



**May 29, 2015**

## **PROPOSAL**

# **Lake Heney Sampling Program 2015**

**Submitted to:**  
Tom McKenna  
Heney Lake Foundation  
Iona St.  
Ottawa ON  
K1Z 7B9

**PROPOSAL**



**Proposal Number: P1405259-2**

**Distribution:**

1 e-copy - Heney Lake Foundation  
1 copy - Heney Lake Foundation  
1 copy - Golder Associates Ltd.





## Table of Contents

<b>1.0 INTRODUCTION.....</b>	<b>1</b>
1.1 Understanding of Objectives.....	1
<b>2.0 APPROACH AND METHODOLOGY .....</b>	<b>1</b>
2.1 Background Data Review .....	1
2.2 Field Surveys.....	1
2.3 Health and Safety .....	2
2.4 Laboratory Analysis .....	2
2.5 Deliverables.....	4
<b>3.0 PROJECT TEAM .....</b>	<b>5</b>
<b>4.0 COST ESTIMATE AND ASSUMPTIONS .....</b>	<b>5</b>
<b>5.0 CLOSING.....</b>	<b>7</b>
<b>TABLES</b>	
Table 1: Estimated Fees and Expenses.....	6



### 1.0 INTRODUCTION

Golder Associates Ltd. (Golder) is pleased to provide a scope of work and cost to conduct the annual water quality monitoring program at Lake Heney, Municipalities of Lac-Ste-Marie and Gracefield, Québec (the Site) for the Heney Lake Foundation.

#### 1.1 Understanding of Objectives

Golder understands that Lake Heney was suffering from an excess of phosphorus (P) whose cause was partly attributable to the operation of a commercial fish farm between 1994 and 1999. However, since the closure of the fish farm in 1999, the average concentration of total P remained elevated and the lake showed little sign of recovery.

In 2006, the Comité paritaire of Lake Heney took the decision to proceed with the addition of reactive iron (Fe) in the fall of 2007 in order to immobilize a portion of the P.

Since the introduction of reactive Fe, annual monitoring has been conducted to document the changes in water quality. In order to understand the changing phosphorus levels, the Heney Lake Foundation wishes to continue with its annual monitoring program, previously performed by the Université de Montreal.

### 2.0 APPROACH AND METHODOLOGY

#### 2.1 Background Data Review

Golder will conduct a desktop study of the lake to develop an understanding of the history of the lake and the current lake conditions. In addition, a review of current technologies in the field of phosphorous management in lake systems will be conducted. Background data review for this project will include a number of information sources. These include, but are not limited to:

- Recent research in the field of phosphorous management (see references below);
- Existing Reports on Lake Heney;
- Information provided by the Ministère du Développement Durable, l'Environnement et des Parcs (MDDEP);
- Information provided by the Ministère des Ressources naturelles et de la Faune (MRNF); and
- Centre de données sur le patrimoine naturel du Québec (CDPNQ) Database;

#### 2.2 Field Surveys

The field surveys will follow the same methodologies and utilize the same equipment to the extent possible. Efforts will be made to identify potential efficiencies and improvements to the existing plan in an attempt to improve the sampling program and provide a better analysis of the lake phosphorous cycling, if possible.

This proposal includes a scope of work for sampling of the Central Basin at 11 depths, with the exception of chlorophyll-a, which will only be sampled at 6 depths (1 -15m). The field sampling will be conducted five (5) times during the year between May and December (early May, as soon as possible after ice-out, July, August, October, and November). The following parameters will be analyzed in-situ via a YSI 6920 multiparameter sonde: pH, conductivity, dissolved oxygen, temperature and turbidity. Secchi-depth will also be recorded. In order to ensure accuracy of the in-situ measurements, one sample, at random, per sampling date will be



submitted to the laboratory for analytical testing for pH, conductivity, and dissolved oxygen. Samples will be collected for water chemistry and delivered to Maxxam Analytics laboratories in Ottawa, Ontario. Water chemistry parameters to be analyzed include total phosphorus, dissolved phosphorus, total nitrogen, nitrate+nitrite, ammonium, and planktonic chlorophyll (chlorophyll-a). Total and dissolved phosphorous will be analyzed at the ultra-low detection limit of 0.001 mg/L. Ten percent duplicate sampling will be conducted in the field for quality control purposes (CCME, 2011). In addition, Maxxam Analytics laboratory will also conduct duplicate sampling following their standard operating procedures.

