TOWNSHIP OF PERTH EAST

MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT

PART 2

FOR UPGRADES TO THE SHAKESPEARE WELL SUPPLY

SCREENING REPORT

BMROSS
engineering better communities

TOWNSHIP OF PERTH EAST

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SCREENING REPORT

April 17, 2023
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File No. 21270

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TOWNSHIP OF PERTH EAST

MUNICIPALITY CLASS ENVIRONMENTAL ASSESSMENT – PART 2

FOR UPGRADES TO THE SHAKESPEARE WELL SUPPLY

SCREENING REPORT

1.0 INTRODUCTION

1.1 Purpose of the Report

The Township of Perth East owns and operates a drinking water system servicing approximately 160 properties in the community of Shakespeare. The source of water for the system is two bedrock wells. Historical arsenic concentrations in the well water typically range from 10 to 17 µg/L. On January 1, 2018, the province changed the standard for arsenic from 25 to 10 µg/L. The Ministry of the Environment, Conservation and Parks (MECP) has given the Township until September 30, 2023 to comply with the new standard.

The Township completed a Class Environmental Assessment (Class EA) in April 2021, which evaluated the potential impacts associated with required upgrades to the existing municipal well supply servicing the community of Shakespeare. The study process followed the procedures set out in the Municipal Class Environmental Assessment document, dated October 2000, as amended in 2007, 2011 and 2015 (Ref. 1). B.M. Ross and Associates Limited (BMROSS) was engaged to conduct the Class EA investigation on behalf of the Township.

The Class EA concluded that the preferred solution was to provide additional treatment to reduce the existing arsenic and iron concentrations in the treated water. Subsequent evaluations focussed on establishing the specific treatment technology. During those evaluations it was determined that the treatment system would benefit from on-site storage. Further, adequately sized treated water storage could potentially benefit the whole community by increasing system capacity and providing water for community level fire protection.

In January 2022 the Township initiated a second Class EA process to examine the feasibility of adding treated water storage to the Shakespeare Drinking Water System (DWS) in conjunction with treatment for arsenic and iron. The study process followed the procedures set out in the Municipal Class Environmental Assessment document, dated October 2000, as amended in 2007, 2011 and 2015 (Ref. 1).

The purpose of this report is to document the Class EA planning and design process followed for this project. The report includes the following major components:

- An overview of the general project area.
- A summary of the infrastructure deficiencies associated with the project area.
- A description of the alternative solutions considered to resolve the identified problems.
- A synopsis of the decision-making process conducted to select a preferred alternative.
- A detailed description of the preferred alternative.

1.2 Environmental Assessment Process

Municipalities must adhere to the Environmental Assessment Act of Ontario (EA Act) when completing road, sewer, or waterworks activities. The Act allows the use of Class Environmental Assessments for most municipal projects. A Class EA is an approved planning document which describes the process that proponents must follow in order to meet the requirements of the EA Act. The Class EA approach allows for the evaluation of alternatives to a project, alternative methods of carrying out a project, and identifies potential environmental impacts. The process involves mandatory requirements for public input.

Class EA studies are a method of dealing with projects which have the following important characteristics in common:

- They are recurring.
- They are usually similar in nature.
- They are usually limited in scale.
- They have a predictable range of environmental effects.
- They are responsive to mitigating measures.

If the Class EA planning process is followed, a proponent does not have to apply for formal approval under the EA Act. The development of this investigation has followed procedures set out in the Class EA. Figure 1.1 presents a graphical outline of the procedures. The Class EA planning process is divided into the following phases:

- Phase 1 – Problem/Opportunity identification.
- Phase 2 – Evaluation of alternative solutions to the defined problems/opportunities and selection of a preferred solution.
- Phase 3 – Identification and evaluation of alternative design concepts in the selection of a preferred design concept.
- Phase 4 – Preparation and submission of an Environmental Screening Report (ESR) for public and government agency review.
- Phase 5 – Implementation of the preferred alternative and monitoring of any impacts.

Throughout the Class EA process, proponents are responsible for the following key principles of environmental planning:

- Consultation with affected parties throughout the process.
- Examination of a reasonable range of alternatives.
- Consideration of effects on all aspects of the environment.
- Application of a systematic methodology for evaluation alternatives.
- Clear documentation of the process to permit traceability of decision-making.

1.3 Project Management

The Township is considered the project proponent under the terms of the Class EA document. The Township engaged BMROSS to carry out the Class EA study process on their behalf.

1.4 Classification of Project Schedules

Projects are classified into different project schedules according to the potential complexity and the degree of environmental impacts that could be associated with the project. There are four schedules:

- Schedule A – Projects that are approved with no need to follow the Class EA process.
- Schedule A+ – Projects that are pre-approved but require some form of public notification.
- Schedule B – Projects that are approved following the completion of a screening process that incorporates, as a minimum, Phases 1 and 2 of the Class EA process.
- Schedule C – Projects that are approved following the completion of the full Class EA process.

The Class EA process is self-regulatory, and municipalities are expected to identify the appropriate level of environmental assessment based upon the project they are considering.

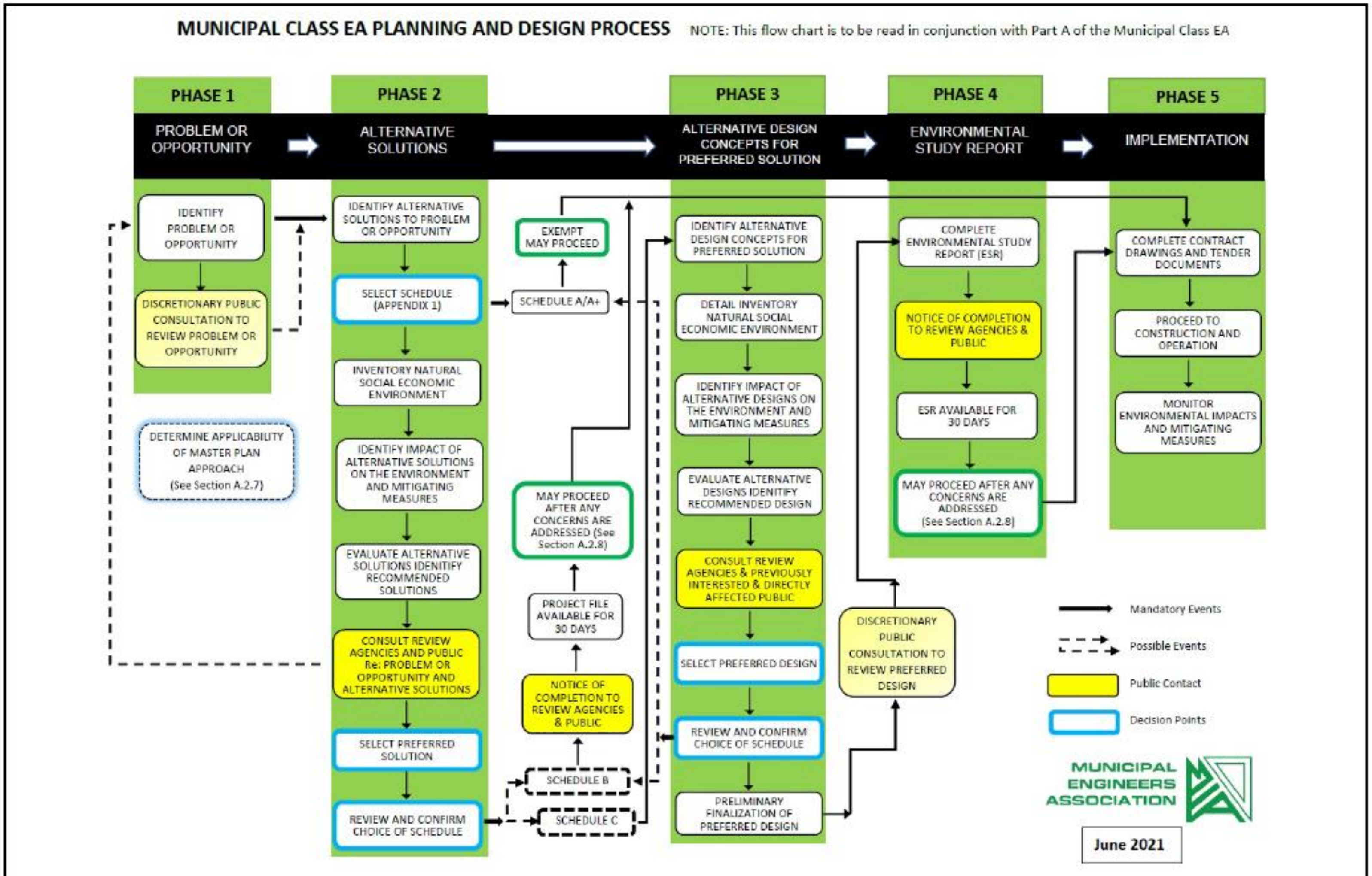
1.5 Screening Report

A Screening Report provides documentation of the decision-making process followed by the proponent of a project. Included in the report is: a description of the problem or opportunity, pertinent background information, the rationale for the selection of the preferred solution, descriptions of the environmental considerations and impacts, any mitigating measures that will be undertaken to minimize environmental effects, a description of the consultation process, and a description of any monitoring programs to be carried out during the construction phase. Upon completion, the Screening Report is made available for comment to the public and review agencies for a period of 30 calendar days.

1.6 Mechanism to Request a Higher Level of Environmental Assessment

Under the terms of the Class EA, the requirement to prepare an individual environmental assessment for approval is waived. However, if it is perceived that a project going through the Class EA process has significant environmental impacts, a person/party may convey their concerns to the Township of Perth East, for further consideration. A request may be made to the Ministry of the Environment, Conservation and Parks (MECP) for an order requiring a higher level of study (i.e. requiring an individual/ comprehensive EA approval before being able to proceed), or that conditions be imposed (e.g. require further studies), only on the grounds that the requested order may prevent, mitigate or remedy adverse impacts on constitutionally protected Indigenous and treaty rights. Requests made on any other grounds will not be considered by the Ministry of Environment Conservation and Parks.

Figure 1.1: Class EA Process



BMROSS engineering better communities	**TOWNSHIP OF PERTH EAST** MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT FOR WATER SYSTEM UPGRADES - SHAKESPEARE **CLASS EA PROCESS**	DATE DEC. 07, 2022	PROJECT No. 21270
		SCALE None	FIGURE No. 1.1

2.0 BACKGROUND REVIEW

2.1 Class EA Approach

The Township initiated a second formal Class EA process in January 2022 to examine the feasibility of adding treated water storage to the Shakespeare Drinking Water System (DWS) in conjunction with treatment for arsenic and iron. The associated investigations followed the environmental screening process prescribed for Schedule B activities under the Class EA document. In general, the screening process required to conduct a Class EA incorporates these primary components:

- Background Review and Problem Definition
- Identification of Practical Solutions
- Evaluation of Alternatives
- Project Recommendations and Implementation

The following sections of this report document the findings for each stage of the Class EA. Figure 2.1 illustrates the general tasks associated with the Schedule B screening process.

2.2 Background Review

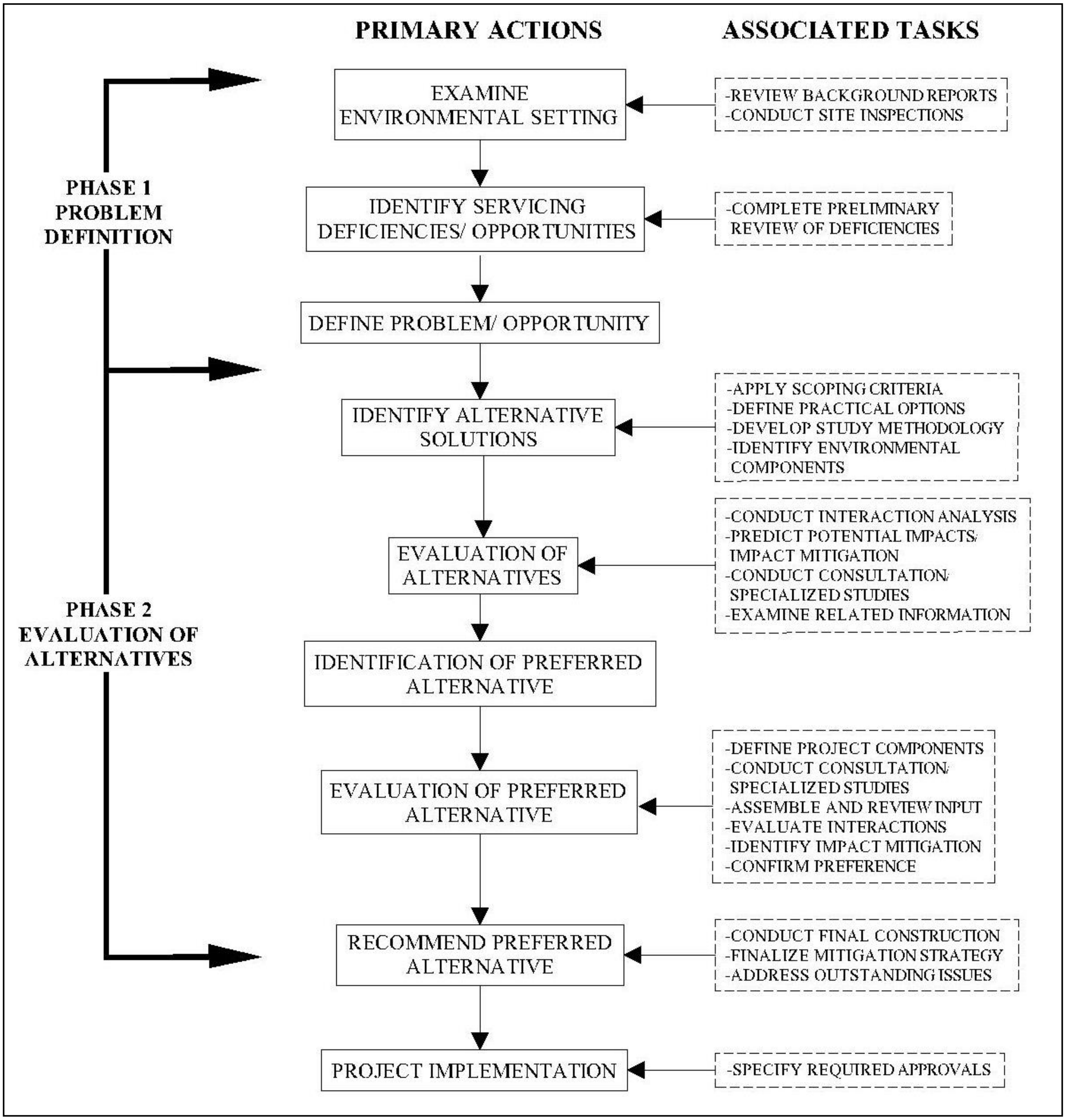
A background review was carried out to characterize the project study area and to identify those factors that could influence the selection of alternative solutions to the defined problems. The background review for this Class EA process incorporated these activities:

- A general description of the study area and the Township of Perth East.
- Assembly of information on the environmental setting and the existing infrastructure.
- Review of previous studies and reports pertaining to the project study area.

A desktop analysis of the project setting was completed as part of the background review. The following represent the key sources of information for this analysis:

- Ministry of Natural Resources and Forestry (MNRF). Natural Heritage Information Centre (website).
- Township of Perth East. Files and discussions with staff.
- Environment Canada. Species at Risk Public Registry.
- Upper Thames River Conservation Authority (UTRCA). Watershed Report Cards.
- UTRCA Source Water Protection Terms of Reference – Thames River Source Protection Area, Assessment Report and Proposed Source Protection Plan.

Figure 2.1: Class EA Schedule B Screening Process and Related Tasks



2.3 Description of Study Area

2.3.1 County of Perth

The County of Perth is the upper-tier municipal government for a jurisdiction comprised of four member municipalities; the townships of Perth East and Perth South and the municipalities of North Perth and West Perth. In total, Perth County has a population of more than 81,000 (Ref. 2) permanent residents and a land base of approximately 2,160 km^2. In general, the jurisdiction is comprised of several urban settlements dispersed throughout a predominately rural landscape. Two large urban centres, the City of Stratford and the Town of St. Marys are independent municipalities situated within the geographical boundary of Perth County.

