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## ENVIRONMENTAL ASSESSMENT REGISTRATION DOCUMENT

CONTINENTAL STONE LIMITED

PROPOSED BELLEORAM CRUSHED ROCK EXPORT QUARRY BELLEORAM, NL

Submitted by:

Continental Stone Limited

P.O. Box 5424

St. John's, NL A1C 5W2

December 2020

Continental Stone Limited  
Environmental Assessment – Registration Document  
Proposed Crushed Granite Rock Quarry, Belleoram

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## PREFACE

Continental Stone Limited (Continental Stone) proposes to develop a crushed rock export quarry in Belleoram on the south coast of Newfoundland. As required under the provincial Environmental Assessment Regulations, 2003, the project was originally registered with the Minister of Environment and Conservation (currently Environment, Climate Change and Municipalities) in March 2006.

In response to the Registration, the Minister required Continental Stone to submit an Environmental Preview Report (EPR). Guidelines for the EPR were released in June 2006 and the EPR was submitted in November 2006. In 2007, the project was released from the environmental assessment process with the acceptance and approval of the EPR (January 2007) and Environmental Protection Plan and Spill Contingency Plan (July 2007).

The project as released in January 2007 did not commence and the Minister's decision as per the Environmental Assessment Regulations, 2003, expired. The project was registered for a second time in October 2014 and was again released by the Minister in March 2015 subject to the following conditions:

- A Site Drainage and Silt Control Plan must be submitted and approved by the Minister of Environment and Conservation prior to construction.
- A Communication Plan for blasting and vessel scheduling must be submitted to and approved by the Minister of Fisheries and Aquaculture (Fisheries, Forestry, and Agriculture), and, Minister of Environment and Conservation (Environment, Climate Change and Municipalities) prior to construction.
- A Contingency Plan for super chill and biosecurity events must be submitted to and approved by the Minister of Fisheries and Aquaculture (Fisheries, Forestry, and Agriculture), and, Minister of Environment and Conservation (Environment, Climate Change and Municipalities) prior to construction.
- An Environmental Effects Monitoring Program for Air Quality must be submitted and approved by the Minister of Environment and Conservation (Environment, Climate Change and Municipalities) prior to construction.
- An Environmental Protection Plan including Avifauna must be submitted to and approved by the Minister of Environment and Conservation (Environment, Climate Change and

Municipalities) prior to construction.

This current submission provides an updated project registration document, in addition, five appendices that address each of the above five conditions.

Under the Physical Activities Regulations (SOR/2019-285) of the *Impact Assessment Act* (IAA) (S.C. 2019, c.28, s.1), a new stone quarry or sand or gravel pit with a production capacity of 3,500,000 t/year or more (Section 18(f)), or expansion of an existing mining operation that results in an increase in the area of mining operations of 50% or more and the total production capacity would be 3,500,000 t/year or more after the expansion (Section 19(f)), would be considered a designated project and therefore require assessment under the federal IAA federal. The proposed Belleoram Quarry does not exceed this production capacity.

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**1 NAME OF UNDERTAKING      Belleoram Crushed Rock Export Quarry**

**PROPOSER**

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## **2 Description of the Undertaking**

Continental Stone Limited (CSL) proposes to develop an 89ha granite aggregate export quarry in Belleoram, Newfoundland (**Figure 1**, **Figure 2**) to supply raw material to international markets. The project will be carried out in 3 stages: Development, Operations and Decommissioning, as described below.

**Development.** Excavation and removal of overburden material will be completed to facilitate the construction of a site access road and quarry area clearing. This stage will also include the excavation of an area for setup of the crusher and associated equipment and a suitable marine terminal for the project. All equipment will be established during this stage.

**Operation.** Operations will consist of drilling and blasting of the rock source, with the fractured rock being crushed into various sizes. The crushed rock will then be conveyed to the marine terminal for loading onto a bulk aggregate carrier and shipped to international markets.

**Decommissioning.** This will involve demobilizing all unsuitable structures at the site and stabilization of the area and the creation of an area that will naturally regenerate and be user friendly and safe for the community.

As per the Quarry Development and Reclamation Plan (**Appendix 1**), there are 58 “Phases” to this project, with each Phase being approximately equivalent to an operating season. It is estimated that during Phase 1, which will focus predominantly on site development (Development Stage), there will be approximately 0.5 million tonnes of aggregate shipped to market, followed by 1 million tonnes in Phase 2 as site development continues, and 2 million tonnes by Phase 3, at which time the project site will be fully developed and considered at “normal” production capacity, i.e. the Operations Stage.

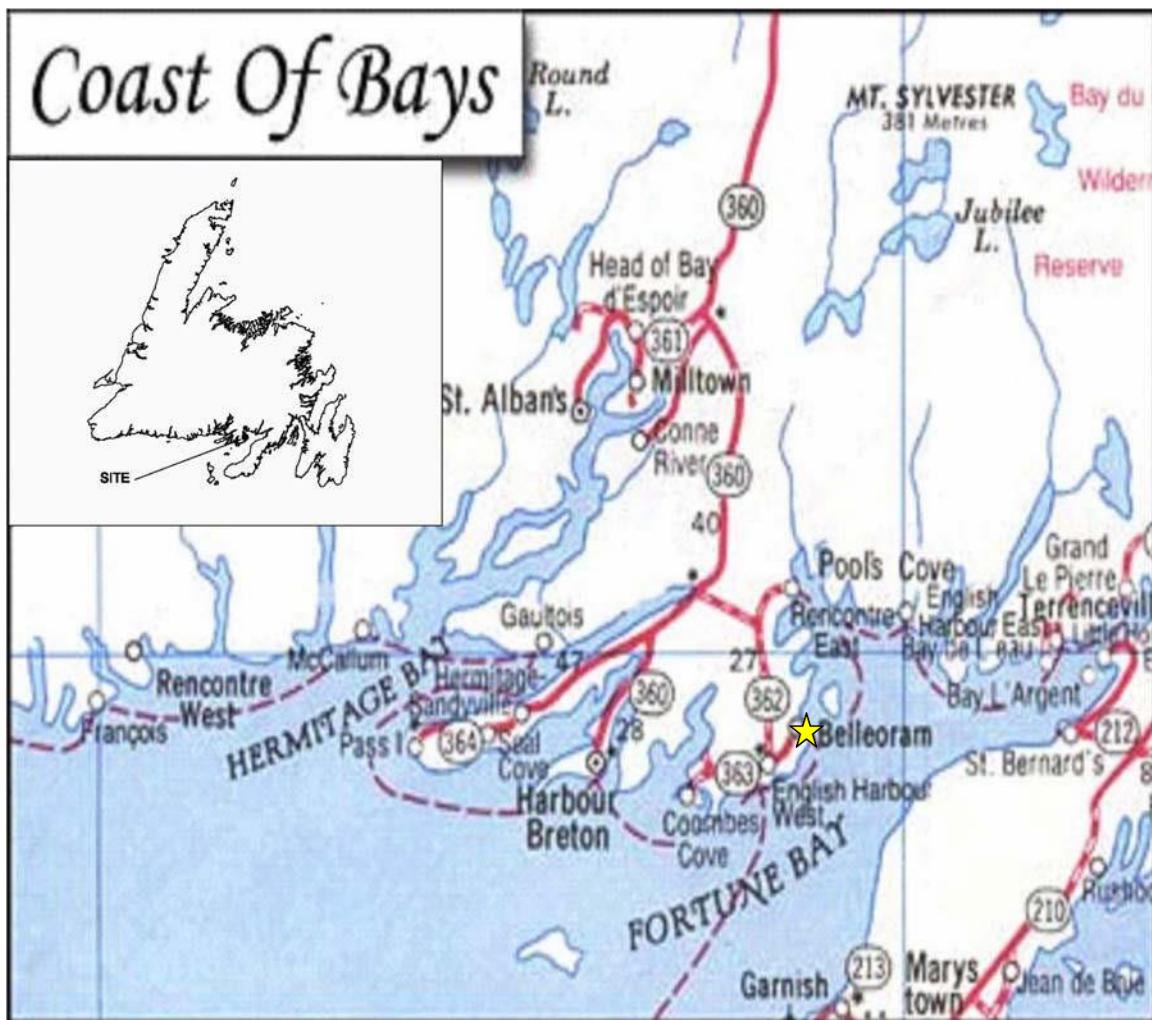


Figure 1: Belleoram, NL

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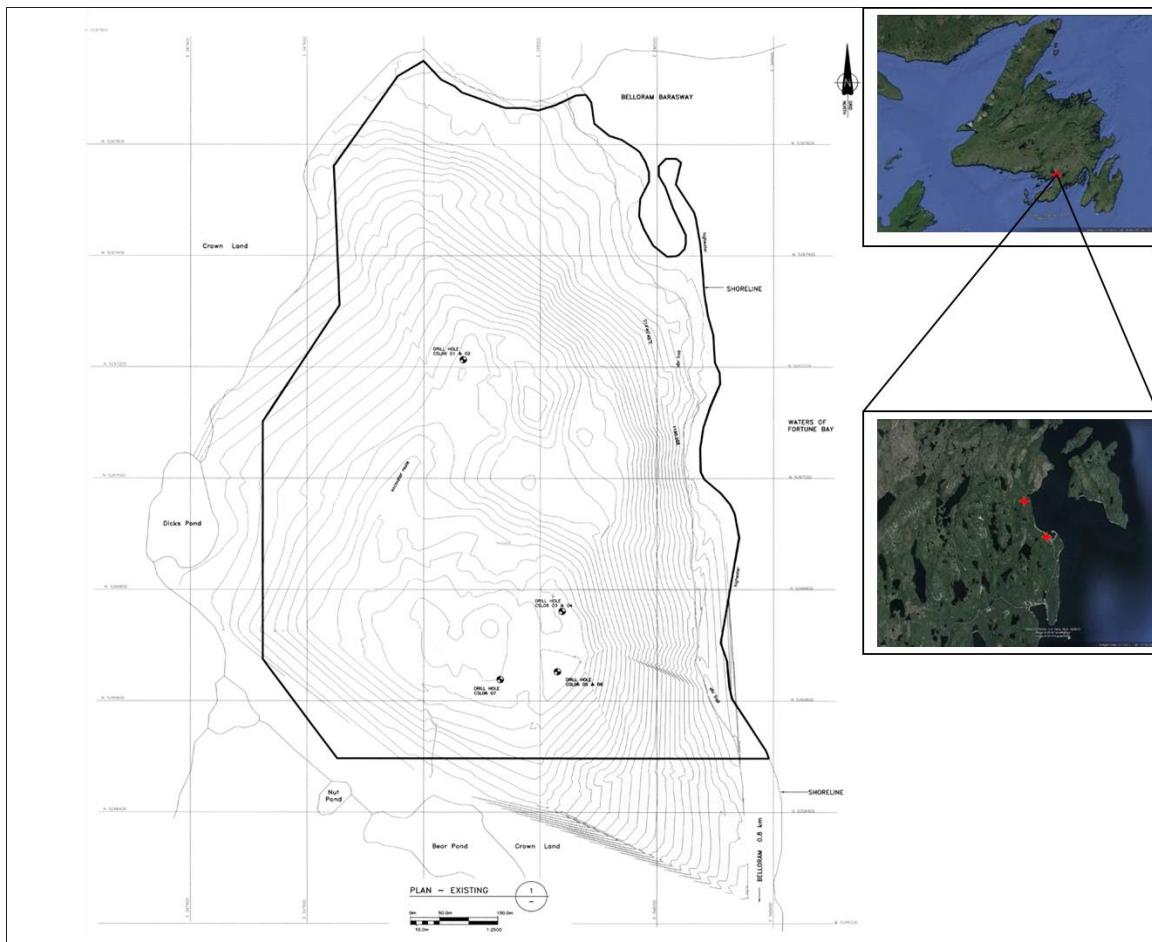


Figure 2: Location of the proposed rock quarry and the development boundary

### **3 Purpose/Rationale/Need for the Undertaking**

The purpose of the project is to gain a market share of the aggregate industry, with a view of enhancing the long-term viability of Continental Stone and the economy of the Connagre Peninsula through the creation of sustainable employment. The project is expected to bring 20 – 30 full time direct jobs with the potential for numerous indirect jobs for a project life of up to 58 years.

#### **3.1 Alternative Means of Carrying Out the Project**

Continental Stone has evaluated technically and economically feasible alternative means of carrying out the project, including different modes of transportation and alternative project locations.

In terms of transportation, consideration was given to the environmental and socio-economic implications of shipping crushed aggregate versus moving it overland. Continental Stone has determined that the use of ocean-going vessels along established and approved shipping lanes would be less intrusive to the surrounding communities and also less expensive. Furthermore, it was also determined that the use of ocean-going vessels would require less construction and maintenance of infrastructure (eg. roads and highways capable of withstanding the repeated heavy loads of trucks). Adopting the shipping mode of transportation is deemed to have the additional benefit of restricting the spatial extent of potential effects on the terrestrial environment in the project area as well as disturbance to the surrounding communities.

The Belleoram site was chosen due to its large deposit of high grade and accessible granite, a deep ice-free port, proximity to international shipping lanes, minimal tidal action and availability of suitable labour.

#### **3.2 Project Physical Features**

The primary physical features will include the quarry, a marine wharf (**Appendix 2**) and a new access road. Additional features will include a rock crusher, a conveyor system, stockpiles, etc. (see **Figure 3, Appendix 3**).

The access road will be constructed from the community to the quarry site following an established trail along the shoreline. The road will be gated for security and safety. A conveyor system will transport crushed rock from the crushers and screeners to the transport vessel.

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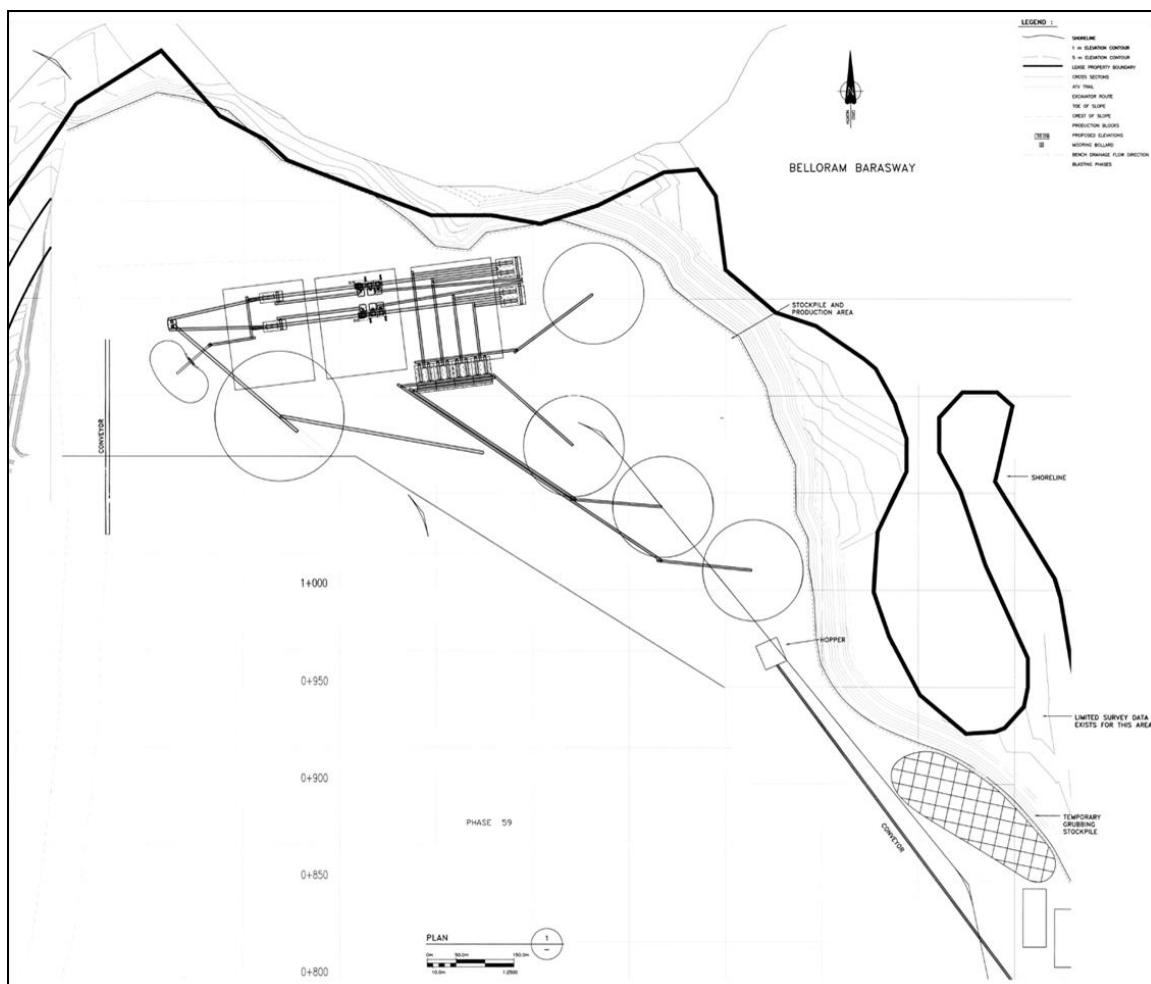


Figure 3: Approximate locations of the quarry's major features

A detailed Site Plan is provided in Appendix 3.

## 4 PROJECT LOCATION

### 4.1 Geographical Location

The site is located in the South Coast Barrens Sub-region of the Maritime Barrens Ecoregion of Newfoundland. The proposed site of the Continental Stone quarry is approximately 2kms north of the community of Belleoram, Fortune Bay Newfoundland (**Figure 4**). The town has a population of approximately 374 people (Statistics Canada 2016). Fishing is currently the main industry in the area. Representative photographs of the site are presented in **Appendix 4** including viewscape photos from the quarry and the town of Belleoram.

### 4.2 Existing Environment

The average daily temperature in the area ranges from 15.2 °C in August to -6.3°C in February. Annual precipitation is 1829 mm with January and November being the months of highest precipitation. The terrain can be described as rugged with steep to gently rolling topography. Site elevation ranges from sea level to approximately 320 metres.

#### 4.2.1 Terrestrial Environment

##### ***Vegetation***

The site is located in the South Coast Barrens Sub-region of the Maritime Barrens Ecoregion of Newfoundland. This sub-region is characterized by extensive heathland interspersed with bogs, fens and forests. Forests dominated by balsam fir and to a lesser extent black spruce occur primarily in sheltered valleys and on leeward hillsides. Typical heathland shrub species include rhododendron, common juniper, Labrador tea, sheep laurel, blueberry, crowberry, partridge berry, bunch berry and bakeapple (Protected Areas Association 2000). Herbaceous plants are less common but include aster, sedges and minor amounts of grasses. The moss and lichen layer is usually dominated by reindeer lichen with minor amounts of moss that typically includes red-stemmed feathermoss.

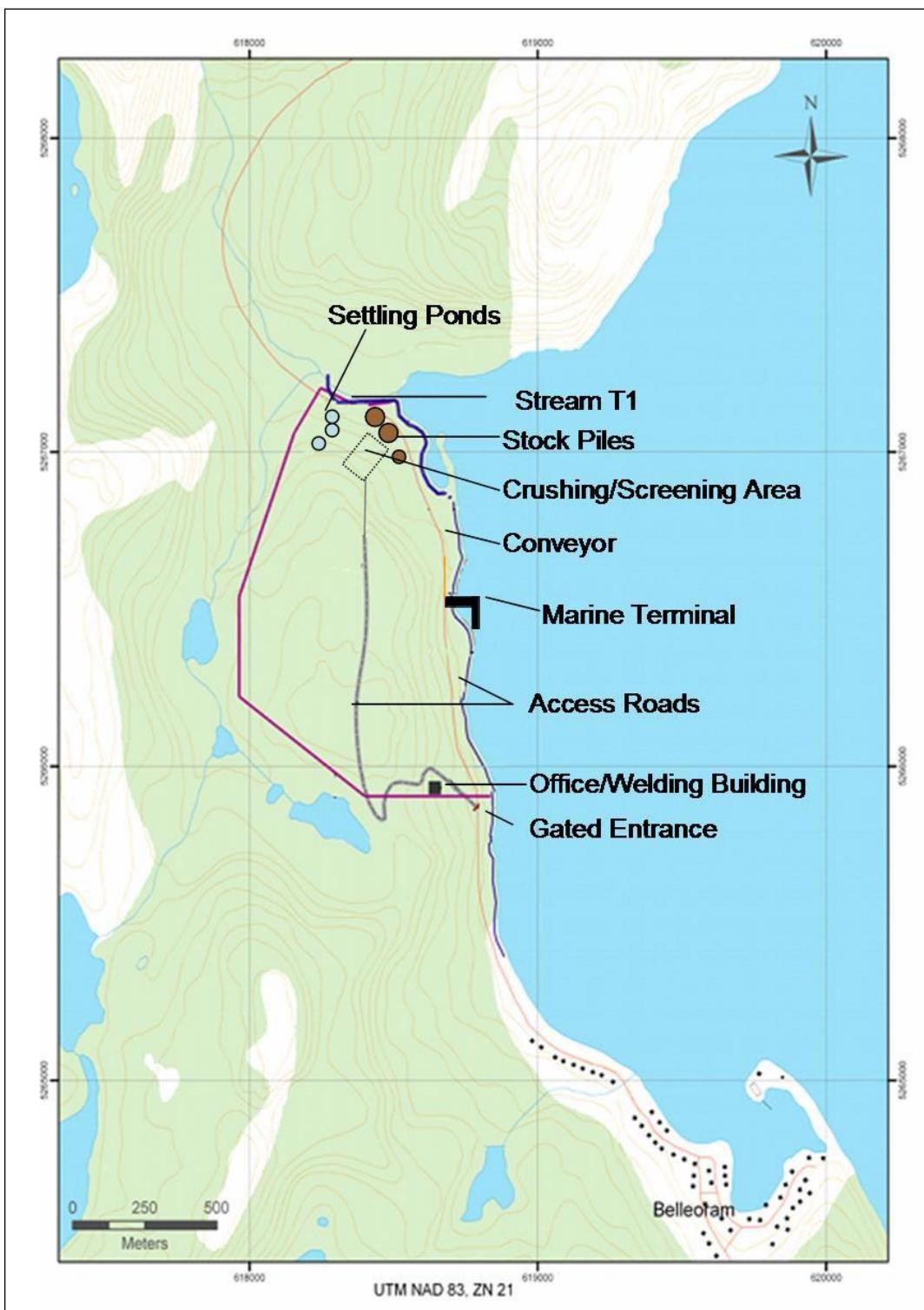


Figure 4: Project Location, Belleoram, NL.

### ***Wildlife***

Wildlife in the South Coast Barrens Sub-region includes many of the same species found throughout the rest of the island. Mammals such as caribou, moose, black bear, red fox, snowshoe hare and mink are common throughout, while red squirrel, meadow voles, and masked shrews are less abundant. Beaver and muskrat may be found around freshwater bodies. The project area falls within Moose and Black Bear Management Areas 25 and Caribou Management Area 64.

The Connaigre Peninsula in general is subject to migratory shorebirds, waterfowl and seabirds. Birds in the area are also typical of the boreal ecosystem and likely include migratory species such as osprey and bald eagle, and migrant passerines including thrushes, warblers and fly catchers. Common year-round resident birds likely include common raven, boreal chickadee, willow ptarmigan, spruce grouse, dark-eyed junco and pine grosbeak. Common waterfowl such as the Canada goose, black ducks and green-winged teal may also frequent the area.

### ***Inland Fish***

There are no freshwater bodies within the proposed development site.

#### **4.2.1 Marine Environment**

Belleoram is located on the south coast in Fortune Bay. The Fortune Bay area supports moderate lobster, scallop, and ground fish. While aquaculture sites are no longer in the Belleoram area, the region formally supported a number of aquaculture sites with the closest to the project being a distance of approximately 2 km. The physical environment in the area of the proposed wharf consists of grass, small trees and a marshy area with no previous construction. The bathymetry from the shore has a sloping drop to a depth of 15m at a distance of approximately 15m from the shore.

The proposed location of the marine terminal is within Belle Bay. Underwater benthic surveys were conducted by divers utilizing video surveillance equipment within the proposed marine terminal site on October 28th and 29th, 2006 (**Figure 5**).

The marine terminal site habitat is typical of a semi-protected marine bay ecosystem. The habitat observed throughout was consistent for the whole area surveyed. Substrates generally consisted of small/large boulders interspersed with gravel patches and small sections dominated by bedrock.

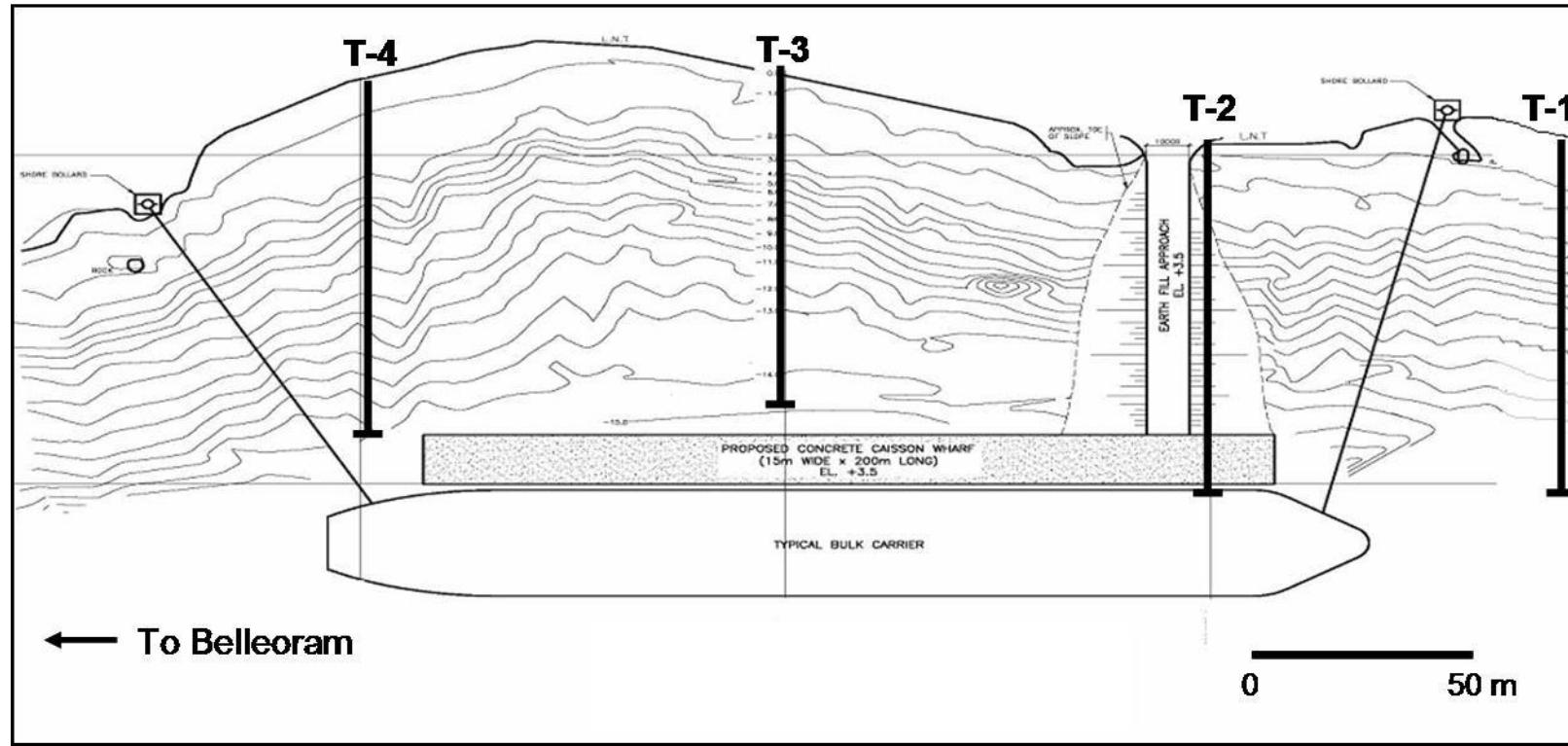


Figure 5: Marine benthic habitat survey locations at the proposed marine terminal location for the Belleoram Crushed Rock Export Quarry, Belleoram, NL

The marine terminal site macroflora consisted primarily of large beds of wave damaged and stunted kelp (*Laminaria*) beds in the deeper water (>15 m offshore) and wave damaged knotted wrack/rockweed within the nearshore. Other algal species observed included tubed weed, crustose algae, sea colander, sour weed, dulse, cord weed, kelp (*Alaria*), red fern, sea lettuce, Irish moss, and sausage weed.

The marine terminal Macrofauna was dominated by cunners that were consistently encountered from shoreline to deeper water. Periwinkle were encountered in substantial numbers on large boulders both within the nearshore and deeper water. Sea urchins were noted in moderate numbers from the shoreline to a distance of 50 m along one of the four 100 m transects conducted. Starfish were generally noted in moderate numbers from the shoreline to a distance of 50 m, although they were occasionally observed within the 90- 100 m distance upon shallow boulder clusters. Tube worms were occasionally observed in moderate to high numbers growing on kelp leaves.

Species observed infrequently within the surveyed area included blue mussel, frilled anemone, lobster (one individual), sponge (one individual), shorthorn sculpin (one individual), sea raven (one individual), white crust, leafy bryozoan (two individuals), ocean pout (one individual), cod (one individual), and scallop (one individual). Consultation with locals indicates the area for the proposed wharfing facility is not fished for lobsters. Further investigations will be completed by a marine biologist if required by the Department of Fisheries and Oceans to accommodate the Fisheries Act Authorization process.

The shipping route from the proposed loading dock to the mouth of Fortune Bay is not an area of concentrated fishing activities (pers. Comm. Stuart May and Barry Fiander 2006). Historically there has not been any conflict between commercial shipping and fishing vessels.

#### **4.2.2 Air Quality**

The region within 10 kilometres of the proposed site, and Newfoundland in general, experiences good air quality because there are few industrial sources of emissions. Climate conditions support good dispersion of air borne particles and the frequent rainfall help dilute those air particles. The air quality is also enhanced by the infusion of relatively clean, oceanic air masses from the North Atlantic Ocean. The climate is relatively wet with a winter season that typically lasts for 4 months. This snow cover results in the saturation of the surface and thus it is expected there is little background particulate matter.

## **5 CONSTRUCTION/DEVELOPMENT**

Development of the quarry is tentatively scheduled to begin in Winter 2020 and will consist of:

- Access development;
- Timber salvage;
- Stripping of overburden; and
- Building and wharf construction.

### **5.1 Access**

An access road will be constructed from the community to the quarry following an established trail along the shoreline. Construction of the access road is expected to take approximately 4 weeks. The access road will be used to transport employees and service vehicles to the site but will not be used on a regular basis for heavy equipment. A network of site roads will be constructed as needed within the quarry for safe and efficient movement of people and equipment.

### **5.2 Timber Salvage**

Merchantable timber (greater than 10 cm diameter-at-breast-height) will be salvaged by local contractors with an expected start date in Spring 2021. Timber salvage will progress across the site as the aggregate is quarried.

### **5.3 Stripping of Overburden**

Overburden will be removed to uncover bedrock during each development phase. Overburden thickness varies, with the starting pit targeting an area of minimal cover to minimize the volume to be removed and stored. Overburden will be stored in an area north of the settling ponds. The stored overburden and waste rock will be used for on future rehabilitation of the quarry site.

### **5.4 Building and Wharf Construction**

The establishment of the quarry operations will require the construction of some permanent structures. These include several crushers and screens which will be connected via an open conveyor belt system. Equipment size, type, and precise location may vary pending final project design approval.

A building will also be built at the main gate entrance to house offices, an aggregate laboratory, and maintenance operations.

Construction of the marine wharf is expected to begin in 2021 and will take a year to complete. The wharf will include the construction and placement of caissons, as well as a ship loader with a hopper and conveyors, the installation of a girder supported wharf section, and anchorage emplacement. A rock fill section will be constructed with clean armour stone from within the quarry site. These stones will be placed using dump trucks, loaders, and excavators. The exact location will be chosen pending the collection of geotechnical information at the site, as a 14m depth is required for shipping purposes. Any marine construction will require review any possible authorization under the *Fisheries Act* and this process will begin during the permitting process upon project release. No fish and fish habitat disturbance will occur without DFO authorization.

## **5.5 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.

### **5.5.1 Effluent**

Site run-off water will be directed to vegetated areas within the site, or storm water ponds/sumps, which will filter suspended solids (see **Appendix 6**). All water releases will meet the regulatory requirements of the Environmental Control (Water and Sewage) Regulations and provincial permits.

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. There will be no on-site bulk storage of fuel or oil.

### **5.5.2 Waste and Litter**

Domestic garbage will be collected from the construction site and disposed of in the Regional landfill. Any food or organic garbage onsite will be held in animal-proof containers to prevent attracting wildlife.

### **5.5.3 Air Emissions**

All equipment will have the appropriate emission-control features. Dust control measures (i.e., water application) will be applied as required for vehicle traffic on the access road. As per the conditions of the project release in 2015, an Environmental Effects Monitoring Program for Air Quality has been developed and appended to this registration (**Appendix 7**).

### **5.6 Potential Resource Conflicts during Construction**

Current resource use of the project area is likely minimal due to the rugged environment, limited access to the area and small local population. Resource conflicts, if any, during construction are likely restricted to big and small game hunting, berry harvesting and domestic wood cutting. Informal consultations with local residents indicate that wood cutting is confined to an area closer to the town of Belleoram (Robert Rose pers. comm.).

A literature review found no reference to prehistoric sites in the area. If, however, during development or operation, historic resources are encountered, work in the area of the discovery will stop and appropriate measures will be taken, including, but not limited to contacting the Provincial Archaeology Office.

## **6 OPERATION**

The operational phase will include the following operations: 1) drilling and blasting; 2) primary, secondary, and tertiary crushing; 3) dry and wet screening; 4) stockpiling; 5) reclaiming of finished products; and 6) ship loading.

A Water Use License under the *Water Resources Act* is required for the use of water from any source for any purpose; therefore, approval from the Water Resources Management Division within the Department of Municipal Affairs and Environment (DMAE), shall be obtained prior to any water use. Aggregate washwater will be obtained from Dick's Pond, or alternate source, upon approval from DMAE. The ground facilities will be maintained according environmental health and safety standards and regulations. Blasting operations will be conducted by contracted licensed blasters.

Explosives will not be manufactured or stored on site but will be ordered on a regular basis from reputable suppliers.

Quarrying operations are expected to run for approximately 40 weeks from March to December each year, having two shifts as required. The ship loading activities are expected to run year-round in order to supply contract demands. The quarry is expected to operate for approximately 60 years. As with the construction phase, the Best Management Practices (BMP) Handbook will be adhered to during the operation phase of the quarry.

## 6.1 Blasting Protocol

Blasting operations will be conducted at the Belleoram Granite Quarry in accordance with:

- *The Fisheries Act*, DFO Canada
- *The Newfoundland and Labrador Environmental Protection Act and Occupational Health and Safety Act*
- *The Explosives Act*, Natural Resources Canada
- “Guidelines for the Use of Explosives in or Near Canadian Fisheries Waters”, DFO Canada, Wright and Hopky (1998)
- Dyno Nobel Canadian Blast Site Safety Procedures.

Blasting during quarry start-up will be once per week during start-up, moving to twice per week during full production, corresponding to a weekly production of 40,000 tonnes at startup and increasing to 80,000 tonnes during the life of the quarry. All blasts will be conducted between 0700 hours and 1900 hours. It should be noted that quarry activity will be located approximately 2.5 km from the centre of town and is situated behind a hill which will serve to reduce the overall noise on the town. As per the conditions of the project release in 2015, a Communications Plan for blasting and vessel schedule has been developed and provided in **Appendix 8** of this registration. Communication will include, for example, a ‘Blast Notice Board’ at the entrance to the quarry shall be erected detailing the time and date of any proposed blast as well as a description of the blast signaling system. Communication with town representatives is also outlined within the Communication Plan (**Appendix 8**).

Continental Stone Limited will be employing the following blast parameters during production operations:

- Bench Height 12.0 m
- Hole Diameter 165 mm

- Burden 4.87 m
- Spacing 4.87 m
- Subdrill 1.52 m
- Collar 3.04 m

Each bore hole will be loaded with 290 kilograms of Dyno Gold 70-30 Bulk Emulsion Blend explosive pumped into the bore hole using bulk explosives delivery systems. The bore holes will be double primed using 350-gram cast boosters used in conjunction with Nonel EZ detonators having a 25 millisecond surface delay and a 500 millisecond in-hole delay interval. The Nonel EZ detonators are to be used with Nonel EZ Trunkline Delays in such a fashion that each bore hole in the blast is fired independently and with a minimum of an 8 milliseconds of delay interval. The collar of each blast hole will be filled with 20 mm clean crushed stone to contain the gasses within the bore hole and reduce unwanted air overpressure. Drilling will be conducted using Down The Hole (DTH) drills equipped with a vacuum dust collections system or a water injection dust suppression mechanism.

## **6.2 Potential Sources of Pollution During Operation**

The potential sources of pollution during the operations phase may include pollution from blasting operations (ANFO), dust, site run-off, accidental fuel spills/releases, sewage, waste and litter, and air emissions.

### **6.2.1 ANFO (Ammonium Nitrate/Fuel Oil)**

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/chemical-degradation of ammonia. Water quality monitoring will be employed to ensure any runoff to the marine environment complies with applicable regulations (i.e. Environmental Control Water and Sewage Regulations, 2003).

### **6.2.2 Dust**

Dust may be generated during blasting operations. To mitigate this, bore hole collars will be filled with 20 mm clean crushed stone to help suppress dust and gases during blasting. Should dust become a problem, water trucks will be used to moisten surfaces and keep dust down.

### **6.2.3 Site Runoff**

As per the conditions of the Project release in 2015, a Site Drainage and Site Control Plan has been developed to assist in appropriate management of site runoff (**Appendix 6**). If the aggregate requires washing, industry approved settling ponds will be constructed that will screen out the silt and other suspended solids. This treated water will be recycled back into the aggregate cleaning process. All water releases will meet the regulatory requirements of the Environmental Control Water and Sewage Regulations, 2003 and provincial permits.

Site runoff will be directed to vegetated areas within the project boundaries, which will filter any potential suspended solids. Sedimentation ponds will be installed as required (see **Appendix 6**).

With respect to drinking water, it is noted that the town of Belleoram does not utilize the watershed near the project for potable water.

### **6.2.4 Accidental Fuel Spills and Hydrocarbon Fuel Storage**

There will be no on-site bulk storage of fuel or oil and all fuel handling is to comply with the Storage and Handling of Gasoline and Associated Products Regulations. Any waste oil generated will be handled, stored and disposed of by a licensed disposal agent in accordance with the Used oil Regulations. As part of the Project Environmental Protection Plan (EPP), machinery will be checked for leakage of lubricants or fuel and will be in good working order. Refueling will be done at least 30 m from any water body. An adequate supply of hydrocarbon spill clean-up equipment will be on-site at all times. All spills or leaks will be promptly contained, cleaned up, and reported to site environmental representatives for reporting to the 24-hour environmental emergencies report system (1-800-563-9089) as required.

### **6.2.5 Sewage**

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 waters disposed of on the proposed site will comply with the Environmental Control Water and Sewer Regulations, 2003.

### **6.2.6 Waste and Litter**

During operation, domestic garbage will be collected and hauled to the Regional waste facility in accordance with the Waste Management Regulations, under the *Environmental Protection Act*. Any food or organic garbage onsite will be held in animal-proof containers to prevent attracting

bear, fox, birds, or other wildlife.

#### **6.2.7 Air Emissions**

All activities will be carried out in accordance with the Air Pollution Control Regulations (2004). Construction equipment must be fitted with standard and well-maintained emission control and noise suppression devices. Dust control measures will be applied as appropriate and as described in the BMP Handbook and the Project EPP. Monitoring of air emissions will be completed in accordance with the Environmental Effects Monitoring Program for Air Quality (see **Appendix 7**).

### **6.3 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. It has been noted that local residents occasionally use the area for hiking (by means of a small foot path that will be developed into a larger access road along the shoreline), hunting, and lumber harvesting. However, this represents a very small minority of the local population, with the area being very rugged and not ideal for game hunting or fishing. Lumber harvesting activities occur only on the outskirts of the project's boundaries. Access to the site will be restricted by means of a gated entry to ensure the safety of the general public, therefore restricting general usage of the area.

Interactions with respect to fisheries and shipping are discussed in detail in later sections and therefore will not be outlined here.

## **7 DECOMMISSIONING/REHABILITATION**

All decommissioning and rehabilitation will be completed as per the Quarry Development and Reclamation Plan, March 2008 (**Appendix 1**).

## **8 OCCUPATIONS**

Contractors will be retained during the Development stage of the quarry (i.e. for blasting operations, materials shipping, etc.). Site construction and operations for the proposed quarry will likely include the following occupations, classified as per National Occupational Classification, 2006, and equipment. All listed personnel are anticipated to be direct hires, if available.

### Construction Phase

2	Health, Safety and Environment Advisor (2263)
2	Security Attendant (6541)
2	Site Foreman/Supervisor (7217)
6	Heavy Equipment Operators (7421)
1	Welder (7237)
10	Carpenters (7271)
8	Silviculture and Forestry Workers (8422)
4	Truck Drivers (7411)
4	Heavy Equipment Mechanics (7312)
<u>4</u>	<u>Labourer (7611)</u>
43	Total

### Operations

2	General Manager (0016)
2	Health, Safety and Environment Advisor (2263)
2	Security Attendant (6541)
2	Site Foreman/Supervisor (7217)
18	Heavy Equipment Operators (7421) – Loader, excavator, fork lift, crusher equipment
12	Truck Drivers (7411)
7	Heavy Equipment Mechanic (7312)
<u>12</u>	<u>Labourer (7611)</u>
57	Total

Continental Stone is committed to equity in employment and will encourage all qualified individuals to apply for employment.

## **9 ENVIRONMENTAL EVALUATION**

This section provides an overview of the evaluation of the potential adverse environmental effects of the project, as identified in the Environmental Preview Report (EPR) guidelines issued in 2007. Specifically, the guidelines identified the marine environment, and in particular the former (and possibly future) aquaculture sites in the area, as the Valuable Ecosystem Components (VEC) in need of additional assessment. As of September 2015, all aquaculture site in the Belleoram area were fallowed and therefore no existing interaction currently exists. However, given that aquaculture operations could be possible in the future at these sites, the evaluation has been completed. The following sections reiterate findings from the original 2007 EPR, with updates to reflect current conditions where required.

## **9.1 Evaluation Procedure**

Evaluation of the potential effects of each phase of the undertaking involved a three-step process:

- Identification of project and environment interactions (i.e. issue scoping);
- Identification and evaluation of potential effects; and
- Identification and description of mitigation measures, identification of residual effects and determination of significance.

### **9.1.1 Identification of Project and Environment Interactions**

The following project features are identified as potentially adversely affecting the marine environment, and in particular potential aquaculture sites in the area (including those that are proposed/approved):

- Potential effects of vibrational and acoustic shock from blasting;
- Potential effects of shipping;
- Potential effects of dust fines;
- Potential effects of sedimentation; and
- Potential effects of explosive chemicals.

