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WEST LONDON DYKE MASTER REPAIR PLAN

Executive Summary

Introduction

The Upper Thames River Conservation Authority (UTRCA) in partnership with the City of London (City) has undertaken a Master Repair Plan (MRP). This is a strategic document to assist in the overall planning for a period of up to 20 years to address aging infrastructure, flood protection, public use, and integration of other City initiatives. The intent of the Master Repair Plan is to develop the required strategic plan to allow the UTRCA and the City to have a method for determining when a trigger point for repair and/or replacement of a portion of the dyke is required.

The Master Repair Plan is being undertaken in accordance with the Master Planning requirements of the MEA Municipal Class Environmental Assessment (October 2000, as amended in 2007 and 2011).

The MEA offers four approaches for undertaking a Master Plan and based on our review Municipal Class EA Approach #2 appears to be the most accurate. Approach #2 allows for the preparation of a Master Plan document at the conclusion of Phases 1 and 2 of the Municipal Class EA process where the level of investigation, consultation and documentation are sufficient to fulfill the requirements for Schedule B projects identified within the Master Plan. Accordingly, the final public notice for the Master Plan could become the Notice of Completion for Schedule B projects within it. Any Schedule C projects, however, would have to fulfill Phases 3 and 4 prior to filing an Environmental Study Report (ESR) for public review. The Master Plan would provide the basis for future investigations for the specific Schedule C projects identified within it. While Master Plans are not subject to requests for a Part II Order, members of the public or other stakeholders may submit a request to the Minister for a Part II Order for individual Schedule B projects identified within the Master Plan.

Overview of West London Dyke

The West London Dyke is approximately 2,300 m long and runs along the west bank of the north branch of the Thames River extending north of Oxford Street to the Forks of the Thames River and then along the north bank of the main branch to the west of the Wharncliffe Road Bridge and terminating in Cavendish Park. The West London Dyke is primarily an engineered structure which protects life and property during periods of extreme river flows. In addition to serving a critical control function, the dyke is also an integral component of the City's recreational pathway system and its location at the Forks of the Thames makes it a prominent structure in the downtown area of the City.

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History of the West London Dyke

Due to the proximity of early settlements within London to the Thames River, these areas were often subjected to flood events. A catastrophic flood in July 1883 prompted the construction of a formalized dyke system. A flood event in April 1937 overtopped the dyke and resulted in five deaths, the destruction of approximately 1,100 homes and severe damage to roads and bridges. As a result of the flood, the dykes along the river were reconstructed and raised.

Flood control measures implemented subsequent to the formation of the UTRCA after the 1947 flood have resulted in the construction of several dams, flood control channels, floodwall and dyke rehabilitation.

Replacement of a 300 m section of dyke between the Queens Avenue Bridge and Rogers Avenue with a near vertical modular block wall with geogrid reinforcement was completed in 2007. This section was replaced rather than repaired after structural deficiencies were noted in 2006 during the initial stages of a concrete repair program.

Consultation

Residents within the area surrounding the West London Dyke as well as other stakeholders were provided with a Notice of Commencement, which included information on Public Information Centre 1 (PIC 1), Notice of Public Information Centre 2 (PIC 2), Notice of Public Information Centre 3 (PIC 3) and Notice of Completion through Canada Post.

Project Area Description

With regard to engineering review, costing, and trigger point determination, the Master Repair Plan considered the following segments (from upstream to downstream) which were derived based on the physical location and/or physical characteristics of the dyke:

1. Oxford North;
2. St. Patrick's (Oxford Street West – Empress Avenue);
3. Blackfriars (Empress Avenue – Cummings Avenue);
4. Natural Bank (Cummings Avenue – Leslie Street);
5. Labatt Park/Forks (Leslie Street – Dundas Street);
6. Wharncliffe (Dundas Street – Wharncliffe Road North);
7. Cavendish East; and
8. Cavendish West.

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These segments however are not intended to represent exact limits for future construction projects. Future works (involving repair or replacement) may involve either work within a segment, or overlapping or portions of segments.

Project Drivers

In order to properly define the long-term planning requirements for the West London Dyke, it is critical that appropriate projects drivers (potential reasons to implement or otherwise initiate work) are defined. As part of the Master Repair Plan planning process, a conceptual list of project drivers were developed based on the guiding principles for presentation to interested stakeholders and for subsequent evaluation during selection of the preferred alternative(s). The project drivers identified are as follows:

- Flood Risk Reduction
- Public Safety
- Functional Improvements
- Environmental Considerations
- Funding Opportunities
- Other (Hydrologic Considerations)

Assessment of Environment

The following provides a general description of each component in reference to the West London Dyke Structure and surrounding area:

- Natural Environment: Element addressing the protection of the natural and physical elements of the environment (i.e., air, water, land, etc.). This includes both natural heritage and environmentally sensitive areas;
- Social/Cultural Environment: Component that addresses the potential effects on the public, including adjacent landowners (residents, businesses), community groups, social elements, historical/archaeological and heritage factors, and development objectives of the City;
- Economic: Component that addresses capital and maintenance costs, potential flood damage impacts, etc.;
- Legal: Factor that considers potential land requirements related to each proposed alternative; and

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- Technical: Component that addresses the technical requirements and suitability of each alternative.

