



## REGISTRATION FORM

Pursuant to Section 7 of the Environmental Assessment Act

**NAME OF UNDERTAKING:** Plateau Dolomite Quarry

**PROPONENT:**

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## TABLE OF CONTENTS

	<b>Page</b>
<b>1.0 INTRODUCTION .....</b>	<b>1</b>
1.1 Background.....	1
1.2 Environmental Protection .....	1
<b>2.0 THE UNDERTAKING:.....</b>	<b>1</b>
2.1 Nature of the Undertaking: .....	1
2.2 Rationale/Need for the Undertaking .....	3
<b>3.0 DESCRIPTION OF THE UNDERTAKING.....</b>	<b>3</b>
3.1 Geographic Location .....	3
3.2 Physical Features .....	3
3.3 Existing Environment.....	3
3.4 Construction (Development).....	6
3.4.1 Access .....	6
3.4.2 Timber Salvage .....	6
3.4.3 Stripping of Overburden .....	6
3.4.4 Potential Sources of Pollution during Construction .....	7
3.4.5 Potential Resource Conflicts during Construction .....	8
3.5 Operation.....	8
3.5.1 Potential Sources of Pollution during Operation .....	10
3.5.2 Potential Resource Conflicts during Operation .....	11
3.6 Decommissioning/Rehabilitation .....	11
3.6.1 Abandonment .....	12
3.7 Occupations.....	13
3.8 Project Related Documents.....	13
<b>4.0 APPROVAL OF THE UNDERTAKING .....</b>	<b>13</b>
<b>5.0 SCHEDULE .....</b>	<b>14</b>
<b>6.0 FUNDING .....</b>	<b>14</b>
<b>7.0 SUBMISSION .....</b>	<b>15</b>
<b>8.0 REFERENCES .....</b>	<b>15</b>
<b>Appendix 1</b>	<b>Relevant Standard Operating Procedures</b>
<b>Appendix 2</b>	<b>First Pages of Permits issued for Activities Related to the Dolomite Quarry</b>

## LIST OF FIGURES

		<b>Page</b>
Figure 1	Location of Existing and Proposed Dolomite Quarries .....	2
Figure 2	Air Photo Showing Outline of Proposed Quarry .....	4
Figure 3	Plan of the Plateau Dolomite Quarry .....	5
Figure 4	Conceptual Site Plan of Plateau Dolomite Quarry .....	9

## LIST OF TABLES

		<b>Page</b>
Table 1	Permits that have been Issued for Activities at the Proposed Quarry .....	13
Table 2	Permits and Approvals that May Be Required for Plateau Dolomite Quarry .....	14

## **1.0 INTRODUCTION**

### **1.1 Background**

The Iron Ore Company of Canada (IOC) has been operating the Carol Project at Labrador City since 1962. Iron ore is extracted using open pit mining techniques from several large open pits. The ore is crushed on site, concentrated and formed into pellets at a mill onsite. The pelletized product is transported by rail to Sept Isles in Quebec for transport to customers world-wide.

A large portion of the pellets are produced as fluxed pellets by the addition of dolomite that neutralizes natural acid content of the processed iron ore. Dolomite ( $\text{CaMg}(\text{CO}_3)_2$ ) is a form of limestone that is not easily erodible and is not a known contaminant. The advantages of fluxed pellets over the traditional acid type are:

- lower energy requirement in the blast furnace;
- lower heat losses;
- increased blast furnace productivity; and
- significantly higher pellet reducibility.

At present the dolomite is quarried from the Leila Wynne Quarry located on the east side of Wabush Lake approximately 12 km from the IOC pellet plant. Access to the existing quarry is by the Javelin Road, which is currently maintained by contractors during the dolomite hauling season (winter and fall). Leila Wynne Quarry was opened in 1989 and will be exhausted in 2006. A new dolomite quarry will be needed to continue the production of flux pellets into the future.

A rehabilitation and closure plan for the Leila Wynne Quarry is being developed by IOC in consultation with the Department of Natural Resources, Mines Branch and the Department of Environment and Conservation, Pollution Prevention Division.

### **1.2 Environmental Protection**

IOC operates the Carol Project under the IOC Environmental Management System (EMS), which includes a full set of Standard Operating Procedures (SOPs), some of which are referenced in this registration. All activities will be conducted in compliance with provincial and federal government regulations, with Rio Tinto environmental standards, and with IOC's EMS, which is consistent with ISO 14001.

IOC will develop an Environmental Protection Plan for the construction and operation of the quarry.

## **2.0 THE UNDERTAKING:**

### **2.1 Nature of the Undertaking:**

IOC proposes to develop a new dolomite quarry named Plateau Dolomite Quarry east of Wabush Lake. The Plateau Quarry will replace the Leila Wynne Quarry (Figure 1).

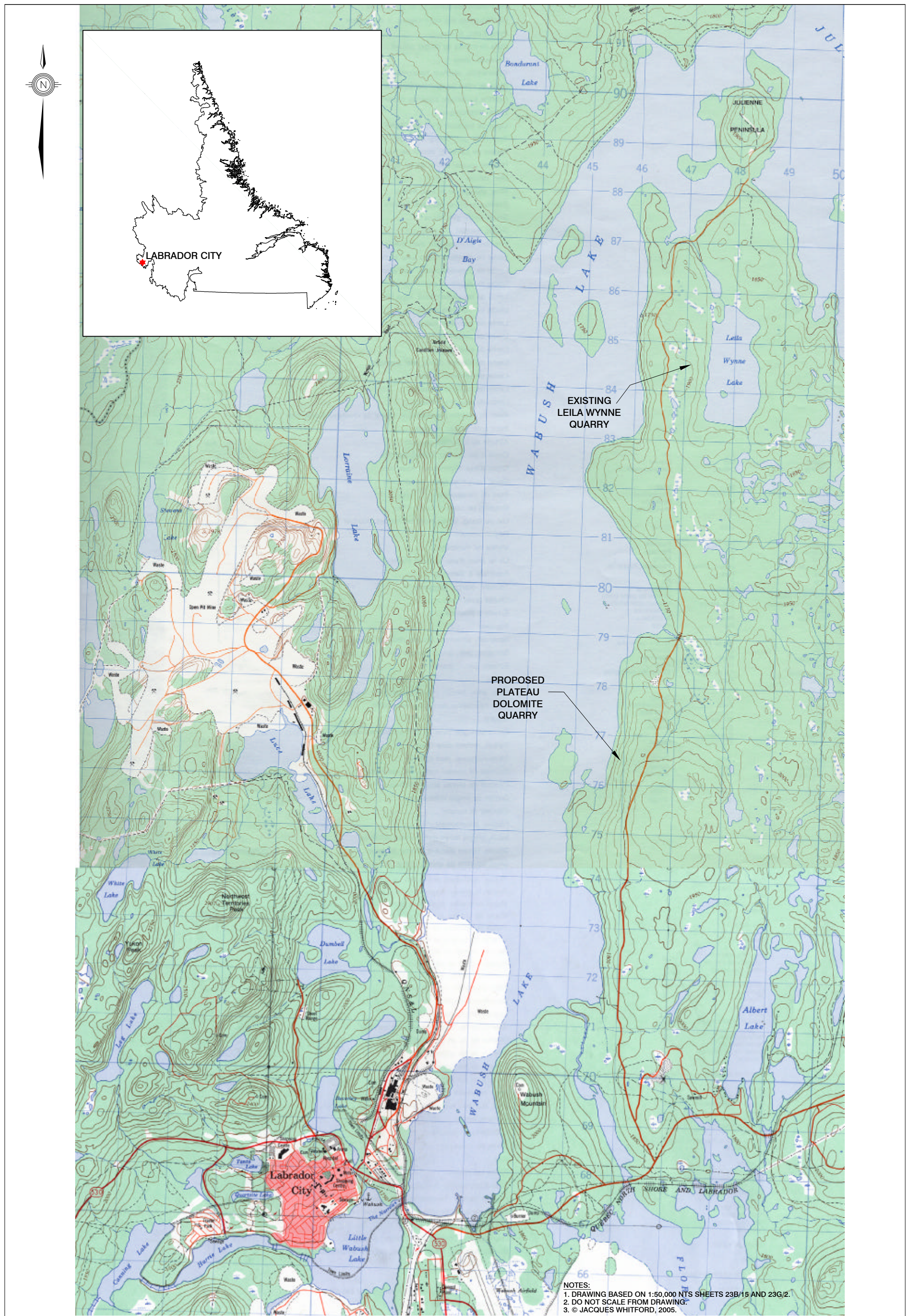


FIGURE 1

LOCATION OF EXISTING AND PROPOSED DOLOMITE QUARRIES



The dolomite will be quarried using standard methods, and will be truck-hauled to the pellet plant via Javelin Road, which is currently used to truck dolomite from Leila Wynne Quarry. The proposed Plateau Dolomite Quarry will be located on land currently under IOC map-staked license (claim).

