protection plan. The project area is subject to the South Georgian Bay Lake Simcoe Source Protection Plan and is within the Nottawasaga Valley Source Protection Area. Source water protection planning for the Town of Collingwood is coordinated by the NVCA, who is a partner in the South Georgian Bay Lake Simcoe Protection Region.

  Included within the Source Protection Plan are a series of assessment reports that summarize the technical studies completed to delineate vulnerable areas and potential significant drinking water threats within each municipality. Chapter 11 of the *Nottawasaga Valley Source Protection Area Assessment Report* provides direction for the Town of Collingwood. The Intake Protection Zones (IPZ) for the Raymond A. Barker Ultrafiltration WTP are shown in Figure 4. IPZ-1 consists of a 1 km radius centered on the crib of the intake and has a Vulnerability Score of 6. The Vulnerability Score ranks the relative vulnerability of the intake to contaminants. No activities that are potential Significant Drinking Water Threats were identified for the WTP within the IPZ-1. Potential Significant Threats to Drinking Water are only assigned where Vulnerability Scores are 8 or greater.

Figure 4: Intake Protection Zones



Under the *Safe Drinking Water Act*, Ontario Regulation 205/18 came into effect July 1, 2018 and instructs new amendments related to municipal residential drinking water systems in source protection areas. System owners are required to ensure that work to assess the vulnerability of a new or expanding drinking water system is completed and accepted by the Source Protection Authority (SPA) before the owner can apply for a drinking water works permit / license, and that the water not be provided to the public until the updated source protection plan that protects the system is approved by the MECP.

Under section 2(3) of O. Reg. 205/18, an application for an amendment to a drinking water works permit / license, must be accompanied by a copy of a Notice (described in Clause 48 (1.1) (b) of O. Reg. 287/07) given to the owner of the drinking water system. This Notice must state that the SPA is satisfied that the technical work has been completed, for the purpose of identifying amendments to the source protection plan that

are anticipated to be necessary, and the timing to submit any proposed amendments to the MECP.

Phase 1 of the WTP expansion will operate within the capacity limits of the Town's current Permit to Take Water (PTTW) which allows a taking of 68,250m^3/d and therefore it is anticipated that only a renewal of the existing Permit will be required for the approval of the Phase 1 capacity increase. In order to achieve the Ultimate buildout capacity, a new PTTW will be required. The process described under O. Reg 205/18 will need to be fulfilled by the Town in the future. It is not anticipated that the expansions will require any work within Nottawasaga Bay, nor is any disruption of the existing shoreline anticipated. During detailed design further analysis will be completed and any additional mitigation measures identified will be implemented.

- *Conservation Authorities Act, 1990*

  The project study area is located within an area regulated by the NVCA. NVCA guards against the risks posed by flooding, erosion and other natural hazards by regulating development in the watershed. The Shoreline Hazard limit associated with Georgian Bay traverses through the existing WTP land area, while the entire proposed WTP expansion area is within lands designated as Shoreline Hazard. Development within hazardous lands as described in the Provincial Policy Statement would require approval under the Planning Act. However, development associated with the proposed infrastructure is authorized through completion of the environmental assessment process. A permit from the NVCA will be required for the construction of any buildings within the regulated area. This regulation is administered under Section 28 of the *Conservation Authorities Act* known as the *Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulation (Ontario Regulation 172/06)*.

- *Considering Climate Change in the Environmental Assessment Process, 2017*

  This MECP Climate Change document provides guidance relating to the Ministry's expectations for considering climate change during the EA process. The Guide is now a part of the EA program's Guides and Codes of Practice. The environmental assessment of proposed undertakings is to consider how a project might impact climate change and how climate change may impact a project. Climate Change was considered during the course of this Class EA and is discussed further in Section 12 of this report.

4 Existing Conditions

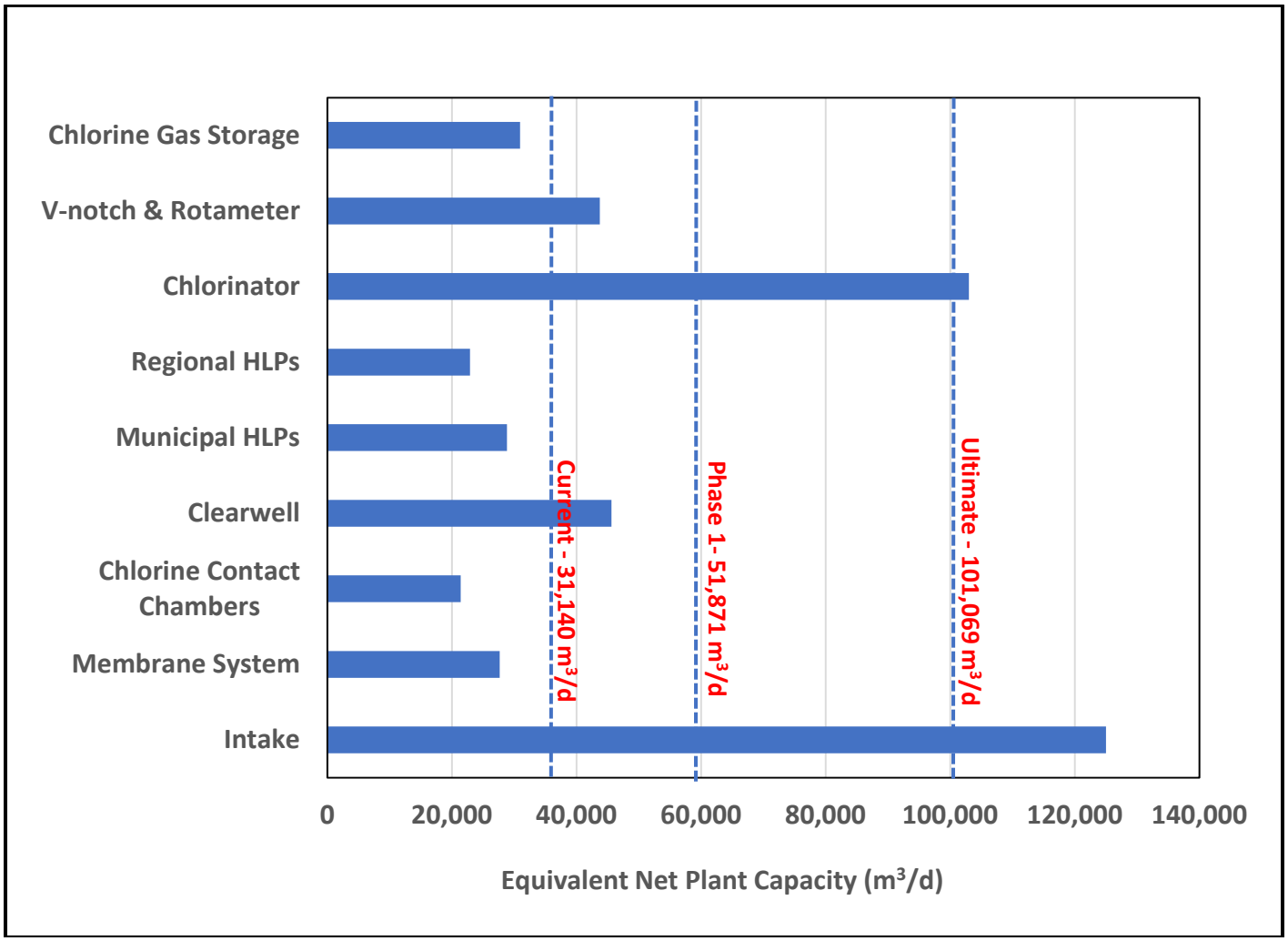
4.1 General

As part of Phase 3 of this Class EA, various field studies were completed to determine existing environmental conditions as well as to identify any potential impacts the alternatives pose to the environment. The following assessments were undertaken and are summarized hereinafter:

4.2 Existing Plant Performance/Capacity Assessment

Prior to determining design options to achieve the ultimate capacity, an assessment of the existing plant was conducted. The preliminary conclusion of the performance assessment is that there are no new treatment processes that need to be added to the Raymond A. Barker WTP to improve the treated water quality to meet the proposed performance targets. The report recommended that the expansion of the plant focus on capacity limitations. The capacity assessment presented a detailed catalogue of the existing capacity of each unit treatment of the WTP based on current design standards. Figure 5 shows the current equivalent capacity of the various treatment units in the existing plant. It is important to note that although the capacity of some of the identified unit processes per current guidelines may not match the current overall rated capacity of the plant, the plant can still provide up to 31,140 m^3/d. The full report can be found in **Appendix C**.