### **9.1.2 Identification and Evaluation of Potential Effects**

The 2007 EPR provided additional information on the identified interactions and described their potential effects in terms of whether they are positive/negative, short/long term and direct/indirect. Effects predictions were explicitly stated and the theory or rationale upon which they are based was also presented. The results are summarized herein.

### **9.1.3 Description of Mitigation Measures and Residual Impacts**

Residual effects analysis is conducted following the consideration of standard mitigation measures incorporated into the design of the project, as well as other mitigations to be implemented as per federal and provincial agencies through permit conditions or as protection procedures. All applicable mitigation procedures are described in the following sections. Residual

effects, those which remain after mitigative measures have been implemented, are defined in terms of significance, nature, magnitude, spatial extent, probability, duration, and frequency. Irreversible impacts have been clearly identified. In this manner, the residual environmental effects of the undertaking can be determined.

## 9.2 Definitions

The definitions outlined in this section have been applied to all effects predictions in this section unless otherwise noted. For any such exceptions, applicable definitions are presented within the text of that section.

### 9.2.1 Residual Impact Significance Criteria

The terminology used to describe a residual effect should be clear, objective, and easily understood. This section provides criteria for evaluating the significance of residual environmental effects (negative or positive). Precise definitions for the ranking of residual impacts on populations (or in this case, possible caged aquaculture sites), where applicable, were used in the 2007 EPR, and reiterated herein, as follows:

**A Major (significant)** residual environmental effect is one affecting a whole stock or population of a VEC in an area in such a way as to cause a change in abundance and/or change in distribution beyond which natural recruitment (reproduction and immigration from unaffected areas) would not return that population, or any populations or species dependent upon it, to its former level within several generations. In this instance where aquaculture facilities are also considered a VEC, a major (significant) residual affect is one affecting a whole size class of penned fish in such a way as to cause a change in abundance beyond typical industry expected mortality and morbidity rates.

**A Moderate (significant)** residual environmental effect is one affecting a portion of a population in an area that results in a change in abundance and/or distribution over one or more generations of that portion of the population, or any populations or species dependent upon it, but does not change the integrity of any population as a whole; it may be localized. A change in habitat (including food sources) that produces the same result in populations would be moderate. In this instance where aquaculture facilities are also being considered a VEC, a moderate (significant) residual affect is one affecting a portion of a size class of penned fish in such a way as to cause a change in abundance beyond typical industry expected mortality and morbidity rates.

A **Minor (not significant)** residual environmental effect is one affecting the population or a specific group of individuals in a localized area and/or over short period (one generation or less) but not affecting other trophic levels or the integrity of the population itself. In this instance where aquaculture facilities are also considered a VEC, a minor (not significant) residual effect is one affecting the behavior of a portion of a size class of penned fish, but not causing any change in abundance beyond typical industry expected mortality and morbidity rates.

A **Negligible (not significant)** residual environmental effect is one affecting the population or a specific group of individuals in a localized area and/or over short period in such a way as to be similar in effect to small random changes in the population due to natural irregularities, but having no measurable environmental effect on the population as a whole. In this instance where aquaculture facilities are considered a VEC, a negligible (not significant) residual effect is one affecting the behavior of a portion of a size class of penned fish for short periods of time. A negligible residual effect would have no measurable effect on the penned group of fish and not cause any change in abundance beyond typical industry expected mortality and morbidity rates.

### **9.3 Vibrational and Acoustic Shock from Blasting**

#### **9.3.1 Project and Environment Interaction**

Detonation of explosives during quarrying operations will produce vibrational and acoustic noise in the surrounding environment. The extent to which these factors can cause negative impacts is directly related to the distance from the blast, the magnitude of the blast, and the sensitivity of the organism to vibrations or sound (NRC 2003).

Fish react to sound and vibrations in the water, although there is relatively little knowledge on how they make use of acoustic information. Some species of fish use it for communication and courtship (Popper & Fay 1993; Fay & Popper 2000; Popper et al. 2003), aggression (Hawkins and Rasmussen 1978; Hawkins 1993) and some fish may even use sound as a primitive form of echo location (Tavolga 1971). With respect to how fish receive and can be affected by sounds or vibrations, there are two main variables of interest; 1) shock pressure, represented and measured in Peak Particle Velocity (PPV), and 2) compressional seismic waves, measured as a pressure force (kPa). These phenomena can lead to disturbance or damage to fish by affecting their sensory organs (Hawkins and Johnstone 1978; Whalberg and Westerberg 2005). Sound/vibrations are perceived in two ways; 1) through the lateral line or 2) through the buoyancy-regulating air-filled sac, known as the swim bladder. The lateral line system consists of sensory

cells called neuromasts located in fluid-filled canals on the side of the fish. These cells do not measure acoustic waves directly, but they detect local low frequency (below 150 Hz) water flow relative to the fish (Sand 1984; Enger et al. 1989). Thus, they detect an acoustic field very close to the source and are susceptible to mechanical damage from intense pressures (McCauley et al. 2003). The swim bladder is an air-filled sac that is also sensitive to sound/pressure waves depending on how much air it contains; with a greater volume of air making it more sensitive to sound waves. If a fish receives sound pressures above a threshold value (varies depending on species, environmental conditions, wave parameters, etc.), the swim bladder can rupture (along with other organs) causing decreased fitness, disease resistance, growth rate or even death

(McCauley et al. 2003; Whalberg and Westerberg 2005). Potentially farmed species near the proposed Project would include Atlantic salmon and northern cod. Both lateral line systems and swim bladders and therefore excessive noise and vibration has the potential to impact them.

Past studies of the effects of high intensity sound waves on fish have been conducted with varying results. Fish exposed to short pulses of high intensity sounds in the range of 170-180 dB showed both transitory effects as well as damage to fish sensory cells. A brief alarm response was noted in Chapman and Hawkins (1969), Schwartz and Greer (1984), and Pearson et al. (1992) with no detected effect on fish health. McCauley et al. (2003) was not able to identify what level of sound was required to cause damage to fish, however the report does state that repeated sound levels of 180 dB from 500 m away did in fact damage fish sensory cells. It should be noted that 180dB from 500m away is a very intense sound pulse and would be considered extreme (eg. a jet engine typically generates 140dB).

### **9.3.2 Mitigation Measures**

Continental Stone recognizes the potential sensitivity of farmed fish and has incorporated this into their designed blasting regime and operational procedures to minimize negative effects while maximizing safety and efficiency. The following standard mitigation measures will be implemented:

- Utilization of the guidelines set out by Wright and Hopky's Technical Report for the use of explosive near Canadian fisheries waters (1998);
- Utilization of the Dyno Nobel North America "Canadian Blast Site Safety Manual" guidelines to ensure for safe, environmentally conscious, blasting procedures;
- No blasting underwater or within a waterbody;

- Use of explosives in compliance with all applicable laws and regulations;
- Restricting explosives handling and detonation to persons properly trained and qualified to use them in accordance with the manufacturer's instructions and government laws and regulations;
- Obtaining Blasters Certificates and a Temporary Magazine License (from Natural Resources Canada) prior to drilling and blasting to ensure that the proper procedures are known and followed; and
- Making a blasting plan available to the local interest committee.

While the above standard mitigation measures will be incorporated into the Project's Environmental Protection Plan (EPP), further design of the blasting program is outlined below.

Blast patterns and procedures will be implemented and incorporated in all final blast designs to minimize shock or instantaneous peak noise levels to ensure that the magnitude of explosions is limited to only what is necessary. Briefly, design considerations include:

- plugging the 12 m bore holes with a 3 m collar of 20 mm, clean, crushed stone to trap gases and dust during blasting;
- optimizing drill hole patterns;
- using explosives in a manner that will minimize scatter of blasted material beyond the limits of the activity; employing the proper working on time-delayed blasting cycles (500 millisecond in-hole delay and a 25 millisecond surface delay); and
- using reliable material such as Nonel EZ Dets, or similar blast initiation system, which allow accurate firing of the explosives.

While the above steps will be taken to reduce vibrations resulting from blasting, it will be impossible to eliminate all unwanted seismic noise from the operation. Therefore, the blast design will be such that interaction with the identified VEC will be minimized to the extent possible. In that regard, this subsection provides estimates of the likelihood that cage-reared Atlantic salmon in Fortune Bay will be affected by the vibrational or acoustic effects as a result of the proposed blast design.

### ***Peak Particle Velocity***

DFO guidelines state that: "no explosive is to be detonated that produces, or is likely to produce

a PPV greater than 13mm/second in a spawning bed during the period of egg incubation" (Wright and Hopky 1998). An estimate of PPV can be calculated using the following equation (Oriard 2002):

$$\text{PPV} = 150(\text{SD}/\text{W}^{0.5})^{-1.6}$$

Where:

- PPV: inches per second
- SD: distance from the blast in feet
- W: weight in pounds per delay

By altering the blast configuration and estimated weight of each charge for the proposed Project (294kg), the PPV experienced by any nearby aquaculture facilities can be estimated. The current blast design produces the following predicted PPV at various distances:

- 50 m 187mm/sec
- 200 m 20 mm/sec
- 300m 13.0 mm/sec
- 500 m 4.87 mm/sec
- 1500 m 0.75 mm/sec
- 2000 m 0.37 mm/sec

By observing this DFO guideline, blasting would need to be approximately 300 m from any area of fish egg incubation. As shown, the particle velocity values for distances between the proposed quarry and the former aquaculture facilities (estimated conservatively at 2500m; **Figure 6**) are not likely detectable using currently available blast monitoring seismographs (Pers. Com., Keith Phelan: Hard Rock Newfoundland, 2006). Further, since spawning is a fish's most sensitive life stage, these values would be considered more conservative for adult rearing operations. In addition, the PPV value at 2000 m is over seventeen times less than that required for egg incubation.

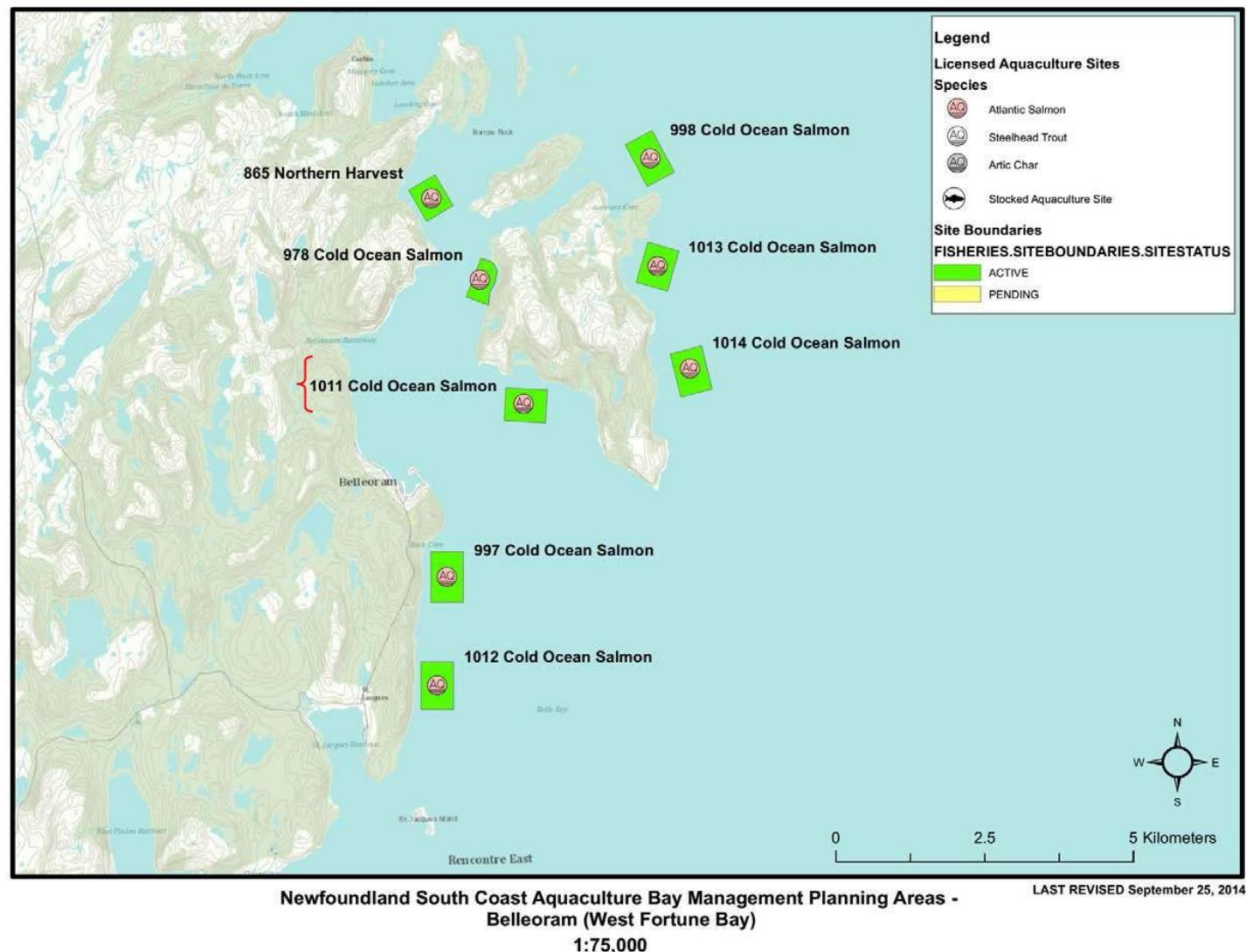


Figure 6: Locations of former local fish farms in relation to proposed activities (all fallow as of September 2014).

### ***Compressional Seismic Waves***

DFO guidelines further state that: “no explosive is to be detonated in or near fish habitat that produces, or is likely to produce, an instantaneous pressure change greater than 100kPa (14.5 psi) in the swim bladder of the fish” (Wright and Hopky 1998). To calculate the minimum distance that an onshore blast could occur from fish habitat, the following equation can be used:

$$SD = 5.03(W)^{0.5}$$

Where:

- SD: distance from the blast in meters
- W: charge weight per delay (pers. com., Keith Phelan, Hard Rock Newfoundland, 2006).

Using this formula and based on the predetermined charge weight of 294 kg, the estimated distance that a blast must be from fish habitat is estimated at 86 meters.

### ***Propagation of Sound from Air to Water***

Although sound may propagate in air over several kilometers as a result of blast detonations, its effect relative to submerged marine fishes is considered to be minimal. This statement is supported by Rayles Equation which describes the reflective abilities as sound passes from one medium to another. Salt water is a far more dense substance than air (1,027 kg/m<sup>3</sup> and 1.2 kg/m<sup>3</sup>, respectively). Using the Rayles Equation, the following results are obtained.

$$R = z_2 - z_1 / z_2 + z_1$$

Where:

- $z_1$  (acoustic impedance of air) = density (1.2 kg/m<sup>3</sup>) x the speed of sound in air (343 m/s)  
= 411.6
- $z_2$  (acoustic impedance of salt water) = density (1027 kg/m<sup>3</sup>) x the speed of sound in salt water (1500 m/s) = 1540500

Solving for R, we get a value of 0.99. An R-value of <1 indicates a rigid boundary where most of the sound energy will be reflected off the surface with little transmission. Due to the distance between the aquaculture sites and the proposed quarry operation, the sound pressure in air would not likely be enough to penetrate the water's surface.

### ***Additional Blast Monitoring Commitment***

Since real-world data has not been obtained to support the above calculations, additional monitoring is being considered within Fortune Bay. During the initial stages of blasting, sound/vibration measuring equipment (i.e. hydrophones) will be deployed to measure the effects at various points within Fortune Bay to validate the above calculations/predictions.

#### **9.3.3 Residual Impact**

Blasting will occur at the proposed quarry to allow efficient processing of granite aggregate. At normal production, blasting, and any associated residual impact on the VEC, will happen at a maximum of 1-2 times per week. As the above calculations demonstrate, the probability that fish will be exposed to levels of sound/vibration intense enough to cause damage or any reaction outside mild, transitory, avoidance behavior, are highly remote. Due to the physical distance between the former aquaculture locations and the proposed quarry, the mitigations outlined above and the design of the proposed blast operations, it was determined the impact will be Minor (not significant) for any locations that re-open.

### **9.4 Shipping**

#### **9.4.1 Project and Environment Interaction**

The economic transport of crushed granite aggregate from the proposed quarry site to market will be via marine bulk carriers. With an anticipated aggregate production level between 40,000 and 80,000 tonnes weekly, carriers will be required to enter Fortune Bay and dock at the proposed marine terminal on an estimated weekly basis and will have an anticipated 60,000 tonne capacity. Due to their large size and the need for these vessels to turn one hundred and eighty degrees once they reach the dock for loading, speeds within Fortune Bay are anticipated to be less than two knots. Potential interactions between the bulk carriers and former aquaculture sites in the area that may re-open are related to sounds/vibrational disturbance, wake, water quality and the possible amplification of the risks involved with superchill events.

Shipping activities will be contracted out to a third party, who will be responsible for the vessels and shipping, as well as its operation and maintenance. All ships will be double-hulled and will be required to adhere to all Communication Plans (**Appendix 8**), Environmental Protection Plans (EPP) (**Appendix 9**) and Contingency Plans (**Appendix 10**) committed and implemented by Continental Stone Limited. All ships will also adhere to, and be responsible for, all environmental

compliance, permits and certificates, and meet all regulatory standards pursuant to the *Canadian Shipping Act*. It should be noted that no “tanker” traffic will occur as part of the Project and that there will be no bulk oil/fuel transport, no oil/fuel refueling of ships and no bilge water discharge at the Project site.

Studies on the potential effect of vessel noise on caged fish have been conducted. When simulated vessel noise was played back to caged schools of cod and herring (species that are more sensitive to sound than salmon), a moderate avoidance reaction was observed at sound levels of 120 to 130 dB (Engås et al. 1995). No alarm responses were observed, suggesting that even if the fish does perceive a ship's sound, there is little adverse reaction.

#### **9.4.2 Mitigation Measures**

While shipping by bulk carrier was determined to be the most economic method of transporting the material to market, the potential interaction between this option and the marine environment, particularly any possible local aquaculture operations that may re-open, has been recognized. Standard mitigations with respect to vessel traffic have been outlined below and will also be included in Continental Stone's Communications, EPP and Contingency Plans.

Mitigations to reduce any potential effects include:

- All bulk carriers will be required to travel within a predetermined pathway that will allow for both adequate passage into the bay as well as maximizing the distance any ship will be from a potential farm location at any one time. As can be seen on **Figure 7**, the green lines indicate the path that is a maximum possible distance from former aquaculture locations (Cold Ocean Salmon Inc., approximately 620 m at the nearest point);
- All bulk carrier speeds will be such that they do not create an excessive wake or vibrations at the farm sites;
- All bulk carriers will turn off engines (except for any generators required for power) when ships are docked at the marine terminal for loading to minimize exposure to mechanical noise;
- All bulk carriers will carry oil spill clean-up equipment (eg. absorbents, inflatable dykes) with trained crew members in spill prevention and clean up techniques;
- No bulk carrier will be refueled at the marine terminal;

- No dumping of bilge or ballast water outside the allowable restrictions of the *Canadian Shipping Act* (i.e., not within the Fortune Bay area); and
- All bulk carriers will be double hulled.

#### **9.4.3 Residual Impact**

Shipping will occur approximately once per week using a 60,000 tonne bulk carrier inside a designated shipping corridor. This corridor is located ~ 620 m away from the nearest fallowed aquaculture site. Due to the slow movement of the vessels, low frequency of visits relative to other traffic (i.e. boats associated with the operation of the aquaculture facilities and local fishermen), the probability is very low that fish will be exposed to any of the following:

- levels of sound/vibration intense enough to cause damage or any reaction outside a mild, transitory, avoidance behavior;
- wake action to cause any damage to fish or facilities;
- degraded water quality due to fuel spills or bilge water discharge.

Due to the physical distance between the aquaculture facilities and the proposed bulk carrier travel corridor and the mitigations outlined above, it is determined that shipping will have a Negligible (not significant) impact on any wild or farmed fish within Fortune Bay.

It should be noted that superchill and the potential interaction with the Project are addressed in the section below.

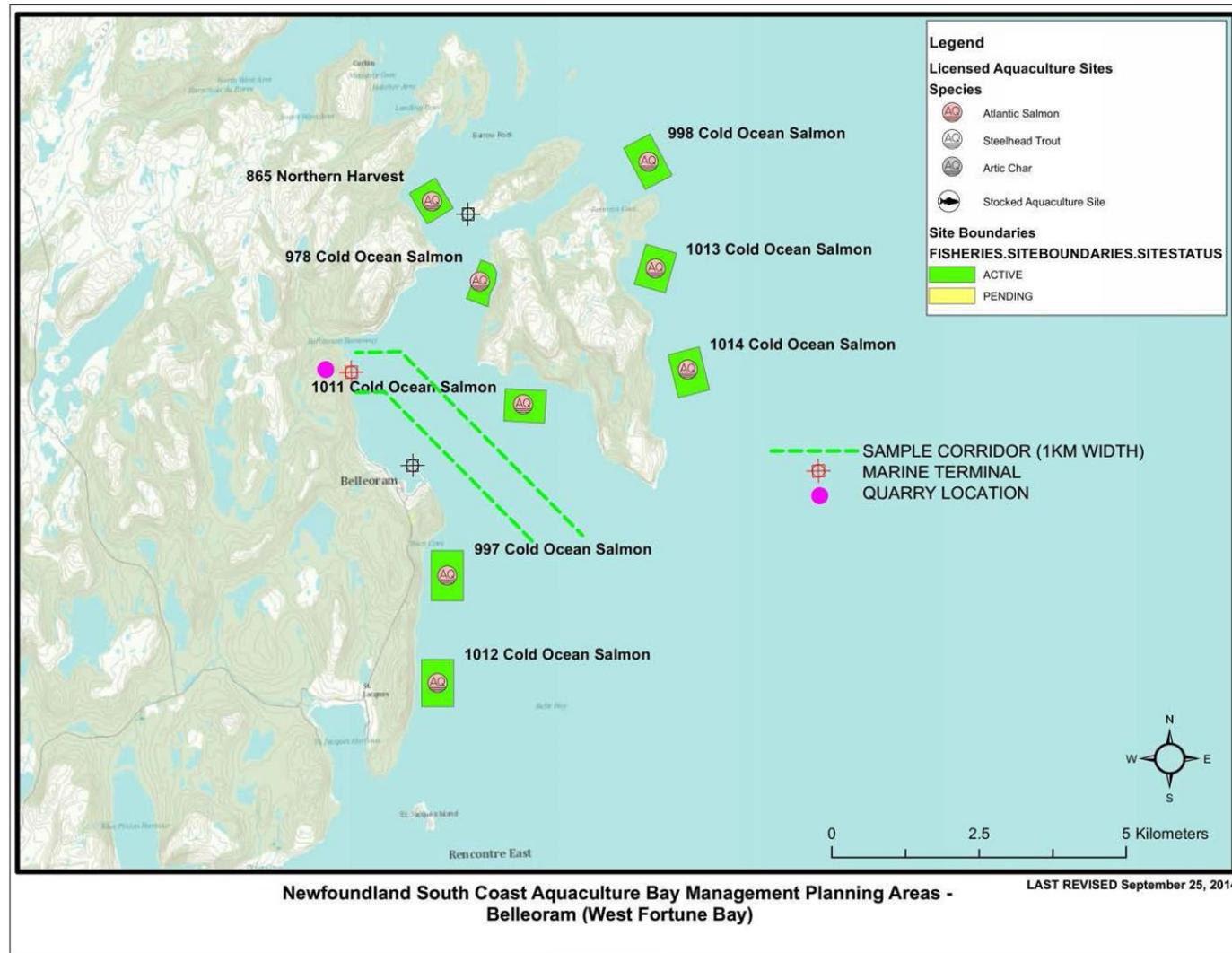


Figure 7: Proposed bulk carrier shipping route into the Fortune Bay area in relation to fallowed local fish farms.

## 9.5 Superchill

### 9.5.1 Project and Environment Interaction

Superchilling occurs when the ambient water temperature reaches -0.7° C, or lower (Hew et al. 1991). This temperature is usually only attained in the top few meters of the water column when there is no ice formation and generally when it is windy, lasting anywhere from a few hours to a couple of days (Jeff Perry, personal communication). Such an environment is lethal to most teleost fish, such as commercially important salmonids (Fletcher et al. 2004). At the superchill point, if these fish come into contact with an ice crystal, its tissues can freeze solid (a process known as nucleation) causing instantaneous death or, in some cases, sublethal destruction of their gills which permanently impairs their function (Hew et al., 1991). Therefore, aquaculture operations are physically restricted to a relatively small area in the most southerly part of the region where the waters freeze infrequently (Hew et al. 1995; Aiken 1986). Although these events are rare, they have the potential to cause serious financial damage to an active aquaculture operation. During the winter of 2003, losses were estimated at CAN\$12 million (Raynor and Campbell 2003) due to superchill.

**Table 1** shows historic average sea surface temperature data (2019-2020) for the Fortune Bay Smart Buoy (47° 15.6514, 55°029.9072 W). The monitoring buoy is further offshore from the nearshore cages but shows that subzero temperatures have been possible in the past. However, the waters within Fortune Bay had not been observed at a temperature less than 0.7°C often (Cooke Aquaculture, personal communication, 2006). The moderating effects of onshore prevailing winds, allows Fortune Bay to stay mostly ice free, making the chances of a superchill event very rare.

Under normal aquaculture operations, fish will naturally avoid superchill by remaining on the bottom of the cages where it is slightly warmer and less turbulent than at the immediate surface. If, however, they move into the upper superchill layer, damage can occur. Aquaculture operations typically monitor water temperatures near cages and will have Contingency Plans for when temperatures reach near superchill. Measures can include vessel movement around cages and restricted feeding, as these may bring fish to the surface and potentially expose them to superchilled water. With this in mind, both blasting and bulk carrier traffic have the potential to interact with aquaculture operations by causing a behavioral avoidance reaction which may bring them to the surface into superchill.

Table 1: Average sea surface temperatures for 2019-2020 for the Fortune Bay Buoy Station.

Year	Sea Surface Temperature (°C)											
	2019						2020					
Month	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Average	13.9	17.4	11.6	9.2	6.8	4.4	1.7	0.6	0.4	1.4	3.1	10.0
Standard Deviation	1.4	0.6	0.9	0.4	1.3	0.7	0.6	0.3	0.1	0.5	1.1	2.7
Minimum	11.0	15.0	9.8	8.6	4.4	1.2	0.9	-0.2	0.3	0.5	1.5	4.9
Maximum	17.7	19.2	13.6	10.3	8.8	5.4	2.6	1.2	0.9	2.7	6.3	16.6

### 9.5.2 Mitigation Measures

Despite the remote chance of superchill in Fortune Bay and the limited number of aquaculture sites in the Belleoram area, the following mitigations are included: communication and scheduling (**Appendix 8** refers to additional details). These mitigations will be on-going, and increased diligence if it is suspected that a superchill event may occur while active aquaculture sites are occurring (due to observed weather and ice conditions) will ensure these mitigations are effective.

The single-most important mitigation to eliminate possible superchill effects from shipping is no winter shipping from January to March (see **Appendix 8**). As stated in previous sections, both blasting and shipping will occur on a weekly basis, therefore any superchill event lasting hours or a couple of days may be avoided to suit the needs of the local residents and business owners.

### 9.5.3 Residual Impact

As noted above, superchill would be considered an extremely rare event in Fortune Bay and mitigations such as scheduling and communication can reduce any interaction between the Project and any active aquaculture operations during such events. Due to the physical distance between the aquaculture facilities, the extreme low frequency of superchill, and the mitigations outlined above, it is determined that blasting and shipping will have a Negligible (not significant) impact on any wild or farmed fish within Fortune Bay.

## 9.6 Dust Fines

### 9.6.1 Project and Environment Interaction

Dust fines can become airborne as a result of a blasting event or from the operation of equipment and vehicles during quarrying operations (i.e. crushing, screening, and conveying the aggregate

granite). The potential effects dust may have on the marine environment include increased siltation, decreased water clarity and visibility, and the disruption of fish gill function (in extremely high dust quantities).

Dust emissions during the construction of the marine terminal are expected to be minimal. Infilling will utilize clean granite fill from the quarry itself, containing less than 5% fines with a low potential to release dust before being put in place. Once in place, fill will be underwater with no dusting potential. Silt curtains will serve to contain and collect any fines released so as to not increase suspended solids in the marine environment. This will also prevent fines from washing ashore, where they can dry and subsequently become airborne.

Dusting as a result of vehicles accessing the marine terminal will be largely confined to the construction stage, with large trucks transporting equipment and materials to the site. Once construction is complete, it is anticipated that only small service vehicles will be used at the terminal site. Further, the proximity of the work site to the ocean, and fact that the area consists mainly of exposed granite bedrock, makes the potential for dry, dusty, conditions to be low. However, any areas with a high dust potential will be sprayed with water to decrease the chance of particles becoming airborne.

The decision to use a marine terminal and bulk aggregate carriers, instead of dump trucks, to transport the aggregate also greatly decreases the Project's potential for dust emissions. Bulk aggregate carriers will be loaded approximately every 5-7 days via a shiploader fed by a covered conveyor belt. This allows for a single point source of dust, instead of the large number of trucks that would be required to transport the same amount of product overland. Further, the shiploader will be fitted with a luffable spout fitted with dust skirts (see **Figure 8**). Essentially, this is a rubber tube through which the aggregate will flow into the ship, allowing it to be placed as low in the ship's hold as possible. This serves to greatly reduce dust emissions from the aggregate by avoiding dropping it from a significant height, keeping the product intact and avoiding spills.

The aggregate will contain less than 5% fines at the time of shiploading, having been screened and washed prior to conveying to the marine terminal. All areas of the marine terminal will conform to the NL Criteria for Acceptable Air Quality which allows a total suspended particulate concentration of 80  $\mu\text{g}/\text{m}^3$  and 120  $\mu\text{g}/\text{m}^3$  for 1 hour and 24-hour exposure, respectively.

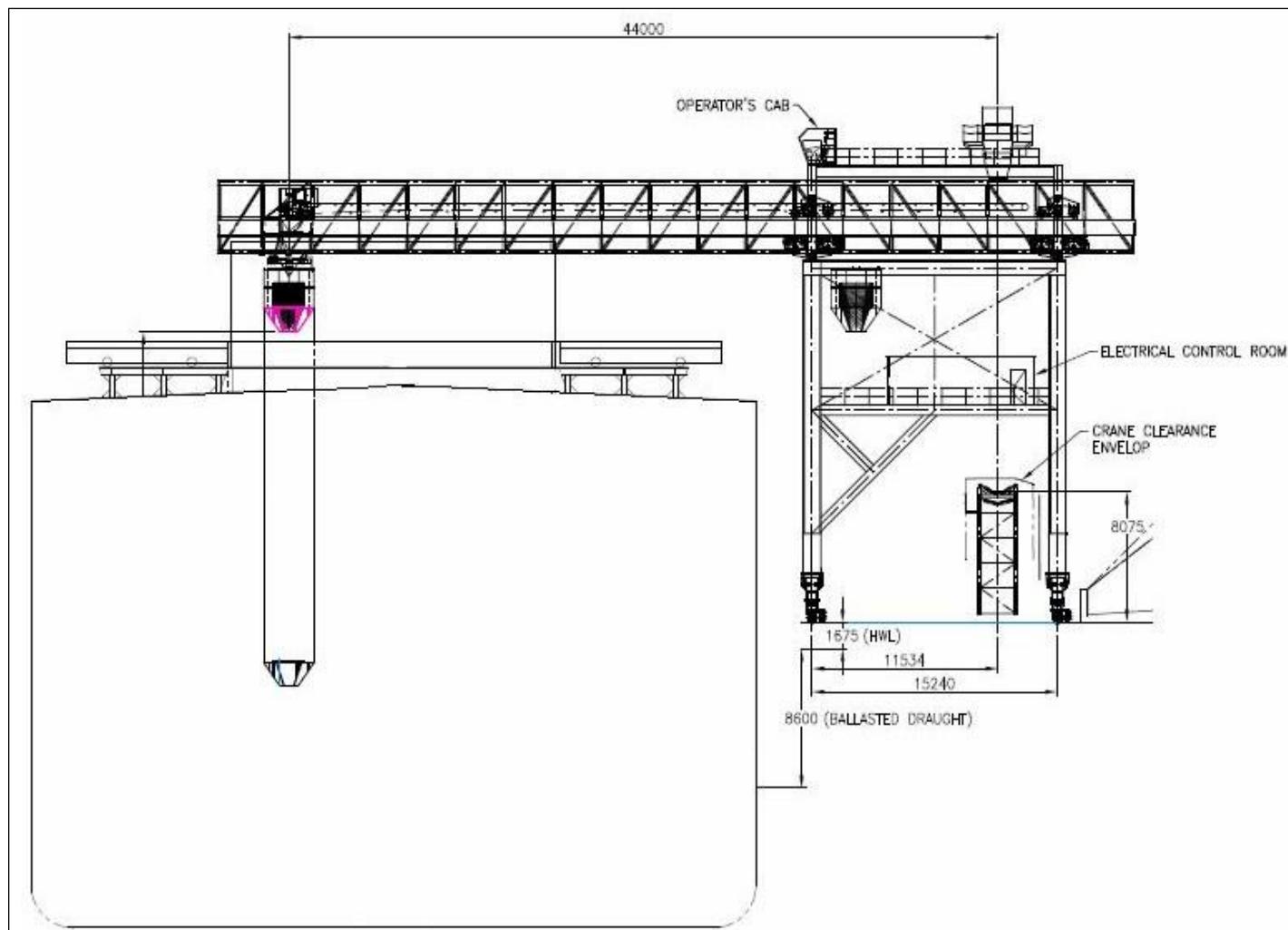


Figure 8: Diagram of a shiploader typical of that which will be used at the proposed marine terminal (modified from Comalco Aluminum Ltd.).

The nearest residence to the proposed quarry is approximately 800 m away, with the centre of the Town of Belleoram being approximately 1900 m away. All residences and businesses in the area are up-wind of the quarry, making the probability of human health effects related to air quality within the town very low. Further, exhaust emissions are expected to be low, with the use of diesel-powered heavy vehicles/equipment at the marine terminal largely confined to the construction phase. These machines will be maintained in good working condition and adhere to provincial and federal emissions standards. The conveyor and ship loader will be electrically operated.

The marine terminal has a low potential to generate dust due to aggregate type, screening and washing procedures, and dust suppression measures. Nevertheless, if emissions are generated the region has low dispersion potential, making any potential atmospheric releases from the marine terminal minor. With dust suppression mitigations in place (e.g. covered conveyors, screening/washing) all areas of the marine terminal are expected to comply with the NL Criteria for Acceptable Air Quality (which allows a total suspended particulate concentration of 80  $\mu\text{g}/\text{m}^3$  and 120  $\mu\text{g}/\text{m}^3$  for 1 hour and 24-hour exposure, respectively). All workers will be required to wear proper dust suppressants (e.g. masks, respirators) whenever hourly dust emissions exceed 80  $\mu\text{g}/\text{m}^3$  in their work areas (as per the Canadian Environmental Protection Agency's ambient air quality guidelines).

Natural factors of the area will assist in minimizing any interactions between dust and the surrounding environment. The impact of fugitive dust sources depends on the quantity and drift potential of the dust particles injected into the atmosphere. Since the ground material in the area will predominately contain granite, with very little overburden (<5 m; which will be cleared prior to blasting), the amount of dust escaping after a blast is anticipated to be small and localized. Further, due to granite's high density, particles ejected by a blast would be restricted to the vicinity of the quarry site, with very little blow-over to the neighboring land or water.

Climate conditions in the area supports good dispersion of air borne particles and the frequent rainfall will help dilute those particles in the air. The wet climate has a winter season that typically lasts for 4 months, with snow cover resulting in surface saturation, thus little background particulate matter is expected. Air quality is also enhanced by the infusion of relatively clean, oceanic air masses from the North Atlantic Ocean. Winds on the south coast of Newfoundland blow predominantly from the southwest: however, local conditions at Belleoram have a great effect on their direction. The topography of the area will act to shelter the quarry site, slowing

winds in the area (Bowyer and Gray 1995), thereby reducing the distance that any dust released from the quarry will travel. Also, there is a channeling effect between Belleoram and Chapel Island, causing winds to be forced up to the north, to north- west. Therefore, the majority of airborne dust would be directed away from the nearest aquaculture sites.

### **9.6.2 Mitigation Measures**

Continental Stone Limited will have, as part of its EPP and Contingency Planning, mitigation measures to control quarry-related dust, both from an environmental as well as occupational health and safety perspective. Outlined mitigations include:

- Wright Hopky's 'Guidelines for the Use of Explosives in or Near Canadian Fisheries Waters" (1998) will be incorporated into the blasting operations and the EPP;
- the Aggregate Operators Best Management Practices Handbook for British Columbia, volume 2 (2002) will be incorporated into the blasting operations and EPP;
- Dust suppression and/or collection equipment during drilling will be used as well as using drills equipped with either a vacuum dust collection system or a water injection dust suppression mechanism;
- All blast bore holes will be plugged with 3m collars of 20 mm, clean, crushed stone to trap gases and dust during blasting;
- Wash water will be directed to settling ponds which will remove accumulated silt (wash water will be recycled back into production rather than allowing it to runoff into local streams or marine environment); and
- Equipment will be sprayed with clean water to suppress airborne particles if high dust levels occur as a result of crushing, screening, or conveying.

### **9.6.3 Residual Impact**

Blasting will take place twice a week, on average, and crushing and screening operations will be ongoing throughout the quarry's lifespan. Due to the rock type and overburden levels, the frequency of blasting is not expected to release sizable amounts of dust, in comparison to vehicular traffic on a dirt road for instance. Also, through the adherence to the above mitigations, and the design of the proposed blast operations, is determined to be a Negligible (not significant) impact.

## 9.7 Sedimentation

### 9.7.1 Project and Environment Interaction

Phase 1 of the quarry project is located adjacent to the ocean shore and also contains the lower end of a small stream/pond system which flows into the Belleoram Barasway. The quarry site naturally has a shallow overburden layer (<5 m) and stripping of this material has the potential to increase runoff into the surrounding terrestrial, freshwater, and marine environments. Further, the nature of the quarrying activities leads to the potential for the runoff to carry silt, hydrocarbons, and ammonia from explosives.

### 9.7.2 Mitigation Measures

The possibility of detrimental effects from runoff is a recognized part of operating a quarry and is addressed by adequate planning and operating practices (see **Appendix 6**). The mitigations outlined below will be incorporated into the Project's construction and operation EPP and Contingency Plans:

- A 50 m buffer zone of undisturbed natural vegetation between construction areas and all waterbodies will be maintained, where possible (fish habitat protection guidelines recommend a buffer width of  $12\text{ m} + 1.5 \times \% \text{ slope}$ , Scruton et al. 1997);
- Siltation control structures (i.e. silt curtains, cofferdams, sediment fences, etc.) will be constructed prior to commencing activities that involve the disturbance of the site and work along the shoreline;
- Soil disturbance will be minimized by limiting the area exposed at any one time, stabilizing exposed soil with anti-erosion devices (i.e. rip rap, filter fabrics, gravel or wood chips), and revegetation of disturbed areas;
- To facilitate filtering of suspended solids, water will be directed from the site to vegetated areas (natural or man- made) within the project boundaries;
- Wash water will be collected and piped through an enclosed steel pipeline to industry approved settling ponds to allow suspended solids to settle out;
- Wash water will be recycled from the settling ponds back into the operations for reuse in aggregate washing, dust suppression, etc;
- Sewage will be collected and temporarily stored in approved portable facilities which will

be emptied by a pump truck on a regular basis and disposed of in an approved, off- site, waste disposal facility;

- Machinery will be in good working order and thoroughly checked for leakage of lubricants or fuel;
- Fuels and other hazardous substances will be handled only by persons who are trained and qualified in handling these materials in accordance with the manufacturer's instructions and governmental laws and regulations;
- Operators will be present for the duration of refueling;
- Vehicle refueling will occur at least 30 m from any water body;
- Hydrocarbon spill clean-up equipment will be on-site, with adsorbents being used to recover any hydrocarbon sheen in pit water;
- All spills or leaks on land or in the water will be promptly contained, cleaned up, and reported to the 24-hour environmental emergencies report system (1-800-563- 9089) as required by the *Fisheries Act*;
- No on-site bulk storage of fuel or oil (used or new) will be conducted; and
- Water testing as per criteria listed in Schedule A of the Environmental Control Water and Sewage Regulations (2003) under the *Water Resources Act* will be performed before it is discharged to a water body.

### **9.7.3 Residual Impact**

Taking into consideration the rock type and overburden levels, adherence to the above mitigations, and the design of the proposed blast operations, it is determined that the residual impact is Negligible (not significant).

## **9.8 Explosive Chemicals**

### **9.8.1 Project and Environment Interaction**

The quarry will use a Dyno Gold bulk emulsion explosive, containing ANFO (Ammonium Nitrate/Fuel Oil). This type of explosive, like all explosives, contains ammonia (ammonium) that has the potential to be released into the water from contaminated shot rock, through spillage,

incomplete detonation, and through pit drainage/runoff. The toxicity of ammonia varies with pH and temperature, with lower temperature and pH causing an increase in the toxicity of free ammonia (Wiber, et al., 1991). In aqueous solutions, ammonia exists in two forms: free ammonia which carries no ionic charge (NH<sub>3</sub>), and ammonium which carries a positive charge (NH<sub>4</sub>). The free ammonia is the more toxic of the two and converts hemoglobin to methaemoglobin which impairs oxygen transport.

### **9.8.2 Mitigation Measures**

In light of the hazards involved with ammonia release, the following measures will be put into place, including:

- using a bulk emulsion explosive that is proven to reduce ammonia's release rate, which will allow any wastage to assimilate into the environment at a more sustainable rate;
- using suppression and/or collection equipment during drilling, ie. using DTH drills equipped with either a vacuum dust collection system or a water injection dust suppression mechanism;
- discharging pit water to vegetated areas to encourage bio/chemical-degradation of ammonia;
- monitoring water quality to ensure runoff to the marine environment complies with provincial and federal regulations. Non-compliant water will be treated by alternate means;
- ensuring that the handling, transportation, storage and use of explosives will be conducted in compliance with all applicable laws, regulations, and orders of the Department of Environment, Climate Change and Municipalities and the Department of Industry, Energy and Technology;
- only allowing persons properly trained and qualified to handle explosives in accordance with the manufacturer's instructions and governmental laws and regulations;
- maintaining the integrity of all storage containers, tanks, and loading equipment to prevent explosives spills, and following the manufacturer's spill clean-up recommendations; using explosives in a manner that will minimize scatter of blasted material beyond the limits of the activity;
- developing blasting patterns and procedures that minimize shock or instantaneous peak

noise levels and ensures that the magnitude of explosions is limited to only that which is necessary, such as:

- plugging the 12 m bore holes with a 3 m collar of 20 mm, clean, crushed stone to trap gases and dust during blasting
- optimizing drill hole patterns
- using explosives in a manner that will minimize scatter of blasted material beyond the limits of the activity
- employing the proper working on time-delayed blasting cycles (500 ms in-hole delay and a 25 ms surface delay using a Nonel EZ Dets or similar blast initiation system which allows accurate firing of the explosives);
- making a blasting plan available to the local committee; and
- not blasting underwater or within a waterbody.

