Environmental Study Report for Fullarton Dam Rehabilitation

January 29, 2025

Prepared for:
Upper Thames River Conservation Authority
1424 Clarke Road
London, ON N5V 5B9

Prepared by:
Stantec
100-300 Hagey Boulevard
Waterloo ON N2L 0A4

Project Number:
160901056

Limitations and Sign-off

The conclusions in the Report titled Environmental Study Report for Fullarton Dam Rehabilitation are Stantec's professional opinion, as of the time of the Report, and concerning the scope described in the Report. The opinions in the document are based on conditions and information existing at the time the scope of work was conducted and do not take into account any subsequent changes. The Report relates solely to the specific project for which Stantec was retained and the stated purpose for which the Report was prepared. The Report is not to be used or relied on for any variation or extension of the project, or for any other project or purpose, and any unauthorized use or reliance is at the recipient's own risk.

Stantec has assumed all information received from Upper Thames River Conservation Authority (the "Client") and third parties in the preparation of the Report to be correct. While Stantec has exercised a customary level of judgment or due diligence in the use of such information, Stantec assumes no responsibility for the consequences of any error or omission contained therein.

This Report is intended solely for use by the Client in accordance with Stantec's contract with the Client. While the Report may be provided to applicable authorities having jurisdiction and others for whom the Client is responsible, Stantec does not warrant the services to any third party. The report may not be relied upon by any other party without the express written consent of Stantec, which may be withheld at Stantec's discretion.

Prepared by: Digitally signed by Gibson, Shelby Date: 2025.01.29 08:55:33 -05'00'
Signature

Shelby Gibson, Ph. D
Environmental Planner
Printed Name and Title

Reviewed by: Digitally signed by Raheem, Ferenaz Date: 2025.01.29 11:36:46 -05'00'
Signature

Ferenaz Raheem, RPP MCIP
Senior Environmental Planner
Printed Name and Title

Reviewed by: Digitally signed by Hill, Laura Date: 2025.01.29 15:44:19 -05'00'
Signature

Laura Hill, M.Env.Sc.
Project Manager, Environmental Scientist
Printed Name and Title

Approved by: Digitally signed by Amirault, Heather DN: CN="Amirault, Heather", OU=Internal, OU=users, OU=stantec, DC=corp, DC=ads Date: 2025.01.29 14:29:25-05'00'
Signature

Heather Amirault, P.Eng.
Stream Restoration Engineer
Printed Name and Title

Executive Summary

Fullarton Conservation Area is located at 3000 Perth Road 163, Fullarton, Ontario and is a 34-hectare recreational area used for baseball, hiking, picnicking and other activities. The existing Fullarton Dam is an earth dam that was built in the 1950s to create a recreational lake. A 2007 dam safety assessment (ACRES 2007) indicated that the updates were required to bring the dam into compliance with current guidelines and that additional testing on slope stability would be required.

As required under the *Lakes and Rivers Improvement Act, 2019*, any dam reconstruction requires an environmental assessment (EA) in accordance with the *Environmental Assessment Act* (EA Act) of the proposed activities for the dam and surrounding areas to evaluate impacts on the environment and provide mitigation measures.

As owners and operators of the dam, the Upper Thames River Conservation Authority (UTRCA) is undertaking an EA study described in accordance with the *Conservation Ontario Class Environmental Assessment for Remedial Flood and Erosion Control Projects* (approved January 2002 and amended June 2013), herein referred to as the Class EA, which fulfills the requirements of the EA Act. As part of the mandate of Conservation Authorities, UTRCA regularly reviews projects and develops plans to eliminate the need for future remedial flood and erosion projects. Therefore, the undertaking to which this Class EA applies is Riverine Flooding.

This Class EA study examines four alternative design concepts for remedial works and evaluates each based on a series of environmental, social, and technical criteria and recommends a preferred design. The four alternatives examined were:

- Alternative 1 – "Do Nothing" (Maintain Existing Dam)
- Alternative 2 – Maintain Reservoir and Dam with New Fish Bypass Channel
- Alternative 3 – Partial Dam Removal with New Constructed Bypass Channel
- Alternative 4 – Dam Decommissioning and Watercourse Restoration

Alternative 4 was recommended as the preferred alternative design. Overall, Alternative 1 and 2 have the same risk of flood impact downstream due to dam failure as the same volume of water in the reservoir is retained. Both presume basic dam maintenance or require upgrades for the dam structure. The flood risk is reduced by Alternative 3 and is managed appropriately by Alternative 4. Alternative 4 fulfills additional environmental planning and design principles such as addressing flood risk, dam safety, reinstating fish passage without the need for significant future maintenance and operational costs. Additional permits and approvals may be required prior to commencing construction activities from the Ministry of Environment, Conservation and Parks (MECP), Ministry of Natural Resources and Forestry (MNRF), and from Fisheries and Oceans Canada (DFO). There is potential for temporary environmental effects, including accidental spills to surface water, changes in groundwater quantity and quality, impacts to healthy vegetation, reptiles, fish and fish habitat, sediment, and social effects such as nuisance noise, light, and recreational usage during construction. All impacts are expected to be mitigated using standard mitigation and



monitoring measures. Positive effects from the project include improved surface water flow and thermal regime in the watercourse, increased groundwater recharge and baseflows, improved native habitat for terrestrial species, and removal of barriers to fish passage. Recreation, including trails will be maintained. Lastly, the Project is expected to improve health and safety of visitors to Fullarton Conservation Area through improved water management.

This environmental study report (ESR) has been made available for public and agency review as part of a 30-day review period. Subject to comments received on this ESR and the receipt of necessary approvals and funding, the UTRCA is expected to proceed with the implementation of Alternative 4. The implementation phase of the Project will involve the preparation of detailed plans and specifications, contractor selection and construction.

Table of Contents

1 Background 1
1.1 Study Purpose 1
1.2 Study Area 2
1.3 Dam Description 4
1.4 Class EA Process 4
2 Problem and Opportunity Statement 7
3 Existing Conditions and Alternatives 8
3.1 Existing Conditions 8
3.1.1 Surface Water 8
3.1.2 Groundwater 9
3.1.3 Terrestrial Environment/Species at Risk 10
3.1.4 Aquatic Environment/Species at Risk 12
3.1.5 Soil 14
3.1.6 Noise and Vibration 14
3.1.7 Built Heritage Resources and Cultural Heritage Landscapes 15
3.1.8 Archeological Resources 15
3.1.9 Social Environment and Land Use 16
3.1.10 Economic Environment 16
3.1.11 Air Quality 16
3.1.12 Infrastructure and Utilities 16
3.1.13 Health and Safety 17
3.1.14 Climate Change Considerations 17
3.2 Alternative Solutions 17
3.2.1 Alternative 1: “Do Nothing” (Maintain Existing Dam) 18
3.2.2 Alternative 2: Maintain Reservoir and Dam with New Fish Bypass Channel 18
3.2.3 Alternative 3: Partial Dam Removal with New Constructed Bypass Channel 21
3.2.4 Alternative 4: Dam Decommissioning and Watercourse Restoration 23
3.3 Environmental Effects Screening and Evaluation 25
3.4 Evaluation of Alternative Solutions 29
3.5 Summary of Evaluation 31
3.5.1 Alternative 1: “Do Nothing” (Maintain Existing Dam) 31
3.5.2 Alternative 2: Maintain Reservoir and Dam with Fish Bypass Channel 31
3.5.3 Alternative 3: Partial Reservoir and Partial Dam Removal with Constructed Bypass Channel 32
3.5.4 Alternative 4: Dam Decommissioning and Channel Restoration 32
3.6 Selection of Preferred Solution 34

4 Effects Assessment, Mitigation and Monitoring 35
4.1 Effects 35
4.1.1 Surface Water 35
4.1.2 Groundwater 36
4.1.3 Terrestrial Environment/Species at Risk 37
4.1.4 Aquatic Environment/Species at Risk 38
4.1.5 Soil 39
4.1.6 Noise and Vibration 40
4.1.7 Built Heritage Resources and Cultural Heritage Landscape 40
4.1.8 Archaeological Resources 41
4.1.9 Social Environment and Land Use 42
4.1.10 Economic Environment 43
4.1.11 Air Quality 43
4.1.12 Infrastructure and Utilities 43
4.1.13 Health and Safety 44
4.1.14 Climate Change Considerations 44
4.2 Summary of Potential Effects, Mitigating Measures and Monitoring Activities 45
5 Consultation 50
5.1 Public Consultation 50
5.1.1 Study Website 50
5.1.2 Contact List 50
5.1.3 Notice of Commencement and Online Public Information Session 50
5.1.4 Online Public Information Session 51
5.1.5 Notice of Publication of Environmental Study Report 52
5.2 Agency Consultation 53
5.2.1 Consultation Meetings 53
5.3 Indigenous Consultation 53
6 Timing of Implementation 55
6.1 Project Schedule 55
7 References 56

List of Tables

Table 1 Aquatic Species At Risk Known to Occur in the Study Area 13
Table 2 Environmental Effects Screening 25
Table 3 Summary of Environmental Effects Screening 28
Table 4 Evaluation of Alternative Remedial Measures 29
Table 5 Evaluation of Alternative Solutions Summary 33
Table 6 Summary of Potential Effects, Mitigation Measures, and Monitoring Activities 46
Table 7 Question/Comment and Responses from online Public Information Session. 52

List of Figures

Figure 1 Key Map of Fullarton Dam and UTRCA Regulated Areas 3
Figure 2 Conservation Ontario Class Environmental Assessment for Remedial Flood and Erosion Control Projects Process 5
Figure 3 Alternative 2 – Maintain Reservoir and Dam with Fish Bypass Channel 20
Figure 4 Alternative 3 – Partial Dam Removal with Constructed Bypass Channel 22

List of Appendices

Appendix A Baseline Geomorphological Characterization Report
Appendix B Baseline Hydrogeological Characterization Report
Appendix C Environmental Inventory / Existing Conditions
Appendix D Dam Safety Report – Gap Analysis
Appendix E Cultural Heritage Report
Appendix F Stage 1 Archaeological Assessment
Appendix G Consultation Materials
Appendix G.1 Contact List
Appendix G.2 Notices
Appendix G.3 Public Information Centre Slides and Written Comments
Appendix G.4 Indigenous Consultation

Acronyms / Abbreviations

AA	Archaeological Assessment
ANSI	Areas of Natural and Scientific Interest
BHR	Built Heritage Resource
CA	Conservation Area
CDA	Canadian Dam Association
CHRS	Canadian Heritage River Systems
CHL	Cultural Heritage Landscape
DSI	Dam Safety Inspection
DSMS	Dam Safety Management System
DFO	Fisheries and Oceans Canada
EPRP	Emergency Preparedness and Response Plan
EA	Environmental Assessment
EAA	*Environmental Assessment Act*
ELC	Ecological Land Classification
ESA	*Endangered Species Act*
ESR	Environmental Study Report
HPC	Hazard Potential Classification
IHP	Incremental Hazard Potential
MECP	Ministry of the Environment, Conservation, and Parks
MNR	Ministry of Natural Resources
MNRF	Ministry of Natural Resources and Forestry
OMS	Operation, Maintenance and Surveillance
HVA	Highly Vulnerable Aquifer
PWQO	Provincial Water Quality Objectives
SAR	Species at Risk
SARA	*Species at Risk Act*
UTRCA	Upper Thames River Conservation Authority
WHPA	Well Head Protection Area
WWR	Water Well Records
WWTP	Wastewater Treatment Plant

1 Background

Fullarton Conservation Area is located at 3000 Perth Road 163, Fullarton, Ontario in the municipality of West Perth and is a 34-hectare recreational area used for baseball, hiking, fishing, picnicking and other activities. There are two trails in Fullarton Conservation Area that allow for walking around the reservoir, or through a mixed deciduous and pine wood forest. Two baseball diamonds are located on the northwest portion of the Fullarton Conservation Area and are part of the Fullarton Centennial Park which opened on June 25, 1966 and is owned and operated by the Upper Thames River Conservation Authority (UTRCA).

The existing Fullarton Dam is an earth dam that was built in the 1950s to create a reservoir. An unnamed watercourse flows through the reservoir and dam and discharges into the North Thames River downstream. A 2007 dam safety assessment indicated (ACRES 2007) that the updates were required to bring the dam into compliance with current guidelines and that additional testing on slope stability would be required. The ACRES (2007) report concluded that the condition of the earth dam would require works to rehabilitate the dam to meet appropriate safety and stability standards.

As required under the *Lakes and Rivers Improvement Act, 2019*, dam reconstruction requires an Environmental Assessment (EA) in accordance with the *Environmental Assessment* (EA Act) of the proposed activities for the dam and surrounding areas to evaluate impacts on the environment and provide mitigation measures.

This EA will support long-term planning for the Fullarton Dam and evaluate options to. Additionally, this EA will evaluate impacts and opportunities of proposed alternatives related to the marsh area in the reservoir which currently provides habitat for snapping turtles.

1.1 Study Purpose

This Environmental Study Report (ESR) has been prepared for remedial works related to the Fullarton Dam pursuant to the *Class Environmental Assessment for Remedial Flood and Erosion Control Projects (*Conservation Ontario 2013) class of projects (herein referred to as the Class EA), which was prepared to fulfill the requirements of the *Environmental Assessment Act* and the *Lakes and Rivers Improvement Act, 2019.* A Class EA is required to support long-term planning for the Fullarton Dam. It is noted that although a new 2024 Class EA has been released, this project began prior to the 2024 release, therefore is being completed in accordance with the 2013 version.

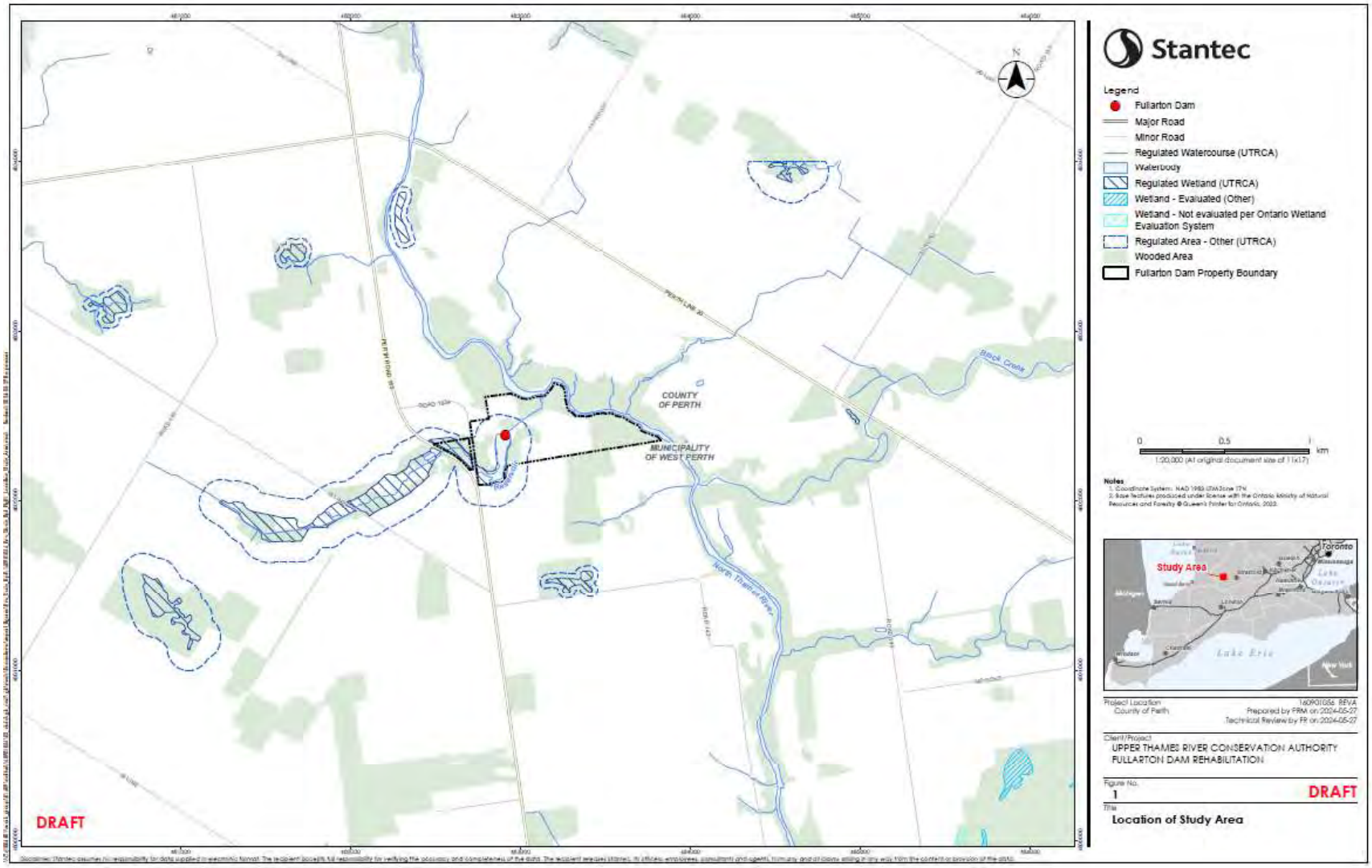
This ESR forms part of the overall Class EA and serves to document the environmental assessment planning process that was followed. That process, which is documented herein, has resulted in the selection of the preferred alternative (i.e., ‘the undertaking’) to rehabilitate the Fullarton Dam (the Project). The proponent of the undertaking is UTRCA, who owns and operates the Fullarton Dam. UTRCA retained Stantec to assist with the planning of the Project.

This ESR has been made available for public and agency review as part of a 30-day review period. Subject to comments received on this ESR and the receipt of necessary approvals and funding, the UTRCA is expected to proceed with the implementation of the project. The implementation phase of the Project will involve the preparation of detailed plans and specifications, contractor selection and construction.

1.2 Study Area

The Fullarton Conservation Area (Fullarton CA) (3000 Perth Rd 163A Fullarton, Ontario) is a day-use area located on the North Thames River in the Municipality of West Perth. The Fullarton CA has a small dam, pond, and foot trails located on the property. The CA is 34 hectares and features forested and wetland areas (see Figure 1).

Figure 1 Key Map of Fullarton Dam and UTRCA Regulated Areas



1.3 Dam Description

The Fullarton Dam is located on a tributary of the North Thames River in the Fullarton Conservation Area. The dam and pond were constructed for recreational purposes. The Fullarton Dam is an earth embankment dam approximately 110 m long by 3.4 m high and with a 6.0 m wide crest. The dam creates a pond on the upstream side and the water level in the pond is controlled by the concrete inlet overflow structure in the middle of the pond with an outlet made of pre-cast concrete pipe on the downstream side of the dam. This allows the water to discharge into North Thames River (Naylor 2006).

A Geotechnical Investigation was conducted for UTRCA to determine the structural integrity of Fullarton Dam (Naylor 2006). The investigation also provided geotechnical recommendations to upgrade the dam embankment to meet safety standards (Naylor 2006). A Dam Safety Assessment report for Fullarton Dam was completed for UTRCA in 2007 (ACRES 2007).

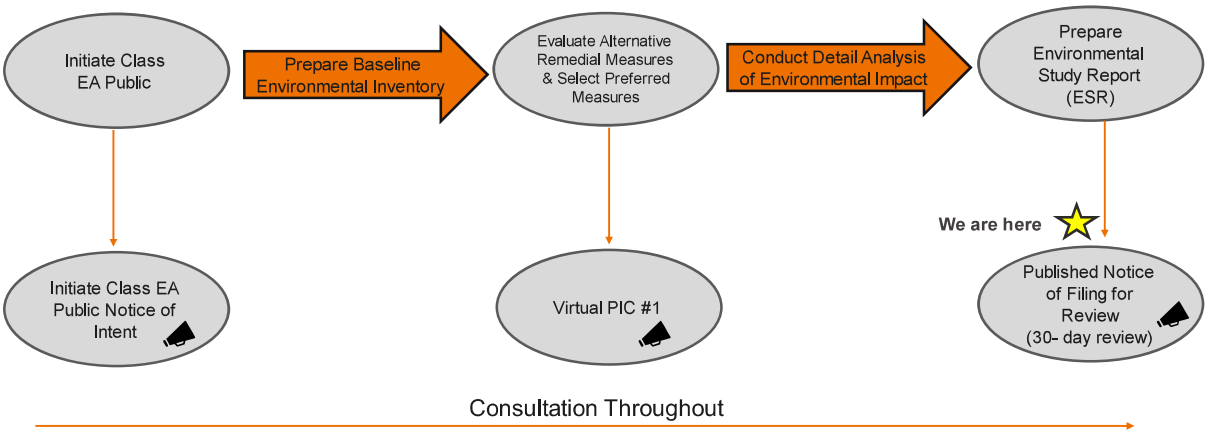
1.4 Class EA Process

As part of the mandate of Conservation Authorities, UTRCA regularly reviews projects and develops plans to eliminate the need for future remedial flood and erosion projects. This review includes assessing the risk to public safety associated with flood and erosion and the recognition that flooding and erosion can lead to ancillary problems such as:

- Sedimentation of watercourses and coastal wetland areas
- Degradation of aquatic habitats, such as fish spawning grounds
- Loss of fertile soil, and the destruction of terrestrial vegetation and associated habitat resources
- Loss of natural shoreline protective features such as beaches, berms, and dunes
- Imbalances in natural processes which provide aquatic and terrestrial habitat.
- Personal hardship and severe social disruption
- Impacts to or loss of culturally heritage resources, including built heritage resources (bridges, mills, and houses), cultural heritage landscapes and archaeological resources.

The Class EA sets out procedures and environmental planning principles for Conservation Authorities to follow to plan, design, evaluate, implement and monitor a remedial flood and erosion control project so that environmental effects are considered as required under the *Environmental Assessment Act*.

Figure 2 Conservation Ontario Class Environmental Assessment for Remedial Flood and Erosion Control Projects Process



The undertaking to which this Class EA applies is Riverine Flooding. Two main causes of flooding in the riverine system are an increase in water level from a storm event, or rapid snow melt, including as a result of the formation of ice jams, frazil ice, or other debris in watercourses. Usually, alternative remedial measures to protect areas from flooding include preventing the entry of floodwater to a specific site or altering the flows through the channel during flood events. When designing alternative solutions, consideration can be made for flows to be altered by increasing the hydraulic capacity of the watercourse, diverting water from flood vulnerable areas, and increasing upstream storage. As part of the list of alternatives, dam decommissioning is also a Project Type classified under Riverine Flooding (Conservation Ontario 2013).

According to the Class EA guidance document (Conservation Ontario 2013), the design principles for remedial flood and erosion control projects must consider concern for the environment. This consideration requires that emphasis be placed not only on the prevention and mitigation of environmental impacts but also on environmental enhancement. The principles applicable to this Project are summarized as follows:

- Alternative methods which replicate the natural environment shall be given preference over “hard” alternatives wherever possible, and all projects should evaluate opportunities for enhancement of terrestrial or aquatic habitats as part of project design.
- Remedial project design shall strive to re-establish, maintain, or enhance the natural function (both biological and physical) and appearance of the watercourse or shoreline and associated features (floodplain, valley, wetlands, beaches etc.) while recognizing and preserving existing cultural and archaeological features of significance in the Project’s Study Area.
- Remedial measures shall be designed based on a thorough understanding of the biological, physical, and hydrological characteristics of the watercourse or the coastal processes of the lake. Where remedial works are necessary in a riverine situation, the solution shall be developed based upon an appropriate river reach or valley system.

- During rehabilitation, provide for the re-establishment of vegetative cover in the shoreline or valley system, particularly adjacent to the watercourse (riparian zone) or shoreline (backshore). Vegetation re-establishment shall be compatible with the existing, local, or disrupted community and efforts should be made to use native species of the local flora.
- The design of remedial works, involving migratory corridors, shall strive for preservation or enhancement of the migratory character of the feature for flora, fauna, and human activity, where appropriate.
- In identifying the objectives for the aquatic/terrestrial environments, the potential quality of the ecosystem, as well as its existing condition, shall be considered.

In situations where the flood plain has been historically developed it may be necessary to alter the flow through the channel during flood events. One way of doing this is to increase the hydraulic capacity of the waterway, thereby allowing lower levels of water to overflow onto the floodplain. There are a few ways an increase in hydraulic capacity can be accomplished (Conservation Ontario, 2024):

- Dam Decommissioning
    - Issues surrounding structural integrity and stability may require that the dam be decommissioned in order to address safety concerns, eliminate long-term operating and maintenance costs, and enhance local and downstream environmental conditions. Wherever possible, the principles of natural channel design should be employed when designing the post-dam conditions of the watercourse. Stream corridor function should be recognized as fundamental to the restoration of the system to create a self-sustaining system that is in dynamic equilibrium.
- Channel Realignment
    - Relocation of the waterway may be used to increase its capacity. The new channel is designed and constructed to hold a higher capacity and then water is relocated to this new route.

2 Problem and Opportunity Statement

Many dams in Ontario are nearing the end of their life expectancy and in many instances the purpose for which they were built no longer applies. Issues surrounding structural integrity and stability may require that the dam be decommissioned in order to address safety concerns, eliminate long-term operating and maintenance costs, and enhance local and downstream environmental conditions. In accordance with the EA guidance, wherever possible, the principles of natural channel design should be employed when designing the post-dam condition of a watercourse. Stream corridor function should be recognized as fundamental to the restoration of a system to create a self-sustaining system that is in dynamic equilibrium.

As part of the EA process, the following Problem and Opportunity Statement was identified:

The Upper Thames River Conservation Authority operates the Fullarton Dam, an earth dam constructed in the 1950's, located at the Fullarton Conservation Area. In 2007, conclusions of a Dam Safety Assessment identified the need to undertake improvements in order to meet appropriate safety and stability standards. The purpose of this EA is to identify alternatives that address the safety deficiencies caused by Riverine Flooding by selecting a preferred management strategy for the dam that considers the natural environment and the social uses associated with the dam, reservoir and rest of Fullarton Conservation Area.

3 Existing Conditions and Alternatives

3.1 Existing Conditions

An inventory of existing environmental conditions was undertaken for this Project, as described herein. Information included in this section was taken directly from the Baseline Geomorphological Characterization Report (Appendix A), Baseline Hydrogeological Characterization Report (Appendix B), Environmental Inventory/Existing Conditions Report (Appendix C), Dam Safety Report – Gap Analysis (Appendix D), Cultural Heritage Report (Appendix E), and the Stage 1 Archeological Assessment (Appendix F).

3.1.1 Surface Water

Stantec was retained to conduct a Baseline Geomorphological Characterization Report (Appendix A). The unnamed watercourse flows through the reservoir and dam and discharges into the North Thames River at the downstream end of the project site. The contributing drainage area for the unnamed watercourse at the confluence of the North Thames River is approximately 4 km^2. The North Thames River extends 350 m downstream of the Fullarton Dam. The land use in the unnamed watercourse drainage area is predominantly agricultural and undifferentiated rural land use (85%), with approximately 5% marsh/swamp along the channel corridor, 5% treed area, and community infrastructure and open water over the remaining area (Appendix A.).

The Fullarton Corridor 2017 Watershed Report Card states that 50-70% of the local streamflow is baseflow from groundwater discharge (UTRCA 2017b). This groundwater discharge that characterizes the watershed supports cold-water aquatic habitat. The UTRCA has identified the unnamed watercourse as providing potential cold-water habitat.

The Environment and Climate Change Canada Stratford Wastewater Treatment Plant weather station (ID 6148105) indicates that the area receives an average annual precipitation of 1070 mm based on data from 1981 to 2010.

The unnamed watercourse runs through the Fullarton Conservation area and provides potential cold-water habitat (UTRCA, 2017). The dam blocks fish passage to upstream reaches of the unnamed watercourse. Background reporting (Howes, 1967) identifies portions of the unnamed watercourse as a municipal drain. Email correspondence between the UTRCA and Dietrich Engineering (pers corr. 2023) confirmed that the downstream extent of the municipal drain designation is 130 m north of Line 18; this location is approximately 500 m upstream of the project area. Therefore, the alternative solutions identified for the project site will not be subject to the *Drainage Act.*

The bankfull discharge of the unnamed watercourse is between 1 and 2 m^3/s based on field observations by Stantec. The bankfull discharge typically occurs at a return period of approximately 1.5 years. Therefore, the bankfull discharge estimated based on site observations helps corroborate the 2-year flows developed as part of the background study.

Modelling as part of the dam safety review (Acres 2007) indicates a baseflow in the unnamed watercourse of 0.12m^3/s and 0.01 m^3/s for the spring and fall, respectively. These baseflow calculations were calibrated against a local watershed. Considering the small draining area of the unnamed watercourse, these results indicate suitable baseflows for open channel habitat during low-flow periods (i.e., continuous flow in the unnamed watercourse).

Hydraulic modelling indicates that the dam overtops as frequently as a 3-year return period flow event (Konecny et al. 2018; Acres 2007). During a 250-year event, modelling (Konecny et al. 2018) indicates that water depths overtopping the dam crest are approximately 0.4 m. This control depth at the crest causes flooding to sections of the conservation area trails adjacent to the reservoir and contributes to flooding of Perth Road 163a, located immediately upstream of the reservoir. Elsewhere in the project area, the 250-year flood is contained in the channel valley.

The site assessment by Stantec observed that the unnamed watercourse is stable in the project area. Aggradation was observed upstream of the reservoir, consistent with background reporting and the anticipated impacts of a dam (i.e., limiting downstream sediment transport). Disrupting the supply of fine gravels and pebbles to the unnamed watercourse below the dam has potential impacts on aquatic habitats (e.g., spawning beds).

Surface water and groundwater quality data near the reservoir is limited. UTRCA provides report cards for the Upper Thames River watershed every five years, the most recent of which was created in 2022 covering the years from 2016 to 2021 (UTRCA 2022a). In the Fullarton Corridor of the watershed, there are two surface water quality monitoring stations: one station being located approximately 8.0 km north of the Site with the other station located approximately 6.0 km south of the Site. The report card indicates the Fullarton Corridor (watershed) has improved since the last report card and scores an overall grade of C. Phosphorus levels, bacteria (E.coli) levels and Benthic scores are lower than the watershed average, however, all still continue to be higher than the Provincial Guidelines. UTRCA has a water quality target of a B grade by 2037.

3.1.2 Groundwater

Stantec was retained to conduct a Baseline Hydrogeological Characterization Report for the Fullarton Dam Rehabilitation (Appendix B). The dam is located in the till moraines (specifically, the Milverton and Mitchell moraines) of the physiographic region defined as the Stratford Till Plain. The Stratford Till Plain is a relatively uniform silty clay throughout the region. Spillways associated with the North Thames River are also present.

A review of the MECP Water Well Records (WWRs) indicated that there are 11 WWRs located within 500 m of the Site. Seven of the eleven WWRs are identified as being private water supply wells, however no private water supply wells are located between the dam and the North Thames River. The nearest private water supply well is located approximately 335 m to the southwest of the dam and is constructed in bedrock. The only mapped overburden water supply well within 500 m of the Site is located approximately 710 m to the west of the dam.

Removal of the dam and reservoir has the potential to impact groundwater recharge and baseflows in the unnamed watercourse. The baseline hydrogeological assessment informs potential impacts and mitigation requirements related to low-flow conditions in the unnamed watercourse.

The closest Well Head Protection Area (WHPA) (WHPA-E) is located approximately 4.75 km south of the Site and is associated with the Town of St. Mary's WHPA, which has production wells located approximately 12.5 km south of the Site. There is also a WHPA associated with the Town of Mitchell municipal water supply system located approximately 9.5 km north of the Site. There are no surface water Intake Protection Zones nearby. A review of the MECP Source Protection Information Atlas (MECP 2022) indicates the Site is not located in either a Significant Groundwater Recharge Area or a Highly Vulnerable Aquifer.

3.1.3 Terrestrial Environment/Species at Risk

An Environmental Inventory/Existing Conditions Report was completed through a review of background natural heritage data from technical reports, online databases, provincial wildlife atlases, and species at risk mapping sources (Appendix C). A site visit was conducted in January 2023 to provide a reconnaissance-level evaluation and to recommend additional studies (if necessary). The recommendations from the first site visit were to complete an ecological land classification (ELC) survey and a breeding bird survey. Two subsequent site visits were conducted by Stantec on June 22 and July 5, 2023, to complete these surveys.

Three natural heritage features were documented in the background data review including the North Thames River, a Mixed Wader Nesting Colony, and the Fullarton Moraine (MNRF 2023a).

For the natural heritage assessment, the project location plus adjacent lands within 120 m were collectively known as the Ecological Study Area. Forest cover represents only 9.8% of the land in the Fullarton Corridor of the Upper Thames River watershed and has a D Grade from the last report card, showing slight improvement. The North Thames River (as a tributary to the Thames River) is a priority Canadian watershed and the watershed is benefitting from conservation efforts, but more is needed to improve natural habitat in the watershed.

The Fullarton Moraine (glacial till deposit) is an Earth Science Areas of Natural and Scientific Interest (ANSI) and is present in the entire Study Area (MNRF 2023a).

Plants

Several different vegetation communities are found in the Study Area. A high diversity of plant species exists, of which 35% are non-native. White water buttercup (*Ranunculus trichophyllus*) is abundant in the reservoir. The rare plant, Shining-branch Hawthorn (*Crataegus magniflora*) is known to occur in the geographical area but was not observed in the reservoir. No rare or species at risk (SAR) plants were documented during UTRCA (2017) surveys.

The 2023 Stantec ecological land classification (ELC) survey documented six main vegetation communities: cultural woodland (CUW), coniferous plantations (CUP3), shallow marsh (MAS), shallow aquatic (SA), cultural meadow (CUM), and Reed-canary grass graminoid mineral meadow marsh type (MAM2-2) in the cultural woodland area (Appendix C, Figure 1). Coniferous plantations are located west of the reservoir adjacent to cultural meadow which is north-west of the reservoir. Cultural woodland is located north of the reservoir in two sections divided in the middle by Reed-canary grass graminoid mineral meadow marsh type. Coniferous plantation is located to the northeast and east of the reservoir, and shallow water and shallow marsh are located south of the reservoir.

Birds

A diversity of birds was documented in the Ecological Study Area during UTRCA wildlife surveys (43 bird species). Two species of Special Concern were documented: the Bald Eagle (*Haliaeetus leucocephalus*) and Barn Swallow (*Hirundo rustica*) (UTRCA 2017). Common waterfowl such as Canada Goose (*Branta canadensis*) and Mallard (*Anas platyrhynchos*) were documented occasionally. Six SAR birds are known to occur in the geographical area: Bobolink (*Dolichonyx oryzivorus*), Canada Warbler (*Cardellina canadensis*), Eastern Meadowlark (*Sturnella magna*), Eastern Wood-Pewee (*Contopus virens*), Least Bittern (*Ixobrychus exilis*), and Wood Thrush (*Hylocichla mustelina*) (Cadman 2007), however, only one species of SAR bird could potentially be impacted by the proposed dam decommissioning: the Least Bittern.

The Least Bittern is listed as Threatened under the Endangered Species Act (ESA). Threatened species receive individual and habitat protection under the Act. The Least Bittern nests in dense vegetation above marsh water, hidden amongst cattails and often near open water, which is used for foraging (MECP 2022). The reservoir and associated marsh wetland habitat may provide suitable conditions for the Least Bittern. Surveys targeting marsh breeding birds were not undertaken in the UTRCA (2017) study.

An updated breeding bird survey was undertaken in 2023 by Stantec, which included breeding bird surveys with a focus on the Least Bittern. The surveys were also conducted on June 22 and July 5, 2023, in accordance with the National Least Bittern Survey Protocol (Jobin et al. 2011). The conservation status of all species of birds recorded during the 2023 surveys was “secure” or “apparently secure” in Ontario. No Least Bittern or other priority (based on conservation status) marsh birds were detected during either of the 2023 surveys.

Herptiles

Six species of herptiles (reptiles and amphibians) were documented as incidental wildlife observations in the Study Location (UTRCA 2017), including Snapping Turtle (Chelydra serpentina) which was observed in the reservoir (iNaturalist 2023, UTRCA 2017). The Snapping Turtle is listed as Special Concern under the ESA. The 2023 Stantec field visits documented Midland Painted Turtle (*Chrysemys picta marginata*) which is federally listed as Special Concern and Snapping Turtle (*Chelydra serpentina*) which is listed both federally and provincially as Special Concern.

Mammals

Five species of mammal were documented in the Ecological Study Area by the UTRCA (UTRCA 2017a). All are common species in Ontario. American Mink (*Neovison vison*) is also documented to occur in the reservoir (iNaturalist 2023). Four bat SAR occur in the geographical area including Eastern Small-footed Bat (*Myotis leibii*), Little Brown Myotis (*Myotis lucifugus*), Northern Myotis (*Myotis septentrionalis*), and Tricoloured Bat (*Perimyotis subflavus*). Hoary Bat (*Lasiurus cinereus*), Silver-haired Bat (*Lasionycteris noctivagans)* and Eastern Red Bat (*Lasiurus borealis)* are now officially listed as Endangered in Ontario, with protection being afforded starting January 2025. Each of these bats have range overlap in the Study Area. These bats use large trees with cavities, cracks, peeling bark, open canopy, and other features for maternity roosting. Tree assessment for bat maternity roost suitability was not completed by the UTRCA (2017a) or Stantec.

Insects

Seven species of butterfly were documented in the Project Location by the UTRCA (2017), of which one is listed as Special Concern under the ESA: the Monarch (*Danaus plexippus*). No other rare or SAR insects were documented in the background data review.

3.1.4 Aquatic Environment/Species at Risk

The unnamed watercourse has a permanent flow regime and is classified as a coldwater watercourse (MNRF 2022b), which means it supports fish species that spawn in fall or combination of spring/fall and supports sensitive fish species (DFO 2017).

Fish community sampling completed by the UTRCA (2017, 2023) documented a diverse fish community in the unnamed watercourse, especially downstream from the Fullarton Dam reservoir. The watershed (North Thames River watershed) is known to support 48 species of fish, and 13 species of freshwater mussels (UTRCA 2017, 2023).

Fish sampling upstream of the dam documented nine species of fish including Mottled Sculpin (*Cottus bairdii*). Mottled Sculpin are indicators of coldwater with preferred water temperature of 13-18 degrees Celsius (Eakins 2023) indicating the unnamed watercourse provides coolwater / coldwater conditions (UTRCA 2017). Seven species of fish were documented in the reservoir, all of which are tolerant of warm water and pond habitat. Thirty-four species of fish were collected downstream of the reservoir including various trophic levels from baitfish to predators including Northern Pike (*Esox lucius*).

Mottled Sculpin were also collected downstream from the reservoir (UTRCA 2017). The reservoir has a warming effect on the unnamed watercourse resulting in higher average water temperatures and greater water temperature fluctuation downstream from the Fullarton Dam. The presence of Mottled Sculpin downstream of the dam suggests that there are groundwater upwellings in the unnamed watercourse downstream of the dam that provide cold-water microhabitat for the species, since Mottled Sculpin is a coolwater / coldwater species.

From June to September 2015 and June to July 2016, continuous water temperature data was collected in the unnamed watercourse by the UTRCA (2017) upstream and downstream of the Fullarton Dam. The data show that unnamed watercourse water temperature upstream of the reservoir is consistently cooler than downstream. In 2015, water temperature in unnamed watercourse upstream of the reservoir was up to 2.3°C cooler than downstream. And in 2016, water temperature was 4 to 7°C cooler upstream than downstream of the reservoir.

The Northern Sunfish (*Lepomis peltastes*) is known to occur in the unnamed watercourse and the Fullarton Dam reservoir (UTRCA 2017, 2022b, DFO 2022, iNaturalist 2023), and is listed as Special Concern under the Species at Risk Act (SARA) and the ESA. The North Thames River is known to support five aquatic SAR in this area, and critical habitat for two of those species (DFO 2022): Black Redhorse (*Moxostoma duquesnei*), Northern Sunfish (*Lepomis peltastes*), Silver Shiner (*Notropis photogenis*), Rainbow mussel (*Villosa iris*), and Wavy-rayed Lampmussel (*Lampsilis fasciola*) (Table 1).

Table 1 Aquatic Species At Risk Known to Occur in the Study Area

Common Name	Scientific Name	Animal Group	SARA1 Status	ESA2 Status
Black Redhorse[3]	*Moxostoma duquesnei*	Fish	Threatened	Threatened
Northern Sunfish	*Lepomis peltastes*	Fish	Special Concern	Special Concern
Silver Shiner[3]	*Notropis photogenis*	Fish	Threatened	Threatened
Rainbow	*Villosa iris*	Mussel	Special Concern	Special Concern
Wavy-rayed Lampmussel	*Lampsilis fasciola*	Mussel	Special Concern	Threatened

NOTES:

[1] SARA: *Species at Risk Act*

[2] ESA: *Endangered Species Act*

[3] critical habitat under the SARA and ESA is present in the North Thames River

Critical habitat for the Silver Shiner under the SARA (DFO 2022b) is defined as “the entire bankfull channel width, the meander belt width, and the riparian vegetation in it and associated 30 m of riparian vegetation extending from the meander belt width”, whereas the ESA (MECP 2017) categorizes general habitat for Silver Shiner into Categories 1 (in-channel), 2 (nearshore habitats), and 3 (floodplains and riparian areas). Following these habitat descriptions, it is estimated that the critical habitat for the Silver Shiner includes all riparian area of the North Thames River beginning approximately 230 m downstream from the Fullarton Dam and does not extend up to and past the dam. Black Redhorse critical habitat is only present in the North Thames River and does not include a riparian buffer. The watershed and Fullarton Dam are mapped as habitat for the Northern Sunfish, which is listed as Special Concern under the ESA and SARA. The dam is a barrier to fish passage both upstream and downstream of the dam under normal flow conditions. Benthic sampling recorded 15 species at various life stages representing biotic index ranging from 4-8 (UTRCA 2023).

3.1.5 Soil

Stantec conducted a Dam Safety Review – Gap Analysis (Appendix D) in which the foundation of the dam structure is identified. The dam fill was identified as homogenous fill, mainly silt with some clay and trace to some gravel. Shear strength of clay material was determined by pocket penetrometer and was in the range 100 to 200 kPa, indicating stiff clay consistency. The dam fill appears to be uniform zone, there is no zonation within the dam, except upstream rip-rap layer. There is no drain to control the piezometric level within the dam, and there is no erosion protection layer on the downstream slope.

There is no design or as-built document available which provide information regarding foundation preparation or dam construction of the Fullarton Dam. Based on the borehole logs, it is assumed that the loose materials and organics were removed prior to constructing the dam. It is believed that the ground surface consists of clay, silt, sand, and gravel meaning it is under the dam and reservoir. It is unknown the depth at which the bedrock is encountered (ACRES 2007). During 2005 field investigation, it was found that there was a layer of peat under the dam foundation (BH102) and some pockets of peat were found within the dam fill (BH101).

Bedrock near the Site is described by Armstrong and Dodge (2007) as the Oxford Formation (Appendix B). The Oxford Formation consists of dolostone, shale and/or sandstone. The topography is characterized by low relief, with the steepest slopes near the North Thames River. The topography near the Site varies between 325 to 335 m above mean sea level (AMSL).

The Study Area is situated in the Stratford Till Plain physiographic region of southern Ontario. The Stratford Till Plain is a broad clay till plain extending from London to the Grand River Valley. The plain consists of a large ground moraine interrupted by several terminal moraines. It is divided in its drainage by the Thames River in the centre and southern areas and by the Grand River in the northern area. The plain is included in the Lake Huron lake-effect belt and receives more precipitation than average in southern Ontario. This, combined with the good natural soil fertility, allows it to be one of the most agriculturally productive areas in Ontario (Appendix B)

3.1.6 Noise and Vibration

The Study Area is in the Municipality of West Perth in a park area. The Municipality of West Perth By-Law NO. 053-2009 prohibits construction-related noise from 9:00 PM to 7:00 AM. Sensitive receptors primarily include a residence and farmstead within 70 m and 180 m of the lower reservoir. No substantive noise generating sources or activities were identified in the Study Area. Based on the definitions provided by the MECP in the *Environmental Noise Guideline* (NPC-300) the area would be considered a Class 3 Area, a rural area with an acoustical environment that is dominated by natural sounds having little or no road traffic (Ontario 2021).

3.1.7 Built Heritage Resources and Cultural Heritage Landscapes

Stantec was retained to prepare a Cultural Heritage Report: Existing Conditions and Preliminary Impact Assessment (Appendix E). The County of Perth is located on the traditional lands of the Anishinaabe peoples. The Study Area and Perth County is located on land covered under Treaty 29, also known as the Huron Tract Purchase. This treaty was signed in 1827 between the Crown and certain Anishinaabe peoples.

Known and potential built heritage resources and cultural heritage landscapes were assessed based on the Ministry of Citizenship and Multiculturalism (MCM) Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes (MCM 2016), which was supplemented by historical research, field investigations, and professional judgement. Properties with buildings or structures 40 or more years old were field documented and screened as having potential Cultural Heritage Value or Interest if they met one or more of the criteria prescribed in O. Reg. 9/06. Also, each property was considered both as an individual built heritage resource and as part of a larger potential cultural heritage landscape. If a property contained a known or potential built heritage resource or cultural heritage landscape, the built heritage resource (referred to as BHR) and cultural heritage landscape (referred to as CHL) was assigned a number. A total of seven properties and the Thames River were screened. Following application of the screening criteria, three BHR and one CHL was identified.

The Thames River (CHL-1) is part of the Canadian Heritage River Systems (CHRS) and is 273 kilometres in length. Part of the north branch of the Thames River is located within the Study Area (for the *Cultural Heritage Report* – includes a 50-metre boundary around the Fullarton Conservation Area property parcel). The Thames River within and adjacent to the Study Area is located within a shallow valley and largely surrounded by riparian vegetation and mature trees. In addition, three BHR were identified during the assessment; two farmsteads and one residence. One farmstead (BHR-1) is located at 3049 Perth Road 163 and is comprised of a residence, barn, outbuilding, and silos. BHR-1 is located adjacent to the Fullarton Dam property boundary, more than 420 m northwest of the property parcel associated with the Fullarton Dam. The second farmstead (BHR-2) is located at 2954 Perth Road 163 and is also comprised of a residence, barn, outbuildings, and silos. BHR-2 is located adjacent to the Fullarton Dam property boundary, more than 75 m west of the property parcel associated with the Fullarton Dam. The third residence (BHR-3) is located at 2955 Perth Road 163 and contains a residence and outbuildings. BHR-3 is located adjacent to the Fullarton Dam property boundary, within 45 m of the property parcel associated with the Fullarton Dam.

3.1.8 Archeological Resources

A Stage 1 Archaeological Assessment (AA) was completed for the Fullarton Dam Rehabilitation by Stantec on March 9, 2023 (Appendix F).

The results of the Stage 1 AA of the Study Area for the Project determined that much of the Study Area, approximately 77.34%, retains archeological potential. 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 AA is required for any portion of the Project's anticipated construction activities which impact an area of archaeological potential.

The remaining portions of the Study Area, approximately 22.66%, retain low to no archaeological potential due to deep and extensive modern disturbances from the construction of the Fullarton Dam, areas identified as steeply sloped, or low and permanently wet areas. In accordance with Section 1.3.2, Section 2.1 Standard 2, and Section 7.74 of the Ministry's 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011), Stage 2 AA is not required for any portion of the Project's anticipated construction activities which impact an area of low to no archaeological potential.

3.1.9 Social Environment and Land Use

The Municipality of West Perth has a population of 9,038 and an area of 578.88 km^2, with a population density of 15.6/km^2 (Statistics Canada 2021). The population of the Municipality of West Perth (2024) is expected to reach 10,000 within the next 20 years. In 1998 the following Townships were incorporated into the Township of West Perth: Logan, Hibbert, Fullarton, and Mitchell (West Perth 2024). The Municipality of West Perth (2024) has a large area of outdoor space for recreational land use, including some area that has restored wildlife habitat such as wetlands. The Fullarton Conservation Area has amenities for hiking, fishing, and picnicking. Local conservation area users have established a formal trail over the dam. Fullarton Conservation Area lies within the Municipality of West Perth and falls under their Comprehensive Zoning By-Law No. 100-1998. In the County of Perth, the dominant land use type is agricultural (County of Perth 2024). The Official Plan places a high importance on the preservation of agricultural land (County of Perth 2024).

3.1.10 Economic Environment

The National Household Survey (2011) reported that the largest economic sectors in the Municipality of West Perth are manufacturing, health care and social assistance, and construction. Other smaller sectors of employment include wholesale trade, retail trade, and transportation and warehousing (NHS 2011). Agricultural businesses and those associated with agriculture form a dominant part of the local economy in the County of Perth (County of Perth 2024).

3.1.11 Air Quality

Air Quality in West Perth is generally good with low particulate matter and is safe for outdoor activities (IQAir 2024).

3.1.12 Infrastructure and Utilities

The utilities that exist in the Study Area include electricity (Hydro One), and gas (Enbridge Gas Inc.) (OEB 2024). Identification of potential utility conflicts will occur in Detail Design. There is no municipal water at the Project Site. Adjacent lands use well water. Fullarton Conservation Area is accessed by Perth Road 163. Road 163A is located adjacent to Fullarton Conservation Area.

3.1.13 Health and Safety

The current state of Fullarton Dam potentially creates a health and safety concern due to the flooding and lack of resilience in extreme weather events.

The ACRES Dam Safety Report (ACRES 2007) found the Fullarton Dam to be classified as “very low” for incremental hazard potential (IHP) regarding dam failure during a flood event. This report also found the upstream and downstream slopes did not meet acceptance criteria during normal conditions (ACRES 2007). The Stantec Dam Safety Review – Gap Analysis (Appendix D) found that the guidelines used to determine the IHP were revised in 2011 (MNRF 2011). Under new MNRF guidelines, there is no “very low” class anymore. A new dam classification system was developed called Dam Hazard Potential Classification (HPC). HPC varies from Low to Very High and the criteria of classification has been changed since. The Fullarton dam classification should be reviewed again in accordance with latest MNRF guidelines.

Currently, there is no documentation on the Dam Safety Management System (DSMS), and Operation, Maintenance and Surveillance (OMS) manuals. Dam Safety Inspections (DSIs) are conducted annually. Stantec recommended preparation of an OMS manual including an instrumentation monitoring plan and procedures to monitor dam performance and manage risk in accordance with Canadian Dam Association (CDA) guidelines, as this dam is free for the public to access the structure. The annual DSI should be considered as part of the future DSMS.

3.1.14 Climate Change Considerations

There is currently a partnership between the Municipality of West Perth and Perth County, North Perth, Perth East, Perth South, and Stratford (West Perth 2024) to address risks of climate change. The municipalities are committed to working together to address climate change through a Greenhouse Gas Reduction Plan (West Perth 2024). The goal of this plan is to increase adaptability and reduce risk from climate change (West Perth 2024).

3.2 Alternative Solutions

As part of the Class EA planning process, reasonable and feasible alternatives solutions to the problem statement were identified and described. The alternatives were developed based on baseline site characterization for natural heritage, archaeological resources, cultural heritage, hydrogeological and geomorphic features, and dam geotechnical considerations, with the primary goal of preventing future flooding and erosion. Four alternative remedial measures were identified, which were then evaluated against potential environmental impacts. The magnitude of the net positive and negative effects of each alternative solution were identified and evaluated. Based on this evaluation, a preferred alternative solution was selected and confirmed based on consultation with Indigenous Nations, public, agencies, and other stakeholders.

3.2.1 Alternative 1: "Do Nothing" (Maintain Existing Dam)

Alternative 1 maintains the existing dam and reservoir at the site. The existing dam is a 3.4 m high earth dam with approximately 2 m of hydraulic head. The dam is on-line (in the active flow channel) on the watercourse and creates an approximately 2 ha reservoir upstream that provides pond and wetland (marsh) habitat, including snapping turtle habitat. The dam outlet controls the elevation of the reservoir through a drop inlet structure. The outlet structure is not fish passable. Thermal warming in the reservoir is increasing water temperatures of the watercourse downstream of the reservoir and impacting water quality. With continued sediment loading the reservoir will continue to become shallower and potentially enhance the effects of thermal warming. Continued thermal warming will maintain a warmwater habitat.

The existing dam and reservoir will continue to affect the morphology of the watercourse. Sediment accumulation in the reservoir causes sediment discontinuity downstream of the dam, depriving the downstream channel of sediment. The dam creates a reservoir that results in a backwater impact that is present approximately 300 m upstream of Perth Road 136a. This impact includes low flow velocities and deeper water depths than would be present without the reservoir, affecting sediment transport and limiting natural channel forming processes. Maintaining the aging dam and outlet infrastructure may present a dam safety risk as aging infrastructure can become a liability for the owner since safety standards are often updated and compliance can be difficult to achieve.

A formal trail exists over the dam. This trail would remain under Alternative 1.

The condition of the dam will have to be further assessed against the 2017 Ministry of Natural Resources and Forestry (MNRF 2017) guidelines as the previous dam assessment was measured against outdated guidelines. The new assessment may require a dam upgrade and development of DSMS including instrumentation, Operation, Maintenance and Surveillance (OMS) manual, and Emergency Preparedness and Response Plan (EPRP). Maintaining the dam structure in compliance with dam safety regulations will require upgrades to flow controls and safety measures. Any standard maintenance activities for the dam would remain necessary with this Alternative.

3.2.2 Alternative 2: Maintain Reservoir and Dam with New Fish Bypass Channel

Alternative 2 maintains the dam, reconfigures the dam outlet and includes the construction of a fish passage bypass channel around the dam (Figure 3). The bypass channel would likely take the form of a nature-like fishway, and consistent with one of the guiding principles of the EA document, restore fish passage around the dam for as many species as feasible based on design constraints. However, this alternative does not address the ultimate requirement to remediate flooding and erosion concerns. It also does not consider altering flows by increasing the hydraulic capacity of the watercourse, diverting water from flood vulnerable areas and increasing upstream storage. High flows will continue to spill over the dam and the dam spillway may require repairs or reconfiguration in the future. Construction of the fish passage channel will impact upland habitat along the edge of the existing watercourse and reservoir. The reconfigured reservoir outlet will not significantly impact the reservoir levels or footprint. The fish passage channel will not restore sediment continuity to the watercourse or eliminate the upstream (upstream of

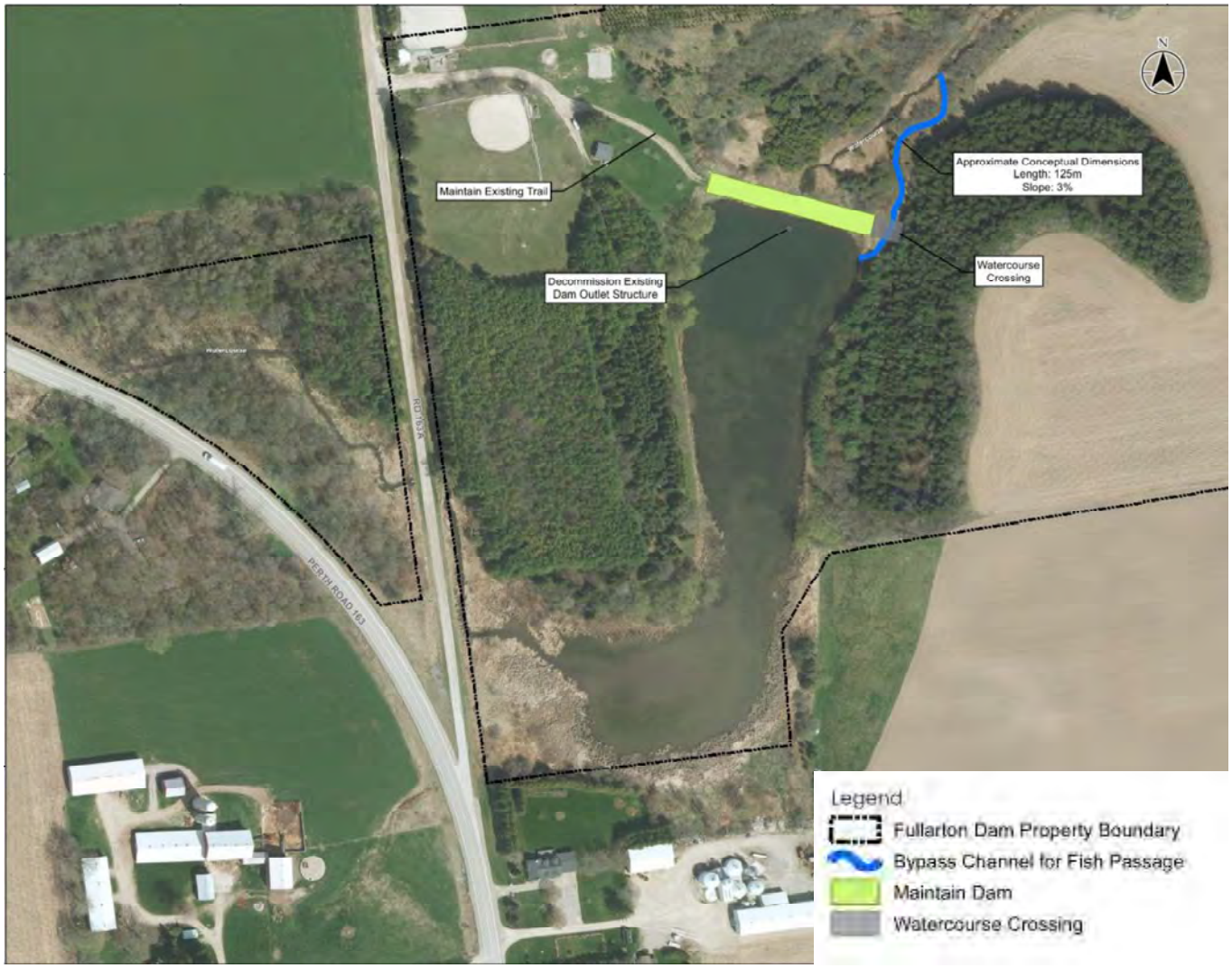


Perth Road 163a) impacts of the dam backwater. Vegetation removals will be required to construct the bypass channel. The formal trail over the dam would remain and a watercourse crossing will have to be constructed over the fish passage channel to maintain recreational access to the south side of the dam.

The condition of the dam will require assessment against updated MNRF Administrative Guide (MNRF 2017), similar to Alternative 1. The new assessment may require a dam upgrade and DSMS including instrumentation, an OMS manual and an EPRP. Removing or modifying the internal outlet infrastructure of the dam (i.e., drop inlet and pipe structures) will be beneficial in terms of improving dam safety, as it will reduce the risk of internal erosion along the culvert. However, maintaining the dam structure retains the inherent safety risk outlined in Alternative 1.

The on-line reservoir will continue to provide wetland and turtle habitat, however, thermal warming and water quality impacts from the reservoir will continue. The creation of a fish passage bypass channel will create upstream and downstream connectivity between the upper and lower sections of the watercourse and between the upper areas of the watercourse and the North Thames River, potentially increasing fish population diversity.

Figure 3 Alternative 2 – Maintain Reservoir and Dam with Fish Bypass Channel



3.2.3 Alternative 3: Partial Dam Removal with New Constructed Bypass Channel

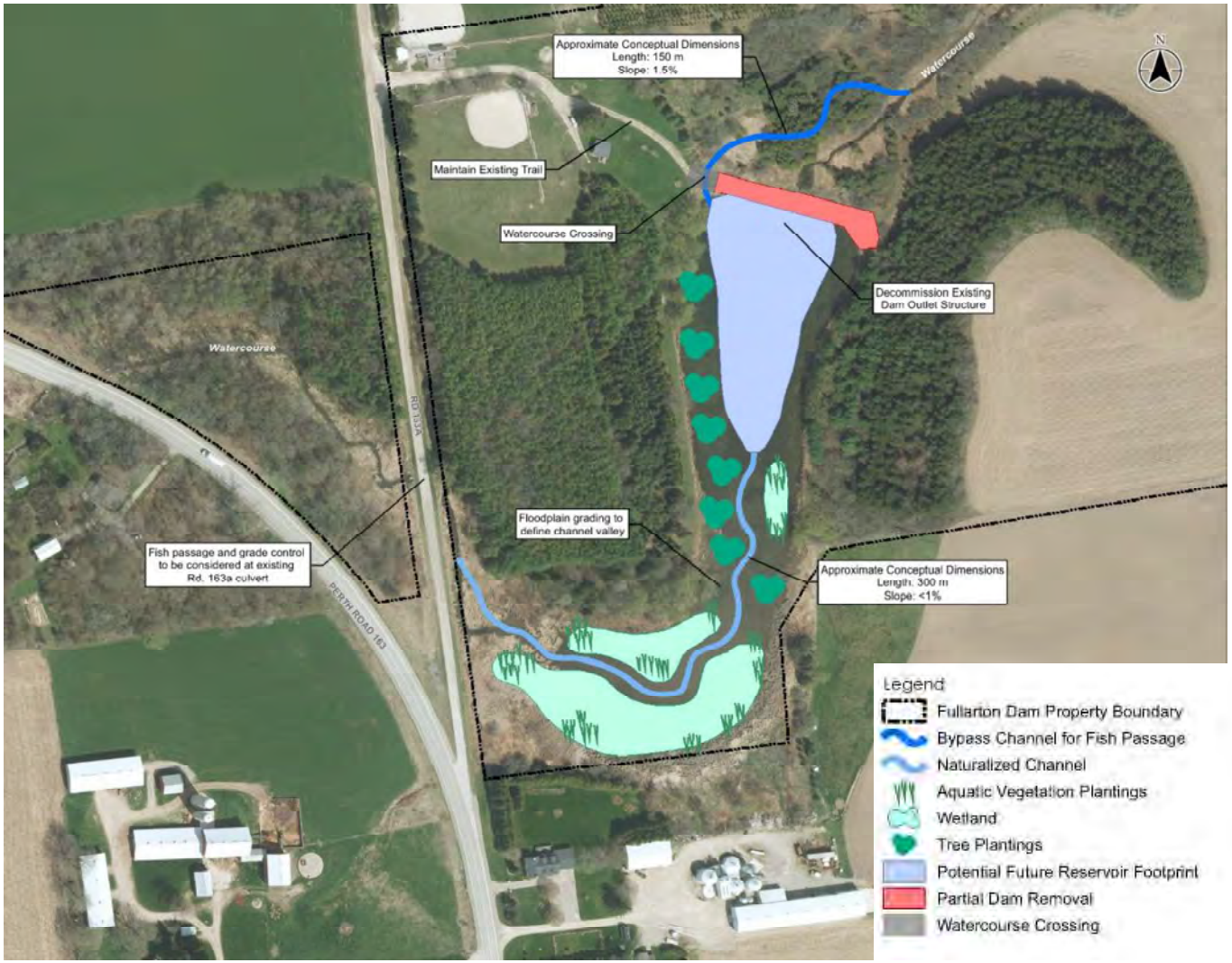
Alternative 3 includes lowering the height of the dam to reduce the water levels in the reservoir, eliminating the drop inlet reservoir outlet, and construction of a bypass channel around the dam (Figure 4). The bypass channel would likely take the form of a nature-like fishway, and per one of the goals of the EA, restore fish passage around the dam for as many species as feasible based on design constraints. The fish passage bypass channel presented in Alternative 3 would be able to be constructed at a shallower slope than the bypass channel possible in Alternative 2, which would increase the success rate of fish passage by decreasing flow velocity. Vegetation removals will be required for the creation of the bypass channel and new terrestrial habitat will be created upstream of the reservoir, in the former reservoir area that would be exposed by reducing reservoir levels. The watercourse is proposed to be restored in the former reservoir area using natural channel design techniques. A watercourse crossing will be constructed over the fish passage channel to maintain access to the south side of the dam.

Lowering the height of the dam by at least 1.4 m will decrease the reservoir surface area to less than 2 ha. A dam only requires improvements by a qualified engineer when the height of the dam is greater than 2 m and the corresponding reservoir is greater than 2 ha. After lowering the dam to a height of less than 2 m height, it will no longer be defined as a dam under the *Lakes and Rivers Improvement Act, 2019* and associated Administrative Guide (MNRF 2017). Alternative 3 will present unique water and sediment management challenges during construction. Dam assessment requirements will no longer be as rigorous as per the Act as safety risks will be reduced. However, maintenance of the structure will be still required to prevent erosion and to maintain minimum freeboard.

A reduced reservoir size will require construction of a naturalized channel and floodplain through the area that was formerly reservoir. The new channel will increase natural riverine habitat and restore the natural channel morphology to a section of the watercourse. Consideration would be made for fish passage and grade control at Road 163a. Wetlands would be constructed on the floodplain to mitigate loss of turtle habitat due to the reduced reservoir footprint. Mussel habitat will persist in the remaining reservoir and created channel area, with potential to colonize the constructed wetland features.

While the trail over the dam would be eliminated under Alternative 3 a new crossing would be considered as part of detailed design.

Figure 4 Alternative 3 – Partial Dam Removal with Constructed Bypass Channel



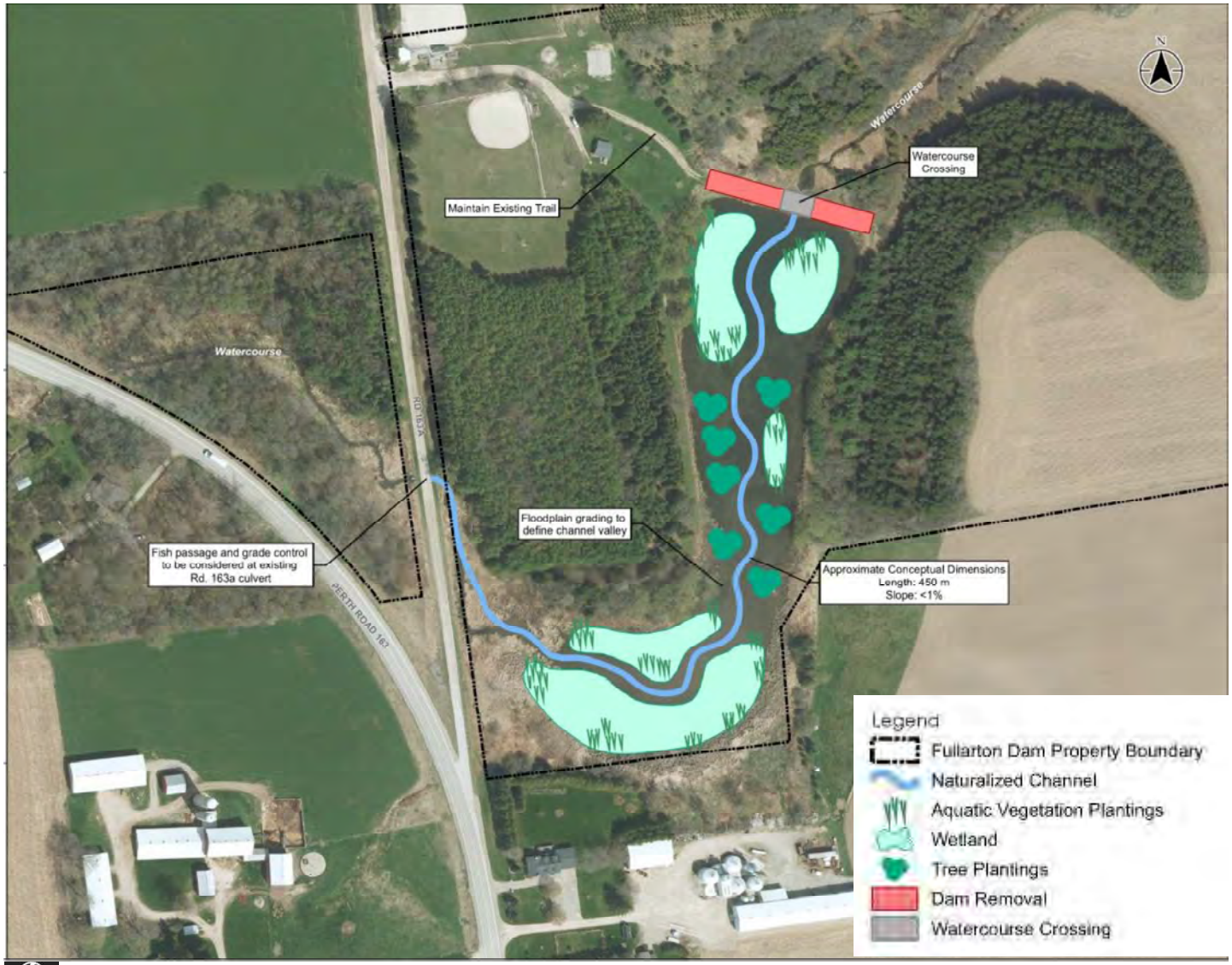
3.2.4 Alternative 4: Dam Decommissioning and Watercourse Restoration

Alternative 4 proposes eliminating the dam and restoring the watercourse through the footprint of the former reservoir (Figure 4). The fish barrier created by the dam would be eliminated, and a naturalized channel would be constructed at the historical channel slope. It may not be required to remove the entire dam structure, but a large section should be removed to allow water passage during major flow events (to be confirmed during Detail Design). This large section would reduce the potential for debris or ice blockages forming. Removing the dam will restore sediment continuity to the watercourse and reduce the upstream morphological impacts of the dam backwater. While the existing trail over the dam would be removed, a new trail would be considered as part of Detail Design.

Removing the entire dam will declassify the existing structure under the *Lakes and Rivers Improvement Act*, *2019* Dam safety updates and maintenance will no longer be a requirement.

Restoration of the watercourse to a naturalized channel with a floodplain would occur in the existing reservoir area. The new channel will increase natural riverine habitat and restore the natural channel morphology. Consideration would be made for fish passage and grade control at Road 163a. Constructed wetlands on the floodplain will be included to mitigate for the loss of reservoir turtle and fish habitat in the pond. The created channel area is expected to provide mussel habitat. Thermal warming and associated water quality effects to the watercourse will be improved with anticipated benefits to aquatic species. Notably conditions could improve to a level that would provide an opportunity for cold-water species to complete their lifecycle into the watercourse.

Figure 5 Alternative 4 –Dam Decommissioning and Channel Restoration



3.3 Environmental Effects Screening and Evaluation

For each alternative, a screening of the potential environmental effects was conducted. The purpose of the screening was to identify alternatives that could result in significant, net negative environment impacts (i.e., with mitigation in place), which if identified, could indicate that an alternative should be discounted (i.e., screened from further consideration), or that the project should be subject to an Individual Environmental Assessment.

The screening process involved an identification of the types and extent of impacts according to a series of environmental factors (i.e., screening criteria from the Class EA, 2013). Both positive and negative effects were considered, as well as an assessment of whether the impact would be temporary during construction, long-term or permanent due to operation and maintenance. The significance of each potential effect was classified as positive, neutral, or negative based on a qualitative assessment of the magnitude of the potential effect.

The results of the screening are presented in Table 2 and key points are discussed thereafter. The potential effects are identified as negative (-), neutral (NIL) or positive (+) in direction and magnitude is rated as relatively high or low (++ or --), or not applicable (N/A). For each screening criteria, the alternatives have been indicated in Table 4 for Alternatives 1, 2, 3 and 4 based on the anticipated potential effect of each alternative on the criteria. The alternative with the most positive net effects is selected for further detailed analysis of potential impacts and required mitigation measures.

To identify the most appropriate solution for the Fullarton Dam rehabilitation, the project alternatives were compared in terms of their overall effectiveness (increased safety, reduced life cycle cost, improved environmental conditions to eliminate flooding and erosion), net environmental effects and mitigation requirements. The outcome of the effects screening is shown in Table 2 while Table 3 provides a tally of net environmental impacts, ranking from most favourable with highest positive net benefit, to lowest. Table 4 explains the advantages and disadvantages of each alternative and outlines net environmental effects for the alternatives that have been carried forward.

Table 2 Environmental Effects Screening

Screening Criteria	- -	-	NIL	+	++	N/A
Physical						
Unique Landforms						1,2,3,4
Existing Mineral / Aggregate Resources Extraction Industries						1,2,3,4
Earth Science – Areas of Natural and Scientific Interest						1,2,3,4
Specialty Crop Areas						1,2,3,4
Agricultural Lands or Production						1,2,3,4
Niagara Escarpment						1,2,3,4

Screening Criteria	- -	-	NIL	+	++	N/A
Oak Ridges Moraine						1,2,3,4
Environmentally Sensitive / Significant Areas (physical)						1,2,3,4
Air Quality						1,2,3,4
Agricultural Tile or Surface Drains (Watercourse drainage)			1	2,3	4	
Noise Levels and Vibration						1,2,3,4
High/Storm Water Flow Regime	1,2			3	4	
Low/Base Water Flow Regime		1		2,3	4	
Existing Surface Drainage and Groundwater Seepage			1,2,3,4			
Groundwater Recharge / Discharge Zones	4	3	1,2			
Littoral Drift						1,2,3,4
Other Coastal Processes						1,2,3,4
Water Quality		1, 2		3	4	
Soil/Fill Quality			1,2,3,4			
Contaminated Soils / Sediments / Seeps						1,2,3,4
Existing Transportation Routes (traffic flow)			1,2,3,4			
Construction Crossing (e.g., bridges, culverts)			1,2,3,4			
Geomorphology	1	2		3	4	
Biological						
Wildlife Habitat			1	2,3	4	
Habitat Linkages or Corridors (fish passage)		1		2,3	4	
Significant Vegetation Communities		2	1	3	4	
Environmentally Sensitive / Significant Areas (biological)				1,2,3	4	
Fish Habitat	1			2,3	4	
Species of Concern (e.g., species at risk, vulnerable / threatened / endangered species, conservation priorities – either flora or fauna) (snapping turtles and Northern Sunfish)			1,2	3	4	
Exotic / Alien and Invasive Species			1,2,	3,4		
Wildlife / Bird Migration Patterns (stopover)			1,2,3,4			
Wildlife Population			1	2,3	4	
Wetlands			1, 2	3	4	

Screening Criteria	- -	-	NIL	+	++	N/A
Microclimate						1,2,3,4
Life Science ANSI's						1,2,3,4
Unique Habitats						1,2,3,4
Cultural						
Traditional Land Uses			1	2,3	4	
Indigenous Nations - TBC[1]						
Outstanding Land Claims			1,2,3,4			
Transboundary Water Management Issues						1,2,3,4
Riparian Uses			1	2	3,4	
Recreational Use of Existing Shoreline Access Locations (hike, fish, canoe)				3,4	1,2	
Aesthetic or Scenic Landscapes or Views				1,2	3,4	
Archaeological Resources, Built Heritage Resources and Cultural Heritage Landscapes		3, 4	1,2			
Historic Canals						1,2,3,4
Federal Property						1,2,3,4
Heritage River System						1,2,3,4
Socioeconomic						
Surrounding Neighborhood or Community (park users)			1,2,3,4			
Surrounding Land Uses or Growth Pressure						1,2,3,4
Existing Infrastructure, Support Services, Facilities (Watercourse road crossing)	1,2				3,4	
Pedestrian Traffic Routes (trail over dam)			1,2,3,4			
Property Values or Ownership						1,2,3,4
Existing Tourism Operations						1,2,3,4
Property/Farm Accessibility			1,2,3,4			
Engineering / Technical						
Rate of Erosion in Ecosystem (sediment transport)	1,2			3	4	
Sediment Deposition Zones in Ecosystem	1,2	3			4	
Flood Risk in Ecosystem	1,2	3			4	

[1] Interest from Indigenous Nations has been expressed, however as Alternatives have not yet been presented, we are not able to evaluate.

Screening Criteria	- -	-	NIL	+	++	N/A
Slope Stability (dam)		1, 2		3	4	
Existing Structures (dam and dam safety)			1,2	3	4	
Hazardous Lands (floodplain)			1,2	3	4	
Hazardous Sites						1,2,3,4

Notes:

Alternative 1: “Do Nothing” (Status Quo)
Alternative 2: Maintain Reservoir and Dam with New Fish Bypass Channel
Alternative 3: Partial Reservoir and Dam Removal with New Constructed Channel
Alternative 4: Full Dam Decommissioning and Watercourse Restoration

Table 3 Summary of Environmental Effects Screening

Alternative	Number of Criteria					
	- -	-	NIL	+	++	N/A
Alternative 1 – Overall high negative net impact (red)	6	2	10	1	1	26
Alternative 2 – Overall low positive net impact (light green)	5	4	7	10	1	26
Alternative 3 – Overall high positive net impact (green)	0	7	2	17	3	26
Alternative 4 – Overall highest positive net impact (dark green)	1	4	2	2	21	26

Notes:

Alternative 1: “Do Nothing” (Status Quo)
Alternative 2: Maintain Reservoir and Dam with New Fish Bypass Channel
Alternative 3: Partial Reservoir and Dam Removal with New Constructed Channel
Alternative 4: Full Dam Decommissioning and Watercourse Restoration

Based on the findings of the screening it was concluded that none of the alternatives, with the exception of the ‘Do Nothing’ option, would result in the highest net negative environmental impacts that would preclude their consideration as a viable project alternative. As ‘Do Nothing’ is required to be carried forward, all alternatives have been evaluated in the next section.

The results presented in Table 3 indicate that Alternative 4 has the highest positive net impacts, while Alternative 1 has the most negative and least positive impacts. While Alternative 3 still has a high positive net impact, there is a variance as Alternative 4 has more positive impacts and fewer negative impacts.

3.4 Evaluation of Alternative Solutions

Table 4 Evaluation of Alternative Remedial Measures

Alternative Solution Summary and Estimated Cost	Effectiveness (Safety, Cost, Environmental)		Potential Environmental Effects	
	Advantages	**Disadvantages**	**Natural Environment**	**Social Environment**
Alternative 1: "Do Nothing" (Status Quo) • Age of dam and outlet infrastructure may present a safety risk related to potential leaks developing at the outlet location or potential berm failure • Outlet structure is not fish passable • Thermal warming in reservoir increasing water temperature, impacting water quality • Maintaining dam in compliance with safety regulations would require upgrades to flow controls and safety measures Construction cost: $245,000 On-going Dam Safety cost (every 10 years): $430,000 Total: $675,000	• No disturbance to existing aquatic or terrestrial habitat • Dam trail can be retained. • Potential recreational activities within reservoir	• Does not address flood risk. • Potential risk of dam failure • Standard maintenance and safety upgrades required for regulatory compliance (annual requirements / costs) • Barrier to fish passage • Poor water quality • Reservoir will continue to infill with sediment. • Thermal warming will continue and counteract measures to reinstate cold water fish species. • Least resilient to climate change impacts • Risk of structural integrity and stability of dam	• Thermal impact to water affecting fish habitat. • Potential environmental impacts of Dam failure	• Dam failure could cause property damage and safety concerns
RESULTS:		**LEAST PREFERRED**		
Alternative 2: Maintain Reservoir & Dam with New Fish Bypass Channel • Maintain dam, eliminate drop inlet reservoir outlet • Construction of fish passage channel • High flows will continue to spill over the dam • Fish passage will increase connectivity and fish diversity • Does not resolve risks associated with dam structure, requires ongoing maintenance and safety plans Construction cost: $1,095,000 On-going Dam Safety cost (every 10 years): $430,000 Total: $1,525,000 Assumes all excavated material remains at the Fullarton Conservation Area and is not transported off-site for re-use or disposal	• Moderate improvement to fish passage • Dam trail can be retained. • Potential recreational activities within reservoir	• Does not address flood risk. • Potential risk of dam failure, though lesser than Alternative 1 • Standard maintenance and safety upgrades required for regulatory compliance (annual requirements / costs) • No improvements to water quality • Reservoir will continue to infill with sediment. • Thermal warming will continue. • Partial dam removal will present water and sediment management challenges. • Least resilient to climate change impacts (flood risk) • Requires Stage 2 Archaeological Assessment • Vegetation removals for construction of fish passage • Watercourse crossing required over fish passage channel	• Vegetation and tree removals for construction access due to the creation of the fish bypass channel • Potential impacts to reptiles to create construction access for the fish bypass channel. • Improvement of aquatic habitat due to creation of fish passage • Potential for sediment entering water during construction	• Dam failure could cause property damage and safety concerns fish bypass could impact access to trail during construction
RESULTS:		**SOMEWHAT PREFERRED**		
Alternative 3: Partial Dam Removal & New Constructed Bypass Channel • Lower dam height to reduce reservoir water levels • Eliminate drop inlet reservoir outlet and construct fish passage channel	• Further reduces risk and consequence of dam failure.	• social impact due to partial removal of reservoir • Vegetation removals for construction of fish passage	• Vegetation and tree removals for construction access due to the creation of the fish bypass channel	• Modifications to the existing trail however will be reinstated

Alternative Solution Summary and Estimated Cost	Effectiveness (Safety, Cost, Environmental)		Potential Environmental Effects	
	Advantages	**Disadvantages**	**Natural Environment**	**Social Environment**
• Increased terrestrial habitat upstream in former reservoir area • Requires ongoing dam maintenance and safety plans Construction cost: $701,000 On-going maintenance and safety/regulatory costs: $0 Assumes all excavated material remains at the Fullarton Conservation Area and is not transported off-site for re-use or disposal. Assumes the dam height is less than 2 m after partial removal and therefore it no longer meets the definition of a dam *(MNRF 2017)*	• Dam classification is changed to a non-regulated structure, reducing dam safety assessments and dam maintenance requirements (MNRF 2017) • Improves fish passage. • Reduces the morphological impacts of dam backwater to the watercourse upstream of Perth Rd. • Reduced potential for debris or ice blockages forming	• Less resilient to climate change impacts (flood risk) relative to Alternative 4 • Partial dam removal will present water and sediment management challenges. • Thermal warming and associated water quality concerns will remain (less than Alternatives 1 and 2) • Will not fully restore sediment continuity to the watercourse. • Possible impact to groundwater levels adjacent to former reservoir. • Requires Stage 2 Archaeological Assessment • Maintenance still required for dam structure. • Watercourse crossing required over fish passage channel	• Potential impacts to reptiles and other ground-dwelling animals to create construction access for the fish bypass channel. • Potential for sediment or construction debris entering the water. • Potential for sediment movement downstream during operation or requirement for sediment grading during construction • Groundwater impact at site has a low potential of impacting wells	• Improved community safety as a result of partial dam removal • Reduced potential for recreational activities within reservoir
RESULTS:		**MODERATELY PREFERRED**		
Alternative 4: Dam Removal & Watercourse Restoration • Eliminate dam and restore watercourse • Create naturalized channel through former reservoir • Wetlands will be constructed on floodplain to offset loss of reservoir habitat • Dam safety and maintenance no longer required Construction cost: $672,000 On-going maintenance and safety/regulatory costs: $0 Assumes all excavated material remains at the Fullarton Conservation Area and is not transported off-site for re-use or disposal. Assumes new channel through reservoir is formed / constructed using reservoir lowering and field-fit techniques.	• No dam or reservoir maintenance or safety regulatory approvals required. • Highest improvement to fish passage • Highest diversity of habitat creation • Most improvement to water passage during major flow events • Reduce potential for debris or ice blockages forming. • Restore sediment continuity to the watercourse. • Eliminate upstream morphological impacts of the dam backwater to the watercourse. • Thermal warming and associated water quality impacts from reservoir will be eliminated. Increase resiliency to climate change (flooding)	• Vegetation and tree removals for construction access • Low social impact due to removal of reservoir • Dam decommissioning will present water and sediment management challenges. • Requires Stage 2 Archaeology where areas of soil disturbance are required where it was previously undisturbed. • Anticipated to have the most earthworks to shape the channel valley through the former reservoir. • Possible impact to groundwater levels adjacent to former reservoir. • Watercourse crossing required over watercourse	• Creation of wetlands, and overall increase in instream habitat • Loss of pond habitat in reservoir • Reservoir no longer impacting the thermal regime of the watercourse. • Reservoir no longer impacting sediment transport. • Vegetation and tree removals for construction access • Potential impacts to reptiles and other ground-dwelling animals to create construction access. • May require groundwater monitoring	• Modifications to the existing trail however will be reinstated • Loss of recreational activities within reservoir
RESULTS:		**PREFERRED**		

3.5 Summary of Evaluation

3.5.1 Alternative 1: "Do Nothing" (Maintain Existing Dam)

As required by the Class EA process, the "Do Nothing" alternative was carried forward and evaluated based on impacts to the environment, as well as compared with other alternatives. The evaluation concludes that this alternative does not address the key issue surrounding the remediation of flooding and erosion. In addition, this alternative would still require dam upgrades and perpetual maintenance. In the event of failure of the dam, the potential impacts to the natural environment could include:

- Sudden release of large volumes of water into the watercourse and river downstream with rapid escalation of erosive forces.
- Release of large quantities of sediment to downstream habitat of the watercourse.
- Sudden drainage of lake environment resulting in immediate impacts to the reservoir and aquatic habitat / aquatic life.

Aside from dam failure, the barrier to fish passage will remain which does not adhere to design considerations for replicating the natural environment and enhancing aquatic habitats. There would be no changes to the current water quality and thermal impacts of the existing dam structure on the watercourse.

The cost for the "Do Nothing" option is not $0. The costs associated with bringing the structure into compliance with regulatory and safety requirements and the costs of on- going structure maintenance remain as necessary spending.

If the dam is maintained properly the risk of dam failure can be reduced to acceptable levels. However, maintaining the existing dam does not mitigate flooding concerns and there is continued flood risk which is associated with negative biophysical and social impacts to the surrounding environment and safety of park users. Thus, this alternative has been identified as the least preferred.

3.5.2 Alternative 2: Maintain Reservoir and Dam with Fish Bypass Channel

The second alternative carried forward and evaluated based on impacts to the environment, as well as compared with the other alternatives, was the option to maintain the reservoir and dam and create a fish bypass channel. The evaluation concludes that this alternative does not address the key issues surrounding the remediation of flooding and erosion. Maintaining the reservoir and dam carries the same negative impacts as Alternative 1 (Do Nothing) with the exception of eliminating the barrier to fish passage. While this alternative fulfills the design principles surrounding enhancement of aquatic habitats by creating a new bypass channel for fish, it does not accomplish the re-establishment of the natural function of the waterway. The costs associated with bringing the structure into compliance with regulatory and safety requirements and the costs of on-going structure maintenance remain as necessary spending.



Additionally, the cost for this option will require a design and construction budget for the fish bypass, the effectiveness of which will be determined during Detail Design.

