Embro Dam Class Environmental Assessment

Community Liaison Committee Meeting No. 2

Scott Robertson, P.Eng.
Mariëtte Pushkar, M.Sc., P.Geo
Jeff Prince, P.Eng.

November 22, 2023

Matrix Solutions Inc.
A Montrose Environmental Company

Traditional Land Acknowledgement

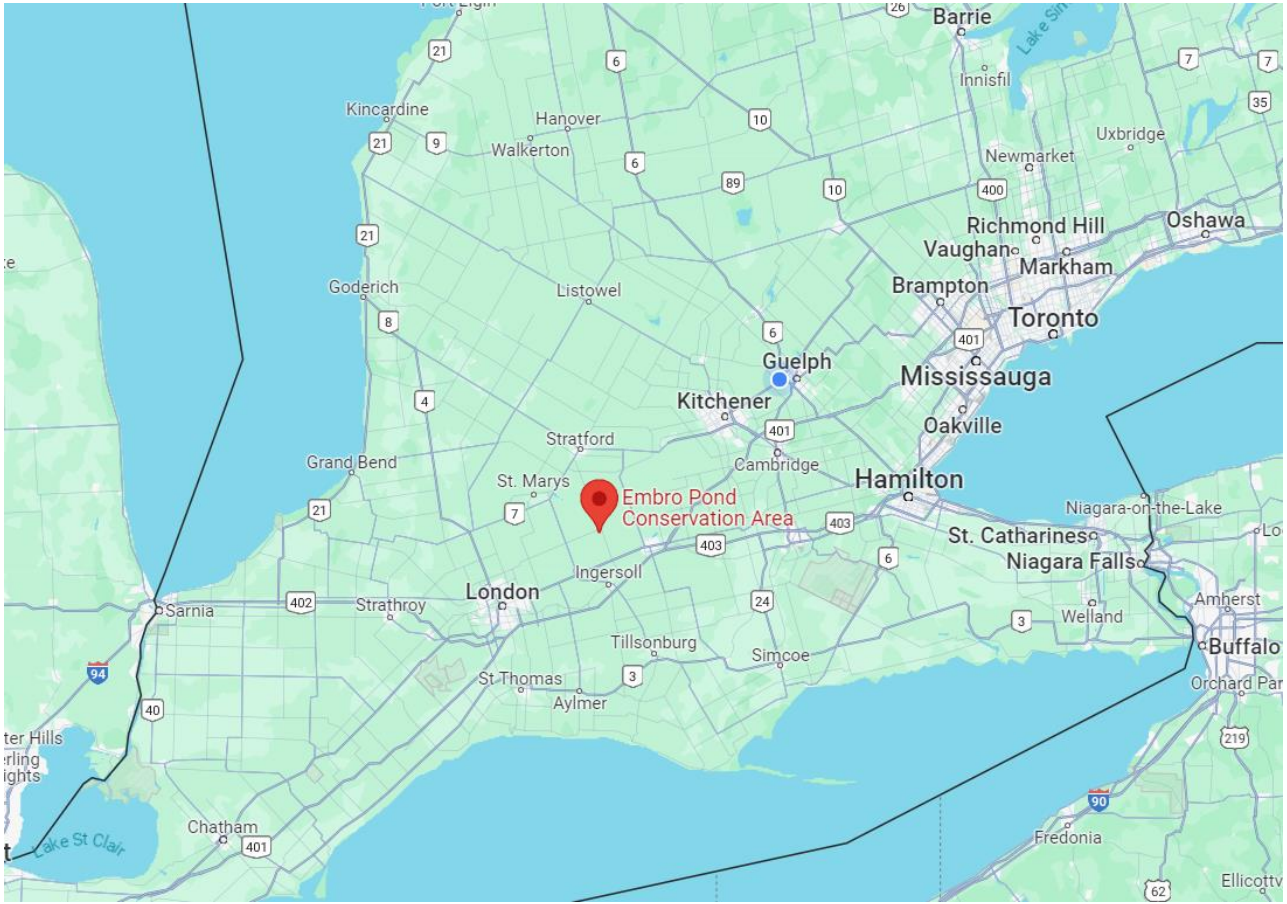
Matrix Solutions Inc.
A Montrose Environmental Company

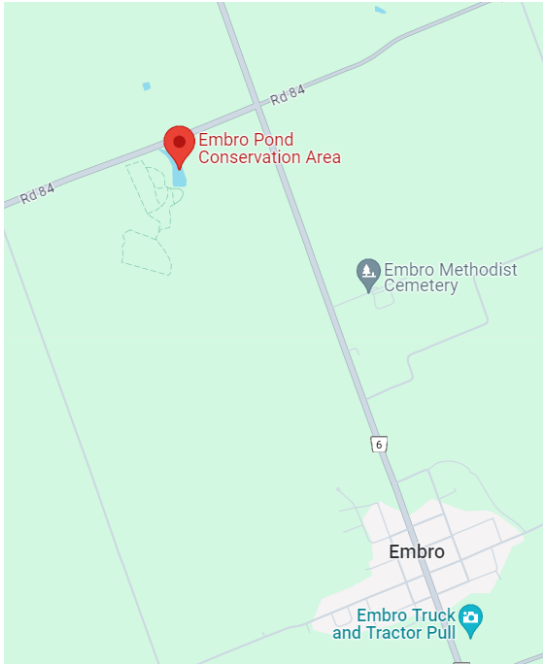
Agenda

- Environmental Assessment Study
- DRAFT Project Implementation Plan
- Next Steps

Environmental Assessment Study

STUDY LOCATION





STUDY LOCATION

Embro Dam was acquired by UTRCA in 1958 and reconstructed in 1959. The dam is located on Spring Creek, also known as Youngsville Drain, and is a tributary of North Branch Creek.

