Appendix B
Progress Meeting Minutes

AINLEY GRAHAM & ASSOCIATES LIMITED
2724 Fenton Road, Ottawa, ON K1T 3T7
Tel: (613) 822-1052 • www.ainleygroup.com

Meeting Minutes

Project:	Township of South Glengarry Glen Walter Water Tower and Watermain Replacement
Date:	October 27, 2022
Time:	10:00 AM to 10:40 AM
Location:	Microsoft Teams
Present:	Sarah McDonald / General Manager of Infrastructure Services Dillen Seguin / Director of Water & Waste Water Zhifei Hu / Ainley - VP Mike Ainley / Ainley – Lead for Water Tower Guy Ste-Croix / Ainley PM
Distribution:	All Present

1 First Item

Mike Ainley mike.ainley@ainleygroup.com and Guy Ste-Croix guy.ste-croix@ainleygroup.com will be the primary contacts for Ainley and Sarah McDonald smcdonald@southglengarry.com and Dillen Seguin dseguin@southglengarry.com for the Township.

Action By: N/A

2 Second Item

The workplans defined in our proposal dated July 28, 2022 for Parts A (i.e., New Water Tower) and B (i.e. Existing WM Replacement, New WM to Water Tower & Pump Replacement) are still valid, no changes required at the moment.

Action By: N/A

3 Third Item

The Engineering Agreement has been signed by Ainley, awaiting the final executed copy for our files.

Action By: Sarah / Township

4 Fourth Item

All relevant documents / files (i.e., too large to email, from both parties) shall be uploaded to the South Glengarry – Water Tower 'Teams Site' created by Zhifei Hu / Ainley.

Action By: N/A

5 Fifth Item

The Township does not have their own design standards; therefore, industry standards (i.e., MECP, OPSD, etc.) will be used.

Action By: N/A

6 Sixth Item

A copy of the water model, as-built drawings, etc. shall be uploaded to the project 'Teams Site' as soon as possible.

Action By: Sarah and/or Dillen / Township

7 Seventh Item

All First Nation consultation will be coordinated by the Township. It was noted by the Township that a First Nation Consultation Team would not be required.

Action By: N/A

8 Eighth Item

The original schedule (i.e., start date) defined in our proposal dated July 28, 2022 has been delayed by approx. two months. However, a delay / shift of two months in the project schedule should not be an issue. The schedule will be continually monitored during the life of the project. We due note however that the upcoming winter season could potential affect some of the anticipated field programs such as topographic survey, etc.

Action By: N/A

9 Nineth Item

Some discussions took place regarding underground storage vs tower. It was noted by Sarah / Township that a raised water tower was defined in the Master Plan and therefore should be the direction moving forward. A further more concise review of the Master Plan to be completed.

Action By: Mike / Ainley

Any errors and/or omissions from these Minutes should be reported to the undersigned as soon as possible.

Minutes prepared by:

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Vice President & Branch Manager

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Meeting Minutes

Project:	Township of South Glengarry Glen Walter Water Tower and Watermain Replacement
Date:	January 17, 2023
Time:	10:00 AM to 11:30 AM
Location:	Microsoft Teams
Present:	Sarah McDonald / General Manager of Infrastructure Services Dillen Seguin / Director of Water & Waste Water Mike Ainley / Ainley – Lead for Water Tower Guy Ste-Croix / Ainley PM Sue Ainley / Ainley Rural Economic Development Anmar Al-Faraj / Ainley Project Engineer
Distribution:	All Present

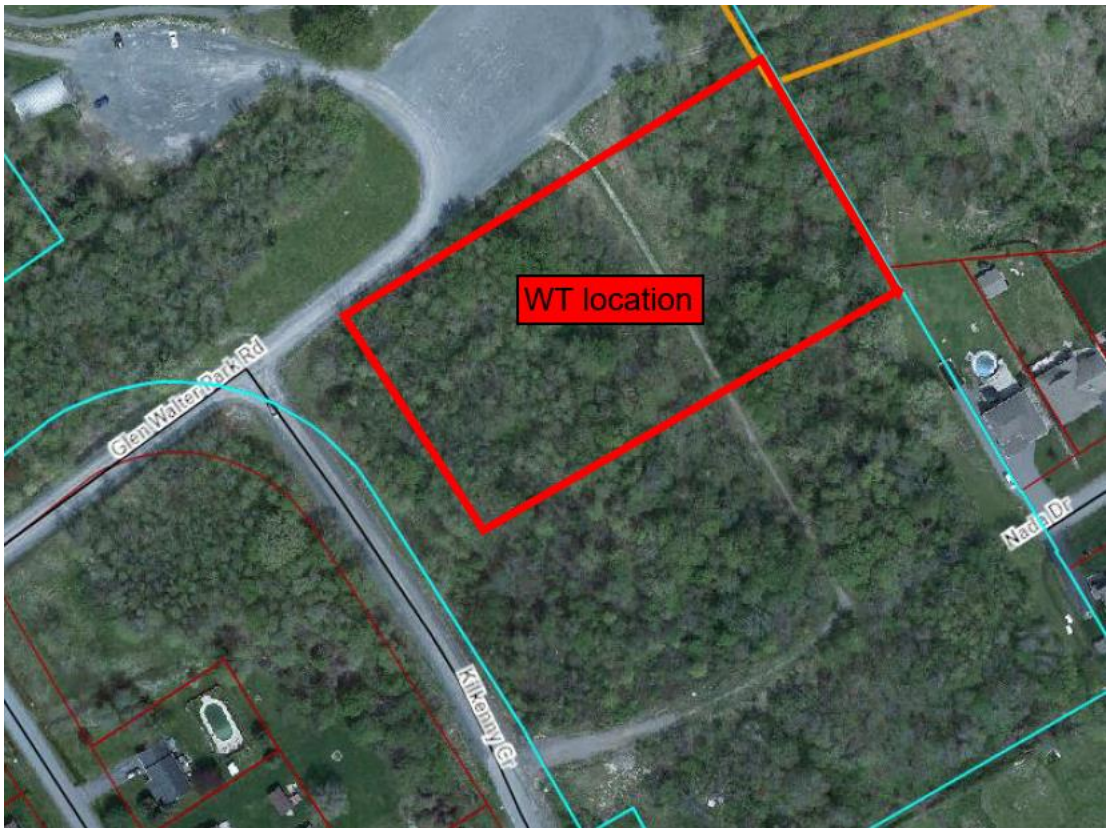
1 First Item

Mike Ainley mike.ainley@ainleygroup.com and Guy Ste-Croix guy.ste-croix@ainleygroup.com will be the primary contacts for Ainley and Sarah McDonald smcdonald@southglengarry.com and Dillen Seguin dseguin@southglengarry.com for the Township.

Action By: N/A

2 Second Item

Discussion regarding water tower location. Consensus during the meeting was reached for the general area (north) and lot size. Ainley to investigate the isolated location of the water tank so geotechnical and survey work can be coordinated.



Action By: Mike / Ainley

3 Third Item

Discussion regarding designation of land. Township confirmed they own the land and it is zoned / designated as Institutional (IN). Total area of parcel is 46.5 acres. Residential lands abut the site.

Action By: N/A

4 Fourth Item

Minimum parcel size required for the water tower is 0.5 ha (~1.25 acres).

Action By: N/A

5 Fifth Item

Discussed water tower - elevated storage types.

1. Spheroid: economical for less storage requirements. Limited suppliers in Ontario.
2. Multi-column: multiple steel legs. Not aesthetically pleasing. Require more maintenance (typically every 5-years)

3. Composite: modern. Less maintenance compared with the multi-column. 80-year projected life span.

4. Composite glass-lined: concrete piler with glass-liner tank on top. Cost competitive. Less maintenance. 60-year projected life span.

The Township suggested to eliminate the analysis for the spheroid and multi-column and focus the analysis on the composite and composite glass-lined options.

Public consultation to be conducted at early stages to avoid project delays and setbacks.

Action By: Mike / Ainley

6 Sixth Item

Discussed looping opportunities of the water network to increase efficiency. One example presented is looping Nada Drive and Kilkenny Crescent.

Action By: N/A

7 Seventh Item

350 L/day/capita AADD used in the Master Plan will be used for the existing and proposed water models.

The water model has been reviewed but no analysis has been done to date. The outcome of the model will inform pipe sizes and where the new lines will be added.

Action By: Mike / Ainley

8 Eighth Item

Discussed the water services plan and the quality of the existing drawings.

Although some areas are serviced by wells and were excluded from the Master Plan, the Township noted that the Council recommended to extending new watermains to the new subdivisions to service the future growth.

The Township noted also that the localized water service on Hwy 2 that services the cottages do not need to be replaced.

Action By: N/A

9 Nineth Item

Discussed site accessibility and tree clearing to complete the geotechnical and survey work. Once the public is consulted and the water tower location is pinned and agreed, discussion with the Township to confirm tree clearing area, geotechnical program and schedule will ensue.

Action By: Mike / Ainley & Sarah / Township

10 Tenth Item

Township noted that currently there is a high-water loss (50-60%) but they couldn't confirm the source(s).

Action By: N/A

11 Eleventh Item

Revised schedule is discussed. Schedule will be updated as necessary.

Updated Schedule:

Part A – Water Tower

- Water Tower Schedule B EA: November 2022 – March 2023
- Preliminary Design: April 2023 – May 2023
- Detailed Design (60% and 90%): June 2023 – September 2023
- Tender Ready (100%): October 2023 – November 2023
- **Project to be awarded late winter / early spring 2024, to allow construction to begin late spring / early summer 2024.**
- **Project completion – Fall 2025 (i.e. 18 months).**

Part B – Watermains and Pump Replacement

- Field Investigations and Studies: January 2023 – April 2023
- Preliminary Design: May 2023 – June 2023
- Detail Design Packages (60% and 90%): July 2023 – October 2023
- Tender Ready (100%): November 2023 – December 2023
- **Project to be awarded early spring 2024, to allow construction to begin late spring / early summer 2024.**
- **Project completion – Fall 2025 (i.e. 2 construction periods / seasons including a winter shutdown).**

Action By: N/A

12 Twelfth Item

Township to provide us with the following:

- LiDar Data if available
- Fire hydrant locations
- RP plans

Action By: Sarah / Township

Any errors and/or omissions from these Minutes should be reported to the undersigned as soon as possible.

Minutes prepared by:

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Project Engineer

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Book a meeting with me Here!

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Meeting Minutes

Project:	Township of South Glengarry Glen Walter Water Tower and Watermain Replacement
Date:	March 23, 2023
Time:	9:00 AM to 10:00 AM
Location:	Microsoft Teams
Present:	Dillen Seguin / Director of Water & Waste Water Mike Ainley / Ainley - Lead for Water Tower Guy Ste-Croix / Ainley PM Sue Ainley / Ainley - Rural Economic Development Norman Sandberg / Ainley - Water Modelling
Distribution:	All Present Sarah McDonald / General Manager of Infr. Services (absent) Anmar Al-Faraj / Ainley Project Engineer (absent)

1 First Item

Discussed status of EA report:

1) Draft report is in good shape, should be ready for the Townships review / comments at our next meeting scheduled in two weeks (April 6, 2023 at 9am).

2) Went over the new 2023 MCEA document, no changes anticipated to this project (i.e., still a Schedule B).

3) Public Information Centre (PIC)

    a. In-person or online

        i. It was noted by Dillen that an in-person PIC at the Fire Hall (near the proposed water tower location) would probably be best. To be further discussed / confirmed.

    b. PIC date still to be determined.

4) As previously discussed, it was noted by Dillen that the geotechnical investigation to comment on both foundation and dewatering requirements at the proposed water tower location shall be completed only after the PIC process has been completed due to the tree clearing requirements.

Action By: N/A

2 Second Item

Discussed potential watermain looping issues / advantages:

1) Our initial water modelling findings show that looping some of the dead end watermains would increase pressure and allow a greater capacity for fire protection without having to potentially replace / upsize the existing watermains.

2) Dillen noted that some of the proposed watermain looping (as shown on the sketch below with a solid blue line) has already been completed. Ainley will review the drawings prepared by EVB (received from Dillen by email on March 23, 2023).

3) Dillen also noted that phase 4 and 5 of the St. Laurent Development (located where we show the proposed watermain looping below) is in progress and/or has already been completed. The concept plan for phase 6 currently shows the two roads connecting.

4) A more comprehensive review / discussion of the water modelling results is anticipated at our next meeting scheduled in two weeks (April 6, 2023 at 9am).

Action By: Mike and Norman / Ainley

3 Third Item

Commenced discussion of additional studies that may and/or will be required prior to the PIC and completion of the Final Report for Project Filing:

1) Heritage Cultural and new Archaeological Screening checklist. Hopefully we determine that we do not need full studies.

2) Natural Environmental Assessment and Species-at-risk.

3) A more detailed list will be prepared for review / discussion at our next meeting scheduled in two weeks (April 6, 2023 at 9am).

Action By: Mike and Guy / Ainley

Any errors and/or omissions from these Minutes should be reported to the undersigned as soon as possible.

Minutes prepared by:

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Vice President & Branch Manager

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Meeting Minutes

Project:	Township of South Glengarry Glen Walter Water Tower and Watermain Replacement
Date:	April 6, 2023
Time:	9:00 AM to 11:30 AM
Location:	Microsoft Teams
Present:	Sarah McDonald / General Manager of infr. Services Dillen Seguin / Director of Water & Waste Water Mike Ainley / Ainley - Lead for Water Tower Sue Ainley / Ainley - Rural Economic Development Norman Sandberg / Ainley - Water Modelling Sharon Maddock / Ainley Senior Project Engineer Anmar Al-Faraj / Ainley Project Engineer
Distribution:	All Present Guy Ste-Croix / Ainley PM (absent)

1 First Item

Discussed status of EA report:

1) Presented the initial draft of the EA report, see attached. The project File Report should be ready by end of July.

2) The placeholder for the Figures in the report to be updated by Ainley.

3) Township provided the Council resolution with respect to the master servicing area accompanied with the staff report, see attached.

4) Discussed the project study area. The Township advised to not be too specific about the study area or service area, as there has been some revisiting of the service area since the Masterplan. This will be further discussed, after Ainley's internal review, with Township in the next meeting.

5) PIC tentatively scheduled on May 16th. Township to confirm the availability of the Fire Station Hall. Two sessions are proposed one in the afternoon and one in the evening.

6) Township to provide a list of the utility contacts (e.g. Bell, Rogers, Cornwall Electric) for inclusion in the stakeholder contact list, see attached.

7) Township to provide news paper contact for the PIC notice.

8) Ainley to coordinate with the Township the Notice of PIC. The Notice to be sent out 2-weeks before the PIC date. Notice to be via News Paper and the Township's Website.

9) Township indicated that they don't have approved land acknowledgment statement. Ainley to review and update PIC presentation accordingly.

10) Township to provide a photographic picture of the site looking down from the fire station. The purpose of this is for Ainley to include a representation of the water tower in the power point slides.

11) Ainley to add slide to describe the alternative water towers. Also, to add a better map of the Study Area.

12) Discussed the geotechnical scope for the water tower and indicated that Ainley has the capability and resources to complete the geotechnical work.

13) Landmark will probably be the general contract for this design-built water tower. However, the Township will confirm if their procurement policy and funding document allow for sole sourcing or if competitive bidding is required.

Action By: Ainley / SG

2 Second Item

Discussed the Archaeological Screening Potential Checklist:

1) Archaeological Screening Potential Checklist is attached.

2) Went over the checklist with the team and answered the questions collectively.

3) The Township to confirm with First Nations on some questions regarding the Archaeological Screening checklist.

4) It is anticipated that if the answer 'No' to each question in the checklist are confirmed, the screening will conclude that additional studies are not required.

Action By: Sarah / SG

3 Third Item

Discussed the Cultural Heritage Landscapes Checklist:

1) Went over the checklist (attached) with the team and answered the questions collectively.

2) The Township to confirm with First Nations and Conservations Authority on some questions regarding the Cultural Heritage checklist and get everyone onboard with the answers of this screening checklist.

3) It is anticipated that if the answer 'No' to each question in the checklist are confirmed, the screening will conclude that additional studies are not required.

4 Fourth Item

Discussed the project schedule:

1) Went over the project schedule, see attached. The EA project file report is anticipated to be completed and submitted to the Ministry by end of July. Total design is anticipated to take 3 months while 18 months is the anticipated period for construction.

2) Cultural Heritage and new Archaeological Screening checklist to be completed within the next three weeks.

3) We have healthy allowance to go to competitive bidding.

4) There is around 10 months of grace period between project completion and until the funding expires on October 2026.

5) A more detailed list will be prepared for review / discussion at our next meeting that will be scheduled tentatively in three weeks (April 25, 2023 at 9am).

Action By: Mike and Guy / Ainley

Any errors and/or omissions from these Minutes should be reported to the undersigned as soon as possible.

Minutes prepared by:

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Meeting Minutes

Project:	Township of South Glengarry Glen Walter Water Tower and Watermain Replacement
Date:	April 25, 2023
Time:	9:00 AM to 11:00 AM
Location:	Microsoft Teams
Present:	Sarah McDonald / General Manager of infr. Services Dillen Seguin / Director of Water & Waste Water Mike Ainley / Ainley - Lead for Water Tower Guy Ste-Croix / Ainley PM Sue Ainley / Ainley - Rural Economic Development Norman Sandberg / Ainley - Water Modelling Sharon Maddock / Ainley Senior Project Engineer Anmar Al-Faraj / Ainley Project Engineer
Distribution:	All Present

1 First Item

Discussed progress on PIC presentation and public notices:

1) Township confirmed venue (Fire Station Hall), date (May 16, 2023) and time (Hall is booked for the whole day).

2) May 1st, 2023 is the deadline to send notice to news papers.

    a. Ainley to send draft notices to Town for review.

    b. Township to provide feedback / comments before Friday 28th, 2023 preferably to finalize letters.

    c. Township to handle sending the letters / notice to the new papers contacts for publishing.

3) Indigenous letter is revised with Lachlan McDonald as the Mayor and Kelli Campeau and the Acting Chief Administrative Officer.

4) Ainley to send PIC presentation to Township. Township to review the PIC presentation and provide feedback / comments on the Evaluation criteria table (e.g. Aesthetics, Access to Storage, etc.).

5) Township to confirm if specific address was designated in Masterplan or any other correspondence regarding the exact location of the water tower.

6) Township to provide a list of the utility contacts (e.g. Bell, Rogers, Cornwall Electric) for inclusion in the stakeholder contact list, see attached.

7) Township to identify and send out notifications to affected residents using their electronic distribution system.

8) Township to provide a photographic picture of the site looking down from the fire station. The purpose of this is for Ainley to include a representation of the water tower in the power point slides.

Action By: Ainley / SG

2 Second Item

Discussed potential required environmental studies:

1) Ainley to review and provide proposals / quotes for the environmental studies required (e.g. Archaeological, Heritage studies, etc.).

    a. It was noted that these studies are not required to be completed before the scheduled PIC but are required to fulfill the MCEA requirements.

Action By: Ainley

3 Third Item

Discussed the Geotechnical scope:

1) Ainley to review and provide proposal for the geotechnical scope of work.

Action By: Ainley

4 Fourth Item

Discussed progress on water model:

1) Township to provide the Technical Memorandum No. 1 noted in EVB report page 10, section 5.2 “Growth Potential within Areas”, first sentence, “As identified in the Technical Memorandum No. 1, where plans of subdivision exist for proposed subdivisions, the number of units were based on the plans and population estimates were based on 3.5 persons per lot.”

2) The minimum water system operating pressure is updated to 140 kPa from 138 kPa to ensure alignment with MOE guidelines.

3) Discussed potential looping to enhance water quality / aging and fire supply requirements.

4) The model to be further reviewed / discussed.

Action By: SG

Any errors and/or omissions from these Minutes should be reported to the undersigned as soon as possible.

Minutes prepared by:

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Meeting Minutes

Project:	Township of South Glengarry Glen Walter Water Tower and Watermain Replacement
Date:	June 15, 2023
Time:	10:30 AM to 11:30 AM
Location:	Microsoft Teams
Present:	Sarah McDonald / General Manager of infr. Services Dillen Seguin / Director of Water & Waste Water Mike Ainley / Ainley - Lead for Water Tower Guy Ste-Croix / Ainley PM Sue Ainley / Ainley - Rural Economic Development Norman Sandberg / Ainley - Water Modelling (**absent**) Sharon Maddock / Ainley Senior Project Engineer Anmar Al-Faraj / Ainley Project Engineer
Distribution:	All Present + Norman Sandberg

1 First Item

Discussed outcomes of the PIC:

1) General questions received from the public. The community is supportive of this project.

2) Ainley to follow up with Jon Orpana from the MECP office in Kingston regarding some aspects to the Master Plan and additional studies. Mike to follow up with Ron.

Action By: Ainley

2 Second Item

Discussed Natural Heritage Assessment Study:

1) Report should be completed by mid-end July 2023.

2) Five butternut and one butternut hybrid tree were observed on the property. Butternut Health Assessment (BHA) was completed to determine the trees are retainable or non-retainable. Initial review indicates the trees are in poor health and will be non-retainable. There is a 30-day window once the BHA report is submitted to the MECP for them to audit.

3) Small wetland (approx. 8x15m) was identified on the property. Ainley to reach out to the Conservation Authority to determine the applicable regulation (i.e. applicable setbacks, etc.)

4) Birds and vegetation survey was completed. Trees were identified suggesting that the subject property may provide day roosting for bats. As such, vegetation removal is to be completed outside of the active season for bats (April 15 – September 30).

5) No SAR turtle habitat was observed on the subject property

6) No grassland bird habitat was observed on the subject property.

Action By: Ainley

3 Third Item

Discussed the Archaeology Study:

1) Based on the location of the project area it has been deemed that stage 2 archaeological study will be required. In effort to reduce costs and complete the study as efficiently as possible, the study is proposed to be completed as a combined stage 1 and stage 2 archaeological study.

2) Ainley provided the Township with a fee proposal to complete the archaeological study for their review and approval.

Action By: Ainley

4 Fourth Item

Discussed the Geotechnical Field Program / Tree Clearing:

1) The Township will handle tree clearing activities.

2) As the vegetation clearing is restricted between April 15 – September 30 as described in Item 2d above, tree clearing might be considered in two stages; stage 1 is to clear a path for the boring machinery so we are able to complete the required geotechnical investigation for the proposed water tower and stage 2 to clear the subject area outside the tree clearing restriction window.

3) Ainley to review and provide proposal for the geotechnical scope of work. It is noted that the turnaround time for the geotechnical work is 10-12 weeks from confirmation to proceed.

Action By: Ainley / SG

5 Fifth Item

Discussed Sole Sourcing / Competitive Bidding of Water Tower:

1) Ainley to reach out to other contractors who have completed similar projects for other municipalities and inquire how the work was contracted (open bidding vs pre-qualification)

2) Township to reach out to other municipalities who have completed similar projects and inquire how the work was tendered (sole sourcing vs open bid).

Action By: Ainley / SG

6 Sixth Item

Discussed progress on water model:

1) Water model scenario to fill the water tower from Cornwall will be assessed.

2) Township to provide water lift pump as-built drawings to Ainley.

Action By: Ainley / SG

7 Seventh Item

Discussed project schedule:

ID	Task Name	Duration	Start	Finish
1	**Part A - Water Tower**	**915 days**	**Thu 22-10-27**	**Wed 26-04-29**
2	Water Tower Schedule B EA	240 days	Thu 22-10-27	Wed 23-09-27
3	Preliminary Design	165 days	Thu 23-03-02	Wed 23-10-18
4	Preselect Design Build Contractor	60 days	Thu 23-07-27	Wed 23-10-18
5	Detailed Design (60% and 90%)	90 days	Thu 23-10-19	Wed 24-02-21
6	Construction Ready (100%)	45 days	Thu 24-02-22	Wed 24-04-24
7	Start of Construction	0 days	Wed 24-05-01	Wed 24-05-01
8	Construction	520 days	Thu 24-05-02	Wed 26-04-29
9	Project Completion (Substantial)	0 days	Wed 26-04-29	Wed 26-04-29

Action By: n/a

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Minutes prepared by:

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Meeting Minutes

Project:	Township of South Glengarry Glen Walter Water Tower and Watermain Replacement
Date:	August 1, 2023
Time:	1:00 PM to 2:00 PM
Location:	Microsoft Teams
Present:	Sarah McDonald / General Manager of infr. Services Dillen Seguin / Director of Water & Waste Water Mike Ainley / Ainley - Lead for Water Tower Guy Ste-Croix / Ainley PM Sue Ainley / Ainley - Rural Economic Development Norman Sandberg / Ainley - Water Modelling Sharon Maddock / Ainley Senior Project Engineer Anmar Al-Faraj / Ainley Project Engineer
Distribution:	All Present

1 First Item

Discussed water tower location:

1) The NHS identified a butternut tree (species at risk) in the same vicinity of the proposed water tower.

    a. Discussed options to remove the tree and plant new ones elsewhere if applicable.

    b. Discussed options to move the water tower south outside the 50m setback from the butternut tree.

        i. Township indicated that it is preferred to keep the tower where it is originally planned to be.

    c. Further discussion, after this meeting, between Guy, Anmar and the environmental engineer indicated that there is a workaround to plant other trees in lieu of retaining the existing tree located in the same area as the tower. To be further discussed / investigated.

2) Report should be completed by August 2023.

Action By: Ainley

2 Second Item

Discussed the possibility of an interim geotechnical field program to get a feel of the soils in the area. Possible test pits in the middle of the existing trail. Ainley to investigate and advise.

Action By: Ainley

3 Third Item

Discussed the Water modelling:

1) Township confirmed that the level of fire safety to the Islamic Center is a municipal decision.

2) Township confirmed that the fire flow requirements to the Islamic Center will be supplied through pumper trucks, directly from the St. Lawrence River. Thus, the Township will stick to the 1,500 cu.m Water Tower.

3) Water supply to the Tower from Cornwall or WTP is discussed. No further updates from the Township regarding either supply.

4) Watermain / water modelling to be finalized.

5) Ainley provided the Township with a fee proposal to complete the archaeological study for their review and approval.

Action By: Ainley

4 Fourth Item

Discussed the Tendering:

1) There seems to be consensus for the project to follow competitive tendering process (i.e. open bidding).

Action By: n/a

5 Fifth Item

Discussed Landmark / Water Tower Elements / Cost / Etc.:

1) Discussed two types of water towers, their relative cost.

2) Composite tank is safer against wind / seismic forces. It has 80 years of service life.

3) Discussed stairs versus ladder options, advantages and disadvantages for each, and cost difference.

4) Discussed optional systems that might be required like mixing system, re-chlorination system, ice protection system.

5) It was mentioned that the single most important variable that usually impacts the cost is the geotechnical studies and the soils conditions.

Action By: n/a

Any errors and/or omissions from these Minutes should be reported to the undersigned as soon as possible.

Minutes prepared by:

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Meeting Minutes

Project:	Township of South Glengarry Glen Walter Water Tower and Watermain Replacement
Date:	October 10, 2023
Time:	9:30 AM to 10:30 AM
Location:	Microsoft Teams
Present:	Sarah McDonald / General Manager of infr. Services Dillen Seguin / Director of Water & Waste Water Mike Ainley / Ainley - Lead for Water Tower Guy Ste-Croix / Ainley PM Sue Ainley / Ainley - Rural Economic Development Norman Sandberg / Ainley - Water Modelling Anmar Al-Faraj / Ainley Project Engineer
Distribution:	All Present Sharon Maddock / Ainley Senior Project Engineer (Absent)

1 First Item

Discussed water tower location:

1) Confirmed water tower site area is where it was shown on the PIC presentation.

Action By: n/a

2 Second Item

Discussed Natural Heritage Report:

1) Ainley to circulate draft report this week for Township review.

2) Butternut tree hybridity test results is still pending. Ainley to circulate once available.

3) Butternut health assessment was submitted to MECP on September 21, 2023. This means that any tree clearing for geotech could technically begin after October 21. A notice of activity should be filed prior to those works taking place.

4) Township to be on standby to complete tree clearing once Ainley sets a WT site plan.

Action By: Ainley/Guy

3 Third Item

Discussed Stage 1 & 2 Archeological Assessment Report:

5) Ainley to follow up on report status. Final report in anticipated next week.

Action By: Ainley/Guy

4 Fourth Item

Discussed the Water modelling:

1) Modelling is completed. Ainley to finalize the result and the technical memo

Action By: Ainley/Norman

5 Fifth Item

Discussed Geotechnical memo / desktop review:

1) Township provide the geotechnical report completed for Glen Walter Fire Hall.

2) Ainley to circulate a geotechnical desktop review memo once available.

3) Discussion about full geotechnical program or the need of an interim geotechnical investigation that might be needed to be included in the Project File Report

Action By: Ainley/Guy

6 Sixth Item

Discussed Project File Report

1) Project File Report submission is anticipated by end of November 2023.

Action By: n/a

7 Seventh Item

Discussed Landmark Schedule:

2) Landmark is preparing a schedule. Schedule will be circulated once made available to Ainley

Action By: Ainley/Mike

Any errors and/or omissions from these Minutes should be reported to the undersigned as soon as possible.

Minutes prepared by:

Anmar Al-Faraj, P.Eng., PMP
Project Engineer

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Email: anmar.al-faraj@ainleygroup.com

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Meeting Minutes

Project:	Township of South Glengarry Glen Walter Water Tower and Watermain Replacement
Date:	December 05, 2023
Time:	9:30 AM to 10:30 AM
Location:	Microsoft Teams
Present:	Sarah McDonald / General Manager of infr. Services Dillen Seguin / Director of Water & Waste Water Mike Ainley / Ainley - Lead for Water Tower Guy Ste-Croix / Ainley PM Sharon Maddock / Ainley Senior Project Engineer Sue Ainley / Ainley - Rural Economic Development Norman Sandberg / Ainley - Water Modelling Anmar Al-Faraj / Ainley Project Engineer
Distribution:	All Present

1 First Item

Discussed Project File Report:

1) Publishing the project file report is aimed in late January.
2) All the studies that needed to be completed are completed (desktop geotechnical, natural environment, archaeological and heritage checklists).
3) Waiting to finalize the technical memo.
4) Appendices to be assembled and finalized.

Action By: Ainley

2 Second Item

Discussed Technical Memorandum re Water Modelling:

1) Modelling to be further reviewed.
2) Water looping at the subdivisions that are being built will be put on the developer.

3) Water supply and redundancy to water tower from both streets (Lana and Kilkenny). Water main supply to the tower may need to be constructed prior to water tower construction.

4) Water supply source will be either from the water treatment plant expansion or from Cornwall.

Action By: Ainley/Norman

3 Third Item

Discussed First Nation Consultation:

1) Acknowledgement from First Nation is required before publishing the final project report.

2) Township to follow up with First Nation to obtain their acknowledgement / response.

Action By: SG/Sarah

4 Fourth Item

Discussed the Legal Survey:

1) Legal surveyor is needed to confirm the existing property line and establish new bars and control points that will be used for the duration of construction. This will aid in staking out the borehole location with confidence.

2) Township to provide Ainley with most recent survey plan for the site.

3) Township to provide Ainley with contact information of local OLS surveyor

4) Ainley to prepare terms of reference for the legal survey work and obtain quote(s) from local surveyors

Action By: SG/Sarah
Action By: Ainley/Guy

5 Fifth Item

Discussed Landmark Schedule:

1) Final / up-to-date budget and schedule needed from landmark. The budget we have is missing few line items.

Action By: Ainley/Sharon

Any errors and/or omissions from these Minutes should be reported to the undersigned as soon as possible.

Minutes prepared by:

Anmar Al-Faraj, P.Eng., PMP
Project Engineer

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Appendix C

Hydraulic Model Analysis

Glen Walter Water Distribution System Hydraulic Model Update Technical Memo
(Ainley Group March 2024)

Glen Walter Water Distribution System Hydraulic Model Update

Technical Memo

Prepared For:

Township of South Glengarry

APRIL 2024

CREATING QUALITY SOLUTIONS TOGETHER

Ainley GROUP

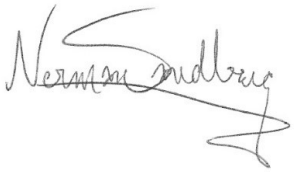
GLEN WALTER WATER DISTRIBUTION SYSTEM - HYDRAULIC MODEL UPDATE
TECHNICAL MEMO

PROJECT NO. 122083

Prepared For:

Township of South Glengarry

By:



Norman Sandberg, CET
Executive Technologist

Checked By:

Mike Ainley, P.Eng., PMP
Vice President, Corporate Affairs

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DOCUMENT QUALITY REVIEW RECORD

Project Name: Glen Walter Water Tower & Watermain Replacement **Project No.:** 122083

Client: Township of Glengarry

Document Title: Glen Walter Water Distribution System Hydraulic Model Update – Technical Memo

Review Stage: Notice of Filing of PFR

VERIFICATION & APPROVAL

Rev.	Prepared By (Name / Affiliation)	Date	Revision (Name / Affiliation)	Date
	Norman Sandberg, CET (Ainley Group)	24-Mar-2024	Mike Ainley, P.Eng., PMP (Ainley Group)	10-Apr-2024

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

Table of Contents

Table of Figures

Table of Tables

1 Introduction

The Township of South Glengarry (Township) is undertaking a Schedule "C" Municipal Class Environmental Assessment (MCEA) to determine a preferred solution for the Glen Walter WTP expansion. In parallel to the WTP Expansion Schedule "C" MCEA, the Township applied for and received funding in May 2022 under the Green Stream of the Investing in Canada Infrastructure Program to support the implementation of the following water assets as a part of the recommendation in the Master Plan:

- Rehabilitate Glen Walter's Water Treatment Plant reservoir with a new and elevated 640 m^3 water storage tank with new pumps
- Replace 4,000 metres of Glen Walter's existing watermains with new 300 mm PVC pipes

The completion of this project will address critical health and safety issues and increase the access of potable water to the community.

Under the Green Stream of the Investing in Canada Infrastructure Program, the engineering design of the above scope of work should start by September 01, 2022 and the infrastructure should be in service by September 2026. The Township retained Ainley Group Inc. (Ainley) to provide engineering services for the above funded water assets.

Based on the Masterplan (2022) and the funded water assets, the Township and Ainley reviewed the detailed scope of work to complete engineering design for the funded water assets. Because the construction skills of a water tower are different from watermain replacement, it was recommended that two separate tendering packages be prepared, including:

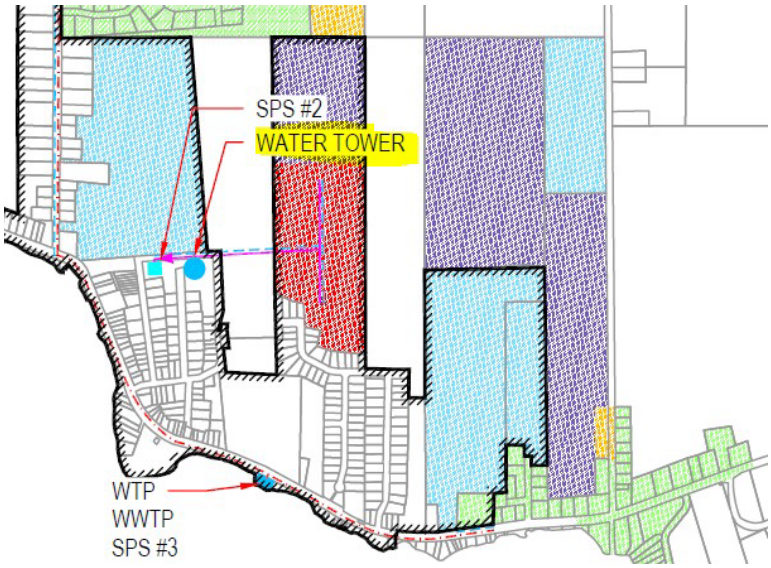
- Part A: A New Water Tower
- Part B: Existing Watermain Replacement + (Potentially) New Watermain to Water Tower and Pump Replacement

The Master Plan (2022) included an "all-pipe" hydraulic network water model using the program WaterGEMS by BentleyTM, an industry standard software modelling program, to represent the existing Glen Walter water distribution system and water demands. The model was constructed in 2018 and calibrated by WSP Canada Inc (WSP) using GIS data and other water servicing infrastructure and planning information provided by the Township. Based on the projected future flow demands and fire flow requirements, a combination of pumping and storage is recommended in the Masterplan (2022) to adequately supply the system during maximum day demand and fire flow conditions.

Although the Masterplan (2022) identified a general area for the new water storage tank (Figure 1), it did not:

- Finalize the height of the new water storage facility,
- Indicate if the proposed storage facility can be filled by a branch from the existing (or upgraded) distribution system,
- Recommend a pipe route to convey the treated flow into the new storage tank nor
- Quantify the new pumping capacity requirements.

Figure 1: Masterplan (2022) Recommended General Area for the Water Storage Tank



2 Background Information

2.1 Existing Water System

The existing Glen Walter water distribution system (2023) comprises approximately 9,866 m of watermain, including:

Table 1: Summary of Existing Watermains

Diameter	Material	Length (m)
50	HDPE	366
75	HDPE	468
100	PVC	180
150	PVC	3,972
200	PVC	2,906
250	PVC	1,556
300	HDPE	428*

* Includes 390m of water plant intake pipe.

The existing Water Treatment Plant (WTP) is, located at 18352 County Road 2 in the Township of South Glengarry, is a package direct filtration plant. It was constructed in 1988 with a rated capacity of 995 m^3/d (Ontario Drinking Water License #185-102). It has 623m^3 of a total clear well storage comprising the north cell and the south cell. Of this volume, 230m^3 is usable as Emergency Storage.

There are two high lift vertical turbine pumps (one duty and one standby) located at the Treatment Building, each with a design capacity of 16.44 L/s at 52.27m of head. Under normal operating conditions only one pump operates at a time. As such, the firm pumping capacity of the facility is 16.44 L/s (1,420 m^3/d). The lead pump is chosen by the operator.

Note that the firm pumping capacity exceeds the permitted treatment capacity by:

$$1{,}420\ m^3/d\ -995\ m^3/d\ =\ 425\ m^3/d\ (4.92\ Lps)$$

As such, at maximum pumping rate, the usable emergency storage would be depleted within:

$$Emergency\ storage\ (m^3)\ /\ Max.pump\ rate\ (m^3/d)\ =\ 230\ m^3\ /\ 425\ m^3/d\ =\ 0.54\ days\ =\ 13\ hrs$$

The water distribution system and the Water Treatment Plant are owned, operated and maintained by the Township of South Glengarry.

2.2 Existing Water and Wastewater Servicing Master Plan

The Township of South Glengarry (Township) had retained the services of WSP Canada Inc. (WSP) to undertake a Water and Wastewater Master Servicing Plan for the Glen Walter Area. WSP prepared a draft document in September 2018, including a comprehensive computer hydraulic model of the existing and proposed future water distribution system, including a proposed elevated water tank. Prior to initiating the public consultation process, the Township retained EVB Engineering to review the recommendations and complete the environmental assessment process in accordance with the Municipal Engineers Association Publication Municipal Class Environmental Assessment. Although EVB Engineering's evaluation and recommendations differ from those made in the WSP report, many of the sections and supporting studies in WSP's report remain relevant. EVB also relied upon the WSB computer hydraulic water model. The EVB Master Servicing Plan, published in 2022, and relevant sections from WSP's report are referenced in this document.

2.3 Existing Water Model

The existing water model was constructed using WaterGEMS software and calibrated by WSP in 2018, existing input data (diameter and node elevations) were cross-checked against the as Constructed drawings provided by the Township.

Some minor piping corrections were made to this model. These are primarily in the waterfront areas where some 50mm and 75mm HDPE piping servicing shoreline properties had been identified as 150mm diameter PVC pipe. This does not affect the supply of water to these areas under any design demand condition except Fire Flow. Fire Flow is available, however, within 100m of these areas from hydrants on larger diameter mains along Highway 2.

Furthermore, the existing model was reviewed in the context of standard modelling assumptions and practice, in particular the distribution of recorded demand data (assigned on a per node basis based upon demand per contributing lots) and model calibration based upon field test results. We are in general agreement with the assumptions and practices undertaken with the construction of the reference hydraulic model.

For the Ainley assignment, the Township had identified some minor recent extensions to the water distribution system to be added to the 2018 WSP WaterGEMS model. Specifically:

- St Laurent Blvd East– Phase 4 – Approx. 245m of 150mm dia. PVC DR18 watermain
- St Laurent Blvd West– Phase 5 – Approx. 234m of 150mm dia. PVC DR18 watermain
- Glen Walter Park Road, Bray St to Approx. 50m east of Kilkenny Crescent – Approx. 206m of 150mm dia. PVC watermain

- Lawrence St, Glen Walter Park Road to Approx. 77m south - Approx. 77m of 150mm dia. PVC watermain
- Kilkenny Crescent, Glen Walter Park Road to Approx. 155m south - Approx. 155m of 150mm dia. PVC watermain

3 Future Service Area

The EVB Report identified several servicing options for future service areas. Of those considered, Option 2B was recommended. The preferred option for the provision of water and wastewater servicing within the Study area is:

Option 2B: Expansion of the Municipal Services Boundaries

"This option includes ensuring that there is capacity in the municipal water and wastewater systems to support growth within the following areas: infill within the Glen Walter Core and Farlinger Point (Area A), Place St. Laurent (Area D), and Country Club Estates (Area E). In addition, development will be permitted in areas K and U (refer to Figure 6). The development of these areas is expected to increase the service population within the municipal serviced area from just under 1,000 persons (2021) to just under 3,000 persons (2051).

The infrastructure required to implement this servicing plan includes:

- Expansion of the Glen Walter Water Treatment Plant from 995 m^3/d to 2,300 m^3/d;
- Construction of a new Glen Walter Wastewater Treatment Plant increasing the capacity from 787 m^3/d to 1,900 m^3/d;
- Construction of a 1,500 m^3 elevated water storage tower;
- Replacement of some areas of the water distribution system to ensure that peak flows and fire flows can be conveyed through the system"

In accordance with Council Resolution 383-2022 (December 05, 2022)) the Township directed Ainley to expand the water service area to include area "A", Area "B", Area "C1", Area "D4" and "D5", Area "K" and Area "U".

Figure 2: Calculation of MDDs for Future Development Areas

122083 - Glen Walter Elevated Tank Design

Designed by: Andrew Buckley - 2023-05-15

Checked by: Norman Sandberg - 2023-06-26

Time-Area Method

Area Name	Area Type	Area (ha)	Lots/ha	# of Lots	Person/lot	# of People	Avg. Flow (l/cap/day)	Avg. Flow (l/day)	Max. Day Factor	Max. Flow (l/day)	Max Flow (l/s)	Node in Water Model
U	Low Density	11.40	5.8	66	3.5	231	350	80997	2	161994	1.87493056	N-42
D4 & D5	Low Density	5.43	5.8	31	3.5	110	350	38580	2	77160	0.89305903	J-21
K	Low Density	12.10	5.8	70	3.5	246	350	85971	2	171941	1.99005787	J-92

Notes:

1 Density assumption based on the EVB Servicing Plan. Determined area using South Glengarry Township GIS (https://sdgcounties.maps.arcgis.com/apps/MapSeries/index.html?appid=a6e909191556430f958db4b315046591)

2 Determined area using South Glengarry Township GIS (https://sdgcounties.maps.arcgis.com/apps/MapSeries/index.html?appid=a6e909191556430f958db4b315046591)

3 Per Lot Calculation

(Assumed 350 L/d/person water usage)

ADD (demand | MDD (max. demand per unit) (l/s/unit)

0.014178241 0.028356 0.0283565

Considering the above population and demand, the updated Option 2B servicing population is as follows:

Figure 3: Tank Design Calculations Based on Future MDDs

Additional Service Areas											
Development Areas - Opiton 2B		Description	Status	Area (Ha)	Lots per Ha	No of Lots	People per Lot	Demand L/cap/d	ADD (m3/d)	MDD (ADD*2)	Population
Existing Glen Walter Core		Serviced	Existing			440				897	963
		Serviced	Unconnected			73	3.5	350	89	149	255.5
Area "A"	Farlinger Point	Water Service Only	Existing			36	3.5	350	44	88	126
Area "B"	Sutherland Sub-division	Private Services	Existing			60	3.5	350	74	147	210
Area "C1"	Saphire Hill	Private Services	Existing			192	3.5	350	235	470	672
Area "D"	Place St. Laurent	Serviced	Phase 1			15	3.5	350	18	37	53
		Serviced	Phase 2			14	3.5	350	17	34	49
Areas "D4" & "D5"		Serviced		5.43	5.8	31	3.5	350	39	77	110
Area "E"	Country Club Estates	Serviced	Undeveloped			42	3.5	350	51	103	147
Area K"	Area K	Unserviced	Undeveloped	12.1	5.8	70	3.5	350	86	172	246
Area "U"	Area U	Unserviced	Undeveloped	11.4	5.8	66	3.5	350	81	162	231
			Total			1039				2337	3062

From EVB Report: Fire Storage = 792 m^3

A = Fire Flow 111 L/s for 2 hours (Pop 3062) 799 m^3

If Fire Storage = 792 m^3 for 2 hours

B = Equalisation 25% MDD (25% x 1926 m^3) 584 m^3

Then, Fire Flow = Fire Storage(m^3)/2 hours/(3600 secs/hr/1000 L/m^3)

A+B = Emergency=25% of A+B (25% x (742+481)) 346 m^3

= 799/2/3.6

Total Storage 1729 m^3

= 111.0 L/s

Population for FF of 111 L/s = 3,062 (MECP Design Guidelines)

Total Storage from EVB Report for Option 2B = 1710 m^3

4 Future Water Supply Source

The existing Glen Walter Water Treatment Plant has a firm pumping capacity of 16.44 L/s and a maximum treatment capacity of 995 m^3/d. The WSB Report recommends a future expansion of the WTP to 2,300 m^3/d. The expansion of the exiting WTP or a new WTP at a different location is the subject of a Municipal Class Environmental Assessment currently being undertaken by others. As such, it is not addressed in this report. Nonetheless, the computer modeling undertaken for this report considers capacity for providing future demands from the location of the existing WTP and, alternatively, a new supply from the City of Cornwall.

5 Location of Proposed Elevated Water Storage Tank

The EVB Report identified a preliminary general location for the proposed elevated water tank in the vicinity of Glen Walter Park Road east of Lawrence Street. This was based upon the computer hydraulic modelling work undertaken by WSB. The specific location was to be determined by others at a later date.

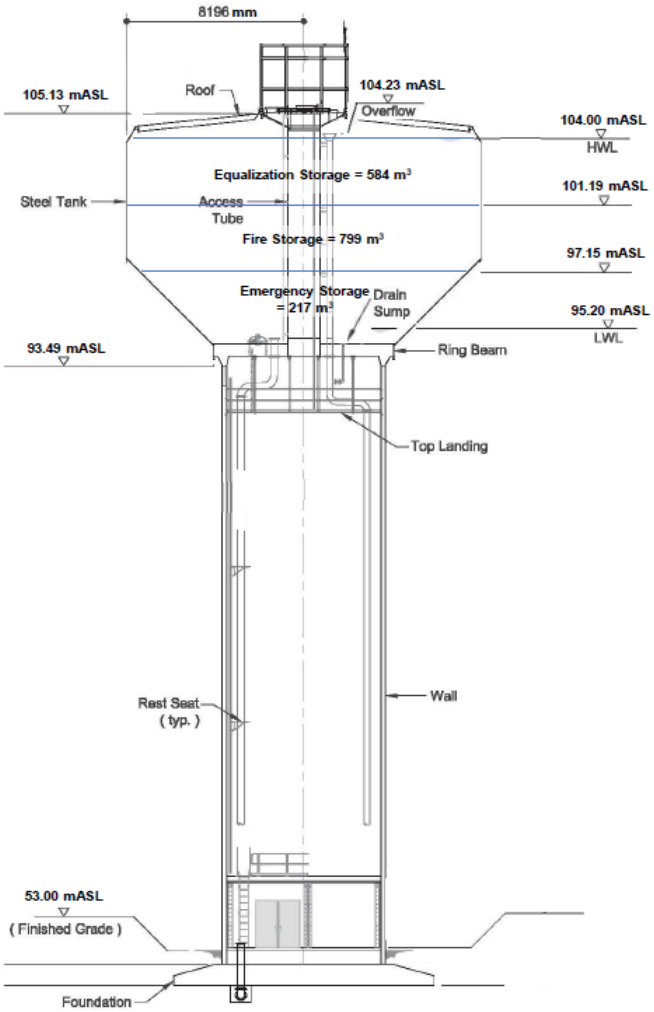
As part of its work, Ainley was directed to locate the proposed elevated water tank on municipally owned greenfield property immediately south of Glen Walter Park Road east of Lawrence Street (see Figure 4). This location is consistent with the general location identified in the WSB and EVB reports. The existing site topography varies from approximately 52.0 – 54.0 m.a.s.l. For the purpose of the Ainley assignment, a base of tank pedestal elevation is assumed to be 53.0 m.a.s.l.

Figure 4: Location of Proposed Elevated Water Tank

6 Conceptual Pre-Design of Elevated Water Tank

The total future storage requirement of 1,729 m^3 identified in Section 3.0 is consistent though marginally greater than the 1,710 m^3 identified in the EVB Report. As identified in the EVB Report, there is available storage of 230 m^3 at the existing water treatment plant. As such, the required additional elevated storage is 1,729 m^3 – 230 m^3 = 1,500 m^3. In speaking with Landmark Structures, an elevated water storage tank manufacturer, it is apparent that a 1,600 m^3 elevated tank is more standard than a 1,500 m^3 elevated tank. As such, it is more economical to construct. Based upon a typical 1,600 m^3 elevated tank design, the following dimensions and water elevations have been determined through the updated computer modelling undertaken as part of the Ainley assignment, see Figure 5.

Figure 5: Pre-Design Drawing of Elevated Water Tank



7 Updated Water Model – Proposed Elevated Water Tank

As discussed in Section 2.3, the existing water model was constructed using WaterGEMS software and calibrated by WSP in 2018, existing input data (diameter and node elevations) were cross-checked against the as Constructed drawings provided by the Township. As part of this assignment, the existing water model was updated using WaterGEMS software. The update included the final proposed elevated water tank site identified by the Township, the final planning horizon service area identified by the Township and two potential water supply scenarios, also identified by the Township.

7.1 Existing (2023) System – Existing Water Treatment Plant

This section discusses the results of the hydraulic analysis of the various design conditions discussed in Section 2.1. The MECP Design Guidelines recommend that, under normal operating conditions, the "*system should be designed to maintain a minimum pressure of 140 kPa at ground level at all points in the distribution system under maximum day demand plus fire flow conditions. pressures should be between 350 and 480 kPa. And not less than 275 kPa. Pressures outside of this range may be dictated by distribution size and/or topography.*"

The MECP Design Guidelines further state that, "*the maximum pressures in the distribution system should not exceed 700kPa to avoid damage within the serviced building due to the installation of equipment or appurtenances (water meters, backflow preventers, etc.)*". Note that the Ontario Building Code recommends maximum distribution system pressures of 550 kPa to avoid damage within the serviced buildings.

Under this scenario, the following system improvements were identified to achieve MECP Design Guideline recommendations (see Table 2):

- Proposed 1,600 m^3 elevated water storage tank with a High-Water Level of 104 m.a.s.l. located on south side of Glen Walter Park Road east of Lawrence Street,
- The existing flow control valve at the water treatment plant set to 11.52 L/s to match the rated capacity of the WTP.

Table 2: Improvements Identified to the Existing System

Street	From	To	Diameter (mm)	Length (m)	Phasing
Lana Dr.	Existing 250mm stub	Glen Walter Park Rd, 104m east of Kilkenny Cres.	250	211	Immediate
Lana Dr.	Page Dr	Riverview Dr.	Twin existing 150mm or replace with 250mm	126	Immediate
Lana Dr	Riverview Dr	Existing 250mm on Lana Dr.	Twin existing 150mm or replace with 250mm	236	Immediate
Glen Walter Park Rd.*	County Road 2	Bray St	Twin existing 150mm or	147	Future

Street	From	To	Diameter (mm)	Length (m)	Phasing
			replace with 250mm		
Bray St.*	Glen Walter Park Rd	Glen Walter Park Rd	Twin existing 150mm or replace with 250mm	26	Future
Glen Walter Park Rd*	Bray St.	Lawrence St	Twin existing 150mm or replace with 250mm	122	Future
Glen Walter Park Rd*	Lawrence St	Kilkenny Cres	Twin existing 150mm or replace with 250mm	111	Future
Glen Walter Park Rd	Kilkenny Cres	104m east of Kilkenny Cres	Twin existing 150mm or replace with 250mm	104	Immediate
Glen Walter Park Rd	104m east of Kilkenny Cres	East on Glen Walter Park Rd, then south to Elevated Tank site	300	47	Immediate
Kilkenny Cres	208 south of Glen Walter Park Rd	Glen Walter Park Rd	Twin existing 150mm or replace with 250mm	208	Immediate
Place St. Laurent	Phase 6 looping	St. Laurent Blvd to Yacht Blvd	150	345	Near-term (by Developer)
St Laurent Blvd to Sutherland Ave Looping	St Laurent Blvd	Sutherland Ave	150	291	Future

*For future conditions to the north (Sapphire Court, Coral Dr. East and Ruby Drive), with an expanded WTP in its current location, the model indicates that Fire Flow of 38 L/s at 140 kPa cannot be achieved without the upsizing of the existing watermain on Glen Walter Park Road. This is marginal at 36 L/s yet still deficient. However, it is recommended that the portion of watermain upsizing identified on Glen Walter Park Road between County Road 2 and Kilkenny Crescent be deferred until servicing of the Sapphire Court, Coral Dr. East and Ruby Drive area is imminent and/or the Municipal Class Environmental Assessment for the Water Treatment Plant is completed. At that time, water distribution system dynamics can be reassessed and appropriate design considerations be made.

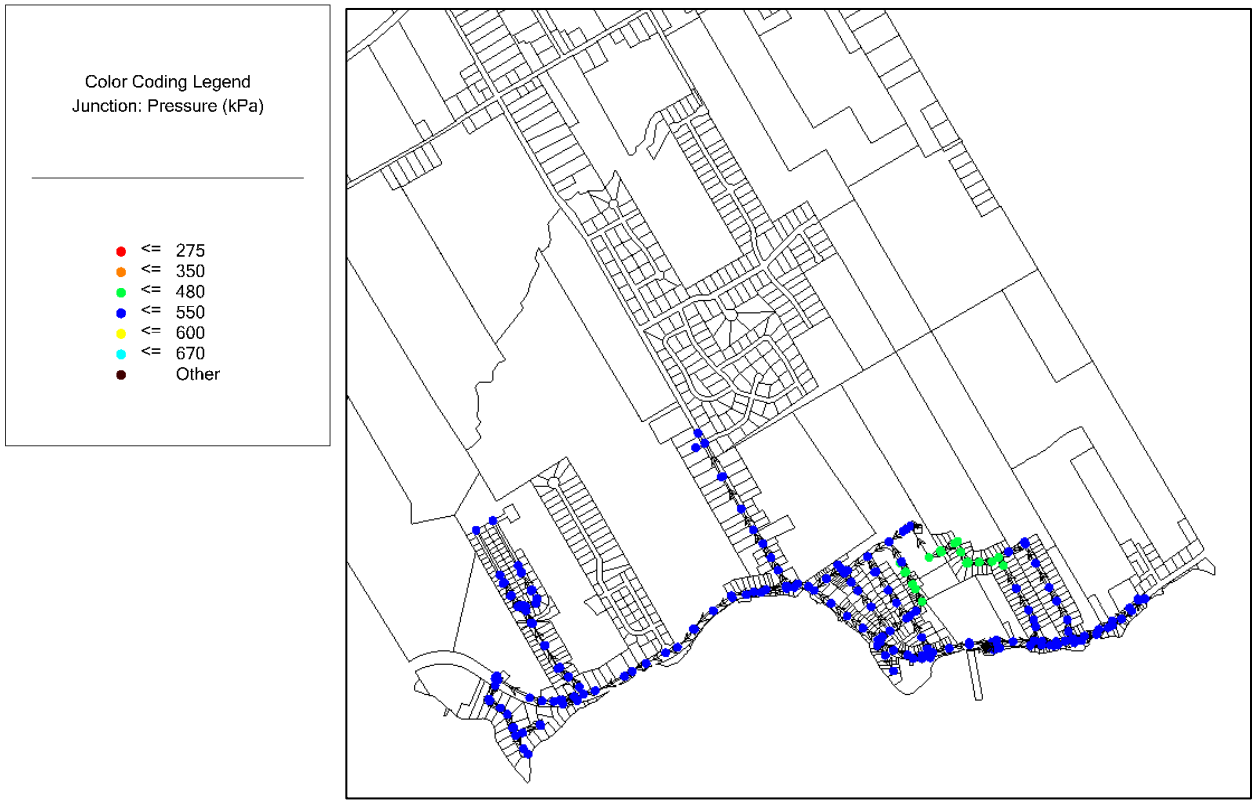
Figure 6: Existing System with Improvements – Pipe Diameters

7.1.1 Maximum Day Demand – Existing Water Treatment Plant

In this demand condition it is assumed that the water in the elevated tank is 101.19 m.a.s.l. (2.81m below HWL). This elevation Is at the bottom of the Equalization storage volume and represents the "worst case" scenario for water tank elevation at which MDD is provided from supply. As such, one high lift pump (firm capacity) at the Treatment Plant is running at a rate of approximately 11.52 L/s.