Alternative 2 still requires ongoing maintenance and safety-related costs because the dam would remain as a regulated structure. For Alternatives 3 and 4, however, the dam classification would change to a non-regulated structure under the *Lakes and Rivers Improvement Act, 2019*, eliminating the need for on-going dam safety and dam maintenance requirements. There are no mitigation measures available in Alternative 2 as an alternative to flood remediation, therefore there is a continued flood risk and possibility of future dam failure which will cause negative biophysical and social impacts to the surrounding environment and safety of visitors. Temporary construction impacts may be mitigated if this alternative were to move forward. The enhancement of the aquatic habitat positions this alternative to be considered somewhat preferred.

3.5.3 Alternative 3: Partial Reservoir and Partial Dam Removal with Constructed Bypass Channel

The third alternative which includes retaining part of the reservoir in addition to a constructed bypass channel was evaluated based on impacts to the environment and compared to the other alternatives. The evaluation concludes that this alternative partially addresses the key issue surrounding the remediation of flooding and erosion. Maintaining part of the reservoir and dam includes similar impacts to Alternative 2. Thermal warming and water quality impacts will remain however the magnitude would be reduced. This alternative allows for constructed wetlands on the floodplain to offset loss of turtle habitat in the reservoir. Overall, this option supports partial re-establishment of natural function (both biological and physical) and appearance of the watercourse. It also includes opportunities to enhance the terrestrial and aquatic habitats and offers opportunity to mitigate temporary construction impacts and result in a small net benefit for terrestrial and aquatic habitat. Unlike Alternatives 1 and 2, the dam classification would change to a non-regulated structure under the *Lakes and Rivers Improvement Act, 2019*, eliminating the need for ongoing dam safety and dam maintenance requirements. The costs for this Alternative are related to design and construction of the dam structure modifications, by-pass channel, and of implementing a new channel in the former reservoir area. Therefore, the evaluation concludes this alternative to be partially preferred.

3.5.4 Alternative 4: Dam Decommissioning and Channel Restoration

The fourth alternative proposes the decommissioning of the existing dam and reservoir and a full restoration of the watercourse to a naturalized channel. This alternative was evaluated against its impacts to the environment, as well as compared with other alternatives. This alternative supports design principles for an EA remedial project on flood risk, including enhancing terrestrial and aquatic habitat; re-establishing and enhancing the natural function and appearance of the watercourse; remediation designed based on riverine situation taking into account continuity of the watercourse; opportunities for re-establishment of vegetative cover; and consideration for the objectives for the aquatic environment and



quality of the ecosystem. The alternative includes the following positive net impacts above other alternatives:

- Floodplain will allow for reduced risk of impacts resulting from climate change.
- Channel increases natural riverine habitat to restore the natural channel morphology.
- Removal of thermal warming and water quality effects to the watercourse resulting from the removal of the dam and reservoir.
- Best opportunity for reinstatement of cold-water fish into the watercourse.

Recreational possibilities may change as a result of the elimination of the reservoir. Negative impacts from construction are expected to be temporary. Alternative recreational opportunities and enhancements for the site should be considered in any future Fullarton CA Management Strategy. While this option has the longest construction period, the construction costs are less than Alternative 3 while achieving a full re-establishment of a natural watercourse. The costs for this Alternative are related to design and construction of the dam decommissioning and of implementing a new channel in the former reservoir area. Similar to Alternative 3, Alternative 4 eliminates the ongoing dam maintenance and safety costs required for Alternatives 1 and 2.

Overall, this option supports full re-establishment of natural function of the watercourse and includes opportunities to enhance the terrestrial and aquatic habitats. Temporary construction impacts can be mitigated, and the project will result in a net benefit for terrestrial and aquatic habitat.

Therefore, the evaluation concluded that Alternative 4 is the Preferred Alternative. A summary of the results of the evaluation of alternatives is provided in Table 5.

Table 5 Evaluation of Alternative Solutions Summary

	Alternative 1: Maintain existing dam and reservoir at the site	Alternative 2: Maintain Reservoir & Dam with New Fish Bypass Channel	Alternative 3: Partial Dam Removal & New Constructed Bypass Channel	Alternative 4: Dam Removal & Watercourse Restoration
Physical	●	◉	◉	○
Biological	◉	◉	◉	○
Cultural	◉	◉	◉	○
Socioeconomic	◉	◉	○	○
Engineering/ Technical	●	◉	◉	○
Conclusion	Least Preferred	Somewhat Preferred	Moderately Preferred	Preferred

Least Preferred ● → ◉ → ◉ → ○ Most Preferred

3.6 Selection of Preferred Solution

Alternative 4 – Full Dam Decommissioning and Channel Restoration is the preferred alternative. Overall, Alternative 1 and 2 have the same risk of flood impact downstream due to dam failure as the same volume of water in the reservoir is retained. Both presume basic dam maintenance or require upgrades for the dam structure. The flood risk is reduced by Alternative 3 and is managed appropriately by Alternative 4. Alternative 4 fulfills additional environmental planning and design principles such as:

- Addresses Riverine Flooding through Dam Decommissioning and Channel Realignment
- Enhances terrestrial and aquatic habitat
- Re-establishes natural function and appearance of the watercourse
- Creation of habitat linkages with fish passage
- Removal of thermal warming and water quality effects caused by the reservoir
- Low future ongoing dam maintenance and safety costs

4 Effects Assessment, Mitigation and Monitoring

This phase of the EA process involves identifying the impact of the preferred design concept on the environment as well as corresponding mitigation measures and monitoring activities. The construction and operation of the Project has potential impacts on the social, economic, cultural environment and climate change and technical factors which are described in the following sections. Potential impacts were determined based on the environmental inventory described in Section 3.1 and the evaluation criteria discussed in Section 3.4. In general, the operation of the preferred alternative will have limited effect on the environment, however several of the proposed activities will require regulatory approval.

4.1 Effects

4.1.1 Surface Water

Potential negative effects to surface water include possible spills into the water from Project activities. Potential positive effects to surface water from the Project include that the reservoir will no longer be impacting the thermal regime of the watercourse and sediment transport. Another positive effect is the elimination of the upstream morphological impacts of the dam backwater to the watercourse. Thermal warming and associated water quality impacts from the reservoir will be eliminated. The long-term effects will include the reduction in the flood risk within the Study Area. UTRCA mapping will be updated during detailed design to reflect final design details. Dam removal projects are regulated under the *Lakes and Rivers Improvement Act, 2019*, and the MNRF must approve any proposed changes to the structure, including removal.

Impacts to the surface water environment shall be mitigated through design and construction management measures including:

- Appropriate erosion and sediment controls shall be employed during all phases of construction to reduce erosion and sediment transport to downstream areas the extent possible.
- Sediment fencing shall be used along all construction areas adjacent to natural features to prevent sediment migration. No equipment will be permitted to enter natural features beyond the fencing.
- Materials requiring stockpiling (fill, topsoil, etc.) shall be stabilized and kept outside of the channel corridor.
- Erosion and sediment control materials (sediment fence, strawbales, clear stone) are to be kept on site for emergencies and repairs.
- Erosion and sediment controls shall be monitored and maintained, as required. Controls are to be removed only after the soils of the construction area have been stabilized and adequately protected and until cover is re-established.
- A permit is required from UTRCA under Ontario Regulation (O. Reg.) 41/24. Permit conditions shall be followed during all activities.

- Demolition and construction shall be phased to allow for the efficient management of water flow and site management with respect to sediment and erosion control.
- Construction fencing shall be installed to delineate the Project construction areas prior to the start of construction and shall be reviewed by an engineer and wildlife fencing will be used where there is a risk of turtles entering the workspace.
- Equipment should be refueled using a two-person refueling system. In the event that an accidental spill occurs, spill control materials, should be kept on site to quickly address any accidental spills immediately.

4.1.2 Groundwater

Removal of the dam and reservoir has the potential to positively impact groundwater recharge and baseflows in the unnamed watercourse. There is potential for negative impacts to groundwater levels adjacent to the former reservoir. Groundwater quantity and flow may also be affected by changes in infiltration of precipitation due to dam removal. Infiltration could decrease depending on the construction of riparian habitat adjacent to the unnamed watercourse or could be enhanced due to an increase in permeable surfaces resulting from the removal of the dam and loss of the reservoir. These changes are unknown due to a lack of knowledge of local groundwater flow direction. The installation of monitoring wells in the overburden surrounding the dam may assist in supporting a better understanding of groundwater quantity and local flow dynamics in the shallow groundwater system. The proposed Project may require groundwater monitoring due to potential impacts to groundwater levels adjacent to the former reservoir.

Impacts to the groundwater environment shall be mitigated through design and construction management measures including:

- A private well survey should be conducted to assess domestic groundwater use near the Project and a private well monitoring program may be implemented for well owners within 1 km downstream of the dam who rely on groundwater supply. This monitoring program may include pre-construction water quality monitoring as well as water level monitoring, if available. Should a private water well be affected by Project construction, a potable water supply should be provided, and the water well should be repaired or restored as required.
- If groundwater dewatering is required, the MECP allows registration under the EASR for construction dewatering projects where groundwater takings will be greater than 50,000 L/day and less than 400,000 L/day; however, should groundwater takings exceed 400,000 L/day, a PTTW may be required from the MECP.

4.1.3 Terrestrial Environment/Species at Risk

Potential negative effects on the terrestrial environment from the Project during construction include the disturbance, displacement, or mortality of wildlife resulting from vegetation removal. Vegetation and tree removals are required for construction access, which could potentially impact reptiles and other ground-dwelling animals. There is also potential for the loss of migratory bird nests, eggs, and nestlings if tree cutting, or other vegetation impacts due to construction occur during the general nesting periods. There is also the potential for the removal of SAR bat habitat during construction.

Trees and other vegetation will be planted in the floodplain during revegetation. Long-term positive impacts are anticipated from the revegetation and naturalization. Native vegetation may provide new habitat to terrestrial species, for example for foraging and nesting. The proposed dam decommissioning and channel restoration has the highest diversity of habitat creation.

To limit impacts to terrestrial wildlife, an Information Gathering Form will be prepared under the provincial ESA and submitted to the MECP to determine if an ESA permit is required.

A Wildlife Scientific Collectors Authorization will be required from the MNRF to rescue any wildlife encountered during the construction period (e.g., turtles).

Impacts to the terrestrial environment shall be mitigated through design and construction management measures including:

- Reduce the area of impact to the extent possible.
- Retain natural habitat features such as wildlife trees wherever possible and practical.
- Wildlife barrier fencing should be installed before any construction activity is initiated.
- If construction is initiated during turtle nesting season, a qualified biologist should visually inspect the site for turtle nests and adult turtles.
- If wildlife is encountered, measures will be implemented to avoid death, injury, or interference with the species, and its habitat. For example, construction activities will cease, or be reduced, and wildlife will be allowed to move off-site and away from the construction area on its own. A qualified biologist will be contacted to advise on the appropriate actions for the situation.
- In accordance with the Migratory Birds Convention Act, 1995 (MBCA), the loss of migratory bird nests, eggs and/or nestlings due to tree cutting or other vegetation clearing shall be avoided by limiting clearing of vegetation to outside of the general nesting period for migratory birds in this region (C2) as identified by Environment and Climate Change Canada (ECCC) (i.e., between April 1 and August 31). If work must be performed in this window, a survey for active nests or breeding activity shall be conducted by a qualified biologist before work commences and additional mitigation measures (e.g., implementation of avoidance distances during construction) employed, as required.

- Construction machinery shall be cleaned prior to entering the site at construction start-up to reduce the potential for establishment of invasive species, such as Phragmites, that may have been encountered by the machinery on a previous site location. Machinery should also be cleaned prior to demobilization.
- Avoid vegetation removals between April 1 and August 31 for protection of impact to migratory bird nests, eggs, and nestlings. In the event removals are required during this window, a nest sweep is to be conducted by a qualified biologist up to 5 days prior to removals.
- Tree removals should be completed outside of the bat maternity roost season (March 15 to September 30). Any tree removals need to be consulted with the MECP through an IGF review.
- Implement a native species revegetation planting plan within the restoration area to provide riparian habitat.

4.1.4 Aquatic Environment/Species at Risk

The aquatic environment will be impacted negatively by having the loss of the pond habitat in the current reservoir. Potential positive effects on the aquatic environment from the Project implementation post-construction includes providing fish passage opportunities for all species and year classes of fish, addressing temperature impacts by removing the source of temperature increase, and allowing for free sediment transport. The proposed dam decommissioning and channel restoration has the highest improvement to fish passage.

Working within fish habitat will require submission of a Request for Review to DFO. Further investigation may be required to identify proximity of Silver Shiner critical habitat in the North Thames River riparian area to determine if the dam decommissioning activity would occur within critical habitat for the species. The Request for Review submission will also allow regulator review of aquatic SAR in the study area. DFO review may indicate that a Fisheries Act Authorization or a Species at Risk Permit are required for the Project.

Negative impacts to the aquatic environment shall be mitigated through design and construction management measures including:

- No in-water work should take place from March 15 to July 15. If in-water work is necessary in this timing window, an approval from DFO may be required.
- The contractor shall monitor the five-day weather forecast on a daily basis to anticipate weather conditions and shall be prepared to leave the site in a stable and secure condition should water levels rise.
- In water work areas shall be isolated from flow as required to limit the transport of suspended sediment; the method of work area isolation will be determined by the contractor. The contractor will need to have sufficient by-pass capability on-site to handle significant weather events.
- Prior to instream construction activity, fish shall be rescued from the isolated work areas by implementing a fish removal and relocation plan to be conducted by qualified aquatic biologists in accordance with the conditions of a License to Collect Fish for Scientific Purposes.



- During dewatering of in-water work areas the dewatering pump inlet shall be covered with filter fabric or clear stone. Water from dewatering and unwatering operations shall be directed to a sediment control measure such as a sediment bag, trap and/or a vegetated discharge as far as practical from the top of bank of any waterbody, prior to discharge to the natural environment. No dewatering shall be sent directly to a sewer. These control measures shall be monitored for effectiveness and maintained or revised to meet the objective of reducing the risk of the entry of sediment into the watercourse.
- Implement a native species revegetation planting plan within the restoration area to provide diverse aquatic habitat.
- All requirements of the Fisheries Act will be met; further mitigation measures may be provided by DFO as a result of the submission of a Fisheries Request for Review or need for a Fisheries Act Authorization.

4.1.5 Soil

Mitigation measures for sedimentation, erosion and dust control should be implemented to prevent loss of soil through sedimentation and wind erosion. Soil and dust can enter sensitive natural features during earthworks, soil stockpiling and removal, and grading. The primary principles associated with sedimentation and erosion protection measures aim to lessen the duration of soil exposure; retain existing vegetation; encourage revegetation; reduce runoff and divert it away from exposed soils, and trap sediment as close to the source as possible. Soil and sediment management will be required due to the need for earthworks, soil, and sediment removal and grading at the dam location and reservoir.

Impacts to soil shall be mitigated through design and construction management measures including:

- O.Reg. 406/19 (On-Site and Excess Soil Management) and the associated MECP document *Rules for Soil Management and Excess Soil Quality Standards* referenced by O.Reg. 406/19 should be followed for soil that is excavated and managed on-site or off-site during construction, stockpiling and transport of excavated soil, on-site soil management, and liquid soil management, if applicable.
- Silt fencing and/or barriers should be used along all construction areas adjacent to any natural areas.
- All exposed soil areas should be stabilized and revegetated, through the placement of seed and mulching or seed and an erosion control blanket, promptly upon completion of construction activities.
- All sediment and erosion controls should be monitored regularly and properly maintained, as required. Controls are to be removed only after the soil of the construction area has been stabilized and adequately protected or until cover is re-established.
- Disturbed natural areas should be restored to pre-construction conditions, or better following a revegetation plan.

4.1.6 Noise and Vibration

Short-term noise and vibration impacts are expected as a result of construction activities. There are no long-term noise or vibration impacts. A noise and vibration report will be completed during detailed design and mitigation measures will be proposed and followed during construction which would include:

- Noise emissions of the construction equipment shall be reviewed to confirm that they are in compliance with the NPC-115 and NPC-118 limits. If they are expected to exceed the limits, quieter equipment should be considered for the Project. Alternatively, noise control options, such as silencers/mufflers should be investigated and implemented for specific equipment.
- Construction related noise emissions shall adhere to the Municipality of West Perth By-Law (BY-LAW NO. 053-2009) which prohibits construction-related noise from 9:00 PM to 7:00 AM daily.

4.1.7 Built Heritage Resources and Cultural Heritage Landscape

The following built heritage resources and cultural heritage landscapes may be at potential risk of direct impacts due to land disturbance as they contain built heritage resources or cultural heritage landscapes within 50 metres of the Fullarton Dam property boundary:

- North Thames River (CHL-1)
    - **Indirect Impact:** The Thames River and its associated riparian vegetation is located within and adjacent to the Fullarton Dam property boundary. If construction or grading activity occurs adjacent to the Thames River there is a potential for land disturbance that may alter the natural vegetation of the river.

To mitigate indirect impact to the above noted resources, the preferred option includes avoidance of the Thames River through a design and implementation plan that avoids construction within the Thames River valley. Alternatively, if avoidance is not deemed feasible, potential mitigation measures can be refined during detail design.

- 2955 Perth Road 163 (BHR-3)
    - **Indirect Impact:** The property is located adjacent to the Fullarton Dam property boundary. The residence is located within 45 metres of the property parcel associated with the Fullarton Dam. The position of the residence within 45 metres has the potential for indirect impacts resulting from vibration damage during construction activities.
- 3049 Perth Road 163 (BHR-1)
    - The property is located adjacent to the Fullarton Dam property boundary. The residence and barn are located more than 420 metres northwest of the property parcel associated with the Fullarton Dam. Therefore, the property is not at risk of direct or indirect impacts and no mitigation measures or further cultural heritage evaluation are required.

- 2954 Perth Road 163 (BHR –2)
    - The property is located adjacent to the Fullarton Dam property boundary. The residence and barn are located more than 75 metres west of the property parcel associated with the Fullarton Dam. Therefore, the property is not at risk of direct or indirect impacts and no mitigation measures or further cultural heritage evaluation are required.

Potential impacts to Built Heritage Resources and Cultural Heritage Landscapes shall be mitigated through design and construction measures including:

- Avoid the BHRs by establishing a buffer zone around the residence to limit construction activity to more than 50 meters away. This should use appropriate preventative measures such as mapping the BHR on construction maps and temporary fencing. Staging and laydown areas should also be non-invasive and avoid the BHR. Where avoidance is not feasible, the alternative option should not be applied.
- Where construction activities are anticipated within the 50 m buffer zone, a pre-construction vibration assessment by a qualified engineer is recommended to determine if vibration monitoring or site plan controls are required.

4.1.8 Archaeological Resources

Based on the findings of the Stage 1 AA (Section 3.1.8), 22.66% of the Study Area was determined to have low to no archeological potential and 77.34% of the area to have archeological potential. If Project Activities occur within the area of low to no archaeological potential (previously disturbed, low-lying, wet), then no impacts to archaeological resources are expected during the Project. If Project Activities occur outside of this area, a Stage 2 AA (test pit survey) may be required for portions of the dam removal. The Project footprint will be determined in the detailed design. The results of any Stage 2 AA must be submitted to the Ministry of Citizenship and Multiculturalism.

In the event that unassessed or documented archaeological materials are encountered during construction, the following mitigation measures shall be implemented:

- Should previously undocumented archaeological resources be discovered or suspected of being 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 O. Reg. 30-11, the coroner shall notify the Registrar, Ontario Ministry of Public and Business Services 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 should also be notified (at archaeology@ontario.ca) to ensure that the archaeological site is not subject to unlicensed alterations which would be a contravention of the Ontario Heritage Act.
- Performance of the project work will occur in land previously subject to an Archaeological Assessment.
- Any site personnel responsible for carrying out or overseeing land-disturbing activities will be informed of their responsibilities in the event that an archaeological resource is encountered.

4.1.9 Social Environment and Land Use

Implementation of the Project will not change the overall land use in the project area, however there may be temporary impacts to visitors of the Conservation Area during construction phases. Temporary disruptions to community access to the Fullarton Conservation Area trails are anticipated during construction phases, which will be considered during detailed design. There is potential for temporary visual aesthetic impacts during construction. Long-term, the Project will enhance the existing natural views/landscapes of the area. Moreover, construction activities have the potential to increase light, traffic, and dust pollution in nearby areas. Potential long-term positive effects to the social environment may include enjoyment of the more naturalized area, increased usability of the area, and increased access to the water. There may be modifications to the existing trail and a loss of recreational activities within the reservoir.

As the existing reservoir has the potential to support boating, Transport Canada should be consulted with respect to the Navigable Waters Act.

Potential effects to the social environment will be mitigated through design and construction management measures including:

- Reduce closure of associated trails used by the community during excavation and naturalization and provide detour signage where appropriate.
- During construction, a designated UTRCA representative should be available to monitor and respond to requests and concerns voiced by residents and business owners.
- Stakeholders included on the distribution list including residents within a 1 km radius will receive construction notification and schedule information at least 30 days prior to the start of construction.
- Access to nearby recreational areas will be maintained for pedestrian and cyclist traffic, to the extent feasible. Potentially affected residents, tenants, and business owners will be notified of initial construction schedules, as well as modifications to these schedules as they occur.



- Potential effects to pedestrian and cyclist activities during construction will be mitigated through the installation of appropriate wayfinding, regulatory, and warning signs.
- The constructor will perform the works in such a way that avoids or mitigates obtrusive light with respect to adjacent residents, communities and/or businesses.
- In the presence of persistent complaints and subject to the results of an investigation, identify reasonable alternative control measures, where possible.
- Establish a complaints protocol to respond to concerns that arise during construction.
- If possible, construction is recommended to be completed within the winter period when flows are typically low and when it will have the least socio-economic disturbance.
- Maintaining the dam crossing to allow farm equipment retains the access to the agricultural property owned by UTRCA east of the dam.

4.1.10 Economic Environment

There is no change of ownership or property acquisition required as part of the Project. Cost savings are anticipated as a result of the removal of the dam due to the need for no future maintenance. There may be a positive long-term impact of increased naturalized greenspace which may draw visitors to the Fullarton Conservation Area.

4.1.11 Air Quality

There is the potential for negative short-term effects to air quality during construction from emissions from equipment and dust. Following construction, there is the potential for positive impacts to air quality including increased oxygen production from vegetation in the naturalized area.

The following mitigation measures will be used:

- All construction equipment to be maintained and in good working order in accordance with operational manual.
- Employ dust control measures.

4.1.12 Infrastructure and Utilities

Excavation and construction for Fullarton Dam in the Study Area may have the potential to impact existing utilities. Potential effects to utilities shall be mitigated through design and construction management measures including:

- Obtain permits and consents from and with all utility companies with respect to the design, construction, installation, servicing, operation, repair, preservation, relocation, and/or commissioning of utility infrastructure.

Furthermore, corresponding monitoring activities include:

- Maintain regular communication with applicable utility companies.
- In the event of potential effects to critical utilities, instrumentation and monitoring shall be carried out to protect the critical utilities and structures and reduce risks of damage due to construction activities such as excavation.

4.1.13 Health and Safety

There is potential to impact the health and safety of Fullarton CA visitors due to construction nuisance such as noise and vibration, reduced air quality, and traffic safety. Mitigation and monitoring measures will be implemented to address such impacts. The Project is expected to improve health and safety of Fullarton CA visitors after construction due to improved water management and improved recreational opportunities. Signage and barriers may be used to communicate construction hazards and to implement temporary safety measures.

A positive effect of the Project on Health and Safety is that no dam or reservoir maintenance or safety regulatory approvals are required for the Project operation and maintenance.

The following mitigation measures will be used:

- Signage and barriers may be used to communicate construction hazards and to implement temporary safety measures.

4.1.14 Climate Change Considerations

The Project provides opportunities to improve local resiliency to climate change through the implementation of increased ability to handle extreme weather events which are expected to occur more frequently.

While naturalization will improve local resiliency to climate change, the short-term construction impacts will temporarily increase known climate change contributors (i.e., GHG emissions).

The long-term impacts of the Project on climate change include benefits such as:

- Improved flood resilience.
- Improved water quality and habitat conditions.
- Introduction of vegetation to absorb carbon dioxide and emit oxygen.

4.2 Summary of Potential Effects, Mitigating Measures and Monitoring Activities

A summary of the potential effects, mitigation measures and proposed monitoring for the various components of the environment described in the previous sections of the ESR has been outlined in Table 6. UTRCA is responsible for confirming that the recommendations are met but may direct a third party to undertake future activities (i.e., contractor, technical consultant). The intent of this table is to provide a summary of those commitments and responsibility of third parties where the City determines applicability. These are recommendations that will be confirmed as Project planning advances into detailed design.

Table 6 Summary of Potential Effects, Mitigation Measures, and Monitoring Activities

Environment	Environmental Component	Project Activity	Potential Effects	Mitigation Measures	Monitoring Activities
Natural Environment	Surface Water	Dam Removal/ Construction Activities	Accidental spills into the water	• Appropriate erosion and sediment controls shall be employed during all phases of construction to reduce erosion and sediment transport to downstream areas the extent possible. • Sediment fencing shall be used along all construction areas adjacent to natural features to prevent sediment migration. No equipment will be permitted to enter natural features beyond the fencing. • Materials requiring stockpiling (fill, topsoil, etc.) shall be stabilized and kept outside of the channel corridor. • Erosion and sediment control materials (sediment fence, strawbales, clear stone) are to be kept on site for emergencies and repairs. • Erosion and sediment controls shall be monitored and maintained, as required. Controls are to be removed only after the soils of the construction area have been stabilized and adequately protected and until cover is re-established. • A permit is required from UTRCA under O. Reg. 41/24. Permit conditions shall be followed during all activities. • Demolition and construction shall be phased to allow for the efficient management of water flow and site management with respect to sediment and erosion control. • Construction fencing shall be installed to delineate the Project construction areas prior to the start of construction and shall be reviewed by an engineer and wildlife fencing will be used where there is a risk of turtles entering the workspace. • Equipment should be refueled using a two-person refueling system. In the event that an accidental spill occurs, spill control materials, should be kept on site to quickly address any accidental spills immediately.	Environmental inspection recommended. No monitoring required.
Natural Environment	Groundwater	Dam Removal	Changes in Groundwater Quality and Quantity (levels adjacent to former reservoir)	• Stantec recommends the completion of a door-to-door survey of residential and commercial properties within 1.0 km downstream of the dam to confirm the presence or absence of supply wells. • If groundwater dewatering is required, the MECP allows registration under the EASR for construction dewatering projects where groundwater takings will be greater than 50,000 L/day and less than 400,000 L/day; however, should groundwater takings exceed 400,000 L/day, a PTTW may be required from the MECP.	Private well monitoring program may be completed during construction.
Natural Environment	Terrestrial Environment/Species at Risk	Site clearing for construction access. Dam Removal / Construction Activities	Impact to healthy vegetation (e.g., removal) Impacts to reptiles and ground-dwelling animals Removal of SAR bat habitat	• Reduce the area of impact to the extent possible. • Retain natural habitat features such as wildlife trees wherever possible and practical. • Wildlife barrier fencing should be installed before any construction activity is initiated. • If construction is initiated during turtle nesting season, a qualified biologist should visually inspect the site for turtle nests and adult turtles. • If wildlife is encountered, measures will be implemented to avoid death, injury, or interference with the species, and its habitat. For example, construction activities will cease, or be reduced, and wildlife will be allowed to move off-site and away from the construction area on its own. A qualified biologist will be contacted to advise on the appropriate actions for the situation. • In accordance with the MBCA, 1995, the loss of migratory bird nests, eggs and/or nestlings due to tree cutting or other vegetation clearing shall be avoided by limiting clearing of vegetation to outside of the general nesting period for migratory birds in this region (C2) as identified by ECCC (i.e., between April 1 and August 31). If work must be performed in this window, a survey for active nests or breeding activity shall be conducted by a qualified biologist before work commences and additional mitigation measures (e.g., implementation of avoidance distances during construction) employed, as required.	Environmental inspection recommended. No monitoring required.

Environment	Environmental Component	Project Activity	Potential Effects	Mitigation Measures	Monitoring Activities
				• Construction machinery shall be cleaned prior to entering the site at construction start-up to reduce the potential for establishment of invasive species, such as Phragmites, that may have been encountered by the machinery on a previous site location. Machinery should also be cleaned prior to demobilization. • Avoid vegetation removals between April 1 and August 31 for protection of impact to migratory bird nests, eggs, and nestlings. In the event removals are required during this window, a nest sweep is to be conducted by a qualified biologist up to 5 days prior to removals. • Tree removals should be completed outside of the bat maternity roost season (March 15 to September 30). Any tree removals need to be consulted with the MECP through an IGF review. Implement a native species revegetation planting plan within the restoration area to provide riparian habitat.	
Natural Environment	Aquatic Environment/Species at Risk	Dam Removal / Construction Activities including vegetation removal, grading, excavation, backfill, watercourse isolation and diversion and vegetation planting	Potential to impact fish and fish habitat	• No in-water work should take place from March 15 to July 15. If in-water work is necessary in this timing window, an approval from DFO may be required. • The contractor shall monitor the five-day weather forecast on a daily basis to anticipate weather conditions and shall be prepared to leave the site in a stable and secure condition should water levels rise. • In water work areas shall be isolated from flow as required to limit the transport of suspended sediment; the method of work area isolation will be determined by the contractor. • Prior to instream construction activity, fish shall be rescued from the isolated work areas by implementing a fish removal and relocation plan to be conducted by qualified aquatic biologists in accordance with the conditions of a License to Collect Fish for Scientific Purposes. • During dewatering of in-water work areas the dewatering pump inlet shall be covered with filter fabric or clear stone. Water from dewatering and unwatering operations shall be directed to a sediment control measure such as a sediment bag, trap and/or a vegetated discharge as far as practical from the top of bank of any waterbody, prior to discharge to the natural environment. No dewatering shall be sent directly to a sewer. These control measures shall be monitored for effectiveness and maintained or revised to meet the objective of reducing the risk of the entry of sediment into the watercourse. • Implement a native species revegetation planting plan within the restoration area to provide diverse aquatic habitat. • All requirements of the Fisheries Act will be met; further mitigation measures may be provided by DFO as a result of the submission of a Fisheries Request for Review or need for a Fisheries Act Authorization.	Environmental inspection recommended. No monitoring required.
Natural Environment	Soil	Excavation	Potential for loss of soil through sedimentation and erosion	• O.Reg. 406/19 (On-Site and Excess Soil Management) and the associated MECP document *Rules for Soil Management and Excess Soil Quality Standards* referenced by O.Reg. 406/19 should be followed for soil that is excavated and managed on-site or off-site during construction, stockpiling and transport of excavated soil, on-site soil management, and liquid soil management, if applicable. • Silt fencing and/or barriers should be used along all construction areas adjacent to any natural areas. • All exposed soil areas should be stabilized and revegetated, through the placement of seed and mulching or seed and an erosion control blanket, promptly upon completion of construction activities. • All sediment and erosion controls should be monitored regularly and properly maintained, as required. Controls are to be removed only after the soil of the construction area has been stabilized and adequately protected or until cover is re-established. • Disturbed natural areas should be restored to pre-construction conditions, or better following a revegetation plan.	Environmental inspection recommended. No monitoring required.

Environment	Environmental Component	Project Activity	Potential Effects	Mitigation Measures	Monitoring Activities
Socio-Economic Environment	Noise and Vibration	Dam Removal / Construction	Potential to impact social environment due to construction noise	• Noise emissions of the construction equipment shall be reviewed to confirm that they are in compliance with the NPC-115 and NPC-118 limits. If they are expected to exceed the limits, quieter equipment should be considered for the Project. Alternatively, noise control options, such as silencers/mufflers should be investigated and implemented for specific equipment. • Construction related noise emissions shall adhere to the Municipality of West Perth By-Law (BY-LAW NO. 053-2009) which prohibits construction-related noise from 9:00 PM to 7:00 AM daily.	Establish a complaints protocol to respond to concerns that arise during construction. During construction, a designated UTRCA representative should be available to monitor and respond to requests and concerns voiced by residents and business owners. In the presence of persistent complaints and subject to the results of an investigation, identify reasonable alternative control measures, where possible.
	Built Heritage Resources/ Cultural Landscape	Dam Removal / Land Disturbance	Impact to Thames River (CHL-1) and BHR 1 to 3	• Avoid the BHRs by establishing a buffer zone around the residence to limit construction activity to more than 50 meters away. This should use appropriate preventative measures such as mapping the BHR on construction maps and temporary fencing. Staging and laydown areas should also be non-invasive and avoid the BHR. Where avoidance is not feasible, the alternative option should not be applied. • Where construction activities are anticipated within the 50 m buffer zone, a pre-construction vibration assessment by a qualified engineer is recommended to determine if vibration monitoring or site plan controls are required.	Vibration monitoring may be recommended where construction activities are anticipated within the 50-metre buffer zone of the BHR.
	Archeological Resources	Excavation and construction for dam rehabilitation	Potential for the disturbance of unassessed or documented archeological resources.	• Should previously undocumented archaeological resources be discovered or suspected of being 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 O. Reg. 30-11, the coroner shall notify the Registrar, Ontario Ministry of Public and Business Services 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 should also be notified (at archaeology@ontario.ca) to confirm that the archaeological site is not subject to unlicensed alterations which would be a contravention of the *Ontario Heritage Act*. • Performance of the project work will occur in land previously subject to an Archaeological Assessment. • Any site personnel responsible for carrying out or overseeing land-disturbing activities will be informed of their responsibilities in the event that an archaeological resource is encountered.	Performance of the work will occur in land previously subject to an Archaeological Assessment. Any site personnel responsible for carrying out or overseeing land-disturbing activities will be informed of their responsibilities in the event that an archaeological resource is encountered.
	Social Environment and Land Use	Dam Removal / Construction	Potential for temporary impact to aesthetics during construction, increases in light, traffic and dust, and restrictions to land access and recreational land use	• Reduce closure of associated trails used by the community during excavation and naturalization and provide detour signage where appropriate. • During construction, a designated UTRCA representative should be available to monitor and respond to requests and concerns voiced by residents and business owners. • Stakeholders included on the distribution list including residents within a 1 km radius will receive construction notification and schedule information at least 30 days prior to the start of construction. • Access to nearby recreational areas will be maintained for pedestrian and cyclist traffic, to the extent feasible. Potentially affected residents, tenants, and business owners will be notified of initial construction schedules, as well as modifications to these schedules as they occur. • Potential effects to pedestrian and cyclist activities during construction will be mitigated through the installation of appropriate wayfinding, regulatory, and warning signs.	Establish a complaints protocol to respond to concerns that arise during construction. During construction, a designated UTRCA representative should be available to monitor and respond to requests and concerns voiced by residents and business owners. In the presence of persistent complaints and subject to the results of an investigation, identify reasonable alternative control measures, where possible.

Environment	Environmental Component	Project Activity	Potential Effects	Mitigation Measures	Monitoring Activities
				• The constructor will perform the works in such a way that avoids or mitigates obtrusive light with respect to adjacent residents, communities and/or businesses. • In the presence of persistent complaints and subject to the results of an investigation, identify reasonable alternative control measures, where possible. • Establish a complaints protocol to respond to concerns that arise during construction. • If possible, construction is recommended to be completed within the winter period when flows are typically low and when it will have the least socio-economic disturbance. • Maintaining the dam crossing to allow farm equipment retains the access to the agricultural property owned by UTRCA east of the dam. .	
	Air Quality	Use of construction equipment and vehicles Excavation and construction for naturalization at the site	Potential for temporary impacts to local air quality due to construction-related air pollution (such as dust emissions, vehicle exhaust)	• All construction equipment to be maintained and in good working order in accordance with operational manual. • Employ dust control measures.	Environmental inspection recommended. No monitoring required.
Cultural Environment	Infrastructure and Utilities	Excavation and construction	Potential impacts to local utilities (gas and water).	• Obtain permits and consents from and with all utility companies with respect to the design, construction, installation, servicing, operation, repair, preservation, relocation, and/or commissioning of utility infrastructure.	Maintain regular communication with applicable utility companies. In the event of potential effects to critical utilities, instrumentation and monitoring shall be carried out to protect the critical utilities and structures and reduce risks of damage due to construction activities.
Socio-Economic Environment	Health and Safety	Construction Activities	Potential impact to health / safety of residents	• Signage and barriers may be used to communicate construction hazards and to implement temporary safety measures.	Environmental inspection recommended. No monitoring required.
Climate Change & Technical Factors	Climate Change	Excavation and construction	Short-term increase in GHG emissions due to construction equipment	• Up-to-date maintenance of all construction equipment and in proper working order per manufacturers guidelines.	Environmental inspection recommended. No monitoring required.

5 Consultation

The Class EA process provides opportunities for stakeholders to review the Project findings and submit comments for consideration in development of the Project. The following sections summarize the approach to consultation during this Project.

5.1 Public Consultation

5.1.1 Study Website

Background information (including the Fullarton Embankment Stability Assessment, Fullarton Dam Safety Assessment, Fullarton Existing Conditions, Cultural Heritage Existing Conditions and Preliminary Impact Assessment, Natural Heritage Baseline Existing Conditions, Stage 1 Archeological Assessment), notifications (including the Notice of Intent and Notice of virtual PIC), updates, and links to consultation content were provided on the Project webpage, as they became available. The consultation materials are provided in Appendix G. Through the Project webpage, users were invited to contact study team members through their email account. The webpage for the Project is: https://thamesriver.on.ca/water-management/recreational-dams/fullarton-dam-class-ea/?doing_wp_cron=1709321830.1253879070281982421875.

5.1.2 Contact List

A comprehensive contact list consisting of government agencies, City staff, utilities, emergency service providers, Indigenous Nations, Indigenous Organizations, local organizations and interest groups and members of the public who expressed interest in the Project was developed at the onset of the Class EA. This list was updated as the study progressed. The latest version of this contact list is provided in Appendix G.1.

5.1.3 Notice of Commencement and Online Public Information Session

The purpose of the Notice of Study Commencement was to inform the public that UTRCA had initiated the Class EA process to complete the planning and preliminary design of this Project. The notice briefly outlined the objective of the study, the Study Area location map, and contact information for the Project team representatives. Additionally, UTRCA held a Public Information Session (PIS). The PIS informs the public about the purpose of the project and how to access the PIC materials and provided the study team's contact information.

The Notice of Study Commencement and Notice of PIS was communicated via the local newspaper and posted on the Project website. Additionally, a copy of the notice was emailed to the contact mailing list. A copy of the notice is provided in Appendix G.2 of this document.



5.1.4 Online Public Information Session

An online PIS was held live and recorded on March 28, 2024, at 7:00pm. There were 10 attendees to the online meeting which included a description of Project background and dam safety concerns, existing conditions, alternatives considered as a solution to manage dam safety, criteria and scoring of the evaluation of Alternatives, recommended Preferred Alternative, and mitigation considerations (Appendix G.3).

An additional notice was posted on April 10, 2024, to announce the availability of the recording of the virtual PIC on the Project website. Comments received until April 24, 2024, were included in the EA.

Comments received and how they were addressed as part of the design are summarized below and are in detail in 8:

- Concern for removal of terrestrial and aquatic species due to dam removal
    - Response: While the Project removes the reservoir, which is home to some species, the naturalization of the watercourse will enhance the natural habitat and remove the existing barrier to fish passage.
- Question of cost analysis conducted for alternatives.
    - Response: A cost analysis was conducted for each alternative and results indicated that while dam removal may appear to be more costly at the outset, it excludes the need for dam maintenance in perpetuity. Additionally, this Project can be carried out over time, therefore additional cost savings are possible when nature is permitted to assist in the naturalization of the site over the course of several years.
- Question regarding the possibility of flooding and need for the Project.
    - Response: The Project is being conducted under the Conservation Authority Class EA, which includes infrastructure needs resulting from flood risk. Due to the safety implications caused by the dam, there was an opportunity to investigate alternatives to modify the structure, which in future, carries the potential risk for flooding due to climate change. Naturalizing the watercourse allows for flexibility to manage climate change impacts at the site.

Additionally, letters of support for Alternative 4 as the preferred alternative were also received (Appendix G.3).

Table 7 Question/Comment and Responses from online Public Information Session.

Topic	Question/Comment	Response
Natural Heritage	Will the removal of any terrestrial or aquatic species be part of the dam decommissioning?	Any fish or wildlife encountered in the work area during construction will be rescued under a 'Licence to collect fish for scientific purposes' or a 'Wildlife Scientific Collector's Authorization'. The fish or wildlife will be relocated to an appropriate location outside the work area by qualified biologists.
Natural Heritage	What fish species are present (i.e., including brook trout or other temperature-sensitive species)? Are endangered or SAR mussels present?	The most sensitive fish there is the mottled sculpin. The Northern Sunfish is Special Concern and there is evidence of Rainbow Shell mussel that is Special Concern.
Indigenous	Will you be consulting with the First Nations communities?	Yes, letters to invite Indigenous Nations affected by the project to provide comment have been circulated. Meetings have been held for requests received.
Surface Water	How are downstream farmlands abutting the river affected if the dam is removed?	Removing the dam has a low likelihood of affecting farmland downstream of the dam. Removing the dam will improve sediment transport processes in the watercourse. Flood levels downstream of the dam should not be affected by the preferred alternative.
Surface Water	Is flooding possible?	The flood levels in the watercourse upstream of the dam structure are expected to be reduced by implementing the preferred alternative.
Economic	What cost analysis has been conducted for each of the alternatives?	High level cost analysis was completed for each alternative. Alternative 1 and 2 include costs associated with maintaining the dam in good condition and in compliance with dam regulations. Options 3 and 4 do not require compliance with dam regulations. In general, construction costs for Option 2 were found to be highest, with Option 3 as the next most expensive and Option 1 and 4 coming at similar price points at the lowest cost. During detailed design, construction methods will be examined to determine cost effective ways of implementing the preferred alternative.

5.1.5 Notice of Publication of Environmental Study Report

The Notice of Completion of the ESR was placed in the Mitchell Advocate. The Notice was also available on the Project website and distributed vial mail and email to agencies, key stakeholders, Indigenous Nations, and the public on the study mailing list. This notice briefly outlined the Preferred Alternative and notes that the ESR will be posted on the Project website for a 30-day public review period.

5.2 Agency Consultation

The Class EA provides for the involvement of MECP's various branches as well as other provincial and federal ministries and outside agencies. The list of Review Agencies varies depending on the scope of the Project, its location, and the potential environmental impacts.

All applicable agencies that were provided with the Notices are listed in the Contact List which can be found in Appendix G.1. Agency comments are available in Appendix G and are summarized below.

Notices of EA and PIC were sent to MECP. MECP provided an Acknowledgement of Notice of Intent for the Class Environmental Assessment for Remedial Flood and Erosion Control Projects. The Acknowledgement of Notice of Intent outlined all applicable areas of interest for the EA study. Areas of interest included planning and policy, source water protection, climate change, air quality, dust and noise, ecosystem protection and restoration, species at risk, surface water, groundwater, excess materials management, contaminated sites, servicing, utilities and facilities, mitigation and monitoring, and consultation.

The MCM was provided with the *Cultural Heritage Report: Existing Conditions and Preliminary Impact Assessment for the Fullarton Dam Rehabilitation* (prepared by Stantec on March 4, 2024) for review and comment. Comments were provided by MCM on April 5, 2024, and focused on municipal and agency requests and re-evaluation of design alternatives.

5.2.1 Consultation Meetings

Following the publication of the Notice of Study Commencement, a pre-consultation meeting was held with the Municipality of West Perth on February 26, 2024. The meeting presentation included details of the Alternatives evaluated and the recommendation of the Preferred Alternative. Comments received included questions regarding the expected cost implications to the Municipality and clarification of further design elements and implementation schedule.

5.3 Indigenous Consultation

The following Indigenous Nations and Indigenous Organizations are considered to be interested parties of the Project were provided with a Notice of Request to Consult at the time of study commencement:

- Aamjiwnaang First Nation
- Chippewas of the Thames First Nation
- Chippewas of Kettle and Stony Point First Nation
- Oneida Nation of the Thames
- Walpole Island First Nation

The Indigenous Consultation Log can be found in Appendix G.4. Throughout Phases 1-2, Notices and Letters of Request to Consult were sent by email.

A meeting request was received from the Chippewas of the Thames First Nation. The meeting with the Chippewas of the Thames First Nation was requested prior to the Online PIC, therefore the presentation focused on the Alternatives evaluation and recommendation of the Preferred Alternative, which was met with support due to its focus on naturalization.

Chippewas of Kettle and Stony Point First Nation provided a letter to the Consultation Team regarding the Project and concerns related to capacity funding for review of the environmental assessment, First Nations Archaeological Monitor to supervise Stage 2 AA, and lack of Indigenous engagement as part of the Cultural Heritage, Natural Heritage, and 2017 Existing Environmental Conditions Report. UTRCA responded in a letter agreeing to provide capacity funding for review of the EA, invitation to provide capacity funding for a First Nations Archaeological Monitor for the Stage 2 AA, and to meet prior to public consultation sent in March 2024.

Additional email outreach was sent to Oneida Nation of the Thames in April 2024 after the Online PIC. This email included expressing interest in meeting to present the Alternatives Evaluation and Preferred Design Solution. No response was received.

6 Timing of Implementation

6.1 Project Schedule

Detailed design, permitting, and any further required studies (such as Phase 2 Archaeological Assessment) are anticipated to take place in 2024 and 2025. Construction is anticipated to take place in phases from 2026 to 2027.

7 References

ACRES International. 2007. *Dam Safety Assessment Report for Fullarton Dam*. Retrieved June Fullarton-Dam-Safety-Assessment-August-2007.pdf (thamesriver.on.ca).

Cadman, M.D., D.A. Sutherland, G.G. Beck, D. Lepage and A.R. Couturier (eds). 2007. Atlas of the Breeding Birds of Ontario 2001- 2005. Bird Studies Canada, Environment Canada, Ontario Field Ornithologists, Ontario Ministry of Natural Resources, and Ontario Nature, Toronto. 706 pp.

Conservation Ontario. 2013. *Class Environmental Assessment for Remedial Flood and Erosion Control Projects.* Retrieved June 3, 2024 from: https://conservationontario.ca/fileadmin/pdf/conservation_authorities_section_planning___regulations/Class_EA_for_Remedial_Flood_and_Erosion_Control_ProjectsCA.pdfCounty of Perth. 2024. Section 5 – Agriculture. https://www.perthcounty.ca/en/resources/Section-05-Agriculture.pdf.

DFO (Fisheries and Oceans Canada). 2017. Guidance for Maintaining and Repairing Municipal Drains in Ontario. Version 1.1.

DFO. 2022a. Aquatic species at risk map. Canada. Available at: http://www.dfo-mpo.gc.ca/species-especes/sara-lep/map-carte/index-eng.html.

DFO. 2022b. Recovery Strategy and Action Plan for the Silver Shiner (Notropis photogenis) in Canada. Species at Risk Act Recovery Strategy Series. Fisheries and Oceans Canada, Ottawa. vi + 51 p.

Eakins, R.J. 2023. Ontario Freshwater Fishes Life History Database. Available at: https://www.ontariofishes.ca/home.htm.

Garlick, R. and A. Kartick. 2022. Creating a Health Environment: Greenhouse Gase Reduction Plan. https://www.westperth.com/en/resourcesGeneral/Creating-a-Healthy-Environment-A-Greenhouse-Gas-Reduction-Plan.pdf#page=83&zoom=100,93,336.

Government of Ontario. 2011. Standards and Guidelines for Consultant Archaeologists. Toronto: Ministry of Tourism, Culture and Sport.

Howe, J. 1967. *Neil Drain Report.*

IQAir. 2024. Air quality in Perth. https://www.iqair.com/ca/canada/ontario/perth.

Jobin, B., R. Bazin, L. Maynard, A. McConnell and J. Stewart. 2011. National Least Bittern Survey Protocol. Technical Report Series No. 519, Environment Canada, Canadian Wildlife Service, Quebec Region, Quebec, 26 p.

Konecny et al. (Hydrophilics). 2018. *Neil drain and Fullarton reservoir rehabilitation – phase 1 final report.*

MECP (Ministry of the Environment, Conservation and Parks). 2017. Silver Shiner General Habitat



Description. Available at: https://www.ontario.ca/page/silver-shiner-general-habitat-description.

MECP. 2022. Species at risk in Ontario. Available at: https://www.ontario.ca/page/species-risk-ontario.

MNRF (Ministry of Natural Resources). 2011. *Technical Bulletin – Classification and Inflow Design Flood Criteria*.

MNRF. 2017. *Administrative Guide: Lakes and Rivers Improvement Act*. Available at: https://files.ontario.ca/lria-administrative-guide.pdf.

MNRF. 2022a. Natural Heritage Information Centre (NHIC). Make A Map: Natural Heritage Areas. Available at: https://www.lioapplications.lrc.gov.on.ca/Natural_Heritage/index.html?viewer=Natural_Heritage.Natural_Heritage&locale=en-CA.

MNRF. 2022b. Land Information Ontario (LIO). Digital mapping of natural heritage features. Available at: https://geohub.lio.gov.on.ca/.

NHS (National Household Survey). 2011. NHS Profile, 2011. https://www12.statcan.gc.ca/nhs-enm/2011/dp-pd/prof/index.cfm?Lang=E.

Naylor (Naylor Engineering Associates). 2006. Geotechnical Investigation Fullarton Dam Embankment Stability Assessment, Municipality of West Perth, Ontario. Fullarton-Embankment-Stability-Assessment.pdf (thamesriver.on.ca).

Ontario. 2021. Environmental Noise Guideline – Stationary and Transportation Sources – Approval and Planning (NPC-300).

OEB (Ontario Energy Board). 2024. Ontario Electricity and Natural Gas Utilities Map. https://experience.arcgis.com/experience/710b2687d8eb403a9163d7fbd0e09432/.

Statistics Canada. 2021. Population and dwelling counts: Canada, provinces, territories, census divisions and census subdivisions (municipalities). https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=9810000203&geocode=A000235.

Toronto Entomologists' Association. 2022a. Ontario Butterfly Atlas. Available at: https://www.ontarioinsects.org/atlas/.

Toronto Entomologists' Association. 2022b. Ontario Moth Atlas. Available at: https://www.ontarioinsects.org/moth/.

UTRCA (Upper Thames River Conservation Authority). 2017. Fullarton Dam and Conservation Area. Existing Environmental Conditions. March 2017 Draft. Internal Document.

UTRCA. 2022a. Fullarton 2022 Watershed Report Card. Retrieved July 15, 2024 from https://thamesriver.on.ca/wp-content/uploads/RC_Fullarton.pdf.

UTRCA. 2022b. Fullarton Pond Fish Sampling Records. Internal document.



UTRCA. 2023. Benthic Sampling Data. Internal document.

West Perth. 2024. About West Perth. https://www.westperth.com/en/my-west-perth/about-west-perth.aspx.

Appendices

Appendix A Baseline Geomorphological Characterization Report

Fullarton Dam Rehabilitation Environmental Assessment, Baseline Geomorphological Characterization Report

Revision 2

January 28, 2025

Prepared for:

Upper Thames River Conservation Authority

Prepared by:

Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo, ON N2L 0A4
Tel.: (519) 579-4410

Project Number: 160901056

Revision	Description	Author	Date	Quality Check	Date	Independent Review	Date
0	Final Report	Chase Konecny	2023-03-10	Andrew Doherty	2023-03-10	Heather Amirault	2023-03-10
1	Updated with minor text edits	Chase Konecny	2024-11-19	Andrew Doherty	2024-11-19	Heather Amirault	2024-11-19
2	Updated with minor text edits	Chase Konecny	2024-01-28	Andrew Doherty	2024-01-28	Heather Amirault	2024-01-28

The conclusions in the report titled Baseline Geomorphological Characterization Report are Stantec's professional opinion, as of the time of the report, and concerning the scope described in the report. The opinions in the document are based on conditions and information existing at the time the scope of work was conducted and do not take into account any subsequent changes. The report relates solely to the specific Project for which Stantec was retained and the stated purpose for which the report was prepared. The report is not to be used or relied on for any variation or extension of the Project, or for any other project or purpose, and any unauthorized use or reliance is at the recipient's own risk.

Stantec has assumed all information received from UTRCA (the "Client") and third parties in the preparation of the report to be correct. While Stantec has exercised a customary level of judgment or due diligence in the use of such information, Stantec assumes no responsibility for the consequences of any error or omission contained therein.

This report is intended solely for use by the Client in accordance with Stantec's contract with the Client. While the report may be provided by the Client to applicable authorities having jurisdiction and to other third parties in connection with the Project, Stantec disclaims any legal duty based upon warranty, reliance or any other theory to any third party, and will not be liable to such third party for any damages or losses of any kind that may result.

Prepared by Konecny, Chase Digitally signed by Konecny, Chase DN: CN="Konecny, Chase", OU=Internal, OU=users, OU=stantec, DC=corp, DC=ads Date: 2025.01.28 14:26:33-05'00'

(signature)

Chase Konecny, B.A.Sc.

Reviewed by Digitally signed by Doherty, Andrew Date: 2025.01.28 14:22:58 -05'00'

(signature)

Andrew Doherty, P.Eng.

Approved by Digitally signed by Amirault, Heather DN: CN="Amirault, Heather", OU=Internal, OU=users, OU=stantec, DC=corp, DC=ads Date: 2025.01.28 14:14:27-05'00'

(signature)

Heather Amirault, P.Eng.

Table of Contents

1.0 INTRODUCTION 1.1
1.1 BACKGROUND 1.1
1.2 BASIS 1.3

2.0 HYDROLOGY 2.1
2.1 DESIGN FLOW 2.1
2.2 BANKFULL FLOW 2.2
2.3 BASEFLOW 2.2

3.0 HYDRAULICS 3.1
3.1 HYDRAULICS AT THE DAM 3.1
3.2 HYDRAULIC EFFECTS OF THE THAMES RIVER 3.1
3.3 RESERVOIR BACKWATER 3.1

4.0 GEOMORPHOLOGY 4.1
4.1 HISTORICAL WATERCOURSE 4.1
4.2 SEDIMENTATION 4.1
4.3 SEDIMENT CONTINUITY 4.2
4.4 REACH DESCRIPTIONS 4.3

5.0 CONCLUSION 5.1

6.0 REFERENCES 6.1

LIST OF TABLES

Table 1: Baseline Characterization Data Sources 1.3
Table 2: HEC-HMS Model Average Flows (Acres International, 2007) 2.1
Table 3: Existing Watercourse Reach Characteristics 4.5

LIST OF FIGURES

Figure 1: Location of Study Area 1.2
Figure 2: Watercourse Channel and Sediment Profile (UTRCA, 2017) 4.2
Figure 3: Reach Delineations 4.4

LIST OF APPENDICES

Appendix A: Photographic Inventory
Appendix B: Key Background Documentation

1.0 INTRODUCTION

Stantec Consulting Ltd was retained by the Upper Thames Region Conservation Authority (UTRCA) to conduct an Environmental Assessment (EA) for the Fullarton Dam and reservoir at the Fullarton Conservation Area (the Project) in the Municipality of West Perth, Ontario. The EA is being conducted to support long-term planning for the Fullarton Dam. As part of the initial phases of the EA, this report was prepared to establish a baseline characterization of geomorphological conditions for the unnamed watercourse that flows through the reservoir and dam and discharges into the North Thames River at the downstream end of the project site (Figure 1).

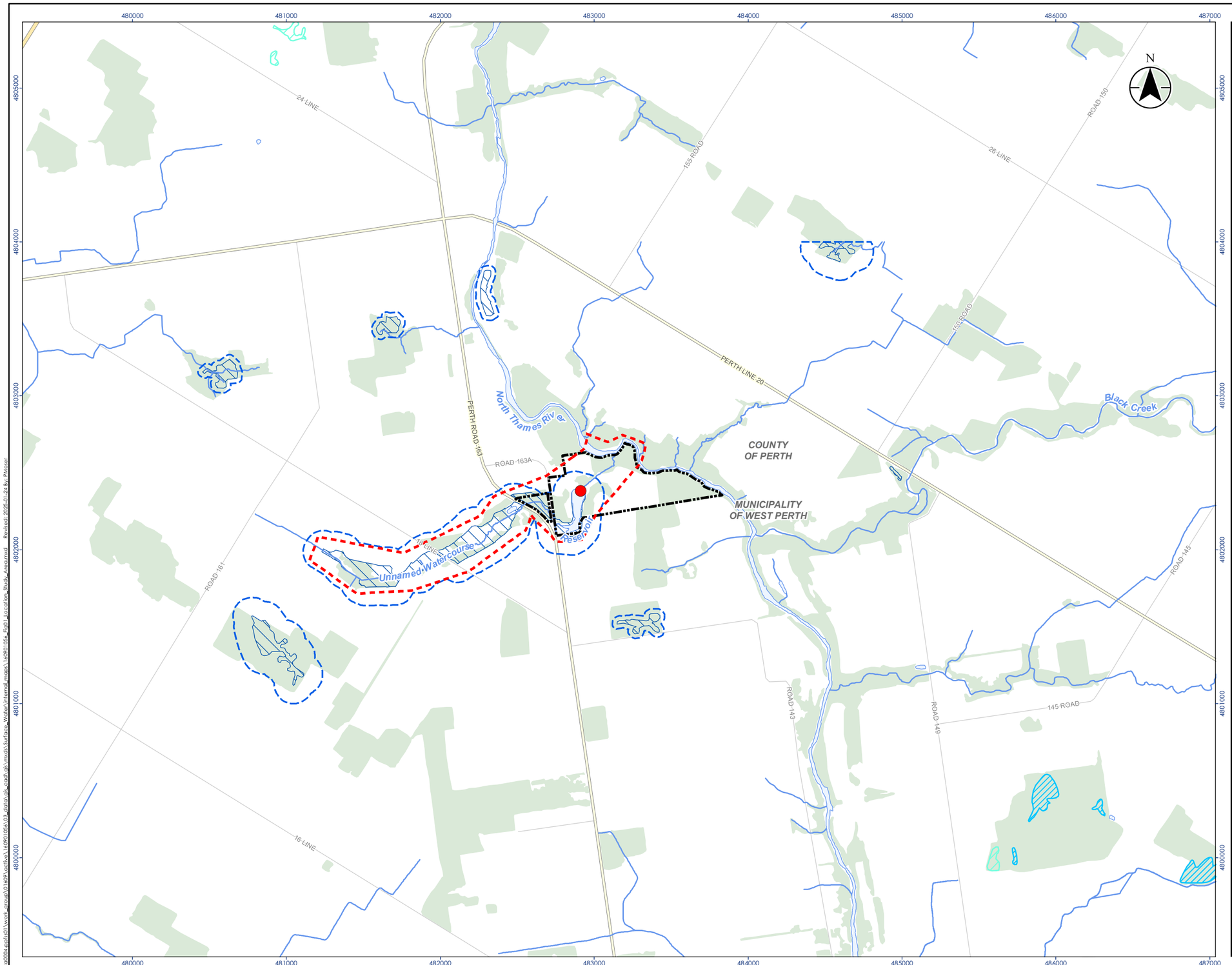
The baseline assessment was prepared based on a field assessment conducted by Stantec and available background site information, including hydrology, hydraulic data, and topographic information. Establishing baseline conditions will inform the development and evaluation of alternative solutions as part of the EA's anticipated next steps. These alternative solutions are expected to include options related to maintaining the dam or removing all or a portion of the dam combined with restoring the unnamed watercourse at the project site. Concurrently under separate covers, Stantec is also conducting a geotechnical review of the dam and baseline site assessments of hydrogeology, archaeology, natural heritage, and cultural heritage to provide key input to evaluating alternatives.

The EA will evaluate impacts and opportunities for the alternatives, including associated costs, habitat considerations for unnamed watercourse and the reservoir (e.g., snapping turtles), fish passage, and use of the conservation area by local residents. Under the Lakes and Rivers Improvement Act (2017), any contemplated dam reconstruction or modification requires an EA of the dam and surrounding areas.

1.1 BACKGROUND

Fullarton Conservation Area is a 34-hectare area used recreationally for hiking, fishing, canoeing, and picnicking. Trails are located throughout the Conservation Area, including around the reservoir and through the site's mixed deciduous and pine wood forested areas. Two baseball diamonds are located on the northwest portion of the Fullarton Conservation Area; they are part of the Fullarton Centennial Park, which opened on June 25, 1966.

The Fullarton Dam, an earth dam, was installed on the unnamed watercourse in the 1950s to create a recreational lake/reservoir. This reservoir has an area of approximately 2.5 hectares. The earth dam structure impounding is 110 m long, with a crest width of approximately 6 m and approximately 2.5 m of hydraulic head impounded at low flow conditions. Based on the project discussions, dam maintenance is the responsibility of the Municipality of West Perth.



Stantec

Legend

- Fullarton Dam
- Expressway / Highway
- Major Road
- Minor Road
- Regulated Watercourse (UTRCA)
- Waterbody
- Regulated Wetland (UTRCA)
- Wetland - Evaluated (Other)
- Wetland - Not evaluated per Ontario Wetland Evaluation System
- Regulated Area - Other (UTRCA)
- Wooded Area
- Fullarton Dam Property Boundary
- Geomorphological Characterization Study Area

0 0.5 1 km

1:25,000 (At original document size of 11x17)

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, 2023.



Project Location
County of Perth

160901056 REVA
Prepared by PRM on 2025-01-24
Technical Review by CK on 2025-01-24

Client/Project
UPPER THAMES RIVER CONSERVATION AUTHORITY
FULLARTON DAM REHABILITATION

Figure No.
1

Title
Location of Study Area

Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.

\\Cd004-sgfs01\work_group\01469\active\160901056\03_data\gis\mxds\Surface_Water\Interim_maps\160901056_Fig01_Location_Study_Area.mxd Revised: 2025-01-24 By: PMcnair

The unnamed watercourse runs through the Fullarton Conservation Area and provides potential coldwater habitat (UTRCA, 2017). The dam blocks fish passage to upstream reaches of the unnamed watercourse. Email correspondence between the UTRCA and Dietrich Engineering (March 7, 2023) confirmed that alternative solutions identified within the project site will not be subject to the *Drainage Act*.

1.2 BASIS

The baseline characterization is based on a site assessment conducted by Stantec on January 11, 2023, project discussion with the UTRCA and Municipality of West Peth, and multiple background data sources available for the site. Table 1 summarizes the background data available and reviewed as part of this baseline assessment report. In addition, Appendix A presents photographs from the site assessment, and Appendix B provides key background documentation.

Table 1: Baseline Characterization Data Sources

Data Type	Source
Field Data	• Channel Survey by Stantec (2023) • Fluvial Geomorphological Field Assessment by Stantec (2023) • Detailed Site Survey by Konecny et al. (2018) • Fluvial Geomorphological Field Assessment by Konecny et. al. (Fall 2018)
Site Photographs	• Stantec Field Visit (2023) • UTRCA (2010, 2011, 2015, 2019, 2022)
Models	• Hydraulic HEC-RAS Model (Konecny et al. 2018) • Hydrologic HEC-HMS as part of the 2007 Dam Safety Assessment Report (DSA; Acres International, 2007)
UTRCA Data	• 2022 Watershed Report Card – Fullarton (UTRCA, 2022) • Report Card Watersheds Map (UTRCA, 2022)
Historical Imagery	• Aerial photography provided by the University of Toronto (2023) and the National Air Photo Library
Reports	• Environmental Conditions Report (UTRCA 2017) • Neil Drain & Fullarton Reservoir Rehabilitation – Phase I Final Report (Konecny et al., 2018) • Neil Drain & Fullarton Reservoir Rehabilitation – Phase II Final Report (Konecny et al., 2018) • Dam Safety Report (Acres International, 2007) • Neil Drain Report (Howes, 1967)

2.0 HYDROLOGY

The drainage area for the unnamed watercourse at the confluence of the North Thames River is approximately 4 km^2. The North Thames River is 350 m downstream of the Fullarton Dam. The land use within the unnamed watercourse drainage area is predominantly agricultural and undifferentiated rural land use (85%), with approximately 5% marsh/swamp along the channel corridor, 5% treed area, and community infrastructure and open water over the remaining area (Ontario Flow Assessment Tool, n.d.).

The Fullarton Corridor 2022 Watershed Report Card states that 50-70% of the local streamflow is baseflow from groundwater discharge. This groundwater discharge that characterizes the watershed supports coldwater aquatic habitat. The UTRCA has identified unnamed watercourse as providing potential coldwater habitat.

Environment Canada's Stratford WWTP weather station (ID 6148105) indicates that the area receives an average annual precipitation of 1070 mm based on data from 1981 to 2010.

2.1 DESIGN FLOW

A HEC-HMS hydrology model was developed as part of the dam safety analysis conducted for the Fullarton Dam (Acres, 2007). This model calculates design flows for the unnamed watercourse into the reservoir. These design flows will inform the development of alternative solutions, including, for example, conceptual channel and floodplain dimensions. Model inputs used local climate data (Woodstock, Stratford, and London Airport) and physical parameters for the drainage area, including stream length and average watershed slope using topographic and soil mapping obtained from the Department of Energy, Mines and Resources Canada and Ontario Ministry of Natural Resources and Forestry (MNRF).

Table 2 summarizes average design flows from the dam safety analysis for both spring and summer flow conditions. The flows consider an average of the flows ranging from 1-day to 8-day rain-on-snowmelt events in the spring, and 6-hour to 5-day rainfall events in the summer. The dam safety analysis considered additional snowmelt and rain scenarios and corresponding flow responses.

Table 2: HEC-HMS Model Average Flows (Acres International, 2007)

Return Period (years)	Spring (m^3/s)	Summer (m^3/s)
2	3.6	3.2
5	5.1	6.8
10	6.1	9.4
25	7.3	13.0
50	8.3	15.8
100	9.2	18.6
250	10	22.5
Hurricane Hazel	NA	32.5

Additionally, the dam safety analysis (Acres, 2007) used a reservoir storage routing technique to model the attenuation of watercourse flows through the reservoir. The modelling indicates that the maximum reduction between the reservoir inflow and outflow is 0.1 m^3/s for all modelled flow events up to the 250-year event. Based on this modelling, the dam provides negligible flow attenuation during high flows. Therefore, peak flows during high-flow events downstream of the reservoir would not be expected to change appreciably because of removal of the dam.

2.2 BANKFULL FLOW

The bankfull discharge of the unnamed watercourse at the project is between 1-2 m^3/s based on field observations by Stantec. The bankfull discharge typically occurs at a return period of approximately 1.5 years. Therefore, the bankfull discharge estimated based on site observations helps corroborate the 2-year flows (Table 2) developed as part of the background study.

2.3 BASEFLOW

Modelling as part of the dam safety review (Acres 2007) indicates a baseflow in the watercourse of 0.12 m^3/s and 0.01 m^3/s for the spring and fall, respectively. These baseflow calculations were calibrated against a local watershed. Considering the small drainage area of the watercourse, these results indicate suitable baseflows for open channel habitat during low-flow periods (i.e., continuous flow in the watercourse).

Removal of the dam and reservoir has the potential to impact groundwater recharge and baseflows in unnamed watercourse. The baseline hydrogeological assessment prepared concurrently with this geomorphology assessment will inform potential impacts and mitigation requirements related to low-flow conditions in unnamed watercourse.

3.0 HYDRAULICS

Background data of the project site includes hydraulic models on the unnamed watercourse and Fullarton Dam (Konecny et al. 2018; Acres 2007). This modelling, combined with detailed site survey data (Konecny et al. 2018), will inform and provide a basis for developing and evaluating conceptual alternative solutions for restoring the unnamed watercourse as part of options related to a full or partial removal of the Fullarton Dam. Key hydraulic conditions that will inform the development and evaluation of alternatives are discussed in the following sub-sections.

3.1 HYDRAULICS AT THE DAM

The typical hydraulic head across Fullerton Dam is approximately 2.5 m (i.e., the elevation difference between the reservoir and the unnamed watercourse downstream). Flow is conveyed through a rectangular concrete drop-inlet structure in the reservoir and discharges through an 800 mm diameter concrete outlet pipe into unnamed watercourse. An emergency spillway is positioned on the right side of the dam, discharging to a vegetated channel leading downstream to the unnamed watercourse.

Hydraulic modelling indicates that the dam overtops as frequently as a 3-year return period flow event (Konecny et al. 2018; Acres 2007). During a 250-year event, modelling (Konecny et al. 2018) indicates that water depths overtopping the dam crest are approximately 0.4 m. This control depth at the crest causes flooding to sections of the conservation area trails adjacent to the reservoir and contributes to flooding of Perth Road 163a, located immediately upstream of the reservoir. Elsewhere in the project area, the 250-year flood is contained in the channel valley.

3.2 HYDRAULIC EFFECTS OF THE THAMES RIVER

The North Thames River is approximately 350 m downstream of the Fullarton Dam. As part of the background study by Konecny et al. (2018), water levels in the North Thames River were identified to hydraulically control the watercourse up to the dam as frequently as a 2-year North Thames River flow event. Additionally, the hydraulic modelling estimated that a 5 to 10-year North Thames flow inundates the watercourse floodplain between the confluence and dam. A 250-year event inundation map completed by Konecny et al. (2018) is provided in Appendix B. These hydraulic conditions will be considered as part of unnamed watercourse alternatives.

3.3 RESERVOIR BACKWATER

Stantec's site assessment and channel survey indicate that the low-flow water surface elevation in the reservoir backwaters through the existing 1,200 mm corrugated steel pipe culvert beneath Perth Road 168a. Survey data shows that the bed elevation of the existing unnamed watercourse matches the reservoir's low-flow surface water level approximately 300 m upstream of the culvert crossing. It is anticipated that the culvert crossing will become the hydraulic control for channel flows upstream of Perth Road 163a after a full or partial removal of the dam. The background site topography, including Perth

Road 163a culvert crossing survey data, will inform consideration for impacts related to removing the backwater condition as part of alternative solutions.

4.0 GEOMORPHOLOGY

The site assessment by Stantec observed that the unnamed watercourse is stable in the study area. Aggradation was observed upstream of the reservoir, consistent with background reporting and the anticipated impacts of a dam (i.e., blocking downstream sediment transport). The unnamed watercourse is unconfined throughout the study area with a wide, well-connected floodplain. Riparian vegetation is well-established, which supports channel stability and coldwater aquatic habitat (i.e., shade). Channel banks were observed to consist of loam and silt, transitioning to higher sand/clay content closer to the confluence of the North Thames River. General observations indicate the presence of gravel and cobble substrate in areas where silt has not inundated perceived historical sediment

The unnamed watercourse historically descended from tablelands, down the North Thames River valley wall in a steeper reach (through the existing reservoir area), and onto the North Thames River floodplain. Under current conditions, the elevation drop between tablelands and the North Thames River is made through the Fullarton Dam, and terminates approximately 120 m downstream of the dam. Background channel profile data indicates a historical average channel slope of approximately 0.3% through the study area prior to dam installation. Average channel slope appears to have remained similar to historical conditions, with the exception of more localized changes immediately upstream of Perth Road 163a where the slope has decreased as a result of sedimentation.

4.1 HISTORICAL WATERCOURSE

Aerial photography of the site from 1954, before the construction of the Fullarton Dam, informs the geomorphological interpretation of the impacts of the dam on unnamed watercourse. Aerial photography after dam installation in 1959 and 1963 documents change in the unnamed watercourse. Historically, the unnamed watercourse is observed within a channel corridor with limited vegetation and relatively uniform width for its approximately 1,100 m length through the study area. Sinuosity upstream of Perth Road 163a was appreciably higher than the downstream reaches (pre- and post-dam) and existing site conditions at this upstream location. The reach of the unnamed watercourse now inundated by the reservoir was through notably barren land in 1954. The 1959 imagery showed that the unnamed watercourse was still a channel through the existing marsh area, with some sparse vegetation on the floodplains. By 1963, aerial photographs suggest that the unnamed watercourse upstream of the original pond began to transition into marsh.

4.2 SEDIMENTATION

The background study by Konecny et al. estimates sediment accumulation at the reservoir as a result of the dam. Additionally, background data provided by the UTRCA (2006 and 2016) assesses sediment depths in the reservoir. The background data estimated a 90 to 160 m3/year sediment loading rate. Additionally, UTRCA's Fullarton Dam and Conservation Area existing condition report (2017) estimates a natural channel bottom compared to the top of the sediment profile, corresponding to average sediment



depths of 0.3-0.4 m in the reservoir. The UTRCA's sediment and natural channel profile is presented in Figure 3 below.

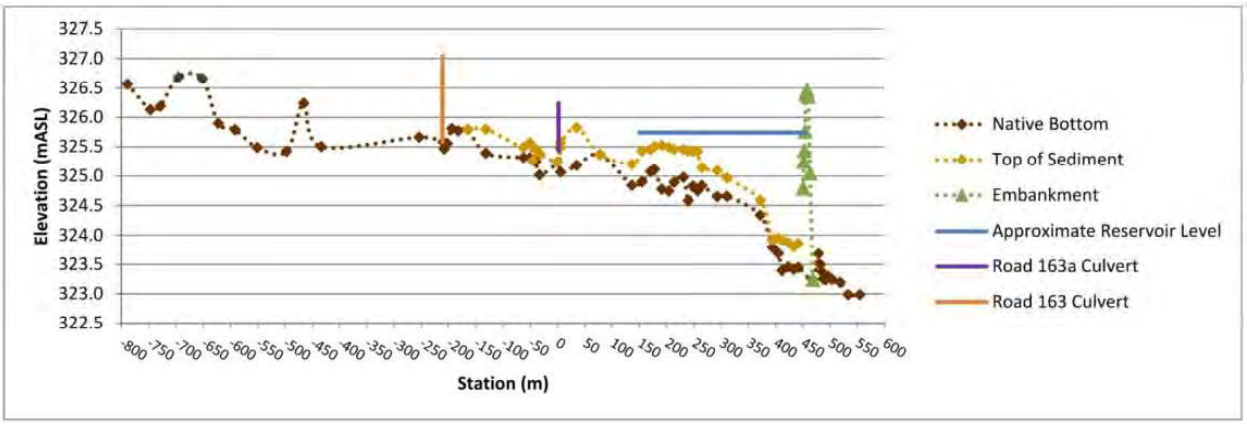


Figure 2: Watercourse Channel and Sediment Profile (UTRCA, 2017)

Figure 2 by UTRCA indicates that sedimentation extends upstream of the dam's reservoir through the Perth Road 163a culvert to nearly Perth Road 163, located approximately 670 m from the dam and corresponding to the identified extent of reservoir backwater discussed in section 3.3. Stantec observed the sedimentation between Perth Road 163 and Perth Road 163a and noted that sediment depths increased closer to Perth Road 163a, contributing to a reduction in channel slope upstream of the reservoir. Sedimentation from the effects of reservoir backwater has caused a morphological transition of the unnamed watercourse upstream of the reservoir, with sediment filling pools, inundating riffles and resulting in a plane-bed flow.

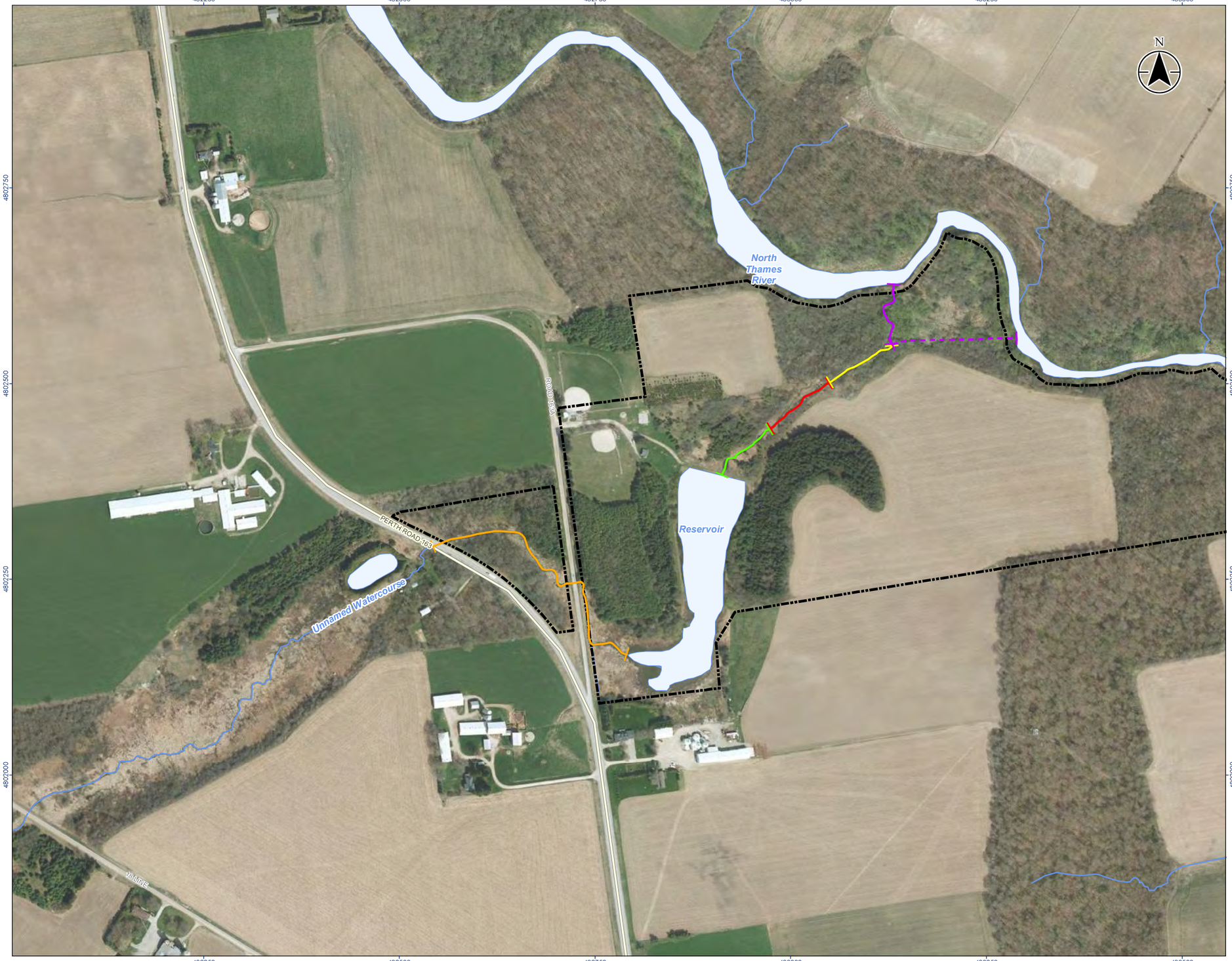
The background profile and sedimentation data will support the development of alternative conceptual solutions, including evaluating potential invert elevations of a restored channel and high-level requirements for earthworks and excavation during construction.

4.3 SEDIMENT CONTINUITY

The Fullarton Dam and reservoir disrupt sediment transport continuity in the unnamed watercourse. The sediment supply downstream of the dam is impacted due to particles settling out in the reservoir. Downstream of the dam, the point bar substrate was assessed to approximate the channel bed load particle size (i.e., fine gravel) by Konecny et al. (2018). The *Fullarton Existing Conditions Report* (UTRCA, 2017) notes that gravels and pebbles have been observed in the channel bed upstream of the area affected by backwater from the reservoir, confirming that there is an upstream bed load sediment supply consistent with the bed load particle size for unnamed watercourse below the dam identified by Konecny et al. (2018). Disrupting the supply of fine gravels and pebbles to the unnamed watercourse below the dam has potential impacts on aquatic habitats (e.g., spawning beds). The alternative solutions developed in the EA's next phases will evaluate the opportunity to restore sediment transport in unnamed watercourse and the potential benefits to aquatic habitats.

4.4 REACH DESCRIPTIONS

Stantec identified five reaches of unnamed watercourse (not including the reservoir) at the project site (Figure 3). The reaches are distinguished by differing morphology, channel dimensions, or channel slope. One of the reaches is upstream of the reservoir, and four are downstream (between the dam and the North Thames River). Table 3 and the site photographs in Appendix A summarize geomorphological characteristics.



Stantec

Legend

- Major Road
- Minor Road
- Regulated Watercourse (UTRCA)
- Waterbody
- Fullarton Dam Property Boundary

Reach

- Reach 1
- Reach 2
- Reach 3
- Reach 4
- Reach 5
- 1954 Channel Alignment

0 100 200 metres

1:5,000 (At original document size of 11x17)

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, 2023.
3. Orthoimagery © First Base Solutions, 2023. Imagery Date, 2010.



Project Location
County of Perth

160901056 REVA
Prepared by PRM on 2025-01-24
Technical Review by CK on 2025-01-24

Client/Project
UPPER THAMES RIVER CONSERVATION AUTHORITY
FULLARTON DAM REHABILITATION

Figure No.
3

Title
Stream Reaches

Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.

C:\Projects\01\Workgroup\01\609\active\160901056\03_data\gis_cad\gis\mxds\Surface_Water\Internal_maps\160901056_Fig03_Stream_Reach.mxd Revised: 2025-01-24 By: PMcIsaac

Table 3: Existing Watercourse Reach Characteristics

Reach	Channel Length (m)	Channel Slope (%)	Channel Substrate	Sinuosity	Bankfull Channel Width (m)	Morphology	Vegetation	Comments
1	120	0.25	Silt dominated with sparse gravel and cobble	Low	3-4	Plane-Bed following transition from riffle-pool	Shrub saplings upstream, herbaceous vegetation downstream with mixed deciduous floodplain	• Saturated floodplain soils in the downstream half of the reach suggest a high water table
2	120	0.6	Gravel and cobble dominated, with some boulders in the riffles and silty sand in the pools	Moderate	3-4	Riffle-Pool	Shrub-sapling and herbaceous vegetation with mixed coniferous and deciduous trees on the floodplain	• Steeper because of its location on the valley wall between tablelands and the North Thames River floodplain
3	70	0.34	Silt	Low	6-7	Plane-Bed	Shrub-sapling and herbaceous vegetation with sparse coniferous and deciduous trees	• Recently over-widened (no over-widening in 1954 historical imagery) • Potentially affected by backwater from historical beaver damming or floodplain contraction experienced at high flow stages
4	90	0.34	Gravel and cobble dominated with some boulders in riffles and siltation in pools	Moderate	3-4	Riffle-Pool	Shrub-sapling and herbaceous vegetation with deciduous trees	• Appears as a reference reach of the historical riffle-pool sequence on the North Thames River floodplain • Observed lack of bed load particles • Silt in pools is likely the result of high-flow backwater from downstream beaver dam
5	60	Steep bed, hydraulic slope dependent on North Thames WSE	Silt over cobble and gravel	Moderate	6-8	Plane-Bed	Shrub-sapling and herbaceous vegetation with deciduous trees	• Historical planform realignment decreased reach length and increased channel slope • Hydraulically controlled by a beaver dam • Historically hydraulic control from the North Thames River • Silt accumulation from beaver damming

5.0 CONCLUSION

Stantec conducted a geomorphologic baseline of the unnamed watercourse at the Fullarton Conservation Area in the Municipality of West Perth, Ontario. This baseline assessment was conducted as part of the initial phases of an EA to support long-term planning for Fullarton Dam. As part of the next steps, the EA is expected to develop and evaluate alternative options related to maintaining the dam or removing all or a portion of the dam combined with restoring the unnamed watercourse at the project site.

The baseline assessment is based on a site assessment conducted by Stantec and a review of background data and reporting available for the project site. Overall, the site assessment characterized the unnamed watercourse as stable and well-vegetated with a wide and well-connected floodplain. The unnamed watercourse is aggrading in some reaches, and the effects of the online dam installation have impacted watercourse morphology and sediment transport.

The Background data reviewed as part of the baseline assessment included hydrologic and hydraulic modelling results, background studies, and detailed site topographic data. These background data, combined with the site assessment, will provide a basis for developing and evaluating alternative solutions.

6.0 REFERENCES

Acres International. (August, 2007). *Dam safety assessment report for Fullarton Dam*.

Howe, J. (January 9, 1967). *Neil Drain Report.*

Konecny et al. (Hydrophilics). (November 26, 2018). *Neil drain and Fullarton reservoir rehabilitation – phase I final report.*

Konecny et. al. (Hydrophilics). (April 1, 2019). *Neil drain and Fullarton reservoir rehabilitation – Phase II final report* – Report prepared to fulfill the degree requirements of a Bachelor of Applied Science in Environmental Engineering at the University of Waterloo.

Upper Thames River Conservation Authority. (March, 2017). *Fullarton dam and conservation area – existing environmental conditions.* – Report prepared to fulfill the degree requirements of a Bachelor of Applied Science in Environmental Engineering at the University of Waterloo.

Upper Thames River Conservation Authority. (2022). *Maps of watershed information.* Upper Thames River Conservation Authority. https://thamesriver.on.ca/watershed-health/watershed-report-cards/watershed-maps/.

Upper Thames River Conservation Authority. (2022). *2022 Upper Thames River watershed report cards.* Upper Thames River Conservation Authority. https://thamesriver.on.ca/watershed-health/watershed-report-cards/.

APPENDIX A:
Photographic Inventory



Photo 1: Fullarton Dam and Reservoir.



Photo 2: Reservoir Drop Inlet Structure.



Photo 3: Reservoir outlet structure.



Photo 4: Looking downstream from the Fullarton Dam outlet at the unnamed watercourse.



Photo 5: Reach 1 plane-bed channel with silt between Perth Road 163 and Perth Road 163a.



Photo 6: Reach 1 looking upstream from Perth Road 163a culvert.



Photo 7: Reach 1 looking upstream between Perth Road 163a and the marsh.



Photo 8: Looking downstream at the termination of Reach 1 at the marsh.



Photo 9: Reach 2 looking downstream.



Photo 10: Reach 2 looking downstream at riffle-pool sequencing.



Photo 11: Reach 2 fine gravels on glide between pool and downstream riffle.



Photo 12: Reach 3 lower gradient over-widened channel.



Photo 13: Reach 3 silt accumulation and over-widened channel.



Photo 14: Reach 4 looking downstream with cobbles on channel bed.



Photo 15: Reach 4 looking upstream at riffle-pool sequencing.



Photo 16: Reach 5 looking upstream at silt in a backwatered reach.



Photo 17: Reach 5 looking downstream at downstream beaver dam.



