Krugerdorf Chutes, Blanche River – Photo © ORMG Inc.

Environmental Report

Marter Township (Blanche River)

Hydroelectric Generating Station Project

FOREWORD

The Final Environmental Report

Xeneca Power Development Inc. (Xeneca), the project proponent, is pleased to present the Final Environmental Report (ER) for the proposed Marter Township Hydroelectric Generating Station on the Blanche River (the "project"). This document represents the culmination of important and considerable joint effort among Xeneca, regulatory agencies, local residents, public stakeholders and Aboriginal communities over the last four years. It was prepared to meet the requirements of the Ontario *Environmental Assessment Act* and the objectives of the *Green Energy Act*.

One function of this Final report is to advise the public and government ministries and agencies on the outcomes of the completed studies and consultations. Xeneca has welcomed comments and questions about the proposed project throughout the ER preparation period.

Submission of this final report under the Waterpower Class Environmental Assessment (EA) process represents a significant milestone in the obligations to the Ontario Power Authority under the Feed-In Tariff (FIT) contract issued to Xeneca for this undertaking. In order to initiate construction, Xeneca is required to successfully satisfy the requirements of the Waterpower Class EA, and subsequently obtain all applicable provincial and federal regulatory permits and approvals; receive approval for final engineering design; and obtain approval of detailed plans and specifications, all within a relatively aggressive schedule. Xeneca has undertaken a multitude of investigations and studies of the project site spanning a four year period (2010 to 2013) that has included natural habitat studies; archaeological investigations; water quality and fish tissue sampling; geotechnical studies; public and agency consultation; and engagement with Aboriginal communities. Xeneca is pleased with the contribution of all agencies in reaching this milestone and looks forward to a continued positive working relationship on the detail design, permitting and construction parts of the project to meet the FIT program contractual agreements to have the project in-service by October 2018.

Advancing Provincial Strategies

The government of Ontario has stated many times that a reliable supply of clean energy is necessary to maintain a strong economy and a healthy and prosperous quality of life for Ontario's growing population.

The provincial government has also placed a priority on expanding the amount of energy produced from renewable energy sources. Renewable energy development is a cornerstone of the province's future prosperity and its commitment to protecting the environment. The Ministry of Natural Resources (MNR) has stated that renewable energy projects contribute to the environmental, social and economic wellbeing of the province. Renewable projects such as waterpower help reduce the impacts of climate change and provide sustainable sources of

energy. Supporting the government's green energy initiative, the MNR makes Crown land available for renewable energy development including waterpower (Ministry of Natural Resources, http://www.mnr.gov.on.ca/stdprodconsume/groups/lr/@mnr/@renewable/documents/document/stdprod_087667.pdf). The proposed Marter Township project helps fulfill the MNR mandate to support the government's green energy initiative.

Waterpower continues to help to fuel Ontario's growth and is the backbone of Ontario's renewable power supply. In 2011, 22% of electricity generated in Ontario came from hydroelectric facilities. Waterpower has a number of benefits over other sources of clean energy since it can easily respond to sudden changes in energy needs and the facilities generally have long life cycles, on the range of 75 to 100 years. Waterpower is a reliable, clean, local and naturally recurring source of energy. The Ministry of Energy document referenced below notes the additional benefit of water level and flow management provided by reservoirs and dams that help to support recreational activities and contribute to public safety by minimizing flooding (Ministry of Energy, http://news.ontario.ca/mei/en/2010/08/waterpower-projects-support-local-communities.html).

Waterpower is a key contributor to implementing the Ontario government's 20-year Long-Term Energy Plan, Building Our Clean Energy Future. This plan includes building the largest expansion in hydroelectric power in almost 40 years (Ministry of Energy, http://news.ontario.ca/mei/en/2011/02/long-term-energy-plan-takes-another-step-forward.html). The government of Ontario has committed to continue to grow its hydroelectric capacity with a target of 9,000 MW by adding new facilities and maximizing the use of Ontario's existing facilities. The proposed Marter Township project will help to fulfill this commitment.

Renewable energy development is a cornerstone of the province's future prosperity and its commitment to protecting the environment. The Ministry of Natural Resources (MNR) has stated that renewable energy projects contribute to the environmental, social and economic wellbeing of the province. Renewable projects such as waterpower help reduce the impacts of climate change and provide sustainable sources of energy. Supporting the government's green energy initiative, the MNR makes Crown land available for renewable energy development including waterpower (Ministry of Natural Resources, http://www.mnr.gov.on.ca/stdprodconsume/groups/lr/@mnr/@renewable/documents/document/stdprod_087667.pdf).

Moving Forward

This Final Environmental Report is the foundation of Xeneca's planning and development process that will be used to inform the subsequent detail design and permitting/approval stages. This document is also a record of the binding commitments of Xeneca as it proceeds with development and operation of the proposed project.

EXECUTIVE SUMMARY

Xeneca Power Development Inc. (Xeneca) is proposing the construction of a 2.1 MW hydroelectric generating station (GS) on the Blanche River in Marter Township, on Lot 12, Concession 5. The project falls within the geographic Township of Marter, in the Township of Chamberlain.

The project site is located on the Blanche River at the Krugerdorf Chutes, approximately 9 km north of the Town of Englehart. For the purpose of this report, the project site includes the area where the majority of the civil works (i.e. dam, powerhouse, penstock) are proposed. The project footprint includes the project site, ancillary components (such as access road and transmission line corridors), the upstream zone of inundation, and the downstream Zone of Influence. The proposed project would meet the provincial government's objectives to generate sustainable and reliable hydroelectric power under the *Green Energy Act*. The project received a forty (40) year Feed-in Tariff contract from the Ontario Power Authority (OPA) which, subsequent to a successful Environmental Assessment (EA) outcome and the ensuing permitting and approvals phase, would see the facility commissioned and delivering electricity to the provincial supply grid by October 2018.

With an initial capital construction cost of $10.5 million, the project represents a significant socio-economic benefit to the local community of approximately $5.25 million at the construction phase. The annual generation rate for the Marter Township GS is estimated to be 9.17 GWh, with the Gross Revenue Charge for the project estimated to be $44,030.00 per annum, or $1,320,912 over 40 years (including a 10-year tax holiday).

This Environmental Report (ER) documents the EA planning process undertaken in support of the proposed project in accordance with the provincial Class Environmental Assessment for Waterpower Projects (Waterpower Class EA), as required under the Ontario *Environmental Assessment Act*. The purpose of an environmental assessment is to ensure that potential effects are identified, evaluated and considered in the planning stages of a project, allowing for the avoidance or minimization of the negative impacts and the optimization of the positive impacts in advance of the regulatory permitting phase that governs the construction phase. The EA process is designed to ensure the proponent of a project undertakes meaningful engagement of all stakeholders who wish to be involved in the planning process. In the context of environmental assessment, the environment includes the natural/physical, socio/economic, and cultural/human landscape in which the project is proposed.

Effects of an undertaking may be either positive or negative, and are assessed for their significance based on such factors as duration, geographic extent, and reversibility. Negative impacts can be avoided or mitigated through planning and further project refinement and where required, through the provision of compensatory measures to offset impacts which cannot be mitigated against in accordance with the mandatory regulatory approvals framework. The residual

environmental effects are those which mitigation cannot address and these must be assessed against existing or reasonably foreseeable activities to determine whether there is a potential for cumulative effects to a specific area or resource. Significant residual effects may lead to project redesign or regulatory rejection of the proposed undertaking.

This Environmental Report has been organized in the following format:

- Introduction and project overview;
- Description of the regulatory framework under which the project is being assessed;
- Identification of the existing conditions of the environment in which the project is situated;
- A technical description of the proposed project as conceptualized, including its physical makeup, construction requirements, and proposed operational regime;
- Discussion of stakeholder engagement efforts undertaken throughout the EA process, and the results of the engagement efforts;
- Identification of the likely effects of the project both positive and negative, proposed mitigation measures to avoid or minimize the negative impacts, any residual effects, and the proposed construction and operational monitoring initiatives;
- Anticipated regulatory approvals which will be required prior to the initiation of construction activities and those necessary prior to facility commissioning (operation);
- Conclusions and recommendations.

An environmental assessment is meant to enhance the project as it is presently conceptualized through site specific investigations in consultation with regulatory bodies, stakeholders, First Nation and Aboriginal communities and the general public. The EA presents a conceptual project design to inform on the general scope of the project both in terms of potential impacts to the environment and anticipated socio-economic benefits of the project. A final project design is required in support of securing regulatory permits and approvals.

Throughout the environmental planning process, Xeneca has endeavoured to understand the environment in which the project would be built by undertaking an extensive information and data collection program. Data on areas of the environmental setting of the project was collected by discipline experts including:

- Stage 1 and 2 archaeological assessments;
- A natural environment characterization and impact assessment;
- A high level erosion study and fluvial geomorphic assessment on the riverine system in the zone of influence;
- Database analysis and mapping;
- Wetland assessment and routing of connection line and access roads corridors;
- A statistical analysis of historical hydrological data;
- Hydraulic analyses;

- Conceptual engineering design; and
- Baseline surface water quality program.

The proposed mitigation measures have been developed using recognized industry standards and best management practices, through the discipline expertise of the EA team members, and in accordance with regulatory framework which governs the proposed project. Xeneca will continue to work closely with provincial and federal regulators during the formal review of this document, and through the detailed design, permitting, construction, and operational phases of the project. Xeneca is committed to verifying the implementation and effectiveness of the mitigation measures and compensatory measures detailed in this document. As part of this effort, Xeneca will regularly issue a Project Implementation Report to agencies to update the project status, provide results of on-going environmental assurance and verification programs, and results of monitoring and mitigation programs.

A summary of the existing conditions at the proposed project site, the project details and the findings of the environmental assessment is presented below.

General Site Description

The Blanche River is considered a navigable waterway as defined under the *Navigable Waters Protection Act (NWPA).* The project site is located within the Kirkland Lake MNR Administrative District; as noted previously, the project site is situated approximately 9 km north of the Town of Englehart, and falls within Lot 12, Concession 5, within the geographic Township of Marter in the Township of Chamberlain. The project site is situated primarily on privately-owned land. Legal authority to flood or otherwise affect privately-owned land will be required prior to securing regulatory approvals for the initiation of construction activities.

The Blanche River in proximity to the project site is characterized as having a high suspended sediment concentration, and as being prone to bank erosion. The pool at the base of Krugerdorf Chutes is the most ecologically-varied section of the Blanche River within the general project area; the habitat in the pool at the base of the Chutes was also identified as being suitable for benthic invertebrates.

An important set of rapids, known as Stuart's Rapids, are located approximately 3.7 km downstream of the proposed dam site of the Marter Township GS. Stuart's Rapids is a significant feature within the project's affected area because it contains one of few gravel/sandbar habitats in this part of the Blanche River, and the area downstream of theses rapids is confirmed spawning habitat for Lake Sturgeon and possibly Walleye.

General Project Description

There are presently two development options being examined by Xeneca for the proposed project. The High Dam Option (also referred to as "Option 1") is the preferred project option and would capture a surveyed gross head of 17.5 m; the Low Dam Option ("Option 2") would capture a surveyed gross head of 12.5 m, and is located approximately 80 m downstream of the proposed location for the High Dam Option. The selection of the High Dam Option as the final design is dependent on acquiring all necessary landowner tenure agreements. Agreements with private landowners are either completed or are in the process of being completed.

Construction activities can only begin following the execution of landowner agreements, regulatory approvals and authorizations, and will be subject to the requirements of applicable legislation, industry guidelines and best management practices. Xeneca will provide results of on-going environmental assurance and verification programs to the appropriate regulatory bodies. The proponent requires legal authority to flood or otherwise affect private lands prior to construction.

Operation Strategy

The operation strategy was developed based on the conceptual engineering design, available environmental data and the findings of various studies. A "modified run-of-river" mode of operation is proposed for the Marter Township GS, in which the operation of the facility would vary between run-of-river and intermittent peaking depending on the flows in the river. When natural flows are below the maximum capacity of the turbines (16 m^3/s), but above the required ecological flow (0.5 m^3/s), water will be stored during off-peak hours for use during peak hours, affecting water levels upstream and flows downstream. This approach allows for operating the facility in an environmentally responsible manner while maximizing the waterpower potential of the site for the delivery of clean electricity to the province especially during peak demand periods. All electricity produced displaces the need for electricity from fossil or nuclear sources. Distributed generation to remote areas also "Islands" consumers against service interruptions (e.g., ice storms and black-outs) and provides positive benefits to the power grid. Over the long-term, the electricity produced will provide financial benefits to local and provincial government.

The construction of the proposed Marter Township GS will result in a backwater effect upstream of the proposed dam location, increasing water depths and newly inundating adjacent riparian lands. The affected area is known as the inundation area; the High Dam Option would result in upstream inundation extending approximately 2.4 km upstream of the dam; the Low Dam Option would result in upstream inundation extending approximately 1.7 km from the water control structure. In order to minimize negative environmental impacts, storage is limited to a few hours during moderate and low flows.

The proposed modified run-of-river operations will result in a "Variable Flow Reach" spanning from the area immediately downstream of the facility to a distance downstream where the variability in flow is attenuated by the presence of a lake or a confluence with a significant tributary. Within the Variable Flow Reach, water depth, flow velocity and wetted channel perimeter can change substantially from on-peak to off-peak hours under modified run-of-river operations. Downstream of the confluence between the Blanche River and the Englehart River (approximately 13.8 km downstream of the project site), any alteration in flow caused by the Marter Township GS would be difficult to distinguish from existing conditions.

Downstream of the confluence between the Blanche River and the Misema River (approximately 2 km downstream of the Marter Township project site), flows are currently influenced by operations of the Misema GS. In order to minimize potential cumulative impacts resulting from operations of two waterpower facilities, the Marter Township GS is proposed to operate in a harmonize fashion with the Misema GS, in order to meet the following objectives:

- Avoid simultaneous peaking of both the Marter Township GS and the Misema GS;
- Avoid increasing the magnitude of fluctuations on the Blanche River (downstream of the confluence with the Misema River) beyond those currently experienced;
- Ensure that flows on the Blanche River, as measured at the Water Survey of Canada gauge 02JC008 (downstream of the Marter/Misema confluence), do not fall below 2.3 m^3/s, the minimum flow currently experienced at that location.

Potential Project Effects

In order to mitigate against negative impacts to Walleye and Lake sturgeon spawning downstream of the Marter Township GS, special operating restrictions will be implemented that will see the facility operate as purely run-of-river for much of the spawning and early life stages of these species; larval drift of Lake sturgeon will be facilitated by limiting the magnitude of modified operations to a maximum daily range of 5 m^3/s with no intermittent operations. Specific water temperature triggers will determine when these operating restrictions start and end in a given year; these triggers were selected based on water temperature ranges in which Walleye and Lake sturgeon spawning and larval drift are known to occur.

During the construction and operation phases of development, the applicable regulations will be respected in order to ensure the health and safety of all contractors, construction crews and operational staff. For the safety of the public, access will be restricted during construction activities. Safety measures will be erected to restrict public access to the work areas, and a permanent portage trail will be constructed to provide recreational users with a means to bypass the built structures.

Consideration was also given to impacts specifically related to potential accidents and malfunctions that may occur during the construction and operation of the facility. The proper implementation of mitigation measures and best management practices will minimize the likelihood of accidents such as spills and leaks during the construction period. A spill response plan will be developed for the construction program to manage any accidental releases of contaminants required for the operation of construction equipment; any releases of contaminants will be reported to the MOE Spills Action Centre. A detailed list of mitigation measures to be implemented during the construction program is provided in this ER.

In order to preserve the aesthetic quality of the project area, the proponent will strive to maintain and enhance vegetative buffers between the river, roads and any ancillary works.

Positive Effects

The construction of the proposed facility will introduce employment opportunities to the communities of Englehart and surrounding area through local sourcing of materials, equipment and services (where available). Employment opportunities may also exist for area First Nation and Aboriginal communities.

Hydro-electric generating station owners and water power leaseholders are required to pay taxes and charges calculated on their hydro-electric generating station's gross revenue. These taxes and charges are defined under section 92.1 of the *Electricity Act*, 1998 and are known as the Gross Revenue Charge (GRC). The GRC is composed of three components; property tax, property rental charge, and water rental charge. The amount of annual gross revenue payable to the Ministry of Finance by the hydropower proponent is determined by considering these three factors in a simple mathematical calculation and by multiplying the station's annual generation for the year by a standard rate of $40,000 dollars. The annual generation rate for the Marter Township GS is estimated to be 9.17 GWh, therefore the gross revenue charge for the Marter Township GS is estimated to be $44,030.00 per annum, or $1,320,912 over 40 years (including a 10-year tax holiday).

Benefits to Aboriginal communities, including employment opportunities, are being discussed as outlined in the Aboriginal Consultation Plan. Discussions also include MNR's "Business to Business" relationship process for Identified Aboriginal Communities. Xeneca has voluntarily committed to support the Crown's consultation responsibilities to the Aboriginal Communities and its fiduciary obligations as defined within *Bill 150, Green Energy and Green Economy Act, 2009 (GEA)* and the Ontario Power Authority's Feed-In Tariff process and other related Crown objectives.

The project will provide to the region a source of reliable and clean electricity for 75+ years that will help meet local demand and support local supply during interruptions to service such as ice storm and blackouts.

As a lower cost source of electrical production, waterpower will provincially assist in keeping electricity prices economical and help displace fossil fuel and nuclear sources of generation and improve system reliability.

New projects such as the Marter Township GS will help Ontario's waterpower industry facilitate a generational knowledge transfer that will allow it to compete in the global market for the potential 575,000 MW of new supply and 875,000 MW of refurbishments. Domestic development of waterpower has been stagnant in Ontario since the 1990s and the Marter Township GS also provides this Ontario industry an opportunity to showcase its talents and expand so as to meet the growing global demand for equipment and talent for waterpower maintenance and development.

Positive environmental effects are the production of 9,300 MW of clean electricity with no aerial emissions for 75+ years that provide a reliable source of electricity that is economical. Environmental benefits are estimated at:

- The displacement of 6,411 metric tons of carbon dioxide equivalent per annum;
- Reduction of annual greenhouse gas emissions equivalent to 1,257 passenger vehicles; or,
- The sequestering of carbon from nearly 1,367 hectares of pine or fir forests.

Residual Adverse Effects

The effects of a project that are expected to remain despite the application of mitigation measures are referred to as residual effects. The residual effects of the proposed Marter Township GS development, both positive and negative, and their significances were evaluated during the course of the EA planning process.

Negative residual effects are anticipated for habitats (terrestrial and aquatic) that will be inundated as a result of the creation of the headpond. The loss of terrestrial habitat for shoreline species is deemed to be not significant due to the small area to be impacted in relation to the abundance of these habitat types on the surrounding landscape; therefore any loss of habitat would likely have a negligible effect on their overall regional populations.

Significant negative residual effects are anticipated for fish and benthic habitat within the upper extent of the inundation area as a result of the project. The extent of these will be measured for discussion with DFO and MNR in the final engineering design phase of the project for federal permitting purposes; adaptive management for fisheries habitat will be applied as required.

Positive residual effects are expected for local and regional employment, potential for economic development, the reduction of aerial emissions, and for the reliability and security of electricity and energy in the region.

Cumulative Effects

Cumulative effects are the long term changes resulting from the combined effects of successive actions on the environment, and can result from the interaction of residual effects from multiple projects in a given area or multiple activities acting on a single ecosystem component.

The proper implementation of the proposed operating restrictions for the Marter Township GS, including the harmonization of its operations with those of the Misema GS, will minimize potential cumulative impacts downstream of the confluence of the Blanche River and the Misema River. While the duration of each peaking event will be staggered over a longer time period, the *magnitude* of daily peaking events downstream of this confluence will remain within the range currently experienced on the river; additionally, there will continue to be only one discernible peak in the river each day following project construction. The development of the Marter Township GS is anticipated to result in a 25% increase in the number of peaking events per year, due to the days in which only the Marter Township GS (and not the Misema GS) is operating.

Monitoring and Follow-up Programs

Monitoring programs have been proposed for the construction, post-construction and operation phases of the development. These programs will ensure that mitigation measures and industry best management practices are being properly implemented and adverse effects are minimized.

Conclusion

It is anticipated that the implementation of offsets, to be discussed with the MNR and DFO, will minimize the negative residual impacts associated with the loss of benthic habitat and potential fish spawning habitat in the proposed headpond. It is the conclusion of this environmental assessment that there will be no additional significant negative residual environmental effects after application of mitigation measures and compensation measures. The proponent believes there will be a net economic benefit of the project.

There are also many positive environmental effects associated with the project which are considered to offset any potential environmental impacts. These are: the tangible economic benefits for the local communities and the regional/provincial economy, employment and training opportunities, the creation of reliable and secure green energy for the province, and the generation of electricity through a renewable energy supply in support of the province's *Green Energy Act.*

The proponent believes the project provides net positive environmental and socioeconomic impacts to the region and the province. The project also meets the desired direction of the "One Window" on energy procurement and the objectives as defined within the *Green Energy Act*.

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Acronyms

AANDC	Aboriginal Affairs and Northern Development Canada (formerly Indian and Northern Affairs Canada)
AST	Above-ground Storage Tank
BMA	Bear Management Area
BMP	Best Management Practice
CEAA	*Canadian Environmental Assessment Act*
CEA Agency	Canadian Environmental Assessment Agency
CMP	Construction Management Plan
DFO	Fisheries and Oceans Canada
EA	Environmental Assessment
EAA	*Environmental Assessment Act*
EC	Environment Canada
ER	Environmental Report
FEAC	Federal Environmental Assessment Coordinator
FIT	Feed-In Tariff
FMP	Forest Management Plan
FN	First Nation
FRMG	First Resource Management Group
FSL	Full Supply Level
GEA	*Green Energy Act*
GRC	Gross Revenue Charges
GS	Generating Station
HADD	Harmful Alteration or Disruption of Fish Habitat
LIRA	*Lakes and Rivers Improvement Act*
ME	Ministry of Energy
MNDM	Ministry of Northern Development and Mines
MNR	Ministry of Natural Resources
MOE	Ministry of the Environment
MTCS	Ministry of Tourism, Culture and Sport
NOC	Notice of Commencement
NOL	Normal Operating Limit
NRCan	Natural Resources Canada
NWPA	*Navigable Waters Protection Act*
OFAH	Ontario Federation of Anglers and Hunters
OPA	Ontario Power Authority
OPG	Ontario Power Generation
OSB	Oriented Strand Board
OWA	Ontario Waterpower Association
PC	Point of connection
PCC	Point of common coupling

PIC	Public Information Centre
PWQMN	Provincial Water Quality Monitoring Network
PWQO	Provincial Water Quality Objectives
Q_{99}	Streamflow exceeded 99% of time
Q_{95}	Streamflow exceeded 95% of time
Q_{80}	Streamflow exceeded 80% of time
Q_{50}	Streamflow exceeded 50% of time
Q_{20}	Streamflow exceeded 20% of time
Q_{EA}	Downstream environmental flow target
Q_{COMP}	Compensatory flow (between dam and tailrace)
Q_{MED}	Median streamflow value
Q_{TMAX}	Maximum turbine capacity
Q_{Tmin}	Minimum turbine flow
Q_{TL}	Limited turbine flow – modified ROR
Q_{HWM}	Streamflow corresponding to high water mark
7Q2	2 year return period 7-day-average-low flow
7Q10	10 year return period 7-day-average-low flow
7Q20	20 year return period 7-day-average-low flow
Q1:2	High streamflow event; occurrence of 1 in 2 yr
Q1:100	High streamflow event; occurrence of 1 in 100 yr
RA	Responsible Authority
ROR	Run-of-River
ROW	Right-of-way
SAR	Species at Risk
SARA	*Species at Risk Act*
SFL	Sustainable Forest Licence
SIP	Site Information Package
TC	Transport Canada
TFAI	Timiskaming Forest Alliance Inc.
VEC	Valued Ecosystem Components
WHSL	Woodland Heritage Services Ltd.
WMP	Water Management Plan
WMU	Wildlife Management Units
ZOI	Zone of Influence

Units

°C	degrees Celsius
dBA	decibel
km	Kilometre
km^2	Kilometre squared
kV	Kilovolt

kW	kilowatt
kWh	kilowatt hour
m	metres
m^2	square metres
masl	metres above sea level
m/s	metres per second
m^3	Cubic metre
m^3/s	cubic metres per second
MW	megawatt
MWh	megawatt hour
r/min	revolutions per minute
µg	microgram
umho/cm	micromhos per centimetre

1. INTRODUCTION

This section presents an introduction to waterpower in Ontario, an overview of the proposed project, and the methods used to complete the work presented herein.

1.1 WATERPOWER IN ONTARIO

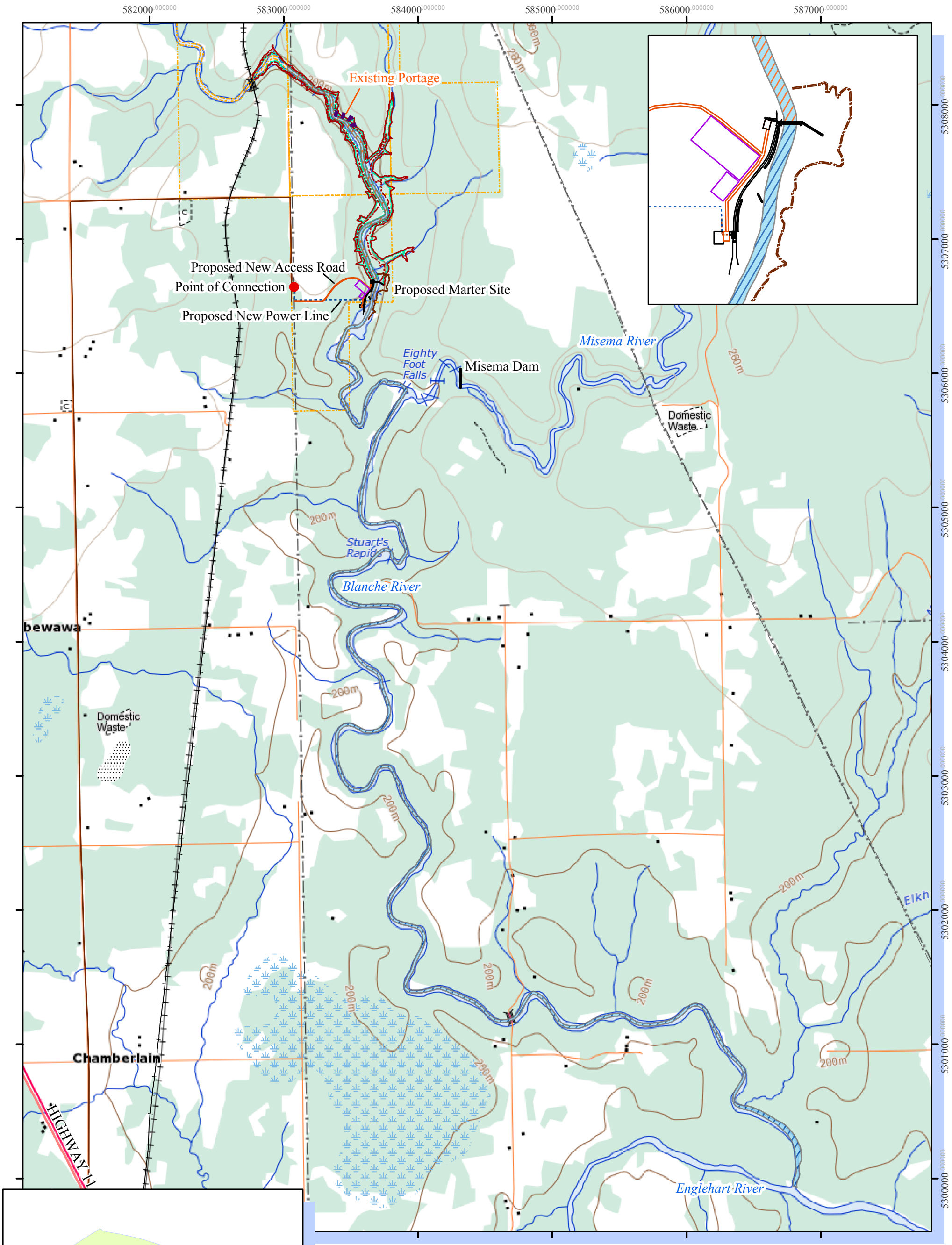
Hydroelectricity is generated from water, a naturally replenished source making waterpower both a renewable and sustainable resource. Waterpower currently accounts for approximately one-quarter of Ontario's installed capacity and electricity production (OWA Class EA, January 2014). The greenhouse gas emissions from a hydroelectric generating station are effectively zero. Waterpower generation can provide both peak and base load energy, which replaces non-renewable sources of power such as coal and natural gas. Some waterpower facilities are designed and operated to store energy (water) until it is needed for peak periods of usage.

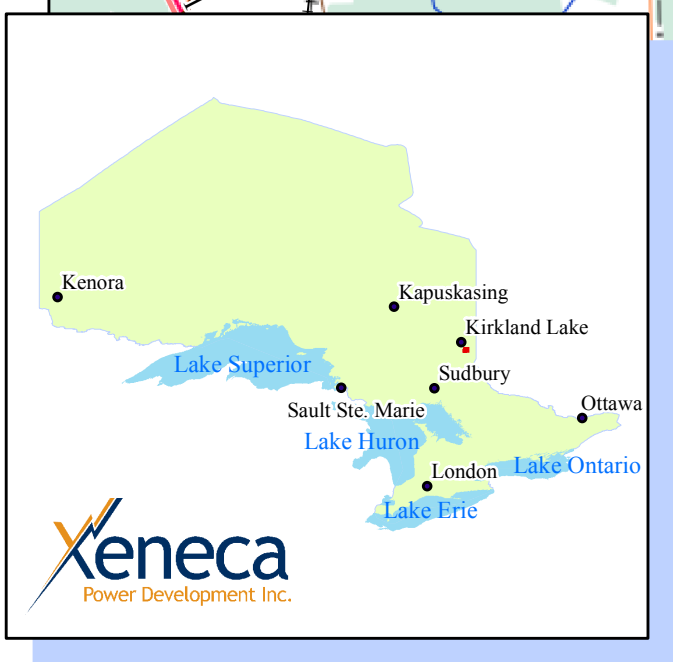
Hydroelectric generating stations are long-lived, lasting upward of eighty (80) years; there remain operating facilities within the province that were constructed at the turn of the 20th century. In 2009, the Ontario *Green Energy Act* (*GEA*) was enacted with the aim of making the province a global leader in clean, renewable energy. The Feed-In Tariff (FIT) Program administered by the Ontario Power Authority (OPA) was established under the *GEA* to encourage the development of renewable energy in Ontario while phasing out the province's coal-fired electricity by 2014. The FIT was designed to promote economic activity, the development of renewable energy technologies and the creation of new green industries and jobs.

1.2 INTRODUCTION TO PROJECT

Xeneca Power Development Inc. (Xeneca) is proposing the construction of a 2.1 megawatt (MW) hydroelectric generating station (GS) on the Blanche River in Marter Township, on Lot 12, Concession V. The proposed project would meet the provincial government's objectives to generate sustainable and reliable hydroelectric power. The project was awarded a 40-year FIT contract from the OPA which, subsequent to a successful Environmental Assessment (EA) outcome and the ensuing permitting and approvals phase, would see the facility commissioned and delivering electricity to the provincial supply grid by October 2018. (*Note: in a June 26, 2013 directive to the OPA, the Minister of Energy stated that existing waterpower FIT contracts were to be offered a 3-year extension to the Milestone Date for Commercial Operation. Prior to the announcement of the 3-year extension, the Marter Township GS had a commissioning date of October 2015.*)

The project site is located on the Blanche River, approximately 9 km north of the Town of Englehart. The project site falls within the geographic Township of Marter in the Township of Chamberlain. Two design options are being considered for the proposed project, which will be described in greater detail in Section 3. These two options involve a "High Dam Option" (also referred to as "Option 1" in the supporting material of this ER) and a "Low Dam Option (also referred to as "Option 2"). Site location maps for the High Dam Option and the Low Dam Option are presented below as Figures 1a and 1b, respectively.





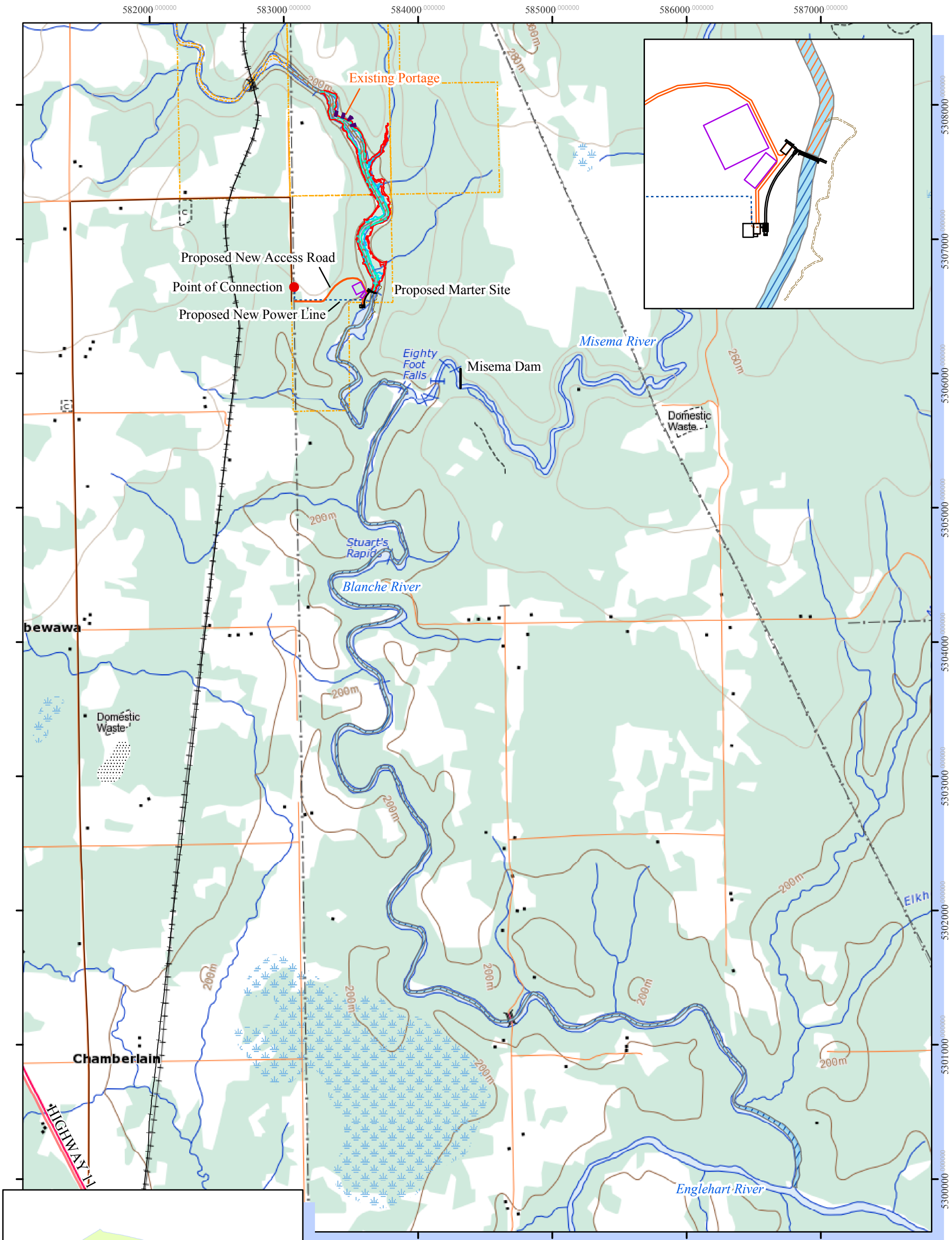
Reference data from the LIO, MNR, NRCan - UTM 17N - Rev 6 Produced by N Collard 2013 Oct 11 (Rev 1 - Kerri-Ann Jones 2013 Jan 18).

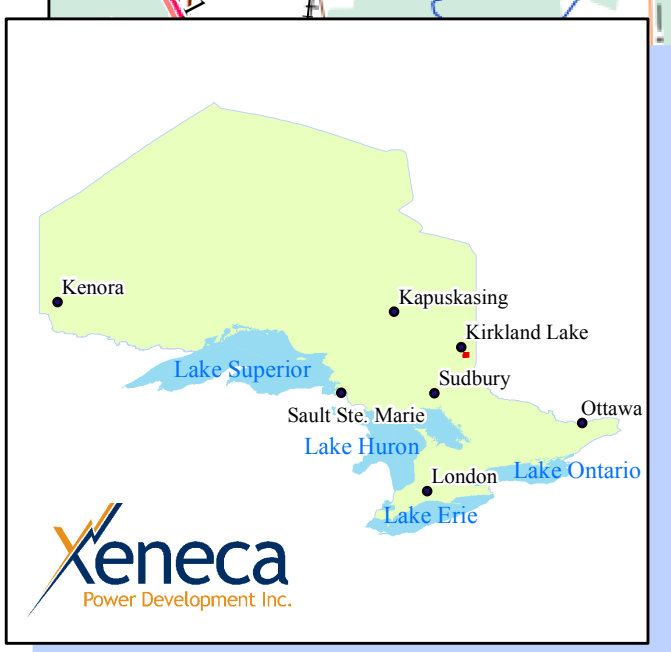
Figure 1a: Marter Twp Site Location and Zone of Influence (Option 1)

- Upstream Zone of Influence
- Downstream Zone of Influence
- Municipal Lots - Private
- Marter Dam - Option 1
- Substation
- Laydown Areas
- Proposed New Power Line
- Existing Conditions LTAF Flood Elevation
- Proposed Conditions LTAF Flood Elevation
- Existing Conditions 100 Year Flood Elevation
- Proposed Conditions 100 Year Flood Elevation
- Utility Lines
- Public Transmission Line
- Railway
- Existing Road
- Proposed New Access Road
- Existing Portage
- New Portage Trail

N

0 205 410 820 Meters





Reference data from the LIO, MNR, NRCan - UTM 17N - Rev 6 Produced by N Collard 2013 Oct 11 (Rev 1 - Kerri-Ann Jones 2013 Jan 18).

Figure 1b: Marter Twp Site Location and Zone of Influence (Option 2)

- Upstream Zone of Influence
- Downstream Zone of Influence
- Municipal Lots - Private
- Existing Road
- Marter Dam - Option 2
- Substation - Option 2
- Laydown Areas - Option 2
- Proposed New Power Line - Option 2
- Existing Conditions 100 Year Flood Elevation
- Existing Conditions LTAF Flood Elevation
- Proposed Conditions 100 Year Flood Elevation
- Proposed Conditions LTAF Flood Elevation
- Utility Lines
- Public Transmission Line
- Railway
- Proposed New Access Road
- Existing Portage
- New Portage Trail

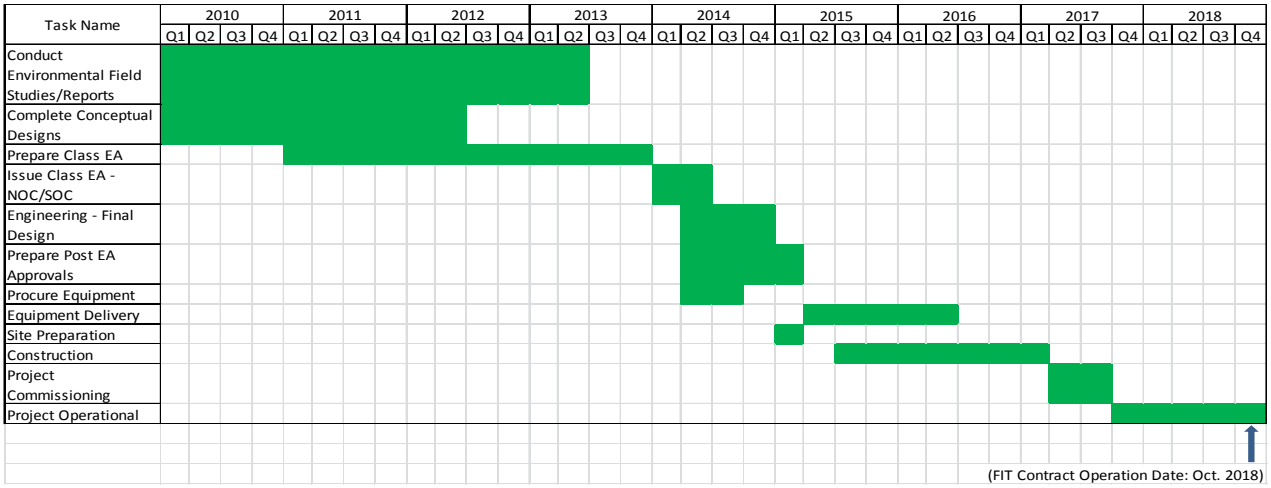
N

0 205 410 820 Meters

1.2.1 Tentative Project Development Schedule

A tentative project development schedule outlining key project phases which have been or will be completed is provided below in Figure 2.

Figure 2: Project Development Schedule



1.3 Overview of the Environmental Screening Process

The purpose of an EA is to recognize the potential effects of a project life cycle early in the project planning phase and take these effects into account during the development and design of the project. Environmental effects include both the positive and negative effects that a project would have, or could potentially have, on the environment at any stage in the project life cycle. The assessment also considers the effects of the environment on the project. The environment is defined as a combination of natural/physical, socio-economic, and cultural/human factors.

The planning process under the Class EA for Waterpower Projects (revised January 2014) developed by the Ontario Waterpower Association (OWA) allows a proponent to assess the potential effects to the environment using the best information available in order to make an informed decision about whether a project should proceed to implementation. The proponent is required to identify potential effects from the proposed undertaking and propose mitigation on the proposed effects. The proponent is also required to consult with regulatory agencies, the public and Aboriginal communities in the identification of potential effects and to seek resolution to issues that are raised during the EA process. This process is frequently referred to as the Waterpower Class EA.

The components of hydroelectric projects evaluated by the Waterpower Class EA can include reservoirs or head ponds, water control structures, water conveyance structures (canals or penstocks), powerhouses, and access routes. Connection lines rated less than 115 kV and transformer stations rated less than 115 kV are also components of the overall project, but the assessment of these components is not required under the Waterpower Class EA; any information related to the connection line presented in this report is provided for the information of the reader (see also the discussion in Section 1.4.1 on the MNR-RSFDP Class EA process).

For each of the project components, there are direct activities associated with their construction, operation and maintenance (e.g. removal of vegetation in the project footprint and the initial filling of the headpond). There are also indirect activities related to the maintenance and operation of these facilities, including small volumes of non-hazardous waste generation and their disposal, and a backup generating system powered by fuel.

The process of conducting this EA entailed the examination and evaluation of each component of the proposed development and their potential effect on each aspect of the current environment. Environmental effects may include, but are not limited to, alteration/loss/gain of natural features, flora or fauna and their habitat, ecological functions, natural resources, air and water quality, and cultural or heritage resources. Environmental effects may also include the displacement, impairment, or interference with existing land uses, land use and resource management plans, businesses or economic enterprises, recreational uses or activities, cultural pursuits, and social conditions and economic attributes.

1.3.1 Addendum Provisions for Environmental Reports

Should changes be proposed to the Marter Township GS from what is presented in this ER, Xeneca must determine if the addendum provisions outlined in Section 8.8 of the Class EA for Waterpower Projects (January 2014) apply to the project change. Similarly, these addendum provisions must be applied if, following the construction/implementation of the project as described in this ER, Xeneca wishes to make a minor modification to the Marter Township GS project (i.e., a modification that is below the threshold for a significant modification under the Electricity Projects Regulation). A significant modification is any expansion of or change in the facility that would increase the name plate capacity of the facility by 25% or more. If a significant modification is considered at any time in the future a full Class EA planning process would be required to assess the effects of the change.

The addendum provisions of the Class EA for Waterpower Projects would require the proponent to determine whether the proposed change(s) may result in new negative effects to the environment. In such a scenario, an Addendum to the ER must be prepared, outlining the proposed changes, the rationale for proposing and the implications of these changes, and a review of the mitigation measures that will be applied to minimize these effects. As with the ER

presented herein, an Addendum to the ER would be subject to a minimum 30-day review period with the opportunity to request a Part II Order.

1.4 APPROACH TO THE ENVIRONMENTAL SCREENING PROCESS

The EA team included internal departments within Xeneca (i.e. personnel from the Corporate Affairs and Communications (including Public Affairs and Aboriginal Relations), Environmental Affairs, Engineering, and Legal Affairs departments), as well as technical consultant firms retained by Xeneca for the proposed undertaking as such:

- Canadian Projects Ltd.
- Coldwater Consulting Ltd.
- Hatch
- Hutchinson Environmental Sciences Ltd.
- KBM
- BluMetric Environmental Inc.
- Ontario Resource Management Group Inc. (ORMG)
- ORTECH Consulting Inc.
- Northern Bioscience
- Parish Geomorphic Limited
- Woodland Heritage Services Ltd. (WHSL)

1.4.1 Legal Framework

As a waterpower development with an installed capacity less than 200 MW, this project is subject to the Class Environmental Assessment for Waterpower Projects (herein referred to as the Waterpower Class EA) planning process developed by the OWA as approved by the MOE in October 2008 (revised in January 2014) under the Ontario *Environmental Assessment Act (EAA)*. This section of the Blanche River is part of a waterway system that includes the Misema and Englehart rivers which have a number of existing water level or flow control facilities, therefore the proponent has categorized the proposed waterpower facility on the Blanche River at Marter Township as a 'new project on a managed waterway' as per the definitions in the Waterpower Class EA (see Appendix A of this report).

The EA team also reviewed other applicable environmental assessment guidelines and legislation regulating small hydroelectric developments in the Province of Ontario, and determined that the following regulatory processes and guidelines may be applicable to this undertaking:

- The Federal Requirements for Waterpower Development Environmental Assessment Processes in Ontario – Practitioner's Guide (DFO-OWA, 2010); and
- The Water Management Planning Guidelines for Waterpower, Ontario (MNR, May 2002).

The proposed project may also require an authorization from Fisheries and Oceans Canada (DFO) under the *Fisheries Act* and an approval from Transport Canada under the *Navigable Waters Protection Act* (NWPA). In the early stages of the planning process, these federal regulatory approvals triggered the requirement for a screening-level environmental assessment under *Canadian Environmental Assessment Act* (*CEAA*). Since the enactment of the new *EAA* 2012 a federal screening is no longer required. As such, this ER document is primarily intended to meet the Waterpower Class EA requirements, through federal regulatory information requirements have been addressed where possible.

Based on a preliminary review of the project, the MNR indicated that the assessment of the connection line to be constructed as part of the project would also be subject to review under the Class Environmental Assessment for MNR Resource Stewardship and Facility Development Projects, Ministry of Natural Resources (MNR-RSFDP Class EA). Subsequent amendments were made to Ontario *Regulation 334* under the *EA Act* (s. 15.0.1) that exempt any undertakings by or on behalf of the Crown that are being carried out only for the purposes of implementing a renewable energy project. Waterpower projects are subject to the requirements of the *EA Act* under Ontario *Reg. 116/01*, with the Waterpower Class EA as the primary planning process. The proposed connection line for the Marter Township GS falls into a 'Category A' undertaking as per O. *Reg. 116/01* and is therefore exempt from an *EA* requirement. As the Ministry responsible for managing most Crown resources, through disposition, approval and permits under a number of statutes, MNR has indicated that it still requires information to support decisions related to the disposition, approvals or permits required for transmission line projects. As such, Xeneca has included preliminary information on the connection line route in this document and in public information centres towards satisfying future permitting consultation requirements.

1.4.2 Characterize Local Environment of Proposed Development

The EA team collaborated in the completion of the Potential Effects Identification Matrix. This matrix was included in the Project Description document (Appendix B) developed by Xeneca, and circulated to regulators in order to begin the planning process. The EA team worked with many stakeholders at the local, provincial and federal levels to ensure that the local environment including physical, social/cultural and economic aspects were well understood.

The EA team completed the following tasks to characterize the local environment in the proposed development areas:

- A detailed literature review of existing information available through provincial, federal and other databases and reports. The documents are identified in the References section (Section 16) in this document and in the technical reports referenced throughout this document.
- Field investigations to supplement the terrestrial and aquatic biology data available for the site. The EA team undertook detailed field investigations throughout the project area to document existing conditions and assess the potential effects of the project on these conditions. The results of these studies are presented throughout this document. This information and the expert advice of the EA team members are presented throughout this document. The results of these studies are presented throughout this document and in detailed reports in Annexes III and IV.
- Stage 1 and Stage 2 Archaeological Assessments to supplement the available historical record for the site. The results of these studies are presented throughout this document and in a detailed report in Annex V.
- Engineering field investigations to supplement the topography, water depth and hydrology data. A statistical analysis of historical hydrological data was completed. Hydraulic modeling was also undertaken to assess flow depths and velocities. Steady-state and unsteady-state hydraulic models were developed using HEC-RAS. This information can be found in Annexes I and II.
- A leaf-off aerial photography program was undertaken for all distribution line and access routes (20 centimetre (cm) resolution) utilizing digital true colour RGB ortho-photography. This was later augmented by a ground-truthing exercise for route segments running along existing roads. Each of the forest management companies that held Sustainable Forest Licenses (SFLs) were consulted regarding the project sites and additional information was obtained from the licensees. A summary report on the proposed transmission lines and roads can be found in Annex VI.
- A geomorphic assessment to characterize existing channel form and processes, including sediment dynamics, in the Blanche River in and around the project site. The potential impacts of the proposed project on sediment dynamics and slope stability were assessed. The geomorphic assessment report can be found in Annex I. Two addendums to the geomorphic assessment were also developed to address issues related to erosion monitoring and total suspended solids, and these documents can also be found in Annex I.

1.4.3 Identify Potential Environmental Effects

The EA team used a consultative approach to identify the potential effects of the project in the early stages of the planning process through the completion of the Potential Effects Identification Matrix from the Class EA for Waterpower Projects (Appendix B of this report). The matrix is useful in determining the data gathering and analysis program; it was circulated to the regulators at the beginning of the environmental assessment planning process.

In examining the potential effects of this project, the EA team considered the construction and operation/maintenance phases of the project, and their potential impacts within the determined ZOI. It should be noted that the project is expected to operate for more than 75 years, and the legislative requirements for decommissioning may evolve substantially over that time period. Additionally, a proper assessment of the impacts of decommissioning the Marter Township GS requires a solid understanding of baseline conditions, which in this case, are the characteristics of the biophysical and socio-economic environment prior to the start of any proposed decommissioning activities. Knowing that the biophysical and socio-economic environment may evolve substantially over a period of 75+ years, any assessment of decommissioning impacts, if conducted at this early stage of project development, would be speculative at best. As such, decommissioning activities are not assessed as part of this EA; the planning and approval of decommissioning will be addressed through the applicable legislation in place at that time (planning and other applicable regulations).

1.4.4 Identify Required Mitigation, Monitoring or Additional Investigations

Based on their areas of expertise, members of the EA team developed a summary of recommended actions to prevent or mitigate negative effects of the proposed undertaking on the environment. These mitigation measures were compiled based on the information collected during the study period (field and desktop), the Ontario Waterpower Association resource library, through consultation with government agencies, the information collected through the public consultation initiative, and Aboriginal engagement efforts. The residual effects, those that cannot be prevented, avoided or mitigated, are classified based on their significance. It should be noted that residual effects also include the positive benefits that would be achieved through the lifecycle of this project to ensure that all potential net effects are afforded consideration.

Recommendations for environmental monitoring, where on-going data collection will be required to monitor short-term or longer term effects (i.e. those that would be experienced during construction and those that may be experienced subsequent to commissioning) are included within this document. Environmental monitoring, if required, during both construction and operation will be subject to regulatory approval at the permitting stage in advance of construction.

The proponent has offered formal commitments related to the undertaking which may be required in advance of permitting, including additional data collection. A list of commitments proposed by Xeneca in support of the waterpower development is presented in Section 14, and throughout the main document and annexes.

1.4.5 Agency and Public Consultation and Aboriginal Communities Engagement

The consultation and engagement initiatives was designed to combine the regulatory, public and Aboriginal community notification, engagement and consultation requirements for all applicable environmental assessment and regulatory approval processes, and present the results of these

initiatives within this document. The regulatory agencies, First Nations, Aboriginal groups, municipalities/townships, public interest groups, and additional stakeholders that may have an interest in the proposed undertaking that were identified during the EA planning process for the project include:

Canadian Environmental Assessment Agency (CEA Agency)
Aboriginal Affairs and Northern Development Canada (AANDC) (*formerly Indian and Northern Affairs Canada*)
Fisheries and Oceans Canada (DFO)
Transport Canada (TC)
Environment Canada (EC)
Natural Resources Canada (NRCan)

Ontario Ministry of Aboriginal Affairs (MAA)
Ontario Ministry of the Environment (MOE)
Ontario Ministry of Energy (ME)
Ontario Ministry of Municipal Affairs and Housing (MMAH)
Ontario Ministry of Natural Resources (MNR)
Ontario Ministry of Northern Development and Mines (MNDM)
Ontario Ministry of Tourism, Culture and Sport (MTCS)
Ontario Ministry of Transportation (MTO)

Beaverhouse First Nation
Matachewan First Nation
Wahgoshig First Nation
Timiskaming First Nation
Temiskaming Métis Council
Temagami First Nation
Métis Nation of Ontario
Wabun Tribal Council

Township of Chamberlain
Town of Englehart
Town of Kirkland Lake

Riparian landowners

Bayly Watershed and Lakes Association
Timiskaming Forest Alliance
Ontario Federation of Anglers and Hunters
Kirkland Lake District Game & Fish Protective Association

Canadian Sportfish Industry Association
Swamp Rats 4x4 Club
Ontario Federation of Snowmobiles Club
Ontario Trails Council
Environmental Committee, Paddle Canada
Whitewater Ontario
Ontario Recreational Canoeing and Kayaking Association
Englehart Nordic Ski Club

A summary of the key consultation activities is provided below:

- A Notice of Commencement (NOC) and two subsequent revisions to the Notice were issued by Xeneca. The NOCs were concurrently advertised in local media. The first NOC was issued on July 28, 2010. The NOC was revised to include a tentative project schedule and anticipated legislative requirements, and re-issued on November 10, 2010, and again on December 22, 2010.
- A Project Description for the hydroelectric generating station was issued in August 2011 to provincial ministries, municipal stakeholders, the OWA and circulated federally through the Federal Environmental Assessment Coordinator (FEAC). An EA Coordination planning meeting was held on October 21, 2011, and was attended by federal and provincial regulators. A record of Agency consultation is provided in Appendix C, a summary of the regulatory consultation is presented in Section 6.3.
- Public Information Centres (PIC) were held in the Town of Englehart on August 23, 2011, and on June 27, 2012. Public consultation events held in support of this undertaking are detailed in Section 6.4; a public consultation log is presented in Appendix D.
- The Project Description was distributed on August 31, 2011 to the Beaverhouse First Nation, the Wahgoshig First Nation, the Matachewan First Nation, the Timiskaming First Nation and the Métis Nation of Ontario. A record of Aboriginal engagement and consultation in support of this undertaking is provided in Sections 6.5 to 6.8.
- Advertisements, mandatory notifications, and correspondences for the Marter Township GS project are discussed further in this report and copies are provided in their respective appendices.
- While there is no formal requirement for an inspection of the Draft ER under the Class EA for Waterpower Projects for new projects on managed waterways, a Draft ER was circulated to key agencies in order to facilitate an efficient regulatory review of the final document. The Draft ER was circulated to the MNR, MOE, DFO and Ministry of Northern Development and Mines (MNDM) on August 30, 2012.
- A Notice of Completion is issued for publication in local media, emailed to stakeholders and posted on the Xeneca website.

- The Final ER is provided to regulatory agencies, First Nations, Aboriginal groups and made available for electronic review to local stakeholders that were identified during the EA planning process. As per the Class EA for Waterpower Projects, the Final ER will be available for a 33-day formal review period (February 10, 2014 to March 14, 2014). Hard copies of the ER are placed in the following public viewing locations:
    - Englehart Town Hall (Town of Englehart)
    - Chamberlain Town Hall (Township of Chamberlain)
    - Teck Centennial Library (Town of Kirkland Lake)

- During the review period, all reviewers (regulator, public and Aboriginal groups) have the opportunity to submit comments on the Final ER. It is anticipated that as early as possible during the review period, participants will contact Xeneca directly to identify any outstanding issues and engage with the proponent to resolve these issues to both parties' satisfaction.
    - If, at the end of the review period, the stakeholder is not satisfied with Xeneca's proposed resolution, the stakeholder may make a written request to Xeneca to extend the review period in order to continue the discussion. If this request is not provided and/or the issue is unresolvable the stakeholder may make a written request to MOE for a Part II Order prior to the closing date of the review period. Such requests are to be compliant with requirements of the Class EA for Waterpower Projects.
    - Once the proponent has met the requirements of the Waterpower Class EA and has resolved all outstanding issues raised during the formal review period, and satisfactorily addressed any Part II Order requirements (if filed), the proponent may file a Statement of Completion.

2. EXISTING CONDITIONS

This section provides a description of the existing environmental conditions in the proposed project area.

2.1 LOCATION AND LAND OWNERSHIP IN PROJECT AREA

For the purpose of this report, the project site includes the area where the majority of the civil works (i.e., dam, powerhouse, penstock) are proposed. The project footprint includes the project site, the affected areas upstream and downstream in the river, and ancillary components such as new access roads and connection line routes.

The project site is located on the Blanche River at Krugerdorf Chutes, approximately 9 km north of the Town of Englehart. The project site falls within the geographic Township of Marter in the Township of Chamberlain; a site location map is provided as Figure 1. The project footprint is located on both private lands and Crown land. Conceptual design details are found in Annex II. The approximate geographic coordinates for the project site are (latitude, longitude): 47.906°; -79.880°. The watershed drainage area at the site is 961 kilometres squared (km^2).

Sections 2.2 to 2.8 will outline the existing infrastructure and physical environment in the general area surrounding the project site; these sections include details of existing hydroelectric facilities and water control structures, existing roads, railway lines and power lines, site topography and climate, and the geology, hydrogeology and geomorphology of the project area.

2.2 EXISTING INFRASTRUCTURE

2.2.1 Water Control Structures and Water Management Plan

There is presently no hydroelectricity being generated on the Blanche River, although generating stations can be found on its tributaries.

A 3 MW waterpower facility, the Misema GS, is currently operating on the Misema River, whose confluence with the Blanche River is located approximately 2 km downstream of the proposed Marter Township GS (see Figures 1a and 1b). Owned and operated by TransAlta, the Misema GS is approved to operate as a run-of-river facility as per the terms of the Misema River Water Management Plan.

The Englehart River flows into the Blanche River approximately 13.8 km downstream of the proposed Marter Township GS. The nearest waterpower facility on the Englehart River is the Charlton Dam in the Town of Charlton, which is rarely operated and therefore for the purposes of this impact assessment has been considered to function as a fixed weir. The Charlton Dam is located more than 25 km upstream of the Blanche River/Englehart River confluence.

2.2.2 Roads, Railway Lines and Power Lines

Highway 11 follows a southeast-northwest route through the Town of Englehart, approximately 9 km south of the Marter project. This highway is the primary traffic route through this part of Northern Ontario.

There are no public access points along the Blanche River in the area of interest. The closest access road to the site is via 1 St Road, which runs north from Highway 11. 1 St Road, a municipal road, travels parallel to the Blanche River for approximately 9 km, and transitions to Marter 2 Road. At the end of the municipal road, the Marter site is roughly 0.5 km northwest. A map of the general area can be viewed in Figures 1a and 1b above, as well as in the Power Line and Access Road Summary Report (Annex VI) and a series of downstream features maps (Annex I).

Forest access roads are administered by Timiskaming Forest Alliance Inc. which holds tenure over the area's Sustainable Forest Licenses and Forest Management Plan (FMP, 2011). There is a forest access road network associated with a clear-cut within the vicinity of the site. The nearest forest access road is approximately 400 m to the south of the site. There is potential for small boat or canoe access below the proposed project site at the Misema Generating Station. Additional small boat or canoe access close to the site can also be gained from several access roads over private property (permission is required for private land access).

An existing 44 kV transmission line (Feeder 9M5) runs west of the site location, owned by the Ontario Power Generation (OPG).

A railway line (owned by Ontario Northland Transport Commission) also runs mostly parallel to the river and passes through the center of Englehart. The railway line crosses the Blanche River approximately 2.4 km upstream of the proposed location of the dam for the Marter Township GS.

2.3 TOPOGRAPHY

The proposed dam site for the Marter Township GS is located at the upstream end of a bedrock chute known as Krugerdorf Chutes, where the rock currently obstructs the flow, forming a slow-flowing backwater area immediately upstream.

The topography of the general area is characterised by deeply incised valleys, principally the result of mechanical erosion of the surficial geology by way of the Blanche River. The Blanche River channel occurs in a valley formed by steep clay slopes. The slopes are densely vegetated, though landslide scars were documented during field visits (see the geomorphic assessment report in Annex I). The northern extent of the study area on the west side of the Blanche River features steeply sloped terrain that drops in elevation from south-west to north-east, toward the river.

During field visits in support of the geomorphic assessment (see Annex I), very few signs of channel instability were observed. While a few eroding banks and lateral bars were observed, the erosion activity is the result of localized issues rather than being directly related to channel dynamics. Between the ONR railway bridge (approximately 2.4 km upstream of the proposed dam site) to the confluence with the Misema River, both sides of the Blanche River are lined with mature vegetation, and little hydraulic erosion is believed to occur along this length: the rapids sections of the river are dominated by boulders and bedrock that are not easily eroded, and the long, backwater reaches have low energy gradients and moderate bank angles. The areas that are considered the most likely to experience erosion are the clayey sandy bluffs adjacent to the channel at the outside of channel bends.

