Fullarton Dam Environmental Assessment - Natural Heritage Baseline Existing Conditions Report

March 16, 2023

Prepared for:
UTRCA

Prepared by:
Stantec Consulting Ltd.

Project Number:
160901056

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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 (**Figure 1, Appendix A**).

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 Neil Drain 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 Neil Drain 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.

The Neil Drain runs through the Fullarton Conservation Area and provides potential coldwater habitat (UTRCA 2017a). The dam blocks fish passage to upstream reaches of the Neil Drain. Background reporting (Howes 1967) identifies the Neil Drain as a municipal drain. Email correspondence between the UTRCA and Dietrich Engineering (March 7, 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. For the purposes of this report, the watercourse will be called the Neil Drain.

The Fullarton Dam is an earth dam that was installed on the Neil Drain 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 Neil Drain 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, Online Data and Provincial Wildlife Atlas's	• 2017 Watershed Report Card – Fullarton (UTRCA 2017a) • Report Card Watersheds Map (UTRCA 2017b) • 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)
Reports	• Fullarton Dam and Conservation Area, Existing Environmental Conditions Report (UTRCA 2017c)

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 Neil Drain upstream of the reservoir was undertaken as part of the meeting. Following the meeting, Stantec staff walked a portion of the Neil Drain 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 Neil Drain 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 Neil Drain 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 (2017c) 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 (2017c) 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 (2017c) report. The following sections provide a summary of the natural heritage features and functionsstudied 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). The watershed is known to support 48 species of fish, and 13 species of freshwater mussels (UTRCA 2017a). 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 2017a).

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). Colonial bird nesting was not documented in the UTRCA (2017c) 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 (2017c) 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 2017c). 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 2017c). 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*), 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 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 (2017c) 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 (2017c).

3.2.3 Herptiles

Six species of herptiles (reptiles and amphibians) were documented as incidental wildlife observations in the Project Location (UTRCA 2017c), including Snapping Turtle (*Chelydra serpentina*) which was observed in the reservoir (iNaturalist 2023, UTRCA 2017c). 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 2017c). 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 (2017c).

3.2.5 Insects

Seven species of butterfly were documented in the Project Location by the UTRCA (2017c), 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

Neil Drain has a permanent flow regime and has a Class D designation (MNRF 2023b). Class D drains are typed as having permanent flow, supporting fish species that spawn in fall or combination of spring/fall and supporting sensitive fish species (DFO 2017).

Fish community sampling completed by the UTRCA (2017c) documented a diverse fish community in Neil Drain, 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 ºC (Eakins 2023) indicating Neil Drain provides coolwater / coldwater conditions (UTRCA 2017c). 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 2017c), however, the reservoir creates a warming effect to Neil Drain resulting in higher average water temperatures and greater water temperature fluctuation downstream from the Fullarton Dam when compared to upstream of the dam (UTRCA 2017c). The presence of Mottled Sculpin downstream of the dam suggests that there are groundwater upwellings in Neil Drain 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 Neil Drain by the UTRCA (2017c) upstream and downstream of the Fullarton Dam. The data show that Neil Drain water temperature upstream of the dam is consistently cooler than downstream. In 2015, water temperature in Neil Drain upstream of the dam was up to 2.3ºC cooler than downstream. And in 2016, water temperature was 4 to 7ºC cooler upstream than downstream of the dam.

Benthic sampling was completed by the UTRCA (2017c) in Neil Drain 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 Neil Drain 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 Neil Drain.

The Northern Sunfish (*Lepomis peltastes*) is known to occur in Neil Drain and the Fullarton Dam reservoir (UTRCA 2017c, 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) (**Figure 1, Appendix A**). 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 (2017c) 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 (2017c) 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 Neil Drain 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 (2017c) work and provide additional information for the evalution of alternatives in the EA and to support future management recommendations.