Figure 5: Equivalent Existing Net Plant Capacity of Unit Processes



4.3 Condition Assessment

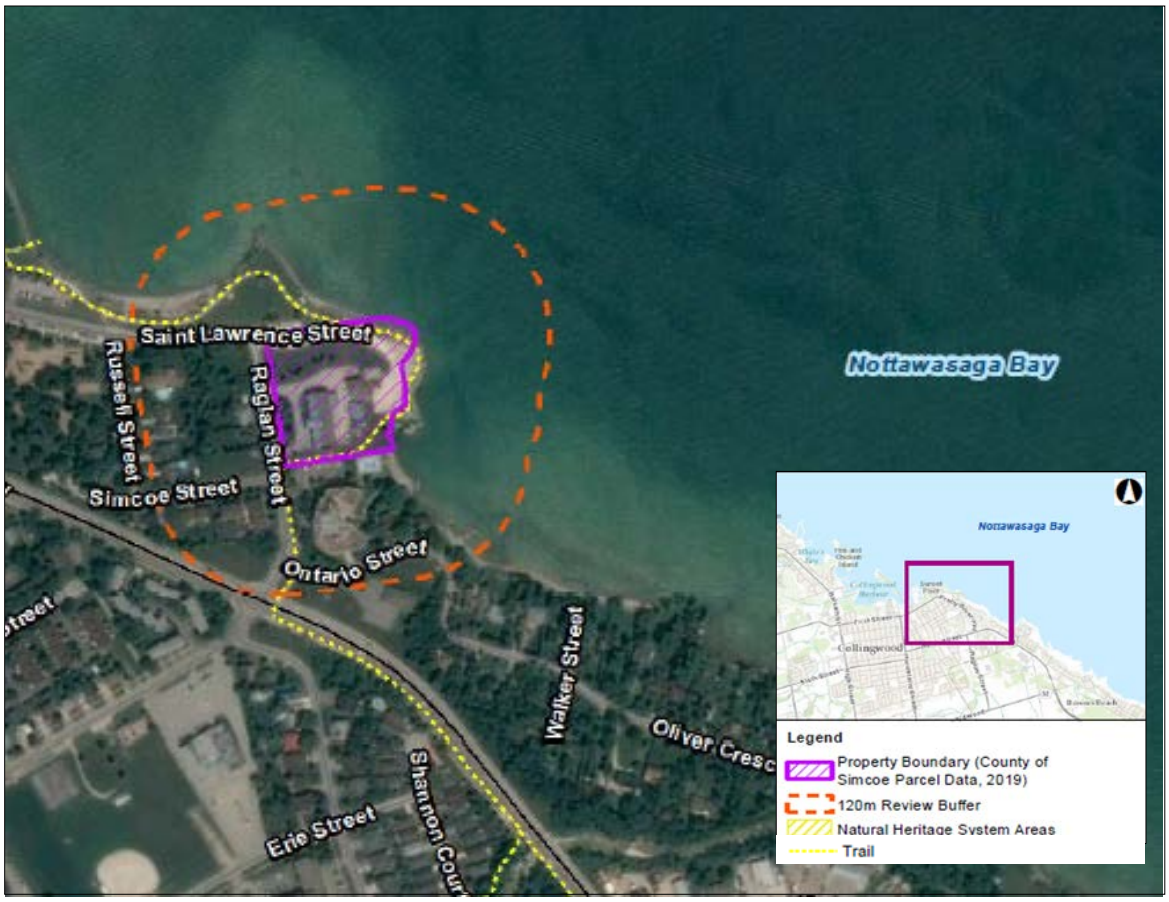
Architectural and structural condition assessments, limited to a visual inspection of exposed components from ground level, were conducted for the Raymond A. Barker WTP. Interior and exterior areas of the plant buildings assessed included the surge chamber, raw water building, generator building, industrial building, and main plant building. Recommendations are presented in the Report along with an opinion of costs for immediate and future recommended repairs and upgrades which will be incorporated as necessary into the design and construction of the expansion. The full Report can be found in **Appendix D.** The identified plant repairs and upgrades are summarized as follows:

- **Surge Chamber:** Repair cracks and provide stairs for access and safety.
- **Raw Water Building:** Demolish (to be replaced with low-lift pumping station).
- **Generator Building:** Repair epoxy floor and leaks; complete safety code upgrades including fuel storage system.
- **Industrial Building:** Demolish (incorporate into new low-lift pumping station).
- **Main Plant Building:** Repair numerous wall and floor cracks throughout the building, repair epoxy floor, replace all of the exterior hollow metal doors and frames, some interior doors and stair handrails including and large diameter loading dock stair handrail, and complete other safety and building code upgrades The Town is planning to complete roof and window repairs prior to the plant expansion.

4.4 Natural Environment Technical Report

To establish existing conditions of the site's natural environment a Natural Environment Assessment was completed. Information was established through the completion of field investigations and background reviews to obtain information on known natural environment features and a review of species records in the vicinity of the study area, as well as consultation with the Ministry of Natural Resources and Forestry (MNRF). The assessment indicated that there are no designated natural environment features or areas (e.g., significant wetlands, etc.) or ecological communities within the study area, as illustrated in Figure 6. Potential impacts to noted species at risk or their habitat are considered low provided implementation of avoidance and mitigation measures are followed. The full report can be found in **Appendix E**.

Figure 6: Existing Natural Heritage Features



4.5 Stage 1 Archaeological Assessment

A Stage 1 Archaeological Assessment was completed to determine whether there is potential for archaeological sites on the property. The result of the assessment is that the potential for the recovery of archaeological resources has been removed as a result of extensive, deep land alterations associated with previous construction and underground utilities at the site. Based on these findings, no further archaeological work is required. The full report can be found in **Appendix F**.

5 Regulations, Design Standards and Technology

Current Regulations and design standards will be used for the proposed plant expansion. Source water may contain turbidity, particles, and organic material. Particulate removal processes reviewed as part of this Class EA are:

- Conventional treatment involving the sequential combination of a number of processes including coagulation, flocculation, clarification and granular media filtration.
- Direct filtration consisting of chemical coagulation, flocculation, and granular media filtration for the effective removal of particulate and turbidity from the water.

- Membrane filtration described as a pressure or vacuum-driven physical separation process in which particulate matter is rejected by an engineered permeable membrane.

The assessment outlined in the Technical Memorandum (See Section 6 below) determined that conventional treatment and direct filtration will not be considered for the following reasons:

- Low pressure membrane filtration will provide a higher filtration capacity on the existing site than conventional and direct filtration (considering the limited site area).
- Lower pressure membrane filtration will provide a much higher pathogen removal credit than conventional treatment and direct filtration.
- The plant operations staff are accustomed to operating a low-pressure membrane filtration system.

The Town requires that "technological advances" be considered as part of the assessment process. The Performance/Capacity Report found that no new treatment processes were required. Therefore, the assessment of technological advances has been limited to the membranes. Since the construction of the original WTP in 1998 using ZeeWeed® 500a and 500b membranes, there have been redevelopments in the Zenon membranes including ZeeWeed® 500d "short" and "long" membranes and ZeeWeed® 1000 membranes.

The ZeeWeed® 500 series of membranes were the first hollow fibre low pressure membranes manufactured by Suez (then Zenon). They are a very rugged membrane capable of filtering difficult-to-treat water sources, including wastewater and industrial water, as well as potable water. Advancements in the ZeeWeed® 500 series have provided increased capacity, generally within the same module configuration. The ZeeWeed® 500d "long" membrane modules provide greater capacity but are too long to retrofit as replacements for original ZeeWeed® 500 modules. Therefore, Suez has also developed a ZeeWeed® 500d "short" module which can be readily adapted to replace their original membranes.

The ZeeWeed® 1000 membranes are also hollow fibre low pressure membranes that provide significantly greater capacity than the 500 series within the same footprint. They are less robust than ZeeWeed® 500s, ideal for water treatment but not recommended for difficult-to-treat source waters. Even with their shorter life expectancy their capital and life cycle costs are much lower than ZeeWeed® 500 membranes.

Both ZeeWeed® 500d short and ZeeWeed® 1000 membranes have been incorporated into the current plant in addition to some remaining 500b membranes.

It is also noted that improvements have been made by other membrane manufacturers. Considering that all of the options identified in this Environmental Study Report (ESR) are based on the use of membranes, the membrane supplier will be determined through a pre-selection process based on specific requirements established by the Town. Sole sourcing of new membrane units will not be acceptable. Based on an assessment of the pre-selection process, the Town will make the selection of the membrane supplier and will then consider

pre-purchasing the units. It is recommended that the selection of the membrane supplier be made through a competitive process as an initial step in the design process.

6 Alternatives Selection Technical Memorandum

6.1 General

An Alternatives Selection Technical Memorandum (TM) was prepared to present alternatives for achieving the plant capacity for Phase 1 and Ultimate demands; and recommend preferred design based on a cost-benefit evaluation. A conceptual design and opinion of costs of the preferred upgrades for Phase 1 and Ultimate flows are also provided. The work completed through the TM aligns with the requirements under Phase 3 of the Class EA process. Details from the TM are discussed in the sections following, and a copy of the full report is included in **Appendix G**.

6.2 Required Upgrades Common to All Alternatives

The following components were reviewed, and the upgrades identified are required for all alternative designs considered:

- **Intake:** The current PTTW authorizes the withdrawal of water up to 68,250 m^3/d which is sufficient for Phase 1. However, an application for an increase in the PTTW limit will be required for Ultimate buildout. The instantaneous capacity of the intake (125,000 m^3/d) is sufficient for Phase 1 instantaneous capacity requirements (67,876 m^3/d). The instantaneous capacity is the amount of raw water required in order to provide the desired treated water flow rate allowing for plant losses. Both the demand and the actual intake capacity should be re-evaluated in the future for the plant's Ultimate expansion.

- **Low-Lift Pumping Station and Micro-screening:** There is currently no low-lift pumping at the existing plant. The installation of micro-screens and the need for additional membrane treatment capacity (all at a higher hydraulic grade line) will require the addition of low-lift pumps to achieve the required future instantaneous flowrates. The Phase 1 municipal flowrate including an allowance for plant losses is estimated to be 65,876 m^3/d. The estimated industrial raw water demand is 2,000 m^3/d for a total of 67,876 m^3/d. This is the estimated intake raw water maximum instantaneous flow for Phase 1. The new low-lift pumping station will be required to meet this rate for Phase 1, and this will be provided by three new low-lift pumps and two micro-screens. For the Ultimate expansion a fourth low-lift pump and third micro-screen will be added.

