TAVISTOCK NEW WELL SUPPLY - SCHEDULE C MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT

Environmental Study Report

December 2024

FINAL REPORT

Prepared for:
Oxford County

Prepared by:
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Project Number:
165630184

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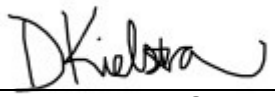
Prepared by: 

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Executive Summary

Overview

The County of Oxford (Oxford County) has retained Stantec Consulting Ltd. (Stantec) to conduct a Municipal Class Environmental Assessment (Class EA), to determine a new well supply solution for the Village of Tavistock, Township of East Zorra-Tavistock.

The Class EA Study is being planned in accordance with the planning and design process for Schedule "C" projects as outlined in the *Municipal Engineers Association Municipal Class Environmental Assessment Document* (2000, as amended 2007, 2011, 2015), which is an approved process under Ontario's *Environmental Assessment Act*. This project was initiated prior to the release of the 2023 Municipal Class EA document in March 2023, which provided updates to the classification of some projects, although the general process is unchanged. As such, the 2015 MEA document continued to govern the EA process for this study.

This Environmental Study Report (ESR) was completed to define the problem and opportunity, consider existing conditions, and document the decision-making process for developing the preferred design based on consultation with agencies, Indigenous communities, and the public.

Existing Conditions

The existing Tavistock water supply system currently receives water services from three wells located within the centre of the Village, near Queen's Park. The County of Oxford owns and operates the three production wells in addition to treatment and storage facilities located at the same site which provide a water supply to the community. Conditions within the current Permit to Take Water prevents two of the wells from operating at the same time, which limits the maximum permitted supply capacity. Planned growth will result in an increase in water demands, which is anticipated to exceed the existing maximum capacity within the 20-year planning period. In addition, the County identified existing pressure fluctuations within the distribution system in the northwest area, in the vicinity of an industrial customer as a result of water demand patterns.

The Study Area for the project is located in Tavistock, a community within the Township of East Zorra-Tavistock in Oxford County. The Study Area is shown on **Figure 1**.

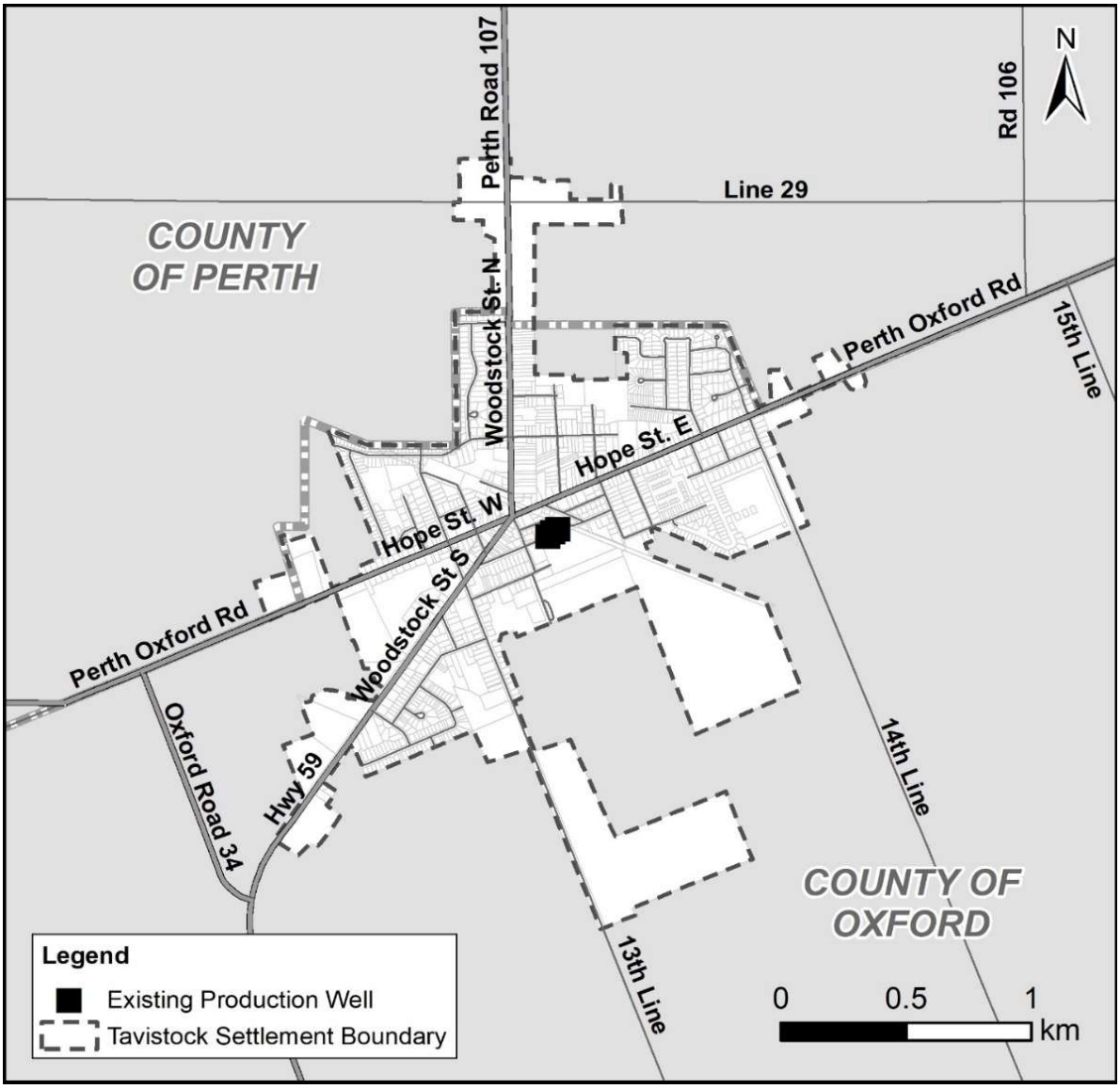


Figure 1: Study Area[1]

EA Process

A problem and opportunity statement was developed as part of Phase 1 of the EA process. The statement identified that alternatives would be developed to provide redundancy and water supply security for the existing water supply, as well as to identify whether additional water is available to address future population growth and development in Tavistock. Phase 2 of the EA consisted of an inventory of the natural, social, and economic environments in the Study Area, as well as the identification and

[1] Note that the study limits do not imply servicing or development potential.

evaluation of Alternative Solutions. The inventory was focused on areas associated with three test well locations that were identified based on hydrogeological investigations.

The project included publication of the Notice of Study Commencement in the Oxford Sentinel Review on February 24 and March 3, 2022, as well as on the County of Oxford website (https://speakup.oxfordcounty.ca/new-well-supply-tavistock). Notification was also provided to relevant agencies, Indigenous communities, and property owners within 150 m of the three test well sites in Tavistock.

This project included other opportunities for public engagement, including two Public Consultation Centres (PCCs). PCC 1 was held virtually, with presentation materials also made available online following the online meeting on December 8, 2022, where the Alternative Solutions assessment was presented. PCC 2 was held online on September 26, 2023, and presented the evaluation of Alternative Design solutions.

Evaluation of Opportunities

A long list of potential Alternative Design solutions was prepared based on their ability to address the problem and opportunity statement. The Study weighed the potential impact of water conservation and efficiency measures against the attainment of its objectives. It was concluded that while these initiatives remain pivotal in the County's water management strategy, they alone cannot adequately meet the study's objectives. Therefore, rather than treating water conservation and efficiency efforts as standalone solutions, they are recognized as indispensable components integrated within any proposed alternative solution, ensuring their ongoing implementation as an integral component of the final resolution.

Three alternatives were carried forward for further evaluation: ‘Do Nothing’, ‘Water Supply from Adjacent System’, and ‘New Well at a Different Site’. To support the assessment of the ‘New Well at a Different Site’ alternative, three locations were selected for the advancement of a test well to assess the water supply potential at each site.

The three locations were quantitatively evaluated against social, cultural, natural, and technical environment criteria, and were assessed from a financial perspective. The evaluation determined that the ‘New Well at a Different Site’ was the most preferred alternative solution. It was determined that Test Well 3 (TW3) was the preliminary preferred location for a new well for the following reasons:

- Maintains the preferred localized footprint for infrastructure and construction-related impacts such as noise, traffic, and aesthetics.
- Achieved the highest expected well yield.
- Minimal environmental impact and avoids designated natural environment features.

The Alternative Design phase evaluated two design alternatives for the new well site. Decentralized (on-site) and centralized (at existing site) treatment options were identified and evaluated against social, cultural, natural, and technical environment criteria, and were assessed from a financial perspective. It was determined that decentralized treatment is the preferred design option for the project for the following reasons:

- The solution can be designed with consideration for current and future treatment requirements, as well as existing water conservation efforts
- Infrastructure and construction-related impacts, such as noise, traffic, and aesthetics, are localized to the site
- Avoids the need for significant watermain installation within existing rights-of-way
- Addresses local growth potential and improves the resiliency and redundancy of the water supply system

Water treatment requirements were then considered as part of further technical review completed in the Alternative Designs phase.

Several parameters were identified that resulted in the selection of the potential treatment options including free ammonia, iron, manganese, and strontium. Free ammonia can be removed by the addition of chlorine to the water, which is also required for disinfection purposes. Iron and manganese treatment can be achieved through sequestration or physical removal. Lastly, the removal of strontium, although not presently required, can be achieved through ion exchange (IX). These treatment options were considered when developing the Alternative Design Concepts.

In addition, the County of Oxford's 2024 Water and Wastewater Master Plan identified existing water storage deficiencies in Tavistock. As such, in-ground and on-ground storage alternatives were considered when developing the Alternative Design Concepts.

Six Alternative Design Concepts with different storage and treatment options were developed and evaluated to determine the preferred Alternative Design Concept for the project. The alternatives were evaluated based on their technical and financial feasibility, as well as potential impacts to adjacent properties from siting of the infrastructure.

Preferred Design Concept Overview

The Alternative Design Concept evaluation determined that the two-stage pumping with iron/manganese filtration and split-stream IX treatment is the preferred design concept. This design concept also includes an on-ground equalization storage tank at the back of the property. The concept is presented in **Figure 2**. This alternative was selected as the preferred design concept for the following reasons:

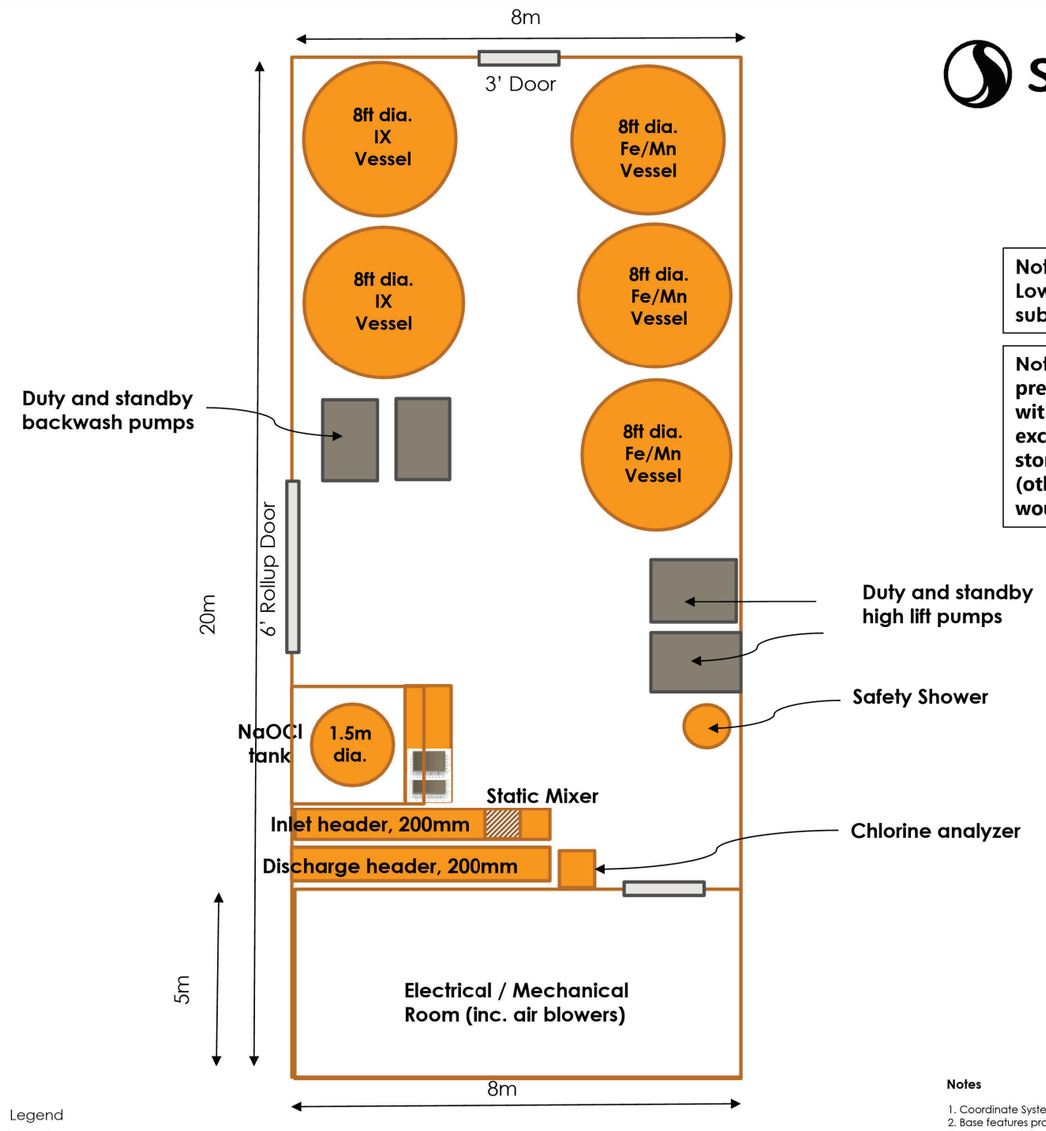
- Provides an opportunity to supplement storage in the overall Tavistock water supply system
- Provides an ability to potentially mitigate transient issues that are occurring in this vicinity of Tavistock due to nearby industrial use and water demand patterns, including a reduction in pressure fluctuations in the localized distribution system
- Includes catalytic iron-removing filters which is preferred over iron sequestering given the concentrations in the raw water source
- On-ground reservoir for storage is lower in cost than construction of in-ground storage
- Option allows for implementation of IX treatment should future water quality regulations related to strontium come into effect. Depending on timing of work and status of regulatory changes, Oxford County can choose to defer equipment installation if desired. Backwash supply volume for IX would need to be considered during on-site storage volume sizing
- While higher in capital cost versus most other design options, this option achieves the key servicing objectives

Next Steps

It is anticipated that a future Detailed Design assignment will further refine the design basis and may require modifications to the approximate sizes of the major facilities as noted in the concept plan. In addition, further review of the on-site storage may be required to optimize its location on site based on comments raised by nearby residents. Lastly, further environmental investigations will be conducted during Detailed Design once the final site footprint has been confirmed:

- A Noise Study to consider operational noise from the new well
- Site-specific terrestrial and fish habitat investigations to inventory and confirm existing conditions, including potential species at risk or species of conservation concern, and potential impacts
- Complete any subsequent recommended archaeological assessments (i.e., Stages 2 to 4) based on the recommendations of the Stage 1 Archaeological Assessment, as required

Following the 30-day public review period and Ministry of the Environment, Conservation and Parks review period, the municipality is permitted to proceed to detailed design and implementation.



Legend

- Generator
- New Production Well (Approx. Location)
- Raw Water Line
- Treated Water Line
- Backwash Line
- Proposed New Path
- CT Pipes
- Backwash EQ Tank
- EQ Tank
- Proposed Water Treatment Plant

0 10 20 Meters

Stantec

Note [1]:
Low Lift Pumping = submersible pump in well

Note [2]:
pressure tanks are excluded with option to discharge excess flows back to storage using PRVs (otherwise, pressure tanks would be necessary).

Notes

1. Coordinate System:NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2022.

Project Location REVA

Prepared by jacwalker on 2023-08-16
Technical Review by ABC on yyyy-mm-dd

Client/Project
County of Oxford
Tavistock Well 4 Class EA

Figure No.
6a

Title
Site Layout Option 6a
Two-Stage Pumping, Split-Stream IX Treatment, On-Grade Storage

1 Introduction

The Village of Tavistock currently receives water services from three wells located within the centre of the Village, near Queen's Park. The County of Oxford owns and operates the three production wells in addition to treatment and storage located at the same site which provides water supply to the community.