The dam controls a drainage area of 7 km^2 of mostly agricultural lands, forming a small reservoir of approximately 0.8 ha with an estimated volume of 3,000 m^3.

The dam structure consists of a 100 m long earthen embankment (4.5 m 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.

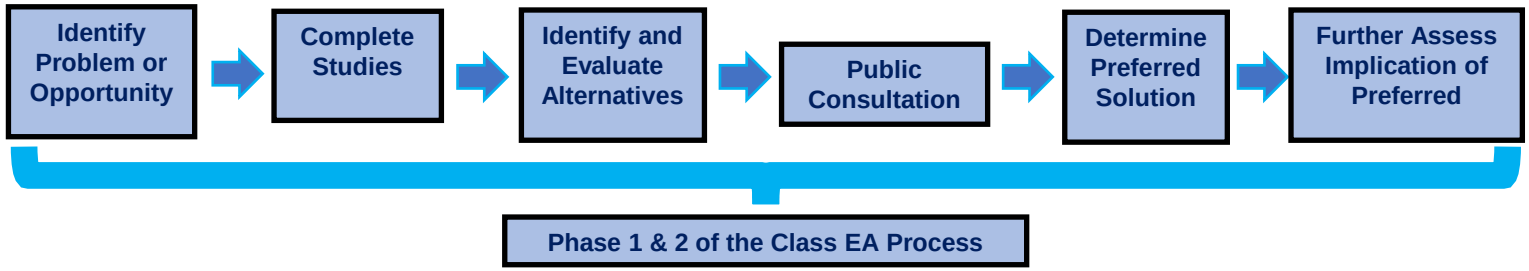
PROJECT HISTORY AND PROBLEM STATEMENT

- Dam safety and stability assessment studies (2007/2008) identified related concerns with the structure.
- Class EA project initially commenced in 2015
- Draft EA project file report completed in 2017
- Per comments received, UTRCA undertook additional cultural heritage assessments
- EA process recommenced Fall 2022

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

A Class Environmental Assessment was 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.

CLASS ENVIRONMENTAL ASSESSMENT PROCESS



Conservation Ontario Class Environmental Assessment for Remedial Flood and Erosion Control Projects process requires the establishment of a Community Liaison Committee (as necessary).

OVERVIEW OF KEY FINDINGS

Dam

- 100m long crest, does not meet current safety or stability standards

Pond

- Reservoir of approximately 0.5 ha, 27-35% of available pond volume has filled with sediment

Hydrology

- Upstream drainage area is 7 km^2; watercourse has high resiliency to drought / low flow conditions

OVERVIEW OF KEY FINDINGS

Geomorphology

- Channel downstream of Embro Dam degrading, channel upstream of road is aggrading

Natural Heritage

- 8 fish species upstream of pond, 21 fish species downstream of pond, confirmed or candidate Species at Risk (SAR; barn swallow, bats) and Species of Conservation Concern (SOCC; Snapping turtle)

Water Quality

- Water temperature is higher downstream of the dam (up to 7^{o}C measured in 2016)
- Other water quality parameters are within range of watershed

Brook Trout

Image Source: Mandrak and Crossman, 1992

OVERVIEW OF KEY FINDINGS

Social

- Conservation area used for passive recreation, hiking trails, cross country skiing trails and picnic areas

