Appendix K

Formal Meetings

1. Presentation to the Township of Zorra (December 21, 2022)
2. Meeting between the Zorra Heritage Committee and UTRCA (January 05, 2023)
3. Meeting with the UTRCA Board of Directors (February 28, 2023)
4. Presentation to the Zorra Township Council (March 01, 2023)
5. Presentation to the Zorra Township Council (January 17, 2024)
6. Presentation to the UTRCA Board of Directors (January 30, 2024)

Presentation to the Township of Zorra (December 21, 2022)

Embro Dam Class Environmental Assessment 2022

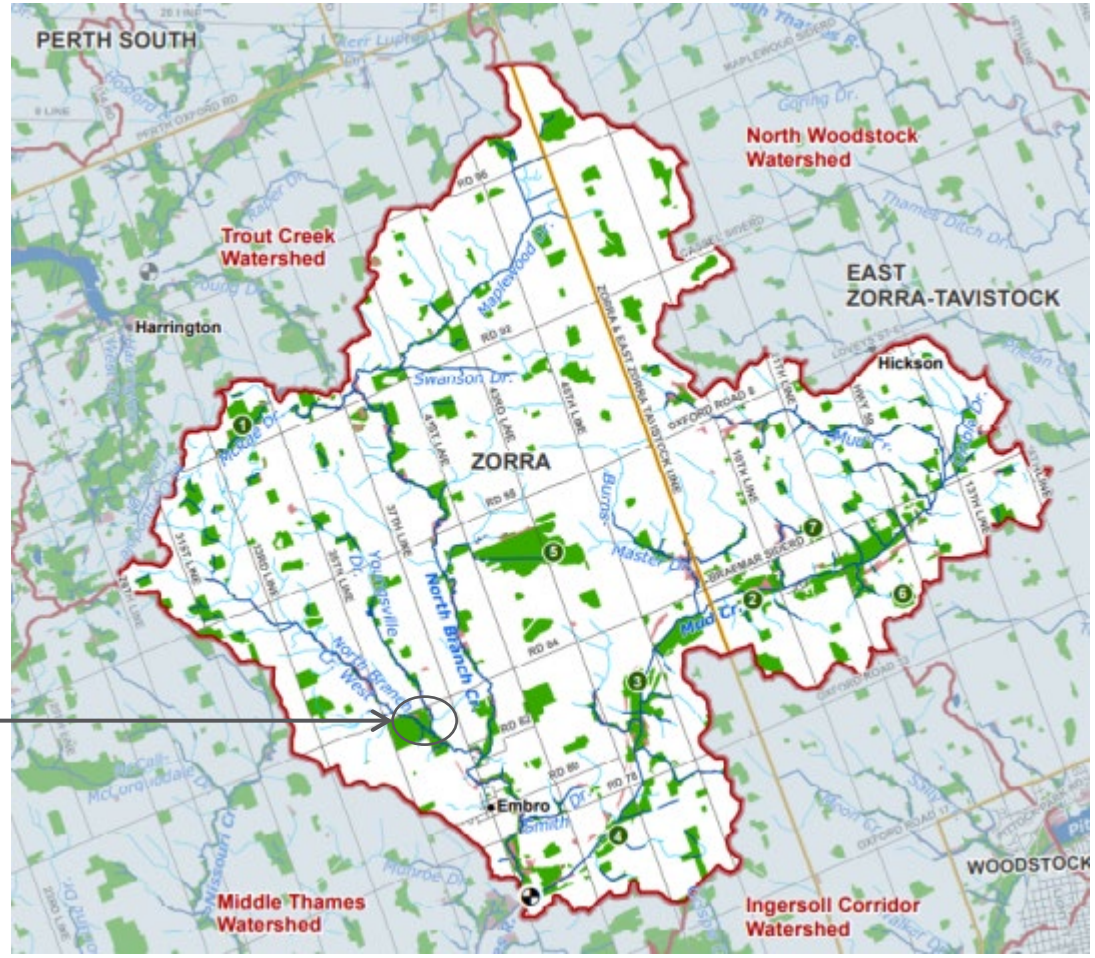
Presentation 1 – Zorra Township Council

December 21st, 2022

UPPER THAMES RIVER CONSERVATION AUTHORITY

Project Site Overview

Embro Conservation Area



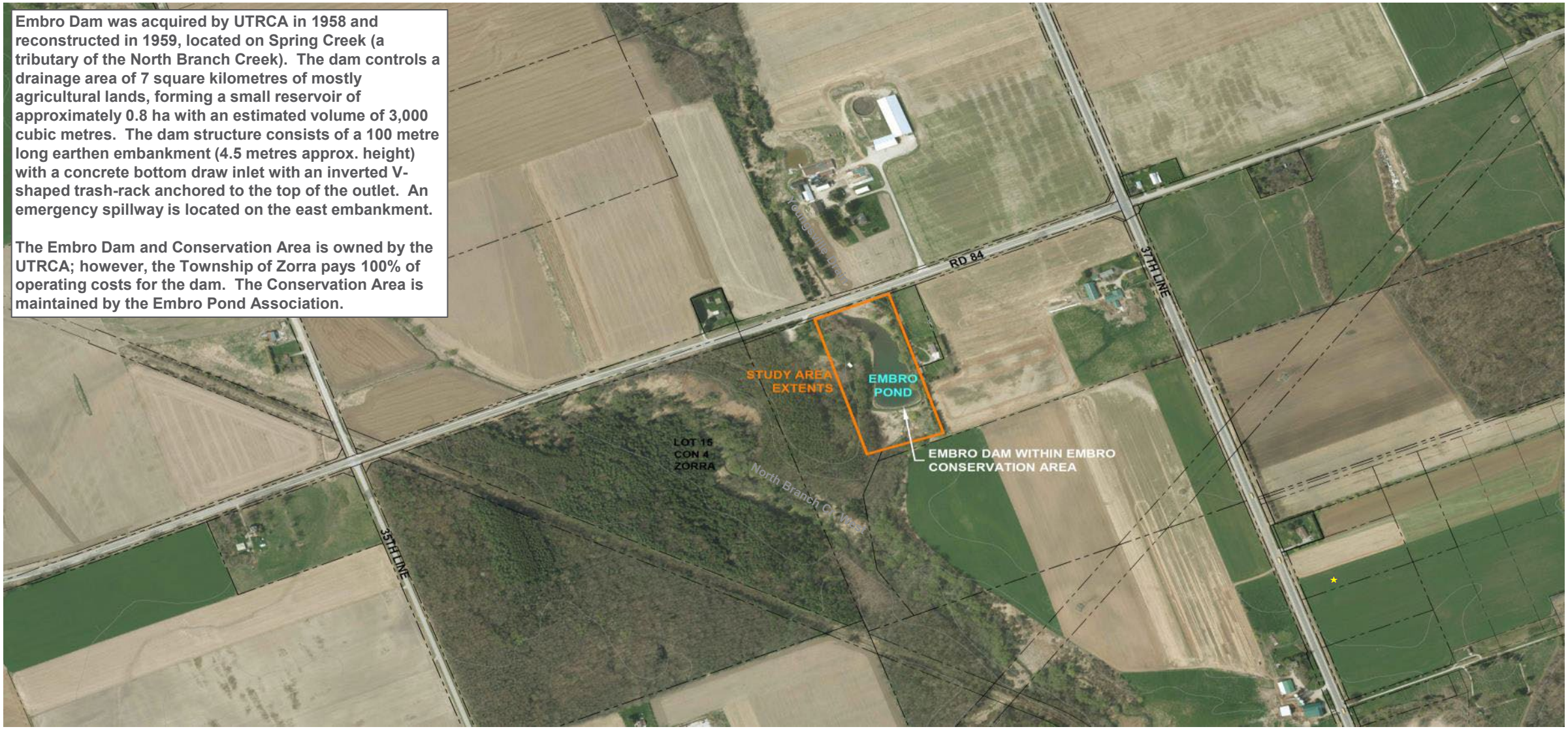
Mud Creek Watershed

UPPER THAMES RIVER CONSERVATION AUTHORITY

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.



UPPER THAMES RIVER CONSERVATION AUTHORITY

Upper Thames River Conservation Authority
Public Information Centre

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.

UPPER THAMES RIVER
CONSERVATION AUTHORITY

Upper Thames River Conservation Authority
Public Information Centre

Problem Statement: Why is a Class EA Necessary?

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*

This is a continuation of a Class Environmental Assessment that was initiated in 2015 to evaluate a range of alternatives to address the identified issues in consideration of the environmental, social, economic, and technical aspects of the dam.

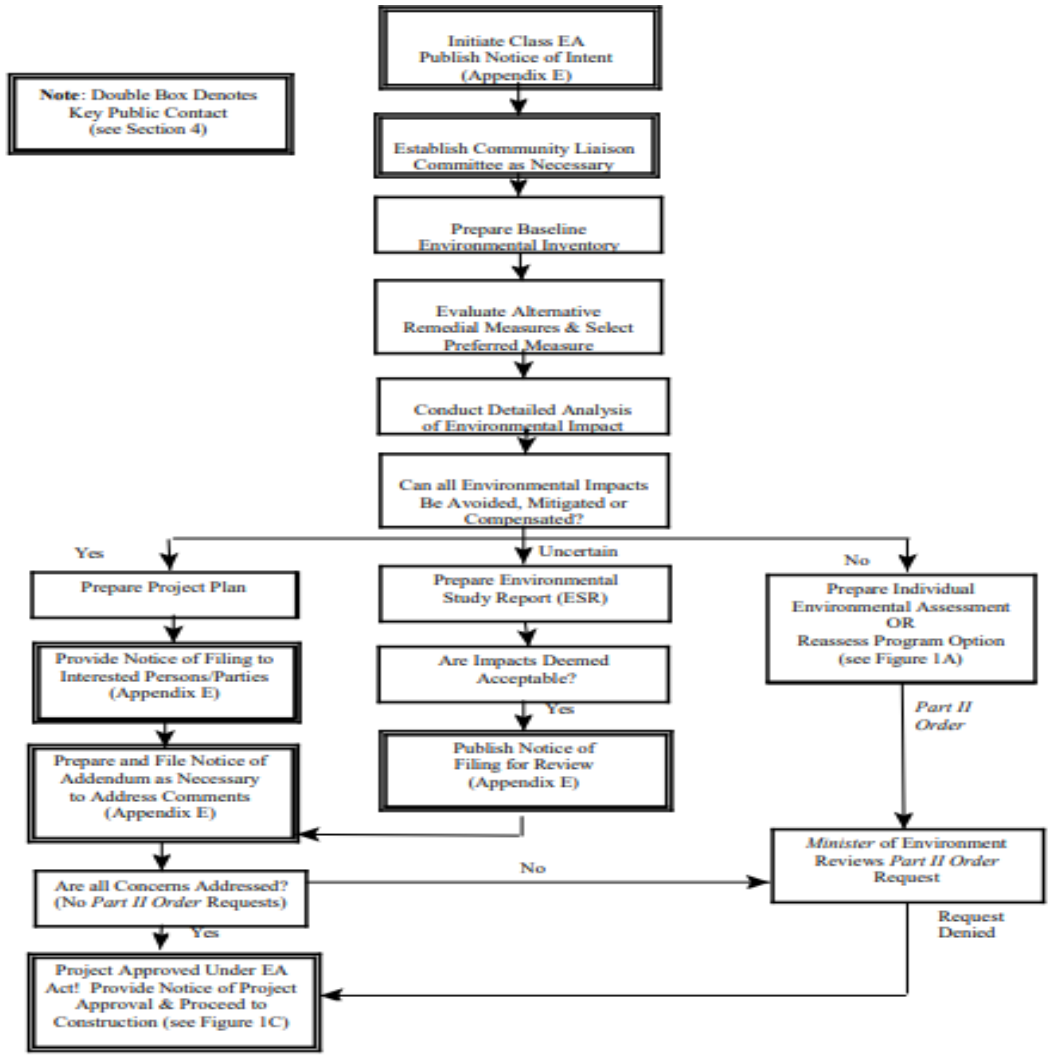
The project will continue under the Conservation Ontario Class Environmental Assessment for Remedial Flood and Erosion Control Projects Document (June, 2013).

Class Environmental Assessment Process and Problem Statement

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

In a nutshell:

- Publish Notice of Intent to advise all affected about the study
- Undertake a program to collect background information and relevant data on the study area
- Prepare a characterization of the study area as it relates to the problem statement, this includes technical, social and cost factors
- Develop alternatives that could address the issues
- Evaluate alternatives against a criteria (technical, social and cost)
- Select the preferred alternative
- Prepare concept level plans to depict the preferred alternative
- Prepare the EA report (project plan) and file for 30 days



https://conservationontario.ca/fileadmin/pdf/conservation_authorities_section_planning___regulations/Class_EA_for_Remedial_Flood_and_Erosion_Control_ProjectsCA.pdf

Field Data Collection and Site Characterization

A range of technical, environmental, and social factors has been 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.

Topographic Survey	Aquatic Biology	Geotechnical Engineering and Hydrogeology	Civil Engineering (Dam Structure and Hazard Assessment)
Hydrology	Terrestrial Biology	Sediment Quality	Water Quality
Fluvial Geomorphology	Cultural/Social Environment	Archaeology	Sediment Survey

Alternative Evaluation Criteria

Criteria	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Technical/ Engineering	11	17	25	24	18
Natural Environment	8	10	20	21	15
Social/ Cultural Environment	16	19	15	14	18
Economic	15	17	20	17	10
OVERALL NORMALIZED CATEGORY SCORE (100% WEIGHTING)	50	63	80	76	61
PREFERRED OVERALL RANKING (1 = most preferred; 5 = least preferred)	5	3	1	2	4

1 – Do Nothing
2 – Repair Dam
3 – Remove Dam and construct Natural Channel
4 – Remove dam and construct offline pond / wetland
5 – Lower dam crest and outlet, naturalize pond

Preferred Alternative – Alternative 3 - Remove Dam and Construct Natural Channel

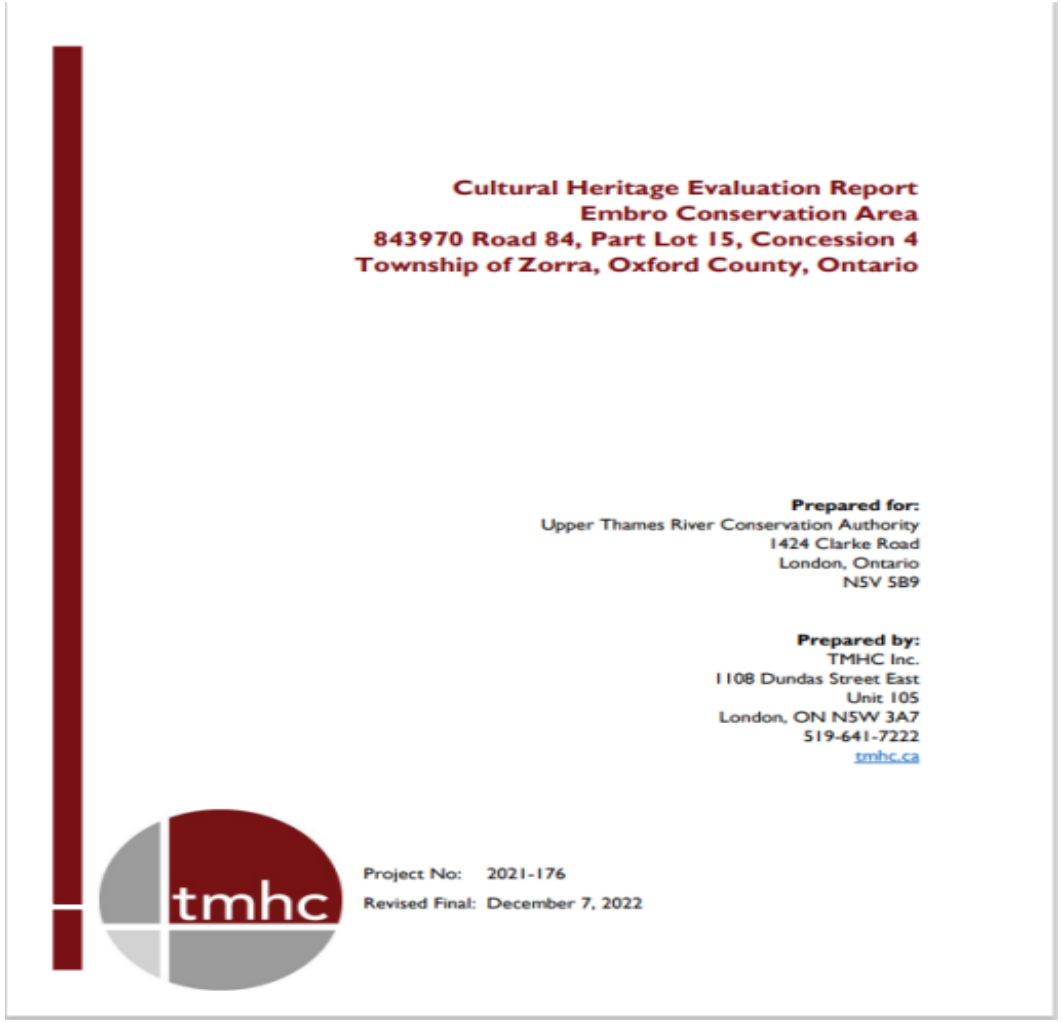
Cost Estimates

Alternatives	Primary elements/ factors influencing costs	Initial Costs (1 to 5 years)	Operation and Maintenance
Alternative 1 Do nothing	Repairs to concrete structures, site restoration in the event of failure (assumed)	$3,000 to $15,000	$1,500 to $5,000 per year
Alternative 2 Repair dam	Improved dam embankment and outlet, construct emergency spillway, rock protection	$150,000 to $200,000	$1,500 to $20,000 per year. Dam retirement (75 yrs) costs $80,000[1]
Alternative 3 Remove dam and construct natural channel	Dam removal, channel construction, sediment removal, site restoration	$250,000 to $320,000	$1,500 to $3,000 per year
Alternative 4 Remove dam and construct offline pond / wetland	Dam removal, channel construction, sediment removal, offline pond construction, site restoration	$350,000 to $450,000	$1,500 to $5,000 per year
Alternative 5 Lower dam crest and outlet, naturalize pond	Dam crest reconstruction, replace outlet bottom draw structure, sediment removal	$500,000 to $600,000	$3,000 to $20,000 per year. Dam retirement (75 yrs) costs $80,000[1]

[1] dam retirement cost reflects 2016 cost

Cultural Heritage Evaluation Report, TMHC (2022)

- Intended to provided heritage evaluation of the subject site against the criteria set out by the Ontario Heritage Act (OHA), O. Reg 09/06.
- Current heritage status as “Natural Area or Park” on Oxford County Heritage Resources Inventory
  - No National Historic Sites, Ontario Heritage Trust-owned owned properties, conservation easements or Provincial Heritage Properties present on or adjacent to the subject site.
- Contains historical research and analysis: Indigenous settlement and treaties, early municipal settlement, and local property history.



UPPER THAMES RIVER
CONSERVATION AUTHORITY

Cultural Heritage Evaluation Report, TMHC (2022)

Community Engagement

- UTRCA provided contents of Public Information Centres from 2015 Class EA to TMHC
- TMHC also contacted:
  - Township of Zorra,
  - Embro Pond Association,
  - Oxford County Archives,
  - Ontario Heritage Trust, &
  - Ontario Ministry of Tourism, Culture and Sport (Duties of the OHA are now under the Ontario Ministry of Citizenship and Multiculturalism).
- UTRCA will re-post the CHER report (revised on Dec 12, 2022 to reflect comments from MCM)
- Additional comments may be received through the ongoing EA consultation

UPPER THAMES RIVER
CONSERVATION AUTHORITY

Cultural Heritage Evaluation Report, TMHC (2022)

Evaluation

- Embro Dam was found to not meet the O.Reg 9/06 Criteria.
- Interpretive signage recommended.

2. The property has historical value or associative value because it:

Criterion	Summary of Response
i. has direct associations with a theme, event, belief, person, activity, organization or institution that is significant to a community,	No; the Subject Site is not known to have direct associations with a theme, event, belief, person activity, organization or institution that is significant to a community. The current mill pond and dam are the result of alterations to the property that occurred after its industrial usage when the site was converted to a public-access Conservation Area. There are no visible remains that associate the property with its industrial past.
ii. yields, or has the potential to yield, information that contributes to an understanding of a community or culture, or	No; the property is not known to yield information that contributes to an understanding of a community or culture. There exists no visible remains that relate to the former industrial usage of this property.
iii. demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community	No; the property is not known to demonstrate the work or ideas of an architect, builder, designer or theorist who is significant to a community.

Table 2: Historical or Associative Value

Page 30, Cultural Heritage Evaluation Report, TMHC, 2022

1. The property has design value or physical value because it:

Criterion	Summary of Response
i. is a rare, unique, representative or early example of a style, type, expression, material or construction method,	No; while the Subject Site is an example of a mid-20th century adaptation of a former industrial site, it is not a significant example and many other such properties exist in Ontario. The pond in its current form, which is the result of this post-industrial expansion, is not indicative of the mill function that the property once served. The current dam is a modest example of a concrete pipe conduit and emergency spillway. No visible remains of the former mill exist.
ii. displays a high degree of craftsmanship or artistic merit, or	No; while the property is an example of a mid-20th century conservation area, it does not demonstrate a high degree of craftsmanship or artistic merit relative to what is typical for this typology. Both the pond and dam, in their current state, are the result of alterations to the property that occurred when the property was established as a Conservation Area.
iii. demonstrates a high degree of technical or scientific achievement.	No; while the property is an example of a concrete pipe conduit dam, it does not demonstrate a high degree of technical or scientific achievement relative to what is typical for this typology.