Photo 18: Downstream of beaver dam where the unnamed watercourse outlets to the North Thames River.



Photo 19: Confluence of the unnamed watercourse and the North Thames River.



Photo 20: Beaver dam obstructing pre-1954 watercourse Alignment.



Photo 21: Perth Road 163a culvert.



Photo 22: Reach 2 riffle cobbles.

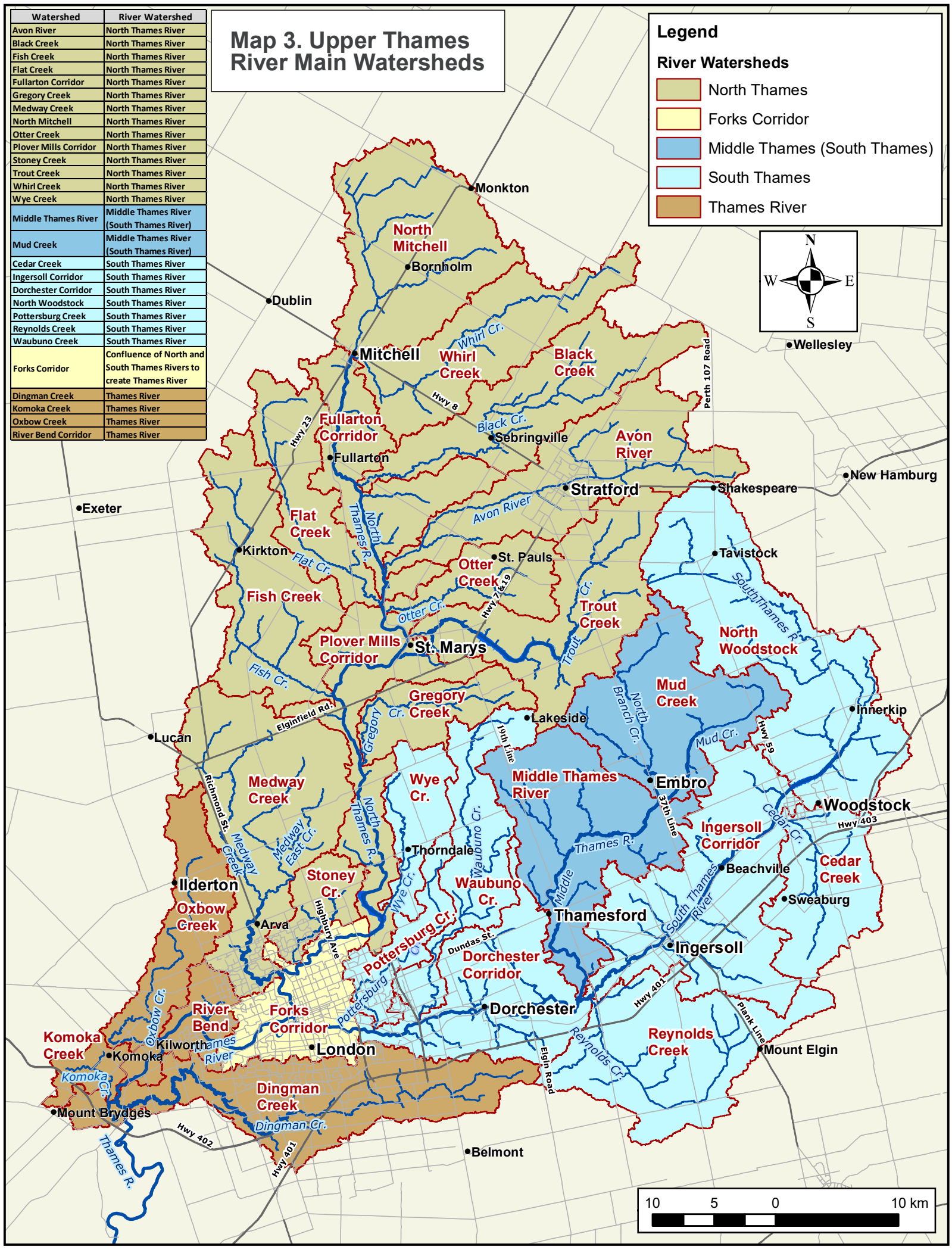
APPENDIX B:
Key Background Documentation

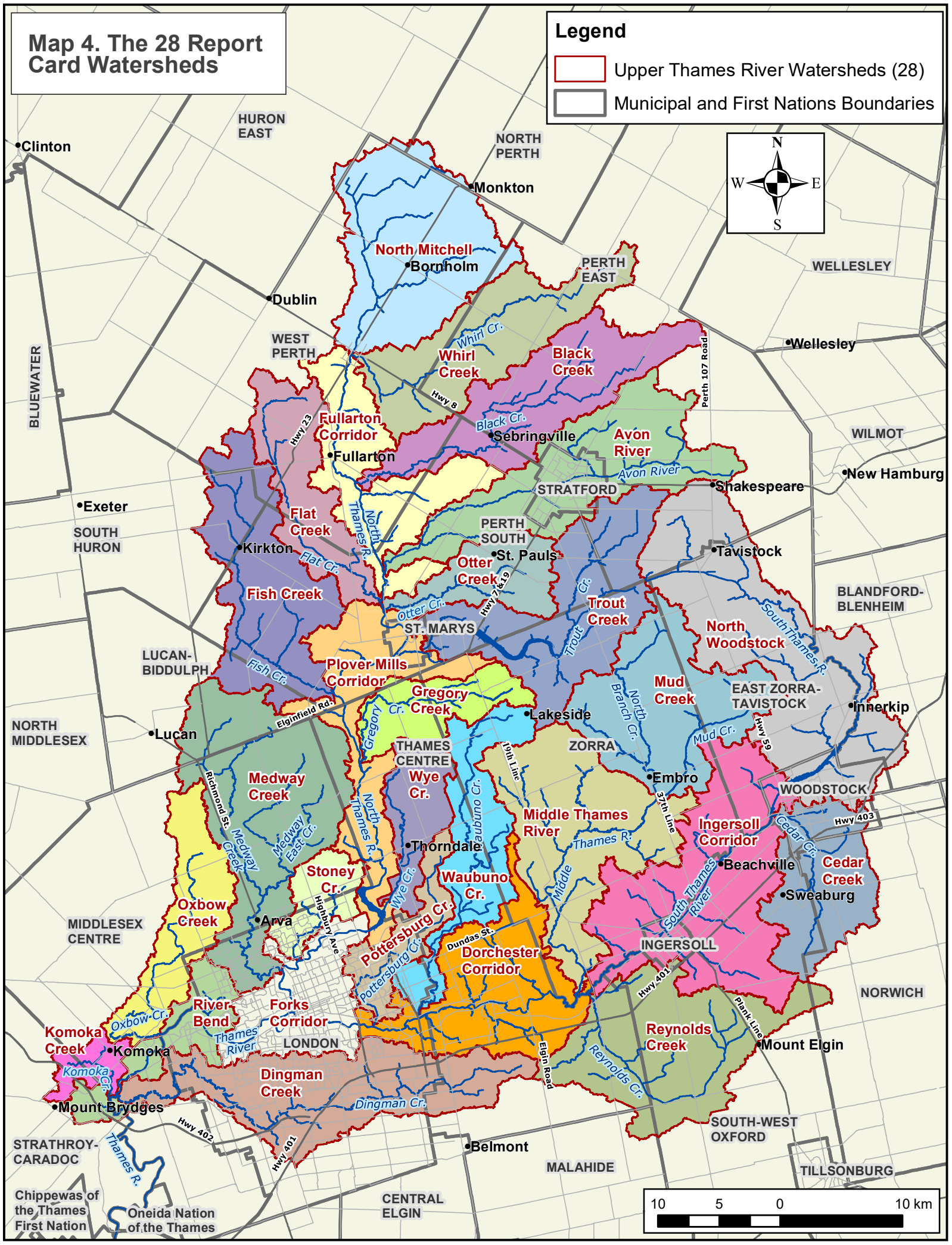


Figure 3. Floodplain Map Showing Regulatory 250 Year Flood Lines

Watershed	River Watershed
Avon River	North Thames River
Black Creek	North Thames River
Fish Creek	North Thames River
Flat Creek	North Thames River
Fullarton Corridor	North Thames River
Gregory Creek	North Thames River
Medway Creek	North Thames River
North Mitchell	North Thames River
Otter Creek	North Thames River
Plover Mills Corridor	North Thames River
Stoney Creek	North Thames River
Trout Creek	North Thames River
Whirl Creek	North Thames River
Wye Creek	North Thames River
Middle Thames River	Middle Thames River (South Thames River)
Mud Creek	Middle Thames River (South Thames River)
Cedar Creek	South Thames River
Ingersoll Corridor	South Thames River
Dorchester Corridor	South Thames River
North Woodstock	South Thames River
Pottersburg Creek	South Thames River
Reynolds Creek	South Thames River
Waubuno Creek	South Thames River
Forks Corridor	Confluence of North and South Thames Rivers to create Thames River
Dingman Creek	Thames River
Komoka Creek	Thames River
Oxbow Creek	Thames River
River Bend Corridor	Thames River

Map 3. Upper Thames River Main Watersheds



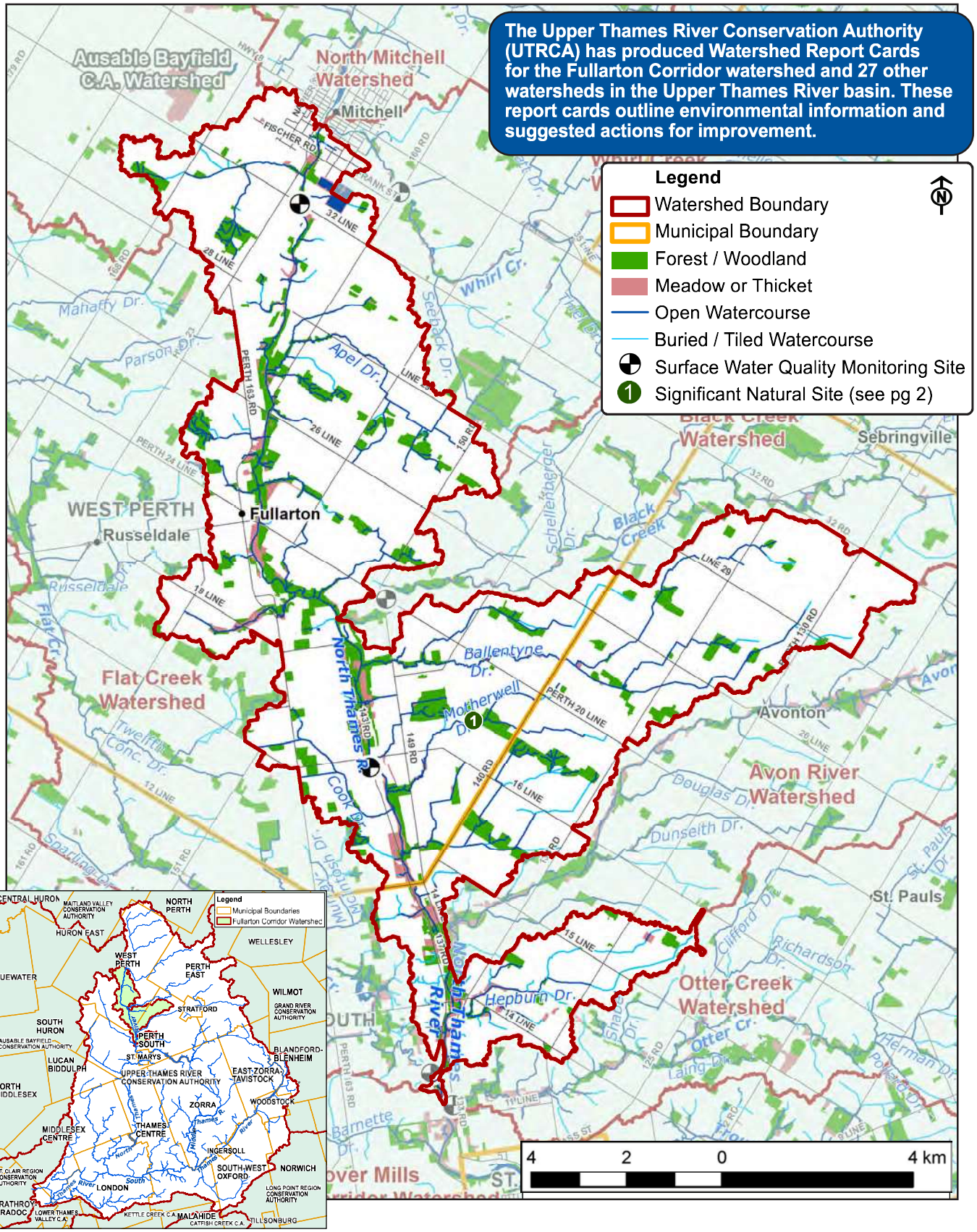

Map 4. The 28 Report Card Watersheds
Legend
Upper Thames River Watersheds (28)
Municipal and First Nations Boundaries
N
W
E
S
HURON EAST
Clinton
NORTH PERTH
Monkton
North Mitchell
Bornholm
PERTH EAST
WELLESLEY
Dublin
WEST PERTH
Whirl Cr.
Whirl Creek
Black Creek
Wellesley
BLUEWATER
Hwy 8
Perth 107 Road
Black Cr.
Fullarton Corridor
Hwy 23
Sebringville
Avon River
WILMOT
Fullarton
Avon River
New Hamburg
STRATFORD
Shakespeare
Exeter
Flat Creek
North Thames R.
PERTH SOUTH
SOUTH HURON
Kirkton
Flat Cr.
St. Pauls
Otter Creek
Tavistock
Hwy 7&19
Fish Creek
Otter Cr.
Trout Creek
BLANDFORD-BLENHEIM
ST. MARYS
North Woodstock
South Thames R.
LUCAN-BIDDULPH
Fish Cr.
Plover Mills Corridor
Gregory Creek
Mud Creek
EAST ZORRA-TAVISTOCK
Innerkip
Elginfield Rd.
Gregory Cr.
Lakeside
North Branch Cr.
Hwy 59
NORTH MIDDLESEX
Lucan
THAMES CENTRE
ZORRA
Mud Cr.
19th Line
Wye Cr.
Embro
WOODSTOCK
Richmond St.
Medway Creek
Medway Creek
Medway East Cr.
North Thames R.
Waubuno Cr.
37th Line
Middle Thames River
Thames R.
Ingersoll Corridor
Hwy 403
Cedar Cr.
Thorndale
Beachville
Cedar Creek
Stoney Cr.
Wye Cr.
Middle
Sweaburg
Oxbow Creek
Waubuno Cr.
South Thames River
MIDDLESEX CENTRE
Arva
Highbury Ave
Pottersburg Cr.
Dundas St.
Dorchester Corridor
INGERSOLL
Hwy 401
NORWICH
Oxbow Cr.
River Bend
Forks Corridor
Komoka Creek
Komoka
Thames River
LONDON
Plank Line
Reynolds Creek
Mount Elgin
Komoka Cr.
Elgin Road
Dingman Creek
Dingman Cr.
Mount Brydges
Hwy 402
SOUTH-WEST OXFORD
STRATHROY-CARADOC
Thames R.
Hwy 401
Belmont
MALAHIDE
TILLSONBURG
Chippewas of the Thames First Nation
Oneida Nation of the Thames
CENTRAL ELGIN
10 5 0 10 km

Surface Water Quality
C - Improved

Forest Conditions
D - Slight Improvement

2022 Watershed Report Card

Fullarton



2022 Watershed Report Card

Watershed Features

Feature	Description
Municipalities	West Perth (64%, 76 km^2), Perth South (36%, 42 km^2). Total area: 11,777 ha (118 km^2), 3% of the Upper Thames River watershed. 815 km^2 lies upstream.
Significant Natural Sites	Wetlands: (1) Motherwell Blue Heron Swamp. (See numbered site on map). Earth Science Areas of Natural and Scientific Interest: Fullarton Moraine, North Thames Valley.
Land Cover	82% agriculture, 12% natural vegetation, 1% open space, 4% urban, < 1% aggregates, 1% water. 2% of the watershed is in impervious cover (e.g., hard surfaces such as roofs and roads).
Population	1,723 in 2021; a 16% increase since 2016, partly due to watershed boundary corrections.
Soil Type	50% silty loam, 39% clay loam, 8% bottomland, 2% loam, 1% not mapped/urban
Physiography	71% undrumlinized till plain, 17% spillway, 12% till moraine
Soil Erosion/ Delivery	13% highly erodible (lands that could potentially contribute > 7 tonnes/ha/yr of soil to a watercourse). The average for the Upper Thames River watershed is 9%.
Tiling and Drainage	72% of the watershed has agricultural field tile (21% random + 51% systematic), 4% urban drainage, 24% no tiling. There has been very little change over the last five years.
Watercourse Characteristics	Total length: 189 km of watercourses Watercourse type: 40% natural, 42% channelized, 18% buried/closed Temperature: 21% cool/coldwater, 79% warmwater/unconfirmed Main channel slope: 0.26% slope (low/flat) for North Thames, 0.35% slope (moderate) for McEwan and 20th Con. Dr.; range is 0.09-1.26% in Upper Thames River watersheds
Dams and Barriers	9 barriers to fish passage have been recorded including the Fullarton Conservation Area Dam and other smaller perched culverts, beaver dams, etc.
Spills	2001-2005: 1; 2006-2010: 3; 2011-2015: 1; 2016-2020: 1 Recent reported spill involved an industrial chemical.
Sewage Treatment	The Mitchell Wastewater Treatment Plant services the Town of Mitchell and discharges treated effluent to the North Thames River just downstream of Mitchell. All other homes and businesses in the watershed are serviced by private septic systems.
% Vegetation Cover and Types	Vegetation cover: 1,425 ha or 12.1% of the Fullarton Corridor watershed Composition: 69% deciduous forest, 3% mixed forest, 9% plantation/coniferous forest, 15% meadow, 4% thicket
Wetland Cover	3.3% (388 ha) of the watershed is in wetland cover. Environment Canada (2013) recommends at least 6% wetland cover. No wetland cover was lost between 2010 and 2015.
Woodlot or Patch Size	See table below
Fish and Mussels	Fish Species: 48 species including 3 with only historic records Gamefish: Smallmouth and Largemouth Bass, and Northern Pike Mussel Species: 13 species
Species-at-Risk	Birds: 10 species including Barn Swallow and Wood Thrush Fish: 3 species including Black Redhorse and Silver Shiner Insect: Monarch Mussels: Rainbow and Wavy-rayed Lampmussel Reptiles: Snapping Turtle and Midland Painted Turtle Plants: Kentucky Coffee-tree

Size Category	Number of Woodlots	Average Size (ha)	Total Woodland Area (ha)	% of Woodland Area	Largest Woodlot (ha)
Small (< 10 ha)	121	3	351	30	157
Medium (10-30 ha)	16	19	299	26	
Large (> 30 ha)	9	57	510	44	

For more information on watershed features and how they compare to the other 27 subwatersheds, see the tables in the full report: 2022 Upper Thames River Watershed Report Cards at www.thamesriver.on.ca.



2022 Watershed Report Card

Surface Water Quality

Fullarton Corridor has improved since the last report card and scores an overall grade of C. The surface water quality of the watershed is monitored at the downstream end on the North Thames River at Perth Line 12 (see map). The UTRCA has a water quality target of a B grade for Fullarton Corridor by 2037.

Phosphorus levels have improved since 2015 and are much lower than the Upper Thames River average. Bacteria (*E.coli*) levels are low and better than the Upper Thames River average. Recent chloride levels (mainly from road salt) are low, and below the aquatic life guideline. Recent nitrate levels are mostly above the aquatic guideline. General improvements in water quality are seen at this site compared to an upstream monitoring site at Line 32, south of Mitchell. A healthy, natural river channel running through this area is helping to improve water quality.

Steam health or water quality, as indicated by benthic score from the North Thames site near Science Hill, continued to show slight improvement.

Indicators	Fullarton Corridor					Upper Thames 2016-2020	Provincial Guideline	Indicator Description
	1996-2000	2001-2005	2006-2010	2011-2015	2016-2020			
Phosphorus (mg/l) *	No data	No data	0.060 C	0.135 D	**0.053 C Improved**	0.110 D	0.030 B Aquatic Life	Phosphorus is found in products such as fertilizer, detergents, and waste, and contributes to excess algae and low oxygen in streams and lakes.
Bacteria (CFU *E. coli*/ 100 ml) **	No data	No data	84 B	157 C	**128 C Steady**	211 C	200 C Recreation	*E. coli* is a fecal coliform bacteria found in human and animal (livestock/ wildlife/pets) waste. *E. coli* is a strong indicator of the potential to have other disease-causing organisms in the water.
Benthic Score (FBI)	5.79 D	5.82 D	5.62 C	5.38 C	**5.34 C Steady**	5.99 D	< 5.00 B Target Only	Benthic organisms (aquatic invertebrates that live in stream sediments) are good indicators of water quality and stream health. The Family Biotic Index (FBI) scores each taxa according to its pollution tolerance.

*75th percentile, UTRCA data. **Geometric mean, Health Unit data. Province-wide grading system used (see page 8).
In 2019, the Provincial Recreational Guideline for *E. coli* changed from 100 Colony Forming Units *E.coli* / 100 ml to 200 CFU *E.coli* / 100 ml.

Found in the Fullarton Corridor watershed, the Mottled Sculpin is a common inhabitant of spring-fed streams. It has a large mouth and can eat prey items almost as large as itself. It has been driven out of many of its habitats by the invasive Round Goby.





Extreme flooding in February 2018 in St. Marys, Ontario.

Climate Change

Climate change continues to be a critical issue. Locally, storms and floods are becoming more intense and frequent, which affects water quality by increasing runoff and erosion. Flooding and increased temperatures also stress native plant and animal species. Many local municipalities and industries are enacting Climate Action Plans that focus on reducing greenhouse gases and developing adaptation strategies, including nature-based solutions. Increasing natural cover (trees, wetlands, and forests) and green cover (agricultural cover crops) will absorb carbon and improve resiliency to climate change impacts.

Grade: D
Slight Improvement

2022 Watershed Report Card

Forest Conditions

Forest conditions in the Fullarton Corridor watershed have improved slightly since the last watershed report cards in 2017, and score an overall grade of D. It should be noted that some of the change is due to improved mapping methods and boundary corrections.

The percent forest cover (9.8%) has increased slightly from 9.4% five years ago primarily due to improved mapping and succession (see table). The Environment Canada (EC) guideline for southern Ontario is a minimum of 30% forest cover. Meadows and thickets add another 2.3% cover for a total of 12.1% natural vegetation cover.

The percent forest interior (0.7%) is very low, indicating most woodlots are too small and narrow to support area sensitive species such as Scarlet Tanager and Ovenbird. The EC guideline is 10% forest interior.

The percent riparian zone forested (37.4%) has increased from 28.3% in 2016, primarily due to mapping improvements. Levels are still below the EC guideline of 50%. Additional riparian areas are in permanent meadows and thickets (12.4%) for a total of 49.8% riparian zone vegetated. The North Thames River is well-vegetated in this area, unlike the tributary watercourses and drains.

Indicators	Fullarton Corridor 2022*	Upper Thames Average 2022*	EC Guideline **	Indicator Description
% Forest Cover	**9.8 D**	11.3 D	30.0 B	Percent forest cover is the percentage of the watershed that is forested or wooded. Forest cover includes upland and wetland forest types.
% Forest Interior	**0.7 F**	1.5 F	10.0 B	Percent forest interior is the percentage of the watershed that is forest interior. Forest interior is the protected core area 100 m inside a woodlot that some bird species require to nest successfully. The outer 100 m is considered “edge” habitat and prone to high predation, wind damage and alien species invasion.
% Riparian Zone Forested	**37.4 C**	35.7 C	50.0 B	Percent riparian zone forested is a measure of the amount of forest cover within a 30 m riparian/buffer zone adjacent to all open watercourses. Riparian habitats support high numbers of wildlife species and provide an array of ecological functions including water quality protection.

* 2022 report card data is based on 2015 colour air photography. ** EC Guideline - Environment Canada guideline based on “How much habitat is enough?” 2013. Grades based on Conservation Ontario (2022).

Losses and Gains

Forest Area Removed

Years	ha
2000-2006	3
2006-2010	<1
2010-2015	3

Approximately 3 ha of forest were cleared and converted to other uses (e.g., urban, agriculture, aggregates) between the 2010 and 2015 air photography. An additional 3-4 ha of forest were cleared in the previous 10 years.

Forest Area Gained

Years	ha
2010-2015	62

New data shows that approximately 62 ha of forest were gained between 2010 and 2015 due to forest succession and improved mapping. Several 20- to 30-year-old tree planting sites and some thickets matured to the point where they could be classified as mature woodland in 2015. This data demonstrates the value of continued tree planting and conservation efforts.



Red-bellied Woodpeckers nest locally in tree cavities often at the edge of woodlands. Photo: Sharon Nethercott

2022 Watershed Report Card

Groundwater

Municipal Water Supply

The Town of Mitchell has 4 municipal wells which draw groundwater from a deep bedrock aquifer, and supply water to 4870 people. Municipal well water is tested and treated.

Private Wells

Approximately 270 private wells are on record in this watershed, the majority drawing from bedrock aquifers. Properly constructed deep wells have a lower risk of contamination from the surface when compared to shallow wells. The highest risk to any well is from contaminants and activities closest to the well. The safety, testing, and treatment of a private well are the responsibility of the well owner.

Groundwater Monitoring

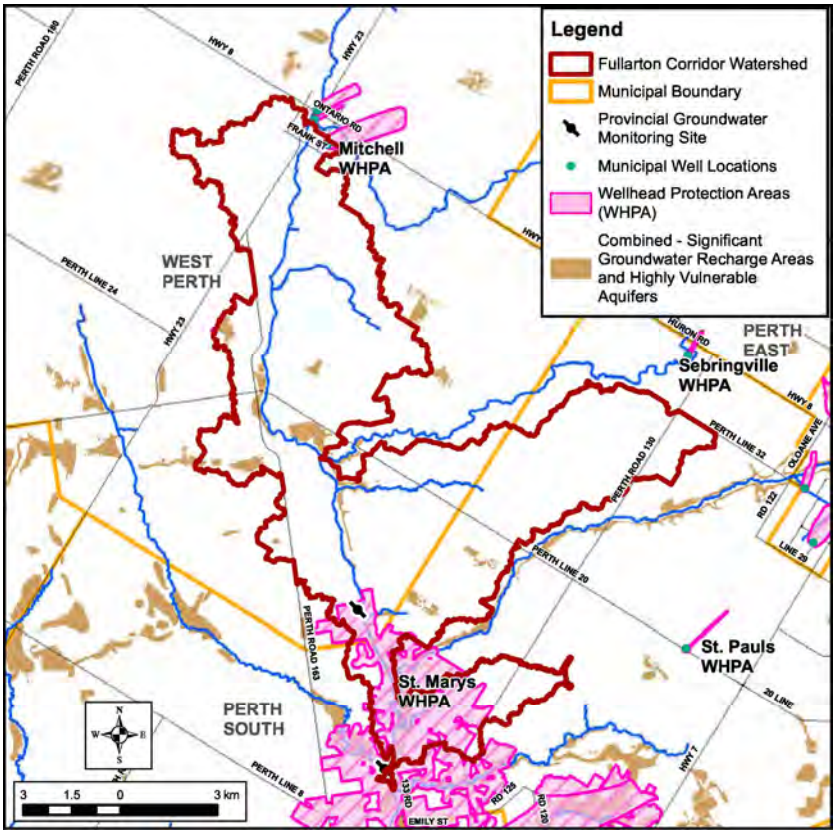
The Provincial Groundwater Monitoring Network has shown groundwater levels generally decline from May to October and increase (recharge) from late fall to early spring, with the largest increase in March (up to 1.5 m change). Recent data shows the recharge period is shifting later to November to May, with a trend of warmer and drier weather from October to November and cooler temperatures in May. The rate of decline in groundwater levels is directly related to maximum air temperatures. Summer rainfall does not typically affect groundwater levels as evaporation and plant uptake greatly exceeds rainfall, and most rainfall is utilized by plants during summer.

Did you know?

- About 50-70% of total local streamflow is baseflow from groundwater discharging into streams.
- Vegetation relies more on groundwater as it is more stable than rainfall. Most remaining wetlands are groundwater dependent.

Drinking Water Source Protection

Local source protection plans have been completed to protect sources of municipal drinking water. The Thames-Sydenham and Region Source Protection Plan (2015) has policies to address risks to municipal water systems. Visit www.sourcewaterprotection.on.ca for information on groundwater resources, Source Protection Plan policies, and a Water Supply System Summary for Mitchell.



On The Map

Significant Groundwater Recharge Areas: Areas where a relatively large volume of water makes its way from the ground's surface down to the aquifer.

Highly Vulnerable Aquifers: Areas where there is a relatively fast pathway from the ground's surface down to an aquifer, generally making the aquifer more vulnerable to contamination.

Wellhead Protection Areas: Areas surrounding the wellhead, through which contaminants are reasonably likely to move toward or reach the well

Protecting these areas is very important for the protection of local groundwater as a source of drinking water.

2022 Watershed Report Card

Local Actions for Improvement

Individuals, groups, businesses, municipalities, and agencies all have a role in improving the health of the watershed through these suggested actions. For more information on agencies that can help, contact the UTRCA (see page 8).

A number of the local actions listed below are also identified in the following reports:

- The Thames River (Deshkan Ziibi) Shared Waters Approach to Water Quality and Quantity (Thames River Clearwater Revival, 2019),
- Perth Natural Heritage Systems Study (Perth County, 2018 and 2019),
- Upper Thames River Source Protection Area Approved Assessment Report (Thames-Sydenham Source Protection Region, 2015), and
- Recovery Strategy for the Thames River Aquatic Ecosystem (Thames River Recovery Team, 2005).

Local Actions to Improve Surface Water and Groundwater

- Protect and establish buffers (native trees, grasses) along watercourses to cool streams, provide food for aquatic species, stabilize banks, and trap and absorb nutrients and other pollutants.
- Assess the purpose of eight dams/barriers in Fullarton Corridor to determine if any should be removed or modified to improve river health and fish passage. At least two watercourses, Hepburn Drain and Neil Drain, have coldwater habitat that may be suitable for Brook Trout introduction if the barriers are removed or mitigated.
- Use drain maintenance methods that protect aquatic habitat (e.g., low flow channels, spot or bottom cleanouts).
- Repair or replace faulty septic systems and ensure proper maintenance of the system.
- Continue to implement agricultural Best Management Practices (BMPs):
  - Establish cover crops to protect soil from erosion, prevent nutrient loss, and build soil health.
  - Reduce nutrient loss from cropland (4R Stewardship Approach: right source, right rate, right time, right place).
  - Use best practices in manure storage and spreading, pesticide and fertilizer storage and application, fuel storage, and restricting livestock access to watercourses.
  - Complete and follow Environmental Farm Plans and Nutrient Management Plans (www.omafra.gov.on.ca).
  - Utilize grants for stewardship work from the UTRCA Clean Water Program (www.cleanwaterprogram.ca).
- In Mitchell, continue the following actions:
  - For new development, implement urban stormwater planning using Low Impact Development (LID), stormwater BMP, subwatershed studies, catchment area planning, and erosion control.
  - Incorporate LID into the planning process and promote the implementation of LID techniques, including in Master Plans, Secondary Plans, and any subwatershed studies.
  - Consider using a water balance and landscape approach for inbuilt and new development to manage stormwater runoff.
  - Maintain base flow to natural heritage features through water balance.
  - For existing development, implement pollution prevention and control planning for all aspects of stormwater runoff including combined storm-sewer overflows.
  - Continue to upgrade sewer systems where risk of contamination is greatest (e.g., extend sanitary sewers to urban properties on septic systems).
  - Minimize use of fertilizers, adhere to Ontario's Cosmetic Pesticide Ban, and utilize the municipal hazardous waste disposal program.



Blocks of trees are planted using a machine planter in a prepared field.

Local Actions to Improve Drinking Water

- Decommission abandoned wells according to Ministry of Environment, Conservation, and Parks standards.
- Homeowners with wells should understand the condition of their well and risks to their water supply (see www.wellaware.ca).
- Sample private wells each spring and fall (available through the Health Unit).
- Keep contaminants (e.g., fuel, pesticides, manure, waste) away from your well area. Consider septic system inspections (see www.omafra.gov.on.ca)
- To protect municipal drinking water sources, implement Source Protection Plan policies.

Local Actions to Improve Forest and Vegetation Cover

- Connect the existing riverside woodlands and meadows with additional plantings to create a continuous wildlife corridor along the North Thames and its tributaries.
- For tree planting and naturalization projects, create a more natural and diverse habitat by using a variety of native plant species that are better adapted to the local climate, pests, etc. The UTRCA provides tree planting assistance and advice, and grants may be available (see contact information on page 8).
- Municipalities can conserve woodlands, wetlands, and other natural areas by strengthening tree conservation by-laws and enforcement, Official Plan designations, and providing landowner incentives and education.
- Connect isolated woodlots by planting shelterbelts, windbreaks, and buffers along fields and watercourses, which will also protect against soil erosion and improve water quality. Thin older, denser windbreaks.
- Increase forest interior by making woodlots larger and wider by planting native trees and shrubs along the edges or allowing the edges to naturalize on their own.
- Landowners wishing to selectively log their woodlots should use Good Forestry Practices (i.e., Basal Area Guidelines, not Diameter Limit Harvesting) and hire a Certified Tree Marker to mark the woodlot and oversee harvesting.
- Woodlot owners can improve the quality of their woodlots by identifying and removing invasive alien species such as buckthorn (see www.ontarioinvasiveplants.ca and www.thamesriver.on.ca). Keep out livestock and unauthorized motorized vehicles to protect habitat quality.

Great Lakes Connection

The Fullarton Corridor is in the Thames River watershed, which is part of the Lake Erie watershed. Water from the Fullarton Corridor (North Thames River) takes 4-10 days to flow through London and Chatham, and then into Lake St. Clair. About two weeks later, it reaches Lake Erie via the Detroit River.

Shared Waters Approach

In 2012, partners in the Thames River watershed formed the Thames River Clear Water Revival to work together on the protection of water, with the shared goal of a healthy and vital Thames River which would also benefit Lake St. Clair and Lake Erie. This partnership brings together Indigenous peoples, three levels of government, two local conservation authorities, and the local community. A state of the environment report with a focus on actions needed for water quantity and quality was completed in 2019: The Thames River (Deshkan Ziibi) Shared Waters Approach to Water Quality and Quantity. Implementation by all partners is underway. The Shared Waters Approach contains significant input from four of the eight distinct First Nations whose traditional territory includes the Thames River watershed and highlights the positive participation and sharing of traditional ecological knowledge within this approach.



2022 Watershed Report Card

Highlights of Progress Since 2017

The Fullarton Corridor watershed is benefiting from many conservation efforts that continue to be implemented by individuals, groups, businesses, agencies, and municipalities on private and public lands. Examples of activities since 2017 include:

- Perth South held its first Tree Power in 2021, a partnership between UTRCA and the municipality. A total of 300 trees were available and residents of Perth South were able to order their choice of five native hardwood species. The goal is to increase local tree and leaf cover.
- Many municipalities in the Upper Thames watershed are taking action on climate change. For Perth County municipalities, there is a shared Climate Change Coordinator. There is a commitment to reducing emissions and taking action on climate change by the Federation of Canadian Municipalities under the Partners for Climate Protection Program, a network of more than 350 Canadian municipal governments.
- Perth County contracted the UTRCA to complete the Perth County Natural Heritage Systems Study (Perth County, 2018 and 2019) to identify existing important natural heritage features on the landscape.
- Over 5,035 trees were planted at 16 properties from 2016 to 2020 under the UTRCA's Private Land Reforestation Program. Trees were planted into windbreaks, along watercourses, and in block plantings to enlarge existing woodlots or create new woodlots.
- Under the UTRCA's Communities for Nature Program, 100 trees were planted by 30 students at the Mitchell Wetlands.
- Watershed landowners completed 10 Clean Water Program projects from 2016 to 2020 including fragile land retirement and erosion control measures. The CWP was initiated in 2001 as a partnership between local municipalities to fund environmental projects (www.cleanwaterprogram.ca). From 2001 to 2020, 82 projects were completed.
- Local volunteers continue to improve this stretch of the North Thames River through the annual Thames River Cleanup that started in 2000. Each spring, volunteers remove garbage and litter from the river and its banks.



Perth South Tree Power 2021

Ontario-Wide Report Cards

Conservation Authorities produce report cards for their watersheds every five years to track changes, using a standardized grading system (www.conservationontario.ca). Grades vary across the province, reflecting the range of physical characteristics and human activities. The complete set of UTRCA report cards and supporting information are available in a report titled 2022 Upper Thames River Watershed Report Cards (thamesriver.on.ca).

For more information, contact:

Upper Thames River Conservation Authority
1424 Clarke Road, London, Ontario, Canada N5V 5B9
519-451-2800
infoline@thamesriver.on.ca
www.thamesriver.on.ca

UPPER THAMES RIVER CONSERVATION AUTHORITY

Thames Canadian Heritage River

Appendix B Baseline Hydrogeological Characterization Report

Baseline Hydrogeological Characterization Report, Fullarton Dam Rehabilitation

March 20, 2023

Updated November 26, 2024

Prepared for:
Upper Thames River Conservation Authority
1424 Clarke Road
London, Ontario N5V 5B9

Prepared by:
Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo, Ontario N2L 0A4

Project Number:
160901056

Stantec

Limitations and Sign-off

The conclusions in the Report titled Baseline Hydrogeological Characterization Report, Fullarton Dam Rehabilitation are Stantec's professional opinion, as of the time of the Report, and concerning the scope described in the Report. The opinions in the document are based on conditions and information existing at the time the scope of work was conducted and do not take into account any subsequent changes. The Report relates solely to the specific project for which Stantec was retained and the stated purpose for which the Report was prepared. The Report is not to be used or relied on for any variation or extension of the project, or for any other project or purpose, and any unauthorized use or reliance is at the recipient's own risk.

Stantec has assumed all information received from Upper Thames River Conservation Authority (the "Client") and third parties in the preparation of the Report to be correct. While Stantec has exercised a customary level of judgment or due diligence in the use of such information, Stantec assumes no responsibility for the consequences of any error or omission contained therein.

This Report is intended solely for use by the Client in accordance with Stantec's contract with the Client. While the Report may be provided to applicable authorities having jurisdiction and others for whom the Client is responsible, Stantec does not warrant the services to any third party. The report may not be relied upon by any other party without the express written consent of Stantec, which may be withheld at Stantec's discretion.

Prepared by: Digitally signed by Healey, Allison Date: 2025.01.28 12:40:08 -05'00'

Signature

Allison Healey M.Sc., P.Geo.
Hydrogeologist

Printed Name and Title

Reviewed by: Whitehead, Grant 2025.01.28 12:43:03 -05'00'

Signature

Grant Whitehead MES, P.Geo. (Limited)
Senior Hydrogeologist

Printed Name and Title

Table of Contents

Limitations and Sign-off ..... **i**
1 Introduction **1**
2 Site Setting **2**
2.1 Physiography and Surficial Geology 2
2.2 Local Groundwater Supply 2
2.3 Surface and Groundwater Quality 3
2.4 Municipal Water Supply and Source Water Protection 4
3 Gap Analysis **5**
3.1 Changes in Groundwater Quality 5
3.2 Changes to Groundwater-Surface Water Interactions 5

List of Appendices

Appendix A Figures

1 Introduction

Stantec Consulting Ltd. (Stantec) was retained by the Upper Thames River Conservation Authority (UTRCA) to complete baseline characterization reports in support of an Environmental Assessment (EA) for the rehabilitation of the Fullarton Dam at the Fullarton Conservation Area (Site), located at 2999 Perth Road 163A in Perth County, Municipality of West Perth, Lot 15, Concession Mitchell Road East Side (Figure 1).

Fullarton Conservation Area (CA) is a 34-hectare area used for recreation such as hiking, fishing, canoeing in the pond, and picnicking. There are two trails in Fullarton CA that allow for day trips through the wetland and around the pond, or through a mixed deciduous and pine wood forest. The existing Fullarton Dam, an earth dam, was built along an unnamed watercourse in the 1950s to create a recreational lake. The outcome of a 2007 dam safety assessment indicates that the current condition of the earth dam requires rehabilitation to meet appropriate safety and stability standards.

2 Site Setting

2.1 Physiography and Surficial Geology

The Site (Figure 2) is located within the till moraines (specifically, the Milverton and Mitchell moraines) of the physiographic region defined as the Stratford Till Plain. The Stratford Till Plain is a relatively uniform silty clay throughout the region (Chapman and Putnam, 1984). Spillways associated with the North Thames River are also dominant at the Site (Figure 3).

Surficial geology mapping by the Ontario Geological Survey (OGS, 2010) is presented on Figure 4. The Site is mapped within an area of fine-textured glaciolacustrine deposits of silt and clay (Figure 4, unit 8a). The Fullarton Dam property boundary extends into modern alluvial deposits associated with the North Thames River (Figure 4, unit 19) and glaciolacustrine-derived silty to clayey till (Figure 4, unit 5d).

Bedrock near the Site is described by Armstrong and Dodge (2007) as the Oxford Formation. The Oxford Formation predominantly consists of dolostone, shale and/or sandstone.

The topography is characterized by generally low relief, with the steepest slopes near the North Thames River. The topography near the Site varies between 325 to 335 m above mean sea level (AMSL).

2.2 Local Groundwater Supply

A review of aerial imagery shows the Site resides in a rural to agricultural area. A review of the Ministry of Environment, Conservation, and Parks (MECP) Water Well Records (WWRs; MECP, 2023) indicated that there are 11 WWRs located within 500 m of the Site (Figure 5), with no private water supply wells being located downgradient between the dam and the North Thames River. Seven of the eleven WWRs are identified as being private water supply wells. The nearest private water supply well is located approximately 335 m to the southwest of the Site and is constructed in bedrock. The only mapped overburden water supply well within 500 m of the Site is located approximately 710 m to the west of the dam.

According to the WWRs, overburden ranges from 25 to 41 m in thickness and predominately consists of clay with shallow deposits of gravel and stones. Four of the seven water supply wells are screened in overburden and only one well record (Well 5002028) provides water level information. For Well 5002028, which is located 145 m west of the Site, the static water level is reported as being 1.8 m below ground surface (BGS).

2.3 Surface and Groundwater Quality

Surface water and groundwater quality data near the Site is limited. The Upper Thames River Conservation Authority (UTRCA) provides report cards for the watershed every five years. The two most recent report cards were analyzed, the most recent of which was created in 2022 covering the years from 2016 to 2020 (UTRCA 2022[1]) followed by the 2017 report card which covers the years between 2011 and 2015 (UTRCA 2017a[2]). Based on these report cards, there are two surface water quality monitoring stations located within the watershed, one station located approximately 8.0 km north of the Site with the other station located approximately 6.0 km south of the Site near the intersection of Line 16 and 137 Road. These stations are part of the Provincial Water Quality Monitoring Network and are sampled monthly between April and November of each year. The report cards indicate the following:

- Surface water phosphorus concentrations in the Fullarton Corridor have decreased since 2015 but still exceed the Provincial Water Quality Objective (PWQO) for the excessive growth of plants in rivers and streams (0.03 mg/L). Phosphorus concentrations during the 2017 reporting were 0.135 mg/L (75th percentile) whereas concentrations during the 2022 reporting period decreased to 0.053 mg/L (75th percentile).
- *E. coli* concentrations in surface water in the Fullarton watershed have decreased from a geometric mean of 157 CFU/ 100 mL in the 2017 reporting period to 128 CFU/ 100 mL in the 2022 reporting period. The Provincial Recreational Guideline for *E. coli* was updated in 2019 from 100 CFU/100 mL to 200 CFU/100 mL. As such, the *E.coli* concentration presented in the 2022 report card is below the Provincial Recreational Guideline.
- The 2022 report card indicates that chloride concentrations in surface water is below the aquatic life guideline and that nitrate concentrations in surface water is mostly above the aquatic life guideline. The range in surface water concentrations observed is not provided in the document, nor is the provincial guideline against which the concentrations are compared.
- The UTRCA summarized surface water sampling completed in the reach of the unnamed watercourse where the Fullarton Dam is built as part of their Existing Conditions Report (UTRCA 2017b[3]). The watercourse was sampled three times in June and September of 2015 at three locations: upstream of Fullarton Pond, in Fullarton Pond upstream of the dam, and downstream of the dam. Results from this surface water quality sampling were as follows:
- *E.coli* concentrations were variable, ranging from approximately 10 CFU/100 mL to over 1000 CFU/100 mL. With the exception of the late fall at the pond and downstream locations, *E. coli* concentrations exceeded the PWQO for recreational waters of 100 CFU/ 100 mL.
- Nitrate concentrations were variable, ranging from approximately 1 mg/L to 11 mg/L. Concentrations were above the Canadian Environmental Quality Guideline (CEQG) for the protection of aquatic life (2.93 mg/L) during all sampling events at the upstream sampling location, during the early June sampling event at the pond, and during both June sampling events

[1] UTRCA 2022. 2022 Watershed Report Card, Fullarton. Prepared by the Upper Thames River Conservation Authority.
[2] UTRCA 2017a. 2017 Watershed Report Card, Fullarton. Prepared by the Upper Thames River Conservation Authority.
[3] UTRCA 2017. Fullarton Dam and Conservation Area, Existing Environmental Conditions. Prepared in draft, March 2017.

at the downstream location. When compared to the Ontario Drinking Water Quality Guidelines (ODWQS), nitrate concentrations exceed the chemical standard of 10 mg/L at the three sample locations during the first sampling round in June 2015.

- Chloride concentrations at all sampling locations were below 30 mg/L, noting that the corresponding ODWQS Aesthetic Objective for chloride is 250 mg/L.

The nearest Provincial Groundwater Monitoring Network site operated by the UTRCA is Well 54, which is a bedrock well located approximately 6.0 km downstream of the Site. The quality of groundwater at Well 54 is deemed excellent (Nicks 2017[4]).

2.4 Municipal Water Supply and Source Water Protection

The closest Well Head Protection Area (WHPA) (WHPA-E) is located approximately 4.75 km south of the Site and is associated with the St. Mary's WHPA, which has production wells located approximately 12.5 km south of the Site (Figure 6). There is also a WHPA associated with the Mitchell municipal water supply system located approximately 9.5 km north of the Site. There are no surface water Intake Protection Zones (IPZs) nearby. As the Site is not located within a WHPA or an IPZ, under the *Clean Water Act* (2006) list of prescribed drinking water threats, there are no activities that would result in a significant chemical and/or pathogen threat to the surface water supply if present during dam rehabilitation (MECP, 2018[5]).

A review of the MECP Source Protection Information Atlas (2022) indicates the Site is not located within either a Significant Groundwater Recharge Area (SGRA) or a Highly Vulnerable Aquifer (HVA) (Figure 7). Therefore, under the *Clean Water Act* (2006) list of prescribed drinking water threats, there are no activities that would pose a significant chemical and/or pathogen threat to the surface water supply as part of the potential dam rehabilitation works (MECP, 2018[4]).

[4] Nicks, L. 2017. Appendix B, Hydrogeology Assessment of Fullarton Conservation Area. Prepared January 17, 2017.
[5] Ministry of the Environment, Conservation and Parks (MECP). 2018. Table of Drinking Water Threats, Clean Water Act 2006. Originally Published November 20, 2008, Re-published following amendments. Effective July 1, 2018.

3 Gap Analysis

3.1 Changes in Groundwater Quality

The current surface water quality of the Fullarton Dam reservoir is unknown, as the last known sampling was conducted in 2015. At the location of the dam, Stantec anticipates that after dam removal, the overall hydraulic head will be decreased due to the loss of the ponded area and, subsequently, may reduce the rate of groundwater recharge in this area (i.e., due to reduction in vertical hydraulic gradients). As such, the infiltration of surface water stored within the reservoir potentially containing chemical parameters exceeding the ODWQS may also be reduced.

The release of surface water downstream, the quality of which exceeds the ODWQS for *E.coli* and nitrate based on sampling completed in 2015, during dam removal may have the opportunity to impact downstream shallow groundwater supply wells, if present. A review of the MECP WWR database indicates that there are no shallow supply wells downstream of the dam and that most the supply wells near the dam are screened in bedrock; however, Stantec recommends the completion of a door-to-door survey of residential and commercial properties within 1.0 km downstream of the dam to confirm the presence or absence of supply wells. A preliminary review of aerial imagery indicates that there may be four to six properties within this area. A water sample may be taken prior to the dam removal and on an as-needed basis after removal. If only bedrock wells are present, the impact of the release of the reservoir water during dam removal is not expected to impact these supply wells, especially considering the subsurface consists of thick clay-based till unit and fine-grained material that is likely characterized by low permeability (e.g., aquitard) that provides a natural protective barrier between the ground surface and deeper bedrock aquifer.

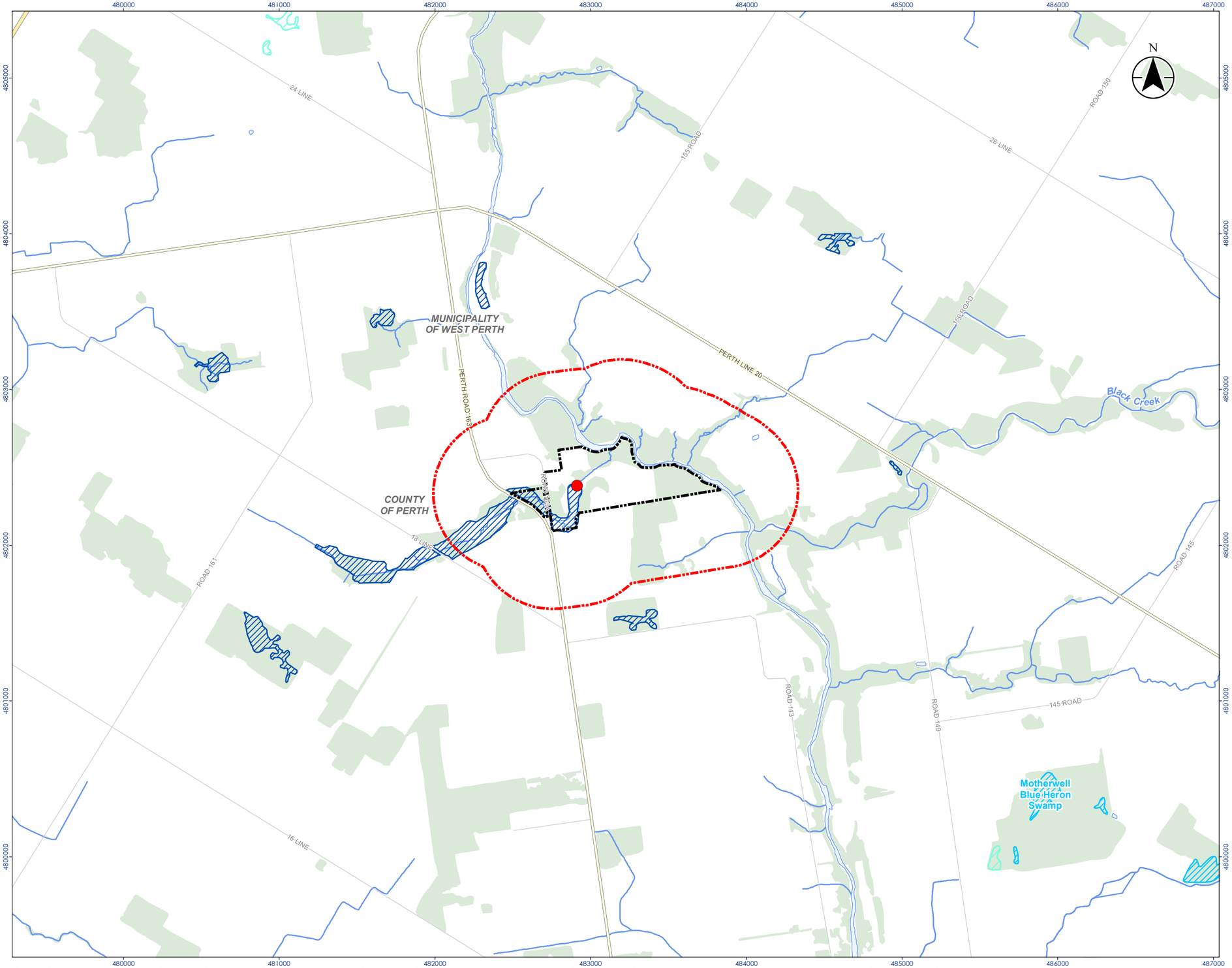
3.2 Changes to Groundwater-Surface Water Interactions

Baseflow contributions to the reservoir and connected unnamed watercourse near the Site is not known; however, it is reasonable to assume that contributions to these features from groundwater is likely similar to other groundwater-surface water relationships in other areas of the watershed (i.e., 50-70% of flows in local watercourses attributed to groundwater discharge; UTRCA 2017b[2]). Assuming the width and depth of the watercourse following its rehabilitation does not change notably from its current state, Stantec does not anticipate that groundwater discharge to the unnamed watercourse will be detrimentally altered following dam removal. However, to confirm this assertion, a field investigation to observe and track the location of potential groundwater seeps could be conducted prior to removing the dam. These seeps could be tracked during and after dam removal to understand changes, should they occur.

Groundwater quantity and flow may also be affected by changes in infiltration of precipitation due to dam removal. Infiltration could decrease depending on the construction of riparian habitat adjacent to the watercourse associated with the Fullarton Dam or could be enhanced due to an increase in permeable surfaces resulting from the removal of the dam and loss of the reservoir. These changes are unknown due to a lack of knowledge of local groundwater flow direction. The installation of monitoring wells in the overburden surrounding the dam may assist in supporting a better understanding of groundwater quantity and local flow dynamics in the shallow groundwater system.

Appendices

Appendix A Figures



Stantec

Legend

- Fullarton Dam
- Expressway / Highway
- Major Road
- Minor Road
- Regulated Watercourse (UTRCA)
- Waterbody
- Regulated Wetland (UTRCA)
- Wetland - Evaluated (Other)
- Wetland - Not evaluated per Ontario Wetland Evaluation System
- Wooded Area
- Fullarton Dam Property Boundary
- Fullarton Dam Study Area (500m)

0 500 1,000 metres

1:25,000 (At original document size of 11x17)

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, 2023.



Project Location
County of Perth

160901056 REVA
Prepared by PRM on 2023-01-25
Technical Review by GW on 2023-01-25

Client/Project
UPPER THAMES RIVER CONSERVATION AUTHORITY
FULLARTON DAM REHABILITATION

Figure No.
1

Title
Site Location

Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.

C:\Cad\2021\work_groups\01609\active\160901056\03_data\gis_cad\gis\mxds\Hydrology\report_figures\HG_Investigation\160901056_HG_Invest_Fig01_Site_Location.mxd Revised: 2023-01-25 by mmaier



Stantec

Legend

- Fullarton Dam
- Major Road
- Minor Road
- Regulated Watercourse (UTRCA)
- Waterbody
- Regulated Wetland (UTRCA)
- Fullarton Dam Property Boundary
- Fullarton Dam Study Area (500m)

0 250 500 metres

1:10,000 (At original document size of 11x17)

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, 2023.
3. Orthoimagery © First Base Solutions, 2023. Imagery Date, 2010.



Project Location
County of Perth

160901056 REVA
Prepared by PRM on 2023-01-25
Technical Review by GW on 2023-01-25

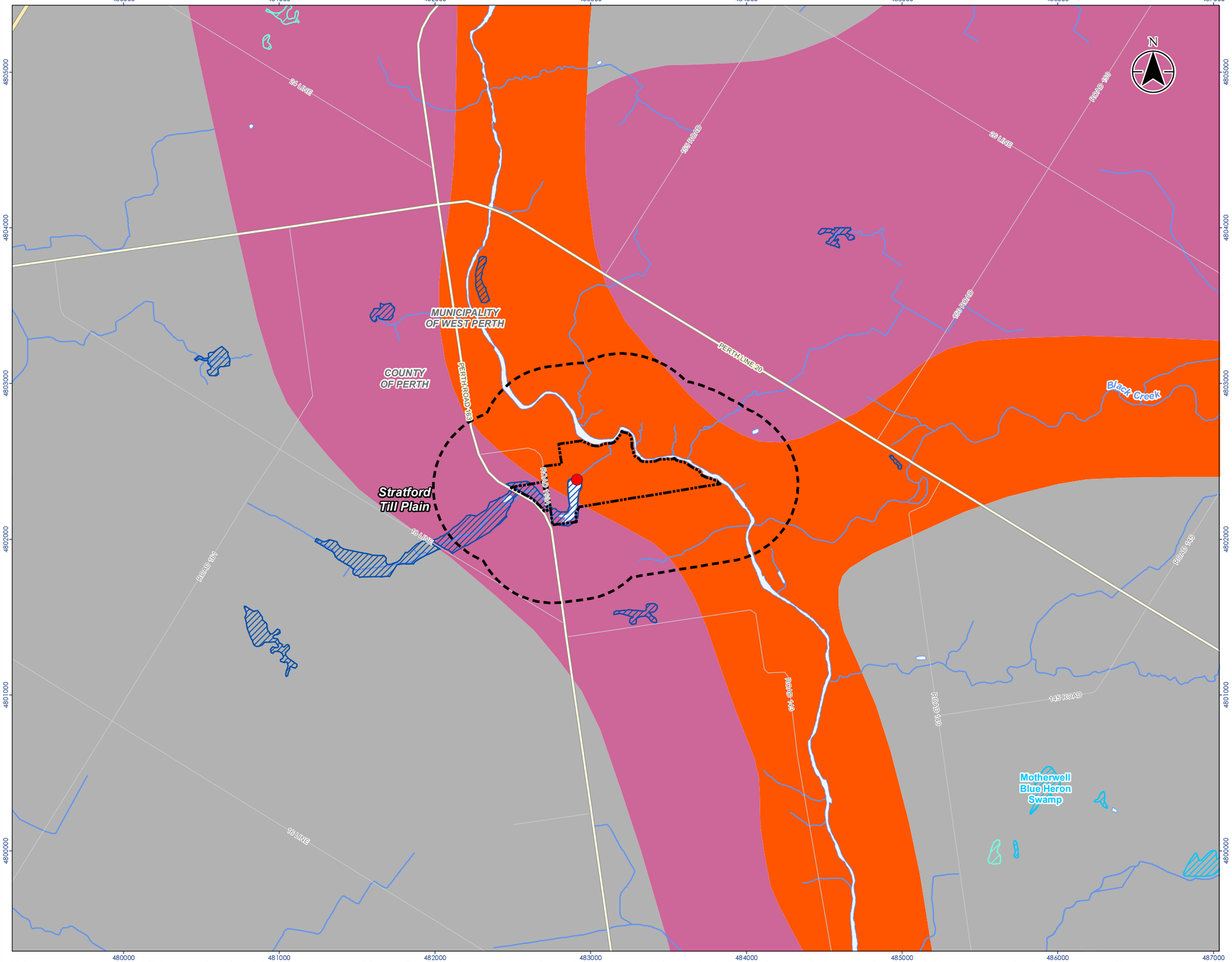
Client/Project
UPPER THAMES RIVER CONSERVATION AUTHORITY
FULLARTON DAM REHABILITATION

Figure No.
2

Title
Study Area

Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.

C:\Users\pmoser\Documents\160901056\active\160901056\03_data_gis_cad_dtm\mxds\Updated\Report_Figures\HG_Investigation\160901056_HG_Revised_Fig02_Study_Area.mxd Revised: 2023-01-25 By: pmoser



Stantec

Legend

- Fullarton Dam
- Expressway / Highway
- Major Road
- Minor Road
- Regulated Watercourse (UTRCA)
- Waterbody
- Regulated Wetland (UTRCA)
- Wetland - Evaluated (Other)
- Wetland - Not evaluated per Ontario Wetland Evaluation System
- Physiographic Region Boundary

Physiography

- 5: Till Plains (Undrumlinized)
- 3: Spillways
- 2: Till Moraines
- Fullarton Dam Property Boundary
- Fullarton Dam Study Area (500m)

0 500 1,000 metres

1:25,000 (At original document size of 11x17)

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, 2023.
3. Chapman, L.J. and Putnam, D.F. 2007. Physiography of southern Ontario; Ontario Geological Survey, Miscellaneous Release—Data 228.



Project Location
County of Perth

160901056 REVA
Prepared by PRM on 2023-01-25
Technical Review by GW on 2023-01-25

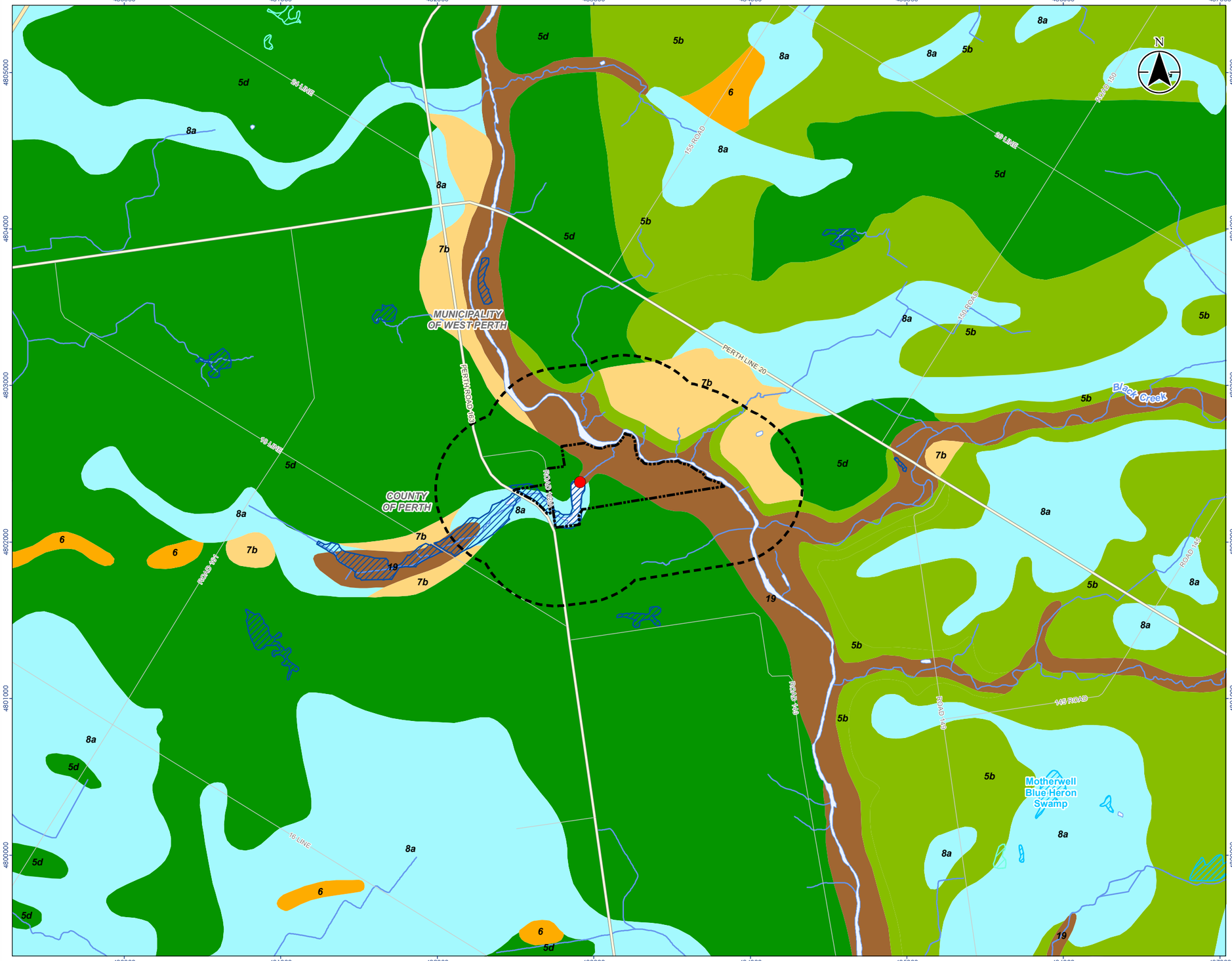
Client/Project
UPPER THAMES RIVER CONSERVATION AUTHORITY
FULLARTON DAM REHABILITATION

Figure No.
3

Title
Physiography

Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.

V:\Cd100\401\work_group\01699\active\160901056\02_data\gis_cad\gis\mxds\Hydrogeology\report_figures\HG_Investigation\160901056_HG_InvestFigs_Physiography.mxd Revised: 2023-01-25 by prmoser



Stantec

Legend

- Fullarton Dam
- Expressway / Highway
- Major Road
- Minor Road
- Regulated Watercourse (UTRCA)
- Waterbody
- Regulated Wetland (UTRCA)
- Wetland - Evaluated (Other)
- Wetland - Not evaluated per Ontario Wetland Evaluation System

Surficial Geology

- 19: Modern alluvial deposits
- 8a: Fine-textured glaciolacustrine deposits (Massive-well laminated)
- 7b: Glaciofluvial deposits (Gravelly deposits)
- 6: Ice-contact stratified deposits
- 5b: Stone-poor, carbonate-derived silty to sandy till
- 5d: Glaciolacustrine-derived silty to clayey till
- Fullarton Dam Property Boundary
- Fullarton Dam Study Area (500m)

0 500 1,000 metres

1:25,000 (At original document size of 11x17)

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, 2023.
3. Ontario Geological Survey 2010. Surficial geology of Southern Ontario; Ontario Geological Survey, Miscellaneous Release--Data 128-REV ISBN 978-1-4435-2483-4



Project Location
County of Perth

160901056 REVA
Prepared by PRM on 2023-01-25
Technical Review by GW on 2023-01-25

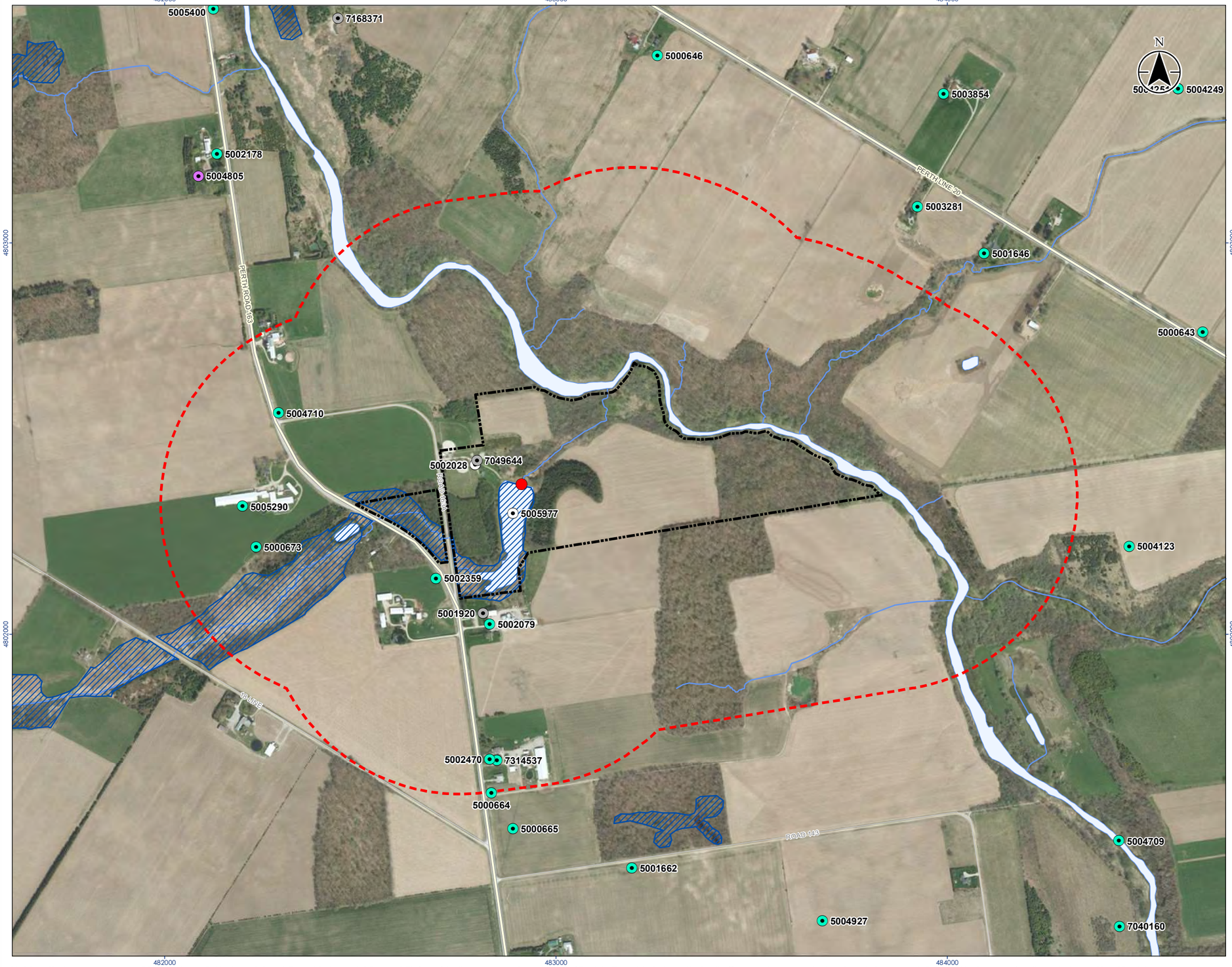
Client/Project
UPPER THAMES RIVER CONSERVATION AUTHORITY
FULLARTON DAM REHABILITATION

Figure No.
4

Title
Surficial Geology

Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.

\\Cd1004401\work_group\01169\active\160901056\05_data\gis_cad\gis_mxds\Hydrogeology\report_figures\HG_Revised_Figure_Surficial_Geology.mxd Revised: 2023-01-25 By: prmoser



Stantec

Legend

- Fullarton Dam

Water Well Record (MECP)

- Observation Wells
- Test Hole
- Water Supply
- Abandoned / Other
- Major Road
- Minor Road
- Regulated Watercourse (UTRCA)
- Waterbody
- Regulated Wetland (UTRCA)
- Fullarton Dam Property Boundary
- Fullarton Dam Study Area (500m)

0 250 500 metres

1:10,000 (At original document size of 11x17)

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, 2023.
3. Orthoimagery © First Base Solutions, 2023. Imagery Date, 2010.
4. MECP water well record locations have been positioned based on published UTM coordinates and their locations should be considered approximate.



Project Location
County of Perth

160901056 REVA
Prepared by PRM on 2023-01-25
Technical Review by GW on 2023-01-25

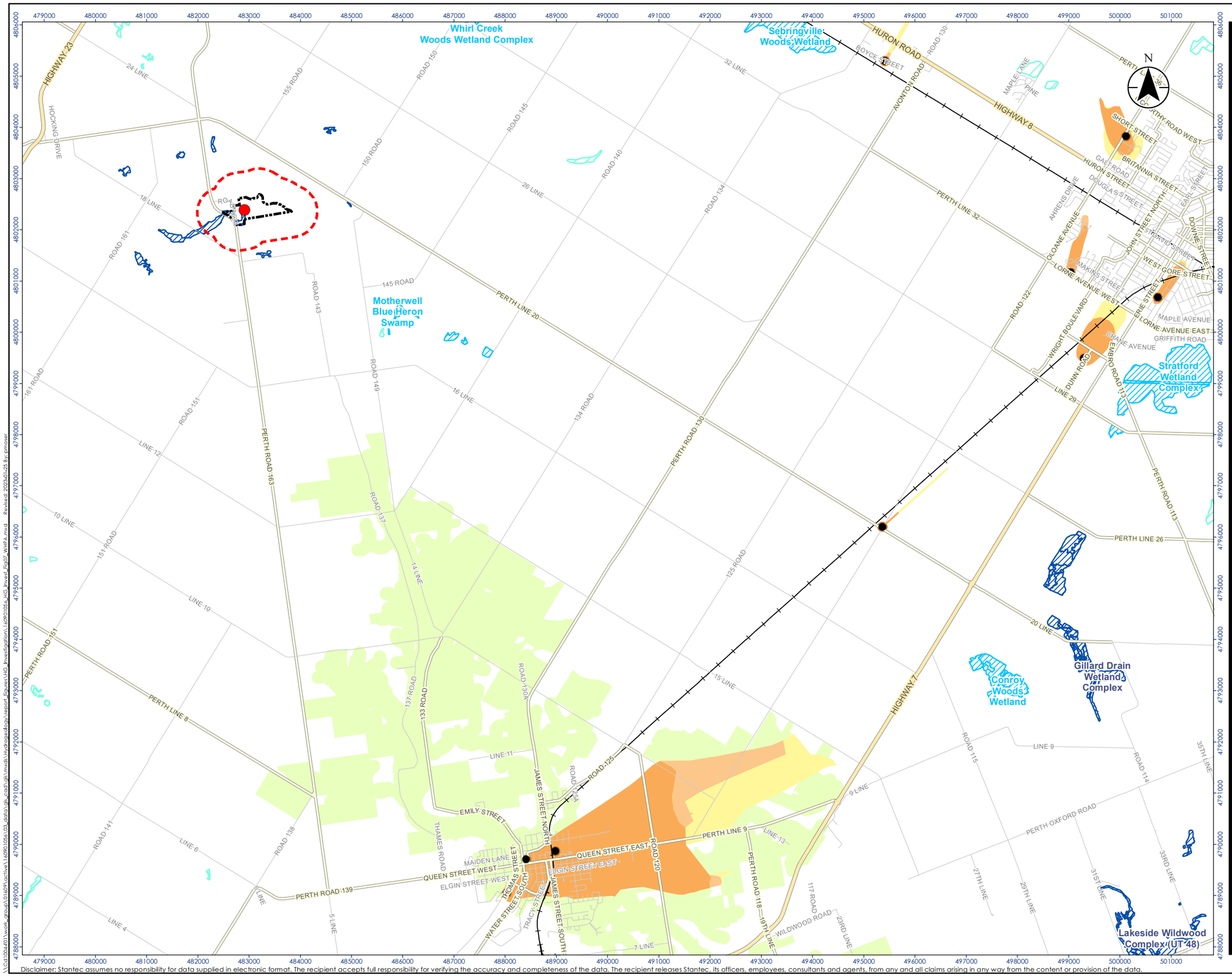
Client/Project
UPPER THAMES RIVER CONSERVATION AUTHORITY
FULLARTON DAM REHABILITATION

Figure No.
5

Title
MECP Water Well Records

Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.

\\Cd1004201\work_groups\160901056\active\160901056_data\gis_cad\gis\mxds\Hydrogeology\report_figures\MS_InvestigationLayers\160901056_MS_InvestFigs_MECP_WaterWellRecords.mxd Revised: 2023-01-25 By: pmosier



Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.



Stantec

Legend

- Fullarton Dam
- Expressway / Highway
- Major Road
- Minor Road
- Regulated Watercourse (UTRCA)
- Waterbody
- Regulated Wetland (UTRCA)
- Wetland - Evaluated (Other)
- Wetland - Not evaluated per Ontario Wetland Evaluation System
- Significant Groundwater Recharge
- Highly Vulnerable Aquifer
- Fullarton Dam Property Boundary
- Fullarton Dam Study Area (500m)

0 250 500 metres

1:25,000 (At original document size of 11x17)

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, 2023.
3. Orthoimagery © First Base Solutions, 2023. Imagery Date, 2010.



Project Location
County of Perth

160901056 REVA
Prepared by PRM on 2023-01-25
Technical Review by GW on 2023-01-25

Client/Project
UPPER THAMES RIVER CONSERVATION AUTHORITY
FULLARTON DAM REHABILITATION

Figure No.
7

Title
UTRCA Source Water Protection Data

Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.

C:\Cad\2021\Work_Groups\01\EPA\active\160901056\03_data\gis\arcgis\mxds\Hydrogeology\report_figures\HG_Investigation\160901056_HG_Invest_Fig08_Source_Water_Protection_Info.mxd Revised: 2023-01-25 By: pmosier

Appendix C Environmental Inventory / Existing Conditions

Fullarton Dam Environmental Assessment
Natural Heritage Baseline Existing Conditions Report

March 16, 2023

Prepared for:
UTRCA

Prepared by:
Stantec Consulting Ltd.

Project/File:
160901056

Stantec

Limitations and Sign-off

The conclusions in the Report titled Fullarton Dam Environmental Assessment - Natural Heritage Baseline Existing Conditions Report are Stantec's professional opinion, as of the time of the Report, and concerning the scope described in the Report. The opinions in the document are based on conditions and information existing at the time the scope of work was conducted and do not take into account any subsequent changes. The Report relates solely to the specific project for which Stantec was retained and the stated purpose for which the Report was prepared. The Report is not to be used or relied on for any variation or extension of the project, or for any other project or purpose, and any unauthorized use or reliance is at the recipient's own risk.

Stantec has assumed all information received from UTRCA (the "Client") and third parties in the preparation of the Report to be correct. While Stantec has exercised a customary level of judgment or due diligence in the use of such information, Stantec assumes no responsibility for the consequences of any error or omission contained therein.

This Report is intended solely for use by the Client in accordance with Stantec's contract with the Client. While the Report may be provided by the Client to applicable authorities having jurisdiction and to other third parties in connection with the project, Stantec disclaims any legal duty based upon warranty, reliance or any other theory to any third party, and will not be liable to such third party for any damages or losses of any kind that may result.

Prepared by:  Ellah, Mitch 2023.03.16 11:41:39 -04'00'

Signature

Mitch Ellah, B.Sc

Printed Name

Reviewed by:  Digitally signed by Geddes, Sean Date: 2023.03.16 11:50:36 -04'00'

Signature

Sean Geddes

Printed Name

Table of Contents

Limitations and Sign-off ..... **i**
Table of Contents ..... **ii**
1 Introduction **1**
1.1 Background 1
1.2 Baseline Data Sources 2
2 Field Observations **2**
3 Existing Conditions **3**
3.1 Natural Heritage Features 3
3.2 Terrestrial Ecology 4
3.2.1 Vegetation 4
3.2.2 Birds 4
3.2.3 Herptiles 5
3.2.4 Mammals 5
3.2.5 Insects 5
3.3 Aquatic Ecology 5
4 Recommendations **7**
5 Conclusion **8**
6 References **9**

List of Tables

Table 1 Baseline Characterization Data Sources 2
Table 2 Aquatic Species at Risk Known to Occur in the Study Area 7

1 Introduction

Stantec Consulting Ltd was retained by the Upper Thames Region Conservation Authority (UTRCA) to conduct an Environmental Assessment (EA) for the Fullarton Dam and reservoir at the Fullarton Conservation Area (the Project). The Fullarton Conservation Area (the Project Location) is in the Municipality of West Perth, Fullarton, Ontario.

The EA is being conducted to support long-term planning for the Fullarton Dam. As part of the initial phases of the EA, this report was prepared to provide a baseline characterization of natural heritage conditions for the Project Location plus Adjacent Lands within 120 m, collectively known as the Study Area.

The natural heritage baseline existing conditions assessment was completed through a review of background natural heritage data from technical reports, online databases, provincial wildlife atlases, and species at risk mapping sources. A site visit was also conducted to provide a reconnaissance-level confirmation of site context for the Project.

Background information, including designated natural heritage features, rare species, Species at Risk (SAR) and their habitats, fish communities and fish habitat within the Study Area was collected and reviewed to characterize the baseline conditions.The assessment of baseline conditions will then inform the development and evaluation of alternatives in the EA. Additionally, the assessment identifies data gaps that may need to be addressed as part of the EA or as part of a future design.

The alternative solutions to be developed and evaluated as part of the EA are anticipated to include options related to maintaining the dam or removing all or a portion of the dam combined with restoring the unnamed watercourse at the project site. The EA will evaluate the impacts and opportunities of alternatives, including the impacts of maintenance versus removal with respect to ecology and overall project costs, habitat considerations for the unnamed watercourse and the reservoir (e.g. snapping turtles), fish passage, and use of the conservation area by local residents. Other considerations, such as physical conditions and historical significance (e.g. archaeology) will also inform the evaluation of alternatives.

Under the Lakes and Rivers Improvement Act (2017), any contemplated dam reconstruction or modification requires an EA of the dam and surrounding areas. The EA will evaluate opportunities, impacts, and mitigation measures related to alternative solutions evaluated.

This report provides a summary of the natural heritage baseline existing conditions for the Study Area.

1.1 Background

Fullarton Conservation Area is a 34-hecatre area used recreationally for hiking, fishing, canoeing, and picnicking. There are trails in the Fullarton Conservation Area that allow for day trips through the wetland and around the pond or through a mixed deciduous and pine wood forest. Two baseball diamonds are located on the northwest portion of the Fullarton Conservation Area and they are part of the Fullarton Centennial Park that opened on June 25, 1966.

An unnamed watercourse runs through the Fullarton Conservation Area and provides potential coldwater habitat (UTRCA 2017a). The dam blocks fish passage to upstream reaches of the unnnamed watercourse.

The Fullarton Dam is an earth dam that was installed on the unnamed watercourse in the 1950s to create a recreational lake/reservoir. This reservoir has an area of approximately 2.5 hectares. The earth dam structure is 110 m long with a crest width of approximately 6 m. There is 2.5 m of head between the reservoir and the downstream unnamed watercourse under low flow conditions. Dam maintenance is the responsibility of the Municipality of West Perth.

1.2 Baseline Data Sources

The natural heritage baseline characterization is based on a site assessment conducted by Stantec on January 11, 2023, project discussions with the UTRCA and Municipality of West Peth, and multiple background data sources available for the site. Table 1 summarizes the background data available and reviewed as part of this baseline existing conditions report.

Table 1 Baseline Characterization Data Sources

Data Type	Source
Field Data	Stantec Field Visit (2023)
UTRCA Data, Reports,Online Data and Provincial Wildlife Atlas's	• Fullarton Dam and Conservation Area, Existing Environmental Conditions Report (UTRCA 2017a) • 2017 Watershed Report Card – Fullarton (UTRCA 2017b) • 2022 Watershed Report Card – Fullarton (UTRCA 2022) • The Natural Heritage Information Centre (NHIC) (MNRF 2023a) • Land Information Ontario (LIO) (MNRF 2023b) • Fisheries and Oceans Canada (DFO) Aquatic Species at Risk Map (DFO 2023) • Ontario Reptile and Amphibian Atlas (ORAA) (Ontario Nature 2019) • Species at Risk in Ontario (SARO) List (MECP 2023) • Ontario Breeding Bird Atlas (OBBA) (Cadman et al. 2007) • Ontario Butterfly Atlas (OBA) (Toronto Entomologists' Association 2023a) • Ontario Moth Atlas (OMA) (Toronto Entomologists' Association 2023b) • eBird Online Database (eBird 2023) • iNaturalist Online Observations (iNaturalist 2023)

2 Field Observations

A site meeting was held with representatives from UTRCA, the Municipality of West Perth and Stantec on January 11, 2023. A brief site tour of the reservoir and a reach of the unnamed watercourse upstream of the reservoir was undertaken as part of the meeting. Following the meeting, Stantec staff walked a portion of the unnamed watercourse downstream of the reservoir.

The reservoir is established by the earth dam that is largely manicured. The reservoir level is controlled by discharge through a rectangular concrete drop-inlet structure covered by a trash rack on the upstream

side of the dam that outlet through an 800 mm diameter concrete outlet pipe into the channel downstream of the dam.

Upstream of the reservoir, natural channel conditions in the unnamed watercourse include a wetted width of 1 to 1.5m within a bankfull width of 3 to 4 m. The overall flow pattern was a flat with pools and riffles also occurring, and substrates were primarily silt with scattered gravel and cobble patches. The surrounding riparian zone consisted of wetland roughly coincident with the meander belt as a corridor through mixed forest.

Downstream of the reservoir, the creek exhibits riffle-pool morphology with changing wetted width and bankfull dimensions depending on the location between the reservoir and the North Thames River. Flow morphology is influenced by local topography associated with the slope down to the floodplain of the North Thames River, and flattens out as the channel enters the floodplain and eventually is influenced by the water levels of the North Thames River.

Except for crossings by Perth Road 163 and 163a Road, the unnamed watercourse and the reservoir are within a corridor of well-established natural vegetation with minimal encroachment or disturbance.

A photo log of representative morphology and habitat conditions is provided in the Appendix B of the Baseline Geomorphic Characterization Report (Stantec 2023) prepared under separate cover.

3 Existing Conditions

The UTRCA (2017a) Existing Environmental Conditions draft report for the Fullarton Conservation Area provided the majority of the background data for this assessment and was comprehensive in its documentation of natural heritage features and ecology in the Project Location. The majority of the data collected and findings in the UTRCA (2017a) study are sufficient to assess impacts in the EA. Details of flora and fauna species lists known to occur in the Study Area can be found in the UTRCA (2017a) report. The following sections provide a summary of the natural heritage features and functions studied by the UTRCA with supplemental information obtained through other background data sources.

3.1 Natural Heritage Features

Three natural heritage features were documented in the background data review including the North Thames River, a Mixed Wader Nesting Colony and the Fullarton Moraine (MNRF 2023a).

Within the Study Area, the North Thames River flows through the Fullarton Corridor watershed (UTRCA 2017b, UTRCA 2022). The watershed is known to support 48 species of fish, and 13 species of freshwater mussels (UTRCA 2017b, UTRCA 2022). Natural vegetation cover represents only 12.2% of the land in the watershed. The North Thames River (as a tributary to the Thames River) is a priority Canadian watershed and the watershed is benefitting from conservation efforts but more is needed to improve natural habitat in the watershed (UTRCA 2017b, UTRCA 2022).

The Mixed Wader Nesting Colony is assumed to be associated with a wetland called the Motherwell Blue Heron Swamp which is located in the Fullarton Corridor watershed (UTRCA 2017b, UTRCA 2022).



Colonial bird nesting was not documented in the UTRCA (2017a) study and is assumed to be absent from the Study Area.

The Fullarton Moraine (glacial till deposit) is an Earth Science Areas of Natural and Scientific Interest (ANSI) and is present within the entire Study Area (MNRF 2023a).

