

**IRON ORE COMPANY OF CANADA  
SMALLWOOD NORTH PIT EXTENSION  
PROJECT,  
LABRADOR CITY**

***Environmental Assessment Registration***

*Pursuant to the Newfoundland & Labrador Environmental Protection Act (Part X)*

Submitted by:

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August 31, 2018



**Rio Tinto**

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## List of Acronyms

<b>AANDC</b>	Aboriginal Affairs and Northern Development Canada
<b>ACCDC</b>	Atlantic Canada Conservation Data Centre
<b>AMEC</b>	AMEC Environment & Infrastructure
<b>ARD</b>	Acid Rock Drainage
<b>ATO</b>	Automatic Train Operation
<b>BRRP</b>	Business Resilience and Recovery Program
<b>CAC</b>	Criteria air contaminants
<b>CAM</b>	Conseil des Atikamekws et des Montagnais
<b>CAP</b>	Community Advisory Panel
<b>CH4</b>	Methane
<b>CO</b>	Carbon Monoxide
<b>CO<sub>2</sub></b>	Carbon Dioxide
<b>CO<sub>2</sub>eq</b>	Carbon Dioxide Equivalent
<b>COSEWIC</b>	Committee on the Status of Endangered Wildlife in Canada
<b>CWS</b>	Canadian Wildlife Service of Environment Canada
<b>DFLR</b>	Department of Fisheries and Land Resources
<b>DTCII</b>	Department of Tourism, Culture, Industry and Innovation
<b>EA</b>	Environmental Assessment
<b>EMS</b>	Environmental Management System
<b>EPP</b>	Environmental Protection Plan
<b>ERRP</b>	Emergency Response and Reporting Plan
<b>GIS</b>	Geographical Information System
<b>GHG</b>	Greenhouse gases
<b>GPS</b>	Global Positioning System
<b>Ha</b>	Hectares
<b>HSEQ MS</b>	Health, Safety and Environmental and Quality Management System
<b>IOC</b>	Iron Ore Company of Canada
<b>bcm</b>	Bank cubic meters
<b>kbcm</b>	Thousand bank cubic meters
<b>km</b>	Kilometer
<b>kt</b>	Kilotonne
<b>LIF</b>	Lower Iron Ore Formation
<b>LWCoC</b>	Labrador West Chamber of Commerce
<b>MAC</b>	Mining Association of Canada
<b>MAE</b>	Department of Municipal Affairs and Environment
<b>MASL</b>	Meters above sea level
<b>MBCA</b>	<i>Migratory Birds Convention Act</i>
<b>m</b>	Meter
<b>mbgs</b>	Meters below ground surface
<b>MIF</b>	Middle Iron Ore Formation
<b>mm</b>	Millimeter
<b>MMER</b>	Metal Mining Effluent Regulations

<b>Mm<sup>3</sup></b>	Million Cubic Meters
<b>mRL</b>	Metres Relative Level
<b>Mtpa</b>	Million tonnes per annum
<b>Mt</b>	Million tonnes
<b>MW</b>	Megawatt
<b>N<sub>2</sub>O</b>	Nitrous oxide
<b>NAG</b>	Non-acid generating
<b>NCC</b>	NunatuKavut Community Council
<b>NLDNR</b>	Newfoundland and Labrador Department of Natural Resources
<b>NLDMAE</b>	Newfoundland and Labrador Department of Municipal Affairs and Environment
<b>NNK</b>	Naskapi Nation of Kawawachikamach
<b>NL EPA</b>	<i>Newfoundland and Labrador Environmental Protection Act</i>
<b>NL ESA</b>	<i>Newfoundland and Labrador Endangered Species Act</i>
<b>NLSA</b>	Newfoundland and Labrador Statistics Agency
<b>NOX</b>	Nitrogen Oxides
<b>PAO</b>	Provincial Archaeology Office
<b>PM</b>	Particulate Matter
<b>PM<sub>2.5</sub></b>	Particulate matter less than 2.5 microns
<b>PM<sub>10</sub></b>	Particulate matter less than 10 microns
<b>QNS&amp;L</b>	Quebec North Shore and Labrador
<b>RTF</b>	Regional Task Force
<b>SAR</b>	Species at Risk
<b>SARA</b>	<i>Species at Risk Act</i>
<b>SEM</b>	Sikumiut Environmental Management Limited
<b>SO<sub>2</sub></b>	Sulfur dioxide
<b>TLH</b>	Trans Labrador Highway
<b>TMF</b>	Tailings Management Facilities
<b>TPM</b>	Total Particulate Matter
<b>TST</b>	Tshiuetin Rail Transportation
<b>WNS</b>	White-nose Syndrome

## 1.0 Introduction

**Project Name:** Smallwood North Pit Extension Project

The Iron Ore Company of Canada (IOC) plans to expand the boundaries of an existing pit to support its ongoing operations in Labrador City. IOC has been operating the Carol Project in Labrador City since the early 1960's. The Smallwood North Pit Extension Project (the Project) is located just north of the Smallwood Pit, which was mined from 1962 until the early 1990s.

The Project is situated within IOC's existing mining leases and encompasses approximately 160 hectares (1.6 km<sup>2</sup>) of land. Activities associated with the proposed Project will involve vegetation/tree mulching, removal and stockpiling of overburden and organics/topsoil, haul road development, pit development, drilling and blasting, transporting waste rock to a new waste dump and transporting ore to existing on-site facilities for processing. Contractors will be used for the pit extension and waste dump development and IOC's existing workforce, equipment and infrastructure will be utilized during operations activities associated with the proposed Project. The proposed open pit mining operations in the Smallwood North Pit Extension will be carried out using IOC's existing mining practices. IOC will use ore mined from the Smallwood North Pit Extension to supplement concentrator feed sourced from other areas of its operations. The size of the Project area represents less than 2% of the total mining lease area (9500 ha) and the Project will not increase the overall mining rate for IOC's operations in Labrador City.

This Environmental Assessment (EA) Registration document has been prepared for the proposed Smallwood North Pit Extension by IOC, with assistance from SEM Limited. The document format follows the guidance for Project Registration under the Newfoundland and Labrador EA process.

### 1.1 Proponent Information

IOC is a major producer of iron ore in Canada, and a leading global supplier of iron ore pellets and concentrate.

<b>Name of Corporate Body:</b>	Iron Ore Company of Canada
<b>Corporate Address:</b>	1190 des Canadiens-de-Montréal Ave., Suite 400 Montreal, QC, H3B 0E3 T: (418) 968-7400
<b>Operations Address:</b>	2 Avalon Drive, Labrador City, NL, A2V 2Y6
<b>President and CEO:</b>	Mr. Clayton Walker



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IOC currently operates open pit mines, a concentrator and a pellet plant in Labrador City, and transports its products along a 418 km railway to its port facilities in Sept-Îles, Quebec on the St Lawrence Seaway. Approximately 1,707 persons are employed in permanent positions at IOC's Labrador City facilities.

The company's existing mining operations in Labrador City consist of four active open pit mining areas (Luce, Humphrey Main/West/Sherwood, Humphrey South and Lorraine South), one existing pit to be reactivated (Spooks), and a new open pit (Wabush 3) that is in the development stage (Figure 1). IOC's Labrador City properties also contain significant quantities of additional iron ore resources, which could be utilized for future development.

IOC's concentrator has an annual production capacity of approximately 23 million tonnes of iron ore concentrate, which is a 5 million tonne increase since the recent completion of the Concentrator Expansion Program. Of that amount, approximately 9 to 13 million tonnes are pelletized and the balance is sold directly as iron ore concentrate.

After processing at the Labrador City facilities, the iron ore concentrate and pellets are transported south via the Quebec North Shore and Labrador (QNS&L) railway, a wholly owned subsidiary of IOC, to the company's shipping terminal and deep water port in Sept-Îles, Quebec, which handles ore carriers up to 255,000 tonnes. IOC exports its concentrate and pellet products to major North American, European and Asian steel makers.

IOC has a comprehensive Health, Safety and Environmental and Quality Management System (HSEQ MS) with associated health, safety and environmental standards, work practices and procedures in place for its construction and operational activities. These have been developed and implemented, and are continuously updated, in accordance with IOC's corporate Health, Safety, Environment, Communities and Quality Policy, other relevant corporate requirements and guidelines, and with a view to meeting, and seeking to surpass, the provisions of applicable legislation and regulations. As part of its HSEQ MS, IOC has a comprehensive Environmental Management System (EMS) certified to the ISO 14001-2004 Environmental Standard, including plans and procedures designed to avoid or reduce the environmental effects of its activities. Associated with its HSEQ MS, IOC has a very rigorous internal and external auditing process which annually evaluates the management systems' performance with the objective of continuous improvement. Rio Tinto's *Iron Ore Health, Safety, Environment and Quality Policy* is provided in Appendix A of this document.



Figure 1: Site Overview

The Project, as it develops through its various phases from conception to closure, will be evaluated to ensure that it fully conforms to IOC's internal standards and complies with all applicable legislation. Risk evaluation is required through each phase of the Project and mitigation measures will be identified and implemented to minimize or eliminate risks. IOC's major shareholder and operator, Rio Tinto, has developed world class standards in the area of health, safety, and environment and community relations.

## 1.2 Rationale for the Undertaking

IOC mines ore from multiple pits to feed its concentrator. These pits are a combination of large, long life pits and smaller shorter life pits. IOC aims to blend the feed from multiple sources to:

- Meet product quality criteria by blending ores of differing quality;
- Balance strip ratios to minimize the variability of material movement rates;
- Provide feed sources close to the various loading pockets of the ore delivery system; and
- Minimize the disruption to production during blasting operations, by providing multiple ore sources.

The Smallwood North pit is located close to loading pocket 3 and has a strip ratio close to the orebody average. It is a small pit, with a short development time, which can be balanced against the larger, longer development time pits (e.g., the later pushbacks on the Humphrey Main pit).

The Project will encompass an area of approximately 53 ha for the pit and approximately 106 ha for the waste dump.

The current design of Smallwood North Pit contains approximately 60 million tonnes of ore and 75 million tonnes of waste. Planned activity at Smallwood North Pit will include site clearing, removal of overburden (topsoil and glacial till), drilling and blasting of the exposed rock, and construction of haul roads.

The Project will be fully integrated with IOC's overall Labrador City Operations and will utilize its existing:

- Mining equipment;
- Labour force;
- Maintenance facilities;
- Ore delivery systems;
- Processing plants; and
- Tailings management facilities (TMF).

The proposed Smallwood North Pit Extension will allow IOC to continue to operate in an efficient manner. Utilization of small, remnant deposits, such as the Smallwood North deposit, also allows IOC to responsibly extract all of the available mineral resource.

### 1.3 Environmental Assessment Process and Requirements

The Newfoundland and Labrador *Environmental Protection Act* (NL EPA) requires anyone who plans a project that could have a significant effect on the natural, social or economic environment (an “Undertaking”) to present it for examination through the provincial EA process.

Under the NL EPA (definitions), an Undertaking “includes an enterprise, activity, project, structure, work or proposal and a modification, abandonment, demolition, decommissioning, rehabilitation and an extension of them that may, in the opinion of the minister, have a significant environmental effect”.

The associated Environmental Assessment Regulations (Part 3) list those projects (potentially including proposed modifications and extensions of same) that require registration and review. These include, for example:

*“33(2) An undertaking that will be engaged in the mining, beneficiating and preparing of a mineral as defined in the Mineral Act whether or not these operations are to be performed in conjunction with a mine or at mills that will be operated separately.”*

Following public, Indigenous and governmental review of this EA Registration, the Minister of Municipal Affairs and Environment will determine whether the Project may proceed, subject to any terms and conditions and other applicable legislation, or whether further assessment is required.

## 2.0 Project Description

The following sections describe the Project location, geographic setting and land tenure.

### 2.1 Property Description and Location

The proposed Smallwood North Pit Extension Project is located to the north-east of the previously mined Smallwood pit. The Project is located in western Labrador within IOC's existing property boundaries. The approximate coordinates of the proposed open pit are 53° 03' 06" N latitude and 66° 55' 30" W longitude at 640 to 850 masl. The proposed Project area has a surface area of 159 ha, comprising a mine pit (53 ha) and a waste rock dump (106 ha) (Figure 2).

Topsoil and overburden from the project will be stored in an existing overburden stockpile to the south of the project area. The pit is located in a north-east – south-west trending valley, which drains into Lorraine Lake (Figure 3). The pit is located immediately to the north of Dorothy Lake and overlaps the northern extent of the old Smallwood pit. A short section of haul road will connect the pit with IOC's existing haul road network.

Ore from the pit will be hauled to existing loading pockets for delivery to IOC's existing concentrator. Most ore will be hauled to the adjacent loading pocket 3. Waste rock will be hauled to the new central west waste dump, which will be built to the west of the pit.

The waste dump will be built against a prominent quartzite ridge and will be bounded on the east by the existing haul road linking loading pockets 3 and 4. A large basin on the east side of the ridge will be filled with waste rock. Access to the waste dump will be developed from an existing area of waste dumps and the new dump will extend over the existing Repeater Hill waste dump. The dump is to the east of the Humphrey North pit.

Both the pit and the waste dump will require the relocation of existing high voltage powerlines. Engineering studies will determine which powerlines need to be replaced and which ones can be removed without being replaced. Realignment of the powerlines, where required, will slightly increase the footprint of the project.

The bottom of the pit will be approximately 50m below the level of water in Lorraine Lake and approximately 150m below the water level of Dorothy Lake; the pit will be located in a regional low point. Consequently, it is likely that significant groundwater extraction will be required to allow for efficient mining operations. It is anticipated that at least one dewatering well will be required and any well placement will occur through the Water Resources Management Division's permitting process.

Surface water from the pit area will be captured in an interception sump at the northern end of the planned pit during initial pit development. As the pit develops, surface water will be captured in sumps developed within the pit as is the current operating practice. Surface water from the waste dump will flow into the existing surface water drain running beside the haul road

between loading pockets 3 and 4 and will be managed by the existing surface water management system.

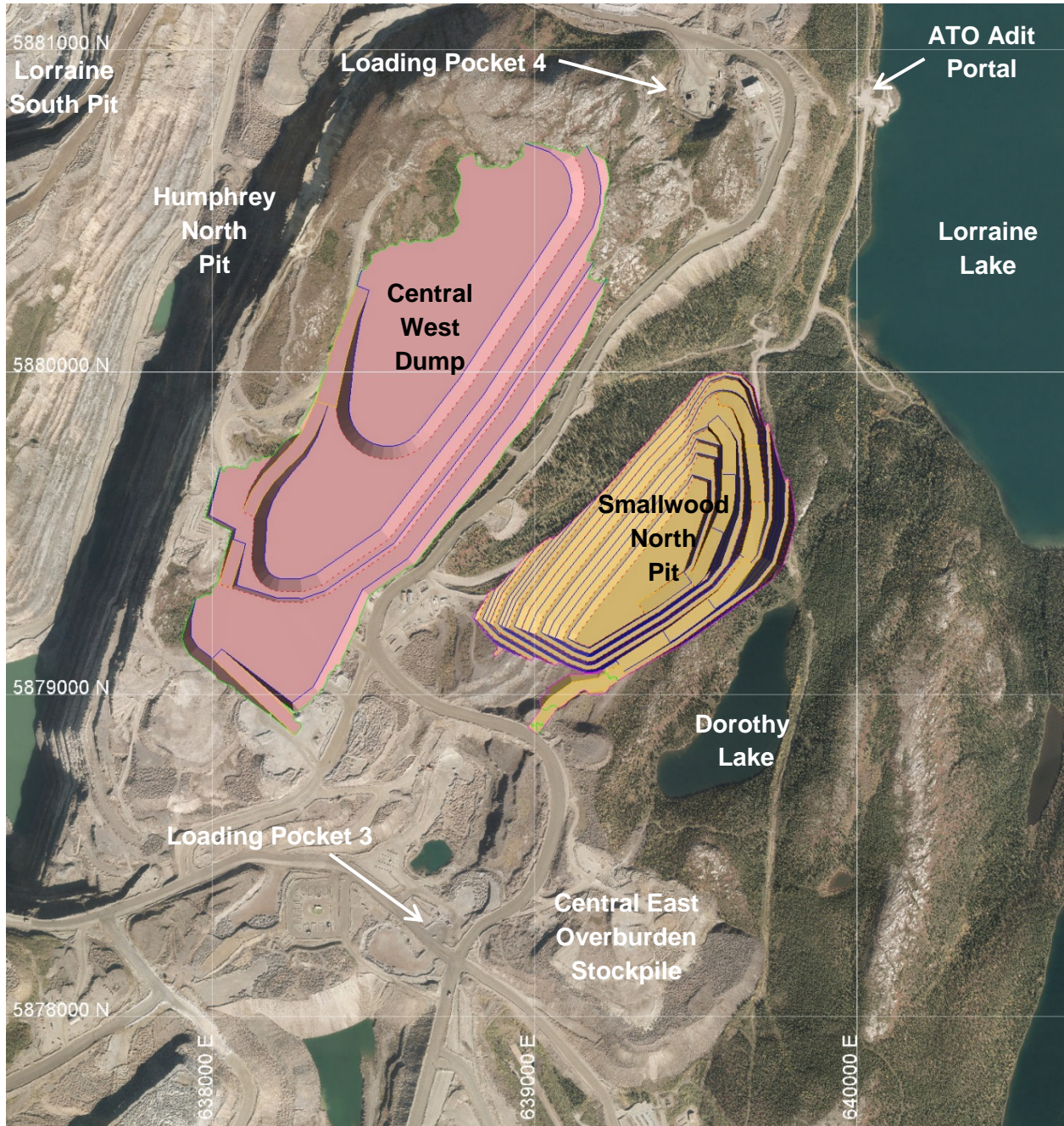
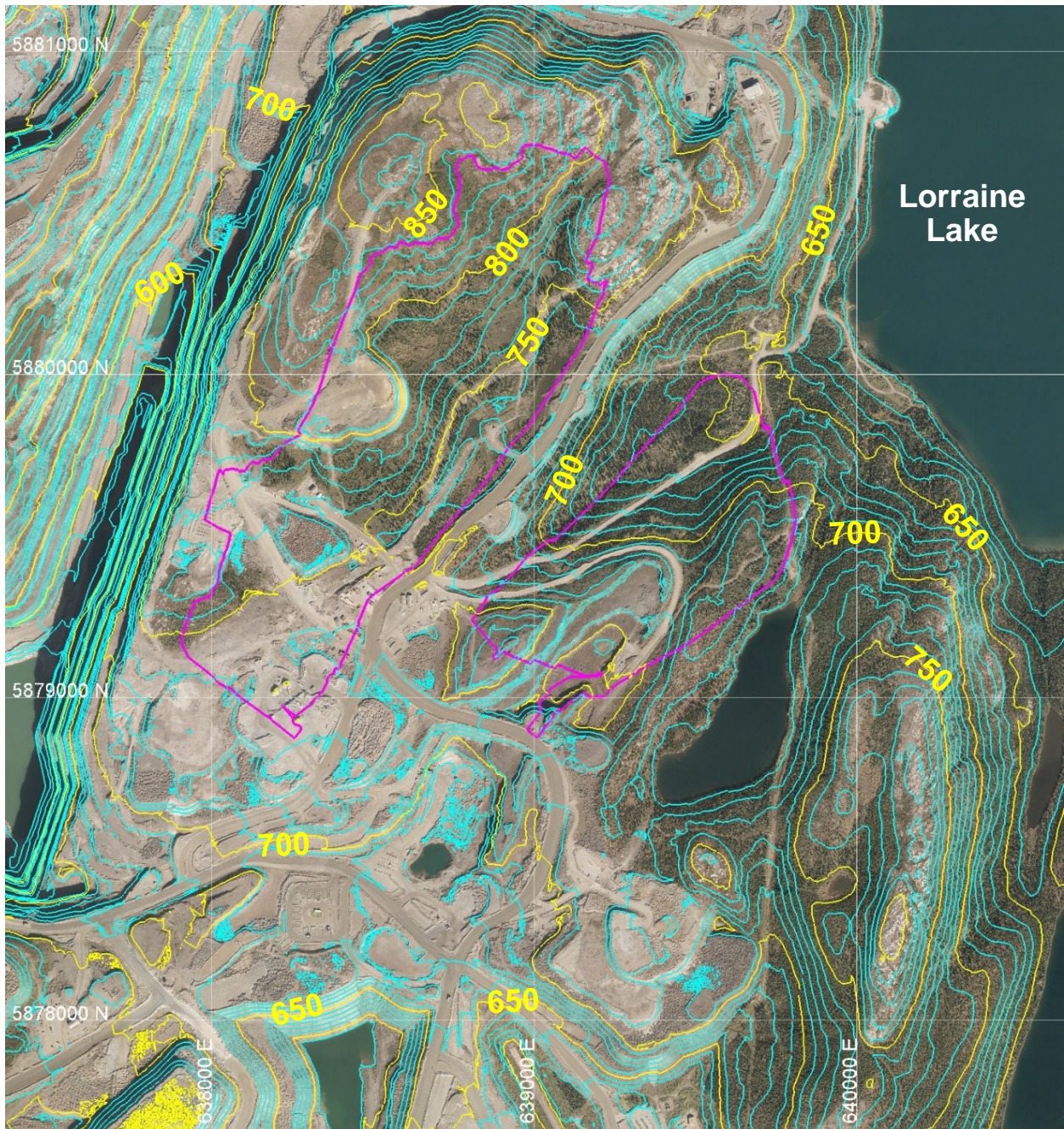


Figure 2: Project Overview



Major Contour Interval 50m; Minor Contour Interval 10m

**Figure 3: Project Topography**

## 2.2 Land Tenure

The proposed Project is located on Mining Lease 12, Block 22-2 (mine pit, haul roads, dewatering infrastructure, power lines, existing overburden stockpile and a portion of the waste dump), Mining Lease 21, Block 64-1 (most of the waste dump) and Mining Lease 10, Block 22-1 (a portion of the waste dump) (Figure 4). The Labrador Iron Ore Royalty Corporation (LIORC) holds mineral rights over all of these Mining Leases. LIORC holds surface rights over Mining Leases 12 and 21 through a grant of surface rights made in 1960 and over Mining Lease 10

through a surface lease issued in 1990 (Figure 5). LIORC subleases these mineral and surface rights to IOC.

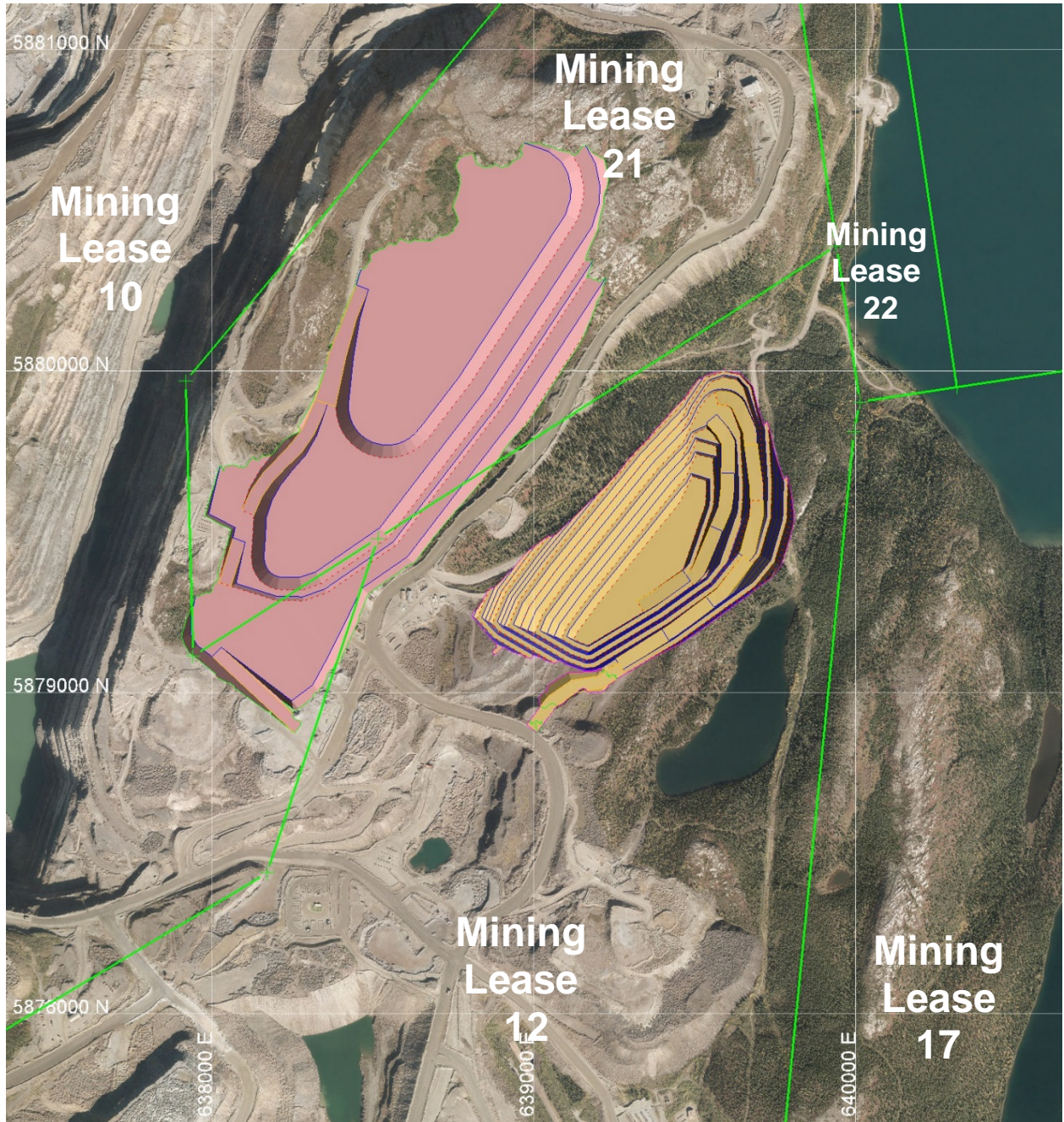


Figure 4: Mineral Tenure – Smallwood North Pit Extension





**Figure 5: Surface Rights – Smallwood North Pit Extension**

**2.3 Alternatives to the Project**

The alternatives to the proposed Project are:

- A delay of the Project;
- Development of other iron deposits within the IOC leases;
- Closure of the IOC operation after exhausting the existing operating pits; or
- No Project

Delaying the project will leave a shortfall in concentrator throughput which will either result in reduced output, or require a short term increase in stripping, to access replacement ore from the existing pits. Reduced throughput adversely impacts IOC's profitability, which adversely impacts the economy of Labrador West. Volatile mining rates lead to workforce volatility, which creates adverse social impacts to the local communities. Progressive development of new deposits, with consequent stability in mining rates results in more stable employment and benefits the communities where IOC operates.

IOC has a number of alternative deposits which are being considered for development in the coming years, but, unlike the Smallwood North Pit Extension, these alternatives are either large pit developments, with considerably larger development costs and timelines, or developments in more environmentally and/or community sensitive areas. Few could provide ore within the same timeframe as Smallwood North Pit and some require considerable additional drilling to confirm mineral resources. These alternative mining projects will be registered for Environmental Assessment once IOC has clarity on likely development scopes and timelines. IOC believes that timelines for developing these alternative deposits does not allow them to replace the proposed Smallwood North Extension Project.

IOC has a considerable remaining mine life from its existing operating pits. Limiting development to those pits, however, could result in an earlier closure of IOC's operation, which will adversely impact both Labrador West and the province. Progressive development of IOC's full resource potential delivers sustained, longer term benefits to both the region and the province.

The No Project alternative would not allow IOC to fully exhaust mineral reserves in areas adjacent to active pits and could also result in an earlier closure of IOC's operation.

IOC has considered alternative means of carrying out the Project, however as this is simply maximizing resource extraction in an existing mining area there are few alternative activities available for consideration. The method of mining (stripping, drilling and blasting, hauling/conveying) is industry standard for iron ore mining activities and IOC has been improving these methods for many years based on cost, schedule and environmental considerations. The open pit footprint is developed based on the economic model for the pit, and as per the *Mining Act* requirements, must exploit all economic ore from the ore body. There are alternatives to the waste rock disposal location, but the planned dump is close to the open pit, within an area which is surrounded by mining disturbance, and is clearly preferable to developing a pristine area. The stripped organics and overburden will be stored for use in future rehabilitation of mine areas in accordance with the requirements of the Department of Natural Resources.

## 2.4 Project Components

The proposed Project involves permitting, construction, operations, closure and rehabilitation, and post-closure monitoring activities.