## **2.2 Rationale/Need for the Undertaking**

The Carol Project, which produces and processes approximately 35,000 tonnes of iron ore pellets per day, requires approximately 300 Kt of dolomite per year. The long term projection is for this consumption rate to increase to 400 Kt of dolomite per year as the amount of crude ore processed is also projected to increase in the long term.

With regard to proximity to the pellet plant and the quality of the dolomite, there are no feasible alternative locations for a new quarry.

## **3.0 DESCRIPTION OF THE UNDERTAKING**

### **3.1 Geographic Location**

The proposed dolomite quarry is located at approximately 58.76 N, 64.62 E (Figures 2 and 3), on the east side of Wabush Lake. Figure 2 shows the existing conditions of the site. The site is accessible by Javelin Road, which is maintained by contractors during the dolomite haulage season (fall and winter). It is approximately 8 km south of the existing Leila Wynne Quarry, and approximately 200 m away from the nearest stream (Javelin Creek).

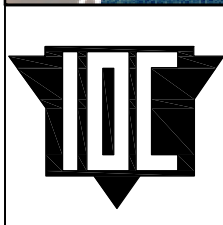
### **3.2 Physical Features**

The primary physical feature will be the quarry. A new access road is not required. A short access (less than 50 m) will be required to link the quarry to the Javelin Road. The quarry road will be gated for security and safety. Transmission lines are not required. The average depth of overburden is 2.5 m and it tends to be organic in nature.

### **3.3 Existing Environment**

The average daily temperature in the area ranges from -22.7 C in January to 13.7 C in July. Annual precipitation is 851.6 mm with the greatest precipitation, 111.5 mm, occurring as rain in July. Winds are predominantly from the west and average 14.4 km/hr (Environment Canada 2004).

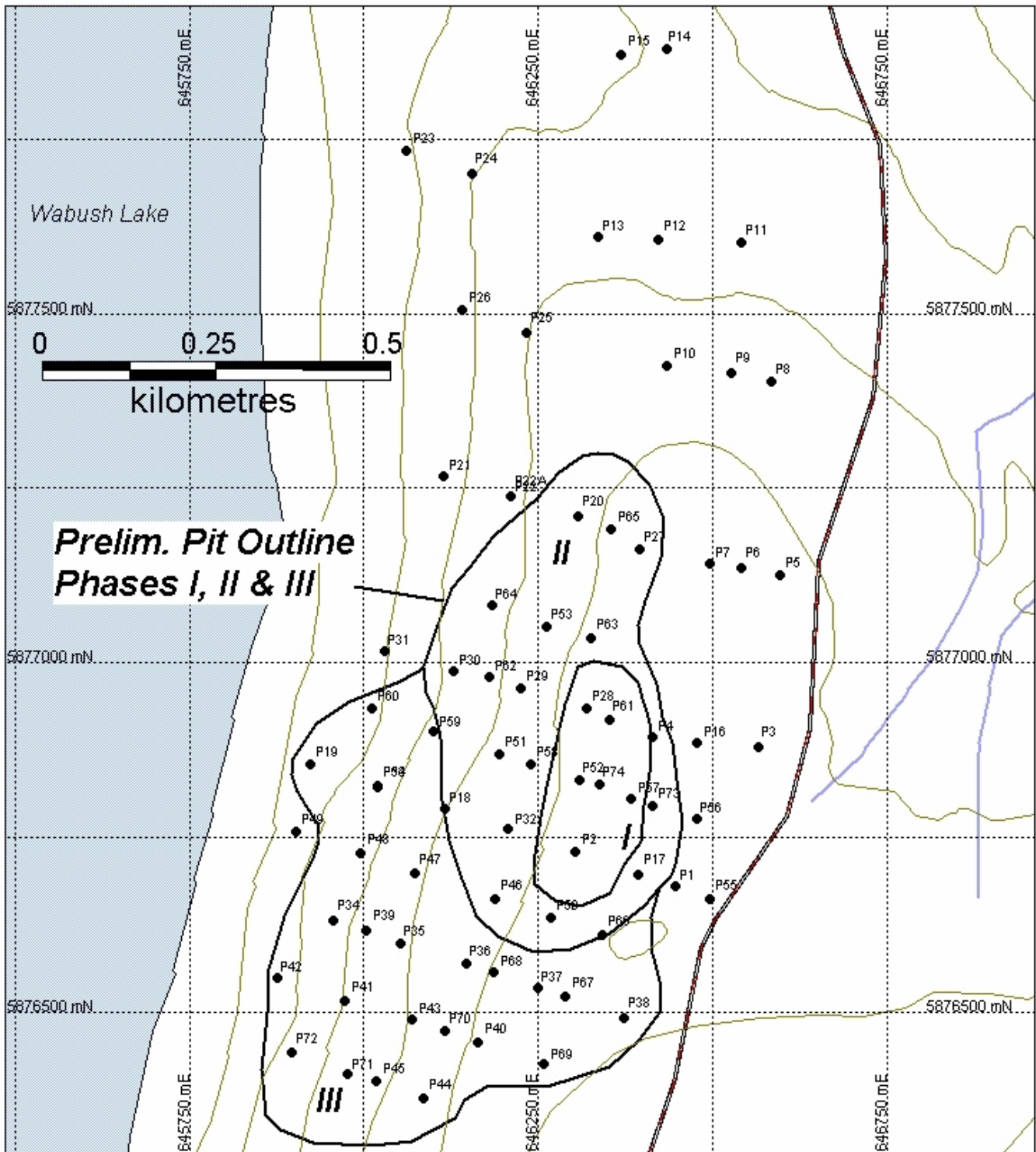
The site is typical spruce/lichen forest and black spruce forest (Meades 1990). It is characterized by an open to dense tree canopy underlain by a carpet of lichens and shrubs. There are no streams or wetland areas on the site. The typical tree species are black spruce (*Picea mariana*), balsam fir (*Abies balsamea*), and may include white spruce (*Picea glauca*), white birch (*Betula papyrifera*) and trembling aspen (*Populus tremuloides*). Shrub species include lambkill (*Kalmia angustifolia*), Labrador tea (*Ledum groenlandicum*), blueberry (*Vaccinium angustifolium*) and alder (*Alnus spp.*). The dominant lichen species are Reindeer lichens (*Cladonia alpestris*, *C. arbuscula*, *C. mitis*).



CLIENT:	IRON ORE COMPANY OF CANADA
PROJECT TITLE:	DOLOMITE QUARRY, CAROL PROJECT LABRADOR CITY, NL
DRAWING TITLE:	Figure 2. Air Photo Showing Outline of Proposed Quarry

SCALE:	1:10000	DATE:	OCT. 28, 2004
DRAWN BY:	P.D.	CHECKED BY:	
EDITED BY:	-	REV. No.	0
DRAWING No.:	NFS10196-ES-01		
CAD FILE:	NFS10196-ES-01.DWG		





**Figure 3 Plan of the Plateau Dolomite Quarry**



Wildlife species present in the area are those typical of boreal forest ecosystems, including red fox (*Vulpes vulpes*), American marten (*Martes americana*), moose (*Alces alces*), black bear (*Ursus americanus*), lynx (*Lynx lynx*), and wolf (*Canis lupus*). Individuals from the George River Caribou (*Rangifer tarandus*) Herd may occasionally move into this area during winter, although the area is on the periphery of the herd's usual annual range. Other mammal species expected to be present in the area include red squirrel (*Tamiasciurus hudsonicus*), snowshoe hare (*Lepus americanus*), porcupine (*Erethizon dorsatum*) and various lemmings and voles.

Birds in the area are also typical of the boreal ecosystem and include migratory species such as osprey (*Pandion haliaetus*) and bald eagle (*Haliaeetus leucocephalus*), and migrant passerines including thrushes, warblers and fly catchers. Common year-round resident birds include common raven (*Corvus corax*), boreal chickadee (*Parus hudsonicus*), Canada jay (*Perisoreus canadensis*), willow ptarmigan (*Lagopus lagopus*), and spruce grouse (*Dendragapus canadensis*). No species identified under provincial or federal species at risk legislations are known to occur in this area.

### **3.4 Construction (Development)**

Development of the quarry is scheduled to begin in July, 2005 and will consist of:

- develop access;
- salvage timber; and
- strip overburden.

#### **3.4.1 Access**

An existing cut line will be upgraded to provide access to the site from Javelin Road. No culverts or bridges will be required.

#### **3.4.2 Timber Salvage**

Merchantable timber (greater than 10 cm dbh) will be salvaged by local contractors. Environmental Protection measures associated with timber clearing are provided in the appended IOC-EMS SOP – *Land Disturbance – Vegetation Clearing and Grubbing*.

#### **3.4.3 Stripping of Overburden**

Overburden will be removed to uncover the bedrock during the development phase. The overburden thickness varies over the projected extent of the quarry. The starting pit will target an area of minimal overburden cover, to minimize the volume to be removed and stored. The volume of overburden that will be removed will be confirmed once the in-fill drilling program and final detailed designs are completed. Overburden will be stockpiled outside of planned quarry limit in close proximity to waste rock dumps. Overburden and waste rock will be used for future rehabilitation of the quarry site. Environmental Protection measures associated with clearing and grubbing are provided in the appended IOC-EMS SOP – *Land Disturbance – Vegetation Clearing and Grubbing*. Environmental

Protection measures associated with waste rock dumps are provided in the appended IOC-EMS SOP – *Waste Rock Dumps – Design of New Landforms*.