3.2 Terrestrial Ecology

3.2.1 Vegetation

The UTRCA completed ecological land classification (ELC) of the Fullarton Conservation Area and identified five vegetation communities (cultural woodland, coniferous plantations, shallow marsh and cultural meadow (2017c). Three-season botanical surveys documented a diverse plant community of 228 species, of which 36% are non-native. White water buttercup (*Ranunculus trichophyllus*) is abundant and the dominant aquatic plant in the reservoir. One rare plant, the Shining-branch Hawthorn (*Crataegus magniflora*), is known to occur in the geographical area, however, rare or SAR plants were not documented during UTRCA botanical surveys.

3.2.2 Birds

Forty-three (43) bird species were documented in the Project Location as incidental wildlife observations during the UTRCA (2017a) study, including two species listed as Special Concern under the *Endangered Species Act* (ESA), the Bald Eagle (*Haliaeetus leucocephalus*) and Barn Swallow (*Hirundo rustica*) (UTRCA 2017a). Nesting was not observed for either species in the Fullarton Conservation Area.

Common waterfowl species including Canada Goose (*Branta canadensis*) and Mallard (*Anas platyrhynchos*) were documented in the reservoir occasionally, and were observed to be feeding, resting, breeding and rearing young. None of the documented birds exclusively rely on ponds or wetlands as these species also utilize streams, rivers and wetlands (UTRCA 2017a). Canada Geese were also noted during the January 11, 2023 site meeting.

Six other bird SAR are known to occur in the geographical area, including Bobolink (*Dolichonyx oryzivorus*), Canada Warbler (*Cardellina canadensis*), Eastern Meadowlark (*Sturnella magna*), Eastern Wood-Pewee (*Contopus virens*), Least Bittern (*Ixobrychus exilis*) (Cadman 2007), and Wood Thrush (*Hylocichla mustelina*) (Cadman 2007, UTRCA 2022), however, only one species of SAR bird could potentially be impacted by the proposed dam decommissioning: the Least Bittern.

The Least Bittern is listed as Threatened under the ESA. Threatened species receive individual and habitat protection under the *Act*. The Least Bittern nests in dense vegetation above marsh water, hidden amongst cattails and often near open water, which is used for foraging (MECP 2022). The reservoir and associated marsh wetland habitat may provide suitable conditions for the Least Bittern. Surveys targeting marsh breeding birds were not undertaken in the UTRCA (2017a) study.

The documented bird community confirmed the wetland habitat associated with the reservoir provides Significant Wildlife Habitat (SWH): *Marsh Breeding Bird Habitat* (MNRF 2015) signified by the documentation of nesting Green Heron (*Butorides virescens*) by UTRCA (2017a).

3.2.3 Herptiles

Six species of herptiles (reptiles and amphibians) were documented as incidental wildlife observations in the Project Location (UTRCA 2017a), including Snapping Turtle (*Chelydra serpentina*) which was observed in the reservoir (iNaturalist 2023, UTRCA 2017a). The Snapping Turtle is listed as Special Concern under the *Endangered Species Act* (ESA). The observed herptile community confirmed the reservoir provides three types of SWH (MNRF 2015) for herptiles including:

- *Amphibian Breeding Habitat (Wetlands)* signified by American Bullfrog (*Lithobates catesbeianus*) and Red-spotted Newt (*Notophthalmus viridescens viridescens*) were documented in the reservoir and;
- *Turtle Wintering Area* and *Special Concern and Rare Wildlife Species* signified by Snapping Turtle documentation in the reservoir.

3.2.4 Mammals

Five species of mammal were documented in the Project Location by the UTRCA (UTRCA 2017a). All are common species in Ontario. American Mink (*Neovison vison*) is also documented to occur in the reservoir (iNaturalist 2023). Four bat SAR occur in the geographical area including Eastern Small-footed Bat (*Myotis leibii*), Little Brown Myotis (*Myotis lucifugus*), Northern Myotis (*Myotis septentrionalis*), and Tricoloured Bat (*Perimyotis subflavus*). These bats will use large trees with cavities, cracks, peeling bark, open canopy and other features for maternity roosting. Tree assessment for bat maternity roost suitability was not completed by the UTRCA (2017a).

3.2.5 Insects

Seven species of butterfly were documented in the Project Location by the UTRCA (2017a), of which one is listed as Special Concern under the ESA: the Monarch (*Danaus plexippus*). No other rare or SAR insects were documented in the background data review.

3.3 Aquatic Ecology

The unnamed watercourse has a permanent flow regime (MNRF 2023b). Fish community sampling completed by the UTRCA (2017a) documented a diverse fish community in the unnamed watercourse, especially downstream from the Fullarton Dam reservoir.

Fish sampling upstream of the dam documented nine species of fish including Mottled Sculpin (*Cottus bairdii*). Mottled Sculpin are indicators of coldwater with preferred water temperature of 13-18 °C (Eakins 2023) indicating the unnamed watercourse provides coolwater / coldwater conditions (UTRCA 2017a). Seven species of fish were documented in the reservoir, all of which are tolerant of warm water and pond habitat. Thirty-four species of fish were collected downstream of the reservoir including various trophic levels from baitfish to predators including Northern Pike (*Esox lucius)*.

Mottled Scupin were also collected downstream from the reservoir (UTRCA 2017a), however, the reservoir creates a warming effect to the unnamed watercourse resulting in higher average water temperatures and greater water temperature fluctuation downstream from the Fullarton Dam when



compared to upstream of the dam (UTRCA 2017a). The presence of Mottled Sculpin downstream of the dam suggests that there are groundwater upwellings in the unnamed watercourse downstream of the dam that provide coldwater microhabitat for the species.

From June to September 2015 and June to July 2016, continuous water temperature data was collected in the unnamed watercourse by the UTRCA (2017a) upstream and downstream of the Fullarton Dam. The data show that the unnamed watercourseswater temperature upstream of the dam is consistently cooler than downstream. In 2015, water temperature in the unnamed watercourse upstream of the dam was up to 2.3°C cooler than downstream. And in 2016, water temperature was 4 to 7°C cooler upstream than downstream of the dam.

Benthic sampling was completed by the UTRCA (2017a) in the unnamedwatercourse upstream and downstream of Fullarton Dam. The benthic community was analyzed with a Family Biotic Index (FBI) which provided an indication of water quality in the unnamed watercourse at the sampling locations. In both sampling locations and for each sampling event (five sample events from 1998 through 2016), the FBI indicated water quality was “Fairly Poor” in the unnamed watercourse.

The Northern Sunfish (*Lepomis peltastes*) is known to occur in the unnamed watercourse and the Fullarton Dam reservoir (UTRCA 2017a, DFO 2022, iNaturalist 2023), and is listed as Special Concern under the *Species at Risk Act* (SARA) and the ESA. Within the Study Area the North Thames River is known to support five aquatic SAR and critical habitat for two of those species (DFO 2022) (Table 2). Habitat and individual protection is given to Threatened aquatic species listed under the SARA and the ESA.

Table 2 Aquatic Species at Risk Known to Occur in the Study Area

Common Name	Scientific Name	Animal Group	SARA Status	ESA Status
Black Redhorse*	Moxostoma duquesnei	Fish	Threatened	Threatened
Northern Sunfish	Lepomis peltastes	Fish	Special Concern	Special Concern
Silver Shiner*	Notropis photogenis	Fish	Threatened	Threatened
Rainbow	Villosa iris	Mussel	Special Concern	Special Concern
Wavy-rayed Lampmussel	Lampsilis fasciola	Mussel	Special Concern	Threatened

Notes
* Indicates critical habitat under the SARA and ESA
SARA: *Species at Risk Act*
ESA: *Endangered Species Act*

Critical habitat for the Silver Shiner under the SARA (DFO 2022b) is defined as "the entire bankfull channel width, the meander belt width, and the riparian vegetation within it and associated 30 m of riparian vegetation extending from the meander belt width", whereas the ESA (MECP 2017) categorizes general habitat for Silver Shiner into Categories 1 (in-channel), 2 (nearshore habitats), and 3 (floodplains and riparian areas). Following these habitat descriptions, it is estimated that the critical habitat for the Silver Shiner include all riparian area of the North Thames River beginning approximately 230 m downstream from the Fullarton Dam.

4 Recommendations

The existing background data and in particular, the existing conditions report prepared by UTRCA (2017a) provide a considerable amount of natural heritage information to support the EA process. The following studies are recommended to supplement the existing information for the EA, particularly for analyzing alternatives and subsequent development of a preferred design:

- Two breeding bird surveys (one in each May and June) with focus on the reservoir/wetland. Include call playback for marsh breeding birds with a focus on Least Bittern
- Vegetation community types will be confirmed while onsite during the breeding bird surveys. If vegetation communities have changed, the ELC will be updated.
- One survey (in August) to document aquatic plant community in the reservoir as recommended in the UTRCA (2017a) study.
- Identification of the proximity of Silver Shiner critical habitat in the North Thames River riparian area to determine if dam decommissioning activity would occur within critical habitat for the species.

5 Conclusion

Stantec conducted a natural heritage baseline existing conditions assessment of the Fullarton Conservation Area Study Area in the Municipality of West Perth, Ontario. This baseline assessment was conducted as part of the initial phases of an EA to support long-term planning for the Fullarton Dam. In subsequent phases, the EA is expected to develop and evaluate alternative options related to the future of the dam and management of the unnamed watercourse catchment area through the Conservation Area.

The baseline assessment was developed based on multi-discipline site visits and a review of background data, technical reports and online databases available for the Study Area. The assessment identifies the known natural heritage features, flora and fauna communities, significant wildlife habitat and rare species / species at risk occurrences and habitat at the Fullarton Conservation Area. Some additional field surveys and SAR habitat mapping are identified to supplement the previous UTRCA (2017a) work and provide additional information for the evalution of alternatives in the EA and to support future management recommendations.

6 References

Cadman, M.D., D.A. Sutherland, G.G. Beck, D. Lepage and A.R. Couturier (eds). 2007. Atlas of the Breeding Birds of Ontario 2001- 2005. Bird Studies Canada, Environment Canada, Ontario Field Ornithologists, Ontario Ministry of Natural Resources, and Ontario Nature, Toronto. 706 pp.

DFO [Fisheries and Oceans Canada]. 2017a. Guidance for Maintaining and Repairing Municipal Drains in Ontario. Version 1.1. May 23, 2017.

DFO [Fisheries and Oceans Canada]. 2022a. Aquatic species at risk map. Canada. Available at: http://www.dfo-mpo.gc.ca/species-especes/sara-lep/map-carte/index-eng.html. Accessed February 10, 2023.

DFO [Fisheries and Oceans Canada]. 2022b. Recovery Strategy and Action Plan for the Silver Shiner (Notropis photogenis) in Canada. Species at Risk Act Recovery Strategy Series. Fisheries and Oceans Canada, Ottawa. vi + 51 p.

Eakins, R.J. 2023. Ontario Freshwater Fishes Life History Database. Available at: https://www.ontariofishes.ca/home.htm. Accessed February 10, 2023.

eBird Canada. (2022). Available Online: eBird Canada: http://ebird.org/content/canada/. Accessed February 10, 2023.

MECP [Ministry of the Environment, Conservation and Parks]. 2017. Silver Shiner General Habitat Description. Available at: https://www.ontario.ca/page/silver-shiner-general-habitat-description. Accessed February 17, 2023.

MECP [Ministry of the Environment, Conservation and Parks]. 2022. Species at risk in Ontario. Available at: https://www.ontario.ca/page/species-risk-ontario. Accessed February 10, 2023.

MNRF [Ministry of Natural Resources and Forestry]. 2022a. Natural Heritage Information Centre (NHIC). Make A Map: Natural Heritage Areas. Available at: https://www.lioapplications.lrc.gov.on.ca/Natural_Heritage/index.html?viewer=Natural_Heritage.Natural_Heritage&locale=en-CA. Accessed February 10, 2023.

MNRF [Ministry of Natural Resources and Forestry]. 2022b. Land Information Ontario (LIO). Digital mapping of natural heritage features. Available at: https://geohub.lio.gov.on.ca/. Accessed February 10, 2023.

Ontario Nature. 2019. Ontario Reptile and Amphibian Atlas. Available at: https://www.ontarioinsects.org/herp/.

Toronto Entomologists' Association. 2022a. Ontario Butterfly Atlas. Available at: https://www.ontarioinsects.org/atlas/. Accessed February 10, 2023.

Toronto Entomologists' Association. 2022b. Ontario Moth Atlas. Available at: https://www.ontarioinsects.org/moth/. Accessed February 10, 2023.

UTRCA [Upper Thames River Conservation Authority]. 2017a. Fullarton Dam and Conservation Area. Existing Environmental Conditions. March 2017 Draft.

UTRCA [Upper Thames River Conservation Authority]. 2017b. Fullarton 2017 Watershed Report Card.

UTRCA [Upper Thames River Conservation Authority]. 2022. Fullarton 2022 Watershed Report Card.

Stantec

Memo

To:	Heather Amirault Waterloo Office	From:	Kayla Ellis, Sean Geddes Waterloo Office
Project/File:	160901056	Date:	November 3, 2023

Reference: Fullarton Dam EA – Natural Heritage Baseline Existing Conditions Report Addendum

Introduction

Stantec Consulting Ltd was retained by the Upper Thames River Conservation Authority (UTRCA) to conduct an Environmental Assessment (EA) for the Fullarton Dam and reservoir at the Fullarton Conservation Area (the Project). The Fullarton Conservation Area (the Project Location) is in the Municipality of West Perth, located approximately 1.5 kilometers south of the village of Fullarton, Ontario.

As part of the EA, a Natural Heritage Baseline Existing Conditions assessment was completed through a review of background natural heritage data from technical reports, online databases, provincial wildlife atlases, and species at risk (SAR) mapping sources. A site visit was also conducted to provide a reconnaissance-level confirmation of site context for the Project. The assessment of baseline conditions was completed to inform the development and evaluation of alternatives in the EA. Also, as part of the EA, a Data Gap Analysis (DGA) was conducted to identify gaps in existing data that may need to be addressed as part of the EA or as part of a future design. Additional surveys were recommended to obtain additional or confirmatory data that would provide additional information for the evaluation of alternatives in the EA and to support future management recommendations, as follows:

- Two breeding bird surveys with a focus on the reservoir/wetland, with surveys to include call playback for marsh breeding birds with a focus on Least Bittern (threatened in Ontario)
- Vegetation community types to be confirmed, and if vegetation communities have changed, the ELC would be updated.

This Addendum memo documents the results of the additional recommended field studies undertaken since the completion of the Natural Heritage Baseline Existing Conditions Report (Stantec 2023) in March 2023.

Reference: Fullarton Dam EA – Natural Heritage Baseline Existing Conditions Report Addendum

Additional Studies

As part of the DGA, ecological land classification (ELC) confirmation, breeding bird surveys and targeted surveys for Least Bittern were completed on June 22 and July 5, 2023, by Kayla Ellis of Stantec.

ELC Confirmation

Previously in 2015, the UTRCA completed ELC of the Fullarton Conservation Area as part of an assessment for an Existing Environmental Conditions report prepared in 2016. The ELC assessment identified five vegetation communities (cultural woodland, coniferous plantations, shallow marsh, shallow aquatic, and cultural meadow; UTRCA 2016). Field survey data for impact assessments are typically considered out of date after 5 years. As the UTRCA ELC data is now eight years old, the ELC communities were reviewed in 2023 to determine if any changes had occurred since 2015.

The 2023 results demonstrated that the previous ELC analysis remains valid. However, it should be noted that an inclusion of Reed-canary Grass Graminoid Mineral Meadow Marsh Type (MAM2-2) is located within the cultural woodland that was identified on Figure 1 of UTRCA's findings report (2016). The perimeter of the MAM2-2 community aligns with the Ecologically Important Meadow layer on Figure 2 of UTRCA's findings report (2016). This community has been highlighted as an inclusion on **Figure 1, Appendix A.**

Breeding Birds

In 2015, UTRCA also undertook breeding bird surveys, recording 43 species in the Fullarton Conservation Area. As the 2015 data were now 8 years old, update surveys were undertaken in 2023. Breeding bird surveys were conducted on June 22 and July 5, 2023, using a wandering transect approach consisting of traversing the area on foot and recording all species of birds that were heard or seen. All species recorded during the surveys are secure (S5) or apparently secure (S4) in Ontario. The complete list of bird species, with their respective status and scientific names, is provided in **Appendix B**.

Least Bittern Surveys

Of the 43 species of birds recorded by UTRCA in 2015, two species of Special Concern were noted. A review of background data in 2023 revealed that six bird SAR are known to occur in the geographical area of Fullarton; however, only one, the Least Bitten (*Ixobrychus exilis*), could potentially be impacted by any future dam and/or headpond alterations.

Reference: Fullarton Dam EA – Natural Heritage Baseline Existing Conditions Report Addendum

The Least Bittern is listed as Threatened under the provincial *Endangered Species Act* (ESA). Threatened species receive individual and habitat protection under the *Act*. The Least Bittern nests in dense vegetation above marsh water, hidden amongst cattails and often near open water, which is used for foraging (MECP 2022).

Least Bittern surveys were conducted on June 22 and July 5, 2023, using methods described in the National Least Bittern Survey Protocol (Jobin et al. 2011). Surveys were conducted at two stations around the reservoir (**Figure 1, Appendix A)** to target potentially suitable breeding habitat. According to the protocol, surveys are conducted early May to mid-July, during morning hours from 30 minutes before sunrise to 10:00 AM with a 10-day period between visits. Surveys cannot be conducted in adverse weather conditions (rain, fog, >30ºC, strong winds). During the survey a 13-minute call broadcast is played per station and all Least Bittern and other priority marsh birds detected are recorded.

A summary of 2023 Least Bittern survey dates, times and weather is provided in **Table 1**.

Table 1: Least Bittern Survey Dates, Times, and Weather Conditions

Date	Time	Temp. (°C)	Wind (Beaufort)	Cloud (%)	Precipitation
June 22, 2023	7:42-8:28	16	1	20	None
July 5, 2023	7:15-7:53	20	1	35	None

No Least Bittern or other priority marsh birds were detected during either of the 2023 surveys.

Incidental Observations

Observations of wildlife (birds, reptiles, mammals, amphibians, and insects) and signs of wildlife were recorded during all Stantec site visits, including species that were detected by sight and sound, dens, nests, burrows, browse, tracks, and scat.

Incidental observations included one mammal, one amphibian, two reptiles and 32 birds. All species recorded are secure (S5) or apparently secure (S4) in Ontario. The complete list of wildlife species and their status and scientific name is provided in **Appendix B**.

Two species of conservation concern (SOCC) were observed during site visits. This includes Midland Painted Turtle (*Chrysemys picta marginata*) which is federally listed as Special Concern and Snapping Turtle (*Chelydra serpentina*) which is listed both federally and provincially as Special Concern.

Reference: Fullarton Dam EA – Natural Heritage Baseline Existing Conditions Report Addendum

Conclusions

Stantec conducted ELC confirmation and targeted surveys for Least Bittern as a part of a natural heritage baseline existing conditions assessment of the Fullarton Conservation Area Study Area in the Municipality of West Perth, Ontario. This was conducted as part of the DGA in the initial phase of an EA to determine long-term planning for the Fullarton Dam.

The results of the 2023 ELC confirmed that little had changed from work completed in 2015. An inclusion inclusion of Reed-canary Grass Graminoid Mineral Meadow Marsh Type (MAM2-2) was added to the updated 2023 mapping but aligns with an Ecologically Important Meadow polygon identified in 2015 by UTRCA. Breeding bird surveys did not reveal any additional SAR, and no Least Bittern were detected during targeted surveys for that species.

The information contained in this Addendum is intended to supplement that of the Natural Heritage Baseline Existing Conditions Report (Stantec 2023) and inform the analysis of alternative options being considered in the Fullarton Dam EA process.

Closing,

STANTEC CONSULTING LTD.

Digitally signed by Ellis, Kayla
Date: 2025.01.22 13:35:43 -05'00'

Kayla Ellis B.E.S (Hons)
Terrestrial Ecologist
Phone: (226) 979-6972
kayla.ellis@stantec.com

Digitally signed by Geddes, Sean
Date: 2025.01.22 13:40:39 -05'00'

Sean Geddes B.Sc. (Hons)
Senior Aquatic Biologist
Phone: (519) 400-9837
sean.geddes@stantec.com

Attachments: Appendix A: Figure 1 - Ecological Land Classification and Survey Location
Appendix B: Wildlife List 2023

Reference: Fullarton Dam EA – Natural Heritage Baseline Existing Conditions Report Addendum

References

Jobin, B., R. Bazin, L. Maynard, A. McConnell and J. Stewart. 2011. National Least Bittern Survey Protocol. Technical Report Series No. 519, Environment Canada, Canadian Wildlife Service, Quebec Region, Quebec, 26 p.

MECP [Ministry of the Environment, Conservation and Parks]. 2022. Species at risk in Ontario. Available at: https://www.ontario.ca/page/species-risk-ontario. Accessed February 10, 2023.

Stantec. 2023. Fullarton Dam Environmental Assessment - Natural Heritage Baseline Existing Conditions Report.

UTRCA [Upper Thames River Conservation Authority]. 2016. Fullarton CA Vegetation and Bird Inventory 2015.

UTRCA [Upper Thames River Conservation Authority]. 2017. Fullarton Dam and Conservation Area. Existing Environmental Conditions. March 2017 Draft.

Reference: **Fullarton Dam EA – Natural Heritage Baseline Existing Conditions Report Addendum**

Appendix A: Figure 1 - Ecological Land Classification and Survey Locations



Stantec

Legend

- Fullarton Dam Property Boundary
- Least Bittern Survey Station
- ELC Inclusion
- Ecological Land Classification Boundary
- **CUM** - Cultural Meadow
- **CUP3** - Coniferous Plantation
- **CUW** - Cultural Woodland
- **MAM2-2** - Reed-canary Grass Graminoid Mineral Meadow Marsh Type
- **MAS** - Shallow Marsh
- **SA** - Shallow Water

0 50 100 metres

1:2,000 (At original document size of 11x17)

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, 2023.
3. Orthoimagery © Firstbase Solutions 2023.



Project Location
County of Perth

160901056 REVA
Prepared by PRM on 2025-01-21
Technical Review by KE on 2025-01-21

Client/Project
UPPER THAMES RIVER CONSERVATION AUTHORITY
FULLARTON DAM REHABILITATION

Figure No.
1

Title
Ecological Land Classification and Survey Locations

Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.

\\Cgn200-cifs01\01609-active\160901056\05_data_gis_cad_gdb\mxds\Ecosystems\Inland_maps\160901056_Fig01_ELC.mxd Revised: 2025-01-21 By: PMoser

Reference: Fullarton Dam EA – Natural Heritage Baseline Existing Conditions Report Addendum

Appendix B: Wildlife List 2023

Incidental Wildlife List
Fullarton Conservation Area

Species Type	Common Name	Scientific Name	Ontario Status	Global Status	SARO	SARA	COSEWIC
Amphibians	Northern Green Frog	Lithobates clamitans	S5	G5			
	Snapping Turtle	Chelydra serpentina	S4	G5	SC	SC	SC
	Midland Painted Turtle	Chrysemys picta marginata	S4	G5T5		SC	SC
Reptiles	Snapping Turtle	Chelydra serpentina	S4	G5	SC	SC	SC
	Midland Painted Turtle	Chrysemys picta marginata	S4	G5T5		SC	SC
Birds	Wood Duck	Aix sponsa	S5B, S3N	G5			
	Mallard	Anas platyrhynchos	S5	G5			
	Killdeer	Charadrius vociferus	S4B	G5			
	Great Blue Heron	Ardea herodias	S4	G5			
	Green Heron	Butorides virescens	S4B	G5			
	Belted Kingfisher	Megaceryle alcyon	S5B,S4N	G5			
	Red-bellied Woodpecker	Melanerpes carolinus	S5	G5			
	Downy Woodpecker	Dryobates pubescens	S5	G5			
	Alder Flycatcher	Empidonax alnorum	S5B	G5			
	Eastern Phoebe	Sayornis phoebe	S5B	G5			
	Eastern Kingbird	Tyrannus tyrannus	S4B	G5			
	Red-eyed Vireo	Vireo olivaceus	S5B	G5			

Species Type	Common Name	Scientific Name	Ontario Status	Global Status	SARO	SARA	COSEWIC
Birds cont.	Blue Jay	Cyanocitta cristata	S5	G5			
	American Crow	Corvus brachyrhynchos	S5	G5			
	Northern Rough-winged Swallow	Stelgidopteryx serripennis	S4B	G5			
	Black-capped Chickadee	Poecile atricapillus	S5	G5			
	House Wren	Troglodytes aedon	S5B	G5			
	American Robin	Turdus migratorius	S5	G5			
	Gray Catbird	Dumetella carolinensis	S5B,S3N	G5			
	Cedar Waxwing	Bombycilla cedrorum	S5	G5			
	American Goldfinch	Spinus tristis	S5	G5			
	Chipping Sparrow	Spizella passerina	S5B,S3N	G5			
	Song Sparrow	Melospiza melodia	S5	G5			
	Swamp Sparrow	Melospiza georgiana	S5B, S4N	G5			
	Baltimore Oriole	Icterus galbula	S4B	G5			
	Red-winged Blackbird	Agelaius phoeniceus	S5	G5			
	Common Grackle	Quiscalus quiscula	S5	G5			
	Common Yellowthroat	Geothlypis trichas	S5B,S3N	G5			
	Yellow Warbler	Setophaga petechia	S5B	G5			
	Pine Warbler	Setophaga pinus	S5B,S3N	G5			
	Rose-breasted Grosbeak	Pheucticus ludovicianus	S5B	G5			
	Indigo Bunting	Passerina cyanea	S5B	G5			
Mammals	Muskrat	Ondatra zibethicus	S5	G5			

Explanation of Status and Acronymns

COSSARO: Committee on the Status of Species at Risk in Ontario

COSEWIC: Committee on the Status of Endangered Wildlife in Canada

S3: Vulnerable—Vulnerable in the province, relatively few populations (often 80 or fewer)

S4: Apparently Secure—Uncommon but not rare

S5: Secure—Common, widespread, and abundant in the province

S#S#: Range Rank—A numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species

S#B- Breeding status rank

S#N- Non Breeding status rank

G5: Very common globally; demonstrably secure

SC: Special Concern

All rankings for birds refer to breeding birds unless the ranking is followed by N

Appendix D Dam Safety Report – Gap Analysis

Fullarton Dam Facilities - Dam Safety Review – Gap Analysis

March 21, 2023

Prepared for:

Upper Thames River Conservation Authority

Prepared by:

Stantec Consulting Ltd.
200-325 25 Street SE
Calgary, AB T2A 7H8

File: 160901056

This document entitled Fullarton Dam Facilities - Dam Safety Review – Gap Analysis was prepared by Stantec Consulting Ltd. (“Stantec”) for the account of Upper Thames River Conservation Authority (the “Client”). Any reliance on this document by any third party is strictly prohibited. The material in it reflects Stantec’s professional judgment in light of the scope, schedule and other limitations stated in the document and in the contract between Stantec and the Client. The opinions in the document are based on conditions and information existing at the time the document was published and do not consider any subsequent changes. In preparing the document, Stantec did not verify information supplied to it by others. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party as a result of decisions made or actions taken based on this document.

Prepared by Khan, Shanjida Digitally signed by Khan, Shanjida Date: 2023.03.21 11:54:29 -06'00'
(signature)

Shanjida Khan, BSc., E.I.T.
Geotechnical Engineer in Training

And by Hojka, Kris Digitally signed by Hojka, Kris Date: 2023.03.21 10:25:36 -04'00'
(signature)

Kris Hojka, M.Sc., P.Eng.
Senior Geotechnical Engineer

Reviewed by Irfan Maan 2023.03.21 10:32:32 -04'00'
(signature)

Irfan Maan, P.Eng.
Senior Associate, Civil Engineering

Table of Contents

1.0 INTRODUCTION 1

2.0 AVAILABLE DOCUMENTATION 1

3.0 GAP ANALYSIS 2
3.1 GENERAL DESCRIPTION 2
3.2 PREVIOUS FIELD INVESTIGATIONS 2
3.3 DAM GEOMETRY AND MATERIAL ZONING 3
3.4 FOUNDATION CONDITIONS 3
3.5 DAM CLASSIFICATION 4
3.6 SLOPE STABILITY ASSESSMENT 4
3.7 DAM SAFETY MANAGEMENT SYSTEM 5
3.8 INSTRUMENTATION AND MONITORING 6

4.0 GAP ANALYSIS SUMMARY AND RECOMMENDATIONS 7

5.0 REFERENCES 8

LIST OF TABLES

Table 3-1: Factor of Safety Comparison 5
Table 4-1: Identified Gaps 7

LIST OF FIGURES

Figure 3-1: Fullarton Dam and Fullarton Pond 2
Figure 3-2: Borehole Locations (Naylor Engineering Associates, 2006) 3

1.0 INTRODUCTION

The Fullarton Dam was constructed in 1955 and is located approximately 2 km south of the Town of Fullarton. Fullarton Pond was constructed for recreational purposes with the dam on the north side of the pond.

2.0 AVAILABLE DOCUMENTATION

Stantec performed a high-level review of the following documents and data obtained from historical and available reports, aerial photos, and figures for the Fullarton Dam:

- Dam Safety Assessment for Fullarton Dam Prepared for Upper Thames River Conservation Authority, August 2007, ACRES International Limited, (ACRES).
- Geotechnical Investigation Fullarton Embankment Stability Assessment Municipality of West Perth, Ontario for Upper Thames River Conservation Authority, February 2006, Naylor Engineering Associates Ltd., (Naylor).
- Fullarton Dam Hydrotechnical and Geotechnical Review, January 17, 2017, Upper Thames River Conservation Authority.

3.0 GAP ANALYSIS

3.1 GENERAL DESCRIPTION

The Fullarton Dam is an earth embankment dam approximately 110 m long 3.4 m high and with a 6 m wide crest. The dam creates a pond on the upstream side and the water level in the pond is controlled by the concrete inlet overflow structure in the middle of the pond with an outlet made of pre-cast concrete pipe on the downstream side of the dam. This allows the water to discharge into North Thames River (Naylor, 2006). There is an emergency overflow spillway located on the east end of the dam with a mouth length of 9.5 m and runs parallel to the creek (ACRES, 2007).



Figure 3-1: Fullarton Dam and Fullarton Pond

3.2 PREVIOUS FIELD INVESTIGATIONS

There were two previous borehole campaigns at the dam. The first in 2003 by ACRES and involved two boreholes BH1 and BH2 advanced from the dam crest centerline.

During the 2005 field investigation, four (4) boreholes were drilled. BH 101 and 102 were drilled on the crest of the dam and two other boreholes BH103 and BH104 were located at the downstream toe (see Figure 3-2).

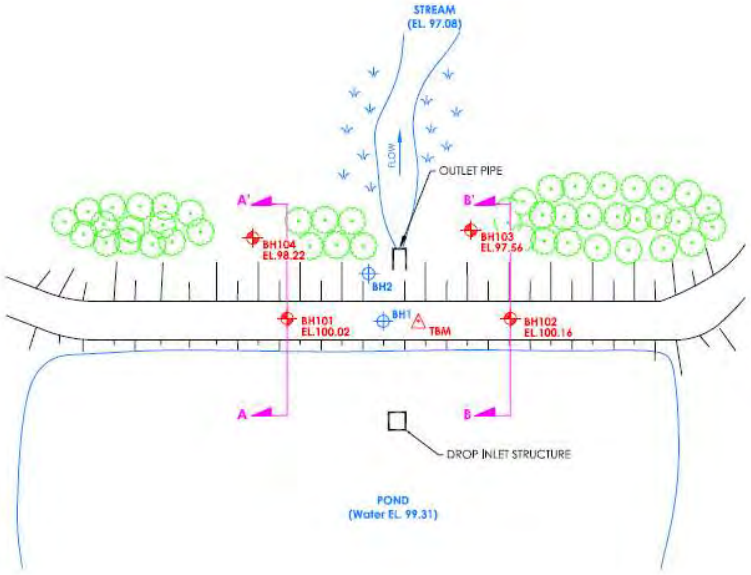


Figure 3-2: Borehole Locations (Naylor Engineering Associates, 2006)

3.3 DAM GEOMETRY AND MATERIAL ZONING

The Fullarton Dam is approximately 110 m long and approximately 3.4 m high (ACRES, 2007), with a width of 6 m on the crest of the dam. It is an earth fill dam with downstream and side slopes varied from 2 to 3 horizontal and 1 vertical (Naylor, 2006). The downstream portion of the dam has an outlet pipe which is covered with loose riprap. The inside diameter of the pre-cast outline pipe is 762 mm.

The dam fill was determined in boreholes 101 and 102 (Naylor, 2006) and was determined as homogenous fill, mainly silt with some clay and trace to some gravel. Shear strength of clay material was determined by pocket penetrometer and was in the range 100 to 200 kPa, indicating stiff clay consistency. **Based on boreholes, t**he dam fill appears to be uniform zone, there is no zonation within the dam, except upstream rip rap layer. There is no drain to control the piezometric level within the dam, and there is no erosion protection layer on the downstream slope.

Gaps:

There is no toe drain in the dam to control piezometric levels

3.4 FOUNDATION CONDITIONS

There is no design or as-built document available which provide information regarding foundation preparation or dam construction of the Fullarton Dam (ACRES, 2007). Based on the borehole logs, it is assumed that the loose materials and organics were removed prior to constructing the dam (ACRES, 2007). It is believed that the ground surface consists of clay, silt, sand, and gravel meaning it is under the

dam and reservoir (ACRES, 2007). It is unknown the depth at which the bedrock is encountered (ACRES, 2007).

During 2005 field investigation, it was found that there was a layer of peat under the dam foundation (BH102) and some pockets of peat were found within the dam fill (BH101) (Naylor, 2006).

Gaps:

Stantec identifies the following gaps.

1. As-built conditions and foundation preparation procedure are unknown.
2. There are pockets of weak organics layer (peat) that apparently was not removed during construction, the extent of the peat is unknown.
3. The peat strength needs to be better defined using CPT investigation.
4. Limited knowledge of foundation conditions from the borehole data which is not adequate for complete assessment.

3.5 DAM CLASSIFICATION

The incremental hazard potential (IHP) of the dam was reported (UTCRA, 2017) to be VERY LOW, as no incremental economic, social, and environmental losses are to be expected in flooding conditions. As well, no potential incremental loss of life is reported to be expected under flooding conditions (UTCRA, 2017). The IHP was assessed in accordance with the 1999 Ontario Dam Safety Guidelines (Draft), which are outdated now. These guidelines were revised in 2011 and are known as Technical Bulletins issued by Ministry of Natural Resources (MNR), 2011 (under LRIA, 2011). Under new MNRF guidelines, there is no Very Low class anymore. The new dam classification system was developed called Dam Hazard Potential Classification (HPC). HPC varies from Low to Very High and the criteria of classification has been changed since. The dam classification has to be reviewed again in accordance with latest MNR guidelines. 2011 standards.

Gaps:

Previous dam classification VERY LOW is outdated and needs to be reviewed in accordance with latest 2011 MNR guidelines and update as needed.

3.6 SLOPE STABILITY ASSESSMENT

Slope stability analyses were performed originally by Acres in 2004 and finalized in 2007. These analyses were reviewed by Naylor (2006) and UTSRA (2017). The following table presents the results as per all loadings conditions as required by MNRF, 2011.

Table 3-1: Factor of Safety Comparison

Loading Conditions	Minimum Factor of Safety	Slope	Reported Factor of Safety*	Reported Loading Conditions*
End of construction before reservoir filling	1.3	Upstream and downstream	Not applicable	
Long-term (steady state seepage, normal reservoir level)	1.5	Upstream and downstream	1.3 to 1.4	Steady state seepgae with maximum storage pool
IDF loading condition	1.3	Upstream and downstream	1.3 to 1.4	
Full or partial rapid drawdown	1.2 to 1.3	Upstream	1.5 to 1.7	
Pseudo-static	Greater than 1.0	Upstream and Downstream	1.3 to 1.4	Psuedo-static horizontal seismic load – downstream and upstream
Post earthquake	1.1		Not evaluated	

*(Naylor Engineering Associates, 2006)

According to the 2007 DSR, the dam does not meet the stability criteria, especially for long term normal conditions. The soil properties selected by ACRES did not consider undrained conditions, in addition peat layer was not considered in the model. Lower factors of safety are anticipated, if more conservative soil strength are used.

Gaps:

Additional slope stability loading conditions should be considered, including post-earthquake.

Cone Penetration Test (CPT) field investigation is recommended to determine undrained soil strengths and apply those to the stability model.

Undrained soil properties for clay and peat should be defined based on the CPT data

3.7 DAM SAFETY MANAGEMENT SYSTEM

Currently, there is no documentation on the Dam Safety Management System (DSMS), and Operation, Maintenance and Surveillance (OMS) manuals. Stantec recommended preparation of an OMS manual including an instrumentation monitoring plan and procedures to monitor dam performance and manage risk in accordance with CDA guidelines, as this dam is free for the public to access the structure. The annual Dam Safety Inspections DSIs should be considered as part of the future DSMS.



There is an Emergency Preparedness Plan and Response Plan (EPRP) developed by UTRCA, giving them the responsibility to follow the correct procedures based on the emergency. The current EPRP is generic and does not contain key details, such as trigger levels, thresholds, key contacts, etc.

Dam Safety Reviews (DSR) and annual Dam Safety Inspections (DSI) are also part of DSMS, there is no record of recent DSIs. The last DSR was performed in 2007 in accordance with old 1999 ODSG. It is recommended that the DSR should be repeated in accordance with latest dam safety guidelines of CDA and MNRF.

As mentioned before the HPC should also be reviewed and updated based on latest MNRF guidelines and frequency of DSRs and DSIs should be determined based on the new updated dam classification.

Gaps:

Stantec indicates the following gaps and recommendation.

1. Update Dam Hazard Potential Classification and design frequency of DSRs and DSIs in accordance with updated classification.
2. OMS manuals and DSMS systems have not been developed. Develop a detailed EPRP for the Fullarton Dam with all the necessary details.
3. Perform annual DSIs.
4. Perform new DSR in accordance with new 2011 MNR standards.

3.8 INSTRUMENTATION AND MONITORING

In November of 2003, two boreholes were drilled, one on the centerline of the dam and one on the downstream slope. A standpipe piezometer was installed in the borehole drilled on the centerline of the dam.

During the 2005 field program piezometers and monitoring wells were installed into the drilled boreholes. Six monitoring wells and two pumping wells were installed during this program (Naylor, 2006). These piezometers were not found during 2022 site visit.

Gaps:

1. Stantec indicates the following gaps.
2. Piezometers were not found at site.
3. Instrumentation monitoring program is not provided.

4.0 GAP ANALYSIS SUMMARY AND RECOMMENDATIONS

The following table summarizes gaps identified for both the Fullarton Dam, as well as recommendations on how to address the gaps.

Table 4-1: Identified Gaps

Gap	Recommendations
HPC Classification	- Update dam Hazard Potential Classification in accordance with 2011 MNR guidelines.
Dam Safety Review/Inspection	- Carry out DSR in accordance with new 2011 MNR. - Carry out DSI every 1 to 2 years.
Design and as-built documentation	- Perform CPT investigation program to define foundation conditions including peat delineation and definition of new undrained strength properties for clay and foundation. - Define design criteria based on the dams' classification using most recent (2011) MNR guidelines. - Perform additional slope stability analyses based on soil parameters obtained from CPT investigation and in accordance with 2011 MNR guidelines. - Re-evaluate emergency spillway capacity and freeboard based on new IDF criteria selected based on updated HPC.
DSMS and OMS manual	- Develop Operation, Maintenance and Surveillance plan to address potential failure modes. The surveillance program should define future DSIs, DSRs and an instrumentation monitoring program.
EPRP	- Develop a detailed EPRP to mitigate potential dam failure. The level of effort should correspond to the dam's classification.

5.0 REFERENCES

ACRES International Limited (2007). *Dam Safety Assessment Report for Fullarton Dam.* Prepared for Upper Thames River Conservation Authority

Naylor Engineering Associates Ltd. (2006). *Geotechnical Investigation Fullarton Dam Embankment Stability Assessment Municipality of West Perth, Ontario*. Prepared for Upper Thames River Conservation Authority

Ontario Ministry of Natural Resources (2011). *Technical Bulletin – Classification and Inflow Design Flood Criteria*. August 2011.

Ontario Ministry of Natural Resources (2011). *Technical Bulletin – Geotechnical Design and Factors of Safety*. August 2011.

Upper Thames River Conservation and Authority (2017). *Appendix A – Fullarton Dam Hydrotechnical and Geotechnical Review.* January 17, 2017

Appendix E Cultural Heritage Report

CULTURAL HERITAGE REPORT: EXISTING CONDITIONS AND PRELIMINARY IMPACT ASSESSMENT—FULLARTON DAM REHABILITATION

FINAL REPORT

November 2024

Prepared for:
Upper Thames River Conservation Authority
1424 Clarke Road
London, Ontario N5V 5B9

Prepared by:
Stantec Consulting Ltd.
400-1305 Riverbend Road
London, Ontario N6K 0J5

Project Number:
160901056

Limitations and Sign-off

The conclusions in the Report titled Cultural Heritage Report: Existing Conditions and Preliminary Impact Assessment—Fullarton Dam Rehabilitation are Stantec's professional opinion, as of the time of the Report, and concerning the scope described in the Report. The opinions in the document are based on conditions and information existing at the time the scope of work was conducted and do not take into account any subsequent changes. The Report relates solely to the specific project for which Stantec was retained and the stated purpose for which the Report was prepared. The Report is not to be used or relied on for any variation or extension of the project, or for any other project or purpose, and any unauthorized use or reliance is at the recipient's own risk.

Stantec has assumed all information received from Upper Thames River Conservation Authority (the "Client") and third parties in the preparation of the Report to be correct. While Stantec has exercised a customary level of judgment or due diligence in the use of such information, Stantec assumes no responsibility for the consequences of any error or omission contained therein.

This Report is intended solely for use by the Client in accordance with Stantec's contract with the Client. While the Report may be provided to applicable authorities having jurisdiction and others for whom the Client is responsible, Stantec does not warrant the services to any third party. The report may not be relied upon by any other party without the express written consent of Stantec, which may be withheld at Stantec's discretion.

Prepared by:  Digitally signed by Smith, Frank
Date: 2024.11.06 16:08:44 -05'00'

Signature

Frank Smith, MA, CAHP

Printed Name

 Digitally signed by Jones, Lashia
Date: 2024.11.06 16:24:37 -05'00'

Signature

Lashia Jones, MA, CAHP

Printed Name

Approved by:  Digitally signed by Rivard, Meaghan
Date: 2024.11.06 16:21:46 -05'00'

Signature

Meaghan Rivard, MA, CAHP

Printed Name

Executive Summary

As part of a Municipal Class Environmental Assessment (MCEA), the Upper Thames River Conservation Authority (UTRCA) (the Client) retained Stantec Consulting Ltd. (Stantec) to support long term planning for the Fullarton Dam. The purpose of this project is to identify alternatives that address the safety deficiencies identified in the *Dam Safety Assessment* and to select a preferred management strategy for the dam that considers the natural environment and the social uses associated with the dam, reservoir, and rest of the Fullarton Conservation Area. The Fullarton Dam was built in the 1950s and is located in the Fullarton Conservation Area, a 34 hectare site used for recreation (Figure 1 and Figure 2).

The requirement to consider cultural heritage in MCEA is discussed in the *Municipal Class Environmental Assessment Manual* (MCEA Manual) (Municipal Engineers Association 2015) and *Provincial Policy Statement* (PPS) (Government of Ontario 2020). The MCEA Manual considers cultural heritage, including built heritage resources and cultural heritage landscapes, as well as archaeological resources, as one in a series of environmental factors to be considered when undertaking an MCEA, particularly when describing existing and future conditions, development alternatives, and determination of the preferred alternative. To facilitate this Project, the Client retained Stantec to conduct a *Cultural Heritage Report: Existing Conditions and Preliminary Impact Assessment.*

Depending on project activities, the following built heritage resources and cultural heritage landscapes may be at risk of potential direct impacts due to land disturbance as they contain built heritage resources or cultural heritage landscapes within 50 metres of the Fullarton Dam property boundary:

- North Thames River (CHL-1)
- 2955 Perth Road 163 (BHR-3)

To further understand the potential for the Project to affect the properties identified as containing Cultural Heritage Value or Interest (CHVI), the impact assessment contained within this report should be amended when design alternative information on proposed construction activity is finalized. When design alternative information is received, potential direct impacts and indirect can be refined, as necessary. An updated copy of the CHR will be provided to MCM's Heritage Planning Unit, the Municipality of West Perth Heritage and Culture Committee, and other interested parties for review and comment.

Potential indirect impacts through land disturbance should be avoided through a development of design alternatives that avoids indirect impacts to the North Thames River (CHL-1) and 2955 Perth Road (BHR-3). If avoidance is not deemed feasible, potential mitigation measures can be refined following the completion of design alternatives.

The executive summary only highlights key points from the report; for complete information and findings, the reader should examine the report.

Table of Contents

LIMITATIONS AND SIGN-OFF I
EXECUTIVE SUMMARY II
TABLE OF CONTENTS III
PROJECT PERSONNEL V
ABBREVIATIONS VI
1 INTRODUCTION 1
1.1 Study Purpose and Objectives 1
2 METHODOLOGY 4
2.1 Requirements 4
2.2 Background History 4
2.3 Municipal and Agency Consultation 5
2.4 Field Program 5
2.5 Screening of Cultural Heritage Value or Interest 5
2.5.1 Ontario Regulation 9/06 5
2.6 Assessment of Impacts 6
3 EXISTING CONDITIONS 8
3.1 Background and Historical Research 8
3.1.1 Introduction 8
3.1.2 Physiography 8
3.1.3 Township of Fullarton 9
3.1.4 Site History 12
3.2 Municipal and Agency Requests 18
3.3 Identification of Known and Potential Built Heritage Resources and Cultural Heritage Landscapes 18
4 PRELIMINARY IMPACT ASSESSMENT 24
4.1 Description of Proposed Undertaking 24
4.2 Identification of Preliminary Potential Project Specific Impacts and Proposed Mitigation Measures 24
4.2.1 Summary of Impacts 25
5 RECOMMENDATIONS 26
5.1 Re-Evaluation when Design Alternatives are Developed 26
5.2 Avoidance 26
6 REFERENCES 27

LIST OF TABLES

Table 1 Canada Company Land Sales in Study Area 12
Table 2 Information Request Results 18
Table 3 Known or Potential Built Heritage Resources and Cultural Heritage Landscapes 21
Table 4 Preliminary Impact Assessment Mitigation Measures 24

LIST OF FIGURES

Figure 1 Location of Study Area 2
Figure 2 Study Area 3
Figure 3 Historical Mapping, 1879 14
Figure 4 Topographic Mapping, 1927 15
Figure 5 Topographic Mapping, 1959-1960 16
Figure 6 Topographic Mapping, 1975-1976 17
Figure 7 Known and Potential Built Heritage Resources and Cultural Heritage Landscapes 23

LIST OF PHOTOS

Photo 1 Perth Road 163, looking south 19
Photo 2 Perth Road 163, looking north 19
Photo 3 Perth Road 163A, looking east 19
Photo 4 Perth Road 163A, looking west 19
Photo 5 Fullarton Conservation Area, looking east 19
Photo 6 Fullarton Dam, looking east 19

LIST OF APPENDICES

Appendix A Project Personnel Biographies

Project Personnel

Project Manager:	Heather Amirault, P.Eng.
Heritage Consultant:	Lashia Jones, MA, CAHP
Report Writer:	Frank Smith, MA, CAHP
GIS Specialist:	Paul Moser
Administrative Assistant:	Priscilla Kwan
Quality Reviewer:	Lashia Jones, MA, CAHP
Independent Reviewer:	Meaghan Rivard, MA, CAHP

Qualifications of heritage project personnel are included in Appendix A

Abbreviations

BHR	Built Heritage Resource
CAHP	Canadian Association of Heritage Professionals
CHRS	Canadian Heritage River System
CHL	Cultural Heritage Landscape
CHVI	Cultural Heritage Value or Interest
EA	Environmental Assessment
MA	Master of Arts
MCEA	Municipal Class Environmental Assessment
MCM	Ministry of Citizenship and Multiculturalism
O. Reg.	Ontario Regulation
OHA	*Ontario Heritage Act*
OHT	Ontario Heritage Trust
PPS	Provincial Policy Statement
UTRCA	Upper Thames River Conservation Authority

1 Introduction

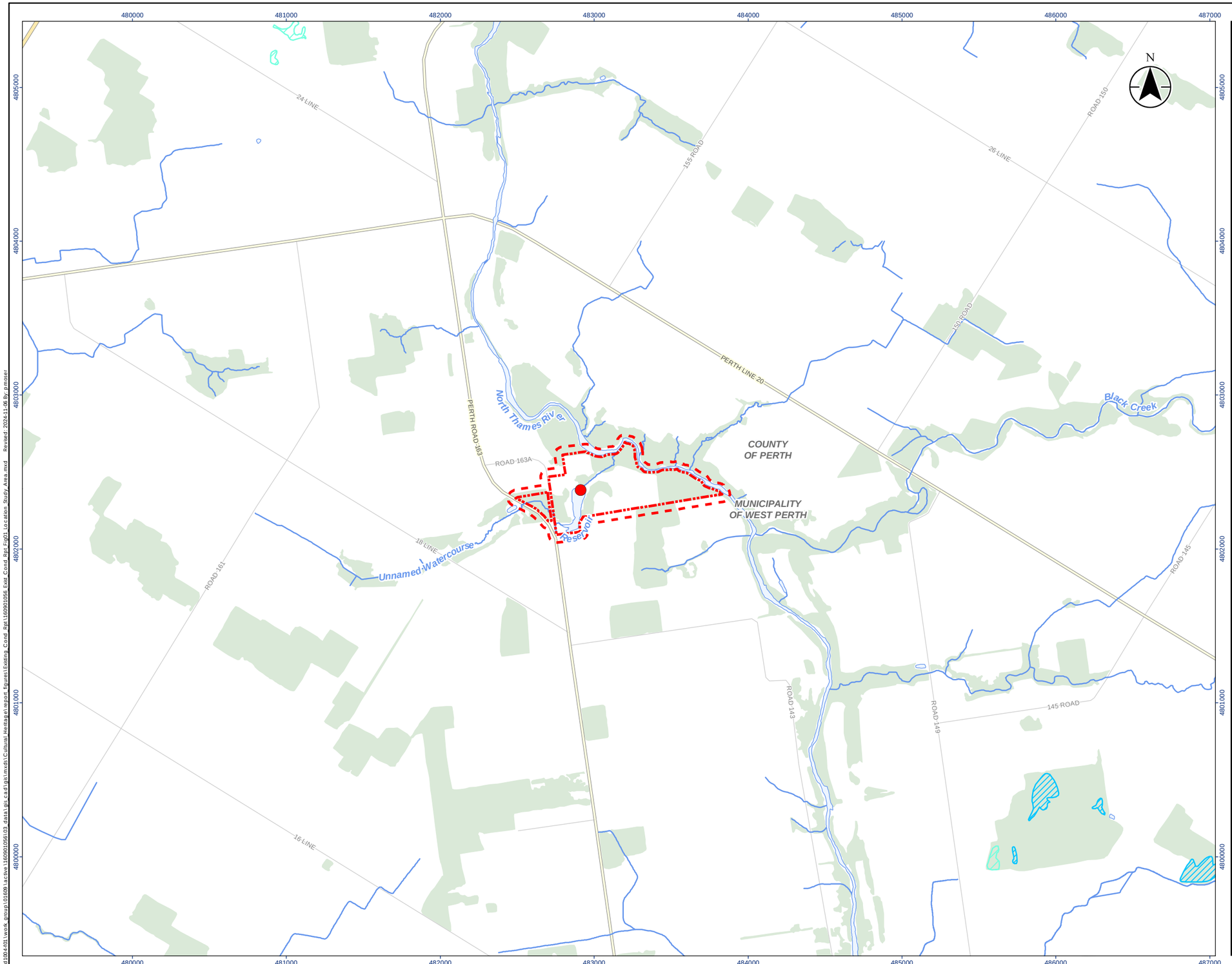
1.1 Study Purpose and Objectives

As part of a Municipal Class Environmental Assessment (MCEA), the Upper Thames River Conservation Authority (UTRCA) (the Client) retained Stantec Consulting Ltd. (Stantec) to support long term planning for the Fullarton Dam. The purpose of this project is to identify alternatives that address the safety deficiencies identified in the *Dam Safety Assessment* and to select a preferred management strategy for the dam that considers the natural environment and the social uses associated with the dam, reservoir and rest of the Fullarton Conservation Area. The Fullarton Dam was built in the 1950s and is located in the Fullarton Conservation Area, a 34 hectare site used for recreation (Figure 1 and Figure 2).

The requirement to consider cultural heritage in MCEA is discussed in the *Municipal Class Environmental Assessment Manual* (MCEA Manual) (Municipal Engineers Association 2015) and *Provincial Policy Statement* (PPS) (Government of Ontario 2020). The MCEA Manual considers cultural heritage, including built heritage resources and cultural heritage landscapes, as well as archaeological resources, as one in a series of environmental factors to be considered when undertaking an MCEA, particularly when describing existing and future conditions, development alternatives, and determination of the preferred alternative. To facilitate this Project, the Client retained Stantec to conduct a *Cultural Heritage Report: Existing Conditions and Preliminary Impact Assessment*.

For the *Cultural Heritage Report: Existing Conditions and Preliminary Impact Assessment*, Stantec defined a Study Area for the assessment that includes a 50 metre boundary around the Fullarton Conservation Area property parcel.

This *Cultural Heritage Report: Existing Conditions and Preliminary Impact Assessment* summarizes the applicable heritage policies, summarizes the Study Area's geography and history, identifies known and potential built heritage resources and cultural heritage landscapes, and screens the potential built heritage resources and cultural heritage landscapes for potential cultural heritage value or interest (CHVI) using the criteria prescribed in *Ontario Regulation* (O. Reg.) *9/06* of the *Ontario Heritage Act* (OHA). Based on this understanding of the Study Area and surrounding area, the potential impacts resulting from the Project are assessed, and future actions are recommended.



Stantec

Legend

- Fullarton Dam
- Expressway / Highway
- Major Road
- Minor Road
- Regulated Watercourse (UTRCA)
- Waterbody
- Wetland - Evaluated (Other)
- Wetland - Not evaluated per Ontario Wetland Evaluation System
- Wooded Area
- Fullarton Dam Property Boundary
- Study Area

0 0.5 1 km

1:25,000 (At original document size of 11x17)

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, 2023.



Project Location
County of Perth

160901056 REVA
Prepared by PRM on 2024-11-06
Technical Review by FS on 2024-11-06

Client/Project
CULTURAL HERITAGE REPORT: EXISTING CONDITIONS AND PRELIMINARY IMPACT ASSESSMENT - FULLARTON DAM REHABILITION

Figure No.
1

Title
Location of Study Area

Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.

\\cd1042401\work_group\01699\active\160901056\03_data\gis_cad_gis\mxds\Cultural Heritage\report_figures\Existing Cond_Rpt\160901056_Exist Cond_Rpt_Fig01_Location Study Area.mxd Revised: 2024-11-06 By: prmoser



Stantec

Legend

- Fullarton Dam
- Major Road
- Minor Road
- Regulated Watercourse (UTRCA)
- Waterbody
- Fullarton Dam Property Boundary
- Study Area

0 250 500 metres

1:10,000 (At original document size of 11x17)

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, 2023.
3. Orthoimagery © SWOOP UTRCA 2023, Imagery date 2020.



Project Location
County of Perth

160901056 REVA
Prepared by PRM on 2023-03-09
Technical Review by FS on 2023-03-09

Client/Project
CULTURAL HERITAGE REPORT: EXISTING CONDITIONS AND PRELIMINARY IMPACT ASSESSMENT - FULLARTON DAM REHABILITION

Figure No.
2

Title
Study Area

Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.

I:\cd1004-f01\work_group\01609\active\160901056\03_data\gis_cad\gis\mxds\Cultural_Heritage_report_figures\Existing_Cond_Rpt\160901056_Exist_Cond_Rpt_Fig02_Study_Area.mxd Revised: 2023-03-09 By: pmoser

2 Methodology

2.1 Requirements

The *Ontario Heritage Act* (OHA) provides the primary statutory framework for the conservation of cultural heritage resources in Ontario. Conservation of cultural heritage resources is a matter of provincial interest, as reflected in the OHA and Ministry of Citizenship and Multiculturalism (MCM) policies.

The requirement to consider cultural heritage in Municipal Class EAs (MCEA) is discussed in the *Municipal Class Environmental Assessment Manual* (MCEA Manual) (Municipal Engineers Association 2015) and the revised 2020 *Provincial Policy Statement* (PPS) (Government of Ontario 2020). The MCEA Manual considers cultural heritage, including built heritage resources and cultural heritage landscapes, as well as archaeological resources, as one in a series of environmental factors to be considered when undertaking an MCEA, particularly when describing existing and future conditions, development alternatives, and determination of the preferred alternative.

The MCEA Manual further suggests that cultural heritage resources that retain heritage attributes should be identified early in the environmental assessment (EA) process and avoided where possible. Where avoidance is not possible, potential effects to these attributes should be identified and minimized. Adverse impacts should be mitigated according to provincial and municipal guidelines. It is suggested that this happen early in the process so that potential impacts to significant features can be included in understanding project impacts and mitigation plans.

In addition to requirements outlined in the MCEA Manual, provisions made under the PPS were also considered in the preparation of the study. Section 2.6 of the PPS addresses cultural heritage in the land use planning process and was considered. The applicable provisions include:

> *2.6.1 - Significant built heritage resources and significant cultural heritage landscapes shall be conserved.*
>
> *2.6.3 - Planning authorities shall not permit development and site alteration on adjacent lands to protected heritage property except where the proposed development and site alteration has been evaluated, and it has been demonstrated that the heritage attributes of the protected heritage property will be conserved.*
>
> (Government of Ontario 2020)

2.2 Background History

To familiarize the study team with the Study Area, local historical resources were consulted, archival documents were reviewed, and a summary of the historical background of the local area was prepared. Specifically, historical mapping from 1879, 1927, 1959, 1960, 1975, and 1976 were reviewed to identify the presence of structures, settlements, and other potential built heritage resources and cultural heritage landscapes.

2.3 Municipal and Agency Consultation

Listings of provincially and locally designated properties, districts, and easements for the municipality were collected from the Ontario Heritage Trust (OHT), the MCM, and the Municipality of West Perth. Consultation with these interested agencies and municipalities within which the Project is proposed was undertaken to determine the presence of designated, listed, or registered heritage properties within the Study Area. Consultation with the public and Indigenous peoples is undertaken as part of the broader EA process. Built heritage resources or cultural heritage landscapes identified by the public of Indigenous peoples will be incorporated into this report.

2.4 Field Program

Frank Smith, Cultural Heritage Specialist with Stantec, conducted a pedestrian and vehicular windshield survey on January 27, 2023, from publicly accessible roadways unless specified otherwise. During the survey, the Study Area was surveyed for previously identified or potential built heritage resources or cultural heritage landscapes. These were photographed, their characteristics noted while in the field, and their locations digitally recorded.

Generally, buildings and structures older than 40 years of age were screened during the survey for their potential to satisfy O. Reg. 9/06 criteria and the MCM *Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes* (MCM 2016). Only properties containing buildings or structures determined to have the potential to satisfy O. Reg. 9/06 were inventoried. The use of the 40-year threshold is generally accepted by both the federal and provincial authorities as a preliminary screening measure for cultural heritage interest or value. This practice does not imply that all buildings and structures more than 40 years of age are inherently of significant heritage value, nor does it exclude exceptional examples constructed within the past 40 years of being of significant cultural heritage value.

2.5 Screening of Cultural Heritage Value or Interest

The criteria for determining CHVI is defined by O. Reg. 9/06 (See Section 2.5.1). Each potential heritage resource was screened both as an individual structure and as a potential cultural heritage landscape. Where potential CHVI was identified, a structure or landscape was assigned a built heritage resource (BHR) or cultural heritage landscape (CHL) number and the property was determined to contain a potential heritage resource.

2.5.1 Ontario Regulation 9/06

1. The property has design value or physical value because it is a rare, unique, representative or early example of a style, type, expression, material or construction method.

2. The property has design value or physical value because it displays a high degree of craftsmanship or artistic merit.

3. The property has design value or physical value because it demonstrates a high degree of technical or scientific achievement.

4. The property has historical value or associative value because it has direct associations with a theme, event, belief, person, activity, organization or institution that is significant to a community.

5. The property has historical value or associative value because it yields, or has the potential to yield, information that contributes to an understanding of a community or culture.

6. The property has historical value or associative value because it demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.

7. The property has contextual value because it is important in defining, maintaining or supporting the character of an area.

8. The property has contextual value because it is physically, functionally, visually or historically linked to its surroundings.

9. The property has contextual value because it is a landmark

(Government of Ontario 2023)

2.6 Assessment of Impacts

Where a component of a previously identified or potential built heritage resource or cultural heritage landscape was situated within the Study Area, the impacts of the proposed undertaking were evaluated. The impacts, both direct and indirect, are evaluated according to InfoSheet #5.

Seven potential negative effects have been identified, including:

1. Destruction of any, or part of any, significant heritage attributes or features
2. Alteration that is not sympathetic, or is incompatible, with the historic fabric and appearance
3. Shadows created that alter the appearance of a heritage attribute or change the viability of a natural feature or plantings, such as a garden
4. Isolation of a heritage attribute from its surrounding environment, context, or a significant relationship
5. Direct or indirect obstruction of significant views or vistas within, from, or of built and natural features
6. A change in land use such as rezoning a battlefield from open space to residential use, allowing new development or site alteration to fill in the formerly open spaces
7. Land disturbances such as a change in grade that alters soils and drainage patterns that adversely affect an archaeological resource

(Government of Ontario 2006)

In addition to direct effects related to destruction, the potential for indirect effects resulting from vibration due to construction and operation activities and the transportation of Project components and personnel were also evaluated. Although the existing effect of traffic and construction vibrations on historic period structures is not fully known, negative effects have been demonstrated on buildings with a setback of less than 40 metres from the curbside (Crispino and D'Apuzzo 2001; Ellis 1987; Rainer 1982; Wiss 1981; National Park Service 2001). The proximity of Project components to built heritage resources and cultural heritage landscapes was considered in this assessment, particularly those within 50 metres, to encompass a wide enough buffer zone to account for built resources less than 40 metres from curbside or potential Project activities. The 50-metre buffer represents a conservative approach to effects identification.

Indirect impacts resulting from land disturbances apply to archaeological resources, which are beyond the scope of this assessment. An Archaeological Assessment has been prepared under separate cover which addresses the archaeological potential of the Study Area and includes recommendations for further work (Stantec 2023). No further consideration to archaeological resources is provided in this report.

3 Existing Conditions

3.1 Background and Historical Research

3.1.1 Introduction

The Study Area is located in southwestern Ontario in the Municipality of West Perth, Perth County. The Study Area includes the Fullarton Conservation Area and a 50-metre buffer surrounding the conservation area's property parcel. The Study Area is historically located in the former Township of Fullarton in the following lots and concessions:

- Lots 15-17, Mitchell Road East Side
- Lots 16-17, Mitchell Road West Side
- Lots 12-14, Concession 9

The County of Perth is located on the traditional lands of the Anishinaabe peoples (West Perth Public Libraries 2021; Stratford Beacon Herald 2022; Native Land 2023). The Study Area and Perth County is located on land covered under Treaty 29, also known as the Huron Tract Purchase. This treaty was signed in 1827 between the Crown and certain Anishinaabe peoples. The treaty covered approximately 2.2 million acres of land in southwestern Ontario (Ministry of Indigenous Affairs 2023).

3.1.2 Physiography

The Study Area is situated within the Stratford Till Plain physiographic region of southern Ontario. The Stratford Till Plain is a broad clay till plain extending from London to the Grand River Valley. The plain consists of a large ground moraine interrupted by several terminal moraines. It is divided in its drainage by the Thames River in the centre and southern areas and by the Grand River in the northern area. The plain is included within the Lake Huron lake-effect belt and receives more precipitation than average in southern Ontario. This, combined with the good natural soil fertility, allows it to be one of the most agriculturally productive areas in Ontario (Chapman and Putnam 1984: 133-134).

Part of the north branch of the Thames River is located within the Study Area. The Thames River is part of the Canadian Heritage River Systems (CHRS) and is 273 kilometres in length. The three branches of the Thames River begin near Mitchell, Hickson, and Tavistock. The upper parts of the Thames River are located in a former glacial spillway. This area contains rocky riverbeds and steep valleys. The north and south branches of the Thames River confluence near downtown London. West of London, the Thames River is located in a shallow channel that was carved by the river. The river empties into Lake St. Clair at Lighthouse Cove (CHRS 2022). The Thames River was historically known as the *Deshkan Ziibi* (Antler River) to the Anishinaabe, *Askunessippi* (Antlered River) to the Neutral People, and *La Tranche* to French explorers. In 1793, it was named the Thames River by Lieutenant Governor John Graves Simcoe (UTRCA 2023a).

3.1.3 Township of Fullarton

Survey and Settlement

The Township of Fullarton was originally part of a large land grant to the Canada Company known as the Huron Tract. The Canada Company was formed in 1826 to assist in the improvement, settlement, and administration of land holdings in Upper Canada (Karr 1974: 3). The privately owned company was organized under the leadership of John Galt with financial backing from merchants in London, England (Karr 1974: 7). The Canada Company was modeled on similar settlement schemes in Australia and New York State (Karr 1974: 8-9). While the company originally intended to purchase all the Crown Reserves and half the Clergy Reserves of the colony, this was met with opposition by John Strachan, Anglican Bishop of Toronto, and his allies in Britain. After several rounds of negotiation, the Canada Company forewent the purchase of Clergy Reserves and instead opted to purchase a one million acre tract in the London and Western District known as the Huron Tract (Karr 1974: 12). In 1827, the boundaries of Huron Tract were finalized, and William Dunlop was dispatched to explore the area (Karr 1974: 30). To facilitate settlement, Canada Company placed agents in the British Isles and the United States to advertise lands for sale and work started on the Huron Road to connect Guelph to the edge of the Huron Tract (Karr 1974: 25; 33).

The baseline of the survey for Fullarton Township was laid out along the south side of the Huron Road by Dunlop and his exploration party in 1829. The townships of South Easthope, Downie, and Ellice also contain baselines along the south side of the Huron Road (Johnston and Johnston 1967: 6). Fullarton Township was named in honour of John Fullarton, a Directory of the Canada Company (Gardiner 1899: 351). Many of the townships in Perth County were named in honour of Canada Company officials (Gardiner 1899: 350). The survey of Fullarton Township was completed in 1835 by John McDonald (Association of Ontario Land Surveyors [AOLS] 1997; Canada Company 1835). The township was surveyed using a special variant used to survey Canada Company lands (AOLS 1997). This system of survey was first used by the Canada Company to survey the Huron Tract and created 100 acres lots that measured 20 chains by 50 chains (1,320 feet by 3,300 feet). Road allowances were located every alternate concession and every fifth lot. Survey lines were located in the centre of road allowances and this created sections of 1,000 acres with ten lots of 100 acres each (Plate 1). In 1850, this survey system was adopted for use in Crown surveys and much of Ontario between Georgian Bay and the Ottawa River was surveyed using this system (Weaver 1968: 16).

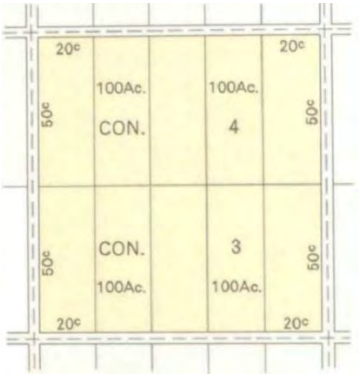


Plate 1: 1,000 Acre Sectional Survey System (Dean 1968)

The Huron Tract grew slowly during the 1830s as Canada Company officials in London, England frequently dictated impractical policy and cheaper land remained widely available elsewhere in Upper Canada (Kerr 1974: 52). By the close of the 1830s, Fullarton Township only contained 11 families (Kerr 1974: 97).

19th Century Development

Immigration to the Huron Tract and Fullarton Township increased during the 1840s. During this time, the Canada Company loosened its direct control of the Huron Tract and initiated a leasing plan to offset the costs associated with relocating to Upper Canada (Kerr 1974: 123-124). By 1844, just over 8,000 acres of land had been sold or leased in Fullarton Township and the population was recorded as 236. However, the township clearly remained in the early stages of development as only 393 acres of land were under cultivation (Kerr 1974: 120). In 1846, *Smith's Canadian Gazetteer* described the township's soil as "mostly good" and noted the population was 419 (Smith 1846: 61).

The most important roadway in Fullarton Township during the mid-19th century was the Mitchell Road (present day County Road 163 and County Road 163A), which is partially located within the Study Area. The road was opened in 1844 to connect St. Mary's and Mitchell. However, conditions on this roadway remained rudimentary and consisted of a narrow strip of land mostly cleared of trees with no bridges over water courses. This road was the last road financed by the Canada Company in present-day Perth County (Johnson and Johnson 1967: 183). Mitchell Road was finally improved in the 1850s by private efforts (Johnson and Johnson 1967: 188).

Fullarton Township was originally located in the Huron District, which was seated in Goderich. Settlers in the Huron District near Stratford resented the considerable distance required to travel to Goderich and petitioned to have the Huron District subdivided (Johnson and Johnson 1967: 37). In 1850, as part of the *Baldwin Act* to establish municipal government, the County of Perth was formed. The new county was comprised of 11 townships from the former Huron District and District of Wellington (Johnson and Johnson 1967: 56-57).

In 1857, the Buffalo and Lake Huron Railway was completed through Fullarton Township and reached Mitchell. The community became an important shipping point and grew to become Fullarton Township's most significant community. As a result, Mitchell was incorporated as a village (Johnson and Johnson 1967: 78). Other hamlets in the township included Fullarton, Russeldale, and Carlingford (Belden 1879). During the 1850s, the township's population grew rapidly and increased from 1,750 in 1851 to 2,890 in 1861 (Census of the Canadas 1853; Census of the Canadas 1861). In 1861, the township contained 405 farmsteads on 36,566 acres of land. A total of 14,006 acres of land were under cultivation (Census of the Canadas 1864).

The population of Fullarton Township reached a peak of 2,903 in 1871. For the remainder of the 19th century and into the mid-20th century the township entered into a period of population decline. In 1891, the population of the township was recorded as 2,511 (Dominion Bureau of Statistics 1953a). The contraction of Fullarton Township's population was part of a broader trend of urbanization in the late 19th and early 20th centuries. The emergence of industrialization increased the number of wage workers required in cities and towns. At the same time, improvements in farm equipment and the mechanization of farming meant that less labour was required on a farm (Samson 2012). This encouraged out-migration from rural areas to the burgeoning cities of Ontario (Drummond 1987: 30).

20th Century Development

Between 1901 and 1911, the population of Fullarton Township decreased from 2,295 to 1,965 (Dominion Bureau of Statistics 1953a). However, the amount of improved land in the township remained high because of agricultural mechanization. The Census of 1911 recorded 401 farmsteads in the township on 40,089 acres of land. A total of 35,399 acres of land was considered improved and only 5,974 acres of land was considered unimproved (Census of Canada 1911).

The township's population decline continued into the early 1950s. In 1951, the population of the township was recorded as 1,548 (Dominion Bureau of Statistics 1953a). That year, the township contained 336 farmsteads on 39,853 acres. The amount of improved land in the township was recorded as 35,175 acres. This improved land included 21,793 acres of crops and 11,207 acres of pasture. The remainder of improved land was fallow or classified as "other" (Dominion Bureau of Statistics 1953b). The continuous population decline of Fullarton Township was reversed in 1956 when the population increased by 65 people between 1951 and 1956 (Johnson and Johnson 1967: 443). After this, the population of the township stabilized at around 1,500 individuals into the 1980s (Johnson and Johnson 1967: 443; Statistics Canada 1982). Located relatively far from major roadways and cities, agriculture continued to remain the dominant economic driver of the township through the remainder of the 20th century and into the present-day.

Beginning in the mid-1990s, the provincial government embarked on a program of municipal restructuring to reduce the total number of municipalities in Ontario. Between 1996 and 2001, the number of municipalities in Ontario was reduced from 815 to 471 (Rusk 2000). As part of this restructuring, the number of municipalities in Perth County was reduced from 14 to four in 1998. The Township of Fullarton was amalgamated with Hibbert Township, Logan Township, and the Town of Mitchell to form the lower-tier Municipality of West Perth (Perth County 2023; Municipal Affairs and Housing 2023). Stratford and

St. Mary's continued to operate outside of county government (Perth County 2023). The population of West Perth was recorded as 8,865 in 2016 (Statistics Canada 2021).

3.1.4 Site History

Like much of Fullarton Township, the Study Area was mostly settled in the 1850s. The Study Area contains five lots situated along the Mitchell Road, an important early roadway through the township. The remainder of the Study Area is located on lots that back onto the Thames River in Concession 9 of the township. All the lots in the Study Area were originally patented to the Canada Company by the Crown. Table 1 contains a list of the individuals in the Study Area to receive title to their lot from the Canada Company.

Table 1 Canada Company Land Sales in Study Area

Lot, Concession	Date of Instrument	Grantee	Source
Lot 15, Mitchell Road East Side	March 24, 1855	James Baker	OnLand 2023a
Lot 16, Mitchell Road East Side	January 29, 1856	John C.W. Daly	OnLand 2023a
Lot 17, Mitchell Road East Side	June 6, 1845	Robert Porteous	OnLand 2023a
Lot 16, Mitchell Road West Side	September 9, 1854	William Haynes	OnLand 2023b
Lot 17, Mitchell Road West Side	March 2, 1849	Thomas Robertson	OnLand 2023b
Lot 12, Concession 9	March 8, 1853	Daniel Colgan	OnLand 2023c
Lot 13, Concession 9	May 15, 1852	Colin McNicol	OnLand 2023c
Lot 14, Concession 9	July 12, 1855	Malcolm McNeil	OnLand 2023c

Among these first landowners, John C.W. Daly can be confirmed as a land speculator. Daly was a land agent of the Canada Company and settled in Stratford in the second frame home built in the settlement (Swainson 1972). Daly amassed significant power in the area through his association with the Canada Company and his appointments as magistrate, coroner, and district councillor. In addition, he owned a mill and ran the post office. Daly was also known for his significant land holdings, this included Lot 16, Mitchell Road East in the Study Area (Johnson and Johnson 1967: 43). The remainder of the lots in the Study Area were likely settled and farmed by the individuals who purchased land from the Canada Company.

Historical mapping from 1879 indicates that many of these original settlers or their descendants remained within the Study Area including the Baker, Porteous, Haynes, Colgan, and McNeil families. The mapping depicts the Study Area along Mitchell Road lined with structures and shows that the lots in Concession 9 also contained structures (Figure 3). The Census of 1881 contains the following entries for the lot occupants. Lot 15, Mitchell Road East was occupied by H. [Henry] Baker, likely a relative of the original landowner James Baker. Henry Baker was enumerated as a 47-year-old farmer born in England. He lived with his wife Elizabeth, age 45, and three children between the ages of 14 and 23. Lot 16, Mitchell Road East was occupied by R. [Richard] Sandercook. He was enumerated as a 57-year-old farmer born in England. He lived with his wife Anne, age 63. Lot 17, Mitchell Road East was occupied by W. [William]

Porteous. He was enumerated as a 55-year-old farmer born in Ontario. He lived with Mary, age 33. Lot 16, Mitchell Road West was occupied by E. [Edward] Haynes (spelled Haines in census records), a 27-year-old farmer born in Ontario. He lived with his wife Christiana, age 26, a 23 year old relative whose first name is illegible, and three children between the ages of six months and three. Lot 17, Mitchell Road West was occupied by T. [Thomas] Currelley. He was enumerated as 43-year-old farmer born in Ontario. He lived with his wife Mary, age 46, and five children between the ages of nine and 18. Lot 12, Concession 9 was occupied by Daniel Colgan. He was enumerated as a 60-year-old farmer born in Ireland. He lived with his three children between the ages of 19 and 26. Lot 13, Concession 9 was occupied by G. Brown. The Census of 1881 does not list anyone with the first name starting with G as a head of a household in Fullarton Township in 1881. Lot 14, Concession 9 was occupied by M. [Malcolm] McNeil. He was enumerated as a 67-year-old farmer born in Scotland. He lived with his wife Margaret, age 57, and their three children between the ages of 18 and 24 (Library and Archives Canada 1881). Descendants of Malcolm McNeil remained on Lot 14, Concession 9 until at least the Canadian Centennial in 1967 as their farmstead was noted as a “Centennial Farm” in Perth County. A Centennial Farm was a farmstead occupied by the same family since at least 1867 (Johnson and Johnson 1967: 449).

Topographic mapping from 1927 shows that the Study Area remained rural. The mapping shows that Mitchell Road had been improved into a gravel road, indicating it remained an important transportation route in the township. Present-day County Road 20 along Concession 9 remained unimproved. The mapping depicts a bridge crossing the stream that is presently dammed by the earthen structure in the Study Area (Figure 4).

In 1953, 77 acres of Lot 16 Mitchell Road East and four acres of Lot 17, Mitchell Road East were sold to the UTRCA by Alonzo Hart and Ernest Rogers respectively (OnLand 2023a). The UTRCA was formed in 1947 to implement flood control measures in the upper watershed of the Thames River (UTRCA 2023b). In 1955, the UTRCA built a nine foot high and 300 foot long earth dam in the Study Area along a stream inhabited by trout fish. This dam was primarily recreational in purpose but served a secondary purpose as part of wider floor control measures in the upper Thames watershed (UTRCA 2023c; UTRCA 2023d). The Fullarton Dam was one of several recreational earth dams built or reconstructed by UTRCA in the 1950s. Other earth dams completed by UTRCA in the 1950s include the Shakespeare Dam (built 1954), Embro Dam (reconstructed 1959), and the Dorchester Dam (built 1958) (UTRCA 2023 e; UTRCA 2023f; UTRCA 2015;). Topographic mapping from 1959 to 1960 shows the dam and pond. The mapping also indicates that Mitchell Road remained paved in gravel (Figure 5). Earth dams (also called embankment dams) have been frequently built in North America over the last 100 years. As of 2002, 72% of all dams in the United States are these types of structures (Bureau of Reclamation 2002).

Between 1962 and 1966, the area around the dam owned by UTRCA was developed into a public park (UTRCA 2023c). In 1967, Norman Clarke sold for $1 an unspecified amount of land in Lot 16, Mitchell Road West to complete the acquisition of the present-day footprint of UTRCA lands within the Study Area (OnLand 2023b). Topographic mapping from 1975 and 1976 shows the pond had grown in size. The mapping also shows that the present-day alignment of Mitchell Road had been completed and the roadway and new alignment were paved with asphalt (Figure 6).



Legend

- Fullarton Dam Property Boundary
- Study Area

Figure Not to Scale

Notes

1. Belden, H. & Co. 1879. Illustrated Historical Atlas of the County of Perth, Ont. Toronto: H. Belden & Co.



Project Location
County of Perth

160901056 REVA
Prepared by PRM on 2023-03-09
Technical Review by FS on 2023-03-09

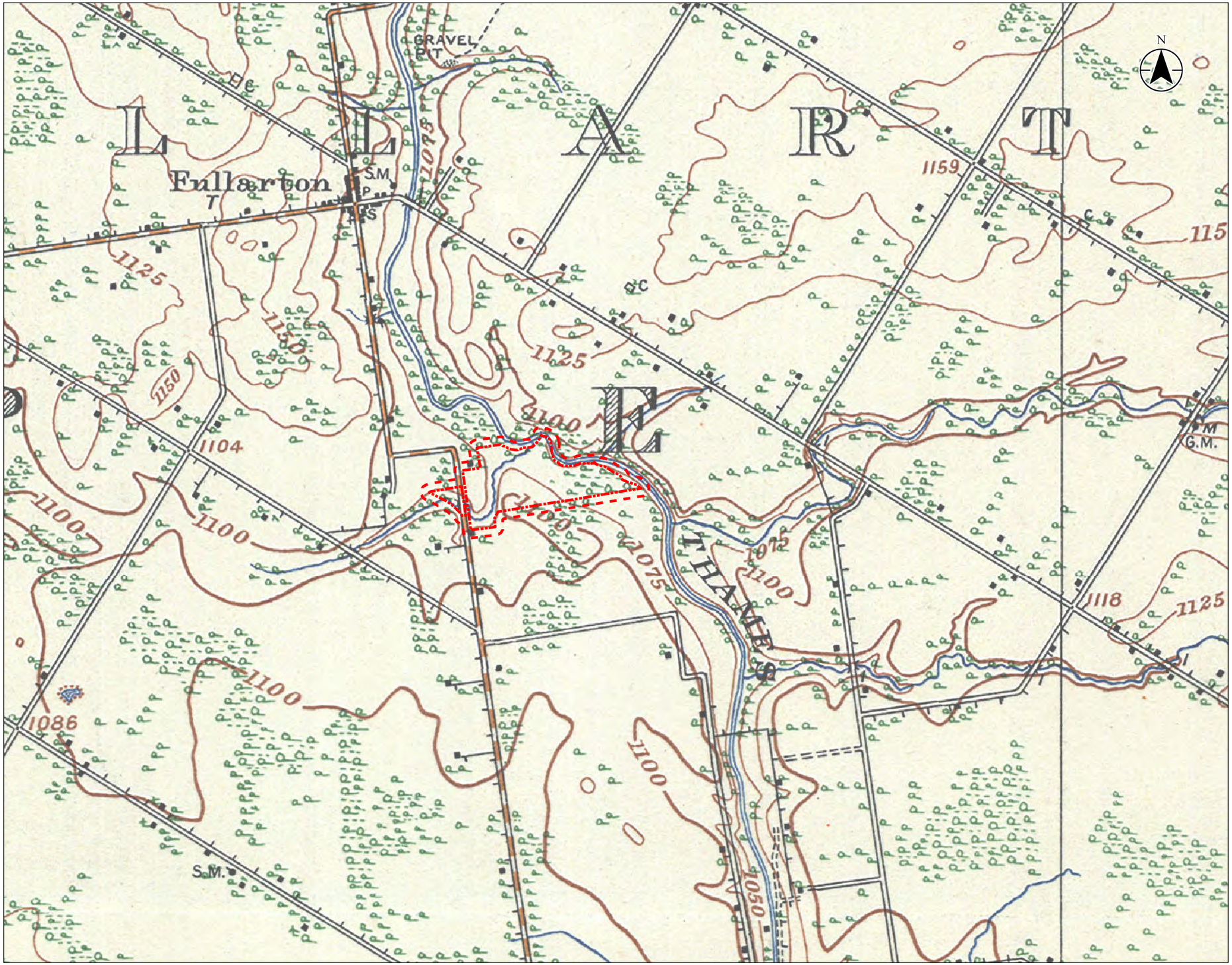
Client/Project
CULTURAL HERITAGE REPORT: EXISTING CONDITIONS AND PRELIMINARY IMPACT ASSESSMENT - FULLARTON DAM REHABILITION

Figure No.
3

Title
Historical Mapping, 1879

Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.

\\cd1004-f01\work group\105\09\160901056\03 data\gis\mxds\Cultural Heritage\report figures\Existing Cond Rpt\160901056 Exist Cond Rpt Fig03 Historic Map 1879 Fullarton_fwhip.mxd Revised: 2023-03-09 By: pmoser



Stantec

Legend

- Fullarton Dam Property Boundary
- Study Area

Figure Not to Scale

Notes

Department of National Defence. 1927. Topographic Map, Ontario, St. Mary's Sheet



Project Location
County of Perth

160901056 REVA
Prepared by PRM on 2023-03-09
Technical Review by FS on 2023-03-09

Client/Project

CULTURAL HERITAGE REPORT: EXISTING CONDITIONS AND PRELIMINARY IMPACT ASSESSMENT - FULLARTON DAM REHABILITION

Figure No.

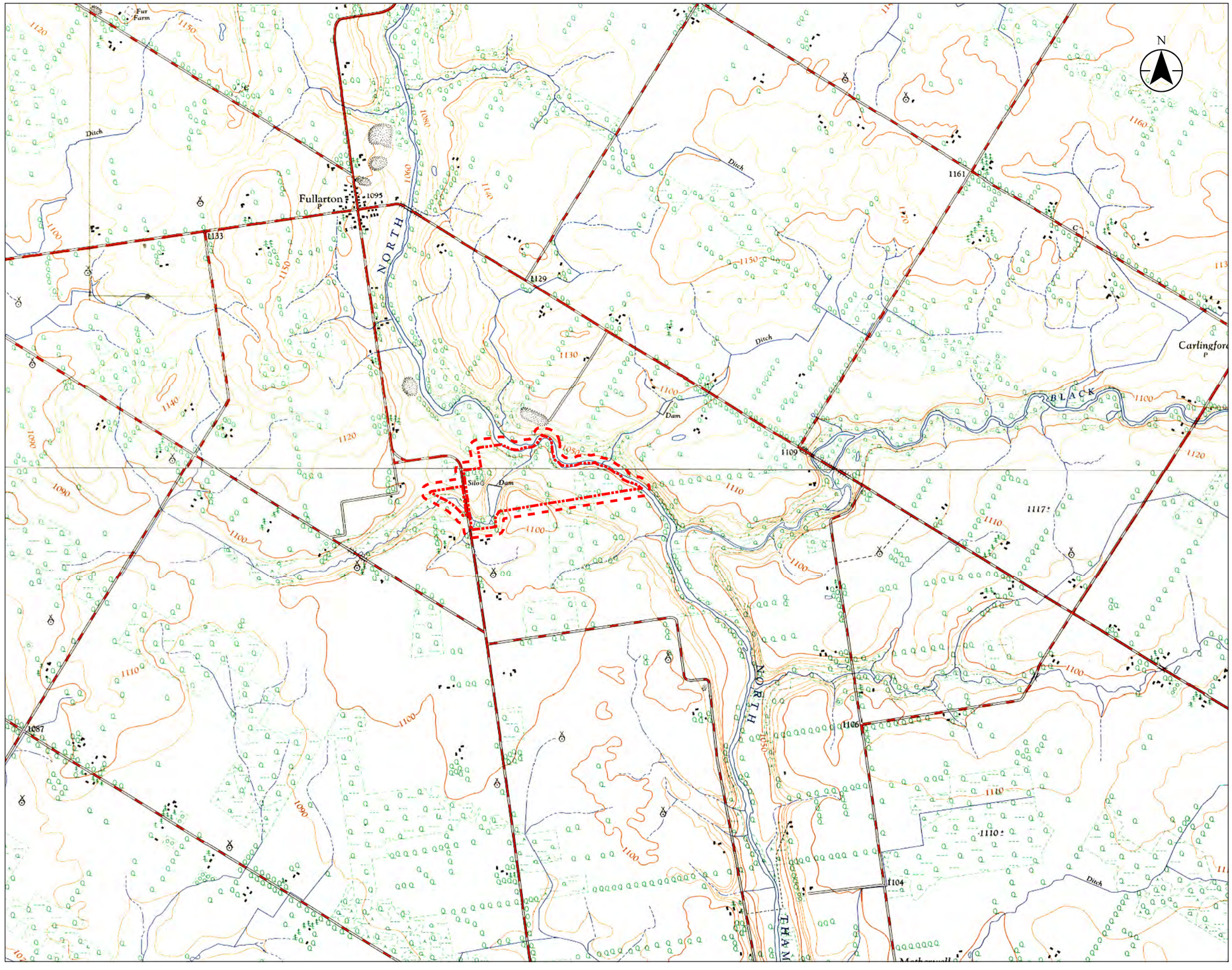
4

Title

Topographic Mapping, 1927

Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.