- **Industrial Pumping Station:** The required industrial (non-potable) pumping station flowrate is 2,000 m^3/d for both Phase 1 and Ultimate flows. Upgrades to the industrial pumping station to achieve the flow requirements include demolishing the existing industrial pumping station, installing two new feed pumps along with industrial headers, flowmeters, and automatic strainers within a new structure which could be part of the low-lift pump station.

- **High-Lift Pump Equalization:** The existing high-lift wet well (HLWW) has an effective operating volume of 475 m^3 which can provide 15 minutes high-lift pump equalization up to 45,600 m^3/d demand. When new disinfection facilities are constructed, the existing chlorine contact chambers will be converted into high-lift wet wells, providing an additional effective equalization volume of 559 m^3, which is enough for 15 minutes equalization at Ultimate capacity.

- **High-Lift Pumping:** The existing firm capacity of the Municipal (Town of Collingwood and Town of The Blue Mountains) high-lift pumps (HLPs) is 28,850 m^3/d, which may be less than the Phase 1 flow Collingwood/Blue Mountains requirement of up to 32,757 m^3/d and considerably less than the Ultimate Collingwood/Blue Mountains flow requirement of 51,483 m^3/d. The existing firm capacity of the Regional (Town of New Tecumseth and Township of Clearview) HLPs is 22,890 m^3/d, which is less than both the revised Phase 1 flow requirement for the Regional Pipe of 24,364 m^3/d, as well as the Ultimate flow requirement of 49,586 m^3/d. There will be a phased approach to replacing the high lift pumps with higher capacity pumps to meet the demand requirements for both water supply trains.

- **Chlorine Gas System:** The existing components that require upgrades are the V-notch and rotameters in each chlorinator, which will require replacement with higher capacity units through the phasing. Increased storage will be required and therefore, the existing chlorine building with monorail, and loading platform, will need to be extended eastward. Installation of a 1-ton chlorine gas scrubber is required for health and safety.

- **Chemical Systems:** In addition to the chlorine gas systems, clean-in-place (CIP) and chemically enhanced backwash (CEB) chemicals are required for the membrane operation. There has been no analysis of these membrane chemical system capacities as there have been no concerns registered by the Operating staff. However, it is recommended that in the future, all chemicals be consolidated into a chemical building with proper health and safety features.

- **Residue Management:** Current capacity is not applicable as this upgrade is associated with the plant expansion. It is recommended that the plant expansion include the installation of two membrane backwash wastewater equalization tanks (1 duty, 1 standby) below grade to equalize block and bleed wastewater and backwash wastewater from the new membrane system. Residue water will be pumped back to the Bay subject to TSS compliance with MECP requirements.

- **Sanitary Sewage Transfer Systems:** Current capacity is not applicable as this upgrade is associated with the plant expansion. It is recommended that the plant expansion include the installation of a sanitary sewage transfer system(s) to collect floor drains and any other sanitary waste from the new building(s), including neutralized wastewater from the membranes chemical cleaning processes, followed by discharge to the Town's sanitary sewer.

- **Site Electrical:** The plant upgrade will require the replacement of the existing 2000kVA transformer with a larger transformer to suit the site electrical requirements for Phase 1. Along with the installation of new electrical manholes and duct banks as required, new electrical rooms will be constructed where required for the various processes including the installation of new monitor control centers and control panels.

- **Standby Power:** The prime rating and standby rating of the existing standby generator is 1,000 kW and 1,150 kW, respectively. A new generator building will be constructed in the location of the existing industrial building, which is adjacent to the existing generator building. The new generator will be sized for 100% of the loads at Phase 1 flows and will be installed within the new generator building. A second new generator will be added during the Ultimate phase expansion. Under Phase 1, additional outdoor diesel fuel storage (sized for 24 hours of storage) will be installed at the current location of the temporary ZW1000 membrane building (to be removed as part of this project). This will facilitate delivery of diesel fuel.

- **SCADA:** The Town is planning to upgrade the SCADA system (HMI software) and replace the control wiring to the permeate pump room prior to the plant expansion. During Phase 1 the programmable logic controls (PLCs) and control wiring to all equipment will be replaced. New PLCs will be installed where required for the Ultimate expansion.

- **Building Services:** The upgrades outlined for the Main Plant Building in Section 4.3 will be completed. The administration area will be reorganized to provide men's and women's washroom/change room, lunch room, updated lab facilities and a meeting/training room with AODA compliant washroom.

- **Site Services:** Current capacity is not applicable as this upgrade is associated with the plant expansion. During Phase 1 and Ultimate phases site grading and landscaping will be completed with appropriate erosion and sediment controls.

6.3 Preliminary Screening Criteria

A preliminary screening of alternatives was initially completed in the TM in order to eliminate those alternatives which are deemed not to be viable for implementation. The assessment considered the preliminary screening criteria shown in Table 2.

Table 2: Screening Criteria

Screening Criteria	Description
Compliance	▪ Ability to continuously meet or exceed the proposed treatment objectives
Technical Feasibility	▪ Adequate space exists for the given location. ▪ Compatibility with existing infrastructure (potential impact on overall construction requirements). ▪ Compatibility with existing processes (operating risk, system reliability, maintenance and monitoring requirements). ▪ Is a common technology used in water treatment facilities in North America.
Capacity	▪ Ability to meet the required water demands
Financial	▪ Is known not to have a high financial and/or operating cost.

6.4 Identified Membrane Options

The following membrane alternatives to achieve the Phase 1 and ultimate net capacity requirements of 51,871 and 101,069 m^3/d, respectively, were identified as follows and Options 1, 2.1, 2.2 and 3 are depicted in Figures which are included in the Technical Memorandum (see **Appendix G**) and reproduced in the PIC material (see **Appendix J**):

- **Option 1:** Maintain Existing ZW500 Membrane Building Capacity with Minor Retrofit and Construct New Membrane Building
- **Option 2.1:** Complete Major Retrofit with New Membranes within Existing ZW500 Membrane Building - With 2 Remaining ZW500d Trains
- **Option 2.2:** Complete Major Retrofit with New Membranes within Existing ZW500 Membrane Building - With 0 Remaining ZW500d Trains
- **Option 3:** Repurpose Existing ZW500 Membrane Building and Construct New Membrane Building
- **Option 4:** Construction of a New Membrane Building for Phase 1 flows and Future Retrofit of the Existing Membrane Building for Balance of Flows
- **Option 5:** Construction of a New Membrane Building Combined with Operating the Existing Membrane Building to Its End of Life (Reducing New Membranes Initially Required)

6.5 Evaluation of Membrane Technology

Options 1, 2.1, 2.2 and 3 were carried forward for further consideration (short-listed). Options 4 and 5 of the membrane alternatives passed the initial screening criteria but were not carried forward for reasons noted as follows:

Option 4: Construction of a New Membrane Building for Phase 1 flows and Future Retrofit of the Existing Membrane Building for Balance of Flows

- Higher capital cost than Option 1 since the existing membrane building would require major modifications (not just retrofits) that would greatly exceed the savings from a smaller new membrane building with no compensating additional benefit.
- Once a new membrane building is constructed for Phase 1 (and potentially higher) flows, the existing membrane building would remain unused for potentially up to 10 years or more.

Option 5: Construction of a New Membrane Building Combined with Operating the Existing Membrane Building to Its End of Life (Reducing New Membranes Initially Required)

- Could be adopted as an ancillary option to defer capital costs by reducing the new membranes required in the short-term (not a sustainable long-term solution).
- Although this option would allow the existing plant to be repurposed as an administrative facility in the long-term, in the short-term, provision of additional administrative facilities would have to be deferred while the membranes are still in use.

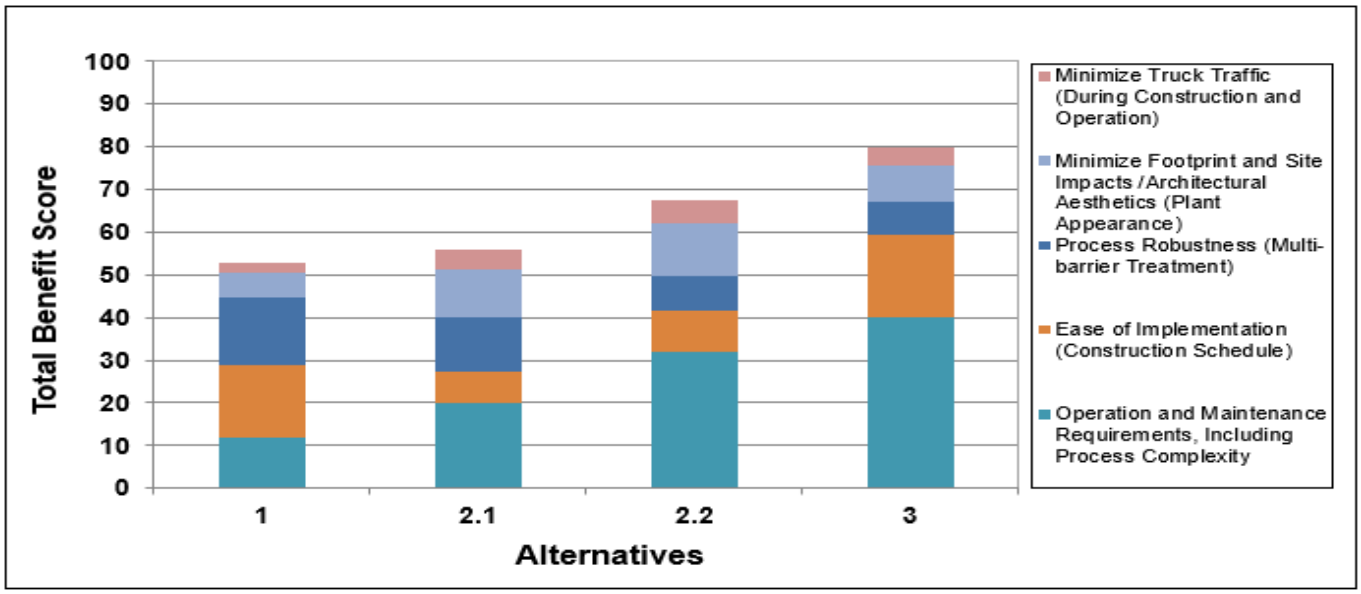
The four short-listed Options were assessed relative to each other and evaluated against a set of pertinent criteria and factors. The evaluation criteria and weighting factors, grouped by primary categories, are shown in the Table 3 for the membrane alternatives.