Table 1: Design or Physical Value

Page 31, Cultural Heritage Evaluation Report, TMHC, 2022

3. The property has contextual value because it:

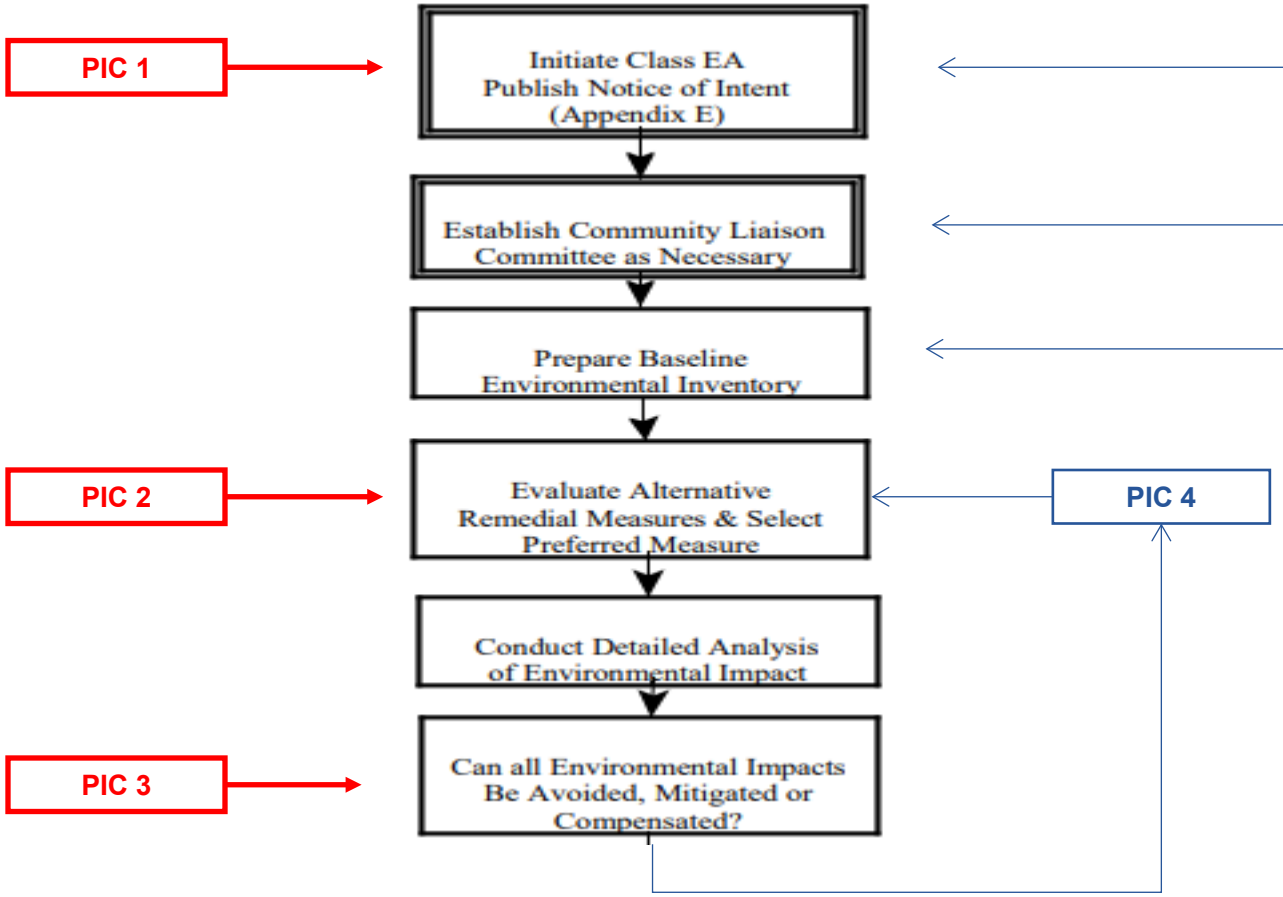
Criterion	Summary of Response
i. is important in defining, maintaining or supporting the character of an area,	No; as part of a relatively modest conservation area in a rural setting, the property is not important in defining, maintaining, or supporting the character of the area. The current pond and dam are the result of a mid-20th century adaptation of the property for recreational use as a Conservation Area that occurred well after its industrial usage.
ii. is physically, functionally, visually or historically linked to its surroundings, or	No; while, the property is integrated with the creek it conveys, it is not physically, functionally, visually, or historically linked to its surroundings such as it meets this criterion. The current form of the pond appears is detached from its historical usage as a mill pond since it was expanded significantly in the middle of the 20th century. Similarly, the dam has been replaced, and the former mill – and resultant industrial function of the area – regardless of where it was located, is no longer present in any distinguishable form.
iii. is a landmark.	No; while the Subject Site is a draw to local visitors, it is part of a relatively modest Conservation Area in a rural setting. As such, the property is not a visual landmark, and it is not currently known or believed to meet this criterion as a community landmark.

Table 3: Contextual Value

Page 31, Cultural Heritage Evaluation Report, TMHC, 2022

UPPER THAMES RIVER
CONSERVATION AUTHORITY

Embro Dam Class EA since 2015



https://conservationontario.ca/fileadmin/pdf/conservation_authorities_section_planning___regulations/Class_EA_for_Remedial_Flood_and_Erosion_Control_ProjectsCA.pdf

- UTRCA issued the “Notice of Intent” on Nov 03, 2022.
- Request interest in the community Liaison committee.
- UTRCA provided information on the updated environmental conditions to its Consultant, Matrix Solutions Inc.
- **Currently**, Matrix is re-evaluating alternative remedial measures, including any new alternatives.
- Another Public Information Centre (PIC 4) will be held in January, 2023.

UPPER THAMES RIVER
CONSERVATION AUTHORITY

Embro Dam Class EA Continuation (2022- 2023)

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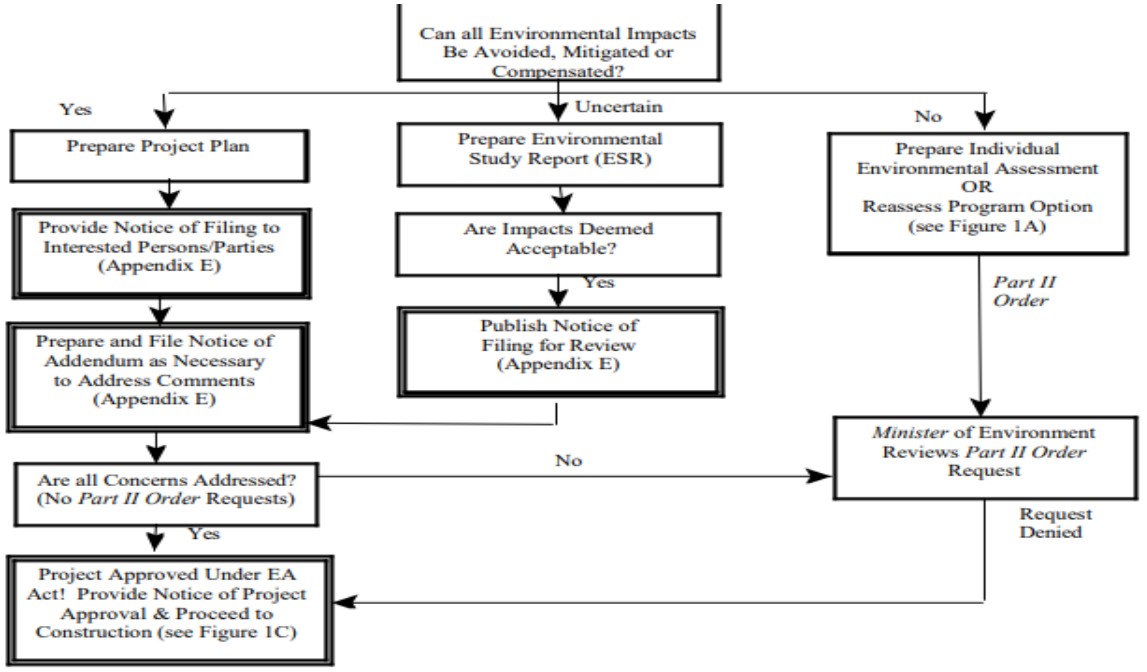
- Another Public Information Centre (PIC 4) will be held in January, 2023.

UPPER THAMES RIVER
CONSERVATION AUTHORITY

Embro Dam Class EA Continuation (2022- 2023)

- **Next Steps:**
  - A Public Information Centre will be held during January 2023 to present project updates and receive feedback.
  - Another presentation to Zorra Township Council during February 2023 with the study updates.
  - UTRCA board report during February 2023.
  - Notice of filing during March 2023.
  - 30-day comment period.



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UPPER THAMES RIVER
CONSERVATION AUTHORITY

Stakeholders

- UTRCA provided the “Notice of Intent” to the following stakeholders:
  - UTRCA; Conservation Ontario;
  - Ministry of Environment, Conservation, and Parks;
  - Ministry of Natural Resources and Forestry;
  - Ministry of Citizenship and Multiculturalism;
  - Ministry of Aboriginal Affairs;
  - Aboriginal Affairs and Norther Development Canada (AANDC); Fisheries and Oceans Canada;
  - Township of Zorra; Oxford County;
  - Métis Nations of Ontario;
  - First Nations;
  - Local groups: Embro Pond Association, Zorra Heritage Committee;
  - Others

Useful Links

- Class Environmental Assessment for Remedial Flood and Erosion Control Projects, Conservation Ontario (June, 2013). https://conservationontario.ca/fileadmin/pdf/conservation_authorities_section_planning___regulations/Class_EA_for_Remedial_Flood_and_Erosion_Control_ProjectsCA.pdf
- UTRCA webpage for Embro Class Environmental Assessment: https://thamesriver.on.ca/water-management/recreational-dams/classea-harrington-embro-dams/embro-dam-class-ea/
- Cultural Heritage Evaluation Report, TMHC (2022) https://thamesriver.on.ca/wp-content/uploads/Embro-Dam-CulturalHeritageEvalReport-12Dec2022-final.pdf

UPPER THAMES RIVER
CONSERVATION AUTHORITY

Meeting between the Zorra Heritage Committee and UTRCA – January 05, 2023

1. Powerpoint Presentation
2. Meeting Minutes (including UTRCA responses)

Presentation to Zorra Heritage Committee (January 05, 2023)

Embro Dam Class Environmental Assessment 2022

Presentation 2 – Zorra Heritage Committee

January 05th, 2022

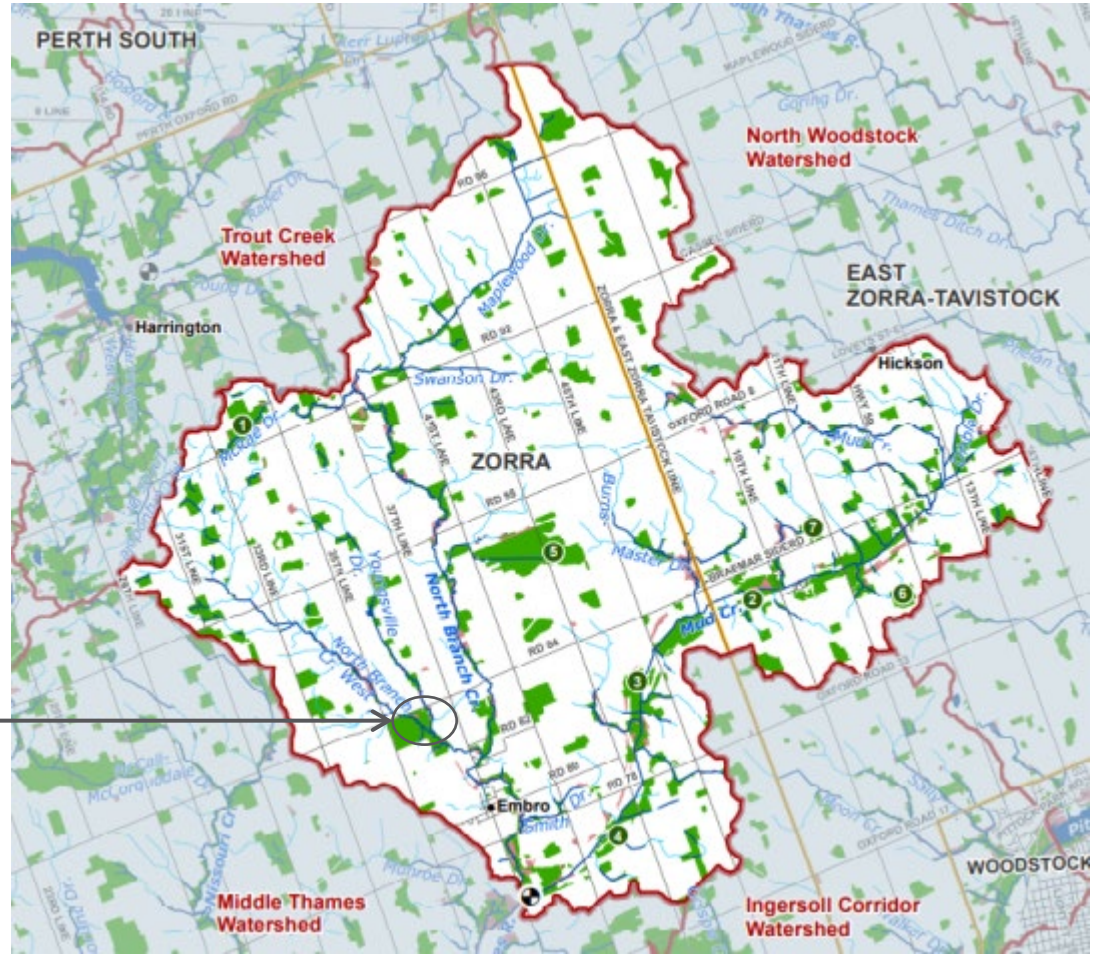
UPPER THAMES RIVER
CONSERVATION AUTHORITY

Agenda

1. Project site overview
2. Problem Statement
3. CO Class EA process
4. Project history (2015 – 2022)
5. Cultural Heritage Evaluation Report
6. Project update and Current Status
7. Next Steps

Project Site Overview

Embro Conservation Area



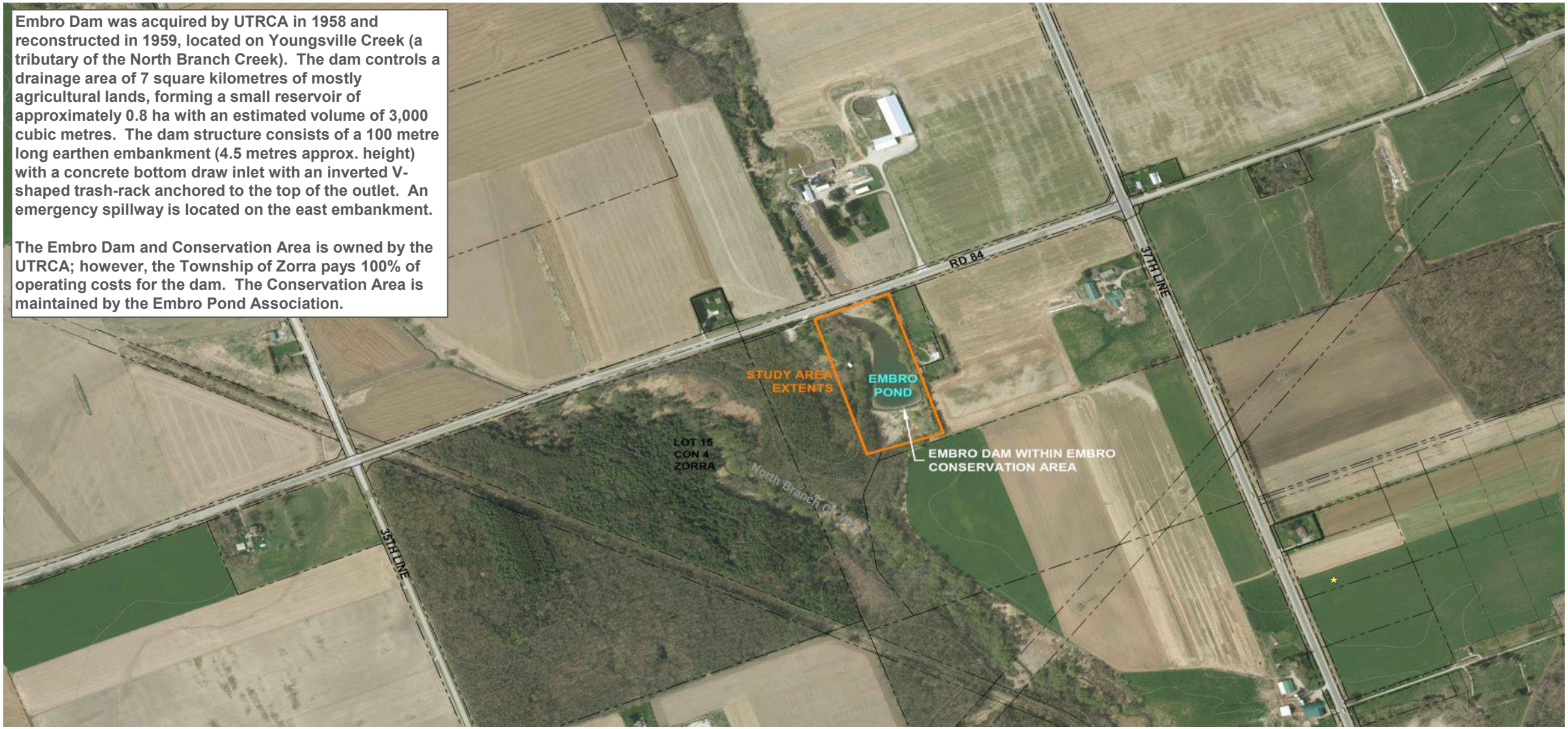
Mud Creek Watershed

UPPER THAMES RIVER CONSERVATION AUTHORITY

Embro Dam Study Area

Embro Dam was acquired by UTRCA in 1958 and reconstructed in 1959, located on Youngsville 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.



UPPER THAMES RIVER CONSERVATION AUTHORITY

Upper Thames River Conservation Authority
Public Information Centre

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.

UPPER THAMES RIVER
CONSERVATION AUTHORITY

Upper Thames River Conservation Authority
Public Information Centre

Problem Statement: Why is a Class EA Necessary?

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*

This is a continuation of a Class Environmental Assessment that was initiated in 2015 to evaluate a range of alternatives to address the identified issues in consideration of the environmental, social, economic, and technical aspects of the dam.

The project will continue under the Conservation Ontario Class Environmental Assessment for Remedial Flood and Erosion Control Projects Document (June, 2013).