Development of the proposed Project includes the following physical components (Figure 2 and Figures 6 to 8):

- An open pit mine;
- An existing overburden stockpile south of the open pit;
- A new waste rock storage site (the Central West Dump), to the west of the open pit;
- A short length (~350 m) of haul road to connect the open pit to the existing haul road network, which provides access to the waste rock dump, the overburden stockpile area(s), the existing ore delivery system and the concentrator facilities;
- Realignment of existing power lines which lie within the footprints of the pit and dump;
- Construction of a short length of powerline to connect the pit to the existing power distribution network;
- A groundwater extraction system and associated pipelines; and
- A mine surface water management system and associated pipelines.

Each of these key components are discussed in the following sections.

#### **2.4.1 Open Pit Mine**

The Smallwood North Pit Extension Project will be a conventional open pit mine with associated components and activities which are being designed to support flexible ore feed to IOC's existing production facilities. The Project targets a discrete mineralized zone to the north of the previously mined Smallwood pit.

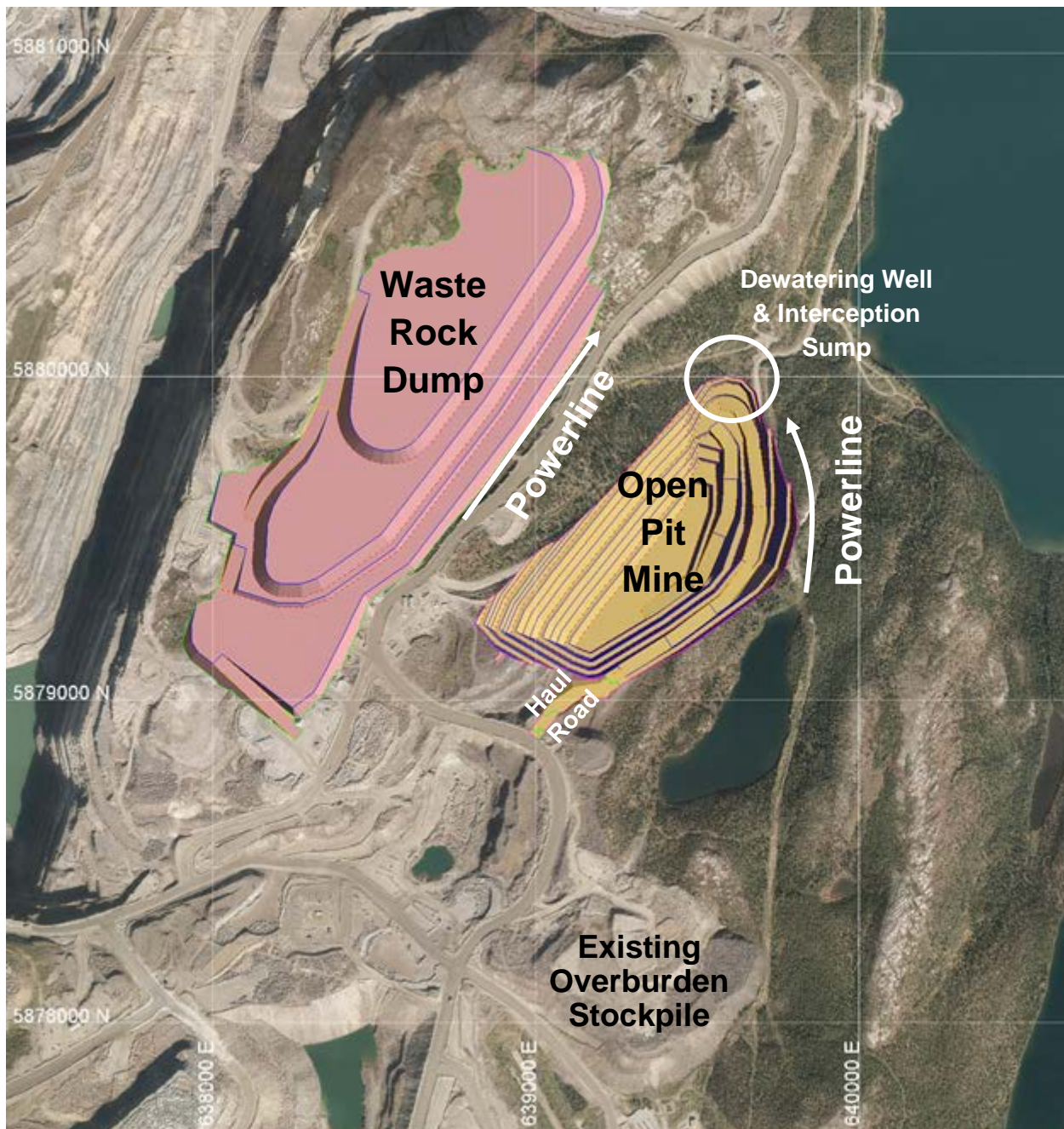
Standard open pit drilling and blasting techniques will be used to break the rock mass and allow excavation and movement of the rock materials. Waste and feed material will be separated at the dig face by the excavators, with waste material being hauled to the new Central West waste rock dump area and the ore being taken to ore delivery system loading pockets for transportation to the concentrator for processing.

The proposed Project has been designed for development in a single phase.

#### **2.4.2 Overburden Handling and Storage**

Prior to commencing overburden removal from both the open pit and waste rock dump areas, the site will be cleared of any brush, shrubs or trees via mulching.

The overburden will be hauled to the existing Central East overburden stockpile and/or to a new stockpile to the east of the existing stockpile. Organic rich material (peat/topsoil) in the pit area will be segregated from the underlying glacial till (soil) and either placed directly onto rehabilitation areas or stockpiled separately from the glacial till soils. The thickness of organic rich material has been assumed to be 0.2 m. The location and design of the overburden stockpiles relative to the pit are shown in Figure 6.



**Figure 6: Project Components**

Estimated overburden volumes for both the pit area (till and organics) and the waste dump area (topsoil only) are listed in Table 1. The overall depth of the overburden at Smallwood North Pit is uncertain. An allowance of 2 m average thickness has been used to estimate overall overburden thickness until measurements can be made. As indicated above, the thickness of the organic rich (topsoil) layer has been assumed to be 0.2 m (assumed to be included within the above 2 m thickness of overburden). Where feasible, till and topsoil will be placed directly onto areas which are being progressively rehabilitated. If, however, suitable rehabilitation areas are not available during development of the pit and waste dump, the Central East overburden

stockpile has sufficient capacity for the above till and topsoil volumes. Top soil will be stockpiled separately from till.

**Table 1: Estimated Overburden Volumes and Tonnages**

	Till/ Sediments	Organics/ Topsoil	Total
	m <sup>3</sup>	m <sup>3</sup>	m <sup>3</sup>
Pit	624,000	69,000	693,000
Waste Dump		128,000	128,000
<b>Total</b>	<b>624,000</b>	<b>197,000</b>	<b>821,000</b>

### 2.4.3 Waste Rock Disposal

Estimated waste rock volumes and tonnages for Smallwood North Pit are listed in Table 2. The waste rock will be placed in the Central West waste rock dump, which will be developed to the north of the pit. The waste dump will be developed using lift heights that are not higher than 30 m. Berms will be left between lifts which are sufficiently wide to allow rehabilitation of the dump to a 20 degree slope angle, to facilitate revegetation of the entire dump.

**Table 2: Estimated Waste Rock Volumes and Tonnages**

Mined Waste		Dumped Waste (25% swell)
Mm <sup>3</sup>	Mt	Mm <sup>3</sup>
<b>2.7</b>	<b>8.8</b>	<b>3.4</b>

It has been assumed that the waste rock increases in volume (“swells”) by approximately 25% when excavated.

Creation of the Central West waste rock dump may require realignment of the access road for 4-Adit and possible relocation of the sewage treatment plant. These operational adjustments will fall within areas already disturbed, or slated for development as part of the Project. Any required permits and approvals will be obtained from the Provincial Government following EA release and prior to initiation of realignment or relocation activity.

### 2.4.4 Ex-Pit Haul Roads

A short (~350 m) haul road will be built from mine waste rock to connect the Smallwood North pit to IOC’s existing haul road network (Figure 6). This haul road will be built at an 8% gradient. IOC will mitigate the risk of collision between pieces of heavy equipment and light vehicles by maintaining conservative road widths and by designing intersections to provide good visibility to all vehicles. Where practical, light vehicles will use roadways which are physically segregated from the heavy equipment haul roads.

### 2.4.5 Power Lines

Figure 7 shows the network of powerlines and the facilities they supply in the Smallwood North project area. Major powerlines run through both the pit and the waste dump areas. Some, but not all, of these powerlines will need to be realigned outside the pit and dump footprints. Further engineering studies are required to finalise the required power network.

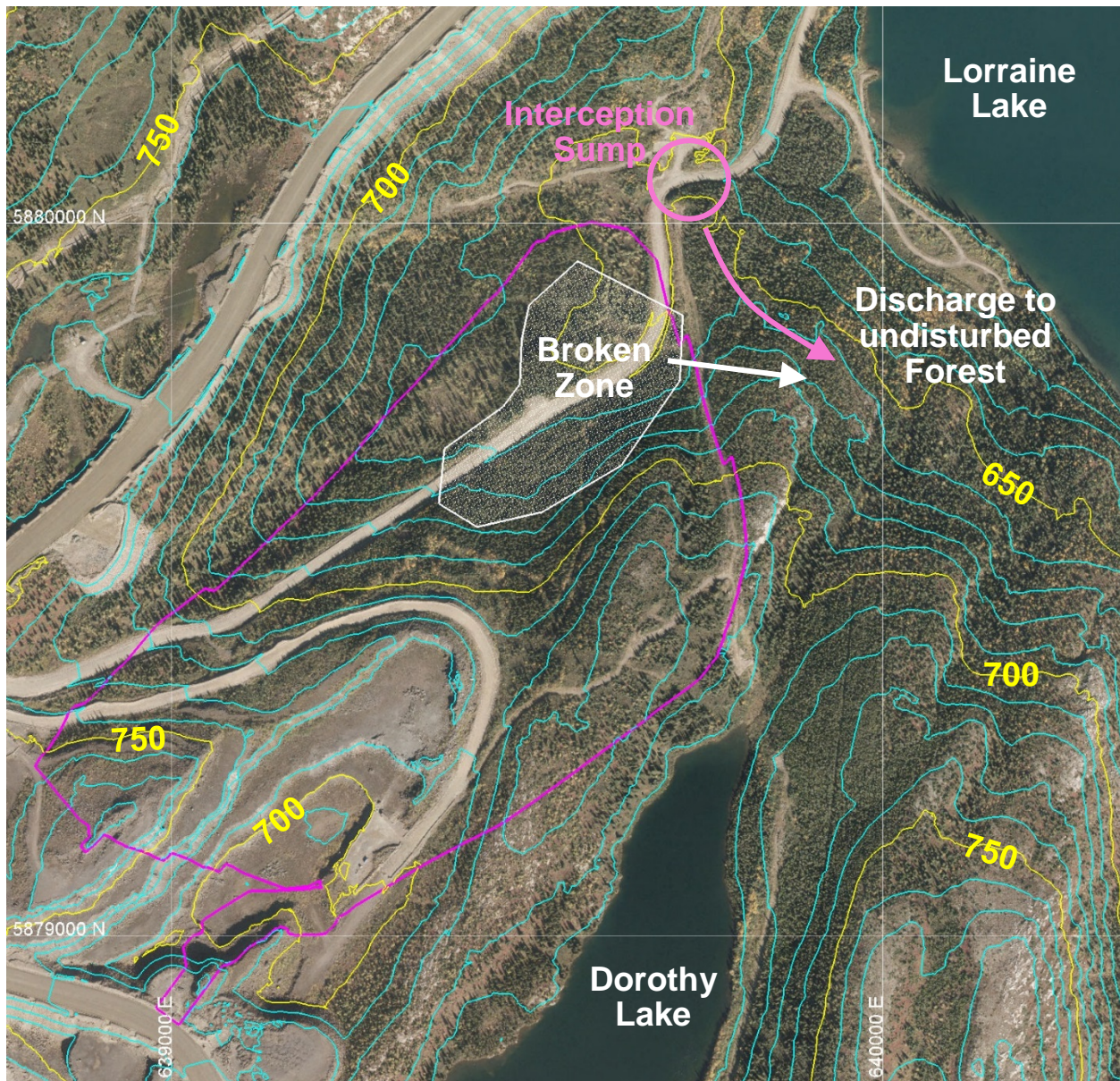
A short branch line is likely to be required to connect the existing high voltage network to the Smallwood North pit. The existing earthing grid is suitable for Project use.



**Figure 7: Power Lines**

### 2.4.6 Groundwater Management

A permeable, limonite altered zone of broken ground has been identified at the northern end of the Smallwood North deposit (Figure 8). Based upon previous experience in other pits where mining has proceeded below the water table, it is likely that this area will provide a suitable target for the construction of one (or more) deep dewatering well(s) to advance-dewater the material at depth which is expected to be saturated. This will allow drilling, blasting, and digging to be conducted under dry conditions. Groundwater extraction rates and the infrastructure required to establish and maintain adequately dewatered conditions at depth within the pit are not currently understood. These issues will be the subject of further study and initial investigative groundwater drilling will be undertaken during 2018.



**Figure 8: Planned Dewatering Well**

Piezometers will be installed in the Project area to allow IOC to better understand the aquifer characteristics and to allow the progress of dewatering to be monitored. If monitoring of the water table indicates that one well will not provide sufficient draw down of the water table within the mine plan timeframe, additional dewatering infrastructure will be developed. Timing of the first installation of dewatering infrastructure is likely to occur well in advance of the planned timing of mining activity to drill, blast, and dig the currently saturated material.

Groundwater discharge is likely to be pumped directly to Lorraine Lake or to an adjacent area of undisturbed forest from where it will flow through naturally occurring vegetation, eventually discharging into Lorraine Lake. Discharge points will be located and designed to minimize or prevent erosion. It is intended that the two discharge points (i.e., for ground water and surface water) will be located near each other to facilitate the on-going efficient monitoring of both discharges.

#### **2.4.7 Surface Water Management**

Surface run-off from the Smallwood North pit area will flow down the natural valley toward Lorraine Lake. To prevent discharge of mine effluent into the lake, an interception sump will be excavated below the pit area prior to the commencement of mine development. Mine run-off collected in the sump will be pumped to a discharge point in an adjacent area of undisturbed vegetation. After the pit has developed below the level of the interception sump, surface run-off will be collected in in-pit sumps and pumped to the same discharge point.

The sump discharge point will be a vegetated area more than 100 m from a waterbody or stream and the water will discharge freely from the pipe onto a prepared rock surface. The rock surface will be designed according to the proposed flow to avoid or minimize any erosion from the discharge. The discharge point will be monitored to ensure it does not damage vegetation or make a direct channel to any lakes or streams. Minimal in-pit groundwater seepage is anticipated, as a consequence of the planned development of advance dewatering infrastructure, as indicated above. Surface run-off from the Central West dump will flow to the existing road-side drain beside the main haul road connecting pockets 3 and 4. From there it will be managed by the existing mine water handling system. The Smallwood North Pit Extension Project will utilize the established surface water management infrastructure (sump, pumps, pipelines & discharge points) to the extent that is feasible.

### **2.5 Construction**

Construction activities are currently planned to commence in 2021, subject to the project being released from Environmental Assessment and once all other regulatory permits and approvals are in place. Construction activities associated with the Project include the following:

- Haulage Road construction;
- Vegetation clearing and grubbing;
- Overburden removal and storage;
- Development of access to the first mining bench;
- Power line installation (if required);



- Installation of a dewatering well; and
- Installation of surface water management facilities (sumps, pumps and pipelines).

The Project will be developed in the same manner as all of IOC’s existing pits and waste dumps. Contractors will be used to clear vegetation (Figure 9), strip organic material and glacial till and carry out the initial drilling and blasting. The contractors will also build the initial haul road and remove some waste to develop access to the initial mining benches.

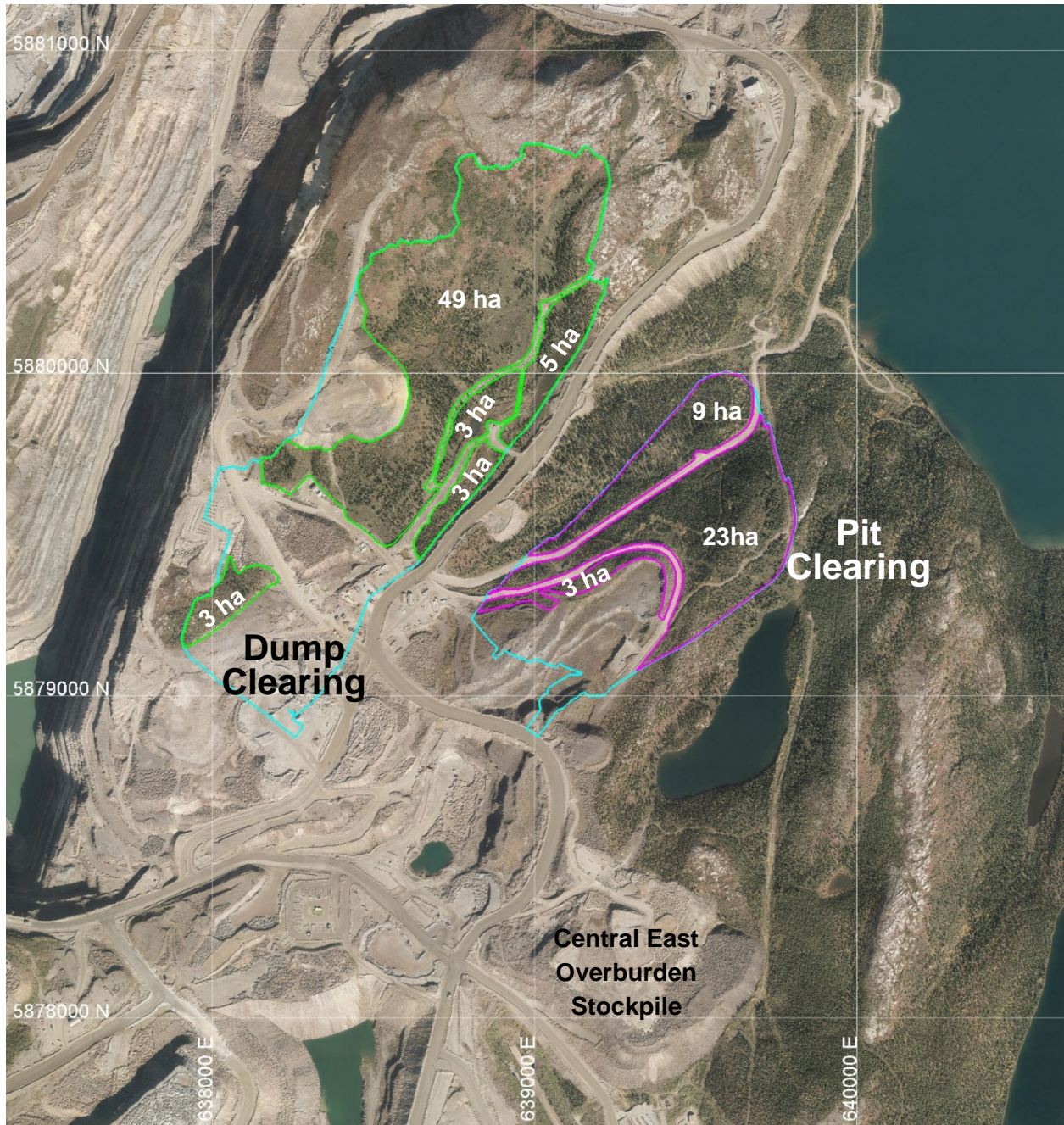


Figure 9: Clearing Areas

Trees in the area of the pit and the waste dump will be mulched. Topsoil and till from the pit area and topsoil from the waste dump area will be stockpiled on the existing Central East overburden stockpile.

Approximately 63 ha will be cleared and stripped in the waste dump footprint and 35 ha will be cleared and stripped in the pit footprint. The remaining areas (42 ha in the dump and 18 ha in the pit) have been previously disturbed.

Pit development drilling and blasting will follow overburden stripping in the pit area and will be carried out by a mine contractor. Access to the top mining bench will be excavated by the contractor fleet.

Initial development volumes are listed in Table 3. The clearing area listed is the total undeveloped area of the pit and dump. Some of this area, particularly in the waste dump, has little or no vegetation or topsoil due to rock outcrops so the actual clearing area and topsoil volume will be somewhat less than listed below.

**Table 3: Development Volumes**

Facility	Total Area	Clearing Area	Previously Disturbed Area	Topsoil	Till	Total Material Stripped	Dev't Drill & Blast
	ha	ha	ha	kbcm	kbcm	kbcm	kbcm
Central West Dump	106.1	64.0	42.1	128		128	
Smallwood North Pit	53.2	34.7	18.5	69	624	693	364
<b>Total</b>	<b>159.3</b>	<b>98.7</b>	<b>60.6</b>	<b>197</b>	<b>624</b>	<b>821</b>	<b>364</b>

## 2.6 Operations and Maintenance

Once the pit has been developed to the point where IOC's larger mining equipment can operate efficiently, the contractors will be replaced by IOC's mining fleet, which will be moved from other areas of the operation. Ore from Smallwood North Pit will be hauled to IOC's Automatic Train Operation (ATO) for transportation to the concentrator.

## 2.7 Possible Accidents and Malfunctions

Human health and safety and environmental protection will be paramount considerations by IOC in the planning and detailed design of the Project. In the construction, operation and maintenance of the Project, established safety procedures specific to human health and environmental protection will be strictly adhered to. IOC has a site wide EPP (Appendix B) with policies and procedures that will be applicable to all aspects of the Project. In addition there are comprehensive Health, Safety and Environmental Management Systems and associated plans and procedures in place for all of IOC's operations in Labrador City. These will be updated as required for the proposed Project. In addition, the construction and operation of the Smallwood North Pit will be designed in compliance with relevant legislation, regulations, standards and

guidelines. Emergency response and spill response procedures are captured in existing IOC plans and procedures.

Potential accidental events or malfunctions that may occur include, but are not limited to, the following:

- An accidental spill of chemicals, fuels or other deleterious substances;
- A fire or explosion of equipment;
- Equipment failure; and
- Traffic mishaps.

## 2.8 Closure and Decommissioning

IOC submitted a site wide Rehabilitation and Closure Plan for its existing mining, processing and product delivery infrastructure on July 21, 2010, which was subsequently accepted by the provincial government. An update to the site wide Rehabilitation and Closure Plan was submitted on February 21, 2017, and is still undergoing review by the NL government.

Upon completion of operations at Smallwood North Pit, continued mine water management will be conducted as outlined by any regulatory requirement. The rehabilitation of the Smallwood North Pit will be added to the IOC's overall Rehabilitation and Closure Plan for their Labrador City operations. The estimated rehabilitation costs will be calculated and appropriate financial assurances will be put in place through the Newfoundland and Labrador Department of Natural Resources (NLDNR).

The incremental rehabilitation plan for the Project will comprise:

- Dismantling and removal of all powerlines, pipelines, pumps and associate facilities and removal of all material from site, in a manner consistent with the approved closure plan;
- Stabilization of the abandoned pit slopes;
- Construction of a perimeter safety berm around the abandoned pit; and
- Revegetation of disturbed areas (including the pit haul road), in a manner consistent with the approved closure plan.

It is anticipated that surface and groundwater flows into the completed Smallwood North pit may result in the development of a pit lake, with a stable water level.

The lifts on the Central West waste dump will be dozed down to a 20 degree slope, spread with overburden and topsoil and revegetated.

The above rehabilitation procedures are consistent with the updated site-wide Rehabilitation and Closure Plan submitted to the NLDNR in February 2017.

Figure 10 shows the conceptual rehabilitated landform of the Smallwood North Pit Extension Project.

Depending on the relative timing of mining operations from Smallwood North and IOC's other deposits, there could be an opportunity to partially or completely backfill the Smallwood North Pit with waste from other mining areas. This will be incorporated into the closure plan when detailed scheduling confirms an opportunity.



**Figure 10: Conceptual Rehabilitated Project Site**

## 2.9 Effects of the Environment on the Project

The regional topography, climate, existing development and hydrogeological conditions primarily influenced the design of the Project. IOC plans that construction activities for the Project will commence during the spring of 2021, so that operations can begin at the end of

summer in 2022. The primary anticipated impact from the environment on the Project is water inflow into the pit. No specific or special mitigation measures, beyond normal water management strategies (e.g., advance dewatering), are proposed relative to the possible effects of the environment on the Project.

### 2.10 Project Schedule

IOC is anticipating construction activities will take place in the summers of 2021 and 2022, assuming release from EA and the receipt of all other required environmental approvals and permits. Open pit mining operations would follow as soon as pit construction activities are completed. Refer to Table 4 for a brief schedule outline.

**Table 4: Indicative Development Schedule**

Activity Name	2021							2022								
	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Contractor mobilisation	█															
Interception Sump		█														
Tree Clearing / Mulching			█	█	█											
Overburden Stripping				█	█	█	█									
Development Drill and Blast												█	█	█	█	
Road Building														█	█	
Dewatering Well				█	█											
Pipeline Installation		█	█	█												
Powerline Construction		█	█	█	█											
Contractor demobilisation																█
Mine production																█

### 2.11 Environmental Management and Protection

The proposed Project would be constructed and operated as part of on-going and long-standing work associated with IOC’s Labrador City operations. The company has in place a comprehensive HSEQ MS and associated environmental plans and procedures for its development and operational activities. These have been developed and are being implemented and continuously updated in accordance with its corporate Health, Safety, Environment and Quality Policy (Appendix A), other relevant corporate requirements and guidelines, and with a view to meeting, and seeking to surpass, the provisions of applicable legislation and regulations.

As part of its existing systems and processes, IOC has in place a comprehensive EMS including various associated plans and procedures designed to avoid or reduce the environmental effects of its activities. The proposed Project will be constructed and operated in

accordance with applicable legislation and regulations, including the environmental protection and planning measures defined through this EA review, and in compliance with IOC policies, procedures and standards.

Table 5 provides a list of some of IOC's existing environmental plans for its Labrador City development activities and operations. A review and updating of these and other existing procedures will be carried out as Project planning and implementation progress, including the incorporation of the proposed Project activities into IOC's overall integrated management system.

**Table 5: Select IOC Environmental Management Plans**

Title of Plan
Contaminated Soil Management
Spills of Toxic or Hazardous Materials
Environmental Reporting
IOC Lab City – Operational and Development Environmental Protection Plan
Hazardous materials and non-mineral waste control and minimization
Water Quality Protection and Water Management Standard
Land and Watercourse Disturbance Permits
Land Disturbance Control and Rehabilitation Standard
Spill Response Reporting

### 2.11.1 Environmental Protection Plan

Environmental protection planning is an integral part of IOC's construction, operations and maintenance programs. As a corporation with significant experience in constructing, operating and maintaining mining related infrastructure and activities in Labrador City and elsewhere, IOC has proven policies and procedures related to environmental protection and management which will be implemented during the construction and operation of the Project.

An EPP is an important tool for consolidating project-specific environmental information and procedures in a format that provides sufficient detail for the implementation of environmental protection measures in the field. An EPP provides concise instructions to personnel regarding protection procedures and descriptions of techniques to reduce potential environmental effects associated with a specific construction or operations activity.

IOC has developed and implemented a site wide EPP for its Labrador City mining activities. This EPP will apply to components and activities associated with construction and operations at the proposed Smallwood North Pit Extension Project.

The EPP includes procedures and measures relative to activities such as vegetation clearing, grubbing, storage and handling of fuel, blasting, quarrying, dust control, waste and sewage disposal, work in or near water, as well as contingency plans for unplanned events such as

spills, rehabilitation and compliance monitoring. A copy of IOC's current site wide EPP is included in Appendix B.

### **2.11.2 Emergency Response and Reporting Plan**

IOC proactively identifies potential emergency situations and develops Emergency Response and Reporting Plans (ERRP), the purposes of which are to identify responsibilities and procedures in the event of an unplanned incident, such as an incident that may affect human health or safety, or the accidental release of hazardous material, and to provide the information and procedures required for the effective response and reporting of such an incident.

There are comprehensive incident prevention, response and reporting plans and procedures in place for IOC's overall Labrador City mining operations.

IOC has established a Business Resilience and Recovery Program (BRRP) that has identified high emergency risks and has developed detailed plans to mitigate them. The BRRP is to ensure that the appropriate resources and incident response plans are prepared, practiced and available. The plans provide an effective response for the mitigation, control and recovery from incidents which can affect or disrupt business at IOC. Activities associated with the Project will be evaluated under the BRRP. The BRRP is routinely tested and audited to ensure it meets the ongoing needs of IOC.