2.3.2 Township of Perth East

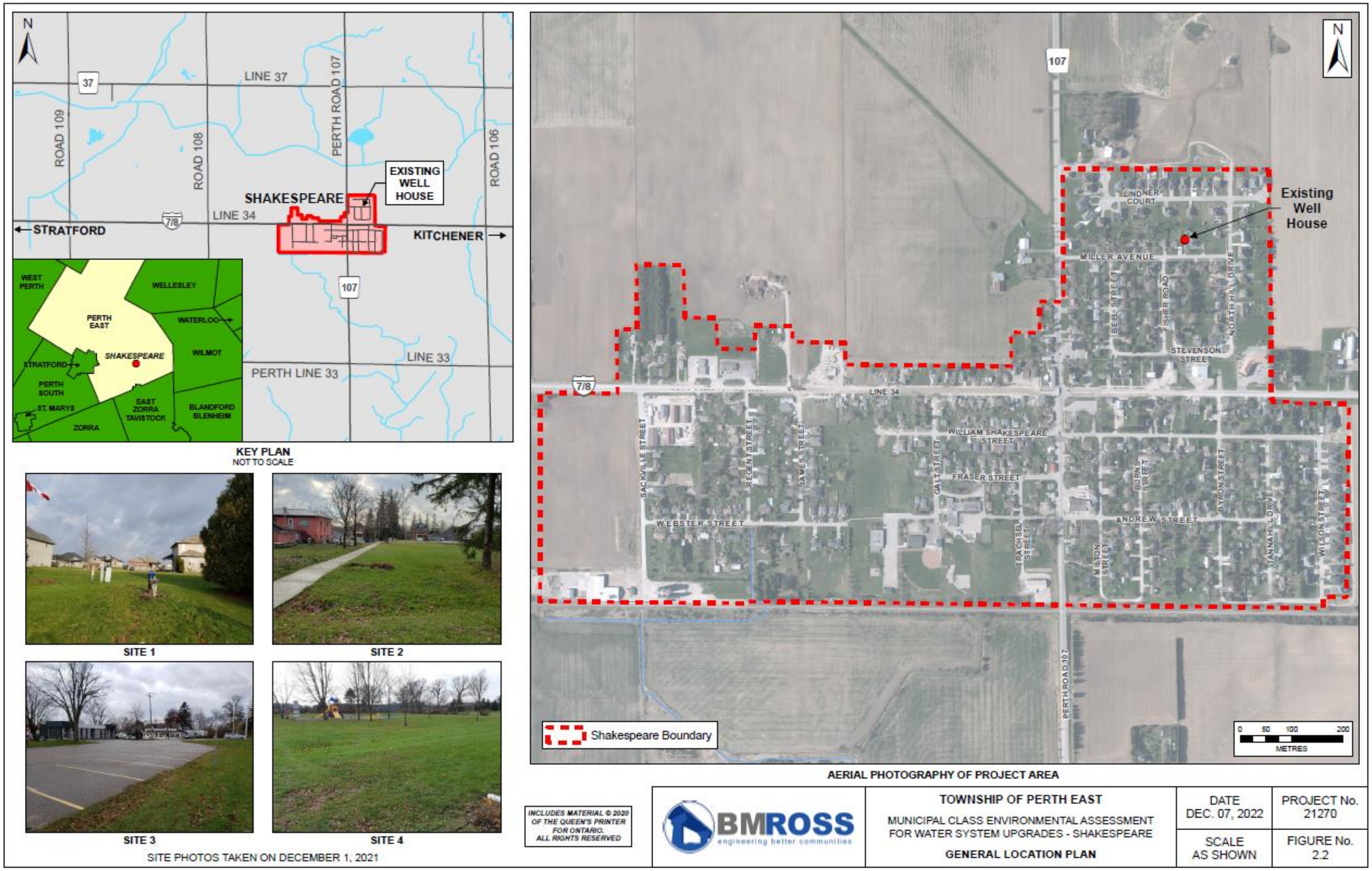
The Township of Perth East comprises the central-east region of the County of Perth, in a predominantly rural area of Southwestern Ontario. Perth East was formed in 1998 through amalgamation of the former townships of Mornington, Ellice, North Easthope, South Easthope and the Village of Milverton. Located north of the City of Stratford and east of Kitchener-Waterloo, Perth East has benefited from population growth associated with proximity to these larger urban centres. The two largest settlement areas within the Township are; Milverton, which is located in the north part of the Township, and Shakespeare, situated on Provincial Highway 7/8 between Stratford and Kitchener. These are the only urban settlements in the Township currently serviced by municipal sewage and water systems.

2.3.3 Community of Shakespeare

The community of Shakespeare is located in the southeast portion of Perth East with an estimated 2020 population of approximately 930. Located 10 km east of Stratford and 25 km west of Kitchener-Waterloo the settlement is situated at the intersection of Provincial Highway 7/8 and Perth County Road 107. Shakespeare was settled in the mid-1800s during development of the Huron Tract when the Huron Road (Highway 7/8) was the main road used by settlers to access new lands in the west. Shakespeare is best known for its antique shops and quaint shopping district located along the Highway 7/8 corridor. Predominately a rural community, Shakespeare has a land area of approximately 95 ha and also supports a local public school and community centre. Figure 2.2 illustrates the location of Shakespeare and the Township of Perth East.

Portions of the community of Shakespeare are serviced by a Township-owned drinking water system (DWS). As of the end of 2022, the system served 168 customers. The community has approximately 400 developed properties.

Figure 2.2: General Location Plan



2.3.4 Project Study Area

(a) General

The existing Shakespeare Drinking Water System serves approximately 168 properties distributed throughout the community, but primarily north of Highway 7/8 and also in the southeast quadrant. The existing municipal well house is located in the northeast corner of Shakespeare within the Miller Ave. residential subdivision. Well 1 was initially drilled to service a new subdivision development in this area before eventually being taken over by the Township and used to service other areas of the community.

The existing well house is located on the north side of Miller Ave. between 2172 and 2178. The property is described as Block A, Plan 491, Block 11, Plan 44M-25, and Part 2, Plan 44R-1776. Well 2 was constructed on the same site in 2017 to serve as a back-up for Well 1. The well house is a brick building with approximate dimensions of 5m x 7m. A diesel generator is located adjacent to the building to provide a back-up power supply. The site is surrounded by existing residential properties on three sides, and adjacent vegetation consists of grass and a few trees and shrubs. There are no natural features present. A photo of the well house is included below in Figure 2.3

Figure 2.3: View of Well House and Generator Looking Northeast from Front of Building

The current Class EA is examining the feasibility of providing treated water storage to operate in conjunction with the existing well supply and the arsenic/iron treatment system. Because treatment and storage can be remote from the supply location, it could be at some other location in the community. For that reason, the project study area is considered to be the whole of the community of Shakespeare.

(b) Possible Treatment Locations

Following initiation of the Class EA, the Township identified four locations within the community, in addition to the existing site, that might serve as possible sites for a water treatment facility. With one exception the four sites are municipally-owned and are located within proximity to the existing water distribution network. Figure 2.4 illustrates the location of the four sites. Additional evaluation of the locations is addressed later in the report.

2.4 Natural Setting

2.4.1 General Physiography

Topographic relief in Perth County is relatively minimal, with the exception of moraine ridges which extend across various parts of the region. Prominent topographic features in the County are largely the result of glacial deposition (moraines, eskers) and erosion (river valleys) during the Quaternary Period. The Township of Perth East is primarily situated within the Stratford Till Plain geologic formation, which incorporates a land base of approximately 3,550 km^2 extending across the counties of Middlesex, Huron, Perth and Wellington (Ref. 3). The till plain is characterized as an area of ground moraines interrupted by several terminal moraines. The till in the Stratford Till Plain formation is predominately brown calcareous silty clay (being derived from the Huron Ice Lobe) (Ref. 4). Shakespeare is located within the North Woodstock sub-watershed of the Thames River, which is administered by the Upper Thames River Conservation Authority. A copy of the watershed report card is included in Appendix A.

The community of Shakespeare is located within the northwest portion of the Tavistock Till, which is characterized by topography that is predominantly a relatively flat, undulating plain with a few breaks provided by several moraines located in the north portion of the physiographic region. The soils surrounding the built-up area of Shakespeare consist of Perth Silt Loam, with imperfect soil drainage (Ref. 4).

2.4.2 Significant Natural Heritage Features

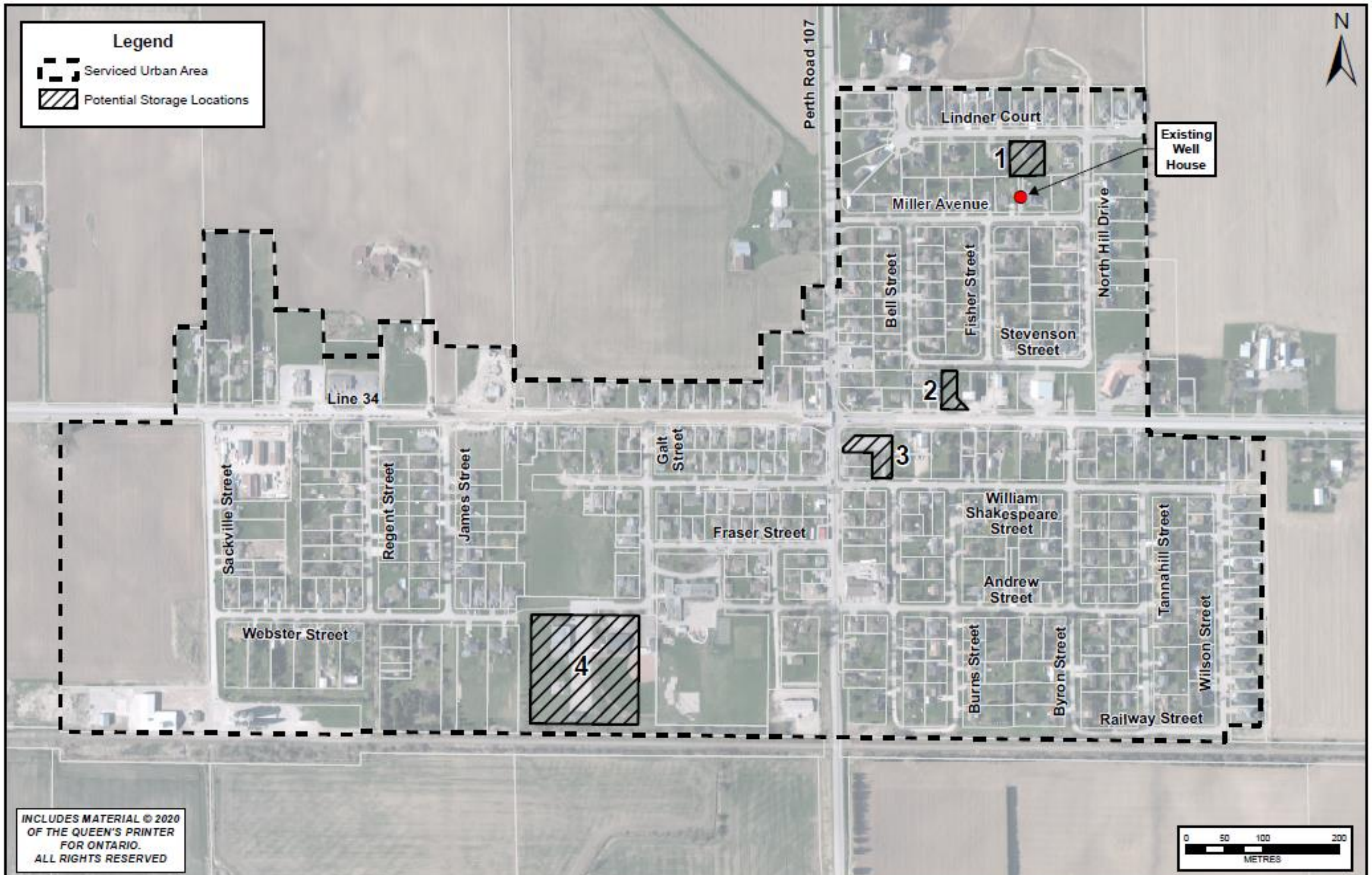
A review of Natural Heritage Area mapping provided by the Ministry of Natural Resources and Forestry indicates that within 5 km of Shakespeare there is:

- One Earth Science ANSI, the East Hope Moraine, located north of Shakespeare.
- One locally significant wetland, the Shakespeare Hills/Avon Banks Swamp located immediately north of Shakespeare.

Beyond a 5 km radius, several significant features exist:

- The Little Lakes Bog and Swamp Forest Complex (ANSI, Life Science) is located due west and the Phillipsburg Southwest Wetland Complex (ANSI, Life Science), is located northeast of Shakespeare.

Figure 2.4: Potential Storage Locations



BMROSS engineering better communities	TOWNSHIP OF PERTH EAST MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT FOR WATER SYSTEM UPGRADES - SHAKESPEARE POTENTIAL STORAGE LOCATIONS	DATE DEC. 07, 2022	PROJECT No. 21270
		SCALE AS SHOWN	FIGURE No. 2.4

Given that the study area and potential treatment/storage locations are within the urban settlement limits, and the separation distance from these significant features, it is anticipated that there will be no impact as a result of the proposed well upgrade project. However, a more detailed assessment was undertaken during the Assessment of Alternatives phase of the Class EA. Figure 2.5 illustrates the natural heritage features located adjacent to Shakespeare.

2.4.3 Species at Risk

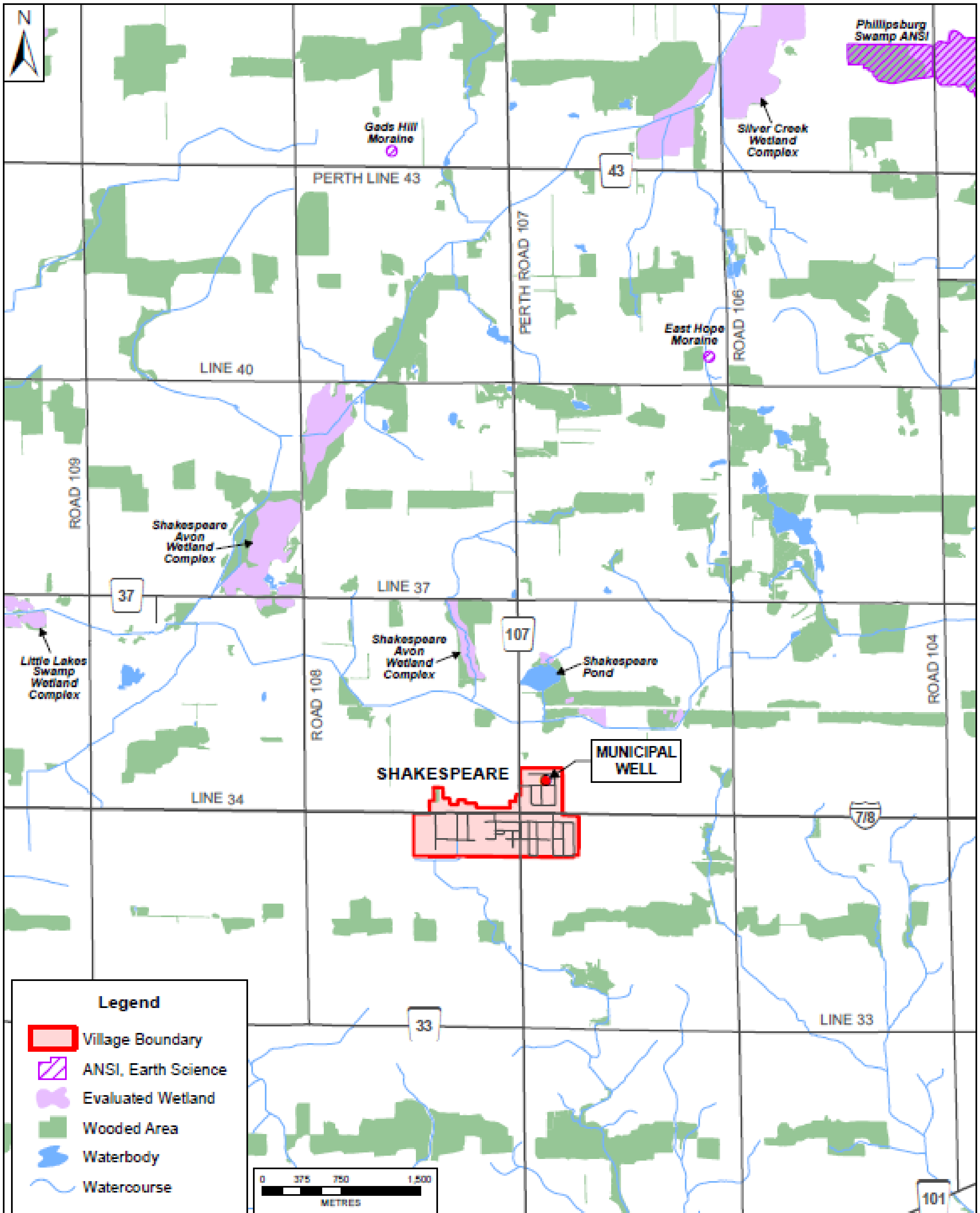
An evaluation for the presence of significant species and their associated habitats within the study area has been incorporated into the project planning process. A review of available information on species and habitat occurrences determined that the study area may contain species and/or associated habitats that are legally protected under provincial and federal species at risk legislation. The protection for species at risk and their associated habitats is directed by the following federal and provincial legislation:

- The federal *Species at Risk Act, 2002* (SARA) provides for the recovery and legal protection of listed wildlife species and associated critical habitats that are extirpated, endangered, threatened or of special concern and secures the necessary actions for their recovery on lands not federally owned. Only aquatic species, and bird species included in the Migratory Bird Convention Act (1994), are legally protected.
- The provincial *Endangered Species Act, 2007* (ESA) provides legal protection of endangered and threatened species and their associated habitat in Ontario. Under the legislation, measures to support their recovery are also defined.

Based on the information available for the occurrence of species at risk and their associated habitats from the following sources, a summary of federally and provincially recognized species, with the potential to be present within the project study areas, are listed in Table 2.1:

- Ministry of Natural Resources and Forestry, *Species at Risk by Area* (Ref. 5).
- Natural Heritage Information Centre, *Make a Natural Heritage Map* (Ref. 6).
  - Study area located within NHIC 1 km grid: 17NJ1302 (north of Shakespeare).
- Environment Canada, Species at Risk Public Registry. SARA Schedule 1 Species List (Ref. 7).

