



Embryo Dam Class Environmental Assessment

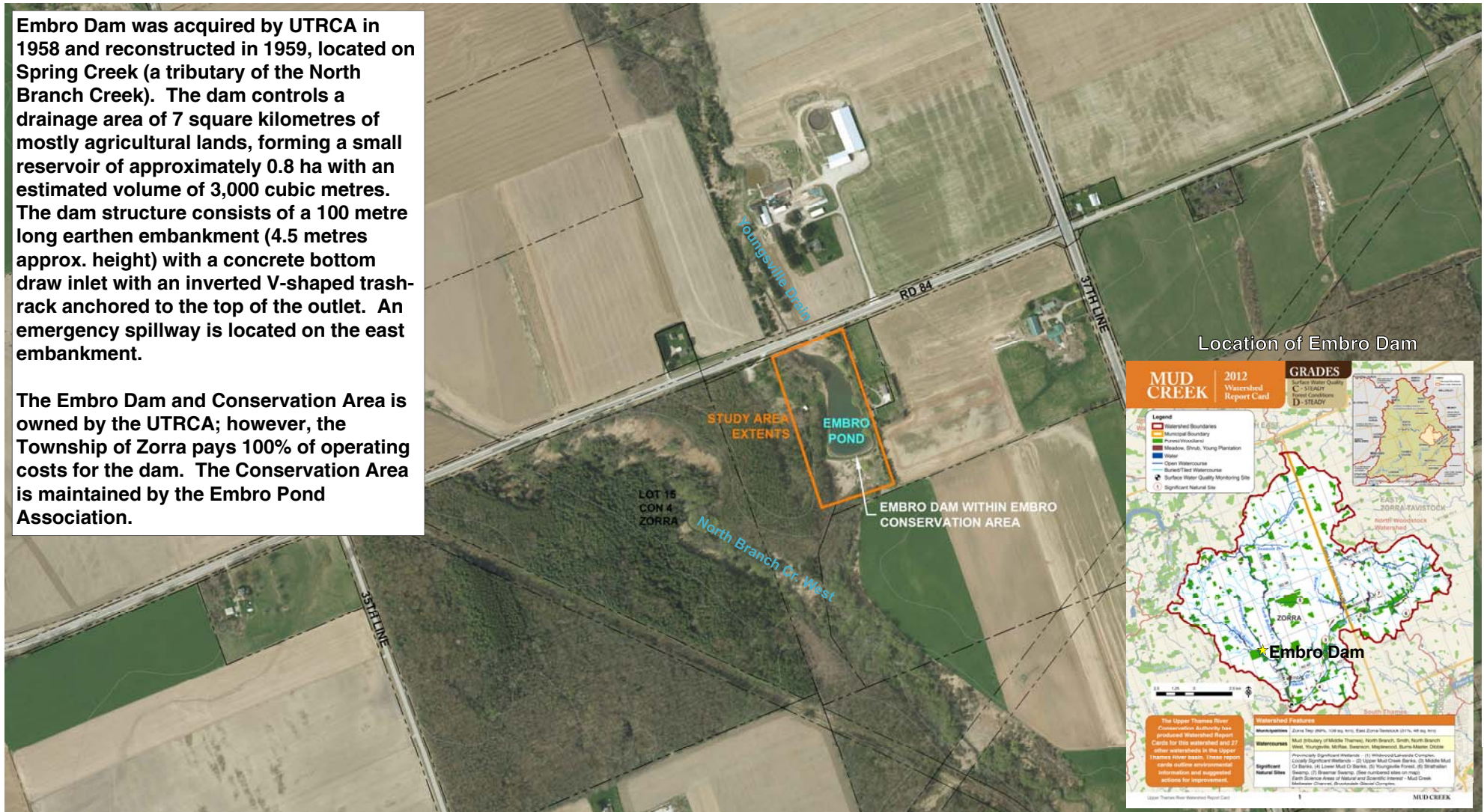
Public Information Centre #1

Upper Thames River Conservation Authority
Embryo Zorra Community Centre
June 23rd, 2015 7:00 p.m. to 9:00 p.m.

Embro Dam Study Area

Embro Dam was acquired by UTRCA in 1958 and reconstructed in 1959, located on Spring Creek (a tributary of the North Branch Creek). The dam controls a drainage area of 7 square kilometres of mostly agricultural lands, forming a small reservoir of approximately 0.8 ha with an estimated volume of 3,000 cubic metres. The dam structure consists of a 100 metre long earthen embankment (4.5 metres approx. height) with a concrete bottom draw inlet with an inverted V-shaped trash-rack anchored to the top of the outlet. An emergency spillway is located on the east embankment.