2.4 CLIMATE

For the City of Kirkland Lake, mean daily temperatures range from a high of 17.8 degrees Celsius (°C) in July to a low of -17.1°C in January (Environment Canada, Kirkland Lake, for the period 1971 – 2000). Mean maximum daily temperatures reach a peak in July of 24.0°C, with 38.9°C being the highest daily temperature on record (July 31, 1975). The lowest mean minimum daily temperatures are reached in January (-23.4°C) with -47°C (January 17, 1982) being the coldest day on record. Annual precipitation averages 883.8 millimetres (mm) with rainfall accounting for 589.7 mm of that total. On average, September is the wettest month and February is the driest.

2.5 OVERBURDEN GEOLOGY

Soils in the project area are surrounded by dominant clay (part of the little claybelt). However, an alluvial deposit exists in the direct vicinity of the Blanche River study area. The primary component of this alluvial deposit is sand, its secondary is clay. Banks on either side of the Blanche River are prone to erosion and slumping based on their soil types. In particular, the high bank located at the confluence of the Blanche and Misema Rivers is highly unstable and has slumped in 2010 (MNR SIP). Site specific soil information may be available following site investigations to be undertaken in the pre-construction phase of the project development following the successful completion of this environmental assessment.

The proposed dam site for the Marter Township GS appears to be situated at a transition point from finer material to coarser glaciofluvial sands occurring to the south. The main river valley through the dam site is characterized by clayey sand deposits, with the exception of. There are areas with exposed bedrock, which occur intermittently along the channel. These areas of exposed bedrock are often capped with a layer of clay, as was observed during field visits during the geomorphic assessment as presented in Annex I.

2.6 BEDROCK GEOLOGY

The project study area is located within the Abitibi greenstone belt of the Canadian Shield (Ayer and Trowell, 2000). Bedrock consists of felsic to intermediate intrusive tonalite and granodiorite as well as mafic to intermediate metavolcanic flows. Geological mapping indicates that there are gold and copper occurrences within approximately 3 km of the project study area.

2.7 HYDROGEOLOGY

A review of Ontario Ministry of the Environment's electronic well records database (MOE, 2014) revealed one reported water well within an approximate 1 km radius. The well is located north of the project site and is reported to be for domestic use (MOE Database accessed on January 6, 2014). The well is located more than 400 m away from the proposed project footprint. The well is referenced as No. 6300845 and is situated on Lot 12, Concession 6 at Easting 583164.80 and Northing: 5307527.00, just north of Aidie Creek Garden Road, and east

of "E" Road. Fresh water in this well was found at 480 feet, and a final water level was set at 145 feet after 15 minutes of pumping. The well record was submitted to the Ministry of the Environment in 1976.

Site investigations to be undertaken in the pre-construction phase of the project development may provide further information on groundwater conditions at the site.

2.8 River Geomorphology and Hydrology

The following hydrological information was collected through field investigations as well as hydrologic analyses, and is presented in greater detail in Annexes I and III.

At the location of the Marter Township GS, the Blanche River has a drainage area of approximately 961 km^2. The highest mean monthly flows occur in the spring, in April and May, whereas the lowest flows occur during the winter, around January and February, as well as the late summer (August-September).

The proposed dam site occurs on the Blanche River at the upriver extent of a bedrock outcrop that forms the river channel for approximately 250 m.

The proposed inundation area will end approximately 50 m downriver of an Ontario Northland Railway (ONR) bridge. There are four (4) distinct sets of rapids in the upper 1.4 km of the proposed inundation extent. Each of these rapids are formed over bedrock outcrops. Below the last set of rapids, the Blanche River widens to form a pool approximately 75 m wide by 140 m long. Below the pool, the characteristics of the Blanche River are extremely uniform to the proposed dam location; the channel is approximately 25 m – 30 m wide. The substrate is clay, and the water is highly coloured by suspended particulate matter from the fine substrate. The current is slow. Aquatic vegetation is absent. Shoreline slopes along the banks are steep or nearly vertical, are comprised of clay, and are striated below the high water mark.

The proposed dam site is located at the upriver extent of a bedrock outcrop that spans approximately 250 m along the Blanche River. Approximately 30 m below the proposed dam site, the Krugerdorf Chutes are formed as the currents of the Blanche River are funnelled into an increasingly narrowed channel within the outcrop. As it progresses southward, the channel decreases in elevation erratically, creating several cascades or small falls within the chutes.

Approximately 120 m downriver of the dam site, a large section of bedrock erupts from the surrounding outcrop to form a large protuberance in the centre of the chutes. The result is two narrowed channels in the Blanche River that span the remainder of the chutes. The primary channel is located on the east side of the outcrop, and contains the entire flow of the river except during periods of high water. This channel is approximately 10 m wide. The western channel only receives flow during seasonal high-water. Aquatic vegetation in the dam site and Krugerdorf Chutes area is limited to abundant algae occupying the bedrock channel below the high water mark.

There are three permanent tributary streams that converge with the Blanche River within the proposed inundation project area. These are located approximately 950 m, 830 m and 10 m upstream of the proposed dam site.

The Krugerdorf Chutes empty into a pool in the Blanche River approximately 250 m below the proposed dam site. This pool is approximately 2.5 ha in size, and is the most ecologically varied section of the Blanche River within the study area. The north and east portions of the pool are shallow with substrate comprised of large boulders and bedrock. The banks here are made of nearly vertical bedrock, and rise approximately 2-3 m above the high water mark. There is a large sandbar on the western portion which creates more shallow water. This sandbar extends nearly to the centre of the pool, and occupies approximately 0.15 ha of land on the west side of the river. The southern portion of the pool is relatively deep. Its substrate is clay and mixed boulder. The south-eastern bank is nearly vertical and formed of clay which is striated below the high water mark. The south-western bank (below the sandbar) is level, and comprised of small-medium sized stone and clay.

Below the pool, there is little variation in the aquatic habitat characteristics of the Blanche River to its confluence with the Misema River, approximately 2 km from the proposed dam site. The substrate is predominantly clay, with small areas of exposed bedrock interspersed. The banks are steep, and often extend 1-2 m above the high water mark. The current is slow, and the water is highly coloured by clay. Aquatic vegetation is absent.

Approximately 130 m upriver from the confluence between the Blanche River and Misema River, there is a bedrock outcrop; this outcrop creates a shallow area for a span of roughly 30 m. During periods of low water, a portion of this outcrop protrudes from the river and extends at least half way across the channel, funneling passing water through a narrow strip on the south side of the river.

The characteristics of the Blanche River from its confluence with the Misema River to its confluence with the Englehart River are largely consistent. The channel is approximately 25 m – 30 m wide. The substrate is clay, and the water is highly coloured by suspended particulate matter from the fine substrate. The current is slow. Aquatic vegetation is largely absent. Shoreline slopes along the banks are steep or nearly vertical, are comprised of clay, and are striated below the high water mark. There are three (3) sets of rapids located in this stretch of the river at approximately 3.7 km (Stuart's Rapids), 5.6 km, and 5.8 km from the proposed dam site. All three rapids are formed as the Blanche River is funneled over bedrock outcrops. There are four (4) permanent tributaries of the Blanche River in this section of the river at 4.9 km, 10.3 km, 11.1 km, and 12.7 km (Moosehorn Creek) from the dam site.

Notable Rapids

Several rapids in the general area, both within and beyond the project's study area, are referenced by their locally-known names throughout this report and in the supporting documentation in the annexes. For the reader's convenience, these rapids are outlined below.

Krugerdorf Chutes consists of an approximately 250 m long, exposed bedrock section, located immediately downstream of the proposed dam. At the downstream end of the bedrock outcrop, the flows pour out into a pool in the Blanche River. This pool is characterised by moderate to fast flows over a variety of substrate, including gravel, sand and stone.

Stuart's Rapids are located approximately 3.7 km downstream of the proposed dam site. The rapids are formed as the river narrows from approximately 25 m to 15 m and the water descends over bedrock. The rapids are approximately 70 m in length, and descend in elevation by approximately 5 m from top to base. At the base of the Stuart's Rapids, the Blanche River widens into a pool about 110 m in diameter. The river meanders at this pool, and begins to flow in a south-west direction. The visible substrate on the north shore of the pool is sand and bedrock. The south shore forms a flat sandy point at the meander. Here, the substrate at the water's edge is sand with fine gravel, clay and coarse organic debris. After the meander, the river resumes a typical width of 30 m and the riverbank substrate returns to clay. See Figures 3a and 3b for photographs of Stuart's Rapids.

Figure 3a. Stuart's Rapids, Blanche River.

Photo © ORMG Inc.

Figure 3b. Stuart's Rapids, Blanche River.

Photo © ORMG Inc.

James' Rapids are located on the Blanche River, downstream of the confluence between the Englehart River and Blanche River, and approximately 18.5 km downstream of the proposed Marter Township GS. As will be discussed in Section 7.1, these rapids are located outside of the zone of influence (ZOI) for the proposed project, but were the subject of discussions with agencies during the delineation of the limits of the ZOI, and are therefore identified here. James' Rapids are characterized by a narrow bedrock shelf, running for a length of approximately 30 m.

2.8.1 Water Levels, Flow and Movement

Flow values for the Blanche River at the proposed Marter Township GS site were prorated using drainage basin area, from Water Survey of Canada gauges 02JC008 - Blanche River above Englehart, 1968 - 2008, and gauge 02JC009 at Swastika from 1968 - 1978. The streamflow station on the Blanche River above Englehart is located approximately 3.6 km downstream of the project site. The Blanche River at the proposed project site has a drainage area of 961 km^2. However, between this site and the streamflow station, the Blanche River is joined by the Misema River, resulting in a drainage area of 1780 km^2. Hydrographs and flow duration curves have been developed for this site and are provided in Annex I.

Stage 2 archaeological field investigations conducted by Woodland Heritage Services Limited noted the lateral migration of the river channel as well as the seasonal erosional scouring and deposition events created by the spring freshet (Annex V).

The development and operation of the proposed generating station would alter the existing river system and the hydrological characteristics of the Blanche River both upstream and downstream of the project site. The proponent is therefore required to determine the flows required to

maintain aquatic ecosystem integrity in the project's ZOI. This was accomplished using a combination of field investigation, desktop study and computer modelling.

Blanche River Downstream of the Confluence with the Misema River

Approximately 2 km downstream of the proposed site of the Marter Township GS, the Misema River joins the Blanche River. At the confluence of the two rivers, approximately 54% of the flow is estimated to originate from the Blanche River (i.e. upstream of the confluence) and the remaining 46% originating from the Misema River. For further references please see the May 9, 2013 Ortech memo presented in Annex I.

An analysis of existing, hourly hydrometric data at a Water Survey of Canada stream gauge indicate that the Misema GS operates on the Misema River as a modified run-of-river facility (see the Ortech report, "Assessment of Pre and Post Project Flow Variability Blanche River, ON (WSC 02JC008 in Annex I). Operations at the Misema GS do not appear to be clearly defined, and the existing hydrometric records indicate that the facility appears to have few limitations in terms of frequency, duration or temporal distribution. The Misema GS is capable of varying flows in the Misema River from 0.5 m^3/s to 9.1 m^3/s. The daily peak in flows generally occurs between 4 p.m. and 1 a.m.

The current operations at the Misema GS have important implications for defining the baseline conditions against which the potential impacts of the Marter Township GS are assessed. As potential impacts must be identified on the basis of changes that may occur to the current, existing environment, the currently fluctuating flows in the Blanche River (downstream of its confluence with the Misema River) are assumed to represent baseline conditions. Therefore, flows and levels in the Blanche River prior to the Misema GS operating as a modified run-of-river are not considered.

2.8.2 Surface Water Quality

Surface water quality monitoring was conducted in 2010, 2012 and 2013. All surface water quality investigations reports are provided in Annex IV for reference. The following summary is provided.

A preliminary surface water quality investigation was undertaken in 2010 to establish ambient (baseline) characteristics of the waterway. Two sampling events (spring and summer) were conducted in 2010 at three different locations. During the sampling events, general observation and characteristics of each sampling location was assessed and recorded (i.e. water level, current, color and odour). The results were compared to the Provincial Water Quality Objectives (PWQO). The PWQO were established by the Ministry of the Environment in 1994, the Ministry has jurisdiction of all surface and ground waters in Ontario under the *Ontario Water Resources Act.*

The spring sampling event was undertaken on June 6, 2010; the summer event was completed on August 9th, 2010. Exceedances of a total of five (5) parameters were reported; boron and copper were above the PWQO in the spring event, aluminum, cadmium and chromium exceeded the objectives in the summer event.

A detailed investigation into surface water quality on the Blanche River was developed subsequent to the release of the MOE's draft guidance document titled "From Class EA to Permit to Take Water: A Guide to Understanding the Ministry of the Environment's Technical Requirements for Waterpower," (January, 2012) and subsequent discussions between the proponent and the MOE.

There is a provincial water quality monitoring network (PWQMN) station on the Blanche River at Highway 112, south of Swastika (PWQMN station 18771000402). Data collected at this station over the period extending from 2003 to 2005 was reviewed. PWQMN monitoring indicates that water quality on the Blanche River is closely tied to the river's hydrograph as described in the Rationale Document in Annex IV. Notable seasonal variations in water quality were reflected in the data during spring freshet, the summer low-flow period and during late fall.

Water quality samples were collected downstream of the proposed facility in the spring of 2012, at the location identified as "Baseline" on Figure 4 of the Surface Water Quality and Fish Sampling Guidance document (HESL, 2012 in Annex IV of this ER). The baseline sampling location was selected as representative of existing water quality conditions both immediately downstream and upstream of the proposed facility site. The baseline water quality conditions should reflect the conditions to a future upstream reference site which would be beyond the zone of impact of the proposed facility. The baseline water quality samples will provide a comparative benchmark against water quality in the project area after the development of the generating station. This will allow for an assessment of whether the project affecting water quality both upstream and immediately downstream of the facility. No appreciable tributaries or inputs that would affect water quality between the facility and the future upstream reference site were identified. Additional information on the post development sampling methodology is provided in Annex IV, the location of the upstream reference point and the post development downstream sampling location are shown on Figure 4 in that document.

Pre-development surface water sampling was also completed in 2012 and 2013. Three annual open water flow periods were sampled by reviewing the mean daily hydrography for the Blanche River and as follows: immediately after the first flush of the spring freshet (mid-April to mid-May), during the summer low-flow period (late August to early September) and during the increasing fall flow (November).

The water quality sampling results indicated that all parameters is all seasons were less than the PWQO with the exception of total aluminum and iron (all events); chromium, cobalt, copper and vanadium (spring 2012); and total phosphorus (all events except the fall of 2012). These

sampling results indicate that the Blanche River in the project area has water quality results typical of that of a Canadian River overlying a clay plain. The exceedances noted are largely due to the prevalence of clay in the study area. Further sources may be attributed to the stormwater inputs from Kirkland Lake and Swastika, agricultural runoff and wastewater treatment plant effluent from the Kirkland Lake Wastewater Treatment Plant.

Methyl mercury concentrations remained relatively consistent throughout the year. A slight increase was noted during the summer sampling event, which is consistent with the trend for most metals as described below.

Water temperature was the highest in the summer and dissolved oxygen concentrations increased subtly throughout the year. This change was noted independent of temperature.

The analytical results for alkalinity indicated a moderated buffering capacity in the river. The pH was stable with a slight decrease as alkalinity dropped in the spring and fall. Thus, indicating a mild decreased buffering capacity of the river during those seasons.

Therefore, the water quality of the river is linked to seasonal flows during certain times of the year. Water quality is most sensitive to metals and nutrients which sorb to sediment during the spring freshet.

<u>Methyl Mercury</u>

Mercury is known to exist naturally in Canadian soils. Mercury can also be deposited from the air as it relates to man-made air pollution as well as natural air borne sources. High levels of mercury have been measured in northern and arctic regions, suggesting that global air borne transport and condensation of mercury in cold regions is a contributing factor in the global occurrence of mercury.

Under certain natural as well as man-made conditions, mercury can be released from the soil and lead to the formation of organic methyl mercury. Methyl mercury is readily absorbed by organisms and can accumulate in fish tissue over time. Frequent consumption of fish with high levels of methyl mercury can pose a health risk concern for humans. The provincial and federal levels of government monitor methyl mercury levels in sport fish tissue and posts consumption advisories to the public in affected areas (e.g. MOE's Guide to Eating Ontario Sport Fish, 2013) and Health Canada's Human Health Risk Assessment of Mercury in Fish and Health Benefits of Fish Consumption, 2007. These advisories provide information on how much fish can be consumed safely given the prevailing fish tissue concentrations in an area. Various water bodies across Ontario are subject to such consumption advisories, even in areas where no local man-made sources are known to exist.

During the flooding process, the decomposition of organic matter in the soils and vegetation, which naturally contain mercury, enhances the methylation of mercury process and results in the creation of methyl mercury. Methyl mercury is bioavailable and toxic. When present it is biomagnified within the food chain and poses a health concern to humans and wildlife through fish consumption.

Mercury concentrations in fish may increase after impoundment and then decrease to stable conditions in subsequent years (Hutchinson, 2013). Due to these changes, it is important to monitor the mercury concentrations in the fish tissue before and after the development occurs. Pre-development sampling will help to establish a reference of water quality and mercury concentrations in fish which then can later be compared to post-development samples to determine impacts, if any. To determine any impacts, a study was undertaken to determine the mercury concentrations in fish in the project area and establish a baseline (pre-development) concentration of mercury in fish. Large Fish samples were collected for the study using 4' trap nets. A total of four (4) sets were established at two (2) locations upriver from the inundation area of the Marter Township project from 27-30 August 2012. Forage Fish samples were collected during the same timeframe using seine nets. A composite sample of various minnow species *(Cyprinidae* spp.*)* totalling 160 g was prepared for testing on forage fish. Post-development sampling of fish tissue is recommended on three occasions, starting on the year 3 of operation, followed by sampling in years 6 and 9. It is noted that peak fish mercury levels occur approximately 5 to 15 years after flooding occurs.

Baseline sampling was completed between August 26 and 30, 2012 to coincide with the period when forage fish catches are most abundant. The fish tissue sampling was coordinated to coincide with the water quality sampling event to correlate the analytical results. The results of this study determined that the majority of large fish, such as the Smallmouth Bass and White Sucker, did not exceed the MOE consumption guideline concentrations of mercury which would limit consumption. It was noted that all fish contained mercury concentrations that were less than the average concentrations in Walleye and Northern Pike as calculated from 79 lakes throughout Northern Ontario (Hutchinson, 2013). However, some fish sampled did exceed the more stringent consumption guidelines. Therefore, as noted above, with the potential increase in mercury it will be important to continue to monitor fish post development. Based on the sampling conducted, the post-development forage fish will be the primary indicator for indications of bioaccumulation. The study noted that larger fish would be difficult to use as a representative sample as there is no barrier to upstream fish migration in the project area. Sampling should include fish located downstream of the facility to ensure the mercury concentrations of these fish do not exceed the guidelines.

A detailed methodology for the surface water quality investigation and the fish tissue sampling program and analysis is provided in Annex IV.

2.9 ECOLOGY

The following sections on the existing natural heritage environment at the Marter Township project site were summarized from information collected through review of the available literature and from field investigations. At the initiation of the project, a Site Information Package (SIP) for the Marter Township Waterpower Project, Site #2JC16-2JC17, was provided by the Ministry of Natural Resources, and is appended to this ER in Appendix A. Additional literature reviews as well as the results of site investigations (2010 – 2013) are detailed in a series of Natural Heritage reports prepared by ORMG, titled:

- 2010 Environmental Characteristics Report,
- 2011 Environmental Characteristics Report,
- 2012-2013 Environmental Characteristics Report, and
- Mitigation and Recommendations Summary Report.

A "rapid assessment" of wetlands within 500 m of proposed roads and transmission lines was conducted by Northern Bioscience, and outlined in the report, "Wetlands Rapid Assessment, Marter Township Hydroelectric Project, Roads and Transmission Lines". This report, as well as the reports by ORMG listed above, can be found in Annex III of this ER.

2.9.1 Study Area and Scoping of Natural Heritage Investigations

Detailed fisheries and aquatic habitat, and terrestrial habitat and species investigations were completed throughout 2010 - 2013 to supplement the available background information. Further investigations were required in some areas to reduce or eliminate data deficiencies. These investigations included;

- Aquatic and shoreline habitat surveys in the extended downriver study area
- Aquatic habitat cross-sections at Stuart's and James' Rapids
- Extended inundation area aquatic and terrestrial habitat survey
- Surface water quality testing on the Blanche River
- Generalized wildlife surveys
- Methylmercury fish tissue sampling
- Acoustic receiver surveys at selected habitats across the study area
- Broadcast call surveys for Canada Warbler *(Cardellina canadensis)* and Rusty Blackbird *(Euphagus carolinus)*
- Bobolink *(Dolichonyx oryzivorus)* assessment in agricultural area
- Nocturnal invertebrate light trap survey
- Raptor nest survey in the transmission line/ access corridor area
- Benthic kick-and-sweep survey in suitable habitat in the inundation area

The field investigation study area was defined based on the predicted zone of impact determined through modeling exercises (see Section 7.1). The study area for the proposed project is considered to include the upstream inundation area, the downstream 'variable flow reach' and lands adjacent to these areas, including the footprint of built structures, temporary construction areas, and the line and road corridors.

The aquatic study area extends 2.4 km upstream of the proposed dam, down to the confluence of the Englehart River. The terrestrial study area is defined as the shorelines extending 2.4 km upriver from the proposed dam, including lands adjacent extending approximately 250 m inland from each shoreline along the Blanche River. The terrestrial study area also includes the physical footprint of the project components and two private agricultural lots adjacent to the Blanche River which fall within the footprint of the proposed access route and the interconnection power line.

The aquatic habitats of the permanent water bodies within the Marter Township GS Project study area were surveyed in July and October 2010, May through August 2011, and May and August 2012. Surveys were performed in a small motorized watercraft on the Blanche River, and by foot along the tributary streams. Temperature loggers were installed above and below the project site to collect water temperature data in the project area.

2.9.2 Aquatic Habitat and Species

A description of the aquatic habitat within the study area and photographic documentation are provided in Annex III.

There are several notable aquatic habitat features in the Blanche River within the project ZOI. These include four (4) sets of rapids and three (3) permanent tributary streams in the inundation area; the Krugerdorf Chutes in the bypass area; the pool below Krugerdorf Chutes; 80 Foot Falls on the Misema River; and Stuart's Rapids, two unnamed rapids and four (4) tributaries on the Blanche River below the Misema confluence.

In addition to the permanent features listed above, the study area for the proposed project contains several habitat features that can be characterized as either terrestrial or aquatic habitat for different periods of the annual hydrologic cycle: intermittent creeks, seeps, swamps, and riparian areas are features that are generally wet and/or inundated for at least part of the year. These semi-aquatic habitats are ecologically important because they frequently contain unique features and vegetation that are preferred or required by many wildlife species, including SAR. These are described in Annex III.

Locations and key features of ecological consideration which have been studied include as described below:

1) Krugerdorf Chutes, a bedrock chute that is located immediately downstream of the proposed water control structure;

2) Krugerdorf Pool, a pool located at the base of the Krugerdorf Chutes;
3) The Misema River, a tributary of the Blanche River, to the base of 80 Foot Falls below the Misema GS;
4) Stuart's Rapids (located 3.7 km downstream of the proposed dam site);
5) James' Rapids (located 18.5 km downstream of the proposed dam site); and
6) Rapids #1 - #4 (ORMG, 2011; ORMG, 2013) located in the upper inundation area.

Upstream Key Features

There are three permanent tributary streams that converge with the Blanche River within the study area upstream of the proposed dam site. Tributary #1 converges with the Blanche River on its east side approximately 950 m upriver of the proposed dam site. Tributary #2 converges with the Blanche River approximately 830 m upriver of the proposed dam site. Tributary #3 converges with the Blanche River approximately 10 m upriver of the proposed dam site.

Benthic invertebrate production sites are located within four rapids located in two locations within the upstream project area. These rapids have been characterized as Rapids #1 - #4 by the 2011 and 2012-2013 reports (ORMG, 2011 and ORMG 2013). Riffle habitats are present in between rapids sections in both sets. These features meet the criteria for suitable benthic invertebrate production. Suitable invertebrate habitat in the upstream rapids can be broken down into two characterizations: riffle habitat and rapid habitat. There is approximately 0.29 ha of riffle habitat, and 3.38 ha of rapids habitat. These habitats are further described and mapped in Figure 19 of the Mitigation and Recommendations Summary Report, Annex III.

Downstream Key Features

The following text details the key aquatic habitat features in the downstream sections of the study area.

Krugerdorf Chutes

Krugerdorf Chutes is a bedrock chute that is situated at the proposed dam site.

Pool below Krugerdorf Chutes

Krugerdorf Chutes empties into a deep pool approximately 250 m below the proposed dam site. This pool is approximately 2.5 ha in size, and is the most ecologically varied section of the Blanche River within the study area. The north and east portions of the pool are shallow. The banks here are made of nearly vertical bedrock, and rise approximately 2 - 3 m above the high water mark. There is a large sandbar on the western portion of the pool which creates a shallower water habitat. This sandbar extends nearly to the centre of the pool, and occupies approximately 0.15 ha of land on the west side of the river. The southern portion of the pool is relatively deep.

A portion of the sandbar habitat runs along the west bank of the Blanche River and forms a seasonally inundated riparian habitat below the proposed bypass reach. The southern portion of the sandbar riparian habitat is located within a small bay. It is lower in elevation than the northern portion; thus, it is more affected by seasonal high water. As a result, vegetation in this area is characteristic of wetland habitats, and emergent vegetation is present within the Blanche River along the submerged portion of the sandbar.

The habitat in the pool at the base of Krugerdorf Chutes is suitable for benthic invertebrates.

Aquatic Habitat - Krugerdorf Chutes to the Englehart River

From Krugerdorf Chutes to the Misema River confluence located approximately 2 km downstream and downstream to the Englehart River confluence, the habitat is consistent with the majority of the study area, being composed of highly turbid, slow-moving waters flowing over a clay substrate.

The exception is a bedrock outcrop is located approximately 1.8 km downstream from the Marter Township GS dam site. This outcrop is approximately 600 m^2 in size, and occupies a stretch of the river approximately 8 m in length.

On the Misema River, a short distance upstream of the Misema River confluence, is "80 Foot Falls", located below the Misema GS, that funnels the waters of the Misema River into a bedrock basin below. The falls is a natural formation that has been chiseled out of exposed bedrock.

Stuart's Rapids

As noted in Section 2.8, Stuart's Rapids is approximately 3.7 km downstream from the proposed dam site and downstream of the confluence of the Misema River with the Blanche River.

These rapids are not considered to be a natural barrier to upstream fish passage in the Blanche River. The exception to this supposition is Lake Sturgeon, for which Stuart's Rapids may potentially only form a seasonal barrier. The main pool area immediately below Stuart's Rapids has been identified by Kirkland Lake MNR as significant habitat for spawning Lake Sturgeon. Stuart's Rapids is a significant feature within the project's affected area because it contains one of few gravel/sandbar habitats and the area downstream of theses rapids is confirmed spawning habitat for Lake Sturgeon and possibly Walleye. The shoreline in the remaining areas of the project consists of highly erodible clay along much of the upstream and downstream banks.

Rapids below Stuart's Rapids

Another set of rapids, which is referred to as Rapids No. 2 by the 2012-2013 Environmental Characterization Report (ORMG, 2013), is located 1.9 km downstream of Stuart's Rapids (5.6 km downstream of the proposed dam site) and is 75 m in length; here the river narrows from 25 m to 15 m and flows over stone and exposed bedrock.

Rapids No. 3 (ORMG, 2013) is situated 200 m downstream of Rapids No. 2 (5.8 km from the proposed dam site) and is formed where the river passes over a bedrock shelf and narrows to 25 m in width. At this location, a large bedrock outcrop divides the river into two channels and the rapids are approximately 45 m in length. The river bottom is fine gravel over clay downstream of these rapids.

Within the downriver study area, four permanent tributaries and a total of 59 small streams and seeps flow into the Blanche River, the largest of which is Moosehorn Creek. Six natural landslides are also situated within the downriver study area, and are naturally re-establishing vegetation.

James' Rapids

James' Rapids, located approximately 18.5 km downriver from the proposed dam location, is formed by waters of the Blanche River being funneled over a narrow bedrock shelf. This shelf emerges from the clay substrate at the head of the rapids, and runs for approximately 30 m before the river bottom abruptly drops off and the substrate returns to clay. The shelf extends across the channel and emerges as an outcrop on the southern shoreline. The riverbanks surrounding the outcrop, and the entire northern bank, are comprised of clay. The clay banks are steeply sloped. James' Rapids is situated outside of the area affected by the proposed project, but was investigated at the request of regulatory agencies due to it being potentially significant habitat for Lake sturgeon.

Key Aquatic Species

Fish and Aquatic Invertebrates

Fisheries surveys were performed in the project area during years 2010–2012. These surveys utilized gill nets, trap nets, angling, minnow traps and seine nets to gather information on fish species presence in the project area. The surveys were performed in the Blanche River from its confluence with the Misema River and extended upriver of the inundation area.

The MNR have documented that Lake Sturgeon (*Acipenser fulvescens*) are present in the Blanche River approximately 2.5 km downriver from the proposed dam location. This population of Lake Sturgeon is listed as Threatened under the ESA and by the Committee on the Status of Endangered Wildlife in Canada. It is not yet listed on any of the schedules of the federal SARA, and therefore does not have federal protection under this Act. This species is likely to be spawning below Stuart's Rapids, and could potentially be spawning at the base of 80 Foot Falls

on the Misema River. In its existing state, the Krugerdorf Chutes is a probable barrier to upriver sturgeon migration. Lake Sturgeon were not detected by any surveys on the Blanche River during the current study.

According to the available literature, a total of eighteen (18) fish species are documented to occur within Blanche River, including Walleye (*Sander vitreus*) and Northern Pike (*Esox lucius*). Documented spawning areas for both species are located approximately 4 km downstream of the project location. The following species were detected in the Blanche River during the current study:

- White Sucker *(Catostomus commersonii*)
- Smallmouth Bass *(Micropterus dolomieu)*
- *Walleye (Sander vitreus)*
- *Northern Pike (Esox lucius)*
- Fallfish *(Semotilus corporalis)*
- Minnows *(Cyprinidae* spp.*)*

Surveys for benthic invertebrates included generalized searches and kick-and-sweep methodologies. The rapids at the upper extent of the inundation area (Rapids #1-Rapids #4: ORMG, 2011; ORMG, 2013) and the pool at the base of Krugerdorf Chutes contain confirmed benthic invertebrate habitat.

Key Semi-Aquatic Mammals

Semi-aquatic mammals such as the North American River Otter (*Lotra canadensis*), American Beaver (*Castor canadensis*) and American Mink (*Neovison vison*) rely heavily on the aquatic habitats within the Blanche River, playing a vital role in the aquatic ecosystem. The North American Beaver is a keystone species that creates lacustrine/wetland habitats. North American Beaver and American Mink were confirmed in the project area during the current study.

2.9.3 Terrestrial Habitat and Species

Terrestrial habitat extending 250 m inland from the shoreline on either side of the Blanche River within the 2.4 km upstream area was assessed. Also, the hydro line and two private agriculture lots adjacent to the Blanche River were assessed based on potential impact to road access and/or transmission line routing.

The terrestrial habitat of the Marter Township GS Project was divided into three terrestrial survey zones: the Hydro Line Zone, Agricultural Zone, and Forested Zone. A detailed description of the terrestrial habitat for each survey zone is provided in Annex III.

The Hydro Line Zone is located at the northern extent of the study area, on the west side of the Blanche River. This zone is approximately 6.5 ha in area, and occurs on the northern portion of Lot 12, Concession 5 of Marter Township. The terrain here is steeply sloped, dropping in

elevation from south-west to north-east, toward the Blanche River. A hydro line runs roughly north-south through the zone, the transmission corridor creating a large swathe of disturbed land bordered by a narrow strip of forest along the Blanche River shoreline.

The Agricultural Zone includes two (2) privately owned agricultural fields at Lot 12, Concessions 5 and 6 of Marter Township.

The forested Zone incorporates the steep slopes of the valley surrounding the Blanche River within the inundation area. These slopes are entirely forested. This zone encompasses the entire study area east of the Blanche River, and includes a strip of forested habitat west of the river and east of the Agricultural Zone that ranges from 150 m - 350 m wide. The forest habitat within the study area can be characterized by several major components. There is a strip of varying width of Black Spruce *(Picea mariana)* along the Blanche River shoreline. Behind this, mixedwood forest dominates the slopes of the valley surrounding the Blanche River. The top of the slope is dominated by Trembling Aspen *(Populus tremuloides)* and Balsam Poplar *(Populus balsamifera)*.

Evidence of seven (7) mammal species was observed during field visits, Black Bears *(Ursus americanus)*, Raccoons *(Procyon lotor)*, Red Squirrels *(Tamiasciurus hudsonicus)*, White-tailed Deer *(Odocoileus virginianus)*, River Otter *(Lontra canadensis)*, North American Beaver *(Castor canadensis)*, and American Mink *(Neo vison vison)*.The MNR Site Information Package (SIP) indicated the presence and location of two known Moose Calving Areas. Female moose with their young of year calves will remain in within close proximity to these areas in the weeks immediately following calving. Such sites are valuable for their qualities of offering protection from predators and access to water and food, and generally exhibit dense conifer cover adjacent to a water source. It is noted that these locations were not found within the project area.

The terrestrial invertebrate species that were detected do not receive any mandated protection, either for individuals or habitat.

Surveys were completed for Reptiles and Amphibians in 2011 and 2012. Eastern Garter snakes (*Thamnophis sirtalis*) were noted in terrestrial habitats on site. Common amphibians such as Wood Frog (*Rana sylvatica*) and American Toad (*Bufo americanus*) were also observed in the vicinity of the Project area. No Salamander species were noted within the survey area, although it is possible that common species such as Eastern Newt (*Notophthalmus viridescens*) do exist in the vicinity of the Project.

A list of the confirmed and potential terrestrial species, including trees, other flora, invertebrates, birds, and amphibians in the Marter Township GS Project area is provided in Annex III.

2.9.4 Valued Ecosystem Components

An environmental component, whether a species or a natural feature, can be recognized as a Valued Ecosystem Component (VEC) if they have socioeconomic value; the categorization of a

species as a VEC is not dependent on its conservation status. Within the Marter Township GS study area, a VEC was determined and limited to one fish species in the area affected by the proposed project. A summary discussion of the natural environment VEC is provided below.

Walleye

Walleye populations on the Blanche River are identified as a VEC as they are a targeted species for both recreational and subsistence fishing. The habitat characteristics favoured by Walleye are present at the base of Krugerdorf Chutes and the three (3) rapids located on the Blanche River between the Misema and Englehart Rivers. Walleye were captured in the project area during the current study.

2.9.5 Endangered and Threatened Species-Terrestrial

A list of Species at Risk (SAR) with potential to occur in the project area was compiled from background review and through direct field observations. Species listed as "Threatened" or "Endangered" under the provincial ESA or Federal SARA are afforded protection to habitat and individuals under their respective acts. Further information about these species, their conservation status and their preferred habitat can be found in Annex III. The following terrestrial SAR were considered by the current study:

Category of Species	Species name	National Status (COSEWIC)	Federal Status (SARA)	Ontario Status (COSSARO/ ESA)
Birds	Peregrine Falcon *(Falco peregrinus anatum)*	SC	-	THR
	Yellow Rail (*Coturnicops noveboracensis)*	SC	SC	SC
	Bald Eagle (*Haliaeetus leucocephalus)*	NAR	-	SC
	Golden Eagle (*Aquila chrysaetos)*	NAR	-	END
	Black Tern (*Chlidonias niger*)	NAR	-	SC
	Eastern Whip-poor-will (*Antrostomus vociferus*)	THR	-	THR
	Golden-winged Warbler (*Vermivora chrysoptera*)	THR	THR	SC
	Rusty Blackbird (*Euphagus carolinus*)	SC	SC	-
	Common Nighthawk (*Chordeiles minor*)	THR	THR	SC
	Canada Warbler *(Wilsonia Canadensis)*	THR	THR	SC
	Bobolink *(Dolichonyx oryzivorus)*	THR	-	THR
	Red Knot *(Calidris canutus rufa)*	END	-	-
	Eskimo Curlew *(Numenius borealis)*	END	END	EXP
	Short-eared Owl *(Asio flammeus)*	SC	SC	SC
	Chimney Swift *(Chaetura pelagica)*	THR	THR	THR
	Olive-sided Flycatcher *(Contopus cooperi)*	THR	THR	SC

	Barn Swallow *(Hirundo rustica)*	THR	-	THR
Fishes	Lake Sturgeon** *(Acipenser fulvescens)*	THR	-	THR
Mammals	Eastern Cougar *(Puma concolor)*	DD	-	END
Arthropods	Monarch Butterfly *(Danaus plexippus)*	SC	SC	SC

** Status codes*: END – Endangered; THR – Threatened; SC – Special Concern; EXP – Extirpated; DD – Data Deficient
** Great Lakes - Upper St. Lawrence population

SAR Field surveys were scoped with the regulators and conducted in order to confirm presence of these species within the footprint of the project. Based on the field surveys, the key terrestrial ecological concerns for the Marter Township GS project are with respect to the Bobolink (*Dolichonyx oryzivorus)* and the Canada Warbler (*Cardellina canadensis).*

Bobolink (*Dolichonyx oryzivorus*) (THR) are confirmed within the area west of the project footprint, in open field habitat which borders the proposed road and transmission line route. Targeted surveys confirmed several Bobolink as resident, and mitigation measures have been proposed to alleviate potential impacts to their habitat.

In 2011, a Canada Warbler call was recorded in the vicinity of the proposed transmission line and roadway route. During subsequent surveys, no other evidence has been noted. Therefore, it is likely that the call noted was from a transient individual and the Canada Warblers are not using this project area for habitat or for breeding or nesting activities.

No other SAR were detected in the study area during 2010 - 2013 field studies.

2.9.6 Endangered and Threatened Species-Aquatic

The MNR has documented that Lake Sturgeon (*Acipenser fulvescens*) are present in the Blanche River approximately 2.5 km downriver from the proposed dam location. This population of Lake Sturgeon is listed as Threatened under the ESA and by the Committee on the Status of Endangered Wildlife in Canada. It is not yet listed on any of the schedules of the federal SARA, and therefore does not have federal protection under this Act. This species is likely to be spawning below Stuart's Rapids, and could potentially be spawning at the base of 80 Foot Falls on the Misema River. In its existing state, the Krugerdorf Chutes is a probable barrier to upriver sturgeon migration. Lake Sturgeon were not detected by any surveys on the Blanche River during the current study.

2.9.7 Significant Wildlife Habitats

No significant vegetation communities or habitats were identified within the study area by field observation or background review.

2.10 ARCHAEOLOGICAL POTENTIAL AND BUILT HERITAGE

A Stage 1 Archaeological and Cultural Heritage Resource Assessment was completed for the proposed project by WHS to gain an understanding of the archaeological resources of the area. The Stage 1 assessment determined that the project area contained areas of archaeological potential, and it was recommended that an intrusive Stage 2 investigation be conducted for those areas. The report is appended in Annex V.

A Stage 2 Archaeological and Cultural Heritage Resource Assessment was completed with field investigations occurring in October 2011 and November 2012. The Stage 2 study focused on sub-surface testing of the high potential areas identified in the Stage 1 assessment. The areas bordering the Blanche River with level terrain were tested. The rapids to the northwest and the chute to the south of the proposed project location provided the highest archaeological potential. Some areas lacked archaeological potential due to the presence of steep slopes or permanently saturated soils.

No archaeological or cultural heritage resources were located during the Stage 2 field investigations. One portage trail was located upstream of the project location. The age of this portage remains unknown; local sources reports that groups of campers have been travelling the Blanche River over the past 20 years. A copy of the Stage 2 Archaeological and Cultural Heritage Resource Assessment Report (modified for public access to protect a known archaeological site) is appended as Annex V.

2.10.1 Archaeological Sites

The registered site database maintained by the Ontario Ministry of Tourism Culture and Sport (MTCS) returned one registered site, ClGx-1, located within 5 kilometres of the study area. This site is associated with the portage for the "Eighty Foot Falls," on the Misema River.

2.11 CURRENT LAND AND WATER USE

The following sections summarize current land use practices and uses of the Blanche River in the vicinity of the Marter Township GS project site. The information was collected from a search of the available literature.

2.11.1 Land Use/Land Policies

The project is located in Chamberlain Township and will be built mostly on private land, although some features of the generating station would also be on Crown land. Agreements with private land owners are either completed or in the process of being completed.

Specifically the development area lies across the Crown land area known as the General Use Area G1841 http://publicdocs.mnr.gov.on.ca/View.asp?Document_ID=17256&Attachment_ID=36930: 'Little Clay Belt' (MNR 2010), a 148,480 ha area in MNR's Kirkland Lake and North Bay administrative districts. The area consists of eleven municipalities including urban areas Englehart and Earlton. Agriculture is the major land use in the area followed by tourism. Six commercial tourism establishments, one tent and trailer campground, two municipal parks and twenty-three cottages are located in this area. The Blanche River was used as a camping site by the First Nations according to the Ottawa River Heritage Designation Committee (2005). Hunting, fishing, snowmobiling and canoeing in the Englehart and Blanche rivers alongside timber harvesting are also among activities in the area.

According to the MNR Policy Report 2006, the primary land use of this area is agricultural production. Forestry, mineral aggregate extraction, waterpower development and mining are acceptable uses. Urban development is allowed and day-use recreation activities are encouraged.

Commercial activities on Crown land include aggregate extraction (generally not permitted in shoreline areas), bait fishing, commercial fur harvesting, commercial hydro development, timber harvesting, commercial tourism, mineral exploration and development, peat extraction and wild rice harvesting.

2.11.2 Access

The headworks area of the project site is currently accessible by a combination of existing access road and an ATV trail situated on privately owned land.

The site would be accessed for development by travelling approximately 12 km north of Englehart on Hwy 11, followed by approximately 6 km on Aidie Creek Garden Road.

There is no public access to the Blanche River in the project area since lands in the vicinity of the project are privately owned. There is potential for boat or canoe access downstream of the project location, but access is dependent on permission from private landowners.

2.11.3 Recreation Use and Commercial Tourism

The Blanche River is valued for its recreational and tourism opportunities. Boat launching areas, trailer camps, and portages all contribute to recreational activities in the surrounding area. Day use recreational activities are encouraged by the MNR.

2.11.4 Cottaging

The proposed Marter project is not within any known cottaging area however there are permanent residences situated in the immediate vicinity of the project site.

2.11.5 Camping and Picnicking

Camping on Crown land is generally free for Ontario residents and a result is not tracked. Since the Blanche project is largely on patent and private land, camping around the site would likely be based likely on a fee structure.

Based on the PIC survey results, one landowner uses the nearby area for camping. The individual is in support of the project and feels that the area does not presently contributes a great deal to the economy and the Marter Twp GS project could change that to bring forward great socio-economic benefits.

2.11.6 Snowmobiling

Snowmobiling is a popular pastime for local residents and tourists in the area. The area around the proposed site is located in the Ontario Federation of Snowmobile Club (OFSC)'s District 14. This part of the district falls under the supervision of a volunteering group, Club Echo.

No trails exist in the immediate vicinity of proposed dam site. There is a snowmobile trail that reaches to within 400 m of the site from both the south and eastside (MNR Site Information Package (SIP)). This trail is A108, a Feeder Trail, which is approximately 20 km in length and is situated in the North-eastern Ontario area. The trail is shown on Blanche River on the MNR Resource Values Mapping in the SIP (Appendix A) as well as the OFSC Interactive Trail Guide map. The ice trail is marked by the OFSC markers and is maintained by the snowmobile club volunteers who test for ice thickness; existing arrangements with the Sustainable Forestry Licensee ensure unrestricted safe use of the corridor during the winter months.

No known issues regarding snowmobiling or trail use have been raised in regards to the Marter Twp. GS project.

2.11.7 Boating/Kayaking/Canoeing

Blanche River is a designated canoe route in Ontario, and supports a moderate degree of primarily local usage (G1841: MNR's Crown Land Use Atlas Policy Report). Further, during a discussion with stakeholders during a Marter PIC held in June 2012, it was noted that most people use the Blanche River for canoeing/kayaking/recreational use.

2.11.8 Snowshoeing/Skiing/Hiking

During the Marter PIC, via survey results and comment forms, a landowner in the area informed Xeneca that the area near the site is used for recreational activities like snowshoeing, cross-country skiing and hiking. All such types of recreational use of the river and area will not be affected by the project due to its small footprint of the dam and associated infrastructure.

2.11.9 Area Aesthetics

The area has been used for many years by residents of the region for various recreation activities and nature appreciation. Nature appreciation and bird watching are increasingly popular activities throughout Ontario and are closely associated with the natural aesthetics of an area. As evident from the results of the recreational usage surveys, the general area associated with the Marter Township project is used by residents and visitors of the region for various recreational activities and nature appreciation. The Blanche River has an aesthetic value with local residents and recreational users of the area who use it to enjoy the visual aspects of the river.

Maintaining or enhancing existing vegetative buffers between the river, roads, and any ancillary works should be a consideration during detailed design to preserve the aesthetic quality of the area.

2.11.10 Navigation

Information provided by MNR did not identify any canoe routes or portages in the vicinity of the project site. The Blanche River is a designated canoe route in Ontario, and supports a moderate degree of primarily local usage. During a discussion with stakeholders during a Marter PIC held in June 2012, it was noted that most people use the Blanche River for canoeing/kayaking/recreational use. A portage was located upstream of the project location during archaeological field investigations. The feature is located on privately owned land and is situated within the maximum zone of inundation (High Dam Option).

According to Transport Canada, which administers the *Navigable Waters Protection Act (NWPA)*, navigable waters include all bodies of water that are capable of being navigated by any type of floating vessel for transportation, recreation or commerce. As such, the Blanche River is considered a navigable waterway. The Act prohibits construction in navigable waters unless an Approval is issued for the undertaking. Approvals under the *NWPA* are not issued until the final engineering design stage of the project.

2.11.11 Forestry

The study area is situated within the Timiskaming Forest, managed by the Timiskaming Forest Alliance Inc. (TFAI), which holds the Sustainable Forest License (SFL). The SFL is a 20 year license renewable every five years in conjunction with the completion of a sustainable forest management plan and subject to the results of an independent forest audit. The First Resource Management Group (FRMG) acts as agent for TFAI and carries out all forest management and business responsibilities from its office in Englehart, Ontario.

The Timiskaming Forest Management Unit is primarily located within the Kirkland Lake and Timmins administrative districts of the MNR. The management units lies within two ecoregions as identified by Hills (1976) and Crins & Gray (in prep.); ecoregion 3 - Eastern Boreal Forest

(comprising 75% of the unit) and ecoregion 4 – Upper Great Lakes-St. Laurence Ecoregion (comprising 25% of the landbase).

These two ecoregions lie within the Ontario Shield Ecozone and share common precambian bedrock geology. The area surrounding the proposed project site contains mesic to wet mesic mixed forest on moderately deep soils, dry mesic to mesic mixed forest on talus rock, dry mesic predominantly coniferous forest on rock outcrops, ridges, plateaus, cliff faces and rims. Tree species present within the area include black spruce, tamarack, white spruce, balsam fir, poplar, jack pine and white birch.

The forest comprises of approximately 1.25 million hectares of both Crown land and water, of which 1.09 million hectares is forested land. Productive forest land accounts for approximately 960,000 hectares.

The forest is currently being harvested in accordance with the approved Timiskaming Forest Management Plan (FMP) (2011 to 2021). The FMP identifies future forest harvesting, site preparation and regeneration areas, as well as infrastructure requirements such as expanded logging road networks.

Although no known commercial forestry is taking place in the vicinity of the project, there are a various forest management activities taking place in the Timiskaming Forest. The following companies are identified as harvesting timber from this forest and may be contracted to perform services for Xeneca's Marter Township GS project:

- Cheminis Lumber Inc.
- Eacom Timber Corp.
- Georgia-Pacific
- Liskeard Lumber Ltd.
- AbitiBowater
- True North Hardwood Plywood
- Rosko Forestry Operations Ltd.
- W. Paiement and Sons Ltd.
- Greg Woolings

During the period between 2003 and 2007 an annual average of 1,188,019.08 m^3 of round wood was delivered from the Timiskaming Forest to 26 different forest processing facilities. The majority of the round wood produced is consumed primarily by two mills: Georgia-Pacific (Englehart) and Elk Lake Planning Mill where both Eacom Timber Corp. and Liskeard Lumber Ltd. operate. These mills consume 31.3%, 30% and 12.7% of the total round wood delivered from the Timiskaming Forest, respectively. This amounts to 74% of the forest's total output.

Lands adjacent to the site are private and forested. Forest harvesting will be required for areas of expected inundation and may present some employment opportunities for local service providers. A forest harvest block (Marter 130) overlaps the GS construction site, continues south of the WPD area and is designated to be harvested in 2011. FRMG (in Englehart) will be contacted regarding harvesting operations in the development location as well as any additional clearing required for roads, power lines or other infrastructure.

2.11.12 Mining/ Mineral/ Aggregate Extraction

Mineral extraction and development is a permitted use in the Crown land area according to the Policy report.

Several active and inactive privately operated aggregate pits are in proximity of the proposed project location. The following list summarized the majority of the useable pits (KBM Roads Access Summary):

- Permit #20659 - aggregate pit 9.5 km northwest of project site
- Permit #9344 - aggregate pit 9.1 km northeast of dam site
- Permit # 10007 aggregate pit 10.5 km southeast of dam site

Although there are no existing mining claims overlapping/associated with the project site (SIP; CLAIMaps), there are at least two mining claims within one kilometre of the project site (Debicki, 2010). According to MNDM CLAIMaps website, the closest mining claim to the Marter Township GS site is located approximately 0.25 km to the east. Similarly, another block of claims, all held by Golden Dawn Minerals Inc. (20% interest) and Nass Valley Gateway Ltd. (80% interest), is located approximately 2 km east-northeast of the project site. There is also a pending disposition approximately 120 m south of the project.

Xeneca has requested the MNDM to withdraw the surface rights within a specified area along the Blanche River from prospecting, staking out, sale or lease, under Section 35 of the *Mining Act*. This area includes surface rights to a mining claim by Golden Dawn Minerals Inc and Nass Valley Gateway Ltd (mining claim no. 4225614). Xeneca has received consent & approval of both record holders over the use of their mining claim for the Marter project. Once it is approved by the MNDM, the site will be subject to long-term waterpower lease agreement via the *Public Lands Act*. (Source: SIP and CLAIMaps)

There is a known mine hazard from the Sawka-Allard Mine situated in Lot 12, Concession 5 of Marter Township, which is situated on the right bank of the Blanche River, 60 m upstream of the junction of the Misema River. This hazard has been identified as a potential hazard during project construction however it should be noted the location of the hazard is more than one kilometre downstream of the project site.

2.11.13 Hunting

Hunting is a significant social/recreational activity in this part of Ontario. The MNR has identified the Blanche River and surrounding area as valued area for hunting.

Large game species include black bear, white tailed deer and moose, while small game species include hare and grouse. All areas of the province have been divided into geographically distinct Wildlife Management Units (WMUs) for the purposes of managing wildlife populations. There is one WMU in the study area, WMU 28. Open hunting seasons for the various wildlife species potentially hunted in the site vicinity are provided below:

Table 1: Hunting Season Species and Dates

Species Open	Hunting Season
Black Bear	August 15 – October 31
Moose	Archery: September 20 – October 5
	Gun: October 11 – November 15
Grouse	September 15 – December 31
Weasel	October 25 – end of February
Red Fox	September 15 – end of February
Snowshoe Hare	September 1 – June 15
Ruffed Grouse	September 15 – December 31
Sharptail Grouse	September 15 – March 31
Spruce Grouse	September 15 – March 31
Deer	Gun: November 3 – November 16
	Archery: Oct. 1 to Nov. 3; Nov. 17 to Nov. 30
Duck	September 10 – December 25
Goose	September 1 – December 16

In order to manage black bear populations and provide resident and non-resident hunting opportunities, Crown Land areas known as Bear Management Areas (BMAs) are assigned to commercial camp owners for the purposes of providing bear hunting services. Resident hunters may hunt wherever there is an open season, provided they have a valid licence and game seal for use in that specific WMU in which they are hunting. There is one BMA located within the study area (KL-28-000).

Economic returns from hunting in the area are primarily gained through two main species, the black bear and moose. Based on an analysis completed by the Ontario Federation of Anglers and Hunters (OFAH) in 2008, the total annual moose hunting expenditure for the WMU 28 was $3.33 million. The total annual bear hunting expenditure (from both resident and non-resident bear hunter) for the WMU 28 was $251,910 in 2008. The total hunting expenditures derived from the two species for 2008 was $3.53 million (FMP Supplementary data, 2011).

Xeneca's operations are not expected to have any significant impact on hunting activities. It is anticipated that these areas will likely have minimal impacts from habitat loss or disturbance because similar habitat is available in the surrounding area.

2.11.14 Fishing

The Blanche River, which incorporates the proposed project site, is a cold thermal regime river, and is known to contain White Sucker (*Catostomus commersoni*), Northern Pike (*Esox lucius*), Yellow Perch (*Perca flavescens*), and Walleye (*Stizostedion vitreum*). Since the MNR's Crown Policy report does not allow commercial fishing, sport fishing is the most frequent type of recreation.

Walleye is the most sought after species in the sport fishery making up more than 65% of the harvest in most creel surveys (MacRitchie 1984; Seyler 1997). The Blanche River is in Fisheries Management Zone 8, where the angling season for walleye is closed each year from April 15 to the third Saturday in May.

Contact with the OFAH, through PICs and email, regarding riparian and aquatic species has not raised any significant issues with respect to angling.

2.11.15 Trapping and Baitfish Harvesting

Commercial trapping and baitfish harvesting are permitted activities within the project area. There are no known trap / baitfish cabins present within the expected zone of influence. All Crown land open for trapping in the province has a registered trapline system to manage trapping. Each trapline represents a specific geographical area, in which the holder of the trapline licence is allowed to conduct trapping activities. Each trapline is issued a quota for the animals which can be trapped within the area. The quota is specific to each trapline, being based on past harvest levels, or recent furbearer population surveys. Numerous trappers can or may be licensed under one trapline.

The Marter project site is located adjacent to a registered MNR trapline KL-084, though the project itself is not included in a trapline zone. While baitfish harvesting does occur in the Township of Marter, it is anticipated that the project would not adversely impact it.

Xeneca has discussed with local trap line operators the impacts of the project and, where appropriate, mitigation or compensation measures will be undertaken.

2.11.16 Protected Areas

There are no parks or protected areas on the Blanche River in the vicinity of the Marter Township GS project site. Rather, the nearest protected areas are located on the Englehart River and the Larder River, whose confluences with the Blanche River are located more

than 13 km downstream of the Marter Township GS project site. Kap Kig-Iwan Provincial Park is located on the Englehart River, two kilometers south of Englehart, just off Highway 11. This park features whitewater rapids and falls located within a picturesque valley. The Larder River Provincial Park is located northeast of Englehart, on the Larder River. It is a non-operating Provincial Park and is outside of the zone of influence of the Marter Project.

2.12 ABORIGINAL LAND AND WATER USE

2.12.1 Reserves and Communities

In Ontario, First Nations (FN) communities and Métis have strong historical and traditional ties to the land, rivers and lakes. As such, Xeneca is prepared to work with FN and Aboriginal communities at varying levels, depending on community interests, goals and objectives.

Characteristics of the communities are noted below:

Beaverhouse First Nation

Beaverhouse FN is a community without reserve land.

Beaverhouse FN is an old settlement on the banks of the Misema River system northeast of Kirkland Lake Ontario. There is no direct road access and Beaverhouse is only accessible by boat in the summer and snow machine in the winter.

Matachewan First Nation

Matachewan FN is an Ojibway community that has served as the traditional living site for many First Nation families. The community is located in the Timiskaming District, approximately 30 km northeast of the town of Matachewan and about 60 km west of Kirkland Lake off of Highway 66. The Matachewan FN reserve (officially Matachewan 72) is 4,158.60 hectares (10,276.1 acres) and approximately 75 people live on the reserve as of 2006. As of June 2012, the FN had a total registered population of 664 people.

Wahgoshig First Nation

Wahgoshig FN, an Anishinaabe (Algonquin and Ojibwa) and Cree FN, is located near Matheson in the Cochrane district in North Eastern Ontario. The Wahgoshig FN reserve (officially Abitibi 70) encompasses 7770.10 ha; the north end meets the south shore of Abitibi Lake, which divides North Eastern Ontario from North Western Quebec. Accessible from Highway 101, the village occupies 70 hectares of flat land adjacent to Blueberry Lake. The reserve populates 115 people (2006) and as of June 2012, the FN had a total registered population of 295 people.

Timiskaming First Nation

Timiskaming FN is an Algonquin community situated at the head of Lake Timiskaming, and adjacent of the municipality of Notre-Dame-du-Nord, Quebec, accessible by Highway 101. The FN occupies an area of 1 852 hectares (4 576.3 acres) and is located less than 50 km from the nearest service center. As of December 2010, there are 1,689 members registered to the Timiskaming FN; 630 live within the territory and about 1059 live outside the community.

Temagami First Nation

The main community of Temagami FN is located on Bear Island in the heart of the Lake Temagami, 88.5 km northwest of North Bay. Temagami FN (number 222) is situated on a one square mile island in the pristine Temagami wilderness and they occupy an area of approximately 294 ha. There are 758 members registered with the FN as of July 2012.

The Métis are a distinct Aboriginal people with a unique history, culture, language and territory that includes the waterways of Ontario, surrounds the Great Lakes and spans what was known as the historic Northwest. Métis Nation of Ontario is an aboriginal organization for the Métis population in Ontario. It provides a host of services to all Métis individuals in Métis Nation communities and Regions in Ontario.

Temiskaming Métis Council

The Temiskaming Métis Council is a member of Region 3 of the Métis Nation of Ontario. They have traditional territories in the lands surrounding the Projects; however, they are not signatories to Treaty 9. They presently engage in hunting, fishing, trapping and harvesting activities in their traditional areas (Métis Nation of Ontario, 2013).

2.12.2 Spiritual, Ceremonial, Cultural and Burial Grounds

All waterways are viewed in traditional Aboriginal culture as the 'veins or lifeblood of Mother Earth'. Water quality and water ecosystem health and function are typically mentioned as concerns by Aboriginal people in relation to natural resource management and development projects.

Xeneca has engaged with Aboriginal communities from the onset of the project and continues to do so. Our work in engagement continues and it is considered very important by Xeneca. To date no environmental information specific to lands or water has been provided by individual Aboriginal community members.

Information on the engagement of members of the Aboriginal communities during the project development is provided in Sections 6.5 to 6.8.

2.13 SOCIAL AND ECONOMIC

The purpose of compiling an economic and a socio-demographic profile is to develop an understanding of the trends, issues and dynamics of the local communities in proximity to Xeneca's projects. The profile also enables Xeneca to identify a sustainable balance between economic growth facilitated by hydropower and socio-environmental objectives. This information can be used to create a socioeconomic baseline against which potential project impacts can be compared.

Information used to characterize the socioeconomic environment has been obtained from various sources including government and local documents and websites (e.g. Statistics Canada, Ontario Provincial Parks, Forest Management Plans, and the Crown Land Use Policy Atlas (CLUPA), agency correspondence, stakeholder input, literature review and field observations. Information obtained at the PICs sessions, held on August 17, 2011 and June 27, 2012, was also incorporated into this section.

2.13.1 Municipal Structure and Community Profile

The proposed project is situated at Blanche River, within a rural area, approximately 9 km north of the Town of Englehart in the geographic Township of Marter which has been annexed by the Township of Chamberlain and has municipal jurisdiction on the site.

The Town of Kirkland Lake, located approximately 40 km northwest of the site, and the City of Temiskaming Shores, located approximately 55 km southeast of the site, form the other municipalities in the area.

Town of Englehart

The Town of Englehart occupies a total area of 3.04 km^2 and is situated along the western shoreline of the Englehart River in the Timiskaming District, on the Highway 11 (Trans-Canada Highway).

The Statistics Canada 2011 Population Census lists the population of the Town of Englehart to be 1519 people from 1494 people in 2006. This represents a 1.7% increase in the population from 2006 levels (Table 2).

English is the primary language for 90% of Englehart residents, while 5% speak French. Roughly 1% of the Englehart population is bilingual in both official languages and 4% speak languages other than English or French (City-data).

Table 2: Outline of the community profile for Englehart as per the Statistics Canada Census 2001, 2006 and 2011

Canada census – Englehart (Ontario) Community Profile			
	2011	2006	2001
Population:	1,519	1,494	1,595
Percentage difference	1.7%	-6.3%	-6.3%
Land area:	3.04 km^2	3.04 km^2	3.04 km^2
Population density:	499.9 persons /km^2	491.4 persons/km^2	524.7 persons/km^2

Township of Chamberlain

Chamberlain Township occupies an area of 110.22 km^2 and is bounded to the south by Chamberlain-Dack Township Road and to the west by Highway 573. Highway 11 runs in a northwest to southeast direction across the Township.

The Township of Chamberlain has a population of 297 according to the 2011 Census. This represents a 7.8% decrease in the population from 2006 levels (Table 3).

Similarly, compared to Englehart, Chamberlain has a high (86%) English only population, 6% speak only French with the rest of the population speaking in languages other than English or French (City-data).

Table 3: Outline of the community profile for Chamberlain Township as per the Statistics Canada Census 2001, 2006 and 2011

Canada census – Chamberlain (Ontario) Community Profile			
	2011	2006	2001
Population:	297	322	348
Percentage difference	-7.8%	-7.5%	-3.6%
Land area:	110.22 km^2	110.22 km^2	110.13 km^2
Population density:	2.7 persons/km^2	2.9 persons/km^2	3.2 persons/km^2

Township of Kirkland Lake

Kirkland Lake is a town and municipality located in the Timiskaming District in Northeastern Ontario. Packed in between Timmins and Temiskaming Shores on Highway 66, approximately 14 km east of the junction with Highway 11, it forms one of the most travelled places in Northeastern Ontario.

