
ENVIRONMENTAL REPORT FOR THE REDEVELOPMENT OF THE HOUND CHUTE GENERATING STATION



Submitted To:

ONTARIO POWER
GENERATION

Submitted By:



SENES Consultants Limited

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ENVIRONMENTAL REPORT FOR THE REDEVELOPMENT OF THE HOUND CHUTE GENERATING STATION

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EXECUTIVE SUMMARY

Ontario Power Generation (OPG) plans to redevelop the existing Hound Chute Generating Station (GS). This Environmental Report (ER) has been prepared pursuant to the terms and conditions of OPG's *Class Environmental Assessment for Modifications to Hydroelectric Facilities* under the Ontario Environmental Assessment (EA). The Hound Chute GS is located on the Lower Montreal River in the District of Timiskaming in Northeastern Ontario. The site itself straddles the boundaries of both the Town of Latchford and Township of Coleman. This Environmental Report (ER) has been prepared pursuant to Ontario Power Generation's *Class EA for Modifications to Hydroelectric Facilities* and approvals requested in accordance with terms and conditions of the Class EA approval.

The purpose of redeveloping the Hound Chute GS is that it has been in operation as a run-of-the-river plant for over 90 years and is now at the end of its designed service life. The Generating Station is in need of structural and electrical/mechanical repair. As well, OPG has a mandate from the Government of Ontario to expand, develop and/or improve its hydroelectric generation capacity. This project will increase power production from approximately 4 to 10 megawatts (MW) largely through technological advances and making better use of the water that is available. The increased production can be done without making any changes to the approved Montreal River System Water Management Plan.

This ER: describes the Proposed Undertaking including the existing and proposed facility; assesses project alternatives; describes the existing natural and socio-economic environment; describes the public, First Nations and agency consultation undertaken; assesses the environmental effects of redevelopment; and proposes mitigation measures to obviate or minimize the effects.

Description of the Existing and Proposed Facility

The Hound Chute GS was built in 1908 in order to provide power to the growing needs of the silver mining industry in the Cobalt area. In 1948 Hound Chute was purchased by the Hydro Electric Power Commission of Ontario (HEPCO), a predecessor to Ontario Hydro and then OPG.

The Hound Chute GS will continue to operate as a run-of-the-river facility in compliance with the Montreal River System Water Management Plan. There are no plans to change the river flows and OPG will continue to operate within the recognized water level compliance zone. Upon completion of the Proposed Undertaking, Ontario Power Generation will make reasonable effort, within local control, to maintain a consistent operating level year around at Hound Chute within the existing Water Management Plan's compliance zone. This level will be as high as practically possible within the limits of the operating regime, in the summer band (273.87m to 274.10m), and will minimize the extreme low and high peaks in the spring. This commitment ultimately recognizes that OPG's first priority is to public, employee and dam safety.

As part of the redevelopment project, OPG is committing to spending additional capital in order to increase the discharge capacity at Hound Chute by an additional 97 m³/s (cubic meters per second) at an elevation of 274.10 meters over the present discharge capacity of the existing flashboard weir. This 97 m³/s is in addition to the expected increased flow through the new generating station (existing station capacity is 57 m³/s and expected new station capacity is approximately 105 m³/s). In essence the site discharge capacity at an elevation of 274.10 will be increased by approximately 150 m³/s when the units are operating.

Along with increasing the power production from 4 MW to 10 MW, annual energy production will be improved from 26 Gigawatt (GWh) hours to 47 GWh.

The Proposed Undertaking involves: the decommissioning and removal of the existing powerhouse and associated internal equipment; the construction of a new powerhouse in the same location as the existing one; installation of necessary equipment; refurbishments to the existing dams, wingwall and other civil structures; the installation of an inflatable Obermeyer weir; and, the installation and removal of temporary facilities for construction such as cofferdams and laydown areas. The proposed facility will be connected to the Hydro One Networks Inc. Distribution system.

Existing Environment

The Hound Chute Generating Station is located on the Canadian Shield in the northern transitional area between the Great Lakes St. Lawrence Forest to the south and the Boreal Forest to the north. As such, the major forest cover is mixed and includes more southern species such as red and white pine and more typical boreal species such as black and white spruce, poplar and birch. Typical mammalian species include moose, black bear, snowshoe hare and lynx, amongst others.

The Montreal River is located within the Ottawa River drainage basin of the Great Lakes-Saint Lawrence Drainage System. The Montreal River extends approximately 282 km from its headwaters in the Shining Tree area west of Gowganda to its confluence with Lake Timiskaming. The Montreal River and its tributaries drain approximately 7,122 km². Based on historical hydrological data, greatest streamflow occurs during the spring freshet in April, May and June with the lowest flows occurring generally during the summer period.

The Montreal River is typical of watercourses on the Shield where there are moderate gradients and channels that are narrow and well-defined. Based on its good water quality, the Montreal River is the source of the Latchford potable water supply. Sediments in the Montreal River can be expected to be predominantly silt and clay, particularly in the in-stream lakes and slower moving sections of the river.

The Montreal River in the vicinity of the Hound Chute GS provides a variety of riverine habitats, with varying flow velocities and water depths. Substrate type is relatively coarse. Large boulders, steep inclines, large woody debris and an old bridge remnant provide good habitat structure.

The Montreal River and associated reservoir lakes provide coolwater fish habitat. The primary fish species are walleye, northern pike, smallmouth bass, yellow perch, lake whitefish and white sucker. Walleye are present throughout the river system and are extremely important to the local tourism economy as the most sought after species in the recreational fishery. Twenty-nine fish species are recorded in the Montreal River watershed. Of these, 14 species have been recorded near the Latchford Dam, whereas six species were observed near the Hound Chute GS.

Hound Chute GS is located in a wilderness area about 10 kilometers south of Cobalt in the District of Timiskaming. Access to the GS is via Silverfields Road, a private road maintained by OPG, but open to public use. Human uses near the Hound Chute GS are restricted to outdoor recreation including fishing, hunting and canoeing along with the occasional logging operation. Similar to other parts of Northern Ontario, the Timiskaming District is largely dependent on resource based industries such as forest products, mining, resource based tourism and agriculture.

Virtually all of the land within a few kilometres of the Hound Chute GS is crown general use land. Two crown land use designations occur on either side of the Montreal River at the location of the Hound Chute GS. On the east side of the river is the Pine Lake Integrated Management Area and on the west side of the river is the Roosevelt Road Integrated Management Area.

Public, First Nations and Government Involvement

Significant public, First Nations and government agency consultation has taken place on the Proposed Undertaking. Opportunities for the general public to comment on the project have been provided throughout the course of the project. The public has been notified about the project via notifications in newspapers and through the project mailing list (newsletters) which numbered over 100 individuals and organizations. Two open houses/public meetings have been held, one in April 2006 in Latchford and one in October 2006 in Coleman Township. In general, the public has been supportive of the project, recognizing that it involves the redevelopment of the existing facility, the contribution of this plant to the Province's energy supply and the economic benefits to Northeastern Ontario. The Township of Coleman has passed a council resolution in support of the project.

The majority of attendees at the public meetings are residents of an area known as Marsh Bay, which is upstream of the Hound Chute Generating Station. These individuals own properties along the river and their properties are susceptible to fluctuating water levels (for instance during the spring freshet). Presently, manually operated flashboards are used to assist in the

control of the water levels at Hound Chute GS. Typically before spring freshet OPG has to remove the flashboards in preparation for high spring flows and once the river flows subside the flashboards are placed back. This operation causes the water levels to fluctuate up to 2 metres.

In order to address the concerns of the property owners, OPG is proposing to replace the existing flashboards with an inflatable Obermeyer Weir as part of the Proposed Undertaking. The inflatable weir, which would be automatically controlled, would allow OPG to more tightly control the water levels upstream of Hound Chute and thereby reduce the fluctuating water levels throughout the year, particularly in the spring. On a reasonable effort basis, OPG will operate Hound Chute in order to maintain the water level towards the upper end of the Montreal River System Water Management Plan's summer operating regime (at Hound Chute), year round. Overall, the property owners at Marsh Bay will experience more consistent water levels than what they have previously experienced. The concerns of the Marsh Bay residents are historic concerns associated with the location of these properties and the operations at the existing Hound Chute Generating Station. The effects that are of a concern are therefore historic and the Proposed Undertaking at Hound Chute represents a unique opportunity to address these concerns and improve the existing situation.

An offer of consultation was made to four First Nations – Matachewan, Temagami, the Teme-Augama Anishnabai and Mattagami. While discussions were held with Chiefs from all the First Nations, none of the First Nations requested to be consulted on a significant basis and no concerns with respect to the redevelopment were raised in these discussions. The Crown was involved in all steps of the consultation planning process with the First Nations.

Consultation with municipal, provincial and federal agencies has been ongoing throughout the course of the Proposed Undertaking. Many formal meetings have been held with various agencies to address identified interests.

Environmental Effects of Redevelopment

As this plant is currently operating, the incremental environmental effects of redevelopment will largely occur during the construction period.

During the proposed construction phase, potential impacts on the aquatic environment may occur due to in-water construction activities, blasting, soil erosion and turbidity generation, and accidental spills. Based on an assessment of the available baseline information and potential effects, as well as the implementation of the recommended mitigative measures, SENES concludes that effects during construction will be minimal, localized and short-term.

During the proposed operations phase of the Proposed Undertaking, potential impacts on the aquatic environment may occur due to accidental spills. Based on assessment of the baseline information and potential effects, SENES concludes that the operation of the proposed Hound Chute GS will have negligible effects on the aquatic environment.

Environmental protection during construction will be ensured by adherence to a site-specific Environmental Management Plan, as well as compliance with regulatory standards and guidelines. The Environmental Management Plan for the Proposed Undertaking redevelopment ensures that environmental protection will be achieved by addressing government agency requirements, OPG policy, project commitments and recommended mitigation measures to be undertaken. The Environmental Management Plan will include an Erosion and Sediment Control Plan, Spills Emergency Preparedness and Response Plan, Hazardous Materials Management Plan and Waste Management Plan.

The Proposed Undertaking will comply with the Montreal River System Water Management Plan. Upon completion of the redevelopment of the Hound Chute GS, Ontario Power Generation will make reasonable effort, within local control, to maintain a consistent operating level year round at Hound Chute within the existing Water Management Plan's compliance zone. This level will be as high as practically possible within the limits of the operating regime, in the summer band (273.87m to 274.10m), and will minimize the extreme low and high peaks in the spring.

No changes to land use or human use in the areas around the Generating Station are expected. The air and noise effects associated with the Proposed Undertaking are limited to the construction period and would be typical for construction sites. There are no receptors close to the Hound Chute GS and the effects are to be managed by adherence to good construction practices.

It is estimated that there will be significant economic benefits to the Northeastern Ontario economy from the project. It is estimated that project expenditure in the region will be in the range of \$12M to \$17M, resulting in a total sales of \$19M to \$25M and total person years of employment to be in the range of 136 to 181 of which 83 to 110 would be direct. The redevelopment will also ensure the continuance of the existing employment associated with the existing facility.

Due to extensive prior disturbances, no significant archaeological features or sites of interest were recorded that will be impacted by the Proposed Undertaking. The overall cultural landscape of the site will remain – as this site will remain in use as a hydroelectric generating station. While the powerhouse will be replaced the existing dam, wing wall and other related infrastructure will remain with only minor refurbishments.

Overall Benefits of the Project

There are a number of overall benefits of the Proposed Undertaking. It will add more clean renewable power to the Province's supply; ensure the continuance of this existing source of power; benefit the local and regional economy during construction of the project; address the concerns of Marsh Bay residents; result in less water level fluctuation upstream of the GS and thereby having local ecological benefits; and, ensures the continuance of the economic benefits that are currently derived from the facility.

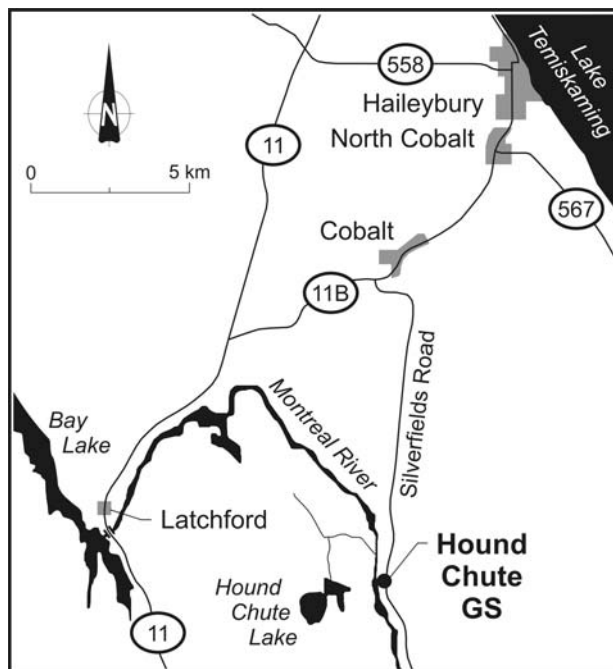
The benefits identified above can all be achieved while adhering to the existing approved Water Management Plan for the Montreal River System. The overall environmental impacts associated with the project are expected to temporary and minor (associated with the construction activities) and mitigable.

1.0 INTRODUCTION

This Environmental Report (ER) is submitted to the Ontario Ministry of the Environment (MOE) by Ontario Power Generation Inc. (OPG) for review by MOE in order to redevelop the Hound Chute Generating Station located near Cobalt.

This ER has been prepared pursuant to the *Class EA for Modifications to Hydroelectric Facilities* and approvals request in accordance with terms and conditions of the Class EA approval.

The Proposed Undertaking will involve the decommissioning and removal of the existing powerhouse and the construction of a new powerhouse and associated equipment. There will also be some refurbishments and modifications made to the existing civil works such as the dams and weirs.



Other permits, approvals and clearances will be sought as the project moves into the Design-Build stage. Section 8 of this report identifies a full range of possible approvals required; however specific permits and approvals will likely be required under the Lakes and Rivers Improvement Act, Environmental Protection Act and clearances under the Navigable Waters Protection Act.

OPG will be using a Design Build Contractor (DBC) approach to these projects. A short-list of contractors has already been identified and OPG plans to go to its Board of Directors for final approval in the summer of 2007 after obtaining EA Approval. Once the project is approved by the OPG Board, and a Design Build Contractor has been selected, construction would commence.

This document is the product of over a year of extensive study and consultation with First Nations, the general public and government agencies. This report and the associated technical support documents were prepared by SENES Consultants Limited (SENEC) with the assistance of Ontario Power Generation and a number of sub-consultants. The EA process was conducted in accordance with the terms of the *Class EA for Modifications to Hydroelectric Facilities*.¹

¹ Ontario Hydro. Class Environmental Assessment for Modifications to Hydroelectric Facilities Prepared under the Ontario Environmental Assessment Act. Second Submission Approved in August 1993. Approval granted through 2008.

2.0 UNDERTAKING

2.1 Purpose of the Undertaking

The purpose of the Proposed Undertaking is to redevelop the existing Hound Chute GS located on the Lower Montreal River. This facility has been in operation as a run-of-the river plant for over 90 years and is at the end its designed service life.

Ontario Power Generation has been directed by its shareholder, the Government of Ontario to expand, develop and or improve its hydroelectric generation capacity. This Proposed Undertaking will increase the capacity of the existing Hound Chute Generating Station from approximately 4 megawatts to approximately 10 megawatts and will meet the requirements of the Water Management Plan for the Montreal River System (OPG *et al.*, 2004).

2.2 Description of the Undertaking

Ontario Power Generation Inc. is proposing to redevelop the Hound Chute Generating Station located on the Lower Montreal River. The site of the Hound Chute Generating Station (GS) straddles the boundaries between Coleman Township and the Town of Latchford in the District of Timiskaming.

The Proposed Undertaking involves: the decommissioning and demolition of the existing powerhouse and associated equipment; the construction of a new powerhouse; installation of necessary equipment; refurbishments to the weir and wing wall; installation of an inflatable Obermayer weir; and, installation and removal of temporary facilities for construction such as cofferdams and laydown areas.

The Proposed Undertaking will be connected to the existing distribution system. A full description of the undertaking occurs in Section 4.

3.0 DESCRIPTION AND ASSESSMENT OF ALTERNATIVES

A number of alternatives to the Proposed Undertaking were considered during the EA. Alternatives are categorized according to the terms of the Ministry of Environment's (MOE) *Class Environmental Assessment for Modifications to Hydroelectric Facilities Prepared under the Ontario Environmental Assessment Act* (Ontario Hydro, 1993). A description and assessment of the four alternatives to the Proposed Undertaking is presented in Section 3.1. Section 3.2 discusses the alternative methods of carrying out the Proposed Undertaking.

3.1 Alternatives to the Proposed Undertaking

All alternatives were evaluated using economic, technical and environmental considerations.

For the alternatives being evaluated, costs included initial capital costs and lifetime operating and maintenance costs. For the retirement alternative, costs included capital associated with dismantling, sealing and decommissioning the station in order to leave the site in a safe condition. For all alternatives, benefits included the incremental additional power and energy which result from the undertaking. All estimates of cost used in this evaluation are subject to change as OPG's forecasts of cost escalators, interest rates and the value of system power and energy are updated regularly.

Technical considerations included the existing operating constraints in the area (e.g., water levels, flows), the transmission incorporation requirements, construction requirements, the condition and efficiency of the existing civil structures, electrical and mechanical equipment, and the layout of the site.

Environmental factors examined for each alternative included elements of the biophysical environment as well as the socio-economic environment. Examples included the aquatic environment, wildlife, botanical resources, resource and recreational uses, and heritage resources. A key area of concern was the potential effect of the various alternatives on the existing fish habitat in the area.

All alternatives will maintain the existing water levels upstream and downstream of the generating station within its current range of compliance as stipulated in the Water Management Plan for the Montreal River System.

Alternatives to the undertaking were examined for the project proposal including:

- The "Do Nothing" or Null Alternative;
- Retirement of Facility;
- Facility Life Extension (30 Years); and
- Facility Redevelopment (90 Years).

3.1.1 The “Do Nothing” or Null Alternative

This alternative is to "do nothing", i.e., to continue operating the station and water control structures with no action other than regular maintenance and periodic overhaul of the generating equipment. The existing powerhouse is at the end of its design life. In addition to being inefficient by current standards, the equipment is at end of useful life and the civil structure is in very poor shape.

This alternative would do nothing to reverse the escalation in maintenance costs and forced outages can be expected to increase as the equipment and civil structures continue to age. It provides no opportunity to improve station efficiency, to optimize the available water resource at the site for power generation, or to ease the Province's need for more electricity by a clean renewable source.

The null alternative is essentially a deferment of a decision to exercise another alternative. In the case of the existing station, this is considered unacceptable from reliability and cost points of view and does not meet the purpose of optimizing the available water resource at the site. No environmental benefits to "doing nothing" at this site were identified. In fact, given the age of the powerhouse there is always an increased likelihood that something may go wrong and therefore the potential, albeit small, for a risk to the environment from an unforeseen accident. Furthermore, this alternative would do nothing to address the concerns of the Marsh Bay residents upstream of the facility.

3.1.2 Retirement of Facility

The retirement of the facility includes all activities necessary to discontinue production in the existing powerhouse. It could involve removal of the equipment and removal or blockage of the intake.

Although small in scale, the replacement of lost power from the existing station by other facilities will incrementally increase environmental effects elsewhere, depending on the source and nature of power generation. Assuming the energy from this GS would be replaced by fossil generation, the corresponding emissions emitted into the atmosphere annually would be:

- 25,300 tonnes of carbon dioxide;
- 95 tonnes of sulphur dioxide;
- 22 tonnes of nitrous oxide;
- 117 tonnes total acid gas; and,
- 8 tonnes of particulates.

Retiring this facility would not support Provincial policy of encouraging more generation from clean and renewable sources.

3.1.3 30-Year Facility Life Extension

This alternative involves carrying out a major work program to restore the existing powerhouse to a condition suitable for a further 30 years of operation. The station capacity and energy production would be approximately equal to historical values. Water to Wire equipment and auxiliaries would be rehabilitated and the powerhouse civil structure would be rehabilitated (excluding dam repairs).

The costs for upgrades to extend the life of the facility will be high. The annual OM&A costs under this alternative are estimated to be the same as in the case of the Null Alternative.

From a technical point of view, this alternative returns old, inefficient generating units to service for an extended period. Some uncertainty would exist regarding the expected life of some of the components in the turbines and generators. Sudden fatigue failure could result in unplanned unit retirement or long outages for repairs. This alternative would also require Ontario Power Generation to re-assess other modification alternatives (e.g., retrofit or redevelopment) in 20 to 30 years from now.

Environmental effects of this alternative are predicted to be minimal, with short-term effects associated with construction activities. Operating patterns are predicted to be identical to the existing condition. Upon consideration of the economic, technical and environmental aspects of this alternative, the rehabilitation option is not preferred.

3.1.4 90-Year Facility Redevelopment (the Preferred Alternative)

Redevelopment involves the construction of a new powerhouse as well as refurbishments to the civil structures and installation of the inflatable Obermeyer weir. This was identified as the preferred alternative for the Hound Chute GS site, based on economic, technical and environmental considerations.

Technical advantages of this alternative include the much greater capacity to make more efficient use of the available water resource at the site, to optimize the operation of the hydroelectric facility with the other hydroelectric facilities on the river system, and the opportunity to install more modern, automated and efficient generating units. Overall, the redevelopment alternative will increase the power production from this generating station from 3.6 to 9.5 MW, producing badly needed additional power for the Province.

Environmental effects of redevelopment will be beneficial particularly with respect to water level fluctuations. Redevelopment will produce short-term environmental effects which will be minor, temporary and mitigable (these effects are described in detail throughout the EA). Noise, air and socio-economic effects on the human and natural environments are considered to be very minor, temporary and mitigable. Effects on the fish and aquatic biota are also considered to be within the realm of mitigable and acceptable effects. Long-term environmental effects are predicted to be minimal because the existing total discharge pattern and associated range of

water level fluctuations is not predicted to change. However, over the long run the installation of the inflatable Obermeyer weir will reduce the fluctuating water levels that occur upstream. This is likely to have a variety of beneficial effects but in particular is likely to result in less exposure of waterfowl nests and fish spawning areas. Once completed, the facility would maintain its EcoLogo certification.

The installation of the inflatable Obermeyer weir, which is part of this alternative, would also have positive socio-economic benefits for the residents of Marsh Bay. The Obermeyer weir will reduce the fluctuating water levels that residents are currently exposed to at their properties.

This alternative also has broader socio-economic benefits for Northeastern Ontario. The redevelopment of this facility will guarantee that the existing employment and other economic benefits associated with the operations of this facility will be perpetuated in the future. As well, the redevelopment of the facility is expected to have a temporary but significant benefit in the economy of Northeastern Ontario.

Redevelopment will result in the installation of new, safe and efficient generating units, which will provide power and energy benefits to Ontario consumers for the next 90 years.

Although small in scale, the new Hound Chute facility will result in fewer environmental effects elsewhere, depending on the source and nature of power generation. Assuming the energy from the new GS would be replaced by fossil generation, the corresponding emissions emitted into the atmosphere annually would be:

- 45,778 tonnes of carbon dioxide;
- 172 tonnes of sulphur dioxide;
- 61 tonnes of nitrous dioxide;
- 233 tonnes total acid gas; and,
- 15 tonnes of particulates.

Redeveloping this facility would support the Provincial policy of encouraging more generation from clean and renewable sources.

Redevelopment was determined to be technically and environmentally sound, and to have substantial economic benefits over the other alternatives.

3.2 Alternative Methods of Carrying Out the Undertaking

The Environmental Assessment Act requires the identification and evaluation of alternative methods of carrying out the undertaking. This was done during the concept and definition phases for the Hound Chute site redevelopment. This section describes the alternative methods of carrying out the redevelopment of the Hound Chute GS, and the reasons for choosing the preferred methods. Conceptual engineering studies identified and evaluated

various redevelopment schemes and to assess whether they were economically, environmentally and technically feasible. A further review of the redevelopment alternatives was also undertaken as part of the preliminary engineering studies.

Alternative ways of carrying out the undertaking which were examined included the number of units, the type of unit, the capacity for the unit(s) and station locations. These are discussed below as follows.

The redevelopment alternatives considered at Hound Chute GS involve the replacement of four existing Francis turbines with two new vertical Kaplan turbines in a new powerhouse. Two options were considered for the location of the new powerhouse. Option 1 would utilize the existing intake and tailrace locations while Option 2 would require a new intake canal and tailrace.

Two location options for the new powerhouse were considered including:

1. the existing powerhouse footprint; or
2. a location downstream of the existing powerhouse on the east bank of the river.

Both redevelopment options will entail decommissioning of all existing facility and would not allow for generation of the existing powerhouse during the construction period.

The new turbines will be able to use rated flows of 105 m³/s, an increase of 48% over the present flows of 57 m³/s.

Environmental Effects

The environmental effects of all site alternatives will involve loss of the present powerhouse (built 1908). Option 2 would result in the larger loss of upland habitat due to an intake canal and tailrace and additional disturbance to the property (loss of vegetation, etc.) for the new powerhouse, intake canal and tailrace. Option 2 may also result in more disturbance to the pre-1900 historic portage. Option 1 will use the existing tailrace thereby eliminating potential long-term fish habitat effects and will result in less disturbance to the soils, bedrock and vegetation of the site. The relocation of the tailrace for Option 2 would result in the loss of historical flows provided by the former powerhouse in that section of the river. Other environmental effects of these alternatives would be temporary and mainly related to the effects of cofferdams (at intake and tailrace) on the aquatic environment.

Power Generation Potential during Redevelopment

Loss of power generation during construction will be a common factor in both options for Hound Chute. Power capacity and annual power generation increase will be similar for both options as indicated below:

Present Capacity	Proposed Capacity	% Increase	Present Annual Generation	Proposed Annual Generation	% Increase
3.6 MW	9.5 MW	155	26 GWh	47GWh	87

Option 2 will carry additional costs of constructing an intake canal and tailrace. As a result, Option 1 is the preferred option for redevelopment at the Hound Chute GS for cost reasons and result in less impact on the environment by using the existing footprint (Table 3-1).