### **9.8.3 Residual Impact**

Continental Stone Ltd. acknowledges that ammonia losses are most effectively prevented prior to the explosion ever occurring. Poor handling, storage, and loading practices can lead to significant material losses, particularly when bulk explosives are used. Further, improper drilling can cause incomplete detonation and incorrect timing increases the chance of misfires, which can increase waste ammonia runoff. It is for these reasons that the blasting protocol has been adjusted (reflected herein) to maximize efficiency and minimize losses. This has been achieved through the optimization of drill patterns, collar length, explosive type, priming, and timing delays as well as having only properly trained personnel handle and set the explosives. Therefore, with this thorough evaluation of its blasting procedures and the mitigations stated above, the impacts of ammonia release are determined to be a Negligible (not significant) impact.

### **9.9 Local Special Interest Committee**

In keeping with Continental Stone's commitment to ensuring a minimum impact on the local environment and its residents, it will invite all interested parties to take part in a committee which will allow them to voice their concerns and offer any comments they have. This committee could include residents of Belleoram, property owners in the area, local business owners,

owners/operators of active aquaculture sites within Fortune Bay, and recreational users of the area. It is also recommended that a scientific advisor be a member, such as a veterinarian specializing in fish aquaculture or an aquatic scientist. Continental Stone will openly accept and consider all comments and concerns expressed by these interested parties and strive to provide any information requested by them. The ultimate goal of this committee will be to provide an avenue for efficient communication between stakeholders and to prevent conflicts from escalating to situations that may negatively affect any of the parties involved, whether the issues are social, environmental, or quality of life. Thus, this preventative, hands-on, approach should ensure the prosperity, stability and long-term viability of the region through the elimination of potential conflicts and the minimization of the quarry's effects. Communication with the local special interest committee is also outlined within the Communication Plan (Appendix 8).

## **9.10 Monitoring**

Continental Stone Ltd. will be responsible for both environmental compliance and effects monitoring at appropriate stages of the quarry's operation. The environmental compliance monitoring will include activities that require monitoring to ensure compliance with regulatory and self-imposed environmental requirements. These will be conducted as per permit requirements and regulatory frameworks. For example, runoff will be periodically tested, as needed, to ensure it conforms to all regulatory requirements. All permit requirements will be identified in the EPP and Contingency Plan to ensure adherence to schedule.

The EPP and a field- usable Contingency Plan shall:

- Reflect, at a minimum, the mitigation measured outlined in this Registration document;
- Include additional measures that may be included as permits conditions; and
- Outline contingency procedures for possible unforeseen events.

Environmental effects monitoring is conducted to validate impact predictions and to evaluate the effectiveness of and identify the need for altering or improving mitigative measures. The impact predictions outlined above which are based on past research and calculations will be part of an environmental effects monitoring program as outlined below.

The marine environment will be monitored for temperatures in the waters adjacent to the quarry. Blast vibrations will be measured for the first ten firings at locations throughout the Fortune Bay area, with particular attention being paid to seismic readings near aquaculture sites. The local

committee's observations and recommendations will also be considered, and any concerns they may have will be addressed by Continental Stone Ltd.

## **10 Project Related Documents**

Under the Physical Activities Regulations (SOR/2019-285) of the IAA (S.C. 2019, c.28, s.1), a new stone quarry or sand or gravel pit with a production capacity of 3,500,000 t/year or more (Section 18(f)), or expansion of an existing mining operation that results in an increase in the area of mining operations of 50% or more and the total production capacity would be 3,500,000 t/year or more after the expansion (Section 19(f)), would be considered a designated project and therefore require assessment under the federal IAA federal. The proposed Belleoram Quarry does not exceed this production capacity.

The project was previously submitted to Department of Fisheries and Ocean Canada for review and assessment, but that assessment has expired; the project will be submitted for review under current legislation.

Applications have previously been submitted to Crown Lands for the Laydown Area/Wharf and the Access Road (Application No. 128756, File Reference No. 2024088)

The Town of Belleoram have previously provided a “Municipal Recommendation Form for Crown Land Applications within Municipal and Planning Area Boundaries”, which they consider still valid (**Appendix 4**), and the area has been successfully rezoned.

## 11 Approval of the Undertaking

The following is a list of likely key permits, licenses and approvals required for this project.

*Table 2: Potential Project Permits.*

Regulatory Authority	Approvals / Certificates / Permits
Impact Assessment Agency/Regulatory Authorities	Release from EA process
Fisheries and Oceans Canada	Authorization for the Harmful Alteration, Disruption or Destruction of fish habitat
Transport Canada	Permit for construction within navigable waters
	Permit to store, handle and transport dangerous goods
Department of Industry, Energy and Technology, Mines Branch	Exploration Licence
	Quarry Permit
Department of Environment, Climate Change and Municipalities	Lease/Permit to Occupy Crown Lands
	Release from the EA process
	Permit to alter a body of water
	Permit to alter a body of water (site drainage)
	Permit for water withdrawal
	Water use license
	Authorization to control nuisance animals
Department of Fisheries, Forestry and Agriculture, Forestry Branch	Certificate of authorization
	Permit to cut crown timber
Department of Immigration, Skills and Labour	Permit to burn
	Blasters Safety Certificate
Department of Transportation and Infrastructure	Compliance standard; no permit required
Town of Belleoram	Development Permit
	Approval for waste disposal

## 12 Schedule

- Registration document Submission December 2020
- Government Review and Decision January 2021
- Road Construction April 2021
- Wharf Construction May 2021
- Operations September 2021

### **13 Funding**

The capital costs of this project is \$53,000,000. This project is dependent on partial funding from the Government of Newfoundland and Labrador. The Government of Canada is anticipated in assisting this project through the Atlantic Canada Opportunity Agency.

### **14 Submission**

December 7, 2020

Date



for Name: Mr. John Williams, President

Continental Stone Ltd.

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**APPENDIX 1**

**Quarry Development and Rehabilitation Plan**



**Continental Stone Limited  
Belleoram Quarry  
FILE # 711:7545**

**FOR**

**COMPLIANCE WITH THE MINING ACT  
AND QUARRY MATERIALS ACT OF THE  
GOVERNMENT OF NEWFOUNDLAND AND LABRADOR  
(revised March 13, 2008 submission)**

**Prepared For:**

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**March, 2008**

**AMEC Project # TF7352206**

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## 1.0 INTRODUCTION

This project is the development of a granite aggregate export quarry on the south coast of Newfoundland. Continental Stone Limited (CSL) will produce aggregate products to supply markets in the US. It is the intent of CSL to create an efficient, safe and environmentally sound development plan for the Belleoram quarry operation.

The development, operational , reclamation and closure plans will be in compliance with the Quarry Materials Act and the Mining Act of the province of Newfoundland and Labrador.

## 2.0 SITE LOCATION AND DESCRIPTION

Located approximately 1 km north of the community of Belleoram on the south coast of Newfoundland, the proposed lease area is 79 hectares in size and is located on NTS map sheet 1M/11 and is shown on Figure 1. A detailed legal survey of the site is attached in Appendix C.

## 3.0 GEOLOGY

The proposed lease area has been extensively explored by CSL. The exploration programs completed at this site to date consist of: reconnaissance prospecting; sampling and testing; geological mapping; surface sampling and testing; diamond drilling; and chemical and physical testing. The lease area covers the Middle Paleozoic to Devonian Belleoram Granite. The Belleoram Granite consists of grey to pink, medium to fine grained, equigranular granite containing many small dark grey to green to black inclusions. Figure 2 shows the geology of the Belleoram quarry and surrounding area.

The field studies confirmed the continuous nature of the Belleoram Granite in the area between the community of Belleoram, north approximately 2.5 km to the Belleoram Barasway and west approximately 3 km toward Route 362. The general joint strike pattern of the Belleoram Granite trends east and north with near vertical dip. Additional sub-horizontal joints create the appearance of sheeting in exposed bedrock. These joint orientations give rise to rectangular and cubic shaped talus particles.

A diamond drill program showed the rock is consistant in quality. The first 5 metres of the core in all the drill holes was fractured with joint spacing 5 to 10 cm apart. The fracturing near surface is interpreted to be the result of surface weathering. The joint spacing increased at depth to 50 to 100 cm apart with consistent, dominant jointing planes generally 90° to the core axis in the vertically drilled holes and 45° or less to the core axis in the inclined holes. The frequency of occurrence of xenoliths varied throughout the core from 5 to 20% by volume. Also the size of xenoliths varied from 2 to 5 cm to over 20 cm. However the presence of the xenoliths did not affect the quality of the rock as a source of aggregate as shown by the index testing completed. Secondary mineralization in the core was limited mainly to the occurrence of occasional quartz and calcite veins. In all cases these occurrences were of sub-millimeter to centimeter sized veins and made up 1% or less of the total core collected.

Only two minute occurrences of sulphide minerals were noted in the core as blebs in quartz veins. A 30 element ICP analysis of representative core samples confirmed that only background levels of any potential sulphide minerals occur in the core.

#### 4.0 EXISTING SITE

In accordance with the requirements for quarry development under the Quarry Materials Act, attached in Appendix A, Drawing CSL-07-01 shows the existing features and the boundary of the proposed lease. The site is currently undeveloped.

#### 5.0 SITE DEVELOPMENT

Upon the required approvals from all appropriate agencies, CSL will begin construction of the quarry access and haul roads, production areas, stockpile areas, dock and load-out facilities. A list of the required permits and the status of each is tabled below. The construction phase is expected to take 12 to 24 months to complete with most of the infrastructure such as the dock, roads and ship-loader being put in place within 12 months and the creation of the ultimate production and stockpile areas taking 24 months to finish.

**Table 5.1** Permits and Approvals Required for the Project

Permit/Approval	Agency	Status
<b>Provincial</b>		
Quarry Lease	Department of Natural Resources	Pending
Environmental Assessment	Department of Environment	Released
Approval to alter a water body	Department of Environment	Received
Certificate of Approval for Construction (site drainage)	Department of Environment	Pending
Cutting Permit	Department of Natural Resources	Received
Permit to Burn	Department of Natural Resources	Pending
<b>Municipal</b>		
Development Permit	Town of Belleoram	Received
Approval for Waste Disposal	Town of Belleoram	Received
<b>Federal</b>		
Environmental Assessment	Fisheries and Oceans	Released
Authorization to alter fish habitat	Fisheries and Oceans	Received
Permit to construct in Navigable waters	Transport Canada	Received
Permit to transport Dangerous goods	Transport Canada	Received

### Access and Haul Roads

The southern boundary of the CSL quarry is located at the end the paved community road in Belleoram. Figure 1 shows this access. The main haul road through CSL quarry will require the upgrading of an existing trail from the community road. The main haul road, shown on Drawing CSL-07-02, will go directly to the dock and production area and to the quarry face of phase 3 to the south. The maximum grade of the haul roads will be 8%. Drawing CSL-07-02 also shows the access and haul roads.

### Dock and Load-Out Facility

Drawing CSL-07-02 shows the location of the dock and ship-loader. The Dock is a typical concrete caisson structure as shown in Figure 3. All the aggregate required to construct the dock will be produced on site.

The ship-loader will have a boom capable of luffing +15 degrees to -10 degrees supported by a carriage structure that can travel on rails mounted to the wharf. The shiploader will be mounted on a pivot on a slew so as to be capable of rotating horizontally through an operational range of 210 degrees. The shuttle will give a variable outreach from 27 metres to 46 metres.

The ship-loader consists of:

- a. the rail mounted shuttle structure
- b. luffing and slewing boom
- c. slewing pivot
- d. traversing carriage structure
- e. tripper on associated feed conveyor, C3A, to raise material onto boom belt
- f. mechanisms for slewing, luffing and shuttling the boom.
- g. operator's cab mounted on the top end of the tripper structure.(optional)
- h. electrical equipment room in the tripper structure.
- i. cable reel mounted on the tripper for power supply to the shiploader.

### Production and Stockpile Areas

Shown on Drawing CSL-07-02, the ultimate production and stockpile area will require the excavation of approximately 775,000 cubic metres of material of which only 83,000 cubic metres will be required as fill. The construction of this area will create the first aggregate production for the quarry; approximately 691,000 cubic metres of rock will be processed. Some aggregate to be used on-site during the construction of the dock and roads and rest as saleable aggregate. As shown on Drawing CSL-07-02 a 20 metre buffer will be maintained between the production and stockpile area and the ocean to the east and the stream to the north, grubbing from the site will be stored as shown and the entire site will be graded away from the ocean and the stream and all run-off will be directed into a collection ditch also shown on Drawing CSL-07-02. Once in the ditch, the site water will pass through a series of rock-check dams to bring any suspended solids to within acceptable limits before being discharged.

### Pit Water Run-off Control

Once the normal aggregate production commences at Phase 3 (projected to start in year 3 of the operation), all run-off from each production bench will be directed into vegetated areas within the lease which will naturally filter the pit water. The location of the collection ditches are shown on each bench.

### Project costs

The cost of the project is presented as three separate phases. The Construction Year or Phase, which will also include aggregate production; the Phase I Aggregate Production which will be the switch from mobile to permanent crushing equipment and finally, Phase II Aggregate Production with ultimate expansion of the crusher set-up to maximize production. Tabled below is a break down of estimated cost of the major capital expenditures for each of the project phases. Noted in yellow are the estimated costs to bring Hydro power to the site and to construct permanent buildings at the site. Both these items are currently in the planning stage.

**Table 5.2** Capital Expenditures for the Project

<b>Construction Year 2008</b>	
Marine Dock and Associated Construction	\$15,000,000.00
Locotrack and Other Mobile Crushers	\$3,500,000.00
Shiploader (Installed and Commissioned)	\$6,000,000.00
Generator System for Mobile Crushers	\$800,000.00
Overland Conveyors to Shiploader	\$3,401,247.00
Material Handling Equipment (Loaders, Trucks,etc)	\$6,000,000.00
<b>Total Expenditures Construction Year</b>	<b>\$35,901,247.00</b>
<b>Phase 1 Crushing Production</b>	
Phase 1 Crusher and Stockpile System	\$8,607,946.00
Phase 1 Electrical/Mechanical/Concrete	\$5,500,000.00
Overland Conveyors from Quarry to Crushers	\$3,401,247.00
NL Hydro Customer Cost to Construct	\$1,000,000.00
Office/Garage/Laboratory	\$1,200,000.00
<b>Total Expenditures Production Year 1</b>	<b>\$18,509,193.00</b>
<b>Phase 2 Crushing and Production</b>	
Phase 2 Crusher and Stockpile System	\$6,432,618.00
Phase 2 Electrical/Mechanical/Concrete	\$8,300,000.00
<b>Total Expenditures Phase 2 Crushing</b>	<b>\$14,732,618.00</b>
<b>Total Cost</b>	<b>\$69,143,058.00</b>

### Project Employment

The Belleoram Project is expected to create 56 jobs ranging from labours to managers. Table 5.3 lists the employee requirements for the project.

**Table 5.3** Employment Requirements

<b>POSITION</b>	<b>NUMBER OF EMPLOYEES</b>
General Manager	1
Marketing Rep	1
Secretary	1
Foreman	3
Security	4
Store Clerk	1
Lab Supervisor	1
Crusher Operators	2
Control Trailer Operator	2
Equipment Operators	4
Welders	4
Mechanics	2
Lab Tech	2
Ship Loaders	4
Drillers	6
Labours	18
<b>TOTAL</b>	<b>56</b>

## **6.0 QUARRY DEVELOPMENT**

The projected normal production rate for the CSL quarry is 2,000,000 tonnes annually with an expansion capacity up to 6,000,000 tonnes annually. However, during the start-up period, which will coincide with the construction period, the production rate will be varied. In general, the excess rock mined from the cut required to create the production area (approximately 691,000 cubic metres) will be processed using mobile crushing equipment and sold. The quantity of salable production is difficult to estimate because a portion of this rock will be required during site construction and the possibility of excess amounts of oversized materials produced during construction blasting. After the start-up period, the quarry will be mined in a series of phases with an 11 metre bench height starting at an elevation of 150 metres to the final quarry floor of 18 metres above sea level. Each phase will be mined on a block by block basis where each block represents approximately 70,000 tonnes of blast rock and each phase represents approximately 2,000,000 tonnes of blast rock production. Each bench is labeled in accordance with its proposed pit floor elevation. The blocks and phases are sized based on the projected estimate of annual production and are shown on the Development Drawings.

The required annual update of the quarry development plan will plot the mining progress of the production blocks and phases.

## 7.0 AGGREGATE RESOURCE ESTIMATE

To date, exploration programs completed at this site consisted of: reconnaissance prospecting; surface sampling, diamond drilling, chemical and physical testing.

Geological mapping was completed and representative surface samples were collected in May 2006, confirming the continuous nature of the Belleoram Granite in the area between the community of Belleoram, north approximately 2.5 km to the Belleoram Barasway and west approximately 3 km toward Route 362. The general joint strike pattern of the Belleoram Granite trends east and north with near vertical dip. Additional sub-horizontal joints create the appearance of sheeting in exposed bedrock. These joint orientations give rise to rectangular and cubic shaped talus particles. A barite occurrence noted by previous mapping could not be located and no other secondary mineralization was noted while mapping the surface rocks. Fourteen samples of in-situ rock were collected and sent to the AMEC Laboratory in St. John's for index testing. the sample description data is tabled below. Figure 2 shows the geology of the site and the location of the samples collected.

**Table 7.1** Surface Sample Data

Sample ID	Easting (UTM)	Northing (UTM)	Description
CSL-06-01	618726.00	5265392.00	Fine grained pink granite
CSL-06-02	618679.00	5265543.00	Fine grained pink granite
CSL-06-03	618721.00	5265600.00	Fine grained pink granite
CSL-06-04	618623.00	5265960.00	Fine grained pink granite
CSL-06-05	618615.00	5265993.00	Fine grained pink granite taken in shear zone 4.5 m wide, near vertical, trending 206°
CSL-06-06	618600.00	5266506.00	Fine grained pink granite
CSL-06-07	618670.00	5265700.00	Fine grained pink granite
CSL-06-08	618361.00	5265762.00	Fine grained pink granite
CSL-06-09	618409.00	5265789.00	Fine grained pink granite, minor slickensides present on sample
CSL-06-10	618455.00	5265942.00	Fine grained pink granite
CSL-06-11	618400.00	5266034.00	Fine grained pink granite
CSL-06-12	618336.00	5266155.00	Fine grained pink granite
CSL-06-13	618510.00	5266277.00	Fine grained pink granite
CSL-06-14	618491.00	5266400.00	Fine grained pink granite

The mapping and surface sampling was followed up by a diamond drilling program designed to test the insitu consistency of the rock and to provide representative samples to test the physical and chemical properties of the rock throughout the deposit. Seven diamond drill holes were collared at four setup locations to test the consistency and rock quality along a topographic high between Belleoram Barasway and Bear Pond. Three of these setups were positioned along an approximate north west-south south-east line and were between 450 and 150 metres apart defined by accessibility for the drilling equipment. A fourth setup was positioned inland to the west of the others. Continuous core in NQ size (47.6 mm diameter) was recovered from all boreholes.

At the first setup location, at the northern limit of the test area, two drilling holes were collared at an elevation of 117.69 metres above sea level. Hole DDH-06-01 was drilled vertically to a depth

of 95 metres and hole DDH-06-02 was drilled at a  $45^0$  dip on a bearing of  $097^0$  to a depth of 103 metres.

Due to the rough terrain, the second setup was located approximately 485 metres south of the first. At this site two drill holes were collared at an elevation of 146.50 metres above sea level. Hole DDH-06-03 was drilled at a  $60^0$  dip on a bearing of  $85^0$  to a depth of 120 metres and hole DDH-06-04 was drilled vertically to a depth of 95 metres.

The third setup site, representing the southern limit of the test area, was located approximately 110 metres from the second setup site. Here two drill holes were collared at 153.47 metres above sea. Hole DDH-06-05 was drilled vertically to a depth of 115 metres. Hole DDH-06-06 was drilled at  $60^0$  dip on a bearing of  $085^0$  to a depth of 126 metres.

The fourth setup site was located approximately 100 metres to the west of the alignment of the other three setup sites and was meant to confirm the consistency of the rock quality in the westerly direction. Here one drill was collared at an elevation of 149.77 metres above sea level. Hole DDH-06-07 was drilled vertically to a depth of 121.2 metres.

The diamond drill setup and hole data is tabled below, and the drill hole locations and cross sections are shown on Figures 4 and 5, respectively.

**Table 7.2** Diamond Drill Hole Data

DDH #	EASTING (UTM)	NORTHING (UTM) EASTING (UTM)	COLLAR ELEVATION	DIP AT COLLAR	AZIMUTH	DEPTH OF HOLE	SAMPLED
DDH-06-01	347866.25	5267216.42	117.69 m	$90^0$	na	95m	YES
DDH-06-02	347866.25	5267216.42	117.69 m	$45.3^0$	$097^0$	103m	NO
DDH-06-03	348036.17	5266764.08	146.50 m	$60.1^0$	$105.4^0$	120m	NO
DDH-06-04	348036.17	5266764.08	146.50 m	$90^0$	na	95m	YES
DDH-06-05	348027.64	5266655.90	153.47 m	$90^0$	na	120m	YES
DDH-06-06	348027.64	5266655.90	153.47 m	$59.1^0$	$095.6^0$	110m	NO
DDH-06-07	347930.30	5266641.50	149.77 m	$90^0$	na	121.2m	YES

The drill core confirmed the consistence in quality of the aggregate. The first 5 metres of the core in all the drill holes was fractured with joint spacing 5 to 10 cm apart. The fracturing near surface is interpreted to be the result of surface weathering. The joint spacing increased at depth to 50 to 100 cm apart with consistent, dominant jointing planes generally  $90^0$  to the core axis in the vertically drilled holes and  $45^0$  or less to the core axis in the inclined holes. The frequency of occurrence of xenoliths varied throughout the core from 5 to 20% by volume. Also the size of xenoliths varied from 2 to 5 cm to over 20 cm. However the presence of the xenoliths did not affect the quality of the rock as a source of aggregate as shown by the index testing completed. Secondary mineralization in the core was limited mainly to the occurrence of occasional quartz and calcite veins. In all cases these occurrences were of sub-millimeter to centimeter sized veins and made up 1% or less of the total core collected.

Only two minute occurrences of sulphide minerals were noted in the core as blebs in quartz veins. A 30 element ICP analysis of representative core samples confirmed that only background levels any potential sulphide minerals occur in the core.

## 7.1 SAMPLING METHOD AND APPROACH

For the initial round of surface sampling completed in May of 2006, the approach was to collect representative surface samples in order to determine, in a general way, the quality of the rock as a construction aggregate. The sampling method was standard and involved locating suitable sample sites, identifying the sites using a hand held GPS, collecting approximately 10 kg of insitu rock, labeling and sealing the sample bags in the field and shipping the samples directly to the AMEC laboratory in St. John's for testing.

For the diamond drill core collected in August 2006, the sampling approach was to collect composite samples of the rock through the deposit roughly corresponding to typical bench heights of a potential quarry at the site. The sampling method consisted of collecting core from the vertical diamond drill holes at specific depth intervals and submitting these composite samples for a suite of index testing as directed by the client. The sample data is tabled below.

**Table 7.3** Drill Core Sample Data

DDH #	EASTING (UTM)	EASTING (UTM)	SAMPLING INTERVAL
DDH-06-01	347866.25	5267216.42	10-30 m
			50-70 m
DDH-06-04	348036.17	5266764.08	10-30 m
			50-70 m
DDH-06-05	348027.64	5266655.90	10-30 m
			50-70 m
			100-120 m
DDH-06-07	347930.30	5266641.50	10-30 m
			50-70 m

Sample Security is assured through the AMEC Quality Management System (QMS). The QMS procedures define the mechanism for controlling documents and ensure the quality requirements of the project are achieved. The objectives are to meet the quality requirements and to complete the work on schedule. To this end it provides the client established details of the quality requirements as well as reporting and documentation procedures.

All product certifications, materials testing, and inspection records are considered Quality Records. Testing equipment used on the project meet the requirements of the applicable specifications. Traceability was provided by the Lab Number assigned upon delivery. In order to satisfy the traceability element, the following was included:

- Lab Number
- Job Number
- Date Taken/Received
- Contract Number (if applicable)
- Unique customer number (if applicable)

Once clearly identified, the sample is moved to a designated "To Be Tested Location" upon which all information is recorded in a Laboratory Log book and includes:

- Lab Number, contract and customer contract number

- Client name
- Date sampled
- Date received
- Testing required
- Date tested/technician
- Date Completed

All test results are recorded on Standard AMEC laboratory worksheets in ink and all corrections are initiated.

The sample analysis included a complete suite of index testing required to certify the quality of the rock as a suitable product for the potential target markets. The following is a list of analysis completed on the Belleoram samples:

Abrasion Loss (%)	(CSA Test Method A23.2-17A)
Soundness by $MgSO_4$ (%)	(CSA Test Method A23.2-9A)
Relative Density $kg/m^3$	(CSA Test Method A23.2-12A)
Absorption (%)	(CSA Test Method A23.2-12A)
Loss by Micro Deval (%) Fine Aggregate	(CSA Test Method A23.2-23A)
Unconfined Freeze Thaw (%)	(CSA Test Method A23.2-24A)
Accelerated Mortar Bar Expansion	(CSA Test Method A23.2-25A)
Concrete Prism Expansion	(CSA Test Method A 23.2-14A)
Micro-Deval Abrasion Loss, Coarse Aggregate	(CSA Test Method A23.2-29A)
Unconfined Freeze – Thaw Loss	(CSA Test Method A23.2-24A)
Petrographic Examination	(ASTM C295-90)
ICP 30 Geochemical Analysis	

Below, Table 7.4 shows a summary of the physical testing completed for the Belleoram core samples compared to various aggregate quality specifications for the target markets. The results of the above testing and analysis confirmed the Belleoram granite is a source a quality aggregate.

**Table 7.4** Coarse Aggregate Physical Properties Summary



DDH-06-01						
Depth	Laboratory Test	Sample Results	Standard Requirements/Acceptance Limits			
			CSA A23-00	ASTM	PWGSC*	Provincial TW**
10 m - 30 m	Abrasion Loss (%)	17.1	50% maximum	35% maximum	35% maximum	35% maximum
	Soundness by MGS0 4 (%)	3.04	12% maximum	18% maximum	12% maximum	12% maximum
	Relative Density kg/m <sup>3</sup>	2628	N/A	N/A	2650 kg/m <sup>3</sup> Minimum	2650 kg/m <sup>3</sup> Minimum
	Absorption (%)	0.94	N/A	N/A	2.0% Maximum	1.75% Maximum
	Loss by Micro Deval (%)	2.8	14% Maximum	14% Maximum	N/A	20% Maximum
	Unconfined Freeze Thaw (%)	1.6	6% Maximum	6% Maximum	N/A	8% Maximum
50 m - 70 m	Abrasion Loss (%)	21.1	50% maximum	35% maximum	35% maximum	35% maximum
	Soundness by MGS0 4 (%)	2.51	12% maximum	18% maximum	12% maximum	12% maximum
	Relative Density kg/m <sup>3</sup>	2582	N/A	N/A	2650 kg/m <sup>3</sup> Minimum	2650 kg/m <sup>3</sup> Minimum
	Absorption (%)	1.18	N/A	N/A	2.0% Maximum	1.75% Maximum
	Loss by Micro Deval (%)	3.7	14% Maximum	14% Maximum	N/A	20% Maximum
	Unconfined Freeze Thaw (%)	1.8	6% Maximum	6% Maximum	N/A	8% Maximum
DDH-06-04						
Depth	Laboratory Test	Sample Results	Standard Requirements/Acceptance Limits			
			CSA A23-00	ASTM	PWGSC*	Provincial TW**
10 m - 30 m	Abrasion Loss (%)	16.6	50% maximum	35% maximum	35% maximum	35% maximum
	Soundness by MGS0 4 (%)	2.9	12% maximum	18% maximum	12% maximum	12% maximum
	Relative Density kg/m <sup>3</sup>	2642	N/A	N/A	2650 kg/m <sup>3</sup> Minimum	2650 kg/m <sup>3</sup> Minimum
	Absorption (%)	0.84	N/A	N/A	2.0% Maximum	1.75% Maximum
	Loss by Micro Deval (%)	ongoing	14% Maximum	14% Maximum	N/A	20% Maximum
	Unconfined Freeze Thaw (%)	ongoing	6% Maximum	6% Maximum	N/A	8% Maximum
50 - 70 m	Abrasion Loss (%)	16.9	50% maximum	35% maximum	35% maximum	35% maximum
	Soundness by MGS0 4 (%)	1.92	12% maximum	18% maximum	12% maximum	12% maximum
	Relative Density kg/m <sup>3</sup>	2632	N/A	N/A	2650 kg/m <sup>3</sup> Minimum	2650 kg/m <sup>3</sup> Minimum
	Absorption (%)	0.84	N/A	N/A	2.0% Maximum	1.75% Maximum
	Loss by Micro Deval (%)	ongoing	14% Maximum	14% Maximum	N/A	20% Maximum
	Unconfined Freeze Thaw (%)	ongoing	6% Maximum	6% Maximum	N/A	8% Maximum

DDH-06-05						
Depth	Laboratory Test	Sample Results	Standard Requirements/Acceptance Limits			
			CSA A23-00	ASTM	PWGSC*	Provincial TW**
10 - 30 m	Abrasion Loss (%)	17.2	50% maximum	35% maximum	35% maximum	35% maximum
	Soundness by MGS0 <sub>4</sub> (%)	2.3	12% maximum	18% maximum	12% maximum	12% maximum
	Relative Density kg/m <sup>3</sup>	2623	N/A	N/A	2650 kg/m <sup>3</sup> Minimum	2650 kg/m <sup>3</sup> Minimum
	Absorption (%)	1.01	N/A	N/A	2.0% Maximum	1.75% Maximum
	Loss by Micro Deval (%)	ongoing	14% Maximum	14% Maximum	N/A	20% Maximum
50 - 70 m	Abrasion Loss (%)	15.2	50% maximum	35% maximum	35% maximum	35% maximum
	Soundness by MGS0 <sub>4</sub> (%)	2.11	12% maximum	18% maximum	12% maximum	12% maximum
	Relative Density kg/m <sup>3</sup>	2637	N/A	N/A	2650 kg/m <sup>3</sup> Minimum	2650 kg/m <sup>3</sup> Minimum
	Absorption (%)	0.76	N/A	N/A	2.0% Maximum	1.75% Maximum
	Loss by Micro Deval (%)	2.8	14% Maximum	14% Maximum	N/A	20% Maximum
100 - 120 m	Unconfined Freeze Thaw (%)	ongoing	6% Maximum	6% Maximum	N/A	8% Maximum
	Abrasion Loss (%)	16.1	50% maximum	35% maximum	35% maximum	35% maximum
	Soundness by MGS0 <sub>4</sub> (%)	2.23	12% maximum	18% maximum	12% maximum	12% maximum
	Relative Density kg/m <sup>3</sup>	2506	N/A	N/A	2650 kg/m <sup>3</sup> Minimum	2650 kg/m <sup>3</sup> Minimum
	Absorption (%)	0.45	N/A	N/A	2.0% Maximum	1.75% Maximum
	Loss by Micro Deval (%)	2.6	14% Maximum	14% Maximum	N/A	20% Maximum
	Unconfined Freeze Thaw (%)	1.5	6% Maximum	6% Maximum	N/A	8% Maximum

DDH-06-07

Depth	Laboratory Test	Sample Results	Standard Requirements/Acceptance Limits			
			CSA A23-00	ASTM	PWGSC*	Provincial TW**
10 - 30 m	Abrasion Loss (%)	18.2	50% maximum	35% maximum	35% maximum	35% maximum
	Soundness by MGS0 <sub>4</sub> (%)	3.01	12% maximum	18% maximum	12% maximum	12% maximum
	Relative Density kg/m <sup>3</sup>	2629	N/A	N/A	2650 kg/m <sup>3</sup> Minimum	2650 kg/m <sup>3</sup> Minimum
	Absorption (%)	1.06	N/A	N/A	2.0% Maximum	1.75% Maximum
	Loss by Micro Deval (%)	2.6	14% Maximum	14% Maximum	N/A	20% Maximum
	Unconfined Freeze Thaw (%)	0.7	6% Maximum	6% Maximum	N/A	8% Maximum
50 - 70 m	Abrasion Loss (%)	17.0	50% maximum	35% maximum	35% maximum	35% maximum
	Soundness by MGS0 <sub>4</sub> (%)	2.49	12% maximum	18% maximum	12% maximum	12% maximum
	Relative Density kg/m <sup>3</sup>	2628	N/A	N/A	2650 kg/m <sup>3</sup> Minimum	2650 kg/m <sup>3</sup> Minimum
	Absorption (%)	0.11	N/A	N/A	2.0% Maximum	1.75% Maximum
	Loss by Micro Deval (%)	ongoing	14% Maximum	14% Maximum	N/A	20% Maximum
	Unconfined Freeze Thaw (%)	ongoing	6% Maximum	6% Maximum	N/A	8% Maximum

**Remarks:**

CSA A23-00 Standard requirements extracted most stringent exposure classes.

\*PWGSC - Public Works Government Services Canada Federal Specifications (various sections, most stringent specifications)

\*\* Provincial TW - Government of Newfoundland and Labrador Transportation and Works Highway Design Specifications (various sections, most stringent specifications)

Based on the consistency of the rock quality as determined by the geological mapping, surface sampling, diamond drilling and laboratory testing the northern section of the Belleoram deposit can be classified as an indicated aggregate resource and the southern half of the deposit can be classified as a measured resource.

The sub-division and boundary of the resource area is shown on Figure 4 and in cross section on Figure 5, the resource classification presented are based on the several reasonable assumptions about the geology of the Belleoram Granite Pluton and the area of influence of the diamond drill hole data as follows:

- The geological mapping indicates that the Belleoram granite is very consistent in nature across the detailed assessment area shown on drawing figure 4. There is virtually no change in the description of the surface expression of the rock across this area.
- Only a few minor structural features were mapped in the detailed assessment area.
- The physical testing of the surface samples collected across the detailed assessment area show the similar and consistent results.
- The results of the physical and geochemical testing completed on core from diamond drills DDH-06-01 and 02 and the core from the more closely spaced holes DDH-06-03, 4, 5, 6 and 7 were very similar and showed the rock was of very good aggregate quality.

Therefore, based on the above-mentioned assumptions, the radius of influence assigned to the diamond drill hole data is 200 metres.

Based on the assigned radius of influence for the diamond drill data, a specific gravity for the granite at 2600 kg/m<sup>3</sup> and an ultimate pit floor elevation of 18 metres above sea level, the resource area has been divided into an indicated aggregate resource in the northern section of approximately 61,000,000 tonnes and a measured aggregate resource in the southern section of approximately 80,000,000 tonnes. Please note that these resource estimates do not allow for dilution as a result of mining and processing and the preservation of sloping buffers required under terms and conditions of a quarry or mining lease or the sterilization of resources in the processing area. Considering these, the total measured and indicated aggregate resource is approximately 122,336,500 tonnes. For the purposes of this quarry development plan the above-noted resource classifications are treated as minable except the volume of rock required to slope the southern quarry wall to a 30 degree slope. Any adjustments to the aggregate resource estimate will be made in the annual update to the quarry plans required in accordance with the Mining Act. Table 7.1.3 below details the aggregate resource estimate on a phase and bench basis.

**Table 7.5** Estimated Aggregate Resource per Phase

Phase	Bench	Phase Tonnage	Phase	Bench	Phase Tonnage
1&2	N/A	1,796,600.00			
3	150, 139	2,002,000.00	34	62	2,002,000.00
4	139, 128	2,002,000.00	35	62	2,002,000.00
5	128	2,002,000.00	36	62	2,002,000.00
6	128	2,002,000.00	37	62	2,002,000.00
7	117	2,002,000.00	38	62, 51	2,002,000.00
8	117	2,002,000.00	39	51	2,002,000.00
9	117	2,002,000.00	40	51	2,002,000.00
10	117, 106	2,002,000.00	41	51	2,002,000.00
11	106	2,002,000.00	42	51	2,002,000.00
12	106	2,002,000.00	43	51	2,002,000.00
13	106	2,002,000.00	44	51	2,002,000.00
14	106	2,002,000.00	45	51, 40	2,002,000.00
15	95	2,002,000.00	46	40	2,002,000.00
16	95	2,002,000.00	47	40	2,002,000.00
17	95	2,002,000.00	48	40	2,002,000.00
18	95	2,002,000.00	49	40	2,002,000.00
19	95	2,002,000.00	50	40	2,002,000.00
20	95, 84	2,002,000.00	51	40	2,002,000.00
21	84	2,002,000.00	52	29	2,002,000.00
22	84	2,002,000.00	53	29	2,002,000.00
23	84	2,002,000.00	54	29	2,002,000.00
24	84	2,002,000.00	55	29	2,002,000.00
25	84	2,002,000.00	56	29	2,002,000.00
26	84, 73	2,002,000.00	57	29	2,002,000.00
27	73	2,002,000.00	58	29, 18	2,002,000.00
28	73	2,002,000.00	59	18	2,002,000.00
29	73	2,002,000.00	60	18	2,002,000.00
30	73	2,002,000.00	61	18	2,002,000.00
31	73	2,002,000.00	62	18	2,002,000.00
32	73, 62	2,002,000.00	63	18	419,900.00
33	62	2,002,000.00	total		122,336,500.00

## 8.0 GRUBBING MANAGEMENT

In advance of development, all trees will be cut and salvaged and all overburden and grubbing will be cleared and stored at one of two sites for the first five years of the operation. A third, long term storage area is proposed to be developed north of the quarry lease. CSL has started the planning for this third site and once approved it will be incorporated into the development plans.

1. Firstly the grubbing at the production area that is less than one metre thick and located within the 'fill' area of the site will be left in place and buried during construction of the site. All grubbing in excess of a metre thick will be removed as will all grubbing from the 'cut' area and will be temporarily stored as shown on Drawing CSL-07-02. This grubbing storage site will be bermed and the grubbing will be seeded in order to stabilize it and reduce run-off. Any run-off that does occur will be directed to the collection ditch created for the production area.
2. The second temporary storage site will be an area approximately 170 metres by 70 metres located in the centre of the quarry lease. This site will receive grubbing from Phase 3 up to Phase 6 on the 128 metre bench. This area is shown on the Development drawings.
3. The third, long-term, grubbing storage area is proposed to be developed to the north of the quarry lease. Grubbing from the temporary sites and all grubbing removed from Production Phase 7 onward that is not used in progressive reclamation will be stored at this site. Details of this proposed waste dumping area shown on Figure 6. This site will also be bermed and the grubbing will be seeded and any run-off will be directed to undisturbed vegetated areas to be absorbed.

When the mining of Phase 9 is completed on the 117 metre bench level, the stored grubbing will be used to reclaim the sloped southern wall of the quarry. Reclamation of the southern quarry will continue from that bench to the ultimate pit floor at the 18 metre level and the stored grubbing will be used for that purpose according.

## **9.0 MINING METHOD**

As stated above, the start-up mining phases will employ mobile crushing equipment and will produce aggregate from the excess rock cut required to create the production area of the quarry. Once this start-up is complete development in the quarry will proceed as follows:

Shown on Drawing CSL-07-03, the first 71,500 tonne production block will be blasted at the end of the haul road where the mobile primary crusher will be placed. The primary crusher will be fed using a tracked excavator and conveyors will carry the primary crushed aggregate to the secondary crushing and production area at the 18 metre level. The finished aggregate will be stockpiled and loaded onto vessels via the 3,000 tonne per hour ship-loader. Two loaders will feed aggregate from the stockpiles to the hoppers of the ship-loader. The first phase will require quarrying to the 139 metre level bench. Subsequent phases will be quarried in a similar manner with the mobile primary crushing equipment and the conveyors being relocated to service the current quarry face. At the 117 metre level bench the southern wall of the quarry will, for the first time, be quarried below the southern horizon. Quarry operations will continue in a similar manner as described above with the addition of progressive reclamation of the southern wall of the quarry. The western wall of the quarry will be benched to allow access for future expansion of the quarry. However, as part of the CSL overall reclamation plan, the western wall will be benched containing a sufficient volume of rock to allow sloping of each bench to a 30 degree slope.

The quarry operation will continue in the manner described above until mining is complete. The detailed quarry plans show the progression of the quarry production and progressive reclamation envisioned for the Belleoram quarry.

## **10.0 PIT WATER MANAGEMENT**

There are no permanent ponds or streams identified in the proposed quarry area. Currently, the natural drainage within the proposed lease boundaries is by overland flow towards the north. The hydrogeological characteristics of the lease area have not been fully defined but groundwater inflow is not expected to be an issue during the first five years of the development plan. CSL intends to initiate a groundwater monitoring program during year one of the pit development. Information from this monitoring program will determine any adjustments to pit water management plan described below.

Pit water will be managed and collected on each production bench in collection ditches. From these ditches, water will be directed to vegetated areas within the lease which will serve as a natural filter. Testing for contaminants will be carried out at the collection ditches on each bench on a weekly basis to confirm compliance with all standards before the water is released.

## **11.0 OVER-SIZED ROCK AND WASTE MANAGEMENT**

All efforts will be made to reduce the amount of over-sized muck produced during the blasting operations. However, it is realized that muck too large to be crushed by the primary crusher will be produced, especially at the start of the operation, above the 117 metre bench where the perimeter production blocks will not have a back wall. It is estimated that between 2% and 5% of the quarry production will be over-sized rock. CSL will seek markets for this material as well.

Additionally, a yet undetermined, volume of waste (rock dust) will be collected in run-off pond from the mining benches and crushing area on the 18 metre level. In the long term this waste will be stored in the proposed silt dumping area shown on Figure 6, off the quarry lease and later re-used to reclaim the quarry. This site has an approximate holding capacity of 530,000 cubic metres. All the grubbing and waste produced annually will be dumped and vegetated. After Mining Phase 9, some of this material will be used to reclaim the southern wall of the quarry at the 117 metre bench and this practice will continue until mining is complete. Section 13 below details the company's reclamation plans.

In the short term, this waste will be either temporarily stored at the production area in a bermed impoundment area or trucked to the local landfill site.

## **12.0 AGGREGATE CRUSHING FACILITY**

The initial start-up phases of the Belleoram operation will be completed employing portable crushing equipment consisting of a jaw-crusher and two cone-crushers that will produce aggregate from the rock cut required to create the production area for the ultimate crusher setup. The ultimate crusher setup will consist of permanent crusher installations at the production area and a mobile crusher unit at the quarry face. The

mobile jaw at the production face will crush the blast rock to 15cm minus material. The discharge belt of the primary crusher will feed the hopper of a mobile conveyor system. The conveyor will transport aggregate from the production bench to the secondary and tertiary crushers located in the production area. This setup, shown on the development drawings will produce and stockpile the various aggregate products ready for loading. Stockpiles of up to 250,000 tonnes of these various products will be maintained to insure supplies at all times. When the quarry operations on the 18 metre bench level are complete, the crushing and washing operation will be re-located adjacent to the loading facility to allow for more efficient loading.