The Town has a population of 8,493 in 2011 which is a 3.0% increase from 2006 levels (Table 4). Of the 8,493 people, 27% are bilingual while over 70% speak only English (City-data).

Table 4: Outline of the community profile for Kirkland Lake as per the Statistics Canada Census 2001, 2006 and 2011

Canada census – Kirkland Lake (Ontario) Community Profile			
	2011	2006	2001
Population:	8,493	8,248	8,616
Percentage difference	3.0%	-4.3%	-13.0%
Land area:	262.54 km^2	262.54 km^2	262.54 km^2
Population density:	32.3 persons/km^2	31.4 persons/km^2	32.8 persons/km^2

City of Temiskaming Shores

Temiskaming Shores was created by the amalgamation of the town of New Liskeard, the town of Haileybury, and the township of Dymond in 2004. It is Ontario's second smallest city, in terms of population, with 10,400 people living in the City in 2011, representing a 0.4% decrease in population levels compared to 2006 (Table 5).

Approximately 58% people speak only English while 40% are bilingual and the rest speak other languages besides English and French.

Table 5: Outline of the community profile for Temiskaming Shores as per the Statistics Canada Census 2006 and 2011

Canada census – Temiskaming Shores (Ontario) Community Profile		
	2011	2006
Population:	10,400	10,442
Percentage difference	-0.4%	-1.8%
Land area:	177.91 km^2	177.91 km^2
Population density:	58.5 persons/km^2	59.0 persons/km^2

A comparison based on the data compiled for these cities and townships illustrates that Ontario's change in population was an increase of 5.7% between the period of 2006 - 2011 and the national average being an increase of 5.9% for the same time period.

2.13.2 Employment & Economic Setting

The long-term prosperity of Ontario municipalities is tied to the health of their economic base. Communities with substantive commercial and industrial sectors and diverse economies tend to be economically healthier and have the tendency to grow and to endure economic downturns.

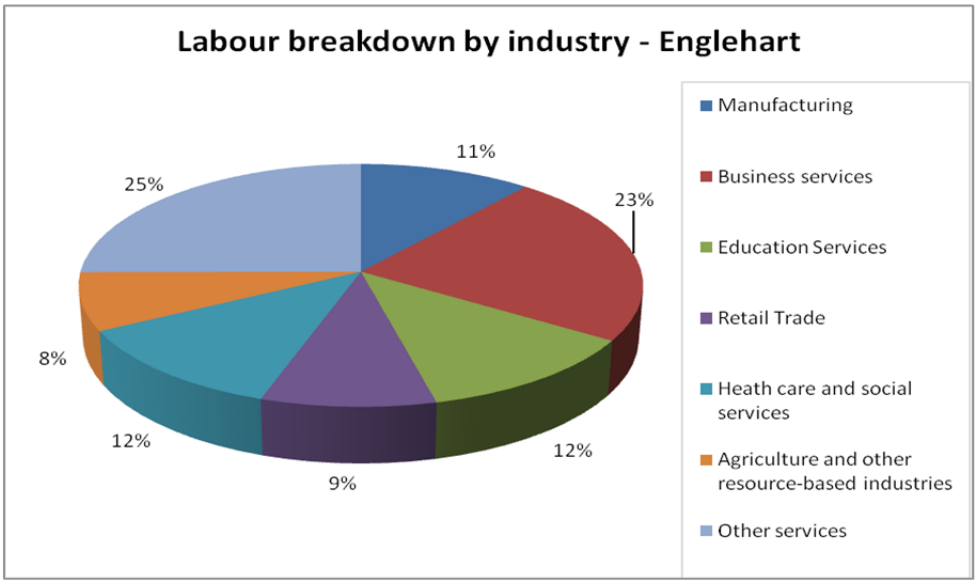
Town of Englehart

Historically, the area of Englehart was developed as a result of a colonization line designed by the provincial government to provide access to the agricultural lands of the Little Clay Belt for community settlement and to use the area's vast timber resources. This migration route was the Temiskaming and Northern Ontario Railway (T. & N.O.)

Currently, the Town of Englehart functions as a service center mainly due to its location being centrally located along the Highway 11 (Hwy 11) corridor which provides excellent local and regional access and visibility necessary for commercial development.

Englehart serves mainly through business services and retail trade, which occupies approximately 32% of the workforce, while 25% of the workforce are employed in the forest industry, with health care (12%), education services (12%) and manufacturing (11%) forming the rest of the major occupations in the town (City-data) (Figure 4).

Figure 4: Labour Force breakdown by Industry in the Town of Englehart



Source: City-data website analysis

The economy of Englehart is dependent on two major employers: Ontario Northland Railway (ONR), which has been here since the inception of the town, and Georgia Pacific.

Georgia Pacific (formerly Grant Forest Products) is the biggest employer in the town of Englehart. It employs about 250 employees at its oriented strand board (OSB) mill with spin off employment in the form of fuel, trucking, logging, and many suppliers of goods and services related to the forestry sector.

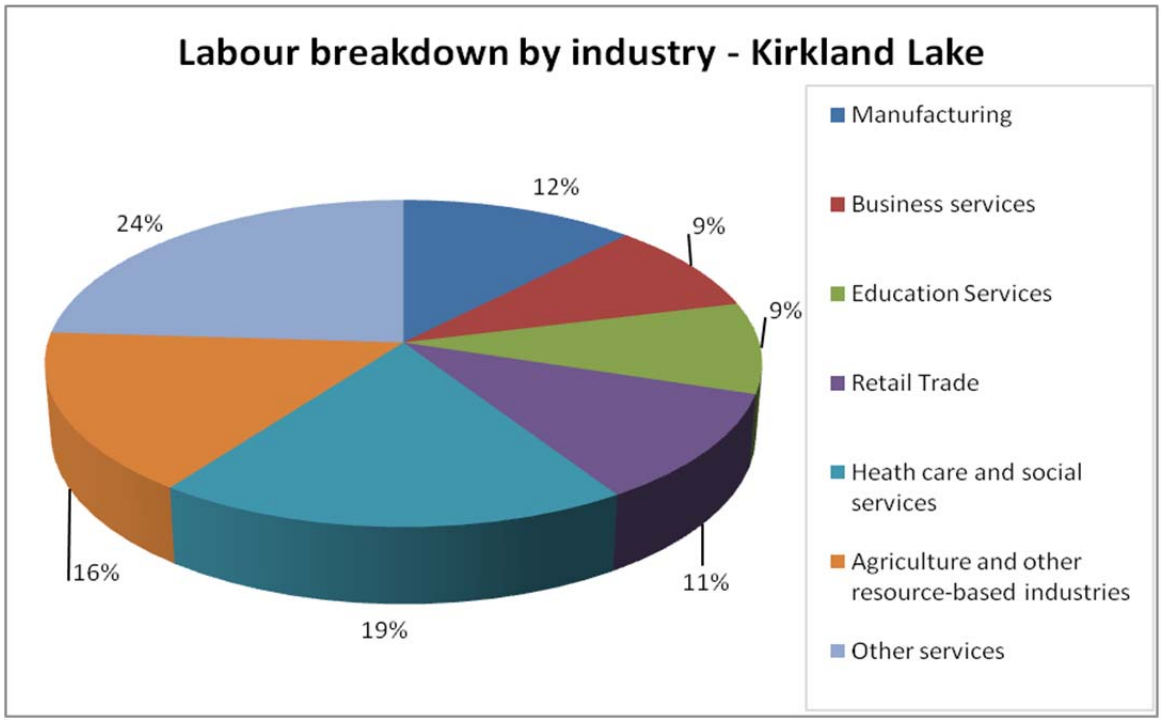
The Ontario Northland Railway (owned by Ontario Northland Transportation Commission (ONTC)) plays a considerable role in the community's economic health by providing rail freight services for the transportation of mineral and forest products, chemicals, petroleum and other products to and from Northeastern Ontario and Northwestern Quebec. The Ontario Northland Railway employs approximately 100 people directly related to ONR's operations within the Town of Englehart.

Overall, transportation services, retail businesses and the forestry industry are involved in securing and supporting Englehart to propel and prosper in Northern Ontario.

Town of Kirkland Lake

Kirkland Lake is a community located approximately 250 km north of North Bay, at the junction of two Trans Canada Highways (Hwys 11 & 66) servicing both Ontario and Quebec. Due to its moderate winter temperatures and warm summers, residents of Kirkland Lake enjoy the great outdoors of Northern Ontario.

Figure 5: Labour Force breakdown by Industry in the Town of Kirkland Lake



Source: City-data website analysis

As illustrated in Figure 5, the Kirkland Lake economy is driven mainly by the governmental sector (24%) and the resource based industries (16%), primarily gold (City-data).

The Town has well established roots in gold mining, known as the second highest producer of gold in Canada in the early 1920's. Throughout the 1940's to 1960's, Kirkland Lake was justifiably known as the "Hub of the North"; being one of the major industrial-commercial centres in Northern Ontario. Over the last decade, active gold mines in the area has created close to 1,000 jobs in this sector alone and there is still potential for growth in the regional economy for decades to come (Kirkland Lake, 2010).

The community also acts as a regional center for a number of government services including the Ontario regional office of the Department of Veteran Affairs.

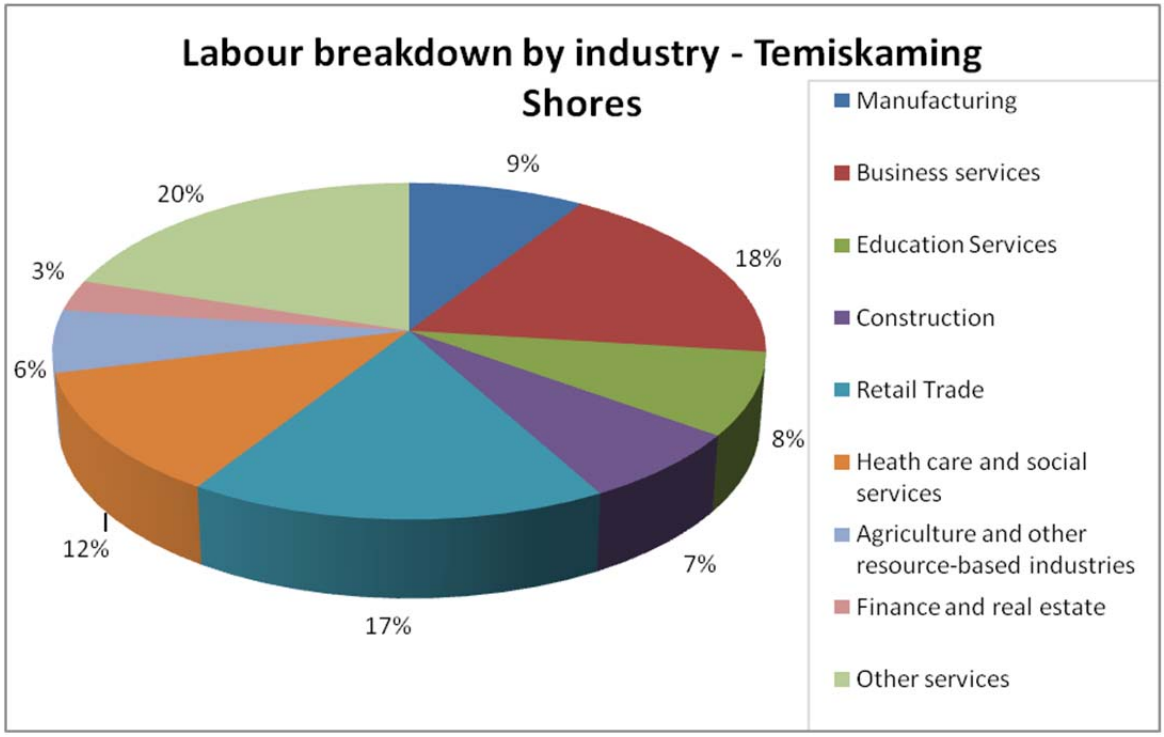
Furthermore other professional services sector (education, health care, etc.) represents the second largest economic sector in Kirkland Lake with combined labour force of 28%. Aside from that, manufacturing (12%), retail trade (11%) and business services (9%) make up the rest of the workforce. Its current capacity is fairly robust, reflecting the fact that the Town is the regional service centre for the north Timiskaming District.

City of Temiskaming Shores

The City of Temiskaming Shores is strategically located on Hwy 11 at the north end Lake Temiskaming, a primary recreation and tourism attractor in the area. The restructuring and amalgamation of the City brought together multiple communities while providing it with a healthy economic and service hub in the region for goods and services (City of Temiskaming Shores, 2010).

The economic base concentration in the provision of regional and tourism services reveal that Temiskaming Shores offers relatively more tourism and business based jobs than the average community in Canada. As illustrated in Figure 6, business services account for 18% of the workforce while tourist attractions and other services are a further 20%. Retail trade (17%), health care services (12%) and manufacturing (9%) form the other major services provided by the City as per statistics.

Figure 6: Labour Force breakdown by Industry in the city of Temiskaming Shores



Source: City-data website analysis | Temiskaming Shores Community Profile

3. DESCRIPTION OF THE PROPOSED PROJECT

As noted in the earlier sections of this ER, the proposed Marter Township GS project involves the construction of a 2.1 MW "modified run-of-river" generating station on the Blanche River, approximately 9 km north of the Town of Englehart, and approximately 2 km upstream of the confluence between the Blanche River and the Misema River. Two design options were investigated during the EA planning process; the two options and the rationale for the preferred option are described in Section 3.1. The different components of the generation station, the proposed access road and connection line corridor and the ancillary works are detailed in Sections 3.2 to 3.4.

The proponent necessarily reserves the right to variances between the conceptual design presented herein and the final detailed engineering design, provided that such variances do not materially and negatively impact the environment beyond the scope of the impacts described herein. The proponent recognizes that any changes to the project where it is determined that there is a potential for new negative effect(s) to the environment will require the application of the addendum provisions for the ER as per Section 8.8 of the Class EA for Waterpower Projects (January 2014), and as summarized in Section 1.3.1 of this ER. An addendum to a Final ER will also be subject to mandatory regulatory and public review.

Possible variances from conceptual to final design include:

1. Detailed design may incorporate changes that are specifically meant to address and/or accommodate stakeholder issues identified and resolved during the consultation process.
2. Construction materials may vary from those shown on conceptual drawings. Earth material may be interchanged with concrete or steel material as required in the final engineering design. Where alternative material is specified, volumes and footprints may be adjusted to reflect safe engineering design requirements.
3. Physical sizes and orientation of structures.
4. Physical size of construction site areas may be adjusted where it is required for safe site management.
5. Specifications of mechanical and electrical equipment may vary, including the physical size, number of units, and total rating.
6. Design specifications for protection of fish, such as inflow velocities and inlet spacing of trash racks.
7. The powerhouse angle and alignment may be adjusted. The location of spillway and powerhouse structures may be adjusted along the dam axis to optimize engineering design and safety.
8. Road and connection line routes may be refined.

As stated previously, if any changes to the project are determined to have the potential for a new negative effect(s), they may be subject to the addendum provisions of the Waterpower Class EA.

3.1 Design Options and Rationale

There are presently two development options being examined by Xeneca for the proposed project. The "High Dam Option" (also referred to as Option 1 in the conceptual engineering drawings in Annex II) would capture a surveyed gross head of 17.5 m. The "Low Dam Option" (also called Option 2) would capture a surveyed gross head of 12.5 m. Both of the options share the same access, powerhouse, and approximate penstock alignment. The two proposed dam locations are separated by a distance of roughly 80 m, with the higher dam option being located further upstream. The conceptual development for each option would incorporate the use of a spillway dam; however the High Dam Option would have a taller dam and a longer water conveyance structure. In both options, a penstock situated on the west shore of the river will conduct flows from the river to an intake before directing them through a single Pit/Bulb Kaplan turbine with a nameplate capacity rating of 2.1 MW.

The High Dam Option is preferred from an engineering and generation perspective; however, as it would result in a longer inundation area, the selection of this option will be dependent on agreements with potentially affected landowners upstream.

3.2 GENERATING STATION COMPONENTS

The following is a description of the different generating station components; the description applies to both dam options unless indicated otherwise. The reader is referred to Annex II for conceptual engineering drawings in support of the information detailed below.

It should be noted that final engineering drawings for the components of the proposed undertaking must be submitted for regulatory review at the permitting and approvals stage to secure permission to initiate construction. Detailed habitat information, a fish habitat compensation plan (if applicable) and an operation plan must also be supplied to DFO so that a determination under the *Fisheries Act* can be made. The details presented below are based on conceptual engineering design calculations and subject to some modification at the final design stage.

Artistic renderings of the preferred option for the proposed facility (High Dam Option) are included as Figures 7 to 9 below. The renderings show the proposed headworks structure, powerhouse and substation under varying flow conditions (Figure 7: Summer Time Mid-Flow, Figure 8: Fall Low Flow, Figure 9: Spring High Flow).

Figure 7: Artist's Rendering of the Marter Township GS – Summer Time Mid-Flow

Figure 8: Artist's Rendering of the Marter Township GS – Fall Low Flow

Figure 9: Artist's Rendering of the Marter Township GS – Spring High Flow

3.2.1 Installed Capacity and Annual Energy Output

The approximate installed capacity of this project will be 2.1 MW, generated by one turbine unit. This will provide approximately 9,300 MWh of renewable energy annually which represents the equivalent of:

- The displacement of 6411 metric tons of carbon dioxide equivalent; or
- The annual greenhouse gas emissions from 1,257 passenger vehicles; or
- The sequestering of carbon from nearly 1,367 hectares of pine or fir forests.

3.2.2 Headworks Structure

The proposed headworks structure will feature a concrete and earthfill dam and spillway. The relative amount of earthfill to concrete will depend on the final project design. Depending on the option selected, the headworks dam and spillway will have an approximate footprint of 500 m^2 (High Dam Option) or 300 m^2 (Low Dam Option).

3.2.3 Intake and Conveyance System

The intake will be constructed of formed concrete and structural steel and will divert water from the river to the penstock constructed for the facility. The intake will have a total footprint of approximately 300 m^2 (High Dam Option) or 350 m^2 (Low Dam Option).

The penstock will extend along the west bank to the powerhouse downstream. The alignment for the penstock is approximately the same between both options, though it will be 80 m longer for the High Dam Option.

Excavation and construction of intake will require the construction of cofferdams as discussed in Section 4.2.3.

3.2.4 Powerhouse

Both options would have a similarly sized powerhouse with a footprint of approximately 400 m^2. Depending on final engineering design the powerhouse could be constructed from reinforced concrete, insulated steel panels or a combination of the two based on physical needs and constraints. The water passage within the powerhouse will be constructed from a combination of concrete and steel conduits.

3.2.5 Turbines

Turbine selection is based on the project site head, flow and economics. In instances of low head and intermediate to large flows, Kaplan, Propeller or Cross Flow (Banki-Ossberger) type turbines are deemed most efficient. For very low heads, a horizontal Kaplan is the

preferred option as it requires less excavation than the vertical turbine and can maximize turbine efficiency over a wide range of flows. Regarding additional economics of the turbine selection, cost varies directly with the maximum operating flow, but because a large component of cost is fixed for a development regardless of the flow, an optimum size results through balancing the cost versus the revenue generated from turbines of various sizes (diameters).

Based on the rationale described above, either option for the project (High Dam and Low Dam) would utilize a single Pit/Bulb Kaplan turbine.

The turbine will require at least 4.8 m^3/s to operate, and will have a maximum flow capacity of 16 m^3/s.

3.2.6 Tailrace

Under both design options, the facility's tailrace would occupy the same footprint and have an overall area of 450 m^2, which would be primarily excavated through the existing west bank to connect back to the river downstream. During construction, a small portion of in-water excavation would be required, necessitating the use of cofferdams as described in Section 4.2.3.

3.3 Access Roads and Connection Lines

<u>Access Roads</u>

Access to the site will be constructed maximizing use of existing access roads and trails with a minimum amount of new construction. The headworks area of the project site is currently accessible by a combination of existing access road and ATV trail. The site will be accessed by driving approximately 3 km north west of Englehart on Hwy 11, followed by approximately 7.5 km north on Wawbewawa Road, followed by approximately 2 km east on Aidie Creek Garden Road, followed by approximately 1 km south on E Road. From E Road approximately 700 m of new road would be constructed eastbound to access the powerhouse and stockpile/laydown areas. An additional section of up to 180 m of new road will be built to access the headworks.

New road construction will require the clearing of up to a 20 m right-of-way (ROW). Access road details are provided in Annex VI. The proposed power lines and road corridors for the High Dam Option and the Low Dam Option are illustrated in Figures 1a and 1b, respectively.

<u>Connection Lines</u>

The preliminary connection line route was prepared based on the location of the facility. The point of common coupling (PCC) and the point of connection (PC) are identified in the conditionally approved FIT application. The proposed line location was then overlain with

assembled values layers and a summary of the potentially impacted values was compiled and summarized. Data layers used for this exercise included:

- Land Information Ontario dataset
- Natural Resources Canada (NRCan) Topographic data
- 2008 Forest Resource Inventory data
- Medium resolution SPOT panchromatic orthoimagery from NRCan
- NRVIS Data Layers (circa Feb 2011)

Consultation with the SFL holders linked to the project was also undertaken and most of the license holders provided GIS datasets including all road networks, planned harvest block locations and aggregate pit locations. Additionally, digital aerial photography and ground truthing of the proposed access routes was undertaken in 2011. Field verification of potentially significant wildlife habitats for the distribution line was completed during the 2010 to 2013 field seasons as presented in Annex III.

The line route was reviewed using all available information and revised where appropriate in an effort to:

- reduce environmental impact (i.e. streams & wetland crossings);
- minimize landscape footprint and fragmentation;
- coincide with existing road corridors; and
- reduce total line length.

The proposed power line from the Point of Common Coupling (PCC) to the Point of Connection (PC) travels south and west with a total line distance of 673 m. A total of 637 metres of the power line is located on patent land with the final 36 m being located on Crown land. No known water crossings or wetlands are impacted by the proposed power line.

3.4 ANCILLARY WORKS

The following describes the ancillary works proposed for the project.

3.4.1 Electrical Substation

A transformer substation will be required and located adjacent to the powerhouse at the site. Under both project design options, the substation will have a footprint of approximately 300 m^2 and will be located on the west bank of the river.

Access to the substation during construction and operation of the facility will be limited to properly trained personnel; signage and fencing will be installed around the structure.

3.4.2 Flood Channel Wall and Flood Berm

Due to the topography of the project site, both options proposed incorporate the construction of a flood channel wall and berm to ensure that increased flows do not pose a risk to project infrastructure or safety of personnel. In both options, the footprint of the proposed channel wall will be 50 m^2; however the flood berm in the High Dam Option will be 350 m^2 as compared to 150 m^2 in the Low Dam Option.

3.4.3 Portage Trail

A portage trail will be constructed in the project site in order to provide recreational users of the river with a means of bypassing the weir.

The portage trail will be constructed along the eastern bank of the river, and will be signed in order to notify users of the construction activities. A permanent safety boom will be installed across the river upstream of the powerhouse, and equipped with signage in order to direct users towards the trail. Similarly, during project construction, a temporary safety boom will be installed downstream of the tailrace, so that users travelling upstream will be directly towards the downstream end of the trail. The portage trail will be equipped with stairs and handrails as needed in the steeper sections.

Before any blasting activities take place, the trail will be checked and cleared of users, and the entry points guarded to restrict users from entering the project site.

Permanent signage will be installed after the completion of construction activities in order to notify users of the portage trail.

The portage trail for the two dam options is illustrated on Figures 1a and 1b, and can also be seen on the construction sequence plans in the Construction Management Plan (Annex II).

4. CONSTRUCTION STRATEGY

The following is a summary of the construction activities and temporary works required during the construction of the project. A construction management plan, including conceptual drawings, has been prepared and is presented in Annex II. It should be noted that final engineering details for these temporary works will be submitted for applicable regulatory approval in advance of the construction stage of the undertaking. The details presented below are based on conceptual engineering design calculations and subject to some modification at the final design stage.

4.1 CONSTRUCTION SCHEDULE

Assuming an issuance of the Statement of Completion by April 2014, site preparation activity will commence in the spring of 2015. Construction of the proposed facility is scheduled to take place between September 2015 and February 2017 with commissioning of the facility anticipated by July 2017. Under the terms of the FIT contract awarded to Xeneca, the facility must be commissioned no later than October, 2018.

Tentative dates for the commencement and completion of various project components are presented in Table 6.

Table 6: Project Component Construction Schedule

Component	Dates	
Roads and Bridges	Start	February 2015
	Finish	April 2015
Intake and Penstock	Start	Sept 2015
	Finish	Dec 2015
Powerhouse	Start	June 2016
	Finish	February 2017
Control Structures	Start	Sept 2015
	Finish	July 2016
Connection Line and Associated Components	1st Phase	April 2016 August 2016

As both design options generally cover the same footprint, the same construction sequencing and temporary structures would apply to either option.

The following construction stages are proposed for the construction of the generating station and its appurtenant facilities:

- clearing and grubbing of the right-of-ways;
- clearing of temporary laydown, stockpile and construction areas;
- construction of new road access and laydown areas;
- construction of stage 2 cofferdams at tailrace and intake;
- excavation of powerhouse, penstock, intake and tailrace;
- begin construction of substation and connection line;
- connection line right-of-way clearing and line construction;
- construct intake, and 1st spillway section;
- build diversion channel and flood berm/wall;
- Begin construction of penstock and powerhouse;
- removal of stage 2 cofferdam and installation of stage 3 cofferdam;
- completion of spillway structure;

- removal of stage 3 cofferdams;
- close intake and diversion works to divert flow over completed spillway;
- complete powerhouse and substation construction;
- electrical and mechanical installation within the powerhouse;
- complete construction of penstock;
- site rehabilitation/reclamation and removal of temporary works.

Construction will be initiated once all applicable regulatory approvals and authorizations have been issued. The construction program will be advanced to meet the requirements of relevant legislation, industry guidelines and best management practices aimed at ensuring the highest level of protection of the environment. Specific proposed mitigation measures that will be integrated into the site's construction strategies are presented in Section 7 and explained in further detail throughout the supporting Annexes of this report. In-water construction related timing restrictions will be stipulated by the regulatory agencies during the permitting and approvals stage. Some general construction strategies are presented below.

4.2 CONSTRUCTION ACTIVITIES

4.2.1 Clearing and Grubbing

Trees cut within the inundation area and along the connection line and access roads rights-of-way will have their roots left intact wherever possible. Efforts will be made to remove as much organic material and woody debris as possible from the area of inundation to reduce the potential effects of mercury methylation.

Merchantable timber cut from the site will be segregated for removal by the SFL holder including timber cut from the powerhouse and spillway area, within the area to be inundated, along new access road corridors and along the connection line route. Clearing will be managed in accordance with applicable forestry management guidelines and best management practices (BMP). All clearing of timber will conform to the *Crown Forest Sustainability Act*, and the Forest Operations and the Silviculture Manual.

4.2.2 Construction Materials and Laydown Areas

Granular material will be required for the construction of roads, embankments, yards, cofferdams and concrete structure backfill. Should the materials excavated from the powerhouse and road alignment be suitable for re-use, these will be used for the road bed and other construction requirements. Some on-site processing of the material (e.g. screening and crushing) may be required before use. Additional required materials will be trucked to the site from licensed sources; at least five licensed and privately operated Class A and B aggregate pits are known to operate within 10 to 25 km of the project site in the Englehart area, and could potentially serve as sources of aggregate material for the proposed project.

A temporary 5,000 m² stockpile area will be cleared along the access road to the site. A 1,000 m² laydown area will be prepared for construction materials, equipment storage, construction office, parking, etc. This area could be reduced post-construction with some area remaining for operational purposes.

A combination of earthfill and concrete will be used to construct the spillway structure and the flood channel wall, the relative amounts of which will depend on the final project design. Earthfill will be sourced on-site to the extent that it is available, including from the abutment areas of the spillway and the excavation for the powerhouse and tailrace, provided it is suitable for construction use. Overburden excavated from the penstock route will be reused to bury the penstock, assuming it is suitable for reuse.

4.2.3 Cofferdams

Temporary cofferdams will be installed in the river during the construction process to divert flow first from the tailrace area, then from the spillway area to allow the construction to occur in dry conditions. Cross-section and conceptual design details for the cofferdams are illustrated on Drawing no. 00-151 in Annex II (Construction Management Plan); the proposed placement of the cofferdams for the construction of the High Dam Option and the Low Dam Option are illustrated on Drawings 151 and 152, respectively, in the Construction Management Plan. Cofferdams will be constructed of cargo bags filled with clean, granular material taken from excavation activities and/or transported to the site from local licensed aggregate sources. Cofferdams would be installed using an excavator and/or a crane to place the bags sequentially in the river.

The total length of cofferdams required for construction is estimated at 150 m. The total footprint of the cofferdams will depend on the height/elevation of the dam required to manage the 1:20 year flow rate and the depth to suitable substrate within the river. If one assumes a cofferdam height of 3 m or less is required, the total footprint for the cofferdams would be approximately 500 m². Drawings for the cofferdam will be submitted with the engineering package for approval under the *Lakes and Rivers Improvement Act* (*LRIA*) during the regulatory permits and approvals phase of the development process.

4.2.4 Dewatering

Water that accumulates behind the cofferdams will be discharged in accordance with the *Environmental Protection Act*. The MOE will confirm the requirements for a Permit to Take Water (Category 2 or 3) and an Environmental Compliance Approval for Sewage Works prior to the initiation of in-water construction activities. Dewatering approvals will require the proponent to submit a Sediment and Erosion Control Plan and possibly a surface water monitoring plan for regulatory review.

4.2.5 Excavation of Powerhouse and Tailrace Channel

Excavation for the powerhouse and tailrace will be completed using appropriate methods. Tailrace excavation at the intersection with the river will be completed within the MNR's established timing window for in-stream work. The excavation will be advanced from the powerhouse working towards the watercourse so that flowing water does not infiltrate the cut until the final phase of excavation.

4.2.6 Concrete Production

A concrete batch plant will not be required at the work site. A permanent batch plant is located at Kirkland Lake, 50 km north of the site, and at New Liskeard, 55 km away. Both are located within a 1-hour drive of the project site. Truck traffic to the project site during construction, including the transport of concrete, is estimated to be on average 20 trucks per day, with an expected maximum of 50 trucks per day.

4.2.7 Connection Line

Clearing of the power line right-of-way and the construction of the line will occur in the least impactful and most cost-effective way possible. Overland sections of power line right-of-way (i.e. where the power line is not constructed parallel to an access road) are planned to be cleared in winter with tracked vehicles working on snow-covered, frozen ground. Where the power line is parallel to the access road, the line work can occur in winter or summer with minor impact.

4.2.8 Management of Waste Materials during Construction

Solid nonhazardous construction waste (e.g. material packaging) generated during the construction process will be removed from the site to an approved disposal location. The Town of Englehart Public Works Landfill will accept construction waste generated within the Township of Marter. Two waste management companies, Erocon Waste Management and Phippen Waste Management, located in Timmins and Haileybury, respectively, have been contacted, and are confirmed to have the capability of transporting construction waste from the project site to locally approved landfills.

Keith R Thompson Inc. (KRT), located in Sudbury, was contacted and was confirmed to have to capability of transporting and disposing of liquid hazardous waste from the project site.

No gaseous wastes other than construction equipment emissions are anticipated. Industrial liquids such as paints, sealants, fuels and lubricating fluids will be stored in secure containment areas and disposed of in accordance with provincial and federal liquid waste disposal regulations (e.g. *Environmental Protection Act*, *O. Reg. 347*, and *Transportation of Dangerous Goods Act*).

4.2.9 Water Crossings

There are no known water crossings or wetlands within the proposed corridors for the access road and power line (Annex VI). However, proper road drainage will be accomplished with the installation of culverts where needed.

5. OPERATION STRATEGY

This section summarizes how the facility will be operated and how the operation will be adapted to maintain key seasonal functions such as aquatic life and recreational use. The proponent's proposed Operating Plan for the Marter Township GS is presented in Annex I.

The operations strategy is based on the conceptual engineering completed to date, and environmental data collected during the field investigation program. The operations strategy was developed based on data analysis from various studies, including:

- Lidar Survey: mapping of the upstream and downstream river reach using remote sensing technology;
- Conceptual Design: drawings of structures as conceptually proposed for the project (Annex II of this ER);
- Hydrology Study: an analysis of the natural river flows (Annex I);
- Bathymetric Study: field study of water depths upstream and downstream of the project location and a spot measurement of flows for hydraulic model calibration (Annex I);
- Hydraulic Studies: detailed hydraulic engineering analyses to better understand the various hydraulic parameters relevant to assess operational and environmental matters. The work included one-dimensional steady-state HEC-RAS modeling upstream and downstream of the proposed development, as well as unsteady-state flow modeling in the downstream area affected by operation of the project (Annex I);
- Erosion/Sedimentation Study: desktop analysis completed to identify upstream locations that may be sensitive to shoreline erosion once the project is commissioned (Annex I);
- Fluvial geomorphic assessment: Determining and quantifying bank and bed erosion potential and general sediment transport associated with the proposed generating station (Annex I);
- Environmental field investigations: studies of the natural habitat and key environmental features (Annex III).

The operations strategy may be refined subsequent to regulatory review and comment, and once the project enters the final design stage, provided that such variances do not materially and negatively impact the environment beyond the scope of the impacts described in this ER.

5.1 HEADPOND INUNDATION

An important factor in modified run-of-river operation is the availability of water storage upstream of the facility. Based on the dynamic modeling (HEC-RAS) of the river channel completed to date, the Marter Township GS may result in an inundation area extending up to 2.4 km upstream of the dam under the "High Dam" option (representing the worst case scenario out of the two dam options; the "Low Dam" option would result in inundation extending 1.7 km upstream). Under the High Dam option, water levels in the headpond immediately upstream of the proposed structure will be raised by approximately 6.7 to 7.5 m.

During modified run-of-river operations, headpond water levels will fluctuate from on-peak to off-peak hours. Water levels will rise during off-peak hours as outflow from the plant is reduced to below the natural rate of river inflow, whereas the opposite will occur during the next business day as production and plant outflows are increased above the natural rate of river inflow. The results of steady-state HEC-RAS modeling indicate that for a distance of approximately 1.8 km upstream of the proposed structure (High Dam option), water levels during post-project long term annual flow will be higher than they were during pre-project 1:100 year flood levels.

The operating plan aims to allow for a certain amount of fluctuation in headpond water levels without having a significant negative impact on shoreline erosion, aquatic habitat, and civil structures and private property. The operation plan therefore establishes limits on the extent to which the facility can manipulate water levels upstream (see the Operating Plan in Annex I).

5.2 SITE OPERATING STRATEGY

The electricity to be generated from the proposed generating station was contracted to the OPA under a FIT Contract. The FIT program encourages the producer to generate electricity between the hours of 11 am and 7 pm (on-peak hours) from Monday to Friday, when needed most in Ontario.

It is proposed that Marter Township GS will operate as a "*modified run-of-river*" generating facility. Effectively, the operations of the facility would vary between run-of-river and intermittent operation depending on the flows present in the river. This mode of operation takes into account the objective of building and operating the project in an environmentally sensible manner, while meeting the Province's objective of generating electricity to supply peak demand. Additionally, the operating plan for the Marter Township GS proposes that the specific times for daily operations be harmonized with those of the Misema GS, currently operating on the Misema River (to be discussed further in Section 5.4).

Run-of-river versus Modified run-of-river operations

Whether the Marter Township GS operates in run-of-river or modified run-of-river mode at any given moment will depend in large part on the natural flows in the Blanche River. The different operating scenarios are described below.

Run-of-river operations

When natural flows exceed the maximum amount of water that can be passed through the turbine (16 m^3/s in the case of the Marter Township GS), excess water would be diverted through the spillway structure. The combined flow of the water passed through the turbine to generate electricity and the water bypassed over the spillway will be equal to the natural flow of the river. This situation occurs primarily during spring run-off (freshet) conditions and during/after significant precipitation events. The Marter Township GS would therefore operate in run-of-river mode when inflows exceed 16 m^3/s.

Run-of-river operations would also occur during normal, seasonal low flow periods when natural flows are so low that any available water must be released downstream to maintain ecological function of the waterway. Flows are also typically too low for the generation of electricity during such periods. All available water will be passed through/over the dam to maintain aquatic habitat downstream. This situation occurs primarily in late summer and late winter when natural flows are typically very low.

Modified Run-of-River Operations

At other times, the facility would be operated to "modify" the natural flow in the river by storing some of the natural river flow during off-peak hours for release to produce electricity during on-peak hours (i.e. intermittent operation) when the demand is greater. Modified run-of-river operation would occur during moderate and lower flows when the natural flow in the river is below the maximum capacity of the turbine (16 m^3/s), but above the minimum flow required to maintain the ecological health of the waterway (0.5 m^3/s). During these flow conditions, some of the natural river can be saved during off-peak hours for use during on-peak hours.

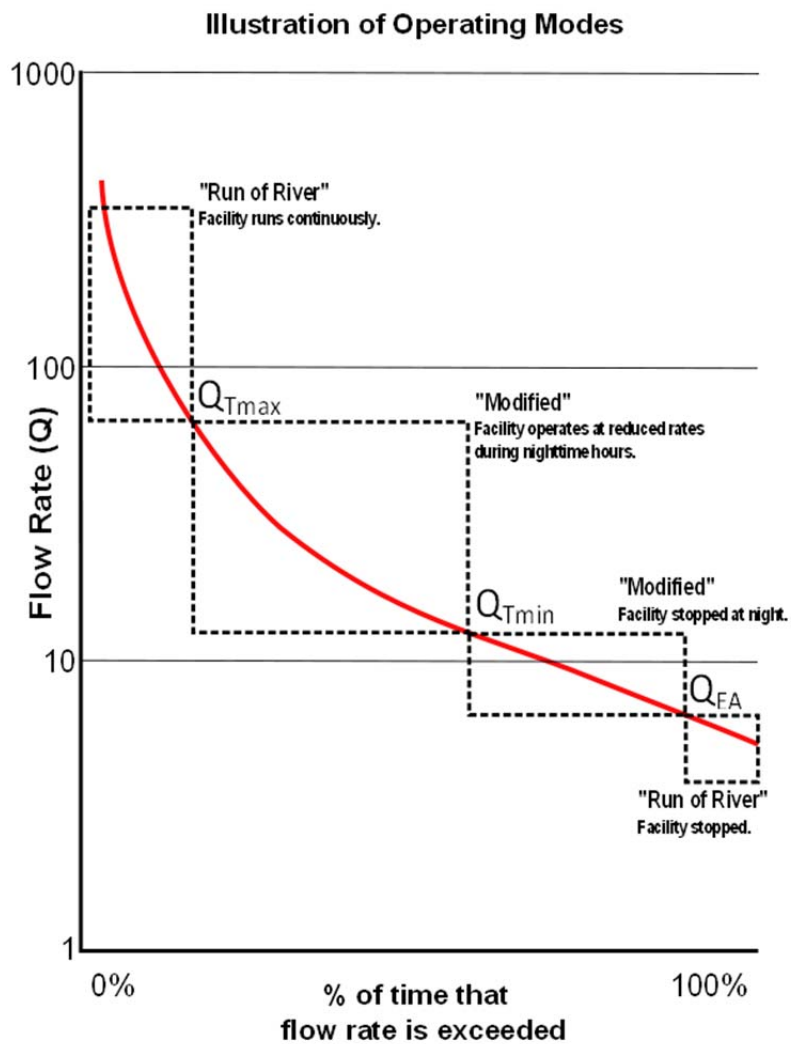
When natural river flows are between the minimum and maximum turbine capacity (4.8 m^3/s and 16 m^3/s, respectively), the facility runs continuously, with some of the water stored during off-peak hours. This operation results in downstream flows that are smaller than natural river flows during off-peak hours and larger than natural river flows during on-peak hours. However, flow releases under this mode of operation would never fall below 4.8 m^3/s.

When natural river flows are below the minimum turbine capacity (4.8 m^3/s), the facility will cease operating during some off-peak hours to store water until operation is again possible. The lower the natural river flow, the longer the period of stoppage will be. When the facility operates, it operates at a rate less than maximum turbine capacity (16 m^3/s). To ensure that the

river downstream of the facility maintains sufficient flow to preserve ecological function, an appropriate amount of water is released through a bypass valve located in the powerhouse while the turbine operation is stopped (a Q_{EA} of 0.5 m^3/s). Typically, the facility operation will be stopped at night to allow the headpond to fill in preparation for the following day (on-peak).

Figure 10 below illustrates the mode of operation that occurs depending on the amount of natural flow in the river.

Figure 10: Modes of Operation



The proposed undertaking will have a limited ability to store water in the headpond, with a live storage of 180,000 m^3, equivalent to 5 hours of operation in intermittent operating mode. This places a limit on the depth and area of inundation upstream, and by extension, the magnitude and spatial extent of the associated environmental impact. This, in addition to the limited amount of storage available for operation relative to the natural flow of the river, differentiates modified run-of-river projects from hydroelectric projects with large storage reservoirs capable of

storing water for weeks or months and which have the ability to "peak" when seasonal periods of hot or cold weather raise the demand for electricity. Modified run-of-river projects typically have less environmental impact than such peaking hydroelectric projects.

5.3 SPILLWAY FLOW ALLOCATION

Upon reaching the water control structure, flows in the Blanche River will be released downstream via two possible routes:

1) Part of the flow will be diverted towards the intake, through the penstock and into the powerhouse, and will be released back into the natural river channel at a point approximately 150 m downstream of the control structure;
2) The remainder of the flow will pass over the spillway. The two routes are not mutually exclusive, as outlined below.

Flows in the Blanche River at the site of the powerhouse and spillway will be allocated between the two structures in such a way that ecological flow requirements identified during the environmental assessment process are met. The proportion of flows going into each structure will depend on the amount of inflow into the project area and the operating status of the powerhouse. Under typical flow conditions, flows are allocated between the two structures in the following manner:

- High flow (> 16 m^3/s): When natural flows in the river exceed the maximum turbine capacity (16 m^3/s), any excess flow is directed over the spillway. This occurs primarily during spring flood flows.
- Moderate flow (4.8 – 16 m^3/s): When natural flows are between the minimum (4.8 m^3/s) and maximum (16 m^3/s) turbine capacity, all flows are typically passed through the powerhouse to generate electricity, with no flow being passed over the spillway into the bypass reach; however, if moderate flows occur during the spring, a compensatory flow of 0.5 m^3/s must in this case be passed over the spillway. Moderate flows occur much of the time, and during various times of the year.
- Low flow (0.5 – 4.8 m^3/s): During low flows, all flows are typically passed through the powerhouse, with no flow going over the spillway unless these low flows are occurring during the spring (at which point, a compensatory flow of 0.5 m^3/s is released over the spillway). Since the amount of inflow is insufficient for continuous operation, flows from the powerhouse are interrupted intermittently, with only the minimum environmental flow (Q_{EA} of 0.5 m^3/s) being released downstream when the facility is not operating.
- Very low flow (< 0.5 m^3/s): During very low flows, inflow is insufficient for any type of operation, and all inflows are directed through the bypass valve located in the powerhouse, and the powerhouse is inactive.

5.4 VARIABLE FLOW REACH

The Variable Flow Reach spans from the area immediately downstream of the facility to a distance downstream where the variability in flow is attenuated by the presence of a lake or a confluence with a significant tributary. Within the Variable Flow Reach, water depth, flow velocity and wetted channel perimeter can change substantially from on-peak to off-peak hours under modified run-of-river operations. Variability in flow may impact aquatic habitat, navigation, public safety and civil structures, and ice scour. The operating parameters of the proposed undertaking will ensure that ecological flow requirements are met, take into consideration any downstream navigation constraints, and avoid significant negative impact on public safety and civil structures.

The Variable Flow Reach downstream of the Marter Township GS can be divided into two major segments:

1. The Blanche River between the facility and the confluence with the Misema River, and
2. The Blanche River from its confluence with the Misema River to its confluence with the Englehart River. Downstream of the confluence of the Englehart River, any alteration in flow caused by the Marter Township GS would be difficult to distinguish from existing conditions.

Between the Marter Township GS and the Misema River confluence, the variability of flows will be controlled solely by operations at the Marter Township GS. The degree of variability will depend on the mode of operation and the magnitude in daytime vs. nighttime flows. This variability will typically be greater when the facility is operating intermittently (i.e. stopped at night) compared to situations where the facility is operating continuously but at reduced rates at night. Under continuous, modified run-of-river operations, daytime flows will generally be no more than 4 times larger than nighttime flows. Conversely, under intermittent operations, when only the minimum environmental flow (0.5 m^3/s) is released at night, daytime flows can be 10+ times larger than those at night.

Downstream of the confluence with the Misema River, the variability in flows will be influenced by operations of both the Marter Township GS and the Misema GS. The results of unsteady-state HEC-RAS modelling indicated that the variable flow releases from the Marter Township GS would have the most substantial effect at a pool and narrow control section approximately 5 – 5.6 km downstream of the proposed dam location, and that the effects on water levels and flow variation decrease downstream of the deep pool reach. The model results also indicate that the greatest magnitude of these effects would occur in February due to the larger range of outflows from the plant during this time of year, and smaller average inflows. For a detailed description of the unsteady state hydraulic modelling conducted for the proposed Marter Township GS, see the reports "HEC-RAS Unsteady Flow Modelling" (CPL, January 2013) and "HEC-RAS Environmental Flow Comparison" (CPL, November 2013) in Annex I of this ER.

The Marter Township GS is proposed to operate in a 'harmonized' fashion with the Misema GS, in order to meet the following objectives:

- Avoid simultaneous peaking of both the Marter Township GS and the Misema GS;
- Avoid increasing the magnitude of fluctuations on the Blanche River (downstream of the confluence with the Misema River) beyond those currently experienced;
- Ensure that flows on the Blanche River, as measured at the WSC gauge 02JC008 (downstream of the Marter/Misema confluence), do not fall below 2.3 m^3/s, the minimum flow currently experienced at that location.

Depending on the respective operations at the two facilities, the following effects on flows would therefore be observed downstream of the Misema River confluence:

- When the Marter Township GS is in modified operations and the Misema GS is in ROR operations, there will be an increase in the duration and frequency of daily peaking events, but the magnitude of water level variability will be within the existing range of conditions.
- When *both* facilities are in modified ROR mode, individual peaking events will experience an increase in duration, but the magnitude of the peak will remain within existing conditions. As noted above, operations at the Marter Township GS will seek to maintain a minimum flow of at least 2.3 m^3/s at the current WSC Gauge Station 02JC008.
- In the event that water is being held back by the Misema GS for time periods in excess of 24 hours, the Marter Township GS would operate based upon inflow conditions at the Marter Township site while at the same time ensuring that downstream flow and level commitments are satisfied.
- When the Marter Township GS is in ROR mode, there will be no change to flows downstream of the confluence with the Misema River (i.e. any variability in flow would be the result of operations at the Misema GS, and would be equivalent of existing conditions).

To reduce the potential for impact within the Variable Flow Reach during intermittent operations, the following factors were considered when selecting operating parameters for the Marter Township GS:

1. Timing of event: Special attention was given to the timing of aquatic habitat events and the relationship to the range of natural flows that could occur during these periods. Where intermittent operation may occur during the identified periods, the bypass flow to be provided while the facility is stopped was given special consideration.

2. Sizing of bypass flows: Bypass flows were considered in the context of the associated water depth, flow velocity and wetted perimeter in the Variable Flow Reach. The objective is to minimize the amount of water released during times when the facility is stopped, while providing enough water to minimize stress on the aquatic environment. For the proposed Marter Township GS, a minimum environmental flow of 0.5 m^3/s will be released downstream via a bypass valve in the powerhouse when the facility shuts down during intermittent operations.
3. Controlled ramping of flows: To minimize the sudden release of water that occurs during start up, a ramping procedure was developed. The ramping procedure requires the facility to start at minimum turbine capacity and gradually ramp up output until the desired operating rate is reached. For the proposed Marter Township GS, it is proposed that both ramp up and ramp down occur gradually over a period of 60 minutes.
4. Limiting maximum turbine flow: During intermittent operation, the turbine flow will be set to not exceed an upper limit to minimize the amount of flow variability that occurs on a daily basis. For the proposed Marter Township GS, turbine flow will not exceed 10.4 m^3/s during intermittent operations.

The proposed operating parameters have been designed with the objective of avoiding significant impacts on the downstream habitat. It should be noted that operating parameters for turbine flows depend on the final design and equipment selected at construction. As such, some variation in the identified parameters may occur, however the objectives of the mitigation and ecological flows provided will remain as stated.

5.5 Operating Parameters

In establishing the operating parameters for the proposed facility, the environmental aspects of the project site and surroundings were considered so as to provide a reasonable balance among operational constraints, environmental features and mitigation of possible impacts.

It should be noted that daily changes in upstream levels and downstream flows related to operation occur only when the facility is in modified run-of-river operations mode. While the facility is in run-of-river mode and subject to the amount of natural flow in the river, the upstream levels will be maintained at a constant level and downstream flows will equal the natural flow in the river.

The proposed operating parameters and estimated water levels associated with the two dam options are listed in Table 7. Maps showing the two dam options and their associated inundations areas are shown in Figures 1a and 1b in Section 1.2 above.

Table 7: Hydraulic Characteristics for the High Dam Option and Low Dam Option for the proposed Marter Township GS

	High Dam (Option 1)	Low Dam (Option 2)
Normal operating headwater level	201 masl	196 masl
Normal operating gross head	17.5 m	12.5 m
Length of inundation area	2.4 km	1.68 km
Maximum daily fluctuation	1.0 m	
Normal tailwater level downstream of powerhouse	183.5 masl	

During walleye and Lake Sturgeon spawning events, when the Marter Township GS operates in run-of-river mode, the headpond will be maintained at the normal operating headwater level.

The operating parameters managing downstream flows/levels are:

- Upper Turbine Limit (Q_{TL}): During intermittent operation, daily fluctuations in flows can vary substantially, as only the minimum environmental flow (0.5 m^3/s) is released at night. In order to minimize the difference between on-peak and off-peak flows, the maximum turbine flow during intermittent operations will be limited to 10.4 m^3/s. As such, flows will fluctuate between 0.5 m^3/s and 10.4 m^3/s during intermittent operations, rather than between 0.5 m^3/s and 16 m^3/s (the actual maximum turbine capacity).
- Environmental Flow (Q_{EA}): The amount of flow that is provided to the Variable Flow Reach during intermittent operation when the turbine is stopped. Two Q_{EA} values are proposed for the two segments of the Variable Flow Reach (recall the discussion in Section 5.4 above, regarding the variability of flows upstream and downstream of the confluence with the Misema River):
    - For the length of the Variable Flow Reach spanning from the Marter Township GS to the confluence with the Misema River, a Q_{EA} of 0.5 m^3/s is proposed.
    - The proposed Q_{EA} for the Variable Flow Reach *downstream* of the confluence with the Misema River, as measured at the Water Survey of Canada (WSC) stream gauge 02JC008, is 2.3 m^3/s. Additional flow (or run-of-river operations) will be provided by the Marter Township GS if the WSC gauge indicates flows are less than 2.3 m^3/s. The purpose of having a second Q_{EA} target is to avoid scenarios where both the Marter Township GS and Misema GS are shut down at the same time and releasing only their respective minimum flows (0.5 m^3/s in each case), which would drop flows at the WSC to approximately 1 m^3/s.
- Compensatory Bypass Flow (Q_{COMP}): The amount of flow that is provided to the river reaches between the control structure and the powerhouse tailrace outflow. Although the bypass reach itself is of limited ecological value, spawning is known to occur in the pool located at the confluence of the bypass reach and the tailrace outflow. A Q_{COMP} of

0.5 m^3/s is proposed in the spring, in order to allow larvae to properly drift downstream and not become trapped in a backwater eddy at the pool.

Table 8 provides a summary of the flow hydrology information for the project site and the proposed operating parameters which have been determined for the facility. It should be noted that the turbine flow parameters may be adjusted during the detailed engineering design and as commercially available equipment options are selected, provided that such adjustments do not materially or negatively impact the environment beyond the scope of the impacts described in this ER.

Table 8: Marter Proposed Operating Parameters

Description	Acronym	Project & Streamflow Conditions (m^3/s)			
		Spring	Summer	Fall	Winter
Streamflow Exceeded 99% of the time	Q_{99}	2.8	1.4	1.4	2.2
Streamflow Exceeded 95% of the time	Q_{95}	4.7	1.8	1.8	2.5
Streamflow Exceeded 80% of the time	Q_{80}	12.0	3.0	2.5	3.1
Streamflow Exceeded 50% of the time	Q_{50}	25.7	5.8	5.7	4.7
Streamflow Exceeded 20% of the time	Q_{20}	51.9	10.3	11.2	9.4
Minimum environmental flow during intermittent operations – Blanche River between the tailrace and the confluence with the Misema River	Q_{EA}	No Int. Op.	0.5	0.5	0.5
Minimum environmental flow during intermittent operations – Blanche River *downstream* of the confluence with the Misema River		No Int. Op.	2.3	2.3	2.3
Compensatory flow (between tailrace and dam)	Q_{COMP}	0.5	0.0	0.0	0.0
Maximum turbine flow capacity	Q_{TMAX}	16.0			
Minimum turbine flow capacity	Q_{TMIN}	4.8			
Maximum turbine flow during intermittent operations	Q_{TL}	10.4			
Long term annual flow, average annual mean	LTAF	12.5			
Median streamflow value	Q_{MED}	6.6			
2 year return period 7-day-average-low flow	7Q2	2.17			
10 year return period 7-day-average-low flow	7Q10	1.54			
20 year return period 7-day-average-low flow	7Q20	1.39			

Description	Acronym	Project & Streamflow Conditions (m^3/s)			
		Spring	Summer	Fall	Winter
High streamflow event; occurrence of 1 in 2 yr	Q1:2	94			
High streamflow event; occurrence of 1 in 100 yr	Q1:100	166			
Turbine ramp time		60 minutes			
Turbine down ramp time		60 minutes			

Seasonal Operations

Potential operational impacts to environmental components vary significantly depending on the mode of operation and flow conditions which are in turn typically dependent on seasonal conditions. For the purposes of the operating plan, the operating seasons have been determined by reviewing a hydrograph of average annual flows and periods of special environmental significance (i.e. fish spawning). Table 9 summarizes the start and end dates for each season as they relate to the operations of the Marter Township facility.

Table 9: Seasonal Hydrological Periods

Spring	April 1st – June 15th (76 days)
Summer	June 16th – September 1st (77 days)
Fall	September 2nd – November 1st (61 days)
Winter	November 2nd – April 1st (151 days)

The frequency with which each type of operating mode is employed will vary seasonally. The proposed frequency of each mode of operation was determined using available hydrology, design parameters and operating restrictions (see Table 10).

Table 10: Operating Mode Occurrence by Season

Operating Mode	Inflow	Spring	Summer	Fall	Winter	Annual
Run-of-River (Continuous Operation)	$>Q_{Tmax}$	69%	8%	8%	7%	20%
Modified Run-of-River (Continuous Operation)	$>Q_{Tmin}$	26%	52%	48%	43%	42%
Modified Run-of-River (Intermittent Operation)	$<Q_{Tmin}$	4%	39%	43%	49%	37%
Run-of-River (Facility Not Operating)	$<Q_{EA}$	1%	1%	1%	1%	1%
		100%	100%	100%	100%	100%

Strategy for harmonizing the modified run-of-river operations at the Marter Township GS and the Misema GS

The report titled, "Assessment of Pre and Post Project Flow Variability Blanche River, ON (WSC 02JC008)", in Annex I of this ER, outlines a strategy for harmonizing modified run-of-river operations at the Marter Township GS in such a way that it does not peak simultaneously with the Misema GS.

The Marter Township GS is proposed to ramp up (increase flow releases) as the Misema GS is ramping down (decreasing flow releases as the peak in electricity generation subsides). As proposed in the above-referenced report, the Misema GS can be considered to be ramping down when the WSC gauge 02JC008 indicates a decrease in flows by 3 m^3/s over a two-hour period. By increasing flow releases from the Marter Township GS before the Misema GS is fully shut down (at which point the Misema GS is releasing only its minimum environmental flow of 0.5 m^3/s), the duration of daily peaks will be elongated, rather than creating a dual peaking effect within the same 24-hour period.

Two means are available for coordinating harmonized operations of the Marter Township GS and the Misema GS. The preferred means is to enter into a data-sharing agreement with the operators of the Misema facility. In the event that this cannot be accomplished, the alternate approach available would be for Xeneca to install a logger downstream of the Misema GS tailrace to monitor flow releases from the facility. Should neither of these be possible at any one time, the Marter Township GS will operate in run-of-river mode until normal data sharing or recording can resume.

Operating Restrictions

Over the course of the EA planning process, special operating restrictions were developed in order to mitigate against potential impacts to walleye and lake sturgeon spawning downstream of the Marter Township GS. As the operating restrictions were developed following the assessment of potential impacts as described in Section 7.3.10 of this ER, the specifics of these operating restrictions are detailed therein. For the convenience of the reader, the proposed operating restrictions are briefly introduced here in order to ensure that all information pertinent to operations are grouped within a specific section of the ER.

During walleye and lake sturgeon spawning, the facility will operate in ROR mode for a period, followed by modified ROR with no intermittent operations during lake sturgeon larval drift. Water temperature will be used as the basis for determining when these special operating restrictions begin and end (see Tables 26 and 27 in Section 7.3.10 (Aquatic Habitat and Species) for the detailed operating strategy).

Additional operating restrictions for the Marter Township GS include:

- The facility will go into run-of-river operation when a Level 3 drought is declared by the Province for the watershed.
- As discussed in Section 5.4 above, modified run-of-river operations at the Marter Township GS will be harmonized with operations at the Misema GS. In the event that the modified run-of-river operations at the two facilities cannot be harmonized, the Marter Township GS will default to run-of-river operations until proper scheduling and coordination between the two facilities can resume.
- As discussed in Section 5.5 above, the maximum turbine flow during intermittent operations (when only 0.5 m^3/s is being released at night) will be limited to 10.4 m^3/s, in order to reduce the magnitude of daily fluctuations in flows and levels downstream.
- When natural inflow is sufficient to support minimum generation requirements (Q_{MIN} = 4.8 m^3/s + Q_{COMP}), intermittent operations will not occur. That is, nighttime flows in the Variable Flow Reach will be 4.8 m^3/s (plus Q_{COMP}, if applicable), and not 0.5 m^3/s as would otherwise occur during intermittent operations.

5.6 SPECIAL EVENT OPERATION

Operation during special events, such as floods, droughts and safety emergencies, may need to deviate from the normal operating parameters to manage flows and mitigate impacts.

- Normal Flood Operation: Normal flood events are defined as flows that exceed the maximum capacity of the plant (Q_{Tmax} = 16 m^3/s) up to and including the one in two year flood event level. Flood events of this magnitude are normal occurrences in the river and present minimal concern for public safety or environmental impacts. During these periods, the facility is operated to manage water levels upstream below the maximum

upstream operating water level where possible. This is achieved by allowing any water that is in excess of the maximum turbine capacity to bypass the facility through the spillway.

- High Flood Operation: High flood events are defined as events that exceed the one in two year flood event level but are within the safe design level of the facility. Flood events of this frequency are anticipated to occur only infrequently over the life of the facility. The objective of this type of operation is to ensure public safety. This is typically achieved by allowing any water that is in excess of the maximum turbine capacity to bypass the facility through the spillway and by operating the spillway and the power generation facility in a manner that achieves this objective.
- Extreme Flood Operation: Extreme flood events are defined as events at which the facility cannot be attended safely by operators and where the risk of flooding of the generation equipment is possible. The emphasis on operation is on ensuring public and operator safety. Where advance warning is received that an extreme event may occur, the operation of the facility will be adjusted in advance of the flood peak to maximize its ability to pass water and provide minimal obstruction to the passing of flood waters.

The inundation maps and river profile mapping provided in Annex I show the water depths and extents for various flood conditions. The objective of flood operation for the spillway, turbine and bypass is to ensure that the backwater inundation effect is minimized and kept within the projected distance limits.

5.7 COMPLIANCE CONSIDERATIONS

For compliance purposes, the Target Operating Zone will be the legal operating limits as provided in Section 7 of the Operating Plan for the Marter Township GS. The facility will be considered out of compliance with this Operating Plan when outside of these defined operating parameters. Xeneca will be required to submit an Incident Report following standard compliance procedures outlined by MNR whenever the head pond water levels or downstream flow targets deviate outside the Target Operating Zone.

During periods of drought or extreme flooding events equipment constraints may prevent water levels or flows from being maintained solely within the Target Operating Zone. Xeneca will not be required to submit an Incident Report whenever the operating parameters deviate outside the Target Operating Zone under these conditions. Xeneca will keep on record the occurrence of these events and resultant conditions.

When river flows are above the maximum turbine design capacity (16 m^3/s), Xeneca will not have the ability to control water levels whether upstream or downstream of the proposed facility. Water levels and flows will rise and fall in accordance with natural inflows until flow decreases back to or below the design capacities of the turbine. For compliance purposes, no Incident Report will be required if flows exceed the design capacity of the facility. However,

when inflow rates decrease below the facility design capacity, Xeneca will become subject to the Target Operating Zone Parameters as discussed above.

5.7.1 Effectiveness Monitoring Program

A post-construction environmental monitoring program is outlined in the Class Environmental Assessment for Waterpower Projects and includes assessment of the effectiveness of mitigation proposed, including effectiveness of the proposed operating plan in achieving the objectives outlined in Section 5.5.

5.7.2 Compliance Monitoring and Reporting Program

Xeneca will be required to report the following for the facility:

- one instantaneous discharge (flow) reading at 15-minute intervals;
- one instantaneous head pond water level reading at 15-minute intervals;
- one instantaneous discharge (flow) reading at 15-minute intervals at the Water Survey of Canada Gauge Station 02JC008 (or equivalent location); and
- a summary record outlining time and duration of events where intermittent operations at Marter could not be coordinated with those of the Misema generating station.