Table 3: Evaluation Criteria and Weighting for Membrane Alternatives

Primary Criteria	Weight	Secondary Criteria	Relative Weight	Absolute Weight
Technical Considerations	80	Operation and maintenance requirements, including process complexity	50	40
		Ease of implementation (construction schedule)	30	24
		Process robustness	20	16
Maximum Sub-total Score – Technical Considerations				**80**
Social Considerations	20	Minimize footprint and site impacts/architectural aesthetics (plant appearance)	70	14
		Minimize truck traffic (during construction and operation)	30	6
Maximum Sub-total Score – Social Considerations				**20**
Total Overall Maximum Score				**100**

Each short-listed alternative was assigned a technical score out of 10 for each evaluation criteria. The assigned score represents how well the specific alternative met the criterion under consideration – the higher the ability to perform or meet the criterion, the higher the score assigned. The short-listed alternative with the highest score suggests that it provides the most "benefits" to this project. Details of the complete evaluation of the short-listed alternatives, as well as the rationale upon which the scores have been relatively assigned, are presented in full in the TM. A summary of the Technical Scoring is represented in Figure 7.

Figure 7: Technical Scoring Results for Membrane Alternatives



Option	Alternative Description	Total Technical Score	Technical Ranking
1	Maintain Existing ZW500 Membrane Building Capacity with Minor Retrofit of ZW500d Trains and Construct New Membrane Building	52.8	4
2.1	Complete Major Retrofit with New Membranes within Existing ZW500 Membrane Building - With 2 Remaining ZW500d Trains	56.0	3
2.2	Complete Major Retrofit with New Membranes within Existing ZW500 Membrane Building - With 0 Remaining ZW500d Trains	67.6	2
3	Repurpose Existing ZW500 Membrane Building and Construct New Membrane Building	79.8	1

6.6 Identified Disinfection Options

The disinfection alternatives to achieve the Phase 1 and ultimate net capacity requirements for this project were identified as follows:

- **Option 1:** Chlorinate Year-Round in Intake and Chlorine Contact (CT) Chambers
- **Option 2:** Super-chlorinate and De-chlorinate in Existing CT Chambers
- **Option 3:** Practice pH Adjustment in Existing CT Chambers
- **Option 4:** Chlorinate in New CT Chambers
- **Option 5:** Practice UV Disinfection in New Building and Chlorinate in New CT Chamber

6.7 Evaluation of Disinfection Options

Alternatives 4 and 5 were carried forward (short-listed) for further assessment. Options 1, 2 and 3 were not carried forward for reasons noted as follows

Option 1: Chlorinate Year-Round in Intake and CT Chambers.

- Raw water in the intake has solids that can shield pathogens from the chlorine, thus not guaranteeing inactivation of the pathogens.
- Chlorination year round within the intake is not preferred by the MECP.

- A higher chlorine dosage than normal is required, increasing the potential for disinfection by-products and decreasing the pH of the water making the water more corrosive, exceeding the water quality objectives.
- Additional de-chlorination will be required.
- At ultimate flows, this option does not provide sufficient disinfection.

Option 2: Super-chlorinate and De-chlorinate in Existing CT Chambers

- Increased potential for disinfection by-product formation exceeding the water quality objectives.
- Increased potential for a decrease in the pH of the water making the water more corrosive, exceeding the water quality objectives.
- Increased potential for an adverse exceedance of 4.0 mg/L free chlorine residual in the distribution system, exceeding the water quality objectives.
- A substantial amount of additional chlorine containers will need to be transported to and then stored on-site.
- Additional de-chlorination will be required.

Option 3: Practice pH Adjustment in Existing CT Chambers

- Potential for increasing the corrosivity of the water, exceeding the water quality objectives.
- New chemical systems (acid and base) will need to be installed on-site requiring additional transportation, storage and handling of chemicals on-site.

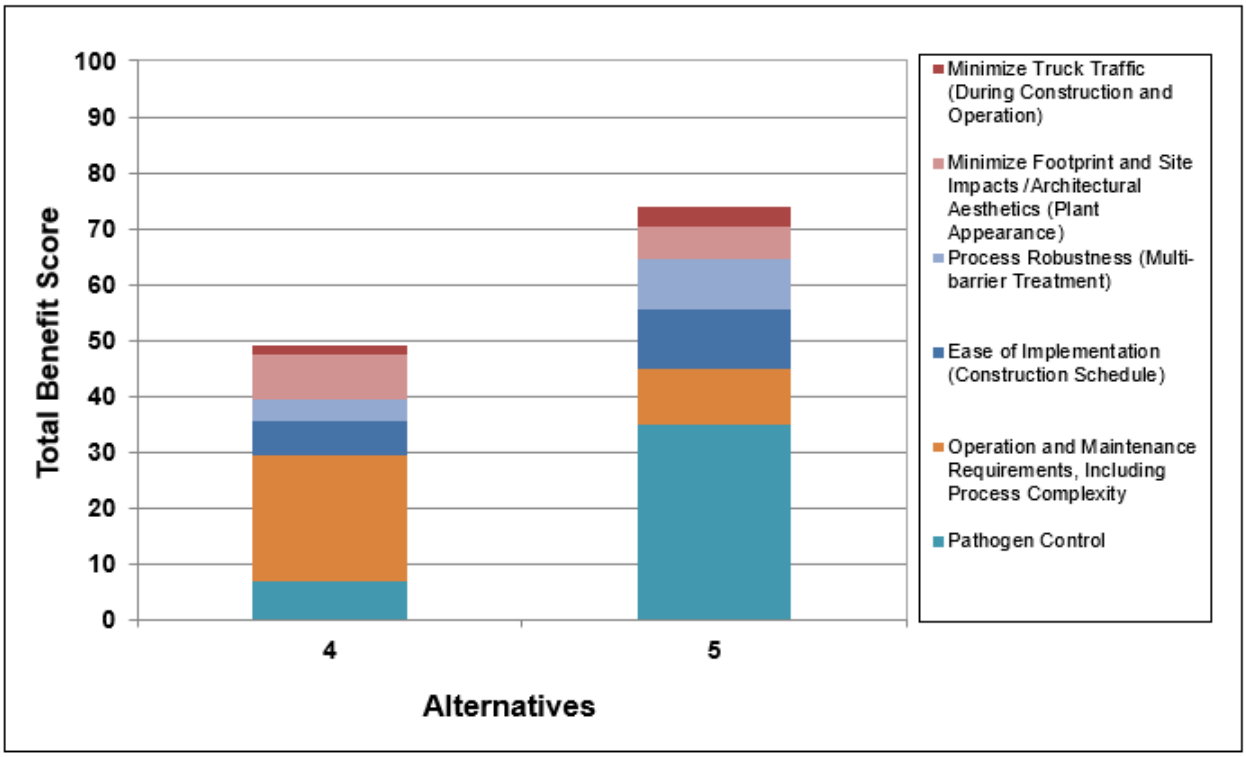
The short-listed Options were assessed relative to each other and evaluated against a set of pertinent criteria and factors. The evaluation criteria and weighting factors, grouped by primary categories, are shown in the Table 4 for the disinfection alternatives.

Table 4: Evaluation Criteria and Weighting for Disinfection Alternatives

Primary Criteria	Weight	Secondary Criteria	Relative Weight	Absolute Weight
Water Quality	35	Pathogen control	100.0	35
			Maximum Sub-total Score – Water Quality	35
Technical Considerations	50	Operation and maintenance requirements, including process complexity	50.0	25
		Ease of implementation (construction schedule)	30.0	15
		Process robustness	20.0	10
			Maximum Sub-total Score – Technical Considerations	**50**
Social Considerations	15	Minimize footprint and site impacts/architectural aesthetics (plant appearance)	66.7	10
		Minimize truck traffic (during construction and operation)	33.3	5
			Maximum Sub-total Score – Social Considerations	**15**
			Total Overall Maximum Score	**100**

Each short-listed alternative was assigned a technical score out of 10 for each evaluation criteria. The assigned score represents how well the specific alternative meets the criterion under consideration – the higher the ability to perform or meet the criterion, the higher the score assigned. The short-listed alternative with the highest score suggests that it provides the most "benefits" to this project. Details of the complete evaluation of the short-listed alternatives, as well as the rationale upon which the scores have been relatively assigned, are presented in full in the TM. A summary of the Technical Scoring is represented below.in Figure 8.

