Embro Dam
Class Environmental Assessment

Public Information Centre #3

Upper Thames River Conservation Authority
Embro Community Centre
October 17th, 2016 7:00 p.m. to 9:00 p.m.

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Overview

- Impetus of project
- Class EA process
- PIC 2 feedback
- Evaluation process
- Embro dam evaluation
- Preferred alternative

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Introduction and Background

- UTRCA acquired dam in 1959
- Significant concerns related to the structural integrity and hydraulic capacity of the Embro Dam based on:
  - *Acres International. July, 2007.*
  - *Naylor Engineering Associates. September 2008.*

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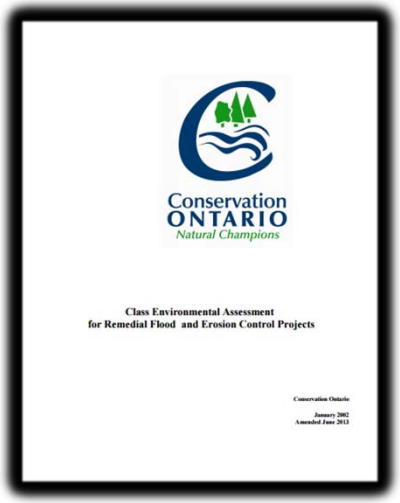
Study Process

- In addition to repair, other options are available that require study
- As a public body, UTRCA must plan any activities associated with the dam according to the Environmental Assessment Act
- Under the Act, UTRCA is required to undertake a *Class Environmental Assessment for Remedial Flood and Erosion Control*



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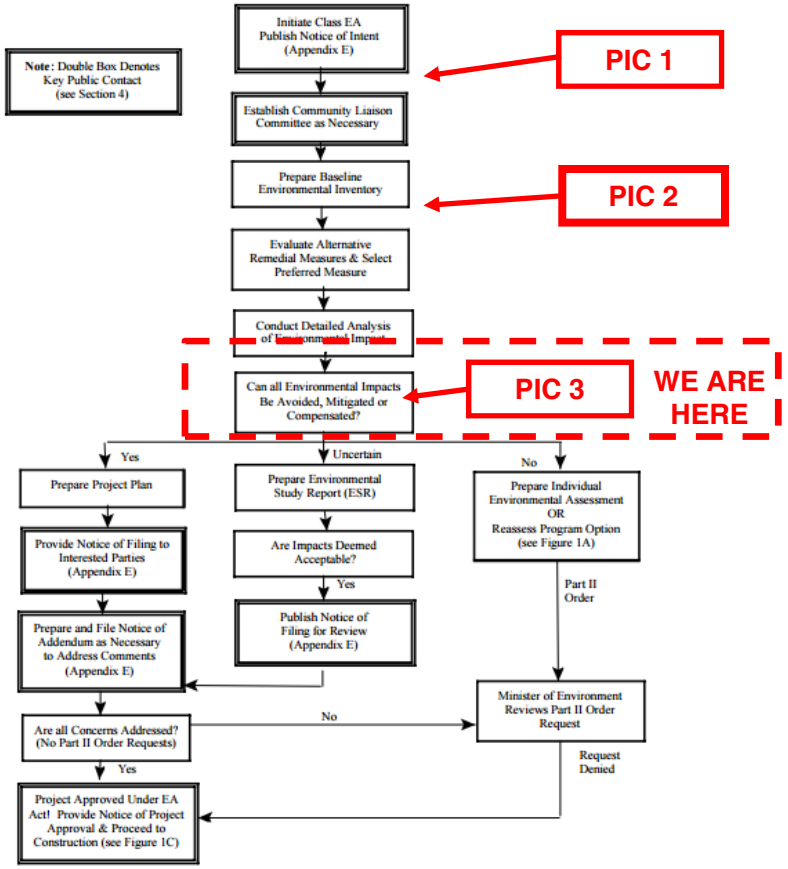
Class EA Process for Conservation Ontario Remedial Flood and Erosion Control Works