For total instantaneous discharge readings, this would be a combination of gauged/measured flows through the facility and calculated discharge from the spillway.

For the purposes of compliance monitoring, the head pond water level will be monitored from a water level gauge located on the upstream side of the powerhouse. Downstream flows will be monitored either at WSC 02JC008 or an equivalent location.

Water temperature in the head pond will also be monitored on an hourly basis and this data will be reported with the flow and water level reading data.

This information will be reported annually in a compliance monitoring report to MNR. The information will be provided in an electronic format that can be graphed as well as in a written format.

An out-of-operating zone situation will require the submission of an Incident Report as noted in Section 12.2.

5.8 Provisions for Plan Reviews, Amendments and Plan Renewals

There is no existing water management plan (WMP) for the Blanche River, however an existing water management plan is in place for the Misema River which flows into the Blanche River approximately 2.5 km downstream of the project site; the variable flow reach of the proposed

Marter facility extends beyond the Misema River confluence at Blanche River; therefore a combined water management plan may be developed for both rivers. Continued consultations with MNR will determine the scale of planning that best suits the river system. Recent amendments to the LRIA may result in changes to the way that LRIA approvals are sequenced and coordinated in the future, as a result of upcoming policy changes. Xeneca is committed to meeting the requirements of existing WMP policy.

6. FEDERAL, PROVINCIAL AND MUNICIPAL AGENCY AND STAKEHOLDER CONSULTATIONS

This section presents the methods and scope of stakeholder consultation conducted for this proposed development. For the reader's convenience, a summary of the issues identified during the regulatory agency and public consultation process is provided in tabular format as Table 25 (Identified Issues and Management Strategies), and includes the proposed resolution to the issue. Additional measures potentially required at the permitting or operation stage are also outlined in Section 7 and 13 of this report.

6.1 CONSULTATION GUIDELINES

One of the main objectives of the Waterpower Class EA process is to coordinate and integrate the requirements of regulatory agencies under the provincial *EAA* and any applicable federal legislation. This involves gathering information from public, private and Aboriginal stakeholders to identify environmental concerns and to inform project decision makers. To meet this objective and to effectively engage with agencies and stakeholders, the Waterpower Class EA builds on the public notification requirements mandated under the *EAA*, and other processes (i.e. *LRIA*, *Public Lands Act*, etc.) which requires consultation and engagement planning be incorporated as an integral component of the planning process. Xeneca's consultation programs are designed to identify potential stakeholders, engage stakeholders and provide the means and opportunity for participation in the development planning process. The goals of the consultation programs are to:

- Identify and notify potentially interested and affected stakeholders;
- Identify and assess the range of positive and negative environmental and socio-economic effects of the project;
- Address the concerns of adjacent property owners, local and regional interest groups, individual members of the public and Aboriginal communities that may be directly affected by the project.

To achieve these goals, the consultation programs strive to:

- Identify potentially affected stakeholders;
- Describe how the project may affect the natural and socio-economic environment;
- Provide notification to identified stakeholders as prescribed by the Waterpower Class EA;
- Inform the public, Aboriginal communities and regulatory agencies where, when and how they can engage in the process;
- Identify public and Aboriginal community benefits, concerns and issues related to the project;
- Address public, Aboriginal community and regulatory agency concerns and issues raised regarding the development and operation of the project;
- Document public, Aboriginal community and regulatory agency input and how concerns were addressed, issues avoided and mitigation measures put into place during project planning.

The records of agency, public and Aboriginal community consultation undertaken in the planning of this development proposal are provided in Appendices C, D and E, respectively.

6.2 CONSULTATION STRATEGIES

The consultation programs undertaken by Xeneca meet all mandatory consultation requirements and uses stakeholder input to develop a better project that builds on the socio economic benefits and/or mitigates negative social or environmental impacts. Public and Aboriginal Community Consultation Plans for the proposed development are presented in Appendices D and E, respectively. Key components of the consultation plans including the specific tools and approaches to consultation are described below.

6.2.1 General Print and Mailing

General mailing of reports, notices and letters through postal, courier, e-mail and website postings were used. To promote environmental sustainability, the EA team did attempt to minimize printed media; however, hard copy print was used where electronic formats were not guaranteed to reach the intended target audience and where specifically requested.

6.2.2 Print Media

Print advertising in support of the undertaking was initially circulated in the Northern News (Kirkland Lake). To ensure consistency on outreach, formal notification of meeting advertisements were posted in the same publication, the Kirkland Lake News, two weeks in advance of the PIC meeting dates of August 23, 2011 and June 27, 2012. Furthermore, notice of a September 25, 2012 Public meeting at Chamberlain Township Municipal offices was distributed through annual tax roll notifications to all property owners within the municipality.

6.2.3 Web Media

Xeneca has provided regular project status updates through email and through its website throughout the EA process to complement the consultation and engagement program. Key documents (e.g., Project Descriptions, etc.) and notifications were provided through email and Xeneca's website at www.Xeneca.com; preliminary distribution of Project Descriptions was through the former OEL-HydroSys (now BluMetric) website at www.wesa.ca. In some cases, Xeneca personnel also employed other tools including phone calls and face-to-face meetings to garner and provide feedback to the public.

6.2.4 Meetings

Direct and/or teleconference meetings with various stakeholders such as municipalities, and public interest groups were a component of the consultation initiative intended to assist in the identification and resolution of environmental concerns. A summary of these events is presented in Sections 6.3 and 6.4.

Meetings were held with identified Aboriginal communities as part of the business to business Aboriginal consultation initiative. As part of these meetings, considerations to the concerns of FN and other Aboriginal communities located in the vicinity of, and/or having a potential interest in the project was afforded. To help facilitate these activities, Xeneca assisted interested Aboriginal communities in accessing government programs and funding.

FN and other Aboriginal communities located within or having traditionally used the project area were identified in the MNR Site Information Package provided to the proponent and through dialogue with the Ministry. A copy of all notifications of the proposed undertaking provided by the proponent to FN and Aboriginal communities is provided in Appendix E.

Meetings were also held with private businesses to determine if local economic benefit could be achieved. Meetings were also held with private landowners, municipal officials and individual stakeholders.

6.2.5 Public Information Centres (PICs)

In addition to direct correspondence, two PICs were held to collect information from the public on concerns and issues as well as to allow the EA team to inform members of the public of the basic design and environmental impact/mitigation measures. The dates and times for the PICs were advertised in a local publication, the Northern News, and notifications were sent either electronically or via post to participating members of stakeholder groups and government agencies well in advance of the scheduled date.

At each of the Public meetings, existing project area information, design, operating plans and social/economic impacts were presented. At later meetings, changes to the project, project modifications occurring as a result of stakeholder input and new information reports were also presented. Xeneca provided project information which showed the most significant impact possible. It is expected that impacts will be less than what has been presented and as such, Xeneca has conveyed the "worst case scenario" to all stakeholders.

Members of Xeneca staff as well as key discipline experts from the EA team were on hand to answer public questions and to address concerns related to the project. Attendees were asked to provide their contact information, to identify whether they wished to be provided with project updates, and to provide feedback on the project. A summary of these events is presented in Section 6.4.2.

6.3 GOVERNMENT AND AGENCY CONSULTATION

The EA team took the lead for regulatory agency consultation with additional meetings scheduled through the proponent. Xeneca issued a Notice of Commencement for the proposed undertaking on July 28, 2010. A revised Notice of Commencement was issued on November 10, 2010, and again on December 22, 2010. A copy of each Notice is provided in Appendix D. The Project Description document was provided to regulators in August 2011. The EA team invited federal, provincial and municipal agency representatives to an EA Coordination meeting on September 14, 2011 to introduce the project, collect preliminary comment on the project and details on the project site, and discuss project scoping and regulatory approvals.

A record of agency consultation, including meeting minutes is presented in Appendix C. Comments and issues raised by the individual agencies during the EA planning process are summarized in their respective sections below.

6.3.1 Federal

It is important to remind the reader that the proponent initially approached the EA planning process with a view to presenting one harmonized environmental assessment report document to meet the requirements of both provincial and federal planning processes. Since the enactment of the new *CEAA, 2012*, a federal environmental assessment is no longer required for this project. Therefore, the information contained in the following section is based on the preliminary project approach and should therefore be considered in the light of the regulatory setting it was undertaken in despite the current requirements for EA planning. There is merit in recounting the entire planning process accurately so the entire federal consultation record has been included in order to provide a comprehensive account of the planning process. Additional consultation with federal regulators may be required subsequent to the release of this document and prior to obtaining authorizations or approvals required under applicable federal legislation.

Canadian Environmental Assessment Agency

The Canadian Environmental Assessment Agency (CEA Agency) was provided with a project overview by Xeneca in June 2010. The CEA Agency confirmed it would be acting at the FEAC for the proposed project. The CEA Agency requested a detailed Project Description and clarification as to whether federal funding was being contemplated for the project. The proponent was advised that federal agencies to be contacted through the FEAC would include Environment Canada (EC), DFO, Health Canada, Indian and Northern Affairs Canada (now Aboriginal Affairs and Northern Development Canada, AANDC), NRCan, and Transport Canada. Xeneca was informed that project documents may be made available to the public, and that information related to the EA would be posted on the Canadian Environmental Assessment Registry.

In a March 17, 2011 letter to the proponent, the CEA Agency recommended that Xeneca follow a coordinated EA process, which would result in the submission of a single body of documentation for each project that satisfies both federal and provincial EA requirements. The CEA Agency advised the proponent that the collection of adequate baseline data was required to support the assessment of potential environmental effects, noting that this information would be required before a responsible authority could reach an EA decision. In response to a proposed timeline for the issue of Environmental Reports, Xeneca was advised that the federal review process would be determined in part by the quality of the report, the complexity of project specific issues and the level of associated public and Aboriginal community concerns.

The Project Description was provided to the FEAC and each of the above referenced federal agencies in August 2011.

An EA Coordination meeting for the proposed project was held in Kirkland Lake on September 14, 2011. The CEA Agency was in attendance via teleconference. The Agency identified Transport Canada and DFO as the Responsible Authorities (RAs) for the project file.

The Agency issued a Scoping Document for the proposed undertaking on October 24, 2011 to detail the information that would be required in the EA screening report to constitute the basis for the RAs to render a decision under Section 20 of the then-applicable *Canadian Environmental Assessment Act.* The Scoping Document (a copy of which is provided in Appendix C) identified a list of environmental components to be assessed for the proposed undertaking, including:

- Surface geology and soils
- Surface water quality and quantity
- Hydrogeology, groundwater quality and quantity
- Air quality and climate
- Fish and fish habitat
- Vegetation and wetlands

- Wildlife and wildlife habitat (including migratory birds)
- Species at Risk
- Environmental changes resulting in effects on other environmental components

Included in the Scoping Document were requirements to clearly describe public and Aboriginal consultation, including the identification of any concerns raised during consultation with respect to traditional activities being practiced near the project site.

The proponent received an electronic notice from the CEA Agency on August 10, 2012, informing them that the CEA Agency is no longer involved in any of the waterpower projects proposed by Xeneca subsequent to the enactment of *CEAA 2012*.

All correspondence to and from the CEA Agency is provided in Appendix C.

Fisheries and Oceans Canada

The Department's role as a Responsible Authority (RA) under the *Fisheries Act* was confirmed at the EA Coordination meeting on September 14, 2011. At this meeting, the DFO listed several key sections of the *Fisheries Act* that may require Authorizations, include fish passage, HADD (the Harmful Alteration or Disruption, or the Destruction, of fish habitat), screening of intakes, destruction of fish, etc. Correspondence was issued to the proponent on October 27, 2011 detailing the project's possible impacts to fish and fish habitat that would require Authorizations under the legislation.

Correspondence was jointly issued to the proponent by DFO and Transport Canada on October 28, 2011 with respect to consultation with Aboriginal communities for all of Xeneca's proposed waterpower development projects. With respect to the Marter Township GS project, the proponent was advised that the Temagami FN should be included as a potentially identified Aboriginal group, and should be added to the Aboriginal Consultation Plan for the Marter Township GS project.

The proponent received an electronic correspondence from the department on July 12, 2012 in advance of an upcoming meeting. Concerns regarding effects to fish movement at the downstream rapids resulting from decreased flows at the project site were noted. The department also requested that a discussion on fish turbine mortality rates be presented in the ER. *[Note: as fish turbine mortality rates are required in support of an authorization under the Fisheries Act, rather than being required under the Waterpower Class EA, Xeneca will develop and provide the information during the approval process. This approach was communicated to DFO during the July 20, 2012 agency meeting; meeting minutes are provided in Appendix C of this ER.]*

In a separate letter dated July 12, 2012 the proponent was informed via DFO that federal environmental assessments for Xeneca's proposed waterpower projects are no longer required, however stating that all other applicable legislative, regulatory, and constitutional requirements must still be fulfilled. These include the requirement for detailed engineering drawings, detailed habitat information, compensation plans (if applicable) and the operating plan before DFO can issue a determination under the *Fisheries Act*.

DFO was provided with a copy of the Draft ER for their review on August 30th, 2012. On September 28, 2012, DFO provided their comments on the Draft ER to Xeneca. The communication identified that Stuart's Rapids provides a potential seasonal barrier for the migration of Lake Sturgeon, but that for all other fish species, the rapids are not considered a barrier. Further information regarding the potential of Krugerdorf Chutes to function as spawning habitat was requested, and DFO advised that without supplemental information being provided, DFO would apply the precautionary principle and would consider the base of these rapids as providing spawning habitat. DFO commented that additional discussion on significant adverse effects on fish habitat be provided, and requested an update on HADD definitions within the EA. The letter concluded by stating that DFO would await the results of further field studies.

On July 12, 2013 in an email, DFO staff advised the proponent that Walleye and Lake Sturgeon spawning tables were to be prepared to form part of the operating plans, and confirmed the upper temperature limits to be used for the peak spawning period for Walleye and Lake Sturgeon, as a result of recent discussions.

Throughout the second half of 2013, multiple discussions were held between Xeneca, DFO, MNR and MOE to discuss operating restrictions for mitigating impacts to fish spawning activities. Xeneca proposed run-of-river operations throughout the full temperature range of spawning to yolk sac absorption, following by modified run-of-river operations with a maximum daily fluctuation of 5 m^3/s and with continuous flow releases of at least 4.8 m^3/s. In a November 15, 2013 correspondence, DFO noted that, with the proposed restrictions and the short distance separating the Marter Township GS site to the Misema River confluence, they were satisfied that the proposed operations represent a low risk to fish and fish habitat.

Transport Canada

On September 28, 2010, Transport Canada (TC) provided comments to the CEA Agency on the draft Project Descriptions issued by the proponent. TC noted that where there is a proposal for new works including dams, booms, and water crossings, the *NWPA* will be triggered. TC advised that to confirm its role under *CEAA*, a Request for Project Review under *NWPA* should be submitted by the proponent as early as possible to the Navigable Waters Protection Office. The agency could provide an opinion as to the navigability of the waterway and whether or not the *NWPA* will apply to the project. The proponent was advised to include the results of this navigability assessment in the Project Description if possible.

TC was unable to attend the EA Coordination meeting held on September 14, 2011, however the Agency's role as a RA for the project was confirmed in an email issued on the same day. The Agency advised the proponent to submit its application for a project review request under the *NWPA* as soon as possible, identifying what was required in support of the application, and prior to the issuance of an Approval; the Act prohibits the construction or placement of any "works" in, on, over, under, through or across navigable waters without first obtaining approval.

On October 28, 2011, TC, in co-ordination with DFO, provided written correspondence to Xeneca, outlining their delegation of the procedural aspects of Aboriginal consultation to the proponent, and requested that project-specific consultation plans be prepared and submitted to the agencies by November 25, 2011. The agencies advised Xeneca of their ultimate role in ensuring that Aboriginal consultation is conducted, including monitoring the implementation of Aboriginal consultation plans, and monitoring the mitigation and consultation measures arising from the consultation process. Detailed engineering drawings will be required by the Agency before it can issue a determination under the *NWPA*.

Although not a requirement of the OWA Class EA, an application for approval under the *NWPA* was first submitted on September 5, 2012; however, TC informed Xeneca that a review of the application cannot be started until the final design option for the project is selected (as noted in Sections 3 and 5 above, two dam options are currently being considered, and the option to be selected will depend on the outcome of landowner agreements). Xeneca informed TC on September 10, 2012, that the application will be resubmitted once a final design is chosen.

Environment Canada

The results of the 2010 surface water quality investigation (Annex IV) were provided to EC on March 15, 2011. EC was also informed of the proponent's timeline for releasing additional supporting documentation, including reports that would encompass hydrology, operations, existing conditions and archaeology.

Although no comments have been received from EC on the results of the 2010 surface water quality investigation on the Blanche River, comments were received from the Agency for other Xeneca surface water investigation programs, applying the same methodology. It is therefore anticipated that the Agency would have similar comments that generally would include:

- Information on the reference sampling area prior to headpond creation to ensure appropriate sampling for baseline conditions is completed;
- Estimate of the expected temperature and volume of the thermal discharge from the powerhouse in order to quantify the potential change in surface water temperature in the head pond due to increased surface area and slower flow velocity;
- Additional analytical parameters in relation to hardness of water, water levels and currents, etc.

An EC representative participated in the September 2011 EA Coordination Meeting.

The proponent undertook consultation with EC in conjunction with the MOE in 2012 in order to scope and undertake additional surface water quality investigations in order to determine any potential negative effects of the proposed project within the project's zone of influence.

Natural Resources Canada

An agency representative from NRCan was not available for the September 2011 EA Coordination meeting; however the agency offered expert advice on hydrology and mercury.

Electronic correspondence was received from NRCan on August 13, 2012, confirming that NRCan is no longer involved in the undertaking as a result of *CEAA 2012* coming into force.

6.3.2 Provincial

Various provincial ministries were provided with a Notice of Commencement, a revised Notice of Commencement, the Project Description document and a copy of the Draft ER. A record of provincial agency consultation is provided in Appendix C.

The following is a synopsis of the consultation undertaken with provincial regulators.

Ontario Ministry of Natural Resources

The MNR, with a mandate to manage natural resources and to promote renewable energy in the province, has a legislative role in this project with respect to natural heritage, water management planning, and the management of Crown land.

Numerous meetings, phone calls, email exchanges, and letters formed a robust, thorough and comprehensive exchange between members of the EA team and the MNR to refine field study work plans and investigation protocols, and confirm reporting requirements. Discussions towards reaching consensus were initiated and will continue beyond the report submission stage. A record of exchange between Xeneca and the MNR can be found in the comment and response table at the end of Appendix C of this ER.

The proponent's notification and consultation with the Ministry includes the provision of early notification of the project, requests for background/baseline information on natural heritage information and data in the vicinity of the project site, scoping consultation, and application for scientific permits and approvals to complete natural habitat and geotechnical investigations.

Discussions were also held between the EA project team to discuss potential impacts resulting from the proposed development as it relates to Lake Sturgeon and other species at risk.

MNR participated in the September 14, 2011 EA coordination meeting. A brief summary of the main topics discussed is presented below, and the resolutions that were ultimately reached in later stages of the EA planning process are described in the last bullet point. Detailed meeting minutes are included in Appendix C.

- MNR confirmed that it was not able to provide site release until all landownership issues were appropriately addressed, and that this would require legal agreements from all affected landowners agreeing to occupancy or flooding.
- MNR noted that soils in the area are very erodible, and that fluctuations in the proposed headpond will cause shoreline erosion. Xeneca confirmed that erosion potential was being taken into account and would be reviewed following the completion of the dynamic modeling.
- MNR indicated that they had provided comments to Xeneca on the project description which pointed out inaccuracies in the project description and suggested that the proponent look into how corrections or project updates can be made and communicated to the public through Xeneca's website.
- The Ministry stressed that the cumulative effects of both the proposed undertaking and the operating Misema Power facility will have to be assessed as part of the Marter EA process. MNR added that the onus is on the proponent to show that the Marter facility will not affect the Misema operation, and that the combined effects of these two projects will not impact species at risk and the fisheries, adding that an agreement, and possibly a permit under the *ESA* for Lake sturgeon may be required prior to the commissioning of the facility. MNR noted that they have concerns regarding the impacts of erosion from the project on the downstream sturgeon habitat.
- It was confirmed that the proponent will require a permit under the *Endangered Species Act* prior to the construction of the powerline should it intersect bobolink habitat.
- MNR noted no Crown reserve along the shorelines.
- Key permitting requirements were discussed, including *LRIA*, *Public Lands Act*, and *ESA*.
- MNR noted that the Temiskaming FN has recently asserted Aboriginal rights in the project area.
- *[Note: the feedback obtained in this and subsequent meetings led to the implementation of additional studies and consultation. A geomorphic assessment study was conducted in 2012 – 2013 to address the issue of shoreline erosion, and a monitoring program was developed for the construction and operational phases of the project (see the geomorphic assessment report in Annex I and the post-construction monitoring plan in Section 12.2). Project updates and corrections to past documentation were communicated to the public through Xeneca's website. In order to address potential cumulative impacts downstream of the confluence with the Misema River, the Marter Township GS will operate in a 'harmonized' fashion with the Misema GS; such that the magnitude of daily fluctuations does not exceed those experienced under existing conditions (see Section 5.4 and the*

proposed Operating Plan in Annex I). The Temiskaming FN were included in subsequent consultation by the proponent (see Section 6.6.6).]

A modified Site Information Package (SIP) for the Marter project was provided to the proponent by the Ministry in October, 2011. The modification identified the absence of information on Aboriginal communities identified for possible business to business relationships. The modification was necessary due the absence of classification of the project with respect to site release. Classification for this project is dependent the proponent securing landowner agreements which would classify the project as a direct site release which will in turn dictate the level of consultation and business relationships with local FN communities. The Ministry also provided review comments on the Marter Township GS Project Description document. Comments included the addition of the Township of Chamberlain as a stakeholder in the undertaking, the requirement to extend the downstream zone of influence beyond the confluence of the Marter and Misema Rivers, disagreement on qualifying the Blanche River as an unmanaged waterway, additional information on information that will be required in advance of permitting, landowner agreement requirements, and the inclusion of Wahgoshig FN and Timiskaming First Nation as interested Aboriginal communities, and the identification of the Timiskaming First Nation's asserted traditional territory at the project site. As with the EA coordination meeting, this feedback on the Project Description was used to scope and refine the subsequent field investigations and consultation processes, such that the concerns raised in the MNR's review comments were ultimately addressed for this Final ER.

During 2011 and 2012, Xeneca and senior officials from the MNR, the MOE and, to a limited extent, DFO, engaged in a series of meetings to determine a reasonable and efficient approach to engaging the review agencies at the regional and district levels.

In October of 2011, MNR reviewed the project description for the Marter Project, and provided a series of written comments, which indicated that field studies must reflect the ZOI, and must also include assessment of cumulative impacts. The MNR recommended key data collection sites for the collection of biological information, including Krugerdorf Chutes, Stuart's Rapids, and James' Rapids. In 2012, meetings were held on February 8, March 13, April 16, May 4 and June 8. These efforts resulted in a mutually agreed upon communications strategy and a single point of contact for the proponent's questions regarding the planning and approval process. On August 12, 2012, Xeneca advised MNR that field studies were underway to complete a site reconnaissance and obtain water depths at James' Rapids, and that the results of studies being completed at James' Rapids would be submitted as part of the Final ER.

MNR, MOE and DFO were present for a July 20, 2012 meeting with the proponent. Discussions centered on natural habitat investigations, the extent of the downstream ZOI for the project, and upcoming surface water quality sampling events. The MNR sought additional information on work done focusing on sediment and erosion control, since there have been recent landslides

downstream of project. The proponent confirmed that the orientation of the tailrace would be aligned to reduce any additional effects to the shoreline, and that this would be presented during the plans and specification stage. The proponent was advised to share any information on the downstream ZOI with the public, with the MNR noting that there may be public concerns regarding a downstream walleye spawning area. Facility operation with respect to the downstream sturgeon spawning habitat was discussed with possible adaptive management strategies, including the provision of a ROR operating regime during the egg incubation and spawning and nursery period (the discussions from this and subsequent meetings contributed to the development of the operating restrictions presented in the Operating Plan in Annex I of this ER). An update was provided with respect to the engagement and consultation efforts with the Aboriginal communities. A copy of the meeting minutes is provided in Appendix C.

A pre-submission consultation meeting with multiple agencies (MNR, DFO and MOE) occurred on January 17, 2013 in Kirkland Lake. Key points of discussion at the meeting included:

- Minimum flows, including effects on flows at a gravel bar at the base of Krugerdorf Chutes.
- The requirement for continued fish passage in the downstream river reach.
- Potential cumulative impacts resulting from operations at the Marter Township GS and the Misema GS. To mitigate against such impacts, Xeneca proposed to develop an operational regime that would consider the Marter Township GS reverting to ROR when the Misema GS is functioning. Xeneca committed to submitting a formal proposal to MNR, MOE and DFO to demonstrate how Marter Township GS operation would work in conjunction with the Misema GS operation.
- Effects of fluctuating flows on downstream habitat. Xeneca committed to monitoring the effects of varying flows on downstream river reaches, and was reminded by DFO that fish mortality estimates would be required, and appropriate avoidance/mitigation measures would need to be developed to enable a HADD authorization.
- The mitigation measures to avoid impact on Bobolink were discussed and were deemed to be sufficient.
- A three-party technical working group had formed with Xeneca, DFO and the MNR to focus on the downstream zone of influence. *(Note: Xeneca has since followed the guidance outlined in a June 6, 2013 memo from the Northeast Region MNR for defining the downstream zone of influence. The memo is included in Appendix C, in the subsection "Ministry of Natural Resources – Downstream Zone of Influence Discussion").*
- Xeneca confirmed that the Ontario North Railway was contacted regarding the Marter project. Xeneca confirmed there would be no impacted to the Ontario North Railway bridge or abutments (*Note: Hydraulic modelling and a sensitivity analysis of the model parameters was conducted, in which it was confirmed that there would be no appreciable changes to water level, velocity, depth or other hydraulic conditions at the railway bridge*

under 1:100 year flood events. See also Section 7.4.4 below and the April 9, 2013 HEC-RAS report in Annex I).

- Aboriginal consultation was discussed, and Xeneca committed to providing all Aboriginal communities with project updates following ZOI confirmation.

On February 22, 2013, a teleconference was scheduled to follow up on items discussed at the January meeting. Impacts of modified run-of-river operations on water levels downstream were discussed, particularly for the periods when both the Marter Township GS and the Misema GS would be varying flow releases. During the meeting, Xeneca noted their commitment to keep the magnitude of daily fluctuations downstream of the Misema River confluence within the range currently observed on the river. There was general agreement among the meeting attendees on using water temperatures, rather than calendar dates, for determining when fish spawning occurs and thus when the applicable operating restrictions should come into effect.

On April 11 and 12, 2013, multi-agency meetings with MNR, MOE and DFO took place. Key points of discussion during these meetings were:

- Operations: the Marter Township GS would operate in ROR mode under drought conditions, and operations would be staggered to offset effects of operations at the Misema GS. Xeneca committed that if they are unable to achieve an operational agreement with Misema, they would revert to ROR operations.
- Additional data and studies to be conducted and reported to agencies including:
    - Operating scenarios under different flow conditions
    - Report of potential impacts to water temperature as a result of operations
- Potential impacts on the sandbar at Krugerdorf Chutes: Xeneca committed to ROR operations during the spawning season to mitigate potential impacts on fish spawning.
- Consultation efforts: It was stated that in general, the proponent's consultation efforts with potentially affected landowners has been robust and thorough, though agreements with two remaining landowners remained outstanding.
- Downstream zone of influence: outstanding concerns remain, and the MNR was seeking clarification from their Northeast Regional Director's office.
- Outstanding concerns on archaeological and ecological assessment of roads: Xeneca indicated that these will be incorporated into the Final ER (see Annexes III and V).
- Sedimentation and erosion: MNR expressed concern that there is a lot of suspended sediment in the river, there is potential for headpond slumping, and there are areas of bank instability and failure (to address these concerns, a monitoring program was subsequently developed in order to monitor suspended sediment loads, changes to channel morphology and early warning indicators of slope adjustments before and during facility operations. See the Addendum #2 of the geomorphic assessment report in Annex I of this ER).

- The potential of a bank erosion event which could block the river was discussed, and the proponent's consultant indicated that the risk of this type of event would be low in the headpond area but slightly greater downstream. The proponent agreed to provide bathymetry and LIDAR data to MNR, and to prepare a report showing potential erosion effects and mitigation.

On April 12th, 2013, Xeneca submitted an information gathering form to MNR regarding Bobolink. Lauren McDonald of MNR was to review and provide comments. MNR clarified that an information gathering form for Lake Sturgeon would also be required to be submitted, prior to permits and approvals.

On May 2, 2013, the MNR was provided with a memo outlining the proponent's rationale for concluding that the proposed Marter Township GS project is not likely to result in changes to water temperature (see the memo dated April 16, 2013 in Annex I).

On May 7, 2013 a multi-agency meeting took place. The focus of this meeting was on the geomorphology report. Baseline monitoring for slope stability and sediment monitoring were discussed. The Metcalfe approach for determination of the ZOI was discussed. The potential for changes to the sediment regime and how this may influence the location of the ZOI was discussed. Potential backwater effects on the Marter dam as a result of the Misema operation were discussed. MNR confirmed that before issuing LRIA permits, Xeneca would need to provide additional information on the potential impacts to the ZOI at flows of less than 20 m^3/s. Additional clarity on the geomorphology and impacts on the ZOI will be included as part of the Operating Plan.

On May 13, 2013, an additional meeting took place, with a focus on the downstream zone of influence and how it would be impacted as a result of operations. Xeneca stated that as a result of its studies, they had determined that the downstream ZOI ended at the Misema confluence. Real-time data collected from downstream of the Misema operation will assist Xeneca in its operations at Marter. Agency representatives expressed concerns that without an agreement in principle with TransAlta, knowledge of the operational regime would be lacking and operations would be reactive. Xeneca indicated their operational approach would change to work around the Misema operations by incorporating data from a real-time level logger downstream of the Misema tailrace; the objective would be to avoid peaking both plants at the same time, and to avoid two peaking events on a single day. MNR requested that Misema's information be provided to them. Xeneca has proposed a minimum flow of not less than 2.3 m^3/s at the confluence of the Blanche and Misema Rivers. If this requirement cannot be met for any reason, the Marter Township GS will go into ROR operations. Xeneca committed to updating their operating plan and providing it to the agencies, to clarify what impact a minimum flow of 2.3 m^3/s would have on the downstream ZOI.

On July 5, 2013, a teleconference meeting with the MNR and MOE took place. The preliminary results of the geomorphology report indicated that changes in sedimentation would not be significant based on the operating plan. No sediment deprivation would occur downstream, and effects would be limited to a small river reach from the Marter dam to the confluence of the Misema GS. MNR indicated they would like to conduct their own geomorphological work, but it could occur post-EA. The 20 cm difference in head between Krugerdorf Chutes and the Misema GS confluence was disputed. The proponent committed to including a monitoring plan for total suspended solids in the geomorphology report. Potential backwater effects to the base of Krugerdorf Chutes as a result of Misema operations were discussed. MOE indicated they would be considering MNR's comments in their determination of the impact of the Marter Township GS. Slope stability and the amount of slope analysis required to finalize the EA was discussed. Impacts to Lake Sturgeon habitat as a result of sedimentation would need to form part of the analysis. The degree of suspended solids is often a reflection of the degree of dilution of flows (higher suspended solids at lower flows). The need for good pre-construction baseline information was clarified. It was agreed that if anticipated impacts were to extend beyond the Misema River confluence, that additional sedimentation and geomorphological information would need to be collected.

During a teleconference held on July 15, 2013, Xeneca indicated that with the development of the Marter Township GS, the Blanche River would experience additional days of peaking downstream of the Misema River confluence compared to current conditions, in which only the Misema GS is operating. However, they indicated that the magnitude of daily fluctuations would remain within the range currently experienced on the river. All landowners along the Blanche River down to the town of Englehart have been advised of the flow alterations that will result from facility operation.

Xeneca committed to developing a data sharing agreement with the operators of the Misema GS, to coordinate low flow requirements and flow adjustments between the two facilities. Xeneca committed to implementing a real-time monitoring sensor at the confluence of the Misema and Blanche Rivers, if attempts to reach a data-sharing agreement are unsuccessful. The purpose of the monitoring sensor would be to provide the data necessary to adjust the flow at the Marter Township GS as soon as a change in flow is detected at the Misema GS to minimize cumulative impacts related to downstream pulses in flow.

On August 7, 2013, Xeneca prepared a response to MNR regarding comments on the downstream ZOI. The letter detailed that MNR and Xeneca appear to have reached a consensus regarding the extent of impact to the downstream sections of the Blanche River, which can be divided into three main zones: the dam site to the Misema River confluence, the Misema River confluence to the Englehart River confluence, and the area of river downstream of the Englehart River confluence. Outstanding issues were outlined and included the need to rationalize cumulative impacts to the river as a result of additional days of operation, the need

for Xeneca to demonstrate how its operations will not result in two daily cycles rather than one cycle as is the case under existing conditions, and the need for Xeneca to rationalize any additional habitat analysis or monitoring to assess the impacts that may result from additional flow alternations.

A meeting between Xeneca, MNR and MOE was held on August 26, 2013 to discuss the latest hydraulic modelling studies; the findings of a pre- and post-project flow variability assessment was presented (the results of which are summarized in the August 22, 2013 Ortech report in Annex I). It was communicated to the MNR that the proposed operations at the Marter Township GS would result in a 25% increase in daily peaks on the Blanche River downstream of the confluence with the Misema River. The MNR noted that the effects of going from existing conditions to a minimum environmental flow of 0.5 m^3/s, and its ecological impacts at the confluence, need to be understood. A teleconference call was scheduled for September to discuss biological effects, described below.

A teleconference call between Xeneca, MNR and MOE was held on September 19, 2013, to discuss biological effects of the project and potential mitigation. The MNR noted that at certain times of the year, sturgeon are capable of passing Stuart's Rapids up to Krugerdorf Chutes; additionally, walleye may be spawning at the base of Stuart's Rapids and potentially the base of Krugerdorf Chutes as well. To mitigate against negative impacts to spawning activity, Xeneca would revert operations at the Marter Township GS to run-of-river when water temperatures reach the range at which spawning is known to occur.

<u>Ontario Ministry of the Environment</u>

A project overview and draft NOC was provided to the MOE on June 10, 2010.

A response to the draft NOC for the Blanche River project was received from the Ministry on August 9, 2010. The proponent was advised that moving forward with project planning prior to having secured Applicant of Record Status presented some risk, and that it limited the availability of information available from the provincial government. The proponent was advised to consult with the MNR with respect to categorizing the Blanche River as a managed waterway since MNR had identified the waterway as being unmanaged (the categorization of the Blanche River as a managed waterway was ultimately retained based on the descriptions provided in the Class EA for Waterpower Projects. The rationale for this categorization is also provided in the Aird & Berlis letter in Appendix A of this ER). Information was also provided with respect to project planning, consultation and permitting (a noise assessment was conducted in 2013, in which it was concluded that the noise levels from the proposed facility will be well within the applicable MOE sound level limits at the nearest sound sensitive points of reception; see also Section 7.4.8 below and the sound study report in Annex II of this ER).

Information on noise screenings was provided by the MOE on September 15, 2011 with respect to facility construction within 1000 m of a point of noise receptor.

MOE representatives were in attendance for the September 2011 EA Coordination meeting. There were discussions on hydraulic and hydrologic computer modeling parameters. The MOE also cautioned the proponent to ensure that all data analysis and possible project affects be completed prior to the issuance of the ER in order to meet the intent of the environmental assessment process, adding that the MOE could issue no permits without the availability of all baseline data. MOE commented on the surface water investigation program and advised that surface water analyses for total and methyl-mercury as well as tissue analysis for mercury in fish tissue should be conducted. On October 13, 2011 the MOE identified that the Project Description for the project did not include surface water analysis for mercury and identified that fish tissue analysis for mercury be completed as part of baseline studies. The agency also commented on the lack of total organic carbon monitoring for surface waters (note: baseline studies on fish tissue mercury was subsequently conducted and a water quality monitoring program was developed; these are described in greater detail in the reports by Hutchinson Environmental in Annex IV of this ER and in Section 12.2 below).

At a July 20, 2012 meeting, the MOE expressed concern with the hydraulic modeling completed for the project. MOE also requested an update on the surface water quality investigation program.

Xeneca met with MOE representatives' on August 7, 2012, during which the proponent agreed to collect additional bathymetric survey information in key sections of the river. This information will be used to compare the HEC-RAS unsteady state modeling results with the results that are based on FRI DSM information in the river reach for which LiDAR information is not available. It was agreed during the meeting that the Marter Township GS project will, in this sense, represent a pilot project for the proponent's other proposed undertakings that have similar kinds of data available.

An additional meeting with MOE representatives was held on August 15, 2012 to discuss the hydraulic modeling. During this meeting, the downstream ZOI was discussed. The MOE expressed support for the proposal of basing the extent of the ZOI on parameters falling within the range of natural variation, but indicated that the MOE will require accurate flow data, modeling and operating scenarios on which to base its decisions. Extensive flow modelling and assessment was subsequently conducted in 2013 and provided to MOE; the reports detailing the modelling work are included in Annex I of this ER.

On October 19, 2012, the MOE provided its comments on the Draft ER submitted on August 30, 2012. The MOE identified concerns with the public and aboriginal community consultation completed to date, stating that meetings with key public stakeholders had been held prior to having a defined ZOI for the facility, and prior to having completed all aquatic and

terrestrial habitat investigations. The MOE recommended that additional work be completed to document all public concerns and how these concerns have been addressed. With respect to aboriginal consultation, the Draft ER did not indicate when the Aboriginal Consultation Plan for this project had been approved, what specific issues had been raised by the communities, what specific issues had been raised by Aboriginal communities and how specific Aboriginal issues had been addressed. The MOE identified areas where further study and analysis was required, including detailed assessment of road and transmission corridors, additional archaeological fieldwork with the Temiskaming FN, assessment of cumulative effects, additional shoreline and aquatic habitat investigations, analysis of potential for acid rock drainage, analysis and reporting of baseline water quality, and further consultation with upstream and downstream riparian landowners.

The MOE recommended that to better identify the ZOI, pressure transducers could be installed at confluence locations of several rivers to better evaluate the proposed ZOI of the facility. Sampling of suspended sediments was also recommended at key locations that could assist in describing the current sediment regime of the river. Additional work was recommended as part of the steady flow hydraulic modelling, which would include additional transect determination and evaluation. The MOE recommended that the downstream modelling conducted for determination of the ZOI be remodelled, and that additional analysis be completed of the impact of operations on downstream users. Additional discussion regarding minimum flows was also recommended. Further detail was required on fish tissue and water quality monitoring. Other recommendations to improve the report were made by the MOE, on additional topics including water quality monitoring during construction, management of excavated materials, road and transmission corridors, archaeological, social and economic effects of the project, waste, and other required approvals.

In their October 19, 2012 review comments on the Draft ER, the MOE also recommended that monitoring of water discharge to the environment should be carried out throughout the dewatering process during construction, and not just as a contingency measure. Further that the temperature should be monitored in addition to pH and total ammonia concentrations to allow for the determination of un-ionized ammonia concentrations in the discharge.

[Note: In consideration of the feedback received from the MOE in their review comments on the Draft ER, four level loggers were ultimately installed downstream of the proposed project site (two near the confluence with the Englehart River, one near the confluence with the Larder River, and one near Temiskaming Lake); additionally, a comprehensive sediment monitoring plan was developed and additional HEC-RAS modelling was conducted throughout 2013 (see the reports in Annex I of this ER). Dialogue was maintained with the regulatory bodies in 2013 on minimum flow requirements, the outcome of which is reflected in the proposed Operating Plan in Annex I. The Construction Management Plan (Annex II) and post-construction monitoring plans (Section 12.2) were revised where required.]

On November 16, 2012, Xeneca met with MOE and succeeded in narrowing the list of key concerns applicable to multiple projects. The concerns were restricted to surface water quality issues, issues related to the ZOI, and aboriginal consultation issues.

On January 16, 2013, Xeneca submitted an updated Lines and Roads Report, and a Geomorphology Report to the regulatory agencies. On January 17, 2013, a pre-submission consultation meeting was held with multiple agencies including MNR, DFO and others. MOE requested to be kept in the loop with respect to minimum flow discussions as these requirements would need to be included as part of the permit to take water application. MOE stated that appropriate mitigation measures would need to be considered for Species At Risk, and the proponent would have to confirm that all data necessary to properly assess impacts had been collected. MOE stated they were under the impression that tripartite efforts were underway to delineate the zone of influence. MOE stated that the proponent should consider additional consultation to better inform public and aboriginal communities, once a final ZOI is determined.

On March 27, 2013, Xeneca issued responses to regulatory agencies (including MOE) on the comments to the draft geomorphology report, providing clarification on the questions raised by the different ministries.

On April 3, 2013, a call with the MOE representatives took place. The call was to clarify the requirement for roads assessment as part of the OWA Waterpower Class EA. Xeneca's approach to roads assessment was presented, and incorporates on-the-ground assessment of sensitive values with a robust desktop review. Route information had previously been presented to the public and FN. Spring field work (weather-dependent) was scheduled to take place to identify areas of significant habitat and potential impacts. Archaeological assessments would also take place for roads, and would focus on water crossings and areas of high archaeological potential. The approaches to field and desktop assessment were determined to be sufficient by the MOE. The MOE reminded the proponent that the MNR is ultimately required to provide a disposition of the Crown Resource, and that any disposition must be consistent with Crown Stewardship EA requirements.

On May 7, 2013, at the request of Xeneca, the MOE responded to a question regarding the use of degree-days for determining appropriate timing to mitigate impacts to spawning fish. MOE recommended that Xeneca commit within the EA to develop a thermal-based approach to address fish spawning concerns identified by the MNR and the DFO prior to the issuance of regulatory approval by each agency. The MOE recommended that the final ER document that had been done to date on this matter and that the ER should state that the details of the final thermal based approach will be agreed to with the MNR and the DFO at the permitting stage.

On July 3, 2013, the MOE provided written correspondence to activities discussed at a technical meeting held on May 13, 2013. This letter advised the proponent that the MOE did not have sufficient information to confirm that the ZOI ended at the Misema River confluence, and

requested that Xeneca provide additional rationale with respect to their requested minimum flow. Further it was requested that Xeneca provide additional information on their proposed operation with respect to frequency, magnitude, duration, timing, and rate of change of flows.

On July 5, 2013, Xeneca prepared a response to the MOE on the Marter Thermal Report. Xeneca committed to following the MOE's monitoring recommendations to complete temperature profiles of the reservoir for three consecutive years, to confirm a lack of thermal stratification in the reservoir, and to consider mitigative measures if thermal stratification occurs. On the same date and in a follow-up discussion on July 15, 2013, a multi-agency teleconference was held to discuss a number of issues including the downstream of ZOI, minimum flow requirements, flow splitting between the tailrace and spillway, operating around TransAlta, erosion and sedimentation monitoring, degree-day versus a degree approach for operations, aboriginal and public consultation, and updates to the Marter GS operating and monitoring plans.

On August 26, 2013, a teleconference was held to discuss hydrogeology for the Marter Site. The focus of the meeting was on clearly defining operations (minimum flows and releases) with respect to the cumulative impacts of the Misema Generating Station, and on the results of modelling. The MOE raised the issue of transistors being installed at certain locations below the Englehart River. The MOE indicated they wanted an opportunity to review the report provided on August 12th with the team, and that transducers be used to assist in confirming the hydrological data. On September 19th 2013 a biological effects call was scheduled with the regulatory agencies including MNR and MOE. The purpose of the call was to define the extent of the effects of the project. Xeneca stated their position is that that the majority of influence of the Marter project will be from Krugerdorf Rapids to the confluence of the Misema River. This area is already subject to fluctuations due to Misema GS. Below the confluence Xeneca proposes to operate within existing conditions, based on the records obtained from the Misema GS. Discussion took place to ensure that habitat and spawning would continue at Stuart's Rapids, where juvenile sturgeons have been captured, by reverting to run-of-river during spawning periods. Xeneca committed to providing updated modelling information (within a new operating plan) for a 0.5 m^3/s scenario in the Marter to Misema reach, and 2.3 m^3/s flows downstream of the confluence. The pool at the base of Krugerdorf Chutes was discussed with respect to spawning flows. Xeneca was asked to provide rationalization for the selection of the minimum flow values. Backwater effects of the Misema GS to the Marter site were discussed with respect to their potential influence on minimum flow values in this reach. MOE indicated that regarding the hydrological effects downstream, data is being reviewed, and technical comments would be provided.

On November 15, 2013, the Ministry of the Environment provided technical comments to the proponent. MOE identified several issues of concern. These included the use of MNR data, modelling of current hydrological conditions, justification for minimum instream flows, modelling

calibration, and inundation modelling. MOE recommended that the current model be utilized to modify inflows to represent estimated conditions for 2012-2013. This would allow the data collected from several locations along with MNR data to be utilized to evaluate the effects of the proposed operations.

On November 26, 2013, Xeneca responded to MOE's recommendations in a lengthy written correspondence. Regarding the use of MNR Data, Xeneca responded that the primary purpose of the model was to determine how daily operational changes in water levels attenuate downstream. Xeneca hired independent engineers to collect field data and update the model, and it is Xeneca's position that the model clearly confirmed that water levels attenuate quickly with distance downstream. Analysis on existing operations on the Misema River was done by comparing the degree of water level fluctuation close to Misema GS to MNR data from the Englehart confluence. The model provides reasonable predictions of project impacts in the opinion of the proponent.

In the letter, Xeneca disagreed with MOE that more modelling work is required to define the existing conditions, since data collected (and the model developed) clearly shows the hydrological impacts downstream both with the Misema GS operating, and without it operating. Xeneca has committed to harmonize the operation of the proposed Marter project with the operation of the existing Misema GS, in a manner that will ensure the water level alteration will be within the ranges of the natural condition.

Xeneca stated their concern with the minimum flow requirement being deemed unsatisfactory by MOE, and requested clarity from MOE regarding the proposed minimum flow requirement. Xeneca also stated a number of concerns regarding the data provided by MOE in reference to minimum flows. They stated that the proposed value of 2.3 m^3/s was based on existing conditions (with the Misema GS operational) and is solidly based on available monitoring data. Xeneca pointed out that additional data loggers installed downstream of the Misema GS in the fall of 2012 could not be calibrated because this would need to occur during a time when the Misema GS is operating and the Misema GS has not been operating since that time. Xeneca also stated that they don't believe calibration of these loggers is required for the completion of the EA because they have met the objective of the Class EA, namely, to define existing conditions, and outlined proposed alterations and effects.

Regarding MOE's comment on inadequate modelling of the headpond inundation, Xeneca stated that the steps taken to define the headpond inundation reflect best engineering practice, and had been augmented with collection of additional bathymetric cross-sectional data in the upper extent of the proposed headpond.

Ontario Ministry of Tourism, Culture and Sport

The Ministry of Tourism, Culture and Sport (MTCS) was provided with the Stage 1 Archaeological and Cultural Heritage Resource Assessment Report in January 2011. The MTCS was provided with a Draft Stage 2 Archaeological and Cultural Heritage Resource Assessment Report in July 2012.

On February 5, 2013, the MTCS advised Xeneca that the Stage 2 Archaeological and Cultural Heritage Assessment had been entered into the Ontario Public Register of archaeological reports without technical review.

Ontario Ministry for Municipal Affairs and Housing

In response to the request for comments on the proposed project, the Ontario Ministry for Municipal Affairs and Housing advised the proponent on July 20, 2010 that their Ministry did not intend to comment specifically on any of the projects proposed by Xeneca. It was understood that consultation efforts with potentially affected communities was being undertaken by the proponent.

Ontario Ministry of Energy

The ME requested additional information on Xeneca's proposed approach to fostering Aboriginal and FN partnerships within the development proposal via an e-mail on December 21, 2010. ME noted that although the Ministry might not participate in all planning meetings, the Ministry would like to be kept abreast of the planning process developments. Additionally, ME confirmed on January 5, 2011 that they wanted to be included in the distribution of all technical documents and the ER in order to provide comment where appropriate.

Ontario Ministry of Transportation

The Ministry of Transportation, along with other provincial and federal regulatory bodies, was provided with project updates and announcements (e.g. NOC, PIC announcements, and the distribution of the Draft ER for regulatory review). However, the Ministry did not provide comment in any reviews associated with this project.

Ontario Ministry of Northern Development and Mines

Xeneca received an electronic correspondence from the Ministry of Northern Development and Mines on August 26, 2011 identifying a known mine hazard downstream of the project location, in Lot 12, Concession 5, Marter Township. A 7 m vertical shaft is documented as being situated on the right bank of the Blanche River, approximately 60 m upstream from the junction with the Misema River. The Ministry advised the proponent to exercise caution with respect to worker health and safety within 500 m of this confluence.

The Ministry also identified a patent for surface and mineral rights within the project area and advised the proponent to complete a title search. The proponent subsequently secured disposition of the surface rights from the title holder, and the information was forwarded to the Ministry on July 4, 2012, along with a request that part of the area be removed from the claim. As of January 14, 2014, the area has not yet been withdrawn, but a proposed disposition under the *Public Lands Act* is registered (Claimmaps, MNDM, January 14, 2014). The Ministry identified that the area has high mineral potential for gold, copper and diamonds. Four known mineral occurrences (for gold and copper) are present within the immediate area of the proposed project. The Ministry advised that there is a high potential for exploration to occur in the area, but did not express any concern regarding project impacts.

6.3.3 Municipal

The NOC was provided to the Town of Englehart, Township of Chamberlain and the Town of Kirkland Lake. Municipal associations that were also provided information on the project include:

- Temiskaming Shores & Area Chamber of Commerce and Tourism Information Centre
- Englehart Chamber of Commerce
- Tri-Town & District Chamber of Commerce

On June 16, 2010, Xeneca provided written correspondence to the Town of Englehart and the Town of Kirkland Lake introducing the Marter Township GS project. A further presentation on the project and meeting was held with the members of Town of Englehart Council on August 23, 2011.

On February 8, 2011, the Town of Kirkland Lake provided Xeneca with a letter of support regarding the Marter project and requested that additional information be provided to the Town on a continuing basis. On September 14, 2011, a resolution was passed by the Town of Englehart supporting the Marter Township GS project.

On September 16, 2011, Xeneca provided written correspondence to the Corporation of the Township of Chamberlain. The letter introduced the Marter Township GS project, and requested the Township's assistance with identifying any individual or stakeholder interests in the area. The economic and social benefits of the project were described and an offer was made to provide a project briefing. On October 3, 2011, a full project description was provided to the Township of Chamberlain.

Mark Holmes of Xeneca gave the Chamberlain Township Reeve and Council a project briefing on November 1, 2011. Specific issues were raised during this project briefing including:

- Affected landowners

- Potential revenue streams to municipality (GRC)
- Building permits
- Rezoning/municipal approvals
- Road improvement and maintenance for Xeneca access to site
- Road routing, width of roads, road allowances
- Development schedule
- Impact on local economy
- Job creation
- Environmental impacts

Reeve and Council were told that Xeneca will pay for improvements to roads required to access the site as well as ongoing maintenance. Commitment was made to ascertain if an arrangement could be made in which Xeneca undertakes road improvements for a period and then the Township assumes the roads.

After explanation of GRC, Reeve and Council indicated strong interest in working with Xeneca to lobby government for a portion of the GRC. Reeve and Council were also keenly interested in their role in assigning building permits, development fees, inspections, taxation, etc. Interest in local job creation was also expressed and it was noted that a company based out of Englehart provide map making expertise which could be of use to Xeneca.

On November 24, 2011 Xeneca provided the Township of Chamberlain with additional information pertaining to gross revenue charge calculations and a legal opinion on dispositions. A resolution was passed by Chamberlain Township Council on December 9, 2011 in support of Marter Township GS project.

On January 3, 2012, the Township of Chamberlain corresponded with the Honourable Dwight Duncan regarding the reinstatement of GRC to municipalities, and requested a meeting to discuss this issue.

Xeneca held a subsequent meeting on June 28, 2012 with Chamberlain Township, during which the Township expressed general support for the project on the Blanche River. The Township requested that a public meeting be held at its offices to provide local residents with an overview of the project; this meeting was ultimately held on September 25, 2012. A brief update on the project was included in a flyer issued to local residents with the August tax bills. The Township requested that the proponent commit to ensuring public access to the river. Xeneca explained that public access to the river is dependent upon the agreements made with private landowners in the project area, and that for safety reasons; some areas may need to be fenced. There was concurrence at the meeting that developing some recreational amenities within the Township would be highly desirable; the Township added that, if Xeneca owns shoreline that can be used by the public, they would appreciate a couple of picnic tables, a parking or rest area and some interpretive signage.

During the June 28, 2012 meeting at the Township of Chamberlain, members of council expressed concern that the provincial government no longer allows municipalities to collect a portion of the GRC. Xeneca noted that they had been lobbying the government to restore the municipal portion of the GRC and will continue to do so while encouraging municipalities to support the effort.

It was noted that agreements with landowners are in varying degrees of finalization and a commitment was made to provide notice to the Township of Chamberlain when agreements are in place. Xeneca provided information on road access to the Marter site and necessary road improvements to allow for the construction program. The Township expressed interest in discussing how they may assume road maintenance and snowplowing for the improved roads.

6.4 PUBLIC CONSULTATION

Public consultation was undertaken by the proponent in the form of direct communications, published notices, two PICs and focus group meetings as well as notices posted on the Xeneca website. PICs were advertised in local publications at least ten days prior to the event. Copies of the advertising undertaken in support of the PIC as well as a record of consultation compiled by Xeneca is provided in Appendix D; where applicable, private contact information and financial information have been removed to protect confidentiality.

Members of the public, including local residents and other stakeholders including the Swamp Rats 4x4 Club, the Ontario Federation of Anglers and Hunters, the Kirkland Lake District Game and Fish Protective Association, the Canadian Sportfish Industry Association, the Ontario Federation of Snowmobile Clubs, the Ontario Trails Council, the Bayley Watershed and Lakes Association were added to the public mailing list and sent project information upon request.

Other stakeholders on the mailing list included the Environmental Committee of Paddle Canada, Whitewater Ontario, the Ontario Recreational Canoeing and Kayaking Association, the Ontario Rivers Alliance, the Englehart Nordic Ski Club, First Resource Management Group, Township of Chamberlain, Town of Englehart and Town of Kirkland Lake.

6.4.1 Consultation with Landowners

Extensive consultation has occurred with landowners whose property may be potentially affected by the proposed development. The creation of headpond under both design options requires agreements with nearby landowners whose property falls within the area proposed for inundation and/or affected by other project components.

Discussions with one landowner, a portion of whose property falls within the proposed headpond, began around the spring of 2011. In telephone calls and email correspondences with Xeneca, the landowner recognized that their traditional use of the river will be altered, but did not foresee any insurmountable issues with the proposed Marter Township GS. They nonetheless

expressed concern about the potential impacts to their private property and the broader physical environment. Their concerns included:

- Potential bank erosion and a resulting loss of productive timber and property value;
- Liability for any impacts resulting from bank erosion on their property;
- Siltation along the banks in the proposed headpond;
- Reduction in recreational enjoyment of the river and shoreline;
- Reduction in the remoteness of the property (the landowner noted that they did not wish to see a heavy increase in public access to the general area compared to current conditions);
- Potential impacts downstream.

This upstream landowner requested to be provided with modelling results and similar documentation in order to gain an understanding of the potential impacts, and requested a draft agreement outlining how their concerns would be addressed. Xeneca provided the landowner with the Project Description for the Marter Township GS and agreed to share pertinent documentation concerning the project. A draft agreement outlining the proposed compensation was provided to the landowner in July, 2011, followed by an invitation the following month to attend the August 23, 2011 PIC. Xeneca met with the landowner in August 2011 and again in November 2011 to discuss options for compensating for the loss of private land in the proposed headpond area. In March 2012, Xeneca secured formal consent with the upstream landowner to move forward with land ownership agreements.

Land ownership discussions were also held with another nearby landowner, as the proposed dam and a portion of the access road fell within his property. In an August 2011 agreement document, the landowner consented to the implementation of environmental and technical investigations on his property, and to move forward on land ownership agreements. Agreements are now in place for all but one landowner who remains in negotiation.

Prior to the first PIC on August 23, 2011, some property owners expressed concern with the impact of the project on water flows and levels. One of the landowners at the project site expressed concerns that the project would negatively impact the remoteness of the area by increasing public access to the waterway. Those issues have now been addressed through landowner agreements and/or sale.

Detailed letters were mailed to all identified downstream landowners on February 21, 2013 with information about the project and soliciting input/questions/concerns that may not have already been communicated to Xeneca. These landowners were also advised that the final ER would be released in the coming months. A template of the issued letter, received by 19 landowners, is included in Appendix D. Two additional downstream landowners received a variant of the standard letter on February 25, 2013, to reflect their specific location relative to the proposed

project (one is located immediately downstream of the Marter Township GS, and the other is in relatively close proximity to the proposed project, but is not a riparian landowner).

6.4.2 Public Information Centres (PICs)

The first PIC was held on August 23, 2011 in Englehart; approximately 16 participants were in attendance. Many attendees came seeking information on other proposed Xeneca developments. No significant concerns specific to the Marter Township GS project were identified at this public consultation event.

Those present at the June 27, 2012 PIC in Englehart included representatives from the MNR, MOE, MNDM, and the Ontario Federation of Anglers and Hunters (OFAH). Approximately fifteen participants attended the four-hour session. OFAH members sought information on the project and possible impacts to Stuart's Rapids and the sturgeon population. Xeneca representatives expressed that given that Stuart's Rapids is downstream of the confluence between the Misema River and the Blanche River, impacts are expected to be minimal. Questions were posed regarding protection of the fishery, the cost of electricity, GRC, decommissioning commitments, First Nation involvement and project development timelines. MNR acknowledged that a large amount of new project information was presented, but expressed concerns on the accuracy of downstream impacts (*note: additional hydraulic modelling has since been conducted, the results of which are presented in the HEC-RAS reports in Annex I of this ER*).

6.4.3 Other Focus Group Discussions and Meetings

On October 4, 2011, the Kirkland Lake Trappers Council requested a project description and inquired about what traplines were located within the area. After a change in leadership at the Council, a Xeneca representative contacted the new President on August 15, 2012 and project information was provided. The Council was also offered a face-to-face meeting and presentation; however, the Council opted to not pursue the offer.

On November 17, 2011 the Kirkland District Game and Fish Protective Association (KDGFPA) requested copies of the biological reports completed to date. Natural habitat information (Environmental Characterization Report and Stage 1 Archaeology report) was subsequently provided to the association by the proponent on June 22, 2012. The Stage 2 Archaeological Assessment report (included in Annex V of this ER) was subsequently provided to the KLGFPA on January 10, 2013.

On September 25th, 2012, the proponent also met with First Resource Management Group (FRMG), the managers of the Timiskaming Forest Management Unit (FMU). At this meeting, Xeneca and FRMG noted that the Wabun Tribal Council is the primary contact for FN interest in the area, and that Algonquin communities are actively participating in local forestry activities.

The FRMG President stated that there was no apparent conflict between the proposed Marter Township GS and forestry interests in the area. FRMG has communicated Xeneca's offer to present their projects to Forestry-related Local Citizen's Committees in the Timiskaming FMU.

Due to concerns expressed by MNR over potential impacts to the ONR bridge, located approximately 2.4 km upstream of the proposed High Dam option (see Figure 1a), Xeneca contacted the owners of the bridge, Ontario Northland Transportation Commission (ONTC), in January 2013. Xeneca outlined the proposed development and provided the results of the hydraulic modelling conducted to date, noting that the proposed inundation is not anticipated to affect the bridge. In ONTC's response, they expressed concern over potential impacts to the aging bridge structure. Xeneca subsequently conducted additional hydraulic modelling and prepared a formal agreement in April 2013 to indemnify ONTC in the event of losses during project operation. Xeneca provided ONTC with the results of the additional hydraulic modelling, supporting the earlier assessment that the headpond would not impact the rail bridge. A draft indemnification agreement was also provided. Several attempts have been made by Xeneca to discuss the model results and draft agreement with ONTC, but, as of the time of writing of this report, no response was received from ONTC.

On June 11, 2013, Mark Holmes of Xeneca presented to the Nipissing Naturalists Club in North Bay, ON. The theme of the presentation was "The Power of Partnership." The presentation focused somewhat on the Marter Township GS project as it is in close proximity to North Bay, but included information about all of Xeneca's projects. No major concerns with regards to the Marter Township GS project were raised during the meeting. Comments were received regarding waterpower in general and cost of residential hydro bills.

In July 2013, upon recommendation from the MOE, Xeneca made the Draft ERs of its active projects publicly available on their website (www.xeneca.com), including the Draft ER for the Marter Township GS. No public comments on the Draft ER for the Marter Township GS were received.

6.5 ABORIGINAL ENGAGEMENT

6.5.1 Aboriginal Engagement Introduction

Xeneca's general approach to Aboriginal engagement and consultation follows:

- the Ontario Waterpower Association Class EA process and best practices adopted from the Ontario Power Authority (OPA) Consulting with First Nations and Métis Communities: Best Practices, Good Business (Ontario Power Authority, July 2008) document; and
- the Government of Canada's Aboriginal Consultation and Accommodation: Updated Guidelines for Federal Officials to Fulfill the Duty to Consult Guide (AAND 2011).

Using these documents, Xeneca developed an Aboriginal Consultation Plan that outlines a proposed approach to consultation with Aboriginal communities.

Xeneca has drafted an Aboriginal Consultation Plan which contains methods and goals for aboriginal consultations during the Class EA period. Highlights of these goals are defined below, a full text of the Aboriginal Consultation Plan can be found in Appendix E, Section 01.

General Consultation Protocol

Xeneca places great importance on its relationships with potentially affected Aboriginal communities and has created an Aboriginal Relations Liaison position within Xeneca to manage Aboriginal Relations Policy, Guiding Principles and ensure that the consultation requirements of the Class EA are satisfied.