Cultural

- Site does not meet O.Reg. 9/06 and therefore is not considered a landmark

Archaeology

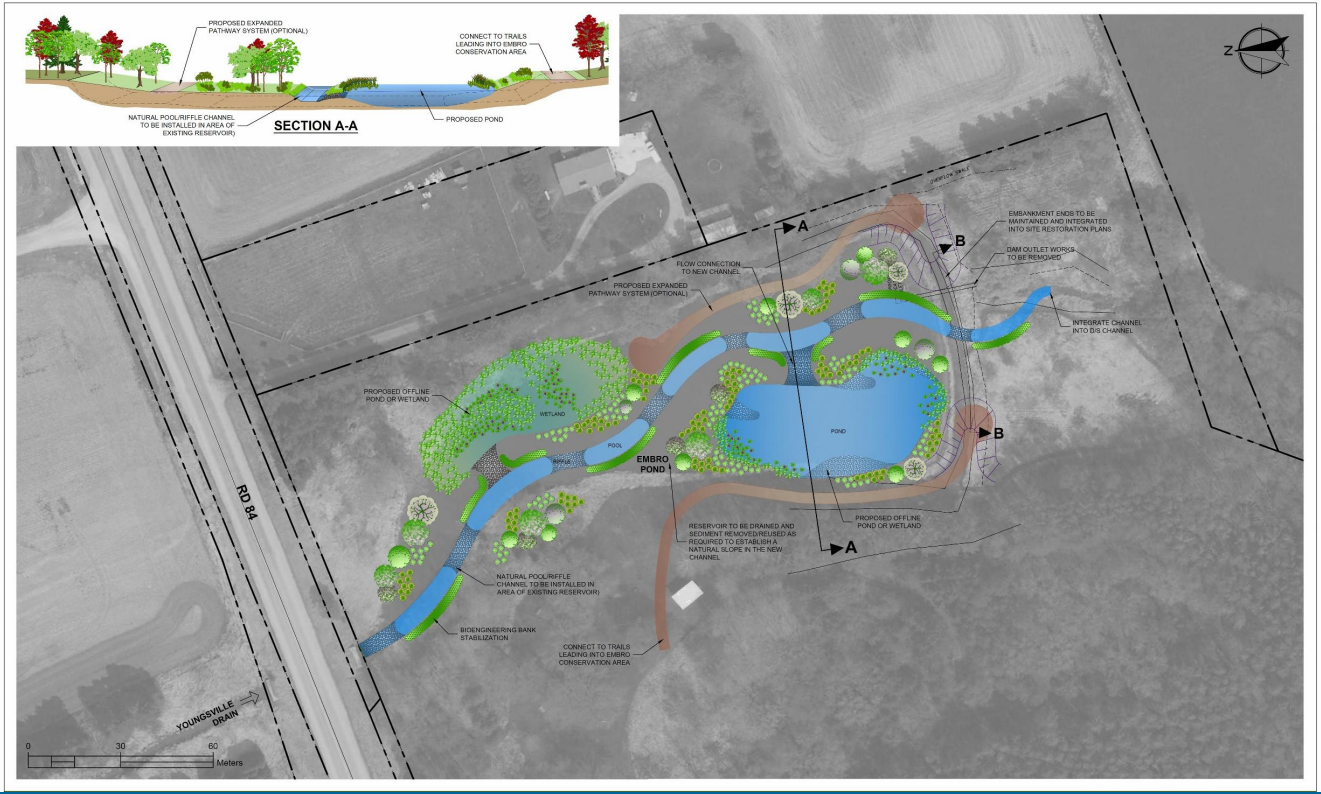
- Site has a reduced archaeological potential

ALTERNATIVE – DO NOTHING

ALTERNATIVE 2 – REPAIR / RECONSTRUCT EXISTING DAM

ALTERNATIVE 3 – REMOVE DAM & CONTRUCT NATURAL CHANNEL

ALTERNATIVE 4 – REMOVE DAM & CONSTRUCT OFFLINE POND(S) WETLAND(S)



ALTERNATIVE 5 – LOWER DAM CREST AND OUTLET & NATURALIZE NEW POND PERIMETER

ALTERNATIVE EVALUATION CRITERIA

Four primary categories

- **Technical**
  - ability to reduce flooding impacts, improve safety, constructability, approvability
- **Natural Environment**
  - benefits to aquatic and terrestrial ecology, geomorphology, water quality
- **Social/ Cultural Environment**
  - impacts to cultural / heritage features, to public / private property, to recreational opportunities
- **Financial**
  - capital outlay, reduced short- and long-term operational costs, ability to access external funding

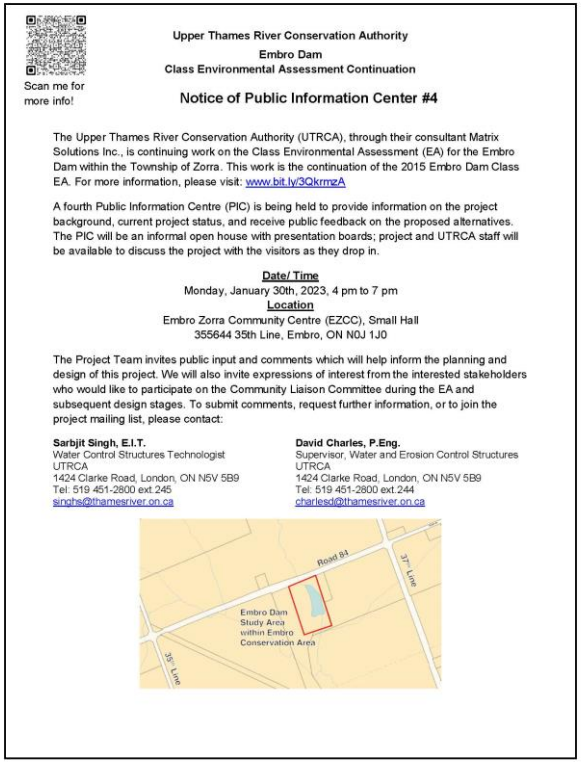
PUBLIC CONSULTATION

Public Information Centre #4 (Jan 30, 2023)

- 21 public participants
- Open-house format, display boards
- UTRCA and Matrix staff were present
- Public comments received using input forms and evaluation charts
- UTRCA invited “expressions of interest” from the public to engage in a Community Liaison Committee (CLC)
- Notice for public input issued Jan. 31, 2023 via e-mail and media release.
- 2-weeks comment period (Feb 13, 2023 deadline)

Results

- Input received from 8 individuals
- Public provided input to weighting of evaluation criteria
- 6 expressed interest in joining the CLC



Scan me for more info!

