## Potential Project Effects and Mitigation Measures

| Environmental Component | Issue | Mitigation | Resolution / Result | Residual Effect (Yes/No) | Value of Resource | Magnitude | Geographic Extent (km) | Duration (months) | Reversibility | Ecological/ Social Context | Likelihood of Effect | Significance |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **General Natural Environment** | | | | | | | | | | | | |
| Air quality | Exhaust emissions from equipment and vehicles | • implement standard construction site best management practices<br>• limit construction equipment engine idling | Low negative impacts - impacts mitigated or eliminated where possible | Yes | High | Low | 1-10 | 1-12 | Reversible | Previously Impacted | High | Not Significant |
| | Noise from operation of electrical generator and transformer at powerhouse/electrical connection | • design powerhouse to reduce level of noise outside the powerhouse building<br>• Environmental Compliance Approval (ECA) will be required for facility commissioning for emissions to air (noise) | Low negative impacts - impacts mitigated or eliminated where possible through design. ECA will be required for emissions to air prior to commissioning of facility as per results of Noise Screening. | Yes | High | Low | < 1 | | Reversible | Previously Impacted | High | Not Significant |
| | Odour | • remove construction waste to licensed landfill and/or recycle where appropriate<br>• utilize best practices for VOC/organic waste disposal<br>• provide appropriate waste disposal containers on site and ensure removal of waste on a regular basis | No impacts anticipated | No | | | | | | | | |
| | Offset of greenhouse gas emissions | • electricity produced from waterpower offsets GHG emissions from coal fired generation | Positive effects due to GHG offsets | Yes | High | Low | > 10,000 | | Reversible | Previously Impacted | High | Positive |
| | Dust emissions from construction activities | • project personnel will control dust at work site using water spray or approved dust suppressant applications as warranted<br>• dust control measures will be implemented prior to reaching critical conditions<br>• any trucks transporting fill on site will be required to use dust covers<br>• during concrete removal above the water line, tarps should be employed as a containment measure for particulate | Low negative impacts - impacts mitigated or eliminated where possible. Moisture content of concrete should not result in significant dust emissions | Yes | High | Low | 1-10 | 1-12 | Reversible | Previously Impacted | High | Not Significant |
| Water quality - surface and groundwater | Surface water - general construction activities | • implement standard construction site best management practices<br>• construction machinery should arrive on site in a clean condition<br>• ensure a spill response and contingency plan is in place<br>• maintain appropriate emergency response measures<br>• implement wet weather restrictions<br>• stabilize all waste materials a minimum of 30 m from waterway<br>• all concrete work will be completed in dewatered areas, water will not be reintroduced to dewatered areas until concrete is cured<br>• project personnel will be made aware of safe concrete handling procedures. Concrete preparation will employ watertight forms, spill contingencies, and designated truck clean out pits<br>• turbidity of water in project area and downstream will be monitored<br>• contain material when working in or near water bodies; cofferdams, turbidity curtains, sediment traps and settling ponds<br>• turbidity curtains should be utilized behind the cofferdams during the construction of the new tailrace as well as immediately downstream of any concrete removal work or pouring of cement<br>• isolated work areas should be dewatered using appropriate pumps, discharge water should be directed to an appropriately sized vegetated area or to a sediment containment feature<br>• contractor will be responsible for ensuring the water re-entering the system is clean (specific control measures will be detailed in the Sediment and Erosion Control Plan which will be subject to regulatory approval prior to permitting)<br>• ensure that sediment control materials (i.e. fencing, rip rap) are readily available<br>• removal of riparian vegetation should be minimised and should not begin until sediment control measures are in place<br>• monitor sediment control measures daily for accumulation of sediment and remove sediment build-up | Low negative impacts - impacts mitigated or eliminated wherever possible through implementation of mitigation measures. Construction of new powerhouse will be completed on dry land. Upgrade of tailrace will be completed in the dry. Concrete construction of weir, demolition and excavations will be completed during low flow conditions and after dewatering. In water work areas will be isolated where conditions allow. | Yes | High | Low | < 1 | 1-12 | Reversible | Previously Impacted | Low | Not Significant |
| | Surface water - Re-suspension of sediments | • proponent will ensure that maximum suspended sediment concentration does not decrease the Secchi disc reading by more than 10%. Sampling locations and frequency will be developed as part of the Sediment and Erosion Control Plan.<br>• the proponent will refer to the Canadian Water Quality Guidelines for the Protection of Aquatic Life which specifies maximum increases in turbidity for clear flow waters and high flow or turbid waters<br>• proponent's contractor will ensure weather forecast does not predict rains during the cofferdam installation or removal<br>• prior to removal of cofferdam the isolated work area will be cleaned of sediment<br>• removal of cofferdam will be completed prior to removal of silt curtain<br>• turbidity curtain removal will be completed gradually<br>• sediment fencing should not be removed until vegetation is re-established | Low negative impacts - impacts mitigated or eliminated wherever possible through implementation of mitigation measures | Yes | High | Low | < 1 | 1-12 | Reversible | Previously Impacted | Low | Not Significant |
