Harrington Dam
Class Environmental Assessment

Public Information Centre #3

Upper Thames River Conservation Authority
Harrington Hall and Library
October 20th, 2016 7:00 p.m. to 9:00 p.m.

UPPER THAMES RIVER CONSERVATION AUTHORITY

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Class Environmental Assessment Process and Problem Statement

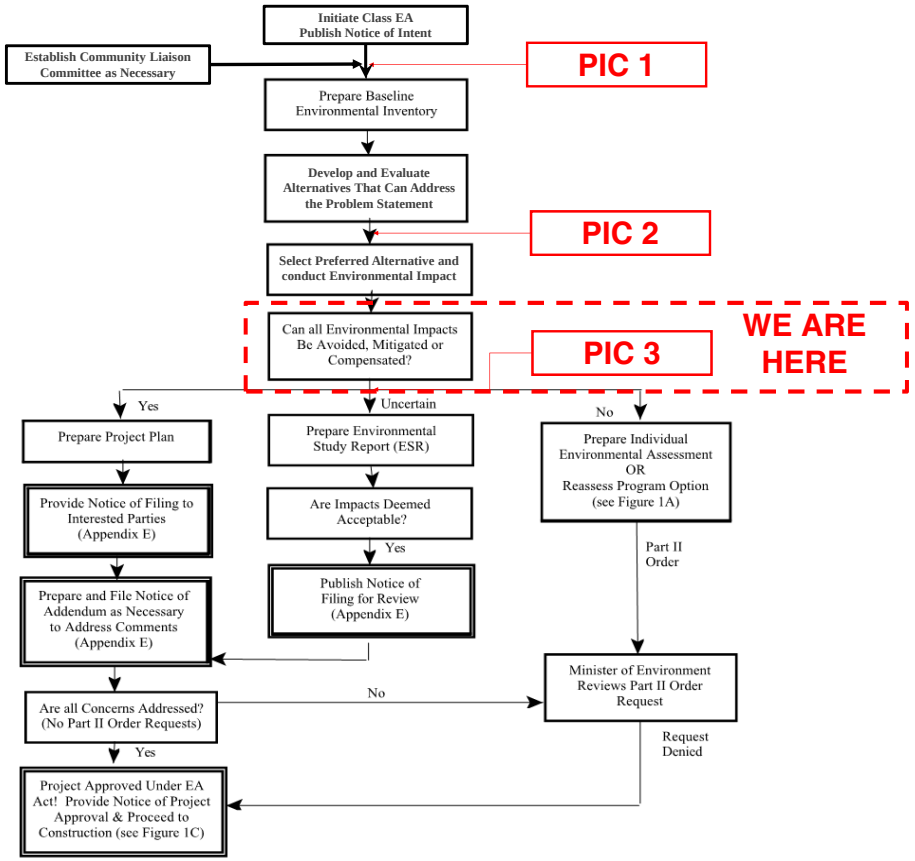
Problem Statement

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

- ***Acres International. July, 2007****. Dam Safety Assessment Report for Harrington Dam: Identified issues with insufficient spillway capacity, spillway instability and embankment stability*
- ***Naylor Engineering Associates. September 2008****. Geotechnical Investigation Harrington Dam Embankment Stability Assessment: The existing dam does not meet current standards and is not considered stable under existing conditions*