## **2.12 Other Required Environmental Approvals**

In addition to approval under the provincial EA process, the proposed Project requires a number of other permits and authorizations. IOC will obtain all required permits or applicable authorizations for the Project.

### 3.0 Environmental Baseline

The sections below provide an overview of the existing biophysical and socioeconomic environments for the proposed Project.

#### 3.1 Natural Environment

The area surrounding the proposed Smallwood North Pit Extension Project has been affected by IOC's mining operations for the past five decades. Many components of the natural environment have been affected by this previous work to varying degrees.

##### 3.1.1 Atmospheric Environment

Iron ore mining forms the industrial base for the Towns of Labrador City and Wabush and is the main industry affecting the quality of the local atmospheric environment. Releases of air contaminants are generally classified into criteria air contaminants (CACs) and greenhouse gases (GHGs). CAC's are a set of criteria pollutants that cause smog, acid rain and other health hazards, and include particulate matter (PM), sulfur dioxide (SO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>), and carbon monoxide (CO). Table 6 provides a list of typical sources of CAC emissions from iron ore operations.

**Table 6: Iron Ore Mining Sources of CAC Emissions**

Source of Emissions	Type of Emission
Use of large trucks and excavators to mine iron ore	Particulate, NO <sub>2</sub> , SO <sub>2</sub> and CO
Blasting	Particulate, NO <sub>x</sub> and SO <sub>2</sub>
Fugitive emissions from active quarries and tailings piles	Particulate
Rock crushers	Particulate
Concentrator Plants	Particulate, metals, NO <sub>2</sub> , SO <sub>2</sub> and CO
Pelletizing Plants	Particulate, metals, NO <sub>2</sub> , SO <sub>2</sub> and CO
Transport – Rail	Particulate, NO <sub>2</sub> , SO <sub>2</sub> and CO
Use of smaller service trucks onsite	Particulate, NO <sub>2</sub> , SO <sub>2</sub> and CO

Mining operations at IOC are typical of other open pit mining operations in the area. Blasting is conducted to free the crude ore by drilling holes into the rock and filling them with emulsion explosives product. Ore and waste rock are mined using large front end loaders, hydraulic excavators and electrical shovels. Haul trucks, the automatic train operation and the overland conveyor system transport the rock to the primary crushers. The ore is reduced in size in the crushers and then sent to the concentrator where it is ground to a fine sand size to separate the iron ore from the waste minerals (tailings). The tailings are slurried and piped to the tailings disposal areas. At IOC, a portion of the concentrate is pelletized with additional grinding and



sintering in a furnace. Pellets and concentrate are loaded and transported by rail to Sept Îles for export.

The main contributor to possible negative air quality at IOC's Labrador City operations is the pelletizing operation. IOC has improved the air quality of their operations over the past 20 years through pollution abatement projects. There has also been a large reduction in particulate emissions with the replacement of dry mill processes with wet grinding mills.

### 3.1.1.1 Air Quality Monitoring

IOC maintains three air quality monitoring stations at their Labrador City operations that are in close proximity to the local community and to recreational facilities (Figure 11). Data from these monitoring stations is compiled by the Newfoundland and Labrador Department of Municipal Affairs and Environment (NLDMAE) and the results published in annual Air Quality Reports. These reports can be viewed at the following web address:

[http://www.mae.gov.nl.ca/publications/env\\_protection/2016%20Air%20Quality%20Annual%20Report.pdf](http://www.mae.gov.nl.ca/publications/env_protection/2016%20Air%20Quality%20Annual%20Report.pdf).



**Figure 11: Air Quality Monitoring Stations at Labrador City Operations**

Results from the 2015 and 2016 monitoring programs indicate no exceedances of SO<sub>2</sub>, NOX or PM<sub>2.5</sub> at any established monitoring locations. IOC believes that given the distance of the Project area from both Labrador City and Wabush, there are unlikely to be any negative effects to air quality during construction or operation of the Smallwood North Pit. Air quality monitoring will continue and the data will be analyzed to verify these predictions. No new or modified air

quality monitoring/modeling is planned given the results of on-going air quality monitoring and also given the distance of the proposed Project from residential areas (Figure 12).



**Figure 12: Smallwood North Pit Relative to the Town of Labrador City**

3.1.1.2 Fugitive Dust

IOC has in place a Standard Operating Procedure, Fugitive Dust Management Operations, which applies to all operations at Labrador City. Implementation of the procedure includes continued efforts to carry out annual rehabilitation and revegetation of inactive sections of the

TMF and this has led to reductions in fugitive dust. Some minor revegetation also occurs within the mine at berms and other small areas no longer in use. IOC has also installed a dust suppression system to mitigate the fugitive dust in the pellet plant loadout area. Mitigations such as regular road watering also contribute to significantly reducing fugitive dust levels at the mine site and in the neighboring community. All applicable mitigations will be implemented as necessary during development and operation of the Smallwood North Pit Extension Project.

#### 3.1.1.3 Greenhouse Gas Emissions

GHGs including carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O) can be emitted from a number of natural and anthropogenic sources. The 2015 total Newfoundland and Labrador GHGs expressed as carbon dioxide equivalent (CO<sub>2</sub> eq) is 10.3 Mt CO<sub>2</sub> eq (Environment Canada 2015), an increase of 2.1 % from the 2005 level. On average, normal IOC Carol operations (mining, transport, processing) produce approximately 1.0 Mt CO<sub>2</sub> eq annually, which account for approximately 10% of the CO<sub>2</sub> eq emissions for the province.

The 2015 total Canada GHGs expressed as CO<sub>2</sub> eq is 722 Mt, a decrease of 2.2 % from the 2005 level (Environment and Climate Change 2015). A comparison of the total CO<sub>2</sub> eq emissions for Canada with CO<sub>2</sub> eq emissions from the existing IOC operations indicates that IOC emissions represent approximately 0.14 % of the CO<sub>2</sub> eq emissions for Canada.

Since both construction and operation activities associated with the Smallwood North Pit will utilize existing equipment and employment resources, and no net increase in ore production is anticipated, no additional GHGs will be produced as a result of this new development.

#### 3.1.1.4 Noise and Vibration

IOC has established monitors in key locations within the Labrador City area to measure noise and vibration from blasting activities in the Wabush 3 pit (Figure 13). These monitors will continue to record data from IOC's Wabush 3 pit. Considering the distance of the proposed Project from recreational and residential areas, it is highly unlikely that any negative effects will be felt at these locations as a result of proposed activities at the Project site.

### 3.1.2 Regional Climate

The Project area is located in western Labrador, within IOC's existing Labrador City mine site. The site is located within the extensive Mid Subarctic Forest ecoregion (Meades 1989; 1990), which encompasses the upland plateaus of central and western Labrador. This area has a continental, subarctic climate with cool, short summers and long cold winters. At Wabush Airport daily average temperatures range from - 22.7 °C in January to + 13.7 °C in July, with 482.6 mm of rainfall and 445.7 cm of snowfall per year and prevailing westerly winds (Environment Canada 2004).



**Figure 13: Noise and Vibration Monitor Locations**

Climate information for the Project area presented in Table 7 is based on data recorded from 1981-2010 at the Wabush Lake Airport climate station (Climate ID: 8504175). The Project area,

at an elevation of 785-845 meters above sea level (MASL) is located approximately 8 km northwest of the Wabush Airport, which is located at an elevation of 551 MASL.

**Table 7: Wabush Airport Climate Normals (1981-2010)**

Parameter	Unit	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Rainfall	mm	0.6	1.6	2.6	12.1	40.4	80.6	113.9	103.4	92.3	42	10.9	2.5	502.9
Snow	cm	63.8	50.9	65.9	44.3	14.4	2.1	0.0	0.1	4.4	39	77.5	66.2	428.7
Precipitation	mm	49.2	40.3	54.1	48.8	53.5	82.7	113.9	103.5	96.5	75.7	70.9	50.4	839.5
Average Temperature	°C	-22.2	-20.6	-13.3	-4.3	4.0	10.3	13.8	12.5	7.6	0.5	-8.2	-17.5	-3.1

Source: Environment and Climate Change Canada [http://climate.weather.gc.ca/climate\\_normals/results\\_1981\\_2010](http://climate.weather.gc.ca/climate_normals/results_1981_2010)

The average monthly temperature in the area is  $-3.1^{\circ}\text{C}$ . The average monthly temperature range from October to April is  $0.5$  to  $-27^{\circ}\text{C}$  and  $4.0$  to  $7.6^{\circ}\text{C}$  from May to September. (Environment Canada 2012a).

Monthly precipitation from May to September ranges from  $53.5$  to  $96.5$  mm and monthly average snowfall ranges from  $42$  to  $75$  cm in the winter months. Almost half of the annual precipitation falls in the June to September period.

### 3.1.3 Geology and Topography

The topography of the proposed Smallwood North Pit Extension Project area is typical of the larger, surrounding region, and is predominantly bedrock controlled and somewhat rugged with rolling hills and valleys.

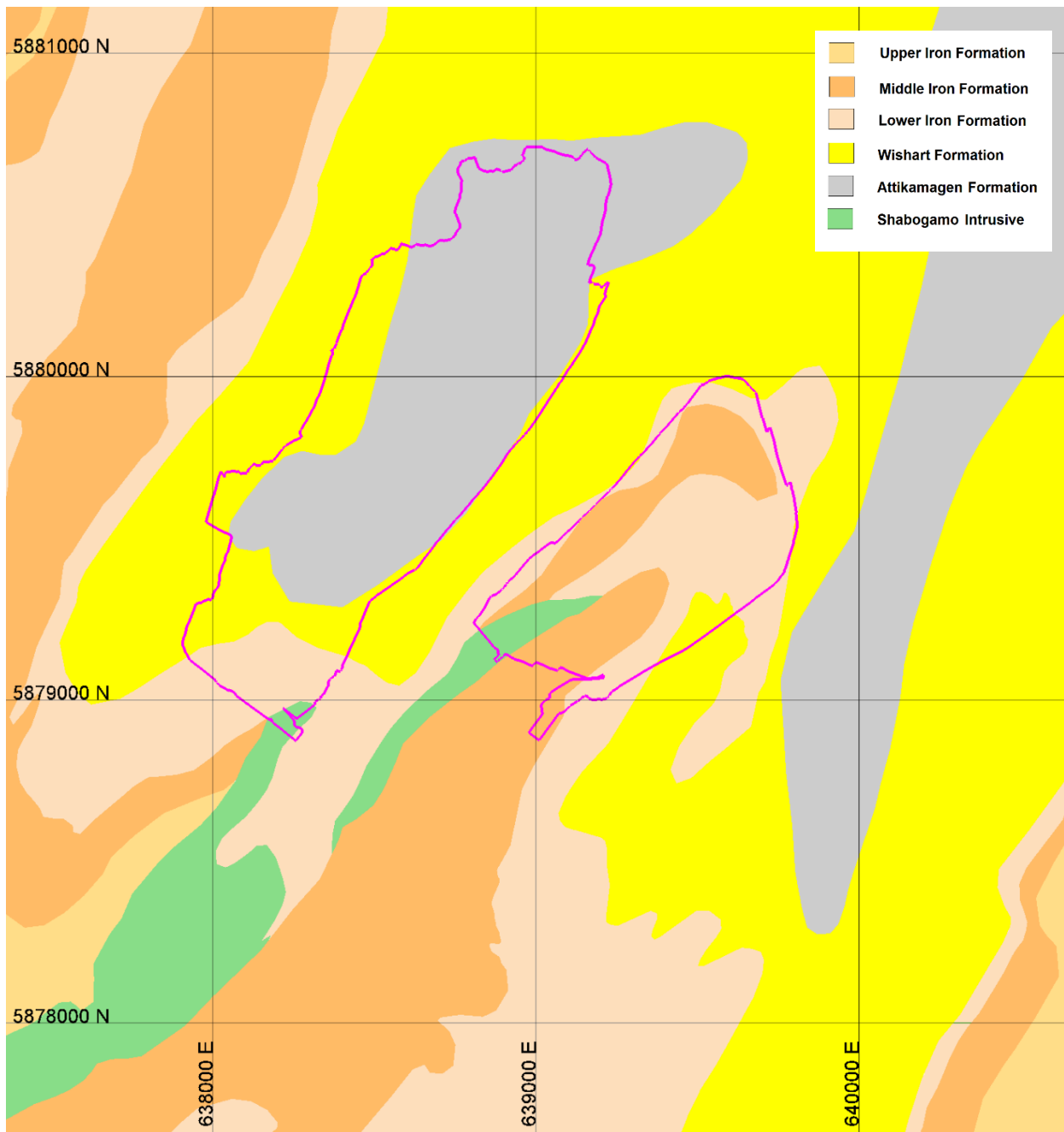
Smallwood North Pit is situated in the Labrador Trough, which comprises a thick Proterozoic sedimentary sequence. This area is part of the Grenville Orogeny and has undergone medium to high-grade metamorphism and extensive multi-phase deformation to form a terrain that is characterized by thrusting and non-cylindrical folding. Like the other iron ore deposits at IOC, the Humphrey deposit, which includes the Project area, is locally referred to as a meta-taconite and may be classified as a metamorphosed version of the “Lake Superior-Minnesota Type”.

As with all of IOC’s reserves and resources, the Smallwood North deposit lies within the Sokoman Iron formation, which consists of a lower waste unit (LIF), overlain by a middle ore-bearing unit (MIF), which is, in turn, overlain by an upper waste unit (UIF) (Table 8). The MIF unit is also cut by internal waste units of quartz-carbonate, fibre, limonite, and metagabbro. Figure 14 shows the interpreted surface geology of the Project area. The pit footprint is covered almost entirely by Sokoman Formation and the waste dump footprint is mostly over an outcrop of Attikamagen Formation, with some areas of Wishart quartzite and lower iron formation.

The various strata in the Smallwood North area are intensely folded, with the waste dump lying over an anticline and the pit exploiting a syncline. Dips of the fold limbs and fold axis vary locally between  $30$  and  $50$  degrees.

**Table 8: Bedrock Geology of the Carol Lake Operation, Stratigraphically Upwards**

Formation		Primary Rock Types
Shabagomo		Metagabbro gneiss dykes and sills with lesser amphibolite schist
Menihek		Youngest formation of Knob Lake Group comprising mainly quartz-feldspar-mica-graphite schist
Sokomon (previously Wabush)	Upper Iron Ore Fm (UIF)	Light brown/white quartz-carbonate (siderite) gneiss with variable amounts of magnetite, hematite, grunerite, tremolite, and actinolite
	Middle Iron Ore Fm (MIF)	Quartz-magnetite, and/or quartz-specular hematite-magnetite, and/or quartz-specular hematite-magnetite-carbonate, and/or quartz-specular hematite-magnetite-anthophyllite gneiss and schist units
	Lower Iron Ore Fm (LIF)	Light brown/white quartz-carbonate (siderite) gneiss with variable amounts of magnetite, hematite, grunerite, tremolite, and actinolite-quartz-carbonate, and/or quartz-carbonatemagnetite, and/or quartz-carbonate-silicate, and/or quartz-carbonate-silicate-magnetite, and/or quartz-magnetitespecular hematite units
Wishart (previously Carol)		White massive to foliated quartzite
Attikamagen (previously Katsao)		The oldest formation of the Knob Lake Group comprising medium to coarse grained quartz-feldspar-biotite-muscovite schist and lesser gneiss



**Figure 14: Surface Geology of Project Area**

**3.1.4 Vegetation**

The Project area lies within the Mid Subarctic Forest or Michikamau ecoregion. This ecoregion encompasses the upland plateaus of central and western Labrador. This region has a continental climate characterized by short summers and long winters. Black spruce is the dominant trees species, except in the most northern areas, where white spruce dominates, as is the case on the Smallwood North Pit Extension Project site. Open lichen woodlands and extensive ribbed fen-string bog complexes are characteristic of this ecoregion; however, these vegetation types are not present on the Project site (Fisheries and Land Resources 2017).

Vegetation typing was carried out to delineate habitat types at a fine scale. Many species, especially rare and uncommon species, have specific habitat associations. Habitat types can be used to determine if there is an elevated potential for occurrence for these species. Vegetation typing was completed by an experienced vegetation specialist using ArcGIS mapping software to derive vegetation cover polygons within the Project boundary. Initial vegetation line work was interpreted at a scale of 1:5,000 using high resolution digital imagery and information gathered in the field. Information was captured consistently based on a static zoom level (1:5,000) with the interpreter defining homogeneous regions for each targeted ecotype. The typing line work was supplemented by a point file within ArcGIS that was populated with attribute information related to each vegetation polygon. This point data was entered based on the interpreter's field experience and familiarity with regional ecotypes and information collected in the field.

The Canadian Wetland Classification System (CWCS 1997) was used to classify wetlands to class and type. Wetland form is difficult to infer through photo interpretation because the attributes that are required to identify wetlands to this level, such as peat depth and land form, cannot be readily assessed. However, it was possible to describe wetlands to form and type based on information collected in the field.

The vegetation mapping for the ELC study area identified seven primary ecotypes among a total of 21 polygons. These included White spruce/fir feathernoss, Open spruce/fir feathernoss, Mixedwood, Rocky outcrop, Alpine shrub, Wetland, and Pond. Ecotype characteristics are described below.

#### White spruce/fir feathernoss (WSFF)

White spruce/fir feathernoss forest is the most abundant ecotype on the Smallwood site. White spruce (*Picea glauca*) and balsam fir (*Abies balsamea*) make up a significant proportion of the tree stratum of this ecotype although black spruce (*Picea mariana*) and sphagnum moss occur as a transitional habitat between coniferous dominated forest and wetland ecotypes. The shrub layer typically consists of low shrub species such as; Labrador tea (*Ledum groenlandicum*) and lowbush blueberry (*Vaccinium angustifolium*). Herbaceous vegetation consists of bunchberry (*Cornus canadensis*), wild lily of the valley (*Maianthemum canadense*), twinflower (*Linnaea borealis*), stiff clubmoss (*Lycopodium annotinum*) and Clinton lily (*Clintonia borealis*). Ground cover consists of a continuous layer of feathernoss species, especially Scheber's moss (*Pleurozium schreberi*).

#### Open spruce/fir feathernoss (OSFF)

Open spruce/fir feathernoss ecotype is a sub-type of WSFF. Open spruce/fir feathernoss is characterized by an open canopied forest of white spruce, black spruce and balsam fir in various stages of development. Reindeer lichen (*Cladonia rangiferina*) and caribou lichen (*Cladonia stelleris*) tend to be more prevalent due to xeric conditions. The shrub layer is similar to the WSFF, however the density of low shrubs is higher. OSFF is generally topographically confined to ridge tops or areas where soils are thin and water availability is low.



### Mixedwood (MXD)

This ecotype is dominated by white spruce, balsam fir and white birch. It may transition to WSFF over time as the white birch component dies. The shrub and herbaceous layers are similar to that found in WSFF.

### Rocky outcrop (RO)

This ecotype is windswept with a thin surface layer that is comprised of bedrock, exposed soil, stone and boulders. The shrub layer is composed mainly of ericaceous shrubs. Ground cover consists of grasses, lichens, mosses and smaller berry plants such as black crowberry.

### Alpine shrub (AS)

Alpine shrub is defined as a non-forested, shrub-dominated habitat found on hummocky terrain and may have thin soils with exposed bedrock. Ericaceous shrubs dominate; having relatively high percent cover values. Tree species are always stunted and rarely grow above the shrub layer. The herb layer, also species-rich, is nearly always dominated by ground lichen and, in particular, reindeer lichen.

### Wetland (WL)

The wetland ecotype is comprised of two sub-ecotypes, fen and marsh, respectively. Wetland ecotypes were classified using the CWCS, which divides wetlands into class, form and type. Five classes are recognized under the CWCS; bog, fen, swamp, marsh and shallow water. Forms are differentiated based on surface morphology, pattern, water type and underlying mineral soil. Types are classified according to dominant vegetation.

Of the five wetland classes recognized by the CWCS only two classes were identified on the Smallwood North site, fen and shallow water wetland. Fens are characterized by the movement of mineral rich surface water via pools, channels and open water. A single type of fen was identified on the Smallwood North site, sedge basin fen. Shallow water wetlands are characterized by standing or flowing water that is less than 2 metres deep during mid-summer. Water levels are seasonally stable and aquatic plants dominate vegetation.

### Pond

Ponds are waterbodies greater than 2 m deep. Water levels are seasonally stable and vegetation tends to be confined to pond margins.

## 3.1.5 Hydrology

Hydrological information for the area is mainly limited to IOC's Carol Operations. Existing hydrology of the area is based on climate drainage, geology and topography. All surface water run-off from the proposed Project area will be captured via sumps and either pumped or gravity fed via ditches to ensure runoff reports directly to vegetated areas and does not flow directly to

any waterbodies (e.g., Lorraine Lake). The discharge point for any surface water collected will be in a vegetated area more than 100 m from a waterbody or stream.

### 3.1.6 Hydrogeology

In 2002, Piteau Associates (Piteau) undertook a review of the hydrogeology of current and historic operations of the IOC Carol Operation in the area of the proposed Smallwood North Pit. That review provides information on the basic hydrostratigraphy that occurs at the existing and historic IOC mine operations to the north of Labrador City. An important aspect of the hydrostratigraphy is the occurrence of deep pre-glacial weathering that occurs at depths of 100 meters below ground surface (mbgs). According to Piteau (2002), the most permeable hydrostratigraphic unit is the LIF, which has the highest content of carbonate materials. The relatively high hydraulic conductivity of this unit is caused by weathering associated with leaching of silica and carbonate and/or oxidation of iron minerals (magnetite and specularite) to goethite and limonite. The weathering is noted to be strong along fractures in the LIF and is more prevalent in open pits operating at lower elevation (e.g., Humphrey Main) where the weathering has not been removed by glacial action. The hydraulic conductivities of the weathered zones are noted as being as high as  $1 \times 10^{-4}$  to  $1 \times 10^{-3}$  m/s, which suggests that the LIF and possibly the base of the MIF is a reasonable aquifer capable of providing baseflow to local streams/rivers and supporting flows to lakes. In addition to the relatively highly permeable weathered strata commonly found in the Carol Lake project area, fracture dominated groundwater flow has also been noted which, depending upon the location and setting, can show reasonably permeable characteristics.

Open pit mines receive groundwater seepage as they extend below the water table and where advance dewatering has not been undertaken. Previous hydrogeological investigations (Piteau 2002) of IOC's open pits estimated groundwater seepage into each pit for mitigation purposes. Estimates of groundwater seepage ranged in value from as low as 80 USGPM (~440 m<sup>3</sup>/d) for Humphrey South Pit up to 1,000 USGPM (~5,400 m<sup>3</sup>/d) for the Humphrey Main Pit. At Spooks Pit seepage has been estimated at 1,740 USGPM (~9,500 m<sup>3</sup>/d) associated with seepage through the weathered eastern face from Lake Lorraine (Piteau 2002).

Further investigation will be undertaken during 2018 to better define and understand groundwater occurrence in the North Smallwood area and establish hydrogeological baseline conditions. At least one pilot hole will be drilled and hydraulically tested to provide some insight to the magnitude of advance dewatering that may be required. This (these) pilot hole(s) will be completed as a piezometer and ongoing data collection and review will be routinely undertaken from the time that they are constructed.

### 3.1.7 Regional Wildlife

The interior of western Labrador, with its myriad forest types and extensive wetlands, provides habitats for a range of wildlife that are typical of boreal forest ecosystems. During the fall of 2017, SEM carried out field surveys within the footprint of the proposed Smallwood North Project area to better understand the habitat types and the wildlife species using them.

Habitat types encountered included White spruce/fir feathernoss, Open spruce/fir feathernoss, Mixedwood, Rocky outcrop, Alpine shrub, Wetland, and Pond. The first two types are dominated by balsam fir and white spruce, with black spruce in wetter areas. Mixedwood is primarily found along slopes and is scarce in the Smallwood North area. These various habitat types are suitable for a diversity of wildlife species, including terrestrial birds, small and large mammals, and amphibians.

### 3.1.7.1 Species at Risk

Species at Risk (SAR) in Newfoundland and Labrador are protected at two levels: under the Federal *Species at Risk Act* (SARA 2002) and under the Provincial *Endangered Species Act* (ESA) (Government of Newfoundland and Labrador 2001). The SARA was created to prevent listed species from disappearing, to facilitate recovery of listed species, and to avoid further declines in species of special concern. This legislation makes it an offence to kill, harm, harass, capture, take, possess, collect, buy, sell or trade an individual, or damage or destroy the residence of a species listed in Schedule 1 of SARA as endangered, threatened or extirpated. The intent of SARA is to protect critical habitat as much as possible through voluntary actions and stewardship measures (SARA 2017). The Provincial ESA provides protection for native plant and animal species, sub-species and populations considered to be endangered, threatened, or vulnerable.

There were no SAR observed in the proposed Project area during the October surveys. However, these baseline surveys were conducted outside of the customary temporal window (spring/summer) to optimally detect most SAR. Therefore a habitat assessment combined with a literature search was utilized to evaluate the baseline potential for wildlife SAR within the boundaries of the proposed Project area. Several SAR are conceivably using habitats within the Smallwood North area, but most are unlikely given historical data and the landscape context (i.e., the area exists within the matrix of a highly disturbed landscape with considerable human presence, noise, and machinery use). Table 9 below summarizes the results of the SAR review.

**Table 9: Species at Risk with Ranges that may extend into the Smallwood North area**

Common name	Scientific name	Taxon	SARA status	Provincial Status	Presence at Smallwood
Little Brown Bat	<i>Myotis lucifugus</i>	Mammals	Endangered	None	Possible
Caribou	<i>Rangifer tarandus</i>	Mammals	Threatened	Threatened	Possible
Common Nighthawk	<i>Chordeiles minor</i>	Birds	Threatened	Threatened	Possible
Olive-sided Flycatcher	<i>Contopus cooperi</i>	Birds	Threatened	Threatened	Possible

**Table 9: Species at Risk with Ranges that may extend into the Smallwood North area (Cont'd)**

Common name	Scientific name	Taxon	SARA status	Provincial Status	Presence at Smallwood
Rusty Blackbird	<i>Euphagus carolinus</i>	Birds	Special Concern	Vulnerable	Possible
Short-eared Owl	<i>Asio flammeus</i>	Birds	Special Concern	Vulnerable	Possible
Bank Swallow	<i>Riparia riparia</i>	Birds	Threatened	None	Possible
Chimney Swift	<i>Chaetura pelagica</i>	Birds	Threatened	Threatened	Highly unlikely
Eskimo Curlew	<i>Numenius borealis</i>	Birds	Endangered	Endangered	Highly unlikely
Harlequin Duck	<i>Histrionicus histrionicus</i>	Birds	Special Concern	Vulnerable	Highly unlikely
Peregrine Falcon	<i>Falco peregrinus tundrius/anatum</i>	Birds	Special Concern	Vulnerable	Highly unlikely
Wolverine	<i>Gulo gulo</i>	Mammals	No Status	Endangered	Highly unlikely
Barrow's Goldeneye	<i>Bucephala islandica</i>	Birds	Special Concern	Vulnerable	Highly unlikely

Note: Several other species were omitted from this table according to their distribution, known occurrences, biology, and/or habitat requirements.

### 3.1.7.2 Mammal Species at Risk

There are three mammal SAR that could potentially occur in western Labrador, as determined from the Newfoundland and Labrador *Endangered Species Act* (ESA) (2001) and the federal SAR Public Registry (2017), including Wolverine, Woodland Boreal Caribou and the Little Brown Bat. Each is discussed below.

Wolverine (*Gulo gulo*) is listed as Endangered in the federal SARA registry, and under the provincial *ESA*, but it has not been verified in Labrador since 1950, and there is no evidence to suggest this species exists in the vicinity of the Smallwood North area or any other IOC property in Labrador City. Wolverines have extremely large home ranges and require relatively pristine and unfragmented habitat.

Similarly, the Woodland Boreal Caribou (*Rangifer tarandus*), currently listed as Threatened under the provincial *ESA* and under the federal *SARA*, would be unlikely to inhabit lands in such close proximity to mining operations. A study by Weir et al. (2007) determined that caribou avoid mine areas by as much as 4 km, and group sizes were impacted up to 6 km from mine sites. The Project is not anticipated to overlap or interact with the current ranges of the Woodland Boreal Caribou in western Labrador, specifically the Lac Joseph herd which is known to occur to the south and east of the Project area.