\\cd1004-f01\work_group\01\609\active\160901056\03_data\gis_cad\gis\mxds\Cultural Heritage\report figures\Existing_Cond_Rpt\160901056_Exist_Cond_Rpt_Fig04_Topographic_Map_1927.mxd Revised: 2023-03-09 By: pmorse



Stantec

Legend

- Fullarton Dam Property Boundary
- Study Area

Figure Not to Scale

Notes

1. Army Survey Establishment. 1959. St. Mary's, Perth County, Ontario.
2. Army Survey Establishment. 1960. Mitchell, Perth County, Ontario.



Project Location
County of Perth

160901056 REVA
Prepared by PRM on 2023-03-09
Technical Review by FS on 2023-03-09

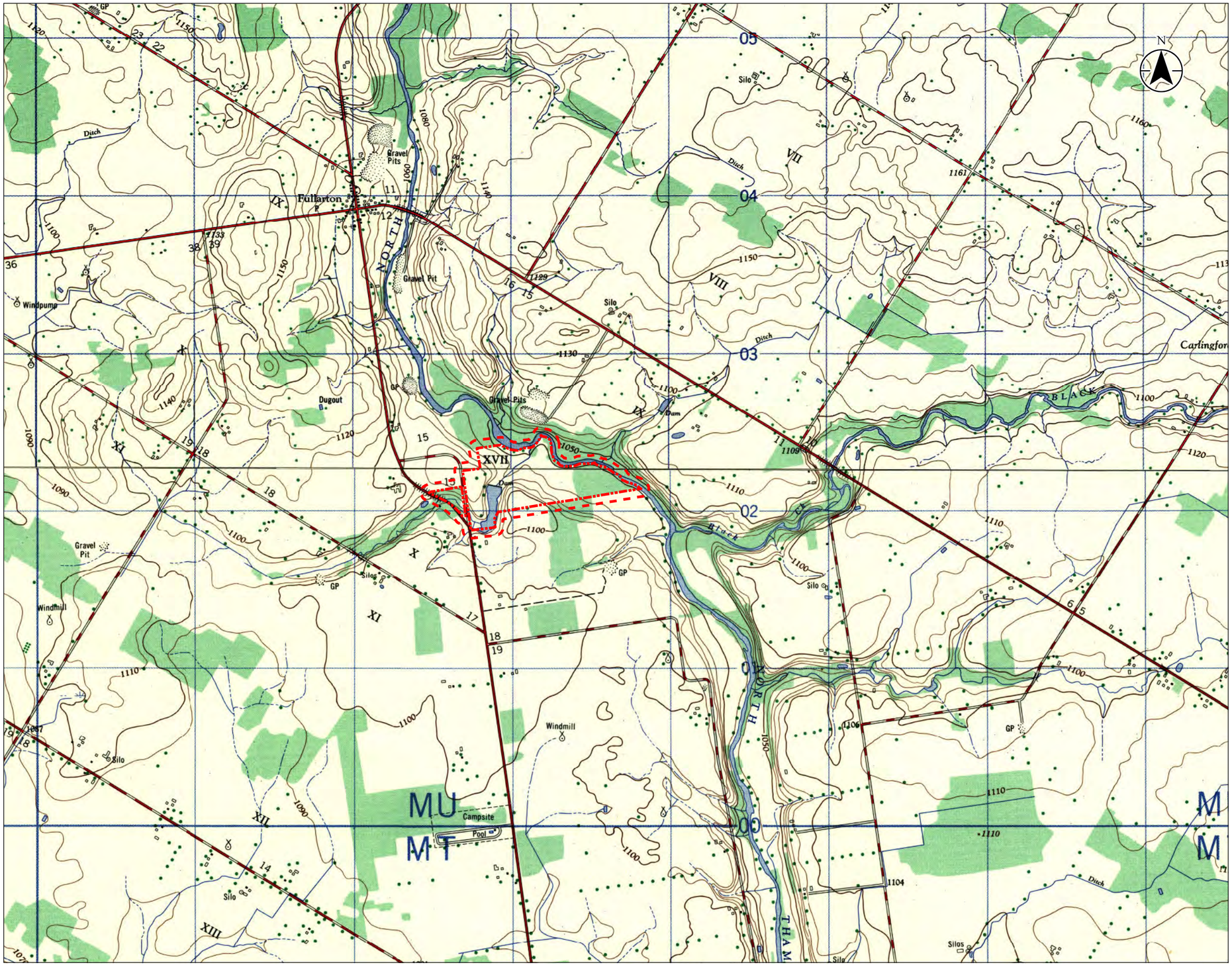
Client/Project
CULTURAL HERITAGE REPORT: EXISTING CONDITIONS AND PRELIMINARY IMPACT ASSESSMENT - FULLARTON DAM REHABILITION

Figure No.
5

Title
Topographic Mapping, 1959-1960

Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.

\\cd1004-f01\work_group\01\609\active\160901056\03_data\gis_cad\gis\mxds\Cultural Heritage\report figures\Existing Cond Rpt 160901056 Exist Cond Rpt_Fig05_Topographic_Map_1960.mxd Revised: 2023-03-09 By: pmorse



Stantec

Legend

- Fullarton Dam Property Boundary
- Study Area

Figure Not to Scale

Notes

1. Department of Energy, Mines, and Resources. 1975. St. Mary's, Perth County, Ontario. Ottawa: Canada Map Office.
2. Department of Energy, Mines, and Resources. 1976. Mitchell, Perth County, Ontario. Ottawa: Canada Map Office.



Project Location
County of Perth

160901056 REVA
Prepared by PRM on 2023-03-09
Technical Review by FS on 2023-03-09

Client/Project
CULTURAL HERITAGE REPORT: EXISTING CONDITIONS AND PRELIMINARY IMPACT ASSESSMENT - FULLARTON DAM REHABILITION

Figure No.
6

Title
Topographic Mapping, 1975-1976

Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.

\\cat1041\work_group\01409\active\160901056\08_data\gis_cad\gis\mxds\Cultural Heritage\report figures\Existing Cond Rpt\160901056_Exist Cond Rpt Fig06_Topographic Map_1976.mxd Revised: 2023-03-09 By: pmoore

3.2 Municipal and Agency Requests

To identify previously identified built heritage resources or cultural heritage landscapes, the MCM, Ontario Heritage Trust (OHT), and Municipality of West Perth were contacted, and municipal heritage registers were reviewed. The results of the information requests are presented in Table 2. Consultation with Indigenous communities and the general public is carried out as part of the broader EA process. A summary of these consultations is contained in the *Environmental Study Report for Fullarton Dam Rehabilitation* (Stantec 2024). Should built heritage resources and cultural heritage landscapes be identified by the general public and Indigenous communities during the course of consultation, they will be incorporated into the findings of this report.

Table 2 Information Request Results

Organization	Contact	Results
MCM	Karla Barboza, Team Lead, Heritage	MCM replied that it is not aware of any provincial heritage properties within or adjacent to the Study Area.
OHT	Kevin Baksh, Provincial Heritage Registrar	The OHT does not have any conservation easements or trust-owned properties within or adjacent to the Study Area.
West Perth	Municipal Website	A response from the municipality was not received.

3.3 Identification of Known and Potential Built Heritage Resources and Cultural Heritage Landscapes

As described in Section 2.4, a windshield and pedestrian survey of the Study Area was undertaken to identify potential built heritage resources and cultural heritage landscapes within the Study Area and confirm the presence of previously identified protected properties. Where identified, the site was photographically documented from publicly accessible roadways, and its location was digitally recorded.

The Study Area is situated within and adjacent to the Fullarton Conservation Area, located on Perth Road 163 and Perth Road 163A. Perth Road 163 is a two-lane asphalt paved roadway with gravel shoulders and no curbs. Perth Road 163A is a gravel paved roadway that is located on an alignment of the former Mitchell Road that was bypassed in the mid-20th century (Photo 1 and Photo 2). Perth Road 163A now serves as an access route to the Fullarton Conservation Area. Timber utility poles follow the original alignment of the Mitchell Road on Perth Road 163 and Perth Road 163A (Photo 3 and Photo 4). The general character of the area is rural and agricultural. Perth Road 163 is mostly lined with a mix of mid-19th to late-20th century agricultural properties with large agricultural fields and Perth Road 163A is surrounded by agricultural fields and recreational land part of the Fullarton Conservation Area.

The Fullarton Conservation Area contains baseball fields, a picnic area, nature trails, and wood lots (Photo 5). The Fullarton Dam is located approximately 165 metres east of Perth Road 163A. The dam is an earthen structure with a pathway along the top of the dam. Both slopes of the dam contain vegetation in early stages of ecological succession. The pond formed by the dam is located on the south side of the dam. The stream on the north side of the dam flows into the Thames River (Photo 6).



Photo 1 **Perth Road 163, looking south**



Photo 2 **Perth Road 163, looking north**



Photo 3 **Perth Road 163A, looking east**



Photo 4 **Perth Road 163A, looking west**



Photo 5 **Fullarton Conservation Area, looking east**



Photo 6 **Fullarton Dam, looking east**

As described in Section 2, known and potential built heritage resources and cultural heritage landscapes were assessed based on the MCM *Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes* (MCM 2016), which was supplemented by historical research, field investigations, and professional judgement. Properties with buildings or structures 40 or more years old were field documented and screened as having potential CHVI if they met one or more of the criteria prescribed in *O. Reg. 9/06*. Also, each property was considered both as an individual built heritage resource and as part of a larger potential cultural heritage landscape. If a property contained a known or potential built heritage resource or cultural heritage landscape, the built heritage resource (referred to as BHR) and cultural heritage landscape (referred to as CHL) was assigned a number. A total of seven properties and the Thames River were screened. Following application of the screening criteria, three built heritage resources and one cultural heritage landscape was identified.

While the Study Area contains several agricultural properties with multiple built and landscape components, they were not considered cultural heritage landscapes as they remain active agricultural operations with circulation routes, modern structures, and farming methods that do not resemble 19th and early 20th century farmsteads in southern Ontario.

Properties screened and determined not to contain a potential for CHVI include 5461 Perth Line 20, 2978 Perth Road 163, and the Fullarton Conservation Area (including the dam). The properties on 5461 Perth Line 20 and 2978 Perth Road 163 contain modern or heavily modified structures. The Fullarton Conservation Area is one of many recreational areas operated by UTRCA and the Fullarton Dam is one of several earthen dams built by UTRCA in the 1950s. This style of dam remains prevalent across Canada and the United States, including among the dams operated by UTRCA.

An inventory of the built heritage resources and cultural heritage landscape identified within the Study Area through documentary research and field investigations is provided in the following section in Table 3. These identified built heritage resources and cultural heritage landscapes are mapped in Figure 7.

Table 3 Known or Potential Built Heritage Resources and Cultural Heritage Landscapes

Reference Number	Type of Property	Location	Heritage Recognition	Description of Known or Potential CHVI	Photograph
BHR-1	Farmstead	3049 Perth Road 163	Identified during field program	This property contains a farmstead comprised of a residence, barn, outbuilding and silos. The residence is a two and one half storey structure with a medium pitched hip roof with a centre gable peak with bargeboard and a wood sash window. The exterior of the residence is red brick and the residence contains a mix of vinyl sash and wood sash windows with stone or concrete lintels. The front façade contains a full width porch and balcony with rusticated concrete block and wood porch support columns. The foundation is poured concrete or concrete parging. The rear (east) façade of the residence contains a hip roof and gable roof addition. The barn is a gable roof bank barn with a stone foundation and earth ramp. The barn is clad in metal siding. The barn contains gable and shed roof additions on the south, east, and north facades. The barn additions are also clad in metal. A small mid-20th century to late 20th century gable roof outbuilding clad in metal is located between the barn and residence. Three cast-in-place concrete silos are located just west of the barn. The property is landscaped with deciduous and coniferous trees, shrubs, and agricultural fields. The residence was likely built between 1900 and 1927 based on architectural style and topographic mapping. The barn was likely built between 1854 and 1880 based on settlement patterns, materials, and architectural style. The residence has potential design value as a representative example of an early 20th century Ontario vernacular structure with a predominantly Edwardian design influence. The barn has potential design value as a representative example of a Central Ontario barn.	
BHR-2	Farmstead	2954 Perth Road 163	Identified during field program	This property contains a farmstead comprised of a residence, barn, outbuildings, and silos. The residence is a two storey structure with a cross hip roof with wood brackets. The exterior of the residence is buff brick and contains segmental arch window openings with modern windows and buff brick drip moulds. The front (east) façade contains a partial width front porch. The foundation is stone. The barn is a gable roof bank barn with an earth ramp, metal cladding, and a stone foundation. The barn contains a gable roof addition on the west façade and a gable roof addition on the north façade connected to two cast-in-place concrete silos. The property contains four mid-20th century to late 20th century gable roof outbuildings with a mix of wood and metal cladding. The property is landscaped with deciduous and coniferous trees, a post and wire fence, and agricultural fields. The residence was likely built between 1871 and 1910 based on historical research, architectural style, and materials. The barn was likely built between 1849 and 1880 based on historical research, materials, and architectural style. The residence has potential design value as a representative example of a late 19th to early 20th century Ontario vernacular structure with Italianate design elements. The barn has potential design value as a representative example of a Central Ontario barn.	
BHR-3	Residence	2955 Perth Road 163	Identified during field program	This property contains a residence and outbuildings. The residence is a one and one half storey structure with a medium pitched side gable roof with return eaves and bookend concrete block chimneys. The exterior of the residence is stone and wood sash windows and stone lintels. The front (west) façade is symmetrical in composition and contains a pointed arch window above the main entrance. The main entrance contains a modern frontispiece and stone soldier course. The rear (east) of the residence contains a gable roof addition clad in stone with two gable dormers. A hip roof garage is attached to this gable addition. The property contains two mid-20th to late 20th century gable roof outbuildings clad in metal and a mid-20th century to late 20th century gambrel roof outbuilding clad in timber. The residence was likely built between 1862 and 1890 based on historical research, architectural style, and materials. The residence has potential design value as a representative example of mid-19th to late 19th century Ontario vernacular structure with Classic Revival and Gothic Revival design influences.	

Reference Number	Type of Property	Location	Heritage Recognition	Description of Known or Potential CHVI	Photograph
CHL-1	River	N/A—Thames River	Canadian Heritage River Systems	The Thames River is part of the CHRS and is 273 kilometres in length. The three branches of the Thames River begin near Mitchell, Hickson, and Tavistock. The Thames River within and adjacent to the Study Area is located within a shallow valley and largely surrounded by riparian vegetation and mature trees. The Thames River contains historical and associative value for its role with Indigenous communities for over 11,000 years and its history of European exploration and settlement beginning in the 17th century (CHRS 2023). As a result, the Thames River played an important role in the development and settlement of southwestern Ontario.	



Stantec

Legend

- Fullarton Dam
- Built Heritage
- Cultural Heritage Landscape
- Major Road
- Minor Road
- Regulated Watercourse (UTRCA)
- Waterbody
- Fullarton Dam Property Boundary
- Study Area

0 250 500 metres

1:10,000 (At original document size of 11x17)

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, 2023.
3. Orthoimagery © SWOOP UTRCA 2023, Imagery date 2020.



Project Location
County of Perth

160901056 REVA
Prepared by PRM on 2023-03-09
Technical Review by FS on 2023-03-09

Client/Project
CULTURAL HERITAGE REPORT: EXISTING CONDITIONS AND PRELIMINARY IMPACT ASSESSMENT - FULLARTON DAM REHABILITION

Figure No.
7

Title
Known and Potential Built Heritage Resources and Cultural Heritage Landscapes

Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.

I:\cd\004-f01\work_group\01\609\active\160901056\GIS_data\gis_cad\gis\mxds\Cultural_Heritage_report_figures\Existing_Cond_Rpt\160901056_Exist_Cond_Rpt_Fig07_Potential_Heritage_Resources.mxd Revised: 2023-03-09 By: pmoser

4 Preliminary Impact Assessment

4.1 Description of Proposed Undertaking

The UTRCA retained Stantec to support long term planning for the Fullarton Dam. The purpose of this project is to identify alternatives that address the safety deficiencies identified in the Dam Safety Assessment and to select a preferred management strategy for the dam that considers the natural environment and the social uses associated with the dam, reservoir, and rest of the Fullarton Conservation Area. The EA is presently in initial phases and gap analysis and baseline characterizations are being conducted to facilitate the development of alternatives.

4.2 Identification of Preliminary Potential Project Specific Impacts and Proposed Mitigation Measures

The results of the preliminary impact assessment and preparation of mitigation measures are presented in Table 4.

Table 4 Preliminary Impact Assessment Mitigation Measures

Reference Number	Location	Heritage Recognition	Type and Description of Potential/Anticipated Impact	Mitigation
CHL-1	N/A—North Thames River	CHRS	**Indirect:** The Thames River and its associated riparian vegetation is located within and adjacent to the Fullarton Dam property boundary. If construction or grading activity occurs adjacent to the Thames River there is a potential for land disturbance that may alter the natural grading and vegetation of the river.	**Preferred Option:** Potential indirect impacts to the Thames River should be avoided through a design that avoids construction within the Thames River valley. **Alternative Option:** If avoidance is not deemed feasible, potential mitigation measures can be refined following the completion of design alternatives.
BHR-1	3049 Perth Road 163	Identified during field program	**No Impacts Anticipated:** The property is located adjacent to the Fullarton Dam property boundary. The residence and barn are located more than 420 metres northwest of the property parcel associated with the Fullarton Dam. Therefore, the property is not at risk of direct or indirect impacts and no mitigation measures or further cultural heritage evaluation are required.	Continued avoidance is recommended.

Reference Number	Location	Heritage Recognition	Type and Description of Potential/Anticipated Impact	Mitigation
BHR-2	2954 Perth Road 163	Identified during field program	**No Impacts Anticipated:** The property is located adjacent to the Fullarton Dam property boundary. The residence and barn are located more than 75 metres west of the property parcel associated with the Fullarton Dam. Therefore, the property is not at risk of direct or indirect impacts and no mitigation measures or further cultural heritage evaluation are required.	Continued avoidance is recommended.
BHR-3	2955 Perth Road 163	Identified during field program	**Indirect:** The property is located adjacent to the Fullarton Dam property boundary. The residence is located within 45 metres of the property parcel associated with the Fullarton Dam. The position of the residence within 45 metres has the potential for indirect impacts resulting from vibration damage during construction activities.	**Preferred Option:** Avoid the BHR by establishing a buffer zone around the residence to limit construction activity to more than 50 metres away. This should use appropriate preventive measures such as mapping the BHR on construction maps and temporary fencing. Staging and laydown areas should also be non-invasive and avoid the BHR. Where avoidance is not feasible, the alternative option should be applied. **Alternative Option:** Where construction activities are anticipated within the 50 metre buffer zone, a pre-construction vibration assessment by a qualified engineer is recommended to determine if vibration monitoring or site plan controls are required.

4.2.1 Summary of Impacts

The following built heritage resources and cultural heritage landscapes may be at potential risk of direct impacts due to land disturbance as they contain built heritage resources or cultural heritage landscapes within 50 metres of the Fullarton Dam property boundary:

- North Thames River (CHL-1)
- 2955 Perth Road 163 (BHR-3)

The remaining properties identified to contain CHVI are not at risk of indirect impacts.

5 Recommendations

5.1 Re-Evaluation when Design Alternatives are Developed

To further understand the potential for the Project to affect the properties identified as containing CHVI, the impact assessment contained within this report should be amended when design alternative information on proposed construction activity is finalized. When design alternative information is received, potential direct impacts and indirect can be refined as necessary. An updated copy of the CHR will be provided to MCM's Heritage Planning Unit, the Municipality of West Perth Heritage and Culture Committee, and other interested parties for review and comment.

5.2 Avoidance

Potential indirect impacts through land disturbance should be avoided through a development of design alternatives that avoids indirect impacts to the North Thames River (CHL-1) and 2955 Perth Road. If avoidance is not deemed feasible, potential mitigation measures can be refined following the completion of design alternatives.

6 References

Association of Ontario Land Surveyors [AOLS]. 1997. List of Subdivided Townships in the Province of Ontario with Dates and Systems of Survey. On File at Stantec.

Belden, H. 1879. Illustrated Historical Atlas of the County of Perth, Ont. Toronto: H. Belden & Co.

Bureau of Reclamation. 2002. 100 Years of Embankment Dam Design and Construction in the U.S. Bureau of Reclamation.

Chapman, L.J., and D.F. Putnam. 1984. The Physiography of Southern Ontario, Third Edition. Toronto: Ontario Ministry of Natural Resources.

Canada Company. 1835. Map of the Township of Fullarton. Toronto: Canada Company.

Canadian Heritage River Systems (CHRS). 2023. Thames River. Electronic Document: https://chrs.ca/en/rivers/thames-river. Last Accessed: January 26, 2023.

Census of the Canadas. 1853. Census of the Canadas 1851-2, Personal Census, Vol. I. Quebec: John Lovell.

Census of the Canadas. 1861. Census of the Canadas 1860-61, Personal Census, Vol. I. Quebec: S.B. Foote.

Census of the Canadas. 1864. Census of the Canadas, 1860-61, Agricultural Produce, Mills, Manufactories, Houses, Schools, Public Buildings, Place of Worship. Quebec: S.B. Foote.

Census of Canada. 1911. Fifth Census of Canada 1911, Agriculture, Volume IV. Ottawa: J. De L. Tache.

Crispino, M. and M. D'Apuzzo. 2001. Measurement and Prediction of Traffic-induced Vibrations in a Heritage Building. Journal of Sound and Vibration 246(2): 319-335.

Dean, W.G. 1969. Economic Atlas of Ontario. Toronto: University of Toronto Press.

Dominion Bureau of Statistics. 1953a. Census of Canada 1951, Volume I—Population. Ottawa: Edmond Cloutier.

Dominion Bureau of Statistics. 1953b. Census of Canada, 1951, Volume VI—Agriculture. Ottawa: Edmond Cloutier.

Drummond, Ian M. 1987. Progress Without Planning: The Economic History of Ontario from Confederation to the Second World War. Toronto: University of Toronto Press.

Ellis, P. 1987. Effects of Traffic Vibration on Historic Buildings. The Science of the Total Environment. 59: 37-45.

Gardiner, Herbert F. 1899. Nothing But Names. Toronto: George N. Morang and Company Limited.

Government of Ontario. 2023. Ontario Regulation 9/06, Criteria for Determining Cultural Heritage Value or Interest, Under the Ontario Heritage Act. Electronic document: https://www.ontario.ca/laws/regulation/060009. Last accessed: January 26, 2023.

Government of Ontario. 2006. InfoSheet #5 in Heritage Resources in the Land Use Planning Process, Cultural Heritage and Archaeology Policies of the Ontario Provincial Policy Statement, 2005. Electronic Document: http://www.mtc.gov.on.ca/en/publications/Heritage_Tool_Kit_Heritage_PPS_infoSheet.pdf. Last accessed: January 26, 2023.

Government of Ontario. 2020. Provincial Policy Statement. Electronic Document: https://www.ontario.ca/page/provincial-policy-statement-2020 Last accessed: January 26, 2023.

Johnston, W. Stafford and Hugh J.M. Johnston. 1967. History of Perth County to 1967. Stratford: Municipal Corporation of the County of Perth.

Karr, Clarence. 1974. The Canada Land Company: The Early Years. Ottawa: Ontario Historical Society, Love Printing Service Ltd.

Library and Archives Canada. 1881. Census of Canada, 1881. District 171, Subdistrict F, Reel C-13271.

MCM. 2016. Criteria for Evaluation Potential for Built Heritage Resources and Cultural Heritage Landscapes. Electronic Document: https://www.forms.ssb.gov.on.ca/mbs/ssb/forms/ssbforms.nsf/MinistryDetail?OpenForm&ACT=RDR&TAB=PROFILE&ENV=WWE&NO=021-0500E. Last accessed: January 26, 2023.

Ministry of Indigenous Affairs. 2023. Treaties in Ontario. Electronic Document: https://www.ontario.ca/page/map-ontario-treaties-and-reserves. Last Accessed: January 27, 2023.

Municipal Affairs and Housing. 2023. Municipal Restructuring Activity Summary Table. Electronic Document: https://data.ontario.ca/en/dataset/municipal-restructuring-activity-summary-table. Last Accessed: January 27, 2023.

Municipal Engineers Association. 2015. Municipal Class EA Manual. Electronic Document: https://www.municipalclassea.ca/manual. Last Accessed: January 26, 2023.

National Park Service. 2001. Identifying and Avoiding Risks from Adjacent Construction. Electronic Document: https://www.nps.gov/orgs/1739/upload/tech-note-temporary-protection-03-during-construction.pdf. Last Accessed: January 26, 2023.

Native Land. 2023. Native Land Digital. Electronic Document: https://native-land.ca/. Last Accessed: January 26, 2023.

OnLand. 2023a. Perth (44), Fullarton, Book 199, East Mitchell Road Concession. Electronic Document: https://www.onland.ca/ui/44/books/63898/viewer/579537059?page=32. Last Accessed: January 27, 2023.

OnLand. 2023b. Perth (44), Fullarton, Book 199, West Mitchell Concession. Electronic Document: https://www.onland.ca/ui/44/books/65184/viewer/547957377?page=55. Last Accessed: January 27, 2023.

OnLand. 2023c. Perth (44), Fullarton, Book 198, Concession 9. Electronic Document: https://www.onland.ca/ui/44/books/65232/viewer/581511297?page=33. Last Accessed: January 27, 2023.

Perth County. 2023. History. Electronic Document: https://www.perthcounty.ca/en/discover/history.aspx. Last Accessed: January 27, 2023.

Rainer, J.H. 1982. Effect of Vibrations on Historic Buildings. The Association for Preservation Technology Bulletin. 14 (1): 2-10.

Rusk, James. June 12, 2000. Municipal politicians exiting in droves. Globe and Mail.

Samson, Daniel. 2021. Rural Canada in an Urban Century. Canadian History: Post Confederation. Electronic Document: https://opentextbc.ca/postconfederation/chapter/9-14-rural-canada-in-an-urban-century/. Last Accessed: January 26, 2023.

Smith, William H. 1846. Smith's Canadian Gazetteer. Toronto: H. & W. Roswell.

Stantec. 2023. Stage 1 Archaeological Assessment: Fullarton Dam Rehabilitation. On File at Stantec.

Stantec. 2024. *Environmental Study Report for Fullarton Dam Rehabilitation.* On File at Stantec.

Statistics Canada. 1982. 1981 Census of Canada, Population, Ontario. Ottawa: Minister of Supply.

Statistics Canada. 2021. Census Profile, 2016 Census, West Perth. Electronic Document: https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/details/page.cfm?Lang=E&Geo1=CSD&Code1=3531025&Geo2=PR&Code2=35&SearchText=West%20Perth&SearchType=Begins&SearchPR=01&B1=All&GeoLevel=PR&GeoCode=3531025&TABID=1&type=0. Last Accessed: January 27, 2023.

Stratford Beacon Herald. 2022. Perth County Adopts Official County Land Acknowledgement. Electronic Document: https://www.stratfordbeaconherald.com/news/local-news/perth-county-council-adopts-official-county-land-acknowledgement. Last Accessed: January 26, 2023.

Swainson, Donald. 1972. Daly, John Corry Wilson. Dictionary of Canadian Biography, Vol X. Toronto: University of Toronto Press.

UTRCA. 2023a. The Thames River Watershed and Traditional Territory. Electronic Document: https://thamesriver.on.ca/about-us/thames-river-watershed-and-traditional-territory/#:~:text=The%20Upper%20Thames%20River%20watershed,and%20region%20of%20southwestern%20Ontario. Last Accessed: January 26, 2023.

UTRCA. 2023b. Flooding on the Thames River. Electronic Document: https://thamesriver.on.ca/water-management/flooding-on-the-thames-river/#:~:text=In%201947%2C%20the%20Upper%20Thames,watershed%20of%20the%20Thames%20River.. Last Accessed: January 30, 2023.

UTRCA. 2023c. Fullarton CA. Electronic Document: https://thamesriver.on.ca/parks-recreation-natural-areas/day-use-cas-and-tracts/fullarton-ca/. Last Accessed: January 30, 2023.

UTRCA. 2023d. Other Dams. Electronic Document: https://thamesriver.on.ca/water-management/recreational-dams/. Last Accessed: January 30, 2023.

UTRCA. 2023e. Dorchester CA. Electronic Document: https://thamesriver.on.ca/parks-recreation-natural-areas/day-use-cas-and-tracts/dorchester-ca/. Last Accessed: January 30, 2023.

UTRCA. 2015. Embro Dam Class Environmental Assessment, Public Information Centre #1. Electronic Document: https://thamesriver.on.ca/wp-content/uploads/FloodStructures/OtherStructures/EmbroDam-display-PublicInfoCentre-June2015.pdf. Last Accessed: January 30, 2023.

UTRCA. 2023f. Shakespeare CA. Electronic Document: https://thamesriver.on.ca/parks-recreation-natural-areas/day-use-cas-and-tracts/shakespeare-ca/. Last Accessed: January 30, 2023.

Weaver, W.F. 1968. *Crown Surveys in Ontario.* Toronto: Department of Lands and Forests.

West Perth Public Libraries. 2021. Respect and Acknowledgement. Electronic Document: https://westperthpl.ca/sites/default/files/Respect_and_Acknowledgement.pdf. Last Accessed: January 26, 2023.

Wiss, J.F. 1981. Construction Vibrations; State-of-the-Art. Journal of Geotechnical Engineering Division. 107: 167-181.

Appendix A Project Personnel Biographies

Lashia Jones, MA, CAHP: Lashia Jones is a Senior Cultural Heritage Specialist and member of Stantec's Environmental Services Team, with experience in identifying, evaluating and planning for cultural heritage resources. Ms. Jones is a member of the Canadian Association of Heritage Professionals, and has a Master's Degree in Canadian Studies from Carleton University, specializing in Heritage Conservation. Ms. Jones has worked for both public and private sector clients, providing a variety of cultural heritage services including heritage impact assessments, cultural heritage evaluations, inventories of cultural heritage resources, heritage conservation districts, heritage master plans, conservation plans and cultural heritage bridge evaluations. Ms. Jones is well versed with local, provincial and national tools for the identification, evaluation and planning best practices for cultural heritage resources, including the Ontario Heritage Act, Provincial Policy Statement, Planning Act, Environmental Assessment Act, Ontario Heritage Tool Kit, Standards and Guidelines for the Conservation of Provincial Heritage Properties and the Standards and Guidelines for the Conservation of Historic Places in Canada. Lashia's role on various project types has given her experience in public engagement and consultation, constructive dialogue with clients, heritage committees, local councils and multi-disciplinary project teams.

Frank Smith, MA, CAHP: Frank Smith is a Cultural Heritage Specialist with over seven years of experience in detailed historical research, interpretation, and conservation of cultural heritage resources. Frank attained his Bachelor of Arts degree *magna cum laude* in history from Adelphi University in Garden City, New York and his Master of Arts degree in history (public history stream) from Western University in London, Ontario. Before joining Stantec, he was the Curator of the John P. Metras Sports Museum and Research Assistant for the Census of Canada 1891 project. Since joining Stantec, Frank has assisted in the completion of dozens of environmental assessment reports, including reports for private clients, municipal clients, and prescribed public bodies. Frank has screened and evaluated thousands of properties for cultural heritage value or interest as part of the environmental assessment process. Frank is a member of the Canadian Association of Heritage Professionals.

Meaghan Rivard, MA, CAHP: Meaghan Rivard is Stantec's Senior Heritage Consultant with over 12 years of experience in the identification, research, evaluation, and documentation of heritage resources as well as expertise in the environmental assessment process as it pertains to heritage resources. Ms. Rivard attained her Bachelor of Arts degree with honours and distinction in history from Brock University in St. Catharines, Ontario and her Master of Arts degree in history (public history stream) from Western University in London, Ontario. Ms. Rivard is a member of the Canadian Association of Heritage Professionals.

Ms. Rivard has experience managing and executing all aspects of Cultural Heritage Evaluation Reports, Heritage Impact Assessments, Photographic Documentations, and Heritage Conservation Plans. She has assessed more than 2,500 properties as part of windshield surveys and worked under various classed environmental assessments. In addition to environmental assessment related work, Meaghan continues to be actively involved in the assessment of individual properties. Here she utilizes knowledge in the identification, evaluation, and documentation of heritage resources alongside expertise in the assessment of proposed change and preparation of options to mitigate negative impacts on heritage resources.

Meaghan is focused on regulatory satisfaction balanced with an admiration for the heritage of our province.

Through her specialization in the Environmental Assessment process, over the past 14 years Meaghan has reviewed, authored, and contributed in various capacities to hundreds of cultural heritage reports under a wide variety of reporting requirements for municipal, provincial, and federal clients. Meaghan has completed work directly for Ontario's Ministry of Transportation, Hydro One Networks Inc., Metrolinx, Ontario Power Generation, and Infrastructure Ontario. She has also been listed as the lead heritage consultant on retainer assignments for the Ministry of Transportation and Infrastructure Ontario.

Appendix F Stage 1 Archaeological Assessment

Stage 1 Archaeological Assessment: Fullarton Dam Rehabilitation

Part of Lots 16 and 17, Mitchell Road East Side, and Lot 16, Mitchell Road West Side, Geographic Township of Fullarton, now Municipality of West Perth, Perth County, Ontario

March 9, 2023

Prepared for:
Upper Thames River Conservation Authority
1424 Clarke Road
London, Ontario N5V 5B9

Prepared by:
Stantec Consulting Ltd.
600-171 Queens Avenue
London, Ontario N6A 5J7

Project Number:
160901056

Licensee: Darren Kipping, MA
License Number: P422
Project Information Form Number:
P422-0027-2023
Project Number: 160901056

ORIGINAL REPORT

Executive Summary

Stantec Consulting Ltd. (Stantec) was retained by the Upper Thames River Conservation Authority (UTRCA) (the Client) to conduct a Stage 1 archaeological assessment as part of a Municipal Class Environmental Assessment (EA) to support long term planning for the Fullarton Dam and Fullarton Conservation Area (the Project). The study area for the Project comprises approximately 33.68 hectares located in parts of Lots 16 and 17, Mitchell Road East Side, and Lot 16, Mitchell Road West Side, Geographic Township of Fullarton, now Municipality of West Perth, Perth County, Ontario.

The Stage 1 archaeological assessment was completed under Project Information Form number P422-0027-2022, issued to Darren Kipping, MA by the Ministry of Citizenship and Multiculturalism (the Ministry). A property inspection was conducted on January 11, 2023, by Darren Kipping (P422).

The Stage 1 archaeological assessment of the study area for the Project determined that much of the study area, approximately 77.34%, retains archaeological potential. 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 any portion of the Project's anticipated construction activities which impact an area of archaeological potential.**

The remaining portions of the study area, approximately 22.66%, retain low to no archaeological potential due to deep and extensive modern disturbances from the construction of the Fullarton Dam, areas identified as steeply sloped, or low and permanently wet areas. In accordance with Section 1.3.2, Section 2.1 Standard 2, and Section 7.74 of the Ministry's 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011), **Stage 2 archaeological assessment is not required for any portion of the Project's anticipated construction activities which impact an area of low to no archaeological potential.**

Full and detailed recommendations are provided in the body of the report.

The Ministry is asked to review the results presented and to accept this report into the *Ontario Public Register of Archaeological Reports*.

The Executive Summary highlights key points from the report only; for complete information and findings, the reader should examine the complete report.

Table of Contents

Executive Summary ..... **i**

Project Personnel ..... **iii**

1 Project Context **4**
1.1 Development Context 4
1.1.1 Objectives 4
1.2 Historical Context 5
1.2.1 Pre-Contact Indigenous Resources 5
1.2.2 Post-Contact Indigenous Resources 8
1.2.3 Euro-Canadian Resources 9
1.3 Archaeological Context 12
1.3.1 Natural Environment 12
1.3.2 Registered Archaeological Sites and Surveys 14
1.4 Existing Conditions 15

2 Field Methods **16**

3 Analysis and Conclusions **17**

4 Recommendations **20**

5 Advice on Compliance with Legislation **22**

6 Bibliography and Sources **23**

7 Images **28**
7.1 Photographs 28

8 Maps **37**

9 Closure **47**

List of Tables

Table 1: Generalized Cultural Chronology of the Study Area 5
Table 2: Applicable Landowner Information from the 1879 Map of Fullarton Township 11
Table 3: Registered Archaeological Sites within One Kilometre of the Study Area 14
Table 4: Previous Archaeological Assessment Completed near the Study Area 15

List of Figures

Figure 1: Location of the Project 38
Figure 2: Location of Study Area 39
Figure 3: Treaties and Purchases (Adapted from Morris 1943) 40
Figure 4: Portion of the 1831 Survey Map of Fullarton 41
Figure 5: Portion of the 1879 Map of Fullarton Township 42
Figure 6: Aerial Imagery – 1954 and 1959 43
Figure 7: Aerial Imagery – 1963 and 2020 44
Figure 8: LiDAR Hillshade Relief Map 45
Figure 9: Stage 1 Results and Recommendations 46

Project Personnel

Licensed Archaeologist:	Darren Kipping, MA (P422)
Project Manager:	Heather Amirault, P.Eng.
Licensed Field Director:	Darren Kipping, MA (P422)
Mapping:	Paul Moser
Report Writer:	Darren Kipping, MA (P422)
Quality Review:	Colin Varley, MA, RPA (P002)
Independent Review:	Parker Dickson, MA (P256)

Acknowledgements

Proponent Contact:	Jillian Smith – Upper Thames River Conservation Authority
Ministry of Citizenship And Multiculturalism:	Robert von Bitter – Archaeological Data Coordinator

1 Project Context

1.1 Development Context

Stantec Consulting Ltd. (Stantec) was retained by the Upper Thames River Conservation Authority (UTRCA) (the Client) to conduct a Stage 1 archaeological assessment as part of a Municipal Class Environmental Assessment (EA) to support long term planning for the Fullarton Dam and Fullarton Conservation Area (the Project) (Figure 1). The study area for the Project comprises approximately 33.68 hectares located in parts of Lots 16 and 17, Mitchell Road East Side, and Lot 16, Mitchell Road West Side, Geographic Township of Fullarton, now Municipality of West Perth, Perth County, Ontario (Figure 2).

The Stage 1 archaeological assessment conducted by Stantec was undertaken in the preliminary planning and design process for the Class EA requirements under the *Ontario Environmental Assessment Act* (Government of Ontario 1990c).

1.1.1 Objectives

In compliance with the provincial standards and guidelines set out in the Ministry of Citizenship and Multiculturalism's (the Ministry) 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011), the objectives of the Stage 1 archaeological assessment are as follows:

- To provide information about the study area's geography, history, previous archaeological fieldwork, and current land conditions.
- To evaluate the study area's archaeological potential, which will support recommendations for Stage 2 survey for all or parts of the property.
- To recommend appropriate strategies for Stage 2 survey.

To meet these objectives, Stantec archaeologists employed the following research strategies:

- A review of relevant archaeological, historical, and environmental literature pertaining to the study area.
- A review of the land use history, including pertinent historical maps.
- An examination of the Ministry's *Ontario Archaeological Sites Database* to determine the presence of registered archaeological sites in and around the study area.
- A query of the Ministry's *Ontario Public Register of Archaeological Reports* to identify previous archaeological assessments completed within 50 metres of the study area.
- A property inspection of the study area by a licensed archaeologist.

Permission to enter the study area was provided by the UTRCA.

1.2 Historical Context

"Contact" is typically used as a chronological benchmark when discussing Indigenous archaeology in Canada and describes the contact between Indigenous and European cultures. The precise moment of contact is a constant matter of discussion. Contact in what is now the province of Ontario is broadly assigned to the 16th century (Loewen and Chapdelaine 2016).

1.2.1 Pre-Contact Indigenous Resources

This portion of southwestern Ontario has been occupied by Indigenous peoples since the retreat of the Wisconsin glacier approximately 11,000 years ago. Much of what is understood about the lifeways of Indigenous peoples is derived from archaeological evidence and ethnographic analogy. In Ontario, Indigenous culture prior to the period of contact with European peoples has been distinguished into cultural periods based on observed changes in material culture. These cultural periods are largely based on observed changes in formal lithic tools and separated into the Early Paleo, Late Paleo, Early Archaic, Middle Archaic, and Late Archaic periods. Following the advent of ceramic technology in the Indigenous archaeological record, cultural periods are separated into the Early Woodland, Middle Woodland, and Late Woodland periods, based primarily on observed changes in formal ceramic decoration. It should be noted that these cultural periods do not necessarily represent specific cultural identities but are a useful paradigm for understanding changes in Indigenous culture through time. Table 1 provides a general outline of the cultural chronology of the study area, summarized from Ellis and Ferris (1990). The provided time periods are based on the "Common Era" calendar notation system: Before Common Era (BCE) and Common Era (CE).

Table 1: Generalized Cultural Chronology of the Study Area

Period	Characteristics	Time	Comments
Early Paleo	Fluted Projectiles	9000 – 8400 BCE	Spruce parkland, caribou hunters
Late Paleo	Hi-Lo Projectiles	8400 – 8000 BCE	Smaller but more numerous sites
Early Archaic	Kirk and Bifurcate Base Points	8000 – 6000 BCE	Slow population growth
Middle Archaic	Brewerton-like Points	6000 – 2500 BCE	Environment similar to present
Late Archaic	Narrow Point	2000 – 1800 BCE	Increasing site size
	Broad Point	1800 – 1500 BCE	Large chipped lithic tools
	Small Point	1500 – 1100 BCE	Introduction of bow hunting
Terminal Archaic	Hind Points	1100 – 950 BCE	Emergence of true cemeteries
Early Woodland	Meadowood Points	950 – 400 BCE	Introduction of pottery
Middle Woodland	Dentate/Pseudo-Scallop Pottery	400 BCE – CE 500	Increased sedentism
	Princess Point	CE 550 – 900	Seasonal hunting and gathering
Late Woodland	Early Ontario	CE 900 – 1300	Incipient agriculture
	Middle Ontario	CE 1300 – 1400	Agricultural villages
	Late Ontario	CE 1400 – 1650	Earth worked villages, warfare

Period	Characteristics	Time	Comments
Contact Indigenous	Various Algonkian and Iroquoian Groups	1600 – 1875 CE	Early written records and treaties
Historical	French/Euro-Canadian	1749 CE – present	European settlement

Local environmental conditions during the Paleo period were significantly different from what they are today. Ontario's first peoples would have crossed the landscape in small groups in search of food, particularly migratory game species. In this area, caribou may have been a Paleo diet staple, supplemented by wild plants, small game, birds, and fish. Given the low density of populations on the landscape at this time and their mobile nature, Paleo sites are small and ephemeral. They are sometimes identified by the presence of fluted points. Sites are frequently located adjacent to the shorelines of large glacial lakes. Between 9000 and 8000 BCE, Indigenous populations were sustained by hunting, fishing, and foraging and lived a relatively mobile existence across an extensive geographic territory. Despite these wide territories, social ties were maintained between groups. One method to maintain social ties between distant groups was through gift exchange, evident through exotic lithic material documented on many sites (Ellis 2013:35-40).

Archaeological records indicate subsistence changes around 8000 BCE at the start of the Archaic Period in southwestern Ontario. Since the large mammal species that formed the basis of the Paleo diet became extinct or moved north with the warming of the climate, Archaic populations had a more varied diet, exploiting a range of plants and bird, mammal, and fish species. Reliance on specific food resources like fish, deer, and several nut species became more noticeable through the Archaic Period and the presence of warmer, more hospitable environs led to expansion of group and family sizes. In the archaeological record this is evident in the presence of larger sites.

By approximately 8000 BCE, evidence exists, and becomes more common, for the production of ground-stone tools such as axes, chisels, and adzes. These tools are believed to be indicative specifically of woodworking. This evidence can be extended to indicate an increase in craft production and, arguably, craft specialization. This latter statement is also supported by evidence, dating to approximately 7000 BCE, of ornately carved stone objects, which would be laborious to produce and have explicit aesthetic qualities (Ellis 2013:41). This is indirectly indicative of changes in social organization that permitted individuals to devote time and effort to craft specialization. Starting around 8000 BCE, the Great Lakes basin experienced a low-water phase, with shorelines significantly below modern lake levels (Stewart 2013: Figure 1.1.C). It is presumed that the majority of settlements would have been focused along these former shorelines. At approximately 6500 BCE the climate had warmed considerably since the recession of the glaciers and the environment had grown more similar to the present day. By approximately 4500 BCE, evidence exists from southern Ontario for the utilization of native copper, i.e., naturally occurring pure copper metal (Ellis 2013:42). The recorded origin of this material along the north shore of Lake Superior indicates the existence of extensive exchange networks across the Great Lakes basin.

The coniferous forests of earlier times were replaced by stands of mixed coniferous and deciduous trees by about 4000 BCE. The transition to more productive environmental circumstances led to a rise in population density. As a result, Archaic sites become more abundant over time. Artifacts typical of these occupations include a variety of stemmed and notched projectile points; chipped stone scrapers; ground



stone tools (i.e., celts, adzes) and ornaments (i.e., bannerstones, gorgets); bifaces or tool blanks; animal bone; and chert waste flakes, a by-product of the tool making process (Ellis *et al*. 1990).

At approximately 3500 BCE, the isostatic rebound of the North American plate following the melt of the Laurentide glacier had reached a point which significantly affected the watershed of the Great Lakes basin. Prior to this, the Upper Great Lakes had drained down the Ottawa Valley via the French River and Mattawa River valleys. Following this shift in the watershed, the drainage course of the Great Lakes basin had changed to its present course. This also prompted a significant increase in water-level to approximately modern levels (with a brief high-water period); this change in water levels is believed to have occurred catastrophically (Stewart 2013:28-30). This change in geography coincides with the earliest evidence for cemeteries (Ellis 2013:46). By 2900 to 2500 BCE, the earliest evidence exists for the construction of fishing weirs (Ellis *et al.* 1990: Figure 4.1; Stevens 2004). There is some evidence to suggest that fishing weirs had been constructed much earlier. A radiocarbon sample from a weir site in Lovesick Lake along the Trent-Severn Waterway provided a date of 4600 BCE (Stevens 2004). Construction of these weirs would have required a large amount of communal labour and are indicative of the continued development of social organization and communal identity. The large-scale procurement of food at a single location also has significant implications for permanence of settlement within the landscape. This period is also marked by further population increase and by 1500 BCE evidence exists for substantial permanent structures (Ellis 2013:45-46).

By approximately 950 BCE, the earliest evidence exists for populations using ceramics. Populations are understood to have continued to seasonally exploit natural resources. This advent of ceramic technology correlated, however, with the intensive exploitation of seed foods such as goosefoot and knotweed as well as mast such as nuts (Williamson 2013:48). The use of ceramics implies changes in the social organization of food storage as well as in the cooking of food and changes in diet. Fish also continued to be an important facet of the economy at this time. Evidence continues to exist for the expansion of social organization (including hierarchy), group identity, ceremonialism (particularly in burial), interregional exchange throughout the Great Lakes basin and beyond, and craft production (Williamson 2013:48-54).

By approximately 550 CE, evidence emerges for the introduction of maize into southern Ontario. This crop would have initially only supplemented Indigenous peoples' diet and economy (Birch and Williamson 2013:13-14). Maize-based agriculture gradually became more important to societies and by approximately 900 CE permanent communities emerge which are primarily focused on agriculture and the storage of crops, with satellite locations oriented toward the procurement of other resources via hunting, fishing, and foraging. By approximately 1250 CE, evidence exists for the common cultivation of historic Indigenous cultigens, including maize, beans, squash, sunflower and tobacco. The cultural affiliation of populations within the region of the study area at this time period is debated, whether they may have spoken a form of Iroquoian language or Algonquian (Murphy and Ferris 1990). The extent archaeological record demonstrates many cultural traits similar to historical Indigenous nations (Williamson 2013:55).

1.2.2 Post-Contact Indigenous Resources

The post-Contact Indigenous occupation of southern Ontario was heavily influenced by the dispersal of various Iroquoian-speaking communities by the New York State Iroquois and the subsequent arrival of Algonkian-speaking groups from northern Ontario at the end of the 17th century and beginning of the 18th century (Konrad 1981; Schmalz 1991).

From the mid-16th century until the turn of the 17th century, the region of the study area was within the extended political territory of Iroquoian populations who were probably ancestral to those historically described as the *Neutre* (by the French), the *Neutral* (in English) or the *Atawandaron* (by the Huron-Wendat); their autonym is not conclusively known (Birch 2015). Following the turn of the 17th century, the region of the study area seems to have been abandoned by permanent settlement and constituted a liminal territory between the Atawandaron and the Fire Nation, an Algonquian group occupying the western end of Lake Erie. It is argued, however, that at this time the Atawandaron expanded extensively westward, displacing the Fire Nation, and occupying the region of modern Chatham-Kent (Lennox and Fitzgerald 1990:418-419).

By 1690, Algonkian speakers from the north appear to have begun to repopulate Bruce County (Rogers 1978:761). This is the period in which the Mississaugas are known to have moved into southern Ontario and the lower Great Lakes watersheds (Konrad 1981). In southwestern Ontario, however, members of the Three Fires Confederacy (Chippewa, Ottawa, and Pottawatomi) were immigrating from Ohio and Michigan in the late 1700s (Feest and Feest 1978:778-779). At approximately 1790, the study area was occupied by populations of Ottawa, Chippewa, Pottawatomi, and Wyandot (Feest and Feest 1978:777, 779).

Despite the differentiation of Indigenous groups in Euro-Canadian sources, there was a considerably different view by Indigenous nations concerning their self-identification during the first few centuries of European contact. These peoples relied upon kinship ties that cut across European notions of nation identity (Bohaker 2006:277-283). Many of the British-imposed names, such as Chippewa, Odawa, Pottawatomi, or Mississauga, artificially separated how self-identified Anishinaabeg classified themselves (Bohaker 2006:1-8) and as a result, a number of these groups were culturally and socially more alike than contemporary European documentation might indicate.

The expansion of the fur trade led to increased interaction between European and Indigenous people, and ultimately intermarriage between European men and Indigenous women. During the 18th century the progeny of these marriages began to identify as Métis and no longer directly identified with either their paternal or maternal. The ethnogenesis of the Métis progressed with the establishment of distinct Métis communities along the major waterways in the Great Lakes of Ontario. Métis communities were primarily focused around the upper Great Lakes and along Georgian Bay, however, Métis people have historically lived throughout Ontario (Métis Nation of Ontario 2023; Stone and Chaput 1978:607-608).

The nature of Indigenous settlement size, population distribution, and material culture shifted as European settlers encroached upon their territory. Despite this shift, “written accounts of material life and livelihood, the correlation of historically recorded villages to their archaeological manifestations, and the similarities of those sites to more ancient sites have revealed an antiquity to documented cultural



expressions that confirms a deep historical continuity to…systems of ideology and thought" (Ferris 2009:114). As a result, Indigenous peoples have left behind archaeological resources throughout southern Ontario which show continuity with past peoples, even if they have not been recorded in Euro-Canadian documentation.

Since contact with European explorers and immigrants, and, later, with the establishment of provincial and federal governments (the Crown), the lands within Ontario and the Geographic Township of Fullarton have been included in various treaties, land claims, and land cessions. The study area, and Perth County generally, is located on land covered under Treaty 29, also known as the Huron Tract Purchase. This treaty was signed in 1827 between the Crown and certain Anishinaabe peoples. The treaty covered approximately 2.2 million acres of land in southwestern Ontario (Government of Canada 2016). Though not an exhaustive list, Morris (1943) provides a general outline of some of the treaties within the Province of Ontario from 1783 to 1923. While it is difficult to exactly delineate treaty boundaries today, Figure 3 provides an approximate outline of the limits of Treaty Number 29 or Huron Tract Purchase (identified by the letter "T").

1.2.3 Euro-Canadian Resources

1.2.3.1 Perth County

Present day Perth County was originally a part of the District of Hesse, one of four districts founded in 1788 after the British came into possession of most of North America. The District of Hesse comprised all British territories west of Long Point, which makes up most of Western Ontario. In 1792, Upper Canada re-organized into 19 counties. The District of Hesse was renamed the Western District and contained two counties, Kent and Essex, which spanned the region now referred to as southwestern Ontario. In 1827, the Canada Company, formed by British investors, purchased one million acres of land from the Crown with intentions to sell plots for settlement. The land bought by the Canada Company became known as the Huron Tract or Huron District, which included the area of land bordered by Lake Huron to the west, the historical Township of Bosanquet to the south, the historical Township of Colborne to the north and the historical Townships of North and South Easthope to the east, including much of the present-day Perth County (Johnston and Johnston 1967:4). By 1849, the district system had been abolished; Perth County was established in January 1850 and included 11 townships (Johnston and Johnston 1967:56).

Settlement in Perth County began as early as 1829 as European settlers began living in the central townships of the county. Large scale settlement, however, did not begin until the 1840s (Johnston and Johnston 1967:15). The 11 townships in Perth County were laid out and surveyed as early as 1850. The majority of surveyed lots were assigned to European settlers from Germany, Ireland, and Scotland (Johnston and Johnston 1967:14-15).

The Township of Fullarton was originally part of a large land grant to the Canada Company known as the Huron Tract. The Canada Company was formed in 1826 to assist in the improvement, settlement, and administration of land holdings in Upper Canada (Karr 1974:3). The privately owned company was organized under the leadership of John Galt with financial backing from merchants in London, England (Karr 1974:7). The Canada Company was modeled on similar settlement programs in Australia and New York State (Karr 1974:8-9). While the company originally intended to purchase all the Crown Reserves



and half the Clergy Reserves of the colony, this was met with opposition by John Strachan, Anglican Bishop of Toronto, and his allies in Britain. After several rounds of negotiation, the Canada Company forewent the purchase of Clergy Reserves and instead opted to purchase a one-million-acre tract in the London and Western District known as the Huron Tract (Karr 1974:12). In 1827, the boundaries of Huron Tract were finalized, and William Dunlop was dispatched to explore the area (Karr 1974:30). To facilitate settlement, the Canada Company placed agents in the British Isles and the United States to advertise lands for sale and work started on the Huron Road to connect Guelph to the edge of the Huron Tract (Karr 1974:25; 33).

1.2.3.2 Township of Fullarton

The baseline of the survey for Fullarton Township was laid out along the south side of the Huron Road by Dunlop and his exploration party in 1829. The townships of South Easthope, Downie, and Ellice also contain baselines along the south side of the Huron Road (Johnston and Johnston 1967:6). Many of the townships in Perth County were named in honour of Canada Company officials (Gardiner 1899:350); Fullarton Township was named in honour of John Fullarton, a director of the Canada Company (Gardiner 1899:351).

The survey of Fullarton Township was completed in 1835 by John McDonald (Association of Ontario Land Surveyors [AOLS] 1997; Canada Company 1835). The township was surveyed using a special variant used to survey Canada Company lands (AOLS 1997). This system of survey was first used by the Canada Company to survey the Huron Tract and created 100-acre lots that measured 20 chains by 50 chains (1,320 feet by 3,300 feet). Road allowances were located every alternate concession and every fifth lot. Survey lines were located in the centre of road allowances and this created sections of 1,000 acres with ten lots of 100 acres each. In 1850, this survey system was adopted for use in Crown surveys and much of Ontario between Georgian Bay and the Ottawa River was surveyed using this system (Weaver 1968:16). The 1831 survey of Fullarton Township (McDonald 1835) does not illustrate landowners on the lots (Figure 4). The map shows the existing road network, including what would become Mitchell Road, the north branch of the Thames River, and Black Creek to the southeast of the study area. The southwest corner of Lot 16 is shown to be marsh, indicated by the green stippling (Figure 4).

The first recorded European settler in Fullarton Township was Hugh Kennedy Junck, who settled on Lot 20, Concession 1. Junck built a sawmill on Whorl Creek in what would become the Town of Mitchell. Settlement in the township was slow until 1843, when an influx of European settlers arrived. The most important roadway in Fullarton Township during the mid-19th century was Mitchell Road (present-day County Road 163 and County Road 163A), which is partially located within the study area. The road was opened in 1844 to connect St. Mary's and Mitchell. However, conditions on this roadway remained rudimentary and consisted of a narrow strip of land mostly cleared of trees with no bridges over water courses. This road was the last road financed by the Canada Company in present-day Perth County (Johnston and Johnston 1967:183). Mitchell Road was improved in the 1850s by private efforts (Johnston and Johnston 1967:188).

In 1857, the Buffalo and Lake Huron Railway was completed through Fullarton Township and reached Mitchell. The community became an important shipping point and grew to become Fullarton Township's most significant community. As a result, Mitchell was incorporated as a village (Johnston and Johnston 1967:78). Other hamlets in the township included Fullarton, Russeldale, and Carlingford (Belden & Co. 1879). During the 1850s, the township's population grew rapidly and increased from 1,750 in 1851 to 2,890 in 1861 (Census of the Canadas 1853; Census of the Canadas 1861). In 1861, the township contained 405 farmsteads on 36,566 acres of land. A total of 14,006 acres of land was under cultivation (Census of the Canadas 1864). The population of Fullarton Township reached a peak of 2,903 in 1871 (Johnston and Johnston 1967). For the remainder of the 19th century and into the mid-20th century the township entered into a period of population decline.

The *Illustrated Historical Atlas of the County of Perth, Ontario* (Belden & Co. 1879) notes that Fullarton Township was widely occupied by 1879, with landowners listed for most lots (Figure 5). Table 2 provides a summary of the landowners associated with Lots 16 and 17, Michell Road East Side, and Lot 16, Mitchell Road West Side.

Table 2: Applicable Landowner Information from the 1879 Map of Fullarton Township

Lot	Concession	Landowner	Comment
16	Mitchell Road East Side	R. Sandercook	One structure is illustrated in the northwest portion of the lot, within the study area. The lot abuts north branch of the Thames River.
16	Mitchell Road West Side	E. Haynes	One structure is illustrated in the northern portion of the lot, northwest of the study area.
17	Mitchell Road East Side	W. Porteous	One structure is illustrated in the northwest portion of the lot, south of the study area. The lot abuts the north branch of the Thames River.

Historical county atlases were produced primarily to identify factories, offices, residences, and landholdings of subscribers, and were funded by subscription fees. Landowners who did not subscribe were not always listed on the maps (Caston 1997:100). As such, structures were not necessarily depicted or placed accurately (Gentilcore and Head 1984). Further, review of historical mapping, including treaty maps, also has inherent accuracy difficulties due to potential error in geo-referencing. Geo-referencing is conducted by assigning spatial coordinates to fixed locations and using these points to spatially reference the remainder of the map. Due to changes in "fixed" locations over time (e.g., road intersections, road alignments, watercourses, etc.), errors/difficulties of scale and the relative idealism of historical cartography, historical maps may not translate accurately into real space points. This may provide obvious inconsistencies during historical map review. Nonetheless, the majority of the region surrounding the study area has been subject to European-style agricultural practices for over 150 years, having been settled by Euro-Canadian farmers by the late 19th century. Much of the region today continues to be used for agricultural purposes.

1.2.3.3 Fullarton Dam and Conservation Area

The UTRCA was formed in 1947 to implement flood control measures in the upper watershed of the Thames River (UTRCA 2023b). In 1953, 77 acres of Lot 16 Mitchell Road East Side and four acres of Lot 17, Mitchell Road East Side were sold to the UTRCA by Alonzo Hart and Ernest Rogers, respectively, in preparation of the construction of an earthen dam (OnLand 2023a). In 1955, the UTRCA built a nine-foot high and 300-foot long earthen dam on the Neil Drain to create a recreational lake or reservoir. This dam was primarily recreational in purpose but served a secondary purpose as part of wider floor control measures in the Upper Thames watershed (UTRCA 2023c; UTRCA 2023d). The Fullarton Dam was one of several recreational earth dams built or reconstructed by UTRCA in the 1950s. Other earth dams completed by UTRCA in the 1950s include the Shakespeare Dam (built 1954), Embro Dam (reconstructed 1959), and the Dorchester Dam (built 1958) (UTRCA 2023e; UTRCA 2023f; UTRCA 2015).

A historical aerial photo from 1954 depicts the surrounding topography of the Neil Drain and its course through the study area prior to construction of the dam (Figure 6). The 1954 aerial photo also depicts a structure on the northwest portion of the study area, which is likely the structure illustrated on the 1879 historical atlas on Lot 16, Mitchell Road East Side (see Figure 5 and Figure 6). The 1959 historical aerial photo depicts the study area four years after the construction of the earthen dam and reservoir. The area still shows signs of disturbance following construction of the dam, including areas around the reservoir, likely from grading, and the channel of Neil Drain that has been significantly altered west of Mitchell Road (now 163A Road) prior to the dam construction (Figure 6). The structure in the northwest portion of the study area was also removed sometime between 1954 and 1959. The 1963 historical aerial photo does not show any significant changes for the area surrounding the dam and reservoir. However, at some point between 1959 and 1963, Mitchell Road (now Perth Road 163) was routed south over Neil Drain just west of the study area (Figure 7). Between 1962 and 1966, the area around the dam owned by UTRCA was developed into a public park (UTRCA 2023c). In 1967, Norman Clarke sold, for $1, an unspecified amount of land in Lot 16, Mitchell Road West Side to complete the acquisition of the present-day footprint of UTRCA lands within the study area (OnLand 2023b). Based on aerial imagery, the only significant alteration to the study area between 1963 and 2020 is the construction of the baseball diamonds and associated infrastructure in the northwest portion of the study area as well as the planting of trees surrounding the dam and reservoir (Figure 7).

1.3 Archaeological Context

1.3.1 Natural Environment

The study area is situated within the Stratford Till Plain physiographic region of southern Ontario (Chapman and Putnam 1984:133). The Stratford Till Plain is described as a:

> *…broad clay plain of 1,370 square miles, extending from London in the south to Blyth and Listowel in the north with a projection toward Arthur and Grand Valley. It is an area of ground moraine interrupted by several terminal moraines. The moraines are more closely spaced in the southwestern portion of the region; consequently that part resembles the Mount Elgin Ridges…. Throughout this area the till is fairly uniform, being a brown*

> *calcareous silty clay whether on the ridges or the more level ground moraine. It is a product of the Huron ice lobe. Some of the silt and clay is calcareous rock flour, probably a good deal of it coming from previously deposited varved clays of the Lake Huron Basin.*
>
> (Chapman and Putnam 1984:133)

Soils within the study area comprise Huron clay loam, Burford loam, and bottom land (Hoffman and Richards 1952). Huron clay loam, which has rolling topography, is relatively stone free, and has good drainage. Burford loam is level to undulating, moderately stony, and has good drainage. Bottom land is level and associated with alluvial deposits from waterways. Maize was the most important subsistence crop for pre-Contact Indigenous agriculture. Soil variability can account for significant difference in bushel yield per acre for corn agriculture (Government of Ontario 2022). The ideal soil texture and drainage for corn cultivation is well-drained silt. Despite this, both Huron clay loam and Burford loam may have been suitable for Indigenous maize cultivation.

To highlight the topography of the study area, Figure 8 illustrates a hillshade relief map of the surrounding region. The hillshade relief map was developed using Ontario's Light Detection and Ranging (LiDAR) Digital Terrain Model (DTM) which comprises a 50-centimetre resolution dataset representing bare-earth terrain developed from a LiDAR point cloud (Government of Ontario 2017). The Ontario LiDAR DTM was overlaid on the study area and rendered using a hillshade relief to enhance slope and changes in topography. Figure 8 highlights the low-lying topography for portions of the area (mainly related to creeks, drainages, and the North Branch of the Thames River) in relation to elevated topography adjacent to the waterways, as well as the sloped areas between the high and low areas of elevation.

The closest potable water source is the former Neil Drain, now part of the Fullarton Dam system, which is located within the study area. The North Branch of the Thames River abuts the northern and eastern portion of the study area. The Thames River is part of the Canadian Heritage River Systems and is 273 kilometres in length. The three branches of the Thames River begin near Mitchell, Hickson, and Tavistock. The upper parts of the Thames River are located in a former glacial spillway. This area contains rocky riverbeds and steep valleys. The north and south branches of the Thames River confluence near downtown London. West of London, the Thames River is located in a shallow channel that was carved by the river. The river empties into Lake St. Clair at Lighthouse Cove (Canadian Heritage Rivers System 2023). The Thames River was historically known as the *Deshkan Ziibi* (Antler River) to the Anishinaabe, *Askunessippi* (Antlered River) to the Neutral, and *La Tranche* to French explorers. In 1793, it was named the Thames River by Lieutenant Governor John Graves Simcoe (UTRCA 2023a). Use of the Thames River has evolved over time from being a transportation route used by early Indigenous inhabitants and Euro-Canadian explorers and settlers, to an industrial power source to support the early mills of the area, and finally to a water course used for recreational purposes throughout the 20th and 21st centuries. The Thames River is designated as a Canadian Heritage River on the merit of its over 11,000 years of Indigenous occupation and its importance in Canada's post-contact history (Canadian Heritage Rivers System 2023).

1.3.2 Registered Archaeological Sites and Surveys

In Canada, archaeological sites are registered within the Borden system, a national grid system designed by Charles Borden in 1952 (Borden 1952). The grid covers the entire surface area of Canada and is divided into major units containing an area that is two degrees in latitude by four degrees in longitude. Major units are designated by upper case letters. Each major unit is subdivided into 288 basic unit areas, each containing an area of 10 minutes in latitude by 10 minutes in longitude. The width of basic units reduces as one moves north due to the curvature of the earth. In southern Ontario, each basic unit measures approximately 13.5 kilometres east-west by 18.5 kilometres north-south. In northern Ontario, adjacent to Hudson Bay, each basic unit measures approximately 10.2 kilometres east-west by 18.5 kilometres north-south. Basic units are designated by lower case letters. Individual sites are assigned a unique, sequential number as they are registered. These sequential numbers are issued by the Ministry who maintain the *Ontario Archaeological Sites Database*. The study area under review is located within Borden Block AiHh.

Information concerning specific site locations is protected by provincial policy and is not fully subject to the *Freedom of Information and Protection of Privacy Act* (Government of Ontario 1990a). The release of such information in the past has led to looting or various forms of illegally conducted site destruction. Confidentiality extends to media capable of conveying location, including maps, drawings, or textual descriptions of a site location. The Ministry will provide information concerning site location to the party or an agent of the party holding title to a property, or to a licensed archaeologist with relevant cultural resource management interests.

An examination of the *Ontario Archaeological Sites Database* has shown that there are three registered archaeological sites located within a one-kilometre radius of the study area (Government Ontario 2023a). Table 3 provides a summary of the registered archaeological sites within one kilometre of the study area. None of the registered archaeological sites are within 50 metres of the study area.

Table 3: Registered Archaeological Sites within One Kilometre of the Study Area

Borden #	Site Name	Cultural Affiliation	Site Type
AiHh-1	Morris	Indigenous, Late Archaic	Findspot
AiHh-2	Wiebe 2	Indigenous, Early Archaic	Scatter; workshop
AiHh-3	Wiebe 1	Indigenous	Findspot

A query of the *Ontario Public Register of Archaeological Reports* was completed to identify any previous archeological assessment completed within, or adjacent to, the study area. Based on the query, two previous archaeological assessments have been completed within the study area or within 50 metres of the current study area (Government of Ontario 2023b). A summary of the previous assessments in relation to the study area is presented in Table 4 and discussed further below.

Table 4: Previous Archaeological Assessment Completed near the Study Area

Year	Report	Author	Project Information Form (PIF) #
1979a	*Assessment of the Prehistoric and Historic Cultural Resources within the Glengowan Dam Project Area Phase I*	Scarlett Janusas	Not applicable (n/a)
1979b	*Archaeological Survey of the Glengowan Dam Project Area Phase II*.	Scarlett Janusas	n/a

On behalf of the UTRCA, the former Museum of Indian Archaeology, now Museum of Ontario Archaeology, at the University of Western Ontario conducted an archaeological assessment (Phase I) in 1979 to determine the potential cultural resources that may be impacted by the proposed Glengowan Dam and provide recommendations for further research (Janusas 1979a). The proposed Glengowan Dam was to be constructed north of St. Mary's, near the confluence of the North Branch of the Thames River and the Avon River (approximately 13 kilometres southeast of the study area), which would have created a large narrow reservoir covering approximately 728 hectares (Janusas 1979a). Background research in conjunction with landowner interviews about artifact collections and approximate collection areas, were conducted to provide an overview of potential archaeological site locations and determine the archaeological potential of the area. The Phase I study determined that the probability of archaeological sites existing within the Glengowan Dam impact area was high and that an archaeological field survey be conducted in the form of Phase II (Janusas 1979a).

The archaeological survey, or Phase II, was conducted over eight weeks in 1979 as part of the Glengowan Environmental Assessment for the proposed Glengowan Dam project (Janusas 1979b). The in-field archaeological assessment consisted of pedestrian survey and test pit survey at varying intervals depending on the archaeological potential of the field or area (Janusas 1979b). Fifteen archaeological sites were identified during the Phase II survey, including the three archaeological sites identified within one kilometre of the study area for this project: Morris (AiHh-1), Wiebe 2 (AiHh-2), Wiebe 1 (AiHh-3). All three archaeological sites were identified within agricultural fields adjacent to the North Branch of the Thames River. From the mapping in the Phase II report, it appears as though the Fullarton Conservation Area property was assessed by a combination of test pit survey at five to nine metre intervals (for the Neil Drain, dam, reservoir areas) and pedestrian survey at five to nine metre intervals (surrounding agricultural fields) (Janusas 1979b: Figure 1). No archaeological resources were identified within the Fullarton Conservation Area.

The proposed Glengowan Dam was never constructed, and the project was officially cancelled by UTRCA in 2018 (The Londoner 2018).

1.4 Existing Conditions

The study area consists of approximately 33.68 hectares of the Fullarton Conservation Area which includes trails, wetland, manicured lawn, mixed deciduous and pine wood woodlots and managed forests, agricultural fields, baseball diamonds, a creek, an earthen dam, and associated dam reservoir.



2 Field Methods

Prior to the start of the Stage 1 archaeological assessment, the UTRCA provided preliminary mapping for the Project, the Fullarton Conservation Area (i.e., the study area). This mapping was geo-referenced by Stantec's Geographical Information Services (GIS) team and a digital file (i.e., a shape file) was created of the study area. The digital file of the study area was uploaded to ArcGIS Field Maps powered by ESRI, customized by Stantec for archaeological survey and assessment, for digital data recording in the field. Data was recorded in the field on a handheld mobile device paired with a Trimble R1 Global Navigation Satellite System (GNSS) receiver to an accuracy of less than one metre.

Initial background research compiled information concerning registered and/or potential archaeological resources within the study area. A property inspection was conducted on January 11, 2023, by Darren Kipping (P422) under PIF number P422-0027-2022, issued to Darren Kipping, MA by the Ministry. The property inspection involved spot-checking the entirety of the study area to identify the presence or absence of features of archaeological potential in accordance with Section 1.2 of the Ministry's *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011).

During the property inspection on January 11, 2023, the weather was overcast and cold. At no time were field, lighting, or weather conditions detrimental to the identification of features of archaeological potential. The photography from the property inspection is presented in Section 7.1 and confirms that the requirements for a Stage 1 property inspection were met, as per Section 1.2 and Section 7.7.2 Standard 1 of the Ministry's 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011). Figure 9 illustrates photo locations from the property inspection of the study area.

Based on the results of the property inspection, approximately 77.34% of the study area consists of agricultural fields, scrubland, and woodlots (Photos 1 to 8).

Approximately 7.04% of the study area consists of modern disturbances from the construction and grading associated with the existing dam, asphalt and gravel laneways, and structures. Photos 7 to 12 illustrate typical examples of existing disturbance identified throughout the study area.

Approximately 9.00% of the study area consists of areas of steep slope. Photos 13 to 15 illustrate areas of steeply sloped terrain throughout the study area.

The remainder of the study area, approximately 6.62%. consists of low and permanently wet areas, mainly the Neil Drain and associated marshlands. Photos 16 and 17 illustrate examples of low and permanently wet areas throughout the study area.

3 Analysis and Conclusions

Archaeological potential is established by determining the likelihood that archaeological resources may be present on a subject property. Stantec applied archaeological potential criteria commonly used by the Ministry (Government of Ontario 2011) to determine areas of archaeological potential within the region under study. These variables include proximity to previously identified archaeological sites, distance to various types of water sources, soil texture and drainage, glacial geomorphology, elevated topography, and the general topographic variability of the area. However, it is worth noting that extensive land disturbance can eradicate archaeological potential (Government of Ontario 2011).

Potable water is the single most important resource for any extended human occupation or settlement and since water sources in Ontario have remained relatively stable over time, proximity to drinkable water is regarded as a useful index for the evaluation of archaeological site potential. In fact, distance to water is one of the most commonly used variables for predictive modeling of archaeological site locations. Distance to modern or ancient water sources is generally accepted as the most important determinant past human settlement patterns and considered alone, may result in a determination of archaeological potential. However, any combination of two or more other criteria, such as well-drained soils or topographic variability, may also indicate archaeological potential.

As discussed above, distance to water is an essential factor in archaeological potential modeling. When evaluating distance to water it is important to distinguish between water and shoreline, as well as natural and artificial water sources, as these features affect site location and type to varying degrees. The Ministry categorizes water sources in the following manner:

- Primary water sources: lakes, rivers, streams, and creeks.
- Secondary water sources: intermittent streams and creeks, springs, marshes, and swamps.
- Past water sources: glacial lake shorelines, relic river or stream channels, cobble beaches, and shorelines of drained lakes or marshes.
- Accessible or inaccessible shorelines: high bluffs, swamp or marshy lake edges, and sandbars stretching into marsh.

As stated in Section 1.3.1, the dammed Neil Drain runs southwest to northeast through the study area and the North Branch of the Thames River runs northwest to southeast along the eastern edge of the study area. Ancient and/or relic tributaries of other primary and secondary water sources may have existed but are not identifiable today and are not indicated on historical mapping. Soil texture can also be an important determinant of past settlement, usually in combination of other factors such as topography. As stated previously, soils within the study area consist of Huron clay loam, Burford loam, and alluvial deposits. Both Huron clay loam and Burford loam have good natural drainage and would have been suitable for Indigenous agriculture, especially in areas of elevated topography as illustrated on Figure 8.

A review of the *Ontario Archaeological Sites Database* identified three registered Indigenous archaeological sites within one kilometre of the study area, each identified within similar environmental



contexts as the study area (Government of Ontario 2023a; Janusas 1979b). Two of the Indigenous archaeological sites were dated to the Archaic period (approximately 8000 BCE to 1100 BCE), suggesting a long period of use of the area by Indigenous peoples. It should also be noted that the paucity of assessments and registered archaeological sites may be due to the relatively undeveloped landscape surrounding the study area and is not necessarily reflective of an absence of archaeological resources or potential.

Archaeological potential can be extended to areas of early Euro-Canadian settlement, including places of military or pioneer settlements; early transportation routes; and properties listed on the municipal register or designated under the *Ontario Heritage Act* (Government of Ontario 1990b) or property that local histories or informants have identified with possible historical events, activities, or occupations. Historical mapping demonstrates that the study area was occupied as early as the mid-to-late 19th century. The 1831 survey of Fullarton Township does not list any landowners or structures. Much of the established road and rail networks and agricultural settlement from the 19th century is still visible today. The 1879 map of Fullarton Township demonstrates that the study area follows early interior roads and concessions with structures illustrated as fronting these roads. A structure is illustrated on the 1879 map within the study area. Based on aerial imagery reviewed for this assessment, the structure was demolished sometime between 1954 and 1959. Structures depicted on the historical atlases and maps within the study area are no longer extant, however, the foundations, features, and cultural material associated with these habitations may exist in subsurface deposits of areas not subject to extensive or deep land alteration within the study area. There are no registered Euro-Canadian archaeological sites within one kilometre of the study area. However, similar to the few Indigenous sites, the paucity of assessments and registered archaeological sites may be due to the relatively undeveloped landscape surrounding the study area and is not necessarily reflective of an absence of archaeological resources or potential.

Background and archival research have determined that the study area for the Project retains archaeological potential. The 1979 Phase 1 study for the proposed Glengowan Dam project also supports the area retaining archaeological potential (Janusas 1979a). The Phase II archaeological survey for the proposed Glengowan Dam project overlapped with portions of the study area for this Project, and no archaeological resources were identified (Janusas 1979b). However, based on the Phase II report and its associated mapping (Janusas 1979b), it is difficult to determine the extent of the archaeological survey within the study area for this Project. Thus, it was not feasible to illustrate any previous area of assessment on Figure 9. In addition, the 1979 archaeological survey was not completed to the current archaeological methods outlined in the Ministry's 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011) and therefore these areas still retain archeological potential.

The Stage 1 property inspection determined that portions of the study area, particularly sports infrastructure, driveways, and the lands impacted by the construction of the dam itself, have been subject to deep and extensive land disturbance which has removed archaeological potential. The Stage 1 property inspection also determined that portions of the study area are steeply sloped and low and permanently wet, these areas do not retain archaeological potential. The Stage 1 property inspection determined the remaining portions of the study area comprises manicured lawn, agricultural fields,



scrublands, and woodlots/managed forests and these areas are determined to retain archaeological potential.

In summary, the Stage 1 archaeological assessment of the Project, involving background research and a property inspection, determined that much of the study area retains archaeological potential. However, the property inspection also indicted that approximately 7.04% of the study area consists of modern disturbances, approximately 9.00% of the study area consists of areas of steep slope, and approximately 6.62% consists of low and permanently wet areas, mainly the Neil Drain and associated marshlands (Figure 9). These areas, cumulatively 22.66% of the study area, are considered to retain low to no archaeological potential. The remaining 77.34% of the study area is considered to retain archaeological potential.

4 Recommendations

The Stage 1 archaeological assessment of the study area for the Project determined that much of the study area, approximately 77.34%, retains archaeological potential. 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 any portion of the Project's anticipated construction activities which impact an area of archaeological potential (Figure 9).**

The objective of the Stage 2 archaeological assessment is to document archaeological resources within the portions of the study area still retaining archaeological potential and to determine whether these archaeological resources require further assessment. The Stage 2 archaeological assessment will include the systematic walking of open ploughed fields as outlined in Section 2.1.1 of the Ministry's 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011). The Ministry standards require that all agricultural land, both active and inactive, be recently ploughed and sufficiently weathered to improve the visibility of archaeological resources. Ploughing must be deep enough to provide total topsoil exposure, but not deeper than previous ploughing, and must provide at least 80% ground surface visibility.

For areas inaccessible for ploughing, the Stage 2 archaeological assessment will include a test pit survey as outlined in Section 2.1.2 of the Ministry's 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011). The Ministry standards require that each test pit be at least 30 centimetres in diameter, excavated to at least five centimetres into subsoil, and have excavated soil screened through six-millimetre hardware cloth to facilitate the recovery of any cultural material that may be present. Prior to backfilling, each test pit will be examined for stratigraphy, cultural features, or evidence of fill.

If the archaeological field team determines any additional lands to be low and permanently wet, steeply sloped, or disturbed during the Stage 2 field work, those areas will not require survey, but will be photographically documented in accordance with Section 2.1 of the Ministry's 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011).

It is further recommended that Stage 2 archaeological assessment of the study area for the Project include engagement with interested Indigenous communities. Indigenous engagement practices conducted during the Stage 2 archaeological assessment will be completed in accordance with the Ministry's 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011) and the Ministry's draft technical bulletin on *Engaging Aboriginal Communities in Archaeology*.

The remaining portions of the study area, approximately 22.66%, retain low to no archaeological potential due to deep and extensive modern disturbances from the construction of the Fullarton Dam, areas identified as steeply sloped, and low and permanently wet areas. In accordance with Section 1.3.2, Section 2.1 Standard 2, and Section 7.74 of the Ministry's 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011), **Stage 2 archaeological assessment is not required for**



any portion of the Project's anticipated construction activities which impact an area of low to no archaeological potential (Figure 9).

The Ministry is asked to review the results presented and to accept this report into the *Ontario Public Register of Archaeological Reports*.

5 Advice on Compliance with Legislation

In accordance with Section 7.5.9 of the Ministry's 2011 Standards and Guidelines for Consultant Archaeologists (Government of Ontario 2011), the following standard statements are a required component of archaeological reporting and are provided from the Ministry's 2011 Standards and Guidelines for Consultant Archaeologists (Government of Ontario 2011).

This report is submitted to the Minister of Citizenship and Multiculturalism as a condition of licensing in accordance with Part VI of the *Ontario Heritage Act*, R.S.O. 1990, c 0.18 (Government of Ontario 1990b). The report is reviewed to ensure that it complies with the standards and guidelines that are issued by the Minister, and that the archaeological fieldwork and report recommendations ensure the conservation, protection and preservation of the cultural heritage of Ontario. When all matters relating to archaeological sites within the project area of a development proposal have been addressed to the satisfaction of the Ministry of Citizenship and Multiculturalism, a letter will be issued by the ministry stating that there are no further concerns with regard to alterations to archaeological sites by the proposed development.

It is an offence under Sections 48 and 69 of the *Ontario Heritage Act* (Government of Ontario 1990b) for any party other than a licensed archaeologist to make any alteration to a known archaeological site or to remove any artifact or other physical evidence of past human use or activity from the site, until such time as a licensed archaeologist has completed fieldwork on the site, submitted a report to the Minister stating that the site has no further cultural heritage value or interest, and the report has been filed in the *Ontario Public Register of Archaeological Reports* referred to in Section 65.1 of the *Ontario Heritage Act* (Government of Ontario 1990b).

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* (Government of Ontario 1990b). The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out archaeological fieldwork, in compliance with Section 48(1) of the *Ontario Heritage Act* (Government of Ontario 1990b).

The *Funeral, Burial and Cremation Services Act*, 2002, S.O. 2002, c.33 (Government of Ontario 2002) requires that any person discovering human remains must notify the police or coroner and the Registrar of Cemeteries at the Ministry of Public and Business Service Delivery.

Archaeological sites recommended for further archaeological fieldwork remain subject to Section 48(1) of the *Ontario Heritage Act* (Government of Ontario 1990b) and may not be altered, or have artifacts removed, except by a person holding an archaeological license.

6 Bibliography and Sources

Association of Ontario Land Surveyors [AOLS]. 1997. List of Subdivided Townships in the Province of Ontario with Dates and Systems of Survey. On File at Stantec.

Belden & Co. 1879. *Historical Atlas of the County of Perth, Ontario*. Toronto: Belden.

Birch, Jennifer. 2015. Current Research on the Historical Development of Northern Iroquoian Societies. *Journal of Archaeological Research* 22(4):263-323.

Birch, Jennifer and Ronald F. Williamson. 2013. *The Mantle Site: An Archaeological History of an Ancestral Huron Wendat Community*. Lanham: Altamira Press.

Bohaker, Heidi Rosemary. 2006. *Nindoodemag: Anishinaabe Identities in the Eastern Great Lakes Region, 1600 to 1900*. Unpublished Ph.D. dissertation. Toronto: University of Toronto.

Borden, Charles E. 1952. *A Uniform Site Designation Scheme for Canada*. Anthropology in British Columbia 3:44-48.

Canada Company. 1835. *Map of the Township of Fullarton*. Toronto: Canada Company.

Canadian Heritage Rivers System. 2023. *Thames River*. Electronic document: https://chrs.ca/en/rivers/thames-river. Last accessed on February 8, 2023.

Caston, Wayne A. 1997. *Evolution in the Mapping of Southern Ontario and Wellington County*. Wellington County History 10:91-106.

Census of the Canadas. 1853. Census of the Canadas 1851-2, Personal Census, Vol. I. Quebec: John Lovell.

Census of the Canadas. 1861. Census of the Canadas 1860-61, Personal Census, Vol. I. Quebec: S.B. Foote.

Census of the Canadas. 1864. Census of the Canadas, 1860-61, Agricultural Produce, Mills, Manufactories, Houses, Schools, Public Buildings, Place of Worship. Quebec: S.B. Foote.

Ellis, Chris J. 2013. Before Pottery: Paleoindian and Archaic Hunter-Gatherers. In *Before Ontario: The Archaeology of a Province*, edited by Marit K. Munson and Susan M. Jamieson, pp. 35-47. Montreal and Kingston: McGill-Queen's University Press.

Ellis, Chris J. and Neal Ferris (editors). 1990. *The Archaeology of Southern Ontario to A.D. 1650*. Occasional Publication of the London Chapter, Ontario Archaeological Society, Number 5.

Ellis, Chris J., Ian T. Kenyon, and Michael W. Spence. 1990. The Archaic. In Ellis and Ferris 1990, pp. 65-124.