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

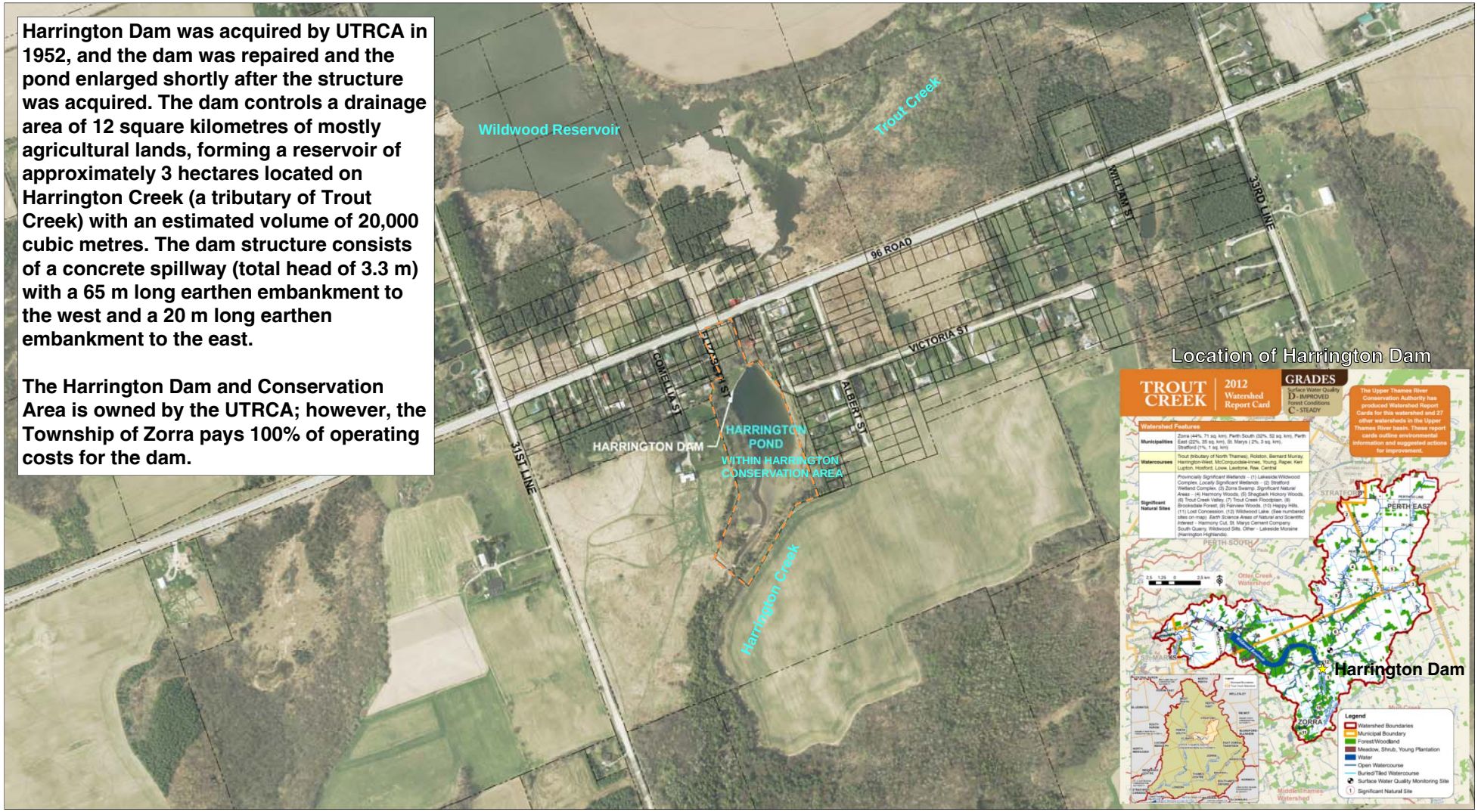
Class EA Process for Conservation Ontario Class Environmental Assessment for Remedial Flood and Erosion Control Works



Harrington Dam Study Area

Harrington Dam was acquired by UTRCA in 1952, and the dam was repaired and the pond enlarged shortly after the structure was acquired. The dam controls a drainage area of 12 square kilometres of mostly agricultural lands, forming a reservoir of approximately 3 hectares located on Harrington Creek (a tributary of Trout Creek) with an estimated volume of 20,000 cubic metres. The dam structure consists of a concrete spillway (total head of 3.3 m) with a 65 m long earthen embankment to the west and a 20 m long earthen embankment to the east.

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



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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)	$20,000 to $500,000	$5,000 – 20,000 per year
Alternative 2 Remove Dam, Construct Rocky Ramp	Dam removal, construction of grade control 'Rocky Ramp' , some sediment removal and site stabilization	$300,000 to $360,000	$1,500 to $3,000 per year
Alternative 3 Remove Dam, Construct Natural Channel	Dam removal, channel construction, sediment removal, site restoration	$600,000 to $800,000	$1,500 to $3,000 per year
Alternative 4 Remove Dam, Construct Offline Pond and Channel	Dam removal, channel construction, sediment removal, offline pond construction, site restoration	$800,000,to $1,000,000	$1,500 to $5,000 per year
Alternative 5 Replace Dam with New Earth Dam Downstream of Existing	Dam Removal, Excavation and installation of new core, bottom draw structure, sediment removal	$1,200,000 to $1,600,000	$5,000 to $35,000 per year. Dam retirement (75 yrs) costs $120,000[1]
Alternative 6 Replace Dam with New Earth Dam, lower crest	Dam Removal, Excavation and installation of new core, bottom draw structure, sediment removal	$1,100,000 to $1,500,000	$5,000 to $35,000 per year. Dam retirement (75 yrs) costs $120,000[1]
Alternative 7 Reconstruct Dam in Current Location	Dam Removal, Excavation and installation of new core, concrete dam, sediment removal	$1,800,000 to $2,100,000	$5,000 to $35,000 per year. Dam retirement (75 yrs) costs $120,000[1]