The County of Oxford (Oxford County) has retained Stantec Consulting Ltd. (Stantec) to conduct a Municipal Class Environmental Assessment (Class EA Study), to determine a long-term water servicing solution for the Village of Tavistock, Township of East Zorra-Tavistock.

1.1 Project Context and Background

This project was initiated to provide redundancy and water supply security for the existing water supply, as well as to identify whether additional water is available to address future population growth and development in Tavistock.

The three existing wells consist of one overburden production well (Well 1 [W1], rated at 900 L/min) and two bedrock wells (Well 2 [W2A], rated at 1,920 L/min, and Well 3 [W3], rated at 3,000 L/min).

Conditions within the current Permit to Take Water (PTTW) prevents W2A and W3 from operating at the same time, which limits the maximum permitted supply capacity. Planned growth will result in an increase in water demands which is anticipated to exceed the maximum capacity within the 20-year planning period, as discussed in **Section 4.2**.

This Class EA Study is being undertaken in accordance with the planning and design process for Schedule "C" projects, as outlined in the *Municipal Engineers Association Municipal Class Environmental Assessment Document* (2000, as amended 2007, 2011, 2015), which is an approved process under Ontario's *Environmental Assessment Act* (EA Act).

The project was initiated prior to the release of the 2023 Municipal Class EA document in March 2023, which provided updates to the classification of some projects, although the general process is unchanged. As such, the 2015 MEA document continued to govern the EA process for this study.

This Environmental Study Report (ESR) documents the Municipal Class EA process that was followed. The ESR was also completed to define the problem and opportunity, consider existing conditions, and documents the decision-making process for

developing the preferred design based on consultation with agencies, Indigenous communities, and the public.

1.2 Study Area

The Study Area for the project is located in Tavistock, a community within the Township of East Zorra-Tavistock in Oxford County. The Study Area is shown on **Figure 1**.

2 Environmental Assessment Process

2.1 Municipal Class Planning Process

All municipalities in Ontario are subject to the provisions of the EA Act, which mandates the completion of an Environmental Assessment (EA) before constructing municipal infrastructure projects. The environments included under the EA Act encompass social, cultural, natural, and economic aspects of Ontario. The Ministry of the Environment, Conservation and Parks (MECP) is responsible for administration of the EA Act.

The Municipal Engineers Association (MEA) *Municipal Class Environmental Assessment* document (October 2000, as amended in 2007, 2011, 2015), provides guidelines approved under the EA Act which protect the environment during the completion of municipal road, sewage, and water infrastructure projects. The undertakings are considered pre-approved provided the mandatory environmental planning process, as set out in the Municipal Class EA document, is completed. The MEA Municipal Class EA document provides municipalities with a five-phase planning process approved under the EA Act to plan and undertake all municipal infrastructure projects in a manner that protects the environment.

This project was initiated prior to the release of the 2023 Municipal Class EA document in March 2023, which provided updates to the classification of some projects, although the general process is unchanged. As such, the 2015 MEA document continued to govern the EA process for this study.

Key components of the Class EA planning process include:

- Consultation with potentially affected parties early and throughout the process;
- Consideration of a reasonable range of alternative solutions;
- Systematic evaluation of alternatives;
- Clear and transparent documentation; and
- Traceable decision-making.

The MEA Municipal Class EA document provides a framework by which projects are classified as Schedule A, A+, B, or C based on a variety of factors including the general complexity of the project, level of investigation required, and the potential impacts on the natural, social, cultural, and economic environments that may occur. Each schedule classification requires a different level of documentation and review to be compliant with the EA Act and satisfy the requirements of the Municipal Class EA. Schedule A and A+ are exempt of certain report requirements since they are pre-approved. The proponent is responsible for identifying the appropriate schedule for any given project and reviewing the applicability of the schedule at multiple stages throughout the project.

Schedule A projects are limited in scale with minimal anticipated environmental impacts. They are pre-approved and may be implemented without undertaking public consultation or following the planning process as outlined in the Municipal Class EA. Examples of Schedule A projects include on-going maintenance activities, normal operation of sewage treatment plants, and increasing pumping station capacity by adding or replacing equipment where new equipment is located within an existing building or structure.

Schedule A+ projects are similarly pre-approved but require that proponents notify potentially affected parties prior to implementation. An example of a Schedule A+ project includes retiring a water infrastructure facility or retrofitting a facility for improvements.

Schedule B projects have the potential for some adverse environmental and social impacts. Thus, proponents are required to undertake a screening process involving mandatory contact with potentially affected members of the public, Indigenous communities, and relevant review agencies to ensure that they are aware of the project and that their concerns are addressed. Schedule B projects require the completion of Phases 1 and 2 of the Municipal Class EA planning process, which is documented in a Project File and submitted for a mandatory 30-day comment period.

Schedule C projects have the potential for significant environmental impacts and must follow the full planning process specified in the Municipal Class EA document, including Phases 1 through 4. The project is documented in an ESR, which is then filed for a mandatory 30-day comment period. Projects generally include the construction of new facilities, and major expansions to existing facilities. The current Tavistock New Well Study is a Schedule C project.

2.2 Planning Process

Figure 3 illustrates the Municipal Class EA planning process and identifies the steps considered mandatory for compliance with the requirements of the EA Act.

In accordance with the Municipal Class EA document, this study is being planned as a Schedule C undertaking, which will include the completion of Phases 1-4 of the

Municipal Class EA study process. Under the Municipal Class EA, Schedule C undertakings include construction of a new water system including construction of a new well or a new water treatment plant.

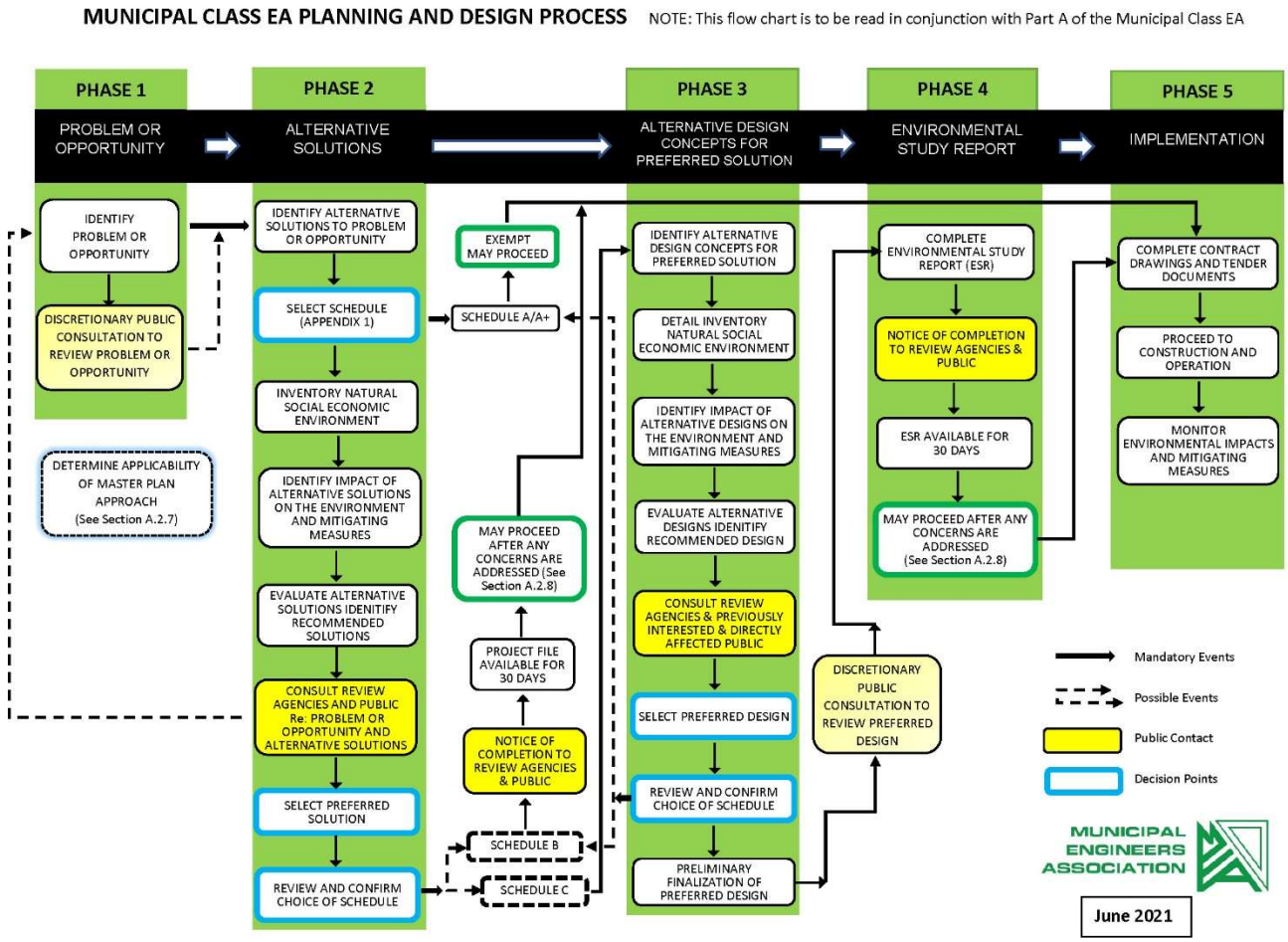


Figure 3: MEA Municipal Class EA Planning and Design Process (2015)

2.3 Section 16 Order Process

Following the filing of the Notice of Completion, a request may be made to the Minister of the Environment, Conservation and Parks under Section 16 of the EA Act 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., requiring further studies), only on the grounds that the requested order may prevent, mitigate, or remedy adverse

impacts to constitutionally protected Aboriginal and treaty rights. Requests on other grounds will not be considered. Requests should include the requester's contact information and full name for the MECP.

Requests should specify what kind of order is being requested (i.e., request for additional conditions or a request for an individual/comprehensive EA), how an order may prevent, mitigate, or remedy potential adverse impacts to constitutionally protected Aboriginal and treaty rights, and any information in support of the statements in the request. This will ensure that the MECP is able to efficiently begin reviewing the request.

The request should be sent in writing by mail or by email to:

Minister of the Environment, Conservation and Parks
Ministry of Environment, Conservation and Parks
777 Bay Street, 5th Floor
Toronto, Ontario
M7A 2J3
minister.mecp@ontario.ca

and

Director, Environmental Assessment Branch
Ministry of Environment, Conservation and Parks
135 St. Clair Ave. W, 1st Floor
Toronto, Ontario
M4V 1P5
EABDirector@ontario.ca

Requests should also be sent to the County of Oxford:

A.R. (Tony) Lotimer
County of Oxford
21 Reeve Street
P.O. Box 1614
Woodstock, Ontario
N4S 7Y3
water@oxfordcounty.ca

2.4 Canadian Environmental Assessment Act

Under the *Canadian Environmental Assessment Act, 2012* (CEAA, 2012), a federal EA study may be required to comply with the physical activities that constitute a "designated project", under the project list identified in the *Regulations Amending the Regulations Designating Physical Activities, 2013*. This project list ensures that federal

EAs are focused on major projects with the greatest potential for significant adverse environmental impacts to matters of federal jurisdiction.

The Tavistock New Well Supply Class EA study does not constitute a “designated project” and, therefore, does not require an EA under the CEAA, 2012. However, the Minister of the Environment, Conservation and Parks may order an assessment for any project not included in the project list, where there may be adverse environmental effects related to matters of federal jurisdiction.

3 Consultation and Engagement

Consultation is an integral part of the Municipal Class EA process. Active engagement with all potentially affected parties including government agencies, community members, special interest groups, and Indigenous communities ensures a transparent and responsible planning process. In addition, the design and elements of this project benefit from meaningful and engaging consultation with members of the community.

All Notices associated with this project, including the Notice of Study Commencement, Notices of Public Consultation Centres, and the Notice of Completion were shared with the project contact list and published as newspaper ads. The notices were also shared publicly on the “Speak Up, Oxford!” project page at the following address: https://speakup.oxfordcounty.ca/new-well-supply-tavistock

The Notice of Study Commencement and Notice of Public Consultation Centres were sent to identified agencies and interested parties by email to inform them that the study was being undertaken. Residents near the test well sites were also provided a copy of the notice by mail. Individuals that requested to be added to the mailing list, or that attended the Public Information Centres, were added to the mailing list to receive notifications at project milestones. Copies of the notices are included in **Appendix A**.

3.1 Stakeholder Consultation

A key component of the MCEA process is public consultation. For this study, the main points of public consultation included:

- Notifying the public that the study was commencing;
- Receiving public input regarding the project including the evaluation criteria, environmental considerations, and evaluation of alternatives;
- Providing an opportunity to review and submit feedback on the preliminary preferred alternative including proposed mitigation measures; and
- Providing an opportunity to review the ESR during the 30-day comment period.

Stakeholders included, but were not limited to:

- Public – this includes individual members of the public including property owners potentially affected by the project, individuals that may have a general interest in the project, special interest groups, community groups, and developers
- Review agencies – this includes government agencies who represent Provincial or Federal Ministry departments or agencies such as Conservation Authorities
- Oxford County Internal Staff (Public Works, Corporate services, Community Planning) or Council, as notified by Oxford County
- Area Municipal staff (Township of East Zorra-Tavistock, Township of East Perth)
- Utilities, School Boards, and Emergency Services

A project contact list was created which includes multi-level government agencies and officials, local municipal staff, committees, emergency service providers, potentially interested Indigenous communities, members of the public, utility services, special interest groups, property owners and residents within the Study Area. The list was regularly updated to include those who expressed interest in the study. A copy of the contact list is provided in **Appendix A**.

3.1.1 PUBLIC AND AGENCY NOTIFICATIONS

The study notifications are provided in **Appendix A**, including:

- **Notice of Study Commencement**
    - Published in the *Oxford Sentinel Review* on February 24 and March 3, 2022 (2 consecutive week editions)
    - The Notice was sent to agencies and groups on the project contact list on February 24, 2022. MECP was provided with a copy of the notice as well as the Project Information Form (PIF) on February 24, 2022. The Notice was also published on the County of Oxford https://speakup.oxfordcounty.ca/new-well-supply-tavistock
    - Local residents within 150 m of the test well sites were sent a copy of the Notice

- **Notice of Public Consultation Centre (PCC) 1:**
    - Published on the *Speak Up Oxford!* website (speakup.oxfordcounty.ca/) on November 24, 2022
    - Published in the *Wilmot-Tavistock Gazette* on December 1, 2022, and December 8, 2022
    - The Notice of PCC 1 was sent to agencies, members of the public of the project contact list, and addresses within 150 m of the test well sites on November 24, 2022
    - A newspaper article about the upcoming public meeting was also included in the December 8, 2022, edition of *Oxford Review* and *Wilmot-Tavistock Gazette*
- **Notice of Public Consultation Centre 2:**
    - Published on the *Speak Up Oxford!* website (speakup.oxfordcounty.ca/) on August 30, 2023
    - Published in the *Oxford Review* and *Stratford Herald Beacon* on September 7, 14, and 21, 2023. The Notice was published in the *Wilmot-Tavistock Gazette* on August 30, 2023, as well as September 6, 13, and 20, 2023
    - The Notice of PCC 2 was sent to agencies, members of the public of the project contact list, and addresses within 150 m of the test well sites on September 14, 2023
- **Notice of Study Completion**
    - At the conclusion of the project, a Notice of Study Completion will be distributed to the contacts on the project contact list, including agencies, stakeholders, and members of the public that requested to be on the mailing list
    - The Notice will indicate the start of the 30-day public comment period, and how to provide comments

3.2 Indigenous Community Engagement

Based on information provided by the Ministry of the Environment, Conservation and Parks (MECP) at the outset of the study, the following Indigenous communities were identified to be engaged as part of this study:

- Six Nations of the Grand River Territory
- Haudenosaunee Confederacy Council
- Mississaugas of the Credit First Nation
- Chippewas of the Thames First Nation
- Oneida Nation of the Thames
- Munsee-Delaware Nation
- Delaware Nation at Moraviantown (Eelūnaapèewii Lahkèewiit)
- Bkejwanong Territory (Walpole Island)
- Caldwell First Nation
- Chippewas of Kettle and Stony Point First Nation
- Aamjiwnaang First Nation
- Metis Nation of Ontario

The Indigenous communities and First Nations above were included on project notifications at key milestones of the project including the Notice of Study Commencement, PCCs, and the Notice of Completion.