Current information also indicates that the migratory George River Herd is known to occur to the north and northeast of the Project area. A February 2012 aerial survey completed for IOC by SNC did not produce any caribou observations within a 40 x 40 km (1,600 km<sup>2</sup>) regional study area that encompassed IOC's Labrador City operations (SNC 2012).

SEM identified one SAR (Little Brown Bat), protected under SARA, that has more potential than the other SAR to occur in the study area. The Little Brown Bat (*Myotis lucifugus*) was given an emergency listing of “Endangered” by SARA in 2014 because of rapid population declines in Canada due to a deadly wildlife disease known as White-nose Syndrome (WNS). According to Environment and Climate Change Canada, “The population decline that has been documented for this species is considered by some experts to be the most rapid decline of mammals ever documented anywhere in the world.” (Environment Canada 2014).

### 3.1.7.3 Avifauna Species at Risk

There are several bird SAR that may occupy the proposed Project area during some months of the year. The Smallwood North area would not be considered prime habitat for these species given the habitat types present in the area, and the scarcity of wetlands and open habitats, which the following species prefer. In addition to the SARA and ESA legislation, the *Migratory Bird Convention Act, 1994*, (MBCA) protects these species and nests during the breeding season.

The Common Nighthawk is listed as Threatened on SARA and the ESA because of large declines across an extensive portion of its range. This brownish-greyish insectivorous bird breeds across Canada, and requires open foraging areas, such as wetlands or fields for hawking insects. Common Nighthawk has been observed several times from the Labrador City area (eBird 2017). The cause of the massive Canada-wide decline remains unknown at this time, but possible threats include habitat loss/fragmentation, reduced insect populations, and climate change. Environment Canada (2015) states: “At present, the available information is not adequate to identify the habitat necessary for the survival or recovery of the Common Nighthawk in Canada.” The Smallwood North area contains several wetlands and open areas which would comprise potentially suitable foraging habitat for Common Nighthawk. These habitats would be identified as Wetland, Rocky Outcrop, and Alpine shrub ecotypes within the Smallwood North area.

The Olive-sided Flycatcher is also listed as Threatened both Federally and Provincially. This large flycatcher hawks insects on the wing in open areas like bogs, forest edges, meadows, and burned areas. Declines in this species may be attributed to a widespread loss of wintering habitat in Central America, and because of the rapid decline, the IUCN has classed the species as “Near Threatened” (IUCN 2016). There are three records of this species from the Labrador City area (eBird 2017). There are some wetland and open areas within the proposed Project area, which would comprise suitable foraging and breeding habitat for Olive-sided Flycatcher. These habitats would be identified as Wetland, Rocky Outcrop and Alpine shrub ecotypes within the Smallwood North area.

Rusty Blackbird is listed as Vulnerable on the ESA (and by the IUCN), and as a species of Special Concern on SARA. It has experienced a long-term decline but the decline has accelerated in recent years (IUCN 2017). The males of this medium-sized blackbird have a greenish sheen and a yellow eye, while females are greyish-black and lack the greenish sheen. Rusty Blackbird may be found throughout Newfoundland and Labrador during spring/summer,

breeding in forest wetlands (mostly bogs), often with dead standing timber. Multiple sightings of this species have been recorded for the Labrador City area (eBird 2017). Marginally suitable wetland habitat exists for Rusty Blackbird within the proposed Project area but with minimal standing timber, it would be atypical for the Rusty Blackbird to use these wetlands for breeding.

The Short-eared Owl listed as Vulnerable on the ESA list and as a species of Special Concern on the SARA list, is known from several observations in the Wabush and Labrador City area (Schmelzer 2005, eBird 2017). Short-eared Owl was not detected during surveys of the Wabush 3 area (south of the Smallwood North area) by SEM in 2017 (SEM 2017). This species breeds in open habitats including bogs, tundra, marshes, pastures, and grassland. They are highly nomadic, moving around with fluctuations in small mammals densities. It is a difficult species to monitor because of its nomadic nature, and because it is usually difficult to observe except when flying. It is most easily seen at dawn and dusk (i.e., crepuscular activity). In Arctic climates eggs are laid in mid to late June (so Labrador may be slightly ahead of this, but records appear to be non-existent), incubation has approximately a month-long duration, and nestlings fledge after two weeks in the nest. Accurate estimates of Short-eared Owl populations have eluded biologists, but according to data from the North American Breeding Bird Survey (Sauer *et al.* 2016), overall populations have remained relatively stable between 1966 and 2015. Habitat loss has been implicated as the major contributor to declining populations of this species (Cornell University 2017). There are some open habitats within the boundaries of the Project area that would comprise suitable foraging and nesting habitat for this species, in particular the Rocky outcrop and Alpine shrub ecotypes in the northern sections of the Smallwood North area.

Bank Swallow has shown a long-term decline of close to 98% (COSEWIC 2013) in recent decades, but the definitive causes of the decline are unclear. Under COSEWIC the species is designated as Threatened as of May 2013 but has yet to be listed under the SARA. With such severe and rapid declines, this listing is likely imminent. Bank Swallows nest in a variety of natural and altered environments, in vertical banks. These can range from natural banks along rivers, lakes and oceans, but can also include those of aggregate pits, road cuts and stockpiles of soil. These birds are highly social, nesting in colonies of between 10 to 2,000 active nests (BNA Online 2017). This species is widespread across North America and has variable nesting chronology, depending on the region. The period in which these nests are used not only includes incubating eggs and taking care of flightless chicks, but also a period after the chicks learn to fly as they return to the colony to roost. For western Labrador the maximum duration of nesting for Bank Swallow would likely encompass May to mid-August. Overburden stockpiles created within the proposed Project area could provide nesting habitat for Bank Swallows. Bank Swallows can establish colonies quickly, over a few days, with constructions reported as quickly as overnight. Dorothy Lake would comprise suitable foraging habitat for Bank Swallow, as would the wetland areas within the Smallwood North boundaries.

The other avian SAR that have distribution ranges overlapping the proposed Project area are chimney swift, harlequin duck, peregrine falcon, and Barrow's goldeneye. The harlequin duck's breeding habitat is fast-flowing mountain rivers so it is improbable the species would use the

area for anything more than staging habitat. Another SAR that is possible but unlikely for the Smallwood North area is the Eskimo curlew (Endangered and probably extinct).

No avian SAR were detected during October wildlife surveys of the Smallwood North area. Based on the habitat assessment conducted and the established ranges for these SAR, the proposed Project area would be unsuitable habitat for most avian SAR that may exist in western Labrador.

#### 3.1.7.4 Regional Wildlife Surveys

To establish baseline information on mammals using or potentially using the Smallwood North area, SEM conducted baseline wildlife transect surveys in October 2017, and combined the information with that from literature on occurrence and distribution of mammals in western Labrador. In addition, information was incorporated from previous studies on adjacent IOC properties, the Nature Conservancy, Environment Canada, and local ecological knowledge of trappers. Transects were surveyed on foot along routes that traversed various habitat types to ensure adequate coverage and wildlife evidence detection.

Along the transects wildlife biologists recorded all evidence of wildlife, including evidence of small mammals, furbearers, black bear (*Ursus americanus*), ungulates, birds, and amphibians. Evidence of the presence of these animals consisted of observations of tracks, scat and auditory detections by biologists trained and experienced in the identification of animal sign, wildlife habitat, and bird vocalizations. Tracks in close proximity (<50 m) of each other were counted as one track if the age of the track was equivalent. Transect data were combined with information from literature searches to give a comprehensive list of wildlife species that use, or may use, the proposed Project area.

Tracks or evidence of several mammal species were detected during October surveys of the Smallwood North area, including American marten (*Martes americana*), American mink (*Mustela vison*), deer mouse (*Peromyscus maniculatus*), ermine (*Mustela erminea*), red fox (*Vulpes vulpes*), red squirrel (*Tamiasciurus hudsonicus*), snowshoe hare (*Lepus americanus*), and vole spp. (*Microtus* spp.). Tracks were detected across all the habitat types.

For a previous study on Sherwood North (GEMTEC 2017), a nearby property to the Smallwood North area, biologists conducted transect surveys to detect mammals using the area, including small mammals, furbearers, black bear (*Ursus americanus*), and ungulates. Mammal species detected included black bear, Canada lynx (*Lynx canadensis*), gray wolf (*Canis lupus*), moose (*Alces alces*), muskrat (*Ondatra zibethicus*), red fox and red squirrel. Moose, wolf and red squirrel were the most commonly detected mammal species in the Sherwood North area. A survey of Wabush 3 in 2012 produced observations/sign for eight mammal species in the area; red fox, wolf, snowshoe hare, marten, ermine, red squirrel, northern flying squirrel (*Glaucomys sabrinus*) and porcupine (*Erethizon dorsatum*) (AMEC 2012a). In addition, otter (*Lontra canadensis*) and muskrat (*Ondatra zibethicus*) are known to occur in lakes around the IOC properties (SEM 2017, pers. comm.).

Other mammals that may be found in the general area of IOC in Labrador City, but were not detected on previous surveys, include beaver (*Castor canadensis*), cinereus shrew (*Sorex cinereus*), pygmy shrew (*Sorex hoyi*), eastern heather vole (*Phenacomys ungava*), rock vole (*Microtus chrotorrhinus*), least weasel (*Mustela nivalis*), fisher (*Martes pennanti*), little brown bat (*Myotis lucifugus*), meadow jumping mouse (*Zapus hudsonius*), meadow vole (*Microtus pennsylvanicus*), northern bog lemming (*Synaptomys borealis*), southern red-backed vole (*Clethrionomys gapperi*) and star-nosed mole (*Condylura cristata*).

From the 2017 wildlife survey list, it is quite likely that the marten, mink, snowshoe hare and some of the vole and mouse species are residing in the Smallwood North area. It is possible that beaver and otter are using the Project area, specifically at Dorothy Lake, which would provide adequate foraging and breeding habitat for either species. All the ecotypes identified for Smallwood North could be potential habitat for mammal species.

There are several amphibian species in Labrador including American toad (*Anaxyrus americanus*), wood frog (*Lithobates sylvaticus*), mink frog (*Lithobates septentrionalis*), northern leopard frog (*Lithobates pipiens*), spring peeper (*Pseudacris crucifer*), northern two-lined salamander (*Eurycea bislineata*), and blue-spotted salamander (*Ambystoma laterale*). There are records for all of these species in western Labrador, except for the northern leopard frog, which is known from the Lake Melville area (Newfoundland and Labrador Nature Atlas 2017, COSEWIC 2009). These species all prefer moist to wet environments, including bogs, marshes, ponds, and streams. Within the Smallwood North Area, the suitable ecotypes for amphibians would consist primarily of Wetland and Pond. SEM conducted wildlife surveys around Sherwood North, an area near Smallwood North, in the summer of 2017. Two amphibian species were observed during those transect surveys: tadpoles of American toad (*Anaxyrus americanus*) and wood frog (*Lithobates sylvaticus*).

Overall, the proposed Project area appears to have abundant wildlife species and diversity, as expected for the ecoregion type in western Labrador. No evidence of SAR were detected in the Smallwood North area during wildlife transect surveys. However, it is possible that the little brown bat, a federally Endangered species, is using the area. The habitat types utilized by wildlife species in the area is abundant and covers vast regions in western Labrador, and the Smallwood North area is relatively miniscule in comparison. Any habitat affected by the proposed Project is readily available in nearby areas and it is anticipated wildlife species in the area will have abundant and suitable replacement habitats available.

### 3.1.8 Avifauna

Common resident and migratory species of birds in the interior of western Labrador include raptors, waterfowl, passerines and upland game birds. There are over 170 species of birds known from the Labrador City area (Audubon and Cornell University, 2017). This total includes all species observed from the area, including those passing through during migration, rarities, and several species for which the Smallwood North area would not be considered suitable habitat. The biodiversity of bird species expected for Project area is low to moderate, given the



relative homogeneity of forested habitat and data from past surveys on nearby IOC properties, but many of the species would be mature forest specialists.

Many migratory bird species are protected by the MBCA which states that that it is illegal to harass or kill migratory birds, or to destroy or disturb their nests or young. Some bird Families, such as Accipitridae (ospreys, eagles, and hawks), Falconidae (falcons), Strigidae (owls), Phasianidae (grouse, ptarmigan and other gamebirds) as well as some species of Icteridae (blackbirds) and Corvidae (jays and crows) are not protected by MBCA. However, breeding raptors and owls are protected under Provincial legislation with the requirement for buffers around nests. For example, clearing of land is not permitted within 800 metres of a bald eagle or osprey nest during the nesting season (March 15 to July 31) and not allowed within 200 metres during the remainder of the year. The 200 m buffer also applies to all other raptor and owl nests (e.g., northern goshawk (*Accipiter gentilis*), sharp-shinned hawk (*Accipiter striatus*), merlin (*Falco columbarius*), American kestrel (*Falco sparverius*), great-horned owl (*Bubo virginianus*), boreal owl (*Aegolius funereus*) and northern saw-whet owl (*Aegolius acadicus*)).

Data from past surveys of Wabush 3, a nearby IOC property to the south, provide pertinent information to estimate the baseline conditions of the Smallwood North area with respect to bird diversity. The bird species of Wabush 3 area were described in 2012, 2014, and 2017 (AMEC 2012 b and c, AMEC 2014, SEM 2017). Some of the species most frequently detected during breeding season surveys were white-throated sparrow (*Zonotrichia albicollis*), American robin (*Turdus migratorius*), Swainson's thrush (*Catharus ustulatus*), dark-eyed junco (*Junco hyemalis*), fox sparrow (*Passerella iliaca*), hermit thrush (*Catharus guttatus*), yellow-rumped warbler (*Setophaga coronata*), Lincoln's sparrow (*Melospiza lincolni*), red-breasted nuthatch (*Sitta canadensis*), yellow warbler (*Setophaga petechial*) and common raven (*Corvus corax*). A 2012 fall migration survey produced detections of sixteen bird species, including common raven, gray jay, ruby-crowned kinglet, boreal chickadee, Wilson's snipe, white-throated sparrow, fox sparrow, dark-eyed junco, pine grosbeak, pine siskin (*Spinus pinus*), song sparrow (*Melospiza melodia*) and American pipit (*Anthus rubescens*). A 2012 winter survey of the Wabush 3 mine site produced detections of spruce grouse (*Falcipennis canadensis*), willow ptarmigan (*Lagopus lagopus*), snow bunting (*Plectrophenax nivalis*), common raven, pine grosbeak (*Pinicola enucleator*), boreal chickadee (*Poecile hudsonicus*) and gray jay (*Perisoreus canadensis*) (AMEC 2012b).

In addition to the surveys above, SEM conducted surveys of the Smallwood North area in October 2017, Magy Lake Strike Extension in October 2017, and of Wabush 3 in June 2017. Those Smallwood North fall surveys produced detections of the following species: American robin, common raven, spruce grouse, white-winged crossbill, pine grosbeak, gray jay and pine siskin. Magy Lake Strike Extension surveys produced detections of those same species with the addition of black-backed woodpecker. Wabush 3 transect surveys covered all habitat types within Wabush 3, most of which would also exist within the Smallwood North area. Some of the species detected during those surveys included: alder flycatcher, boreal chickadee, brown creeper, common loon, common raven, dark-eyed junco, fox sparrow, gray jay, great-horned owl, hermit thrush, magnolia warbler, northern flicker, northern waterthrush, orange-crowned

warbler, ruby-crowned kinglet, solitary sandpiper, spruce grouse, Swainson's thrush, Tennessee warbler, three-toed woodpecker, white-crowned sparrow, Wilson's snipe, Wilson's warbler, white-throated sparrow, yellow-rumped warbler, and yellow warbler. These species are all possible breeders within the boundaries of the proposed Smallwood North area.

### 3.1.8.1 Raptors

Raptors are protected by the Newfoundland and Labrador *Wild Life Act*, which prohibits the hunting, taking, killing, or possessing of any eagle, falcon, hawk, osprey or owl.

There are a number of raptor species that are known in the Labrador City area, including:

- American kestrel (*Falco sparverius*)
- Bald eagle (*Haliaeetus leucocephalus*)
- Boreal owl (*Aegolius funereus*)
- Golden eagle (*Aquila chrysaetos*)
- Great-horned owl (*Bubo virginianus*)
- Merlin (*Falco columbarius*)
- Northern goshawk (*Accipiter gentilis*)
- Northern harrier (*Circus cyaneus*)
- Northern hawk owl (*Surnia ulula*)
- Osprey (*Pandion haliaetus*)
- Red-tailed hawk (*Buteo jamaicensis*)
- Rough-legged hawk (*Buteo lagopus*)
- Short-eared owl (*Asio flammeus*)

SEM conducted avifauna surveys and an aerial raptor survey in June 2017 for the Wabush 3 Project and noted observations of red-tailed hawk, rough-legged hawk, osprey, bald eagle, northern goshawk and American kestrel. No nests were discovered for these species at the Wabush 3 site. Red-tailed hawk was also observed on July 6, 2017, 50 m west of the IOC main gate, being "mobbed" by common ravens (*Corvus corax*). Additionally, SEM conducted avifauna point count surveys and an aerial raptor survey in early July 2017 on the Sherwood North Project Area. Northern Goshawk was the only raptor species detected during avian point count surveys and no raptors were detected during the aerial survey of the Project area.

Other raptor species that may exist in the vicinity of Smallwood North include the sharp-shinned hawk (*Accipiter striatus*) and gyrfalcon (*Falco rusticolis*). The sharp-shinned hawk is on the northern threshold of its range in the Labrador City area and, although not observed, it is a possible breeder in the Smallwood North area. The gyrfalcon, the largest of the falcons, and a ptarmigan specialist, is typically a non-breeder in the Labrador City area, preferring more northerly climes above the tree line. It could possibly occur in the Labrador City area but is very unlikely to be found at Smallwood North given its habitat preferences (open tundra). Similarly, the golden eagle is unlikely to breed in the area of IOC's Labrador City operations given its intolerance for disturbance and development.

### 3.1.8.2 Waterfowl

Waterfowl species are protected federally by the *Migratory Birds Convention Act* (1994). Some of the species known to occur in the Labrador City area include:

- American black duck (*Anas rubripes*)
- Canada goose (*Branta canadensis*)
- Common goldeneye (*Bucephala clangula*)
- Common loon (*Gavia immer*)
- Common merganser (*Mergus merganser*)
- Green-winged teal (*Anas crecca*)
- Northern pintail (*Anas acuta*)
- Red-breasted merganser (*Mergus serrator*)
- Ring-necked duck (*Aythya collaris*)

Waterfowl surveys conducted in 2012 and 2014 by AMEC, (AMEC 2012b, AMEC 2014), noted observations of common goldeneye, ring-necked duck, and red-breasted merganser.

Suitable habitat for waterfowl is very scarce in the Project area, and consists primarily of Dorothy Lake and some marginally suitable wetland areas along the haul road through the center of the proposed Project area. The general region surrounding the Project area has abundant and highly suitable habitat available and, as such, the project is not expected to affect any significant waterfowl habitat.

### 3.1.9 Wetlands

Wetlands are defined as areas of land that are saturated or covered by water for some time during the growing season, have poorly drained soils, and host predominantly hydrophytic (i.e., water-loving) vegetation. Wetlands are environmentally significant for several reasons, including: water filtration, water storage (water recharge), flood reduction and control, carbon absorption, erosion control, and wildlife habitat (Nova Scotia Museum 1996).

An October 2017 survey of the area identified several small wetlands within the boundary of the Smallwood North area however none were considered significant wetland habitats.



**Figure 15: Shallow water wetland along the haul road in Smallwood North**



**Figure 16: Sedge basin fen in the NW section of the Smallwood North area**

### 3.1.10 Acid Rock Drainage (ARD) Potential

The sequence of sedimentary rocks hosting IOC's iron deposits are generally low in sulphides and not believed to be acid generating. In over 50 years of operations IOC has not observed any acid rock drainage in its ore, waste or tailings. Recent studies, however, have indicated the potential for acid generation from low sulphide material in the Shabogamo intrusive unit (~0.15% S) and in limonitically altered iron formation (~0.04% S).

The Smallwood North pit is expected to contain both Shabogamo intrusives and limonitic alteration, so both drill core and grade control samples will be assessed for acid generating potential, using a simple Acid-Base Analysis (ABA). ARD risk will be managed by either encapsulating the potentially acid generating waste with high carbonate waste, or ensuring good mixing of acid generating and acid neutralising wastes.

## 3.2 Human Environment

### 3.2.1 Historic and Heritage Resources

In July 2017, SEM conducted a review of existing archaeology reports to determine historic or heritage resources that could be present in the proposed development area of the Sherwood North Project. The Sherwood North Project is in the same general vicinity as the Smallwood North Pit. The Provincial Archaeology Office (PAO) of the Department of Tourism, Culture, Industry and Innovation (DTCII) did advise that the potential for findings in the area was low, and that no comprehensive field study of the project area was warranted. For the Smallwood North area, SEM consulted with the PAO and was advised that no study (desktop or field) was warranted for the Project area.

SEM's report (SEM 2017) outlined the cultural and historical sequence of historic occupation in western Labrador and adjacent parts of Québec during the Pre-contact, historic and contemporary periods. It also contained a listing and discussion of any archaeological and/or contemporary sites or materials discovered within, or close to the proposed development area. The report addressed the overall historic and archaeological resources potential of the proposed development area based on its general location, its hydrographic and topographic features, as well as other factors, as determined through an analysis of aerial imagery and topographic mapping.

The results of the review (SEM 2017) indicated that many archaeological and contemporary sites have been discovered in the western Labrador region and in adjacent parts of Quebec; however, only one Pre-contact period artifact of Maritime Archaic Indian origin, of uncertain provenience, is known for the Labrador City area. Additionally, no historic period materials or sites have been identified or reported on in historic sources. The resources that have been recorded and registered with the PAO for the area are of relatively recent origin and appear to be associated with harvesting activities along road and/or railway corridors.

The proposed Project site is predominantly a wooded landscape on elevated points of ground and is greater than 100m from shorelines of the area's principal waterbodies. Past

archaeological research conducted in the interior of Labrador and Quebec has shown that it is the shorelines of lakes and rivers where occupation would typically be expected to occur, and not at a considerable distance in the forest away from the water's edge. As a result, this segment of the area would not have been well-suited for past human settlement by small groups of Indigenous hunters/gatherers or non-Indigenous peoples. These landscape attributes render the site as having low potential for historic or archaeological resources.

### 3.2.2 Socioeconomic Considerations

The Labrador West region includes the communities of Labrador City (38.83 km<sup>2</sup>) and Wabush (46.25 km<sup>2</sup>), which have a combined population of 10,528 residents in 2016 (Statistics Canada 2016). Mining and mineral processing, together with related support industries, have always been the backbone of the economy in Labrador West, which experiences the effects of a cyclical industry. The year 2010 saw an economic “boom” resulting from high iron ore prices which in turn put pressure on local services and amenities. Five years later the price of iron ore declined and, as a result, Wabush Mines, located in the neighboring town of Wabush, closed resulting in a loss of approximately 500 jobs in the region. IOC continued production through the economic downturn and remains the largest employer in the region. In 2010, the region had a total labour force of 4,590 workers, of which 1,670 (36 percent) worked in “mining and quarrying”. In that same year, the region had a labour force participation rate of 73.6 percent and an unemployment rate of 5.2 percent (Statistics Canada 2010). The average family income in these communities in 2010 was approximately \$130,318.

Initial development of the Smallwood North Pit Extension Project will require modest and short term employment through the hiring of contractors for site clearing. No new employment will be created from the development or operation of the Smallwood North Pit, as employees for operations will be redeployed from other IOC operating mines. The Project will allow IOC to maintain production capacity at its plant and continue its positive socioeconomic contribution to the region and the Province.

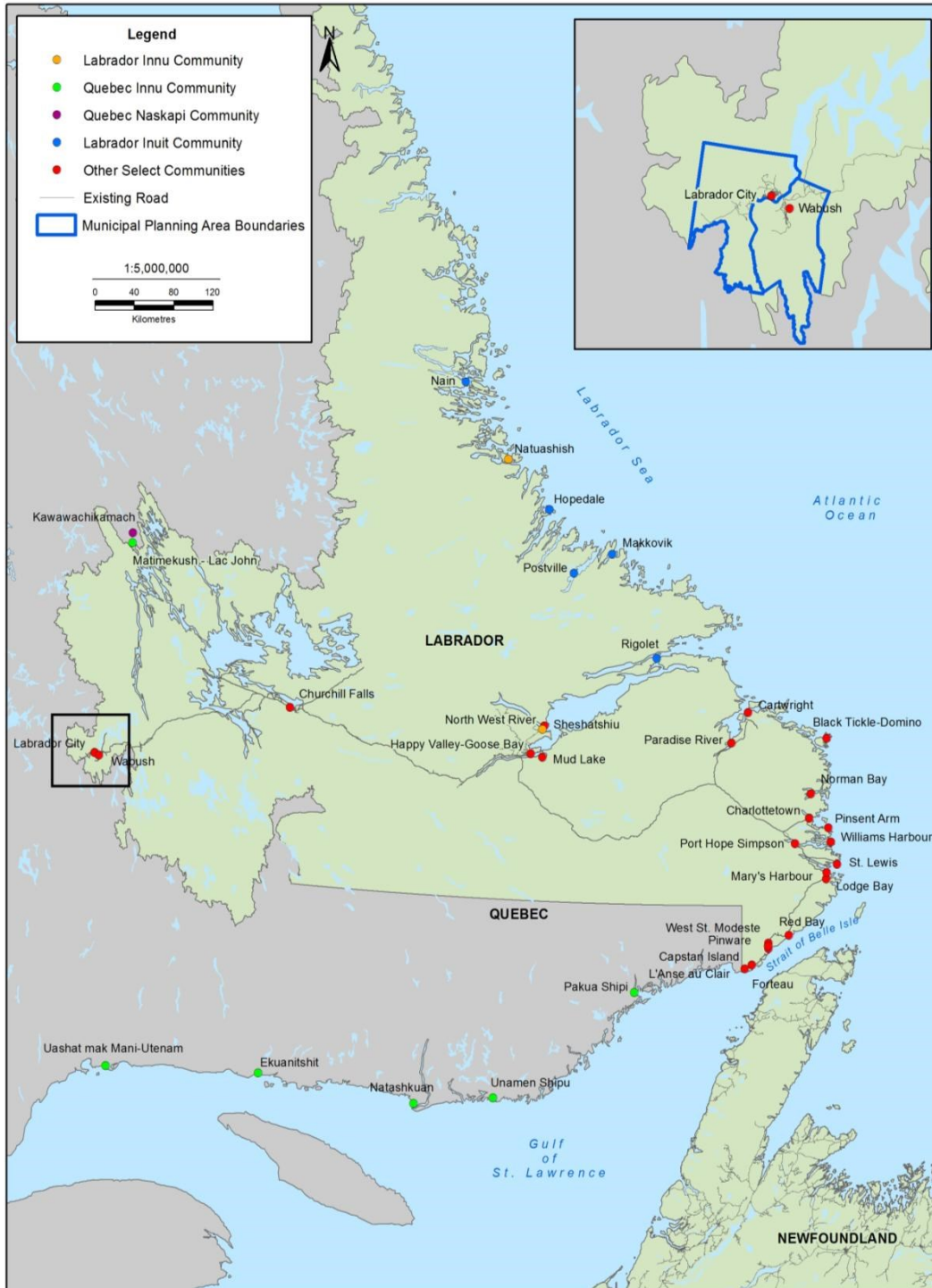
The proposed Smallwood North Pit Extension Project is located within IOC's existing mining project site. Public access to the site is therefore restricted and land and resource uses and other public activities do not take place in the immediate area.

### 3.2.3 Indigenous Groups and Traditional Activities

Several Indigenous groups have overlapping claims and/or assert Indigenous rights and/or other interests in the region where IOC operates. These groups are the:

- Innu Nation (Sheshatshiu and Natuashish, Labrador);
- NunatuKavut Community Council (Labrador);
- Innu of Uashat mak Mani-Utenam (Québec);
- Innu of Matimekush-Lac John (Québec); and
- Naskapi Nation of Kawawachikamach (Québec).

The claims and/or asserted Aboriginal rights and/or other interests of these groups are at varying stages, however IOC engages in a variety of ways with the five identified Indigenous groups in Labrador and Québec. Figure 17 shows locations of the Indigenous communities in Labrador and Quebec.



**Figure 17: Indigenous Communities in Labrador and Quebec**

Indigenous traditional uses are often considered to refer to the practices, traditions and customs that distinguish the distinctive culture of an Indigenous group and which were practiced prior to European contact and control, and can include, for example, hunting or fishing for food and ceremonial purposes. Section 35 of the *Canadian Constitution Act* (1982) recognizes and affirms the existing Indigenous and treaty rights of the First Nations, Inuit and Métis peoples of Canada, the nature, scope and existence of which have been further defined through various legal decisions as well as through Land Claims and other agreements (treaties) between governments and particular Indigenous groups in specific areas. The following sections provide an overview of these relevant Indigenous groups.