To support the Crown's Duty to Consult to the best of its ability Xeneca proposes to:

- Provide project information to potentially affected communities and to be responsive to questions, concerns and input in a timely manner;
- Through the environmental assessment planning process provide all available information and accept from Aboriginal communities all information they wish to share regarding existing and traditional use for those resources and environmental components that might be impacted by the project;
- Ensure that any traditional knowledge shared by a Community is presented in an agreed upon manner to ensure that it remains the property of the Community;
- Afford consideration to any potential adverse impacts to treaty rights in the Class EA planning process;
- Clearly outline the EA Consultation and engagement process, and potential project related issues to the Communities;
- Maintain records of correspondence and engagement;
- Reflect on input questions and responses in the EA Report and subsequent processes accurately, respectfully and in a timely manner;
- Seek to have Aboriginal Communities obtain benefits from the projects where reasonably possible;
- Respect an Aboriginal Community's right not to engage; and
- Provide the Crown requested information concerning the proponent's Aboriginal consultation and engagement activities.

Xeneca is committed to carry out engagement with identified Aboriginal Communities & Métis Councils through written correspondence and direct telephone communications, including follow up on numerous occasions if communities are non-responsive. Upon appropriate direct contact, Xeneca has sought meetings with community leaders or designated lead person(s) in order to

introduce Xeneca and the projects which may impact that particular community. Upon receiving an invitation from the host Aboriginal Community, Xeneca will conduct and sponsor community engagement sessions. Xeneca is also prepared, when requested, to provide access to its professional staff and consultants to answer technical questions. Finally, where a request is made, Xeneca is committed to providing necessary resources to support meaningful engagement including the retention of external consultants to peer review material presented to the communities.

By meeting these objectives and following the above-noted processes, Xeneca strives to foster and sustain a mutually respectful relationship with its aboriginal neighbours beyond the requirement to provide consultation support to the Crown.

The following is a list of methods of communication and engagement approaches employed throughout the EA Process in order to seek input from the Aboriginal communities involved with the Marter Project:

- Providing project information to potentially affected communities and being responsive to questions, concerns and formal engagement letters;
- Follow-up Email(s) and phone call(s);
- Formal invitations to participate in Public Information Centres (PICs);
- Offer to host information sessions in individual Communities;
- Extend invitations and offer financial assistance to participate in Stage II Archaeological field work program;
- Offer financial resources, technical staff and consultants to assist in the review of the Draft Environmental Report and supporting documents; and
- Where Xeneca has received a protocol from the Aboriginal community that provides details on how the communities are to be consulted with, Xeneca has collaborated with the community to create a mutual understanding on a process to proceed.

6.5.2 Identified Communities

The identification of communities was completed through consultation with the District Office of the Ministry of Natural Resource (MNR) as part of the Crown Land Site Release (Site Release) process. A draft site release package was issued by the Kirkland Lake District Office of the MNR in November 2011 which didn't identify any aboriginal communities at that time. Xeneca held conversations with the district MNR and decided to raise these discussions with the local First Nation and Aboriginal communities themselves surrounding the Marter Twp. project to ascertain their level of interest or participation as part of the Site Release process. These communities are listed below:

- Beaverhouse First Nation

- Matachewan First Nation
- Métis Nation of Ontario
- Temagami First Nation
- Temiskaming Métis Council
- Timiskaming First Nation (Québec)
- Wahgoshig First Nation

The identification of Federal Aboriginal Communities for consultation was completed through written direction from Transport Canada, with assistance from Fisheries and Oceans Canada, National Defence and Aboriginal Affairs and Northern Development Canada, to further define communities which may have treaty rights, traditional territories or interests within the project areas by way of correspondence dated October 28, 2011. This letter defined communities in addition to those listed above. These communities are listed below:

- Beaverhouse First Nation (known federally as the "Beaverhouse Aboriginal Community" as it is not INAC recognized by AANDC)
- Matachewan First Nation
- Métis Nation of Ontario
- Temagami First Nation
- Timiskaming First Nation

Below is a table of each community identified above and their organizational structure.

Table 11: Community Organization

Community/Community Council	Tribal Council/Region	Grand Council/Nation
Beaverhouse First Nation	Wabun Tribal Council	NishnawbeAski Nation
Matachewan First Nation	Wabun Tribal Council	NishnawbeAski Nation
Temagami First Nation	N/A	Independent
Timiskaming First Nation	Algonquin Nation Secretariat	N/A
Temiskaming Métis Council	Region 3	Métis Nation of Ontario
Wahgoshig First Nation	Algonquin Anishinabeg Nation Tribal Council	N/A

6.5.3 Consultation through Site Release

The aboriginal consultation and engagement process began as a component of the Crown Land Site Release Process, and has included components of the Waterpower Class EA (Class EA) planning process in parallel. An application was made for this site through the Crown Land Site Release process in 2007. The engagement process as required by the Site Release Process and the Consultation Process as required by the Class EA process, were connected and where possible, completed in parallel.

While Site Release and the consultation process required by the Class EA were connected and completed in parallel, a separate report updating the MNR on the status of the consultation process for the Site Release process will be completed independently of this Class EA.

6.5.4 Areas under Land Claim

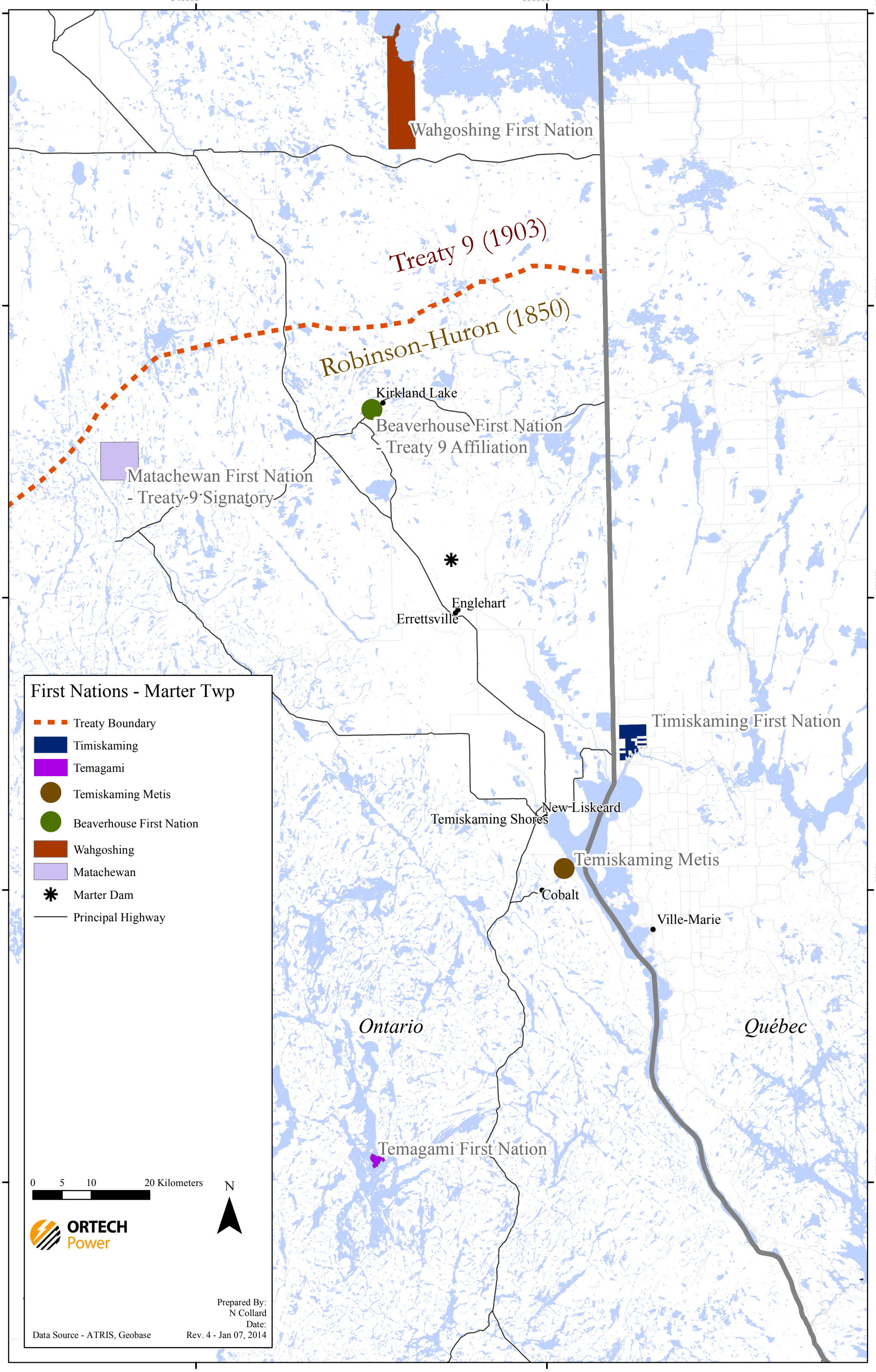
There is presently a Comprehensive Land Claim Agreement in Principle on file between the Canadian Federal Government and the Nishnawbe Aski Nation which is the Grand Council of Treaty 9, and represents all those communities which are signatories to Treaty 9 (refer to Table 11). At this time a final agreement has not been negotiated (Aboriginal Affairs and Northern Development Canada, 2013)

There is presently a Comprehensive Land Claim Agreement in Principle with respect to Governance on file between the Canadian Federal Government and the Anishinabek Nation/ Union of Ontario Indians which is the Grand Council of Robinson – Huron Treaty of 1850. This claim is unrelated to the Nishnawbe Aski Nation Claim. At this time a final agreement has not been negotiated (Minister of Affairs and Northern Development and Federal Interlocutor for Métis and Non-Status Indians, 2007).

There is presently a Specific Claim Under Assessment between the Canadian Federal Government and the Timiskaming First Nation (Band-064), Wolf Lake (Band-068) - *Alleged failure to protect traditional lands from encroachment by settlers, and to follow through on the creation of the 100,000 acre reserve on Lake Timiskaming by surveying it and setting it aside, as approved and directed by the August 1849 Order-In-Council.* (Aboriginal Affairs and Northern Development Canada, 2013)

http://services.aadnc-aandc.gc.ca/SCBRI_E/Main/ReportingCentre/PreviewReport.aspx?output=HTML

The Project location is not located within the boundaries of any First Nation reserve lands, nor areas expressly stated as protected through Robinson – Huron Treaty of 1850 or Treaty 9 (see Figure 11 on the next page). Communities may assert protections to activities and rights under this treaty which are not explicitly stated within the treaty text. Where those rights are asserted, they have been documented as impacts. The Project location is assumed to be within the traditional territories and current usage areas of the aboriginal communities engaged and consulted throughout the Class EA process.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Wahgoshing First Nation
Treaty 9 (1903)
Robinson-Huron (1850)
Kirkland Lake
Beaverhouse First Nation
- Treaty 9 Affiliation
Matachewan First Nation
- Treaty 9 Signatory
Englehart
Errettsville
Timiskaming First Nation
New Liskeard
Temiskaming Shores
Temiskaming Metis
Cobalt
Ville-Marie
Ontario
Québec
Temagami First Nation
First Nations - Marter Twp
Treaty Boundary
Timiskaming
Temagami
Temiskaming Metis
Beaverhouse First Nation
Wahgoshing
Matachewan
Marter Dam
Principal Highway
0 5 10 20 Kilometers
N
ORTECH Power
Prepared By:
N Collard
Date:
Rev. 4 - Jan 07, 2014
Data Source - ATRIS, Geobase

6.5.5 Consultation Requirements

The Class EA for waterpower projects requires that aboriginal communities be consulted with regards to their rights within treaty and traditional lands and how their rights and interests may be impacted by project development and operation. This consultation and engagement is designed in part to help determine whether the Crown has a legal duty to consult under the Constitution Act of 1982, and is not intended to replace that duty. The Class EA requires that aboriginal engagement includes active engagement to determine if the project activities will impact aboriginal uses and values within the area.

What follows below is a description of the major highlights of engagement and consultation activities as they relate to the Class EA. A full description of all consultation activities, copies of major correspondence and a log of all correspondence can be found in Appendix E. A full description of all consultation activities for each community follows. It is expected that consultation activities will continue throughout final permitting, design and the lifecycle of the Project.

6.6 COMMUNITY ENGAGEMENT

6.6.1 Beaverhouse First Nation

Beaverhouse First Nation is a member of Wabun Tribal Council. The community has a settlement on the banks of the Misema River northeast of Kirkland Lake. The community is only accessible by boat in the summer and snow machine in winter. Beaverhouse First Nation is not a signatory to Treaty 9 at its original signing in 1906 (Wabun Tribal Council, 2013). This community is a member of Wabun Tribal Council but has opted to engage separately. Beaverhouse has decided not delegated any responsibility for economic development or consultation on environmental/cultural heritage issues to Wabun Tribal Council.

Summary of Engagement

The Community was first contacted in a letter dated June 24, 2010, which provided notification of the project and upcoming consultation, and requested information about the Community's consultation policies.

On July 8, 2010, the Community was provided with a letter indicating that Xeneca was preparing for and issuing the Notice of Commencement for the waterpower Class EA for the project. The letter provided information about the Class EA process vs. the Site Release process, and eligibility for government funding.

On September 16, 2010, the Community was provided with a letter outlining the phased process for archaeological studies, and inviting them to participate in upcoming archaeological studies in their area.

On October 13, 2010, the Community was provided with a letter inviting them to attend PICs for the project held on November 10th and 11th, 2010, in Kirkland Lake and Englehart, respectively. On October 25, 2010, the Community was sent a letter notifying them that these PICs would be rescheduled.

On December 20, 2010, the Community was provided with a letter containing the download information for the Project Description, and indicating that hard copies of the document would be available upon request. The Community was also invited to participate in a coordination meeting,

On May 13, 2011, the Community was provided with a compilation of notices and past correspondences related to the project, including a copy of the project Notice of Commencement. A copy of a draft Aboriginal Consultation Plan was also provided.

On August 11, 2011, the Community was invited to attend a Public Information Centre for the project in Englehart on August 23, 2011.

On August 31, 2011, the Community was provided with a letter containing a download link for the Project Description.

On June 14, 2012, the Community was invited to attend a Public Information Centre for the project in Englehart on June 27, 2012.

On July 24, 2012 the Community was sent a letter advising them of Xeneca's recognition of additional communities for consultation as identified by federal agencies. A draft copy of an Aboriginal Consultation Plan was also provided.

On July 26, 2012, the Community expressed interest in setting up a Community Information Centre.

On August 10, 2012, the Community was provided with electronic copies for recent Xeneca correspondence related to the project.

On October 31, 2012, the Community was provided with an electronic copy of the Draft Environment Report, as well as hard copies of panels from recent Public Information Centres.

On February 27, 2013, Xeneca provided the Community with a letter notifying them of changes to the Canadian Environmental Assessment Act, and that the project would no longer require federal environmental assessment. The letter confirmed Xeneca's intent to continue to work proactively with the Community.

On April 11, 2013, Xeneca provided the Community with a copy of the Stage II Archaeological report for the project.

On May 27, 2013, the Community notified Xeneca that they had developed a consultation process which requires development proponents to obtain a permit prior to commencing operations or activity. A permit application package was provided to Xeneca, who submitted a completed application to the Community in July 2013.

On August 7, 2013, Xeneca met with the Chief and Council of the community to discuss draft term sheets, reasonable technical support to help understand EA documents, the Beaverhouse consultation process, and economic opportunities. The status of the Environmental Report was also discussed. At that time, Xeneca was advised that they wished to continue to be informed about the development of the project but that other than some employment/contracting opportunities, the current Council was not interested in pursuing an equity stake in the project. Xeneca was also invited to an upcoming forum to present to community members the proposed project.

On August 26, 2013, Xeneca thanked the Community for meeting with them on August 7, 2013, in a formal letter. The letter also included a number of DVDs and information posters to facilitate questions and comments from Community members.

On November 14, 2013, Xeneca met with the Community and made a general presentation on renewable energy development, and specifically the Marter project in particular at a Youth Forum organized by Beaverhouse and attended by members of Council and the Lands & Resources Department. There were no substantive issues that were raised.

Table 12: Beaverhouse First Nation ER Milestone Dates Summary

Milestone	Delivery Date	Delivered to
Project Description	August 31, 2011	Chief Marcia Brown Martel
Notice of Commencement	May 13, 2011	Chief Gloria McKenzie
Draft Environmental Report	October 31, 2012	Chief Marcia Brown Martel

Current Status of Engagement

Throughout this period Xeneca has continued to engage Beaverhouse First Nation. To date the community has tabled specific concerns related to aboriginal treaty rights, traditional lands and specific community issues. The Community has indicated a general concern for developments in their territory impacting the water quality of downstream communities, and an interest in economic and contracting opportunities as identified on Table 13. Based on a general understanding of the community's traditional and current use of the area, potential concerns for the community are listed in the impact and mitigation matrix in section 7. Consultation and engagement with this community will continue throughout the construction period, and into the lifecycle operations of the project.

Table 13: Issues and Concerns – Beaverhouse

Issue/Concern Raised	Date Identified	Response on Record
The community inquired about project updates.	7/6/2011	Xeneca provided a status update on July 6, 2011, and asked if the community and any specific issues or concerns.
Do downstream communities experience water quality issues? Beaverhouse FN is located at the height of the land and needs to be conscientious of development occurring in their territory and the impact on downstream communities.	8/7/2013	Xeneca understands the stewardship and responsibility of First Nations and is undertaking water quality monitoring pre and post project.
Questions with regards to economic opportunities and contracting.	8/7/2013	Xeneca will share the procurement policy with the Community.

6.6.2 Matachewan First Nation

Matachewan First Nation is a member of Wabun Tribal Council and a signatory to Treaty 9. The community is situated approximately 60 km west of Kirkland Lake. The community has been working with resource development industries to establish "mutually beneficial agreements", where they are able to work towards focusing on "protecting the environment and ecology" in their traditional territories (Matachewan First Nation, 2013).

Summary of Engagement

The community was first notified of the project on June 24, 2010, when the Community was provided with a letter indicating that Xeneca was preparing the necessary documents for the waterpower Class EA for the project. The letter provided information about the Class EA process, and eligibility for government funding.

On July 8, 2010, the Community was provided with a letter indicating that Xeneca was preparing for and issuing the Notice of Commencement for the waterpower Class EA for the project. The letter provided information about the Class EA process vs. the Site Release process, and eligibility for government funding.

On July 28, 2010, Xeneca participated in a call with the Community to discuss issues raised by the community, business relationships, and a potential Community Information Centre.

On September 16, 2010, the Community was provided with a letter outlining the phased process for archaeological studies, and inviting them to participate in upcoming archaeological studies in their area.

On September 23, 2010, the Community met with Xeneca to discuss the project.

On October 13, 2010, the Community was provided with a letter inviting them to attend PICs for the project held on November 10th and 11th, 2010, in Kirkland Lake and Englehart, respectively. On October 25, 2010, the Community was sent a letter notifying them that these PICs would be rescheduled.

On December 20, 2010, the Community was provided with a letter containing the download information for the Project Description, and indicating that hard copies of the document would be available upon request. The Community was also invited to participate in a coordination meeting,

On May 13, 2011, the Community was provided with a compilation of notices and past correspondences related to the project, including a copy of the project Notice of Commencement. A copy of a draft Aboriginal Consultation Plan was also provided.

On August 11, 2011, the Community was invited to attend a Public Information Centre for the project in Englehart on August 23, 2011.

On August 31, 2011, the Community was provided with a letter containing a download link for the Project Description.

On June 14, 2012, the Community was invited to attend a Public Information Centre for the project in Englehart on June 27, 2012.

On July 24, 2012 the Community was sent a letter advising them of Xeneca's recognition of additional communities for consultation as identified by federal agencies. A draft copy of an Aboriginal Consultation Plan was also provided.

On October 31, 2012, the Community was provided with an electronic copy of the Draft Environment Report, as well as hard copies of panels from recent Public Information Centres.

On December 11, 2012, the Community was provided with electronic copies of the cover letters for recent Xeneca correspondence.

On February 27, 2013, Xeneca provided the Community with a letter notifying them of changes to the Canadian Environmental Assessment Act, and that the project would no longer require federal environmental assessment. The letter confirmed Xeneca's intent to continue to work proactively with the Community.

On April 11, 2013, Xeneca provided the Community with a copy of the Stage II Archaeological report for the project.

Table 14: Matachewan First Nation ER Milestone Dates Summary

Milestone	Delivery Date	Delivered to
Project Description	August 31, 2011	Chief Alex Batisse
Notice of Commencement	May 13, 2011	Chief Alex Batisse
Draft Environmental Report	October 31, 2012	Chief Alex Batisse

Current Status of Engagement

Throughout this period Xeneca has continued to engage Matachewan First Nation both individually, and through the Wabun Tribal Council. To date the community has not individually tabled any specific concerns related to aboriginal treaty rights, traditional lands or specific community issues. Based on a general understanding of the community's traditional and current use of the area, potential concerns for the community are listed in the impact and mitigation matrix in section 7. Xeneca has already received a signed non-binding Term Sheet and Letter of Intent with Matachewan and is working towards the completion of the definitive legal agreements which are expected in short order. Consultation and engagement with this community will continue throughout the construction period, and into the lifecycle operations of the project.

6.6.3 Métis Nation of Ontario

The Métis Nation of Ontario (MNO) provides a host of services to all Métis individuals in Métis Nation communities and Regions in Ontario.

Xeneca is working with the MNO through their Lands, Resources and Consultation Branch collaboratively in order to establish a consultation protocol that will involve regional meetings and will include opportunities for review and input on project developments by representatives from the Temiskaming Métis Council, and any other interested Community Councils. The MNO has provided their consultation protocol to Xeneca with the intent that it be used as a model to develop a consultation process and aid in the implementation of an MOU that addresses capacity and accommodation requirements between the two parties.

As part of the consultation strategy, any written correspondence materials provided to Community Councils were also copied to the MNO for their information purposes.

Summary of Engagement

The Métis Nation of Ontario (MNO) was notified about the project on June 10, 2010 when a formal letter was sent introducing the company, notifying the community of the Project, the need for a Class EA process, and inviting the MNO to engage in upcoming Class EA related discussion.

On October 1, 2010, at the request of Xeneca, the MNO sent Xeneca a letter of support for Xeneca's decision to issue Notice of Commencement on eighteen of its projects, including the Marter project.

On October 13, 2010, the Community was provided with a letter inviting them to attend PICs for the project held on November 10th and 11th, 2010, in Kirkland Lake and Englehart, respectively. On October 25, 2010, the Community was sent a letter notifying them that these PICs would be rescheduled.

On May 13, 2011 Xeneca provided the Community a package of information containing copies of several important project specific documents. The package included copies of all of the Notice of Commencements, along with past communications, and a Project Description. A copy of Xeneca's draft Aboriginal Consultation Plan was also included.

On June 18, 2011, Xeneca provided the Community with a copy of the Stage I archaeological report, as well as notification of upcoming Stage II and III archaeological field studies. The Community was invited to participate in the field work.

On August 31, 2011, the Community was provided with a letter containing a download link for the Project Description.

On September 20, 2011, The Community met with Xeneca to discuss the project, MNO consultation protocols, and the distribution of information.

On October 26, 2011, The Community met with Xeneca to discuss employment and procurement opportunities, and meeting locations, logistics and budgeting for consultation activities. During this meeting the MNO described complications between the Metis and the Algonquin's of Ontario relationship in the Matawan region, which highlighted the need for Xeneca to be sensitive of these issues during their consultations with both groups.

On July 24, 2012 the Community was sent a letter advising them of Xeneca's recognition of additional communities for consultation as identified by federal agencies. A draft copy of an Aboriginal Consultation Plan was also provided.

On August 10, 2012, the Community was provided with electronic copies for recent Xeneca correspondence related to the project.

On October 31, 2012, the Community was provided with an electronic copy of the Draft Environmental Assessment Report, as well as hard copies of panels from recent Public Information Centres.

On November 19, 2012, the Community was provided with electronic copies for recent Xeneca correspondence related to the project.

On December 18, 2012 Xeneca provided the Community with electronic copies of several documents for priority projects, including project descriptions, baseline reports, cover letters, PIC panels, and a copy of the Draft Class EA for review.

On January 23, 2013 Xeneca met with the MNO to discuss the Project. Topics covered include project background, introduction to Xeneca and investor groups, the consultation process, and opportunities for economic participation.

On February 27, 2013, Xeneca provided the Community with a letter notifying them of changes to the *Canadian Environmental Assessment Act*, and that the project would no longer require federal environmental assessment. The letter confirmed Xeneca's intent to continue to work proactively with the Community.

On April 11, 2013, Xeneca provided the Community with a copy of the Stage II Archaeological report for the project.

Table 15 – Métis Nation of Ontario ER Milestone Dates Summary

Milestone	Delivery Date	Delivered to
Project Description	May 13, 2011	Melanie Paradis
Notice of Commencement	May 13, 2011	Melanie Paradis
Draft Environmental Report	October 31, 2012	Mark Bowler

Current Status of Engagement

Throughout this period Xeneca has continued to engage MNO individually. To date this Community has tabled some specific concerns related to Community rights, traditional lands and specific community concerns. These can be found in Table 16 below. Based on a general understanding of the community's traditional and current use of the area, potential concerns for the community are listed in the impact and mitigation matrix in Section 7. Consultation and engagement with this community will continue throughout the construction period, and into the lifecycle operations of the project. Xeneca is progressing towards an MOU with the MNO and the Councils within Region 3 associated with the Project.

Table 16: Issues and Concerns-Metis Nation of Ontario

Issue / Concern Raised	Date Identified	Response on Record
MNO requests a letter of support to applications to the Northern Partnership Fund. MNO hopes Xeneca can fulfill the role of Industry Partner and employer.	9/23/2010	Xeneca provided the requested letter on September 23, 2010.
MNO sends letter of support for the Notice of Commencement indicating that they appreciate the effort made by Xeneca to work with the MNO by demonstrating a willingness to engage in a timely fashion.	10/1/2010	Noted
MNO reminds Xeneca that they should use terminology 'First Nations & Métis' in notices rather than just 'First Nations.'	10/18/2010	Noted. Xeneca will ensure they use the appropriate terminology in the future.
Consultation should take into account MNO policies and capacity. MNO has GIS and data transfer capabilities. MNO avoids independent technical review since principles and regulations in practice should build trust. A technical review should only be necessary if something controversial arises. MNO are concerned about the speed at which Xeneca needs to work. MNO indicated a concern about Xeneca leaving things to the last minute leaving insufficient time to address concerns.	9/21/2012	Xeneca developed an MOU that will support ongoing development of a Traditional Knowledge Database. Xeneca has provided draft reports in order to allow for review and to work within community consultation processes and offered compensation to support this review process.
What are Xeneca's 10 priority projects?	9/21/2012	Big Eddy, Marter Township, Wanatango, The Chute, Third Falls, Lapingam, Middle Township Buchan, Near North Boundary (Known as Kapuskasing), Wabagishik Rapids.
MNO inquired regarding Education, Training, and jobs opportunities.	9/21/2012	At the appropriate time when the FN communities are prepared to discuss economic benefits on this project, Xeneca is prepared to incorporate into its Term Sheets and definitive legal agreements opportunities to benefit both in terms of equity in the projects, as well as contracting, jobs and initiatives to enhance capacity within the FN communities.
MNO indicates which Regional Consultation Committee will have jurisdiction for each of Xeneca's projects.	10/31/2012	Noted

Are changes of the Canadian Environmental Assessment Agency (CEAA) affecting the development process?	1/23/2013	Changes to *CEAA 2012* mean that there is no longer the requirement to complete a federal EA. Ongoing obligations exist where federal permits and approvals are required on projects, and projects would still be subject to CEAA. For example, if a project required a permit from Transport Canada or the Department of Fisheries and Oceans (DFO), then consultation is still required under CEAA.
How is Dundee wealth related to Dundee Reality?	1/23/2013	They are not related.
What is Ecologo certification?	1/23/2013	It is a fee based industry standard and auditing system. Xeneca is striving to achieve the Ecologo industry imposed standard.
Are changes of the Canadian Environmental Assessment Agency (CEAA) affecting the development process?	1/23/2013	Changes to CEAA in 2012 mean that there is no longer the requirement to complete a federal EA. However, ongoing obligations still exist where federal permits and approvals are required on projects, and are still subject to CEAA. For example, if a project required a permit from Transport Canada or the Department of Fisheries and Oceans (DFO), then consultation is still required under CEAA.

6.6.4 Temagami First Nation

Temagami First Nation an independent community located on Bear Island, in Lake Temagami (Temagami First Nation, 2011).

Summary of Engagement

The Community was first notified of the project on July 26, 2012, when Xeneca sent a letter noting additional communities for consultation brought forward by the Canadian Environmental Assessment Agency, and providing a draft Aboriginal Consultation Plan.

On July 27, 2012, the Community was sent a letter indicating the communities and organizations Xeneca was required to consult with, as identified by federal and provincial agencies. The letter included copies of various documents, including a Notice of Commencement and Project Description.

On September 5, 2012, the Community was provided with a hard copy and an electronic copy of the project description.

On October 31, 2012, the Community was provided with an electronic copy of the Draft Environmental Assessment Report, as well as hard copies of panels from recent Public Information Centres.

On January 15, 2013, Xeneca met with the Lands and Resources Committee from Temagami First Nation to discuss the project. The federal and provincial consultation requirements were discussed, along with project background, impact assessment requirements, and economic participation. During the meeting with the Lands and Resources Committee, a review was conducted with their traditional territorial maps and it was determined that the Marter Twp. project did not fall within their traditional territories. Xeneca was informed that it was their view that this was definitively not within the traditional territories of Temiskaming First Nation.

On January 24, 2013, the Community provided Xeneca with a letter indicating that based on the information and inundation profile presented to them, no impacts to the Community are expected, and the Community has no interest in the project from an Aboriginal Rights, Title, and Treaty perspective. The letter requested that the Community be advised if any of the modelled information changed. A Copy of this letter can be found in Appendix E, subsection 6.X.

On February 7, 2013, Xeneca sent a letter thanking the Community for their January 24, 2013 letter, and indicating that Xeneca would provide additional information to the Community if any changes to the project affecting the modelling information were to occur.

Table 17: Temagami First Nation ER Milestone Dates Summary

Milestone	Delivery Date	Delivered to
Project Description	July 27, 2012	Chief Roxanne Ayotte
Notice of Commencement	July 27, 2012	Chief Roxanne Ayotte
Draft Environmental Report	October 31, 2012	Chief Roxanne Ayotte

Current Status of Engagement

As a result of consultation and engagement to date, the Community has indicated that they have no interest in the project from an Aboriginal Rights, Title, and Treaty perspective based on the information they were provided in the October 31, 2012 Draft Class EA document. Xeneca has indicated that they will advise the Community of any project modifications that may cause the modelling information used to support this conclusion to change. Issues and concerns raised by the community during consultation and engagement are shown in Table 18. Further consultation with this community will only occur where it is required.

Table 18: Issues and Concerns-Temagami First Nation

Issue / Concern Raised	Date Identified	Response on Record
Concern with regards to change in water levels downstream	1/15/2013	Change depends on amount of water naturally occurring. The Blanche River has steep banks that lessen the amount of land inundated. Xeneca also used historical water records to model impacts. Downstream effects are expected to attenuate at the confluence of the Englehart River.
Inquiry with regards to employment for youths interested in trade.	1/15/2013	Xeneca supplied information about their relationship with Queens University and the opportunity for internships.
Marter project falls outside Temagami traditional lands.	1/15/2013	Xeneca requested a letter indicating Temagami's position for the formal record. This letter was provided on January 24, 2013 indicating that Temagami First Nation has no interest in the Project based on current predictive modelling. Xeneca committed to advise them on any future changes in modelling.
Whether or not the Blanche River is federally protected.	1/15/2013	Xeneca indicated that it is not.

6.6.5 Temiskaming Métis Council

The Temiskaming Métis Council is a member of Region 3 of the Métis Nation of Ontario. They have traditional territories in the lands surrounding the Projects; however, they are not signatories to Treaty 9. They presently engage in hunting, fishing, trapping and harvesting activities in their traditional areas (Métis Nation of Ontario, 2013).

Summary of Engagement

The Community was first notified of the project when they were sent a copy of the Draft Environmental Assessment Report on October 9, 2012. Copies of the Public Information Centre panels were also included.

On April 11, 2013, Xeneca provided the Community with a copy of the Stage II Archaeological report for the project.

On October 4, 2013 Xeneca provided the community with copies of the Notice of Commencement and the Project Description for review and comment. This notification also provided details on the EA Report delivery and review period.

Table 19: Temiskaming Métis ER Milestone Dates Summary

Milestone	Delivery Date	Delivered to
Project Description	October 4, 2013	Ms. Liliane Ethier
Notice of Commencement	October 4, 2013	Ms. Liliane Ethier
Draft Environmental Report	October 9, 2012	Ms. Liliane Ethier

Current Status of Engagement

Throughout this period Xeneca has engaged the Temiskaming Métis Council directly and through the Métis Nation of Ontario. This engagement and consultation process is progressing towards a Memorandum of Understanding (MOU) on their behalf through the Métis Nation of Ontario. To date the community has not tabled any specific concerns related to aboriginal treaty rights, traditional lands or specific community issues. Based on a general understanding of the community's traditional and current use of the area, potential concerns for the community are listed in the impact and mitigation matrix in Section 7. Consultation and engagement with this community will continue into the lifecycle operations of the project.

6.6.6 Timiskaming First Nation

Timiskaming First Nation is a member of the Algonquin Nation Secretariat. This community is located close to Notre-Dame-du-Nord, Quebec near the top of Lake Timiskaming. They have traditional territories surrounding the Project; however they are not signatories to Treaty 9 (Timiskaming First Nation).

Summary of Engagement

The Community was first notified of the project on August 11, 2011, when Xeneca sent an e-mail indicating that they had recently been made aware of Community interest on the Blanche River, and inviting the Community to attend a Public Information Centre in Englehart on August 23, 2011.

On August 31, 2011, the Community was provided with a letter containing the download information for the Project Description, and indicating that hard copies of the document would be available upon request. The Community was also invited to participate in a coordination meeting,

On September 27, 2011, the Community's solicitors provided Xeneca with a letter asserting the Community's rights and interests in the project area with a view to initiating a dialogue regarding consultation and accommodation. The letter requested that Xeneca confirm their intentions. Xeneca responded to the September 27, 2011 letter noting that Xeneca would consider the Community in consultation and engagement with respect to the project.

On May 23, 2012, the Community provided an electronic copy of their May 22, 2012 letter containing a number of questions and comments relating to the project. Questions and comments related to general information, water storage, operating conditions, decommissioning, archaeology, proximity to aboriginal reserves and territory, and a request for copies of field reports. A summary of these questions can be found in Table 20 below.

On June 14, 2012, Xeneca invited the Community to participate in a Public Information Centre in Englehart on June 27, 2012.

On June 18, 2012, the Community was provided with an electronic copy of Xeneca's June 18, 2012 letter responding to the questions posed in the Community's May 22, 2012 letter. A copy of the Stage 1 Archaeology report was also included.

On July 24, 2012 the Community was sent a letter advising them of Xeneca's recognition of additional communities for consultation as identified by federal agencies. A draft copy of an Aboriginal Consultation Plan was also provided.

On September 5, 2012, the Community was provided with a hard copy of the project description.

On September 19, 2012, the Community met with Xeneca to discuss the project. Xeneca made a presentation including project updates, design, environmental studies, and archaeology. Economic models were also discussed.

On October 31, 2012, the Community was provided with an electronic copy of the Draft Environment Report, as well as hard copies of panels from recent Public Information Centres.

On March 7, 2013, the Community participated in a teleconference with Xeneca.

On April 11, 2013, Xeneca provided the Community with a copy of the Stage 2 Archaeological report for the project.

On September 4, 2013 Xeneca hosted a Community meeting which allowed members of the community to ask Xeneca staff questions about the Project.

On October 4, 2013 Xeneca provided the community with a copy of the Notice of Commencement, which was issued on several occasions. This notification also provided details on the EA Report delivery and review period.

Table 20: Timiskaming First Nation ER Milestone Dates Summary

Milestone	Delivery Date	Delivered to
Project Description	August 31, 2011	Chief Arden McBride
Notice of Commencement	October 4, 2013	Chief Terence McBride
Draft Environmental Report	October 31, 2012	Chief Arden McBride

Current Status of Engagement

Throughout this period Xeneca has continued to engage Timiskaming First Nation individually towards a Letter of Intent. To date the Community has indicated specific concerns related to aboriginal treaty rights, traditional lands or specific community issues as shown on Table 21. Based on a general understanding on the community's traditional and current use of the area, potential concerns for the community are listed in the impact and mitigation matrix in section 7. Xeneca has provided resources for an internal peer review of the Final Environmental Report and is anticipating their report shortly. Xeneca has discussed the peer review informally already with Timiskaming by way of teleconference call on January 10, 2014. At that time, Xeneca was advised that there are no land use issues related to the project, other than some fishing by a few community members near the confluence of the Englehart and Misema Rivers. A request was made to Xeneca to work with the community on water quality sampling and to see if a partnership could be established on future monitoring. Xeneca took this under advisement and indicated that it would be very amenable to working with the Timiskaming on this issue. Consultation and engagement with this Community will continue through the construction period, and into the lifecycle operations of the Project.

Table 21: Issues and Concerns – Timiskaming First Nation

Issue/Concern Raised	Date Identified	Response on Record
Where will the site be remotely operated from?	5/22/2012	Once the plant is up and running, they will be tied into the province's overall electrical grid system which is controlled by the government owned agency known as the Independent Electric System Operator (IESO). The IESO will turn the facility on or off as needed with consideration for other factors such as environmental effects (i.e. fish spawning), extreme weather conditions (i.e. flood or drought), and socioeconomic factors (i.e. recreational use).
What will be controlled on-site?	5/22/2012	Remote operation will not preclude a human presence for cleaning, maintenance, safety, or other reasons and as such a small number of part-time permanent jobs will be created.
What is the anticipated life span of the project?	5/22/2012	The lifespan of the project can be 80 years or longer. Xeneca's contract with the Province of Ontario is for 40 years and can be renewed. With regular maintenance and upgrades the physical lifespan of the project is well in excess

		of 80 to 100 years.
Will Xeneca be placing funds in trust for decommissioning? If not, what rationale is there to justify this?	5/22/2012	Given the expected significant lifespan of hydro assets (many existing facilities have been producing reliable renewable energy for more than a century) and the continued advancement of engineering and ecological science, it is not particularly prudent to predict the details of potential decommissioning. We will comply with the standards of the day (e.g. Canadian Dam Association) should decommissioning become necessary. Should decommissioning occur, advance planning would include dedication of revenues to a decommissioning fund.
It is inferred that Xeneca may not be the owner of the site in the future - Does Xeneca intend to sell the structure?	5/22/2012	There are no plans to sell the structure. The investors in this and other Xeneca projects are seeking a long term return, and are therefore likely to retain ownership of the asset.
With respect to Traditional Canoe and Fur Trade Route: When will the stage I and II archaeological assessments occur? Prior notification and on-site presence for these assessments is requested.	5/22/2012	Stage 1 archaeology report attached to June 18, 2012 Xeneca response letter. TFN was invited to participate in fieldwork by e-mail dated July 11, 2012.
With respect to proximity to Aboriginal Reserves and Traditional Territory: Correction - the site falls within the traditional territory of the Timiskaming First Nation.	5/22/2012	Xeneca acknowledges and has documented the assertion.
Copies of 2010 biological field surveys and any other baseline reports relevant to the project are requested.	5/22/2012	Field studies provided electronically.
Table 5.1 Criteria Lands subject to land claims: Correction - Criteria Lands subject to land claims. Timiskaming First Nation is preparing a	5/22/2012	Xeneca acknowledges and has documented the assertion of land claim.

comprehensive land claim that includes the site of Xeneca's hydroelectric project.		
TFN is concerned about fish habitat	3/7/2012	Fish Habitat has been assessed as part of the Environmental Assessment, and details regarding impacts and mitigation methods can be found in Section 7.3.10 and Annex III of the Environmental Assessment
What is the availability of additional information or data?	3/7/2012	Additional information is now available and is included in the Class EA, which has been provided to the communities for their review and comment.

6.6.7 Wabun Tribal Council

Wabun Tribal Council provides a host of services to its member communities including health, employment and technical services. They represent Mattagami First Nation. In addition they represent Beaverhouse First Nation and Matachewan First Nation, as well as, Brunswick House First Nation, Chapleau Objiwe First Nation, and Flying Post First Nation which are not within the engagement and consultation areas for this project and therefore were not included in consultations activities directly.

As part of the consultation strategy, any written correspondence materials provided to each represented community were also copied to Wabun Tribal Council for their informational purposes.

Xeneca acknowledges the approach taken by Wabun Tribal Council as it relates to consultation on the Projects. This position was made clear during an initial teleconference call in 2010 with the member communities and Wabun Tribal Council, wherein the participating Chiefs and Councillors made it clear that they were delegating their authority to Wabun Tribal Council to negotiate an appropriate economic arrangement prior to moving forward on the consultation process. Notwithstanding their position, Xeneca has been sharing, and will continue to share, all of the relevant project information as required for the Class EA process.

Summary of Engagement

On June 24, 2010, Wabun was provided with a Letter from Xeneca indicating Xeneca's projects in their area and requesting ongoing communication regarding questions and concerns.

On July 8, 2010, Wabun was provided with a letter indicating that Xeneca was preparing for and issuing the Notice of Commencement for the waterpower Class EA for the project. The letter provided information about the Class EA process vs. the Site Release process, and eligibility for government funding.

On September 2, 2010, Wabun participated in a teleconference with Xeneca. MNR consultation policy was discussed, and future meeting dates were proposed.

On September 16, 2010, Wabun was provided with a letter outlining the phased process for archaeological studies, and inviting them to participate in upcoming archaeological studies in their area.

On October 13, 2010, Wabun was provided with a letter inviting them to attend PICs for the project held on November 10th and 11th, 2010, in Kirkland Lake and Englehart, respectively. On October 25, 2010, the Community was sent a letter notifying them that these PICs would be rescheduled.

On October 14, 2010, Wabun met with Xeneca to discuss the project. Project locations, available information, and the potential for business to business relationships were discussed.

On August 11, 2011, Wabun was invited to attend a Public Information Centre for the project in Englehart on August 23, 2011.

On October 21, 2011, Xeneca provided the Community a letter indicating that Xeneca would respect the Community's request to not be provided with project information or to be engaged in the Class EA process until an MOU has been signed.

On October 4, 2013 Xeneca provided the community with a copy of the Notice of Commencement and the Project Description. This notification also provided details on the EA Report delivery and review period.

Table 22: Wabun Tribal Council ER Milestone Dates Summary

Milestone	Delivery Date	Delivered to
Project Description	October 4, 2013	Jason Batise
Notice of Commencement	October 4, 2013	Jason Batise

Current Status of Engagement

Recently Xeneca signed a series of Non-Binding Letters of Intent and Term Sheets with the Wabun communities including Matachewan for this project. Presently Xeneca is concluding negotiations with Wabun Tribal Council's legal and economic advisory team towards the final binding legal agreements. Wabun has indicated that it has not been delegated responsibility to discuss aboriginal treaty rights, traditional lands or specific community issues and as such have not listed such concerns as shown on Table 23.

Although Xeneca has engaged Wabun throughout this period, it has been adamant in its position that no consultation with them can occur in advance of an agreement being reached. Xeneca continues to work with Wabun and its representative communities towards finalizing the definitive agreements.

Table 23: Issues and Concerns – Wabun Tribal Council

Issue / Concern Raised	Date Identified	Response on Record
How/if Wabun will be involved in business relationship discussions on behalf of member nations	7/27/2010	Wabun First Nations will explore the option of entering into an agreement which will see any development in their territories with Xeneca pursued as a collective. Wabun indicates at Feb 17, 2011 teleconference that they have been given band council resolutions from the Chiefs to move forward to discuss a potential partnership.
There are other communities involved with the projects that are not part of Wabun	9/2/2010	Noted. Consultation process requires this.
There is concern with the MNR process used to identify First Nations involved in the projects. MNR uses tertiary watershed data and does not consider traditional territories. How/when MNR is involved in the discussions must be determined. Approach going forward with government agencies (MNR, MAA) with respect to business discussions need to be identified.	9/2/2010	Xeneca is in partnership with various Aboriginal communities and will defer to their processes and what they collectively agree to.
A description of the sites (vicinity and size) was requested.	9/2/2010	Project Descriptions were delivered to Wabun Tribal Council
A member of Mattagami First nation indicated that they felt Xeneca was sidestepping the protocol of engagement by meeting with Matachewan First Nation on Oct. 23 2010.	10/5/2010	Xeneca meets with any community at request. There was no intent to bypass the agreed upon delegated process of Wabun Tribal Council

What is ECT?	10/14/2010	ECT = Electrical Connection Test. FIT contract was not issued to the project due to lack of space on the distribution and transmission system. Xeneca is working on quantifying and resolving ECT issues.
What is the location of the projects?	10/14/2010	Xeneca has produced maps and are happy to share them. Wabun has landscape maps with project areas (see Tim Mutter, MNR Cochrane). The MNR can produce maps with the sites and include the First Nation community location for reference. Xeneca has provided positive feedback to the MNR and their maps. Maps were provided along with the Project Description in October 2013.
What is the status on the Kamiskotia?	10/14/2010	This Project does not currently have a FIT Contract. There is potential for this Project to move forward at some point in the future under the new Competitive Procurement Program.
How much information is available for the sites?	10/14/2010	The site status, mapping, Project Descriptions, related Class EA information, MNR site releases, Class EA drafts were made available to the Community. Archaeological field studies and Class EA project descriptions were released periodically to Wabun. This is detailed in Section 6.5 of the Final ER.
How does Applicant of Record relate to permitting and establishing business relationship? Wabun can support the Applicant of Record at some point in the process.	10/14/2010	Applicant of Record is a policy which may allow proponents first access to crown sites after they have begun working towards business to business relationships with identified First Nation communities. It is an intermediate step which occurs prior to location approval being issued under the LRIA
Recommended that habitat study be completed by December; and that it examine endangered species.	10/14/2010	The habitat study was completed over several field seasons in accordance with the MNR guidelines. The report can be found in Annex III

Need to set-up a process for consultation with Wabun. There is urgency to create a formalized relationship, Wabun is progressive and experienced. Consultation is separate from business discussions but can inform the process and act as due diligence.	10/14/2010	Xeneca is open to an engagement at a comprehensive level with communities. Xeneca is comfortable with a conglomerate approach to projects.
Information sheet on projects was requested for the communities.	10/14/2010	Xeneca provided a Project Description on October 4, 2013
An activity report for the projects was requested.	10/14/2010	Wabun was kept updated on the Project status through email and phone call communications. Formal reporting was not completed.
An agenda on how to approach field work needs to be developed.	10/14/2010	The approach on field work could not be developed, as Wabun Tribal Council implemented their protocol on resource development which prevented Xeneca from engaging directly with individual Wabun communities and the Council on matters related to the EA. All field work was sent to Wabun for review as part of Draft ER
Wabun expressed concern about the commencement of 'consultation exercises' (public information centres and the release of project descriptions) prior to finalizing an agreement with Wabun. Wabun is also concerned with the time it has taken Xeneca to review the MOU they provided. Wabun also indicated that additional consultation beyond public open houses is required (i.e. separate engagement and consultations are necessary). Wabun will not participate in any PICs or consultation until an agreement has been reached.	1/7/2011	PICs and PDs must be planned in advance to meet government regulations and guidelines. Wabun is not the only First Nation organization or party Xeneca must satisfy, but Xeneca is not ignoring Wabun. First Nations are a priority. The information released illustrates that the projects are at the beginning of the planning stages and there is nothing binding or pin pointing beyond Xeneca's assertion to work with First Nations. Xeneca will work to establish an MOU in short order.

6.6.8 Wahgoshig First Nation

Wahgoshig First Nation is located near Matheson on Abitibi Lake, they are a member of Algonquin Anishinabeg Nation Tribal Council, and are signatories to Treaty 9. The reserve is home to two Communities, Wahgoshig First Nation in Ontario, and Pikogan in Quebec. Only the Wahgoshig branch of the Community has been engaged on this Project (Wahgoshig First Nation, 2013).

Summary of Engagement

The Community was first notified of the project on August 31, 2011, when the Community was provided with a letter containing a download link for the Project Description.

On June 14, 2012, the Community was invited to attend a Public Information Centre for the project in Englehart on June 27, 2012.

On July 24, 2012 the Community was sent a letter advising them of Xeneca's recognition of additional communities for consultation as identified by federal agencies. A draft copy of an Aboriginal Consultation Plan was also provided.

On August 10, 2012, the Community was provided with electronic copies for recent Xeneca correspondence related to the project.

On September 11, 2012, the Community met with Xeneca to discuss the project. Xeneca's approach to consultation, archaeology, traditional land use studies, environmental studies, and business relationships with aboriginal communities was discussed. Xeneca asked the Community about a potential interest in the project.

On October 31, 2012, the Community was provided with an electronic copy of the Draft Environment Report, as well as hard copies of panels from recent Public Information Centres.

On November 16, 2012, the Community provided Xeneca with an e-mail indicating that they did not think the project falls within their territory.

On April 11, 2013, Xeneca provided the Community with a copy of the Stage II Archaeological report for the project.

On October 4, 2013 Xeneca provided the community with a copy of the Notice of Commencement. This notification also provided details on the EA Report delivery and review period.

Table 24: Wahgoshig First Nation ER Milestone Dates Summary

Milestone	Delivery Date	Delivered to
Project Description	August 31, 2011	Chief David Babin
Notice of Commencement	October 4, 2013	Chief David Babin
Draft Environmental Report	October 31, 2012	Chief David Babin

Current Status of Engagement

Throughout this period Xeneca has engaged Wahgoshig First Nation. As a result of consultation and engagement to date, the Community has indicated that they do not think the project falls within their territory, but has yet to date not provided anything formally confirming their stated position.

6.7 COMMUNITIES NOT IDENTIFIED FOR CONSULTATION BY AGENCIES

6.7.1 Ontario Métis Aboriginal Association

The Ontario Métis Aboriginal Association represents the Woodland Métis community in Ontario and has been in receivership since 2007. Consultation with this community has not continued as they were not an identified community for consultation.

The Ontario Métis Aboriginal Association was notified about the project in June 2010 when a formal letter was sent introducing the company, notifying the Association of the project, the need for a Class EA process, and providing information related to the Site Release. This letter provided contact information for Xeneca and contact information for the MNR if any further information was required.

In October 2010, Xeneca sent a letter inviting the Association preliminary Public Information Centres (PIC) on November 10th and 11th, 2010. Due to unforeseen circumstances, this PIC was canceled and a formal letter notifying the community of this change was sent on October 25, 2010.

On May 13, 2011 a package of information was sent to the Association containing copies of several important project specific documents. The package included copies of all of the Notice of Commencements which were filed on three separate occasions, along with past communications, a draft Aboriginal Consultation Plan for the communities review and input, and information regarding the continuing archaeological work.

6.8 ABORIGINAL CONSULTATION AND ENGAGEMENT DISCUSSION

The ongoing engagement for Marter starting in 2010 through to the present has provided the communities involved with notification as well as relevant information along with the opportunity to provide input and feedback to Xeneca on environmental issues and conceptual planning for the project.

Xeneca will continue to meet with communities and groups after the EA process to advise them on progress with the construction and operation of the project. Xeneca is committed to adaptive management and establishing protocols within each community for addressing unidentified issues as they arise during the post construction phase and over the lifecycle of the Project. Xeneca has committed to continuing to work with each First Nation or Aboriginal community to review project information as they may require. Xeneca has also made available funding for necessary review of the environmental work that has been completed to date for a peer review, if it is determined to be necessary by each community.

7. EVALUATION OF POTENTIAL PROJECT EFFECTS

7.1 ZONE OF INFLUENCE

For the purposes of this assessment, the zone of influence (ZOI; also commonly called the "Zone of impact") of the project consists of the areas which will be affected by the construction and operations of the facility. These areas include the facility, inundation zone, variable flow reach, construction area footprints, and access road and connection line right of ways. A full discussion and rationale for the delineation of the ZOI is presented in the October 18, 2013 document, "Marter Project – The rationale for zone of influence" in Appendix A, a summary of which is provided below.

Identification of the Upstream ZOI

The proponent's preferred option for the proposed option for this project involves the construction of a 7-metre (m) high dam at Krugerdorf Chutes. The upstream ZOI is defined as the area immediately upstream of the dam that will be affected by the new inundation, and includes areas that currently exist as terrestrial habitat and aquatic habitat. Existing terrestrial habitat falling within the upstream ZOI will be converted to aquatic habitat upon creation of the headpond. Existing aquatic habitat within the upstream ZOI will be altered by increased water depth and lower flow velocities.

In order to determine the extent of the inundation, two main data sources and studies were conducted:

- A LiDAR survey was carried out to obtain detailed topographic information throughout the anticipated inundation area;
- A hydrology study and HEC-RAS hydraulic modeling study were carried out to predict the inundation extent that will result from the proposed Project (the technical reports detailing these studies can be found in Annex I of this Environmental Report (ER)).

The inundation extent was defined for two conditions; normal flows (i.e. long term average flow) and maximum flood extent (1:100 year flood event). The inundation extent associated with normal flow was used to map the areas where terrestrial habitat will be altered to aquatic habitat. The aquatic and terrestrial habitat in the proposed headpond area was assessed for existing baseline conditions and potential changes related to inundation.

Following the creation of detailed topographic data in support of hydraulic modelling, the extent of the upstream ZOI was determined. Under Option 1 (the "High Dam") for the proposed Marter Township GS, the headpond will extend 2.4 km upstream of the dam, ending just downstream of the Ontario Northern Railway (ONR) bridge. This situation represents the worst case scenario for the project under which the environmental impact assessment was conducted. Under Option 2 (the "Low Dam"), the headpond will extend approximately 1.7 km upstream. The upstream ZOI for both dam options is illustrated on Figures 1a and 1b.

Downstream ZOI

The downstream ZOI encompasses the area downstream of the proposed project that will be directly affected by variability in flow rates and water levels resulting from the proposed modified run-of-river operation as outlined in the Operating Plan (see Section 5 for a summary of the proposed operations, and Annex I for a copy of the Operating Plan document). It should be noted that over the course of a day, the same total volume of water will be released by the proposed Project to downstream of Krugerdorf Chutes as would have occurred under existing conditions. However, a larger proportion of the water will be released during the day than at night for much of the year. The resulting downstream flow alteration has been considered in determining the downstream extent of the ZOI. Daily flow alterations are known to attenuate and dissipate with distance such that the endpoint of the flow alteration occurs gradually and not at a specific point. Hydraulic modeling (See Annex I for separate report and technical memos) was used to define the degree of flow attenuation with distance.

Approximately 2 kilometres (km) downstream of the proposed Marter Township Generating Station (GS) dam site, the Blanche River is joined by one of its tributaries, the Misema River. Flows on the Blanche River downstream of this confluence are currently influenced by operations at the Misema GS on the Misema River, which also operates as a modified run-of-river facility. As will be discussed in greater detail in Section 5, below, and in the Operating Plan (Annex I), the Marter Township GS is proposed to operate in such a way that the fluctuations in flows

downstream of the confluence will remain within the range currently experienced in the Blanche River.

At a point approximately 13.8 km downstream of the proposed project site, the Englehart River flows into the Blanche River. A dam exists on the Englehart River upstream of this confluence, but the dam appears to operate in a purely run-of-river fashion with no modification of flow. Therefore, the constant additional inflow from the Englehart River will help in attenuating any flow modification on the Blanche River resulting from the operation of the proposed Marter Township GS and the existing Misema GS.

Based on the above geography and layout, the area of flow alterations can be broken down into three river reaches of the Blanche River:

1. Proposed dam site (Krugerdorf Chutes) to Misema River confluence
2. Misema River confluence to Englehart River confluence
3. Englehart River confluence and beyond

As outlined in more detail below, the end of the downstream ZOI was determined to be the confluence zone with the Englehart River. Hence, the first two river reaches are deemed to lie inside the ZOI and were assessed in detail. The reach beyond the Englehart River confluence is considered to lie outside of the ZOI as further rationalized below. The flow alteration downstream would be difficult to distinguish from the existing condition and no direct and immediate environmental effects on values, features and functions are expected beyond the confluence with the Englehart River.

<u>River Reach 1 - Krugerdorf to Misema</u>:

The 2 km river reach from Krugerdorf Chutes (i.e. the location of the proposed dam and powerhouse) to the confluence of the Misema River is considered to be within the downstream ZOI for the following reasons:

- The reach will be subject to daily variability in flows and levels whenever natural inflow is less than the maximum powerhouse flow rate of 16 m^3/s based on operation of two power units. The degree of water level fluctuations has been modeled (see HEC-RAS unsteady state Hydraulic Modeling Report in Annex I), and was determined to be most pronounced during low inflow conditions (less than 5 m^3/s), potentially resulting in level changes of up to 0.6 m from day to night (i.e. ± 0.3 m above and below the natural water level).
- Up to 0.2 m in level fluctuation occurs at certain times under existing conditions, due to a backwater effect from the facility operation on the Misema River (see unsteady state Hydraulic Modeling study in Annex I). However, this backwater effect is much smaller in amplitude than the proposed 0.6 m level changes proposed for this reach and does not

occur as often as the proposed operation. As a result, the reach will experience alteration of flow with greater amplitude and more often than what occurs under existing conditions.

- The degree of alteration is significant enough to potentially affect habitat conditions directly by affecting flow velocities or water levels. As outlined in Section 5.5, special operating restrictions are proposed in order to mitigate potential impacts to key life cycle events of Lake Sturgeon and Walleye.

River Reach 2 - Misema to Englehart:

The reach of the Blanche River from the Misema River confluence to the Englehart River confluence is considered to fall within the ZOI for the following reasons:

- This reach of the river is subject to existing fluctuations in flows and levels from the operation of the facility on the Misema River as documented in the Water Survey of Canada station located in this reach. However, the operation of the proposed Project would result in additional days of fluctuations of similar magnitude (see Annex I technical memos by ORTECH Consulting, 2013).
- The operation of two facilities on the river could result in additional fluctuations unless the operation of the two facilities is harmonized.
- The operation of two facilities on the river could result in additional high or additional low flow occurrences unless the operation of the two facilities is harmonized.

The Operating Plan (see Annex I) has been designed to maintain fluctuations of flows and levels within the existing conditions where possible. The potential for additional fluctuations and extra high or low flows has been mitigated by special operating restrictions. However, an additional flow alteration will remain even with mitigation, due to the additional days of operation (i.e. days when the Marter Township GS operates while the Misema GS is not).

It should be noted that the proposed flow alteration in this reach exceeds the number of water level fluctuations occurring under existing conditions, but the magnitude of those changes remains within those currently experienced on the river. The amplitude of operation and level fluctuation, as well as, the provision of minimum flows will be maintained.

Reach 3 – Beyond Englehart:

The ZOI was determined to end at the confluence of the Blanche River and Englehart River, located 13.8 km downstream of the proposed dam and powerhouse location at Krugerdorf Chutes. This determination was made based on the results of the following studies:

- Downstream of the Misema River confluence the proposed operation is within the documented existing condition (see Annex I, technical memos on existing flow conditions by ORTECH Consulting, 2013) with extremely limited potential for environmental or

riparian impacts. Any additional alteration downstream of the Misema River confluence, and hence downstream of the Englehart River confluence will be consistent in amplitude compared to existing conditions, but may occur on a larger number of days.

- The unsteady state hydraulic modeling studies (see Annex I) have shown that the modification of flow at Krugerdorf Chutes attenuates naturally with distance downstream. The model predicts that a fluctuation of 0.6 m (i.e. ± 0.3 m above and below the natural water level) at Krugerdorf Chutes will attenuate to 0.2 m or less (i.e. ± 0.1 m above and below the natural water level) by the time the flow reaches the Englehart River confluence.
- The 0.6 m fluctuation referenced above represents a worst case scenario. Under most flow conditions, the fluctuations will be less than ± 0.3 m at Krugerdorf Chutes and hence less than ± 0.1 m at the confluence with the Englehart River.
- Actual water level fluctuations are expected to be less than those modeled. Monitoring data collected at Englehart River confluence in 2012, when the facility on the Misema River was operating, showed fluctuations that were significantly less than projected by the hydraulic model. This information confirmed that the model predictions are acceptable and conservative.
- The maximum predicted fluctuations are small in comparison to the total water depth, even at low flows, with little appreciable impact on wetted perimeter. The Blanche River is primarily flat and deep from the Englehart River confluence to Lake Timiskaming. The shallowest location downstream occurs at James' Rapids (approximately 4.7 km downstream of the Englehart River confluence). A field investigation by a professional biologist revealed that even this shallow location has significant depths and would not be affected by small water level fluctuations of ± 0.1 m or less.
- The Operating Plan (Annex I) restricts any flow modification during the critical habitat period (i.e. spawning). Hence no environmental effect would result during such periods either within the downstream ZOI or downstream thereof.
- Assessment of temperature revealed no downstream effect and hence requires no further assessment (see Annex IV, technical memo on temperature, ORTECH Consulting, 2013).
- Assessment of geomorphology did not identify significant erosion or sediment issues in the most affected reach (Krugerdorf to Misema) and hence no concern downstream of Misema where the proposed operation is largely within existing conditions. Flow fluctuations associated with dam operations will have only minor impacts downstream, where, because of the presence of valley wall slope failures in areas of predominantly clay substrate, and because of complications involved with cohesive banks, post-construction erosion monitoring has been recommended.
- Assessment of water quality did not identify significant changes except a possible transient effect on methyl mercury common to all new inundations (see Annex IV, report by Hutchinson Environmental, 2013).

- Ongoing monitoring has been proposed for key indicators, including flows, levels, temperature, sediment and water quality as outlined in the monitoring section of this ER (Section 11.2).