Figure 7 shows the water distribution system and pressures resulting from this hydraulic analysis. An examination of the results of the hydraulic analysis under the MDD conditions reveals that very little change occurred in the pressure distribution. The minimum noted pressure is 413 kPa and the maximum noted pressure is approximately 454 kPa.

Figure 7: Existing Improved System – MDD Pressures



7.1.2 Maximum Day Demand Plus Fire Flow – Existing Water Treatment Plant

The MECP Design Guideline indicates that the minimum required fire flow is 38 L/s. This is to allow for the fighting of a typical detached single-family dwelling fire. The MECP guidelines require the system to be able to provide MDD plus FF at a minimum system pressure of 140 kPa. This means that a fire must be fought at a minimum residual pressure of 140 kPa while maintaining a minimum pressure of 140 kPa at any point within the distribution system.

The following criteria were input into the computer model prior to running a fire flow simulation:

- Minimum Fire Flow 38 L/s
- Maximum Fire Flow 221 L/s
- Minimum Pressure at the fire 140 kPa
- Minimum Residual pressure in system 140 kPa

In this condition it is assumed that the water in the elevated tank is 97.15m (6.85m below full). This is the potential worst-case MDD + FF scenario in terms of system pressure at which the calculated Fire Storage volume has about to be depleted. As such, one high lift pump at the Treatment Plant is running at a rate of approximately 11.52 L/s to provide MDD and fire flow is provided from storage.

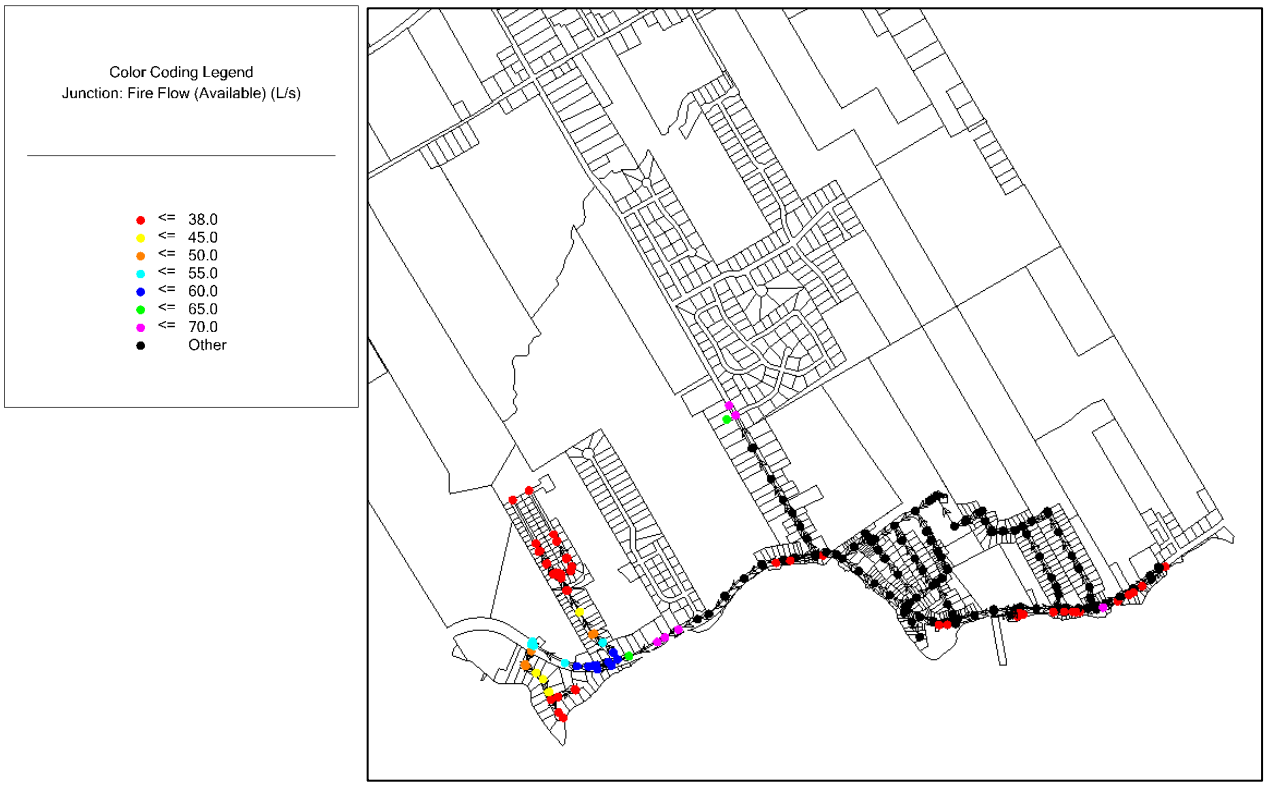
The computer software uses the minimum residual pressure as the governing criteria. Therefore, no node is seen with a pressure of less than 140 kPa. Three small areas within the

serviced area are noted as not being able to provide the minimum required 38L/s at a minimum residual and/or system pressure of 140 kPa. These areas are:

- Along the shoreline where properties are serviced by 50mm and 75mm HDPE watermains. This is not a concern as fire protection is provided from hydrants located on the 300mm PVC trunk watermain running parallel along County Road 2.
- Farlinger Court shoreline area - This watermains of this area of approximately 10 homes cannot provide the minimum fire flow as they have dead-ends. Fire flows must be provided as they are now, via tanker trucks and/or pumping from the St. Lawrence River.
- Various areas south of County Road 2 - These areas are serviced with 50mm and 75mm dia. pipes. This was likely so designed to maintain water quality for these small service areas. Fire flow can be provided, however, from fire hydrants behind these properties on the 300mm watermain on County Road 2. Alternatively, as is current practice, Fire Flow can be provided via tanker trucks and/or pumping from the St. Lawrence River.

Figure 8 shows the water distribution system and available fire flows.

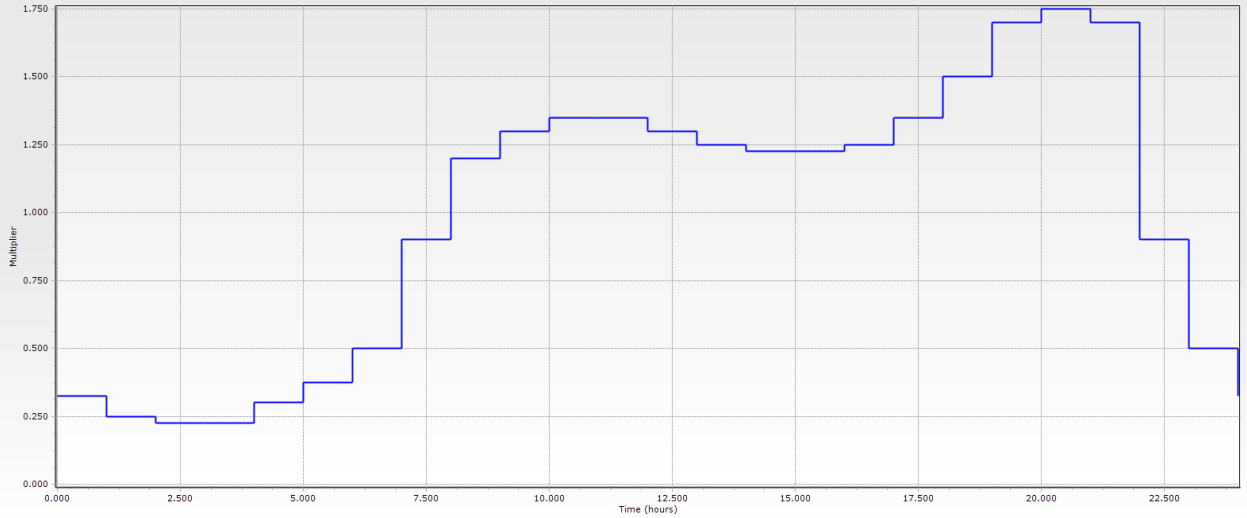
Figure 8: Existing Improved System – Fire Flows



7.1.3 Maximum Day Demand – Extended Period Simulation – Existing Water Treatment Plant

An Extended Period Simulation (EPS) was run with the aforenoted system improvements, utilising the same parameters as those established by WSP in the original modelling work. That is, a typical diurnal curve was applied to the Maximum Day Demand scenario.

Figure 9: Existing System – MDD EPS – Diurnal Curve



The MDD EPS was simulated with a duration of 72 hours because, although the MDD occurs on one day only (24-hours), it often is bookended by similar high demand days. A typical example of this is an extended period of high temperatures in the summer, leading to higher water usage. Simulating a MDD condition over 72 hours allows for review of the system under what is considered to be very conservative conditions, especially the fill-drain characteristics of the storage facilities.

The fill-drain characteristics of the water storage facilities is important to understand as an indication of maintaining acceptable water levels and storage volumes over time. The diurnal curve was applied to the MDD and a 72-hour extended period scenario (EPS) was carried out in the model. The results of the model simulation indicate that the storage in the system, both in terms of volume and location, and in terms of pump capacity is adequate for the current demands.

Figure 10 shows the water levels in the proposed elevated storage tank storage facility over the 72-hours. Though the tank level declines somewhat over the 72-hour period, this shows a stabilised curve profile and acceptable operation condition. Also, Figure 11 shows the corresponding pressure fluctuation at each node within the system over the same 72-hour simulation. As can be noted, the system pressures range from a low of 404 kPa to a high of 552 kPa. These pressures are within the MECP Design Guidelines parameters. Note that the diurnal curve incorporates all system design conditions of Minimum Hour, Average day Demand (ADD), Maximum Day Demand MDD) and Peak Hour (PH).

Figure 10: Existing System – MDD EPS – Proposed Tank – Levels

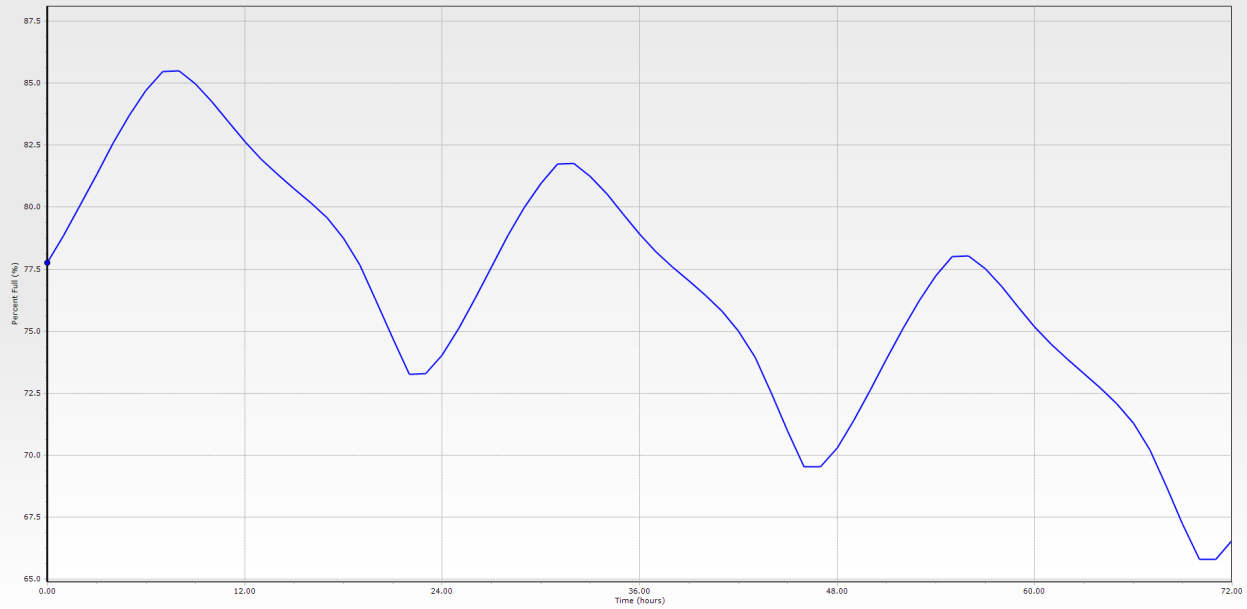
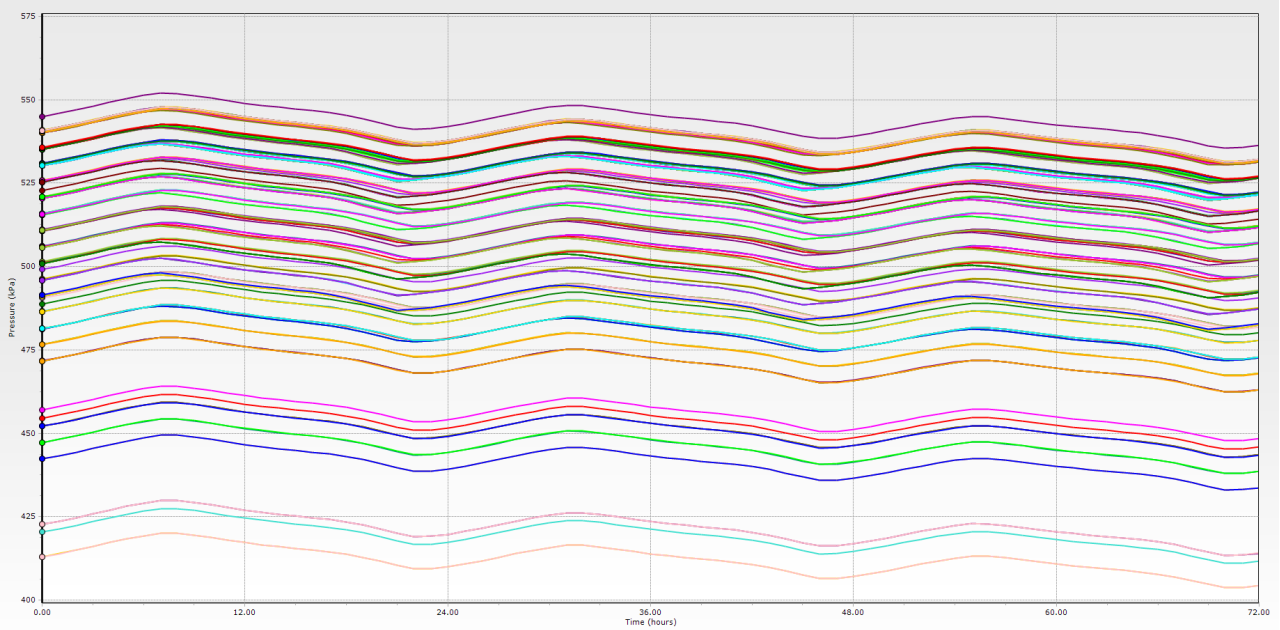


Figure 11: Existing System – MDD EPS – Node Pressures



7.2 Future (2041) System – Expanded Water Treatment Plant

This section discusses the results of the hydraulic analysis of the various design conditions discussed in Section 2.1. The MECP Design Guidelines recommend that, under normal operating conditions, the "*system should be designed to maintain a minimum pressure of 140 kPa at ground level at all points in the distribution system under maximum day demand plus fire flow conditions. pressures should be between 350 and 480 kPa. And not less than 275 kPa. Pressures outside of this range may be dictated by distribution size and/or topography.*"

The MECP Design Guidelines further state that, "*the maximum pressures in the distribution system should not exceed 700 kPa to avoid damage within the serviced building due to the installation of equipment or appurtenances (water meters, backflow preventers, etc.)*". Note that the Ontario Building Code recommends maximum distribution system pressures of 550 kPa to avoid damage within the serviced buildings.

Under this scenario, the following system improvements were identified to achieve MECP Design Guideline recommendations (see Figure 13 and Figure 14):

- Proposed 1,600 m^3 elevated water storage tank with a High-Water Level of 104 m.a.s.l. located on Glen Walter Park Road east of Lawrence Street,
- An expanded water treatment plant on the existing site with the flow control valve at the water treatment plant set to 27.04 L/s to match the future MDD,
- Upgraded pump with a duty point of 27.04 L/s at 55m TDH to match the future MDD. This pump was modelled as a single duty point curve (See Figure 12). Actual pump design to be undertaken at the time of the WTP expansion.
- Trunk watermains of 250mm dia. were modelled with local watermains of 150mm dia. along the streets of existing un-serviced areas.
- Future demands were assigned in the manner consistent with the original WSP model. That is, lot counts were undertaken and assigned on a units/node basis to best represent the actual future population distribution throughout the future system. The calculated per unit demand was then applied accordingly to best represent the future demand distribution throughout the future system. In development areas where no existing street network exists, the total calculated demand for that area was assigned as a point demand.
- Trunk watermain of 250mm dia. are required along Purcell Road from the existing 200mm dia. watermain to Samuel Drive and along Samuel Drive from Purcell Road to Sapphire Drive.
- Trunk watermain of 200mm dia. are required on Randy St to Wendy St, east along Wendy St connecting to Sapphire Dr and north along Sapphire Dr to Coral Dr East.
- A 200mm dia. watermain has been assumed to service future development Area "E", Country Club Estates. It is recommended that this be confirmed by further computer hydraulic analysis once details of this development area are known.
- Looping of the 150mm watermain in St Laurent Blvd development to the future 150mm dia. watermain along Sutherland Road area is required to provide minimum Fire Flow of 38 L/s to the northern reaches of both areas.

Figure 12: Future System – Upgraded Pump Curve

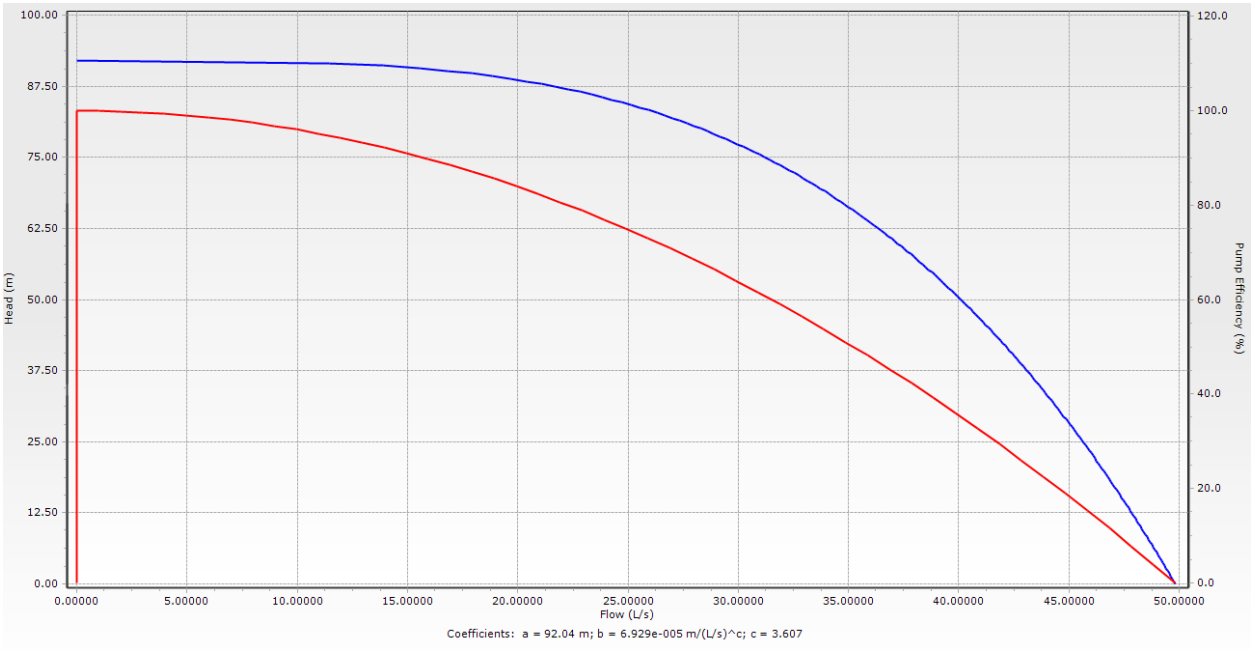


Figure 13: Future System – Supply from WTP – Diameters

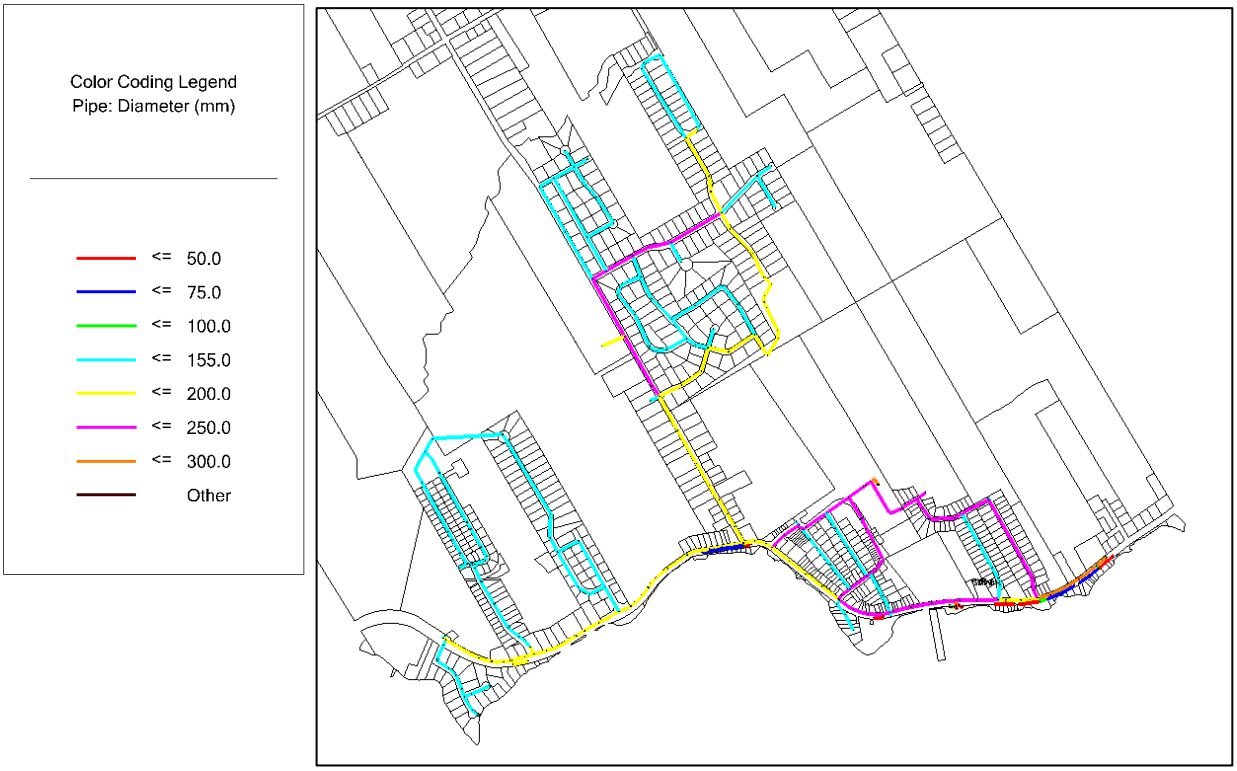
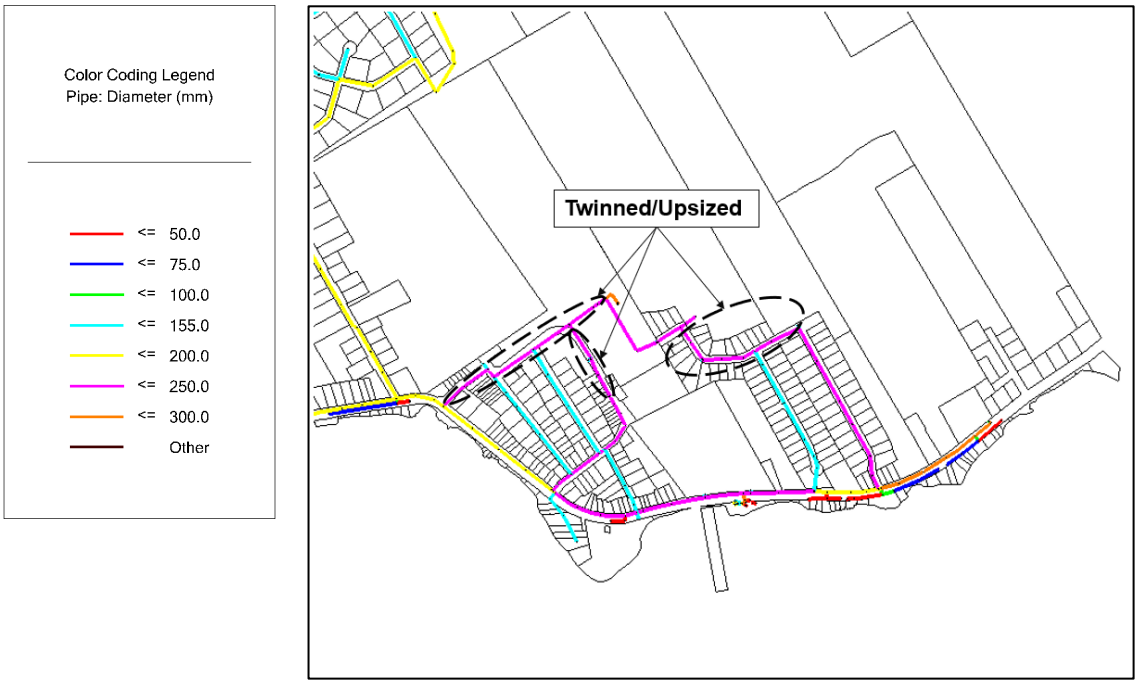


Figure 14: Future System – Supply from WTP – Pipes to Twin or Upsize

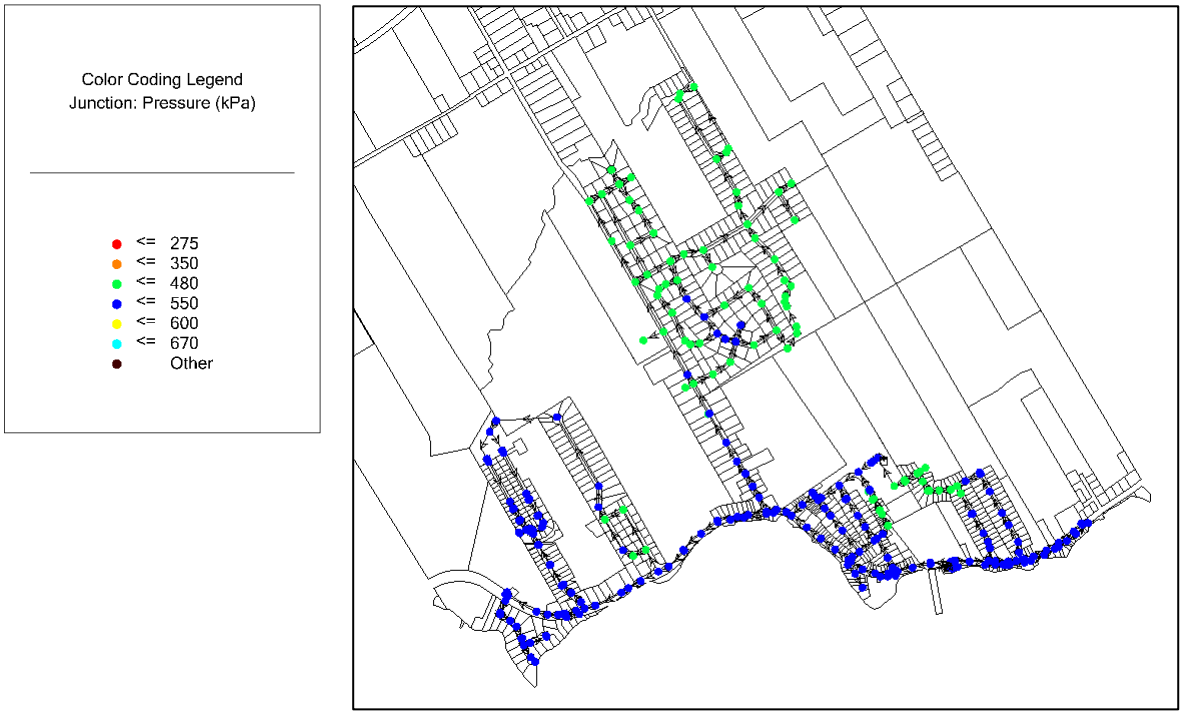


7.2.1 Maximum Day Demand – Future with Expanded Water Treatment Plant

The same recommended pressures under MDD conditions of 27.04 L/s apply as per the MECP Design Guideline. In this demand condition it is assumed that the water in the elevated tank is 101.19 m.a.s.l. (2.81m below HWL). This elevation Is at the bottom of the Equalisation Storage volume and represents the “worst case” scenario for water tank elevation at which MDD is provided from supply. As such, one high lift pump (firm capacity) at the Treatment Plant is running at a rate of approximately 27.04 L/s to match the MDD.

Figure 15 shows the water distribution system and pressures resulting from this hydraulic analysis. An examination of the results of the hydraulic analysis under the MDD conditions reveals that very little change occurred in the pressure distribution. The minimum noted pressure is 375 kPa and the maximum noted pressure is approximately 543 kPa.

Figure 15: Future System – Supply from WTP – MDD Pressures



7.2.2 Maximum Day Demand Plus Fire Flow – Future with Expanded Water Treatment Plant

The MECP Design Guideline indicates that the minimum required fire flow is 38 L/s. This is to allow for the fighting of a typical detached single-family dwelling fire. The MECP Guidelines require the system to be able to provide MDD plus FF at a minimum system pressure of 140 kPa. This means that a fire must be fought at a minimum residual pressure of 140 kPa while maintaining a minimum pressure of 140 kPa at any point within the distribution system.

The following criteria were input into the computer model prior to running a fire flow simulation:

- Minimum Fire Flow 38 L/s
- Maximum Fire Flow 221 L/s
- Minimum Pressure at the fire 140 kPa
- Minimum Residual pressure in system 140 kPa

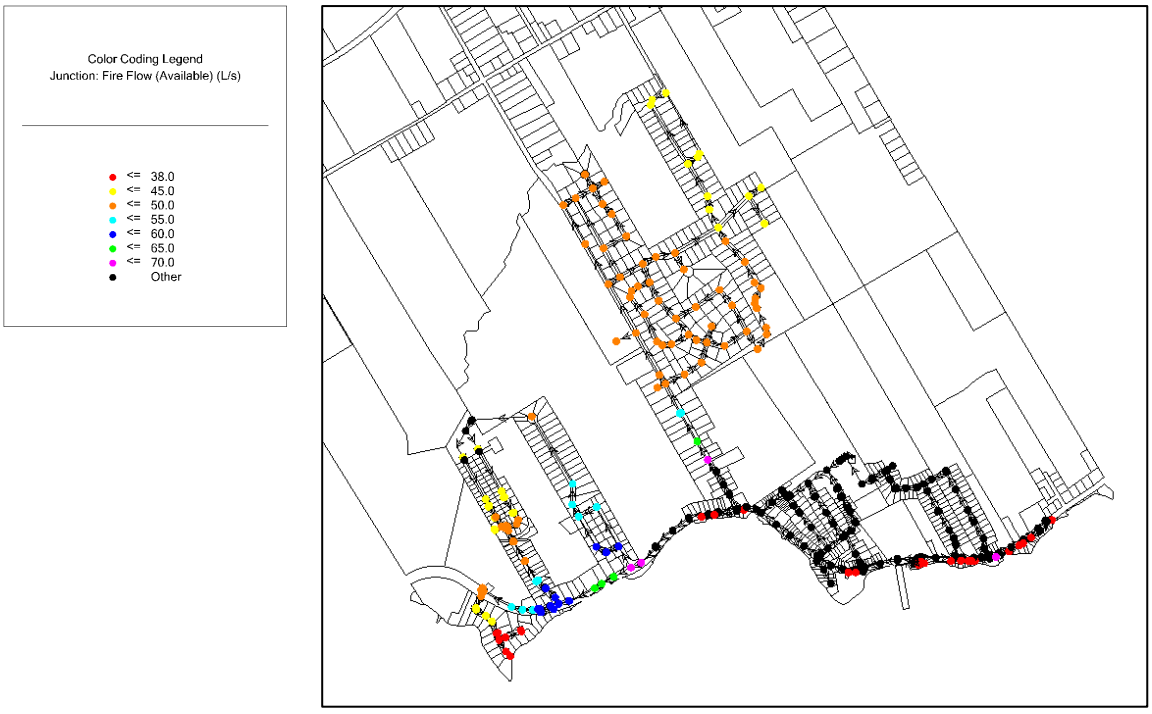
In this condition it is assumed that the water in the elevated tank is 97.15m (6.85m below full). This is the potential worst-case MDD + FF scenario in terms of system pressure at which the calculated Fire Storage volume has about to be depleted. As such, one high lift pump at the Treatment Plant is running at a rate of approximately 27.04 L/s to provide MDD and fire flow is provided from storage.

The computer software uses the minimum residual pressure as the governing criteria. Therefore, no node is seen with a pressure of less than 140 kPa. Two small areas within the serviced area are noted as not being able to provide the minimum required 38 L/s at a minimum residual and/or system pressure of 140 kPa. These areas are:

- Farlinger Court shoreline area - The watermains of this area of approximately 10 homes cannot provide the minimum fire flow as they have dead-ends. Fire flows must be provided as they are now, via tanker trucks and/or pumping from the St. Lawrence River.
- Various areas south of County Road 2 - These areas are serviced with 50mm and 75mm dia. pipes. This was likely so designed to maintain water quality for these small service areas. Fire flow can be provided, however, from fire hydrants behind these properties on the 300mm watermain on County Road 2. Alternatively, as is current practice, Fire flow can be provided via tanker trucks and/or pumping from the St. Lawrence River.

Figure 16 shows the water distribution system and available fire flows.

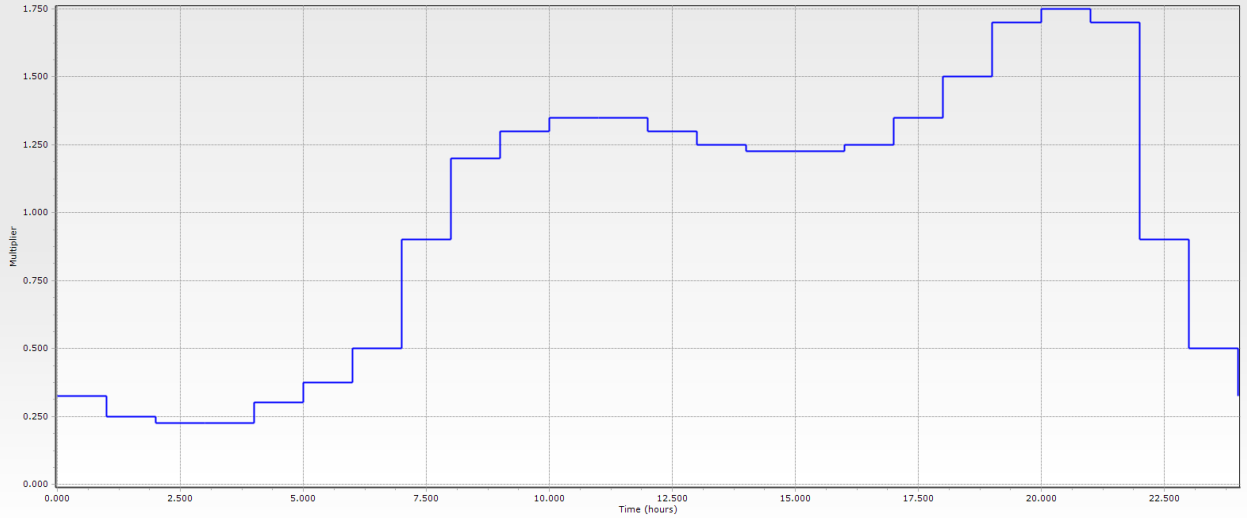
Figure 16: Future System – Supply from WTP – Fire Flows



7.2.3 Maximum Day Demand – Extended Period Simulation – Future with Expanded Water Treatment Plant

An Extended Period Simulation (EPS) was run with the aforenoted system improvements, utilising the same parameters as those established by WSP in the original modelling work. That is, a typical diurnal curve was applied to the Maximum Day Demand scenario.

Figure 17: Future System – Supply from WTP – MDD EPS – Diurnal Curve



The MDD EPS was simulated with a duration of 72 hours because, although the MDD occurs on one day only (24-hours), it often is bookended by similar high demand days. A typical example of this is an extended period of high temperatures in the summer, leading to higher water usage. Simulating a MDD condition over 72-hours allows for review of the system under what is considered to be very conservative conditions, especially the fill-drain characteristics of the storage facilities.

The fill-drain characteristics of the water storage facilities is important to understand as an indication of maintaining acceptable water levels and storage volumes over time. The diurnal curve was applied to the MDD and a 72-hour extended period scenario (EPS) was carried out in the model. The results of the model simulation indicate that the storage in the system, both in terms of volume and location, and in terms of pump capacity is adequate for the current demands.

Figure 18 shows the water levels in the proposed elevated storage tank storage facility over the 72-hours. Though the tank level declines slightly over the 72-hour period, this shows a stabilised curve profile and acceptable operation condition. Also, Figure 19 shows the corresponding pressure fluctuation at each node within the system over the same 72-hour simulation. As can be noted, the system pressures range from a low of 358 kPa to a high of 565 kPa. These pressures are within the MECP Design Guidelines parameters.

Figure 18: Future System – Supply from WTP – MDD EPS – Proposed Tank – Levels

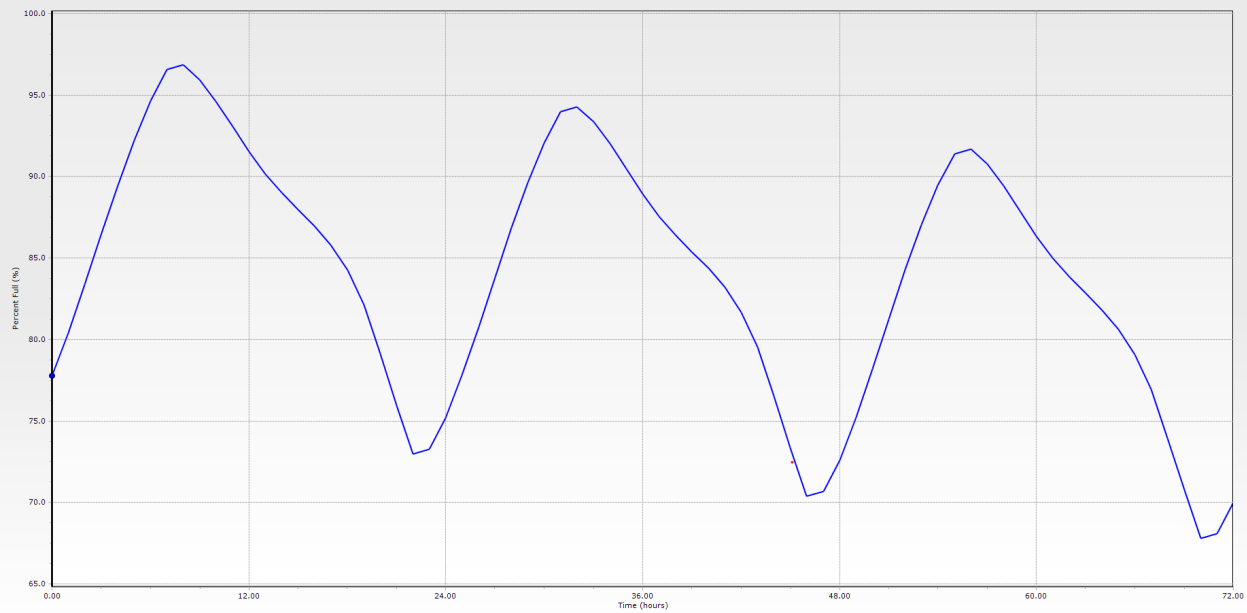
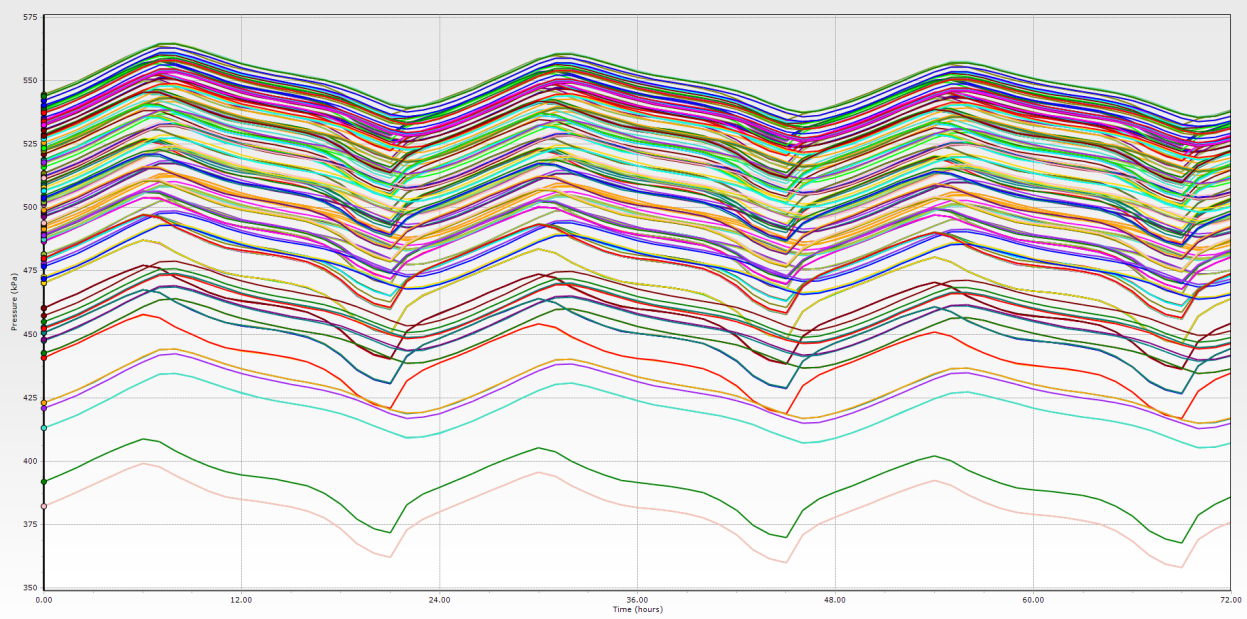


Figure 19: Future System – Supply from WTP – MDD EPS – Node Pressures



7.3 Future (2041) System – Water Supply from Cornwall

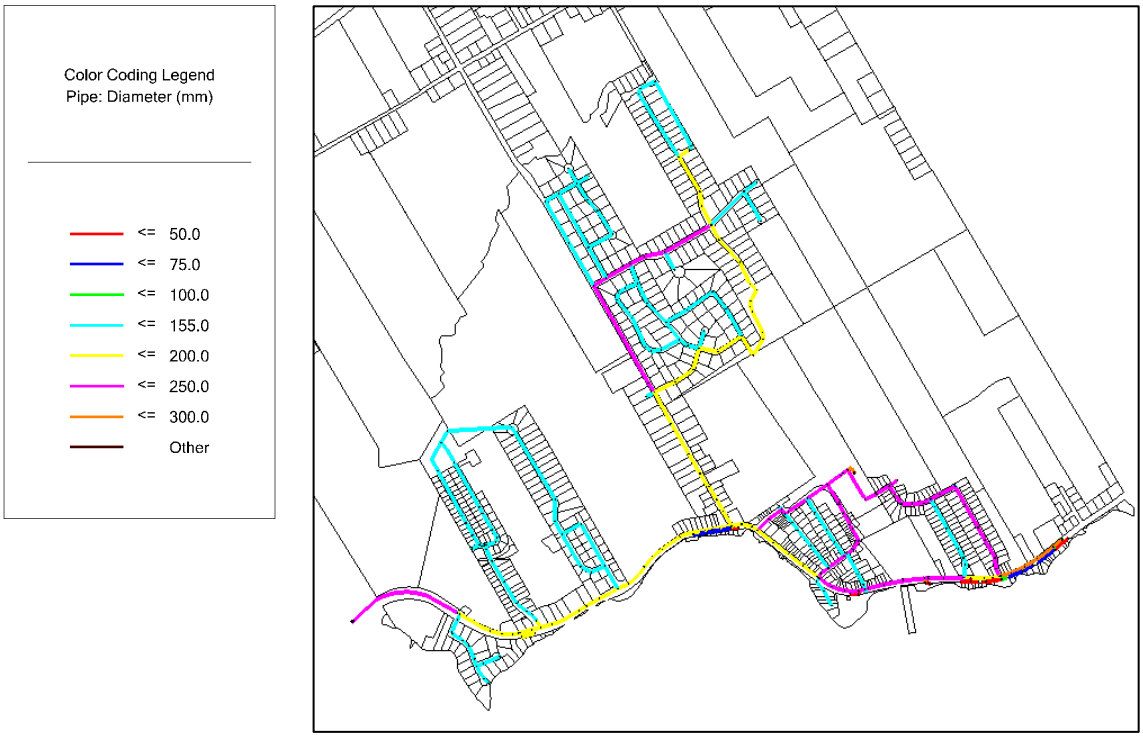
This section discusses the results of the hydraulic analysis of the various design conditions discussed in Section 2.1. The MECP Design Guidelines recommend that, under normal operating conditions, the "*system should be designed to maintain a minimum pressure of 140 kPa at ground level at all points in the distribution system under maximum day demand plus fire flow conditions. Pressures should be between 350 and 480 kPa. And not less than 275 kPa. Pressures outside of this range may be dictated by distribution size and/or topography.*"

The MECP Design Guidelines further state that, "*the maximum pressures in the distribution system should not exceed 700k Pa to avoid damage within the serviced building due to the installation of equipment or appurtenances (water meters, backflow preventers, etc.)".* Note that the Ontario Building Code recommends maximum distribution system pressures of 550 kPa to avoid damage within the serviced buildings.

Under this scenario, the following system improvements were identified to achieve MECP Design Guideline recommendations (see Figure 20):

- This scenario was simulated with future water supply from Cornwall located in the vicinity of Boundary Road and County Road 2. The assumption is that the existing WTP has been abandoned. The nature of this supply source has not been determined in this exercise and is being considered in a Municipal Class Environmental Assessment undertaken by others. No investigation of the Cornwall distribution system in this area was undertaken. It is not known if water can be supplied directly, through an in-line booster pumping station or a new grade level reservoir complete with high lift pumps. As such, the potential water supply is represented in an oversimplified manner by a reservoir at an elevation of 105 m.a.s.l.
- An approximately 539m long 300mm dia. watermain extension on County Road 2 from the existing 300mm dia. Stub located on County Road 2 at Farlinger Drive to Boundary Road.
- A flow control valve at the Cornwall water supply set to 27.04 L/s to match the rated capacity of the existing water treatment plant
- Proposed 1,600 m^3 elevated water storage tank with a High-Water Level of 104 m.a.s.l. located on Glen Walter Park Road east of Lawrence Street,
- As in Section 7.2, trunk watermains of 250mm dia. were modelled with local watermains of 150mm dia. Along the streets of existing un-serviced areas.
- As in Section 7.2, future demands were assigned in the manner consistent with the original WSP model. That is, lot counts were undertaken and assigned on a units/node basis to best represent the actual future population distribution throughout the future system. The calculated per unit demand was then applied accordingly to best represent the future demand distribution throughout the future system. In development areas where no existing street network exists, the total calculated demand for that area was assigned as a point demand.

Figure 20: Future System – Supply from Cornwall – Pipe Diameters

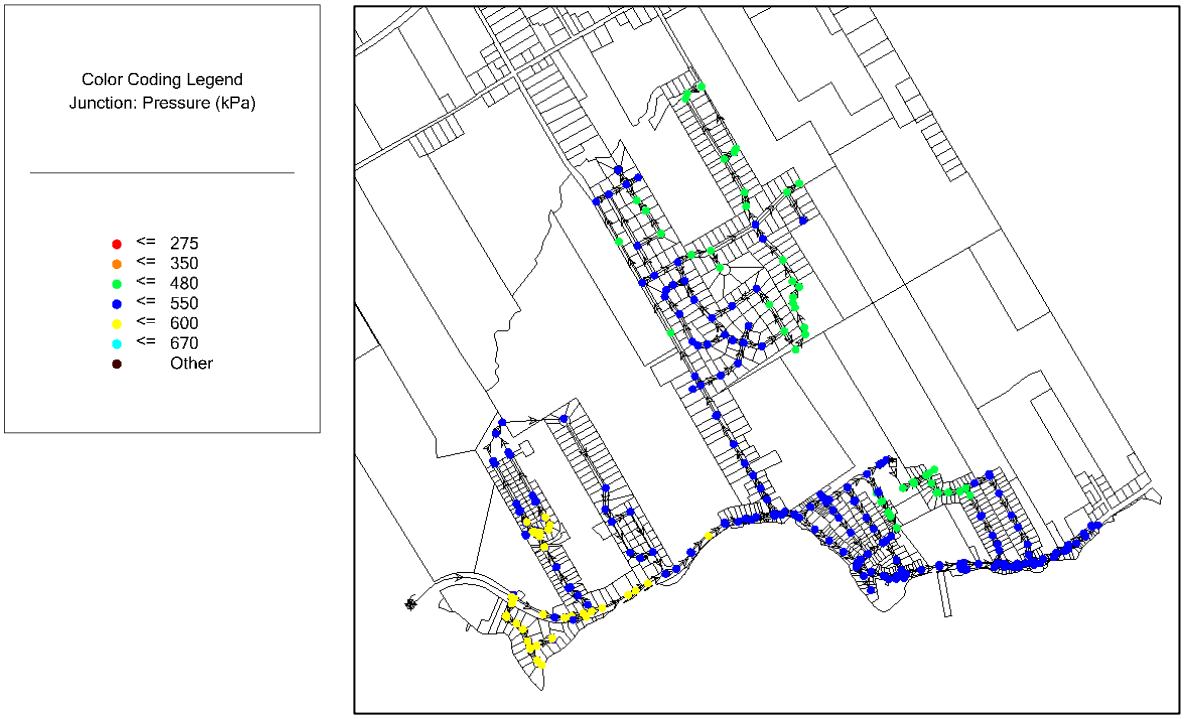


7.3.1 Maximum Day Demand – Future with Water Supply from Cornwall

this demand condition it is assumed that the water in the elevated tank is 101.19 m.a.s.l. (2.81m below HWL). This elevation Is at the bottom of the Equalization storage volume and represents the "worst case" scenario for water tank elevation at which MDD is provided from supply. As such, water is being supplied from Cornwall at a rate of approximately 27.04 L/s to match the MDD.

Figure 21 shows the water distribution system and pressures resulting from this hydraulic analysis. An examination of the results of the hydraulic analysis under the MDD conditions reveals that very little change occurred in the pressure distribution. The minimum noted pressure is 382 kPa and the maximum noted pressure is approximately 577 kPa.

Figure 21: Future System – Supply from Cornwall – MDD Pressures



7.3.2 Maximum Day Demand Plus Fire Flow – Future with Water Supply from Cornwall

The MECP Design Guideline indicates that the minimum required fire flow is 38 L/s. This is to allow for the fighting of a typical detached single-family dwelling fire. The MECP guidelines require the system to be able to provide MDD plus FF at a minimum system pressure of 140 kPa. This means that a fire must be fought at a minimum residual pressure of 140 kPa while maintaining a minimum pressure of 140 kPa at any point within the distribution system.

The following criteria were input into the computer model prior to running a fire flow simulation:

- Minimum Fire Flow 38 L/s
- Maximum Fire Flow 220 L/s
- Minimum Pressure at the fire 140 kPa
- Minimum Residual pressure in system 140 kPa

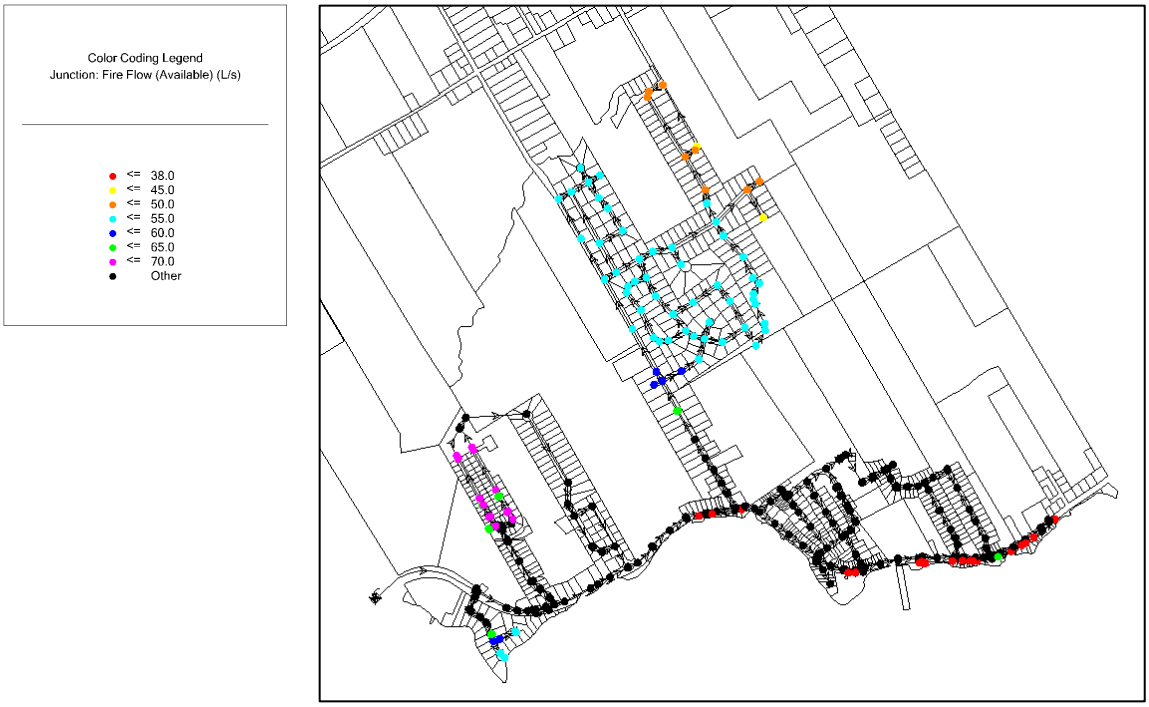
In this condition it is assumed that the water in the elevated tank is 97.15m (6.85m below full). This is the potential worst-case MDD + FF scenario in terms of system pressure at which the calculated Fire Storage volume has about to be depleted. As such, one high lift pump at the Treatment Plant is running at a rate of approximately 27.04 L/s to provide MDD and fire flow is provided from storage.

The computer software uses the minimum residual pressure as the governing criteria. Therefore, no node is seen with a pressure of less than 140 kPa. One small area within the serviced area is noted as not being able to provide the minimum required 38 L/s at a minimum residual and/or system pressure of 140 kPa. These areas are:

- Various areas south of County Road 2 - These areas are serviced with 50mm and 75mm dia. pipes. This was likely so designed to maintain water quality for these small service areas. Fire flow can be provided, however, from fire hydrants behind these properties on the 300mm watermain on County Road 2. Alternatively, as is current practice, Fire Flow can be provided via tanker trucks and/or pumping from the St. Lawrence River.
- The Farlinger Court shoreline area has sufficient Fire Flow from a Cornwall supply source.

Figure 22 shows the water distribution system and available fire flows.

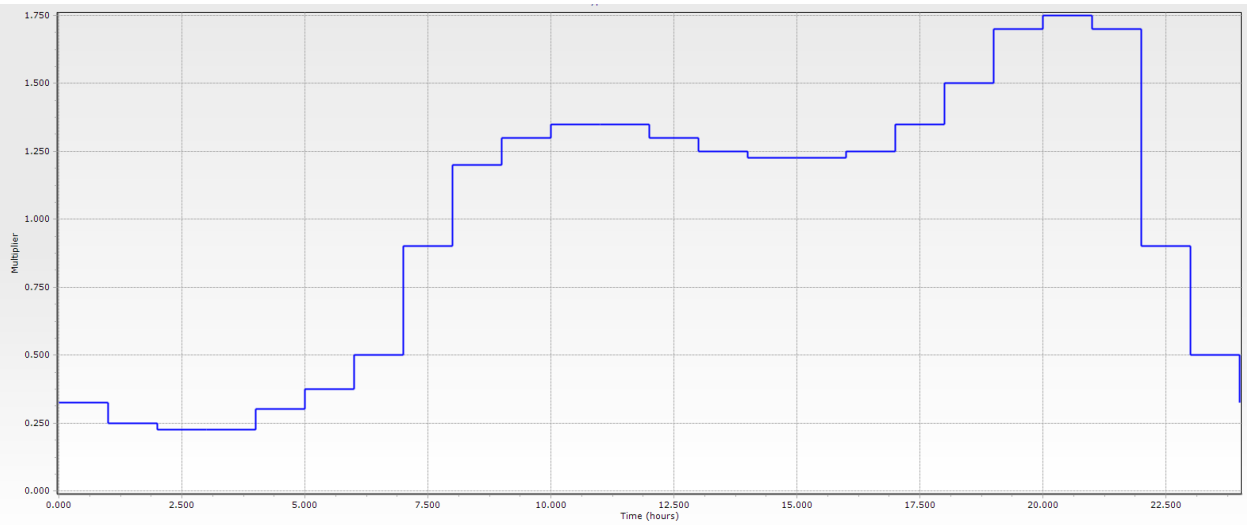
Figure 22: Future System – Supply from Cornwall – Fire Flows



7.3.3 Maximum Day Demand – Extended Period Simulation – Future with Expanded Water Treatment Plant

An Extended Period Simulation (EPS) was run with the aforenoted system improvements, utilising the same parameters as those established by WSP in the original modelling work. That is, a typical diurnal curve was applied to the Maximum Day Demand scenario.