Field sampling will take place over a one day period at five (5) separate dates. The sampling will be conducted by two (2) qualified field biologists with experience in surface water sampling.

### 2.3 Health and Safety

We value the health and safety of our employees and are committed to providing the time and resources necessary to enable our employees to perform their work in a safe and healthy manner. Golder has a comprehensive health and safety program, including but not limited to:

- a structured health and safety management system;
- a health and safety manual detailing procedures for all work activities, including but not limited to: hazard identification checklists, Best Practice guides for the hazardous materials surveys, emergency response plans, safe work procedures, first aid procedures, and others;
- a structured incident response and reporting system; and
- a structured health and safety training program, including WHMIS, which all Golder employees undertake on joining the company, and which is documented in personnel files.

As standard practice, Golder Project Managers are responsible for preparing project-specific Health and Safety Plans at the outset of every project, which are reviewed by our regional Health and Safety Coordinator prior to issuance to project personnel. These plans are understood and carried by our field personnel at all times while conducting project site survey work.

### 2.4 Laboratory Analysis

Maxxam Analytics will be contracted to provide the chemical analysis of the water samples using the methods and detection limits described below:

**Conductivity** – Conductivity Reference Method: Standard Methods for the Examination of Water and Wastewater, 22nd Ed., American Public Health Association, Washington, DC, 2005, Method 2510 B. Conductivity is determined sequentially (usually with pH, Alkalinity, Fluoride and Turbidity) on a sample using a fully automated instrument. Electrometric methods are calibrated daily to account for probe drift and fluctuations in temperature. Detection limit of 1 µmho/cm.

**Dissolved Oxygen** – Dissolved Oxygen by DO Meter. Volta metric (polarographic) sensor of dissolved oxygen.

**Ammonia** – Ammonia USGS I-2522-90 Nitrogen, ammonia, colourimetry, salicylate-hypochlorite, automated-segmented flow, Ammonia reacts with salicylate and hypochlorite ions in the presence of a nitroprusside catalyst in a phosphate buffer to form the salicylic acid analog of indophenol blue. The resulting color is proportional to



the ammonia concentration. The ammonia nitrogen is measured colorimetrically at 660 nm, using Quikchem 8000 by Lachat Instrument. Ammonia and ammonium ions are initially buffered to pH10 to convert ammonium cation to ammonia before being analyzed and the total ammonia (the sum of  $\text{NH}_4^+$  +  $\text{NH}_3$ ) is reported as mg/L Nitrogen. Detection limit of 0.01 mg/L.

**Nitrate** – Nitrate Standard Methods for the Examination of Water and Wastewater, 22nd Edition, American Public Health Association, 2012. The nitrite in the aqueous sample or extract is determined colourimetrically by diazotizing with sulfanilamide followed by coupling with N- (1-naphthyl) ethylenediamine dihydrochloride. The resulting water-soluble dye has a magenta colour and the absorbance measured at 520nm which is proportional to the nitrite in the sample. Nitrate is quantitatively reduced to nitrite by passage of the sample through a copperized cadmium column. The nitrite (reduced nitrate plus original nitrite) is then determined by the procedure above. This value is known as total oxidized nitrogen (TON) equal to ( $\text{NO}_2^-$  +  $\text{NO}_3^-$ ). Nitrate is determined by subtracting nitrite from TON value obtained from the cadmium column reduction and analysis. Detection limit of 0.1 mg/L.

**pH** - pH Method 4500-H+ B, "pH Value – Electrometric Method", Standard Methods for the Examination of Water and Wastewater, 22nd Ed., American Public Health Association, ISBN 0-87553-235-7 pH is determined sequentially on a sample using a fully automated instrument. Electrometric methods are calibrated daily to account for probe drift and fluctuations in temperature.