[1] dam retirement cost reflects today's (2016) cost

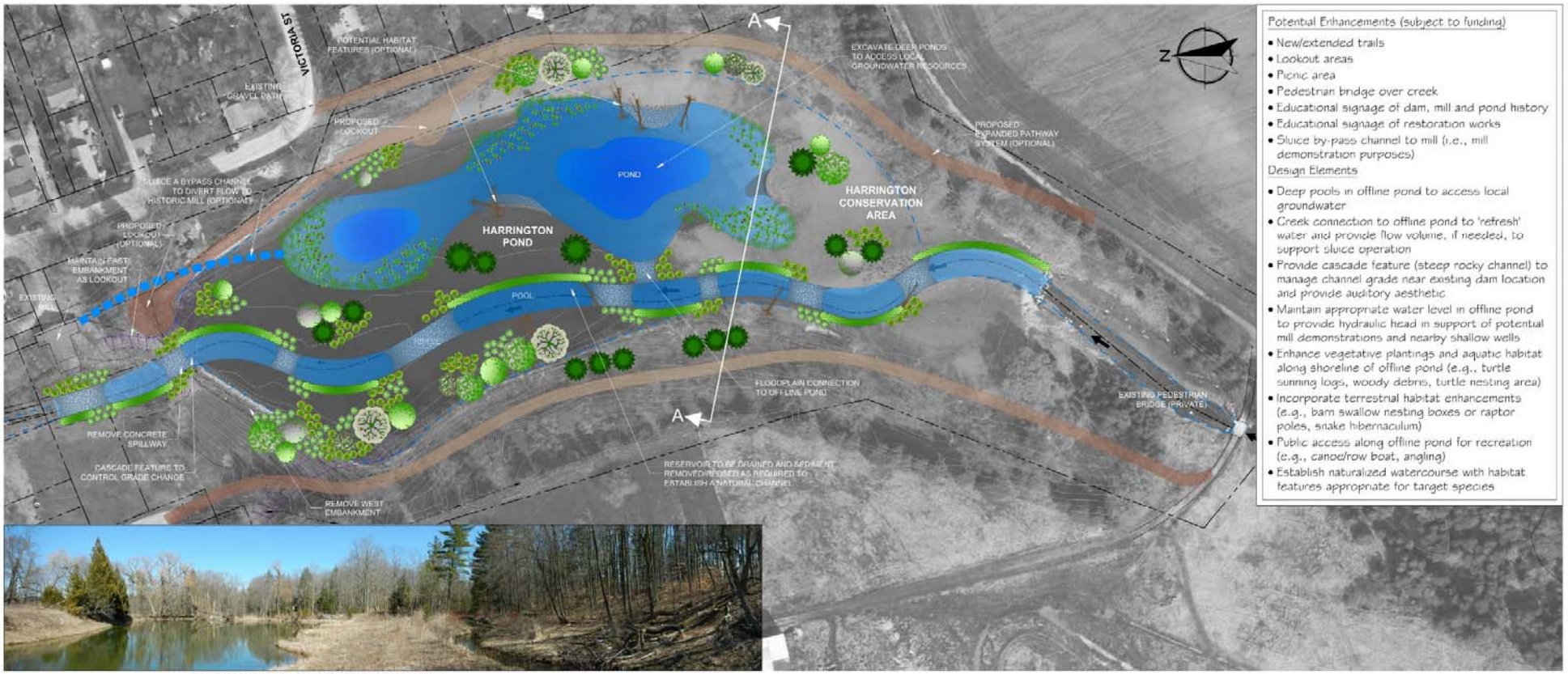
Alternative Evaluation – Equal Weighting