  - Indigenous communities were sent a letter on County of Oxford letterhead on February 24, 2022. All communities on the MECP list of Indigenous communities were sent the notice
  - Indigenous communities were sent an email with the Notice of PCC 1 on November 24, 2022
  - Indigenous communities were sent a cover letter and the Notice of PCC 2 on September 13-14, 2023, with a follow up email sent on September 15, 2023

This project received correspondence from the following Indigenous communities. A summary of relevant engagement is included below. The full Indigenous Consultation Log was prepared, and is included in Table 2, within Appendix C of the ESR.

- **Chippewas of the Thames First Nation:**
  - Email (March 15, 2024): The community responded and identified minimal concerns with the project based on screening/review.
  - The project team responded (April 11, 2022) to thank the community for their input, and to identify that the community would be kept informed and if there are any changes of a significant nature. The community continued to received notices.

- **Bkejwanong Territory (Walpole Island First Nation):**
    - A response was received (March 7, 2022) that indicated the notice of study commencement was received. The community indicated its interest in participating in any archaeological assessments. The project team will keep WIFN informed of any archaeological assessments required for the site.
    - The project continued to inform the community, and no further correspondence was received.
- **Caldwell First Nation:**
    - The community provided an email and letter with updated contact information. The community requested that the project uses its Consult With Caldwell website for future engagement. Consultation protocol information was provided, along with field participation agreement information. The community indicated it would be interested in deploying a field liaison representative or technical reviews of documents.
    - Response (February 24, 2023: Thank you for your email regarding the Tavistock New Well Supply Municipal Class Environmental Assessment and for providing a link to your consultation website. At this time the project has completed an environmental background review to support Phase 2 of the Municipal Class Environmental Assessment process. A Stage 1 Archaeological Assessment will be completed once the proposed site is confirmed, although timing of this investigation is not yet available. Once complete, we can let you know the results of the investigation and indicate if further assessment may be required. Requirements for additional environmental investigations have not yet been confirmed are not included in the current project. We have added you to the project mailing list and we will continue to provide project updates as they become available. Your community will also be notified when the Environmental Study Report is prepared and available for review.
    - The community continued to be informed, and no further correspondence was received.
- **Mississaugas of the Credit First Nation, Metis Nation of Ontario, and Chippewas of Kettle and Stony Point First Nation:** Emails were provided to request updates to mailing list contact information. All updates were made, as requested. No project-related comments were provided.

The full Indigenous community correspondence log is included in **Appendix C**.

3.3 Public Consultation Centres

Two PCCs were held for this Municipal Class EA study to present study details. The first PCC was held virtually via Microsoft Teams on December 15, 2022, from 6:00 pm to 8:00 pm. The purpose of PCC 1 was to provide information about the project including the assessment of alternative solutions and the recommended solution. Five members of the public attended the session virtually. Members of the project team were available to address comments received at the event, or any comments received by email after the PCC by January 4, 2023. Presentation materials were also available for review on the County *Speak Up Oxford!* website: speakup.oxfordcounty.ca/.

PCC 2 was held virtually via Microsoft Teams on September 26, 2023, from 6:00 pm to 8:00 pm. The purpose of PCC 2 was to provide an update on the project including the assessment of alternative designs and the recommended alternative design concept. Presentation materials were also available to review on the County *Speak Up Oxford!* Website: from September 27, 2023, to October 6, 2023.

Eight people attended PCC 2, including:

- Phil Schaefer, Mayor, East Zorra-Tavistock
- Brad Smith, Deputy Mayor, East Zorra-Tavistock
- Tom Lightfoot, Public Works Manager, East Zorra-Tavistock
- Julie Welker, Sourcewater Protection Project Manager, Upper Thames River Conservation Authority
- Four members of the public

Individuals were asked to provide comments to the project team by October 6, 2023.

PCC displays are provided in **Appendix B**. A summary of PCC1 and PCC 2 comments, along with responses or actions taken by the project team, is provided in **Table 3** and **Table 4** of the **Appendix C** consultation summary.

3.4 Speak Up Oxford Project Webpage

All Notices, PCC presentation materials, and other information from the study has been published on the “Speak Up, Oxford!” webpage (speakup.oxfordcounty.ca/). Individuals were able to access team contact information and provide comments. Comments have been incorporated into the public consultation summary in **Appendix C**.

3.5 Incorporating Consultation Input

Input and information gathered from consultation with the public, agencies, and Indigenous communities, or acquired during the PCCs or webpage were reviewed by the project team and considered in the development of the Tavistock New Well EA Study. Comment responses or actions taken to address the comments in the EA are documented in **Appendix C**.

4 Existing Conditions

Phase 2 of the Municipal Class Environmental Assessment Study includes preparing an inventory of the existing natural, social, and cultural environment for the Study Area. Alternative Solutions are then identified and evaluated, based on the available information.

County of Oxford Official Plan (1995, as updated in 2020) mapping was consulted as part of this project to identify existing land use policies and natural heritage features within the Study Area. Official Plan mapping is located in **Appendix D**.

4.1 Socio-Economic Environment

A summary of the existing land use, and provincial and municipal planning and policy context is provided below as it relates to the Tavistock New Well Supply Class EA study. As the study aims to serve future servicing demands, the planning documents reviewed consider long-term recommendations and vision for the Study Area and surroundings.

4.1.1 PROVINCIAL POLICY STATEMENT

The *Provincial Policy Statement* (PPS) (2020) is issued under Section 3 of the *Planning Act*. Section 3 of the Act states decisions affecting planning matters “shall be consistent with” the PPS. The consistency of the proposed improvements (defined as “infrastructure” in the PPS) with the relevant Infrastructure and Public Service Facilities policies included in Section 1.6.6 of the PPS is summarized as follows:

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.

Through the PPS, the province seeks to ensure that its resources are managed in a sustainable manner to protect essential ecological processes and public health and safety, minimize environmental and social impacts, and meet its long terms needs.

4.1.2 LAND USE

4.1.2.1 County of Oxford Official Plan

The Village of Tavistock is located in the Township of East Zorra-Tavistock. The township is one of the eight lower-tier municipalities under the jurisdiction of Oxford County and follows the *County of Oxford Official Plan* (1995, as updated in 2020) (OP). There is no lower-tier OP for the Township.

The OP includes policies to direct current and future land use in the community, including addressing growth and infrastructure needs. Oxford County plans and manages municipal drinking-water supply systems through an integrated, comprehensive approach that provides direction on appropriate servicing options, ensures adequate capacity for future growth, promotes efficient water use, and protects water quality. The OP promotes centralization of the water and wastewater systems. The majority of growth will be directed to settlements with centralized water and water supply facilities to minimize risks of contamination to air, land, surface water and groundwater, to preserve agricultural land, and to reduce costs (Oxford OP, Chapter 2).

The Study Area is mainly situated within the settlement boundary of the Village of Tavistock. Tavistock is a “Serviced Village” under the OP which is a type of “Rural Settlement” (Oxford OP, Schedule C-3 and Section 6.1). Rural settlements provide residential and employment opportunities, and population related services, but at a smaller scale than large urban centres.

The northwest portion of the Study Area consists of “Village Core” areas, with pockets of low-density residential and industrial land. The Village Core designation refers to a predominantly compact, commercial district which historically functioned as a downtown pedestrian shopping district (Oxford OP, Schedule E-2).

The northeast portion of the Study Area consists of “Open Space”, which denotes areas identified as possessing opportunities to conserve ecological functioning and promote recreation and passive use of the environment in its natural state, in addition to low-density residential and medium-density residential designations.

The southern portions of the Study Area consist of industrial, low-density, medium-density and major institutional designations. It appears that much of the land currently available for growth within Tavistock is located at the southern extent of the Village, mostly within the lands which are designated for industrial uses.

There are no designated features within the Study Area per the County of Oxford OP Environmental Features Plan (Schedule C1). The plan does not list any of the following in the vicinity of Tavistock: Locally Significant Natural Heritage Features, Provincially Significant Wetlands, Areas of Natural and Scientific Interest, Significant Valleylands, Conservation Authority Lands, or watershed boundaries.

An Area of Unstable soil is located in the vicinity of County Road 34 and Hope Street (Schedule C2).

Relevant OP Mapping is included in **Appendix D**.

4.1.2.2 Water and Wastewater Master Plan – County of Oxford

The County of Oxford initiated a *Water and Wastewater Master Plan* (W/WW MP) in March 2022 and progress on the W/WW MP was monitored throughout the study. The Notice of Completion for the W/WW MP was filed in November 2023.

The W/WW MP provides the County with:

- Strategic long-term water and wastewater strategies to service existing settlement areas and growth to the year 2046;
- Water and wastewater strategies that are consistent with and conform to Provincial policies/legislation and support the County’s OP and strategic initiatives;

- Options for optimizing the effectiveness of the existing water and wastewater infrastructure; and
- An integrated multi-year water and wastewater capital implementation plan which affords infrastructure reliability, redundancy, and sustainability.

While a separate study, elements of the W/WW MP were considered as information became available to ensure that both planning processes were consistent.

4.1.2.3 Upper Thames River Conservation Authority

UTRCA Regulated Areas were identified within the community boundaries, including all of TW1. Regulated Areas are located near site TW2 and TW3, as shown on **Figure 4**. To ensure that the regulatory policies associated with the Regulated Areas are complied with, the County will continue consultation with UTRCA throughout the timeline of this project.

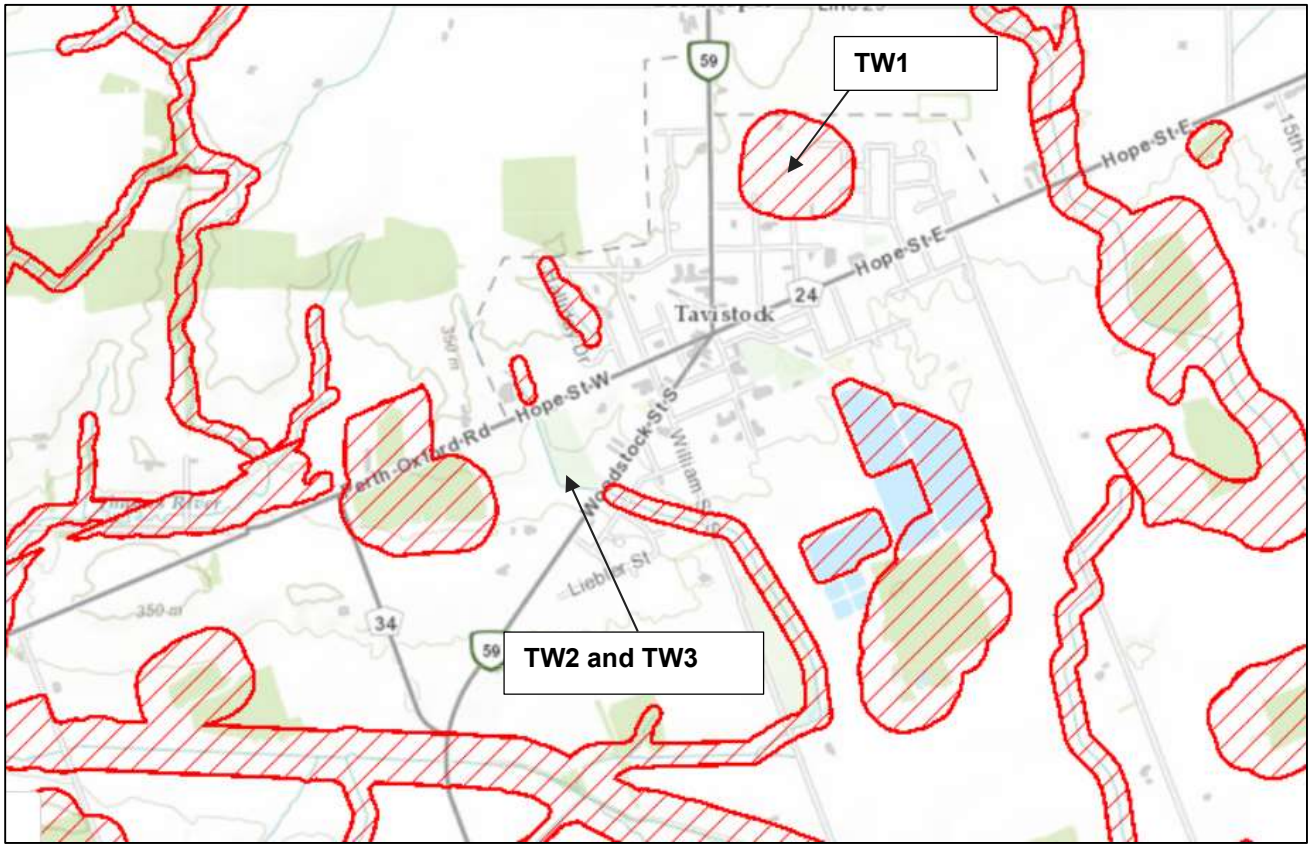


Figure 4: UTRCA Regulated Areas extract (UTRCA Online Interactive Mapping)

4.1.3 CLIMATE CHANGE

Under clause 31(1)l of the *Environmental Assessment Act*, the Minister of the Environment, Conservation and Parks may gather, publish, and disseminate information with respect to the environment or EAs for the purposes of the administration and enforcement of the *Environmental Assessment Act* and its policies such as "Considering Climate Change in the Environmental Assessment Process". These policies seek to have undertakings or projects that account for alternative methods to reduce its greenhouse gas emissions and negative impacts on carbon sinks.

For this project, additional water supply alternatives are being considered to address the project objectives related to growth and water security needs in Tavistock. Water security will seek to make sustainable use of local aquifers to improve climate change resiliency.

The potential to avoid natural features, such as significant wetlands and woodlands which may act as carbon sinks, was considered during the evaluation of the Alternative Solutions (see Section 6.1.3). The potential for Alternative Solutions to limit or reduce greenhouse gas emissions was also evaluated.

4.2 Technical Environment

4.2.1 EXISTING INFRASTRUCTURE

The Tavistock Drinking Water System (DWS) is classified as a Large Municipal Residential water system in accordance with Ontario Regulation 170/03 (O. Reg. 170/03) made under the *Safe Drinking Water Act, 2002* (SDWA). The system currently services a population of approximately 3,375 people, as noted in *2022 Annual Drinking Water System Annual Report* from Oxford County.

The water treatment system and wells are located within the centre of the village, near Queen's Park in Tavistock. The Tavistock system includes three (3) wells that are classified as groundwater sources. The permitted capacity of the wells are as follows:

- W1: 900 L/min
- W2A: 1,920 L/min
- W3: 3,000 L/min

Conditions within the current PTTW prevents W2A and W3 from operating at the same time; therefore, the maximum supply capacity of the system is 3,900 L/min (W1 and W3 in operation) or 5,616 m^3/day.

Further information on the components of the existing system can be found in Technical Memorandum #1 and Technical Memorandum #6, in **Appendix F**.

In addition to the above capacity ratings, information provided by the County as part of the background data review indicated that pressure changes and surges (transients) have been experienced in the northwest area portion of the distribution system. These pressure variances are likely due to water taking/usage characteristics of a large industrial development within the area.

4.2.1.1 Future Water Demands

Tavistock is a rural community with a population of 3,171 (2021 Statistics Canada Census) and is in the jurisdiction of the County of Oxford. The community grew at a rate of 7.3 percent since the 2016 census.

The Tavistock DWS had an average day demand of approximately 1,493 m³/day with a maximum day flow of about 2,372 m³/day in 2022. With a firm capacity of 4,061 m³/day, the DWS has sufficient capacity to address current system demands.

As part of the background review, the County provided demand projections for the Tavistock DWS. In general, yearly demands were estimated to increase by 71 m³/day beyond 2022, with maximum day demands increasing by 77 m³/day. Projecting this forward, it is estimated that by 2043, the maximum day demands will reach 4,106 m³/day, which exceeds the firm capacity of the DWS.

The County previously undertook the *Phase One Comprehensive Review* (Hemson, 2020) to provide input into the County's OP update. Based on the findings, population growth is expected within the Township of East Zorra-Tavistock over the study timeframe (2019 to 2039) which will result in increased water demands. Based on the five-year period between 2016 to 2021, the report noted an average of 56 residential units per year of development. Assuming a similar trend for future growth, the Hemson findings would suggest that by 2036 the maximum day demand (~4,114 m³/day) would exceed the firm capacity of the DWS.