| | Surface and ground water - Contamination from spills or leaks of hazardous substances | • spill control equipment and materials will be made available at work sites for the duration of the construction program<br>• hazardous materials will be stored at least 30 m from water bodies<br>• impervious dikes and liners will be used around oil, fuel and chemical storage areas<br>• in-water works will be halted during periods of high precipitation<br>• machinery will be refueled on impermeable pads or pans designed to allow for full containment of spills a minimum of 30 m from water bodies<br>• fuelling and maintenance activities will occur within designated areas where sediment erosion control measures and all precautions have been made to prevent oil, grease, antifreeze or other materials from inadvertently entering the ground or the surface water flow<br>• these areas will be monitored for leakage, in the unlikely event of spillage the Environmental Monitor or any crew member will halt appropriate construction activities and corrective measures would be implemented. Any spills would be immediately reported to the MOE Spills Action Centre (1-800-268-6060) | Low negative effect - impacts possible in the event of accident/malfunction; impacts mitigated or eliminated where possible through implementation of mitigation measures | No | High | Low | < 1 | 1-12 | Reversible | Previously Impacted | Low | Not Significant |
| Species at Risk (SAR) and their habitat | Upstream and downstream passage for American eel migration and entrainment | • Proponent will be required to adhere to Agreement under the Endangered Species Act<br>• Proponent will work with MNR and AOO in developing and implementing a management strategy for provision of passage, design, and application of mitigation measures at existing facility to prevent entrainment | The provision of eel passage will result in a positive effect in that existing barriers will be retrofitted for passage. The proponent will be required to enter into an Agreement under the Endangered Species Act.<br><br>It is anticipated that a Management Strategy will be required to facilitate migration. This may include specialty screens, adjusting operations during key periods, and technological applications. The management strategy will be designed in consultation with the MNR and the AoO. | Yes | High | Medium | 11-100 | | Reversible | Previously Impacted | High | Positive |
| Significant earth or life science features | No issues | | | | | | | | | | | |
| Land subject to natural or human made hazards | No issues | | | | | | | | | | | |
| Terrestrial wildlife (numbers, diversity, distribution) | General disturbance to urban wildlife during construction and operation | • minimize the removal of riparian vegetation<br>• use small machinery for the removal of woody vegetation<br>• removal of woody vegetation would not occur during the breeding bird season from April 15th to July 31st inclusive, unless a qualified biologist has searched the site for nests and concluded that no nests are present, no more than 5 days prior to clearing<br>• clearly delineate area for clearing and grubbing<br>• work should be completed during daylight hours when possible<br>• tree stumps (60cm of trunk) should be left in place to maintain erosion control<br>• project will connect to an existing line, if a new transformer is required it will be installed in place of the old transformer | Low negative effects anticipated - project area is located within an urban centre and there is little natural habitat. Powerhouse will be constructed on site that has been previously disturbed. | Yes | Low | Low | < 1 | 1-12 | Reversible | Previously Impacted | High | Not Significant |
| | Loss of vegetation from construction of powerhouse, intake and tailrace | • small equipment should be utilized in order to prevent harming woody vegetation not intended for removal<br>• the areas where vegetation removal is required should be minimized and clearly delineated<br>• Where possible, re-vegetate with native vegetation following the completion of the construction phase<br>• majority of clearing will be limited to existing parkland and access road<br>• the area above the buried penstock will be re-vegetated following construction<br>• erect appropriate sediment and erosion control measures prior to the removal of any vegetation within 30 m of shoreline | No impacts anticipated after mitigation, powerhouse to be constructed on previously disturbed land. | Yes | Low | Low | < 1 | Permanent | Irreversible | Previously Impacted | High | Not Significant |
| Significant natural heritage features and areas | No issues | | | | | | | | | | | |
| **Aquatic and Riparian Ecosystem** | | | | | | | | | | | | |
| Wetland Dependent Species | No issues | | | | | | | | | | | |