Figure 2.5: Natural Heritage Features



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		SCALE 1 : 50,000	FIGURE No. 2.5

Table 2.1: Potential Species at Risk within Perth County and the Study Area

	Species		Status Designation		Suitable Habitat in the Study Area
	Common Name	**Scientific Name**	***SARA**** **Schedule 1 (Federal)**	**ESA**** **(Provincial)**	
Birds	Barn Swallow	*Hirundo rustica*	Threatened	Threatened	No
Birds	Black Tern	*Chlidonias niger*	-	Special Concern	No
Birds	Bobolink	*Dolichonyx oryzivorus*	-	Threatened	Potential – depends on crop
Birds	Chimney Swift	*Chaetura pelagica*	Threatened	Threatened	Potential – cavities
Birds	Eastern Meadowlark	*Sturnella magna*	-	Threatened	Potential – depends on crop
Birds	Least Bittern	*Ixobrychus exilis*	Threatened	Threatened	No
Birds	Northern Bobwhite	*Colinus virginianus*	Endangered	Endangered	No
Birds	Red-headed Woodpecker	*Melanerpes erythrocephal us*	Endangered	Endangered	No
Birds	Short-eared Owl	*Asio flammeus*	Special Concern	Special Concern	No
Birds	Wood Thrush	*Hylocichla mustelina*	Threatened	Special Concern	No
Birds	Yellow Breasted Chat	*Icteria virens*	Special Concern	Endangered	No
Fish and Mussels	Black Redhorse	*Moxostoma duquesneiIcte ria virens*	Special Concern	Threatened	No
Fish and Mussels	Northern Brook Lamprey	*Ichthyomyzon fossor*	Special Concern-	Special Concern	No
Fish and Mussels	Northern Sunfish	*Lepomis peltastes*	Special Concern	Special Concern	No
Fish and Mussels	Rainbow	*Villosa iris*	Special Concern	Special Concern	No
Fish and Mussels	Rayed Bean	*Villosa fabalis*	Endangered	Endangered	No
Fish and Mussels	Reside Dace	*Clinostomus elongatus*	Endangered	Endangered	No
Fish and Mussels	Silver Shiner	*Notropis photogenis*	Endangered	Threatened	No

	Species		Status Designation		Suitable Habitat in the Study Area
	Common Name	**Scientific Name**	***SARA** Schedule 1 (Federal)**	**ESA** (Provincial)**	
	Wavy-rayed Lampmussel	*Lampsilis fasciola*	Special Concern	Threatened	No
Insects	Gypsy Cuckoo Bumble Bee	*Bombus bohemicus*	Endangered	-	No
Insects	Yellow-banded Bumble Bee	*Bombus terricola*	Special Concern	Special Concern	No
Plants & Lichens	Black Ash	*Fraxinus nigra*	-	Endangered	No
Plants & Lichens	Butternut	*Juglans cinerea*	Endangered	Endangered	No
Plants & Lichens	Green Dragon	*Arisaema dracontium*	-	Special Concern	No
Plants & Lichens	Willowleaf Aster	*Symphyotrichum praealtum*	Threatened	Threatened	No
Reptiles and Amphibians	Eastern Milksnake	*Lampropeltis Triangulum*	Threatened	-	No
Reptiles and Amphibians	Midland Painted Turtle	*Chrysemys picta marginata*	Special Concern	-	No
Reptiles and Amphibians	Northern Map Turtle	*Graptemys geographica*	Special Concern	Special Concern	No
Reptiles and Amphibians	Snapping Turtle	*Chelydra serpentina*	Special Concern	Special Concern	No
Reptiles and Amphibians	Spiny Softshell	*Apalone spinifera spinifera*	Threatened	Endangered	No
Reptiles and Amphibians	Western Chorus Frog	*Pseudacris maculata*	Threatened	-	No

Species in **bold** are those identified as potentially occurring within 1km of the study area based on historical observation records.

Notes:
*As determined by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) under the Species at Risk Act (SARA), 2002 legislation. Species listed are designated as 'Schedule 1' species and are legally protected under the Act.
**As determined by the Committee on the Status of Species at Risk in Ontario (COSSARO) under the Endangered Species Act (ESA), 2007 legislation.

Shakespeare is an urban environment with few natural features present in the vicinity of the potential treatment/storage locations. The relevant species list was provided by the MNRF for the entire County which incorporates a large area and a wide variety of environs that include terrestrial and aquatic habitat. Based on review of the MNRF NHIC data, the following historical observations within the study area were noted:

- One historical observation of Chimney Swift (*Chaetura pelagica*) (1995).
- Observations of Snapping Turtle (*Chelydra serpentina*) (17NJ1301 & 17NJ1302).
- Observations of Eastern Meadowlark (*Sturnella magna*) (17NJ1302 & 17NJ1202).
- Observations of Bobolink (*Dolichonyx oryzivorus*) (17NJ1302 & 17NJ1202).

2.4.4 Breeding Birds

The Atlas of Breeding Birds of Ontario was used to identify the bird species with confirmed, probable and possible breeding habitat in proximity to the study area (Ref. 8). The study area is within the 100 km^2 area identified by the Atlas as Square 17NJ10, in Region 7: Waterloo Region.

- 17NJ10: A total of 37 birds have confirmed breeding status in the survey region, including Barn Swallow and Bank Swallow, species at risk in Ontario. An additional 34 species were categorized as having probable breeding status, including Eastern Wood-Pewee, a species at risk in Ontario. Eleven species are considered to have possible breeding status in the area (Bird Studies Canada, 2022).

Further analysis was conducted during the assessment of alternatives phase of the Class EA process in order to determine if suitable habitat for any of the identified species occurs in the vicinity of the study area.

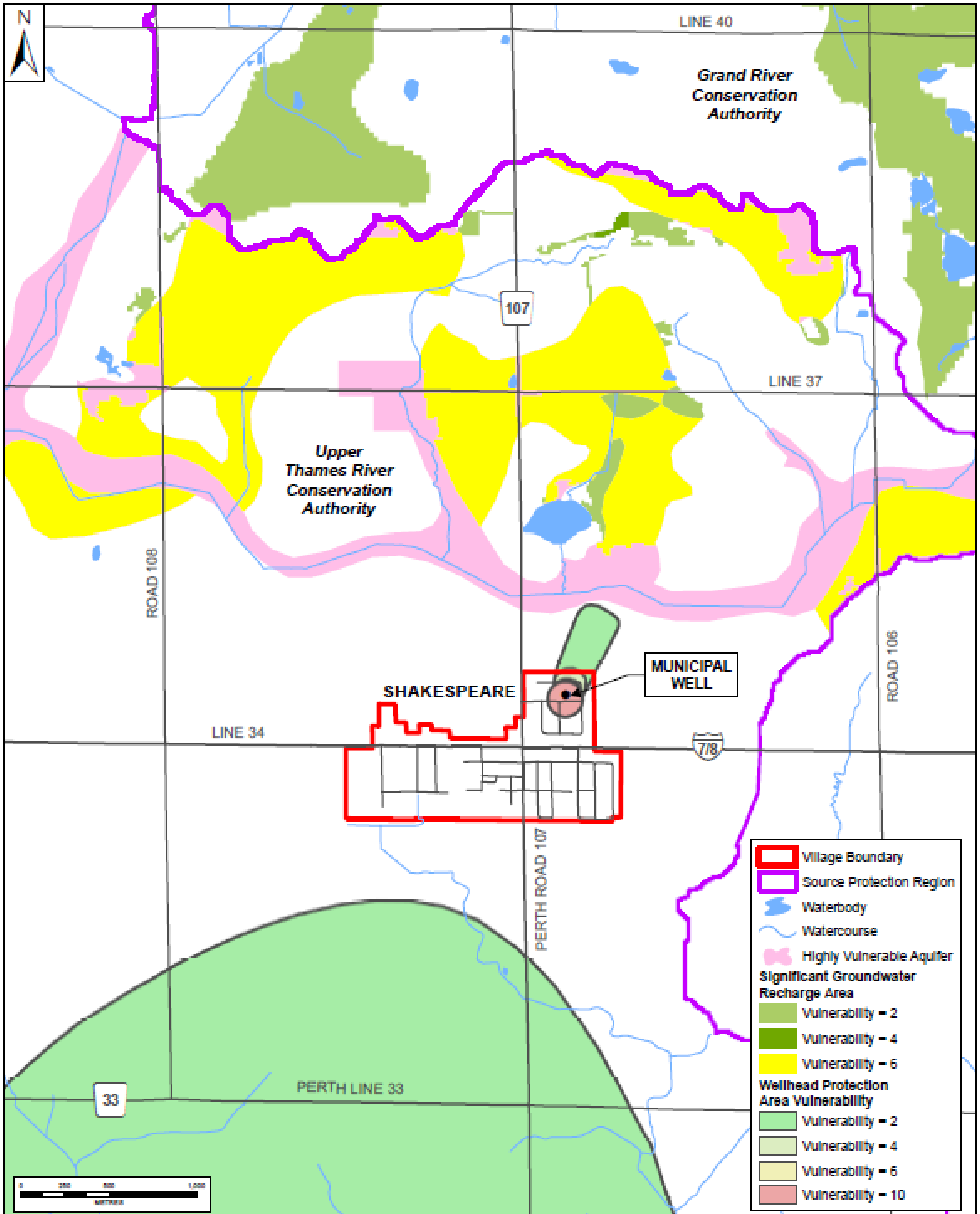
2.5 Clean Water Act

The intent of the Clean Water Act (CWA), 2006, is to "*protect existing and future drinking water*" sources in Ontario. Under the Act, source water protection areas and regions were established, giving Conservation Authorities the duties and powers of a drinking water source protection authority (Ref. 9).

Shakespeare is located within the Thames-Sydenham and Region Source Protection Region which covers an area of approximately 10,826 m^2 (Ref. 10). The Source Protection Region includes watersheds managed by the Upper Thames River Conservation Authority (UTRCA), Lower Thames Valley Conservation Authority and the St. Clair Region Conservation Authority.

The existing wells have a Wellhead Protection Area (WHPA) extending northeast from the community boundary which identifies vulnerable areas that could potentially affect the water supply. Given the depth of the aquifer, the area has been judged to have a low vulnerability. Figure 2.6 shows the location of the wells and well house, the associated WHPA, and other vulnerable areas in the vicinity of the wells.

Figure 2.6: Source Water Protection



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		SCALE AS SHOWN	FIGURE No. 2.6

2.6 Climate Change

As part of the Class Environmental Assessment process, impacts associated with climate change must be evaluated. Some of the phenomena associated with climate change that must be considered include:

- Changes in the frequency, intensity and duration of precipitation, wind and heat events.
- Changes in soil moisture.
- Changes in sea/lake levels.
- Shifts in plant growth and growing seasons.
- Changes in the geographic extent of species ranges and habitat.

There are two approaches that can be utilized to address climate change in project planning. These are as follows:

1) Reducing a project's impact on climate change (climate change mitigation). For example:
    a. Reducing the impact of greenhouse gas emissions related to the project.
    b. Determining if there are alternative methods of completing the project that would reduce any adverse contributions to climate change.
2) Increasing the project's and local ecosystem's resilience to climate change (climate change adaptation). For example:
    a. Determining how vulnerable the project is to climate-related severe events.
    b. Considering alternative methods of carrying out the project that would reduce the negative impacts of climate change on the project.

Through the evaluation of alternatives phase of the Class EA, consideration of each of these approaches was undertaken and included in the final determination of the preferred approach to completing the project.

2.7 Socio-Economic Environment

2.7.1 Land Uses

As previously noted, Shakespeare is primarily a residential community with highway commercial uses located along the Highway 7/8 corridor and several institutional uses scattered throughout the community, including a primary school and community centre. A fire hall is located on Highway 7/8 near the east limit and the sewage treatment facility is situated in the southwest part of the settlement near the community centre. Limited industrial/commercial activities are located in the south and southwest.

2.7.2 Land Use Planning

Shakespeare is governed by the Perth County Official Plan as Perth East does not have a lower-tier Official Plan for any communities other than Milverton. Several policies contained within the plan may have a bearing on the current project.

(a) Provincial Policy Statement

The Provincial Policy Statement (PPS - 2020) was issued under Section 3 of Planning Act and provides policy direction on matters of provincial interest. A number of the policies contained within the PPS have relevance to the current project. Excerpts from the Policy document are included below as follows:

Section 1.6 Infrastructure and Public Service Facilities

1.6.1 Infrastructure and public service facilities shall be provided in an efficient manner that prepares for the impacts of a changing climate while accommodating projected needs.

Planning for infrastructure and public services facilities shall be coordinated and integrated with land use planning and growth management so that they are:

a) financially viable over their life cycle, which may be demonstrated through asset management planning; and

b) available to meet current and projected needs.

1.6.2 Planning authorities should promote green infrastructure to complement infrastructure.

Section 1.6.6 Sewage, Water and Stormwater

1.6.6.1 Planning for sewage and water services shall:

a) accommodate forecasted growth in a manner that promotes the efficient use and optimization of existing:

1. municipal sewage services and municipal water services; and

2. private communal sewage services and private communal water services, where municipal sewage services and municipal water services are not available or feasible;

b) ensure that these systems are provided in a manner that:

1. can be sustained by the water resources upon which such services rely;

2. prepares for the impacts of a changing climate;

3. is feasible and financially viable over their lifecycle; and

4. protects human health and safety, and the natural environment;

c) promote water conservation and water use efficiency;

d) integrate servicing and land use considerations at all stages of the planning process; and

e) be in accordance with the servicing hierarchy outlined through policies 1.6.6.2, 1.6.6.3, 1.6.6.4, and 1.6.6.5. For clarity, where municipal sewage services and municipal water services are not available, planned or feasible, planning authorities have the ability to consider *the use of the servicing options set out through policies 1.6.6.3, 1.6.6.4, and 1.6.6.5 provided that the specified conditions are met.*

1.6.6.2 Municipal sewage services and municipal water services are the preferred form of servicing for settlement areas to support protection of the environment and minimize potential risks to human health and safety. Within settlement areas with existing municipal sewage services and municipal water services, intensification and redevelopment shall be promoted wherever feasible to optimize the use of the services.

1.6.6.3 Where municipal sewage services and municipal water services are not available, planned or feasible, private communal sewage services and private communal water services are the preferred form of servicing for multi-unit/lot development to support protection of the environment and minimize potential risks to human health and safety.

1.6.6.4 Where municipal sewage services and municipal water services or private communal sewage services and private communal water services are not available, planned or feasible, individual on-site sewage services and individual on-site water services may be used provided that site conditions are suitable for the long-term provision of such services with no negative impacts. In settlement areas, individual on-site sewage services and individual on-site water services may be used for infilling and minor rounding out of existing development.

At the time of the official plan review or update, planning authorities should assess the long-term impacts of individual on-site sewage services and individual on-site water services on the environmental health and the character of rural settlement areas. Where planning is conducted by an upper-tier municipality, the upper-tier municipality should work with the lower-tier municipalities at the time of the Official Plan review or update to assess the long-term impacts of individual on-site sewage services and individual on-site water services on the environmental health and the desired character of rural settlement areas and the feasibility of other forms of servicing set out in policies 1.6.6.2 and 1.6.6.3.

1.6.6.5 Partial services shall only be permitted in the following circumstances:

a) Where they are necessary to address failed individual on-site sewage services and individual on-site water services in existing development; or

b) within settlement areas, to allow for infilling and minor rounding out of existing development on partial services provided that site conditions are suitable for the long-term provision of such services with no negative impacts.

Where partial services have been provided to address failed services in accordance with subsection (a), infilling on existing lots of record in rural areas in municipalities may be permitted where this would represent a logical and financially viable connection to the existing partial service and provided that site conditions are suitable for the long-term provision of such services with no negative impacts. In accordance with subsection (a), the extension of partial services into rural areas is only permitted to address failed individual on-site sewage and individual on-site water services for existing development.

1.6.6.6 Subject to the hierarchy of services provided in policies 1.6.6.2, 1.6.6.3, 1.6.6.4, and 1.6.6.5, planning authorities may allow lot creation only if there is confirmation of sufficient reserve sewage system capacity and reserve water system capacity within municipal sewage services and municipal water services or private communal sewage services and private communal water services. The determination of sufficient reserve sewage system capacity shall include treatment capacity for hauled sewage from private communal sewage services and individual on-site sewage services.

Section 2.2 Water

2.2.1 Planning authorities shall protect, improve or restore the quality and quantity of water by:

- *a) using the watershed as the ecologically meaningful scale for integrated and long-term planning, which can be a foundation for considering cumulative impacts of development;*
- *b) minimizing potential negative impacts, including cross-jurisdictional and cross-watershed impacts;*
- *c) evaluating and preparing for the impacts of a changing climate to water resource systems at the watershed level;*
- *d) identifying water resource systems consisting of ground water features, hydrologic functions, natural heritage features and areas, and surface water features including shoreline areas, which are necessary for the ecological and hydrological integrity of the watershed;*
- *e) maintaining linkages and related functions among ground water features, hydrologic functions, natural heritage features and areas, and surface water features including shoreline areas;*
- *f) implementing necessary restrictions on development and site alteration to:*
    - *a. protect all municipal drinking water supplies and designated vulnerable areas; and*
    - *b. protect, improve or restore vulnerable surface and ground water, sensitive surface water features and sensitive ground water features, and their hydrologic functions;*
- *g) planning for efficient and sustainable use of water resources, through practices for water conservation and sustaining water quality;*
- *h) ensuring consideration of environmental lake capacity, where applicable; and*

i) *ensuring stormwater management practices minimize stormwater volumes and contaminant loads, and maintain or increase the extent of vegetative and pervious surfaces.*

(b) Perth County Official Plan

Section 6.4.7 of the County Plan contains policies that are intended to guide land use change in the urban areas of Atwood and Shakespeare (Ref.11).

"*Section 6.4.7 Servicing Requirements*

Not all of the lands in the settlement areas are serviced with municipal water supply. When considering applications for new development the preferred servicing option is connection to municipal water and sewer services. The following policies shall apply to all development or redevelopment:

6.4.7.1 All new development shall be connected to the municipal sanitary sewer system.

6.4.7.2 New development shall be directed to areas that allow for extension to existing water supply, sanitary sewerage and storm water systems in an economic and practical manner.

6.4.7.3 New sanitary and storm sewers will be over-sized according to the level of development anticipated by the local municipality relative to the service area.

6.4.7.4 Development proceeding by plan of subdivision or multiple unit developments shall be connected to the municipal water supply system.

6.4.7.5 Where municipal water is not available or feasible, small scale development or redevelopment, including consents for the creation of new residential lots, may be permitted on private wells subject to the approval of the local municipality.