Figure 23: Future System – Supply from Cornwall – MDD EPS – Diurnal Curve



The MDD EPS was simulated with a duration of 72 hours because, although the MDD occurs on one day only (24-hours), it often is bookended by similar high demand days. A typical example of this is an extended period of high temperatures in the summer, leading to higher water usage. Simulating a MDD condition over 72 hours allows for review of the system under what is considered to be very conservative conditions, especially the fill-drain characteristics of the storage facilities. Note that the diurnal curve incorporates all system design conditions of Minimum Hour, Average day Demand (ADD), Maximum Day Demand MDD) and Peak Hour (PH).

The fill-drain characteristics of the water storage facilities is important to understand as an indication of maintaining acceptable water levels and storage volumes over time. The diurnal curve was applied to the MDD and a 72-hour extended period scenario (EPS) was carried out in the model. The results of the model simulation indicate that the storage in the system, both in terms of volume and location, and in terms of pump capacity is adequate for the current demands.

Figure 24 shows the water levels in the proposed elevated storage tank storage facility over the 72-hours. Though the tank level increases somewhat over the 72-hour period, this shows a stabilised curve profile and acceptable operation condition. Also, Figure 25 shows the corresponding pressure fluctuation at each node within the system over the same 72-hour simulation. As can be noted, the system pressures range from a low of 350 kPa to a high of 578 kPa. These pressures are within the MECP Design Guidelines parameters.

Figure 24: Future System – Supply from Cornwall – MDD EPS – Proposed Tank – Levels

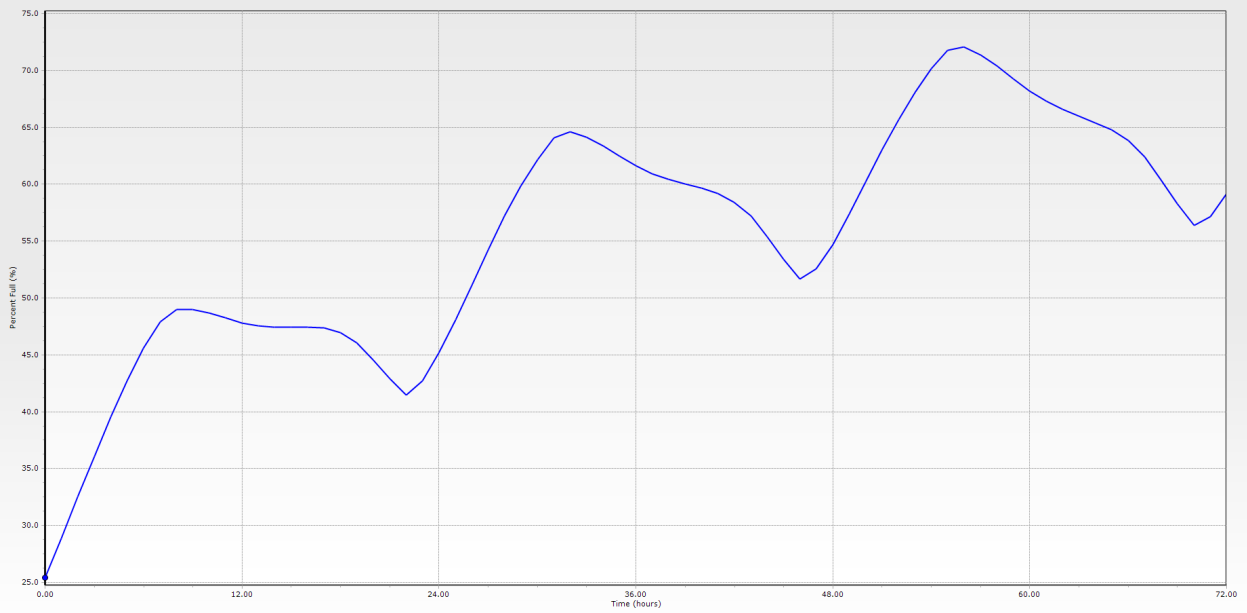
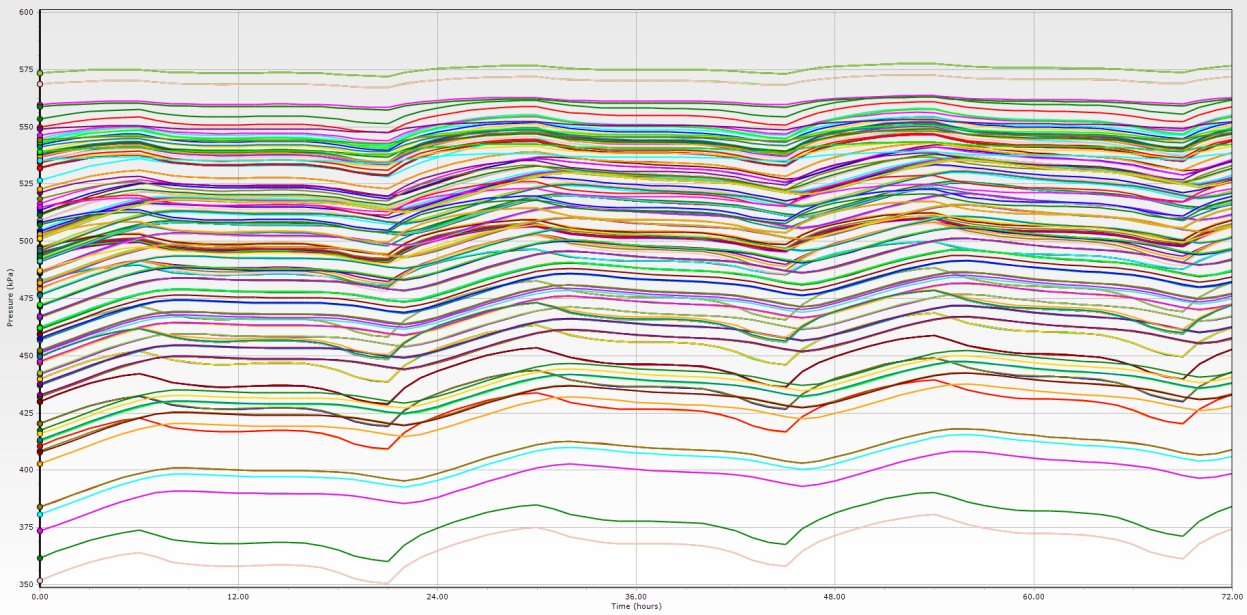


Figure 25: Future System – Supply from Cornwall – MDD EPS – Node Pressures



8 Conclusions and Recommendations

8.1 Existing System

The existing water distribution system is a closed loop system. The reservoir at the existing water treatment plant has insufficient volume for fire fighting and the existing high lift pumps are not sized for fire fighting. It would seem that the original system designers had contemplated future expansion of the original service area. This is indicated by the original construction of

trunk watermains along County Road 2 (300mm and 250mm dia.), Page Drive (250mm dia.) and Purcell St. (250mm dia.). The construction of a new elevated water tank to provide fire storage and emergency storage for the existing and future service areas will require extension of these trunk watermains to the elevated tank site.

The existing WTP has a rated capacity of 995 m^3/d (11.51 L/s). Considering that the existing service area has a MDD of 897 m^3/d, the existing WTP can accommodate servicing of up to an additional MDD of 98 m^3/d. The existing pumps at the WTP, having a firm rated capacity of 16.44 L/s have sufficient capacity to accommodate that growth without upsizing. We understand that a Municipal Class Environmental Assessment is currently being undertaken for the provision of additional water supply. Careful monitoring of the impact of extending service must be undertaken to ensure that capacity is not compromised prior to the expansion of the existing WTP or the construction of a new WTP with increased capacity.

As identified in Section 7.1 following system improvements are recommended to provide fire storage, emergency storage for the existing service area:

- Proposed 1,600 m^3 elevated water storage tank with a High-Water Level of 104 m.a.s.l. located on Glen Walter Park Road east of Lawrence Street,
- The existing flow control valve at the water treatment plant set to 27.04 L/s to match the future MDD calculated in Section 4.0

Table 3: Improvements Identified to the Existing Systems

Street	From	To	Diameter (mm)	Length (m)	Phasing
Lana Dr.	Existing 250mm stub	Glen Walter Park Rd, 104m east of Kilkenny Cres.	250	211	Immediate
Lana Dr.	Page Dr	Riverview Dr.	Twin existing 150mm or replace with 250mm	126	Immediate
Lana Dr	Riverview Dr	Existing 250mm on Lana Dr.	Twin existing 150mm or replace with 250mm	236	Immediate
Glen Walter Park Rd.*	County Road 2	Bray St	Twin existing 150mm or replace with 250mm	147	Future
Bray St.*	Glen Walter Park Rd	Glen Walter Park Rd	Twin existing 150mm or replace with 250mm	26	Future
Glen Walter Park Rd*	Bray St.	Lawrence St	Twin existing 150mm or replace with 250mm	122	Future

Street	From	To	Diameter (mm)	Length (m)	Phasing
Glen Walter Park Rd*	Lawrence St	Kilkenny Cres	Twin existing 150mm or replace with 250mm	111	Future
Glen Walter Park Rd	Kilkenny Cres	104m east of Kilkenny Cres	Twin existing 150mm or replace with 250mm	104	Immediate
Glen Walter Park Rd	104m east of Kilkenny Cres	East on Glen Walter Park Rd, then south to Elevated Tank site	300	47	Immediate
Kilkenny Cres	208 south of Glen Walter Park Rd	Glen Walter Park Rd	Twin existing 150mm or replace with 250mm	208	Immediate
Place St. Laurent	Phase 6 looping	St. Laurent Blvd to Yacht Blvd	150	345	Near-term (by Developer)
St Laurent Blvd to Sutherland Ave Looping	St Laurent Blvd	Sutherland Ave	150	291	Future

*For future conditions to the north (Sapphire Court, Coral Dr. East and Ruby Drive), with an expanded WTP in its current location, the model indicates that Fire Flow of 38 L/s at 140 kPa cannot be achieved without the upsizing of the existing watermain on Glen Walter Park Road. This is marginal at 36 L/s yet still deficient. However, it is recommended that the portion of watermain upsizing identified on Glen Walter Park Road between County Road 2 and Kilkenny Crescent be deferred until servicing of the Sapphire Court, Coral Dr. East and Ruby Drive area is imminent and/or the Municipal Class Environmental Assessment for the Water Treatment Plant is completed. At that time, water distribution system dynamics can be reassessed and appropriate design considerations be made.

8.2 Immediate Growth Within Service Area

The WSP, EVB and this Report all indicated that approximately 98 m^3/d of water under Maximum Day conditions is available within the capacity of the existing Water Treatment Plant. Based upon the design assumptions for MDD of 2.45 m^3/d per household within these three Reports, that is the equivalent of approximately (98 m^3/d) / (2.45m^3/d per household) = 40 households. The WTP must be carefully monitored as these additional households are connected to ensure that the WTP capacity is not exceeded.

8.3 Future (2051) Build-Out

Distribution system considerations for future build-out (2051) are consistent regardless of the water supply being delivered from an expanded of the service area WTP on the existing site or an alternate water supply from the City of Cornwall located at approximately County Road 2 and Boundary Road.

Under this scenario, the following system improvements were identified to achieve MECP Design Guideline recommendations (see Figure 13 and Figure 14):

- Proposed 1,600 m^3 elevated water storage tank with a High-Water Level of 104 m.a.s.l. located on Glen Walter Park Road east of Lawrence Street,
- Trunk watermains of 250mm dia. are required along Purcell Road from the existing 200mm dia. watermain to Samuel Drive and along Samuel Drive from Purcell Road to Saphire Drive.
- Trunk watermains of 200mm dia. are required on Randy St to Wendy St, east along Wendy St connecting to Sapphire Dr and north along Sapphire Dr to Coral Dr East.
- A 200mm dia. watermain has been assumed to service future development Area “E”, Country Club Estates. It is recommended that this be confirmed by further computer hydraulic analysis once details of this development area are known.
- Looping of the 150mm watermain in St Laurent Blvd development to the future 150mm dia. watermain along Sutherland Road area is required to provide minimum Fire Flow of 38 L/s to the northern reaches of both areas.
- Local watermains of 150mm dia.

Appendix D

Preliminary Water Tower Quotes

Budget Pricing 1500 m^3 Composite Elevated Tank
(Landmark December 6, 2023)

Budget Pricing 1500 m^3 Glass-Fused to Steel Elevated Tank
(Landmark December 6, 2023)

Budget Pricing

Project:
CAN 0615 - South Glengarry - Glen Walter

Notes:
1. Budgets provided at pre-design are typically based on an incomplete understanding of all project details.
2. Budget refinements are required as additional project information and details become available.
3. Note the list of options and exclusions. Budget should be adjusted accordingly.
4. HST is not included

Composite Elevated Tank Only [See Inclusions below]		$ 4,550,000
Allowances included (See detail in Inclusion and Exclusion Sections)		
Electrical and Controls	$ 600,000	$ 800,000
Cathodic Protection	$ 40,000	$ 40,000
Site Works - Pre Tank construction (clear / strip / grade / cut & fill / prep.)	$ 600,000	$ 800,000
Site Works - Post Tank Construction (fine grade / gravel) - Incl.		
Utility Works - Water / Storm / Sanitary - Incl.		
Landscaping	$ 60,000	$ 80,000
Paving	$ 100,000	$ 200,000
Fencing	$ 50,000	$ 80,000
HVAC/Plumbing	$ 100,000	$ 200,000
Total Budget Range with Above Allowances	$6,100,000	$ 6,750,000

Note: Electrical, Mechanincal and Site costs vary greatly from project to project based on site conditions and complexity of systems specified

Additional Project specific options and requirements that may need to be added are highlighted in the exclusions list (See below)

Inclusions:

The following have been included in the above budget:

Design Standards and Codes			
AWWA D107 - Composite Elevated Tanks for Water Storage			included
NBC - National Building Code of Canada			included
OBC - Ontario Building Code			included
CET Configuration and Elevations			
Total Storage Volume	1,500.00	m^3	included
Equalization Storage Volume	606.00	m^3	included
Fire Storage Volume	792.00	m^3	included
Emergency Storage Volume	102.00	m^3	included
Site Elevation - Grade	54.00	m	included
Minimum Fire + Equalization Elevation	92.77	m	included
Low Water Level (LWL) Elevation (minimum)	91.86	m	included
Height from grade to LWL	37.86	m	included
Top Capacity Level (TCL) Elevation	101.00	m	included
Height from grade to TCL	47.00	m	included
Operating Range	9.14	m	included

Budget Pricing

Foundation			
Shallow raft at 2.6m ft depth (200 kPa SLS allowable soil bearing)			included
Concrete Support Structure			
AWWA D107 standard support wall	7.30	m (dia)	included
Architectural concrete with exterior rustication pattern			included
Pedstal Sweep Blast			included
Steel Tank			
AWWA D107 standard	15.09	m (dia)	included
Steel Tank Coatings			
Interior - AWWA D-102 ICS- 3 or ICS- 4			included
Exterior - AWWA D-102 OCS- 4			included
Disinfection			included
Piping and Mechanical			
Inlet - Type 304 SS - vertical riser pipe only	300	mm	included
Outlet - Type 304 SS - vertical riser pipe only	300	mm	included
Overflow - Type 304 SS - discharge externally with Flap Valve	200	mm	included
Tank Drain - outlet / overflow crossover	150	mm	included
Inlet/Outlet Control Valves (2BFV/2CHK)			included
Pipe Heat Trace, Insulation & Jacketing (Inlet & Outlet only)			included
Accessories			
AWWA D-107 (Section 8) standard accessories			included
Galvanized ladders and rest seats			included
Safety climb system with 3 pc. harness / lanyard			included
Pedestal access - double mandoor			included
Ventilation - steel tank and concrete pedestal			included
Steel tank roof handrail			included
Steel tank floor manhole and 2 pc. roof hatch			included
Slab on grade within pedestal			included
Insulated masonary valve room with composite deck ceiling			included
Coatings - Interior floor, masonry walls.			included
Administrative			
Insurance - General, Professional and Auto			included
Insurance - All Risk			included
Bonding - 100% Performance and Payment			included
Commissioning			included
Operations/Project management, Administration			included
Temporary Site Facilities			included

Budget Pricing

Exclusions and Options:

The following have not been included in the above budget:

Probable requirements for this project are highlighted

Budget cost range (typical) for the following items.	Low	High	
Foundation			
Shallow foundation - additional due to lower allowable bearing	$ 15,000	$ 65,000	not included
Deep foundations	$ 175,000	$ 500,000	not included
Steel Tank			
Corrosion Allowance	$ 20,000	$ 35,000	not included
Reverse Cone Feature	$ 30,000	$ 45,000	not included
Steel Tank Coatings			
Logo and special colors	$ 20,000	$ 50,000	not included
Containment for Exterior sandblasting and coatings (at Grade)	$ 150,000	$ 175,000	not included
Piping and Mechanical			
Recirculation Piping	$ 25,000	$ 75,000	not included
Larger diameter inlet, outlet, overflow or valve chamber			not included
Additional control valves & related piping	$ 5,000	$ 50,000	not included
High pressure pipe rating (exceed AWWA D107 requirement)			not included
Specialty pipe materials - Type 316 SS	$ 5,000	$ 20,000	not included
Specialty pipe coatings - Fusion bonded epoxy			not included
Rechlorination system	$ 75,000	$ 75,000	not included
Accessories			
Landings - intermediate (in lieu of rest seats)	$ 10,000	$ 20,000	not included
Circular pedestal stairs from grade to upper pedestal landing	$ 250,000	$ 250,000	not included
Vehicle Door	$ 15,000	$ 25,000	not included
Tank Mixing System	$ 50,000	$ 80,000	not included
Roof Handrail - Architectural	$ 20,000	$ 40,000	not included
Roof Handrail - roof outer perimeter	$ 20,000	$ 40,000	not included
Communications			
Antenna provisions - roof mounted cellular / microwave structure	$ 60,000	$ 80,000	not included
Cable Tray System from Grade to tank roof	$ 15,000	$ 25,000	not included
Testing and Inspection - 3rd party			
Soils / Foundation	$ 5,000	$ 10,000	not included
Concrete	$ 15,000	$ 25,000	not included
Welding- Visual Inspection	$ 10,000	$ 20,000	not included
Coatings	$ 20,000	$ 30,000	not included
Other			
Schedule compression			not included
Permits and related fees			not included
Contingencies / Cash Allowances / Provisional Items			not included
Maintenance Bond			not included

Budget Pricing

Project:
CAN 0615 - South Glengarry - Glen Walter

Notes:
1. Budgets provided at pre-design are typically based on an incomplete understanding of all project details.
2. Budget refinements are required as additional project information and details become available.
3. Note the list of options and exclusions. Budget should be adjusted accordingly.
4. HST is not included

Glass Fused to Steel (BET) - Composite Elevated Tank Only [See Inclusions below]		$ 4,950,000
Allowances included (See detail in Inclusion and Exclusion Sections)		
Electrical and Controls	$ 600,000	$ 800,000
Cathodic Protection	$ 40,000	$ 40,000
Site Works - Pre Tank construction (clear / strip / grade / cut & fill / prep.)	$ 600,000	$ 800,000
Site Works - Post Tank Construction (fine grade / gravel) - Incl.		
Utility Works - Water / Storm / Sanitary - Incl.		
Landscaping	$ 60,000	$ 80,000
Paving	$ 100,000	$ 200,000
Fencing	$ 50,000	$ 80,000
HVAC/Plumbing	$ 100,000	$ 200,000

Note: Electrical, Mechanincal and Site costs vary greatly from project to project based on site conditions and complexity of systems specified

Total Budget Range with Above Allowances	$6,500,000	$ 7,150,000

Additional Project specific options and requirements that may need to be added are highlighted in the exclusions list (See below)

Inclusions:

The following have been included in the above budget:

Design Standards and Codes			
AWWA D103 - 97 - Factory Coated Bolted Tanks for Water Storage			included
Sidewall design using max. 15,000 psi Tensile Strength Steel			included
Minimum tank sidewall shell steel of 5 mm			included
Minimum tank floor steel of 3 mm			included
NBC - National Building Code of Canada			included
OBC - Ontario Building Code			included
CET Configuration and Elevations			
Total Storage Volume	1,500.00	m^3	included
Equalization Storage Volume	606.00	m^3	included
Fire Storage Volume	792.00	m^3	included
Emergency Storage Volume	102.00	m^3	included
Site Elevation - Grade	54.00	m	included
Minimum Fire + Equalization Elevation	93.40	m	included
Height from grade to Minimum Fire + Equalization Elevation	39.40	m	included
Low Water Level (LWL) Elevation (minimum)	92.80	m	included
Height from grade to LWL	38.80	m	included
Top Capacity Level (TCL) Elevation	101.00	m	included
Height from grade to TCL	47.00	m	included

Budget Pricing

Operating Range	8.20	m	included
Foundation			
Shallow ring at 2.4m ft depth (200 kPa SLS allowable soil bearing)			included
Concrete Support Structure			
AWWA D107 standard support wall	11.60	m (dia)	included
Architectural concrete with exterior rustication pattern			included
Pedestal Sweep Blast			included
Steel Tank			
AWWA D103 standard	15.35	m (dia)	included
Aluminum geodesic dome roof			included
Steel Tank Coatings			
Interior - Factory Applied Vitrium Glass Fused to Steel Coating - White			included
Exterior - Factory Applied Vitrium Glass Fused to Steel Coating - White			included
1pc - Vinyl Logo (Basic)			included
Tank Cleaning and Disinfection			included
Piping and Mechanical			
Inlet - Type 304 SS - vertical riser pipe only	300	mm	included
Outlet - Type 304 SS - vertical riser pipe only	300	mm	included
Overflow - Type 304 SS - discharge externally with Flap Valve	200	mm	included
Tank Drain - outlet / overflow crossover	150	mm	included
Inlet/Outlet Control Valves (2BFV/2CHK)			included
Pipe Heat Trace, Insulation & Jacketing (Inlet & Outlet only)			included
Accessories			
AWWA D-107 (Section 8) standard accessories			included
Galvanized ladders and rest seats			included
Safety climb system with 3 pc. harness / lanyard			included
Pedestal access - double mandoor			included
Ventilation - steel tank and concrete pedestal			included
Dome roof walkway with standard side handrail			included
Slab on grade within pedestal			included
Insulated masonary valve room with composite deck ceiling			included
Coatings - Interior floor, masonry walls.			included
Administrative			
Insurance - General, Professional and Auto			included
Insurance - All Risk			included
Bonding - 100% Performance and Payment			included
Commissioning			included
Operations/Project management, Administration			included
Temporary Site Facilities			included

Budget Pricing

Exclusions and Options:

The following have not been included in the above budget:

Probable requirements for this project are highlighted

Budget cost range (typical) for the following items.	Low	High	
Foundation			
Shallow foundation - additional due to lower allowable bearing	$ 15,000	$ 65,000	not included
Deep foundations	$ 175,000	$ 500,000	not included
Steel Tank Coatings			
Logo and special colors	$ 20,000	$ 50,000	not included
Piping and Mechanical			
Recirculation Piping	$ 25,000	$ 75,000	not included
Larger diameter inlet, outlet, overflow or valve chamber			not included
Additional control valves & related piping	$ 5,000	$ 50,000	not included
High pressure pipe rating (exceed AWWA D107 requirement)			not included
Specialty pipe materials - Type 316 SS	$ 5,000	$ 20,000	not included
Specialty pipe coatings - Fusion bonded epoxy			not included
Rechlorination System	$ 75,000	$ 75,000	not included
Accessories			
Landings - intermediate (in lieu of rest seats)	$ 10,000	$ 20,000	not included
Circular pedestal stairway from grade to upper pedestal landing	$ 420,000	$ 420,000	not included
Vehicle Door	$ 15,000	$ 25,000	not included
Tank Mixing System	$ 50,000	$ 80,000	not included
Communications			
Antenna provisions - pedestal mounted cellular	$ 25,000	$ 50,000	not included
Cable Tray System from Grade to tank roof	$ 15,000	$ 25,000	not included
Testing and Inspection - 3rd party			
Soils / Foundation	$ 5,000	$ 10,000	not included
Concrete	$ 15,000	$ 25,000	not included
Other			
Schedule compression			not included
Permits and related fees			not included
Contingencies / Cash Allowances / Provisional Items			not included
Maintenance Bond			not included

Appendix E

Cultural Heritage and Archaeological Assessments

Criteria for Built Heritage Resources and Cultural Heritage Landscapes Checklist

Criteria for Evaluating Archaeological Potential Checklist

Criteria for Evaluating Marine Archaeological Potential Checklist

Cover Letter and Stage 1 and Stage 2 Archaeological Assessment, Glen Walter Water Tower Assessment, Part of Lots 6 and 7, Concession 1 St. Regis IR, Geographic Township of Charlottenburgh, Glengarry County (The Central Archaeological Group Inc. September 8, 2023)

MCM Letter of October 12, 2023 – re: Stage 1 and Stage 2 Report Entered into Register

Ontario

Ministry of Tourism, Culture and Sport

Programs & Services Branch
401 Bay Street, Suite 1700
Toronto ON M7A 0A7

Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes

A Checklist for the Non-Specialist

The **purpose of the checklist** is to determine:

- if a property(ies) or project area:
    - is a recognized heritage property
    - may be of cultural heritage value
- it includes all areas that may be impacted by project activities, including – but not limited to:
    - the main project area
    - temporary storage
    - staging and working areas
    - temporary roads and detours

Processes covered under this checklist, such as:

- *Planning Act*
- *Environmental Assessment Act*
- *Aggregates Resources Act*
- *Ontario Heritage Act* – Standards and Guidelines for Conservation of Provincial Heritage Properties

Cultural Heritage Evaluation Report (CHER)

If you are not sure how to answer one or more of the questions on the checklist, you may want to hire a qualified person(s) (see page 5 for definitions) to undertake a cultural heritage evaluation report (CHER).

The CHER will help you:

- identify, evaluate and protect cultural heritage resources on your property or project area
- reduce potential delays and risks to a project

Other checklists

Please use a separate checklist for your project, if:

- you are seeking a Renewable Energy Approval under Ontario Regulation 359/09 – separate checklist
- your Parent Class EA document has an approved screening criteria (as referenced in Question 1)

Please refer to the Instructions pages for more detailed information and when completing this form.

Project or Property Name

Glen Walter Water Tower and Watermain Replacement

Project or Property Location (upper and lower or single tier municipality)

Glen Walter Park Road, Township of South Glengarry

Proponent Name

Sarah McDonald

Proponent Contact Information

smcdonald@southglengarry.com

Screening Questions

	Yes	No
1. Is there a pre-approved screening checklist, methodology or process in place?	☐	☑

If Yes, please follow the pre-approved screening checklist, methodology or process.

If No, continue to Question 2.

Part A: Screening for known (or recognized) Cultural Heritage Value

	Yes	No
2. Has the property (or project area) been evaluated before and found **not** to be of cultural heritage value?	☐	☑

If Yes, do **not** complete the rest of the checklist.

The proponent, property owner and/or approval authority will:

- summarize the previous evaluation and
- add this checklist to the project file, with the appropriate documents that demonstrate a cultural heritage evaluation was undertaken

The summary and appropriate documentation may be:

- submitted as part of a report requirement
- maintained by the property owner, proponent or approval authority

If No, continue to Question 3.

	Yes	No
3. Is the property (or project area):		
a. identified, designated or otherwise protected under the *Ontario Heritage Act* as being of cultural heritage value?	☐	☑
b. a National Historic Site (or part of)?	☐	☑
c. designated under the *Heritage Railway Stations Protection Act*?	☐	☑
d. designated under the *Heritage Lighthouse Protection Act*?	☐	☑
e. identified as a Federal Heritage Building by the Federal Heritage Buildings Review Office (FHBRO)?	☐	☑
f. located within a United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Site?	☐	☑

If Yes to any of the above questions, you need to hire a qualified person(s) to undertake:

- a Cultural Heritage Evaluation Report, if a Statement of Cultural Heritage Value has not previously been prepared or the statement needs to be updated

If a Statement of Cultural Heritage Value has been prepared previously and if alterations or development are proposed, you need to hire a qualified person(s) to undertake:

- a Heritage Impact Assessment (HIA) – the report will assess and avoid, eliminate or mitigate impacts

If No, continue to Question 4.

Part B: Screening for Potential Cultural Heritage Value

	Yes	No
4. Does the property (or project area) contain a parcel of land that:		
a. is the subject of a municipal, provincial or federal commemorative or interpretive plaque?	☐	☑
b. has or is adjacent to a known burial site and/or cemetery?	☐	☑
c. is in a Canadian Heritage River watershed?	☐	☑
d. contains buildings or structures that are 40 or more years old?	☐	☑

Part C: Other Considerations

	Yes	No
5. Is there local or Aboriginal knowledge or accessible documentation suggesting that the property (or project area):		
a. is considered a landmark in the local community or contains any structures or sites that are important in defining the character of the area?	☐	☑
b. has a special association with a community, person or historical event?	☐	☑
c. contains or is part of a cultural heritage landscape?	☐	☑

If Yes to one or more of the above questions (Part B and C), there is potential for cultural heritage resources on the property or within the project area.

You need to hire a qualified person(s) to undertake:

- a Cultural Heritage Evaluation Report (CHER)

If the property is determined to be of cultural heritage value and alterations or development is proposed, you need to hire a qualified person(s) to undertake:

- a Heritage Impact Assessment (HIA) – the report will assess and avoid, eliminate or mitigate impacts

If No to all of the above questions, there is low potential for built heritage or cultural heritage landscape on the property.

The proponent, property owner and/or approval authority will:

- summarize the conclusion
- add this checklist with the appropriate documentation to the project file

The summary and appropriate documentation may be:

- submitted as part of a report requirement e.g. under the *Environmental Assessment Act, Planning Act* processes
- maintained by the property owner, proponent or approval authority

Instructions

Please have the following available, when requesting information related to the screening questions below:

- a clear map showing the location and boundary of the property or project area
    - large scale and small scale showing nearby township names for context purposes
- the municipal addresses of all properties within the project area
- the lot(s), concession(s), and parcel number(s) of all properties within a project area

For more information, see the Ministry of Tourism, Culture and Sport's Ontario Heritage Toolkit or Standards and Guidelines for Conservation of Provincial Heritage Properties.

In this context, the following definitions apply:

- **qualified person(s)** means individuals – professional engineers, architects, archaeologists, etc. – having relevant, recent experience in the conservation of cultural heritage resources.
- **proponent** means a person, agency, group or organization that carries out or proposes to carry out an undertaking or is the owner or person having charge, management or control of an undertaking.

1. Is there a pre-approved screening checklist, methodology or process in place?

An existing checklist, methodology or process may already be in place for identifying potential cultural heritage resources, including:

- one endorsed by a municipality
- an environmental assessment process e.g. screening checklist for municipal bridges
- one that is approved by the Ministry of Tourism, Culture and Sport (MTCS) under the Ontario government's Standards & Guidelines for Conservation of Provincial Heritage Properties [s.B.2.]

Part A: Screening for known (or recognized) Cultural Heritage Value

2. Has the property (or project area) been evaluated before and found not to be of cultural heritage value?

Respond 'yes' to this question, if all of the following are true:

A property can be considered not to be of cultural heritage value if:

- a Cultural Heritage Evaluation Report (CHER) - or equivalent - has been prepared for the property with the advice of a qualified person and it has been determined not to be of cultural heritage value and/or
- the municipal heritage committee has evaluated the property for its cultural heritage value or interest and determined that the property is not of cultural heritage value or interest

A property may need to be re-evaluated, if:

- there is evidence that its heritage attributes may have changed
- new information is available
- the existing Statement of Cultural Heritage Value does not provide the information necessary to manage the property
- the evaluation took place after 2005 and did not use the criteria in Regulations 9/06 and 10/06

Note: Ontario government ministries and public bodies [prescribed under Regulation 157/10] may continue to use their existing evaluation processes, until the evaluation process required under section B.2 of the Standards & Guidelines for Conservation of Provincial Heritage Properties has been developed and approved by MTCS.

To determine if your property or project area has been evaluated, contact:

- the approval authority
- the proponent
- the Ministry of Tourism, Culture and Sport

3a. Is the property (or project area) identified, designated or otherwise protected under the *Ontario Heritage Act* as being of cultural heritage value e.g.:

i. designated under the *Ontario Heritage Act*

- individual designation (Part IV)
- part of a heritage conservation district (Part V)

Individual Designation – Part IV

A property that is designated:

- by a municipal by-law as being of cultural heritage value or interest [s.29 of the *Ontario Heritage Act*]
- by order of the Minister of Tourism, Culture and Sport as being of cultural heritage value or interest of provincial significance [s.34.5]. **Note**: To date, no properties have been designated by the Minister.

Heritage Conservation District – Part V

A property or project area that is located within an area designated by a municipal by-law as a heritage conservation district [s. 41 of the *Ontario Heritage Act*].

For more information on Parts IV and V, contact:

- municipal clerk
- Ontario Heritage Trust
- local land registry office (for a title search)

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ii. subject of an agreement, covenant or easement entered into under Parts II or IV of the *Ontario Heritage Act*

An agreement, covenant or easement is usually between the owner of a property and a conservation body or level of government. It is usually registered on title.

The primary purpose of the agreement is to:

- preserve, conserve, and maintain a cultural heritage resource
- prevent its destruction, demolition or loss

For more information, contact:

- Ontario Heritage Trust - for an agreement, covenant or easement [clause 10 (1) (c) of the *Ontario Heritage Act*]
- municipal clerk – for a property that is the subject of an easement or a covenant [s.37 of the *Ontario Heritage Act*]
- local land registry office (for a title search)

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iii. listed on a register of heritage properties maintained by the municipality

Municipal registers are the official lists - or record - of cultural heritage properties identified as being important to the community.

Registers include:

- all properties that are designated under the *Ontario Heritage Act* (Part IV or V)
- properties that have not been formally designated, but have been identified as having cultural heritage value or interest to the community

For more information, contact:

- municipal clerk
- municipal heritage planning staff
- municipal heritage committee

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iv. subject to a notice of:

- intention to designate (under Part IV of the *Ontario Heritage Act*)
- a Heritage Conservation District study area bylaw (under Part V of the *Ontario Heritage Act*)

A property that is subject to a **notice of intention to designate** as a property of cultural heritage value or interest and the notice is in accordance with:

- section 29 of the *Ontario Heritage Act*
- section 34.6 of the *Ontario Heritage Act.* **Note**: To date, the only applicable property is Meldrum Bay Inn, Manitoulin Island. [s.34.6]

An area designated by a municipal by-law made under section 40.1 of the *Ontario Heritage Act* as a **heritage conservation district study area**.

For more information, contact:

- municipal clerk – for a property that is the subject of notice of intention [s. 29 and s. 40.1]
- Ontario Heritage Trust

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v. included in the Ministry of Tourism, Culture and Sport's list of provincial heritage properties

Provincial heritage properties are properties the Government of Ontario owns or controls that have cultural heritage value or interest.

The Ministry of Tourism, Culture and Sport (MTCS) maintains a list of all provincial heritage properties based on information provided by ministries and prescribed public bodies. As they are identified, MTCS adds properties to the list of provincial heritage properties.

For more information, contact the MTCS Registrar at registrar@ontario.ca.

3b. Is the property (or project area) a National Historic Site (or part of)?

National Historic Sites are properties or districts of national historic significance that are designated by the Federal Minister of the Environment, under the *Canada National Parks Act*, based on the advice of the Historic Sites and Monuments Board of Canada.

For more information, see the National Historic Sites website.

3c. Is the property (or project area) designated under the *Heritage Railway Stations Protection Act*?

The *Heritage Railway Stations Protection Act* protects heritage railway stations that are owned by a railway company under federal jurisdiction. Designated railway stations that pass from federal ownership may continue to have cultural heritage value.

For more information, see the Directory of Designated Heritage Railway Stations.

3d. Is the property (or project area) designated under the *Heritage Lighthouse Protection Act*?

The *Heritage Lighthouse Protection Act* helps preserve historically significant Canadian lighthouses. The Act sets up a public nomination process and includes heritage building conservation standards for lighthouses which are officially designated.

For more information, see the Heritage Lighthouses of Canada website.

3e. Is the property (or project area) identified as a Federal Heritage Building by the Federal Heritage Buildings Review Office?

The role of the Federal Heritage Buildings Review Office (FHBRO) is to help the federal government protect the heritage buildings it owns. The policy applies to all federal government departments that administer real property, but not to federal Crown Corporations.

For more information, contact the Federal Heritage Buildings Review Office.

See a directory of all federal heritage designations.

3f. Is the property (or project area) located within a United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Site?

A UNESCO World Heritage Site is a place listed by UNESCO as having outstanding universal value to humanity under the Convention Concerning the Protection of the World Cultural and Natural Heritage. In order to retain the status of a World Heritage Site, each site must maintain its character defining features.

Currently, the Rideau Canal is the only World Heritage Site in Ontario.

For more information, see Parks Canada – World Heritage Site website.

Part B: Screening for potential Cultural Heritage Value

4a. Does the property (or project area) contain a parcel of land that has a municipal, provincial or federal commemorative or interpretive plaque?

Heritage resources are often recognized with formal plaques or markers.

Plaques are prepared by:

- municipalities
- provincial ministries or agencies
- federal ministries or agencies
- local non-government or non-profit organizations

For more information, contact:

- municipal heritage committees or local heritage organizations – for information on the location of plaques in their community
- Ontario Historical Society's Heritage directory – for a list of historical societies and heritage organizations
- Ontario Heritage Trust – for a list of plaques commemorating Ontario's history
- Historic Sites and Monuments Board of Canada – for a list of plaques commemorating Canada's history

4b. Does the property (or project area) contain a parcel of land that has or is adjacent to a known burial site and/or cemetery?

For more information on known cemeteries and/or burial sites, see:

- Cemeteries Regulations, Ontario Ministry of Consumer Services – for a database of registered cemeteries
- Ontario Genealogical Society (OGS) – to locate records of Ontario cemeteries, both currently and no longer in existence; cairns, family plots and burial registers
- Canadian County Atlas Digital Project – to locate early cemeteries

In this context, adjacent means contiguous or as otherwise defined in a municipal official plan.

4c. Does the property (or project area) contain a parcel of land that is in a Canadian Heritage River watershed?

The Canadian Heritage River System is a national river conservation program that promotes, protects and enhances the best examples of Canada's river heritage.

Canadian Heritage Rivers must have, and maintain, outstanding natural, cultural and/or recreational values, and a high level of public support.

For more information, contact the Canadian Heritage River System.

If you have questions regarding the boundaries of a watershed, please contact:

- your conservation authority
- municipal staff

4d. Does the property (or project area) contain a parcel of land that contains buildings or structures that are 40 or more years old?

A 40 year 'rule of thumb' is typically used to indicate the potential of a site to be of cultural heritage value. The approximate age of buildings and/or structures may be estimated based on:

- history of the development of the area
- fire insurance maps
- architectural style
- building methods

Property owners may have information on the age of any buildings or structures on their property. The municipality, local land registry office or library may also have background information on the property.

Note: 40+ year old buildings or structure do not necessarily hold cultural heritage value or interest; their age simply indicates a higher potential.

A building or structure can include:

- residential structure
- farm building or outbuilding
- industrial, commercial, or institutional building
- remnant or ruin
- engineering work such as a bridge, canal, dams, etc.

For more information on researching the age of buildings or properties, see the Ontario Heritage Tool Kit Guide Heritage Property Evaluation.

Part C: Other Considerations

5a. Is there local or Aboriginal knowledge or accessible documentation suggesting that the property (or project area) is considered a landmark in the local community or contains any structures or sites that are important to defining the character of the area?

Local or Aboriginal knowledge may reveal that the project location is situated on a parcel of land that has potential landmarks or defining structures and sites, for instance:

- buildings or landscape features accessible to the public or readily noticeable and widely known
- complexes of buildings
- monuments
- ruins

5b. Is there local or Aboriginal knowledge or accessible documentation suggesting that the property (or project area) has a special association with a community, person or historical event?

Local or Aboriginal knowledge may reveal that the project location is situated on a parcel of land that has a special association with a community, person or event of historic interest, for instance:

- Aboriginal sacred site
- traditional-use area
- battlefield
- birthplace of an individual of importance to the community

5c. Is there local or Aboriginal knowledge or accessible documentation suggesting that the property (or project area) contains or is part of a cultural heritage landscape?

Landscapes (which may include a combination of archaeological resources, built heritage resources and landscape elements) may be of cultural heritage value or interest to a community.

For example, an Aboriginal trail, historic road or rail corridor may have been established as a key transportation or trade route and may have been important to the early settlement of an area. Parks, designed gardens or unique landforms such as waterfalls, rock faces, caverns, or mounds are areas that may have connections to a particular event, group or belief.

For more information on Questions 5.a., 5.b. and 5.c., contact:

- Elders in Aboriginal Communities or community researchers who may have information on potential cultural heritage resources. Please note that Aboriginal traditional knowledge may be considered sensitive.
- municipal heritage committees or local heritage organizations
- Ontario Historical Society's "Heritage Directory" - for a list of historical societies and heritage organizations in the province

An internet search may find helpful resources, including:

- historical maps
- historical walking tours
- municipal heritage management plans
- cultural heritage landscape studies
- municipal cultural plans

Information specific to trails may be obtained through Ontario Trails.

Ontario

Ministry of Tourism, Culture and Sport

Programs & Services Branch
401 Bay Street, Suite 1700
Toronto ON M7A 0A7

Criteria for Evaluating Archaeological Potential

A Checklist for the Non-Specialist

The **purpose of the checklist** is to determine:

- if a property(ies) or project area may contain archaeological resources i.e., have archaeological potential
- it includes all areas that may be impacted by project activities, including – but not limited to:
  - the main project area
  - temporary storage
  - staging and working areas
  - temporary roads and detours

Processes covered under this checklist, such as:

- *Planning Act*
- *Environmental Assessment Act*
- *Aggregates Resources Act*
- *Ontario Heritage Act* – Standards and Guidelines for Conservation of Provincial Heritage Properties

Archaeological assessment

If you are not sure how to answer one or more of the questions on the checklist, you may want to hire a licensed consultant archaeologist (see page 4 for definitions) to undertake an archaeological assessment.

The assessment will help you:

- identify, evaluate and protect archaeological resources on your property or project area
- reduce potential delays and risks to your project

Note: By law, archaeological assessments **must** be done by a licensed consultant archaeologist. Only a licensed archaeologist can assess – or alter – an archaeological site.

What to do if you:

- **find an archaeological resource**

  If you find something you think may be of archaeological value during project work, you must – by law – stop all activities immediately and contact a licensed consultant archaeologist

  The archaeologist will carry out the fieldwork in compliance with the *Ontario Heritage Act* [s.48(1)].

- **unearth a burial site**

  If you find a burial site containing human remains, you must immediately notify the appropriate authorities (i.e., police, coroner's office, and/or Registrar of Cemeteries) and comply with the *Funeral, Burial and Cremation Services Act*.

Other checklists

Please use a separate checklist for your project, if:

- you are seeking a Renewable Energy Approval under Ontario Regulation 359/09 – separate checklist
- your Parent Class EA document has an approved screening criteria (as referenced in Question 1)

Please refer to the Instructions pages when completing this form.

Project or Property Name

Glen Walter Water Tower and Watermain Replacement

Project or Property Location (upper and lower or single tier municipality)

Glen Walter Park Road, Township of South Glengarry

Proponent Name

Sarah McDonald

Proponent Contact Information

smcdonald@southglengarry.com

Screening Questions

	Yes	No
1. Is there a pre-approved screening checklist, methodology or process in place?	☐	☑

If Yes, please follow the pre-approved screening checklist, methodology or process.

If No, continue to Question 2.

	Yes	No
2. Has an archaeological assessment been prepared for the property (or project area) and been accepted by MTCS?	☐	☑

If Yes, do **not** complete the rest of the checklist. You are expected to follow the recommendations in the archaeological assessment report(s).

The proponent, property owner and/or approval authority will:

- summarize the previous assessment
- add this checklist to the project file, with the appropriate documents that demonstrate an archaeological assessment was undertaken e.g., MTCS letter stating acceptance of archaeological assessment report

The summary and appropriate documentation may be:

- submitted as part of a report requirement e.g., environmental assessment document
- maintained by the property owner, proponent or approval authority

If No, continue to Question 3.

	Yes	No
3. Are there known archaeological sites on or within 300 metres of the property (or the project area)?	☐	☑
4. Is there Aboriginal or local knowledge of archaeological sites on or within 300 metres of the property (or project area)?	☐	☑
5. Is there Aboriginal knowledge or historically documented evidence of past Aboriginal use on or within 300 metres of the property (or project area)?	☐	☑
6. Is there a known burial site or cemetery on the property or adjacent to the property (or project area)?	☐	☑
7. Has the property (or project area) been recognized for its cultural heritage value?	☐	☑

If Yes to any of the above questions (3 to 7), do **not** complete the checklist. Instead, you need to hire a licensed consultant archaeologist to undertake an archaeological assessment of your property or project area.

If No, continue to question 8.

	Yes	No
8. Has the entire property (or project area) been subjected to recent, extensive and intensive disturbance?	☐	☑

If Yes to the preceding question, do **not** complete the checklist. Instead, please keep and maintain a summary of documentation that provides evidence of the recent disturbance.

An archaeological assessment is not required.

If No, continue to question 9.

	Yes	No
9. Are there present or past water sources within 300 metres of the property (or project area)?	☑	☐

If Yes, an archaeological assessment is required.

If No, continue to question 10.

	Yes	No
10. Is there evidence of two or more of the following on the property (or project area)?	☐	☐

- elevated topography
- pockets of well-drained sandy soil
- distinctive land formations
- resource extraction areas
- early historic settlement
- early historic transportation routes

If Yes, an archaeological assessment is required.

If No, there is low potential for archaeological resources at the property (or project area).

The proponent, property owner and/or approval authority will:

- summarize the conclusion
- add this checklist with the appropriate documentation to the project file

The summary and appropriate documentation may be:

- submitted as part of a report requirement e.g., under the *Environmental Assessment Act, Planning Act* processes
- maintained by the property owner, proponent or approval authority

Instructions

Please have the following available, when requesting information related to the screening questions below:

- a clear map showing the location and boundary of the property or project area
  - large scale and small scale showing nearby township names for context purposes
- the municipal addresses of all properties within the project area
- the lot(s), concession(s), and parcel number(s) of all properties within a project area

In this context, the following definitions apply:

- **consultant archaeologist** means, as defined in Ontario regulation as an archaeologist who enters into an agreement with a client to carry out or supervise archaeological fieldwork on behalf of the client, produce reports for or on behalf of the client and provide technical advice to the client. In Ontario, these people also are required to hold a valid professional archaeological licence issued by the Ministry of Tourism, Culture and Sport.
- **proponent** means a person, agency, group or organization that carries out or proposes to carry out an undertaking or is the owner or person having charge, management or control of an undertaking.

1. Is there a pre-approved screening checklist, methodology or process in place?

An existing checklist, methodology or process may be already in place for identifying archaeological potential, including:

- one prepared and adopted by the municipality e.g., archaeological management plan
- an environmental assessment process e.g., screening checklist for municipal bridges
- one that is approved by the Ministry of Tourism, Culture and Sport under the Ontario government's Standards & Guidelines for Conservation of Provincial Heritage Properties [s. B.2.]

2. Has an archaeological assessment been prepared for the property (or project area) and been accepted by MTCS?

Respond 'yes' to this question, if all of the following are true:

- an archaeological assessment report has been prepared and is in compliance with MTCS requirements
  - a letter has been sent by MTCS to the licensed archaeologist confirming that MTCS has added the report to the Ontario Public Register of Archaeological Reports (Register)
- the report states that there are no concerns regarding impacts to archaeological sites

Otherwise, if an assessment has been completed and deemed compliant by the MTCS, and the ministry recommends further archaeological assessment work, this work will need to be completed.

For more information about archaeological assessments, contact:

- approval authority
- proponent
- consultant archaeologist
- Ministry of Tourism, Culture and Sport at archaeology@ontario.ca

3. Are there known archaeological sites on or within 300 metres of the property (or project area)?

MTCS maintains a database of archaeological sites reported to the ministry.

For more information, contact MTCS Archaeological Data Coordinator at archaeology@ontario.ca.

4. Is there Aboriginal or local knowledge of archaeological sites on or within 300 metres of the property?

Check with:

- Aboriginal communities in your area
- local municipal staff

They may have information about archaeological sites that are not included in MTCS' database.

Other sources of local knowledge may include:

- property owner
- local heritage organizations and historical societies
- local museums
- municipal heritage committee
- published local histories

5. Is there Aboriginal knowledge or historically documented evidence of past Aboriginal use on or within 300 metres of the property (or property area)?

Check with:

- Aboriginal communities in your area
- local municipal staff

Other sources of local knowledge may include:

- property owner
- local heritage organizations and historical societies
- local museums
- municipal heritage committee
- published local histories

6. Is there a known burial site or cemetery on the property or adjacent to the property (or project area)?

For more information on known cemeteries and/or burial sites, see:

- Cemeteries Regulation Unit, Ontario Ministry of Consumer Services – for database of registered cemeteries
- Ontario Genealogical Society (OGS) – to locate records of Ontario cemeteries, both currently and no longer in existence; cairns, family plots and burial registers
- Canadian County Atlas Digital Project – to locate early cemeteries

In this context, 'adjacent' means 'contiguous', or as otherwise defined in a municipal official plan.

7. Has the property (or project area) been recognized for its cultural heritage value?

There is a strong chance there may be archaeological resources on your property (or immediate area) if it has been listed, designated or otherwise identified as being of cultural heritage value by:

- your municipality
- Ontario government
- Canadian government

This includes a property that is:

- designated under *Ontario Heritage Act* (the OHA), including:
  - individual designation (Part IV)
  - part of a heritage conservation district (Part V)
  - an archaeological site (Part VI)
- subject to:
  - an agreement, covenant or easement entered into under the OHA (Parts II or IV)
  - a notice of intention to designate (Part IV)
  - a heritage conservation district study area by-law (Part V) of the OHA
- listed on:
  - a municipal register or inventory of heritage properties
  - Ontario government's list of provincial heritage properties
  - Federal government's list of federal heritage buildings
- part of a:
  - National Historic Site
  - UNESCO World Heritage Site
- designated under:
  - *Heritage Railway Station Protection Act*
  - *Heritage Lighthouse Protection Act*
- subject of a municipal, provincial or federal commemorative or interpretive plaque.

To determine if your property or project area is covered by any of the above, see:

- Part A of the MTCS Criteria for Evaluating Potential for Built Heritage and Cultural Heritage Landscapes

Part VI – Archaeological Sites

Includes five sites designated by the Minister under Regulation 875 of the Revised Regulation of Ontario, 1990 (Archaeological Sites) and 3 marine archaeological sites prescribed under Ontario Regulation 11/06.

For more information, check Regulation 875 and Ontario Regulation 11/06.

8. Has the entire property (or project area) been subjected to recent extensive and intensive ground disturbance?

Recent: after-1960

Extensive: over all or most of the area

Intensive: thorough or complete disturbance

Examples of ground disturbance include:

- quarrying
- major landscaping – involving grading below topsoil
- building footprints and associated construction area
  - where the building has deep foundations or a basement
- infrastructure development such as:
  - sewer lines
  - gas lines
  - underground hydro lines
  - roads
  - any associated trenches, ditches, interchanges. **Note**: this applies only to the excavated part of the right-of-way; the remainder of the right-of-way or corridor may not have been impacted.

A ground disturbance does **not** include:

- agricultural cultivation
- gardening
- landscaping

Site visits

You can typically get this information from a site visit. In that case, please document your visit in the process (e.g., report) with:

- photographs
- maps
- detailed descriptions

If a disturbance isn't clear from a site visit or other research, you need to hire a licensed consultant archaeologist to undertake an archaeological assessment.

9. Are there present or past water bodies within 300 metres of the property (or project area)?

Water bodies are associated with past human occupations and use of the land. About 80-90% of archaeological sites are found within 300 metres of water bodies.

Present

- Water bodies:
  - primary - lakes, rivers, streams, creeks
  - secondary - springs, marshes, swamps and intermittent streams and creeks
- accessible or inaccessible shoreline, for example:
  - high bluffs
  - swamps
  - marsh fields by the edge of a lake
  - sandbars stretching into marsh

Water bodies not included:

- man-made water bodies, for example:
  - temporary channels for surface drainage
  - rock chutes and spillways
  - temporarily ponded areas that are normally farmed
  - dugout ponds
- artificial bodies of water intended for storage, treatment or recirculation of:
  - runoff from farm animal yards
  - manure storage facilities
  - sites and outdoor confinement areas

Past

Features indicating past water bodies:

- raised sand or gravel beach ridges – can indicate glacial lake shorelines
- clear dip in the land – can indicate an old river or stream
- shorelines of drained lakes or marshes
- cobble beaches

You can get information about water bodies through:

- a site visit
- aerial photographs
- 1:10,000 scale Ontario Base Maps - or equally detailed and scaled maps.

10. Is there evidence of two or more of the following on the property (or project area)?

- elevated topography
- pockets of well-drained sandy soil
- distinctive land formations
- resource extraction areas
- early historic settlement
- early historic transportation routes

- **Elevated topography**

  Higher ground and elevated positions - surrounded by low or level topography - often indicate past settlement and land use.

  Features such as eskers, drumlins, sizeable knolls, plateaus next to lowlands, or other such features are a strong indication of archaeological potential.

  Find out if your property or project area has elevated topography, through:

  - site inspection
  - aerial photographs
  - topographical maps

- **Pockets of well-drained sandy soil, especially within areas of heavy soil or rocky ground**

  Sandy, well-drained soil - in areas characterized by heavy soil or rocky ground - may indicate archaeological potential

  Find out if your property or project area has sandy soil through:

  - site inspection
  - soil survey reports

- **Distinctive land formations**

  Distinctive land formations include – but are not limited to:

  - waterfalls
  - rock outcrops
  - rock faces
  - caverns
  - mounds, etc.

  They were often important to past inhabitants as special or sacred places. The following sites may be present – or close to – these formations:

  - burials
  - structures
  - offerings
  - rock paintings or carvings

  Find out if your property or project areas has a distinctive land formation through:

  - a site visit
  - aerial photographs
  - 1:10,000 scale Ontario Base Maps - or equally detailed and scaled maps.

- **Resource extraction areas**

  The following resources were collected in these extraction areas:

  - food or medicinal plants e.g., migratory routes, spawning areas, prairie
  - scarce raw materials e.g., quartz, copper, ochre or outcrops of chert
  - resources associated with early historic industry e.g., fur trade, logging, prospecting, mining

  Aboriginal communities may hold traditional knowledge about their past use or resources in the area.

- **Early historic settlement**

  Early Euro-Canadian settlement include – but are not limited to:

  - early military or pioneer settlement e.g., pioneer homesteads, isolated cabins, farmstead complexes
  - early wharf or dock complexes
  - pioneers churches and early cemeteries

  For more information, see below – under the early historic transportation routes.

- **Early historic transportation routes** - such as trails, passes, roads, railways, portage routes, canals.

  For more information, see:

  - historical maps and/or historical atlases
    - for information on early settlement patterns such as trails (including Aboriginal trails), monuments, structures, fences, mills, historic roads, rail corridors, canals, etc.
    - Archives of Ontario holds a large collection of historical maps and historical atlases
    - digital versions of historic atlases are available on the Canadian County Atlas Digital Project
  - commemorative markers or plaques such as local, provincial or federal agencies
  - municipal heritage committee or other local heritage organizations
    - for information on early historic settlements or landscape features (e.g., fences, mill races, etc.)
    - for information on commemorative markers or plaques

Ontario

Ministry of Tourism, Culture and Sport

Programs & Services Branch
401 Bay Street, Suite 1700
Toronto ON M7A 0A7

Criteria for Evaluating Marine Archaeological Potential
A Checklist for Non-Marine Archaeologists

Purpose

The **purpose of this checklist** is to help proponents determine:

- if a property or project area may contain marine archaeological resources or have marine archaeological potential

A marine archaeological site is fully or partially submerged, or lies below or partially below the high-water mark of any body of water.

The property or project area includes all submerged areas that may be impacted by project activities, including, but not limited to:

- the main project area
- temporary storage and stockpiling locations
- staging and work areas, such as docking platforms and dredging locations
- temporary features such as access routes, anchors, moorings and cofferdams.