4.2.1.2 Transportation

Tavistock is located at the intersection of Perth Oxford Road and Highway 59 (Oxford Road 89), known locally as Hope Street and Woodstock Street, respectively. The existing wells are located to the southeast of this key intersection on Hendershot Street in a mixed residential/commercial area.

4.3 Natural Environment

A Natural Heritage desktop-level screening was undertaken for the study and is documented in a *Natural Heritage Desktop Review Memo*, which is included in **Appendix E1** and summarized below. The purpose of the review was to identify environmental features within the Study Area including terrestrial and surface water features.

Three proposed well locations (TW1, TW2, and TW3) were identified based on hydrogeological investigations. These locations, including adjacent lands (within 120 m of the sites), were the focus of a more detailed review of natural environment features, including designated natural areas, fish communities and fish habitat, and potential Species at Risk (SAR) and Species of Conservation Concern (SOCC) that may be sensitive to construction of a new well and water taking.

4.3.1 TERRESTRIAL ECOSYSTEMS

4.3.1.1 Vegetation

Ecological Land Classification (ELC) mapping was conducted around potential well site locations. ELC mapping is summarized below:

- Site TW1: This candidate well location is within a deciduous swamp community (SWD). A shallow cattail marsh (MAS) is located north of the swamp and there is a meadow marsh (MAM) associated with the forest. Other land uses within this Study Area include agricultural fields (OAG), residential development (CVR) and commercial buildings (CVC-1).
- Site TW2: The candidate well is located within a manicured recreational parkland (Optimist Park, CGL-4) bordered with rows and patches of planted deciduous and coniferous trees. A small wetland appears to be present behind the commercial building at the edge of the agricultural field. Mapping shows two tributaries crossing the parkland, but based on digital imagery, these tributary sections appear to be piped underground and emerge downstream just south of Woodstock Street South. Downstream from Woodstock Street South the stream channel is well defined, and water is visible on current aerial imagery. Other land uses in the Study Area include agricultural fields (OAG), residential development (CVR), and commercial buildings (CVC-1).
- Site TW3: The candidate well is in the northeast corner of Optimist Park, the same park that contains candidate well location TW2. On the north side of Hope Street, there is a deciduous forest community (FOD), marsh communities (MA), and a mixed meadow community (MEM). In addition to the recreational park, other land uses in the Study Area include agricultural, residential, and commercial development. A drain located on the western border of the Study Area supplies water to the pond.

4.3.1.2 Designated Features

Two features identified in the Oxford County Natural Heritage System were within 120 m of potential well site TW1: an “Ecologically Important Woodland”, which corresponds with portions of the SWD community, and an “Other Ecologically Important Feature”, which may correspond with the swamp and marsh communities.

Site TW2 does not contain any features within the Oxford Natural Heritage System.

Site TW3 contains three areas designated in the Oxford Natural Heritage System. These features correspond with the deciduous forest (FOD) and the marsh communities (MA) in the Study Area.

4.3.1.3 Species at Risk and Species of Conservation Concern

SAR are defined as species that are listed as Endangered or Threatened on the Species at Risk in Ontario List. SOCC are defined as species that are classified as Special Concern provincially or federally or ranked as S1-S3 in the MNRF's Natural Heritage Information Centre (NHIC) database. There were 11 SAR and 8 SOCC with records of occurrence in the Tavistock settlement area based on background sources identified in the memorandum, although their presence or absence would need to be confirmed through fieldwork:

Table 1: SAR and SOCC with records in the Tavistock Settlement Area

Group	Common Name	Scientific Name	ESA Status	SARA Status	S-Rank	SAR or SOCC
Fish	Northern Sunfish (Great Lakes – St. Lawrence pop.)	*Lepomis peltastes pop. 2*	SC	SC	S3	SOCC
Bird	Acadian Flycatcher	*Empidonax virescens*	END	END	S1B	**SAR**
	Bald Eagle	*Haliaeetus leucocephalus*	SC	-	S4	SOCC
	Bobolink	*Dolichonyx oryzivorus*	THR	THR	S4B	**SAR**
	Chimney Swift	*Chaetura pelagica*	THR	THR	S3B	**SAR**
	Common Nighthawk	*Chordeiles minor*	SC	THR	S4B	SOCC
	Eastern Meadowlark	*Sturnella magna*	THR	THR	S4B, S3N	**SAR**
	Eastern Whip-poor-will	*Antrostomus vociferus*	THR	THR	S4B	**SAR**
	Eastern Wood-pewee	*Contopus virens*	SC	SC	S4B	SOCC

Group	Common Name	Scientific Name	ESA Status	SARA Status	S-Rank	SAR or SOCC
	Least Bittern	*Ixobrychus exilis*	THR	THR	S4B	**SAR**
	Northern Bobwhite	*Colinus virginianus*	END	END	S1?B	**SAR**
	Red-headed Woodpecker	*Melanerpes erythrocephalus*	SC	THR	S3	SOCC
Insect	Monarch	*Danaus plexippus*	SC	SC	S2N,S4B	SOCC
	Transverse Lady Beetle	*Coccinella transversoguttata*	END	-	S1	**SAR**
Mammal	Eastern Small-footed Myotis	*Myotis leibii*	END	-	S2S3	**SAR**
	Little Brown Myotis	*Myotis lucifugus*	END	END	S3	**SAR**
	Tri-coloured Bat	*Perimyotis subflavus*	END	END	S3?	**SAR**
Reptile	Snapping Turtle	*Chelydra serpentina*	SC	SC	S4	SOCC
	Midland Painted Turtle	*Chrysemys picta marginata*	-	SC	S4	SOCC

4.3.2 FISH AND FISH HABITAT

Background mapping shows a constructed drain associated with the deciduous swamp (SWD) within the Study Area for candidate well site TW1. However, a review of aerial imagery suggests that the drain is buried from the south edge of the swamp to Hope Street.

The watercourse mapped in the Study Area for candidate well sites TW2 and TW3 is known as Hohner Drain. Based on the background information, the drain is classified as a warm water thermal regime and supports habitat for Northern Sunfish (*Lepomis peltastes*), which is an aquatic SOCC and is listed as Special Concern both provincially and federally.

Fish community sampling that occurred in Hohner Drain in July 2013 (MNRF 2021b) documented three fish species: Eastern Blacknose Dace, Brook Stickleback, and Creek Chub, which are identified as coolwater fish species. Hohner Drain and the two tributaries near candidate wells TW2 and TW3 are piped underground between Hope

Street West and Woodstock Street South. The drain appears to surface into an impoundment area approximately 60 m south of Woodstock Street South.

In July 2023, the County was made aware by the Township of East Zorra-Tavistock that a municipal drain had recently been constructed near the site of TW2 (at the south end of Optimist Park). Any additional impacts associated with this new drain were not assessed through the initial background review, although it is not near the TW3 site.

4.3.3 NATURAL ENVIRONMENT SUMMARY

The desktop review identified potential SAR, SOCC, designated natural areas, and fish habitat within the 120 m radius Study Area for each of the three candidate well sites. The desktop habitat suitability assessment indicated that potentially suitable habitat for some of the species identified from the background data is present in the Study Area.

Site TW1 is within a forest that provides potential habitat for SAR/SOCC (Red-headed Woodpecker, Eastern Wood-pewee, and bat SAR). Site-level field assessments in Detailed Design would be required to verify if suitable habitat for SAR/SOCC is present within the forest in the vicinity of the well site.

There are a number of large diameter trees (greater than 10 cm diameter at breast height) in the vicinity of sites TW2 and TW3 that could potentially function as bat maternity roost trees for bat SAR. Site-level field assessments would be required in Detailed Design to confirm the suitability of the trees as bat maternity roost habitat and if there are anticipated impacts based on the proposed works. Other potential SAR (Bobolink and Eastern Meadowlark) habitat is present in agricultural communities within the Study Areas; however, the proposed well locations are not anticipated to impact these communities.

Detailed construction plans for the preferred site will be assessed to identify potential impacts, refine standard and site-specific mitigation recommendations, and determine requirements for authorization under the relevant federal (*Fisheries Act*) and provincial (*Conservation Authorities Act, Endangered Species Act,* and *Fish and Wildlife Act*) legislation.

4.3.4 SOURCEWATER PROTECTION

In accordance with Ontario's *Clean Water Act* (*CWA*), Oxford County has enacted policies through the Thames-Sydenham and Region Source Protection Region to protect groundwater sources. Source Protection Plan (SPP) policies work to reduce risk by regulating proposed and existing activities which have been identified as posing significant threats to drinking water safety. Depending on the hydrology and geology of an area, as well as potential risks posed by activities onsite, different policies under the SPP may apply to the Study Area.

UTRCA Online Interactive Mapping identifies that the Study Area is within a Well Head Protection Area (WHPA) which extends northward from the three wells located on Hendershot Street. The built-up areas of Tavistock are located within a Designated Vulnerable Area where activities may be a significant threat. To the west of Tavistock is a Significant Groundwater Recharge Area (SGRA) and Highly Vulnerable Aquifer (HVA). Source Water Protection Mapping is provided in **Appendix D**.

4.4 Cultural Environment

Section 4.4. describes the existing conditions of the cultural heritage component of the environment. Cultural heritage resources include archaeological resources, built heritage resources and cultural heritage landscapes.

4.4.1 BUILT HERITAGE RESOURCES AND CULTURAL HERITAGE LANDSCAPES

Known (previously recognized) and potential built heritage resources and cultural heritage landscapes (BHR/CHL) impacted by the three preliminary well investigation locations were reviewed through the completion of the MCM (formerly Ministry of Heritage, Sport, Tourism and Culture Industries' (MHSTCI) *Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes Checklist*, as follows:

- Site TW1: No known or potential BHR/CHL
- Site TW2: No known or potential BHR/CHL
- Site TW3: 223 Hope Street West (Lot 36, Concession 12, former Township of Zorra) is located within 50 m of the site. The structure on the property is greater than 40 years old and was owned by Henry Eckstine, who was Tavistock's first businessman. He owned the first hotel in the Village and farmed the property.

Requirements for cultural heritage assessments were identified based on the evaluation and identification the preferred site alternative and completion of the MCM checklist which indicated that a Cultural Heritage Assessment report (CHER) should be completed for the TW 3 site if selected. A copy of the checklist is provided in **Appendix E2.**

A Cultural Heritage Evaluation Report and Heritage Impact Assessment report (CHER/HIA) was completed for 223 Hope Street West. The CHER/HIA concluded that the property at 223 Hope Street was found to meet criterion four in O.Reg. 9/06 regarding cultural heritage value or interest. Criterion four is identified as: "direct associations with a theme, event, belief, person, activity, organization, or institution that is significant to a community."

Based on recent updates to the Ontario Heritage Act (OHA), two or more criteria must be met in order for a municipality to designate a property under Part IV of the OHA. As 223 Hope Street West did not meet the threshold for municipal designation, and identification of heritage attributes was not required. Therefore, a discussion of impacts and mitigation measures is not applicable and no further cultural heritage studies were recommended.

The CHER/ HIA can be found in **Appendix E2**.

4.4.2 ARCHAEOLOGICAL RESOURCES

A Stage 1 archaeological assessment (AA) (under Project Information Form number P256-0827-2024) was conducted by Stantec Consulting Ltd. for the preliminary preferred well location. The Stage 1 AA consisted of a review of geographic, land use and historical information for the property and relevant surrounding area, and contacting MCM to find out whether, or not, there are any known archaeological sites on or near the property. Its purpose is to identify areas of archaeological potential and further archaeological assessment (e.g. Stage 2-4) as necessary. This Stage 1 AA has been entered into the Ontario Public Register of Archaeological Reports. The report is found in **Appendix E3**.

The Stage 1 AA of the study area determined that 7.1% of the study area retains low to no archaeological potential due to previous disturbance. In accordance with Section 1.3.2 and Section 7.7.4 of the Ministry's 2011 Standards and Guidelines for Consultant Archaeologists (Government of Ontario 2011), no further archaeological assessment for this portion of the study area is recommended.

The Stage 1 AA of the study area determined that 92.9% of the study area retains potential for the identification and documentation of archaeological resources. In accordance with Section 1.3.1 and Section 7.7.4 of the Ministry's 2011 Standards and Guidelines for Consultant Archaeologists (Government of Ontario 2011), Stage 2 archaeological assessment is required for this portion of the study area.

The Stage 2 archaeological assessment will be completed during the detailed design phase of the project. Any further recommended archaeological assessment (e.g. Stage 3 or 4) will be completed as soon as possible during detailed design and prior to any ground disturbing activities.

5 Problem and Opportunity Statement

Based on the existing and future conditions related to the Study Area, the following problems were identified:

- Security:
    - The current supply and treatment system is centrally located. W1 is completed in an overburden aquifer, with W2A and W3 completed in the bedrock aquifer.
    - Any potential disruption to the facility or impact to the wellfield would significantly impact the ability to supply potable water.
- Growth Planning:
    - Additional residential (620 homes) and employment lands (19 ha) will be required to accommodate the growth projections within the Township by 2047.
    - County estimates suggest maximum day demands for water will reach 4,106 m^3/day by 2043, exceeding the existing treatment capacity.
    - Oxford County OP population/residential growth trends indicate a maximum day demand of 4,114 m^3/day, which could exceed treatment capacity as early as 2036.
- Pressures:
    - Pressure variations and transients are experienced in specific areas of the distribution system, notably near a larger industrial customer in the northeast area of the system. The pressure fluctuations are caused by water taking characteristics of this customer.

The following opportunities were also identified:

- **Demand:** Establishment of an additional water supply source is needed to supplement the existing supply, and to ensure that long-term water demands resulting from the development projections can be satisfied
- **Operations:** Potential to consider if an additional well source and related water system infrastructure could mitigate operational risks related to redundancy and, where possible, to mitigate pressure fluctuations and transients in the system

Based on a review of the identified problems and opportunities in the Study Area, the following **Problem and Opportunity Statement** was developed:

The Village of Tavistock currently receives water services from three wells located within the centre of the village, near Queen's Park. The County of Oxford is initiating a Municipal Class Environmental Assessment Study to explore potential opportunities for a new well supply to improve the security and supply of drinking water for the community.

6 Alternative Solutions

6.1 Development of Alternative Solutions

6.1.1 LONG LIST OF ALTERNATIVES

The following long list of Alternative Solutions was developed to address the existing system supply and security constraints as described in the Problem and Opportunity Statement:

- Alternative 1: Do Nothing – This alternative involves maintaining the existing supply and treatment system as-is. No improvements would be made to address the existing conditions. This alternative is carried forward as a benchmark in the evaluation of other alternative solutions.
- Alternative 2: Limit Community Growth – This alternative involves limiting residential growth through municipal policy in the community and is typically considered when evaluating options for municipal infrastructure. Under this alternative, no new water supply would be obtained; therefore, no improvements would be made to water security.
- Alternative 3: Implement Water Conservation Measures – This alternative involves initiating water conservation programs to reduce demand. Measures may include municipal by-laws, educational programs, and/or individual monitoring and changes to volume-based water charges.
- Alternative 4: Water Supply from Adjacent System – This alternative would involve interconnection to another municipal system to provide additional capacity and/or security of supply. Through this alternative, an interconnection could allow two currently independent systems to provide additional supply to one another to meet increased demand conditions.
- Alternative 5: New Well on Same Site – Under this alternative, an additional municipal well would be constructed on the same site to provide additional supply capacity. Presently, the majority of the water supply is provided by the two bedrock wells (W2A and W3) which account for about 90% of total production.

- Alternative 6: New Well at a Different Site – This alternative would include construction of a new municipal well at an alternate site to provide the additional targeted capacity. Should a potential new production well source be located, this option could provide the added capacity and redundancy to address the Problem and Opportunity Statement.

6.1.1.1 Preliminary Screening of Long List of Alternative Solutions

A high-level screening process was used to screen the long list of potential alternative solutions based on their ability to address the Problem and Opportunity Statement.

Based on the review of background information and characterization of the study area, the criteria shown below were identified for this study and used in the assessment and evaluation of alternatives. *Technical Memorandum #5: Evaluation Criteria* (**Appendix F**) provides detail on the selection of the criteria.

Social Environment

- Minimizes impacts on existing residences, business, community features, and other planned land uses/ long-term planning
- Protects health/safety

Technical Environment

- Minimizes land requirements
- Provides reliable service
- Meets County and Ministry standards, permits, and approvals
- Meets existing and future infrastructure needs/ performance quality requirements
- Aligns with existing and future land use
- Constructability/ System redundancy

Cultural Environment

- Protects archaeological and cultural heritage resources

Natural Environment

- Protects environmental features, wildlife, and species at risk
- Protects groundwater, streams, and rivers
- Considers climate change impacts

Financial

- Provides low lifecycle costs
- Estimated capital cost
- Identified property acquisition cost
- Identified operation and maintenance costs

Table 2 provides a summary of the preliminary screening and recommendations on whether each alternative solution should be carried forward for further evaluation.