The Embro Dam and Conservation Area is owned by the UTRCA; however, the Township of Zorra pays 100% of operating costs for the dam. The Conservation Area is maintained by the Embro Pond Association.



Class Environmental Assessment Process and Problem Statement

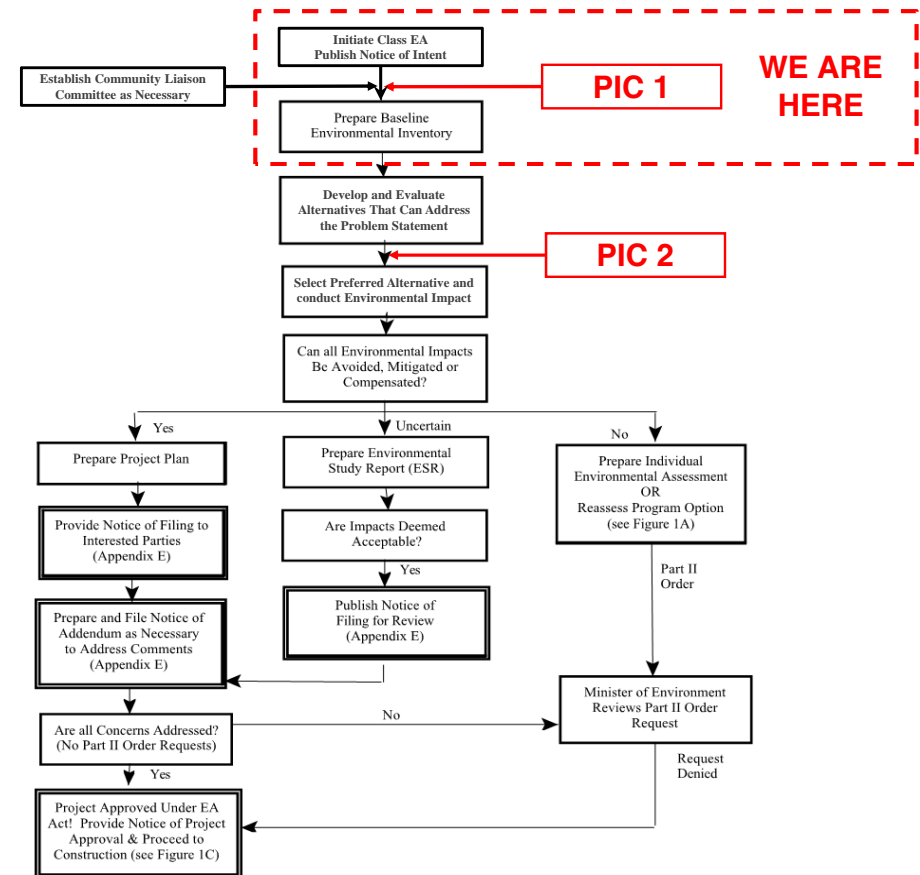
Class EA Process for Conservation Ontario Class Environmental Assessment for Remedial Flood and Erosion Control Works

Problem Statement

Significant concerns related to the structural integrity and hydraulic capacity of the Embro Dam have been identified through recent engineering assessments.

- *Acres International. July, 2007. Dam Safety Assessment Report for Embro Dam: Upstream and downstream embankment slopes do not meet stability acceptance criteria*
- *Naylor Engineering Associates. September 2008. Geotechnical Investigation Embro Dam Embankment Stability Assessment: The existing dam does not meet current standards and is not considered stable under existing conditions*

A Class Environmental Assessment has been initiated to evaluate a range of alternatives to address the identified issues in consideration of the environmental, social, economic, and technical aspects of the dam.



Embro Dam and Area Description



The Embro Dam is approximately 100 m in length, 4.5 m in height and includes 1.1 m of freeboard. The entire dam is founded on overburden as opposed to bedrock or engineered soil.



The dam contains water year round and includes approximately 3.4 m of head acting across the dam.



Low earth fill embankment, a grassed, emergency spillway is located at the east end of the embankment. This spillway has a clear width of about 4.0 m and the inlet invert is 0.6 m below the crest of the dam.