Please refer to the **instructions** on pages 4 through 9 when completing this checklist

Processes covered

- *Planning Act*
- *Environmental Assessment Act*
- *Aggregate Resources Act*
- *Ontario Heritage Act*
  - Standards & Guidelines for Conservation of Provincial Heritage Properties
- *Canadian Environmental Assessment Act*
- *Canada Shipping Act*

Marine archaeological assessment

The assessment will help you:

- identify, evaluate and protect marine archaeological resources on your property or project area
- reduce potential delays and risks to your project

If you are not sure how to answer one or more of the questions on the checklist, you may want to hire a licensed marine archaeologist (defined on page 5) to undertake a marine archaeological assessment.

Note: Under Part VI of the *Ontario Heritage Act*, all marine archaeological assessments **must** be done by a licensed marine archaeologist. Only a licensed marine archaeologist can assess – or alter – a marine archaeological site.

Have you found a site?

If you find something you think may be of marine archaeological value during project work, you **must** – by law – stop all activities immediately and contact a licensed marine archaeologist. The marine archaeologist will carry out the fieldwork in compliance with the *Ontario Heritage Act*.

Have you found human remains?

If you find remains (e.g., bones) that could be of human origin, you **must** – by law - immediately notify the appropriate authorities (police, coroner's office, or Registrar of Cemeteries) and comply with the *Funeral, Burial and Cremation Services Act*.

Other Checklists

Please use a separate checklist for your project if:

- your Parent Class EA document has approved screening criteria
- your ministry's or prescribed public body's approved Identification and Evaluation Process includes approved screening criteria

Project or Property Name
Glen Walter Water Tower and Watermain Replacement

Project or Property Location (upper and lower or single tier municipality)
Glen Walter Park Road, Township of South Glengarry

Proponent Name
Sarah McDonald

Proponent Contact Information

Telephone Number	Fax Number	Email Address
		smcdonald@southglengarry.com

Screening Questions

1. Is there a government-authorized, pre-approved screening checklist, methodology or process in place?

☐ Yes ☑ No

If **Yes**, please follow the pre-approved screening checklist, methodology or process. Do not complete the rest of this checklist.
If **No**, continue to Question 2.

2. Has a marine archaeological assessment been prepared for the property or project area and been entered by MTCS into the Ontario Public Register of Archaeological Reports?

☐ Yes ☑ No

If **Yes**, do **not** complete the rest of the checklist. You are expected to follow the recommendations in the marine archaeological assessment report(s).

The proponent and/or approval authority will:

- summarize the previous marine archaeological assessment
- follow any recommendations for further marine archaeological assessment work, as applicable
- add this checklist to the project file, with the appropriate documents that demonstrate a marine archaeological assessment was undertaken (e.g. MTCS letter that states that the report has been entered into the Ontario Public Register of Archaeological Reports)

The summary and appropriate documentation may be:

- submitted as part of a report requirement, e.g. environmental assessment document
- maintained by the proponent or approval authority

If **No**, continue to Question 3.

3. Are there known marine or land-based archaeological sites on or within 500 metres of the property or project area?

☐ Yes ☑ No

4. Is there Aboriginal or local knowledge of marine or land-based archaeological sites on or within 500 metres of the property or project area?

☐ Yes ☑ No

5. Is there Aboriginal knowledge or historically documented evidence of past Aboriginal use on or within 500 metres of the property or project area?

☐ Yes ☑ No

6. Is there a known burial site or cemetery on the property or adjacent to the property or project area?

☐ Yes ☑ No

7. Has the property or project area been recognized for its cultural heritage value?

☐ Yes ☑ No

If **Yes** to any of questions 3 to 7, do **not** complete the checklist. Your property or project area could contain marine archaeological resources: please hire a licensed marine archaeologist to conduct a marine archaeological assessment.
If **No**, continue to Question 8.

8. Has the entire property or project area been subjected to recent, extensive and intensive disturbance?

☐ Yes ☑ No

If **Yes**, do **not** complete the checklist. Instead, please keep and maintain a summary of documentation that provides evidence of the recent disturbance. A marine archaeological assessment is not required.
If **No**, continue to Question 9.

9. Are there two or more reported or registered ship wreck sites or reports of lost ships within a five kilometre radius of the property or project area?

☐ Yes ☑ No

If **Yes**, a marine archaeological assessment is required.

If **No**, continue to Question 10.

10. Is the property or project area within one kilometre of an active or historic harbour, seaplane or floatplane base, tunnel, ferry route, marine terminal, or winter road?

☐ Yes ☑ No

If **Yes**, a marine archaeological assessment is required.

If **No**, continue to Question 11.

11. Where the project impacts fourth order or higher watercourses, are there existing narrows, rapids, waterfalls or does the watercourse enter or leave a body of water within 300 metres of the property or project area?

☐ Yes ☑ No

If **Yes**, a marine archaeological assessment is required.

If **No**, continue to Question 12.

12. Are there potential built heritage or cultural heritage landscape resources that may be of cultural heritage value or interest adjacent to the watercourse or water body?

☐ Yes ☑ No

If **Yes**, a marine archaeological assessment is required.

If **No**, continue to Question 13.

13. Are there inundated beaches, bluffs, lakeshores, streams or river banks within 300 metres of the property or project area?

☐ Yes ☑ No

If **Yes**, a marine archaeological assessment is required.

If **No**, continue to Question 14.

14. Are there inundated beaches, lakeshores or river/creek banks beyond 300 metres and at greater depth than the project area with evidence of two or more of the following in the project area?

- elevated bathymetric features such as drumlins, eskers, kames, ridges, etc.
- pockets of sandy lakebed
- distinctive bathymetric formations such as escarpments, shoals, promontories, reefs, etc.
- inundated resource extraction areas (quarry, fishery)
- inundated historical settlement including built heritage resources or cultural heritage landscapes
- inundated historical transportation routes

☐ Yes ☑ No

If **Yes**, a marine archaeological assessment is required.

If **No**, there is low potential for marine archaeological resources at the property (or project area).

The proponent, property owner and/or approval authority will:

- summarize the conclusion
- add this checklist with the appropriate documentation to the project report or file

The summary and appropriate documentation may be:

- submitted as part of a report requirement, e.g. under the *Environmental Assessment Act*, *Planning Act* processes
- maintained and retained by the property owner, proponent or approval authority

Instructions

Please have the following available, when requesting information related to the screening questions:

- a clear map or chart showing the location and boundary of the property or project area
  - large scale and small scale maps/charts showing nearby islands or township names for context
- the municipal addresses of all properties or water lots within or adjacent to the project area, if any
- the lot, concession, parcel number or mining claims of any properties within the project area

In this context, the following definitions apply:

- **licensed marine archaeologist** means an archaeologist who has a valid marine archaeology licence issued by the Ministry of Tourism, Culture and Sport to practice in Ontario. As a consultant, a licensed marine archaeologist enters into an agreement with a client to carry out or supervise marine archaeological work on behalf of the client, produce reports for or on behalf of the client and provide technical advice to the client.
- **proponent** means a person, agency, group or organization that carries out or proposes to carry out an undertaking or is the owner or person having charge, management or control of an undertaking.

1. Is there a pre-approved screening checklist, methodology or process in place?

An existing checklist, methodology or process may be already in place to identify marine archaeological potential, including:

- one prepared and adopted by the municipality, such as an archaeological management plan
- an environmental assessment process, such as a screening checklist for municipal bridges
- projects being reviewed under the Canadian *Environmental Assessment Act*.
- one that is approved by the Ministry of Tourism, Culture and Sport under the Ontario government's Standards & Guidelines for Conservation of Provincial Heritage Properties [s. B.2.]

2. Has a marine archaeological assessment been prepared for the property or project area and been entered into the Ontario Public register of Archaeological Reports?

Respond 'yes' to this question, if all of the following are true:

- a marine archaeological assessment report has been prepared and complies with MTCS requirements
  - a letter has been sent by MTCS to the licensed marine archaeologist confirming that MTCS has entered the report into to the Ontario Public Register of Archaeological Reports (Register)
- the report contains a recommendation stating that there are no further concerns regarding impacts to marine archaeological sites

If a marine archaeological assessment report has been completed and deemed compliant by MTCS, and the report contains a recommendation that further marine archaeological assessment work be undertaken, this work will need to be completed.

For more information about previously conducted marine archaeological assessments, contact:

- approval authority (such as a municipality or conservation authority)
- proponent for whom the marine archaeological assessment was carried out
- consultant archaeologist qualified to hold a marine archaeology licence in Ontario
- Ministry of Tourism, Culture and Sport at archaeology@ontario.ca

3. Are there known marine or land-based archaeological sites on or within 500 metres of the property or project area?

MTCS maintains a database of marine and land-based archaeological sites reported to the ministry. Land-based archaeological sites may extend into adjacent waterbodies.

For more information, contact MTCS Archaeological Data Coordinator at archaeology@ontario.ca.

4. Is there Aboriginal or local knowledge of marine or land-based archaeological sites on or within 500 metres of the property or project area?

Check with:

- Aboriginal communities in your area
- local municipal staff

Aboriginal communities may have knowledge that can contribute to the identification of cultural heritage resources, and we suggest that any engagement with Aboriginal communities includes a discussion about known or potential cultural heritage resources that are of value to these communities. Aboriginal communities and local municipal staff may have information about marine archaeological sites that are not included in the MTCS database or reported to the ministry.

Other sources of local knowledge include the following:

- property owner
- local heritage organizations and historical societies, Association for Great Lakes Maritime History
- local and provincial dive organizations (Save Ontario Shipwrecks, Ontario Underwater Council), Preserve Our Wrecks, Ontario Marine Heritage Committee)
- local dive shops
- local amateur divers and diving associations
- local museums
- municipal heritage committees
- published local histories

5. Is there Aboriginal knowledge or historically documented evidence of past Aboriginal use on or within 500 metres of the property or project area?

Check with:

- Aboriginal communities in your area
- local municipal staff

Other sources of local knowledge include the following:

- property owner
- local heritage organizations and historical societies
- local museums
- municipal heritage committees
- published local histories

6. Is there a known burial site or cemetery on the property or adjacent to the property or project area?

For more information on known cemeteries or burial sites contact the following:

- Cemeteries Regulation Unit, Ontario Ministry of Consumer Services – for database of registered cemeteries
- Ontario Genealogical Society (OGS) – to locate records of Ontario cemeteries, both currently and no longer in existence; cairns, family plots and burial registers
- Canadian County Atlas Digital Project – to locate early cemeteries

In this context, ‘adjacent’ means ‘contiguous’, or as otherwise defined in a municipal official plan.

When wrecks are associated with a loss of life, the area in the vicinity of the wreck may be established as a cemetery.

7. Has the property or project area been recognized for its cultural heritage value?

There is a strong chance there may be marine archaeological resources on the property or project area if it has been listed, designated or otherwise identified as being of cultural heritage value by:

- Municipal government
- Ontario government
- Canadian government

This includes a property that is:

- designated under *Ontario Heritage Act* (the OHA), including:
  - individual designation (Part IV)
  - part of a heritage conservation district (Part V)
  - a land or marine archaeological site (Part VI)
- subject to:
  - an agreement, covenant or easement entered into under the OHA (Parts II or IV)
  - a notice of intention to designate (Part IV)
  - a heritage conservation district study area by-law (Part V) of the OHA
- included on:
  - a municipal register or inventory of heritage properties
  - Ontario government's list of provincial heritage properties
  - Federal government's list of federal heritage buildings
- part of a:
  - National Historic Site
  - UNESCO World Heritage Site
- designated under:
  - *Heritage Railway Station Protection Act*
  - *Heritage Lighthouse Protection Act*
- subject of a municipal, provincial or federal commemorative or interpretive plaque.

To determine if your property or project area is covered by any of the above, see:

- Part A of the MTCS Criteria for Evaluating Potential for Built Heritage and Cultural Heritage Landscapes

Part VI – Archaeological Sites
Includes three marine archaeological sites prescribed under Ontario Regulation 11/06 and five terrestrial archaeological sites designated by the Minister under Regulation 875 of the Revised Regulation of Ontario, 1990.

For more information, refer to Regulation 875 and Ontario Regulation 11/06.

8. Has the entire property or project area been subjected to recent, extensive and intensive disturbance?

Recent: after-1960

Extensive: over all or most of the area

Intensive: thorough or complete disturbance

Examples of ground disturbance include:

- quarrying
- dredging
- structural footprints and associated construction areas
  - where the structure has deep foundations or footings
- infrastructure development such as:
  - dams
  - pipelines, hydro lines or other utility trenches
  - causeways
  - bridges

Note: this applies only to the excavated part of the right-of-way or corridor as the remainder may not be impacted

A ground disturbance does not include:

- aqua-cultural activities, such as a fish farm
- areas of traditional or commercial harvesting of fish, shellfish or water-based vegetation
- traditional agricultural areas that have been inundated

Property (Project Area) Inspection

Some documentation may provide evidence of prior disturbance, such as:

- photographs
- maps
- detailed descriptions and blueprints of prior projects

If complete disturbance isn't clear from documents available, an archaeologist licensed for marine archaeology can be hired to undertake an underwater and/or remote-sensing inspection of the study area to determine whether there is any remaining marine archaeological potential.

9. Are there two or more reported or registered ship wreck sites or reports of lost ships within a five kilometre radius of the property or project area?

The presence of two or more ship wreck sites or reports of lost ships in the vicinity may indicate increased marine archaeological potential for additional marine wrecks.

10. Is the property or project area within one kilometre of an active or historic harbour, seaplane or floatplane base, tunnel, ferry route, marine terminal, or winter road?

Focussed areas of marine activity on- and off-shore are indicators for potential marine archaeology due to:

- deliberate structures built in or on the water, such as:
  - mooring and anchoring structures
  - weirs, piers, docks, cribwork
  - groynes, breakwaters, artificial reefs
  - vessels scuttled for utilitarian or other purposes
  - infrastructure related to the construction or operation of a facility like marine railways
- incidental features, such as:
  - beached or sunken vessels or aircraft
  - dropped objects

As a result, there is potential for marine archaeological features or artifacts.

11. Where the project impacts fourth order or higher watercourses, are there existing narrows, rapids, waterfalls or does the watercourse enter or leave a body of water within 300 metres of the property or project area?

Fourth order and higher watercourses (on the Strahler scale) have potential association with human activity around narrows, rapids, waterfalls and proximity to waterbodies such as lakes due to:

- fish harvesting and related dams or weirs
- portage locations for navigable waterways
- early historical fording locations
- early historical water power sources for mills

These activities may result in marine archaeological features or artifacts.

12. Are there potential built heritage or cultural heritage landscape resources that may be of cultural heritage value or interest adjacent to the watercourse or water body?

Euro-Canadian settlement immediately adjacent to water bodies or watercourses may be focussed on the water for specific industrial, commercial or residential uses resulting in marine archaeological features or artifacts. For guidance, see the MTCS Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes

13. Are there inundated beaches, bluffs, lakeshores, streams or river banks within 300 metres of the property or project area?

The margins of water bodies are associated with past human occupations and use of the land. About 80-90% of archaeological sites are found within 300 metres of water bodies.

- water body types:
  - primary - lakes, rivers, streams, creeks
  - secondary - springs, marshes, swamps and intermittent streams and creeks
- water bodies can include constructed water bodies or watercourses, such as:
  - temporary channels for surface drainage
  - rock chutes and spillways
- Accessible or inaccessible shorelines can also have archaeological potential, for example:
  - high bluffs or cliffs
  - sandbars

You can get information about inundated shoreline features through:

- a site visit
- aerial photographs
- bathymetric data
- geological and physiographic studies

14. Are there inundated beaches, lakeshores or river/creek banks beyond 300 metres and at greater depth than the project area with evidence of two or more of the following in the project area?

- elevated bathymetric features such as drumlins, eskers, kames, ridges, etc.
- pockets of sandy lakebed
- distinctive bathymetric formations such as escarpments, shoals, promontories, reefs, etc.
- inundated resource extraction areas (quarry, fishery)
- inundated historical settlement including built heritage resources or cultural heritage landscapes
- inundated historical transportation routes

Landforms associated with past human occupations that have later been inundated, as historically documented or demonstrated through water-level chronologies, retain their archaeological potential.

- **Elevated bathymetric features**
  Higher ground and elevated positions, surrounded by low or level topography, often indicate past settlement and land use. Features such as eskers, drumlins, sizeable knolls, plateaus next to lowlands or other such features are a strong indication of archaeological potential.
  Find out if your property or project area had elevated topography prior to inundation through:
  - nautical charts
  - bathymetric data

- **Pockets of sandy lakebed**

  Areas of sandy soil, prior to being inundated, that would be well-drained and in areas characterized by heavy soil or rocky ground may indicate archaeological potential

  Find out if your property or project area had sandy soil through:

  - site visits
  - lakebed studies and sediment borehole data

- **Distinctive bathymetric formations**

  Distinctive land formations include – but are not limited to:

  - waterfalls
  - rock outcrops or faces
  - caverns
  - mounds

  Prior to inundation such features were often important to past inhabitants as special or sacred places. The following sites may be present at – or close to – these formations:

  - burials
  - structures
  - offerings
  - rock paintings or carvings

  Find out if your property or project area has a distinctive land formation through:

  - site visits
  - aerial photographs
  - bathymetric data

- **Inundated resource extraction areas**

  Prior to inundation, the following resources were collected in these extraction areas:

  - food or medicinal plants e.g. migratory routes, spawning areas, prairie
  - scarce raw materials e.g. quartz, copper, ochre or outcrops of chert
  - resources associated with early historic industry e.g. fur trade, logging, prospecting, mining

  Aboriginal communities may hold traditional knowledge about their past use or resources in the area.

- **Inundated early historic settlement**

  Early Euro-Canadian settlements include – but are not limited to:

  - early military or pioneer settlement, e.g. pioneer homesteads, isolated cabins, farmstead complexes
  - early wharf or dock complexes
  - pioneers churches and early cemeteries

- **Inundated early historic transportation routes** - such as trails, passes, roads, railways, portage routes, canals.

  For more information, see:

  - historical maps or atlases
    - for information on early settlement patterns such as trails (including Aboriginal trails), monuments, structures, fences, mills, historic roads, rail corridors, canals, etc.
    - Archives of Ontario holds a large collection of historical maps and atlases
    - digital versions of historical atlases are available on the Canadian County Atlas Digital Project
  - commemorative markers or plaques such as those posted by local, provincial or federal agencies
  - municipal heritage committees or other local heritage organizations
    - for information on early historic settlements or landscape features (e.g. fences, mill races)
    - for information on commemorative markers or plaques

The Central Archaeology Group Inc.

2401 5th Line East
Campbellford, ON K0L 1L0

Email: lmcrae@centralarchaeology.ca
Phone: 705.868.2697

September 8, 2023

Operations Administrative Clerk
Ministry of Citizenship and Multiculturalism
Heritage Operations Unit
Heritage & Libraries Branch
401 Bay Street
Suite 1700
Toronto, ON M7A 0A7

Re: PIF # P248-0427-2023
Licence Number - P248
Licensee - Laura McRae, lmcrae@centralarchaeology.ca
Original Report
Original Cover Letter
Stage 1 and Stage 2 Archaeological Assessment, Glen Walter Water Tower Assessment, Part of Lots 6 and 7, Concession 1 St. Regis IR, Geographic Township of Charlottenburgh, Glengarry County
Project Designation - CAGI-2023-LM6

Dear Sir/Madame,

The Stage 1 and Stage 2 Archaeological Assessment, Glen Walter Water Tower Assessment, Part of Lots 6 and 7, Concession 1 St. Regis IR, Geographic Township of Charlottenburgh, Glengarry County was finalized on September 8, 2023 and is being submitted by The Central Archaeology Group Inc. for review. This project was undertaken for:

Proponent David Davison
Environmental Planner
Ainley Graham & Associates Ltd.
139 Front Street, Unit 100
Belleville, ON K8N 2Y6
E: david.davison@ainleygroup.com
P: 613.966.4243 x109

The Central Archaeology Group Inc.

2401 5th Line East
Campbellford, ON K0L 1L0

Email: lmcrae@centralarchaeology.ca
Phone: 705.868.2697

Approval Authority Sarah McDonald, P. Eng
General Manager - Infrastruture
Township of South Glengarry
6 Oak Street, Box 220
Lancaster, ON K0C 1N0
E: smcdonald@southglengarry.com
P: 613.347.3411

The regulatory process under which the project is proceeding is the *Planning Act*.

This supplementary documentation package includes information regarding First Nations engagement undertaken by CAGI.

Who was engaged and why?

The following First Nations communities were contacted at the onset of this project to inform the communities of the project and to inquire as to First Nations concerns and if there were any historical information they would like included within the document:

Mohawk Council of Akwesasne - Natalie Jacobs, Liaison Officer
Nation Huronne-Wendat - Thiéfaine Terrier, Isabelle Lechasseur and Jean-François Richard

The above First Nations communities were engaged by CAGI on July 13, 2023.

How were they engaged?

All communities were engaged by the CAGI archaeologist, Laura McRae (professional licence P248), via email. All correspondence was conducted through email and digital means.

When were they engaged?

Contact was initiated with the two communities on July 13, 2023. CAGI did not receive a response from either community.

The Central Archaeology Group Inc.

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Phone: 705.868.2697

Strategies used to incorporate input into the fieldwork?

CAGI reached out to the Mohawk Council of Akwesasne and the Nation Huronne-Wendat. It was hoped that trained monitors would attend the project area with the field crew when the Stage 2 survey was scheduled. Although neither community responded to CAGIs request, the CAGI archaeologist determined that each community would be approached should anything be uncovered during the fieldwork.

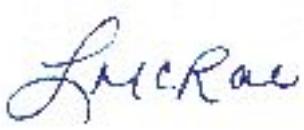
The process for reporting results of engagement to the Community?

As neither community responded to CAGIs request for the Stage 1/2 archaeological assessment, Ainley Graham & Associates suggested they be circulated the report as part of the EA process in the Project File report.

I, the undersigned, hereby declare that, to the best of my knowledge, the information in this report and submitted in support of this report is complete and accurate in every way, and I am aware of the penalties against providing false information under section 69 of the *Ontario Heritage Act*.

Sincerely yours,

The Central Archaeology Group Inc.



Laura McRae MA
Director and Chief Archaeologist

23

Stage 1 and Stage 2 Archaeological Assessment
Glen Walter Water Tower Assessment
Part of Lots 6 and 7, Concession 1 St. Regis IR, Geographic Township of Charlottenburgh, Glengarry County

ORIGINAL REPORT

2401 5th Line East, Campbellford, ON K0L 1L0
Telephone: 705.868.2697 Email: lmcrae@centralarchaeology.ca

The Central ARCHAEOLOGY Group Inc.

The Central Archaeology Group Inc.

Stage 1 and Stage 2 Archaeological Assessment

Glen Walter Water Tower Assessment, Part of Lots 6 and 7, Concession 1 St. Regis IR, Geographic Township of Charlottenburgh, Glengarry County

ORIGINAL REPORT
SUBMISSION: September 8, 2023

The Central Archaeology Group Inc.
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E: lmcrae@centralarchaeology.ca

Stage 1 and Stage 2 Archaeological Assessment

Glen Walter Water Tower Assessment, Part of Lots 6 and 7, Concession 1 St. Regis IR, Geographic Township of Charlottenburgh, Glengarry County

Submitted to:

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PIF No. P248-0427-2023
Laura McRae (License No. P248)

Submitted by:

The Central Archaeology Group Inc.
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CAGI Project No. CAGI-2023-LM6

Report in PDF format distribution:

Ainley Graham & Associates Ltd.
Township of South Glengarry
Ministry of Citizenship and Multiculturalism

PROJECT PERSONNEL

Field and Project Director
Laura McRae, P248
Client Contact
David Davison, Ainley Graham & Associates Ltd.
Archival Reseach
Derek Paauw
Fieldwork
Laura McRae
Derek Paauw
Helga Stephens
Mapping
Laura McRae
Report Preparation
Laura McRae
Report Reviewer
Derek Paauw

STATEMENT OF LIMITATIONS

The Central Archaeology Group Inc. (CAGI) has prepared this report in accordance with the standards and expertise expected of professional archaeologists practicing under similar conditions in the jurisdiction. However, it is important to note that the scope of this report is limited by the time constraints and physical limitations specific to this project.

The purpose of this report is to present the findings of the property survey conducted and offer the professional opinion of the authors. CAGI does not provide any other warranties, whether expressed or implied.

It is important to emphasize that this report has been specifically developed for the site, design objective, developments, and purpose as communicated to CAGI by Ainley Graham & Associates Ltd. (the Client) on behalf of the Township of South Glengarry. The factual data, interpretations, and recommendations outlined in this report are applicable only to this particular project and should not be used for any other project or site location.

Unless explicitly stated otherwise, the suggestions, recommendations, and opinions provided in this report are intended to guide the Client in the design of the specific project.

It is crucial to recognize that there are inherent risks associated with archaeological investigations aimed at identifying subsurface conditions. Despite conducting a comprehensive investigation, sampling, and testing program, it is still possible that certain archaeological resources may go undetected. The sampling strategies employed in this study adhere to the Ontario Ministry of Citizenship and Multiculturalism's Standards and Guidelines for Consultant Archaeologists (2011).

CAGI cannot assume responsibility for any events or circumstances that may have transpired since the preparation date of the report. Furthermore, with regards to subsurface, environmental, or geotechnical conditions, CAGI cannot be held accountable for any geographic or temporal variations that may exist.

ACKNOWLEDGMENT OF TRADITIONAL TERRITORY

The Central Archaeology Group Inc. (CAGI) recognizes and acknowledges that they are working on the traditional territory of the Mohawk Council of Akwesasne, Huron-Wendat, and Haudenosaunee Nations. They express their respect and gratitude to the Indigenous peoples who have been stewards of this land for generations. CAGI values their deep connection to the land, their teachings, and their role as custodians of the natural and cultural resources in this territory.

CAGI is committed to fostering meaningful relationships and engaging in respectful consultation and collaboration with Indigenous communities in accordance with the principles of reconciliation and the United Nations Declaration on the Rights of Indigenous Peoples. They strive to incorporate Indigenous perspectives, knowledge, and priorities in their work, promoting the preservation and sharing of Indigenous history and cultural heritage.

CAGI recognizes that archaeological investigations on this traditional territory may uncover evidence of the ancestral heritage and historical presence of Indigenous peoples. They are dedicated to ensuring that these findings are treated with sensitivity, respect, and cultural appropriateness. CAGI demonstrates its commitment to promoting understanding, fostering positive relationships, and supporting the goals of reconciliation and Indigenous self-determination.

In conclusion, CAGI expresses its gratitude for the opportunity to work in collaboration with Indigenous communities, seeking mutual understanding and shared objectives in the field of archaeology. By acknowledging the traditional territory of the Mohawk, Huron-Wendat, and Haudenosaunee Nations, CAGI demonstrates its commitment to promoting understanding, fostering positive relationships, and supporting the goals of reconciliation and Indigenous self-determination.

Signed,

Laura McRae
Chief Archaeologist and Director
Central Archaeology Group Inc. (CAGI)

ACKNOWLEDGMENTS

The Central Archaeology Group Inc. would like to extend their gratitude to the following individuals and parties:

* David Davison, Ainley Graham & Associtates Ltd..
* The Glengarry County Land Registry Office.
* The staff at the Trent University Maps and Geospatial Resources section of the Bata Library, Peterborough.

ACRONYMS

a.s.l.	above sea level
AP	Archaeological Potential
cm	centimetre (s)
CAGI	Central Archaeology Group Inc.
C1STIR	Concession 1 St. Regis IR
CR	County Road
GToC	Geographic Township of Charlottenburgh
GC	Glengarry County
Hwy	Highway
km	kilometre (s)
L6/7	Lots 6&7
m	metre (s)
MCM	Ministry of Citizenship and Multiculturalism
NAP	No Archaeological Potential
ToSG	Township of South Glengarry

EXECUTIVE SUMMARY

**The Executive Summary offers a succinct summary of the report, highlighting its crucial aspects. Nonetheless, to gain a thorough understanding of the information, findings, and limitations, it is highly advisable that the reader refers to the complete report.*

The Central Archaeology Group Inc. (CAGI) was commissioned by David Davison, Ainley Graham & Associates Ltd. to conduct a comprehensive Stage 1/2 archaeological assessment for the proposed development of the Glen Walter Water Tower in Glen Walter, Ontario. The Township of South Glengarry has requested this assessment as part of its planning process. The primary objective of this investigation is to establish a foundational dataset encompassing existing and potential cultural heritage resources within the designated property and provide recommendations for further development.

This study entailed an extensive examination of various records, including historic settlement maps, land titles and documents, historical land use and ownership records, primary and secondary sources, as well as the Ministry of Citizenship and Multiculturalism's archaeological sites database. It also elucidates the pre-contact and historic archaeological sequence of the First Nations, provides insights into the Euro-Canadian historic settlement record within the area, offers an overview of the physiography of the project area, and assesses the archaeological potential based on the information analyzed.

A property survey involving test pits was conducted as the project area was situated within a secondary growth treelot. No cultural materials were recovered during the assessment.

We request the Ministry of Citizenship and Multiculturalism review the findings and recommendations presented in this report. We request their acknowledgement of satisfaction in accordance with the 2011 Standards and Guidelines for Consultant Archaeologists, as well as the terms and conditions for archaeological licenses. We also request this report be included in the Ontario Public Register of Archaeological Reports.

TABLE OF CONTENTS

1.0 PROJECT CONTEXT

1.1 Objectives

The objectives of a Stage 1 background study, as outlined by the Standards and Guidelines for Consultant Archaeologists (2011:13), are as follows:

- Provide information on the subject property's geography, history, previous archaeological fieldwork, and current land condition;
- Evaluate the archaeological potential for the property and support recommendations for a Stage 2 survey; and,
- Recommend appropriate strategies for future assessments within the property.

The purpose of a Stage 2 property survey, as outlined by the Standards and Guidelines for Consultant Archaeologists (2011:27), are as follows:

- To document all archaeological resources on the property;
- To determine whether the property contains archaeological resources requiring further assessment; and,
- To recommend appropriate Stage 3 assessment strategies for archaeological sites identified.

In accordance with Provincial Policy Statement 2.6, if significant sites are found, a strategy (usually avoidance, preservation or excavation) must be put forth for their mitigation.

1.2 Development Context

The Central Archaeology Group Inc. (CAGI) was retained by David Davison, Ainley Graham & Associates Ltd. (the proponent) to conduct a Stage 1/2 archaeological assessment for the proposed Glen Walter Water Tower in the Town of Glen Watler, Township of South Glengarry. This archaeological assessment was triggered by the Planning Act. The study area includes part of Lots 6&7 (L6/7), Concession 1, St. Regis IR (C1SRIR) in the Geographic Township of Charlottenburgh (GToC), Glengarry County (GC) (Plan 1; Map 1; Image 1).

The archaeological assessment was conducted in compliance with the Ontario Heritage Act (R.S.O. 1990), the Standards and Guidelines for Consultant Archaeologists (2011), and the Planning Act (R.S.O. 1990). Access permission for the archaeological assessment

was granted by David Davison, Ainley Graham & Associates Ltd. (AG). without any restrictions imposed on the access.

All archaeological consulting activities were undertaken by Laura McRae (P248) under her Professional Archaeological License. The Ontario Ministry of Citizenship and Multiculturalism has designated this assessment as PIF P248-0427-2023, and it is identified as project CAGI-2023-LM6 in CAGIs records.

1.3 Historical Context

1.3.1 Historic Documentation

There are many historic literary documents regarding the settlement and development of Glengarry County, from its use by the pre-contact First Nations peoples through to Euro-Canadian settlement. Some of the more useful documents include: *The Archaic Occupation of the Ottawa Valley* (Clermont 1999), *History of glacial Lake Algonquin in the Haliburton Region* (Kaszycki 1985), *The Upper Ottawa Valley* (Kennedy 1970), *Illustrated Historical Atlas of Lanark & Renfrew Counties, Ontario* (Belden 1880) and the Nomination Document for the Ottawa River, Ontario (Ottawa River Designation Committee 2006).

The above documents are only a sample of written materials. There are a considerable number of consultant reports, both archaeological and built heritage, available for consultation from various sources, including the County, municipalities, the MCM, township offices, and local historical societies. Historical maps, plans, orthographic images, and photographs from the National Air Photo Library (NAPL) can also serve as valuable references.

The study area is located within the Geographic Township of Pembroke (GToP), which became part of the Township of South Glengarry following its amalgamation in 2000. The history of the area will be further discussed below.

1.3.2 Pre-Contact Period

The Palaeoamerican Period. Within the realm of Ontario archaeology, the presence of Palaeoamerican sites in the eastern reaches of the province has been notably restricted, a consequence of the intricate glacial history entwined with the formation of the Champlain Sea. The methodologies traditionally employed by archaeologists in this locale have further contributed to the scarcity of such sites (Gordon and McAndrews 1992:80; Pollock 2005:10; Watson 1999a:38). To unearth these enigmatic sites necessitates

a meticulous examination of localized geological events that precipitated fluctuations in lake levels and coastal formations (Storck 1997; 2004).

The zenith of the Wisconsinian glacial period witnessed the sprawling reach of the Laurentian Ice sheet, encompassing vast swathes of Canada and extending as far south as New York City (Watson 1999a:28). The gradual recession of the Laurentide glacier from the corridors of the St. Lawrence River and the Ottawa Valley commenced approximately 11,000 BP. This retreat facilitated the inundation of the St. Lawrence Valley and segments of the Ottawa Valley by the Atlantic Ocean, ultimately leading to the formation of the Champlain Sea. The latent potential for unearthing Late Palaeoamerican sites is notably pronounced along the ancient shores of these meltwater formations.

The intricate interplay of isostatic rebound, shoreline transformation, and inundation has shrouded the maritime adaptations of the Palaeoamerican populace in mystery. Nonetheless, insights gleaned from analogous regions across North America (Faught 1996; 2004; Faught and Brinnen 1998; Faught and Donoghue 1997; Faught and Gusick 2011; Gusick and Faught 2011; Marks and Faught 2003) hold the potential to illuminate these enigmatic practices. In a broader context, Palaeoamericans are characterized by their extensive terrestrial journeys and the distinctive nature of their lithic tool assemblages. Recovered artifacts from archaeological enclaves in Ontario furnish evidence of high-quality chert, procured from locales hundreds of kilometres distant (Storck 2004:33).

Central to the Palaeoamerican toolkit are lance-shaped points, a hallmark devoid of notches or stems, which were conventionally employed for hafting by later cultural groups (Ellis and Deller 1990:38). The extended distances traversed by Palaeoamerican communities in pursuit of prized chert resources engendered the recurrent resharpening and retouching of their implements (Dickson 2011:52; Ellis and Deller 1990:45). This era also witnessed the prevalence of a diverse array of tool categories, including end-scrapers, side-scrapers, knives, gravers, and drills (Ellis and Deller 1990:49, 59). The assortment of artifacts encountered within sites was contingent upon their proximity to chert sources, whereby sites distanced from quarries bore scant evidence of core reduction or preliminary-stage preform shaping, activities typically reserved for or proximate to quarry sites (Dickson 2011:52; Ellis and Deller 1990:45).

These versatile tools, in effect, facilitated the multifaceted daily activities of the Palaeoamerican populace, particularly those associated with subsistence and resource extraction. The ecological panorama of eastern Ontario during this epoch proffered an

array of subsistence possibilities, encompassing grand game such as caribou and various whale species (white, humpback, and common finback), alongside avian fauna, waterfowl, and assorted fish species (Watson 1999a:33). Indications derived from other Palaeoamerican sites within southern Ontario hint at the processing of fish (Storck 1997:278). It is plausible that Palaeoamerican groups in the eastern expanse of Ontario adhered to a seasonal migratory routine, reliant on maritime resources during specific periods, while venturing inland, conceivably during winter, for the pursuit of migratory and herd-based fauna. This subsistence pattern exhibits a closer alignment with maritime-focused Palaeoamerican groups situated along the eastern seaboard of North America, diverging from the customary inland-oriented subsistence model often linked with southwest Ontario by many archaeologists.

To date, Ontario archaeologists' diligent endeavours have culminated in identifying three distinct categories of Palaeoamerican sites: sites featuring dropped points, quarry locales, and transient habitation campsites. Palaeoamerican vestiges have emerged in proximity to Perth (Pilon 2005:14, Watson 1999a:34), within Lanark County (Kenett and Branson 1999:77), and to the north of Kingston within the expanse of the Rideau Lakes area (Watson 1982; Earl and Kennett 2000). Analogous to the early Palaeoamerican phase, later Palaeoamerican collectives traversed extensive terrains in response to the undulating rhythms of seasonal resource availability. Notably, the prevalence of Late Palaeoamerican projectile points surpasses their Early Palaeoamerican counterparts across the province, an indication suggestive of a relative augmentation in population density (Ellis and Deller 1990:62).

The Archaic Period. Ample empirical evidence pinpointing the inception of the Archaic Period in Ontario approximates to circa 4,000 BCE, coinciding with the emergence of the Laurentian Archaic culture. This transitional phase is widely believed to have evolved from the preceding Palaeoamerican Period, although it is plausible that with the influx of migratory groups, novel concepts and technological innovations were introduced. A marked departure from the intricately crafted projectile points emblematic of the Palaeoamerican era is discerned in the embrace of simplified manufacturing techniques, albeit accompanied by an expanded repertoire of exploited stone resources. This material transformation is suggests shifts in local flora and fauna, thereby influencing dietary practices. Manifestly, the subsistence strategies of early Archaic enclaves shift from protracted seasonal migrations to a heightened emphasis on locally available sustenance.

Notably, the Archaic Period heralds a technological metamorphosis characterized by the incorporation of grinding and pecking techniques into the production of stone

implements. The introduction of a diverse spectrum of axe forms further alludes to a geographic transition from sub-arctic surroundings to a more temperate milieu. A pivotal change during this epoch entails the replacement of handheld thrusting spears, dominant throughout the Palaeoamerican Period, with the atlatl. The archaeological record also attests to the emergence of finely polished and ornamented stone tools, postulated to function as atlatl counterweights. Moreover, the Archaic inhabitants manifest a proficiency in crafting implements and adornments from native copper resources gleaned from the environs of Lake Superior's northern shores.

Conclusive insights into subsistence practices are gleaned from the remains of discarded faunal elements. Predominantly, the Laurentian Archaic populace engaged in the hunting of sizable mammals, encompassing deer, elk, and bear. Concurrently, the exploitation of smaller game, exemplified by the beaver, is also evidenced. Aquatic resources, notably fishing and shellfish collection, supplemented their dietary spectrum, while botanical sources played a supplementary role. The religious beliefs inherent within the Archaic milieu are illuminated by burial practices, which encompass the interment of mortuary goods alongside the deceased and the application of red ochre upon the body. These grave goods encompass a medley of stone, bone, and native copper implements and embellishments.

Although the origins of the Upper St. Lawrence culture, stemming from the Palaeoamerican and early Archaic epochs, remain nebulous, the advent of a distinct and pervasive Laurentian Archaic tradition is distinctly discernible by 4,000 BCE. The discernible prominence of the Laurentian Archaic tradition is primarily attributed to its expansive subsistence strategies and concomitant demographic upsurge (Mason 1981). A profusion of Archaic Period sites, prominently clustered around the environs of Rice Lake, contribute to the empirical landscape. However, it is salient to acknowledge that a substantial proportion of these sites predominantly belong to the Late Archaic or Laurentian Tradition (MCR 1981:39). The Laurentian groups strategically inhabited the biotic confluence zone positioned betwixt the deciduous forests to the south and the boreal expanses to the north.

The Woodland Period. The Woodland Period is renowned for its hallmark contribution to archaeological discourse – the advent of ceramic technology. According to Jackson (1980), the Early Woodland Period's subsistence and settlement dynamics mirrored those of the preceding Laurentian Archaic, albeit featuring an augmented focus on nut processing and, conceivably, rudimentary experimentation with plant cultivation. Regrettably, the scarcity of Early Woodland sites within the region is a consequence of

both the Period's brief duration and the intrinsic challenges in site detection (Ellis et al. 1990:78).

Distinctly characterizing the Middle Woodland Period in this milieu are burial mound sites, often strategically positioned on elevated promontories near the confluences of rivers, possibly emblematic of ancestral territorial demarcation. The pronounced richness and diversity of burial assemblages denote the Middle Woodland society's access to an extensive web of exotic commodities, reaching as far-flung as Ohio and Indiana (Spence et al. 1990).

The Late Woodland Period heralds a paradigm shift in subsistence and settlement paradigms. This transformation encompasses the occupation of seasonal hunting and fishing encampments, frequently superimposed upon former Middle Woodland village locales, alongside the emergence of substantial interior longhouse settlements. Within these sprawling communities, early cultivated crops such as corn, beans, and squash were nurtured.

The culmination of the Woodland Period is conspicuously illuminated by the revelation of several Huron village sites. These enclaves appear to encapsulate both Huron and St. Lawrence Iroquois habitation, though the precise origins of the inhabitants remain enigmatic (Sutton 1990:54; Ramsden 1990). Significantly, the Huron eventually relinquished their foothold within the region as a primary locus of habitation, a transition believed to have materialized during the late sixteenth century. Subsequently, this realm functioned as an intermediary buffer zone between the Huron and the New York Iroquois.

St. Lawrence Iroquois. The St. Lawrence Iroquois, believed to be the indigenous group encountered by Jacques Cartier in 1535, form a significant facet of early contact history. Subsequent French explorations unearthed forsaken settlements dotting the St. Lawrence River. Concurrently, an observable surge in St. Lawrence Iroquois ceramic vessel types emerges within Huron sites east of Lake Simcoe. Despite the French arrival in the region, the Huron persisted within their ancestral domain for an additional century. It was only in 1649 that they were dislodged from their lands by the Iroquois Five Nations, their resilience sapped by the impact of European diseases (Trigger 1976).

The material culture ascribed to this distinctive culture is epitomized by its pottery. An array of vessels encompassing unadorned or minimally collared pots bearing simplistic motifs and well-defined collars adorned with intricate patterns of parallel incised lines and chevrons constitute their archaeological signature. Among the invaluable

contributions of Pendergast (1966), garnered through meticulous investigations of the Salem, Grays Creek, and Beckstead sites, four primary ceramic typologies have been demarcated: Type A, characterized by incised chevron and punctate circle motifs adorning overhanging castellations; Type B, akin to A yet employing a dentate stamp or dentate stamps and incised lines; Type C, encompassing low-collared or collarless vessels embellished with dentate, corded, ovoid, or rectangular stamp motifs at the apex; and Type D, encapsulating rudimentary vessels with low, channelled convex collars ornamented with horizontal or oblique lines of chevrons.

St. Lawrence Iroquois settlements are primarily distinguished by either expansive interior villages or specialized, task-specific locales such as fishing stations along the St. Lawrence and principal watercourses of the valley. Notably, the Steward site, situated in the contemporary Morrisburg vicinity, is an exemplar of these specialized encampments, consisting of two longhouses replete with internal house pits and a stratified midden. Similarly, the Glenbrook site, nestled along the South Raisin River, spans an impressive two to three acres. This site features prominently within the Summerstown Cluster of St. Lawrence Iroquois village sites, alongside the Summerstown Station site, the Salem site, the Sugarbush site, the Grays Creek site, and the MacDougall site.

The St. Lawrence Iroquois in Ontario found their nexus in Grenville County and Lake St. Francis, positioned to the west and east of Cornwall, respectively. Over time, their horticultural inclinations prompted a gradual shift away from riverside habitation, pushing them further inland. Noteworthy among their settlements is the Roebuck Village site in the Prescott region, estimated to have encompassed a staggering 40 longhouses and potentially accommodated up to 2,000 inhabitants. The largest of the St. Lawrence Iroquois settlements, the Roebuck Village site, sprawled across 3.2 hectares, characterized by a robust defensive system comprising multiple stockade lines, strategically flanked by marshes on three sides, and fortified by an earthwork (Wright 2004:1261).

The St. Lawrence Iroquois held the distinction of being the first Iroquoian nation encountered by Jacques Cartier in 1534 within the Gaspé region, thus punctuating their historical significance. The subsequent encounters, notably by Cartier, represent the initial and concluding chapters of European interaction with the St. Lawrence Iroquois prior to their enigmatic disappearance. Limited historical accounts beyond Cartier's sixteenth-century narratives obscure our understanding. Among the villages documented during Cartier's voyages, spanning east to west, are Ajoaste (potentially situated on the Cap Tourmente plain), Starnatan (proximate to

Sainte-Anne-de-Beaupré), Taille (potentially atop a mountain, perhaps in the vicinity of Château-Richer), Sitadin (near Beauport), Stadacona (Québec City), Tequenonday (adjacent to Cap Rouge, atop a mountain), Achelay (near Portneuf), and Hochelaga (the substantial, fortified settlement at the base of Mount Royal).

As Champlain embarked on subsequent explorations within the St. Lawrence Valley, the once-vibrant presence of the St. Lawrence Iroquois had seemingly dissolved. The disconcerting vanishing act of this distinct group has engendered a multitude of explanations, the foremost among them attributing their decline to a combination of European diseases and resultant conflicts. While both postulations are inherently speculative, it remains irrefutable that the scourge of European diseases exacted a devastating toll upon the indigenous populations of the Americas, a phenomenon exemplified by the epidemics that decimated the Huron during the seventeenth century, coinciding with the perils commonly accompanying trade and interaction. By the juncture of Champlain's return to the St. Lawrence Valley, the St. Lawrence Iroquois had conspicuously evaporated from the regional landscape, leaving a legacy shrouded in historical intrigue.

Table 1. Summary of the First Nations archaeological sequence in southern Ontario.

Date	Periods and Cultural Tradition
11,500 BP - 9,000 BP	Palaeoamerican
9,000 BP - 3,000 BP	Archaic
3,000 BP - 300 BP	Woodland
300 BP - Present	Historic

1.3.3 Post-Contact Period

1.3.3.1 Mohawk Nation of Akwesasne

The ensuing account encapsulates the insights derived from Aren Akwek's discourse on the Mohawk migration, elaborating upon the succinct précis presented earlier in this section. Rooted predominantly in oral tradition, this narrative delves into the transformative journey of the St. Regis Mohawk, renowned as the People of the Flint, as they embarked from their ancestral abode along the Mohawk River in New York State, eventually establishing their contemporary enclave in Akwesasne (1948:23-27).

Originally situated on the verdant banks of the Mohawk River, the St. Regis Mohawk, recognized as the People of the Flint, once inhabited the expanse of New York State. Thriving within a landscape blanketed by dense forests, their domicile consisted of elongated bark dwellings. This realm, sited atop the majestic turtle's carapace, was revered as the earth's epicenter, from which waters flowed in all cardinal directions – north, south, east, and west. Central to their social fabric were the primary Mohawk clans: the Bear Clan, the Turtle Clan, and the Wolf Clan.

Strategically aligned with the meandering course of the Mohawk River, the principal Mohawk villages adorned key points along its tributaries. Te-uge-ga graced the confluence of West Canada Creek, while Sko-har-le nestled near the outlet of Schoharie Creek. Similarly, Ta-la-que-ga flourished in proximity to Little Falls, while Ga-ha-oose held its position near Cohoes. These locales teemed with diverse wildlife to hunt, fish to catch, and avian species to ensnare. The People's lifestyle encompassed not only subsistence agriculture, with thriving corn, beans, and squash fields, but also intertribal conflict.

In a remarkable turn of events, visionary leaders Deganawida and Hayowentha endeavored to quell the incessant strife and bloodshed that plagued the Nations. Invoking the Creator's intervention, they planted the Tree of Peace, extending their wisdom across numerous council fires – the Senecas, the Cayugas, the Onondagas, the Oneidas, and the Mohawks, collectively forming the Five Nations. Through five years of relentless discourse, their message resonated, culminating in a grand council where the Five Nations united, forging peace and solidifying their bond by partaking in the Pipe of Friendship. A sacred wampum belt, known as the belt of peace, stood as a tangible embodiment of their unity, composed of a chain of four links enfolding a white tree at its heart. This union heralded the dawn of a collective identity.

Analogous to the construct of a longhouse, their alliance found allegorical resonance – the Mohawks safeguarded the Eastern Door of the Long House, the Senecas assumed guardianship of the Western Door, while the Onondagas, centrally positioned, upheld the mantle of the Council Fire. Nevertheless, the tranquility was short-lived, marred by an unforeseen shadow cast upon the Ho-de-no-sau-ne, the People of the Long House.
Across the vast expanse of the great saltwater emerged the figure of the white man, a harbinger of transformation encompassing the French and the English. Driven by avarice for furs and territorial expansion, they extended enticements of firearms, tomahawks, and potent libations in exchange for beaver pelts. A duplicitous liaison unfolded, epitomized by the simultaneous offering of a hand of camaraderie and a venomous rattlesnake, heralding peril and death.

With mutual ambition for dominance over the fur trade, both French and English cunningly manipulated various indigenous Nations into waging wars against rival factions and those supporting their rivals. Most Iroquois aligned themselves with the English, triumphing over the French and their allies in resounding victories.

The advent of Jesuit missionaries, colloquially referred to as Black Robes, orchestrated a migration of numerous Iroquois to Canada. Here, a novel community, christened Caughnawaga, emerged along the St. Lawrence River. Yet, the tendrils of conflict persisted, eclipsing the wisdom of prophets Deganawida and Hayowentha, igniting fresh waves of bloodshed.

Subsequent to these tumultuous episodes, traders from Montreal traversed the river, ferrying firewater and fueling societal discord. In their quest to counteract this insidious influence, the missionaries orchestrated relocations. The emergence of afflictions such as smallpox, measles, and whooping cough further compounded the distress. In collective accord, the elders and Jesuit Fathers resolved to abandon their dwellings and the malevolence across the river. Thus, they undertook a journey upstream along the St. Lawrence River, ultimately discovering a site imbued with fertile soil, abundant game, and bountiful fishing.

This chosen locale, distinguished by the confluence of numerous small rivers with the St. Lawrence River, emerged as an idyllic haven. Isolated from external tumult, a church graced the river's edge, an edifice complemented by the encircling embrace of homes. This newfound territory was christened Akwesasne, denoting the Place Where the Partridge Drums – a poignant testament to their revitalized existence.

1.3.3.2 The Huron-Wendat

During the contact period in Ontario, the Huron-Wendat people played a significant role in shaping the region's history and cultural landscape. As one of the prominent Indigenous nations, the Huron-Wendat had established prosperous communities in the area that is now known as Ontario, particularly in the region surrounding Lake Simcoe and the Georgian Bay.

The Huron-Wendat were a confederacy of Wendat-speaking groups comprised of the Attignawantan, Attigneenongnahac, Arendarhonon, and Tahontaenrat. Their communities were characterized by well-organized villages, with fortified longhouses

serving as central gathering places. These longhouses, constructed from poles and bark, housed multiple families and facilitated communal living and social cohesion.

The contact period brought significant changes to the Huron-Wendat way of life, as European explorers and settlers arrived in the region. Early contacts with European fur traders, primarily the French, introduced new trade networks and commodities to the Huron-Wendat. The fur trade, particularly in beaver pelts, became a pivotal aspect of their economic activities and intercultural exchanges.

The Huron-Wendat's strategic location within the Great Lakes region allowed them to establish trade alliances with various Indigenous nations and European traders. Their extensive trading networks facilitated the exchange of goods, ideas, and technologies, contributing to the cultural diversity and economic vitality of the region.

However, the contact period also brought significant challenges and disruptions to the Huron-Wendat way of life. The arrival of European diseases, such as smallpox and measles, had devastating consequences for their communities, leading to population decline and social disarray. The introduction of firearms and European military tactics during intertribal conflicts and colonial rivalries further complicated their socio-political dynamics.

In response to these challenges, the Huron-Wendat demonstrated resilience and adaptability. They actively engaged in diplomatic negotiations and strategic alliances with neighboring Indigenous nations, including the French and the Haudenosaunee, to ensure their survival and maintain their sovereignty.

The Huron-Wendat possessed a rich cultural heritage that encompassed spirituality, art, and oral traditions. Their spiritual beliefs centred around the interconnectedness of all living beings and the importance of maintaining harmony with the natural world. Ceremonies, rituals, and storytelling played vital roles in preserving their cosmology, historical narratives, and moral values.

Artistic expressions, such as intricate beadwork, pottery, and woodcarving, showcased the Huron-Wendat's craftsmanship and aesthetic sensibilities. These artistic traditions reflected their cultural identity and were imbued with symbolic meanings and narratives passed down through generations.

Despite the challenges and disruptions of the contact period, the Huron-Wendat continue to assert their cultural heritage and sovereignty. Today, the Huron-Wendat

maintain vibrant communities, where language revitalization, cultural practices, and land stewardship are prioritized.

1.3.3.3 The Haudenosaunee

The Haudenosaunee, a confederacy composed of six nations (Mohawk, Oneida, Onondaga, Cayuga, Seneca, and Tuscarora), hold a significant historical and cultural presence in Ontario, including the Buckhorn area. Their traditional territories span across what is now known as New York State and parts of Ontario and Quebec.

The Haudenosaunee boast a multifaceted and extensive history, characterized by their deep-rooted connection to the land, rivers, and forests. Their presence in the region predates European contact, with their ancestors establishing vibrant communities along the waterways, including the Trent-Severn Waterway.

Haudenosaunee communities showcased well-defined social structures and governance systems. Guided by the Great Law of Peace, a constitution facilitating a balanced power and decision-making among the nations, each nation assumed distinct roles and responsibilities within the confederacy, contributing to the overall welfare of the community.

Agriculture played a pivotal role in Haudenosaunee societies. They skillfully cultivated crops such as corn, beans, and squash, employing sustainable agricultural practices that honoured the land's fertility and biodiversity. This agricultural expertise was integral to their sustenance and formed the foundation of their self-sufficiency.

The Haudenosaunee exhibited proficiency in hunting, fishing, and gathering, capitalizing on the region's abundant natural resources. They possessed a profound respect for the environment, practicing sustainable resource management and recognizing the interconnectedness of all living beings.

Oral tradition held significant importance among the Haudenosaunee, with their history, cultural values, and teachings passed down through storytelling, songs, and ceremonies. Their oral literature encapsulated invaluable insights into their worldview, cosmology, and moral principles. These stories persistently endure and are meticulously preserved by Haudenosaunee communities today.

The ramifications of colonization, including the displacement of Haudenosaunee communities and the imposition of colonial policies, have significantly impacted their

way of life. Nonetheless, the Haudenosaunee in the Buckhorn area, alongside other Haudenosaunee communities, have displayed remarkable resilience and an unwavering commitment to preserving their cultural heritage.

Presently, Haudenosaunee communities actively assert their rights, sovereignty, and self-determination. They actively engage in cultural revitalization initiatives, encompassing language preservation, traditional arts and crafts, and the restoration of governance structures. Furthermore, the Haudenosaunee collaborate with intertribal alliances and work alongside Indigenous and non-Indigenous groups to safeguard the environment and advocate for their rights.

1.3.3.4 The Tsikaristisere / Dundee Claim Area

The genesis of the Dundee land claim can be traced back to the intricate web of land parcels initially leased to Euro-Canadian settlers by Akwesasne leaders, as thoughtfully depicted in Map 4. Facilitated by the Crown, these leases swiftly led to the occupation of substantial tracts by the settlers, thus setting the stage for a complex and protracted dispute.

Over time, however, this coexistence on the land proved less harmonious than envisioned. Struggling settlers frequently faltered in meeting their financial obligations, even though the leases extended the option of payment through goods and services. As the leases reached their expiration dates, a pivotal shift ensued, marked by Akwesasne's assertive efforts to reclaim possession of the lands.

The Mohawk, endeavoring to regain their ancestral holdings, found themselves ensnared in a contentious struggle with the burgeoning settler population. Rising tensions culminated in a series of events that saw the Mohawk charged with trespass and subsequently arrested by local authorities. Regrettably, the culmination of these struggles resulted in the forfeiture of ownership over these lands to the settlers, casting a shadow over the Mohawk's aspirations.

The latter part of the nineteenth and the early twentieth centuries witnessed a modest reversal of fortune, as Akwesasne succeeded in repurchasing fragments of the land, symbolically reclaiming parcels of their heritage. Yet, the larger trajectory of the Dundee land claim lay far from resolution.

In a significant development, the Mohawk Council of Akwesasne's claim to the remaining territory gained partial traction in 1988. This marked a milestone, as it

underscored the acknowledgment of historical injustices and inadequate compensation arising from the 1888 surrender. However, the optimism stemming from this acknowledgment proved short-lived, as subsequent negotiations faltered, casting a pall over the prospects of resolution in the mid-1990s.

Recent years have seen a revitalized endeavor to address the lingering grievances that persist within the ambit of the Dundee land claim. Presently, the involved parties are actively engaged in an earnest pursuit to untangle the intricate threads of unresolved issues. Paramount among these matters is the overarching question of the invalid surrender, wherein the rights to the land were purportedly relinquished under circumstances marred by duress and inequity.

Moreover, the ongoing discourse delves into the complex realm of fiduciary duties. Akwesasne contends that the Canadian government breached its fiduciary obligations in the administration of the leases, exacerbating the historical disparities and exacerbating the very issues at the heart of the claim.