#### **3.4.4 Potential Sources of Pollution during Construction**

The development phase will consist of earth-moving activities. The potential sources of pollution are limited to site drainage (effluent from overburden storage areas/waste rock and wash water), solid waste, equipment exhaust, noise, and the unlikely event of an accidental release of fuel or lubricant.

##### **Effluent**

Site run-off water will be directed to vegetated areas, which will filter suspended solids. Spills kits will be maintained near fuelling facilities. All water releases will meet the regulatory requirements of the *Environmental Control (Water and Sewage) Regulations* and provincial permits. Environmental Protection measures associated with dewatering pits and grubbing are provided in the appended IOC-EMS SOP – *Dewatering – Pits and Lakes*.

Sewage will be handled by an approved portable facility during construction. The holding tanks will be emptied by a pump truck on a regular basis and disposed of in an appropriate manner.

All fuel handling and storage will comply with the *Storage and Handling of Gasoline and Associated Products Regulations*. All waste oil generated at the quarry will be disposed of by a licensed disposal agent.

A minimum buffer width of 100 m will be maintained between the quarry and Wabush Lake.

##### **Waste and Litter**

During construction, domestic garbage will be collected and hauled to the incinerator operated by Labrador City, in accordance with the *Waste Material Disposal Act*. Any food or organic garbage onsite will be held in animal-proof containers to prevent attracting bear, fox, birds, or other wildlife.

##### **Air Emissions**

All equipment will have the appropriate emission-control features. Noise levels will be the same as those at the existing Leila Wynne Quarry. Dust control measures (i.e., water application) will be applied as required for vehicle traffic on the Javelin Road.

The reduced haul distance from Plateau Quarry as compared with Leila Wynne Quarry will reduce total vehicle emissions, resulting in lower releases of greenhouse gases and related pollutants.

### **3.4.5 Potential Resource Conflicts during Construction**

The site is currently map-staked license (claim). In June 2005, it is planned to convert the claim to a mining lease. Land use and water use permits are currently being processed. Public access is restricted and all recreation and sport activities, hunting, fishing and trapping are prohibited on IOC property. No recreational activities such as snowmobiling or hiking currently take place at the new quarry site. Javelin Road is used by the public to access cabins at the northern end of Wabush Lake and to transport boats to the boat dock at Julienne Lake. Two cabins are located on the shoreline of Wabush Lake, approximately 2.5 km north of the proposed quarry site and another cabin is located on Javelin Road, approximately 2 km south of the proposed quarry site. Several cabins are located at the north end of Wabush Lake, in the vicinity of the existing dolomite quarry. There is limited recreational fishing and no commercial fishing on Wabush Lake.

The proposed quarry site lies within moose management area (MMA) 48, where 5 licenses were issued for the 2004/2005 season. Caribou are rarely seen in the area and hunting typically occurs in areas to the north. There are no registered trap lines in the vicinity of IOC's property.

Merchantable timber will be removed by contractors.

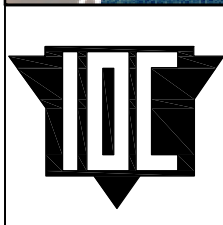
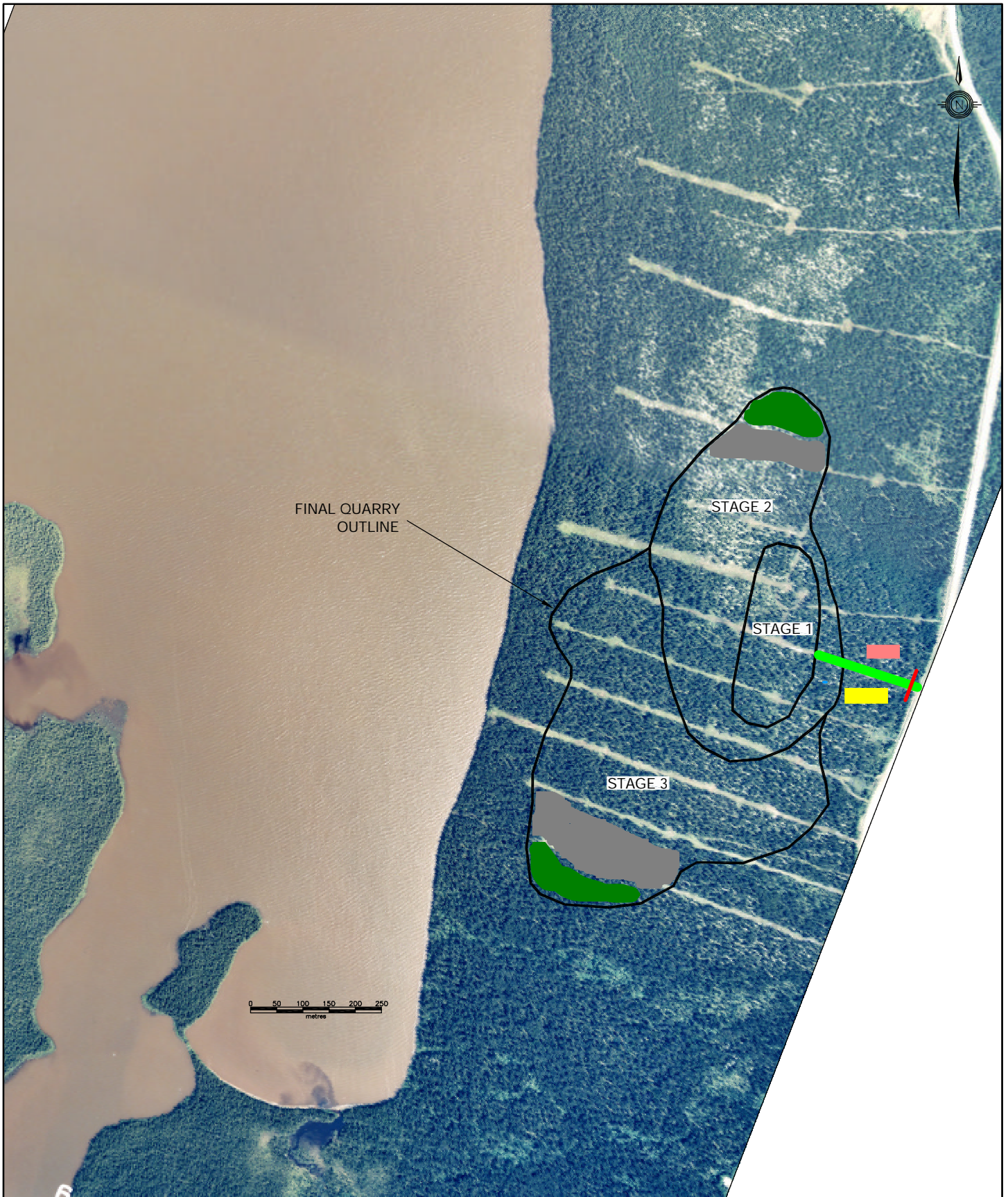
A literature review conducted prior to development of the existing Leila Wynne quarry, 8 km to the north, found no reference to prehistoric sites in the area around Javelin Road (G. Penney and Assoc. Ltd. 1989). If, however, during development or operation, historic resources are encountered, work in the area of the discovery will stop and the foreman will notify the proper authorities.

### **3.5 Operation**

Typical quarrying methods to extract the dolomite will be used. Operation will include drilling and blasting, loading and hauling from the quarry to the stockyard adjacent to the pellet plant at IOC where the dolomite will be crushed. Waste rock generated during quarrying will be stored adjacent to overburden stockpiles and will be used for future rehabilitation of the quarry site.

The new quarry will require the same level of facilities and equipment that is currently required at the Leila Wynne Quarry. This will include administration and employee facilities (offices, lunch trailer, restrooms) and power facilities. The quarry will use diesel generators for power supply with a diesel fuel storage tank on site (Figure 4). The power for Plateau Quarry would be provided by the contractor through a similar arrangement to that currently existing for Leila Wynne Quarry. No water is required during quarry operations.

All operating equipment will be supplied by the contractor and will include drills, loaders or excavators, haulage trucks, de-watering equipment. Primary pit equipment will include a 988 loader, 50-R drill, D9 tractor, portable power generator, and a fleet of 25 tonne trucks. Submersible pumps will also be used as required. Blasting will be required and bulk explosives (ANFO) will be delivered to the blast sites as required from the Orica facility located on the Carol Project site.



CLIENT:	IRON ORE COMPANY OF CANADA
PROJECT TITLE:	DOLOMITE QUARRY, CAROL PROJECT LABRADOR CITY, NL
DRAWING TITLE:	Figure 4. Conceptual Site Plan of Plateau Dolomite Quarry

SCALE:	1:10000	DATE:	OCT. 28, 2004
DRAWN BY:	P.D.	CHECKED BY:	
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The number of trucks to be used during operation will be determined by the contractors based on the requirement of up to 400 Kt per year. Fuel for quarrying equipment will be delivered by a local fuel supplier to a 2200 litre above ground tank at the quarry site.