Upper Thames River Conservation Authority
Embro Dam
Class Environmental Assessment Continuation

Notice of Public Information Center #4

The Upper Thames River Conservation Authority (UTRCA), through their consultant Matrix Solutions Inc., is continuing work on the Class Environmental Assessment (EA) for the Embro Dam within the Township of Zorra. This work is the continuation of the 2015 Embro Dam Class EA. For more information, please visit: www.bit.ly/3QkrmzA

A fourth Public Information Centre (PIC) is being held to provide information on the project background, current project status, and receive public feedback on the proposed alternatives. The PIC will be an informal open house with presentation boards; project and UTRCA staff will be available to discuss the project with the visitors as they drop in.

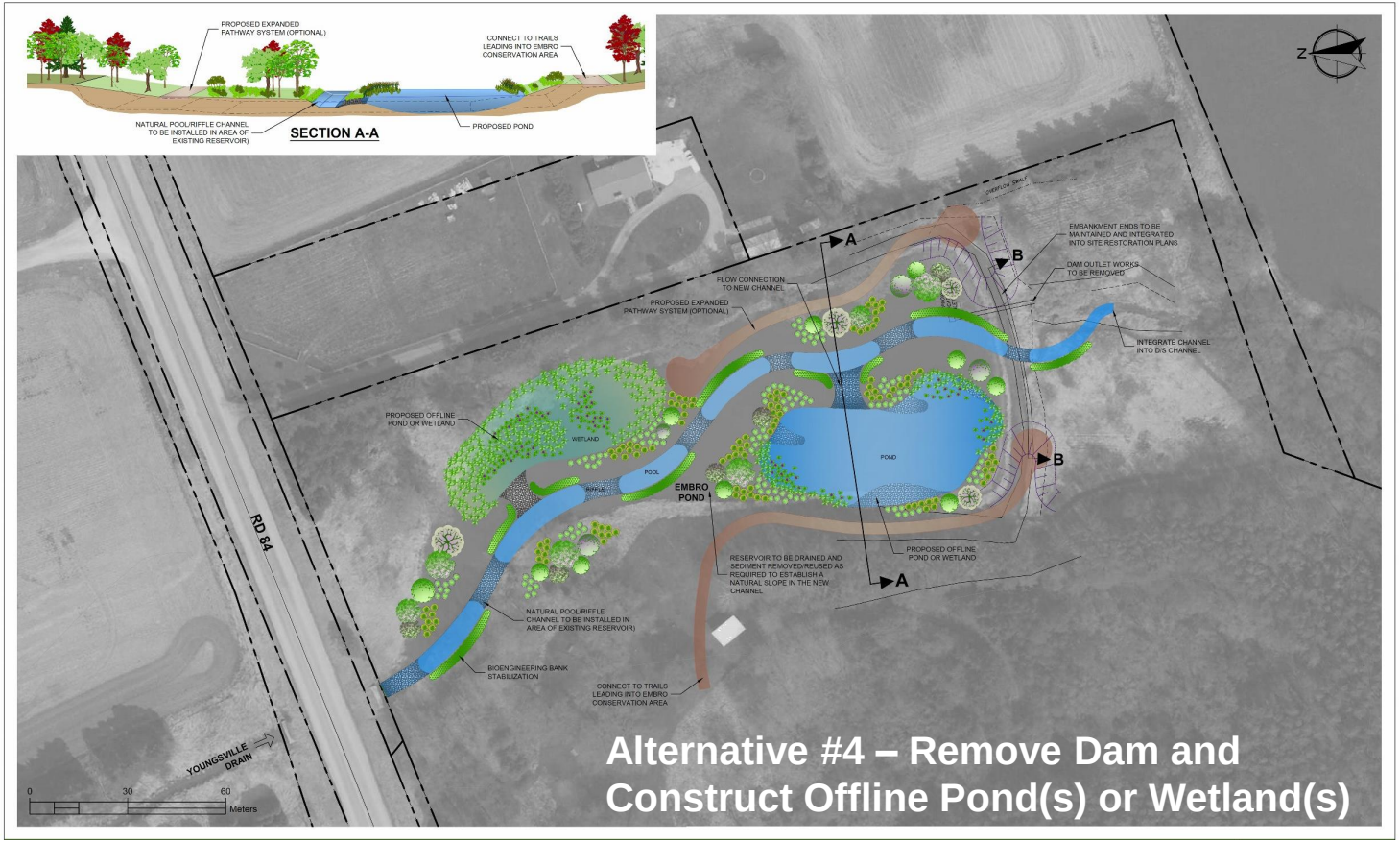
Date/ Time
Monday, January 30th, 2023, 4 pm to 7 pm
Location
Embro Zorra Community Centre (EZCC), Small Hall
355644 35th Line, Embro, ON N0J 1J0