As these negotiations unfold, the Mohawk Council of Akwesasne is steadfastly committed to championing the rights and restitution owed to their community. Through a diligent examination of historical records, legal tenets, and moral imperatives, the hope is that the Dundee land claim can forge a path towards genuine reconciliation, rectifying the past and setting a course for a more equitable future (Mohawk Council of Akwesasne 2018).

1.3.4 Euro-Canadian Settler History

Beginning in the early seventeenth century with the French, explorers such as Samuel de Champlain and Étienne Brûlé, encountered groups of people speaking an Algonquian language along the Ottawa River Valley. These were the Weskarini, Onotchataronon, Kichesipirini, Matouweskarini, and Otaguotouemin Algonquians (Trigger 1976:279). The loosely aligned First Nations groups subsisted by hunting, fishing, and gathering, and undertook limited horticulture. Champlain first met the Algonquians in 1603 at the trading centre of Tadoussac near the mouth of the St. Lawrence River (Hessel 1993:14). Searching for the Northwest Passage in 1613, Champlain entered Algonquin territory and explored the Ottawa Valley as far north as Morrison's and Allumette Islands. The main body of the Kichesipirini lived on Morrison's Island and controlled the portages at the base of Allumette Lake. From their strategic location, the Kichesipirini collected tolls from all French trade to and from the interior nations such as the Nipissing, Huron, Ottawa, and Ojibway (Hessel 1993;

Trigger 1976). Since at least the late sixteenth century, the Algonquin groups were at war with the Mohawk Iroquois, over control of the upper St. Lawrence trade routes.

By the mid-seventeenth century, French traders and missionaries began to resent the Algonquin self-proclaimed role as middlemen along the Ottawa River which resulted in adversarial relations between the Algonquin leaders and French colonial officials. The endemic warfare of the age, and severe smallpox epidemics in 1623-1624, and again between 1634 and 1640, brought about drastic population decline among the Algonquin peoples (Hessel 1993). The French unwillingness to provide military support to the Algonquin against their mutual enemy, the Mohawk, led to the defeat and dispersal of the known Algonquian bands by the Five Nations Iroquois between 1640 and 1650 (Trigger 1976:610, 637-638). Survivors of the various bands coalesced as a single First Nation people to the north of the Ottawa Valley, and at the French posts of Montréal, Sillery, and Trois-Rivières.

Following the dispersal of the Ontario Iroquois and the Ottawa Valley Algonquin, the Five Nations of New York State (Mohawk, Oneida, Onondaga, Cayuga, and Seneca) eventually occupied a series of winter hunting bases and trading settlements near the mouths of the major rivers flowing into the north shore of Lake Ontario (Konrad 1981). The first recorded Five Nations settlement to relocate northward were two Cayuga villages established at the northeastern end of Lake Ontario. Two French Sulpician missionaries joined the Cayuga in 1668 at their settlement known as Kente, now Carrying Place, near the narrows separating the western end of Prince Edward County from the Hastings County mainland. A second Cayuga settlement, known as Ganneious, may have been near the mouth of the Napanee River, or further south on the Bay of Quinte (Edwards 1984:10). As a results of increased tensions between the Five Nations and the French, and a declining population from disease and warfare, the Cayuga settlements were abandoned in 1680 (Edwards 1984:17).

Following the American Revolutionary War (1775-1783), the British government encouraged disbanded and discharged soldiers as well as families and individuals loyal to the Crown (United Empire Loyalists [UEL]), to re-settle their families in English territory (Belden 1879:5). Stormont and Dundas Counties, as well as New Johnston (now the City of Cornwall) were settled by the King's Royal Regiment of New York (the Royal Yorkers) and their families, and Glengarry County was settled by Highland Scotch Catholics (Belden 1879:5; Harkness 1946:42-45).

Stormont and Dundas Counties were predominantly settled by former soldiers from the Valley of the Mohawk in New York State. The majority of these settlers were German

immigrants who had settled in America before the American Revolutionary War, mostly on land that had been presented to the Queen by Mohawk Chiefs, when on tour of London under the guidance of Peter Schulyer and Colonel Nicholson, in 1710 (Harkness 1946:12). Having served British sovereignty during the war, in 1783 these soldiers (known as United Empire Loyalists) found themselves enemies of the victorious, and newly formed, American government and ousted from their homes. As compensation for their lost estates and property, England provided them farmland in what would become known as the Province of Upper Canada (Belden 1879:5).

Sir Frederick Haldimand, a colonial administrator, under orders from the British government, decided that the Loyalists would be settled on Crown lands west of Rivière Beaudette, beyond the western boundary of the last seigneury holding (Senior 1983:14). Sir John Johnson requested that the granted lands be laid out from the upper end of Mr. Longueuil's seigneury, as the land was reported to be rich and fertile (Senior 1983:15). The families of the soldiers marched from their homes in the Valley of the Mohawk to Whitehall and were then ferried by boat to Isle aux Noix. After spending a winter in the barracks, the Loyalists and their families traveled up the St. Lawrence via boat and arrived at Cornwall in the summer of 1784 (Belden 1879:5). The date of the first settlement at Cornwall is debated. It is reported that by the time the soldiers were disbanded in 1784 and directed to take their families to Cornwall, it had already been surveyed (Harkness 1946:42-45). However, Senior (1983:17) reports that the slowness of government surveyors to lay out the proposed townships irked Johnson and that he ordered Patrick McNiff and 26 of his own men to begin surveying the area in 1784.

Johnson traveled to Point Maligne (the site of Cornwall) and was met by chiefs and warriors from the aboriginal community of St. Regis. The land Johnson wanted surveyed was not occupied, and was considered a source of revenue for St. Regis as the French had paid them well for the timber they cut down in the area. This was the first indication that the land on the north side of the St. Lawrence, opposite that of the settlement of St. Regis, had been regarded as part of their seigneury (Senior 1983:17). The chiefs informed Johnson that papers indicating ownership of this land - from the mouth of the Raisin River six leagues (33.336 km) to a creek a little above the Long Sault - had been destroyed in a Church fire. Johnson, believing the claim as groundless, returned to Montreal to consult with Haldimand. Haldimand could find no information indicating ownership in the register of Crown lands and decided to propose that St. Regis retain a tract of land running northwards between the new townships so that they could have direct access to their Algonquin allies of La Petit Nation. Joseph Brant proposed this offer to the St. Regis inhabitants that he found "reasonable enough about the land" and assured them they would still have three miles (or a little less) of river

frontage on the north bank of the St. Lawrence as a throughway to the Petit Nation River (Senior 1983:20). They were also given land south of the St. Lawrence from which they would receive rent (Senior 1983:20).

Finally, on May 6, 1784, the plans for the settlement that would become the Township of Cornwall were agreed upon; settlement would begin near the Raisin River, and what would become the City of Cornwall was situated near the St. Lawrence River. The centre of the township was quickly surveyed, laid out, and settlement commenced immediately (Senior 1983:20). By June 1784, Pointe Maligne became known as Johnson's Point.

Upon arriving in Cornwall, the soldiers of the Royal New York Regiment were greeted by recently settled Loyalists who had traveled from the Isle of Jesus and acquired lots in Cornwall via lottery. Johnson decided to go against Haldimand's wishes and allowed his officers first choice of the lands they wished to settle. This granted land consisted of 100 acres along the river and 200 acres inland. As with the date of the original settlement of Cornwall, there are discrepancies between reports of the acreage received by Loyalist settlers through lottery. Harkness (1946:45) reports that captains sometimes received in excess of 2,000 acres, lieutenants received 500 acres, and privates received 200 acres with provisions made for their offspring. It is generally conceded though, that the lottery occurred in 1784 with the result that riverfront land in the Townships of Cornwall, Osnabruck, Williamsburg, and Matilda of Stormont and Dundas Counties were simultaneously and successfully settled by a group of industrious Loyalist families and that Black Loyalists received land grants in Lake Township (Belden 1879:5; Senior 1983:41).

Early Churches. In 1786 there occurred a migration of approximately 500 Highlanders from Knoydart in Glengarry, Scotland to Upper Canada. The migration was led by Reverend Alexander Macdonnell, one of the first non-French Catholic priests to arrive in Upper Canada. He founded St. Raphael's parish and built "The Blue Chapel," thus named for the colour of its ceiling. The Blue Chapel was the first Roman Catholic church in Glengarry County and was ministered by Rev. Macdonnell until his death in 1803 (Harkness 1946:50; OntarioGenWeb 2010). Reverend John Bethune settled in Glengarry in 1787 and conducted the first Presbyterian services in small churches at Williamstown, Cornwall, Lancaster, and possibly Summerstown. Lutherans of Dundas County built a church in Williamsburg in 1790, which was ministered to by the Reverend Samuel Schwerdfeger (Harkness 1946:52). Around 1790, Methodist missionaries from the Methodist Episcopal Church of New York began to arrive in Upper Canada and in 1797 the first Methodist church was built in Dundas County at Point Iroquois. (Harkness

1946:112-115). In the 1840s, German and Irish Catholic labourers arrived in Dundas County and a Roman Catholic chapel was erected near Mariatown (Harkness 1846:115). The first churches in Stormont County were built by Roman Catholics at St. Andrew's and by Presbyterians at Cornwall (Harkness 1946:115). The first Baptist church in the Ottawa Valley was organized in 1816 following the immigration of Scots to Glengarry from Breadalbane, Scotland (Harkness 1946:128-131).

The Early Years in the Province of Upper Canada. In 1788, the British stopped sending provisions to the settlers in Upper Canada, whom they had been supplying for three years. The ensuing period of hardship and famine was amplified by a significant failure of crops in 1787. Mercifully, there was a good crop in 1789, thus ending the famine (Harkness 1946:55-56).

Before 1792, when Lieutenant-Governor Simcoe proclaimed that the Province of Upper Canada be divided into 19 counties, Stormont, Dundas, and Glengarry had been part of the District of Lunenberg. Lunenberg was one of the four districts created from the District of Lancaster (Upper Canada) by Lord Dorchester in 1788. Stormont, Dundas, and Glengarry Counties are the only three united counties in Ontario (Belden 1879:5). The year 1792 witnessed the establishment of the first Council of the new Province of Upper Canada. John Macdonnell was elected to the House of Assembly as the member for Glengarry and was subsequently appointed Speaker. Alexander Campbell was elected as the member for Dundas County and Jeremiah French represented Stormont County (Harkness 1946:65-69).

In July 1799, a ferry was established between the communities of Cornwall and St. Regis. David McCuen was charged with maintaining a boat and two canoes (Harkness 1946:77). William Bintinck, a traveler who passed through the area in the spring of 1801, recalled a conversation with a German soldier in Williamsburg who came originally from the Banks of the Mohawk in New York. The soldier and his wife described the Banks of the Mohawk as having been settled by peaceful people, while Williamsburg was inhabited by scores of Americans with a penchant for gambling and drinking alcohol. Upon arrival, the American immigrants to Upper Canada would cite their "attachment to our government" as the reason for their migration. However the German soldier and his wife, whom Bintinck encountered in Williamsburg, surmised that the real reason for the influx of Americans was the "cheapness of land and no taxes" (Harkness 1946:77)

Lord Selkirk, who travelled down the St. Lawrence River in the winter of 1804 recorded in his journal comments made by Mr. Bethune, who described the settlers in Glengarry

County as "laborious and economical" individuals who "are more assiduous than the Americans and allow themselves less indulgence" (Harkness 1946:81).

Geographic Township of Charlottenburgh (Map 4) *and the Civic Organization of the Counties*. In the early to mid-1780s, "Royal Townships" were established along the north shore of the St. Lawrence River. There were nine such townships which were numbered consecutively from east to west and later, in 1788, given the following names: No.1, Lancaster; No. 2, Charlottenburg; No. 3, Cornwall; No. 4, Osnabruck; No. 5, Williamsburg; No. 6, Matilda; No. 7, Edwardsburg; No. 8, Augusta; No. 9, Elizabethtown. Only eight of the townships were considered habitable, as Lancaster Township consisted mostly of swamplands and thus was called the "Sunken Township" (Mika and Mika 1976:155-165).

With the establishment of the province of Upper Canada in 1792, the former District of Lunenburg was renamed the Eastern District. Included in the Eastern District were the present counties of Stormont, Dundas, and Glengarry, along with the neighbouring counties of Prescott, Russell, Leeds, Grenville and Carleton. In 1800, Leeds, Grenville and Carleton counties seceded from the Eastern District to form the Johnstown District. The counties of Prescott and Russell became the Ottawa District in 1816. In 1850, all the Districts were abolished and the Eastern District became the United Counties of Stormont, Dundas, and Glengarry.

Glengarry County is comprised of the townships of Lancaster, Charlottenburgh, Kenyon and Lochiel. Dundas County, named for Henry Dundas, Lord Advocate for Scotland and Colonial Secretary, comprised of Williamsburg and Matilda Townships until 1798 when the northern portions of both townships separated to form Winchester and Mountain Townships, and Stormont County comprised of the townships of Cornwall, Osnabruck, Finch, and Roxborough. These twelve townships were created when six of the original Royal Townships of Upper Canada (namely: Lancaster, Charlottenburgh, Cornwall, Osnabruck, Williamsburg, and Matilda) were divided.

In 1998, the townships were amalgamated to form six townships (North Stormont, South Stormont, North Dundas, South Dundas, North Glengarry, and South Glengarry) and remain part of the three United Counties.

1.3.4.1 Study Area

Lot 6, Concession 1 St. Regis IR. This property was first granted by the Crown to John McDonell on August 15, 1807. Willed to Helen McDonell on July 5, 1810. Sold to

Alexander McCracken by Aleander McDonell on Septemer 26, 1840. Deeded by D.E. McDonell to Roderick McDonald on December 23, 1854 who then sold it to Alexander McCracken on the same day. Alex McCracken sold the east half to John McLaughlin on the same day and the west half to John Nicholson on January 18, 1855. The east half owned by John McLaughlin remained in the McLaughlin family until 1948. The west half of the lot remained in the Nicholson family until 1910.

Lot 7, Concession 1 St. Regis IR. As with the above lot, this property was first granted by the Crown to John McDonell on August 15, 1807. Willed to Helen McDonell on July 5, 1810. However, in 1842, the lot was deeded to Alexander and John McBean by Alexander McMartin (sheriff). There is no information included in the land registry documents regarding how the land came into the hands of McMartin. McBean sold the entire lot to the Honourable Peter McGill on February 4, 1943.

1.3.5 Summary

The current trajectory of Palaeoamerican archaeological research in Ontario indicates an expectation that these sites will be discovered further inland from contemporary lake and river levels. While numerous sites have already been documented in southwestern Ontario, it is anticipated that additional sites will be unearthed across the region, particularly during the early stages of land development. Such inland locations may have been used as refugia during the early post-glacial period, providing a haven for early human groups in the region.

For the Archaic Period, it is reasonable to expect the presence of sites near present-day water levels along waterways that once served as transportation corridors for trade and offered abundant food resources within the ecotone. These sites may contain remains of expedient tool manufacturing processes, which can be difficult to identify in the archaeological record and, thus, easily overlooked.

Similarly, Woodland sites are expected to be concentrated along rivers, lakes, and marshes. Woodland period sites may differ from those of the Archaic Period in the presence of ceramics and cemeteries. Moreover, past archaeological investigations associated with the Woodland Period have revealed a wider variety of specialized site types, including base camps, satellite camps, and larger gathering sites. These sites may reveal significant information about the social organization, trade, and exchange systems of Woodland period societies.

Regarding the Euro-Canadian movement and settlement in the region, it is important to acknowledge that the British government, along with its representatives, facilitated the settlement of Upper Canada, with an influx of refugees (UEL) from the Ameriacn Revolutionary War. Land registries, census records, and historic maps provide evidence that the area was predominantly rural and agricultural in nature, with relatively low population density throughout the eighteenth, nineteenth, twentieth, and even twenty-first centuries. Thus, the Euro-Canadian period is likely to have left behind a different type of archaeological record, such as farmsteads, early settlements, and historic land-use patterns, which may be used to better understand the region's colonial and agricultural history.

1.4 Archaeological Context

1.4.1 Current Conditions

The property consists of 3.45 hectares (ha) and displays some ground disturbance in close proximity to Kilkenny Crescent and Glen Walter Park Road (i.e., aggregate materials). The topography was irregularly undulating across the PA.

CAGI noted the presence of secondary growth vegetation both inside and outside the property which serves as an indicator of the soil's physical characteristics. The vegetation includes trees and/or shrubs (i.e., staghorn sumac, black walnut, current, honeysuckle, basswood, maple, ash, elm and gray dogwood), wildflowers (i.e., wood avens, black-eyed susan, goldenrod, virginia stickseed, red raspberry, buttonbush, ground ivy, aster, wild parsnip, Queen Anne’s lace, red clover, wood sorrel, ragweed, yellow foxtail, wild lettuce, self heal, trefoil, purple loose strife, obedient plant, New England aster, sow thistle, milkweed, motherwort, vetch, tansy, burdock and chicory), vines (i.e., wild cucumber, riverbank grape, thicket creeper,) fungi (i.e., dryads saddle), grasses (i.e., reeds, perennial ryegrass) and moss.

In addition to the above, wild parsnip was noted throughout the PA.

There was also a recently constructed pole structure currently being used by the local residents. It was recorded within the south-central portion of the project area (Map 11; Image 8).

Images 2 to 14 illustrate the current conditions of the PA and are discussed in Section 2.0. The photographs can be found in Section 10.0.

1.4.2. Physiography

Assessing the physical and environmental conditions of a region holds great importance for analyzing historical human settlement behaviour and interpreting landscape features and site patterns. The cultural progress of any society is heavily impacted by the natural environment that surrounds it, offering a limited range of resources utilized by humans to meet diverse needs. Geomorphology, soils, water sources, climate, and vegetation all play significant roles in comprehending landscape patterns. As the landscape evolves over time, it directly influences the archaeological assessment by influencing the types of cultural artifacts discovered and their visibility.

Location. The project area is located within Glengarry County which is situated within eastern Ontario, south of the Ottawa River Valley and west of the St. Lawrence River. The county is bounded by Prescott County to the north, the St. Lawrence River to the east and south, and Stormont County to the west. The Geographic Township of Charlottenburgh is situated within the southern portion of the county, along the St. Lawrence River.

Glacial History and Geomorphology. Landscape features seen today are the result of the most recent period of glaciation. Beginning with the Illinoian glacier and ending with the Wisconsinan, the ice masses advanced as far south as Ohio and as far east as the continental shelf edges. The first interstadial period, the Sangamonian, witnessed ice retreat of the Illinoian glacier as far north as Hudson Bay. At this time, Easton (1992) posits that global temperatures were warmer or similar to that which we experience today. This period extended until approximately 75,000 years BP with the onset of the Wisconsinan glaciation.

The Wisconsinan glaciation is characterized by a series of advances (stadials) and retreats (interstadials), scouring, transporting and depositing surface materials across Ontario. Seven major stadials and six interstadials, along with several minor phases, have been recorded (Table 2).

Table 2. Major stadial and interstadial periods, including timelines and features, of the Wisconsinan glaciation (taken from Remmel 2009:20-23).

Period	Stadial / Interstadial	Years BP	Features
Nicolet	Stadial	70,000	-blocked the St. Lawrence River -caused water to dam into Lake

			Scarborough -created the Scarborough Bluffs
St. Pierre	Interstadial	67,000	-St. Lawrence is free of ice -Great Lakes waters drain towards the Atlantic Ocean
Guildwood	Stadial	55,000	-ice covers all of Ontario and extends into the northern US
Port Talbot	Interstadial	48,000 - 36,000	-two warm intervals separated by a cold phase -palynological studies indicate boreal tree taxa -meltwaters drain through present-day New York
Cherrytree	Stadial	35,000 - 28,000	-the ice sheet covers most of Southern Ontario -formation of Glacial Lake Thorncliffe
Plum Point	Interstadial	27,000	-ice retreats across Ontario
Nissouri	Stadial	20,000	-ice sheet reaches the maximum extent
Erie	Interstadial	15,000	-ice retreats -Lake Erie drains eastward through the St. Lawrence River
Port Bruce	Stadial	14,000	-ice advances across Ontario and into the US
Mackinaw	Interstadial	13,000	-ice retreat causes splitting of ice lobes -split exposes a dome of higher land called Ontario Island -Proglacial Lakes Arkona I, II and III form at southern ice margins
Port Huron	Stadial	12,900	-short-lived advance -Glacial Lakes Lake Whittlesey, Warren I, Warren II, Wayne, and Warren III form

North Bay	Interstadial	11,840 - 8,100	-warmer climate -ice retreats across Canadian Shield -drainage flows east -formation of Glacial Lake Grassmere
Driftwood	Stadial	8,200 - 8,100	-deposition of clay tills in the Lake Barlow-Ojibway region -about 8,000 Glacial Lakes Ojibway and Agassiz catastrophically drain into Hudson Bay

The North Bay Interstadial, as it retreated across the landscape, exposed our project area.

Retreat during this phase was quite rapid and a number of post glacial lakes developed as a result of meltwater flow and drainage, ice dams and glacial deposits (i.e., Lake Iroquois, Lake Erie and the Champlain Sea). Consequently, substantial areas would have been inundated by the copious flow of meltwaters at elevations well above modern sea levels before the formation of drainage outlets. Three major drainage outlets formed during this period: the Kirkfield Outlet (~11,500 BP) which drained Lake Algonquin into Lake Iroquois across the Kawarthas (south of the project area); the Fossmill Outlet (~10,800) which drained Lake Algonquin into the Champlain Sea to the Atlantic Ocean through Algonquin Park by way of the Petawawa and Barron Rivers; and, the Mattawa Outlet was exposed as the glacier receded northward and exposed lower outlets (~10,000) which continued to drain Lake Algonquin into the Champlain Sea via the Mattawa River (north of the project area) (Chapman and Putnam 1984:25-39; Larsen 1987:19; and Kaszycki 1985).

In existence from ~12,800 BP - 10,000 BP (Chapman and Putnam 1984:39; Gadd 1980), the Champlain Sea was a temporary inlet of the Atlantic Ocean (Map 5). Although the maximum extent of this marine transgression is not yet known in specific terms, it has been posited that its eastern limits extended to the clay beds found within Leeds County and the Frontenac Axis, an eastern extension of the Canadian Shield which reaches into the Appalachian region of the United States. We also know that the northwestern arm of the Champlain Sea extended just north of Deep River (Barnett 1988). Unfortunately, because of the rocky nature of the region, the shoreline features of the western extension of the Champlain Sea remain unknown (Chapman and Putnam 1973:117).

As these glacial water sources drained, the zones created could have supported an extensive variety of animal, insect, bird, and vegetation species. Resource exploitation of these zones by early peoples is supported by the discovery of archaeological sites along the edges of ancient shorelines (palaeoshorelines) across North America.

This suggests that marine as well as terrestrial exploitation of food resources would have been an important aspect of the subsistence practices of the local indigenous populations. Therefore, the probability of at least a partial maritime-based economy in the region of the project area is high. The study of the geological history of the project area is important not only for understanding its natural history but also for gaining insight into the subsistence practices and cultural history of the local indigenous populations.

Palaeoecology. The last ice age completely disturbed vegetational patterns throughout Eastern Ontario. Climatic warming marked an official end to the Pleistocene Period and caused an abrupt change in the composition of forests, woodlands, and parklands south of the ice sheets.

Vegetation migrated northwards with deglaciation, resulting in the colonization of different species along the ice-free margins. Palynological analysis of pollen grains, as documented by Pielou (1991), Remmel (2009:30), and Wright (1964), reveals that more diversified vegetation emerged with minor differences noted between the west side of the continent and the lowlands and east side of the continent. The recolonization process depended on the production rates of various species and their capacity to grow on newly exposed terrain, which may have caused a reduction in pH levels (Matthews 1992:122). Initially, herbaceous tundra environs grew common species, such as herbs, mosses, and lichens, followed by shrub tundra communities, including sedges and small shrubs, and eventually, spruce (Picea ssp.) and poplar (Populus ssp.) woodlands. As temperatures rose, deciduous growth like hemlock and beech proliferated, causing treelines to shift northward, terrestrial and marine species to expand their range northward, and the above to move to higher elevations in the mountains.

The taxa present in the project area today are not significantly different from those that existed thousands of years ago. The project area is located in the Northern Hardwood Forest, within the Great Lakes-St. Lawrence Forest ecoregion, which extends from the northeastern United States to eastern Canada. The Northern Hardwood Forest is characterized by a mix of deciduous tree species, such as sugar maple, American beech, yellow birch, red maple, and basswood.

This forest community typically occurs on moist to mesic sites with deep, well-drained soils, and is often found on slopes and ridges. The canopy of the Northern Hardwood Forest is typically dominated by sugar maple, which is a long-lived, slow-growing species that can reach heights of up to 30 meters. Other common canopy species include American beech, yellow birch, and red maple.

Understory species in the Northern Hardwood Forest include shade-tolerant shrubs such as hobblebush, striped maple, and witch-hazel, as well as a variety of herbaceous plants, including wildflowers and ferns.

Climatic disruptions brought about diverse changes in the migration patterns and habitats of terrestrial and marine animals and birds. Mammals that are commonly found today in these environments, such as caribou, bear, fox, hare, chipmunk, squirrel, mouse, weasel, lemming, vole, moose, porcupine, and bat, would have been present during the late Pleistocene and early Holocene periods in the project area, as suggested by Remmel (2009:32). Black bear (Ursus americanus), moose (Alces alces), white-tailed deer (Odocoileus virginianus), and wolf (Canis lycaon) are frequently observed in the region today. Additionally, marine fossils found in the vicinity of the former Champlain Sea indicate that large mammals such as whales, walruses, and seals inhabited the area during the open-water season, as noted by Chapman and Putnam (1984), Cronin (1977), and Loring (1980). Since these mammals would have migrated to the region to follow their food sources, it is also reasonable to assume that smaller marine life, whose skeletal remains may not have been preserved in the archaeological record, were present. Moreover, as the prevailing climate of the time likely caused the Champlain Sea to freeze over during the winter season, marine mammals would have been forced to migrate into the Gulf of St. Lawrence, where the waters were open. However, as hypothesized by Loring (1980:35), "local populations of belugas or seals might have been trapped in areas of open water surrounded by ice and would have been easily killed by hunters..." This suggests that both marine and terrestrial exploitation of food resources would have been a significant aspect of subsistence practices for the local indigenous populations. In *Fossils and Geology of Lanark County* (2015), Brett illustrates the locations of whale, seal and walrus fossils found in relation to the Champlain Sea. It is therefore, highly probable that at least a partial maritime-based economy existed in the region of the project area.

Physiography and Geology. Located within Ontario's second northernmost terrestrial ecozone, the region between the Hudson Plains and the Mixed Wood Plains, is the Boreal Shield (Map 6). According to Natural Resources Canada (2011):

> "This ecozone is covered with a multitude of lakes and contains about 10% of all Canada's freshwater. The land is well irrigated. The terrain is a massive rolling plain of ancient bedrock. The climate is continental with long cold winters and short warm summers. Precipitation is abundant. Boreal forest, mixed with innumerable bogs, marshes and other wetlands, covers this ecozone."

Bedrock geology within the project area is comprised of Ordovician and Precambrian rocks (Map 7). The Shield is broken into many sections, or "provinces." Almost 3 billion years ago, these provinces began to rub against each other, causing friction and a build up of pressure. Many fissures and faults were created in the area as the Earth's crust twisted, sheared, and folded. Molten material, specifically andesite, a dark grey coloured rock, was forced up through the fissures to the surface. As it reached the ground, the new rock, in some cases carrying precious metals such as gold and silver, cooled and became part of the landmass. These ancient folded rocks are known as Greenstone belts which eventually were overlain with more recent glacial sediments.

Sedimentary rocks of Paleozoic and Mesozoic age formed between approximately 570 to 66.4 million years ago, during a global warming period, when several periods of marine inundation of North America were responsible for the deposition of thick layers of sediments which eventually resulted in the formation of shale, limestone and sandstone (Eyles 2002:5).

The area surrounding the project area is composed of Upper Ordovician era formations. Specifically, the project is located within a formation which includes such rocks as limestone, dolostone, shale, arkose and sandstone of the Ottawa Group, Simcoe Group or Shadow Lake Formation. These formations usually include chert formations.

One of the most common characteristics of Palaeoamerican material assemblages is the prevalence of cherts and similarities of lithic tools across wide ranging regions (Mason 1981, 1986; Goodyear 1989). Chert is a fine-grained, siliceous material which is easy to knap and therefore commonly used in the production of stone tools. In addition to chert use, quartz materials were also widely utilized, particularly in more northern regions or within the Canadian Shield, where quartz and quartzite materials were more locally available.

An increase in quartz exploitation during the Archaic period has been documented in the Northeast (Deal 1991; McGhee and Tuck 1974; Robinson 2006; Sanger 2006; Suttie 2005). As veins of good-quality siliceous material (i.e., chert, ryolite, chalcedony) are limited, it stands to reason that this could also be anticipated within the area.

The physiography of the study area encompasses two surficial geology types - clay plains and peat and mulch (Map 8). These surficial types are a direct result of the inundation of the area by the Champlain Sea.

Soils. Soil, in terms of its morphological characteristics, is defined as a natural, unconsolidated material composed of minerals, organic matter, and the living organisms within it. It is a dynamic entity, constantly undergoing processes of absorption, release, and transformation.

The formation of soil is influenced by various factors, including parent material, climate, topography, biological activity, and time. However, climate and living matter play a predominant role in the conversion of material into soil. For instance, in areas with abundant moisture and vegetation, deep and organically rich soils suitable for agriculture may develop. On the other hand, desert regions characterized by low precipitation may have limited soil development, with thin and mineral-rich soils often devoid of vegetation. Additionally, human activities such as burials, settlements, farming, and waste disposal can impact soil development, giving rise to unique soil characteristics.

The soils found in the project area have evolved over approximately the past 10,000 years, following the melting of glaciers at the end of the last ice age. Soils derived from glacial deposits exhibit variations in composition based on the types of rocks over which the glaciers travelled. As glaciers advance and retreat over time, the parent material's composition and depositional environment become complex. The texture of soils formed in glacial deposits reflects the transportation mode, distance, and type of rock eroded. Shale and limestone erosion typically results in soils with higher clay and silt content, while sandy soils are more common in areas where igneous and metamorphic rocks were scoured. Deposits beneath the ice generally consist of finer and denser materials, while outwash, frontal, and lateral deposits tend to be coarser. Glacial till, glaciofluvial sediments, and glaciolacustrine sediments often occur in close association. Over time, distinct soil horizons, representing zones within the soil with unique physical, chemical, and biological properties, develop (Holliday 2004:3). Collectively, these soil horizons form a profile, which is the vertical arrangement of horizons visible during observations in a two-dimensional manner.

The soils of Glengarry County vary somewhat across the region, with textured till, outwash and lacustrine soils. However, the southern portion of the county have drainage problems to some degree (Matthews et al. 1952:18). The main limitations

associated with the soils therefore are depressional, wet areas and poor drainage. The only limitations associated with the soils are depressional, wet areas and stoney areas. The project area is comprised of two soil types - Eamer loam (El) and North Gower clay loam (NGcl) (Table 3; Map 9).

Table 3. Soil characteristics of the project and immediately surrounding area.

Soil Type	Texture	Topography	Drainage	Great Group
Eamer loam (El)	Moderately stony to bouldery	Smooth moderately sloping	Good	Brown Forest
North Gower clay loam (Ngcl)	Stonefree	Smooth level	Poor	Dark Grey Gleysolic
Kars gravelly sandy loam (Kg)	Slightly to moderately stony	Smooth moderately sloping	Good	Grey-Brown Podzolic
Muck (M)	Stonefree	Depressional	Very poor	Organic

Hydrology. The present-day watercourses we observe have undergone significant changes as the ancestral waterways and their tributaries adapted to the retreat of the Champlain Sea. During the melting of glaciers at the end of the Pleistocene and the beginning of the Holocene periods, the project area experienced a much larger volume of water flow than it does currently. As a result, rivers shifted into new channels on multiple occasions. However, approximately 8,000 years ago, the modern drainage patterns were established (Kennedy 1970).

The project area is currently situated within the Raisin River watershed, which is a part of the larger St. Lawrence River watershed (Map 10). The watershed lies within Stormont and Glengarry counties and is a vast geographical area encompassing a network of rivers, lakes, and tributaries that collectively contribute to the flow of the St. Lawrence River. It is approxiamtely 546 kilometres square with its headwaters originating in a bog near Lunenberg. The watershed plays a crucial role in the ecological and hydrological processes of the region and serves as a vital water source for numerous communities, supporting various industrial, agricultural, and recreational activities.

Within or in close proximity to the project area today, there are various water bodies, including the St. Lawrence River, Grays Creek, Fraser Creek, the South Raisin River, and the Raisin River. Additionally, there are several low-lying and wet areas identified as marshes or swamps.

Water routes have played a pivotal role in the early development of Canada, serving as essential transportation routes for indigenous groups even before the arrival of European settlers. These water sources facilitated travel across the interior of the province prior to the establishment of railways and road networks. Areas presenting challenges along these routes, such as rapids or chutes requiring portages, hold significant potential for the discovery of archaeological resources. Additionally, the shores of rivers and creeks were attractive locations for temporary and semi-permanent settlements, particularly in easily accessible areas along the shore. These locations were of particular interest not only for transportation purposes but also due to their provision of clean water and abundant food resources, notably fish. Furthermore, secondary water sources such as permanently or seasonally flooded swamps and bottomlands offered diverse resources, including migratory birds, rice, and reeds suitable for basket-making. The tributaries of the Ottawa River served as important transportation routes for traversing the interior of the province before the advent of railways and road networks. From an archaeological perspective, these routes present significant opportunities for unearthing valuable archaeological resources, particularly in areas that presented considerable challenges such as rapids or chutes necessitating portaging. Additionally, the riverbanks and creek sides were highly desirable locations for establishing temporary and semi-permanent settlements, especially in easily reachable areas accessible by water. These sites were sought-after not only for their transportation advantages but also for their access to clean drinking water and abundant food resources, notably fish.

Moreover, the presence of secondary water sources, including perennially or seasonally flooded swamps, offered access to a wide range of resources such as migratory birds, rice, and reeds suitable for basket-making. These waterbodies played a vital role in the local ecosystem, providing a diverse array of resources that were essential for the sustenance and advancement of human populations.

Climate. Climate patterns in the present era are significantly influenced by geographic location and human impact on the environment. Specifically, in the project area located in eastern Ontario, the Great Lakes play a vital role in shaping the region's climate. Throughout the autumn and winter seasons, the Great Lakes contribute moisture to the atmosphere and act as a protective barrier against extreme cold temperatures.

Conversely, during the spring and summer months, they aid in regulating the overall temperature. This combination of effects results in a favorable environment for agricultural activities, characterized by an extended growing season and milder winters compared to other regions across Canada.

1.4.3 Previous Archaeological Research

The St. Lawrence River Valley has a long and varied archaeological history. The area has been occupied by Indigenous peoples for thousands of years, and traces of their presence remain visible in the landscape to this day.

Archaeological investigations have revealed that prior to European contact, the Indigenous peoples of the region were skilled hunters, gatherers, and fishermen who relied on the natural resources of the area for subsistence. Various sites have been identified, including village sites, campsites, burial grounds, and trading post locations. The artifacts recovered from these sites provide insights into the daily lives, technologies, and cultural practices of the people who lived here.

In recent years, there has been a growing recognition of the importance of engaging Indigenous communities in archaeological research and interpretation. Collaborative efforts between archaeologists and Indigenous peoples have contributed to a more comprehensive understanding of the St. Lawrence River Valley's archaeological history. Traditional knowledge, oral histories, and Indigenous perspectives have enriched the interpretation of archaeological sites, providing a more holistic and inclusive understanding of the region's past.

One notable archaeological site in the Ottawa River Valley near Pembroke is the Degeer Site. Excavations at this site have provided valuable insights into the Late Woodland period and the interactions between Indigenous peoples and European traders. The Degeer Site contains evidence of a fortified village and extensive trade networks, with artifacts such as pottery, stone tools, and European trade goods.

Another significant site in the region is the Allumette Island archaeological complex, which includes multiple village sites spanning several periods of Indigenous occupation. Excavations at these sites have uncovered a wide range of artifacts, including pottery, tools, and evidence of long-distance trade. The Allumette Island complex showcases the complexity and diversity of Indigenous cultures in the Ottawa River Valley.

In addition to traditional archaeological methods, modern technologies such as remote sensing and Geographic Information Systems (GIS) are being used to map and analyze archaeological sites. These tools enable researchers to identify potential sites, document their features, and study patterns of human settlement and land use in the Ottawa River Valley.

The archaeological history of the Pembroke area is not limited to Indigenous peoples. European settlers, including fur traders, missionaries, farmers, and other agricultural workers, arrived in the area in the 17th, 18th, and mid-19th centuries. Archaeological investigations have revealed the remains of early homesteads, farmsteads, and other structures that provide insight into the lives of these early European settlers and their impact on the landscape.

However, a search of the database on July 13 2023, found that no archaeological assessments have been conducted within 100 metres of the study area.

1.4.4 Registered Archaeological Sites

The Ontario Ministry of Citizenship and Multiculturalism maintain a database (OASD) of all known registered archaeological sites in the Province. A search of the database (completed on July 13, 2023) within a one-kilometre radius around the study area showed the presence of two registered archaeological sites - the Flanagan site (BgFp-50) and the Colquhoun site (BgFp-49). The Flanagan site is a contact period archaeology site dating to around 1850 recorded in 2020. There were a total of 107 cultural materials recovered during the Stage 2 property survey. The site is recommended for further assessment (McCartney 2020).

The Colquhoun site was encountered in 2013 by CAGI during a Stage 2 property survey. The artifacts (n=490) recovered indicate a post-contact period date of 1870 related to the settlement of the region. It is recommended for additional archaeological work (CAGI 2013)

1.4.5 Historical Plaques

In addition to the existence of registered archaeological sites nearby, the presence of extant archaeological remains can also be indicated by the proximity of historical plaques in the vicinity of the study area. These plaques serve to commemorate significant events in the region's history, such as the birth of notable individuals, specific battle sites, or the construction of distinctive buildings. Typically, historical plaques and

markers are placed at specific locations on the landscape that are accessible to the public. While they may not be situated precisely where the event occurred, they are generally in close proximity, considering public access. In Ontario, historical plaques are erected by various entities, including the federal government, through the Historic Sites and Monuments Board of Canada (HSMBC), the Ontario Heritage Trust (OHT), as well as local heritage agencies or historical societies. However, it is important to note that no historical plaques or markers have been identified within the study area.

1.4.6 Summary

The physical attributes of the project area suggest that it has the potential to harbour cultural materials related to pre-and post-contact First Nations and Euro-Canadian settlement in the region.

During the migration of Palaeoamerican groups across Ontario, it is believed that they followed the northward retreat of the ice sheet, adapting to the changing environment along the way. The newly exposed landscape would have been rich in resources, supporting a diverse range of terrestrial and marine mammals, birds, insects, and vegetation along the margins. This abundance of biomass would have provided ample food sources for migrating populations. The areas that were once the palaeoshorelines of the Champlain Sea likely resembled a seasonally frozen Subarctic sea, combining characteristics found in present-day Hudson Bay and the northern portion of the Gulf of St. Lawrence. A number of whale, seal and walrus fossils have been found around the PA.

Although Palaeoamerican peoples have been characterized as "big game hunters," this conclusion is primarily based on the archaeological evidence of lithic tools and the remains of large mammals such as mastodons, caribou, and whales. The preservation and recovery of these artifacts have been significantly impacted by factors such as erosion, acidic soils, and landscape changes, while smaller organic materials are less likely to have survived over thousands of years. Some argue that wetland areas hold limited potential for archaeological resources; however, wetlands have been historically significant resources, and preserved archaeological remains may be located beneath layers of soil and sediment.

The Glen Walter area has a rich and diverse archaeological history that spans thousands of years, with Indigenous peoples skilled in hunting, gathering, and fishing, relying on the natural resources of the area to sustain their way of life. While no evidence of archaeological remains has been found through previous archaeological and cultural

heritage work conducted in the immediate vicinity of the project area, factors such as erosion, acidic soils, and landscape changes can significantly impact the preservation and recovery of these artifacts. Smaller organic materials are less likely to have survived over thousands of years, and some argue that wetland areas hold limited potential for archaeological resources. However, wetlands have been historically significant resources, and it is possible that preserved archaeological remains may be located beneath layers of soil and sediment.

Further archaeological research and investigation in the project area have the potential to uncover valuable information about the region's pre- and post-contact history. This research can provide insight into the lifestyles, beliefs, and practices of Indigenous peoples, and also aid in the preservation and interpretation of their cultural heritage. It is crucial to note that this research must be conducted in a respectful and collaborative manner that recognizes the sovereignty and cultural rights of Indigenous peoples.

2.0 PROPERTY INSPECTION

A property inspection of the Project Area was undertaken by Laura McRae on August 22, 2023 under the professional archaeological consulting license P248 (P248-0427-2023) in order to observe the current land conditions and evaluate the Project Area's archaeological potential. The inspection was undertaken to determine if there were any areas of disturbance which would affect archaeological potential and to determine which survey strategies would be appropriate for a Stage 2 property survey.

The site inspection systematically covered the entire study area. As the study area was situated alongside a public road, it was easily accessible and permission for conducting work within the PA was provided by David Davison (AG), the proponent.

The weather on August 22, 2023 was 25ºC with some cloudy periods and a slight breeze. At no time during the archaeological assessment were weather or lighting conditions detrimental to the observation of features of archaeological potential.

The PA is located on private property, east of Kilkenny Crescent and south of Glen Walter Park Road, in the Town of Glen Walter. (Plan 1; Map 1; Image 1). There are no listed or registered heritage properties or cemeteries within the PA, or within 50 m of the Project Area.

Topographic maps and orthographic images were examined to confirm if features of archaeological potential were present and if there were any areas of extensive disturbance which would have removed archaeological potential.

Field notes and photographs of the study areas were taken during the inspection by Laura McRae. Image locations and orientations were noted and are illustrated on the site conditions map (Map 10).

The archaeological assessment was carried out following approval of the project proposal. David Davison was able to provide an orthographic image of the PA in advance of the archaeological assessment. These plans and a .kmz file (google earth) were used for base mapping of conditions, potential and results.

Table 4. Photograph and description.

Photo #	Description
2	Viewing southeast.
3	Viewing southeast down the trail from Glen Walter Park Road into the PA.
4	Large boulder in the eastern portion of the PA.
5	Viewing northwest along the eastern limits of the PA.
6	Viewing east along the trail.
7	Viewing east.
8	Viewing northeast. A pole structure has been constructed in the area and is being used by local residents.
9	Viewing south.
10	Viewing southwest along the northern limits of the PA. This area was elevated compared to the roadway. The materials included aggregate materials indicating that the PA was likely infilled sometime in the past.
11	Viewing east from the intersection of Kilkenny Cresent and Glen Walter Park Road.
12	Viewing southeast. Note the reeds (indicating moist soils).
13	Viewing east along the trail from Kilkenny Crescent.
14	Viewing south from the north corner of the PA.

3.0 FIELD METHODS

Section 2.1 of the *Standards and Guidelines for Consultant Archaeologists* (2011:28-30), states that the entire property, including lands immediately adjacent to built structures (both intact and ruins), must be surveyed. However, it is further stated that survey is not required where:

1. lands are evaluated as having no or low potential based on the Stage 2 identification of physical features of no or low archaeological potential, including but not limited to: permanently wet areas; exposed bedrock; and, steep slopes (>20o) except in locations likely to contain pictographs or petroglyphs;

2. lands are evaluated as having no or low potential based on the Stage 2 identification of extensive and deep land alteration that has severely damaged the integrity of archaeological resources;

3. lands have been recommended to not require Stage 2 assessment by a Stage 1 report, where the Ministry has accepted the Stage 1 report into the Ontario Public Register of Archaeological Reports;

4. lands are designated for forest management activity without potential for impacts to archaeological sites, as determined through the Stage 1 forest management plans process (see section 1.4.3);

5. lands are formally prohibited from alteration such as areas in an environment easement, restrictive setback, or prohibitive zoning, where the constraint prohibits any form of soil disturbance. (Open space and other designations where allowable uses include land alterations must be surveyed.); and,

6. it has been confirmed that the lands are being transferred to a public land-holding body, e.g., municipality, conservation authority, provincial agency. (This does not apply to lands which a future transfer is contemplated but not yet confirmed.)

Furthermore, if the project area has been identified as needing a property survey, the survey should be undertaken when the weather and lighting conditions permit good visibility of land features. Survey should *not* take place when weather and lighting conditions (e.g., snow cover, frozen ground, heavy fog) reduce the chance of finding evidence of archaeological resources. During survey a Global Positioning System (GPS) should be used to record the locations of all diagnostic artifacts; sufficient artifacts to provide an estimate of the limits of the archaeological site; and all fixed reference

landmarks. All field activities must be mapped in reference to fixed landmarks, survey stakes and development markers and all mapping must be accurate to five metres or to the best scale available. Photo-document examples of all field conditions encountered. Do not use heavy machinery to remove soil, except when removing sterile or recent fill covering areas where it has been determined that there is the potential for deeply buried or sealed archaeological sites (e.g., in urban areas, floodplains).

In addition to the above, Section 7.8.1.2 further posits that detailed and explicit descriptions be provided for:

a. How each standard was addressed for property survey generally (Section 2.1, MCM 2011:28-30).

The entire PA weas subject to a test-pit survey at five metre intervals by the CAGI field crew (identified in red on Map 12) as it was determined that the property retained archaeological potential for both Pre- and Post-Contact First Nations cultural materials and Euro-Canadian historic artifacts. Survey took place under suitable lighting conditions and there was no heavy fog or excessive precipitation. GPS co-ordinates taken on a Trimble GeoXH handheld GPS unit with Hurricane Antenna (using datum NAD 1983).

Field activities were mapped with the Trimble GeoXH handheld GPS unit, which after post- processing, provided accuracy of co-ordinates of less than 100 cm deviation. Photographs were taken of field conditions (Maps 11 and 12; Images 2 to 17) and a discussion of these can be found within the Results sub-section of this section of the report (Table 9). Heavy machinery was not utilized by The Central Archaeology Group Inc. for this project.

b. How each standard was addressed for pedestrian survey and test pit survey (Section 2.1.1, MCM 2011:30-31).

Given that the areas of archaeological potential that could be impacted by the proposed project consisted of lands where ploughing was not possible or viable, it was necessary to utilize the test pit survey method to complete the Stage 2 property assessment. In this method, CAGI crew members hand-excavated small regular test pits with a minimum diameter of 30 cm at prescribed intervals across the study area. Section 2.1.2 of the Standards and Guidelines for Consultant Archaeologists stipulates that lands within 300 m of any feature of archaeological potential be examined at a maximum interval of 5 m, and any lands more than 300 m from such features be examined at a maximum interval of 10 metres (MCM 2011:31–32). Given the presence of multiple indicators of

archaeological potential in the vicinity of the study area (e.g. water source), a five metre interval was adopted for the property assessment.

In accordance with Section 2.1.2 of the Standards and Guidelines for Consultant Archaeologists, each test pit was excavated into the first five cm of subsoil or to bedrock (MCM 2011:32). The resultant pits were then examined for stratigraphy, cultural features and/or evidence of fill. The soil from each test pit was screened through 6 mm mesh and examined for archaeological materials. If archaeological materials were encountered over the course of the test pitting survey, each Positive Test Pit would be documented and all artifacts would be collected according to their associated test pit.

All test pits were backfilled upon completion (MCM 2011:32).

All area of archaeological potential that could be impacted by the proposed project were assessed according to these methods. No cultural materials were encountered.

c. Address any differences in approach for areas possessing different conditions.

Not applicable.

d. How each standard was addressed where alternative methods acceptable through guidelines of special conditions were used.

No alternative methods were applied during the Stage 2 property assessment.

Finally, Section 7.8.1.3 (MCM 2011:137) requests estimates of the percentage of each of the following be provided:

a. The property surveyed by coverage and survey interval.

Area of Stage 2 Assessment : 100%
Property assessed by test pit survey at five metre intervals: 100%

b. The property not surveyed because there were areas of no or low archaeological potential.

Not applicable.

c. The property where standard survey intervals could not be maintained due to pockets of exposed bedrock or other physical constraints.

Not applicable.

3.1 Results

The Stage 2 archaeological assessment of the Project Area was conducted on August 22, 23, 27 and 28, 2023 under the field direction of Laura McRae, MA (P248). At no time were the weather or lighting conditions detrimental to the observation or recovery of archaeological resources (Table 5).

Table 5. Weather conditions during the Stage 2 property survey.

Date	Temperature	Weather
August 22, 2023	25	Partly cloudy with sunny periods. Slight breeze.
August 23, 2023	27	Mostly sunny with a slight breeze. Some afternoon cloudy periods.
August 28, 2023	25	Mostly sunny with some cloudy period. Slight breeze throughout the day.
August 29, 2023	25	Mostly cloudy with a breeze.

The project area was accessed via Kilkenny Crescent and Glen Walter Park Road.

Soil colours were identified using Munsell Soil-Color Charts (2009) to ensure uniformity in recording. Colours were noted when soils were freshly excavated and slightly damp. Although compaction was based on a slightly modified version of the clay and sand density tests provided on the Geotechnical Gauge by W. F. McCollough. Where the clay density test by W. F. McCollough identified six clay consistencies, only three consistency classifications for clay were used during the course of investigations, which included: loosely compacted, moderately compacted, and densely compacted. A comparison of the two methods is provided in Table 6. With sand, the Geotechnical Gauge by W. F. McCollough provided five soil types and the associated field test, whereas this was reduced to three categories for the purposes of this study as well, which included loosely compacted, moderately compacted, and densely compacted. A comparison of the two methods is provided in Table 7.

Table 6. Comparison of W. F. McCollough and CAGI clay compaction classification.

	W.F. McCollough	CAGI
Clay Consistency	Thumb Penetration	CAGI Classification
Very Soft	Easily penetrated several inches by thumb. Exudes between thumb and fingers when squeezed in hand.	LOOSELY COMPACTED
Soft	Easily penetrated one inch by thumb. Molded by light finger pressure.	LOOSELY COMPACTED
Medium Stiff	Can be penetrated over 1/4″ by thumb with moderate effort. Molded by strong fingers pressure.	MODERATELY COMPACTED
Stiff	Indented about 1/4″ by thumb but penetrated only with great effort.	MODERATELY COMPACTED
Very Stiff	Readily indented by thumbnail.	DENSELY COMPACTED
Hard	Indented with difficulty by thumbnail.	DENSELY COMPACTED

Table 7. Comparison of W. F. McCollough and CAGI sand compaction classification.

	W.F. McCollough	CAGI
Sand Consistency	Thumb Penetration	CAGI Classification
Very Loose Sand	Easily penetrated with 1/2″ reinforcing rod pushed by hand.	LOOSELY COMPACTED
Loose Sand	Easily penetrated with 1/2" reinforcing rod pushed by hand.	LOOSELY COMPACTED
Medium Dense Sand	Penetrated a foot with 1/2″ reinforcing rod driven with a 5lb hammer.	MODERATELY COMPACTED
Dense Sand	Penetrated a foot with 1/2" reinforcing rod	MODERATELY

	driven with a 5 lb hammer.	COMPACTED
Very Dense Sand	Penetrated only a few inches with 1/2" reinforcing rod driven with a 5 lb hammer.	DENSELY COMPACTED

The frequency of roots and stones within a soil horizon was divided into: a) small or low percentage; b) medium or moderate percentage, and; C) high or heavy percentage. This system of classification is based on the inclusions frequency chart within the Geotechnical Gauge by W. F. McCollough, where a 3% to 15% frequency of roots and stones within the soil horizon was determined to be small or low; 15% to 40% was determined to be medium or moderate, and; 40% and above was considered high or heavy.

Stratigraphy, in general, was typically comprised of three levels: O horizon, A horizon (topsoil) and B horizon (subsoil). In some cases, the topoil and subsoil exhibited evidence of aggregate materials (sand, gravel, etc.). This was expected as the project area appeared to be elevated in comparison to the surrounding landscape. Soil colours, texture and compaction remained consistent throughout the project area and for each stratigraphic level. This can also be seen within the project area photographs.

*Vegetation typically associated with moist soils was noted throughout the PA in the form of ground moss, bracken, reeds and fungi.

Map 12 shows the location of the points from which the photographs were taken. Culvert stratigraphy will be discussed in Table 8. A description of each photograph is provided in Table 9.

Table 8. PA soil stratigraphy.

Humus	A Horizon	B Horizon	Aggregate
-Between 2 and 5 cm thick -Loosely compacted -High percentage of small pebbles -Moderate percentage of roots and rootlets -Silty sand texture	-Between 21 and 60 cm thick -Moderately compacted -High percentage of small to large pebbles and small cobbles -Moderate percentage of rootlets	-At least 5 cm -High percentage of rootlets -Low percentage of rootlets -Sandy texture -Dark yellowish brown (10YR 4/6) to	-Ranged from 4 to 25 cm -Moderately to densely compacted -Noted around the trails -Gray (10YR 5/1) to light gray (10YR

-Dark grayish brown (10YR 4/2)	-Silty sand texture -Grayish brown (10YR 5/2) to brown (10YR 5/3)	yellowish (10YR 5/8)	brown 7/1)

Table 9. Photo # and description.

Photo #	Description
15	Test pit from the northeast portion of the PA. This test pit was 64 cm deep and included three levels of stratigraphy: humus, topsoil and subsoil. The humus level was very thin at 3 cm thick. It was loosely compacted and dark grayish brown (10YR 4/2). Topsoil was 55 cm thick, moderately compacted and grayish brown (10 YR 5/2). Subsoil was yellowish brown (10YR 5/8) and moderately compacted. No cultural materials were recovered.
16	North profile of the above test pit.
17	Subsoil close-up of a test pit in the western portion of the PA.

**During the assessment wild parsnip was recorded across the PA and was avoided by the CAGI field crew as it is considered a noxious (and potentially dangerous) plant. According to the ontario.ca website (https://www.ontario.ca/page/wild-parsnip):

> "The plant can form dense stands and spreads quickly in disturbed areas such as abandoned yards, waste dumps, meadows, open fields, roadsides and railway embankments. Its seeds are easily dispersed by wind and water, and on mowing or other equipment. Like giant hogweed and other members of the carrot family, it produces sap containing chemicals that can cause human skin to react to sunlight, resulting in intense burns, rashes or blisters."

4.0 RECORD OF FINDS

Section 7.8.2, Record of Finds, of the Standards and Guidelines for Consultant Archaeologists (2011:137-138) requires that this section contain all finds but for non-archaeological cultural heritage features (i.e., built heritage, cultural heritage landscapes) unless those features are part of or relevant to the archaeological record (MCM 2011:137).

The Stage 1 and Stage 2 archaeological assessment of the PA did not recover any cultural materials. In consequence, the requirements of Section 7.8.2 of the archaeological standards and guidelines do not apply to this report.

An inventory of the documentary record generated in the field is provided below (Table 10). Representative photographs and their locations indicated on maps are provided in Section 12.0. The documentation related to this project will be held by The Central Archaeology Group Inc. in their lab and office facilities in Campbellford, Ontario. Curation will continue until such a time that arrangements for their transfer to Her Majesty the Queen in the right of Ontario, or other public institution, can be made to the satisfaction of the project owner (s), the MCM, and any other legitimate interest group.

Table 10. Inventory of the documentary record.

Type	Location	Comments
Photographs - 69	CAGI office at 2401 5th Line East, Campbellford, ON K0L 1L0	Stored on CAGI computers.
Field Notes - 1 page	CAGI office at 2401 5th Line East, Campbellford, ON K0L 1L0	Hard copy within project files. Digital copy on CAGI computers.
GPS Data	CAGI office at 2401 5th Line East, Campbellford, ON K0L 1L0	GPS log data on file and stored on CAGI computers.
Maps - 2 pages	CAGI office at 2401 5th Line East, Campbellford, ON K0L 1L0	Stored on CAGI computers.
Research and Reporting Materials	CAGI office at 2401 5th Line East, Campbellford, ON K0L 1L0	Stored on CAGI computers.
Artifacts - n/a	n/a	n/a

5.0 ANALYSIS AND CONCLUSIONS

The standard specified within Section 7.7.3 of the Standards and Guidelines for Consultant Archaeologists (MCM 2011:138) requires that this section address the following statement: Summarize all findings from the Stage 2 survey, or state that no archaeological sites were identified."

As stated in the development context section of this report, a property survey was carried out on August 22, 23, 28 and 29, 2023, on the PA. No archaeological remains were recovered.

Further to the above, the standard that is articulated in Section 7.8.3.2b of the standards and guidelines (MCM 2011:139) requires that this section of the report include a comparison against the criteria in Stage 2 Property Assessment to determine whether further assessment is required. Those elements of the standard are addressed below.

The standard that is specified in Section 7.8.1.2a of the standards and guidelines (MCM 2011:137) requires that this section of the Stage 2 report provide detailed and explicit descriptions of how each standard was addressed for the property survey.

Area of Stage 2 Assessment : 100%
Property assessed by test pit survey at five metre intervals: 100%

Accordingly, the survey satisfies this standard.