Class Environmental Assessment Process and Problem Statement

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

In a nutshell:

- Publish Notice of Intent to advise all affected about the study
- Undertake a program to collect background information and relevant data on the study area
- Prepare a characterization of the study area as it relates to the problem statement, this includes technical, social and cost factors
- Develop alternatives that could address the issues
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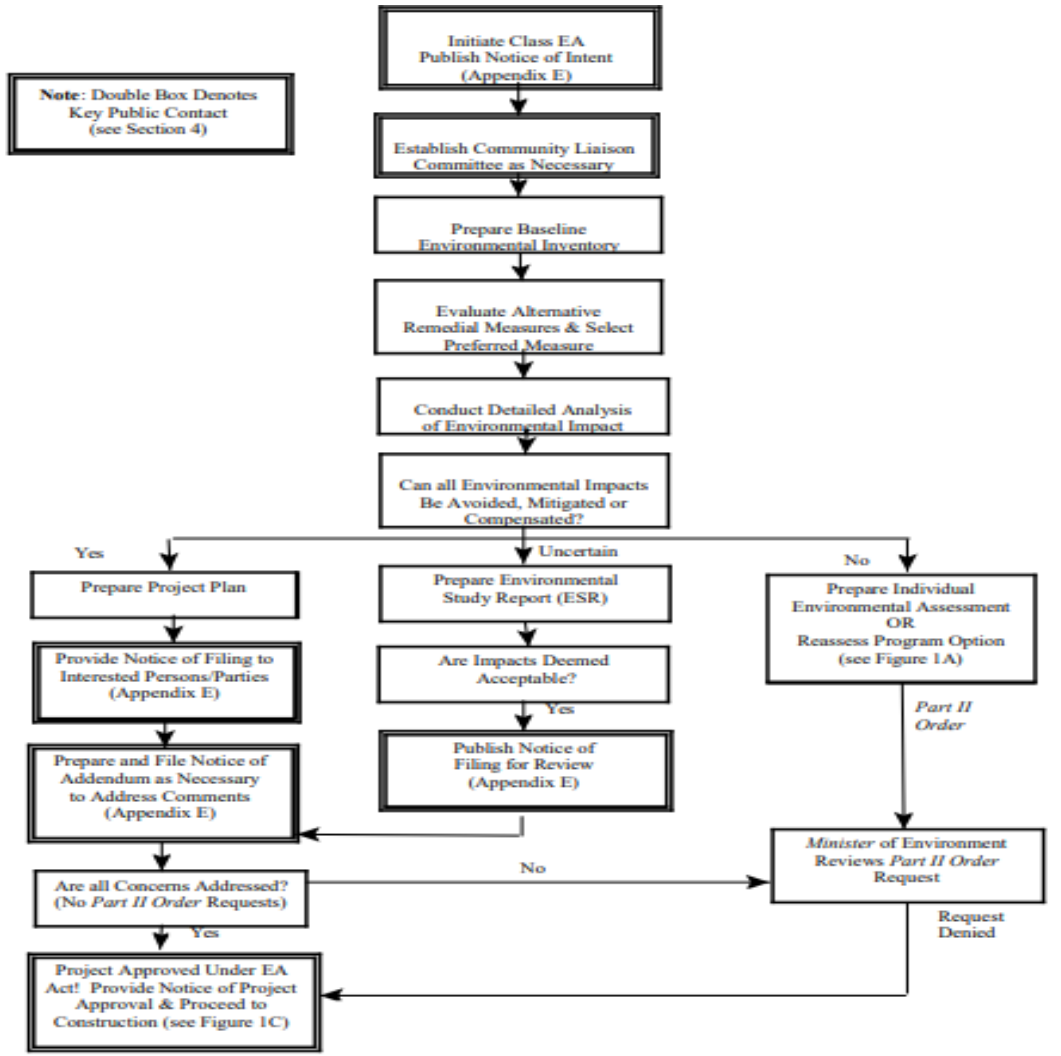

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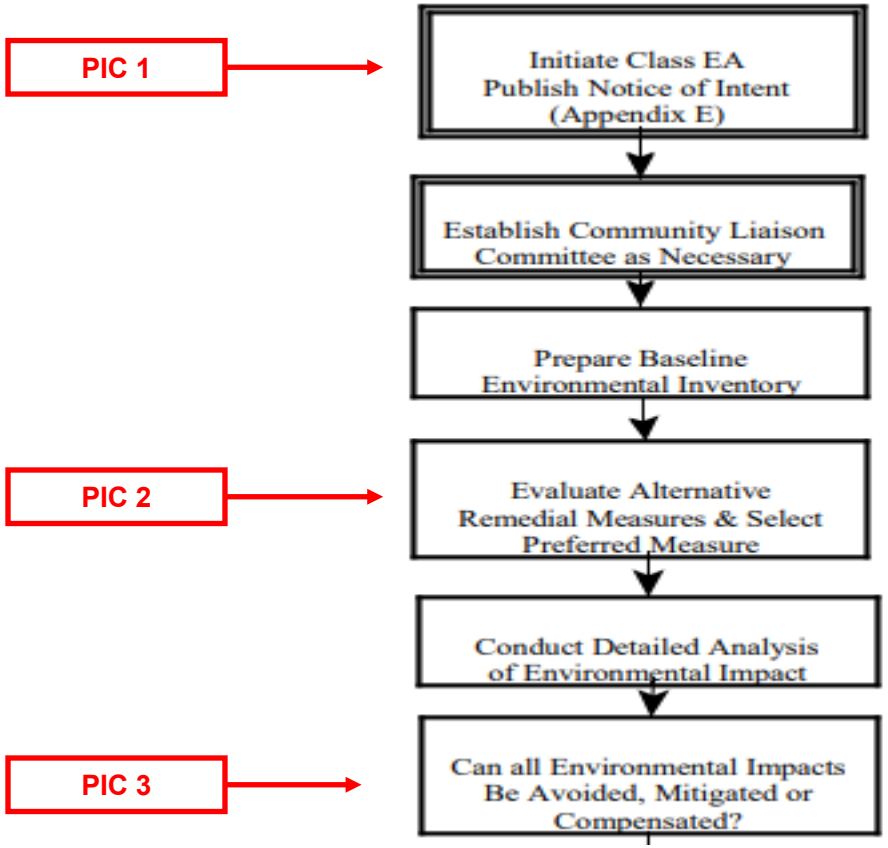
Embro Dam Class EA 2015 - 2017



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UPPER THAMES RIVER
CONSERVATION AUTHORITY

Embro Dam Class EA 2015 – 2017

Field Data Collection and Site Characterization

A range of technical, environmental, and social factors has been 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.

Topographic Survey	Aquatic Biology	Geotechnical Engineering and Hydrogeology	Civil Engineering (Dam Structure and Hazard Assessment)
Hydrology	Terrestrial Biology	Sediment Quality	Water Quality
Fluvial Geomorphology	Cultural/Social Environment	Archaeology	Sediment Survey

Embro Dam Class EA 2015 – 2017

Alternative Evaluation Criteria

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PREFERRED OVERALL RANKING (1 = most preferred; 5 = least preferred)	5	3	1	2	4

1 – Do Nothing
2 – Repair Dam
3 – Remove Dam and construct Natural Channel
4 – Remove dam and construct offline pond / wetland
5 – Lower dam crest and outlet, naturalize pond

Embro Dam Class EA 2015 – 2017

Preferred Alternative – Alternative 3 - Remove Dam and Construct Natural Channel

Embro Dam Class EA 2015 – 2017
Cost Estimates

Alternatives	Primary elements/ factors influencing costs	Initial Costs (1 to 5 years)	Operation and Maintenance
Alternative 1 Do nothing	Repairs to concrete structures, site restoration in the event of failure (assumed)	$3,000 to $15,000	$1,500 to $5,000 per year
Alternative 2 Repair dam	Improved dam embankment and outlet, construct emergency spillway, rock protection	$150,000 to $200,000	$1,500 to $20,000 per year. Dam retirement (75 yrs) costs $80,000[1]
Alternative 3 Remove dam and construct natural channel	Dam removal, channel construction, sediment removal, site restoration	$250,000 to $320,000	$1,500 to $3,000 per year
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[1] dam retirement cost reflects 2016 cost

Cultural Heritage Evaluation Report, TMHC (2022)

- Intended to provided heritage evaluation of the subject site against the criteria set out by the Ontario Heritage Act (OHA), O. Reg 09/06.
- Current heritage status as “Natural Area or Park” on Oxford County Heritage Resources Inventory
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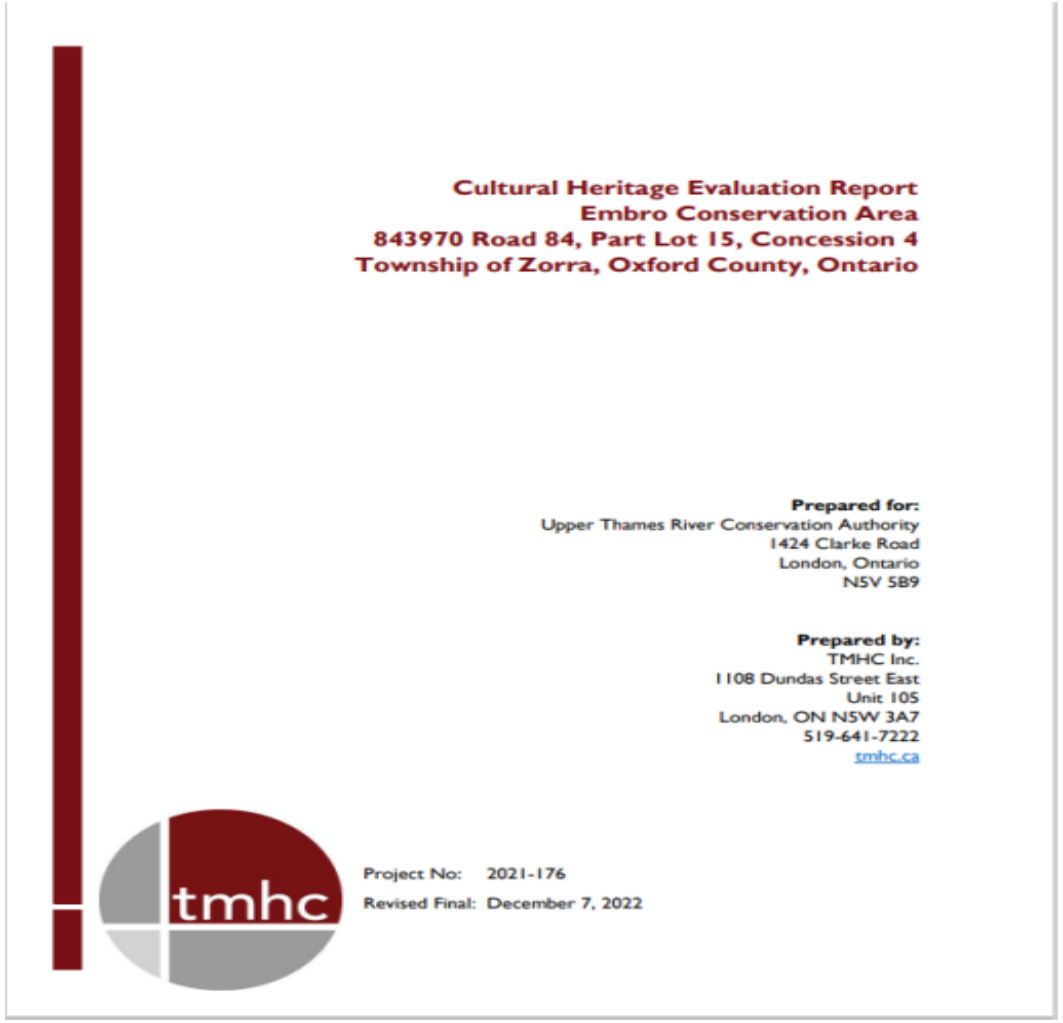

UPPER THAMES RIVER
CONSERVATION AUTHORITY

Cultural Heritage Evaluation Report, TMHC (2022)

Community Engagement

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- TMHC also contacted:
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- Additional comments may be received through the ongoing EA consultation

UPPER THAMES RIVER
CONSERVATION AUTHORITY

Cultural Heritage Evaluation Report, TMHC (2022)

Evaluation

- Embro Dam was found to not meet the O.Reg 9/06 Criteria.
- Interpretive signage recommended.

2. The property has historical value or associative value because it:

Criterion	Summary of Response
i. has direct associations with a theme, event, belief, person, activity, organization or institution that is significant to a community,	No; the Subject Site is not known to have direct associations with a theme, event, belief, person activity, organization or institution that is significant to a community. The current mill pond and dam are the result of alterations to the property that occurred after its industrial usage when the site was converted to a public-access Conservation Area. There are no visible remains that associate the property with its industrial past.
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Table 2: Historical or Associative Value

Page 30, Cultural Heritage Evaluation Report, TMHC, 2022

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ii. displays a high degree of craftsmanship or artistic merit, or	No; while the property is an example of a mid-20th century conservation area, it does not demonstrate a high degree of craftsmanship or artistic merit relative to what is typical for this typology. Both the pond and dam, in their current state, are the result of alterations to the property that occurred when the property was established as a Conservation Area.
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Table 1: Design or Physical Value

Page 31, Cultural Heritage Evaluation Report, TMHC, 2022

3. The property has contextual value because it:

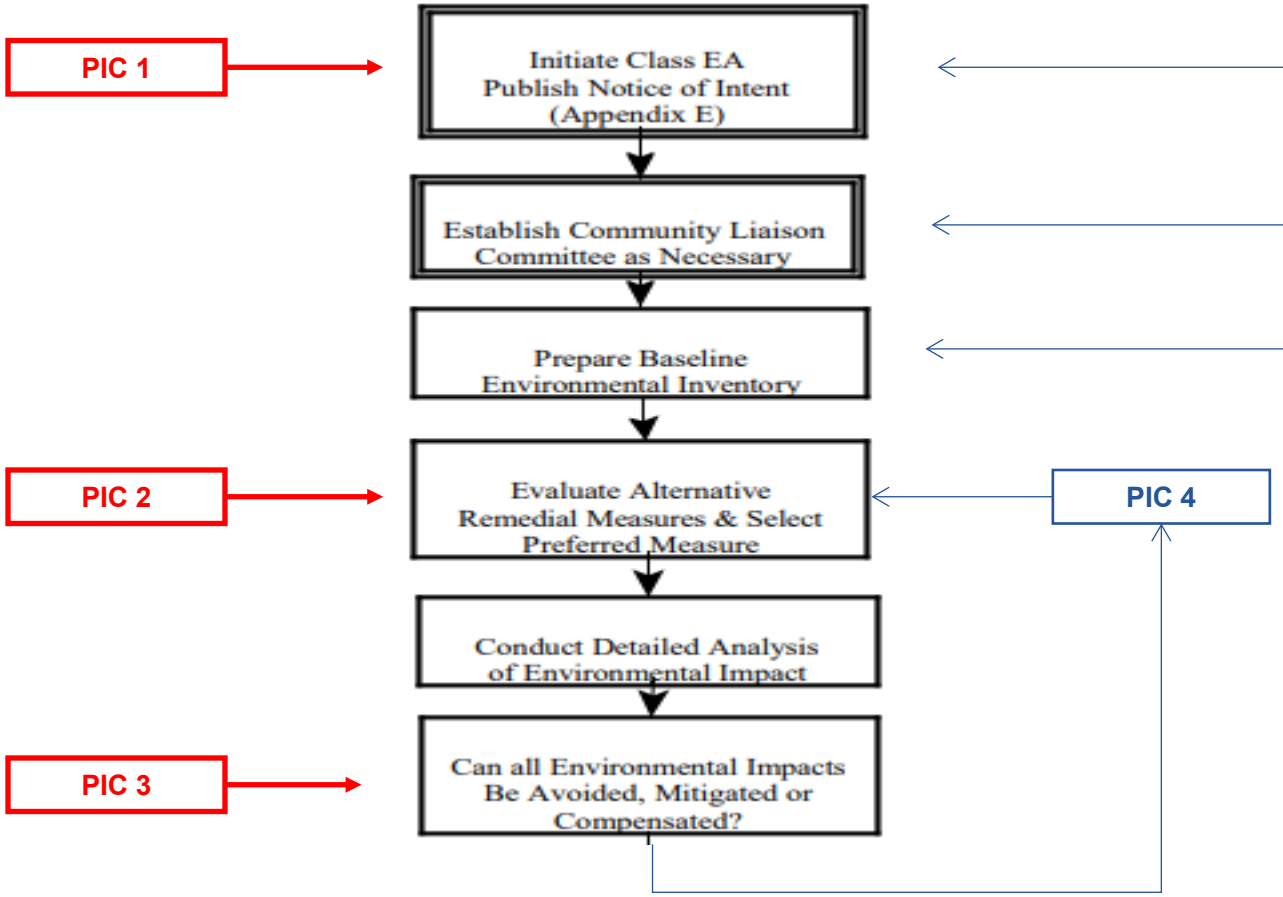
Criterion	Summary of Response
i. is important in defining, maintaining or supporting the character of an area,	No; as part of a relatively modest conservation area in a rural setting, the property is not important in defining, maintaining, or supporting the character of the area. The current pond and dam are the result of a mid-20th century adaptation of the property for recreational use as a Conservation Area that occurred well after its industrial usage.
ii. is physically, functionally, visually or historically linked to its surroundings, or	No; while, the property is integrated with the creek it conveys, it is not physically, functionally, visually, or historically linked to its surroundings such as it meets this criterion. The current form of the pond appears is detached from its historical usage as a mill pond since it was expanded significantly in the middle of the 20th century. Similarly, the dam has been replaced, and the former mill – and resultant industrial function of the area – regardless of where it was located, is no longer present in any distinguishable form.
iii. is a landmark.	No; while the Subject Site is a draw to local visitors, it is part of a relatively modest Conservation Area in a rural setting. As such, the property is not a visual landmark, and it is not currently known or believed to meet this criterion as a community landmark.

Table 3: Contextual Value

Page 31, Cultural Heritage Evaluation Report, TMHC, 2022

UPPER THAMES RIVER
CONSERVATION AUTHORITY

Embro Dam Class EA since 2015



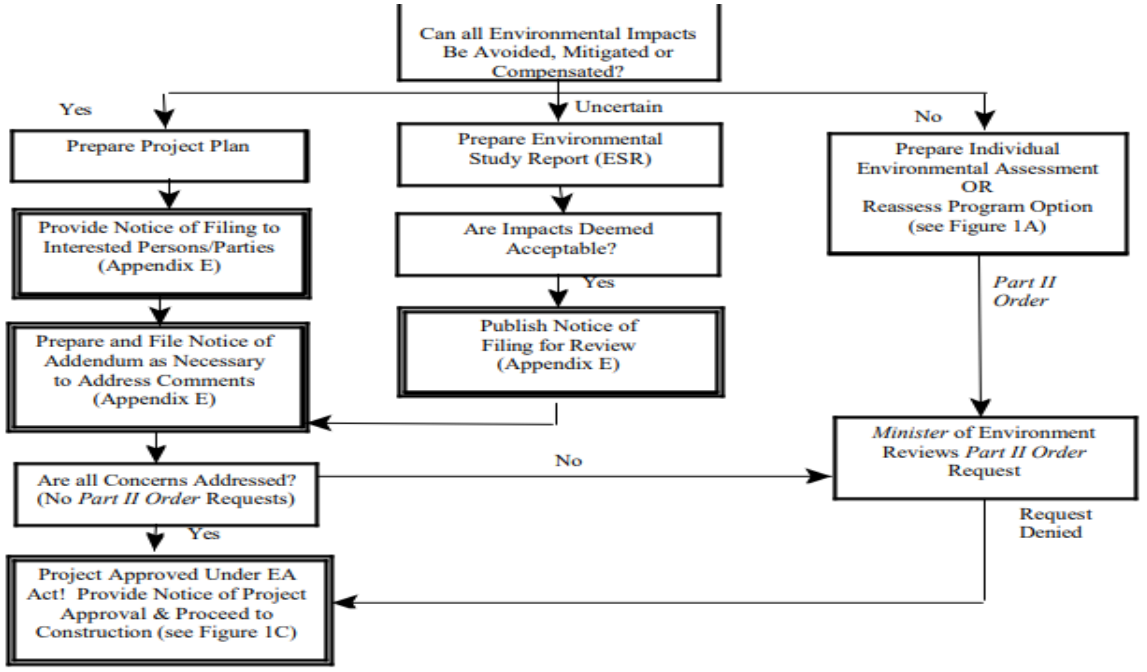
https://conservationontario.ca/fileadmin/pdf/conservation_authorities_section_planning___regulations/Class_EA_for_Remedial_Flood_and_Erosion_Control_ProjectsCA.pdf

- UTRCA issued the “Notice of Intent” on Nov 03, 2022.
- Request interest in the community Liaison committee.
- UTRCA provided information on the updated environmental conditions to its Consultant, Matrix Solutions Inc.
- **Currently**, Matrix is re-evaluating alternative remedial measures, including any new alternatives.
- Another Public Information Centre (PIC 4) will be held in January, 2023.

UPPER THAMES RIVER
CONSERVATION AUTHORITY

Embro Dam Class EA Continuation (2022- 2023)

- **Next Steps:**
  - A Public Information Centre will be held during January 2023 to present project updates and receive feedback.
  - Another presentation to Zorra Township Council during February 2023 with the study updates.
  - UTRCA board report during February 2023.
  - Notice of filing during March 2023.
  - 30-day comment period.



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UPPER THAMES RIVER
CONSERVATION AUTHORITY

Stakeholders

- UTRCA provided the “Notice of Intent” to the following stakeholders:
  - UTRCA; Conservation Ontario;
  - Ministry of Environment, Conservation, and Parks;
  - Ministry of Natural Resources and Forestry;
  - Ministry of Citizenship and Multiculturalism;
  - Ministry of Aboriginal Affairs;
  - Aboriginal Affairs and Norther Development Canada (AANDC); Fisheries and Oceans Canada;
  - Township of Zorra; Oxford County;
  - Métis Nations of Ontario;
  - First Nations;
  - Local groups: Embro Pond Association, Zorra Heritage Committee;
  - Others

Meeting Minutes (UTRCA responses in red)

Thank you for providing draft minutes. It seems there was additional discussion on the CHER after we left. We would provide the following clarification to the bullets in the hopes that the minutes accurately represent the reports and in to help in submitting comments on the CHER or the EA document once posted.

Points were discussed for possible inclusion in a submission from ZHC regarding the CHER (UTRCA comments in red):

- The conclusion about the dam not being a landmark (page 31) seems to dismiss the site for being too rural to be a landmark.

The consultant indicated in their report that the subject site doesn't meet the criteria under the O.Reg 9/06. This evaluation is based on three criteria, namely: design value or physical value, historical value or associative value, and contextual value (tables 1, 2, & 3, Cultural Heritage Evaluation Report, TMHC, 2022). Each of these have 3 sub-criteria that were evaluated, not just the landmark criteria identified in the minutes. When asked about this comment, TMHC indicated that it wasn't that the site was too rural for it to meet the landmark criteria, there are absolutely rural landmarks, but that the nature of the site as a modestly-sized conservation area in a rural setting makes it consistent with and less distinct from its surroundings.

- Concerns were raised about the suggested interpretive signage that it be adequately preserved into the future and that the content be made accessible online as well as on site.

As mentioned during the meeting (Jan 04, 2023), the impetrative signage will be a part of the planning and design process, after the completion of the Class Environmental Assessment. The UTRCA will consult with the community regarding the interpretive signage at this later stage. Maintenance of the signs can be incorporated into the overall maintenance of the Conservation Area.

- Recognizing that UTRCA staff, as stewards of the land, may hold a bias towards balancing environmental considerations more strongly than cultural heritage, the fact that CHER's are required for this type of EA indicates that cultural heritage should be fully considered. If environmental assessments generally always weigh environment over heritage that would suggest an inappropriate bias is at play in how EAs are being performed.

The 2017 draft report – Embro Dam Class Environmental Assessment, Ecosystem Recovery Inc., contains the Alternatives Evaluation Criteria (Table 1, page 47) used at that time. Each of the four Evaluation Criteria were equally weighted (i.e., 25% each). These criteria included: Technical/ Engineering, Natural Environment, Social/ Cultural, and Economic. The cultural heritage was among one of the sub-criteria for Social/ Cultural Criteria. This draft report can be found at: https://thamesriver.on.ca/wp-content/uploads//FloodStructures/OtherStructures/EmbroDamEA-report-Jn09-17.pdf.

The consideration of heritage signage demonstrates a commitment to going beyond minimum requirements for heritage.