Table 3-1: Summary Evaluation of Redevelopment Alternative Methods

Options	Technical Ranking	Economic Ranking	Environmental Ranking	Overall Ranking
1	good	good	good	good
2	fair	poor	fair	poor-fair

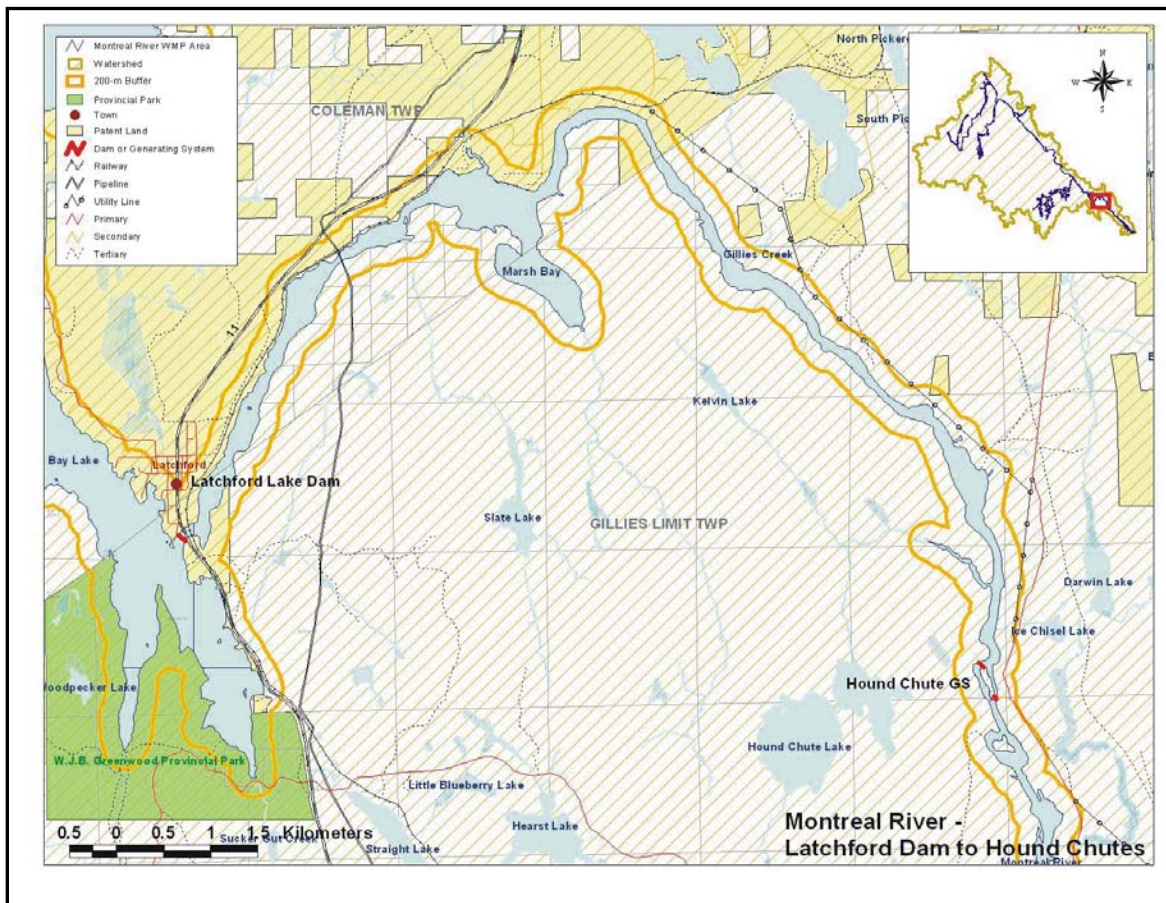
Recommended Option

Option 1: Replace the four existing Francis turbines with two new vertical Kaplan turbines in a new powerhouse on the existing footprint.

4.0 DESCRIPTION OF THE EXISTING AND PROPOSED GENERATION FACILITY

Ontario Power Generation Inc. is proposing to redevelop the Hound Chute Generating Station (GS), a run-of-the-river hydroelectric power plant located on the Montreal River in Northeastern Ontario (see Figure 4-1). The existing nameplate capacity of the Hound Chute GS is 3.6 megawatts (MW). The Proposed Undertaking will replace the existing generating facility and when completed, will provide an expected nameplate capacity of about 10 MW, an increase of approximately 6.0 MW. The proposed Hound Chute GS will be connected to the existing 44-kilovolt (kV) feeder as part of the local distribution system. In order to construct the new powerhouse, the existing powerhouse and associated water conveying and electricity connection facilities will be decommissioned and dismantled. In addition to building a new generating station, all existing civil structures on the site shall be rehabilitated or upgraded including the replacement of the flashboards with an automatic bladder type weir (Obermeyer).

Figure 4-1: Hound Chute Generating Station Location



The new facility will continue to operate under the existing operating regime that has been long established and more recently formalized in the Water Management Plan for the Montreal River (OPG *et al.*, 2004).

In 2000, the Ontario Lakes and Rivers Improvement Act (LRIA) was amended to establish the statutory authority of the Ministry of Natural Resources (MNR) to order the preparation of a Water Management Plan for operation of waterpower facilities and associated control structures and ensure compliance with the Plan throughout the Province. The intent of the Water Management Plan is to provide certainty and clarity as to how waterpower facilities and control structures are operated with respect to levels and flows so as to balance environmental, social and economic objectives.

The Water Management Plan for the Montreal River system is the result of partnership between OPG, the MNR, Canadian Hydro Developers Inc. and Public Works and Government Services Canada (PWGSC) which operate hydroelectric generating facilities as well as flood control and civil structures along the river, as well as First Nations and the general public, which participated in the form of various advisory committees (OPG *et al.*, 2004).

The Water Management Plan was prepared in accordance with the Water Management Planning Guidelines for Waterpower (MNR, 2002). The plan has been submitted to the regulator for review and approval.

4.1 DESCRIPTION OF EXISTING FACILITY

The 3.6 MW Hound Chute GS is located on the Montreal River straddling the boundary between the Town of Latchford and Township of Coleman in the District of Timiskaming, approximately 10 km southwest of the Town of Cobalt. This 4-unit plant, initially placed in service in 1908, is accessed by Silverfields Road which is maintained by OPG but open to public use. Photograph 4-1 depicts Hound Chute GS.

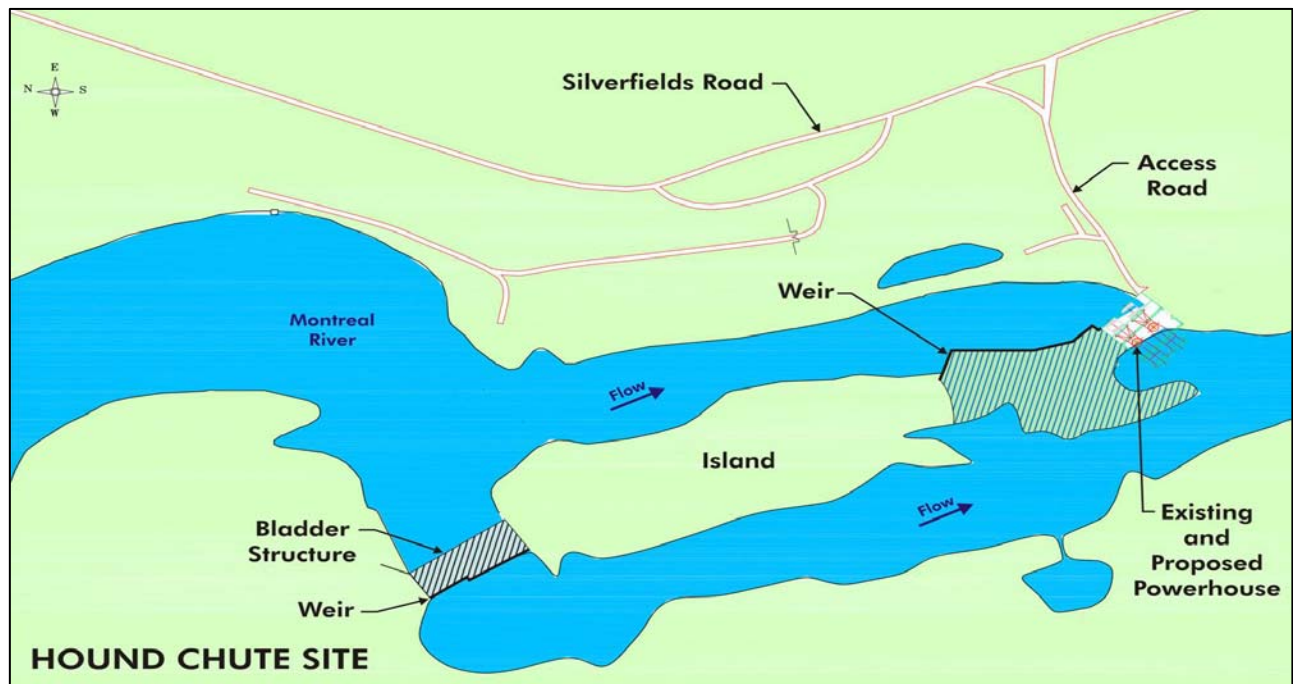
Photograph 4-1: Hound Chute Generating Station



The Hound Chute GS has a concrete-capped rockfill weir and a concrete spillway terminating in abutments at each end. Flashboards are removed each spring prior to the freshet to help mitigate flooding upstream. The dam diverts the river through a 427 m intake canal excavated along the east bank of the river, directly to the headgates (see Figure 4-2). The bottom of the large forebay is 0.3 m deeper than the intake. Two underflow sluices built at the south end of the powerhouse are large enough to take all of the water during very low water flow conditions. At the

intake of each turbine chamber, there is a gate 3 m high by 4.6 m wide with a pass and gate lifting apparatus as well as two stoplog checks.

Figure 4-2: Current Facilities at Hound Chute Generating Station

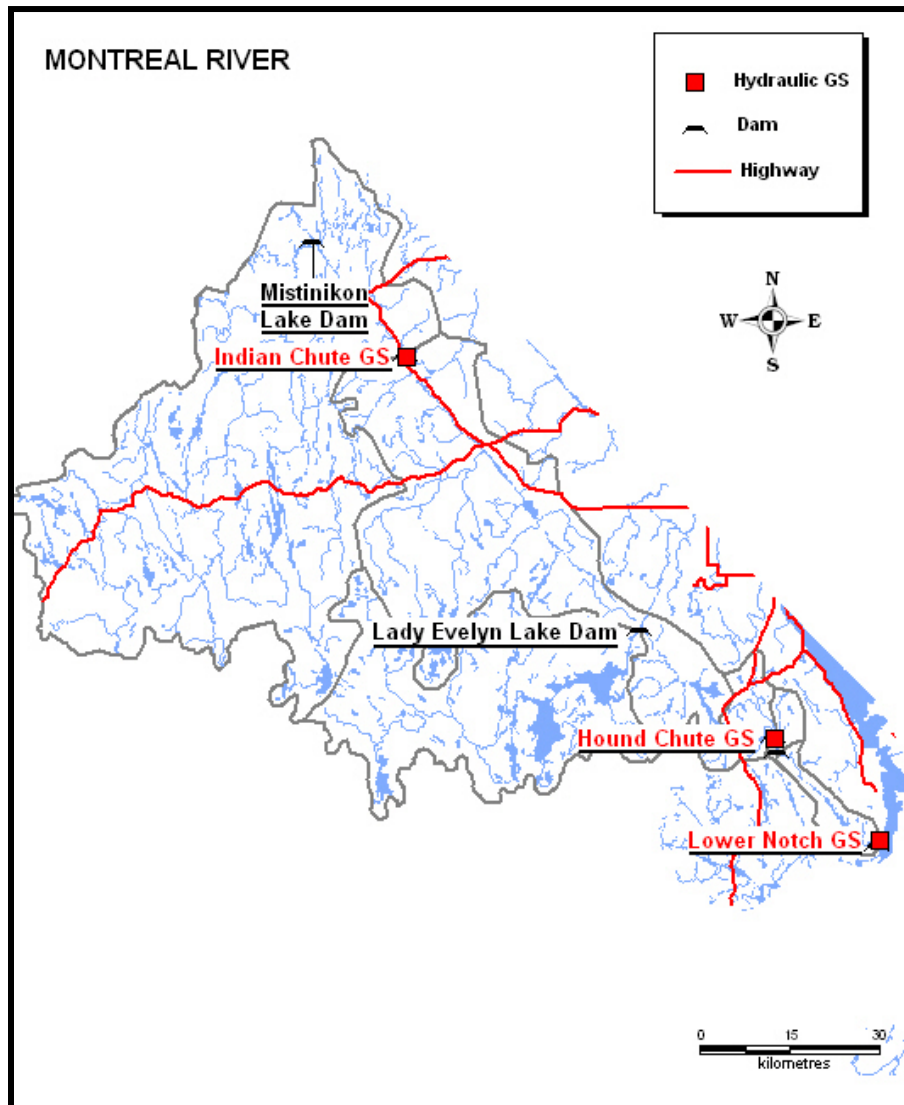


4.1.1 Operating Pattern

Upstream storage is provided by the Lady Evelyn Dam which replaced the Mattawapika Dam on the upstream Lady Evelyn River in 1972 (see Figure 4-3). This dam, operated by OPG, consists of four sluices with sluices 2 and 3 having double stoplog gains so underwater flow is possible. The dam has an operating range of 5.1 m and a capacity of 3,620 m³/s days. The Bay Lake Dam in Latchford is owned and controlled by Public Works and Government Services Canada (PWGSC) which operates it for the benefit of the power stations downstream except during the navigational season.

Flashboards at Hound Chute GS are normally removed each spring prior to freshet to help mitigate flooding upstream (OPG *et al.*, 2004). An inflow of less than 70 m³/s must be maintained while removing or installing flashboards. The forebay is held between 273.87 and 274.10 m from the time the flashboards are installed until Thanksgiving Day weekend on a best effort basis for recreational and navigational purposes, e.g., for the Marsh Bay resort located 10 km upstream of the GS.

Figure 4-3: Montreal River Watershed and OPG Facilities



4.2 DESCRIPTION OF PROPOSED FACILITY

The Proposed Undertaking is planned to be located on the same footprint as the existing powerhouse and will consist of two units with a total expected nameplate capacity of approximately 10 MW. The existing powerhouse will be dismantled followed by the construction of the new facility.

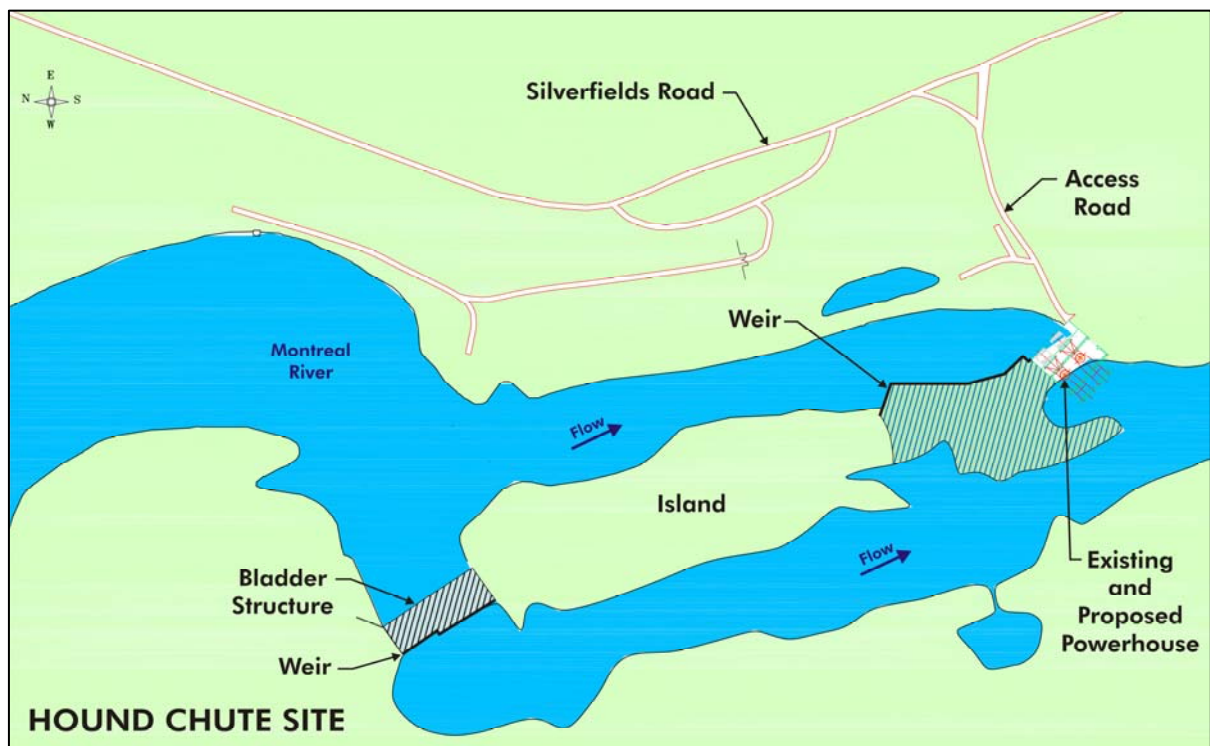
Water would continue to be conveyed from the forebay along the existing canal into a direct intake in the new powerhouse.

A small amount of excavation and slope stabilization will be required for the new powerhouse foundation and underground tailrace canal.

A cofferdam is being proposed at the inlet of the forebay for a number of reasons. First, there is an existing submerged structure located in this area which can be utilized for cofferdam construction. Second, having the cofferdam in this location will allow for equipment and materials to be more easily transported to the island for the planned rehabilitation and modification work on the western channel weir. This will result in less impact to the trees and vegetation on the island. Third, it is recommended that upon construction completion, the cofferdam and submerged structural material be removed resulting in improved flow of water to the powerhouse. This cofferdam would likely be in place for 12 to 14 months and will result in a de-watered area of 13,900 m² (1.4 ha).

The cofferdam on the downstream side of the powerhouse is likely to be in place for 12 to 14 months as well and result in an area to be dewatered of approximately 1,000 m² (0.1 ha).

Figure 4-4: Proposed Facilities and Cofferdam Locations, Hound Chute Generating Station



The submerged structure is visible at low water levels as indicated in Photograph 4-2.

Photograph 4-2: Existing Submerged Structure at Low Water Levels in Hound Chute Generating Station Forebay Inlet



Refurbishments to the wing wall will be required and can be done in the dry while the powerhouse is being constructed.

The dam with flashboards on the western channel will also require rehabilitation and modifications. At this point it is not known whether a cofferdam will be required to refurbish this structure or whether this can occur in the wet. The need for this cofferdam will not be certain until a Design-Build-Contractor (DBC) is retained by OPG and this selection will not occur until summer 2007. While the cofferdam is an uncertainty, it is taken into account in this environmental assessment. If a cofferdam is required, it likely will be in place for 3 to 4 months and the Department of Fisheries and Oceans (DFO) will be consulted. Should a cofferdam be required at this location, it will be installed at the beginning of construction with all the water in the river channelled through the forebay and powerhouse, and over the wing wall weir. Once this dam is refurbished, the water in the river will be directed down the western channel while the cofferdam at the forebay neck is built and the powerhouse subsequently constructed.

A new electrical substation will be built. The proposed facility will be connected to the existing 44 kV feeder.

Table 4-1 provides a summary of the existing and proposed plant operating characteristics. The gross head, i.e., the difference in elevation between the water surface at the intake and tailrace, will remain the same. However, the rated flow through the Hound Chute GS will increase from 57 to 105 m³/s, decreasing the frequency of spill over the Obermeyer weir.

Table 4-1: Existing and Proposed Plant Operational Summary

Parameter	Hound Chute Generating Station	
	Existing	Proposed
Number of Units	4	2
Capacity (MW)	3.6	9.5
Annual Energy	26.2	50
Gross Head (m)	10.3	10.3
Rated Flow (m ³ /s)	57	105
Capacity Factor (%) ¹	74.0	55.0

¹ Ratio of the actual energy produced to the maximum energy which could be delivered under continuous operation at maximum rating.

4.3 PROJECT SCHEDULE

OPG has pre-qualified a number of possible Design-Build Contractors (DBC). A preferred DBC is expected to be selected in the summer of 2007. Once the contractor is selected, and the project is approved by OPG's Board of Directors to move to the execution phase, detailed design drawings will be submitted to agencies for permitting.

OPG plans to go to its Board of Directors for final approval in summer 2007.

Construction is expected to commence in 2007.

5.0 DESCRIPTION OF THE EXISTING ENVIRONMENT

5.1 STUDY AREA AND METHODS

Study areas were selected for each major component of the natural and socio-economic environment. This selection was based on a preliminary assessment of the areas that were expected to be affected directly or indirectly by the undertaking.

Data sources used to document the existing environment included: published and unpublished literature, government files, personal interviews, public open houses and field studies. Where possible, existing data sources were used; however, extensive field studies were required to complete the study. Principal methods for the research are documented in the Technical Support Documents for the various disciplines.

5.2 BIOLOGICAL

5.2.1 Terrestrial Environment

5.2.1.1 Climatic Conditions

The climate of this region of Northeastern Ontario is classified as modified continental, moderated by the Great Lakes (Lake Huron and Georgian Bay) to the south and, to a lesser extent, by Lake Temagami to the south and Hudson Bay to the north (Chapman and Thomas, 1968). The modified continental climate is characterized by short, warm summers and long, cold winters, with moderate precipitation. In summer, warm humid air masses from the south alternate with cooler, drier air masses from the north to produce periods of clear, dry weather followed again by warm, humid weather. Winters are characterized by snow squalls and high winds alternating with clear, cold, dry weather.

Based on the Ecoclimatic Region classification system (Ecoregions Working Group, 1989), the Proposed Undertaking is located within the Humid Low-Boreal Ecoclimatic Region of the Boreal Ecoclimatic Province. In this Ecoclimatic Region, summers are warm and winters are cold. Mean daily temperatures greater than 0°C last for approximately seven months, although frosts are common except from May to mid-September. Monthly precipitation ranges from 50 to 100 mm, with maximum amounts occurring during the summer months. Mean annual precipitation is about 800 mm.

5.2.1.2 Geology and Soils

From a geological standpoint, the Proposed Undertaking is located within the Cobalt Plate Subprovince of the Superior Province of the Canadian Shield (Stockwell *et al.*, 1970). This area is characterized by low hummocky terrain controlled by flat-lying Precambrian sedimentary

bedrock. Diabase ridges crosscut the sedimentary rocks, forming local relief of 150 to 180 m above the lowlands (Thurston, 1992).

The area around the Hound Chute GS is underlain by bedrock of the Precambrian Shield, specifically Middle Precambrian sedimentary rocks of the Cobalt Group of the Huronian Supergroup composed of metamorphosed sedimentary and volcanic rocks (Bennett *et al.*, 1992).

From a physiographic standpoint, the Proposed Undertaking is located within the Abitibi Upland Subregion of the James Bay Physiographic Region (Bostock, 1970). In this area, the peneplained landscape typical of the Shield is modified by variable, and in some areas considerable, thicknesses of Quaternary glacial sediments, as well as by recent organic surficial materials. These sediments tend to obscure the already low relief of the underlying bedrock. The dominant physiographic feature is the New Liskeard Lowlands, which is a major fault-controlled plain trending northwest. The eastern part of the lowland is nearly flat and underlain by glaciolacustrine clay beds deposited by proglacial lakes during the waning of Quaternary glaciation, among them glacial Lake Barlow-Ojibway, forming the Little (Temiskaming) Clay Belt. Extensive organic terrain occurs in flat, poorly drained areas of the plain.

Overburden on the Hound Chute GS property consists of a shallow layer of sandy or silty till, about 1.5 m thick, of glaciofluvial outwash origin (Gartner Lee, 2001).

In the Little Clay Belt, gleysolic soils occur on poorly-drained sites, whereas grey wooded or podzolic soils are present on well- and imperfectly-drained sites (Webber and Hoffman, 1967). Extensive organic soil deposits also occur in this area.

Soils on the Hound Chute GS property and surrounding lands consist of the Timiskaming Complex, composed of Haileybury, Hanbury, New Liskeard and Milberta mineral soils, as well as organic soils and rock outcrop (Gillespie *et al.*, 1990). Overall, soils of the Timiskaming Complex are exceedingly stony.

Agricultural land use in this area is only of local importance. The cold, moist climate limits the range of crops that can be grown and reduces productivity.

5.2.1.3 Vegetation

The Proposed Undertaking is located in the Temagami Forest Section of the Great Lakes-Saint Lawrence River Lowlands Forest Region (Rowe, 1972). The mixed woods forest of the Great Lakes-Saint Lawrence Forest Region is a transitional type between the southern hardwood forests and the northern coniferous forests. It is characterized by the occurrence of eastern white pine, red pine, eastern hemlock and yellow birch, in association with a number of dominant broadleaved species such as sugar maple, red maple, red oak, basswood and white elm. Other wide-ranging species are eastern white cedar and large-toothed aspen. Boreal

species such as white spruce, black spruce, balsam fir, jack pine, trembling aspen, balsam poplar and white birch, are intermixed and, in certain areas, red spruce becomes abundant.

Eastern white pine with scattered white spruce and white birch is a typical forest community in the Temagami Forest Section. Another common though variable association includes a mixture of white birch, eastern white pine and white spruce, with balsam fir, trembling aspen and large-toothed aspen. Red pine occurs along ridges, whereas jack pine is confined to dry, rocky sites. The tolerant hardwood species such as yellow birch and sugar maple have only a scattered occurrence. The presence of sandy soils has favoured the occurrence of white pine, red pine and jack pine in upland locations. The poorly-drained swamp lowlands are characterized by communities of black spruce, tamarack and eastern white cedar (Rowe, 1972).

As the powerhouse will be located on the same footprint as the existing powerhouse, the permanent displacement of vegetation and trees due to project construction will be minimal. However, additional areas beyond the existing parking lots will be needed as construction laydown areas. A small northern section of the island will also be partially cleared to allow for refurbishment of the western channel weir. This area of the island has already been impacted by previous construction activities.

A field survey was undertaken on 24 August 2006 to identify the vegetation communities and inventory the flora at the locations to be affected by construction activities.

Of the 74 plant taxa (72 species) identified at the locations to be affected by construction activities, 64 were S5, i.e., very common in Ontario and demonstrably secure (NHIC, 2006a). The remaining eight species were designated SE, i.e., exotic, not believed to be a native component of Ontario's flora.

None of the flora species identified during the field survey are designated as species at risk nationally (COSEWIC, 2006) or provincially (MNR, 2006a). Similarly, based on examination of the MNR Natural Heritage Information Centre (NHIC, 2006a) database, no species within the local study area are designated as species at risk.

Based on examination of the MNR Natural Heritage Information Centre (NHIC, 2006b) database, there are no Provincially Significant Wetlands, Areas of Natural and Scientific Interest or Environmentally Sensitive Areas within the 5-km radius local study area.

5.2.1.4 Wildlife

The two big game species of significance in Northeastern Ontario are moose and black bear. There are no areas of significant moose habitat (e.g., concentration areas, aquatic feeding areas) within the 5-km radius study area.

The Proposed Undertaking is located near the northern extent of white-tailed deer distribution. However, deer are becoming more common in this area. No significant deer concentration areas have been identified in the study area.