The requirement outlined in Section 2.1.3 of the standards and guidelines (MCM 2011:29) mandates that a property must be surveyed under favourable weather and lighting conditions that enable clear visibility of land features. The weather and lighting conditions during the assessment detailed in this report fulfilled this standard. Furthermore, Section 2.1.5 of the standards and guidelines (MCM 2011:29) stipulates that assessment reports must include precise mapping of all field activities, including the location and extent of field methods, survey intervals, and development markers, with reference to fixed landmarks and survey stakes. The standard also requires that the mapping must be accurate to a five-meter scale or to the best available scale. The mapping presented in this report complies with this standard.

As no archaeological resources were encountered, the archaeological assessment process as outlined by the MCM may be considered complete.

6.0 RECOMMENDATIONS

Based on the background research and the results of the property survey, the archaeological assessment has provided the basis for the following recommendations:

1) The Stage 2 archaeological assessment yielded no cultural materials or artifacts during the survey activities. It is therefore recommended that the project area be cleared of archaeological concerns.

Despite the findings and recommendations put forward in this study, it should be noted that even the most comprehensive and diligent archaeological assessment cannot guarantee the identification or consideration of every potential isolated or deeply buried archaeological deposit. Consequently, in the event that any archaeological remains are encountered during subsequent construction and development activities, the consultant archaeologist, approval authority, and the Cultural Programs Unit of the MCM must be promptly notified.

It is requested that the MCM review and provide written confirmation of their satisfaction with the results and recommendations outlined in this report, in accordance with the 2011 Standards and Guidelines for Consultant Archaeologists and the terms and conditions for archaeological licenses. It is further recommended that this report be included in the Ontario Public Register of Archaeological Reports.

7.0 ADVICE ON COMPLIANCE WITH LEGISLATION

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. 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 regards to alterations to archaeological sites by the proposed development.

It is an offense under Sections 48 and 69 of the Ontario Heritage Act 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 archaeological 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 Report referred to in Section 65.1 of the Ontario Heritage Act.

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 archaeological fieldwork, in compliance with Section 48 (1) of the Ontario Heritage Act.

The Cemeteries Act, R.S.O. 1990 C. 4 and the Funeral, Burial and Cremation Services Act, 2002, S.O. 2002, C. 33 (when proclaimed in force) require that any person discovering human remains must notify the police or coroner and the Registrar of Cemeteries at the Ministry of Consumer Services.

8.0 CLOSURE

This report is pending Ministry approval.

If you have any questions or if CAGI can be of further assistance, please contact the Laura McRae, Chief Archaeologist.

CAGI

Laura McRae, MA, APA
Chief Archaeologist

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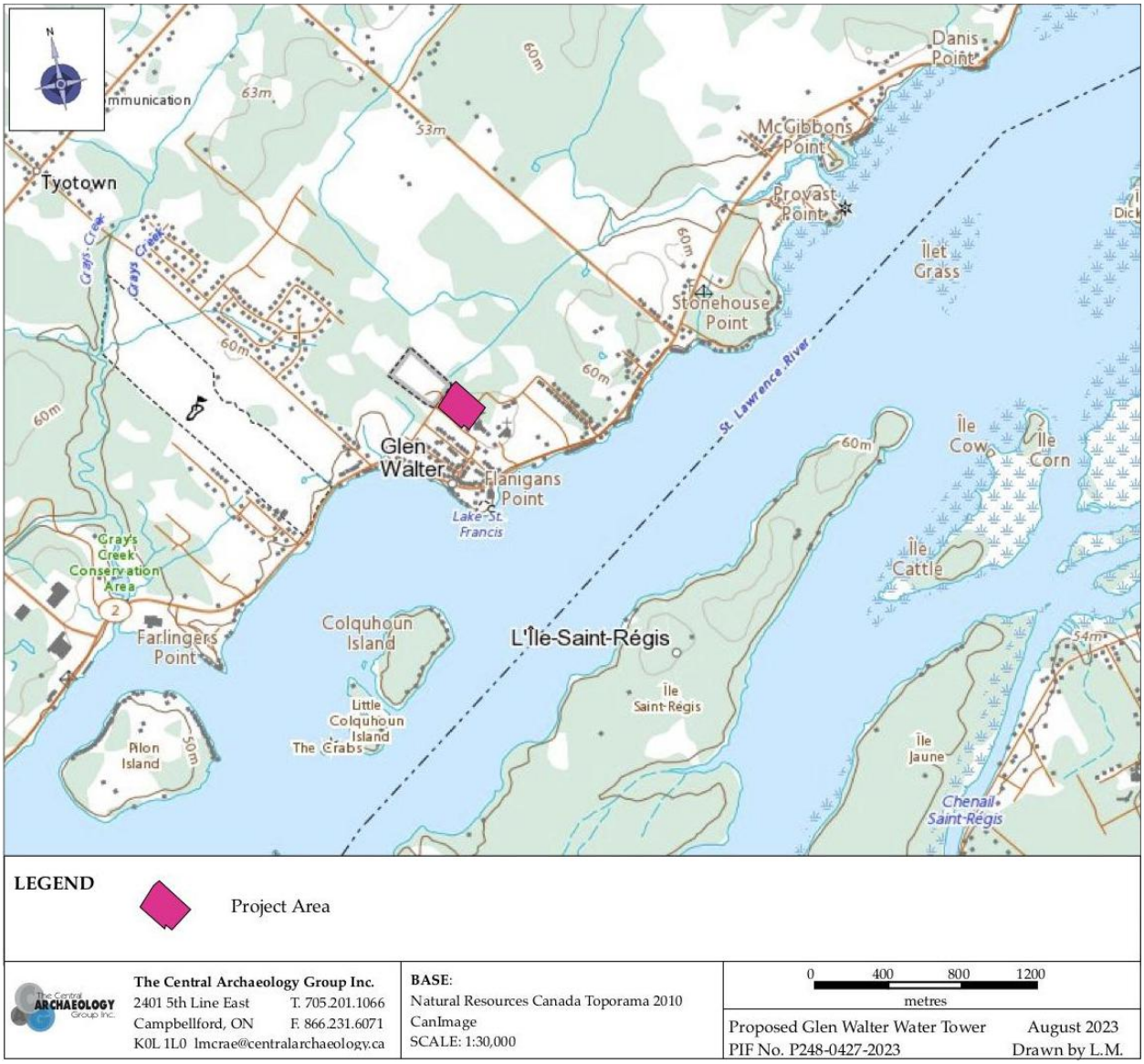
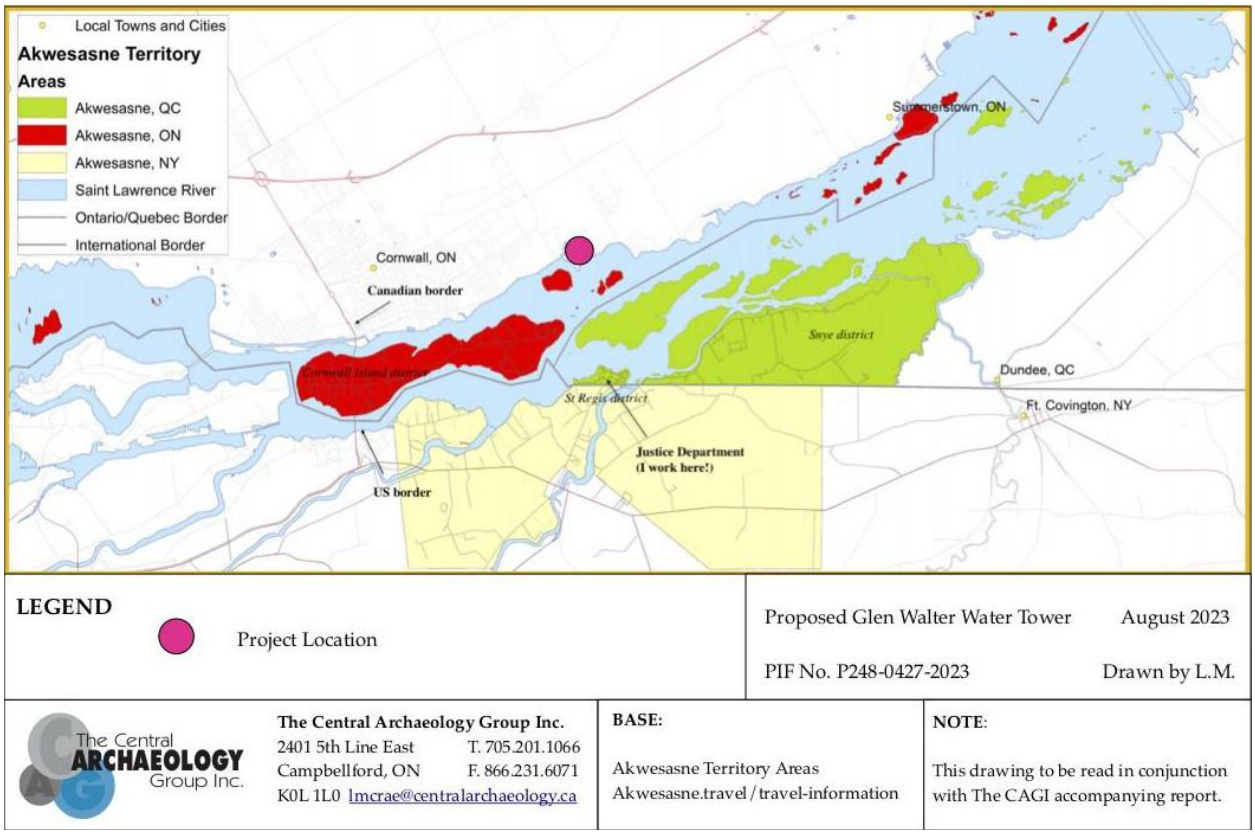
10.0 PLANS

Plan 1. Archaeological area of assessment (Ainley Graham & Associates Ltd.).

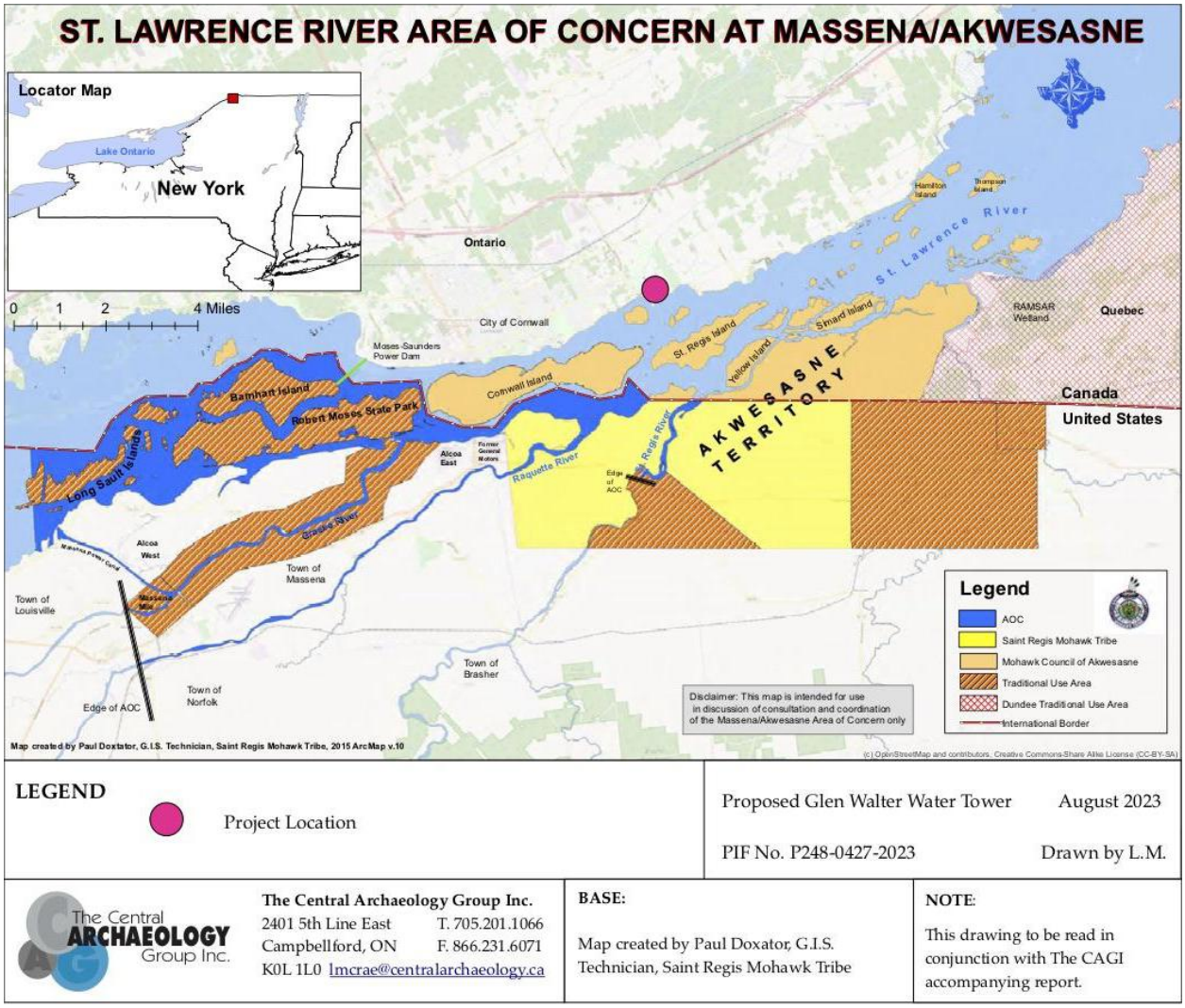
11.0 MAPS



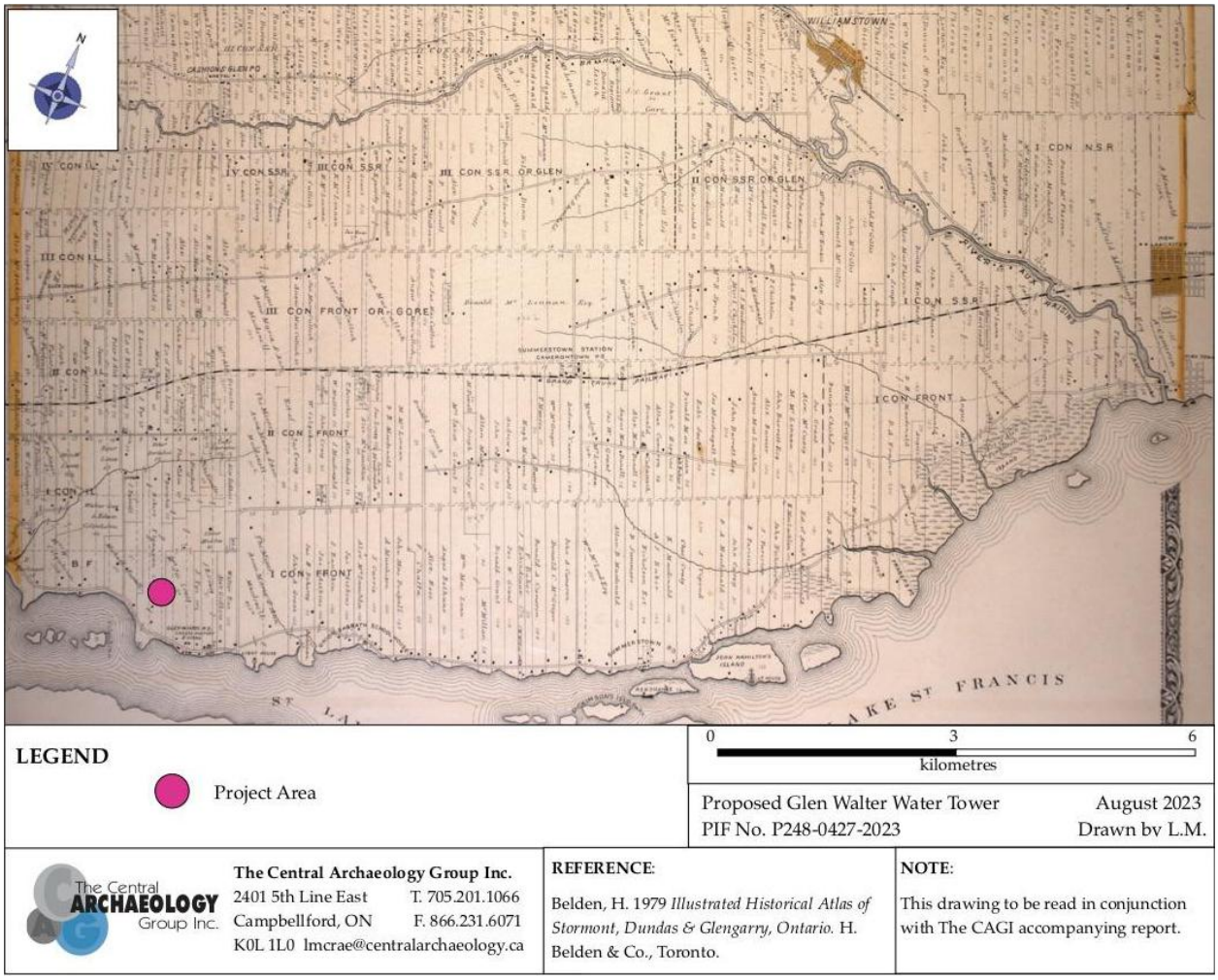
Map 1. Location of the project area.



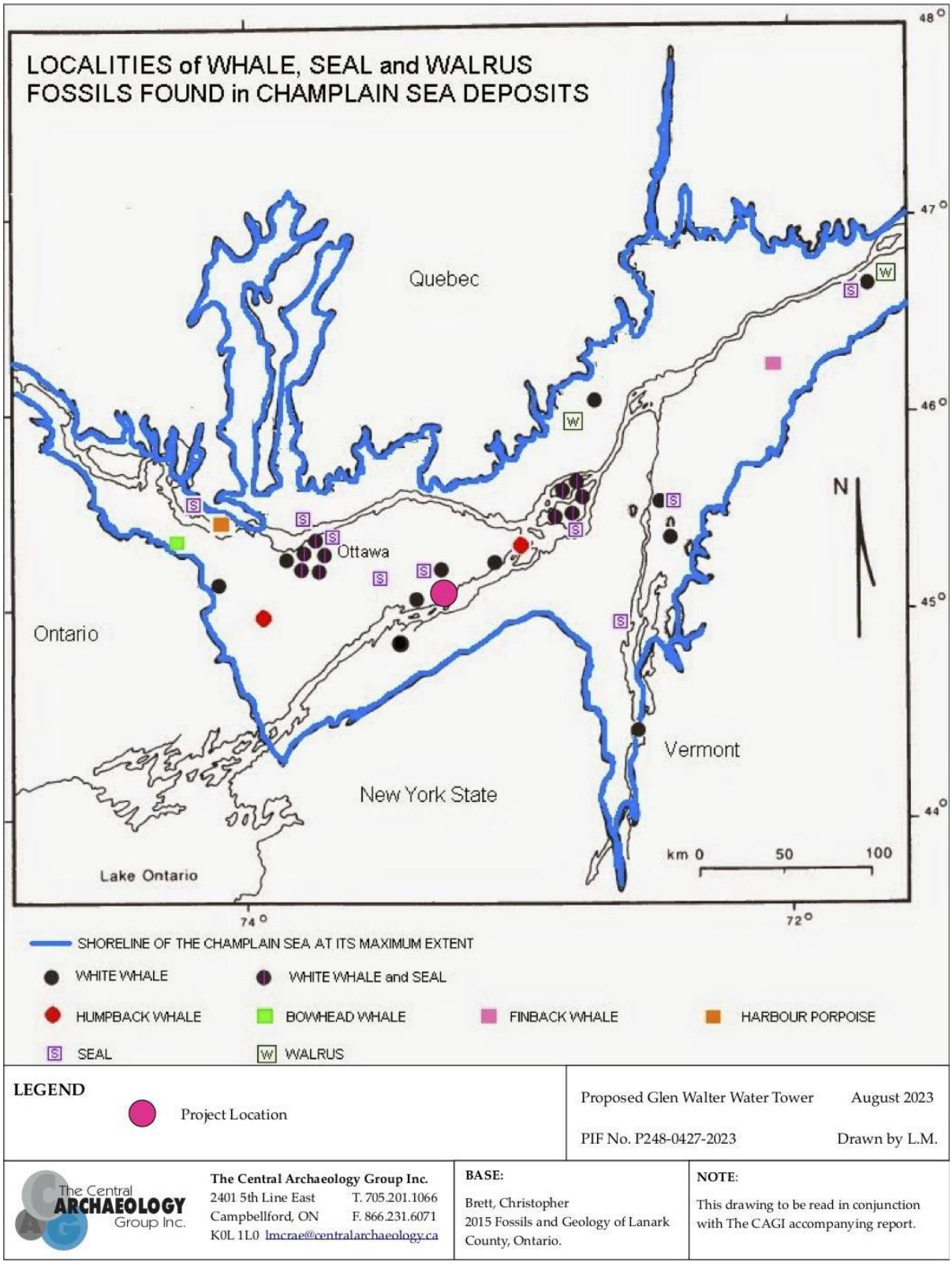
Map 2. Akwesasne territory areas (Akwesasne.travel/travel-information).



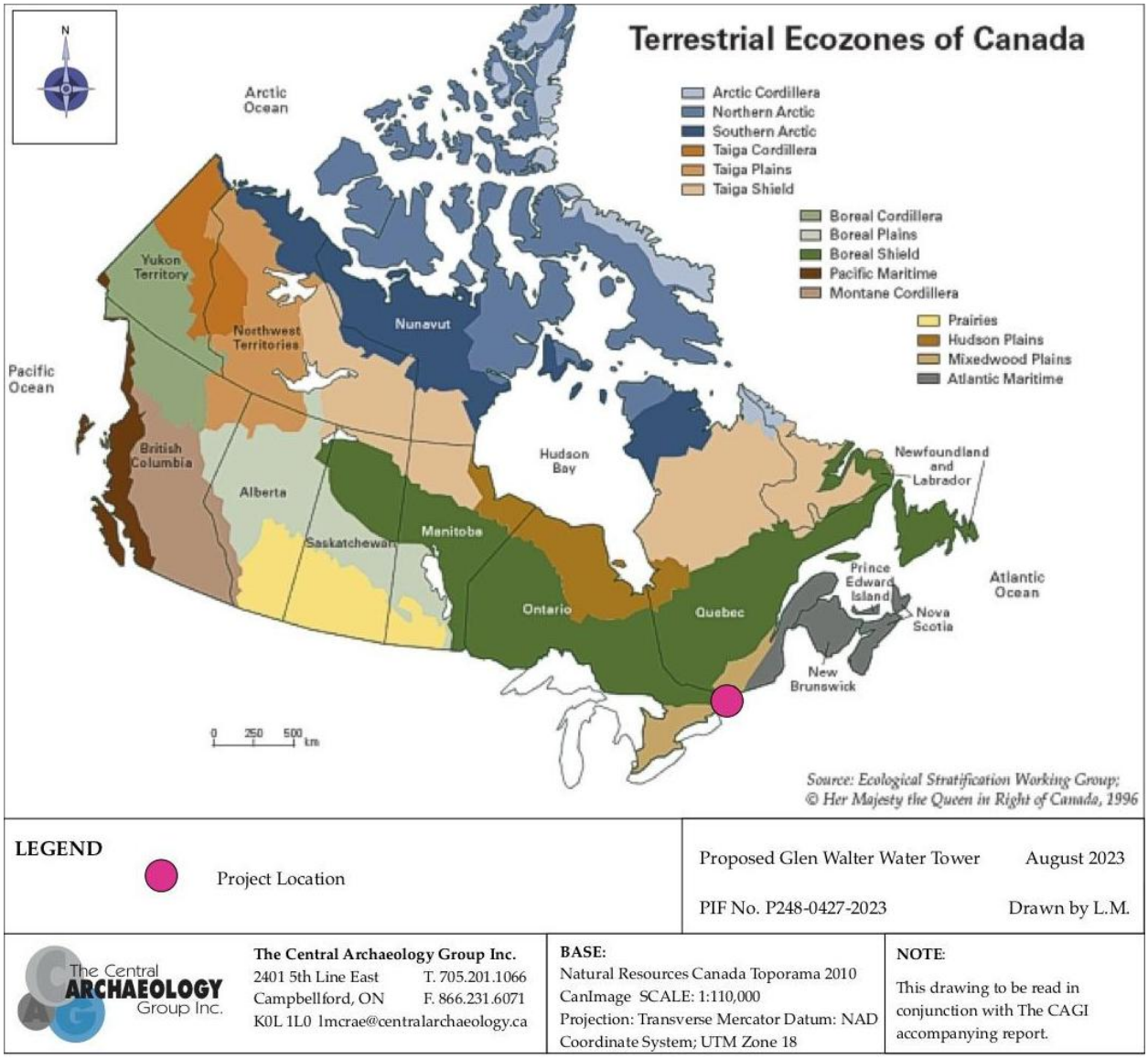
Map 3. Dundee land claim area (Saint Regis Mohawk Tribe 2015).



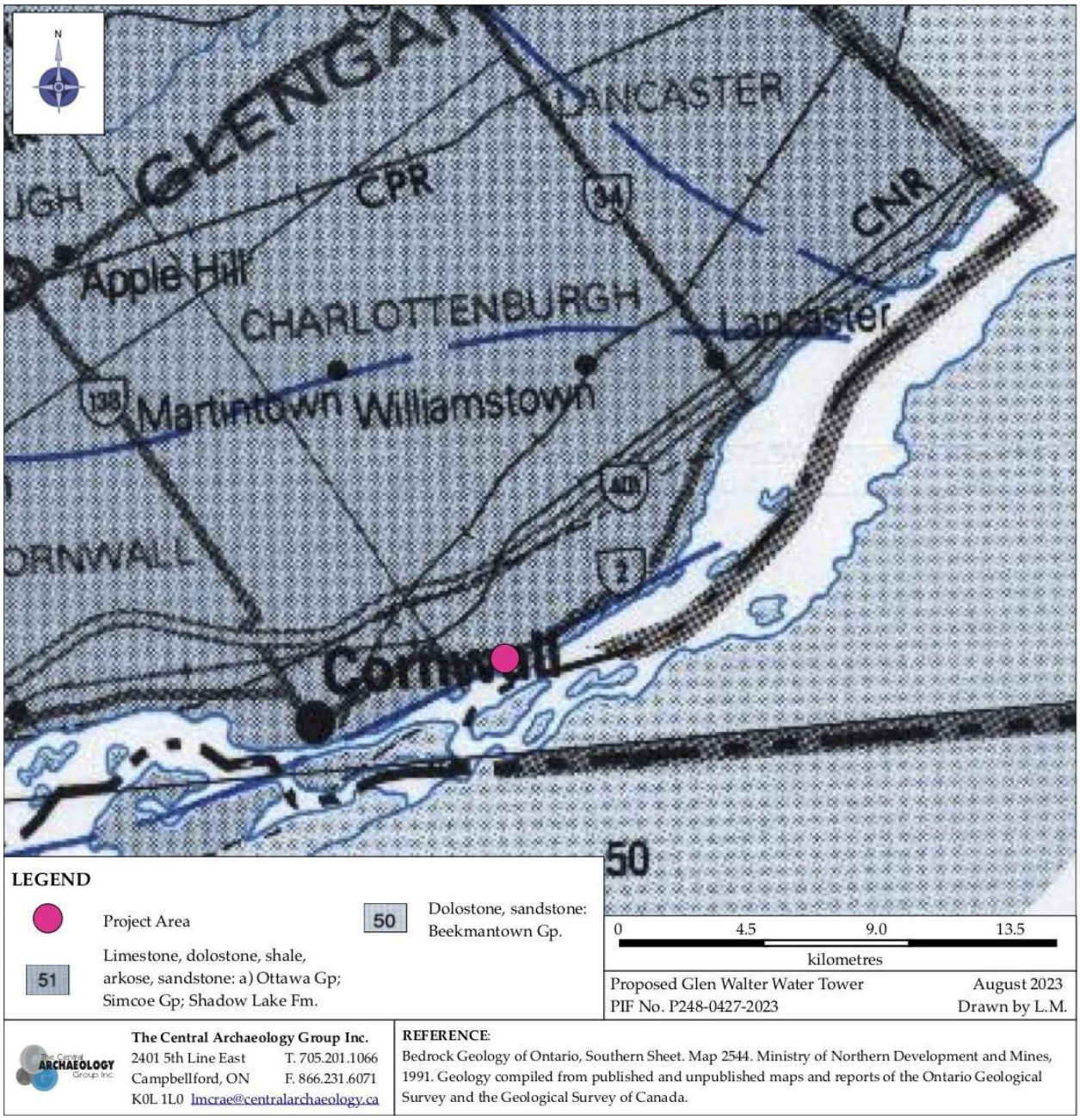
Map 4. Historical atlas illustration of the GToL (Belden 1979).



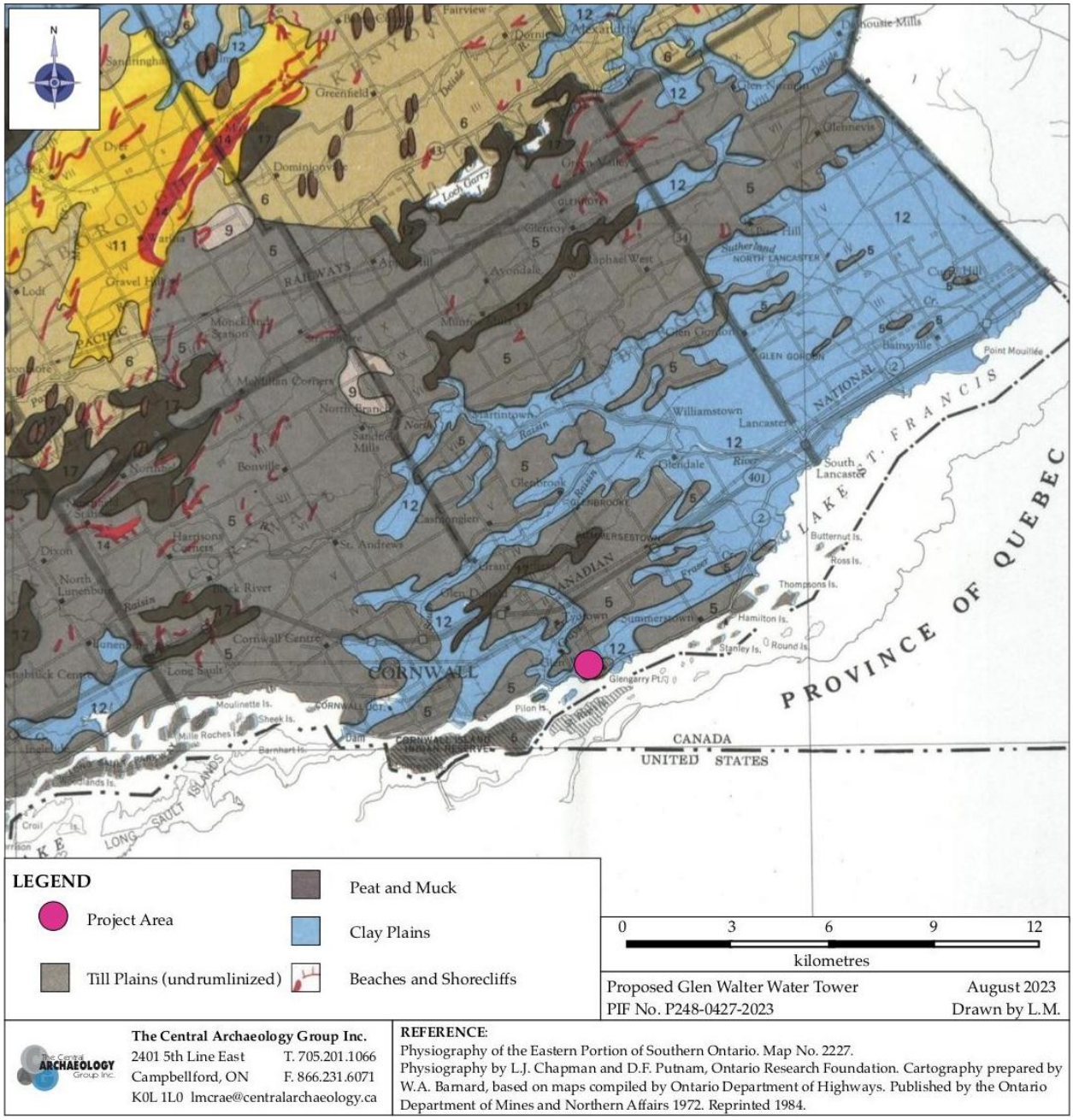
Map 5. Location of the Champlain Sea (Brett 2015).



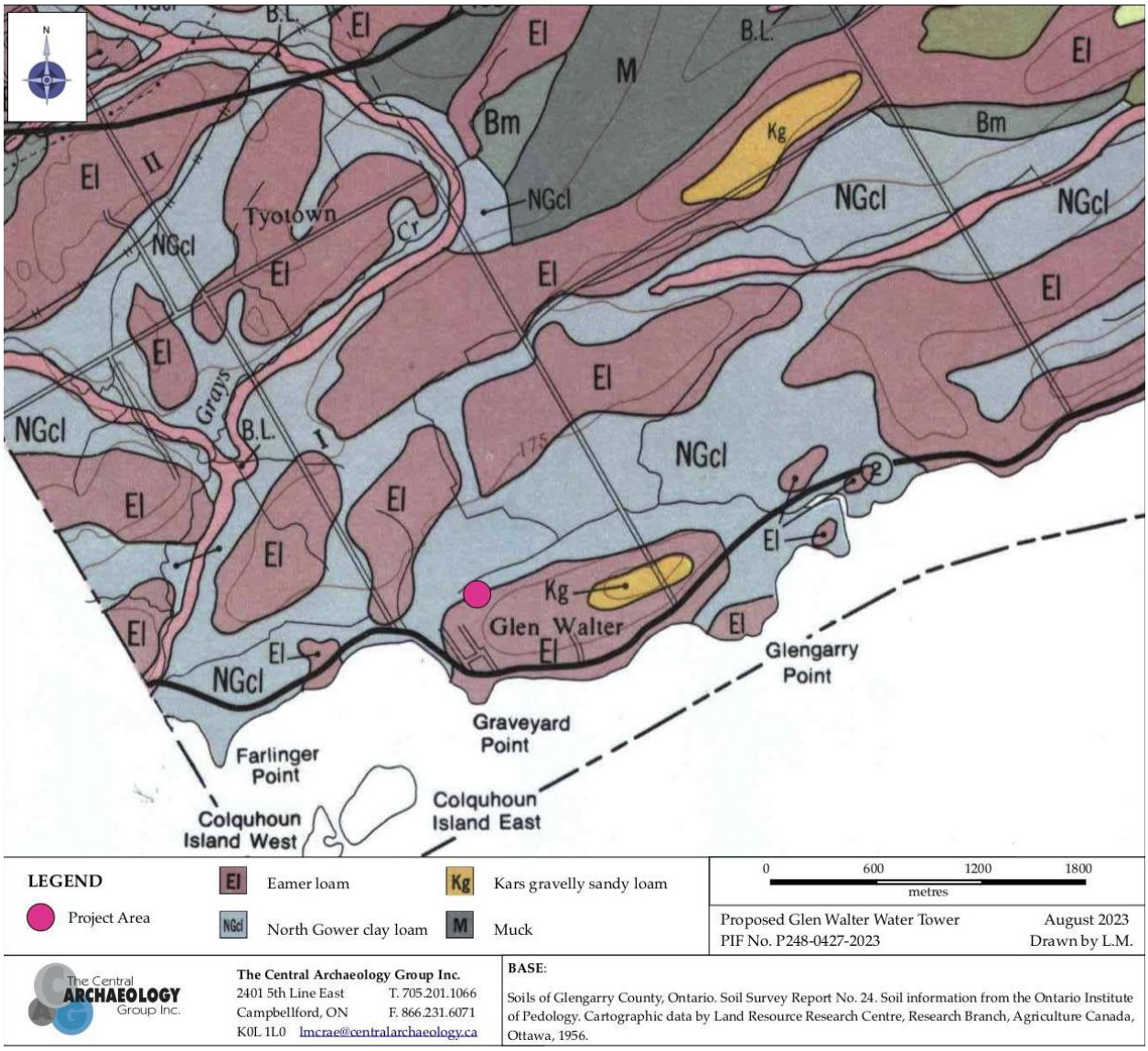
Map 6. Terrestrial ecozones of Canada (Ecological Stratification Working Group 1996).



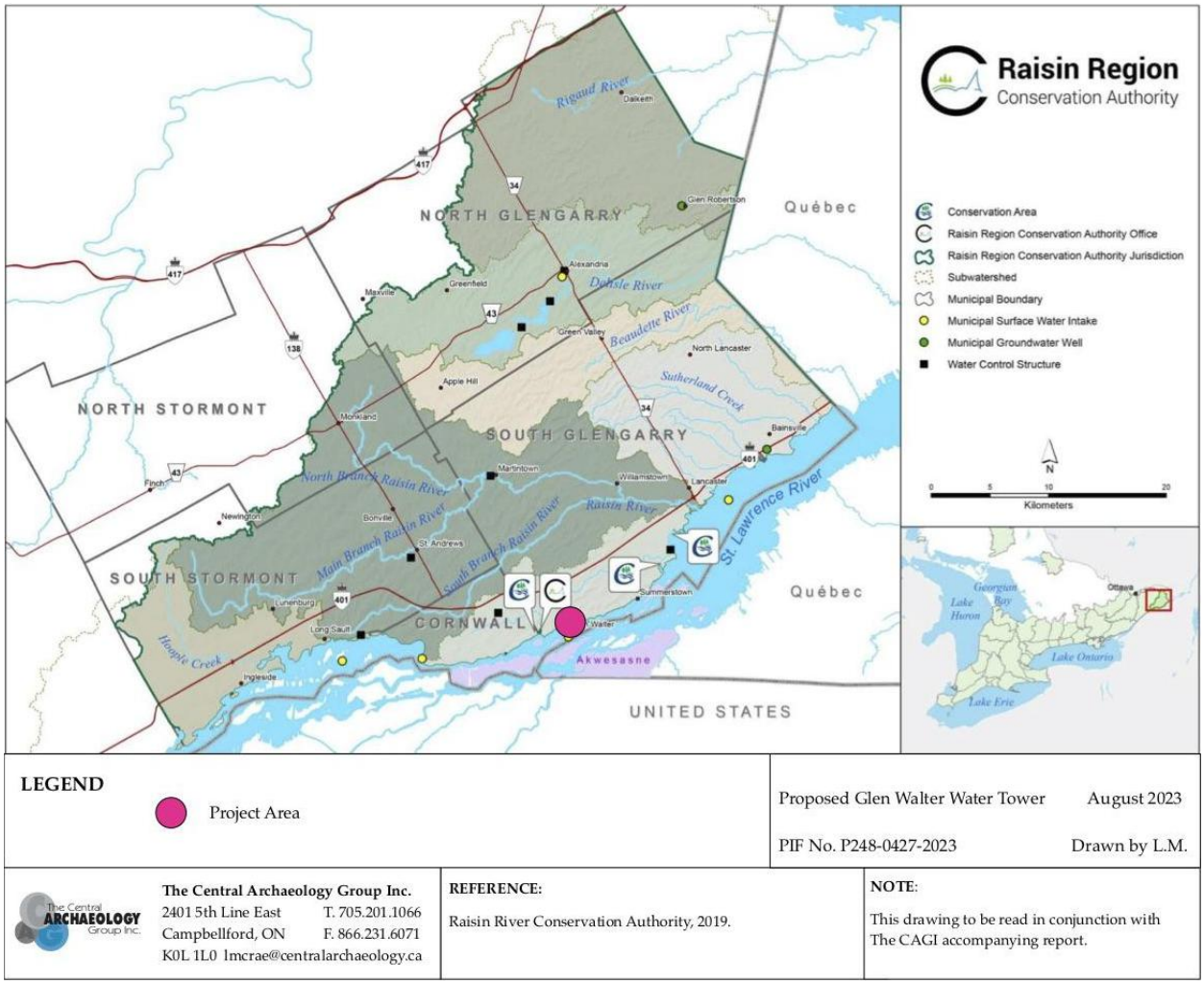
Map 7. Bedrock geology of the project and surrounding area (Ontario Geological Survey 1991).



Map 8. Surficial geology in the project and surrounding area (Ontario Department of Mines and Northern Affairs 1972).



Map 9. Soils of the project and surrounding area (Ontario Institute of Pedology 1956).



Map 10. Raisin River watershed (Raisin Region Conservation Authority 2019).

Map 11. Location and orientation of the photographs taken during the site inspection and archaeological potential of the PA.

Map 12. Stage 2 property survey results.

12.0 IMAGES

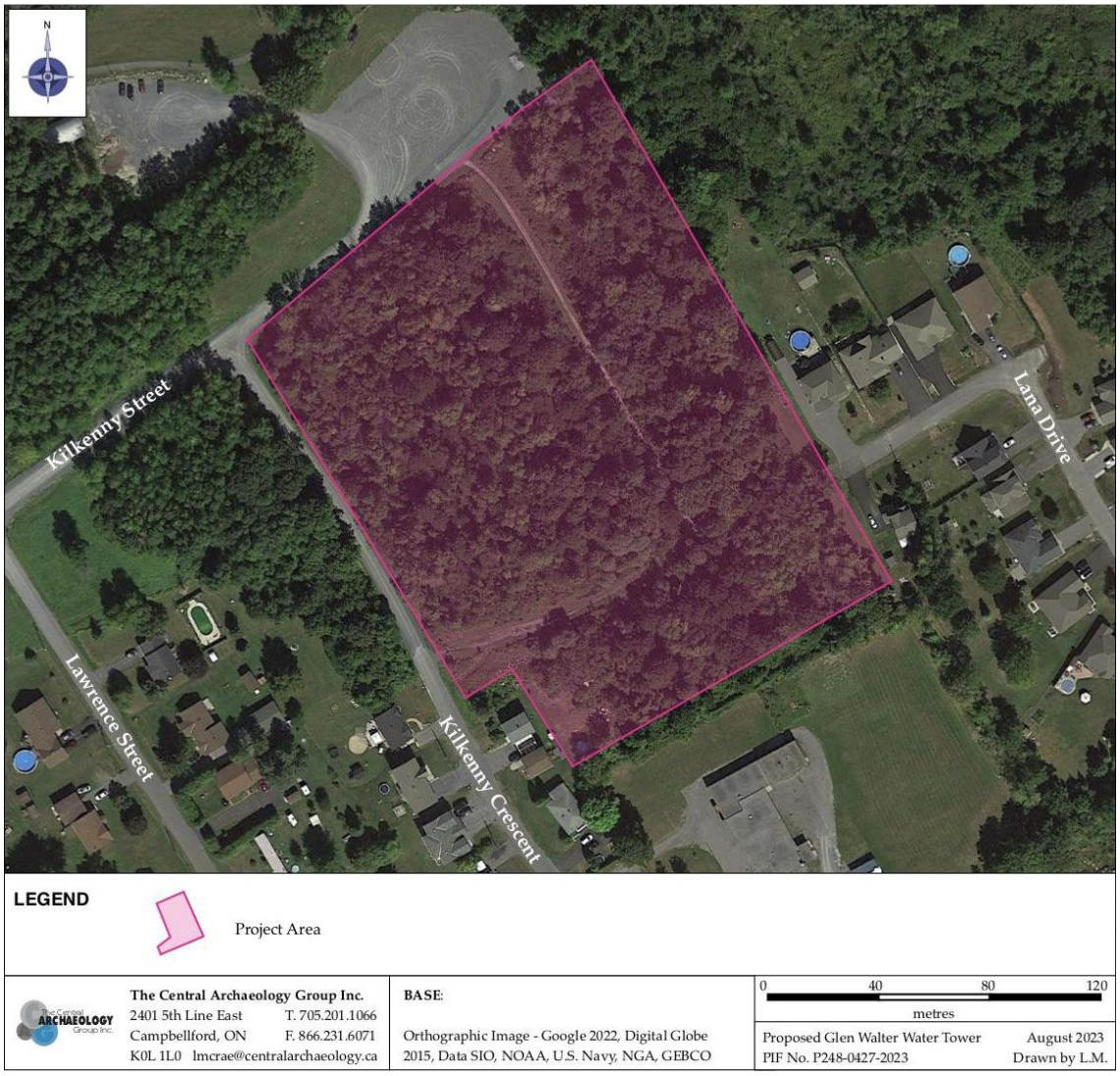


Image 1. Orthographic image of the project area (Google Earth 2022).

Image 2. Viewing southeast.

Image 3. Viewing southeast down the trail from Glen Walter Park Road into the PA.

Image 4. Large boulder in the eastern portion of the PA.

Image 5. Viewing northwest along the eastern limits of the PA.

Image 6. Viewing east along the trail.

Image 7. Viewing east.

Image 8. Viewing northeast. A pole structure has been constructed in the area and is being used by local residents.

Image 9. Viewing south.

Image 10. Viewing southwest along the northern limits of the PA. This area was elevated compared to the roadway. The materials included aggregate materials indicating that the PA was likely infilled sometime in the past.

Image 11. Viewing east from the intersection of Kilkenny Cresent and Glen Walter Park Road.

Image 12. Viewing southeast. Note the reeds (indicating moist soils).

Image 13. Viewing east along the trail from Kilkenny Crescent.

Image 14. Viewing south from the north corner of the PA.

Image 15. Test pit from the northeast portion of the PA. This test pit was 65 cm deep and included three levels of stratigraphy: humus, topsoil and subsoil. The humus level was very thin at 3 cm thick. It was loosely compacted and dark grayish brown (10YR 4/2). Topsoil was 55 cm thick, moderately compacted and grayish brown (10 YR 5/2). Subsoil was yellowish brown (10YR 5/8) and moderately compacted. No cultural materials were recovered.

Image 16. North profile of the above test pit.

Image 17. Subsoil close-up of a test pit in the western portion of the PA.

13.0 GLOSSARY OF TERMS

A Horizon - mineral horizon at or near the ground surface (topsoil). May be dark brown due to accumulated humus (Ah) or grey or lighter brown when clay, iron and humus have been leached out (Ae). It is most commonly disturbed by human activities.

Archaeology - is the scientific study of the physical evidence of past human societies recovered through excavation.

Archaeological Site - is a place in which physical evidence of past human activity is preserved and which has been, or may be, investigated using the discipline of archaeology.

Archaic Period - in Ontario is characterized by the appearance of ground stone tools, notched or stemmed projectile points, the predominance of less extensively flaked stone tools, increased reliance on local chert resources, a lack of pottery and smoking pipes, and an increase in the numbers and sizes of sites.

Atlatl - a tool used to throw spears faster and with more accuracy. It consists of a short pole with a handle at one end and a hook for engaging the spear in the other.

B Horizon - below the A Horizon (subsoil). It could be enriched with iron (Bf), with iron and organic matter (Bhf), with organic matter (Bh) or with clay (Bt). If saturated for extended periods, B horizons show signs of gleying or mottling (Bfg, Btg, Bg).

Bioturbation - results in changes to the nature, form, and arrangement of archaeological deposits and sediments as a result of biological activity in the ground. This includes root action, animal activity, and the degeneration of organic matter.

BP - Before Present. Years before present (1950), used in dating sites and/or artifacts from an archaeological site.

Borden Number - a borden number is an identifier given to an archaeological site in Canada. It was created by Charles E. Borden and contains four letters and one to several numbers.

Burial Goods or Burial Paraphernalia - items interred with an individual (or group) burial that may give clues to their social and/or economic and/or political position within their culture.

Chert - is a fine-grained, sedimentary rock, similar to flint. In antiquity, chert was one of the universally preferred materials for making stone tools.

Contact Period - refers to the period when European and First Nations peoples were first exposed to one another. In Ontario from 450 BP to 200 BP.

Cultural Resources - are sites, structures, landscapes, and objects of particular importance to a culture or community.

Diagnostic - a distinguishing characteristic serving to identify or determine the artifact.

Disarticulated - this occurs when bones are found separated at the joints.Disturbed - refers to a study area that has recently been excavated or altered from its original characteristics.

Ecozone - classification system that defines different parts of the environment with similar geography, vegetation, animals, climate, topography and water sources.

Environmental Assessment Act - sets up a process for reviewing the environmental impact of proposed activities prior to the granting of government funds.

Erratic - large rock or boulder that differs from the surrounding rock and is believed to have been transported a long distance as a result of glacial action.

Excavation - is the systematic digging and recording of an archaeological site. Flake - is a fragment of stone removed from a core or from another flake.

Feature - is a collection of one or more contexts representing some human activity that has a vertical characteristic to it in relation to site stratigraphy.

Fluted - grooved or channeled. A fluted point is a projectile point which has had one or more long thinning flakes removed from the base along one or both faces.

Glaciofluvial - sediments laid down by glacial meltwater action (i.e., rivers or streams).Ground Stone - is a stone artifact shaped by sawing, grinding, and/or polishing with abrasive materials.

Historic Period - the period when written records become available.

Holocene - the most recent period. Began approximately 10,000 years ago following the end of the Pleistocene.

Knap - to shape a piece of stone material by striking it at specific angles. Term used by archaeologists to denote the manufacture of a lithic tool.

Lanceolate - lance-shaped, much longer that wide, widened at or above the base and opening to the apex.

Lithic - stone, or made of stone.

Maize - also known as corn, is a cereal grain that was first domesticated in Mesoamerica and then spread throughout the American continents.

Mitigation - measures undertaken to limit the adverse impact of construction methods on archaeological sites or cultural resources.

Ochre - used as a natural pigment, colour is commonly reddish-brown to yellow.

Ontario Heritage Act - allows municipalities and the provincial government to designate individual properties and districts in Ontario as being of cultural heritage value or interest.

Palaeoamerican Period - first evidence of human occupation in Ontario. This period is characterized by groups hunting large game and seasonal occupation along shore environments.

Pleistocene - an epoch within the Quaternary Period which began approximately 2,000,000 millions years ago and ended approximately 10,000 years ago. Immediately preceded the Holocene Period.

Projectile Point - is an artifact used to tip an arrow, atlatl dart, spear, or harpoon. Usually made of chipped or ground stone, however, some are also made of copper.

Stage 1 Background Study - The purpose of a Stage 1 assessment is to investigate the cultural land use, archaeological history, and the present conditions of a property. The majority of the Stage 1 process is conducted in the office and involves the examination of records such as historic settlement maps, land titles, and documents, historical land use and ownership records, primary and secondary documentary sources, and the Ministry of Culture's archaeological site database. The study may also involve interviews with individuals who can provide information about the property and consultation with local First Nations communities. The background study is followed by a property inspection to examine geography, topography and current conditions, and to determine the potential for archaeological resources. Stage 1 background research is usually completed in conjunction with a Stage 2 property survey.

Stage 2 Property Survey - A Stage 2 property survey is undertaken if the Stage 1 background study finds that a property retains archaeological potential. It involves the documentation of archaeological resources by collecting artifacts and mapping cultural features. Depending on the nature of the property environment, two methods are employed in the survey: 1) pedestrian survey on cultivable properties, and; 2) test-pit survey on properties not cultivable due to tree growth, rock content, etc.

Strata - are layers of rock, soil, cultural material, etc. with internally consistent characteristics that distinguish contiguous.

Stratigraphy - the layering of deposits on archaeological sites. Cultural remains and natural sediments become buried over time, forming strata.

Subsistence - obtaining food and shelter necessary to support life.

Survey - is used to accurately determine the terrestrial or three-dimensional space position of points and the distances and angles between them.

Woodland Period - is a period of time following the Archaic Period. Middle, and Late.

Ministry of Citizenship and Multiculturalism (MCM)

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Oct 12, 2023

Laura McRae (P248)
The Central Archaeology Group Inc.
5Campbellford ON K0L 1L0

RE: Entry into the Ontario Public Register of Archaeological Reports: Archaeological Assessment Report Entitled, "Stage 1 and Stage 2 Archaeological Assessment, Glen Walter Water Tower Assessment, Part of Lots 6 and 7, Concession 1 St. Regis IR, Geographic Township of Charlottenburgh, Glengarry County", Dated Sep 8, 2023, Filed with MCM Toronto Office on N/A, MCM Project Information Form Number P248-0427-2023, MCM File Number 0019685

Dear Ms. McRae:

The above-mentioned report, which has been submitted to this ministry as a condition of licensing in accordance with Part VI of the *Ontario Heritage Act*, R.S.O. 1990, c 0.18, has been entered into the Ontario Public Register of Archaeological Reports without technical review.[1]

Please note that the ministry makes no representation or warranty as to the completeness, accuracy or quality of reports in the register.

Should you require further information, please do not hesitate to send your inquiry to Archaeology@Ontario.ca

cc. Archaeology Licensing Officer
Dave Davison,Ainley Graham &Associates Ltd.
Sarah McDonald,Township of South Glengarry

1*In no way will the ministry be liable for any harm, damages, costs, expenses, losses, claims or actions that may result: (a) if the Report(s) or its recommendations are discovered to be inaccurate, incomplete, misleading or fraudulent; or (b) from the issuance of this letter. Further measures may need to be taken in the event that additional artifacts or archaeological sites are identified or the Report(s) is otherwise found to be inaccurate, incomplete, misleading or fraudulent.*

Appendix F

Natural Environment Assessment

Natural Heritage Study
(Ainley Group, October 2023)

Butternut Hybridity Testing Results
(Nature Metric North America Ltd. October 13, 2023)

Glen Walter Area Water Tower
Municipality of South Glengarry

Natural Heritage Study

Prepared For:

Municipality of South Glengarry

February 2024

CREATING QUALITY SOLUTIONS TOGETHER

Natural Heritage Study

for

Proposed Water Tower Location

Municipality of South Glengarry

Prepared by Ainley Group

February 2024

Prepared By:

Chelsea Green (Env)
Environmental Technician
Ainley Group

Scott Reynolds, B.Sc. (Env), EP
Manager of Environmental Planning
Ainley Group

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

1.0 INTRODUCTION

Ainley Group was retained by the Municipality of South Glengarry to prepare a Natural Heritage Study (NHS) relating to the proposed construction of the Glen Walter water tower in Glen Walter, Ontario. The proposed location is east of Kilkenny Street, approximately 0.54 km east of County Road 2 (see **Figure 1**).

Preliminary sketches for the placement of the water tower are anticipated to include a footprint of approximately 75 m x 75 m within the 18.8 ha parcel of land. The water tower is proposed to be sited in the northeast corner of the subject property. Primary access will be via the existing parking lot on the north side of the subject property. It is anticipated that the existing pedestrian trail which bisects the subject property will be retained. The water tower is proposed to have a height of 48 m, and capacity of 1500-1700 cubic metres (m^3). It is intended that this NHS will provide supporting information for the completion of the water tower design.

2.0 PURPOSE OF THE REPORT AND SCOPE OF WORK

The purpose of the NHS is to inventory and assess all natural heritage features within the study area, including a review for Species at Risk (SAR). The scope of work for the NHS included the following items:

- Field investigations by Ainley Group to review natural heritage features including:
    - Surface water features.
    - SAR.
    - Migratory and breeding birds.
    - Terrestrial inventory of vegetation, including occurrence of Butternut.
- Documentation of natural heritage inventories, identification of potential constraints, and identification of potential impacts resulting from the water tower development and recommendation of mitigation measures which should be implemented to minimize these potential impacts.

3.0 SOURCES OF EXISTING BASELINE INFORMATION

The following resources were identified and used to review background data on terrestrial and aquatic species within or in close proximity to the study area as part of the existing conditions and impact assessment.

- MNRF – Land Information Ontario (LIO) / Natural Heritage Make-a-Map review for natural heritage data.
- Ebird – review for bird species observation data.
- Ontario Breeding Bird Atlas (OBBA) – review for bird species observation data.

- Ontario Reptile and Amphibian Atlas (ORAA) – review for herpetofaunal species observation data.
- iNaturalist – review for wildlife and vegetation species observation data.
- Aerial Photographs – review aerial photographs of the study area.

Details pertaining to the above information sources and available information were utilized to compile existing conditions information in the study area, and are summarized in the existing conditions section of the report.

The sections below summarize the above information sources and available information.

MNRF LIO / Natural Heritage Make-a-Map (MNRF, 2023)

Mapping available from LIO and Natural Heritage Make-a-map identified an unevaluated wetland to the west of the study limits. No other features including Provincially Significant Wetlands (PSWs) or Areas of Natural or Scientific Interest (ANSIs) were identified within or adjacent to the project limits. Information provided by the NHIC also indicated species of concern present within the area, which included the Yellow Banded Bumble Bee (SC) and Bobolink (THR) in the proximity of the study limits.

Ebird (Cornell Lab of Ornithology, 2023)

Ebird was reviewed to determine observations of bird species (including SAR) which have historically occurred in the study area.

Ontario Breeding Bird Atlas (Bird Studies Canada, 2023)

OBBA was reviewed to determine observations of bird species (including SAR) which have historically occurred in the study area.

Ontario Reptile and Amphibian Atlas (Ontario Nature, 2023)

ORAA was reviewed to determine observations of herpetofaunal species (including SAR) which have historically occurred in the study area.

iNaturalist (California Academy of Sciences and the National Geographic Society, 2023)

iNaturalist was reviewed to determine observations of wildlife and vegetation species (including SAR) which have historically occurred in the study area.