Criteria	Description	Alternative 1 Do Nothing	Alternative 2 Remove Dam and Install Rocky Ramp	Alternative 3 Remove Dam and Construct a Natural Channel	Alternative 4 Remove Dam and Construct an Offline Pond and Natural Channel	Alternative 5 Replace Dam with new Structure Downstream of the Existing Dam	Alternative 6 Replace Dam with an Earthen Dam of Lower Crest Elevation and Naturalize Perimeter	Alternative 7 Reconstruct the Existing Dam in Current Location with New Materials
TECHNICAL/ENGINEERING								
Dam Safety	Effectiveness of the alternative to address dam safety requirements, reduce risk of failure	1	4	5	5	3	3	4
Flooding Impacts/Enhancement	Effectiveness of the alternative to manage or reduce flooding, or not cause negative impacts to flooding	1	3	5	4	2	3	2
Geomorphology/Sediment Transport	Effectiveness of the alternative to promote dynamic stability of channel processes and mitigate sediment impacts	1	4	5	5	1	1	1
Protection of Infrastructure	Effectiveness of the alternative in mitigating risk to adjacent infrastructure (e.g., roads)	1	5	5	5	4	5	4
Constructability	Potential to construct the project using conventional, accepted construction and engineering practices	5	4	4	4	5	5	5
Implementability	Potential to implement the alternative, based on common accepted management practise	3	5	5	4	4	4	4
Approvability	Potential for regulatory agencies to grant approval for implementation	1	4	5	4	3	3	3
	TOTAL CATEGORY SCORE	13	29	34	31	22	24	23
	NORMALIZED CATEGORY SCORE (25% WEIGHTING)	9	21	24	22	16	17	16
	CATEGORY RANKING (1 most preferred; 7 least preferred)	7	3	1	2	6	4	5
NATURAL ENVIRONMENT								
Aquatic (River) Habitat Impacts/Enhancement	Effectiveness of the alternative to enhance fisheries resources; fish diversity, food source, and fish passage	1	4	4	5	2	2	3
Aquatic (Pond) habitat Impacts/Enhancements								
Terrestrial Habitat Impacts/Enhancement	Potential for impact and/or enhancement to connectivity and terrestrial/wildlife (amphibian, mammal etc.) habitat due to implementation of the alternative	1	4	4	5	1	3	1
SAR Impacts/Enhancements	Potential for impact and/or enhancement to SAR species	1	3	4	4	1	1	1
Groundwater Impacts/Enhancement	Potential for impact and/or enhancement to groundwater regimes in the project area (baseflow, recharge, etc.)	3	3	4	4	3	4	3
Water Quality Impacts/Enhancement	Effectiveness of the alternative to improve water quality, TSS, phosphorous, nutrient uptake	1	3	5	5	1	2	1
	TOTAL CATEGORY SCORE	10	19	22	26	13	16	13
	NORMALIZED CATEGORY SCORE (25% WEIGHTING)	8	16	18	22	11	13	11
	CATEGORY RANKING (1 most preferred; 7 least preferred)	7	3	2	1	5	4	5
SOCIAL / CULTURAL ENVIRONMENT								
Impact to Private Property	Measure of the impact to adjacent private property (i.e., loss of property, access to property, aesthetic)	3	4	3	3	4	4	4
Impact to Public Access	Measure of impact to public access (e.g., trails, recreation - picnic, fish, boat)	3	4	3	4	4	4	4
Impact to Public Safety	Measure of the impact to public safety in the surrounding area resulting from the alternative	1	3	5	4	3	3	3
Impact to Cultural/Heritage Features	Potential impact to existing cultural and/or heritage features in the project area	3	2	2	4	5	5	5
Recreational Impacts/Enhancement	Measure of the impact to existing recreation and opportunities to enhance recreational activities in the project area	3	4	2	4	4	4	4
	TOTAL CATEGORY SCORE	13	17	15	19	20	20	20
	NORMALIZED CATEGORY SCORE (25% WEIGHTING)	13	17	15	19	20	20	20
	CATEGORY RANKING (1 most preferred; 7 least preferred)	7	5	6	4	1	1	1
ECONOMIC								
Construction Costs	Relative measure of the initial costs to install/construct the proposed works, including environmental mitigation, sediment management, well mitigation etc.)	5	4	3	3	2	2	1
Maintenance/Future Costs	Relative measure of the ongoing maintenance costs following implementation (sedimentation)	1	3	4	4	2	2	2
Availability of Funding	Estimate of the availability for funding to implement the alternative	3	3	5	4	2	1	1
	TOTAL CATEGORY SCORE	9	10	12	11	6	5	4
	NORMALIZED CATEGORY SCORE (25% WEIGHTING)	15	17	20	18	10	8	7
	CATEGORY RANKING (1 most preferred; 7 least preferred)	4	3	1	2	5	6	7
	OVERALL NORMALIZED CATEGORY SCORE (100% WEIGHTING)	46	70	78	81	57	58	54
	PREFERRED OVERALL RANKING (1 most preferred; 5 least preferred)	7	3	2	1	5	4	6
Notes:	Scoring ranks alternatives in their potential to address the criteria from a least positive to a most positive impact, 1 being the least positive and 5 being the most positive							
	Negative impacts which may be involved in some alternatives, such as site disturbance, are temporary and are seen as mitigatable impacts							