The document for Class Environmental Assessment for Remedial Flood and Erosion Control Projects, Conservation Ontario (June, 2013) can be found at: https://conservationontario.ca/fileadmin/pdf/conservation_authorities_section_planning__regulations/Class_EA_for_Remedial_Flood_and_Erosion_Control_ProjectsCA.pdf

We look forward to receiving comments on the documents. Thanks again for the opportunity to discuss this project with the Zorra Heritage Committee.

Meeting with the UTRCA Board of Directors (February 28, 2023)

1. Questions by board member(s) before the presentation
2. Presentation by Matrix Solutions Inc.
3. Meeting minutes

Question: Sandy, one of our Board members routinely asks questions in advance of the BOD meetings to allow staff to be prepared to respond during the meeting - and it is much appreciated. He had a few questions related to Embro Dam.

He asked:

- **Will the community support the rec?**
- **What is the impact on the Brook Trout pop?**
- **I see in the EA it is to be positive as the Pond has a warming effect. But didn't Tony have concerns about downstream impacts of more trout in Trout Creek?**
- **What does our new aquatic biologist think?**

Response by Sarbjit Singh (UTRCA)

Hi Tracy,

I can add on the community support for the different alternatives.

Based on the comments obtained through the public consultation process, the public seems to be more in support of alternative #4 compared to the other possible solutions. The public input was received between Jan 30 and Feb 13, 2023. 8 people provided written comments.

Members of the public recognized the benefits of this option to the natural environmental. A member of the Zorra Heritage Committee said that alternative #4 could enhance the area, and make it more interesting and diverse; and, that this option can help build community acceptance and support for changes.

The attached board memo contains a table of all comments on different alternative solutions received through the consultation process.

Please let me know if you have any questions.

Response by Erin Caroll (UTRCA)

It is very helpful to get these questions in advance of the meeting! I have pulled together some information on the impacts of the Embro Dam on Brook Trout. Is this the kind of response you are looking for?:

Based on extensive sampling, both upstream and downstream of the Embro Pond, Youngsville Drain has been found to support a fairly stable native Brook Trout dominated fish community. Brook Trout are an important component of the Upper Thames River biodiversity. They are often referred to as an indicator species because they are sensitive to changes in water quality and habitat

conditions. The presence of Brook Trout in a stream or lake can indicate that the ecosystem is healthy and functioning properly.

Removing the dam is likely to have benefits for the Youngsville Drain Brook Trout populations for the following reasons:

Habitat Restoration and Spawning Habitat: Dams can alter stream flows and temperatures, which can negatively impact Brook Trout habitat. Brook Trout typically require clean, cold, and fast-flowing water to spawn. Dams can disrupt this process by altering water flows and temperatures. The abundance of Brook Trout above the dam suggests that Youngsville Drain provides good quality cold water habitat. Brook Trout presence below the dam indicates that the numerous seeps and extensive aquatic vegetation that develops throughout the summer months (limiting sunlight penetration) counteract the warming effect of the Embro Pond and allow the cool water habitat to persist. The decreased presence of young- of- the- year trout in the downstream samples indicate that the cool water habitat is somewhat marginal, not ideal for trout recruitment. Removing the dam can help restore natural stream flows, natural thermal regime, improve water quality, and provide overall improved downstream habitat for Brook Trout.

Fish Movement and Migration: Brook Trout need to move upstream and downstream to find suitable habitat and food sources. Dams can block their movement and limit their ability to migrate, which can negatively impact their survival. Based on available fish data from 1999 to 2022, there is a large discrepancy in species diversity between upstream and downstream of the pond. Nine species were recorded upstream and twenty-seven species downstream. The low species diversity is fairly typical of trout dominated systems, but likely also reflects the impact of the barrier to fish movement that is due to the Embro Dam and Pond. Any trout that passed over the dam likely became trapped, downstream. Removing the dam can help restore natural stream connectivity and allow Brook Trout to access previously inaccessible habitats.

Genetic Diversity: Brook Trout populations can become isolated by dams, reducing genetic diversity and making them more vulnerable to disease and environmental stressors. The Embro Dam restricts the upstream movement of Brook Trout. Removing the dam can help reconnect fragmented populations and promote genetic diversity within the local Brook Trout populations.

Overall, removing the Embro dam would help restore natural stream processes and provide better habitat for Brook Trout, which can benefit the health and sustainability of the local Brook Trout populations.

Erin Carroll
Aquatic Biologist

Question: Are there any potential concerns with other competing species being able to move upstream? Do the benefits outweigh any potential impacts?

Response by Erin Caroll(UTRCA):

Good question!

Invasive species: Only native species were detected in the vicinity below the dam, so competition from invasives isn't currently a concern. Unfortunately, I have observed first-hand how quickly new invaders can spread through a system. In the Sydenham, Round Goby spread upstream at an alarming rate. Now a small dam in Strathroy acts as a barrier to the Goby's upstream dispersal into the headwaters. The ever-present threat of invasives is something to consider for any barrier removal.

Native species competition: There are three native species documented downstream of the dam, but not upstream that may also directly compete with Brook Trout for resources once the dam is removed. Largemouth Bass, Smallmouth Bass, and Black Bullhead are large carnivorous/omnivorous fish that could feed on Brook Trout eggs, young trout, and compete for resources if they moved upstream. Largemouth Bass and Black Bullhead are warmwater species. Since Brook Trout is better adapted to the cooler water found in Youngsville Drain, they should be better suited to the habitat and that may give Brook Trout a competitive edge. Smallmouth Bass is a coolwater species and could compete with Brook Trout. It is hard to say for sure if one species would out-compete the other or if some sort of equilibrium would be achieved.

River adapted species rely on a free-flowing system:

The Thames River watershed supports one of the most diverse aquatic, semi-aquatic and riparian-dependent faunal communities within the Great Lakes basin. Ninety species of fish, 30 species of freshwater mussels, and 30 species of reptiles and amphibians inhabit the Thames. Countless birds, mammals and invertebrates also depend on the existence and health of the Thames River watershed. The watershed supports species of fish, mussels and turtles that are rarely found anywhere else in Canada and some that are at risk of disappearing from the wild.

River-adapted species are especially susceptible to change, including alteration, loss and fragmentation of critical habitat features caused by damming. Most of

these native species are sensitive to environmental changes, and are dependent on a particular quantity regime of stream flow. In the Thames, some sensitive aquatic species are at risk of disappearing including Black Redhorse sucker, Eastern Spiny Softshell turtle, Queensnake, and Wavy-rayed Lampmussel. River management that fails to take into account the dynamic nature of rivers can provoke undesired impacts to the plants and animals it supports.

Historically, the Thames River supported one of the richest communities of freshwater mussels in Canada, though there has been a significant decline in freshwater mussel diversity in recent years. The mussel species that have disappeared were characteristic of a healthy aquatic environment, so their loss is an indication that conditions in the river may be deteriorating. Destruction of habitat including the construction of dams that have altered the river flows is one of the primary threats to freshwater mussels. Damming of the stream channel has been shown to detrimentally affect mussels in many ways. Reservoirs alter downstream flow patterns and disrupt the natural thermal profiles of the watercourse while impoundments act as physical barriers potentially separating mussels from their host fish.

Weighing the costs and benefits, of potential for spread of invasives upstream, competition from additional native fish species, and the dependence of sensitive river adapted species to natural conditions, I would argue that it is best for the plants and animals the live in Youngville Drain for the stream to return to it's naturally free-flowing condition.

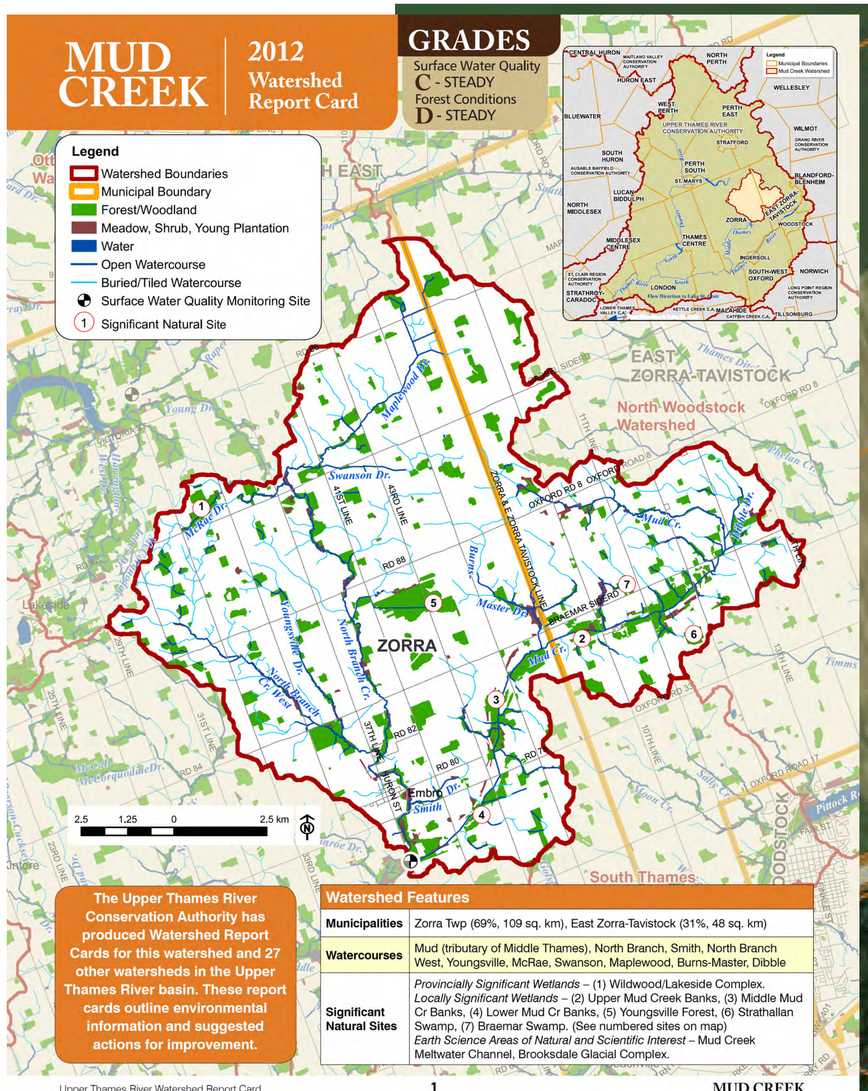
Presentation to the UTRCA of Directors (February 28, 2023) by Matrix Solutions Inc.

Embro Dam - Class Environmental Assessment
Presentation to UTRCA Board of Directors
February 28, 2023

UPPER THAMES RIVER CONSERVATION AUTHORITY

Matrix Solutions Inc. ENVIRONMENT & ENGINEERING

STUDY LOCATION



UPPER THAMES RIVER CONSERVATION AUTHORITY

Embro Dam - Class Environmental Assessment
UTRCA Board of Directors Meeting
February 28, 2023

Matrix Solutions Inc. ENVIRONMENT & ENGINEERING

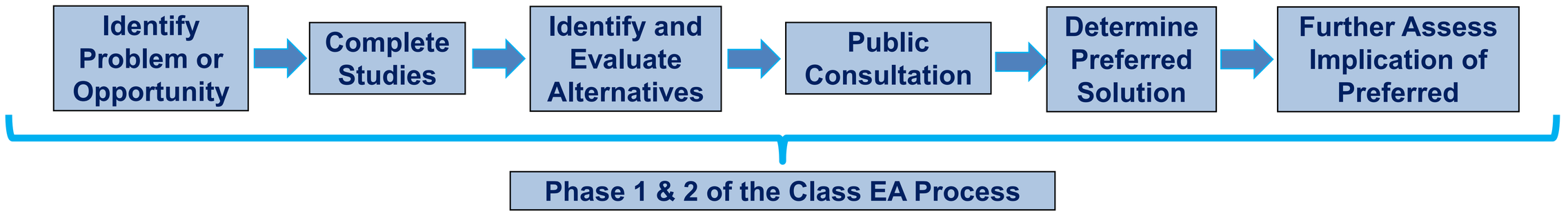
PROJECT HISTORY AND PROBLEM STATEMENT

- **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

Social

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

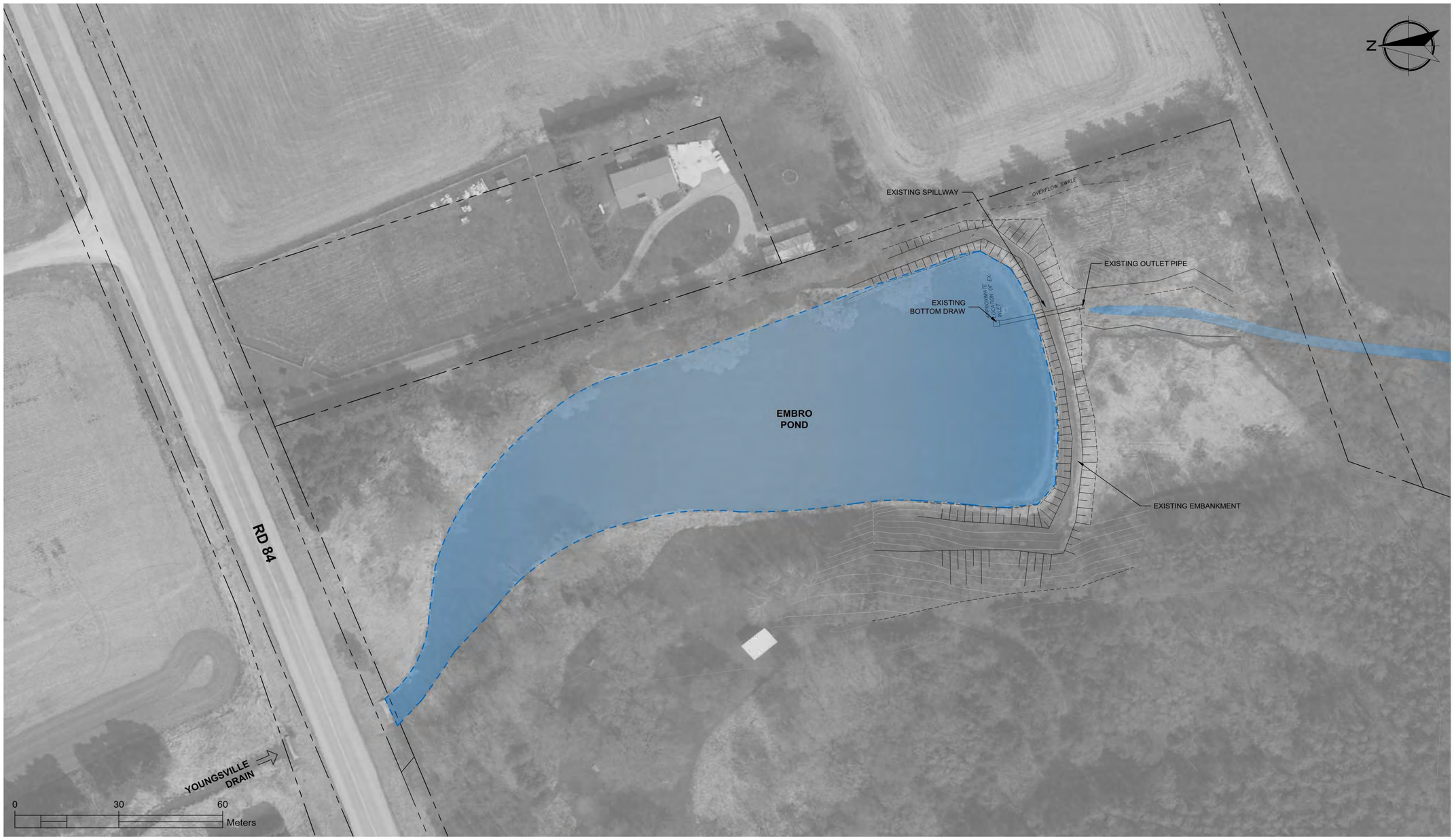
Cultural

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

Archaeology

- Site has a reduced archaeological potential

ALTERNATIVE 1 – DO NOTHING

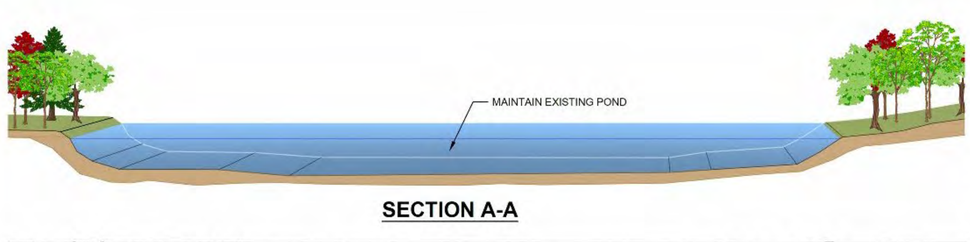


UPPER THAMES RIVER CONSERVATION AUTHORITY

Embro Dam - Class Environmental Assessment
UTRCA Board of Directors Meeting
February 28, 2023

Matrix Solutions Inc. ENVIRONMENT & ENGINEERING

ALTERNATIVE 2 – REPAIR / RECONSTRUCT EXISTING DAM

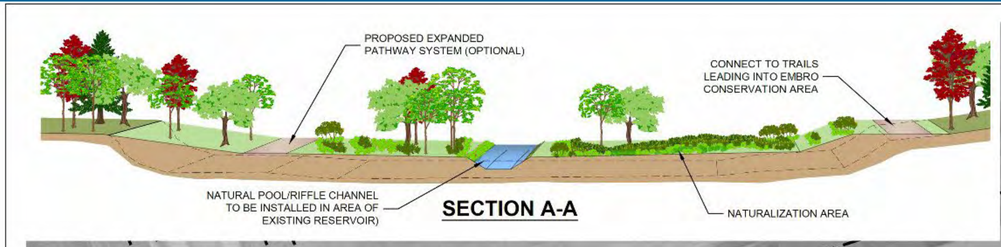


UPPER THAMES RIVER CONSERVATION AUTHORITY

Embro Dam - Class Environmental Assessment
UTRCA Board of Directors Meeting
February 28, 2023

Matrix Solutions Inc. ENVIRONMENT & ENGINEERING

ALTERNATIVE 3 – REMOVE DAM & CONTRUCT NATURAL CHANNEL

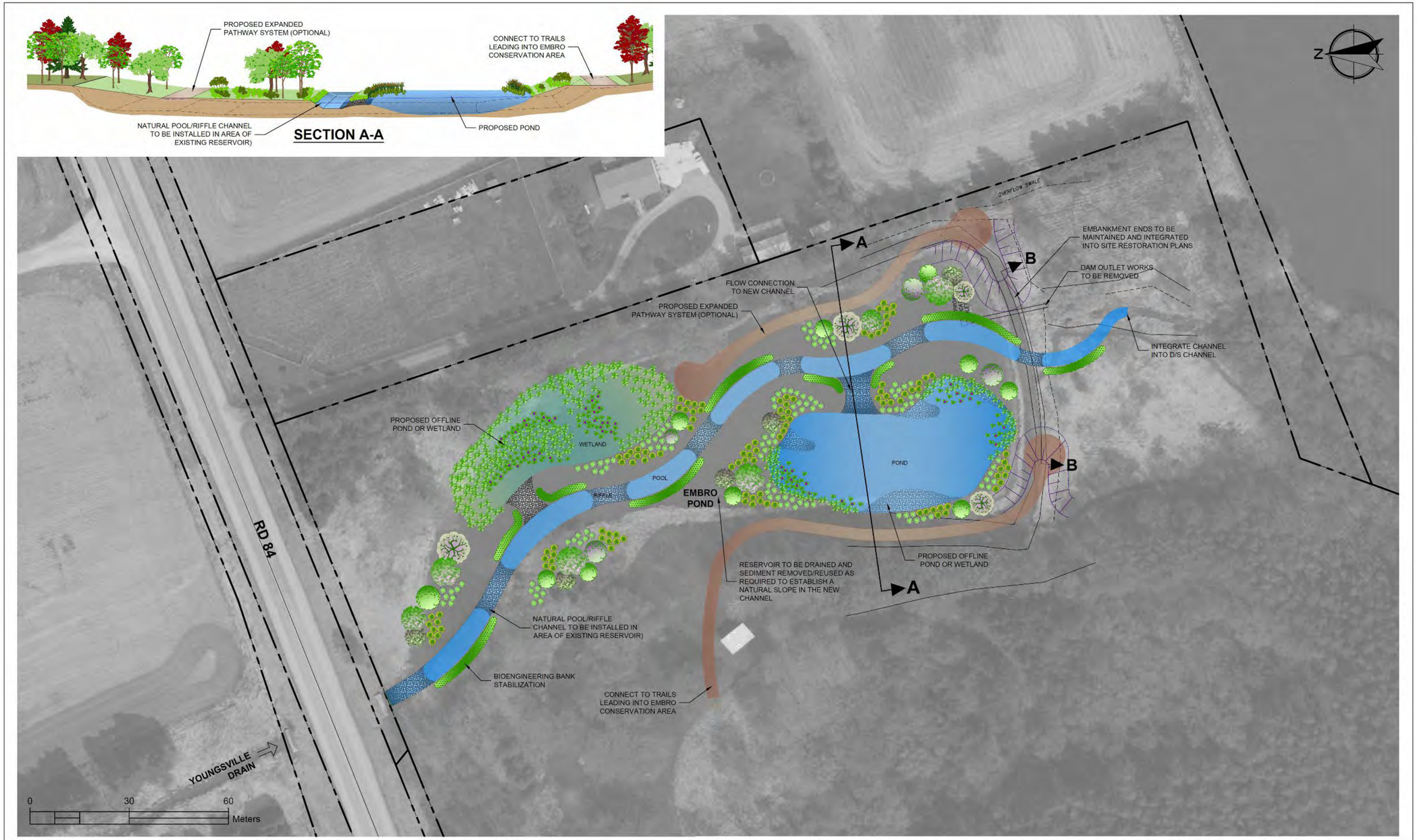


UPPER THAMES RIVER CONSERVATION AUTHORITY

Embro Dam - Class Environmental Assessment
UTRCA Board of Directors Meeting
February 28, 2023