Feest, Johanna E. and Christian F. Feest 1978. The Ottawa. In H*andbook of North American Indians*. Volume 15, Northeast, edited by Bruce G. Trigger, pp. 772-786. Washington: Smithsonian Institution Press.

Ferris, Neal. 2009. *The Archaeology of Native-Lived Colonialism: Challenging History in the Great Lakes. Tucson*: University of Arizona Press.

Gardiner, Herbert F. 1899. *Nothing But Names*. Toronto: George N. Morang and Company Limited.

Gentilcore, Louis R. and C. Grant Head. 1984. *Ontario's History in Maps*. Toronto: University of Toronto Press.

Government of Canada. 2016. *Treaty Texts – Upper Canada Land Surrenders*. Electronic document: https://www.rcaanc-cirnac.gc.ca/eng/1370372152585/1581293792285#ucls23. Last accessed on January 19, 2023.

Government of Ontario. 1990a. Freedom of Information and Protection of Privacy Act, R.S.O. 1990, CHAPTER F.31. Electronic document: https://www.ontario.ca/laws/statute/90f31. Last accessed on February 8, 2023.

Government of Ontario. 1990b. Ontario Heritage Act, R.S.O. 1990, CHAPTER O.18. Electronic document: http://www.ontario.ca/laws/statute/90o18. Last accessed on February 8, 2023.

Government of Ontario. 1990c. Ontario Environmental Assessment Act, R.S.O. 1990, CHAPTER E.18. Electronic document: https://www.ontario.ca/laws/statute/90e18?search=environment+assessment+act. Last accessed on February 8, 2023.

Government of Ontario. 2002. Funeral, Burial and Cremation Services Act, 2002, S.O. 2002, c. 33. Electronic document: https://www.ontario.ca/laws/statute/02f33. Last accessed on February 8, 2023.

Government of Ontario. 2011. Standards and Guidelines for Consultant Archaeologists. Toronto: Ministry of Tourism, Culture and Sport.

Government of Ontario. 2017. *LiDAR Digital Terrain Model*. Ministry of Natural Resources and Forestry.

Government of Ontario. 2020. Provincial Policy Statement, 2020, Under the Planning Act. Electronic document: https://files.ontario.ca/mmah-provincial-policy-statement-2020-accessible-final-en-2020-02-14.pdf. Last accessed on January 13, 2023.

Government of Ontario. 2022. Agronomy Guide for Field Crops – Publication 811. Available online: Agronomy Guide for Field Crops | ontario.ca. Last accessed on February 8, 2023.

Government of Ontario. 2023a. Ontario Archaeological Sites Database Files. Ministry of Tourism, Culture and Sport. Past Portal. Last accessed June 1, 2022.

Government of Ontario. 2023b. Ontario Public Register of Archaeological Reports. Ministry of Tourism, Culture and Sport. Past Portal. Last accessed June 1, 2022.

Hoffman, D.W., and N.R. Richards. 1952. *Soil Survey of Perth County*. Report No. 15 of the Ontario Soil Survey. Guelph: Experimental Farms Service, Canada Department of Agriculture and the Ontario Agricultural College.

Janusas, Scarlett. 1979a. *Assessment of the Prehistoric and Historic Cultural Resources within the Glengowan Dam Project Area Phase I.* London: Museum of Indian Archaeology at the University of Western Ontario.

Janusas, Scarlett. 1979b. *Archaeological Survey of the Glengowan Dam Project Area Phase II*. London: Museum of Indian Archaeology at the University of Western Ontario.

Johnston, W.S. and H.J.M. Johnston. 1967. *History of Perth County to 1967*. Stratford: Municipal Corporation of the County of Perth.

Karr, Clarence. 1974. *The Canada Land Company: The Early Years*. Ottawa: Ontario Historical Society, Love Printing Service Ltd.

Konrad, Victor. 1981. An Iroquois Frontier: The North Shore of Lake Ontario during the Late Seventeenth Century. Journal of Historical Geography 7(2): 129-144.

Lennox, Paul A. and William R. Fitzgerald. 1990. The Culture History and Archaeology of the Neutral Iroquoians. In Ellis and Ferris 1990, pp. 405-456.

Loewen, Brad and Claude Chapdelaine (editors). 2016. Contact in the 16th Century: Networks among Fishers, Foragers and Farmers. Mercury Series Archaeology Paper 176. Ottawa: University of Ottawa Press.

McDonald, John. 1835. *Map of the Township of Fullarton.* Map on file with the Ontario Ministry of Natural Resources and Forestry. Peterborough.

Métis Nation of Ontario. 2023. Métis Historic Timeline. Electronic document: http://www.metisnation.org/culture-heritage/m%C3%A9tis-timeline/. Last accessed on February 8, 2023.

Morris, J.L. 1943. Indians of Ontario. 1964 reprint. Toronto: Department of Lands and Forests.

Murphy, Carl and Neal Ferris. 1990. The Late Woodland Western Basin Tradition in Southwestern Ontario. In Ellis and Ferris 1990, pp. 189-278.

OnLand. 2023a. Perth (44), Fullarton, Book 199, East Mitchell Road Concession. Electronic Document: https://www.onland.ca/ui/44/books/63898/viewer/579537059?page=32. Last Accessed on January 27, 2023.

OnLand. 2023b. Perth (44), Fullarton, Book 199, West Mitchell Concession. Electronic Document: https://www.onland.ca/ui/44/books/65184/viewer/547957377?page=55. Last Accessed on January 27, 2023.

Rogers, E.S. 1978. Southeastern Ojibwa. In Handbook of North American Indians, Volume 15 Northeast, edited by Bruce G. Trigger, pp. 760-771. Washington: Smithsonian Institution Press.

Schmalz, Peter S. 1991. The Ojibwa of Southern Ontario. Toronto: University of Toronto Press.

Stevens, E. W. 2004. First Nations underwater archaeology of the Trent-Severn Waterway. Copy on file at Parks Canada, Ottawa.

Stewart, Andrew M. 2013. Water and Land. In Before Ontario: The Archaeology of a Province, edited by Marit K. Munson and Susan M. Jamieson, pp. 24-34. Montreal and Kingston: McGill-Queen's University Press.

Stone, Lyle M. and Donald Chaput. 1978. Southeastern Ojibwa. In Handbook of North American Indians. Volume 15, Northeast, edited by Bruce G. Trigger, pp. 602-609. Washington: Smithsonian Institution Press.

The Londoner. 2018. *Conservation authority cancels Glengowan Dam and Reservoir project*. Electronic document: https://www.thelondoner.ca/news/local-news/conservation-authority-cancels-glengowan-dam-and-reservoir-project-2/wcm/323650ce-0484-45ce-800f-f3d9a4beb68c/amp/. Last accessed on February 13, 2023.

UTRCA. 2015. Embro Dam Class Environmental Assessment, Public Information Centre #1. Electronic Document: https://thamesriver.on.ca/wp-content/uploads/FloodStructures/OtherStructures/EmbroDam-display-PublicInfoCentre-June2015.pdf. Last accessed on January 30, 2023.

UTRCA. 2023a. The Thames River Watershed and Traditional Territory. Electronic Document: https://thamesriver.on.ca/about-us/thames-river-watershed-and-traditional-territory/#:~:text=The%20Upper%20Thames%20River%20watershed,and%20region%20of%20southwestern%20Ontario. Last accessed on January 26, 2023.

UTRCA. 2023b. Flooding on the Thames River. Electronic Document: https://thamesriver.on.ca/water-management/flooding-on-the-thames-river/#:~:text=In%201947%2C%20the%20Upper%20Thames,watershed%20of%20the%20Thames%20River.. Last accessed on January 30, 2023.

UTRCA. 2023c. Fullarton CA. Electronic Document: https://thamesriver.on.ca/parks-recreation-natural-areas/day-use-cas-and-tracts/fullarton-ca/. Last accessed on January 30, 2023.

UTRCA. 2023d. Other Dams. Electronic Document: https://thamesriver.on.ca/water-management/recreational-dams/. Last accessed on January 30, 2023.

UTRCA. 2023e. Dorchester CA. Electronic Document: https://thamesriver.on.ca/parks-recreation-natural-areas/day-use-cas-and-tracts/dorchester-ca/. Last accessed on January 30, 2023.

UTRCA. 2023f. Shakespeare CA. Electronic Document: https://thamesriver.on.ca/parks-recreation-natural-areas/day-use-cas-and-tracts/shakespeare-ca/. Last accessed on January 30, 2023.

Weaver, W.F. 1968. *Crown Surveys in Ontario.* Toronto: Department of Lands and Forests.

Williamson, Ronald F. 2013. The Woodland Period, 900 BCE to 1700 CE. In Before Ontario: The Archaeology of a Province, edited by Marit K. Munson and Susan M. Jamieson, pp. 48-61. Montreal and Kingston: McGill-Queen's University Press.

7 Images

7.1 Photographs

Photo 1: Area retaining archaeological potential, agricultural field in distance and scrubland in foreground, facing east



Photo 2: Area retaining archaeological potential, manicured lawn, facing south-southwest



Photo 3: Area retaining archaeological potential, woodlot/managed forest, facing south-southeast



Photo 4: Area retaining archaeological potential, woodlot/managed forest, facing north



Photo 5: Area retaining archaeological potential on left, area of low and permanently wet ground at right, facing north



Photo 6: Area retaining archaeological potential, woodlot, facing southwest



Photo 7: Area retaining archaeological potential, woodlot, facing south-southwest



Photo 8: Area retaining archaeological potential, woodlot, facing north



Photo 9: Area of previous disturbance, sports infrastructure and asphalt driveway, facing east



Photo 10: Area of previous disturbance, sports infrastructure and asphalt driveway, facing northwest



Photo 11: Area of previous disturbance, earthen dam, facing east



Photo 12: Area of previous disturbance, dam and reservoir, facing south



Photo 13: Area of steep slope, facing northeast



Photo 14: Area of steep slope, facing south



Photo 15: Area of steep slope, facing north-northeast



Photo 16: Low and permanently wet area, facing north-northeast

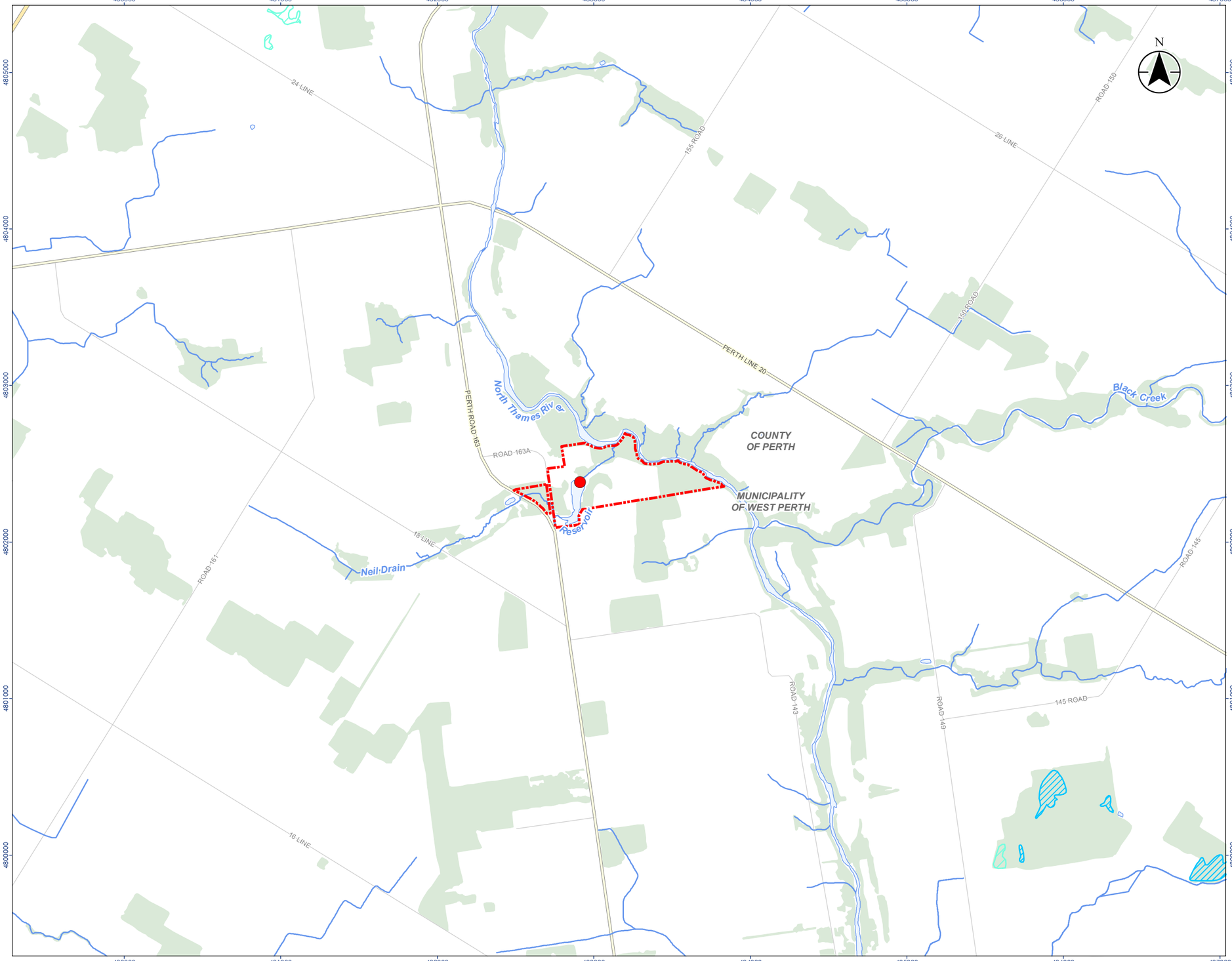


Photo 17: Low and permanently wet area, facing east



8 Maps

Maps of the study area for the Stage 1 archaeological assessment follow on succeeding pages.



Stantec

Legend

- Fullarton Dam
- Expressway / Highway
- Major Road
- Minor Road
- Regulated Watercourse (UTRCA)
- Waterbody
- Wetland - Evaluated (Other)
- Wetland - Not evaluated per Ontario Wetland Evaluation System
- Wooded Area
- Study Area

0 0.5 1 km

1:25,000 (At original document size of 11x17)

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, 2023.



Project Location
County of Perth

160901056 REVA
Prepared by PRM on 2023-02-16
Technical Review by DK on 2023-02-16

Client/Project
UPPER THAMES RIVER CONSERVATION AUTHORITY
FULLARTON DAM REHABILITATION
STAGE 1 ARCHAEOLOGICAL ASSESSMENT

Figure No.
1

Title
Location of the Project

Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.

\\Cd1004301\work_groups\01499\active\160901056\02_data\gis_cad\gis\mxds\Archaeology\report_figures\S1_Rpt\160901056_S1_Rpt_Fig01_Location_Project.mxd Revised: 2023-02-16 By: prmoser



Stantec

Legend

- Fullarton Dam
- Major Road
- Minor Road
- Regulated Watercourse (UTRCA)
- Waterbody
- Study Area

0 250 500 metres

1:10,000 (At original document size of 11x17)

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, 2023.
3. Orthoimagery © SWOOP UTRCA 2023, Imagery date 2020.



Project Location
County of Perth

160901056 REVA
Prepared by PRM on 2023-02-16
Technical Review by DK on 2023-02-16

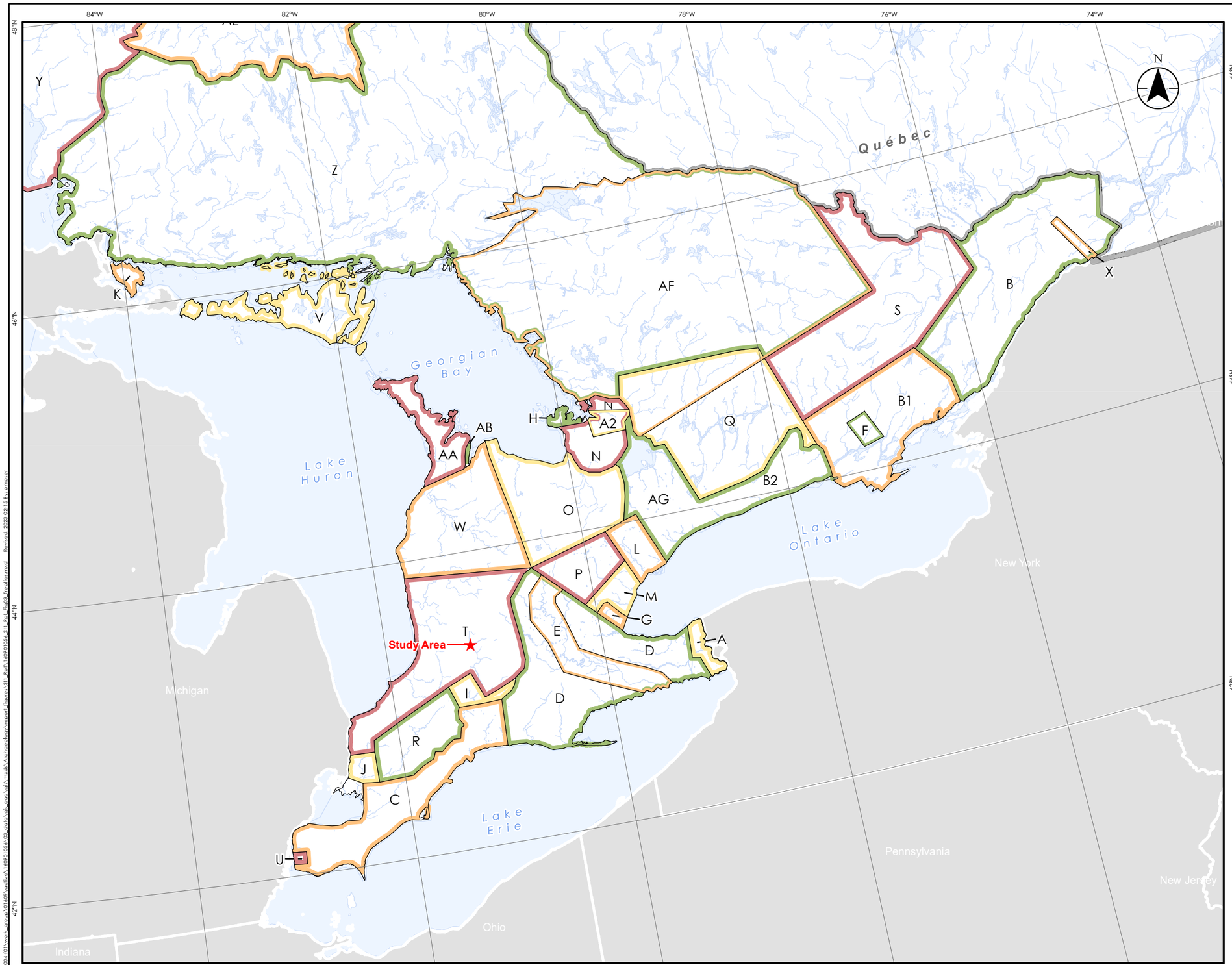
Client/Project
UPPER THAMES RIVER CONSERVATION AUTHORITY
FULLARTON DAM REHABILITATION
STAGE 1 ARCHAEOLOGICAL ASSESSMENT

Figure No.
2

Title
Location of Study Area

Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.

\\Cd1001-001\work_group\01469\active\160901056\03_data\gis_cad\gis\mxds\Archaeology\report_figures\S1_Rpt_Fig02_Location_Study_Area.mxd Revised: 2023-02-16 By: prmoser



Stantec

Legend

- Study Area
- Waterbody

A Treaty No. 381, May 9th, 1781 (Mississauga and Chippewa)
AA Treaty No. 72, October 30th, 1854 (Chippewa)
AB Treaty No. 82, February 9th, 1857 (Chippewa)
AE Treaty No. 9, James Bay 1905, 1906 (Ojibway and Cree)
AG Williams Treaty, October 31st, 1923 (Chippewa)
A2 John Collins' Purchase, 1785 (Chippewa)
B Crawford's Purchase, October 9th, 1783 (Algonquin and Iroquois)
B1 Crawford's Purchase, October 9th, 1783 (Mississauga)
B2 Crawford's Purchase, 1783, 1787, 1788 (Mississauga)
C Treaty No. 2, May 19th, 1790 (Odawa, Chippewa, Pottawatomi, and Huron)
D Treaty No. 3, December 2nd, 1792 (Mississauga)
E Haldimand Tract: from the Crown to the Mohawk, 1793
F Tyendinaga: from the Crown to the Mohawk, 1793
G Treaty No. 3 3/4: from the Crown to Joseph Brant, October 24th, 1795
H Treaty No. 5, May 22nd, 1798 (Chippewa)
I Treaty No. 6, September 7th, 1796 (Chippewa)
J Treaty No. 7, September 7th, 1796 (Chippewa)
K Treaty No. 11, June 30th, 1798 (Chippewa)
L Treaty No. 13, August 1st, 1805 (Mississauga)
M Treaty No. 13A, August 2nd, 1805 (Mississauga)
N Treaty No. 16, November 18th, 1815 (Chippewa)
O Treaty No. 18, October 17th, 1818 (Chippewa)
P Treaty No. 19, October 28th 1818 (Chippewa)
Q Treaty No. 20, November 5th, 1818 (Chippewa)
R Treaty No. 21, March 9th, 1819 (Chippewa)
S Treaty No. 27, May 31st, 1819 (Mississauga)
T Treaty No. 29, Huron Tract, July 10, 1827 (Chippewa)
U Treaty No. 35, August 13th, 1833 (Wyandot or Huron)
W Treaty No. 45½, August 9th, 1836 (Saugeen)
X Treaty No. 57, June 1st, 1847 (Iroquois of St. Regis)
Y Treaty No. 60, Robinson, Superior, September 7th, 1850 (Ojibwa)
Z Treaty No. 61, Robinson, Huron, September 9th, 1850 (Ojibwa)

0 50 100 Km
1:3,000,000 (At original document size of 11x17)

Notes
1. Coordinate System: NAD 1983 Statistics Canada Lambert
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2018.
3. Treaty boundaries adapted from Morris 1943 (1964 reprint). For cartographic representation only.

Project Location
County of Perth

160901056 REVA
Prepared by PRM on 2023-02-15
Technical Review by DK on 2023-02-14

Client/Project
UPPER THAMES RIVER CONSERVATION AUTHORITY
FULLARTON DAM REHABILITATION
STAGE 1 ARCHAEOLOGICAL ASSESSMENT

Figure No.
3

Title
Treaties and Purchases (Adapted from Morris 1943)

Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.

\\ca1001-s401\work_group\01469\active\160901056\gis\mxds\Archaeology\report_figures\S1_Rpt\160901056_S1_Rpt_Fig03_Treaties.mxd Revised: 2023-02-15 By: pmouser



Stantec

Legend

Study Area

Figure Not to Scale

Notes

1. McDonald, John. 1835. Map of the Township of Fullarton. Map on file with the Ontario Ministry of Natural Resources and Forestry, Peterborough.



Project Location
County of Perth

160901056 REVA
Prepared by PRM on 2023-02-16
Technical Review by DK on 2023-02-16

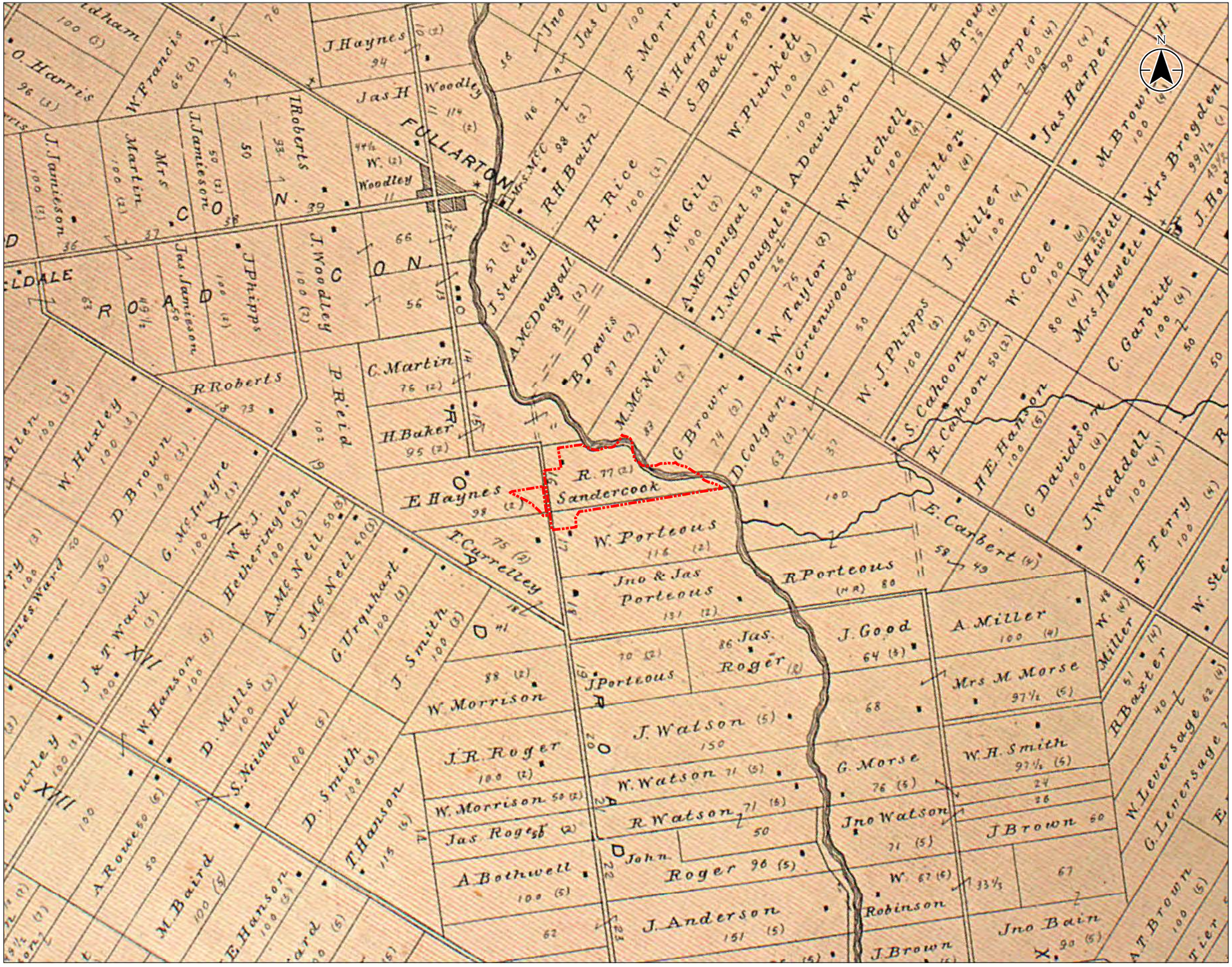
Client/Project
UPPER THAMES RIVER CONSERVATION AUTHORITY
FULLARTON DAM REHABILITATION
STAGE 1 ARCHAEOLOGICAL ASSESSMENT

Figure No.
4

Title
Portion of the 1831 Survey Map of Fullarton Township

Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.

\\Cd1004201\work_group\01609\active\160901056\03_data_gis_cad_rpt\mxds\Archaeology\report_figures\01_Rpt_Fig04_Historic_Map_1831_Fullarton_Twnp.mxd Revised: 2023-02-16 By: prmoser



Stantec

Legend

Study Area

Figure Not to Scale

Notes

1. Belden, H. & Co. 1879. Illustrated Historical Atlas of the County of Perth, Ont. Toronto: H. Belden & Co.

Project Location
County of Perth

160901056 REVA
Prepared by PRM on 2023-02-16
Technical Review by DK on 2023-02-16

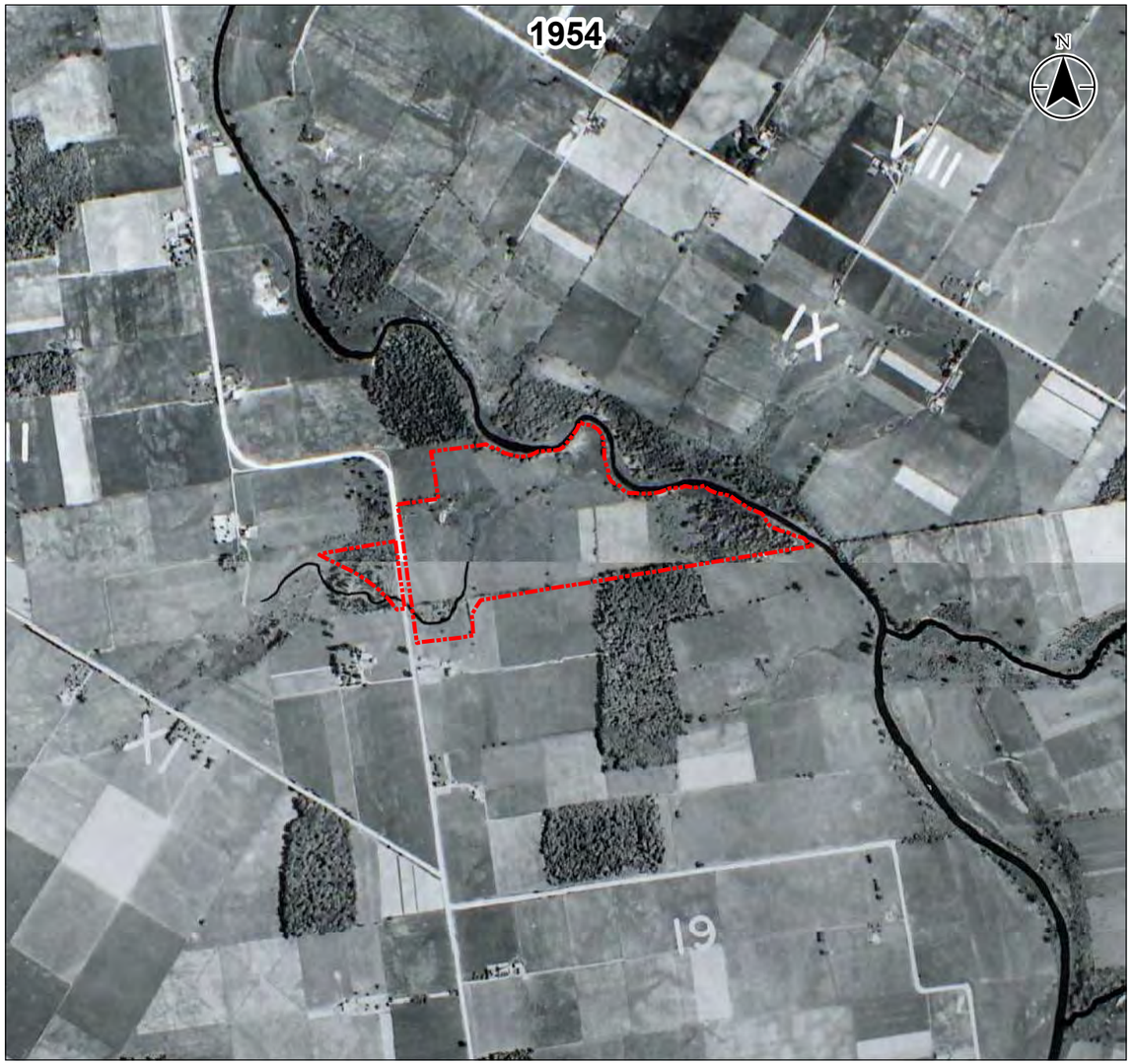
Client/Project
UPPER THAMES RIVER CONSERVATION AUTHORITY
FULLARTON DAM REHABILITATION
STAGE 1 ARCHAEOLOGICAL ASSESSMENT

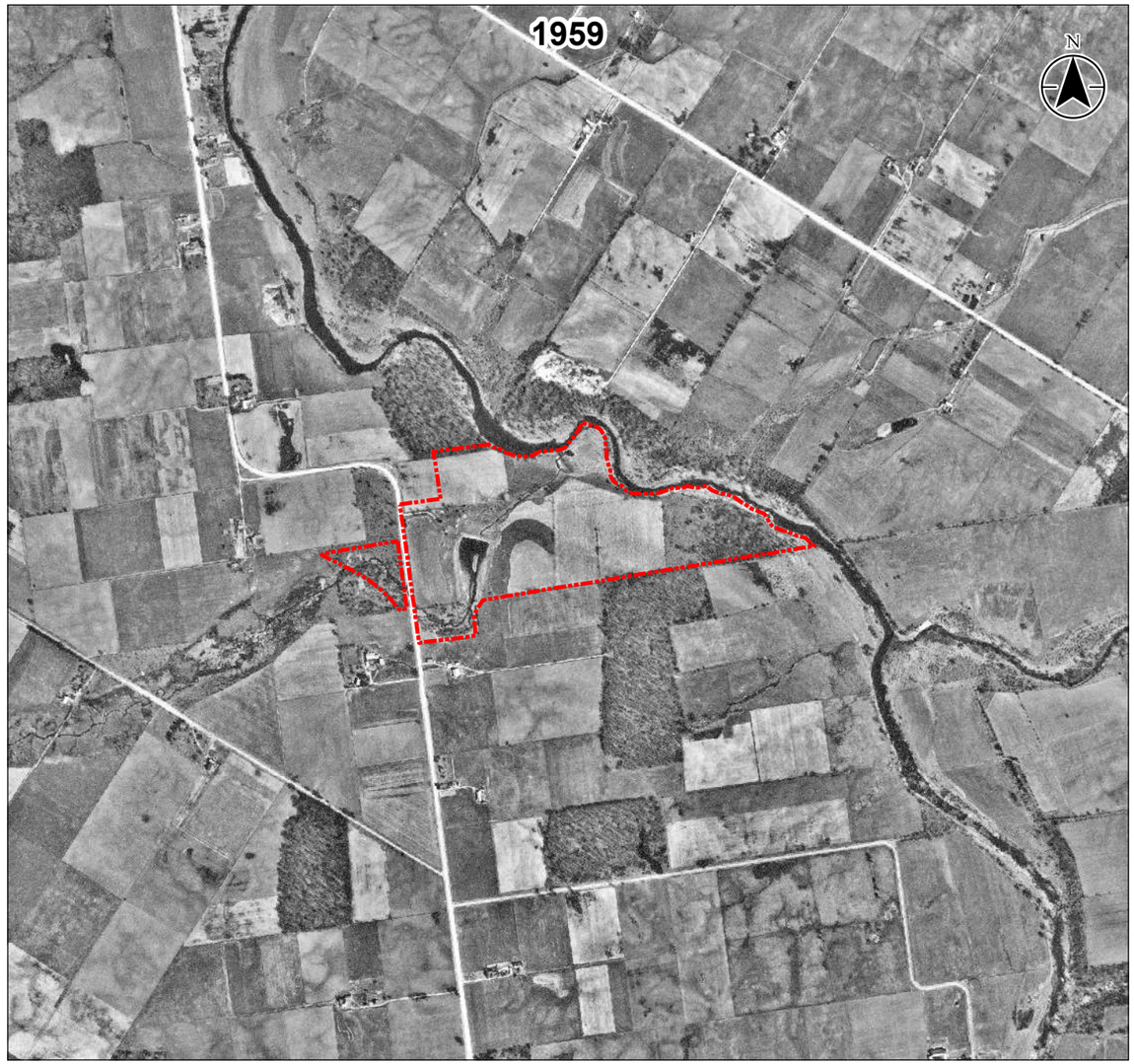
Figure No.
5

Title
Portion of the 1879 Map of Fullarton Township

Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.

Revised: 2023-02-16 By prmoser
\\cd1004201\work_group\01659\active\160901056\03_data\gis_cad_rpt\mxds\Archaeology\report_figures\01_2pn\160901056_01_Rpt_Fig05_Historic_Map_1879_Fullarton_Twnp.mxd







Legend

Study Area

Figure Not to Scale

Notes

1. University of Toronto Map and Data Library. *1954 Air Photos of Southern Ontario*. 434.811.
2. National Air Photo Library. 1959. A16447_071

Stantec

Project Location Township of Puslinch	160901056 REVA Prepared by PRM on 2023-02-16 Technical Review by DK on 2023-02-16

Client/Project

UPPER THAMES RIVER CONSERVATION AUTHORITY
FULLARTON DAM REHABILITATION
STAGE 1 ARCHAEOLOGICAL ASSESSMENT

Figure No.

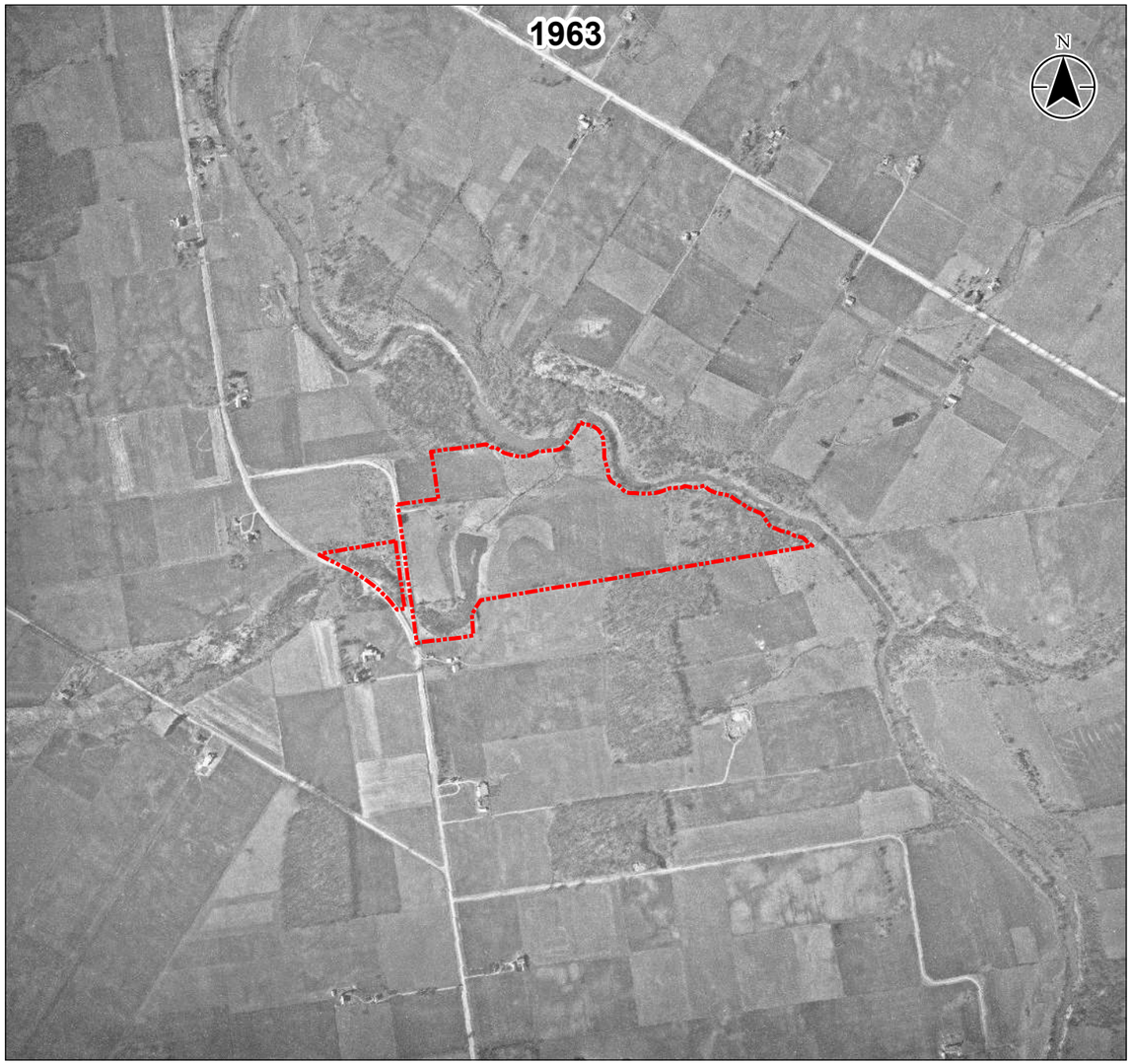
6

Title

Aerial Imagery - 1954 and 1959

Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.

\\Cd1004-f01\work_group\01669\active\160901056\03_data\gis_cad\gis\mxds\Archaeology\report_figures\91_rpt\160901056_91_Rpt_Fig06_Aerial_1954_and_1959.mxd Revised: 2023-02-16 By: prmoser







Legend

Study Area

Figure Not to Scale

Notes

1. National Air Photo Library. 1963. A17970_152.

Stantec

Project Location Township of Puslinch	160901056 REVA Prepared by PRM on 2023-02-16 Technical Review by DK on 2023-02-16

Client/Project

UPPER THAMES RIVER CONSERVATION AUTHORITY
FULLARTON DAM REHABILITATION
STAGE 1 ARCHAEOLOGICAL ASSESSMENT

Figure No.

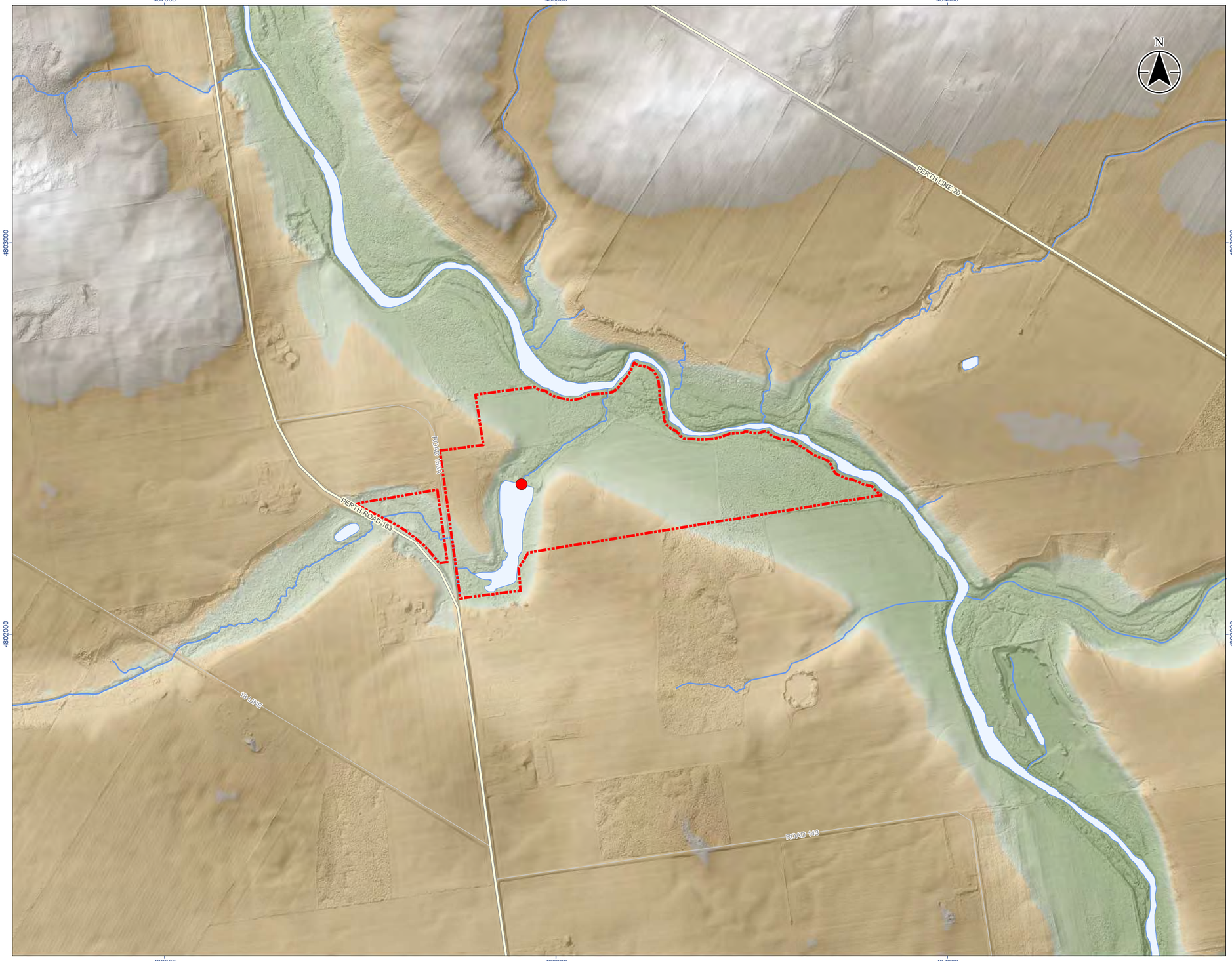
7

Title

Aerial Imagery - 1963 and 2020

Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.

\\Cd1004d01\wat_group\01609\active\160901056\03_data\gis_cad_gis\mxds\Archaeology\report_figures\STI_Rpt\160901056_STI_Rpt_Fig07_Aerial_1963_and_2020.mxd Revised: 2023-02-16 By: pmoser



Stantec

Legend

- Fullarton Dam
- Major Road
- Minor Road
- Regulated Watercourse (UTRCA)
- Waterbody
- Study Area

Ground Surface Elevation

High : 352.335

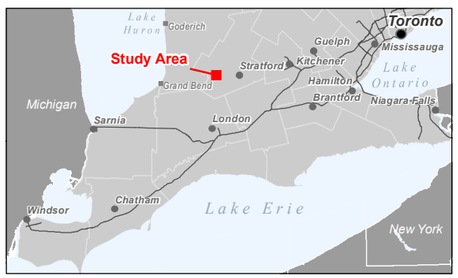
Low : 317.15

0 250 500 metres

1:10,000 (At original document size of 11x17)

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, 2023.
3. Ground Surface Elevation SWOOP 2017 (UTRCA).



Project Location
County of Perth

160901056 REVA
Prepared by PRM on 2023-02-16
Technical Review by DK on 2023-02-16

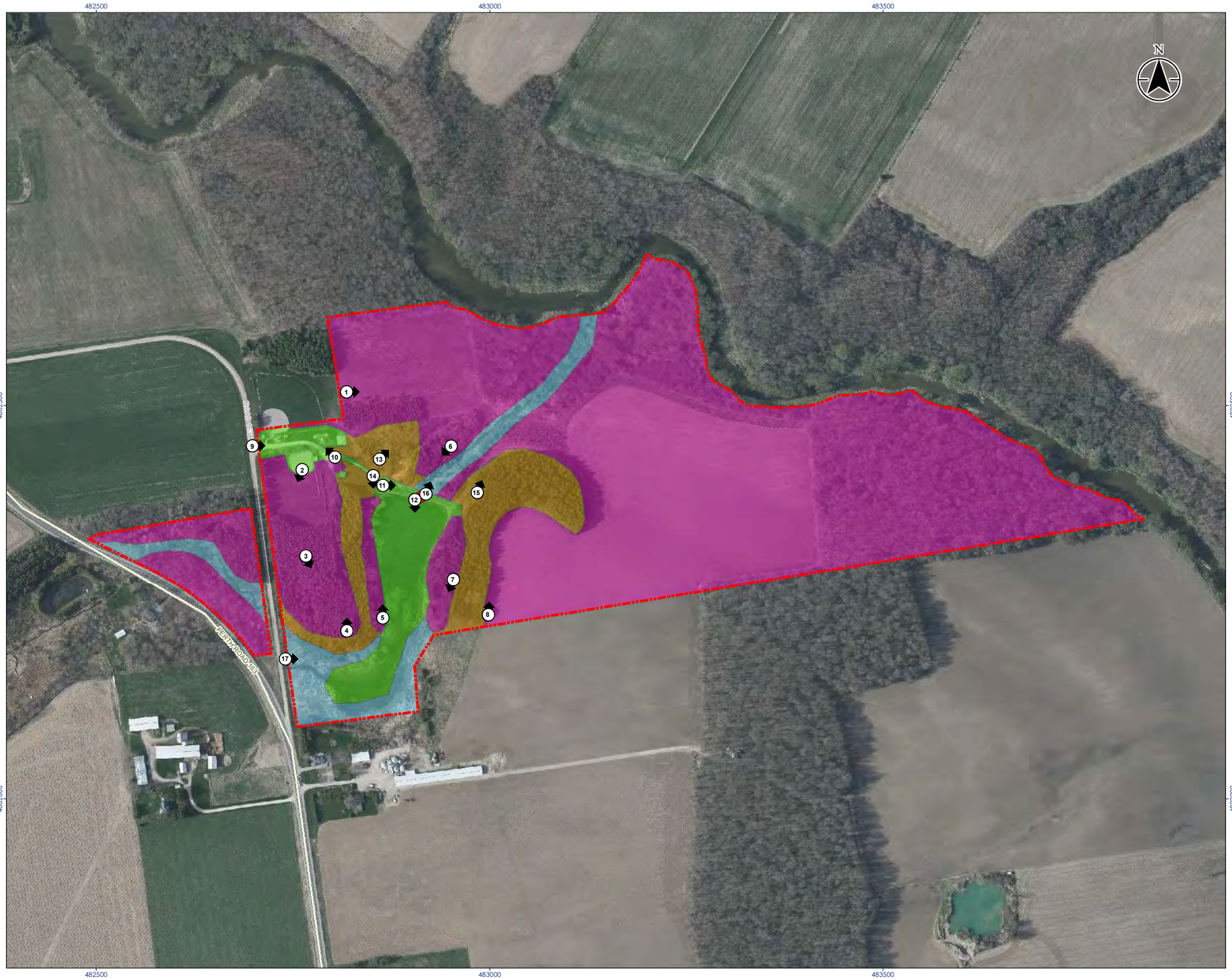
Client/Project
UPPER THAMES RIVER CONSERVATION AUTHORITY
FULLARTON DAM REHABILITATION
STAGE 1 ARCHAEOLOGICAL ASSESSMENT

Figure No.
8

Title
LiDAR Hillshade Relief Map

Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.

Revised: 2023-05-16 By: prmoser
\\CA1001401\work_groups\01699\active\160901056\03_data_gis_cad_gis\mxds\Archaeology\report_figures\S1_Fig01_160901056_S1_Fig01_LiDAR_Relief_Map.mxd



Stantec

Legend

- Fullarton Dam
- Archaeology Photo Log
- Major Road
- Minor Road
- Study Area

Archaeological Assessment

Assessment Method

- Area of Archaeological Potential - Further Archaeological Work Required (Stage 1)
- Area of Steep Slope, Low to No Archaeological Potential - No Further Archaeological Work
- Low and Permanently Wet Area, Low to No Archaeological Potential - No Further Archaeological Work Required
- Previously Disturbed, Low to No Archaeological Potential - No Further Archaeological Work Required

0 100 200 metres

1:5,000 (At original document size of 11x17)

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, 2023.
3. Orthoimagery © SWOOP UTRCA 2023, Imagery date 2020.



Project Location
County of Perth

160901056 REVA
Prepared by PRM on 2023-02-16
Technical Review by DK on 2023-02-16

Client/Project
UPPER THAMES RIVER CONSERVATION AUTHORITY
FULLARTON DAM REHABILITATION
STAGE 1 ARCHAEOLOGICAL ASSESSMENT

Figure No.
9

Title
Stage 1 Results and Recommendations

Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.

\\Cd1004d01\work_group\01609\active\160901056\03_data\gis_cad\gis\mxds\Archaeology\report_figures\91_Rpt\160901056_91_Rpt_Fig09_Stage_Results.mxd Revised: 2023-02-16 By: prmoser

9 Closure

This report documents work that was performed in accordance with generally accepted professional standards at the time and location in which the services were provided. No other representations, warranties or guarantees are made concerning the accuracy or completeness of the data or conclusions contained within this report, including no assurance that this work has uncovered all potential archaeological resources associated with the identified property.

All information received from the client or third parties in the preparation of this report has been assumed by Stantec to be correct. Stantec assumes no responsibility for any deficiency or inaccuracy in information received from others.

Conclusions made within this report consist of Stantec's professional opinion as of the time of the writing of this report and are based solely on the scope of work described in the report, the limited data available and the results of the work. The conclusions are based on the conditions encountered by Stantec at the time the work was performed. Due to the nature of archaeological assessment, which consists of systematic sampling, Stantec does not warrant against undiscovered environmental liabilities nor that the sampling results are indicative of the condition of the entire property.

This report has been prepared for the exclusive use of the client identified herein and any use by any third party is prohibited. Stantec assumes no responsibility for losses, damages, liabilities, or claims, howsoever arising, from third party use of this report. We trust this report meets your current requirements. Please do not hesitate to contact us should you require further information or have additional questions about any facet of this report.

Quality Review  Digitally signed by Colin Varley
Date: 2023.03.09 15:01:38 -05'00'

Colin Varley – Senior Archaeologist, Senior Associate

Independent Review  Dickson, Parker
2023.03.09 16:34:18 -05'00'

Parker Dickson – Senior Associate, Senior Archaeologist

Appendix G Consultation Materials

Appendix G.1 Contact List

Agency Contact List

First Name	Last Name	Organization	Department	Position	Address	City/Town	Postal Code	Telephone	E-mail	Notes
Ben	Lobb	Constituency Office (Goderich)	Huron-Bruce	Elected Official - MP	30 Victoria Street	Goderich, ON	N7A 2R6	519-524-6560	Ben.lobb@parl.gc.ca	
Lisa	Thompson	Constituency Office (Blyth)	Huron-Bruce	Elected Official - MPP	408 Queen St.	Blyth, ON	N0M 1H0	519-523-4251	lisa.thompsonco@pc.ola.org	
Walter	McKenzie	Municipality of West Perth		Mayor	160 Wellington Street, PO Box 609	Mitchell, ON	N0K 1N0	226-921-0674	wmckenzie@westperth.com	
Steve	Herold	Municipality of West Perth		Councillor - Fullarton Ward	160 Wellington Street, PO Box 609	Mitchell, ON	N0K 1N0		sherold@westperth.com	On the Fullarton Conservation Committee.
Alex	Foster	Municipality of West Perth		Councillor - Fullarton Ward	160 Wellington Street, PO Box 609	Mitchell, ON	N0K 1N0		Afoster@westperth.com	On the Fullarton Conservation Committee.
Jeff	Brick	Municipality of West Perth	Administration	Chief Administrative Officer	160 Wellington Street, PO Box 609	Mitchell, ON	N0K 1N0	519-348-8429 x 225	jbrick@westperth.com	Retiring in August - new CAO hasn't been assigned yet.
Richard	Wright	Municipality of West Perth	Operations Department	Environmental Services Coordinator	160 Wellington Street, PO Box 609	Mitchell, ON	N0K 1N0	519-348-8429 x 236	rwright@westperth.com	
		Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA)			667 Exter Road	London, ON	N6E 1L3		omafra.eanotices@ontario.ca	Email as initial step prior to circulating documents.
David	Marriot	Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA)	Land Use Policy & Stewardship - Food Safety and Environmental Policy Branch	Rural Planner	1 Stone Road West	Guelph, ON	N1G 4Y2	519-766-5990	david.marriott@ontario.ca	
Joerg	Wittenbrinck	Ministry of Energy	Governance, Strategy and Analytics Branch	Manager (A)	77 Greenville Street, 6th Floor	Toronto	M7A 1B3	289-980-8124	joerg.wittenbrinck@ontario.ca	
Michael	Di Cosmo	Ministry of Energy	Strategic Policy and Cabinet Liaison	A/Coordinator				437-770-7960	michael.dicosmo@ontario.ca	
To whom it may concern		Ministry of Environment, Conservation and Parks (MECP)							ClassEAnotices@ontario.ca	
To whom it may concern		Ministry of Environment, Conservation and Parks (MECP)	South West Region						eanotification.swregion@ontario.ca	
Kirsten	Service	Ministry of Environment, Conservation and Parks (MECP)	Conservation and Source Protection Branch	Director	14th Flr, 40 St Clair Ave W	Toronto, ON	M4V 1M2	705-987-5144	kirsten.service@ontario.ca	
John	Ritchie	Ministry of Environment, Conservation and Parks (MECP)	Owen Sound District Office	Manager	3rd Flr, 101 17th St E	Owen Sound	ON N4K 0A5	519-377-1058	john.s.ritchie@ontario.ca	
Tracey	Burton	Ministry of Mines	Strategic Support Unit	Manager(A)	Willet Green Miller Centre, 2nd Flr 933 Ramsey Lake Rd	Sudbury, ON	P3E 6B5	705-918-1609	tracey.burton@ontario.ca	
Melanie	Johnson	Ministry of Mines	Strategic Support Unit	Senior Strategic Initiatives Lead	Willet Green Miller Centre, 2nd Flr 933 Ramsey Lake Rd	Sudbury, ON	P3E 6B5	705-698-5041	melanie.johnson@ontario.ca	
Attn: Amanda McCloskey & Gillian Hartman		Ministry of Natural Resources and Forestry (MNRF)	Southern Region	Amanda: Land Use Planning Supervisor Gillian: Regional Planning Coordinator	300 Water Street, Box 7000 4th Floor, South Tower	Peterborough, ON	K9J 8MS	Amanda: T: 705-313-0507 Gillian: T: 705-761-7061	SR.Planning@ontario.ca	
To whom it may concern		Ministry of Natural Resources and Forestry (MNRF)	Aylmer District						MNRF.Ayl@ontario.ca	
Karla	Barboza	Ministry of Citizenship and Multiculturalism	Heritage, Tourism and Culture Division Heritage Planning Unit, Programs and Services Branch	Team Lead - Heritage (Acting)	400 University Ave. 5th Floor	Toronto	M7A 2R9	416-660-1027	Karla.barboza@ontario.ca	
Joseph	Harvey	Ministry of Citizenship and Multiculturalism	Heritage, Tourism and Culture Division Heritage Planning Unit, Programs and Services Branch	Heritage Planner	400 University Ave. 5th Floor	Toronto	M7A 2R9	613-242-3743	joseph.harvey@ontario.ca	
Faud	Abdi	Ministry of the Solicitor General	Facilities and Capital Planning Branch	Director (A)	Ministry of the Solicitor General George Drew Bldg 13th Flr, 25 Grosvenor St	Toronto	M7A 1Y6	416-884-5632	fuad.abdi@ontario.ca	
Erick	Boyd	Ministry of Municipal Affairs and Housing	Community Planning and Development - Western Municipal Services Office	Manager	659 Exeter Road, 2nd Floor	London	N6E 1L3	519-873-4025	erick.boyd@ontario.ca	
Ainsley	Davidson	Infrastructure Ontario	Notice Review	Director, Land Use Planning	Suite 200, 1 Dundas St W	Toronto, ON	M5G 1Z3	647-264-3605	noticereview@infrastructureontario.ca	
Peter	Cuddy	Upper Thames Region Conservation Authority	Board of Directors	City of London Councillor	1424 Clarke Road	London, ON	N5V 5B9	519-451-2800	infoline@thamesriver.on.ca	
Anna	Hopkins	Upper Thames Region Conservation Authority	Board of Directors	City of London Councillor	1424 Clarke Road	London, ON	N5V 5B9	519-451-2800	infoline@thamesriver.on.ca	
Skylar	Franke	Upper Thames Region Conservation Authority	Board of Directors	City of London Councillor	1424 Clarke Road	London, ON	N5V 5B9	519-451-2800	infoline@thamesriver.on.ca	
Sandy	Levin	Upper Thames Region Conservation Authority	Board of Directors	City of London Vice-Chair	1424 Clarke Road	London, ON	N5V 5B9	519-451-2800	infoline@thamesriver.on.ca	
Debbie	Heffernan	Upper Thames Region Conservation Authority	Board of Directors	Municipality of Middlesex Centre Councillor	1424 Clarke Road	London, ON	N5V 5B9	519-451-2800	infoline@thamesriver.on.ca	
Tom	Heenman	Upper Thames Region Conservation Authority	Board of Directors	Municipality of Thames Centre, Township of Lucan-Biddulph Councillor	1424 Clarke Road	London, ON	N5V 5B9	519-451-2800	infoline@thamesriver.on.ca	
Scotty	Zehr	Upper Thames Region Conservation Authority	Board of Directors	Township of Blandford-Blenheim, Township of East-Zorra Tavistock Councillor	1424 Clarke Road	London, ON	N5V 5B9	519-451-2800	infoline@thamesriver.on.ca	
Brian	Petrie	Upper Thames Region Conservation Authority	Board of Directors	Township of Ingersoll Mayor (Chair)	1424 Clarke Road	London, ON	N5V 5B9	519-451-2800	infoline@thamesriver.on.ca	
George	Way	Upper Thames Region Conservation Authority	Board of Directors	Township of Norwich, Township of South-West Oxford Councillor	1424 Clarke Road	London, ON	N5V 5B9	519-451-2800	infoline@thamesriver.on.ca	
Mark	Schandenberg	Upper Thames Region Conservation Authority	Board of Directors	City of Woodstock Councillor	1424 Clarke Road	London, ON	N5V 5B9	519-451-2800	infoline@thamesriver.on.ca	
Paul	Mitchell	Upper Thames Region Conservation Authority	Board of Directors	Township of Zorra Councillor	1424 Clarke Road	London, ON	N5V 5B9	519-451-2800	infoline@thamesriver.on.ca	
Hugh	McDermid	Upper Thames Region Conservation Authority	Board of Directors	Township of Perth East Deputy Mayor	1424 Clarke Road	London, ON	N5V 5B9	519-451-2800	infoline@thamesriver.on.ca	
Jim	Craigmile	Upper Thames Region Conservation Authority	Board of Directors	Township of Perth South, Town of St. Marys, Municipality of South Huron Councillor	1424 Clarke Road	London, ON	N5V 5B9	519-451-2800	infoline@thamesriver.on.ca	
Harj	Nijar	Upper Thames Region Conservation Authority	Board of Directors	City of Stratford Deputy Mayor	1424 Clarke Road	London, ON	N5V 5B9	519-451-2800	infoline@thamesriver.on.ca	
Dean	Trenowsky	Upper Thames Region Conservation Authority	Board of Directors	Municipality of West Perth Deputy Mayor	1424 Clarke Road	London, ON	N5V 5B9	519-451-2800	infoline@thamesriver.on.ca	
Bruce	Skinner	Fullarton Baseball Diamond Committee	President						bskinner@cyg.net	Added as request of Municipality of West Perth

Indigenous Nation and Community Contact List

Title	First Name	Last Name	Nation	Position	Address	City/Town	Postal Code	Telephone	E-mail	Notes
Chief	Christopher Todd	Plain	Aamjiwnaang First Nation	Chief	978 Tashmoo Avenue	Sarnia, ON	N7T 7H5		chief.plain@aamjiwnaang.ca	
	Cathleen	O'Brien	Aamjiwnaang First Nation	Environment Department Manager	978 Tashmoo Avenue	Sarnia, ON	N7T 7H5		cobrien@aamjiwnaang.ca	
Chief	Jacqueline Susanne	French	Chippewas of the Thames First Nation	Chief	320 Chippewa Road	Muncey, ON	N0L 1Y0		jfrench@cottfn.com	
	Fallon	Burch	Chippewas of the Thames First Nation	Consultation Coordinator	320 Chippewa Road	Muncey, ON	N0L 1Y0	519-289-5555 x 251	fburch@cottfn.com	
Chief	Kimberly Desiree Sim	Bressette	Chippewas of Kettle and Stony Point First Nation	Chief	6247 Indian Lane	Lambton Shores, ON	N0N 1J1	519-786-2152	Kimberly.Bressette@kettlepoint.org	
	Claire	Sault	Chippewas of Kettle and Stony Point First Nation	Band Manager	6247 Indian Lane	Lambton Shores, ON	N0N 1J1	519-786-2152	claire.Sault@kettlepoint.org	
Chief	James Todd	Cornelius	Oneida Nation of the Thames	Chief	2212 Elm Avenue	Southwold, ON	N0L 2G0		todd.cornelius@oneida.on.ca	
	Galah	Antone	Oneida Nation of the Thames	Chief Assistant	2212 Elm Avenue	Southwold, ON	N0L 2G0		galah.antone@oneida.on.ca	
	Janet	Macbeth	Walpole Island First Nation	Heritage Centre Manager	117 Tahgahoning Road	Wallaceburg, ON	N8A 4K9	(519) 628-5700	janet.macbeth@wifn.org	

Third Party Contact List

Title	First Name	Last Name	Organization	Position	Address	City/Town	Postal Code	Telephone	E-mail	Notes
	To whom it may concern		Enbridge Gas Inc.		500 Consumers Road	Toronto, ON	M2J 1P8		CdnPublicAwareness@enbridge.com	
	To whom it may concern		Hydro One Networks Inc.						SecondaryLandUse@hydroOne.com	

Public Stakeholder Contact List

Title	First Name	Last Name	Organization	Position	Address	City/Town	Postal Code	Telephone	E-mail	Notes
			Wiebe Maple Products		2955 Perth Road	Fullarton, ON	N0K 1H0		wiebemaple@gmail.com	
			Beekeeper Supply		5399 Perth Line 20	Fullarton, ON	N0K 1H0		mail@beekeepersupply.ca	
			Wild Rose Sanctuary		3058 149 Road	Fullarton, ON	N0K 1H0		julia@thewildrosesanctuary.com	
			Harmer Concrete Pumping		551 18 Line	Fullarton, ON	N0K 1H0		harmerpumping@quadro.net	
			Windmill Family Campground		2778 Perth Count Road 163	Fullarton, ON	N0K 1H0		info@windmillfamilycampground.com	
			Koertland Fullaton Inc		5692 Perth County Line 20	Fullarton, ON	N0K 1H0		koertland.fullarton@outlook.com	
			Thamesview United Church		3178 Perth Road 163	Fullarton, ON	N0K 1H0		thamesviewunitedchurch@gmail.com	
			Ontario Federation of Snowmobile Clubs - District 5 Office		684783 Highway 2, RR3	Woodstock, ON	N4S 7V7	519.539.5151	info@ofscdistrict5.com	

Appendix G.2 Notices

Fullarton Dam Rehabilitation Class Environmental Assessment

NOTICE OF COMPLETION

Fullarton Dam Rehabilitation

The Upper Thames River Conservation Authority has now completed the Class Environmental Assessment (Class EA) evaluating a remedial flood and erosion control project at the Fullarton Dam, located in the Fullarton Conservation Area.

The Process

The Class EA process invited members of the public and interested parties to provide input at key stages of the study. The Class EA process defined the issue and its causes, considered and evaluated alternative solutions, assessed the potential impacts of the preferred solution, and identified measures to reduce potential adverse impacts.

We Want to Hear from You

Interested persons may provide written comments to our project team by DATE – 30 days after this notice. All comments and concerns should be sent directly to the project team identified below.

We thank you for your interest, and for your participation in the planning of this project.

Please visit the project webpage: https://thamesriver.on.ca/water-management/recreational-dams/fullarton-dam-class-ea.

For more information please contact:

Jillian Smith
Upper Thames Region Conservation Authority
Phone: (519) 954-6181, ext 320
smithj@thamesriver.ca

Heather Amirault
Stantec Consulting Ltd.
Phone: (519) 585-7453
heather.amirault@stantec.com

In addition, a request to the Minister of the Environment, Conservation and Parks for an order imposing additional conditions or requiring an individual environmental assessment may be made on the grounds that the requested order may prevent, mitigated or remedy adverse impacts on constitutionally protected Aboriginal and treaty rights. Request should include your full name and contact information.

Requests should specify what kind of order is being requested (additional conditions or an individual environmental assessment), explain how an order may prevent, mitigate or remedy potential adverse impacts, and can include any supporting information.

The request should be sent to:

Minister of the Environment, Conservation and Parks Ministry of Environment, Conservation and Parks 777 Bay Street, 5th Floor Toronto ON M7A 2J3 minister.mecp@ontario.ca	Director, Environmental Assessment Branch Ministry of Environment, Conservation and Parks 135 St. Clair Ave. W, 1st Floor Toronto ON M4V 1P5 EABDirector@ontario.ca

Requests should also be sent to the Upper Thames River Conservation Authority by mail or e-mail. Please visit the ministry's website for more information on requests for orders under section 16 of the Environmental Assessment Act at: https://www.ontario.ca/page/class-environmental-assessments-section-16-order.

All personal information included in your request – such as name, address, telephone number and property location – is located, under the authority of section 30 of the Environmental Assessment Act and is collected and maintained for the purpose of creating a record that is available to the general public. As this information is collected for the purpose of a public record, the protection of personal information provided in the Freedom of Information and Protection of Privacy Act (FIPPA) does not apply (s. 37). Personal information you submit will become part of a public record that is available to the general public unless you request that your personal information remain confidential.

This notice issued:

Appendix G.3 Public Information Centre Slides and Written Comments



Upper Thames River Conservation Authority

Virtual Public Meeting
March 28, 2024

Fullarton Dam Rehabilitation Project Environmental Assessment

Stantec



Agenda

1. Study Area
2. Purpose of Public Meeting
3. Class EA Process
4. Problem / Solutions
5. Evaluation Criteria
6. Alternative Solutions
7. Evaluation of Alternatives
8. Recommended Alternative
9. Next Steps

Study Area

Project Location

The Fullarton Dam and reservoir are located at the Fullarton Conservation Area in the Municipality of West Perth, Ontario.

Environmental Assessment

Class Environmental Assessment for Remedial Flood and Erosion Control Projects (the Class EA) is being prepared to support long-term planning of the Fullarton Dam.



Source: Google Maps, 2024

Thames River Watershed & Traditional Territory

- Upper Thames River Watershed is located within the Traditional territory of the Attawandaron, Anishinaabeg, Haudenosaunee, and Lunaapeewak peoples

- 10 First Nations whose traditional territory overlaps with the Upper Thames River Watershed, including Chippewas of the Thames First Nation

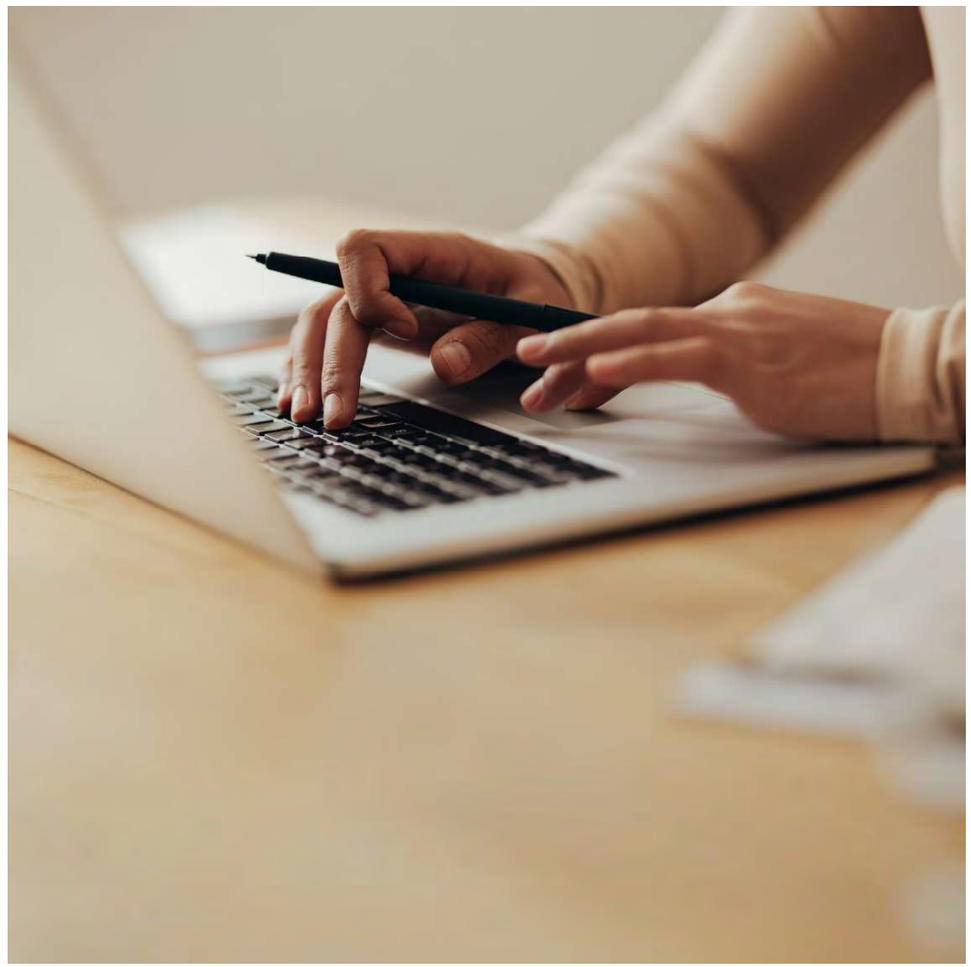
- Fullarton Conservation Area is located on the North Thames River, which feeds into Fanshawe Lake and the Thames River



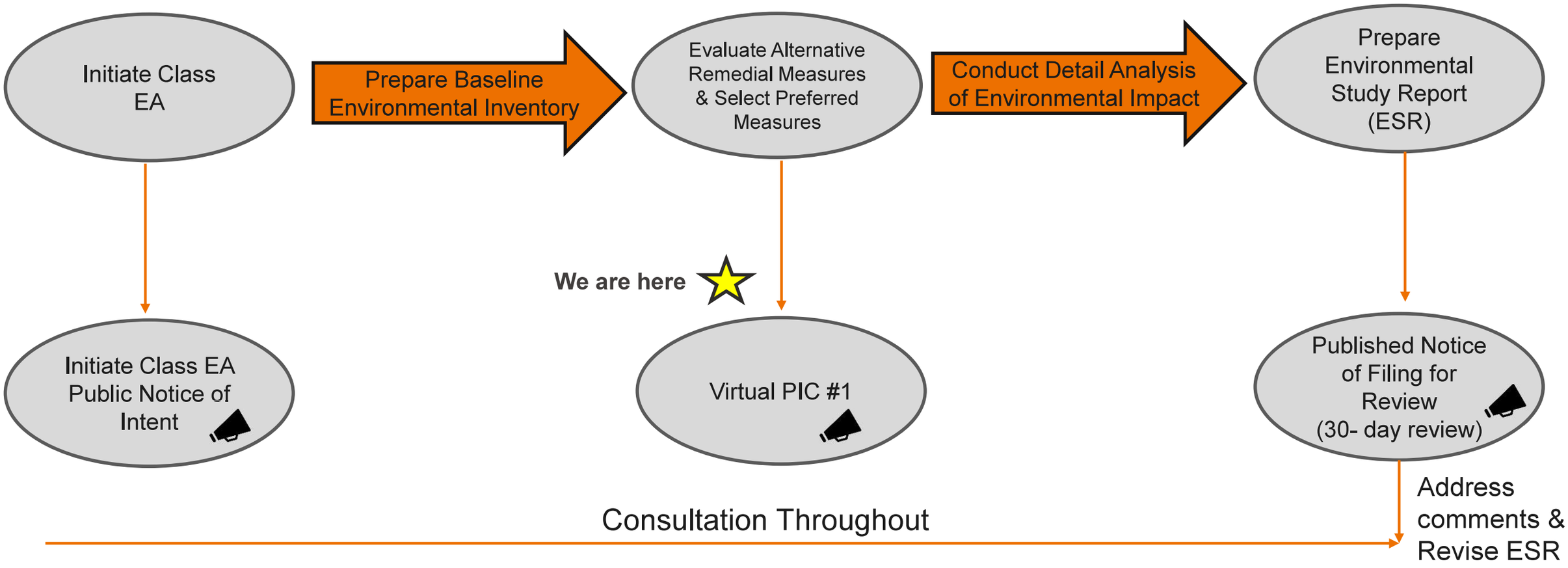
What is the purpose of this meeting?

To present and gather your input on the:

- Study background & purpose
- Existing and future dam needs
- Problem and opportunities
- Existing environmental conditions
- Evaluation of Alternative Solutions
- Recommended Solution
- Potential impacts to the environment and proposed mitigation measures
- Next Steps in the process



Conservation Ontario Class Environmental Assessment for Remedial Flood and Erosion Control Projects



Site Background

The Upper Thames River Conservation Authority (UTRCA) operates the Fullarton Dam. The dam is an earth dam that was constructed in the 1950's and is in the Fullarton Conservation Area.

In 2007, UTRCA completed a Dam Safety Assessment that identified the need to undertake improvements to the dam structure to meet appropriate safety and stability standards.







Problem Statement

EA Category

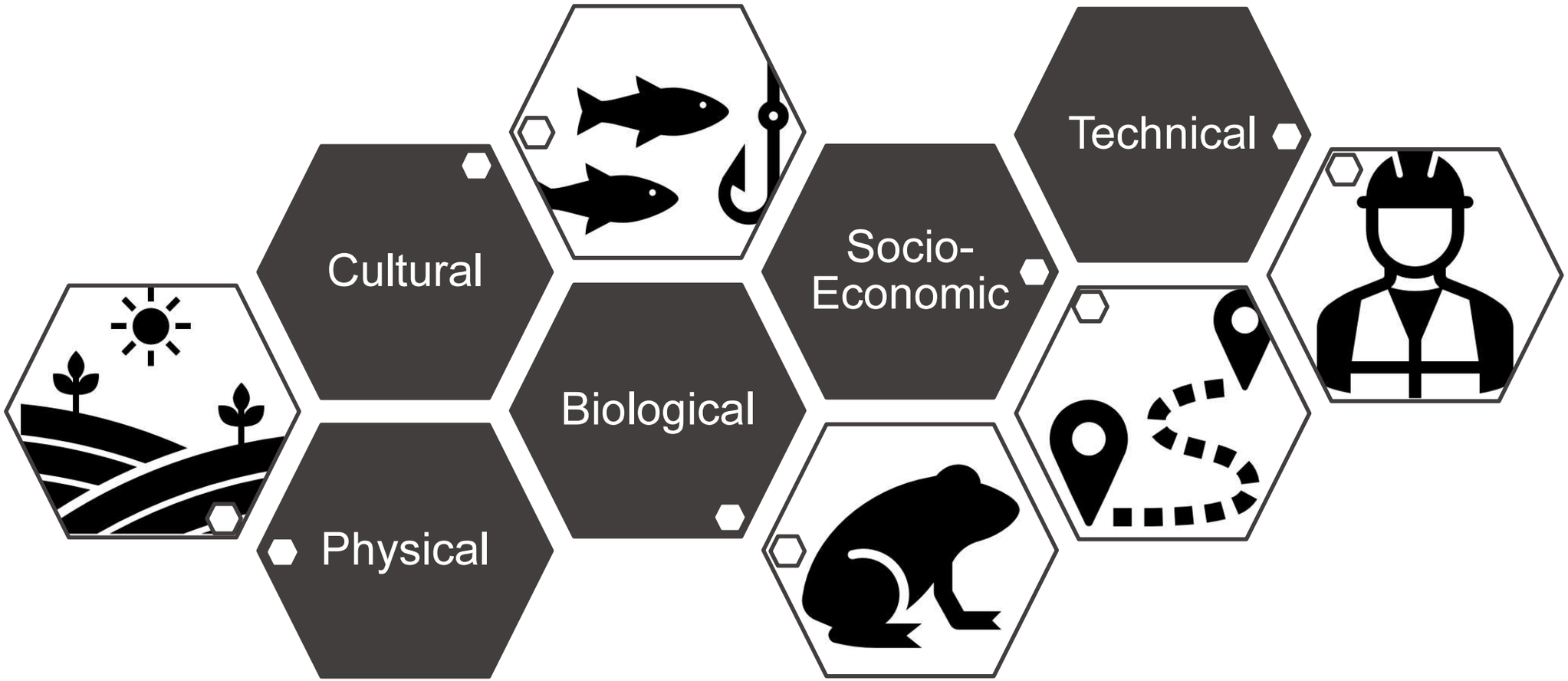
Riverine Flooding

The purpose of this EA is to identify alternatives that address the dam safety deficiencies. The preferred management strategy for the dam will be selected based on natural environment considerations and the social uses associated with the dam, reservoir and rest of the Fullarton Conservation Area.

Potential Solutions

- Riverine flooding and dam safety issues can be mitigated by:
  - Dam Decommissioning to address safety, enhance local environmental conditions, and restore stream function
  - Channel Realignment to support flow conveyance and capacity

Evaluation Criteria: What is considered during the evaluation?



Environmental Evaluation Criteria

- Fish and fish habitat
- Wildlife habitat
- Significant vegetation communities

Biological



- Unique Landforms
- Geomorphology
- Earth Science - Areas of Natural and Scientific Interest

Physical



Environmental Evaluation Criteria

- Traditional Land Uses
- Recreational Use of Existing Shoreline Access Locations (hike, fish, canoe)
- Aesthetic or Scenic Landscapes or Views
- Heritage

Cultural



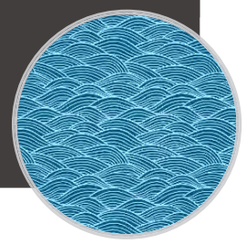
- Surrounding Neighborhood or Community (park users)
- Existing Infrastructure
- Pedestrian Traffic Routes (trail over dam)

Socioeconomic



- Rate of Erosion in Ecosystem (sediment transport)
- Flood Risk in Ecosystem
- Slope Stability (dam)

Engineering/ Technical



Alternative 1

Do Nothing: Repair existing dam and maintain reservoir at the site

- Age of dam and outlet infrastructure may present a safety risk related to leaks developing at the outlet location
- Outlet structure is not fish passable
- Thermal warming in reservoir increasing water temperature, impacting water quality
- Dam would require further assessment; maintaining dam in compliance with safety regulations would require upgrades to flow controls and safety measures



Alternative 2

Maintain Reservoir & Dam with New Fish Bypass Channel

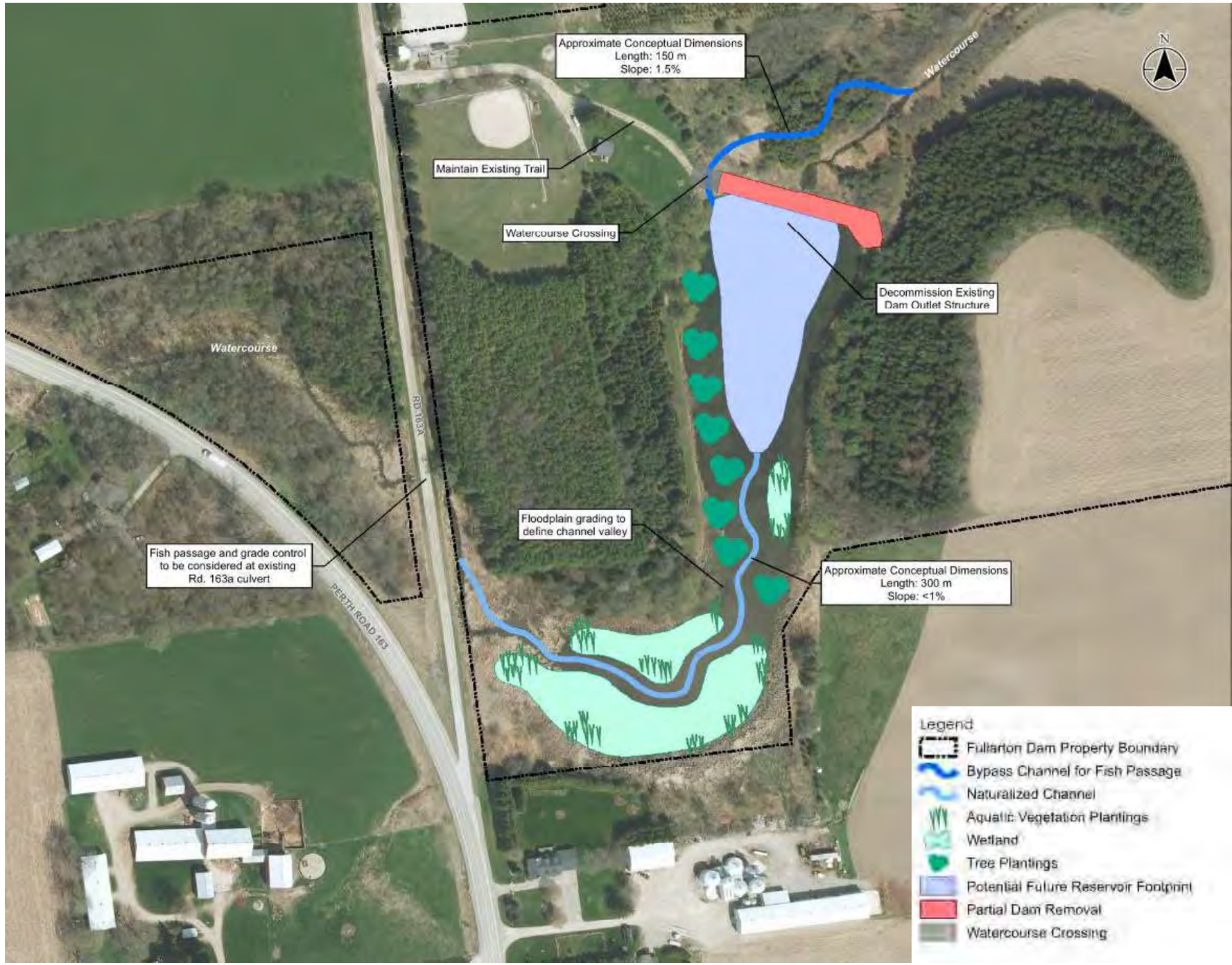
- Maintain dam, eliminate drop inlet reservoir outlet
- Construction of fish passage channel
- High flows will continue to spill over the dam
- Fish passage will increase connectivity and fish diversity
- Does not resolve risks associated with dam structure, requires ongoing maintenance and safety plans



Alternative 3

Partial Dam Removal & New Constructed Bypass Channel

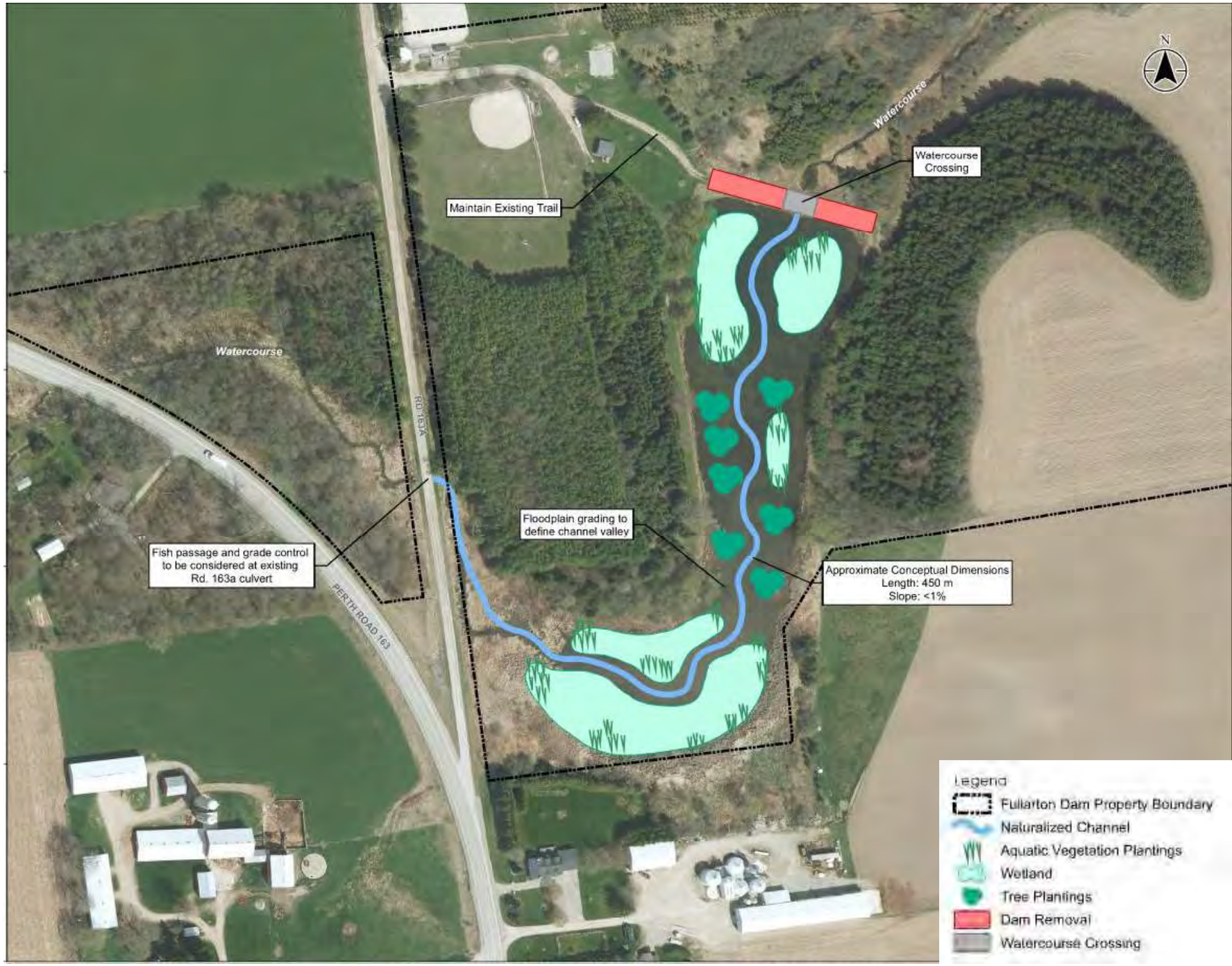
- Lower dam height to reduce reservoir water levels
- Eliminate drop inlet reservoir outlet and construct fish passage channel
- Increased terrestrial habitat upstream in former reservoir area



Alternative 4

Dam Decommissioning & Watercourse Restoration

- Eliminate dam and restore watercourse
- Create naturalized channel through former reservoir
- Wetlands will be constructed on floodplain to offset loss of reservoir habitat
- Dam safety and maintenance no longer required



Evaluation of Alternative Solutions

	Alternative 1: Maintain existing dam and reservoir at the site	Alternative 2: Maintain Reservoir & Dam with New Fish Bypass Channel	Alternative 3: Partial Dam Removal & New Constructed Bypass Channel	Alternative 4: Dam Removal & Watercourse Restoration
Physical	●	●	○	○
Biological	●	○	○	○
Cultural	●	○	○	○
Socioeconomic	●	●	○	○
Engineering/ Technical	●	●	○	○
Conclusion	Least Preferred	Somewhat Preferred	Moderately Preferred	Preferred



Recommended Solution

Alternative 4: Dam Removal and Watercourse Restoration is the preferred solution

- Addresses Riverine Flooding through Dam Decommissioning and Channel Realignment
- Enhances terrestrial and aquatic habitat
- Re-establishes natural function and appearance of the watercourse
- Creation of habitat linkages with fish passage
- Removal of thermal warming and water quality effects caused by the reservoir
- Low future ongoing dam maintenance and safety costs

Mitigation Measures & Environmental Considerations

Surface Water / Soil Stabilization

- Erosion and sediment control measures employed

Terrestrial

- Avoid vegetation removal from April 1 to August 31
- Permits may be required from MECP, UTRCA

Aquatic

- No in-water work from May 1 to July 15
- Approval from DFO with Request for Review for working within fish and mussel habitat
- Permits may be required from DFO, MECP

Noise

- Adhere to Municipality of West Perth By-Law (NO. 053-2009) which prohibits construction-related noise from 9:00 PM to 7:00 AM daily

Groundwater

- Conduct supply well survey

Built Heritage

- North Thames River
- 2955 Perth Road 163

Archaeology

- Undertake Stage 2 Archaeological Assessment as required

Social

- Re-establish trail crossing

Climate Change

- Improve flood resilience
- Improve water quality and habitat conditions

Next Steps & Feedback

To submit your feedback on the project, please contact:

Jillian Smith
Upper Thames River
Conservation Authority
Phone: (519) 451-2800, ext 320
smithj@thamesriver.on.ca

Heather Amirault
Stantec Consulting Ltd.
Phone: (519) 585-7453
heather.amirault@stantec.com

For more information, please visit:

https://thamesriver.on.ca/water-management/recreational-dams/fullarton-dam-class-ea/



Next Steps:

- Review feedback from consultation and incorporate into alternatives & evaluations where possible
- Notice of Completion (Filing Environmental Study Report)

All information will be collected in accordance with the *Freedom of Information and Protection of Privacy Act* (2009). Except for personal information, all comments will become part of the public record.