The small wetlands in the area may provide suitable habitat for a number of aquatic mammals such as beaver, otter and muskrat. Other furbearers that are relatively abundant throughout the area include mink, marten, weasel, fisher, lynx, red fox, coyote, wolf and squirrels.

Of the 45 native species with reported sightings in the Temagami Planning Area, 34 are ranked by the NHIC (2006a) as S5, i.e., very common in Ontario and demonstrably secure; five are S4, i.e., common in Ontario and apparently secure; one is S3S4 (rock vole), i.e., rare to common in Ontario; one is S3 (northern long-eared bat), i.e., possibly rare to uncommon in Ontario; one is SU, i.e., status uncertain; and one is SH (eastern cougar), i.e., historically known from Ontario, but not verified recently. No ranking is provided for the eastern timber wolf.

The terrestrial birds in the area of the Proposed Undertaking tend to be migratory. Very few species reside in the region year-round, e.g., grosbeaks, chickadees, woodpeckers, ravens, jays and grouse.

Of the 152 species observed in the Temiskaming area, 98 are considered by the NHIC (2006a) to be S5, i.e., very common in Ontario and demonstrably secure; three are S4S5, i.e., common to very common in Ontario; 30 are S4, i.e., common in Ontario and apparently secure; five are S3S4 (great grey owl, short-eared owl, Carolina wren, grey-cheeked thrush, pine grosbeak), i.e., rare to common in Ontario; four are S2S3 (peregrine falcon, bohemian waxwing, northern shrike, yellow-headed blackbird), i.e., very rare to uncommon in Ontario; two are S1 (rough-legged hawk, golden eagle), i.e., extremely rare in Ontario; six are SZN, i.e., no clearly definable occurrences; and four are SE, i.e., exotic, not believed to be a native component of Ontario's fauna.

Like its vegetation, breeding bird communities of the hemlock and pine forests of the Great Lakes – Saint Lawrence Forest Region are transitional between the boreal and eastern deciduous forests. The most obvious change from the spruce-fir communities to pine-hemlock stands is that the boreal chickadee is replaced by the black-capped chickadee (Erskine, 1977). Ruby-crowned kinglet, Tennessee warbler, Nashville warbler, American redstart, and purple finch are generally absent or at best scarce in hemlock forests. Three species of warbler, i.e., northern parula, black-throated green warbler and black-and-white warbler, first appear in this forest type. The most common birds found in the white spruce forests are black-capped chickadee, red-breasted nuthatch, Blackburnian warbler, pine warbler and ovenbird. In pine forests, the dark-eyed junco, the common sparrow of boreal habitats, is replaced by chipping sparrow. In balsam fir-dominated forests, the spruce grouse and grey jay are replaced by the ruffed grouse and blue jay, respectively. Species such as ruffed grouse, yellow-bellied sapsucker, least flycatcher, black-capped chickadee, American robin, hermit thrush, red-eyed vireo, black-and-white warbler, ovenbird, Canada warbler, American redstart and rose-breasted grosbeak are typical of northern poplar or birch stands.

Grouped together, amphibians and reptiles are called herptiles. They are generally dependent on more mesic (wetter) habitats and particularly wetland habitats associated with mature forests. Of the 21 species likely present in the Temagami Planning Area, 12 are ranked by the NHIC (2006a) as S5, i.e., very common in Ontario and demonstrably secure; and nine are S4, i.e., common in Ontario and apparently secure.

Of the many terrestrial species that have been designated by the Committee on the Status of Endangered Wildlife in Canada COSEWIC (2006) or Committee on the Status of Species at Risk in Ontario COSSARO (MNR, 2006a) as endangered, threatened or of special concern, only nine have ranges in Ontario overlapping the regional study area (Table 5-1).

Table 5-1: Wildlife Species at Risk with Ranges Overlapping the Regional Study Area

Common Name	Scientific Name	Habitat Requirements ¹	Status
Eastern cougar	<i>Felis concolor cougar</i>	Various, including swamps, wooded river valleys and coniferous forests	Endangered ²
Golden eagle	<i>Aquila chrysaetos</i>	Sparsely treed rock crags and cliffs along rivers and lakes	Endangered ²
Peregrine falcon	<i>Falco peregrinus</i>	Open forest, with cliffs and crags, especially near water	Threatened ³
Eastern timber wolf	<i>Canis lupus lycaon</i>	Coniferous, mixedwoods and deciduous forests	Special concern ^{2,3}
Bald eagle	<i>Haliaeetus leucocephalus</i>	Forests (especially coniferous) near large rivers and lakes	Special concern ²
Red-shouldered hawk	<i>Buteo lineatus</i>	Riparian forest, wooded swamp	Special concern ^{2,3}
Short-eared owl	<i>Asio flammeus</i>	Bogs, marshes	Special concern ^{2,3}
Great grey owl	<i>Strix nebulosa</i>	Coniferous, mixedwoods and deciduous forests	Special concern ²
Monarch butterfly	<i>Danaus plexippus</i>	Open areas with milkweed	Special concern ^{2,3}

¹ References used to determine habitat requirements: Banfield (1974); Peck and James (1983); Godfrey (1986); Cadman *et al.* (1987); Opler (1992).

² MNR (2006a).

³ COSEWIC (2006).

Based on the SARA Schedule 1 Species at Risk Web Mapping Application (Environment Canada, CWS, 2004), of the nine species listed in Table 5-1, only the occurrences of peregrine falcon, eastern wolf and monarch butterfly have been documented to overlap the Hound Chute GS property. The first two species are listed under Schedule 1 of the SARA.

As indicated in Table 5-1, the peregrine falcon prefers open forest habitat with cliffs and crags, especially near water. Nests are normally scrapes made on cliff ledges on steep cliffs, usually near wetlands. This type of habitat occurs along the shore of Chown Lake and Lake Timiskaming (e.g., Devil Rock) approximately 8 and 13 km northeast, respectively, of the Hound Chute GS, and possibly along Giroux Creek at Greywacke Mountain approximately 4.5 km north.

As indicated in Table 5.1, the eastern wolf prefers conifers, mixedwoods and deciduous forests. A mixedwoods forest is present in the local study area (see Section 2.3 of the Terrestrial TSD) potentially providing habitat for eastern wolf. However, this potential is minimized by the lack of significant habitat for moose or white-tailed deer (the principal prey) in the local study area (Section 2.5.1 of the Terrestrial TSD).

As indicated in Table 2.8, the monarch butterfly prefers open areas with milkweed (*Asclepius* spp.). Milkweed was not observed on the Hound Chute GS property (Table 2.4).

Examination of the NHIC (2006a) database indicated that no species at risk have been recorded within a 5-km radius of the Hound Chute GS.

Examination of the NHIC (2006a) database indicated that no species at risk have been recorded within a 5-km radius of the Hound Chute GS.

During the summer months, the monarch butterfly may also be found in the open habitats in the Latchford area. The monarch butterfly has been designated as a species of special concern federally (COSEWIC, 2006) and/or provincially (MNR, 2006a).

5.2.2 Aquatic Environment

5.2.2.1 Site Surface Hydrology and Groundwater

Surface water drainage is downgradient toward the Montreal River (Gartner Lee, 2001).

In the area of the Proposed Undertaking, groundwater yields in the overburden are generally less than 1 L/s (MNR, 1984). These well yields are suitable for domestic purposes. In areas of organic deposits, the watertable may come within 1 metre of the surface.

5.2.2.2 Montreal River Hydrology

The Montreal River is located within the Ottawa River drainage basin of the Great Lakes-Saint Lawrence Drainage System. The Montreal River extends approximately 282 km from its headwaters in the Shining Tree area west of Gowganda to its confluence with Lake Timiskaming (OPG *et al.*, 2004). The Montreal River and its tributaries drain approximately 7,122 km² (see Figure 4.3).

Based on historical hydrological data, greatest streamflow occurs during the spring freshet in April, May and June with the lowest flows occurring generally during the summer (August, September) period. Maximum and minimum daily discharges of the Montreal River at Mountain Chutes and the Lower Notch GS located approximately 60 km upstream and 25 km downstream, respectively, of the Hound Chute GS are depicted in Figure 2.1. Extreme maximum and minimum monthly flows at Mountain Chutes were 279 m³/s in May 1979 and 5.99 m³/s in March 1968, respectively. Extreme maximum and minimum daily flows at this

same location were 517 m³/s on 28 April 1979 and 2.94 m³/s on 02 September 1976, respectively. For the Lower Notch GS, extreme maximum and minimum monthly flows were 407 m³/s in May 1979 and 10.4 m³/s in September 1992, respectively. Extreme maximum daily flow at this same location was 589 m³/s on 01 May 1979. No data were available for extreme minimum daily flow.

Annual daily flow hydrographs from 1972 to 1995 for the Montreal River at Hound Chute are depicted in Figure 5-1. Annual flow metrics based on the 23 years of data for Hound Chute are presented in Table 5-2.

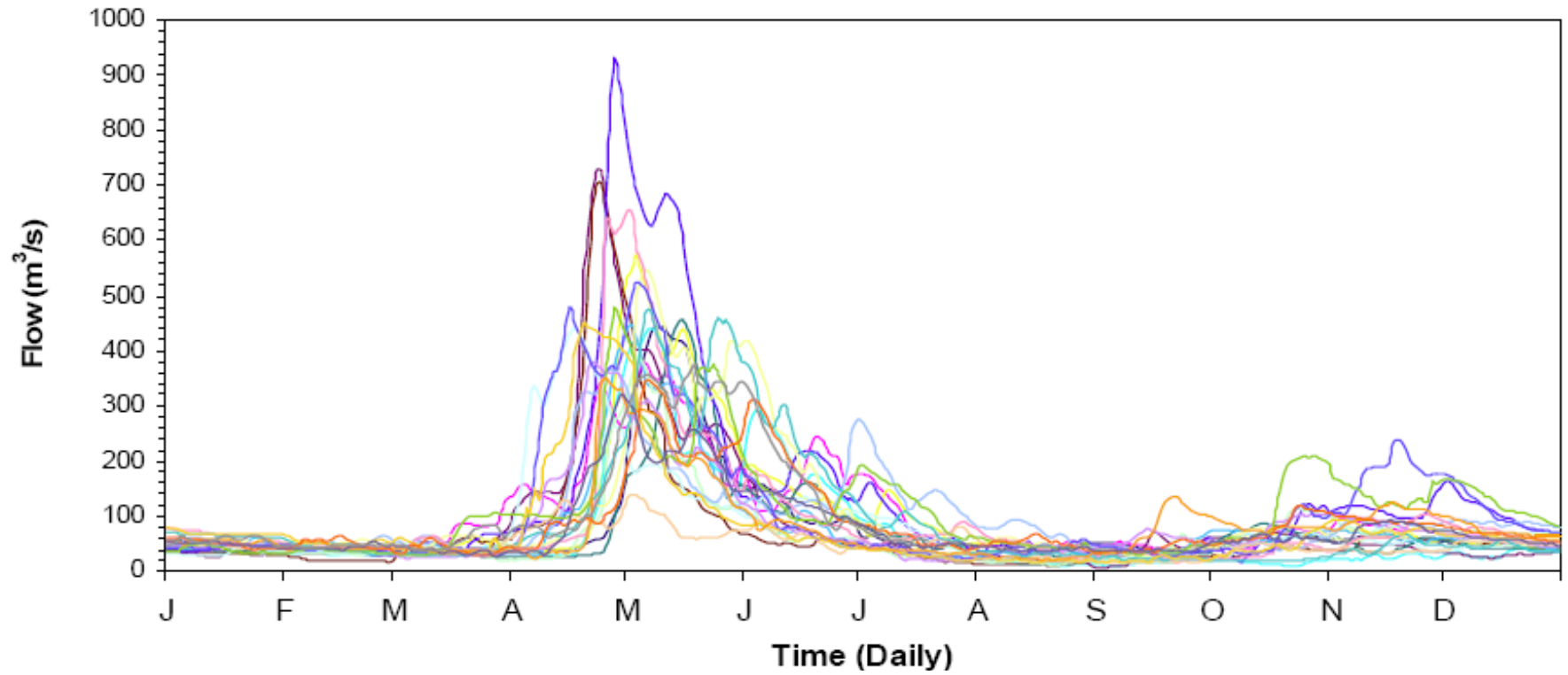
Table 5-2: Annual Flow Metrics for the Montreal River at Hound Chute, 1972 To 1995¹

Descriptive Metric	Value
Drainage Area (km ²)	6,362
Mean Annual Flow (m ³ /s)	86.3
20% Time Exceeded Flow (m ³ /s)	104.0
Median Flow (m ³ /s)	50.9
80% Time Exceeded Flow (m ³ /s)	34.7
Month of Maximum Median Flow	May
Month of Minimum Median Flow	September

¹ Source: Metcalfe *et al.* (2003).

As indicated in Section 1.1, upstream storage for the Hound Chute GS is provided by the Lady Evelyn Dam operated by OPG on the Lady Evelyn River, as well as the Bay Lake Dam operated by PWGSC in Latchford (except during the navigational season).

Figure 5-1: Annual Daily Flow Hydrographs from 1972 to 1995 for the Montreal River at Hound Chute



5.2.2.3 Montreal River Morphology and Bathymetry

The characteristics of watercourses in the area are directly related to the underlying geology and the effects of glaciation on the landscape. In this area where the Precambrian Shield dominates, the lakes tend to be elongated, reflecting the direction of glacial ice movement, with deep basins and moderately to steeply sloping shores. Watercourses in the Shield area such as the Montreal River have moderate gradients and channels that are narrow and well-defined. A more detailed description of morphology and bathymetry of the Montreal River upstream and downstream of the Hound Chute GS are provided in the Aquatic Environment Technical Support Document.

5.2.2.4 Montreal River Water Quality

Based on its good water quality, the Montreal River is the source of the Latchford potable water supply. The Aquatic Environment Technical Support Document presents available water quality data.

5.2.2.5 Montreal River Sediments and Sediment Quality

Sediments in the Montreal River can be expected to be predominantly silt and clay, particularly in the in-stream lakes and slower moving sections of the river. Sediment type immediately upstream and downstream of the Hound Chute GS is relatively coarse. A more detailed description of substrate type and distribution is provided in the Aquatic Environment Technical Support Document. Sediment quality at a location on the Montreal River approximately 12 km upstream of the Hound Chute GS was considered to be good (Fitchko, 1991).

5.2.2.6 Aquatic Vegetation

Coker and Portt (2006a) observed no aquatic macrophytes and a general lack of epiphytic growth on the substrate in the Montreal River near the Hound Chute GS.

Examination of the Natural Heritage Information Centre (NHIC, 2006a) database indicated no significant aquatic vegetation species have been recorded within a 5-km radius of the Hound Chute GS.

5.2.2.7 Plankton

There are two algal communities in most lotic (fast river) systems: the potamoplankton, or drift plankton, and the periphyton (Aufwuchs), or benthic algae. Lakes on lotic systems are the major source of potamoplankton, with diatoms almost universally the most important constituents (Williams and Scott, 1962). However, the periphyton is by far the more important algal community in terms of the ecology and productivity of rivers. Similarly, lakes are the major source of zooplankton with rotifers the dominant taxon in rivers (Williams, 1966).

5.2.2.8 Benthic Macroinvertebrates

The composition of the benthic fauna has been the most widely used indicator of water quality. This is because the macroinvertebrates from relatively sedentary communities in the sediments, thereby reflecting the character of both the water and the sediment. Alteration of benthic community structure is used to assess the trophic or general pollutional status of a waterbody. This assessment is usually based on interpretation of indicator species, changes in the relative numbers of individuals and species, and/or the derivation of a species diversity or community comparison index.

The benthic macroinvertebrate community downstream of the Hound Chute GS was characterized by 32 taxa with a total density of 6,079 organisms per m². The Shannon-Wiener diversity index value was 3.68 indicative of unpolluted conditions (good water quality). There were no dominant major taxa, with bivalvids (clams) and coleopterans (aquatic beetles), comprising 26.6 and 26.1% of the benthic community, respectively. The aquatic beetle, *Stenelmus*, and the clam, *Cyclocalyx (Pisidium)*, were the most common genera representing 25.0 and 22.9% of the benthic community, respectively. Other common taxa were midgefly larvae (18.6%) represented by 12 chironomid genera, nematodes (8.5%) and trichopterans (caddisfly nymphs) (8.0%).

5.2.2.9 Fisheries Resources

The Montreal River and associated reservoir lakes provide coolwater fish habitat. The primary fish species are walleye, northern pike, smallmouth bass, yellow perch, lake whitefish and white sucker (OPG *et al.*, 2004). Walleye are present throughout the river system and are extremely important to the local tourism economy as the most sought after species in the recreational fishery.

Table 5-3 presents the 29 species recorded in the Montreal River watershed. Of these, 14 species have been recorded near the Latchford Dam (Dillon, 1999), whereas six species were recorded during the June 2006 survey of fish habitat and communities near the Hound Chute GS (Coker and Portt, 2006a) (see Table 5-4).

Table 5-3: Fish Species Recorded In the Montreal River¹

Common Name	Scientific Name	Status
Brassy minnow	<i>Hybognathus hankinsoni</i>	N/A ²
Common shiner	<i>Luxilus cornutus</i>	River resident
Golden shiner	<i>Notemigonus crysoleucas</i>	N/A
Emerald shiner	<i>Notropis atherinoides</i>	River resident
Blacknose shiner	<i>N. heterolepsis</i>	River resident
Spottail shiner	<i>N. hudsonius</i>	River resident
Mimic shiner	<i>N. volucellus</i>	River resident
Northern redbelly dace	<i>Phoxinus</i>	Tributaries, occasional resident
Finescale dace	<i>P. neogaeus</i>	Tributaries, occasional resident
Bluntnose minnow	<i>Pimephales notatus</i>	River resident
Fathead minnow	<i>P. promelas</i>	N/A
Longnose dace	<i>Rhinichthys cataractae</i>	River resident
White sucker	<i>C. commersoni</i>	River resident
Redhorse sucker	<i>Moxostoma</i> sp.	River resident
Northern pike	<i>Esox lucius</i>	River resident
Cisco (lake herring)	<i>Coregonus artedi</i>	River resident
Lake whitefish	<i>C. clupeaformis</i>	River resident
Brook trout	<i>Salvelinus fontinalis</i>	Tributaries, occasional resident
Burbot	<i>Lota lota</i>	River resident
Brook stickleback	<i>Culaea inconstans</i>	Tributaries, occasional resident
Mottled sculpin	<i>Cottus bairdi</i>	River resident
Rock bass	<i>Ambloplites rupestris</i>	River resident
Pumpkinseed	<i>Lepomis gibbosus</i>	River resident
Smallmouth bass	<i>Micropterus dolomieu</i>	River resident
Yellow perch	<i>Perca flavescens</i>	River resident
Walleye	<i>Sander vitreus</i>	River resident
Iowa darter	<i>Etheostoma exile</i>	River resident
Johnny darter	<i>E. nigrum</i>	River resident
Logperch	<i>Percina caprodes</i>	River resident

¹ Source: Based on 1973 MNR and 1999 Royal Ontario Museum data (Dillon, 1999); OPG *et al.* (2004).

² N/A = not available.

Table 5-4: Fish Species Captured and/or Observed Near the Latchford Dam and Hound Chute Generating Station

Common Name	Scientific Name	Near Latchford Dam ¹	Near Hound Chute GS ²
Spottail shiner	<i>Notropis hudsonius</i>	X	
Mimic shiner	<i>N. volucellus</i>	X	X
Bluntnose minnow	<i>Pimephales promelas</i>		X
Longnose dace	<i>Rhinichthys cataractae</i>		X
White sucker	<i>Catostomus commersoni</i>	X	
Northern pike	<i>Esox lucius</i>	X	
Lake whitefish	<i>Coregonus clupeaformis</i>	X	
Burbot	<i>Lota lota</i>	X	
Nine-spine stickleback	<i>Pungitius pungitius</i>	X	
Mottled sculpin	<i>Cottus bairdi</i>	X	X
Rock bass	<i>Ambloplites rupestris</i>	X	
Smallmouth bass	<i>Micropterus dolomieu</i>	X	X
Yellow perch	<i>Perca flavescens</i>	X	
Walleye	<i>Sander vitreus</i>	X	X
Johnny darter	<i>Etheostoma nigrum</i>	X	
Logperch	<i>Percina caprodes</i>	X	

¹ Source: Dillon (1999).

² Source: Coker and Portt (2006a).

The ninespine stickleback collected by Dillon (1999) had not been previously recorded in the 1973 MNR and 1999 Royal Ontario Museum databases.

The fish community in the vicinity of the Hound Chute GS appears to be relatively simple and numerically sparse (Coker and Portt, 2006a). Only six species were observed by underwater video and/or captured by electrofishing (see Table 5-4). The clear water, lack of aquatic macrophytes and general lack of epiphytic growth on the substrate are indicative of relatively low productivity conditions.

There is an important walleye spawning area located below the dam at Latchford. In the spring, a minimum flow is maintained from the east side of the dam to ensure that the walleye spawning bed downstream is covered by water (OPG *et al.*, 2004).

Important northern pike spawning and nursery habitat is present in Marsh Bay located on the Montreal River between Latchford Dam and the Hound Chute GS.

To improve bass spawning habitat upstream, flashboards at the Hound Chute GS are installed prior to 01 June or after 30 June, or if the elevation drops to the sill level of 272.95 m during June (OPG et al., 2004). A minimum flow of 10 m³/s is maintained during flashboard installation to enable continued operation of the Ragged Chute GS located approximately 4 km downstream.

There are four hydroelectric generating stations on the Montreal River system as well as four control dams (OPG et al., 2004). These barriers impede upstream movement of many fish species. The downstream movement of species and mixing of stocks likely continues despite in-stream development.

The river sections from the Latchford Dam to 30 m downstream of the Ontario Northland Transportation Commission bridge in Latchford, as well as 150 m upstream and downstream from the concrete abutments at Fountain Falls located approximately 5.5 km and 1.5 km downstream of the Hound Chute GS and Ragged Chute GS, respectively, have been designated as Fish Sanctuaries by the MNR. For these two sanctuaries, fishing for any species is prohibited from 15 April to the Friday before the third Saturday in May (MNR, 2005).

5.2.2.10 Fish Habitat and Communities

The Montreal River in the vicinity of the Hound Chute GS provides a variety of riverine habitats, with varying flow velocities and water depths (Coker and Portt, 2006a). Substrate type is relatively coarse. Large boulders, steep inclines, large woody debris and an old bridge remnant provide good habitat structure. Depth contours, flow patterns and substrate types are presented in Figures 5-2 and 5-3.

Much of the aquatic habitat downstream of the Hound Chute GS (including the spillway channel) is fairly shallow, with the exception of a plunge pool immediately downstream of the falls at the upstream end of the spillway channel and at the excavated tailrace. Most of the aquatic habitat upstream of the Hound Chute GS is deeper. Based on the difference in average depths, flow velocity is generally higher downstream of the generating station. Flow velocity generally increases with flow discharge. However, as OPG maximizes flow through the Hound Chute GS, the headrace channel and spillway channel will show less and more variation in flow velocity, respectively. The spillway channel has very high flow velocities during the spring freshet, but is essentially a quiet backwater area during the summer. Most of the substrate is dominated by cobble, boulder and gravel in various proportions. Bedrock is exposed within the two falls, as well as in a portion of the headrace channel. Large woody debris is present at a few locations, generally where the water is deepest. The remains of an old bridge, consisting of rock-filled wood cribs and weathered concrete piers, are located at the upstream end of the headrace channel.

As indicated in Section 5.2.2.9, fish diversity and abundance are low in the area of the Hound Chute GS likely due to the low productivity conditions.

No walleye spawning was observed upstream and downstream of the Hound Chute GS on 30 April and 04 May 2006, when many walleye were observed spawning on both nights at the Latchford Dam. Despite the lack of observed walleye spawning activities near the Hound Chute GS, possibly low numbers of walleye and white sucker utilize the riffles near the generating station to spawn. These riffles differ throughout in water depth, flow velocity and substrate size, and therefore, the location of the optimal combination of these parameters that are required for spawning will vary with discharge conditions through the powerhouse and the spill channel. During the spawning surveys, most of the riffles in the vicinity of the Hound Chute GS had flow velocities that were too high for walleye spawning. However, spawning conditions may be suitable on other occasions when lower river discharge rates occur. It is possible the walleye spawning occurs further downstream where substrate and low velocities are suitable.

The lack of observed walleye spawning during the spring 2006 survey may also reflect the limited and generally poor spawning habitat that was accessible for viewing or low walleye abundance in the reach of the Montreal River between Hound Chute GS and the dam at Ragged Chute, approximately 4.2 km downstream.

The small fish species captured during the 2006 survey (see Table 5-4) likely reside year-round, taking advantage of local areas with suitable spawning conditions.

