

Proposal for a 2026 Water Quality Monitoring Program Using AUV/ROV Technologies

Prepared for: *The Township of the Archipelago Council*

Prepared by: *Georgian Bay Forever*

Date: April 2026

1. Executive Summary

The Township of the Archipelago has consistently demonstrated leadership in freshwater protection. Georgian Bay Forever (GBF) proposes a 2026 water quality monitoring program using Autonomous Underwater Vehicles (AUVs), Remotely Operated Vehicles (ROVs), and the *Georgian Baykeeper* research vessel to collect high-resolution environmental data in the waters adjacent to the **Meaford Department of National Defence (DND) facility**, where a pumped-storage hydroelectric project is proposed.

The program will deliver **six completed offshore sampling missions** between May and mid-October 2026, supported by a **\$20,000 contribution from the Township**, with GBF providing additional funding, staff time, and analytical support.

An optional **sediment coring and laboratory analysis module**, conducted in partnership with academic partners, is available to deepen the scientific value of the program.

Water quality and physical surveys are important to enable analysis of future submissions from the project proponent and in an effort to encourage transparency as the Government of Ontario considers any Special Economic Zone designation.

In our “**Comments on the Project Description for the Ontario Pumped Storage Project (TC Energy) – IAAC Registry #89803**”, after reviewing the Initial Project Description for the Ontario Pumped Storage Project, GBF concludes that the document significantly understates the scale, permanence, and ecological risks associated with both construction and operation. The Project Description does not provide the level of detail, transparency, or scientific rigour required for a robust federal impact assessment under the Impact Assessment Act.

As such GBF has requested that the Impact Assessment Agency require TC Energy to:

1. Correctly characterize the marine facility as a port and assess full shoreline impacts.
2. Provide detailed engineering and environmental analysis of the underground powerhouse cavern.
3. Fully assess lakebed tunneling and intake/outlet impacts.
- 3A. Require baseline studies including:
 - hydrodynamic modelling
 - sediment transport modelling
 - benthic habitat surveys
 - entrainment and impingement baseline

- quagga mussel colonization baseline
 - nutrient cycling baseline
 - groundwater flow and fracture mapping
 - drinking water intake mapping
 - UXO contamination baseline
4. Explicitly acknowledge that the project is an open-loop system and require a full alternatives assessment, including alternatives that avoid or reduce the use of Georgian Bay as the lower reservoir.
 5. Require a comprehensive assessment of quagga mussel fouling and antifouling measures across all wetted project components.
 6. Provide decommissioning plans for the preferred option and all alternatives (lifecycle comparison requirement)
 - 6A. Provide credible decommissioning plans for all surface and underground structures (infrastructure end-of-life requirement).
 7. Require a full geotechnical and hydrogeological assessment of karst conditions and prohibit the use of non-committal mitigation language (“where feasible”).
 8. Require a complete drinking-water effects assessment, including hydrodynamic and thermal modelling, entrainment analysis, antifouling chemical fate and transport, and cumulative-effects evaluation for all municipal and private intakes.
 9. Require a comprehensive cumulative-effects assessment addressing the interaction of environmental, hydrological, geotechnical, cultural, and socio-economic impacts, including interactions among hydrodynamic alteration, karst conditions, tunneling, thermal discharge, quagga mussel colonization, UXO disturbance, and risks to municipal and private drinking-water intakes.
 10. Require integration of the DND Relocated Infrastructure Project at 4 CDTC into this Project Description and effects assessment and expand assessment of UXO and DND land disturbance impacts.
 11. Submit a substantially revised Table 11-1.
 - 11A. Require assessment of vibration and acoustic impacts across underwater, atmospheric, and ground-borne pathways, including effects on aquatic species, shoreline communities, and DND infrastructure.
 12. Submit a revised Waste and Emissions inventory (Table 12-1).

It is important to collect baseline data in the area to be able to assess any future studies submitted by the proponent as this process moves forward. The collection of:

- Various typical water quality parameters
- turbidity and suspended solids
- thermal structure, including loss of cold-water refugia

in order to be able to assess physical and thermal modelling of discharge effects.

2. Program Objectives

The monitoring program will:

- Establish **baseline physical, chemical, and biological conditions** in offshore waters adjacent to the proposed pumped-storage site.
- Detect **seasonal variability** in water quality parameters relevant to potential project impacts.
- Document **benthic habitat conditions** using ROV video transects.
- Conduct **AUV-based spatial mapping** of water column structure and underwater features.
- Provide **transparent, scientifically defensible data** to support future evaluation of environmental assessments for the proposed Pumped Storage project.
- Strengthen regional collaboration on freshwater protection.

3. Study Area

The monitoring zone is located offshore of the **Meaford DND Training Facility**, within Georgian Bay waters potentially influenced by pumped-storage operations. All missions will be conducted using the *Georgian Baykeeper*, home-ported in Collingwood.

4. Methodology

4.1 Sampling Frequency

- **Six completed sampling missions** between May and mid-October
- **Eight missions scheduled**, assuming a **25% weather cancellation rate**

4.2 Activities Conducted During Each Mission

AUV-Based Sampling (Primary Water Quality Platform)

The AUV will conduct all water-column sampling, including:

- **CTD-equivalent profiles:**
 - Temperature
 - Conductivity
 - Depth
 - Dissolved oxygen
 - pH
- **Water sampling at surface and depth** (AUV-mounted samplers)
- **Turbidity and clarity measurements**
- **Spatial transects** for mapping water column structure
- **Georeferenced datasets** for trend analysis

ROV-Based Sampling

The ROV will provide:

- **Temperature readings at depth** (ROV-mounted sensors)

- **High-definition benthic video transects**
- **Substrate and habitat characterization**
- **Visual assessment of disturbance zones**

Vessel-Based Sampling

The *Georgian Baykeeper* will conduct:

- **Secchi disk measurements** for water clarity

4.3 Data Management

- QA/QC review of all datasets
- Georeferenced AUV and ROV archives
- Seasonal summary report for Council
- Optional public-facing communication materials

5. Optional Add-On: Sediment Coring and Laboratory Analysis

In partnership with academic researchers.