Figure 8: Summary of Technical Scoring for Disinfection Alternatives



Option	Alternative Description	Total Technical Score	Technical Ranking
4	Chlorinate in New CT Chambers	49.0	2
5	Practice UV Disinfection and Chlorinate in New CT Chambers	74.0	1

6.8 Cost Evaluation of Alternatives

Table 5 summarizes the capital and operating opinion of costs and the net present values for the short-listed *membrane* and *disinfection* alternatives. It is noted that these opinions of cost are *relative* comparisons for the membrane treatment and disinfection systems only. They do not include cost estimates of the associated plant upgrades that are common to all alternatives. They do include opinion of costs for the Phase 1 and the Ultimate buildout water supply requirements with inflation and interest considered from 2020. The associated plant upgrades are identified in the TM (See **Appendix G**) and are summarized in Section 6.2 of this ESR.

Table 5: Capital and Operating Cost Estimates for Membrane and Disinfection Alternatives

Option	Alternative Description	Capital Costs ($million)	Operating Costs ($million)	Net Present Value ($million)
Membrane Alternatives				
1	Maintain Existing ZW500 Membrane Building Capacity with Minor Retrofit of ZW500d Trains and Construct New Membrane Building	$55.1	$22.6	$77.6
2.1	Complete Major Retrofit with New Membranes within Existing ZW500 Membrane Building - With 2 Remaining ZW500d Trains	$46.6	$14.7	$61.3
2.2	Complete Major Retrofit with New Membranes within Existing ZW500 Membrane Building - With 0 Remaining ZW500d Trains	$40.7	$10.8	$51.6
3	Repurpose Existing ZW500 Membrane Building and Construct New Membrane Building	$39.1	$9.6	$48.6
Disinfection Alternatives				
4	Chlorinate in New CT Chambers	$9.2	$0.06	$9.3
5	Practice UV Disinfection and Chlorinate in New CT Chambers	$6.1	$0.86	$7.0

The Cost-Benefit analysis is a value analysis tool that provides an alternative means to include costs in the evaluation process. The Cost-Benefit analysis was carried out as follows and the results are provided in Table 6:

- Total technical score obtained for each short-listed alternative was carried forward and given a weighting of 70%.
- The calculated net present value (NPV) for each short-listed alternative was prepared and given a weighting of 30%.
- The cost score was added to the technical score to result in a *Total Score* with the highest score being the recommended alternative.

Table 6: Cost- Benefit Analysis Results

Option	Description	Net Present Value ($million)	Costs Score (Points out of 100)	Technical Score (Points out of 100)	Total Score	Overall Ranking
Membrane Alternatives						
1	Maintain Existing ZW500 Membrane Building Capacity with Minor Retrofit of ZW500d Trains and Construct New Membrane Building	$77.6	62.7	52.8	**55.8**	4
2.1	Complete Major Retrofit with New Membranes within Existing ZW500 Membrane Building - With 2 Remaining ZW500d Trains	$61.3	79.4	56.0	**63.0**	3
2.2	Complete Major Retrofit with New Membranes within Existing ZW500 Membrane Building - With 0 Remaining ZW500d Trains	$51.6	94.4	67.6	**75.6**	2
3	Repurpose Existing ZW500 Membrane Building and Construct New Membrane Building	$48.6	100.0	79.8	**85.9**	1
Disinfection Alternatives						
4	Chlorinate in New CT Chambers	$9.3	75.2	49.0	**56.9**	2
5	Practice UV Disinfection and Chlorinate in New CT Chambers	$7.0	100.0	74.0	**81.8**	1

7 Recommended Design

Based on the cost-benefit analysis it was determined that Membrane Alternative 3 and Disinfection Alternative 5 would be presented as a portion of the Phase 3 Recommended Design. It was also determined that the overall Phase 3 Recommended Design should include the identified plant upgrades. Enhanced water conservation and efficiency measures were previously identified in the MSP as complementary solutions. The membrane and disinfection alternatives were presented to the public and review agencies for comment as part of the virtual PIC (April 24, 2020 to June 1, 2020).

8 Consultation

8.1 MSP Phase 1 and 2 Consultation

The MSP is being used in support of Phases 3 and 4 of this Class EA as it addresses Phases 1 and 2 of the Class EA process. The following public and stakeholder consultation activities were completed throughout the Master Plan process as described on Page 7 in the MSP document:

Table 7: Master Plan Study Consultation Milestones

Milestone	Timeline	Description
Notice of Study Commencement	October 2017	A Notice of Study Commencement was issued on October 10, 2017. The Notice reviewed the purpose of the study and the study process. Contact information for the Town of Collingwood Project Manager was provided.
Notice of PIC	March 2019	A Notice of Public Information Centre was issued on March 11, 2019. The Notice identified the location, time, and purpose of the PIC. Contact information for the Town of Collingwood Project Manager was provided.
Public Information Centre (PIC)	March 27, 2019	A Public Information Centre was held on March 27, 2019 at the Collingwood Public Library (55 Ste. Marie Street). The PIC was 3-hours in length, from 4:00PM to 7:00PM.
Notice of Study Completion	December 19, 2019	A Notice of Study Completion will be issued on December 2019.
Master Plan Endorsement	January 27,2020	Subject to endorsement by Collingwood Town Council.

8.2 Phase 3 Consultation

A Notice of Study Commencement was placed in the Collingwood Connection newspaper for the August 15 and 22, 2019 editions and a copy of the notice was also posted on the Town of Collingwood's website. A mail out to area residents adjacent to the project study area, relevant

review agencies as well as Indigenous communities and agencies was issued on August 15, 2019 providing notification of the commencement of the project. Copies of the issued letters and notices, as well as the agency mailing list and copies of all comments received and associated responses as a result of the Notice of Study Commencement are included in **Appendix H**. A summary of the comments and responses is also provided in Table 8 (see **Appendix I**).

Specific to a request from NVCA a meeting to discuss project details was held on December 4, 2019 at the NVCA Administration Centre and a copy of the meeting notes from this meeting is also provided in **Appendix H**.

8.3 Public Information Centre (PIC)

It was the Town's intention to host an informal, drop-in style public information meeting to present the planning work done to date to interested members of the public and review agencies. The PIC was to be held on Tuesday March 24, 2020 at the Collingwood Library. A Notice of PIC was sent by mail and email to area residents adjacent to the project study area, relevant review agencies as well as Indigenous communities and agencies on March 9, 2020. A copy of the Notice of PIC was placed in the Collingwood Connection newspaper for the March 12, 2020 edition. During this time a national pandemic was declared surrounding the public health crisis of COVID-19. This crisis resulted in the closing of all non-essential workplaces including municipal offices and public libraries. Furthermore, during the pandemic, public gatherings were prohibited and regarded as a health risk. The PIC scheduled for March 24, 2020 was declared to be postponed and all agencies, Indigenous communities and public members were informed of the postponement of the PIC until further notice. This postponement notice was sent out on March 16, 2020 and a Notice of PIC Postponement was placed in the Collingwood Connection newspaper for the March 19, 2020 edition.

During this period, on March 17, 2020 a virtual meeting was also held with New Tecumseth to provide a preview of the recommended design and budget.

It is considered that the expansion of the WTP is required for the good of the Town's residents. The project is important to the community and it was considered essential to move forward with the Class EA planning process. The project team deliberated and explored various options to move forward with public engagement and consultation under the circumstances of the health pandemic. It was decided that a digital PIC would be organized that would allow for valuable information exchange. The PIC presentation and engagement were conducted using the Engage Collingwood online platform. A Notice of Virtual PIC was sent by mail to area residents adjacent to the project study area on April 20, 2020, while relevant review agencies as well as Indigenous communities were emailed the Notice of PIC on April 23, 2020. A Notice of PIC was placed in the Collingwood Connection newspaper for the April 23, April 30, and May 28, 2020 editions and a copy of the Notice was also posted on the Town of Collingwood's website. Copies of the issued letters, notices, agency mailing list and notes from the March 17, 2020 meeting with New Tecumseth are provided in **Appendix I**.

An online page using the Engage Collingwood platform was created and was made accessible as of April 24, 2020. The Engage Collingwood site was retained until June 1, 2020. The digital PIC provided an opportunity for all interested parties to review the alternative designs developed for the WTP expansion, to discuss the project with the study team and to provide comment on both the process and the Recommended Design. The presentation was presented in an audible form as well as a downloadable format. A copy of the PIC presentation material can be found in **Appendix I**.

The Recommended Design, based on the technical and cost-benefit evaluations described previously, and the conclusions defined by both the MSP and the Existing Plant Performance/Capacity Assessment Report is to proceed with the following:

- Design and construction of Option 3 of the Membrane upgrade alternatives;
- Design and construction of Option 5 of the Disinfection upgrade alternatives;
- Design and construction of the associated plant upgrades also identified in the Alternatives Selection Technical Memorandum; and;
- Encourage enhanced water efficiency and conservation by reviewing and expanding the Town's current efforts to reduce daily water use and to continue with undertaking repairs to Town infrastructure where water may be unnecessarily wasted.

Comments were accepted through the Engage Collingwood platform to allow individuals to express their opinions and concerns. A downloadable comment sheet was also made available for those wishing to comment by mailed hard copy or by email to the project team. The public was informed that the comment period would end on June 1, 2020.

Analytics provided by the Engage Collingwood platform reported that 205 people visited the project website, of these 113 proceeded to view multiple pages on the site. A total of 43 people viewed at least one of the 3-D renderings presented of the WTP expansion. There were no comments submitted through the Engage Collingwood platform. The Town did receive 4 comments via direct email to Town staff. Comments received related to the viewscape of the expanded building, water delivery volumes, and general technical troubleshooting questions regarding the use of the platform.