Figure 5-2: Bathymetry, Substrate and Flow Velocity Features within the Upstream Portion of the Hound Chute Generating Station Study Area

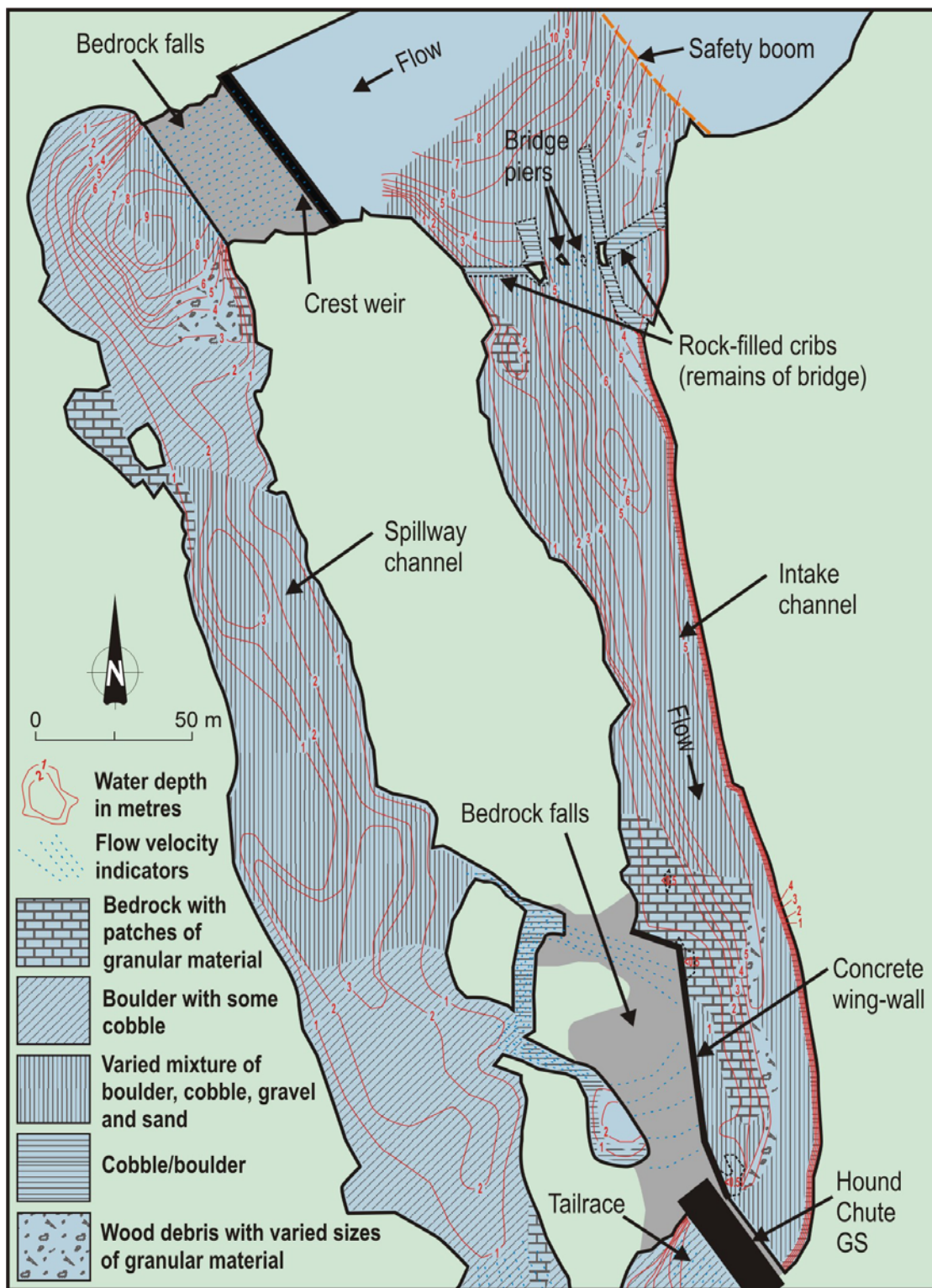
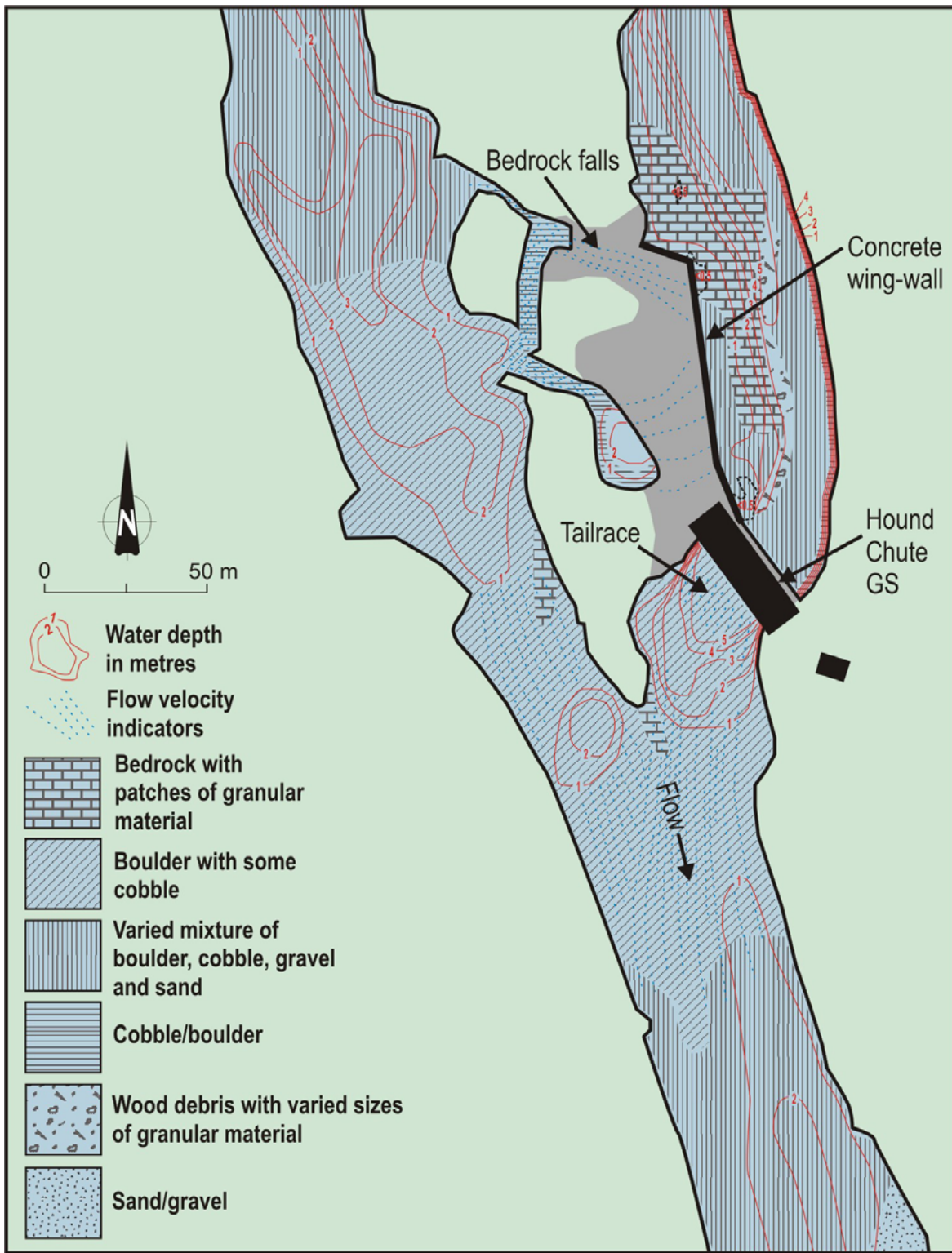


Figure 5-3: Bathymetry, Substrate and Flow Velocity Features within the Downstream Portion of the Hound Chute Generating Station Study Area



5.2.2.11 Aquatic Avifauna

All waterfowl species, including shorebirds, in the area are migratory. This area lies within the overlap between the Mississippi and Atlantic flyways. Migratory bird habitats of most concern are wetlands and open water areas throughout the region, which provide suitable feeding and/or roosting habitat, and allow relatively large accumulations of waterfowl as they prepare to begin or resume their migratory flights. Common migrating and breeding ducks in this area include mallard, American black duck, wood duck, ring-necked duck, American wigeon, blue-winged teal, common goldeneye, hooded merganser and common merganser.

Of the 36 aquatic avifauna species that have been recorded as breeding in the Temiskaming area, 16 are designated by the NHIC (2006a) as S5, i.e., very common in Ontario and demonstrably secure; 17 are S4, i.e., common in Ontario and apparently secure; one is S3 (black tern), i.e., rare to uncommon in Ontario; and two are S2 (greater scaup, ruddy duck), i.e., very rare in Ontario.

5.2.2.12 Significant Aquatic Wildlife Species

Of the aquatic species recorded in the Temiskaming area, the least bittern is considered to be threatened by COSEWIC (2006). The least bittern and black tern have been designated as threatened and of special concern, respectively, by COSSARO but are not listed in regulation under the Ontario Endangered Species Act (MNR, 2006a). COSEWIC (2006) does not consider black tern to be at risk. Only the black tern has been recorded as breeding in the Temiskaming area.

Based on examination of the NHIC (2006a) database, neither species has been recorded within a 5-km radius of the Hound Chute GS.

5.3 AIR/NOISE

The Hound Chute GS is located in largely a wilderness area. Local air quality is good, reflective of a wilderness area. Human noises in the area are rare and generally limited to car and truck travel along the road. The most significant source of noise is the sound of water being spilled around the generating station.

The existing air quality was not assessed as part of the project, as hydroelectric generating stations generally do not produce air emissions except for the occasional emissions associated with backup generators.

The existing noise conditions at Hound Chute GS were not assessed as hydroelectric generating stations produce very little detectable noise. This is because most of the equipment is housed in the powerhouse.

5.4 SOCIO-ECONOMIC ENVIRONMENT

5.4.1 Demographics, Community and Economy

Northern and Northeastern Ontario has a resource based economy driven primarily by the forest products and mining sectors. Tourism which is largely resource-based (e.g., fishing, hunting, other outdoor recreation) is a lesser but important contributor to the economy as is the production of energy. Government services whether it be federal, provincial or local are also a major contributor to the economy and employer of people. Most of the other sectors of the northern Ontario economy such as retail and wholesale trade, other manufacturing, construction and services are generally dependent on and strongly impacted by the resource industries.

The District of Timiskaming is comprised of a large number of towns, villages and rural areas. The largest communities are the City of Timiskaming Shores which was formerly the Towns of Haileybury and New Liskeard and the Township of Dymond. Other communities in the District include Kirkland Lake, Larder Lake, Latchford, Cobalt, Coleman, Elk Lake, Englehart and Matachewan. In total there are 23 incorporated municipalities in Timiskaming District. The communities of the District are located in relative close proximity to each other allowing residents to live in one community and work in another. As such the economy is very integrated in the region. There are no large private sector employers in the District of Timiskaming; however, there are a number of medium sized employers including Grant Forest Products, Grant Transport, Elk Lake Planning Mill and 3-H Manufacturing. The former Town of New Liskeard is the main service area for the region and includes a large number of public sector employers such as the Temiskaming Hospital (OPG *et al*, 2004).

According to the 2001 Census, total employment in the District was 15,735, with the principal sectors being: agriculture and other resource extraction (including logging) (1,715); manufacturing and construction (2,585); wholesale and retail trade (2,395); finance and real estate (505); health and education (3,090); business services (2,460); and, other services (2,985).

Historically, the District was known as an important mining area and while there is still small scale mining operations and claim staking there are no major mines at present in operation.

Ontario Power Generation's Northeast Plant Group (NEPG) employs 173 people in its operations and a total number of 34 people are employed at Dymond.

The total population of the District of Timiskaming in 2001 was 34,442, an 8.9% reduction from the 1996 population of 37,807. Population of the Town of Latchford and Coleman Township in 2001 was 363 and 550 respectively (Statistics Canada, 2006). The median age of the population of Timiskaming District was 41.1, in contrast to 37.2 of the Province, indicating that the region is aging in place. The combination of the loss of population and aging of population would indicate that many young people in the District are leaving the area in search of economic opportunities elsewhere.

The median income for the District was \$17,972, which was lower than the provincial median of \$24,816. The median family income in 2000 was \$45,885 compared to the Provincial median of \$61,024. The average dwelling value was \$87,314 compared to \$199,884 in the Province as a whole. The composition of total income demonstrates that the population of Timiskaming relies to a greater extent on government transfer payments. Eighteen percent of total income is derived from government transfers in contrast to 9.8% for the Province as a whole. This indicates that the population relies higher on government transfers such as employment insurance, Canada Pension Plan payments, welfare, etc. The unemployment rate in Timiskaming was 10.0% in contrast to 6.1% for the Province as a whole. Overall, the economic indicators reinforce the notion that there are fewer and more limited economic opportunities in the District than the Province as a whole with a resultant effect of the population being less well off.

5.4.2 Land-Use Planning

The Hound Chute GS is located about 10 kilometres southeast of the Town of Latchford. The Hound Chute GS straddles Coleman Township and the Town of Latchford, with the weir on the western channel being located in Coleman Township and the powerhouse located in Latchford. In early 2006, Latchford annexed these lands formerly known as Gilles Limit. There is no Official Plan that covers the site as the Town's OP is restricted to the village (May, 2006).

It is important to note that sections 1.8.2 and 1.8.3 of the *Provincial Policy Statement* (MMAH, 2005) encourage increased energy supply from waterpower resources:

“Increased energy supply should be promoted by providing opportunities for energy generation facilities to accommodate current and projected needs, and the use of renewable energy systems² and alternative energy systems, where feasible.”

“Alternative energy systems and renewable energy systems shall be permitted in settlement areas, rural areas and prime agricultural areas in accordance with provincial and federal requirements. In rural areas and prime agricultural areas, these systems should be designed and constructed to minimize impacts on agricultural operations.”

Virtually all of the land within a few kilometres of the Hound Chute GS is crown general use land. Two crown land use designations occur on either side of the Montreal River at the location of the Hound Chute GS. On the east side of the river is the Pine Lake Integrated Management Area (Crown Land Use Atlas ID: 1963), an 11,457 ha General Use Area. The management of this area is governed by the policies of the Temagami Land Use Plan (1997), however that Plan did not mention or address hydro development (MNR, 2006). The general

² Renewable energy systems means the production of electrical power from an energy source that is renewed by natural processes including, but not limited to, wind, water, a biomass resource or product, or solar and geothermal energy.

land use intent articulated in the policy makes no mention of concerns, objectives or strategies relevant to hydro power. On the west side of the river is the Roosevelt Road (Integrated management Area) (Crown Land Use Atlas ID: 1965) a 23,261 ha General Use Area. The management of this area is governed by the policies of the Temagami Land Use Plan (1997), however that Plan did not mention or address hydro development (MNR, 2006). The general land use intent articulated in the policy makes no mention of concerns, objectives or strategies relevant to hydro power. The site is located about 5 km north of the Cliff Lake Conservation Reserve.

5.4.3 Resource Use

Access to the Hound Chute GS is via the gravel Silverfields Road which runs south of Cobalt. OPG maintains this road although it is open for public use. Traffic on the road is very light and generally limited to OPG vehicles, vehicles associated with the operation of the Ragged Chute Generating Station operated by Canadian Hydro Developers Inc. and outdoor enthusiasts include anglers, hunters and canoeists. The road is also occasionally used for logging. This is a well maintained road because of the need for permanent access by OPG and Canadian Hydro Developers, which operates the Ragged Chute Generating Station, downstream of Hound Chute.

The Hound Chute GS is located in the Temagami Forest, the last forest in the Province that is still managed by the MNR. Wood resources from the forest flow to a variety of local and regional forest products mills.

The Hound Chute GS occurs in largely a wilderness setting south of Cobalt. The area is primarily used by outdoor enthusiasts such as anglers, hunters and canoeists. The Lower Montreal River is an identified canoe route within the Temagami area. The route is identified in both the MNR's "Canoeing in the Temagami Area" and in Hap Wilson's "Temagami Canoe Routes". This route is identified in Wilson's book as the "Latchford – Montreal River Route" with a total length of 46 kilometres and an estimated duration of 2 days. While Temagami is a well-known canoe-camping destination area in Ontario and beyond it is likely that this route is too short to be of high interest by canoeists. OPG staff at the Hound Chute GS have mentioned that they observe a few canoe parties per season.

5.5 BUILT HERITAGE AND ARCHAEOLOGICAL RESOURCES

5.5.1 Built Heritage

SENES retained Unterman McPhail Associates, Heritage Resource Management Consultants, to undertake a cultural heritage resource assessment and to present mitigation recommendations for the built heritage and cultural heritage landscape resources as part of the study for the redevelopment of the Hound Chute GS. The full cultural heritage report appears as a separate Technical Support Document to this Environmental Report.

The Montreal River was an important transportation route for aboriginals, fur traders and early lumbermen before being adapted to produce power. It was well suited for the development of hydroelectric power with a number of waterfalls in relatively close proximity of the Cobalt mining camp. First exploited for the Cobalt mining companies, the power was provided to other mining camps, notably Kirkland Lake, residential users and pulp and paper companies. Hound Chute GS, constructed in 1910, was the first site developed on the Montreal River for hydroelectric power.

C. A. and B. C. Beck incorporated the Cobalt Power Company, Limited in December 1906 and the new company secured a lease for waterpower on the Montreal River at Hound Chute Falls together with about 70 acres of land and “had permission to construct, maintain, complete, and operate works for the production, sale and distribution of electricity for the purposes of light, heat, and power”.³ Preliminary investigations were carried out in 1906 and 1907 with construction commencing in fall 1908.

A. Vonaesch, M. E., Hydraulic Engineer of the William Kennedy & Sons, Limited, Owen Sound, Ontario, designed the Hound Chute plant including the hydraulic machinery. The resident engineer was A. Gillies, B. A. Sc. William Kennedy & Sons furnished the hydraulic equipment and General Electric Company of Sweden through dealers Kilman, Pullen and Burnham, Toronto supplied the electric equipment.

The Cobalt Power Company, Limited and the British Canadian Power Company, Limited, formerly the Mines Power, Limited, amalgamated in 1911 to form the Northern Ontario Light and Power Company. The company operated the Hound Chute and Matabitchuan generating stations in addition to Ragged Chute Compressed Air Plant.

Canada Northern Power Corporation, controlled by Nesbitt, Thomson and Company a Montreal based securities firm, acquired the Northern Ontario Light and Power Company in 1926. In turn, the Hydro Electric Power Commission (a predecessor to OPG) acquired all the assets of the Canada Northern Power Corporation on November 30, 1944.

The Hound Chute GS is not designated under the Ontario Heritage Act. Representatives of the Ontario Ministry of Culture were consulted during the assessment. *Planning for Hydroelectric Generating Stations as a Cultural Resource*, a study undertaken in the early 1980s by the former Ministry of Citizenship and Culture, in co-operation with Ontario Hydro provided a preliminary ranking, Class A, B or C, of the hydroelectric generating stations now owned by OPG. Class A stations were deemed to be those of the greatest heritage importance, Class B a good example of a type and Class C a fair example. Hound Chute was identified as a Class A structure as typical example of a low-head development from the early 20th century and for its association with the Cobalt Mining Camp.

³ *The Canadian Engineer* (October 13, 1910), 499.

5.5.2 Archaeological Resources

Woodland Heritage Services Limited conducted the archaeological and cultural heritage assessment at the Hound Chute GS as the project has the potential to impact archaeological and cultural heritage sites including First Nations buried archaeological values. A ground based Stage 1 assessment was carried out. This work was undertaken according to Ontario Heritage Act Regulations which involved field visits by a licenced archaeologist.

The complete "Archaeological and Cultural Heritage Impact Assessment of the Hound Chute Generating Station Redevelopment Project Located on the Lower Montreal River" appears as a Technical Support Document to this Environmental Report.

Aboriginal sites in the broader study along the Montreal River relate to the Matachewan First Nation and the Temagami First Nation. These Aboriginal Peoples have shared this area for more than four hundred years with European settlers. However, their history in the area goes back a minimum of 7,000 years and perhaps several thousand years earlier to the days of glacial Lake Ojibway. The entire area was utilized including many inland areas and the small creeks during this time. The traditional territories of both the Temagami First Nation (including additional Teme-Augama Anishnabai members at other locations) on Bear Island and the Matachewan First Nation overlap within the study area.

The Matachewan First Nation is located north of Elk Lake and northeast of the community of Matachewan. They are the original inhabitants of the upper Montreal River watershed, from Elk Lake north to the lower part of Nighthawk Lake. The Matachewan First Nation is part of Treaty No. 9 even though the Reserve is physically located within the Robinson-Huron Treaty area, about seven kilometres south of the boundary of Treaty No. 9. The Band's traditional northern boundary likely extended as far north as Nighthawk Lake. Some current Band members are descended from individuals who lived in the vicinity of Nighthawk and Frederick House Lakes as well as the Lake Temagami and Lake Temiskaming areas in the early eighteenth century.

The Temagami First Nation home and Reserve is on Bear Island in Lake Temagami. The northern part of their territory extends from Anima Nipissing Lake, through Lady Evelyn to Mountain Lake and Gowganda. The traditional territory of the Temagami First Nation and the Teme-Augama Anishnabai includes the areas south and west of the Montreal River.

The goal of the archaeological work was to ascertain if any pre-contact First Nations archaeological sites might be present (these would mainly be found in undisturbed areas) and/or historic archaeological sites, artifacts and features. Historic archaeological features would include the foundations and footings of former buildings, houses, stables, root cellars, ice houses, dams, weirs and industrial machinery. In addition, hydro colony (residential) house foundation remains are of value since they provide evidence of the scale, location and function of worker communities that once existed on the site. As well, the project would document any archaeological features and artifacts that provide evidence of the physical evolution of the site which took place during the site's history. Any industrial and domestic refuse deposits or

middens would also be useful as they would provide information on the historic generating station operations, generating technology and the domestic life of the historic plant operators.

The Stage 1 archaeological assessment identified a few features: a remnant of a pre-1900 Heritage Portage Trail; old machinery in the bush on the Hound Chute island; and old concrete remnants of a former cofferdam or weir. Significant evidence of archaeological heritage sites (buried sites and ruins) or features was not located.

5.6 FIRST NATIONS

5.6.1 Context

Based on OPG's and SENES' experience in the region, previous correspondence with First Nations and direction provided by the MNR, inquiries were placed with four First Nations to determine if they had any interest in the Proposed Undertaking and in being consulted. The First Nations identified for consultation were: Temagami First Nation, the Teme-Augama Anishnabai, Matachewan First Nation and Mattagami First Nation. Early on in the process OPG held conversations with the Mattagami First Nation regarding other projects on the Upper Mattagami River. At that time the Chief of Mattagami First Nation identified that they have no interest in the Hound Chute project. More information on the consultation program with First Nations is summarized in Section 7.1.2 and is also located in the First Nations Consultation Technical Support Document for the Hound Chute Project.

5.6.2 Temagami First Nation

The Temagami First Nation (TFN) has a total population of 555 of which 198 are on reserve. Temagami's Reserve is Bear Island located in the middle of Lake Temagami. There are approximately 50 homes on the reserve. Major employers include the Band office and First Nation privately owned companies and businesses in the building, construction, recreation and hospitality industries (OPG *et al.*, 2004).

5.6.3 Matachewan First Nation

The Matachewan First Nation is located near the unincorporated municipality of Matachewan in the northwest section of Timiskaming District. Matachewan has a total population of 494 of which 49 live on reserve.

5.6.4 Teme-Augama Anishnabai

The Teme-Augama Anishnabai are known as the Deep Water People of the Algonquin and Ojibway Nations. The Temagami First Nation represents the First Nation Registered (status) Band population and the Teme-Augama Anishnabai (TAA) represents all Temagami aboriginals with ties to the traditional lands (Daki Menan). The TFN and the TAA are in the midst of negotiations with the crown for a land claim to the Daki Menan area (OPG *et al.*, 2004).

6.0 PREDICTED ENVIRONMENTAL EFFECTS AND PROPOSED MITIGATION MEASURES DURING CONSTRUCTION AND OPERATIONS

6.1 POTENTIAL SOURCES OF EFFECTS

This chapter describes the environmental effects expected as a result of the Proposed Undertaking. The chapter first highlights the potential source of the effect and then more fully describes the predicted effects attributed to the proposed redevelopment. Typically, impacts relate to both the construction of the redeveloped site and the operation of the new powerhouse. Operational impacts of the Proposed Undertaking are expected to be similar to the current operating conditions. Because the redeveloped facility will continue to operate in accordance with the Water Management Plan, and result in a significant reduction in water level fluctuations, it is expected that almost all the effects associated with the project will be during the construction phase.

6.2 BIOLOGICAL EFFECTS

6.2.1 Terrestrial Environment

The available environmental baseline information and site-specific vegetation inventory provided the basis for an assessment of potential construction and operational effects on the terrestrial environment, e.g., due to vegetation clearing, soil erosion, noise, blasting, increased human activity, etc.

Recommended mitigative measures for project effects on the terrestrial environment are based on standard environmental construction guidelines, relevant government guidelines for proposed hydroelectric power plant development, as well as government agency and other organization consultation.

The significance of potential impacts was based on their magnitude, duration and extent after the implementation of recommended mitigative measures.

6.2.1.1 Geology and Soils

The new powerhouse is planned to be located on the same footprint as the existing powerhouse. Blasting may be required to excavate a base for the new powerhouse foundation.

Explosives used in construction will be closely controlled, with their use restricted to authorized personnel who have been trained in the use of explosives in a manner so as to minimize impacts on the environment. Appropriate government agencies and the local residents will be informed of the blasting schedule in advance of construction, as well as just prior to the detonation program. All necessary permits will be obtained by the DBC, who will also comply with all legal requirements in connection with the use, storage and transportation of explosives,

including, but not limited to, the Canada Explosives Act and the Transportation of Dangerous Goods Act. The DBC will be required to retain a consulting engineer with technical expertise in blasting to provide advice on maximum loading of explosives for all blasting, as well as an engineering report indicating recommended charges and blasting methods to be used at specific locations. All blasting will occur in such a way as to be in compliance with federal regulations and directions.

During federal agency consultation, Environment Canada expressed a concern regarding acid generation potential of rock blasted during the proposed Hound Chute GS redevelopment. As indicated in Section 1.1, bedrock on the Hound Chute GS property has low acid generation potential (Martin, 2006). Based on modified acid base accounting analyses, all rock samples tested had a low potential for acid rock drainage (ARD). Acid potential (AP) is calculated from sulphide sulphur content. The sulphide sulphur levels ranged from 0.07 to 0.12%. A sulphide sulphur level of less than 0.3% is used as a draft guideline by Price (1997) as having low potential for ARD, unless the rock has elevated metal levels and/or the levels of neutralizing potential (NP) are low. The NP/AP ratio is commonly used to assess the potential for ARD. Based on this ratio, the rock samples had negligible to low potential for ARD. As a result, no mitigative measures are recommended.

No effects on geology are anticipated beyond the area currently affected by the existing powerhouse and possibly due to grading of rock outcrops in the proposed laydown/assembly and road/parking expansion areas.

The physiography of the new powerhouse site will likely be altered due to requisite slope stabilization. The physiography of the proposed laydown/assembly and road/parking expansion areas are likely to be altered due to requisite grading. A Site Development Plan will be prepared by the DBC, including planning considerations; site development scheduling; site development; selection of construction equipment; and site development details.

As the effects of site development are expected to be negligible on overall physiography, no mitigation measures are required beyond those set out in the Site Development Plan.

No effects on geology and physiography are anticipated as a result of the operation of the Proposed Undertaking; therefore, no mitigation is required.

Soils in the Hound Chute GS property consist of the Timiskaming Complex, composed of mineral soils developed on lacustrine clays, as well as organic soils and rock outcrop (see Section 2.2.3). Overall, the mineral soils are exceedingly stony and susceptible to erosion.

During construction, soil erosion generally results from water or wind action on the disturbed terrain surfaces as a result of the removal of vegetative cover, alteration of topography and improper restoration. All construction work should be conducted so as to avoid unnecessary disturbance of the ground by the placement or excavation of materials, the disruption of

established natural surface and subsurface, or the disturbance of natural vegetation cover that is to be preserved.

Till and gully erosion caused by channelized overland flow can be a major source of soil erosion. Sheet erosion can be an additional source of sediment.