| Fish Habitat | Impacts to aquatic habitat as a result of excavation, construction and demolition activities | • all in water work will occur during the established MNR timing window July 1 - March 14 , inclusive)<br>• fish salvage will be completed by a qualified fish biologist during cofferdam installation<br>• removal of trees and shrubs adjacent to the access roads will be minimized<br>• cofferdam will be erected to prevent impacts to fish habitat beyond the work area<br>• Sediment and Erosion Control Plan will be submitted for acceptance by MNR and measures contained within it will be implemented<br>• project site will be monitored immediately below cofferdam and further downstream for suspended sediments<br>• tailrace substrate will consist of cobbles, boulders, pieces of broken bedrock<br>• there will be an overall net gain of between 474 and 496 $m^2$ of newly accessible or created fish habitat | Short-term negative effects will result from temporary loss of in-water habitat within cofferdam. Long-term impacts include the construction of the powerhouse, in-filling of the old tailrace, excavation upstream of the existing weir and excavation of the new tailrace. The construction of the new powerhouse will result in the loss of 327$m^2$ of aquatic habitat located on the bedrock shelf (low productivity/value). The infilling of the old tailrace will result in the loss of 83$m^2$ of aquatic habitat and the excavation of the new tailrace will create up to 48$m^2$ new aquatic habitat, of similar value to the existing tailrace for a net effect of a loss of 35$m^2$ of existing tailrace habitat. However, reorientation of the weir and the excavation of the bedrock upstream of the existing weir would result in the creation and access to between 801$m^2$ and 823$m^2$ of habitat. Overall, there will be a net gain of available aquatic habitat at the site. | Yes | Medium | Medium | < 1 | Permanent | Irreversible | Previously Impacted | High | Positive |
| Fish Migration | Upstream and downstream passage for fish | • The proponent is committed to the provision for upstream and downstream passage for American eel (see Species at Risk and their habitat) and the provision of upstream eel passage will result in a positive effect in that existing barriers will be retrofitted for passage. | *See Species at Risk above* | | | | | | | | | |
| Fish injury or mortality | Fish impingement or entrainment resulting in injury or mortality | • facility intake and design velocities will be engineered to account for fish swimming capabilities to minimize potential for impingement or entrainment through turbine<br>• pumping of isolated work areas should be completed using pumps that are no larger than 3" in diameter. If larger pumps are required, then the pump should be placed in a box with 13 mm mesh screening, in addition to the installation of fish screen on the pump to prevent impingement | Authorization may be required under Section 32 of the *Fisheries Act*. No blasting in water is anticipated. Should this change, the Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters (Fisheries and Oceans Canada) would be followed. | Yes | Medium | Low | < 1 | | Reversible | Previously Impacted | Low | Not Significant |

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| Erosion and sedimentation | Overland flow of runoff within the construction areas has the potential to carry construction-related sediment to the watercourse. | • sediment and erosion control measures will be installed prior to construction, regularly inspected and maintained throughout the construction operations<br>• stockpile areas will be established a minimum of 30 m from watercourse and be isolated with sediment and erosion control measures to prevent migration of material to the watercourse<br>• excess material from in-water excavation will be removed immediately from the tailrace and the upstream area and temporarily stockpiled in suitable location | No impacts anticipated - Adhere to all applicable standard best management practices available to the industry. A Sediment and Erosion Control Plan will be prepared prior to construction. | No | | | | | | | | |
| Water levels, flows and movement (surface water) | Alterations to flows and levels within the main channel (mainstem) as a result of operations | • water levels upstream and downstream of the weir will not be changed<br>• water levels elsewhere on Mississippi River will remain unchanged | No impacts anticipated | No | | | | | | | | |
| Changes to overall thermal regime of waterway | No issues | | | | | | | | | | | |
| Drainage, flooding and drought patterns | No issues | | | | | | | | | | | |
| **Aboriginal Community** | | | | | | | | | | | | |
| First Nations reserves or other Aboriginal communities | No issues | | | | | | | | | | | |
| Spiritual, ceremonial, cultural, archaeological or burial sites | None identified | | | | | | | | | | | |
| Traditional land or resources used for harvesting, hunting, fishing, trapping | None identified | | | | | | | | | | | |
| Lands subject to land claims | Project lies within the Algonquins of Ontario land claim | • Information concerning the project has been provided to the Algonquins of Ontario office (and to the ANRs through previous representation) throughout EA process; consultation is ongoing | Ongoing consultation | Unknown due to outstanding data and information gaps | | | | | | | | |
| **Land and Resource Use** | | | | | | | | | | | | |
| Access to inaccessible areas | No issues | | | | | | | | | | | |
| Navigation | No issues - existing weir restricts navigation in project area | | | | | | | | | | | |
| Riparian rights or privileges | No issues | | | | | | | | | | | |
| Recreational use | No issues | | | | | | | | | | | |
| Angling, hunting opportunities | No issues | | | | | | | | | | | |
| Trapping | No issues | | | | | | | | | | | |
| Baitfish harvesting activities | No issues | | | | | | | | | | | |
| Views or Aesthetics | No issues | | | | | | | | | | | |
| An existing land or resource management plan | The Mississippi River is managed under the Mississippi River Water Management Plan | • Enerdu GS is governed by the MRWMP | An Amendment to MRWMP (anticipated to be Minor) will be required under the *Lakes and Rivers Improvement Act* | No | | | | | | | | |
| Protected areas | No issues | | | | | | | | | | | |