### 3.2.3.1 Innu Nation

The Innu Nation are indigenous inhabitants of an area they refer to as Nitassinan, an area which comprises much of the Québec-Labrador Peninsula. The Innu Nation Peoples were traditionally a nomadic people, whose movements responded to the seasons and to the migrations of the animals they relied upon.

The Innu Nation Peoples currently number an estimated 2,200 and reside primarily in two communities, Sheshatshiu in central Labrador and Natuashish on the Labrador North Coast. Small numbers of Innu Nation Peoples also reside in other parts of Labrador and on the island portion of the province. Both communities are represented by Innu Nation in land claims negotiations and on other matters of common interest.

### 3.2.3.2 NunatuKavut Community Council

The NunatuKavut Community Council (NCC) reports a membership of over 6,000 persons who reside primarily in southeastern and central Labrador and who are descendants of Inuit and Europeans who traveled to Labrador in the 1700-1800s (NCC 2012). NunatuKavut means “our ancient land” and is the territory of the Inuit of NunatuKavut, the Southern Inuit. NCC is a modern land claimant organization whose Land Claim includes the Indigenous rights, titles and Treaty rights of the Southern Inuit. Its traditional territory covers all of southern and central Labrador, the adjacent marine areas and also extends westward to the Labrador/Quebec border.

For hundreds of years, Southern Inuit have been dependent on natural resources and their identity is shaped by the land, sea and ice. Their relationship with nature is based on respect and they believe that, when the environment is respected and protected, it will provide for generations to come. Some of the primary resources integral to Southern Inuit survival have been fish, caribou, birds, seal and berries.

NCC often engages in building relationships with industry partners through the negotiation of formal agreements. Nunacor, a wholly-owned NunatuKavut company, has a mandate to explore economic development opportunities that benefit Southern Inuit.



### 3.2.3.3 Québec Innu and Naskapi Groups

In addition to Indigenous groups residing in Labrador, three Indigenous groups located in Quebec in the Schefferville area and along the Québec North Shore claim lands and/or assert Indigenous rights in Western Labrador:

- Uashat Mak Mani-Utenam
- Matimekush - Lac John First Nation:
- Naskapi Nation of Kawawachikamach

The land claims asserted by Québec First Nations for territory in Labrador have not been accepted for negotiation by the Government of Newfoundland and Labrador.

### 3.2.3.4 Innu of Uashat Mak Mani-Utenam

Uashat Mak Mani-Utenam (ITUM) are First Nations peoples with approximately 3,900 members, most of whom live in the communities of Uashat and Maliotenam. Uashat is located on the western outskirts of Sept-Îles and Maliotenam is located 16 km east of Sept-Îles. The traditional language spoken by members of the Uashat Mak Mani-Utenam is Innu-aimun and they also speak French.

The Innu of Uashat mak Mani-Utenam are the descendants of an Indigenous population that has occupied parts of the Québec-Labrador peninsula for centuries. The traditional territory of this First Nation encompasses much of eastern Québec and western Labrador, and extends along the rivers from the coast of the Québec North Shore into the Québec-Labrador interior (Hydro-Québec 2007). Traditionally, this group was involved in nomadic hunting and fishing.

### 3.2.3.5 Innu Nation of Matimekush - Lac John

Matimekush Lac-John is a First Nations reserve near Schefferville and has a population of approximately 850, most of whom live in the two reserve settlements, Matimekush and Lac-John. Together with the Matimekush Reserve, the communities are represented by the Innu Nation of Matimekush Lac-John. Their traditional language is Innu-aimun. They also speak French.

There are approximately ten businesses on this reserve including services such as a convenience store, pharmacy, heavy equipment, auto mechanics, camping equipment and supplies, plumbing, gas station, outfitting and video rental.

### 3.2.3.6 Naskapi Nation of Kawawachikamach (NNK)

The Naskapi Nation of Kawawachikamach is a small community approximately 12 km northeast of the Town of Schefferville on the Québec-Labrador border which is only accessible by plane, or by train from Sept-Îles. The Naskapi population represents approximately 1,356 registered members. The population is increasing rapidly and over 55% of the total population is less than 30 years of age.

The vast majority of Kawawachikamach residents are Naskapi. Naskapi is their principal language, and English is their second language, although many younger persons also speak some French.

The NNK traditionally followed the migration patterns of the George River caribou herd across the Québec-Labrador Peninsula (Weiler 1992). Land and resource use activities such as hunting, trapping and fishing remain important to the culture and economy of the NNK, whose members continue to pursue these activities near Kawawachikamach, along the Trans Labrador Highway (TLH) and Quebec North Shore and Labrador (QNS&L) Railway, and occasionally at outpost camps (CAM 1983; Weiler 1992; 2009).

### 3.2.3.7 Summary

Existing and available information does not indicate that Labrador and Québec Indigenous groups currently undertake traditional land and resource use activities within or near the proposed Project area.

Current land and resource use by the Innu Nation, for example, appears to be focused in other areas of central and south eastern Labrador, and while there is reportedly some activity in western Labrador (particularly along the Trans-Labrador Highway), the available information does not indicate that such activities take place in or near the Project area.

The Québec Innu of Uashat Mak Mani-Utenam continue to use their traditional territory, especially the southern portions and other areas that are accessible by railway and road, and the Matimekush - Lac John Innu also primarily use the area surrounding their communities and well to the north of the Project area.

The Naskapi Nation of Kawawachikamach also primarily undertakes land and resource use activities in the areas around their community and other areas that are accessible by railway and road. NCC members live and work in the Labrador West area and undertake contemporary recreational land and resource use activities throughout the region, which are considered integrally within the overall assessment of current land and resource use in and near the Project area.

The area that encompasses the proposed Project has seen on-going mining activity since the 1960s. As a result of the significant and long-standing industrial activity surrounding the proposed Project area, and the public site access restrictions that have been in place on IOC's property since that time, traditional land and resource use activities do not occur in this area.

## 4.0 Consultation

Effective consultation is a fundamental component of the EA process. This EA registration document will be available for a public review period (usually 35 days from the date of registration) and the Provincial Government will ensure adequate time for regulatory, Indigenous and public commentary prior to making a determination whether the Project will be subject to further assessment or released. A period of 45 days from the date of registration is usually allotted for the Minister to make this determination. IOC has endeavored to provide as much detail as possible regarding the Project so various stakeholders can undertake an informed review of the Project. Throughout the review period, IOC will maintain contact with the EA Division to field any questions to facilitate the review process.

### 4.1 Regulatory Consultation

IOC corresponded with the EA Division prior to the submission of this EA Registration document. On November 21, 2017, IOC submitted to the EA Division a brief project description for the Smallwood North Pit Extension Project for purposes of determining whether registration under the NL *EPA* was required. On December 1, 2017, the EA Division advised IOC that registration was required. During a project update meeting held on March 1, 2017, between IOC and various Government of NL representatives, IOC provided an overview of the proposed Project and noted that the related EA Registration (this document) would be submitted in the near future. IOC will continue to consult with government officials during the EA review process. It is understood the Project will require permitting in the post-EA phase and this process will allow for additional consultation between IOC and relevant regulatory departments and agencies. IOC will apply for and adhere to all required permits and other authorizations for Project construction and operations.

### 4.2 Indigenous Consultation

IOC recognizes that Indigenous consultation is an integral part of the EA process. As such, during the provincial EA process, this registration document will be made available by the NL Government to all relevant Indigenous groups for their information, review and comment. IOC will endeavor to support the efforts of the Provincial Government as they communicate with relevant Indigenous groups regarding the registration document, to answer questions relative to the Project and to address any comments and concerns specific to the Project. Upon release from EA and during the Project permitting process, major permit applications will also be subject to Indigenous consultations.

### 4.3 Public Consultation

Public consultation is an integral part of the regulatory and EA processes. IOC has been operating in Labrador City since the early 1960s, maintaining a long-standing presence and contributing to the local communities and overall region. IOC has a number of established consultative forums in place, through which it regularly communicates and discusses ongoing business objectives and project changes/developments with stakeholders.

In 2006, IOC formed a Community Advisory Panel (CAP), consisting of representatives of the town councils of Labrador City and Wabush as well as local community stakeholders. The CAP meets quarterly to discuss issues of common interest in the region. IOC also established the Labrador West Regional Task Force (RTF) in 2011. The RTF's mandate is to bring regional mining companies together with local, provincial and federal government representatives to discuss and address socioeconomic challenges and opportunities associated with ongoing and future mining operations. In addition, IOC meets quarterly with the Town of Labrador City as a Joint Planning Committee to provide updates to each party on relevant topics impacting both the business and the community.

IOC will continue to consult with local communities and stakeholders on its operations, including the proposed Project, through these and other forums.

## 5.0 Environmental Effects & Analysis

### 5.1 Natural Environment

The Natural Environment is comprised of relevant components of the biophysical environment that may interact with the Project, including vegetation, soils, avifauna, wildlife, air quality, water resources and wetlands.

#### 5.1.1 Construction

Project construction will involve site clearing activities covering an overall area of approximately 100 ha. The Project area is characterized by patches of mixed wood forest interspersed with areas of moss, lichen cover and exposed rock and earth. There are no listed or rare plant species that are known to occur within or near the proposed Project area.

##### 5.1.1.1 Vegetation and Soils

The proposed project area is within IOC's existing lease and the surrounding areas have been subject to previous development and disturbance. Vegetation clearing and other ground disturbance activities will be confined to those areas where it is required and limits of clearing will be marked in advance. Clearing will be completed in compliance with relevant permits and regulations.

##### 5.1.1.2 Wildlife, Avifauna and Species at Risk

Mining activity has been occurring around the Project area for the past five decades. Recent studies have confirmed that the area is not within the current range of the migratory and sedentary caribou populations that occur in western and central Labrador and Quebec, and therefore the Project will not likely result in any adverse effects upon caribou.

Baseline studies have shown that a number of wildlife species do travel through the area via transmission lines, but given the proposed Project area's proximity to industrial mining activity, it is unlikely that this is an area of key importance for many species. Wildlife, including avifauna that use the area, have likely habituated to on-going human activity. The potential for interactions between the Project and regional wildlife is therefore limited. There are no listed SAR that are documented as occurring within or near the proposed Project area. A number of measures will be implemented during the construction phase of the Project to further reduce the potential for interactions between Project activities and any wildlife that may occur in the area:

- Construction areas will be kept clear of garbage;
- Construction personnel will not hunt or harass wildlife while on site;
- Pets will not be permitted on the construction site;
- Equipment and vehicles will yield the right-of-way to wildlife; and
- Any nuisance animals will be dealt with in consultation with the NL Wildlife Division.

IOC anticipates that contractor mobilization to site will occur in June of 2021, and initial clearing of the Project site will begin by August 2021. The Project site to be cleared comprises approximately 100 ha in a heavily disturbed area. Migratory birds have the ability to adapt to nearby noise disturbances. As a consequence, effects to migratory bird breeding activity are not expected to be significant nor persistent. If possible, clearing activity will be conducted outside the migratory bird nesting season. Should clearing activity coincide with the migratory bird breeding season, IOC will employ the following mitigations specific to avifauna:

- Monitoring for bird nests will be conducted in advance of site clearing during the breeding season (May 1<sup>st</sup> to August 15<sup>th</sup>) and efforts will be made to avoid trees with nests during that time. Non-intrusive surveys for nests will be conducted, in accordance with the Specific Considerations Related to Determining the Presence of Nests (Environment Canada 2012).
- The MBCA protects most bird species and their nests, with the exception of the following groups: certain game birds (grouse, quail, pheasants and ptarmigan), raptors (hawks, owls, eagles and falcons), cormorants, pelicans, crows, jays and kingfishers, and some species of blackbirds (starlings, mynas).
- Should a nest of a migratory bird be found, the following steps will be taken (in accordance with guidelines outlined in the *MBCA*):
  - all activities in the nesting area should be halted until nesting is completed (*i.e.*, the young have left the vicinity of the nest);
  - any nest found should be protected with a buffer zone appropriate for the species and the surrounding habitat until the young have left their nest; and
  - nests should not be marked using flagging tape or other similar material as these increase the risk of nest predation.
- Raptors, although not protected under the *MBCA*, are protected under Newfoundland and Labrador's *Wild Life Act*. In accordance with provincial guidelines, should a nest of a raptor be found, the following steps will be taken:
  - a buffer zone of 800 m should be maintained while the nest is active;
  - after the young have left their nest, a buffer zone of 250 m should be maintained; and
  - if work within the appropriate buffer zone cannot be avoided, the Newfoundland Department of Fisheries and Land Resources (DFLR) should be contacted for advice on how to minimize disturbance of the nest.

#### 5.1.1.3 Wetlands

The wetlands that exist within the boundary of the Smallwood North area will possibly be removed by construction. Each of these wetlands is relatively insignificant in size, and field surveys in 2017 indicated these wetlands only provide marginal wildlife habitat, given their proximity to mining operations and converted landscape. Wetlands are fairly common outside the Project area thus providing highly functioning wetland habitat in close proximity to the Project area. It is therefore unlikely that the removal, if necessary, of these small wetlands would be considered limiting to wildlife currently living in or moving through the Project area.

#### 5.1.1.4 Water Management

Water management activities during construction will be focused on managing any surface runoff from clearing and pit development. As required, ditching will be utilized to direct any surface water, via gravity feed, away from mine infrastructure and any water bodies and to a discharge area in an undisturbed forest. Also as required, vegetative filters will be utilized to ensure any surface water is filtered prior to final discharge. If required, any sumps created from surface water collection will be filtered and dewatered via pumps or gravity feed to an undisturbed vegetated area to prevent sediment transport to any nearby lakes. No negative interactions or adverse effects on the natural environment are therefore anticipated during the construction of Smallwood North Pit Extension Project.

#### 5.1.1.5 Air Quality

Air quality monitors will be in operation during the construction phase of the Project and the results will be analysed to determine if these activities are contributing to a decrease in air quality for the area. Given the distance and routine nature of the activities associated with the construction phase, it is not anticipated that there will be any cumulative increases in emissions at the mine site due to construction activities.

### 5.1.2 Operation

During the mining operations phase of the proposed Project, it is unlikely there will be many interactions with the biophysical environment (vegetation and soils, wildlife, avifauna, water resources, air quality and wetlands). Operational activities will be characterized primarily by the movement of materials to and from the site and associated activities. Smallwood North Pit will be mined using existing equipment and personnel. The activities will not be any noisier, closer to communities nor otherwise more disruptive than normal in this area of long-standing and on-going industrial activity.

#### 5.1.2.1 Vegetation and Soils

During operations of the Smallwood North Pit Extension Project, there will be no additional soil or vegetation disturbance, therefore, little or no potential for further effects to these biophysical components are anticipated.

#### 5.1.2.2 Wildlife, Avifauna and Species at Risk

As the area will be cleared during construction, it is expected that wildlife and avifauna species will avoid areas of major disturbance and relocate to adjacent undisturbed areas. Blasting has been occurring at IOC's Labrador City operations for decades and in varying pit locations. Wildlife and avifauna that live in the general area have presumably become acclimatized to this source and level of noise.

### 5.1.2.3 Air Quality

Air quality monitors will continue to be operated and the results analysed to monitor any changes over time to the air quality in the vicinity of IOC's Labrador City's operations. Given that there will be no net increase in operations activities as a result of the proposed Project development, it is not anticipated that there will be any cumulative increases in emissions.

### 5.1.2.4 Noise

Noise monitoring equipment will also be maintained at established sites but given the routine nature of the proposed Project activities and the distance from residential areas, it is not anticipated that there will be any negative effects from Project activities.

### 5.1.2.5 Wetlands

It is unlikely that operation activities will lead to any indirect loss of wetlands outside of the Project area due to changes in drainage and local hydrology.

### 5.1.2.6 Water Management

Water management activities during operations will primarily involve dewatering well(s) and in-pit pumps to dewater the pit as necessary. If required, the use of sumps may be required seasonally to manage any surface water buildup. As required, ditching will be utilized to direct any surface water, via pumps and gravity feed, away from mine infrastructure and any water bodies and to a discharge area in an undisturbed forest. Also as required, vegetative filters will be utilized to ensure any surface water is filtered prior to final discharge. A dewatering well is likely to be constructed, equipped, and operationalized to advance dewater the "below water table" saturated material ahead of drilling, blasting, and digging. A zone of broken ground, likely to be suitable for this new dewatering well, is discussed earlier in this document (Section 2.4.6). The effects from water management activities associated with the operation of Smallwood North Pit are not anticipated to be significant or adverse on the natural environment.

The edge of the pit lies within 100 m of Dorothy Lake. Seepage from the lake to the pit would be at right angles to the bedding strike direction and no evidence to date has been identified of faulting or alteration between the lake and the pit. Consideration of current understanding suggests limited hydrogeological connection between the lake and the pit area and seepage rates from the lake into the pit are therefore expected to be low. As a result lake levels are not expected to be adversely impacted by the pit development.

### 5.1.2.7 Accidental Events

Spills or releases of hazardous substances (e.g., fuels, oils and lubricants) from accidents or malfunctions of vehicles and equipment are possible during all Project phases. Such accidental events have the potential to result in adverse environmental effects to soil and water.



The likelihood of occurrence of an accidental spill or release of hazardous substances, and extent of resulting environmental effects, is minimized through adherence to applicable mitigation measures throughout all Project phases. Fuel and other hazardous materials are securely stored, vehicles and equipment are refueled at designated areas. Equipment and vehicles are inspected and maintained in good working order, and any leaks are addressed immediately. Emergency spill kits are onsite at all times. Mitigation measures to avoid collisions such as adhering to posted speed limits, and respecting established radio communication protocols will reduce the likelihood of an accidental spill or release.

Potential accidental events or malfunctions during Project construction and/or operations such as a fire or a spill of fuel or other chemicals could affect vegetation, soils and/or other aspects of the Natural Environment in or around the Project area. The resulting environmental effects of such an incident would depend on the nature and magnitude of the event.

As indicated above, IOC has various measures, plans and procedures in place to prevent potential accidents and malfunctions, such as a fire, spill, or other associated event, as well as to respond to such an accident should one occur. These measures will be applied to (and refined as required for) the Project, and will be further reinforced through the various provincial government permits, other authorizations and regulations, and compliance standards that will be relevant to the construction and operation of the Project.

IOC currently has procedures in place for the management of solid and hazardous wastes at its Labrador City operations, which will apply to the construction and operations phases of the proposed Project. Waste materials generated through construction activities that cannot be reused or recycled will be removed from the area and disposed of at an approved site. Non-hazardous construction refuse will be stored in covered metal receptacles, and will be disposed of on an as-needed basis at an approved landfill site, as per IOC's on-going operations and practices. Under no circumstances will solid wastes be buried onsite.

Any hazardous wastes will be stored in sealed, labelled containers and disposed of according to applicable regulations and IOC practice. These include procedures for the characterization, identification, storage, inspection, labelling and transportation of hazardous wastes produced at the facility, as well as emergency preparedness/prevention and training. There will therefore be no adverse interaction between construction waste materials and the environment.

### **5.1.3 Cumulative Environmental Effects**

Although the proposed Project will have an effect on vegetation and soils within the construction footprint as a result of clearing and excavation activities during the construction phase, any such disturbances will not overlap or interact cumulatively with those of other projects and activities in the area.

The operation of the Project will not result in an increase in overall production of iron concentrate or pellets. Therefore, the discharge of tailings to the TMF will not increase or change in metallurgical or chemical composition and thereby not contribute to any cumulative environmental effects.

The water quality of discharges or runoff from the Project will be controlled with treatment systems designed to comply with any Federal and Provincial requirements. Potential effects to water quality caused by the Project would likely be restricted to water bodies near the operation. There is potential for cumulative environmental effects with respect to changes in surface and groundwater flows in the Smallwood North Pit area. No significant negative impacts on the aquatic environment or associated species are expected as a result of the Project. Hydrologic and hydrogeologic equilibria will be re-established after project completion.

The Project will not affect listed or rare species, and will therefore not have any effect on overall biodiversity in the region, nor will it affect caribou populations or other wildlife. The proposed Project is unlikely to contribute measurably to any overall, negative cumulative environmental effects to the wildlife, SAR or avifauna in the region.

The development and operation of Smallwood North Pit is not likely to contribute to any reduction in overall air quality or increase in noise levels in the area. Given that neither the Kami Iron Ore mine nor the Scully Mine are currently operating, there is a very low potential for any cumulative effects to noise or air quality to be felt in the vicinity of Labrador City or Wabush. If these facilities or others begin operations, there is a potential for cumulative effects to be felt relative to noise and air quality. However, given that ongoing monitoring has indicated that CAC's measured have generally been within Provincial ambient air quality standards, the addition of other mining projects to the area may not change the regional air quality to the level of regulatory exceedance.

#### **5.1.4 Environmental Effects Analysis: Natural Environment**

A summary of potential environmental interactions, identified mitigation measures, and any residual environmental effects of the proposed Project on the Natural Environment is provided in Table 10.

**Table 10: Table of Environmental Effects Analysis – Natural Environment**

Environmental Component	Project Phase / Potential Interaction			Key Considerations and Environmental Mitigation	Residual Effects
	Construction	Operations	Issues / Interactions		
Wildlife	x	x	<ul style="list-style-type: none"> <li>• Travel corridors currently through the Project site</li> <li>• Loss of habitat due to vegetation clearing</li> </ul>	<ul style="list-style-type: none"> <li>• Mitigations in place for the Project</li> <li>• IOC will monitor all wildlife sightings in or near the Project site</li> <li>• Large quantities of suitable habitat available nearby for displaced animals</li> </ul>	NS
Avifauna	x	x	<ul style="list-style-type: none"> <li>• Loss of habitat due to vegetation clearing</li> </ul>	<ul style="list-style-type: none"> <li>• Mitigations in place should disturbance activities occur in breeding season</li> <li>• Avifauna observations to be recorded by IOC staff, including raptors, waterfowl and other avifauna</li> <li>• Large quantities of suitable habitat available nearby for displaced avifauna</li> </ul>	NS
Species at Risk			<ul style="list-style-type: none"> <li>• Potential for Little Brown Bat to use the area</li> <li>• Potential for bank swallow and common nighthawk to use the area</li> </ul>	<ul style="list-style-type: none"> <li>• None documented in or near the Project area</li> <li>• Any observations will be recorded and appropriate mitigations determined from consultation with appropriate regulators</li> <li>• Monitoring for avifauna and other wildlife SAR is ongoing at IOC mine site</li> <li>• Suitable habitat available nearby for any displaced SAR</li> </ul>	NS
Wetlands	x		<ul style="list-style-type: none"> <li>• Small wetland area to be removed from within Project footprint</li> </ul>	<ul style="list-style-type: none"> <li>• The area was surveyed and determined to not represent fish or significant wildlife habitat</li> <li>• Obtain necessary permits and consult with GNL</li> <li>• Avoid any interaction with wetlands outside the Project area</li> </ul>	NS

**Table 10: Table of Environmental Effects Analysis – Natural Environment (Cont'd)**

Environmental Component	Project Phase / Potential Interaction			Key Considerations and Environmental Mitigation	Residual Effects
	Construction	Operations	Issues / Interactions		
Air Quality	x	x	<ul style="list-style-type: none"> <li>No additional emissions predicted from either construction or operations activities</li> <li>Monitors to determine any changes in air quality</li> <li>Additional mitigations can be implemented should data indicate a reduction in air quality</li> </ul>	<ul style="list-style-type: none"> <li>Significant distance from residential areas &amp; no increased levels of site wide emissions predicted</li> <li>Ongoing mitigations for fugitive dust control</li> <li>Existing mitigations for construction and operations activities</li> <li>Follow EPP</li> <li>Continue with progressive rehabilitation measures such as revegetation</li> </ul>	NS
Noise	x	x	<ul style="list-style-type: none"> <li>No additional noise predicted</li> </ul>	<ul style="list-style-type: none"> <li>Significant distance from residential areas &amp; no increased levels of site wide noise predicted</li> <li>Follow EPP recommendations</li> <li>QC program in place re blasting program</li> <li>Noise monitors in place</li> </ul>	NS
Surface Water	x	x	<ul style="list-style-type: none"> <li>Potential accidental spills</li> <li>Increase in surface area runoff for Lorraine Lake watershed</li> </ul>	<ul style="list-style-type: none"> <li>Compliance with regulations and permits</li> <li>Design mitigation (erosion and sediment control plan, spill containment, etc.)</li> <li>Accidental event prevention and response</li> <li>Water quality monitoring prior to discharge in the environment</li> </ul>	NS

**Table 10: Table of Environmental Effects Analysis – Natural Environment (Cont'd)**

Environmental Component	Project Phase / Potential Interaction			Key Considerations and Environmental Mitigation	Residual Effects
	Construction	Operations	Issues / Interactions		
Groundwater (Quantity and Quality)	x	x	<ul style="list-style-type: none"> <li>Pumping rate</li> <li>Potential accidental spills</li> </ul>	<ul style="list-style-type: none"> <li>Compliance with regulations and permits</li> <li>Design mitigation (pump down plan, spill containment, controlled pumping rate, etc.)</li> <li>Accidental event prevention and response</li> <li>Discharge of extracted groundwater within the surface watershed of the Smallwood North Pit</li> <li>Water quality monitoring prior to discharge to the environment</li> </ul>	NS
Vegetation & Soils	x		<ul style="list-style-type: none"> <li>Removal during construction will be a direct loss</li> </ul>	<ul style="list-style-type: none"> <li>Compliance with regulations and permits</li> <li>Accidental event prevention and response</li> <li>Only necessary clearing will be carried out</li> <li>Progressive rehabilitation will be carried out wherever possible</li> <li>Overburden will be stockpiled for rehabilitation purposes</li> </ul>	NS
<b>Key:</b> X Potential Project Interaction (by Phase) N No likely adverse residual environmental effect NS Not significant adverse residual environmental effect S Significant adverse residual environmental effect P Positive residual environmental effect					

## 5.2 Human Environment

The Human Environment includes relevant components of the human and cultural environments, including historic and heritage resources, human health and well-being, land and resource use, community services, employment and the economy.

### 5.2.1 Construction

Historic and heritage resources include sites, objects or other materials of historic and archaeological, paleontological, architectural, cultural and/or spiritual importance. In Newfoundland and Labrador such resources are protected under provincial legislation and valued by Indigenous and other people in the province. Construction activities and associated ground disturbance have the potential to disturb or destroy archaeological sites and other historic and heritage resources.

There are no known historic and heritage resources within the proposed project area. Given the location, levels of existing disturbance, and topographic features at the Project site, there was little potential that the area contains, or that the Project will result in the disturbance or destruction of, historic and heritage resources.

During Project construction standard precautionary and reporting procedures will be implemented. Should an accidental discovery of historic resources occur, all work will cease in the immediate area of the discovery until authorization is given for the resumption of the work. Any archaeological materials encountered will be reported to the PAO, including information on the nature of the material discovered and the location and date of the find.

The proposed Project area is located within IOC's existing mining leases in Labrador City and on IOC property. Public access to the site is restricted so use of the area for hunting, gathering and other activities do not occur in the area. No negative interactions with, or adverse effects upon land and resource use (e.g., municipal, traditional or recreational) in the area are anticipated.

In addition, since the proposed Project will be located more than 8 km from any residential areas, it is not anticipated that the Project will have any negative effects on human health and well-being for the local communities or elsewhere.

The Project is meant to provide a consistent feed to the IOC mill in order to ensure critical production rates are maintained. Consistent operations at IOC's Labrador City facility provide job stability and economic benefits for the region as a whole. Therefore, the Project will make positive contributions to the socioeconomic environment of the region and province.

### 5.2.2 Operation

Once construction of the Project has been completed, there will be no additional ground disturbance. Negative effects to historic and heritage resources are not anticipated. The precautionary and reporting procedures implemented for construction will be maintained throughout the life of the Project.

No negative interactions with local commercial, municipal, traditional or recreational land and resource use activities are anticipated, nor are there any implications for human health and well-being.

The operations workforce that will be needed for the proposed Project will be redistributed from IOC's existing operations workforce. In addition, no additional demands on community infrastructure or services are anticipated during this phase of the Project.

### **5.2.3 Accidental Events**

An accidental event or malfunction during any phase of the Project could affect the Human Environment through, for example, an effect on human health and well-being or through an increased demand for local safety and health services. The probability of such events occurring is low, and any potential effects would depend upon the specific nature and magnitude of the event.