Erosion and sediment control will be an integral component of the construction planning process. All personnel involved with the proposed works will be briefed on erosion and sediment control including engineers, contractors, inspectors and environmental staff. In general, the following guidelines will be applied in the development of the Erosion and Sediment Control Plan:

- fitting of proposed works to the terrain;
- timing of grading and construction activities to minimize soil exposure;
- retention of existing vegetation where feasible;
- restriction of the use of heavy construction equipment to within the approved work areas to minimize soil disturbance and vegetation destruction;
- storage of stripped soil at upland locations;
- implementation of erosion control measures, e.g., rip rap berms underlain by filter geotextile, straw bales used as filters, silt fencing along the shoreline and/or mulching for interim stabilization;
- diversion of runoff away from exposed areas;
- minimization of the length and steepness of slopes;
- maintenance of low runoff velocities;
- design of drainage works, such as ditches and outfalls, to handle concentrated runoff;
- retention of sediment on site;
- routine inspection and maintenance of erosion and sediment control measures; and,
- re-vegetation of disturbed areas by seeding and/or planting following construction as soon as seasonal conditions permit.

The site-specific Erosion and Sediment Control Plan will be part of a broader Environmental Management Plan.

After construction is completed the site will be rehabilitated. A Site Rehabilitation Plan including planning considerations, soil stabilization and re-vegetation will be prepared.

Dust may be generated during the construction of the proposed Hound Chute GS due to heavy equipment movement. Dust generation during dry, windy conditions can be controlled by water trucks and/or sprinklers as necessary to reduce dust to acceptable levels (e.g., Cheminfo, 2005).

The implementation of the Erosion and Sediment Control Plan and Site Rehabilitation Plan during construction and rehabilitation will obviate or minimize potential effects on soils.

Incidental spills of oil, gas, diesel fuel and other liquids to the environment could occur during construction. In addition, sanitary and other wastes will be generated during construction. Fuelling and lubrication of construction equipment should be carried out in a manner that minimizes the possibility of releases to the environment. Measures for containment and cleanup of contaminant releases should be followed to minimize contamination of the natural environment, e.g., placement of fuel tanks and generators on plastic sheets bermed around the edges, and use of suitable hydrocarbon absorbent material for cleanup and approved landfill or other disposal. Any spills with the potential to create an impact to the environment should be reported to the MOE as required by provincial spills legislation. Interim sanitary waste collection and availability of treatment facilities should be arranged for the duration of the construction period. All construction waste, washwater and wastewater should be disposed of in accordance with regulatory requirements.

A Hazardous Materials Management Plan, Waste Management Plan and a Spills Emergency Preparedness and Response Plan will be developed for the proposed redevelopment project as part of the broader Environmental Management Plan.

The implementation of these pollution prevention plans will obviate or minimize the environmental effects of accidental releases to the natural environment.

The operation of the hydroelectric facility is not expected to have an effect on property soils. Therefore, no mitigation is required.

6.2.1.2 Vegetation

As indicated in Section 5.2.1.3, permanent displacement of vegetation and trees due to project construction will be minimal. However, additional areas, predominantly cultural meadow vegetation community type, beyond the existing parking lots will be needed as construction laydown areas. In addition, a small northern section of the island will be partially cleared to allow for the refurbishment of the western channel weir. This area of the island has already been impacted by previous construction activities. An area, dominated by balsam poplar and alder, along an existing road that leads to the submerged structure will also likely need to be enlarged.

Based on the vegetation survey of those locations likely to be affected by construction activities, no significant or unusual areas of native vegetation were identified that would preclude or be affected by the construction of the proposed Hound Chute GS. In addition, no floral species documented at these construction locations during the field survey or within the local study area based on examination of the NHIC (2006a) database are designated to be at risk by COSEWIC (2006) or COSSARO (MNR, 2006a). In fact, all of the species observed during the field survey were either ranked by NHIC (2006a) as S5, i.e., very common in Ontario and demonstrably secure, or SE, i.e., exotic, not believed to be a native component of Ontario's flora. Removal of these plant species will have negligible effect on their overall populations in Ontario.

Vegetation clearing will adhere to standard construction practices as listed below:

- vegetation clearing should be restricted to the minimum necessary for construction activities;
- brush and trees should be felled into the area to be cleared to prevent damage to adjacent vegetation;
- branches overhanging the cleared area should be cut (pruned) cleanly and stubs should not be dressed;
- merchantable timber should be cut and neatly stacked for removal as requested by the MNR;
- specimen trees marginal to the cleared area should be identified prior to construction, flagged and protected from damage, where possible;
- clearing should not take place between 01 May and 31 July in northern Ontario (this issue is further discussed in Section 6.2.1.4 with respect to migratory birds);
- all slash, brush, roots and stumps are typically raked into piles for burning or disposed in a manner prescribed by the MNR; and
- slash material should not be stored near the Montreal River.

Cutting of merchantable timber and burning of slash will require approval (permits) of the MNR.

After construction of the proposed Hound Chute GS, the cleared areas of natural vegetation that have not been displaced by permanent re-development infrastructure will be rehabilitated as described in the Site Rehabilitation Plan, emphasizing use of native plant species for revegetation of disturbed areas.

Overall, with the implementation of the standard vegetation clearing construction practices, the construction and operation of the proposed Hound Chute GS will have minimal effect on vegetation communities or species.

6.2.1.3 Wetlands and Environmentally Significant Areas

As indicated in Section 5.2.1.5, there are no environmentally significant areas within the 5-km radius local study area. Due to the geographic separation, construction and operation of the Proposed Undertaking will have no effect on environmentally significant areas.

6.2.1.4 Wildlife

As indicated in Section 5.2.1.5, most of the land around the Hound Chute GS remains in native vegetation. On the Hound Chute GS property, the primary vegetation community is a mixed woods forest with some open meadow areas.

The local study area lands are designated as Class 4 and Class 5 with moderate and moderately severe limitations, respectively, for the production of ungulates. There are no areas of significant moose or white-tailed deer habitat within the study area.

Most native mammal and avian species likely present in the local study area are ranked by the NHIC (2006a) as S5 and S4, i.e., very common and common in Ontario, respectively. All of the herpetofauna species are ranked by the NHIC (2006a) as S5 and S4.

Although two mammal species (eastern cougar, eastern timber wolf), six bird species (golden eagle, peregrine falcon, bald eagle, red-shouldered hawk, short-eared owl, great grey owl) and the monarch butterfly are considered to be at risk by COSEWIC (2006) and/or COSSARO (MNR, 2006a) and have ranges in Ontario overlapping the study area, none have been recorded within the local study area (NHIC, 2006a).

As indicated in Sections 2.3.2 and 2.5.4 of the Terrestrial TSD, the occurrence of three SARA species at risk, the peregrine falcon, eastern wolf and monarch butterfly, has been documented to overlap with the Hound Chute GS property (Environment Canada, CWS, 2004). The absence of preferred cliff habitat, lack of significant prey habitat and the local absence of milkweed minimizes the potential for the occurrence of peregrine falcon, eastern wolf and monarch butterfly, respectively, which have not been recorded within the local study area (NHIC, 2006a).

Based on its location relative to any environmentally significant areas, the Proposed Undertaking will not affect significant wildlife habitat; thereby conforming with the *Wildlife Policy of Canada* (CWS, 1990) and the *Provincial Policy Statement* (OMMAH, 2005).

The construction disturbance will be sufficiently local that little displacement of wildlife will occur. Any resident animals can relocate temporarily to avoid noise and disturbance associated with construction activities.

As indicated in Section 2.5.2 of the Terrestrial TSD, a number of terrestrial bird species are likely locally resident and may nest on the Hound Chute GS property. Most of these species are protected under the *Migratory Birds Convention Act*. Recently, the Canadian Wildlife Service (CWS) has stipulated that vegetation clearing should not be undertaken during the breeding season of migratory birds in order to avoid the destruction of any bird nests. Specifically, clearing should not take place between 01 May and 31 July in northern Ontario. Otherwise, a breeding bird survey must be conducted by a qualified avian biologist and any nests found must not be disturbed by the clearing activity until the young have fledged. A buffer zone with a 50 m allowance restricting active construction activities is usually applied around a nest. The CWS will be consulted on the appropriate mitigation measures. To preclude the potential institution of a buffer zone that may affect construction activities, it is recommended that vegetation be removed prior to nesting season initiation, i.e., 01 May, or after nesting season completion, i.e., 31 July.

Once construction of the Proposed Undertaking is completed, any displaced animals could reoccupy the habitat created on the rehabilitated areas of the property and the habitat associated with the natural and cultural vegetation communities not directly affected by construction activities.

During operation, noise will be generated from the powerhouse. This steady noise from the proposed plant will be similar to that of the existing facility and not elicit an adverse reaction from nearby habituated wildlife.

Overall, the construction and operation of the Proposed Undertaking will have minimal effect on wildlife populations or wildlife-carrying capacity of the area.

6.2.1.5 Summary and Conclusions

During the construction phase, potential impacts on the terrestrial environment may occur due to soil erosion and fugitive dust; accidental spills; noise and human activity; and vegetation clearing. Based on an assessment of the available baseline information and potential effects, as well as the implementation of the recommended mitigative measures, SENES concludes that effects during construction will be minimal, localized and short-term.

During the operation phase, potential impacts on the terrestrial environment may occur due to noise and human activity. Based on assessment of the baseline information and potential effects, SENES concludes that the operation of the proposed Hound Chute GS will have negligible effects on the terrestrial environment.

Environmental protection during proposed generating station construction and operation will be ensured by adherence to the Environmental Management Plan, as well as compliance with regulatory standards and guidelines.

The Environmental Management Plan therefore ensures that environmental protection will be achieved by describing government agency requirements, OPG policy, project commitments and recommended mitigation measures to be undertaken. The Environmental Management Plan will include the Erosion and Sediment Control Plan, Spills Emergency Preparedness and Response Plan, Hazardous Materials Management Plan, Waste Management Plan and Site Rehabilitation Plan.

Table 6-1 summarizes potential construction and operation effects, the recommended mitigative/remedial measures to minimize or obviate these impacts and the net effects.

Table 6-1: Summary of Potential Effects and Recommended Mitigative/ Remedial Measures

Effect	Recommended Mitigative/Remedial Measure	Net Effect
Construction		
Soil erosion	<ul style="list-style-type: none"> Adherence to Erosion and Sediment Control Plan. 	Negligible effect
Fugitive dust	<ul style="list-style-type: none"> Use of water trucks and/or sprinklers (e.g., Cheminfo, 2005). 	Negligible effect
Incidental spills of oil, gasoline and other liquids during construction	<ul style="list-style-type: none"> Adherence to Spills Emergency Preparedness and Response Plan. 	Negligible effect
Hazardous Materials/Waste	<ul style="list-style-type: none"> Adherence to Hazardous Materials Management Plan and Waste Management Plan. Waste disposal in accordance with regulatory requirements. 	Negligible effect
Displacement of nesting birds	<ul style="list-style-type: none"> Vegetation clearing to be undertaken outside the migratory bird breeding season (01 May to 31 July). 	Negligible effect
Vegetation clearing	<ul style="list-style-type: none"> Implementation of the Site Rehabilitation Plan. 	Net benefit
Blasting	<ul style="list-style-type: none"> Adherence to blasting engineer recommendations. Guidelines for the Use of Explosives In and Near Canadian Fisheries Waters 	Negligible effect
Noise	<ul style="list-style-type: none"> Use of well-maintained equipment and noise silencers (as required). 	Negligible effect
Operation		
Noise	<ul style="list-style-type: none"> Ambient noise levels to remain unchanged. 	Negligible effect
Incidental spills of oil, gasoline and other liquids during operation	<ul style="list-style-type: none"> Adherence to Spills Emergency Preparedness and Response Plan. 	Negligible effect

6.2.2 Aquatic Environment

The available environmental baseline information and site-specific aquatic vegetation, benthic macroinvertebrate and fisheries survey findings provided the basis for an assessment of potential construction and operational impacts on the aquatic environment, e.g., due to cofferdam installation/removal, dewatering, blasting/rock fragment excavation, soil erosion and turbidity generation, etc.

Recommended mitigative measures for the effects of the Proposed Undertaking on the aquatic environment are based on standard environmental construction guidelines, relevant government guidelines for proposed hydroelectric power plant development, as well as government agency and other organization consultation.

The significance of potential impacts was based on their magnitude, duration and extent after the implementation of recommended mitigative measures.

6.2.2.1 Surface and Groundwater Hydrology

The proposed powerhouse is planned to be located on the same footprint as the existing powerhouse. A small amount of excavation and slope stabilization will be required for the new powerhouse foundation and underground tailrace canal. Two or three cofferdams will be required for powerhouse construction and weir refurbishment. Areas will be cleared of vegetation for construction material laydown and assembly.

Till and gully erosion caused by channelized overland flow can be a major source of soil erosion during construction. Sheet erosion can be an additional source of sediment.

As indicated in Section 6.2.1.1, a site-specific Erosion and Sediment Control Plan, addressing the area around the powerhouse and its ancillary infrastructure, as well as the construction laydown and assembly areas, will be prepared and implemented during construction. The site-specific Erosion and Sediment Control Plan will be part of a broader Environmental Management Plan for the redevelopment project.

For any new temporary crossings of drainage ditches, standard construction procedures will be followed involving crossing design (culvert or ford), installation and maintenance. For new crossings, a permit must be obtained from the MNR.

The implementation of these standard procedures during construction and rehabilitation will obviate or minimize potential effects on surface hydrology.

At the Proposed Undertaking, blasting may be required to demolish the existing powerhouse and its foundation. Blasting could have a potential effect on groundwater quality and flow in the immediate vicinity of the blasting operations (Fitchko *et al.*, 1998). It has been estimated that peak particle velocities produced from blasting operations in excess of 600 mm/s will cause cracks and discontinuities in sedimentary rock up to a 5-m radial distance from the blast using the sophisticated techniques and control measures employed in modern blasting practice. Damage (seam creation) will be less and more localized in Precambrian rocks. Minimization of the physical effects of blasting will be ensured by following the recommendations of the blasting engineer and will be undertaken in accordance with the DFO Blasting Guidelines.

Wells providing potable or other service groundwater within 100 m of blasting activities should be identified and sampled for water quality and level prior to and after blasting to confirm no effects on groundwater resources.

No effects on surface hydrology and groundwater are anticipated as a result of the operation of the proposed Hound Chute GS; therefore, no mitigation is required.

6.2.2.2 Montreal River Construction Impacts

For construction of the powerhouse a cofferdam is proposed at the inlet of the forebay to take advantage of an existing submerged structure. Upon construction completion, the cofferdam and submerged structural material (remains of an antecedent bridge) be knocked down and distributed along the bottom of the forebay resulting in improved flow of water to the powerhouse. This cofferdam would likely be in place for 12 to 14 months and will result in a dewatered area of 13,900 m² (1.4 ha).

It should be noted that the DFO is currently undertaking a screening level environmental assessment under CEAA of the proposed de-watering of the forebay area behind the cofferdam. While the area to be de-watered does not include any critical habitat, the total area to be de-watered led to the trigger.

The cofferdam on the downstream side of the powerhouse is likely to be in place for 12 to 14 months as well and result in an area to be dewatered of approximately 1,000 m² (0.1 ha).

Refurbishments to the wing wall will be required and can be done in the dry while the powerhouse is being constructed.

The dam with flash boards on the western channel will also require refurbishment. At this point it is not known whether a cofferdam will be required to refurbish this structure or whether this can occur in the wet. The need for this cofferdam will not be certain until a DBC is retained by OPG and this selection will not occur until Q3 2007. If a cofferdam is required it likely will be installed at the beginning of construction and be in place for 3 to 4 months, channelling all the water in the river through the forebay and powerhouse, and over the wing wall weir. Once this dam is refurbished the water in the river will be directed down the western channel while the cofferdam at the forebay neck is built and subsequently the powerhouse constructed.

The temporary cofferdams will be composed of clean rock fill. Temporary cofferdam construction will require the use of heavy equipment along the shoreline and on the rockfill wall as it is built up around the site. The work will also involve dewatering to the area downstream of the cofferdam and as necessary the placement of erosion control structures.

Blasting of bedrock will be required within the dewatered zones adjacent to the proposed powerhouse with the rock fragments removed by backhoe. The DFO has developed a number of guidelines on methods and practices which are intended to prevent or avoid the destruction of fish, or any potentially harmful effects to fish habitat that could result from the use of explosives (Wright and Hopky, 1998). The use of temporary cofferdams to permit blasting within the dewatered areas and adherence to the DFO guidelines and blasting engineer recommendations will avoid the destruction of fish and/or harmful alteration, disruption or destruction (HADD) of fish habitat.

6.2.2.3 Hydrology

As indicated above, during the periods when no flow is diverted through the generating station, all flow in the Montreal River will be passed over the weirs. As a result, the hydrology of the river will not be affected downstream of the generating station during construction.

6.2.2.4 Water Quality

During the construction period, water quality of the Montreal River may be affected by soil erosion and turbidity generation, in-water construction activities, accidental spills and waste material dispersion.

As indicated in Section 6.2.1.1, a site-specific Erosion and Sediment Control Plan will be prepared and implemented during construction.

With the implementation of the site-specific Erosion and Sediment Control Plan, the potential effects of soil erosion and turbidity generation in the Montreal River will be minimized or obviated.

The potential effects of in-water construction activities, such as cofferdam construction, on water quality in the Montreal River will be minimized by using clean rock fill, the placement of rock fill over similar coarse substrate and judicious selection of the discharge location and water pressure during dewatering.

As indicated in Section 6.2.1.1, a Hazardous Materials Management Plan, Waste Management Plan and Spills Emergency Preparedness and Response Plan will be developed for the project as part of the broader Environmental Management Plan.

The implementation of these pollution prevention plans will obviate or minimize the environmental effects of accidental releases to the natural environment that have the potential to affect water quality in the Montreal River.

During weir refurbishment, there is a potential for accidental loss of cement during surface application. Any dripped cement should be recovered from the river bottom for suitable disposal prior to temporary cofferdam removal. All trash and other solid debris should also be collected for appropriate disposal.

Overall, the effects of generating station construction on Montreal River water quality are expected to be localized, temporary and negligible.

6.2.2.5 Sediments

As indicated in Section 5.2.2.5, bottom substrate in the Montreal River in the vicinity of the Hound Chute GS consists predominantly of coarse material, e.g., sand, gravel, cobble, boulder and/or bedrock. After construction, substrate type and quality will be similar to that currently in place. The potential use of fragmented rock generated by blasting activities for fish habitat enhancement and/or use for nearshore/shoreline erosion protection will be discussed with DFO.

Otherwise, the excess rock will be removed from the dewatered areas behind the temporary cofferdams for suitable upland disposal.

As the new facility will continue to operate under the existing Water Management Plan Operating Regime (OPG *et al.*, 2004), no alternation of sediment type or quality is anticipated.

6.2.2.6 Aquatic Vegetation

As indicated in Section 5.2.2.6, no aquatic vegetation was observed by Coker and Portt (2006a) near the Hound Chute GS.

6.2.2.7 Plankton

Plankton populations will not be affected by construction or operation of the hydroelectric facility. Any plankton confined behind the cofferdams will be returned to the river during dewatering.

6.2.2.8 Benthic Macroinvertebrates

The placement of rock fill may have a localized adverse effect on benthic macroinvertebrate communities on the surface and within the substrate. The extent of disruption depends on the type of bottom substrate, the extent of the disturbed area, any resultant turbidity and sedimentation, and the timing of construction. As indicated in Section 2.2, the substrate in the areas to be excavated consists primarily of boulder, cobble, gravel and/or sand over bedrock, or bedrock. The placement of rock fill over this type of similar substrate will minimize any detrimental effect on the benthic macroinvertebrate communities.

With the use of the larger-size rockfill, sufficient interstitial spaces will be available for the survival and migration of mobile benthic fauna. Recovery after cofferdam removal is expected to be rapid. For example, recovery rates from dredging activities range from six days (McCabe *et al.*, 1998), 14 days (Rosenberg and Snow, 1977), three weeks (Diaz, 1994), 38 days (Griffith and Andrews, 1981) and up to one year (Griffiths and Walton, 1978).

Blasting of the redevelopment nearshore areas will result in localized destruction of the benthic communities. Benthic mortality will be a function of distance from and intensity of the blast (Schwartz, 1961). However, recovery from blasting is expected to be rapid.

6.2.2.9 Fish Populations

Temporary cofferdam installation could disrupt fish spawning activities and impact on the early life stages of fish, e.g., eggs and fry. However, installation and removal of the temporary cofferdams will occur outside of the timing restriction for in-water construction to protect the fish spawning and egg incubation period for warmwater and coolwater fisheries of 01 April to 30 June.

The area within the temporary cofferdams will be dewatered to facilitate intake reconstruction, tailrace excavation and dam refurbishment. An impervious geotextile will be placed on the

cofferdam face to preclude water ingress. Fish within the area to be dewatered will be collected by electrofishing during drawdown and released to the river. The temporary unavailability of this habitat during the excavation period will have negligible effect on the local fish populations.

Blasting of bedrock will be required in the nearshore areas to be excavated. No blasting will be conducted in the water. Numerous studies have been undertaken to assess fish mortality due to in-water blasting (e.g., Chamberlain, 1976, 1979; Teleki and Chamberlain, 1978). The degree of blasting impact on fish will depend on the type of explosive, type of substrate blasted, blasting technique, fish physiology and timing. Injury to fish from in-water blasting will result from physical abrasion from ejected debris and from pressure changes associated with the blast shock waves.

Common blast-induced injuries to fish include haemorrhage in the coelomic or pericardial cavity and rupture of the swim bladder. Differences in species-specific susceptibility to blast injuries are a function of the fish's shape and swim bladder formation (Teleki and Chamberlain, 1978). Physoclistic (with swim bladder isolated from oesophagus) and laterally compressed fish such as the centrarchids, e.g., smallmouth bass, are the most sensitive to pressure changes. Mortality within this group varies with orientation of the laterally-compressed body to the pressure front at the time of a blast. Physostomic (with swim bladder connected to the oesophagus by an open duct, which provides pressure release) fish with fusiform shape, such as the white sucker, are most resistant to pressure changes.

To obviate injury to fish, blasting will be undertaken in the "dry", i.e., after dewatering and removal of fish. The shockwaves (peak particle velocities) produced from blasting using the sophisticated techniques and control measures employed in modern blasting practice will be attenuated rapidly within the bedrock. With the width of the cofferdam and its sufficient distance from the limit of blasting, no injury to fish from pressure changes associated with the blast shockwaves is expected. Moreover, blasting mats will be used to minimize the occurrence of fly-rock.

During powerhouse construction when no flow is being diverted through the GS, all flow in the Montreal River will be passing over the crest weir and through the spill channel. During the refurbishment of the crest weir all flow in the Montreal River will be passing through the intake channel, and then either through the GS and/or over the wing-wall.

Diverting all flow temporarily through the spill channel will not likely result in increased erosion (Coker and Portt, 2006b). The average annual flow at Hound Chute is 86.3 m³/s, with 5-y and 20-y return flows of 406 m³/s and 522 m³/s, respectively (OPG *et al.*, 2004). Despite these periodically high flow rates, there was no evidence of past erosion, which may be due, in part, to the bedrock/boulder shores of the spill channel that are densely covered with woody vegetation. Since water management within the Montreal River will not change between pre- and post-construction, flows upstream and downstream of the spill channel will not be affected. Walleye spawning observations in 2006 did not identify the spill channel as a significant spawning area for walleye or suckers, and no other critical or important habitats are present that may be

impacted by this temporary change in spill channel flow regime. The temporary change in spill channel flow regime is not expected to have a negative effect upon the resident fish community within the spill channel.

Diverting all flow through the intake channel during the refurbishment of the crest weir will not likely result in increased erosion (Coker and Portt, 2006b). Work on the crest weir will be short term and can be accommodated during the period of low flow.

To minimize or obviate effects on fish populations, Coker and Portt (2006b) recommended the following mitigative measures:

- In-water construction activities should be timed to avoid the spawning and incubation period of spring spawning fishes such as walleye, suckers and smallmouth bass, which typically excludes in-water work from 01 April to 30 June;
- If all water is being diverted through the spill channel at the time of the walleye and sucker spawning period, all water should continue to be diverted through the spill channel until the end of the hatch (15 June);
- Dredged material should be disposed of on land above the high water level and suitably contained/stabilized to prevent the dredged material from re-entering the water;
- Sediment and erosion control measures should be implemented as required prior to work and maintained during the work phase to prevent entry of sediment into the water, including sediment removal from water pumped from within cofferdam enclosures;
- Blasting should adhere to the DFO guidelines (Wright and Hopky, 1998) and blasting engineer recommendations;
- All materials and equipment used for the purpose of site preparation and project completion should be operated and stored in a manner that prevents any deleterious substance (e.g., petroleum products, debris etc.) from entering the water; and
- The floor of the new tailrace and any area of the existing riverbed that is re-contoured to expose bedrock should be covered by a layer of cobble-sized material to provide better habitat.