**Total Kjeldahl Nitrogen** – TKN U. S. EPA 351.2, Determination of Total Kjeldahl Nitrogen by Semi-Automated Colourimetry, Revision 2.0, 1993. Total Kjeldahl Nitrogen (TKN) is the term used to describe the sum of ammonia and organic nitrogen compounds. Sample volume captured in sample loop of the injection valve is injected onto the chemistry manifold where pH is controlled by raising it to known, basic pH neutralization and with a concentrated buffer. This in-line neutralization converts the ammonia cation to ammonia, and also prevents undue influence of the sulphuric acid matrix on the pH-sensitive colour reaction which follows. The ammonia thus produced is heated with salicylate and hypochlorite to produce blue colour, which is proportional to the ammonia concentration measured at 660nm. Adding sodium nitroprusside intensifies the colour. The presence of potassium tartrate in the buffer prevents precipitation of calcium and magnesium. Detection limit of 0.1 mg/L.

**Phosphorus** – Phosphorus Standard Methods 22nd Ed. Method 4500-P H (Manual Digestion and Flow Injection Analysis for Total Phosphorus). The colorimetric method is based on specific reaction of the orthophosphate ion. Dissolved Orthophosphate (DOP) reacts with antimonyl molybdate reagent (in an acid medium) to form the antimonyl-substituted 12-molybdo-phosphoric acid icosahedral cage structure. This complex is reduced with ascorbic acid to yield an intense blue chromophore proportional in concentration to the orthophosphates present in the original sample. The absorption is measured at 880 nm. Polyphosphates are converted to the orthophosphates forms by sulphuric acid digestion and organic phosphorus is converted to orthophosphates by persulphate digestion. Detection limit of 0.001 mg/L.



## 2.5 Deliverables

### Interim Reports

An interim report will be completed within 30 days following each field survey. The interim report will provide the results of the water chemistry analysis, a table and graph showing the trends over time, and any sampling anomalies encountered during the event.

### Annual Report

A draft annual report, summarizing the results of the background data review, methodology, field survey results, calculations, statistical analysis, and observed changes in water quality during 2015 in comparison to previous years, will be completed by 28 February, 2016. This report will include graphs demonstrating the changes in parameters throughout the year in addition to an analysis of annual, temporal or seasonal trends.

Golder scientists will provide expertise in interpreting water quality data based on years of experience in studying nutrient dynamics in numerous temperate lakes across North America. We also provide expertise in nutrient management and can provide assistance in determining remedial alternatives. Lake management studies in the literature have recently emphasized the need to address nitrogen levels when programs are initiated to reduce phosphorous loading (Finlay et al. 2013; Jeppesen 2007). In lakes that are deep and stratify intensively, such as Lake Heney, phosphorous that is associated with the lake bottom is quickly mobilized through anaerobic bacterial processes when dissolved oxygen is depleted because of heavy organic loading. Although usually reducing the source and removal of P through addition of agents like Ferric Chloride, results in downward trends in eutrophication, the recent increases in Lake Heney suggest some other issues may remain. This may include nutrient loading from continued development of the lake front properties, through non-point sources (Bluewater Biosciences 2009) or climatic changes that may result in increased available of P because of changes in the length of the growing season and temperature effects. There are numerous methods that have been used to reduce phosphorous loading and nuisance algal blooms (<http://www.cyanodata.net/review.php>) that have various technical and cost challenges to implement.

As part of reporting the results of the water survey, Golder staff will examine the data and provide a weight of evidence (Burtona et al. 2002) approach for determining the most likely explanation for the trends and a brief review of possible avenues that are available for addressing the problem and their limitations. The report will be illustrative of possible alternative approaches but will not draw conclusions or provide detailed analysis of alternatives (e.g. no cost-benefits, engineering or risk assessments).

Our scope includes preparation of one draft annual report, time for review by the client, followed by preparation of a final report incorporating 1 round of consolidated client comments.



### **3.0 PROJECT TEAM**

#### **Sean Miller, M.Sc. Water Quality Specialist and Senior Review**

Mr. Miller is a Water Quality Specialist who provides technical expertise to a wide range of project sectors, including mining, resource management, transportation, and energy. Sean has expertise in design of water quality monitoring programs, water intake and discharge quality and assimilation studies, development of watershed management plans, nutrient mass-balance studies, food-web assessments, statistical analysis, and environmental impact studies. Mr. Miller has worked closely with cottage and landowner interest groups on lakes in Ontario, specific to concerns on nutrient loading and impacts to water quality. He has participated in volunteer training workshops, public presentations and negotiations with industry and municipal government stakeholders. When he is not supporting the protection and management of lakes in Canada, he manages large environmental impact studies for industrial development projects.