Alternative Evaluation – Altered Weighting

Criteria	Description	Alternative 1 Do Nothing	Alternative 2 Remove Dam and Install Rocky Ramp	Alternative 3 Remove Dam and Construct a Natural Channel	Alternative 4 Remove Dam and Construct an Offline Pond and Natural Channel	Alternative 5 Replace Dam with new Structure Downstream of the Existing Dam	Alternative 6 Replace Dam with an Earthen Dam of Lower Crest Elevation and Naturalize Perimeter	Alternative 7 Reconstruct the Existing Dam in Current Location with New Materials
TECHNICAL/ENGINEERING								
Dam Safety	Effectiveness of the alternative to address dam safety requirements, reduce risk of failure	**1**	**4**	**5**	**5**	**3**	**3**	**4**
Flooding Impacts/Enhancement	Effectiveness of the alternative to manage or reduce flooding, or not cause negative impacts to flooding	1	3	5	4	2	3	2
Geomorphology/Sediment Transport	Effectiveness of the alternative to promote dynamic stability of channel processes and mitigate sediment impacts	1	4	5	5	1	1	1
Protection of Infrastructure	Effectiveness of the alternative in mitigating risk to adjacent infrastructure (e.g., roads)	1	5	5	5	4	5	4
Constructability	Potential to construct the project using conventional, accepted construction and engineering practices	5	4	4	4	5	5	5
Implementability	Potential to implement the alternative, based on common accepted management practise	3	5	5	4	4	4	4
Approvability	Potential for regulatory agencies to grant approval for implementation	1	4	5	4	3	3	3
	TOTAL CATEGORY SCORE	**13**	**29**	**34**	**31**	**22**	**24**	**23**
	NORMALIZED CATEGORY SCORE (20% WEIGHTING)	**7**	**17**	**19**	**18**	**13**	**14**	**13**
	CATEGORY RANKING (1 most preferred; 7 least preferred)	**7**	**3**	**1**	**2**	**6**	**4**	**5**
NATURAL ENVIRONMENT								
Aquatic (River) Habitat Impacts/Enhancement	Effectiveness of the alternative to enhance fisheries resources; fish diversity, food source, and fish passage	1	4	4	5	2	2	2
Aquatic (Pond) habitat Impacts/Enhancements	Effectiveness of the alternative to enhance pond habitat (fish, fowl, and wildlife) resources, diversity, food source	3	2	1	3	5	4	5
Terrestrial Habitat Impacts/Enhancement	Potential for impact and/or enhancement to connectivity and terrestrial/wildlife (amphibian, mammal etc.) habitat due to implementation of the alternative	1	4	4	5	1	3	1
SAR Impacts/Enhancements	Potential for impact and/or enhancement to SAR species	1	3	4	4	1	1	1
Groundwater Impacts/Enhancement	Potential for impact and/or enhancement to groundwater regimes in the project area (baseflow, recharge, etc.)	3	4	3	4	3	4	3
Water Quality Impacts/Enhancement	Effectiveness of the alternative to improve water quality, TSS, phosphorous, nutrient uptake	1	3	5	5	1	2	1
	TOTAL CATEGORY SCORE	**10**	**20**	**21**	**26**	**13**	**16**	**13**
	NORMALIZED CATEGORY SCORE (20% WEIGHTING)	**7**	**13**	**14**	**17**	**9**	**11**	**9**
	CATEGORY RANKING (1 most preferred; 7 least preferred)	**7**	**3**	**2**	**1**	**5**	**4**	**5**
Impact to Private Property	Measure of the impact to adjacent private property (i.e., loss of property, access to property, aesthetic)	3	4	3	3	4	4	4
Impact to Public Access	Measure of impact to public access (e.g., trails, recreation - picnic, fish, boat)	3	4	3	4	4	4	4
Impact to Public Safety	Measure of the impact to public safety in the surrounding area resulting from the alternative	1	3	5	4	4	4	4
Impact to Cultural/Heritage Features	Potential impact to existing cultural and/or heritage features in the project area	3	2	2	3	5	5	5
Recreational Impacts/Enhancement	Measure of the impact to existing recreation and opportunities to enhance recreational activities in the project area	3	4	2	4	5	5	5
	TOTAL CATEGORY SCORE	**13**	**17**	**15**	**18**	**22**	**22**	**22**
	NORMALIZED CATEGORY SCORE (40% WEIGHTING)	**21**	**27**	**24**	**29**	**35**	**35**	**35**
	CATEGORY RANKING (1 most preferred; 7 least preferred)	**7**	**5**	**6**	**4**	**1**	**1**	**1**
Construction Costs	Relative measure of the initial costs to install/construct the proposed works, including environmental mitigation, sediment management, well mitigation etc.)	5	4	3	3	2	2	1
Maintenance/Future Costs	Relative measure of the ongoing maintenance costs following implementation (sedimentation)	1	3	4	4	2	2	2
Availability of Funding	Estimate of the availability for funding to implement the alternative	3	3	5	4	2	1	1
	TOTAL CATEGORY SCORE	**9**	**10**	**12**	**11**	**6**	**5**	**4**
	NORMALIZED CATEGORY SCORE (20% WEIGHTING)	**12**	**13**	**16**	**15**	**8**	**7**	**5**
	CATEGORY RANKING (1 most preferred; 7 least preferred)	**4**	**3**	**1**	**2**	**5**	**6**	**7**
	OVERALL NORMALIZED CATEGORY SCORE (100% WEIGHTING)	**47**	**70**	**73**	**79**	**64**	**66**	**62**
	PREFERRED OVERALL RANKING (1 most preferred; 5 least preferred)	**7**	**3**	**2**	**1**	**5**	**4**	**6**
Notes:	Scoring ranks alternatives in their potential to address the criteria from a least positive to a most positive impact, 1 being the least positive and 5 being the most positive							
	Negative impacts which may be involved in some alternatives, such as site disturbance, are temporary and are seen as mitigatable impacts							