6.4.7.6 Costs for upgrades to municipal water, sanitary sewers and storm sewer systems to service new developments shall be paid for by the developer."

Given the proximity of Shakespeare to adjacent growth centres in Stratford and Kitchener-Waterloo, the potential for new residential development in Shakespeare is high. Based on the policies above, all new development will need to be connected to municipal water and sewage. Therefore, any upgrades to the well supply will need to consider the potential increase in demand.

(c) Perth East Zoning By-Law (ZBL)

The Township of Perth East By-Law No. 30 of 1999, consolidated March 1. 2019, was consulted to determine applicable regulations and permitted land uses for the potential treatment/storage locations Table 2.2 shows the applicable zoning regulations for the four locations. Copies of relevant policies are shown in Appendix B.

Table 2.2: Shakespeare Zoning Information

Parcel	Current Zone Designation	Setbacks	Existing Water Systems
1 – 2175 Lindner Court	Residential Medium Density - R2	Lot Area (min): 460m^2 Lot Frontage (min): 15m Interior Side Yard (min) – 2.4m Front Yard (min): 7.5m Exterior Side Yard (min): 7.5m Rear Yard (min): 7.5m Lot Coverage: 40% Building Height (max): 10m	Within existing water servicing area.
2 – 2184 Line 34	Residential Medium Density - R2	Lot Area (min): 460m2 Lot Frontage (min): 15m Interior Side Yard (min) – 2.4m Front Yard (min): 7.5m Exterior Side Yard (min): 7.5m Rear Yard (min): 7.5m Lot Coverage: 40% Building Height (max): 10m	Within existing water servicing area.
3-Corner of Perth Road 107 & Line 34	Commercial - C1	Lot Area (min): 200 m^2 Lot Frontage (min): 6m Front Yard (min): 3m Interior Side Yard (min): 1.2m Exterior Side Yard (min): 3m Rear Yard (min): 6m Lot Coverage (max): none Building Height (max): 10m	Within existing water servicing area.
4 – 3976B Galt Street	Institutional - IN	Lot Area (min): 900m^2 Lot Frontage (min): 15m Front Yard (min): 7.5m Interior Side Yard (min): 4.5m Exterior Side Yard (min): 7.5m Rear Yard (min): 7.5m Lot Coverage (max): 40% Building Height (max): 12m	Not within existing water servicing area.

Section 5.23 of the Perth East ZBL provides requirements regarding public uses, utilities, and services. It notes that provisions in this By-law shall not prevent the use of a lot and/or building or structure or the construction of a building or structure for the purposes of public service. The construction of a building or structure must comply with provisions in the zone. In any Residential Zone, open goods, materials, or equipment is not permitted and constructed buildings and structures should be designed, constructed, and maintained in accordance with neighbouring residential buildings.

Once a preferred location is identified for the proposed treatment/storage facility, existing zoning provisions will be reviewed to confirm requirements. If necessary, a change to the existing zoning will be implemented.

2.7.3 Population and Growth

(a) Existing Population

Little historic data is available for the community's population because Shakespeare was not an incorporated village or a recognized census subdivision by Census Canada. Therefore, the Perth East Public Works customer database was utilized to determine household numbers for the community.

(b) Water and Sewage Customers

The Public Works Department provided the following information, effective December 2022:

- Total No. of Water Customers in Shakespeare - 168 (152 Residential, 16 Non-residential).
- Total No. of Wastewater Customers in Shakespeare – 399.
- Total No. of Customers in Shakespeare served only by sewers – 231.

(c) Growth Projections

The existing water system currently serves approximately 40% of the community.

Treated water storage would allow the existing supply to serve more of the community than the wells currently can because the wells will only have to satisfy the maximum day demand, not the peak rate as they currently do.

The County of Perth is undergoing an update of its Official Plan. Preliminary documents (Ref. 13) indicate that Shakespeare has some capacity for infill development but real growth may be constrained because the existing communal water system does not serve the whole community. In May of 2021 it was expected that growth in the 2020 to 2045 planning period would be in the order of 55 residential units.

Given the uncertainty regarding growth it was decided to base the conceptual design of the facilities on the capacity of the existing well supply rather than a growth projection. As will be discussed later in the ESR, the existing supply can serve different populations depending on whether storage is provided or not.

2.8 Cultural Heritage Environment

Cultural Heritage Resources include archaeological resources, built heritage resources and cultural heritage landscapes.

2.8.1 Archaeological Resources

A Stage 1-2 archaeological assessment (AA) (under Project Information Form number P1078-0182-2023) will be completed by Timmins Martelle Heritage Consultants Inc. A Stage 1-2 AA consists of a review of geographic, land use and historical information for the property and relevant surrounding area, contacting MCM to find out whether, or not, there are any known archaeological sites on or near the property, and a site visit. Its purpose is to identify areas of archaeological potential and further archaeological assessment (e.g. Stage 3-4) is necessary.

2.8.2 Built Heritage Resources and Cultural Heritage Landscapes

The screening checklist, Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes, developed by the Ministry of Tourism, Culture and Sport (now MCM), was completed as part of the project file (see Appendix C). The study area was determined to have low potential for built heritage resources and cultural heritage landscapes. Therefore, no technical cultural heritage studies have been undertaken.

2.9 Shakespeare Drinking Water System

2.9.1 Description

Portions of the community of Shakespeare are serviced by a Township-owned drinking water system (DWS). The system currently (January 2023) serves approximately 168 customers. The community has approximately 400 developed properties (based on the number of sewage customers).

The DWS operates under Municipal Drinking Water License (MDWL) No. 053-101, Issue No. 8 (Ref. 13) and Drinking Water Works Permit No. 053-201.

The original system was constructed in approximately 1994 to 1997. A second well was constructed in 2017 and has been brought on-line as a back-up supply. The second well does not increase system capacity but improves redundancy. Figure 2.7 shows the well and distribution system. Table 2.3 summarizes the approved water supply capacity for the Shakespeare DWS.

Table 2.3: Shakespeare Water Supply Facility

System Component	Capacity	Source Information
Well Supplies	545.76 m^3/d	MDWL[1.]
Well 1	545.76 m^3/d	PTTW [2.]
Well 2	545.76 m^3/d	PTTW [2.]
Combined Wells 1 & 2	545.76 m^3/d	PTTW [2.]

Note: 1. MDWL No. 053-101 Issue No. 8, Nov. 24, 2020
2. PTTW No. 1006-AV9PDF, February 2, 2018

Because of the redundancy provided by Well 2, the firm capacity of the Shakespeare DWS is considered to be 545 m^3/day.

Because there is no treated water storage the supply must meet the peak demands of the system. These typically occur in the morning and late afternoon periods and are often coincident with lawn watering in the summer months.

2.9.2 Existing Water Demands

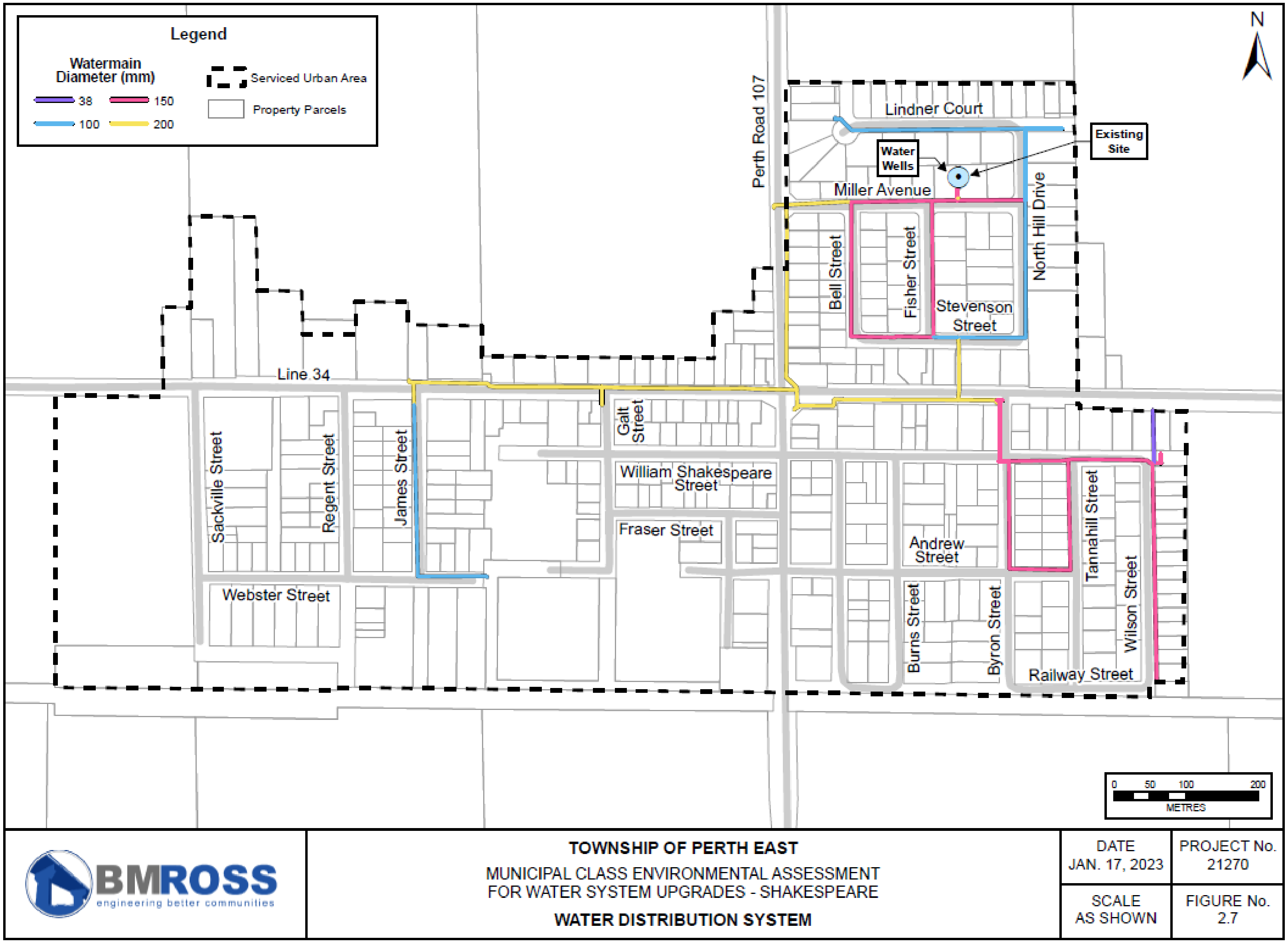
Water pumpage rates are recorded on a daily basis. Table 2.4 provides a summary of recent historical water demand values.

Table 2.4: Shakespeare Treated Water Demands (2018 to 2022)

Year	Avg. Day (m^3)	Max. Day (m^3)	Ratio (Max/Avg.)
2018	62.2	236	3.8
2019	67.8	141	2.1
2020	75.6	180	2.4
2021	77.8	138	1.8
2022	85.1	156	1.8
3 Year Average	79.5		2.0
3 Year Max. Day	--	180	--

It is noted that there is considerable variation in the maximum day values from year to year and also that the average usage has been steadily increasing.

Figure 2.7: Shakespeare Water System



2.9.3 Reserve Capacity

To establish the reserve capacity of the existing system the existing demands were deducted from the rated capacity**.**

From Table 2.4 we note that existing average annual usage is approaching 80 m^3/day. The MECP design guidelines for water supply (MOE, 2008) recommend a multiplier of 4.4 times average to estimate peak demands. Therefore, the estimated predicted peak for 2022 is approximately 352 m^3/day. Peak demand per customer, based on 168 existing customers, is therefore approximately 2.1 m^3/day. The existing supply is rated at 545 m^3/day. Therefore the reserve, for a system without treated water storage, is as follows:

Rated capacity	=	545 m^3/day
Existing demand	=	<u>352</u>
Reserve	=	193 m^3/day.

At 2.1 m^3/day per customer this amount can serve approximately 90 additional customers. This exceeds existing commitments, but it cannot provide adequate capacity for the unserved part of the community.

Recent existing maximum day demands have been in the order of 2.0 times annual average. MECP Design Guidelines (MOE, 2008) recommend a value of 2.75 for populations between 500 and 1,000. For forecasting purposes, we propose to defer to a value closer to the Guideline and use 2.6.

Existing annual average demands are approximately 80 m^3/day. Based on 2.6 times average, maximum day demands would be approximately 208 m^3/day or 1.25 m^3/day per customer. If peak demands are supplied from storage, then the existing supply of 545 m^3/day could serve up to 436 customers which, at 2.5 people per unit, would be approximately 1,100 people.

3.0 IDENTIFICATION OF THE PROBLEM AND REVIEW OF ALTERNATIVES

3.1 Study Initiation

The limit for arsenic in the Ontario Drinking Water Quality Standards (O.Reg. 169/03) was lowered on January 1, 2018, from 0.025 mg/L to 0.010 mg/L to align with federal and international standards. The limit is based on the risk from lifetime exposure to arsenic, and standards were adjusted based on the latest science, research and information available. Historical samples from the Shakespeare drinking water system Wells 1 and 2 indicate that raw water arsenic concentrations typically range from 0.010 to 0.017 mg/L, consistently above the limit.

As a result of this information and following additional discussions with the Perth District Health Unit and the MECP, the Township of Perth East initiated a Municipal Class EA in March 2020 to investigate options to address the elevated arsenic levels. The Screening Report for the Class EA was published in April 2021. The Class EA concluded that the preferred solution was to provide additional treatment to reduce the existing arsenic and iron concentrations in the treated water.

Subsequent evaluations focused on establishing the specific treatment technology. During those evaluations it was determined that the treatment system would benefit from on-site storage. Further, adequately sized treated water storage could potentially benefit the whole community by increasing system capacity, increasing system redundancy, and providing water for community level fire protection.

The current Class EA was initiated in January 2022 with the specific goal of determining whether or not it is feasible to provide both a treatment and a storage system that will:

1. Meet the short-term goal of improving water quality.
2. Create the opportunity to improve fire protection in Shakespeare.
3. Ensure that money spent on improvements now, also considers the long-term interests of the whole community.

3.2 Problem/Opportunity Definition

The first phase of the Class EA process involves the identification of the problem or opportunity to be addressed. Based on the issue discussed previously, the following opportunity was identified:

> *The existing water supply serving portions of the community of Shakespeare has concentrations of arsenic that exceed the Ontario Drinking Water Quality Standard, O. Reg 169/03. Treating the water to lower arsenic concentrations is required and feasible. Providing treated water storage facilities in conjunction with treatment has the potential benefit of increasing both the system servicing capacity and value to the community*.

3.3 Class EA Schedule

Provision of treated water storage facilities is considered a Schedule B activity in the Municipal Class EA document. From the Class EA perspective, Schedule B projects are approved subject to the completion of a screening process that incorporates Phases 1 and 2 of the Class EA process (i.e. Problem Identification and Evaluation of Alternative Solutions). This involves screening the project for environmental impacts and developing mitigation strategies. Public and government agency consultation is a component of the screening process.

3.4 Identification of Alternatives

The second phase of the Class EA process involves the identification and evaluation of alternative solutions to address the defined problem or alternatively, to take advantage of an opportunity. In this case there is an opportunity to maximize the long-term servicing potential of the water system which is consistent with the goals listed in Section 3.1.

Alternatives exist for both what might be built as well as where it might be built. The "where" also controls what can be built because each location may have different site constraints. Therefore, "what" and "where" are not independent.

The first step in developing a list of alternatives was to identify what is known. This includes:

- The existing well site has serious space constraints that will increase the cost of any improvements including the provision of water treatment.
- The existing well site can only provide supply for approximately 90 additional properties which means that the whole community, or alternatively significant new development, cannot be served from that location.
- The existing site and system does not provide water supply for fire protection.

In general terms the alternatives consist of staying at the existing location or constructing the treatment facilities at an alternate location (i.e. off-site). For treatment off-site the preferred location would be one that:

- Maximizes opportunities to improve and expand service at an acceptable cost.
- Has an acceptable degree of impact.

In the context of alternate locations and opportunities the following were examined:

- Increasing the effective capacity of the existing system by providing sufficient storage for peak flow management.
- Providing sufficient storage such that the system can support fire protection.
- Having the capability to be a potential site for a future third well.

Based on the above considerations, a number of possible solutions were identified at the outset of this Class EA process. The alternatives, stated below, build upon the findings of a preliminary engineering assessment completed at the start of the process.

Alternative 1: Provide Treatment at the Existing Well Site

This is essentially the alternative examined in conjunction with the 2021 Class EA. Treatment would be provided at the existing well house location without the addition of system storage.

Alternative 2: Provide treatment that maximizes future opportunities.

The existing well location does not have sufficient space to provide both treatment and storage facilities. This alternative considers a combined treatment and storage facility at an alternate location. Untreated water would be pumped from the existing well site to the treatment/storage location. The storage volume could be sufficient for just peak flow management or peak flow management and fire protection. Subject to the preferred location there may also be opportunity for a future third well.

Alternative 3: Do Nothing

This option proposes that no improvements or changes be made to the system.

The Do Nothing alternative may be implemented at any time in the design process prior to construction. This decision is typically made when the costs of all alternatives, both financial and environmental, significantly outweigh the benefits.

3.5 Method for Evaluation of Alternatives

The purpose of this phase is to determine a preferred solution and involves the evaluation and comparison of the identified alternatives. Effort is put into determining what alternatives may not be feasible, examining the potential environmental impacts associated with the proposed works and examining potential mitigation for any identified impacts. The evaluation stage generally includes the following activities:

- A technical review of alternatives.
- A review of the environmental impacts of an alternative.
- Preliminary selection of a preferred option.
- Consultation with the general public and review agencies.
- Final selection of a preferred option.