From: [redacted]
To:
Subject: FW: Fullarton Dam Environmental Assessment- Notice of Intent
Date: September 27, 2023 4:47:59 PM
Attachments: 2023 09 27_Fullarton Dam_MNRF_Response.pdf

FYI

[redacted]

The content of this email is the confidential property of Stantec and should not be copied, modified, retransmitted, or used for any purpose except with Stantec's written authorization. If you are not the intended recipient, please delete all copies and notify us immediately.

From: [redacted]
Sent: Wednesday, September 27, 2023 3:37 PM
To: [redacted]
Subject: RE: Fullarton Dam Environmental Assessment- Notice of Intent

Dear [redacted]

The Ministry of Natural Resources and Forestry (MNRF) received the Notice of Intent for the Fullarton Dam Environmental Assessment on September 26, 2023. Thank you for circulating this to our office. Please note the ministry has not completed a screening of natural heritage, natural hazards, other natural resource values, or applicable ministry permits or approvals at this time.

This response provides information to guide you in identifying ministry interests and engaging the ministry for advice as needed. MNRF has prepared the attached MNRF Areas of Interest package to provide proponents an overview of MNRF mandated interests and the ministry's commenting role in respect of external requests for comment for projects subject to the *Environmental Assessment Act*.

Please note it is the proponent's responsibility to be aware of, and comply with, all relevant federal or provincial legislation, municipal by-laws and/or other agency approvals.

After reviewing the information provided, if you have identified that your project would not impact any MNRF interests there is no need to circulate any subsequent notices to our office. If you have identified MNRF interests and/or may require permit(s) or further technical advice, please direct your specific questions to the undersigned.

If you have any questions or concerns, please feel free to contact me.

Best Regards,

[redacted]

Ontario

As part of providing accessible customer service, please let me know if you have any accommodation needs or require communication supports or alternate formats.

From: [redacted]
Sent: September 27, 2023 2:55 PM
To: [redacted]
Subject: FW: Fullarton Dam Environmental Assessment- Notice of Intent

From: [redacted]
Sent: September 26, 2023 1:21 PM
Cc: [redacted]
Subject: Fullarton Dam Environmental Assessment- Notice of Intent

CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.

Good afternoon,
I hope this email finds you well, my name is Jillian Smith and I work at the Upper Thames River Conservation Authority. This email is to inform you that the Upper Thames River Conservation Authority and Stantec have initiated an Environmental Assessment of the Fullarton Dam. Attached is the Notice of Intent, I will continue to email you and provide you with updates as the project progresses.
Please do not hesitate to contact me and [redacted] for any questions or concerns you may have.
Thank you,

UPPER THAMES RIVER
CONSERVATION AUTHORITY

[redacted]

Caution: This email originated from outside of Stantec. Please take extra precaution.

Attention: Ce courriel provient de l'extérieur de Stantec. Veuillez prendre des précautions supplémentaires.

Atención: Este correo electrónico proviene de fuera de Stantec. Por favor, tome precauciones adicionales.

From: [redacted]
To:
Cc:
Subject: FW: File 0018488: Fullarton Dam Environmental Assessment- Notice of Intent
Date: Friday, November 17, 2023 1:01:22 PM
Attachments: ATT00001
Notice of Intent_1.pdf
2023-11-17_FullartonDamRehab-MCM-Ltr.pdf

Hi Team,
FYI and attached.

[redacted]

The content of this email is the confidential property of Stantec and should not be copied, modified, retransmitted, or used for any purpose except with Stantec's written authorization. If you are not the intended recipient, please delete all copies and notify us immediately.

From: [redacted]
Sent: Friday, November 17, 2023 11:08 AM
To: [redacted]
Subject: FW: File 0018488: Fullarton Dam Environmental Assessment- Notice of Intent

You don't often get email from [redacted] Learn why this is important

[redacted]

Please find attached our initial advice on the above referenced undertaking.

Please note that the responsibility for administration of the *Ontario Heritage Act* and matters related to cultural heritage have been transferred from the Ministry of Tourism, Culture and Sport (MTCS) to the Ministry of Citizenship and Multiculturalism (MCM). Individual staff roles and contact information remain unchanged. Please continue to send any notices, report and/or documentation to both Karla Barboza and myself.

Please do not hesitate to contact me with any questions or concerns.

Regards,

[redacted]

From: [redacted]
Sent: September-26-23 1:21 PM
Cc: [redacted]
Subject: Fullarton Dam Environmental Assessment- Notice of Intent

CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.

Good afternoon,
I hope this email finds you well, my name is Jillian Smith and I work at the Upper Thames River Conservation Authority. This email is to inform you that the Upper Thames River Conservation Authority and Stantec have initiated an Environmental Assessment of the Fullarton Dam. Attached is the Notice of Intent, I will continue to email you and provide you with updates as the project progresses.
Please do not hesitate to contact me and [redacted] for any questions or concerns you may have.
Thank you,

UPPER THAMES RIVER
CONSERVATION AUTHORITY

[redacted]

Caution: This email originated from outside of Stantec. Please take extra precaution.

Attention: Ce courriel provient de l'extérieur de Stantec. Veuillez prendre des précautions supplémentaires.

Atención: Este correo electrónico proviene de fuera de Stantec. Por favor, tome precauciones adicionales.

Ministry of Citizenship and Multiculturalism

Heritage Planning Unit
Heritage Branch
Citizenship, Inclusion and Heritage Division
5th Flr, 400 University Ave
Tel.: 613.242.3743

Ministère des Affaires civiques et du Multiculturalisme

Unité de la planification relative au patrimoine
Direction du patrimoine
Division des affaires civiques, de l'inclusion et du patrimoine
Tél.: 613.242.3743

November 17, 2023

EMAIL ONLY

[redacted]

MCM File : 0018488
Proponent : Upper Thames River Conservation Authority
Subject : Remedial Flood and Erosion Control Works Class EA Notice of Intent
Project : Fullarton Dam Rehabilitation
Location : Fullarton, West Perth

Dear [redacted]:

Thank you for providing the Ministry of Citizenship and Multiculturalism (MCM) with the Notice of Intent for the above-referenced project.

MCM's interest in this project relates to its mandate of conserving Ontario's cultural heritage, which includes:

- archaeological resources, including land and marine);
- built heritage resources, including bridges and monuments; and
- cultural heritage landscapes.

Under the EA process, the proponent is required to determine a project's potential impact on known (previously recognized) and potential cultural heritage resources.

Project Summary
The Upper Thames River Conservation Authority has initiated an Environmental Assessment for the Fullarton Dam, located in the Fullarton Conservation Area. A Dam Safety Assessment was completed in 2007 which identified spillway capacity issues and stability concerns. As a result the Environmental Assessment was initiated to assess the existing conditions and evaluate alternative solutions. The project will be assessed in accordance with the Conservation Ontario Class Environmental Assessment for Remedial Flood and Erosion Control Projects document (June 2013).

Identifying Cultural Heritage Resources
While some cultural heritage resources may have already been formally identified, others may be identified through screening and evaluation.

Archaeological Resources
A stage 1 archaeological assessment (under Project file number P422-0027-2023) was found to be compliant and entered into the Ontario Public Register of Archaeological Assessment Reports, recommending Stage 2 archaeological assessment.

The Stage 2 archaeological assessment and any further recommended archaeological assessment (e.g., Stage 3,4) should be undertaken as early as possible during detailed design and prior to any ground disturbing activities.

Please note that archaeological concerns have not been fully addressed until reports have been entered into the Ontario Public Register of Archaeological Reports where those reports recommend that:

1. the archaeological assessment of the project area is complete and
2. all archaeological sites identified by the assessment are either of no further cultural heritage value or interest (as per Section 48(3) of the *Ontario Heritage Act*) or that mitigation of impacts has been accomplished through excavation or an avoidance and protection strategy.

Proponents should wait to receive the MCM's review letter indicating that the report(s) has been entered into the Register before issuing a decision or proceeding with any ground disturbing activities.

Built Heritage Resources and Cultural Heritage Landscapes
We understand that a preliminary *Cultural Heritage Report: Existing Conditions and Preliminary Impact Assessment* (dated March 9, 2023, by Stantec Consulting Ltd.) was posted on the project website. This preliminary report includes a discussion on existing conditions, and we understand that the report will be updated, and the preliminary impact assessment will be included once more detailed information is available regarding the design of the preferred alternative.

Please submit the updated Cultural Heritage Report, once available, to MCM's Heritage Planning Unit, the Municipality of West Perth Heritage and Culture Committee and other interested parties for review and comment.

Environmental Assessment Reporting
All technical cultural heritage studies and their recommendations are to be addressed and incorporated into EA projects. Please provide the technical cultural heritage studies to MCM before issuing a Notice of Completion or commencing any work on the site. If screening has identified no known or potential cultural heritage resources, or no impacts to these resources, please include the completed checklists and supporting documentation in the EA report or file.

Please note that the responsibility for administration of the *Ontario Heritage Act* and matters related to cultural heritage have been transferred from the Ministry of Tourism, Culture and Sport (MTCS) to the Ministry of Citizenship and Multiculturalism (MCM). Individual staff roles and contact information remain unchanged. Please continue to send any notices, report and/or documentation electronically to both Karla Barboza and myself.

- [redacted]

- [redacted]

Thank you for consulting MCM on this project and please continue to do so throughout the EA process. If you have any questions or require clarification, please do not hesitate to contact me.

Sincerely,

[redacted]

It is the sole responsibility of proponents to ensure that any information and documentation submitted as part of their EA report or file is accurate. The Ministry of Citizenship and Multiculturalism (MCM) makes no representation or warranty as to the completeness, accuracy or quality of the any checklists, reports or supporting documentation submitted as part of the EA process, and in no way shall MCM be liable for any harm, damages, costs, expenses, losses, claims or actions that may result if any checklists, reports or supporting documents are discovered to be inaccurate, incomplete, misleading or fraudulent.

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 Registrar, 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 should also be notified (at archaeology@ontario.ca) to ensure that the archaeological site is not subject to unlicensed alterations which would be a contravention of the *Ontario Heritage Act*.

Ministry of the Environment, Conservation and Parks

Environmental Assessment Branch

1st Floor
135 St. Clair Avenue W
Toronto ON M4V 1P5
Tel.: 416 314-8001
Fax.: 416 314-8452

Ministère de l'Environnement, de la Protection de la nature et des Parcs

Direction des évaluations environnementales

Rez-de-chaussée
135, avenue St. Clair Ouest
Toronto ON M4V 1P5
Tél. : 416 314-8001
Téléc. : 416 314-8452

November 8, 2023

[redacted]

BY EMAIL ONLY

Re: **Fullarton Dam Rehabilitation**
Upper Thames Region Conservation Authority
Class Environmental Assessment for Remedial Flood and Erosion Control Projects
Acknowledgement of Notice of Intent

Dear [redacted],

This letter is in response to the Notice of Intent for the above noted project. The Ministry of the Environment, Conservation and Parks (MECP) acknowledges that the Upper Thames Region Conservation Authority (proponent) has indicated that the study is following the approved environmental planning process for a project under the Class Environmental Assessment (Class EA) for Remedial Flood and Erosion Control Projects under the Ontario *Environmental Assessment Act*.

The **updated (August 2022)** attached "Areas of Interest" document provides guidance regarding the ministry's interests with respect to the Class EA process. Please address all areas of interest in the EA documentation at an appropriate level for the EA study. Proponents who address all the applicable areas of interest can minimize potential delays to the project schedule. **Further information is provided at the end of the Areas of Interest document relating to recent changes to the Environmental Assessment Act through Bill 197, Covid-19 Economic Recovery Act 2020.**

The Crown has a legal duty to consult Aboriginal communities when it has knowledge, real or constructive, of the existence or potential existence of an Aboriginal or treaty right and contemplates conduct that may adversely impact that right. Before authorizing this project, the Crown must ensure that its duty to consult has been fulfilled, where such a duty is triggered. Although the duty to consult with Aboriginal peoples is a duty of the Crown, the Crown may delegate procedural aspects of this duty to project proponents while retaining oversight of the consultation process.

The proposed project may have the potential to affect Aboriginal or treaty rights protected under Section 35 of Canada's *Constitution Act* 1982. Where the Crown's duty to consult is triggered in relation to the proposed project**, the MECP is delegating the procedural aspects of rights-based consultation to the proponent through this letter.** The Crown intends to rely on the delegated consultation process in discharging its duty to consult and maintains the right to participate in the consultation process as it sees fit.

Based on information provided to date and the Crown`s preliminary assessment the proponent is required to consult with the following communities who have been identified as potentially affected by the proposed project:

- Aamjiwnaang First Nation
- Bkejwanong (Walpole Island)
- Caldwell First Nation
- Chippewas of Kettle and Stony Point
- Chippewas of the Thames First Nation
- Oneida Nation of the Thames

Steps that the proponent may need to take in relation to Aboriginal consultation for the proposed project are outlined in the "Code of Practice for Consultation in Ontario's Environmental Assessment Process". Additional information related to Ontario's Environmental Assessment Act is available online at: www.ontario.ca/environmentalassessments.

Please also refer to the attached document "A Proponent's Introduction to the Delegation of Procedural Aspects of consultation with Aboriginal Communities" for further information, including the MECP's expectations for EA report documentation related to consultation with communities.

The proponent must contact the Director of Environmental Assessment Branch (EABDirector@ontario.ca) under the following circumstances after initial discussions with the communities identified by the MECP:

- Aboriginal or treaty rights impacts are identified to you by the communities;
- You have reason to believe that your proposed project may adversely affect an Aboriginal or treaty right;
- Consultation with Indigenous communities or other stakeholders has reached an

impasse; or
- A Section 16 Order (formerly Part II Order) request is expected based on impacts to Aboriginal or treaty rights.

The MECP will then assess the extent of any Crown duty to consult for the circumstances and will consider whether additional steps should be taken, including what role you will be asked to play should additional steps and activities be required.

Please ensure a copy of the final notice is sent to the ministry's South West Region EA notification email account [redacted] Depending on the documentation process that is followed, a Project Plan or an Environmental Study Report will be prepared and the draft and final copies should be made available for the MECP upon request.

Should you or any members of your project team have any questions regarding the material above, please contact me at [redacted]

Sincerely,

[redacted]

Cc: [redacted]

Enclosed: Areas of Interest

Attached: Client's Guide to Preliminary Screening for Species at Risk

A Proponent's Introduction to the Delegation of Procedural Aspects of Consultation with Aboriginal Communities

AREAS OF INTEREST (v. August 2022)

It is suggested that you check off each section after you have considered / addressed it.

☐ **Planning and Policy**

- Applicable plans and policies should be identified in the report, and the proponent should describe how the proposed project adheres to the relevant policies in these plans.
    - Projects located in MECP Central, Eastern or West Central Region may be subject to **A Place to Grow: Growth Plan for the Greater Golden Horseshoe (2020)**.
    - Projects located in MECP Central or Eastern Region may be subject to the **Oak Ridges Moraine Conservation Plan (2017)** or the **Lake Simcoe Protection Plan (2014)**.
    - Projects located in MECP Central, Southwest or West Central Region may be subject to the **Niagara Escarpment Plan (2017)**.
    - Projects located in MECP Central, Eastern, Southwest or West Central Region may be subject to the **Greenbelt Plan (2017)**.
    - Projects located in MECP Northern Region may be subject to the **Growth Plan for Northern Ontario (2011).**

- The **Provincial Policy Statement (2020)** contains policies that protect Ontario's natural heritage and water resources. Applicable policies should be referenced in the report, and the proponent should describe how the proposed project is consistent with these policies.

- In addition to the provincial planning and policy level, the report should also discuss the planning context at the municipal and federal levels, as appropriate.

☐ **Source Water Protection**

The *Clean Water Act*, 2006 (CWA) aims to protect existing and future sources of drinking water. To achieve this, several types of vulnerable areas have been delineated around surface water intakes and wellheads for every municipal residential drinking water system that is located in a source protection area. These vulnerable areas are known as a Wellhead Protection Areas (WHPAs) and surface water Intake Protection Zones (IPZs). Other vulnerable areas that have been delineated under the CWA include Highly Vulnerable Aquifers (HVAs), Significant Groundwater Recharge Areas (SGRAs), Event-based modelling areas (EBAs), and Issues Contributing Areas (ICAs). Source protection plans have been developed that include policies to address existing and future risks to sources of municipal drinking water within these vulnerable areas.

Projects that are subject to the Environmental Assessment Act that fall under a Class EA, or one of the Regulations, have the potential to impact sources of drinking water if they occur in designated vulnerable areas or in the vicinity of other at-risk drinking water systems (i.e.

systems that are not municipal residential systems). Class EA projects may include activities that, if located in a vulnerable area, could be a threat to sources of drinking water (i.e. have the potential to adversely affect the quality or quantity of drinking water sources) and the activity could therefore be subject to policies in a source protection plan. Where an activity poses a risk to drinking water, policies in the local source protection plan may impact how or where that activity is undertaken. Policies may prohibit certain activities, or they may require risk management measures for these activities. Municipal Official Plans, planning decisions, Class EA projects (where the project includes an activity that is a threat to drinking water) and prescribed instruments must conform with policies that address significant risks to drinking water and must have regard for policies that address moderate or low risks.

- The proponent should identify the source protection area and should clearly document how the proximity of the project to sources of drinking water (municipal or other) and any delineated vulnerable areas was considered and assessed. Specifically, the report should discuss whether or not the project is located in a vulnerable area and provide applicable details about the area.

- If located in a vulnerable area, proponents should document whether any project activities are prescribed drinking water threats and thus pose a risk to drinking water (this should be consulted on with the appropriate Source Protection Authority). Where an activity poses a risk to drinking water, the proponent must document and discuss in the report how the project adheres to or has regard to applicable policies in the local source protection plan. This section should then be used to inform and be reflected in other sections of the report, such as the identification of net positive/negative effects of alternatives, mitigation measures, evaluation of alternatives etc.

- While most source protection plans focused on including policies for significant drinking water threats in the WHPAs and IPZs it should be noted that even though source protection plan policies may not apply in HVAs, these are areas where aquifers are sensitive and at risk to impacts and within these areas, activities may impact the quality of sources of drinking water for systems other than municipal residential systems.

- In order to determine if this project is occurring within a vulnerable area, proponents can use Source Protection Information Atlas, which is an online mapping tool available to the public. Note that various layers (including WHPAs, WHPA-Q1 and WHPA-Q2, IPZs, HVAs, SGRAs, EBAs, ICAs) can be turned on through the "Map Legend" bar on the left. The mapping tool will also provide a link to the appropriate source protection plan in order to identify what policies may be applicable in the vulnerable area.

- For further information on the maps or source protection plan policies which may relate to their project, proponents must contact the appropriate source protection authority

More Information

For more information on the *Clean Water Act*, source protection areas and plans, including specific information on the vulnerable areas and drinking water threats, please refer to Conservation Ontario's website where you will also find links to the local source protection plan/assessment report.

A list of the prescribed drinking water threats can be found in section 1.1 of Ontario Regulation 287/07 made under the *Clean Water Act*. In addition to prescribed drinking water threats, some source protection plans may include policies to address additional "local" threat activities, as approved by the MECP.

- **Climate Change**

The document "Considering Climate Change in the Environmental Assessment Process" (Guide) is now a part of the Environmental Assessment program's Guides and Codes of Practice. The Guide sets out the MECP's expectation for considering climate change in the preparation, execution and documentation of environmental assessment studies and processes. The guide provides examples, approaches, resources, and references to assist proponents with consideration of climate change in EA. Proponents should review this Guide in detail.

- **The MECP expects proponents of Class EA projects to:**

    1. Consider during the assessment of alternative solutions and alternative designs, the following:
        a. the project's expected production of greenhouse gas emissions and impacts on carbon sinks (climate change mitigation); and
        b. resilience or vulnerability of the undertaking to changing climatic conditions (climate change adaptation).
    2. Include a discrete section in the report detailing how climate change was considered in the EA.

How climate change is considered can be qualitative or quantitative in nature and should be scaled to the project's level of environmental effect. In all instances, both a project's impacts on climate change (mitigation) and impacts of climate change on a project (adaptation) should be considered.

- The MECP has also prepared another guide to support provincial land use planning direction related to the completion of energy and emission plans. The "Community Emissions Reduction Planning: A Guide for Municipalities" document is designed to educate stakeholders on the municipal opportunities to reduce energy and greenhouse gas emissions, and to provide guidance on methods and techniques to incorporate consideration of energy and greenhouse gas emissions into municipal activities of all types. We encourage you to review the Guide for information.

- **Air Quality, Dust and Noise**

- If there are sensitive receptors in the surrounding area of this project, a quantitative air quality/odour impact assessment will be useful to evaluate alternatives, determine impacts and identify appropriate mitigation measures. The scope of the assessment can be determined based on the potential effects of the proposed alternatives, and typically includes source and receptor characterization and a quantification of local air quality impacts on the sensitive receptors and the environment in the study area. The assessment will compare to all applicable standards or guidelines for all contaminants of concern. **Please contact this office for further consultation on the level of Air Quality Impact Assessment required for this project if not already advised.**

- If a quantitative Air Quality Impact Assessment is not required for the project, the MECP expects that the report contain a qualitative assessment which includes:

    - A discussion of local air quality including existing activities/sources that significantly impact local air quality and how the project may impact existing conditions;
    - A discussion of the nearby sensitive receptors and the project's potential air quality impacts on present and future sensitive receptors;
    - A discussion of local air quality impacts that could arise from this project during both construction and operation; and
    - A discussion of potential mitigation measures.

- As a common practice, "air quality" should be used an evaluation criterion for all road projects.

- Dust and noise control measures should be addressed and included in the construction plans to ensure that nearby residential and other sensitive land uses within the study area are not adversely affected during construction activities.

- The MECP recommends that non-chloride dust-suppressants be applied. For a comprehensive list of fugitive dust prevention and control measures that could be applied, refer to *Cheminfo Services Inc. Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities* report prepared for Environment Canada. March 2005.

- The report should consider the potential impacts of increased noise levels during the operation of the completed project. The proponent should explore all potential measures to mitigate significant noise impacts during the assessment of alternatives.

Ecosystem Protection and Restoration

- Any impacts to ecosystem form and function must be avoided where possible. The report should describe any proposed mitigation measures and how project planning will protect and enhance the local ecosystem.

- Natural heritage and hydrologic features should be identified and described in detail to assess potential impacts and to develop appropriate mitigation measures. The following sensitive environmental features may be located within or adjacent to the study area:
  - Key Natural Heritage Features: Habitat of endangered species and threatened species, fish habitat, wetlands, areas of natural and scientific interest (ANSIs), significant valleylands, significant woodlands; significant wildlife habitat (including habitat of special concern species); sand barrens, savannahs, and tallgrass prairies; and alvars.
  - Key Hydrologic Features: Permanent streams, intermittent streams, inland lakes and their littoral zones, seepage areas and springs, and wetlands.
  - Other natural heritage features and areas such as: vegetation communities, rare species of flora or fauna, Environmentally Sensitive Areas, Environmentally Sensitive Policy Areas, federal and provincial parks and conservation reserves, Greenland systems etc.

We recommend consulting with the Ministry of Natural Resources and Forestry (MNRF), Fisheries and Oceans Canada (DFO) and your local conservation authority to determine if special measures or additional studies will be necessary to preserve and protect these sensitive features. In addition, for projects located in Central Region you may consider the provisions of the Rouge Park Management Plan if applicable.

Species at Risk

- The Ministry of the Environment, Conservation and Parks has now assumed responsibility of Ontario's Species at Risk program. Information, standards, guidelines, reference materials and technical resources to assist you are found at https://www.ontario.ca/page/species-risk.

- The Client's Guide to Preliminary Screening for Species at Risk (Draft May 2019) has been attached to the covering email for your reference and use. Please review this document for next steps.

- For any questions related to subsequent permit requirements, please contact [redacted]

☐ **Surface Water**

- The report must include enough information to demonstrate that there will be no negative impacts on the natural features or ecological functions of any watercourses within the study area. Measures should be included in the planning and design process to ensure that any impacts to watercourses from construction or operational activities (e.g. spills, erosion, pollution) are mitigated as part of the proposed undertaking.

- Additional stormwater runoff from new pavement can impact receiving watercourses and flood conditions. Quality and quantity control measures to treat stormwater runoff should be considered for all new impervious areas and, where possible, existing surfaces. The ministry's Stormwater Management Planning and Design Manual (2003) should be referenced in the report and utilized when designing stormwater control methods. **A Stormwater Management Plan should be prepared as part of the Class EA process** that includes:

    - Strategies to address potential water quantity and erosion impacts related to stormwater draining into streams or other sensitive environmental features, and to ensure that adequate (enhanced) water quality is maintained
    - Watershed information, drainage conditions, and other relevant background information
    - Future drainage conditions, stormwater management options, information on erosion and sediment control during construction, and other details of the proposed works
    - Information on maintenance and monitoring commitments.

- Any potential approval requirements for surface water taking or discharge should be identified in the report. A Permit to Take Water (PTTW) under the *Ontario Water Resources Act* (OWRA) will be required for any water takings that exceed 50,000 L/day, except for certain water taking activities that have been prescribed by the Water Taking EASR Regulation – *O. Reg. 63/16*. These prescribed water-taking activities require registration in the EASR instead of a PTTW. Please review the Water Taking User Guide for EASR for more information. Additionally, an Environmental Compliance Approval under the OWRA is required for municipal stormwater management works.

☐ **Groundwater**

- The status of, and potential impacts to any well water supplies should be addressed. If the project involves groundwater takings or changes to drainage patterns, the quantity and quality of groundwater may be affected due to drawdown effects or the redirection of

existing contamination flows. In addition, project activities may infringe on existing wells such that they must be reconstructed or sealed and abandoned. Appropriate information to define existing groundwater conditions should be included in the report.

- If the potential construction or decommissioning of water wells is identified as an issue, the report should refer to Ontario Regulation 903, Wells, under the OWRA.

- Potential impacts to groundwater-dependent natural features should be addressed. Any changes to groundwater flow or quality from groundwater taking may interfere with the ecological processes of streams, wetlands or other surficial features. In addition, discharging contaminated or high volumes of groundwater to these features may have direct impacts on their function. Any potential effects should be identified, and appropriate mitigation measures should be recommended. The level of detail required will be dependent on the significance of the potential impacts.

- Any potential approval requirements for groundwater taking or discharge should be identified in the report. A Permit to Take Water (PTTW) under the OWRA will be required for any water takings that exceed 50,000 L/day, with the exception of certain water taking activities that have been prescribed by the Water Taking EASR Regulation – *O. Reg. 63/16*. These prescribed water-taking activities require registration in the EASR instead of a PTTW. Please review the Water Taking User Guide for EASR for more information.

- Consultation with the railroad authorities is necessary wherever there is a plan to use construction dewatering in the vicinity of railroad lines or where the zone of influence of the construction dewatering potentially intercepts railroad lines.

Excess Materials Management

- In December 2019, MECP released a new regulation under the Environmental Protection Act, titled "On-Site and Excess Soil Management" (O. Reg. 406/19) to support improved management of excess construction soil. This regulation is a key step to support proper management of excess soils, ensuring valuable resources don't go to waste and to provide clear rules on managing and reusing excess soil. New risk-based standards referenced by this regulation help to facilitate local beneficial reuse which in turn will reduce greenhouse gas emissions from soil transportation, while ensuring strong protection of human health and the environment. The new regulation is being phased in over time, with the first phase in effect on January 1, 2021. For more information, please visit https://www.ontario.ca/page/handling-excess-soil.

- The report should reference that activities involving the management of excess soil should be completed in accordance with O. Reg. 406/19 and the MECP's current guidance

document titled "Management of Excess Soil – A Guide for Best Management Practices" (2014).

- All waste generated during construction must be disposed of in accordance with ministry requirements

Contaminated Sites

- Any current or historical waste disposal sites should be identified in the report. The status of these sites should be determined to confirm whether approval pursuant to Section 46 of the EPA may be required for land uses on former disposal sites. We recommend referring to the MECP's D-4 guideline for land use considerations near landfills and dumps.
  - Resources available may include regional/local municipal official plans and data; provincial data on large landfill sites and small landfill sites; Environmental Compliance Approval information for waste disposal sites on Access Environment.

- Other known contaminated sites (local, provincial, federal) in the study area should also be identified in the report (Note – information on federal contaminated sites is found on the Government of Canada's website).

- The location of any underground storage tanks should be investigated in the report. Measures should be identified to ensure the integrity of these tanks and to ensure an appropriate response in the event of a spill. The ministry's Spills Action Centre must be contacted in such an event.

- Since the removal or movement of soils may be required, appropriate tests to determine contaminant levels from previous land uses or dumping should be undertaken. If the soils are contaminated, you must determine how and where they are to be disposed of, consistent with *Part XV.1 of the Environmental Protection Act* (EPA) and Ontario Regulation 153/04, Records of Site Condition, which details the new requirements related to site assessment and clean up. Please contact the appropriate MECP District Office for further consultation if contaminated sites are present.

Servicing, Utilities and Facilities

- The report should identify any above or underground utilities in the study area such as transmission lines, telephone/internet, oil/gas etc. The owners should be consulted to discuss impacts to this infrastructure, including potential spills.

- The report should identify any servicing infrastructure in the study area such as wastewater, water, stormwater that may potentially be impacted by the project.

- Any facility that releases emissions to the atmosphere, discharges contaminants to ground or surface water, provides potable water supplies, or stores, transports or disposes of waste must have an Environmental Compliance Approval (ECA) before it can operate lawfully. Please consult with MECP's Environmental Permissions Branch to determine whether a new or amended ECA will be required for any proposed infrastructure.

- We recommend referring to the ministry's environmental land use planning guides to ensure that any potential land use conflicts are considered when planning for any infrastructure or facilities related to wastewater, pipelines, landfills or industrial uses.

Mitigation and Monitoring

- Contractors must be made aware of all environmental considerations so that all environmental standards and commitments for both construction and operation are met. Mitigation measures should be clearly referenced in the report and regularly monitored during the construction stage of the project. In addition, we encourage proponents to conduct post-construction monitoring to ensure all mitigation measures have been effective and are functioning properly.

- Design and construction reports and plans should be based on a best management approach that centres on the prevention of impacts, protection of the existing environment, and opportunities for rehabilitation and enhancement of any impacted areas.

- The proponent's construction and post-construction monitoring plans must be documented in the report, as outlined in Section 3.9 of the Class EA for Remedial Flood and Erosion Control Projects parent document.

Consultation

- The report must demonstrate how the consultation provisions of the Class EA have been fulfilled, including documentation of all stakeholder consultation efforts undertaken during the planning process. This includes a discussion in the report that identifies concerns that were raised and **describes how they have been addressed by the proponent** throughout the planning process. The report should also include copies of comments submitted on the project by interested stakeholders, and the proponent's responses to these comments (as directed by the Class EA to include full documentation).

- Please include the full stakeholder distribution/consultation list in the documentation.

- **Class EA Process**

- When it is determined that formal Conservation Authority involvement is required to address a problem involving existing development which is at risk from flooding or erosion, an evaluation of possible alternative solutions shall be completed, and the Conservation Authority will initiate the Class EA process. Once the preferred alternative method of carrying out the undertaking is selected, then it will be subjected to a more detailed study of the net impacts likely to be associated with implementation as previously determined.

    - A Project Plan (PP) is prepared for remedial works for which it has been demonstrated that there are no negative impacts or outstanding concerns held by the Conservation Authority or reviewers.

    - An Environmental Study Report (ESR) is prepared for projects for which it has been demonstrated that negative impacts will occur, and tradeoffs must be made, in choosing among alternative methods of carrying out the proposed remedial work. An ESR may also be prepared in response to concerns that arise in the preparation and/or review of a PP.

- The report should provide clear and complete documentation of the planning process in order to allow for transparency in decision-making.

- The Class EA requires the consideration of the effects of each alternative on all aspects of the environment (including planning, natural, social, cultural, economic, technical). The report should include a level of detail (e.g. hydrogeological investigations, terrestrial and aquatic assessments, cultural heritage assessments) such that all potential impacts can be identified, and appropriate mitigation measures can be developed. Any supporting studies conducted during the Class EA process should be referenced and included as part of the report.

- Please include in the report a list of all subsequent permits or approvals that may be required for the implementation of the preferred alternative, including but not limited to, MECP's PTTW, EASR Registrations and ECAs, conservation authority permits, species at risk permits, MTO permits and approvals under the *Impact Assessment Act*, 2019.

- Ministry guidelines and other information related to the issues above are available at http://www.ontario.ca/environment-and-energy/environment-and-energy. We encourage you to review all the available guides and to reference any relevant information in the report.

Amendments to the EAA through the Covid-19 Economic Recovery Act, 2020
Once the report is finalized, the proponent must issue a Notice of Completion providing a minimum 30-day period during which documentation may be reviewed and comment and input can be submitted to the proponent. The Notice of Completion must be sent to the appropriate MECP Regional Office email address.

The public can request a higher level of assessment on a project if they are concerned about potential adverse impacts to constitutionally protected Aboriginal and treaty rights. In addition, the Minister may issue an order on his or her own initiative within a specified time period. The Director (of the Environmental Assessment Branch) will issue a Notice of Proposed Order to the proponent if the Minister is considering an order for the project within 30 days after the conclusion of the comment period on the Notice of Completion. At this time, the Director may request additional information from the proponent. Once the requested information has been received, the Minister will have 30 days within which to make a decision or impose conditions on your project.

Therefore, the proponent cannot proceed with the project until at least 30 days after the end of the comment period provided for in the Notice of Completion. Further, the proponent may not proceed after this time if:

- a Section 16 Order request has been submitted to the ministry regarding potential adverse impacts to constitutionally protected Aboriginal and treaty rights, or
- the Director has issued a Notice of Proposed order regarding the project.

Please ensure that the Notice of Completion advises that outstanding concerns are to be directed to the proponent for a response, and that in the event there are outstanding concerns regarding potential adverse impacts to constitutionally protected Aboriginal and treaty rights, Section 16 Order requests on those matters should be addressed in writing to:

[redacted]

and

[redacted]

Ministry of the Environment, Conservation and Parks

Environmental Assessment Branch

1st Floor
135 St. Clair Avenue W
Toronto ON M4V 1P5
Tel.: 416 314-8001
Fax.: 416 314-8452

Ministère de l'Environnement, de la Protection de la nature et des Parcs

Direction des évaluations environnementales

Rez-de-chaussée
135, avenue St. Clair Ouest
Toronto ON M4V 1P5
Tél. : 416 314-8001
Téléc. : 416 314-8452

Ontario

Instructions for Providing Class EA Notices to the Ministry of the Environment, Conservation and Parks

The following protocol for providing Class EA notifications to the Ministry of the Environment, Conservation and Parks is in effect as of **May 1, 2018.** Important information is below. Please read carefully.

You must follow the process described below and submit an electronic version of the Notice and completed Project Information Form to the appropriate Regional EA Notification email address. These email addresses are provided below.

All Notices of Commencement and Completion are to follow this process. Please feel free to pass along this information to your colleagues. Thank you.

Notification Procedure:

The Ministry of the Environment, Conservation and Parks becomes aware of streamlined environmental assessments (e.g., class environmental assessment projects, electricity projects and waste management projects) through notifications by project owners. Notifying the ministry is an important step in the streamlined environmental assessment processes. As part of the ministry's ongoing efforts to improve processes and ensure the ministry has an opportunity to provide input on projects undergoing streamlined environmental assessments, the ministry has established dedicated email accounts in each regional office. These accounts will be used to receive notices as required in your class environmental assessment process along with a new "Project Information Form". As of May 1, 2018, proponents must use this new process.

4 Step Process for Submitting Notices for Streamlined EAs

To submit your notice, you must do the following:

1. **Download and complete the Project Information Form.** (The Form can be found here under "Streamlined EAs". It is an excel spreadsheet with columns that need to be filled out by the proponent. The form has been developed for ease of use (i.e. drop-down pick list for most fields). Instructions on filling out the form are contained in 2 tabs within the form itself).

2. **Create an email. The subject line of your email must include in this order: Project location, Type of streamlined EA, and Project name**

   For example:

   - York Region, MEA Class EA, Elgin Mills Rd East (Bayview to Woodbine)
   - Durham Region, Electricity Screening Process, New Cogeneration Station
   - City of Ottawa, Waste Management Screening Process, Landfill Expansion

3. **Attach the completed Project Information Form (in excel format) and a copy of your project notice (in PDF format) to the email.**

4. **Send by email to the appropriate ministry regional office:**

[redacted]

Notes:

- The hyperlink to the MECP District Officer Locator website, can be used to assist with determining what ministry region your project is located.
- The minimum requirement is to send project initiation and completion notices (and where applicable, Revised Notice of Completion, Notice of Filing of Addendum, Statement of Completion). All other notices (e.g. Notice of PIC/OH) can be sent to the Regional email address but not required.
- If your project is located in more than one ministry region, you need to submit your notices to all appropriate regions.

Ontario

A PROPONENT'S INTRODUCTION TO THE DELEGATION OF PROCEDURAL ASPECTS OF CONSULTATION WITH ABORIGINAL COMMUNITIES

DEFINITIONS

The following definitions are specific to this document and may not apply in other contexts:

Aboriginal communities – the First Nation or Métis communities identified by the Crown for the purpose of consultation.

Consultation – the Crown's legal obligation to consult when the Crown has knowledge of an established or asserted Aboriginal or treaty right and contemplates conduct that might adversely impact that right. This is the type of consultation required pursuant to s. 35 of the *Constitution Act, 1982*. Note that this definition does not include consultation with Aboriginal communities for other reasons, such as regulatory requirements.

Crown – the Ontario Crown, acting through a particular ministry or ministries.

Procedural aspects of consultation – those portions of consultation related to the process of consultation, such as notifying an Aboriginal community about a project, providing information about the potential impacts of a project, responding to concerns raised by an Aboriginal community and proposing changes to the project to avoid negative impacts.

Proponent – the person or entity that wants to undertake a project and requires an Ontario Crown decision or approval for the project.

I. PURPOSE

The Crown has a legal duty to consult Aboriginal communities when it has knowledge of an existing or asserted Aboriginal or treaty right and contemplates conduct that may adversely impact that right. In outlining a framework for the duty to consult, the Supreme Court of Canada has stated that the Crown may delegate procedural aspects of consultation to third parties. This document provides general information about the Ontario Crown's approach to delegation of the procedural aspects of consultation to proponents.

This document is not intended to instruct a proponent about an individual project, and it does not constitute legal advice.

II. WHY IS IT NECESSARY TO CONSULT WITH ABORIGINAL COMMUNITIES?

The objective of the modern law of Aboriginal and treaty rights is the *reconciliation* of Aboriginal peoples and non-Aboriginal peoples and their respective rights, claims and interests. Consultation is an important component of the reconciliation process.

The Crown has a legal duty to consult Aboriginal communities when it has knowledge of an existing or asserted Aboriginal or treaty right and contemplates conduct that might adversely impact that right. For example, the Crown's duty to consult is triggered when it considers

issuing a permit, authorization or approval for a project which has the potential to adversely impact an Aboriginal right, such as the right to hunt, fish, or trap in a particular area.

The scope of consultation required in particular circumstances ranges across a spectrum depending on both the nature of the asserted or established right and the seriousness of the potential adverse impacts on that right.

Depending on the particular circumstances, the Crown may also need to take steps to accommodate the potentially impacted Aboriginal or treaty right. For example, the Crown may be required to avoid or minimize the potential adverse impacts of the project.

III. THE CROWN'S ROLE AND RESPONSIBILITIES IN THE DELEGATED CONSULTATION PROCESS

The Crown has the responsibility for ensuring that the duty to consult, and accommodate where appropriate, is met. However, the Crown may delegate the procedural aspects of consultation to a proponent.

There are different ways in which the Crown may delegate the procedural aspects of consultation to a proponent, including through a letter, a memorandum of understanding, legislation, regulation, policy and codes of practice.

If the Crown decides to delegate procedural aspects of consultation, the Crown will generally:

- Ensure that the delegation of procedural aspects of consultation and the responsibilities of the proponent are clearly communicated to the proponent;
- Identify which Aboriginal communities must be consulted;
- Provide contact information for the Aboriginal communities;
- Revise, as necessary, the list of Aboriginal communities to be consulted as new information becomes available and is assessed by the Crown;
- Assess the scope of consultation owed to the Aboriginal communities;
- Maintain appropriate oversight of the actions taken by the proponent in fulfilling the procedural aspects of consultation;
- Assess the adequacy of consultation that is undertaken and any accommodation that may be required;
- Provide a contact within any responsible ministry in case issues arise that require direction from the Crown; and
- Participate in the consultation process as necessary and as determined by the Crown.

IV. THE PROPONENT'S ROLE AND RESPONSIBILITIES IN THE DELEGATED CONSULTATION PROCESS

Where aspects of the consultation process have been delegated to a proponent, the Crown, in meeting its duty to consult, will rely on the proponent's consultation activities and documentation of those activities. The consultation process informs the Crown's decision of whether or not to approve a proposed project or activity.

A proponent's role and responsibilities will vary depending on a variety of factors including the extent of consultation required in the circumstance and the procedural aspects of consultation the Crown has delegated to it. Proponents are often in a better position than the Crown to discuss a project and its potential impacts with Aboriginal communities and to determine ways to avoid or minimize the adverse impacts of a project.

A proponent can raise issues or questions with the Crown at any time during the consultation process. If issues or concerns arise during the consultation that cannot be addressed by the proponent, the proponent should contact the Crown.

a) What might a proponent be required to do in carrying out the procedural aspects of consultation?

Where the Crown delegates procedural aspects of consultation, it is often the proponent's responsibility to provide notice of the proposed project to the identified Aboriginal communities. The notice should indicate that the Crown has delegated the procedural aspects of consultation to the proponent and should include the following information:

- a description of the proposed project or activity;
- mapping;
- proposed timelines;
- details regarding anticipated environmental and other impacts;
- details regarding opportunities to comment; and
- any changes to the proposed project that have been made for seasonal conditions or other factors, where relevant.

Proponents should provide enough information and time to allow Aboriginal communities to provide meaningful feedback regarding the potential impacts of the project. Depending on the nature of consultation required for a project, a proponent also may be required to:

- provide the Crown with copies of any consultation plans prepared and an opportunity to review and comment;
- ensure that any necessary follow-up discussions with Aboriginal communities take place in a timely manner, including to confirm receipt of information, share and update information and to address questions or concerns that may arise;

- as appropriate, discuss with Aboriginal communities potential mitigation measures and/or changes to the project in response to concerns raised by Aboriginal communities;
- use language that is accessible and not overly technical, and translate material into Aboriginal languages where requested or appropriate;
- bear the reasonable costs associated with the consultation process such as, but not limited to, meeting hall rental, meal costs, document translation(s), or to address technical & capacity issues;
- provide the Crown with all the details about potential impacts on established or asserted Aboriginal or treaty rights, how these concerns have been considered and addressed by the proponent and the Aboriginal communities and any steps taken to mitigate the potential impacts;
- provide the Crown with complete and accurate documentation from these meetings and communications; and
- notify the Crown immediately if an Aboriginal community not identified by the Crown approaches the proponent seeking consultation opportunities.

b) What documentation and reporting does the Crown need from the proponent?

Proponents should keep records of all communications with the Aboriginal communities involved in the consultation process and any information provided to these Aboriginal communities.

As the Crown is required to assess the adequacy of consultation, it needs documentation to satisfy itself that the proponent has fulfilled the procedural aspects of consultation delegated to it. The documentation required would typically include:

- the date of meetings, the agendas, any materials distributed, those in attendance and copies of any minutes prepared;
- the description of the proposed project that was shared at the meeting;
- any and all concerns or other feedback provided by the communities;
- any information that was shared by a community in relation to its asserted or established Aboriginal or treaty rights and any potential adverse impacts of the proposed activity, approval or disposition on such rights;
- any proposed project changes or mitigation measures that were discussed, and feedback from Aboriginal communities about the proposed changes and measures;
- any commitments made by the proponent in response to any concerns raised, and feedback from Aboriginal communities on those commitments;
- copies of correspondence to or from Aboriginal communities, and any materials distributed electronically or by mail;

- information regarding any financial assistance provided by the proponent to enable participation by Aboriginal communities in the consultation;
- periodic consultation progress reports or copies of meeting notes if requested by the Crown;
- a summary of how the delegated aspects of consultation were carried out and the results; and
- a summary of issues raised by the Aboriginal communities, how the issues were addressed and any outstanding issues.

In certain circumstances, the Crown may share and discuss the proponent's consultation record with an Aboriginal community to ensure that it is an accurate reflection of the consultation process.

c) Will the Crown require a proponent to provide information about its commercial arrangements with Aboriginal communities?

The Crown may require a proponent to share information about aspects of commercial arrangements between the proponent and Aboriginal communities where the arrangements:

- include elements that are directed at mitigating or otherwise addressing impacts of the project;
- include securing an Aboriginal community's support for the project; or
- may potentially affect the obligations of the Crown to the Aboriginal communities.

The proponent should make every reasonable effort to exempt the Crown from confidentiality provisions in commercial arrangements with Aboriginal communities to the extent necessary to allow this information to be shared with the Crown.

The Crown cannot guarantee that information shared with the Crown will remain confidential. Confidential commercial information should not be provided to the Crown as part of the consultation record if it is not relevant to the duty to consult or otherwise required to be submitted to the Crown as part of the regulatory process.

V. WHAT ARE THE ROLES AND RESPONSIBILITIES OF ABORIGINAL COMMUNITIES' IN THE CONSULTATION PROCESS?

Like the Crown, Aboriginal communities are expected to engage in consultation in good faith. This includes:

- responding to the consultation notice;
- engaging in the proposed consultation process;
- providing relevant documentation;

- clearly articulating the potential impacts of the proposed project on Aboriginal or treaty rights; and
- discussing ways to mitigates any adverse impacts.

Some Aboriginal communities have developed tools, such as consultation protocols, policies or processes that provide guidance on how they would prefer to be consulted. Although not legally binding, proponents are encouraged to respect these community processes where it is reasonable to do so. Please note that there is no obligation for a proponent to pay a fee to an Aboriginal community in order to enter into a consultation process.

To ensure that the Crown is aware of existing community consultation protocols, proponents should contact the relevant Crown ministry when presented with a consultation protocol by an Aboriginal community or anyone purporting to be a representative of an Aboriginal community.

VI. WHAT IF MORE THAN ONE PROVINCIAL CROWN MINISTRY IS INVOLVED IN APPROVING A PROPONENT'S PROJECT?

Depending on the project and the required permits or approvals, one or more ministries may delegate procedural aspects of the Crown's duty to consult to the proponent. The proponent may contact individual ministries for guidance related to the delegation of procedural aspects of consultation for ministry-specific permits/approvals required for the project in question. Proponents are encouraged to seek input from all involved Crown ministries sooner rather than later.

Client's Guide to Preliminary Screening for Species at Risk

Ministry of the Environment, Conservation and Parks

Species at Risk Branch, Permissions and Compliance

DRAFT - May 2019

Table of Contents

1.0 Purpose, Scope, Background and Context 3
1.1 Purpose of this Guide 3
1.2 Scope 3
1.3 Background and Context 4
2.0 Roles and Responsibilities 5
3.0 Information Sources 6
3.1 Make a Map: Natural Heritage Areas 7
3.2 Land Information Ontario (LIO) 7
3.3 Additional Species at Risk Information Sources 8
3.4 Information Sources to Support Impact Assessments 8
4.0 Check-List 9

1.0 Purpose, Scope, Background and Context

1.1 Purpose of this Guide

This guide has been created to:

- help clients better understand their obligation to gather information and complete a preliminary screening for species at risk before contacting the ministry,
- outline guidance and advice clients can expect to receive from the ministry at the preliminary screening stage,
- help clients understand how they can gather information about species at risk by accessing publicly available information housed by the Government of Ontario, and
- provide a list of other potential sources of species at risk information that exist outside the Government of Ontario.

It remains the client's responsibility to:

- carry out a preliminary screening for their projects,
- obtain best available information from all applicable information sources,
- conduct any necessary field studies or inventories to identify and confirm the presence or absence of species at risk or their habitat,
- consider any potential impacts to species at risk that a proposed activity might cause, and
- comply with the *Endangered Species Act* (ESA).

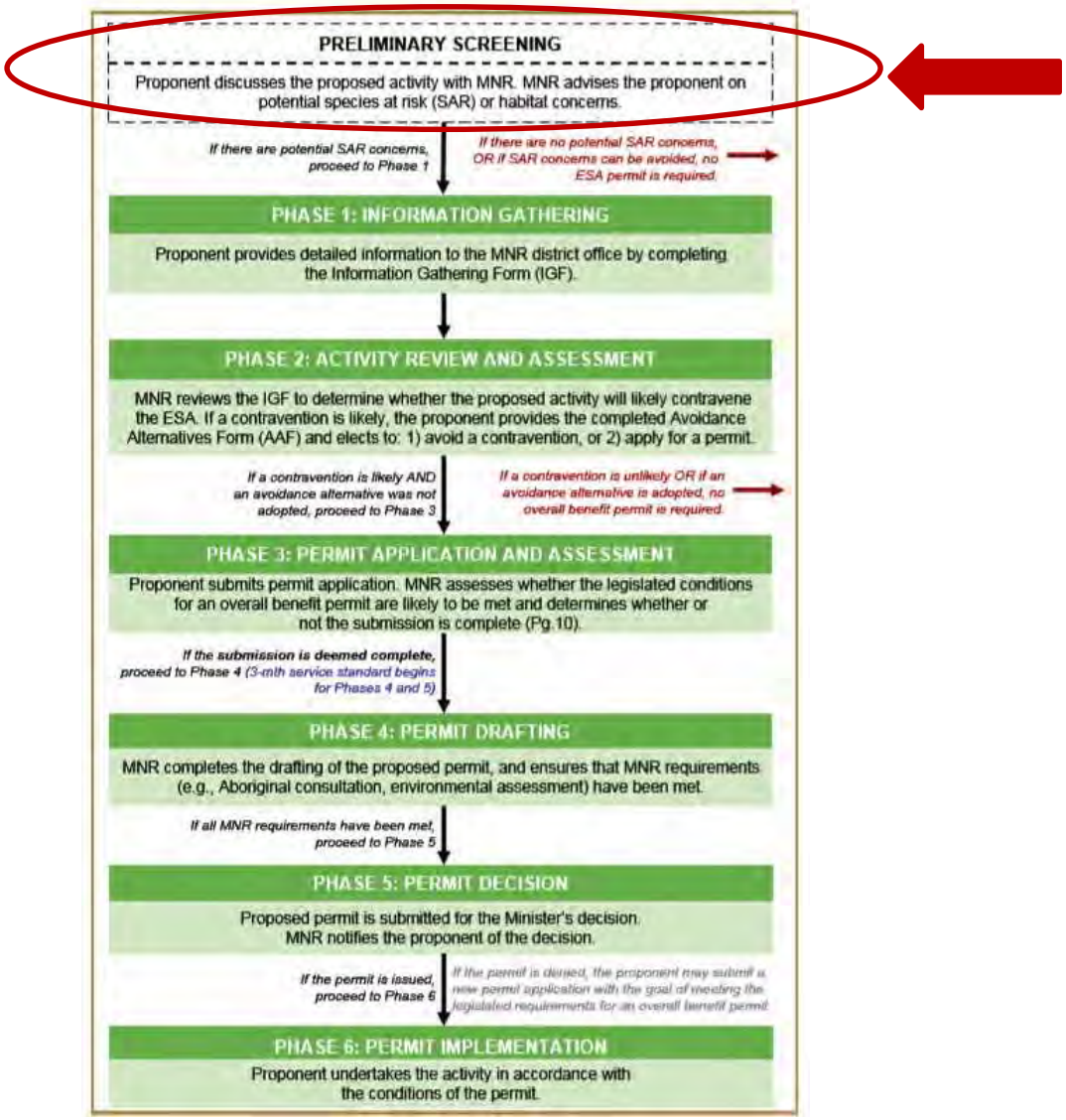
To provide the most efficient service, clients should initiate species at risk screenings and seek information from all applicable information sources identified in this guide, at a minimum, prior to contacting Government of Ontario ministry offices for further information or advice.

1.2 Scope

This guide is a resource for clients seeking to understand if their activity is likely to impact species at risk or if they are likely to trigger the need for an authorization under the ESA. It is not intended to circumvent any detailed site surveys that may be necessary to document species at risk or their habitat nor to circumvent the need to assess the impacts of a proposed activity on species at risk or their habitat. This guide is not an exhaustive list of available information sources for any given area as the availability of information on species at risk and their habitat varies across the province. This guide is intended to support projects and activities carried out on Crown and private land, by private landowners, businesses, other provincial ministries and agencies, or municipal government.

1.3 Background and Context

To receive advice on their proposed activity, clients must first determine whether any species at risk or their habitat exist or are likely to exist at or near their proposed activity, and whether their proposed activity is likely to contravene the ESA. Once this step is complete, clients may contact the ministry at SAROntario@ontario.ca to discuss the main purpose, general methods, timing and location of their proposed activity as well as information obtained about species at risk and their habitat at, or near, the site. At this stage, the ministry can provide advice and guidance to the client about potential species at risk or habitat concerns, measures that the client is considering to avoid adverse effects on species at risk or their habitat and whether additional field surveys are advisable. This is referred to as the "Preliminary Screening" stage. For more information on additional phases in the diagram below, please refer to the *Endangered Species Act Submission Standards for Activity Review and 17(2)(c) Overall Benefit Permits* policy available online at https://www.ontario.ca/page/species-risk-overall-benefit-permits



2.0 Roles and Responsibilities

To provide the most efficient service, clients should initiate species at risk screenings and seek information from all applicable information sources identified in this guide prior to contacting Government of Ontario ministry offices for further information or advice.

Step 1: Client seeks information regarding species at risk or their habitat that exist, or are likely to exist, at or near their proposed activity by referring to all applicable information sources identified in this guide.

Step 2: Client reviews and consider guidance on whether their proposed activity is likely to contravene the ESA (see section 3.4 of this guide for guidance on what to consider).

Step 3: Client gathers information identified in the checklist in section 4 of this guide.

Step 4: Client contacts the ministry at SAROntario@ontario.ca to discuss their preliminary screening. Ministry staff will ask the client questions about the main purpose, general methods, timing and location of their proposed activity as well as information obtained about species at risk and their habitat at, or near, the site. Ministry staff will also ask the client for their interpretation of the impacts of their activity on species at risk or their habitat as well as measures the client has considered to avoid any adverse impacts.

Step 5: Ministry staff will provide advice on next steps.

Option A: Ministry staff may advise the client they can proceed with their activity without an authorization under the ESA where the ministry is confident that:

- no protected species at risk or habitats are likely to be present at or near the proposed location of the activity; or
- protected species at risk or habitats are known to be present but the activity is not likely to contravene the ESA; or
- through the adoption of avoidance measures, the modified activity is not likely to contravene the ESA.

Option B: Ministry staff may advise the client to proceed to Phase 1 of the overall benefit permitting process (i.e. Information Gathering in the previous diagram), where:

- there is uncertainty as to whether any protected species at risk or habitats are present at or near the proposed location of the activity; or
- the potential impacts of the proposed activity are uncertain; or
- ministry staff anticipate the proposed activity is likely to contravene the ESA.

3.0 Information Sources

Land Information Ontario (LIO) and the Natural Heritage Information Centre (NHIC) maintain and provide information about species at risk, as well as related information about fisheries, wildlife, crown lands, protected lands and more. This information is made available to organizations, private individuals, consultants, and developers through online sources and is often considered under various pieces of legislation or as part of regulatory approvals and planning processes.

The information available from LIO or NHIC and the sources listed in this guide should not be considered as a substitute for site visits and appropriate field surveys. Generally, this information can be regarded as a starting point from which to conduct further field surveys, if needed. While this data represents best available current information, it is important to note that a lack of information for a site does not mean that species at risk or their habitat are not present. There are many areas where the Government of Ontario does not currently have information, especially in more remote parts of the province. The absence of species at risk location data at or near your site does not necessarily mean no species at risk are present at that location. On-site assessments can better verify site conditions, identify and confirm presence of species at risk and/or their habitats.

Information on the location (i.e. observations and occurrences) of species at risk is considered sensitive and therefore publicly available only on a 1km square grid as opposed to as a detailed point on a map. This generalized information can help you understand which species at risk are in the general vicinity of your proposed activity and can help inform field level studies you may want to undertake to confirm the presence, or absence of species at risk at or near your site.

Should you require specific and detailed information pertaining to species at risk observations and occurrences at or near your site on a finer geographic scale; you will be required to demonstrate your need to access this information, to complete data sensitivity training and to obtain a Sensitive Data Use License from the NHIC. Information on how to obtain a license can be found online at https://www.ontario.ca/page/get-natural-heritage-information.

Many organizations (e.g. other Ontario ministries, municipalities, conservation authorities) have ongoing licensing to access this data so be sure to check if your organization has this access and consult this data as part of your preliminary screening if your organization already has a license.

3.1 Make a Map: Natural Heritage Areas

The Make a Natural Heritage Area Map (available online at http://www.gisapplication.lrc.gov.on.ca/mamnh/Index.html?site=MNR_NHLUPS_NaturalHeritage&viewer=NaturalHeritage&locale=en-US provides public access to natural heritage information, including species at risk, without the user needing to have Geographic Information System (GIS) capability. It allows users to view and identify generalized species at risk information, mark areas of interest, and create and print a custom map directly from the web application. The tool also shows topographic information such as roads, rivers, contours and municipal boundaries.

Users are advised that sensitive information has been removed from the natural areas dataset and the occurrences of species at risk has been generalized to a 1-kilometre grid to mitigate the risks to the species (e.g. illegal harvest, habitat disturbance, poaching).

The web-based mapping tool displays natural heritage data, including:

- Generalized Species at risk occurrence data (based on a 1-km square grid),
- Natural Heritage Information Centre data.

Data cannot be downloaded directly from this web map; however, information included in this application is available digitally through Land Information Ontario (LIO) at https://www.ontario.ca/page/land-information-ontario.

3.2 Land Information Ontario (LIO)

Most natural heritage data is publicly available. This data is managed in a large provincial corporate database called the LIO Warehouse and can be accessed online through the LIO Metadata Management Tool at https://www.javacoeapp.lrc.gov.on.ca/geonetwork/srv/en/main.home. This tool provides descriptive information about the characteristics, quality and context of the data. Publicly available geospatial data can be downloaded directly from this site.

While most data are publicly available, some data may be considered highly sensitive (i.e. nursery areas for fish, species at risk observations) and as such, access to some data maybe restricted.

3.3 Additional Species at Risk Information Sources

- The Breeding Bird Atlas can be accessed online at http://www.birdsontario.org/atlas/index.jsp?lang=en
- eBird can be accessed online at https://ebird.org/home
- iNaturalist can be accessed online at https://www.inaturalist.org/
- The Ontario Reptile and Amphibian Atlas can be accessed online at https://ontarionature.org/programs/citizen-science/reptile-amphibian-atlas
- Your local Conservation Authority. Information to help you find your local Conservation Authority can be accessed online at https://conservationontario.ca/conservation-authorities/find-a-conservation-authority/

  Local naturalist groups or other similar community-based organizations
- Local Indigenous communities
- Local land trusts or other similar Environmental Non-Government Organizations
- Field level studies to identify if species at risk, or their habitat, are likely present or absent at or near the site.
- When an activity is proposed within one of the continuous caribou ranges, please be sure to consider the caribou Range Management Policy. This policy includes figures and maps of the continuous caribou range, can be found online at https://www.ontario.ca/page/range-management-policy-support-woodland-caribou-conservation-and-recovery

3.4 Information Sources to Support Impact Assessments

- Guidance to help you understand if your activity is likely to adversely impact species at risk or their habitat can be found online at https://www.ontario.ca/page/policy-guidance-harm-and-harass-under-endangered-species-act and https://www.ontario.ca/page/categorizing-and-protecting-habitat-under-endangered-species-act
- A list of species at risk in Ontario is available online at https://www.ontario.ca/page/species-risk-ontario. On this webpage, you can find out more about each species, including where is lives, what threatens it and any specific habitat protections that apply to it by clicking on the photo of the species.

4.0 Check-List

Please feel free to use the check list below to help you confirm you have explored all applicable information sources and to support your discussion with Ministry staff at the preliminary screening stage.

- ✓ Land Information Ontario (LIO)
- ✓ Natural Heritage Information Centre (NHIC)
- ✓ The Breeding Bird Atlas
- ✓ eBird
- ✓ iNaturalist
- ✓ Ontario Reptile and Amphibian Atlas
- ✓ List Conservation Authorities you contacted:_____

  _____
- ✓ List local naturalist groups you contacted:_____

  _____
- ✓ List local Indigenous communities you contacted:_____

  _____
- ✓ List any other local land trusts or Environmental Non-Government Organizations you contacted:_____

  _____
- ✓ List and field studies that were conducted to identify species at risk, or their habitat, likely to be present or absent at or near the site: _____

  _____
- ✓ List what you think the likely impacts of your activity are on species at risk and their habitat (e.g. damage or destruction of habitat, killing, harming or harassing species at risk):_____

  _____

Ministry of Natural Resources and Forestry

Land Use Planning and Strategic Issues Section
Southern Region

Regional Operations Division
300 Water Street
Peterborough, ON K9J 3C7
Tel.: 705 761-4839

Ministère des Richesses naturelleset des Forêts

Section de l'aménagement du territoire et des questions stratégiques
Région du Sud

Division des opérations régionales
300, rue Water
Peterborough (ON) K9J 3C7
Tél. : 705 761-4839

Ontario

September 27, 2023

[redacted]

SUBJECT: Fullarton Dam Rehabilitation Class Environmental Assessment – Notice of Intent to Undertake a Remedial Project

The Ministry of Natural Resources and Forestry (MNRF) received the Notice of Intent on September 26, 2023. Thank you for circulating this to our office. Please note that we have not competed a screening of natural heritage or other resource values for the project at this time. This response, however, does provide information to guide you in identifying and assessing natural features and resources as required by applicable policies and legislation, as well as engaging with the Ministry for advice as needed.

Please also note that it is the proponent's responsibility to be aware of, and comply with, all relevant federal or provincial legislation, municipal by-laws or other agency approvals.

Natural Heritage

MNRF's natural heritage and natural resources GIS data layers can be obtained through the Ministry's Land Information Ontario (LIO) website. You may also view natural heritage information online (e.g., Provincially Significant Wetlands, ANSI's, woodlands, etc.) using the Make a Map: Natural Heritage Areas tool.

We recommend that you use the above-noted sources of information during the review of your project proposal.

Natural Hazards

A series of natural hazard technical guides developed by MNRF are available to support municipalities and conservation authorities implement the natural hazard policies in the Provincial Policy Statement (PPS). For example, standards to address flood risks and the potential impacts and costs from riverine flooding are addressed in the *Technical Guide River and Stream Systems: Flooding Hazard Limit (2002)*. We recommend that you consider these technical guides as you assess specific improvement projects that can be undertaken to reduce the risk of flooding.

Petroleum Wells & Oil, Gas and Salt Resources Act

There may be petroleum wells within the proposed project area. Please consult the Ontario Oil, Gas and Salt Resources Library website (www.ogsrlibrary.com) for the best-known data on any wells recorded by MNRF. Please reference the 'Definitions and Terminology Guide' listed in the publications on the library website to better understand the well information available. Any oil and gas wells in your project area are regulated by the *Oil, Gas and Salt Resource Act*, and the supporting regulations and operating standards. If any unanticipated wells are encountered during development of the project, or if the proponent has questions regarding petroleum operations, the proponent should contact the Petroleum Operations Section at POSRecords@ontario.ca or 519-873-4634.

Fish and Wildlife Conservation Act

Please note, that should the project require:

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

Public Lands Act & Lakes and Rivers Improvement Act

Some Project may be subject to the provisions of the *Public Lands Act* or *Lakes and River Improvement Act*. Please review the information on MNRF's web pages provided below regarding when an approval is, or is not, required. Please note that many of the authorizations under the *Lakes and Rivers Improvement Act* are administered by the local Conservation Authority.

- For more information about the *Public Lands Act*: https://www.ontario.ca/page/crown-land-work-permits
- For more information about the *Lakes and Rivers Improvement Act*: https://www.ontario.ca/page/lakes-and-rivers-improvement-act-administrative-guide

After reviewing the information provided, if you have not identified any of MNRF's interests stated above, there is no need to circulate any subsequent notices to our office. If you have identified any of MNRF's interests and/or may require permit(s) or further technical advice, please direct your specific questions to the undersigned.

If you have any questions or concerns, please feel free to contact me.

Best Regards,

[redacted]

ONTARIO RIVERS ALLIANCE

[redacted]

10 April 2024

[redacted]

[redacted]

Re: Fullarton Dam Environmental Assessment - Alternatives

Dear Madams:

The Ontario Rivers Alliance (ORA) is a not-for-profit grassroots organization with a mission to protect, conserve and restore riverine ecosystems across the province. The ORA advocates for effective policy and legislation to ensure that development affecting Ontario rivers is environmentally and socially sustainable.

An important impact of dams and their associated reservoirs that was not mentioned in the presentation are the copious amounts of greenhouse gas (GHG) emissions, including methane, that will continue to be generated for the full life cycle of the dam and pond. The reservoir warms in the sun and collects sediment and biomass behind the dam, creating the perfect environment for microbes to feast on the biomass and decompose submerged organic matter in a process that results in carbon, methane and nitrous oxide emissions being released into the atmosphere.

ORA is in perfect alignment with the preferred management strategy for the dam, to be selected based on natural environment considerations and social uses associated with the Fullarton Conservation Area.

In consideration of the purpose of this Environmental Assessment, as well as the four alternatives for the Fullarton Dam and its reservoir, the ORA offers our strong support and recommendation for Option 4 – dam decommissioning and watercourse restoration.

Full dam decommissioning and watercourse restoration comply with the preferred management strategy and criteria in the following ways:

1. Removes all dam safety deficiencies and public safety risks.
2. Removes dam monitoring, maintenance and management responsibilities.
3. Removes the risk of floodwaters backing up behind the dam and flooding stakeholders.
4. Restores stream flow, reduces stream temperature and improves water quality.
5. Increases stream resilience to a warming climate.
6. Increases the extent of uninterrupted fish habitat.
7. Converts a GHG emitter into a GHG sink.
8. A healthy, free-flowing river provides for the perfect family outing on a beautiful sunny day.

In addition, full dam decommissioning would improve stream temperature and habitat conditions for temperature-sensitive fish species, such as the Mottled Sculpin, and for the Northern Sunfish and Rainbow Shell Mussel, which is of Special Concern.

Thank you for this important opportunity to comment and provide our recommendations!

[redacted]

[redacted]

March 28, 2024

[redacted]

Re: Fullarton Dam Environmental Assessment – Public Comment Submission

Good afternoon,

I would like to thank the UTRCA staff and project consultants for their efforts to date and for providing communication and information respecting this project to the public in a timely manner. The information related to the processes associated with this project is helpful in keeping those of us who are interested informed.

As a user of the existing day-use trail system located at the Fullarton CA, my input is based around a desire to see that consideration is given to maintaining public access to the existing passive recreational uses that are permitted currently at this CA.

As a long time visitor to this space, I appreciate the spirit of the initial land donation which was done for the purpose of creating a naturalized area which could be enjoyed by future generations. I am grateful to be one of these – and it is important to me that we preserve these spaces.

I am cognizant of the environmental and resource challenges associated with the existing dam and maintenance thereof. The assessment documentation provided to date outlines the existing conditions well – and I trust that the consultants who undertook this work are knowledgeable, and have presented sound recommendations and alternatives to move forward.

Further, I know that CA's in Ontario are experiencing a time of transition – the new legislative requirements around land inventories, programs and services, and the potential for future disposition of CA lands is more than a small challenge for our CA's.

I would ask that the UTRCA and maintain or enhance the trail network as is possible, and when moving forward with the implementation of the preferred alternative, make efforts to maintain public access to the outdoor space where possible during the transition period.

Sincerely,

[redacted]

Ministry of Citizenship and Multiculturalism

Heritage Planning Unit
Heritage Operations Branch
Citizenship, Inclusion and Heritage Division
5th Flr, 400 University Ave
Toronto, ON M5G 1S7
Tel.: 437-212-5945

Ministère des Affaires civiques et du Multiculturalisme

Planification relative au patrimoine
Opérations relatives au patrimoine
Division des affaires civiques, de l'inclusion et du patrimoine
5e étage, 400, av. University
Toronto, ON M5G 1S7
Tél.: 437-212-5945

Ontario

July 09, 2025 EMAIL ONLY

Jillian Smith
Water Control Structures Technologist
Upper Thames River Conservation Authority
smithj@thamesriver.ca

MCM File	**:**	**0018488**
Proponent	**:**	**Upper Thames River Conservation Authority**
Subject	**:**	**Class Environmental Assessment for Remedial Flood and Erosion Control Projects – Notice of Completion**
Project	**:**	**Fullarton Dam Rehabilitation**
Location	**:**	**Fullarton Conservation Area, Municipality of West Perth, Perth County**

Dear Jillian Smith:

Thank you for providing the Ministry of Citizenship and Multiculturalism (MCM) with the Notice of Completion for the above-referenced project.

MCM's interest in this environmental assessment (EA) project relates to its mandate of conserving Ontario's cultural heritage.

Project Summary
The Upper Thames River Conservation Authority has now completed the Class Environmental Assessment (Class EA) evaluating a remedial flood and erosion control project at the Fullarton Dam, located in the Fullarton Conservation Area. A Dam Safety Assessment was completed in 2007 which identified spillway capacity issues and stability concerns.

The project was assessed in accordance with the Conservation Authority Class Environmental Assessment for Remedial Flood and Erosion Control Projects document (2024). The preferred alternative is the dam decommissioning and watercourse restoration.

Comments
MCM finds that due diligence has been undertaken in preparing the *Environmental Study Report (ESR) for the Fullarton Dam Rehabilitation* (dated January 29, 2025, prepared by Stantec) by:

- undertaking a Stage 1 archaeological assessment (AA) and report (under Project Information Form number P422-0027-2023, included in Appendix F of the ESR), which has been entered into the Ontario Public Register of Archaeological Reports; and
- undertaking a Cultural Heritage Report: Existing Conditions and Preliminary Impact Assessment (dated November 2024, prepared by Stantec), which identified 4 (four) known or potential built heritage resources and cultural heritage landscapes and provided recommendations to mitigate any negative impacts.

However, MCM has the following comments and recommendations:

- We have reviewed a previous version of the Cultural Heritage Report (May 2024) and found that the report is overall consistent with the requirements, guidance and standards of an EA process and with best practice guidance prepared by MCM. However, we note that *Appendix E Cultural Heritage Report* refers to a subsequent version (November 2024) but only the first few pages were included. Currently the information from *Appendix D Dam Safety Report – Gap Analysis* seems to be repeated in Appendix E after the cover page. The ESR should be revised to include the complete Cultural Heritage Report.

- Section 4.1.8 (Archaeological Resources) - the sentence "The results of any Stage 2 AA must be submitted to the Ministry of Citizenship and Multiculturalism" should be revised to say, "The Stage 2 AA and any further recommended archaeological assessment(s) must be submitted by an archaeologist licensed under the *Ontario Heritage Act* to the Ministry of Citizenship and Multiculturalism as early as possible during detailed design and prior to any ground disturbing activities".

- Throughout the report, any reference to the "Ontario Ministry of Public and Business Services Delivery" should be revised to reflect the Ministry's updated name the "Ontario Ministry of Public and Business Service Delivery **and Procurement**".

Thank you for consulting MCM on this project and please continue to do so throughout the EA process. If you have any questions or require clarification, please do not hesitate to contact me.

Sincerely,

Amanda Antwi-Nsiah
Heritage Planner
Amanda.Antwi-Nsiah@ontario.ca

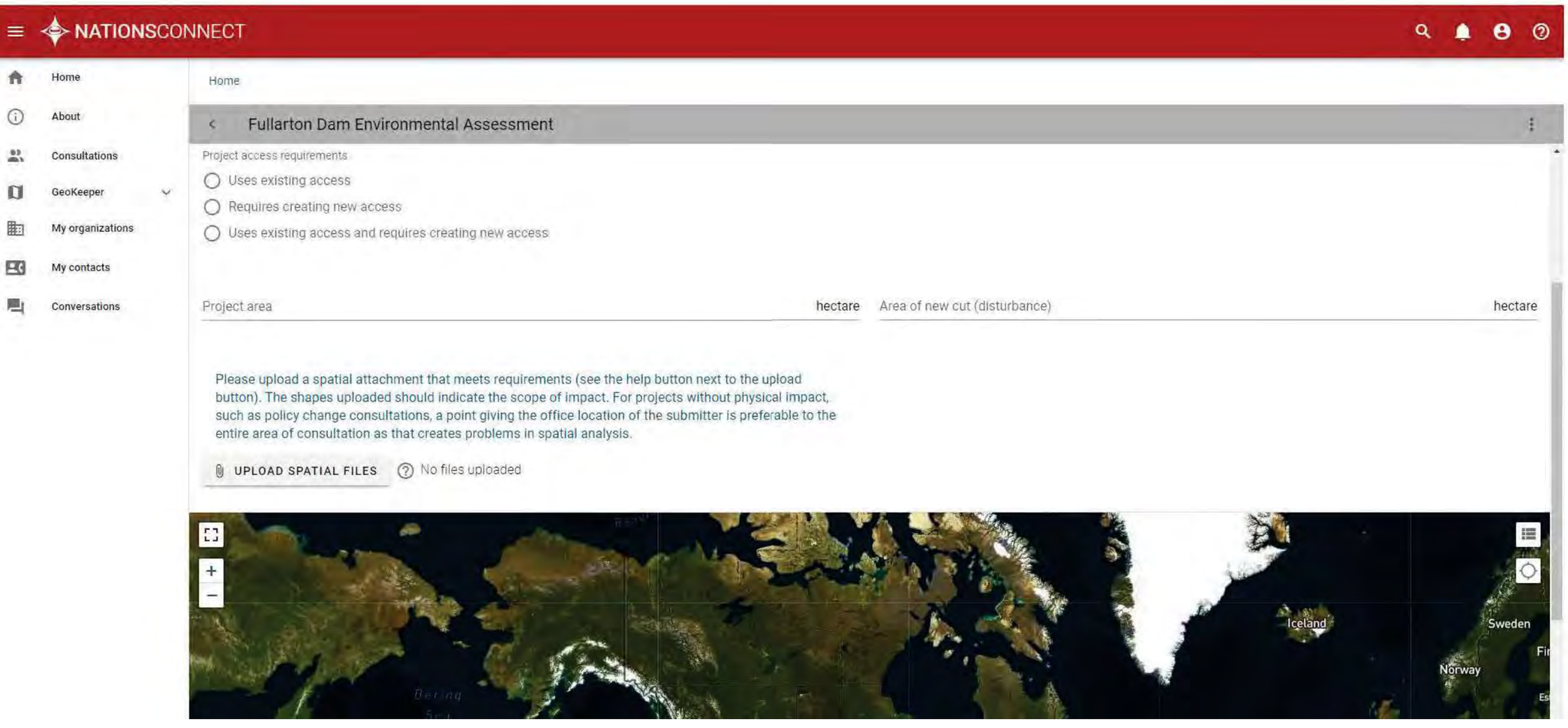
Copied to: Karla Barboza, Team Lead, Heritage Planning Unit, MCM
Heather Amirault, Stream Restoration Engineer, Stantec
Shelby Gibson, Environmental Planner, Stantec
EA notices to SW region, MECP
Monika Macki, Environmental Resource Planner & EA Coordinator, MECP

It is the sole responsibility of proponents to ensure that any information and documentation submitted as part of their EA report or file is accurate. The Ministry of Citizenship and Multiculturalism (MCM) makes no representation or warranty as to the completeness, accuracy or quality of the any checklists, reports or supporting documentation submitted as part of the EA process, and in no way shall MCM be liable for any harm, damages, costs, expenses, losses, claims or actions that may result if any checklists, reports or supporting documents are discovered to be inaccurate, incomplete, misleading or fraudulent.

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 Registrar, Ontario Ministry of Public and Business Service Delivery and Procurement, 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 should also be notified (at archaeology@ontario.ca) to ensure that the archaeological site is not subject to unlicensed alterations which would be a contravention of the *Ontario Heritage Act*.

Appendix G.4 Indigenous Consultation



Organize pages

Add comments

Request e-signatures

Scan & OCR

Protect a PDF

Redact a PDF

Compress a PDF

Prepare a form

Fill & Sign

Deshkan Ziibiing
Chippewas of the Thames
First Nation Treaties, Lands
and Environment

320 Chippewa Road
Muncey, ON, N0L 1Y0
Tel: 519-289-5555
Fax: 519-289-2230
info@cottfn.com

Project Name:
Fullarton Dam Environmental Assessment

FN Consultation ID:

Consulting Org Contact:
[redacted]

Consulting Organization:
Upper Thames River Conservation Authority

Date Received:
Tuesday, October 10, 2023

October 29, 2023

Dear [redacted]

Chippewas of the Thames First Nation (COTTFN) has received the notice of intent concerning the Fullarton Dam Environmental Assessment, dated October 10, 2023. The proposed project is located within the Huron Tract Treaty, and within the Big Bear Creek Additions to Reserve (ATR) land selection area, as well as COTTFN Traditional Territory.

After screening this project, we have identified it to be of moderate concern. As this time, I am requesting that COTTFN be updated as project details and updates emerge. UTRCA can continue to upload any relevant documents on the NationsConnect Portal for review. We also would like to be added to the email list of interested parties.

Throughout the project, if there is a need for an Archaeology Assessment, we require notification and the opportunity to actively participate by sending First Nation Field Liaisons on behalf of this First Nation.

We look forward to continuing this open line of communication. To implement meaningful consultation, COTTFN has developed its own protocols - a document and a process that will guide positive working relationships. We would be happy to meet with you to review COTTFN's Consultation Protocols if needed. As per 'Appendix C' of the Wiindmaagewin, we will be sending an invoice based on our time to review the documentation pertinent to the project. The invoice will come from COTTFN's Finance Department. Please do not hesitate to contact me if you need further clarification of this letter.

Sincerely,

_____
Original Signed
[redacted]

Subject: Re: Fullarton Dam EA - Notice of Intent

Good afternoon,

Thank you for your comments regarding the Fullarton Dam Environmental Assessment. Please see the attached response letter.

We look forward to working with you on this ongoing project.

Thank you,

UPPER THAMES RIVER
CONSERVATION AUTHORITY

[redacted]

>>>

From: [redacted]
To:
CC: [redacted]

Date: 2023-10-02 10:18 AM
Subject: EXTERNAL EXTERNAL Re: Fullarton Dam EA - Notice of Intent

Good morning [redacted],

I hope this message finds you well.

CKSPFN Consultation is writing to address some important aspects regarding the Class Environmental Assessment (Class EA) for the Fullerton Dam.

1. Future Correspondence: As previously mentioned, kindly inform the UTRCA and Stantec contact involved in this project to direct all future correspondence to the Consultation email channel via [redacted].

2. Archaeological Assessment: CKSPFN Consultation anticipates the Stage 2 archaeological assessment report due to the significant archaeological potential in the study area (77%). We request information on scheduling for Stage 2 test-pitting and expect UTRCA to provide funding for a First Nation archaeological monitor to supervise archaeological activities.

3. Capacity Funding: To thoroughly review the Class EA report and related documentation, CKSPFN Consultation estimates needing approximately $5,000 in capacity funding. Further engagement for cultural and natural heritage considerations may require additional support.

4. Reports Caution: The Cultural Heritage, Natural Heritage, and 2017 Existing Environmental Conditions reports lack evidence of engagement with Indigenous communities or groups. CKSPFN Consultation advises against relying solely on these reports for the Class EA.

We appreciate your attention to these matters and anticipate your collaboration as we progress with the project. Please don't hesitate to contact us for any inquiries or clarification needed.

Miigwetch,

CKSPFN Consultation

From: [redacted]
Date: Friday, September 29, 2023 at 8:19 AM
To: [redacted]
Cc: [redacted]
Subject: Fullarton Dam EA - Notice of Intent

Good morning, [redacted]

CKSPFN administration forwarded our team a notice of intent for an EA of the Fullarton dam.

For all consultation notices, please send directly to this email - [redacted]

We look forward to ongoing collaboration with the Upper Thames River Conservation Authority.

Miigwetch,

CKSPFN Consultation

Caution: This email originated from outside of Stantec. Please take extra precaution.

Attention: Ce courriel provient de l'extérieur de Stantec. Veuillez prendre des précautions supplémentaires.