#### **Karin Ponader, M.Sc. Aquatic Ecologist and Project Manager**

Karin is an intermediate aquatic ecologist with over 9 years of experience in conducting aquatic ecology studies in freshwater environments. Her technical foundations are rooted in aquatic science, specifically ecological interactions in freshwater systems. She has lots of experience with analysis, interpretation and reporting on aquatic ecology and bio-criteria, and is specialized in assessing the effects of nutrient impairment on algal communities. She's been involved in all aspects of project management, data analysis, design and development of work plans and execution including submission of proposals, and interaction with clients. Karin has worked on Environmental Impact Assessments and research in many different market sectors and brings a broad scope of project history to Golder.

#### **Ross Breckels, Ph.D. Aquatic Biologist**

Ross is an Aquatic Biologist with a PhD in Biology (with Environment and sustainability) focusing on the effects of environmental stressors on fish. Ross has eight years of research and consulting experience, specializing in aquatic ecology. He has worked at Golder for the past year, furthering his knowledge and experience in collecting aquatic field inventory and habitat data for environmental impact assessments, environmental effects monitoring and SAR. Ross has experience working in Ontario, Quebec, Manitoba, the United Kingdom and the United Arab Emirates (UAE). Prior to his PhD, Ross worked for an environmental consultancy company in Abu Dhabi, UAE where he worked on many marine and terrestrial baseline assessments for multiple industries.

### **4.0 COST ESTIMATE AND ASSUMPTIONS**

Our cost estimate to complete the above described scope of work is \$37,031 excluding applicable taxes. This cost includes a total of five (5) days of aquatic field studies by two (2) qualified biologists, and five (5) interim reports following each sampling event, one (1) annual draft report, time to address client comments on the annual report, and a final annual report. The following is a breakdown of the estimated fees and disbursements.

Table 1 provides a breakdown of the anticipated fees and expenses:



## LAKE SAMPLING PROGRAM - LAKE HENEY, QUEBEC

**Table 1: Estimated Fees and Expenses**

<b>Task</b>	<b>Professional Fees</b>	<b>Expenses</b>	<b>Totals</b>
Background data review	1,922	-	1,922
Field surveys: 5 sampling events (1 station: Central Basin, 1 day )	10,463	9,191	19,654
Reporting			
Interim Reports (5)	3,554	125	3,679
Annual Report	8,833	150	8,983
Meeting	588	-	588
Project Management	2,205	-	2,205
<b>TOTAL</b>			<b>37,031</b>

Assumptions include the following:

- All documents are available from previous studies including raw data for figure compilation/statistical analysis, trends etc.;
- English will be the primary language for reporting and translation costs have not been included.



## **5.0 CLOSING**

Golder's Authorization to Proceed and Consulting Services Agreement is attached to this letter and forms part of this proposal. If you wish to proceed with this work, kindly sign and return the agreement to the attention of Karin Ponader.

We are very interested in working with you on this project. If there is a misalignment with the scope and costs we have provided in this proposal, we would like to discuss it with you. There may be solutions and synergies that can be recognized by working with the Heney Lake Foundation that have not been captured in this workplan.

We look forward to hearing from you.

### **GOLDER ASSOCIATES LTD.**

Karin Ponader (M.Sc.)  
Aquatic Ecologist

Sean Miller (M.Sc.)  
Associate, Environmental Science and Assessment

KCP/SAM/kf

\\golder.gds\gal\ottawa\active\2014\1126 - es&a\1405259 lake heney\proposal april 2015\reviews\proposal reviews\p1405259-2\p1405259-2 lake heney 29 may 2015\_final.docx