Recognizing that Alternatives 1 and 3 involved use of the existing site without storage the technical evaluation of alternatives for this project involved three steps:

1. Determining the physical requirements to provide treatment at the existing site.
2. Determining the preferred location for a combination treatment/storage facility.
3. Determining the preferred facilities (e.g. reservoir size, pump arrangement) to be constructed at the preferred location.

3.6 Technical Review of Alternatives

3.6.1 Alternative 1 - Treatment at the Existing Site

The existing well site is approximately 5.5 m wide. The existing pumphouse is 4.1 m wide. In the absence of agreement from the adjacent property owners no additional facilities could be built at the existing site. Even with agreement there would be significant limitations on the depth of any excavation without the further agreement of the adjacent property owners.

The arsenic treatment facilities involve filtration. The filters must be periodically backwashed to regenerate capacity. A source of treated water is required to allow backwash. For the existing site the backwash water would be stored in a pre-fabricated storage tank located within the pumphouse addition provided for the filters. Given the restrictions regarding excavation it would be necessary to have the base of the storage tank at grade. A consequence will be a very tall building addition.

Based on the work completed in the 2021 Class EA, which examined alternatives for treatment, to provide treatment without storage is technically feasible at the existing well location. Storage for filter backwashing can be provided in a pre-fabricated tank located within the building. Because of the constrained size of the site the building height would have to be in the order of eight metres.

The advantages of this location are:

- There would be no requirement to divide facilities over two or more locations.
- No raw water piping from the wells to the treatment location is required thus reducing costs and construction impacts.

The disadvantages to this location are:

- The space constraints at the existing site require that the adjacent property owners must agree to allow access during construction.
- The site is very small and construction costs will be significantly higher to account for construction access challenges.
- Additional costs will result from the need to relocate existing electrical panels to accommodate access to the treatment facilities.
- There is no ability to expand or incorporate storage at a later time.
- System capacity will be restricted to what the existing wells can serve at peak flow demand (i.e. 260 properties).

In our opinion incorporating treatment facilities into the existing site is only marginally feasible and potentially more costly than providing treatment at Site 2. The aesthetic appearance of the required building could be a concern for the adjacent residential properties. There would be no long-term advantage. Use of the existing site does not maximize future opportunities at an acceptable cost.

The three adjacent property owners were contacted regarding their willingness to enter into an agreement to allow the facilities to be constructed. Two of the three responded and indicated that they were not prepared to enter into an agreement. In the absence of such agreement, Alternative 1 is not feasible.

Given that the adjacent owners will not agree to grant the Township access to construct the required facilities at the existing site then this alternative is not feasible and will not be evaluated further.

3.6.2 Alternative 2 – Provide Treatment that Maximizes Future Opportunities

(a) Physical Facilities

If system storage is provided in conjunction with water treatment it creates the opportunity to service additional customers with the same well supply. Depending on the storage volume provided and the arrangement for pumping it is also possible to have the water distribution system supply water for fire protection.

This alternative requires evaluation of potential sites for treatment/storage facilities. The preferred approach to providing treated water storage is to provide concrete tankage below grade that would be integral with a pumphouse/treatment facility located above the storage. Raw water would come from the existing well site, pass through the arsenic/iron treatment system and discharge into the reservoir. Pumps, referred to as high-lift pumps, would be placed in the reservoir and discharge treated water to the distribution system. If the facility is to provide fire protection a larger fire pump would be provided in addition to the high-lift pumps. Wastewater from the treatment process would drain to the existing sanitary sewer system. Standby power supply by means of a diesel driven generator would be located outside the structure but adjacent.

Required storage volumes are established by formulas found in MECP design guidelines (MOE, 2008). To establish the minimum storage required we have used the maximum population that could be served by the existing wells (i.e. 1,100 people).

For peak flow equalization the minimum storage volume would be 25% of the maximum daily demand (MDD) plus a contingency amount. On the basis that the existing well site can meet an MDD of 545 m^3/day the calculated minimum volume would be in the order of 300 m^3.

Water storage volumes for fire protection are determined based on community population. Based on MECP design guidelines a reservoir sized to provide fire protection for a community of 1,100 people, including provision for peak flow equalization, backwash for the treatment system, and chlorine contact time would be approximately 710 m^3.

Based on optimum dimensions for construction, a storage facility sufficient for peak flow equalization would have a footprint similar to the pump house/treatment facility located above it. A storage facility sufficient for fire protection would be considerably larger and have a much larger footprint.

For storage to provide peak flow equalization only, the required site dimensions would ideally be at least 15 m by 21 m. If storage for fire protection is added the optimum minimum dimensions become 18 m by 27 m. These dimensions assume the site is reasonably flat and there are no problematic soil conditions.

(b) Determining a Preferred Location

The primary criteria used to establish alternative locations for new facilities were as follows:

- The location should be in or adjacent to the community to reduce impacts to agricultural lands.
- It should already be owned by the Township or believed to be available.
- It should be sufficiently large enough to economically accommodate the planned upgrades.

In addition, a set of secondary criteria, which are considered desirable but not absolutely necessary, were established. In this regard the site should:

- Permit reasonably economic connection to the existing system.
- Be suitable for any future expansion of the water system.
- Have access to three phase power.
- Be suitable for a potential 3rd well.

(c) Location Alternatives

Four potential sites were identified based on the primary criteria. These were in addition to the existing well site on Miller Avenue. Figure 3.1 shows the location of the four locations. With the exception of Location 1, all locations met the criteria of being within the community and being owned by the Township.

Review of Location 1 – Adjacent to Well Site

This site is located between the existing well site and Lindner Court. It is not currently owned by the Township and its availability has not been confirmed. The site is approximately 10 to 12 m in width. It is currently part of a developed residential property. The site is situated adjacent to Wells 1 and 2 and thus requires very little raw water pipeline but, at an estimated 12 m in width, is not wide enough for economic construction of even the smaller reservoir. The site is also not suitable for a potential 3rd well given the proximity to the existing wells.

Review of Location 2 – North Side of Highway 7/8

Location 2 is a Township-owned irregularly shaped vacant parcel with a 20 m minimum width. The site extends from the highway northerly to Stevenson Street and has a walking path along the east limit for pedestrian access to/from the highway. Immediately west is a residence and to the east is a commercial property. The site slopes southward from Stevenson Street. The site is zoned medium density residential. Use of the site for water works facilities would eliminate the potential for any future use of the property. A variance may be necessary in order to allow lesser setbacks than currently required by the zoning.

A historical review of the site (MTE, 2022) indicated that “no significant environmental concerns were identified” with Location 2 although there have been two reported furnace fuel spills on an adjacent property that have “the potential to impact soil and/or groundwater at Site 2.”

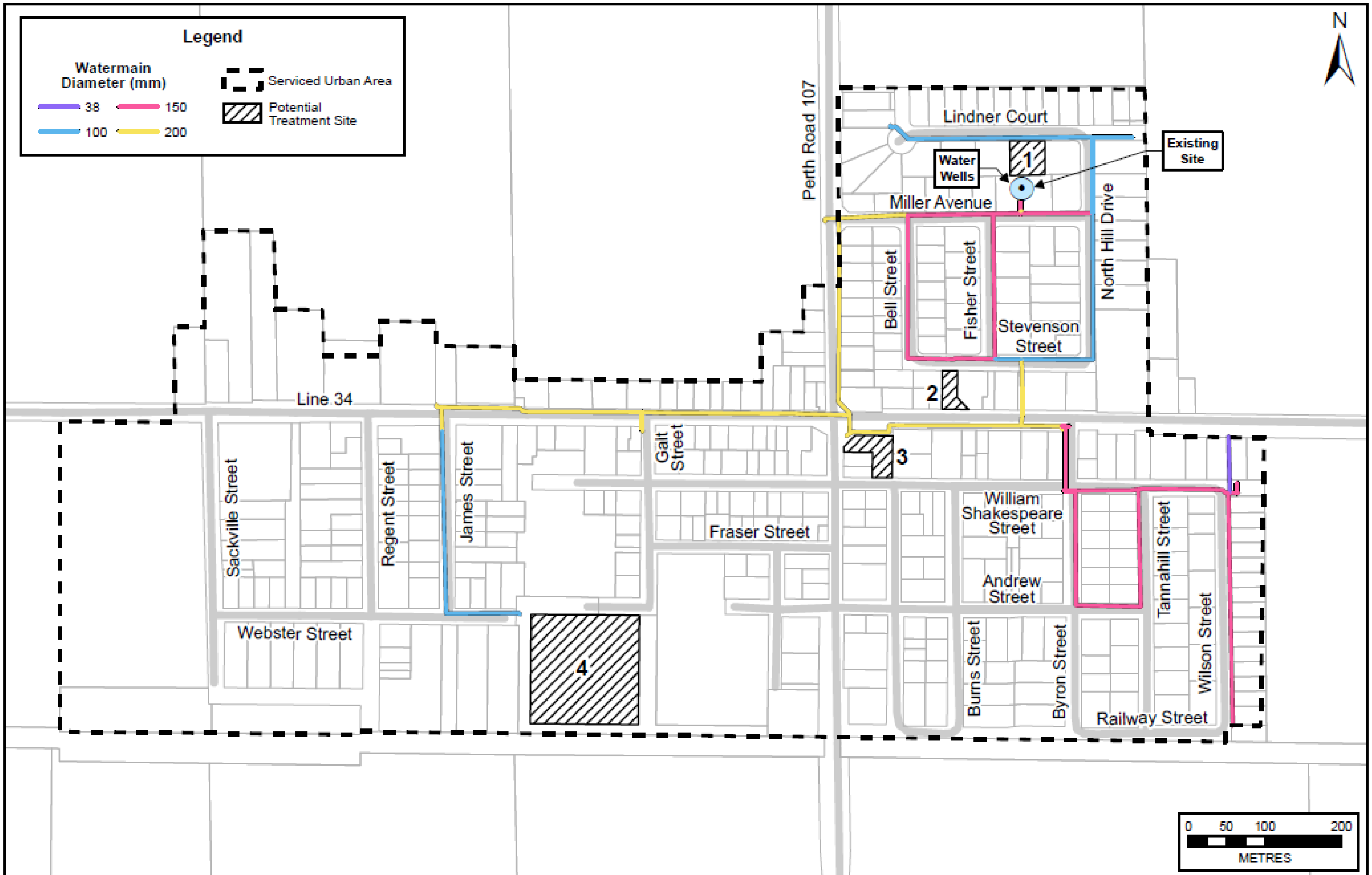
Based on the dimensions identified previously, the site is marginally large enough to accommodate a reservoir for fire protection. Given a history of adjacent fuel contamination, further investigation would be required. Of the four sites being considered Location 2 is the second closest to the existing well site and would require approximately 340 m of raw water supply piping between the existing wells and the treatment facility.

Review of Location 3 – Southeast Corner of Highway 7/8 and Perth Road 107

This site is also municipally owned. It is irregular in shape, fronting on Highway 7/8 with access to William Shakespeare Street to the south. The site is paved and appears to have served as a parking area for commercial properties located on adjacent parcels. It is zoned Commercial-C1. Use of the site for water works facilities would reduce the potential for any future use such as commercial. The part of the site fronting Highway 7/8 is approximately 50 m by 20 m deep (north to south). The part of the property aligned north south is approximately 56 m by 25 m.

A historical review of the site (MTE, 2022) indicated that, similar to Location 2, previous adjacent land uses had resulted in soil and groundwater contamination that could have migrated to Location 3 and further investigations would be required to confirm the suitability of the site. The investigations also noted that a building had been present on the site at one time and there is the possibility that demolition debris could be present. Location 3 is large enough for siting a reservoir. It is approximately 510 m from Wells 1 and 2 and a raw water supply would require a crossing of Highway 8.

Figure 3.1: Water Distribution and Potential Sites



BMROSS engineering better communities	TOWNSHIP OF PERTH EAST MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT FOR WATER SYSTEM UPGRADES - SHAKESPEARE WATER DISTRIBUTION SYSTEM & POTENTIAL SITES	DATE DEC. 19, 2022	PROJECT No. 21270
		SCALE AS SHOWN	FIGURE No. 3.1

Review of Location 4 – Community Centre south of Webster Street

This site is also municipally owned. It is relatively large and already contains recreational facilities, the community's wastewater treatment plant (WWTP) and a community centre building. The site is currently zoned institutional.

Location 4 has significant open space immediately west of the community centre building to accommodate a treatment facility and a reservoir adequate for fire protection.

Location 4 is also the furthest from the existing wells and thus would require the longest length of raw water piping. Based on preliminary routing the distance would be approximately 1,200 m and require a crossing of Highway 7/8.

(d) Potential for a 3rd Well

Although not absolutely required, the possibility of having a 3rd municipal well at the treatment/storage site was considered as an opportunity. To establish the potential for a future well, a desktop evaluation of available well records was completed (Wilson, 2022). The purpose of the investigation was to establish which of the four locations could most likely also serve as a potential municipal well site. It is important to note that it would be necessary to actually construct a test well to confirm the suitability of any location. Key considerations were the potential of a site to have adequate water quantity but also limit the potential for interference with existing wells. The following conclusions were reached regarding site suitability for a well.

1. Theoretically higher-yielding wells are predominantly distributed throughout the southern periphery of the community.
2. On the basis of the general trend of theoretically higher-yielding wells, municipal Location 4 should be the first choice for a new municipal well, followed by Location 3.
3. On the basis of interference potential, Location 4 also provides the most available setback from neighbouring wells and the existing municipal wells. Available information indicates that the future municipal well should be situated more than 240m from existing wells.
4. The southeast corner of the community indicates the greatest well yield potential, if viable lands were available.
5. A review of the depths of the theoretically higher-yielding wells indicates that the majority of these wells are completed in the upper 10m of the bedrock (i.e. to depths of 60 to 70m below grade). Deeper drilling is not indicated to consistently obtain greater well yields.
6. Although the above analysis indicates favourable aquifer conditions for future municipal well development, due to heterogeneous distribution of water-bearing zones in bedrock aquifers, lower-yielding wells may occur, and there is no assurance of obtaining the desired well yield at any particular location. Based on the well records analysis, there is approximately an overall 23% potential of obtaining a lower well yield at any particular location.

7. The quality of water from Well 2 in 2017 indicated aesthetically elevated levels of iron and manganese, and arsenic at or near the maximum acceptable level under current Ontario Drinking Water Quality Standards. Acceptable bacteriological water quality was indicated. Similar groundwater quality can be expected from properly constructed drilled wells throughout the community.

In summary, Location 4 would be preferred if the treatment storage site was to also be the site of a 3rd Well.

(e) Summary of Comparison of Locations

The following Table provides a summary of the site comparison findings. Where possible the sites were ranked 1 to 4 with 4 being the most preferred location and 1 being the least preferred.

Table 3.1: Comparison of Potential Locations

Comparison Criteria	1	2	3	4
General location	Adjacent to existing wells	North side of Hwy 7/8	South side of Hwy 7/8	Community Centre
Municipally-owned	No	Yes	Yes	Yes
Suitability for peak flow storage	1	4	4	4
Suitability for fire storage	1	4	4	4
Length of raw water piping (m)	4	3	2	1
Impact on future adjacent use	1	3	3	4
Further investigation required	Yes	Yes	Yes	No
Suitability for expansion	1	4	4	4
Overall cost to develop	4	3	2	1
Total Score	**12**	**21**	**19**	**18**

As indicated by Table 3.1, not every site is suitable for all purposes. In this section we discuss the potential use at each site relative to the project goals.

Limiting Costs:

If the goal is to limit costs, then Location 1 is preferred. It requires very little raw water piping and would provide adequate space to construct the required treatment facilities but not system storage facilities. Given the residential location, special consideration would have to be given to the appearance of the building.

Limiting Costs and Providing Equalization Storage:

If the goal is to limit costs but provide equalization storage then Location 2 would be preferred. Some further site investigations to confirm that there is no current soil or groundwater contamination would be necessary.

Providing Fire Storage:

A reservoir sufficient for fire storage for the entire community can be constructed at locations 2, 3 or 4. Location 2 has minor space limitations and a small premium might be paid for construction related complexities. Location 3 is less restrictive but potentially effects future adjacent (commercial) uses. Both Locations 2 and 3 are adjacent to Highway 7/8 and therefore have a greater risk related to future spills.

Providing Fire Storage with the Potential for a 3rd Well:

Based on the site comparison, and particularly the hydrogeologic assessment, only Location 4 has the potential to be a location for a future 3rd well. The site is also large enough for any currently anticipated water works related uses. The key deficiency of Location 4 is that it is the furthest site from the existing wells and thus will have the greatest development cost. Location 4 maximizes opportunities for potential expansion of service.

(f) Preliminary Probable Costs

In Section 3.4 it was noted that the preferred location would be one that:

- Maximizes opportunities to improve and expand service at an acceptable cost.
- Has an acceptable degree of impact.

The purpose of this section is to identify the probable costs associated with constructing facilities at each possible location. The following discussion identifies the options for what can be built at Location 2 and at what cost. Costs are presented in 2023$. Values are preliminary and include allowances for engineering and a 30% cost variance. Probable costs are presented in the following table.