The Project Team invites public input and comments which will help inform the planning and design of this project. We will also invite expressions of interest from the interested stakeholders who would like to participate on the Community Liaison Committee during the EA and subsequent design stages. To submit comments, request further information, or to join the project mailing list, please contact:

Sarbjit Singh, E.I.T.
Water Control Structures Technologist
UTRCA
1424 Clarke Road, London, ON N5V 5B9
Tel: 519 451-2800 ext.245
singhs@thamesriver.on.ca

David Charles, P.Eng.
Supervisor, Water and Erosion Control Structures
UTRCA
1424 Clarke Road, London, ON N5V 5B9
Tel: 519 451-2800 ext.244
charlesd@thamesriver.on.ca

PREFERRED ALTERNATIVE



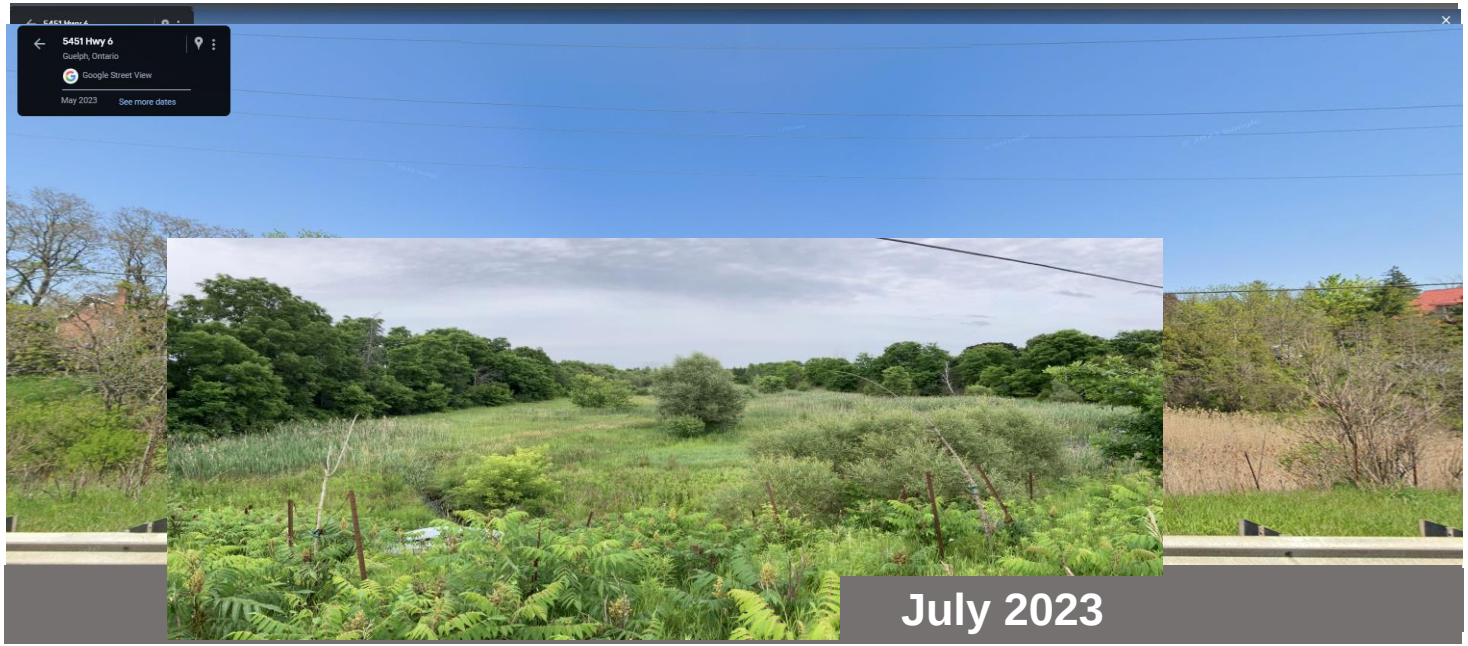
Examples

Hodges Pond Removal

Cedar Creek Restoration

Example – Marden Creek/Pond Removal

Example – Marden Creek/Pond Removal



Matrix Solutions Inc.
ENVIRONMENT & ENGINEERING

IMPACTS OF PREFERRED ALTERNATIVE

Technical

- May interfere with nearby shallow groundwater wells
- Eliminates dam safety hazard

Environmental

- Enhances terrestrial corridor and vegetation diversity
- Improved water cooling
- Removes fish migration impediment, improve species diversity
- Enhances aquatic habitat through channel restoration
- Re-adjustment to an unattenuated flow regime