Atención: Este correo electrónico proviene de fuera de Stantec. Por favor, tome precauciones adicionales.

UPPER THAMES RIVER
CONSERVATION AUTHORITY

January 25, 2024

Via email [redacted]

Attention: Consultation Team
Chippewas of Kettle and Stony Point First Nation
6247 Indian Lane, Lambton Shores

Dear Consultation Team,

RE: Upper Thames River Conservation Authority (UTRCA), Fullarton Dam Rehabilitation Environmental Assessment, Request to Consult

Thank you for your feedback provided via email on October 2, 2023.

The Upper Thames River Conservation Authority believes that consultation with First Nations is an integral part of the Class EA process, and understands that the study area is important to you. We acknowledge that the Cultural Heritage, Natural Heritage, and 2017 Existing Environmental Conditions work was done prior to consultation with Indigenous communities and we welcome your involvement as this work is updated as part of this ongoing study. We see the opportunity for naturalizing the flow as an important improvement to the Natural Heritage of the area and we would appreciate your involvement in this project as you have outlined in your email.

UTRCA would like to:

1) Provide the requested capacity funding to review the Environmental Assessment reports and related documentation including updated information. We look forward to receiving your input into this work.
2) Extend an invitation and provide capacity funding for a First Nations Archeological Monitor to help supervise the Stage 2 Archaeological Assessment.
3) Meet with you to discuss the project in more detail prior to public consultation.

We look forward to meeting with you, please provide us with some dates you are free to discuss the project further. As requested we will direct future correspondence to the Consultation email channel via [redacted]

UPPER THAMES RIVER
CONSERVATION AUTHORITY

Sincerely,

[redacted]

Cc: [redacted]

From: [redacted]
Cc:
Subject: EXTERNAL EXTERNAL Consultation submitted
Date: October 5, 2023 1:45:47 PM

The following project has been submitted for review on NationsConnect:

Fullarton Dam Environmental Assessment
https://nationsconnect.ca/i-Consultation-9247

Once your project details have been reviewed for completion and accuracy, the project will be sent to the selected communities.

Please log back in to NationsConnect to check the status of your project.
[redacted]

Regards,
The NationsConnect Support Team

From: [redacted]
To:
Subject: FW: Fullarton Dam EA - Notice of Intent
Date: September 29, 2023 9:36:48 AM

FYI for consultation contact.

[redacted]

The content of this email is the confidential property of Stantec and should not be copied, modified, retransmitted, or used for any purpose except with Stantec's written authorization. If you are not the intended recipient, please delete all copies and notify us immediately.

From: [redacted]
Sent: Friday, September 29, 2023 8:20 AM
[redacted]
Subject: Fullarton Dam EA - Notice of Intent

Good morning, [redacted]

CKSPFN administration forwarded our team a notice of intent for an EA of the Fullarton dam.

For all consultation notices, please send directly to this email - consultation@kettlepoint.org.

We look forward to ongoing collaboration with the Upper Thames River Conservation Authority.

Miigwetch,

CKSPFN Consultation

[redacted]

Caution: This email originated from outside of Stantec. Please take extra precaution.

Attention: Ce courriel provient de l'extérieur de Stantec. Veuillez prendre des précautions supplémentaires.

Atención: Este correo electrónico proviene de fuera de Stantec. Por favor, tome precauciones adicionales.

From: [redacted]
To:
Subject: FW: Fullarton Dam Environmental Assessment- Notice of Intent
Date: September 27, 2023 11:07:30 AM
Attachments: image001.png
NationsConnect User Guide.pdf

FYI

[redacted]

The content of this email is the confidential property of Stantec and should not be copied, modified, retransmitted, or used for any purpose except with Stantec's written authorization. If you are not the intended recipient, please delete all copies and notify us immediately.

From: [redacted]
Sent: Wednesday, September 27, 2023 10:12 AM
To: [redacted]
Cc: [redacted]
Subject: RE: Fullarton Dam Environmental Assessment- Notice of Intent

Good morning,

The Chippewas of the Thames First Nation has transitioned to using NationsConnect to receive consultation and engagement requests. **Notifications or requests sent over email, mail or fax are not considered submitted and will not be reviewed.**

To register for NationsConnect, and submit your request, please visit [redacted]

Along with the project information, a spatial file in .kml, .kmz, or .zip shapefile formats will be required to submit your request. Once your project has been submitted, you can attach additional files or send updated communication through the Conversations feature on NationsConnect.

If you have any technical questions about NationsConnect, please reach out to [redacted]

[redacted]

[redacted]

COTTFN

[redacted]

Visit us online at cottfn.com

This communication is intended for the use of the recipient to whom it is addressed and may contain confidential and or privileged information. If you are not the intended recipient of this communication any information received should be deleted or destroyed.

From: [redacted]
Sent: Tuesday, September 26, 2023 1:21 PM
Cc: [redacted]
Subject: Fullarton Dam Environmental Assessment- Notice of Intent

Good afternoon,
I hope this email finds you well, my name is [redacted] and I work at the Upper Thames River Conservation Authority. This email is to inform you that the Upper Thames River Conservation Authority and Stantec have initiated an Environmental Assessment of the Fullarton Dam. Attached is the Notice of Intent, I will continue to email you and provide you with updates as the project progresses.
Please do not hesitate to contact me and [redacted] for any questions or concerns you may have.
Thank you,

UPPER THAMES RIVER
CONSERVATION AUTHORITY

[redacted]

Caution: This email came from someone outside CHIPPEWA OF THE THAMES Do not open attachments or click on links if you do not recognize the sender.

Caution: This email originated from outside of Stantec. Please take extra precaution.

Attention: Ce courriel provient de l'extérieur de Stantec. Veuillez prendre des précautions supplémentaires.

Atención: Este correo electrónico proviene de fuera de Stantec. Por favor, tome precauciones adicionales.

[redacted]

[redacted]

CONSULTATION PROTOCOL



CONTENTS

Part I: Introduction and Purpose

1. History of Deshkan Ziibiing Aki (COTTFN) p. 3
2. Territory p. 3
3. Community Profile p. 4
4. Historical Relationships p. 4
5. Principles of Intersocietal Governance and Communication p. 5
6. Statement of Reserved Rights p. 8

Part II: Obligation to Consult

7. Purpose and Application p. 11
8. Definitions p. 11
9. Objectives and Responsibilities p. 13
   - Objectives of consultation p. 13
   - Responsibilities of the Parties p. 13

Part III: Consultation Process

10. Triggering Consultation p. 18
11. Submitting Notice to Deshkan Ziibiing p. 18
12. Notifications for Archaeology Requests p. 19
13. Evaluation of Activity and Scope of Consultation p. 20
    - Minimal Impact Consultation p. 21
    - Moderate Impact Consultation p. 21
    - Extensive Impact Consultation p. 22
14. Workplan p. 23
15. Nation to Nation Engagement p. 24
16. Traditional Knowledge and Confidentiality p. 24
17. Internal Community Engagement p. 24
18. Conditions for Providing Consent p. 25
19. Ongoing Consultation p. 25
20. Capacity Requirements p. 25
21. Deshkan Ziibiing Initiated Research p. 26
22. Crown Delegation p. 26
23. Mitigation and Accommodation p. 26
24. Dispute Resolution p. 27

Appendices

A. Deshkan Ziibiing/Chippewas of the Thames Consultation Map
B. Consultation Flow Chart
C. Consultation Service Fees

PART I: Introduction and Purpose

1. History of Deshkan Ziibiing Aki (Chippewas of the Thames First Nation)

The watersheds of southwestern Ontario have been the home of Anishinaabe people for millennia. Deshkan Ziibiing edbendaagzijig, "those that belong to Antler River," comprise one of the traditional Anishinaabe nations governing the territory of Waawayaatanong or "Round Lake." This region is known as the third stopping place of the Water Drum on its sacred journey to Madeline Island, centuries before the era of colonization.

The purpose of this protocol is to ensure that our relationships with others develops in ways that respect Deshkan Ziibiing's responsibilities to mother earth and protects the full range of our rights. This protocol shall serve to guide governments and third-party proponents who are interested in pursuing healthy and mutually beneficial relationships with Deshkan Ziibiing within our traditional territory.

2. Territory

Deshkan Ziibiing edbendaagzijig's traditional territory was recognized and affirmed by Canada in the Big Bear Creek Land Claim Settlement Agreement (2013). Within this territory, we are also signatory to pre-Confederation Treaties with the British Crown. Traditional Anishinaabe territory in southwestern Ontario includes lands addressed in the McKee Treaty (1790), the London Township Treaty (1796), the Sombra Township Treaty (1796), the Longwoods Treaty (1822), and the Huron Tract Treaty (1827). Deshkan Ziibiing is party with other Anishinaabe nations to several of these treaties but is the sole Anishinaabe party to the Longwoods Treaty.

A comprehensive description of our ancestral lands is attached as Appendix "A" together with a map.

We who are Deshkan Ziibiing edbendaagzijig continue our commitment to protect the watersheds of the Thames River, Bear Creek, the Au Sable River, and the Erie and Huron

lakeshores. We regard all of our ancestral lands as part of our consultation territory. Our treaties did not "surrender" our lands or waters.

3. Community Profile

As a community, Deshkan Ziibiing has always welcomed and incorporated people from other nations. Our families have always shared a common world around the Great Lakes with the families of the Pottawatomis and the Odawas. Delawares (Lenape) and Oneidas were welcomed here between 1791 and 1840 and allowed to create their own communities on land adjacent to and within our homeland. At various times, other Haudenosaunee, Shawnees, Huron/Wendats, as well as Anglo or French traders and settlers marrying our people, have all been incorporated into our society. Today, our population is approximately 3,200 people, with 1,000 residing within Deshkan Ziibiing's unceded reserve land.

4. Historical Relationships

Deshkan Ziibiing's relationships with other nations have generally been pursued through the creation of Treaty partnerships.

The great Treaty of Niagara (1764) emerged from this long practice and is the template for all subsequent treaties between Britain and Deshkan Ziibiing. The Two Row Wampum, a belt the Haudenosaunee first used with the Dutch in 1613, recognized a relationship of equals.

The imposition of colonialism and Canada's shameful conduct in breaking sacred promises contained in our Treaties have had a lasting effect on the people of Deshkan Ziibiing. Colonial rule presumed the 'surrender' of well over 90% of our traditional territory. Efforts to 'civilize' and assimilate our people, through Canada's unilateral imposition of legislation, harsh policies, and the residential school system have taken a toll on our people and have unlawfully infringed our human rights as well as our Aboriginal and Treaty rights.

However, despite Canada's assertions of sovereignty over our lands and people, we have remained resilient and have continued to assert our inherent rights as a sovereign nation.

Deshkan Ziibiing remains intent on protecting our traditional territory. Our vision for the engagement formalized in this protocol remains that of Tecumseh, our Treaty chiefs, and the Two Row Wampum.

We are fundamentally committed to self-determination and the preservation and restoration of our Anishinaabe jurisdiction and heritage. We expect that those with whom we engage in matters respecting our traditional territories will act in a manner consistent with the principles contained in the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) and shall seek to fulfil the objectives of reconciliation.

We are focused on fair partnerships based on our free, prior, and informed consent and the wise and respectful use of our traditional lands and waters.

5. Principles of Intersocietal Governance and Communication

Our engagement with other communities stems from our recognition of several principles, which derive from our Creator's gifts to us of life and land, and from our Creator having placed us within a world full of relationships with others. Our responsibility to maintain these relationships, in accordance with principles derived from our creation story, is central to our continued wellbeing as a people. These principles guided our ancestors in their Treaty partnerships historically, and they remain foundational today in our dealings with federal, provincial, and municipal bodies. They indicate our fundamental orientation towards all matters of discussion concerning our rights and responsibilities and underpin our approach to "the duty to consult" as articulated by the Supreme Court of Canada in *Haida Nation* (2004) and subsequent cases.

Our principles provide a basis for fruitful and healthy intersocietal development, governance, and communication.

a. Principles of Governance

(1) Gdinawendimi: "We are all related." A basic truth of our creation story is that we are related to everything that shares the world with us. We expect that all consultation and

discussion with governments and third parties will focus on how the proposed project will foster this relatedness.

(2) Mno-bmaadiziwin: "The good life." We understand that the Creator placed us within our world's web of spiritual and bio-physical relationships in order for life to flourish. Life flourishes when we base our relationships on the gifts of the Seven Grandfathers: Nbwaakaawin "wisdom," Zaagidiwin "love," Minaadendamowin "respect," Aakde'ewin – or Zoongide'ewin "bravery," Gwakwaadiziwin "honesty," Dbaadendiziwin "humility," Debwewin "truth." Proposals should enhance the good life for all our relations and discussions regarding those proposals should be grounded in the Seven Grandfather teachings.

(3) Naaknigewin: "Law". We expect that all consultation and discussion with governments and third parties will aim to respect and embody our laws, including our Chi-Inaakonigewin, as the measure for our decisions provided by the Creator.

(4) Anishinaabe dbendizawin: "Anishinaabe independence," or "self-determination." We were created to live as an independent people, and are therefore able to ally with, but not to become subject to, other independent peoples. The Two Row Wampum embodies this alliance of equals, each party free to follow its own way without interference, but each also attentive to the wellbeing of the other. We expect that all proposals from governments will respect this most basic tenet of the Two Row Wampum.

b. Principles of communication

(1) Zgaswediwin: "To smoke together." When Anishinaabeg met in council, they began with the ceremony of smoking. In our stories, Nanabush provided our ancestors with the pipe of peace to help us foster the path of goodwill and reconciliation towards earth, plants, animals, and our fellow humans. Asemaa, "tobacco," carries our thoughts and prayers to the Creator, and demonstrates our desire to speak the truth, and to build relationships that reflect

gratitude in our dependence on the natural order. We expect that all consultation will be grounded in truth, reconciliation, and gratitude.

(2) Ginoondiwin: "talk to each other." Our practice has been to reach decisions in common, after full and satisfying discussion addressing the concerns of all involved. Consultation must be designed and implemented with flexibility, respecting the nature of the rights potentially impacted and the scope of the possible impacts. Deshkan Ziibiing expects to determine the level of consultation that is necessary and appropriate where our rights and interests are potentially impacted.

(3) Gii-nenmaasiinaawaan: "they didn't let them". In all consultations which impact our Treaty and traditional lands, we expect Crown and Proponents to adhere to the principle of Free, Prior, and Informed Consent, embodied in article 32(2) of the United Nations Declaration on the Rights of Indigenous Peoples (2007).

Chi-dibaakinigewin: a "great judgment," Our ancestors negotiated with settler governments to reach mutually beneficial agreements. However, colonial governments have ignored obligations under these solemn agreements and have justified erosion of our rights over time. We expect that governments will adhere to the true intent of treaties and agreements and will respect the gravity of the promises that are made.

c. Principles of Co-Existence and Economy

(1) Gdoonaaganinaan: "Our Dish," the agreement reached with the Haudenosaunee in 1701, enabled our respective peoples to hunt and harvest in mutual safety, and ensured mutual wellbeing, within our ancestral lands. We expect all Proponents to demonstrate how proposed projects will promote mutual safety and wellbeing.

(2) Maatookiiwin: "sharing". Our Treaties concern our sharing of the lands that the Creator has shared with us. There are no Anishinaabemowin transcriptions of treaties that

use the word adaawaage, meaning “to sell.” It is our expectation that in the spirit of sharing what the Creator has provided, benefits related to projects will also be shared.

(3) Gnawenjigewin: “to take care of things.” Our use of the lands and waters of our territory is subject to Anishinaabe principles of stewardship, derived from our creation story, and instilled through the growth of Traditional Knowledge. We expect that all project proposals will respect and incorporate conservation practices and Traditional Knowledge of Deshkan Ziibiing.

(4) Niigaan-inaabiwin: “looking ahead”. Decision-making that respects the full web of relationships within which the Creator has placed us, and aims to chart the impacts of our choices as far as possible into the future to ensure harmony and balance. We expect project proposals with the potential to affect our lands, waters, air, health and wellbeing to demonstrate as concretely as possible the long- term implications for Deshkan Ziibiing.

6. Statement of Reserved Rights

The rights that Deshkan Ziibiing exercises in relation to our traditional lands, Treaty lands, reserve lands, and Addition to Reserve lands, are inherent - grounded most basically in the Creator’s gift of lands, waters, and way of life to ndodeminaanig, “our clans.” These rights are embodied in our historical and ongoing occupation of our territory, and in our practice of self- determination as a people.

Our rights as a self-determining people are recognized in several instruments, including, the Royal Proclamation of 1763, our Treaties, s.35(1) of *Canada’s Constitution Act* and the *United Nations Declaration of the Rights of Indigenous Peoples (UNDRIP)(2007*).

UNDRIP recognizes, among other things, the need to respect and promote the inherent rights of Indigenous peoples, including our right to self-determination within our traditional lands and territories. Our rights derive from our political, economic, and social structures and from our cultures, spiritual traditions, histories, and philosophies. UNDRIP encourages States to comply

with and effectively implement all their obligations as they apply to Indigenous peoples under international instruments in consultation and cooperation with the peoples concerned. Relevant articles include, but are not limited to:

Article 11

1. Indigenous peoples have the right to practise and revitalize their cultural traditions and customs. This includes the right to maintain, protect and develop the past, present and future manifestations of their cultures, such as archaeological and historical sites, artefacts, designs, ceremonies, technologies and visual and performing arts and literature.

2. States shall provide redress through effective mechanisms, which may include restitution, developed in conjunction with indigenous peoples, with respect to their cultural, intellectual, religious and spiritual property taken without their free, prior and informed consent or in violation of their laws, traditions and customs.

Article 12

1. Indigenous peoples have the right to manifest, practise, develop and teach their spiritual and religious traditions, customs and ceremonies; the right to maintain, protect, and have access in privacy to their religious and cultural sites; the right to the use and control of their ceremonial objects; and the right to the repatriation of their human remains.

2. States shall seek to enable the access and/or repatriation of ceremonial objects and human remains in their possession through fair, transparent and effective mechanisms developed in conjunction with indigenous peoples concerned.

Article 26:

Indigenous peoples have the right to the lands, territories and resources which they have traditionally owned, occupied or otherwise used or acquired.

Article 32:

1. Indigenous peoples have the right to determine and develop priorities and strategies for the development or use of their lands or territories and other resources.

2. States shall consult and cooperate in good faith with the indigenous peoples concerned through their own representative institutions in order to obtain their free and informed consent prior to the approval of any project affecting their lands or

> territories and other resources, particularly in connection with the development, utilization or exploitation of mineral, water or other resources.
>
> 3. States shall provide effective mechanisms for just and fair redress for any such activities, and appropriate measures shall be taken to mitigate adverse environmental, economic, social, cultural or spiritual impact.

In June 2021, Canada passed into law the *United Nations Declaration on the Rights of Indigenous Peoples Act* which affirmed UNDRIP as a universal international human rights instrument with application in Canadian law; thereby providing a framework for Canada's implementation of UNDRIP.

This legislation represents a step toward implementing UNDRIP as a framework for reconciliation as recommended by the Truth and Reconciliation Commission of Canada in their "Calls to Action" – which Canada committed to addressing.

Within the *UNDRIP* Act, Canada rejects all forms of colonialism and commits to advancing relations with Indigenous peoples that are based on good faith and on the principles of justice, democracy, equality, non-discrimination, good governance, and respect for human rights. Canada further committed to taking effective measures including legislative, policy and administrative measures, in consultation and cooperation with Indigenous peoples, to achieve the objective of UNDRIP.

This Wiindmaagewin represents a framework for consultation which is consistent with the principles of UNDRIP and Canada's stated commitment to implementing these principles to achieve reconciliation; however, the Wiindmaagewin is based on the Nation's inherent rights which are not dependent on Canada's legal system or recognition.

PART II Obligation to Consult

7. Purpose and Application

7.1. This Consultation Process balances Deshkan Ziibiing's laws with the legal principles derived from the western common law as well as international instruments, such as UNDRIP. We adhere to the principle of Free, Prior, and Informed Consent. Therefore, where any proposed Activity within Deshkan Ziibiing's Traditional or Treaty Territory, Additions to Reserve Land or any land over which Deshkan Ziibiing claims Aboriginal title, may potentially cause an impact to the environment, health or Deshkan Ziibiing's rights or asserted rights, including changes to laws, regulations or policies, Deshkan Ziibiing expects the Crown and Proponents to respect and follow the processes set forth in this Wiindmaagewin.

7.2. Nothing in this Protocol, nor the process or documents derived from it shall be construed to abrogate or derogate from the rights of Deshkan Ziibiing, regardless of whether such rights are recognized, established or defined.

7.3. Nothing in this Protocol may be construed to limit any consultation or accommodation obligations owed to Deshkan Ziibiing by the Crown or any Proponent.

7.4. Deshkan Ziibiing retains the right to challenge through the legal process, any Activity having the potential to impact the citizens or lands of Deshkan Ziibiing.

8. Definitions

a. **Activity** means any Crown or Proponent activity.
b. **Crown** means either or both of the governments of Canada and Ontario and its component parts and agents, as well as its designates including municipalities.

c. Crown Activity means:

- New or changes to legislation, regulations, policies, programs and plans that provide authority to or are implemented or to be implemented by the Crown;
- Issuance, variation, approval, suspension or cancellation of permits, licenses, authorizations, renewals or anything similar by the Crown;
- Any unfunded mandate or obligation sought to be imposed by the Crown upon Deshkan Ziibiing without provision of corresponding adequate resources, financial or otherwise;
- Any failure to act by the Crown where the Crown is obligated to take action to protect or given effect to Deshkan Ziibiing's Aboriginal or Treaty rights; and
- Any other action which may be authorized or undertaken by the Crown.

d. Proponent means the party (which could include the Crown, a municipality, a Land Use Planning Authority, a corporation, partnership, sole proprietorship, association, organization, person or the like) that proposes to undertake or is undertaking the Proponent Activity but excludes any business in which Deshkan Ziibiing has a majority interest or financial control.

e. Proponent Activity means any Activity pursuant or incidental to anything authorized or ordered by the Crown or that the Crown is contemplating authorizing or ordering. This includes Planning Authorities who are required to engage and coordinate with Indigenous communities on land use planning matters and consider our interests when identifying, protecting, and managing cultural heritage and archaeological resources. It does not include any Activity of Deshkan Ziibiing or a member of the Nation or a business in which members of the Nation have majority control or interest which Activity Deshkan Ziibiing has authorized.

f. Impact means any effect that an Activity may have on the land, economy or environment within or around Deshkan Ziibiing's Reserve, Additions to Reserve, Traditional or Treaty territory or any adverse effect on the health of any Deshkan Ziibiing member or on the Aboriginal or Treaty rights of Deshkan Ziibiing or any of its

citizens. This assessment of impact may relate to the cumulative impacts (long-term, ongoing, intermittent or repetitive) of a Proponent's proposed Activity or it may relate to the cumulative impacts of development generally which, as a whole will have an adverse impact on the right(s) of Deshkan Ziibiing.[1]

g. **Protocol** means this Wiindmaagewin, the Deshkan Ziibiing Consultation Protocol.

9. Objectives and Responsibilities

9.1. Objectives of Consultation

Appropriate consultation is a dialogue between communities, a mutual engagement, rather than a mere notification of an external party's intention. Consultation ensures Deshkan Ziibiing is fully informed about Activities that may affect our Nation's rights and interests; it promotes and deepens the path of reconciliation that will ensure a healthier future for both settler and Anishinaabe communities; it encourages the development of projects that are mutually beneficial to all parties; and it ensures that projects have wide legitimacy both within Deshkan Ziibiing, and also within the larger network of Anishinaabe nations at home around the Great Lakes.

9.2. Responsibilities of the Parties

All parties engaged in consultation activities have responsibilities in common. Among these are the responsibilities to participate in good faith, and to treat each other with respect, transparency, and honesty. In addition, each party has its own unique responsibilities to ensure that the outcome of consultation is successful and good relations endure.

9.2.1 Crown Responsibilities

Where Deshkan Ziibiing asserts rights or interests which may potentially be impacted, the

[1] This is consistent with evolving case law on cumulative impacts: See *Yahey v British Columbia*, 2021 BCSC 1287 (Yahey)

Crown must act honourably. This requires that any rights that are protected or potentially protected by s.35 of the Constitution are recognized and respected. In all situations, the honour of the Crown requires reasonable, good faith efforts to engage in meaningful consultation and, where appropriate, accommodation to reconcile the interests at stake. Consultation is an ongoing obligation, and this duty may change during the course of consultation based on changing circumstances and information.

Specific Crown responsibilities include, but are not limited to:

a) Full and complete collaboration with Deshkan Ziibiing, taking into account the Community's input and perspective in designing and implementing the consultation and accommodation process, respecting Deshkan Ziibiing 's laws and Traditional Knowledge, and acting with transparency, honour, and good faith, all in the spirit of reconciliation;

b) Full and timely disclosure of all relevant information from the earliest stages of any contemplated Activity/project and as it becomes available throughout the consultation process;

c) Effective oversight and coordination with other Crown agencies, departments, and Proponents as required;

d) Timely and transparent communications with Deshkan Ziibiing, including whether and how aspects of consultation are being delegated and the scope of that delegation;

e) Where delegation occurs, ensuring an appropriate designate is appointed to oversee the effectiveness of the consultation process and ensuring the honour of the Crown is maintained during consultation and accommodation;

f) Approaching every project/Activity with an open mind and an intention to be flexible and accommodate Deshkan Ziibiing by substantially addressing legitimate concerns raised by the community including concerns related to

cumulative impacts or effects;

g) Incorporating Deshkan Ziibiing as a partner into the strategic planning and decision-making process related to the project; and

h) Funding for all reasonable costs associated with Deshkan Ziibiing's meaningful participation, including costs associated with receiving, reviewing, and processing initial notices of proposed activities in the form of reasonable application or processing fees.

9.2.2 Proponent Responsibilities

Deshkan Ziibiing acknowledges that Proponents are often delegated certain procedural aspects of the Crown's duty to consult when proposed activities potentially affect our asserted rights and interests.

Specific Proponent Responsibilities include, but are not limited to:

a) Providing full, accurate, and up-to-date information about their projects on an ongoing basis. Such information should be provided as it becomes available and should not be dependent on explicit requests from Deshkan Ziibiing staff;

b) Facilitating Deshkan Ziibiing's full participation in any necessary consultation activities and collaborating on Activity specific protocols which will detail consultation activities, timelines, and funding, including access to resources and expertise where required;

c) Building consultation capacity within the Nation;

d) Considering alternative approaches, including potential changes which may mitigate impacts;

e) Respecting our role as steward and taking into account our Traditional Knowledge, practices, and perspectives;

f) Responding to requests for information and adjusting timelines to facilitate the consultation process; and

g) Exploring opportunities to share meaningfully in the range of benefits that might result from the Activity contemplated.

Should consultation proceed past the initial stage, we expect project Proponents to provide us with the following written acknowledgements, as requested:

i. a statement fully acknowledging our inherent and Treaty rights, and our responsibilities to our territory, as they relate to the Activity;

ii. a statement indicating that the Proponent will share this acknowledgement of our rights and responsibilities in all subsequent communication about the project with shareholders, the public, government departments, lenders, and others, and that the Proponent's subcontractors would function within the same framework.

9.2.3. Deshkan Ziibiing Responsibilities:

Our Elders have conveyed from the Creator our obligations to protect the land and waters of our traditional territory. Our responsibilities to our partners in consultation are similar to those we undertook together with our historic partner in Treaty.

Specific Deshkan Ziibiing Responsibilities include, but are not limited to:

a) Upholding the terms of this protocol, as well as of any subsequent agreements arising in regard to the consultation process;
b) Reciprocal good faith engagement with the Crown and Proponents;
c) Providing timely information and responses as our capacity allows;
d) Engaging leadership and our people in a meaningful way regarding proposed Activities;
e) Stating our rights clearly and facilitating an understanding of how any potential impacts will adversely affect us; and,
f) Providing input about how Proponents and governments might resolve our concerns in good faith, including participation in commercial relationships and/or

partnerships where appropriate.

PART III: Consultation Process

10. Triggering the Consultation Process

The duty to consult is triggered when the Crown contemplates or becomes aware of any Activity which has the potential to affect our Aboriginal or Treaty rights. At the earliest possible moment, notice of this Activity shall be submitted to Deshkan Ziibiing by the Crown and/or Proponents in accordance with the contact procedures outlined below. If any Activity has begun or is underway before the consultation process is initiated, Deshkan Ziibiing expects the Crown or Proponent to suspend such Activity until Deshkan Ziibiing has been appropriately notified and engaged.

11. Submitting Notice to Deshkan Ziibiing

Deshkan Ziibiing uses the "NationsConnect" platform to receive consultation and engagement requests.

All inquiries and initial proposals for activities from the Crown and/or Proponents must be submitted to the NationsConnect portal, at the earliest possible moment in the development of a project idea. Notifications sent through regular mail, email, or fax will not receive a response and will not be considered submitted for consultation.

To submit, first go to https://nationsconnect.ca/ to register. Click on the Sign Up Now button to get started.

Proponents will be required to submit information about their project. A spatial file in .kml, .kmz, or .zip shapefile formats are also required for submission. Once the project has been submitted, additional files can be attached. Communications can also be kept up to date through the Conversations feature on NationsConnect.

Consultation staff will respond to NationsConnect submissions within 45 days. Proponents are prompted to select a response date in the NationsConnect portal. Staff will attempt to respond

by the date noted, but it may not be possible due to capacity restraints.

If you need to contact Consultation staff and are NOT submitting a new consultation, email [redacted] or call the office at [redacted] A staff member will respond to emails within seven business days. If you do not receive a response within that time frame, please resend.

Reasonable processing and/or consultation service fees will be charged in accordance with the fee schedule outlined in the appendix of this Protocol. The updated Protocol can be found on Deshkan Ziibiing's Website at: [redacted] under "Duty to Consult."

No action or inaction on the part of Deshkan Ziibiing in regard to a failure to provide proper Notice shall be deemed to be a waiver of Deshkan Ziibiing's right to be consulted.

12. Notifications for Archaeology Requests

12.1. Deshkan Ziibiing participates in archaeological fieldwork occurring within the Nation's Traditional and Treaty Territory by sending Archaeological Field Liaisons (AFLs) to sites. By participating in archaeological fieldwork, the Nation's AFLs help protect the Nation's rights and interests, material culture, and, where applicable, ancestors' remains and sacred items. Treaties, Lands and Environment is developing further protocols around the care of ancestors' remains and potential repatriation of sacred bundles and Anishinaabe material culture. Protocols will be shared when they are finalized.

12.2. The AFL program is managed by the Consultation Unit. Deshkan Ziibiing expects to participate in all archaeological fieldwork from Stage 2 to 4. In order to participate in fieldwork, COTTFN and the Proponent or Consultant must execute an Archaeology Field Liaison Agreement. Proponents or Consultants may obtain a copy of this agreement by contacting [redacted].

12.3. Invitations to participate in archaeological fieldwork must be emailed to consultation@cottfn.com. Due to technical and time constraints, archaeology requests must NOT be submitted to the NationsConnect portal. Proponents may submit a copy of archaeology-related documents to an existing project in the NationsConnect portal for record-keeping, as long as the documents are first submitted via email.

12.4. Given the time required to complete the agreement, archaeology requests should be submitted at least two weeks prior to the proposed commencement of fieldwork. Once an agreement is in place, the Consultation Unit requires fieldwork notification at least 48 hours prior to the scheduled start time. If insufficient time is given, COTTFN expects the Proponent/Consultant to reschedule the fieldwork to allow for COTTFN's participation.

12.5. COTTFN requests the opportunity to review draft Archaeological Assessments prior to final submission to the Ontario government, whether the Nation was able to send AFLs to the site or not. The Consultation Unit typically requires one month to review and respond to Archaeological Assessments.

12.6. Proponents and consultants should refer to the AFL agreement for comprehensive terms.

13. Evaluation of Activity and Scope of Consultation

13.1. Upon receiving the Notice, Deshkan Ziibiing will undertake an assessment of the Activity and categorize it as follows:

> ***Minimal* impact**, (a routine or low risk Activity that is unlikely to substantively impact the Aboriginal or Treaty rights and claims of Deshkan Ziibiing, for instance: road repair and resurfacing)
> ***Moderate* impact** (e.g. aggregate pits)
> ***Extensive* impact** (e.g. nuclear energy waste storage facilities, alternative energy

developments, oil and gas pipelines or facilities, and landfills)

13.2. Minimal Impact Consultation

a) The Proponent registers through the NationsConnect portal and submits the required information about the Project to the Consultation Department.
b) The Consultation Department responds within 45 days.
c) The Consultation Department requests to send Archaeological Field Liaisons to any archaeological fieldwork occurring from Stages 2-4, at the expense of the Proponent.
d) The Consultation Department screens the proposal and logs details.
e) Generally, for minimal impact activities, status reports will be requested from the Proponent.
f) Processing/Consultation Service fees will apply.

13.3. Moderate Impact Consultation

a) The Proponent registers through the NationsConnect portal and submits the required information about the Project to the Consultation Department.
b) The Consultation Department responds within 45 days.
c) The Consultation Department requests to send Archaeological Field Liaisons to any archaeological fieldwork occurring from Stages 2-4, at the expense of the Proponent.
d) The Consultation Department screens the proposal and logs details.
e) Within 60 days, and following an internal review of the Activity, the Consultation Department will communicate the results of its assessment of the Activity and its requirements for next steps based on its assessment.
f) The party may be invited to meet with the Lands & Environment department and may be asked to provide additional information to determine the extent of concern.
g) Where appropriate, a consultation plan will be developed.
h) Processing/Consultation Service fees will apply.

13.4. Extensive Impact Consultation

a) The Proponent registers through the NationsConnect portal and submits the required information about the Project to the Consultation Department.
b) The Consultation Department responds within 45 days.
c) The Consultation Department requests to send Archaeological Field Liaisons to any archaeological fieldwork occurring from Stages 2-4, at the expense of the Proponent.
d) The Consultation Department screens the proposal and logs details.
e) Processing/Consultation Service fees will apply.
f) Within 60 days, and following an internal review of the Activity, the Consultation Coordinator will communicate the results of its assessment of the Activity and its requirements for next steps based on its assessment.
g) For all Extensive Impact Activities, the Proponent will be required to engage in developing a consultation framework together with Deshkan Ziibiing.
h) In this event, Deshkan Ziibiing expects that within 30 days following the notice that a consultation framework is required, a meeting will occur between the Crown, Deshkan Ziibiing, and the Proponent to discuss:
    i. the Activity and the sufficiency of the information provided;
    ii. Deshkan Ziibiing's history, rights, claim, and interests that may be impacted by the Activity;
    iii. Traditional knowledge, laws, values, and stewardship obligations and how these will be considered and respected as part of the Activity design conditions or approvals;
    iv. Identification of any gaps in information and a process to address those gaps including by considering whether additional studies, environmental assessment monitoring or other studies or reports are required;
    v. The timeline for the Activity and approvals; and
    vi. The development of a workplan, schedules and associated budgets in

collaboration with the relevant Crown agency/ department and the project Proponent.

14. Workplan

14.1 The Workplan should include, but not be limited to the following:

a) Identification of significant milestones and timelines associated with achieving those milestones;
b) Funding throughout the phases of the proposed Activity to ensure and support effective, meaningful participation of Deshkan Ziibiing in the consultation process. Deshkan Ziibiing expects that reasonable costs associated with travel, hosting community engagement sessions, distributing information and providing Elder honoraria would be provided;
c) Further information required from each party and a process identified to ensure timely information exchange throughout;
d) Identification of studies, assessments, technical reviews or reports that may be required to collect additional information about potential impacts;
e) Archaeological monitoring by Deshkan Ziibiing including through the participation of the Archaeological Field Liaisons;
f) Identification of community engagement processes;
g) Mechanisms to incorporate Traditional Knowledge and ensuring same is obtained in accordance with Deshkan Ziibiing's internal protocols;
h) Identifying schedule for future meetings and objectives including work plan monitoring; and
i) Mechanisms for joint and /or independent monitoring of the Activity and its impacts.

14.2. Work plans may need to be revised as consultation proceeds and should be done collaboratively. Should Parties not be able to reach agreement following good faith discussions, the assistance of a mediator may be sought.

15. Nation to Nation Engagement.

15.1. Deshkan Ziibiing expects the Crown to respect the Nation to Nation relationship. For any Activity that has been identified as "Extensive Impact", Deshkan Ziibiing expects the Crown will participate in consultation processes, even where consultation or engagement is being undertaken primarily by a Proponent. While administrative staff will be involved, negotiations involving rights will be with the rights-holders.

16. Traditional Knowledge and Confidentiality

16.1. Deshkan Ziibiing will advise how Traditional Knowledge informs our assessment of an Activity. Deshkan Ziibiing will engage citizens, including Elders and Knowledge Keepers as appropriate in the assessment of the project. We expect the Crown and Proponents to fully respect the internal protocols we have developed regarding the gathering of information from our community members.

16.2. Traditional Knowledge and data collected through the consultation process in relation to the Activity will remain the sole property of Deshkan Ziibiing. To the extent that confidential information is shared, parties shall be required to enter into a confidentiality agreement prior to gaining access to this information.

16.3 Where Deshkan Ziibiing determines that the knowledge is of such a nature that it should not be in the public realm, the parties shall meet to discuss the concerns regarding this information and the mechanisms to protect same and thereafter, only Deshkan Ziibiing shall determine whether any part of it shall be shared.

17. Internal Community Engagement

17.1. Deshkan Ziibiing's practice of governance reflects a long history of community-based decision making. Depending upon the matter for consultation, government departments and project Proponents will need to embrace our approach to internal

community engagement and be willing to work with the processes necessary for Deshkan Ziibiing edbendaagzijig to determine their level of trust and support for the project.

18. Conditions for Providing Consent

18.1. Decisions regarding a project may be achieved in two ways. Those projects having little impact on Deshkan Ziibiing lands, air, waters, health, and wellbeing may be evaluated completely through the efforts of administrative staff, select committees of Council, and/or Chief and Council.

18.2. Those projects with significant potential to impact Deshkan Ziibiing lands, air, waters, health, and wellbeing, will require the scrutiny of the community as whole. Our traditions of governance charge our leaders with gathering and articulating the voices of the community as a whole. Thus, projects raising significant concerns for Deshkan Ziibiing edbendaagzijig will need to be accepted by the community in order for Chief and Council to speak in favour of them.

19. Ongoing Consultation

19.1. In certain cases, consultation may be required past the life of a particular Activity. Where, for instance, decommissioning or cumulative effects raise continuing or additional concerns regarding our rights and interests, we expect consultation to continue.

20. Capacity Requirements:

20.1 Deshkan Ziibiing receives many notifications regarding proposed activities daily. As the duty to consult is reciprocal, Deshkan Ziibiing is required to respond. In an effort to meet the increasing demands, Deshkan Ziibiing has acquired data management systems and employed staff in an effort to respond and handle information flow more efficiently. In order to offset the infrastructure and labour costs associated with the consultation process, Deshkan Ziibiing is required to charge processing and/or consultation service fees in accordance with the services provided.

A complete breakdown of consultation service fees for the varying levels of project impact is attached as Appendix C.

21.Deshkan Ziibiing Initiated Research

21.1 In addition to the Crown or Proponent studies, it may be necessary for Deshkan Ziibiing to supplement our understanding of the impacts. For instance, we may require additional research on the cumulative effects of an Activity or further assessments of the impacts on biodiversity, endangered species, or water quality. This may be the case where either the existing reports or assessments are deemed deficient or not objective, or where a project is especially contentious. We expect that the costs to engage in such research will be reimbursed by the Crown and Proponents.

22. Crown Delegation

22.2. Although the Crown may delegate aspects of Consultation and Accommodation to a Proponent, the Crown cannot delegate its duty to act honourably or its responsibility to ensure that consultation has been adequately and effectively carried out. In cases where a Proponent has been delegated aspects of the duty to consult, the Crown shall maintain oversight over this process and shall ensure that all Parties involved have received Notice of the Crown's intention to delegate, the scope of the delegation and the name of the designate who shall remain charged with oversight over the Crown's duty to consult.

23. Mitigation Measures and Accommodation

23.1. The protection of our inherent and Treaty rights, and the respect for our obligations to preserve the lands and waters of Deshkan Ziibiing, are matters to resolve prior to any discussion of potential benefits that might result from an Activity. Where our lands, waters, health, and wellbeing may be adversely impacted, the Activity cannot proceed without our determining in advance the nature and scope of impacts, how adverse effects will be mitigated, and how our concerns will be accommodated.

23.2. If, through consultation, it is agreed the Activity may proceed, the following represent a non-exhaustive list of measures through which Deshkan Ziibiing edbendaagzijig may embrace the legitimacy of the Activity:

a) Environmental and protection/monitoring agreements

b) Stewardship agreements

c) Co-Management or Recognition agreements respecting resources/jurisdiction

d) Impact benefits/revenue sharing/ agreements

e) Compensation

f) Equity and Partnership agreements

g) Protection of Intellectual Property and Confidentiality agreements

h) Lease/royalty/licensing agreements

i) Training/employment/education and scholarship opportunities

Deshkan Ziibiing expects the Crown to act honourably and provide assistance as requested in the consultation process including in the negotiation of accommodation measures which must be agreed to before the Activity begins.

24. Dispute Resolution Mechanisms

24.1. In the event that Parties have disagreements throughout the consultation process, Deshkan Ziibiing's expects:

a) Good faith discussions would take place between senior decision makers in an attempt to resolve the dispute.

b) In the event those efforts fail, the parties may resort to mediation where a mediator is agreed to by all Parties.

c) Where mediation fails to resolve the disagreement within 60 days, parties may resort to the appropriate court for adjudication of the issue.

d) The Crown and/or Proponent shall bear all costs of dispute resolution.

Deshkan Ziibiing expects a hold will be placed on the Activity, pending resolution of the issue in dispute.

25. APPENDICES

A. COTTFN Consultation Map

B. Consultation Flow Chart

C. Consultation Service Fees

This protocol is subject to revision and further development as determined by Chief and Council reflecting the consent of Deshkan Ziibiing edbendaagzijig.

For use with permission of Deshkan Ziibiing/Chippewas of the Thames.

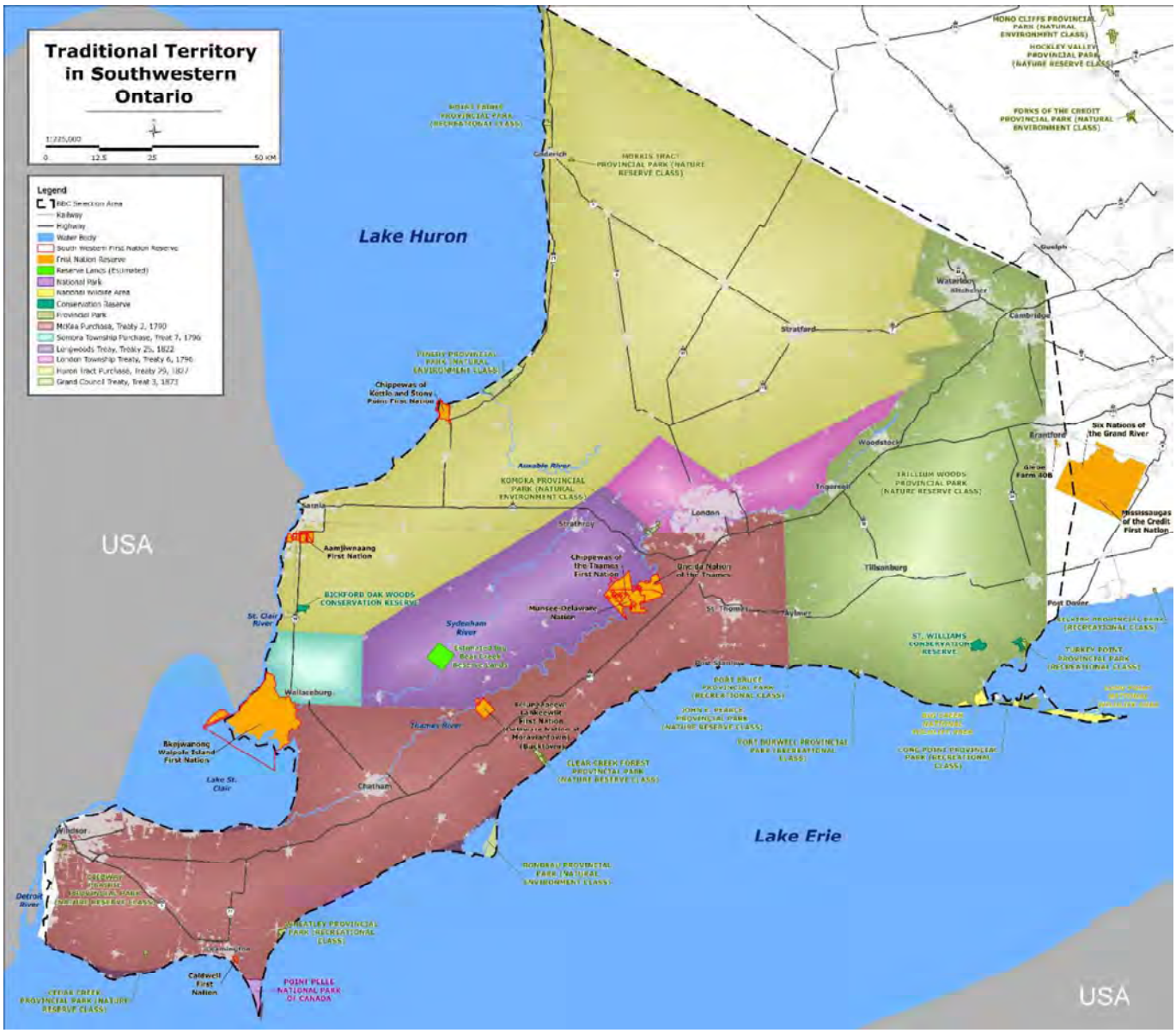
APPENDIX "A"

COTTFN Consultation Map

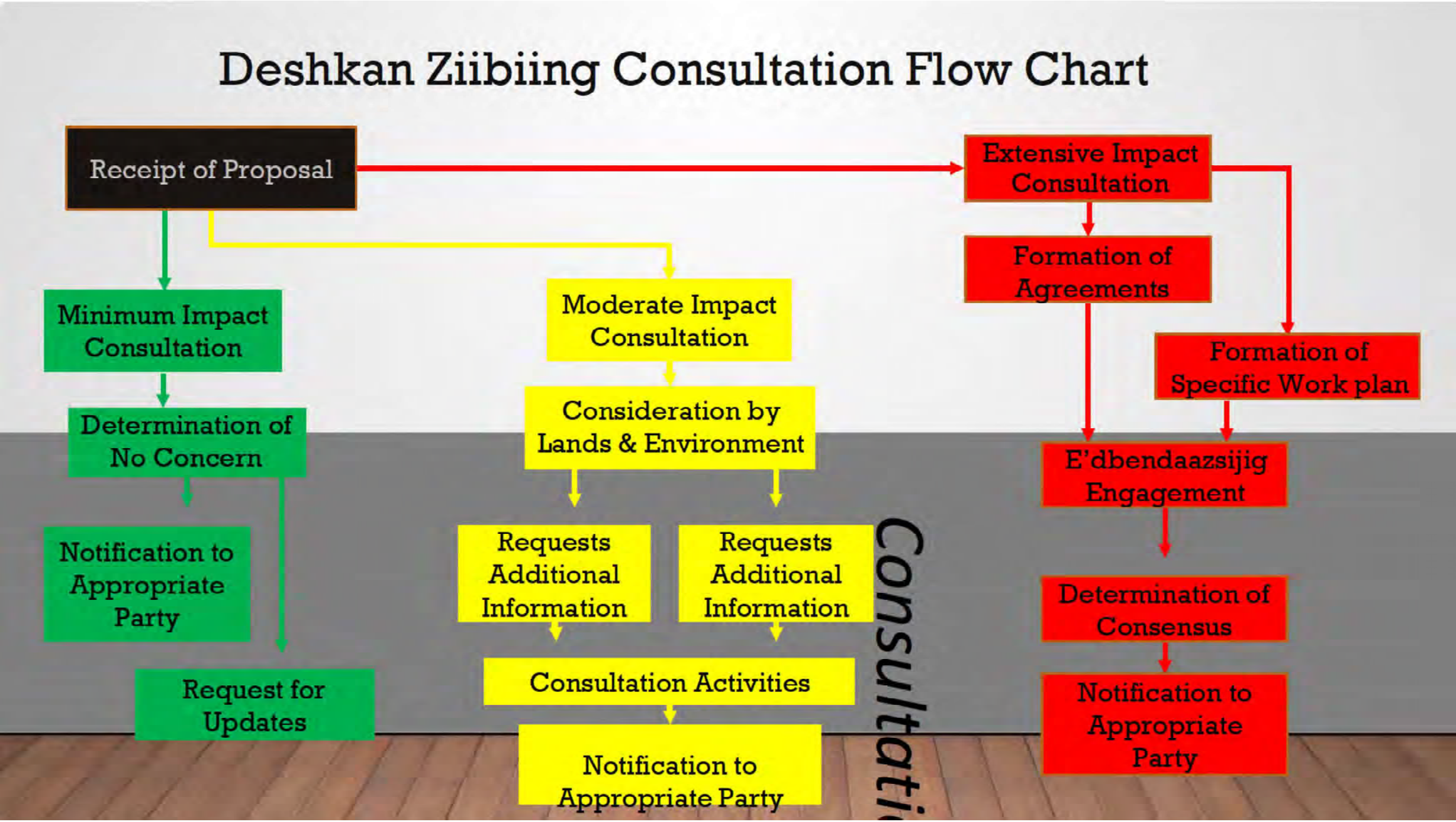
As recognized in these treaties, the ancestral lands of Deshkan Ziibiing includes all the lands and waters between Lake Huron to the north and Lake Erie to the south and stretching eastward from the eastern banks of the St. Clair and Detroit rivers to the Mississaugas of New Credit 1792 treaty lands (see Appendix A for Consultation map). In addition, Deshkan Ziibiing's territory extends into what are now the American states of Michigan and Ohio. Historically, Deshkan Ziibiing managed portions of our territory in common with other Anishinaabe nations, and at times in partnership with the Haudenosaunee. However, the lands bordering the northern bank of the Thames River have been solely in the stewardship and possession of Deshkan Ziibiing since before the treaty era.

NOTE – COTTFN engages in consultation in the area within the dotted black line (see map on next page). The boundary line for Big Bear Creek Land Selection Area is an approximation, not the exact outline. The Consultation Map is not a comprehensive or definitive outline of the Nation's Traditional Territory. It is used for consultation purposes.

Consultation Map



Deshkan Ziibiing Consultation Flow Chart



Appendix C – Consultation Service Fees

As a department within COTTFN's Administration, Treaties, Lands & Environment is task with carrying out the administrative aspects of Consultation for the Nation. The Nation responds to requests for engagement under the Duty to Consult to protect its rights an interests. The Consultation Unit receives minimal government funding that has not kept with the scale of activities occurring within the Nation's Treaty and Traditional Territory Nations should not bear the financial burden of consultation, as affirmed in case law.[2] F reason, the Consultation Unit operates on the principle of cost recovery, whereby prop are invoiced for the time and effort involved in engaging on the project. The payment o does not fulfill the Duty to Consult.

COTTFN has developed three levels of response based on the impacts of the project, wh in turn based on several factors that the First Nation has developed to ensure appropria identification and response required on behalf of the Nation.

By identifying various response levels to project proponents, the First Nation is better a plan for the resourcing that each project requires and to communicate to project propo the supports or resourcing that may be required for more complex, high impact project

The rates listed below are subject to change.

Colour Coded Ranking of Projects

Definition	Colour
Level 1: Minimal Impact	Costs Associated-Standard
Level 2: Moderate Impact	Costs Associated-Standard
Level 3: Extensive Impact	Costs Associated-Standard

[2] For example, Saugeen First Nation v. Ontario (MNRF), 2017 ONSC 3456

Consultation Service Fees, EMS-CA-Rc-03

LIST OF STANDARD RATES

ITEM	DESCRIPTION OF ACTIVITY	RATE
Filing fee	Fee charged to accept a project for processing and filing retention. Multiple sites for the same project may be submitted as one project with one filing.	$500 per project
COTTFN staff time (excluding members of COTTFN Senior Management)	Hourly rate for technical services, including assessing project risks, issuing correspondence, meeting with proponents, preparing briefings for Chief and Council, etc.	$200/hour
TLE Director or another member of COTTFN Senior Management (excluding Executive Administrator)	Hourly rate for project review or meeting attendance.	$250/hour
Executive Administrator	Hourly rate for project review or meeting attendance.	$300/hour
Introductory meeting	Flat rate for an introductory meeting for a new project, up to 2 hours in length. The standard staff time rate applies for subsequent meetings and correspondence.	$500 per meeting
Treaties, Lands and Environment Committee	Reviews projects that have been submitted by the Treaties, Lands and Environment Department and approves recommendations by staff and/or provides further direction on the project.	$500 per meeting
COTTFN Council meeting	Reviews projects, deliberates, and provides overall direction to Department.	$1000 per meeting
Councillor	Attendance by a member of Council on a project-related committee	$250 per meeting (subject to change without notice per Council's honorarium policy)
Travel	For proponent meetings, open houses, site visits.	0.58 per km (subject to change without notice based on CRA quarterly rates)
Community engagement costs	Venue rental, catering costs, Elder honoraria, door prizes, etc.	Varies by item At cost
Administration Charge	Charge that contributes to central mail, phone and internet service, as well as financial services (e.g. payroll, accounts payable and receivable).	15% applied to sub-total

LEVEL 1-ENGAGEMENT EXAMPLE

ENGAGEMENT, CONSULTATION AND ACCOMMODATION					
Level 1					
Project Notice					
Minimal Impact					
Task/Persons Involved	**Activity**	**Daily**	**Hourly**	**Units Estimated**	
Filing Fee	Fee charged to accept a document for processing and filing retention.	$ 500.00		1	$ 500.00
Introductory Meeting	Introductory meeting for new project, up to 2 hours.	$ 500.00		1	$ 500.00
Senior Environment Officer	Environmental review for impacts to traditional territory and based on First Nation concerns, such as, but not limited to: noise, air, waste, contaminants, discharges, greenhouse gases, permitting required, cumulative effects. Development of Recommendations and support to the COTTFN Environment Committee.		$ 200.00	2	$ 400.00
Consultation Coordinator	Receipt of Information, Risk Identification, Internal Notification of Projects, Entry into Database, Issuing Correspondence, Maintenance of filing system, Library Services. Report production for the COTTFN Environment Committee and administrative support.		$ 200.00	4	$ 800.00
				SUB-TOTAL	$ 2200.00
ADMINISTRATION CHARGE 15%	Central Mail, Financial Services: payroll, reimbursement procedures, accounts payable and receivable, production of financial statements, year-end audit. Photocopying, phone and internet service.			**15%**	$ 330.00
				TOTAL:	**$ 2530.00**

***These prices are effective June 12, 2023.*

LEVEL 2-CONSULTATION EXAMPLE

ENGAGEMENT, CONSULTATION AND ACCOMMODATION					
Level 2					
Project Notice					
Moderate Impact					
	Activity	**Daily**	**Hourly**	**Units Estimated**	**Projected Cost**
Filing Fee	Fee charged to accept a document for processing and filing retention.	$ 500.00		1	$ 500.00
Introductory meeting	Introductory meeting for new project, up to 2 hours.	$ 500.00		1	$ 500.00
Director	Review, attending meetings and providing high level direction to staff on the First Nation's response.		$ 250.00	1	$ 250.00
Senior Environment Officer	Environmental review for impacts to traditional territory and based on First Nation concerns, such as, but not limited to: noise, air, waste, contaminants, discharges, greenhouse gases, permitting required, cumulative effects.		$ 200.00	4	$ 800.00
Consultation Coordinator	Receipt of Information, Risk Identification, Internal Notification of Projects, Entry into Database, Issuing Correspondence, Maintenance of filing system, Library Services, Report production for the COTTFN Environment Committee and administrative support.		$ 200.00	5	$ 1000.00
Events Coordinator	Development of internal community consultation communication website and social media update, and event planning		$ 200.00	5	$ 1000.00
Treaty Research	Identification of project in relation to traditional territory, Treaty areas, unceded areas, historical occupation.		$ 200.00	1	$ 200.00
COTTFN Environmental Committee	Reviews projects that have been submitted by the Treaty, Lands and Environment Department and approves recommendations by staff, and/or provides further direction on the project.	$ 500.00		1	$ 500.00
COTTFN Band Council	Reviews projects, deliberates, and provides overall direction to Treaty, Lands & Environment	$ 1000.00		1	$ 1000.00
				SUB-TOTAL	**$ 5750.00**
ADMINISTRATION CHARGE 15%	Central Mail, Financial Services: payroll, reimbursement procedures, accounts payable and receivable, production of financial statements, year-end audit. Photocopying, phone and internet service.			**15%**	$ 862.50
TRAVEL	For proponent meetings, workshops, open houses, public meetings.			**0.58 / km**	TBD
				GRAND TOTAL:	**$ 6612.50**

***These prices are effective June 12, 2023.*

**This does not include all engagement costs, such as venue rentals or Elder honoraria.*

**These prices do not include any archaeological monitoring costs.*

LEVEL 3- HIGH IMPACT EXAMPLE

ENGAGEMENT, CONSULTATION AND ACCOMMODATION					
Level 3					
Negotiations and/or Hearings					
Extensive Impact					
Tasks/Persons Involved	**Activity**	**Daily**	**Hourly**	**Units Estimated**	**Projected Cost**
Filing Fee	Fee charged to accept a document for processing and filing retention.	$ 500.00		1	$ 500.00
Introductory meeting	Introductory meeting for new project, up to 2 hours.	$ 500.00		1	$ 500.00
Director	Reviewing, attending meetings, and providing high level direction to staff on the First Nation's response.		$ 250.00	2	$ 500.00
Senior Environment Officer	Environmental review for impacts to traditional territory and based on First Nation concerns, such as, but not limited to: noise, air, waste, contaminants, discharges, greenhouse gases, permitting required, cumulative effects. Development of Recommendations and support to the COTTFN Environment Committee.		$ 200.00	6	$ 1200.00
Consultation Coordinator	Receipt of Information, Risk Identification, Internal Notification of Projects, Entry into Database, Issuing Correspondence, Maintenance of filing system, Library Services. Report production for the COTTFN Environment Committee and administrative support.*		$ 200.00	10	$ 2000.00
Events Coordinator	Development of internal community consultation communication website and social media update, and event planning		$ 200.00	5	$ 1000.00
Treaty Research	Identification of project in relation to traditional territory, Treaty areas, unceded areas, historical occupation		$ 200.00	1	$ 200.00
COTTFN Environmental Committee	Reviews projects that have been submitted by the Treaty, Lands and Environment Department and approves recommendations by staff; and/or provides further direction on the project.	$ 500.00		2	$ 1000.00
COTTFN Band Council	Reviews projects, deliberates, and provides overall direction to Treaty, Lands & Environment	$ 1000.00		2	$ 2000.00
Executive Administrator	Reviewing, attending meetings, and providing high level direction to staff on the First Nation's response.		$ 300.00	3	$ 900.00
				SUB-TOTAL	**$ 9800.00**
ADMINISTRATION CHARGE	Central Mail, Financial Services: payroll, reimbursement procedures, accounts payable and receivable, production of financial statements, year-end audit. Photocopying, phone and internet service.			**15%**	$ 1470.00
TRAVEL	For proponents meetings, workshops, open houses, public meetings.			**0.58 / km**	TBD
				GRAND TOTAL:	**$ 11270.00**

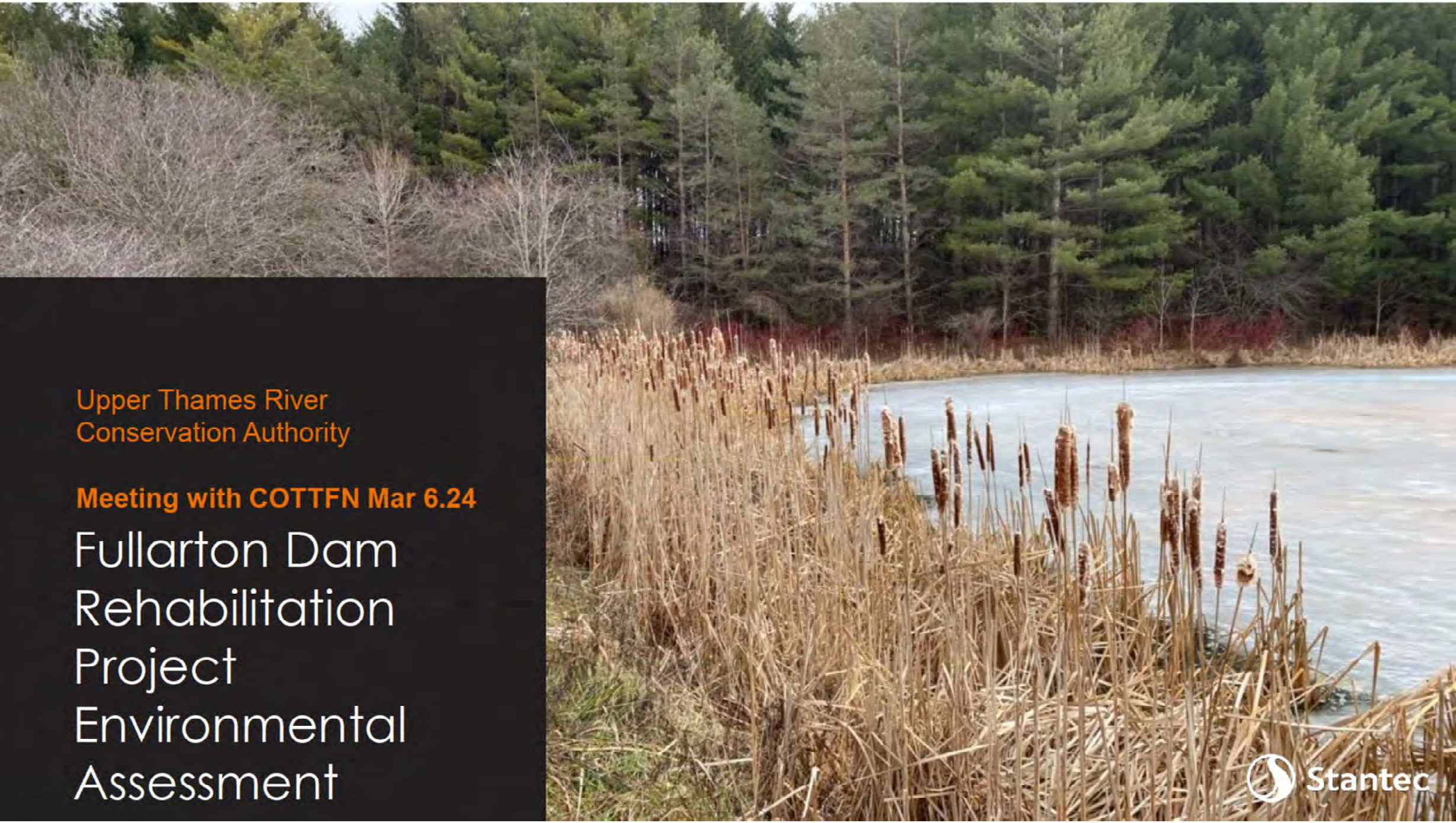
***These prices are effective June 12, 2023.*

**This does not include all engagement costs, such as venue rentals or Elder honoraria.*

*These prices do not include any archaeological monitoring costs.

Fee Schedule Revision History

Revision Number	Date	Description of Changes	Requested By
N/A	3-Dec-13	Design of form	M. Alikakos
1	13-Jan-14	Edition of linked worksheets and COTTFN Band Council rates	M. Alikakos
2	02-Apr-16	Formatted, changed processing fee dates	M. Alikakos
3	14-Jul-16	Name change, removal of flow chart, removal of levels of concern.	F. Burch
4	29-Nov-18	Added filing fee and increased staff fees	F. Burch
5	12-June-23	Increased fees, unified staff hourly rate	F. Burch



Upper Thames River
Conservation Authority

Meeting with COTTFN Mar 6.24

Fullarton Dam Rehabilitation Project Environmental Assessment

Stantec



Agenda

1. Study Area
2. Alignment of Priorities
3. Purpose of Meeting
4. Class EA Process
5. Problem / Solutions
6. Evaluation Criteria
7. Alternative Solutions
8. Evaluation of Alternatives
9. Recommended Solutions

Study Area

Project Location

The Fullarton Dam and reservoir are located at the Fullarton Conservation Area in the Municipality of West Perth, Ontario.

Environmental Assessment

Class Environmental Assessment for Remedial Flood and Erosion Control Projects (the Class EA) is being prepared to support long-term planning of the Fullarton Dam.



Source: Google Maps, 2024

Thames River Watershed & Traditional Territory

- Upper Thames River Watershed is located within the Traditional territory of the Attawandaron, Anishinaabeg, Haudenosaunee, and Lunaapeewak peoples

- 8 First Nations whose traditional territory overlaps with the Upper Thames River Watershed, including Chippewas of the Thames First Nation

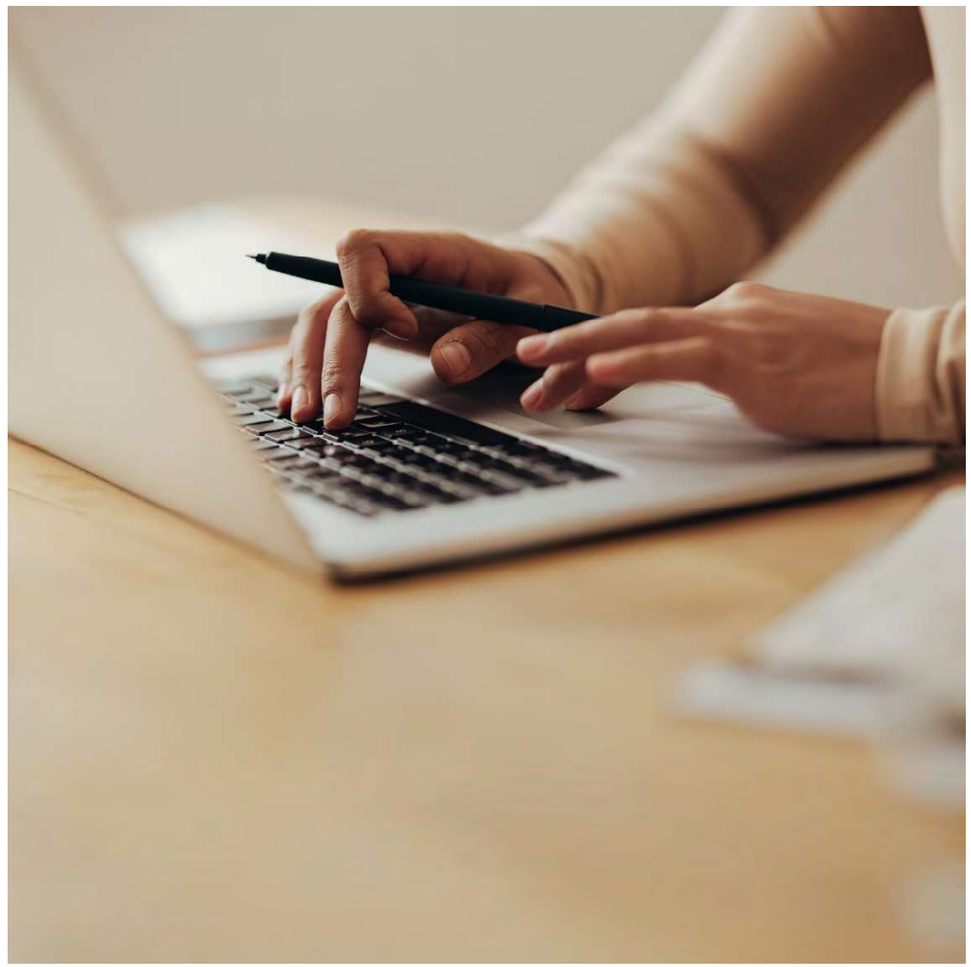
- Fullarton Conservation Area is located on the North Thames River, which feeds into Fanshawe Lake and the Thames River



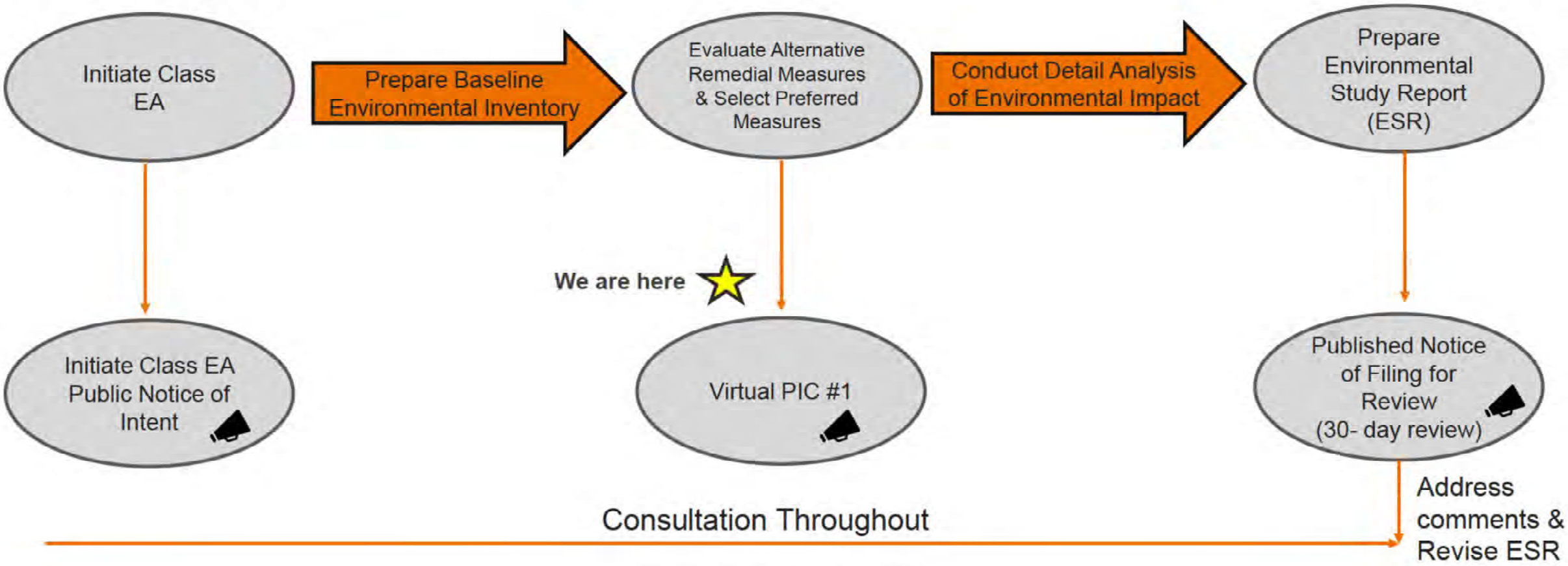
What is the purpose of this meeting?

To present and gather your input on the:

- Study background & purpose
- Existing and future dam needs
- Problem and opportunities
- Existing environmental conditions
- Evaluation of Alternative Solutions
- Recommended Solution
- Potential impacts to the environment and proposed mitigation measures
- Next Steps in the process



Conservation Ontario Class Environmental Assessment for Remedial Flood and Erosion Control Projects



Site Background

The Upper Thames River Conservation Authority (UTRCA) operates the Fullarton Dam. The dam is an earth dam that was constructed in the 1950's and is in the Fullarton Conservation Area.

In 2007, UTRCA completed a Dam Safety Assessment that identified the need to undertake improvements to the dam structure to meet appropriate safety and stability standards.







Problem Statement

EA Category

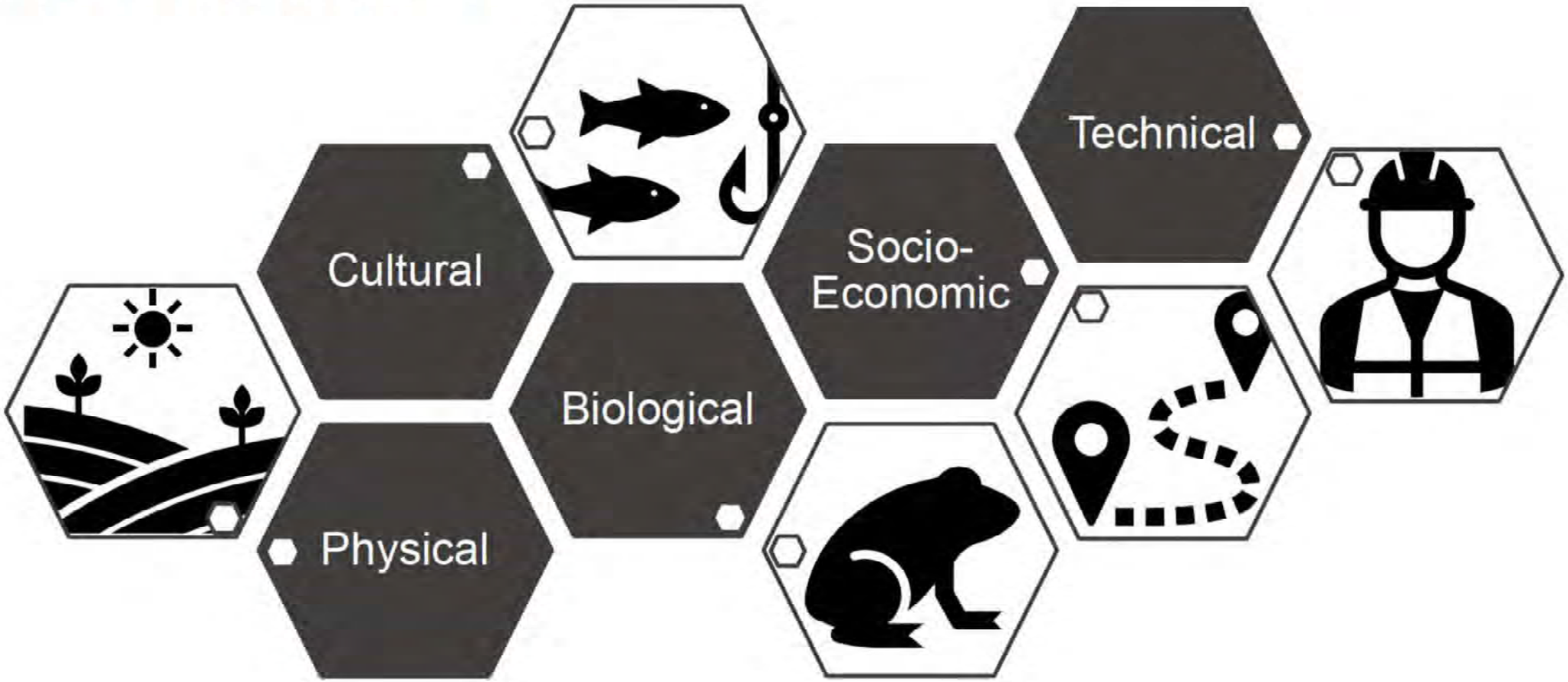
Riverine Flooding

The purpose of this EA is to identify alternatives that address the dam safety deficiencies. The preferred management strategy for the dam will be selected based on natural environment considerations and the social uses associated with the dam, reservoir and rest of the Fullarton Conservation Area.

Potential Solutions

- Riverine flooding and dam safety issues can be mitigated by:
  - Dam Decommissioning to address safety, enhance local environmental conditions, and restore stream function
  - Channel Realignment to support flow conveyance and capacity

Evaluation Criteria: What is considered during the evaluation?



Environmental Evaluation Criteria

- Fish and fish habitat
- Wildlife habitat
- Significant vegetation communities

Biological



- Unique Landforms
- Geomorphology
- Earth Science - Areas of Natural and Scientific Interest

Physical



Environmental Evaluation Criteria

- Traditional Land Uses
- Recreational Use of Existing Shoreline Access Locations (hike, fish, canoe)
- Aesthetic or Scenic Landscapes or Views
- Heritage

Cultural



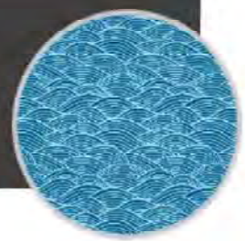
- Surrounding Neighborhood or Community (park users)
- Existing Infrastructure
- Pedestrian Traffic Routes (trail over dam)

Socioeconomic



- Rate of Erosion in Ecosystem (sediment transport)
- Flood Risk in Ecosystem
- Slope Stability (dam)

Engineering/ Technical



Alternative 1

Do Nothing: Repair existing dam and maintain reservoir at the site

- Age of dam and outlet infrastructure may present a safety risk related to leaks developing at the outlet location
- Outlet structure is not fish passable
- Thermal warming in reservoir increasing water temperature, impacting water quality
- Dam would require further assessment; maintaining dam in compliance with safety regulations would require upgrades to flow controls and safety measures



Alternative 2

Maintain Reservoir & Dam with New Fish Bypass Channel

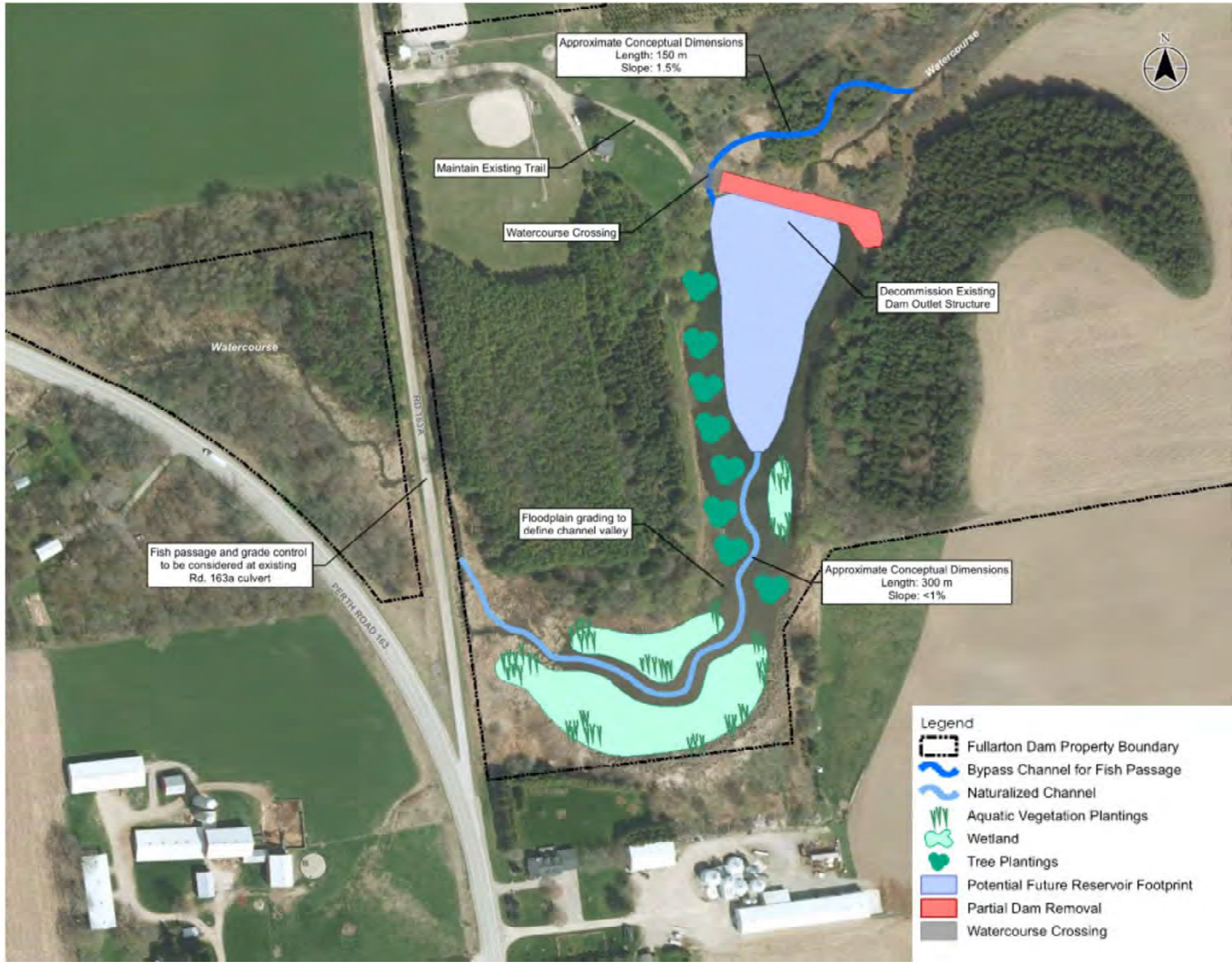
- Maintain dam, eliminate drop inlet reservoir outlet
- Construction of fish passage channel
- High flows will continue to spill over the dam
- Fish passage will increase connectivity and fish diversity
- Does not resolve risks associated with dam structure, requires ongoing maintenance and safety plans



Alternative 3

Partial Dam Removal & New Constructed Bypass Channel

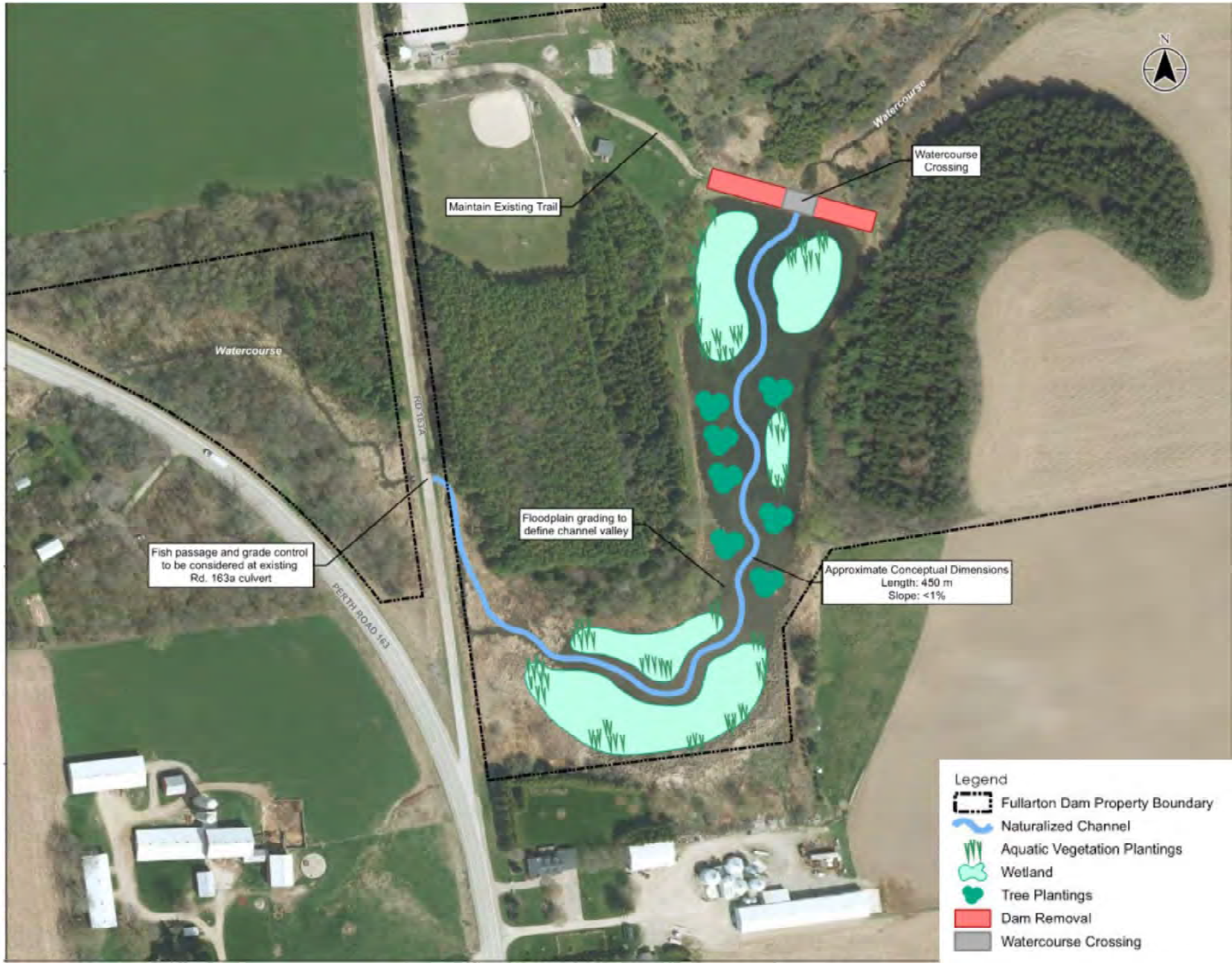
- Lower dam height to reduce reservoir water levels
- Eliminate drop inlet reservoir outlet and construct fish passage channel
- Increased terrestrial habitat upstream in former reservoir area



Alternative 4

Dam Decommissioning & Watercourse Restoration

- Eliminate dam and restore watercourse
- Create naturalized channel through former reservoir
- Wetlands will be constructed on floodplain to offset loss of reservoir habitat
- Dam safety and maintenance no longer required



Evaluation of Alternative Solutions

	Alternative 1: Maintain existing dam and reservoir at the site	Alternative 2: Maintain Reservoir & Dam with New Fish Bypass Channel	Alternative 3: Partial Dam Removal & New Constructed Bypass Channel	Alternative 4: Dam Removal & Watercourse Restoration
Physical	●	◉	◉	○
Biological	◉	◉	◉	○
Cultural	◉	◉	◉	○
Socioeconomic	◉	◉	○	○
Engineering/ Technical	●	◉	◉	○
Conclusion	Least Preferred	Somewhat Preferred	Moderately Preferred	Preferred



Recommended Solution

Alternative 4: Dam Removal and Watercourse Restoration is the preferred solution

- Addresses Riverine Flooding through Dam Decommissioning and Channel Realignment
- Enhances terrestrial and aquatic habitat
- Re-establishes natural function and appearance of the watercourse
- Creation of habitat linkages with fish passage
- Removal of thermal warming and water quality effects caused by the reservoir
- Low future ongoing dam maintenance and safety costs