- Environmental Assessment Act, RSO 1990, chapter E.18.
- Code of Practise: Preparing, Reviewing and Using Class Environmental Assessments in Ontario. (MOE, 2014)
- Class Environmental Assessment for Remedial Flood and Erosion Control Projects (Conservation Ontario, 2012)



Class EA Process

- Problem Identification – PIC 1
  - Structural integrity and hydraulic capacity of dam
- Baseline Inventory – PIC 2
  - Background review and field assessments
- Alternative Identification – PIC 2
  - Methods that can be used to address problem, mitigate impacts
- Alternative Evaluation – PIC 3
- Preferred Alternative – PIC 3
  - Identify measures to further avoid, mitigate, and/or enhance

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Alternatives

1) Do Nothing
2) Repair Dam
   - construct dam ‘shell’, add rock protection, extend outlet pipe, provide emergency spillway
3) Remove Dam and Construct a Natural Channel
   - provide landscape restoration
4) Remove Dam and Construct Offline Pond(s) or Wetland(s)
   - create natural channel, provide landscape enhancement
5) Lower Dam Crest and Outlet and Naturalize New Pond and Perimeter
   - provide landscape enhancement

Alternative 1 – Do Nothing

EMBRO DAM CLASS
ENVIRONMENTAL ASSESSMENT

ALTERNATIVE 1
DO NOTHING

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FIGURE 4-1

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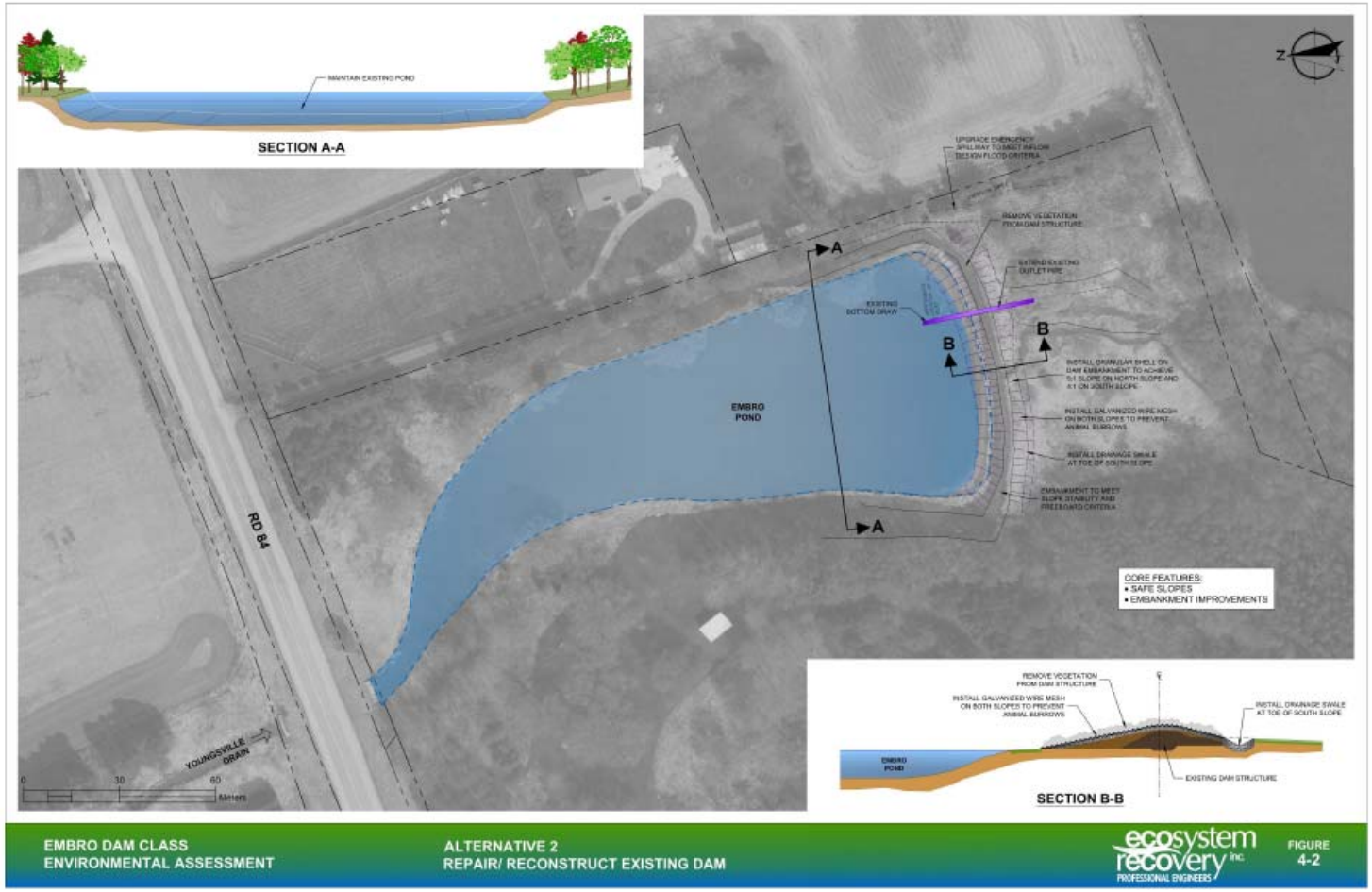
Alternative 2 – Repair Dam



