



PGL

Pottinger Gaherty
Environmental Consultants Ltd.
1200 - 1185 West Georgia Street
T 604.682.3707
F 604.682.3497
Vancouver, BC Canada V6E 4E6
www.pggroup.com

Memo

PGL File #: 0130-12.04

DATE: July 17, 2013

Re: Terms of Reference – Enos Lake Protection and Monitoring Program

Enos Lake is an integral part of the natural environment of the Lakes District, as described in the Environmental Impact Assessment prepared by Pottinger Gaherty Environmental Consultants Ltd. (PGL) (February 2010), and the Integrated Stormwater Management Plan (ISMP) (KWL, 2012). The Lakes District Neighbourhood Plan (February 2011) includes a policy for the development and implementation of an Enos Lake Protection and Monitoring Program (the Program) to monitor potential effects from the development of the Lakes District. The purpose of the ISMP is to mitigate these possible effects on the lake through stormwater management design. The Program will be developed and implemented to verify the effectiveness of the ISMP to manage Enos Lake water quality and quantity.

Section 3.2.2 of the Lakes District Neighbourhood Plan outlines the policies for the proposed Regional Park, including:

- f. In conjunction with the landowner and the appropriate federal and provincial agencies and according to a schedule outlined within the PDA, develop an Enos Lake Protection and Monitoring Program which includes, but is not limited to: base line water quality monitoring and assessment acceptable to the provincial Ministry of Environment (MoE); support in the development of site specific Water Quality Objectives for Enos Lake based on MoE protocols; and guidelines for invasive species management practices.

This "Terms of Reference" document outlines the objectives of the Program, timing and responsibilities, and an overview of the steps that will be involved in designing the Program and achieving the above policy.

BACKGROUND

Enos Lake is a small lake in a mostly undeveloped area of the Fairwinds Community located in Nanoose Bay, BC. The lake is about 18ha, with a watershed of about 235ha. About 12ha of the watershed has already been developed and a further 86ha are scheduled for future development over several phases (over an estimated 10–20 years). Almost half the watershed (112ha) is designated for conservation and passive recreational uses, and will remain undeveloped as a public park. Surface inlet streams to the Lake are minor and are generally seasonal. The lake discharges at its outlet to Enos Creek. The outlet of the lake has a weir structure to maintain water levels. The weir was installed in 1956 and upgraded in 1994. The outlet also has Water Licenses for storage and irrigation that are in place for use by the Fairwinds golf course.

OBJECTIVES

The overall intent of the Program is to monitor (a) the effectiveness of the ISMP relative to significant changes to the water quality and quantity in Enos Lake, and (b) inform decisions regarding water management as required. The ISMP sets criteria for the quality and quantity of stormwater from developed areas entering the lake. Stormwater-management design measures are proposed to meet the objectives set by standard government guidance for land development, including the BC Stormwater Guidebook (2002) and the Department of Fisheries and Oceans Canada (DFO) Land Development Guidelines (1993).

The specific tasks to develop and implement the Program include:

1. Compilation and review of past water quality data for Enos Lake;
2. Detailed design of a sampling program, including selection of key monitoring parameters and thresholds;
3. Establishment of a baseline profile of the lake water quality using past data, and the collection of new pre-development sampling as needed; and
4. Implementation of a water sampling program during the build out of the neighbourhood.

1. Historical Water Quality Data

The water quality data that exists for Enos Lake was largely obtained through monitoring that was conducted for Fairwinds over the last several years to verify stormwater management. An initial compilation and review of this data will be essential to establish historical background conditions for the monitored parameters. The data will provide an understanding of past changes in the Enos Lake limnology and provide a baseline for comparison with post-development monitoring in the future. Based on a review of the data by an aquatic ecologist, additional pre-development sampling may be recommended to substantiate the baseline knowledge.

2. Design the Program

The Program design will need to consider past data collected for Enos Lake and identify the specific locations and parameters to appropriately monitor the effectiveness of the ISMP. The Program will be designed to be practical, focused and defensible in its ability to detect significant changes (should they occur) to the water quality and quantity of the lake. Qualified environmental specialists, with input from a lake ecologist, should design the Program.

The Program will include typical water quality parameters following standard limnology study procedures. Preliminary indications are that the parameters of interest would be turbidity, light transmission, total suspended solids, nutrients, temperature, and water level. The Program design will provide a detailed outline of the locations and timing (e.g., seasonal, monthly) of sampling for each parameter. The sampling program should follow guidelines set out in the BC Resources Information Standards Committee protocols:

- *Guidelines for Designing and Implementing a Water Quality Monitoring Program in British Columbia* (1998);
- *Ambient Freshwater and Effluent Sampling Manual* (1997); and
- *Guidelines for Interpreting Water Quality Data* (1998).

The sampling plan should also include observations for invasive species and their proliferation.

3. Establish Baseline & Thresholds

The next step will be to establish the baseline conditions of the lake, prior to land-clearing activities. This would include pre-development levels and variations for all key parameters identified in the study design. The historical data from Task 1 should be analyzed and reported to establish the baseline conditions for (i) the parameters of concern, (ii) at the locations for future monitoring, (iii) over a full calendar year prior to initial land clearing for development. If gaps are identified, then new data should be collected.

Each parameter will be assigned site-specific target thresholds based on baseline data and government guidance for water quality objectives. Depending on the parameter, thresholds may vary over the year and with location. The thresholds will be linked with triggers for additional attention if a specific parameter has exceeded an established threshold. In this event, mitigation options may be required, including changes to the ISMP. This decision framework will be outlined at this step.

4. Implement the Program

Sampling will be repeated at the determined frequency on an ongoing basis, and the results will be compiled and analyzed annually. Trends in water quality parameters over time can be plotted to monitor the status of the lake's water quality and its performance against standards. Should the Program identify that water quality objectives are not being met, an R.P.Bio. will review the results and, if appropriate, discuss possible actions that could be applicable to future phases. A third-party review by a Registered Professional Biologist may be considered to verify these conclusions, following each season's sampling event.

The results will be provided annually to the RDN (attn.: Engineering Dept.) and the BC Ministry of Environment, and will also be made publically available.

MNH/mtl
P:\001-199\130\12-04\m-130-12-04-Jul13.doc