The Belleoram operation will have various mobile and portable equipment requirements as tabled below.

**Table 12.1** Mobile Equipment

Equipment	Units Required	Personnel Required
Jaw Crusher	1	1
Cone Crusher	2	2
Excavator	3	3
Loader	2	2
Rock Trucks	4	4

All equipment will be refueled on a daily basis via tanker truck. Refueling will take place at the working area of the particular equipment. All equipment will be outfitted with split kits.

### **13.0 SHIP LOADING FACILITY**

The loaders will feed the ship-loader located south of the stockpile by a conveyor system. The ship-loader with a design load rate of 3,000 tonnes per hour will have a boom capable of luffing +15 degrees to -10 degrees supported by a carriage structure that will travel on rails mounted to the wharf. The ship-loader will be mounted on a pivot on a slew to enable horizontal rotation through an operational range of 210 degrees. The shuttle will give a variable outreach from 27 metres to 46 metres. The ship-loader shall consist essentially of:

- the rail mounted shuttle structure
- luffing and slewing boom
- slewing pivot
- traversing carriage structure
- tripper on associated feed conveyor, C3A, to raise material onto boom belt
- mechanisms for slewing, luffing and shuttling the boom
- operator's cab mounted on the top end of the tripper structure
- electrical equipment room in the tripper structure
- cable reel mounted on the tripper for power supply to the ship-loader.

### **14.0 RECLAMATION PLAN**

Because of the nature of the topography at the Belleoram quarry and the quarry method to be employed, no sloping will be required on a per bench basis until the quarry has progressed to the 117 metre bench. At which point, progressive reclamation of the

southern wall of the quarry will begin and continue to the final pit floor at the 18 metre level. Reclamation of the southern wall will consist of sloping to 30 degrees, covering the slope with a mixture of silt from the washing operation and stockpiled grubbing. The progressive sloping of the southern pit wall is depicted in Drawings CSL-07-05 to CSL-07-14.

Also when the re-location of the crushing and washing operation is complete the progressive reclamation of the 18 metre bench will begin and will consist of spreading a silt and grubbing mixture over areas not slated for other quarry or production uses in future operations.

The western wall of the quarry will not be sloped as this will be the direction of future quarry development at the site. As shown on the pit development drawings, a sufficient volume of rock will be left in place along the western wall to allow sloping to a 30 degree slope with retreat blasting. The geotechnical characteristics of these vertical benches will be assessed as the pit development advances to insure the stability of the western wall and any required pit wall configuration changes will be made if changing geotechnical conditions are encountered. These slope specifications are in accordance with the Mining Act and the Quarry Act of Newfoundland and Labrador.

## **15.0 SITE CLOSURE PLAN**

CSL will create and maintain a quarry reclamation fund that will financially support the reclamation and closure plans for the Belleoram Quarry. This fund will be created by a per tonne deduction from aggregate sales and will be available and sufficient to cover the complete reclamation of the site at any point in the operation. The amount of slope required to conform with the Quarry Materials and Mining Act has been calculated on a per phase basis in the event of the closure of the quarry. Table 15.1 below is the financial assurance for the Belleoram Quarry.

Table 15.1 Required Financial Assurance for Quarry Lease 711: 7545

Pit After End of Development Phase	Average Pit Wall Height (m)	Total Pit Wall Length (m)	Volume Required to Slope (m <sup>3</sup> )	Drill/Blast & Dress Cost (\$/m <sup>3</sup> )	Required Security (\$)	Pit Wall Reclaimed	Value of Progressive Reclamation (\$)	Net Annual Cost (\$)
Existing Pit	0	0	0	3			0	0
1	11	328.63	34,341.84	3	103,025.51		0	103,025.51
2	11	425.51	44,465.80	3	133,397.39		0	133,394.39
3	11	468.185	48,925.33	3	146,776.00		0	146,776.00
4	11	0		3	146,776.00		0	146,776.00
5	11	596.46	62,330.07	3	186,990.21		0	186,990.21
6	11	510.2504	53,321.17	3	159,963.50		0	159,963.50
7	11	460.4541	48,117.45	3	144,352.36	448.62	46,881	97,471.57
8	11	445.3314	46,537.13	3	139,611.39		0	139,611.39
9	11	742.88	77,630.96	3	232,892.88		0	232,892.88
10	11	822.66	85,967.97	3	257,903.91		0	257,903.91
11	11	448.66	46,884.97	3	140,654.91		0	140,654.91
12	11	0		3	140,654.91	224.04	23,412	117,242.73
13	11	461.6	48,237.20	3	144,711.60		0	144,711.60
14	11	650.718	68,000.03	3	204,000.09		0	204,000.09
15	11	630.1798	65,853.79	3	197,561.37		0	197,561.97
16	11	663.0632	69,290.10	3	207,870.31		0	207,870.31
17	11	551.9042	57,673.99	3	173,021.97		0	173,021.97
18	11	976.4903	102,043.24	3	306,129.71	353.62	36,953	269,176.58
19	11	1215.189	126,987.21	3	380,961.63		0	380,961.63
20	11	1215.79	127,050.02	3	381,150.07		0	381,150.07
21	11	1200.853	125,489.14	3	376,467.42		0	376,467.42
22	11	1214.786	126,945.13	3	380,835.38		0	380,835.38
23	11	1196.447	125,028.71	3	375,086.13		0	375,086.13
24	11	1119.025	116,938.08	3	350,814.24	513.38	53,648	297,165.87
25	11	1326.563	138,834.84	3	416,504.53		0	416,504.53
26	11	1379.442	144,151.64	3	432,454.91		0	432,454.91
27	11	1367.863	142,941.64	3	428,824.93		0	428,824.93
28	11	1313.147	137,223.87	3	411,671.62		0	411,671.62
29	11	1373.652	143,546.61	3	430,639.84		0	430,639.84
30	11	1633.346	170,684.65	3	512,053.94	560.63	58,686	453,468.59
31	11	1781.838	186,202.05	3	558,606.15		0	558,606.15
32	11	1798.784	187,659.43	3	562,978.28		0	562,978.28
33	11	1795.334	187,612.43	3	562,837.30		0	562,837.30
34	11	1807.174	188,849.67	3	566,549.02		0	566,549.02
35	11	1813.437	189,504.14	3	568,512.41		0	568,512.41
36	11	2336.925	244,208.69	3	732,625.08	597.42	62,430	670,195.90
37	11	2632.591	275,105.74	3	825,317.22		0	825,317.22
38	11	2697.789	281,918.92	3	845,756.76		0	845,756.76
39	11	2750.046	287,379.80	3	862,139.39		0	862,139.39
40	11	2757.696	288,179.24	3	864,537.73		0	864,537.73
41	11	2750.438	287,420.77	3	862,262.31		0	862,262.31
42	11	2698.203	281,753.16	3	845,259.48		0	845,259.48
43	11	3455.52	361,101.87	3	1,083,305.61	633.54	66,205	1,017,101.08
44	11	3662.817	382,764.41	3	1,148,293.22		0	1,148,293.22
45	11	3778.827	394,887.39	3	1,184,662.17		0	1,184,662.17
46	11	3779.148	394,920.95	3	1,184,762.84		0	1,184,762.84
47	11	3788.381	395,885.79	3	1,187,657.38		0	1,187,657.38
48	11	3751.867	392,070.07	3	1,176,210.21		0	1,176,210.21
49	11	3467.765	362,381.48	3	1,087,144.45		0	1,087,144.45
50	11	4466.756	466,775.97	3	1,400,237.91	662.11	69,191	1,331,137.03

51	11	4640.932	484,977.39	3	1,454,932.18			0	1,454,932.18
52	11	4706.222	491,800.21	3	1,475,400.63			0	1,475,400.63
53	11	4704.212	491,590.14	3	1,474,770.43			0	1,474,770.43
54	11	4663.466	487,332.19	3	1,461,996.56			0	1,461,996.56
55	11	4729.315	494,213.46	3	1,482,640.38			0	1,482,640.38
56	11	5276.131	551,355.65	3	1,654,066.94	704.91	73,663	1,580,403.60	
57	11	5553.301	580,319.95	3	1,740,959.86			0	1,740,959.86
59	11	5677.036	593,250.25	3	1,779,750.75			0	1,779,750.75
60	11	5700.298	595,681.17	3	1,787,043.52			0	1,787,043.52
61	11	5723.778	598,134.81	3	1,794,404.43			0	1,794,404.43
62	11	5740.15	599,845.63	3	1,799,536.90	743.95	77,743	1,721,793.97	

## 16.0 POSSIBLE CHANGES TO THE DEVELOPMENT PLANS

The sections above details the development plan for the Belleoram quarry for the first five years and shows in a more general way the long term development plan. One change to the development plan will be treatment of grubbing and waste. CSL intends to acquire crown land to the north of the quarry lease to serve as a long term dump site. The site is shown on Figure 6 and preparation of this submission is underway. Once approved, the use of the site will be incorporated into annual update to the development plans.

A second possible change could be the addition of aggregate washing circuit into to production sequence. This also will be incorporated into an annual update required in the Mining Regulations.

## 17.0 CLOSURE

This proposed Quarry Development Plan was prepared for the exclusive use of CSL for specific application to the site. The design was made in accordance with the work plans developed for this site and verbal requests from the client. The work was performed using generally accepted practices and procedures commonly used in the industry. The limitations of this report are stated in Appendix D.

Respectfully Submitted,

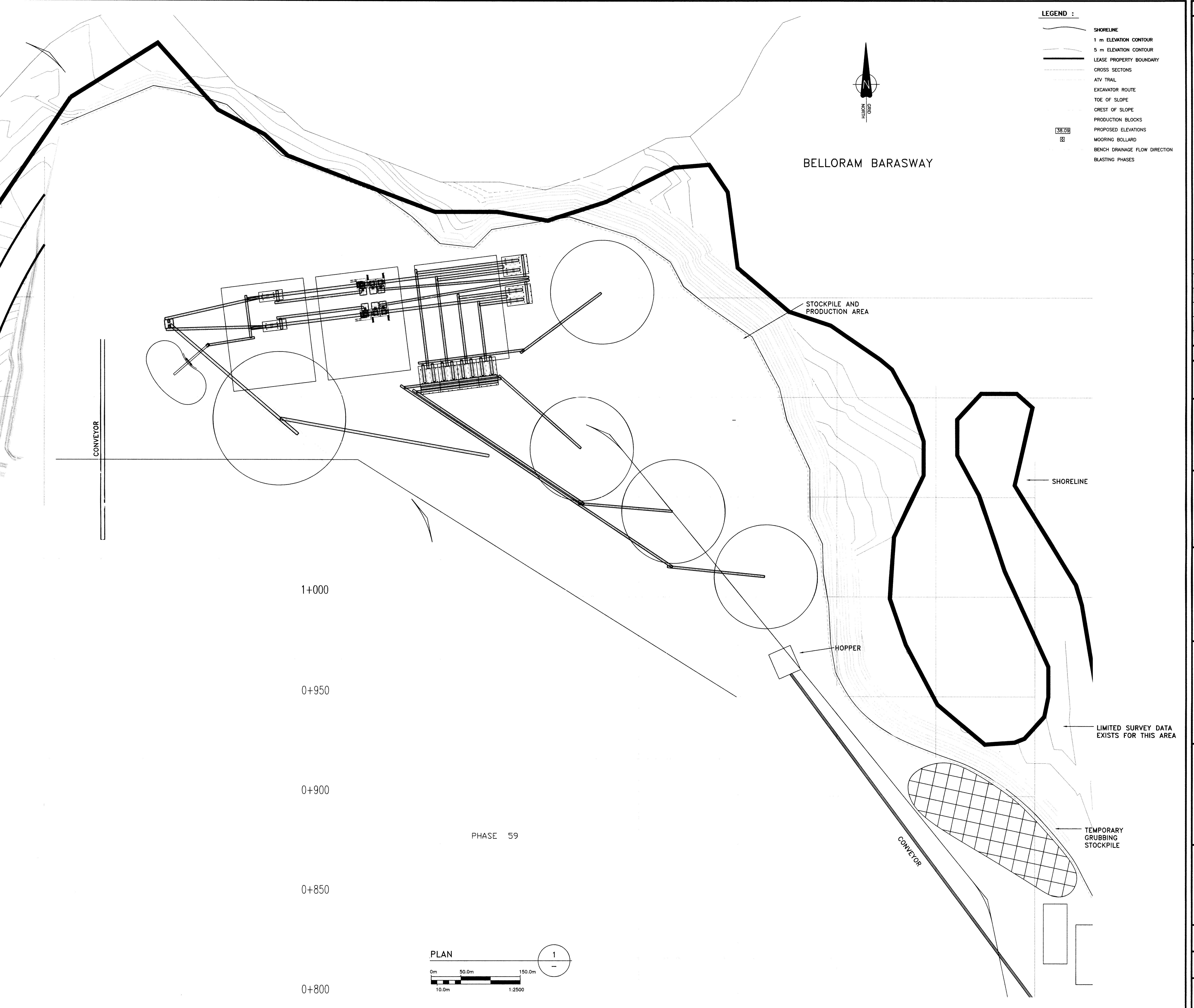
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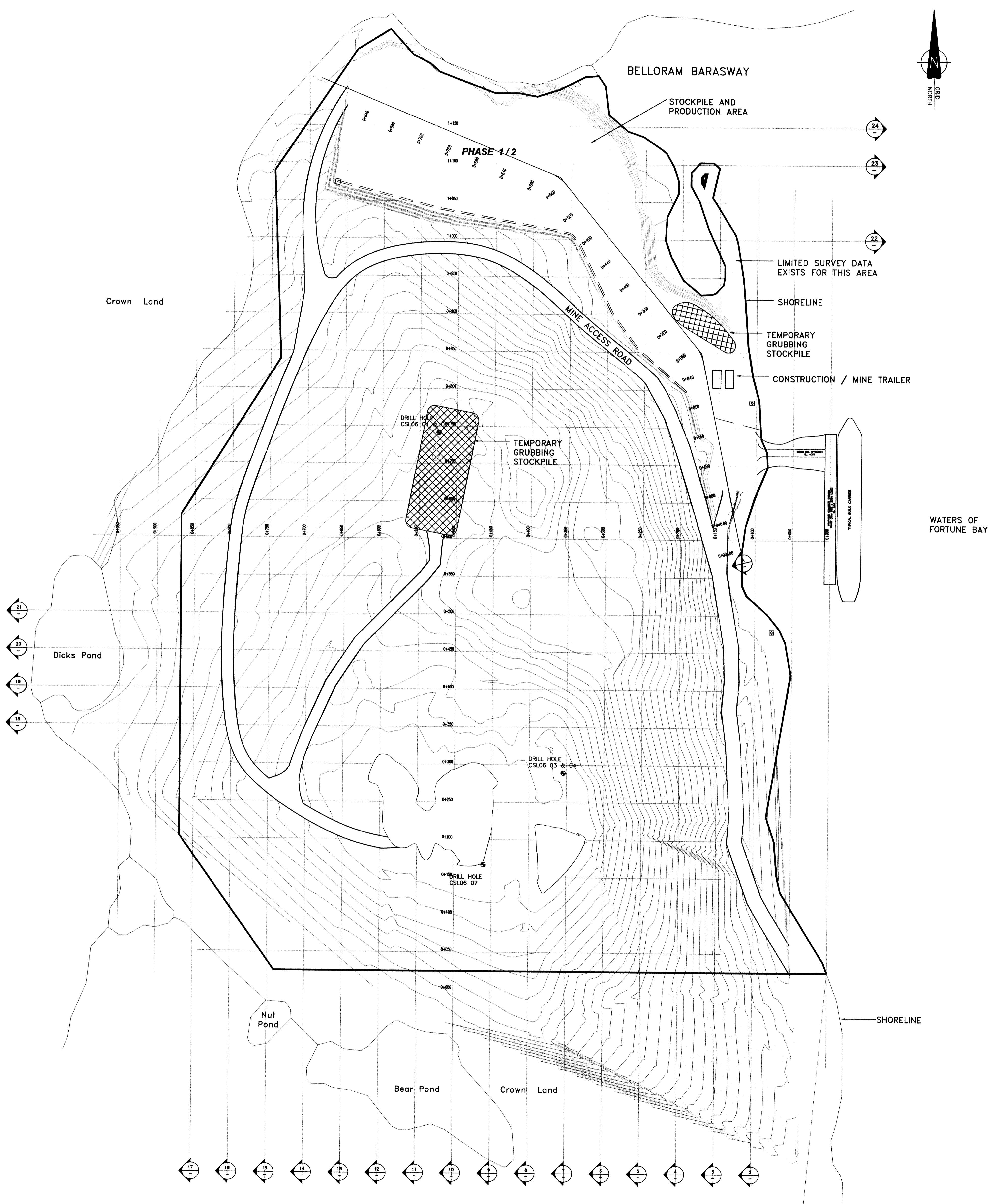
**Roderick Mercer, P. Geo.**  
Senior Geologist

**Calvin Miles, P. Geo.**  
Senior Associate

**APPENDIX A**  
**DRAWINGS**



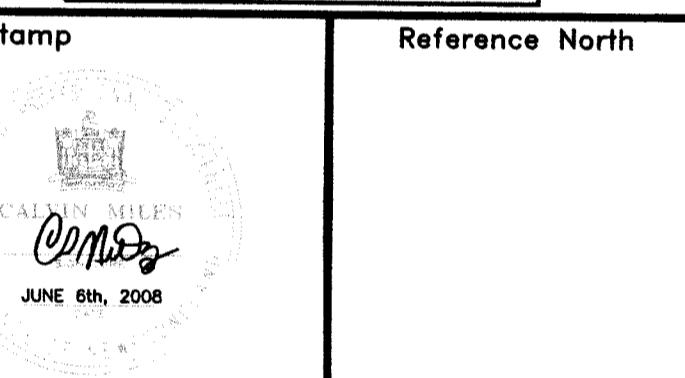
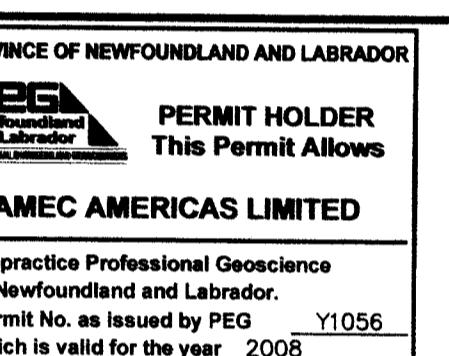
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A1B 3N4		
<b>PROJECT</b>		
<b>BELLEORMAN QUARRY DEVELOPMENT</b>		
<b>DRAWING TITLE</b>		
<b>PRODUCTION AREA</b>		
<b>SCALE</b>		
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CSL-07-16		
<b>REV.</b>		



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PROJECT

BELLEORMAN QUARRY  
DEVELOPMENT

DRAWING TITLE  
PLAN  
ROCK EXCAVATION  
PRODUCTION AREA

SCALE

1 : 2500

PROJECT NUMBER

TF 7352206

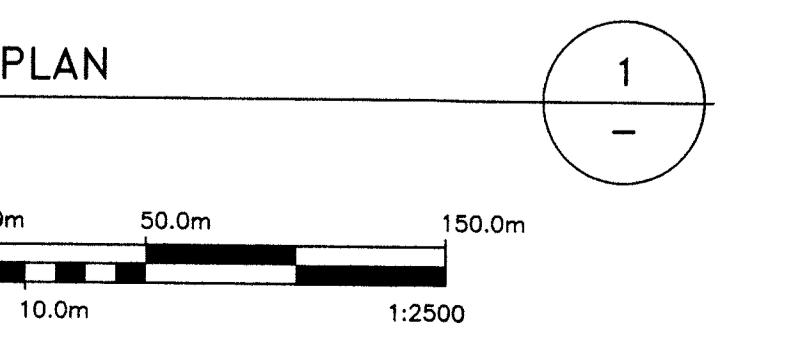
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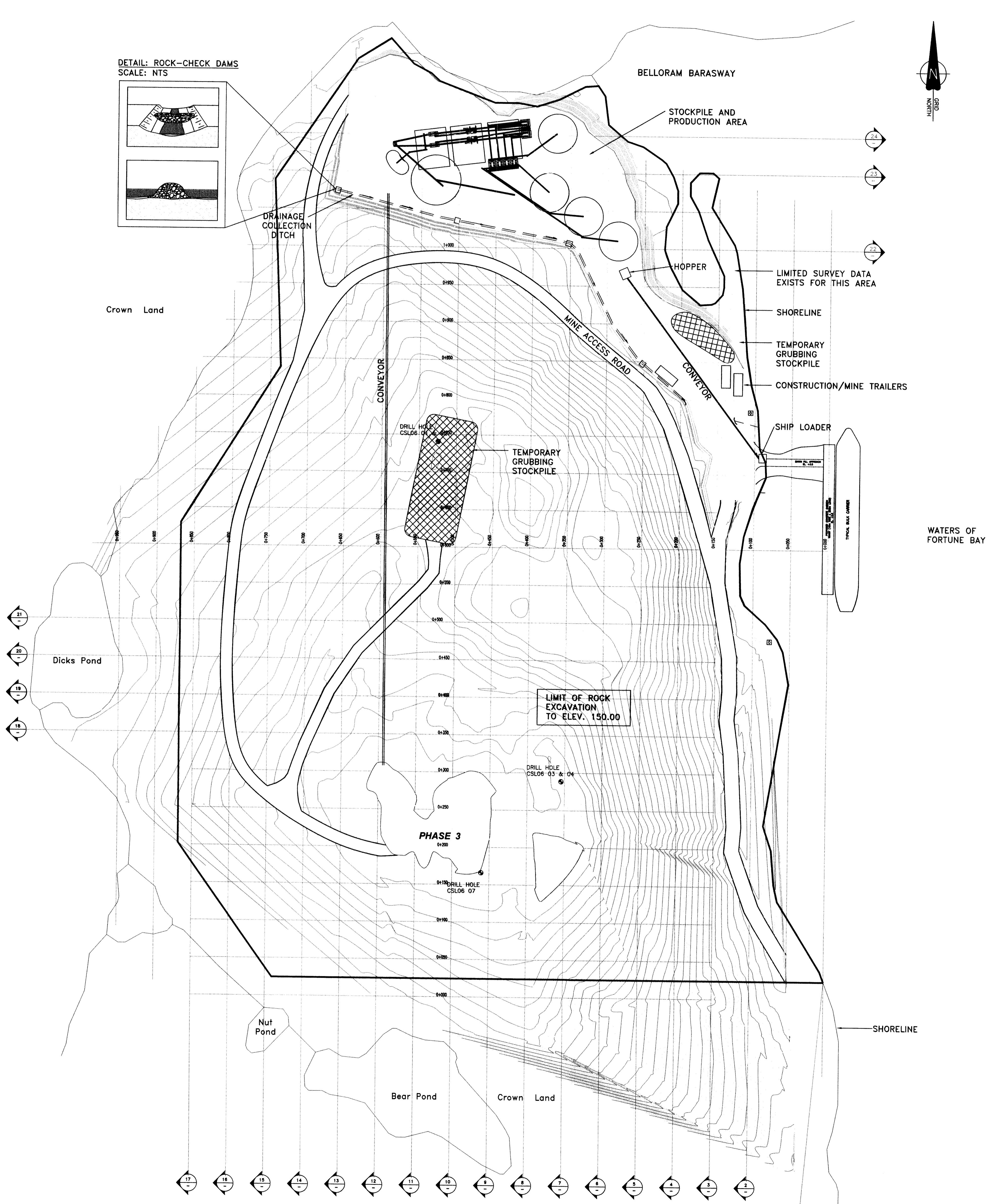
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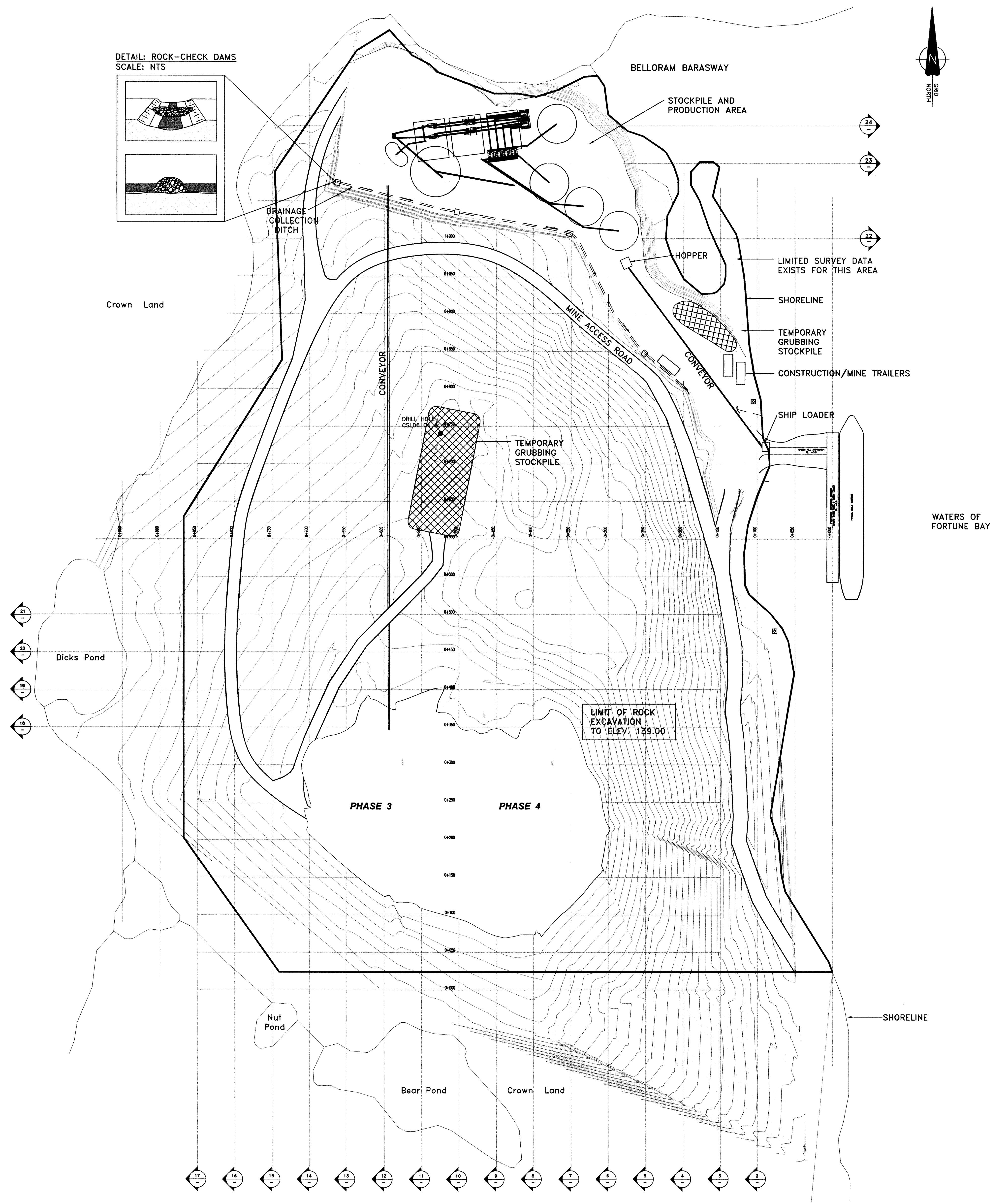
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CSL-07-02

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LEGEND :

SHORELINE  
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5 m ELEVATION CONTOUR  
LEASE PROPERTY BOUNDARY  
DRILL HOLE LOCATION  
CROSS SECTIONS  
ATV TRAIL  
EXCAVATOR ROUTE  
TOE OF SLOPE  
CREST OF SLOPE  
PRODUCTION BLOCKS  
PROPOSED ELEVATIONS  
MOORING BOLLARD  
BENCH DRAINAGE FLOW DIRECTION  
BLASTING PHASES  
DRAINAGE DITCH

NOTES

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PROJECT  
BELLEORAM QUARRY  
DEVELOPMENT

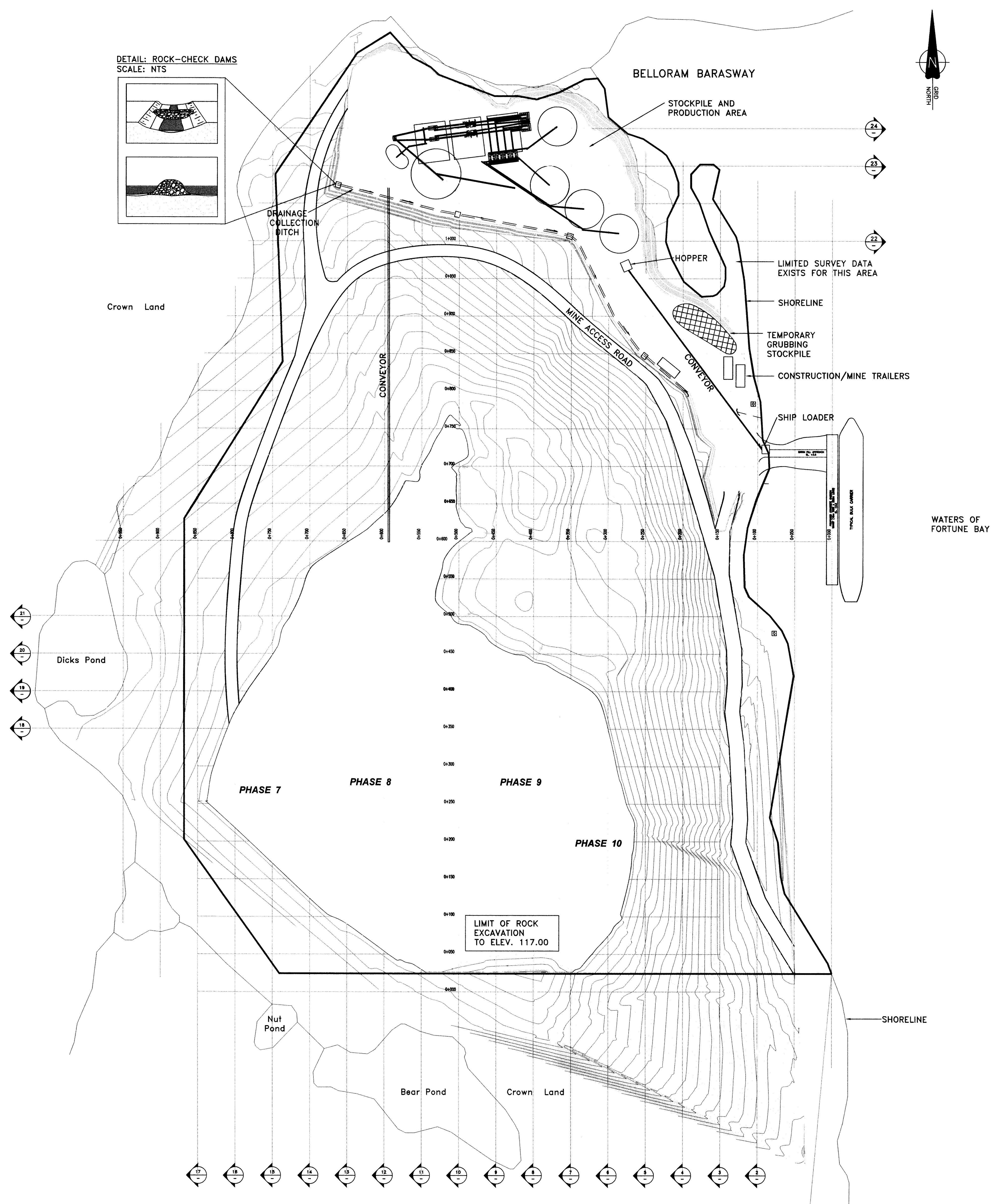
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ELEVATION 139

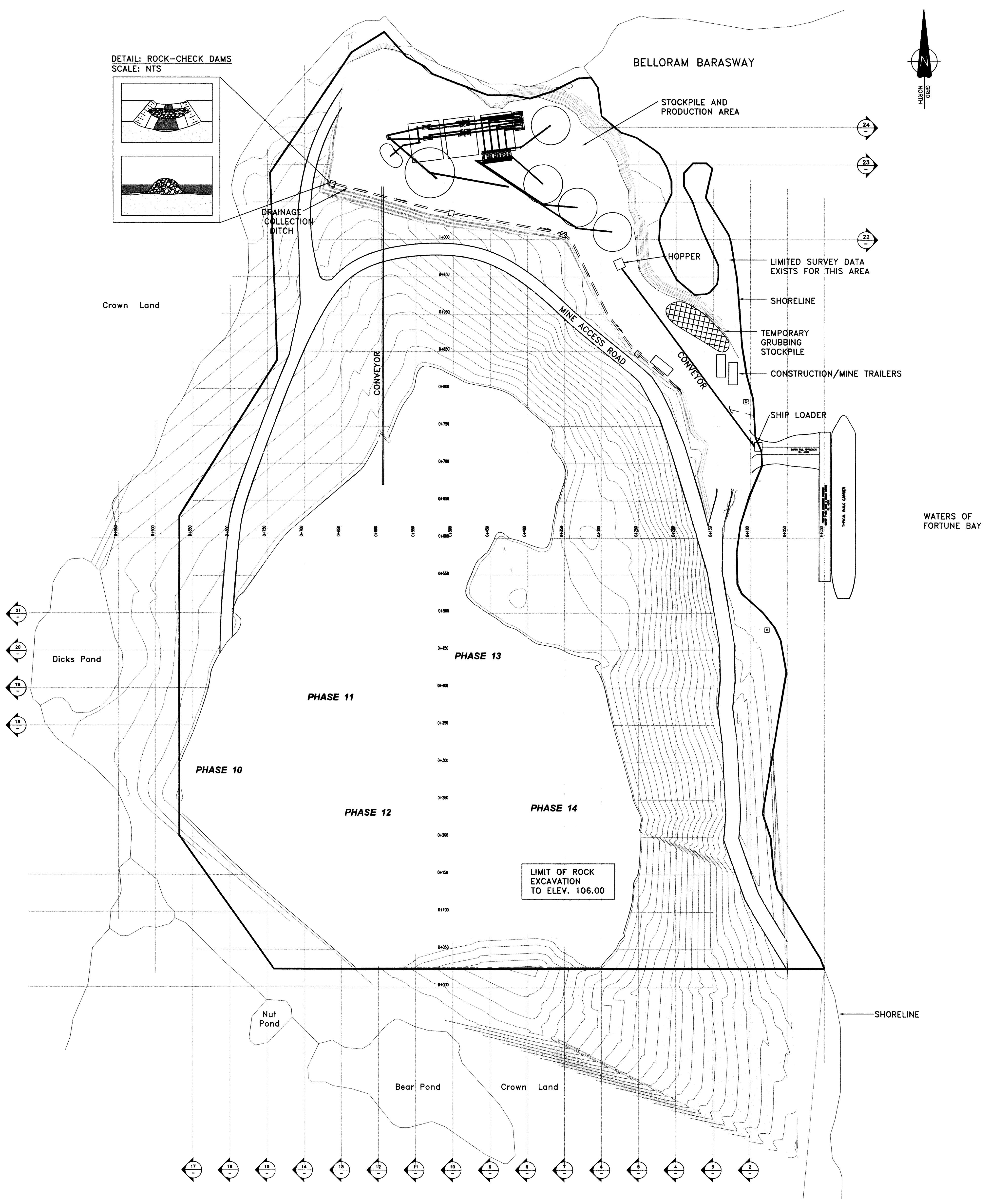
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DRAWING NO.  
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LEGEND :

- SHORELINE
- 1 m ELEVATION CONTOUR
- 5 m ELEVATION CONTOUR
- LEASE PROPERTY BOUNDARY
- CROSS SECTIONS
- ATV TRAIL
- EXCAVATOR ROUTE
- TOE OF SLOPE
- CREST OF SLOPE
- PRODUCTION BLOCKS
- PROPOSED ELEVATIONS
- MOORING BOLLARD
- BENCH DRAINAGE FLOW DIRECTION
- BLASTING PHASES
- = DRAINAGE DITCH

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B	location drawing no.
C	drawing no. where detailed

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PROJECT

BELLEORAM QUARRY  
DEVELOPMENT

DRAWING TITLE

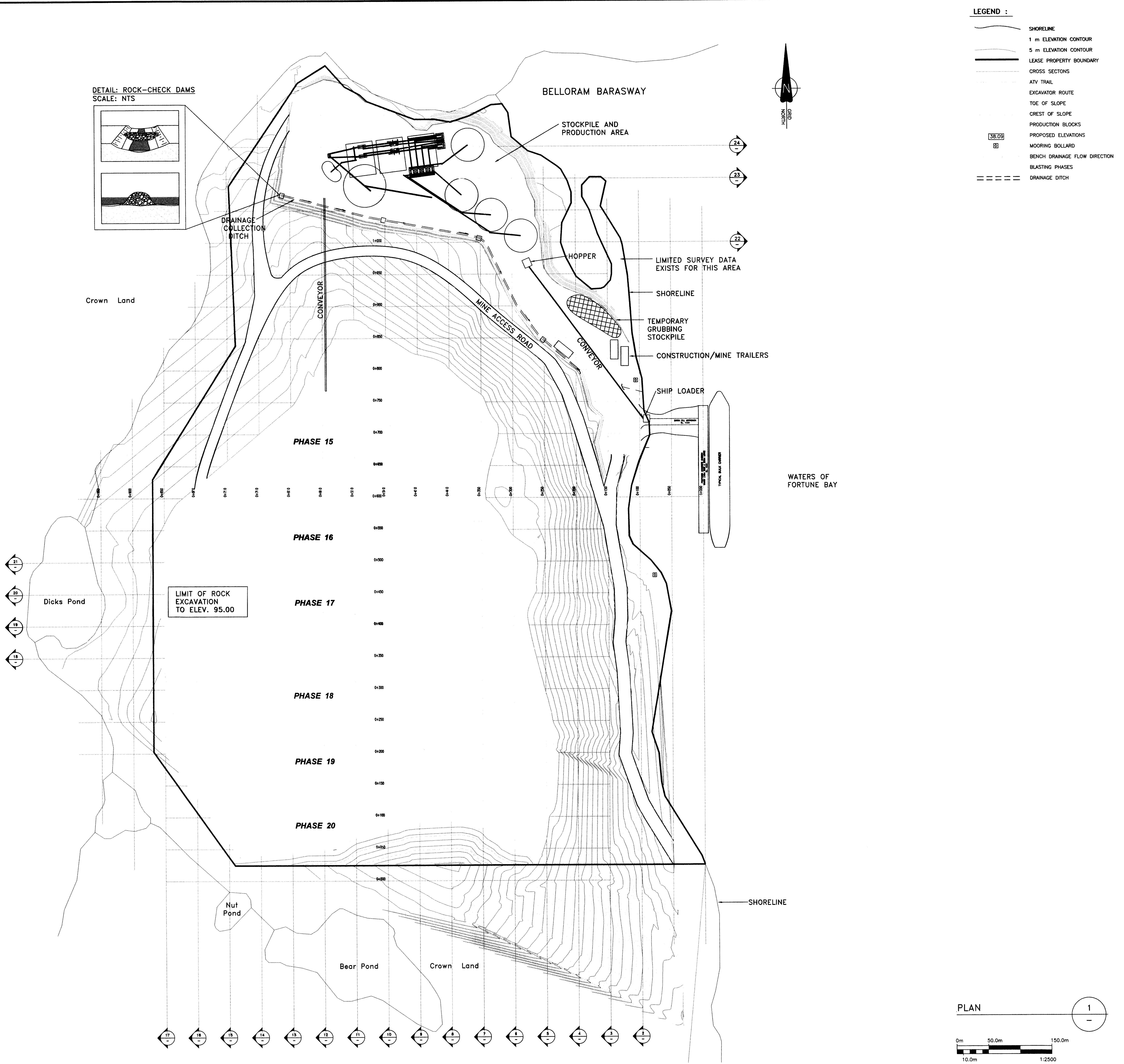
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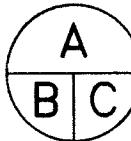


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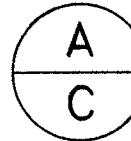
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**A**



**A**

**B**

**C**

**A** detail no.

**B** location drawing no.

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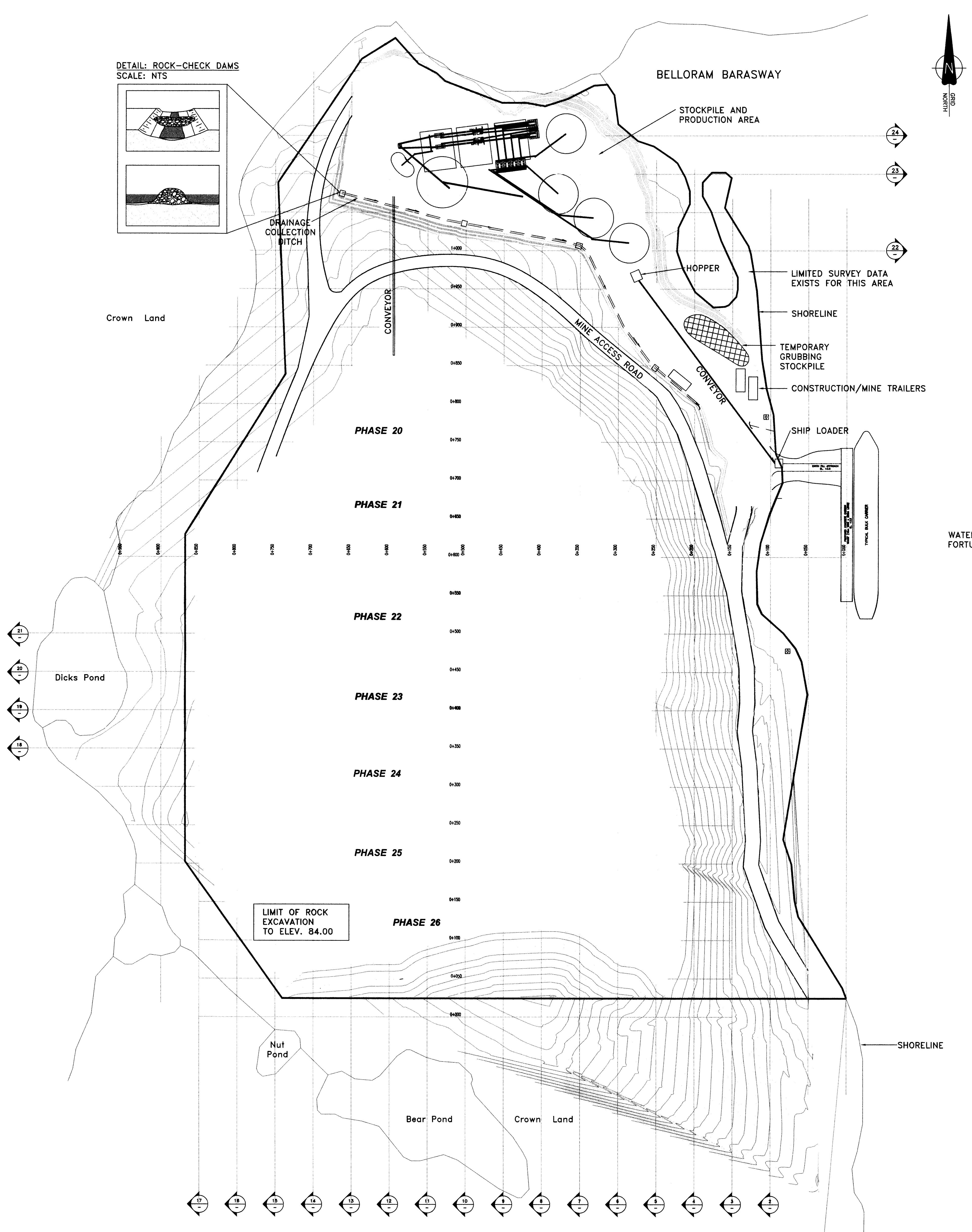
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# PROJECT