IOC has various measures, plans and procedures in place to prevent and respond to, a fire, explosion or other associated event at its Labrador City operations.

### **5.2.4 Cumulative Environmental Effects**

The proposed Project will occur during a slow economic period in Labrador West. Given the scale and timing of this Project, it is unlikely that the proposed Project will negatively affect the socioeconomic environment of the region; rather it will contribute positively to the local economy with continued employment and operation.

### **5.2.5 Environmental Effects Analysis**

A summary of potential environmental interactions, identified mitigation measures, and any residual environmental effects of the Project on the Human Environment is provided in Table 11.

**Table 11: Environmental Effects Analysis – Human Environment**

Environmental Component	Project Phase / Potential Interaction			Key Considerations and Environmental Mitigation	Residual Effects
	Construction	Operations	Issues/Interactions		
Historic and Heritage Resources	x		<ul style="list-style-type: none"> <li>• Ground disturbance</li> </ul>	<ul style="list-style-type: none"> <li>• Localized and short-term construction activity</li> <li>• Low potential for historic and heritage resources</li> <li>• Standard precautionary and reporting procedures</li> </ul>	N
Land and Resource Use			<ul style="list-style-type: none"> <li>• None</li> </ul>	<ul style="list-style-type: none"> <li>• Currently a restricted area, on IOC property</li> <li>• No public use of the site</li> </ul>	N
Human Health and Well-Being	x	x	<ul style="list-style-type: none"> <li>• Possible accidents affecting human health</li> </ul>	<ul style="list-style-type: none"> <li>• Distance from and minimal interaction with communities</li> <li>• Accidental event prevention and response</li> </ul>	N
Communities and Economy	x	x	<ul style="list-style-type: none"> <li>• Employment and business opportunities</li> </ul>	<ul style="list-style-type: none"> <li>• Positive effects (direct and indirect)</li> </ul>	P
<b>Key:</b> X Potential Project Interaction (by Phase) N No likely adverse residual environmental effect NS Not significant adverse residual environmental effect S Significant adverse residual environmental effect P Positive residual environmental effect					



## 6.0 Environmental Monitoring & Follow-up

IOC has strong environmental, health and safety management systems and associated plans, practices and procedures in place for their Labrador City operations. Any potential environmental or human health effects which may be associated with the proposed Project will be addressed and mitigated through the application of these established practices and procedures. Any potential effects can be further addressed through specific permitting requirements and compliance standards and guidelines which will apply to the proposed Project.

Once operational, the Project will be subject to regular inspections and maintenance as required. As IOC is ISO 14001 certified, the existing monitoring, measuring and auditing processes will be extended to include the Smallwood North Pit Extension Project.

As part of its regular and ongoing construction and operations procedures, IOC will conduct ambient air, and end of pipe water quality monitoring with programs that are described throughout this Project Registration document.

## 7.0 Summary & Conclusion

The scope of the proposed Project includes construction and operation of Smallwood North Pit, a groundwater extraction system, a waste rock disposal area, an overburden stockpile area and haulage roads to connect the mine to an existing transportation system. The transportation system moves ore to the concentrator plant and waste rock and overburden to their respective disposal/stockpile areas. The proposed Project does not require any additional infrastructure as the existing ore processing, tailings management, ore and final product transportation systems and equipment maintenance facilities already exist. The Project will not result in any increase in ore, concentrate, pellet or tailings production, rather it will contribute to achieving critical production targets. The operation of Smallwood North Pit will not result in an increase in the labour force at IOC's Labrador City operations; rather the operational plan will be to redeploy existing equipment and personnel to Smallwood North Pit from other current operational areas.

The proposed Project will be planned and implemented in accordance with IOC's environmental and health and safety policies, plans and practices to help ensure that it is constructed and operated in a safe and responsible manner. IOC has a comprehensive environmental management system certified to the ISO 14001 Environmental Standard, including various associated plans and procedures designed to avoid or reduce any negative environmental effects of its activities.

Rio Tinto has a number of established community policies and standards within its Communities and Social Performance Framework that each of its operating companies, including IOC, must follow. As a member of the Mining Association of Canada (MAC), IOC follows MAC's social policies and guidelines, performance measures and protocols.

The proposed Project will be constructed and operated in accordance with applicable provincial legislation and regulations and in compliance with IOC policies, procedures and standards. IOC is committed to complying with all relevant legislation and regulations, and any conditions associated with environmental assessment release. The proposed Project should not pose any significant negative effects for the following environmental and social components:

- Air quality within the community of Labrador City;
- Water quality;
- Vegetation and soils;
- Wetlands of the region;
- Wildlife, including SAR;
- Avifauna, including SAR;
- Historic and heritage resources;
- Communities and economies;
- Human health and well-being; and
- Land and resource use.

IOC will continue to consult as required with all relevant government, community and Indigenous organizations throughout the EA process, and will continue as required through all stages of mine life.

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## **Appendix A**

### **Health, Safety, Environment and Quality Policy**

## Iron Ore Health, Safety, Environment, Communities and Quality Policy

The global Iron Ore group is comprised of mining and processing operations in Australia and Canada with dedicated sales offices in Asia, Canada and Europe and a global marine freight management network.

- The business is diverse and covers:
- Operations and expansion projects in the Pilbara, Western Australia and at the Iron Ore Company of Canada
  - Rio Tinto Marine
  - Service and Support functions in our central offices globally
  - Major development opportunity at Orissa



Andrew Harding,  
Chief executive Iron Ore  
20 June 2013

We are an organization that cares about our people's needs both at work and at home, supporting our business's overall goal of achieving zero harm.

We aim to be industry leaders in health, safety, environmental and community performance. Our belief is that quality engagement with contractors, suppliers, customers, communities and government regarding our strategies and plans is essential to building robust relationships and is fundamental to our long term success.

Through effective leadership we continuously strive to improve our HSECQ performance and our success requires shared dedication and active participation by each of us.

We will endeavour to meet our commitments by:

- Making sure no one is harmed or hurt while they are at work
- Living and working by the standards of conduct defined in "The Way We Work"
- Communicating the vision of our business, linked to our annual plan priorities
- Contributing to the health and well-being of local communities
- Being open and transparent with local stakeholders, respecting their culture and diversity and considering their interests in the company's management decisions
- Recognizing our customers' needs with product and pricing options
- Ensuring the service and technical support we are providing to our suppliers and customers is responsive, fair, courteous and timely
- Identifying climate change improvement solutions through dedicated optimization work programmes
- Prioritizing research and implementation programmes through technology to reduce impacts to land, enhancing our contribution to biodiversity and improving our efficiency in water and energy use
- Identifying and managing business risk and fully implementing business resilience capability
- Ensuring leadership encourages effective employee, contractor, supplier and community participation in achieving our goals
- Implementing and improving systems to identify, control and monitor HSECQ risks across the business
- Providing and developing adequate resources and expertise to manage HSECQ performance
- Reporting regularly to all stakeholders on our performance and seek their feedback to further improve HSECQ

*This policy shall be communicated to all Iron Ore group employees, service providers and internal and external stakeholders and made available to the public.*



## **Appendix B**

### **Operational and Development Environmental Protection Plan**





# **IOC Labrador City - Operations**



## **Operational Environmental Protection Plan**

**Iron Ore Company of Canada  
P.O. Box 1000  
1 Avalon Drive  
Labrador City, NL  
A2V 2L8**

**Issued**



**IOC HEALTH, SAFETY AND ENVIRONMENT POLICY**

**Rio Tinto**



**Iron Ore Health, Safety, Environment, Communities and Quality Policy**

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Through effective leadership we continuously strive to improve our HSE/CQ performance and our success requires shared dedication and active participation by each of us.

We will endeavour to meet our commitments by:

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- Communicating the vision of our business, linked to our annual plan priorities
- Contributing to the health and well-being of local communities
- Being open and transparent with local stakeholders, respecting their culture and diversity and considering their interests in the company's management decisions
- Recognizing our customers' needs with product and pricing options
- Ensuring the service and technical support we are providing to our suppliers and customers is responsive, fair, courteous and timely
- Identifying climate change improvement solutions through dedicated optimization work programmes
- Prioritizing research and implementation programmes through technology to reduce impacts to land, enhancing our contribution to biodiversity and improving our efficiency in water and energy use
- Identifying and managing business risk and fully implementing business resilience capability
- Ensuring leadership encourages effective employee, contractor, supplier and community participation in achieving our goals
- Implementing and improving systems to identify, control and monitor HSE/CQ risks across the business
- Providing and developing adequate resources and expertise to manage HSE/CQ performance
- Reporting regularly to all stakeholders on our performance and seek their feedback to further improve HSE/CQ

*This policy shall be communicated to all Iron Ore group employees, service providers and internal and external stakeholders and made available to the public.*





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## **1.0 INTRODUCTION**

The Iron Ore Company of Canada (IOC<sup>1</sup>) is one of Canada's leading producers of iron ore. Our product is in demand around the world for its quality, consistency and chemistry. IOC has operated mines and associated processing facilities at the Carol Project property near Labrador City, Newfoundland and Labrador, since 1962.

### **1.1 Purpose of the Environmental Protection Plan**

This EPP outlines practical procedures required for all project personnel (i.e., IOC employees, contractors and suppliers) to reduce or eliminate the potential environmental effects associated with the operations and decommissioning phases of the Carol Mining Project – Operational and Development Sites. This EPP also:

- ensures that commitments to reduce environmental effects are met;
- documents environmental concerns and appropriate protection measures;
- provides a reference document for personnel when planning and/or conducting specific activities;
- provides direction for developing contingency plans for accidental events;
- communicates changes in the program through the revision process;
- provides a reference to and instructions for IOC to understand applicable legal and other requirements;
- includes a quick reference for both project personnel and regulators to monitor compliance and recommend improvements; and
- provides direction at the corporate level for ensuring commitments made in policy statements are implemented and monitored.

Any deviation from the procedures and commitments outlined in the EPP must first be discussed with, and approved by, the Manager Environment & Sustainable Development.

In addition to outlining required environmental protection procedures for the Operational and Development Sites, this EPP was required by the Department of Fisheries and Oceans prior to issuance of a Section 35(2) Authorization under the *Fisheries Act*, and as a condition of release

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<sup>1</sup> Refer to Appendix A for a list of all abbreviations and acronyms used in this Environmental Protection Plan.



**IOC Lab City - Operational Development  
Environmental Protection Plan**

**Version:** 07

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**Revised:** July 2017

of the project from assessment requirements under the *Newfoundland Environmental Assessment Act*.



## **1.2 Environmental Protection Plan Organization**

This EPP has been developed for specific activities to be conducted in support of the Operational and Development Sites. It provides instructions for addressing both planned and unplanned activities/events associated with the project. This EPP contains the following sections:

- **Section 1.0** provides an introduction to the EPP. It outlines the EPP purpose and organization, roles and responsibilities and environmental orientation.
- **Section 2.0** provides an overview of the undertaking.
- **Section 3.0** lists the permits, approvals and authorizations required for the undertaking, and provides an overview of compliance monitoring.
- **Section 4.0** describes environmental concerns and environmental protection procedures for planned project activities.
- **Section 5.0** outlines the contingency plans for potential unplanned and accidental events.
- **Section 6.0** describes procedures for making revisions to the EPP.
- **Section 7.0** contains a list of key project and regulatory contacts.
- **Section 8.0** lists references cited in the EPP, as well as a number of sources of further information.

## **1.3 Roles and Responsibilities**

The Iron Ore Company of Canada will:

- provide final approval for the EPP and any subsequent revisions;
- in consultation with the Operational and Development Site Project Managers, designate the Environmental Advisors for the undertaking;
- monitor and inspect the work being carried out; and
- liaise with relevant government agencies and community interest groups as required

The designated Environmental Advisors will:





- ensure the implementation of the EPP;
- be IOC's representative on-site;
- review revision requests;
- conduct a review of the EPP on an as-needed basis;
- ensure revisions are distributed to EPP holders;
- maintain document control;
- report to the Manager Environment;
- hold an environmental orientation session for the contractor and its personnel, and any other personnel to be involved in the project on an as-needed basis;
- ensure EPP holders and their staff are familiar with the EPP and its procedures;
- ensure that all applicable approvals, authorisations and permits are obtained;
- monitor or designate a representative to monitor project work to ensure compliance with the EPP, and all regulatory requirements and commitments; and
- report to the Operational and Development Site Project Managers, Manager Environment, and/or appropriate agency all incidents of non-compliance.

The contractor and site personnel will:

- familiarize themselves with the EPP;
- implement the EPP commitments;
- ensure all personnel and subcontractors comply with the EPP, all requirements of the contract and with all applicable laws and regulations;
- maintain a training record;
- maintain regular contact with the Environmental Advisor, including, but not limited to:
  - immediately reporting concerns to the Environmental Advisor over any aspect of the EPP, and
  - immediately reporting any spills or other event that may have an effect on human or environmental health and/or safety;
- obtain all applicable approvals, authorizations and permits;
- ensure the implementation of any conditions outlined in approvals, authorizations and permits; and
- carry out clean-up, reclamation or restorative measures as directed by the Operational and Development Sites Project Managers, Environmental Advisors and/or appropriate



government agency.

All EPP Holders will:

- keep their copy of the EPP current and ensure all revisions are entered on the revision control record;
- familiarize themselves and their personnel with the EPP and any revisions; and
- initiate changes to improve the quality of the plan.

#### **1.4 Environmental Orientation**

Through orientation and ongoing awareness training throughout the undertaking, IOC will ensure that all project personnel are competent to do their jobs properly. Employees will understand their roles and responsibilities, as well as the potential environmental effects of the overall project and their specific work activities. All workers will receive an environmental orientation prior to the start of any new activity and thereafter on an as-needed basis.



## **2.0 PROJECT OVERVIEW**

Development activities represent a continuation of ongoing IOC operations at the Carol Lake Mining Project within its original mining lease. All development activities shall be within the constraints of the original lease agreements. Any extensions to the lease should be recorded.

**It is currently proposed to continue mining using existing methods, infrastructure, and processing facilities, with some modification to on-site haulage roads and transmission lines.**

### **2.1 Construction**

With regards to activities relating to the construction of any Operational Development, this EPP only outlines the environmental protection measures associated with the operations and decommissioning of the project.

### **2.2 Operations**

This EPP outlines the environmental protection measures associated with any operational developments at the Iron Ore Company of Canada, including site preparation activities (e.g., clearing of trees, earth moving, dewatering, etc.) and mining activities.

#### ***2.2.1 Ongoing Site Preparation Activities***

Ongoing site preparation activities and development work (i.e., preparation for material removal) include those activities required to support the continued mining of any Operational Development such as extension of roads, power lines, construction of physical features and environmental assessments. Operational Development areas that require tree clearing prior to any development activities, should reference Section 4.2, 4.3, and 4.4 of this Environmental Protection Plan.

Where required, an environmental assessment shall be conducted at the planned Operational and Development Sites, by IOC Environment Department. Any obsolete infrastructure and utilities (ie. disengaged power lines, poles, dewatering pipes) shall be removed prior to any operational development activity.



### Overburden and Waste Rock Removal

Unconsolidated material or overburden that covers the Operational Development area will be removed to the hard rock surface in preparation for mining. Overburden will be placed in designated storage areas as determined by IOC. Site preparation also involves the development of terraces within the operational development area by drilling and blasting the sloped natural ground to specified bench elevations in 13.7 m increments for IOC production equipment. Waste rock will be dumped at waste rock dumps located at IOC Mine Site, with the exception of those quantities to be used as construction material. This material may be used to upgrade the existing network or on-site haul roads. Alternatively, waste rock could be placed in the pits using conventional backfill techniques.

Waste rock and overburden piles will be sloped and bermed to prevent pooling of surface water. Structures such as silt fences will be used as a means of sediment control as required, and collection ditches and settling ponds will be used as required to manage surface runoff and any groundwater flows.

For further information please see the E13- Chemically Reactive Mineral Waste Control Standard.

### Roadways

Operational Development areas will require both new road construction and upgrading of existing roads. All roads will require grading, culvert installation, adequate drainage, dust control, and maintenance, all of which are subject to specific guidelines and regulations. The location and extent of these roads will be finalized at the detailed design stage.

### Marshalling and Storage Areas

Marshalling areas will be located at various locations on the project site to facilitate the receiving and storage of materials and equipment such as piping and culverts. Existing facilities at the Carol Mining Project will be used wherever possible.

### Associated Facilities and Infrastructure

Maintenance facilities, equipment and processing facilities will be used during the operational phase. If required, transmission lines will generally follow road rights-of-way. Lunchroom/washroom facilities shall be used at the workforce area.



### ***2.2.2 Mining Activities at IOC (typical)***

Mining activities at the Iron Ore Company of Canada will proceed from the highest bench elevation to the lowermost planned bench. The nominal bench height will be 13.7 m. Bench accesses will initially be developed using waste rock as mining proceeds downwards. The haulage pit ramps will be 40 m wide, with a maximum gradient of 8%. The bench face angle will be 35 to 90 degrees, and the overall pit slope angle will be 30 to 58 degrees.

### **2.3 Decommissioning**

A rehabilitation and closure plan has been developed in accordance with the *Newfoundland Mining Act*. A sustainable closure configuration will be implemented throughout the operational life as appropriate.

In general, the reclamation systems and abandonment facilities will be designed for long term stability, allowing for gradual erosion and deformation at a geomorphic rate comparable to that of the natural environment. Structures will be designed to remain functional for the long term (+1,000 years).

Progressive Reclamation: The reclamation of the mine area will be staged over the life of the facility, resulting in minimal reclamation investment at the end of the mine life. Progressive reclamation activities will include contouring and re-vegetating inactive mine areas.

Decommissioning: The primary decommissioning criterion is to ensure a maintenance-free facility after mine closure.



### 3.0 REGULATORY REQUIREMENTS AND COMMITMENTS

#### 3.1 Approvals, Authorizations and Permits

The approvals, authorizations and permits required for development activities are listed in Table 3.1.

**Table 3.1: Regulatory Requirements – Permits and Authorizations**

Permit/ Approval	Legislation/ Guidelines	Activity Requiring Compliance	Responsible Agency	Comment
<b>Federal Government Requirements</b>				
Release from the <i>Canadian Environmental Assessment Act</i>	<i>Canadian Environmental Assessment Act</i>	Activities that fall under Section 35(2) of the <i>Fisheries Act</i> and the <i>Navigable Waters Protection Act</i> .	Habitat Management, DFO	
Authorization pursuant to Section 35(2) of the <i>Fisheries Act</i>	<i>Fisheries Act</i>	Activities that may affect fish habitat	Habitat Management, DFO	A Fish Habitat Compensation Plan has to be approved by DFO. A monitoring program shall be implemented to measure the program's effectiveness. Other activities having potential impact should be reviewed with Area Habitat office in GooseBay.
<b>Provincial Government Requirements</b>				
Release from the <i>Environmental Assessment Act</i>	<i>Environmental Assessment Act and Regulations</i>	Any Development Activity	Environmental Assessment Division, Dept of Municipal Affairs & Environment	
Certificate of Approval for drawdown of Development Area Waterbody.	<i>Environment Act</i>	Drawdown of a lake, pond.	Water Resources Division, Dept of Municipal Affairs & Environment	A Certificate of Approval must be obtained.



<b>Permit/ Approval</b>	<b>Legislation/ Guidelines</b>	<b>Activity Requiring Compliance</b>	<b>Responsible Agency</b>	<b>Comment</b>
Compliance standard; no permit required	<i>Wildlife Regulations</i> pursuant to the <i>Wildlife Act</i>	Presence of personnel	Wildlife Division, Department of Tourism, Culture and Recreation	It is unlawful to take or destroy the eggs or nest of any wild bird. IOC and contractor personnel will not harass or disturb wildlife, or remove or destroy nests or eggs. Clearing of vegetation may result in the loss of nests.
Permit to Burn	<i>Forestry Act</i> and <i>Forest Fire Regulations</i>	Any burning required during the project.	Department of Forest Resources and Agrifoods	A permit is required to light fires outdoors between April and December. Permits are not issued during forest fire season.  IOC will comply with the Environmental Code of Practice for Open Burning
Mill Licence	<i>Mining Act</i>	Operating of mill	Department of Municipal Affairs and Environment	Operating a mill requires a mill licence for a term of 5 years or longer.
Mineral Rights	<i>Minerals Act</i>	Mining Leases	Department of Municipal Affairs and Environment	A mining lease shall be filed with government within 6 months of date of application.
Procedural and financial obligations	<i>Aboriginal Consultation Policy</i>	Minimization of any potential adverse impacts of projects and developments on the asserted rights of Indigenous groups	Department of Municipal Affairs and Environment	Consultation and accommodation with associated aboriginal groups
Permit to Infill	<i>Water Resources Act</i>	Infilling of water body	Department of Municipal Affairs and Environment	A permit is required to infill a body of water.
Permit to Alter a Body of Water	<i>Water Resources Act</i>	Develop of wetlands	Department of Municipal Affairs and Environment	A permit is required to develop wetlands requiring special conditions and alterations.



<b>Permit/ Approval</b>	<b>Legislation/ Guidelines</b>	<b>Activity Requiring Compliance</b>	<b>Responsible Agency</b>	<b>Comment</b>
Compliance standard	<i>Endangered Species Act</i>	Any activity that may affect and endangered or threatened species	Department of Municipal Affairs and Environment	Provide protection to endangered and threatened species and protection of their habitats
Permit of Investigation	<i>Historic Resources Act</i>	If any archaeological objects are uncovered	Department of Municipal Affairs and Environment	An investigation permit is required to perform an archaeological investigation

### 3.2 Compliance Monitoring

Inspections and monitoring ensure the implementation of the environmental protection measures that are specified in this document and that will be specified in the applicable contracts and other relevant permits, approvals and authorizations. Monitoring will also ensure that all development project activities comply with applicable regulatory requirements and that mitigation measures are being employed effectively.

The Environment Department is responsible for environmental compliance monitoring on-site; and on the environment-related general, special and technical clauses to be implemented as part of the contracts.

Compliance monitoring will be required for various activities during the undertaking. Federal and provincial government compliance standards that apply to the project include but are not limited to those listed in Table 3.2. Project personnel will comply with relevant approvals, authorizations, permits and legislation.

**Table 3.2: Compliance Standards**

<b>Legislation/ Guidelines</b>	<b>Activity Requiring Compliance</b>	<b>Responsible Agency</b>	<b>Comment</b>
<b>Federal Regulations</b>			
<i>Fisheries Act</i> , Section 35(2), Harmful Alteration, Disruption, or Destruction of Fish Habitat	There will be follow-up (compliance) monitoring to verify the effectiveness of fish habitat compensation provisions.	Department of Fisheries and Oceans	Monitoring requirements and schedule are detailed in the Fish Habitat Compensation Agreement that is attached to the authorization issued by the Minister.
<i>Fisheries Act</i> , Section	Any run-off from the project	Environment and	Any deposited substance or discharge must





<b>Legislation/ Guidelines</b>	<b>Activity Requiring Compliance</b>	<b>Responsible Agency</b>	<b>Comment</b>
36(3), Deleterious Substances	site being discharged to receiving waters (freshwater or marine).	Climate Change Canada	not be deleterious (i.e., must be acutely non-lethal). Liquid effluents that enter freshwater or marine waters must comply with the Act.
<i>Migratory Birds Convention Act and Regulations</i>	Mortality of migratory birds, and endangered species and any species under federal authority.	Canadian Wildlife Service, Environment Canada	CWS should be notified about the mortality of any migratory bird in the project area, including passerine (songbirds), seabird and waterfowl species. Harmful substances (e.g., oil, wastes, etc.) that are harmful to migratory birds must not be deposited into waters that are frequented by them. Nests, eggs, nest shelters, eider duck shelters or duck boxes of migratory birds must not be disturbed or destroyed.  Notice should also be given about the mortality of any species known to be endangered or under federal authority, including polar bears, wolverine and marine mammals.
<i>Transportation of Dangerous Goods Act and Regulations</i>	Handling and transporting of dangerous goods.	Transport Canada	If the materials are transported and handled fully in compliance with the regulations, a permit is not required. A Permit of Equivalent Level of Safety is required if a variance from the regulations is necessary.
<i>Canadian Environmental Protection Act</i>	Activities that have the potential to interact with the environment and human health.	Environment Climate Change Canada	CEPA provides a framework for setting environmental quality objectives, guidelines and codes of practice, pollution prevention plans, regulation of toxic substances, controlling pollution of other wastes and environmental emergency plans.
<i>Federal Policy on Wetland Conservation</i>	Activities that have the potential to affect wetlands	Environment Climate Change Canada	If wetland will be affected due to mining an offset must be established to remedy the difference.
<i>Explosives Act</i>	Activities surrounding blasting using explosives	Environment Climate Change Canada	Must comply with the storage and use of all explosives on site as per regulations.
<b>Provincial Regulations</b>			
<i>Waste Material Disposal Act</i>	Any Development Operation.	Pollution Prevention Division, Dept of Municipal Affairs & Environment	All waste material shall be considered prior to disposal, for reuse, resale or recycling. All waste materials associated with the construction and operation, shall be disposed at an approved waste disposal site.
<i>Occupational Health and Safety Act</i>	Project personnel.	Workplace Health and Safety, Department of Labour	Outlines minimum requirements for workplace health and safety. Workers have the right to refuse dangerous work and must be informed of potential hazards they may be exposed to during work. All workers must be provided with and use appropriate



<b>Legislation/ Guidelines</b>	<b>Activity Requiring Compliance</b>	<b>Responsible Agency</b>	<b>Comment</b>
			personal protective equipment.
<i>Storage and Handling of Gasoline and Associated Products Regulations</i>	Storage, handling and disposal of gasoline and other fuels.	Pollution Prevention Division, Dept of Municipal Affairs & Environment	A spill contingency plan should be developed that includes emergency response contacts/support and access to spill response equipment.
<i>Workplace Hazardous Materials Information System, under the Occupational Health and Safety Act</i>	Handling and storage of hazardous materials.	Operations Division, Department of Government Services	Outlines procedures for handling hazardous materials and provides details on various hazardous materials.
<i>Dangerous Goods Transportation Act and Regulations</i>	Transporting fuel to the site.	Department of Works, Services and Transportation	Transporting goods considered dangerous to public safety must comply with regulations.
<i>Historic Resources Act</i>	General project activities.	Cultural Heritage, Department of Tourism, Culture and Recreation	All archaeology sites and artefacts are considered to be the property of the Crown and must not be disturbed. Any archaeology materials encountered must be reported to the Provincial Archaeology Office.
<i>Cutting of Timber Regulations</i>	Cutting or Removal of Timber.	Department of Natural Resources.	Cutting and Removal of Timber shall be approved by the IOC Environment Department.
<i>Wildlife Act</i>	Activities that have the potential to interact with wildlife	Department of Municipal Affairs and Environment	Sighting of any wildlife in the area the Dept. of Natural Resources must be contacted for removal.
<i>Air Pollution Control Regulations</i>	Maintain good air quality levels as prescribed in regulations	Department of Municipal Affairs and Environment	Burning is prohibited for certain materials listed in Schedule E of the regulations. In addition, certain fuels are prohibited as well.
<i>Water Resources Act Environmental Control Water &amp; Sewage Regulations</i>	Discharging sewage and other materials into a body of water or public sewer shall comply with standards, condition and provisions in these regulations	Department of Municipal Affairs and Environment	Effluent samples and receiving water samples using analytical procedures.
<i>Urban &amp; Rural Planning Act</i>	Established the province's land use planning system	Department of Municipal Affairs and Environment	Consultation with public and municipal governments so that development decisions can be subjected to independent reviews.
<i>Management of Greenhouse Gas Act</i>	Monitor and record all emissions related to GHG	Department of Municipal Affairs and Environment	Submission of an annual report regarding the greenhouse gas emissions released with 3 <sup>rd</sup> party verification.



### **3.3 Reporting**

#### ***3.3.1 Internal Communication***

Environmental performance and issues at any Operational and Development Site or area will be communicated internally as required. The Operational and Development Site Project Managers are responsible for communicating IOC policies and procedures and legal and other requirements to project personnel. Project personnel will communicate all environmental incidents and near misses to the Environmental Advisors as per CR-E-E-PRO Environmental Reporting.

#### ***3.3.2 External Communication***

When required, IOC will report on environmental issues relating to the development site to the Newfoundland and Labrador Department of Environment and Conservation. Issues which may be communicated include but are not necessarily limited to:

- Stream crossings;
- Burrow Sites;
- Dust;
- Erosion;
- Historic resources;
- Wildlife encounters; and
- Permits and authorizations.