Table 2: Preliminary Screening of Alternative Solutions

Alternative	Preliminary Screening Description	Carried Forward?
Alternative 1 – Do Nothing (Status Quo)	• Does not satisfy the Problem and Opportunity Statement - no change in water supply or improvements. • Lack of system resiliency and potentially higher costs if existing wells cannot operate.	**Carried forward for comparison purposes only**
Alternative 2 – Limit Community Growth	• Does not satisfy the Problem and Opportunity Statement - no change in supply or water security. • Does not adhere to water infrastructure planning requirements or growth approaches in the PPS or Oxford County OP.	No
Alternative 3 – Implement Water Conservation Measures	• Does not satisfy the Problem and Opportunity Statement – water supply security concerns are not addressed. • Does not address long-term needs for additional capacity. • Does not adhere to water infrastructure planning requirements or growth approaches in the PPS or Oxford County OP.	**YES – Part of the County's overall water supply strategy.** **Cannot be a stand-alone solution but should be considered as part of other shortlisted solutions**
Alternative 4 – Water Supply from Adjacent System	• May have potential to address the Problem and Opportunity Statement if capacity is available in a nearby system.	**YES**
Alternative 5 – New Well on Same Site	• Does not address the Problem and Opportunity Statement - water security is not addressed.	No
Alternative 6 – New Well at a Different Site	• May have potential to address the Problem and Opportunity Statement if capacity is available at a new location.	**YES – Technical review completed to confirm that water quality and quantity is available**

6.1.1.2 Preliminary Investigation of Water Quantity and Quality in Tavistock

A background review was conducted to confirm that the water quantity and quality is available to support a new well within Tavistock (Alternative 6).

Preliminary work was completed and documented in *Technical Memorandum 1 – Identification of Preferred Test Drilling Locations* to provide an overview of the steps undertaken in the identification and prioritization of test well drilling sites which would form part of Alternative 6. The memorandum is provided in **Appendix F**. The initial steps taken included:

- Step 1 – Identification of potentially accessible land
- Step 2 – Development of feasibility criteria to prioritize test drilling locations
- Step 3 – Ranking of test drilling locations

The following three (3) sites were selected for advancement of a test well to assess supply potential:

- TW1 – Former reservoir located in northwest Tavistock, to the east of Woodstock Road North
- TW2 – Optimist Club near Woodstock Street South, located at the south end of Optimist Park
- TW3 – Optimist Club near Hope Street West, located at the north end of Optimist Park

Figure 5 depicts the locations of potential well sites that were initially identified for review and includes the three sites that were ultimately selected for installation of test wells.

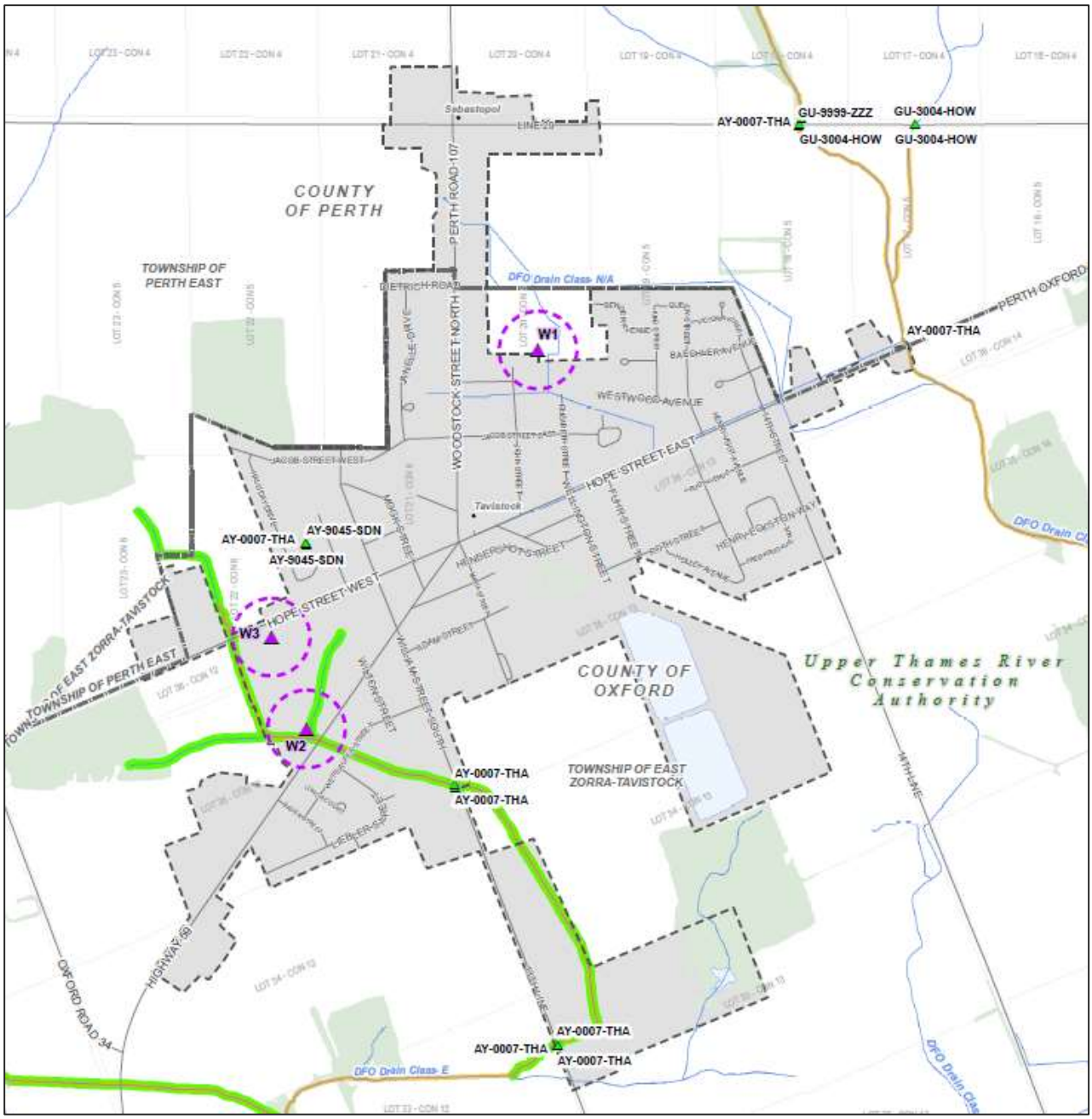


Figure 5: Preliminary Well Testing Locations in Tavistock

Technical Memorandum 2 – Summary of Test Well Drilling, Installation and Development at Tavistock Well Field provides results of the test well investigations at the three shortlisted sites. A copy of the memorandum is provided in **Appendix F**.

Three test wells were drilled in Tavistock. Each had similar water quality, and each had water availability. Based on the results, TW3 was recommended as the preferred site

for hydrogeological reasons, including increased quantity of supply, and further technical evaluation was required to complete additional pumping tests to confirm capacity and water quality. Results of the pumping test are summarized in *Technical Memorandum 3 – Pump Test Results of Test Well TW3, County of Oxford*. A copy of the memorandum is included in **Appendix F**.

6.1.2 WATER CONSERVATION AND EFFICIENCY MEASURES

Water conservation measures constitute a fundamental aspect of Oxford County's comprehensive, long-term water management solution. The County has implemented various initiatives to promote water conservation and efficiency, mirroring strategies adopted by many municipalities in Ontario. This includes a summer water conservation by-law aimed at curbing peak demand on the drinking water system during dry weather and high outdoor usage periods. Encouraging the use of rain barrels among residents is another ongoing effort to conserve water resources. Additionally, rebates are offered to homeowners looking to upgrade to more water-efficient washing machines or toilets. A non-residential water capacity buyback program is also in effect, reimbursing users for facility upgrades that result in sustained water savings.

While these measures play a crucial role in the County's water management strategy, they alone cannot fully mitigate the risks outlined in the Class EA Study, such as the potential contamination of aquifers from a localized well supply or the identified storage deficiencies highlighted in the Problem and Opportunity Statement. However, water conservation remains an integral component of the overall solution. For more details on Oxford County's water conservation efforts, visit the county website at www.oxfordcounty.ca/waterconservation.

6.1.3 SHORT LIST OF ALTERNATIVE SOLUTIONS

Two Alternative Solutions were carried forward for further evaluation:

- Water Supply from Adjacent System
- New Well at a Different Site - three sites to be reviewed

Do Nothing is carried forward for comparison only since it cannot satisfy the Problem and Opportunity Statement even when considering continued application of water conservation and efficiency measures.

A qualitative assessment will be used to consider how effectively the Alternatives address the evaluation criteria:

- Most preferred – able to address most or all criteria
- Moderately preferred – some ability to address the criteria
- Least preferred – low or no ability to address the criteria

6.1.3.1 Evaluation of Alternative Solutions: Water Supply Sources

The short-listed alternatives were assessed against the evaluation criteria. A summary of the evaluation is provided in **Table 3**. The full evaluation of the alternatives table is presented in *Technical Memorandum 6* in **Appendix F**. Water conservation and efficiency measures will continue to be implemented as part of the community's water servicing strategy regardless of the alternative solution selected.

Table 3: Evaluation Summary of Short-Listed Alternative Solutions: Water Supply Sources

CRITERIA	ALTERNATIVE 1 Do Nothing	ALTERNATIVE 4 Water Supply from Adjacent System	ALTERNATIVE 6 New Well at a Different Site
Social Environment	Moderately Preferred	Least Preferred	Most Preferred
Cultural Environment	Most Preferred	Least Preferred	Moderately Preferred
Natural Environment	Most Preferred	Least Preferred	Moderately Preferred
Technical Environment	Least Preferred – does not satisfy the statement	Moderately Preferred	Most Preferred

CRITERIA	ALTERNATIVE 1 Do Nothing	ALTERNATIVE 4 Water Supply from Adjacent System	ALTERNATIVE 6 New Well at a Different Site
Financial Environment	Most Preferred	Least Preferred	Moderately Preferred
OVERALL	**NOT CARRIED FORWARD**	**LEAST PREFERRED**	**MOST PREFERRED**
SUMMARY	Although this is the lowest cost alternative with the fewest potential impacts to the natural environment, the existing well supply system in Tavistock does not satisfy the Problem and Opportunity Statement even when considering water conservation and efficiency measures.	Has the potential to address the Problem and Opportunity Statement, although construction is complex due to utilities, water crossings, and coordination with other infrastructure improvements. In addition, this alternative has high design/construction costs, and operation and maintenance costs.	Best addresses the technical requirements, and preliminary test wells indicate water quantity is available to meet current and projected needs. There is moderate construction complexity relative to Alternative 4, with moderate costs.

Alternative 6 – a “New Well at a Different Site” in Tavistock is the preliminary preferred alternative solution for the following reasons:

- Localized footprint for infrastructure and construction-related impacts such as noise, traffic, and aesthetics
- Less pumping infrastructure than a large transmission watermain route

- Reduced impact to the natural environment by avoiding agricultural areas, watercourse crossings, and other designated natural features located outside Tavistock
- Test wells (TW1, TW2, or TW3) indicate that the water supply can be obtained locally
- Solution can be designed with consideration for current and future treatment requirements
- Addresses local growth potential and Tavistock water supply system resiliency
- Water efficiency measures will be implemented in the existing system to complement the alternative to reduce demand. Measures may include municipal by-laws, educational programs, and/or individual monitoring and changes to volume-based water charges

6.1.3.2 Evaluation of Alternative Solutions: Well Locations

The three test well sites were further evaluated to determine the preferred location for a new well, based on the evaluation criteria. A summary of the evaluation is provided in **Table 4**. The full evaluation of alternatives for well locations is provided in *Technical Memorandum 7* in **Appendix F**. A post-EA revised version of Technical Memorandum #7 is included based on revisions to incorporate the CHER/HIA and Stage 1 AA into the evaluation. No significant changes were required based on the incorporation of these results as it did not change the summary results for the Cultural Environment category.

Table 4: Evaluation Summary of Alternative Solutions: Well Locations

CRITERIA	SITE TW1	SITE TW2	SITE TW3
Social Environment	Most Preferred	Most Preferred	Most Preferred
Cultural Environment	Most Preferred	Most Preferred	Most Preferred
Natural Environment	Least Preferred	Most Preferred	Most Preferred

CRITERIA	SITE TW1	SITE TW2	SITE TW3
Technical Environment	Least Preferred	Moderately Preferred	Most Preferred
Financial Environment	No significant difference	No significant difference	No significant difference
OVERALL	**LEAST PREFERRED**	**MODERATELY PREFERRED**	**MOST PREFERRED**
SUMMARY	Least estimated water supply capacity (est. 20 L/s)	Second-highest estimated water supply capacity (est. 20 L/s)	Best addresses technical requirements. Highest estimated water supply capacity (est. 40 L/s or greater)

6.2 Preferred Alternative

Site TW3 was the preliminary preferred location for a new well for the following reasons:

- Maintains the preferred localized footprint for infrastructure and construction-related impacts such as noise, traffic, and aesthetics;
- Achieves the highest capacity of approximately 40 L/s or greater and is the most efficient well of the three sites reviewed; and
- Minimizes environmental impacts and avoids designated natural environment features.

The preliminary preferred location was presented at PCC 1. No comments were received regarding the suitability of the site from a water quality or water quantity perspective. A comment was received from a nearby property owner/business regarding the site ownership, and due diligence was completed by the County of Oxford which

included confirming current ownership with the Township of East-Zorra Tavistock. Permission to advance the test well was originally granted by the Township. Property purchase or transfer discussions will occur in Detailed Design.

TW3 is carried forward as the preferred new well location. Treatment requirements were considered as part of further technical review completed in the Alternative Designs phase.

The final well location site plan will be confirmed in detailed design, but it is anticipated to be at, or in the immediately vicinity of, the test well to make the best use of the available data collected to date.

7 Alternative Designs

Phase 3 of the MCEA includes evaluating Alternative Design solutions based on the preferred Alternative Solution identified in **Section 6.2**.

7.1 Identification of Well Treatment Options

To provide a safe water supply to the community, water treatment is required as part of the drinking water system. Potential decentralized and centralized treatment options were identified for the new well and are described below:

- ***Alternative Design Option A – Centralized Treatment***: This option would include installation of the production well at TW3 within the unopened road allowance or in its immediate vicinity to provide access to the well site from Hope Street West. Raw water would be pumped from a new wellhouse and directed via a dedicated raw (or pretreated) watermain to the existing well treatment site located off Hendershot Street. This option would allow for centralized treatment of flows from both the existing and proposed new well sites at the existing water treatment facility site. Various watermain routes could be considered under this option, including:
    - Route 1: Raw or pretreated watermain extension from the site along Hope Street West to William Street South, heading south to Woodstock Street South, then east along Decew Street West and past Maria Street to the existing well treatment site
    - Route 2: Raw watermain extension within Optimist Park from the site, heading south to Woodstock Street South, then east along Decew Street West and past Maria Street to the existing well treatment site

Technical Memorandum #7 provides the high-level routing alternatives associated with Design Option A. A copy of *Technical Memorandum #7* is included in **Appendix F**.

- ***Alternative Design Option B – On-Site Treatment (Decentralized):*** This option would include installation of the production well at TW3 within the unopened road allowance or in its immediate vicinity to provide access to the well site from Hope Street West. On-site treatment would be provided and would include additional system storage to enhance security of supply and improve operational performance. While this alternative would work in conjunction with the existing wells and elevated water tower to meet the water demands of the community, all required treatment to meet current regulations would be provided at a new and larger facility at this new well site. Various process design options could be integrated to the facility design and could include:
    - Consideration for ultimate full flow capacity of the production well (~40 L/s or greater)
    - Potential system water storage requirements to meet existing and future water demands
    - Treatment requirements to address primary, secondary, and aesthetic treatment needs based on results of groundwater testing to meet current regulatory requirements
    - Ability for proposed design to accommodate emerging water quality parameters of concern
    - Ability to maintain a trail access off Hope Street West to North Optimist Park

While the results of the previous testing suggest that a theoretical taking of up to 40 L/s may be possible at the TW3 location, this capacity will need to be proven by additional testing in order to support the registration of the new source well and the amendment to the existing Permit to Take water. The 40 L/s is a theoretical capacity and has not yet been demonstrated.