6.2.2.10 Fish Habitat

The existing Hound Chute GS will be completely demolished and the proposed powerhouse will be built upon the footprint of the existing powerhouse. The general configuration of the proposed powerhouse will remain the same as the existing powerhouse, with water from the intake channel directly entering short penstocks contained within the powerhouse, passing through the turbines and draft tubes, and then discharging via the tailrace. The proposed powerhouse will be longer and rotated approximately 28° counter-clockwise from the existing powerhouse, which extends the proposed facility into the intake channel (Figure 6-1) and tailrace, resulting in a permanent loss of approximately 262 m² (0.026 ha) of habitat in the intake channel, and 111 m² (0.011 ha) of habitat in the tailrace. The intake and the tailrace of the proposed facility will occupy similar locations and have almost the same orientation as the

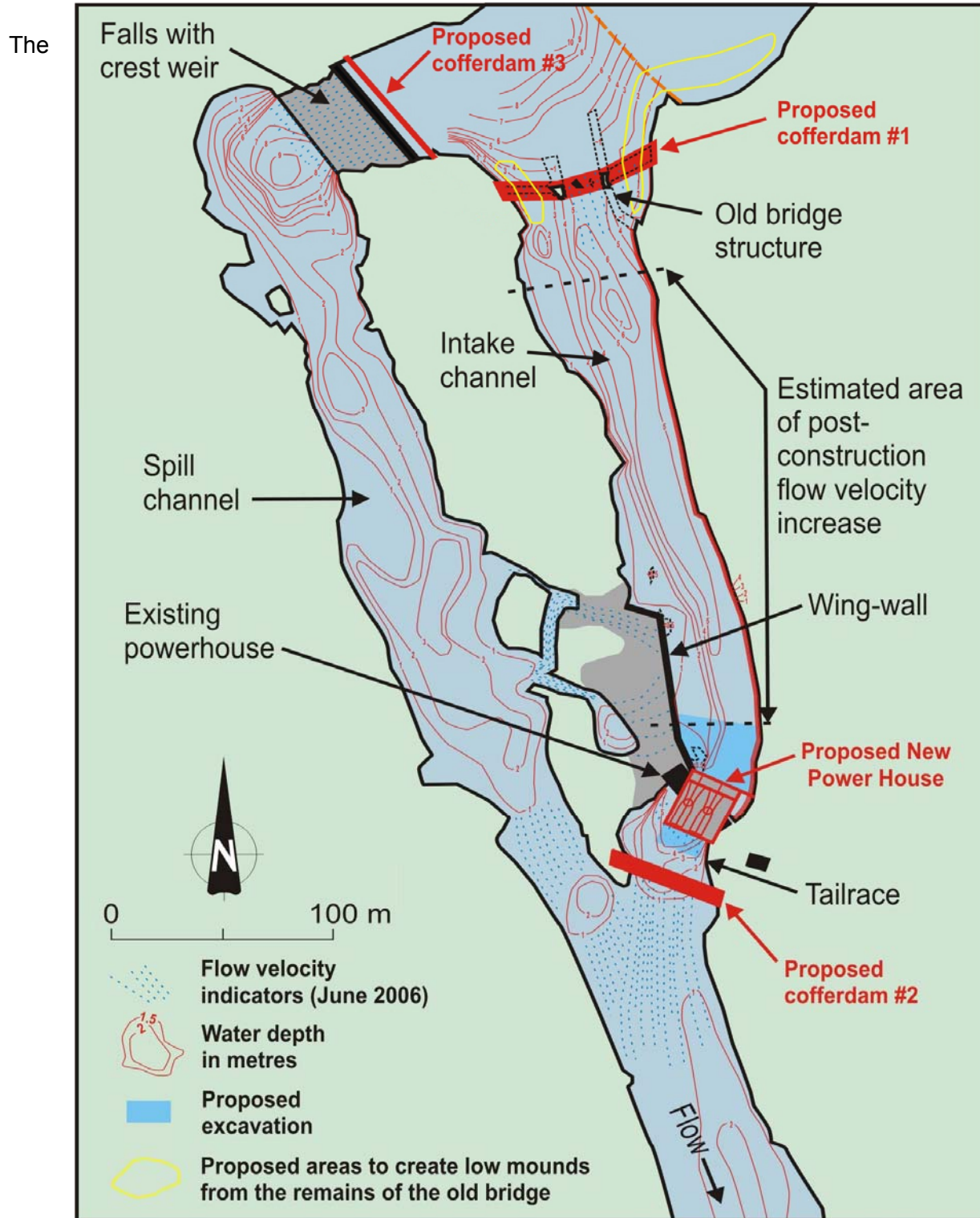
existing facility; however, they will be deepened to accommodate the larger plant flows (F. Vitez, Gestion Conseil SCP, 2006, pers. comm.). Intake and tailrace excavation will extend approximately 34 m upstream and 10 m downstream of the GS, respectively. To facilitate flow through the intake channel, the remains of the old rock-filled crib and concrete bridge that is located within the upstream end of the intake channel (Figure 6-1) will be demolished, and the material will be used to create additional habitat structure nearby.

The areas being altered or covered are not thought to be critical habitats, and likely have substrates of exposed bedrock or exposed bedrock overlain with a relatively thin layer of coarse granular material (Coker and Portt, 2006b). After construction, the excavated areas will be mitigated with the addition of coarse granular material, which will restore these areas to their current condition, only deeper. The old rock-filled crib and concrete bridge structure provides some habitat structure in its present form, and may enhance local habitats in its post-construction form as low rubble and log piles on the river bottom near the upstream end of the intake channel and in the shallow area to the east of the intake channel (Figure 6-1).

Temporary impacts to fish habitat will occur due to the placement of cofferdams and the dewatering of habitat within those cofferdams. A cofferdam (#1) is required at the upstream end of the intake channel to dewater approximately 13,900 m² (1.39 ha) of the Montreal River between the GS and cofferdam (Figure 6-1). Cofferdam #1 will be a rock structure built upon the remains of an old bridge that is composed of rock-filled wooden cribs and concrete (Figure 6-1). This old bridge will be demolished and its material redistributed as low piles upon the bottom when the cofferdam is removed. This is the cofferdam that DFO is currently undertaking an environmental assessment on.

A cofferdam (#2) is also required at the tailrace to dewater approximately 1,000 m² (0.1 ha) of river, which is presently the existing tailrace (Figure 6-1), to allow construction of the new tailrace configuration. Cofferdam #2 will be a rock structure positioned at a shallow location downstream of the tailrace, and is expected to be in place for 12 to 14 months (Figure 6-1). A cofferdam (#3) may be required at the upstream side of the existing spillway crest weir to allow the refurbishment of the dam. At this time it is not known if Cofferdam #3 will be required, but if it is it will likely be made of wood and attached to the top of an existing submerged cofferdam, located immediately upstream of the crest weir (F. Vitez, Gestion Conseil SCP, 2006, pers. comm.). Cofferdam #3 is expected to be in place for 3 to 4 months.

Figure 6-1: Proposed Cofferdams - Water Depths and Other Details Considered in the Fisheries Impact Assessment. (Note that the blue velocity indicators show areas where the water surface is broken, and denote faster water when close together, and slower water when more widely spaced.)



areas that will be temporarily dewatered do not constitute critical or important habitat (Coker and Portt, 2006b). Some have historically been impacted by the construction and operation of the existing Hound Chute GS. Although the area between cofferdam #1 and the GS is relatively large (1.4 ha), it does not contain any critical habitats and represents only 0.46% of the area between Hound Chute and the upstream Latchford Dam, or 12.5% of the aquatic habitat area within 1 km upstream of the existing GS. This area was also sparsely inhabited by fish, as indicated by the underwater video observations conducted on 28 June 2006. These areas are not thought to be critical for any life stages of any of the species present, and the fact that they will be temporarily unavailable is not expected to have any significant or measurable impact on the overall fish production of the system, or even within a kilometre of the Hound Chute GS.

In summary, no critical fish habitat, such as walleye, sucker or smallmouth bass spawning habitat, will be directly altered. The areas that will be directly altered are mostly manmade habitats, i.e., the intake structure and the adjacent substrate for approximately 34 m upstream; the tailrace and the adjacent substrate for approximately 10 m downstream; and the submerged remains of the old bridge structure. These locations will continue to provide similar habitats post-construction.

The locations of the cofferdams and the dewatered areas will be temporarily unavailable as fish habitat, and will be completely reinstated post-construction. Although they do contain fish, the fact that they will be temporarily unavailable is not expected to have a significant impact on the productive capacity of the system.

6.2.2.11 Aquatic Avifauna

A number of aquatic avian species likely use the Montreal River from the Latchford Dam to downstream of the Hound Chute GS as breeding, staging, stopover and/or feeding habitat.

CLI (1970) mapping for waterfowl production indicates that the Montreal River between Gillies Depot, located approximately 7 km upstream of the Hound Chute GS and Lake Timiskaming, is categorized as Class 6 with severe limitations due to adverse topography and fast water flow.

Although two aquatic avian species at risk have been recorded in the Temiskaming area, i.e., least bittern and black tern, there are no records of these species within a 5-km radius of the Hound Chute GS.

The construction disturbance will be sufficiently local that little displacement of aquatic avifauna will occur. Any resident birds can relocate temporarily to avoid human activity associated with construction activities. Most bird species habituate rapidly to noise and vehicular traffic.

Noise from blasting could have an initial effect on avian startle flight; however, it is anticipated that over time birds will become habituated to the impulse noise. During the St. Lawrence River crossing by a natural gas pipeline, blasting had no effect on waterfowl in the area (Silver and

Fitchko, 1992). Noise effects due to other construction activities can be acceptably mitigated by conventional construction practices and are predicted to be localized, minor and transient.

6.2.2.12 Montreal River Operational Impacts

As indicated in Section 1.0, the generating station has operated as a run-of-the-river plant and will continue to do so. The new Proposed Undertaking with the automatically controlled inflatable weir as well as significantly increased discharge capacity, will enable a reduction of water level fluctuations and provide improved control of water levels and flows. The Proposed Undertaking will continue to operate under the Montreal River System Water Management Plan operating regime.

6.2.2.13 Water Quality

As indicated in Section 6.2.1.1, a Hazardous Materials Management Plan, Waste Management Plan and Spills Emergency Preparedness and Response Plan will be developed for the redevelopment project as part of the broader Environmental Management Plan. The implementation of these pollution prevention plans will obviate or minimize the environmental effects of accidental releases to the natural environment that have the potential to affect water quality in the Montreal River.

6.2.2.14 Sediments

As the new facility will continue to operate under the existing Water Management Plan operating regime (OPG *et al.*, 2004), no alternation of sediment type or quality is anticipated.

6.2.2.15 Aquatic Vegetation

As indicated in Section 2.2.3, no aquatic vegetation was observed by Coker and Portt (2006a) near the Hound Chute GS.

6.2.2.16 Plankton

Plankton populations will not be affected by the operation of the hydroelectric facility.

6.2.2.17 Benthic Macroinvertebrates

As the redeveloped Hound Chute GS will continue to operate under the existing Water Management Plan operating regime (OPG *et al.*, 2004), no effect on benthic macroinvertebrate communities is anticipated.

6.2.2.18 Fish Populations

The Hound Chute GS will remain a run-of-the-river hydroelectric plant, and therefore redevelopment will not change the flow regime of the Montreal River or the management of water levels in the upstream reservoir between Hound Chute and Latchford Dam. However, the proposed GS will have a greater flow capacity and therefore will alter the distribution of flow volume between the GS and the 400-m long spill channel (Figure 6-1). Presently, water is spilled through the spill channel or over the wing-wall when flows exceed the 57 m³/s capacity of the GS, which occurs approximately 40% of the time (OPG *et al.* 2004). The redeveloped Hound Chute GS will have a rated flow of 104 m³/s which will decrease the frequency of water spilled through the spill channel or over the wing-wall to approximately 20% of the time. When the GS is capable of taking all river flow, a very small amount of leakage occurs through the crest weir and the wing-wall, but essentially the spill channel becomes a quiet backwater. This is not expected to change as a result of redevelopment (Coker and Portt, 2006b).

Downstream of where the tailrace joins with the spill channel, flow velocity and volume will not differ between pre- and post-redevelopment. However, the adjusted location and discharge direction will result in some minor changes in flow velocity pattern in the immediate vicinity of the tailrace. Flow velocity entering the GS intake and exiting the tailrace will not differ significantly between pre- and post-development. However, the flow velocity in the intake channel, upstream of the proposed excavated area (Figure 6-1), will almost double from a maximum of approximately 0.9 m/s to a maximum of approximately 1.6 m/s between pre- and post- construction when the GS is operating at capacity and there is no flow over the wing-wall (F. Vitez, Gestion Conseil SCP, 2006, pers. comm.). The maximum flow velocity in the vicinity of the old bridge structure will not change significantly between pre- and post-construction, since the old bridge structure is presently restricting the channel cross-section to approximately half its potential. Post-construction flow velocity will remain similar to pre-construction velocity when the structure is demolished and the flow volume of the GS is doubled. The estimated area where post-construction flow velocity will be greater than pre-construction flow velocity is shown in Figure 6-1 (Coker and Portt, 2006b).

The existing flow regime within the spill channel due to leakage at the crest weir and the wing-wall is ≤ 1 m³/s for approximately 60% of the time. Post-development flows of ≤ 1 m³/s within the spill channel will occur approximately 80% of the time, with most flows in excess of this occurring between April and June (OPG *et al.*, 2004). This will likely have a negligible effect upon the productivity within the spill channel; however, it is possible that this may have a slightly positive effect. The flow velocity in the spill channel appeared high for walleye spawning during the spring of 2006, and so a reduction in post-construction flows may improve the conditions for walleye spawning. Post-construction, the quiet backwater that the spill channel becomes during low flow will not be disturbed as often by periodic spill events. This change is not expected to affect fish productive capacity (Coker and Portt, 2006b).

The post-construction doubling of flow velocities within a portion of the intake channel (Figure 6-1) will likely have some effect upon the fish community composition within the affected

area. However, given that the area affected is small and the existing habitat in that area is not critical and based on the underwater video not heavily utilized, increased flow velocities will not have a significant or measurable impact on fish productivity (Coker and Portt, 2006b).

Based on the impact assessment and provided that the recommended mitigation measures are implemented, Coker and Portt (2006b) concluded that the redevelopment of the Hound Chute site and the subsequent operation of the new and enlarged GS will not have a significant or measurable impact upon the composition or production of the Montreal River fish community.

6.2.2.19 Aquatic Avifauna

During operation, noise will be generated from the proposed generating station. This steady noise from the proposed GS will be similar to that of the existing facility and not elicit an adverse reaction from nearby habituated aquatic wildlife.

6.2.2.20 Water Uses

During operation of the proposed generating facility, there will be no impact on recreational activities on the Montreal River. Upon completion of the redevelopment, Ontario Power Generation will make reasonable effort, within local control, to maintain a consistent operating level year around at Hound Chute within the existing Water Management Plan's compliance zone. This level will be as high as practically possible within the limits of the operating regime, in the summer band (273.87m to 274.10m), and will minimize the extreme low and high peaks in the spring. Therefore, there will be no negative impact on recreational boating or canoeing in fact it is anticipated that local residents will see a positive impact as the levels will be maintained relatively constant.

6.2.2.21 Summary and Conclusions

During the construction phase, potential impacts on the aquatic environment may occur due to in-water construction activities, blasting, soil erosion and turbidity generation, and accidental spills. Based on an assessment of the available baseline information and potential effects, as well as the implementation of the recommended mitigative measures, SENES concludes that effects during construction will be minimal, localized and short-term.

During the operation phase, potential impacts on the aquatic environment may occur due to accidental spills. Based on assessment of the baseline information and potential effects, SENES concludes that the operation of the GS will have negligible effects on the aquatic environment.

Environmental protection during proposed generating stations construction and operation will be ensured by adherence to the site-specific Environmental Management Plan, as well as compliance with regulatory standards and guidelines.

The Environmental Management Plan ensures that environmental protection will be achieved by describing government agency requirements, OPG policy, project commitments and recommended mitigative measures to be undertaken. The Environmental Management Plan will include the Erosion and Sediment Control Plan, Spills Emergency Preparedness and Response Plan, Hazardous Materials Management Plan and Waste Management Plan.

Table 6-2 summarizes potential construction and operation effects, the recommended mitigative/remedial measures to minimize or obviate these impacts and the net effects.

Table 6-2: Summary of Potential Effects and Recommended Mitigative/ Remedial Measures

Effect/Activity	Recommended Mitigative/Remedial Measure	Net Effect
Construction		
Soil erosion	<ul style="list-style-type: none"> • Adherence to Erosion and Sediment Control Plan. 	Negligible effect
Incidental spills of oil, gasoline and other liquids during construction	<ul style="list-style-type: none"> • Adherence to Spills Emergency Preparedness and Response Plan. 	Negligible effect
Hazardous Materials/ Waste	<ul style="list-style-type: none"> • Adherence to Hazardous Materials Management Plan and Waste Management Plan. • Waste disposal in accordance with regulatory requirements. 	Negligible effect
Blasting	<ul style="list-style-type: none"> • Adherence to DFO guidelines (Wright and Hopky, 1998) and blasting engineer recommendations. 	Negligible effect
In-water construction activities	<ul style="list-style-type: none"> • Use of clean rock fill for cofferdam. • Placement of rock fill over similar coarse substrate. • Judicious selection of discharge location and water pressure during dewatering. • Adherence to in-water construction timing restriction. • Confined upland disposal of dredged material. • Provision of cobble-sized material on the floor of the new tailrace area of the proposed Hound Chute GS. 	Negligible effect
Operation		
Incidental spills of oil, gasoline and other liquids during operation	<ul style="list-style-type: none"> • Adherence to Spills Emergency Preparedness and Response Plan. 	Negligible effect

6.3 AIR/NOISE EFFECTS

A full analysis of the air and noise effects of the proposed development and recommended mitigation measures are identified in the Air and Noise Technical Support Document for the Hound Chute Project.

6.3.1 Noise

The Proposed Undertaking is a potential source of local noise during the demolition and construction phase. All work is expected to be completed using conventional construction methods. The noise associated with this phase of the proposed project would most likely be a result of activities such as demolition, site grading, site preparation, pile driving and foundation work. All of these activities, which are expected to take approximately 18 months, will require the use of various pieces of heavy equipment including bulldozers, front-end loaders, small trucks, backhoes, bobcats, dump trucks, compactors, ready-mix concrete trucks and cranes. Other construction activities, such as those related to the placement of the facility components (e.g., generator) and activities inside the building (once built) are expected to generate less noise. The movement of worker vehicles will also result in minor increase in the background sound levels during the 24 months construction period. The Proposed Undertaking will be constructed using standard construction best management practices and therefore, no unusual construction noise effects are anticipated.

The addition of noise to an environment can be an impact to people, in particular more sensitive receptors that may live in close proximity to the origins of noise. Noise assessments are typically done in areas where people live, work and/or play. However, the Hound Chute GS is located in a remote wilderness area and as there are no noise receptors located within 5 kilometres of the Hound Chute GS and therefore no noise assessment was undertaken. Public use near the Hound Chute GS is light and restricted to the occasional canoeist, hunter or angler either along the river or travelling along Silverfields Road. Noise exposure will be confined to the limited times that these individuals travel near the site and noise may not even be audible depending on the construction stage or time of day.

During the operation stage of the project the noise conditions will return to the existing situation. Typically, the noise effects of hydroelectric generating stations are barely audible as the equipment is housed in the powerhouse and the sound of water spilling over the wing wall and dam masks any sound that may emanate from the generating station.

6.3.2 Air

The demolition of the existing powerhouse and the construction of the new powerhouse have the potential to affect the air quality in the vicinity of the Hound Chute GS. As indicated in the Section 6.3.1, there are no permanent receptors near the Hound Chute GS and only occasional recreational users. However, emissions to the air should be reduced and mitigated in order to reduce potential effects on workers and the occasional other user in the area. Emissions which are associated with construction activities are primarily dust and typical combustion emissions

from construction equipment such as carbon monoxide, nitrogen oxides and sulphur dioxide. As with any construction site, these emissions will be of relatively short duration and unlikely to have any adverse effect on the surrounding areas.

A variety of best practices with respect to the control of air emissions have been identified and should be implemented on the construction site (e.g., Cheminfo, 2005). The best practices should include: plans to minimize dust generation through planning, site layout and the proper use of materials, tools and equipment; use of wind fencing; compacting disturbed soil; activity scheduling; storage piles management; minimization of drop heights; barriers to prevent dispersion of materials; avoidance of blasting where feasible; work practices for loading debris; avoidance of prolonged storage of debris; and proper techniques for the use of materials that include VOCs.

These mitigation measures are fully documented in the Air and Noise Technical Support Document for the Hound Chute Project. Overall, the impacts of the proposed project on the air environment at the Hound Chute GS are likely to be minor and temporary and occurring only during the course of the demolition and construction phase of the project.

During the operation stage of the project, air quality will return to the existing situation. There are no air emissions associated with the hydroelectric generating station except for the very use of backup generators to re-start equipment.

6.4 SOCIO-ECONOMIC ENVIRONMENT EFFECTS

6.4.1 Demographics, Community and Economics

The Proposed Undertaking will have a positive economic impact on the Province, Northeastern Ontario and Timiskaming District. The economic impact of the Proposed Undertaking was assessed using the Lake Abitibi Model Forest Community Constellation Impact Model.⁴ An economic impact is the economic activity generated from some initial expenditure by an individual, a business, or government. In this case, the expenditure will be the implementation or capital cost to OPG resulting from the Proposed Undertaking.

High and low estimates of the total project expenditures were identified. These expenditures were further broken down according to three geographies – Northeastern Ontario, Ontario and National/International. This was done in order to ensure that economic impacts within the north and throughout the Province would not be overstated.

⁴ This model is an economic input/output (I/O) model developed by Econometric Research Limited for the Lake Abitibi Model Forest and several Northeastern Ontario communities. I/O models are typically developed and used at the provincial and national levels; however this model has been adapted for more regional and local interpretation. SENES and OPG prepared a series of input tables for the model and the City of Timmins Economic Development Corporation, which has a license for use of the model, performed the actual model runs. This I/O model can be run by just selecting Northeastern Ontario as the desired geography. Therefore economic impacts are presented just for Northeastern Ontario (which includes the Timiskaming District) and not at the community level.

For the proposed Hound Chute redevelopment, it is estimated that expenditure in the range of \$12M to \$17M will be made in the Northeastern Ontario economy. This initial expenditure will primarily occur in the non-residential construction sector but also in other business services. The expenditure is estimated to have the following economic impacts within Northeastern Ontario.

- Total sale volume of \$19M - \$25M (which includes the initial expenditure);
- Total income of \$10M - \$14M;
- Total wages and salaries of \$8M to \$10M;
- Wages and salaries will account for 73.3% of the gross provincial income associated with the project;
- For every dollar of expenditure associated with the project a total of \$1.50 in sales will occur in Northeastern Ontario (sales multiplier of 1.50);
- 136 (83 direct) – 181 (110 direct) years of permanent full-time job equivalents;
- 11 person years per one million dollars of expenditure; and,
- For every one job associated with the initial expenditure 0.65 jobs are supported in the economy at large.

Beyond the impact within Northeastern Ontario this project is anticipated to result in an expenditure of \$10M to \$13M⁵ in other parts of Ontario. The expenditure will result in the following economic impacts within Ontario: total sales of \$23M to \$31M; total wages and salaries of \$8M to \$11M; sales multiplier of 2.42; and, 160 (66 direct) to 211 (86 direct) PYs of employment.

The higher sales multiplier and higher ratio of indirect and induced employment to direct employment in Ontario versus Northeastern Ontario is a result of the larger economy.

As a result of the project's expenditure, the following tax benefits are predicted to occur: \$9M to \$11M in taxes will accrue to all levels of government with roughly 50% of the tax revenue accruing to the federal government, 39% to the provincial government and 11% to local government.

In summary the project will have significant positive impacts on the economy of Northeastern Ontario and positive impacts on the economy of Ontario during the construction phase. In particular the project will have positive economic and resultant social benefits in the District of Timiskaming which has experienced difficult economic times.

OPG estimates that even though the redeveloped generating station will increase the power production, the overall operational employment and expenditures associated with the existing Hound Chute facility will be maintained at present day levels. As such there is no expected economic and social change in the community as a result of the project over the long-term. The

⁵ The provincial expenditure is an additional expenditure anticipated on top of the Northeastern Ontario expenditure.

redevelopment does provide more certainty around the maintenance of those jobs in the community and region.

6.4.2 Land-Use Planning

As the Hound Chute GS currently exists there will be no effect on land use and development in the area.

It is estimated that the daily traffic associated with the construction phase of the project will be 15 to 20 vehicles, some of which will be large construction vehicles and some of which will be personal vehicles of the contractors. OPG does not propose to alter any of the access roads adjacent to the site. The DBC will use existing parking lots and access roads. All roads will have a half load restriction mid-April to 1st of June.

6.4.3 Resource Use

Other social and economic uses in the area around Hound Chute GS are very limited and are largely outdoor recreation based. The project during either the construction or operation phases will not impact local recreational, social and economic uses.

Access along Silverfields Road will continue throughout the construction period and therefore, not impact other users.

Portions of the existing portage would be blocked during construction; however, OPG has identified an alternative route around construction activities and staging areas.

Because of the area's importance as a fishing, wilderness and recreation area it is important that workers associated with the project not degrade the experience of these other users. Therefore, it is recommended that contractors and employees of the DBC be restricted from fishing at the site during the duration of the construction period. As well, overnight trailers and stays by workers will not be permitted.

6.4.4 Marsh Bay

During the development of the Montreal River System Water Management Plan a group of property owners located in the Marsh Bay area of Coleman Township upstream of the Hound Chute GS raised a variety of socio-economic and environmental concerns to the Ministry of Natural Resources and to OPG. These individuals own properties along the river. Specifically, the concerns of the residents included:

- Historic fluctuating water levels on their properties ;
- Maximum impact of water levels during a flood event;
- Property rights; and,
- Risks to the natural environment from fluctuating water levels.

OPG initiated a number of studies in order to better understand the extent of the fluctuating water levels and impacts on individual properties. These additional studies included improved

bathymetric data for the riverbed; topographic surveying of the properties and buildings of owners to 0.5 meter contours; and, modelling of the abrupt water level fluctuations during the operation of the flashboards.

Presently, manually operated flashboards are used to assist in the control of the water levels during spring run off. In the event that there is fluctuation in water levels, OPG dispatches personnel to manually install or remove the flashboards.

In order to address the concerns of the property owners OPG is proposing to replace the existing flashboards with an inflatable Obermeyer weir as part of the redevelopment of the existing Hound Chute GS. The inflatable weir, which would be automatically controlled, would allow OPG to more tightly control the water levels upstream of Hound Chute and thereby reduce the fluctuating water levels throughout the year, but in particular in the spring. On a reasonable effort basis, OPG will operate Hound Chute in order to maintain the water level towards the upper end of the Montreal River System Water Management Plan's summer operating regime (at Hound Chute), year round. The redevelopment will also include plans for OPG to increase the discharge capacity of the GS by approximately 150 m³/s (100 m³/s from the weir and 50 m³/s from the additional station capacity) and thereby have additional capacity to reduce the potential for flooding of properties upstream of the Hound Chute Generating Station.

The Obermeyer weir will:

- Eliminate the need to drop the water level in order to remove and install flashboards.
- Provide for automatic water level operation within discharge capacity of generating station and weir.
- Result in a major reduction in water level fluctuation compared to that experienced in the past.
- Lower the likelihood of exposing spring spawning and/or nursery areas (pike and walleye).
- Lower the likelihood of exposing early summer spawning areas (smallmouth bass).
- Provide more consistent water levels throughout the year.

Overall, the property owners at Marsh Bay will experience more consistent water levels than what they have previously experienced. While the station predates many of the residents, and their concerns are therefore historic in nature, the Proposed Undertaking at Hound Chute represents a unique opportunity to address these concerns and minimize the fluctuating water levels at Marsh Bay.

6.5 BUILT HERITAGE AND ARCHAEOLOGICAL RESOURCES EFFECTS

6.5.1 Built Heritage

The new Hound Chute powerhouse will be located on the same footprint as the existing powerhouse. As such, the Proposed Undertaking will decommission the 1910 powerhouse and equipment and the associated electricity connections will be decommissioned. There will also

be refurbishments and modifications made to the civil works, such as the dam. The generating station will connect to the local distribution system via an existing 44 kilovolt feeder. The proposed replacement of the Hound Chute Generating Station may result in modifications to the dam that may affect the former log chute. The overall design and layout of the Proposed Undertaking will remain unchanged from the existing state.