Any spills of petroleum products or other hazardous materials will be reported to the **IOC Emergency Services and Security** (709) 944-8400, ext. 8320, who will report the incident to the IOC Environment Department.

**Any activity having the potential environmental impact to fish and fish habitat outside the realm of the compensation agreement (such as stream crossings and culvert installations) should be forwarded to the IOC Environment Department, who will consult the Fisheries and Oceans Area Habitat office in Goose Bay for review and subsequent issuance of appropriate Letters of Advice.**

Other compliance reporting required by permits or through compliance requirements not listed above will also be submitted to the IOC Department of Environment, or appropriate departments at IOC.



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Reporting results of Environmental Effects Monitoring and/or Fish Habitat Compensation Plan monitoring will be provided to DFO and other appropriate agencies as required.



## **4.0 ENVIRONMENTAL PROTECTION PROCEDURES**

This Section provides a description of environmental protection procedures for the following anticipated project-related activities:

- 4.1 Marshalling and Storage Areas
- 4.2 Clearing Vegetation
- 4.3 Grubbing and Overburden Removal
- 4.4 Erosion Prevention and Siltation Controls
- 4.5 Buffer Zones
- 4.6 Drilling
- 4.7 Blasting
- 4.8 Water Course Crossings
- 4.9 Dewatering Work Areas and Site Drainage
- 4.10 Equipment Use and Maintenance
- 4.11 Handling and Transfer of Fuel and Other Hazardous Material
- 4.12 Solid Waste Disposal
- 4.13 Mineral Waste Rock and Overburden
- 4.14 Vehicle Traffic
- 4.15 Dust Control
- 4.16 Hazardous Waste Disposal
- 4.17 Road Maintenance
- 4.18 Trenching
- 4.19 Surveying
- 4.20 Public Traffic and Activity

When required, this EPP will be revised to include new or amended environmental protection procedures to ensure that activities conducted at the developing site are completed properly and that the site's significant environmental aspects are well managed.



## **4.1 Marshalling and Storage Areas**

### **Environmental Concerns**

Areas will be required for storing and maintaining equipment and supplies through the development and operational phases of the Carol Lake Project. Concerns include:

- Vegetation and soil disturbance may cause erosion and run-off of sediment into nearby water bodies.
- Spills/leaks of hydrocarbons from storing and maintenance activities

### **Environmental Protection Procedures**

- a) Existing marshalling and storage areas will be used outside the development site, where feasible.
- b) Any new marshalling, maintenance or storage areas required for the project will only be established within the IOC Labrador City property.
- c) Establishing any new marshalling or storage areas will follow the procedures for vegetation clearing (Section 4.2), grubbing and overburden removal (Section 4.3), and erosion prevention (Section 4.4).
- d) Any marshalling or storage areas shall be located at least 100 m from a waterbody
- e) External storage areas will be placed on level terrain and kept free of ponding or run-off.
- f) Drainage from areas of exposed fill will be controlled by grade or ditching and directing run-off away from water bodies.
- g) Any maintenance work completed on equipment must have the appropriate spill material available and dip pans must be used
- h) Secondary containment required where hazardous products are stored. The size of the containment should be a minimum 110% of the material volume.
- i) Marshalling and storage areas not required during operations will be rehabilitated.



## **4.2 Clearing Vegetation**

### **Environmental Concerns**

Vegetation clearing (e.g., trees, shrubs, etc.) will be required in advance of site preparation activities. Concerns include habitat loss, impact to nesting birds, erosion and sedimentation into vegetative areas and waterbodies, uncontrolled burning of slash, impact to historical/archeological sites, and stockpiling vegetation in or near watercourses.

### **Environmental Protection Procedures**

- a) Clearing activities will comply with the requirements of all applicable permits. A Site Clearance Permit must be completed and submitted to the Environment Department.
- b) Clearing or removal of trees will be restricted to only those areas designated by IOC.
- c) Project footprint should be minimized wherever possible and clearing limits and work areas must be clearly marked
- d) Avoid ecologically sensitive areas such as hardwoods and aquatic habitats wherever possible and practical
- e) Clearing will consist of cutting to within 15 cm of the ground and disposing of all standing trees, as well as removing all shrubs, debris and other perishable materials from the area indicated on the engineering/survey drawings.
- f) Where practical, vegetation will be stored so that it can be later used as a seed source, moisture retention aid, and shade for new growth during reclamation.
- g) Reasonable effort will be made to dispose of usable timber by either using it in project related construction, or by providing the timber for local use off-site. Otherwise, timber will be mulched and mixed with the overburden.
- h) Slash and any other construction material or debris will not be permitted to enter any watercourse, and will be piled above spring flood levels. No burning is permitted on-site unless proper approvals acquired.



- i) Trees will be either sawed or mulched using mechanized cutting /mulching equipment. The use of mechanical clearing methods, such as bulldozers, will not occur except where it can be demonstrated that there is no merchantable timber, and where the resulting terrain disturbance and erosion will not result in the loss of topsoil or the sedimentation of water bodies.
- j) A 100 m buffer zone of undisturbed vegetation will be maintained between **all water bodies and watercourses on the Carol Project**. If this buffer cannot be maintained, the Environment Department must be consulted to determine the appropriate buffer requirement and approve additional mitigations.
- k) Timber shall be felled inward toward the work area to avoid damaging any standing trees within the immediate work area.
- l) Workers will not destroy or disturb any features indicative of a cultural or archaeological site. Such features should be avoided until a report has been made to the Provincial Archaeology Office and clearance to proceed has been received (see Section 5.7).
- m) IOC is aware of the value of wetlands and will attempt to avoid such disturbance of wetlands outside of the work areas where feasible.
- n) All equipment used will be handled and maintained according to the procedures in Section 4.10.
- o) Firefighting tools and water delivery systems must be available
- p) Where feasible, vegetation clearing will be scheduled to avoid disturbance during the critical nesting period, from May to August. If clearing is scheduled between May and August, conduct nest searches in advance of vegetation clearing to avoid active nests during breeding season.
- q) No clearing shall take place within 800 m of an active raptor nest between May 15 and August 15. If a nest is encountered during clearing activities, the area is to be demarcated and clearing is to be avoided until the Environmental Department determines that work may continue in consultation with the NL Wildlife Division.





- r) Should additional nests/dens be identified during clearing activities, work must stop and the Environmental Advisor contacted immediately to establish buffer zones.
  
- s) If identified during construction, IOC will relocate any Species at Risk (SAR) or Species of Conservation Concern (SCC).



### **4.3 Grubbing and Overburden Removal**

#### **Environmental Concerns**

The principle concerns associated with grubbing and disposal of related debris are the potential adverse effects on freshwater ecosystems and water quality through the release of sediment into watercourses, as well as the potential for disturbing historic resources.

#### **Environmental Protection Procedures**

- a) Grubbing of the organic material and/or the upper soil horizons will be restricted to the minimum area required. The organic material must be removed separately from the upper soil horizon material.
- b) The organic vegetation material and upper soil horizon material that has been grubbed will be spread in a manner to cover inactive exposed areas.
- c) Any surplus of such material will be stored or stockpiled for site rehabilitation and re-vegetation purposes. Organic material will be stockpiled separately from the upper soil horizon material. The location of the stockpiles will be recorded and accessible for future rehabilitation purposes.
- d) If stockpiled material is to be disturbed, the site is to be inspected by the Environmental Advisor to ensure that bank swallow nests, if present, are not impacted (May 15 to end July)
- e) Measures will be implemented to reduce and control runoff of sediment-laden water during grubbing, and the re-spreading and stockpiling of grubbed materials. Where grubbed materials are re-spread or stockpiled, as many stumps and roots as possible will be left on the ground surface to maintain soil cohesion, dissipate the energy of runoff and promote natural re-vegetation.
- f) Runoff of sediment laden water during grubbing will be minimized by using such measures as settling ponds, ditch blocks, interception ditches and filter fabrics. Erosion control measures such as rip rap, filter fabrics, drainage channels and gravel, hay bales or wood chip mulches will be implemented in areas prone to soil loss.



- g) Where erosion into a water body is a concern, the length of time that inactive grubbed areas will be left exposed to the natural elements will be minimized to prevent unnecessary erosion.
- h) Grubbing activities will adhere to the buffer zone requirements outlined in Section 4.5.
- i) During grubbing, care will be taken to ensure that grubbed material will not be pushed into areas that are to be left undisturbed. Grubbing material will be mixed with the overburden for future rehabilitation.
- j) Discovery of historic resources will be handled according to the procedures outlined in Section 5.6.
- k) IOC is aware of the value of wetlands and will attempt to avoid such disturbance of wetlands outside of the work areas where feasible.
- l) All equipment used will be handled and maintained according to the procedures in Section 4.10.
- m) There should be avoidance of grubbing in high slope areas near water bodies.
- n) Dust control is to be provided during clearing and grubbing operations as outlined in Section 4.15.



#### **4.4 Erosion Prevention and Siltation Controls**

##### **Environmental Concerns**

Eroded material may alter drainage patterns, increase stream velocities, cause siltation in water bodies and, subsequently, decrease suitable habitat for aquatic and terrestrial animals.

##### **Environmental Protection Procedures**

- a) All work in the vicinity of the developing site, will be conducted according to the conditions set out in the permits and/or approvals and authorizations from the Newfoundland and Labrador Municipal Affairs & Environment (NL MAE), and DFO.
- b) Areas to be disturbed should be minimized where possible and practical. Vegetative buffers will be maintained around waterbodies and sensitive areas.
- c) Drainage ditches will be stabilized (e.g., lining with vegetation or rock, terracing, interceptor swales, installation of rock check dams) to reduce soil erosion. Any such measures will be properly maintained following installation.
- d) Excavation, embankment construction and grading in the vicinity of stream crossings will be done in a manner that avoids or reduces erosion and sedimentation of watercourses or bodies.
- e) All areas of exposed erodible soil will be stabilized by back-blading, grading and/or compacting to meet engineered slope requirements. Roughening slopes with horizontal depressions will also reduce the risk of erosion.
- f) Where there is potential for erosion along exposed erodible slopes and a natural vegetation buffer of less than 20 m from the high water mark exists between erodible areas and water bodies, a settling pond or silt fence will be constructed to control silt runoff. Engineering requirements will vary depending on the locations of the silt fence and will take into consideration such factors as drainage/surface area of exposed soil and time of year that the silt fences are used.
- g) If an environmental inspection reveals that silt is entering a watercourse, further mitigative measures will be implemented, such as temporary drainage ditches, siltation



control (settling) ponds, ditch blocks/check dams or sediment dam traps, to intercept runoff. The necessary or appropriate measures will be determined in the field.

- h) All stream bank sections that contain loose or erodible materials will be stabilized.
- i) All areas will be monitored for erosion and appropriate repair action taken as necessary.
- j) Existing or new siltation control structures used in this work will be monitored regularly by the Environmental Advisors for excessive accumulation of sediment. Accumulated sediment from control structures will be removed as necessary to ensure the effectiveness of the systems.
- k) Remove excess water from siltation control systems prior to excavation of sediment. Trucks will be equipped with liners when required to prevent loss of wet sediment during transport.



## **4.5 Buffer Zones**

### **Environmental Concerns**

Buffer zones are vegetated boundaries maintained along water bodies. Without adequate buffer zone vegetation, streams, ponds and lakes can become laden with silt from run-off. Vegetation also provides cover for fish. Streamside vegetation may:

- Provide shade thereby helping to regulate water temperature;
- Provide stream bank stability thereby preventing erosion and subsequent introduction of sediment into the water;
- Intercept precipitation, and through evaporation and transpiration, regulate the amount of water discharged into the stream;
- Provide insect drop which is a food source for fish;
- Introduce leaf litter and decaying vegetative matter into the stream which provides food for aquatic organisms on which fish feed.

### **Environmental Protection Procedures**

- a) A minimum buffer zone of 100 m of undisturbed natural vegetation is to be maintained and clearly marked between work areas and all water bodies and sensitive areas. Where buffer zones cannot be maintained, the buffer requirement will be discussed and determined in consultation with the Environmental Advisor.
- b) In areas where the slope is greater than 30%, the minimum width of the buffer zone will be calculated by the following formula: Buffer Width (m) = 20 m + 1.5 x slope (%), as recommended by DFO.
- c) Any work within 15 m of a water body will require a permit under the Water Resources Act.
- d) Sediment control structures are to be placed outside of the buffer requirements.
- e) Bulk fuel storage will maintain a minimum buffer zone of 100 m from high water marks of waterbodies and ecologically sensitive areas.



## **4.6 Drilling**

### **Environmental Concerns**

Drilling for both development and production has the potential to impact the environment. The environmental concerns associated with drilling are disposal of drilling fluids and cuttings, generation of dust & noise, destruction of historic resources, impacts on air quality and impacts to aquatic ecosystems.

### **Environmental Protection Procedures**

- a) Due to the nature of drilling activities (quicksnaps, couplings) oil drops and leaks may occur. The area shall be cleaned up at every opportunity and all rigs shall be equipped with spill kits (as outlined in Section 6.13).
- b) In the event of a hose rupture or loss of hydraulic fluid, the Environmental Contingency Plan shall be followed.
- c) Disposal of all drilling materials and associated solid wastes shall be undertaken in accordance with the procedures in Section 6.18.
- d) Fuel shall be stored, handled and transported according to Section 6.17.
- e) Water applications shall be used to control dust. Water-based drilling dust suppression systems may require anti-freeze in winter months, which shall be approved by NL ENVC. The use of water for dust control or coring/wash boring shall be undertaken in a manner that ensures return water does not enter watercourses.
- f) Drilling equipment shall have muffled exhaust to minimize noise.
- g) No person shall deposit or permit deposition of oil, oil wastes or any other substance harmful to fish or migratory birds in any waters or areas frequented by fish or migratory birds.



## **4.7 Blasting**

### **Environmental Concerns**

Blasting will be undertaken in association with a number of the work elements. The principal environmental concerns associated with blasting on land include:

- Destruction of vegetation outside the pit and development area limits;
- Noise disturbances to wildlife;
- Effects to fish and aquatic animals;
- Disturbance of historical/archeological resources;
- Dust and fume generation;
- Water quality; and
- Potential introduction of silt and ammonia into the water column.

### **Environmental Protection Procedures**

- a) All blasting will be done in compliance with the appropriate permits and approvals. All blasters will have a Blasters Safety Certificate. All magazines for explosive storage have the appropriate approvals.
- b) The handling, transportation, storage and use of explosives and all other hazardous materials will be conducted in compliance with all applicable laws, regulations, and orders of the Newfoundland and Labrador Departments of Labour and Mines and Energy, and the *Dangerous Goods Transportation Act*.
- c) Blasting pattern and procedures will be used which reduce shock or instantaneous peak noise levels.
- d) Time delay blasting cycles will be used if necessary, to control the scatter of blasted material.
- e) Blasting will not occur in the vicinity of fuel storage facilities.
- f) Use of explosives will be restricted to authorized personnel who have been trained in their use.





- g) There are separate magazines on site; a magazine for explosives and a smaller cap magazine for dynamite blasting caps.
- h) All personnel must comply with the safe blasting procedures established by IOC as described in the Mine Orientation training course.
- i) The immediate area of the site will be surveyed within three hours prior to a blast to ensure no members of the public are within the blast area.
- j) Historical resources and features will not be disturbed during blasting. Any historic discoveries will be reported to the relevant government agencies.

### **On Land**

- a) The immediate area of the site will be surveyed within three hours prior to a blast and operations will be curtailed if sensitive animals (e.g. black bears, caribou, moose) are observed within 100 m. Any other animal sightings will be reported to the Environmental Advisor. Blasting may be delayed in such circumstances until wildlife have been allowed to leave the area.

### **In Close Proximity to Water**

- a) In order to reduce the potential effect of blasting operations on the aquatic environment, blasting within 150 m of a water body will only occur in situations where such operations are deemed necessary and will comply with the following:
  - i. When blasting operations are within 200 m of a waterbody occupied by fish, the operations shall be carried out in accordance with DFO guidelines.
  - ii. Drilling and blasting activities will be done in a manner that ensures that the magnitude of explosions is limited to that which is absolutely necessary.
  - iii. Three hours prior to any blasting within 150 m of a water body, a visual reconnaissance of the area will be undertaken to ensure that there are no waterfowl or aquatic furbearers present. Blasting will be delayed in such circumstances until they have been allowed to leave the area of their own accord. Under no circumstances will noise or other devices be used to harass or otherwise disturb these animals to encourage them to leave the area of the proposed blast.



## **4.8 Watercourse Crossings**

### **Environmental Concerns**

The project will involve upgrading of existing roads and on-site trails. The environmental concerns associated with stream crossings and culvert installations include erosion/siltation, disturbance of waterfowl, potential mortality of fish, and loss of fish habitat.

All watercourses and water bodies will be examined on a site-specific basis in order to evaluate the specific mitigations required. When fish are present at a proposed watercourse crossing, the nature (water depth, flow, and substrate type) and quantity of fish habitat at the site will be noted and reported by the Environmental Advisors. The type of crossing (fording, culvert, or bridge) and design will also be noted by the monitor for the purpose of establishing regulatory requirements.

Also, an evaluation of soil erosion potential will be conducted at each of the stream crossings. This assessment of erosion risk will assist in the development of specific erosion stabilization methods and effective sedimentation control practices on a site-specific basis.

Proposed crossing of a watercourse visible on a 1:50,000 topographic map shall require a permit from NL MAE. The Environment Department should be consulted on all crossings to ensure proper permits and mitigations are established prior to conducting any work.

### **Environmental Protection Procedures**

Stream crossings will be constructed in compliance with the required Culvert Approval and Letters of Advice from the Newfoundland and Labrador Department of Environment and Conservation, and DFO, respectively. IOC will consult with DFO to develop mitigation strategies to reduce effects of in-stream work during sensitive periods.

The following measures will be implemented to reduce the potential effects of stream crossings:

- a) If fish are present at a stream crossing, construction activities between September 1 and June 15 will be undertaken under the direct supervision of the Environmental Advisor.



- b) Work will be performed in such a way as to ensure deleterious substances including, but not limited to, materials such as sediment, fuel and oil do not enter watercourses and water bodies.
- c) The number of water crossings will be minimized.
- d) Procedures for buffer zones that are outlined in Section 4.5 will be followed.

### **Culverts**

In those locations where culverts are required, application will be made to the Newfoundland and Labrador Department of Environment and Conservation, and DFO. The culverts used will be sized to handle the 1 in 10 year return period flood and will be constructed in accordance with all provincial requirements.

The following measures will also be implemented:

- a) Install culvert(s) in accordance with **best** engineering and environmental practices.
- b) Unless otherwise indicated, all work should take place in dry conditions, either by the use of cofferdams or by diverting the stream.
- c) In the event of fish being present, installation of cylindrical culverts shall be counter sunk such that the culvert bottom is 15% the diameter below the streambed (for culverts greater than 2000 mm in diameter), and 300 mm for culverts up to 2000 mm in diameter.
- d) In multiple (gang) culvert installations, install one culvert at an elevation lower than the others.
- e) Ensure that the natural low flow regime of the watercourse is not altered.
- f) A culvert will not be installed before site specific information such as localized stream gradient, fish habitat type and species present have been evaluated. Culverts are to be installed according to DFO guidelines.
- g) Use riprap outlets and inlets to prevent erosion of fill slopes.



- h) Use culverts of sufficient length to extend a short distance (minimum of 300 mm) beyond the toe of the fill material.
- i) Use backfilling material which is of a texture that shall support the culvert and limit seepage and subsequent washing out.
- j) Align culverts such that the original direction of stream flow is not significantly altered.
- k) Remove fill and construction debris from the culvert area to a location above the peak flow level to prevent its entry into the stream.
- l) Confine construction activity to the immediate area of the culvert.
- m) Fill material shall not be removed from streambeds or banks except when installing a culvert when removal of material is necessary to ensure a flat foundation.
- n) Limit and restrict the use of heavy equipment in and near watercourses; an excavator will be used from shore rather than a bulldozer in the watercourse. Where it is absolutely necessary to do so, in-stream work will be performed by rubber tired vehicles only, and will only be done in compliance with approvals from the Newfoundland and Labrador Department of Environment and Conservation, and DFO, respectively.
- o) As required, cofferdams of non-erodible material shall be used to separate work areas from the watercourse when excavating for culverts and footings.
- p) Cofferdams shall be removed upon completion of construction and the streambed returned as closely as possible to its original condition.

### **Fording**

Fording of watercourses will be avoided as much as possible and where necessary will be limited to situations of a single round trip (i.e., multiple use of a site will be facilitated by a temporary bridge). When fording any watercourse, all relevant guidelines/regulations will be adhered to including the NL MAE Environmental Guidelines for Fording and the DFO fact sheet for Temporary Fording sites. Before and after photos should be taken at the fording location to document conditions.



The following will be applied to any fording activity:

- a) In the unlikely event that fording is required in fish-bearing water, areas of spawning habitat will be avoided.
- b) Crossings shall be restricted to a single location and crossings made at right angles to the watercourse.
- c) Equipment activity within the watercourse shall be reduced by limiting the number of crossings.
- d) Ensure that all equipment is mechanically sound to avoid leaks of oil, gasoline and hydraulic fluids.
- e) Stabilize the entire fording area using vegetation mats, corduroy roads or coarse material (125 mm diameter or greater) when such material is available from a reasonably close location within the right-of-way, and the ford area is not natural bedrock, or is easily disturbed by fording. When the substrate of the ford area is not subject to easy disturbance by fording, or coarse material is not easily available within the right-of-way, then fording under existing substrate conditions may occur under the direction of the Environmental Advisors.
- f) Ensure that fording activities are halted during high flow periods.
- g) Stabilize all bank sections which contain loose or erodible materials. If banks must be sloped for stabilization, no material shall be deposited within the watercourse. Sloping shall be accomplished by back-blading and the material removed shall be deposited above the high water mark of the watercourse.
- h) Fording activities shall not decrease the depth of the watercourses to less than 20 cm. Where the existing depth is less than 20 cm, that depth shall be maintained.
- i) All fording activities will comply with the required approvals from the Newfoundland and Labrador Department of Environment and Conservation and DFO.



#### **4.9 Dewatering Work and Site Drainage**

**Please note an environmental assessment of the water body at the developing site is required prior to discharging it.**

##### **Environmental Concerns**

The major concerns associated with site dewatering and the drainage of any water body at a developing site are potential siltation and direct fish mortality and/or habitat destruction for freshwater species.

##### **Environmental Protection Procedures**

- a) Filtration or other suitable measures, such as settling ponds, silt fences and dykes, will be provided to remove silt from, and reduce the turbidity of, water pumped from work areas before discharging.
- b) Site water may be discharged to vegetated work areas to further reduce any potential effects on watercourses.
- c) The area of settling ponds will be gauged to accommodate the anticipated volume of discharged water.
- d) Discharged water will be encouraged to follow natural surface drainage patterns.
- e) Perform water treatment and quality monitoring prior to discharge to the environment, in compliance with applicable federal and provincial regulatory requirements.
- f) For fish relocation: Use methods for live capture of fish that are established and recognized in Newfoundland and Labrador and documented in a Fish Removal Plan (to be developed on case by case basis).



#### **4.10 Equipment Use and Maintenance**

##### **Environmental Concerns**

A variety of vehicles and heavy equipment will be used throughout the project, as well as in accompanying support and supply facilities and activities. Environmental concerns associated with operating and using such equipment includes noise, air emissions, accidental spills, artificial lighting and leaks that may contaminate on-site water bodies or sensitive receptors.

##### **Environmental Protection Procedure**

- a) Pre-use inspections are to be completed on all equipment. All equipment shall be regularly maintained and inspected. If problems are identified the equipment will be serviced to prevent the risk of a spill/leak.
- b) Construction equipment will be on good operating condition, free of leaks and with all appropriate emission filters
- c) All pieces of equipment will have exhaust systems that are regularly inspected and properly functioning to manufacturers specifications.
- d) Spill kits will be strategically located on site, clearly labelled and regularly maintained.
- e) Drip pans will be placed underneath pumps.
- f) Hoses and connections on equipment will be inspected routinely for leaks and drips.
- g) Equipment maintenance and fuelling activities will be performed at sites designated by the Environmental Advisor and in compliance with applicable regulations.
- h) All maintenance on the mobile fleet (e.g., haul trucks) will be performed at the Mine Maintenance Facility or at a designated area.
- i) Only minor repairs and maintenance (e.g., lubrication) of ‘non-mobile’ equipment, such as the shovel or drilling equipment, will be performed on-site. All major repairs are to be performed at the Mine Maintenance Facility.



- j) All leaks will be repaired and reported immediately to Security, who will notify the Environmental Department.
- k) All fuel and other hazardous materials will be handled according to the procedures in Section 4.11.
- l) Vehicles and equipment will be stored at designated areas a minimum of 100 m from water bodies when not in use.

All equipment (e.g. diesel generator, etc.) shall meet requirements of the NL Air Pollution Control Regulations under the Environmental Protection Act, as required.

#### **4.11 Storage, Handling and Transfer of Fuel and Other Hazardous Material**

Typical hazardous substances that may be used on site include, but are not necessarily limited to:

- chlorinated and non-chlorinated solvents (*e.g.*, cleaner-degreasers);
- flammable gases (*e.g.*, acetylene);
- waste petroleum products (*e.g.*, used engine oil);
- corrosives (*e.g.*, battery acid);
- glycol (*e.g.*, antifreeze); and/or
- ozone-depleting gases (*e.g.*, freon);
- petroleum, oil and lubricants

#### **Environmental Concerns**

The primary concern with using hazardous substances is that there may be an uncontrolled release to the environment through spillage, and subsequent adverse effects on terrestrial and aquatic habitat and species, soil, groundwater quality, and human health and safety.

#### **Environmental Protection Procedures**

- a) The *Workplace Hazardous Materials Information System (WHMIS) Regulations* under the *Occupational Health and Safety Act* will apply to all handling and storage of





hazardous materials. All relevant current Safety Data Sheets (SDS) will be readily available on site.

- b) All necessary precautions will be taken to prevent and reduce the spillage, misplacement or loss of fuels and other hazardous materials. In the event of a spill on-land or in the freshwater environment, the Canadian Coast Guard will be contacted immediately at 1-800-563-9089.
- c) Satellite fuel storage tanks (and associated fuelling equipment) will largely be replaced with a mobile fuelling truck, which will be responsible for re-fuelling mobile equipment. Personnel transferring fuel from tank trucks to mobile units will inspect transfer equipment prior to product transfer.
- d) All fuel storage systems will be registered and comply with the *Storage and Handling of Gasoline and Associated Products (GAP) Regulations*. Verification of the storage tank approval will be retained for IOC.
- e) Only persons who are qualified and trained in handling these materials as stated in the manufacturer's instructions and government laws and regulations will handle fuel and other hazardous materials.
- f) Fuel truck drivers will be in attendance for the duration of refuelling operations.
- g) Fuel and other hazardous materials will be stored at least 100 m from any surface water.
- h) Handling and fuelling procedures will comply with the *GAP Regulations* and any additional requirements put forth by the Newfoundland and Labrador Municipal Affairs & Environment in order to limit potential contamination of soil or water.
- i) Appropriate fuel spill control and clean up material must be available during fueling activities.
- j) Any above-ground fuel container, with the exception of those exempted under the *GAP Regulations*, will be surrounded by an impervious dyke of sufficient height (minimum height 0.6 m) to contain:



- i) where a dyked area contains only one storage tank, the dyked area shall retain not less than 110% of the capacity of the tank
- ii) where a dyked area contains more than one storage tank, the dyked area shall retain not less than 110% of the capacity of the largest tank or 100% of the capacity of the largest tank plus 10% of the aggregate capacity of all the other tanks whichever is greater. Otherwise approved self-dyked storage tanks will be used where required.
- iii) all dykes of earthwork construction will have a flat top not less than 0.6 m wide, and be constructed and maintained to be liquid tight to a permeability of 25 L/m<sup>2</sup>/day. The distance between a storage tank shell and the centre line of a dyke will be at least one half the tank height.
- k) Fuel storage areas and non-portable transfer lines will be clearly marked or barricaded to ensure that they are not damaged by moving vehicles. The markers will be visible under all weather conditions. Barriers will be constructed in compliance with the *GAP Regulations*.
- l) Waste oils, lubricants, and other used oil will be retained in a tank or closed container, and disposed of in accordance with the *Waste Material Disposal Act*.
- m) Any soil contaminated by small leaks of oil or grease from equipment will be disposed of according to the *Waste Material Disposal Act*.
- n) All storage tank systems will be inspected on a regular basis by the Environmental Advisor as per Section 18 of the *GAP Regulations*. This involves, but is not limited to, gauging or dipping, reconciliation of records, and the proper maintenance of reconciliation records for a period of two years.
- o) Contracted fuel suppliers will, before transporting or positioning fuel or oil, have on file at IOC a copy of their fuel and hazardous material spills contingency plan which is required under *GAP Regulations* and which is acceptable to IOC. The fuel and hazardous material spills contingency plan for IOC is provided in Section 5.3.
- p) Transportation of hazardous and dangerous materials shall be conducted in accordance with provincial, territorial and federal transportation regulations. Transportation



documents shall be retained in a retrievable filing system and stored for the duration of the undertaking.