DRAWING TITLE

PLAN  
ROCK EXCAVATION TO  
ELEVATION 95

SCALE	PROJECT N
1 : 2500	TF
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DWTF7357	
DRAWING NO.	
CSL-07-	



**LEGEND :**

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3	08/06/06	CORRECTIONS AND REVISIONS	RM
A	08/03/12	ISSUED WITH REPORT	RM
o.	Date	Description	Drawn Chk'd

## REVISIONS

- A detail no.
- B location drawing no.
- C drawing no. where detailed

**PERMIT HOLDER**  
**This Permit Allows**

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To practice Professional Geoscience  
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## Reference North

amec

**AMEC Americas Limited**  
Earth and Environmental  
**AMEC Building, 133 Crosbie Road**  
**P.O. Box 13216**  
**St. John's, NL, A1B 4A5**

ENT

CONTINENTAL STONE LIMITED  
1309 TOPSAIL ROAD  
P.O. BOX 8274, STN A  
ST. JOHN'S, NL  
A1B 3N4

## PROJECT

# BELLEORAM QUARRY DEVELOPMENT

DRAWING TITLE

## PLAN

PLAN  
ROCK EXCAVATION TO  
ELEVATION 84

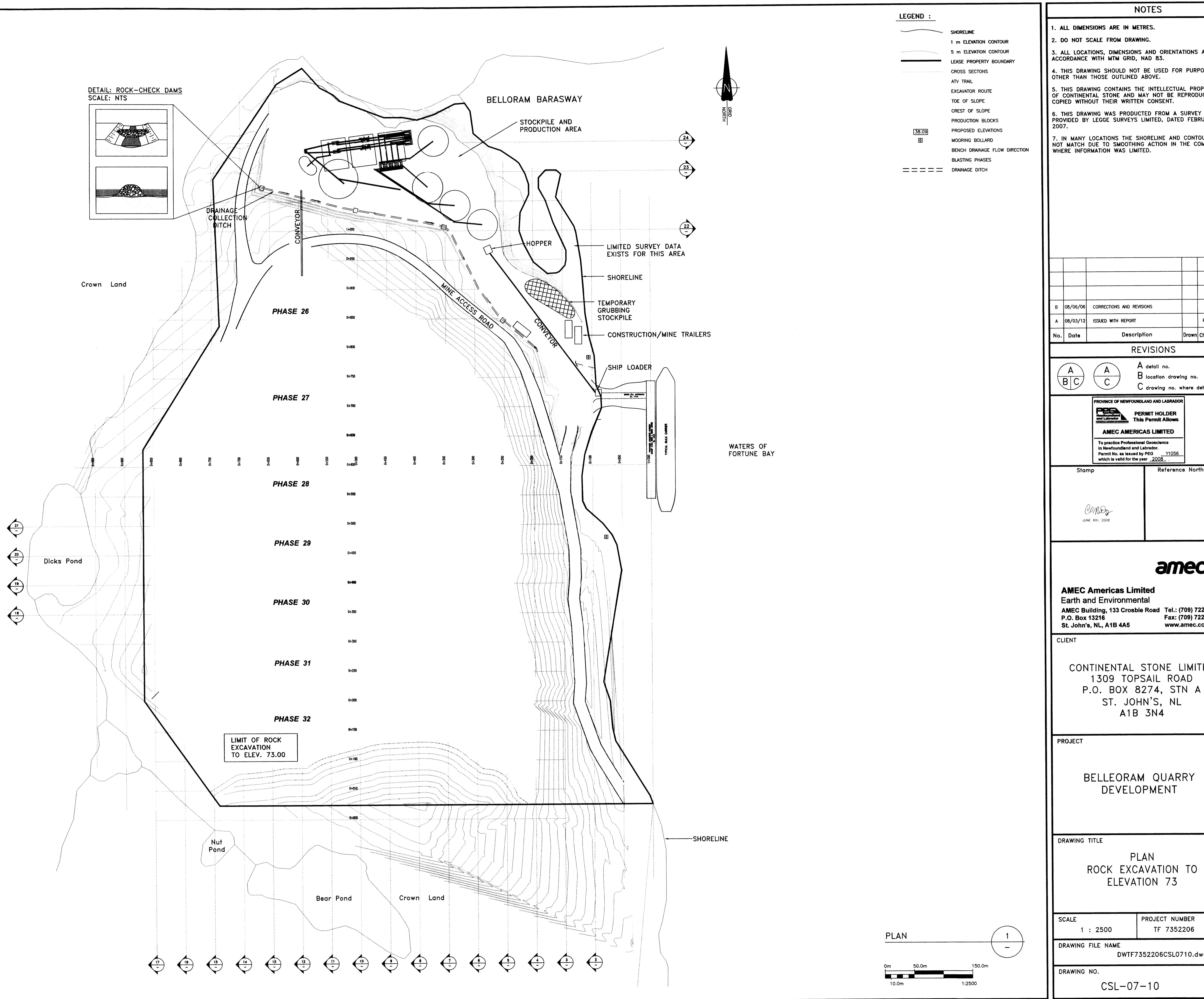
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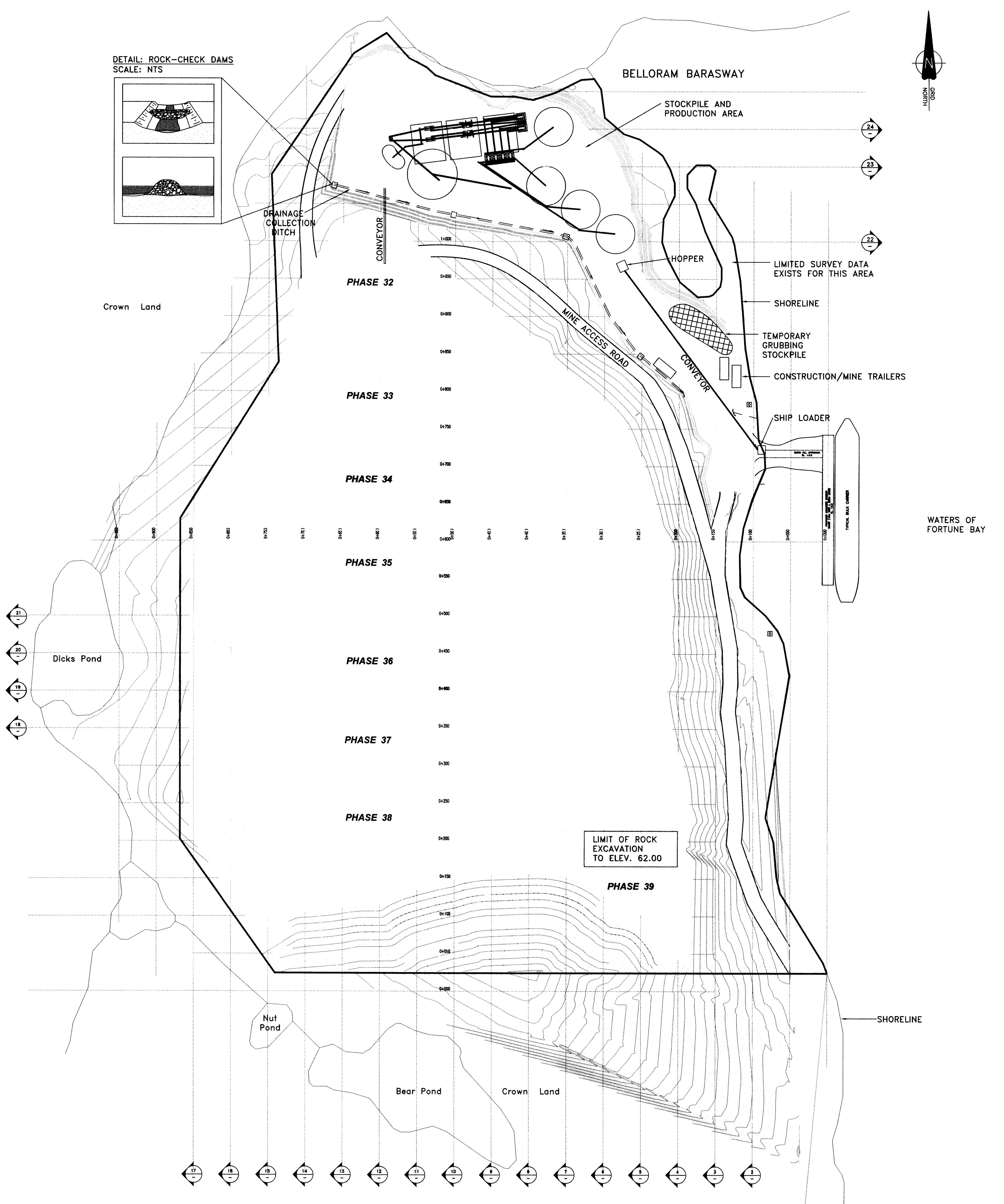
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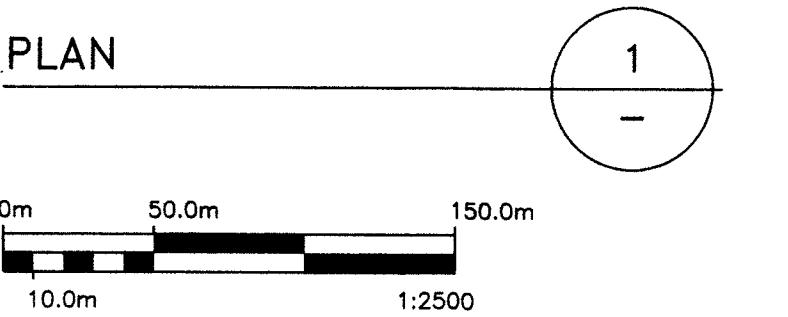
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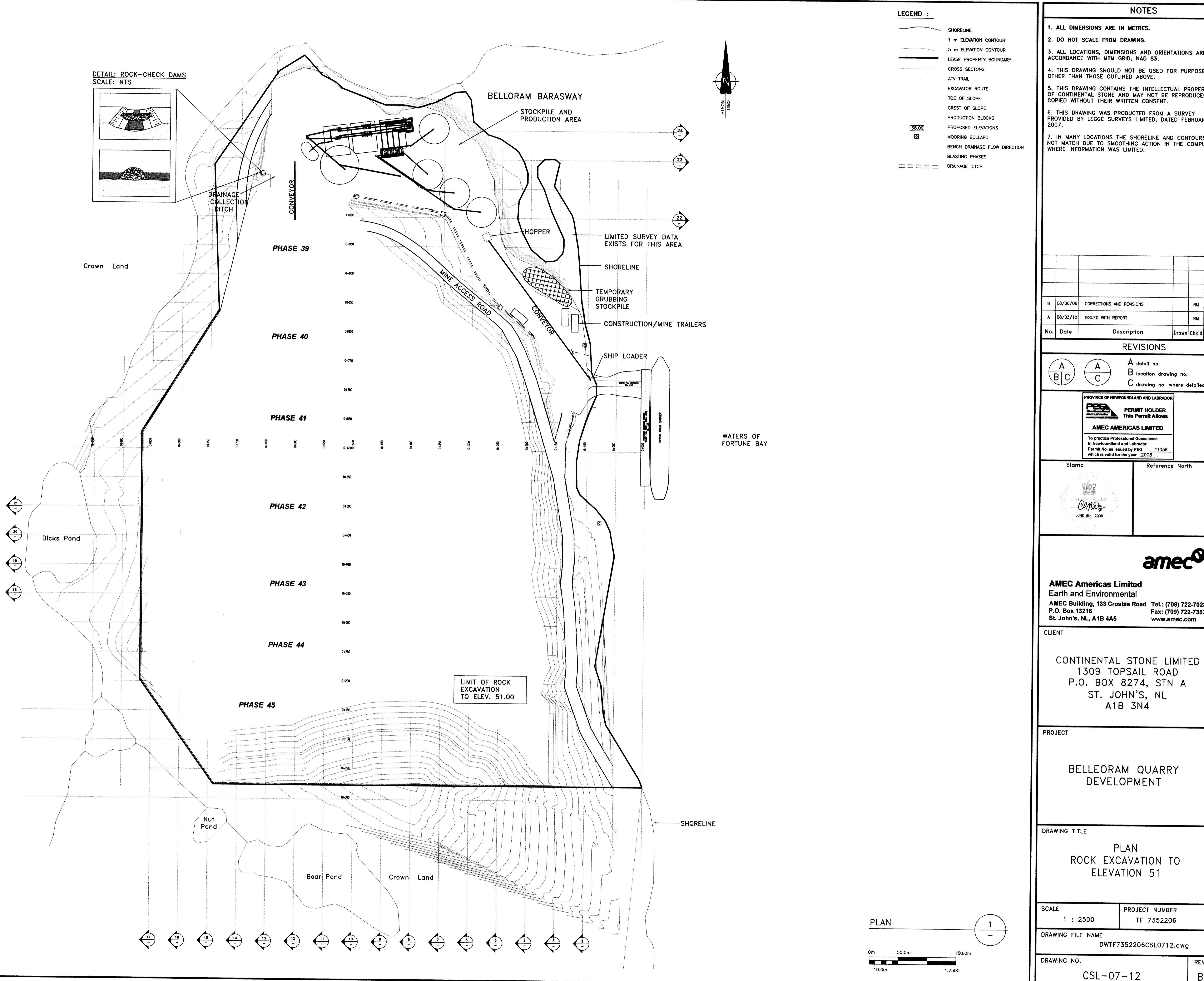
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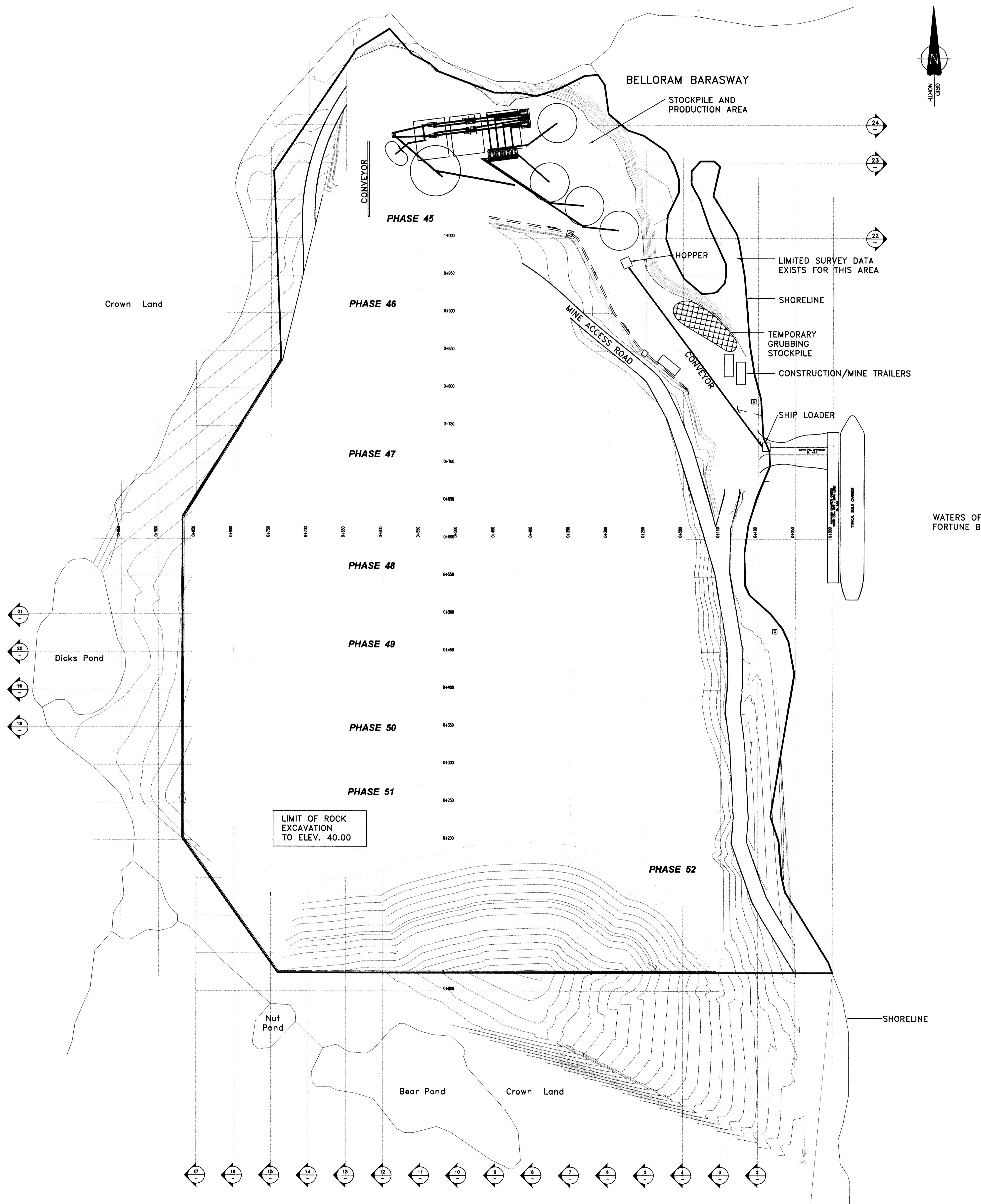




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REVISIONS		
A detail no. B location drawing no. C drawing no. where detailed		
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<b>AMEC Americas Limited</b> Earth and Environmental AMEC Building, 133 Crosbie Road Tel.: (709) 722-7023 P.O. Box 13216 Fax: (709) 722-7353 St. John's, NL, A1B 4A5 <a href="http://www.amec.com">www.amec.com</a>		
CLIENT		
<b>CONTINENTAL STONE LIMITED</b> 1309 TOPSAIL ROAD P.O. BOX 8274, STN A ST. JOHN'S, NL A1B 3N4		
PROJECT		
<b>BELLEORAM QUARRY DEVELOPMENT</b>		
DRAWING TITLE		
<b>PLAN</b> <b>ROCK EXCAVATION TO ELEVATION 62</b>		
SCALE	PROJECT NUMBER	
1 : 2500	TF 7352206	
DRAWING FILE NAME		
DWTF7352206CSL0711.dwg		
DRAWING NO.		
CSL-07-11		
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No.	Date	Description	Drawn

REVISIONS

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B	C	B location drawing no.
C		C drawing no. where detailed

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	In Newfoundland and Labrador.
	Permit No. as issued by PEG
	Y1056
	which is valid for the year 2008

Stamp Reference North

*C. M. D.*  
JUNE 6th, 2006

**amec**

**AMEC Americas Limited**  
Earth and Environmental  
AMEC Building, 133 Crosbie Road Tel.: (709) 722-7021  
P.O. Box 13216 Fax: (709) 722-7361  
St. John's, NL, A1B 4A5  
www.amec.com

CLIENT

CONTINENTAL STONE LIMITED  
1309 TOPSAIL ROAD  
P.O. BOX 8274, STN A  
ST. JOHN'S, NL  
A1B 3N4

PROJECT

BELLEORAM QUARRY DEVELOPMENT

DRAWING TITLE

PLAN  
ROCK EXCAVATION TO  
ELEVATION 40

SCALE 1 : 2500 PROJECT NUMBER TF 7352206

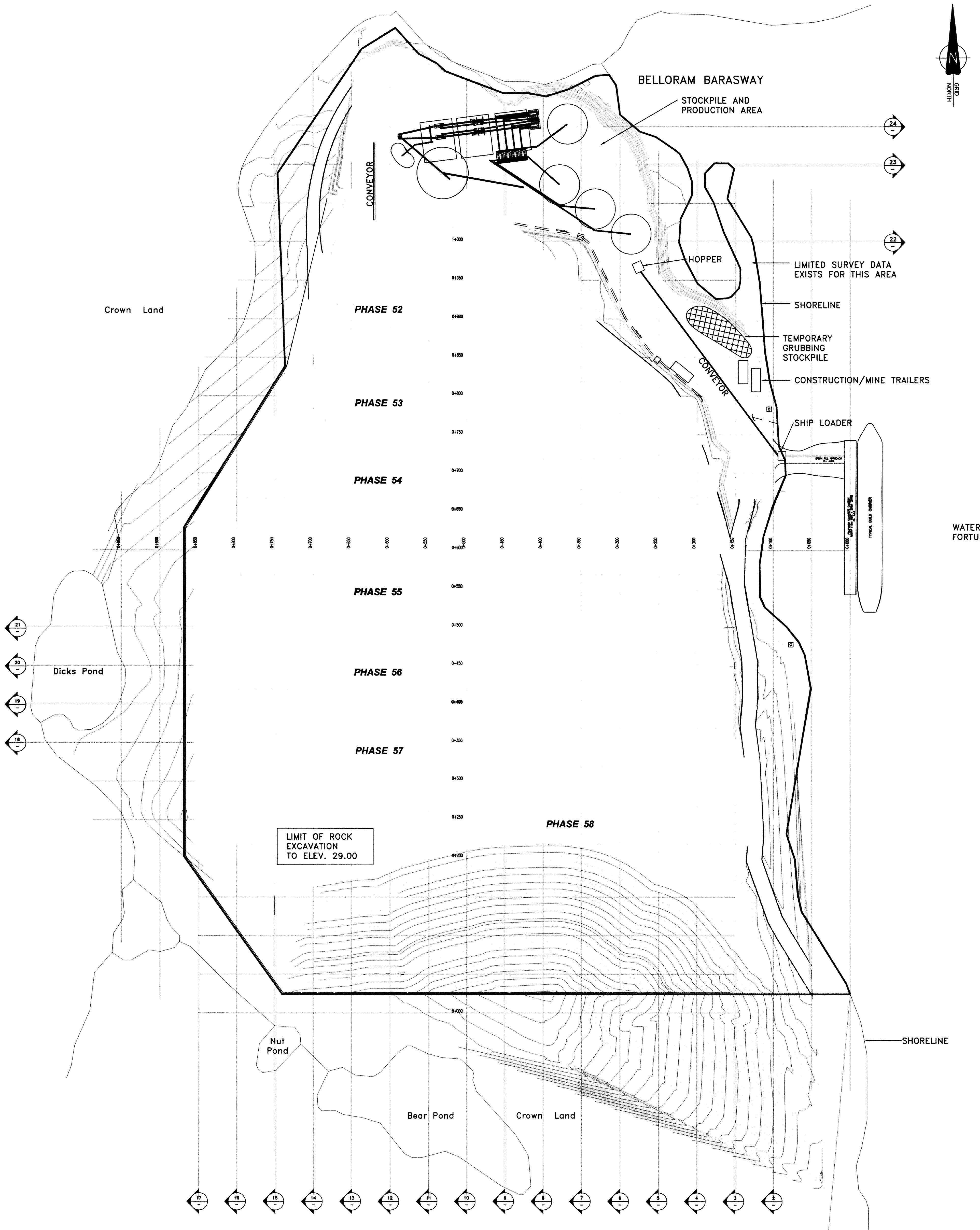
DRAWING FILE NAME DWTF7352206CSL0713.dwg

DRAWING NO. CSL-07-13 R

PLAN

1

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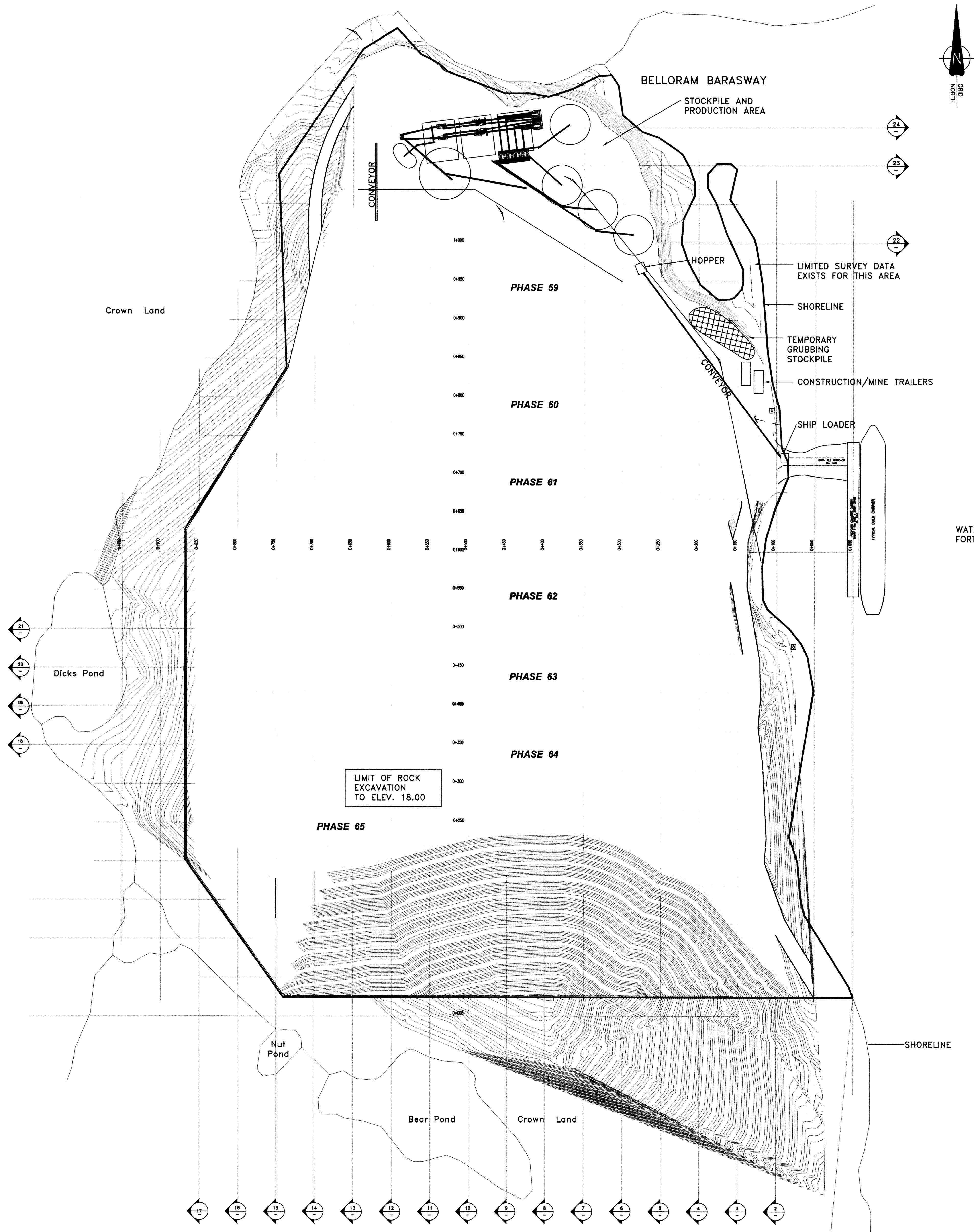
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<b>B/C</b>	<b>C</b>	<b>A</b> detail no. <b>B</b> location drawing no. <b>C</b> drawing no. where detailed
<b>PROVINCE OF NEWFOUNDLAND AND LABRADOR</b>  <b>PERMIT HOLDER</b> <b>AMEC AMERICAS LIMITED</b> To practice Professional Geoscience in Newfoundland and Labrador, Permit No. as issued by PEGS, Y1056, which is valid for the year 2008.		
Stamp	Reference North	
JUNE 6th, 2008		
 <b>AMEC Americas Limited</b> Earth and Environmental AMEC Building, 133 Crosbie Road Tel: (709) 722-7023 P.O. Box 13216 Fax: (709) 722-7353 St. John's, NL, A1B 4A5 <a href="http://www.amec.com">www.amec.com</a>		
CLIENT		
<b>CONTINENTAL STONE LIMITED</b> 1309 TOPSAIL ROAD P.O. BOX 8274, STN A ST. JOHN'S, NL A1B 3N4		
PROJECT		
<b>BELLEORAM QUARRY DEVELOPMENT</b>		
DRAWING TITLE		
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CSL-07-14		
REV B		

PLAN

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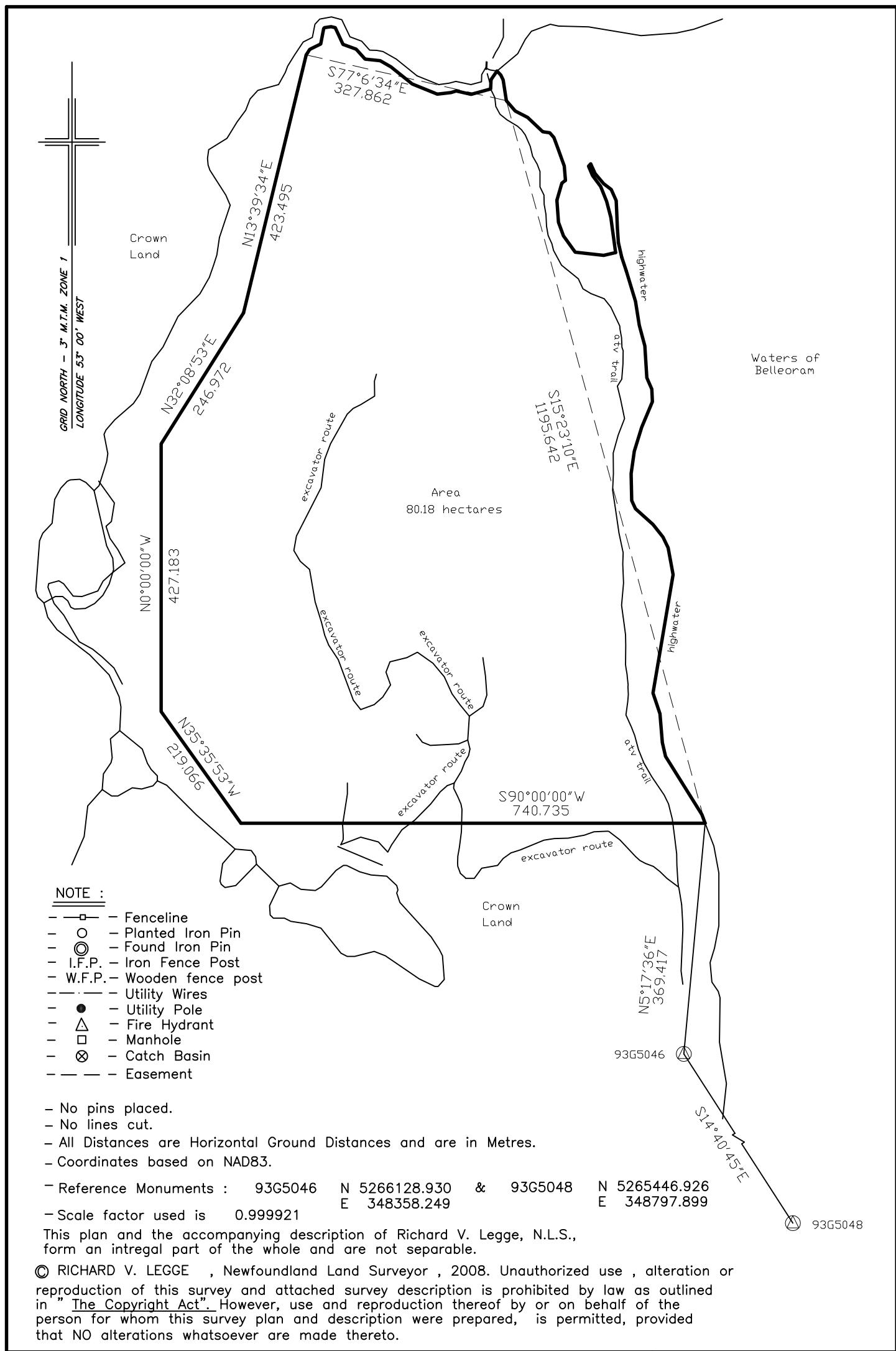
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No.	Date	Description	Drawn	Chkd
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		A detail no.		
		B location drawing no.		
		C drawing no. where detailed		
		PROVINCE OF NEWFOUNDLAND AND LABRADOR		
		PERMIT HOLDER		
		This Permit Allows		
		AMEC AMERICAS LIMITED		
		To practice Professional Geoscience		
		In Newfoundland and Labrador.		
		Permit No. as issued by PEG Y1056		
		which is valid for the year 2008		
Stamp	Reference North			
	JUNE 6th, 2008			
<b>amec</b>				
<b>AMEC Americas Limited</b> Earth and Environmental				
AMEC Building, 133 Crosbie Road Tel: (709) 722-7023				
P.O. Box 13216				
St. John's, NL, A1B 4A5				
www.amec.com				
CLIENT	CONTINENTAL STONE LIMITED			
	1309 TOPSAIL ROAD			
	P.O. BOX 8274, STN A			
	ST. JOHN'S, NL			
	A1B 3N4			
PROJECT	BELLEORAM QUARRY			
	DEVELOPMENT			
DRAWING TITLE	PLAN			
	ROCK EXCAVATION TO			
	ELEVATION 18			
SCALE	1 : 2500	PROJECT NUMBER		
		TF 7352206		
DRAWING FILE NAME	DWTF7352206CSL0715.dwg			
DRAWING NO.	CSL-07-15	REV		
		B		

**APPENDIX B**  
**QUARRY LEASE QUESTIONNAIRE**

**APPENDIX C**  
**LEGAL SURVEY**



LEGGE SURVEYS LIMITED  
P.O. BOX 8274, STATION "A", ST. JOHNS, NL, A1B 3N4  
Tel: 709-364-5008 Fax: 709-364-4833

REVISED SURVEY FOR CONTINENTAL STONE LIMITED  
BELLEFOND, NL

SCALE : 1 : 7500 JOB No. : 2007-677A  
DATE : MAY 5, 2008 SURVEY : G.C. / I.D.

**APPENDIX D**  
**LIMITATIONS**

## **AGGREGATE RESOURCE DEVELOPMENT PROJECT LIMITATIONS**

The information contained herein in no way reflects on the over all viability of the project, unless otherwise stated and determined by a feasibility study. Resource quantity was estimated based on the size of the permit area and the mining method. This quantity may differ from the amount of material that will actually be extracted during quarry development, and could not be detected or anticipated at the time of the site investigation. Except as otherwise specified, AMEC disclaims any obligation to update this report for events taking place, or with respect to information that becomes available to AMEC after the time during which AMEC conducted the assessment.

In evaluating the property, AMEC has relied in good faith on information provided by other individuals noted in this report. AMEC has assumed that the information provided is factual and accurate. In addition, the findings in this report are based, to a large degree, upon information provided by the current owner/occupant. AMEC accepts no responsibility for any deficiency, misstatement or inaccuracy contained in this report as a result of omissions, misinterpretations or fraudulent acts of persons interviewed or contacted.

The recommendations given in this report are applicable only to the project described in the text, and the comments made in this report relating to development of the site(s) are intended only for the guidance for the final feasibility study. This work has been undertaken in accordance with normally accepted geoscientific practices. No other warranty is expressed or implied.

Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. AMEC accepts no responsibility for losses of any kind whatsoever, including direct or consequential financial effects on transactions or property values, or requirements for follow-up actions and costs, or for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

AMEC makes no other representations whatsoever, including those concerning the legal significance of its findings, or as to other legal matters touched on in this report, including, but not limited to, ownership of any property, or the application of any law to the facts set forth herein. With respect to regulatory compliance issues, regulatory statutes are subject to interpretation and change. Such interpretations and regulatory changes should be reviewed with legal counsel.



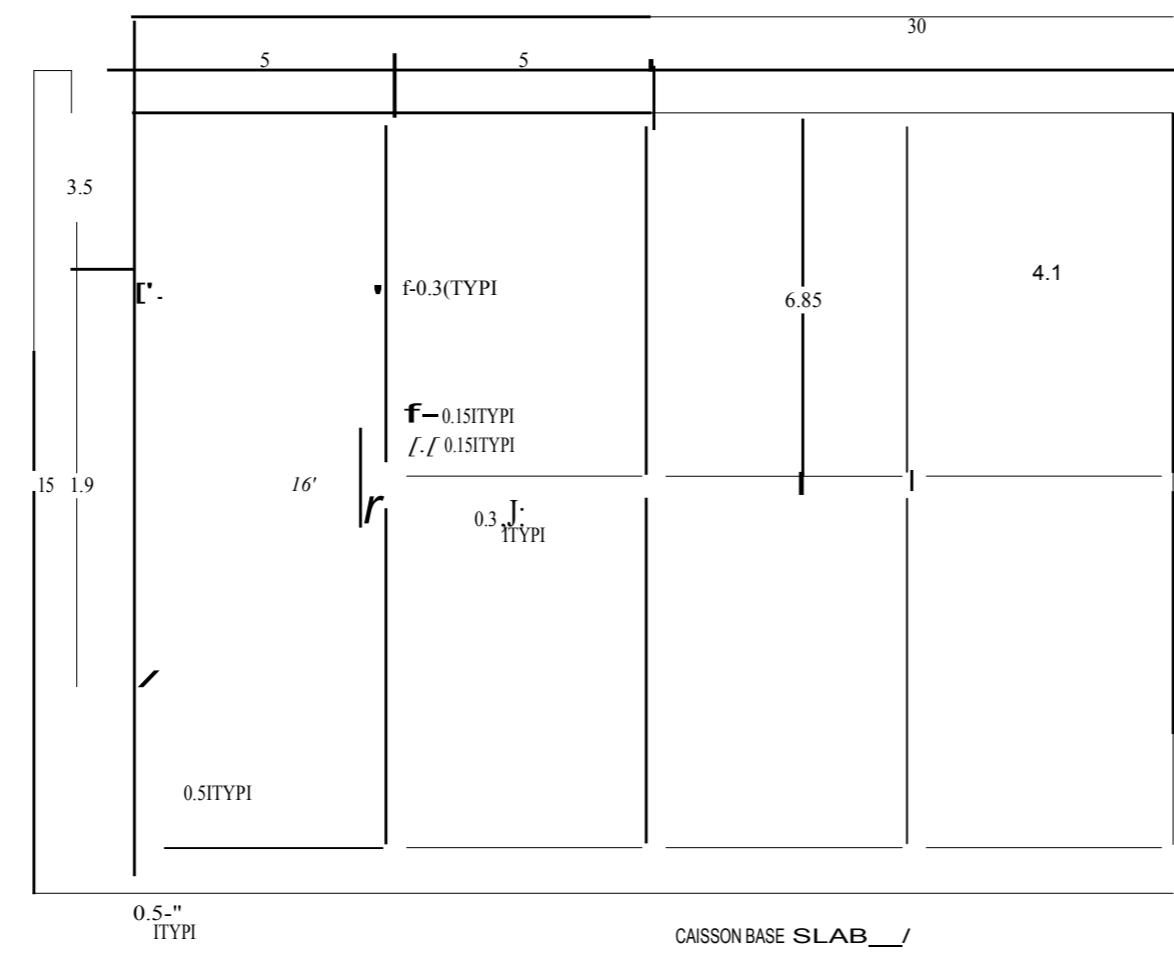
## **APPENDIX 2**

### **Marine Wharf Design**



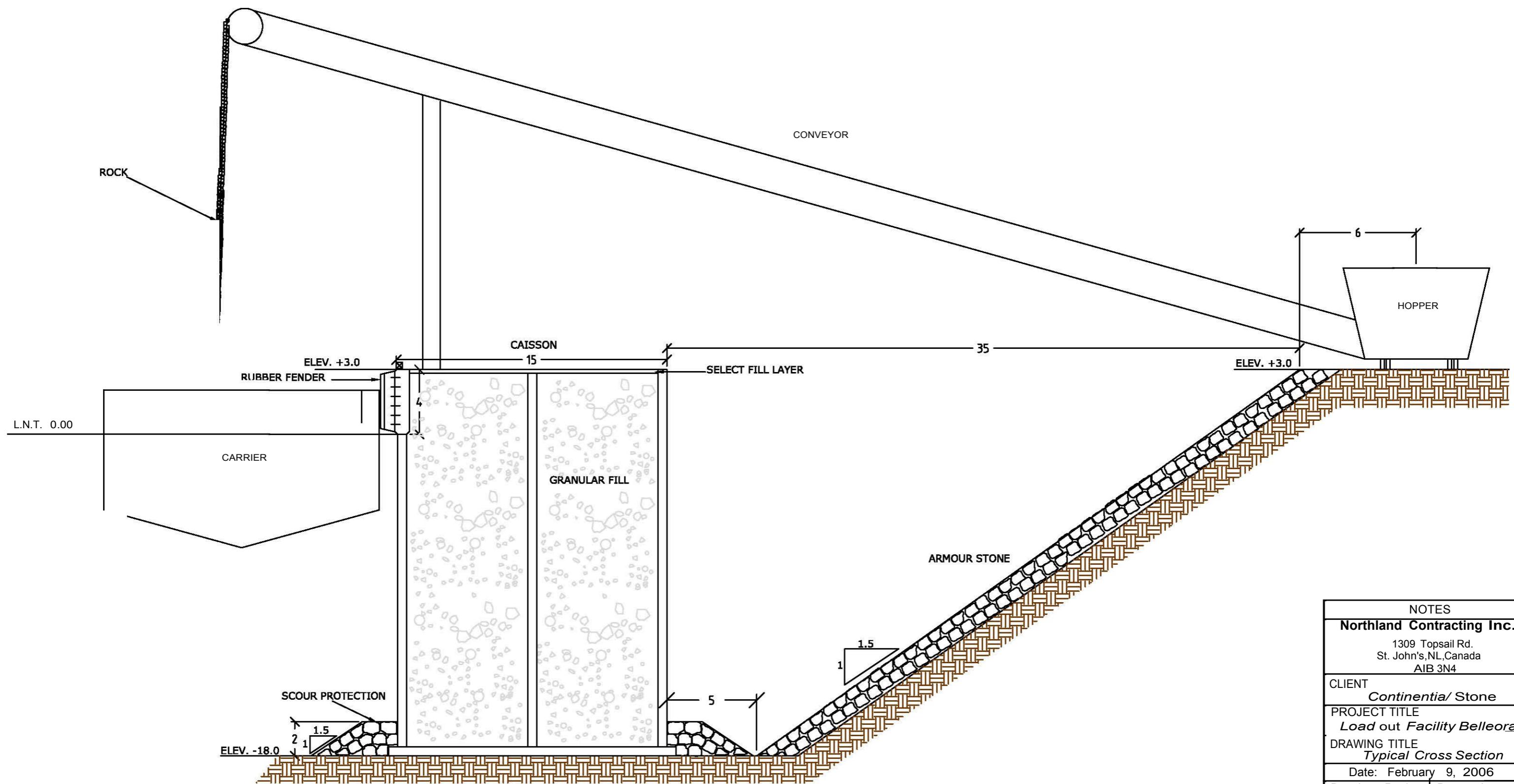


TYPICAL GIRDER SECTION

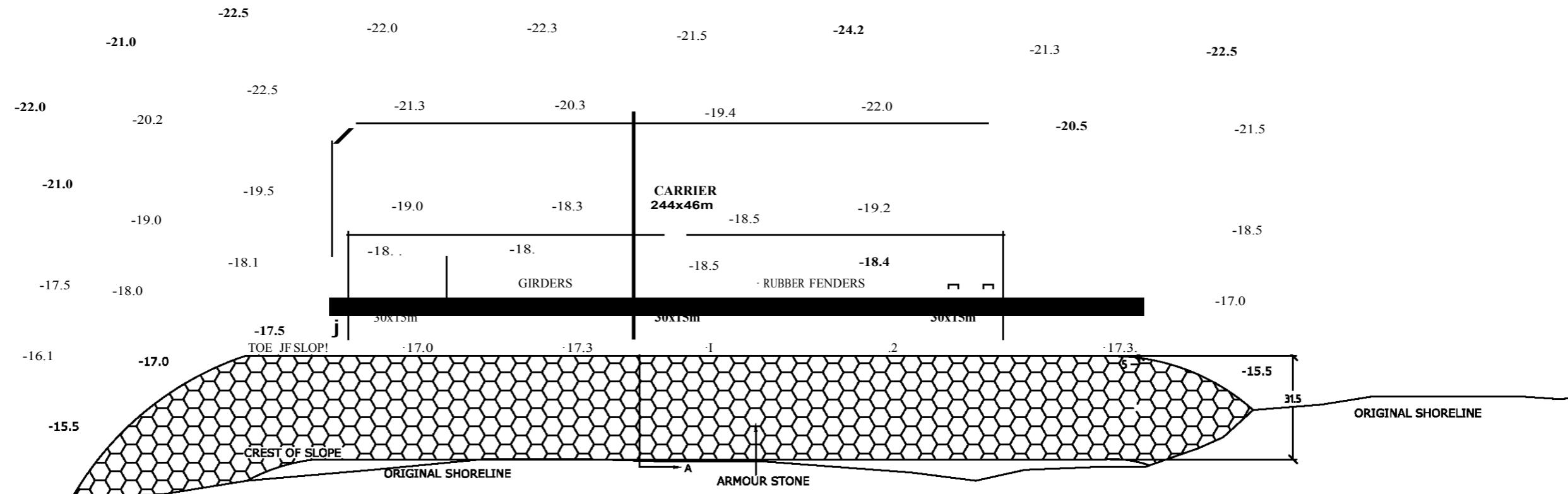


TYPICAL CAISSON LAYOUT

NOTES	
Northland Contracting Inc.	1309 Topsail Rd. St. John's, NL, Canada A1B 3N4
CLIENT	Continentia/ Stone
PROJECT TITLE	Load out Facility Belleoram
DRAWING TITLE	Caisson & Girder Layout
Date:	February 9, 2006
Drawin	Review
L. PUDDISTER	J. O'Brien
Scale: NTS	Sheet REV.
UNITS: METRIC	B-03