Groundwater seepage into the quarry is expected to be modest. Similarly, seasonal surface run-off is anticipated to be minimal. Dewatering, if required, will be through pumping of pit water via a fit-for-purpose sump to ensure fines are not captured in the effluent. Water will then be pumped to a location determined by surrounding topography where it will be released to flow overland to ensure appropriate filtration prior to entering any waterbody. Dewatering will comply with standard operating procedures established by IOC.

Monitoring of site run-off at Leila Wynne Quarry has been conducted bi-weekly from June to November each year, as per provincial requirements. It is anticipated that a similar monitoring regime will be required at the Plateau Quarry.

The current volume of stockpiled dolomite (approximately 60 Kt) and its storage location will remain the same when the new quarry becomes operational.

The projected life of the new quarry will be 20 years, to be confirmed through in-fill ore-body definition drilling in 2005.

### **3.5.1 Potential Sources of Pollution during Operation**

The potential sources of pollution will be ANFO, dust, site run-off, and an accidental spill of fuel. At the quarry the only dust emissions will result from blasting. Should dust become a problem during blasting, water trucks will be used to moisten surfaces and keep dust down.

#### **Effluent**

Site run-off will be directed to vegetated areas, which will filter any potential suspended solids. Adsorbents will be used to recover any hydrocarbon sheen in the pit water. The use of ANFO explosives has the potential to produce ammonia blast residue in the pit water and waste rock drainage. Although elevated levels of ammonia are toxic to some aquatic life, the discharge to vegetated areas will encourage bio- and chemical degradation of ammonia.

Spills kits will be maintained near fuelling facilities. All water releases will meet the regulatory requirements of the *Environmental Control (Water and Sewage) Regulations* and provincial permits. Environmental Protection measures associated with dewatering pits and grubbing are provided in the appended IOC-EMS SOP – *Dewatering – Pits and Lakes*.

Sewage will be handled by an approved portable facility during operation. The holding tanks will be emptied by a pump truck on a regular basis and disposed of in an appropriate manner.

All fuel handling and storage will comply with the *Storage and Handling of Gasoline and Associated Products Regulations*. Vehicles and mechanical equipment will be maintained in good working order to prevent leaks and spills. The fuel storage tank will be properly dyked to ensure containment should any leaks occur. As noted above, a minimum 100 m buffer zone will be maintained between all quarry activities and Wabush Lake. All waste oil generated at the quarry will be disposed of by a licensed disposal agent.

A minimum buffer width of 100 m will be maintained between the quarry and Wabush Lake.

### **Waste and Litter**

During operation, domestic garbage will be collected and hauled to the incinerator operated by Labrador City, in accordance with the *Waste Material Disposal Act*. Any food or organic garbage onsite will be held in animal-proof containers to prevent attracting bear, fox, birds, or other wildlife.

### **Air Emissions**

All equipment will have the appropriate emission-control features. Noise levels will be the same as those at the existing Leila Wynne Quarry.

### **3.5.2 Potential Resource Conflicts during Operation**

The potential resource conflicts associated with operation of the quarry are the same as those for construction as the scope and nature of activities are quite similar.

### **3.6 Decommissioning/Rehabilitation**

IOC will notify, in writing, the Department of Natural Resources of the intention to complete mining activity at least 30 days prior to the intended completion date. IOC will also notify the Department of the proposed date for completion of rehabilitation of areas affected by mining activity. Rehabilitation of the site will follow an approved rehabilitation plan that will be prepared by IOC within three years of commencement of quarry operation. The plan will be developed in consultation with the Department of Environment and Conservation and Mines Division of Department of Natural Resources.

IOC will implement progressive reclamation where possible; otherwise the overall rehabilitation process will include the following:

- terrain, soil and vegetation disturbances will be limited to that which is absolutely necessary to complete the work within the defined project boundaries;
- where possible, overburden and excavated rock will be stockpiled separately and reserved for later rehabilitation work;
- surface disturbances will be stabilized on an ongoing basis to limit erosion and promote natural revegetation;

- natural revegetation of surface disturbances will be encouraged and active revegetation will be pursued where this is deemed critical and where terrain and soil conditions permit, and
- IOC will incorporate environmental measures in the contract documents.

### **3.6.1 Abandonment**

Rehabilitation subsequent to mine closure will involve the following activities:

- dismantling and removal of all surface infrastructure;
- contouring to establish permanent drainage patterns, minimize erosion, and ensure safety of the public;
- replacement (where appropriate) of stockpiled till, peat, or other suitable materials to encourage natural revegetation; and
- revegetation, where natural revegetation does not occur, or if site conditions such as erosion necessitates such an action.

The bulk of the surface infrastructure (buildings and equipment) will be dismantled upon abandonment and disposed of in accordance with the *Waste Material Disposal Act*. Much of the material will be reusable or of value; these items will be removed from the project site. Certain waste materials (e.g., miscellaneous scrap metal) will be disposed of in accordance with approved means.

The short access and site road bases will be contoured to blend with the natural terrain and will be scarified to promote natural vegetation. Culverts will be removed and the sites restored as directed in the watercourse alteration permits.

Till, soil, and excavated wasterock stockpiles will be accessed and distributed over the contoured road and facility sites to provide suitable substrata for natural re-vegetation. Based on an assessment of soil fertility, erosion potential and other site characteristics, and where natural re-vegetation is not expected to occur in a reasonable period of time, or where site conditions indicate a requirement for speedy re-vegetation, an active re-vegetation program will be undertaken. These areas will be scarified, limed (if required), fertilized and planted with a grass seed mix or other vegetation that is appropriate for the site.

The success of erosion control, re-vegetation, and other rehabilitation measures will be inspected periodically subsequent to abandonment.

#### **3.6.1.1 Waste Rock Areas**

The waste rock area will be graded to a stable slope angle and the top and side slopes will be covered with topsoil. Natural re-vegetation will be promoted and if required, an active re-vegetation program will be implemented as noted above. Environmental Protection measures associated with rehabilitating waste rock dumps are provided in the appended IOC-EMS SOP – *Waste Rock Dumps – Design of New Landforms*.

### 3.6.1.2 Open Pit

The edges of the open pit will be graded to a stable slope if required. A rock barrier will be constructed around the circumference of the pit and warning signs erected to ensure public safety. The open pit will be allowed to flood and will create an open water body after the closure of the quarry.

### 3.7 Occupations

Contractors will be used for development of the quarry. The overburden removal and site preparation phase will require mobile equipment operators (excavators, haul trucks, dozers, graders). Drilling and blasting operations will require experienced development drillers and blasters. It is envisaged that a maximum of 20 persons will be required for each of the development phases.

Quarry operations will be contracted out to meet inventory and consumption requirements. All operational occupations will be determined by the contractor as deemed necessary to fulfill consumption requirements.

### 3.8 Project Related Documents

There are no project-related documents.

## 4.0 APPROVAL OF THE UNDERTAKING

The proposed quarry will be over 10 ha in size, and is therefore subject to environmental assessment provisions of the *Newfoundland Environmental Protection Act*, pursuant to Section 33(3) of the *Environmental Assessment Regulations*. The proposal is not subject to the *Canadian Environmental Assessment Act* because federal permits or authorizations are not required, and federal funding will not be used. The permits and approvals in place are listed in Table 1 and those that may be required are listed in Table 2. First pages of issued permits are in Appendix 2.

**Table 1 Permits that have been Issued for Activities at the Proposed Quarry**

Potential Authorization Required	Applicable Legislation	Relevant Activity	Responsible Agency
Exploration Approvals (dated 7 Jan 2005 and 10 Jan 2005)	<i>Quarry Materials Act</i> and Regulations	Exploration Activities	Mines and Energy Division, Department of Natural Resources
Commercial Cutting Permit (dated 26 Jan 2005)	<i>Forestry Act</i> and Cutting of Timber Regulations	Clearing land	Forest Resources Division, Department of Natural Resources
Water Use Licence (WUL-05-005 dated 19 Jan 2005)	<i>Water Resources Act</i>	Water withdrawal for use during quarry development	Water Resources Division, Department of Environment and Conservation



**Table 2 Permits and Approvals that May Be Required for Plateau Dolomite Quarry**

Potential Authorization Required	Applicable Legislation	Relevant Activity	Responsible Agency
Authorization to Proceed	<i>Environmental Protection Act – Assessment Regulations</i>	Proceed with the undertaking	Minister of Environment and Conservation
Quarry Permit	<i>Quarry Materials Act and Regulations</i>	Dolomite extraction	Mines and Energy Division, Department of Natural Resources
Certificate of Approval for Construction Site Drainage	<i>Water Resources Act</i>	Run-off from site being discharged into receiving waters	Water Resources Division, Department of Environment and Conservation
Certificate of Approval for Storing and Handling Gasoline and Associated Products	<i>Environmental Protection Act and Storage and Handling of Gasoline and Associated Products Regulations</i>	Storing and handling gasoline-associated products	Government Service Centre
Blasters Safety Certificate		Blasting	Government Service Centre
Approval for Operation of Temporary Lunchroom/ Washroom Facilities			Newfoundland and Labrador Department of Health, Public Health Inspector

## 5.0 SCHEDULE


- April 2005 Submission of Registration
- May 2005 Government decision
- May - June 2005 Obtain permits
- July – September 2005 Site preparation (timber clearing, overburden removal) at Plateau Quarry
- January – March 2006 Development (drilling and blasting) at Plateau Quarry
- March – June 2006 Site preparation and relocation of infrastructure from Leila Wynne Quarry to Plateau Quarry
- July 2006 Commence quarrying of dolomite at Plateau Quarry

## 6.0 FUNDING

The project will be funded by IOC.

