

May 9, 2018
WE 17016

Ms. Theresa Bisch
Treasurer
Township of Wellesley
4639 Lobsinger Line
St. Clements, ON
N0B 2M0

Dear Ms. Bisch:

**RE: Concept Plans & Detailed Design for Wellesley Pond Enhancement
Design Narrative**

1.0 Introduction

An ongoing collaboration between the Township of Wellesley, the Grand River Conservation Authority and the Friends of Wellesley Pond led to the development of the Wellesley Pond Enhancement Project. The objective was to assess and address several issues imposed upon the pond and surrounding features and to develop an Enhancement Strategy that met both ecological and Township objectives.

2.0 Design Objectives

The following criteria were established by the Steering Committee:

- Improve water quality (WQ)
 - Improve flow
 - Reduce geese access to pond
- Improve habitat quality & quantity- aquatic (HQ)
- Maintain functions, i.e., existing pond community functions (MF)
 - Provide access to pond for fishing derbies and boating regattas
 - Provide green space for gatherings

3.0 Design Options

Wellesley Pond is part of the Grand River Conservation Area watershed and is primarily used for the surrounding community to connect with nature. Through collaborative efforts, three options were produced which seek to achieve the aforementioned objectives.

However, due to the various objectives, a decision had to be made whether to preserve and increase the community functions or to have a focus on improving water quality and habitat quality and quantity. Although these three objectives are not mutually exclusive, the options presented have a series of pros and cons as they fall along a continuum where either the focus is fully on the channel rehabilitation and restoration, or on the enjoyment and convenience of the surrounding community.

In order to ensure that the criteria for the enhancement of Wellesley Pond were met, Water's Edge provided the following three options:

Option 1: Natural Channel/Wetland Limited Enhancement

- Design of a natural channel through the pond area upstream of Queens Bush Road only (WQ, HQ)
- Wetlands in the upper pond and lower pond area (HQ)
- Log-vanes to increase flow velocity in the upper pond (HQ)
- Riparian plantings to discourage geese (WQ, HQ)
- Open grass areas for social activities. Steep banks with armour-stone steps for pond access but not for geese! (MF)
- Log-piles, stone piles, and sunken trees to increase habitat diversity in the pond and wetlands
- Tree-sweepers to direct flow and provide habitat (HQ)
- Raptor pole (HQ)

Pros: Most area for recreational activities

Cons: Least habitat and water quality enhancement.

Option 2: Natural Channel/Wetland Partial Enhancement

- Design of a natural channel through the pond area upstream of Queens Bush Road and for a limited distance downstream (WQ, HQ)
- Wetlands in the upper pond and lower pond area (HQ)
- Riparian plantings to discourage geese
- Open grass areas for social activities. Steep banks with armour-stone steps for pond access but not for geese! (MF)
- Log-piles, stone piles and sunken trees to increase habitat diversity in the pond and wetlands
- Tree-sweepers to direct flow and provide habitat (HQ)
- Raptor-pole (HQ)

Pros: Some Habitat and water quality enhancement

Cons: Reduced pond area for recreational activities

Option 3: Full Natural Channel Enhancement

- Design of a narrowed watercourse to increase the flow velocity through the pond area both upstream and downstream of Queens Bush Road (WQ, HQ)
- Riffle-pool meandering channel design (WQ, HQ)
- Wetlands in the upper pond and lower pond area (HQ)
- Riparian Plantings to discourage geese (WQ)
- Log-vanes to increase flow velocity (HQ)
- Root-wads for bank stability and added habitat (HQ)
- Log-piles and stone piles to increase the habitat diversity in the wetlands (HQ)
- Tree-sweepers to direct flow and provide habitat (HQ)
- Raptor pole (HQ)
- Grassed areas for gatherings (MF)

Pros: Best option for both habitat and water quality enhancement

Cons: No pond area for recreational activities

After further review, by both the community and Friends of Wellesley Pond, the decision to explore Option 1 was made and revisions were considered and implemented. The final option is attached.

4.0 Design Narrative

A brief narrative to describe the Option 1 plan is provided as follows:

In order to most effectively understand the design drawings, including a proper understanding of the cross sections and dimensions on each plan, a brief outline thereof has been provided.

First of all, the cross sections (A, B, and C) are all scaled the same way in that when moving horizontally, the lines are increments of 5m, and the vertical is exaggerated by a 4:1 ratio.