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Alternative 3 – Remove Dam, Natural Channel

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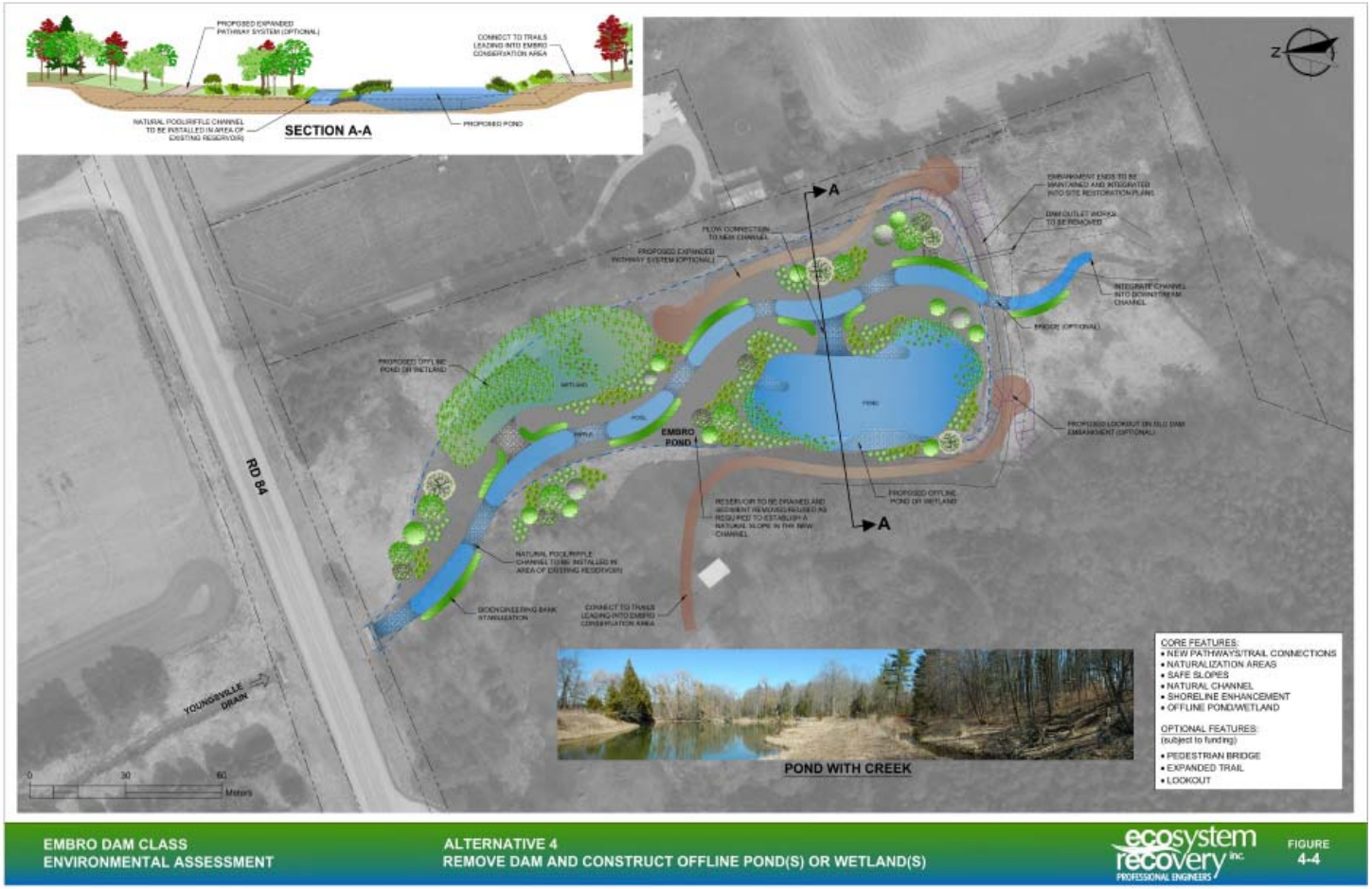
Alternative 4 – Remove Dam, Natural Channel and Offline Pond