Along with maintaining Hound Chute as a hydroelectric generating station and maintaining the same site layout three other mitigation measures are recommended. First a full documentation of Hound Chute is to be prepared including a visual record. Second, some equipment is to be offered to the local museum. Third, consideration will be given to incorporating typical architectural elements of the existing powerhouse, such as, rectangular floor plan, flat roof, masonry/concrete structure and window openings with operable sash into the design of the new powerhouse. As part of this approach, elements of the cultural heritage landscape such as the access road and transmission line would be retained in the same location. The full cultural heritage assessment appears as a separate Technical Support Document.

6.5.2 Archaeological Resources

Archaeological sites are a non-renewable resource requiring proper planning, development, management and protection. Based on the archaeological fieldwork completed, only one archaeological feature of interest was recorded, i.e., a short section of an original portage trail located on the downstream side of the powerhouse.

The archaeological and cultural heritage impact assessment report recommended that the Ministry of Culture give approval to the project to proceed subject to two conditions: “The original section of the pre-1900 portage trail be fenced off and marked on project plans as a no work/no go zone”; and “should a change in construction plans result in the disturbance of previously undisturbed areas or if foundations or significant artefacts are uncovered, Stage 2 construction monitoring by a licenced archaeologist will be immediately undertaken” (Woodland Heritage, 2006).

The full report assessing archaeological resources appear as separate Technical support Documents titled: “Archaeological and Cultural Heritage Impact Assessment of the Hound Chute Generating Station Located on the Lower Montreal River” to this Environmental Report.

6.6 EFFECTS ON FIRST NATIONS

Based on research, consultation and that this is an existing generation station currently in operation, there are no identified impacts to any traditional First Nation use activities or values. Research conducted by Woodland Heritage Services Inc. identified that there were no published First Nations sites of interest at the Hound Chute GS. No other First Nation values have been identified through consultations on the Montreal River System Water Management Plan.

7.0 PUBLIC, FIRST NATIONS AND GOVERNMENT CONSULTATION

7.1 CONSULTATION WITH PUBLIC

7.1.1 Objectives and Approach

The objective of the public consultation program for the Hound Chute Undertaking was “to provide the public with an opportunity to have meaningful input on the project and address public concerns where possible and feasible.” The key components of the public consultation program included: two open houses/public meetings; two project newsletters; a project website; ongoing public inquiries; and an, an issue tracking system. All of these components have been implemented as planned. A Hound Chute Public and Agency Consultation Technical Support Document has been prepared on the project and provide in more detail a summary of the overall public consultation program.

7.1.2 Summary of Activities

A database of stakeholders who were to be notified about the project and the key consultation opportunities was developed based on OPG, consultation and agency knowledge, a review of property owners within 200 meters of the river (between the Latchford Dam and Hound Chute) and public submissions made throughout the course of the project. A total of 103 stakeholders were on the list at the time of the mailing for the second open house.

The first public open house with respect to the Proposed Undertaking was held on Thursday April 20th from 3:00 pm to 8:00 pm at the Latchford Community Centre. The agenda included an open house followed by a formal presentation and questions and answers period. A total of 43 individuals attended the Open House, of which most attended the presentation. While there were a small number of individuals who had more general interests or represented agencies, the vast majority of individuals attending the Open House were residents in the Marsh Bay area.

The second public open house with respect to the Proposed Undertaking was held on Tuesday October 17th from 3:00 pm to 8:00 pm at the Coleman Township office. The agenda included an open house followed by a formal presentation and questions and answers period. A total of 17 individuals attended the Open House. Of these, approximately ten attended the presentation. The attendees included individuals from Marsh Bay, local municipal representatives from Coleman Township and Town of Latchford and individuals in the region interested in economic opportunities associated with the project and some representatives of local organizations.

A web site about the project was set up and can be found at www.houndchute-ea.com. The website provided a project description, some FAQs, a description of the EA process, notifications about public meetings and contact information. This website was active by early April 2006. Phone numbers and e-mail addresses to the OPG Project Manager and the SENES

environmental co-ordinator have been available throughout the course of the project on the internet site, albeit these have only been very lightly used by the public.

7.1.3 Public Issues and Concerns

The public and agency consultation process for the Proposed Undertaking has been comprehensive and inclusive of all interested individuals and government representatives. Throughout the course of the project there has not been a single individual indicating any opposition to the redevelopment of the Hound Chute Generating Station.

The majority of comments made during the open houses/public meetings were about the historic and existing concerns of Marsh Bay residents and fluctuating water levels that they experience at the properties upstream of the Hound Chute S. While the concerns of these individuals have focused on the existing conditions, OPG embarked on a significant amount of work to better understand the problem and address the existing concerns.⁶

In order to address the concerns of the property owners OPG is proposing to replace the existing flashboards with an inflatable Obermeyer Weir. The inflatable weir, which would be automatically controlled, would allow OPG to more tightly control the water levels upstream of Hound Chute GS and thereby reduce the fluctuating water levels throughout the year, particularly in the spring. On a reasonable effort basis, OPG will operate Hound Chute in order to maintain the water level towards the upper end of the Montreal River System Water Management Plan's summer band (at Hound Chute), year round. OPG will also increase the discharge capacity of the generating station by approximately 150 cubic meters per second (100 from the weir and 50 from the additional station capacity) and thereby have additional capacity to reduce the potential for flooding of properties upstream of Marsh Bay.

Overall, the property owners at Marsh Bay will experience more consistent water levels than what they have previously experienced. The concerns of the Marsh Bay residents are historic concerns associated with the location of these properties and the operations at Hound Chute. The effects that are of a concern are therefore historic and the Proposed Undertaking represents a unique opportunity to address these concerns and improve the existing situation.

Other than the concerns of fluctuating water levels at Marsh Bay there were only a limited number of other issues raised. There was some general interest on the impact on the fisheries as well as the economic benefits associated with the project. The full list of issues raised by the public and responses by OPG are contained in Section 7 of the Public and Agency Consultation TSD.

⁶ The concerns of Marsh Bay residents and the proposed solution by OPG are described in more detail in Section 6.5.4.

7.2 CONSULTATION WITH FIRST NATIONS

7.2.1 Objectives and Approach

A First Nations Consultation Plan was prepared for the purposes of the EA with the overall objective “to provide First Nations (FN) with an opportunity to have meaningful input on the project and address pertinent First Nations concerns wherever feasible through a process that is fair and reasonable with respect to the Hound Chute Project.” The First Nations Consultation Plan identified the First Nations to be contacted and key contact persons along with possible communication vehicles.

The approach for the First Nations consultation was based on an understanding of Supreme Court of Canada Decisions with respect to the Crown’s obligation to meaningfully consult and accommodate. As well, knowledge by the consulting team on current First Nations consultation practices employed in Northern Ontario with respect to resource management and development was used. Finally, it was recognized that a number of First Nations participated in the Montreal River System Water Management Planning exercise.

The Supreme Court of Canada has identified in decisions such as the Haida case that while the Crown may delegate the procedural aspects of consultation to industry proponents of projects, the ultimate legal responsibility for consultation and accommodation remains with the Crown. While OPG is the proponent of the Project, the Ministry of Natural Resources was provided a copy of the First Nations Consultation Plan, asked for input on the consultation strategy, participated in First Nations consultation and was copied on all correspondence to First Nations. Therefore, OPG implemented its consultation with First Nations with the knowledge and support from the Crown. Furthermore, it is OPG’s understanding that MNR is adopting the procedural aspects of consultation that OPG implemented.

While MOE is the lead agency in the EA review, MOE deferred to MNR on consultation with First Nations. For this reason, OPG has ensured that MNR was aware of its First Nations Consultation Plan, and included MNR in all meetings where First Nations responded. OPG has had considerable discussions and interactions with the District and Regional MNR staff with respect to OPG’s First Nations consultation initiatives.

In assessing the scope of the consultation for the Proposed Undertaking two factors were taken into consideration. An assessment of the overall impact of the project on First Nations rights, values and interests and the strength of the First Nations interest. In assessing the overall impact of the redevelopment of Hound Chute it was OPG’s assessment that the impact was low. The generating station has existed for close to 100 years, the site has been disturbed by the initial construction and ongoing maintenance activities associated with its operation, the effects associated with the project are localized to the immediate site and are temporary and minor and there is to be no changes to the river levels and flows that are currently adhered to by OPG. The level of First Nations interest in the Project was expected to be low. Several generations of individuals have now become accustomed to the presence of this facility. As well, the MNR undertook extensive consultation with First Nations during the Water Management Plan process

including the examination of site specific issues. There was no indication from that process that there were any outstanding First Nations issues or concerns associated with the site. Furthermore, as part of the EA, OPG had retained a local archaeologist to carry out an archaeological and cultural heritage resource assessment at Hound Chute. The Temagami First Nation has a published set of point values on a map that the archaeologist used.

Based on OPG's and SENES' experience in the region, previous correspondence with First Nations and direction provided by the MNR, inquiries were placed with three First Nations to see if they were interested in being consulted on the project. The First Nations identified for consultation were: Matachewan First Nation; Temagami First Nation (TFN); Teme-Augama Anishnabai (TAA); and, Mattagami First Nation.

7.2.2 Summary of Activities

An offer to consult was made to all four First Nations identified in the First Nations Consultation Plan. Outlined below is a summary of consultation activities undertaken with the First Nations.

7.2.2.1 Temagami First Nation

A registered letter was sent on March 7, 2006 from the OPG Project Manager to Chief Alexander Paul of the Temagami First Nation (TFN), informing him of the project and making an offer to consult on the project. Three phone calls were placed to Chief Alexander Paul in March and April 2006 and messages were left with the receptionist, but no response was forthcoming from the TFN at that time. Prior to the second public open house a second registered letter was sent on October 4th 2006 to Chief Paul asking him again if there was an interest on the part of the TFN to be consulted, with an offer to meet. The second letter indicated that the EA field work was completed that the findings indicated that the project will have temporary minor effects on the environment that can be fully mitigated. In addition, it was indicated that Mr. John Pollock a licensed archaeologist based out of New Liskeard, undertook an archaeological assessment and determined that no archaeological resources will be affected by the project. Following that three phone calls were placed to the TFN and SENES Consultants was successful in speaking to Chief Paul. While Chief Paul did not indicate whether the TFN needed to be consulted on the project, it was agreed to re-courier him all the letters and newsletters previously sent to him. The letter indicated to him that if he had any questions, concerns or interests about the project he was asked to get back to SENES. Additional calls were made, and there has been no response to these calls.

7.2.2.2 Teme-Augama Anishnabai

A registered letter was sent on March 7, 2006 from OPG to Chief John Mackenzie of the Teme-Augama Anishnabai, informing him of the project and making an offer to consult on the project. Three phone calls were placed to Chief Mackenzie in March and April 2006 and messages were left with the receptionist, to have Chief John Mackenzie call back, but no response was forthcoming from him. Prior to the second public open house a second registered letter was sent on October 4th 2006 to Chief Mackenzie asking him again if there was an interest on the

part of the TAA to be consulted, with an offer to meet. The second letter indicated that the EA field work was completed and the findings indicate that the project will have temporary minor effects on the environment that can be fully mitigated. In addition, it was indicated that Mr. John Pollock a licensed archaeologist based out of New Liskeard undertook an archaeological assessment and determined that no archaeological resources will be affected by the project. Following that a follow-up phone call was placed to the TAA and a SENES staff person spoke to Chief Mackenzie. In that phone call Chief Mackenzie did not indicate whether he recalled the letter or if the TAA might have an interest in being consulted. He took down the SENES contact name and information and indicated that he might get back SENES.

7.2.2.3 Matachewan First Nation⁷

A registered letter was sent on March 7, 2006 from OPG to Chief Fabian Batise of the Matachewan First Nation, informing him of the project and making an offer to consult on the project (the letter also included a newsletter and notice providing more details about the project). A total of four phone calls were placed in March and April to determine if Matachewan had an interest. In the second call to Matachewan SENES was successful in speaking to Chief Batise. He requested that the letter be re-faxed to him and stated that Matachewan might have an interest in being consulted on the project and that he may direct the matter to Wabun Tribal Council. Two more phone messages were left with Chief Batise in order to ensure that he received the fax and to receive further direction on whether or not he wanted Matachewan to be consulted on the project and if he wanted the matter directed through Wabun Tribal Council. There was no response to these calls. Prior to the second public open house a second registered letter was sent on October 4th 2006 to Chief Batise asking him again if there was an interest on the part of Matachewan being consulted, with an offer to meet. The second letter indicated that the EA field work was completed and the findings indicated that the project will have temporary minor effects on the environment that can be fully mitigated. In addition, it was indicated that Mr. John Pollock a licensed archaeologist based out of New Liskeard undertook an archaeological assessment and determined that no archaeological resources will be affected by the project. Subsequently, three follow-up phone calls were placed to Matachewan, one with Chief Batise and two with Band Administrator Anne Batise (MNR had informed OPG that Chief Batise had moved to Northwestern Ontario, even though his voice mail remained active). There was no response to these calls.

7.2.2.4 Mattagami First Nation

OPG has consulted with Mattagami FN on several occasions in the last year with respect to the Upper Mattagami projects, which are situated close to the Mattagami Reserve. During an initial meeting with the Chief of Mattagami and some Council members it was asked whether they would have an interest in the Hound Chute site redevelopment the Chief indicated that they would not. The Hound Chute site is located over 150 kilometres southeast of the Mattagami Reserve.

⁷ OPG has made the offer to consult with Matachewan FN for both its Upper Mattagami and Hound Chute projects.

7.2.3 First Nations Issues and Concerns

7.2.3.1 Matachewan First Nation

As indicated in the summary of activities a total of two letters and seven phone calls have been placed to Matachewan First Nation. As there has been no response to date and the Chief of Matachewan was aware of the project, OPG has assumed Matachewan First Nation does not have any issues or concerns.

7.2.3.2 Mattagami First Nation

As indicated in the summary of activities the Chief of Mattagami First Nation did not indicate any interest in being consulted on the proposed Hound Chute redevelopment. It should be noted however that the Mattagami First Nation has been significantly involved in the Upper Mattagami River Project.

7.2.3.3 Teme-Augama Anishnabai

As indicated in the summary of activities a total of two letters and five phone calls have been placed to the Teme-Augama Anishnabai. As there has been no response to date and the Chief of the Teme-Augama Anishnabai was aware of the Undertaking, OPG has assumed the Teme-Augama Anishnabai does not have any issues or concerns.

7.2.3.4 Temagami First Nation

As indicated in the summary of activities a total of two letters and five phone calls have been placed to the Temagami First Nation. As there has been no response to date and the Chief of the Temagami First Nation was aware of the Undertaking OPG has assumed that the Temagami First Nation does not have any issues or concerns.

7.2.3.5 Summary

The First Nations consultation was appropriate and represented a meaningful attempt to identify any interests associated with the proposed redevelopment. OPG discussed with the Crown how it was to undertake each step of the consultation process. It is OPG's perspective that the environmental assessment process is the logical approval step to engage with First Nations on any issues of concern or interest, as it specifically examines the wide array of potential effects of the undertaking and provides an excellent forum to address First Nations concerns. While no First Nation decided to be actively involved in consultation on the Proposed Undertaking, discussions were held with the Chiefs of all the First Nations.

7.3 CONSULTATION WITH GOVERNMENT AND AGENCIES

7.3.1 Objectives and Approach

The overall objective of the agency consultation was to keep the various federal, provincial and municipal authorities informed of the project and offer to meet with them whenever necessary to discuss and resolve question early in the process.

7.3.2 Summary of Activities

OPG has consulted with various municipal, provincial and federal government agencies throughout the environmental assessment process. Outlined below are the key consultation events.

- Meeting with MNR – Discussion of environmental assessment process and key issues – January 19, 2006.
- Meeting and several conference calls with Federal and Provincial Authorities – Discussion of Project Scoping and federal environmental triggers –, February 9, 2006. Agencies represented in person or on phone included the Canadian Environmental Assessment Agency (CEAA), DFO, Transport Canada, Environment Canada, MNR, and Ministry of the Environment (MOE). Several on-going phone calls with agencies.
- Meeting with Ministry of Municipal Affairs and Housing (MMAH) and Ministry of Culture (MCR) – Discussion on an overview of the project and any Culture or MMAH issues, February 23, 2006 and telephone conversations over the course of the project.
- Meeting with DFO – Overview of project and possible Fisheries Act implications, July 13, 2006.
- Teleconference with MOE and MNR – Status update on environmental assessment - September 27, 2006.
- Teleconference with MNR – Discussion of First Nation and Aboriginal Issues - September 29, 2006.
- Teleconference with MNR – Discussion of First Nation and Aboriginal Issues – December 4, 2006.
- Ongoing communications with MOE file coordinator.

7.3.3 Public Issues and Concerns

In the various meetings held with federal, provincial and municipal representatives, agency representatives spoke to their mandates and responsibilities and what studies or work they might want to see. These varied from agency to agency but in general OPG and SENES do not think there are any outstanding issues or concerns that have not been addressed in the EA.

8.0 SUMMARY EVALUATION OF THE UNDERTAKING

8.1 EVALUATION OF ALTERNATIVES TO THE UNDERTAKING

8.1.1 Null Alternative

The null alternative is to continue operating the station with no action other than regular maintenance. In its present state, however, significant civil and mechanical repairs are required to enable the facility to operate safely. This alternative also provides no opportunity to improve station efficiencies, increase the power produced or address the concerns of the Marsh Bay residents and is therefore considered unacceptable from a safety, reliability and economic points of view.

8.1.2 Retirement

Retirement involves the decommissioning or permanent removal of the facility from the OPG electricity system, with the resultant loss of the site as a renewable source of electricity generation. Retirement foregoes the economic contribution made to the OPG electrical system by the station, there will be a loss of clean renewable power to the Province and offers no substantial environmental or technical benefits

8.1.3 30-Year Facility Life Extension

Life Extension involves restoring the existing powerhouse to a condition suitable for a further 30 years of operation. The station capacity and energy production would be approximately equal to historical values. Water to Wire equipment and auxiliaries would be rehabilitated and the powerhouse civil structures would be rehabilitated (excluding dam repairs). The costs for upgrades to extend the life of the facility will be high. The annual Operations, Maintenance and Administration (OM&A) costs under this alternative are estimated to be the same as in the case of the Null Alternative.

From a technical point of view, this alternative returns old, inefficient generating units to service for an extended period. Some uncertainty would exist regarding the expected life of some of the components in the turbines and generators.

Environmental effects of this alternative are predicted to be minimal, with short-term effects associated with construction activities. Upon consideration of the economic, technical and environmental aspects of this alternative, the life extension option is not preferred.

8.1.4 90-Year Facility Redevelopment (the Preferred Alternative)

Redevelopment involves the demolition of the existing powerhouse and construction of a new powerhouse on the existing footprint. Redevelopment will result in the installation of two new,

safe and efficient generating units which will provide power and energy benefits to Ontario consumers for the next 90 years.

Technical advantages of this alternative include the much greater capacity to make more efficient use of the available water resource at the site optimizing the operation of the hydroelectric facility with the other hydroelectric facilities on the river system and producing badly needed additional power for the Province.

Environmental effects of redevelopment may be beneficial in the long run with this alternative. While there were be short-term environmental effects during the redevelopment phase, these effects will be minor, temporary and mitigable (these effects are described in detail throughout the EA). Long-term environmental effects upstream of the facility are likely to benefit as the installation of the Obermeyer weir will allow for less water level fluctuation upstream and therefore lower the risk of exposing spawning beds or waterfowl nests.

The redevelopment of this facility will provide a temporary but significant benefit in the local economy as well as continuing the employment and other benefits associated with the operations of this facility.

Redevelopment was determined to be technically and environmentally sound, and to have substantial economic benefits over the other alternatives.

8.2 EVALUATION OF ALTERNATIVE METHODS OF CARRYING OUT THE UNDERTAKING

Alternative ways of carrying out the undertaking which were examined included the number of units, the type of unit, the capacity for the unit(s) and station location. All options largely leave the overall site layouts in their historic condition. The Kaplan turbine was chosen based on technical and economic criteria, and to reduce the risk of fish entrainment and impingement.

Two redevelopment options were considered for the location of a new powerhouse at Hound Chute GS. The options involved relocation of the powerhouse and a powerhouse built on the existing site.

The preferred option involves the decommissioning and demolition of the existing powerhouse. A new powerhouse with a single unit intake would be located on the existing footprint. The existing dams would remain with refurbishments made as necessary. The four existing Francis turbine-generator units would be replaced with a two vertical Kaplan turbines coupled with a synchronous generator with an installed capacity of 9.5 MW. As well the Obermeyer weir will be installed, and civil works completed.

8.3 ADVANTAGES OF THE PROPOSED UNDERTAKING

8.3.1 Construction

The effects of construction are expected to be localized and the Hound Chute Generating Station is fairly remote from communities.

Depending on the availability of a regional workforce, the relatively short overall duration of the project, and the fact that not all workers would be employed over the project construction period, it is anticipated that there would be some in-migration of construction workers. However, there will be a benefit of the project on communities in the area with regards to local hiring and spending.

8.3.2 Operation

The redevelopment option will enable the site to continue to produce electrical power using a renewable resource for another 90 years, with associated benefits to the community and the electrical consumers of Ontario.

The redeveloped station will give OPG greater ability to manage water flows at the site. It will also make the site more in-step with the operating patterns of upstream and downstream hydroelectric stations.

Upon completion of the redevelopment of the proposed Hound Chute Generating Facility, Ontario Power Generation will make reasonable effort, within local control, to maintain a consistent operating level year around at Hound Chute within the existing Water Management Plan's compliance zone. This level will be as high as practically possible within the limits of the operating regime, in the summer band (273.87m to 274.10m) and will minimize the extreme low and high peaks in the spring. No adverse effects are expected to occur to associated wetlands, aquatic or terrestrial communities. Resource use and socio-economic patterns in the vicinity are not expected to be affected by operations of the new facility.

The station will continue to operate as a run-of-river facility, but will make more efficient use of the available flows for power generation. The need for routine maintenance will be much reduced.

8.4 DISADVANTAGES OF THE PROPOSED UNDERTAKING

8.4.1 Construction

Minor and short-term disruption of air quality, vegetation, and fish and wildlife will occur in the vicinity of the redevelopment site during construction due to activities such as dewatering, excavation, drilling, blasting, rock movement, cofferdam and access ramp construction and removal, equipment use and fuelling.

Although the site is distant from communities, there is a potential for occasional disruption due to movement of heavy vehicles in the region. This effect will be minor and temporary.

Dewatering and reconfiguration of the forebay and tailrace areas during construction may affect some fish and aquatic vegetation habitat; however, these effects are mitigable.

Demolition of the existing powerhouse may result in the loss of a structure with some heritage value. A number of measures are proposed to minimize this effect (see Section 6).

8.4.2 Operation

For the most part, no adverse effects on the bio-physical and socio-economic environments or resource use in the area are predicted during operation of the redeveloped station. Although the need to open the sluiceways or spillways may be reduced, total flows equivalent to those occurring historically will continue to occur. As a result, no significant effects on local aquatic communities downstream of the facility are predicted to occur.

8.5 PROPOSED MITIGATION MEASURES

The following is a summary of key mitigation measures which have been identified for consideration at the Hound Chute redevelopment project. It is not intended to be a comprehensive or final list.

8.5.1 Construction

During construction, the following mitigation measures are proposed.

- The station and equipment will be photographically recorded prior to the station's demolition. If feasible and economical, some equipment from the existing station may be made available to the local communities for historical display.
- All construction equipment will adhere to relevant guidelines for emission and noise control.
- Clearing of vegetation for construction activities will be minimized. Disturbed areas will be re-vegetated after construction to prevent erosion and dust.
- Sediment control devices such as settling/filtering facilities, silt curtains and silt fences will be installed where required to prevent transport of sediments into the river.
- Where applicable, flows through the existing powerhouse will continue to maintain fish habitat in the existing tailrace.
- If all water is being diverted through the spill channel at the time of walleye and sucker

spawning period, all water should continue to be diverted through the spill channel until the end of the hatch (June 15).

- Fish stranded or trapped during dewatering of the coffer-dammed areas will be captured and relocated to the river. Pending discussions with DFO and MNR, rock or selected underwater structure will be placed in the new tailrace areas during construction to enhance existing or create new fish habitat.
- Environmental protection during construction and operation will be ensured by adherence to the site-specific Environmental Management Plan, as well as compliance with regulatory standards and guidelines.
- The Environmental Management Plan ensures that environmental protection will be achieved by describing government agency requirements, OPG policy, project commitments and recommended mitigation measures to be undertaken. The Environmental Management Plan will include the Erosion and Sediment Control Plan, Spills Emergency Preparedness and Response Plan, Hazardous Materials Management Plan, Waste Management Plan and Site Rehabilitation Plan.
- In-water construction activities will be timed to avoid the spring spawning and incubation period of fish.

8.5.2 Operation

For operation, the turbine design and operations have been selected to minimize risk and potential injury to fish due to entrainment.

8.6 PROPOSED ENVIRONMENTAL EFFECTS MONITORING

8.6.1 Construction Monitoring

Pre-operational monitoring will be conducted during the construction period (construction monitoring) to monitor the potential effects of construction activities, including:

- periodic surveillance of construction activities, construction site and constructed work to determine that environmental protection requirements are being met; and
- regular monitoring of suspended solid concentrations in water discharged from settling cells.

8.6.2 Post-Operational Monitoring

As it is expected that future operational effects will be similar to the existing effects, no long-term monitoring is planned beyond normal water management monitoring.

8.7 POST-EA ACT APPROVALS

Approval under the EA Act is the first government approval in a series of permits, licenses and approval required for the Proposed Undertaking. Other legislation such as the Ontario Environmental Protection Act, the Ontario Water Resources Act, the Lakes and Rivers Improvement Act, the Federal Fisheries Act, and the Federal Navigable Waters Protection Act grant authority to designated provincial and Federal Agencies to review and approve components of the proposed works at later stages of design definition, and therefore at a greater level of detail than is typically available at the EA stage. The EA Act specifically prohibits the granting of other approvals prior to EA Act approval. A preliminary list of the environmental permits, licences and approvals required for the generating station is provided in Table 8-1. While the permits and approvals required for the Proposed Undertaking is dependent on the final designs by OPG's Design Build Contractor, a non-exhaustive list of permits and approvals is provided. Depending on the Design Build Contractor's design, many of these approvals may or may not be required; however, the list is provided for illustrative purposes and serves as a generic list.

Other EA Act approvals and communications will be initiated with all relevant government agencies to ensure an up-to-date and complete list of information. This list will be incorporated into a Project Environmental Requirements document, which will be prepared as an approvals guide for project engineering and construction staff.