The outlet of the dam includes a concrete bottom draw inlet structure covered with grated trashrack.



A 762 mm diameter (inner) concrete pipe conveys flow from the pond to a pool at the creek outlet.



The Embro Dam is located within the Embro Conservation Area, with recent restoration and improvement works undertaken by the Embro Pond Association.

Field Data Collection and Site Characterization

A range of technical, environmental, and social factors will be characterized at the study site to provide insight into the generation of potential alternatives for the dam, as well as the evaluation of those alternatives.

<p>Topographic Survey</p> <p>Topographic characterization of the study area using GPS, total station, or level surveys.</p> <p>A topographic survey is required to establish physical constraints on potential alternatives for the dam and pond, as well as to develop concept designs.</p> <p>Topographic surveys are currently underway at the Embro Dam site.</p>	<p>Aquatic Biology</p> <p>Characterization of aquatic life in the pond, as well as upstream and downstream of the pond, including an inventory of fish and benthic macroinvertebrates (bugs).</p> <p>Understanding of the aquatic biology at each site is critical to characterize the current impacts of the pond and dam, and potential impacts and opportunities for proposed alternatives.</p> <p>Aquatic biology surveys and analysis are currently underway.</p>	<p>Geotechnical Engineering and Hydrogeology</p> <p>Geotechnical engineering and hydrogeology will consider the stability of the dam embankments and the flow of groundwater through and around the dam (seepage).</p> <p>Characterization of the current dam stability and seepage is critical in developing potential alternatives for the dam, as well as understanding the risks and impacts of various alternatives.</p> <p>Geotechnical stability assessments have been previously completed and led to the initiation of this study. Further review will take place in the context of this Class EA.</p>	<p>Civil Engineering (Dam Structure and Hazard Assessment)</p> <p>A characterization of the current dam structure will be undertaken, including an update of the Dam Hazard Classification, under the <i>Lakes and Rivers Improvement Act</i>, to understand risks to downstream persons and property.</p> <p>Legislation and guidelines for the management of dam structures have changed in recent years, requiring the results of the previous Dam Safety Assessments to be reclassified and a new Dam Hazard Classification established.</p> <p>The assessment and revision of the Dam Hazard Classification is currently in progress.</p>
<p>Hydrology</p> <p>Hydrologic characterization of the site includes monitoring and rating of river flows upstream and downstream of the dam.</p> <p>An understanding of the site hydrology is required to inform the operational parameters so that potential alternatives can be generated, and to inform a number of other technical disciplines such as aquatic biology, water quality, and fluvial geomorphology.</p> <p>Characterization of site hydrology is currently underway, including flow measurements during rain events and comparison to other similar watersheds.</p>	<p>Terrestrial Biology</p> <p>The terrestrial biology of the site includes the range of vegetative and wildlife species that inhabit the site, as well as connectivity to adjacent natural areas and the significance of species found on site (i.e., Species at Risk, Endangered Species).</p> <p>Understanding of the terrestrial biology of the site is required to establish and characterize the impacts of potential alternatives for the dam, and to recommend restoration and enhancement strategies for the site.</p> <p>Terrestrial biology surveys are currently underway at the site.</p>	<p>Sediment Quality</p> <p>Characterization of the sediment quality in the reservoir involves the collection of sediment samples and analysis at a laboratory to identify a range of constituents of interest (i.e., metals, nutrients, pesticides, hazardous materials).</p> <p>An understanding of the sediment quality at the site is critical for understanding the potential impacts of proposed alternatives for the dam, particularly related to the costs associated with removal and disposal. In addition, upstream pollutant sources may be identified.</p> <p>Sediment testing at the reservoir will be undertaken during summer 2015.</p>	<p>Water Quality</p> <p>Water quality sampling at the site involves collection of water samples during dry weather and wet weather conditions, at locations upstream and downstream of the dam as well as within the pond. Samples are analysed at a laboratory for constituents of interest (i.e., metals, nutrients, pesticides, temperature, dissolved oxygen).</p> <p>Analysing water quality at the site is required to understand the impact of the current dam and pond on the watercourse, specifically on the ability of the watercourse to support aquatic life.</p> <p>Water quality samples will be completed throughout the summer of 2015.</p>