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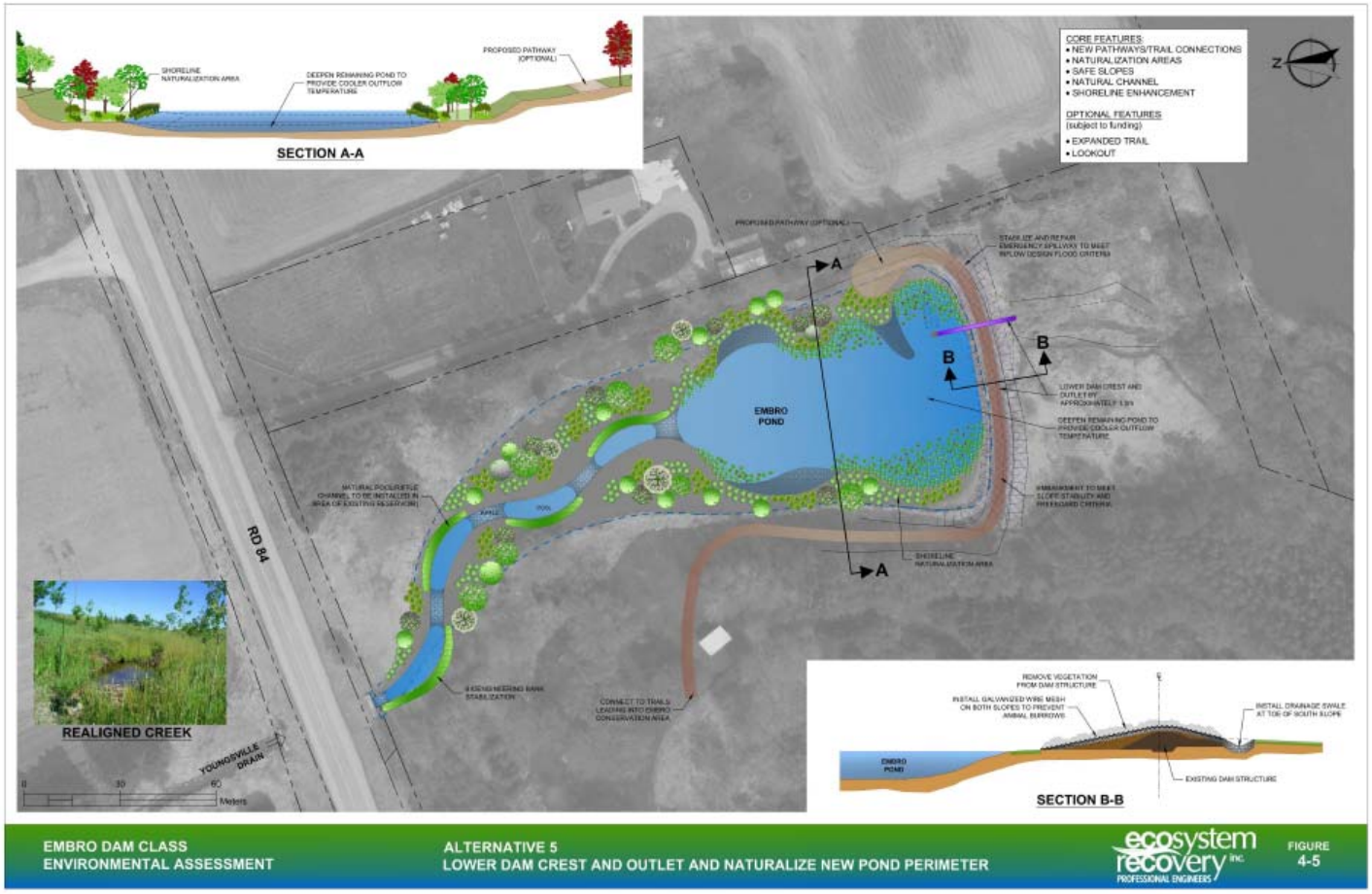
Alternative 5 – Lower Dam Crest, Naturalize Perimeter



