

Executive Summary

Springbank Dam, which is owned by the Corporation of the City of London (City) and is operated by the Upper Thames River Conservation Authority (UTRCA), is located on the Thames River within the west section of the City. The existing structure is 67 m long and 9.8 m high, with flow control equipment consisting of a series of timber stop-log panels, three automatic overshot gates and a powered, vertical lift sluice gate. With all the stop logs in place, the dam has a normal head difference of 5.5 m and creates a 7-km long, 55-ha reservoir. The resulting head pond created by the dam, and the surrounding parkland, is used for a variety of active and passive recreational uses that include canoeing, kayaking, rowing, boating, fishing, cycling and walking. The UTRCA operates the dam for a variety of purposes including recreation, flood handling and fisheries protection.

Recent engineering studies (Acres 2000, 2002) conducted following a flood event in July 2000 (which resulted in significant damage to the south embankment), have identified the following structural, operational and safety concerns associated with the dam and surrounding erosion protection measures:

- Operation of the dam (i.e., stop-log removal) is required to safely pass summer flood flows. Although the dam can pass the required inflow design flood, debris blockage of the sluiceways can make the entire flood handling operation unpredictable, uncontrollable and potentially unsafe for dam operating personnel. Debris blockage of the sluiceways has impaired the ability to remove stop logs during a flood event, resulting in a decreased discharge capacity of the dam to pass flood flows. This has resulted in overtopping of the south bank of the dam, causing significant erosion damage to the downstream bank protection works, hazardous conditions for operational staff trying to access the dam, and public safety concerns.
- The downstream south bank erosion protection and riverbed erosion protection measures have essentially failed, resulting in undermining of the toe of the south shoreline slope and shoreline slumping. Unless repaired/rehabilitated, channel bank erosion will continue to the point that the structural integrity of the dam may be compromised.

It was concluded that the existing Springbank Dam requires

- repairs to the downstream erosion protection works to ensure an adequate erosion protection system is in place

- rehabilitation of the dam to replace deteriorated stop logs, improve the existing hoisting equipment and/or to modify the dam to improve its debris passage ability during flood events to avoid blockage of the sluiceways and overtopping of the dam.

Based on the recommendations of these studies, the City proposed to carry out a project to conduct rehabilitation works to the dam and to the damaged erosion protection works. The objectives of the corrective rehabilitation works were to ensure the integrity and safe operation of the dam, and to minimize future operational and maintenance requirements.

The City, as the proponent, has undertaken this project as a Schedule “B” project under the *Municipal Class Environmental Assessment (Class EA)* (MEA, 2000). This Class EA provides an approved planning process whereby municipal infrastructure projects can be planned, designed, constructed, operated, maintained, rehabilitated and retired without having to obtain project specific approval under the Environmental Assessment Act provided the approval process is followed.

Public consultation was an integral part of the Class EA process and involved several public and agency contacts including first and final newspaper notices, direct stakeholder and agency letter mailings, information postings on the UTRCA website, several meetings with stakeholder groups and a public open house. The public consultation activities were conducted by the City with participation and assistance from the UTRCA.

Rehabilitation of South Bank Erosion Protection Works

In order to assess a broad range of options for the Class EA process, five alternatives, which could provide possible solutions to the damaged south bank erosion protection works, were identified as follows:

- Alternative 1 – Maintain the status quo (i.e., ‘do nothing’)
- Alternative 2 – Repair using riprap
- Alternative 3 – Repair using gabions
- Alternative 4 – Repair using a grout-filled mattress system
- Alternative 5 – Repair using riprap and selective use of armour stone.

Pursuant to the requirements of the Municipal Class EA, each alternative was evaluated in terms of its effectiveness in satisfying the project objectives,

potential for negative environmental effects to both the natural (e.g., fish and wildlife) and social (e.g., recreational use, public safety) environments, required mitigation measures and estimated cost.