IMPACTS OF PREFERRED ALTERNATIVE

Social/ Cultural

- Recreational opportunities will change
- Loss of still water fishing and recreation boating
- Possible trail enhancement, educational signage, and ‘birding’/viewing of wildlife species

Financial

- Larger capital outlay, reduced short- and long-term operational costs

Project Implementation Plan - DRAFT

Planning Steps

- Technical Assessments
- Consultation
- Detailed Design
- Permits and Approvals
- Implementation
  - Site preparation
  - Fish rescue
  - Phased removal
  - Post-Construction Monitoring / Management

Technical Studies

- Contributory watershed hydrology review
- Archaeology – Stage 2
- Hydrogeology – adjacent wells
- Sediment characterization (if off-site transport required)

Continued Consultation

- Indigenous communities
- Community Liaison Committee (CLC)
- Regulatory agencies

UPPER THAMES RIVER
CONSERVATION AUTHORITY

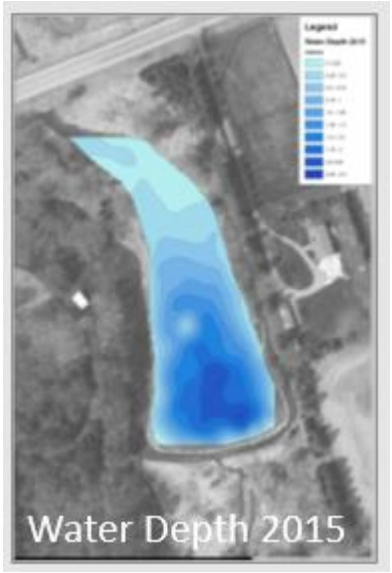
Detailed Design

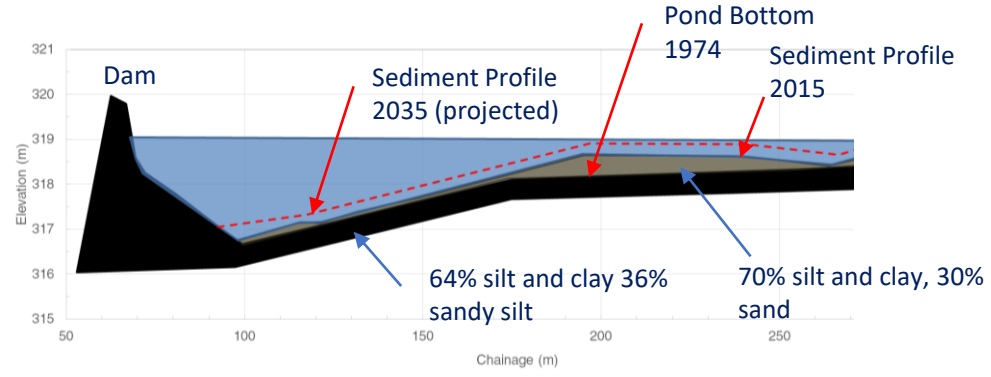
- Dam decommissioning
- Channel configuration (section, profile)
- Project phasing
- Erosion and sediment control
- Recreational planning for the Embro CA (e.g., trails / viewing platforms)

Initial Project Phasing: Pre-design

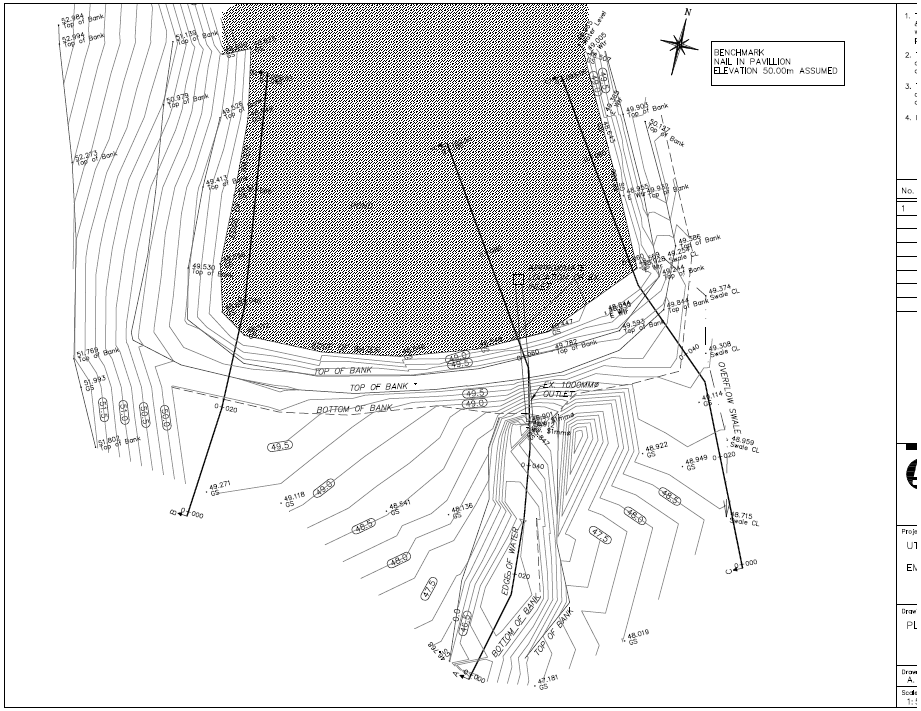
- Draw down of pond (fall 2023)
- Agency consultation (DFO, MNR, MTSC, MECP, UTRCA)
- Potential staged removal of sill within the outlet structure (late spring 2024 (June?)) to maximum extent possible
- Opportunity to seed exposed sediment during drawdown period