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Overview of PIC 2 Feedback

- Comments provided by three representatives of public
  - Alternatives that perpetuate status quo, deteriorating environmental conditions, or lack upgrade to current environmental status not preferred.
  - Technical input – climate change effects, consideration of liability, further documentation and review of conditions (water temperature, fish species)

Alternative	Number of individuals who liked this alternative most
1. Do nothing	
2. Repair dam	1
3. Remove dam and construct a natural channel	3
4. Remove dam and construct offline ponds or wetlands	
5. Lower dam crest and outlet and naturalize new pond perimeter	

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Criteria and Evaluation

Technical/Engineering	Natural Environment
Flooding Impacts/Enhancement Protection of Infrastructure Constructability Implementability Approvability	Aquatic Habitat Impacts/Enhancement Pond Habitat Impacts/Enhancement Terrestrial Habitat Impacts/Enhancement SAR Impacts/Enhancement Geomorphology/Sediment Transport Groundwater Impacts/Enhancement Water Quality Impacts/Enhancement
Social/Cultural	**Economic**
Impact to Private Property Impact to Public Safety Impact to Public Access Impact to Cultural/Heritage Features Recreational Impacts/Enhancement	Construction Costs Maintenance/Future Costs Availability of Funding

Scoring*: 1) least positive benefit --> 5 = most positive benefit*

Estimated Costs for Alternatives

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, Site /sediment restoration ($80,000)
Alternative 2 Repair Dam	Improve 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 is based on 2016 estimate

Criteria	Description	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
TECHNICAL/ENGINEERING						
Dam Safety/Integrity	Effectiveness of the alternative to address dam safety requirements, reduce risk of failure	1	4	5	5	4
Protection of Properties	Effectiveness of the alternative in mitigating risk (flooding, failure) to adjacent properties	1	2	5	5	3
Constructability	Potential to construct the project using conventional, accepted construction and engineering practices	5	5	5	5	5
Implementability	Potential to implement the alternative, based on common accepted management practise	3	3	5	5	3
Approvability	Potential for regulatory agencies to grant approval for implementation	1	3	5	4	3
TOTAL CATEGORY SCORE		11	17	25	24	18
NORMALIZED CATEGORY SCORE (25% WEIGHTING)		11	17	25	24	18
CATEGORY RANKING (1 = most preferred; 5 = least preferred)		5	4	1	2	3

1 – Do Nothing
2 – Repair Dam
3 – Remove Dam, Natural Channel
4 – Remove Dam, Natural Channel and Off-line Pond
5 – Lower Dam Crest and Outlet, Naturalize New Pond Perimeter