## 7.0 SUBMISSION

31 March 2005  
Date

  
Name: Phil Turner  
Position: General Manager, ES&H

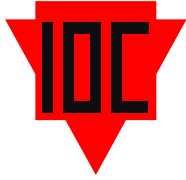
## 8.0 REFERENCES

Environment Canada. 2004. Canadian Climate Normals for Wabush Lake 1971-2000. Online:  
[http://www.climate.weatheroffice.ec.gc.ca/climate\\_normals/](http://www.climate.weatheroffice.ec.gc.ca/climate_normals/)

Gerald Penney and Associates Ltd. 1989. Historic Resources Overview Assessment Dolomite Quarry, Leila Wynne Lake, Western Labrador. IN: JWL (LeDrew Environmental Management Limited. 1989. Environmental Preview Report Leila Wynne Lake Dolomite Quarry Labrador. Prepared for Iron Ore Company of Canada. Labrador City.

Meades, S.J. 1990. Natural Regions of Newfoundland and Labrador. Report Prepared for the Protected Areas Association , St. John's, NL.

**APPENDIX 1**  
**RELEVANT**  
**STANDARD OPERATING PROCEDURES**



**IOC Environmental Management System  
Standard Operating Procedure**

**LAND DISTURBANCE- VEGETATION  
CLEARING AND GRUBBING**

Document Number: SOP-EM-700E

Version Number: 03

Version Date: 2004-11-18

Approved By: Superintendent  
Environment

**1. Purpose** 1.1 To conduct vegetation clearing and topsoil stripping operations in a manner that

- minimises the environmental impact
- meets regulatory requirements.

**2. Scope** 2.1 Applies to all vegetation clearing activities that occur at the Carol Project.

**3. Procedure steps, accountabilities and references**

Steps	Description	Accountability	References
<b>3.1 Clearing Guidelines</b>	3.1.1 Vegetation matter and topsoil shall be removed where practicable from the footprint of disturbance prior to the following activities occurring: <ul style="list-style-type: none"><li>• Waste dumps construction</li><li>• Development/expansion of mine pits, and</li><li>• Construction of roads, laydown yards, work pads pole lines and other works that require clearing.</li></ul> 3.1.2 Approval for clearing is to be obtained from the IOC Environment Department.	Project Supervisor          Project Supervisor	
<b>3.2 Prior to clearing activities occurring</b>	3.2.1 Plans for clearing activities shall be developed which shall consider at a minimum: <ul style="list-style-type: none"><li>• Restricting disturbance to the minimum area required,</li><li>• The storage or use of cleared material in liaison with the Environment Department as per steps 3.4 and 3.5.</li><li>• Maintenance of a 100 m buffer zone between vegetation clearing/grubbing areas and water bodies,</li><li>• Maintenance of a 50m buffer zone between vegetation clearing/grubbing areas and public roads,</li><li>• Avoidance of vegetation disturbance, if feasible, during the critical bird nesting period, from May to mid-July, and</li><li>• Other related environmental procedures.</li></ul>	Project Supervisor	
<b>3.3 Vegetation clearing/ grubbing activities</b>	3.3.1 Vegetation clearing will consist of: <ul style="list-style-type: none"><li>• cutting down standing trees close to the ground, felled inward toward the work area,</li><li>• removing all shrubs, debris and other perishable materials</li><li>• care taken to ensure that material is not pushed into areas that are to be left undisturbed</li></ul>	Project Supervisor	



**IOC Environmental Management System  
Standard Operating Procedure**

**LAND DISTURBANCE- VEGETATION  
CLEARING AND GRUBBING**

Document Number: SOP-EM-700E

Version Number: 03

Version Date: 2004-11-18

Approved By: Superintendent Environment

	<p>3.3.2 The use of heavy vehicles to clear, such as bulldozers, will not occur except where it can be demonstrated that:</p> <ul style="list-style-type: none"> <li>• There is no merchantable timber,</li> <li>• The resulting terrain will not result in the loss of topsoil or the sedimentation to surrounding water-bodies.</li> </ul>	Project Supervisor	
<p><b>3.4 Handling of Cleared Timber</b></p>	<p>3.4.1 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.</p> <p>3.4.2 Timber unable to be reused will be buried, burned or disposed of by other approved means.</p> <p>3.4.3 Disposing of cleared un-merchantable timber, slash and cuttings by burning will comply with requirements defined by the IOC Environment Department. At no time will a fire be left unattended.</p>	<p>Project Supervisor</p> <p>Project Supervisor</p> <p>Project Supervisor</p>	
<p><b>3.5 Handling of Cleared Vegetation Matter and Topsoil</b></p>	<p>3.5.1 Cleared vegetation and the topsoil material shall preferentially be used to restore other disturbed habitat. Techniques of material application to disturbed habitat shall be determined in consultation with the IOC Environment Department.</p> <p>3.5.2 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.</p> <p>3.5.3 If material is unable to be used as per step 3.5.1 it shall be stockpiled according to the following guidelines:</p> <ul style="list-style-type: none"> <li>• Storage to be in an area already disturbed and cleared,</li> <li>• Storage area to be accessible for future rehabilitation purposes,</li> <li>• Storage area will be chosen to prevent excessive re-handling, and be above expected spring flood levels,</li> <li>• Material shall be mapped or marked in a manner to prevent unnecessary or accidental disturbance, and</li> <li>• Where practicable, material will be placed in windrows that are, at a maximum 2m high to maintain seed viability.</li> </ul>	<p>Project Supervisor</p> <p>Project Supervisor</p> <p>Project Supervisor</p>	



**IOC Environmental Management System  
Standard Operating Procedure**

**LAND DISTURBANCE- VEGETATION  
CLEARING AND GRUBBING**

Document Number: SOP-EM-700E

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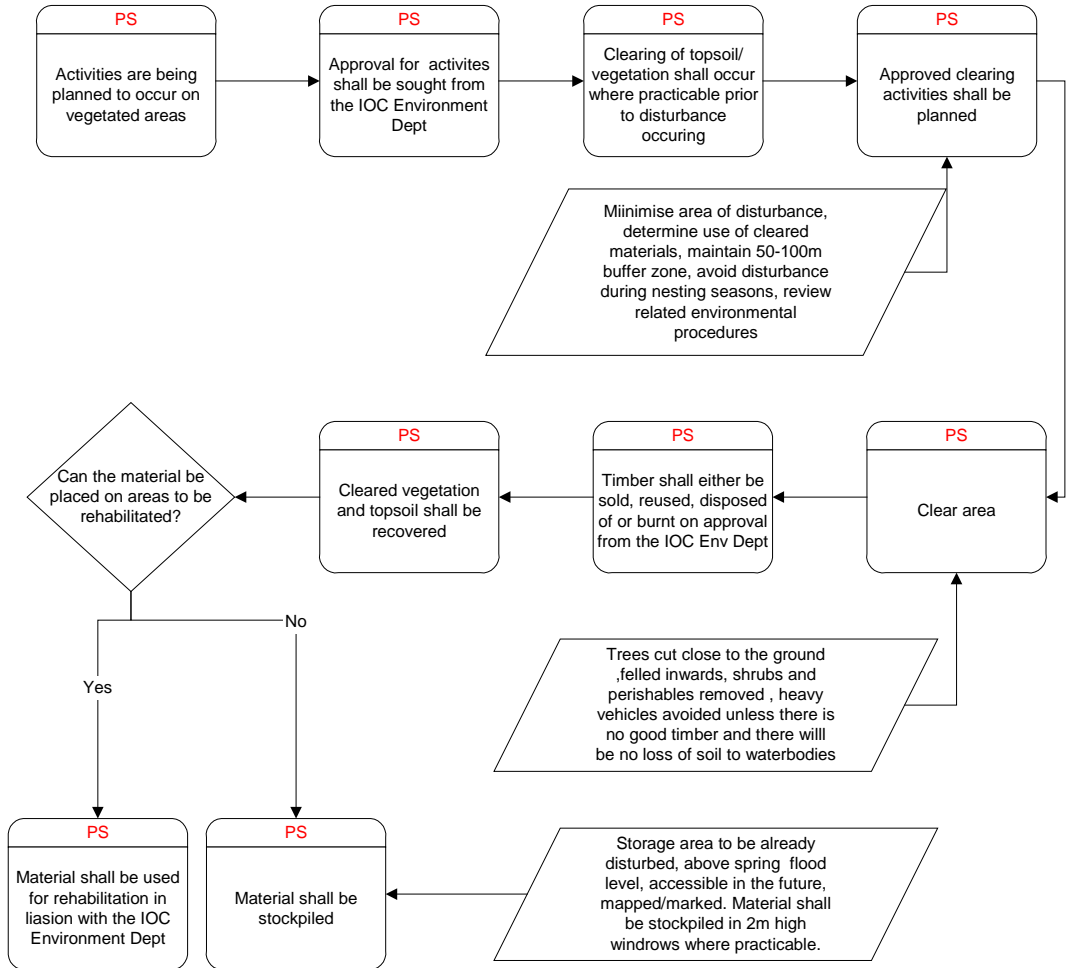
Version Date: 2004-11-18