The County of Oxford will consider any further well testing results obtained, as well as available budget and approvals, to make a determination on whether to proceed with the well. The proposed capacity of 40 L/S is not the required capacity, but rather what is believed to be the achievable minimum capacity at this location. Should the County wish to pursue an alternative well property based on new information which would indicate a lower capacity than what may be required, an EA Addendum may be required to revise the recommendation.

7.2 Evaluation of Well Treatment Options

The high-level design concepts were assessed against the evaluation criteria developed as part of *Technical Memorandum #5*, and a summary of the evaluation is provided in

Table 5. The full evaluation of alternatives is provided in Appendix A of *Technical Memorandum #7*, a copy of which is provided in **Appendix F**. Technical Memorandum #7 was updated to include incorporate the CHER/HIA and Stage 1 AA into the evaluation. No significant changes were required based on the incorporation of these results as it did not change the summary results for the Cultural Environment category.

Table 5: Evaluation of Design Alternatives

CRITERIA	ALTERNATIVE DESIGN OPTION A Centralized Treatment	ALTERNATIVE DESIGN OPTION B On-Site (Decentralized) Treatment
Social Environment	Least Preferred	Most Preferred
Cultural Environment	Least Preferred	Most Preferred
Natural Environment	Moderately Preferred	Most Preferred
Technical Environment	Moderately Preferred	Most Preferred
Financial Environment	Moderately Preferred	Most Preferred
OVERALL	**LEAST PREFERRED**	**MOST PREFERRED**
SUMMARY	Although this option could allow for longer-term operational and maintenance cost savings by reducing the number of treatment facilities, it requires a dedicated watermain from this site to the existing treatment facility near Queen's Park, which significantly increases upfront capital costs and reduces system redundancy by relying on a single treatment facility. The potential long-term operational savings are also generally based on the potential for changes to provincial water regulations, the timing, and details of which are unknown at this time.	Offers increased system redundancy in comparison to Option A, and a lower capital cost. The location of the site (TW3) offers the ability to address existing system pressure issues through design, and site sizing can consider possible expansion or additional treatment needs for the future to address potential regulatory changes to water quality criteria.

Alternative Design Option B – On-Site (Decentralized) Treatment is the preferred design option for the following reasons:

- Solution can be designed with consideration for current and future treatment requirements
- Localized footprint for infrastructure and construction-related impacts such as noise, traffic, and aesthetics
- Reduces socio-cultural impacts by avoiding the need for watermain installation within existing road rights-of-way
- Addresses local growth potential and Tavistock water supply system resiliency, and improves redundancy of supply

The preferred design option is consistent with the recommendations of the 2024 W/WW MP which also identified the need for additional on-site storage to address existing system storage deficiencies and to further enhance system redundancy.

7.2.1 IDENTIFICATION OF SITE CONCEPTS

In order to advance the design of site concepts, the following additional objectives and needs were considered:

- Provision of primary and secondary disinfection. For the purpose of the design development, disinfection via sodium hypochlorite dosing was assumed as it is consistent with the current treatment system at the existing well site
- Provision of treatment or other means to address elevated iron concentrations and presence of manganese
- Consideration for future changes to water quality criteria, notably, the ability for the new facility to provide treatment to reduce strontium levels
- Recommendations from the 2024 W/WW MP

The following subsections provide further information in relation to the above key considerations and informed the concept development.

7.2.1.1 Water Quality Challenges and Treatment Options

Consideration was given to existing water quality characteristics and proposed changes to water quality criteria that are currently under review by the province to assess impacts on the facility footprint and treatment configurations.

Table 6 provides a summary of specific raw water quality parameters that could impact treatment requirements.

Table 6: Water Quality Challenges and Treatment Options

Target Parameter	Problem Statement	Process Alternative
Free ammonia	• Free ammonia is present at the new well location (TW3) at a concentration of 0.35 mg/L (as nitrogen or N) • Free ammonia consumes chlorine at a ratio of around 8:1 chlorine-to-ammonia-N • The existing wells (W2A and W3) also contain ammonia at comparable concentrations	• Free ammonia can be removed by the addition of chlorine (breakpoint chlorination), which is already required for disinfection purposes • The chlorine system will need to be sized for the additional dose requirements
Iron	• Iron is present at the new well location (TW3) at a concentration of 0.56 mg/L • When oxidized by chlorine, iron at this concentration will cause discolouration of the supply (yellow/orange colour) • The existing wells (W1, W2A, and W3) also contain iron at comparable or higher concentrations	• Iron could be sequestered though the addition of sodium silicate (currently in use at other Village wells) or polyphosphate; this would not remove the iron but would prevent the associated discolouration • Alternatively, iron could be physically removed through the addition of catalytic iron-removing filter media filters, using chlorination (already required for disinfection) as the pre-filter metal oxidant

Target Parameter	Problem Statement	Process Alternative
Manganese	• Manganese is present at the new well location (TW3) at a concentration of 0.013 mg/L • When oxidized by chlorine, manganese at this concentration could result in some minor accumulation in the distribution system, leading to discolouration of the supply (brown) in the event of a hydraulic disturbance • Although there is currently no health-based regulation for manganese, Health Canada have proposed a Maximum Acceptable Concentration of 0.12 mg/L, supported by a recommended goal of the concentration leaving treatment facilities being at or below 0.015 mg/L. The concentration of manganese at the new well is below this value • The existing wells (W1, W2A, and W3) also contain manganese at comparable or higher concentrations	• Manganese could be sequestered though the addition of sodium silicate (currently in use at other Village wells) or polyphosphate; this would not remove the manganese but would prevent the associated discolouration. This approach would require the addition of new chemical storage, metering pumps, a control panel, and associated process appurtenances • Alternatively, manganese could be physically removed through the addition of catalytic manganese-removing filter media filters, using chlorination (already required for disinfection) as the pre-filter metal oxidant. This approach would require addition of new filters, backwash pumps, backwash supply storage, and potentially backwash waste storage. The capacity of the local sewer system to accept backwash volume would need to be reviewed

Target Parameter	Problem Statement	Process Alternative
Strontium	• Strontium is present at the new well location (TW3) at a concentration of 7.7 mg/L • Although there is currently no health-based regulation for strontium, Health Canada have proposed a Maximum Acceptable Concentration of 7.0 mg/L • The existing wells (W1, W2A, and W3) also contain strontium, ranging from lower to higher concentrations	• Strontium could be removed through ion exchange (IX). In the absence of upstream iron and manganese removal, this process would likely also remove some fraction of competing cations such as iron and manganese, as well as calcium and magnesium. This approach would require the addition of new ion exchange filters, backwash pumps, backwash supply storage, and potentially backwash waste storage. The capacity of the local sewer system to accept backwash volume would need to be reviewed • Based on the background levels of strontium at TW3, there are two options for consideration: ○ Full-Stream Treatment: provision of IX sized for the full flow capacity of the treatment facility. This option would increase the strontium removal potential but requires additional space for the units and increases the wastewater stream. ○ Split-Stream Treatment: provision of IX sized for a portion of the flow capacity of the facility. The portion of the plant flow treated through IX mixes with the remaining flow. The concentration of the mixed flow would be below the proposed regulatory limit. This option would result in lower strontium removal, but sufficient to meet the provincial requirements, with less space required and reduced wastewater generation.

7.2.1.2 Identification of Storage Needs

The W/WW MP identified existing storage deficiencies within Tavistock and the recommendation to include on-site storage at the new well site. Therefore, the shortlisted design options considered in-ground and on-ground storage alternatives. An in-line pumping option (i.e., supply to distribution system via the submersible pump pressure head) was not considered since it would not address the storage issues at this time.

7.2.1.3 Identification of Surge Protection Needs

Pressure fluctuations and transients were noted by the County and identified as an existing problem within the Tavistock system, specifically in areas within the vicinity of the industrial customer. The proposed alternative design options considered the need to provide surge protection measures within the new facility to mitigate pressure transients.

7.2.2 ALTERNATIVE DESIGN CONCEPTS

Based on the review of existing water quality characteristics, proposed changes to water quality criteria, and noted storage deficiencies, six (6) Alternative Design Concepts were developed. The Alternative Design Concepts include different site layouts, and treatment and storage options. Alternatives 3, 4, 5, and 6, each include the option to provide split-stream or full stream IX treatment, which are denoted by an ‘a’ or ‘b’, respectively (e.g., Alternative 4a includes split-stream IX treatment, and Alternative 4b includes full stream IX treatment) as described in the table in Section 7.2.1.1. Where iron/manganese filtration is noted, it is based on full stream treatment. The six Alternative Design Concepts are provided in **Table 8, Table 9,** and **Table 10**.

Table 7: Legend for Alternative Design Concept Figures

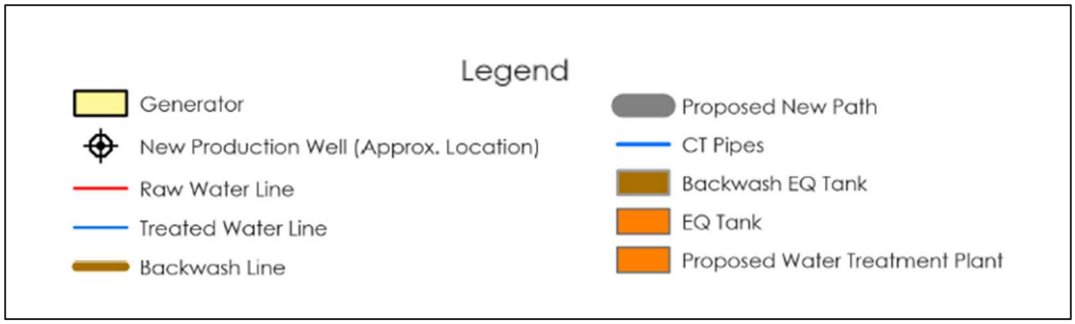


Table 8: Alternative Design Concepts 1 and 2

Alternative Design Concepts	Concept Description Summary
	**Alternative 1: Two-Stage Pumping with on-grade storage and iron sequestering** • New water treatment plant (WTP) (8m x 10m) • Above-ground equalization (EQ) tank at back of property

Alternative Design Concepts	Concept Description Summary
	**Alternative 2: Two-Stage Pumping with in-ground storage and iron sequestering** • New WTP (8m x 10m) • Below-ground storage facility

Table 9: Alternative Design Concepts 3 and 4

Alternative Design Concepts	Concept Description Summary
	**Alternative 3a/b: Two-Stage Pumping with in-ground storage, iron sequestering, and split-stream or full stream ion exchange (IX) treatment** • New WTP (Alternative 3a: 8 m by 14 m, Alternative 3b: 8 m by 16 m) • Below-ground storage facility
	**Alternative 4a/b: Two-Stage Pumping with on-ground storage, iron sequestering, and split-stream or full stream IX treatment** • New WTP (Alternative 4a: 8 m by 14 m, Alternative 4b: 8 m by 16 m) • Above-ground EQ tank at back of property. Larger tank required for Alternative 4a

Table 10: Alternative Design Concepts 5 and 6

Alternative Design Concepts	Concept Description Summary
	**Alternative 5a/b: Two-Stage Pumping with in-ground storage, iron and manganese filtration, and split-stream or full stream IX treatment** • New WTP (Alternative 5a: 8 m by 20 m, Alternative 5b: 8 m by 23 m) • Below-ground storage facility
	**Alternative 6a/b: Two-Stage Pumping with on-ground storage, iron and manganese filtration, and split-stream or full stream IX treatment** • New WTP (Alternative 6a – 8m x 20m, Alternative 6b – 8m x 23m) • Above-ground EQ tank at back of property

7.2.3 EVALUATION OF ALTERNATIVE DESIGN CONCEPTS

The Alternative Design Concepts were evaluated based on their technical and financial feasibility, as well as potential impacts to adjacent properties from siting of the infrastructure. The evaluation table is included in *Technical Memorandum #7* in **Appendix F**. The table was revised based on the results of the CHER/HIA and Stage 1 AA. The revised version added to TM#7.

The evaluation found that **Concept 6a, two-stage pumping with on-ground storage, iron and manganese filtration, and split-stream IX treatment (see**

Figure 2**/Figure 6),** is the preferred Alternative Design Concept for the following reasons:

- Provides an opportunity to supplement storage in the system
- Provides an ability to potentially mitigate transient issues that are occurring in this vicinity of Tavistock due to nearby industrial use and water demand patterns, including a reduction in pressure fluctuations in the localized distribution system
- Includes catalytic iron-removing filters which is preferred over iron sequestering given the concentrations in the raw water source
- On-ground reservoir for storage is lower in cost than construction of in-ground storage
- Option allows for implementation of IX treatment should future water quality regulations related to strontium come into effect. Depending on the timing of work and status of regulatory changes, Oxford County can choose to defer the IX equipment installation if desired. Backwash supply volume for IX would need to be considered during on-site storage volume sizing
- While higher in capital cost versus most other design Alternatives with exception of Alternative 5, this alternative achieves the key servicing objectives

It is anticipated that a future Detailed Design assignment will further refine the design basis and may require modifications to the approximate sizes of the major facilities as noted in the concept plan. In addition, further review of the on-site storage may be required to optimize its location on the site based on comments raised by nearby residents.

8 Project Description

8.1 Design Elements

The Preferred Design “New Production Well and Treatment Facility” consists of the following main elements:

- New production well complete with submersible well pump.
- New treatment plant, to include:
    - Sodium hypochlorite dosing system that injects into a raw incoming line from the well for primary disinfection.
    - Exterior piping to provide appropriate Contact Time (CT) as part of the disinfection process.
    - Catalytic iron-removing filters to address elevated iron levels.
    - Exterior in-ground backwash holding tank/equalization tank with additional pumping to allow for discharge of backwash wastewater into the sanitary collection system.
    - Provision for future IX filters within the facility for split-stream treatment.
    - On-ground storage tank to receive treated water post=chlorine injection for primary disinfection and filtration system. The treated water tank would also provide flows required to backwash the filters.
    - Distribution pumps, to draw water from the tank and into the system.
    - Pressure relief valve off the discharge header to relieve excessive pressure to the on-grade tank, to address concerns with transient events.
    - Sodium hypochlorite dosing system that injects into the discharge header to maintain secondary disinfection in the distribution system.
    - Emergency generator, located in a noise-attenuation enclosure.
    - Electrical and instrumentation equipment for proper monitoring and control.
- Connection to the existing watermain along Hope Street West.

8.2 Utilities

The proposed new well and treatment facility will require a primary electrical service entrance of 200A, 600Y/347V. Depending on final design preferences, there may be a need for a natural gas service to the site for building HVAC needs and/or as a potential fuel source for the standby emergency generator. In addition, connection to the municipal sewer system would be required to address on-site wastewater generation from analyzers and sampling ports, and via the filter backwash process.

Localized watermain work for connection to the existing watermain on Hope Street West will involve work in proximity to existing utilities, including but not limited to sewers, gas, communications, and electrical (buried and overhead). Potential utility conflicts may be encountered but would be addressed as part of Detailed Design and construction.

8.3 Property

While the conceptual design layouts were based on siting of the production well and facility within the unopened road allowance, exact locations for the infrastructure will be determined during Detailed Design. It is possible that the works may overlap into the adjacent North Optimist Park. Potential modifications to the exact location are to be addressed as part of Detailed Design, as it may affect any additional studies (e.g.., Stage 1 Archaeological Assessment) or natural environment field work, if required.

8.4 Construction Staging and Access

As the proposed servicing and design solution involves a new facility, it is anticipated that construction staging will generally be minimal as it relates to the water supply system. Short-term shutdown of the local watermain may be required to allow for connection to the watermain from the new water treatment facility. In addition, connection to the municipal sewer will be required to allow for discharge of wastewater generated on site.

Access to the new production well and treatment facility will be via Hope Street West. Approvals will be acquired from the Township during Detailed Design to secure a new access driveway off the roadway. In order to accommodate the new access driveway off of Hope Street West, in addition to the watermain and sewer connections, some impacts to traffic are anticipated and a traffic management and control plan should be developed as part of the Detailed Design phase of the project.

Impacts associated with pedestrian access to the park from Hope Street West should be reviewed during Detailed Design and may require coordination with the Royal Canadian Legion Branch 518.

8.5 Cost Estimate

An opinion of probable cost was prepared for the preferred servicing solution and design concept. Cost estimate class levels and accuracy ranges followed the Association for the Advancement of Cost Engineering (AACE) Recommended Practice No. 56R-08. The cost estimate for the new well and facility should be considered as a Class 4 estimate, given that some refinement was undertaken to establish the general facility sizing and to obtain key equipment costs. **Table 11** provides a summary of the cost estimate.