Based on the above considerations, the environment and values, features and functions within MNR and MOE mandates will not be affected beyond the downstream extent of the ZOI (i.e. beyond the Englehart River confluence zone).

7.2 POTENTIAL EFFECTS TO THE ENVIRONMENT

In the Class EA for Waterpower Projects (January 2014), an effect is described as:

"Any change to the environment, positive or negative, that could occur as a result of a project", and which can "include the impact or benefit that a project could potentially have, directly or indirectly, on the environment at any stage in the project life cycle."

Under the Ontario *EAA*, "environment" means:

a. air, land or water,
b. plant and animal life, including human life,
c. the social, economic and cultural conditions that influence the life of humans or a community,
d. any building, structure, machine or other device or thing made by humans,
e. any solid, liquid, gas, odour, heat, sound, vibration or radiation resulting directly or indirectly from human activities, or
f. any part or combination of the foregoing and the interrelationships between any two or more of them, in or of Ontario.

The purpose of an EA is to identify all those ecosystem components that are important to the environment (biological, social, cultural and economic) within the project area, and evaluate how the project would affect these VECs during its life-cycle (construction, operation, maintenance and dismantling). The EA team has adopted the conceptual hierarchy of avoidance, prevention and mitigation for this project. Where an impact cannot be avoided or prevented, mitigation measures were considered.

Mitigation measures include:

- Reducing the magnitude and duration of the impact;
- Repairing the situation post-impact to return to a pre-impact state;
- Offsetting the impact through other means.

Investigations undertaken in support of this project identified the anticipated effects of the project, at both the generating station site and ancillary components. Once identified, the EA team worked collectively to apply its expertise to finding solutions to avoiding, mitigating or minimizing the identified effects.

Project effects and management strategies considered by the EA team during the preparation of conceptual site designs, construction plans and operation plans, and those identified through the consultation program, are presented in the following sections.

The results of the project life-cycle potential impact analysis based on available data and information and recommended mitigative measures are presented and discussed within this report under Section 7.3 (for potential ecological effects) and Section 7.4 (for potential socioeconomic effects). All technical information completed by the EA team members is provided in the Annexes which accompany this document. A summary of the recommended mitigative measures is presented in tabular format for the reader's convenience in Table 25. A discussion of Table 25, outlining the identified effects and resolutions developed through the assessment is provided below in the following sections.

Table 25: Identified Issues and Management Strategies

Environmental Component	Issue	Phase of Development	Mitigation	Resolution / Result	Residual Effect (Yes/No)
General Natural Environment					
Air quality	Noise from operation of electrical generator and transformer at powerhouse and electrical connection	Operation	• Design powerhouse to reduce level of noise outside the powerhouse building • Proximity to residence may require environmental compliance approval for the facility	Low negative impacts - impacts mitigated or eliminated where ever possible through design	Yes
	Exhaust emissions from equipment and vehicles	Construction & Operation	• Implement standard construction site best management practices • Reduce equipment engine idling • Limit the use of diesel generator during operation (typically only in emergency situations)	Low negative impacts - impacts mitigated or eliminated where ever possible, Environmental Compliance Approval required	Yes
	Odour	Construction	• Utilize approved waste disposal sites and best practices for VOC/organic waste disposal • Appropriate disposal containers will be available for the prompt disposal of waste • Full disposal containers will be removed to the appropriate waste disposal facility on a regular basis • Organic/food waste will be collected daily and stored in closed, animal resistant containers until disposed of at an approved waste disposal site	No impacts anticipated - proper handling of VOC/organic waste onsite and offsite disposal at an approved disposal location will mitigate potential impacts	Yes
	GHG Offsets	Operation	N/A	Positive effects due to GHG offsets by building a hydroelectric generating station to generate 13,300 MWh of renewable energy represents the displacement of 9.217 tons of carbon dioxide equivalent	Yes
	Dust emissions from construction activities and vehicles	Construction	• Project personnel will control dust at work sites when it is warranted by the conditions • A water truck or alternate method will be used to suppress dust on all project roads and work areas when required as a result of dry or dusty conditions • Dust control techniques will be implemented prior to reaching critical conditions • Trucks will be required to use dust covers when traveling through populated areas	Low negative impacts - impacts mitigated or eliminated wherever possible, Environmental Compliance Approval required	Yes
Water quality (surface and groundwater)	Surface water - general construction activities along shoreline of waterway at facility	Construction	• Implement standard construction site best management practices • Construction machinery should arrive on site in a clean condition • Ensure a spill response plan is in place • Maintain appropriate emergency response measures • Implement wet weather restrictions • Stabilize all waste materials above the high water mark • Use mechanical means (not chemical) to clear and manage vegetation within right-of-way • All concrete work will be completed in dewatered areas, water will not be reintroduced to dewatered areas until concrete is cured • Project personnel will be made aware of safe concrete handling procedures. Concrete handling will employ watertight forms, spill contingencies, and designated truck clean out pits. • Water quality will be tested before discharging water from the work site • contractors will have prepared and will follow a Care of Water Plan • Earthworks will be scheduled to minimize duration of exposure • Turbidity of water close to construction site will be monitored; if turbidity level increases are close to exceeding acceptable limits, the work will be suspended under direction of the environmental monitor until levels drop. • Contain material when working near water bodies; cofferdam, silt curtains, sediment traps and settling ponds • Removal of riparian vegetation should be minimised • No excavation or borrowing will be done without the appropriate plans, surveys, permits, and approvals in place • Where practical, existing borrow sites and associated roads, trails or cut lines will be used instead of developing new sites • Borrow sites for aggregate will be located in upland locations and separated from streams and lakes by a minimum 30 m wide buffer of undisturbed terrain in order to minimize potential for siltation • Borrow area will be staked to prevent accidental over-extension of the affected area	Low negative effect - impacts mitigated or eliminated wherever possible through implementation of mitigation measures	Yes

Environmental Component	Issue	Phase of Development	Mitigation	Resolution / Result	Residual Effect (Yes/No)
Water quality (surface and groundwater)	Surface Water - In-water works construction and removal of the cofferdam: potential for excess sediment to be suspended and carried downstream by river flow	Construction	• Due to the velocities present in this section of river, it may not possible to isolate the cofferdam construction from the channel using a silt curtain or equivalent, in this case; • Ensure that all rock materials placed into the river have been prewashed. • Construct and remove the cofferdam during an appropriate low flow period (generally during the summer months). • Ensure that weather forecast does not predict significant rains during the cofferdam installation or removal time period. • Ensure that construction takes the least possible time by having all construction materials and necessary equipment available prior to construction or removal of the cofferdam. • Avoid construction and removal during the time typically associated with spawning and egg incubation times of warm water fish species (typically April 1 to July 15). Specific timing windows should be agreed to with the local MNR as part of the permitting process	Adhere to all applicable standard best management practices available to the industry	Yes
	Contamination from spills or leaks of hazardous substances	Construction & Operation	• spill prevention and containment measures to be put in place throughout operational period • ensure that workers are adequately trained in the implementation of a prepared spill response plan • personnel will be trained in the requirements for the storage and transport of hazardous material • ensure availability of spill control equipment and materials • store hazardous materials at least 150 m away from water bodies • provide impervious dikes and liners around oil, fuel and chemical storage areas • avoid in-water works during periods of high precipitation • refuel machinery on impermeable pads or pans designed to allow full containment of spills a minimum of 30 m from water bodies • fuelling and maintenance activities should occur within an area where sediment erosion control measures and all precautions have been made to prevent oil, grease, antifreeze or other materials from inadvertently entering the ground or the surface water flow • monitor area for leakage; in the unlikely event of spillage the supervising engineer would halt all construction activities and corrective measures would be implemented; any spills would be immediately reported to the MOE Spills Action Centre • All hydrocarbon fuels, oils, and lubricants will be stored in a secondary containment area • Drip pans will be installed on equipment to intercept minor leaks • Sumps will be installed including an oil trap to prevent contaminated water from being pumped into a water course • All fuel or lubricant contaminated materials will be collected and trucked to an approved regional disposal facility, or will be treated with in situ bio-remediation techniques approved by the Proponent and Regulators	Low negative effect - impacts possible in the event of accident/malfunction; impacts mitigated or eliminated wherever possible through implementation of mitigation measures	Yes
	Surface water - Fluctuation of water levels in the inundation area upstream and fluctuation of flows downstream caused by intermittent operation of facility - increase in suspended sediment, especially clay, due to erosion or ice scouring	Operation	• Limit maximum daily fluctuations of upstream water levels (maximum 1 m - less than the magnitude of seasonal and inter-annual fluctuation that has been occurring naturally in the river prior to the construction of the project) • Limit the rate of change of upstream water levels (the proposed ramping rates of the generating station were increased from 20 minutes, as previously proposed in the Draft ER, to 60 minutes) • Facility will operate as a modified run-of-river facility (run-of-river operation during extreme high and low flow periods of the year) • Annual visual monitoring of clay erosion along shoreline of headpond and downstream • Stuart's Rapids will be monitored during the construction and early operational period to assess the need and nature of an ice scour control program	Negative impacts possible - impacts mitigated or eliminated wherever possible (i.e. use mechanical and vegetative erosion controls along shoreline at risk). Monitoring undertaken to document continued effectiveness of mitigation measures. Additional mitigation measures will be developed as required.	Yes
	Upstream inundation may alter water quality (methyl-mercury and heavy metals) in reservoir	Operation	• Trees and woody debris generally will be removed from the inundation area prior to headpond filling • Headpond created in association with the project will be relatively small and have moving water compared to other hydropower projects where mercury enrichment has occurred • Pre- and post-development monitoring for mercury in fish tissue and surface water is underway and will be continued into the early operational period.	No impact anticipated - The headpond at Marter is relatively small and is well flushed. The proponent has met with regulators in order to determine suitable programs for surface water and mercury in fish flesh for both pre-op and post-construction period based on the MOE SW Guidance Document (Feb 2012).	Yes

Environmental Component	Issue	Phase of Development	Mitigation	Resolution / Result	Residual Effect (Yes/No)
Species at risk (SAR) and their habitat	Potential impacts to the main pool area immediately below Stuart's Rapids (identified by MNR as significant habitat for spawning Lake Sturgeon (*Acipenser fulvescens*))	Construction & Operation	• Install a telemetry receiver unit above Stuart's Rapids that is compatible with MNR telemetry equipment currently used to monitor Sturgeon movement in the Blanche River. • Special operating restrictions will be implemented during Sturgeon spawning periods (see the row "*Potential impacts to Lake Sturgeon spawning habitat in downstream ZOI due to variable flows*" below) • Enter into ESA Agreements/permits as required • A Discovery Protocol will be developed and in place should a SAR species be encountered; a permit under Section 17(2) of the *Endangered Species Act* will be required and may require an overall benefit to the species. Once operation commences an Agreement for Operation and monitoring protocols under the ESA will be made/discussed with the MNR. • Effect on species and their habitat on a regional level is estimated to be negligible given the small size of the area of impact relative to the amount of comparable habitat available in the surrounding landscape.	Low negative impacts possible for Sturgeon. Impacts will be mitigated or eliminated where ever possible through modifications to facility operation plan in consultation with MNR and DFO. ESA or SARA Permit/Agreement may be required for construction/operation. Proponent will continue to monitor for the presence of SAR species which have the potential to be present within the project zone of impact and will contact the responsible agency (provincial or federal) to discuss requirements should individuals be identified.	Yes
	Bobolink (*Dolichonyx oryzivorus*) confirmed in open fields near access road route	Construction	• Identify species-specific mitigation measures in co-operation with MNR and enter into ESA Agreements/permits as required • the proposed routing of distribution line and access road has been selected to reduce interference with all Bobolink habitat and to minimize disturbance to Canada Warblers on site • A Discovery Protocol will be developed and in place should a SAR species be encountered; a permit under Section 17(2) of the *Endangered Species Act* will be required and may require an overall benefit to the species. Once operation commences an Agreement for Operation and monitoring protocols under the ESA will be made/discussed with the MNR. • Effect on species and their habitat on a regional level is estimated to be negligible given the small size of the area of impact relative to the amount of comparable habitat available in the surrounding landscape.	Routing of connection line and access routes selected to avoid impacts. Proponent will continue to monitor for the presence of SAR species which have the potential to be present within the project zone of impact and will contact the responsible agency (provincial or federal) to discuss requirements should individuals be identified.	Yes
Significant earth or life science features	No issues	N/A	• No ANSI identified in project area as indicated by NHIC website review	N/A	No
Terrestrial wildlife (numbers, diversity, distribution)	General disturbance to habitat during construction and maintenance	Construction & Operation	• Schedule construction during winter months to minimize disturbance • Limit use of machinery in and around watercourses and sensitive terrestrial areas • Clearly define access and transportation routes to minimize disturbance • Use woody debris and logs from clearing to establish brush piles and downed logs adjacent to the cleared right-of-way to improve habitat • Allow for detour around sensitive habitat areas • Use mechanical means (not chemical) to clear and manage vegetation within ROW • Limit removal of vegetation during construction/maintenance to maintain habitat connectivity • Schedule activities to avoid migratory nesting periods • All construction traffic should adhere to speed limits and construction crews should be aware of the potential for wildlife crossings	Low negative effect - impacts mitigated or eliminated wherever possible through implementation of mitigation measures	Yes
	Loss of terrestrial habitat in the footprint of the built structures and headpond	Construction & Operation	• Relative to the areas to be impacted, comparable terrestrial habitats are abundant in the surrounding region	Low negative impacts anticipated - small facility footprint and inundation area; impacts to regional populations will be negligible as similar habitat is abundant in the area.	Yes
	Construction effects on potentially significant wildlife habitats, including Bobolink nesting habitat	Construction	• Mitigation through proper timing of construction of access road and distribution line corridor, and through determination of exact nesting sites to better clarify core habitat areas. • MNR has advised that a permit may be required under the *Endangered Species Act*. Surveys should be undertaken in each year during which construction occurs, in order to ensure that increased vehicular traffic does not have an adverse impact on local resident numbers during the construction phase(s). • Additional surveys should be undertaken annually for at least three (3) years post-construction to determine whether population numbers remain stable after the construction of the new roadway and transmission line corridor and structure(s). • Conversion of all or part of the adjacent agricultural fields to a natural meadow state would increase the available nesting and breeding habitat for this specie sin the local area, thereby offsetting any observed loss of habitat due to increased edge effect post-construction.	Impacts to Bobolink will be mitigated to the extent possible; there remains potential for some negative impact; permit under the *Endangered Species Act* may be required.	Yes
	Loss of vegetation and terrestrial wildlife during powerhouse construction activities - clearing, grubbing and stockpiling	Construction	• The area of disturbance within the overall site boundaries will be kept to a minimum and clearing will only occur where necessitated by construction. • High visibility snow fencing will be installed to restrict heavy equipment traffic to the area identified for clearing. • Travel paths, stockpile areas and staging areas will be carefully planned and followed. • Removal of mature trees within the inundation and footprint areas is not avoidable since retention of vegetation within inundation area could result in methylation of mercury.	The clearing and grubbing of land will result in a loss of some vegetation and in turn potential wildlife habitat. Indirect impacts also have potential to occur during active construction (i.e. noise)	Yes

Environmental Component	Issue	Phase of Development	Mitigation	Resolution / Result	Residual Effect (Yes/No)
Terrestrial wildlife (numbers, diversity, distribution)	General disturbance to wildlife	Construction	• Where possible, avoid important habitats • Where possible, activities will be scheduled to avoid sensitive nesting, rearing, mating, or staging periods • All food and food waste will be properly stored and disposed of to prevent attracting wildlife • Equipment and vehicles will yield the right-of-way to wildlife • All Project personnel will use proper care and caution when operating vehicles to avoid collisions with wildlife • A log of wildlife sightings will be kept at the Project office to aid the construction personnel in determining more active wildlife areas in order to target mitigative traffic measures such as crossing signage and reduced speed limits. • Fish or wildlife are relocated as required during the work.	Construction Management Plan will be finalized to include instructions and protocols for minimizing the disturbance to wildlife during the construction program.	Yes
	Potential impacts to migratory bird species - habitat disturbance during construction and road mortality	Construction	• Construction window for the proposed Project will take place outside of the migration, mating, and nesting seasons for migratory birds and will be limited to August 1 to April 15, annually • A speed limit will be in force on access roads to reduce likelihood of mortality on adult birds and fledglings.	No additional mitigation or monitoring is recommended.	No
	Potential impacts on non-aquatic invertebrates - habitat loss in project footprint	Construction & Operation	• No uncommon or rare invertebrate species were identified during surveys at the Marter Project site. • None of the terrestrial habitats within the project footprint are considered uncommon or rare in the surrounding landscape. • Project inundation will not remove a significant portion of any particular habitat type.	No mitigation or monitoring is recommended.	No
Natural vegetation and habitat linkages	Effects on vegetation and habitat during connection line and access roads construction and right-of-way (ROW) maintenance	Construction & Operation	• Schedule construction during winter months, when possible, to minimize habitat disturbance • Limit use of machinery in and around watercourses and sensitive terrestrial areas • Clearly define access and transportation routes to minimize disturbance • Allow areas of exposed soil to naturally regenerate with native species • Use mechanical means (not chemical) to clear and manage vegetation within ROW • Limit removal of vegetation during construction/maintenance to maintain habitat connectivity	Low negative effects anticipated - proper implementation of construction management plan and best management practices will mitigate impacts.	Yes
	Access road and connection line construction - increased potential for forest fires	Construction	• Project personnel will be prepared and be familiar with the site Fire Preparedness Plan • Fire fighting equipment will be available to all workers and the location of such equipment will be outlined in the Fire Preparedness Plan • Locations of equipment and muster points will be advertised as necessary around the site • Project personnel will be familiar with fire-fighting techniques and the use of supplied equipment • Uncontrolled fires will be immediately reported to the nearest fire emergency service and the MNR in the case of an uncontrolled fire on Crown land • Smoking will only be permitted in designated smoking areas equipped with fire extinguishers • Disposal and storage of waste will be put into proper waste containers to prevent fires	No impacts anticipated - proper implementation of construction management plan and best management practices will mitigate impacts.	No
	Access road and connection line construction - habitat fragmentation, increased predation and introduction of invasive species	Construction & Operation	• Retain vegetation to the extent practicable • During clearing, trees will be felled into the proposed site wherever possible • Wildlife trees and other significant trees will be marked for protection; marked trees will only be removed if they are a safety concern that cannot be addressed in other practical ways • Wildlife trees (sticknests) have been avoided in route planning and layouts. Any such trees found during construction will be protected or line would be shifted. • Wood or brush would be disposed of according to guidance from regulators (MNR)	As the routing studies currently underway conclude and the alignment is finalized, it is Xeneca's intention to conduct field surveys (ground truthing at identified areas of special concern. The route would then be optimized to avoid sensitive areas.	Yes
Soil and sediment quality	Soil compaction in project construction footprint and right-of-way (ROW) for connection line and access roads	Construction	• Schedule construction of ROW to minimize ground disturbance (winter) • Stop activities when ground conditions could potentially severely disturb soil profile (high precipitation, etc.) • Be prepared to alter construction activities as a result of sudden thaw conditions • Stabilize high traffic areas with gravel surface layer or other suitable cover material • Establish a designated construction access route to minimize area of impact • Time construction activities to minimize effects on surface vegetation and subsurface rooting zones • Vehicles and equipment access will be restricted to the minimum area necessary • Conduct site reclamation activities as soon as possible following the disturbance	No impacts anticipated - proper implementation of construction management plan and best management practices will mitigate impacts wherever possible. Soil compaction will reverse naturally over time if left undisturbed.	No

Environmental Component	Issue	Phase of Development	Mitigation	Resolution / Result	Residual Effect (Yes/No)
Soil and sediment quality	Management of excavated materials (blast rock, fill, aggregates, etc.)	Construction	• Transport blast rock to lay down area for stockpile and/or crushing • Install mechanical erosion control measures at blast rock storage site near water body • Re-use blast rock for aggregate and shoreline stabilization • Apply water to dry soil/rock to minimize dust • Use temporary wind control structures to avoid dust entry into watercourse • Instruct workers and equipment operators of dust control methods • Install mechanical barriers to prevent run-off from dust piles into water bodies • If Acid Rock Drainage (ARD) is determined to be an issue, an ARD Management Plan will be prepared including measures for avoidance, mitigation, and treatment methods for ARD as well as long-term storage methods for acid-generating spoils which would entail isolation of spoils from water and air to prevent leaching	No impacts anticipated - proper implementation of construction management plan and best management practices will mitigate impacts wherever possible.	No
Significant natural heritage features and areas	None currently identified	N/A	N/A		No
Aquatic and Riparian Ecosystem					
Shoreline Dependent Species	*See Fish Habitat Section below*				
	Loss of habitat for aquatic mammals (River Otter and American Mink confirmed)	Construction & Operation	• Planning for flooding of new reservoirs should avoid the winter/ice over period when filling could cause direct mortality by drowning furbearing mammals in their dens • Impacts associated with construction would be limited to small areas within the structural footprint • Inundation effects could remove existing denning sites, however new shoreline areas with suitable denning habitat will be created following inundation • Suitable habitat for aquatic mammals is abundant in the surrounding landscape	Scheduling the headpond creation during the early summer will allow aquatic mammals sufficient time to re-establish new lodging along the new shoreline. No further mitigation or monitoring is recommended post-construction.	Yes
Wetland Dependent Species	Two known moose calving areas downstream of the Marter Township GS - Potential disturbances to moose calving areas due to reduced flows and water level fluctuations in the downstream ZOI	Operation	• During normal operations, the Marter Township GS is not anticipated to affect water levels at Stuart's Rapids by a significant amount (< 20 cm) • Calving typically occurs during spring freshet (high flows); operations at the Marter Township GS would not fluctuate water levels about the high water mark during this timeframe • Operations should not have any significant impact on moose calving areas adjacent to the river system	No negative impacts anticipated.	No
	Impacts on habitat of reptile and amphibian species resulting from project inundation	Construction	• Inundation of existing riparian areas may increase available shallow water habitat in low-lying areas, providing suitable egg-laying and early life cycle habitat for amphibians.	• Increase in lacustrine habitat in the headpond area will increase suitable aquatic habitat for Eastern newt. • None of the terrestrial habitats in the proposed inundation area are rare • No further monitoring or mitigation is recommended.	Yes
	Impacts on habitat of reptile and amphibian species resulting from project operation	Operation	• Run-of-river operations during spring and early summer will act to maintain sufficient wetted width and depth at early life cycle habitat (eggs, tadpoles) of aquatic amphibians, until the eggs have hatched and the more motile tadpoles are able to move with receding flows. • Water levels will be maintained within current conditions below the Misema facility so no habitat will be lost in this area.	• timing of run-of-river operations will eliminate effect on non-motile life stages • motile life stages will be able to adjust to receding and advancing water levels during modified operations and intermittent operations	No
Fish Habitat	Potential impacts to Lake Sturgeon spawning habitat in downstream ZOI due to variable flows	Operation	• In order to mitigate impacts to lake sturgeon spawning, the facility will revert to run-of-river operation when water temperatures reach 8°C and will continue as such until 32 days after 18°C is reached or 18 days after 20°C is reached. The facility will then move to modified run-of-river operations, with a maximum daily range of 5 m^3/s and no intermittent operations for a period of 21 days in order to facilitate larval drift. After 21 days, normal summer operations can begin. • Sturgeon telemetry station to be installed, maintained and monitored at Stuart's Rapids	Minimal impact anticipated with proper implementation of the proposed operating restraints.	Yes
	Potential impacts to Walleye spawning habitat in downstream ZOI due to variable flows	Operation	• Special operating constraints are proposed in order to mitigate impacts to walleye staging, spawning, egg incubation and larval development: facility will operate in run-of-river mode when water temperatures reach 4°C until 33 days after 12°C is reached.	Run-of-river operations during walleye staging and spawning will ensure that these activities will not be significantly impacted by fluctuations in flows and levels. Similarly, run-of-river operations will mitigate the risk of the eggs being dewatered and the recently hatched larvae being stranded.	Yes
	Loss of spawning habitat for walleye and white sucker at the rapids in the upper extent of project inundation	Construction and Operation	Loss of the potential spawning habitat in the fast water series at the upper extent of the inundation area will not be mitigable.	Proponent will discuss potential offsets with MNR and DFO as part of the post-EA habitat offsetting discussions.	Yes

Environmental Component	Issue	Phase of Development	Mitigation	Resolution / Result	Residual Effect (Yes/No)
Fish Habitat	Potential impacts to fish spawning at James' Rapids due to variable flow releases from the Marter Township GS	Operation	• James' Rapids fall outside the limits of the project's zone of impact • Remaining within existing conditions should preclude any adverse impacts to any population inhabiting the area around this feature. • Mitigation strategies incorporated to ensure sustainability of spawning and benthic habitats upstream of this site will act to mitigate any potential impacts downstream that may be felt at the extent of James' Rapids.	No further mitigation or monitoring is recommended for this location.	No
	General impacts to fish habitat during construction activities in or near water bodies	Construction	• Respect all in-water timing restrictions • Isolate in-water construction area before or after in-water timing restrictions to avoid impacts • Placement of intakes near natural barriers to migration • Ensure a qualified person is on hand to oversee de-fishing activities prior to dewatering • Design habitat mitigation and compensation measures through discussion and guidance with relevant authorities • Employ best management construction practices including fish relocation plan, work site isolation and sediment control measures • Blasting will occur outside of fish spawning and incubation periods (specific requirements to be established with DFO and MNR during permitting and approvals) • Other blasting mitigation measures may include bubble curtains, isolation and dewatering of blast area, use of smaller charges, staggering of blasts • Conduct environmental monitoring to ensure that predicted conditions are accurate • Prompt and effective clean up and restoration once construction is complete	Low negative impacts - impacts mitigated or eliminated wherever possible through implementation of mitigation measures	Yes
	Construction of intake and water conveyance structure and the temporary loss of habitat related to the construction of the cofferdam.	Construction	• The cofferdam is anticipated to be constructed in accordance with the appropriate in-water timing window dictated by the Ministry of Natural Resources. • During construction, it is assumed that flow will be maintained uninterrupted downstream through staging and sequencing of construction. • Construction best management practices will be implemented to minimize the risk of off-site migration of sediments as well as adherence to in-stream timing window restrictions for construction activity.	The impacts related to construction at the proposed powerhouse intake will be limited primarily to the alteration of habitat through the construction of the intake channel and the temporary loss of habitat related to the construction of the coffer dam.	Yes
	Potential effects on habitat and spawning from dewatering operations	Construction	• Dewatering activities will be done in a controlled manner so as not to discharge turbid water to the receiving watercourse. • Materials such as filter bags, straw bales, filter fabric and paige wire fencing will be on site to create a dewatering corral for waste water as a contingency plan in the event that groundwater is encountered and additional filtering properties are required. • Suitable containment/treatment areas will be identified by the Contract Administrator. • The discharge point in the receiving watercourse will be carefully chosen as an area with low scour potential (e.g. bedrock bottom). • If scour potential does exist, the contractor will use energy dissipation in the form of a splash pad or rock protection for the stream bottom.	The ultimate discharge point to the receiving watercourse will be monitored to ensure that the filtering is effective in removing excess sediment. It will also be necessary for qualified professionals under permit from the MNR to complete a fish salvage operation from the area to be dewatered. In the event that not all fish can be successfully collected and relocated, authorization under the *Fisheries Act* will be required.	Yes
Benthic Habitat	Impacts to benthic habitat in proposed headpond area	Operation	• A stretch of fast-water and riffle benthic habitat will be lost at the upstream extent of the proposed inundation area due to flooding.	• Loss of benthic habitat in lower rapids will not be mitigable. • Potential offsets for this loss of habitat will be discussed with MNR and DFO in the Post-EA period.	Yes
Fish migration	Upstream passage through the Krugerdorf Chutes	Operation	• Upstream fish passage through Krugerdorf Chutes is highly unlikely under any flow conditions	No upstream passage implications	No
	Downstream passage	Operation	*See "Fish injury and mortality" below*		
Fish movement	Potential for fish stranding between the Marter Township GS and the confluence with the Misema River due to fluctuating flows	Operation	• Ramping rates (both ramp up and ramp down) will occur gradually over a period of 60 minutes • Areas with potential for fish stranding will be monitored during the first 3 years of facility operation. • Should fish stranding be confirmed during post-construction monitoring, appropriate mitigation measures will be implemented (e.g. minor habitat adjustments, more gradual ramping rates)	Adaptive management strategies will be applied should monitoring results confirm that fish stranding is occurring.	Yes
Fish injury or mortality	Fish impingement against the trashracks or entrainment into the turbine resulting in injury or mortality	Operation	• Engineer facility intake and design velocities to account for fish swimming capabilities to minimise potential for impingement or entrainment through turbine(s) • If significant entrainment potential is identified, consider diversion methods for vulnerable fish species • Turbine design and selection will minimize fish injury or mortality	Turbine selection will be discussed with MNR and DFO to address fish injury and mortality. A Kaplan turbine will be used to provide generation efficiency and minimize fish mortality.	Yes

Environmental Component	Issue	Phase of Development	Mitigation	Resolution / Result	Residual Effect (Yes/No)
Erosion and sedimentation	Construction related impacts - Overland flow paths within the construction areas have the potential to carry construction-related sediment to the watercourse.	Construction	• Areas will be identified in advance of construction and receive added protection and scrutiny during routine construction inspections particularly during the periods before and after rain events. • Sediment and erosion control measures will be installed prior to construction and maintained diligently throughout the construction operations. • Planting of vegetative cover will then follow in the next growing season. • Maintenance and inspection of the vegetative cover will continue until such time as the disturbed areas are sufficiently stabilized through vegetative growth to prevent overland runoff of suspended materials. • If construction finishes in a cleared area, with insufficient time left in the growing season to establish vegetative cover, an overwintering treatment such as erosion control blankets, fibre matting or equivalent will be applied to contain the site over the winter period. • Stockpile and staging areas will be well removed from the watercourse and be isolated with sediment and erosion control measures to prevent migration of material to the watercourse and natural areas. • Excess material from in-water excavation will be removed immediately from the channel area and temporarily stockpiled in suitable locations identified by the design drawings and on-site areas approved by an environmental inspector.	Adhere to all applicable standard best management practices available to the industry	No
	Operation - Increased shoreline erosion, ice scouring and sediment deposition due to inundation and water level fluctuations	Operation	• Limit maximum daily fluctuations of upstream water levels (maximum 1 m - less than the magnitude of seasonal and inter-annual fluctuation that has been occurring naturally in the river prior to the construction of the project) • Limit the rate of change of upstream water levels (the proposed ramping rates of the generating station were increased from 20 minutes, as previously proposed in the Draft ER, to 60 minutes) • Annual visual monitoring of erosion along the shoreline of the headpond; implement additional mitigation measures as required • Stuart's Rapids will be monitored during the construction and early operational period to assess the need and nature of an ice scour control program	• Deposition of sediment may occur at the upstream end of the headpond and immediately upstream of the dam. • Some scouring may occur in the upstream portions of the headpond, but impacts will likely only be local in nature • Operations will be established to minimise erosion where possible. Follow-up monitoring will be completed to determine where erosion and sedimentation are occurring as a result of operations	Yes
	Clay banks/shoreline and in stream features along key downstream sections are prone to landslides/erosion	Construction & Operation	• Orientation of tailrace will be such that it does not contribute to any additional downstream erosion effect, tailrace design will be refined during final engineering stage • If required, the addition of rip rap or larger boulders in key areas immediately downstream of tailrace could be incorporated into project design to further protect against erosion • Erosion hazard locations have been mapped and will be monitored by the proponent during construction and early operational phases	Final engineering design will address tailrace orientation, and whether additional erosion control measures are required. Areas susceptible to erosion will be monitored.	No
Water levels, flows and movement (surface water)	Increase in water level and residency time in headpond	Operation	• Daily fluctuations of upstream water levels will be limited to a maximum of 1 metre, a range less than the amount of seasonal and inter-annual fluctuation that has been occurring naturally in the upstream reach of the river over time. • Limit the rate of change of upstream water levels - during modified run-of-river operations, changes in flow releases from the headpond will occur gradually over a period of 60 minutes • During extreme high and low flow periods of the year, the facility will operate in run-of-river mode • Headpond volume limited to no more than a few hours water storage overnight during intermittent operations • Over any period of 24 hours, the same volume of water will be released downstream as what would occur in the absence of the project.	Proposed operating strategies will minimize the magnitude of impacts associated with changes to flows and levels in the headpond.	Yes
	Drying of Krugerdorf Chutes during low flow conditions	Operation	No adverse effects on upstream fish movement or distribution (downstream movement of fish will still occur during high water periods). Section is limited in terms of available habitat. No impacts to rock slide are anticipated.	No further mitigation or monitoring is proposed for the bypass reach itself.	No
	Variation in flows within downstream variable flow reach - Blanche River between the Marter Township GS and the confluence with the Misema River	Operation	• A downstream minimum environmental flow of 0.5 m^3/s is proposed to be continually released into the variable flow reach during modified run-of-river operations in order to maintain ecological habitat viability (note that during run-of-river operations, all flows entering the headpond are released downstream at the same rate). • During intermittent operations (facility shut down at night), the maximum turbine flow will be lowered from 16 m^3/s to 10.4 m^3/s, in order to minimize the variability of daily flows. • When natural inflows are above the minimum flow required to operate the turbine (4.8 m^3/s), the facility will operate continuously (i.e. flows in the variable flow reach will reach a daily minimum of 4.8 m^3/s, and not 0.5 m^3/s as would occur during intermittent operations).	Variations in flows in the variable flow reach will be inevitable. The proposed operating constraints will minimize the magnitude and frequency with which such variations will occur.	Yes

Environmental Component	Issue	Phase of Development	Mitigation	Resolution / Result	Residual Effect (Yes/No)
Water levels, flows and movement (surface water)	Variation in flows within downstream variable flow reach - Blanche River between the confluence with the Misema River and the confluence with the Englehart River	Operation	• The magnitude of daily fluctuations will remain within the range currently experienced as a result of operations at the Misema GS (see the next row on "*Increase in the frequency and magnitude of peaks in flows/levels in the Blanche River downstream of the confluence with the Misema River*") • A minimum environmental flow of 2.3 m^3/s, as measured at the Water Survey of Canada stream gauge 02JC008 (located downstream of the Blanche/Misema confluence), will be met at all times. If measurements at the gauge indicate that flows will fall below that target, the Marter Township GS will revert to run-of-river operations if it is not already operating as such.	Daily fluctuations in flows downstream of the Blanche River/Misema River confluence will remain within the range occurring under existing conditions. • A ramping rate of 60 minutes has been selected to ensure fluctuations are imposed gradually. • Modified run-of-river operations will occur in harmonized timing with the Misema GS, maintaining water levels within the existing conditions. • Amplitude will remain the same, but the frequency of fluctuations will increase.	Yes
	Increase in the frequency and magnitude of peaks in flows/levels in the Blanche River downstream of the confluence with the Misema River	Operation	• The magnitude of peaks in the Blanche River downstream of the confluence with the Misema River will remain within the range currently experienced as a result of operations at the Misema GS. • Peak flows from the Marter Township GS will be timed such that only one discernible peak in the Blanche River per day, as is occurring under existing conditions. • The number of daily peaks per year is estimated to increase by 25%; this increase in peaking frequency would result from days when the Marter Township GS is operating while the Misema GS is not. • In order to properly coordinate the release of peaking flows relative to those released from the Misema GS, Xeneca will pursue a data sharing agreement with the operators of the Misema GS. In the absence of a data sharing agreement, a real-time monitoring sensor will be installed at the tailrace of the Misema facility.	Low impacts anticipated due to the proposed limit of one peaking cycle per day. If real-time flow data (whether provided directly from the Misema GS or measured in-stream) are not available, at any time for any reason, the Marter Township GS will operate in a manner that will avoid dual peaking, including, if necessary, operating in true run-of-river fashion.	Yes
Changes to overall thermal regime of waterway	Changes to thermal regime of waterway within headpond as a result of inundation and storage	Operation	• The residence time of water in the headpond would increase by an average of 1 day in typical summer months compared to pre-project conditions • The headpond would have an average depth of approximately 4.3 m	No impacts anticipated - small headpond with low storage capacity and timing of temporary storage will mitigate potential for significant change in thermal regime	No
Drainage, flooding and drought patterns	Alteration from natural patterns	Operation	• Limit maximum daily fluctuations of upstream water levels (maximum 1 m - less than the magnitude of seasonal and inter-annual fluctuation that has been occurring naturally in the river prior to the construction of the project) • Limit the rate of change of upstream water levels (the proposed ramping rates of the generating station were increased from 20 minutes, as previously proposed in the Draft ER, to 60 minutes) • Facility will operate as a modified run of river facility (run of river operation during extreme high and low flow periods of the year) • Final facility design to ensure flood passage capacity and public safety issues are adequate to meet the requirements of the *Lakes and Rivers Improvement Act* approval following the completion of the EA	Low negative impacts anticipated - Dynamic modeling shows facility will modify normal flooding patterns	Yes
Aboriginal Community Considerations					
First Nations reserves or other Aboriginal communities	Aboriginal Communities have expressed an interest in engagement with regards to the project and potential impacts	Construction and Operation	• Proponent has corresponded with several Aboriginal communities in the EA process • Xeneca offered funding for a peer review of the draft ER; • Proponent commits to engage in discussion after the issuance of a Notice of Completion at which time EA will be provided to communities for review for a minimum of 30 days	Ongoing engagement and consultation with Aboriginal communities will continue after completion of EA and through the permits and approvals process.	No
	Project Sites are not located on any First Nations reserve lands or lands allocated to any other aboriginal community. The Project is located within an area covered under Treaty 9.	Construction and Operation	Xeneca has issued Letters of Intent and Term Sheets with identified local communities. An executed Letter of Intent/Term Sheet has been signed by Matachewan FN. Beaverhouse Aboriginal Community has indicated that it does not currently wish to participate in any equity arrangements at this time but would like to continue to be considered for future jobs and employment opportunities. TFN (Temiskaming FN) is interested in pursuing a B2B equity arrangement.	Engagement and consultation with Aboriginal communities for purposes of the EA was completed. Xeneca will continue to advise communities of progress on the project after completion of EA and through the permits and approvals process.	Yes
Spiritual, ceremonial, cultural, archaeological or burial sites	Preservation of Aboriginal culture	Construction and Operation	• Proponent has corresponded with Aboriginal communities in the EA process • Proponent commits to continue discussion after the issuance of a Notice of Completion at which time the Environmental Report will be provided to communities for review for a minimum of 30 days • A request to enter into discussions regarding the project and an invitation to share information was issued in June 2010 • Stage 1 Archaeological Summary Report was distributed to the Aboriginal Communities. Stage 2 work was completed in November 2012.	Ongoing engagement and consultation with Aboriginal communities will continue after completion of EA. In addition, a Stage 2 archaeological survey has been conducted in 2012 to identify the presence of and assess impacts to cultural heritage in the footprint of the project. No archaeological or cultural heritage resources were identified during this study.	No

Environmental Component	Issue	Phase of Development	Mitigation	Resolution / Result	Residual Effect (Yes/No)
Spiritual, ceremonial, cultural, archaeological or burial sites	Spirit, (movement) of the water to be impeded by construction of the dam	Operation	The Marter Township GS will be operated in an intermittent manner, that will ensure flowing water is always provided within the zone of impact. The intermittent operation for the Marter project as currently proposed will allow a minimum environmental flow of 0.5 m3/s to be passed into the bypass reach at all times. Additionally, the Marter Township GS will operate such that flows downstream of the confluence of the Blanche River and Misema River do not fall below 2.3 m3/s.	Movement of water will not be impeded by the dam and minimum environmental flows will be maintained at all times.	No
Traditional land or resources used for harvesting activities	Project construction may result in the removal of culturally significant medicinal plants and/or trees	Construction	Construction of infrastructure within the project footprint (including road and transmission line components) does not impact upon any known culturally significant medicinal plants and/or trees. Dominant tree species in the project footprint are comprised of Balsam Fir, Trembling Aspen and Black Spruce which have not been identified as significant medicinal plants or trees.	The presence of culturally significant medicinal plants and/or trees was considered but none have been identified within the project footprint.	No
	Quality and Clarity of water may be affected by the construction of the facility, which would impact an important cultural and spiritual value for many communities	Construction	• Trees and woody debris generally will be removed from the inundation area prior to headpond filling to minimize the potential for methymercury formation • Construction BMP's will be implemented to ensure protection of water during construction Implement standard construction site best management practices • Construction machinery should arrive on site in a clean condition • Ensure a spill response plan is in place • Maintain appropriate emergency response measures • Implement wet weather restrictions • Stabilize all waste materials above the high water mark • Use mechanical means (not chemical) to clear and manage vegetation within ROW • All concrete work will be completed in dewatered areas, water will not be reintroduced to dewatered areas until concrete is cured • Project personnel will be made aware of safe concrete handling procedures. Concrete handling will employ watertight forms, spill contingencies, and designated truck clean out pits. • Water quality will be tested before discharging water from the work site • contractors will have prepared and will follow a Care of Water Plan • Earthworks will be scheduled to minimize duration of exposure • Turbidity of water close to construction site will be monitored; if turbidity level increases are close to exceeding acceptable limits, the work will be suspended under direction of the environmental monitor until levels drop. • Contain material when working near water bodies; cofferdam, silt curtains, sediment traps and settling ponds • Removal of riparian vegetation should be minimised • No excavation or borrowing will be done without the appropriate plans, surveys, permits, and approvals in place • Where practical, existing borrow sites and associated roads, trails or cut lines will be used instead of developing new sites • Borrow sites for aggregate will be located in upland locations and separated from streams and lakes by a minimum 30 m wide buffer of undisturbed terrain in order to minimize potential for siltation • Borrow area will be staked to prevent accidental over-extension of the affected area	No residual impacts on the quality and clarity of water are expected from construction of the facility.	Yes
	Quality and Clarity of water may be affected by the operation of the facility, which would impact an important cultural and spiritual value for many communities	Operation	• Pre- and post-development monitoring for mercury in fish tissue and surface water is underway and will be continued into the early operational period. • Headpond created in association with the project will be relatively small and have well moving water compared to other hydropower projects where mercury enrichment has occurred • Water quality samples will be collected three times a year from within the impoundment, upstream and downstream of the facility, and analyzed for a variety of water quality parameters. Should monitoring identify that water quality is impacted, Xeneca will discuss the issue with regulators to determine if additional sampling is necessary and develop appropriate mitigation measures. • Erosion and sedimentation will be monitored to validate post development headpond sediment infilling, sediment transportation and channel dynamics, especially during high flow events.	Quality and clarity of water will be compared to pre construction condition and reported to Ontario MOE/MNR annually for each monitoring year. No residual effects on the quality or clarity of water are expected.	Yes
	Project construction may result in the removal of culturally significant trees in the inundation area	Construction	No culturally significant trees were identified within the inundation area. Dominant tree species along the shoreline areas are primarily comprised of Black Spruce and Balsam Fir.	Project construction is not expected to impact upon culturally significant trees.	No
	Construction may impact use of the area by waterfowl for foraging and nesting activities which could impact subsistence, harvesting, hunting and cultural activities of communities	Construction	• The proponent will ensure the communities are aware of the construction schedule for the project to minimize the potential for impact on subsistence, harvesting, hunting and other cultural activities. • Construction noise impact on waterfowl will be mitigated by ensuring construction takes place during appropriate timing windows. Impact on traditional activities will be mitigated through placement of signage, and public notifications.	The construction season is recommended to be limited to August 1st to April 15th annually to limit the potential for impact on migration, mating and nesting of bird species.	No

Environmental Component	Issue	Phase of Development	Mitigation	Resolution / Result	Residual Effect (Yes/No)
Traditional land or resources used for harvesting activities	Operation may impact use of the area by waterfowl for foraging and nesting activities which could impact subsistence, harvesting, hunting and cultural activities of communities	Operation	Mallard, common merganser and spotted sandpiper were detected in baseline studies. No specific mitigation or monitoring has been recommended for waterfowl. Impacts on waterfowl habitat including factors such as depth, velocity, oxygenation and aeration may be impacted immediately below the proposed structure. Operations will ensure minimum flow requirement are maintained and will mimic natural flow patterns during run-of-river operations.	Within the inundation area, additional habitat for waterfowl will be created. These additions should offset any losses of habitat for waterfowl habitat being lost below the dam. Hunting opportunities for waterfowl may be enhanced by the creation of the inundation area.	Yes
	Furbearing mammals may be impacted by fluctuating water levels in the headpond during the winter months and alteration of habitat resulting in a change in trapping which may impact traditional lifeways and economic resources of aboriginal peoples.	Construction and Operation	• No active First Nation traplines have been identified to Xeneca within the project area. • Appropriate timing of the initial inundation (early summer) will minimize mortalities on furbearing mammals (who may be denning in winter, and who would experience mortality if inundation is completed during winter). • Summer flooding will allow sufficient time for furbearers to re-establish new lodging, and for Beavers to gather feed piles prior to winter freeze-up. • Altered river flows could impact upon available food supply for furbearing mammals by impacting upon benthic invertebrate populations, especially within the inundation area. • Operational impacts may result from sudden fluctations in water during freezing which could result in flooding of dens. This is mitigated through the operations plan.	No additional monitoring or mitigation is recommended for furbearing mammals. If it is identified that First Nation trapping may be impacted, Xeneca will work with affected individuals to determine appropriate mitigations.	Yes
	Hunting, harvesting, foraging and trapping activities may be disrupted by construction activities (being unable to access site areas)	Construction	• Construction activities will take place mainly on private land. • Where crown land is impacted, all stakeholders will be notified of any access restrictions through placement of signage and through media notifications (ie. placement of information on project website). After construction, access controls will be removed.	Impact on traditional activities will be limited to the construction footprint and access will be reinstated following project development.	No
	Construction activities may impact food bearing plants and impact foraging and harvesting activities of some communities	Construction	Construction activities will take place mainly on private land and will be limited to the project footprint and transmission lines and road corridor. Some commonly found food-bearing plants are present within the study area (ie. Strawberry, Chokecherry, Red Baneberry), however the project footprint has not been identified to Xeneca as foraging or harvesting areas by any of the First Nation communities.	The impact of construction on First Nation foraging and harvesting activities has been considered and is thought to be negligible.	No
	Operation activities may impact food bearing plants and impact foraging and harvesting activities of some communities	Operation	Operation activities will impact aquatic areas only, and there are no known aquatic food-bearing plants (i.e. wild rice) that have been identified to Xeneca by First Nation communities.	The impact of operation on First Nation foraging and harvesting has been considered and is thought to be nonexistent.	No
	Fish species health and abundance may be impacted by activities related to construction of the facility impacting harvesting and subsistence activities of certain communities during specific times of the year	Construction	The Construction Monitoring Plan outlines mitigations to limit impacts on fish populations due to blasting, noise and vibration through construction BMP's (Land Development Guidelines for the Protection of Aquatic Habitat, DFO). These will include habitat monitoring, in-stream work windows to limit effects to fish at sensitive times, identification and relocation of fish stranded through dewatering, erosion and sedimentation controls, and other BMP's for environmentally sensitive work.	Impacts on fish species health and abundance during construction will be appropriately mitigated and should not result in significant impacts to fish populations.	Yes
	Fish species health and abundance may be impacted by activities related to operation of the facility impacting harvesting and subsistence activities of certain communities during specific times of the year	Operation	• Fish community sampling will be completed post-construction to obtain data on CPUE (catch per unit effort) and relative abundance, and to compare to pre-construction conditions and determine whether fish community and abundance have changed. • Fish species (mercury levels in fish tissue) will be monitored and the results will be submitted to MOE and MNR on an annual basis. Fish stranding, impingement and entrainment as a result of operations will be monitored on a regular basis and survey results will be submitted to MNR and DFO annually. • Ramping rates will be controlled to mitigate fish stranding, and engineering design factors will be utilized to mitigate fish entrainment. • Preventative measures will be utilized to reduce the entrainment and impingement of fish through proper engineered design of project components such as trash racks and screening, and management of flow velocities in the intake channel through the operation regime.	Should monitoring reveal changes in fish communities, abundance or health, additional mitigation or compensation strategies may be developed, or additional monitoring recommended. Operational adjustments may be warranted for issues related to fish stranding, impingement or entrainment.	Yes
	Habitat changes as a result of construction may result in changes in habitats of large game such as moose, bear and deer which communities rely on for food and other products	Construction	Temporary impacts to large game within the project footprint will include noise, human presence on the site and general disturbance within the project footprint. Those mammals with large territorial ranges such as White-tailed Deer and Black Bears are unlikely to be impacted by the Marter Project construction. No significant habitat for any mammal species (e.g. denning sites, scrapes and, rendezvous areas) was detected within the study area.	While impacts to terrestrial habitat in the footprint area, roads and transmission line routes are proposed as a result of clearing activities, loss of this small area of habitat does not constitute a significant loss in the region as a whole. No terrestrial mammals are anticipated to be adversely impacted.	Yes

Environmental Component	Issue	Phase of Development	Mitigation	Resolution / Result	Residual Effect (Yes/No)
Traditional land or resources used for harvesting activities	Habitat changes as a result of operation may result in potential impacts on two identified moose calving areas and on deer and bear populations, which communities rely on for food and other products	Operation	During moose calving, flows are at spring freshet high levels, thereby naturally forcing cows to calve on dry ground, above the high water mark. Calving areas will be maintained in a natural state because downstream water level fluctuations will not be significant, and will not fluctuate above the high water mark. The size of the project footprint and the home range of the species identified is large enough that no significant impacts on these wildlife populations are predicted. Impacts upon moose and deer populations are therefore deemed to be negligible. Bear populations will not be impacted because of the small project footprint, and the resulting loss of a small area of habitat, and the fact that aquatic fish and invertebrates are not a primary food source, since bears are omnivorous.	Habitat changes will not be significant enough to result in impacts to species that are used for subsistence purposes by First Nation communities. No monitoring or mitigation is recommended.	No
Employment	Impacts to aboriginal-run tourism operators on the waterway	Construction and Operation	No aboriginal tourism operators were identified on the waterway and no impacts to aboriginal tourism have been identified. If any are identified in the future, Xeneca will engage with them to determine the level of impact and monitoring measures will be developed if required.	Ongoing engagement and consultation with Aboriginal communities will continue after completion of the EA.	No
	Potential impact on employment of First Nation community members.	Construction and Operation	Xeneca has issued draft Letters of Intent and Term Sheets which include the offer of economic benefits that provide for preferential bidding for contracts during the construction and operation of the proposed project. Xeneca has also included a contracting and procurement policy as part of the Term Sheet that favours First Nations employment.	Xeneca will proactively explore employment opportunities with First Nation communities as part of ongoing consultations.	Yes
Lands subject to land claims	Timiskaming First Nation is preparing a Land Claim that includes site of Xeneca's hydro project.	Construction and Operation	Xeneca was made aware of the Timiskaming Land Claim at a meeting with Timiskaming First Nation. Xeneca is following up with TFN to determine the details of their land claim, however, as noted by TFN, much of the project falls within private lands. Xeneca has proposed partnership arrangements that acknowledge and incorporates treaty and traditional territorial claims as part of the proposed accommodation with TFN.	Ongoing engagement and consultation with Aboriginal communities will continue after completion of the EA.	Yes
	The Project site is located in an area where a land claim is on file between the Federal Crown and Nishnawbe Aski Nation which is the Grand Council of Treaty 9. An Agreement in Principle has been reached but no final agreement has been settled.	Construction and Operation	Xeneca proposes an accommodation as part of its economic benefits package with the identified First Nation communities that takes into account treaty and traditional territorial claims as part of the accommodations process.	Xeneca will monitor the land claim process and continue to engage with its local aboriginal communities to identify issues which may arise.	Yes
	The Project site is located in an area where there is a land claim on file between the Federal Crown and the Union of Ontario Indians which is the Grand Council of Robinson-Huron Treaty of 1850.	Construction and Operation	Xeneca proposes an accommodation as part of its B2B economic benefits package with the identified First Nation communities that takes into account treaty and traditional territorial claims as part of the accommodations process.	Xeneca will monitor the land claim process and continue to engage with its local aboriginal communities to identify issues which may arise.	Yes
Economic development	Business opportunities may be possible with nearby First Nation communities (i.e. Wahgoshig)	Construction and Operation	Potential impacts are beneficial.	Xeneca will proactively explore business opportunities with First Nation communities as part of ongoing consultations. Xeneca is open to developing equity partnerships and economic development opportunities with First Nation communities.	Yes
Other	Impact on First Nation access to the project area during construction	Construction	• Install temporary gates, fencing and signage during construction to limit unauthorised public access • Operational staff to monitor for signs of unauthorised access and report to appropriate local authorities/MNR • A schedule of activities will be posted to the project website, or sent out to communities in advance of construction periods	Privately owned lands, degree of access will be determined in land tenure agreements.	Yes
	Beaverhouse FN has concerns that there could be impacts on water quality that may impact upon communities downstream	Construction and Operation	• Water quality samples will be collected three times a year from within the impoundment, upstream and downstream of the facility, and analyzed for a variety of water quality parameters. Should monitoring identify that water quality is impacted, Xeneca will discuss the issue with regulators to determine if additional sampling is necessary and develop appropriate mitigation measures. • Erosion and sedimentation will be monitored to validate post development headpond sediment infilling, sediment transportation and channel dynamics, especially during high flow events. • pH, temperature and conductivity will be monitored in the field and the results will be compared to the pre-construction condition • Water quality monitoring will be limited to the zone of impact of the facility.	Low negative effect - impacts mitigated or eliminated wherever possible through implementation of mitigation measures	Yes

Environmental Component	Issue	Phase of Development	Mitigation	Resolution / Result	Residual Effect (Yes/No)
Other	Community concern regarding water level modifications downstream of the project during operations	Operation	• A downstream minimum environmental flow of 0.5 m^3/s is proposed to be continually released into the variable flow reach during modified run-of-river operations in order to maintain ecological habitat viability (note that during run-of-river operations, all flows entering the headpond are released downstream at the same rate). • During intermittent operations (facility shut down at night), the maximum turbine flow will be lowered from 16 m^3/s to 10.4 m^3/s, in order to minimize the variability of daily flows. • When natural inflows are above the minimum flow required to operate the turbine (4.8 m^3/s), the facility will operate continuously (i.e. flows in the variable flow reach will reach a daily minimum of 4.8 m^3/s, and not 0.5 m^3/s as would occur during intermittent operations).	Variations in flows in the variable flow reach will be inevitable. The proposed operating constraints will minimize the magnitude and frequency with which such variations will occur.	Yes
Land and Resource Use					
Access to inaccessible areas	Facilitation of access as a result of road upgrades or maintenance; can lead to increased use for recreation.	Operation	• Install gates, fencing and signage to limit unauthorised public access • Operational staff to monitor for signs of unauthorised access and report to appropriate local authorities/MNR	Privately owned lands, degree of access will be determined in land tenure agreements.	No
Navigation	The Blanche River is a recognized canoe route and construction/inundation/ variable flows may alter navigational access within the project zone of impact	Construction & Operation	• There is an existing portage north of the project site on private land • Consult with MNR and local boaters to determine periods of use and minimum flow and water level requirements to maintain downstream access • Provide for and maintain portage around the site and within the zone of impact to ensure safe passage and area to be inundated and variable flow reach (if required) • Portage routes will be subject to review under the Navigable Waters Protection Act • Install signage at private areas to alert recreational users of the river	Low negative impact anticipated - continuity of the river for navigation will be interrupted by the presence of the weir and low flows in the bypass reach, but recreational users will be provided with a portage trail to bypass these features.	Yes
Riparian rights or privileges	Impacts associated with inundation	Operation	• Upstream inundation will result from each design option. The proponent requires legal authority to flood or otherwise affect private lands. • Agreements with private landowners are either completed or are in the process of being completed.	No negative impacts anticipated; construction cannot begin without the execution of all required landowner agreements.	No
	Impacts associated with variable flows downstream of the facility	Operation	• Daily water level fluctuations downstream of the confluence between the Misema River and Blanche River will not exceed the magnitude currently experienced on the river.	Maintaining downstream water levels within the operational compliance band as per the *Lakes and Rivers Improvement Act* approvals and commitments made to affected riparian landowners.	No
Recreational use	Impacts to general recreational enjoyment quality at Krugerdorf Chutes - operational period	Operation	• Waterway access will be improved upstream of Krugerdorf Chutes	Upstream inundation will facilitate waterway access	Yes
	Impacts to general recreational enjoyment quality at Krugerdorf Chutes during construction period	Construction	• Krugerdorf Chute is situated adjacent to private land. During construction, some traffic diversions may be needed for a short period.	During construction period some short periods of traffic disruptions may be needed; proper signage and traffic flow control measures will be implemented.	Yes
	Township has expressed desire for addition of recreational infrastructure at project site	Construction & Operation	• Recreational amendments will depend upon agreements made with local landowners • Xeneca will work with the township and landowners to develop agreements on Recreational Improvements.	No impacts anticipated, though the outcome dependant on landowner tenant agreements	No
Angling, hunting opportunities	Projects fall within Bear Management Areas - effects on bear hunting	Construction & Operation	• Keep trails clear of slash • Minimize harassment of wildlife • Keep staging areas tidy and free of litter	No impact anticipated - impacts to the habitat of targeted species is anticipated to be negligible in proportion to the availability of suitable habitat surrounding the area.	No
	Project site is used by anglers	Construction & Operation	Access to project site is limited by presence of private land	Level of access will be determined in land tenure agreements. There will be increased access to the waterway upstream of the project site.	No
Trapping	Project fall within registered trap line areas	Construction & Operation	• Keep trap lines and trails clear of slash • Minimize harassment of wildlife • Keep staging areas tidy and free of litter	No impact anticipated - impacts to the habitat of targeted species is anticipated to be negligible in proportion to the availability of suitable habitat surrounding the area.	No
Baitfish harvesting activities	Project fall within registered commercial baitfish harvesting areas	Construction & Operation	• See Fisheries and Fish Habitat issues and mitigation above • Minimize alteration and turbidity of fish habitat	No impact anticipated	No

Environmental Component	Issue	Phase of Development	Mitigation	Resolution / Result	Residual Effect (Yes/No)
Views or Aesthetics	Potential impacts due to project construction and operation on Blanche River	Construction & Operation	• Facility will operate as a modified run-of-river facility (run-of-river operation during extreme high and low flow periods of the year (approximately 3-4 months per year)) • Intermittent operation would only occur during low flows, most of which occur during the winter months when the river is frozen and recreational uses are limited. • Minimize site clearing. Landscape to be rehabilitated at the construction site. • Apply Best Management Practices and traffic planning to contain construction equipment in designated work areas. • Use natural materials in the new structures wherever practicable.	No impact anticipated	No
An existing land or resource management plan	Forest resources on Crown Land in the vicinity of the site are allocated under a Sustainable Forestry License to Timiskaming Forest Alliance.	Construction	All forestry resources at project site are situated on private land.	No impact anticipated	No
Protected areas	No protected areas identified.	N/A	N/A	N/A	No
Mine claims	There is one mining claim within the vicinity of the project-Golden Dawn Minerals (80% held by Nass Valley Gateway).	Construction & Operation	• Xeneca has requested the Ministry of Northern Development and Mines (MNDM) to withdraw the surface rights within a specified area along the Blanche River from prospecting, staking out, sale or lease, under Section 35 of the *Mining Act*. • Agreements with the existing claim holder Golden Dawn Minerals and their licencee (Nass Valley Gateway Ltd.) have been reached (executed mining consent) regarding the affected lands. A request was issued by the proponent in July 2012 to MNDM to have the affected lands removed from the existing claim.	The proponent is awaiting confirmation that the affected lands have been removed from the existing claim.	No
Cultural Heritage Resources					
Archaeological sites	Disturbance or destruction to archaeological resources	Construction & Operation	• Stage 1 archaeological review identified areas of high archaeological potential within the project area • Areas of high archaeological potential identified during the Stage 1 assessment were subject to sub-surface testing as part of Stage 2 investigations. No archaeological or cultural heritage resources were located. • If archaeological or heritage resources are discovered during clearing or construction, work will be stopped until an archaeologist has assessed the find and a course of action is determined. • A Discovery Protocol will be prepared and implemented for project construction	As no archaeological or cultural heritage resources were located during the Stage 2 investigations, no impacts to such resources are anticipated.	No
Buildings or structures	Disturbance or destruction of heritage buildings or structures	Construction & Operation	• Neither Stage 1 or Stage 2 archaeological assessment identified any potential for built heritage structures within the project area.	No impacts anticipated	No
Cultural heritage landscapes	Disturbance or destruction of cultural heritage landscapes	Construction & Operation	• Neither Stage 1 nor Stage 2 archaeological assessments identified any potential for cultural heritage landscapes within the project area.	No impacts anticipated	No
Social and Economic					
The location of people, businesses, institutions or public facilities	Disruption to access for local landowners during equipment mobilization/demobilization	Construction	• limit disruptions to traffic flow by maintaining adequate access along travelled routes, and alternate access if required • monitor condition of gravel roads and if construction traffic is causing damage, ensure that repairs are undertaken promptly	During construction period some short periods of traffic disruptions may be needed; if so, signage will be installed and police notified in advance.	Yes
Community character, enjoyment of property or local amenities	Potential effects on property enjoyment, recreational water use, tourism values, aesthetic image	Operation	• The proponent requires legal authority to flood or otherwise affect private lands prior to construction • Downstream of the confluence with the Englehart River, any alteration in flow caused by operations at the Marter Township GS would not be discernable from existing conditions.	No impacts anticipated - proponent is required to secure landowner agrerements prior to issuance of permits to construct	No
Employment - Local and regional labour supply	Construction activities will support direct and indirect local employment	Construction	• Promote contract bids and offers of service from local communities including Englehart, Kirkland Lake and surrounding areas including First Nations	Positive impact - construction and operation represents a potential benefit to local communities	Yes
Public health and/or safety	Accidents and Malfunctions (Forest fires, equipment failure, accidental spills, etc. caused as a result of project activities)	Construction & Operation	• Project personnel will be prepared and be familiar with the site Emergency Preparedness Plan. Firefighting equipment will be available to all workers and the location of such equipment will be outlined in the Fire Preparedness Plan. • Locations of equipment and muster points will be advertised as necessary around the site • Uncontrolled fires will be immediately reported to the nearest fire emergency service and the MNR in the case of an uncontrolled fire on Crown land • Disposal and storage of waste will be into proper waste containers to prevent fires	No impacts anticipated – proper implementation of construction management plan and best management practices will mitigate impacts wherever possible.	No
	Impacts associated with facility construction	Construction	• Public access is restricted because land is privately owned • Site access will be maintained as per best management practices (fencing, signage, etc.) • Proper barriers and warning devices installed following construction to restrict public access to intake/tailrace areas during operation, including safety booms, fencing and signage	No impacts anticipated - proper implementation of construction management plan and best management practices will mitigate impacts wherever possible.	No

Environmental Component	Issue	Phase of Development	Mitigation	Resolution / Result	Residual Effect (Yes/No)
Public health and/or safety	Impacts for navigation and recreation associated with facility operation	Operation	• A public safety measures plan will be developed for the site to identify hazards and suggest mitigation measures to address identified safety issues • Proper barriers and warning devices to be installed following construction to restrict public access to intake/tailrace areas during operation, including safety booms, fencing and signage • A portage/hike trail around the facility will be provided by the proponent	No impacts anticipated - proper implementation of construction management plan and best management practices will mitigate impacts wherever possible.	No
	Known mine hazard. Abandoned Mine Information System (AMIS) # 08303 Sawka-Allard Mine in Lot 12, Concession 5 of Marter Township. This site hazard feature is reported to be a vertical shaft situated on the right bank of the Blanche River, 60 m upstream from the junction with the Misema River.	Construction	Review AMIS map provided by MNDM prior to project construction. Note that the exact location of the old shaft is unknown. Exercise caution within at least 500 metres of the location.	No impacts anticipated, there will be no work occuring within 500 m of the abandoned shaft.	No
	Requirement for safety fencing at the site once site is operational for protection of private landowners	Operation	Placement of appropriate safety fencing upon completion of construction phase	No impacts anticipated - proper implementation of public health and safety requirements	No
	Production of waste in and around work site	Construction & Operation	• Appropriate disposal containers will be available for the prompt disposal of waste • Full disposal containers will be removed to the appropriate waste disposal facility on a regular basis • Organic waste will be collected daily and stored in closed, animal resistant containers until disposed of at an approved waste disposal site • Keep staging areas tidy and free of litter • Bear awareness training will be provided to all project personnel.	No impacts anticipated - proper implementation of construction management plan and best management practices will mitigate impacts wherever possible.	No
Aesthetic image of the surrounding area	Powerhouse	Operation	• Powerhouse would be constructed on privately owned land, effect would be limited to what might be visible from waterway	Powerhouse will be a low level structure, would only be visible at close proximity	No
Built structures	Potential impacts to the Ontario Northland Transport Commission (ONTC) railway bridge located approximately 2.4 km upstream of the proposed dam site; impacts due to inundation under the High Dam option.	Operation	• The results of hydraulic modelling (including a sensitivity analysis) indicate that the proposed Marter Township GS will not result in appreciable changes to the existing water level, velocity, depth or other hydraulic conditions at the ONTC railway bridge for flows up to 1:100 year flood events under the High Dam option (the Low Dam option has a shorter headpond and will have no impact on the railway bridge)	No impacts anticipated.	No
Energy/Electricity					
Reliability	Voltage support	Operation	• Capacity of new power generation units are relatively small	Operation of facility in parallel with the existing power grid will provide minor impact on the overall power system reliability and power quality (voltage and frequency)	Yes
Electricity flow patterns	Power flow system	Operation	• Appropriate mitigation technical measures will be proposed in the control system of the power grid and new generation units if required	Operation of the new power generation units will redistribute power flow in the existing distribution system.	Yes
Other	Protection control settings	Operation	• Appropriate mitigation technical measures will be proposed in protection and control system of the power grid.	Operation of the new power generation units will affect existing protection and control settings in the distribution system.	No

7.3 IDENTIFIED POTENTIAL ECOLOGICAL EFFECTS

For discussion purposes, the natural environment effects are grouped into the following categories:

- Air Quality
- Erosion and Sedimentation
- Ice Scour
- Water Quality
- Species at Risk - Terrestrial
- Terrestrial Habitat and Species
- Migratory birds
- Moose calving areas
- Aquatic Habitat and Species
- Species at Risk - Aquatic
- Fish Entrainment and Turbine Mortality
- Fish Stranding

The assessment of the effect of the project on these attributes in each category is detailed in the following sections.