Approved By: Superintendent Environment

**4. Definitions**

5. 1 Refer to Environmental Glossary

**5. Flow Chart**



PS- Project Supervisor

**Flow Chart- Land Disturbance- Vegation Clearing and Grubbing**



**IOC Environmental Management System  
Standard Operating Procedure**

**LAND DISTURBANCE- VEGETATION  
CLEARING AND GRUBBING**

Document Number: SOP-EM-700E

Version Number: 03

Version Date: 2004-11-18

Approved By: Superintendent  
Environment

**6. Amendments**

V3	2004-11-18	Lucy Rogers	Jody Clark	Buffer zone change (step 3.2)- 50m to public road, 100m to natural water body
V2	2004-10-26	Lucy Rogers	Jody Clark	Removal of controlled document signature field
Version	Version Date	Revised By	Approved By	Reason for Change



**IOC Environmental Management System  
Standard Operating Procedure**

**WASTE ROCK DUMPS- DESIGN OF  
NEW LANDFORMS**

Document Number: SOP-EM-603E

Version Number: 01

Version Date: 2004-10-26

Approved By: Superintendent  
Environment

**1. Purpose** 1.1 To create new waste rock dumps with the final landform being safe, stable and non-erosive which will support final land use as defined in the IOC Closure Plans.

**2. Scope** 2.1 This procedure relates to the environmental performance of new waste rock dump designs at IOC's Carol Project.

2.2 It does not address cost, safety, geotechnical or scheduling issues that must be considered in conjunction with environmental guidelines.

**3. Procedure steps, accountabilities and references**

Steps	Description	Accountability	References
<b>3.1 Planning</b>	<p>3.1.1 Waste rock disposal shall be considered as part of the medium to long term mine planning.</p> <p>3.1.2 Backfilling of pits or use of available existing waste rock dumps shall be considered in preference to new waste rock dump construction.</p> <p>3.1.3 Should waste rock dumps be required, design shall be according to steps 3.2 to 3.5.</p>	<p>Mining Engineer-Tech Services</p> <p>Mining Engineer-Tech Services</p> <p>Mining Engineer-Tech Services</p>	
<b>3.2 Design Constraints</b>	<p>3.2.1 Prior to commencing the design of a new waste rock dump, constraints shall be identified.</p> <p>3.2.2 External constraints may include, but not be limited to:</p> <ul style="list-style-type: none"><li>• Location of infrastructure (roads, pipelines, power-lines, workshops etc),</li><li>• Proximity to natural water bodies and lease boundaries (buffer zone guidelines- 100m between disturbance and natural water bodies, 50m between disturbance and public roads),</li><li>• Local topography (slopes, location of significant natural drainage lines etc), and</li><li>• Use of previously disturbed areas in preference to undisturbed land.</li></ul> <p>3.2.3 Constraints related to final closure requirements shall be identified by review of the latest IOC closure plan.</p>	<p>Mining Engineer-Tech Services</p> <p>Mining Engineer-Tech Services</p> <p>Mining Engineer-Tech Services</p>	<p>IOC Closure Plan</p>





**IOC Environmental Management System  
Standard Operating Procedure**

**WASTE ROCK DUMPS- DESIGN OF  
NEW LANDFORMS**

Document Number: SOP-EM-603E

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Version Date: 2004-10-26

Approved By: Superintendent  
Environment

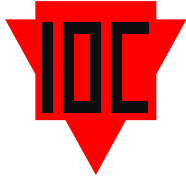
	<p>3.2.3 Waste rock dump design options shall be developed in consideration of the constraints identified in 3.1, and environmental design principles outlined in Attachment 1.</p> <p>Environmental design principles focus on the following factors:</p> <ul style="list-style-type: none"> <li>• Waste characteristics,</li> <li>• Landform geometry,</li> <li>• Hydrology,</li> <li>• Surrounding topography,</li> <li>• Progressive closure requirements.</li> </ul>	Mining Engineer-Tech Services	
<b>3.4 Design Approval</b>	<p>3.4.1 The proposed waste rock dump design shall be reviewed and modified as required in consultation with the IOC Environment Department.</p> <p>3.4.2 The final waste rock dump design shall be documented.</p>	<p>Mining Engineer-Tech Services, Environmental Advisor/ Administrator</p> <p>Mining Engineer-Tech Services</p>	Waste rock dump design
<b>3.5 Construction and Closure</b>	<p>3.5.1 The waste rock dumps shall be constructed as per approved and documented waste dump design, and in compliance with operational procedures.</p> <p>3.5.2 Changes to the documented waste dump design that affect final design form or environmental performance shall be made in consideration of Change Management procedures.</p> <p>3.5.3 Detailed final reshaping and remediation plans shall be determined at the time of closure in liaison with the IOC Environment Department.</p>	<p>Mining Engineer-Tech Services</p> <p>Mining Engineer-Tech Services</p> <p>Mining Engineer-Tech Services</p>	Procedure- Change Management

**4. References**

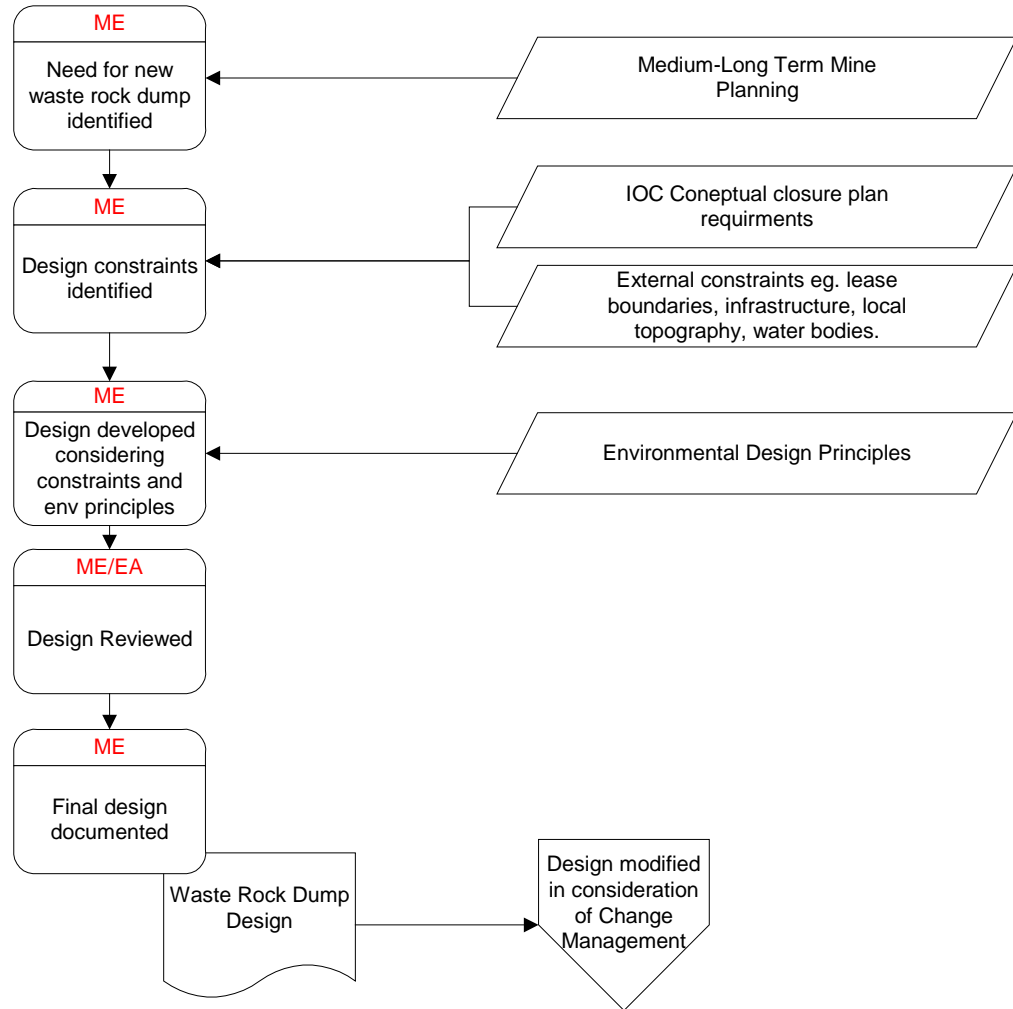
- 4.1 'Conceptual Closure Plan, IOC Carol Lake-NF, Schefferville-QC and Sept-Iles-QC', Senes Consultants Limited, Nov 2001  
 4.2 Procedure- Change Management