8.8 CONCLUSIONS

It is the conclusion of this EA that the redevelopment of the generating station at Hound Chute is the preferred alternative to renew and enhance the hydroelectric generating potential of the existing site. This Environmental Report provides an evaluation of project alternatives, public and government concerns and suggestions, environmental effects and mitigation and monitoring options. Opportunities have been given for input from government reviewers in the scoping of field studies, the identification of effects, selection of potential mitigation measures, and the content of the ER document and Technical Support Documents. Through meetings and discussions and information centres, substantial efforts have been made to inform and involve the public in the project, and to develop a clear understanding of their concerns.

The Proposed Undertaking will provide a benefit to the electricity consumers of Ontario. The existing station has served us for over 90 years and has reached the end of its useful service life. The opportunity now arises to extend and enhance the power output of this site. The construction of the project will provide some employment opportunities to workers in the Region. It is believed that the redeveloped station will not adversely affect the attractiveness of the local areas for tourism and recreation, nor will they adversely affect resource uses by local people.

Ontario Power Generation is fully committed to monitoring project effects and developing appropriate mitigation to eliminate or reduce impacts of the project, or to provide offsetting benefits. Preliminary monitoring recommendations have been provided in this document. There will be several opportunities to address new or outstanding public or government concerns.

It is OPG's intent to submit this Assessment to MOE pursuant to OPG's *Class EA for Modifications to Hydroelectric Facilities* (Ontario Hydro, 1993). A key objective of this assessment was to identify and resolve all project issues, in advance of the 30 day Agency review period stipulated within the Class EA. It is OPG's understanding that this objective has been achieved. If outstanding concerns remain after submission of this ER, a bump-up procedure is available for consideration of those concerns. The final result may be resolution of the issues, agreement to deal with the issues through another process, possible amendments to the document, or, if necessary, formal submission of the EA for review and approval as an individual EA under the terms and conditions of the EA Act.

Ontario Power Generation respectfully requests acceptance of the Proposed Undertaking as described herein, under the terms of the Class EA approval process. This document also provides information on the projects in order for the Department of Transport (Canadian Coast Guard), DFO and other relevant federal authorities to provide the necessary clearances.

Table 8-1: List of Permits, Licenses and Approvals Possibly Required for Hydroelectric Redevelopment

Agency	Statute	Pertinent Permits Licences or Approvals	Comments
Department of Fisheries and Oceans	The Fisheries Act	Letter of Advice (or Authorization required if HADD of fish habitat under Section 35 of the <i>Act</i>). Letter of Advice if no fish destruction conclusion (or authorization for the destruction of fish by means other than fishing under Section 32 of the <i>Act</i>).	Letters of Advice provided to OPG dated January 2, 2007 for Wawaitin, Sandy Falls and Lower Sturgeon.
Department of Transport	Navigable Waters Protection Act	Navigable Waters Protection Act Clearance can be required.	6 copies of final plans to be sent to Transport Canada.
Department of Transport	Transportation of Dangerous Goods Act	Explosives Transportation Permit	Required if transporting up to 2000 kg of explosives – unlikely to be required.
Ministry of the Environment	Environmental Protection Act	C of A (air/noise) Approval for the emissions or discharge of any contaminants into any part of the natural environment other than water (Part II, Section 8 and Regulations).	According to MOE C of A's are needed for any portable generation equipment. This will be a DBC responsibility.
Ministry of the Environment	Certificate of Approval - Waste	Waste generator registration.	Registration for hazardous waste generated during construction and which will be removed from the site.

Table 8-1: List of Permits, Licenses and Approvals Possibly Required for Hydroelectric Redevelopment (Cont'd)

Agency	Statute	Pertinent Permits Licences or Approvals	Comments
Ministry of the Environment	Ontario Water Resources Act	Section 34 of the OWRA requires anyone taking more than a total of 50,000 L of water in a day from a lake, stream, river or groundwater source, with some exceptions, to obtain a permit to take water. Permits to take water for construction and dewatering depending on volume anticipated. MOE regional office.	Permit likely required during construction phase.
Ministry of the Environment	Ontario Water Resources Act	C of A (Industrial Sewage)	Separate approvals would be required for temporary settling ponds and cofferdams requiring pump outs (if required). This is not anticipated but would be dependent on the cofferdam design submitted by DBCs.
Ontario Ministry of Natural Resources	Lakes and Rivers Improvement Act	Consolidated Work Permit Under section 16 of the LRIA: "No person shall alter, improve or repair any part of a dam in the circumstances prescribed by the regulations unless the plans and specifications for whatever is to be done have been approved by the Minister. 1998, c. 18, Sched. I, s. 31"	Consolidated Work Permit under the Act must be acquired from the MNR to undertake work on shore lands or works within a water body; Lakes and Rivers Improvement Act - O. Reg. 454/96.
Ontario Ministry of Natural Resources	Lakes and Rivers Improvement Act	Location Approval for new powerhouses Plans and Specification Approval for works to dams/powerhouses, temporary cofferdams	All part of LRIA
Ontario Ministry of Natural Resources	Public Lands Act	Amendment to Water Power Lease Agreements	
Ontario Ministry of Natural Resources	Public Lands Act	Amendment to Licence of Occupation if head pond area changed	No amendment to Licence of Occupation needed.
Ontario Ministry of Natural Resources	Fish and Wildlife Act	Fish Collection Permit	Required from MNR in order to capture and transfer fish following the construction of the cofferdams and the de-watering of the area behind them.
Ontario Ministry of Natural Resources	Crown Forest Sustainability Act	Forest Resource Licence – Clearance to Harvest	Clearance required to cut timber on crown land (all OPG sites are on crown land). OPG will send pictures to OPG of brush to be cleared – to determine if this is necessary.

Table 8-1: List of Permits, Licenses and Approvals Possibly Required for Hydroelectric Redevelopment (Cont'd)

Agency	Statute	Pertinent Permits Licences or Approvals	Comments
Ministry of Transportation	Dangerous Goods Transportation Act	Waste Manifest	If materials are contaminated, will need to ensure manifests etc are in place if waste is to be transported off site
City of Timmins (for Wawaitin and Sandy Falls) and Ministry of Municipal Affairs and Housing (for Lower Sturgeon)	Planning Act	Official Plan and Zoning By-Law Designation	Use is in conformity.
City of Timmins (for Wawaitin and Sandy Falls) and Ministry of Municipal Affairs and Housing (for Lower Sturgeon)	Planning Act (Building Code)	Building permit approval required from the City. No permit from the Province, but the building must be compliant with the Ontario Building Code.	Building Permit approval will be required for "structural" aspect of the powerhouse, where in municipal boundaries.
City of Timmins (for Wawaitin and Sandy Falls) and Ministry of Municipal Affairs and Housing (for Lower Sturgeon)	Planning Act (Building Code)	Demolition permit approval required from the City	Demolition permits approval required by municipality.
South Porcupine Health Unit	Planning Act (Building Code)	Sewage System Permit Sewage System Demolition Permit and Sewage System Renovation Permit	(Ontario Regulation 22/98 stipulates the minimum requirements for a septic system) Permit will be required for septic systems removals, installations and/or renovations. To be discussed with Health Unit(s).

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LIST OF ABBREVIATIONS, ACRONYMS AND UNITS OF MEASUREMENT

#	Number
&	And
ACNBC	Associate Committee on the National Building Code
AES	Atmospheric Environment Service
ANSI	Area of Natural and Scientific Interest
BMP	Best Management Practice
CEAA	Canadian Environmental Assessment Agency
Cheminfo	Cheminfo Services Inc.
CLI	Canada Land Inventory
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
COSSARO	Committee on the Status of Species at Risk in Ontario
CUM	Cultural Meadow
CWS	Canadian Wildlife Service
DBC	Design-Build-Contractor
DFO	Department of Fisheries and Oceans
Dillon	Dillon Consulting Ltd.
e.g.	For example
EA	Environmental Assessment
ELC	Ecological Land Classification
ER	Environmental Report
ESA	Environmentally Sensitive Area
<i>et al.</i>	And others
<i>Etc.</i>	And so on
FOM	Mixed Forest
FN	First Nation
GLL	Gartner Lee Limited
GS	Generating Station
HADD	Harmful alteration, disruption and destruction (of fish habitat)
HEPCO	Hydroelectric Power Commission of Ontario
i.e.	That is
LRIA	<i>Lakes and Rivers Improvement Act</i>
<	Less than
ML/ARD	Metal Leaching and Acid Rock Drainage
MNR	Ministry of Natural Resources
MOE	Ontario Ministry of the Environment
N	North
No.	Number
NEPG	Northeast Plant Group (Ontario Power Generation)
NHIC	Natural Heritage Information Centre
MMAH	Ministry of Municipal Affairs and Housing
O,M&A	Operations, Maintenance and Administration
OPG	Ontario Power Generation Inc.
OWRA	Ontario Water Resources Act
pers. comm.	Personal communication
PWGSC	Public Works and Government Services Canada
Q2	Second Quarter (of the year)

S1	Extremely rare in Ontario; usually fewer than 5 occurrences (in a 10-km by 10-km Mercator square grid)
S2S3	Very rare to uncommon in Ontario
S3	Rare to uncommon in Ontario; usually between 20 to 100 occurrences (in a 10-km by 10-km Mercator square grid)
S3S4	Rare to common in Ontario
S4	Common in Ontario; apparently secure, usually more than 100 occurrences (in a 10-km by 10-km Mercator square grid)
S4S5	Common to very common in Ontario
S5	Very common in Ontario, demonstrably secure
SE	Exotic; not believed to be a native component of Ontario's fauna
SENES	SENES Consultants Limited
SH	Historically known from Ontario, but not verified recently
sp.	One species
SU	Status uncertain
SZN	Not of practical conservation concern as there are no clearly defined occurrences
TS	Transformer Station
TTN	Taykwa Tagamou Nation
W	West
WMP	Water Management Plan

Measurement Units

°	degree
°C	degree Celsius
GWh	gigawatt-hour
ha	hectare
Hz	hertz
Kg	kilogram
km	kilometre
Km ²	Square kilometre
km/h	kilometre per hour
kV	kilovolt
m	metre
m ²	square metre
mm	millimetre
mm/s	millimetric per second
m ³ /s	cubic metre per second
M	million
MW	megawatt
PY	person year
'	minute
/km ²	per square kilometre
%	percent
"	second

GLOSSARY

Avifauna	Birds.
Boreal	Of the north.
Canal	A channel dug or built to carry water.
Capacity	The greatest load which a unit, station or system can supply (usually measured in kilowatts, megawatts, etc.).
Capacity Factor	Ratio of the actual energy produced to the maximum energy which could be delivered under continuous operation at maximum rating.
Chute	A steeply-inclined natural passageway or constructed pipe or channel which conveys water from a higher to a lower level.
Cofferdam	A temporary dam made of concrete, rockfill, sheet-steel piling, timber/timber-crib or other non-erodible material and commonly utilized during construction to exclude water from an area in which work is being executed.
Coniferous Forest	The largest terrestrial biome on earth (also known as the Taiga or boreal forest) extending in a broad band across North America, Europe and Asia to the southern border of the arctic tundra and usually dominated by one or two species of evergreen trees,
Dam	A concrete or earthen barrier constructed across a river and designed to control water flow or create a reservoir.
Deciduous Forest	In the Northern Hemisphere, this forest type occurs to the south of the coniferous forest and is dominated by broadleaved deciduous hardwood trees typically with a five- to six-month growing period.
Diabase	A fine-grained, dark colored igneous rock composed of lath-shaped plagioclase (feldspar) crystals surrounded by smaller grains of pyroxene and olivine; it commonly occurs as tabular bodies (dikes and sills) intruded into surrounding rocks.
Dike	The vertical veins of igneous rock that form when magma enters and cools in fractures found within the crust.
Flash board	A wood plank, steel member or inflatable rubber membrane placed at the top of a spillway to increase the storage capacity of a reservoir.
Forage	Any food suitable for livestock.
Forebay	The part of a dam's reservoir that is immediately upstream from the powerhouse.
Freshet	High flows in a stream or river, usually occurring in the spring, caused by snow melt, runoff, heavy rains and/or high inflows.
Geotechnical	Concerned with the physical properties of soil, rock and groundwater usually in relation to the design, construction and operation of engineered works.
Glaciofluvial	Of glacial watercourses.

Grey Wooded	Well to imperfectly drained soils that have developed under coniferous and mixed-forest vegetation, as have Podzolic soils, but differ from them in having an accumulation of clay in the B horizon, neutral to slightly acid A and B horizons, and an alkaline parent material.
Greywacke	A hard coarse-grained sandstone characterized by angular particles of quartz, feldspar and other rock fragments embedded in a matrix of clay-sized particles.
Head	The difference in elevation between the water surface at the intake and tailrace.
Headpond	The reservoir from which water is extracted for power generation or spillage.
Herpetofauna (Herpetiles)	Amphibians and reptiles.
Igneous	Rocks formed from the solidification of molten magma either beneath (intrusive igneous rock) or at (extrusive igneous rock) the earth's surface.
Intake	A structure which regulates the flow of water into a water-conveying conduit.
Isostatic rebound	The upward movement of the Earth's crust following depression of the crust by the weight of ice during continental glaciation.
Lacustrine	Of lakes.
Organic	Soils that have developed from accumulations of organic materials such as grasses, reeds, rushes, sedges, mosses and ferns.
Perennial	Continuing, enduring or growing through the year or through many years.
Podzolic	Well and imperfectly drained soils that have developed under coniferous and mixed-forest vegetation and usually found in cold to temperature climates on acid parent materials.
Powerhouse	A primary part of a hydroelectric facility where the turbines and generators are housed and where power is produced by falling water rotating turbine blades.
Riparian	Of or on a river bank.
Run-of-the-River	A power plant that has no upstream storage capacity and must pass all flows as they come.
Sedimentary	Rock formed by the deposition, alteration and/or compression and lithification of weathered rock debris, chemical precipitates, or organic sediments.
Shale	Fine-grained sedimentary rock composed of lithified clay particles.

Sluiceway (Sluice)	An open channel designed to divert excess water which could be within the structure of a hydroelectric dam or separate of the main dam (see spillway).
Spillway	A passageway, or channel, located near or at the top of a dam through which excess water is released or “spilled” past the dam without going through the turbine(s); as a safety valve for the dam, the spillway must be capable of discharging major floods without damaging the dam while maintaining the reservoir level below some predetermined maximum level.
Stoplog	A gate (sometimes made from squared lumber) which can be placed into an opening to shut off or regulate the flow of water.
Tailrace	A channel through which the water flows away from a hydroelectric plant following its discharge from the turbine(s).
Terrestrial	Belonging, living on or growing in the earth or land.
Turbine	A mechanism in an electrical generation facility which converts the kinetic and potential energy of water (in the case of hydroelectric turbines) into mechanical energy which is then used to drive a generator converting mechanical to electrical energy.
Weir	A dam in the river to stop and raise the water.

APPENDIX A

DISPOSITION REPORT COMMENTS

**DISPOSITION REPORT FOR THE HOUND CHUTE PROJECT
COMMENTS BY AGENCIES AND RESPONSES BY OPG AND SENES**

Submitted to:
Ontario Power Generation Inc.
700 University Avenue
Toronto, Ontario
M5G 1X6

By:

Hound Chute EA Consulting Team


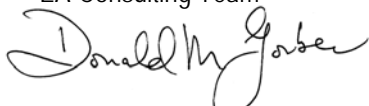
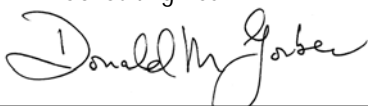
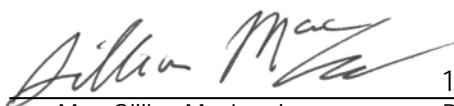
Prepared by:		15 March 2007
	Mr. Phil Shantz, SENES EA Consulting Team	Date
Reviewed by:		15 March 2007
	Dr. Donald Gorber, SENES EA Consulting Team	Date
Approved by:		15 March 2007
	Dr. Donald Gorber, SENES Project Manager EA Consulting Team	Date
Reviewed by:		15 March 2007
	Mrs. Gillian MacLeod Environmental Lead Ontario Power Generation Inc.	Date
Accepted by:		15 March 2007
	Mr. Edward M. Dobrowolski Project Manager Ontario Power Generation Inc	Date

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1.0 INTRODUCTION

Ontario Power Generation provided the main Environmental Report and the associated Technical Support Documents to various agencies prior to issuing a Notice of Completion. The Environment Report and Technical Support Documents were sent to the agencies on February 8, 2007.

The agencies on the distribution list included::

- Township of Coleman;
- Town of Latchford;
- Ontario Ministry of the Environment;
- Ontario Ministry of Natural Resources;
- Ontario Ministry of Culture;
- Ontario Ministry of Municipal Affairs and Housing;
- Department of Fisheries and Oceans;
- Transport Canada; and,
- Environment Canada.

The table below identifies the comments from the various agencies and the response from OPG. Agency comments are provided verbatim.

2.0 TABLE OF COMMENTS AND RESPONSES

COMMENTS	RESPONSE
<p>Ontario Ministry of Natural Resources (North Bay District)</p> <p>The EA Report looks fine.</p>	<p>Acknowledged. No response required.</p>
<p>Ontario Ministry of Culture</p> <p>I have read Dr Pollock's Stage 1 report and concur with his recommendations regarding clearance for the project while preserving the historic portage route. Therefore the Ministry of Culture will have no further concerns unless, as Dr Pollock notes in his report, the plan undergoes changes that would impact previously unassessed areas.</p>	<p>No further response required from OPG.</p>
<p>Department of Fisheries and Oceans</p> <p>No formal comments were provided at this stage.</p>	<p>No further response required from OPG.</p>
<p>Transport Canada</p> <p>Recently you were in touch with Rebecca Earl regarding the OPG Hound Chutes project. I am writing to confirm that Transport Canada does not have a CEAA trigger for this project and the Environment and Engineering group has no further comments and do not require any further involvement with this proposal.</p> <p>However, the work will require approval under Section 10 the Navigable Waters Protection Act (NWP) for the repairs and rehabilitation of the Generating Station. Therefore, Transport Canada - Marine Safety - Navigable Waters Protection Program (NWPP) requires 6 copies of the plans when they have been finalized.</p> <p>At all sites NWPP will be interested in the installation of any turbidity curtains, installation of any temporary works, fluctuations of water levels, maintenance of portage routes during and after construction, installation of warning signs, deposition of blasted material and creation of any fish habitat compensation. When the plans for the proposed works have been finalized, OPG should submit an application under the NWP, where at that time the NWPP will make its determination on the impacts on navigation.</p> <p>Should you have any questions, please contact the NWPP Parry Sound office and speak to Rick Thomas (705-774-9095 or by fax at 705-746-4820).</p>	<p>Six copies of the final plans of each generating station will be forwarded to Transport Canada.</p>

COMMENTS	RESPONSE
<p>Environment Canada</p> <p><u>Environment Report - Acid Rock Drainage</u></p> <p>EC understands from a recent discussion¹ with members of the EA Consulting Team that there is a low potential for acid rock drainage (ARD). EC also understands that drainage from excavated rock having a low potential for ARD will be monitored to confirm that any potential adverse water quality effects of the waste rock are inconsequential. As very little information is provided in the EA Report (p. 6-2) on this issue, and the statement included in the report is somewhat misleading², <u>EC recommends</u> that the updated EA Report and the Technical Support Documents include (under the pertinent sections) an appropriate level of discussion on potential ARD effects and any guidelines used as a basis for any conclusions made on the significance of effects on water quality; and, also include details on the proposed use of waste rock, management of drainage (if special measures are proposed) and any proposed monitoring.</p>	<p>Sections 2.2.1 and 3.1 of the Terrestrial Environment TSD, Sections 1.1, 2.2.1, 3.2.2 of the Aquatic TSD and Section 6.2.1.1 of the Environmental Report have been revised to address this comment.</p>
<p>Environment Canada</p> <p><u>Environment Report - Migratory Birds</u></p> <p>EA Report, s. 6.2.1.2 Vegetation (p. 6-4) and s. 6.2.1.4 Wildlife (p. 6-6) - In areas where structures are proposed to be demolished and vegetation clearing is required, migratory bird habitat may be impacted, or will likely be impacted. If there is a potential to impact migratory bird habitat, work should be timed to avoid adverse effects on nesting migratory birds (including any cliff swallows nesting on existing structures or river banks) as generally indicated under s. 6.2.1.4. <u>EC recommends</u> that reference be also made in the "Vegetation" section to timing constraints for works affecting any vegetated areas, and in the "Wildlife" section to demolition of existing structures and works affecting river banks (i.e., excavation or infilling for cofferdams, etc.) that provide migratory bird habitat.</p> <p>EA Report, s. 6.2.1.4 Wildlife (p. 6-6) – it was indicated that in the event that active migratory bird nests are found that: "A buffer zone with a 50-m allowance restricting active construction activities is usually applied around a nest." The buffer size required to minimize disturbance to nesting birds would likely depend on the species present, work activity adjacent to the nest, and other specific site conditions. Therefore, if a buffer zone much less than the 50-m allowance typically applied (e.g., <15 m from active nests), or other mitigation is proposed, <u>we recommend</u> that EC be contacted prior to its implementation to determine whether the proposed mitigation measures are appropriate.</p>	<p>Section 3.2, ("Vegetation") of the Terrestrial Environment Technical Support Document and Section 6.2.1.2 of the Environmental Report have been revised to address the comment.</p>

¹ Held on March 6, 2007 (G. MacLeod, G. Fitchko, P. Shantz, M. Shaw)

² EC understands that the ARD analyses indicates that bedrock in the project area has a low potential for ARD, however the EA Report indicates that: "(bedrock) is not acid generating"

COMMENTS	RESPONSE
<p>Environment Canada</p> <p><u>Environment Report – Species at Risk</u></p> <p>In Table 5-1 entitled: “Wildlife Species at Risk with Ranges Overlapping the Study Area” (EA Report, p. 5-5), it is stated that “Examination of the NHIC (2006a) database indicated that no species at risk have been recorded within a 5-km radius of the Hound Chute GS”. The proponent should note that a lack of sightings of species at risk (SAR) does not preclude use of habitat in the local study area by SAR, notably the migratory bird species identified as overlapping the study area. <u>EC recommends</u> that reference be made to the status under SARA of the species at risk listed in Table 5-1.</p> <p>As indicated in our prior letter of advice³, in order to determine whether there would be a potential for the project to impact federally listed SAR, EC’s SAR search tool⁴ should be consulted to determine if the ranges of any COSEWIC listed species at risk (including those listed in the Table 5-1) overlap with the site. In order to complete our review, we carried out a preliminary search using the above reference search tool and identified ranges of the following species overlapping the local study area:</p> <ul style="list-style-type: none"> ▪ Peregrine falcon (<i>Falco peregrinus</i>) ▪ Eastern timber wolf (<i>Canis lupus lycaon</i>) ▪ Monarch butterfly (<i>Danaus plexippus</i>) <p>The first two species are listed under Schedule 1 of the federal <i>Species at Risk Act</i> (SARA).</p> <p>Therefore, as indicated before⁴, the following assessment should be carried out for the above SAR species:</p> <ul style="list-style-type: none"> ▪ Information on the habitat requirements of the species should be consulted and compared to habitat descriptions for the study area. For example, the specific habitat requirements of each species (e.g. vegetation requirements, minimum territory area) should have been carefully compared with habitat immediately adjacent to and in the project work area. This information along with the species’ habits (e.g. are they likely to nest close to a well used road/noisy work areas, or are they shy and retiring, etc.), would have given an indication of the potential for the species to be present, and if so, whether activities associated with the project might disturb them. Please note that distribution data contained in these SAR databases do not represent an exhaustive and comprehensive inventory of a species’ current distribution. Only field inventories can determine with certainty which species are present in an area. ▪ If there is potential for species at risk to occur at the project site (i.e. <u>previous known occurrence, species range overlap and/or known habitat preference exists</u>), a qualified biologist should conduct a 	<p>Section 2.5.4 of the Terrestrial Environment TSD and Section 5.2.1.4 of the Environmental Report have been revised to address this comment.</p>

³ Scoping advice and assessment protocols provided by EC letter to OPG dated February 20, 2006 (Shaw/Macleod)

⁴ Available at EC’s web site: http://www.speciesatrisk.gc.ca/map/default_e.cfm

COMMENTS	RESPONSE
<p>thorough biological inventory of all areas of natural habitat that may be affected by the project and have the potential to support species at risk. A strategy should then be developed to protect any identified species at risk, with a primary focus on avoidance.</p> <p>In order to be consistent with objectives of the Canadian Biodiversity Strategy (i.e., to preserve the biodiversity of surrounding vegetation and ecosystems) and provide suitable habitat for migratory birds and other wildlife, <u>we recommend</u> the proposed re-vegetation of any disturbed or restoration areas using native plant species that are indigenous to the area to the maximum extent possible, and also well adapted to the site conditions and uses. Use of invasive species should be avoided.</p>	<p>This comment is addressed in Section 3.2 of the Terrestrial TSD and 6.2.1.2 of the Environmental Report.</p>
<p><u>Township of Coleman, Mayor Colleen Belanger</u></p> <p>The following comment was sent via e-mail and regular mail.</p> <p>This letter is to register an outstanding issue within the Environmental Association process for redevelopment of Hound Chute. The unresolved issue is the easements required for the flooding of private lands within the Township of Coleman between Latchford and Hound Chute.</p> <p>We have received 2(two) drafts of easement proposals from OPG legal department within the last three weeks and there has been back and forth communication between our lawyer and OPG's lawyer. We were informed last week that MNR will not issue permits and approvals for the reconstruction of Hound Chute until OPG has obtained all of the required easements for flooding of private lands above Hound Chute. Council and residents are highly in favour of the new development going forward. In fact we believe that the new development, with proper control of levels, is the only possible solution to the signing of flooding easements.</p> <p>Right now we are awaiting a response from MNR regarding outstanding issues with the W.M.P. We hope to have this reply in the very near future. We will make contact with Mr. Dobrowolski as soon as we receive information. So we can hopefully work together so we can all see the redevelopment of Hound Chute. It is our wish to resolve this easement issue quickly, but it is not an issue that can be overlooked by the E.A. process.</p>	<p>OPG would like to thank Coleman Township for the comments provided on the Hound Chute Environmental Assessment documents. We welcome the support for the project and at the same time we are very aware that all of the parties (OPG, MNR, Coleman Township and Marsh Bay Conservation Association) must work together in order to secure the flooding easements.</p> <p>OPG however will not be in a position to proceed with the project if the requests with respect to the wording in the flooding easement are seen as legally inappropriate by OPG. We have worked very hard on securing the flooding easement and OPG believes the work done to date (studies, field work, analysis and meetings) as well as the commitments made for capital expenditures and benefits of redevelopment surely address the physical concerns the local stakeholders have. We now need to find a solution for the administrative requirement being the flooding easement.</p>