7.3.1 Air Quality

Impacts to air quality associated with the project (dust, odour, exhaust, etc.) are all expected to occur mainly during the construction phase of the project and will be curtailed during operation. Given the mitigative measures which will be taken, these impacts are anticipated to be both short term and minor, and are therefore not considered to be significant.

7.3.2 Erosion and Sedimentation

The Proposed Operating Plan for the Marter Township GS, presented in Annex I, allows for a limited amount of daily fluctuation of headpond water levels (maximum 1 m). To mitigate against shoreline erosion and associated potential impacts to aquatic habitat, civil structures and private property, the maximum daily fluctuation of water levels in the headpond was chosen to be less than the magnitude of seasonal and inter-annual fluctuation that has been occurring naturally in the river prior to the construction of the project.

Following a geomorphic assessment of the Blanche River within the upstream ZOI and the variable flow reach, it was concluded that the construction of the Marter Township GS may only add to processes that are already occurring in the river. The studied reaches are characterized by an alternating sequence of rapids/bedrock chutes and backwater areas; it is anticipated that the backwater areas will become larger and longer in the project headpond, and may therefore

experience a decreased ability to transport sediment. As such, an increase in sedimentation may occur at the upstream end of the headpond, as well as immediately upstream of the dam. Siltation may also occur at the smaller rapids that will be inundated by the creation of the headpond.

Some erosion of the bed and banks may occur in the upstream portion of the headpond, but due to the limited ability of the flow to transport sediment, any eroded material will likely be deposited within a short distance downstream, making the erosion and sedimentation impacts local in nature.

In the first 400 m downstream of the proposed dam, some erosion of finer bank material may occur, but the overall geomorphology of the channel will likely be maintained due to the channel being dominated by bedrock and boulders. Further downstream, where the banks and bed appear to have more clay, only minor erosion impacts are expected to result from dam operations.

The river reach downstream of Misema River confluence to the Englehart River confluence will see very little effects from the operation of Marter Twp project, as the Marter project is proposed to harmonize its operations with those of the Misema GS. Water level and flow fluctuation downstream of the Misema River confluence will not be altered significantly due to the operation of Marter Twp project.

Because of complications involved with cohesive banks and the presence of valley wall slope failures, monitoring of potential erosion impacts is recommended. Monitoring is proposed during the first five years of dam construction and operation and again in years 7 and 10. The proposed monitoring protocol is appended in Annex I (see the October 2013 Addendum #2 by Parish Geomorphic) and summarized in Section 12.2.

In order to minimize erosion impacts potentially resulting from rapid changes in flows and levels, both in the upstream and downstream ZOI, the proposed ramping rates of the generating station were increased from 20 minutes, as previously proposed in the Draft ER, to 60 minutes. Direct and immediate impacts associated with potential erosion and sedimentation resulting from operations (as well as construction) are not expected to be significant, and are expected to represent a low risk to fish and fish habitat.

As concluded in the geomorphic assessment report by Parish (Annex I), sedimentation and erosion regime of the river system will not be affected significantly by the construction and operation of the project. Also, a comprehensive monitoring has been developed to alleviate the any uncertainty of the assessment and analysis.

7.3.3 Ice Scour

Ice can have potentially serious ecological implications within a riverine system, both upstream and downstream of a hydro facility. Localized ice formation behind a dam, and the resulting backwater flooding and breakup during spring freshet, can have profound effects on bank morphology, substrate erosion, sedimentation, and vegetation removal. Ice dams behind the hydro facility can create narrowing of the river through induction of over-bankfull flooding. During freshet flows, break-up ice flowing downstream can scour substrate along erodible banks, increasing particulate loading of the waterway through sediment deposition as flows decrease and/or ice melts, thereby potentially decreasing surface water quality as a result. Spring breakup of ice can cause shoreline scour and ice jams on outside river bends. Due to the lack of historic data for the Blanche River on where (or whether) ice dams occur within the Project ZOI, it will be difficult to monitor alterations or additional impacts resulting from the proposed Marter Project. It may be preferential to continue standard water quality and sedimentation/erosion monitoring practices as outlined in Section 12.2, rather than to attempt to determine potential impacts due to specific ice related events. Where a particular ice damming event can be directly tied to the installation off the Marter Project (e.g. ice damming directly behind the dam structure), discussions with agencies should be undertaken to assess potential impacts and mitigation.

7.3.4 Water Quality Impacts - Construction Phase

Consideration was given to the effects of the project on surface water quality, including the potential use of the waterway as a potable water supply.

There are potential adverse effects on water quality (surface and groundwater) during construction due to erosion and sedimentation, accidental spills, clearing, backfilling, contouring and excavation. As a result, construction industry best management practices (BMPs) will be maintained during the construction program to prevent accidental spills, control erosion and sedimentation, and to manage any groundwater that must be removed from excavations. A preliminary sediment control plan has been developed and is presented in Annex II. Surface water quality testing will be continued post-construction to ensure that sedimentation is not occurring, and that all water quality parameters measured do not exceed baseline levels.

A cofferdam will be utilized to isolate the work area during construction and its use may cause the potential for excess sediment to be suspended and carried downstream by river flow. To minimize potential impacts, construction and removal of the cofferdam will take place during a low flow period, when no significant precipitation is expected. Appropriate timing windows will be developed in conjunction with MNR, to ensure protection of fish species during spawning and egg incubation times. Residual effects are not expected to be significant.

During construction, there is potential for spills or leaks of hazardous substances. Spill prevention and emergency fuel supply containment measures will be required within the facility throughout the operational period; mitigation measures are described in detail in Table 25.

7.3.5 Water Quality Impacts - Operations Phase

During operation, potential effects on water quality may occur as a result of changes in water chemistry, sedimentation, water temperature or accidental spills.

Methyl Mercury

The upstream inundation of 13.1 ha of land and the submergence of vegetation and organic material has the potential to cause the release of methyl mercury into the aquatic environment, due to lowered flow rates in the headpond area, which are conducive to creation of anoxic conditions. To gauge the potential impact of the proposed operation on methyl mercury levels in the Blanche River, a pre and post-construction monitoring program has been established in the project area, which will enable the proponent to advise agencies regarding changes in mercury levels during the first few years of operation, when methyl mercury release is expected to be highest.

Mercury methylation can be minimized by limiting the amount of flow manipulation. For the Marter Township GS, holdbacks of water are proposed to be relatively small and of short duration (< 24 hours), which will restrict the conditions under which methyl mercury formation generally occurs.

Based on these factors, it is unlikely that the proposed Marter Project will have significant impacts on methyl mercury levels in the Blanche River. The potential for mercury methylation can also be mitigated by removing standing timber within the inundation area prior to flooding. Surface water monitoring is proposed for post-construction as required by MOE guidelines. Methyl mercury levels will be monitored under the proposed Surface Water Monitoring Plan summarized in Section 12.2.

Sediment

Sedimentation will be limited through facility operation as described in Section 7.3.2. The following water quality parameters may be affected by the development:

- If appreciable sediment accumulates in the impoundment of the project area, turbidity and total suspended solids (TSS) could increase during peak flows if sediment flushes. The concentrations of metals and nutrients adsorbed to sediment would also increase, possibly resulting in reduced water quality;

- Mercury concentrations could increase independently of suspended sediment as a result of water impoundment alone, but mercury transport out of the impoundment would be markedly higher with increased suspended sediment, as mercury – like other metals – adsorbs to sediment.

Methyl mercury levels and suspended sediment will be monitored under the proposed Surface Water Monitoring Plan summarized in Section 12.2.

Temperature

Following a screening assessment of potential impacts to water temperature, the following determinations were made:

- The increase in surface water resulting from the inundation of land would be less than 1% of the total open water area of the watershed;
- Compared to existing conditions, the residence time of water in the headpond of the proposed Marter Township GS would typically a) be less than a day and b) occurs in the evening and nighttime hours, thus it would not likely result in a significant increase in water temperature under normal conditions;
- The average depth of the proposed headpond was calculated to be approximately 4.3 metres. Due to the shallow average depth of the headpond, and based on the proposed conceptual design of the intake structures to the GS, the water released from the Marter Township GS would not likely be heated to a large extent as a result of thermal stratification in the headpond.

Following development, the water temperature in the impoundment will warm only slightly from increased river surface area, but may result in lower dissolved oxygen concentrations as the water's capacity to retain oxygen decreases. However, the magnitude of warming will be limited by the facility's operation as described above, and the headpond will remain a free-flowing system; as such any reductions in dissolved oxygen are anticipated to be limited.

Therefore, the propensity for changes to water temperature in the Blanche River as a result of the Marter Township GS is low, and no mitigative measures are required. Additional details are presented in the memorandum titled, "Screening Assessment - Water Temperature - Blanche River (Marter Twp)" (April 16, 2013) in Annex IV of this report.

Accidental Releases

Spill prevention and containment measures will be put into place throughout the construction and operational periods to mitigate the potential for a spill into the waterway. Workers will be adequately trained in the implementation of a spill response plan, and will be trained in the proper handling and storage of hazardous materials.

A complete description of pre-development water quality and post-development monitoring is included in Annex IV. Practices to be implemented for spill prevention and clean-up are outlined in the Construction Management Plan in Annex II.

7.3.6 Species at Risk - Terrestrial

Bobolinks have been confirmed at Lot 12, Concession 5 of Marter Township, which is located within the ZOI of the proposed project. It is unlikely this species will be impacted by inundation, however hydro line or access road construction which is proposed to run at the southern boundary of their confirmed habitat will cause a potential for disturbance. Potentially significant bobolink breeding habitat is situated in the central field area and in stands of deciduous trees along the margins of the field area as denoted on Figure 22 of the Mitigation and Recommendations Summary Report in Annex III. Road and hydro line construction must avoid the field, and trees should be left undisturbed in this area. Construction activities adjacent to Bobolink habitat should be performed outside of the Bobolink breeding and nesting season (May 15-July 31st) to avoid potential disturbances.

Maximum speed limits should be imposed on all access roads to minimize the potential of road mortalities, and any fatalities should be reported to MNR. A post-construction monitoring plan should include surveys during each year of construction as well as for three years post-construction to determine whether population numbers remain stable. Additional mitigation strategies could include conversion of all or part of adjacent agricultural fields to a natural meadow state which could increase the amount of nesting habitat available for breeding pairs, offsetting any loss of habitat resulting from "edge effects" of construction. Additional post-monitoring mitigation is recommended if these measures are required to be implemented.

Bobolink survey results (and any additional monitoring results which arise from mitigation measures) will be integrated into a comprehensive monitoring report which will be reported annually.

Canada Warblers were confirmed in 2011 in the Marter Project area in the vicinity of the proposed hydro line and access road construction area. Further targeted surveys failed to detect this species; therefore general mitigative measures for breeding birds will be imposed on the site. These measures will incidentally protect Canada Warbler if it is present for all or part of its lifecycle. No further monitoring or mitigative measures beyond those already proposed for breeding birds are recommended for Canada Warbler.

7.3.7 Terrestrial Habitat and Species

A total of 13.1 hectares of forested land will be cleared to accommodate structural footprints, and to reduce the potential for methyl mercury contamination in the inundation area. Removal of the mature trees within the inundation and footprint areas for the Marter Project is not

avoidable. Retention of trees within the inundation area could result in an increase in overall methylation of mercury due to long-term flooding of woody material, and MOE BMPs generally recommend mature trees be removed by a qualified forestry company in order to salvage timber and reduce the amount of vegetation in the watercourse post-inundation.

No monitoring or mitigation is recommended for the removed trees at this time. If replanting is required to replace trees on the landscape, Trees Ontario and the MNR should be contacted to ensure the appropriate species are used.

7.3.8 Migratory Birds

Migratory birds and nests of migratory birds could potentially be impacted by construction activities on site, in particular for the proposed roadway and transmission line corridor. Adult birds and fledgling mortality could potentially rise with increased road traffic. Construction activities for the proposed project should take place outside of the migration, mating, and nesting seasons for migratory birds and it is recommended that the construction window be limited to August 1-April 15th annually. A speed limit should be enforced on access roads.

7.3.9 Moose Calving Areas

Two moose calving areas are known to exist within the downstream zone of influence; one is located at the south-west corner at the confluence of the Misema and Blanche Rivers, and the other is on the west bank of the Blanche River at Stuart's Rapids. Being located within the project's zone of influence, the calving areas could be impacted by reduced flows or by water level fluctuations, which would make them less attractive to calving cows or make it easier for predators to reach the cows and calves.

Calving usually occurs from mid-May to early July, when flows in the river are typically at high spring freshet levels. During these high flows, the Marter Township GS would likely be operating in run-of-river mode, and there would be no effect on flows and levels at the calving areas compared to existing conditions. If flows are relatively lower during a particular calving period, such that the Marter Township GS is operating in modified ROR mode, operations at the facility would not affect water levels at Stuart's Rapids by a significant amount (< 20 cm) during normal operation.

As flows and levels at the moose calving areas will not be significantly impacted by normal operations at the Marter Township GS (and in many years may be completely unchanged), no significant impact to moose calving areas is anticipated.

7.3.10 Aquatic Habitat and Species

Those effects and management strategies associated with the operation of the facility, especially in the headpond and variable flow reach, are summarised in the Proposed Operating Plan presented in Annex I and in the Environmental Characteristics Reports and the Mitigation and Recommendations Summary Report which are presented in Annex III, and have been summarized in Table 25 of this main report.

Inundation Area

At the upper end of the inundation area (2.7 km upstream of the proposed dam site) a series of rapids may be adversely affected (lost) for species including, but not limited to, Walleye and White Sucker; Lake Sturgeon, however, have not been confirmed above Krugerdorf Chutes, so the loss of the rapids in the inundation area will not impact this species. In addition, benthic habitat will experience an increase in water depth which will adversely impact the functionality of these beds. Loss of the potential spawning habitat and benthic habitat in the fast water series at the upper extent of the inundation area will not be mitigable. The proponent will discuss potential offsets with MNR and DFO, post-EA in the regulatory permits and approvals stage of development.

The depth of water upstream of the proposed dam will increase as a result of inundation, causing disturbance of fine particulate material along the shorelines, and flooding and submergence of vegetation within the inundation area. Beaver and River Otter feeding habitat may be impacted by flooding, as will den and lodge structures. Inundation may result in making additional shoreline trees available for consumption, which may benefit Beaver. To mitigate against the potential for drowning of individuals in their lodges, the initial filling of the headpond should occur in the early summer rather than the winter. Inundation of habitat for shoreline furbearing species and terrestrial and benthic invertebrates is unavoidable. There will be a loss of existing mammal dens and lodges within the inundation area.

Krugerdorf Pool

Alteration to flows and volumes as a result of the proposed Marter Project could have adverse impacts upon spawning and other life cycle stages of species which utilize the habitat within the Krugerdorf Chutes pool. During the spawning season, where water temperatures are between 4 to 12°C for Walleye, 8 to 16°C for Lake Sturgeon, there is sufficient flow within the Blanche River to provide high flow volumes and velocities for spawning, due to the naturally high volumes of water present in the system at that time. The proposed operational strategy of the proposed Marter Project will not adversely impact these flows during early spawning stages, as the facility will be operating in run-of-river during those events.

Post-spawn fluctuations in flow volume, direction and depth would potentially dewater eggs or affect larval drift. Reduction in natural flows available could result in adverse impacts due to reduced flow volumes during the later stages of the spawn.

To mitigate this, the Marter Township GS will revert to run-of-river operations when water temperatures reach 4°C (the temperature at which staging for Walleye typically begins) and will continue operating as such until water temperatures reach 18°C (end of spawning for Sturgeon). Post-spawn, during the egg incubation and larval development for these species, the GS will continue run-of-river operation to ensure sufficient flows are available for eggs and hatched larva for 32 days post- 18°C. Post-incubation, flows will be restricted to maximum daily fluctuation of 5 m^3/s in the Krugerdorf Pool, and no intermittent operations will take place. A summary of the operating restrictions, including water temperature triggers and the objectives of each stage of the restrictions, are presented in Tables 26 and 27 below.

The habitat in the pool at the base of Krugerdorf Chutes will be impacted by the proposed Marter Project due to the powerhouse operations, especially during low flow periods. The penstock will run along the western bank of the Krugerdorf Chutes and empty through the powerhouse and tailrace into the pool, slightly west of the current pool entry point. This diversion will cause Krugerdorf Chutes to be bypassed. Some fluctuations in depth can be expected in the pool and downstream due to powerhouse operation. Water levels within the pool may be reduced during times when water is held back at the dam.

Benthic invertebrate habitat and spawning habitat for Walleye and Lake Sturgeon will be affected, but will be mitigated by maintenance of run-of-river flows during key spawning and life cycle stages, and by tailrace design modifications. A sixty-minute ramping rate will be applied to all operations, and tailrace location will minimize the dewatered area and confine the backwater effect to the northernmost portion of the channel (which is comprised of bedrock). The tailrace will be designed to minimize substrate erosion. During the larval drift stage, cycling of flows will ensure the sustainability of the pool below Krugerdorf Chutes for fish species that rely on this habitat for a portion of their life cycle. Compensatory flows (0.5 m^3/s) will be provided through Krugerdorf Chutes to sustain ecological components in the pool below the chutes during periods of spring spawning and early life cycle stages.

Post-construction monitoring of flow volumes and velocities will be completed to verify that modelling assumptions are correct, and ensure potential adverse impacts to spawning and benthic invertebrate habitat are avoided. Monitoring will employ fish spawning surveys in the first three years post-construction, to ensure that provision of run-of-river flows will result in suitable habitat conditions. Benthic monitoring will also be employed in the pool area. Benthic and fisheries monitoring results will be reported to regulatory agencies as part of an annual post-construction monitoring report.

Reach 1

From Krugerdorf Chutes to the Misema River confluence, flow reductions and water level fluctuations will result from proposed operations. During flow reductions, aquatic habitat will be dewatered, and depth will be reduced. Habitat losses will be most significant in shallow water areas, at the margins of the river; however the steeply sloped nature of the topography in this portion of the river will only result in minor losses of habitat and are not considered significant.

One exception to this will be at the bedrock outcrop located 1.8 km below the proposed dam site, where habitat loss will be confined to shallow water over bedrock. A ramping rate of one hour will mitigate impacts in this reach to create more natural conditions. No additional mitigation or compensation is proposed for this reach.

Reach 2

From the Misema confluence to the Englehart River (excluding Stuart's Rapids), operation of the Marter Project will not result in changes to the magnitude of daily water level fluctuations, but the frequency of water fluctuations will increase. Modified run-of-river operations at Misema GS already result in water level impacts to existing aquatic habitats in this reach of the river. To mitigate any cumulative impacts, modified run-of-river operations will attempt to harmonize timing with Misema GS, as outlined in Section 5.4. No aquatic habitat losses are expected, and no further mitigation or monitoring is recommended.

At Stuart's Rapids, a known spawning site for Walleye, Lake Sturgeon and other species, beginning at 4°C (staging for Walleye) and running through to 18°C (end of spawning for Sturgeon), the proposed Marter Project is committed to run-of-river operations to ensure all available flow is maintained in the system. Post-spawn, during the egg incubation and larval drift stages for these species, the GS will continue run-of-river operation to ensure sufficient flows are available for eggs and hatched larva. During the post-incubation period, the facility will begin modified run-of-river operations, but daily fluctuations will not exceed a magnitude of 5 m^3/s and no intermittent operations will occur (i.e. the facility will not shut down at night, and by extension will not reduce nighttime flows to 0.5 m^3/s). Monitoring of spawning, incubation and larval drift will occur on an ongoing basis and adaptive management discussions with MNR and DFO will occur if detrimental impacts are observed.

At Stuart's Rapids, the depth and wetted width in the spawning habitat located at the pool immediately downstream of the rapids will be carefully monitored throughout key life cycle stages to ensure sufficient flows and depths are maintained within this area after the project is constructed. To mitigate any impacts, flows will be maintained within existing conditions, and fluctuations will not exceed levels currently measured below the Misema GS. Spawning habitat will be maintained during key spring life cycle stages by operating in run-of-river mode.

A telemetry receiver unit to monitor Sturgeon movement will be installed at Stuart's Rapids. The unit will monitor sturgeon movement in the vicinity of the rapids and will be uploaded by the proponent and provided to agency personnel on a regular basis. Monitoring of spawning, incubation and larval drift will occur to verify that the proposed operating flows are sufficient to maintain natural life cycle stages within the reach below Krugerdorf Chutes; if there are detrimental impacts, adaptive management discussions will be required with MNR and DFO. Operating restrictions for Walleye spawning are outlined in Table 26.

Table 26: Operating Restrictions for Walleye Spawning

Walleye Life Stage	Water Temperature / Timing	Temperature / Cumulative Time Trigger	Mode of Operation	Objective
Beginning of Walleye staging and spawning	4°C	4°C	Begin run-of-river	Ensure staging is not affected by operations.
Beginning of active Walleye spawning	6°C	-	Continue run-of-river	Ensure spawning is not affected by operations.
End of active Walleye spawning, ongoing egg incubation	12°C*	-	Continue run-of-river	Ensure eggs are not dewatered by operations.
Walleye egg incubation time from end of spawning until hatch	Allow 18 days after spawning	-	Continue run-of-river	Ensure eggs are not dewatered by operations.
Hatch, yolk sac absorption and continued larval development until fry are free swimming	Allow additional 15 days after hatch	-	Continue run-of-river	Ensure recently hatched larvae are not stranded due to operations.
Fry disperse into open water	-	33 days after 12°C is reached*	End run-of-river, begin normal summer operations	Allow transition to other operations once fry have dispersed from the spawning grounds.

*If water temperature rises very slowly, the range of spawning temperatures (6 - 12°C) may be experienced for several weeks. In these instances, Walleye may spawn at lower than normal temperatures and spawning will end before the temperature reaches 12°C. Alternatively, they may reabsorb their eggs and not spawn. In such circumstances, consultation between Xeneca Power and the MNR may result in a conclusion being reached that the spawn is over (based on known conclusion of spawning elsewhere in the area). In this case, egg incubation time would be considered to start at the time this determination is made.

Aquatic Amphibians

Fluctuations in water volume and depth downstream of the facility may have an adverse impact on aquatic amphibians such as Eastern Newt, especially on early life cycle stages (eggs, tadpole), should shoreline sections be dewatered for an extended period. Proposed spawning flows will provide run-of-river conditions during spring and early summer, and may act to maintain wetted width and depth across such areas until eggs have hatched and the more motile tadpoles are able to move with receding flows.

7.3.11 Species at Risk - Aquatic

The rapids and falls present at Stuart's Rapids, and at Krugerdorf Chutes (the Project site), are probable barriers to upriver passage by Lake Sturgeon. As such, the construction of a hydroelectric dam should not have any appreciable impact on upriver passage by Lake Sturgeon populations in the Project zone of influence. At the upper end of the inundation area, a series of rapids may be adversely affected however, as Lake Sturgeon have not been confirmed above Krugerdorf Chutes, loss of this upstream spawning habitat will not impact on this particular species.

However, water level fluctuations as a result of flow retention and release at the dam site could potentially impact downriver Lake Sturgeon populations. Spawning habitat for Lake Sturgeon has the potential to be affected, but will be mitigated by maintenance of run-of-river flows during key spawning and life cycle stages, and by tailrace design modifications. The tailrace will be designed to minimize substrate erosion and the dewatered area and confine the backwater effect to the northernmost portion of the channel (which is comprised of bedrock). During the larval drift stage, cycling of flows will ensure the sustainability of the pool below Krugerdorf Chutes for Sturgeon and other fish species that rely on this habitat for a portion of their life cycle.

Due to their limited swimming capabilities, Lake Sturgeon larvae require sufficient flows during the larval drift phase in order to travel out of the pool below Krugerdorf Chutes and down the Blanche River. To mitigate impacts to larval drift, a compensatory flow of 0.5 m^3/s will be passed down Krugerdorf Chutes during the spring; additionally, the facility will provide a continuous release of flow downstream with a maximum daily fluctuation of 5 m^3/s until the end of larval drift (39 days after 20°C is reached).

During regulator consultation meetings, regulators have accepted the proposed spawning period operations shown in Table 27 below as acceptable to mitigate potential adverse impacts to Lake Sturgeon during spawning and early life cycle stages.

Post-construction monitoring of flow volumes and velocities will be completed to verify that modelling assumptions are correct, and ensure potential adverse impacts to spawning habitat are avoided. Monitoring will employ fish spawning surveys in the first three years post-construction,

to ensure that provision of run-of-river flows will result in suitable habitat conditions. Lake Sturgeon monitoring results will be reported to regulatory agencies as part of an annual post-construction monitoring report.

Table 27: Operating Restrictions for Lake Sturgeon Spawning

Lake Sturgeon Life Stage	Water Temperature / Timing	Temperature / Cumulative Time Trigger	Mode of Operation	Objective
Beginning of Lake Sturgeon spawning	8°C	8°C	Begin run-of-river	Ensure spawning is not affected by operations.
Beginning of active Lake Sturgeon spawning	11°C	-	Continue run-of-river	Ensure spawning is not affected by operations.
End of active Lake Sturgeon spawning, ongoing egg incubation	18°C	-	Continue run-of-river	Ensure eggs are not dewatered by operations.
Lake Sturgeon egg incubation from end of spawning until hatch	Allow 14 days after spawning, or when water temperature reaches 20°C	-	Continue run-of-river	Ensure eggs are not dewatered by operations.
Hatch, yolk sac absorption and continued larval development	Allow additional 18 days after hatch	-	Continue run-of-river	Ensure recently hatched larvae are not stranded due to operations.
Beginning of Lake Sturgeon larval drift	-	32 days after 18°C is reached, or 18 days after 20°C is reached	Begin modified operations with a maximum daily range of 5 m^3/s and no intermittent operations	Facilitate lake sturgeon larval drift.
Lake Sturgeon larval drift	Allow 21 days for larval drift	-	Continue the modified operations with a maximum daily range of 5 m^3/s and no intermittent operations	Facilitate lake sturgeon larval drift.
End of Lake Sturgeon larval drift	-	56 days after 18°C is reached, or 39 days after 20°C is reached	End special operating restrictions for Lake Sturgeon larval drift, begin normal summer operations.	Allow normal summer operations once ample time has been given for drift in the downstream zone of influence.

7.3.12 Fish Entrainment and Impingement and Turbine Mortality

A discussion of identified potential effects and general mitigation measures in regards to fish entrainment and impingement is presented in Annex III.

Operational and behavioural management measures that can be considered to mitigate the potential risk to fish upstream of the intake is presented in Table 25.

Entrainment occurs when fish travelling downstream toward a hydro facility are swept into the turbines or other portions of the water control structure. Often, smaller fish simply pass through the facility and into the tailrace channel; however some fish suffer turbine mortality during entrainment. Mortality can be caused by injury due to mechanical damage, pressure changes, cavitation damage and shearing damage.

Impingement refers to the "pinning" of larger fish against the trash racks or other screening installed to prevent natural debris from entering the facility, due to the pressure exerted by oncoming water flows. Probability of fish entrainment or impingement is based on the number of fish that encounter intake flows, the size of the fish, and the manner in which they react to these flows. Engineering design factors also play a role.

Adult fish should be capable of escaping entrainment or impingement by swimming against the intake flows for short bursts of speed, until they become fatigued. Studies of swimming speeds of common fish and their resulting "fatigue critical velocity" are summarized in the Mitigation and Recommendations Summary Report (Annex III).

Mitigation measures to reduce the entrainment and impingement of fish relate to preventative measures (trash racks, screening), and management of flow velocities in the intake channel, either through turbine and facility design, or through operation regime.

A single Kaplan-style turbine or two Kaplan turbines will be employed for the Marter Project, with trash rack design spacings of 48 mm, and estimated entrance velocities of 0.75 m/s. In conjunction with the known fish species encountered on the Blanche River, these design specifications have a low likelihood of resulting in impingement and/or entrainment of fish.

7.3.13 Fish Stranding

The Marter Project is expected to operate intermittently, which has raised agency concerns regarding the potential for fish stranding to occur between the project site and the Misema Generating Station, located just upstream of the confluence of the Blanche and Misema Rivers. Research on stranding of salmon id species has revealed that rapid drawdowns result in higher incidences of stranding and beaching. Due to the lack of comparative research on other fish species, it is difficult to predict the potential effects of rapid drawdown on other fish species in the ZOI of the Marter Township GS project.

It is known that the magnitude, frequency, duration and sequencing of ramping rates greatly impact the potential for stranding, with more rapid flow fluctuations having a greater potential for stranding. The shape and depth of the river channel and the water temperature influence a fish's ability to escape dewatered areas. Drawdowns during winter or in cold temperatures can result in a greater incidence of stranding events.

To evaluate how the bathymetric morphology of the Blanche River may influence the potential for fish stranding, six (6) surveyed cross sections were reviewed based on the presence of key potential stranding factors: shoreline slope; shallow depths and promontory features. Water depths within the sections were modeled at a flow of 4.8 m^3/s, and the proposed Qea low flow of 0.5 m^3/s to determine changes in overall depth and wetted width, and to examine areas where shoreline slope, bottom topography and littoral zone structure may increase the potential for stranding at low flows (0.5 m^3/s) within these reaches.

It was found that the shoreline topography of the Blanche River has relatively steep slopes, therefore it is not anticipated that shoreline topography will increase stranding potential. At cross-section -0303, located near the base of Krugerdorf Chutes, monitoring was recommended due to the shallow banks and proximity to the tailrace area. Section -0483 has a high potential for stranding and monitoring here is also recommended to assess stranding on the west shore during low-flow events. Several cross sections (-0360, -0483 and -0779), show a potential for stranding due to substrate exposure when flows are at the proposed Q_{EA} of 0.5 m^3/s. At Section -0483, which crosses one of the narrowest sections of the reach, at a bottleneck immediately below the Krugerdorf pool, flows at 4.8 m^3/s will result in dewatering of the western side of the channel. Section -0779 occurs within a narrow section of the reach between Marter and Misema GS, just below a 90 degree bend in the river. At 0.5m^3/s, several individual channels are created by exposure of substrate, forming a series of narrow, shallow channels through this riverine section. Reduction in flows within this part of the reach poses the highest potential for stranding events.

Based on analysis of surveyed cross sections within the reach Marter to Misema GS, it is evident that there are areas which may potentially result in fish stranding during rapid flow reduction events. Options for mitigation should be considered to reduce this potential. Monitoring should be undertaken to ensure that mitigation measures are successful, to confirm potential stranding incidents so that stranded fish may be salvaged, or under worst case conditions, so that conditions leading to the stranding event can be analyzed in hopes of avoiding future strandings. It is recommended that monitoring of high-potential areas be undertaken in the initial weeks/months post-construction. Where stranding incidents are reported, monitoring will continue in years 1, 2 and 3 post-construction.

Monitoring should be undertaken on the west shore (~5:1 slope) at Section -0303 for potential stranding during decreasing flow events due to highly structured littoral zone habitat, shallow slopes along both shorelines and the potential for channel development under low flow conditions.

Monitoring of the area at Section -0483 for stranding events should be undertaken due to shallow shoreline slopes, structured littoral zone areas and evidence of potentially exposed substrate creating pools or channels during low flow events. Foot searches would be used, at least during early operation cycles, to determine whether the concern for potential stranding at this site is legitimate.

Routine monitoring is recommended for stranding events at Section -0779 due to shallow water depths and potential channel formation at low flows. Given the slightly more remote location of this section, foot surveys on several occasions post-construction may be the only feasible method of monitoring this site for stranding events.

Studies have shown that a "conditioning reduction" period reduced potential stranding events due to fluctuations in flows. It is recommended that the Marter Project provide a combination of an initial "conditioning" decrease in flow rate, followed by a slow final fluctuation in flow down to Q_{EA}. Upon confirmation of a fish stranding event, reports will be provided to agencies as quickly as possible, to ensure salvageable fish are returned to the waterway successfully. Analysis of the cause of any stranding events should be discussed with regulatory agencies, and reporting will be required on an annual basis, as part of an annual monitoring report.

7.4 IDENTIFIED POTENTIAL SOCIOECONOMIC EFFECTS

For discussion purposes, the socio-cultural-economic identified environmental effects are grouped into the following categories:

- Access
- Navigation
- Public health and Safety
- Civil structures and private property
- Operations at nearby dams and waterpower facilities
- Potable water supply
- Area aesthetics
- Noise
- Employment and economy
- Land use/Land tenure
- Fishing/Hunting
- Trapping
- Canoeing/Kayaking

- Snowmobiling
- Mining
- Archaeological resources

The assessment of the identified effects and mitigation measures of the project on these categories is provided in the following sections.

7.4.1 Access

Currently there is no public access to the Blanche River in the vicinity of the project area as the land is privately owned. However, the headworks can be access by road and ATV trail through private land. Further, there is potential for boat or canoe access downstream of the project location but is dependent on permission from private landowners.

For construction and ongoing purposes, the site would be accessed for development by travelling approximately 12 km north of Englehart on Hwy 11, followed by approximately 6 km on Aidie Creek Garden Road.

It was noted during the PIC that most people use the Blanche River for canoeing/kayaking/ recreational use. Therefore, to mitigate this concern a portage trail will be constructed in the project site to provide recreational users a means of bypassing the weir. This trail will be constructed along the eastern bank of the river and equipped with appropriate signage to notify users. During construction, a safety boom will be placed across the river to direct users towards the portage trail. Further safety measures and signage are noted in Section 3.4.3 of this report.

7.4.2 Navigation

The river is not used for commercial navigation; but it is a designated Canoe Route and used for recreational purposes. The construction of a dam across a navigable waterway will require an approval by Transport Canada under the *Navigable Waters Protection Act*.

A portage is currently located upstream of the project site, within the upper ZOI of the proposed facility (see Figures 1a and 1b). The portage will be partially inundated as a result of the creation of the headpond. However, as the portage is intended to provide users with a means to bypass the nearby rapids, and as these rapids will be inundated (and thus converted into an easily navigable, flatter water surface), the ability of users to navigate that area will not be negatively impacted by the Marter Township GS project.

As noted in Section 3.4.3, a portage trail will be built during the construction phase of project development, which will allow recreational users of the river to bypass the spillway. Access through the portage trail will be temporarily interrupted during blasting activities in order to ensure public safety; the trail will be checked and the access points guarded until blasting activities are complete.

Signage and safety booms will be installed during project construction to safely direct users towards the trail. Stairs and railings will be installed along the steeper sections of the trail in order to ensure the safety of the trail users.

7.4.3 Public Health and Safety

Construction of the proposed project poses potential public safety concerns as the area is used for various recreational activities. Primary potential public health and safety risks are generally related to construction traffic, noise and dust levels and restrictive measures for access to the site construction area. Workers safety is subject to the requirements of the Ontario Ministry of Labour, *Occupational Health and Safety Act* O. Reg. 213/91 pertaining to construction sites. This Regulation includes references to other programs including the National & Ontario Building Codes, WHMIS (Workplace Hazardous Materials Information System) and MSDS (Material Safety Data Sheet) and OSHA guidelines (Occupational Safety and Health Association). First aid equipment will be maintained on site throughout the construction period and workers will be trained to deal with emergency situations. Worker safety at the site would be ensured via strict adherence to the Ministry of Labour occupational health and safety regulations pertaining to construction sites. First aid equipment will be maintained on site throughout the construction period and workers will be trained to deal with emergency situations.

Accidents or malfunctions during the construction phases of the hydroelectric dam or other project related infrastructure could be hazardous to the public. These accidents vary in severity and could include accidental spills, excessive dust levels or dam failure. The primary protective measure for accidents and equipment malfunctions is the safe design, construction, operation, and maintenance of the Marter Township GS project and ancillary facilities. Furthermore, contingency planning will be implemented to deal with emergency situations (e.g. the Spill Response Plan to deal with accidental spills of materials followed by adequate spill containment and cleanup materials).

A Fire Preparedness Plan will be prepared for project personnel to adhere to. Petroleum products, fuels, oils and lubricants will comply with industry best practices and regulatory requirements with regard to shipping and handling. Equipment and vehicles will yield the right of way to wildlife, and proper care and caution will be taken when operating vehicles to avoid wildlife collisions. Project personnel will monitor weather forecasts and identify storms that may affect the project.

Where reasonable, similar practices can be used effectively to either eliminate or mitigate the hazards to the public during the operating (post-construction) stage of the project. Moreover, post-construction monitoring will ensure that all equipment is tested and inspected thoroughly to complete safety requirements. Monitoring would occur routinely on a frequency determined within the review process and may include both visual and comprehensive inspections.

A more comprehensive public health and safety assessment for the project will occur during the detailed design stage in accordance with the scope, tenets and responsibilities outlined in Xeneca's Waterway Public Safety Management Guideline (WPSMG); the communication of this plan to the public is an element of this process.

Impacts to air quality associated with the project (dust, odour, exhaust, etc.) are all expected to occur mainly during the construction phase of the project and will be curtailed during operation. Given the mitigative measures which will be taken and the remote nature of the project, these impacts are anticipated to be both short term and minor, therefore not significant.

Additionally, as a modified ROR facility, the project will generate sustainable and renewable energy and, in combination with other green energy projects, contribute to the improvement of air quality and public health in Ontario by facilitating and compensating for the shutdown of coal-fired generation facilities throughout the province.

Those effects and management strategies associated with the construction and operation of the facility are summarized in the proposed Operating Plan presented in Annex I and in the Construction Management Plan presented in Annex II.

7.4.4 Civil Structures and Private Property

Under the High Dam option, the inundation area will extend 2.4 km upstream, coming within close proximity (< 100 m) of a railway bridge owned and operated by Ontario Northland Transport Commission. This distance was determined through hydraulic modeling studies, as summarized in the January 3, 2013 HEC-RAS report in Annex I. Following discussions with Ontario Northland Transport Commission, a sensitivity analysis of the earlier model was conducted, in which it was again concluded that the proposed Marter Township GS will not result in appreciable changes to the existing water level, velocity, depth or other hydraulic conditions at the Ontario Northland Transport Commission railway bridge for flows up to 1:100 year flood events (see the April 9, 2013 report, "Blanche River Site #3 – Marter TWP, Effect on Ontario Northland Transport Commission Railway Bridge", in Annex I).

7.4.5 Operations at Nearby Dams and Waterpower Facilities

As noted in Section 2.2.1 above, the closest dams and waterpower facilities to the proposed Marter Township GS are the Misema GS on the Misema River, and the Chalton Dam on the Englehart River.

Being located on a tributary of the Blanche River, and neither receiving flows from nor sending flows to the Marter Township GS, operations at the Misema GS will not be affected by either the headpond or the flow releases from the proposed project. While much attention is placed on the potential cumulative effects of the two facilities operating in modified ROR mode, these impacts will be mitigated by incorporating special operating constraints into the operating plan

for the Marter Township GS (outlined in Section 5.4; cumulative effects are discussed in Section 10 below). The development of the Marter Township GS in itself will not impose restrictions on operations at the Misema GS.

Both the Charlton Dam and the proposed Marter Township GS are located on different rivers (Englehart River and Blanche River, respectively), upstream of the confluence point between the two rivers in question. Being located outside the project's ZOI, and more than 25 km upstream of the Englehart/Blanche confluence, the Charlton Dam will not be impacted by the development of the Marter Township GS. Therefore, no mitigative measures are proposed.

7.4.6 Potable Water Supply

Consideration was given to the effects of the project on surface water quality, including the potential use of the waterway as a potable water supply.

There are potential adverse effects on water quality that may occur during construction due to erosion and sedimentation, accidental spills, clearing, backfilling, contouring and excavation. As a result, construction industry BMPs will be maintained during the construction program to prevent accidental spills, control erosion and sedimentation, and to manage any groundwater that must be removed from excavations. A preliminary Erosion and Sediment Control Plan was developed for the construction phase of all of Xeneca's proposed undertakings, and is included in Annex II of this report. Spill prevention and emergency fuel supply containment measures will be required within the facility throughout the operational period; mitigation measures are described in detail in Table 25.

7.4.7 Area Aesthetics

Preserving the natural aesthetics of the waterway and surrounding area is being considered as part of the proposed development. The area is popular with anglers, recreational paddlers, and recreational vehicle users. Seasonal residences are also located in proximity to the project site.

Preserving the natural aesthetics of the waterway and surrounding area is being considered as part of the proposed development. The area is popular with anglers, recreational paddlers, berry harvesters, and other recreationalists. Several permanent residences are also located in proximity to the project site. The Township of Chamberlain has suggested that picnic tables and interpretive signage be developed along the river bank to increase the recreational use of the area following installation of the hydro dam; however this potential use will have to be discussed and agreed upon with private landowners in the vicinity.

Short term impacts to the local aesthetics will be apparent during the construction phase of the project. Construction activities such as clearing, grading, blasting, pouring concrete, and installing structural steel and machinery will disturb the solitude of the site and be deemed unpleasant to

those expecting a more natural outdoor experience. However, restoration activities (seeding, tree planting, etc.) will enhance site aesthetics after construction is complete.

Maintaining or enhancing vegetative buffers between the river, roads, and any ancillary works will be considered during detailed design to preserve the aesthetic quality of the area; proposed mitigation measures are provided in Table 25.

7.4.8 Noise

A hydroelectric GS is largely unobtrusive in terms of its impact on the noise environment within the region it occupies. Most of the noise that occurs through operations originates inside and is mitigated by a powerhouse. The more likely source of noise associated with this project is during the construction phase. Moreover, sound levels within the area will also be influenced by natural processes such as the falling of water over rocks.

More information is provided in the Initial Environmental Sound Study Marter Hydro-Power Plant, Marter Township, Ontario by Howe Gastmeier Chapnik Engineering presented in Annex V. A more detailed noise impact assessment will occur during the detailed design stage, as a precursor to the eventual application for an Environmental Compliance Approval (Noise) for the facility under Section 9 of the *Environmental Protection Act*.

The initial acoustical analysis noted above for the proposed Marter Township GS was completed using predicted sound emission levels and acoustical modeling to assess the potential impact of a single electrical transformer associated with the proposed site, with respect to the guidelines of the MOE.

In Ontario, the MOE guidelines form the basis of an environmental noise assessment. Specifically publications NPC-205, Sound Level Limits for Stationary Sources in Class 1 and Class 2 Areas (Urban), and NPC-232, Sound Level Limits for Stationary Sources in Class 3 Areas (Rural). The area surrounding the proposed facility is likely best categorized as a Class 3 environment, due to its remote location and the absence of human development or roadways. For equipment that could operate during both daytime and nighttime hours in a Class 3 environment, the "exclusionary minimum" limit is 40 dBA at any sound sensitive points of reception in the vicinity. Additionally, some types of sound have a special quality which may tend to increase their audibility and potential for disturbance or annoyance. For tonal sound, such as that typically emitted by electrical transformers, the MOE guidelines stipulate that a penalty of 5 dBA is to be added to the measured source level. In the subsequent analysis, a tonal penalty has been applied to the sound of the transformer.

One (1) sound sensitive point of reception within 1000 m (exclusionary setback distance requiring sound level assessment) of the facility has been identified, referred to as POR1. The predicted sound emissions have been assessed conservatively at POR1 which is located 405 m from the

facility as listed in Table 28, below. Figure 1 of the Environmental Sound Study (in Annex II of this ER) shows the predicted energy-equivalent sound level contours resulting from the sound emissions of the proposed facility.

Table 28: Predicted Equivalent Hourly Sound Levels, L_{EQ} [dBA]

Point of Reception	MOE Sound Level Limit	L_{EQ}
POR1 (405m From Transformer)	40 dBA	19 dBA

The analysis indicates no evidence of potential adverse impact relative to the noise guidelines of the MOE. Therefore, no mitigative measures have been proposed.

7.4.9 Employment and Economy

Construction and operation of the project will generate a positive economic effect in the Town of Englehart and Townships of Chamberlain & Marter resulting in opportunities for employment of community members and sourcing of construction materials. Similar employment opportunities will also exist for the FN and Aboriginal community members.

Economic benefits will include employment during construction, expenditures on materials, equipment and services and contribution of renewable energy to the Provincial supply mix. The proposed Marter Township GS will have a total installed capacity of approximately 2.1 MW. Waterpower creates jobs, generates revenue for the taxpayers of Ontario, and is the longest lived and most reliable source of renewable electricity:

- Direct economic activity to build a waterpower project in Ontario is approximately $5 million per megawatt. Generally, about half of this amount is spent locally (approximately $10.5 million in the case of this project), in procuring construction labour & materials, consulting and legal services, trucking and other services such as accommodation, food and fuel.
- Direct job creation (construction) is estimated to be approximately 21,000 person hours of work. Indirect job creation is estimated to be approximately 31,500 person hours of work supporting the project and personnel.
- A significant return to the people of Ontario paid through Gross Revenue Charges (GRC) and provincial and federal income taxes. The annual generation rate for the Marter Township GS is estimated to be 9.17 GWh, and the gross revenue charge for the Marter Township GS is estimated to be $44,030.00 per annum, or $1,320,912 over 40 years (including a 10-year tax holiday). Return to the people of Ontario will continue past the 40 year contract, likely as long as the facility is in operation.

- Waterpower lasts. Many power plants built in the early 1900s are still in operation and with regular maintenance and upgrades can last for many generations. In comparison, the life span for other sources of renewable power is: nuclear 40 years, wind 20 years, solar 20 years.

7.4.10 Fishing/ Hunting

Recreational fishing opportunities may be slightly impacted during construction by limited access to the project site for safety reasons. As a result of operational activity, changes to river flow patterns and safety concerns, recreational fishing near the proposed powerhouse development will be adversely impacted. Opportunities for recreational fishing will remain both upstream and downstream from the site location.

Hunting activities in the area might be temporarily interrupted during the period of construction as animals tend to avoid areas of high human activity. There will also be limited hunting opportunities in the immediate vicinity of the construction areas in order to protect the workforce. Warning signs will be placed along the entrance to the secondary access roads, alerting hunters of construction work at the sites. Following construction, improved access along the roads near the project will allow easier access for local hunters. No significant changes to large mammal populations are expected due to the project since abundant similar habitat is available in the surrounding area.

Hunting opportunities may be enhanced during the operational period due to improved access to potential hunting areas along the new access road and transmission line corridors. Operation of the facilities is not anticipated to have any significant adverse impact on game species; therefore, no negative impact on hunting success as a result of operation of the project is anticipated to occur.

7.4.11 Trapping

No impacts on existing traplines in the project area are anticipated. Impacts to the habitats of targeted species are expected to be negligible in proportion to the availability of habitat in the surrounding area. To mitigate any potential impacts, traplines and trails will be kept clear of slash, and harassment of wildlife will be minimized. Staging areas will be kept tidy and free of litter.

7.4.12 Canoeing/ Kayaking

The Blanche River is a recognized canoe route and construction, inundation and variable flows may alter navigational access within the project ZOI. The existing portage north of the project site on private land may be impacted. Xeneca commits to consult with local boaters and the MNR, to determine periods of use of this portage and the minimum flow and water level

requirements to maintain downstream access. To mitigate the effects, Xeneca will ensure safe passage around the site, and install signage at key areas, to alert recreational users of potential dangers. It is anticipated that the portage route will be reviewed under the *Navigable Waters Protection Act*.

7.4.13 Mining

Xeneca's operations are not expected to have any negative effect on mining activities since mining companies are subject to a '400' surface rights reservation around all lakes and rivers (OMNR, 2010c). Provisions, like the latter, in the *Mining Act* allow for the development of renewable energy (waterpower) on mining claims. Generally, waterpower and mining operations are compatible as they can share infrastructure (power lines/roads) and that a readily available source of reliable power to the mine is seen as a significant advantage. Therefore, no mitigative measures have been proposed.

7.4.14 Snowmobiling

A snowmobile trail reaches to within 400 m of the site from both the south and east. No known impacts on the snowmobile trail have been identified and no mitigations are recommended.

7.4.15 Archaeological Resources

Stage 1 and 2 archaeological and cultural heritage assessments were completed for the proposed project area, and no archaeological or cultural heritage resources were located as a result of the work. The reports are available for review in Annex V. If the scope of development were to change, further archaeological work may be required. There are no known risks to proceeding with the project, therefore, no mitigative measures have been proposed.

If archaeological or heritage resources are discovered during clearing or construction, work will be stopped until an archaeologist has assessed the find, and a course of action is determined. A Discovery Protocol will be prepared and implemented for project construction. The archaeological fieldwork for the project was approved by the MTCS. The clearance letter is presented in Appendix C.

7.5 Identified Aboriginal Community Considerations and Concerns

The Marter GS project will have a positive, long-term impact on the FN communities involved in a business to business relationship with Xeneca due to the economic benefits that will accrue to these communities over the life of the project. These economic benefits are expected to translate into improvements in standard of living, education and health care for those communities.

Xeneca also acknowledges to work together with those communities to address the rights, culture and concerns of all Aboriginal people since consultation with affected communities is a part of Xeneca's ongoing policy.

The project area is located within the Treaty 9 region. Timiskaming FN is preparing a land claim that includes the area of the proposed project. The Project location is located in an area where a land claim is on file between the Federal Crown and Nishnawbe Aski Nation which is the Grand Council of Treaty 9. An Agreement in Principle has been reached but no final agreement has been settled. Until a final agreement has been reached, it is unclear what, if any impacts the project may have on the land claim area. Xeneca will monitor the land claim process and continue to engage with its local aboriginal communities to identify issues which may arise. Since the Marter Township GS project is located primarily on private lands, it is unlikely that these land claims will impact on the project.

Impacts on FN traditional lands are being resolved through ongoing consultation with the affected communities, which will continue after completion of the EA. Potential exists for positive impacts on FN economies and businesses. Xeneca is investigating business opportunities with FN communities as part of ongoing consultations.

7.6 Specific Consultation Issues and Resolutions

Discussion on some of the key issues raised during the consultation process is presented in Section 6. A summary of the specific issues identified during the regulatory agency, public and Aboriginal consultation process is presented in tabular format as Table 25. Table 25 identifies how resolution to each identified issue has been or may be resolved, and whether any outstanding issues or concerns remain. The issues are grouped based on the environmental components which could be affected by the undertaking.

7.7 Consideration of Accidents and Malfunctions

The EA of the undertaking must consider the effects to the environment if an accident or malfunction were to occur during the construction or operation of the project. Consideration must be given to such events as spills and leaks, power failures, toxic substances, and worker and public health and safety. As the mitigation measures and BMPs detailed in Table 25 of this document will be implemented, it is unlikely that spills and leaks would occur during the construction period. The engagement of an environmental monitor to oversee construction activities should further ensure the prevention of releases of deleterious substances to the environment. Additionally, the health and safety of all contractors and construction crews on provincial lands will be subject to *Ontario Regulation 231.91* which governs construction projects in Ontario. The health and safety of operational staff at the generating station will be governed by the *Occupational Health and Safety Act*. Public access will be restricted during the construction activities at both the GS site and along the connection line.

Toxic substances are rarely employed at hydroelectric GS. Generally, only small quantities of normal industrial lubricants are required for operation. A diesel generator for emergency power supply at the generating station will be required, necessitating the installation of an above-ground storage tank (AST) for diesel fuel. The installation and operation of the AST will be subject to the *Technical Standards and Safety Act*, Ontario Reg. 213.01 (fuel oil).

A power failure at the GS will result in the inability of the powerhouse to discharge water which will affect project revenues. Should this power failure occur during peak flow periods, the proponent will be responsible for ensuring that peak discharge can be passed downstream through the bypass channel.

During unscheduled/emergency shut-downs of the facility, minimum flows will continue to be provided into the river downstream of the Marter Township GS. This can be accomplished through the installation of a powerhouse bypass valve that will allow a continuous release of flow until normal operations resume. Alternately, a special turbine-generator package can be used that would allow the continued passage of flow through the turbines even during an emergency shut-down. The final selection of either the powerhouse bypass valve or the turbine-generator package will occur during the detailed engineering design process.

In order to mitigate the risk of forest fires caused by trees falling/growing into the power lines, the proponent will be responsible not only for clearing the power line right-of-way (ROW) of vegetation during construction, but also to ensure that the ROW remains cleared during the operational stage of the project.

8. EFFECTS OF ENVIRONMENT ON THE PROJECT

The project team has also considered how the environment may affect the project. These effects may be of short duration such as a heavy rainfall event, or longer duration such as the anticipated effects of climate change on the project.

Disruptions in energy connection and generation would result in decreased economic returns for the proponent. The powerhouse will be equipped with a back-up generator to ensure that station service power can be restored to the facility should a grid failure occur. However, the facility cannot be operated (i.e. generation cannot recommence) until the electrical grid can accept the power generated. In this situation no water would be passed through the powerhouse but would be directed through the by-pass designed into the facility. The design of this by-pass will represent at least the pre-project capacity of the natural rapids. This aspect of the approval process will be dealt with after the environmental assessment process is completed, as the detailed engineering design is being finalized.

8.1 PRECIPITATION AND FLOODING

Operations during extreme events, such as floods, droughts and safety emergencies may need to deviate from the normal operating parameters to manage flows and mitigate impacts. Proposed operational changes in response to floods are described in Section 5.6.

It should be noted that the facility is not designated to mitigate the effects of naturally occurring events such as floods and droughts as it will be operating in run-of-river mode during such events. However, there are circumstances where the existence of the facility can either aid in managing such an event or pose an additional risk. The flood risk aspects are managed, in part, through the government approval under the *Lakes and Rivers Improvement Act* of the engineering plans and specifications for the design of the facility. The purpose of this process is to ensure that the flood passage capacity of the facility is adequate and that the risk to property and public safety is duly considered. This aspect of the approval process will be dealt with after the environmental assessment process is completed and when the detailed engineering design is being finalized.

8.1.1 Extreme Winter Conditions

Extreme cold weather conditions may lead to a build-up of ice at the intake that could necessitate plant shut-down and an interruption to the delivery of electricity to the provincial supply grid.

8.1.2 Extreme Summer Conditions

Drought conditions could necessitate the shut-down of the facility and an interruption to the delivery of electricity to the provincial supply grid as a result of reduced flows within the river.

8.1.3 Lightning Strikes

A direct hit on the facility may lead to facility shut-down and prolonged interruption to the delivery of electricity to the provincial supply grid.

8.1.4 Accidental Fires

Lightning strikes, as well as, manmade fires could result in uncontrolled forest/brush fires which may interrupt the operation of the facility and the delivery of electricity to the provincial supply grid. Forest fires may also limit the ability of personnel to access the facility to conduct operations or maintenance. During both construction and operation of the facility, the proponent will follow the *Forest Fire Prevention Act* with respect to debris management and will secure the required burning permits where needed.

8.1.5 Earthquakes

The continual shifting of large segments of the earth's crust, called tectonic plates, causes more than 97% of the world's earthquakes. Eastern Canada is located in a relatively stable continental region within the North American Plate and, as a consequence, has a relatively low rate of earthquake activity. Nevertheless, large and damaging earthquakes have occurred here in the past, and will inevitably occur in the future.

The project area is located in the Northeastern Ontario Seismic Zone, and according to Natural Resources Canada (http://earthquakescanada.nrcan.gc.ca) this zone experiences a very low level of seismic zone activity. NRCan reports that from 1970 to 1999, on average, only one or two magnitude 2.5 or greater earthquakes were recorded in this area, and two magnitude 5 earthquakes (northern Michigan and northwest of Kapuskasing) have occurred in this region. The location of the project in this low seismic activity area presents a low potential for the facility to be affected by this type of geological event.

8.1.6 Climate Changes and Other Weather Related Effects

According to the National Round Table on the Environment and the Economy (www.nrtee-trnee.com), widespread impacts are expected across Canada as a result of increasing temperatures and moisture levels. Among the changes predicted, the Round Table is forecasting that Ontario will experience increased disruptions to energy generation and connection. Among the many predictions offered, there includes a doubling in the frequency of extreme rain events and increasing costs to providing community services in Canada during the 21st century.

9. RESIDUAL ADVERSE EFFECTS AND SIGNIFICANCE

A summary of the specific issues identified during the regulatory agency and public consultation process is presented in Table 25. Those issues that have been marked as a residual effect in the last column in Table 25 have been carried over to Table 29: Residual Environmental Effects and Significance (found below) for further analysis.

Section 4.3.1 of the Class EA for Waterpower Projects (January 2014) provides criteria for assessing significance:

<u>Value of Resource</u>

The value or importance placed on the resource by stakeholders or society at large as determined through consultation and the consideration of overall environmental requirements. The value may be related to the relative abundance of the resource, the interest of participating parties, etc.

High Value of the resource which will be affected is considered high. The resource has some form of regulatory status or protection, generates a high level of public interest, is considered scarce or is essential to the integrity of the regional economic and/or ecological environment.

Medium Value of the resource which will be affected is neither high nor low. The resource is acknowledged as an important part of the regional ecological and economic environment, but is not essential. Interest has arisen through consultation but has not been a focus issue.

Low Value of the resource which will be affected is considered low. The resource is abundant, does not significantly contribute to the regional economy or environment, and no concerns have arisen through consultation.

Magnitude

The magnitude of an effect refers to the extensiveness, scale, degree, or size of that effect. As the assessment of this criterion has a high potential to be subjective/qualitative, and measures of scale vary between effects, each level of magnitude has several specific measures for the means of clear definition. When possible, pre-established quantitative scales of magnitude specific to a given effect should be used and referenced. Mitigation measures and strategies or conditions may affect the magnitude of a residual effect to some degree.

High Effect will exceed regulatory or guideline criteria and/or remains controversial by the majority of stakeholders and/or is deemed high by expert judgment/historic precedence, and/or exceeds the carrying capacity of the surrounding ecosystem.

Medium Effect will noticeably change or exceed existing conditions. The change remains within regulatory or guideline criteria, is capable of being absorbed by the surrounding ecosystem, and is not considered controversial by the majority of stakeholders.