NOTES	
Northland Contracting Inc.	1309 Topsail Rd. St. John's, NL, Canada A1B 3N4
CLIENT	Continentia/ Stone
PROJECT TITLE	Load out Facility Belleoram
DRAWING TITLE	Typical Cross Section
Date:	February 9, 2006
Drawin	Review
L. PUDDISTER	J. O'Brien
Scale:	NTS
UNITS:	METRIC
Sheet #	B-02
REV. #	



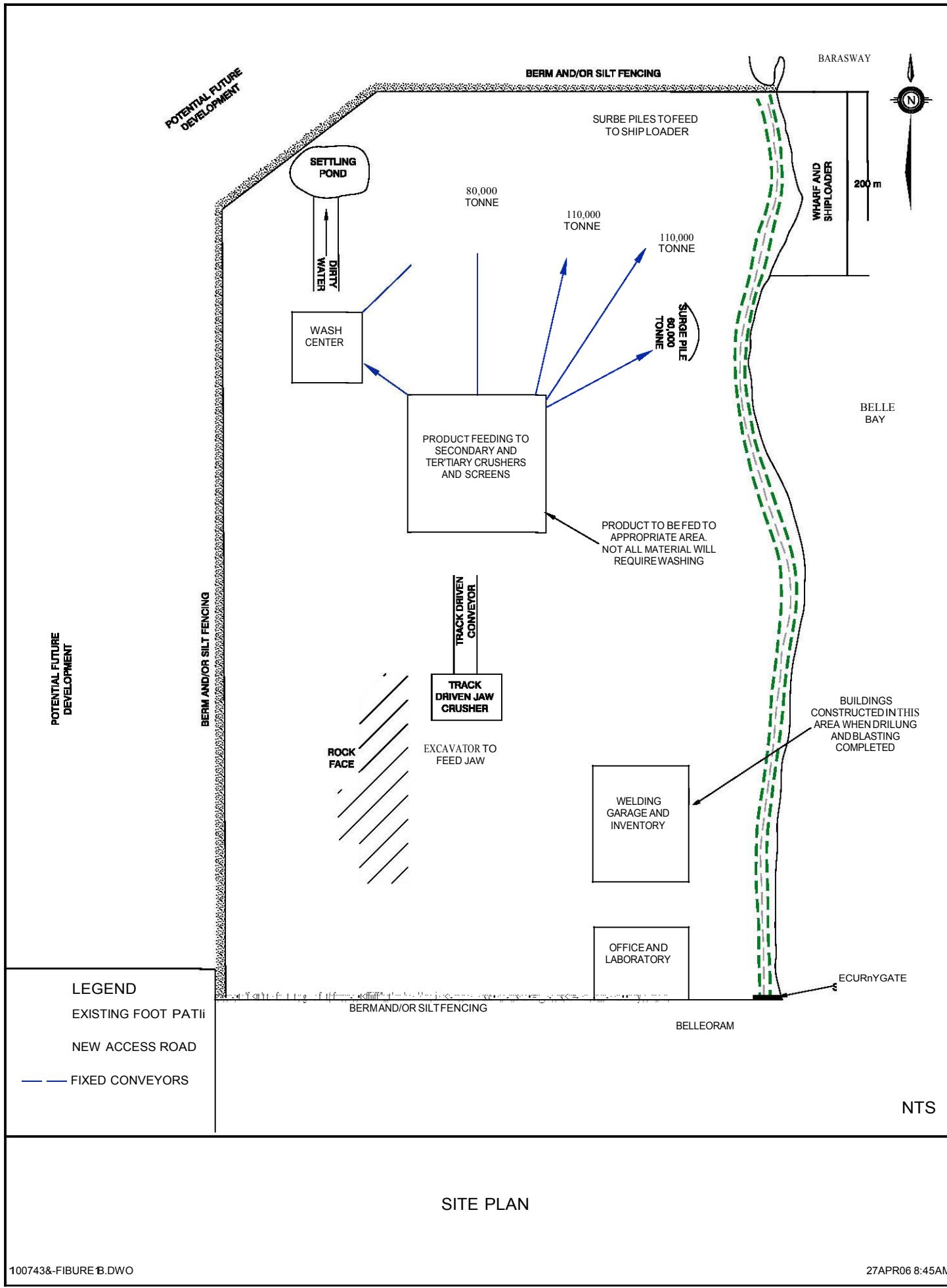
NOTES
>Topsail Rd. Inc. <sup>1</sup> St. John, Canada
CUENT Continental Stone
L.C
DRAWING TITLE Plan
Date: 9, 2006
L.Pu In-R. Scale: NTS Sheet II REV. UNITS: METRIC B-01



## **APPENDIX 3**

### Site Plan







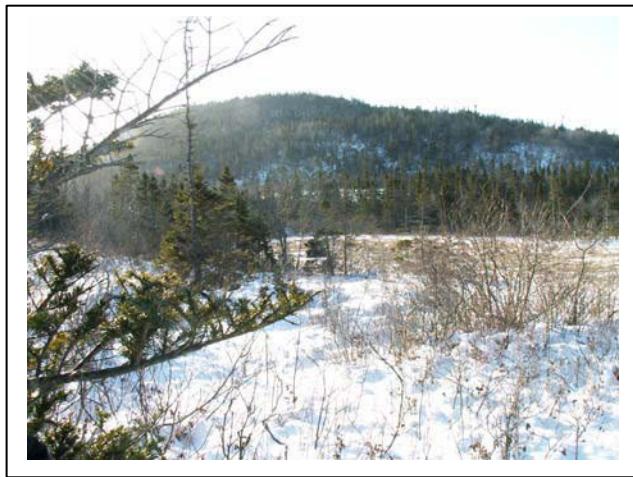
## **APPENDIX 4**

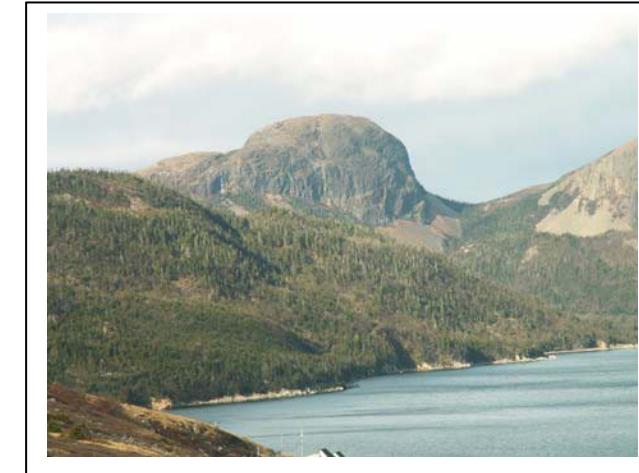
### **Site Photos**





Viewscape photo from quarry area showing location relative to the town of Belleoram. Also shows hill topography between proposed quarry location and town.







## **APPENDIX 5**

### **Municipal Recommendation Form**




  
**Newfoundland**  
**Labrador**

**NEWFOUNDLAND AND LABRADOR**  
**DEPARTMENT OF ENVIRONMENT AND CONSERVATION**  
**LANDS BRANCH**

**Municipal Recommendation Form for Crown Land Applications Within  
Municipal and Planning Area Boundaries**

**A. TO BE COMPLETED BY APPLICANT**

Name of Applicant:	Date of Application:
<i>Continental Holdings Ltd</i> <i>1309 Topsail Road St. John's A1B 3N2</i>	
Mailing Address:	
Telephone No.:	Home: _____ Bus: <i>782-31404</i> Fax: _____
Land to be used for:	<i>Quarry</i>
Location of Land	Dimensions of Land
<i>Belleoram</i>	

**B. TO BE COMPLETED BY MUNICIPAL COUNCIL**

1. Does your community have: An approved Municipal Plan? <input checked="" type="checkbox"/> Concept Plan? <input type="checkbox"/> Neither? <input type="checkbox"/>	by the Development Regulations.
2. The area applied for is zoned <i>Mixed</i>	
3. Is the proposed use (a) Permitted Use? <input checked="" type="checkbox"/> (b) Discretionary Use? <input type="checkbox"/> or (c) A use not included in the Development Regulations? <input type="checkbox"/>	(Attach copy of zoning map showing location of site)
4. Does the proposed use conform to the standards and conditions set out in the Development Regulations? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
5. Describe the land use in the surrounding area: Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Agriculture <input type="checkbox"/> Unused <input checked="" type="checkbox"/> Other <input type="checkbox"/> North side _____ East Side _____ South side _____ West Side _____	
6. If the proposed use will conflict with existing land use in the general area, please explain: <i>no</i>	
7. Indicate which of the following Municipal services are available at the site: Water and Sewer <input type="checkbox"/> Water Only <input type="checkbox"/> Sewer Only <input checked="" type="checkbox"/> No Services	
8. i) Describe type and condition of the road to the site <i>rocks</i>	
ii) Is the road presently maintained year round? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
By Whom? Council <input type="checkbox"/> Transportation <input type="checkbox"/> Applicant <input type="checkbox"/>	
iii) Will road extension or improvements be needed if the application is approved? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
9. In the opinion of the Council, the land applied for is: A) Crown <input checked="" type="checkbox"/> B) Private <input type="checkbox"/> C) Ownership Unclear <input type="checkbox"/>	
10. If site is presently occupied, please give details _____	
THE COUNCIL OF <i>Belleoram</i> TELEPHONE NO. <i>709-881-6161</i>	
<input checked="" type="checkbox"/> Approved <input type="checkbox"/> Refused (give reason) _____ <input type="checkbox"/> Approved subject to the following conditions <input type="checkbox"/> Deferred (give reason) _____	
COMMENTS: _____ _____ _____	
<i>Steven May</i> <i>Mayor</i> <i>Feb 11/2013</i> SIGNED      TITLE      DATE	

SEE REVERSE OF FORM FOR FURTHER INSTRUCTIONS



**APPENDIX 6**  
**Site Drainage and Silt Control Plan**



**Continental Stone Limited****Belleoram Quarry****Draft Site Drainage and Silt Control Plan****Project Number: ME3052201****1.0 INTRODUCTION**

In 2015, the Belleoram Quarry Project was released from the Federal (Reg 167) and Provincial (Reg 1767) environmental assessment processes with conditions including preparation of a Site Drainage and Silt Control Plan to be submitted to and approved by the Provincial Minister of Environment and Conservation prior to construction. This site drainage and silt control plan has been prepared for submission to the current Department of Environment, Climate Change and Municipalities, for approval under the *Water Resources Act*, and to meet the conditions of release.

**1.1 Purpose of the Site Drainage and Silt Control Plan**

The site drainage and silt control plan helps to ensure that all flowing water on the site is properly ditched and culverts are installed if required, to ensure that all storm drainage and wash water from the site is directed to appropriately sized settling pond(s), as required, before being dispersed into the surrounding environment. The plan can become an appendix to the overall mine operations plan.

**1.2 Contents of the Site Drainage and Silt Control Plan**

The Site Drainage and Silt Control Plan will include the following elements:

- Potential hazards.
- Erosion and sediment control overview.
- Environmental protection procedures during site access construction.
- Environmental protection procedures during site preparation and construction.
- Environmental protection procedures during in-water construction activities.
- Environmental protection procedures: operations.
- Erosion and sediment control measures.
- Maintenance and removal of erosion and sediment control measures.

**2.0 POTENTIAL HAZARDS**

Potential erosion and sediment sources on the Belleoram Quarry site include the following:

- Erosion in areas disturbed by access route construction activities.
- Erosion in areas disturbed by site construction activities.
- The disturbance of substrate during in-water construction activities.
- Mobilization of sediment through installation and removal of cofferdams, silt fencing and rock check dams, silt curtains, etc.
- Dewatering of construction area.
- Runoff from stockpiles.

Continued...

- Discharge from aggregate wash water activities.

## 3.0 EROSION AND SEDIMENTATION CONTROL OVERVIEW

### 3.1 General

General guidelines directing the activity of construction in relation to erosion and sedimentation control are summarized in the Erosion and Sediment Control Measures section below (Section 5.0), *Guidelines for Protection of Freshwater Fish Habitat in Newfoundland and Labrador*, published by the Fisheries and Oceans Canada and the Government of Newfoundland & Labrador, *Municipal Water, Sewer and Roads Master Construction Specifications*.

The erosion and sediment control measures outlined in Table 1 have been selected for general application to various aspects of the project during construction. Adaptive selection of these measures will be dependent on variable site conditions and weather. Selected mitigation measures will be applied individually or combined to arrive at the desired level of erosion and sedimentation control.

**TABLE 1: Work Activity, Potential Erosion Hazard and Associated Mitigation Measures**

Type of Work	Potential Hazard	Erosion and Sediment Control Measure
Disturbed soils	<ul style="list-style-type: none"><li>• Overland flow sedimentation</li><li>• Erosive watercourse flows</li></ul>	<ul style="list-style-type: none"><li>• Temporary and permanent vegetation ground cover</li><li>• Erosion control blanket – Riprap</li><li>• Silt fence</li><li>• Clear stone berm</li><li>• Non-erosive cofferdams</li></ul>
Dewatering	<ul style="list-style-type: none"><li>• Overland flow sedimentation</li><li>• Entrained sediments during pumping</li></ul>	<ul style="list-style-type: none"><li>• Establish sediment containment area</li><li>• Discharge to vegetated area minimum 50 m from watercourse</li></ul>
Any new drainage channels to direct local run-off	<ul style="list-style-type: none"><li>• Ditch erosion</li><li>• Concentrated flow sedimentation</li></ul>	<ul style="list-style-type: none"><li>• Riprap lining</li><li>• Temporary rock flow checks</li><li>• Permanent sediment traps</li><li>• Cross culverts</li></ul>
Blasting, materials handling and stockpiling	<ul style="list-style-type: none"><li>• Overland flow sedimentation</li><li>• Concentrated flow sedimentation</li></ul>	<ul style="list-style-type: none"><li>• Temporary and permanent vegetation ground cover</li><li>• Erosion control blanket – Riprap</li><li>• Silt fence</li><li>• Clear stone berm</li><li>• Non-erosive cofferdams</li></ul>
Aggregate washing	<ul style="list-style-type: none"><li>• Overland flow sedimentation</li><li>• Concentrated flow sedimentation</li></ul>	<ul style="list-style-type: none"><li>• Establish sediment containment area</li><li>• Silt fence</li><li>• Settling pond</li></ul>
Operational flow outlet at pipeline	<ul style="list-style-type: none"><li>• Erosion at outlet</li></ul>	<ul style="list-style-type: none"><li>• Embedded Discharge Outlet Infrastructure</li><li>• Scour protection with native boulder/cobble material</li></ul>

## 4.0 SEDIMENTATION AND EROSION PREVENTION

Phase 1 of the Belleoram Quarry project is adjacent to the ocean shore and contains the lower end of a small stream/pond system which flows into the Belleoram Barasway. The Quarry site has a natural shallow overburden layer (<5 m) and stripping of this material has the potential to increase runoff into the

Continued...

surrounding terrestrial, freshwater and marine environments. Further, the nature of the Quarrying activities leads to the potential for runoff to carry silt, hydrocarbons and ammonia from explosives.

## **4.1 Environmental Protection Procedures During Site Access Construction**

Access development is required to obtain entrance to the construction locations. Construction of the access route will include installation of pipe culverts, should it be necessary to cross minor watercourses or drainage areas.

During access route construction, silt fences will be installed on the lower perimeter of slopes and in areas where erosion is potentially high. Areas of concern that require silt fencing will include the bottom of cut or fill slopes, material stockpiles and any disturbed natural areas. Material stockpiles will be fenced completely around the perimeter. Silt fencing will be embedded a minimum of 300 mm in the bottom and sides to prevent movement of fines under or around the fence. Wooden stakes will be installed on the down slope side. Silt fencing will be sufficiently overlapped to prevent movement of fines around or through the seam area when joined. Accumulated sediment will be removed regularly from the silt fence and disposed of in a manner that prevents subsequent entry into any water courses.

During the installation of culverts, the flow will be diverted to provide a "dry" working environment. This will be achieved through use of cofferdams and a pump to route the water around the cofferdam. A pump will also be used to remove sediment-laden water from the work area inside the cofferdams. This water will be treated by discharging to vegetated areas or sediment traps prior to release. Any sandbags damaged during the course of work will be replaced. As the work is completed and the area fully stabilized, the downstream cofferdam will be removed, followed by the upstream cofferdam. All cofferdam materials will be reused or recycled if possible or will be removed from the stream and disposed of at a landfill approved by the appropriate regulatory agency.

In areas where ditch installation is required, rock check dams will be installed to reduce water velocity in the ditch, control erosion and prevent sedimentation of nearby watercourses. The rock check dams will be constructed to provide an impermeable structure and will include a liner, such as geotextile. The centre of the check dam will be lower than the sides to enable movement of accumulated water over the dam. The settled sediment is retained by the sides and lower portion of the dam. The check dam and ditch will be stabilized with riprap and regularly inspected to detect any accumulated sediment for removal. Material removed from the check dam will be disposed of in an appropriate manner that prevents subsequent entry into any water courses. The check dams will be installed in a series to ensure maximum removal of sediment prior to the entry of collected water into the receiving watercourse. The spacing of check dams may vary depending on the steepness of ditch slope and nature of material. Should the waters contain high amounts of sediment immediately prior to discharge into receiving waters, a settlement pond will be constructed. This shall reduce the velocity further allowing an increased time for sediment to drop out.

In construction areas near water, a turbidity boom with an attached silt curtain will be installed during construction. The turbidity boom will be kept in place until construction is complete and the water has been tested.

## **4.2 Environmental Protection Procedures During Site Preparation and Construction**

The possibility of detrimental effects from runoff and erosion is a concern with any quarry operation and is addressed by adequate planning and operation. Standard mitigations outlined below will be incorporated into the Quarry's construction and operation planning.

Continued...

- All work in the vicinity of the Belleoram Quarry will be conducted in accordance with conditions set out in applicable permits, approvals and/or authorizations.
- Construction activities will be coordinated with seasonal constraints (e.g. time clearing, grubbing and excavation activities to avoid heavy precipitation; avoid sensitive periods for fish and wildlife; shut down and stabilize the work site in accordance with pre-established criteria in advance of the winter season).
- A 50 m buffer zone of undisturbed natural vegetation between construction areas and all waterbodies will be maintained, where possible. All work adjacent to streams and ponds will require the erection of heavy-duty silt fence barriers to isolate the construction activity from the water environment.
- Siltation control structures (i.e. silt curtains, cofferdams, sediment fences, etc.) will be constructed prior to beginning any activities involving disturbance of the site and work along the shoreline.
- The extent of land clearing and grubbing will be restricted such that naturally vegetated areas between the site and surrounding properties and thoroughfares are maintained. This will also minimize the volume of material to be stored.
- Soil disturbance will be reduced by limiting the area exposed at any one time, stabilizing exposed soil as soon as possible with anti-erosion devices (i.e. rip rap, filter fabrics, gravel or wood chips) and revegetation of disturbed areas.
- 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 revegetation.
- Water will be directed from the site to vegetated areas (natural or manmade) within the property boundaries, which will filter any potential suspended solids.
- The primary means for controlling erosion will be to avoid activity that contributes to erosion; the disturbance of new areas will be minimized.
- Drainage ditches along the access road will be stabilized if required (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.
- All areas of exposed erodible soil will be stabilized by back-blading, grading and/or compacting to meet engineered slope requirements.
- If an environmental inspection reveals that silt is entering nearby waterbodies, 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 run-off. The necessary or appropriate measures will be determined in the field.
- Existing or new siltation control structures used in this work will be monitored and maintained over the course of the activities (by inspecting and repairing structural problems during and after storm events, removing accumulated sediment at regular intervals or at designated capacities and by disposing of it at an approved site, given its unsuitability as structural fill material). Effluent from control structures will be released to vegetated areas to ensure appropriate filtration prior to entering any waterbody.
- Monitor any nearby receiving waters for total suspended solids (TSS) or contaminants of concern to ensure maintenance of the Canadian Council of Ministers of the Environment (CCME) Environmental Quality Guidelines for the Protection of Aquatic Life ([https://www.ccme.ca/en/resources/canadian\\_environmental\\_quality\\_guidelines/index.html](https://www.ccme.ca/en/resources/canadian_environmental_quality_guidelines/index.html)) when considered in conjunction with existing ambient water quality and site-specific factors.
- Take further mitigative actions as necessary based on monitoring results.

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### **4.3 Environmental Protection Procedures During In-Water Construction Activities**

Disturbance of substrate during in-water activities increases sediment concentrations and turbidity in the water column. This disturbance may alter light penetration and/or water temperature and chemistry regimes and may affect photosynthesis. The Canadian Council of Ministers of the Environment (CCME) *Canadian Environmental Quality Guidelines* recommend that, for protection of marine waters, human activities should not cause suspended solids levels to increase by more than 10% of the natural conditions expected at the time. The guidelines also recommend that no solid debris, including floating or drifting materials or settleable matter, be introduced into marine and estuarine waters.

To minimize and control the release or re-suspension of sediments or contaminants resulting from in-water activities, the following measures should be implemented as applicable:

- Install siltation control structures (e.g. silt curtains) prior to beginning any in-water work. Siltation control structures should be designed and installed to enclose an area from the water surface to the seabed.
- Schedule work to avoid periods of heavy precipitation.
- Use clean fill (less than 5% fines). The fill source will be non-acid generating, blasted rock from the Quarry site.
- Immediately stabilize any disturbed areas along the shoreline to prevent erosion.
- Check the integrity and effectiveness of the siltation control structures daily for the duration of the activity and ensure they remain in place following completion of the work until suspended solids levels return to ambient levels.
- Monitor water quality to ensure TSS levels and contaminant concentrations in the water column are within limits prescribed by the CCME *Environmental Quality Guidelines* for the protection of aquatic life ([https://www.ccme.ca/en/resources/canadian\\_environmental\\_quality\\_guidelines/index.html](https://www.ccme.ca/en/resources/canadian_environmental_quality_guidelines/index.html)) when considered in conjunction with existing ambient water quality and site-specific factors.
- Take further mitigative actions as necessary based on monitoring results.

### **4.4 Environmental Protection Procedures: Operations**

All work in the vicinity of the Belleoram Quarry will be conducted in accordance with conditions set out in applicable permits, approvals and/or authorizations.

- Water will be directed from the site to vegetated areas (natural or manmade) within the property boundaries, which will filter any potential suspended solids.
- All stockpiles will be sloped to avoid collection of water, with runoff from storage areas being directed to properly installed and maintained sediment control structures.
- Wash water will be collected and piped through an enclosed pipeline to industry approved settling ponds to allow suspended solids to precipitate out.
- Wash water will be recycled from the settling ponds back into the operations for reuse in aggregate washing and dust suppression.
- All work and marshalling and storage areas will be monitored for erosion and appropriate repair action taken as necessary.
- Siltation control structures will be monitored and maintained (by inspecting and repairing structural

Continued...

problems during and after storm events, removing accumulated sediment at regular intervals or at designated capacities and by disposing of it at an approved site, given its unsuitability as structural fill material).

- Equipment will be designed to minimize loss of aggregate or dust during loading.
- Immediately stabilize any disturbed areas along the shoreline to prevent erosion.
- Settling ponds will be constructed to process aggregate wash water and runoff. Settling ponds will receive wash water from crushing and screening operations via a fully sealed pipe system. These ponds will be designed according to DFO's *Land Development Guidelines for the Protection of Aquatic Habitat* and *Guidelines for Protection of Freshwater Fish Habitat in Newfoundland and Labrador*. The number and size of ponds required for the Quarry will be based on preliminary tests that determine the amount and size of fines found in the collected wash water being assessed. The results of this analysis will be used by a professional engineer to accurately calculate the size and number of ponds required, considering any and all guidelines set out by DFO. Settling ponds will be built with required safety factors, adhering to guidelines with respect to such design standards as the accommodation of storms (1:5, 1:10 and 1:100 years storms), effective capacity, retention times and location. Their operation and maintenance will include regular inspection and assessment of accumulated sediment load, removing it when required.
- Runoff water from the wash water ponds will adhere to the guidelines set by DFO for suspended solids (or non-filterable residue) above the back-ground suspended solids levels of the receiving waters during normal dry weather operation and for suspended solids above background levels during design storm events. suspended solids in effluent will be regularly tested to ensure compliance.
- Monitor water quality to ensure TSS levels and contaminant concentrations in the water column are within limits prescribed by the CCME *Environmental Quality Guidelines* for the protection of aquatic life ([https://www.ccme.ca/en/resources/canadian\\_environmental\\_quality\\_guidelines/index.html](https://www.ccme.ca/en/resources/canadian_environmental_quality_guidelines/index.html)) when considered in conjunction with existing ambient water quality and site-specific factors.
- Take further mitigative actions as necessary based on monitoring results.

## 5.0 EROSION AND SEDIMENT CONTROL MEASURES

Specific erosion and sediment control measures to be used during construction activities include, but will not be limited to, the following:

- **Clearstone/Riprap:** Riprap shall consist of clean, hard, durable rock, free of cracks. Rock subject to marked deterioration by water or weather will not be accepted. Only those stones approved by the Project Representative shall be used.  
The largest rocks procurable shall be supplied and in no case shall any fragment measure less than 0.0035 cubic metres in volume. Field stones or boulders may be used when approved by the Project Representative. Rip rap will be non-acid generating.
- **Silt Fence Barriers:** Silt fence barriers will be used as a temporary perimeter control to contain sediment within the limits of the construction area. Sediment control fencing will also be used to intercept overland runoff coming into the disturbed construction zone from adjacent areas.  
Where appropriate, silt fences will be installed along contours and used, based on contributing drainage, in combination with other control measures.  
Light or Heavy-Duty silt fence barriers may be applied, depending on site sensitivity and weather

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conditions or as directed by the Project Representative.

Silt fence barriers will be installed in a continuous fashion, perpendicular to the flow. Silt fence barriers will be constructed to control sediment migration from grading activity associated with access to the work area. Where shallow depth to bedrock or frozen conditions exist, the use of a silt fence barrier, cut-off berms or ditches will be implemented to direct runoff to a sediment trap for treatment prior to draining towards the watercourse.

Silt fence barrier will be installed prior to placement of any fill or grading operations.

Details regarding the installation of a silt fence barrier and the location of silt fence barriers to be used during construction are shown in figures provided in the *Guidelines for Protection of Freshwater Fish Habitat in Newfoundland and Labrador*.

- **Silt Barrier – Straw/Hay Bales:** The placement of straw or hay bales in temporary watercourses may be adopted to act as a silt filter barrier. These also reduce the velocity of the water, increasing the settling time to allow the sediment present to drop out.
- Straw/hay bales are used as a temporary measure. It is good practice to have a number bales in areas of concern should they be required in emergency cases.

- **Cut Off Ditch:** Cut off ditches may be used as a temporary perimeter control to contain sediment within the limits of the construction area. Cut off ditches will also be used to intercept sheet runoff coming into the disturbed construction zone from adjacent areas and/or perimeter of a stockpile area.

Cut off ditches may be used with one or more of the other control measures included in this section.

Cut off ditches shall be located as directed by the Project Representative.

- **Rock Check Dams:** The intent of rock check dams are to reduce the velocity of concentrated flow to minimize ditch/channel invert erosion and to detain and trap suspended sediment.

Rock check dams are to be employed in temporary and permanent drainage ditches. In addition, they will be installed wherever the Project Representative and environmental representative observe the need for additional mitigative sediment capture. Rock check dams will consist of a clear stone core, geotextile and riprap stone. All rock for riprap will be non-acid generating.

All dams will be monitored throughout the construction period and cleaned out after each storm or when they become half full of sediment.

Check dams within temporary channels will be removed as soon as vegetation is established on previously disturbed ground. When check dams are removed, they will be excavated to just above the original ground level. Any soil disturbed during removal will be stabilized with seed and mulch.

- **Temporary Vegetation Cover:** Hydromulching/hydroseeding is a one-step application of seed and hydraulic slurry with adhesive binder. This provides permanent stabilization for moderate to steep slopes and disturbed soils.

Hydromulching/hydroseeding of all disturbed areas near watercourses will be conducted upon completion of construction activities, as required. Other sensitive locations such as areas prone to erosion will also be hydroseeded. The remaining disturbed areas will be seeded with standard highway seed mix.

- **Splash Pads:** Prior to the initiation of any by-pass pumping of watercourse flows or dewatering activities, a splash pad will be installed at the pumping discharge point. The pad will be constructed of suitable sized riprap such that it will not be susceptible to movement by the discharged water. One

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layer of riprap will be placed on existing ground to dimensions suitable to accommodate the discharge such that flows do not mobilize materials that might ultimately be conveyed to adjacent watercourse bed and banks.

## **6.0 MAINTENANCE AND REMOVAL OF EROSION AND SEDIMENT CONTROL MEASURES**

Sedimentation control measures will not be removed until all areas have been sufficiently stabilized to prevent the mobilization of sediment.

The removal of erosion and sediment control measures will only be undertaken on the authorization of the Project Representative once environmental inspections have confirmed that the erosion and sedimentation control performance objectives have been satisfied.

In addition, any accumulated sediment will be removed, as part of a maintenance program, from all erosion and sediment control measures when accumulation reaches 50% of the height or volume of the control structure. Removed sediments will be handled as excess material and must not be disposed of within 50 m of a watercourse, to prevent subsequent entry into any water courses.

## **7.0 REFERENCES**

Chilibec B., Chislett G. and Norris G. 1993. Land Development Guidelines for the Protection of Aquatic Habitat. Department of Fisheries and Oceans.

Gosse, M.M., Power A.S., Hyslop D.E. and Pierce, S.L. 1998. Guidelines for Protection of Freshwater Fish Habitat in Newfoundland and Labrador. Fisheries and Oceans, St. John's, NL.

Municipal Water, Sewer and Roads Master Construction Specifications. 2020. Government of Newfoundland & Labrador. <https://www.gov.nl.ca/eccm/capital-works/master-specifications/>

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## 8.0 CLOSURE

This report was prepared exclusively for Continental Stone Limited by Wood Environment & Infrastructure Americas. The quality of information, conclusions and estimates contained herein is consistent with the level of effort involved in Wood's services and based on information available at the time of preparation, data supplied by outside sources and the assumptions, conditions and qualifications set forth in this report. This report is intended to be used by Continental Stone Limited only, subject to the terms and conditions of its contract with Wood. Any other use of, or reliance on, this report by any third party is at that party's sole risk.

Yours sincerely,

**Wood Environment & Infrastructure Solutions,  
a Division of Wood Canada Limited**

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**APPENDIX 7**

**Environmental Effects Monitoring Plan for Air Quality**



13 November 2020

Project Number: ME2052201

Continental Stone Limited  
PO Box 5424  
St. John's, NL A1C 5W2  
Attn: Johnnie Williams

Dear John,

RE: DRAFT - Environmental Effects Monitoring Program for Air Quality (Condition of Reg. 1767 Approval)

## 1.0 INTRODUCTION

Continental Stone Limited is the Proponent of the proposed Belleoram Marine Terminal Project (the Project). The Project entails the development and operation of a 89 ha crushed granite stone quarry and marine terminal to be located to the north of the Town of Belleoram, NL.

In 2015, Newfoundland and Labrador Department of Environment & Conservation approved an Environmental Assessment (EA) for the proposed Project. The approval was associated with Conditions of Approval and Continental Stone Limited is addressing these through development and implementation of a series of reports, management and monitoring plans. In 2015, the project was released from the provincial environmental assessment process subject to the submission and approval of five various plans. With respect to a plan for air quality, the following EA Approval Condition is required to be addressed:

*"An Environmental Effects Monitoring Program for Air Quality must be submitted to and approved by the Minister of Environment and Conservation prior to construction."*

In 2007, Continental Stone Limited submitted the Belleoram Marine Terminal Project Comprehensive Study Report to the Canadian Environmental Assessment Agency (CEAA) in accordance with Section 12.4 of the CEA Act. Table 1.1 provides a summary of key activities which may impact air quality along with the significance of each activity on air quality and a discussion for each item.

**Table 1.1      Summary of the Belleoram Marine Terminal Project Comprehensive Study Report Assessment Outcomes**

Sources	Potential Emissions	Parameters	Significance
Marine Terminal Construction and Operation	<p>During construction particulate emissions are expected to be minimal since clean granite with less than 5% fines will be used from the quarry.</p> <p>Most of the dust generated by vehicles operating over unpaved roads will be confined to the construction phase since a covered conveyor belt will be used to transport materials from the quarry to the marine terminal. Bulk aggregate carriers will however be used on the quarry site.</p>	Total Suspended Particulate (TSP). Particulate Matter less than 10 micron (PM <sub>10</sub> )	Non-Significant

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	The shiploader will be positioned as low as possible to avoid dropping the aggregate from a significant distance (expected to be less than 2 m).		
Blasting	Since the ground material in the area is predominately granite with overburden cleared prior to blasting, the amount of particulate generated by a blast will be small and localized.  A site-specific blasting protocol will be implemented which will also limit particulate emissions.	TSP, PM <sub>10</sub>	Non-Significant
Exhaust Emissions	Exhaust from construction and operation of the quarry will be a small source of the atmospheric pollution related to vehicle exhaust and diesel-powered crushing/screening equipment. All construction equipment will be well maintained and fitted with standard exhaust suppression devices to keep emissions at a minimum and will conform to applicable emissions legislation. The use of heavy equipment will peak during construction, with large trucks transporting building materials and equipment for the construction of the marine terminal.  Conveyor and ship loading equipment are electric, thus releasing no exhaust emissions.  Ships exhaust will comply with applicable emissions legislation including Transport Canada's regulation and shipping standards for air pollution under the Canada Shipping Act. Ships entering or leaving Belle Bay will maintain a speed no more than 2 knots which will serve to minimize exhaust emissions, with the main power plant turned off with the ship is moored.	NO, NO <sub>2</sub> , CO, CO <sub>2</sub> , THC, PM <sub>2.5</sub>	Non-Significant

A review of the Study report determined the main sources with a potential to generate emissions are quarry/marine terminal operation, blasting and exhaust emissions. The Study determined the emissions from these sources are considered non-significant. Exhaust emissions for the project are expected to be minimal since most of the infrastructure, including conveyor and ship loading systems, are electric with no exhaust emissions generated. Exhaust from ships docking will be minimal since the main power plant will be turned off when the ship is moored and ships will only be allowed to maintain a speed of no more than 2 knots when entering or leaving Belle Bay. In addition, the number of ships servicing the facility is expected to be infrequent with a bulk carrier estimated every 5 to 7 days. Ships, on average, will have a 24-hour turnaround time. Due to the use of electric equipment for a significant part of the processing and the infrequent ship visits to the marine terminal, it is expected emissions from these sources will be minimal and monitoring will not be performed for exhaust emission parameters.

The operation of the quarry/marine terminal will involve the use of bulk aggregate carriers on the quarry site which will deliver processed quarry rock to the electric conveyor and ship loading systems. The

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traveling of bulk aggregate carriers over unpaved roads and the dumping of materials will generate particulate emissions. Other onsite activities such as rock crushing/processing, drilling, blasting, material stockpiling, and wind erosion from stockpiles are also common particulate emissions generators for quarrying operations. The dumping of material from the conveyor and ship loading system will also generate particulate emissions to a lesser degree since the material handled is processed and will contain less than 5% fines.

Dust constitutes one of the major environmental concerns near many aggregate quarries, with crushing often being the most significant source. Crushing produces mainly coarse (TSP and PM<sub>10</sub>) dust particulates (Sairanen, Rinne, 2019). Due to the potential for quarrying activities to generate particulate, in particular TSP and PM<sub>10</sub>, the Environmental Effects Monitoring Program for Air Quality will consist of monitoring for these parameters.

## **2.0 AMBIENT AIR MONITORING PROGRAM**

The closest sensitive receptors to the Study area are residences located approximately 450 m to the south in the Town of Belleoram. In 2016, there were a total of 374 people residing in 140 households in this community. Winds from the northwest to north directions (315 to 360 degrees) have the most potential to cause particulate impacts to the Town of Belleoram. This observation is based on the Phase 1 boundary provided in the Belleoram Marine Terminal Project Comprehensive Study. Winds along the south coast of Newfoundland are predominately from the southwest in the summer and northwest in the winter. A review of annual windrose data for Fortune Bay (approximately 34 km from Belleoram) determined, on average, winds can be expected to blow from the northwest and north directions approximately 21% of the time. Based on this information, the ambient air monitoring program will consist of one monitoring location sited at the southern edge of the Study area closest to Belleoram. Refer to Figure 1 for a graphical presentation of the monitoring station location. The parameters chosen for monitoring are TSP and PM<sub>10</sub>. In addition, a meteorological station will be set up at this location.

The Ambient Air Monitoring Program (AAMP) will employ the use of fixed-station reference and equivalency method sampling techniques. The AAMP design is based on the following documents:

- Ontario Ministry of the Environment, Conservation and Parks (MECP) Operations Manual for Air Quality Monitoring in Ontario (MECP, 2019);
- USEPA Air/Superfund National Technical Guidance Study Series. Volume IV – Guidance for Ambient Air Monitoring at Superfund Sites (USEPA, 1993);
- USEPA Air/Superfund National Technical Guidance Study Series. Contingency Plans at Superfund Sites using Air Monitoring, (USEPA, 1990);
- United States Environmental Protection Agency (USEPA) Federal Equivalent Method for Continuous PM<sub>10</sub>, PM<sub>2.5</sub> and PM<sub>2.5-10</sub> (USEPA, 2006)
- USEPA National Primary and Secondary Ambient Air Quality Standards, Appendix B – Reference Method for the Determination of Suspended Particulate Matter in the Atmosphere (High-Volume Method) (40 CFR Subchapter C Part 50) (USEPA, 2019); and
- Government of Canada. National Air Pollution Surveillance Protocols (GC, 2013).

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## 2.1 Regulatory Criteria

The Province of Newfoundland provides air quality criteria under the *NL Criteria for Acceptable Air Quality* for TSP and PM<sub>10</sub>. Refer to Table 1-2 for a summary of criteria.

**Table 1-2: Summary of Relevant Criteria**

POLLUTANT	24 Hour Averaging Period	Annual Averaging Period
TSP	120 ug/m <sup>3</sup>	80 ug/m <sup>3</sup>
PM <sub>10</sub>	50 ug/m <sup>3</sup>	-

Note: “-” denotes not available.

## 2.2 Program Design

The design of the AAMP and the selection of the monitoring site is driven by two main goals:

- To determine the contribution of construction and operation activities to the surrounding airshed by strategically siting the sampler locations; and
- To characterize assess exposure to the community by strategically siting samplers between construction and operation activities and the Town of Belleoram.

It should be noted the proposed location identified in Figure 1 is conceptual and the finalized air monitoring location will be chosen based on the lack of obstruction from local interferences, the adequacy of the particular site to represent the air mass, accessibility, power accessibility and security. As per USEPA requirements, the following specific guidelines will be followed to achieve representative conditions:

- The most desirable height for sampler inlets is near the breathing zone (i.e., about 1.8 to 2 m above ground). Practical factors such as high impermeable fences surrounding the source of material may sometimes require that the sampling inlets be placed slightly higher (at least 1 m above the top of the fence);
- Samplers should be located at least 20 m from the dripline of trees when the trees act as an obstruction to airflow;
- Samplers must be located away from obstacles and buildings, such that the distance between the obstacles and the sampler inlet is at least twice the height that the obstacle extends above the sampler inlet. Airflow must be unrestricted in an arc of at least 270 degrees;
- The sampler and nearby roadways must be sufficiently separated to avoid the effects of dust re-entrainment and vehicular emissions on measured air concentrations; and
- Stations for measuring PM should not be located in an unpaved area, unless there is vegetative ground cover year-round, so as to minimize the effect of locally re-entrained or fugitive dusts.

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## **2.2.1 Equipment and Methods**

The following equipment to be utilized for the quantitative assessment of levels in ambient air at the fixed station location:

- PM<sub>10</sub> – BAM-1020 unit or equivalent; and
- TSP – High Vol sampler; and
- Meteorological station.

The following summarizes the methods to be employed for each parameter and the meteorological station.

### **2.2.1.1 TSP**

The sampling protocol for TSP (High Vol) will be in accordance with the USEPA Method for Suspended Particulate Matter. The Hi-Vol actively samples at a rate of approximately 1,133 litres per minute (L/min) for a target sample volume of 1,630 m<sup>3</sup> over 24 hours. Calibration of the sampler will be performed every 3 months. Initial and final flow checks will be performed on each sampler for the 24-hour sampling period (midnight to midnight). The media that will be used to capture TSP is quartz filters. Analyses will be performed by gravimetric methods.