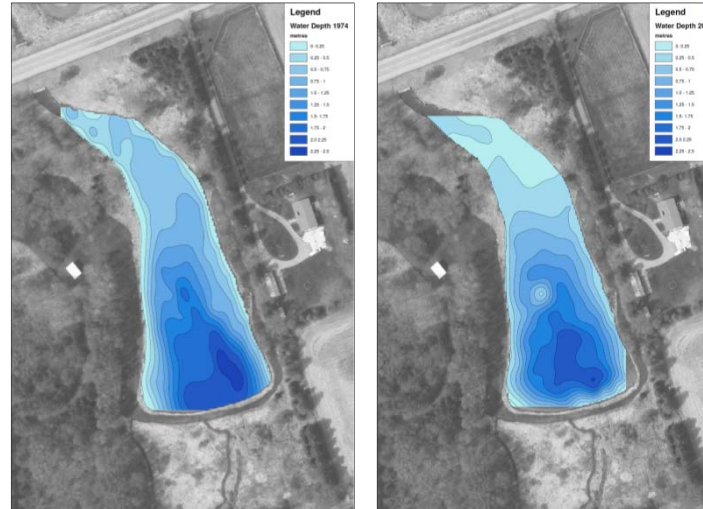
Field Data Collection and Site Characterization

Sediment Survey

Survey of the pond bottom and depths of sediment are completed using GPS survey equipment.

A sediment survey is required to estimate the current quantity of sediment in the pond and to estimate the rate at which sediment is accumulating in the pond, to inform potential alternatives for the dam.

Preliminary sediment depths and volumes have been determined at the pond; contour maps showing water depth (indirectly showing sediment accumulation) are shown at right.

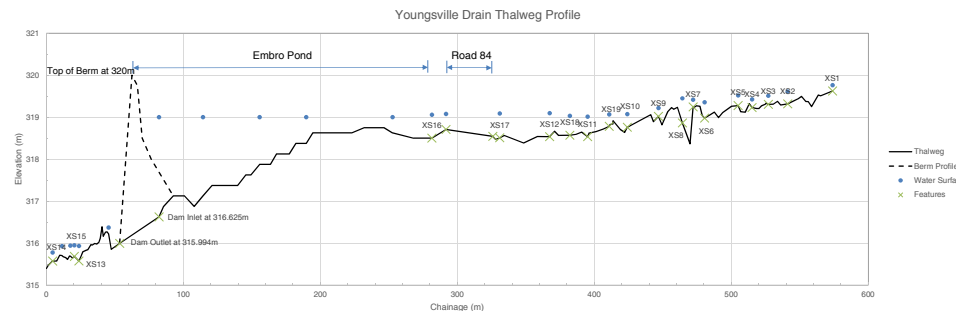


Fluvial Geomorphology

Fluvial geomorphology aims to understand the processes and functions of rivers and creeks, and their role in transporting sediment and providing habitat for aquatic life. A geomorphic characterization of the site, as well as the watercourse upstream and downstream of the site, has been partially completed.

An understanding of the natural watercourse function around the pond is important to characterize impacts of potential alternatives, as well as the current impact of the pond and dam on river processes.

The geomorphic characterization is currently in progress.



Archaeology

A Stage 1 archaeological assessment is being completed for the study area to identify known archaeological sites in the area, evaluate the site's archaeological potential, and recommend mitigation strategies if needed. The assessment will be completed under the provisions of the Ontario Heritage Act.

An archaeological assessment is required to identify potential archaeological and heritage sites that may impact alternatives for the dam, forming constraints and providing opportunities for enhancement and protection of heritage sites.

The assessment is currently in progress.

Cultural/Social Environment

The cultural and social environment of the site includes current and historical uses of the site, and its role as a community gathering and recreational place.

A thorough characterization and understanding of the cultural and social environment is required to understand the impacts of potential alternatives for the dam, and serves to ensure that the "human environment" is considered alongside technical, environmental, and economic criteria.

The review of cultural and social environment is ongoing, and will be supplemented by the input of interested and engaged residents.

Next Steps and Contact Information

Next Steps for our project team include:

- Compile and review feedback from this Public Information Centre
- Complete field investigations and characterization of the study area
- Develop alternatives for the Dam to present at the next Public Information Centre, currently planned for September 2015
- Determine if community interest exists for a tour of dam reconstruction and removal projects in southwestern Ontario

To provide feedback and comments to the project team, please send all correspondence to the project email address:

embro_dam@thamesriver.on.ca

For further information please contact:

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Public Information Centre

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