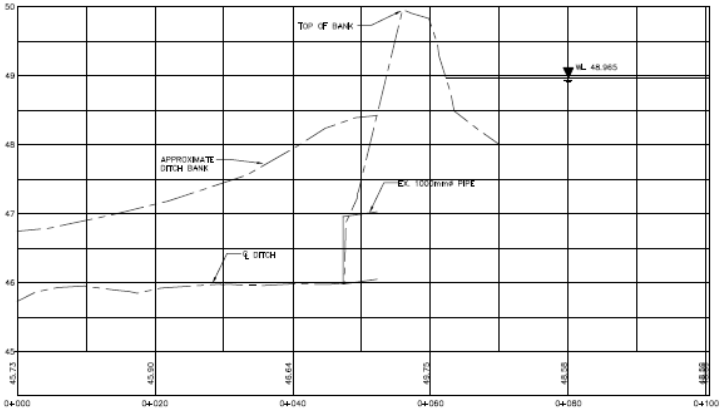
Sediment Profile

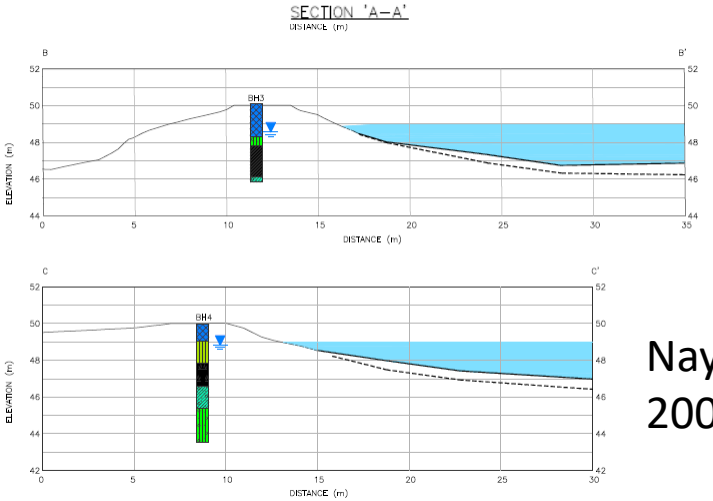




Burnside (2008) drawing





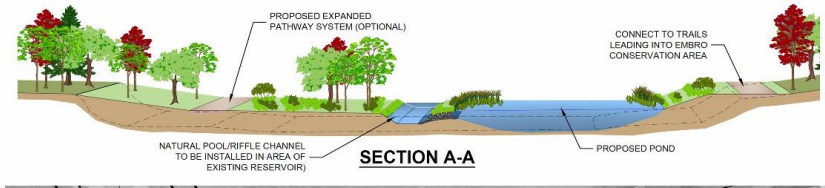


Naylor, 2008

Matrix Solutions Inc.
A Montrose Environmental Company

Design

- Based on visual observation after drawdown and initial stabilization
- Design elements (where, what):
  - Channel sections, profile, planform, substrate
  - Wetland location, configuration
  - Dam embankment removal
  - Stockpile material location
  - Erosion and sediment control
  - Trails and educational signage
- Approvals


PROPOSED EXPANDED
PATHWAY SYSTEM (OPTIONAL)
CONNECT TO TRAILS
LEADING INTO EMBRO
CONSERVATION AREA
NATURAL POOL/RIFFLE CHANNEL
TO BE INSTALLED IN AREA OF
EXISTING RESERVOIR)
PROPOSED POND

SECTION A-A

N
A
B
EMBANKMENT ENDS TO BE
MAINTAINED AND INTEGRATED
INTO SITE RESTORATION PLANS
DAM OUTLET WORKS
TO BE REMOVED
FLOW CONNECTION
TO NEW CHANNEL
PROPOSED EXPANDED
PATHWAY SYSTEM (OPTIONAL)
INTEGRATE CHANNEL
INTO D/S CHANNEL
PROPOSED OFFLINE
POND OR WETLAND
WETLAND
POOL
RIFFLE
POND
EMBRO
POND
RD 84
RESERVOIR TO BE DRAINED AND
SEDIMENT REMOVED/REUSED AS
REQUIRED TO ESTABLISH A
NATURAL SLOPE IN THE NEW
CHANNEL
PROPOSED OFFLINE
POND OR WETLAND
NATURAL POOL/RIFFLE
CHANNEL TO BE INSTALLED IN
AREA OF EXISTING RESERVOIR)
BIOENGINEERING BANK
STABILIZATION
CONNECT TO TRAILS
LEADING INTO EMBRO
CONSERVATION AREA
YOUNGSVILLE
DRAIN
0
30
60
Meters