Matrix Solutions Inc. ENVIRONMENT & ENGINEERING

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

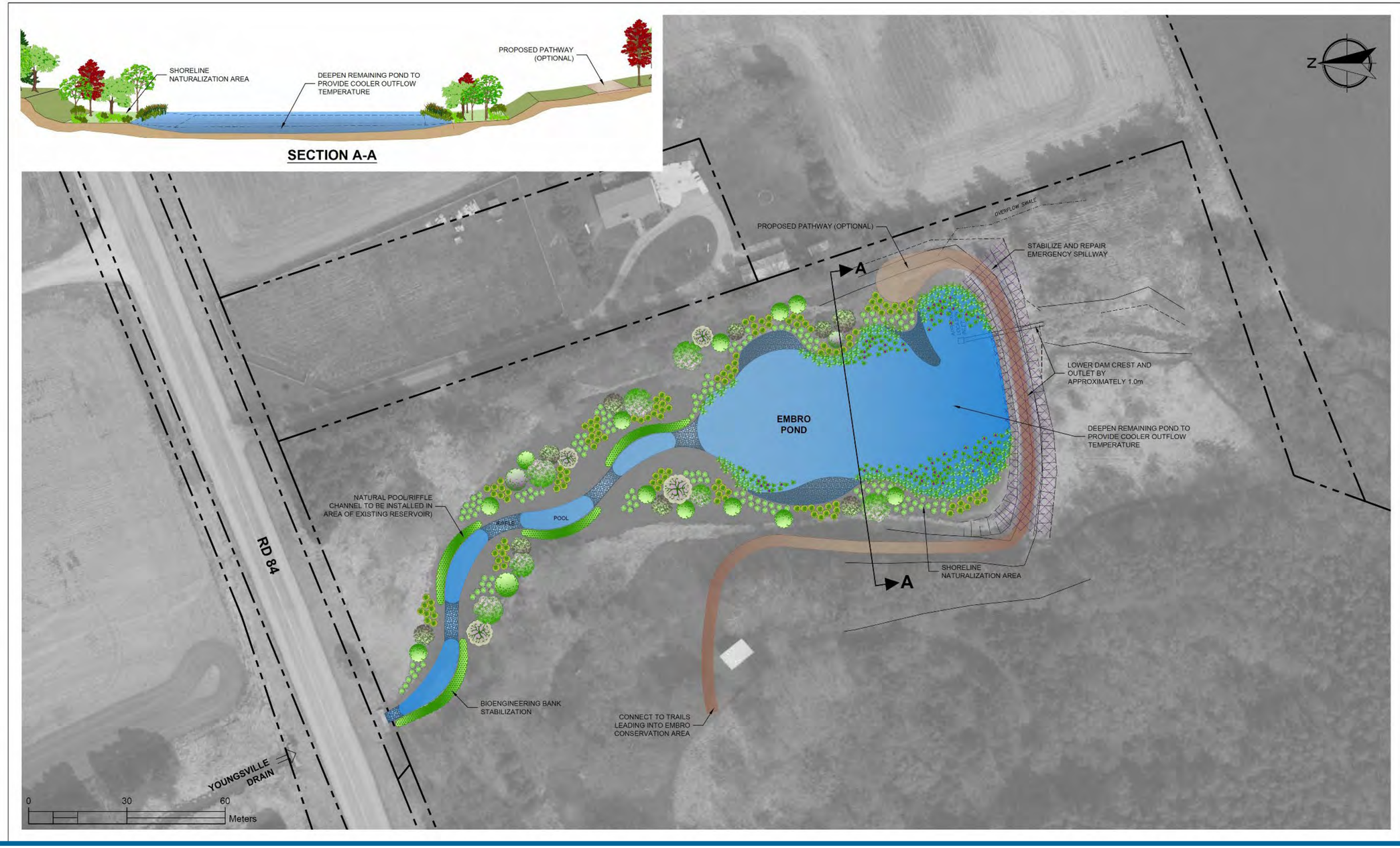


UPPER THAMES RIVER CONSERVATION AUTHORITY

Embro Dam - Class Environmental Assessment
UTRCA Board of Directors Meeting
February 28, 2023

Matrix Solutions Inc. ENVIRONMENT & ENGINEERING

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

OUTCOME OF ALTERNATIVE EVALUATION

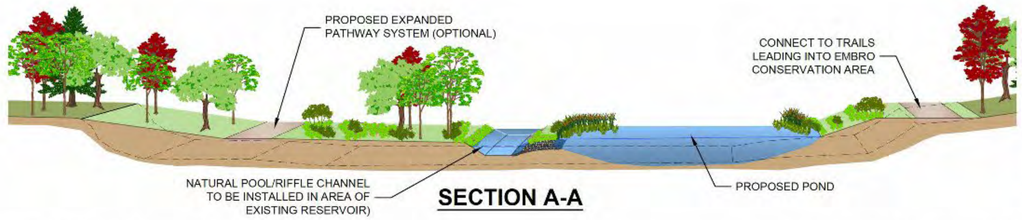
Alternative Rank (most preferred = 1, least preferred = 5):

Alternative	Alternative 1 Do Nothing	Alternative 2 Repair/ Reconstruct Existing Dam	Alternative 3 Remove Dam and Construct Natural Channel	Alternative 4 Remove Dam and Construct Offline Pond(s) or Wetland(s)	Alternative 5 Lower Dam Crest and Outlet and Naturalize New Pond Perimeter
Rank	5	4	2	1	3

The preferred alternative, determined through the evaluation process is Alternative 4

In this alternative the dam would be removed, a naturalized channel with offline ponds or wetlands would be established

PREFERRED ALTERNATIVE



Alternative #4 – Remove Dam and Construct Offline Pond(s) or Wetland(s)

UPPER THAMES RIVER CONSERVATION AUTHORITY

Embro Dam - Class Environmental Assessment
UTRCA Board of Directors Meeting
February 28, 2023

Matrix Solutions Inc. ENVIRONMENT & ENGINEERING

Examples

Hodges Pond Removal

Cedar Creek Restoration

Example – Marden Creek/Pond Removal

Example – Marden Creek/Pond Removal

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

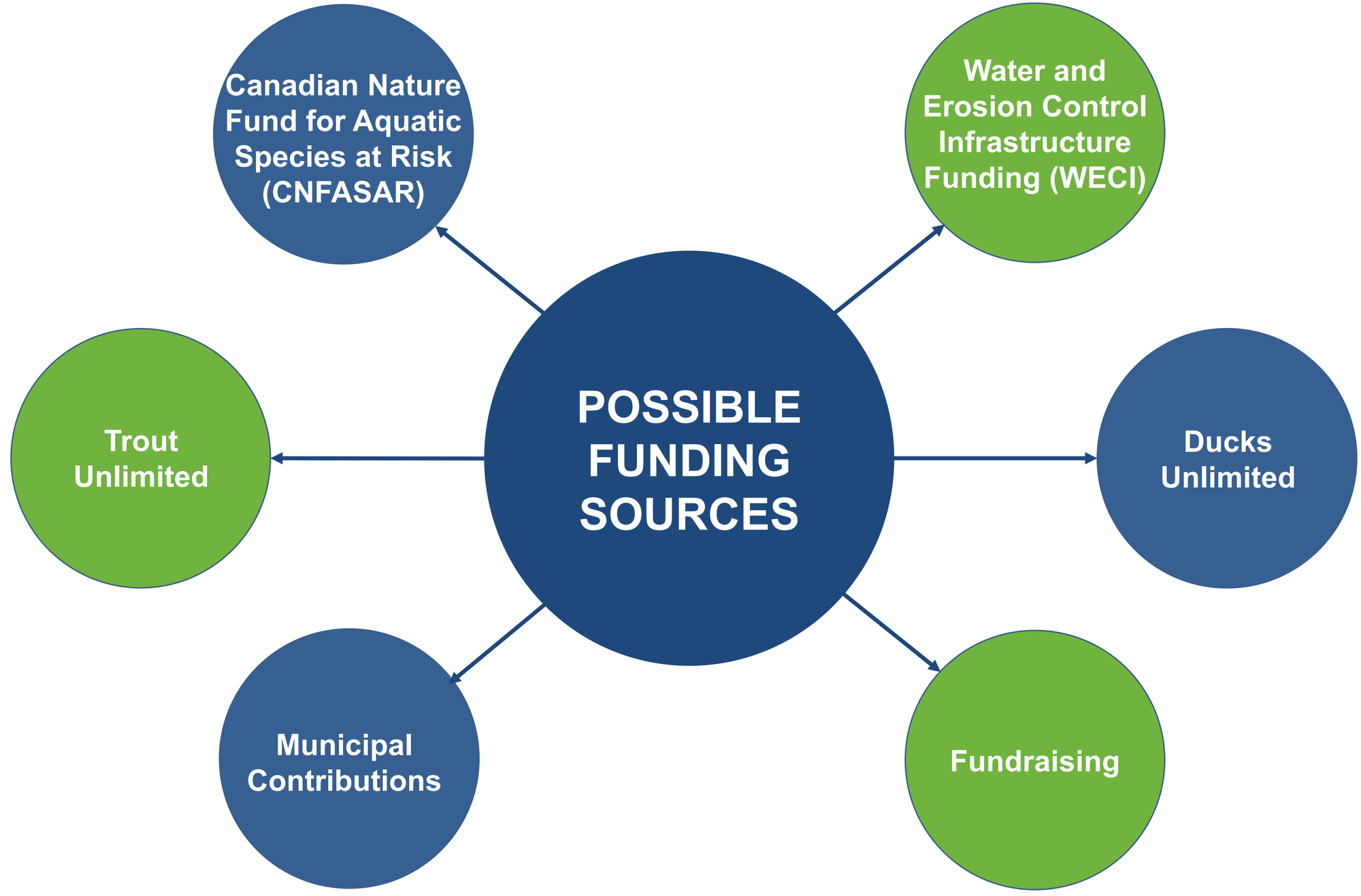
Social/ Cultural

- 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

POSSIBLE FUNDING SOURCES



NEXT STEPS AND CONTACT INFORMATION

- Meet with UTRCA Board
- Finish and File EA
- Obtain Funding
- Detailed Design
- Construction

QUESTIONS?

Meeting Minutes

Sarbjit introduced Martix Solutions (get names). Matrix solutions provided their presentation.

Paul: noted the PIC went really well.

Sandy: assuming that the recommendation from the EA study report gets approved, when is detailed design expected and implemented?

David: We haven't included any projects for Embro Dam on the WECI applications in 2023. We plan to move with design in 2025 at the latest. Once it passes, we can work with township on costing and a phased in approach.

Tom: which is best for slowing the flow and climate change and adaptation?

Scott: The dam will not be there for flood control. Natural system is best able to adapt

Mariëtte: Alternatives 3 & 4 are the best suited to tackle climate change. There will be no impoundment of water; No risk of dam failure. The water will spill into flood way, slow down speed of water and infiltrate the ground to recharge groundwater.

Peter: What will be the impact on shallow wells?

Mariëtte: They would have to deepen the wells.

Anna: What are the financial implications? Who is responsible for the cost?

Scott: UTRCA is the owner, but Zorra has been financially and physically (community group) taking care of the CA .

David: We want to get WECI funding, but it's not very high ranking so it's tricky. Township's cost and any funding support we can get them.

Mark: who makes the final decision? Zorra, UTRCA?

David: it is a joint decision. The community liaison committee was set up to help with that. They would have input in the design process as well.

Debbie: in the event shallow wells need to be drilled who foots the cost?

David: That would come out in the design process.

Tom: turtle pond, does that make it more attractive for funding?

David: Yes. Pond could increase biodiversity as well and opportunities for public engagement in planting and maintaining the pond.

Mover: P.Cuddy

Seconder: T.Heeman

That the UTRCA Board of Directors endorses the Embro Dam EA study report and its recommendation, and recommend final posting of the Class Environmental Assessment Inventory of Programs and Services

Carried.

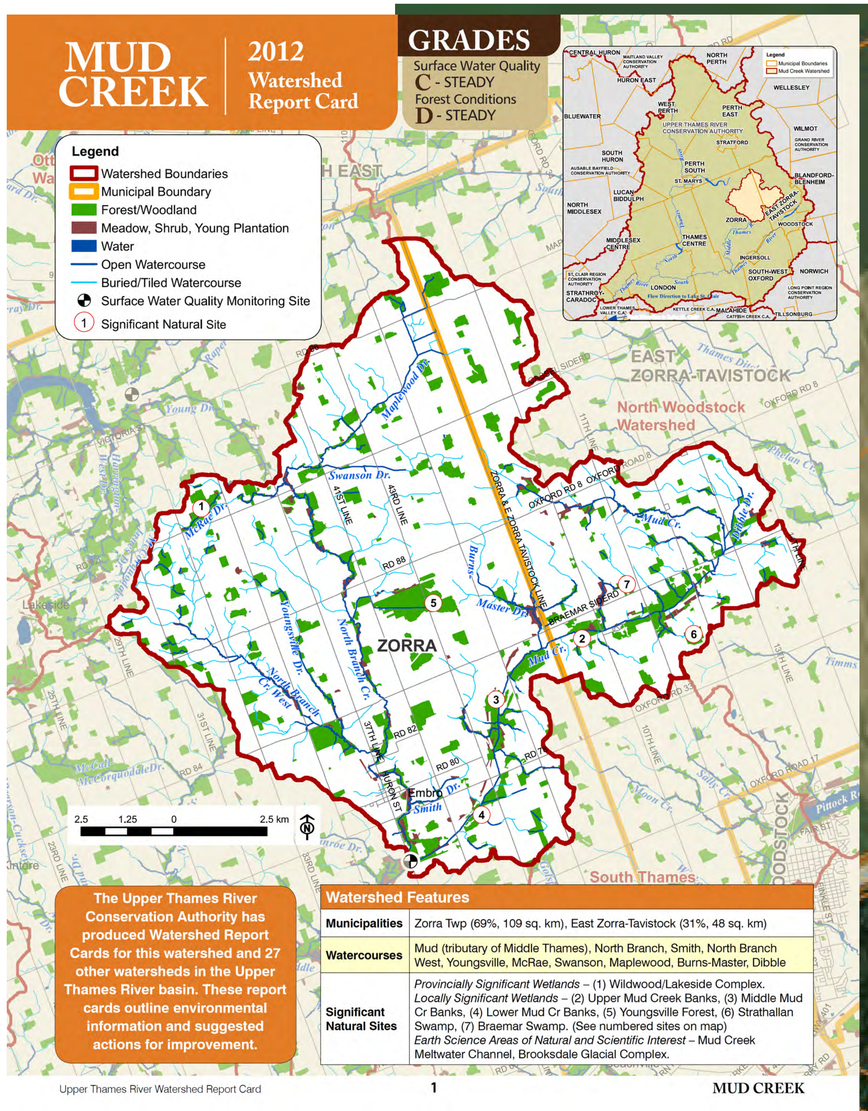
Presentation to the Zorra Township Council (March 01, 2023) by Matrix Solutions Inc.

Embro Dam - Class Environmental Assessment
Township of Zorra – Council Meeting
March 1, 2023

UPPER THAMES RIVER CONSERVATION AUTHORITY

Matrix Solutions Inc. ENVIRONMENT & ENGINEERING

STUDY LOCATION



Embro Dam - Class Environmental Assessment
Township of Zorra – Council Meeting
March 1, 2023

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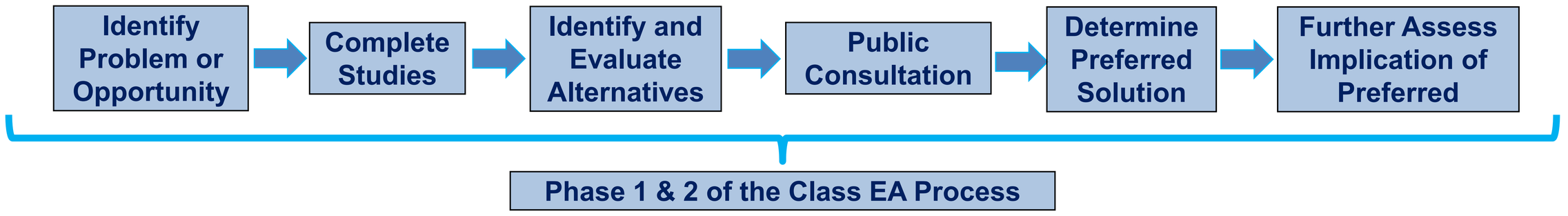
CLASS ENVIRONMENTAL ASSESSMENT PROCESS



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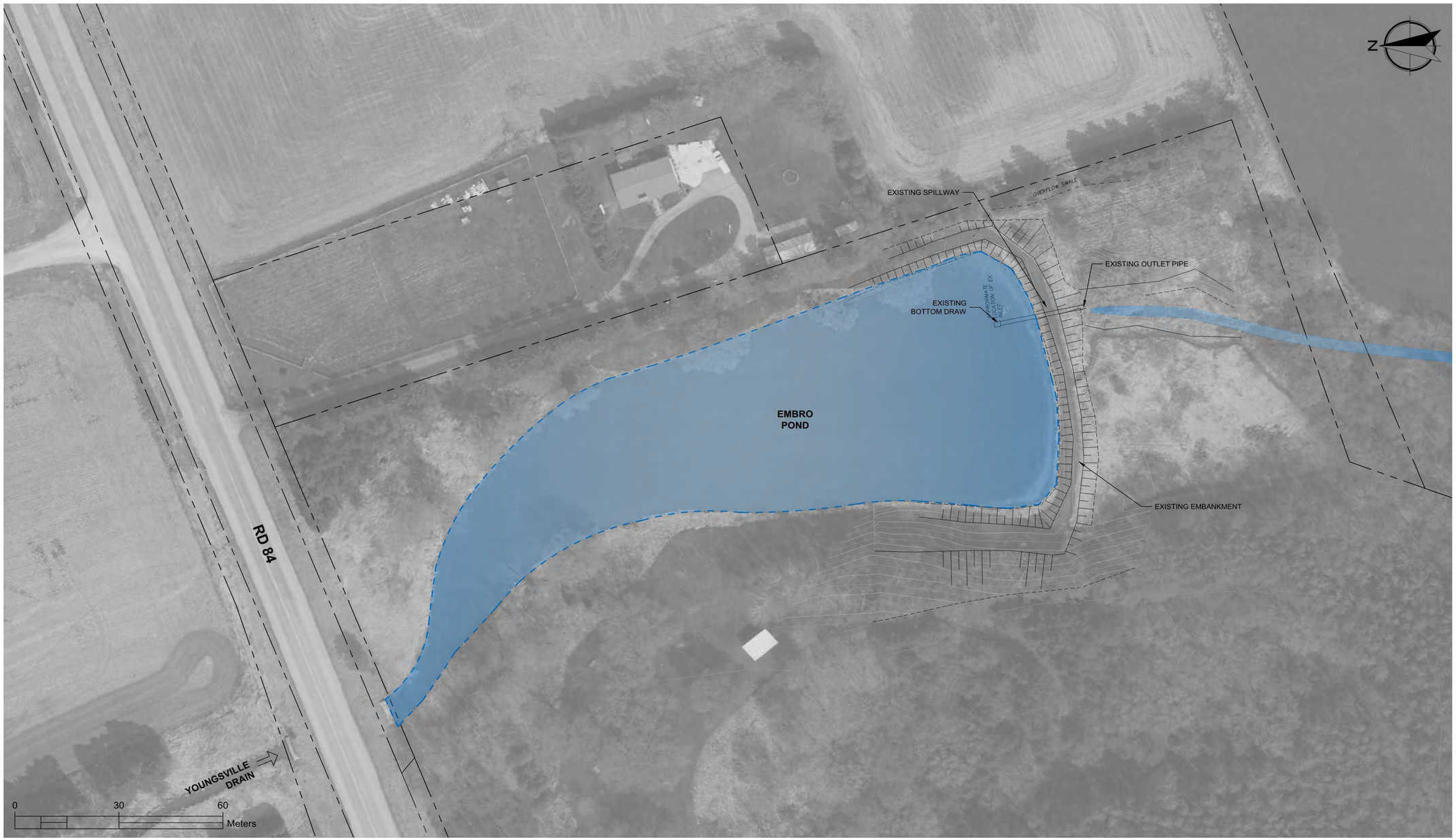
Archaeology

- Site has a reduced archaeological potential

ALTERNATIVE – DO NOTHING

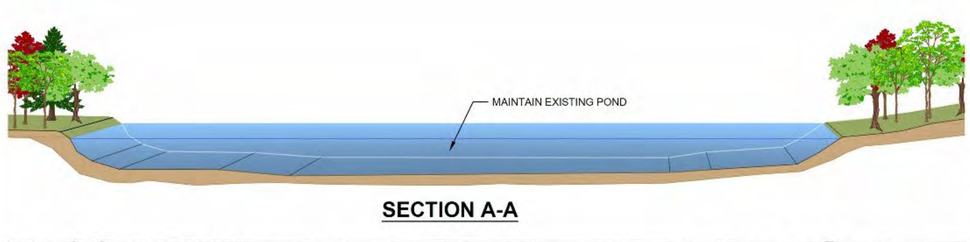


UPPER THAMES RIVER CONSERVATION AUTHORITY

Embro Dam - Class Environmental Assessment
Township of Zorra – Council Meeting
March 1, 2023