Following the PIC review period, a teleconference was held with members of the Saugeen Ojibway Nation (SON). SON provided comments in a letter dated June 8, 2020 and these comments were discussed during the teleconference. Ainley responded to the comments in a letter dated June 15, 2020.

Subsequent to the PIC review period, an email was received from the NVCA dated June 18, 2020. The NVCA recommended that a qualified coastal engineer be retained during the detailed design process to assess and mitigate the risk of shoreline erosion to the facility. The NVCA further stated that "based on review of the above noted PIC presentation, we have no natural heritage related comments to offer at this stage."

Copies of all comments received and associated responses as a result of the PIC can be found in **Appendix I** of this report. A summary of the comments and responses is also provided in Table 8 (see **Appendix I**).

9 Selection of the Preferred Design

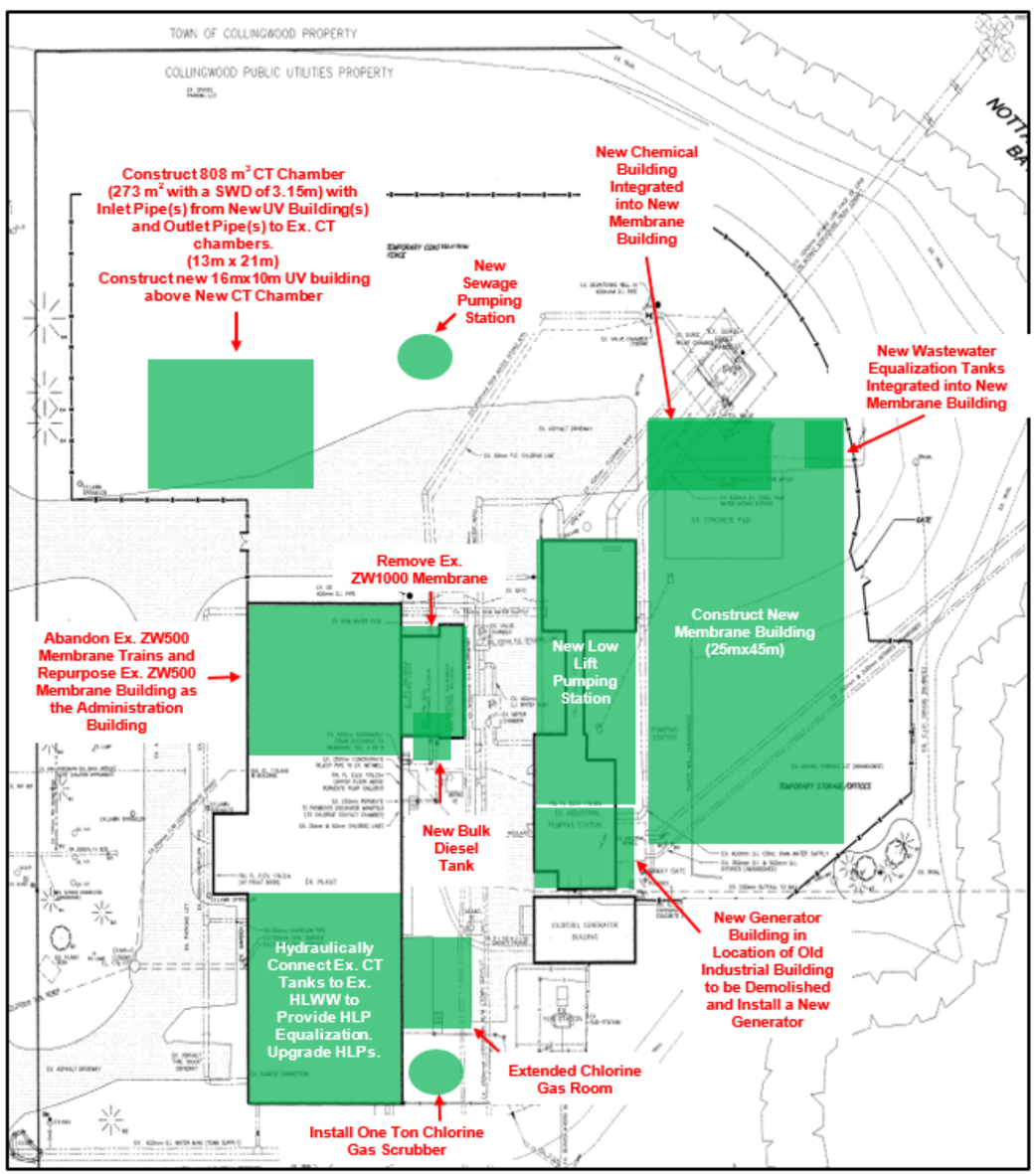
Considering the comments received during Phase 3, it was determined by the Steering Committee that the Recommended Design outlined previously would be presented as the Preferred Design for this Project during the 30-day review of the draft ESR. The Preferred Design is summarized as follows:

- Design and construction of Option 3 of the Membrane upgrade alternatives;
- Design and construction of Option 5 of the Disinfection upgrade alternatives;
- Design and construction of the associated plant upgrades identified by the Existing Plant Performance/Capacity Assessment Report and;
- Encourage enhanced water efficiency and conservation by reviewing and expanding the Town's current efforts to reduce daily water use and to continue with undertaking repairs to Town infrastructure where water may be unnecessarily wasted.

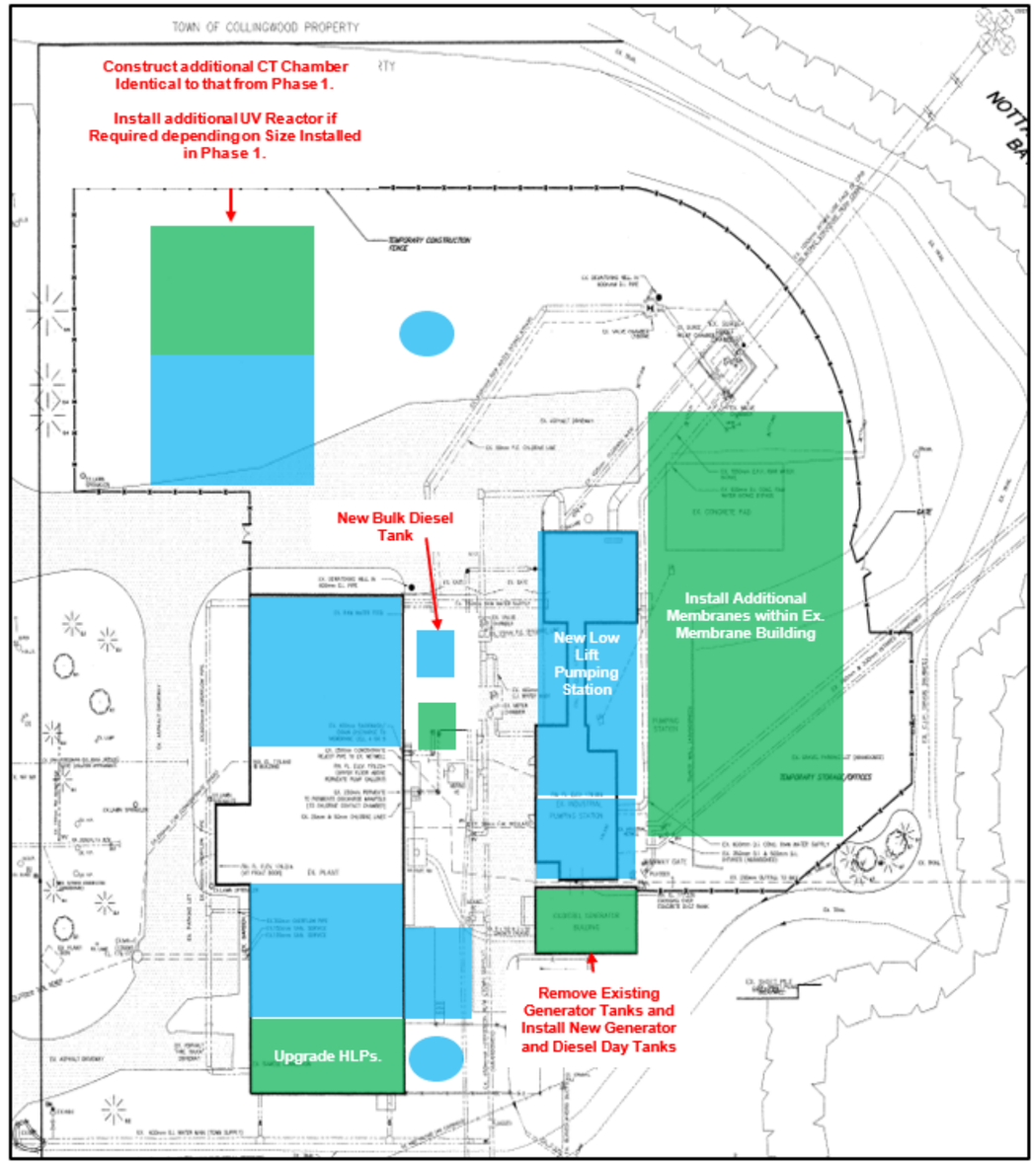
Figure 9 illustrates the Preferred Design to meet Phase 1 and Ultimate demands. During detailed design, there will be opportunities to optimize the layout for both phases.

It has been determined that the WTP can be expanded up to the planned rating of 101,069 m^3/d without the need for additional property.