Regulatory Agency Permits

- Department of Fisheries and Oceans
- Ministry of Natural Resources
- Ministry of Tourism, Sport, and Culture
- Ministry of Environment, Conservation and Parks
- Upper Thames River Conservation Authority

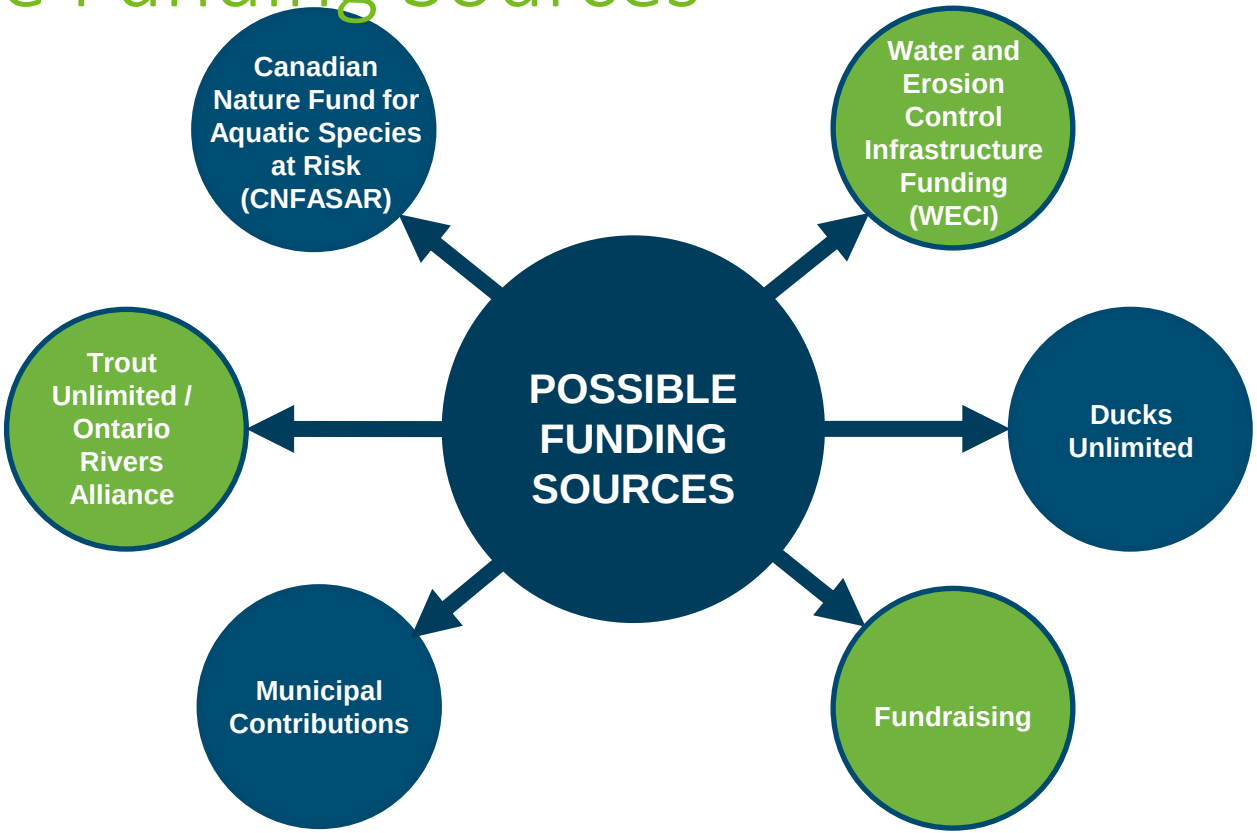
Implementation

- Pre-design drawdown and initial agency consultation (2024)
- Tender documents and contractor
- Detailed design and agency approvals (2024/25)
- Construction (TBD: could be multiple phasing)
- Key: Adaptive Management

Monitoring / Management

- Ensure disturbed areas / exposed sediments are stabilized/planted
- Monitor new (in pond) / existing (upstream / downstream) watercourses:
  - Sections, profile
  - Recovery of aquatic habitat and fish populations (diversity, species)
- Invasive species management (e.g., phragmites)
- Longer-term planning

Possible Funding Sources



Next Steps and Contact

- **Update Project Plan**
- **Meet with Zorra Township**
- **Meet with UTRCA Board**
- **Finish and File EA**
- **Obtain Funding**
- **Detailed Design**
- **Construction**

QUESTIONS?

Contact Us

Mariëtte Pushkar, M.Sc., P.Geo
Principal, Fluvial Geomorphologist
mpushkar@matrix-solutions.com
226.220.3835

Scott Robertson, P.Eng
Senior Water Resource Engineer
srobertson@matrix-solutions.com
226.753.6411

Jeff Prince, P.Eng
Principal, Water Resource Engineer
jprince@matrix-solutions.com
226.339.5605

matrix-solutions.com

Matrix Solutions Inc.
A Montrose Environmental Company