Matrix Solutions Inc. ENVIRONMENT & ENGINEERING

ALTERNATIVE 2 – REPAIR / RECONSTRUCT EXISTING DAM



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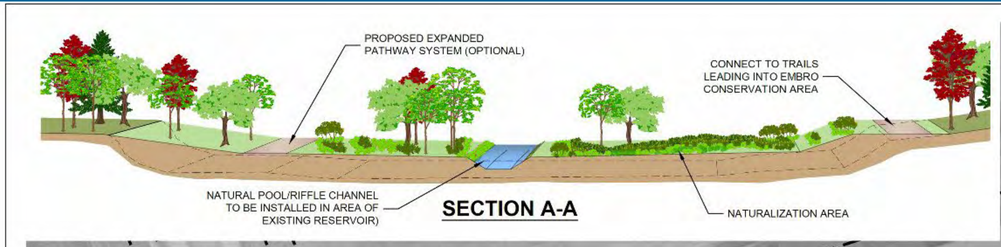
ALTERNATIVE 3 – REMOVE DAM & CONTRUCT NATURAL CHANNEL



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March 1, 2023

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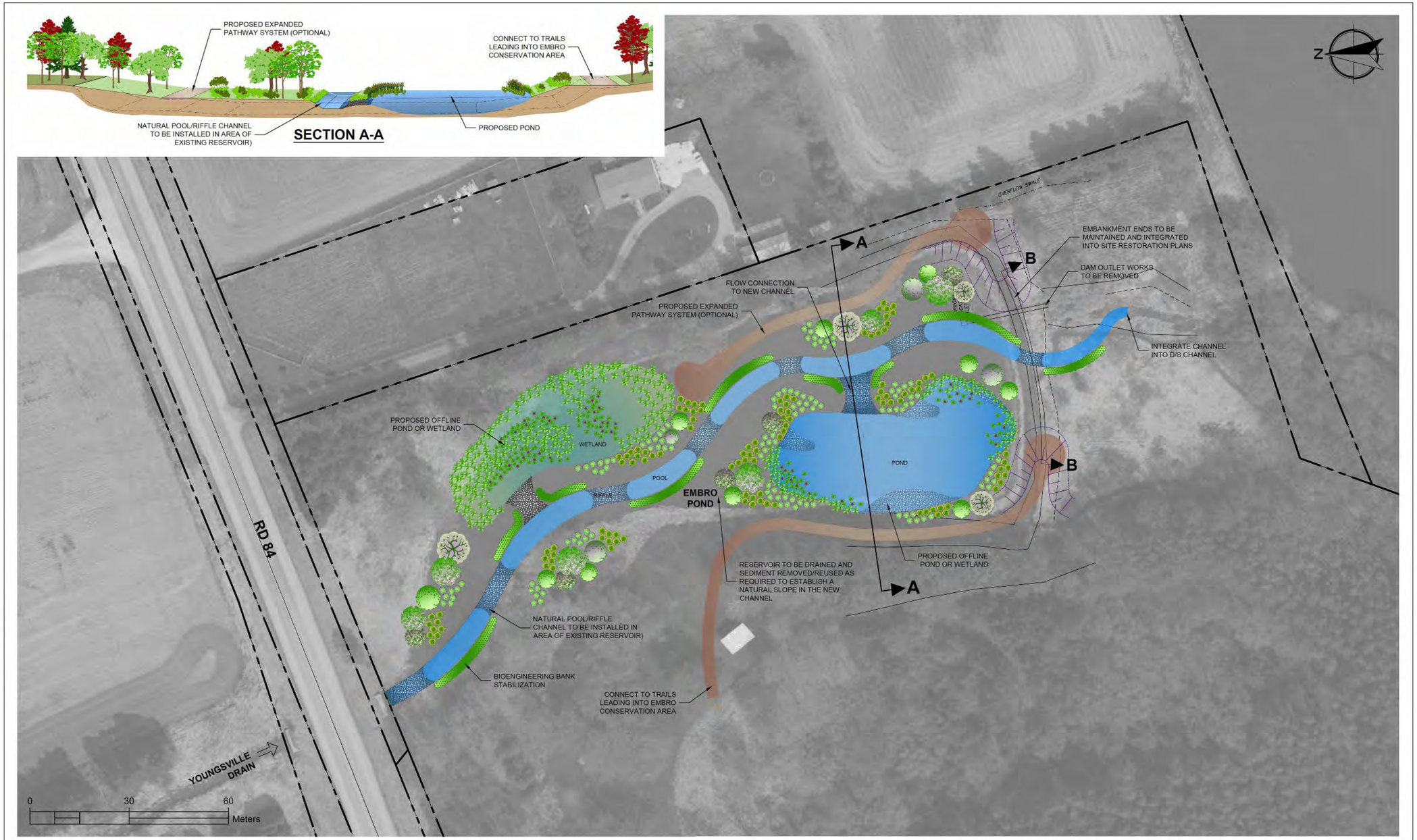
ALTERNATIVE 4 – REMOVE DAM & CONSTRUCT OFFLINE POND(S) WETLAND(S)

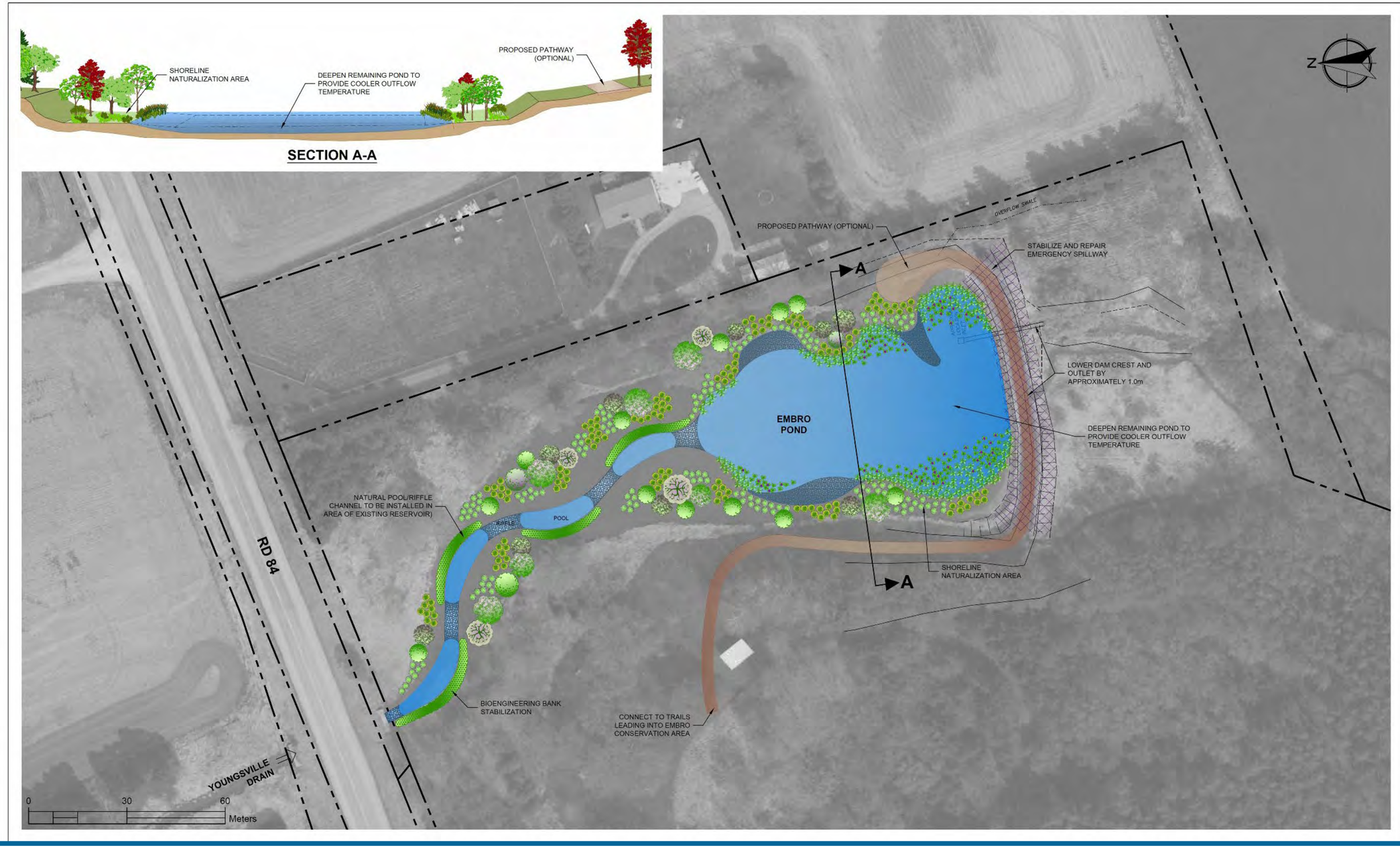


UPPER THAMES RIVER CONSERVATION AUTHORITY

Embro Dam - Class Environmental Assessment
Township of Zorra – Council Meeting
March 1, 2023

Matrix Solutions Inc. ENVIRONMENT & ENGINEERING

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

OUTCOME OF ALTERNATIVE EVALUATION

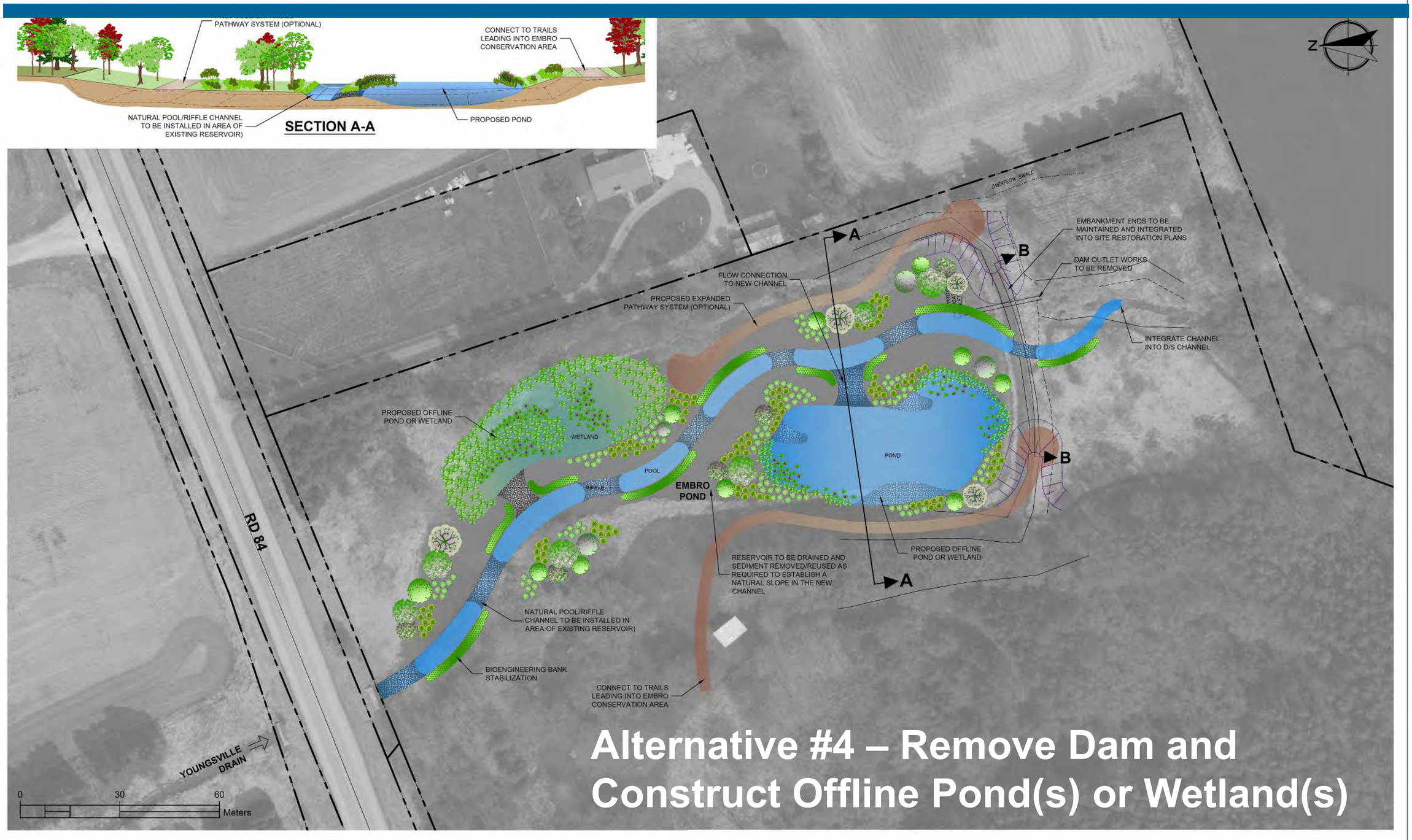
Alternative Rank (most preferred = 1, least preferred = 5):

Alternative	Alternative 1 Do Nothing	Alternative 2 Repair/ Reconstruct Existing Dam	Alternative 3 Remove Dam and Construct Natural Channel	Alternative 4 Remove Dam and Construct Offline Pond(s) or Wetland(s)	Alternative 5 Lower Dam Crest and Outlet and Naturalize New Pond Perimeter
Rank	5	4	2	1	3

The preferred alternative, determined through the evaluation process is Alternative 4

In this alternative the dam would be removed, a naturalized channel with offline ponds or wetlands would be established

PREFERRED ALTERNATIVE



Alternative #4 – Remove Dam and Construct Offline Pond(s) or Wetland(s)

UPPER THAMES RIVER CONSERVATION AUTHORITY

Embro Dam - Class Environmental Assessment
Township of Zorra – Council Meeting
March 1, 2023

Matrix Solutions Inc. ENVIRONMENT & ENGINEERING

Examples

Hodges Pond Removal

Cedar Creek Restoration

Example – Marden Creek/Pond Removal

Example – Marden Creek/Pond Removal

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

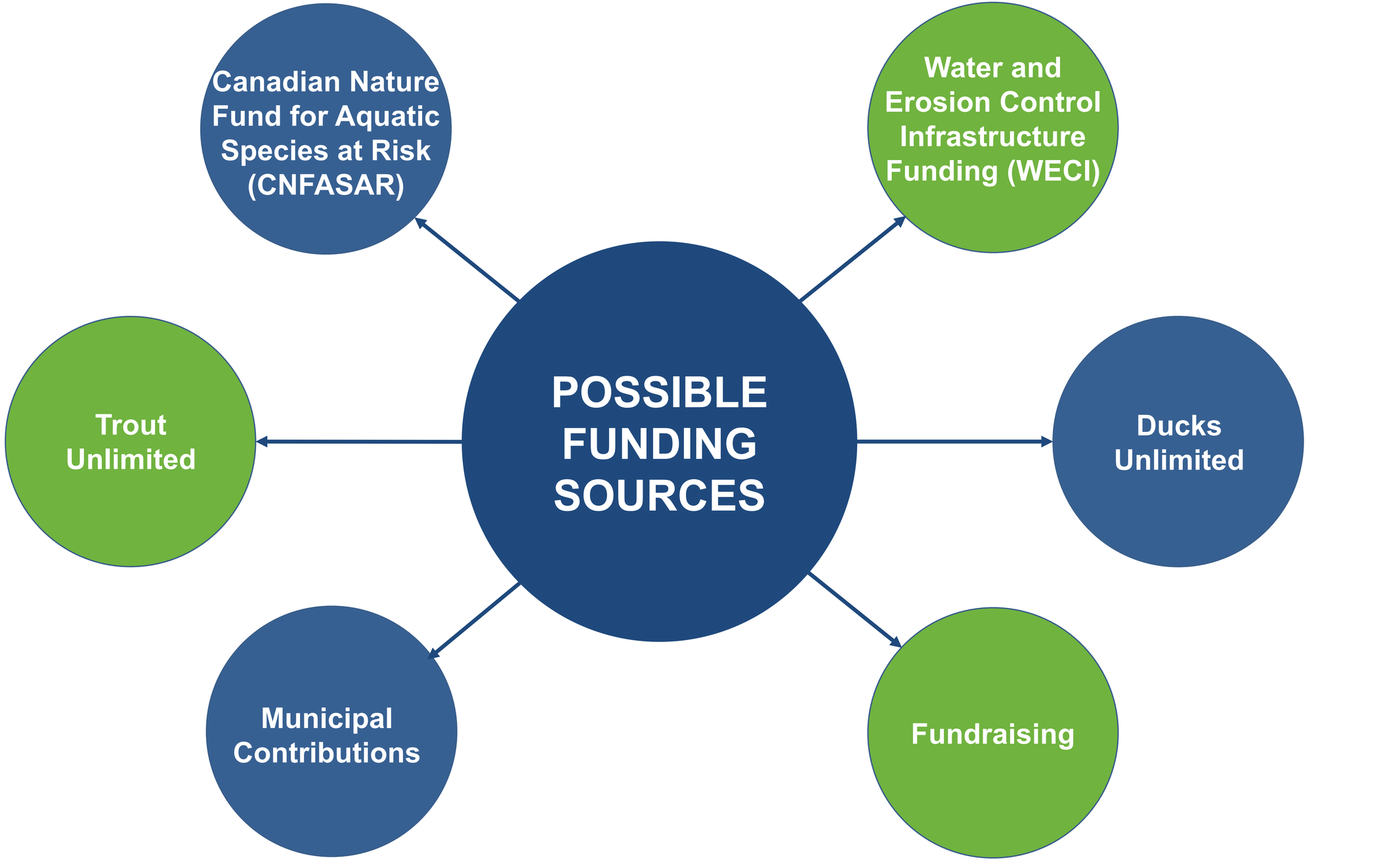
Social/ Cultural

- 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

POSSIBLE FUNDING SOURCES



NEXT STEPS AND CONTACT INFORMATION

- Meet with UTRCA Board
- Finish and File EA
- Obtain Funding
- Detailed Design
- Construction

QUESTIONS?

Presentation to the Zorra Township Council (January 17, 2024) by Matrix Solutions Inc.

Embro Dam Class Environmental Assessment

Township of Zorra Council Meeting

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

January 17, 2024

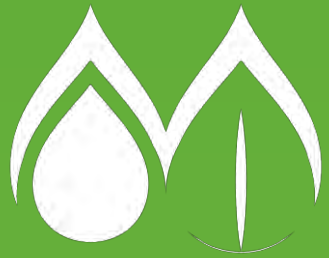
Matrix Solutions Inc.
A Montrose Environmental Company

Agenda

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

Matrix Solutions Inc.
A Montrose Environmental Company

Environmental Assessment Study

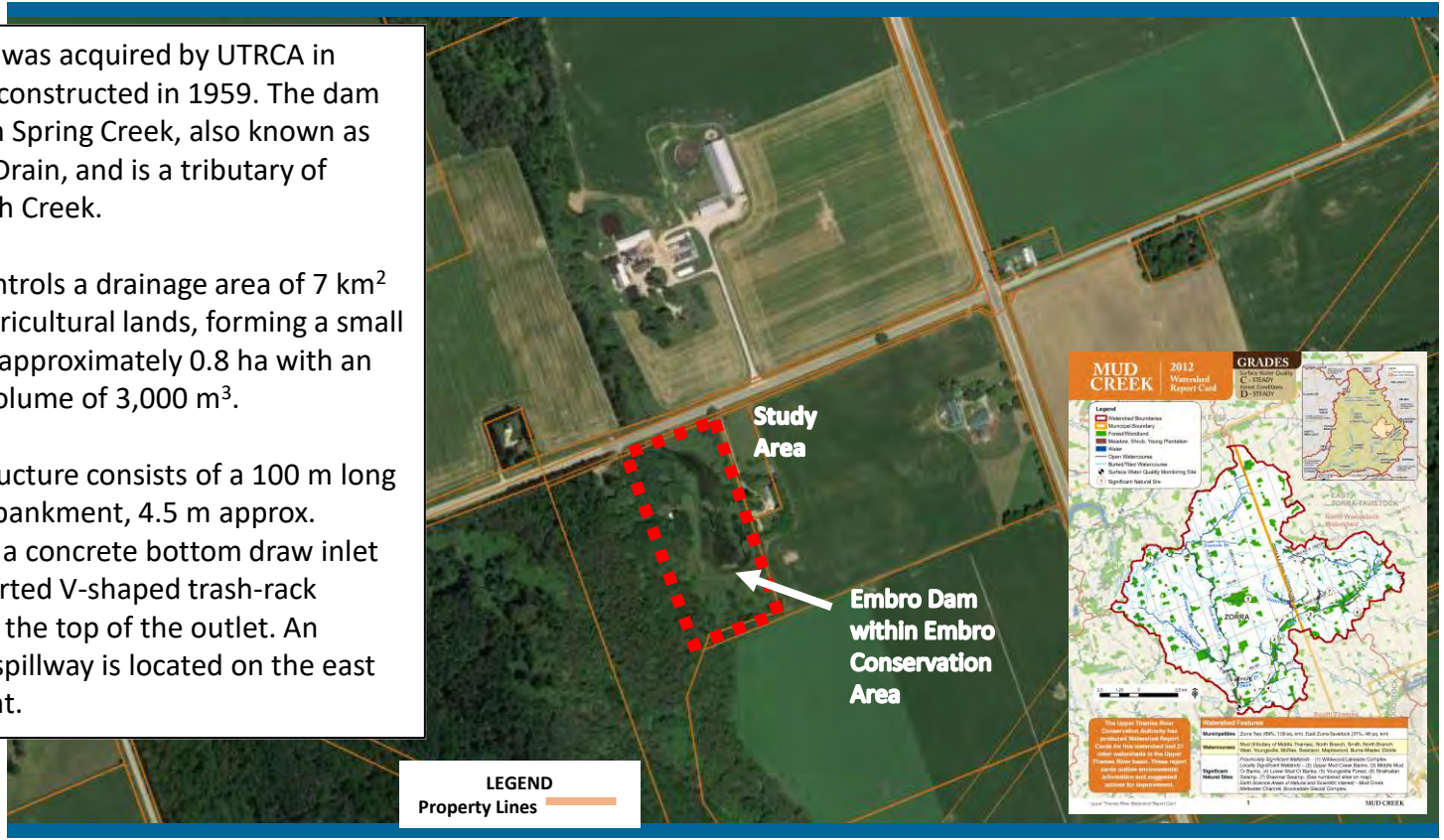


STUDY LOCATION

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 (2022)
- EA process recommenced Fall 2022
- EA updated and presented to Township and UTRCA Board (Winter 2023)
- Community Liaison Committee established (meetings held late Summer and mid-Fall 2023)
- Project implementation plan developed (Fall 2023 / Winter 2024)

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.