Aerial Photographs

Aerial photographs of the study area were reviewed to observe current conditions as well as changes in the study area to better understand the site ecology. The available imagery shows no notable changes to the subject property.

4.0 DATA COLLECTION METHODOLOGY

The following field survey protocols were completed to assess and document the presence of vegetative, wildlife, migratory and breeding birds within the study area. During the field survey, emphasis was placed on SAR with the potential to occur within the study area. Field surveys for respective ecological features were completed in accordance with the following methodology:

Vegetation

Vegetation field survey for species composition was completed within the study area on May 28, June 5, and September 6, 2023. Photographs of the identified vegetation communities are shown in **Appendix B**, a species list is included in **Appendix C**, and ELC field forms are included in **Appendix D**.

Migratory and Breeding Birds

Surveys of breeding birds were completed according to the protocol developed by the *Ontario Breeding Bird Atlas* (OBBA, 2001), including both point counts and incidental observations. The following is a general list of the guidelines that were followed:

- Point counts undertaken for five-minute intervals.
- Representative locations in different habitats were selected for point count surveys.
- Point count locations were established so as to prevent duplicate counts.
- Incidental site observations were also recorded.
- At least two site visits were completed between May 24 and July 10, with all initial visits completed by the third week in June.
    - Surveys were completed on May 28, and June 5, 2023.

Any breeding bird observations were noted along with locational information of the sighting.

Wildlife

Observations of wildlife (turtles, amphibians, birds, snakes, mammals) were recorded during the field visits on May 28, June 5, and September 6, 2023. Any wildlife observations (tracks, scat, burroughs, etc.) were noted along with locational information of the sighting. Specific attention was given to the evaluation for the presence of SAR during the field visits, including SAR turtles, birds, and vegetation.

During the survey, reference for specific habitat requirements for each species was per the *MNR – Significant Wildlife Habitat Technical Guide* (2000).

5.0 PLANNING POLICIES AND FRAMEWORK

The following planning policies and framework were reviewed and applied to establish the suitability of the proposed development in consideration of environmental impacts to the subject land and adjacent properties.

5.1 Provincial Planning Policy

The Provincial Policy Statement (PPS) (MMAH, 2020) outlines policies related to natural heritage features (Section 2.1). The *Planning Act* requires that planning decisions shall be consistent with the PPS.

According to the PPS, development and site alteration shall not be permitted in:

- Habitat of endangered or threatened species, except in accordance with provincial and federal requirements,
- Significant wetlands (in coastal areas or in Ecoregions 5E, 6E and 7E), and
- Significant coastal wetlands.

Similarly, unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions, development and site alteration shall not be permitted within:

- Significant wetlands in the Canadian Shield north of Ecoregions 5E, 6E, and 7E,
- Significant woodlands (Ecoregions 6E and 7E, excluding islands in Lake Huron and the St. Marys River),
- Significant valley lands (Ecoregions 6E and 7E, excluding islands in Lake Huron and the St. Marys River),
- Significant wildlife habitat,
- Significant Areas of Natural and Scientific Interest (ANSI), and
- Coastal wetlands in Ecoregions 5E, 6E, and 7E.

In addition, development and site alteration is not permissible on lands adjacent to the natural features and areas identified above unless the ecological function of the adjacent lands has been evaluated and it has been demonstrated that no negative impacts on natural features and functions will occur.

5.2 Ontario Endangered Species Act

In June 2007, Ontario enacted a provincial Endangered Species Act to protect “species at risk” (SAR) in Ontario. A “species at risk” is defined as any naturally-occurring plant or animal in danger of extinction or of disappearing from the province. Species are added to the Species at Risk in Ontario (SARO) List once they are evaluated and classified as “at risk”. Protection under the Act means this species is protected from being killed, harmed, harassed, or captured. Damaging or destroying the habitat of endangered or threatened species is also prohibited under the Act. Additionally, in order to conform to the PPS no development or site alteration is permitted in the significant habitat of a species of conservation concern (MMAH, 2020).

On July 1, 2013, regulatory changes for modernizing approvals for the *Endangered Species Act* (*Ontario Regulation 176/13*) came into effect. The regulation applies to all species on the SARO list as of January 24, 2014. The requirements of the regulation include common elements of minimizing adverse effects, mitigation plans, monitoring, and reporting and recording. The regulations have streamlined the approvals process by organizing control of activities into four categories; Elimination, Rules in Regulation, Registration and Review and Approval.

The regulations allow common, low risk and frequency activities to be governed by a standard set of rules instead of requiring a permit. Activities that fall under the eligibility conditions are permitted to proceed without the acquisition of a permit or license while abiding by the regulations. Activities that do not meet the eligibility criteria and may have adverse effects on SAR require approval. The current governing authority for provincial SAR is the Ministry of Environment, Conservation, and Parks (MECP).

5.3 Raisin Region Conservation Authority

The study area is located within the jurisdiction of the Raisin Region Conservation Authority (RRCA), and is subject to *Ontario Regulation 175/06 – Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses*.

This regulation pertains primarily to development adjacent to watercourses, floodplains, hazard lands, and wetlands (significant and non-significant). Approvals must be obtained for any development proposed in the regulated areas noted above.

The proposed project does not require an application for *Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Permit*. The unevaluated wetland feature is not presently regulated by the RRCA (see correspondence in **Appendix A**).

6.0 EXISTING CONDITIONS

Existing conditions studies of the project area were completed on May 28, June 5, and September 6, 2023. In summary, the study area was noted to consist of a Basswood and Black Walnut deciduous forest community and a small wetland located along the east property boundary near the midpoint of the site. The wetland was described as a localized depression of stagnant water, with no obvious inflow/outflow, and was noted to collect occasional refuse and debris. The existing conditions of the study area are shown on **Figure 2**, in the photographic log (**Appendix B**), and are detailed in the following sections.

6.1 Land Use, Topography, and Drainage

The predominant land use in the study area was recreational with evidence of previous anthropogenic influence such as fill material and waste, (**Figure 2**). The topography of the study area is described as having a topographic high along the south boundary of the study area that gently slopes to the north. Elevations on the subject property range from approximately 63 m above sea level (masl) along the south boundary to 54 masl along the north boundary. It is anticipated that drainage on the subject property follows the topography with flow towards the

north.

6.2 Surficial and Bedrock Geology

The subject property is located within the Lancaster Flats physiographic region (Chapman and Putnam, 1984). Chapman and Putnam (1984) describe this area as a lowland where the till plain has been buried below water-laid deposits (Chapman and Putman, 1984).

Surficial geology in the study area consists of two soil units (Ontario Geological Survey, 2003);

- Fine textured glaciomarine deposits of silt and clay, minor sand and gravel, massive to well laminated are generally located within the western half of the subject property.
- Stone-poor sandy silt to silty sand textured till on Paleozoic terrain is generally located within the eastern half of the subject property.

Bedrock geology in the study area consists of limestone, dolostone, shale, arkose, and sandstone of the Ottawa and Simcoe Groups, Shadow Lake Formation (Lumbers, 1976).

6.3 Vegetation and Vegetation Communities

The study area is located in the 6E Lake Simcoe-Rideau Ecoregion within the Mixedwoods Plains Ecozone, which is typically dominated by cropland, pasture, and abandoned fields, with deciduous, coniferous, and mixed forests present in small quantities (MNRF, 2009). Field surveys were completed by Ainley Group in May, June, and September of 2023, during which vegetative species and communities within the study limits were documented. Vegetation within the subject property was identified and categorized in accordance with the Ecological Land Classification (ELC) mapping, with vegetative communities assigned ELC codes consistent with the amended ELC classification tables (2013).

Vegetation within the study area consists of the following communities; Dry-Fresh Basswood Deciduous Forest Type (FODM4-9).

No SAR or rare vegetation was identified by NHIC in the general area; however, Butternut, was observed within the proposed footprint during field investigations in 2023. No other SAR or rare vegetation was observed during the field surveys completed by Ainley Group. A discussion regarding SAR vegetation and the subject property is provided in detail within **Section 6.5**.

The following sections provide a detailed summary of the vegetation and vegetative communities observed within and adjacent to the study area during the field investigations in 2023. An aerial view of the subject property and respective vegetation communities is shown in **Figure 2**. A photographic log showing the general vegetation in each community is included in **Appendix B**.

6.3.1 Dry-Fresh Basswood Deciduous Forest Type (FODM4-9)

This community was observed throughout the study area, and consisted of predominantly deciduous tree species with a canopy cover greater than 60%. A small seasonal wetland was located within this vegetation community (discussed in detail within **Section 6.4**). Vegetation species observed within this community included; Basswood (*Tilia americana*), Black Walnut

(*Juglans nigra*), Dame's Rocket (*Hesperis matronalis*), Nannyberry (*Viburnum lentago*), Smooth Solomon's Seal (*Polygonatum biflorum*), Green Ash (*Fraxinus pennsylvanica*), amongst other species.

6.4 Wetland Features

A small wetland inclusion (approximately 8 m wide x 15 m long) was identified within the deciduous forest community (FODM4-9) present in the study area. This wetland was observed within the central east area of the subject property, near the east property boundary. During the June 5, 2023 site visit, the wetland appeared to be a localized depression with stagnant water, and no obvious inflow/outflow. On the September 6, 2023 site visit, observations included dry conditions within the wetland feature. The wetland is considered to present seasonally wetted conditions only during normal years.

RRCA was contacted regarding regulation of the wetland feature (**Appendix A**). On September 7, 2023, the RRCA Planning and Regulations officer noted that RRCA currently does not regulate unevaluated wetland features. Regardless, in an effort to maintain the function that is provided by the unevaluated wetland feature, it is recommended that a 15 m setback be applied to the field verified wetland boundary. This setback should consist of native vegetation in a natural state (i.e. not mowed).

6.5 Birds, Wildlife, and Herpetofaunal Species and Habitat

The following sections summarize the observations of species during the field investigations in May, June, and September of 2023.

6.5.1 Bird Species

Observations of bird species were documented within the study area during the field surveys in May and June 2023. Species which were observed are provided in the list below.

A total of nineteen (19) bird species were observed (visually or audibly) within the study area. A summary of the species list (common names) is included below:

- American Crow (*Corvus brachyrhynchos*)
- American Goldfinch (*Spinus tristis*)
- American Redstart (*Setophaga ruticilla)*
- American Robin (*Turdus migratorius*)
- Black-capped Chickadee (*Poecile atricapillus*)
- Brown Headed Catbird (*Molothrus ater*)
- Canada Goose (*Branta canadensis*)
- Chestnut-sided Warbler (*Setophaga pensylvanica*)
- Chipping Sparrow (*Spizella passerina*)
- Common Yellowthroat (*Geothlypis trichas*)
- Gray Catbird (*Dumetella carolinensis*)
- House Wren (*Troglodytes aedon*)

- Mourning Dove (*Zenaida macroura*)
- Northern Cardinal (*Cardinalis cardinalis*)
- Osprey (*Pandion haliaetus*)
- Red-eyed Vireo (*Vireo olivaceus*)
- Ruffed Grouse (*Bonasa umbellus*)
- Song Sparrow (*Melospiza melodia*)
- Yellow Warbler (*Setophaga petechia*)

Species observation data from the OBBA (Square 18WQ28) indicates the presence of a wide variety of both upland and waterfowl species, which is to be expected given the available features at / adjacent the subject property.

Additional information pertaining to SAR birds with the potential to occur within the study area is provided in **Section 6.5**.

6.5.2 Wildlife / Herpetofaunal Species

Wildlife species within the study area were documented via direct observation and interpretation of sign (i.e. tracks, scat, vocalizations, etc.). Observations of wildlife species during the environmental investigations by Ainley Group in 2023 included; Eastern Chipmunk (*Tamias striatus*) and Red Squirrel (*Sciurus vulgaris*). In addition, the subject property and adjacent lands are anticipated to provide habitat for other typical small mammals of southern Ontario such as; White-tailed Deer (*Odocoileus virginianus*), Red Fox (*Vulpes vulpes*), Coyote (*Canis latrans*), Cottontail Rabbit (*Sylvilagus floridanus*), Raccoon (*Procyon lotor*), and Striped Skunk (*Mephitis mephitis*).

There was no incidental observations of herpetofaunal species during the 2023 field surveys. Given the presence of the seasonal wetland identified within the study area, is also anticipated to provide habitat for herpetofaunal species such as American Toad (*Anaxyrus americanus*), Northern Leopard Frog (*Lithobates pipiens*), and Eastern Gartersnake (*Thamnophis sirtalis sirtalis*), amongst others.

Additional information pertaining to SAR wildlife with the potential to occur within the study limits is provided in **Section 6.5**.

6.6 Significant Natural Heritage Functions / Features

As part of the EIS, the following natural heritage functions and features were reviewed for the subject property:

- Significant habitat of endangered and threatened species;
- Significant wetlands;
- Significant coastal wetlands;
- Significant woodlands;
- Significant valleylands;

- Significant areas of natural and scientific interest.

6.6.1 Species at Risk

To evaluate the potential for species at risk on the subject property a site assessment for SAR was completed, including a review of background data from other sources (i.e. Reptile and Amphibian Atlas, eBird, iNaturalist, and NHIC). Based on the background data sources (**Appendix A**) and previous experience in the general area, the following terrestrial species have been included for review:

Table 1: Species At Risk with the Potential to Occur within the Study Limits

Species (Scientific Name)	Species (Common Name)	Federal	Provincial
Juglans cinerea	Butternut	Endangered	Endangered
Myotis lucifugus	Little Brown Myotis	Endangered	Endangered
Myotis septentrionalis	Northern Myotis	Endangered	Endangered
Perimyotis subflavus	Tri-colored Bat	Endangered	Endangered
Myotis leibii	Eastern Small-footed Myotis	Endangered	Endangered
Lanius ludovicianus	Loggerhead Shrike	Endangered	Endangered
Melanerpes erythrocephalus	Red-headed Woodpecker	Endangered	Endangered
Setophaga cerulea	Cerulean Warbler	Endangered	Threatened
Asio flammeus	Short-eared Owl	Threatened	Threatened
Ixobrychus exilis	Least Bittern	Threatened	Threatened
Dolichonyx oryzivorus	Bobolink	Threatened	Threatened
Riparia	Bank Swallow	Threatened	Threatened
Sturnella magna	Eastern Meadowlark	Threatened	Threatened
Chaetura pelagica	Chimney Swift	Threatened	Threatened
Antrostomus vociferus	Eastern Whip-poor-will	Threatened	Threatened

Vermivora chrysoptera	Golden-winged Warbler	Threatened	Special Concern
Ammodramus savannarum pratensis	Grasshopper Sparrow	Special Concern	Special Concern
Chordeiles minor	Common Nighthawk	Special Concern	Special Concern
Hylocichla mustelina	Wood Thrush	Special Concern	Special Concern
Contopus virens	Eastern Wood-pewee	Special Concern	Special Concern
Hirundo rustica	Barn Swallow	Special Concern	Special Concern
Cardellina canadensis	Canada Warbler	Special Concern	Special Concern
Chelydra serpentina	Snapping Turtle	Special Concern	Special Concern
Chlidonias niger	Black Tern	Special Concern	Special Concern
Bombus terricola	Yellow-banded Bumble Bee	Special Concern	Special Concern
Coturnicops noveboracensis	Yellow Rail	Special Concern	Special Concern
Haliaeetus leucocephalus	Bald Eagle	Special Concern	Special Concern
Falco peregrinus	Peregrine Falcon	Special Concern	Special Concern
Coccothraustes vespertinus	Evening Grosbeak	Special Concern	Special Concern
Sternotherus odoratus	Eastern Musk Turtle	Special Concern	Special Concern
Contopus cooperi	Olive-sided Flycatcher	Special Concern	Special Concern

During the field visits by Ainley Group in 2023 one SAR, Butternut (5 individuals) and one (1) hybrid, was observed on the subject property.

In regards to the above noted Butternut trees, a Butternut Health Assessment (BHA) was completed for all individuals on June 5, 2023, and has been submitted to MECP for review and approval. The results of the BHA note that the four (4) Butternut have been determined to be non-retainable Category 1 trees, and are not subject to the requirements of the ESA. One Butternut (BN2) was determined to be an archivable Category 3 tree. The purity (i.e. whether or not BN2

was a hybrid) was confirmed through genetic testing of a sample from from the tree which confirmed BN2 as a pure Butternut (**Appendix E**). The classification of Butternuts is based on the assessed presence of Butternut canker, and percentage canopy decline. A BHA Report to document these findings has been prepared concurrent to this NHS report. At the completion of the 30-day review period (which starts September 22, 2023), the following will apply:

- **Category 1 trees** – Are considered non-retainable and are not protected under the *ESA*, and can be removed without further approvals. These trees will not have implications on the design.
- **Category 3 trees** – Are considered as potentially archivable. It is anticipated that impacts to this tree can be permitted by Registering the Activity under *O.Reg. 242/08*, with completion of a corresponding compensation program to follow.

The forest community present on the subject property may also be used by day roosting bats. Day roost locations are considered to change frequently (on a daily basis) suggesting that bats may use a number of different trees during the summer period. Impacts to this species could occur should they be roosting during vegetation removal. SAR bats are anticipated to have the potential to be present in woody vegetation during their active season which extends from April 15 to September 30. As such, it is recommended that any vegetation clearing be completed outside of this timing window.

As part of the evaluation, habitat requirements of the species identified above were compared against the habitat types present within the study limits. The results of this assessment are provided in **Table 2**.

As noted in **Table 2**, the below noted threatened or endangered species have the potential to exist within the study limits / be impacted by the proposed Glen Walter water tower installation.

- Little Brown Bat / Northern Myotis / Tri-colored Bat / Eastern Small-footed Myotis (END): The forest habitat provides suitable habitat for day roosting bats.
- Butternut (END): Confirmed species present on subject property.

Mitigation measures to limit impacts to those species identified with the potential to be impacted by the development are discussed further in **Section 8.0**. It should be noted that neither Special Concern (SC) species nor their habitat are afforded protection under the *ESA*.

6.6.2 Significant Wetlands and Coastal Wetlands

Significant wetlands within the region are shown on the NHIC's Natural Heritage Make-a-Map feature. No significant wetlands are mapped as being present at or adjacent to the study area. As such, no impacts to significant wetlands are anticipated as a result of the undertaking.

Per the Natural Heritage Reference Manual (MNRF, 2010), a coastal wetland is defined as:

a) any *wetland* that is located on one of the Great Lakes or their connecting channels (Lake St. Clair, St. Mary's, St. Clair, Detroit, Niagara and St. Lawrence Rivers); or

b) any other *wetland* that is on a tributary to any of the above-specified water bodies and lies, either wholly or in part, downstream of a line located 2 kilometres upstream of the 1:100 year floodline (plus wave run-up) of the large water body to which the tributary is connected.

Based on the above definition, no coastal or tributary wetlands are present within the study area. As such, no impacts to coastal wetlands are anticipated as a result of the undertaking.

6.6.3 Significant Woodlands

Significant woodlands within the region are identified in Schedule B2 of the Stormont, Dundas, and Glengarry Official Plan (SDG, 2017). No significant woodlands are identified for the subject property within this schedule. As such, no impacts to significant woodlands are anticipated as a result of the proposed undertaking.

6.6.4 Significant Valleylands or Areas of Natural and Scientific Interest (ANSI)

Determination of significant valleylands is to be completed by municipalities. It is anticipated that there are no municipal concerns with respect to impacts to significant valleylands as a result of the proposed undertaking, as the subject property is not interpreted to fall within a valley feature.

ANSI's within the region are shown on the NHIC's Natural Heritage Make-a-Map feature. No ANSI's are mapped as being present at or adjacent to the subject property. As such, no impacts to ANSI's are anticipated as a result of the undertaking.

6.6.5 Significant Wildlife Habitat

In accordance with the *Natural Heritage Reference Manual* (MNR, 2010), there are four categories of significant wildlife habitat, which include the following:

- Rare vegetation communities or specialized habitat for wildlife.
- Habitat of species of conservation concern.
- Animal movement corridors.
- Habitats of seasonal concentrations of animals.

A review of the MNRF's *Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E* was completed and compared to the birds, wildlife, and herpetofaunal species observed within the study area.

While the potential for bats to utilize the woodlands for possible day roosting habitat has been identified (as described in **Section 6.5.1**), trees within the study area were generally observed to be less than 0.25 m diameter at breast height (DBH), and are not anticipated to meet the requirements for a maternity colony roost site.

Further to the above, natural heritage features including significant wildlife habitat (where it is known to exist) have been identified within the Municipality of South Glengarry Official Plan –

Schedule 'B'. With respect to the Official Plan, no significant wildlife habitat has been identified within or adjacent to the study area.

It is not anticipated that the undertaking will result in impacts to significant wildlife habitat.

7.0 PROPOSED DEVELOPMENT

The Municipality of South Glengarry is proposing to erect a water tower on Glen Walter Park road, east of Kilkenny street within Cornwall, Ontario. Typical construction aspects of the proposed development are likely to include excavation for the water tower and adjacent facilities such as parking, access, and removal/clearing of vegetation for construction purposes.

It is anticipated that much of the existing forested area within the proposed footprint will be disturbed / cleared as part of the construction process. This includes the Butternut trees identified and further explained within **Section 6.6.1.** Impacts to the identified Category 3 tree can be permitted by Registering the Activity under *O.Reg. 242/08*, with completion of a corresponding compensation program, which will include offset plantings of Butternut and companion trees.

8.0 ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

This section of the report describes the potential impacts on the natural heritage environment associated with the proposed Glen Walter water tower construction. It also outlines proposed mitigation measures, in consideration of standard development practices, in order to minimize or prevent negative impacts from the undertaking.

8.1.1 Erosion and Sediment Control

Potential Impacts

Water tower construction, excavation, and grading activities, may result in the release of sediment into the adjacent natural features. In addition, exposed soils and/or stockpiles of excess material (such as earth, rock) can result in sediment transport to these areas during rain events.

Mitigation

In order to mitigate the transport of sediment during construction, environmental protection measures should be incorporated into the replacement process. To ensure protection of the downgradient environment, the following should be undertaken during development:

- During construction and grading activities, silt fence should be placed along the downgradient boundary of the construction zone to reduce the potential for sediment transport. The erosion and sediment control measures should remain in place until the grading area becomes sufficiently vegetated to limit erosion and sediment transport potential.

8.1.2 Surface Water Contamination and Debris Accumulation

Potential Impacts

During construction activities, the potential for accidental fuel or lubricant spillage, debris accumulation, and subsequent contamination to surface water and / or the adjacent environment is increased.

Mitigation

To prevent the contamination of the environment within and adjacent to the project area during construction, precautions should be taken to avoid accidental spillage or discharge of chemical contaminants (e.g., gasoline, oils and lubricants). These precautions require refueling to be carried out in a controlled manner and at least 30 m from a watercourse to prevent fuel spillage. In addition, an emergency spill response kit should be on site at all times. In the event that a spill occurs, proper containment, clean up and reporting, in accordance with provincial requirements, should be undertaken.

The Contractor should take all necessary precautions to prevent the accumulation of litter and construction debris in any natural areas within and outside of the construction grading limits.

8.1.3 Vegetation

Potential Impacts

Construction activities are anticipated to result in the removal of vegetation for the proposed water tower.

Mitigation

Measures should be taken to limit vegetation removal to the extent possible, in an effort to maintain the ecological integrity of the landscape. Only trees and other vegetation that require clearing to accommodate the water tower (and any related ancillaries) should be removed. As part of tree removal during construction, appropriate tree felling and grubbing procedures should be utilized in order to minimize impacts on surrounding vegetation.

A vegetated buffer of 15 m, as measured from the field verified wetland boundary is recommended for the subject property. This buffer is to consist of native, self-sustaining vegetation that shall not be maintained by mowing.

Migratory breeding birds are protected under the *Migratory Birds Convention Act, 1994*. Under this act it is unlawful to kill or destroy migratory breeding birds or active nests. To avoid impacts to migratory birds, vegetation removal (as necessary) during development of the subject property is to be avoided between April 15 and August 15 (migratory bird breeding and nesting period; Environment and Climate Change Canada, 2018). Further, it should be noted that occupied migratory bird nests are protected at any time of the year (including outside of the migratory bird

breeding and nesting period). Should a migratory bird nest be found to be occupied outside of the migratory bird breeding and nesting period, then any activity that may harm or damage the nest or occupying individual must cease until the nest is no longer occupied.

A discussion of mitigation associated with SAR is provided in **Section 8.1.6**.

8.1.4 Wildlife and Bird Migration

Potential Impacts

The majority of the potential impacts to wildlife are associated with vegetation removal, footprint excavation, and grading activities. The localized construction of the water tower may have some impact on wildlife and bird migration.

Mitigation:

To limit potential impacts, care should be taken during construction to avoid incidental contact with wildlife.

- Timing Windows
    - To avoid impacts to migratory breeding birds, vegetation removal should be avoided between April 15 and August 15 (migratory breeding bird period). Further, it should be noted that occupied migratory bird nests are protected at any time of the year (including outside of the migratory bird breeding and nesting period). Should a migratory bird nest be found to be occupied outside of the migratory bird breeding and nesting period, then any activity that may harm or damage the nest or occupying individual must cease until the nest is no longer occupied.

8.1.5 Significant Wildlife Habitat

Potential Impacts

No areas of significant wildlife habitat were confirmed on the subject property through the completion of the scoped field investigations. As such, no mitigation measures are proposed.

8.1.6 Species At Risk (SAR)

Potential Impacts

As discussed in **Section 6.5.1** and **Table 2,** there is the potential that the following identified threatened and endangered SAR may be present / impacted by the construction of the Glen Walter water tower. The following mitigation measures should be employed to limit the potential effect the construction may have on any SAR in the study area during construction. Special concern SAR do not receive formal protection under the ESA (2007), therefore mitigation for special concern species are not provided below.

- Butternut (END)
- Little Brown Bat (END)
- Northern Myotis (END)
- Tri-colored Bat (END)
- Eastern Small-footed Myotis (END)

Mitigation

Mitigation measures for protection of SAR are required, and should include the following:

- If possible, development should respect a 25 m setback from the butternut tree identified as retainable (i.e. Category 3) under the BHA (**Figure 2**). For this project, it is anticipated that one tree (Category 3 tree) may be harmed / killed. Any development that may impact the identified retainable Butternut tree (i.e. fall within 25 m) should be completed in accordance with *O. Reg. 830/08*. This would include, but not be limited to, registration of the activities with the MNRF and the completion of compensation plantings.
- Vegetation removal is to be completed outside of the active season for bats (April 15 – September 30).
- The construction contractor should be familiar with the SAR noted in this report. If SAR are identified during construction, all works in the immediate area should cease and the MECP must be contacted for direction on how to proceed.
- Harassment to SAR should not occur during construction activities.

8.1.7 Environmentally Sensitive Areas

Potential Impacts

No rare vegetation communities were identified by the MNRF or NHIC within the study limits, nor were any identified during field investigation for ELC.

The identified unevaluated wetland features, and the recommended 15 m setback, are considered to be generally sensitive areas. Encroachment to within these generally sensitive areas has the potential to impact the features or the species utilizing them.

Mitigation

Mitigation measures for protection of environmentally sensitive areas should include the following:

- Mitigation measures as outlined in **Sections 8.1.1** and **8.1.3** are anticipated to limit impacts to these features.

- A vegetated buffer of 15 m, as measured from the field verified wetland boundary has been recommended for the subject property. This buffer is to consist of native, self-sustaining vegetation that shall not be maintained by mowing.

9.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the review of background information, and field visits completed in May, June, and September, 2023, natural heritage features were identified within proximity to the Glen Walter Water Tower study area including unevaluated wetlands and potential habitat for SAR.

Five (5) Endangered or Threatened Species at Risk; Little Brown Bat, Northern Myotis, Tri-colored Bat, Eastern Small-footed Myotis, and Butternut were identified with potential to be impacted within the project limits (described in **Section 6.5.1**). Potential impacts to these species and their core habitat are anticipated to be low provided appropriate mitigation measures are employed.

An unevaluated wetland is also present on the subject property. While this feature is currently not regulated by Raisin Region Conservation Authority, mitigation measures (i.e. 15 m vegetated setback) are recommended for incorporation in the water tower design.

Mitigation measures for the protection of natural heritage features, including those mentioned above, are described in detail in **Section 8.0**.

10.0 CLOSURE

Ainley Group has prepared this Natural Heritage Study to describe the existing natural heritage features, summarize potential impacts due to the undertaking, and identify mitigation measures and monitoring commitments to limit potential impacts associated with the proposed construction of the Glen Walter Water Tower.

11.0 References

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FIGURES

GLEN WALTER WATER TOWER

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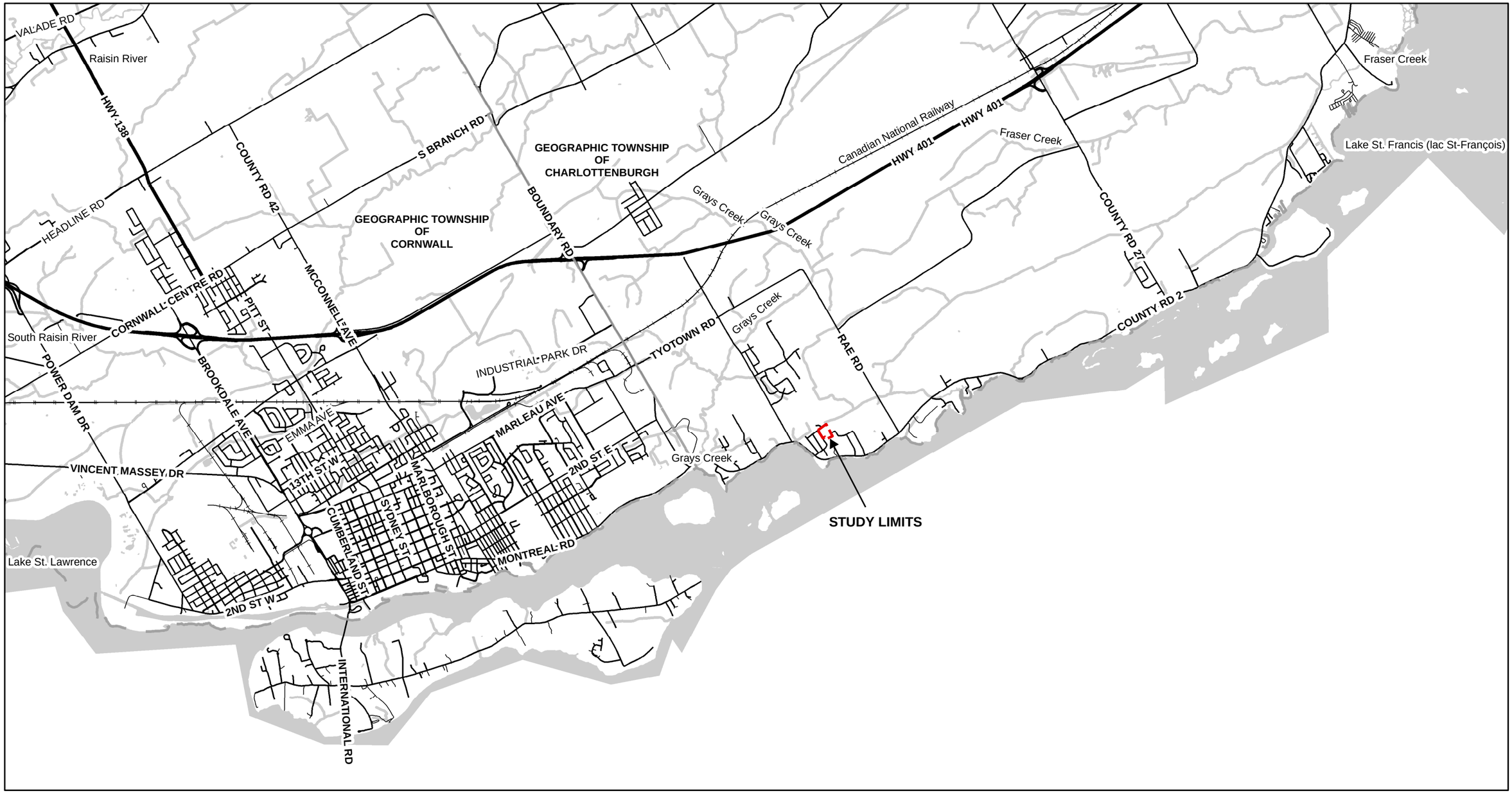
Minley GROUP CONSULTING ENGINEERS PLANNERS

FIGURE 1

REGIONAL LOCATION PLAN



SOURCE: LAND INFORMATION ONTARIO (MNRF)

N.T.S

LEGEND

STUDY LIMITS

PROPOSED WATER TOWER LOCATION

UNEVALUATED WETLAND (FIELD VERIFIED)

METRIC

DIMENSIONS ARE IN METRES AND/OR MILLIMETERS UNLESS OTHERWISE SHOWN

GLEN WALTER WATER TOWER

N

Minley GROUP CONSULTING ENGINEERS PLANNERS

FIGURE 2

EXISTING CONDITIONS

LEGEND

- 15 m WETLAND SETBACK
- UNEVALUATED WETLAND (FIELD VERIFIED)
- PROPOSED WATER TOWER LOCATION
- STUDY LIMITS

METRIC

DIMENSIONS ARE IN METRES AND/OR MILLIMETERS UNLESS OTHERWISE SHOWN

GLEN WALTER WATER TOWER

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Minley GROUP CONSULTING ENGINEERS PLANNERS

FIGURE 3

CONSTRAINTS

TABLES

Glen Walter Water Tower- Natural Heritage Study
Table 2 - Species at Risk Summary (Terrestrial)
22020-1

Common Name	Species Name	S Rank	SARA	SARO	Habitat Requirements	Potential for Species to be Present / Impacted	Rationale / Potential Impacts
Butternut	*Juglans cinerea*	S2?	END	END	Found alone or in small groups, in mixed hardwood stands or along fence lines or open fields / agricultural areas.	Moderate - High	Five (5) Butternut trees were identified during site visits completed by Ainley Group in 2023. Where possible, development should respect a 25 m setback from the observed individuals. If a 25 m setback cannot be respected, then the requirements for an exemption under the *ESA* should be explored.
Little Brown Bat	*Myotis lucifugus*	S4	END	END	Roost in buildings or trees but often select attics, barns, or abandoned buildings.	Minimal - Moderate	Trees within the forest community present on the subject property may provide suitable day roosting habitat for species. Vegetation removal is to be completed outside of the active season for bats (April 15 – September 30).
Northern Myotis	*Myotis septentrionalis*	S3	END	END	Northern Myotis are associated with boreal forests, choosing to roost under loose bark and in the cavities of trees. These bats hibernate from October or November to March or April, most often in caves or abandoned mines.	Minimal - Moderate	Trees within the forest community present on the subject property may provide suitable day roosting habitat for species. Vegetation removal is to be completed outside of the active season for bats (April 15 – September 30).
Tri-colored Bat	*Perimyotis subflavus*	S3?	END	END	Found in a variety of forest habitats, often forming day roots or maternity colonies in older forests and occasionally barns or other structures. The species forages over water and along streams and forests.	Minimal - Moderate	Trees within the forest community present on the subject property may provide suitable day roosting habitat for species. Vegetation removal is to be completed outside of the active season for bats (April 15 – September 30).
Eastern Small-footed Myotis	*Myotis leibii*	S2S3	END	END	These bats can be found roosting in a variety of habitats ranging from rock outcrops, buildings, bridges, caves, mines, or hollow trees. Roost locations often change on a daily basis	Minimal - Moderate	Trees within the forest community present on the subject property may provide suitable day roosting habitat for species. Vegetation removal is to be completed outside of the active season for bats (April 15 – September 30).
Loggerhead Shrike	*Lanius ludovicianus*	S1B	END	END	Grazed pasture, marginal farmland with scattered hawthorn shrubs, hedgerows; fence posts, wires and associated low-lying wetland; located on core areas of limestone plain adjacent to Canadian Shield; greatest threat is fragmentation of suitable habitat due to natural succession; probably needs at least 25 ha of suitable habitat.	Minimal	No observations of species during field surveys by Ainley Group in 2023. No suitable habitat (i.e. grazed pasture, scattered hawthorns) was observed within the site area.
Red-headed Woodpecker	*Melanerpes erythrocephalus*	S4B	END	END	Usually found in open wooded areas and woodland edges with numerous dead trees which the birds use for nesting and as a food source.	Minimal	Suitable habitat (numerous dead trees) was not observed within footprint of proposed area. No observations of species during surveys by Ainley Group in 2023.
Cerulean Warbler	*Setophaga cerulea*	S2B	END	THR	Cerulean Warblers are associated with large tracts of mature deciduous forest with tall trees and an open understory. They are found in both wet bottomland forests and upland areas. They tend to use white oak, cucumber magnolia, bitternut hickory, and sugar maple for nesting and foraging, typically avoiding red oak and red maple.	Minimal	No observations of species during field surveys by Ainley Group in 2023. No Suitable habitat (i.e. mature deciduous forests, open understory) observed within the proposed footprint.

Glen Walter Water Tower- Natural Heritage Study
Table 2 - Species at Risk Summary (Terrestrial)
22020-1

Common Name	Species Name	S Rank	SARA	SARO	Habitat Requirements	Potential for Species to be Present / Impacted	Rationale / Potential Impacts
Short-eared Owl	*Asio flammeus*	S4?B	THR	THR	Short-eared Owl favours open habitats throughout the year, including grasslands, tundra, and wetlands. Breeding typically occurs in open landscapes at least 50-100 ha in area, and nests are preferentially located on the ground near clumps of taller vegetation that provide concealment.	Minimal	No observations of species during field surveys by Ainley Group in 2023. No suitable habitat (i.e. open grasslands, tundra) was present within the subject property.
Least Bittern	*Ixobrychus exilis*	S4B	THR	-	The Least Bittern breeds strictly in marshes dominated by emergent vegetation surrounded by areas of open water. Most breeding grounds in Canada are dominated by cattails, but breeding also occurs in areas with other robust emergent plants and in shrubby swamps. This small heron prefers large marshes that have relatively stable water levels throughout the nesting period.	Minimal	No observations of species during field surveys by Ainley Group in 2023. No Suitable habitat (i.e. marshes with emergent vegetation) observed within the subject property.
Bobolink	*Dolichonyx oryzivorus*	S4B	THR	THR	Dense grasses or hayfields south of the boreal forest of Ontario, where they build their small nests on the ground. Feed off insects that are found in these grassy environments. Minimum area required estimated to be 5 hectares.	Minimal	No observations of species during field survey by Ainley Group in 2023. No observations of suitable habitat (i.e. dense grasses or hayfields) within subject property.
Bank Swallow	*Riparia riparia*	S4B	THR	THR	Found in burrows in natural and man-made setting within vertical faces of silt and sand deposits.	Minimal	No observations of species during field survey by Ainley Group in 2023. No observations of suitable habitat (i.e. vertical faces of silt and sand deposits) on or adjacent the subject property.
Eastern Meadowlark	*Sturnella magna*	S4B	THR	THR	Moderately tall grasslands, pastures, hayfields, alfalfa fields, weedy borders of croplands, orchards, airports, roadsides, shrubby overgrown fields and any other open areas present. Commonly seen sitting on small trees, fence posts or shrubs. Minimum area required estimated to be 5 hectares.	Minimal	No observations of species during field surveys by Ainley Group in 2023. No observations of suitable habitat (i.e. grasslands or pastures) within subject property.
Chimney Swift	*Chaetura pelagica*	S5B	THR	THR	Commonly found in urban areas near buildings; nests in hollow trees, crevices of rock cliffs, chimneys; highly gregarious; feeds over open water.	Minimal	No observations of species during field surveys by Ainley Group in 2023. No observations of suitable habitat (i.e. hollow trees, rock cliffs) within subject property.
Eastern Whip-poor-will	*Antrostomus vociferus*	S4B	THR	THR	Prefers to nest in semi-open forests or patchy forests with clearings, such as barrens or forests that are regenerating following major disturbances. Individuals will often feed in nearby shrubby pastures or wetlands with perches.	Minimal	No observations of species during field survey by Ainley Group in 2023. No observations of suitable habitat (i.e. semi-open forests, barrens) within subject property.

Glen Walter Water Tower- Natural Heritage Study
Table 2 - Species at Risk Summary (Terrestrial)
22020-1

Common Name	Species Name	S Rank	SARA	SARO	Habitat Requirements	Potential for Species to be Present / Impacted	Rationale / Potential Impacts
Golden-winged Warbler	*Vermivora chrysoptera*	S3B	THR	SC	Golden-winged Warblers breed in tangled, shrubby habitats such as regenerating clearcuts, wet thickets, tamarack bogs, and aspen or willow stands. They tend to occur in wetland habitats. Golden-winged Warblers are found in dry uplands, swamp forests and marshes. This warbler shows a preference for public utility (hydro-electric) rights-of-way, the edges of fields, areas where logging has recently occurred, beaver ponds and burned-out or intermittently cultivated areas.	Minimal	No observations of species during field surveys by Ainley Group in 2023. Suitable habitat (i.e. shrubby habitat, wet thickets) was identified within the subject property. As a special concern species, neither individuals nor their habitat are protected.
Grasshopper Sparrow	*Ammodramus savannarum*	S4B	SC	SC	The Grasshopper Sparrow is a grassland bird species known to nest in hayfields, pastures, alvars, prairies, and occasionally grain crops. The species will create a well-hidden cup shaped nest woven from grasses	Minimal	No observations of species during field survey by Ainley Group in 2023. No observations of suitable habitat (i.e. grasslands or pastures) within proposed footprint of structure. Further, as a special concern species, neither individuals nor their habitat are protected.
Common Nighthawk	*Chordeiles minor*	S4B	SC	SC	Traditionally found in natural open areas with minimal vegetation, this species may also be found in culturally disturbed sites such as cultivated fields, mine tailings, etc.	Minimal	No observations of species during field surveys by Ainley Group in 2023. No Suitable habitat (i.e. cultivated fields, mine tailings) observed within the subject property. Further, as a special concern species, neither individuals nor their habitat are protected.
Wood Thrush	*Hylocichla mustelina*	S4B	SC	SC	Found in mature deciduous and mixed forest. Limited to moist stands with well-developed undergrowth and tall trees.	Minimal	No observations of species during field surveys by Ainley Group in 2023. No observations of suitable habitat (i.e. mature deciduous forest) within subject property. Further, as a special concern species, neither individuals nor their habitat are protected.
Eastern Wood-Pewee	*Contopus virens*	S4B	SC	SC	Found in the mid-canopy layer of forest clearings and edges of deciduous and mixed forest. Most abundant in mature forest stands with little understory.	Minimal	No observations of species during field surveys by Ainley Group in 2023. Suitable habitat (i.e. mature forest stand) not observed on the subject property. Further, as a special concern species, neither individuals nor their habitat are protected.
Barn Swallow	*Hirundo rustica*	S4B	SC	SC	Farmlands or rural areas; cliffs, caves, rock niches; buildings or other man-made structures for nesting; open country near body of water.	Minimal	No observations of species during field survey completed by Ainley Group in 2023. No observations of suitable habitat (farmlands, buildings, or other man-made structures) within subject property. Further, as a special concern species, neither individuals nor their habitat are protected.
Canada Warbler	*Cardellina canadensis*	S5B	SC	SC	Wet, mixed deciduous-coniferous forests with a well-developed shrub layer tend to be preferred for breeding, but Canada Warbler also uses riparian shrub forest on slopes and in ravines, and in stands regenerating after natural and anthropogenic disturbances.	Minimal	No observations of species during field surveys by Ainley Group in 2023. Suitable habitat (i.e. mixed forest) not observed on the subject property. Further, as a special concern species, neither individuals nor their habitat are protected.

Glen Walter Water Tower- Natural Heritage Study
Table 2 - Species at Risk Summary (Terrestrial)
22020-1

Common Name	Species Name	S Rank	SARA	SARO	Habitat Requirements	Potential for Species to be Present / Impacted	Rationale / Potential Impacts
Snapping Turtle	*Chelydra serpentina*	S3	SC	SC	Permanent, semi-permanent fresh water; marshes, swamps or bogs; rivers and streams with soft muddy banks or bottoms; often uses soft soil or clean dry sand on south-facing slopes for nest sites; may nest at some distance from water; often hibernate together in groups in mud under water; home range size ~28ha.	Minimal	No observations of species during field survey by Ainley Group in 2023. Wetland feature observed on the subject property not anticipated to be sufficient size to support turtle species. Further, as a special concern species, neither individuals nor their habitat are protected.
Black Tern	*Chlidonias niger*	S4?B	-	SC	Black Terns nest in large freshwater wetlands, usually in dense marshes on the edges of shallow lakes of the open prairies or northern forests. They sometimes nest in rice fields or on river islands. Black Terns normally select marshes that are 50 acres or larger for nesting.	Minimal	No observations of species during field survey by Ainley Group in 2023. No observations of suitable habitat (i.e. dense marshes, freshwater wetlands, shallow lakes) within subject property. Further, as a special concern species, neither individuals nor their habitat are protected.
Yellow-banded Bumble Bee	*Bombus terricola*	S3S5	SC	SC	This species is a forage and habitat generalist, able to use a variety of nectaring plants and environmental conditions. It can be found in mixed woodlands, particularly for nesting and overwintering, as well as a variety of open habitat such as native grasslands, farmlands and urban areas.	Minimal	No observations of species during field survey by Ainley Group in 2023. Suitable habitat (i.e. mixed woodlands) not observed on the subject property. Further, as a special concern species, neither individuals nor their habitat are protected.
Yellow Rail	*Coturnicops noveboracensis*	S3B	SC	SC	Nesting Yellow Rails are typically found in marshes dominated by sedges, true grasses, and rushes, where there is little or no standing water (generally 0-12 cm water depth), and where the substrate remains saturated throughout the summer. They can be found in damp fields and meadows, on the floodplains of rivers and streams, in the herbaceous vegetation of bogs, and at the upper levels (drier margins) of estuarine and salt marshes.	Minimal	No observations of species during field surveys by Ainley Group in 2023. No suitable habitat (i.e. marshes dominated by sedges, true grasses and rushes) observed within the study area. Further, as a special concern species, neither individuals nor their habitat are protected.
Bald Eagle	*Haliaeetus leucocephalus*	S4	Not at Risk	SC	Nest in a variety of habitats and forest types, almost always near a major lake or river where they do most of their hunting. They usually nest in large trees such as pine and poplar. During the winter, Bald Eagles sometimes congregate near open water such as the St. Lawrence River, or in places with a high deer population where carcasses might be found.	Minimal	No observations of species during field surveys by Ainley Group in 2023. No suitable foraging or habitat for nesting individuals (i.e. large pine or poplar) observed within the subject property.

Glen Walter Water Tower- Natural Heritage Study
Table 2 - Species at Risk Summary (Terrestrial)
22020-1

Common Name	Species Name	S Rank	SARA	SARO	Habitat Requirements	Potential for Species to be Present / Impacted	Rationale / Potential Impacts
Peregrine Falcon	*Falco peregrinus*	S4	-	SC	In North America they breed in open landscapes with cliffs (or skyscrapers) for nest sites. They can be found nesting at elevations up to about 12,000 feet, as well as along rivers and coastlines or in cities, where the local Rock Pigeon populations offer a reliable food supply.	Minimal	No observations of species during field surveys by Ainley Group in 2023. No suitable foraging or habitat for nesting individuals (i.e. open landscapes, cliffs) observed within the subject property.
Evening Grosbeak	*Coccothraustes vespertinus*	S4	-	SC	Optimal Evening Grosbeak breeding habitat generally includes open, mature mixedwood forests, where fir species and/or White Spruce are dominant, and Spruce Budworm is abundant.	Minimal	No observations of species during field survey by Ainley Group in 2023. No observations of suitable habitat (i.e. mature mixedwood forests) within the subject property. Further, as a special concern species, neither individuals nor their habitat are protected.
Eastern Musk Turtle	*Sternotherus odoratus*	S3	SC	SC	The Eastern Musk Turtle is a highly aquatic species inhabiting littoral zones of waterways such as rivers, lakes, bays, streams, ponds, canals, and swamps with slow to no current and soft bottoms. During their active season, Eastern Musk Turtles prefer shallow water	Minimal	No observations of species during field survey by Ainley Group in 2023. Wetland feature observed on the subject property not anticipated to be sufficient size to support turtle species. Further, as a special concern species, neither individuals nor their habitat are protected.
Olive-sided Flycatcher	*Contopus cooperi*	S4B	SC	SC	Most often found along natural forest edges and openings where it uses foraging perches. Breeding habitat usualy consists of coniferous or mixed forest adjacent to rivers or wetlands, with nests typically found in White Spruce, Black Spruce, Jack Pine, and Balsam Fir.	Minimal	No observations of species during field survey by Ainley Group in 2023. Suitable breeding habitat (i.e. mixed or coniferous forest) not observed on the subject property. Further, as a special concern species, neither individuals nor their habitat are protected.

1. List of Species at Risk determined though information provided by the MNRF and Natural Heritage Information Centre and Site Observations by Ainley Group.
2. Ministry of Natural Resources. 2000. Significant Wildlife Habitat Guide - Appendix G.

APPENDIX A
Background Data and Correspondence

David Davison

From: David Davison
Sent: September 22, 2023 2:55 PM
To: David Davison
Subject: FW: Wetland Setbacks

From: Matthew Levac <matthew.levac@rrca.on.ca>
Sent: September 7, 2023 10:06 AM
To: Scott Reynolds <scott.reynolds@ainleygroup.com>
Subject: RE: Wetland Setbacks

Hi Scott,

Thank you for contacting the Raisin Region Conservation Authority.

Unevaluated wetland features are not presently regulated by the RRCA.

If you plan to carry out any development or make alterations to land within a provincially significant wetland or within 120 meters of it, you must obtain a permit from the RRCA. Similarly, you need a permit from the RRCA if you intend to undertake development or site alteration within a watercourse, a floodplain , or within 15 meters of these features.

Sincerely,

Matthew Levac
Planning & Regulations Officer
Raisin Region Conservation Authority
613-938-3611 www.rrca.on.ca

From: Scott Reynolds <scott.reynolds@ainleygroup.com>
Sent: Tuesday, September 5, 2023 10:34 AM
To: Matthew Levac <matthew.levac@rrca.on.ca>
Subject: Wetland Setbacks

Hi Matthew,

I hope you had a good long weekend.

We are working through a potential project down in the Cornwall area, and just have a general question for you. What is the general setback requirements for unevaluated wetlands less than 2.0 ha in RRCA jurisdiction? In reviewing O.Reg. 175/06, I interpret that a permit may be required for any works within 30 m of an unevaluated wetland less than 2.0 ha in size if the hydrologic function may be impacted.

When you have a chance, can you please provide the recommended setbacks for RRCA?

Thanks, and happy to chat on the phone if that is easier as well.

Scott

Scott Reynolds, B.Sc.(Env), EP
Manager of Environmental Planning

Tel: (613) 966-4243 ext. 105
Cell: (613) 243-0567

WWW.AINLEYGROUP.COM

Change location | Year-round, All years

Cornwall--Gray's Creek CA

Stormont (/region/CA-ON-SD?yr=all&m=), Dundas and Glengarry (/region/CA-ON?yr=all&m=) County (/region/CA-ON?yr=all&m=) Ontario (/region/CA?yr=all&m=)

Map(/hotspots?hs=L1285220&yr=all&m=)

Directions(https://www.google.com/maps/search/?api=1&query=45.0385965,-74.6657467)

Hotspot navigation

Overview (/hotspot/L1285220?yr=all&m=)

Illustrated Checklist (/hotspot/L1285220/media?yr=all&m=)

VIEW MY...

My eBird (/myebird/L1285220)

Life List (/lifelist/L1285220)

Target Species (/targets?r1=L1285220&bmo=1&emo=12)

Checklists (/mychecklists/L1285220)

EXPLORE...

Hotspot Map (/hotspots?hs=L1285220&yr=all&m=)

Bar Charts (/barchart?r=L1285220&yr=all&m=)

Media (https://ebird.org/media/catalog?regionCode=L1285220)

Printable Checklist (/printableList?regionCode=L1285220&yr=all&m=)

145
Species observed
(/hotspot/L1285220?yr=all&m=)

136
Complete checklists
(/hotspot/L1285220/activity?yr=all&m=)

Sightings

Updated 10 sec ago.