Table 11: Tavistock New Well and Treatment Facility Class 4 Cost Estimate (-20% to +30%)

Item	Cost ($)
External Works including Watermain/Access	$165,000
Site Works	
Site Civil incl. yard piping	$510.000
Special Construction incl. on-grade storage	$835,000
Structural	$860,000
Process/Mechanical[1]	$3,400,000
Electrical/Instrumentation & Controls	$385,000
Miscellaneous	$45,000
Contingency	$300,000
Total	$6,500,000

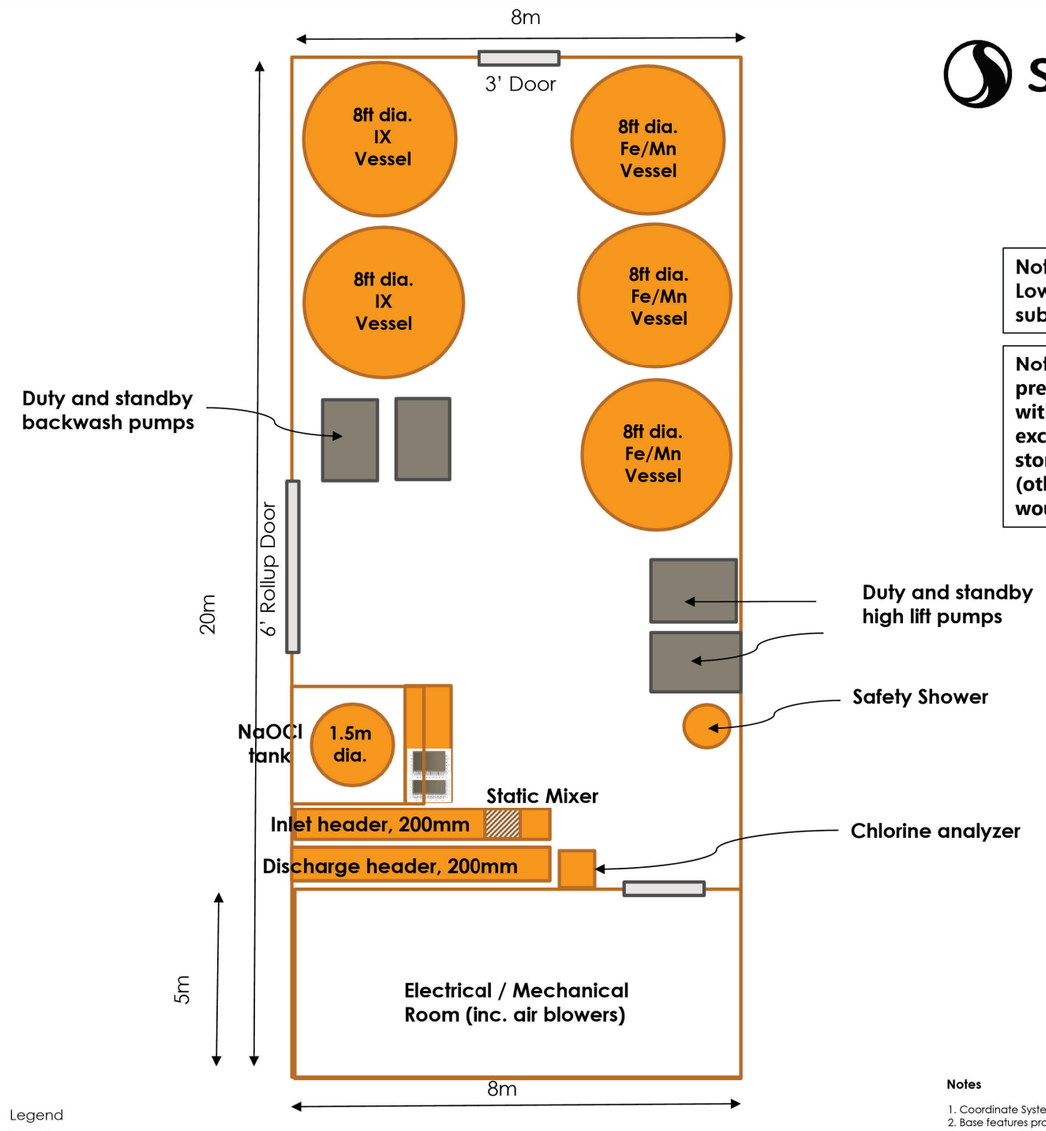
Note:

1. Includes estimated costs for split-stream IX treatment. Actual timing and requirements for IX treatment can be phased if and when regulatory changes stipulate requirement for strontium removal.

The costs noted above exclude additional studies to support Detailed Design, permit/approval costs, and engineering costs.

8.6 Implementation Timeframe and Schedule

It is anticipated that the Detailed Design assignment will proceed in 2024 following approval of the Class EA process, with the design completed in 2026. The proposed upgrades are expected to be in service by 2028, which is consistent with the general timeframe noted in the 2024 W/WW MP.



Legend

- Generator
- New Production Well (Approx. Location)
- Raw Water Line
- Treated Water Line
- Backwash Line
- Proposed New Path
- CT Pipes
- Backwash EQ Tank
- EQ Tank
- Proposed Water Treatment Plant

0 10 20 Meters

Stantec

Note [1]:
Low Lift Pumping = submersible pump in well

Note [2]:
pressure tanks are excluded with option to discharge excess flows back to storage using PRVs (otherwise, pressure tanks would be necessary).

Notes

1. Coordinate System:NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2022.

Project Location REVA

Prepared by jacwalker on 2023-08-16
Technical Review by ABC on yyyy-mm-dd

Client/Project
County of Oxford
Tavistock Well 4 Class EA

Figure No.
6a

Title
Site Layout Option 6a
Two-Stage Pumping, Split-Stream IX Treatment, On-Grade Storage

9 Potential Environmental Impacts and Mitigation Measures

9.1 Natural Environment

The potential impacts to natural features that might reasonably be expected to occur as a result of the proposed new well near Hope Street West are identified and discussed in this section. A conceptual layout (Alternative 6a) was identified (see **Figure 5**) within an existing road allowance and was used to consider potential environmental impacts and mitigation measures.

Site-specific natural environment investigations are recommended for all project components during Detailed Design to identify requirements and natural heritage features (e.g., SAR) that may be impacted by the project once the site footprint has been confirmed.

Preliminary mitigation measures to reduce potential impacts to wildlife and their habitat are presented in this ESR and should be reviewed and confirmed during Detailed Design.

9.1.1 VEGETATION

9.1.1.1 Potential for Vegetation Removal

All vegetation removal associated with the preferred design is located south of Hope Street West. ELC mapping identified the TW3 property as recreational land (CGL-4), which features cut lawn similar to the adjacent Optimist Park. The site size is approximately 0.2 ha. The majority of the site will require excavation to build the treatment building, below ground CT piping, footings for the storage tank, and installation of the backwash/EQ tank.

Site TW3 contains three areas designated in the Oxford Natural Heritage System. These features correspond with the deciduous forest (FOD) and marsh communities (MA) in the Study Area. No vegetation removal will be required to the north of Hope Street where these features are located.

Tree removals may be required along the west side but should be reduced to the extent possible to do the work. ELC mapping for Site TW3 is presented in Figure 2B of the *Natural Heritage Memorandum*, a copy of which is provided in **Appendix E1**.

9.1.1.2 Standard Vegetation Construction Mitigation

The following mitigation measures are recommended, but should be reviewed and confirmed during Detailed Design:

- Delineate the work areas with tree protection fencing prior to construction to reduce impacts to adjacent natural features.
- Wash, refuel and/or service equipment a minimum of 30 m from drainage features and wetlands to reduce the risk of deleterious substances from entering the features. Check machinery regularly for fluid leaks.
- Thoroughly clean construction machinery prior to entering the site to reduce the potential for establishment of highly invasive species such as Phragmites.
- Develop a Spill Management Plan and have it on site for implementation in the event of an accidental spill. Keep an emergency spill kit on site.
- Maintain erosion and sediment control measures until restoration measures have been assessed and are determined to be secure and stable.
- Stabilize and re-vegetate areas of disturbed/exposed soil with native seed mixes and woody vegetation, as soon as practicably possible.

9.1.2 PROTECTION OF WILDLIFE

9.1.2.1 Migratory Birds

To avoid contravention of the *Migratory Birds Convention Act, 1994* (MBCA), avoidance and mitigation measures must be implemented to prevent the disturbance, destruction or taking of a nest, egg, or nest shelter of a migratory bird. Vegetation removal during the core migratory bird nesting period (April 1 – August 31) is not recommended; however, if required, a nest survey may be carried out by a qualified person.

If a migratory bird nest is located within the work area at any time during the nesting period, a no-disturbance buffer will be delineated. This buffer will be maintained for the entire duration of the nest activity, which will be determined using periodic checks by the avian biologist. The radius of the buffer generally varies from 5 m - 60 m depending on the sensitivity of the nesting species. Work will not resume within the nest buffer until the nest is confirmed to be no longer active by a qualified biologist.

Under the new updates to the MBR, Pileated Woodpecker (Dryocopus pileatus) nests are now protected year-round (Migratory Birds Regulations, 2022). If a Pileated Woodpecker nest is determined to be empty of live birds or viable eggs, then the nest must be registered under ECCC's Abandoned Nest Registry. At which point the prescribed period of inactivity can begin to be counted (36-months) before any action can be taken towards the nest. Destroying an unoccupied Pileated Woodpecker nesting cavity prior to the 36-month waiting period will require a permit and may require mitigation measures be applied.

9.1.2.2 Potential to Impact Species at Risk and Species of Conservation Concern Wildlife Habitat

Site TW3 consists primarily of cut grass similar to the adjacent Optimist Park. The desktop review identified records of potential SAR and SOCC present near the well sites, including TW3. The desktop habitat suitability assessment indicated that potentially suitable SAR/SOCC habitat is present in the Study Area. There are a number of large diameter trees (greater than 10 cm diameter at breast height) in the vicinity of site TW3 that could potentially function as bat maternity roost trees for bat SAR.

Site-level field assessments in Detailed Design would be required to verify if suitable habitat for SAR/SOCC is present and whether SAR bat maternity roost habitat may be present. Other potential SAR (Bobolink and Eastern Meadowlark) habitat is present in agricultural communities within the Study Area; however, the proposed well location is not anticipated to impact these communities.

MECP recommends using the following SAR Bat Survey Guidance Documents when considering potential for SAR bat habitat:

- MECP Species at Risk Bats Survey Note – 2022
- MECP Use of Buildings by Species at Risk Bats – Survey Methodology (adapted from MNRF “Bats and Bats Habitats: Guidelines for Wind Power Projects (July 2011)
- MECP Bats – Treed Habitat Maternity Roost Surveys (2022-06 guidance)

Any observations of SAR should be reported to MECP and MNRF within 48 hours. SAR should not be handled, harassed, or moved in any way, unless they are in immediate danger.

9.1.2.3 General Wildlife Mitigation Measures

Site-specific wildlife protection mitigation measures will be recommended following completion of site-specific natural environment investigations in Detailed Design once the project footprint is confirmed. The following mitigation measures are recommended to avoid impacts to wildlife during construction:

- Tree removal should avoid the active season for SAR bats, avoiding tree removal between April 1 and September 30.
- Vegetation removal during the core migratory bird nesting period (April 1 – August 31) is not recommended; however, if required, a nest survey may be carried out by a qualified person.

- A visual search of the work area will be conducted before work commences each day, particularly for the period when most wildlife is active (generally April 1 to October 31). Visual inspections will locate and avoid snakes, turtles, and other ground dwelling wildlife such as small mammals. Visual searches will include inspection of machinery and equipment left in the work area overnight prior to starting equipment.
- If wildlife is encountered, work at that location will stop, and the animal(s) will be permitted reasonable time to leave the work area on their own.
- Contractors will be made aware of the turtle nesting period (May 15 to September 15) and potential for turtle nesting during construction. Sediment fencing will be installed along the limits of the work zone to reduce the potential for turtles to enter the construction area. If possible, installation of sediment fencing will occur before May 15 or after September 15 (i.e., outside of turtle nesting season) to restrict the movement of nesting turtles into the work zone.
- If installation of fencing occurs during the turtle nesting season, it is recommended that the area be searched for evidence of turtles or nests prior to installation of fencing. Further specifications for reptile exclusion fencing will follow *Best Practices Technical Note – Reptile and Amphibian Exclusion Fencing* (MNR 2013) and *Best Management Practices for Mitigating the Effects of Road Mortality on Amphibian and Reptile Species at Risk in Ontario* (MNRF 2016). The exclusion fencing is to be maintained around the work area for the duration of the turtle nesting activity period and checked daily to identify any repairs that may be needed. If found to be deficient, fencing will be repaired immediately.
- If a nesting turtle is encountered during construction at any time, the turtle will not be disturbed. Work in the area must stop until the turtle has completed nesting and/or vacated the area. The nest site will be noted, and a biologist or other qualified professional will be contacted for direction. Turtle nests are protected under the *Fish and Wildlife Conservation Act* (FWCA); therefore, turtle nests will not be disturbed.
- Sediment and erosion control measures, such as fencing or erosion blankets, utilized on the site during construction will avoid products with plastic mesh due to risk of entanglement of snakes or other wildlife.

9.1.3 EROSION AND SEDIMENT CONTROL

An erosion and sediment control (ESC) plan will be developed and employed during construction to reduce the risk of erosion and the entry of sediment into drainage features and wetlands. Mitigation included in the plan will include the following measures:

- Implement project-specific temporary ESC measures prior to starting work (e.g., silt fence and/or sediment logs).
- Keep additional ESC materials available on site to provide a contingency supply in the event of an emergency.
- Monitor and maintain ESC measures, as required. Controls are to be removed only after the soils of the construction area have stabilized and vegetation cover has re-established.
- Stabilize materials requiring stockpiling (e.g., fill, topsoil, etc.) and keep a safe distance (> 30 m) from drainage features and wetlands.

9.1.4 PROTECTION OF FISH AND FISH HABITAT

In-water work is not anticipated to be required as part of the project. Work is not proposed within the wetland north of Hope Street West, or the buried Hohner Drain in the west portion of Optimist Park.

Standard measures for ESC will be implemented to protect surface water features from sediment and other contaminants that may be transported in runoff from disturbed work areas. Where applicable, dewatering discharge will be managed and treated to reduce the risk of erosion and/or release of sediment-laden or contaminated water to surface water features that support fish and fish habitat.

9.1.5 DRAINAGE

Drainage plans will be developed during Detailed Design. Site TW3 is not located within an UTRCA Regulated area under O. Reg. 157/06 or O. Reg. 97/04 of the *Conservation Authorities Act* (CAA). To ensure that the regulatory policies associated with the regulated areas are complied with, the County will continue consultation with UTRCA throughout the timeline of this project.

9.1.6 SOURCEWATER PROTECTION

The Contractor will be advised that there are sensitive groundwater resources within Tavistock as described in **Section 4.3.4**.

The preferred alternative for this study is to develop a new well, which requires obtaining groundwater. It is anticipated that the recommendations of this EA may influence the County's SPP policies. Implications for WHPA changes as a result of this project should be further identified in Detailed Design as part of the hydrogeological investigations to support the final well construction and testing program.

The existing Permit to Take Water for the Tavistock water supply system will need to be amended to include the new water supply well. A PTTW or an Environmental Activity

and Sector Registry (EASR) may be required through MECP if any dewatering is required to facilitate construction.

9.2 Cultural Environment

9.2.1 BUILT HERITAGE RESOURCES AND CULTURAL HERITAGE LANDSCAPES

A CHER/HIA was completed for 223 Hope Street West adjacent to TW3. The report concluded that the property did not meet the threshold for municipal designation (two or more criterion were not met), identification of heritage attributes was not required, and no further cultural heritage studies were recommended.

9.2.2 ARCHAEOLOGICAL RESOURCES

A Stage 1 AA was completed for this project. As recommended by the Stage 1 AA, Stage 2 AA will be completed as early as possible in the detailed design phase of the project, prior to any ground disturbing activities.

Should previously undocumented archaeological resources be discovered, they may be a new archaeological site and therefore subject to Section 48 (1) of the *Ontario Heritage Act*. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed 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 Register, Ontario Ministry of Public and Business Service Delivery, which administers provisions of that Act related to burial sites. In situations where human remains are associated with archaeological resources, MCM should also be notified (at archaeology@ontario.ca) to ensure that the archeological site is not subject to unlicensed alterations which would be a contravention of the *Ontario Heritage Act*.