- q) Smoking will be prohibited within 10 m of a fuel storage area.
- r) Fuelling or servicing of mobile equipment will be conducted in designated areas.
- s) Drum storage areas will not be located within 100 m of a water body. Drums containing hydrocarbon or other hazardous materials will be transported, stored, handled and disposed of such that spillage or leakage does not occur. Drums will be tightly sealed against corrosion and rust and surrounded by an impermeable barrier in a dry building with an impermeable floor. The location of drum storage areas must be approved by IOC.
- t) Small quantities of hazardous material (drums, cans and other containers under 20 L volume) will be stored in a secure location protected from weather and freezing, as well as vehicular traffic.
- u) Where hazardous materials are to be stored outdoors, a designated area will be established, graded and fitted with an impermeable membrane covered with local soil and surrounded by an earth berm.
- v) Within thirty (30) days of decommissioning of a storage tank system, the system will be emptied of all products, the tank and associated piping will be removed (including any contaminated soil) and the area will be cleaned and the site restored.
- w) Decommissioning of any temporary storage tank system will be conducted according to the *Environmental Code of Practice for Aboveground Storage Tank Systems Containing Petroleum Products* (CCME 1994).
- x) Bulk fuel storage facilities will be dipped on a weekly basis in order to accurately gauge fuel consumption. These consumption rates will allow for visually undetectable sources of contamination to be identified and corrected.
- y) If required, a hazardous waste storage area will be constructed in compliance with all applicable federal and provincial legislation.



- z) All petroleum and chemicals must be stored on a secondary containment.



## **4.12 Solid Waste Disposal**

### **Environmental Concerns**

Solid waste (e.g., domestic and industrial wastes, paper, cardboard and wood), if not properly controlled and disposed of, will be unsightly and could cause human safety and health concerns. It could also attract wildlife leading to the potential for human-wildlife conflicts.

### **Environmental Protection Procedures**

- a) All solid waste will be handled according to the provincial *Waste Material Disposal Act*.
- b) Solid waste produced by site personnel and operations will be regularly collected and disposed of at the IOC Landfill.
- c) Waste accumulated on site prior to disposal will be confined so that it does not pose an environmental or health hazard.
- d) Work areas will be kept clear of waste and litter to reduce the potential for attracting wildlife and reducing potential interactions with wildlife (see procedures in Section 5.5 for handling wildlife encounters).
- e) Any waste that may attract animals (i.e., food) will be stored in covered, wildlife-proof containers.
- f) Burning of waste is not permitted.
- g) All hazardous wastes generated, as a result of the treatment alternatives, will be handled according to the procedures for handling fuel and hazardous materials (Section 4.11).



#### **4.13 Mineral Waste Rock and Overburden**

##### **Environmental Concerns**

The principal concern associated with the placement of waste mineral rock and overburden is siltation of the aquatic environment, pertaining to water quality and substrate, as well as loss of habitat and displacement of wildlife. Potential for dust generation from exposed soil/rock may also be a concern.

##### **Environmental Protection Procedures**

- a) Waste rock and overburden storage areas will be located at least 100 meters from a water body.
- b) Overburden and separate organic stockpile locations and volumes will be recorded from salvage to placement.
- c) Structures such as silt fences will be used as a means of sediment control, and collection ditches and settling ponds will be used to manage surface runoff and any groundwater flows.
- d) Waste rock and overburden piles will be sloped and bermed to prevent pooling of surface water.
- e) Waste rock and overburden storage areas will be secured as appropriate and marked with signs to ensure the safety of employees and the public.
- f) Stabilize stockpiles with vegetative cover or temporary covers of mulch or similar until vegetative cover can be established in order to reduce erosion and dust generation.
- g) Implement progressive rehabilitation measures when areas are available.



#### **4.14 Vehicle Traffic**

##### **Environmental Concerns**

Vehicular traffic can result in interactions with wildlife, fugitive dust emissions, noise and historical resources. IOC is committed to the proper operation and maintenance of its vehicles to reduce environmental effects.

##### **Environmental Protection Procedures**

- a) All vehicle and equipment use, including use of all-terrain vehicles, will be restricted to designated routes within and between work, marshalling, maintenance and storage areas.
- b) All vehicles and equipment will be properly maintained to meet emissions standards.
- c) Travel in areas outside designated work areas will not be permitted.
- d) All vehicles and equipment will yield to wildlife (see procedures in Section 5.4 for handling wildlife encounters).
- e) Chasing and/or harassing wildlife with vehicles and equipment will not be permitted.
- f) Maintaining and refuelling vehicles will be restricted to designated areas (See Section 4.10).
- g) Heavy equipment (e.g., dump trucks and front-end loaders) will only be used in work areas.
- h) Site roads will be monitored for signs of erosion and appropriate action will be taken to repair roads, when necessary.
- i) All personnel driving in the pit are required to have a valid pit permit. Personnel must comply with the requirements dictated in the Pit Permit training course.



#### **4.15 Dust Control**

##### **Environmental Concern**

The environmental concerns associated with dust include human health effects and potential effects on aquatic ecosystems and vegetation.

##### **Environmental Protection Procedures**

- a) Plan activities to minimize dust emissions and implement dust control procedures.
- b) Dust from operating activities will be controlled using water. In the event of excessive dust, water will be applied to travel and work surfaces. Waste oil will not be used for dust control, but other agents such as calcium chloride may be used with the approval of the appropriate regulatory agencies.
- c) Dust suppression on site roads will be done by watering the roads as part of IOC's ongoing fugitive dust reduction measures.
- d) Dust will be controlled by retaining trees and shrubs to act as windbreaks and natural erosion prevention. The amount of vegetation to be cleared will be minimized.
- e) Confinement of vehicular traffic to established access routes and lower speed limits will be implemented to reduce dust generation.
- f) Re-vegetation of inactive exposed areas to be completed as directed by the Environment Department.
- g) Use damp feed when crushing rock for road aggregate.
- h) Drills must utilize appropriate dust suppression equipment to prevent dust generation.





## **4.16 Hazardous Waste Disposal**

### **Environmental Concerns**

The primary concern with disposing of hazardous substances is that there may be an uncontrolled release to the environment through leakage or accidental spillage, and subsequent adverse effects on terrestrial and aquatic habitat and species, soil, groundwater quality, and human health and safety.

### **Environmental Protection Procedures**

- a) All hazardous waste will be handled according to the provincial *Waste Material Disposal Act*. Waste classified as “hazardous” or “special” that can not be disposed of in regular landfill sites will be sent for disposal at an approved hazardous waste management company.
- b) All necessary precautions will be taken to prevent and reduce the spillage, misplacement or loss of fuels and other hazardous materials.
- c) Hazardous waste materials will only be handled by persons who are qualified and trained in handling these materials as stipulated in government laws and regulations.
- d) Waste accumulated on site prior to disposal will be confined so that it does not pose an environmental or health hazard.
- e) Waste material will not be disposed of on-site or in a body of water.
- f) Burning of waste is not permitted.
- g) Where hazardous waste materials are to be stored outdoors, a designated area will be established, graded and fitted with an impermeable membrane covered with local soil and surrounded by an earth berm.
- h) Waste oils, lubricants, and other used oil will be retained in a tank or closed container, and disposed of in accordance with the *Waste Material Disposal Act*.



- i) Any soil contaminated by small leaks of oil or grease from equipment will be disposed of according to the *Waste Material Disposal Act*.
  
- j) All hazardous wastes generated, as a result of the treatment alternatives, will be handled according to the procedures for handling fuel and hazardous materials (Section 4.11).



#### **4.17 Road Maintenance**

##### **Environmental Concern**

Routine grading and maintenance of the haulage and development roads may result in material entering roadside ditches, diversions and culvert areas.

##### **Environmental Protection Procedures**

- a) All grader operators and loader operators involved in road maintenance are to be informed of proper road maintenance techniques.
- b) All culverts crossing roadways must be clearly marked. Grading or pushing material in these areas is strictly forbidden.
- c) The diversion channel parallel to the main haulage road must also be clearly marked to prevent accidental in-filling from grading operations.



## **4.18 Trenching**

### **Environmental Concerns**

Environmental concerns associated with trenching include potential runoff of sediment-laden water, which could affect freshwater fish habitat and water quality, lower the quality of water and destroy historic resources.

### **Environmental Protection Procedures**

- a) Topsoil and excavated overburden will be stored in stockpiles for later use during rehabilitation.
- b) Any unsuitable material will be disposed of in a disposal area approved by the Environmental Advisor.
- c) Excavators and backhoes should be used to excavate trenches in areas around overburden and waste rock stockpiles to minimize land disturbance. The use of bulldozers should be avoided.
- d) If required, dewatering of trenches will make use of measures to reduce and control the release of sediment laden water with filtration through erosion control devices, settling ponds, straw bales, geotextiles or other devices.
- e) When feasible, trenches should be backfilled and the finished grade is to be level with the surrounding surface.
- f) If a historic/archeological site is encountered, all work must cease in the area and the Environment Department will consult with the relevant regulatory agencies to determine buffer requirements.



## **4.19 Surveying**

### **Environmental Concerns**

Surveying activities may disturb wildlife species, vegetation and historic resources.

#### **Environmental**

#### **Protection**

#### **Procedures**

- a) Width of survey lines will be limited to that which is necessary for line of sight and unobstructed passage.
- b) Whenever possible, cutting lines to the boundary between trees and open areas will be avoided.
- c) Cutting of survey lines will be kept to a minimum. Where possible, alternate areas not requiring cut lines will be used.
- d) All trees not exactly on transit lines shall be left standing.
- e) When surveying the development area limit, areas that will be cleared require a modified adherence to the above, except trees, shrubs and areas to be saved or left natural as noted on the plans or marked in the field.
- f) No attempt to harass or disturb wildlife will be made by any person (refer to Section 5.4).
- g) Vehicles will yield the right-of-way to wildlife

### **Traversing**

- a) Access by heavy equipment to sensitive areas such as wetlands will only be through established right-of-ways.
- b) All-terrain vehicles (ATVs) will not be allowed off the right-of-way except as approved by the on site manager/supervisor. The use of ATVs will be restricted to designated trails, thus minimizing ground disturbance. ATV use will comply with the Motorized Snow Mobile and All-Terrain Vehicle Regulations, 1996 under the Motorized Snow Mobile



and All-Terrain Vehicle Act and the Environmental Guidelines for Stream Crossings by All-Terrain Vehicles issued by Municipal Affairs & Environment.

- c) No motorized vehicles will enter the areas designated as sensitive without notification and approval of the Site Manager, for establishing targets, permanent benchmarks and transponder locations.
  
- d) In normal ground conditions a 15mm x 400mm long rebar is driven approximately 350mm into the surface with an 8-lb sledgehammer. When bedrock or a large boulder is encountered less than 300mm below the ground surface, a 15mm x 150mm long rebar is cemented in a in a hole drilled in the rock. The rebar will be set into the rock a minimum distance of 80mm.
  
- e) No attempt to harass or disturb wildlife will be made by any person (refer to Section 5.4).



#### **4.20 Public Traffic and Activity**

##### **Environmental Concerns**

Development activities, such as quarry mining, exploration, surveying, drilling and blasting, or activities that involve the clearing or removal of the existing land, may affect the public (ie. private roads, private cabins, etc) in and around the developing areas.

##### **Environmental Protection Procedures**

- a) All operating activities will comply with federal and provincial regulations.
- b) Public notice will identify the schedule and nature of activities and to recommend precautions.
- c) Development Area boundaries will be clearly marked.



## **5.0 CONTINGENCY PLANS**

Contingency plans to address accidents and unplanned situations have been developed, and will be modified as required throughout the project. Notwithstanding the existence of these contingency plans, a policy to implement preventative measures as the first line of defence against the possibility of accidents will be adopted.





## **5.1 Culvert Failure**

The two main causes for failure of a properly installed culvert are a blockage or exceptionally high discharges. Regular inspection and maintenance will avoid blockages, by debris or ice. Failure due to exceptionally high flows cannot be avoided once the culvert is installed and sustained high flows will often limit the ability to mitigate a failure.

### **Environmental Concerns**

The environmental effects of culvert failure are usually a massive release of suspended fine sediment and larger substrate material into the stream. The suspended and finer materials can be transported for considerable distances downstream where fish habitat and fish eggs may be covered and smothered while fish fry and food organisms may be smothered, disturbed, or displaced from their habitat. Introduced coarse substrate may fill pools, disturb spawning gravel, and change or deflect flows, which may lead to additional erosion downstream.

### **Environmental Protection Procedures**

#### **Preventative Measures**

- a) All culvert installation will comply with federal and provincial regulations (Section 4.8, Watercourse Crossings). All necessary permits and authorization will be obtained for culvert installation.
- b) Culverts that are installed will be sized appropriately to reduce the risk of washout due to high flows.
- c) Culverts will be inspected regularly and measures will be taken to ensure stability of the installation, remove debris, and prevent ice blockage.

#### **Response Measures**

- d) There is often little that can safely be done to address culvert failure from high flow once the failure begins. However, high flows are often episodic and short-lived, so it is appropriate to prepare for remedial measures that can be done when flow subsides.



- e) Following a culvert failure, measures will be taken to stabilize the roadbed and stream bank to reduce the risk of additional erosion.
- f) As soon as high flow subsides and it is safe to do so, large debris such as concrete, culvert pipe or newly fallen trees will be removed from the stream and placed where there is no risk of reintroduction into the stream.
- g) Provincial and federal authorities are to be notified (Section 7.0 Contact List) and further remedial work in the stream will only proceed following consultation with DFO.
- h) All necessary provincial and federal permits and authorizations will be obtained prior to conducting any additional in-stream work to restore the stream channel or fish habitat.



## **5.2 Road Washout**

Road washout can occur due to flooding, poorly installed culverts, poorly installed and maintained ditches, or failure of the shoulder or roadbed.

### **Environmental Concerns**

The environmental effects of road washout are the same as for culvert failure. This usually includes a massive release of suspended fine sediment and larger substrate material into the stream. The suspended and finer materials can be transported for considerable distances downstream where fish habitat and fish eggs may be covered and smothered while fish fry and food organisms may be smothered, disturbed, or displaced from their habitat. Introduced coarse substrate may fill pools, disturb spawning gravel, and change or deflect flows, which may lead to additional erosion downstream.

### **Environmental Protection Procedures**

#### **Preventative Measures**

- a) Ditching and site drainage will be inspected regularly and measures will be taken to ensure stability of the installations, remove debris, and prevent ice blockage.

#### **Response Measures**

- b) There is often little that can safely be done to address a road washout from high flow once the failure begins. However, high flows are often episodic and short-lived, so it is appropriate to prepare for remedial measures that can be taken when flow subsides.
- c) Following a road washout, measures will be taken to stabilize the roadbed and adjacent stream banks to reduce the risk of additional erosion.
- d) As soon as high flow subsides and it is safe to do so, large debris such as guard-rails, concrete footings, culvert pipe or newly fallen trees will be removed from the stream and placed where there is no risk of reintroduction into the stream.
- e) Provincial and federal authorities are to be notified (Section 7.0 Contact List) and further



remedial work in the stream will only proceed following consultation with DFO.

- f) All necessary provincial and federal permits and authorizations will be obtained prior to conducting any additional instream work to restore the stream channel or fish habitat.



### **5.3 Fuel and Hazardous Material Spills**

#### **Environmental Concerns**

Fuel and hazardous materials can be damaging to vegetation, soil, surface water, ground water, wildlife, aquatic organisms, historic resources and human health and safety.

#### **Environmental Protection Procedures**

##### **Response Measures**

- a) All spills are to be immediately reported to Security, who will contact the Coast Guard at 1-800-563-9089.
- b) Spills are to be immediately confined and cleaned up as per CR-E-E-PRO Spill Response & Reporting.
- c) All contaminated material is to be transported to the IOC Waste Transfer Building for off-site disposal as per the Waste Material Disposal Act.



## **5.4 Wildlife Encounters**

### **Environmental Concerns**

Wildlife encounters pose a risk for stress or injury to both the wildlife and site personnel. Control measures and environmental protection procedures have been put in place to reduce this risk to wildlife and humans. As a protection measure, hunting, trapping or fishing by project personnel is not permitted at the site.

### **Environmental Protection Procedures**

#### **Prevention**

The following procedures are to be implemented in order to prevent wildlife encounters:

- a) Site and working areas will be kept clean of food scraps and garbage.
- b) Waste will be collected for disposal in wildlife/bear-resistant containers. Waste will be transferred to the on-site landfill routinely as needed.

#### **Response Actions**

All project personnel will abide by the following rules in the case of wildlife encounters:

- a) No attempt will be made by any person at the project site to chase, catch, divert, follow or otherwise harass wildlife by vehicle or on foot.
- b) Equipment and vehicles will yield the right-of-way to wildlife.
- c) No personal pets, domestic or wild, will be allowed on the site.
- d) All personnel should be aware of the potential for encounters with wildlife (black bears, wolves, foxes, etc.) and instructed to immediately report all sightings to Security. At their discretion, the IOC Environmental Department will notify the Newfoundland and Labrador Department of Natural Resources (DNR).



- e) When nuisance animals (e.g. black bear) are identified in the project area, the Environmental Advisor will be responsible for all subsequent actions. Responsive actions will also be the responsibility of the Environmental Advisor, who may consult with DNR. All actions must comply with Wildlife Division regulations and permits.
- f) The Environmental Advisor will authorize the use of deterrent measures for wildlife.
- g) All incidents that result in the displacement or killing of wildlife must be reported to Security.
- h) Under provincial wildlife regulations, the displacement and release of any animal is the sole jurisdiction of NL DNR and is to be undertaken only under appropriate supervision.
- i) If the nest of any raptor or other bird is encountered during development, activity in the vicinity of the nest is to be curtailed until NL DNR is contacted and appropriate mitigation is applied.



## **5.5 Forest Fires**

### **Environmental Concerns**

Activities related to the project could result in a fire, which could spread to the surrounding area. Such events could be damaging to vegetation and wildlife, as well as human health and safety.

### **Environmental Protection Procedures**

IOC or the contractor will take all precautions necessary to prevent fire hazards when working at the site. These include but are not limited to:

- a) Disposal of all flammable waste on a regular basis.
- b) Smoking will be permitted in designated areas only.
- c) IOC or the contractor making available, in proper operating condition, sufficient fire fighting equipment to suit its labour force and fire hazards. Such equipment will comply with, and be maintained to the manufacturer's standards and personnel are to be trained in the use of such equipment.
- d) In the event of a forest fire, IOC or the contractor will take immediate steps to contain or extinguish the fire.
- e) IOC will appoint a supervisory staff member as On-Scene-Commander for the purpose of fighting any forest fires.
- f) Fires shall be reported immediately to Security, the Wabush Forestry office (709) 282-6881 and ultimately to the Forest Management Unit office in Corner Brook (709) 637-2408. The following information will be provided:
  - i) name of the reporter and phone number;
  - ii) time of detection of the fire;
  - iii) size of the fire;
  - iv) location of the fire; and
  - iv) The police will also be notified immediately at (709) 944-7602.





## **5.6 Discovery of Historic Resources or Archeological Sites**

### **Environmental Concerns**

Historic resource material that is disturbed, destroyed or improperly removed from a site represents a cultural loss of information and history that could otherwise be handled and interpreted in an efficient and appropriate manner.

### **Environmental Protection Procedures**

In case of a suspected discovery of historic or archeological sites, the following procedures shall apply;

- a) Stop all work in the immediate area of the discovery until authorized personnel from IOC, having consulted with the Provincial Archaeologist, permit resumption of the work.
- b) Under the Historic Resources Act, RSNL 1990 c.H-4, all archeological sites and artefacts are the property of the Crown, and shall not be disturbed.
- c) Report the find immediately to the Environmental Advisor.
- d) Mark the site's visible boundaries. Personnel will not move or remove any artifacts or associated material unless the integrity of the material is threatened.
- e) The Environmental Advisor will report the find with the following information to the Provincial Archaeology Office, Historic Resources Division, Department of Tourism and Culture, St. John's, and comply with the instruction provided:
  - i) nature of the find;
  - ii) precise descriptive and map location and the time of the find;
  - iii) nature of the activity resulting in the find;
  - iv) identity of the person(s) making the find;



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- v) present location of the material, if moved, and any protective measures initiated for the material and the site; and,
  
- vi) any extenuating circumstances.



## **6.0 ENVIRONMENTAL PROTECTION PLAN CONTROL REVISIONS**

Holders of controlled copies (i.e., those versions which contain all of the up-to-date procedures) of the EPP are included in Appendix B.

EPPs are revised as necessary to reflect site-specific environmental protection requirements, and allow updates as work progresses. All EPP holders may initiate revisions by forwarding proposed revisions to the Environmental Advisor. The following information will be provided on the Revision Request Form (see Appendix C) for all revision requests:

- section to be revised;
- nature of the revision;
- rationale for the revision (*i.e.*, environment/worker safety); and
- who submitted the revision request.

The Environmental Advisors will seek approval for revisions from the Manager Environment & Sustainable Development. When the Environmental Advisor receives approval for the revision request, details of the revision will be distributed to all EPP holders and will be documented in the Revision History Log (Appendix D). Each revision will be accompanied by:

- revision instructions;
- list of sections being superseded; and
- an updated Table of Contents indicating the current status of each section in the EPP.

When EPP Holders receive a revision, they will, within two working days:

- read the text of the revision;
- check the control sheet to ensure that all the listed pages have been received;
- remove and destroy the superseded pages from their copy of the EPP;
- insert the revised pages in the proper place in their copy of the EPP;
- page check the EPP, using the updated table of contents to ensure the EPP is complete and current;
- enter the revision number and date entered on the Revision Control Record;
- incorporate the revision into the area of responsibility, as appropriate; and
- ensure that their personnel are familiar with the revisions.



## **7.0 CONTACT LIST**

### **IRON ORE COMPANY OF CANADA**

Patrick Lauziere  
Manager Environment & Sustainable Development  
Labrador City, Newfoundland  
Tel: (418) 968-7400 ext 7513  
Cell: (418) 960-4331

### **ENVIRONMENT & CLIMATE CHANGE CANADA – CANADIAN COAST GUARD**

Newfoundland and Labrador Regional Office  
Tel: (709) 772-2083 or 1-800-563-9089

### **FISHERIES AND OCEANS CANADA**

Happy Valley Goose Bay, NL  
Tel. (709) 896-6150  
Fax: (709) 896-8419

### **GOVERNMENT SERVICES CENTRE**

Happy Valley-Goose Bay, Labrador  
Tel. (709) 896-5428  
Fax. (709) 896-4340

### **ROYAL NEWFOUNDLAND CONSTABULARY**

417 Booth Street  
Labrador City, NL  
Tel: (709) 944-7602

### **DEPARTMENT OF NATURAL RESOURCES – FORESTRY SERVICES**

District Office  
Wabush, NL  
Tel: (709) 282-6881

### **DEPARTMENT OF MUNICIPAL AFFAIRS AND ENVIRONMENT**

#### **Wildlife Division**

General Enquiries  
T: (709) 637-2025



## **8.0 REFERENCE MATERIAL**

Canadian Council of Ministers of the Environment. 1994. Environmental Code of Practice for Aboveground Storage Tank Systems Containing Petroleum Products.

Department of Municipal Affairs and Environment. Water Resources Management Division. Chapter 3A. Environmental Guidelines for Stream Crossings by All-Terrain Vehicles.

Department of Municipal Affairs and Environment. RSN1990 C W-4 Waste Material Disposal Act.

Department of Municipal Affairs and Environment. 2003. Storage and Handling of Gasoline and Associated Products Regulations.

Department of Municipal Affairs and Environment. RSNL 1990 c.H-4 Historic Resources Act

Department of Municipal Affairs and Environment. SNL2002 C W-4.01 Water Resources Act

Services Newfoundland & Labrador. Fisheries and Land Resources. Motorized Snow Vehicles and All-Terrain Vehicles Act

Department of Natural Resources. Environmental Guidelines for Construction and Mineral Exploration Companies.

Department of Fisheries and Oceans. 1994. Factsheets Vol. 1-26, including:

- |                  |                                             |
|------------------|---------------------------------------------|
| Factsheet No. 2  | Blasting – Fish and Fish Habitat Protection |
| Factsheet No. 4  | Temporary Fording Sites                     |
| Factsheet No. 21 | Freshwater Intake End-of-Pipe Fish Screen   |
| Factsheet No. 26 | Culvert Installations                       |

Department of Fisheries and Oceans. 1995. Freshwater Intake End-of-Pipe Fish Screen Guideline.

Gosse, M.M., A.S. Power, D.E. Hyslop, and S.L. Pierce. 1998. Guidelines for Protection of Freshwater Fish Habitat in Newfoundland and Labrador. Fisheries and Oceans, St. John's, NF. X + 105 pp., 2 appendices.



Iron Ore Company of Canada. CR-E-E-PRO Spill Response & Reporting.

Rio Tinto Standards. E13- Chemically Reactive Mineral Waste Control Standard.

Wright, D.G., and G.E. Hopky. 1998. Guidelines for the use of explosives in or near Canadian Fisheries Waters. Can. Tech. Rep. Fish. Aquat. Sci. 2107: iv+34p.



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**Appendix A**

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**APPENDIX A**

**LIST OF ABBREVIATIONS AND ACRONYMS**



### **LIST OF ABBREVIATIONS AND ACRONYMS**

CCME	–	Canadian Council of Ministers of the Environment
DNR	–	Department of Natural Resources
DFO	–	Department of Fisheries and Oceans
EPP	–	Environmental Protection Plan
GAP	–	Storage and Handling of Gasoline and Associated Products
IOC	–	Iron Ore Company of Canada
NL MAE	–	Newfoundland & Labrador Municipal Affairs and Environment
SDS	–	Safety Data Sheet
NEAA	–	Newfoundland Environmental Assessment Act
WHMIS	–	Workplace Hazardous Materials Information System





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**Appendix B**

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**APPENDIX B**

**EPP COPY DISTRIBUTION LIST**





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**Appendix C**

**Revised: July 2017**

**APPENDIX C**

**REVISION REQUEST FORM**

**REVISION REQUEST FORM**

**SECTION TO BE REVISED:**

**NATURE OF REVISION:**

**RATIONALE FOR REVISION:**

(i.e., environment/worker safety, etc.)

**SUBMITTED BY:**

Please submit request to the Environmental Advisor



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**Appendix D**

**Revised: July 2017**

**APPENDIX D**

**REVISION HISTORY LOG**

## REVISION HISTORY LOG

<b>Version</b>	<b>Date Issued</b>	<b>Name of Last Issuer</b>	<b>Revision Notes</b>
<b>Version</b>	<b>Date Issued</b>	<b>Name of Last Issuer</b>	<b>Revision Notes</b>
0.1	June 9, 2003	Lee Preziosi	Draft EPP (Version 0.1) for review
0.2	July 4, 2003	Lee Preziosi	Draft EPP (Version 0.2) for review
01	July 4, 2003	Lee Preziosi	Final EPP (Version 01) Issued
02	February 16, 2004	Lee Preziosi	Revised taking into consideration DFO's Regional Habitat Co-ordinator's comments. Changes made are in bold.
03	May 16, 2005	Sonya Flynn	Revised with new ESH Policy, removed Call-out procedure, new IOC Logo added, update of names, Note on Draining of Hakim Lake
04	July 31, 2007	Jody Clark	Annual review; revised Environmental Administrator to Environment Advisor.
05	April 1, 2008	Garry Greene	Annual review. Revised Garry Greene to Primary Ore Environmental Advisor. In Appendix B changed Arn Do to Kresho Galovich. Revised Department of Forestry Resources and Agrifoods to Department of Natural Resources Forestry and Wildlife Division. Revised Jody Clark Environment Manager to Patrick Lauziere Superintendent Environment.
06	October 28, 2010	Garry Greene	Consolidated all three EPP's, (Luce, Sherwood, Plateau Quarry) into general EPP that covers the entire IOC Labrador City Operations.
07	July 21, 2017	Danielle Kinsman	Review and update of EPP for the Sherwood North Development Project