Attachment: Authorization to Proceed and Consulting Services Agreement



### References

- American Public Health Association (APHA). 2005. Standard methods for the examination of water and wastewater. 21st Edition. Washington DC.
- American Public Health Association (APHA). 2012. Standard methods for the examination of water and wastewater. 22nd Edition. Washington, DC. ISBN 0-87553-235-7.
- Canadian Council of Ministers of the Environment (CCME). 2011. Protocols Manual for Water Sampling in Canada. ISBN 978-1-896997, pp. 180.
- Bluewater Biosciences. 2009. Water Quality Survey of Blackstone, Crane, Healey and Kapikog Lake, March, 2008. Unpublished web report.
- Burton, G. Allen Peter M. Chapman, & Eric P. Smith. 2002. Weight-of-Evidence Approaches for Assessing Ecosystem Impairment. Human and Ecological Risk Assessment, Volume 8, Issue 7, 2002:1657-1673.
- Finlay, Jacques, C Gaston E. Small, and Robert W. Sterner. 2013. Human Influences on Nitrogen Removal in Lakes. Science 11 October 2013: 247-250.
- Jeppesen, Erik, Martin Søndergaard, Mariana Meerhoff, Torben L. Lauridsen, and Jens Peder Jensen. 2007. Shallow lake restoration by nutrient loading reduction—some recent findings and challenges ahead. Hydrobiologia (2007) 584:239–252.



## Authorization to Proceed and Consulting Services Agreement

Heney Lake Foundation ("Client") and Golder Associates Ltd. ("Golder") agree that the following terms and conditions will apply to any services, including subsequent services and changes, (collectively "Services") to be provided by Golder relating to Proposal No. P1405259-2, dated May 29, 2015 (collectively the "Agreement"):

1. **Standard of Care** - Services performed by Golder will be conducted in a manner consistent with that level of care and skill ordinarily exercised by other professionals currently practicing under similar conditions in the same locality, subject to the time limits and financial, physical or other constraints applicable to the Services. No warranty, express or implied is made.

2. **Invoices and Payment Terms** - Unless otherwise specified in the proposal, Golder will submit monthly invoices to Client and a final bill upon completion of Services. Client shall notify Golder within ten (10) days of receipt of invoice of any dispute with the invoice and the parties shall promptly resolve any disputed items. Full payment is due prior to delivery of Golder's final deliverable. Payment on undisputed invoice amounts is due upon receipt of invoice by Client and is past due thirty (30) days from the date of the invoice. Client agrees to pay a finance charge of one and one-half percent (1-1/2%) per month (18% per annum), or the maximum rate allowed by law, on past due accounts. If payment remains past due sixty (60) days from the date of the invoice, then Golder shall have the right to suspend or terminate all Services under this Agreement, without prejudice or penalty. Client will pay all reasonable demobilization and other suspension or termination costs. Client agrees to pay all legal and collection costs incurred by Golder in pursuit of past due payments. Where the cost estimate for the Services is "not to exceed" a specified sum, Golder shall notify Client before each limit is exceeded, and shall not continue to provide Services beyond such limit unless Client authorizes an increase in the amount of the limitation. If a "not to exceed" limitation is broken down into budgets for specific tasks, the task budget may be exceeded without Client authorization as long as the total limitation is not exceeded.

3. **Changes** - Client and Golder recognize that it may be necessary to modify the scope of Services, schedule, and/or cost estimate proposed in this Agreement. Such changes shall change the Services, schedule, and/or the cost, as may be equitable under the circumstances. If after a good faith effort by Golder to negotiate modifications to the scope of Services, schedule, and/or cost estimate, an agreement has not been reached with the Client, then Golder shall have the right to terminate this Agreement, without prejudice or penalty, upon written notice to the Client.

4. **Delays and Force Majeure** - If site or other conditions prevent or inhibit performance of Services or if unrevealed hazardous waste materials or conditions are encountered, Services under this Agreement may be delayed. Client shall not hold Golder responsible for damages or delays in performance caused by acts or omissions of Client, its subcontractors, governmental authorities, regulatory agencies, civil or labour unrest, acts of God, nature, or terror, disruptions of the Internet, Golder's electronic, telecommunications or hosting services or any other events that are beyond the reasonable control of Golder. In the event of any such delay, the contract completion date shall be extended accordingly and Client shall pay Golder for Services performed to the delay commencement date plus reasonable delay charges. Delay charges shall include personnel and equipment rescheduling and/or reassignment adjustments and all other related costs incurred including but not limited to, labour and material escalation, and extended overhead costs, attributable to such delays. Delays in excess of thirty (30) days within the scope of this Article shall, at the option of either party, make this Agreement subject to termination or to renegotiation.