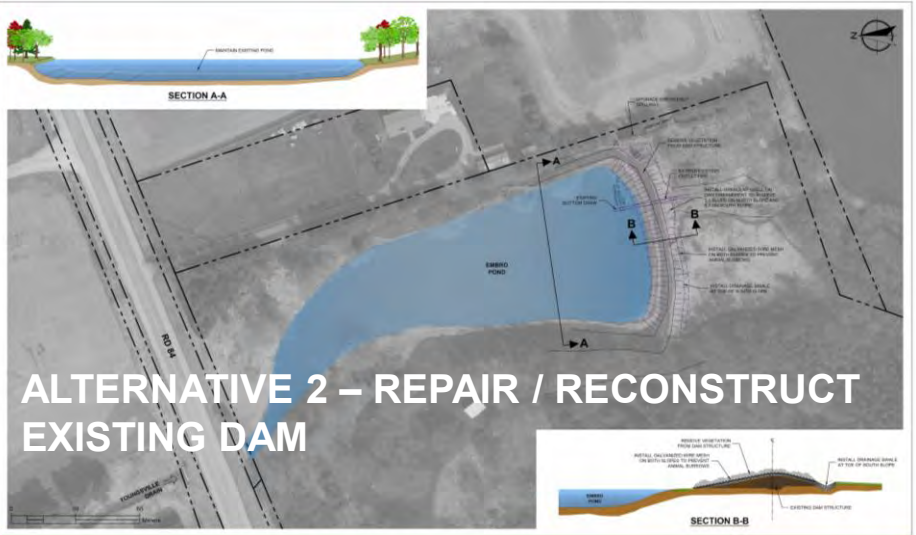
Embro Dam- Issues

Dam

- Does not meet current safety or stability standards
- 2007/2008 geotechnical assessments determined that upstream and downstream embankment slopes do not meet slope stability acceptance criteria
- 2015 Hazard Classification: **Threat levels for Life Safety, Property Losses, Environmental Losses, and Cultural-Built Heritage were considered LOW.**
- Date of last repair is unknown

MNRF requires a review of the Hazard Potential Classification every 10 years to determine if a change is warranted

ALTERNATIVE 1 – DO NOTHING



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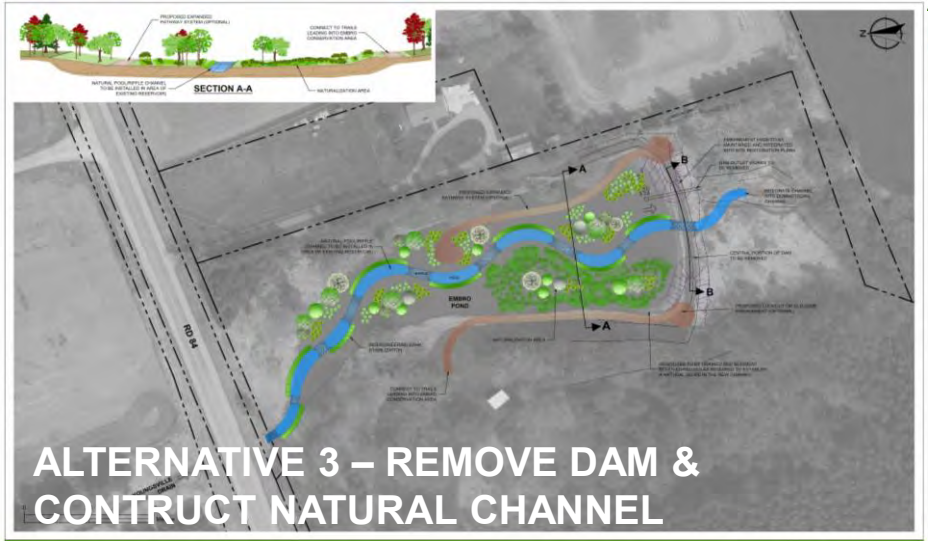
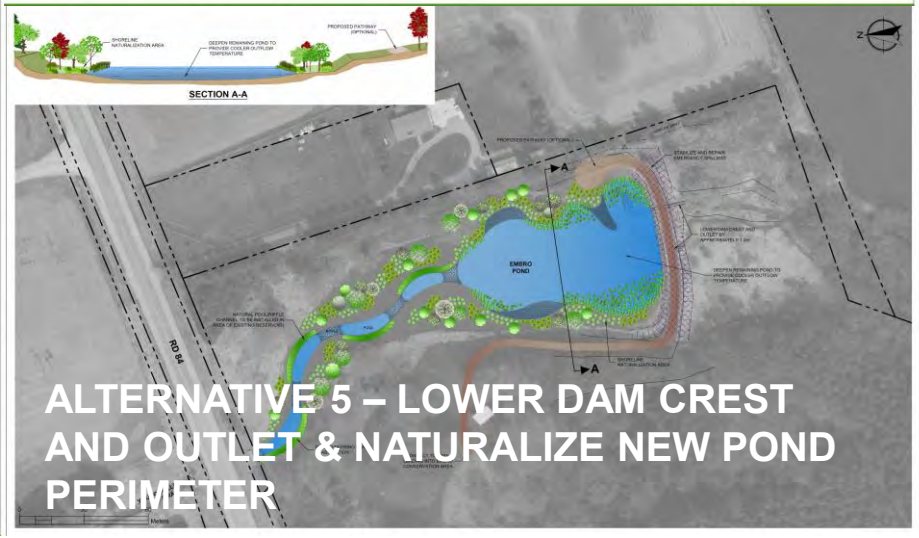


ALTERNATIVE 3 – REMOVE DAM & CONTRUCT NATURAL CHANNEL



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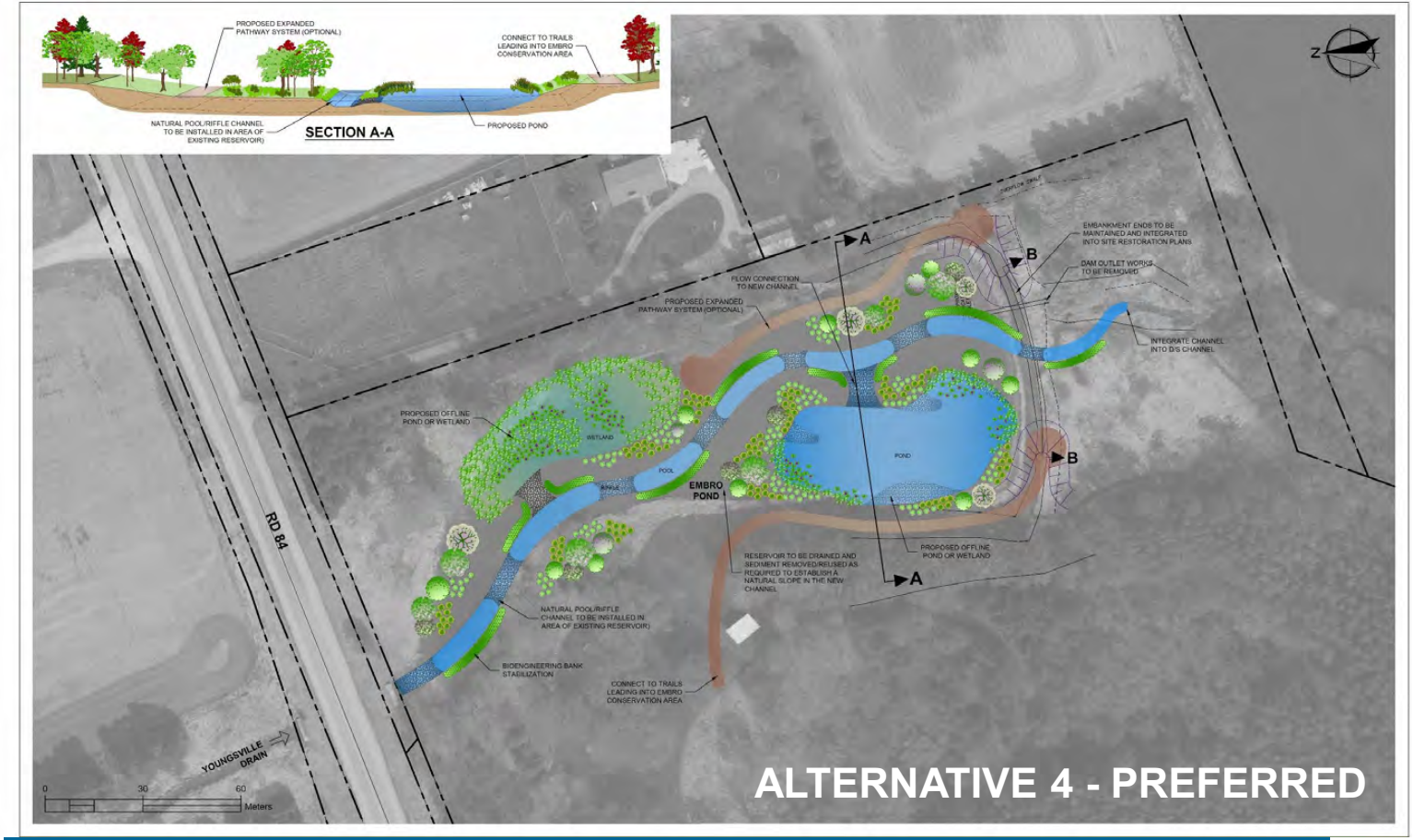


UPPER THAMES RIVER CONSERVATION AUTHORITY

Embro Dam Class Environmental Assessment
Township of Zorra Council Meeting
January 17, 2024

Matrix Solutions Inc.
A Montrose Environmental Company

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

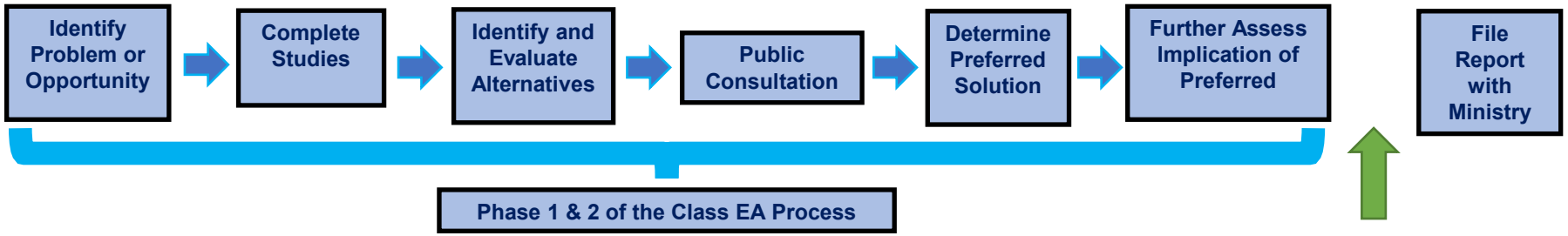
Social/ Cultural

- 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

CLASS ENVIRONMENTAL ASSESSMENT PROCESS



Conservation Ontario Class Environmental Assessment for Remedial Flood and Erosion Control Projects

If implementation is not initiated within 5 years of Project Approval, it will require review in accordance with the EA planning and design process and the preparation of new documentation.

Project Implementation Plan - PRELIMINARY

Planning Steps

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

Technical Studies

- Watershed hydrology review
- Archaeology – limited Stage 2
- Hydrogeology – adjacent wells (review records, monitor)
- Sediment characterization (if offsite transport required)
- Environmental – vegetation, reptiles

UPPER THAMES RIVER CONSERVATION AUTHORITY

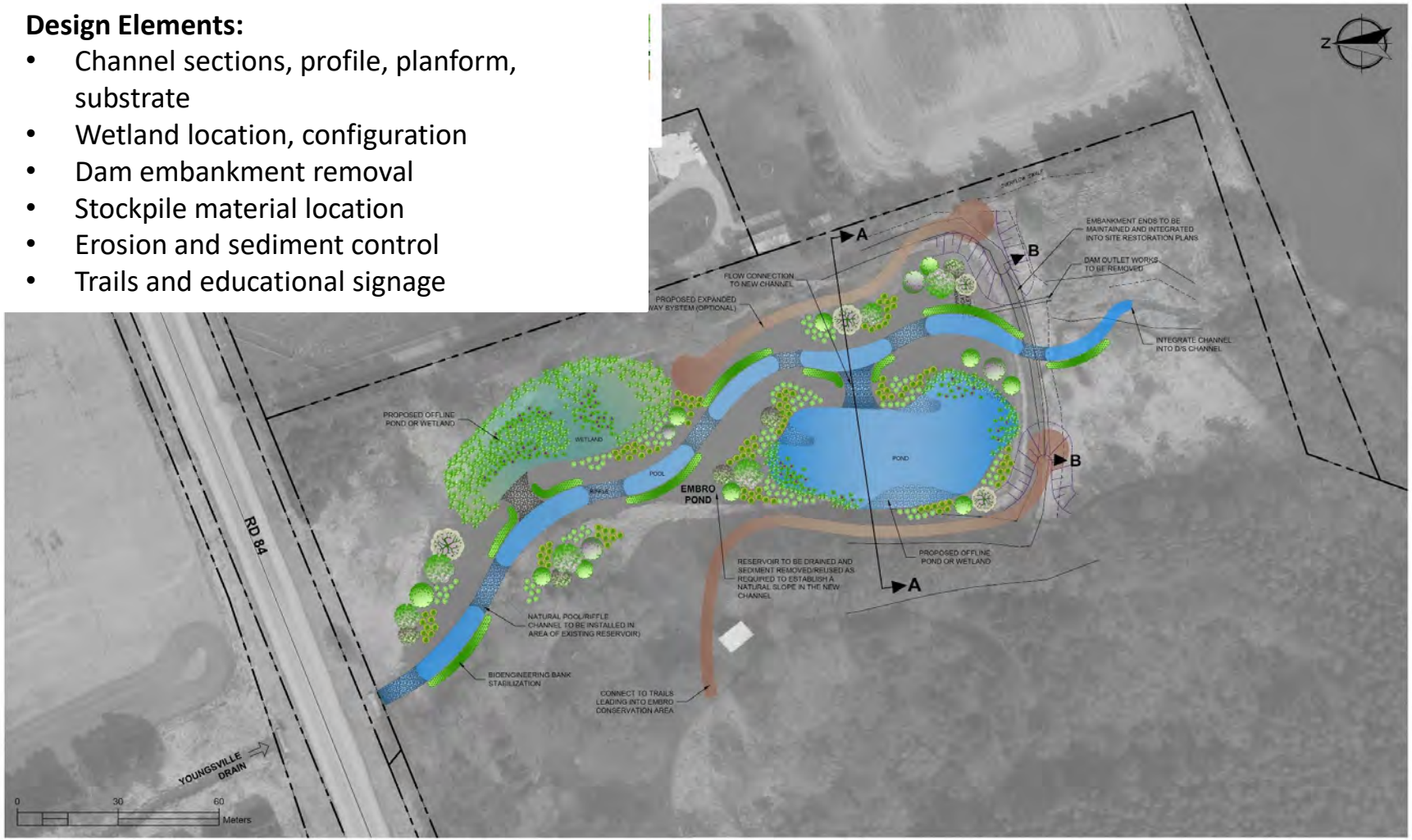
Matrix Solutions Inc.
A Montrose Environmental Company

Continued Consultation

- Indigenous communities
- Community Liaison Committee (CLC)
- Regulatory agencies (MNRF, DFO, MECP, MCM, UTRCA)

Design Elements:

- Channel sections, profile, planform, substrate
- Wetland location, configuration
- Dam embankment removal
- Stockpile material location
- Erosion and sediment control
- Trails and educational signage



Implementation Strategy

Year 1 (UTRCA)

- Technical studies
- Agency consultation
- Staged removal of stoplogs within the outlet structure (late spring)
- Opportunity to seed exposed sediment during drawdown period
- Monitoring (UTRCA)

Year 2 (estimated construction: $80,000)

- Open-up dam embankment
- Construction of outlet channel
- Monitoring (UTRCA)

Year 3 (estimated construction: $60,000)

- Wetland
- Trail and Park amenities
- Monitoring (UTRCA)

Note: for comparison, dam maintenance is projected to cost $200,000 over the next 4 – 5 years, if 'do-nothing' is selected.

Monitoring/Adaptive Management

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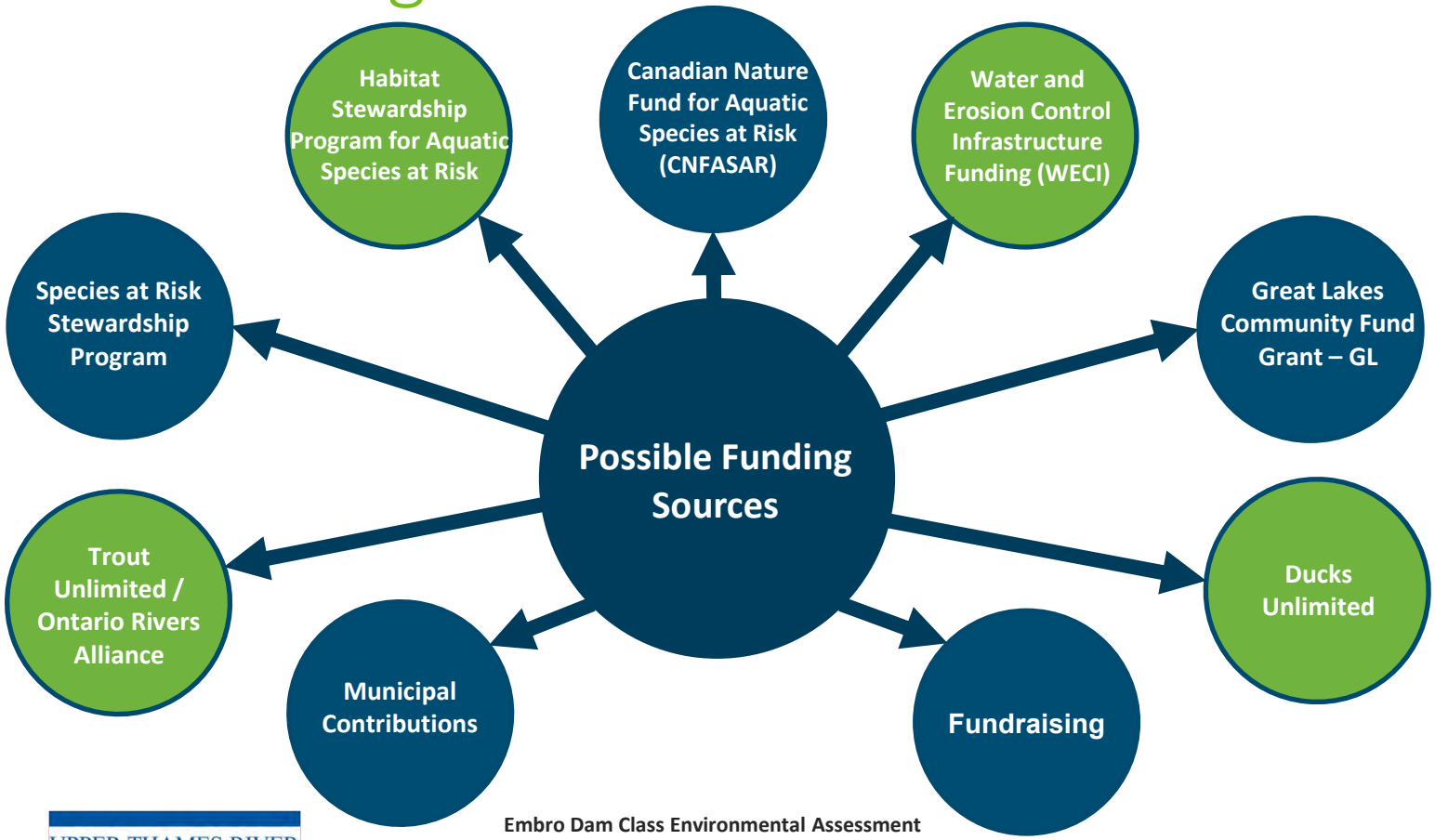
  - Recovery of aquatic habitat and fish populations (diversity, species)
- Invasive species management (e.g., phragmites)
- Longer-term planning

Possible Funding Sources



Next Steps

- Update Project Plan
- Meet with UTRCA Board
- Finish and File EA
- Additional Studies
- Detailed Design
- Obtain Funding
- Construction
- Monitoring

QUESTIONS?

Contact Us

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Senior Water Resource Engineer
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226.753.6411

Jeff Prince, P.Eng.
Principal, Water Resource Engineer
jprince@matrix-solutions.com
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Mariëtte Pushkar, M.Sc., P.Geo
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226.220.3835

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Matrix Solutions Inc.
A Montrose Environmental Company

Presentation to the UTRCA Board of Directors (January 30, 2024) by Matrix Solutions Inc.