Figure 9: Conceptual Plan of Preferred Design



Phase 1



Ultimate

10 Financial Statement

The opinion of capital cost of the Phase 1 expansion of the plant is $65 million (2020 dollars). A further expansion will be necessary to meet the Ultimate water supply requirements. The opinion of capital cost includes engineering and the associated upgrades, as well as the membrane and disinfection costs. It separates the costs for the Phase 1 and Ultimate expansion and provides the costs in 2020 dollars (thus excluding inflation or interest considerations until the actual construction year). Costs associated with efforts to enhance water efficiency and conservation are not included in the capital cost estimates. However, it is considered that any costs associated with these efforts by the Town will be minimal and will result in the reduction of future capital and operating costs.

Funding for the Phase 1 expansion will be provided through a combination of the Town's Allocated Water Reserve Fund (funded through water rates), Development Charges, and contributions from other Municipalities in accordance with Water Agreements. Discussions with the other Municipalities have commenced and should be finalized prior to final design of any expansion/upgrade to the existing WTP facility.

11 Potential Effects and Mitigation Measures

11.1 Aquatic Habitat

Nottawasaga Bay in Georgian Bay provides habitat for various species of fish. However, it is noted that no in-water construction works is anticipated to meet the Phase 1 expansion. Therefore, it is not anticipated that fish habitat will be directly affected by the construction of the Project (Phase 1). A reassessment of impacts on aquatic habitat should be undertaken prior to proceeding with the design of the Ultimate expansion. The potential indirect effects on fish and fish habitat as a result of construction and operation of the WTP are considered low, provided that the avoidance and mitigation measures described are effectively implemented including the following:

- Although no in-water works are anticipated as part of Phase 1, as a best management practice, consideration can be given (wherever possible) to scheduling works near water to respect the timing windows to protect fish, including their eggs, juveniles, spawning adults and/or organisms upon which they feed.
- An Erosion and Sediment Control Plan for the work site will be implemented prior to the start of construction and will minimize the risk of sedimentation to the waterbody during all phases of construction.
- Erosion and sediment control measures will be maintained until all disturbed ground has been permanently stabilized, any suspended sediment has resettled to the bed of the waterbody and/or settling basin and runoff water is clear. Measures will be undertaken for managing water flowing onto the site, as well as water being pumped/diverted from the site such that sediment is filtered out prior to the water entering a waterbody. Consideration will be given to retaining a qualified coastal engineer during final design to review the proposed erosion/sediment control measures.

- Measures will be undertaken to contain and stabilize any construction and other waste material above the High-Water Mark (HWM) to prevent re-entry.
- Inspection and maintenance of erosion and sediment control measures and structures will happen regularly during the course of construction, especially during a major storm event.
- Detailed design should incorporate site management practices (e.g. site grading, curb controls, catch basins) to manage impervious surface run off and impacts from road de-icing during the operation of the new facility to negate the effects of increased runoff to the receiving waters of Nottawasaga Bay
- Activities near water will be planned to ensure that such materials such as paint, primers, blasting abrasives, rust, solvents, degreasers, grout or other chemicals do not enter Nottawasaga Bay.
- A response plan for spills will be developed before work commences. This plan will be implemented immediately in the event of a sediment release or spill of a deleterious substance and keep and emergency spill kit on site.
- Building material used near watercourse will be handled and treated in a manner to prevent the release or leaching of substances into the water that may be deleterious to fish.
- All construction materials will be removed from site upon project completion.
- It will be confirmed that any machinery arriving on site is in a clean good working condition and is maintained free of fluid leaks, invasive species and noxious weeds.
- Measures will be put in place to wash, refuel and service machinery and store fuel and other materials for the machinery in such a way as to prevent any deleterious substances from entering the water.
- Refuelling shall happen at least 30 m away from Nottawasaga Bay on a refuelling pad to prevent spills from entering the watercourse. Stockpiled materials or equipment will be stored within the construction footprint but shall be kept at least 30 m away from Nottawasaga Bay.
- Clearing of riparian vegetation should be kept to a minimum using existing trails, roads or pathways wherever possible to avoid disturbance to the riparian vegetation and to prevent soil compaction. When practicable, pruning or topping the existing vegetation will be undertaken instead of grubbing/uprooting, and,
- The shoreline and/or banks disturbed by any activity associated with the project should be immediately stabilized to prevent erosion and/or sedimentation, preferably through re-vegetation with native species suitable for the site. Salt-tolerant, native species should be considered.
- Inclusion of LID features for storm water management and impervious surfaces will be considered during final design.

11.2 Vegetation

During the operations phase of the Project, it is anticipated that there will be no significant potential effects on vegetation cover beyond the initial removal at the construction phase. The following mitigation measures are recommended:

- Minimize vegetation removal to the extent possible and limit removal to within the construction footprint;

- Clearly delineate the construction footprint to avoid accidental damage to retained vegetation. Delineation will be in the form of construction fencing and/or silt fence barriers with the latter implemented if erosion and sediment control is also required;
- Prune any tree limbs or roots that are accidentally damaged by construction activities using proper arboricultural techniques within 48 hours of damage;
- Additional mitigation measures specific to trees, including Town of Collingwood By-law permitting requirements, may be required;
- Revegetate cleared areas as soon as reasonably possible using native plant species

11.3 Wildlife and Wildlife Habitat (Including Species at Risk)

Wildlife and wildlife habitat are not anticipated to be significantly affected by the operation phase of the Project, as species occurring within the study area are tolerant to disturbances associated with urban settings. The following mitigation measures are recommended:

- Conduct vegetation clearing and trimming outside of the overall bird nesting period (April 1st to August 31st) to avoid incidental take and limit disturbance to migratory birds or their nests. If vegetation removal or trimming must occur during the overall bird nesting period (April 1st to August 31st), nest and nesting activity searches may be conducted by a qualified biologist, no more than 24 hours in advance and within 'simple' habitats or if minor vegetation clearing is required, to ensure that no active nests of breeding birds are destroyed and thereby prevent contravention of the *Migratory Bird Convention Act*;
    - If an active nest or confirmed nesting activity of a protected bird is observed, the area will be protected and no construction activities will occur until the young have fledged or until the nest is no longer active, as confirmed by a qualified biologist. Note that simple habitats refer to habitats that contain few nesting spots or few species of migratory birds, where identification of active nests or confirmed nesting activity can be completed with confidence. Generally, the entire study area may be considered as simple habitat.

- In the event that a Snapping Turtle is encountered within the limits of construction, construction staff will temporarily stop work in the immediate area to allow it to leave the area on its own. If the Snapping Turtle is not moving on its own accord and is not nesting, it can be relocated safely outside of the construction limits to a suitable habitat nearby by an individual qualified in safe handling of wildlife. If the Snapping Turtle is noted to be nesting within the construction limits (this would typically occur in June during the turtle nesting season) or a suspected nest is found, a qualified Biologist should be notified immediately for further direction.

- Workers must never threaten, harass or injure wildlife.
- No Barn Swallows or their nests were identified during field investigations; however, the existing building on the property provide suitable nesting habitat. Protected habitat of Barn Swallow is centered on nests as described in accordance with the General Habitat Description (MNRF, 2013). Although no negative impacts to this species or habitat are anticipated at this time, buildings should be examined prior to construction activities, if

conducted during the overall bird nesting period (April 1st to August 31st), to confirm species presence or absence.

11.4 Archaeological Resources

In the event the following situations are encountered during construction, the contractor should be advised to stop work immediately and take the appropriate actions as noted below:

- Should previously unknown or unassessed deeply buried archaeological resources be uncovered, they may be a new archaeological site and; therefore, subject to section 48 (1) of the *Ontario Heritage Act*. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed archaeologist to carry out archaeological fieldwork, in compliance with section 48 (1) of the *Ontario Heritage Act*. The Heritage Operations Unit of the Ministry of Culture must be immediately notified at 1-807-468-2450.
- In the event that human remains are encountered, the proponent or person discovering human remains must immediately notify the police or coroner and the Registrar of the Bereavement Authority of Ontario at 647-483-2645 or 1-807-468-2450.

11.5 Social Environment

- Appropriate notice will be given to surrounding residents prior to the commencement of construction.
- The Collingwood Loop Trail will be temporarily inaccessible to local residents during the construction phase. All efforts will be made to preserve existing amenities as much as possible and to reinstate the trail.
- The Collingwood Loop Trail and adjacent Enviro Park are popular recreational areas for a variety of activities, including fishing. During construction these activities will be temporarily disrupted.

11.6 Air Quality and Noise

There are no sensitive receptors nearby to the project area other than the residential properties. The mechanical components of the Water Treatment Plant will be constructed within buildings and structures. In addition, current technology provides enhanced noise control compared with the equipment it will replace. Therefore, no noise increase is anticipated from the operation of the plant. Typical air quality impacts from construction are anticipated, these impacts will however be limited in duration. The Town's Noise Bylaw will be enforced throughout construction. During construction, the temporary air quality impact from dust will be mitigated by regularly wetting the construction area with water trucks. Also, proper traffic control management will be implemented to ensure vehicles idle times are at a minimum. Operationally, there are no lasting impacts anticipated from the construction.

12 Climate Change

12.1 General

As per the MECP guidance document referenced in Section 3.2, the project's potential impacts to climate change and how climate change may impact the project were considered. Climate change concerns generally relate to the increased concentration of greenhouse gases in the atmosphere, which can result in a rise in the global mean surface temperature. Increased temperatures worldwide are creating changes in climate that is resulting in extreme weather events.