Engineering Review

As part of the technical component of the Master Repair Plan, a general engineering evaluation of the West London Dyke was undertaken. The intent of the engineering review was to establish the following:

- The current condition of the West London Dyke through a review of previous investigations and monitoring inspections;
- Information on the geotechnical characteristics of the site through literature review;
- Information related to potential legacy issues relating to environmental impacts based on past project experience and available documentation;
- Potential maintenance and constructability issues associated with the dyke;
- Requirements for approvals and permits;
- General guidelines for future work based on previous criteria established through the Phase 1 Replacement project; and
- Requirements or recommendations related to further engineering studies.

Review of Alternatives

The Master Plan and Class EA planning process recognizes that there are often many alternatives to address a particular issue or problem, and that these alternatives should be considered. Alternatives solutions identified as part of the Master Repair Plan are listed as follows:

- **Alternative 1** – Do Nothing;
- **Alternative 2** – Replace with Similar Dyke (Existing Footprint);
- **Alternative 3** – Replace with New Dyke to 100 Year Standard + Freeboard; and
- **Alternative 4** – Replace with New Dyke to 250 Year Standard + Freeboard.

Recommended Implementation Strategy

In general, the prioritization of projects is based on a review of the project drivers. Accordingly, the determination of priority has been based on known existing information as presented in Table E.1, primarily relating to the following:

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- Current condition of the dyke;
- Potential to reduce overall flood damages;
- Constructability considerations; and
- Other impacts or considerations.

Table E.1: Project Implementation Schedule

Segment	Section	Type	Preferred Alt.	Estimated Cost	Estimated EA Cost	Implementation Schedule	Priority Ranking
Oxford North	North of south limit of Oxford St. Bridge	Concrete Revetment / Vegetated Berm	Alt. 4	\$3.7M / \$2.6M ⁷	\$45-\$50K	10 + Years	8
St. Patrick	Oxford St. to St. Patrick St.	Concrete Revetment	Alt. 4	\$2.8M	\$45-\$50K	5 to 10 Years	4
	St. Patrick St. to Empress Ave.	Concrete Revetment	Alt. 4	\$3.0M	\$45-\$50K	5 to 10 Years	5
Blackfriars	Empress Ave. to Blackfriars St.	Concrete Revetment	Alt. 4	\$3.3M / \$2.2M ⁷	\$70-\$80K	1 to 5 Years	2
	Blackfriars St. to Cummings Ave.	Concrete Revetment	Alt. 4	\$2.2M	\$70-\$80K	1 to 5 Years	3
Natural Bank	Cummings Ave. to Leslie St.	Concrete Revetment (Naturalized Toe)	Alt. 4	\$4.6M	\$45-\$50K	10 + Years	6
Labatt Park/Forks	Leslie St. to Rogers Ave.	Concrete Revetment	Alt. 4	\$2.6M	\$45-\$50K	1 to 5 Years	1
	Rogers Ave. to Queens Ave. Bridge	Modular Block Wall with Geogrid	Alt. 1	\$250K	N/A	10 + Years (work completed in 2007/08)	---
	Queens Ave. extending south to Forks	Natural Bank with Gabions	Alt. 4	\$500K	N/A	10 + Years	9 (assumed to coincide with Wharncliffe)

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Segment	Section	Type	Preferred Alt.	Estimated Cost	Estimated EA Cost	Implementation Schedule	Priority Ranking
							segment work)
Wharnclyffe	From Forks to Wharnclyffe Rd. Bridge	Natural Bank with Gabions	Alt. 4	\$4.3M / \$3.3M	\$45-\$50K	10 + Years	9
Cavendish East	Wharnclyffe Rd. Bridge extending west	Concrete Revetment	Alt. 4	\$2.8M	\$45-\$50K	10 + Years	7
	From termination of concrete revetment extending west to City Works Yard	Natural Bank/Berm	Alt. 4	\$2.7M	\$45-\$50K	10 + Years	10
Cavendish West	From City Works Yard extending north, then west along adjacent property limits	Vegetated Berm	Alt. 4	\$1.2M	\$45-\$50K	10 + Years	10

Additional Studies

In addition to capital improvements and repairs, additional studies and programs have been recommended. Recommendations have been based on comments received during the consultation process, the evaluation of project drivers, input from both the UTRCA and the City, and the environmental and technical reviews completed for the West London Dyke.