Embro Dam Class Environmental Assessment

UTRCA Board Meeting

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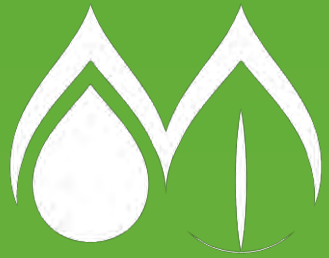

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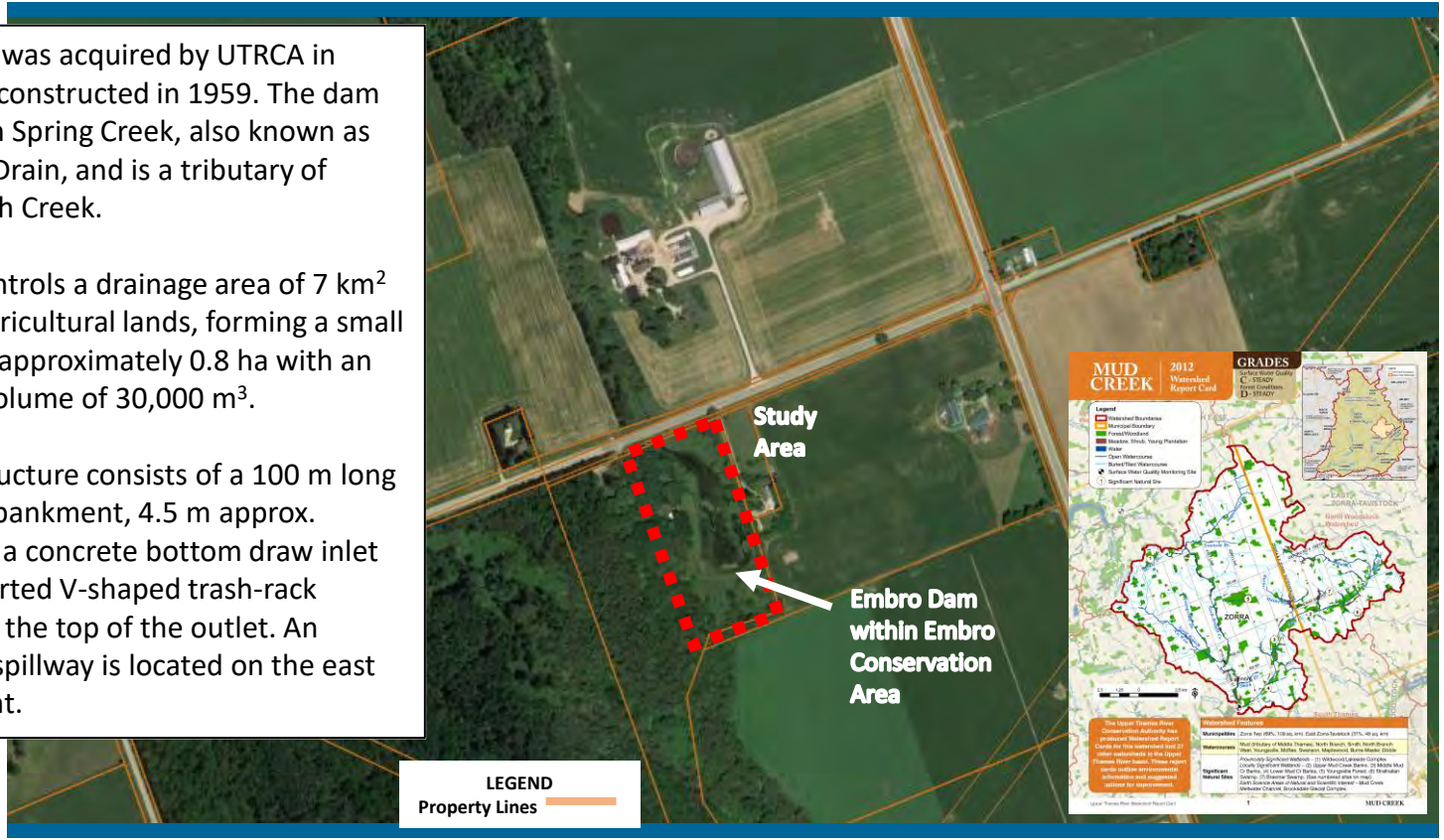

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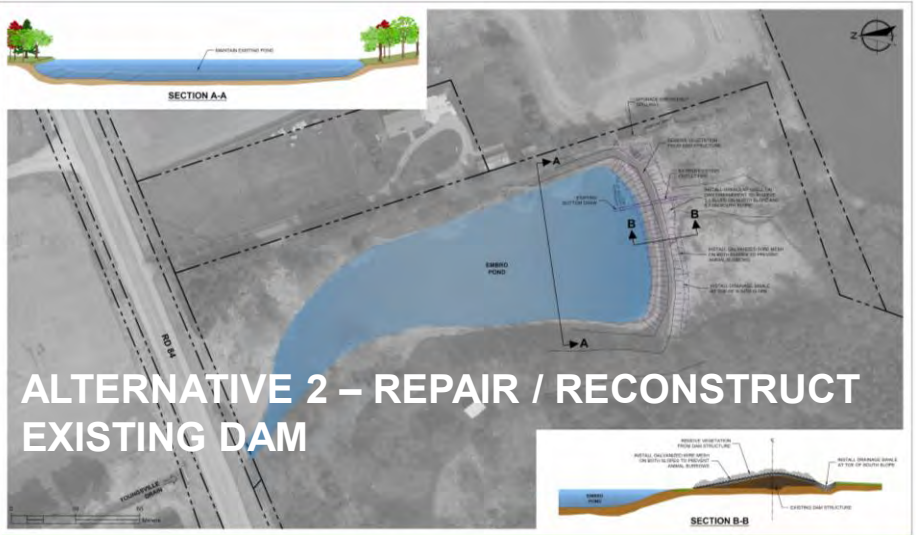

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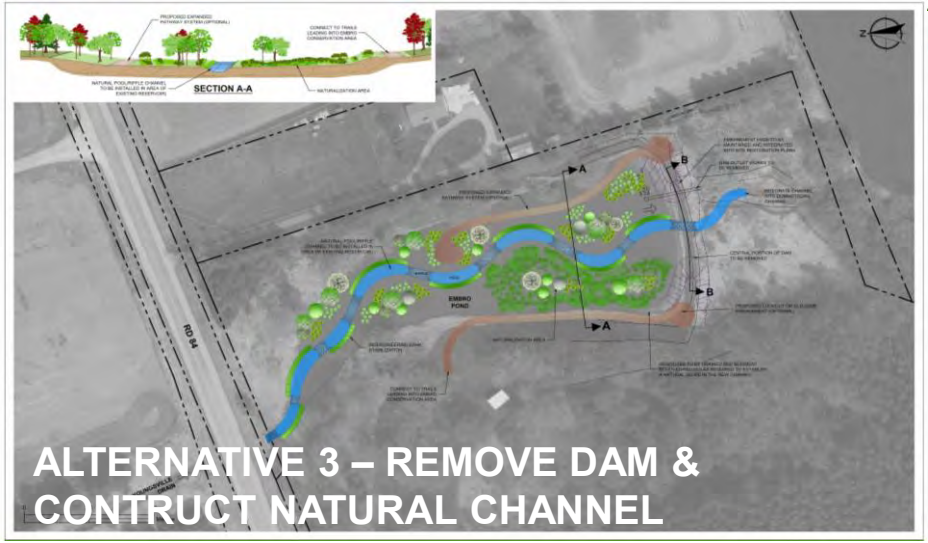

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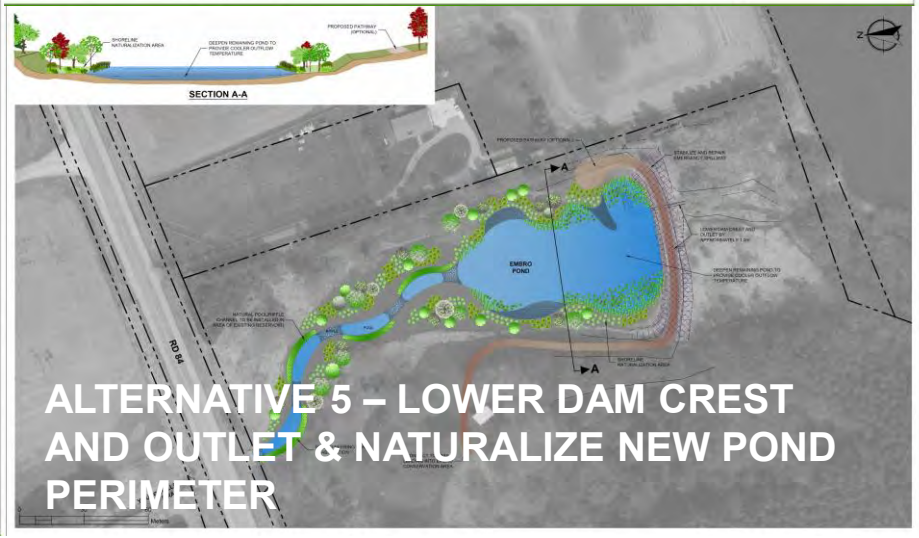

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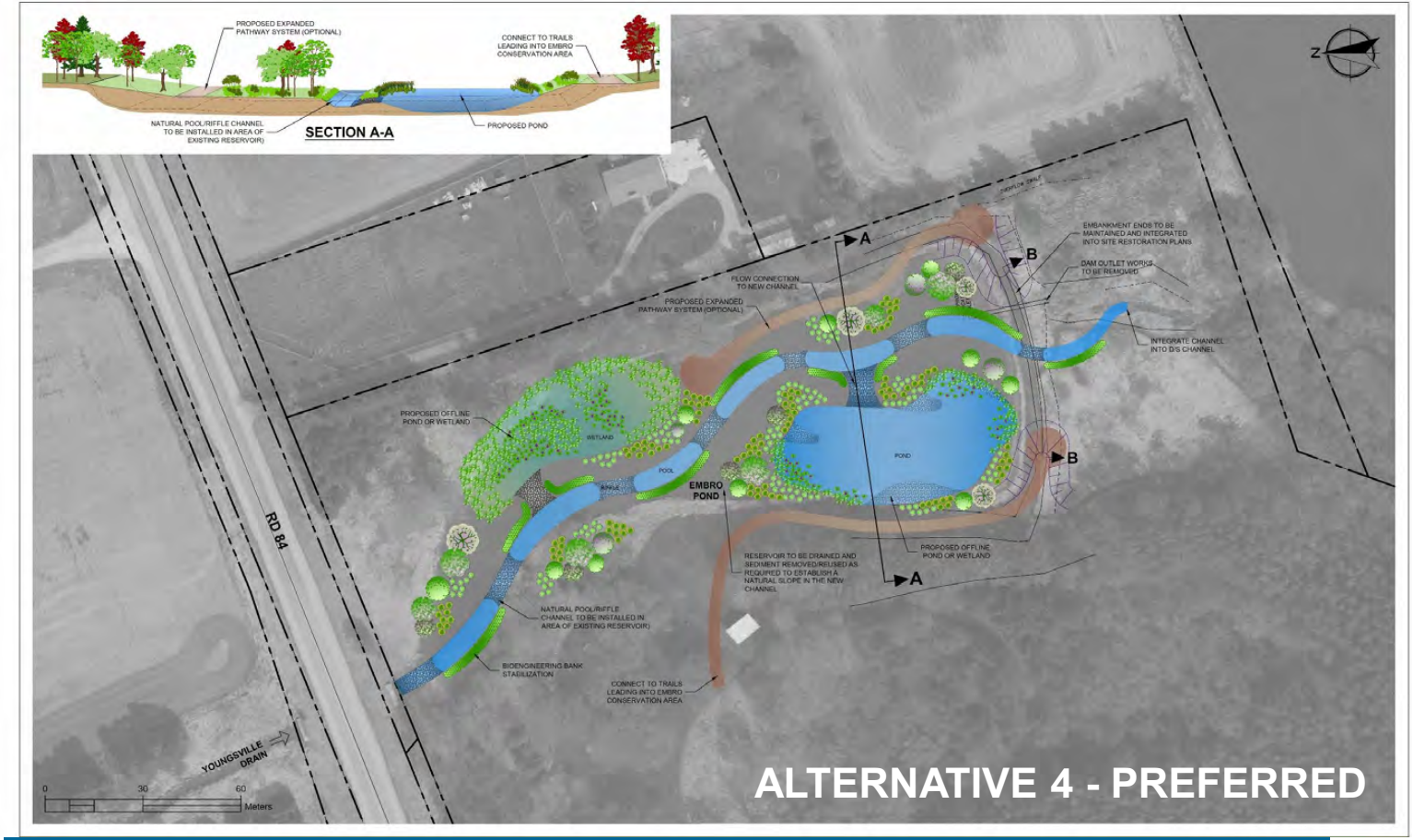

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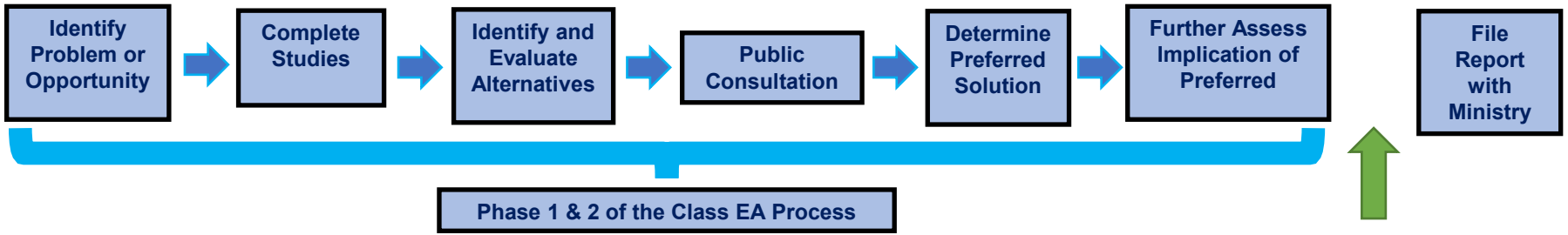

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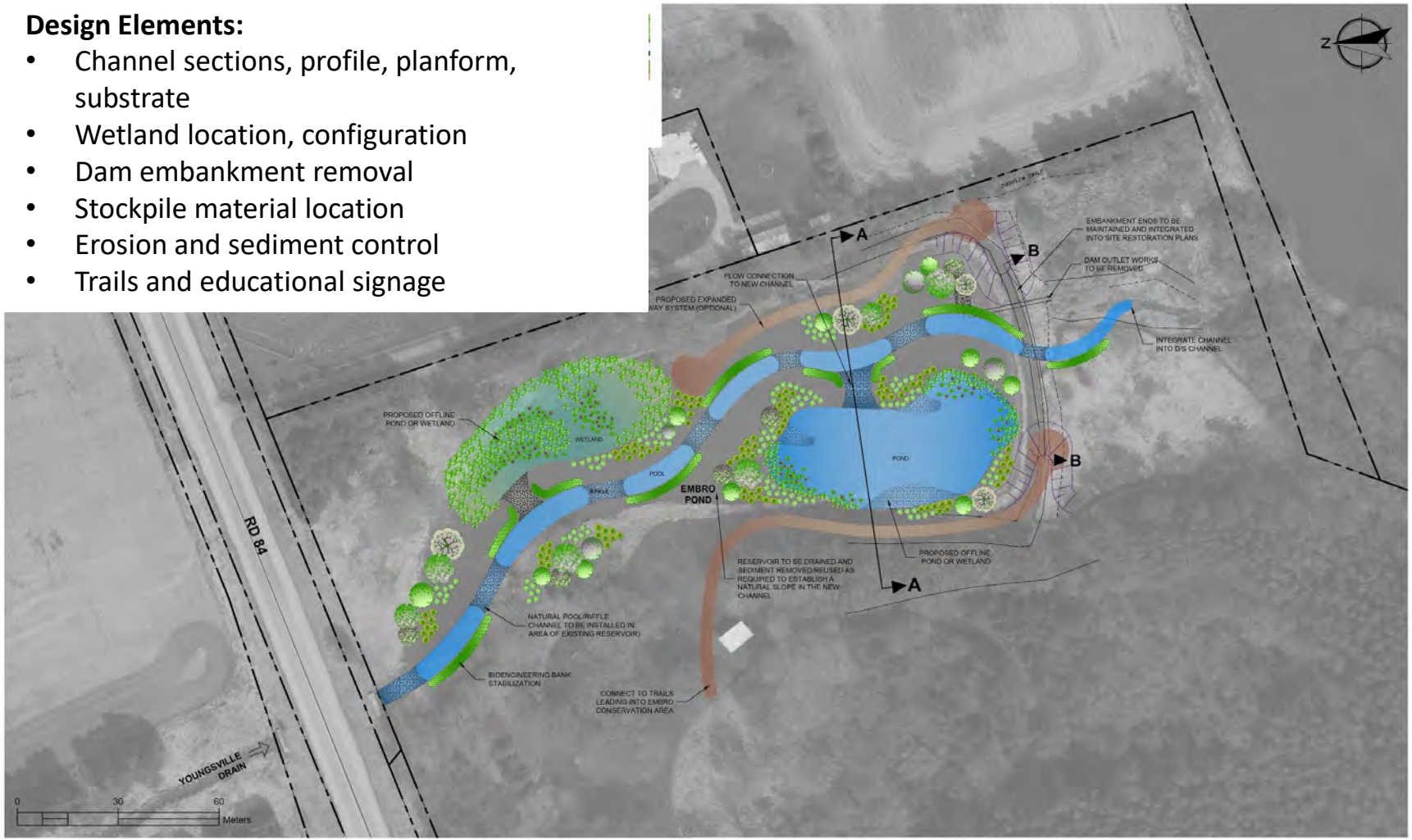

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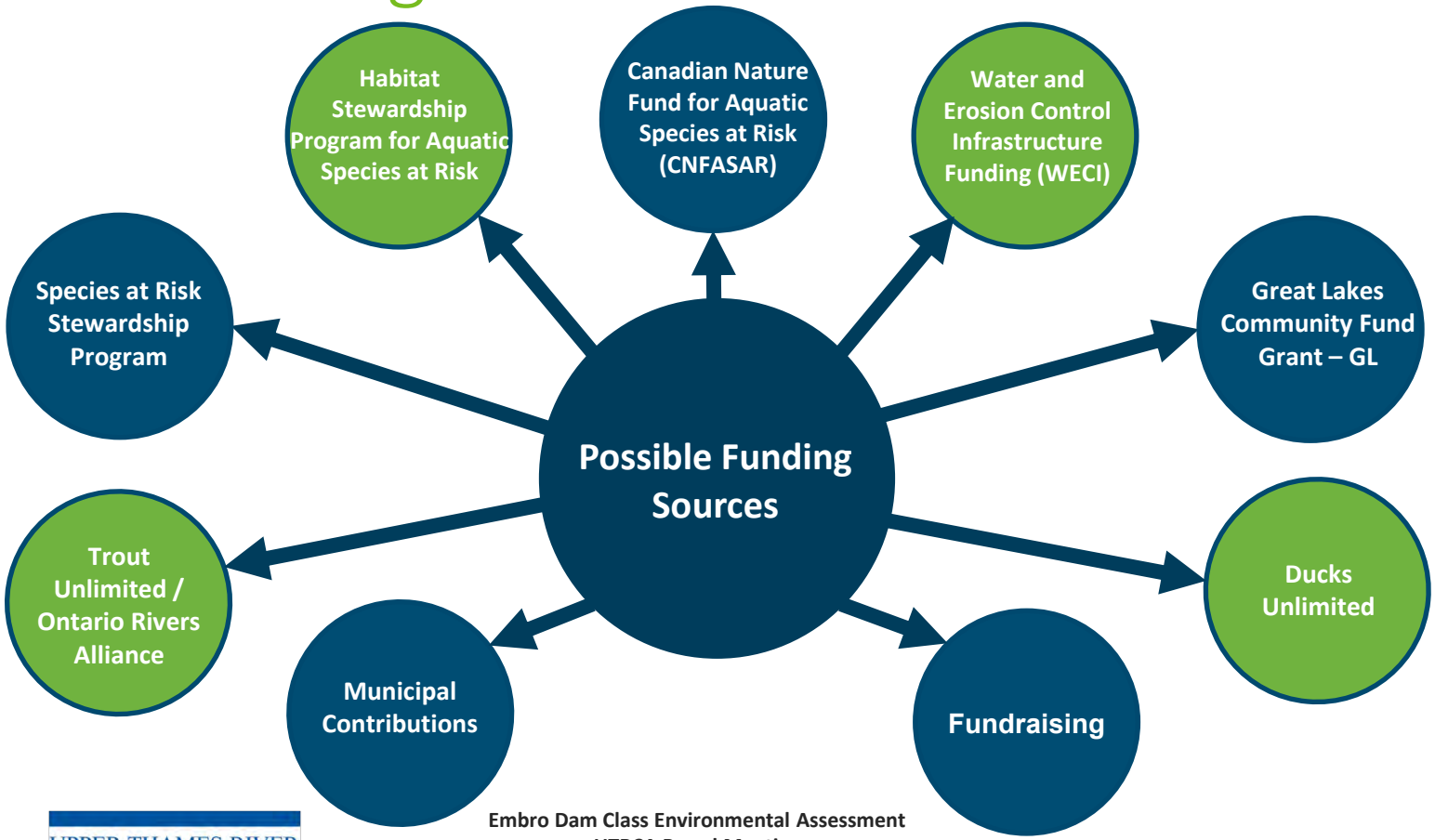

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