Based on the evaluation, **Alternative 5 – Repair using riprap and selective use of armour stone was selected as the preferred solution for the rehabilitation of the south bank erosion protection works.** This alternative would resolve the deteriorated nature of the erosion protection works and provide a repair solution that has a greater life expectancy and lower maintenance requirements than either Alternative 3 or 4. In addition, armour stone could be selectively used to provide improved and safer public access on the slope for persons (e.g., fisherman, canoeists) trying to access the river immediately downstream from the dam.

Dam Rehabilitation Works

In order to address the dam's structural deterioration and to improve its operational effectiveness for flood handling by improving its ability to pass debris and minimize potential blockage, five alternatives were identified as follows:

- Alternative 1 - Maintain the status quo (i.e., 'do nothing')
- Alternative 2 - Conduct maintenance repairs to the dam and tailrace, replace stop logs, improve hoist facilities, and implement a debris management system
- Alternative 3 - Replace the existing stop logs and gates with overflow gates
- Alternative 4 - Remove the existing stop logs and gates and install an overflow rubber dam downstream of the existing piers
- Alternative 5 - Decommission and remove the dam.

Following a comparative evaluation of the dam rehabilitation alternatives, that included an assessment of effectiveness, potential environmental effects and costs, **Alternative 3 – Replace the existing stop logs and gates with overflow gates was selected as the preferred solution to rehabilitate the Springbank Dam.** The installation of new overflow gates would be very effective in terms of improving the debris passage and flood handling capability of the dam while resolving operator and public safety concerns, reducing long-term operating and maintenance costs, and minimizing negative impacts to the natural and social environments.

Project Implementation

Following selection of the preferred dam rehabilitation and south bank erosion protection rehabilitation alternatives, two construction-scheduling options were identified, as follows:

- Alternative A – This option would involve completing the work on the dam over the two consecutive fall/winter periods of 2004 and 2005, with the reservoir lowered from October to March inclusive. South bank erosion protection construction could proceed separately during low flow months (July/August) in 2004.
- Alternative B – This option would involve completing the work on the dam over an extended one-time period from approximately July 2004 to April 2005. Rehabilitation of the damaged erosion protection works could be done as part of the dam contract or under a separate contract.

Alternative A was selected as the preferred scheduling option because it offers the advantage of minimizing negative impacts on the water-based recreational uses of the upstream reservoir during the summer.

1 Introduction

1.1 Project Overview

The Corporation of the City of London (City), as the *proponent*, is proposing to carry out rehabilitation works to the Springbank Dam located on the Thames River within the west section of the City (Figure 1.1).

Springbank Dam is owned by the City and is operated by the Upper Thames River Conservation Authority (UTRCA). The dam was constructed in 1929 and maintains the water level in the Thames River approximately 7 km upstream of the dam to the confluence of the north and south branches of the river (the Forks). The resulting head pond created by the dam is used for a variety of active and passive recreational uses that include canoeing, rowing, kayaking, fishing, cycling and walking.

During the July 2000 flood event, debris blockage of the existing spillway bays combined with the high flows resulted in overtopping of the south bank of the dam, causing considerable damage to the south bank downstream of the dam, and other downstream areas. Subsequent engineering studies undertaken by the UTRCA, including an Erosion Repairs Study (Acres, 2000) and a Dam Safety Assessment (Acres, 2002), identified a number of recommendations to repair/rehabilitate the erosion protection works and to improve the dam's debris passage ability. Based on the studies, the UTRCA recommended that the City support the repair/rehabilitation of the Springbank Dam to ensure the safe and reliable operation of the dam. The City subsequently applied to Superbuild for funding to undertake the rehabilitation of Springbank Dam.

This undertaking follows a defined planning process described in the document entitled *Municipal Class Environmental Assessment* [Municipal Engineers Association (MEA), 2000]. This Class EA provides a means of ensuring that municipal infrastructure projects, for which the Class EA is applicable, are undertaken in accordance with an approved procedure designed to take environmental and public concerns into account. The purpose of this report is to document the required Class EA planning and design activities, including public and agency consultation, that were completed pursuant to a Schedule B project as defined by the Municipal Class EA (MEA, 2000) to arrive at the preferred solution for the Springbank Dam rehabilitation.