There are two approaches to address climate change. These include reducing a project's impact on climate change (climate change mitigation) and increasing the local ecosystem's resilience to climate change (climate change adaptation). This section of the report will discuss the aforementioned aspects in relation to this project utilizing a qualitative approach.

12.2 Potential for Project to Impact Climate Change

The proposed undertaking is considered to be a small-scale project with regard to the construction footprint and involves the reconstruction of an existing disturbed area. There will be an increase in hydroelectric power requirements to operate the expanded WTP but the related impacts to climate change are considered to be minimal. In addition, the use of chemicals at the expanded WTP will increase, resulting in additional truck deliveries to the site. However, the impact to climate change is, again, considered to be minimal.

12.3 Potential for Climate Change to Impact this Project

Climate change has the potential to result in increased storm events that can lead to flooding. This is a small-scale project and a long-term increased risk to surface flooding is not anticipated, however the Project will increase paved surfaces and therefore, impermeable areas. Pre- to post- construction LID stormwater management measures such as retaining walls, stormwater swales, enhanced site vegetative cover, porous pavement and utilization of existing site stormwater infrastructure to intercept, direct, infiltrate and otherwise manage runoff, will be evaluated as part of an overall comprehensive SWM plan that will be developed during detailed design.

Climate change may affect water levels within the Great Lakes on a cyclical basis. Currently, the flood mapping as provided by the NVCA, shows that the site is within the flood plain of Nottawasaga Bay. As a result, it is recognized that future high-water levels, coupled with wave uprush, could impact the WTP. As such, protection from flooding to all building and structure accesses, including doorways, windows hatches and vents will be provided by constructing these components above the 100-year Regional flood elevation (including wave uprush). It is imperative that the facility be fully operational during future high lake level events.

13 Permits and Approvals

During detailed design permits and approvals will need to be acquired from the following agencies:

- Nottawasaga Valley Conservation Authority (NVCA): A work permit will need to be acquired for any construction since the site is a regulated area within the NVCA flood mapping limit. A Source Protection Notice/letter will be required from NVCA for the Ultimate expansion due to the future increased water taking.

- Ministry of Environment, Conservation and Parks (MECP): During detailed design for the Phase 1 expansion the current Permit to Take Water (PTTW) does not require an increase. At the time of the Ultimate phase expansion an increase in water taking is required and a new PTTW will need to be acquired.

- Ministry of Environment, Conservation and Parks (MECP): Following detailed design a new Drinking Water Works Permit (DWWP) will need to be acquired.

- Town of Collingwood: A building permit and site plan approval will need to be acquired for construction of the expansion.

14 Monitoring

Information pertaining to required mitigation and monitoring will be incorporated into the Construction Documents once the detailed design has been finalized. Monitoring will be conducted by on-site construction staff to make certain that environmental protection measures are being implemented and are effective. The Contract Administrator will make certain that environmental protection measures and monitoring, as identified, are implemented during construction and that any repairs to protection measures will be made in a timely fashion. Consideration will be given to retaining a coastal engineer during final design to review the erosion/sediment control mitigation measures.

15 Summary of Phase 1 Requirements, Recommended Mitigation Measures and Future Expansion Requirements

15.1 Phase 1 Requirements

In order to accommodate Phase 1 demands (51,871 m^3/d) for the Town of Collingwood, Town of New Tecumseth, Town of The Blue Mountains and Township of Clearview, the following works represent the Preferred Design for expansion of the Raymond A. Barker Water Treatment Plant:

- Demolish the existing raw water station and industrial building and replace with a new raw water low-lift pumping station.
- Construct a new generator building and install larger generator in the location of the demolished industrial building.

- Construct a new membrane building on the site east of the existing industrial building to accommodate entire Phase 1 water demand.
- Integrate a new chemical building into the new membrane building.
- Integrate membrane backwash wastewater equalization tanks into the new membrane building.
- Construct a new 808 m^3 below-ground chlorine contact (CT) chamber on the site north of the existing membrane building.
- Construct a new UV building on top of the new CT chamber and install a minimum of two UV reactors.
- Abandon the existing membrane trains and repurpose the existing membrane building as the new administration building. Facilities within the new administration building will include men's and women's washroom/change room, lunch room, lab facilities and meeting/training room with AODA compliant washroom.
- Hydraulically connect the existing CT chamber to the existing high-lift wet well to provide additional equalization storage.
- Upgrade the Regional high-lift pumps.
- Install a sanitary sewage transfer system to collect sanitary waste from the new buildings and discharge it to the sanitary sewer.
- Extend existing chlorine building and install 1-ton chlorine gas scrubber.
- Replace the existing 2000kVA transformer with a larger transformer, along with associated electrical maintenance holes, duct banks and electrical rooms.
- Provide outdoor fuel storage in the location of the demolished ZW1000 membrane structure.
- Replace PLCs and control wiring and upgrade SCADA.
- Complete sitework as required.

It was also determined that the Town should complement the Preferred Design with enhanced water conservation and efficiency measures.

15.2 Recommended Mitigation Measures

A summary of the recommended mitigation measures presented throughout this report are listed below for reference related to the Phase 1 upgrades.

- An Erosion and Sediment Control Plan for the work site will be implemented prior to the start of construction. Erosion and sediment control measures will be maintained until all disturbed ground has been permanently stabilized. Inspection and maintenance of erosion and sediment control measures and structures will happen regularly during the course of construction, especially during a major storm event. Consideration will be given to retaining a coastal engineer to review the erosion/sedimentation control measures during final design.
- Measures will be undertaken to contain and stabilize, or transport off-site, any waste material.
- Detailed design should incorporate site management practices.
- Activities near water will be planned to ensure that such materials such as paint, primers, blasting abrasives, rust, solvents, degreasers, grout or other chemicals do not enter Nottawasaga Bay. A response plan for spills will be developed.

- Building material used near watercourse will be handled and treated in a manner to prevent the release or leaching of substances into the water. Clearly delineate the construction footprint to avoid accidental damage to retained vegetation. Delineation will be in the form of construction fencing and/or silt fence barriers.
- All construction materials will be removed from site upon project completion.
- It will be confirmed that any machinery arriving on site is in a clean good working condition and is maintained free of fluid leaks, invasive species and noxious weeds.
- Measures will be put in place to wash, refuel and service machinery and store fuel and other materials for the machinery in such a way as to prevent any deleterious substances from entering the water. Refuelling shall happen at least 30 m away from Nottawasaga Bay.
- The shoreline and/or banks disturbed by any activity associated with the project should be immediately stabilized to prevent erosion and/or sedimentation.
- A reassessment of impacts on aquatic habitat should be undertaken prior to proceeding with the design of the Ultimate expansion.
- Minimize vegetation removal to the extent possible and limit removal to within the construction footprint; Conduct vegetation clearing and trimming outside of the overall bird nesting period (April 1st to August 31st). When practicable, pruning or topping the existing vegetation will be undertaken instead of grubbing/uprooting.
- Prune any tree limbs or roots that are accidentally damaged by construction activities using proper arboricultural techniques within 48 hours of damage. Additional mitigation measures specific to trees, including Town of Collingwood By-law permitting requirements, may be required.
- Revegetate cleared areas as soon as reasonably possible using native plant species
- In the event that a Snapping Turtle is encountered within the limits of construction, construction staff will temporarily stop work in the immediate area to allow it to leave the area on its own. Workers must never threaten, harass or injure wildlife.
- Although no negative impacts to this species or habitat are anticipated at this time, buildings should be examined prior to construction activities, if conducted during the overall bird nesting period (April 1st to August 31st), to confirm species presence or absence.

With respect to archaeological resources, in the event the following situations are encountered during construction, the contractor should be advised to stop work immediately and take the appropriate actions:

- The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed archaeologist to carry out archaeological fieldwork.
- In the event that human remains are encountered, the proponent or person discovering human remains must immediately notify the police or coroner and the Registrar of the Bereavement Authority of Ontario.

15.3 Future Expansion Requirements

In order to accommodate Ultimate demands (101,069 m^3/d) for the Town of Collingwood, Town of New Tecumseth, Town of The Blue Mountains and Township of Clearview, the

following works represent the preferred design for future expansion of the Raymond A. Barker Water Treatment Plant:

- Install additional membranes in the new membrane building.
- Install an additional low-lift pump and micro-screen in the low-lift pumping station.
- Remove generator and tanks in existing generator building and replace with a larger generator and diesel day tanks.
- Provide additional outdoor fuel storage adjacent to the outdoor fuel storage provided in Phase 1.
- Construct a second new 808 m^3 below-ground CT chamber adjacent to the CT chamber constructed in Phase 1.
- Install additional UV reactor(s) in UV building constructed in Phase 1 (if necessary).
- Upgrade the Regional and Municipal high-lift pumps.
- Provide additional electrical maintenance holes, duct banks and electrical room if required.
- Carry out additional PLC, control wiring and SCADA replacements/upgrades as required.
- Complete sitework as required.

At the time of the next expansion, the demand and the actual intake capacity should be re-evaluated to determine if the intake can hydraulically accommodate the flow. In-water work is to be avoided.

In order to achieve the Ultimate capacity of the WTP expansion, a new PTTW will be required. Under section 2(3) of O. Reg. 205/18, an application for an amendment to a drinking water works permit / license, must be accompanied by a copy of a Notice (described in Clause 48 (1.1) (b) of O. Reg. 287/07) given to the owner of the drinking water system. This Notice must state that the SPA is satisfied and subsequently approved by MECP.

The recommended mitigation measures listed in Section 15.2 will also be undertaken for the Ultimate expansion.

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