Table 3.2: Summary of Probable Costs at Location 2

Option No.	Description of Facilities	Probable Cost
2A	Treatment facility only including 6 m x 10 m building and tank storage for backwash water	$2,075,000
2B	Treatment + high-lift pumps + 345 m^3 of equalization storage. Building 9.2 m x 9.5 m and a 345 m^3 reservoir and 340 m of raw water piping.	$2,480,000
2C	Treatment + high-lift and fire pumps. Building 9.2 m x 9.5 m and a 345 m^3 reservoir and 340 m of raw water piping.	$2,740,000
2D	Treatment + high-lift and fire pumps and fire storage. Building 9.2 m x 9.5 m and 710 m^3 reservoir and 340 m of raw water piping.	$2,995,000

(g) The Preferred Location and Facilities

As noted in Section 3.4 the “what is to be built” cannot be separated from the “where it is to be built”. Based on a detailed comparison of the four locations including a preliminary assessment of the probable costs of constructing facilities at each, the preferred site is Location 2 on the north side of Highway 7/8. The site is preferred for the following reasons:

- Although Location 1 has the lowest costs because of its location, it is extremely limited regarding what can be constructed. It creates no opportunity for system improvement (e.g. increased redundancy) or expansion. Further, it is not owned by the Township and there would be a property purchase cost.
- Location 2 can be developed at significantly less cost than Locations 3 and 4, principally because it is closer to the existing well site. The basic requirement of providing treatment can be met with facilities that can be expanded in the future.
- The key advantage of Location 4 is that it could be the site for a future 3rd well and provision could be made in the pumphouse facilities now for the future well. In our opinion, the substantial up-front cost for the additional piping cancels the benefit for creating a future opportunity. When a 3rd well is required it can still be constructed at Location 4 and raw water pumped to Location 2 for treatment.

(h) Summary of the Analysis to Determine the Preferred Location for Alternative 2

As noted previously, the preferred location would be one that:

- Maximizes opportunities to improve and expand service at an acceptable cost.
- Has an acceptable degree of impact.

Previous sections have discussed the feasibility of constructing the treatment facilities at a location other than the existing well site. Site 2 was determined to be the preferred location.

Adding a reservoir to operate in conjunction with the treatment facilities creates the following benefits:

- System capacity (based on the existing wells) increases from 258 properties to approximately 436 properties thus creating opportunity for growth.
- Water for fire protection can be incorporated into the facilities which is a community wide benefit.
- The reservoir would improve system redundancy. Supply can be provided from the reservoir for a period of time if the well supply is not in service.

There is the opportunity to construct the fire protection related facilities (e.g. pumps, reservoir volume) in stages to reduce initial capital costs.

In our opinion, given that Location 2 is available and meets the goal of creating future opportunities it is considered to be a viable location.

Township Council gave consideration to the pros and cons for each location as identified above. Consideration included receiving input from the ratepayers of the community of Shakespeare at a Public Open House and by means of a Questionnaire. Location 2 was selected by Council as the preferred location for any new facilities.

Council also gave consideration to what facilities would be constructed at Location 2. Option 2C (see Table 3.2) was selected. The major components of Option 2C are as follows:

- A raw water pipeline to take water from the well site to Location 2.
- A concrete walled reservoir beneath the treatment building. The reservoir dimensions will be defined by the footprint of the treatment building.
- Filtration facilities for arsenic and iron treatment. The reservoir will be the source of treated water for the filter backwash.
- High-lift and fire pumps that will take water from the reservoir and discharge the water to the existing distribution system.

3.6.3 Alternative 3: Do Nothing

The Do Nothing alternative represents the least expensive option. It does not, however, resolve the problem of arsenic levels in the current supply nor does it, in any way, maximize future opportunities for the water supply. The implementation of this option would not address the water quality deficiencies or achieve compliance with provincial regulations. This option would only be considered if the negative impacts of implementation of other alternatives were considerable and could not be mitigated to an acceptable degree.

3.7 Environmental Considerations

3.7.1 General Approach

Section 3.4 of this report listed the alternative solutions identified to resolve issues relating to elevated arsenic levels and create opportunities for the Shakespeare Water System. As part of the evaluation process, it is necessary to determine what effect or impact each feasible alternative will have on the environment and what measures can be taken to mitigate the impact. The two main purposes of this exercise are to:

- Minimize or avoid adverse environmental effects associated with a project.
- Incorporate environmental factors into the decision-making process.

Under the terms of the EA Act, the environment is divided into five general components:

- Natural environment
- Social environment
- Cultural environment
- Economic environment
- Technical environment

The identified environmental components can be further subdivided into specific elements that have the potential to be affected by the implementation of a solution. Potential impacts are noted in the following section of the report. Table 3.3 provides an overview of the specific environmental components considered relevant to this investigation. These components were identified following the initial round of public and agency input. A preliminary review of each alternative with respect to the environmental setting is summarized in the following discussion.

Table 3.3: Identification of Environmental Components

Environmental Component	Sub-Components	Specific Components
Natural Environment	Terrestrial Habitat	• Soils & Vegetation • Wildlife Habitat • Species at Risk
	Landscape Features	• Trees and Shrubs • Topography
	Surface Water	• Water Quality & Quantity • Drainage Characteristics • Source Water Protection
	Geology/ Hydrogeology	• Groundwater quality & quantity • Drainage Characteristics
Social Environment	Community	• Visual Impacts and Aesthetics • Quality of Life
	Neighbourhood	• Disruption During Construction • Noise
Cultural Heritage Environment	Built Heritage Resources and Cultural Heritage Landscapes	• Known and Potential Built Heritage Resources and Cultural Heritage Landscapes
	Archaeological Resources	• Archaeological Resources and areas of archaeological potential
Economic Environment	Municipal	• Capital and Operating Costs • Land Purchase Costs
	Community	• Property Values • Tax Rates
Technical Environment	Operations	• Technical Complexity • Maintainability
	Approvals	• Regulatory Requirements
	Infrastructure	• Siting Requirements • Utilities • Groundwater Influence • Hydraulic Capacity • Climate Change

The environmental effects of each alternative on the specific components are generally determined through an assessment of various impact predictors (i.e. impact criteria). Given the works likely associated with the alternative solutions, the following key impact criteria were examined during the course of this assessment:

- Nature (direct, indirect or cumulative).
- Magnitude (including the scale, intensity, geographic scope, frequency and duration of potential impacts).
- Technical complexity.
- Mitigation potential (which considers avoidance, compensation and degree of reversibility).
- Public perception.
- Scarcity and uniqueness of affected components.
- Compliance with applicable regulations and public policy objectives.

Using the above considerations, the potential impacts of each alternative solution were systematically evaluated. The significance of the potential impacts posed by each alternative was evaluated considering the anticipated severity of the following:

- Direct changes occurring at the time of project implementation.
- Indirect effects following project completion.
- Induced changes resulting from a project.

For the purposes of this Class EA, impact determination criteria developed by Natural Resources Canada was applied to predict the magnitude of environmental effects resulting from implementation of the project. Table 3.4 summarizes the impact criteria.

Table 3.4: Criteria for Impact Determination

Level of Effect	General Criteria
High	Implementation of the project could threaten sustainability of the feature and should be considered a management concern. Additional remediation, monitoring and research may be required to reduce impact potential.
Moderate	Implementation of the project could result in a resource decline below baseline, but impact levels should stabilize following project completion and into the foreseeable future. Additional management actions may be required for mitigation purposes.

Level of Effect	General Criteria
Low	Implementation of the project could have a limited impact upon the resource during the lifespan of the project. Research, monitoring and/or recovery initiatives may be required for mitigation purposes.
Minimal/Nil	Implementation of the project could impact the resource during the construction phase of the project but would have negligible impact on the resource during the operation phase.

Given the criteria defined in Table 3.4, the significance of adverse effects is predicated on the following assumptions:

- Impacts from a proposed alternative assessed as having a Moderate or High level of effect on a given feature would be considered significant.
- Impacts from a proposed alternative assessed as having a Minimal/Nil to Low level of effect on a given feature would not be considered significant.

3.7.2 Environmental Effects Analysis

The potential interactions between the identified alternatives and environmental components (Table 3.3) were examined. The purpose of the analysis was to determine, in relative terms, the environmental effects of constructing and operating each identified option upon the defined environmental components and sub-components (using the impact criteria described in Table 3.4). In this regard, the level of effect for the environmental interactions were rated as High, Moderate, Low and Minimal/ Nil. Potential mitigation measures were also considered as part of this evaluation.

Table 3.5 summarizes the outcome of the environmental affects analysis carried out for the alternatives.

Table 3.5: Summary of Environmental Effects Analysis

Alternative	Environmental Component	Factor Under Consideration	Level of Effect	Potential Impacts
Alternative 1: Construct treatment facilities at the existing site. Not feasible given property constraints.				
Alternative 2: Provide treatment that maximizes future opportunities. Based on Site 2 with a reservoir.	Natural Environment	Terrestrial Habitat	Low	• Topsoil will be removed from the site. • There are no natural features on the site.
		Landscape Features	Nil	• No Impacts anticipated. • The site is primarily grass covered.
		Surface Water Quality/Quantity	Low	• Deleterious materials could be released during construction. • Sediment and erosion control measures will be implemented to minimize impacts.

Alternative	Environmental Component	Factor Under Consideration	Level of Effect	Potential Impacts
Alternative 2: Provide treatment that maximizes future opportunities. Based on Site 2 with a reservoir.		Geology/ Hydrogeology	Low	• Some excavation would be required for foundations but no significant depths. • No significant impacts are expected.
	Social Environment	Community	Low	• The preferred site is currently vacant.
		Neighbourhood	Low	• Property is currently vacant so addition of a building will alter the aesthetics. • Minor impacts to adjacent properties may occur during the construction phase. • Pumping facilities associated with treatment facilities could increase ambient noise levels slightly.
	Cultural Heritage Environment	Known and Potential Built Heritage Resources and Cultural Heritage Landscapes	Nil	• No cultural heritage resources were identified at Location 2 and the site is currently vacant.
		Archaeological Resources	Moderate	• A Stage 1 & 2 Archaeological Assessment will be completed to address potential impacts.

Alternative	Environmental Component	Factor Under Consideration	Level of Effect	Potential Impacts
Alternative 2: Provide treatment that maximizes future opportunities. Based on Site 2 with a reservoir.	Economic Environment	Municipal	Low to Moderate	• There will be increased costs to operate and maintain the treatment system and building. • No purchase of land would be required to facilitate implementation. The sites are currently owned by the Township.
		Community	Low to Moderate	• No impacts to property values are anticipated. • Depending on the financing approach selected by the Township, some residents may be impacted by capital charges related to the upgrades.
	Technical Environment	Infrastructure	Low	• Sufficient land exists at the site to accommodate the required facilities. • No impacts expected for existing utilities. • Hydraulic capacity will be increased, allowing the existing wells to serve more properties than currently. • It will be possible to improve fire protection throughout the community.

Alternative	Environmental Component	Factor Under Consideration	Level of Effect	Potential Impacts
		Operations	Low to Moderate	• Operation of the reservoir and lift pumps, in conjunction with the fire pumps will be more technically complex than the existing arrangement. • A second site will need to be maintained by staff versus the current well site arrangement.
		Approvals	Low	• Given that the site is vacant, no delays are anticipated in receiving approvals.
Alternative 3: Do Nothing	Natural Environment	Terrestrial Habitat	Nil	• No expected impacts.
		Landscape Features	Nil	• No Impacts Anticipated
		Surface Water Quality/Quantity	Nil	• No expected impacts.
		Geology/ Hydrogeology	Low	• Groundwater quality does not meet current provincial standards.
	Social Environment	Community	Low to Moderate	• Safety of water supply is a concern if arsenic levels are not addressed. • Aesthetic issues (e.g. iron) will continue.
		Neighbourhood	Nil	• No visual impacts anticipated as the existing well house would remain unchanged. • No noise impacts anticipated as no construction would occur.

Alternative	Environmental Component	Factor Under Consideration	Level of Effect	Potential Impacts
Alternative 3: Do Nothing	Cultural Heritage Environment	Known and Potential Built Heritage Resources and Cultural Heritage Landscapes	Nil	• No cultural heritage resources were identified at the project site.
		Archaeological Features	Nil	• No impacts anticipated as no construction is required.
	Economic Environment	Municipal	Low	• Least expensive option. • No land purchase is required
		Community	Moderate	• Property values may be impacted if arsenic levels are not addressed and trust in water system is questioned by residents.
	Technical Environment	Approvals	Moderate	• MECP may order changes to the well if arsenic levels in the water supply are not lowered.
		Infrastructure	Low	• No impacts to utilities are expected.
		Operations	Low to Moderate	• MECP may order changes to the well if arsenic levels in the water supply are not lowered, which may impact the operation of the facilities.

3.7.3 Summary of Environmental Effects Analysis

Based on the results of the assessments as reported above and a review of the technical components associated with the project, the Township has indicated a preference for Alternative 2, which is to provide a treatment system that maximizes opportunities. Alternative 2 would involve constructing the treatment facilities with an integral reservoir at Site 2 which is located on the north side of Highway 7/8.

There are a number of attributes associated with Alternative 2 which justify its consideration as the preferred solution to address the current water quality deficiencies. These are:

- It provides Shakespeare with an improved water supply that, once implemented, will meet all provincial water quality standards.
- It meets the goal of providing opportunities for growth (e.g. increases the system capacity from approximately 260 to 436 users) and fire protection (e.g. provides reservoir storage)
- It can be constructed on Township owned land within economic distance of the existing facilities.
- It requires no significant modifications to the existing wells or distribution network.
- The impact of the new facilities on the adjacent properties will be substantially less than for Alternative 1.
- Improves system security for existing water customers by providing water storage during periods of high use, power outages, or other interruptions.

  Is consistent with Infrastructure and Servicing policies contained within the PPS 2020.

Table 3.6 provides a summary of the key considerations for each option with respect to the environmental components described in Table 3.3. The Table outlines benefits and impacts that were identified as significant during the initial evaluation of alternatives. Potential mitigation measures for the identified impacts are also presented.

Table 3.6: Preliminary Evaluation of Well Upgrade Alternatives

Alternative	Anticipated Benefits	Potential Impacts	Potential Mitigation
Alternative 1: Construct treatment facilities at the existing site. Not feasible given property constraints			
Alternative 2: Provide treatment that maximizes future opportunities	- Increases system capacity by approximately 60%. - Reduces the complexity of the arsenic treatment system. - Creates the opportunity for the water system to provide some fire protection for the community. - Increases system redundancy	- Facilities have more components and increased maintenance needs. - Construction-related activities could have localized noise and air quality impacts.	- Select components to minimize operational and maintenance requirements. - Implement standard mitigation measures to minimize impacts during the construction phase of the project (e.g., limit construction hours, dust control measures).
Alternative 3: Do Nothing	- This is the least expensive alternative.	- Fails to address the arsenic issue in the water supply.	- Identified impact cannot be mitigated.

3.8 Identification of a Preferred Solution

Based on the results of the impact assessment presented above and engineering evaluations of the study alternatives; Alternative 2: Provide Treatment that Maximizes Future Opportunities was selected as the preferred alternative.

Specifically, it was decided to construct a treatment storage facility at Location 2 between Highway 7/8 and Stevenson Street. The facility would have a reservoir and both high-lift and fire pump systems.

This type of project is classified as a Schedule ‘B’ activity under the terms of the MEA Class EA document.

A number of relative factors were identified with the preferred alternative that justified its selection as the preferred approach to increasing capacity. In particular, the preferred alternative provides the following advantages.

In general, Alternative 2:

- Maximizes opportunities to improve and expand service at an acceptable cost.
- Has an acceptable degree of impact.

More specifically:

Adding a reservoir to operate in conjunction with the treatment facilities creates the following benefits:

- System capacity (based on the existing wells) increases from 258 properties to approximately 436 properties thus creating opportunity for growth.
- Water for fire protection can be incorporated into the facilities which is a community wide benefit.
- The reservoir would improve system redundancy. Supply can be provided from the reservoir for a period of time if the well supply is not in service.
- There is the opportunity to expand the reservoir should it be necessary or desirable in the future.

Figures 3.2 and 3.3 provide details of the preliminary concept for the Location 2.