### **2.2.1.2 PM<sub>10</sub>**

Sampling for PM<sub>10</sub> will be performed using BAM-1020 units, which automatically measure and record airborne particulate concentration levels (in milligrams or micrograms per cubic meter) using the industry-proven principle of beta ray attenuation. Met One Instruments' Model BAM-1020 was the first instrument to obtain USEPA Federal Equivalent Method designation for continuous PM<sub>2.5</sub> monitoring, in addition to its longstanding USEPA designation for PM<sub>10</sub> monitoring. The BAM-1020 has also obtained the corresponding PM<sub>10</sub> certification in the European Union. Equipment maintenance and calibration will be carried out in accordance with the equipment manufacturer's operations manual, consistent with the US EPA and Ontario Standard Operating Procedure (MECP, 2019). Meteorological Station.

Wind speed and rainfall data is used to detect conditions conducive to possible excessive dust generation.

The following meteorological parameters shall be monitored on a 10 m tower:

- Wind direction and speed;
- Temperature;
- Relative humidity;
- Barometric pressure;
- Rainfall; and
- Snow fall.

Meteorological monitoring shall continue for the duration of the project to provide input to control measures for construction activities and operational activities. In this manner, for example, if the wind is blowing strongly towards residences on a particular day, applicable mitigation measures can be implemented to minimize dust generating activities.

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Public (Environment Canada) or other reliable weather information services will also be monitored for wind speed, precipitation, and temperature and adjust work activities as appropriate to address any weather limitations.

## 2.2.2 Sampling Frequency

The sampling frequency and duration will be dictated by the nature of the construction activities occurring and their length. For the operation of the quarry/marine terminal, monitoring will be performed for set amount of time (such as 1 year) and the data will be reviewed to determine if additional monitoring is warranted or if the sampling frequency can be reduced. If data suggests exceedances are not occurring, the sampling frequency will be reduced. If data indicates there are frequent exceedances at the Site boundary or if there are complaints of air quality which can be traced back to the quarry/marine terminal operations, the frequency of monitoring will be increased and an additional monitoring location may be installed in the Town of Belleoram.

Table 2-2 provides the projected frequency and duration for each of the community reference sampling locations.

**Table 2-2: Proposed Monitoring Duration and Frequency**

ACTIVITY	PARAMETER	FREQUENCY	TENTATIVE SCHEDULE
Baseline	TSP	Once a week (6 days NAPS)	3 months
	PM <sub>10</sub>	Continuous	
Construction	TSP	Once a week (6 days NAPS)	Duration of construction
	PM <sub>10</sub>	Continuous	
Operation	TSP	Once a week (6 days NAPS)	Duration of operations unless data indicates otherwise
	PM <sub>10</sub>	Continuous	

## 2.3 Reporting

Reporting involves providing regular reports to the Owner, including monthly and reports. Air quality impacts to both environment and human health from fugitive dust will be assessed by comparing ground level concentrations for TSP and PM<sub>10</sub> to Newfoundland's ambient air quality criteria.

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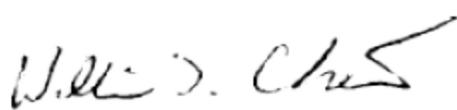
### 3 CLOSURE

This report was prepared exclusively for Continental Stone Limited by Wood Environment & Infrastructure Americas. The quality of information, conclusions and estimates contained herein is consistent with the level of effort involved in Wood's services and based on information available at the time of preparation, data supplied by outside sources and the assumptions, conditions and qualifications set forth in this report. This report is intended to be used by Continental Stone Limited only, subject to the terms and conditions of its contract with Wood. Any other use of, or reliance on, this report by any third party is at that party's sole risk.

Yours sincerely,

**Wood Environment & Infrastructure Solutions,  
a Division of Wood Canada Limited**

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cc:

#### References:

Marjo Sairanen, Mikael Rinne. Dust emission from crushing of hard rock aggregates. Atmospheric Pollution Research. Volume 10, Issue 2, March 2019.

Ontario Ministry of the Environment, Conservation and Parks (MECP) Operations Manual for Air Quality Monitoring in Ontario, 2019

USEPA Federal Registry. Part III Environmental Protection Agency Equivalent Method for Continuous PM<sub>10</sub>, PM<sub>2.5</sub> and PM<sub>2.5-10</sub> (40 CFR Parts 53 and 58), October 17, 2006.

USEPA National Primary and Secondary Ambient Air Quality Standards, Appendix B – Reference Method for the Determination of Suspended Particulate Matter in the Atmosphere (High-Volume Method) (40 CFR Subchapter C Part 50), 2019.

USEPA Air/Superfund National Technical Guidance Study Series. Volume IV – Guidance for Ambient Air Monitoring at Superfund Sites (revised), May 1993;

USEPA Air/Superfund National Technical Guidance Study Series. Contingency Plans at Superfund Sites using Air Monitoring, September 1990;



**APPENDIX 8**  
**Communication Plan**



## Continental Stone Limited

### Belleoram Crushed Rock Export Quarry and Marine Terminal

#### Communication Plan for Blasting and Vessel Scheduling

## 1.0 INTRODUCTION

In 2015, the Belleoram Crushed Rock Export Quarry and Marine Terminal project was released from the Federal (Reg 167) and Provincial (Reg 1767) environmental assessment Processes with conditions including preparation of a Communication Plan for blasting and vessel scheduling to be submitted to and approved by the Provincial Minister of Environment and Conservation prior to construction. This communication plan has been prepared for submission to the current Department of Environment, Climate Change and Municipalities to meet the conditions of release.

### 1.1 Purpose of the Communication Plan

The communication plan helps to ensure nearby residents, mariners, aquaculture operators and other stakeholders are aware of quarry related activities (e.g., blasting and vessel movements) that may potentially compromise safety or result in inconvenience for other users. While the focus is on blasting and vessel traffic, the communication plan can be applicable for any planned, or unplanned, disruptions such as heavy equipment transport and construction activities. The plan can become an appendix to the overall mine operations plan.

## 2.0 COMMUNICATION PROTOCOL

Continental Stone will invite stakeholders to participate in a Local Special Interest Committee to facilitate communications about Belleoram Quarry construction and operations activities and provide a forum for feedback (i.e., comments and concerns) on a regular basis. Continental Stone will openly accept and consider comments and concerns expressed by stakeholders and strive to provide any requested information.

The Committee will provide an avenue for efficient communication with stakeholders and to prevent conflicts from escalating, whether the concerns relate to environmental, social or quality of life issues. Communications will occur through regular meetings as well as establishing a forum (e.g., email list serve) for sharing of timely information (e.g., changes to regular activities). Continental Stone will assign a staff person responsible for coordinating the Committee, receiving information from stakeholders (e.g., aquaculture operations), for sharing information received internally with the responsible parties and ensuring follow-up.

This preventative approach will help ensure the long-term sustainability of the Quarry by limiting and managing potential conflicts and minimizing any adverse effects of construction and operations. In agreement with the Committee, Continental Stone will establish the desired meeting schedule and systems for communications with identified contacts for the Committee and stakeholders.

## 3.0 STAKEHOLDERS

The Committee could include representatives of stakeholder organizations such as the Town of Belleoram, Harbour Authority of Belleoram, commercial fishing enterprises, owner/operators of aquaculture sites (could potentially be a representative of Fortune Bay operators or Newfoundland Aquaculture Industry Association), Department of Fisheries, Forestry and Agriculture and Miawpukek First Nation Band. The

Continued...

Committee could also include recreational boating users of Belleoram harbour facilities, property owners near the Quarry, business owners and recreational users of the area. It is recommended that a scientific advisor also be a member, such as a veterinarian specializing in fish aquaculture or an aquatic scientist to address concerns regarding effects upon aquaculture operations. This could include a representative and/or Chief Aquaculture Veterinarian from the Department of Fisheries, Forestry and Agriculture Aquaculture Development Division.

## **4.0 MITIGATIONS FOR BLASTING AND MARINE VESSEL TRAFFIC**

Interference/navigation issues between the bulk aggregate carriers and boats used for commercial fishing enterprises or aquaculture operators are expected to be negligible, with all quarry-related vessels following the mitigations outlined in Section 2.2.3 of the Comprehensive Study Report (CSR) document and adhering to all procedures and protocols contained in the *Canada Shipping Act*. The CSR for the Belleoram Marine Terminal identified measures to address potential issues related to blasting and marine traffic.

Measures to address other potential issues are included in the Environmental Protection Plan (including avifauna), Environmental Effects Monitoring Plan, Superchlor and Biosecurity Mitigation and Contingency Plan, Environmental Effects Monitoring Program for Air Quality and Site Drainage and Silt Control Plan can be discussed and addressed through the Committee. While mitigations have also been chosen to address other potential environmental issues, those listed below address blasting and marine vessel traffic.

### **Blasting:**

- All blasting plans will be available to the Local Special Interest Committee.
- Continental Stone will maintain constant and open communication with all nearby active aquaculture operators through the Local Special Interest Committee with respect to blasting schedules to lower potential risks during elevated (August-September) and decreased (January-March) water temperature events.
- Some blasting will occur at the shoreline to prepare the access to the marine terminal. Best practices will be used to minimize noise and dust emissions. These blasts will be smaller than those used at the Quarry and be designed for efficiency so that as little as possible blasting will occur. While the shoreline is mainly exposed granite, all overburden will be removed prior to blasting and areas of potential dust generation will be sprayed with water when appropriate.
- Blasting will be consistent with the guidelines of Wright and Hopky's Technical Report for the use of explosive near Canadian fisheries waters (1998).
- Blasting will be consistent with the Dyno Nobel North America "*Canadian Blast Site Safety Manual*" guidelines to ensure for safe, environmentally conscious, blasting procedures.
- No blasting will be conducted underwater or within a waterbody.
- During the initial stages of blasting, sound/vibration measuring equipment (i.e., hydrophones) will be deployed to measure the levels of sound/vibration at various points within Fortune Bay. This will be used to validate the prediction that aquaculture facilities are far enough away from the quarry that sound/vibrations experienced by fish will not be intense enough to cause damage or any reaction outside mild, transitory, avoidance behaviour.
- Explosives use will comply with all applicable laws, regulations and orders of the DOEC and the DNR-Mines.
- Explosives handling and detonation will be restricted to persons properly trained and qualified to use

Continued...

them in accordance with the manufacturer's instructions and governmental laws and regulations.

- Blasters Safety Certificates and a Temporary Magazine License will be obtained prior to drilling and blasting to ensure proper procedures are known and followed.

#### **Marine Vessel Traffic:**

- The Local Special Interest Committee will be consulted with respect to ship arrival and departure times so that the community will be aware of ship traffic to enhance local marine traffic safety.
- Bulk carrier passage will be relatively infrequent, typically one vessel every 5-7 days.
- Ships will have a 24-hour turnaround time at the marine terminal.
- All bulk carriers will be required to travel within a predetermined pathway that will allow for both adequate passage into the bay as well as maximizing the distance the ship will be from the farms at any one time.
- Vessels will travel no closer than 750 m to any aquaculture site within Belle Bay and no closer than 3 km to any landmass.
- Vessels will be fitted with a variety of state-of-the-art electronic navigational aids and radar to ensure the most accurate pilotage.
- Bulk carrier speeds are not to exceed 2 knots within Belle Bay so that they do not create an excessive wake or vibrations at the farm sites.
- All bulk carriers will turn off engines (except for any generators required for power) when ships are docked at the marine terminal for loading to minimize exposure to mechanical noise.
- All bulk carriers will carry oil spill cleanup equipment (e.g., absorbents, inflatable dykes) with trained crew members in spill prevention and clean up techniques.
- No bulk carrier will be refueled at the marine terminal.
- No dumping of bilge or ballast water will occur outside the allowable restrictions of the *Canadian Shipping Act* (i.e. not within the Fortune Bay area).
- All bulk carriers will be double hulled.
- The marine terminal has been engineered to meet all design standards required by the applicable building codes and standards, with the structure and any associated machinery, equipment and vehicles, being regularly inspected and maintained and operated by properly trained employees. Only small company owned vehicles will operate at the marine terminal.

Continued...

## 5.0 CLOSURE

This document has been written for Continental Stone Limited based on information provided in various documents prepared for environmental planning and assessment processes for the Belleoram Crushed Rock Export Quarry and Marine Terminal Project as well as Conditions of Release from Federal (Reg 167) and Provincial (Reg 1767) environmental assessments and comments from the Government Screening Committee.

Yours sincerely,

**Wood Environment & Infrastructure Solutions,  
a Division of Wood Canada Limited**

Prepared by:



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Associate Planner - Environmental

Reviewed by:



Jim McCarthy, MSc, CFP  
Senior Biologist, Ecosystem Insight Lead

**APPENDIX 9**  
**Environmental Protection Plan**



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**BELLEORAM CRUSHED  
ROCK EXPORT QUARRY**

**ENVIRONMENTAL PROTECTION PLAN**

**Continental Stone Limited  
P.O. Box 8274, Station A  
St. John's, NL A1B 3N4**

**December 05, 2020**

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## 1.0 INTRODUCTION

Continental Stone Limited is developing a crushed granite quarry in Belleoram, Newfoundland. Continental Stone intends to supply aggregate material to international markets for the duration of the project life – an estimated 50 years.

Environmental protection planning is an important component of overall project planning and implementation. Environmental Protection Plans (EPPs) are commonly required as part of a project approval by government; EPPs provide a practical way in which a proponent can demonstrate an understanding of environmental regulations, practices, and procedures required to reduce or eliminate the potential environmental effects of the project.

### 1.1 Purpose of the Environmental Protection Plan

This Environmental Protection Plan (EPP) is a field-ready document describing applicable environmental protection measures associated with activities at the Belleoram Crushed Rock Export Quarry. It is intended to be a reference document for project personnel for the planning and execution of project-specific activities, as well as a guidance document for contingency planning. The specific purposes of the EPP are to:

- Provide a reference document to ensure that commitments to reduce or avoid environmental effects will be met;
- Document environmental concerns and appropriate protection measures;
- Provide concise and clear instructions to project personnel regarding procedures for protecting the environment;
- Provide a reference document for personnel when planning and/or conducting specific activities and working in specific areas;
- Provide a training aid during implementation efforts;
- Communicate changes in the program through the revision process; and
- Provide a reference to applicable legislative requirements and guidelines.

This EPP sets out the procedures, responsibilities, and control actions to be taken by Continental Stone personnel in achieving the safe and environmentally sound completion of the work described. The EPP is to be available to all relevant staff and subcontractors to ensure that each is aware of their responsibilities and of the procedures to be used in the management of this work. This will result in open communication at all levels and serve as a means to achieve continuous improvement.

The EPP is a “living” document and, as work proceeds, this plan may be updated. Hence the document is dated and distribution is controlled such that all document holders will receive and incorporate amendments as issued. As per the conditions of the Project release in 2015, this EPP has been developed to include avifauna management.

In addition to environmental protection measures outlined in this EPP, plans were developed as per the conditions of the Project release and should be referred to for the information therein:

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- Site Drainage and Silt Control Plan
- Communication Plan
- Superchill and Biosecurity Mitigation and Contingency Plan
- Air Quality Environmental Effects Monitoring Program

## 1.2 Organization of the EPP

This EPP contains the following sections:

**Section 1.0 Introduction.** This section outlines the purpose and organization of the EPP and describe various roles and responsibilities within the plan.

**Section 2.0 Environmental Policy.** This section outlines environmental policies and statements implemented by Continental Stone Ltd.

**Section 3.0 Document Management.** This section outlines procedures for the distribution, revision, and management of the EPP.

**Section 4.0 Description of the Undertaking.** This section provides a summary of the works associated with development of a crushed rock export quarry in Belleoram, Newfoundland.

**Section 5.0 Permits and Approvals.** This section outlines acts, regulations, and policies pertaining to this project, as well as permits or authorizations required to maintain compliance.

**Section 6.0 Environmental Protection Procedures for Routine Activities/Operations.** This section provides an overview of the environmental concerns and general environmental protection procedures associated with a variety of activities anticipated to occur during this project.

**Section 7.0 Contingency Plans.** This section plans for potential accidental events or unplanned events.

**Section 8.0 Contact List.** This section provides relevant contact information.

**Section 9.0 References.** This section provides a list of relevant information.

**APPENDIX A Permits and Approvals.** This section provides all permits/approvals, including conditions of approval and required monitoring/reporting.

## 1.1 Roles and Responsibilities

Continental Stone will provide the following:

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- Final approval of the EPP and any subsequent revisions, in cooperation with Regulators;
- A Project Environmental Manager to oversee and ensure the implementation of the EPP.

Primary responsibility for the implementation of this EPP rests with Continental Stone Ltd.'s Project Environmental Manager. The Project Environmental Manager will also:

- be Continental Stone's on-site representative;
- review the EPP as required;
- ensure revisions are appropriately distributed;
- provide orientation sessions for project personnel and staff as needed;

## **2.0 ENVIRONMENTAL POLICY**

Continental Stone recognizes that all activities in support of the quarrying and export of aggregate material must be accomplished in a manner that minimizes adverse impacts on the environment.

Continental Stone believes that environmental stewardship is essential to our business success and to the communities in which we live and work.

### **2.1 Statement**

It is the policy of Continental Stone to conduct its affairs in accordance with state-of-the-art environmental practices. To accomplish this, Continental Stone will:

- Consider compliance with laws and regulations, permits, and related agreements to be a minimum and build from this foundation.
- Build and maintain an environmental management system and related standards, programs, and procedures that fully integrate prevention of pollution into business planning.
- Inform all employees of their responsibility to comply with this policy and to be sensitive to the effects of Continental Stone's operations on the environment.
- Encourage employees to suggest improvements.
- Conduct annual audits to verify compliance with the environmental management system and to identify areas for continual improvement and innovation.
- Precede new activities or proposed changes in operating procedures with an environmental assessment to determine the environmental impact. Design such activities to reduce or avoid negative impacts.
- Inform contractors of their responsibility to conform to applicable environmental procedures.

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- Contribute to the development and administration of technically and economically sound environmental standards, regulations, and compliance procedures through interaction with professional and trade groups, legislative bodies, regulatory agencies, and citizens' organizations.
- Establish procedures for reporting, responding to, and correcting any conditions or incidents with the potential for adverse environmental impact.
- Maintain open communication with the community and any concerned stakeholders about Continental Stone's environmental policy, plans, and environmental performance.
- Ensure state-of-the-art and innovative reclamation practices are incorporated into the planning and operations for sites and facilities where appropriate.

## 2.2 Application

This policy applies to Continental Stone's Belleoram Crushed Rock Export Quarry.

## 3.0 DOCUMENT MANAGEMENT

The EPP is a “controlled distribution” document. Project Environmental Manager is responsible for EPP distribution and administration. Requests for copies and suggestions for changes to the document are to be submitted to that office.

### 3.1 Distribution

The EPP distribution includes all those involved in the work scope of the document, management personnel, and regulators. All document recipients are to be listed (see Table 1) and will receive copies of amendments and updates as they are produced. In order to ensure that all EPP documents in circulation are current, the EPP document is not to be photocopied or distributed without the prior permission of Project Environmental Manager.

**Table 1      Belleoram Crushed Rock Export Quarry EPP Distribution List.**

Copy Number	Name	Position	Location
1			
2			
3			
4			
5			
6			
7			

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8			
9			
10			

### 3.2 EPP Maintenance

The Project Environmental Manager is responsible for document control, including:

- review revision requests;
- conduct a review of the EPP on an as needed basis;
- determine if EPP Holders and their staff are familiar with the EPP and its procedures;
- obtain necessary approvals of revisions; and
- distribute approved revisions to plan holders.

EPP holders are to:

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

### 3.3 Revisions

This is a controlled document and revisions may only be made by the Project Environmental Manager. It is anticipated that most of the revisions to the EPP will arise from the operating personnel at site. Other revisions will be as required/requested from the provincial and federal government regulatory agencies and other stakeholders. Plan holders and readers/reviewers may initiate proposed revisions by forwarding recommended changes to the Project Environmental Manager. Recommendations will be reviewed and appropriate revisions incorporated into the EPP. The approved revisions will be issued to all holders of controlled copies of the EPP. Each revision will be accompanied by a Revision Control Sheet that:

- provides revision instructions; and
- lists the sections being superseded.

An updated Table of Contents will be included with each revision. A revision number and revision date will be added to each revised page. EPP holders will be responsible for inserting revision pages into their document. The Revision Control Record is Table 2.

**Table 2      Belleoram Crushed Rock Export Quarry: EPP Revision Control Record**

EPP Section	Revision Date	EPP Holder's Signature

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EPP Section	Revision Date	EPP Holder's Signature

## 4.0 DESCRIPTION OF THE UNDERTAKING

### 4.1 Project Overview

Continental Stone Limited (CSL) proposes to develop an 89 ha granite aggregate export quarry in Belleoram, Newfoundland (Figure 1) to supply raw material to international markets. The project will be carried out in 3 stages: Development, Operations and Decommissioning, as described below.

**Development.** Excavation and removal of overburden material will be completed to facilitate the construction of a site access road and quarry area clearing. This stage will also include the excavation of an area for setup of the crusher and associated equipment and a suitable marine terminal for the project. All equipment will be established during this stage.

**Operation.** Operations will consist of drilling and blasting of the rock source, with the fractured rock being crushed into various sizes. The crushed rock will then be conveyed to the marine terminal for loading onto a bulk aggregate carrier and shipped to international markets.

**Decommissioning.** This will involve demobilizing all unsuitable structures at the site and stabilization of the area and the creation of an area that will naturally regenerate and be user friendly and safe for the community.

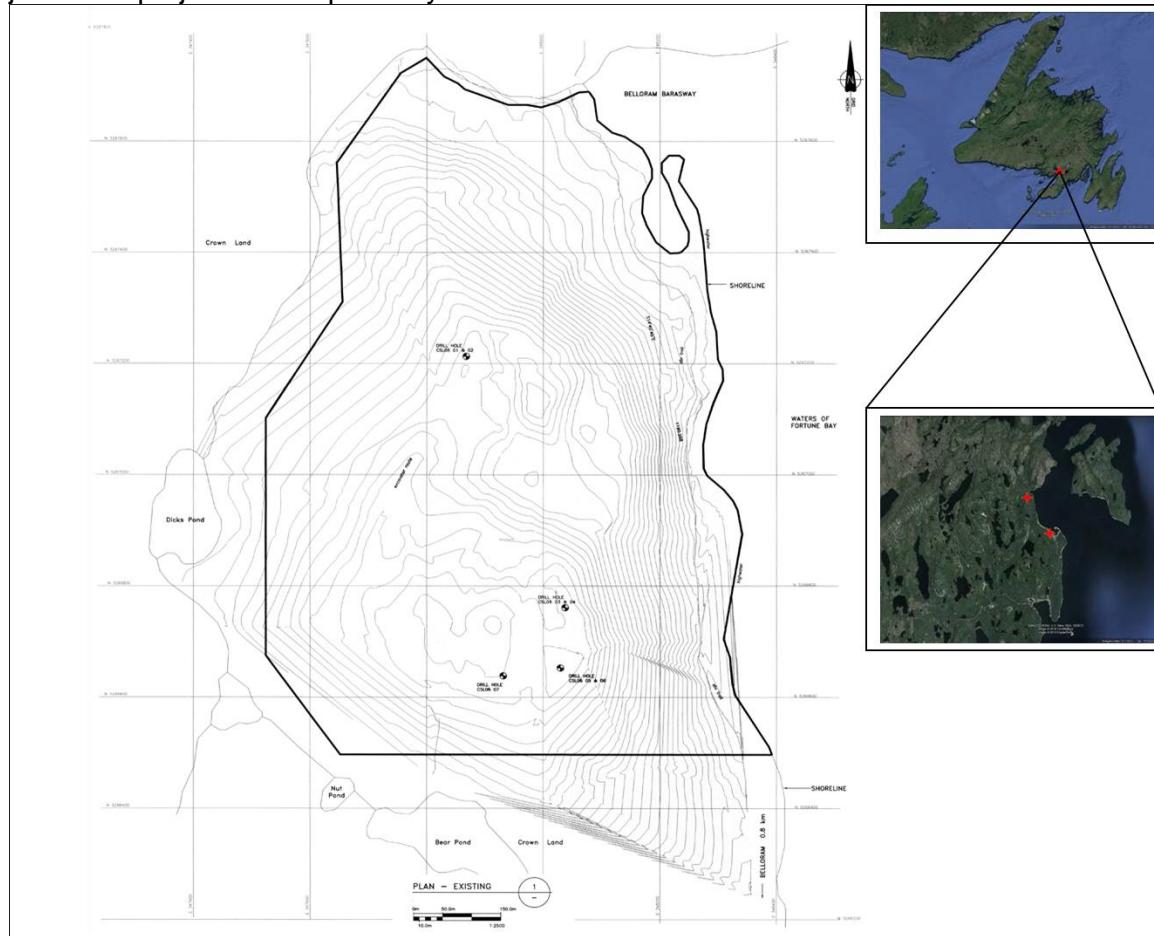
As per the Quarry Development and Reclamation Plan (**Appendix 1**), there are 58 “Phases” to this project, with each Phase being approximately equivalent to an operating season. It is estimated that during Phase 1, which will focus predominantly on site development (Development Stage), there will be approximately 0.5 million tonnes of aggregate shipped to market, followed by 1 million tonnes in Phase 2 as site development continues, and 2 million tonnes by Phase 3, at which time the project site will be fully developed and considered at “normal” production capacity, i.e. the Operations Stage.

### 4.2 Purpose of the Project

The purpose of the project is to gain a market share of the aggregate industry, with a view of enhancing the long-term viability of Continental Stone and the economy of the Connaigre Peninsula through the creation of sustainable employment. The project is

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expected to bring 20 – 30 full time direct jobs with the potential for numerous indirect jobs for a project life of up to 58 years.



**Figure 1      Location of the proposed rock quarry and the development boundary.**

## 5.0 PERMITS AND APPROVALS

The conduct of the work is subject to various regulatory controls. Listed below are the applicable legislation and regulations related to the scope of work.

### 5.1 Provincial Permits and Approvals

**Table 3      Permits issued for activities at the Belleoram Crushed Export Rock Quarry**

Department/Agency	Applicable Legislation	Permit	Project Element

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Department of Industry, Energy and Technology, Mines Branch	<i>Quarry Materials Act</i> and Regulations	Exploration Licence	Exploration and drilling
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**Table 4 Permits and approvals that may be required for the Belleoram Crushed Export Rock Quarry**

Department/Agency	Applicable Legislation	Authorization	Project Element
<b>Federal Government Requirements</b>			
Canadian Environmental Assessment Agency/Regulatory Authorities	<i>Canadian Environmental Assessment Act,</i> 1995	Release from EA process	Applicable Law List controls
Fisheries and Oceans Canada	<i>Fisheries Act,</i> Section 35(2)	Authorization for the Harmful Alteration, Disruption or Destruction of fish habitat	Construction of wharf
Transport Canada	<i>Navigable Waters Protection Act</i>	Permit for construction within navigable waters	Wharf construction
	<i>Transportation of Dangerous Goods Act, 1992</i>	Permit to store, handle and transport dangerous goods	Storage, handling and transportation of fuel and chemicals
<b>Provincial Government Requirements</b>			
Department of Industry, Energy and Technology, Mines Branch	<i>Quarry Materials Act and Regulations</i>	Quarry Permit	Quarry construction and operation
Department of Environment, Climate Change and Municipalities	<i>Lands Act</i>	Lease/Permit to Occupy Crown Lands	Quarry development
	<i>Environmental Protection Act,2002</i>	Release from the EA process	Quarry project
	<i>Water Resources Act</i>	Permit to alter a body of water	Construction of wharf and alteration to ponds and streams
		Permit to alter a body of water (site drainage)	Quarry development
		Permit for water withdrawal	Pumphouse
		Water use license	Water use
	<i>Wildlife Act</i> and	Authorization to	Construction activity

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Department/Agency	Applicable Legislation	Authorization	Project Element
	Regulations	control nuisance animals	
	Used Oil Regulations	Certificate of authorization	Storage of used oil
Department of Fisheries, Forestry and Agriculture, Forestry Branch	<i>Forestry Act and Cutting of Timber Regulations</i>	Permit to cut crown timber	Site clearing and Construction activity
	<i>Forestry Act and Forest Fire Regulations</i>	Permit to burn	Site clearing and Construction activity
Department of Immigration, Skills and Labour		Blasters Safety Certificate	Blasting
Department of Transportation and Infrastructure	<i>Dangerous Goods Transportation Act, 1995 and Regulations</i>	Compliance standard; no permit required	Storage, handling and transportation of fuel
		Highway Access Permit	Highway access
<b>Municipal Government Requirements</b>			
Town of Belleoram		Development Permit	Development within Town Boundary
		Approval for waste disposal	Waste disposal

## 6.0 ENVIRONMENTAL PROTECTION MEASURES FOR ROUTINE ACTIVITIES / OPERATIONS

This section provides a description of environmental protection procedures for routine quarrying activities and associated site development at the Belleoram Crushed Rock Export Quarry, including the following:

- Works in/around the marine environment
- Blasting
- Storage, handling and transfer of fuel and other hazardous material
- Equipment operations, use and maintenance
- Dust control
- Dewatering work areas and site drainage
- Waste disposal
- Clearing vegetation
- Grubbing and disposal of related debris
- Waste rock and overburden
- Sedimentation and erosion prevention
- Buffer zones

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- Shipping
- Surveying
- Stream crossings
- Concrete production
- Groundwater development and use

As required, protection procedures can be modified to address future activities, site conditions, changes in engineering design and/or construction work methods, and overall environmental performance as work proceeds.

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## 6.1 Work Around Nesting Birds

Project construction and clearing activities will occur in terrestrial and marine environments. The primary environmental concerns with activities in these environments would be the disturbance or destruction of birds (e.g., secure and at-risk species) and nests which are prohibited under the *Migratory Birds Convention Act*, *Species at Risk Act*, and *Newfoundland and Labrador Endangered Species Act*. See Section 7.6 for environmental protection procedures associated with discovery of a species at risk. As per the conditions of the Project release in 2015, this section has been developed to include avifauna management to the EPP.

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

- a) To the extent possible, schedule vegetation clearing activities outside of the estimated breeding season (May 15 to August 15) in an effort to minimize disturbance to breeding birds and their nests.
- b) If vegetation clearing is required during this period, thorough nest searches will be conducted within the area prior to clearing activities. If evidence of nesting is detected (e.g., territorial behavior, nests) then appropriately sized protective buffers (Table 5) will be established at these locations. Buffered areas will be maintained until the end of the breeding season or abandonment of the area as confirmed by an experienced avifauna biologist.
- c) Train site environmental monitors in avifauna management including:
  - i) Understanding of provincial and federal legislation, permits, approvals and guidelines.
  - ii) Protocols and best practices for construction activities in the vicinity of active nests.
  - iii) Techniques for locating active nests.
  - iv) Techniques identifying birds to species groups.
- d) A listing of Species at Risk will be posted on site.
- e) If an active nest is found during routine Project activities, avoid all construction in the immediate area until the appropriate buffer is established around the nest.
- f) Adhere to buffer zone requirements (see Section 6.13) and avoid all construction/disturbance in seasonally important habitats (e.g., waterfowl or shorebird staging areas).
- g) Minimize the spatial footprint to the Project to the extent possible and restrict construction activities to the Project area.
- d) Minimize the infilling of adjacent wetlands and maintain hydrological conditions in the Project area (see Section 6.2).
- e) Use existing roads, quarries, and other disturbed areas to the extent possible.

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- f) Implement and enforce a ‘no harvesting’ policy and avoid the harassment of birds and other wildlife (see Section 7.4).
- g) Rehabilitate disturbed areas and access roads to pre-disturbance conditions.
- h) Comply with all provincial and federal legislation, permits, approvals and guidelines.
- i) Limit artificial sources of lighting to the level required for safe operation and limit noise levels to the extent possible.
- j) Use best management practices for the storage and handling of fuels and other hazardous materials. Also ensure that vehicles are not leaking fuel into the environment (see Section 6.4).
- k) Implement various dust-control measures to limit contamination to nesting birds (see Section 6.6).
- l) Site and working areas will be kept clean of food scraps and garbage to avoid attracting scavenging birds and other wildlife (see Section 7.4). The intentional feeding of birds and other wildlife should be avoided.

**Table 5      Buffer zones around bird species group nest sites.**

Species Group		Setback Buffer Radius (m)
Raptor nests	Active	800
	Inactive	200
Waterfowl nests		100
Waterbird nests		100
Shorebird nests		30
Landbird nests		30
Species at Risk nests		100

## 6.2      Works In/Around the Marine Environment

Work required to take place in the marine environment includes construction of a permanent dock facility that will support shipment of aggregate from the quarry. Infilling and dredging may take place during dock construction. The primary environmental concerns associated with marine construction include the following:

- release of sediment fines and petroleum products into the water and substrate; and
- disturbance/destruction of fish and/or fish habitat.

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

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- a) Infilling or dredging activities will be conducted in strict compliance with all authorizations and/or permits as required by the Department of Fisheries and Oceans.
- b) Blasted rock will be used for infilling. Armour stone protection will be placed progressively to minimize erosion and prevent the loss of infill material.
- c) Dredging activities will take place inside a silt curtain/turbidity barrier to prevent sediment from entering the water column away from the work area. The silt barrier will be attached to a flotation boom and extend from the sea surface to 1-2 m from the sea bottom.
- d) Seabed sediment will be removed during dredging activities, placed on a barge deck while inside the silt curtain, and removed for disposal on land.
- e) Heavy equipment will only be used from dry, stable areas or barges specifically designed for that purpose.
- f) Heavy equipment not operating from a barge must complete work below the high water mark during low tide.
- g) Timber used for construction will consist of wood treated with preservatives safe for use in the marine environment or wood will be left untreated.
- h) Timber used in wharf construction will be cut on land, away from waterbodies.
- i) All equipment will be serviced and fueled on land at least 30 m from the marine environment or in areas designated for spill containment.
- j) All vehicles and equipment must be clean and in good repair. Regular inspections will be made for leaks on all equipment; necessary repairs will be completed immediately.

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### 6.3 Blasting

Detonation of explosives during the quarrying operations will produce vibrations and noise in the surrounding environment. The primary environmental concerns associated with blasting include airborne dust/debris and shock waves, with resulting effects on human health, vegetation, and aquatic life.

Noise and dust from blasting can be a human health hazard for workers. Dust and rock from a blast can smother and damage terrestrial vegetation. Blasting in or near water bodies can affect organisms with swim bladders (fish). The introduction of silt into the water column is also a concern for water quality and related effects on aquatic life. As per the conditions of the Project release in 2015, a Communication Plan has been developed to assist in appropriate management of blasting and vessel activities.

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

Continental Stone Ltd. recognizes the potential for effects from blasting, in particular, the potential for sensitivity of farmed fish. As a result, Continental Stone has incorporated operational procedures to reduce or eliminate negative effects, while maximizing safety and efficiency, into their blasting regime. The procedures are as follows:

- a) Although there is no expectation that blasting will occur near water bodies, it is acknowledged that guidance is available in the form of a DFO Fact Sheet (Blasting - Fish and Fish Habitat Protection) and Guidelines for the use of Explosives in or near Canadian Fisheries Waters" (Wright and Hopkey, 1998); these guidelines will be strictly adhered to.
- b) The handling, transportation, storage, and use of explosives will be conducted in compliance with all applicable laws and regulations, including the *Explosives Act* and the *Transportation of Dangerous Goods Act*.
- c) Explosives shall be used in a manner that will reduce or avoid damage or defacement of landscape features outside the work area. Controls will be exercised to calculate explosive loads and control over scattering of blasted material beyond the limit of activity. Time delay blasting cycles or blasting mats shall be used, as necessary, to control the scatter of blasted material.
- d) Blasters' Safety Certificates and Magazine License from Mines Inspection of the Department of Labour shall be obtained and held in good standing.
- e) Use of explosives shall be restricted to authorized, trained, and qualified personnel.
- f) There shall be separate magazines for explosives and for blasting caps. All magazines shall have the appropriate approvals.
- g) All blasting associated debris, such as explosive boxes and used blasting wire, will be collected for proper disposal as soon as possible following each blast.

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- h) Utilization of Dyno Nobel North America “Canadian Blast Site Safety Manual” guidelines to ensure for safe, environmentally conscious, blasting procedures;
- i) A blasting plan will be made available to the local interest committee.
- j) Blast patterns and procedures will be designed to control shock or instantaneous peak noise levels to ensure that the magnitude of explosions is limited to only what is necessary. Briefly, design considerations include:
  - plugging the 12 m bore holes with a 3 m collar of 20 mm, clean, crushed stone to trap gases and dust during blasting;
  - optimizing drill hole patterns;
  - using explosives in a manner that will limit scatter of blasted material to within the limits of the work site;
  - employing the proper working on time-delayed blasting cycles (500 millisecond in-hole delay and a 25 millisecond surface delay); and
  - using reliable material such as Nonel EZ Dets, or similar blast initiation system, which allows accurate firing of the explosives.
- k) The immediate area of the site will be visually surveyed prior to blasting. Operations will be delayed if wild animals (i.e., big game, such as moose) are observed within 100 m of blasting operations. Animals will be allowed to leave of their own accord; under no circumstances will noise or other devices be used to harass or otherwise disturb animals.
- l) During the initial stages of blasting, sound/vibration measuring equipment (i.e., hydrophones) will be deployed to measure the levels of sound/vibration at various points within Fortune Bay. This will be used to validate the prediction that aquaculture facilities are far enough away from the quarry that sound/vibrations experienced by fish will not be intense enough to cause damage or any reaction outside mild, transitory, avoidance behaviour.
- m) Airborne dust shall be reduced by making use of blast mats and utilizing blast patterns that reduce the amount of disturbed material.
- n) Continental Stone will maintain constant and open communication with all nearby active aquaculture operators through the Local Special Interest Committee with respect to blasting schedules to lower potential risks during elevated (August-September) and decreased (January-March) water temperature events.

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## 6.4 Storage, Handling and Use of Fuel and Other Hazardous Materials

Hazardous substances that may be used on site include the following:

- Gasoline, diesel fuel, grease, motor oil, hydraulic fluids;
- Propane;
- Explosives;
- Acetylene;
- Paints;
- Concrete additives;
- Antifreeze;
- Cleaners and solvents.

The primary concern with respect to hazardous substances is an uncontrolled release to the environment, (i.e., a spill). Subsequent adverse effects may include contamination of terrestrial and aquatic environments, as well as groundwater quality and human health concerns.

### ***Environmental Protection Measures***

Only persons qualified in the handling of fuel and other hazardous materials as stated in government laws and regulations will handle fuel and other hazardous materials. Fuel will be handled in accordance with the Storage and Handling of Gasoline and Associated Produce Regulations (2003).

#### *Transport of fuel and other hazardous materials*

- a) The transport of fuel and other hazardous materials will be undertaken in compliance with the *Transportation of Dangerous Goods Act*. All goods entering the site will be inspected to ensure that the appropriate placards or labels and manifest are in place and the security of the product is assured. All persons handling dangerous goods must show proof of certification of training in the transportation of dangerous goods as required under the Act. Security staff and the Project Environmental Manager will be trained in the requirements of the Act.

#### *Storage of fuel and other hazardous materials*

- a) There will be no on-site bulk storage of fuel or oil. Waste oils, lubricants and other used oils shall be reused, recycled or disposed of at an approved licenced waste management facility in accordance with the provincial Used Oil Control Regulations (2002).
- b) Explosives will not be manufactured or stored on site in bulk, but will be ordered on a regular basis from reputable suppliers.

#### *Fuel transfer*

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a) Bulk carriers will not be refueled at the site marine terminal.

*Equipment refueling*

- a) Equipment refueling is to comply with the Storage and Handling of Gasoline and Associated Products Regulations.
- b) Fueling and lubrication of equipment shall occur in such a manner as to minimize the possibility of contamination to soil or water. When refueling equipment, operators shall:
  - o use leak-free containers and reinforced rip and puncture-proof hoses and nozzles;
  - o be in attendance for the duration of the operation; and
  - o seal all storage container outlets except the outlet currently in use.
- c) Regular inspections shall be made of hydraulic and fuel systems on machinery. Leaks shall be repaired immediately.
- d) Fuelling attendants shall be trained in the requirements under the spill contingency plan.
- e) Any soil contaminated by small leaks of oil or grease from equipment will be disposed of according to the Environmental Protection Act.
- f) Fueling or servicing of mobile equipment on land shall not be allowed within 30 m of watercourses, waterbodies or ecologically sensitive areas.

*Hazardous materials*

- a) Hazardous materials shall be used only by personnel who are trained and qualified in the handling of these materials and only in accordance with manufacturers' instructions and government regulations.
- b) The Workplace Hazardous Materials Information System (WHMIS) Regulations under the Occupational Health and Safety Act will apply to all handling of hazardous materials. Safety Data Sheets (SDS) will be readily available on site for all hazardous materials.
- c) All hazardous materials shall be removed and disposed of in an acceptable manner in accordance with government regulations and requirements.

*Spills of fuels and hazardous materials*

- a) Precautions will be taken to prevent and reduce the spill of fuel and other hazardous materials. In the event of a spill on land or in the freshwater environment, the Environmental Emergencies 24 Hour Report Line will be contacted (1-800-563-9089).

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- b) Every effort will be made to immediately control the source of the leak or spill and clean up the contaminated area.
- c) There shall be appropriate spill clean-up equipment will be on site, as required, including one land and one aquatic 55 gallon drum spill response kit.

*Disposal of hazardous wastes*

- a) All hazardous waste will be handled according to the provincial *Environmental Protection Act*. Waste classified as “hazardous” or “special” that can not be disposed of in regular landfill sites will be sent for disposal at a licensed 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 *Used Oil Control Regulations*.
- i) Any soil contaminated by small leaks of oil or grease from equipment will be disposed of according to the *Environmental Protection Act*.

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## 6.5 Equipment Operations, Use, and Maintenance

A variety of vehicles and heavy equipment will be used throughout the quarry site. Environmental concerns associated with operating, using and maintaining such equipment includes air emissions, accidental spills, noises, and chronic leaks that may contaminate on-site water bodies.

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

- a) All approvals, authorizations, and permits for project activities will be followed.
- b) All noise control devices will be maintained in good operating condition.
- c) All equipment will meet the requirements of the provincial *Air Pollution Control Regulations* under the *Environmental Protection Act*. All equipment will have exhaust systems regularly inspected and mufflers will be operating properly.
- d) Regular maintenance inspections for leaks will be made on all equipment. If problems are identified, the equipment will be taken out of service and corrective action taken to prevent release of hydrocarbons into the environment.
- e) Drip pans shall be placed under pumps and generators. Absorbent material will be kept at all sites where pumps and generators are in use.
- f) All hydrocarbon leaks shall be reported to the Supervisor and Project Environmental Manager. Upon detection of a leak, the equipment is to be shut down and corrective action taken to repair the leak and clean up any contamination. Approval of the Project Environmental Manager is required before re-commencing operations.
- g) Hoses and connections on equipment will be inspected routinely for leaks and drips.
- h) Equipment maintenance and fueling activities will be performed at designated sites and in compliance with applicable regulations. All heavy equipment will be maintained and operated as outlined in the Occupational Health and Safety legislation.
- i) Only minor repairs and maintenance (eg. lubrication) of 'non-mobile' equipment such as drilling equipment will be performed on-site. All major repairs are to be performed at a location outside the quarry site.
- j) All fuel and hazardous materials will be handled according to procedures outlined in Section 6.3.