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Criteria	Description	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
NATURAL ENVIRONMENT						
Aquatic (Creek) Habitat Impacts/Enhancement	Effectiveness of the alternative to enhance fisheries resources; fish diversity, food source, and fish passage	1	1	5	5	1
Aquatic (Pond) habitat Impacts/Enhancements	Effectiveness of the alternative to enhance pond habitat (fish, fowl, wildlife) resources, diversity, food source	3	4	1	3	5
Terrestrial Habitat Impacts/Enhancement	Potential for impact and/or enhancement to connectivity and terrestrial habitat (amphibian, avian, mammal) due to implementation of the alternative	1	1	4	5	4
SAR Impacts/Enhancement	Potential for impact and/or enhancement to potential SAR in the project area	1	1	4	5	3
Geomorphology/Sediment Transport	Effectiveness of the alternative to promote dynamic stability of channel processes and mitigate sediment impacts	1	1	5	5	2
Groundwater Impacts/Enhancement	Potential for impact and/or enhancement to groundwater regimes in the project area (baseflow, recharge, water table, etc.)	3	4	4	3	3
Water Quality Impacts/Enhancement	Effectiveness of the alternative to improve water quality, temperature, TSS, phosphorous, nutrient uptake	1	2	5	4	3
	TOTAL CATEGORY SCORE	11	14	28	30	21
	NORMALIZED CATEGORY SCORE (25% WEIGHTING)	8	10	20	21	15
	CATEGORY RANKING (1 = most preferred; 5 = least preferred)	5	4	2	1	3

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Criteria	Description	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
SOCIAL / CULTURAL ENVIRONMENT						
Impact to Private Property	Measure of the impact to adjacent private property (i.e., loss of property, access to property)	4	4	4	3	3
Impact to Public Access	Measure of impact to public access (e.g., trails, recreation - picnic, fish, boat)	3	4	3	3	4
Impact to Public Safety	Measure of the impact to public safety in the surrounding area resulting from the alternative	1	3	4	3	3
Impact to Cultural/Heritage Features	Potential impact to existing cultural and/or heritage features in the project area	5	5	1	1	4
Recreational Impacts/Enhancement	Measure of the impact to existing recreation and opportunities to enhance recreational activities in the project area	3	3	3	4	4
	TOTAL CATEGORY SCORE	16	19	15	14	18
	NORMALIZED CATEGORY SCORE (25% WEIGHTING)	16	19	15	14	18
	CATEGORY RANKING (1 = most preferred; 5 = least preferred)	3	1	4	5	2

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Criteria	Description	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
ECONOMIC						
Construction Costs	Relative measure of the initial costs to install/construct the proposed works, including environmental mitigation, sediment management, etc.)	5	4	3	2	1
Maintenance/Future Costs	Relative measure of the ongoing maintenance costs following implementation (or continued maintenance)	1	3	4	4	3
Availability of Funding	Estimate of the availability for funding to implement the alternative	3	3	5	4	2
TOTAL CATEGORY SCORE		9	10	12	10	6
NORMALIZED CATEGORY SCORE (25% WEIGHTING)		15	17	20	17	10
CATEGORY RANKING (1 = most preferred; 5 = least preferred)		4	2	1	2	5

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Preferred Alternative

Criteria	Description	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
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

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Potential Impacts and Mitigation

- Technical
  - Complete shallow well inventory/assessment
  - Drill new wells,
- Environmental
  - Loss of open water feature

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Potential Impacts and Mitigation

- Social and Cultural
  - Loss of open water feature – replace with trails
  - Stage 2 Archaeological study may be required
- Financial
  - Conservation authority funds
  - Township/Municipal contribution
  - Provincial funding sources
  - NGO funding

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Preferred Alternative

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Clair Creek, Waterloo

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Next Steps and Contact Information

Next Steps for our project team include:

- Compile and review feedback from this Public Information Centre
- Further refine the 'Preferred Alternative'
- Proceed to completion and filing of Project Plan

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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