Figure 3.2: New Reservoir and Pumphouse on Site #2

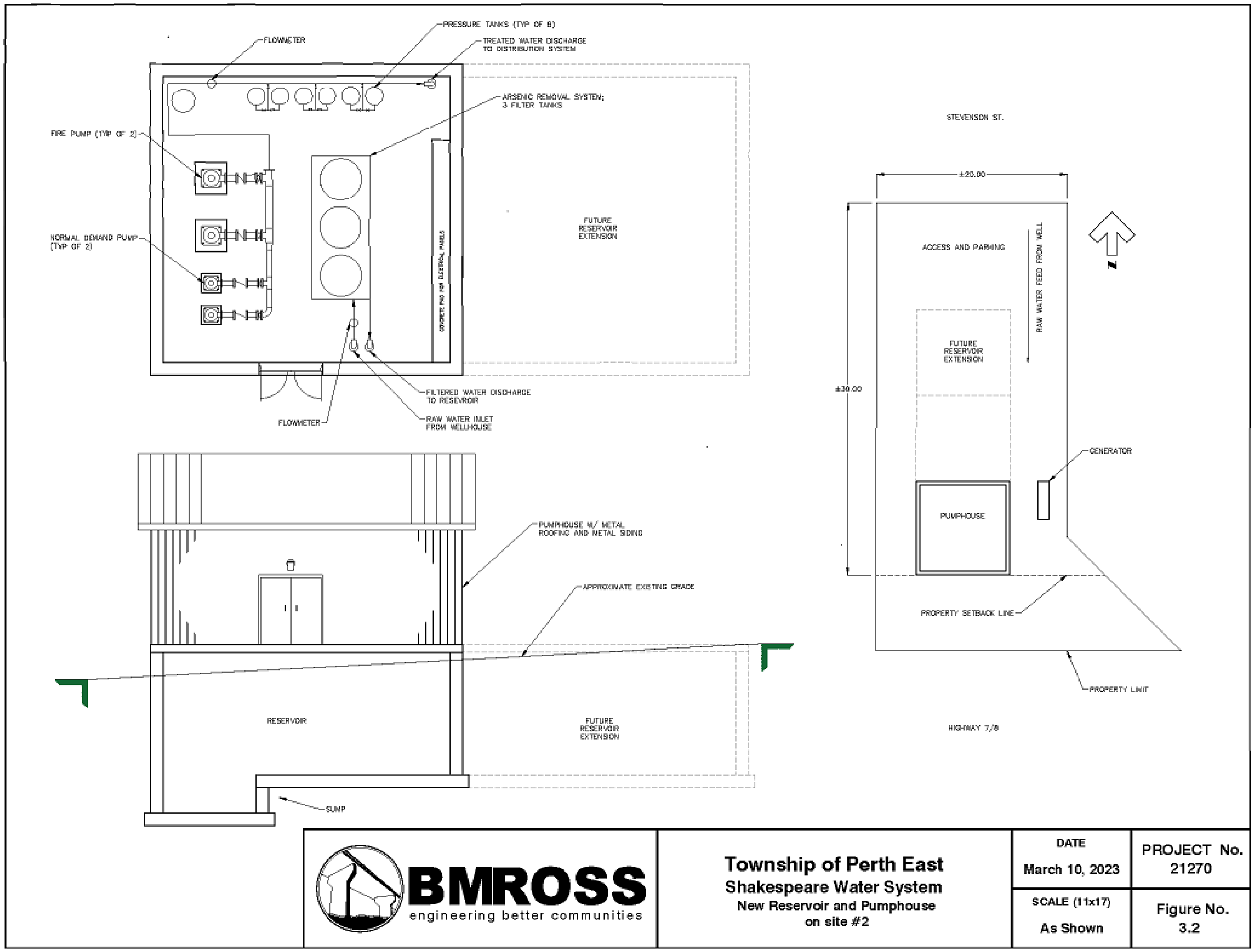


Figure 3.3: Digital Rendering of Treatment Building/Pumphouse

BMROSS engineering better communities	**TOWNSHIP OF PERTH EAST** MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT FOR WATER SYSTEM UPGRADES **DIGITAL RENDERING OF TREATMENT BUILDING/PUMPHOUSE**	DATE FEB. 23, 2023	PROJECT No. 21270
		SCALE None	FIGURE No. 3.3

4.0 IDENTIFICATION OF POTENTIAL IMPACTS AND MITIGATION

4.1 Framework of Analysis

Following the selection of Alternative 2 as the preliminary preferred alternative, a study framework was developed to further evaluate the potential impacts of implementing this project. The purpose of this review was to assess the environmental interactions resulting from the construction and operation of the proposed works, and to determine if the identified interactions would generate environmental impacts.

The assessment of the preferred alternative incorporated these activities:

- Review of engineering methodologies associated with providing treatment and a reservoir at Site 2.
- Assessment of the construction and operational requirements of the proposed works.
- Consultation with the public, stakeholders, Indigenous communities and government agencies.
- Prediction of the environmental interactions between the proposed works and the identified environmental components.
- Evaluation of the potential impacts of the project on the environmental components, including residual effects following mitigation.

Based upon the findings of the preliminary evaluation of alternatives (Section 3) including an environmental effects analysis (Table 3.5), the project, and associated construction related activities, have the potential for a limited number of impacts. The potential impacts and mitigation measures related to the following components of the project and the environment are:

- Construction and operation.
- Community.

The potential impacts to each identified environmental component is described in detail within this section of the report. The determination of appropriate mitigation measures incorporated an assessment of previous studies and investigations, site specific requirements and an evaluation of a broad range of alternatives. This assessment was based on consideration of three broad approaches to impact mitigation: avoidance, minimization of adverse effects, and compensation.

4.2 Construction and Operation

4.2.1 Selection of a Treatment Technology

Preliminary review of various treatment technologies was undertaken during Part 1 of the Class EA completed in April of 2021. It was determined that a number of technologies are available that will lower both arsenic and iron concentrations to acceptable values. The evaluation of technologies will continue and allow the selection of a preferred technology that will take into consideration both capital and operating costs.

4.2.2 Selection of a Reservoir Volume

The capacity of the water system will automatically increase by approximately 70% with the installation of a reservoir and high-lift pumping system. Improved fire protection for the community results from the addition of fire pump(s) and the addition of the reservoir.

Following a Public Open House, held in December 2022, where input from the community was sought on the various alternatives being considered, Perth East Council decided to construct a 345 m^3 reservoir, high-lift and fire pumps. This option provides the benefits of increased capacity for the distribution system and additional fire protection for the community, without the additional capital expenses associated with a larger reservoir. The proposed reservoir will be designed such that future expansions could be constructed at a future date.

4.2.3 Construction Mitigation

Table 4.1 outlines a series of standard mitigation measures that are typically incorporated into construction specifications. For this project, contract specifications may need to be modified depending upon the nature of the construction activity and any additional requirements of the regulatory agencies.

Table 4.1: Summary of Proposed Mitigation Measures (General Construction Impacts)

Construction Activity	Planned Mitigation
Refuelling and Maintenance	- Identify suitable locations for designated refuelling and maintenance areas. - Restrict refuelling or maintenance of equipment near watercourses. - Avoid cleaning equipment in watercourses and in locations where debris can gain access to sewers or watercourses. - Prepare to intercept, clean-up, and dispose of any spillage which may occur (whether on land or water).
Traffic Control	- As applicable, the Contractor shall prepare and submit a traffic plan to the Project Engineer for review and acceptance. - Traffic flow for private access should be maintained at all times during construction. If it is necessary to detour traffic, the Contractor will co-ordinate the routing and provide adequate signage and barricades. - At the end of each working day, a minimum of one lane of traffic, controlled by barricades, delineators, etc. shall be maintained for emergency vehicles.

Construction Activity	Planned Mitigation
Disposal	- Dispose of all construction debris in approved locations. - Avoid emptying fuel, lubricants or pesticides into sewers or watercourses.
Work in Sensitive Areas	- All work will occur in dry conditions. - Slopes disturbed by the construction will be stabilized upon completion of the work.
Drainage and Water Control	- All portions of the work should be properly and efficiently drained during construction. - Provide temporary drainage and pumping to keep excavation and site free from water. - Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with approval agency requirements. - Provide settling ponds and sediment basins as required. - Do not direct water flow over pavements, except through approved pipes/troughs. - Provide splash pads where water is discharged to a watercourse.
Dust Control	- Cover or wet down dry materials and rubbish to prevent blowing dust or debris. - Avoid the use of chemical dust control products.
Site Clearing	- Protective measures shall be taken to safeguard trees from construction operations. - Equipment or vehicles shall not be parked, repaired or refuelled near the dripline area of any tree not designated for removal. Construction and earth materials shall not be stockpiled within the defined dripline areas. - Restrict tree removal to areas designated by the Contract Administrator. - Minimize stripping of topsoil and vegetation.
Sedimentation and Erosion Control	- Minimize the removal of vegetation from slopes. - Complete restoration works following construction.
Noise Control	- Site procedures should be established to minimize noise levels in accordance with local bylaws. - Provide and use devices that will minimize noise levels in the construction area. - Night time or Sunday work shall not be permitted, except in emergency situations.

4.2.4 Operational Phase

All waterworks facilities are operated and maintained by the Township of Perth East, or their agent, in accordance with MECP guidelines and current provincial water regulations. The Township currently has all required approvals for a Drinking Water System and uses an accredited operating authority.

4.3 Heritage and Culture

To determine whether the preferred solution could affect known or potential cultural heritage or archaeological resources, the Ministry of Citizenship and Multiculturalism' screening material was consulted. Impacts to Built Heritage and Cultural Resources were screened using the Screening for Impacts to Built Heritage and Cultural Heritage Landscapes checklist, which is included in Appendix C. To screen for archaeological potential, the Criteria for Evaluating Archaeological Potential was completed and is also included in Appendix C. From the screening checklist for built heritage and cultural heritage landscapes, it appears the preferred solution will have little or no impact on cultural heritage resources.

For the checklist for archaeological potential, it was noted that the preferred site is close to an early historic transportation route – Provincial Highway 8. Therefore a Stage 1-2 Archaeological Assessment will be completed for Location 2 prior to construction.

4.4 Source Water Protection

Given that the existing well will not be modified as part of the preferred solution, no impacts to existing Source Water Protection policies for the current well supply are anticipated.

4.5 Climate Change

Given that the proposed upgrades will not have an effect on the actual taking of water and the overall footprint of the proposed facilities is small, no impacts related to or from climate change are anticipated in conjunction with the project.

4.6 Community Level Impacts

4.6.1 Land Use Impacts

Existing land uses located adjacent to and nearby the proposed works at Location 2 are a mix of residential, institutional and commercial. In our opinion the proposed use will not negatively affect the community from a land use perspective or visually. The proposed storage facility will be designed to blend with adjacent land uses, having a façade that resembles a residential structure.

The provision of the potential to provide fire protection is considered to be a significant positive impact to the community.

4.6.2 Financial Impact to Residents

The project is planned to be financed through a combination of senior government grants, contributions from reserves, and possibly special capital charges against benefitting properties. The latter may include Development Charges applied to future development.

Costs associated with the treatment technologies needed to address the elevated arsenic and iron concentrations will result in capital and operating costs that will be applied to the water system. The Township applied for a grant to assist with the costs and was successful. The grant will be applied to reduce the cost of the treatment system. A portion of the capital cost can be incorporated into a Development Charge and applied to growth.

Costs related to the construction of facilities to improve fire protection may be applied to the entire community as improved fire protection is deemed to be a community benefit.

4.7 Health and Safety

The planned works involve construction work that has the potential to adversely impact the health and safety of the workers and the general public. A series of measures will be set out in construction contract documentation to minimize the risk posed by construction in a manner consistent with health and safety regulations. These specifications may need to be altered depending upon the nature of the construction activity and requirements of regulatory agencies.

5.0 CONSULTATION PROGRAM

5.1 General

Consultation is an integral component of the Class EA process. Consultation allows for an exchange of information which assists the proponent in making informed decisions during the evaluation of alternative solutions. During Phases 1 and 2 of the study process, consultation was undertaken to obtain input from the general public, project stakeholders, review agencies, and indigenous communities that might have an interest in the project. The components of the consultation program employed during the Class EA study are summarized in this Section of the Screening Report and documented in Appendix D. Comments received from the program and related correspondence are discussed below and also documented in Appendix D.

5.2 Public Consultation

5.2.1 Initial Public Notice

Contents:	General study description, summary of proposed work, key plan
Issued:	January 12, 2022
Placed In:	Stratford Beacon Herald, Marketplace (January 12 & 19, 2022)
Circulated To:	Shakespeare property owners
Input Period:	Concluded February 11, 2022

5.2.2 Notice to Residents

All Shakespeare property owners were sent a letter explaining the Class EA process and a copy of the Notice of Study Commencement on January 10, 2022. This correspondence provided property owners with the opportunity to provide input on the Class EA process as well as to provide feedback on the potential impacts to their property or to the general study area.

Thirty-Three (33) responses were received from residents during the initial consultation period which concluded on February 11, 2022. A summary of comments received during the first consultation period is provided below. Copies of correspondence are in Appendix D.

- Twenty-Seven (27) residents with private wells were opposed to connecting to the municipal water system due to multiple reasons including:
    - Water quality of the municipal water (arsenic, high chlorine levels, orange colour, bad taste).
    - Preferred their own well and felt that private treatment systems provided sufficient filtering for arsenic and other impurities.
    - High cost for monthly fees and to connect to municipal well.
    - Recent installation of private well and the associated costs.
    - It is unnecessary.

- 2 residents supported the idea of all residents in Shakespeare connecting to the municipal water.
- 1 resident was concerned regarding the current arsenic levels in the municipal water and 1 resident supported the idea of addressing the high amounts of arsenic in the municipal water.
- 2 residents suggested locations for the installation of a new well.

5.2.3 Project Update

Following the significant response received from the community after the initial consultation phase, a project update letter was sent to residents on April 29, 2022 to clarify the purpose of the Class EA. Fourteen additional responses were received during the second consultation period which concluded on May 27, 2022. A summary of comments received during the second consultation period is provided below:

- 9 residents with private wells were opposed to connecting to the municipal water system.
- 1 resident inquired about the scope of the project.
- 1 resident was concerned about the costs of the upgrades.
- 1 resident supported the idea of additional water storage for fire protection.
- 3 residents were opposed to the idea of providing fire protection to the community for multiple reasons including:
  - It is unnecessary.
  - Too costly.
- 1 resident was concerned with arsenic levels in the municipal water system.

Input received from residents as a result of the Notice of Study Commencement and a later Project Update Letter can be found in Appendix E.

5.2.4 December 13 Public Open House

A public open house was arranged to provide additional information to residents on the Class EA alternatives which were identified for the project. Notice of the public open house was mailed to all property owners in Shakespeare on November 23, 2022 and the meeting was held on Tuesday, December 13, 2022 at Sprucedale Public School, in Shakespeare. An audio version of the presentation was posted on the Township website in advance to provide residents with an opportunity to review the material before the meeting. Display boards were also mounted around the perimeter of the room with additional project details. The pre-recorded presentation was available for residents to view. The general purpose of the meeting was to provide residents with the following:

- Project background
- A summary of the Schedule ‘B’ Class EA process
- A summary of input received from the public and agencies

- A description of the alternatives, including potential cost estimates
- A summary of future actions needed to complete the process

A comment sheet was provided to all residents in attendance at the meeting asking them to indicate a preferred alternative, based on the information provided at the Open House. The comment sheet was also made available in a digital format on the Township website. The information was used to assist council with their selection of a preliminary preferred alternative.

There were approximately 53 residents and stakeholders in attendance at the meeting. Notes can be found in Appendix D along with a copy of the presentation material and the information from the comment sheets submitted during and following the meeting.

5.2.5 Notice of Study Completion

A Notice of Completion was published for the project on April 20, 2023. The Notice included a brief description of the project and provided the preferred alternative selected by the Township following the completion of this study. The Notice was published for two consecutive weeks in a local newspaper, published on the Township website, directly mailed to all residents of the community and emailed directly to local residents who provided input throughout the study.

Two comments were received during the Notice of Completion review period. A summary of the comments is provided below:

- A local resident expressed concern about how costs associated with the upgrades would be distributed. Comments were forwarded to Township staff for consideration.
- A local resident provided comments based on a review of the Class EA documents from commencement to completion. The resident had concerns that the justification for fire protection was not supported effectively, concerns that some issues investigated in the Class EA were not within the scope of the study, concerns about the preferred site, and concerns about the financial aspects of the project. A complete copy of this comment can be found in Appendix E.

5.3 Government Reviewing Agencies

5.3.1 Notice of Project Commencement Phase

Input into the Class EA process was solicited from government review agencies by way of direct mail correspondence. Agencies that might have an interest in the project were initially sent a letter detailing the nature of the project and a copy of the Notice of Study Commencement. Appendix D contains a copy of the information circulated to the review agencies and a list of the agencies contacted. Written correspondence received from agencies is also provided. A summary of the comments can be found in Table 5.1.

Table 5.1: Summary of Review Agency Comments

Review Agency	Comments	Action Taken
Julie Welker, Source Protection Coordinator Thames-Sydenham and Region Drinking Water Source Protection (email) January 12, 2022	- Acknowledged receipt of the Notice of Project Initiation. - Provided several bulletins produced by the Province regarding changes associated with the Safe Drinking Water Act as a reminder to engage early.	- Forwarded to project team.
Mark Badali, Ministry of the Environment, Conservation and Parks (via email) February 3, 2022	- Acknowledged receipt of the Notice of Project Initiation. - Advised that the Township is required to address impacts to source water protection, climate change adaptation and mitigation to species at risk and their habitats, through Class EA process. - Consultation with Indigenous communities is required. - Provided additional guidance on other aspects of the environment that could be impacted by the project.	- Forwarded to project team.
Joseph Harvey, Heritage Planner, Ministry of Heritage, Sport, Tourism and Culture Industries (via email) February 11, 2022	- Advised that the Ministry had received the notice of commencement. - Need to assess potential impacts to cultural heritage features, including archaeological resources, built heritage resources and cultural heritage landscapes. - Checklists were provided to assist with determinations.	- Forwarded to the project team.

5.3.2 Project Update Letter

Following Council's selection of a preliminary preferred alternative, an update letter was compiled for review agencies that outlined the alternatives identified for the project and the preferred alternative selected by council. The update letter was sent to the same agencies that were initially contacted. The update letter was sent on January 18, 2023, with the review period concluded on February 28, 2023. A summary of feedback received from agencies is included in the following Table.

Table 5.2: Summary of Review Agency Comments: Project Update Letter

Review Agency	Comments	Action Taken
Sally McMullen Manager of Planning Corporation of the County of Perth January 18, 2023 (via email)	- Asked for clarification on what input was expected. - Asked for additional details related to the preferred alternative and how many additional residents could be serviced as a result.	- Advised that the letter was intended to provide an update on the preferred alternative selected by Council. - Additional details provided.
Karla Barboza, Heritage Planner, Ministry of Citizenship and Multiculturalism (via email) January 19, 2023	- Please send a draft of the report to both Joseph Harvey and Karla for review.	- A copy of the draft Environmental Study Report was forwarded for review.
Julie Welker, Source Protection Coordinator Thames-Sydenham and Region Drinking Water Source Protection (email) January 20, 2023	- Acknowledged receipt of the Project Update Letter. - Would be happy to review a draft report when available.	- A copy of the draft Environmental Study Report was forwarded for review.
Mark Badali, Ministry of Environment, Conservation and Parks (via email) January 30, 2023	- Advised that BMROSS could forward a draft copy of the report to him for review.	- Forwarded the draft report for review.
Mark Badali, Ministry of Environment, Conservation and Parks (via email) March 23, 2023	- Provided input on the draft Environmental Study Report.	- Report updated based on comments from MECP.
Joseph Harvey, Heritage Planner, Ministry of Citizenship and Multiculturalism (via email) March 30, 2023	- Provided input on the draft Environmental Study Report.	- Report updated based on comments from MCM.