Last seen (/hotspot/L1285220?yr=all&m=&rank=mrec) **First seen (/hotspot/L1285220?yr=all&m=&rank=lrec)**
High counts (/hotspot/L1285220?yr=all&m=&rank=hc)

Show all details

Show all details

Sort by

SPECIES NAME (/HOTSPOT/L1285220?YR=ALL&M=&RANK=MREC&HS_SORTBY=TAXON_ORDER&HS_O=ASC)

COUNT (/HOTSPOT/L1285220?YR=ALL&M=&RANK=MREC&HS_SORTBY=COUNT&HS_O=DESC)

DATE (/HOTSPOT/L1285220?YR=ALL&M=&RANK=MREC&HS_SORTBY=DATE&HS_O=ASC)

OBSERVER

1. **Great Blue Heron(/species/grbher3/L1285220)**
   # 1 | 15 Apr 2023 (/checklist/S133893770) | Robert Scranton
2. **Northern Flicker(/species/norfli/L1285220)**
   # 1 | 15 Apr 2023 (/checklist/S133893770) | Robert Scranton
3. **Blue Jay(/species/blujay/L1285220)**
   # 2 | 15 Apr 2023 (/checklist/S133893770) | Robert Scranton
4. **Black-capped Chickadee(/species/bkcchi/L1285220)**
   # 5 | 15 Apr 2023 (/checklist/S133893770) | Robert Scranton
5. **Tufted Titmouse(/species/tuftit/L1285220)**
   # 1 | 15 Apr 2023 (/checklist/S133893770) | Robert Scranton
6. **Ruby-crowned Kinglet(/species/ruckin/L1285220)**
   # 1 | 15 Apr 2023 (/checklist/S133893770) | Robert Scranton
7. **American Robin(/species/amerob/L1285220)**
   # 3 | 15 Apr 2023 (/checklist/S133893770) | Robert Scranton
8. **Chipping Sparrow(/species/chispa/L1285220)**
   # 1 | 15 Apr 2023 (/checklist/S133893770) | Robert Scranton
9. **White-throated Sparrow(/species/whtspa/L1285220)**
   # 1 | 15 Apr 2023 (/checklist/S133893770) | Robert Scranton
10. **Song Sparrow(/species/sonspa/L1285220)**
    # 2 | 15 Apr 2023 (/checklist/S133893770) | Robert Scranton
11. **Red-winged Blackbird(/species/rewbla/L1285220)**
    # 8 | 15 Apr 2023 (/checklist/S133893770) | Robert Scranton
12. **Common Grackle(/species/comgra/L1285220)**
    # 6 | 15 Apr 2023 (/checklist/S133893770) | Robert Scranton
13. **Northern Cardinal(/species/norcar/L1285220)**
    # 1 | 15 Apr 2023 (/checklist/S133893770) | Robert Scranton
14. **Barred Owl(/species/brdowl/L1285220)**
    # 1 | 26 Mar 2023 (/checklist/S131876486) | Mark Day
15. **Canada Goose(/species/cangoo/L1285220)**

6 | 3 Mar 2023 (/checklist/S130092085) | Chantal Desnoyers

16. **Mallard(/species/mallar3/L1285220)**

2 | 3 Mar 2023 (/checklist/S130092085) | Chantal Desnoyers

17. **Downy Woodpecker(/species/dowwoo/L1285220)**

1 | 3 Mar 2023 (/checklist/S130092085) | Chantal Desnoyers

18. **Hairy Woodpecker(/species/haiwoo/L1285220)**

5 | 3 Mar 2023 (/checklist/S130092085) | Chantal Desnoyers

19. **Pileated Woodpecker(/species/pilwoo/L1285220)**

1 | 3 Mar 2023 (/checklist/S130092085) | Chantal Desnoyers

20. **American Crow(/species/amecro/L1285220)**

3 | 3 Mar 2023 (/checklist/S130092085) | Chantal Desnoyers

21. **White-breasted Nuthatch(/species/whbnut/L1285220)**

2 | 3 Mar 2023 (/checklist/S130092085) | Chantal Desnoyers

22. **Brown Creeper(/species/brncre/L1285220)**

1 | 3 Mar 2023 (/checklist/S130092085) | Chantal Desnoyers

23. **Pine Grosbeak(/species/pingro/L1285220)**

7 | 3 Mar 2023 (/checklist/S130092085) | Chantal Desnoyers

24. **Rock Pigeon(/species/rocpig/L1285220)**

8 | 19 Feb 2023 (/checklist/S129024483) | Chantal Desnoyers

25. **Cedar Waxwing(/species/cedwax/L1285220)**

5 | 19 Feb 2023 (/checklist/S129024483) | Chantal Desnoyers

26. **Mourning Dove(/species/moudov/L1285220)**

1 | 14 Feb 2023 (/checklist/S128316673) | Heather Lodge

27. **Carolina Wren(/species/carwre/L1285220)**

1 | 14 Feb 2023 (/checklist/S128316673) | Heather Lodge

28. **European Starling(/species/eursta/L1285220)**

4 | 14 Feb 2023 (/checklist/S128316673) | Heather Lodge

29. **Dark-eyed Junco(/species/daejun/L1285220)**

3 | 14 Feb 2023 (/checklist/S128316673) | Heather Lodge

30. **Red-tailed Hawk(/species/rethaw/L1285220)**

1 | 14 Sep 2022 (/checklist/S118729334) | Heather Lodge

31. **American Goldfinch(/species/amegfi/L1285220)**

    # 2 | 14 Sep 2022 (/checklist/S118729334) | Heather Lodge

32. **Broad-winged Hawk(/species/brwhaw/L1285220)**

    # 6 | 14 Sep 2022 (/checklist/S118733078) | Sophie Gibbs

33. **Belted Kingfisher(/species/belkin1/L1285220)**

    # 1 | 14 Sep 2022 (/checklist/S118733078) | Sophie Gibbs

34. **Wild Turkey(/species/wiltur/L1285220)**

    # 1 | 9 Jun 2022 (/checklist/S112530727) | Anonymous eBirder

35. **Great Crested Flycatcher(/species/grcfly/L1285220)**

    # 1 | 8 Jun 2022 (/checklist/S112456473) | Anonymous eBirder

36. **Eastern Phoebe(/species/easpho/L1285220)**

    # 1 | 5 Jun 2022 (/checklist/S112192953) | Dave Kaddie

37. **Red-eyed Vireo(/species/reevir1/L1285220)**

    # 2 | 5 Jun 2022 (/checklist/S112192953) | Dave Kaddie

38. **Yellow Warbler(/species/yelwar/L1285220)**

    # 3 | 5 Jun 2022 (/checklist/S112192953) | Dave Kaddie

39. **Chestnut-sided Warbler(/species/chswar/L1285220)**

    # 1 | 5 Jun 2022 (/checklist/S112192953) | Dave Kaddie

40. **Indigo Bunting(/species/indbun/L1285220)**

    # 2 | 5 Jun 2022 (/checklist/S112192953) | Dave Kaddie

41. **Yellow-bellied Sapsucker(/species/yebsap/L1285220)**

    # 1 | 4 Jun 2022 (/checklist/S112157044) | Robert Scranton

42. **Eastern Wood-Pewee(/species/eawpew/L1285220)**

    # 2 | 4 Jun 2022 (/checklist/S112157044) | Robert Scranton

43. **Warbling Vireo(/species/warvir/L1285220)**

    # 1 | 4 Jun 2022 (/checklist/S112157044) | Robert Scranton

44. **Gray Catbird(/species/grycat/L1285220)**

    # 2 | 4 Jun 2022 (/checklist/S112157044) | Robert Scranton

45. **Wood Thrush(/species/woothr/L1285220)**

    # 1 | 4 Jun 2022 (/checklist/S112157044) | Robert Scranton

46. **Baltimore Oriole(/species/balori/L1285220)**

    # 1 | 4 Jun 2022 (/checklist/S112157044) | Robert Scranton

47. **Common Yellowthroat(/species/comyel/L1285220)**

1 4 Jun 2022 (/checklist/S112157044) Robert Scranton

48. **American Redstart(/species/amered/L1285220)**

1 4 Jun 2022 (/checklist/S112157044) Robert Scranton

49. **Philadelphia Vireo(/species/phivir/L1285220)**

2 24 May 2022 (/checklist/S111185140) Dave Kaddie

50. **House Wren(/species/houwre/L1285220)**

1 24 May 2022 (/checklist/S111185140) Dave Kaddie

51. **Rose-breasted Grosbeak(/species/robgro/L1285220)**

1 24 May 2022 (/checklist/S111185140) Dave Kaddie

52. **Double-crested Cormorant(/species/doccor/L1285220)**

1 24 May 2022 (/checklist/S111156431) Igor Kabic

53. **Eastern Kingbird(/species/easkin/L1285220)**

2 24 May 2022 (/checklist/S111156431) Igor Kabic

54. **Common Raven(/species/comrav/L1285220)**

1 24 May 2022 (/checklist/S111156431) Igor Kabic

55. **Blackpoll Warbler(/species/bkpwar/L1285220)**

1 24 May 2022 (/checklist/S111156431) Igor Kabic

56. **Ring-billed Gull(/species/ribgul/L1285220)**

22 23 May 2022 (/checklist/S111179277) Robert Scranton

57. **Yellow-crowned Night-Heron(/species/ycnher/L1285220)**

1 23 May 2022 (/checklist/S111179277) Robert Scranton

58. **Brown Thrasher(/species/brnthr/L1285220)**

1 23 May 2022 (/checklist/S111179277) Robert Scranton

59. **Veery(/species/veery/L1285220)**

2 23 May 2022 (/checklist/S111179277) Robert Scranton

60. **Swamp Sparrow(/species/swaspa/L1285220)**

1 23 May 2022 (/checklist/S111179277) Robert Scranton

61. **Killdeer(/species/killde/L1285220)**

1 23 May 2022 (/checklist/S111091670) Heather Lodge

62. **Turkey Vulture(/species/turvul/L1285220)**

3 23 May 2022 (/checklist/S111091670) Heather Lodge

63. **Least Flycatcher(/species/leafly/L1285220)**

1 23 May 2022 (/checklist/S111091670) Heather Lodge

64. **Tennessee Warbler(/species/tenwar/L1285220)**

1 23 May 2022 (/checklist/S111091670) Heather Lodge

65. **Great Egret(/species/greegr/L1285220)**

1 23 May 2022 (/checklist/S111085699) Michelle Martin

66. **Alder Flycatcher(/species/aldfly/L1285220)**

3 23 May 2022 (/checklist/S111085699) Michelle Martin

67. **Eastern Towhee(/species/eastow/L1285220)**

1 23 May 2022 (/checklist/S111085699) Michelle Martin

68. **Ovenbird(/species/ovenbi1/L1285220)**

2 23 May 2022 (/checklist/S111085699) Michelle Martin

69. **Cape May Warbler(/species/camwar/L1285220)**

1 23 May 2022 (/checklist/S111085699) Michelle Martin

70. **Canada Warbler(/species/canwar/L1285220)**

1 23 May 2022 (/checklist/S111085699) Michelle Martin

71. **Green Heron(/species/grnher/L1285220)**

1 23 May 2022 (/checklist/S111135098) Mark Patry

72. **Ruby-throated Hummingbird(/species/rthhum/L1285220)**

1 21 May 2022 (/checklist/S110858994) Heather Lodge

73. **Blackburnian Warbler(/species/bkbwar/L1285220)**

1 21 May 2022 (/checklist/S110858994) Heather Lodge

74. **Northern Rough-winged Swallow(/species/nrwswa/L1285220)**

1 20 May 2022 (/checklist/S110761588) Rick Beaudon

75. **Tree Swallow(/species/treswa/L1285220)**

6 20 May 2022 (/checklist/S110761588) Rick Beaudon

76. **Osprey(/species/osprey/L1285220)**

1 20 May 2022 (/checklist/S110753123) Heather Lodge

77. **Bald Eagle(/species/baleag/L1285220)**

1 20 May 2022 (/checklist/S110753123) Heather Lodge

78. **Yellow-rumped Warbler(/species/yerwar/L1285220)**

1 20 May 2022 (/checklist/S110753123) Heather Lodge

79. **Wilson's Warbler(/species/wlswar/L1285220)**

    # 1 | 20 May 2022 (/checklist/S110753123) | Heather Lodge

80. **Cooper's Hawk(/species/coohaw/L1285220)**

    # 2 | 14 May 2022 (/checklist/S110069853) | Robert Scranton

81. **Barn Swallow(/species/barswa/L1285220)**

    # 2 | 14 May 2022 (/checklist/S110069853) | Robert Scranton

82. **Magnolia Warbler(/species/magwar/L1285220)**

    # 1 | 14 May 2022 (/checklist/S110069853) | Robert Scranton

83. **Blue-headed Vireo(/species/buhvir/L1285220)**

    # 2 | 3 May 2022 (/checklist/S108808440) | Igor Kabic

84. **Herring Gull(/species/hergul/L1285220)**

    # 1 | 13 Apr 2022 (/checklist/S107057915) | Robert Scranton

85. **House Sparrow(/species/houspa/L1285220)**

    # 6 | 13 Apr 2022 (/checklist/S107057915) | Robert Scranton

86. **Purple Finch(/species/purfin/L1285220)**

    # 1 | 13 Apr 2022 (/checklist/S107057915) | Robert Scranton

87. **Ruffed Grouse(/species/rufgro/L1285220)**

    # 1 | 9 Apr 2022 (/checklist/S106615157) | Heather Lodge

88. **American Woodcock(/species/amewoo/L1285220)**

    # 1 | 21 Mar 2022 (/checklist/S105296137) | Dave Kaddie

89. **Sharp-shinned Hawk(/species/shshaw/L1285220)**

    # 1 | 15 Mar 2022 (/checklist/S104940104) | Dawn Scranton

90. **American Tree Sparrow(/species/amtspa/L1285220)**

    # 1 | 2 Mar 2022 (/checklist/S104481486) | Cécile Piquard

91. **House Finch(/species/houfin/L1285220)**

    # 2 | 25 Nov 2021 (/checklist/S98064342) | Shamla Perumannil

92. **Black-crowned Night-Heron(/species/bcnher/L1285220)**

    # 1 | 16 May 2021 (/checklist/S88300832) | Robert Scranton

93. **Hermit Thrush(/species/herthr/L1285220)**

    # 1 | 16 May 2021 (/checklist/S88300832) | Robert Scranton

94. **Black-and-white Warbler(/species/bawwar/L1285220)**

2 16 May 2021 (/checklist/S88300832) Robert Scranton

95. **Scarlet Tanager(/species/scatan/L1285220)**

2 16 May 2021 (/checklist/S88300832) Robert Scranton

96. **Spotted Sandpiper(/species/sposan/L1285220)**

1 14 May 2021 (/checklist/S88131341) Dawn Scranton

97. **Wood Duck(/species/wooduc/L1285220)**

2 23 Apr 2021 (/checklist/S86201521) Dawn Scranton

98. **Common Redpoll(/species/comred/L1285220)**

34 9 Mar 2021 (/checklist/S83455822) William Irwin

99. **Eastern Bluebird(/species/easblu/L1285220)**

1 14 Feb 2021 (/checklist/S82308886) William Irwin

100. **Common Goldeneye(/species/comgol/L1285220)**

12 26 Jan 2021 (/checklist/S79958768) Richard Knapton

101. **Peregrine Falcon(/species/perfal/L1285220)**

1 5 Oct 2020 (/checklist/S74472855) William Irwin

102. **Snow Goose(/species/snogoo/L1285220)**

1 3 Oct 2020 (/checklist/S74424496) Karen Gordon

103. **Black-throated Green Warbler(/species/btnwar/L1285220)**

1 21 Sep 2020 (/checklist/S73887312) Anonymous eBirder

104. **Merlin(/species/merlin/L1285220)**

1 16 Aug 2020 (/checklist/S72486753) Abdullah Soufi

105. **Red-breasted Nuthatch(/species/rebnut/L1285220)**

1 16 Aug 2020 (/checklist/S72486753) Abdullah Soufi

106. **Black-throated Blue Warbler(/species/btbwar/L1285220)**

1 17 May 2020 (/checklist/S69237005) Robert Scranton

107. **Palm Warbler(/species/palwar/L1285220)**

1 11 May 2020 (/checklist/S68902302) Robert Scranton

108. **Chimney Swift(/species/chiswi/L1285220)**

5 26 May 2019 (/checklist/S56775737) Dave Kaddie

109. **Purple Martin(/species/purmar/L1285220)**

6 26 May 2019 (/checklist/S56770865) Robert Scranton

110. **Nashville Warbler(/species/naswar/L1285220)**

2 | 26 May 2019 (/checklist/S56770865) | Robert Scranton

111. **Bay-breasted Warbler(/species/babwar/L1285220)**

3 | 26 May 2019 (/checklist/S56770865) | Robert Scranton

112. **Pine Warbler(/species/pinwar/L1285220)**

1 | 26 May 2019 (/checklist/S56770942) | Hans van der Zweep

113. **Northern Parula(/species/norpar/L1285220)**

1 | 19 May 2019 (/checklist/S56520141) | Robert Scranton

114. **Common Merganser(/species/commer/L1285220)**

2 | 2 May 2019 (/checklist/S61839994) | William Irwin

115. **Common Loon(/species/comloo/L1285220)**

1 | 30 Apr 2019 (/checklist/S61839922) | William Irwin

116. **Common Gallinule(/species/comgal1/L1285220)**

3 | 10 Aug 2018 (/checklist/S47841757) | josh Ketry

117. **Great Black-backed Gull(/species/gbbgul/L1285220)**

1 | 10 Aug 2018 (/checklist/S47841757) | josh Ketry

118. **Common Tern(/species/comter/L1285220)**

5 | 10 Aug 2018 (/checklist/S47841757) | josh Ketry

119. **Marsh Wren(/species/marwre/L1285220)**

2 | 10 Aug 2018 (/checklist/S47841757) | josh Ketry

120. **Swainson's Thrush(/species/swathr/L1285220)**

1 | 20 May 2018 (/checklist/S45866033) | Robert Scranton

121. **Red-shouldered Hawk(/species/reshaw/L1285220)**

1 | 23 Apr 2018 (/checklist/S44875046) | William Irwin

122. **Pied-billed Grebe(/species/pibgre/L1285220)**

2 | 11 Jun 2017 (/checklist/S37586105) | Paolo De Marchi

123. **Eastern Screech-Owl(/species/easowl1/L1285220)**

1 | 19 Oct 2016 (/checklist/S32122528) | Anonymous eBirder

124. **White-crowned Sparrow(/species/whcspa/L1285220)**

2 | 18 May 2016 (/checklist/S29758396) | Anonymous eBirder

125. **Brown-headed Cowbird(/species/bnhcow/L1285220)**

X | 18 May 2016 (/checklist/S29758396) | Anonymous eBirder

126. **Winter Wren(/species/winwre3/L1285220)**

1 | 21 Oct 2015 (/checklist/S25502209) | Robert Scranton

127. **Mourning Warbler(/species/mouwar/L1285220)**

1 | 12 Sep 2015 (/checklist/S62136968) | William Irwin

128. **Redhead(/species/redhea/L1285220)**

7 | 17 May 2015 (/checklist/S23495430) | Paul Schoening

129. **Black-billed Cuckoo(/species/bkbcuc/L1285220)**

2 | 17 May 2015 (/checklist/S23495430) | Paul Schoening

130. **Black Tern(/species/blkter/L1285220)**

1 | 17 May 2015 (/checklist/S23495430) | Paul Schoening

131. **Olive-sided Flycatcher(/species/olsfly/L1285220)**

1 | 17 May 2015 (/checklist/S23499748) | Robert Scranton

132. **Bohemian Waxwing(/species/bohwax/L1285220)**

56 | 26 Feb 2015 (/checklist/S42272119) | William Irwin

133. **Golden-crowned Kinglet(/species/gockin/L1285220)**

2 | 26 Sep 2014 (/checklist/S19951490) | Anonymous eBirder

134. **Gadwall(/species/gadwal/L1285220)**

2 | 25 May 2014 (/checklist/S18557031) | Paul Schoening

135. **Savannah Sparrow(/species/savspa/L1285220)**

2 | 25 May 2014 (/checklist/S18557031) | Paul Schoening

136. **Bank Swallow(/species/banswa/L1285220)**

2 | 24 May 2014 (/checklist/S18542170) | Anonymous eBirder

137. **Northern Shrike(/species/norshr4/L1285220)**

1 | 9 Feb 2014 (/checklist/S16867259) | Anonymous eBirder

138. **Orange-crowned Warbler(/species/orcwar/L1285220)**

1 | 21 May 2013 (/checklist/S14198670) | James Swanson

139. **Willow Flycatcher(/species/wilfly/L1285220)**

2 | 20 May 2013 (/checklist/S14184633) | Anonymous eBirder

140. **Evening Grosbeak(/species/evegro/L1285220)**

X | 18 May 2013 (/checklist/S14161584) | Anonymous eBirder

141. **Hooded Merganser(/species/hoomer/L1285220)**

12 | 17 Mar 2013 (/checklist/S13429734) | James Swanson

142. **Sandhill Crane(/species/sancra/L1285220)**

1 | 18 Aug 2011 (/checklist/S8686358) | James Swanson

143. **Fox Sparrow(/species/foxspa/L1285220)**

1 | 18 Oct 2009 (/checklist/S9090181) | James Swanson

144. **Wilson's Snipe(/species/wilsni1/L1285220)**

X | 5 May 1987 (/checklist/S43627831) | Rob Worona

145. **Gray Partridge(/species/grypar/L1285220)**

2 | 2 Mar 1977 (/checklist/S71405512) | Patrick Temple

ADDITIONAL TAXA

passerine sp.

1 | 14 Sep 2022 (/checklist/S118733078) | Sophie Gibbs

Sharp-shinned/Cooper's Hawk

1 | 9 Jun 2022 (/checklist/S112530727) | Anonymous eBirder

Alder/Willow Flycatcher (Traill's Flycatcher)

1 | 21 May 2022 (/checklist/S110858994) | Heather Lodge

Ruby-crowned/Golden-crowned Kinglet

1 | 1 May 2022 (/checklist/S108581778) | Dave Kaddie

new world flycatcher sp.

1 | 16 Aug 2020 (/checklist/S72486753) | Abdullah Soufi

Downy/Hairy Woodpecker

1 | 25 May 2020 (/checklist/S69651216) | Robert Scranton

swallow sp.

41 | 29 Apr 2019 (/checklist/S61839819) | William Irwin

Buteo sp.

1 | 10 Aug 2018 (/checklist/S47841757) | josh Ketry

hawk sp.

2 | 14 Sep 2017 (/checklist/S40210459) | William Irwin

merganser sp.

2 | 20 Feb 2017 (/checklist/S40803696) | William Irwin

new world sparrow sp.

1 | 12 Sep 2015 (/checklist/S44694323) | William Irwin

Show all sightings

Top media UPLOADED IN LAST 30 DAYS

No media submitted

Latest media (https://ebird.org/media/catalog?regionCode=L1285220)

Recent visits

OBSERVER	DATE	SPECIES
Robert Scranton	15 Apr 2023 (/checklist/S133893770)	13
Dawn Scranton	15 Apr 2023 (/checklist/S133905569)	13
Mark Day	26 Mar 2023 (/checklist/S131876486)	1
Chantal Desnoyers	3 Mar 2023 (/checklist/S130092085)	11
Chantal Desnoyers	19 Feb 2023 (/checklist/S129024483)	11
valerie biggs	18 Feb 2023 (/checklist/S129128879)	3
Heather Lodge	14 Feb 2023 (/checklist/S128316673)	13
Heather Lodge	14 Sep 2022 (/checklist/S118729334)	13
Sophie Gibbs	14 Sep 2022 (/checklist/S118733078)	11
Dave Kaddie	5 Jun 2022 (/checklist/S112192953)	11

Checklists submitted within the last hour are not shown.

More recent visits (/hotspot/L1285220/activity?yr=all&m=)

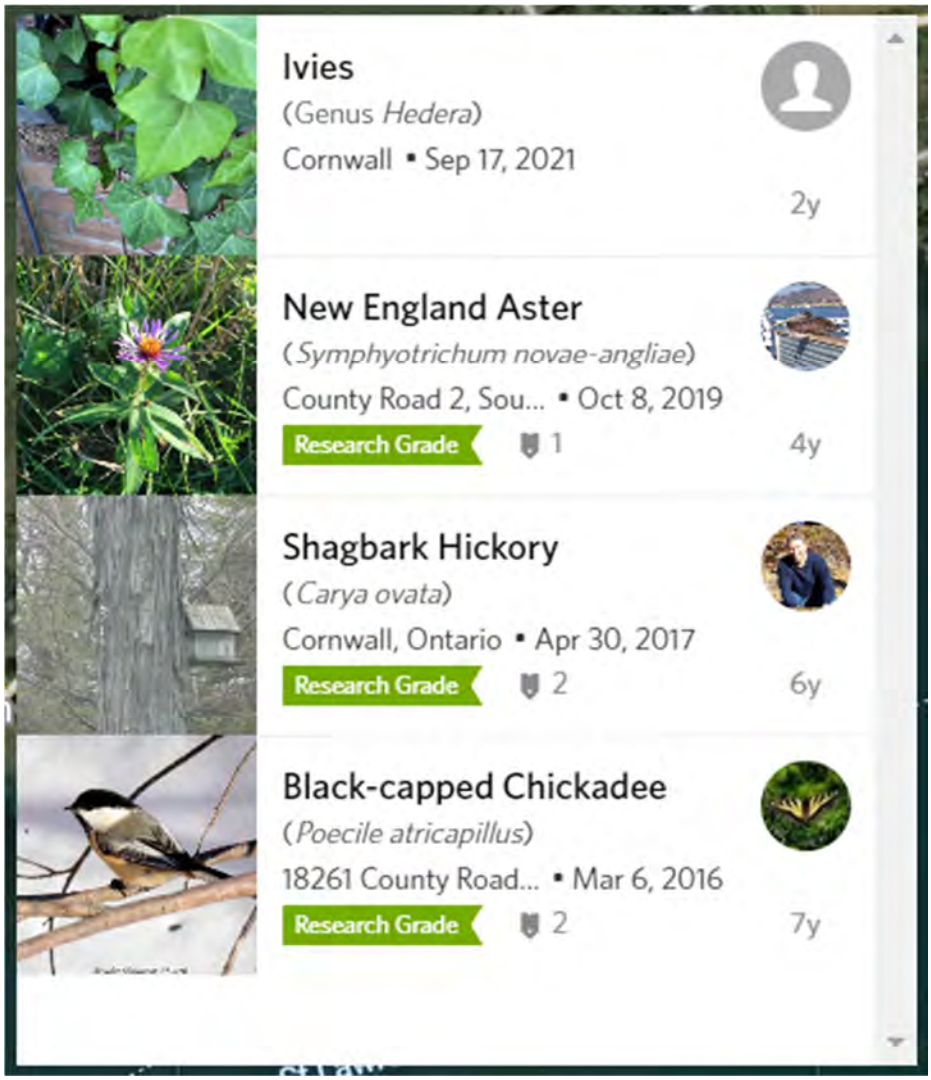
Top eBirders

Updated 10 sec ago.

Species (/hotspot/L1285220?yr=all&m=&sortBy=spp) **Checklists (/hotspot/L1285220?yr=all&m=&sortBy=cl)**

1	Robert Scranton	95
2	Dawn Scranton	88
3	James Swanson	84
4	Dave Kaddie	80
4	Hans van der Zweep	80
6	Paul Schoening	67

7	Paolo De Marchi	66
8	Heather Lodge	60
9	Darlene Kaddie	59
10	Madeline van der Zweep	58


Ivies
(Genus Hedera)
Cornwall • Sep 17, 2021
2y
New England Aster
(Symphyotrichum novae-angliae)
County Road 2, Sou... • Oct 8, 2019
Research Grade
1
4y
Shagbark Hickory
(Carya ovata)
Cornwall, Ontario • Apr 30, 2017
Research Grade
2
6y
Black-capped Chickadee
(Poecile atricapillus)
18261 County Road... • Mar 6, 2016
Research Grade
2
7y

NHIC Data

To work further with this data select the content and copy it into your own word or excel documents.

OGF ID	Element Type	Common Name	Scientific Name	SRank	SARO Status	COSEWIC Status	ATLAS NAD83 IDENT	COMMENTS
1114753	SPECIES	Silver Lamprey (Great Lakes - Upper St. Lawrence populations)	Ichthyomyzon unicuspis pop. 1		SC	SC	18WQ2887	
1114753	SPECIES	Cutlip Minnow	Exoglossum maxillingua		THR	SC	18WQ2887	
1114753	SPECIES	Yellow-banded Bumble Bee	Bombus terricola		SC	SC	18WQ2887	
1114753	SPECIES	Bobolink	Dolichonyx oryzivorus		THR	THR	18WQ2887	

BIRDS CANADA
OISEAUX CANADA

Square Summary (18TWQ28) [change]

	#species				#hours		#pc done	
	poss	prob	conf	total	total	peak	road	offrd
Curr.	13	0	0	13	0.5	0.5	0	0
Prev.	22	22	44	88	47.8	—	25	

Region summary (#23: Cornwall-Hawkesbury, ON)

#squares	#sq with data	#species	#squares (pc)	
			target	compl.
39	39	151	39	6
39	39	172	0	35

Target number of point counts in this square: 25 in total: 20 road side, 5 off road (Broadleaf Forest in 3, Mixed Forest in 1, Shrubland in 1). Please try to ensure that each off-road station is located such that the entire 100m radius circle is within the prescribed habitat.

SPECIES	Prev.	Code	%
Canada Goose	FY		46
Mute Swan ‡			0
Trumpeter Swan ‡			0
Wood Duck	NU		48
Blue-winged Teal §			12
Northern Shoveler			10
Gadwall			7
American Wigeon			5
Mallard	FY		74
American Black Duck			5
Northern Pintail			0
Green-winged Teal			7
Redhead †			7

Ring-necked Duck ‡			5
Lesser Scaup ‡			0
Common Goldeneye ‡			0
Hooded Merganser			5
Common Merganser	FY		5
Ruddy Duck ‡			2
Wild Turkey	FY		87
Ruffed Grouse			25
Gray Partridge †			5
Pied-billed Grebe			15
Rock Pigeon (Feral Pigeon)	AE		74
Mourning Dove	AE		94
Yellow-billed Cuckoo			0
Black-billed Cuckoo			20
Common Nighthawk ‡	T		0
Eastern Whip-poor-will ‡			2
Chimney Swift ‡	P		12
Ruby-throated Hummingbird	H		33
Virginia Rail			15
Sora			7

SPECIES	**Prev.**	**Code**	**%**
Common Gallinule §			15
American Coot ‡			2
Yellow Rail †			0
Sandhill Crane			10
Killdeer §	DD		82
Upland Sandpiper †	AE		17
American Woodcock	S		25
Wilson's Snipe	T		33
Wilson's Phalarope †			2
Spotted Sandpiper	FY		28
Ring-billed Gull § ‡	H		5
Herring Gull § ‡			2
Great Black-backed Gull †			0
Black Tern †			2
Common Tern §			7

Common Loon			2
Double-crested Cormorant §	H		10
American Bittern			25
Least Bittern †			10
Great Blue Heron §	H		23
Great Egret †			2
Green Heron §			20
Black-crowned Night-Heron †			2
Turkey Vulture	P		76
Osprey			15
Northern Harrier	H		56
Sharp-shinned Hawk	AE		10
Cooper's Hawk	H		5
Northern Goshawk ‡			0
Bald Eagle ‡			5
Red-shouldered Hawk ‡			10
Broad-winged Hawk			30
Red-tailed Hawk	V		38

SPECIES	**Prev.**	**Code**	**%**
Eastern Screech-Owl			10
Great Horned Owl	H		2
Northern Hawk Owl ‡			0
Barred Owl			28
Long-eared Owl ‡			0
Short-eared Owl †			0
Northern Saw-whet Owl ‡			0
Belted Kingfisher	A		25
Yellow-bellied Sapsucker			79
Red-headed Woodpecker †			0
Red-bellied Woodpecker ‡			0
Black-backed Woodpecker ‡			0
Downy Woodpecker	AE		58
Hairy Woodpecker	AE		43
Pileated Woodpecker	S		33
Northern Flicker	V		84
American Kestrel §	FY	H	71

Merlin			25
Peregrine Falcon ‡			5
Eastern Wood-Pewee §	V		66
Yellow-bellied Flycatcher ‡			0
Alder Flycatcher	P		56
Willow Flycatcher	T		12
Least Flycatcher	P		43
Eastern Phoebe	S		71
Great Crested Flycatcher	V		66
Eastern Kingbird	CF		76
Yellow-throated Vireo ‡			2
Blue-headed Vireo			7
Philadelphia Vireo ‡			0
Warbling Vireo	T		82
Red-eyed Vireo	T	S	82
Loggerhead Shrike †			0

Breeding Bird Atlas - Summary Sheet for Square 18TWQ28 (page 2 of 2)

SPECIES	Prev.	Code	%
Blue Jay	CF		89
American Crow	AE		92
Common Raven			84
Black-capped Chickadee	FY	H	97
Tufted Titmouse ‡			0
Horned Lark §			15
Northern Rough-winged Swallow	AE		15
Purple Martin §	H		10
Tree Swallow	NY		66
Bank Swallow §	H		10
Barn Swallow §	NY		69
Cliff Swallow §	NE		28
Golden-crowned Kinglet			5
Red-breasted Nuthatch			35
White-breasted Nuthatch	CF		82
Brown Creeper			12
Blue-gray Gnatcatcher ‡			0
House Wren	T		84
Winter Wren			10
Sedge Wren ‡			2
Marsh Wren			15
Carolina Wren ‡		S	2
European Starling	CF		87
Gray Catbird	A	S	79
Brown Thrasher	S		51
Northern Mockingbird ‡			2
Eastern Bluebird			30
Veery	T		53
Swainson's Thrush ‡	T		0
Hermit Thrush			23
Wood Thrush §	T		46
American Robin	AE	S	94
Cedar Waxwing	CF	H	66

SPECIES	Prev.	Code	%

House Sparrow	NY		66
Evening Grosbeak ‡			0
House Finch	NY		15
Purple Finch	P		25
Red Crossbill ‡			0
White-winged Crossbill ‡			2
Pine Siskin §			2
American Goldfinch	CF		84
Grasshopper Sparrow §			0
Chipping Sparrow	NY		82
Clay-colored Sparrow			2
Field Sparrow §	H		7
Dark-eyed Junco ‡	H		0
White-throated Sparrow	T		46
Vesper Sparrow			51
Savannah Sparrow	AE		69
Song Sparrow	AE	S	94
Lincoln's Sparrow ‡			2
Swamp Sparrow	S	S	61
Eastern Towhee §			12
Bobolink §	CF		66
Eastern Meadowlark §	FY		53
Orchard Oriole ‡			0
Baltimore Oriole	CF	H	69
Red-winged Blackbird	NY	S	94
Brown-headed Cowbird	FY		43
Common Grackle	CF		92
Ovenbird	FY		51
Northern Waterthrush	S		25
Golden-winged Warbler †			0
Blue-winged Warbler ‡			0
Black-and-white Warbler			46
Nashville Warbler	CF		10

SPECIES	**Prev.**	**Code**	**%**
Mourning Warbler	S		23
Common Yellowthroat	FY	S	89

American Redstart	FY		56
Cerulean Warbler †			0
Magnolia Warbler			10
Blackburnian Warbler			0
Yellow Warbler	AE	H	82
Chestnut-sided Warbler	S		56
Black-throated Blue Warbler			2
Palm Warbler ‡			2
Pine Warbler			10
Yellow-rumped Warbler			10
Black-throated Green Warbler	S		17
Canada Warbler §			2
Scarlet Tanager	S		43
Northern Cardinal	CF		84
Rose-breasted Grosbeak	S		53
Indigo Bunting	T		71

This list includes all breeding species expected in the region #23 (Cornwall-Hawkesbury). Underlined species are those that you should try to add to this square (18TWQ28). They have not yet been reported in this square, but have been reported in more than 50% of the squares in this region so far. "Prev." is the code for the highest breeding evidence for that species in square 18TWQ28 in the previous atlas. "Code" is the code for the highest breeding evidence for that species in square 18TWQ28 over the last 5 years. The % columns give the percentage of squares in that region where that species was reported (this gives an idea of the expected chance of finding that species in region #23). Rare/Colonial Species Report Forms should be completed for species marked: § (Species of interest), ‡ (regionally rare), † (provincially rare). An up-to-date version of this sheet is available from https://naturecounts.ca//nc//atlas/squaresummaryform.jsp?squareID=18TWQ28&lang=EN
Data current as of **4/05/2023 16:24**.

Display of records for square 18WQ28

All species - All life stages; most recent data first

Number of rows of data displayed below: 52.

Year	Common Name	Unique ID	Square ID
2019	Snapping Turtle	500551	18WQ28
2019	Snapping Turtle	505170	18WQ28
2019	American Toad	529833	18WQ28
2019	Gray Treefrog	529986	18WQ28
2018	Midland Painted Turtle	474829	18WQ28
2018	Eastern Gartersnake	475138	18WQ28
2018	Blue-spotted Salamander	478438	18WQ28
2018	Snapping Turtle	494009	18WQ28
2018	Wood Frog	498845	18WQ28
2018	Eastern Musk Turtle	511008	18WQ28
2017	Eastern Gartersnake	455951	18WQ28
2017	Snapping Turtle	515763	18WQ28
2016	Snapping Turtle	360417	18WQ28
2016	American Bullfrog	503501	18WQ28
2016	American Toad	503527	18WQ28
2016	Green Frog	503843	18WQ28
2016	Green Frog	503861	18WQ28
2016	Green Frog	503866	18WQ28
2016	Green Frog	503874	18WQ28
2010	Snapping Turtle	438308	18WQ28
2010	Snapping Turtle	438309	18WQ28
2009	Spring Peeper	244637	18WQ28
2009	Green Frog	244638	18WQ28
2009	American Bullfrog	244639	18WQ28
2008	Western Chorus Frog	244633	18WQ28

2008	Western Chorus Frog	244634	18WQ28
2008	Green Frog	244635	18WQ28
2007	Green Frog	244636	18WQ28
1996	American Toad	246972	18WQ28
1996	Northern Leopard Frog	246973	18WQ28
1996	American Bullfrog	246974	18WQ28
1990	Spring Peeper	248036	18WQ28
1990	Northern Leopard Frog	248037	18WQ28
1990	Gray Treefrog	248038	18WQ28
1990	American Toad	248039	18WQ28
1986	American Toad	245392	18WQ28
1986	Green Frog	245393	18WQ28
1986	Gray Treefrog	245394	18WQ28
1986	Northern Leopard Frog	245395	18WQ28
1986	Northern Leopard Frog	245396	18WQ28
1986	Eastern Gartersnake	247080	18WQ28
1986	Northern Leopard Frog	247121	18WQ28
1986	Green Frog	247122	18WQ28
1986	Wood Frog	247123	18WQ28
1978	American Bullfrog	245407	18WQ28
1965	American Toad	245382	18WQ28
1965	Eastern Gartersnake	245383	18WQ28
1965	Northern Leopard Frog	245385	18WQ28
1962	Green Frog	245408	18WQ28
1962	Northern Leopard Frog	245409	18WQ28
1952	Red-bellied Snake	245397	18WQ28
1941	Mudpuppy	245379	18WQ28

TEA home page | Main atlas page

APPENDIX B
Photographic Log

Photo 1 – Glen Walter Park access (September 6, 2023).

Photo 2 – View of Kilkenny Road access from subject property (September 6, 2023).

Photo 3 – Dry-Fresh Basswood Deciduous Forest (FODM4-9) community (September 6, 2023).

Photo 4 – Dry-Fresh Basswood Deciduous Forest (FODM4-9) community (June 5, 2023).

Photo 5 – Dry-Fresh Basswood Deciduous Forest (FODM4-9) community (June 5, 2023).

Photo 6 – Dry-Fresh Basswood Deciduous Forest (FODM4-9) community (June 5, 2023). (September 6, 2023).

Photo 7 – Unevaluated wetland inclusion identified in the central east of proposed footprint, seasonally dry (June 5, 2023).

Photo 8 – Unevaluated wetland vegetation (June 5, 2023).

Photo 9 – Unevaluated wetland (June 5, 2023).

Photo 10 – Unevaluated wetland observed in June observed dry during fall field visit (September 6, 2023).

APPENDIX C

Vegetation Species List

Appendix C - Vegetation Species List
Natural Heritage Study
Glen Walter Water Tower

Scientific Name	Common Name	S Rank	N Rank	G Rank	Exotic Status	Coefficient of Conservatism	Coefficient of Wetness	FODM4-9
Acer negundo	Manitoba Maple	S5	N5	G5		0	0	x
Actaea pachypoda	White Baneberry	S5	N6	G6		6	5	x
Amelanchier laevis	Smooth Serviceberry	S5	N5	G5		5	5	x
Arctium minus	Common Burdock	SNA	NNA	GNR	SE5		3	x
Asarum canadense	Canada Wild-ginger	S5	N4	G4		6	5	x
Bromus inermis	Smooth Brome	SNA	NNA	G5T5	SE5		5	x
Carya cordiformis	Bitternut Hickory	S5	N5	G5		6	0	x
Circaea alpina	Small Enchanter's Nightshade	S5	N6	G6		6	-3	x
Cornus sericea	Red-osier Dogwood	S5	N5	G5		2	-3	x
Cornus alternifolia	Alternate-leaved Dogwood	S5	N5	G5		6	3	x
Dactylis glomerata	Orchard Grass	SNA	NNA	GNR	SE5		3	x
Dryopteris carthusiana	Spinulose Wood Fern	S5	N5	G5		5	-3	x
Echinacea purpurea	Eastern Purple Coneflower	SNA		G4G5	SE1		5	x
Erigeron philadelphicus	Philadelphia Fleabane	S5	N5	G5		1	-3	x
Fragaria virginiana	Wild Strawberry	S5	N5	G5		2	3	x
Fraxinus americana	White Ash	S4	N5	G4		4	3	x
Fraxinus pennsylvanica	Red Ash	S4	N5	G4		3	-3	x
Galium palustre	Common Marsh Bedstraw	S5	N5	G5		5	-5	x
Geum canadense	Canada Avens	S5	N5	G5		3	0	x
Glechoma hederacea	Ground-ivy	SNA	NNA	GNR	SE5		3	x
Hesperis matronalis	Dame's Rocket	SNA	NNA	G4G5	SE5		3	x
Hydrophyllum virginianum	Virginia Waterleaf	S5	N5	G5		6	0	x
Tanacetum vulgare	Common Tansy	SNA	NNA	GNR	SE5		5	x
Juglans cinerea	Butternut	S2?	N2?	G3		6	3	x
Juglans nigra	Black Walnut	S4?	N4?	G5		5	3	x
Juniperus virginiana	Eastern Red Cedar	S5	N5	G5		4	3	x
Lactuca biennis	Tall Blue Lettuce	S5	N5	G5		6	0	x
Leucanthemum vulgare	Oxeye Daisy	SNA	NNA	GNR	SE5		5	x
Lonicera tatarica	Tatarian Honeysuckle	SNA	NNA	GNR	SE6		3	x
Medicago lupulina	Black Medick	SNA	NNA	GNR	SE5		3	x
Onoclea sensibilis	Sensitive Fern	S5	N5	G5		4	-3	x
Pastinaca sativa	Wild Parsnip	SNA	NNA	GNR	SE5		5	x
Parthenocissus quinquefolia	Virginia Creeper	S4?	N4?	G5		6	3	x
Picea pungens	Blue Spruce	SNA	NNA	G5	SE1		1	x
Pinus strobus	Eastern White Pine	S5	N5	G5		4	3	x
Plantago major	Common Plantain	SNA	NNR	G5	SE5		3	x
Polygonatum biflorum	Giant Solomon's Seal	S4	N4	G5		8	3	x
Populus deltoides	Eastern Cottonwood	S5	N5	G5		4	0	x
Populus grandidentata	Large-toothed Aspen	S5	N5	G5		5	5	x
Prunus serotina	Black Cherry	S5	N6	G6		3	3	x
Prunus virginiana	Chokecherry	S5	N5	G5		2	3	x
Quercus macrocarpa	Bur Oak	S5	N5	G5		5	3	x
Quercus rubra	Northern Red Oak	S5	N5	G5		6	3	x
Ranunculus acris	Common Buttercup	SNA	NNA	G5	SE5		0	x
Ribes cynosbati	Eastern Prickly Gooseberry	S5	N5	G5		4	3	x
Rhamnus cathartica	European Buckthorn	SNA	NNA	GNR	SE5		0	x
Robinia pseudoacacia	Black Locust	SNA	NNA	G5	SE5		3	x
Rhus typhina	Staghorn Sumac	S5	N5	G5			3	x
Rubus occidentalis	Black Raspberry	S5	N6	G6		2	5	x
Sanguinaria canadensis	Bloodroot	S5	N5	G5		5	3	x
Syringa vulgaris	Common Lilac	SNA	NNA	GNR	SE5		5	x
Taraxacum officinale	Common Dandelion	SNA	N5	G5	SE5		3	x
Tilia americana	Basswood	S5	N5	G5		4	3	x
Trifolium pratense	Red Clover	SNA	NNA	GNR	SE5		3	x
Ulmus americana	White Elm	S5	N5	G4		3	-3	x
Viburnum lentago	Nannyberry	S5	N5	G5		4	0	x

APPENDIX D
Field Forms

Wildlife

Weather information is recorded on the **Wildlife** data card. Such information can be useful for helping to interpret records or results.

Temperature: Record of approximate ambient temperature (°C) during the field survey.

Cloud: Record, in tenths, the proportion of the sky covered by clouds.

Wind: Record the Beaufort Scale number according to Table 20

Table 20. Beaufort Wind Scale (adapted from Whittow 1984).

0	Calm	smoke rises vertically
1	Light Air	smoke drifts, but wind vanes do not
2	Light Breeze	wind felt on face, leaves rustle
3	Gentle Breeze	leaves and small twigs in constant motion; light flags extended
4	Moderate Breeze	wind raises dust and loose paper; small branches move
5	Fresh Breeze	small trees in leaf begin to sway
6	Strong Breeze	large branches in motion; whistling in phone wires; umbrella use difficult
7	Near Gale	whole trees in motion; inconvenience felt when walking against wind
8	Gale	twigs break off trees; progress impeded
9	Strong Gale	slight structural damage – roofing shingles, TV antennae
10	Storm	trees uprooted; considerable structural damage

Precipitation: Brief statement of precipitation, e.g ., none, steady rain, fog.

Conditions: Brief statement of conditions, surveyor mood, etc., which might affect the survey; a text field of 50 characters.

Indicate the **presence** of **Potential Wildlife Habitat** by checking the appropriate box of features that are present within the polygon.

Wildlife: All wildlife **sightings** and signs should be recorded while in the polygon. Record each sighting by **type** (TY) (B = bird, H = herpetofauna, etc.) and by **species** (SP. CODE). Use **four-letter** codes, provided in the **database**, for recording species.

Evidence Codes: (EV) should be **used** to record the type of observation. If possible, give an **indication** of the **estimated** number of **individuals**, pairs or signs for each wildlife **species**.

ELC COMMUNITY DESCRIPTION & CLASSIFICATION

SITE: GLEN WALTER | POLYGON: 1

SURVEYOR(S): DD/EE | DATE: JUNE 5/23 | UTME

START | END | UTMZ | UTMN

POLYGON DESCRIPTION

SYSTEM	SUBSTRATE	TOPOGRAPHIC FEATURE	HISTORY	PLANT FORM	COMMUNITY
☒ TERRESTRIAL	☐ ORGANIC	☐ LACUSTRINE	☒ NATURAL	☐ PLANKTON	☐ LAKE
☐ WETLAND	☒ MINERAL SOIL	☐ RIVERINE	☐ CULTURAL	☐ SUBMERGED	☐ POND
☐ AQUATIC	☐ PARENT MIN	☐ BOTTOMLAND		☐ FLOATING-LVD	☐ RIVER
	☐ ACIDIC BEDRK	☐ TERRACE		☐ GRAMINOID	☐ STREAM
	☐ BASIC BEDRK	☐ VALLEY SLOPE		☐ FORB	☐ MARSH
	☐ CARB. BEDRK	☐ TABLELAND		☐ LICHEN	☐ SWAMP
		☐ ROLL. UPLAND		☐ BRYOPHYTE	☐ FEN
		☐ CLIFF		☒ DECIDUOUS	☐ BOG
		☐ TALUS		☐ CONIFEROUS	☐ BARREN
		☐ CREVICE / CAVE		☐ MIXED	☐ MEADOW
		☐ ALVAR			☐ PRAIRIE
		☐ ROCKLAND			☐ THICKET
		☐ BEACH / BAR			☐ SAVANNAH
		☐ SAND DUNE			☐ WOODLAND
		☐ BLUFF			☒ FOREST
					☐ PLANTATION

SITE	COVER
☐ OPEN WATER	☐ OPEN
☐ SHALLOW WATER	☐ SHRUB
☒ SURFICIAL DEP.	☒ TREED
☐ BEDROCK	

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY	2	4	B. PAPYRIFERA > B. ALLEGHANIENSIS.
2	SUB-CANOPY	3	4	C. BUCCATRON >>
3	UNDERSTOREY	3	3	S. H. SUMAC = T. HEMLOCK SEEDLINGS
4	GRD. LAYER	6	4	W. AVENS = V. WINTERGREEN = V. CANADENSE

HT CODES: 1 = >25 m 2 = 10<HT ≤ 25 m 3 = 2<HT ≤ 10 m 4 = 1<HT ≤ 2 m 5 = 0.5<HT 1 m 6 = 0.2<HT ≤ 0.5 m 7 = HT<0.2 m

CVR CODES: 0 = NONE 1 = 0% < CVR ≤ 10% 2 = 10 < CVR ≤ 25% 3 = 25 < CVR ≤ 60% 4 = CVR > 60%

STAND COMPOSITION: | BA:

SIZE CLASS ANALYSIS:	< 10	10 - 24	25 - 50	> 50
STANDING SNAGS:	< 10	10 - 24	25 - 50	> 50
DEADFALL / LOGS:	< 10	10 - 24	25 - 50	> 50

ABUNDANCE CODES: N = NONE R = RARE O = OCCASIONAL A = ABUNDANT

COMM. AGE	PIONEER	YOUNG	MID-AGE	MATURE	OLD GROWTH

SOIL ANALYSIS:

TEXTURE:	DEPTH TO MOTTLES / GLEY	g =	G=
MOISTURE:	DEPTH OF ORGANICS:		(cm)
HOMOGENEOUS / VARIABLE	DEPTH TO BEDROCK:		(cm)

COMMUNITYCLASSIFICATION:

COMMUNITY CLASS:	CODE:
COMMUNITY SERIES:	CODE:
ECOSITE:	CODE:
VEGETATION TYPE:	CODE:
INCLUSION	CODE:
COMPLEX	CODE:

Notes:

ELC STAND & SOIL CHARACTERISTICS	SITE:
	POLYGON:
	DATE:
	SURVEYOR(S):

TREE TALLY BY SPECIES:

PRISM FACTOR [ ]

SPECIES	TALLY 1	TALLY 2	TALLY 3	TALLY 4	TOTAL	RELATIVE AVERAGE
TOTAL						100
BASAL AREA (BA)						MEAN
DEAD						

STAND COMPOSITION:

SOIL ASSESSMENT:	1	2	3	4
TEXTURE				
DEPTH TO MOTTLES:	g=	g=	g=	g=
DEPTH TO GLEY:	G=	G=	G=	G=
DEPTH OF ORGANICS				
DEPTH TO BEDROCK				
MOISTURE REGIME				

SOIL PROFILE

COMMUNITY PROFILE DIAGRAM

NOTES:

ELC PLANT SPECIES LIST	SITE: GLEN WALTER
	POLYGON: 1
	DATE: JUNE 5/23
	SURVEYOR(S): DB/KR

LAYERS: 1 = CANOPY > 10m 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER

ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COLL
S.H. SUMAC			A		
E. COTTONWOOD	O				
B. WALNUT	A				
BASSWOOD	A				
SMOOTH SOL. SEAL				R	
CREEPING CHARLIE				O	
CONE FLOWER				R	
DAME'S ROCKET				O	
ORCHARD GRASS				O	
R. CLOVER				O	
CREEPING BENT				O	
T. VETCH				O	
P. ASH			R		
G. ASH	O				
BLUEBERRY				O	
HAWTHORN		O			
V. CREEPER				A	
W. PARSNIP				O	
G. DOGWOOD			O		
TANSY				R	
B. MUSIC				R	
MAN. MAPLE	O				
C. CHERRY			R		
C. DANDELION				O	
T. BUTTERCUP				O	
NANNYBERRY			R		
BUTTERNUT	R				

6. CARRIED

SPECIES CODE	LAYER 1	2	3	4	COLL
BALSAM	O				
PRICK GOOSEBERRY				O	
C. BUCKTHORN		A			
W. STRAWBERRY				O	
W. ASTER				A	
C. BURDOCK				O	
SEDGE SP.				O	
BNUT (GRASS)					
T. THIMBLEWEED			A		
R. B. GRASS				O	
PINK FLEABANE				R	
CHOKECHERRY			O		
DOGSBANE				O	
ENCHANTER'S NIGHTSHADE				O	
BLACK RASP				O	
V. VIRGINIA WILD RYE				A	
CLEAR.					
W. GINGER				R	
SWAMP FERN				R	
SPINULOSE WOOD FERN				R	
ROUGH BEDSTRAW				O	
B. LOOSESTRIFE	R				
SW. CHERRY	R				
A. ELM	R				
T. BLUE VERVAIN				R	
SERVICEBERRY			R		

4-B GRNB.

APPENDIX E
Genetic Testing Results

BUTTERNUT HYBRIDITY TESTING **RESULTS**

Order number:	NA-SO00308
Report number:	NM-UMD697
Company:	Ainley Group
Contact:	Scott Reynolds
Project:	Glen Walter Water Tower
Sample type:	Plant tissue
Date of report:	13 Oct 2023
Number of samples:	1

Thank you for sending your samples for analysis by NatureMetrics. Your samples have been **analysed** following our **Butternut RFLP (Restriction Fragment Length Polymorphism)** pipeline supplemented by **Sequence Characterized Amplified Region (SCAR)** codominant marker.

Butternut (*Juglans cinerea* L.) is considered an **endangered (EN)** tree species in Ontario. This report contains biodiversity information that may be sensitive, particularly with respect to endangered or protected species. It is the responsibility of the client to ensure that due consideration is given to the data and that the information is shared in a responsible way.

Disclaimer: Provided test only detects the occurrence of a hybridization event between butternut (*J. cinerea* L.) and Japanese Walnut (*J. ailantifolia* Carr.) similar to the previous OFRI test derived from the publication by Zhao and Woeste (2011).

Here we present an overview of the key results, followed by a more detailed report that starts with the taxonomic composition of the samples followed by a more detailed look at the steps taken to extract, amplify, sequence, and analyse your DNA. A glossary for terms in **bold** is provided at the end of the report to define key terms used within the report.

OVERVIEW OF YOUR RESULTS

- A total of 1 **butternut** sample(s) and 0 **hybrid** sample(s) (see **Disclaimer**) were identified.
- All laboratory **controls** performed as expected.

FULL REPORT

Sample composition

A total of 1 butternut sample(s) and 0 hybrid sample(s) were identified (**Table 1**).

High-quality PCR products were obtained from all four tested markers with corresponding restriction enzyme profiles, where applicable.

All laboratory controls performed as expected.

Table 1. The summary of RFLP and SCAR results of the sample(s) submitted.

Customer ID	Barcode	Date arrived	trnT-R RFLP	ITS RFLP	15R-8 RFLP	22-5 SCAR	Identification
BN2	NAS-01-H0463	22-Sept-23	*J. cinerea*	*J. cinerea*	*J. cinerea*	*J. cinerea*	*J. cinerea*

METHODS

DNA from plant sample(s) was extracted using a commercial plant DNA extraction kit with a protocol modified to produce standard DNA yields suitable for PCR and restriction analysis. An extraction blank was also processed for the extraction batch.

Extracted DNAs for sample(s) and negative extraction control were amplified with **PCR** for four regions: trnT-F, ITS, 15R-8 and 22-5.

All PCRs were performed using pre-validated PCR mixes in the presence of both a **negative DNA extraction control** and a **negative PCR control.** Amplification and restriction enzyme digestion products were analyzed by **gel electrophoresis**.

Markers and corresponding restriction digests:

Assay #1) PCR amplification of chloroplast gene trnT-F, followed by restriction digest with enzyme MboII.

Assay #2) PCR amplification of ITS region of ribosomal nuclear DNA, followed by restriction digest with enzyme BsiEI.

Assay #3) PCR amplification of random nuclear fragment called "15R-8", followed by restriction digest with enzyme AclI.

Assay #4) PCR amplification of SCAR marker 22-5 without restriction digest.

Comment: PCR reactions were consistently successful for all four markers for 1 sample(s). Electrophoresis bands were strong and of the expected size and no PCRs required repeating. No bands were observed on electrophoresis gels for the extraction blank or negative controls.

END OF REPORT

Report issued by: **May Mei**

Report reviewed by: **Natalia Ivanova**

Contact: team@naturemetrics.co.uk

REFERENCES

Zhao, P. & Woeste, K. E. (2011). DNA markers identify hybrids between butternut (*Juglans cinerea* L.) and Japanese walnut (*Juglans ailantifolia* Carr.). Tree Genetics & Genomes, 7, 511-533.

GLOSSARY

Butternut	*Juglans cinerea* L.
Extraction Blank	A DNA extraction with no sample added to assess potential contamination during the DNA extraction process.
Gel Electrophoresis	The process in which DNA is separated according to size and electrical charge via an electric current, while in a gel. The process is used to confirm the successful amplification of a specific size fragment of DNA.
Inhibitors/inhibition	Naturally-occurring chemicals/compounds that cause DNA amplification to fail, potentially resulting in false negative results. Common inhibitors include tannins, humic acids and other organic compounds. Inhibitors can be overcome by either diluting the DNA (and the inhibitors) or by additional cleaning of the DNA, but dilution carries the risk of reducing the DNA concentration below the limits of detection. At NatureMetrics, inhibition is removed using a commercial extraction/purification kit.
Hybrid	In this report – hybrid between butternut (*J. cinerea* L.) and Japanese Walnut (*J. ailantifolia* Carr.).
IUCN Red List	The IUCN (International Union for the Conservation of Nature) is a global union of government and civil organisations that disseminates information to assist conservation. The IUCN Red List of Threatened Species is an inventory of the conservation status of over 100,000 species worldwide. The Red List evaluates data such as population trends, geographic range and the number of mature individuals in order to categorise species based on their extinction risk: **Extinct (EX)** - No individual of this species remains alive. **Extinct in the Wild (EW)** - Surviving individuals are only found in captivity. **Critically Endangered (CE)** - species faces an extremely high risk of extinction in the wild. e.g. Population size estimated at fewer than 50 mature individuals. **Endangered (EN)** - species faces a very high risk of extinction in the wild. e.g. Population size estimated at fewer than 250 mature individuals. **Vulnerable (VU)** - species faces a high risk of extinction in the wild. e.g. Population size estimated at fewer than 10,000 mature individuals and declining. **Near Threatened (NT)** - species is below the threshold for any of the threatened categories (CE, E, V) but is close to this threshold or is expected to pass it in the near future. **Least Concern (LC)** - species is not currently close to qualifying for any of the other categories. This includes widespread and abundant species. **Data Deficient (DD)** - There is currently insufficient data available to make an assessment of extinction risk. This is not a threat

	category - when more data becomes available the species may be recategorised as threatened.
Negative Control	Used to determine if PCR reactions are contaminated.
PCR	Short for Polymerase chain reaction. A process by which millions of copies of a particular DNA segment are produced through a series of heating and cooling steps. Known as an 'amplification' process. One of the most common processes in molecular biology and a precursor to most sequencing-based analyses.
RFLP	Short for Restriction Fragment Length Polymorphism which is a difference in homologous DNA sequences that can be detected by the presence of fragments of different lengths after digestion of the DNA samples in question with specific restriction endonucleases.
Positive Control	Used to determine whether the assay is working correctly.
Primers	Short sections of synthesised DNA that bind to either end of the DNA segment to be amplified by PCR. Can be designed to be totally specific to a particular species (so that only that species' DNA will be amplified from a community DNA sample), or to be very general so that a wide range of species' DNA will be amplified. Good design of primers is one of the critical factors in DNA-based monitoring.
SCAR	Short for Sequence Characterized Amplified Region. SCARs are DNA fragments amplified by the PCR using specific 15-30 bp primers, designed from nucleotide sequences established from cloned RAPD fragments linked to a trait of interest. Obtaining a codominant marker may be an additional advantage of converting RAPDs into SCARs, although SCARs may exhibit dominance when one or both primers partially overlap the site of sequence variation. Length polymorphisms are detected by gel electrophoresis.
Taxon (s.) / **taxa** (pl.)	Strictly, a taxonomic group. Here we use the term to describe groups of DNA sequences that are equivalent to species. We do not use the term species because we are unable to assign complete identifications to all of the groups at this time due to gaps in the available reference databases.
Taxonomy	**species** (s./pl.) - A group of individuals capable of interbreeding. This is the most important taxonomic unit defined by scientists and the population trends of individual species are a key indicator in judging the effect of conservation programs. Related species are grouped together into progressively larger taxonomic units, from genus to kingdom. *Homo sapiens* (human) is an example of a species. **genus** (s.) / **genera** (pl.) - A group of closely related species. Each genus can include one or more species. *Homo* is an example of a genus. **family** (s.) / **families** (pl.) - A group of closely related genera. *Homo sapiens* is in the family Hominidae (great apes). **order** (s.) / **orders** (pl.) - A group of closely related families. *Homo sapiens* is in the order Primates. **class** (s.) / **classes** (pl.) - A group of closely related orders. *Homo sapiens* is in the class Mammalia.