**5. Definitions**

5. 1 Refer to Environmental Glossary

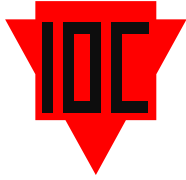


6. Flow Chart



EA= Environmental Advisor/  
Administrator  
ME= Mining Engineer

**Flow Chart- Waste Rock Dumps-  
Design Of New Landforms**



**IOC Environmental Management System  
Standard Operating Procedure**

**WASTE ROCK DUMPS- DESIGN OF  
NEW LANDFORMS**

Document Number: SOP-EM-603E

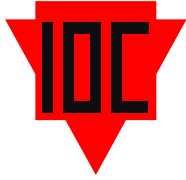
Version Number: 01

Version Date: 2004-10-26

Approved By: Superintendent  
Environment

**7. Amendments**

V2	2004-10-26	Lucy Rogers	Jody Clark	Removal of controlled document signature field. Addition of buffer zone guidelines. Removed reference to '5-yr mine plan'. Replaced with 'med-long term' mine planning.
Version	Version Date	Revised By	Approved By	Reason for Change



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**ATTACHMENT 1:  
NEW WASTE ROCK DUMPS- ENVIRONMENTAL DESIGN PRINCIPLES**

**1. Design Objectives**

1.1 Rio Tinto  
Environmental Standard-  
Mineral Waste  
Management, Sept 2003.

Waste disposal facilities and sites shall be physically, biologically and chemically safe. Waste production shall be minimised and waste re-use, backfill and recycling maximised.

1.2 IOC Conceptual  
Closure Plan, Nov 2001.

To leave waste rock dumps in a physically stable state over the long-term, and to reduce the potential for the encroachment of the dumps upon the adjacent environment.

1.3 Landform Design for  
Rehabilitation,  
Environment Australia,  
1998.

The final landform must be safe, stable, non-erosive and be restored to have those environmental characteristics that will support the final land use agreed between stakeholders and the company.

**2. Environmental Design Principles**

**2.1 Waste Characteristics**

Construction shall ensure that waste rock with low erodibility shall be used to create the outer dump surfaces. Erodible materials shall be encapsulated within the dump.

Note that IOC rock waste is predominately classified as having low erodibility with high water infiltration rates. Small volumes of moderate to highly erodible waste materials include limonites.

**2.2 Final Landform  
Geometry**

Maximise the volume of the dump for a given length of dump perimeter.

E.g. For the same footprint, height and slope gradients, square dumps have more capacity than long rectangular dumps. This reduces rehabilitation requirements per unit of waste.

Avoid converging slopes as concentration of water flow can occur and encourage erosion.

Large waste dump tops allow for more a compact waste holding capacity, but act as water catchment areas. Tops should only be maximised when high rainfall infiltration rates are expected preventing excess rainfall being directed down waste dump slopes.

Final outer slope should not be greater than 20° from the horizontal.



### 2.3 Hydrology

Drainage management of the final landform shall consider the following best practice principles:

Benches should be constructed every 10 vertical meters of waste dump. Benches must back slope into the dump at a gradient of less than 5% (3°) and with a longitudinal gradient of less than 0.5%. Each bench is to drain a maximum area of one hectare or less.

If drainage is to be directed down the face of the waste dump, each bench is to discharge to a stable drop down drain. Each drop down drain should incorporate an energy dissipation structure to prevent erosion away from the dump and at the base of the dump. Drains shall be engineered in consideration of moderate and extreme weather events.

### 2.4 Surrounding Topography

Waste rock dump heights shall not exceed the height of surrounding topography.

The final landform of the waste rock dump shall be designed in consideration of, and sympathetic to, the appearance of the surrounding landscape.

### 2.5 Progressive Rehabilitation

Backfilling of pits shall be considered in preference to waste dump construction.

Construction shall consider the potential for progressive closure and rehabilitation of the dump.

It should be noted that environmental design principles are based on Australian industry guidelines and should be considered conservative. Variations from recommended guidelines shall be considered based on further applicable research or clear on-site examples.

Guidelines are also based on current IOC waste characteristics which are non acid generating and largely non-erodible.

## 3. References

3.1 'Landform Design for Rehabilitation, Best Practice Environmental Management in Mining', Environment Australia, 1998

3.2 'Mineral; waste Management', Rio Tinto Environmental Standard, Sept 2003.

3.3 'Draft Dump Design Guidelines, Report to Hamersley Iron', Chandler and Wilgoose, May 2002.



**IOC Environmental Management System  
Standard Operating Procedure**

**DEWATERING-PITS AND LAKES**

Document Number: SOP-EM-400E  
 Version Number: 01  
 Version Date: 2004-10-26  
 Approved By: Superintendent Environment

**1. Purpose** 1.1 To ensure that the environmental risks associated with de-watering operations at IOC's Carol project are managed.

**2. Scope** 2.1 This procedure applies to all de-watering activities at IOC's Carol project undertaken by IOC personnel or contractors.

**3. Procedure steps, accountabilities and references**

Steps	Description	Accountability	References
<b>3.1 De-watering Strategy Design</b>	3.1.1 De-watering strategies shall be designed following steps 3.1.2 to 3.1.5 to ensure that the impact to the environment is minimised.	Mining Engineer	
	3.1.2 The IOC Environment Department shall be initially consulted to identify the following issues that will influence the de-watering design: <ul style="list-style-type: none"> <li>• Compliance levels that must be achieved,</li> <li>• Regulatory approvals that must be obtained, and</li> <li>• Environmental protection plans that may be required.</li> </ul>	Mining Engineer	
	3.1.3 If compliance levels are considered difficult to meet at the compliance point, reductions may be achieved by using either one or a combination of the following methods: <ul style="list-style-type: none"> <li>• Filtration,</li> <li>• Settling ponds,</li> <li>• Silt fences,</li> <li>• Dykes.</li> </ul>	Mining Engineer	
	3.1.4 De-watering design shall consider the placement of de-watering discharge sites to: <ul style="list-style-type: none"> <li>• Allow discharged water to follow natural surface drainage patterns to minimise erosion, and</li> <li>• To discharge to vegetated work areas as a means of reducing impact on turbidity levels in natural water bodies.</li> </ul> <p>Note: This will not affect compliance levels, which are taken at 'end-of-pipe'.</p>	Mining Engineer	
	3.1.5 Further environmental protection measures shall be developed and implemented as defined by the IOC Environment Department.	Mining Engineer	



**IOC Environmental Management System  
Standard Operating Procedure**

**DEWATERING-PITS AND LAKES**

Document Number: SOP-EM-400E  
 Version Number: 01  
 Version Date: 2004-10-26  
 Approved By: Superintendent Environment

<b>3.2 De-watering- Operations</b>	3.2.1 Once a de-watering design has been implemented, there shall be no changes to the de-watering discharge points without prior liaison with the IOC Environment Department.	Primary Ore Team Leader	
	3.2.2 Extraction at the de-watering sumps shall be managed so the placement of the de-watering pump intake shall be above the lake/sump bottom in an effort to reduce silt intake and minimise the discharge turbidity.  3.2.3 All operating de-watering sumps and discharge points shall be inspected daily to ensure: -The de-watering pump intake is above the lake/sump bottom, -Excessive erosion or sedimentation is not occurring at discharge points.	Primary Ore Team Leader  Primary Ore Team Leader	
<b>3.3 De-watering Monitoring</b>	3.3.1 All de-watering discharge sites shall be sampled and tested in a manner as determined by the IOC Environment Department in consideration of legal requirements.	Environmental Administrator/ Advisor	Analytical Certificates
	3.3.2 De-watering monitoring results shall be inputted into the Environment Database, with the analytical certificates filed in the Environment Department filing system.	ESH Data Management Administrator	Environment Database  Analytical Certificates
	3.3.3 If monitoring results demonstrate that legal requirements are not being met, the de-watering design and operation shall be investigated to determine the root cause and action for improvements.	Environmental Administrator/ Advisor	IOC Incident Investigation Procedure

- 4. References**
- 4.1 Analytical Certificates
  - 4.2 IOC Incident Investigation Procedure
  - 4.3 IOC Database

- 5. Definitions**
- 5. 1 Refer to Environmental Glossary



**IOC Environmental Management System  
Standard Operating Procedure**

**DEWATERING-PITS AND LAKES**

Document Number: SOP-EM-400E

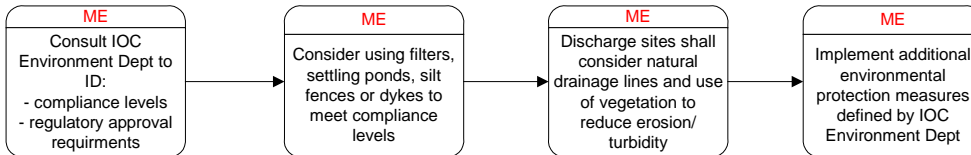
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Version Date: 2004-10-26