Furthermore, to understand the functions of the naturalized areas as well as the inclusion of the various images in and around the pond, a brief explanation is included. The naturalized area along the east shore of the south pond will include armourstone for access to the pond, room for a proposed trail (as requested), a grassy area with gardens for trees and shrubs which help to dissuade geese, a wetland, and a raptor pole. This will be used to help increase biodiversity as raptors are birds of prey that will help to control the rodent population. In reference to wetlands, frogs, birds and minnows will help to control the mosquito population as well as add to the increasing biodiversity of the area. Wetlands are also known to improve water quality as they act as filtering systems to remove sediment, nutrient and pollutants from the water. In an urban environment such as this, wetlands help to manage storm water, and improve the removal of nutrients, suspended material and pathogens prior to its return to the environment. Additionally, the naturalized area on the west side of the north pond is much the same but has a few features that the south pond does not. Root wads, sweepers and half-log structures were added to the north pond's naturalized area. Root wads are made up of the root mass and ball, as well as a portion of the trunk; they are used to armour a stream bank by directing the flow away from the bank, avoiding erosion. They also act as a structural support to the bank, a habitat to fish and other aquatic animals and as a food source for aquatic insects. Sweepers are used to attract juvenile fish by providing dense coverage and food in the form of aquatic organisms. The inclusion of the half-log structures is meant to act as a habitat which fulfills the requirement for increased and varying biodiversity. Additionally, features such as rock piles and logs were added to provide further habitat and will provide shelter and food for mammals, birds, fish and insects. This is necessary to enhance the water quality and habitat for various species. The combination of these features in the naturalized area will lead to a well-sustained ecosystem within and around the pond; further developments and biodiversity are thus encouraged through this.

The plan for the pond is to use dredged sediment from the bed to build up the west side of the north pond and the east side of the south pond. This will create a more naturalized area and will promote a healthier ecosystem. Additionally, the benefits of narrowing the channel at Queen's Bush Road will create more direct benefits to the flow and habitat variability as well as reduce impoundment and sediment accumulation. Balancing the ecosystem was a primary goal of the Friends of Wellesley Pond. As such, this is meant to produce an ecosystem that will thrive.

The following questions were raised during the review of the plans by the Steering Committee:

- 1) *What is the width of the pond at cross-section C? What is the width of the naturalized area at C? (Also, how does one read the scale at each of the cross sections?) What is the length of the south pond from the dam to the narrows?*

The width of the proposed pond is 115m, and the naturalized area is 45m. The length of the south pond from the dam to the narrows is around 210m. To read the scale at each of the cross sections, the horizontal line increases by 5m, and the vertical lines increase by 0.5 m (4:1 ratio).

- 2) *Cross section B; what is the width of the water? What is the width of the naturalized area?*
The width of the water is 15m while the width of the naturalized area is 15m. This was calculated using the above explained method.
- 3) *Cross section A; What is the width of the water? (Note that we asked this to be 150 feet) What is the width of the naturalized area?*
Width of the water is 30m; if it is 150 feet, or 47.5m only the naturalized area will be reduced from 45 to 34m
- 4) *Describe the naturalized area along the east shore of the south pond. What will be done at the water's edge to stabilize the bank? What are the intended effects/benefits of doing this in terms of water quality, species diversity, geese and carp problems etc.*
The naturalized area along the east shore of the south pond will include armour-stone for access to the pond, room for a proposed trail (as requested), a grassy area with gardens for trees and shrubs (helps to dissuade geese), a wetland and a raptor pole. This will be used to increase biodiversity as raptors are birds of prey that will control the rodent population. In reference to the wetland, frogs, birds and minnows will help to control the mosquito population as well as add to the biodiversity of the area. Wetlands are also known to improve water quality as they act as filtering systems to remove sediment, nutrients and pollutants from the water. In an urban environment such as this, wetlands help to manage stormwater and improve the removal of nutrients, suspended material, and pathogens prior to its return to the environment.
- 5) *As in Q4, describe the naturalized area along the west shore on the north side and the intended benefits.*
See question 4. In addition, features such as root wads, sweepers, and half log structures were added to the west side of the north pond. Root wads are made up of the root mass and ball, as well as a portion of the trunk; they are used to armour a stream bank by deflecting the stream flows away from the bank. This also provides structural support to the streambank, habitat for fish and other aquatic animals and also acts as a food source for aquatic insects. Sweepers are used to attract juvenile fish by providing dense coverage and food in the form of aquatic organisms. The inclusion of a half log structure is meant to also provide a habitat for juvenile fish, which fulfills the requirement of varying and improved biodiversity.
- 6) *The Cross sections show top and bottom of sediment. Is it the plan to excavate the sediment to the bottom of the sediment? In the entire open water area or just sections?*
The plan is to dredge the entire pond so as to build up the sediment on the sides to create a more naturalized area. The entire area will be done in order to promote a healthy ecosystem.
- 7) *After excavation, how deep will the water be (how does one read the scale in the cross section?)*
After excavation the water will be 2.5m. The scale is read the same way as explained in the response to question 1.
- 8) *What are the intended benefits of narrowing the channel in the area of the bridge on Queens Bush Rd*
The benefits of narrowing the channel along Queen's Bush Rd will create more direct benefits to the flow and habitat variability and will reduce impoundment and sediment accumulation.

9) *There are numerous features added to the pond (log pile, sweeper, rocks) What are the intended benefits?*

See response to questions 4&5. The addition of a log pile and rocks is primarily for habitat purposes. This is necessary to enhance the water quality and the habitat for the various species.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Ed Gazendam". The signature is fluid and cursive, with a large initial "E" and "G".

Ed Gazendam, Ph.D., P.Eng.,
President, Sr. Geomorphologist
Water's Edge