5. **Independent Judgments of Client** - If the Services include the collection of samples and data, then Golder's performance of the Services is subject to Client's assumption of all Subsurface Risks (such risks being more fully described in Article 12, Subsurface Risks). Golder will not be responsible for the independent conclusions, interpretations or decisions of Client, or others, relating to the Services. Under no circumstances do Golder's Services include making any recommendation, or giving any advice as to whether Client should or should not proceed with any transaction regarding any site related to the Services. Client assumes all responsibility and risk associated with decisions it makes based on the Services.

6. a) **Indemnification by Golder** - Golder agrees to indemnify Client and its officers, directors, and employees from and against all claims, damages, losses or expenses (including but not limited to reasonable legal fees) arising from personal injury, death, or damage to third-party property to the extent that all claims, damages, losses or expenses are finally determined to result directly from Golder's negligence. Such indemnification, as limited by Article 7 Limitation of Liability, shall be Client's sole and exclusive remedy against Golder.

b) **Indemnification by Client** - Client shall, at all times, defend, indemnify and save harmless Golder and its subcontractors, consultants, agents, officers, directors and employees from and against all claims, damages, losses and expenses, including but not limited to reasonable attorneys' fees, court and arbitration costs, arising out of or resulting from the Services of Golder, including but not limited to claims made by third parties, or any claims

against Golder arising from the acts, errors or omissions of Client, its employees, agents, contractors and subcontractors or others. To the fullest extent permitted by law, such indemnification shall apply regardless of breach of contract or strict liability of Golder. Such indemnification shall not apply to the extent that such claims, damages, losses or expenses are finally determined to result directly from Golder's negligence.

7. **Limitation of Liability** - Client agrees to limit the liability of Golder, its affiliates, and their respective employees, officers, directors, agents, consultants and subcontractors ("Golder Group") to Client, its employees, officers, directors, agents, consultants and subcontractors, whether in contract, tort, or otherwise, which arises from Golder's acts, negligence, errors or omissions, such that the total aggregate liability of the Golder Group to all those named shall not exceed Fifty Thousand Dollars (\$50,000) or Golder's total fee for the Services rendered under this Agreement, whichever is greater. Neither party shall be responsible to the other for lost revenues, lost profits, cost of capital, claims of customers, loss of data or any other special, indirect, consequential or punitive damages.

8. **Insurance** - Golder maintains insurance coverage with the following limits:

a) Workers' Compensation (statutory limits)	
b) Automobile Liability	\$1,000,000
c) Commercial General Liability:	
Each Occurrence	\$1,000,000
Policy Aggregate	\$2,000,000
d) Professional Liability Insurance	
Any One Claim	\$1,000,000
Policy Aggregate	\$3,000,000

9. **Professional Work Product** - The Services provided by Golder are intended for one time use only. All documents, including but not limited to, reports, plans, designs, boring logs, field data, field notes, laboratory test data, calculations, and estimates and all electronic media prepared by Golder are considered its professional work product (the "Documents"). Golder retains all rights to the Documents. Client understands and acknowledges that the Documents are not intended or represented by Golder to be suitable for reuse by any party, including, but not limited to, the Client, its employees, agents, subcontractors or subsequent owners on any extension of a specific project not covered by this Agreement or on any other project, whether Client's or otherwise, without Golder's prior written permission. Any reuse unauthorized by Golder will be at Client's sole risk.

10. **Data and Information** - Client shall provide to Golder all reports, data, studies, plans, specifications, documents and other information ("Project Information") which are relevant to the Services. Golder shall be entitled to rely upon the Project Information provided by Client or others, and Golder assumes no responsibility or liability for the accuracy or completeness of such or the impact any inaccurate Project Information may have on Golder's Services.

11. **Right of Entry** - Client will provide for the right of entry for Golder, its subcontractors, and all necessary equipment in order to complete the Services under this Agreement. If Client does not own the site, Client must obtain permission and execute any required documents for Golder to enter the site and perform Services. It is understood by Client that in the normal course of work some surface damage may occur, the restoration of which is not part of this Agreement.