| Forestry | No issues | | | | | | | | | | | |
| **Cultural Heritage Resources** | | | | | | | | | | | | |
| Archaeological sites | None identified during archaeological assessment studies | | | | | | | | | | | |
| Buildings or structures | No issues, existing facilities will be maintained for operation | | | | | | | | | | | |
| Cultural heritage landscapes | No issues | | | | | | | | | | | |
| **Social and Economic** | | | | | | | | | | | | |
| The location of people, businesses, institutions or public facilities | No issues | | | | | | | | | | | |
| The location of people, businesses, institutions or public facilities | Access to the park and waterway by the Old Town Hall will be temporarily unavailable via Bridge Street during Phase 1 and Phase 2 construction activities<br><br>Temporary access gained via private land and Main Street during Phase 3 and 4 construction activities | • temporary closure necessary for public safety during construction period<br>• closure will be limited in duration for minimal interruption<br>• public awareness of closure will be through appropriate signage and media advertising | The exact routing of and permission for the temporary access roads will be determined through consultation with the affected landowners prior to the initiation of any construction activities. | Unknown due to outstanding data and information gaps | | | | | | | | |
| Community character, enjoyment of property or local amenities | Noise and traffic effects to nearby residents during construction program on Main Street and Bridge Street | • proponent will adhere to local noise bylaws<br>• once equipment is mobilized it will remain on site, minimizing traffic interruptions<br>• mobilization and demobilization of construction equipment will be completed during off peak traffic hours to minimize traffic interruptions | Low negative effects associated with construction projects anticipated | No | High | Low | < 1 | 1-12 | Reversible | Previously Impacted | Medium | Not Significant |
| Employment - Local and regional labour supply | Construction activities will support direct and indirect local employment | • where available at a competitive price equipment and supplies will be sourced from nearby communities | Positive impact - represents a potential benefit to local communities | Yes | High | Low | 11-100 | 1-12 | Reversible | Previously Impacted | High | Positive |
| Public health and/or safety | Impacts associated with facility construction | • Restriction of public access to the site during construction (fencing, signage, etc)<br>• provide and maintain routes for the public to be able to bypass the site<br>• proper barriers and warning devices installed following construction to restrict public access to intake/tailrace areas during operation, including safety booms and signage | No impacts anticipated - proper implementation of construction management plan and best management practices will mitigate impacts wherever possible. | No | | | | | | | | |
| | Worker Safety | • contractors will be required to follow the Occupational Health and Safety Act and Ministry of Labour requirements<br>• workers will be provided with appropriate personal protective equipment by their respective employers<br>• construction crews will be reminded to obey all posted speed limits travelling to/from work areas<br>• contractors will be instructed to ensure trucks and heavy equipment are fitted with back-up signals and indicators | No impacts anticipated - proper implementation of industry regulations and best management practices will mitigate impacts wherever possible | No | | | | | | | | |
| Tourism values | Access to a section of the Riverwalk will be temporarily unavailable during Phase 1 and Phase 2 construction activities | • no mitigation to temporary closure<br>• limit duration of closure for minimal interruption<br>• if possible, time closure to coincide with non tourist season<br>• mitigation for public awareness of closure will be through appropriate signage and media advertising | The exact routing of and permission for the temporary access roads will be determined through consultation with the affected landowners prior to the initiation of any construction activities. | Unknown due to outstanding data and information gaps | | | | | | | | |
| Municipal Water supply | No issues - water supply intake is upstream of facility | | | | | | | | | | | |
| **Energy/Electricity** | | | | | | | | | | | | |
| Reliability | Voltage support | • Capacity of new power generation facility is relatively small | Operation of facility in parallel with the existing power grid will provide minor impact on the overall power system reliability and power quality (voltage and frequency) | Yes | High | Low | 1001-10,000 | | Reversible | Previously Impacted | High | Not Significant |
| Security | No issues | | | | | | | | | | | |
| Electricity flow patterns | Power flow system | • Appropriate mitigation technical measures will be proposed in the control system of the power grid and new generation units if required | Operation of the new power generation facility will redistribute power flow in the existing distribution system. | Yes | High | Low | 1001-10,000 | | Reversible | Previously Impacted | High | Not Significant |
| Other | Protection control settings | • Appropriate mitigation technical measures will be proposed in protection and control system of the power grid. | Operation of the new power generation facility will affect existing protection and control settings in the distribution system. | Yes | High | Low | 1001-10,000 | | Reversible | Previously Impacted | High | Not Significant |

**Assessment is based on the preferred option and the successful completion of the planning process.**