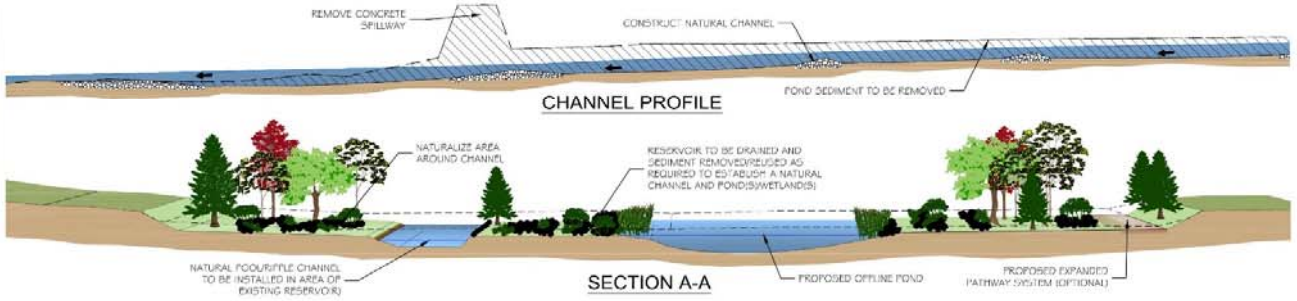
Preferred Alternative



WARD'S POND WITH CREEK (KITCHENER)

CHILIGO POND WITH CREEK (CAMBRIDGE)

CHILIGO POND (CAMBRIDGE)



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HARRINGTON DAM CLASS ENVIRONMENTAL ASSESSMENT

EVALUATION OUTCOME
REMOVE DAM - NATURAL CHANNEL WITH OFFLINE POND

UPPER THAMES RIVER CONSERVATION AUTHORITY

ecosystem recovery Inc. PROFESSIONAL ENGINEERS

Next Steps and Contact Information

Next Steps for our project team include:

- **Compile and review feedback from this Public Information Centre**
- **Update preferred alternative**
- **Complete and file Project Plan**

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

harrington_dam@thamesriver.on.ca

For further information please contact:

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