12. **Subsurface Risks** - Special risks, including but not limited to injury to underground structures or utilities and unavoidable contamination, occur whenever engineering or related disciplines are applied to identify subsurface conditions. Even a comprehensive sampling and testing program implemented in accordance with a professional Standard of Care may fail to detect certain conditions. The environmental, geological, geotechnical, geochemical, hydrogeological and other conditions that Golder interprets to exist between and beyond sampling points may differ from those that actually exist.

13. **Disposal of Samples, Materials and Contaminated Equipment** - All samples obtained pursuant to this Agreement remain the property and responsibility of Client. Uncontaminated soil and rock samples or other specimens may be disposed of thirty (30) days after submission of the directly related work product, due pursuant to the proposal. All contaminated samples, materials and equipment (containing or potentially containing hazardous constituents), including, but not limited to soil cuttings, contaminated purge water, and/or other environmental wastes obtained pursuant to this Agreement remain the property and responsibility of Client and shall be returned to Client for proper disposal. Alternate arrangements to assist Client with proper disposal of such equipment, materials and/or samples may be made at Client's direction and expense.

14. **Control of Work and Job-Site Safety** - Golder shall be responsible only for the activities of its employees and subcontractors. Golder's Services under this Agreement are performed for the sole benefit of the Client and no other entity shall have any claim against Golder because of this Agreement or the performance or non-performance of Services hereunder. Golder will not direct, supervise or control the work of other consultants and contractors or their subcontractors. Insofar as job site safety is concerned, Golder is responsible only for the health and safety of its employees and subcontractors. Nothing herein shall be construed to relieve Client or any other consultants or contractors from their responsibilities for maintaining a safe job site. Golder shall not advise on, issue directions regarding, or assume control over safety conditions and programs for others at the job site.

15. **Public Responsibility** - Golder will endeavour to alert Client to any matter of which Golder becomes aware and believes requires Client's immediate attention to help protect public health and safety, or which Golder believes requires Client to notify others, or to otherwise conform with applicable codes, standards, regulations or ordinances. If Client decides to disregard Golder's recommendations in these respects, (i) Golder shall determine in its sole judgment if it has a duty to notify public officials, and (ii) Golder has the right to immediately terminate this Agreement upon written notice to the Client and without penalty.

16. **Notification and Discovery of Hazardous Materials** - Prior to commencing the Services and as part of Project Information defined in Article 10, Data and Information, Client shall furnish to Golder all documents and information known to Client that relate to past or existing conditions of the site and surrounding area, including the identity, location, quantity, nature or characteristics of any hazardous materials or suspected hazardous materials or subterranean utilities. Golder may rely on such information and documents. Client hereby warrants that, if it knows or has any reason to assume or suspect that hazardous materials may exist at the project site, it has so informed Golder. Client recognizes that hazardous materials or suspected hazardous materials may be discovered on the project site property or on surrounding properties.

17. **Termination** - Either party may terminate this Agreement as a result of a material breach of the other party if the other party does not commence and continue to cure the breach within thirty (30) days of receipt of written notice of the breach from the non breaching party. In the event of termination, Golder shall be paid for Services performed to the termination notice date, reasonable termination expenses, and a portion of its anticipated profits not less than the percentage of the contract services performed as of the termination notice date. Golder may complete such analyses and records as are necessary to complete its files and may also complete a report on the Services performed to the date of notice of termination or suspension. The expenses of termination or suspension shall include all direct costs of Golder in completing such analyses, records and reports.

18. **Intellectual Property** - To the extent that the Services involve Golder providing Client with the right to use or access proprietary Golder software, programs, information management solutions, hosting services, technology, information or data ("Golder Products"), Golder grants Client during the term of the project a non-exclusive, non-transferable, non-assignable license to use the Golder Products for Client's internal purposes, solely in connection with the Services. Except for this limited license, Golder expressly reserves all other rights in and to the Golder Products. To the extent that the Services involve Client providing Golder with the right to use or access proprietary Client software, programs, technology, information or data ("Client Product"), Client grants Golder a perpetual, non-exclusive, non-transferable, non-assignable, royalty free world-wide license to use and access the Client Product as necessary to provide Client with Services. Golder shall own all Intellectual Property (as hereinafter defined) associated with the Services and the Golder Products together with any modifications, updates or enhancements to said Intellectual Property and grants no right or license to such

21. **Authorization to Proceed** - By signing below, Client hereby authorizes Golder to proceed with the Services as outlined in the proposal (referenced above) and in accordance with this Agreement, which includes terms relating to **payment, limitation of liability, insurance and indemnity**, among many other important provisions. Client also represents that any "purchase order" type document which Client may issue subsequent to executing this Agreement, shall be for administrative or accounting convenience only, and that any terms or conditions attached thereto shall not apply, and that all services shall be solely governed by the presently executed agreement.