During consultation, Bkejwanong Territory (Walpole Island) and Caldwell First Nation indicated that they are interested in knowing about any archaeological studies to be completed for this project. Chippewas of the Thames First Nation (COTTFN) indicated its interest in archaeology issues during the PIC comment period. It is recommended that Indigenous communities, including the Bkejwanong Territory, COTTFN and Caldwell First Nation are informed about archaeological studies, and are given an opportunity to participate as field monitors based on interest.

9.3 Socio-Economic Environment

9.3.1 PROPERTY

Property acquisition is required to implement the preferred alternative design concept - a new well in Tavistock and is anticipated to be acquired from the Township of East Zorra-Tavistock. Construction access or easements will be determined during Detailed Design.

9.3.2 NOISE

A Noise Assessment is recommended to be undertaken during Detailed Design to consider operational noise associated with the project and proposed works and to provide measures to reduce noise to the extent possible. This includes implementing appropriate mitigation to reduce the noise associated with the emergency generator and the treatment facility.

The contractor will be required to abide by the municipal noise control by-laws during construction and ensure that all construction equipment is kept in good working order to limit additional noise. The contractor shall also ensure that the idling of construction equipment is kept to a minimum. Additional noise control measures will be identified during Detailed Design and included in the construction contract.

9.3.3 AIR QUALITY

During construction, best management practices will be applied to mitigate any air quality impacts caused by construction dust (e.g., through the use of non-chloride dust suppressants).

9.3.4 VISUAL IMPACTS

Site aesthetics or landscaping will be considered during Detailed Design to minimize disruption to adjacent resident views of the park, where possible.

9.3.5 CLIMATE CHANGE

The MECP's guide, *Consideration of Climate Change in the Environmental Assessment Process provided in Appendix C Correspondence)*, outlines two approaches for consideration of and addressing climate change in project planning including:

- Reducing a project's impact on climate change (climate change mitigation).
- Increasing the project and local ecosystem's resilience to climate change (climate change adaptation).

This project addresses both of the factors above as it:

- provides climate change mitigation by ensuring that the water system has the water supply necessary on an alternate site in case climate change reduces water supply yields at the existing location; and,
- enhances local ecosystem resilience by providing water supply storage which can be an important factor should there be a natural disaster, drought conditions, or other factors. Increasing storage reduces strain on the overall system during periods of high demand.

10 Approvals and Permits

Permit requirements will be confirmed during Detailed Design. A summary of permits and approvals required for the project is provided below.

Upper Thames Conservation Authority / Conservation Authorities Act

Under Ontario Regulation 157/06 of the CAA, UTRCA issues permits for works in or near watercourses, valleys, wetlands, or shorelines, when required. Regulated areas are associated with drainage features and/or wetlands in the Study Area, as shown on UTRCA's (2021) public online viewer; however, UTRCA may regulate additional features that are not mapped.

Detailed construction plans for the preferred site will be assessed to identify permitting requirements in consultation with UTRCA.

Site TW3 is located outside of UTRCA regulated features and is expected to require less authorization requirements under the UTRCA's regulation. Consultation is recommended with UTRCA during Detailed Design to confirm.

As established under the Ontario Clean Water Act, 2006, S.O., 2006, c. 22, source protection areas and associated land use restrictions exist for all municipal drinking water sources located throughout the Thames-Sydenham Source Protection Region. The MECP has designated a WHPA as an area delineated on the ground surface that represents the capture zone for the underlying aquifer in which a given municipal well draws its water. The zone represents the total amount of time it would take for groundwater to flow through the aquifer system and reach the intake of a given municipal well. A WHPA-A is defined as a 100 m radius around the municipal well.

Within a 100 m radius of TW3, there are several residential houses, Optimist Park, the Royal Canadian Legion Branch 518, a farm field, and what aerial imagery suggests is a commercial outbuilding which has numerous vehicles and storage surrounding it. Under the *Clean Water Act* list of prescribed drinking water threats for a WHPA-A, there are several activities that may be associated with land uses near TW3 that would result in a significant chemical and/or pathogen threat to the groundwater supply if present at the site [2]. These could include application to land, storage, and generation of agricultural source material, fertilizer, and pesticide (application, handling, and storage), and road salt application. Depending on what is within and stored around the commercial building, other activities such as fuel handling and storage could result in a significant chemical and/or pathogen threat to the groundwater water supply.

[2] Ministry of the Environment, Conservation and Parks (MECP). 2023. Source Water Protection Information Atlas. Accessed November 2023.

The County should facilitate further consultation with UTRCA regarding changes to the Source Protection Plan including delineation of a WHPA for the new well.

Endangered Species Act, 2007 (MECP)

Should Detailed Design result in potential impacts to provincially regulated SAR or their habitats, consultation with MECP is recommended to confirm authorization requirements under the *Endangered Species Act, 2007* (ESA).

The provincial ESA prohibits the killing, harming, harassing, capturing, or taking of a living member of a species listed as Threatened, Endangered or Extirpated by the SAR in Ontario list (O. Reg 230/08) (S.9), or the damage to habitat of similarly designated species (S.10). An exception is where a permit is issued under S.17(2) of the same Act, or the Activity is registered under Ontario Regulation 242/08 of the ESA.

Fish and Wildlife Conservation Act, 1997 (FWCA)

MNRF manages Ontario's natural resources and wildlife on behalf of Ontarians. The ministry administers the *Fish and Wildlife Conservation Act*, 1997 (FWCA) and supporting regulations. In part, the FWCA regulates the relocation of fish and wildlife.

Accordingly, should the project require:

- The relocation of fish outside of the work area, a Licence to Collect Fish for Scientific Purposes will be required.
- The relocation of wildlife outside of the work area (including amphibians, reptiles, and small mammals), a Wildlife Collector's Authorization will be required.

Licences are issued to the individuals that will be conducting the work and expire on the expiry date provided on each FWCA authorization. Additionally, should the removal of a raptor nest be necessary for the project, a FWCA permit will be required.

Public Lands Act

The MNRF oversees the administration of Crown land, otherwise known as public lands in Ontario. Public land includes the beds of most lakes and rivers. Some activities on shore lands (both public and private) are also regulated by the MNRF.

No work is required on Crown land for this project; therefore, a Crown Land Work Permit will not be required.

Fisheries Act (DFO)

In-water work is not anticipated for the project.

If plans are revised during Detailed Design and the need for in-water work is identified, design details and construction methods are recommended to be submitted to DFO through a Request for Review form for review of the Project under the *Fisheries Act*.

Species at Risk Act

If the need for in-water work is identified, further aquatic investigations may be required, including screening for SAR. Although not anticipated for this project, a DFO Request for Review may be required for alterations to watercourses.

As previously noted, further natural environment investigations are recommended during the Detailed Design phase prior to construction, including a significant wildlife habitat assessment and SAR search in areas to be impacted to consider whether SAR and/or SAR habitat may be present.

County of Oxford/Township of East Zorra-Tavistock Official Plans

Natural environment investigations should be completed to ensure compliance with County of Oxford and Township of East Zorra-Tavistock Natural Heritage System policies when working near natural areas such as woodlands or wetlands across from Hope Street West.

Ministry of the Environment, Conservation and Parks

Based on the anticipated scope of work, the following permits and approvals from the MECP are anticipated:

- MECP Drinking Water Works Permit (DWWP) and Municipal Drinking Water License (MDWL) Amendments
- A PTTW for construction dewatering in excess of 400,000 L/day or an Environmental Activity and Sector Registry (EASR) for construction dewatering between 50,000 and 400,000 L/day, if required

The existing Permit to Take Water for the Tavistock water supply system will need to be amended to include the new water supply well.

11 Commitments for Detailed Design and Future Work

Table 12: Commitments to Carry-Forward to Detailed Design

Category	Mitigation
Traffic, Noise, Air Quality	• Reduce or avoid construction-related impacts through standard mitigation, such as maintaining access to properties, adhering to noise by-laws, and reducing dust. • Conduct a Noise Study in Detailed Design to consider operational noise from the new well once the site footprint is confirmed. • Consider site aesthetics or landscaping in Detailed Design to minimize disruption to adjacent resident views of the park, where possible.
Drainage	• Consider local drainage and comply with UTRCA permits or approvals.
Wildlife and Fish Habitat	• Avoid vegetation removal during typical bird nesting seasons (i.e., April 1 to August 31). • Tree removal should avoid the active season for SAR bats, avoiding tree removal between April 1 and September 30. • If tree removal cannot be avoided, site-level field assessments will be completed in Detailed Design to confirm the presence of candidate SAR bat maternity roost trees. • Conduct future site-specific terrestrial and fish habitat investigations in areas to be impacted to avoid wildlife impacts, including for SAR or SOCC, if present. • Avoid in-water work to the extent possible, and/or utilize trenchless methods for water crossings.

Category	Mitigation
	• Where required, in-water work may be subject to a DFO Request for Review. • Consult with the MECP if SAR may be present. • Any findings of the additional natural environment or archaeological assessment that are required in future implementation phases will be openly shared by the County of Oxford with participating Indigenous communities.
Cultural Heritage Resources	• A Stage 1 AA was completed for this project. As recommended by the Stage 1 AA, Stage 2 AA will be completed as early as possible in the detailed design phase and prior to any ground disturbing activities. • Should previously undocumented archaeological resources be discovered, they may be a new archaeological site and therefore subject to Section 48 (1) of the *Ontario Heritage Act*. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed 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 Register, Ontario Ministry of Public and Business Service Delivery, which administers provisions of that Act related to burial sites. In situations where human remains are associated with archaeological resources, the Ministry of Citizenship and Multiculturalism (MCM) should also be notified (at archaeology@ontario.ca) to ensure that the archeological site is not subject to unlicensed alterations

Category	Mitigation
	which would be a contravention of the *Ontario Heritage Act*. • Continue to engage with Indigenous communities, and identify plans for archaeological fieldwork, including offering Community Field Liaisons an opportunity to participate where Stage 2 fieldwork is identified. • The County of Oxford interprets participation of Indigenous communities to mean the voluntarily observation of the field assessments performed by the County, or its retained consultants. No compensation for this participation is provided for this future work. • Any findings of the natural environment or archaeological assessment that are required in future implementation phases will be openly shared with the same Indigenous representatives respectively.

Category	Mitigation
Permits and Approvals	• UTRCA: Work in or near watercourses/regulated areas. (Ontario Regulation 157/06) • Determine need for construction dewatering requirements during Detailed Design. • Adhere to UTRCA and MECP sourcewater protection policies, including delineation of a new WHPA and integration into the Sourcewater Protection Plan in further discussion with UTRCA. • The existing Permit to Take Water for the Tavistock water supply system will need to be amended to include the new water supply well. • MECP Drinking Water Works Permit (DWWP) and Municipal Drinking Water License (MDWL) Amendments • Continued commitment to implementing water conservation and efficiency measures to ensure the sustainable and effective use of groundwater resources • Engage with MECP if potential to impact SAR is determined, in accordance with the *Endangered Species Act*.

12 EA Documentation Filing

This ESR fulfills the documentation requirements for the Schedule C Class EA planning process. The filing of the ESR for public review completes the planning stage of the project.

This ESR is available for public comment for a period of 30 calendar days. A Notice of Completion will be published in the local newspaper to inform the general public, interested stakeholders, review agencies, and Indigenous communities of the mandatory review period.

The ESR will be available for review online on the County of Oxford website: https://speakup.oxfordcounty.ca/new-well-supply-tavistock

13 Comments Received following the 30-Day Review Period

The ESR was provided for public review from May 30, 2024 to June 28, 2024, and made available on the Oxford County website: www.speakup.oxfordcounty.ca/new-well-supply-tavistock.

Following the 30-day public review period, comments received were responded to and have been summarized in **Table 13**.

MCM requested that a Stage 1 AA and CHER be carried out as part of the Municipal Class EA process and included in the evaluation of alternatives. The assessment tables have been updated to reflect the Stage 1 AA and CHER/HIA findings and are included in Technical Memorandum 6 and Technical Memorandum 7. The results of the Stage 1 AA and CHER/HIA do not change the recommended plan summarized in this ESR.

Table 13 Post-EA Comments

Comment	Summary of Response/ Action Taken
Agency Comments	
Ministry of Citizenship and Multiculturalism June 28, 2024 - MCM requested a Stage 1 archaeological assessment and completion of a cultural heritage evaluation within the Municipal Class EA process.	Response provided via letter dated August 15, 2024: • Identified that the requested studies would be completed and incorporated into the Municipal Class EA. • The ESR has been updated and finalized with this information included.
Indigenous Community	
Chippewa of the Thames First Nation (COTTFN) June 27, 2024 – The Chippewa of the Thames First Nation asked about:	Response provided via letter dated August 15, 2024: • Thank you for your continued interest in this project and for providing your comments in response to the project team's solicitation for feedback. Oxford County is completing a

Comment	Summary of Response/ Action Taken
• community field liaison opportunities • possible impacts to a forest or surface water feature • why two existing wells cannot operate at the same time • how strontium removal was taken into account	Stage 1 archaeological assessment to determine whether archaeological fieldwork (Stage 2 archaeological assessment) is required in detailed design. Oxford County can provide notification of any upcoming archaeological or terrestrial/fish habitat fieldwork investigations, however the County does not provide financial compensation for the Consultation Process, or pay costs for any community field monitors. • Pumping tests were completed at Test well 3 (preferred site). No measurable response to pumping was observed at the nearby surface water feature north of Hope Street, indicating that the shallow overburden sediments are not hydraulically connected to the bedrock aquifer. • Well W2A and W3 are completed in relatively close proximity to each other and experience mutual well interference. The PTTW restricts the operation of both of these wells at the same time due to well and aquifer capacity limitations resulting from the mutual interference. • The current water quality in the Tavistock Drinking Water System and the new water supply from the proposed well and treatment facility will continue to meet all Ontario Drinking Water Standards. The Class EA study process has taken the proactive approach to consider possible regulatory changes. The extent, if any, of these changes is not known at this time. Should the regulations be amended, the proper treatment system to address new requirements can be determined and implemented.

Comment	Summary of Response/ Action Taken
Business	
June 28, 2024 – Canadian Farm Distributors raised questions about property ownership regarding the preferred plan land parcel.	Response provided via letter dated August 15, 2024: • The Project team identified that the property for the preferred well location is owned by the Township of East Zorra-Tavistock and has been since 1977. The property was acquired and rezoned R1-70 at that time. The County currently intends to further enhance the water supply provided to the community on this parcel with the addition of a well and treatment plant. • In 2016, the Township of East-Zorra requested that the County undertake an assessment of potential locations for a future intersection on Hope Street W. This assessment included the subject property, and results indicated that the property is no longer suitable for a road allowance due to heavier traffic volumes and inadequate site distance for a new intersection based on the speed limit of Hope Street W, which would pose a safety concern. Additional concerns related to proximity of adjacent driveways to a new intersection. The proposed use of the site for a new well and treatment plant would involve only a driveway access off Hope Street W to the site. • The property in question will also provide public access to Optimist Park from Hope Street W. The County has highlighted the importance of continuing this community benefit in the ESR and its incorporation into the eventual detailed design phase. • In reference to your comment concerning 163 Hope Street W, we do note that this item falls

Comment	Summary of Response/ Action Taken
	outside of the current Class EA process. As such, no further comment will be provided. • Response letter provided identifying that the property in question has been owned by the Township of East Zorra-Tavistock since 1977 and the property was acquired and re-zoned at that time. The letter also responded to the community's decision to no longer use the parcel as a road allowance. Reference to another parcel at 163 Hope Street west was confirmed to be outside of the study area.

Appendix A
Notification Materials

Appendix B
PCC Materials

Appendix C
Correspondence

Appendix D
Official Plan Figures

Appendix E
Environmental Reports

Appendix E.1
Terrestrial Memo

Appendix E.2
Built Heritage and Cultural Heritage Landscapes

Appendix E.3
Stage 1 Archaeology Assessment

Appendix F
Technical Memorandum Documents

Appendix F.1
Technical Memorandum #1

Appendix F.2
Technical Memorandum #2

Appendix F.3
Technical Memorandum #3

Appendix F.4
Technical Memorandum #4

Appendix F.5
Technical Memorandum #5

Appendix F.6
Technical Memorandum #6

Appendix F.7
Technical Memorandum #7