6 References

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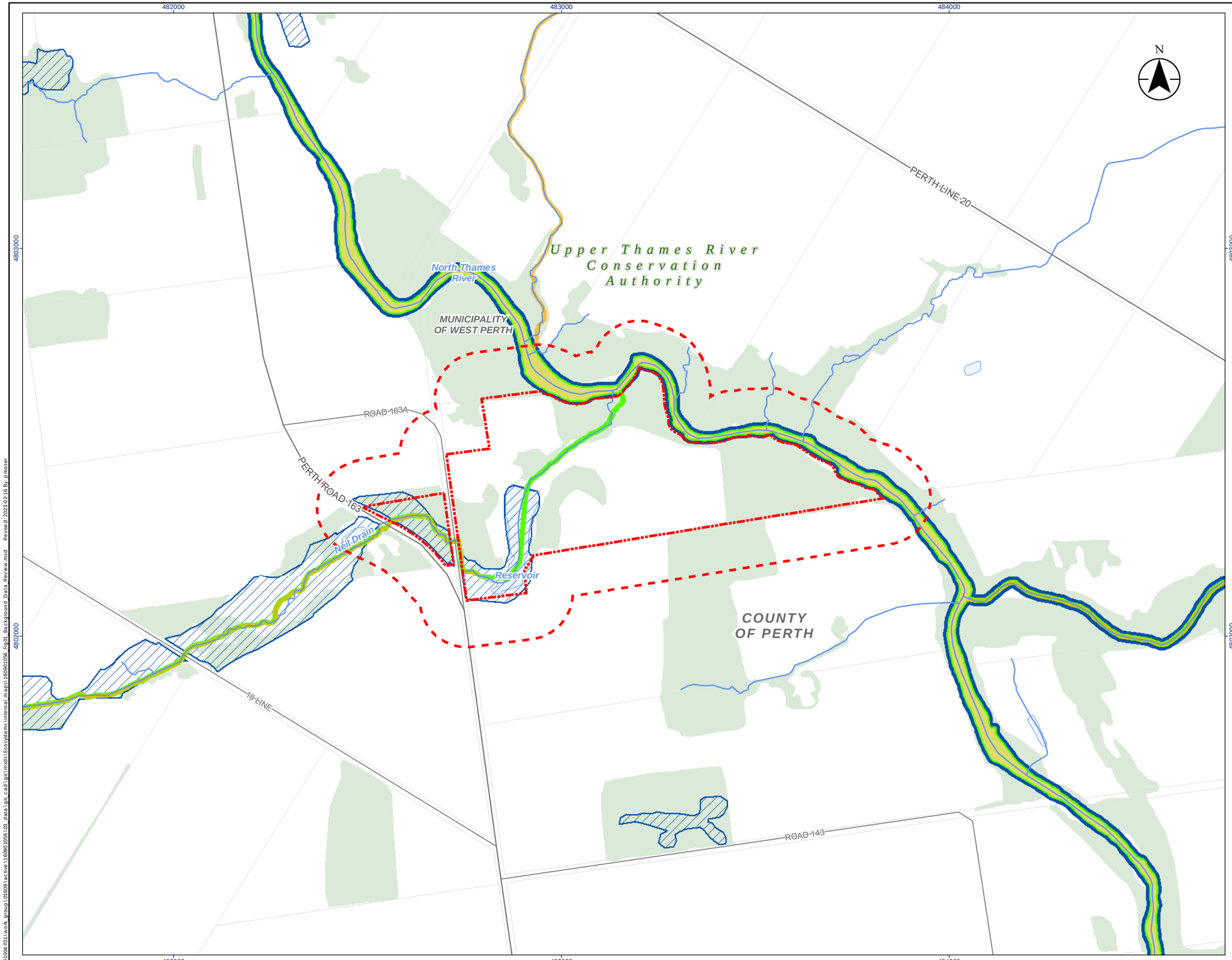
Appendices

Appendix A Figures



Stantec

Legend

- Major Road
- Minor Road
- Regulated Watercourse (UTRCA)
- Thermal Regime, Warm
- Thermal Regime, Warm
- Waterbody
- Regulated Wetland (UTRCA)
- Wooded Area
- Aquatic Species at Risk Distribution – Special Concern Species
- Aquatic Species at Risk Critical Habitat – Threatened Species
- Lot
- Municipal Boundary, Upper
- Municipal Boundary, Lower
- Conservation Area Administrative
- Fullarton Dam Property Boundary
- Study Area (120m)

0 0.6 km

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, 2019.

Project Location
County of Perth

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Prepared by PRM on 2023-02-16
Technical Review by ME on 2023-02-16

Client/Project
UPPER THAMES RIVER CONSERVATION AUTHORITY
FULLARTON DAM REHABILITATION

Figure No.
1

Title
Background Data Review

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