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## 6.6 Dust Control

The environmental concerns associated with dust include human health effects (eg. dust inhalation) and potential effects on aquatic ecosystems, waterfowl, and vegetation (eg. contaminant uptake).

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

The following measures shall be taken to mitigate potential effects of dust:

- a) Dust from road travel and dumping of waste rock shall be controlled where possible by using frequent applications of water.
- b) Waste oil shall not be used for dust control.
- c) Any application of calcium chloride shall be in accordance with guidelines available from the Department of Works, Services and Transportation.
- d) Dust control agents (other than water) shall be stored in areas away from water bodies.

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## 6.7 Dewatering Work Areas and Site Drainage

The primary concern with site dewatering and drainage is the potential for siltation, fish mortality and habitat destruction. As per the conditions of the Project release in 2015, a Site Drainage and Silt Control Plan has been developed to assist in appropriate management of site runoff.

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

- a) Site water that has met applicable regulations will be discharged to vegetated areas as opposed to directly into a waterbody; vegetation will act as a natural filter, reducing any potential effects.
- b) Monitoring site run-off at the quarry will be conducted as per provincial requirements to ensure effluent quality standards.
- c) If silt is found to be entering nearby waterbodies, filtration, or other suitable measures such as silt fences, will be used as required to reduce the turbidity of water pumped from work areas.

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## 6.8 Waste Disposal

Waste (e.g., domestic 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) 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 waters disposed of on the proposed site will comply with the Environmental Control Water and Sewer Regulations, 2003.
- b) Waste receptacles shall be installed at all active areas for use by workers.
- c) All solid waste will be handled according to the provincial *Environmental Protection Act*.
- d) All solid waste materials shall be considered, prior to disposal, for reuse, resale, or recycling.
- e) Solid waste produced by site personnel and operations and not reused, resold or recycled will be regularly collected and disposed of at the Belleoram municipal disposal facility, with the Town's approval.
- f) Waste accumulated on site prior to disposal will be confined, so that it does not pose an environmental or health hazard.
- g) Work areas will be kept clear of waste and litter to reduce the potential for attracting wildlife and reducing potential interactions with wildlife.
- h) Any organic waste that may attract animals (i.e., food) will be stored in covered, wildlife-proof containers.
- i) Burning of waste is not permitted.
- j) All hazardous wastes generated will be handled according to the procedures for handling fuel and hazardous materials (Section 6.3).

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## 6.9 Clearing of Vegetation

Vegetation clearing (e.g., trees and shrubs) will be required for site preparation activities for work areas and lay down areas. Potential environmental concerns include the loss of habitat, disturbance of nesting birds, the sedimentation of watercourses, uncontrolled burning of slash, stockpiling vegetation in or near watercourses, and disturbance or destruction of historic resources. Land clearing and grubbing will follow the Protected Road Zoning Regulations.

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

- a) Clearing or removal of trees will be restricted to only those areas required.
- b) Clearing activities will comply with the requirements of all applicable permits, including the Permit to Burn.
- c) Clearing will consist of cutting as close to the ground as possible, with stump heights not exceeding 15 cm, and disposing of all standing trees, as well as removing all shrubs, debris and other perishable materials from the area.
- d) Chain saws or other hand-held equipment will be used in clearing vegetation except where alternative methods or equipment are approved by Continental Stone. 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 nearby waterbodies. All chainsaw operators will be equipped with an adequate fire extinguisher during the fire season, as well as shovels and axes.
- e) A buffer zone consisting of 50 m of undisturbed vegetation will be maintained between construction areas and all water bodies, watercourses, and ecologically sensitive areas. Clearing activities will adhere to the avifauna nest buffer zones requirements outlined in Section 6.13.
- f) Merchantable or usable timber will be removed by a local contractor.
- g) Disposal of cleared unmerchantable timber, slashings and cuttings by burning shall be in compliance with the *Forest Fire Regulations*, Environmental Code of Practice for Open Burning, and the Permit to Burn. At no time will fires be left unattended.
- 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 for later disposal.
- i) Cleared vegetation will be used to restore habitat where practical.
- j) Where possible, timber will be felled inward toward the work area to avoid damaging any standing trees.

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- k) Continental Stone employees will not destroy or disturb any features indicative of a cultural or archaeological site. Such features will be avoided until a report has been made to the Provincial Archaeology Office and clearance to proceed has been received.

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## 6.10 Grubbing and Disposal of Related Debris

The principal concerns associated with grubbing and disposal of related debris are the potential adverse effects on terrestrial ecosystems and water quality, including:

- destruction of terrestrial habitat; and
- potential for siltation, erosion and run-off.

### *Environmental Protection Procedures*

- Grubbing of the organic vegetation mat and/or the upper soil horizons will be restricted to the minimum area required.
- The organic vegetation mat and upper soil horizon material that has been grubbed will be spread in a manner so as to cover inactive exposed areas.
- Any surplus of such material will be stored or stockpiled for site rehabilitation and revegetation purposes. The location of the stockpiles will be recorded and accessible for future rehabilitation purposes. Grubbed material will be buried with two feet of soil cover to prevent erosion and loss of nutrients.
- 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 revegetation. Erosion control measures will be implemented in areas prone to soil loss (Section 6.12).
- 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 limited to 30 days to prevent unnecessary erosion.
- Grubbing activities will adhere to the buffer zone requirements outlined in Section 6.13
- During grubbing, care will be taken to ensure that grubbed material will not be pushed into areas that are to be left undisturbed.
- Discovery of historic resources will be handled according to the procedures outlined in contingency plans, Section 7.3.
- Continental Stone is aware of the value of wetlands and will avoid intrusion into high quality wetlands.

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## 6.11 Waste Rock and Overburden

The principal concern associated with the placement of waste rock and overburden is siltation of the aquatic environment, pertaining to water quality and substrate, loss of habitat and displacement of wildlife. As well, disturbance and/or excavation of sulfide bearing rock can release contaminants (acidic drainage and dissolved metals – ARD) into the aquatic environment. It is important to note that rock samples previously collected and assayed did not contain sulfides and did not have acid generating potential. Nevertheless, water drainage will be spot checked for pH changes and compared to ambient conditions.

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

- a) Waste rock and overburden storage areas will be in an area north of on-site settling ponds.
- b) Drainage water will be monitored for changes in pH.
- c) Waste rock will be sampled annually and acid-base accounting (ABA) tests will be completed.
- d) Initial sampling has indicated waste rock is not acid generating. Should future sampling indicate acid generating potential, a designated storage pad with associated drainage will be constructed.
- e) If required, collection ditches and settling ponds will be used to manage surface runoff and any groundwater flows.
- f) Waste rock and overburden piles will be sloped to prevent pooling of surface water.
- g) Waste rock and overburden storage areas will be secured as appropriate.
- h) The stored overburden and waste rock will be used for future rehabilitation of the quarry site.

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## 6.12 Sedimentation and Erosion Prevention

Phase 1 of the quarry project is located adjacent to the ocean shore and also contains the lower end of a small stream/pond system which flows into the Belleoram Barasway. The quarry site naturally has a shallow overburden layer (<5 m) and stripping of this material has the potential to increase runoff into the surrounding terrestrial, freshwater, and marine environments. Furthermore, the nature of quarrying activities carries the potential for runoff to carry silt, hydrocarbons, and ammonia from explosives.

Eroded material may cause siltation in water bodies and, subsequently, decrease suitable habitat for aquatic and terrestrial animals.

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

The possibility of detrimental effects from runoff and erosion is a concern with any quarry operation and is addressed by adequate planning and operation.

- a) All work in the vicinity of the Belleoram Quarry will be conducted in accordance with conditions set out in applicable permits, approvals and/or authorizations.
- b) A 50 m buffer zone of undisturbed natural vegetation between construction areas and all waterbodies will be maintained.
- c) Siltation control structures (i.e., silt curtains, cofferdams, sediment fences, etc.) will be constructed prior to beginning any activities involving disturbance of the site and work along the shoreline.
- d) Soil disturbance will be reduced by limiting the area exposed at any one time, stabilizing exposed soil with anti-erosion devices (i.e., rip rap, filter fabrics, gravel or wood chips), and revegetation of disturbed areas.
- e) Water will be directed from the site to vegetated areas (natural or man made) within the project boundaries, which will filter any potential suspended solids.
- f) Wash water will be collected and piped through an enclosed steel pipeline to industry approved settling ponds to allow suspended solids to precipitate out;
- g) Wash water will be recycled from the settling ponds back into the operations for reuse in aggregate washing, and dust suppression;
- h) Primary means for controlling erosion will be to avoid activity that contributes to erosion; the disturbance of new areas will be minimized.
- i) Drainage ditches along the access road will be stabilized if required (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.

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- j) All areas of exposed erodible soil will be stabilized by back-blading, grading and/or compacting to meet engineered slope requirements.
- k) If an environmental inspection reveals that silt is entering nearby waterbodies, 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 run-off. The necessary or appropriate measures will be determined in the field.
- l) All work and marshalling and storage areas will be monitored for erosion and appropriate repair action taken as necessary.
- m) Existing or new siltation control structures used in this work will be monitored for excessive accumulation of sediment; accumulated sediment will be removed from control structures to ensure the effectiveness of the systems. Effluent from control structures will be released to vegetated areas to ensure appropriate filtration prior to entering any waterbody.

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## 6.13 Buffer Zones

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. Buffer zones may also be established around nesting birds (see Section 6.1).

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

- a) A 50 m buffer zone of undisturbed natural vegetation shall be maintained between construction areas and all waterbodies, watercourses, and ecologically sensitive areas.
- b) In areas where the slope is greater than 30%, buffer zone widths will be determined as outlined in Gosse *et al.* (1998).

The minimum width of the buffer zone will be calculated by the following formula:

Buffer Width (m) = 20 m + 1.5 slope (%), unless the 100 m buffer is greater.

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## 6.14 Shipping

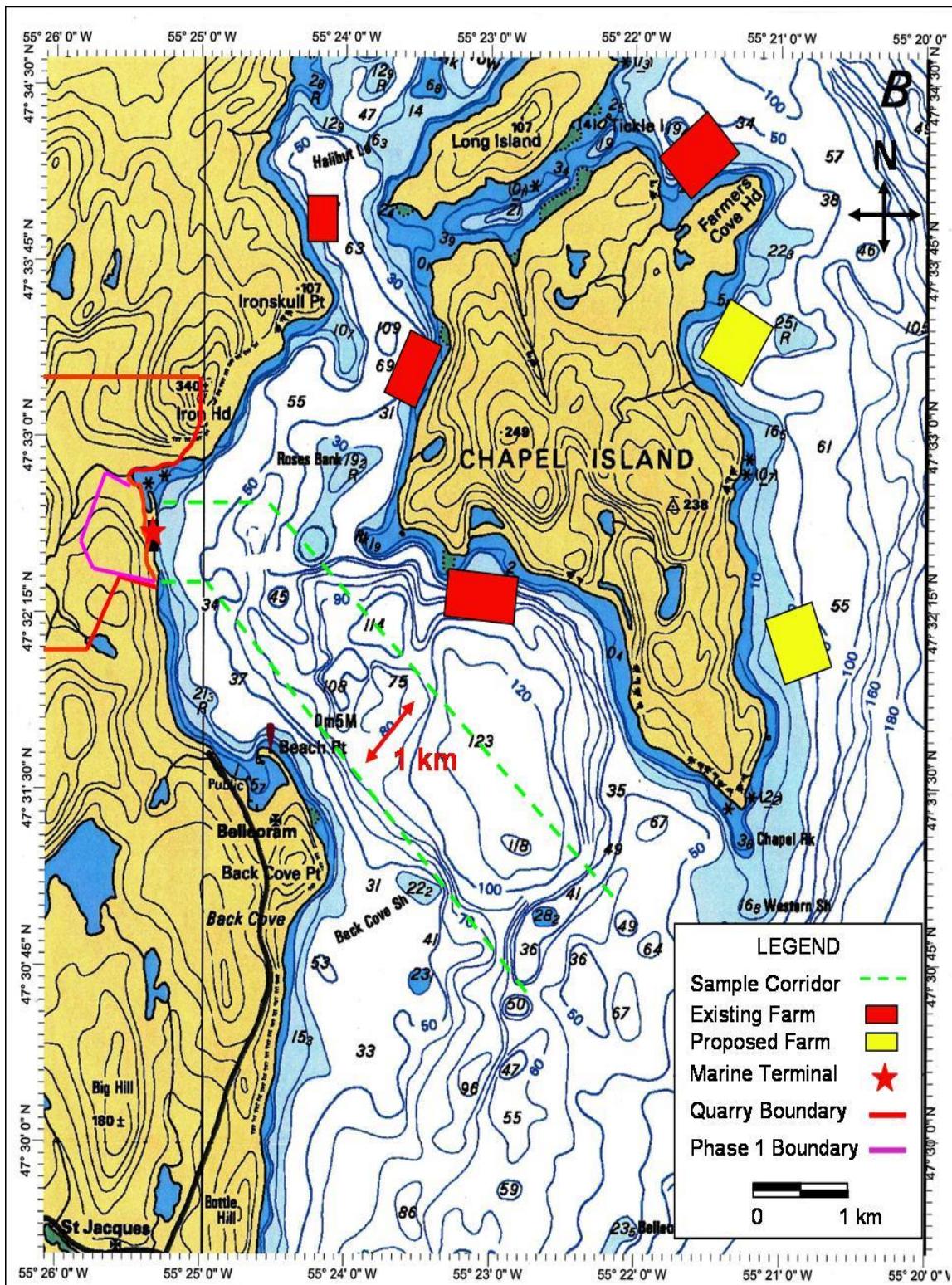
Crushed granite aggregate will be shipped from the Belleoram quarry to market using marine bulk carriers with an anticipated 60,000 dwt. It is anticipated that carriers will be required to enter Fortune Bay and dock at the proposed marine terminal on an estimated weekly basis. Due to their large size and the need for these vessels to turn one-hundred-eighty degrees once they reach the dock for loading, speeds within Fortune Bay are anticipated to be less than two knots. The primary concern related to such activity is the potential for negative effects associated with interactions between carriers and aquaculture facilities in the area, including effects from sounds/vibrational disturbance, wake, water quality, and the possible amplification of the risks involved with superchill events. In addition, there is potential for collision with marine mammals. As per the conditions of the Project release in 2015, a Communication Plan has been developed to assist in appropriate management of blasting and vessel activities.

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

#### *General*

- a) Charter conditions will specify that all bulk carriers will be double-hulled and will adhere to all environmental compliance, permits and certificates, and meet all regulatory standards pursuant to the *Canadian Shipping Act*. It should be noted that no “tanker” traffic will occur as part of the project and there will be no bulk oil/fuel transport, no oil/fuel refueling of ships, and no bilge water discharge at the project site.
- b) Without compromising the responsibility of the ships Master with respect to safety of the vessel and crew, the following precautions will be specified:
  - i) All bulk carriers will be required to travel within a predetermined pathway that will allow for both adequate passage into the bay as well as maximizing the distance the ship will be from aquaculture farms at any time (Figure 2).
  - ii) All bulk carrier speeds will be such that they do not create excessive wake or vibrations at the farm sites.
  - iii) All bulk carriers will turn off engines (except for any generators required for power) when ships are docked at the marine terminal for loading to minimize exposure to mechanical noise.
  - iv) All bulk carriers will carry oil spill clean up equipment (e.g., absorbants, inflatable dykes) with trained crew members in spill prevention and clean up techniques.
  - v) The anticipated operation speed of 2 knots is well below the 13 knots recommended by DFO to avoid collision with marine mammals.

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**Figure 2 Bulk carrier passage lane for the Belleoram Crushed Rock Export Quarry**

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## 6.15 Superchill and Elevated Water Temperature Events

Effects of a superchill (an event lasting hours or a couple of days occurs where ambient water temperature reaches -0.7°C or lower) can be amplified due to shipping. Under normal aquaculture operations, fish will naturally avoid superchill by remaining on the bottom of the cages where it is slightly warmer and the water less turbulent than the immediate surface. As a result, both shipping and blasting activities can interact with aquaculture operations by causing an avoidance response which may bring fish to the surface into superchill. Shipping activities will not occur between January to March when superchill events may occur, thereby lowering potential risk to aquaculture farms.

Elevated water temperatures (>18°C) may result in low oxygenated waters and trigger stress in fish. Similar to superchill events, both shipping and blasting activities can interact with aquaculture operations by causing an avoidance response which may bring fish to lower oxygenated surface waters. Potential for elevated water temperatures is generally between August and September.

As per the conditions of the Project release in 2015, a Superchill and Biosecurity Mitigation and Contingency Plan has been developed to assist in appropriate management of superchill, elevated water temperature, and biosecurity events.

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

- a) Location of all active aquaculture operations in the area will be determined through communication with local community officials and the provincial GIS database (e.g., AquaGIS). The location of these sites will be plotted on maps to ensure sufficient buffer between vessel traffic and active aquaculture activities.
- b) All active aquaculture companies in the area will be included in the local interest committee as well as the Communication Plan.
- c) Regular communication will be maintained between active aquaculture operators and project personnel; including advance notice of blasting and vessel arrival/departure.

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## 6.16 Surveying

Surveying activity may include the following activities:

- Vegetation removal;
- Traversing;
- Establishing targets, permanent benchmarks, and transponder stations.

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

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

#### *Vegetation Removal*

- Width of survey lines will be limited to that which is absolutely necessary for line of sight and unobstructed passage.
- Whenever possible, cutting lines to the edge of open areas will be avoided.
- Wherever possible, trees and shrubs will be cut flush with the ground; stumps will not exceed 15 cm.
- Cutting of survey lines will be kept to 1.5 m or less.
- All trees not exactly on transit lines shall be left standing and trees partly on line should be notched (notch not to exceed 1/3 tree's diameter) instead of removed, to allow sighting.
- Discretion should be used when large trees are encountered. For example, trees greater than 30 cm at diameter breast height (dbh) or larger should, whenever possible, not be cut. On grid lines, trees of 30 cm diameter or larger shall be left intact and shall be traversed to continue the line.
- No attempt to harass or disturb wildlife will be made by any person.
- Vehicles will yield the right-of-way to wildlife.
- There will be no cutting in areas designated as sensitive without notification and approval of the Project Environmental Manager.
- Historic resource discoveries will not be disturbed during survey work and will be reported as per applicable regulations.

#### *Traversing*

- All terrain vehicles will not be allowed off the right-of-way except as approved by the Project Environmental Manager.

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- b) Wildlife will not be disturbed or harassed by any personnel.
- c) Motorized vehicles will not be permitted to enter sensitive areas without notification and approval of the Project Environmental Manager.
- d) The extent of activities in sensitive areas will be minimized.

*Establishing Targets, Permanent Benchmarks and Transponder Locations*

- a) A driven T-bar, well embedded to readily identify each benchmark location will be used.
- b) Wildlife will not be disturbed or harassed by any personnel.
- c) Access to sensitive areas is to be approved by the Project Environmental Manager.
- d) Standard iron bars and sledge hammers are to be used to establish benchmarks.
- e) Heavy equipment will not be used to access sensitive areas.

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## 6.17 Stream Crossings

Stream crossings and culvert installations have the potential to cause direct disturbances to or mortality of fish, disturbance of waterfowl, and disturbance or loss of fish habitat.

### ***Environmental Protect Procedures***

- a) Specific erosion stabilizations methods and effective sedimentation control practices will be implemented on a site-specific basis and based on guidelines and principles as outlined by the Department of Fisheries and Oceans.
- b) Stream crossings shall be constructed in compliance with applicable permits, regulations and authorizations.
- c) Stream crossing activities shall be conducted under the supervision of the Project Environmental Manager.
- d) Work shall be completed in a manner that ensures sediment, fuel and oil do not enter watercourses or waterbodies.
- e) Buffer zones shall be maintained, as per Section 6.13.
- f) At this time, no culverts are planned. If culverts are required, locations will be identified to DFO and adhere to all applicable regulations and permits and be in accordance with the Environmental Guidelines for Culverts from the Department of Environment and Conservation. (Water Resources Division, 1992).

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## 6.18 Concrete Production

Concrete production will be required for the development of infrastructure. The primary concern associated with concrete production is the potential for the release of washwater and/or spoiled concrete to the environment. Spoiled concrete and associated washwater have the potential to contain harmful additives and agents, as well as pH levels in exceeding acceptable limits.

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

- a) Washwater from the cleaning of mixers, mixer trucks, and concrete delivery systems shall be directed to a closed system rinsing/settling basin.
- b) In the event that water from the closed settling system is to be released, it shall be tested prior to release for parameters related to concrete additives used in concrete production including total hydrocarbons, sodium hydroxide, pH, and total suspended solids. The water to be released shall adhere to applicable guidelines/limits; if it does not meet these criteria, it will be treated until discharge criteria are met.
- c) The settling basin will be cleaned as required to maintain retention capacity.

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## 6.19 Groundwater Development and Use

Potable water requirements during construction will be provided from drilled wells. Environmental concerns associated with potable water include the potential for saltwater intrusion, proximity to sources of contamination, and excessive drawdown on the water table.

### *Environmental Protection Procedures*

- a) Wells shall be developed in consultation with the Department of Environment and Conservation, Water Resources Division to avoid areas of groundwater constraint, (e.g., potential sources of contamination, seawater, and other wells).
- b) Water extraction rates shall be established under approval of the Department of Environment and Conservation, Water Resources Division, to address concerns with respect to drawdown or other potential effects on the water table.

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## 7.0 CONTINGENCY PLANS

Contingency plans have been developed to address accidents and unplanned incidents. These contingency plans will be modified as required throughout the life of the project.

The following contingency plans have been developed for this project:

- Fuel and Hazardous Materials Spills
- Failure of Siltation Control Measures
- Forest Fires
- Wildlife Encounters
- Discovery of Historic Resources
- Discovery of a Species At Risk

Continental Stone Ltd. supports preventative measures as the first line of defence against the possibility of accidents.

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## 7.1 Fuel and Hazardous Material Spills

Fuel and hazardous materials (including silt contaminated water or other substances that could affect water quality) can be damaging to vegetation, soil, surface water, ground water, wildlife, aquatic organisms, historic resources and human health and safety.

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

In the event of a fuel or hazardous material spill, the following procedures will apply:

- a) The individual who discovers the leak or spill will make a reasonable attempt to immediately stop the leak or contain the flow.
- b) Spill location, type of fuel or hazardous material, volume, and terrain conditions at the spill site will be determined and reported immediately to the Project Environmental Manager.
- c) Any spill or leak of fuel or other hazardous material in the marine environment or on land reported to the Project Environmental Manager will be then reported directly to Continental Stone Ltd. Any spill in water, and all spills greater than 70 L on land, will be reported to the Canadian Coast Guard spill report number; (709) 772-2083 or 1 (800) 563-9089.

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## 7.2 Failure of Siltation Control Structures

The loss of sediment laden water as a result of spills or the failure of sediment control structures has the potential to adversely affect water quality due to an increase in the total suspended solids of the receiving waters. This can lead to detrimental effects on many forms of aquatic life, including direct effects on fish and their habitat, the smothering of benthic habitat including aquatic vegetation, and more indirect effects on the terrestrial species that depend on these waterbodies for food.

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

In the event of a spill that could increase a waterbody's total suspended solid levels or the failure of a sediment control measure, the following procedures will apply:

- a) The individual who discovers the spill or malfunction will make a reasonable attempt to immediately stop further spills or contain the flow.
- b) The location, nature of the spill/loss, volume, and terrain conditions at the spill site will be determined and reported immediately to the Project Environmental Manager.
- c) Any spill or sediment loss that enters, or has the potential to enter, the aquatic environment will be reported to the Water Resources Management Division at (709) 729-2563.

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### 7.3 Forest Fires

- a) Site must be properly equipped to fight fires. Fire fighting equipment in camps must meet Provincial regulations and all workers must be made aware of the location of extinguishers and fire fighting equipment. At the beginning of the fire season the Department of Natural Resources at Milltown will be contacted (709 882 2200) to obtain a standby list for the fire season. Further, Continental Stone Ltd will arrange to have Roy Flynn, the Conservation Officer for the area, visit the quarry site to familiarize workers with the contact process and general fire safety and awareness.
- b) Other than in an emergency situation, there must be no use of open fires at work sites.
- c) Fire should be reported immediately to the Site Manager, the nearest Forest Management Unit office, as well as the Department of Natural Resources in Milltown at (709) 882-2200. The following information will be provided:

Name of the reporter and phone number  
 Time of detection of the fire  
 Size of the fire  
 Location of the fire

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## 7.4 Wildlife Encounters

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 the risk to both wildlife and humans.

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

#### *Prevention*

Continental Stone Ltd. is responsible for ensuring the following procedures are implemented:

- a) Project personnel are prohibited from hunting, trapping, or fishing on site.
- b) Site and working areas will be kept clean of food scraps and garbage.
- c) Waste will be collected for disposal in appropriate containers. Waste will be transferred to the local 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) When nuisance animals are identified in the project area, Continental Stone Ltd. will be responsible for all subsequent actions. Continental Stone will consult with the Department of Environment and Conservation; all actions will comply with Wildlife Division regulations and permits.
- e) Under provincial wildlife regulations, the displacement and release of any animal is the sole jurisdiction of the Department of Environment and Conservation, and is to be undertaken only under appropriate supervision.
- f) If the nest of any raptor or other bird is encountered, activity in the vicinity of the nest is to be immediately curtailed until the Wildlife Division is contacted and appropriate buffer zones are applied (see Section 6.1).

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## 7.5 Discovery of Historic Resources

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

- a) Stop all work in the immediate area of the discovery until authorized personnel (Project Environmental Manager), having consulted with the Provincial Archaeologist, permit resumption of the work.
- b) Report the find immediately to the Project Environmental Manager.
- c) 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.
- d) Continental Stone will report the find with the following information to the Provincial Archaeology Office, Culture and Heritage Division, Department of Tourism, Culture, and Recreation, 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;
  - v) present location of the material, if moved, and any protective measures initiated for the material and the site; and,
  - vi) extenuating circumstances.

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## 7.6 Discovery of a Species at Risk

The construction and operation of the Project may affect Species at Risk and their habitat. Since these species are extremely sensitive to habitat degradation the following measures will be put into place to ensure that the Project does not pose a threat to their population's survival.

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

- a) A listing of Species at Risk will be posted on site.
- b) The Proponent and all contractors working on-site will adhere to all stipulations set out in the *Species at Risk Act* (SARA), and will be informed that it is illegal to kill, harass, capture or harm any species listed under it.
- c) If a Species at Risk is discovered, all work in proximity to the location will cease and it will be reported to the Project Environmental Manager who will then contact to Environment Canada.
- d) As per Section 73 of the SARA, a competent Minister may enter into an agreement or issue a permit authorizing the activities in proximity to the Species at Risk to commence; however, operations in the area will not continue until such a permit is obtained. To that end, Continental Stone Ltd will successfully demonstrate that: 1) all reasonable alternatives to the activity have been considered; 2) all feasible measures will be taken to minimize the effect of the activity on the species; and 3) the activity will not jeopardize its survival or recovery.
- e) As part of any authorization pertaining to a Species at Risk, an Action Plan will be developed in consultation with Environment Canada to ensure the long term viability of the species/habitat in question.

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## 7.7 Contact List

### **Continental Stone Ltd.**

Robert Rose  
(709) 782-3404

### **Environment and Climate Change Canada**

#### ***Environmental Protection Operations Directorate***

#### ***Environmental Protection Branch***

6 Bruce St  
Mount Pearl NL A1N 4T3  
Fax: 709-772-5097  
Email: ec.immersionenmeratl-disposalatseaatl.ec@canada.ca

### **Environment and Climate Change Canada**

#### ***Canadian Wildlife Service***

PO Box 6227  
17 Waterfowl Lane  
Sackville, NB  
E4L 1G6  
Phone: 506-364-5044  
Fax: 506-364-5062

### **Fisheries and Oceans Canada**

#### **Fish and Fish Habitat Protection Program**

P.O. Box 5667  
St. John's NL A1C 5X1  
Phone: 1-709-772-4140  
Fax: 709-772-5562  
Email: FPP-NL@dfo-mpo.gc.ca

### **Department of Digital Government and Service NL**

100 Prince Phillip Drive  
P.O. Box 8700  
St. John's, NL A1B 4J6  
Tel: 1-709-729-4834  
servicenlinfo@gov.nl.ca

### **Royal Canadian Mounted Police**

1-800-709-RCMP (7267)

### **Department of Industry, Energy and Technology**

Natural Resources Building  
50 Elizabeth Avenue  
P.O. Box 8700  
St. John's, NL A1B 4J6  
Phone: 1-709-729-3017

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**Department of Environment, Climate Change and Municipalities**  
P.O. Box 8700  
St. John's, NL A1B 4J6  
Email: MAEInfo@gov.nl.ca

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## 8.0 MONITORING PLANS AND FOLLOW-UP

Continental Stone Ltd has committed to the implementation of mitigative measures designed to address water quality concerns throughout all stages of the Project. The project has previously been submitted to IAAC (formerly CEAA) for review and was assessed as a comprehensive study. A Follow-Up program was designed during the comprehensive study process in order to: 1) verify the accuracy of the environmental assessment for the Project; 2) to determine the effectiveness of the measures taken to mitigate the adverse environmental effects of the project; and 3) to support and verify predictions made concerning the likelihood of “no significant adverse environmental effects”. The Follow-Up program designed under the previously submitted EA will apply to this project and will include environmental monitoring programs which will assess whether the mitigative measures are having the desired effect and will help ensure that any releases from the site comply with all regulatory and permitting requirements.

The intent of these monitoring programs is not to monitor all components of the environment, but to focus on those areas where areas of concern have been identified. To this end, monitoring programs will be developed for the following Project-related activities, including:

- Air Quality
- Work within or near the marine environment;
- Installation and operation of sediment control structures;
- Water withdrawal from freshwater habitat;
- Sediment pond discharges, and;
- Blasting-related runoff.

Individual Environmental Effects Monitoring Plans (EEM) will be finalized upon prior to the start of the development phase. As per the conditions of the Project release in 2015, a monitoring program has been developed for Air Quality. Details of the EEMs, including the nature, extent, and frequency of testing, will be determined through consultations with the appropriate authorities to meet the requirements of any acts, regulations, licences or permits. Once the EEMs have been set, they will be implemented and overseen by the Project Environmental Manager who will be charged with assessing the effectiveness of any mitigation measures and determining if any changes are necessary to ensure environmental compliance. Further, any authorizations required pursuant to Section 35(2) of the *Fisheries Act* will be detailed by DFO upon completion of their HADD assessment and subsequent compensation strategy. This authorization will also outline the necessary post-construction monitoring measures to be completed by the Proponent to ensure that any compensatory works are functioning as designed.

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## 9.0 REFERENCES

Department of Fisheries and Oceans. 1994. Factsheets Vol. 1-26, including: Factsheet No. 2 Blasting – Fish and Fish Habitat Protection

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, NL. X + 105 pp., 2 appendices.

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.



**APPENDIX 10**  
**Contingency Plan**



## **Superchill and Biosecurity Mitigation Contingency Plan**

**05 December 2020**

### **1.0 INTRODUCTION**

Continental Stone Limited ("Continental Stone") requires the implementation of a site-specific superchill and biosecurity mitigation and contingency plan for the Belleoram Crushed Rock Export Quarry ("Belleoram Quarry"). Superchill in coastal waters and vessel traffic as it relates to any active aquaculture operations and the effects on overwintering fish was a concern during the previous assessment process for this project and a contingency plan was identified as a condition of Project release in 2014. The Contingency Plan has been developed to provide an appropriate and consistent response capability to any potential superchill or biosecurity event.

#### **1.1 Purpose of the Contingency Plan**

The purpose of the Contingency Plan is to have a system in place in the event of an superchill or biosecurity situation for the protection of life, environment and property/equipment.

This plan defines the roles and responsibilities of key personnel and outlines the general procedures to be followed when responding to a potential superchill event in a manner that will avoid or minimize health and safety risks, as well as environmental damage. The plan will be incorporated into the larger, overall Environmental Protection Plan (EPP) for the quarry.

#### **1.2 Continental Stone Environmental Policy**

A key ingredient of Corporate Policy for Continental Stone is a commitment, in the conduct of its activities, to reduce or eliminate any adverse effects on the natural environment. As well, Continental Stone will endeavor to protect the health and safety of its employees and others who may be affected by these activities.

Continental Stone is committed to a strong Environmental Protection Plan (EPP) that protects and preserves the biophysical environment in which its activities are carried out.

Employees at every level, including management, are responsible and accountable for the company's overall environmental initiatives. Complete and active participation by everyone, everyday, in every job, is necessary for the environmental excellence the company expects. Management supports coordination of environmental initiatives and issues among all workers on the jobsite.

Management supports participation in the plan by all employees, and requires that all employees and contractors comply with the company environmental requirements as they relate to planning and the operation and maintenance of facilities and equipment. Employees are responsible for following all procedures and, wherever possible, improving on environmental measures.

The protection and preservation of the biophysical environment is our objective. Through heightened environmental awareness and action this can be accomplished.

### **2.0 MITIGATIONS**

Potential interactions between vessels and blasting, and any active aquaculture sites in the area may possibly amplify the risks associated with superchill, elevated water temperatures, or biosecurity events.

Continued...

Vessel interactions with aquaculture sites during superchill events is limited with no project vessel traffic from January to March. The following standard mitigation measures will be implemented:

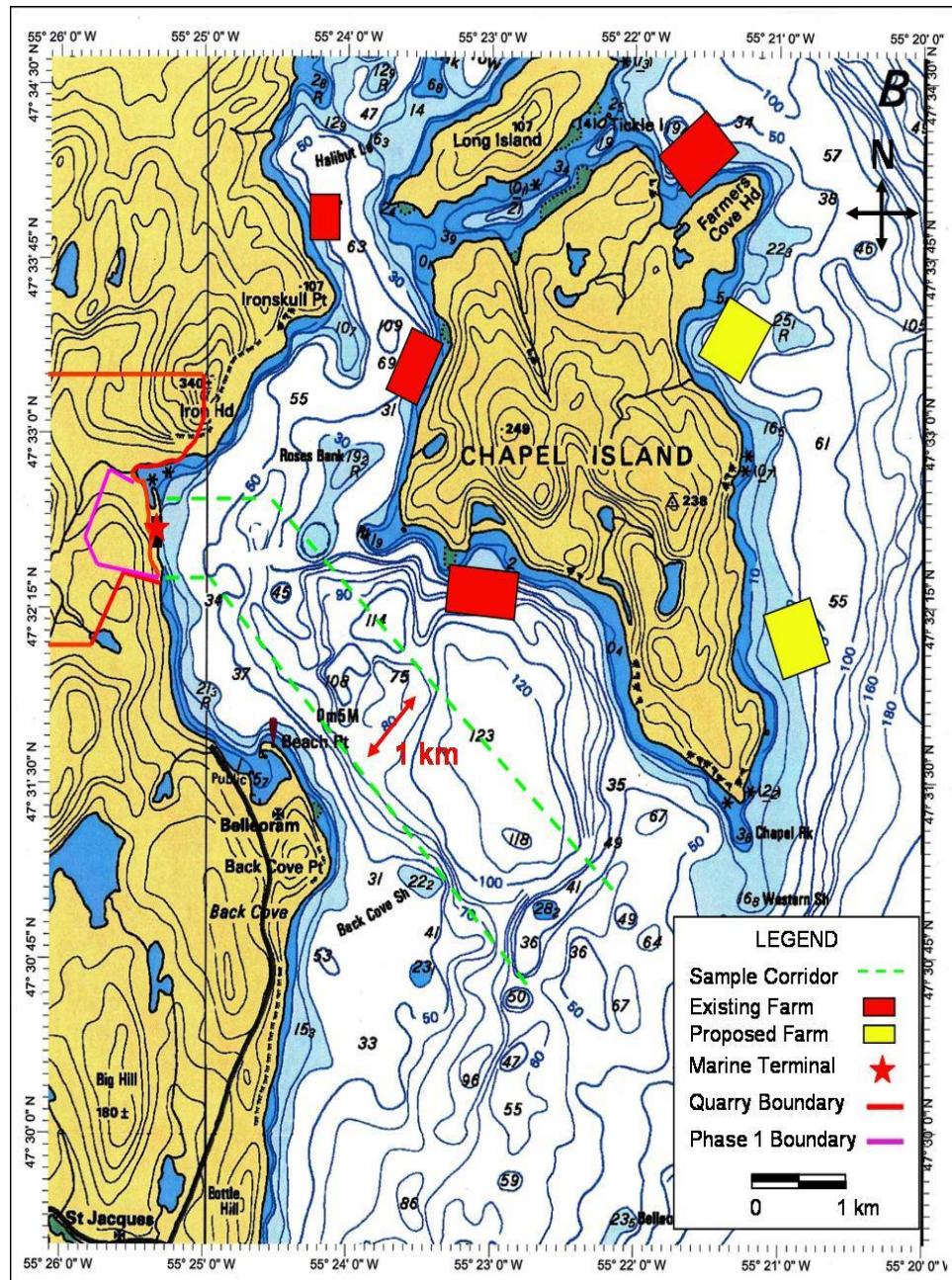
### **Vessels**

- All bulk carriers will be required to travel within a predetermined pathway that will allow for both adequate passage into the bay as well as maximizing the distance the ship will be from the farms at any one time (Figure 2-1);
- All bulk carrier speeds will be such that they do not create an excessive wake or vibrations at the farm sites;
- All bulk carriers will turn off engines (except for any generators required for power) when ships are docked at the marine terminal for loading to minimize exposure to mechanical noise;
- All bulk carriers will carry oil spill cleanup equipment (e.g., absorbents, inflatable dykes) with trained crew members in spill prevention and clean up techniques;
- No bulk carrier will be refueled at the marine terminal;
- No dumping of bilge or ballast water outside the allowable restrictions of the Canadian Shipping Act (i.e. not within the Fortune Bay area); and
- All bulk carriers will be double hulled.

### **Blasting**

- Utilization of the guidelines set out by Wright and Hopky's Technical Report for the use of explosive near Canadian fisheries waters (1998);
- Utilization of the Dyno Nobel North America "Canadian Blast Site Safety Manual" guidelines to ensure for safe, environmentally conscious, blasting procedures;
- No blasting underwater or within a waterbody;
- During the initial stages of blasting, sound/vibration measuring equipment (i.e., hydrophones) will be deployed to measure the levels of sound/vibration at various points within Fortune Bay. This will be used to validate the prediction that aquaculture facilities are far enough away from the quarry that sound/vibrations experienced by fish will not be intense enough to cause damage or any reaction outside mild, transitory, avoidance behaviour.
- Using explosives in compliance with all applicable laws, regulations and orders of the DOEC and the DNR-Mines;
- Restricting explosives handling and detonation to persons properly trained and qualified to use them in accordance with the manufacturer's instructions and governmental laws and regulations;
- Obtaining Blasters Safety Certificates (from the DOEC) and a Temporary Magazine License (from Energy, Mines, and Resources Canada) prior to drilling and blasting to ensure that the proper procedures are known and followed;
- Only allowing persons properly trained and qualified to handle explosives in accordance with the manufacturer's instructions and governmental laws and regulations; and
- Making all blasting plans available to the local interest committee.

Continued...



**Figure 2-1: Bulk carrier passage lane for the Belleoram Crushed Rock Export Quarry**

#### Superchill and Elevated Water Temperature Events

- Regular communication will be maintained between active aquaculture operators and project personnel; including advance notice of blasting and vessel arrival/departure.

Continued...

## **Biosecurity Events**

- All bulk carriers will be required to travel within a predetermined pathway that will allow for both adequate passage into the bay as well as maximizing the distance the ship will be from the farms at any one time to maintain biosecurity (Figure 2-1);
- Regular communication will be maintained between any active aquaculture operators and the Project Operations Manager to share information about regional biosecurity related matters during potential reportable disease scenarios.

## **3.0 CONTINGENCY PLANNING**

### **3.1.1 Determination of Aquaculture Activities**

Location of all active aquaculture operations in the area will be determined through communication with local community officials and the provincial GIS database (e.g., AquaGIS). The location of these sites will be plotted on maps to ensure sufficient buffer between vessel traffic and active aquaculture activities. All active aquaculture companies in the area will also be included in the local interest committee as well as the Communication Plan.

### **3.2 Superchill and Elevated Water Temperature Events**

Continental Stone will maintain constant and open communication with all nearby active aquaculture operators. This is the single-most important mitigation as both blasting and shipping may be re-scheduled to some degree to avoid times when superchill (January-March) or elevated water temperatures (August-September) are identified. Shipping activities will not occur between January to March when superchill events may occur, thereby lowering potential risk to aquaculture farms. Continental Stone will be responsible for maintaining a communications list with nearby active aquaculture operators.

Notification of potential superchill events from aquaculture operators due to observed weather and ice-conditions will be communicated to the Quarry Operations Manager. The Operations Manager will modify activities to the extent possible through discussions with aquaculture operators.

### **3.3 Biosecurity**

Shipping activities will be contracted out to a third party, who will be responsible for the vessels and shipping as well as its operation and maintenance. Third parties will be responsible for records of vessel movements and developing and implementing cleaning and disinfection protocols.

A listing of potential aquatic invasive species will be posted on site. Detection of aquatic invasive species will be reported by Project Environmental Manager to Fisheries and Oceans Canada (DFO). Reports to DFO will include available photos, coordinates of sighting, observation date, and identifying features. Records of vessel movements and cleaning may be provided to regulatory agencies if required. Contact information for reporting aquatic invasive species is below:

Fisheries and Oceans Canada

Toll-free: 1-855-862-1815

Email: [AISEAE.XNFL@dfo-mpo.gc.ca](mailto:AISEAE.XNFL@dfo-mpo.gc.ca)

During a reportable biosecurity event, vessel travel near the aquaculture site may be implemented by regulatory agencies. The Project Environmental Manager will work with regulatory agencies and aquaculture operators to determine if rescheduling of vessel arrivals and departures are required.

Continued...

## **4.0 ROLES AND RESPONSIBILITIES**

Specific responsibilities and duties of personnel are outlined below.

### **4.1 Operations Manager**

The Quarry Operations Manager will assume the overall responsibility of coordinating Project Activities with potential superchill, elevated water temperature, and biosecurity events. They will also be responsible for maintaining this contingency plan current and up-to-date and to maintain communication with all active aquaculture operators. The Operations Manager will have full authority to take necessary and appropriate action with unnecessary delay.

The "Operations Manager" will be responsible for the preparation of a written report, including a detailed summary of the incident, summary of response, and lessons learned. The Town of Belleoram will be notified by the OM in the event of a biosecurity events.

## **5.0 REVISION HISTORY**

<b>Rev no.</b>	<b>Rev date</b>	<b>Rev by</b>	<b>Summary of changes</b>
R1	05-Dec-2020	Justin So	Drafted Document