Low Effect will only be evident at or slightly above existing conditions, will be well within the carrying capacity of the surrounding ecosystem, and will have low social impact as shown through public consultation.

Geographic Extent

The geographic area over which the effect would occur. This can relate to either a linear distance (km) or area (km^2), depending on the issue or effect being described.

<1 Effect will be limited to less than 1 km (distance/area) from the project site
1-10 Effect will be limited to between 1 and 10 km (distance/area) from the project site

11-100	Effect will be limited to between 11 and 100 km (distance/area) from the project site
101-1,000	Effect will be limited to between 101 and 1,000 km (distance/area) from the project site
1,001-10,000	Effect will be limited to between 1,001 and 10,000 km (distance/area) from the project site
>10,000	Effect will be extend beyond 10,000 km (distance/area) from the project site

Frequency and Duration

The frequency of when an effect might occur intermittently over a given period of time. Generally, events that occur less frequently or for a more limited period of time are considered less significant.

Frequency:

<11	The effect will occur less than 11 times per year
11-50	The effect will occur between 11 and 50 times per year
51-100	The effect will occur between 51 and 100 times per year
101-200	The effect will occur between 101 and 200 times per year
>200	The effect will occur more than 200 times per year
Continuous	The effect will occur continuously

Duration:

<1	The effect will occur for less than a month
1-12	The effect will occur for between 1 month and a year
13-36	The effect will occur for between 1 and 3 years
37-72	The effect will occur for between 3 and 6 years
>72	The effect will occur for more than 6 years

Reversibility

Whether or not the effect is reversible if the activity or component of the project which is causing the effect is halted, altered or removed. Irreversible impacts are considered more significant than reversible impacts.

Reversible	Existing conditions would be re-established if the cause of the effect is halted, altered or removed.
Irreversible	Existing conditions would not be re-established if the cause of the effect is halted, altered or removed. In the event that reversibility is unknown, the effect should be considered irreversible.

Waterpower facilities typically have a lifespan in excess of 80 years and can be refitted to last decades longer. The longevity of waterpower projects mean that, once constructed, they are more likely to be upgraded or refitted rather than decommissioned. As a result, when considering the reversibility of residual effects, the physical footprint of the facilities and the inundation area are considered as permanent and irreversible. Additionally, those project components or activities that are required for maintenance or public safety are likewise considered permanent while the facility exists. If these components were to be decommissioned and removed it is conceivable that the environment would return to its natural state but, when compared to the timeframe for other project effects, these effects are not considered reversible. Other activities or effects which could be modified or halted through changes to management or operations or the implementation of further mitigative measures are considered reversible.

Ecological/Social Context

The significance of an effect may be considered more or less significant when considered against an environment that is untouched or has been previously impacted by other activities or issues. The focus during the determination of the significance of the effect is on the change brought about on the existing environment by the project. Therefore, changes to a relatively pristine environment are considered more significant than changes to a previously impacted environment.

Relatively Pristine	The value or resource being affected has not been previously influenced
Previously Impacted	The value or resource being affected has already been influenced by other source(s)

Likelihood of Effect

Some mitigation measures may address the potential of residual effects by reducing the likelihood of their occurrence rather than by reducing the magnitude of the effect.

High	The effect is highly likely to occur
Medium	The effect may occur
Low	The effect is still unlikely to occur

By applying and considering all of the listed criteria, residual effects can be classified as either **Not Significant**, or **Significant** within the context of the project and the environment in which it is proposed. The project may also have residual effects which are considered **Positive** which should be considered and weighed against the potential significant adverse effects.

An assessment of the residual effects (including the positive impacts) of the proposed undertaking are presented in Table 29.

Table 29: Residual Environmental Effects and Significance

Environmental Component	Issue	Residual Effect (Yes/No)	Value of Resource	Magnitude	Geographic Extent (km)	Duration (months) or Frequency	Reversibility	Ecological/ Social Context	Likelihood of Effect	Significance
General Natural Environment										
Air quality	Noise from operation of electrical generator and transformer at powerhouse and electrical connection	Yes	High	Low	< 1	Continuous	Reversible	Relatively Pristine	High	Not Significant
	Exhaust emissions from equipment and vehicles	Yes	High	Low	1-10	13-36	Reversible	Previously Impacted	High	Not Significant
	Odour	Yes	High	Low	< 1	13-36	Reversible	Relatively Pristine	Low	Not Significant
	GHG Offsets	Yes	High	Low	> 10,000	Continuous	Reversible	Previously Impacted	High	Positive
	Dust emissions from construction activities and vehicles	Yes	High	Low	1-10	13-36	Reversible	Relatively Pristine	High	Not Significant
Water quality (surface and groundwater)	Surface water - general construction activities along shoreline of waterway at facility	Yes	High	Low	1-10	13-36	Reversible	Relatively Pristine	Low	Not Significant
	Surface Water - In-water works construction and removal of the cofferdam: potential for excess sediment to be suspended and carried downstream by river flow	Yes	High	Low	11-100	1-12	Reversible	Relatively Pristine	Low	Not Significant
	Contamination from spills or leaks of hazardous substances	Yes	High	Low	1-10	13-36	Reversible	Relatively Pristine	Low	Not Significant
	Surface water - Fluctuation of water levels in the inundation area upstream and fluctuation of flows downstream caused by intermittent operation of facility - increase in suspended sediment, especially clay, due to erosion or ice scouring	Yes	High	Low	1-10	possible for up to 9 months of every year	Reversible	Relatively Pristine	Low	Not Significant
	Upstream inundation may alter water quality (methyl-mercury and heavy metals) in reservoir	Yes	High	Low	11-100	37-72	Irreversible	Relatively Pristine	Medium	Not Significant

Environmental Component	Issue	Residual Effect (Yes/No)	Value of Resource	Magnitude	Geographic Extent (km)	Duration (months) or Frequency	Reversibility	Ecological/ Social Context	Likelihood of Effect	Significance
Species at risk (SAR) and their habitat	Potential impacts to the main pool area immediately below Stuart's Rapids (identified by MNR as significant habitat for spawning Lake Sturgeon (*Acipenser fulvescens*))	Yes	High	Low	11-100	Frequency dependant on operational strategy established for project	Reversible	Relatively Pristine	Low	Not Significant
	Bobolink (*Dolichonyx oryzivorus*) confirmed in open fields near access road route	Yes	High	Low	11-100	13-36	Reversible	Relatively Pristine	Low	Not Significant
Terrestrial wildlife (numbers, diversity, distribution)	General disturbance to habitat during construction and maintenance	Yes	Medium	Low	11-100	Continuous	Reversible	Relatively Pristine	High	Not Significant
	Loss of terrestrial habitat in the footprint of the built structures and headpond	Yes	Medium	Low	1-10	Continuous	Irreversible	Relatively Pristine	High	Not Significant
	Construction effects on potentially significant wildlife habitats, including Bobolink nesting habitat	Yes	High	Low	1-10	Continuous	Reversible	Relatively Pristine	Medium	Not Significant
	Loss of vegetation and terrestrial wildlife during powerhouse construction activities - clearing, grubbing and stockpiling	Yes	Medium	Low	1-10	13-36 Continuous	Irreversible	Relatively Pristine	High	Not Significant
	General disturbance to wildlife	Yes	High	Low	11-100	During construction period and then once every few years for maintenance	Reversible	Relatively Pristine	Medium	Not Significant
Natural vegetation and habitat linkages	Effects on vegetation and habitat during connection line and access roads construction and right-of-way (ROW) maintenance	Yes	Medium	Low	11-100	Continuous	Reversible	Relatively Pristine	High	Not Significant
	Access road and connection line construction - habitat fragmentation, increased predation and introduction of invasive species	Yes	Low	Low	11-100	Continuous	Reversible	Relatively Pristine	High	Not Significant

Environmental Component	Issue	Residual Effect (Yes/No)	Value of Resource	Magnitude	Geographic Extent (km)	Duration (months) or Frequency	Reversibility	Ecological/ Social Context	Likelihood of Effect	Significance
Aquatic and Riparian Ecosystem										
Shoreline Dependent Species	Loss of habitat for aquatic mammals (River Otter and American Mink confirmed)	Yes	Medium	Medium	1-10	< 1	Reversible	Relatively Pristine	High	Not Significant
Wetland Dependent Species	Impacts on habitat of reptile and amphibian species resulting from project inundation	Yes	Medium	Medium	1-10	< 1	Reversible	Relatively Pristine	High	Not Significant
Fish Habitat	Potential impacts to Lake Sturgeon spawning habitat in downstream ZOI due to variable flows	Yes	High	Low	< 1	1-12	Reversible	Relatively Pristine	Low	Not Significant
	Potential impacts to Walleye spawning habitat in downstream ZOI due to variable flows	Yes	High	Low	< 1	1-12	Reversible	Relatively Pristine	Low	Not Significant
	Loss of spawning habitat for walleye and white sucker at the rapids in the upper extent of project inundation	Yes	Low	Low	< 1	Continuous	Irreversible	Relatively Pristine	High	It is expected that offsetting measures will reduce the significance of this residual effect to "Not Significant"
	General impacts to fish habitat during construction activities in or near water bodies	Yes	Medium	Low	< 1	13-36	Reversible	Relatively Pristine	Low	Not Significant
	Construction of intake and water conveyance structure and the temporary loss of habitat related to the construction of the cofferdam.	Yes	Low	High	< 1	1-12	Reversible	Relatively Pristine	High	Not Significant
	Potential effects on habitat and spawning from dewatering operations	Yes	High	Low	< 1	< 11	Reversible	Relatively Pristine	High	Not Significant
Benthic Habitat	Impacts to benthic habitat in proposed headpond area	Yes	Medium	Medium	1-10	Continuous	Irreversible	Relatively Pristine	High	It is expected that offsetting measures will reduce the significance of this residual effect to "Not Significant"
Fish movement	Potential for fish stranding between the Marter Township GS and the confluence with the Misema River due to fluctuating flows	Yes	Medium	Medium	1-10	Continuous	Reversible	Relatively Pristine	Medium	Not Significant

Environmental Component	Issue	Residual Effect (Yes/No)	Value of Resource	Magnitude	Geographic Extent (km)	Duration (months) or Frequency	Reversibility	Ecological/ Social Context	Likelihood of Effect	Significance
Fish injury or mortality	Fish impingement against the trashracks or entrainment into the turbine resulting in injury or mortality	Yes	High	Low	<1	Continuous	Irreversible	Relatively Pristine	High	Not Significant
Erosion and sedimentation	Operation - Increased shoreline erosion, ice scouring and sediment deposition due to inundation and water level fluctuations	Yes	Medium	Low	11-100	possible for up to 9 months of every year	Irreversible	Relatively Pristine		Not Significant
Water levels, flows and movement (surface water)	Increase in water level and residency time in headpond	Yes	High	Medium	1-10	Continuous	Reversible	Relatively Pristine	High	Not Significant
	Variation in flows within downstream variable flow reach - Blanche River between the Marter Township GS and the confluence with the Misema River	Yes	Medium	Low	1-10	Continuous	Reversible	Relatively Pristine	Medium	Not Significant
	Variation in flows within downstream variable flow reach - Blanche River between the confluence with the Misema River and the confluence with the Englehart River	Yes	Medium	Medium	11-100	Continuous	Reversible	Previously Impacted	High	Not Significant
	Increase in the frequency and magnitude of peaks in flows/levels in the Blanche River downstream of the confluence with the Misema River	Yes	Medium	Medium	11-100	Continuous	Reversible	Previously Impacted	High	Not Significant
Drainage, flooding and drought patterns	Alteration from natural patterns	Yes	Medium	Low	1-10	frequency dependant on flood event frequency	Irreversible	Relatively Pristine	High	Not Significant
Aboriginal Community Considerations										
First Nations reserves or other Aboriginal communities	Project Sites are not located on any First Nations reserve lands or lands allocated to any other aboriginal community. The Project is located within an area covered under Treaty 9.	Yes	High	Low	11-100	> 72	Reversible	Relatively Pristine	Medium	Positive
Traditional land or resources used for harvesting activities	Quality and Clarity of water may be affected by the construction of the facility, which would impact an important cultural and spiritual value for many communities	Yes	High	Low	1-10	13-36	Reversible	Relatively Pristine	Low	Not Significant

Environmental Component	Issue	Residual Effect (Yes/No)	Value of Resource	Magnitude	Geographic Extent (km)	Duration (months) or Frequency	Reversibility	Ecological/ Social Context	Likelihood of Effect	Significance
Traditional land or resources used for harvesting activities	Quality and Clarity of water may be affected by the operation of the facility, which would impact an important cultural and spiritual value for many communities	Yes	High	Low	1-10	37-72	Reversible	Relatively Pristine	Low	Not Significant
	Operation may impact use of the area by waterfowl for foraging and nesting activities which could impact subsistence, harvesting, hunting and cultural activities of communities	Yes	Low	Low	1-10	Continuous	Reversible	Relatively Pristine	Low	Not Significant
	Furbearing mammals may be impacted by fluctuating water levels in the headpond during the winter months and alteration of habitat resulting in a change in trapping which may impact traditional lifeways and economic resources of aboriginal peoples.	Yes	Low	Low	1-10	Continuous	Reversible	Relatively Pristine	Medium	Not Significant
	Fish species health and abundance may be impacted by activities related to construction of the facility impacting harvesting and subsistence activities of certain communities during specific times of the year	Yes	Medium	Low	< 1	13-36	Reversible	Relatively Pristine	Low	Not Significant
	Fish species health and abundance may be impacted by activities related to operation of the facility impacting harvesting and subsistence activities of certain communities during specific times of the year	Yes	High	Low	< 1	1-12	Reversible	Relatively Pristine	Low	Not Significant
	Habitat changes as a result of construction may result in changes in habitats of large game such as moose, bear and deer which communities rely on for food and other products	Yes	High	Low	11-100	During construction period and then once every few years for maintenance	Reversible	Relatively Pristine	Medium	Not Significant
Employment	Potential impact on employment of First Nation community members.	Yes	Medium	Medium	1-10	13-36	Reversible	Relatively Pristine	Medium	Positive
Lands subject to land claims	Timiskaming First Nation is preparing a Land Claim that includes site of Xeneca's hydro project.	Yes	Medium	Medium	1-10	Continuous	Reversible	Relatively Pristine	Medium	Positive

Environmental Component	Issue	Residual Effect (Yes/No)	Value of Resource	Magnitude	Geographic Extent (km)	Duration (months) or Frequency	Reversibility	Ecological/ Social Context	Likelihood of Effect	Significance
Lands subject to land claims	The Project site is located in an area where a land claim is on file between the Federal Crown and Nishnawbe Aski Nation which is the Grand Council of Treaty 9. An Agreement in Principle has been reached but no final agreement has been settled.	Yes	Medium	Medium	1-10	Continuous	Reversible	Relatively Pristine	Medium	Positive
	The Project site is located in an area where there is a land claim on file between the Federal Crown and the Union of Ontario Indians which is the Grand Council of Robinson-Huron Treaty of 1850.	Yes	Medium	Medium	1-10	Continuous	Reversible	Relatively Pristine	Medium	Positive
Economic development	Business opportunities may be possible with nearby First Nation communities (i.e. Wahgoshig)	Yes	Medium	Medium	1-10	Continuous	Reversible	Relatively Pristine	Medium	Positive
Other	Impact on First Nation access to the project area during construction	Yes	Low	Low	1-10	13-36	Reversible	Relatively Pristine	Low	Not Significant
	Beaverhouse FN has concerns that there could be impacts on water quality that may impact upon communities downstream	Yes	High	Low	11-100	37-72	Irreversible	Relatively Pristine	Low	Not Significant
	Community concern regarding water level modifications downstream of the project during operations	Yes	Medium	Medium	1-10	Continuous	Reversible	Relatively Pristine	High	Not Significant
Land and Resource Use										
Navigation	The Blanche River is a recognized canoe route and construction/inundation/ variable flows may alter navigational access within the project zone of impact	Yes	Medium	Low	< 1	Continuous	Irreversible	Relatively Pristine	High	Not Significant
Recreational use	Impacts to general recreational enjoyment quality at Krugerdorf Chutes - operational period	Yes	High	Low	11-100	Continuous	Irreversible	Previously Impacted	High	Positive
	Impacts to general recreational enjoyment quality at Krugerdorf Chutes during construction period	Yes	High	Low	11-100	13-36	Reversible	Previously Impacted	High	Not Significant

Environmental Component	Issue	Residual Effect (Yes/No)	Value of Resource	Magnitude	Geographic Extent (km)	Duration (months) or Frequency	Reversibility	Ecological/ Social Context	Likelihood of Effect	Significance
Social and Economic										
The location of people, businesses, institutions or public facilities	Disruption to access for local landowners during equipment mobilization/demobilization	Yes	High	Low	11-100	13-36	Reversible	Previously Impacted	High	Not Significant
Employment - Local and regional labour supply	Construction activities will support direct and indirect local employment	Yes	High	High	101-1000	13-36	Reversible	Previously Impacted	High	Positive
Energy/Electricity										
Reliability	Voltage support	Yes	High	Low	> 10,000	Continuous	Reversible	Previously Impacted	High	Positive
Electricity flow patterns	Power flow system	Yes	High	Low	1001-10,000	Continuous	Reversible	Previously Impacted	Low	Not Significant

9.1 RESIDUAL NATURAL HERITAGE EFFECTS

An analysis was undertaken to determine cumulative effects associated with the interaction between each known residual effect of the project and other past, present and future planned projects and activities within the study area. In order to determine the cumulative effects of the project, a discussion first of each identified residual effect and rating of significance is required. Table 29 reveals the rationale of significance of residual effects of the project after the application of selected management strategies; a complementary discussion of each is provided below.

Air Quality

Impacts to air quality associated with the project (dust, odour, exhaust, etc.) are all expected to occur mainly during the construction phase of the project and will be curtailed during operation. Given the mitigative measures which will be taken and the remote nature of the project these impacts are anticipated to be both short term and minor and therefore not significant.

Additionally, as a modified ROR facility, the project will generate sustainable and renewable energy. This in combination with other green energy projects will contribute to the overall improvement of air quality and public health in Ontario by facilitating and compensating for the shutdown of coal fired generation facilities.

Water Quality

As with air quality, residual impacts may occur to water quality during construction activities. In order to mitigate the risk of sediment from construction being washed into the river, standard construction BMPs as well as sediment and erosion control measures will be implemented. These include measures such as the use of cofferdams and silt fencing, minimizing the removal of riparian vegetation and monitoring the turbidity of water close to the construction sites. With the proper implementation of sediment and erosion control measures, residual effects to water quality during construction are anticipated to be minimal.

During facility operation, changes to water quality will be limited by the facility's design and operation. Changes may occur as a result of new sedimentation processes from changes in flow and inundation, methyl mercury generation, increased water temperature or decreased dissolved oxygen. The potential for changes to cause an adverse effect on water quality is limited based on the small impoundment area and limited change in flow from existing conditions. Water quality will be monitored for at least three years following development to assess if changes are occurring, and if any identified change is causing an adverse effect.

Natural Habitat and Species

Inundation of habitat for shoreline furbearing species, terrestrial and benthic invertebrates and potential spawning habitat in the proposed headpond is unavoidable. There will be a small net loss of benthic beds, marginal walleye spawning beds and existing mammal dens and lodges within the inundation area. However, inundation will also create additional habitat along shorelines, and may increase available feeding resources. It is expected that shoreline furbearing species will re-build along the new shorelines. Due to the non-mitigable impacts anticipated as a result of inundation, monitoring recommendations have been outlined within the relevant sections of this report that address each individual impact and in Section 12 of this main document.

Fish Habitat

Residual effects to species at risk and their habitats include low negative effects upon Lake Sturgeon, in the pool area immediately below Stuart's Rapids, which has been identified as significant spawning habitat. Impacts upon Lake Sturgeon will be monitored through installation of a telemetry unit, and special operating restrictions will be implemented during spawning. Impacts will be mitigated or eliminated to the fullest extent possible through modifications to the facility's operation plan and the proponent will continue to monitor after commencement of operations.

During construction, there will be low residual negative impacts to fish habitat. Impacts will be minimized or eliminated where possible through implementation of standard mitigation measures. Residual effects on fish movement (potential for stranding) and fish injury or mortality as a result of impingement against the trashracks will be resolved through adaptive management strategies that will be applied, should monitoring requirements identify an issue with fish stranding. Turbine selection (Kaplan turbine) will be discussed with regulators to ensure that design will mitigate the potential for impingement.

Disturbance of Terrestrial Wildlife and Vegetation

Migratory birds and nests of migratory birds could potentially be impacted by construction activities on site, especially for the proposed roadway and transmission line corridor. Adult birds and fledgling mortality could potentially rise with increased road traffic. With the proper implementation of mitigation measures, residual effects are anticipated to be minimal.

Negligible residual effects have been identified on Bobolink in open fields near the proposed access road and connection line routes. Routing of connection lines and access routes will be selected to avoid impacts. The proponent will continue to monitor for the presence of SAR species within the project zone of impact.

The greatest potential for adverse impacts to mammalian species as a result of the proposed Project will be through potential loss of lodges or animals due to flooding events, or due to loss of feeding opportunities where benthic invertebrate habitat is inundated. With the proper implementation of mitigation measures, residual effects are anticipated to be minimal.

No uncommon or rare invertebrate species were identified during the surveys completed. None of the terrestrial habitats on site should be considered uncommon or rare in the surrounding landscape. Therefore, the project inundation will not remove a significant portion of any particular habitat type and potential impacts are likely to be negligible.

Reptile and amphibian species will experience some residual impacts as a result of project inundation. Shallow water habitats in low lying areas will increase, providing suitable egg-laying and early life cycle habitat for amphibians. With the exception of the Eastern Newt, all of the salamander species that could potentially occur in the Project area are terrestrial, and inhabit woodland habitats and swamps. There is a potential for woodland areas currently being utilized by salamanders to be flooded by Project inundation, resulting in a loss of salamander habitat. However, none of the terrestrial habitats in the inundation area are rare in the landscape, and displaced salamanders will find no shortage of similar habitat in upland areas.

The Eastern Newt is primarily aquatic in its adult life stage, and the Blanche River in the Project area is potentially suitable for this species. The increase in lacustrine habitat in the headpond area as a result of the Project will increase suitable aquatic habitat for this species. Downriver of the proposed dam and upriver of the Misema River confluence there is potential for some habitat loss as water levels are decreased. However, there is no rare or unique aquatic habitat in this area, so the impacts to the local adult population should be negligible. Water levels will be maintained within current conditions below the Misema River, so no habitat will be lost in this area.

Natural vegetation and habitat linkages will experience some minimal residual effects as a result of access road and connection line construction; routing studies including fieldwork will ensure road alignments will be selected to avoid sensitive areas. Wildlife trees and other sensitive trees will be marked for protection, and stick nests have been avoided in route planning and layout.

Water levels, flows and movement

Residual effects on water levels in the headpond will include an increase in water level in the headpond area, and an increase in residence time. Impacts to flows and levels in the headpond will be minimized through proposed operational strategies.

Between the Misema confluence and the Englehart River, there will be a variation in flows, however daily fluctuations in downstream flows will remain within the range occurring under

existing conditions. To ensure fluctuations are imposed gradually, a 60-minute ramping rate has been selected. To maintain water levels within existing conditions in this reach, modified run-of-river operations will occur in harmonized timing with the Misema GS. More frequent fluctuations than the natural condition will result.

During operations, alterations to natural drainage patterns may occur during flooding and drought occurrences, in that the magnitude of seasonal and inter-annual variations will be reduced, and the facility will modify normal flood patterns. During extreme high and low flow periods; the facility will revert to run-of-river operations. The final facility design will ensure it has the appropriate flood passage capacity and will meet all requirements of the *Lakes and Rivers Improvement Act*.

9.2 Residual Socioeconomic Effects

Aboriginal Community Considerations

Identification and confirmation of residual effects of the project on First Nation reserves and Métis communities may result from engagement and consultation with these communities. Business opportunities for communities may result in positive economic opportunities. Xeneca will continue to advise communities of progress on the project after completion of the EA and through the permits and approvals process.

As a result of the engagement of affected communities to date, traditional lands and resources used for harvesting activities may experience some residual effects due to the proposed project. Specifically, the quality and clarity of water may experience temporary residual impacts as a result of construction of the facility, but these changes will be of a low magnitude and within a limited geographic area. They will have a low likelihood of occurrence due to the mitigations proposed, and will be limited to the duration of the construction period.

The traditional life of aboriginal people may experience residual impacts with respect to trapping, due to the potential for furbearing mammals to experience impacts from fluctuating water levels in the headpond, and from initial inundation of the headpond area. However, no active Aboriginal traplines have yet been identified to the proponent, and appropriate timing of the initial inundation will minimize mortalities on furbearing mammals. If it is identified during the on-going consultation that Aboriginal trapping may be impacted, Xeneca will work with the affected individuals to determine appropriate mitigations.

Activities related to facility construction could result in changes to fish species health and abundance and indirectly affect harvesting and subsistence activities of Aboriginal communities, however these potential effects will be properly mitigated through best management industry practices and should not result in significant impacts to fish populations. Should monitoring reveal changes in fish communities, abundance or health, additional mitigation or compensation strategies may be developed, or additional monitoring and operational adjustments may be recommended.

Xeneca will proactively explore employment opportunities with Aboriginal communities as part of ongoing communications. Positive residual impacts may result for communities related to construction and operation of the proposed project. Xeneca has also included a contracting and procurement policy as part of the Term Sheet that favours Aboriginal employment.

As discussed in Section 6.5.4, the project site falls within three land claim areas. Ongoing engagement and consultation with the affected communities will continue after completion of the EA. Xeneca notes however, that a significant portion of the zone of impact falls within private lands. Notwithstanding this, Xeneca has tabled an equity partnership position and economic development opportunities with Identified First Nation communities.

During construction, there may be minimal impacts on First Nation member access to the project site itself. To ensure the health and safety of the general public, temporary gates, fencing and signage will be installed. A schedule of these activities will be placed on the project website, and sent out to communities in advance of the construction period.

Beaverhouse First Nation has voiced a specific concern that water quality impacts may affect communities located downstream. Water quality will be monitored upstream and downstream of the facility, and within the impoundment area. Should impacts be identified, Xeneca will discuss the issue with regulators to determine if additional sampling is necessary, and to discuss appropriate mitigations. Communications with affected communities will be undertaken. Water quality monitoring will be limited to the zone of impact of the facility.

First Nation communities may have concerns regarding water level modifications downstream of the project during operations. Within the variable flow reach, flow variations will be an inevitable residual impact, but the proposed operating constraints will minimize the magnitude and frequency of such variations. Although the likelihood of variations is high, these variations will occur within a limited geographic extent and are not thought to be significant.

Access

To ensure public safety during construction, public access to the construction areas will be controlled. The residual effect on access to the construction areas will be temporary and limited to the immediate project area, such that the impact will not be significant.

Navigation

The construction of a permanent weir spanning the width of the Blanche River will have a residual effect on the continuity of the river for navigation. As noted in Section 3.4.3, a permanent portage trail will be installed to provide users of the river with a means of safely bypassing the weir and the bypass reach. As passage across the structure will be facilitated through the creation of the portage trail, the overall impact on navigation will not be significant.

Employment and Forestry

There exists a potential benefit to the local and regional population in that the construction of the Marter Township GS may result in the hiring of local labour and sourcing of local construction material (i.e. aggregate).

Energy and electricity reliability, security and distribution

Xeneca's proposed hydroelectric generating facility on the Blanche River will have an installed capacity of 2.1 MW and will be operated to meet the socio-economic objective of generating clean energy when it is required by the province. Consultation with Hydro One and adjustments to the regional distribution grid will be required for connection of the project to the Provincial connection grid. The project's contribution to reliable generation capacity in the province represents a positive residual effect for the proposed development.

10. CUMULATIVE EFFECTS

Cumulative effects can be defined as long term changes that may occur as a result of the combined effects of each successive action on the environment. Cumulative effects may result from interacting effects of multiple projects in a given area, or multiple activities acting on a single ecosystem component. The assessment of the potential cumulative effects posed by a project was a requirement under the previous *CEAA* (1992). Although the previous *CEAA* (1992) and the current *CEAA, 2012* do not apply to the project. Xeneca felt other planning process requirements may also be met by this discussion and therefore have included it herein.

The assessment of cumulative effects examines past, present and "reasonably foreseeable" future activities in addition to the activities posed by the project, and considers how these would affect the VEC within the project area, and beyond, if necessary.

The assessment of cumulative effects outlined below is based on a precautionary approach and the professional judgement of the project team. As additional information about the Marter Township GS project and other projects and activities in the area becomes available, the characterization and assessment of cumulative effects will be further discussed through the detailed design, and permitting stages of the project.

The potential cumulative effects of the proposed development are discussed in the following sections.

Energy and Air Quality

Xeneca's proposed hydroelectric generating facility on the Blanche River will have an installed capacity of 2.1 MW and will have a positive cumulative effect along with all other new generation facilities of the province. The idea of "every kilowatt counts" will be collectively met

to contribute to the government's goal of generating clean energy for the province, compensating for the shutdown of coal-fired generation facilities, and reducing greenhouse gas emissions.

Increase in the Number of Peaking Events Downstream of the Confluence with the Misema River

As noted in Section 2.8.1, the Blanche River downstream of the confluence with the Misema River currently experiences daily fluctuations in flows due to operations at the Misema GS. The development of a new modified ROR facility on the Blanche River upstream of its confluence with the Misema River will result in an increase in the total number of daily peaking events each year on the Blanche River.

One of the proposed operating constraints for the Marter Township GS is to time its peak flow releases in such a way as to avoid a "dual peaking" event (i.e. two distinct peaks within a 24-hour period). In an assessment of pre- and post-development flows (see the Ortech, 2013 report, "Assessment of Pre and Post Project Flow Variability Blanche River, ON (WSC 02JC008)" presented in Annex I), it was determined that this operating constraint would result in an increase in peaking events of 25% above current conditions for the time period of April to November (the change in peaking frequency for December, January, February and March could not be confidently estimated due to uncertainty surrounding the effect of flow corrections on hourly data). It was also estimated that the increase in peaking frequency would occur either during the start or completion of the daily on-peak generation period (in which the on-peak period generally occurs between 11 am and 7 pm).

Following the construction of the Marter Township GS, the number of peaks in the Blanche River is anticipated to be in the range of 185 to 289 peaks/year, compared to a range of 148 to 231 peaks/year under existing conditions. It should be noted that the increase in peaks would only be the result of the Marter Township GS fluctuating flows on days when the Misema GS is in ROR mode, and not because of dual peaking events.

There will also be periods during which the Marter Township GS would have absolutely no effect on daily peaks downstream of the confluence between the Misema River and the Blanche River. As outlined in Section 5.5 above, special operating restrictions are proposed in order to mitigate against impacts to fish spawning, which would see the Marter Township GS operate in purely ROR mode when water temperatures reach 4°C in the spring, and continue as such until 32 days after 18°C is reached (or 18 days after 20°C is reached). Therefore, during fish spawning periods, there will be no change to the frequency, duration or magnitude of daily peaks compared to existing conditions. Similarly, when inflows as measured at WSC gauge 02JC008 are above 30 m^3/s, both the Marter Township GS and the Misema GS will be operating as purely ROR facilities, as inflows into their respective headponds will exceed their maximum turbine capacities and all excess flows must necessarily be passed over their spillways.

Magnitude of Daily Peaks Downstream of the Confluence with the Misema River

A key concern raised during the development of the proposed Operating Plan for the Marter Township GS is the potential for an increase in the *magnitude* of daily fluctuations downstream of the confluence of the Blanche River and Misema River. Another purpose for 'harmonizing' operations at the Marter Township GS with those of the Misema GS is to avoid scenarios where both facilities are peaking and holding back water at the same time, which would otherwise result in extreme daily fluctuations. Staggering the peak flow releases from the two facilities will ensure that the magnitude of flow fluctuations on the Blanche River do not exceed those observed under existing conditions.

The feasibility of controlling the magnitude of daily flow fluctuations was confirmed in an analysis of hourly flows at the WSC gauge 02JC008 (on the Blanche River, downstream of both facilities) under different operating scenarios (see the March 27, 2013 letter report by Ortech presented in Annex I). By timing daily peaks from the Marter Township GS such that they precede the peak emerging from the Misema GS, the peak flow observed at WSC gauge 02JC008 would be lower compared to existing conditions, while the minimum flow would remain approximately the same. The net effect is that the duration of the peaking event would be staggered over a longer time period, but the magnitude of the peaking event would not exceed those observed under existing conditions.

In order to ensure that the time separation between the peaks from the Marter Township GS and the Misema GS is not too large (which would otherwise result in a dual-peaking effect) or too narrow (potentially increasing the magnitude of the peak), a data sharing agreement will be developed with the operators of the Misema GS in order to properly coordinate operations. If such an agreement is not secured by the time the Marter Township GS begins operations, a real-time monitoring sensor will be installed at the confluence of the Blanche River and Misema River. This monitoring sensor will inform the operators of the Marter Township GS when the other facility is peaking. This would allow the operations at the Marter Township GS to be planned accordingly. In the event that neither sources of flow data are available for a period of time for any reason, the Marter Township GS will ensure that only one peaking cycle per day occurs, including, if necessary, reverting to true ROR operations for that period.

11. KEY REVISIONS TO THE PROPOSED PROJECT SINCE THE ISSUANCE OF THE DRAFT ER

For the convenience of readers who have reviewed the Draft ER for the proposed Marter Township GS, issued in August 2012, the following is a brief overview of key revisions that have been made to the proposal in the past year. The changes were made according to feedback received from regulatory bodies on the proposed project.

Operations

Due to concerns regarding potential cumulative impacts of two modified run-of-river facilities affecting flows in the Blanche River, Xeneca is currently proposing to 'harmonize' operations at the Marter Township GS with those of the Misema GS on the Misema River (see Section 5.4 above). This operating restriction was not developed until after the issuance of the Draft ER.

Similarly, Xeneca is proposing an additional minimum flow target of 2.3 m^3/s, as measured at the Water Survey of Canada stream gauge 02JC008 (located downstream of the confluence between the Blanche River and Misema River). The additional minimum flow target was developed in discussion with regulatory bodies regarding potential cumulative impacts with operations at the Misema GS. See also Section 5.4 above.

Proposed turbine ramp times (for both ramp up and ramp down) were 20 minutes in the initial concept for the project. Due to concerns regarding potential erosion impacts resulting from rapid changes in flow, the ramp times are now proposed to be extended to 60 minutes in order to reduce potential erosion. The proposed Operating Plan in Annex I reflect this extended ramp time.

At the time of distribution of the Draft ER, minimum environmental flow (Q_{EA}) requirements were still under discussions with federal and provincial regulators. The Q_{EA} proposed by Xeneca in the Operating Plan (Annex I) and in Section 5.5, above, represent the outcome of discussions and analyses from the past year.

Due to the general lack of suitable habitat within the bedrock-dominated bypass reach, no compensatory flow releases (Q_{COMP}) were previously proposed in the Draft ER. To facilitate larval drift for sturgeon larvae in the pool at the confluence between the Marter Township GS tailrace and the bypass reach, a Q_{COMP} of 0.5 m^3/s is now proposed to be released during the spring; and further, when flows at Misema GS are below 1.8 m^3/s then Marter GS will release water to attain a total flow of 2.3 m^3/s past the confluence with Misema River.

Additionally, the proposed operating restrictions presented in Tables 26 and 27 for protecting walleye and lake sturgeon spawning were extended beyond what was originally presented in the Draft ER submission. For example, the Marter Township GS is now proposed to revert to ROR operations when water temperatures reach 4°C in the spring (the approximate start of walleye staging and spawning), compared to the previously-proposed 6°C (the start of active spawning). Similarly, ROR operations are now proposed to continue until 32 days after 18 degrees is reached (or 18 days after 20 degrees is reached), whereas the previously-proposed duration of ROR mode would have ended after 14 days or when a water temperature of 16°C was reached.

Access road

The previous proposal for the new access road construction followed a different route than that presented in this Final ER. At the time of distribution of the Draft ER, the corridor for the proposed new access road ran parallel to the line corridor. The proposed route for the new access road was since adjusted to follow a less direct path around a hill separating the project site from the nearby existing road, due to the relatively steep gradient of the hill. The proposed corridor for the new power line has remained largely unchanged, with the minor adjustment of the last approximately 100 m of the line running parallel to the existing road before connecting with the Point of Common Coupling. The current proposed lines and roads corridors are illustrated on maps in Annex VI as well as on Figure 1a and 1b in Section 1 of this ER.

Portage trail

As outlined in Section 3.4.3, a portage trail is proposed as one of the ancillary works for the Marter Township GS. Though not initially presented in the Draft ER of August 2012, a portage trail was subsequently incorporated into the project design in order to provide users of the waterway with a means of circumventing the water control structure and the bypass reach.

12. MONITORING & FOLLOW-UP PROGRAMS

Proposed monitoring and follow-up programs are presented below. Additional programs may emerge through continued consultation during the regulatory approvals stages of the development planning.

12.1 CONSTRUCTION MONITORING

Prior to construction, the CMP presented in Annex II will be enhanced to incorporate any construction management strategies outlined in the ER and supporting annexes as well as any permit application or federal approval/authorization requirements. The final CMP will be submitted to the regulators as supporting documentation for construction permits and approvals.

The proponent will:

- Ensure that all necessary regulatory permits and approvals (federal and provincial) have been obtained prior to the start of any site preparation or construction activities.
- Ensure that all contractors are familiar with and are applying the identified mitigation measures outlined in the CMP and industry/regulator BMPs.
- Ensure that controls to minimize environmental effects during construction (e.g. sediment fencing) are regularly inspected and functional, and conduct inspections after any event which might disturb the control measure (e.g. a heavy rainfall event).

- Ensure that the mitigation measures being applied are not creating adverse environmental effects, and that mechanisms are in place for corrective and remedial action to address these if they occur.
- Ensure that all signage and required traffic control measures, including posted speed limits, remain in appropriate locations as construction proceeds and in good visual condition.
- Ensure that all site restoration activities have been implemented.

12.2 POST-CONSTRUCTION / OPERATION MONITORING

Xeneca has prepared a conceptual post-construction monitoring table detailing various aspects of monitoring that will be necessary following the completion of the facility. Table 30, below, was prepared based on the suggestions of the project team and the monitoring requirements identified by regulators through the course of the EA. The post-construction monitoring table will be further developed into a comprehensive post-construction monitoring plan through project permitting and approvals following the completion of the EA as detailed design details become available.

Table 30: Marter Twp Post-Construction Monitoring Plan

Environmental Component		Monitoring Methodology	Monitoring Frequency and Timing	Trigger for Action	Reporting
Aquatic Biota and Habitat	Fish Communities	Fish community sampling to obtain post construction CPUE and relative abundance to compare to pre-construction conditions and determine whether fish community and abundance have changed. Fish community sampling will follow the Riverine Index Netting (RIN) protocol. This sampling will provide specimens for analysis of fish tissue mercury concentration.	Fish community sampling will occur in years 3, 6 and 9 of facility operation.	Should the fish community monitoring results reveal substantial changes in the fish community that are of concern, Xeneca will discuss the matter with MNR. Appropriate mitigation strategies will be developed in the context of the various aspects of resource use that affect the fish community in the Blanche River. Possible mitigation strategies include reducing the flow range due the operation of the generating station (maximum flow- minimum flow) during specific months of the year, which can be achieved by increasing the minimum flow or decreasing the maximum flow. Another consideration would be whether changes to the fish community are caused by impacts on recruitment. In this case, modification to the compensation fish habitat may be an option. Fish stocking could also be a viable management option for a valued species such as walleye.	The results will be submitted to MNR annually for each monitoring year.

Environmental Component		Monitoring Methodology	Monitoring Frequency and Timing	Trigger for Action	Reporting
	Benthic Invertebrates	Ongoing monitoring will be conducted for the following suitable fast-water benthic species habitat. - One of four rapids located in the inundation area. (All other stretches of fast water and riffle benthic habitat upstream will be lost and be compensated for). - A large sandbar on the western portion of the pool at Base of Krugerdorf Chutes. This sandbar feature and associated invertebrate colony(ies) will be monitored for benthics and freshwater mussels. -At Stuart's Rapids. Additional data such as temperature, depth, wetted width, substrate size and flow will be collected during each survey.	Sampling will occur in the first three years of facility operation, and potentially years 6 and 9.	Should a decline be noted that is shown to be related to Marter operations and flow volumes, Xeneca will discuss appropriate mitigation strategies with MNR. Possible mitigation strategies include alteration to the operational flow regime to ensure greater flows or wetted width across the affected habitat, or potential alteration of the habitat itself to maintain wetted width across a wider range of flow conditions.	The results will be submitted to MNR annually for each monitoring year.
	Aquatic Habitat	*Pool at Base of Krugerdorf Chutes* - These habitats are suitable for benthic invertebrate production and potentially for spawning of fish species. The pool below Krugerdorf Chutes will be impacted by the proposed operations during periods of low flow volumes. The actual impacts to flow volumes, velocities and currents post-construction will be monitored to ensure that adverse impacts to potential spawning, incubation, and benthic habitat, and larval drift movements are not permitted.	The first three years post-development	Should monitoring reveal that the velocity or hydraulic patterns within the pool are adversely altered and cause deterioration of pool habitat suitability, Xeneca will determine whether additional monitoring is required and discuss strategies with DFO and MNR to ensure that success goals are achieved.	Survey results will be reported to MNR and DFO annually.

Environmental Component		Monitoring Methodology	Monitoring Frequency and Timing	Trigger for Action	Reporting
		Stuart's Rapids- The main pool area immediately below Stuart's Rapids has been identified by Kirkland Lake MNR as significant habitat for spawning Lake Sturgeon. Depth and wetted width in this pool will be carefully monitored throughout key life cycle stages to ensure sufficient flows and depths are maintained within this area, should the project be constructed. A telemetry receiver unit will be installed above Stuart's Rapids which is compatible with MNR telemetry equipment being utilized to monitor Sturgeon movement in the Blanche River.	As required by agencies.	Lack of movement of transmitted Sturgeon to below the Rapids may occur if flow conditions are not maintained. Run of river flows, and operating flow within existing conditions should negate any possible impacts to fish spawning at Stuart's Rapids.	Data from the monitoring receiver will be provided to agency personnel on an annual or quarterly basis.
	Fish Stranding	Based on analysis of surveyed cross sections within the reach between the proposed Marter Project and the currently operating Misema GS, there are areas which may potentially result in fish stranding during rapid flow reduction events. These areas will be visually assessed for stranding of all fish species. Onsite staff will be trained in the identification of stranding and will be required to notify a biologist of any occurrences for further observation and reporting.	The first three years of facility operation.	Should fish stranding be identified as an issue, possible mitigation measures include minor habitat adjustments at problem areas to provide a pathway for stranded fish to reach the flowing water. Another option would be to adjust the operations such that flow is reduced at a slower rate to provide more time for fish to escape areas being dewatered.	Event reports will be provided to agencies as quickly as possible upon confirmation of a fish stranding event. Where no such incidents are recorded, reporting will be conducted annually.

	Fish Entrainment and Impingement	Fish mortality from entrainment and impingement will be monitored to determine whether entrance velocity and trash rack spacing is adequate.	Should occur in first year following construction when turbine is operating at maximum capacity	Should intake velocities be outside of predicted ranges to protect fish from entrainment and mortality, or should entrainment or impingement be detected, modifications to the intake can be made to prevent or reduce entrainment and impingement including lighting, electrical barriers, air bubbling and sound barriers.	The results will be submitted to OMNR and DFO quarterly.
	Fish Tissue Mercury Concentrations	Fish captured for fish community survey using RIN protocol will be used for fish tissue mercury accumulation analysis. Large fish: total mercury – 10 samples; methyl mercury – 5 samples, of at least 25 to 55 cm length; Forage fish: total mercury and methyl mercury – 5 composite samples, of 5 to 10 individuals of yearling perch or other cyprinid species. Fish will be sampled from upstream of the impoundment (i.e., upstream reference), the impoundment area and downstream of the facility.	Large fish sampling will be conducted in years 3, 6 and 9 and forage fish sampling will be conducted in years 1, 2, 3, 6 and 9 of facility operation, respectively.	Fish tissue mercury might increase for a number of years following construction. The monitoring results will be provided to MOE for their consideration in the annual public Fish Consumption Guidelines advisory. If mercury concentrations have not attenuated to background levels after 9 years, the monitoring program will be extended.	The results will be compared to baseline results and the upstream reference site to identify any changes related to the facility, and reported to MOE for each monitoring year.

	Vegetation and Significant Wildlife Habitat ---Bobolink	Evidence confirms that Bobolink are using an area within ZOI as a breeding area and congregation area for males in early spring. There is potential for disturbance as a result of hydro line or access road construction and use, which are proposed to run on the southern boundary of their confirmed habitat. Surveys should be undertaken in each year during which construction occurs, in order to ensure that increased vehicular traffic does not have an adverse impact on local resident numbers during the construction phases. Additional surveys should be undertaken annually for at least three years post-construction to determine whether population numbers remain stable after the construction of the new roadway and transmission line corridor and structures.	Years during construction and years 1, 2 & 3 post construction	Hydro line and roadway construction should not disturb any of these features. All construction activities should take place outside of the spring Bobolink breeding and nesting season in order to minimize the potential for nest disturbance- between 15 May and 31 July. Should a decrease in breeding/nesting activity be confirmed during the initial 3 years of monitoring post-construction, additional habitat can be created adjacent to the current open field. Should resulting mitigation measures be undertaken as outlined above, additional monitoring post-mitigation is recommended to ensure the efficacy of such measures.	The results will be submitted to MNR annually for each monitoring year.
Facility Operation	Water Levels and Flows	A water level gauge will be installed on the upstream side of the dam to monitor the headpond water level. (See section of Compliance Considerations)	At 15 minute intervals for duration of facility lifetime.	An operating system will be designed to include an alarm to notify the operator when water level deviates outside the target operating range. The facility inflow and outflow will be adjusted until the level returns to the target operating range. An Incident Report following standard compliance procedures outlined by MNR would be submitted.	The results will be submitted to MOE annually for each monitoring year.

		A water level gauge will be installed in the tailrace area to monitor the downstream water level.	At 15 minute intervals for duration of facility lifetime.	Should the water levels fluctuation deviate outside the Target Operating Zone, an Incident Report following standard compliance procedures outlined by MNR would be submitted.	
		River flow near the project will be monitored and documented using the flow through the powerhouse and overflow from the spillway.	At 15 minute intervals for duration of facility lifetime	An operating system will be designed to include an alarm to notify the operator when flow deviates outside the compliance range. The facility inflow and outflow will be adjusted accordingly. An Incident Report following standard compliance procedures outlined by MNR would be submitted.	The results will be submitted to MOE annually for each monitoring year.
		Xeneca plans to enter into a data-sharing arrangement with TransAlta that will facilitate harmonized operations of the two facilities. If TransAlta is not prepared to share the necessary operating information, Xeneca will install a real-time water level logger (monitoring station) at the tailrace of Misema facility to inform Xeneca's operations. This station will also be used to verify the Marter Twp operation minimum environmental flow compliance.	-	Should the downstream flow targets deviate outside the Target Operating Zone; an Incident Report following standard compliance procedures outlined by MNR would be submitted.	The results will be submitted to MOE annually for each monitoring year.
Surface Water Quality	Water temperature	Water temperature in the headpond will be monitored on an hourly basis and this data will be reported with the flow and water level reading data. (See section of Compliance Considerations)	Hourly data will be monitored for duration of facility lifetime.	Should the headpond temperature be adversely impacted, the results will be reviewed with MOE/MNR to develop an adaptive management plan.	The results will be submitted to MOE/MNR annually for each monitoring year.

		A temperature and dissolved oxygen profile will be conducted at the impoundment sample location to identify if thermal stratification is occurring if sufficient water depths permit such an assessment. If stratification is identified, a discrete water quality sample will be collected from each thermal layer during the summer water quality sampling event.	First three years of operation.	If thermal stratification has the potential to occur, mitigated measures in the form of bottom drawer multi-level draw systems will be considered.	The results will be submitted to MOE/MNR annually for each monitoring year.
	Water quality	Samples will be collected from upstream of the impoundment, in the impoundment, and downstream of the proposed facility. • The following parameters will be measured: • pH, conductivity, alkalinity; • Total Suspended Solids (TSS) and Total Dissolved Solids (TDS); • cations (Mg, Na, Ca, K); • anions (Cl, SO_4); • Dissolved Organic Carbon (DOC); • total phosphorus; • nitrate, nitrite, ammonia and total Kjeldahl nitrogen (TKN); • Total metals; • low level total mercury (0.1 ng/L detection limit); and, • low level methyl mercury (0.02 ng/L detection limit). Water temperature, dissolved oxygen, pH and conductivity and turbidity will be measured in the field using a multi-meter.	Samples will be collected three times a year during the spring freshet, the summer low-flow period and the fall mid-flow periods in years 1, 2 and 3 of facility operation.	Should monitoring identify that water quality is impacted; Xeneca will discuss the matter with MOE to determine if additional sampling or investigation into the source of the changes is necessary and develop appropriate mitigation strategies. Monitoring may be extended if water quality has not stabilized after three years.	The results will be compared to pre-construction conditions and the upstream reference to identify any changes from the facility, and reported to MOE for each monitoring year.

Erosion and Sedimentation	The monitoring program is designed to validate post development headpond sediment infilling, sediment transportation and channel dynamics especially during high flow events. Three monitoring stations along the development corridor will be established with the possibility of an additional site: 1. Upstream 'control' station located upstream of the impoundment area. 2. In the impoundment just upstream of the proposed dam location. 3. At the pool located at the bottom of the chute, downstream of the proposed facility. At each location, a benchmarked cross section will be set-up and surveyed. Substrate sampling with pebble-counts will be performed across the section. Total suspended solids (TSS) will be measured through the water samples. Erosion pins will also be installed at the lower two stations to monitor bank erosion. A fully automated water sampling system will be installed at station 3 to measure sediment movement during higher flow events. This will include a control site regarding slope stability upstream, and continuous suspended sediment monitoring downstream. Annual visual monitoring of clay erosion will be conducted along headpond shoreline.	The monitoring stations will be installed and re-established in years 1, 3, 5, 7 and 10 of operation.	Should monitoring program identify that erosion or sedimentation significantly occurs, a detail study will be carried out to determine the cause. If it is due to facility operation, an adaptive management plan will be developed with agencies to modify operations or provide physical shoreline protection measures.	The results of the post-development monitoring will be compared to pre-construction condition and reported to Ontario MOE/MNR annually for each monitoring year.

Ice Scouring	The proposed Marter Project has significant potential for ice scour and resulting erosion and sedimentation due to the prevalence of clay/silt substrate along most shorelines. Post-construction monitoring will be conducted for areas which are most susceptible to adverse ice scour impacts and potential ice dam locations (bends in the river, islands, promontories) to examine whether the Marter Project results in additional damming and/or scour events. A detail erosion and sediment monitoring plan has also been included in Annex II of the ER. Visual inspection of ice scouring at the headpond and downstream ZOI will be documented with photographs taken to determine if and how much ice breakage and wedging occurs.	Years 1, 3, 5, 7 and 10 of operation.	Based on the results of the assessment, the operating plan will be adjusted to mitigate where a significant adverse effect is determined to occur as a result of modified operation.	The results will be submitted to MOE annually for each monitoring year.

13. REGULATORY APPROVALS AND PERMITS

Following the successful completion of the EA and the completion of detailed engineering design, the proponent will make application to various federal, provincial and municipal agencies for regulatory permits, approvals and authorizations. These permits, approvals and authorizations are required before site preparation or construction, or prior to the commissioning of the facility. A list of the regulatory permits that may be required for this undertaking is presented below in Table 31.

Table 31: List of Potential Regulatory Approvals

Permit and Legislative Requirement	Agency
Federal	
Authorization to conduct a Work, Undertaking or Activity resulting in the serious harm of fish - *Fisheries Act* [Section 35]	Fisheries and Oceans Canada
Species at Risk Act (SARA) – authorizations, as applicable	Fisheries and Oceans Canada; Environment Canada
Approval for Construction in Navigable Waters – *Navigable Waters Protection Act* (Section 5)	Transport Canada (Marine)
Explosives Act - Temporary Magazine Licence	Natural Resources Canada (NRCan)
Provincial	
Waterpower Site Release Crown Land (PL. 4.10.05) - Applicant of Record Status required for disposition and development of Crown land/bed	Ministry of Natural Resources
Lakes and Rivers Improvement Act (LRIA) – Section 14 - Location Approval and Plans and Specifications Approval	Ministry of Natural Resources
Lakes and Rivers Improvement Act (LRIA) – Section 23.1 - Water Management Plan	Ministry of Natural Resources
Public Lands Act (PLA) – Work Permits (Parts 1-5, as required).	Ministry of Natural Resources
Public Lands Act (PLA) – Land Use Permit or Licence to Construct	Ministry of Natural Resources
Public Lands Act (PLA) – Water Power Lease Agreement	Ministry of Natural Resources
Public Lands Act (PLA) – Grants of Easements (Policy PL 4.11.04)	Ministry of Natural Resources
Endangered Species Act (ESA) – permits and agreements, as applicable	Ministry of Natural Resources
Crown Forest and Sustainability Act - Forest Resource Licence and Overlapping Licence Agreement	Ministry of Natural Resources
Crown Forest and Sustainability Act – Use/maintenance agreement	Ministry of Natural Resources
Forest Fires Prevention Act - Burn permit on Crown Land	Ministry of Natural Resources
Aggregate Resources Act – Aggregate Permit	Ministry of Natural Resources
Permit to Take Water – *Ontario Water Resources Act* (Section 34), Category 2 (construction) and 3 (operation) [1]	Ministry of the Environment
Environmental Compliance Approval (ECA) (*Environmental Protection Act* - Industrial Sewage, Section 53; Air and Noise, Section 9; Waste Generator Registration, Section 18(1), Ontario Regulation 347)	Ministry of the Environment

Notice of Project and Registration of Contractors – Construction Regulation 213/91	Ministry of Labour
Ontario Energy Board Act - Electricity Generation Licence Potentially leave to construct (section 92) and Wholesaler license if transmission connected. Note would also require market authorization from the IESO if transmission connected.	Ontario Energy Board
Municipal	
Road Use Agreement	Municipality
Building Permit	Municipality
Fire Protection and Prevention Act - Burn Permit	Municipality

[1] It is understood that one of the requirements of the Permit to Take Water application will be a written agreement between the landowner for the project location and Xeneca.

14. COMMITMENTS

The following commitments are made by the proponent, Xeneca Power Development Inc., in order to ensure the development of a sustainable waterpower project;

General

- The proponent is committed to ensuring compliance with the ER as a contract with the people of Ontario.
- The proponent is committed to the adoption and application of the mitigation measures outlined within this document for both the construction and operation of the proposed undertaking according to applicable legislation (i.e. adherence to CMP and BMPs, such as applicable DFO Ontario Operational Statements as listed at http://www.dfo-mpo.gc.ca/regions/central/habitat/os-eo/provinces-territories-territoires/on/index-eng.htm). This may be achieved through the hiring of an environmental monitor for the duration of the construction program and through operator training on environmental issues within the operational phase of the project.
- The proponent is committed to developing appropriate compensation for any significant adverse impacts in cooperation with the Agencies once the engineering details for the project have been advanced during the permitting phase of the project.
- The proponent is committed to the issuance of regular project updates to regulatory agencies in the form of a Project Implementation Report.

Facility Construction and Operations

- The identified erosion hazard locations will be monitored during construction and early operation phases by a qualified erosion/sedimentation specialist.
- During walleye and lake sturgeon spawning, the proponent commits to following the protocol for operation outlined in their operating plan (see the proposed Operating Plan in Annex I).

- Predictive hydraulic model of downstream flows and levels will be verified with operation data within the first year of operation.
- Compliance monitoring will be conducted in order to ensure compliance with the water level commitments outlined in the Operating Plan.
- The proponent commits to operating the facility in run-of-river mode when a Level 3 drought is declared by the Province.
- A lake sturgeon telemetry station will be installed, maintained and monitored at Stuart's Rapids.
- Modified ROR operations at the Marter Township GS will be harmonized with those of the Misema GS. In the event that the respective modified ROR operations at the two facilities cannot be harmonized, the Marter Township GS will operate in ROR mode until such time that proper scheduling of operations can occur.
- The proposal to operate the Marter Township GS in a harmonized fashion to the Misema GS includes a commitment to keep the magnitude of daily fluctuations downstream of the Misema River confluence within the range currently observed on the river. A data sharing agreement will be developed with the operators of the Misema GS in order to properly coordinate operations. If such an agreement is not secured by the time the Marter Township GS begins operations, a real-time monitoring sensor will be installed at the confluence of the Blanche River and Misema River. This monitoring sensor will inform the operators of the Marter Township GS when the other facility is peaking.
- During intermittent operations (facility shut-down at night), a maximum turbine limit of 10.4 m^3/s will be set in order to reduce the magnitude of day-to-night fluctuation in flows.
- When natural inflows are sufficient to permit continuous operation (minimum turbine flow of 4.8 m^3/s + Q_{COMP} of 0 m^3/s or 0.5 m^3/s, depending on the season), intermittent operations will *not* occur.
- All elements of the post-construction monitoring plan, as outlined in Table 30 (Section 12.2) above, will be implemented during facility operations.

<u>Consultation</u>

- The proponent is committed to realizing a signed Memorandum of Understanding with the Wabun Tribal Council.
- Xeneca is committed to continuing negotiation of business to business equity arrangement with Temiskaming First Nation
- The proponent is committed to continuing to engage specific stakeholders on relevant issues after the issuance of the NOC and Statement of Completion.
- Xeneca will construct portages as directed by Transport Canada under the *Navigable Waters Protections Act*.
- The proponent will advise the Township when landowner agreements are finalized.

15. CONCLUSIONS

Xeneca proposes to construct and operate the Marter Township GS on the Blanche River. This document describes the EA carried out as part of the planning process for the proposed project.

Throughout the environmental planning process, Xeneca has endeavoured to understand the environment in which the project would be built by undertaking an extensive information and data collection program. Data on areas of the environmental setting of the project was collected by discipline experts including:

- Stage 1 and 2 archaeological assessment;
- A natural environment characterization and impact assessment;
- Erosion study and fluvial geomorphic assessment on the riverine system in the ZOI;
- Database analysis and mapping exercise and wetland assessment and flyover to route the connection line and access roads;
- A statistical analysis of historical hydrological data;
- A hydraulic model study analysis;
- Conceptual engineering design; and
- Baseline surface water quality studies.

A comprehensive agency and public consultation program also contributed key information towards the identification of the potential adverse and positive environmental effects of the project. Once the proponent has met the requirements of the Waterpower Class EA, resolved any outstanding issues raised during the formal review period and satisfactorily addressed any Part II Order requirements, a Statement of Completion may be filed. The project may then proceed to the permitting and approvals phase of development. Aboriginal and FN engagement was undertaken with each community's leadership as part of the business to business Aboriginal consultation initiative by the proponent. A comprehensive engagement initiative with each community located within, or having traditionally used the project area has been underway since the issuance of the Notice of Commencement and will continue beyond Notice of Completion and into project implementation.

Throughout this environmental assessment, management strategies were developed and applied to known impacts in order to avoid, prevent or minimize any identified adverse environmental effects of the project. It is the conclusion of this environmental assessment that the planned undertaking will result in residual adverse effects. An analysis of the identified residual adverse environmental effects was undertaken to determine their significance, and commitments for any required additional measures for the further management of these potential residual effects have been made.

Following the application of avoidance and mitigation measures, all but two of the identified adverse effects were determined to be "not significant", meaning that they are not likely to cause unacceptable harm to environmental quality, productive capacity of the effected environment, or the socio-economic and cultural attributes of the area. The creation of the headpond will result in the loss of benthic habitat in the lower rapids and the loss of potential spawning habitat for sport fish species within the inundation area; however, the implementation of offsetting measures, to be discussed with MNR and DFO, is expected to minimize these impacts.

While the impacts to fish species and their habitats are expected to be minimal in the broad landscape context, an Authorization may be required under Section 35 of the *Fisheries Act* to conduct a work, undertaking or activity resulting in the serious harm of fish.

The location and nature of the proposed compensation habitat for these anticipated impacts will be further developed and discussed with DFO and the MNR once the engineering details for the project have been advanced during the permitting phase of the project.

There are also many positive environmental effects associated with the project which are considered to off-set the adverse environmental effects associated with the project, these include:

- Tangible Economic Outcomes for the Local Communities and the Regional / Provincial Economy:
    - Job creation during construction both directly and indirectly in the near North Region of Ontario. Direct employment (construction only) for waterpower projects is estimated at 10,000 person hours per MW; indirect jobs multiply by 1.5; and up to 2 part time jobs will be available in the operation and maintenance of the facility.
    - An increase in economic activity (direct and indirect) to build the project procuring everything from consulting and legal services to concrete, steel, trucking and other services such as lodging, food and fuel. The majority of this activity will be created within the local/regional economy.
- Employment and training opportunities (planning, construction and operation phases of the project);
- Creation of reliable and secure green energy for the province and reduced greenhouse gas emissions:
    - The project will reduce CO_2 emissions by eliminating the need for an equivalent amount of electricity to be produced through the combustion of fossil fuels.
    - Benefits to the population, commerce and industries of Ontario by providing more reliable and consistent renewable power to the provincial grid for many years to come. Many power plants built in the early 1900s are still in operation and with regular maintenance and upgrades can last for generations to come.

  - The operation of the facility in the existing power grid will be compatible with the overall power system reliability and power quality (voltage and frequency) objectives while improving distribution customer service reliability in this area, from a sustainable and consistent power source.
- The generation of electricity through a renewable energy supply in support of the province's *Green Energy Act*.

Preliminary planning discussions towards the development of various management strategies are outlined in this document, and the proponent will continue to work with the regulators and other interested parties in support of securing approvals for this undertaking. The application of the recommended management strategies and adherence to the identified commitments by the proponent will help to realize a sustainable renewable energy development project.

16. REFERENCES

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