5.3.3 Notice of Study Completion Phase

A Notice of Study completion was published for the project on April 20, 2023. The Notice included a brief description of the project and provided the preferred alternative selected by the Township following completion of the Class EA. The Notice was emailed or mailed to the list of review agencies identified at the start of the Class EA process. A summary of feedback received from agencies is provided in the following Table.

Table 5.3: Summary of Review Agency Comments: Notice of Completion

Review Agency	Comments	Action Taken
Joseph Harvey Heritage Planner Ministry of Citizenship and Multiculturalism (via email) May 15, 2023	- Provided comments on the Final Screening Report.	- Report updated based on the comments from MCM.
Mark Badali Ministry of Environment, Conservation and Parks (via email) May 17, 2023	- Thanked us for integrating previous feedback into final Report.	- Information noted and filed.

5.4 Indigenous Consultation

5.4.1 Consultation Process

The Crown has a duty to consult with First Nation and Métis communities if there is a potential to impact on Indigenous or treaty rights. This requirement is delegated to project proponents as part of the Class EA process; therefore, the project proponent has a responsibility to conduct adequate and thorough consultation with Indigenous communities as part of the Class EA consultation process.

5.4.2 Results of Indigenous Consultation

In order to identify aboriginal communities potentially impacted by the project, the Aboriginal and Treaty Rights Information System (ATRIS) was consulted. A search was conducted for Indigenous communities, including their traditional territories, within a 50 km radius of the project study area. Utilizing this process twelve Indigenous communities/organizations were identified in conjunction with this project including:

- Chippewas of Kettle and Stony Point First Nations
- Aamjiwnaang First Nations
- Chippewas of the Thames First Nation
- Oneida Nation of the Thames
- Munsee-Delaware Nation
- Métis Nation of Ontario

- Chippewas of Nawash Unceded First Nation
- Chippewas of Saugeen First Nation
- Saugeen Ojibway Nation (SON) – Chippewas of Saugeen & Chippewas of Nawash
- Great Lakes Métis Council
- Walpole Island First Nation (Bkejwanong Territory)
- Caldwell First Nation.

The project study area contains a number of sensitive natural features that may be of concern to First Nation and Métis communities in the area. These features include a tributary of the Nith River (Grand River Watershed) and a tributary of the Thames River (Upper Thames River Watershed). Correspondence was subsequently forwarded to each community/organization detailing the project and asking for input. Copies of all correspondence received or sent is included in Appendix D. Table 5.4 summarizes the comments received as a result of this consultation.

Table 5.4: Summary of Indigenous Comments

Indigenous Community	Comments	Action Taken
Emily Martin, Resources and Infrastructure Associate Saugeen Ojibway Nation (SON) (via email) January 12, 2022	- Thanked us for reaching out to the Saugeen Ojibway Nation's Environment Office. - The project is located outside of their traditional territory so they will not be participating in consultation.	- Comments noted and filed.
Fallon Burch, Consultation Coordinator, Chippewas of the Thames First Nation (via email) January 17, 2022	- The project study area is located within the Chippewas of the Thames First Nation (COTTFN) Big Bear Creek Additions to Reserve Land Selection Area and COTTFN's traditional territories. - No concerns with the project as presented, however would like to stay involved and be advised if the scope of the project changes.	- Comments noted and filed.

5.4.3 Project Update Letter

Following Council's selection of a preliminary preferred alternative, an update letter was compiled for Indigenous Communities that outlined the alternatives identified for the project and the preferred alternative selected by council. The update letter was sent to the same communities that were initially contacted, except SON who indicated the project was outside their traditional territory. The update letter was sent on January 18, 2023 with the review period concluded on February 28, 2023. No additional feedback was received from the identified indigenous communities.

5.4.4 Notice of Completion

A Notice of Completion was published for the project on April 20, 2023. The Notice included a brief description of the project and provided the preferred alternative selected by the Township following the completion of the study. The Notice was emailed or mailed to the identified Indigenous Communities contacted at the start of the Class EA process.

Table 5.5: Summary of Indigenous Comments: Notice of Completion

Indigenous Community	Comments	Action Taken
Fallon Burch, Consultation Coordinator, Chippewas of the Thames First Nation (via email) May 16, 2023	- No concerns with the project as proposed. Requested to stay involved and be advised if the scope of the project changes in a substantive manner.	- Comments noted and filed.

5.5 Consultation Summary

The consultation program developed for this project was directed towards Shakespeare property owners, project stakeholders, federal/provincial review agencies and Indigenous communities. Significant feedback was received from residents. The majority of comments received were from private well owners who are opposed to connecting to the municipal well supply. Other comments received from residents included concerns regarding current arsenic levels and costs of upgrades. Agency feedback was received from the Thames-Sydenham and Region Drinking Water Source Protection, MECP and MCM. Input from Indigenous communities was received from SON and COTTFN.

6.0 PROJECT IMPLEMENTATION

6.1 Selection of a Preferred Alternative

Given the foregoing, **Alternative 2 – Provide Treatment that Maximizes Future Opportunities** was identified as the preferred solution to the identified problem. Specifically, it was decided to construct a treatment storage facility at Location 2 between Highway 7/8 and Stevenson Street. The facility would have a reservoir and both high-lift and fire pump systems. Figure 6.1 illustrates the proposed facility's location and appearance.

6.2 Final Public Consultation

A Notice of Study Completion was recently circulated to local residents, Indigenous Communities and government review agencies. The notice identified the preferred Class EA alternative and indicated the approval process needed to move forward with implementation. The following summarizes the distribution of the Notice.

Contents:	Identification of preferred solution, key project components, key plan
Issued:	April 17, 2023
Placed In:	Stratford Beacon Herald, Marketplace, April 17 & 24, 2023
Distributed to:	Shakespeare Residents, Review Agencies, Indigenous Communities
Review Period:	Concludes May 17, 2023

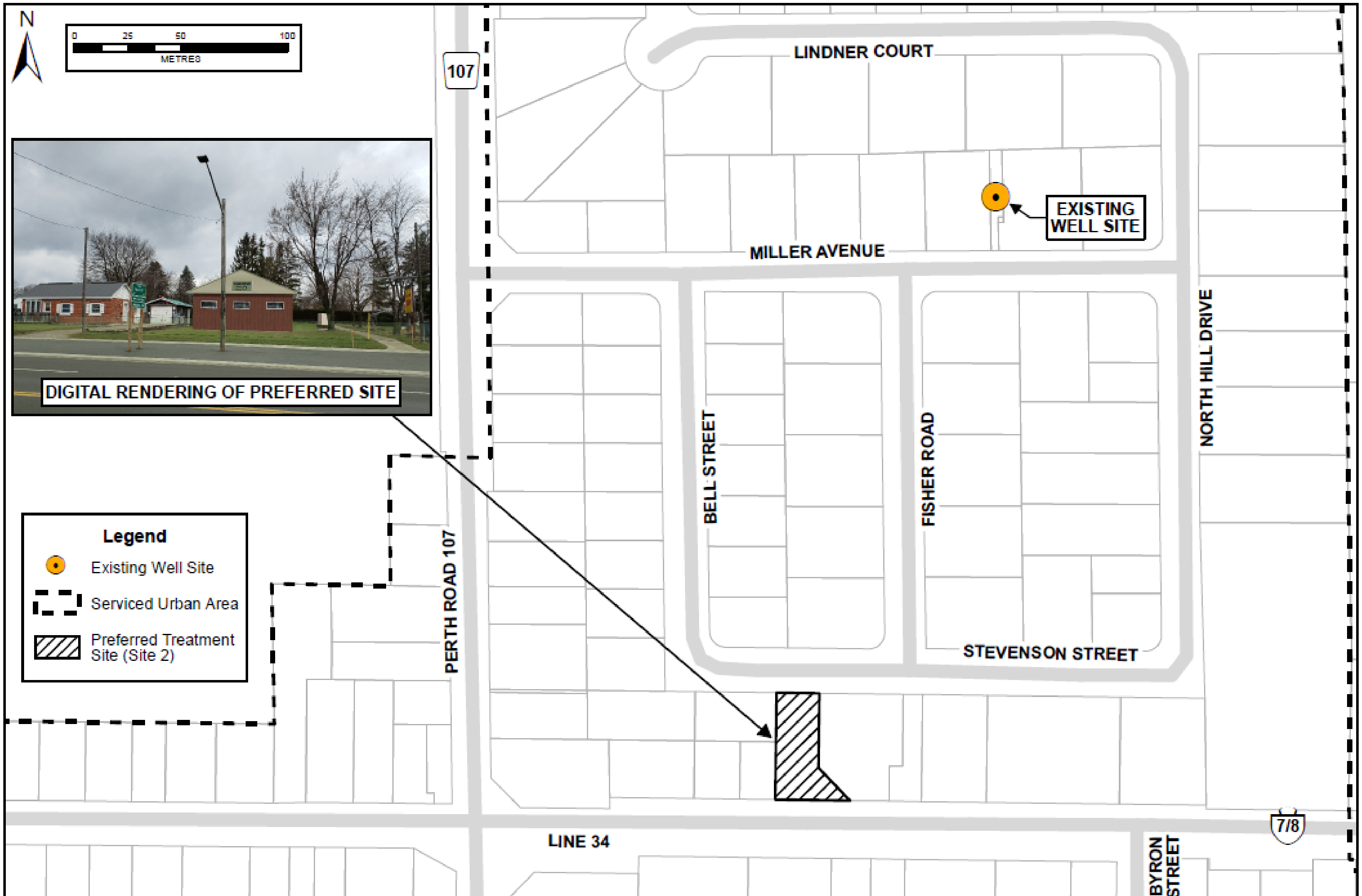
6.3 Class EA Schedule

The recommended solution has been evaluated as a Schedule B project under the terms of the Class EA document, as the project involves the possible installation of treatment technologies which may require connection to the municipal sanitary collection system to dispose of waste residues and the construction of a water storage reservoir. The project is approved following the completion of an environmental screening process.

The following activities are required to complete the formal Class EA screening process:

- Complete the 30-day review period, defined in the Notice of Study Completion.
- Address any outstanding issues arising from the 30-day review.
- Finalize the Screening Report.
- Formal notification to the Township and the MECP when the Class EA study process is complete.
- Obtain necessary approvals.

Figure 6.1: Preferred Site Location



BMROSS engineering better communities	**TOWNSHIP OF PERTH EAST** MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT FOR WATER SYSTEM UPGRADES - SHAKESPEARE **PREFERRED SITE LOCATION**	DATE JAN. 17, 2023	PROJECT No. 21270
		SCALE AS SHOWN	FIGURE No. 6.1

7.0 APPROVALS

7.1 Safe Drinking Water Act

Modifications to the water system require an amendment to the Township's Municipal Drinking Water License and Drinking Water Works Permit, issued under the Safe Drinking Water Act.

7.2 Ontario Water Resources Act

Discharge of treatment residues to the sanitary collection system would be subject to the *Ontario Water Resources Act*.

7.3 Ontario Heritage Act

Compliance with recommendations of the Stage 1-2 archaeological assessment.

Should previously undocumented archaeological resources be discovered, there 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 consultant archaeologist to carry out an archaeological assessment, in compliance with Section 48(1) of the Ontario Heritage Act.

The Funeral, Burial and Cremation Services Act, 2002, S.O. 2002, c.33 requires that any person discovering human remains must cease all activities immediately and notify the police or coroner. If the coroner does not suspect foul play in the disposition of the remains, in accordance with Ontario Regulation 30/11 the coroner shall notify the Registrar, Ontario Ministry of Public and Business Service Delivery, which administers provision of that Act related to burial sites. In situations where human remains are associated with archaeological resources, the Ministry of Citizenship and Multiculturalism should also be notified (at archaeology@ontario.ca) to ensure that the archaeological site is not subject to unlicensed alterations which would be a contravention of the Ontario Heritage Act.

7.4 Ontario Regulation 406/19 – Excess Soil Management

That management of excess soils will be completed in conformity with guidelines and regulations issued under Ontario Regulation 406/19 – On-Site and Excess Soil Management regulation.

Additional soil testing will be completed as part of the on-site geotechnical investigations in support of the regulation criteria above and to address soil quality concerns identified during the Historical Information Review (MTE, 2022).

8.0 PROJECT SCHEDULE

Following completion of the Class EA investigation, the Township intends to complete the selection of the arsenic treatment process and then proceed with the final design and construction of the works associated with this project. Timing of construction will be dependent on receipt of necessary approvals. The project will be completed by a qualified contractor following a competitive selection process. Following construction and commissioning of the facilities, the Township will maintain the physical condition and operate the built works and perform all necessary work in accordance with the requirements of applicable regulatory agencies.

9.0 SUMMARY

This report documents the Municipal Class Environmental Assessment (EA) process conducted to address elevated arsenic concentrations present within the municipal water supply in the community of Shakespeare. Background arsenic concentrations have been present in the well supply since its development. However, recent changes to the standard established by the province, means that the concentrations no longer meet provincial criteria. Upgrades to the supply are required to address the new criteria. A Schedule B Class EA process was initiated by the Township to investigate alternatives available to reduce the arsenic levels.

A background review was carried out to characterize the project study area and identify factors influencing the selection of the alternative solutions. The background review included investigations of heritage and cultural landscapes, natural heritage landscapes, species at risk, local planning policies, hydrogeological context, and an examination of the existing well supply facilities. The background review found no sensitive natural features within the study area and no habitat opportunities for species at risk.

A review of the existing water works facilities included an analysis of the current system capacity, service area, and water usage. Presently, there are two municipal wells (Wells 1 and 2) located within an existing residential subdivision in the northeast corner of Shakespeare. A well house is located adjacent to the two wells to house mechanical and electrical components and provide required treatment facilities. A back-up diesel generator is also located adjacent to the well house. Presently, the water system serves approximately 168 service connections within the community.

The following problem was identified for the Class EA investigation:

> *The existing water supply serving portions of the community of Shakespeare has concentrations of arsenic that exceed the Ontario Drinking Water Quality Standard, O. Reg 169/03. Treating the water to lower arsenic concentrations is feasible. Providing treated water storage facilities in conjunction with treatment has the potential benefit of increasing both the system servicing capacity and value to the community.*

To address the problem, three alternative solutions were identified:

- Alternative 1: Provide Treatment at the Existing Well Site
- Alternative 2: Provide Treatment that Maximizes Future Opportunities
- Alternative 3: Do nothing

Based on the assessments undertaken and a review of the environmental components associated with the project, Alternative 2 was identified as the preferred solution. In conjunction with the preferred alternative, Council also identified Option 2C, which is construction of a 345 m^3 water storage reservoir, high-lift and fire pumps at Location 2, as the preferred location and facility design.

There are a number of attributes associated with Alternative 2 which justified its selection as the preferred option to address the elevated arsenic concentrations present in the Shakespeare water supply. These are:

- It provides Shakespeare with an improved water supply that, once implemented, will meet all provincial water quality standards.
- It meets the goal of providing opportunities for growth (e.g. increases the system capacity from 258 to 436 users) and fire protection (e.g. provides reservoir storage).
- It can be constructed on Township owned land within economic distance of the existing facilities.
- It requires no significant modifications to the existing wells or distribution network.
- The impact of the new facilities on the adjacent properties will be substantially less than for Alternative 1.
- Improves system security for existing water customers by providing water storage during periods of high use, power outages, or other service interruptions.

The proposed project has been evaluated as a Schedule B activity under the terms of the MEA Class EA and is approved subject to the completion of this screening process. The Township of Perth East intends to proceed with the implementation of this project upon completion of the Class EA investigation and after the receipt of all necessary approvals.

All of which is respectfully submitted.

B. M. ROSS AND ASSOCIATES LIMITED

Per ________________________________
Stephen Burns, P. Eng.

Per ________________________________
Kelly Vader, RPP
Environmental Planner

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REFERENCES

1. Municipal Engineers Association. (October 2000 as amended in 2007, 2011, 2015). *Municipal Class Environmental Assessment*.
2. Statistics Canada. (2017). Released November 29, 2017. Perth East Census Profile. 2016 Census. Statistics Canada Catalogue no. 98-316-X2016001. Ottawa.
3. Chapman, L.J. and Putnam, D.F. (1984). *The Physiography of Southern Ontario*. Third Edition.
4. Hoffman, D.W., and Richards. N.R. (April, 1952). Soil Survey of Perth County. Report No. 15 of the Ontario Soil Survey.
5. Ontario Ministry of Natural Resources and Forestry. (2020). *Species at Risk by Area.*
6. Ontario Ministry of Natural Resources and Forestry. (2020). *Natural Heritage Information Centre.*
7. Government of Canada. (2020). Species at Risk Public Registry – SARA Schedule 1 Species List.
8. Bird Studies Canada, Environment Canada's Canadian Wildlife Service, Ontario Nature, Ontario Field Ornithologists and Ontario Ministry of Natural Resources. Ontario *Breeding Bird Atlas*.
9. Clean Water Act. 2006. S.O. 2006, c. 22.
10. Thames-Sydenham and Region Source Protection Committee. (September 17, 2015). *Thames-Sydenham and Region Source Protection Plan.*
11. County of Perth. (March 2020). Consolidated County of Perth Official Plan.
12. B. M. Ross and Associates Limited. (August 15, 2018). The Township of Perth East Water and Wastewater Master Plan (Milverton and Shakespeare).
13. Watson & Associates Economists Ltd. (April 21, 2020). Official Plan Update – Comprehensive Review, Perth County.
14. Ontario Ministry of Environment and Climate Change. (Nov. 2020). Municipal Drinking Water Licence. Shakespeare. Licence number: 053-101. Issue number 8. Issue Date: November 24, 2020.
15. MTE Consultants. (February 14, 2022). Site Historical Information Review, Township Sites 2 & 3, Shakespeare, ON (the Sites).