IN WITNESS WHEREOF, the parties have caused this Agreement to be signed, as of the date and year first set forth above.

GOLDER ASSOCIATES LTD.

Signature \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Proposal No.: P1405259-2

Proposal Date: May 29, 2015

Intellectual Property to Client except as expressly provided in this Agreement. Client conveys to Golder any interest in any such Intellectual Property rights that, notwithstanding the foregoing, would otherwise be deemed by law to vest in Client. "Intellectual Property" includes patents, patent applications, trademarks, trademark applications, copyrights, moral rights or other rights of authorship and applications to protect or register the same, trade secrets, industrial rights, know-how, privacy rights and any other similar proprietary rights under the laws of any jurisdiction in the world. Golder may use and publish the Client's name and give a general description of the Services rendered by Golder for the purpose of informing other clients and potential clients of Golder's experience and qualifications.

19. **Electronic Information** - Client acknowledges that electronic media is susceptible to unauthorized modification, deterioration, and incompatibility and therefore Client cannot rely upon the electronic media versions of the Documents. In the event of any discrepancy, Golder's hardcopy shall prevail.

20. **Miscellaneous**

a) This Agreement supersedes all other agreements, oral or written, and contains the entire agreement of the parties. No cancellation, modification, amendment, deletion, addition, waiver or other change in this Agreement shall have effect unless specifically set forth in writing signed by the party to be bound thereby. Titles in this Agreement are for convenience only.

b) This Agreement shall be binding upon and inure to the benefit of the parties hereto and their respective successors and assigns provided that it may not be assigned by either party without consent of the other. It is expressly intended and agreed that no third party beneficiaries are created by this Agreement, and that the rights and remedies provided herein shall inure only to the benefit of the parties to this Agreement.

c) Client acknowledges and agrees that Golder can retain subconsultants, who may be affiliated with Golder, to provide Services for the benefit of Golder. Golder will be responsible to Client for the Services and work done by all of its subconsultants and subcontractors, collectively to the maximum amount stated in Article 7 Limitation of Liability. Client agrees that it will only assert claims against and seek to recover losses, damages or other liabilities from Golder and not Golder's affiliated companies. To the maximum extent allowed by law, Client acknowledges and agrees it will not have any legal recourse, and waives any expense, loss, claim, demand, or cause of action, against Golder's affiliated companies, and their employees, agents, officers and directors.

d) No waiver of any right or remedy in respect of any occurrence on one occasion shall be deemed a waiver of such right or remedy in respect of such occurrence on any other occasion.

e) All representations and obligations (including without limitation the obligation of Client to indemnify Golder in Article 6 and the Limitation of Liability in Article 7 shall survive indefinitely the termination of the Agreement. Client acknowledges that it may not use Golder's name or any reference to the Services in any press release or public document without the express, written consent of Golder.

f) Any provision, to the extent found to be unlawful or unenforceable, shall be stricken without affecting any other provision of the Agreement, so that the Agreement will be deemed to be a valid and binding agreement enforceable in accordance with its terms.

g) All questions concerning the validity and operation of this Agreement and the performance of the obligations imposed upon the parties hereunder shall be governed by the laws of Ontario unless the law of another jurisdiction must apply for this Agreement to be enforceable.

h) All notices required or permitted to be given hereunder, shall be deemed to be properly given if delivered in writing via facsimile machine, e-mail, regular mail, hand delivery or express courier addressed to Client or Golder, as the case may be, at the addressee set forth below in regard to the Client, and as listed on the Proposal in regard to Golder, with postage thereon fully prepaid if sent by mail or express courier.

Henev Lake Foundation

Signature \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Address Invoices to: \_\_\_\_\_