To complement water column and benthic monitoring, GBF proposes an optional sediment coring module conducted by experts.

5.1 Purpose of Sediment Coring

The purpose of gravity coring in environmental lake studies is to collect bottom sediments in a way that keeps them as undisturbed as possible. This includes preserving the sediment–water boundary, retaining the natural moisture content, and maintaining the original vertical layering of chemical, mineral, and biological materials. Gravity corers are built to push a core tube straight down into the sediment and then bring it back to the surface with the internal structure intact.

Sediment cores provide a **long-term historical record** of environmental conditions and can reveal:

- Fine sediment accumulation and turbidity impacts
- Nutrient loading trends
- Metal concentrations and potential contaminants
- Microbial community structure and biogeochemical processes
- Evidence of benthic disturbance or resuspension events

5.2 Field Methods

- Gravity or Glew corer deployment
- ROV-assisted site selection
- GPS-referenced core locations
- On-vessel sectioning and preservation
- Transport for analysis

5.3 Optional Laboratory Analyses (Academic Partner)

Physical & Chemical Analyses

- Grain size distribution
- Total organic carbon (TOC) and total nitrogen (TN)

- Phosphorus fractionation
- Metals (Fe, Mn, Ca, Mg, trace metals)
- Redox-sensitive species

Biogeochemical & Microbial Analyses

- Microbial community profiling
- Sediment oxygen demand
- Porewater chemistry
- Stable isotope analysis (optional)

5.4 Estimated Optional Costs

Component	Estimated Cost
Field coring (per mission)	\$600–\$900
Laboratory analysis (per core)	\$1,200–\$2,500
Microbial/advanced analyses	+\$800–\$1,500 per core
Reporting & interpretation	Included or billed separately

Example:

Two cores with standard analyses: **\$3,000–\$5,000**

GBF can co-fund or seek external support to reduce municipal cost.

6. Staffing and Equipment

Personnel

- **Captain** (Transport Canada certified)
- **Crew member / AUV-ROV technician**
- Both trained in marine safety and scientific sampling

Equipment

- *Georgian Baykeeper* research vessel
- AUV platform (primary water-quality instrument)
- ROV platform (benthic and temperature-at-depth instrument)
- Secchi disk
- Safety and navigation equipment

7. Budget Summary

7.1 Cost Per Completed Sampling Mission

Category	Cost
Total per completed mission	\$3,225

7.2 Seasonal Program Cost

- **6 completed missions × \$3,225 = \$19,350**
- Remaining buffer: **~\$650**

7.3 Township Requested Contribution

- **\$20,000 total seasonal contribution for 2026**

7.4 GBF Contribution

GBF will contribute:

- Additional staff time
- Data analysis and reporting
- Equipment maintenance beyond mission-based reserves
- Administrative overhead
- Public communication support
- Optional program academic partners

8. Costed Menu of Options for Council

Option	Description	Cost to Township
A. Core Program Only	Six completed AUV/ROV sampling missions; full reporting	\$20,000
B. Core Program + 1 Sediment Core	Adds one sediment core with standard chemical/physical analysis	\$21,500–\$23,000
C. Core Program + 2 Sediment Cores	Two cores with standard analysis	\$23,000–\$25,000
D. Enhanced Biogeochemical Package	Two cores + microbial profiling + porewater chemistry	\$25,000–\$28,000
E. Full Scientific Baseline Package	Core program + 3–4 cores + full biogeochemical suite	\$30,000–\$38,000 (GBF can co-fund)

9. Deliverables

Field Deliverables

- Six completed offshore sampling missions
- AUV water-column datasets
- ROV benthic video and temperature-at-depth data
- Secchi depth measurements
- Sediment core datasets (if selected)

Reporting Deliverables

- **Mid-season update** (August)
- **Final report** (November)
- Maps, figures, and visualizations
- Recommendations for future monitoring
- Optional public-facing communication materials
- Optional presentation to Council

10. Timeline

Phase	Timeline
Mobilization & planning	April 2026
Field sampling missions	May–mid-October 2026
Mid-season update	August 2026
Final analysis & reporting	October–November 2026
Presentation to Council (optional)	November/December 2026

11. Conclusion

The Township of the Archipelago has already passed a resolution opposing the proposed TCE pumped-storage facility. The IAAC assessment window is open now. Comments submitted by GBF include the recommendations for baseline data collection. Independent verification of proponent generated studies will be important to give the public confidence in a transparent process. There is a lack of independent scientific data to substantiate or rebut the analysis of submissions by the proponent in future stages of the assessment process. There is a possibility of the Government of Ontario designating the project area as a Special Economic Zone and bypassing the environmental assessment process. As such, the availability of baseline data is an important part of transparency for public confidence.

Georgian Bay Forever is proposing this monitoring program to help fill that gap. By supporting the initiative, the Township enables the collection of high-quality, independently gathered environmental data that can inform its oversight role, strengthen its stated concerns, and provide a credible technical basis for input into future phases of the IAAC review process.

GBF’s AUV- and ROV-based sampling program offers a transparent, rigorous approach to understanding environmental conditions near the proposed site, and the Township’s contribution would directly support the generation of evidence needed for responsible decision-making on behalf of residents and the broader Georgian Bay ecosystem.