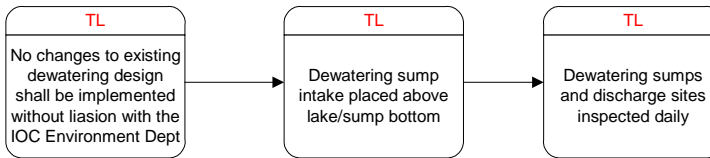
Approved By: Superintendent Environment

**6. Flow Chart**

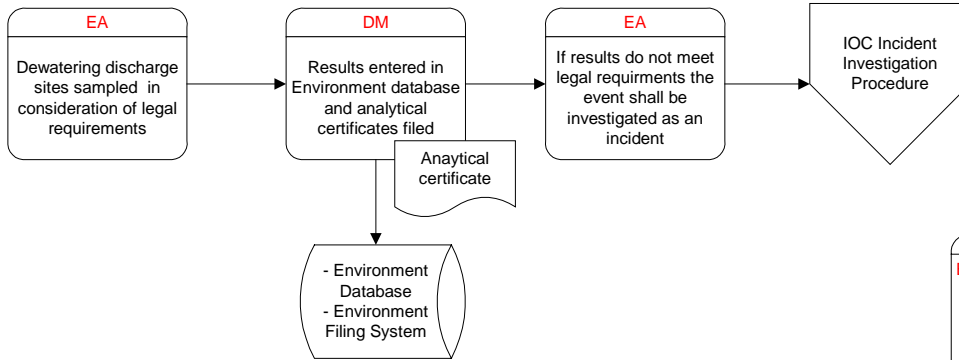
**Design Strategy**



**Operations**



**Monitoring**



EA- Environmental Administrator /Advisor  
ME- Mining Engineer  
TL- Team Leader  
DM- ESH Data Management Administrator

**Flow Chart- Dewatering-Pits and Lakes**

**7. Amendments**

Version	Version Date	Revised By	Approved By	Reason for Change



**APPENDIX 2**

**FIRST PAGES OF PERMITS ISSUED FOR ACTIVITIES  
RELATED TO THE DOLOMITE QUARRY**



GOVERNMENT OF  
NEWFOUNDLAND AND LABRADOR

Department of Natural Resources  
Mines Branch  
Mineral Lands Division

E050001

January 10, 2005

Mr. Wayne Darch  
Iron Ore Company of Canada  
P.O. Box 1000  
Labrador City, NL  
A2V 2L8

Dear Mr. Darch :

**RE: Exploration Approval (86 Diamond Drill Holes & ATV Use)  
for Iron Ore Company of Canada  
on the Carol Lake - Plateau Dolomite Property,  
NTS 23G/02, Licence 6695M**

Your proposed exploration program submitted in compliance with Section 5(4) of the *Mineral Act* has been reviewed and approved.

The following conditions apply to your approval:

1. The proponent must comply with any other Provincial and Federal Act or Regulation, or obtain all permits that may be required in connection with the exploration activity.
2. All personnel must comply with the *Mineral Regulations*, in particular sections 41 - 45 and section 46 which refers to the "Guidelines for Exploration and Construction Companies".
3. You are required to notify this office within twenty-four hours of mobilizing equipment to the project area and upon completion of the exploration activity. You are also requested to submit brief monthly updates of your exploration project. The monthly updates should include copies of any reports or memos during the period concerning environmental issues, accidents, incidents with wildlife or other matters related to the exploration work. This information is necessary so we can monitor the exploration activity in the Province and it will be treated as confidential; please fax the information to Steve Ash at 709-729-6782.
4. As per section 12(2) of the *Mineral Act*, when exploration work is to take place on private land or upon land where a legal or equitable interests are held; the licensee will obtain prior written permission and forward copies to the department.



04-22-00141	Labrador	22	E - Moosehead	E - Moosehead	2005/01/26
PERMIT NUMBER	REGION	DISTRICT	ZONE	W.C.	DATE ISSUED

Under and by virtue of The Forestry Act, Permission is hereby granted to:

**Iron Ore Company of Canada**  
**Labrador City, NF**  
**Labrador City, NL A2V 2L8**

Phone: (709) 944-8617

Driver's Licence #:

to cut timber to the conditions and restrictions as stated below:

Total Volume to be harvested:	softwood	32m <sup>3</sup>
	hardwood	0m <sup>3</sup>

Stumpage Rates:

**None Specified**

Location where timber is to be cut: **Javelin Rd**

Location where timber must be piled for scaling: **Javelin Rd.**

Minimum top-diameter to be utilized: **5 centimeters**

All cutting within 100 meters from the center of any highway is strictly prohibited except under specific approval.

Timber cut under this permit shall not be removed from the scaling location stated above until scaled by a certified scaler, unless permission has been received from the Forestry Official issuing the permit.

All cutting subject to the provisions of this permit, the Regulations under The Forestry Act and The Forestry Act itself.

Additional conditions as attached.

Permit restricted to clearing timber for roads and immediate drilling sites only. Area restricted to Mining Exploration lease # 6695M.

This permit is effective starting: **2005/01/26** and expires **2005/03/31**

Fee for the issuance of this permit is: **\$21.00**

  
\_\_\_\_\_  
FORESTRY OFFICIAL



GOVERNMENT OF  
NEWFOUNDLAND AND LABRADOR  
DEPARTMENT OF ENVIRONMENT AND CONSERVATION

DATE: January 19, 2005

FILE: 517

Water Rights Section  
Water Resources Management Division  
Department of Environment and Conservation  
PO Box 8700  
St. John's NL A1B 4J6

**NOTIFICATION OF ACCEPTANCE OF WATER USE LICENCE**  
**[Water Withdrawal and Use from Several Bodies of Water in Labrador]**

Water Use Licence No. WUL-05-005 issued on January 19, 2005, and valid until December 31, 2009.

As a Licensee of Water Use Licence No. WUL-05-005, issued pursuant to the *Water Resources Act*, **Iron Ore Company of Canada** (the "Licensee") agrees to accept this Licence and abide by all terms and conditions, reservations, exceptions and provisions stated therein. The Licensee acknowledges that failure to abide by the terms and conditions, reservations, exceptions and provisions indicated in Appendices A and B of the Licence, the *Water Resources Act* and regulations thereunder will render the Licence null and void, place the Licensee and/or their agent(s) in violation of the *Water Resources Act* and regulations thereunder and make the Licensee responsible for any remedial measures which may be prescribed by the Department of Environment and Conservation.

Signed, sealed, and delivered by  
**Iron Ore Company of Canada**,  
in accordance with its rules and  
regulations in that behalf  
at \_\_\_\_\_, \_\_\_\_\_, this \_\_\_\_\_ day  
of \_\_\_\_\_, 2005 in the presence  
of:

\_\_\_\_\_  
Witness

Per: \_\_\_\_\_  
Signing Officer

Seal:

**Important:** The attached Water Use Licence is not valid unless the Licensee completes and returns this notification to the address above within thirty (30) days of receipt.



GOVERNMENT OF  
NEWFOUNDLAND AND LABRADOR

Department of Natural Resources  
Mines Branch  
Mineral Lands Division

E050002

January 7, 2005

Mr. Wayne Darch  
Iron Ore Company of Canada  
P.O. Box 1000  
Labrador City, NL  
A2V 2L8

Dear Mr. Darch :

**RE: Exploration Approval (9 Diamond Drill Holes & ATV Use)  
for Iron Ore Company of Canada  
on the Carol Lake Property,  
NTS 23G/02 & 23B/14, Licences 8928M, 8931M, 9284M**

Your proposed exploration program submitted in compliance with Section 5(4) of the *Mineral Act* has been reviewed and approved.

The following conditions apply to your approval:

1. The proponent must comply with any other Provincial and Federal Act or Regulation, or obtain all permits that may be required in connection with the exploration activity.
2. All personnel must comply with the *Mineral Regulations*, in particular sections 41 - 45 and section 46 which refers to the "Guidelines for Exploration and Construction Companies".
3. You are required to notify this office within twenty-four hours of mobilizing equipment to the project area and upon completion of the exploration activity. You are also requested to submit brief monthly updates of your exploration project. The monthly updates should include copies of any reports or memos during the period concerning environmental issues, accidents, incidents with wildlife or other matters related to the exploration work. This information is necessary so we can monitor the exploration activity in the Province and it will be treated as confidential; please fax the information to Steve Ash at 709-729-6782.
4. Operating a diamond drill requires the use of water; this is an industrial activity that requires a Water Use Licence as per the *Water Resources Act*. You are required to obtain a Water Use Licence from Water Resources Division of the Department of Environment and Conservation. For further information please contact Dr. Abdel-Razek at 709-729-4795.